TM 5-3222

TRACTOR, CRAWLER, GASOLINE, 35-DBHP, STANDARD, INTERNATIONAL T-9, 60-inch GAGE

★

MAINTENANCE INSTRUCTIONS AND PARTS CATALOG

APRIL 1944

WAR DEPARTMENT
Washington 25, D. C., 29 Jan 1945

TM 5-3222, Tractor, Crawler, Gasoline, 10 to 35-DBHP, Standard, International T-9, 60-In. Gage, published as Tractor, Crawler, Gasoline, 35-DBHP, Standard, International T-9, 60-Inch Gage, is published for the information and guidance of all concerned.

AG 300.7 (26 Oct 1944).

By order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

Distribution: T/O and T/E 5-157 (2); 5-357 (2); 5-247 (6); 5-567 (2); 5-267 (6); 5-377 (2).

RP 474 GCED-3-3-45-5600

INT. 5720A.

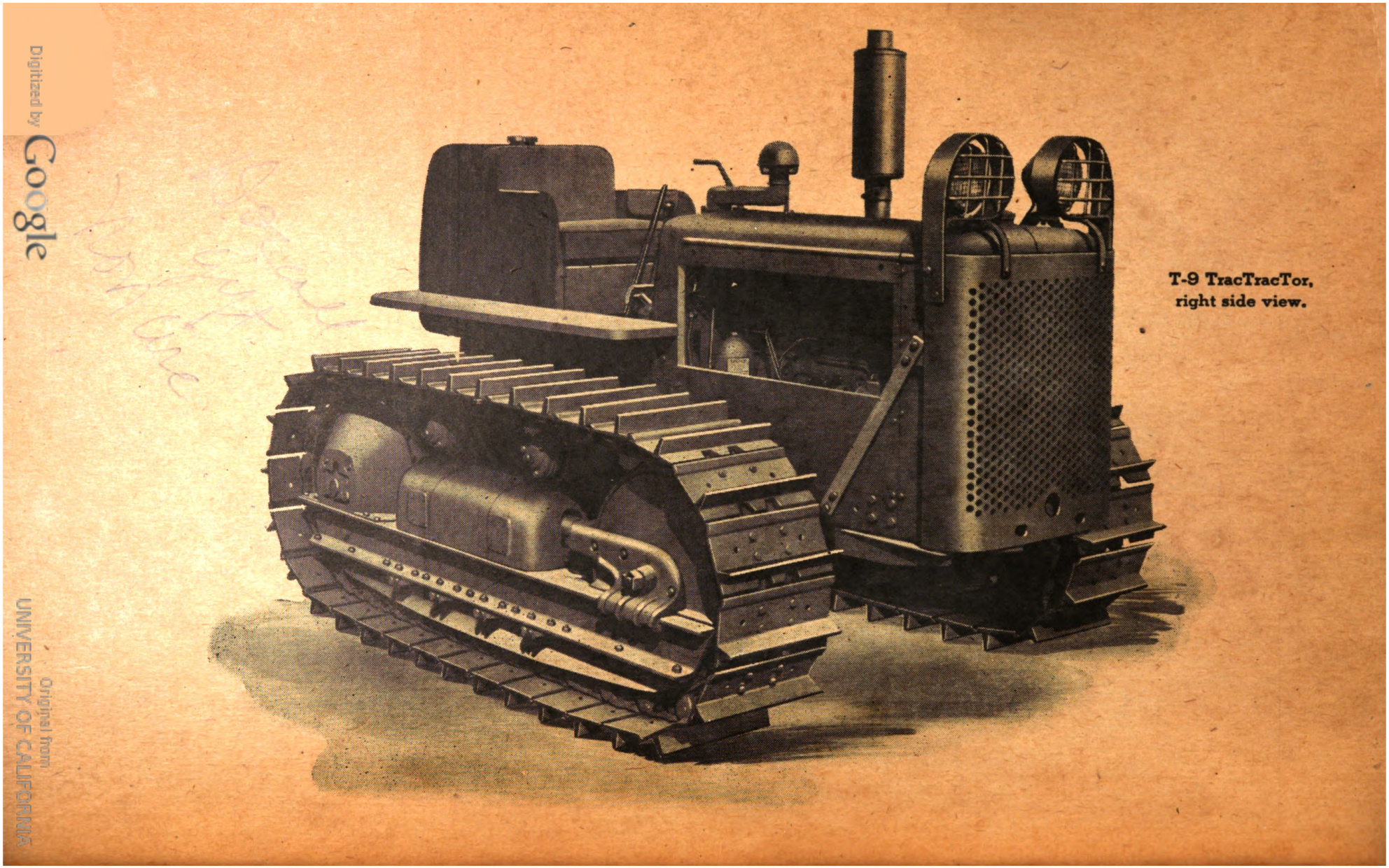
TracTracTor Model T-9

OPERATIONS SECTION

Each section has a black tab which lines up with the corresponding section name and number shown at the right.

The black tabs are quickly located by bending this book back.

INTERNATIONAL HARVESTER COMPANY
180 NORTH MICHIGAN AVE. CHICAGO, ILLINOIS, U.S.A.



T-9 TracTracTor,
right side view.

SPECIFICATIONS TM 5: 3222 1944

Capacities (U.S. Measure)

Fuel tank	31 gals.
Water cooling system	12 gals.
Transmission	22 qts.
Sprocket drive cases (each side)	3 pints
Crankcase pan	11 qts.
Air cleaner oil cup	4 pints

Engine

Cylinders	4
Bore	4.4 in.
Stroke	5.5 in.
Engine speed (governed)(full load)	1400 R.P.M.
Carburetor (updraft)	IHC 1-3/8 in.
Magneto with impulse coupling (counterclockwise)	IHC Type H-4
Spark plug gap	.028 in. to .032 in.
Valve clearance (engine hot)	.017 in.

Engine Clutch

Over-center type (hand-controlled)	13 in.

Steering Clutch

Multiple dry disc - spring-loaded type with manual release	14-1/8 in.

Brakes

External contracting on steering clutch drums	15-3/4 in.

Track

Tread (standard)	44 in.
Tread (wide tread)	60 in.
Ground contact length (normal)	63-7/16 in.
Track shoe width	13 in.

Transmission

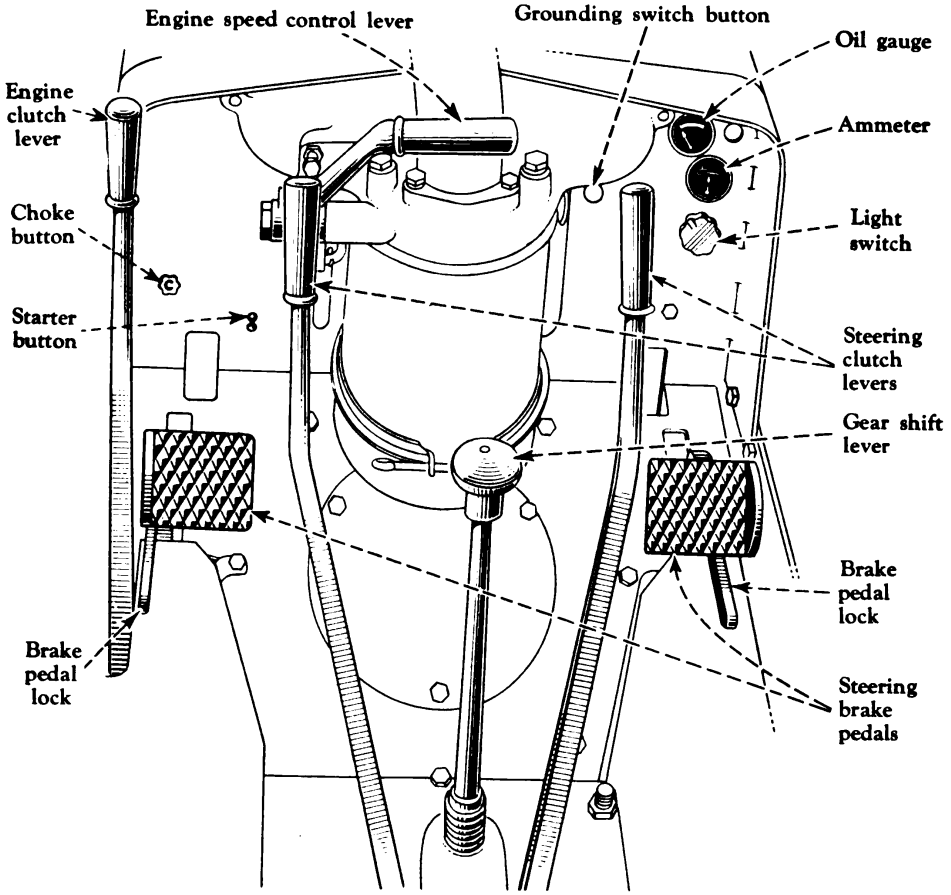
Five speeds forward - M.P.H.	
Low	1-1/2
Second	2-1/4
Third	3
Fourth	3-7/8
High	5-1/4
Reverse	1-3/4

General

Length (overall)	115-1/2 in.
Width (overall)(standard tread)(with 13" shoes)	58-1/2 in.
Width (overall)(wide tread)(with 16" shoes)	76 in.
Height (tip of grouser to top of exhaust muffler)	78-3/4 in.
Drawbar height	13-13/16 in.
Drawbar horizontal adjustment	19-5/8 in.

INSTRUMENTS AND CONTROLS

(See Illust. 1.)



Illust. 1 - Showing the Location of the Controls

ELECTRIC STARTER BUTTON

Pressing on this button with the foot completes the electrical circuit between the battery and the starting motor and causes the starting motor pinion to engage the flywheel ring gear, thereby cranking the engine. Stop pressing the button the moment the engine starts. *Do not run the starting motor for more than 30 seconds at any one time.*

CHOKE BUTTON

Helps start the engine when the engine is cold. Pulling out the rod shuts off air to the carburetor, giving a rich mixture. After the first few revolutions of the engine, push the choke button in half way, or to a point where the engine runs without missing. Push the choke all the way in after the engine has started. Do not run the engine with the choke rod out.

INSTRUMENTS AND CONTROLS - Continued

(See Illust. 1.)

LIGHT SWITCH

Controls the head and tail lamps and the battery charging rate. In its regular position at "L" it is set for low charging. Turn to first position at right, "H" for high charging rate, to second position marked "D" for dim lights, and to last position marked "B" for bright lights.

AMMETER

This is the check on the electrical system. It indicates whether the battery is being charged or discharged. When the engine is operating the needle should be in the "Charge" range. If the ammeter shows discharge continuously the cause should be investigated in order to avoid completely discharging the battery.

LUBRICATING OIL GAGE

Indicates the pounds of pressure of the oil circulating through the engine. The indicator needle should be in the white area when the engine is running. If the indicator is not in the white area, stop the engine immediately and investigate the cause of the oil pressure failure.

ENGINE SPEED CONTROL LEVER

Controls the speed of the engine, and, when set in a given position, maintains a uniform engine speed under variable loads.

ENGINE CLUTCH LEVER

Is used to disengage the engine from the transmission. Push the engine clutch lever all the way forward to disengage the engine clutch.

GEARSHIFT LEVER

Is used to select the various gear ratios provided in the transmission. There are five forward positions and one reverse position. Never attempt to change from one speed to another while the tractor is in motion.

STEERING CLUTCH LEVERS

These levers are used to steer the tractor. Pulling back on either steering lever releases the steering clutch and makes the track on that side inoperative. To turn left, pull on left lever. To turn right, pull on right lever.

STEERING BRAKE FOOT PEDALS

Never apply the steering brake until the steering clutch is fully released. The steering brakes serve two purposes: as an aid in making sharp turns and for parking.

STEERING BRAKE LOCKS

Each steering brake pedal has a locking device to hold the tractor whenever necessary. To lock either brake, push foot brake pedal down and lift up ratchet pawl, which engages in the ratchet locking the brake pedal.

GROUNDING SWITCH BUTTON

Used to stop the engine by grounding the magneto. Pull out button when starting engine and push in to stop the engine.

BEFORE STARTING A NEW TRACTOR

Make a complete inspection of tractor for any shortage or damage which may have occurred while being shipped.

LUBRICATION

(1) Lubricate the entire tractor as indicated in the "Lubrication Guide".

(2) Check the oil levels of the engine crankcase, air cleaner, transmission case and sprocket drive gear cases to see that they are filled to the correct levels with the proper grades of oil for the prevailing temperature *(Refer to specifications of lubricants in the "Lubrication Guide".*

(3) Tractors shipped to destinations in United States, Canada, and Mexico are filled with oil in all parts before leaving the factory. However, lubricant compartments should be checked for proper levels *as outlined in item 2 above.*

(4) Engines shipped to destinations in the United States of America, Canada and Mexico are filled with SAE-20 oil when leaving the factory. For further information, *see "Lubrication Guide".*

TRACTORS PACKED FOR EXPORT

All oil is drained from the engine crankcase, air cleaner, and all gear cases on tractors packed for export.

ENGINE COOLING SYSTEM

Be sure radiator is filled with clean water. (Use soft or rain water if possible). For further information *see "Cooling System," section 4.*

If the tractor is to be operated in freezing temperatures (32° F. or lower) refer to *"Cold Weather Operation" on page 9.*

ELECTRICAL SYSTEM

Tractors are shipped with the braided ground strap at battery end disconnected. In addition the connection at the "F" terminal on the generator is not completed. Do not operate the tractor until battery ground cable is connected and generator wire has been connected at "F" terminal. Batteries when shipped dry should be serviced as outlined on the instruction tag attached to the battery.

PREPARING THE TRACTOR FOR DAILY OPERATION

FUEL SYSTEM

Fill the fuel tank with clean gasoline. It is advisable to carefully strain all gasoline to be sure it is free from foreign substances. The capacity of the fuel tank is approximately 31 gallons (U.S.).

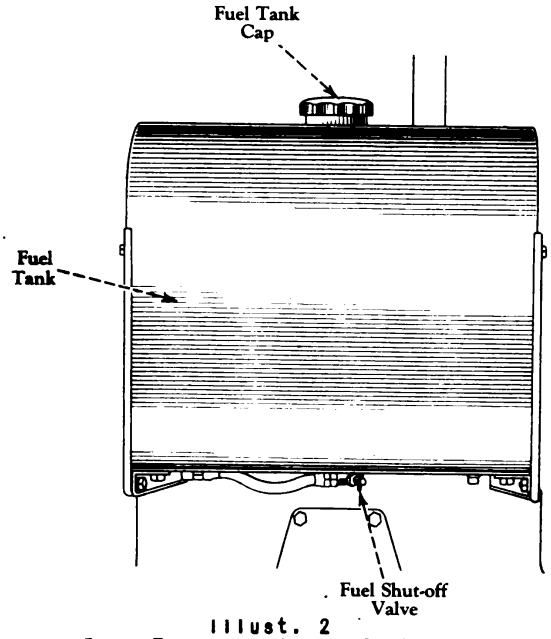
This engine is designed to operate on gasoline with a minimum of 70-72 octane rating.

COOLING SYSTEM

See that the drain cocks are closed. Remove the radiator filler cap and see that the water shows to the level 1-inch above baffle plate (inside of filler hole). Replace the radiator cap.

LUBRICATION

Check to see that there is no leakage in the lubricant compartments. Be sure the oil in the crankcase is up to the full level mark on the oil gage. *See "Lubrication Guide," for complete lubrication requirements.*



Illust. 2
Fuel Tank and Shut-off Valve

TO START THE ENGINE

(Refer to Illust. 1 - OPERATING CONTROLS)

(1) Move the gearshift lever in neutral position and disengage the engine clutch by pushing the lever all the way forward.

(2) Pull out the grounding switch control button.

(3) Push the engine speed control lever about one-third forward and leave it in this position until the engine has been run a few minutes.

(4) Pull the choke button out part way. (In cold weather pull out all the way.)

(5) Step on the starter button.

(6) Push choke button in to a point where the engine runs without missing. As the engine warms up, gradually push it all the way in.

(7) Check the engine oil pressure. If the gage does not indicate pressure, stop the engine and inspect the oil system to find the cause of the failure.

NOTE: If trouble is experienced in starting the engine *refer to "Suggestions for Checking Trouble", page 6, section 6. Also see "Cold Weather Operation", page 10.*

TO HAND CRANK THE ENGINE (IF NECESSARY)

If it is necessary to crank engine with the hand crank, assemble the crank adapter into the coupling in place of the power take-off shaft.

(1) Pull the choke button out all the way.

(2) Crank the engine with two or three half-up strokes.

(3) Then push the choke button three-quarters of the way in and crank with half up-strokes until the engine starts.

(4) During cold weather when the engine is cold, pull the choke button out all the way and crank the engine by using quick up-strokes.

6 to 8 lifts of crank at temperature 0 to 10°.
4 to 5 lifts of crank at temperature 10° to 20°.
2 to 3 lifts of crank at temperature 20° to 30°.

Then push the choke button half-way in and crank the engine with quick up-strokes until the engine starts.

OPERATIONS SECTION

OPERATING THE TRACTOR

SAFETY FIRST

Before dismounting from the tractor, put the gearshift lever in neutral position.

Read and observe "OPERATING PRECAUTIONS" *on page 8.*

After the tractor is in motion extreme care should be taken to prevent accidents and personal injuries.

Before attempting to drive the tractor the operator should be thoroughly familiar with all the instruments and controls. *Refer to pages 2 and 3 for descriptions of the instruments and controls.*

DRIVING THE TRACTOR

(See Illust. 1, 3 and 4.)

When the engine has been running long enough to warm it, set the engine speed control lever in the idling position (lever slightly up from lowest position.) Disengage the engine clutch by pushing the engine clutch control lever (on left hand side) forward as far as it will go. Continue to press forward on the clutch lever to apply the clutch brake, until the clutch stops turning, then carefully move the gearshift lever to the speed desired. *(See Illust. 4.)*

After putting the transmission gears in mesh, increase the speed of the engine (by raising the engine speed control lever) enough to keep the engine from stalling. Carefully engage the engine clutch until the slack between the tractor and the load is taken up, then pull the clutch lever back until the full over-center cam engagement is definitely felt.

ON A NEW TRACTOR - Do not operate a *new tractor* immediately on a full load; run it light for a reasonable length of time.

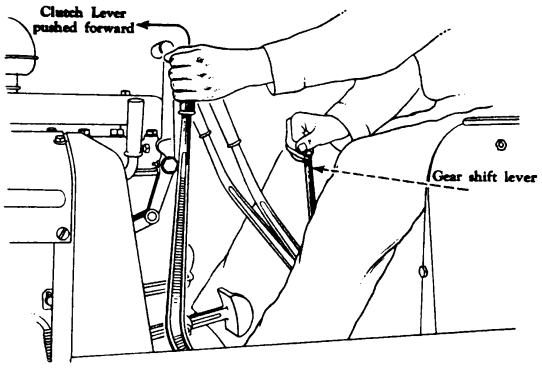
Do not overload the tractor at any time.

GEAR SHIFTING

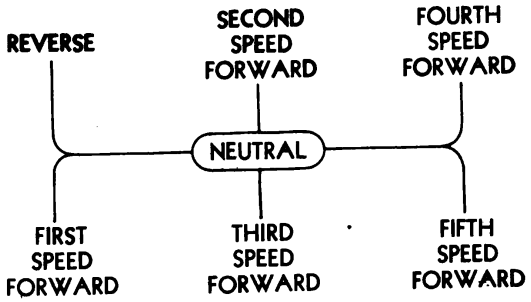
CAUTION! DO NOT SHIFT GEARS WHILE THE TRACTOR IS IN MOTION.

Always disengage the clutch before shifting gears (see above paragraph).

There are five forward speeds and one reverse speed in the transmission. Once a speed has been selected and the tractor is in operation, further gear shifting should not be attempted until the clutch is completely disengaged and the tractor is stopped.



Illust. 3
Disengaging clutch to shift gears.



Illust. 4
Showing the various gear shifting positions.

OPERATING THE TRACTOR - Continued

TO STOP TRACTOR

Disengage the clutch by pushing the clutch lever forward and move the gearshift lever to neutral position. Use the brakes if necessary.

SAFETY FIRST: Always move the gearshift lever into the neutral position when the tractor is stopped.

TO STOP ENGINE

(1) Retard governor control lever.

(2) Push the grounding switch control button in.

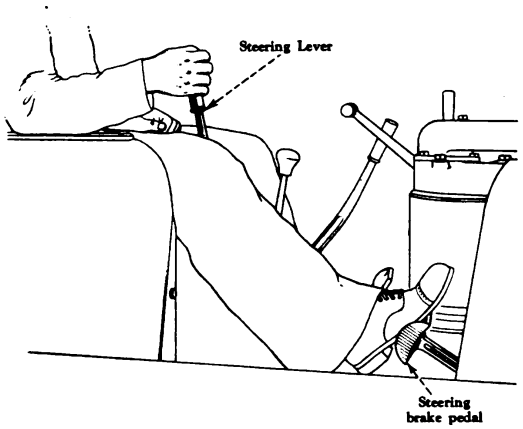
NOTE: It is advisable to close gasoline shut-off valve if engine is to be stopped for any length of time.

STEERING THE TRACTOR

(1) Turn to the right or left by pulling back on the steering clutch lever on the side toward which the turn is to be made, *(see Illust. 5)*.

(2) To make a sharp turn, use the steering brake on the side toward which the turn is to be made. For example: To turn sharply to the right, pull back on the right hand steering clutch lever and then push down on the right steering brake pedal.

(3) If pulling back on the steering clutch lever does not turn the tractor enough, and if pushing the steering brake all the way down turns the tractor too much, press down gently on the steering brake pedal until the desired turn is made.



Illust. 5
Turning to the right

STEERING DOWN GRADE

(1) When going down grade with the tractor pulling the load, steering should be done in the usual manner.

(2) When going down grade, if the load is pushing the tractor, the steering clutch operation is reversed. That is, disengage the right steering clutch to turn left, and the left steering clutch to turn right. Do not apply the brakes.

OPERATING OVER AN OBSTRUCTION

When running over a log or ditch bank, use the steering clutches instead of the engine clutch to slow the tractor. Both steering clutches may be released slightly until the tractor balances on the top of the obstruction. Then engage one clutch gradually so the tractor moves forward at an angle, over and down. If the load is light it might be necessary to use the brakes.

STEERING BRAKE LOCKS

Each foot brake pedal is provided with a locking lever device. To lock either brake, push the foot brake pedal down and lift up the ratchet pawl *(see Illust. 1)*. This engages the pawl in the ratchet and locks the brake pedal.

Do not use the brake pedals as foot rests; this causes undue wear on the brake parts.

OPERATING PRECAUTIONS

(1) Do not attempt to start the engine by towing or coasting the tractor. To do so may cause serious damage to the engine and transmission.

(2) Do not run the starting motor for more than approximately 30 seconds at any one time.

(3) If it is necessary to hand crank the engine, the operator should stand in a position that will eliminate any possibility of being struck by the starting crank if there is a reversal of the direction of the engine. Crank the engine by using quick up-strokes; do not spin it.

(4) **SAFETY FIRST!** Never fill the gasoline tank when lamps are lighted, when near an open flame, or when the engine is running. Keep the funnel, used when pouring in the fuel, in contact with the metal of the tank. By so doing, you will avoid the possibility of an electric spark igniting the gas. Do not light matches near gasoline as the air within a radius of several feet is permeated with a highly explosive vapor.

See that the vent hole in the fuel tank filler cap is kept open at all times to assure proper flow of the fuel.

(5) Do not pour cold water into the radiator if the engine is very hot, unless conditions make it absolutely necessary. Under such conditions, start the engine and let it idle. Then slowly pour the water into the radiator.

(6) *Do not apply the steering brake until the steering clutch is fully released or excessive heating and rapid wear of steering brakes will result.*

When pulling a load, it is not necessary to use the steering brakes except to make sharp turns; the load itself acts as a brake. *Do not use the brakes unless it is necessary to do so in order to make the required turn.*

(7) Do not ride the brake pedals as this will result in excessive wear on brake linings.

(8) Improper use of the steering brakes when making turns will cause the tractor to jerk. Try to avoid this by using the steering control lever intermittently with only a slight pressure on brake pedal when making any turn except a pivot turn. This method of turning gives you a more even turn and does not subject the tractor to sudden impacts.

(9) The drawbar should be free to swing at all times unless it is absolutely necessary to hold it in one position.

COLD WEATHER OPERATION

If the tractor is to be operated when the temperature is 32° F. or lower, observe the following precautions:

FUEL SYSTEM

Use only a high-test winter-grade gasoline for starting. Keep your supply in a closed container so the more volatile portion does not evaporate.

Fill the fuel tank at the end of the day's run to prevent moisture from collecting in the tank.

LUBRICATION

Be sure to use the correct grade of lubricant in the engine crankcase, air cleaner, magneto impulse coupling, transmission, track rollers, track idlers and sprocket drive gear *as specified in the "Lubrication Guide".*

COOLING SYSTEM

When the temperature is likely to be 32° F. or lower, there is danger of the water freezing in the cooling system. To overcome this, either drain the water from the cooling system at the end of each run, or use the recommended anti-freezing solution shown on the next page.

TO DRAIN THE SYSTEM

(1) Open the radiator drain cock on the lower left-hand side of the radiator *(see Illust. 1, section 4).*

(2) Open the drain cock in the left-hand side of the crankcase *(see Illust. 1, section 4).*

(3) See that the drain cocks are not clogged and that the water drains completely.

IMPORTANT! Before filling the radiator in freezing weather, cover the entire radiator and start the engine; then put in the water immediately. This prevents the water from freezing during the warming up period.

TRACKS FROZEN TO GROUND

If the tractor has been left out during cold weather and the tracks become frozen to the ground, do not attempt to jerk them loose with the power of the engine. The sudden impact, if the tracks should not break loose, may damage the tractor. Loosen the tracks before starting the tractor.

COLD WEATHER OPERATION - Continued

OPERATING IN WATER OR SNOW

When operating the tractor in deep water, or in snow that is in a thawing condition, lubricate the track rollers every four hours. This will flush out the water that might be forced past the seals and into the lubricant.

If operating the tractor in water that is deep enough to submerge the bottom of the transmission case, inspect the lubricant in the transmission case and in the drive gear sprocket cases frequently. If any water is present, drain these cases and refill with new lubricant.

NOTE: When operating the tractor in water, or under extremely dusty conditions, water or dust might seep in through the holes in the drain plugs on the engine clutch and steering clutch compartments. To avoid this replace these plugs with solid plugs which have no holes. It is advisable to remove these solid plugs after every sixty-four hours of operation to allow any oil accumulation to drain out.

ANTI-FREEZING SOLUTION

The following table gives the quantities of anti-freeze to be added. To determine the total quantity necessary, multiply the capacity of the cooling system (12 U.S. gallons) by the number of pints per gallon required at the prevailing temperature.

FREEZING POINT (Fahrenheit)	ETHYLENE GLYCOL (Pints Required Per Gallon)
10°F.	2
0°F.	2-1/2
-10°F.	3
-20°F.	3-1/2
-30°F.	4
-40°F.	4-1/2
-50°F.	4-1/2
-60°F.	5
-70°F.	5

CAUTION! Do not mix anti-freeze solutions.

Do not under any circumstances use any of the following in the cooling water as an anti-freeze: honey, salt, Kerosene, Diesel fuel, glucose, or sugar, calcium chloride or any alkaline solution.

IMPORTANT! Before filling the radiator in freezing weather, cover the entire radiator and start the engine; then put the water in immediately. This prevents the water from freezing during the warming-up period.

PERIODIC INSPECTIONS

To assure mechanical efficiency, it is necessary that tractors be systematically inspected at intervals as outlined below.

AFTER 8 HOURS OF OPERATION

Point of Inspection	Remarks
Lubrication points	See "Lubrication Guide".

AFTER 64 HOURS OF OPERATION

Point of Inspection	Remarks
*Air cleaner screen	Wash *(section 6, page 2).*
*Air cleaner intake pipe.	Clean *(section 6, page 2).*
Flexible rubber connection between air cleaner and air intake pipe . .	Inspect for loose fit or damage *(section 6, page 3).*
Fan belt	Check tension; replace when necessary *(section 4, page 2).*
Radiator fins.	Clean spaces *(section 4, page 2).*
Battery liquid	Check amount of specific gravity *(section 5, page 1).*
Battery terminals.	Clean and grease *(section 5, page 1).*
Steering clutch housing drain plugs.	Remove plugs and drain oil accumulation ("Lubrication Guide").
Tracks	Check slack *(section 9, page 1).*
Lubrication points	See "Lubrication Guide".

AFTER 96 HOURS OF OPERATION *(For Ordnance, Navy, Marine Corps and Air Corps.)*

AFTER 128 HOURS OF OPERATION *(For Engineer Corps.)*

Point of Inspection	Remarks
Generator commutator	Clean *(section 5, page 2).*
Starting motor commutator.	
Lubrication points	See "Lubrication Guide".

** - When unusual mud or dust conditions are encountered during operation, it may be necessary to service these points more frequently.*

PERIODIC INSPECTIONS - Continued

AFTER 128 HOURS OF OPERATION

Point of Inspection	Remarks
Lubricating oil filter	Replace filter element *(section 6, page 4).*
Engine crankcase	Drain and change oil ("Lubrication Guide").

AFTER 240 HOURS OF OPERATION *(For Ordnance, Air Corps and Marine Corps.)*
AFTER 256 HOURS OF OPERATION *(For Engineer Corps and Navy.)*

Point of Inspection	Remarks
Gasoline strainer and sediment bowl.	Take apart and clean *(section 7, page 2).*
Spark plugs.	Remove and clean; check gap *(section 5, page 5).*
Magneto breaker points and chamber .	Clean chamber and check gap *(section 5, page 6).*

AFTER 500 HOURS OF OPERATION *(For Ordnance and Marine Corps.)*
AFTER 512 HOURS OF OPERATION *(For Navy and Engineer Corps.)*

Point of Inspection	Remarks
Carburetor fuel screen	Remove and clean *(section 7, page 1).*
Cooling system	Clean *(section 4, page 1).*
Engine valves.	Check for clearance *(section 6, page 5).*
Steering clutch hand levers.	Check for free movement at handles *(section 3, page 1).*
Steering brake pedal	Check for free movement at pedal pad *(section 1, page 1).*
*Air cleaner, complete.	Remove and clean *(section 6, page 2).*
Lubrication points	See "Lubrication Guide".

* - *When unusual mud or dust conditions are encountered during operation, it may be necessary to service these points more frequently.*

STORING AND HOUSING THE TRACTOR

If the tractor is not to be used for a period of time, it should be stored in a dry and protected place. To leave equipment outdoors, exposed to the elements, will result in materially shortening the life of the machine.

The following procedure should be followed when a tractor is placed in storage and the lubrication precautions should be repeated every six months thereafter. We also recommend caution to be practiced in starting an engine that has been in storage.

Wash or clean and completely lubricate the tractor *(Refer to the "Lubrication Guide".)*

When an engine is placed in storage:

(1) Drain the water from the cooling system.

(2) Oil the magneto impulse coupling liberally with the proper grade of oil designated in the "Lubrication Guide".

(3) After the engine has become cold, remove the spark plugs and pour one tablespoonful of SAE-50 lubricating oil of a good grade into each cylinder. Slowly crank the engine 2 or 3 times to distribute the oil over the cylinder walls.

(4) Remove the valve housing cover and flush the valves, rocker arms and push rods with SAE-50 oil. (If any evidence of rust is found, it should be removed before the lubricant is used.) Replace the valve housing cover.

(5) Plug up the end of the breather pipe and exhaust pipe.

(6) Remove the oil filter element. (If any evidence of rust is found on the center stud, clean it thoroughly.) Replace the filter element with a new one. Also, drain out any sludge which might be in the filter base.

(7) Drain the fuel from the fuel tank and carburetor and clean out the fuel strainer glass bowl.

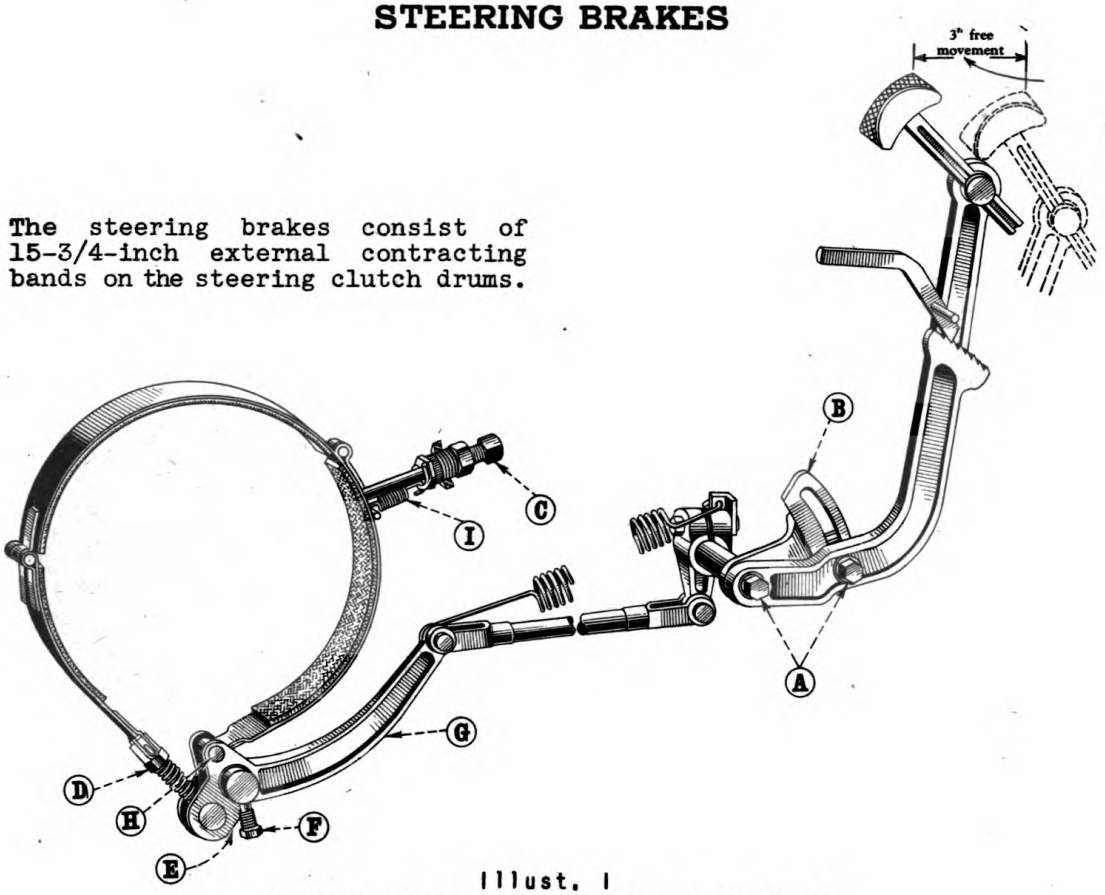
CAUTION: A gummy substance will form in gasoline if allowed to stand in tanks, fuel lines or carburetor. This gum accumulates in the carburetor jets and passages and might cause serious trouble. These gum deposits can be completely dissolved with a mixture of 1 part alcohol and 1 part benzol, or with acetone.

(Refer to section 6, page 7, for instructions on starting engines that have been in storage.)

MEMORANDA

STEERING BRAKES

The steering brakes consist of 15-3/4-inch external contracting bands on the steering clutch drums.



Illust. 1
Diagram of Steering Brake and Controls

ADJUSTMENT

The adjustment to compensate for wear should be made by loosening bolts "A" which hold the brake pedal to the adjuster lock, and pushing the adjuster plate "B" forward until the desired pedal travel is obtained. Then lock the adjuster plate to the pedal by tightening bolts "A".

When adjustment can no longer be made in this manner, loosen the lock bolts "A" and pull the adjuster plate "B" back to the original position and lock it to the pedal. Remove the brake inspection cover under the rear section of the main frame on each side of the tractor. Adjust the brake band set screw "C" to give 1/64-inch clearance between the steering clutch drum and the lining at that point. Lock the set screw. Loosen the jam nut "D" and turn the steering brake band adjusting bolt "E" until you have 1/64-inch clearance between the steering clutch drum and the brake lining at all points. Lock the jam nut "D", replace the covers and adjust the adjuster plate "B" to give a 3-inch free pedal movement.

Subsequent intermediate adjustments can be made by changing the position of the adjuster lock plate on the pedal.

STEERING BRAKES - Continued

BRAKE LINING RENEWAL

(See Illust. 1)

(1) Loosen the bolts "A" and pull the adjuster plate back as far as possible. Remove the hand hole covers on the top of the main frame and steering clutch compartment lower covers.

(2) Back out the band locating screw "C" and remove the brake band anchor spring "I".

(3) Remove the adjusting bolt "E".

(4) Remove the set screw "F" from the pivot shaft and remove the pipe plug from the main frame. Slide the shaft far enough into the main frame so as to remove it from the pivot arm "G".

(5) Pull the toggle down and remove the front band pin "H".

(6) Pull the rear band through the bottom steering brake band inspection hole.

(7) Reline the band and replace it by reversing the above procedure; then adjust the brakes previously outlined.

MINOR CHASSIS SERVICE OPERATIONS

STEERING CLUTCH COMPARTMENT AND CLUTCH HOUSING DRAINS

NOTE: If operating the tractor in water, under very wet conditions, or under extremely dusty conditions, water or dust might seep in through the holes in the drain plugs on the engine clutch and steering clutch compartments. To avoid this, replace these plugs with solid plugs.

Remove these solid plugs after every 60 hours of operation to allow any oil accumulation to drain out.

TRANSMISSION AND SPROCKET DRIVE GEAR CASES

The oil in the transmission case and in the final drive housings should be changed at the interval specified in the "Lubrication Guide".

Remove the drain plugs and drain the oil while it is warm. Allow time for complete drainage, then replace the plugs. Refill to the proper level with approved lubricant. *(See "Lubrication Guide".)*

If the oil in the transmission case and in the final drive housings has been thinned with kerosene for operation in temperatures below zero, be sure to change this oil before the weather becomes hot.

TO WASH TRANSMISSION

Fill the transmission case and the sprocket drive gear cases to the proper level with solvent, dry cleaning; kerosene; or Diesel fuel. Operate the tractor in low gear for a few minutes, then remove the drain plugs and allow time for complete drainage of the kerosene. Replace the plugs and fill to the proper levels with fresh lubricant. *(See "Lubrication Guide".)*

REPLACEMENTS OF MAIN FRAME PARTS

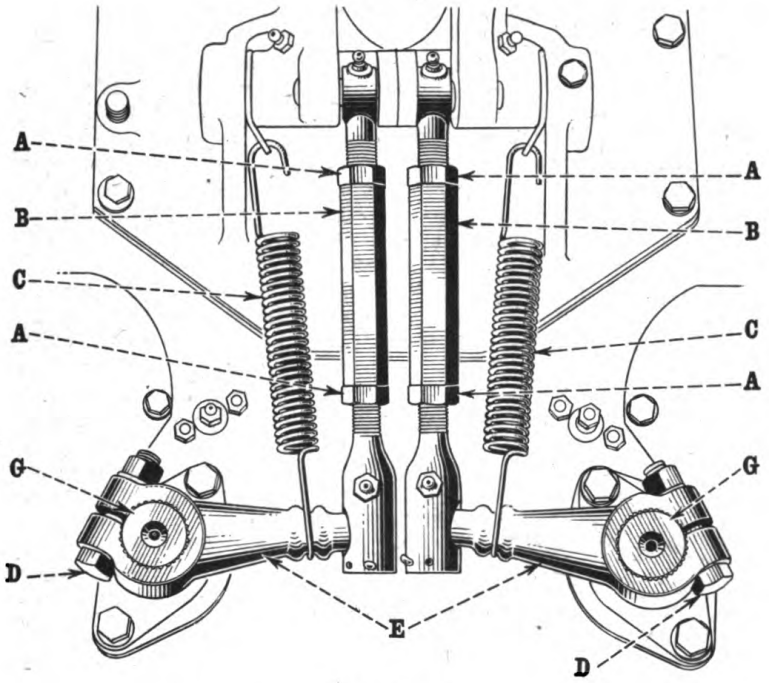
When making replacements of parts in the main frame, the old oil should be thoroughly washed out to remove all sediment, etc.; then, refill with new oil. It is important that this be done because foreign matter, such as very fine dirt, etc., will not separate from the old oil by settling.

SETTING BEVEL GEAR DEFLECTION SET SCREWS

Screw in snug (by hand) against highest point of the gear (turn gear to determine this high point) and back off 1/4 of a turn. If feeler gages are used, .020-inch is the recommended clearance between the set screw and the high-point of the gear.

MEMORANDA

STEERING CLUTCHES



Illust. 1
Adjusting Steering Clutches

If the steering clutch slips, or if the steering clutch hand lever free movement is reduced below 2-inches (measured at the handle of the lever) adjustment as described below is necessary.

TO ADJUST

(1) Loosen the lock nuts "A" and turn the turnbuckle "B" several turns so as to shorten the linkage; then, tighten the lock nuts "A" against the turnbuckle "B".

(2) Check to see if the free movement of the hand lever is 4-inches.

(3) When adjustment can no longer be made by means of shortening the operating linkage, remove the release spring "C" and loosen the lock nuts "A". Turn the turnbuckle "B" to lengthen the linkage as much as possible. Remove the release lever cap screw "D" and pry the release lever "E" off the splined release shaft "G". Turn the right hand release lever counter-clockwise (the left hand release lever clockwise) slightly, and replace the release lever "E" on the splined shaft "G". Replace the release spring "C" and shorten the linkage until free movement of 4-inches is obtained.

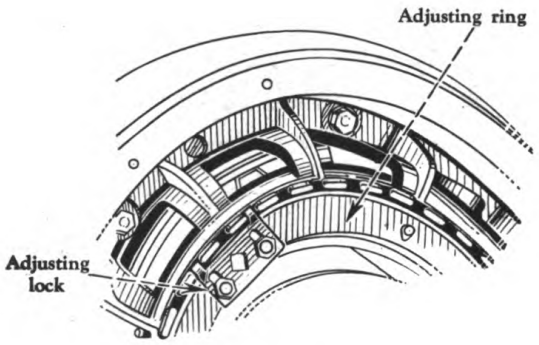
(4) When the desired free movement of the hand lever is obtained, replace and tighten the release lever cap screw "D" and tighten the lock nuts "A" against the turnbuckle.

(5) Subsequent intermediate adjustments can be made by shortening the linkage as described above.

OVER-CENTER ENGINE CLUTCH - 13-INCH

CARE OF THE CLUTCH

The over-center clutch is so designed that it requires a minimum of attention. It is important, however, that the instructions for lubricating, *given in "Lubrication Guide", be followed.*



Illust. 2
Adjustment features of the over-center clutch.

OPERATION

The clutch is fully engaged when the engine clutch hand lever is pulled back all the way so that full over-center cam engagement is definitely felt.

If a noticeable slippage is taking place when the tractor is operating under load the clutch should be adjusted.

ADJUSTMENT

(1) Remove the clutch inspection cover on the floor plate in front of the steering clutch levers.

(2) Loosen the nuts on the adjusting ring lock and disengage the lock from the notches in the back plate.

(3) With clutch hand lever in the disengaged position, turn the adjusting ring in a clockwise direction, moving it one notch, or possibly two notches at the most, at any one time. Engage the ring lock in the back plate. Pull the hand lever back as a check to determine if over-center engagement can be felt.

For satisfactory operation of the clutch do not have the clutch adjusted so tight that this over-center engagement is not easily obtained.

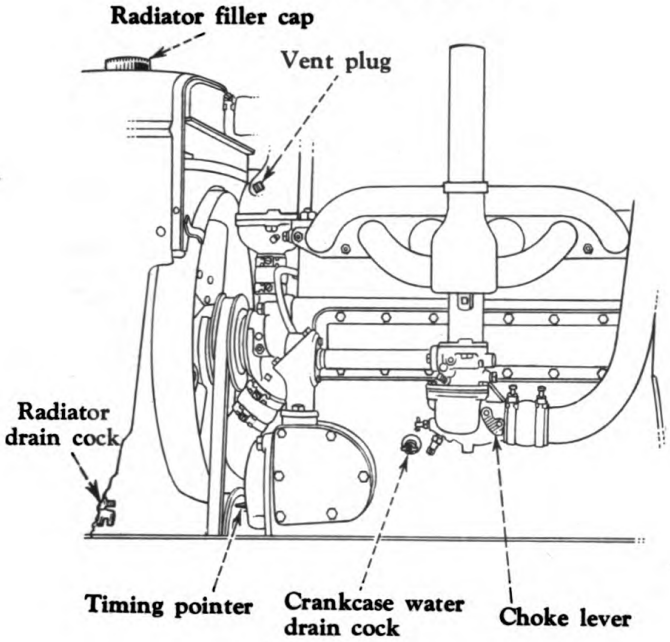
If little or no pressure is required on the end of the hand lever to engage the clutch, then further adjustment, as outlined above, is necessary.

(4) When the correct clutch adjustment is obtained, be sure to tighten the nuts on the adjusting ring lock and replace the cover plate.

(5) The clutch is correctly adjusted when a considerable (not excessive) pressure can be felt when the clutch hand operating lever is pulled back and a definite over-center cam engagement is felt.

(6) If the adjustment has been made as described above, and the cams are so tight that you do not get the full over-center engagement, the adjusting ring should be backed off one notch (in counter-clockwise direction).

COOLING SYSTEM



Illust. 1

The water is circulated through the engine block, cylinder head and radiator by a positive centrifugal pump. The water temperature is controlled by a thermostat that does not allow the water to flow through the radiator until the engine has reached operating temperature. With the thermostat closed, water circulates through the engine only.

TO CLEAN OUT DIRT AND SLUDGE

(1) Drain the cooling system by opening the radiator drain cock and crankcase drain cock *(see Illust. 1).* Allow the system to drain and close the drain cocks.

(2) Fill the cooling system with a solution of 4 to 5 pounds of ordinary washing soda mixed with 12 gallons (U.S.) of water (cooling system capacity).

(3) Leave the radiator filler cap off and run the engine until the water is hot, then drain and flush with clean water.

TO FILL COOLING SYSTEM

The water capacity is approximately 12 U.S. gallons.

(1) Close the crankcase and radiator drain cocks.

(2) Remove the vent plug in the thermostat housing *(see Illust. 1).*

(3) Pour water (soft or rain water if available) into the radiator until water flows from thermostat housing. Replace vent plug and fill the radiator to level 1" below bottom of filler neck.

(4) If the engine becomes overheated, *see "OPERATING PRECAUTIONS" on page 8, section G.*

(5) If the engine is to be operated in freezing temperatures, *refer to "COLD WEATHER OPERATION" on page 9, section G.*

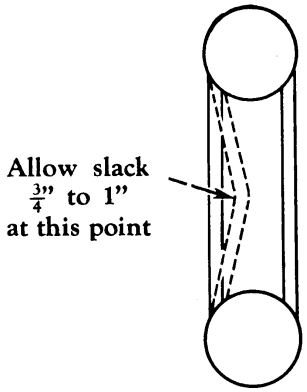
COOLING SYSTEM - Continued

RADIATOR CORE

Overheating is often caused by bent or clogged radiator fins. If the spaces between the radiator fins become clogged, clean them with an air or water hose. When straightening bent fins be careful not to injure the tubes or break the bond between the fins and the tubes.

FAN BELT TENSION

The slack of the fan belt should be checked frequently to assure maintenance of the correct tension. The tension is correct when the belt can be depressed without effort by the thumb, approximately 3/4-inch to 1-inch midway between the two pulleys *as shown in Illust. 2.* If the slack is more than 1-inch, adjust the belt as follows:



Illust. 2
Showing the Correct Belt Tension

ADJUSTING THE BELT

The tension of the fan belt can be adjusted by changing the width of the groove in the fan pulley. To adjust the tension, loosen the set screw (2) *(see Illust. 3)*, then screw the pulley flange (1) in toward the belt to tighten the belt, and out to loosen it. Retighten the set screw (2) after the correct tension is obtained.

After a new belt has been run approximately 50 hours, check the tension and adjust it again if necessary.

The belt should at no time sink to the bottom of the pulley groove because this will wear the belt out rapidly. Adjust the pulley for a narrower groove, if this is possible without increasing the tension more than allowable. Having "V" belts tighter than the tension specified, will result in rapid wear.

REMOVING THE FAN BELT

(See Illust. 3)

To remove the fan belt, loosen the screw (2) in the flange on the fan pulley and unscrew the flange as far as possible. Start belt over the outer flange of the lower pulley and pry it out with a light bar or rod. Slowly crank the engine at the same time and the belt will work off the pulley. After the belt is off the pulley, remove the starting crank. The belt can now be worked over top of the fan blades.

COOLING SYSTEM - Continued

REPLACING FAN BELT

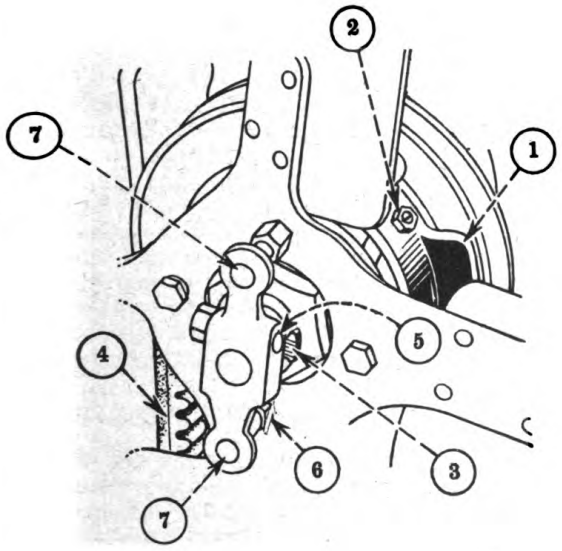
The fan belt should be replaced when it becomes soaked with grease, or when it is so badly worn that it does not drive the fan at the proper speed.

When replacing the belt, reverse the procedure outlined under "Removing Fan Belt" *on page 2*, except the belt can be started on lower pulley by hand, and by slowly cranking the engine, the belt will find the correct position.

WATER PUMP PACKING

The pump may leak due to wear after considerable service. If this occurs, tighten the packing nut (3) *(see Illust. 3)* just enough to stop the leaking. If the tightening of the packing nut does not stop the leaking it may be necessary to install new packing.

To install new packing, remove the driver pin (5) and driver (6). Unscrew and remove the packing nut (3). Place the water pump packing around the shaft and reassemble the packing nut, driver and driver pin.



Illust. 3

Ref. No.	Description
1	Fan pulley flange.
2	Set screw in pulley flange.
3	Water pump packing nut.
4	Fan belt.
5	Driver pin.
6	Driver.
7	Stud.

OPERATIONS SECTION

MEMORANDA

ELECTRICAL EQUIPMENT

PRECAUTIONS:

CAUTION: Before working on any part of the electrical system, disconnect the battery ground cable. Do not reconnect this cable until all other equipment has been connected. This will avoid shorting and causing damage to any of the electrical units.

Be sure all terminals are clean and securely fastened and that there are no broken wires anywhere in electrical circuits.

Tractors, when shipped, have the battery ground cable disconnected at the battery end, and in addition, the connection at the "F" terminal on the generator frame is not completed. Before starting the engine, connect the battery to ground cable and connect the generator wires *as shown in the "Wiring Diagram" in Spare Parts Catalog.*

DANGER! The generator will burn out if the engine is operated with the battery cables or battery charging circuit cables disconnected or broken. To operate the generator without battery, remove the connection from "GEN" terminal on the relay and ground it on the relay mounting screw, or remove the generator field cable from "F" terminal on the generator frame.

STORAGE BATTERIES

To service the battery, remove the seat cushion and support bar, then loosen the two wing nuts on the battery cover and remove the cover.

Keep the vent hole in the filler caps open.

Keep the electrolyte in the batteries up to the proper level at all times to prevent failure of batteries.

Inspect the battery every sixty four hours or oftener to keep the water at the correct level and to maintain the correct specific gravity. A specific gravity reading of about 1.250 corrected to 80° F. should be maintained. *(See Chart "VARIATION OF SPECIFIC GRAVITY WITH TEMPERATURE" on page 4.)*

CAUTION: When adding water to battery in temperature near the freezing point (32° F.), always run the engine long enough to mix the water and the electrolyte or damage to the battery from water freezing will result.

Acid or electrolyte should never be added except by a skilled battery man. Under no circumstances add any special battery "dopes", solutions or powders.

The electrolyte in each cell should be 3/8-inch above the separators. When the electrolyte is below the level, pure distilled water should be added. Never use hydrant water or any water which has been in a metal receptacle. Keep the pure *DISTILLED WATER* in a glass jar on hand for battery use only. Use a clean syringe to put water in a cell.

The battery cable terminals must be clean and tight. Use hot water for removing terminal corrosion and for cleaning the top of the battery. Brighten terminal contact surface with wire wool, apply a light coat of vaseline and reassemble. Be sure terminals are clamped tightly and that battery is clamped securely in the battery box. If this is done two or three times a year, no trouble from corroded terminals should be experienced.

Batteries when shipped dry should be serviced as outlined on the instruction tag attached to the battery.

ELECTRICAL EQUIPMENT - Continued

GENERATOR AND LIGHT SWITCH

Generator has an adjustable third brush for changing charging rate. Also the light switch has a field resistance control to regulate the charging rate of the generator from the dash panel.

The generator field circuit is grounded through the light switch. Therefore, it is absolutely necessary at all times to make sure that there is a good electrical connection between the switch and mounting panel.

The light switch is used to control the generator field resistance and has four positions: Low Charge, High Charge, Dim and Bright.

When the lights are turned on either Dim or Bright, the field circuit is direct to the ground, giving High Charge or increased generator output. This is also true when the switch is on High Charge position.

During the daytime, when lights are not used, the switch should be put in the "Low Charge" position, which adds a resistance coil to the field circuit and reduces the output of the generator to approximately one-half its original charge rate. If the battery is low the switch should be placed in the "High Charge" position until it is fully charged, as indicated on Specific Gravity Chart, *(see page 4)*.

The generator, as received from the factory, will have the third brush set in a position to give an output of approximately 9 amperes when the switch is in the "High Charge" position, and 4 to 5 amperes when the switch is in the "Low Charge" position. It may be desired to reduce these charging rates. This may be accomplished by adjusting the third brush. *(See paragraph relating to third brush adjustment on page 3.)*

The charging rates given above are for average conditions only. The generator output may have to be varied to meet abnormal operating conditions in order to maintain a fully charged battery. To obtain the best life and performance of the battery do not undercharge or overcharge, but maintain the correct specific gravity.

GENERATOR AND STARTING MOTOR COMMUTATORS

If the commutator is dirty or slightly burred, it can be polished with a strip of No. 00 sandpaper. *Never use emery cloth.*

TO CLEAN COMMUTATORS

The commutator can be cleaned by placing a strip of sandpaper between the brush and the commutator, while the armature is revolving. After the polishing operation, all dust must be blown from the commutator. If the commutator is very rough or out of round, it should be referred to the proper maintenance personnel.

GENERATOR LUBRICATION (2 CUPS)

Every 64 hours of operation, put in 8 to 10 drops of engine oil. Do not lubricate excessively since excessive oiling may cause oil and grease to gum on the commutator and cause a reduction of the generator output. *Never oil the commutator.*

GENERATOR BELT TENSION

The slack of the generator belt should be checked frequently to assure maintenance of the correct tension. The tension is correct when the belt can be depressed without effort by the thumb, approximately 3/4 of an inch to 1-inch midway between the two pulleys. If the slack is more than 1-inch, adjust the tension.

ELECTRICAL EQUIPMENT - Continued

TO ADJUST CHARGING RATE BY THIRD BRUSH

(1) Remove cover band "C" *(see Illust. 1).*

(2) Loosen the round head screw "A" on the commutator end bearing casting until the lock washer tension is released. **DO NOT TRY TO REMOVE THE SCREW.** *(See Illust. 1).*

(3) The charging rate can be changed by moving the third brush "B". This brush is the one mounted on a movable carrier, whereas the other main brushes are mounted directly on the end bearing casting.

(4) The rate of charge is increased by moving the third brush in the direction of rotation of the armature. To decrease the rate of charge, move the third brush in a direction opposite to that of the armature rotation.

(5) The maximum rate of charge of this generator is 9-11 amperes with generator hot and 13-16 amperes with generator cold (with switch in high charge position and with no electrical load). *DO NOT SET BEYOND THESE LIMITS.*

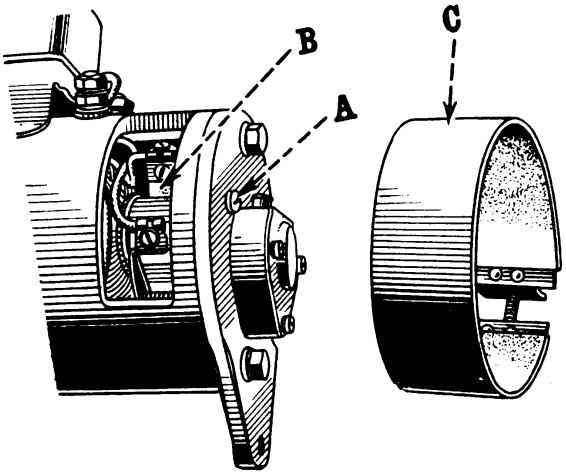
(6) Always check the maximum generator output when operating with a fully charged battery.

(7) **IMPORTANT:** The third brush should never be set closer than 3.2 commutator bars from the main brush. *(See Illust. 2.)*

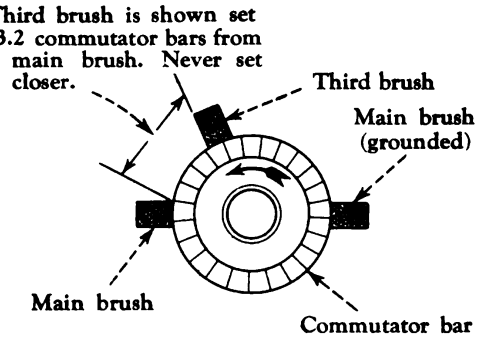
(8) When the above adjustments are completed, be sure to tighten the round head screw "A" *(see Illust. 1)* which locks the third brush carrier in place.

(9) Reassemble the cover band "C" with the joint on the bottom of the generator so that the joint is not over any opening.

Unless you are familiar with this equipment and how to adjust same, the above adjustment should be made by proper maintenance personnel.



Illust. 1
Generator showing Third Brush



Illust. 2
View showing Commutator End (Brush Setting)

Variation of Specific Gravity with Temperature

Consult This Chart

Read the thermometer in the battery acid—read the Hydrometer—then at the top of the table find the column headed by the temperature which is nearest the battery acid temperature; find, in that column, the figure nearest the observed Specific Gravity reading, and trace horizontally across to the 80° F. column. The 80° F. figures are the true acid gravity and should form the basis for any acid adjustment.

The specific gravity of acid in fully charged batteries should not exceed the value specified by the manufacturer (base temperature 80° F.). If hydrometer readings are taken at acid temperatures other than 80° F., allowance must be made for temperature.

All figures in horizontal lines represent the same state of charge but at the various temperatures shown in the column headings; that is, 1.280 Specific Gravity at 80° F. (the base temperature) becomes 1.268 when Electrolyte temperature is 110° F., and 1.312 when Electrolyte temperature is 0° F.

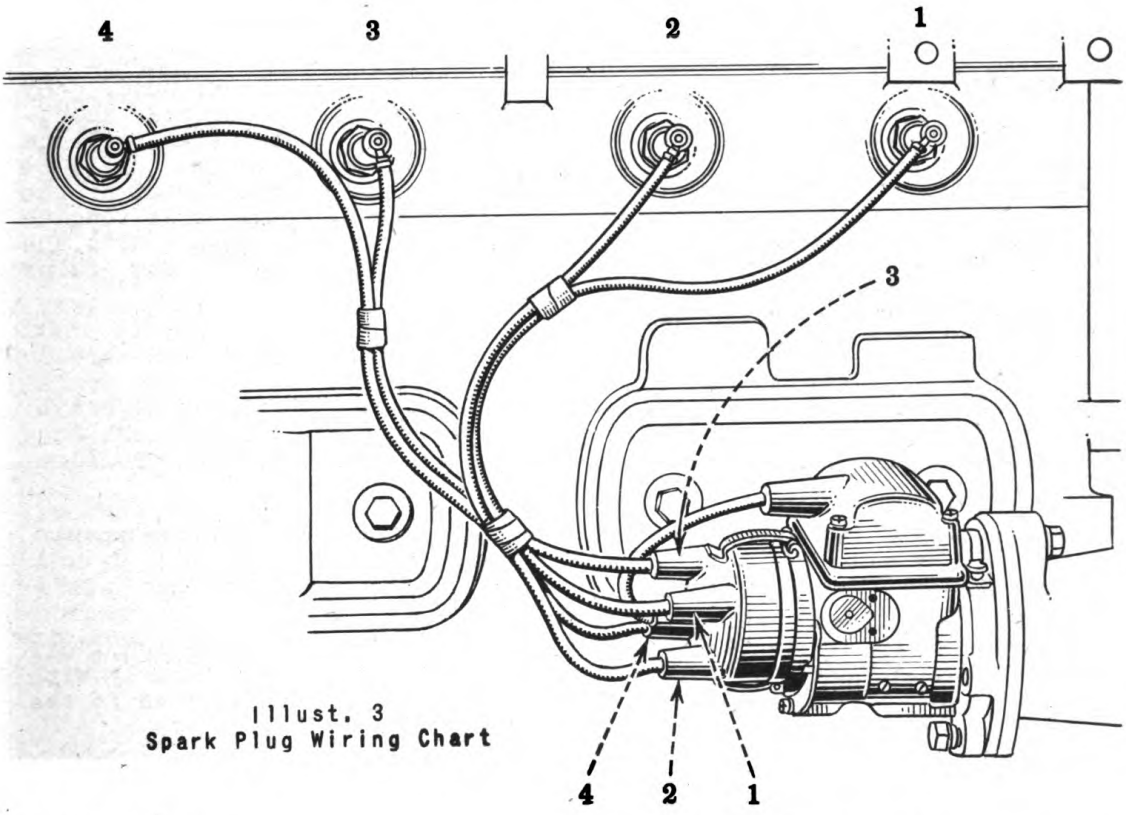
0° F.	10° F.	20° F.	30° F.	40° F.	50° F.	60° F.	70° F.	80° F.	90° F.	100° F.	110° F.	120° F.
1.167	1.163	1.160	1.157	1.154	1.150	1.147	1.144	1.140	1.137	1.134	1.131	1.127
1.177	1.174	1.170	1.167	1.164	1.160	1.157	1.154	1.150	1.147	1.143	1.140	1.137
1.187	1.184	1.181	1.177	1.174	1.170	1.167	1.164	1.160	1.157	1.153	1.150	1.146
1.198	1.195	1.191	1.187	1.184	1.180	1.177	1.173	1.170	1.166	1.163	1.159	1.156
1.208	1.205	1.201	1.198	1.194	1.191	1.187	1.183	1.180	1.176	1.173	1.169	1.165
1.219	1.215	1.211	1.208	1.204	1.201	1.197	1.193	1.190	1.186	1.182	1.179	1.175
1.229	1.225	1.222	1.218	1.214	1.211	1.207	1.203	1.200	1.196	1.192	1.189	1.185
1.239	1.236	1.232	1.228	1.224	1.221	1.217	1.213	1.210	1.206	1.202	1.198	1.195
1.251	1.247	1.243	1.239	1.236	1.232	1.228	1.224	1.220	1.217	1.213	1.209	1.205
1.261	1.257	1.253	1.249	1.246	1.242	1.238	1.234	1.230	1.227	1.223	1.219	1.215
1.271	1.267	1.263	1.259	1.256	1.252	1.248	1.244	1.240	1.236	1.233	1.229	1.225
1.281	1.277	1.273	1.269	1.266	1.262	1.258	1.254	1.250	1.246	1.243	1.239	1.235
1.291	1.287	1.284	1.280	1.276	1.272	1.268	1.264	1.260	1.256	1.252	1.248	1.245
1.301	1.298	1.294	1.290	1.286	1.282	1.278	1.274	1.270	1.266	1.262	1.258	1.255
1.312	1.308	1.304	1.300	1.296	1.292	1.288	1.284	1.280	1.276	1.272	1.268	1.265
1.322	1.318	1.314	1.310	1.306	1.302	1.298	1.294	1.290	1.286	1.282	1.278	1.274
1.332	1.328	1.324	1.320	1.316	1.312	1.308	1.304	1.300	1.296	1.292	1.288	1.284
1.342	1.338	1.334	1.330	1.326	1.322	1.318	1.314	1.310	1.306	1.302	1.298	1.294
1.354	1.350	1.346	1.342	1.337	1.333	1.329	1.325	1.320	1.316	1.312	1.308	1.303

With battery fully charged and on charge at the normal rate, the cell voltage will be about as follows:

Average cell voltage at 80° usually falls between 2.5 and 2.7 volts.
Average cell voltage at 100° usually falls between 2.4 and 2.6 volts.

For accuracy always take acid temperature when reading specific gravity.

SPARK PLUGS AND CABLES



Illust. 3
Spark Plug Wiring Chart

SPARK PLUGS

The spark plugs selected after careful tests as best suited for this engine are the Champion No. 0, Commercial A and AC No. 75, and should be used ordinarily.

Only a complete set of either type of spark plug should be used on the engine.

At the interval *specified under "Periodic Inspections", page 12, section G,* or oftener if necessary, remove the spark plugs for cleaning and checking gaps between electrodes. A gap of .028 to .032-inch should be maintained. (A gage of this thickness is furnished.) When making this adjustment, always bend the outer electrode. Never bend the center electrode as it may damage the insulator. If the gap between the electrodes is too great, due to improper setting or burning off the end, the engine will misfire and be hard to start.

CLEANING SPARK PLUGS

Sand blasting is the recommended method of cleaning spark plugs.

Never scrape or clean the insulator with anything which will scratch the porcelain. Scratched porcelain allows carbon and dirt to accumulate much faster.

NOTE: To remedy fouling or sooting, use a hotter (light service) spark plug. To remedy pre-ignition and burning of electrodes, use a colder (severe service) spark plug. Before using these special plugs notify proper maintenance personnel.

SPARK PLUGS AND CABLES - Continued

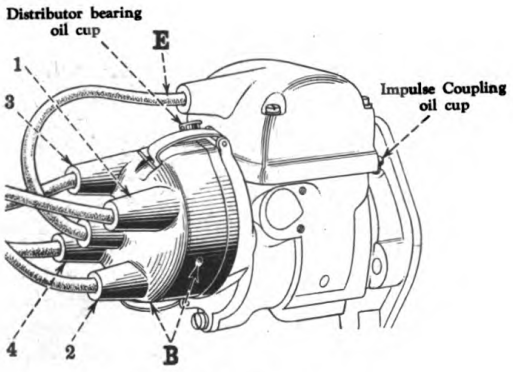
SPARK PLUG CABLES

If the spark plug cables are to be removed for any reason, note the position of each cable on magneto so they can be replaced correctly. *(Wiring Chart Illust. 3 shows correct wiring.)*

There should be 1/4-inch minimum clearance between the spark plug cables and the cylinder head. By maintaining this clearance, shorting-out the spark plug will be prevented, and the cable will be away from the extreme heat of the cylinder head. If the cable touches the head, the heat soon causes the rubber to become soft and ruins the cable.

MAGNETO

The tractor is equipped with a high-tension magneto which is designed and built in accordance with the latest ignition practices. A magneto of this type is used by International Harvester because our engineers have proved that it is superior from the standpoint of performance, long life, and trouble-free operation.



Illust. 4
Counterclockwise Rotation
(viewed from the distributor end)

LUBRICATION

Every 64 hours of operation, oil the impulse coupling liberally with the grade of oil *specified in the "Lubrication Guide"*.

Fill the distributor bearing oil cup with lubricant at the interval *specified in the "Lubrication Guide"*. Do not oil oftener as excessive oil might work into the breaker point chamber and cause rapid point wear.

GREASING BREAKER MECHANISM AND CHECKING POINTS

This magneto requires very little attention other than properly lubricating the oil cups as specified above.

It is important, however, to keep the breaker arm chamber clean, as oil on the breaker points will cause rapid point wear. Over-lubrication of the distributor bearing oil cup *(see Illust. 4)* might cause a dirty breaker point

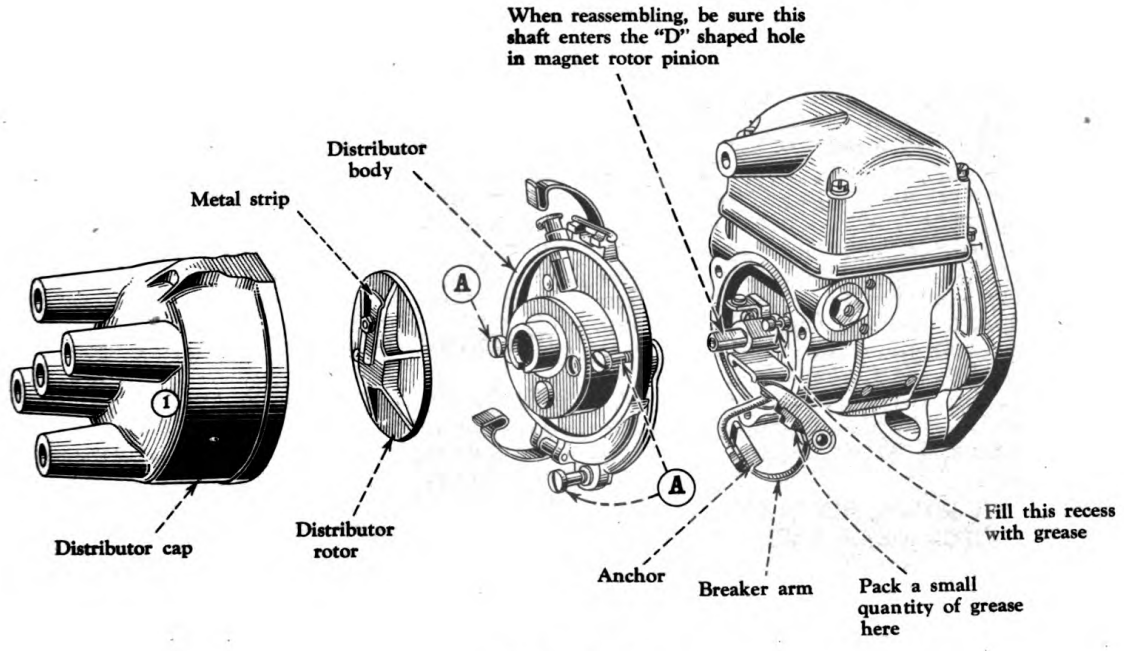
MAGNETO - Continued

chamber. At the interval *specified under "Periodic Inspections", page 12, section G,* inspect the breaker point chamber to assure it is clean. See that the points are in good condition and have the proper clearance. If the chamber is clean, no attention is necessary other than checking the clearance of the points; but if the chamber is dirty, all parts must be thoroughly cleaned. After cleaning the points should be dressed, the point clearance checked, and the breaker arm regreased as outlined below.

To reach the breaker mechanism remove the distributor cap and crank the engine slowly until the metal strip on the distributor rotor points toward the No. 1 terminal on distributor cap and the impulse coupling just trips. Remove the distributor rotor and take off the distributor body by removing the three screws *(see "A", Illust. 5).* Do not crank the engine while the distributor body is removed or it might be necessary to retime the magneto to the engine.

Pry the breaker arm and anchor from the chamber and clean all the parts. Inspect the breaker points and, if necessary, dress them with a sharp fine file. If the points are worn excessively replace both points.

Fill the recess in the breaker post with lubricant and pack a small quantity of lubricant in back of the breaker arm rubbing block *(see Illusts. 5 and 6).* (Refer to "Lubrication Guide" for grade of lubricant to be used.)



Illust. 5

MAGNETO - Continued

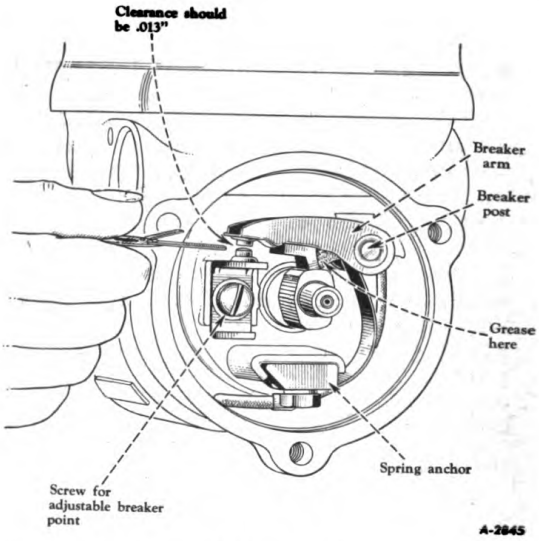
Assemble the breaker arm, leaving the spring anchor projecting 1/8 to 3/16-inch above the top of the slot so it is pushed into place by the distributor body. Be sure the points line up after the breaker arm is pushed into place.

Check the gap between the breaker points. Use the gage furnished with the tractor *(see Illust. 6)*. The point opening should be .013-inch when the rubbing block is on the high part of the cam. If the gap is not correct adjust it by loosening the screw holding the adjustable point *(see Illust. 6)* and moving the point up or down until the gage slips snugly into the opening. After the proper adjustment has been made tighten the screw.

Line up the distributor rotor key with the keyway in the spindle *(see Illust. 5)* and press the rotor loosely on the spindle. With the engine on top dead center of the No. 1 firing stroke, turn the distributor rotor until the metal strip on the rotor points to the No. 1 terminal on the distributor cap. Place the distributor body onto the magneto. Be sure the rotor shaft enters the "D" shaped hole in the magnet rotor pinion. Remove the distributor rotor to tighten the three screws *(see "A", Illust. 5)*. Replace the distributor rotor and distributor cap.

GREASING ROTOR BEARINGS AND DISTRIBUTOR GEAR CASE

Every 2,000 hours of operation, or at least every two years, the magnet rotor bearings, distributor gear case, and distributor gear bearing should be cleaned and repacked. This is to be done by proper maintenance personnel.



Illust. 6

DISTRIBUTOR CAP

Both the inside and outside of the distributor cap should be kept reasonably free of dust and oil deposits. To insure long life of the distributor, care must be taken to keep the two small ventilator holes *(see "B", Illust. 4)* open at all times. The distributor rotor should also be kept clean.

MAGNETO - Continued

INSTALLING AND TIMING THE MAGNETO TO ENGINE

If for any reason the magneto is removed the following instructions must be closely followed when replacing the magneto onto the engine:

(1) To avoid accidental starting, pull out the coil to distributor cable "E" from the coil cover, *Illust. 4.*

(2) Crank the engine until the No. 1 piston (the piston next to the radiator) is on the upper dead center of the compression stroke. (The compression stroke can be determined by removing the No. 1 spark plug and placing the thumb over the opening and having someone slowly crank the engine until an outward pressure is felt.) Continue cranking slowly until the first notch in the rear flange of the fan drive pulley is in line with the pointer on the front crankcase cover. The No. 1 piston is now on top dead center.

Caution: Do not use "DC" mark or other marks on the forward flange of fan drive pulley for timing this engine.

(3) Remove the distributor cap and turn the magneto coupling in a clockwise direction (as viewed from the coupling end) until the arm on the distributor rotor points toward the No. 1 terminal on the distributor cap.

(4) Assemble the magneto onto the engine. Make sure the lugs on the impulse coupling engage into the slots on the magneto drive coupling. (Assemble the magneto so the top is as far from the crankcase as possible.)

(5) Insert the magneto mounting bolts loosely into the magneto flange, just enough to hold the magneto in place. Then crank the engine one complete revolution to the next top dead center. Next, push the upper part of the magneto mounting flange toward the engine until the impulse coupling just trips.

(6) Tighten the mounting bolts securely. Attach the spark plug cables to the engine and magneto. Start by connecting the No. 1 cylinder spark plug to the socket marked "1" on the distributor block, connect the next socket with No. 3 cylinder, next with No. 4 cylinder, and the next with No. 2 cylinder. *(See Illusts. 3 and 4.)*

(7) To check the timing, crank the engine slowly until the top dead center of the No. 1 cylinder is reached, at which time the impulse coupling should just trip.

(8) The magneto is now correctly wired and timed.

(9) Push the cable "E" back into the socket in the coil cover *(see Illust. 4).*

OPERATIONS SECTION

MEMORANDA

MINOR ENGINE SERVICE OPERATION

CYLINDER HEAD GASKET

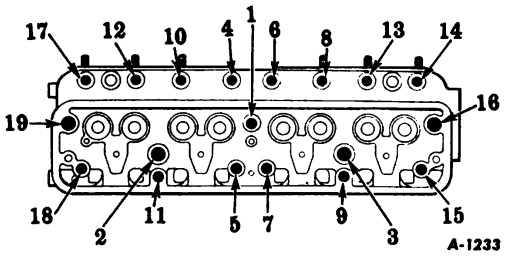
The best method to tighten the cylinder head after installing a new cylinder head gasket is to tighten all the nuts fairly snug. Start with the row in the center, then go to the others. Retighten in the same order, giving each nut a small part of a turn at a time. Continue this until all nuts are tight. Do not screw one nut down perfectly tight and then go to the next as you will not secure an even pressure on the gasket in this manner.

After replacing the cylinder head, it is necessary to insure against leaks by retightening the stud nuts after the engine has been run and water jacket has become thoroughly heated. To tighten the nuts properly, the valve rocker shaft assembly must be raised.

CAUTION: Be sure to adjust valve tappet clearance after the last tightening of cylinder head stud nuts *(see "Valve Clearance Adjustment" on page 5)*.

CRANKSHAFT BEARINGS, PISTONS, AND RINGS

We cannot impress too strongly the necessity of having proper maintenance personnel do the work on the replacement of connecting-rod bearings, crankshaft bearings, pistons and rings, and the grinding of the valves.



Illust. 1
Cylinder Head Nut Tightening Sequence.

AIR CLEANING SYSTEM

Clean air for combustion is assured by the oil-type air cleaner. A heavy screen in the air intake cap prevents the large particles from entering the air cleaner. The air then passes to the oil cup where it goes through a bath of oil. As the air rises to the intake manifold it passes through a series of oil-bathed screens and the fine dust is removed. As the oil from the screens works back down, it carries the dirt with it and settles in the oil cup. The oil cup should be cleaned and refilled regularly with new oil. The capacity of the oil cup is 4 pints (U.S.).

OIL CUP

Clean and refill the oil cup every day or *after every 8 hours of operation* (more frequently under severe dust conditions). Refill the oil cup to the level of the oil level bead with same grade oil as used in the engine crankcase.

Before removing the oil cup, clean or wipe the oil and grit from the top bead of the oil cup, oil cup retaining clamp, and the surface under the clamp.

AIR INTAKE CAP AND TOP CASTING

The air intake cap has an inlet screen which prevents the large particles, such as chaff, leaves, etc., from entering the air cleaner.

Keep this inlet screen clean. The holes in the screen must be kept open and free from paint. Dust, oil or water may collect on the screen and clog up the holes enough to restrict the flow of air to the engine. Restricted air flow will reduce the horse-power delivered by the engine.

The air intake pipe, from the intake cap to the air cleaner, should not be allowed to collect dirt on the inside. Clean this pipe when the air cleaner is removed. At the same time clean the inlet tube through air cleaner.

Also, thoroughly clean out the inside of the top casting.

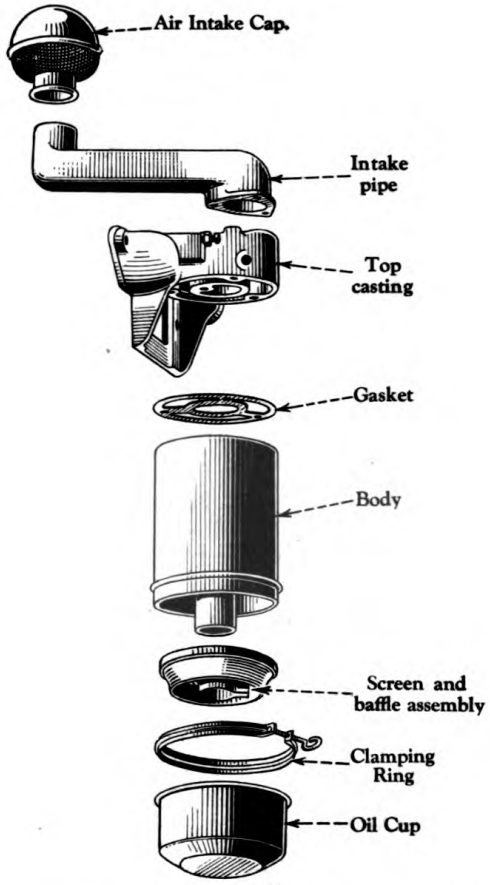
WASHING CLEANER

Inspect the lower screens at intervals frequent enough to assure clean screens. It may be necessary to clean these screens every 64 hours of operation if operating in an atmosphere heavily laden with dust, chaff or lint.

The cleaner has a removable lower screen. Loosen the clamp on the center tube and remove the lower screen for washing. If the screens in the body of the cleaner are clogged, remove the entire cleaner and wash thoroughly in solvent, dry cleaning; kerosene; or Diesel fuel.

Clean or wipe the oil and grit from the top bead of the oil cup, and also from the oil cup retaining clamp and surface under this clamp before replacing the oil cup onto the air cleaner body.

AIR CLEANING SYSTEM - Continued



Illust. 2
Air Cleaner Taken Apart for Cleaning.

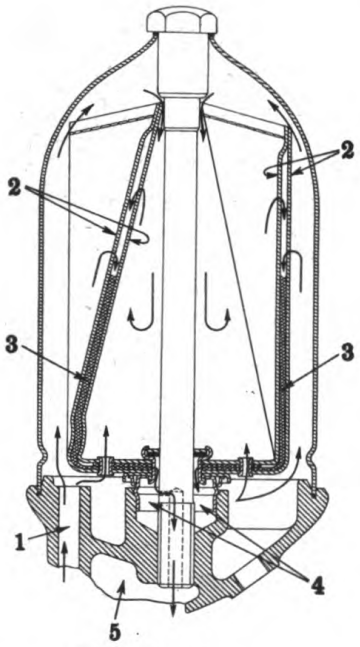
Replace the air cleaner. Make sure all the joints are air tight and the screens are held firmly in place. Replace the air intake cap and replace the oil cup after it has been properly filled with oil. Make sure the oil cup is held securely in place by the cup clamp.

GENERAL PRECAUTIONS

To prevent the entrance of dirt into the engine, it is absolutely essential that frequent inspections be made of flexible rubber connections to the carburetor and air cleaner. These flexible connections should be replaced before they deteriorate. To eliminate any undue strain on the connections, make sure the pipes line up. See that all joints between the air cleaner and the cylinders of the engine are tight. This includes flexible connections, carburetor and manifold joints and gaskets. All gaskets must be in good condition and bolts drawn up tight.

OPERATIONS SECTION

LUBRICATING OIL FILTER



Illust. 3
Cutaway view of filter, showing: (1) Oil inlet; (2) replaceable filtering element; (3) mesh screen separator to provide passage for filtered oil between inner and outer layer of element; (4) outlet for filtered oil; (5) filtered oil return.

The oil filter elements should be replaced each time the engine oil in the crankcase is changed. *(Refer to the "Lubrication Guide".)*

TO CHANGE FILTER ELEMENT

(1) Stop the engine.

(2) Remove oil filter base drain plug and allow the oil filter to drain completely.

(3) Clean off the filter case to eliminate any possibility of dirt dropping into the base.

(4) Unscrew and remove the retaining bar "A".

(5) Lift up and remove case "B".

(6) Remove the old element "C".

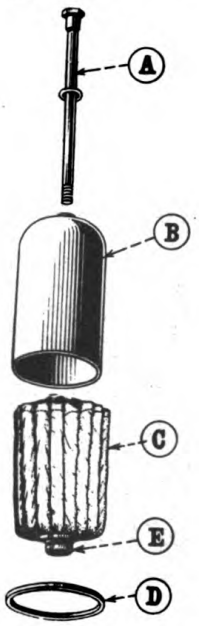
NOTE: If some special equipment on the tractor prevents the lifting of case "B" over element "C", remove the case and the element together.

(7) Wipe out base and the case with a cloth dampened with solvent, dry cleaning; kerosene; or Diesel fuel.

(8) See that the case gasket "D" is in position. Replace the drain plug in the filter base and install the new filter element (pilot "E" must be down). Replace the case and retaining bar "A" and draw the nut up tight.

(9) Check the oil level in crankcase to see that the new oil is up to the proper level *(see "Lubrication Guide")*.

Now start up the engine, see that oil pressure indicator is registering pressure and inspect the filter for oil leaks.



Illust. 4
Detail of Oil Filter Disassembled

VALVE CLEARANCE ADJUSTMENT

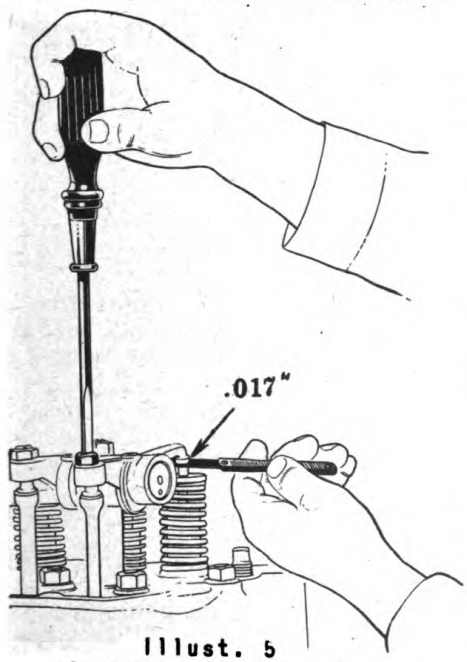
Check the valves for clearance every 500 to 512 hours and adjust the clearance if necessary. A clearance of .017-inch is necessary between end of the valve levers and the valve stems when the valves are closed, when engine is hot.

(1) Before checking the valve clearance "cut-out" the magneto by pulling the cable "E" *(see Illust. 4, section 5)* out of the socket. This will eliminate any danger of accidentally starting the engine.

(2) Remove the valve housing.

(3) Remove the spark plug from the No. 1 cylinder (the cylinder next to the radiator).

(4) Place your thumb over the spark plug opening and slowly crank the engine until an outward pressure can be felt. Pressure indicates No. 1 piston is moving toward upper dead center of the compression stroke.



Illust. 5
Gaging Valve Levers with a Feeler Gage

(5) Continue cranking slowly until first the notch in rear flange of fan drive pulley is in line with the pointer on front crankcase cover. The No. 1 piston is now on top dead center. **Caution: Do not use the "DC" mark or other marks on forward flange of the fan drive pulley for timing this engine.**

(6) Loosen the lock nut and adjust the screw in the valve lever so that the gage slips snugly between the end of the valve lever and the valve stem *(see Illust. 5)*. Tighten the lock nut and recheck the clearance.

(7) Crank the engine one-half of a revolution at a time and check the clearance of each cylinder's valves and adjust the clearance if necessary. Do this on each set of cylinder valves in succession according to the firing order of the engine, which is 1, 3, 4, 2.

(8) Replace the valve housing. Check to see that the valve housing gasket makes an oil tight seal with the cylinder head. Replace the gasket with a new one if necessary.

(9) Replace the magneto cable "E" *(see Illust. 4, section 5)* into the socket from which it was removed.

IMPORTANT! Be accurate - use a feeler gage for checking the valve clearance.

SUGGESTIONS FOR CHECKING TROUBLE

Study the problem before making any changes.

If any adjustments are to be disturbed, the original setting should be noted, so this same setting may be restored in case the part changed does not remedy the trouble.

FAILURE TO START

No gasoline in carburetor.
Fuel valve closed.
Carburetor choked too much.
Fuel pump not performing properly.
Magneto grounded.
Engine speed control lever not advanced.
Gears engaged.
Distillate instead of gasoline in carburetor (for starting).

IRREGULAR SPEED

Governor sticking, out of adjustment, or worn.
Throttle shaft bent or out of alignment.

LACK OF POWER

Governor out of adjustment.
Exhaust pipe clogged.
Engine speed control lever not advanced.
Clutch slipping.
Air cleaner pipe clogged.

OVERHEATING

Insufficient amount of water.
Fan belt slipping.
Excess load.
Inside of radiator and cylinder block limed up or clogged with dirt.
Outside of radiator or radiator screen covered with dirt or chaff.
Excess carbon in the cylinders.
Carburetor improperly adjusted.

MISSING AND BACKFIRING

Water in the fuel
Air leaks around the intake manifold.
Engine not warmed up.
Red-hot carbon deposits in cylinder.

LACK OF OIL PRESSURE

Insufficient amount of oil.
Oil diluted or not as specified.
Oil filter clogged.
Dirt under the oil pressure regulating valve.
Broken oil pressure indicator.
Oil pump strainer clogged or pump not working.

KNOCKING

Excess carbon in the cylinders.
Sticky valve or improperly adjusted valves.
Loose piston pin, connecting rod, camshaft, or crankshaft bearings.
Broken piston rings or loose pistons.

LACK OF COMPRESSION

Sticky, dirty, pitted or improperly adjusted valves.
Stuck, worn or broken piston rings.
Worn pistons.
Leaky cylinder head gasket.

SUGGESTIONS FOR CHECKING TROUBLE - Continued

EXCESS FUEL CONSUMPTION

Running engine with choke button closed.
Air intake cap or air cleaner clogged.
Incorrect amount or improper grade of oil in engine crankcase.
Leaky carburetor fuel valve.
Carburetor adjustment too rich.

LACK OF FUEL

Fuel low in the tank.
Air vent hole in fuel tank filler cap plugged.
Fuel valve closed or only partially opened.
Clogged fuel strainer screen, fuel line or carburetor strainer.
Defective fuel pump *(see Instructions on page 2, section 7).*

DEFECTIVE IGNITION

Wrong kind, old, cracked, dirty or poorly set spark plugs.
Broken, loose or improperly connected wiring.
Dirty distributor block disk.
Dirty, pitted or improperly set breaker points.
Breaker arm not free on its bearing or the breaker arm spring weak or broken.
Magneto not timed correctly with the engine.
Impulse coupling dirty, dry or lubricated with heavy oil.

Explosions in exhaust pipe often occur just after starting, due to first charges not firing in cylinder and passing through into exhaust pipe, where burning gases from first few explosions will ignite them.

STARTING ENGINES THAT HAVE BEEN IN STORAGE

(1) Remove spark plugs and pour a mixture of one-half gasoline and one-half engine oil, SAE-10 into each cylinder (two tablespoonfuls per cylinder is enough).

(2) Remove valve housing cover and flush valve and valve operating mechanism with the same mixture.

(3) Crank engine rapidly until excess oil has been blown out of spark plug holes. This operation will loosen any tight piston rings and wash old gummy oil from valves and pistons.

(4) Flush out the impulse coupling with the same grade of oil used for lubrication and lubricate as specified in the "Lubrication Guide".

(5) Flush out the crankcase with solvent, dry cleaning; kerosene, or Diesel fuel and fill it with the grade of lubricating oil specified in the "Lubrication Guide".

(6) Be sure filter has a new element before starting engine.

(7) Remove crankcase breather pipe plug, and exhaust pipe plug.

(8) Install spark plugs.

(9) Fill water cooling system.

(10) Fill fuel tanks.

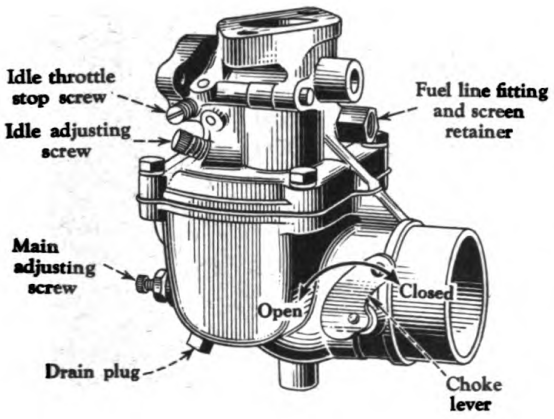
(11) Start engine and let it run slowly; observe if any valves are sticking. If so, pour small quantity of solvent, dry cleaning; kerosene; or Diesel fuel on valve stem until loose.

(12) Assemble valve housing cover.

CAUTION: Do not, immediately after starting, accelerate the engine rapidly or operate at high speed.

MEMORANDA

CARBURETOR (IHC-1-3/8" Up-Draft)



Illust. 1 - Carburetor

CARE OF THE CARBURETOR

Occasionally remove the fuel screen by unscrewing the fuel line fitting--clean the screen and replace it.

The flange nuts which hold carburetor to manifold should be checked periodically for tightness.

Occasionally check the screws that fasten the fuel bowl to the fuel bowl cover. These screws should be kept tight to prevent any leakage of air past the fuel bowl cover gasket.

ADJUSTING THE CARBURETOR

This carburetor was correctly set when shipped from the factory, but if the settings have been disturbed the following procedure should be followed:

Before making any adjustment, close both fuel adjusting screws, then set the main fuel adjusting screw 2-1/2 to 3 turns open and set the idle fuel adjusting screw 1 to 1-1/2 turns open.

MAIN FUEL ADJUSTMENT

Start the engine, fully advance the engine speed control lever and allow engine to run until it is hot (about 20 minutes). Turn the main fuel adjusting screw in until the engine starts to miss or operate unsteadily, then unscrew it to a point where the engine runs steadily. Check this adjustment with the engine under load to make satisfactory operation and maximum amount of power.

For the best operation and minumum dilution, keep adjustment as lean as possible. Screw the main fuel adjusting screw in for lean and out for rich load mixtures.

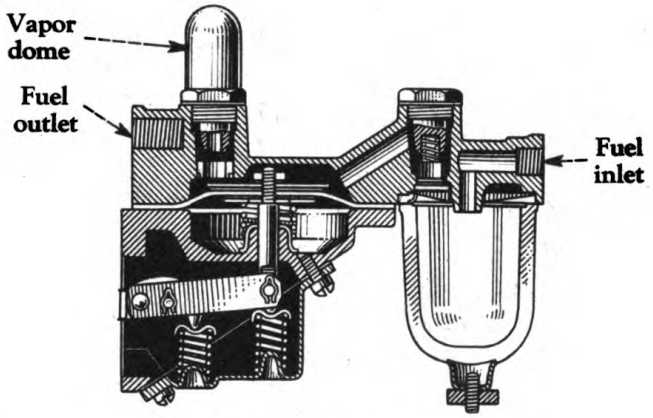
If, after adjusting, the engine still does not get the correct mixture of fuel, it may be caused by the main fuel adjusting screw becoming loose. This can be corrected by tightening the adjusting screw packing nut.

IDLE FUEL ADJUSTMENT

Fully retard the governor control lever. Adjust the idle throttle stop screw to give a slight increase in idle speed. Turn the idle fuel adjusting screw in or out as required to give the smoothest idle with the highest speed (the idle fuel adjusting screw turns in for rich and out for lean mixtures). Adjust the idle throttle stop screw to give the desired idle speed. The engine should not be set to idle so slowly that the impulse coupling will trip continually.

OPERATIONS SECTION

FUEL PUMP

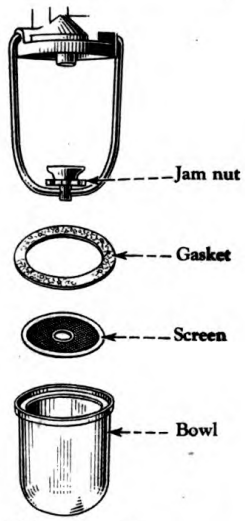


Illust. 2
Cross-Section of Fuel Pump and Fuel Strainer

Do not attempt to dismantel the fuel pump diaphragm. If a sufficient amount of fuel is not being delivered to the carburetor, a careful check should be made befor referring the pump to the proper maintenance personnel.

Usually the trouble will be found in one of several causes, such as bent, leaky or plugged up fuel lines, fuel bowl loose, dirty screen or fuel glass bowl not being cleaned out regularly. *(See Carburator Instructions on preceding page. Also see "SUGGESTIONS FOR CHECKING TROUBLE" on pages 6 and 7, section 6.)*

CLEANING THE FUEL STRAINER AND SEDIMENT BOWL



Illust. 3
Gasoline Strainer Showing Glass Bowl Removed for Cleaning

The strainer which is located on the fuel pump, should be cleaned at the interval *specified under "Periodic Inspections", page 12, section G.*

To take strainer apart for cleaning, close the gasoline shut-off valve, loosen the lower jam nut and the strainer can be disassembled. Clean out the bowl and clean the screen if necessary.

When reassembling, be sure the cork gasket between the bowl and the main body is in good condition and does not leak.

GENERAL ENGINE LUBRICATION

This engine has a pressure feed lubrication system. A gear-type oil pump circulates the lubricating oil under pressure to the crankshaft bearings, connecting-rod bearings, valve mechanism, timing gears, and governor, thereby assuring positive lubrication of all parts.

The engine is equipped with an oil filter which continually cleans the oil while the engine is running. To obtain the full benefit from the filter, the element should be replaced with a new one every time the oil is changed in the crankcase. (See "Lubrication Guide" for the proper oil change interval.) *Cleaning the old element is not satisfactory.*

Do not run the engine for any length of time if the level of the oil is below the lower test cock.

Never check the oil level while the engine is running.

OIL PRESSURE INDICATOR

An oil pressure indicator shows the pressure at which the oil is being supplied to the oil system. Under all operating conditions, the oil pressure of the engine should hold the indicator in the white section. Should the indicator not register, stop the engine at once and inspect oil system to find the cause of failure. If unable to find cause, notify proper maintenance personnel before again operating the engine.

Always look at the oil pressure indicator immediately after starting engine.

OIL PUMP

The gear-type oil pump in the crankcase has a screen attached to the oil intake which stops the large dirt particles from entering the oiling system. This screen should be cleaned whenever the oil pan is removed. The oil intake floats on top of the oil in the crankcase and always draws the oil from the surface, thereby eliminating the possibility of mixing water or sediment with the oil.

IMPORTANT!

Engines shipped to destinations in the United States of America, Canada, and Mexico are filled with S.A.E. 10 oil before leaving the factory. (All lubricating oil is drained from the crankcase on engines for Export.) *Refer to the "Lubrication Guide" for oil to use.*

ENGINE LUBRICATING OIL

Engine lubricating oil shall be of well refined petroleum oils, free from water, sediment, and without admixtures of fatty oils, acids, soaps, resins, or any other substance not derived from petroleum. Oil shall not corrode any metal used in engine construction. Also, engine lubricating oil containing additive products not necessarily derived from petroleum, but being of non-corrosive type, is satisfactory for use in our engines.

See special instructions for Cold Weather Operation on pages 9 and 10 of section G.

Manufacturer's Serial Number located on plate on upper left hand corner of dash.

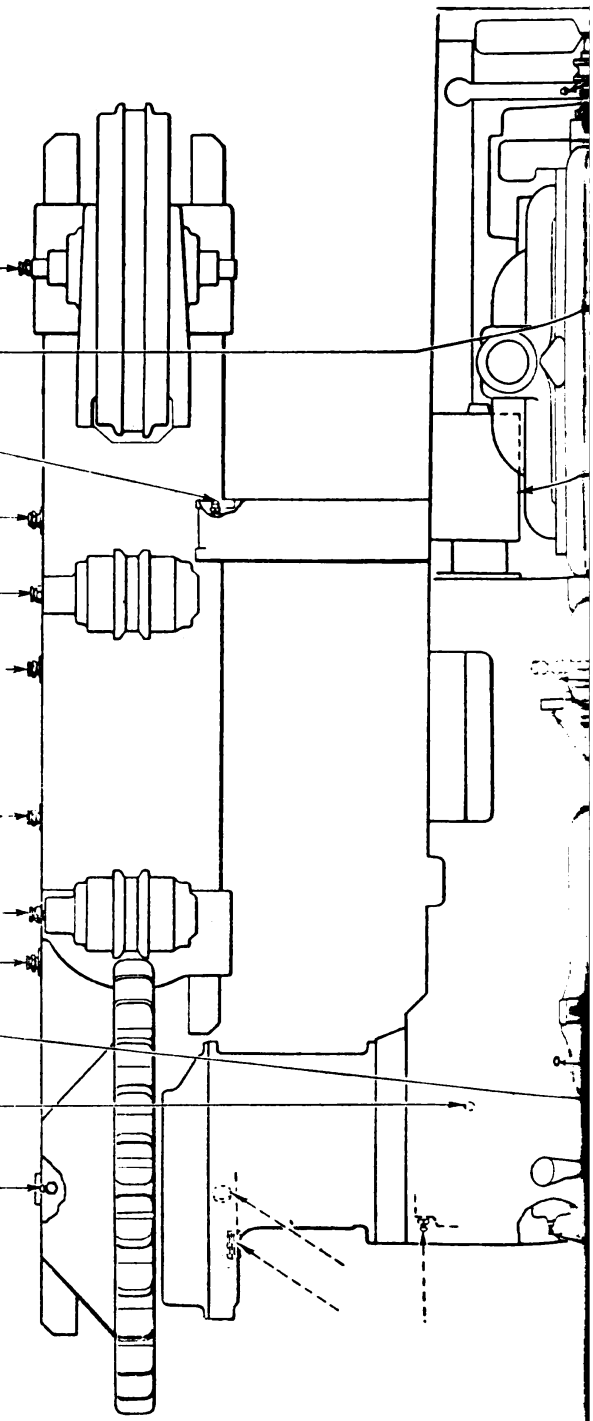
CAUTION! All points indicated by short-shaft, dotted arrows are points that are on both sides of vehicle and must be serviced in accordance with instructions for similar point on opposite side.

INTERVALS

8 = 8 hours
64 = 64 hours
96 = 96 hours
128 = 128 hours
256 = 25
512 = 51
1024 = 102

CHECK DAILY
Crankcase and Air Cleaner.

	Lubricant	Hours
Front idlers (see table). (Note 11)...	GO	8
Crankcase drain plug. (Note 2).....	...	128
Track frame guide rollers.....	CG	8
Track rollers (lubricate 4 fittings on each side) (see table). (Note 6) (Note 11).....	GO	8
Track idlers (see table). (Note 11)...	GO	8
Transmission drain plug.....	...	1024
Steering clutch compartment drain plug. (Note 6).....	...	64
Track frame pivot.....	CG	8



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LUBRICATION GUIDE FOR T-9 TRAC

hours
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hours

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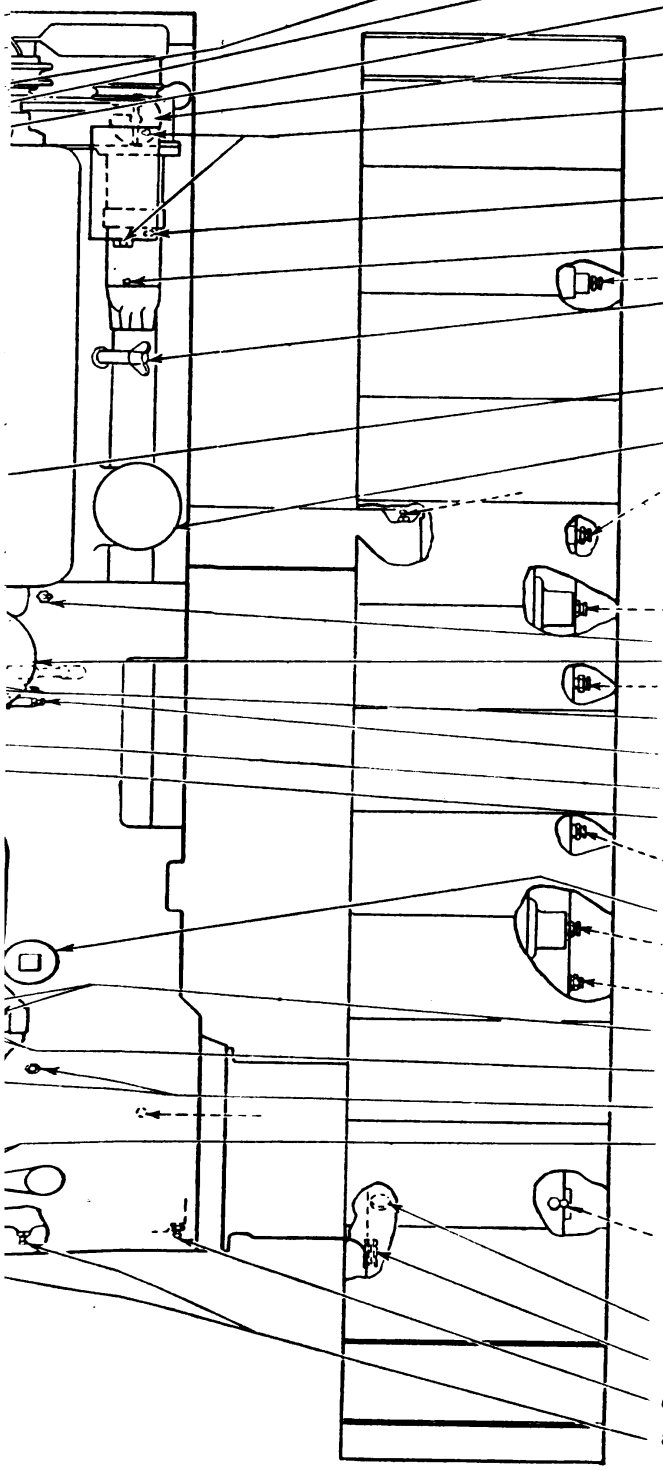


Hours	Lubricant	
64	CG	Front engine support
8	CG	Water pump shaft (capped fittin
64	CG	Fan hub bearing (sparingly)
128	OE	Crankcase (see table) (drain. Check level daily.
64	OE	Generator (sparingly)
64	PS or PL	Magneto impulse coupling
512	PS or PL	Magneto distributor bearing.
8	...	Crankcase oil level gage (Note
	...	Starting motor. (Note 13)
128	...	Oil filter. (Note 3)
64	...	Engine clutch compartment dr
8	OE	Air cleaner. (Note 4)
64	CG	Engine clutch camshaft bear reach fittings)
64	CG	Engine clutch release bearing fitting)
64	CG	Engine clutch pilot bearing (r fitting)
64	CG	Engine speed control lever
128	GO	Transmission (see table) (fill (Note 5)
8	CG	Steering clutch lever bearings
8	CG	Steering clutch turnbuckle eyes
8	CG	Steering clutch release bearings
8	CG	Steering clutch turnbuckle sock
1024	...	Final drive drain plugs
128	GO	Final drive. (Note 5) (Fill a
64	CG	Steering clutch pilot bearing.
8	CG	Track frame diagonal

TRACTOR (For Corps of Engineers)

KEY TO LUBRICANTS

OE = OIL, engine—crankcase grade

GO = LUBRICANT, gear—universal

CG = GREASE, general purpose
No. 1 (Above +32° F.)
No. 0 (+32° F. to 0° F.)
Refer to EFSB-L-1000D
(Below 0° F.)
Refer to EFSB-L-1000E
(Above +90° F.)

WB2 = GREASE, general purpose No. 2

PL = OIL, Lubricating, Preservative, Light
or
PS = OIL, Lubricating, Preservative, Special

TAI

UNIT
Crankcase
Transmission
Final Drive (each u
HIGH TEMPERA

UNIT
Track Rollers and I and Front Idlers

NOTE: If difficul "CG" (

at extr

ADDITIONAL LUBRICATION AND SERVI(

COLD WEATHER: For Lubrication and Se

HIGH TEMPERATURE: For Lubrication a

NOTES

(1) MAGNETO BREAKER ARM RUBBING BLO(rubbing block and in recess in breaker post.

(2) CRANKCASE: *Every 8 hours* check and fill to full l filler cover. Refill to "FULL" mark on gage. R crankcase drain plug.

(3) OIL FILTER: Remove and renew element whe mark on gage. Run engine a few minutes and r

(4) AIR CLEANER: *Every 8 hours* clean and refill oil *hours* clean air cleaner lower screen. Keep all c

(5) GEAR CASES: *Every 128 hours*, with tractor on drain, and refill. When draining, drain immedi

(6) MUD AND DEEP WATER OPERATION: *Ever* in engine and steering clutch compartments. *E*

(7) STEERING CLUTCH PILOT BEARING: Fitt to align fittings with holes.

(8) FITTINGS: Clean before applying lubricant. C

(9) MISCELLANEOUS POINTS OF LUBRICATIO linkage with OE engine oil.

(10) POINTS TO BE LUBRICATED BY MAINTE Magneto rotor bearings.
Magneto distributor gear bearings.

(11) BUTTON-HEAD TYPE FITTINGS: Fill with

(12) CLEANING FLUID: Use Solvent, dry cleanin

(13) POINTS REQUIRING NO LUBRICATION S

.E OF CAPACITIES AND LUBRICANTS TO BE USED

	CAPACITY (Approx.)	EXPECTED ATMOSPHERIC TEMPERATURE		
		ABOVE +32° F.	+32° F. to 0° F.	BELOW 0° F.
	11 U.S. Qts.	OE SAE-30	OE SAE-10	Refer to EFSB-L-1000D
	22 U.S. Qts.	GO SAE-90	GO SAE-80	
	3 U.S. Pts.			

RE: Above +90° F.— refer to EFSB-L-1000E

	EXPECTED ATMOSPHERIC TEMPERATURE		
	ABOVE +32° F.	+32° F. to 0° F.	BELOW 0° F.
's	GO SAE-90 (Note below)	GO SAE-80	Refer to EFSB-L-1000D

s experienced with excessive leakage, at operating temperatures +75° F. and above, use eral purpose grease No. 0

or

operating temperatures above 100° F. use "CG" General purpose grease No. 1.

INSTRUCTIONS ON INDIVIDUAL UNITS AND PARTS

e below 0° F., refer to EFSB-L-1000D

Service above +90° F., refer to EFSB-L-1000E

Every 512 hours pack small quantity WB2 grease back of breaker arm

. *Every 128 hours* drain, when engine is hot. Clean oil strainer screen in oil ngine a few minutes and recheck oil level. Remove cover in guard to reach

anging engine oil. After renewing element, refill crankcase to "FULL" k oil level.

voir to level mark with OE engine oil. (Capacity 3¾ U.S. Pints.) *Every 64* tions tight and intake pipe and outer screen clean.

ground, check oil level and add lubricant, if necessary. *Every 1024 hours* after operation.

urs lubricate track rollers. **CAUTION!** Be sure that solid pipe plugs are *4 hours* remove plugs to drain any accumulated oil.

eached by removing two round plates at rear of main frame. Move tractor

ON! Lubricate track rollers, idlers and frame points after washing tractor. *very 64 hours* lubricate throttle connections, brake shafts, clutch and brake

E PERSONNEL AT TIME OF GENERAL OVERHAUL:

at until increased resistance is felt on lever of IHC bucket-type lubricator.

sene; or Diesel Fuel

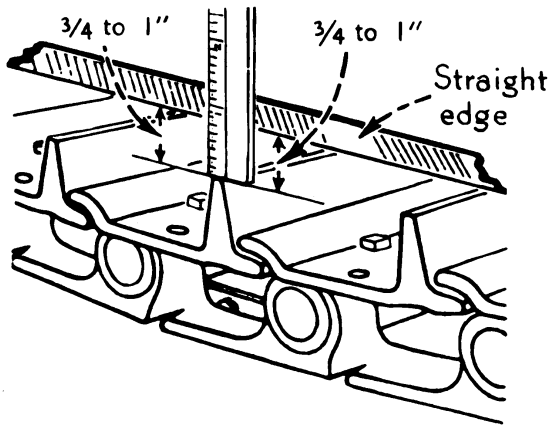
E: Starting motor.

TRACK ASSEMBLIES

When backing the tractor if the track chain is too loose it may have a tendency to climb the sprocket.

If the track adjustment is either too tight or too loose, it will cause undue wear on the track links, pins, bushings and bearings and also on the front idler bearings.

When properly adjusted the track chain spring takes care of the play in the track chain and there is no looseness or tension on the track when in normal operating position.



Illust. 1
Method of Checking Track Chain Tension

On a new unit check the track shoe bolts every 8 hours of operation until it becomes evident that set has taken place. The evidence of set having taken place can be determined when the bolts retain a tightness of 140 to 150 ft. lbs. The bolts used for attaching the Track shoes to the tracks are heat-treated alloy bolts and they will stand considerable tightening strain. (Common bolts should not be used).

While tightening the bolts it is well to strike the head of the bolt several sharp hammer blows and retighten. (As a safety measure we recommend you use goggles to protect your eyes while striking the bolts.)

METHOD OF CHECKING SLACK IN TRACK CHAIN

In order to check the slack in the track chain, the chain must be tight everywhere except on the top, between the front idler and sprocket.

This can be done by placing a wooden block, approximately one foot in height, under the foremost track shoe lug; then, with the engine running, put the TracTor in low gear and engage the clutch just enough so the sprocket drive tightens the chain along the ground and around the sprocket. After locking the brake and stopping the engine, stand on top of the track chain. Your weight will pull the chain tight around the front idler. All slack should now be in the top part of the track chain.

Place a straight edge along the top of the track lugs, extending the full length of chain, between the idlers *(see Illust. 1)*. The chain should have a clearance of approximately 3/4 to 1-inch between the underside of the straight edge and the top of lug (measured at the center, between the supports on the chain).

TO ADJUST TRACK CHAIN

(See Illust. 2)

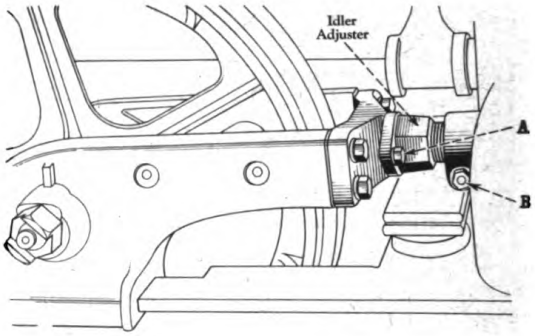
If it is necessary to adjust the track chain remove the two cap screws "A" at the front of the track spring adjuster, and loosen the track spring adjuster. Turn the adjuster clockwise (as viewed from rear, the sprocket end). This

TRACK ASSEMBLIES - Continued

pushes the front idler yoke forward, tightening the track chain. Turn the adjuster counterclockwise to loosen the track chain.

After the correct adjustment has been obtained, replace the cap screws "A" and tighten the track spring adjuster lock bolt "B".

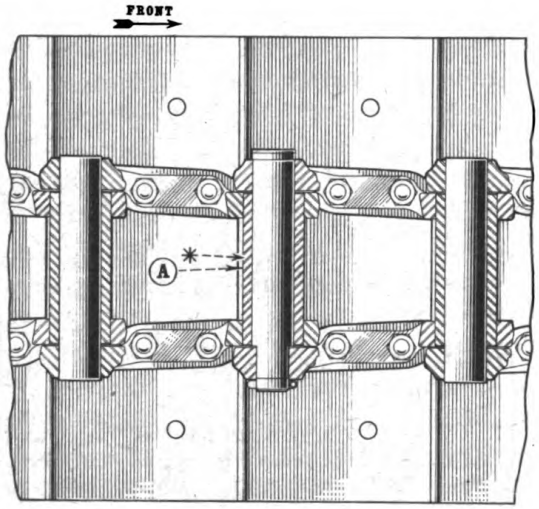
After a new track chain has been thoroughly broken in, it is well to check the clearance and adjust it if necessary.



Illust. 2
Adjuster for Changing Track Chain Tension

REMOVING THE TRACK

To remove the entire track from the tractor, drive the tractor forward until the track link master pin is in the front of the front idler. The tractor should be level when removing the track chain. Loosen the tension in the track chain by turning the adjuster counterclockwise as described under *"To Adjust Track Chain", on preceding page.*



Illust. 3
Track Link Master Pin Assembly

Remove the track link master pin by removing the master pin lock wire and driving out the master pin. Run the tractor backward until it is at the end of the track. Place a plank flush against the rear of the track when the track is flat on the ground *as shown in Illust. 4.* The plank should be approximately the same thickness as the track, narrow enough to fit between the track frame shields, and long enough so the entire tractor can rest on the plank. Now, back the tractor off the tracks and on to the plank.

NOTE: If it is desired to replace the old track with a new one, remove the old track as previously outlined and place the new track flush against rear of the old track, when the track is flat on the ground.

REMOVING THE TRACK - Continued

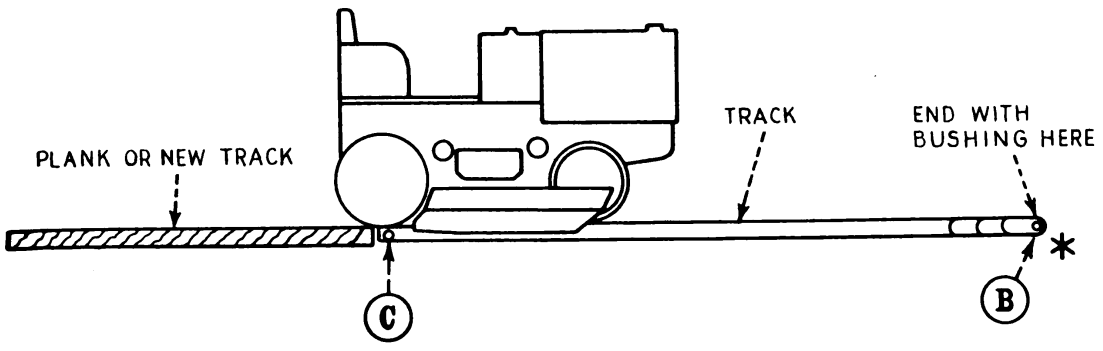
When replacing the track, lay the track flush against the plank with the bushing in the position shown in Illust. 4. Run the tractor forward onto the track until the sprocket is slightly ahead of the rear end of the track. Put a crowbar through the master pin hole "C" *(see Illust. 4)* and pull track up around the sprocket and forward over the track idlers and front idlers as the tractor is driven forward.

CAUTION: Drive the tractor forward in low speed with the engine speed control lever in the idle position and ride the brakes so that the tractor does not go too fast.

Place a block (about 8 to 10-inches high) under the cleat of the shoe on the last link of the track at "B" *(see Illust. 4)*, to hold the track against the idler. Engage the engine clutch and apply just enough power in forward speed to take the slack out of the bottom part of the track. Then, replace the master pin and the lockwire. Adjust the tension in the track chain *as described on pages 1 and 2.*

TRACK ROLLER LUBRICATION

It is important that the track rollers have the proper lubrication. *(See "Lubrication Guide" for further information.*



Illust. 4

OPERATIONS SECTION

MEMORANDA

TracTracTor Model T-9

REPAIR SECTION

The various assemblies in this tractor are arranged alphabetically, in sections, according to their function.

Each section has a black tab which lines up with the corresponding section name and number shown at the right. The black tabs are quickly located by bending this book back.

The contents of each section can be determined at a glance by referring to the index on the other side of this page.

NOTE: Refer to Section 13, page 1, for important note on tolerances clearances and oil seals.

REPAIR SECTION

CONTENTS

REPAIR SECTION

COOLING SYSTEM

SPECIFICATIONS

Type	Centrifugal Pump Circulation
Radiator	IHC Flat Tube
Thermostat, opens at	165°
Thermostat, wide open at	190°
"V" Belt Drive	Adjusted by turning one flange of the pulley
Capacity, U.S. Gallons	12
Water Pump Capacity, gallons per min.	60
Fan Diameter, inches	20
Fan Blades, number	4
Fan, R.P.M.	2,015

WATER PUMP

A positive, centrifugal pump circulates water in a closed system between the engine block, cylinder head and radiator. The temperature is controlled by a thermostat of the bypass type which is set in a casting attached to the front of the cylinder head. The path of water circulation when the engine is cold is from the radiator bottom, up through the water pump, through the engine block, up to the cylinder head and out into the thermostat assembly; then it flows through the thermostat and is bypassed back into the pump. Any water escaping into the radiator is made up from the supply at the bottom of the radiator. This circulation during the warm-up period prevents the formation of steam pockets.

The thermostat opens at 165° F. The temperature controls the amount of opening of the thermostat which in turn controls the amount of water re-circulated through the pump and also the amount of cooler water added from the radiator. With the thermostat wide open at 190° F., the bypass is closed and no water is re-circulated through the pump. The flow is then from the cylinder head through the radiator and back to the pump.

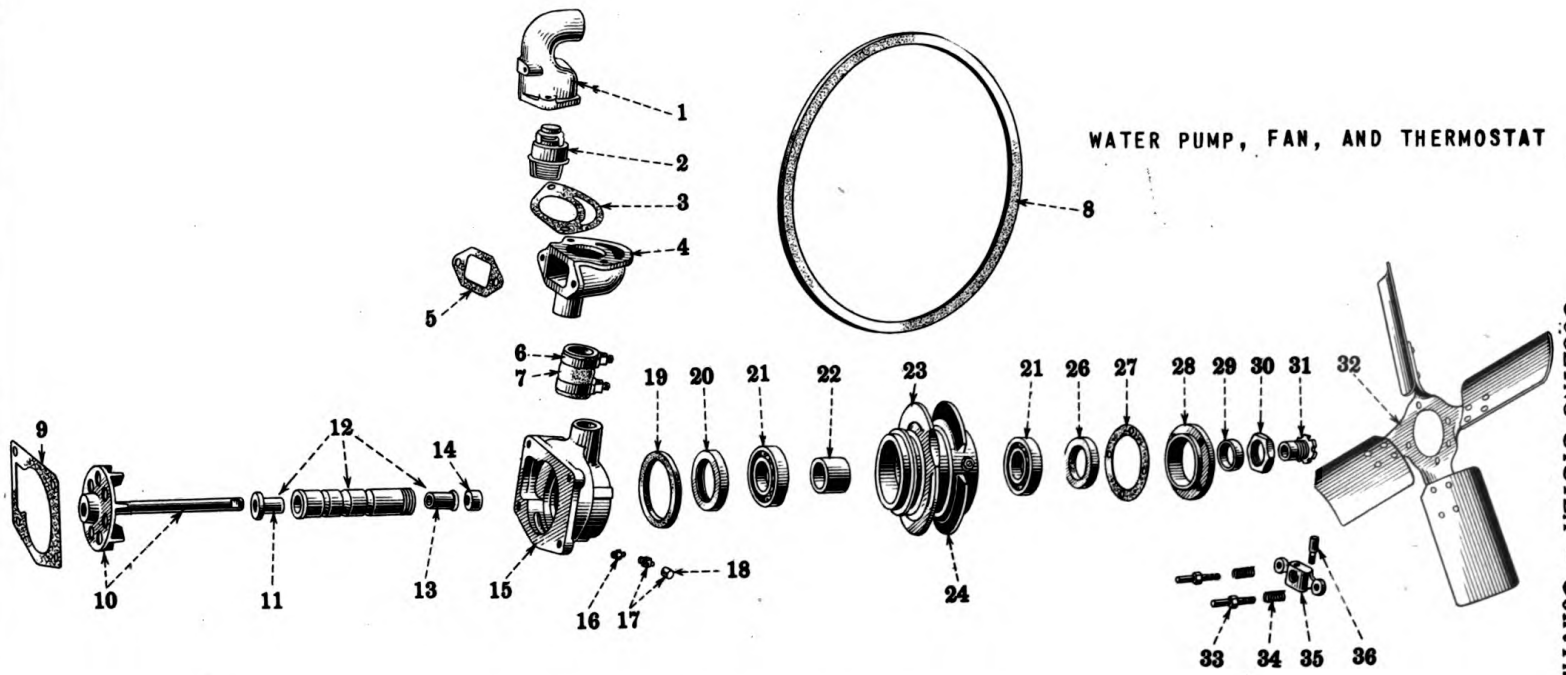
The fan assembly and drive pulley run on ball bearings mounted on a sleeve which is a press fit in the water pump body. The impeller is driven through a full-floating type shaft. The radiator need not be removed to remove the water pump.

REMOVAL OF THE WATER PUMP

Be sure to drain the water before removing the water pump. Loosen the fan belt before loosening the nut on pulley flange (24), *Illust. 1*, backing out the set screw on the flange, and then screwing out the flange. Then remove the tapered driver pin (36). The pump driver (35) and the springs (34) can then be taken out.

Run out the studs (33) and remove the fan (32) and the fan belt, holding the fan assembly close to the radiator to take it out.

Continued on page 3.



Illust. 1. Exploded View of the Water Pump.

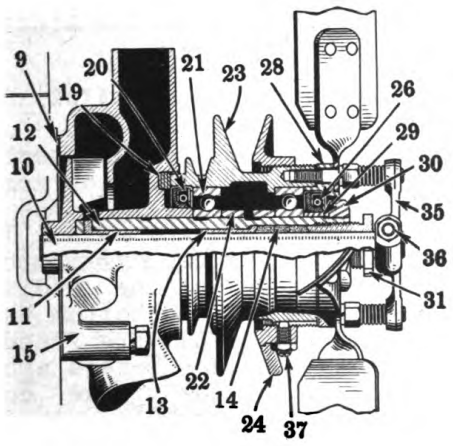
Ref. No.	Description	Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
1	Thermostat housing with pipe plug.	10	Shaft and impeller.	20	Oil seal, rear.	29	Lock sleeve.
2	Thermostat.	11	Thrust bushing.	21	Bearing.	30	Clamp nut.
3	Gasket.	12	Sleeve, with bushings.	22	Spacer.	31	Packing gland.
4	Outlet elbow.	13	Bushing.	23	Fan and generator pulley hub with oil seal.	32	Fan blades and carrier.
5	Gasket.	14	Packing.			33	Driving stud.
6	Hose clamp.	15	Body.	24	Pulley flange	34	Spring.
7	Hose, 1-1/2" I.D. x 2-3/8" long.	16	Lubricator.	26	Oil seal, front.	35	Driver
8	Fan belt.	17	Lubricator with cap.	27	Gasket.	36	Pin.
9	Gasket.	18	Lubricator cap.	28	Retainer with oil seal.		
		19	Felt washer.				

REPAIR SECTION

COOLING SYSTEM - Continued

REMOVAL OF THE WATER PUMP - Continued from page 1

Loosen the upper and lower clamps on hose (7). Remove the two cap screws that secure the inlet pipe (10), *Illust. 3,* to the radiator top tank. Run out the cap screws that secure the water outlet elbow (4), *Illust. 1,* to the cylinder head. Then take out the cap screws that secure the pump body (15) to the engine block. The entire assembly can then be lifted out from the upper left-hand side of the tractor.



ILLUST. 2

Cross Section of the Assembled Water Pump.

9--Gasket; 10--Shaft and Impeller; 11--Thrust Bushing; 12--Sleeve; 13--Thrust Bushing; 14--Packing; 15--Pump Body; 19--Felt Washer; 20--Rear Oil Seal; 21--Bearing; 22--Spacer; 23--Fan Pulley Hub; 24--Pulley Flange; 26--Front Oil Seal; 28--Retainer; 29--Lock Sleeve; 30--Clamp Nut; 31--Packing Gland; 35--Pump Driver; 36--Driver Pin; 37--Set Screw.

DISASSEMBLY OF THE WATER PUMP

The thermostat housing (1) can be separated from the water outlet elbow (4) by taking out the cap screws. The thermostat (2) can then be removed from the thermostat housing.

Now remove the hose (7) from the outlet elbow and body (15). Then run out the packing gland (31) and the clamp nut (30). Pull out the impeller (10).

The bearing retainer (28), gasket (27), front oil seal (26), and sleeve (29) are then free. The oil seal can be removed from the retainer.

The bearing (21) and hub (23) will be freed when the body (15) is held and the hub is pulled toward the fan end. The bearing (21), oil seal (20), and the spacer (22) may come off with the hub.

Now press the sleeve (12) toward the body (15). This will free the sleeve from the body and also the bearing (22), the bearing spacer (22) and the oil seal (20) from the sleeve if they were not removed in the previous step. The felt washer (19) may now be lifted out of the body (15).

REPAIR OF THE WATER PUMP

The bushings (11) and (13) are furnished reamed to size and need only be pressed in place. The impeller shaft diameter is .6215 inch to .6220 inch. The running clearance is .0025 inch to .0035 inch.

REASSEMBLY OF THE WATER PUMP

The first step in reassembling the water pump is to press bushings (11) and (13) into the sleeve (12); then press the sleeve into the pump body (15). The bushing (13) must be inserted from the front end of the sleeve.

REPAIR SECTION

COOLING SYSTEM - Continued

REASSEMBLY OF THE WATER PUMP - Continued

Then place a new washer (19) slightly oil soaked, into the body (15).

Force the bearing (21) into the hub (23) with the adjustable flange (24) already assembled. Assemble the rear oil seal (20) to the body (15) with the leather lip facing forward. The end of the seal should be flush with the hub. Fill the hub with an approved grease and press the hub assembly onto the sleeve and body assembly, supporting the latter under the sleeve. Several bearing spacers (22), welded together, may be used as the pressing tool.

Then replace the bearing spacer (22) and drive the bearing (21) over the sleeve into the hub. Replace the sleeve (29). Assemble the gasket (27), the retainer (28), and the front oil seal (26) as a unit, with the leather lips of the seal facing forward. Run in nut (30) on sleeve (12).

Replace the impeller shaft (10) and then the packing (14). Care must be taken so that the outside diameter of the packing is not torn when passing through the inside diameter of the threads in the sleeve. Run in the packing gland (31) until it contacts the packing. Further tightening of this nut may be necessary after the assembly is on the tractor to prevent leaking. Tighten it only sufficiently to stop the leaking.

Replace the thermostat (2) in the thermostat housing (1), and secure the thermostat housing with gasket (3) to the water outlet elbow (4) with the cap screws. Then replace the hose (7) on the outlet elbow and the body (15).

REPLACEMENT OF THE WATER PUMP

The water pump can be replaced in the reverse order of removal. Be sure to use new gaskets (3), (5), and (9).

RADIATOR

REMOVAL OF THE RADIATOR

The water must be drained from the system before removing the radiator. Then remove the engine top sheet and cap screws that secure the radiator guard. Take out the cap screws that secure the lower water tank (20), *Illust. 3,* to each side panel. Then run out the cap screws from both the inlet pipe (10) and the outlet elbow (25). The radiator assembly can then be lifted out of the tractor.

DISASSEMBLY OF THE RADIATOR

The radiator can be disassembled by running out the cap screws around the outside of the fan housing sheets (18) and (19). Then run out the cap screws around the outer edge of the radiator grille. The top and bottom water tanks (27) and (20) are freed by taking out the cap screws around the top and bottom of the core. The core spacers (22) and (28) are then freed from the core (3) by taking out the cap screws.

REASSEMBLY OF THE RADIATOR

Reassembly of the radiator is the reverse of disassembly.

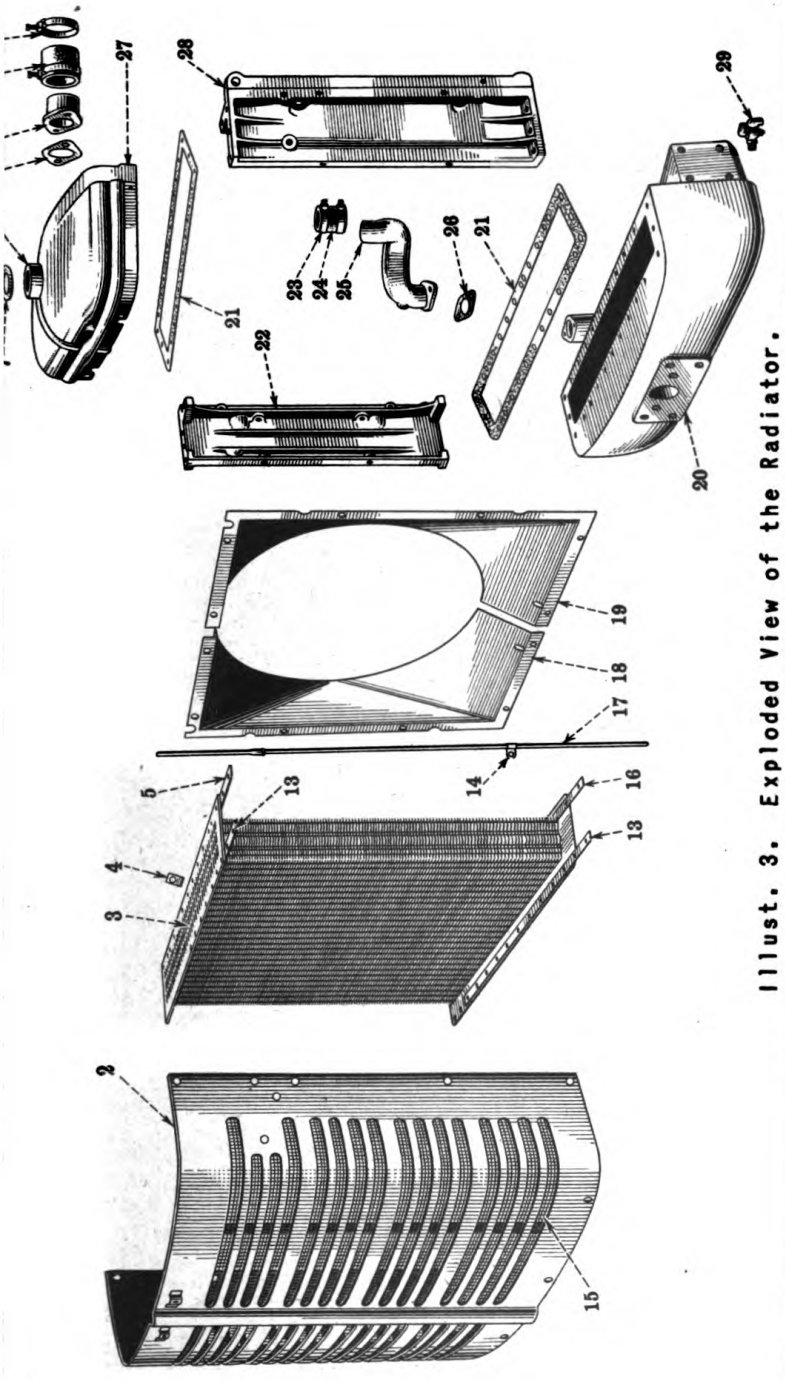
REPLACEMENT OF THE RADIATOR

Replacement of the radiator on the tractor is reverse of removal from the tractor.

REPAIR SECTION

COOLING SYSTEM - Continued

RADIATOR AND CONNECTIONS



Illust. 3. Exploded View of the Radiator.

Ref. No.	Description
2	Grille.
3	Core.
4	Overflow pipe gasket.
5	Core stiffener, upper, rear.
6	Cap.
7	Gasket.
8	Radiator filler neck.
9	Gasket.
10	Inlet pipe.
11	Hose.
12	Hose clamp.
13	Core stiffener, front.
14	Clip.
15	Grille screen.
16	Core stiffener, lower, rear.
17	Overflow pipe.
18	Fan housing sheet, right hand.
19	Fan housing sheet, left hand.
20	Lower water tank.
21	Gasket.
22	Spacer, right hand.
23	Hose clamp.
24	Hose.
25	Outlet elbow.
26	Gasket.
27	Upper water tank.
28	Spacer, left hand.
29	Drain cock

REPAIR SECTION

MEMORANDA

REPAIR SECTION

ELECTRICAL SYSTEM

IGNITION SYSTEM

Magneto Type	International Harvester H-4
Rotation	Counterclockwise
Magneto Grounding Switch	Push Button on Dash
Breaker Point Gap	.013"
Spark Advance	35°
Impulse Coupling Advance	T.D.C.
Magneto Gear, Helical	27 Teeth
Drive	Camshaft
Spark Plug Size	7/8" - 18, 15/16" hex.
Spark Plug Gap	.020" to .025"
Firing Order	1-3-4-2

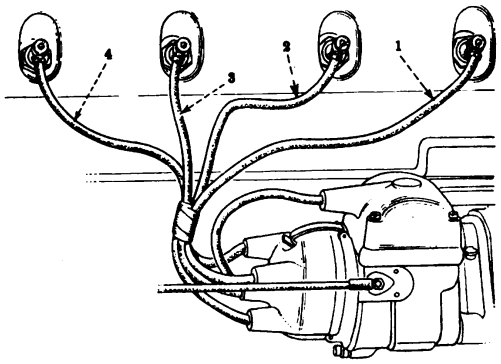
MAGNETO

The magneto is driven through the impulse coupling which has a 150 R.P.M. missing speed. Throwout speed is 240 to 330 R.P.M.

The magneto, *Illust. 1*, has a completely enclosed breaker chamber, a starting impulse coupling, and an Alnico rotor magnet that should never require re-magnetizing. The exterior is extremely clean and all possible dirt-catching points have been eliminated. The flange is mounted to a drive bracket which is connected to the front plate of the engine. All shimming and lining up of various bolt holes when coupling the magneto to the engine is eliminated. Fine adjustment of timing is accomplished by rotating the magneto in slotted holes in flanges of the bracket and magneto.

Designed for operation with 4-cylinder engines, the entire mechanism is fully enclosed and protected against entrance of dirt, dust and moisture. The condenser and coil are located underneath a plastic cover. The magnet is the rotating type, revolving between ends of pole pieces. Near the end of the magnet rotor shaft is the cam which operates the breaker mechanism. The breaker mechanism is sealed from the coil and distributor compartment. The flat on the extreme end of the magnet rotor shaft drives reduction gears which drive the distributor arm. The distributor cap fits only one way and the No. 1 leadout is plainly marked.

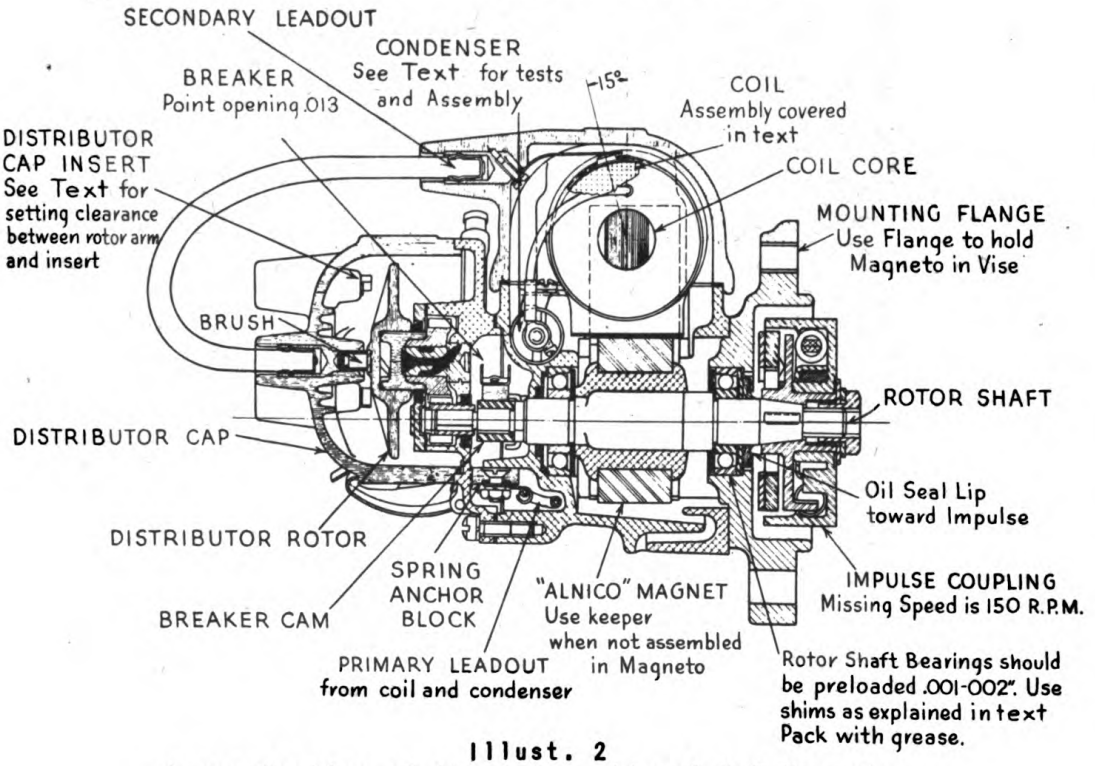
The serial number is stamped on the magneto frame and will identify the magneto and give all necessary information about it.



Illust. 1
Magneto Mounted on the Engine with wires connected. Engine firing order is 1,3,4,2.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued



Illust. 2
Cross Section of the International H-4 Magneto.

REMOVAL OF THE MAGNETO

To remove the magneto, take off the switch cable by removing the fillister head screw and lock washer attaching the wire to the magneto. Pull the spark plug wires from the distributor insert sockets.

The magneto with impulse coupling and gasket are freed after removing the cap screws that secure the magneto to the bracket.

The bracket with the magneto drive can be taken off by running out four 3/8 inch x 1-1/2 inch cap screws that secure it to the front plate.

REPLACEMENT OF THE BRACKET

To replace the bracket on the tractor, secure the bracket assembly with a gasket to the front plate with four 3/8 inch x 1-1/2 inch cap screws. The double punch mark on the magneto gear should match the double punch mark on the camshaft gear. To see the timing marks, the crankcase front cover must be removed when replacing this bracket.

REPLACEMENT OF THE MAGNETO

Replacement of the magneto is described in the *"Operations Section"*. Replace the spark plug wires. Replace the switch cable by using a screw with lock washer.

DISASSEMBLY OF THE BRACKET

Removal can be accomplished as described above.

Bend back the nut lock (10) and run off nut (11), *Illust. 3*, as the first step in disassembling the bracket.

Then, by pressing the drive shaft (6) out of the bracket the gear (9) will be freed. The gear may also be pulled from the shaft.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

REPAIR OF THE BRACKET

The bushing in the bracket is replaceable, steel-back babbitt. When replacing the bushing, the 9/16 inch holes should be assembled to the front end of the bracket and arranged vertically to coincide with a similar opening in the bracket. The four 3/16 inch holes are then toward the magneto end. The end of the bushing should be flush with the front face of the bracket.

The shaft diameter is .9995 inch to 1.0005 inch and the bushings should be reamed to 1.0015 inch to 1.0030 inch. Replacement bushings should have a running clearance of .001 inch to .003 inch. Particular care must be taken while reaming this hole to have the bore square with the mounting face within .002 inch; if not, the gear will run out, causing a noisy timing gear train.

End clearance of the shaft and gear assembly is .003 inch to .013 inch.

REASSEMBLY OF THE BRACKET

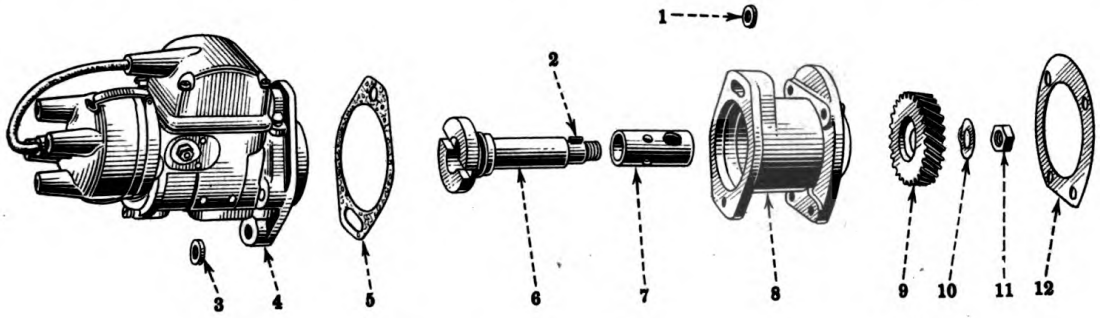
When reassembling, place the drive shaft (6), *Illust. 3*, in the bracket and assemble the key (2).

Press the gear on the shaft and secure it with nut (11) and lock washer (10). The flat side of the gear is assembled against the bracket for end-thrust contact. Check the face of the gear to make sure it runs true with the front surface of the bracket.

Replacement is accomplished as outlined above.

IMPULSE COUPLING

The first purpose of the impulse coupling is to retard the spark at low engine speeds to approximately top dead center of the piston stroke, thereby preventing the engine from back-firing. Secondly, as the magneto member (7), *Illust. 6*, is retarded by the pawls (1), *Illust. 7*, (at low speeds these pawls are stopped by pawl stop pin (7), *(Illust. 24)*, the lug (3) on the magneto member



Illust. 3
Exploded View of the Magneto Bracket Assembly.

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
1	Washer.	5	Gasket.	9	Gear.
2	Key.	6	Shaft.	10	Nut lock.
3	Washer.	7	Bushing.	11	Hex. jam nut.
4	Magneto.	8	Bracket.	12	Gasket.

REPAIR SECTION

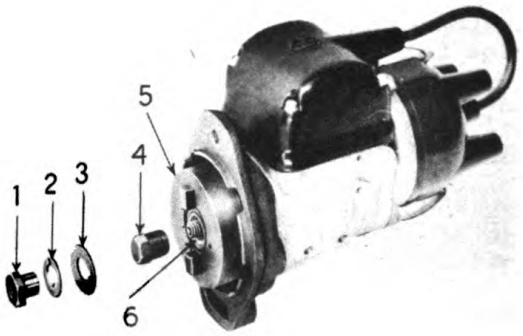
ELECTRICAL SYSTEM - Continued

IMPULSE COUPLING - Continued

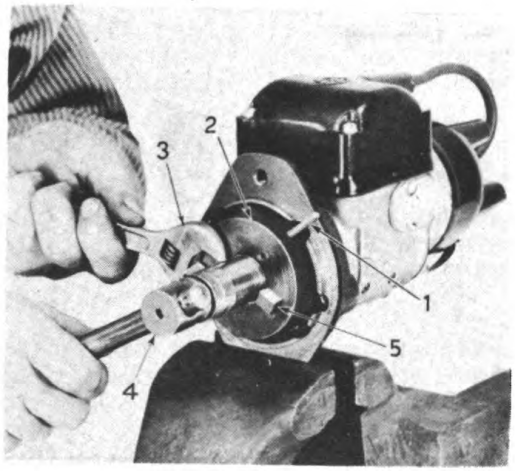
(7) compresses the impulse spring (1), *Illust. 6*. The lugs on driver (6) which continues to rotate at constant speed, trip the pawls (forces them away from the pawl pin) and the magneto member (keyed to the magneto rotor) is forced to rotate by the compressed spring at a greater speed than that of the drive member (6). The increased speed of the rotor provides a much hotter spark to the engine than would be provided by a direct drive to the magneto.

As the speed of the engine increases, the weighted ends (2) of the pawls (1), *Illust. 7*, are thrown out by centrifugal force and their short ends no longer engage the pawl pin in the mounting flange. The spark is no longer retarded. The missing speed, approximately 150 R.P.M., is the speed at which the impulse coupling no longer continually retards the spark. At this speed it retards the spark intermittently only. Over the range of the throwout speed, 240 to 330 R.P.M., the impulse coupling should cease to function completely, giving the effect of a direct drive.

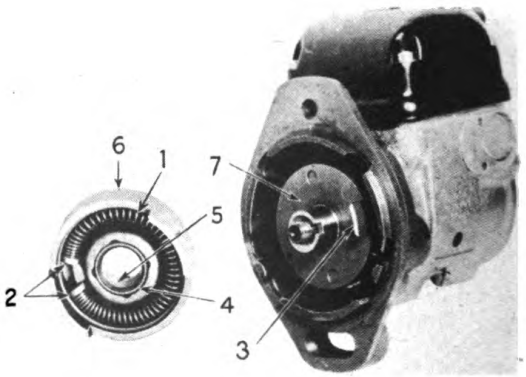
The engine should never be allowed to idle slowly enough to permit the impulse coupling to operate.



Illust. 5
Removing Impulse Coupling. 1--Impulse nut; 2--Lock washer; 3--Washer; 4--Service tool SE-912; 5--Impulse drive member; 6--Thread on inside of magneto member.



Illust. 4
Correct Method of Removing Impulse Coupling Nut. 1--Pin connecting hole in impulse driving member and lug of magneto member; 2--Impulse driving member; 3--Adjustable wrench; 4--Socket wrench; 5--Lug on impulse driving member.



Illust. 6
Impulse Coupling Removed. 1--Impulse spring; 2--Impulse spring button; 3--Lug on magneto member, 4--Felt retainer; 5--Drive member hub; 6--Impulse drive member; 7--Impulse magneto member.

ELECTRICAL SYSTEM - Continued

Impulse Coupling - Continued

Its operation is denoted by a sharp click.

To remove the impulse coupling, insert a nail or pin through hole (1), *Illust. 4,* in the coupling drive member (2), locking the two elements together.

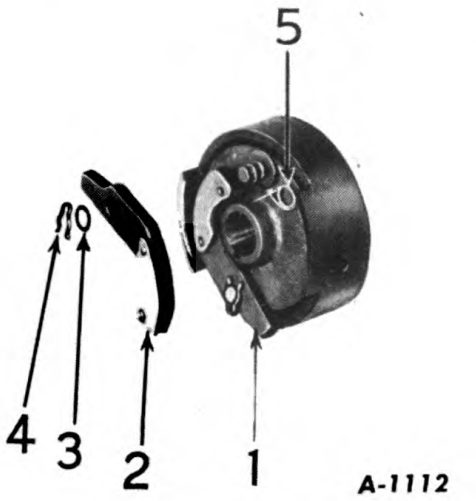
Apply a socket wrench to the nut and a wrench to one of the driving lugs (5) to prevent shearing the nail or pin while removing the nut.

The impulse coupling can now be removed with service tool SE-912 (4), *Illust. 5,* which screws into a thread provided inside the magneto member (6). As the tool is turned in, the inside end contacts the rotor shaft and forces the member off the shaft.

The impulse coupling drive member (6) with impulse coupling spring (1) can readily be removed as shown in *Illust. 6.* The impulse coupling spring (1) should seldom need to be removed from the driving member, but should it be necessary to remove the spring it can readily be pried out of place.

To replace this spring, just compress it sufficiently to fit into the drive member as shown. Before assembling the impulse coupling member (6) with the magneto member (7), soak the wick inside the impulse coupling spring with light oil. Also coat inside hub (5) of the driving member with magneto grease. The lug (3) should be a tight fit between the hardened button (2) on each end of the impulse coupling spring. If the buttons (2) should become worn or grooved, renew them.

The impulse pawl (1), *Illust. 7,* can be taken off after removing the retaining snap ring (4) and washer (3). The impulse pawl springs (5) can then be replaced. Use a small amount of grease on the pawl pivot and replace the springs, pawls, washers, and snap



Illust. 7
Impulse Coupling Complete, Showing Rear Side of Magneto Member with Impulse Pawl Removed. 1. Impulse pawl; 2. Counterweight; 3. Washer; 4. Retaining snap ring; 5. Impulse pawl spring.

rings. The pawls should move freely on their pivots.

When replacing drive member (6), *Illust. 6,* be sure lug (3) of magneto member (7) fits between spring buttons (2).

Place a small amount of magneto grease on the pawl pin (7), *Illust. 24* when replacing.

Press the assembled impulse coupling on the rotor shaft. Make sure that the keyway in the magneto member (7), *Illust. 6,* engages the key in the magneto rotor shaft.

Replace the washer (3), *Illust. 5,* and lock washer (2) which fits in one position only. Tighten impulse nut (1) the same way it was removed.

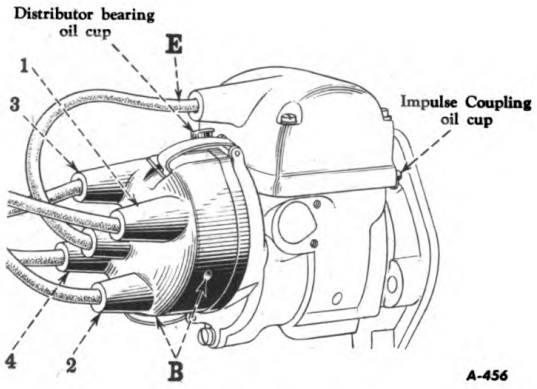
REPAIR SECTION

ELECTRICAL SYSTEM - Continued

DISTRIBUTOR CAP

The lead wire from the secondary coil (E), *Illust. 8,* plugs into the central insert socket and the cables to the spark plugs fit in the outside sockets, starting with No. 1, marked on the face of the cap. Pull out the cables and secondary wire from the distributor cap.

To remove the distributor cap, push the distributor cap springs out of the cap recesses and pull off the cap which fits only one way.



Illust. 8
Order of Connecting Spark Plug Wires in the Sockets of the Distributor Cap on the Counterclockwise Rotation.

The carbon brush (4), *Illust. 9,* in the central socket contacts the monel metal strip (2) of the distributor rotor (1). The brush, which is attached to a spring, should move freely in the socket. The brush (4) and spring can be pulled out of the socket if replacement is necessary.

If the four inserts (3) are badly worn, the cap should be replaced.

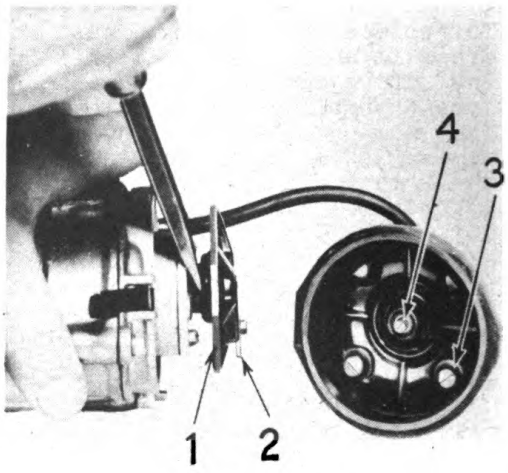
All grease should be removed from the monel strip on the distributor rotor to assure good contact.

The distributor cap should be free from dust or dirt, inside and out, before assembling to the magneto. The two ventilating holes (B), *Illust. 8,* should be open at all times.

Check thoroughly for cracks in the bakelite around the spark cable and secondary insert sockets. Very small cracks will allow a spark to go through the cap and partially short-out the engine.

For adjustment of the distributor rotor arm with respect to the inserts (3), *Illust. 9,* refer to *Illusts. 10 and 11* and the text on the distributor rotor.

The cap fits only one way; the ventilating holes (B), *Illust. 8,* are always on the bottom side. Snap the body springs into the distributor cap recesses, replace the secondary wire and connect up the spark cables.



Illust. 9
Method of Removing Distributor Rotor from its Spindle. 1--Distributor Rotor; 2--Monel Distributor Arm; 3--Distributor Cap Inserts; 4--Secondary Carbon Brush.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

DISTRIBUTOR ROTOR

In removing this part, first take off the distributor cap. Apply the end of a screwdriver against the hub of the rotor and pry off as shown in *Illust. 9.* The bakelite rotor is fragile and should be handled with care.

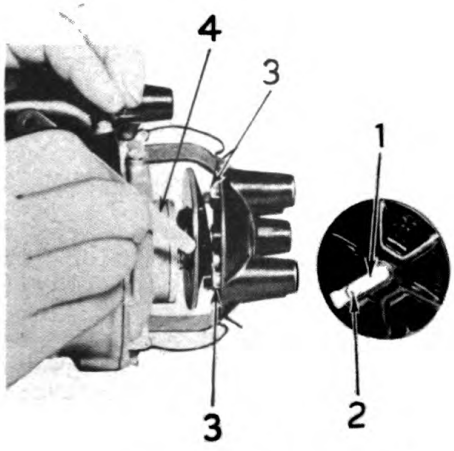
The monel metal arm (1), *Illust. 10,* on the distributor rotor is adjustable and renewable. It is removed by running out the arm nut (2).

The arm (1) should operate as close to the insert in the distributor cap as possible without rubbing. *(Refer to Illusts. 10 and 11.)* To correctly adjust the distributor arm, a cap may be taken from stock and cut away as shown in *Illust. 10.* Then, by using a feeler gage, the distance between the distributor arm and insert in the distributor cap can be checked. The arm can be adjusted slightly to gain the desired clearance.

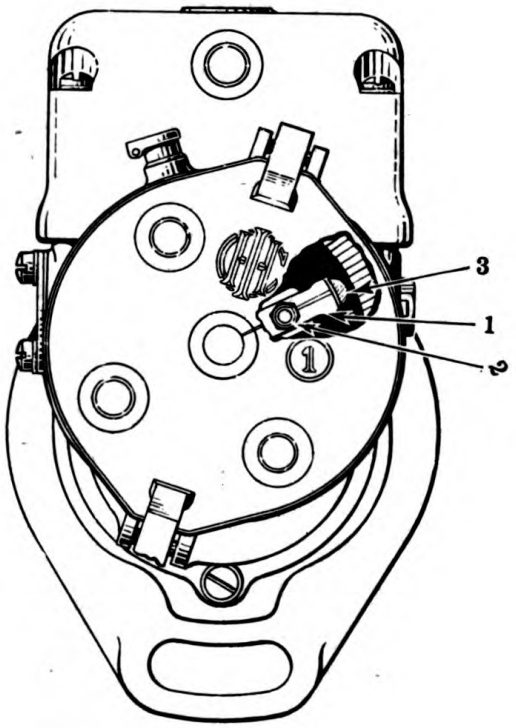
Another method is to apply a little Prussian blue to the end of the distributor arm, then place the distributor cap on the magneto. Next, turn the magneto rotor over several times by hand. If the limits between the distributor arm and caps are close, a small amount of bluing will be transferred to the distributor cap insert. A very slight coating should show on the insert without any actual rubbing occurring.

To adjust the rotor arm, loosen the nut (2), *Illust. 10,* and move the arm to the point where the outside end just clears the vertical portion of the distributor cap inserts (3).

When replacing the rotor, be sure that the key (1), *Illust. 12,* on the inside of the rotor (2) coincides with the slot (3) on the



Illust. 10
Checking Clearance between Distributor Rotor Metal Arm and the Insert in Distributor Cap Using a Cutaway Cap. 1--Monel metal arm; 2--Arm nut; 3--Distributor cap insert; 4--Feeler gauge.

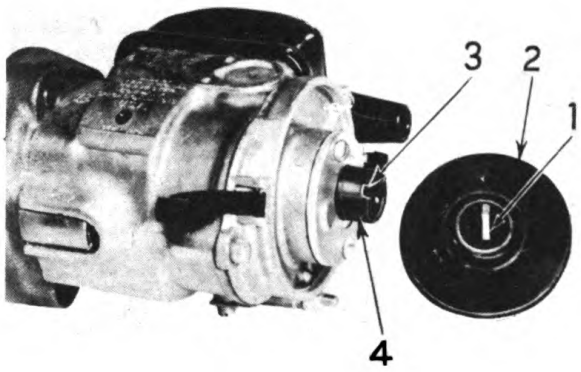


Illust. 11
Loosen nut (2) to adjust distributor rotor arm (1) as close to all four distributor cap inserts (3) as possible without actually rubbing.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

DISTRIBUTOR ROTOR - Continued



Illust. 12
Distributor Rotor Removed Showing Key and Keyway for Locking in Position. 1--Rotor key; 2--Rotor; 3--Distributor spindle keyway; 4--Distributor spindle.

end of the distributor gear spindle (4). To assist in lining up the key with the slot, use the rib which is opposite the monel metal arm on the opposite side of the rotor as a guide, the rib being in line with the key. Be sure that the rotor is pressed on as far as it will go because there is a possibility of entrapped air preventing the rotor from being pushed all the way down on the hub of the distributor gear. The rotor should have a heavy hand-press fit on the distributor spindle.

Replace the distributor cap, spark plug cables, and secondary cable.

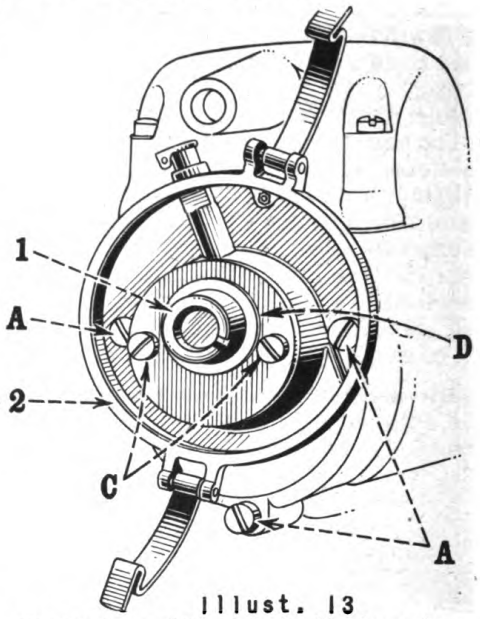
DISTRIBUTOR BODY

REMOVAL AND REPLACEMENT

The distributor body is removed to make the breaker points accessible. This can be done by removing the three cap screws "A", *Illust. 13,* and lifting the complete body (2) from the magneto frame.

After servicing the breaker points, be careful that the flat spot on the rotor shaft (6), *Illust. 14,* lines up with the flat spot on the pinion hub (5) in the distributor body (4). Also be sure to withdraw the spring anchor block (1) slightly so that the pad (2) will push it into place when the body (4) is reassembled to the magneto frame.

Secure the body (4), *Illust. 14,* with the gasket, to the magneto frame with the three cap screws and lock washers when reassembling. The body and gasket fit in one position only.



Illust. 13
Magneto with Distributor Cap and Rotor Removed. 1--Rotor spindle; 2--Distributor body.

DISASSEMBLY AND REASSEMBLY

The distributor gears are contained in a chamber which is a part of the distributor body (2), *Illust. 13.* This chamber is partially filled with magneto grease and sealed with felt washers around the hub of the gears. These seals and the consistency of the grease should prevent any possibility of the grease working out of the chamber.

By removing two screws (C), *Illust. 13,* the cover (2), *Illust. 15,* and gasket come off.

The distributor pinion (5), and the distributor spindle (9) can be lifted out.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

DISASSEMBLY AND REASSEMBLY - Continued

The felt oil seal (3) in the distributor body, *Illust. 14,* may be replaced by driving out the old retainer. Before replacing the retainer and felt, clean out the hole with a metal cutting tool such as a bearing scraping tool. Replace the felt and retainer and lock the new retainer in place by very lightly crimping over the edge of the body with a center punch. The thrust surface of the retainer should be flat. Do not soak the new seal in oil. After assembly, coat it lightly with magneto grease.

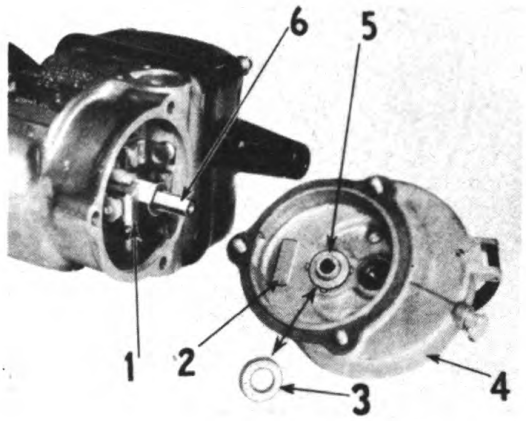
Replace the distributor gear spindle (9), *Illust. 15,* on the shaft (7). It should turn freely on the shaft.

Replace the pinion (5), *Illust. 15,* and check the backlash with the gear (6). A slight movement should be felt (approximately .002 inch to .004 inch).

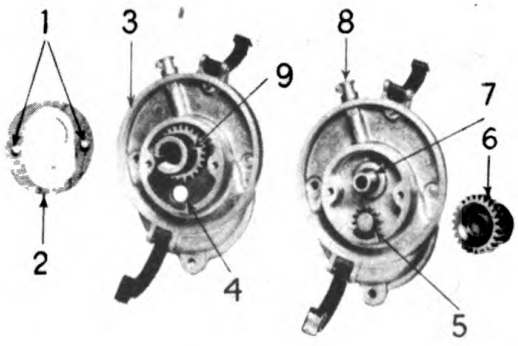
Take off the distributor spindle (9) and fill the bore with magneto grease. Press the distributor gear spindle onto the shaft (7). As the teeth come in contact, time the distributor spindle by meshing the rotor pinion (5) and the distributor gear so that the marked tooth on the pinion (5) is in line with the "L" marking (a counterclockwise magneto) on the gear as shown in *Illust. 16.* This is a very important operation.

Partially fill the remaining chamber with magneto grease. Replace the cover (2) with the gasket and secure with two screws. The distributor body can now be replaced as previously outlined.

Replace the distributor rotor as directed under that section and secure the distributor cap. Refer to the *"Operations Section"* for timing where the gear housing is removed while the magneto is on the engine.



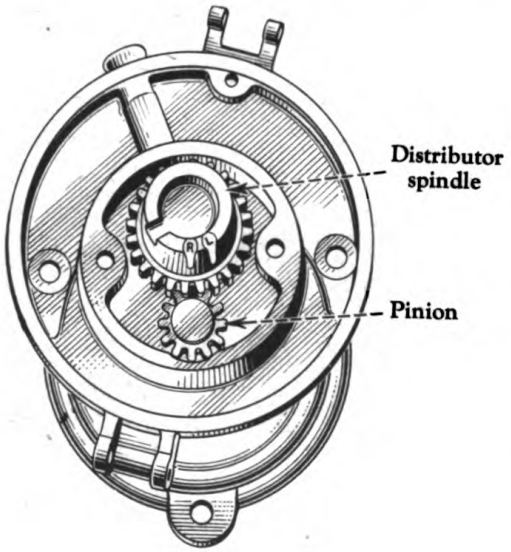
Illust. 14
Magneto with Distributor Body Removed. 1--Spring anchor block; 2--Distributor pad; 3--Distributor pinion oil seal; 4--Distributor body; 5--Distributor pinion hub; 6--Flat on end of rotor shaft.



Illust. 15
Distributor Gear Assembly. 1--Cap screws (2) in cover; 2--Gear chamber cover; 3--Gear body; 4--Bore for distributor pinion shaft; 5--Distributor pinion; 6--Distributor gear; 7--Distributor shaft; 8--Distributor bearing oil cup; 9--Distributor spindle.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued



Illust. 16
Timing Marks on Magneto Distributor Spindle and Pinion. "L"--Counterclockwise Magneto.

BREAKER POINTS

The entire breaker mechanism for the magneto is in its own separate, internal compartment, thoroughly sealed against dirt and moisture. This makes it possible to thoroughly grease the mechanism without grit working into the lubricant causing an abrasive action on working parts.

Remove the distributor cap, distributor rotor (1), *Illust. 9*, and the distributor body (4), *Illust. 14*.

Now the breaker arm assembly (6) and spring anchor block (5), *Illust. 17*, can readily be inspected and removed for any reworking required.

The spring anchor block (5) can be removed by unscrewing the nut that secures it to the breaker arm and primary lead-out wire spring anchor terminal (2), *Illust. 21*.

The stationary point (1), *Illust. 17*, can be removed by running out one screw.

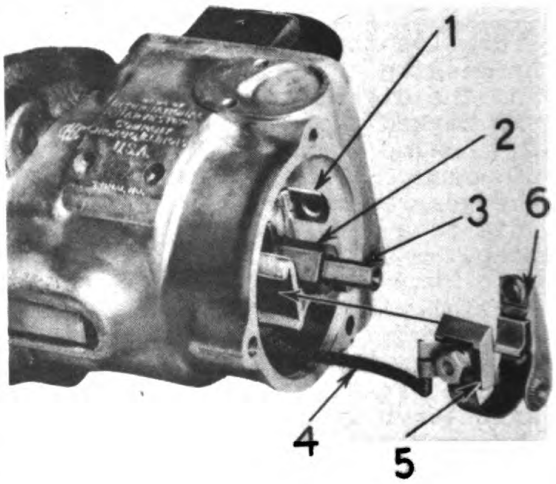
If the rubbing block (2), *Illust. 18*, is worn, use a new breaker arm (3).

To replace the primary wire in the magneto frame, see instructions under that heading following.

Examine the inside of the breaker housing for oiliness or grease. If oil has been leaking into the breaker housing, the grease being used in the distributor gear case is too thin.

Another possibility is that excessive lubricant is being injected into the distributor gear oil cup, or that the felt seal (3), *Illust. 14*, is not functioning properly. The replacement of the felt seal is covered under the *"Distributor Body"* heading.

Remember that a dirty or oily breaker chamber means excessive breaker point wear. Keep the breaker chamber clean at all times.



Illust. 17
Magneto with Breaker Arm Removed. 1--Stationary point; 2--Breaker cam; 3--"D" shaped end of rotor shaft; 4--Primary lead-out wire; 5--Spring anchor block; 6--Breaker arm assembly.

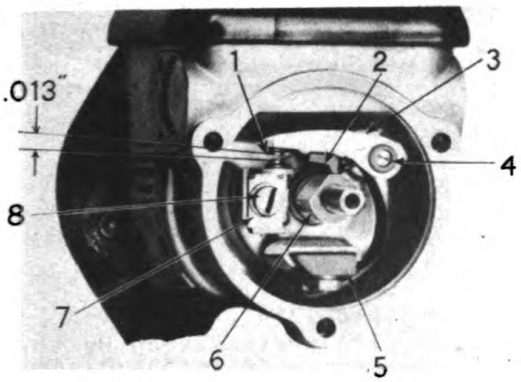
REPAIR SECTION

ELECTRICAL SYSTEM - Continued

BREAKER POINTS - Continued

Before reassembling, thoroughly clean all parts to remove dirt and grease.

Apply a light coating of magneto grease to the breaker cam to prevent rusting.



Illust. 18
End View of Breaker Mechanism. 1--Point opening; 2--Rubbing block; 3--Breaker assembly; 4--Breaker arm pivot recess (fill with magneto grease). 5--Spring anchor block; 6--Breaker cam; 7--Stationary point; 8--Adjusting screw.

Reinstall the fixed breaker point (7), *Illust. 18,* leaving the screw (8) slightly loose until the point opening is adjusted.

Secure the anchor block and spring anchor terminal (2), *Illust. 21,* to the breaker arm when assembling the breaker arm to the magneto. Do not flatten the spring terminal (2) and be careful that it does not touch any part of the magneto frame.

When reinstalling the anchor block (5), *Illust. 18,* do not push it tight against the magneto body frame, but allow it to stick out far enough so that it is pushed into place by the distributor pad (2) onto the distributor body (4), *Illust. 14.* For proper adjustment and timing see the *"Operations Section".*

Replace the body gasket and body and secure it with three screws as outlined under the *"Distributor Body"* heading.

Replace the distributor rotor and distributor cap.

BREAKER ARM CAM

The breaker arm cam (2), *Illust. 17,* should last indefinitely if it is properly lubricated. If the cam should become worn, it is designed so that it can be replaced. The cam is a press fit on the shaft and fits in only one way.

CONDENSER

To remove the condenser (3), *Illusts. 19 and 20,* with the coil in place, bend lock (7) away from the flat on the condenser terminal screw (8). The screw can then be removed with the lock and outer bakelite washer (6).

Remove the coil cover; run out four screws.

Remove screw (2) which holds the condenser clamp.

Remove the flat plate (11) which is held by two screws. Push the condenser back into the frame and remove the inner washer (5) and two primary wires (9), from the condenser terminal. The primary wire from the breaker arm to the condenser is shown in *Illust. 21,* Item (1).

Push the condenser out through the hole in the side of the magneto.

The condenser can be tested with the conventional equipment. Neon condenser tester set for 200 volts will give a satisfactory test.

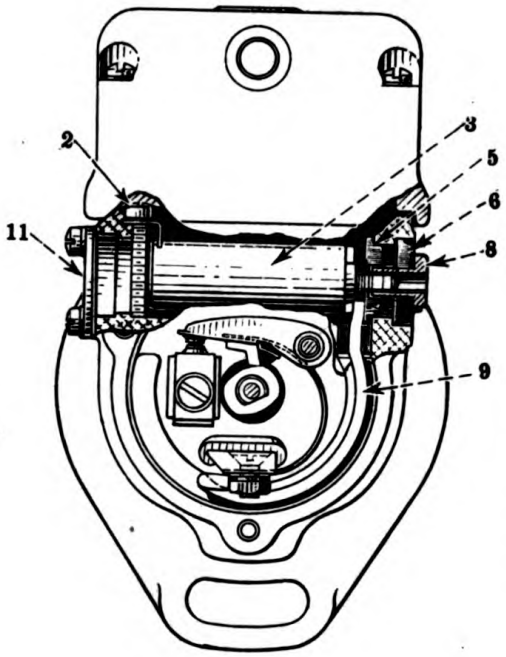
Replace the inner bakelite washer (5), *Illust. 19,* first.

Line up the terminals of the primary wires and insert the condenser.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

CONDENSER - Continued

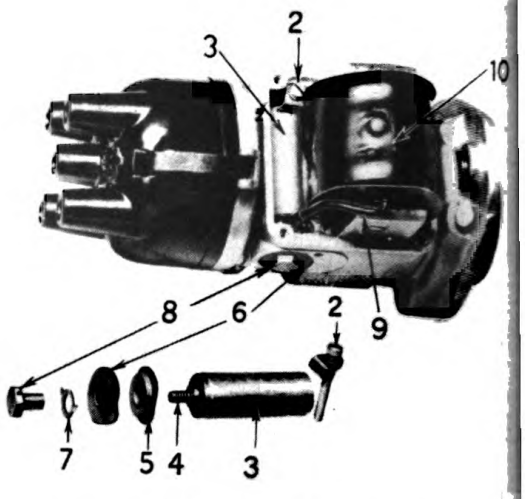


Illust. 19
Cross Section View of Condenser Assembly. 2--Condenser clamp and screw; 3--Condenser; 5--Inner bakelite washer; 6--Outer bakelite washer; 8--Terminal screw; 9--Condenser primary wire; 11--Condenser hole cover plate.

Replace the outer bakelite washer (6) and secure the condenser (3) in position with a nut lock and terminal screw (8). When tightening the condenser terminal (8) there is a possibility of breaking the bakelite washer (6) or breaking the condenser terminal (4). Do not apply too much pressure to the wrench when tightening the screw.

Secure the condenser clamp and screw (2).

Secure the condenser hole plate and gasket (11) with cap screws and washers.



Illust. 20
Magneto with Coil Cover Removed Showing Parts Making Up the Condenser Assembly. 2--Condenser clamp and screw; 3--Condenser; 4--Condenser terminal; 5--Inner bakelite washer; 6--Outer bakelite washer; 7--Condenser terminal lock; 8--Terminal screw; 9--Primary lead-out wire; 10--Coil.

Replace the coil cover and gasket and secure them with four screws.

PRIMARY WIRE

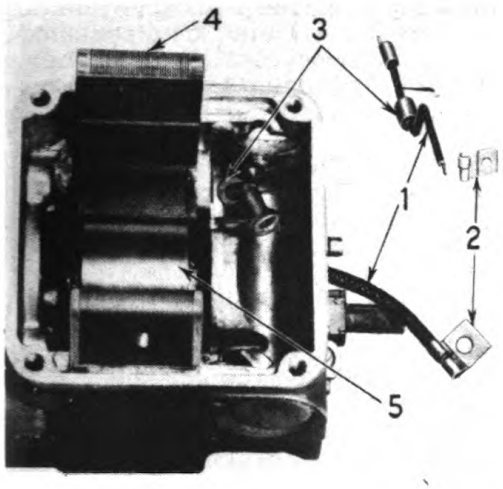
The primary wire (1), *Illust. 21*, connecting the breaker-arm assembly to the condenser terminal should be a tight fit in the rubber grommet (3). This grommet should be a tight fit in the magneto frame. The primary wire and the grommet should make an air-tight job in the magneto frame.

To remove the primary wire (1), the spring anchor terminal (2) must first be unsoldered (assuming the coil cover, distributor cap, rotor and body are removed). Then pull the terminal wire out from the top of the magneto. In reassembling the primary wires, reverse the above procedure. The primary wires to both the coil and condenser should be pulled tightly when the condenser is assembled.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

PRIMARY WIRE - Continued



Illust. 21
Location and Assembly of Primary Wire. 1--Primary wire; 2--Spring anchor terminal; 3--Rubber grommet; 4--Coil inter pole; 5--Rotor magnet bridging air gap.

COIL AND COIL COVER

The coils are marked as to the month and year of their manufacture. For instance, a mark 1-42, means that the coil was built in January, 1942.

Remove the coil cover and gasket by taking out four screws. Screws will be retained in the cover if they are unscrewed only from the magneto frame.

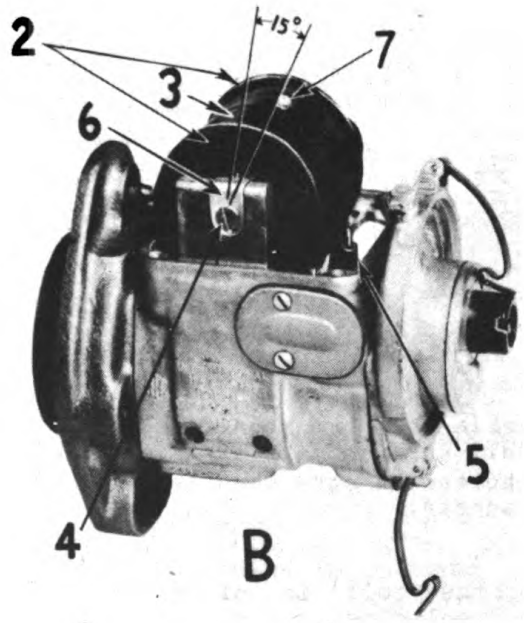
Remove the primary lead-out wire (9) *Illust. 20,* from the condenser terminal by following the same procedure as outlined for removing the condenser.

Illust. 22 shows the magneto with the coil cover removed; it shows the coil strip (6) attached under the countersunk screw (4). Remove the two screws (4) from each end of the coil core. The coil may then be taken out.

IMPORTANT: Before lifting the coil out, turn the magnet to the neutral position or so the pole of the magnet bridges the air gap between the end of the coil pole pieces as shown with arrow (5), *Illust. 21.*

The coil can be tested with conventional equipment.

Inspect the end insulators (2), *Illust. 22* of the coil. If they are damaged they should be renewed.



Illust. 22
Coil Mounting in Magneto. 2--Coil insulators; 3--Coil; 4--Coil core holding screw, countersunk; 5--Condenser to breaker wire; 6--Coil grounding strip; 7--Secondary lead-out terminal.

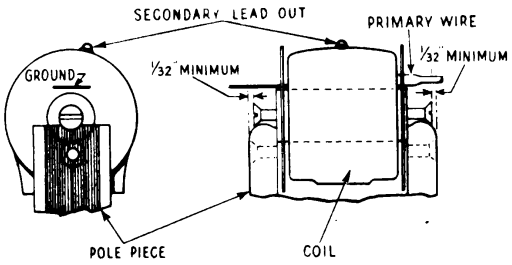
Test the length of the coil-core mounting screw (4) by bottoming the screws lightly in the coil core and pressing the assembly into position as shown in *Illust. 23.* The mounting screws are 5/8 inch long. If either screw head does not fall back of the face of the pole piece by 1/32 inch as shown, it must be removed and enough cut off the threaded end to meet this requirement. When the coil core is in place, the screws will then tighten up in the countersunk hole of the pole piece before the screws bottom in the coil core.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

COIL AND COIL COVER - Continued

CAUTION: Do not file or otherwise deface the ends of the coil core or the face of the pole pieces as this will impair the magnetic circuit and efficiency of the magneto. The coil core should be a tight hand-press fit between the pole pieces.



Illust. 23
Assemble Coil Core Mounting Screws to Coil Core to make sure they do not bottom in core when assembled in Magneto.

Press the coil in place first when replacing. The secondary lead-out terminal (7), *Illust. 22*, should be at an angle of 15° with the center line of the coil. The reason for so positioning the coil terminal is to secure a good contact with the secondary terminal outlet in the coil cover. Secure the coil-core holding screws (4) tightly in position.

Replace the condenser as outlined under that subject, being sure to attach the primary-coil lead-out to the condenser terminal.

Before replacing the coil cover, make sure that the contact points are clean and that the secondary lead-out in the coil cover bears firmly against the secondary lead-out terminal (7), *Illust. 22*. Replace the coil cover and gasket and secure it to the magneto frame with four screws.

MOUNTING FLANGE

Remove the impulse coupling as directed under that subject.

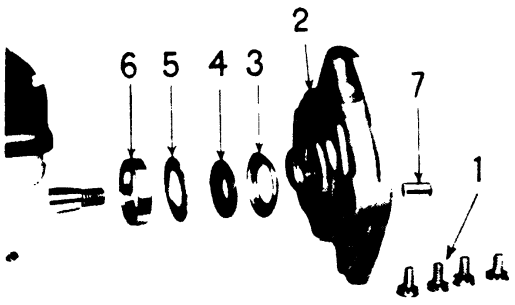
The mounting flange (2), *Illust. 24*, is attached to the magneto bracket and is held to the magneto frame with four countersunk screws and Shakeproof lock washer (1). The flange is freed by taking out these four screws.

If replacement is desired, the leather oil seal can be pushed out of the mounting flange. The outer bearing race (6) must be removed first. Place the outer retainer (3) in position with the internal taper side of the leather seal (4) facing the bearing race; the bulged side of the oil seal faces the retainer (3). Then replace the inner retainer (5) and press the bearing race (6) in position. Assemble the mounting flange to the magneto body and check the rotor shaft for end play as outlined under *"Rotor."*

After the proper adjustments have been made as directed above, replace the flange and secure with four Shakeproof lock washers and countersunk screws.

Replace the impulse coupling.

See *"Bearing Race and Oil Seals"* heading.



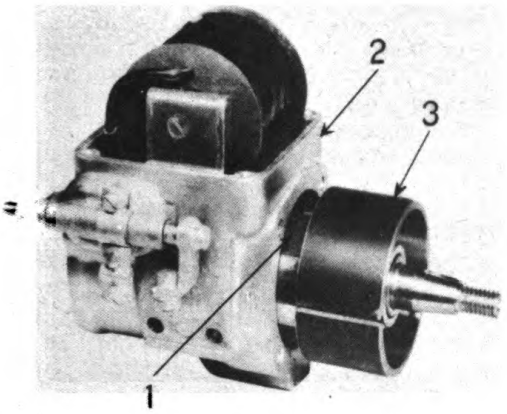
Illust. 24
Magneto with Impulse Coupling Removed, showing Mounting Flange and Rotor Bearing Parts. 1--Countersunk screws with lock washers; 2--Mounting flange; 3--Outer oil seal retainer; 4--Leather oil seal; 5--Inner oil seal retainer; 6--Outer bearing race; 7--Pawl pin.

ELECTRICAL SYSTEM - Continued

ROTOR

A feature of the magneto is the combination of the rotor and the magnet which means that the magnet is the revolving part of the magneto.

To remove the rotor and bearings, it is necessary to remove the impulse coupling and mounting flange as outlined under those subjects.



Illust. 25
Removing Magneto Rotor. Remove rotor (1) from magneto frame (2). Slide keeper No. 57314D (3) over rotor poles before rotor is completely out of frame.

Then slide the rotor magnet into a keeper (3), *Illust. 25,* as it is being removed from the magneto frame. Always have the rotor in the keeper when it is out of the magneto frame. Use extreme care to see that the rotor does not pick up dirt and metal particles. The keeper is available as a service part.

The bearing outer races (6) *Illust. 24,* can be removed and replaced with service tools as outlined under *"Mounting Flange,"* and as shown in *Illust. 29. Refer also to the heading "Bearing Race and Oil Seals."*

The inner bearing race can be readily removed from the rotor by using a puller and adapter as shown in *Illust.27.* It is necessary to remove the inner bearing race when removing or inserting rotor shims (2), *Illust. 26,* for preloading the rotor bearings.

When the bearing inner race (4) has been removed, the inner oil flinger (3) and the rotor shims are free.

Before reassembling, first read the first four paragraphs following the *"Important"* note below.

Thoroughly clean rotor and bearing parts and reassemble to the rotor approximately the same thickness of shims as was taken out. The distributor body assembly (4), *Illust. 14,* should be removed to facilitate correct adjustment of the rotor.

Replace the inner oil flinger (3) *Illust. 26.* with the upset portion toward the rotor magnet.

Press the bearing inner race (4) firmly in place and replace the bearing retainer with balls (5).

The oil seals in the magneto frame and mounting flange can be replaced as directed under *"Mounting Flange"* and *"Bearing Races and Oil Seals."*

IMPORTANT: The next instructions must now be followed carefully and completely for efficient operation of the magneto.

Thoroughly clean the rotor assembly and bearing races of the old grease and any grit. Regreasing of the bearings should not be done until they have been checked for end play.

The bearings, when assembled at the factory, are preloaded .001 inch to .002 inch. The rotor should never have any perceptible end play after it is assembled properly.

REPAIR SECTION

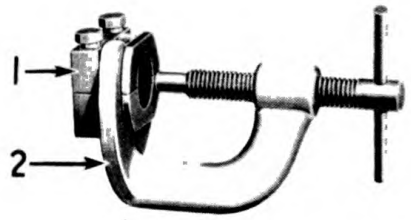
ELECTRICAL SYSTEM - Continued

ROTOR - Continued

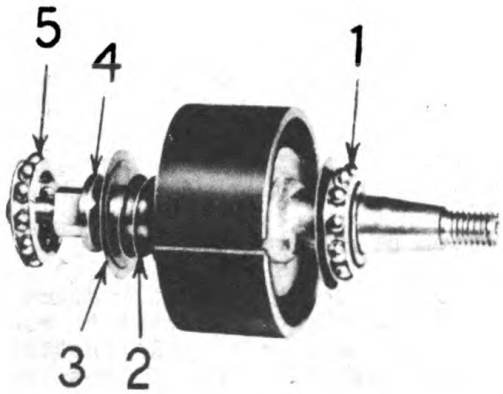
Old bearings and races should be assembled without disturbing shims (2), *Illust. 26.* Should an end play check *(Illust.28)* reveal that end play is present, no attempt should be made to preload old bearings as this will cause rapid deterioration of the bearings. The recommended procedure when end play exists on old bearings is to replace them.

The distributor body assembly (4), *Illust. 14,* should be removed to facilitate correct adjustment of the magneto rotor.

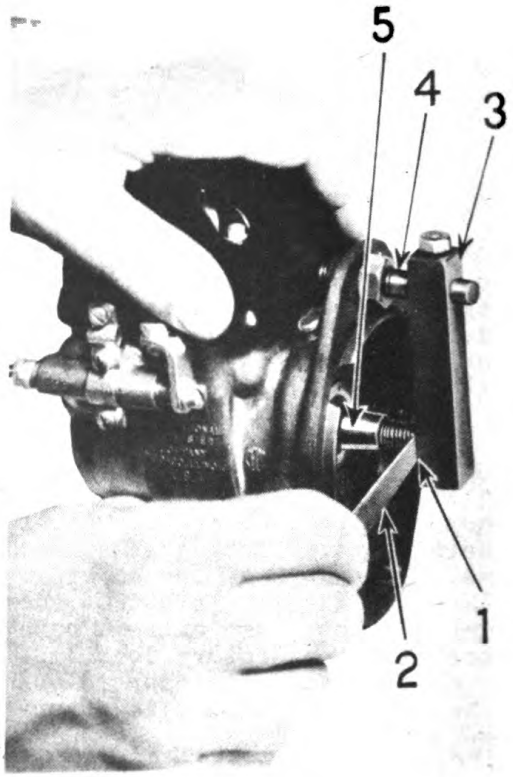
Place sufficient shims (2), *Illust. 26,* in back of the new bearing race to allow a small amount of end play in the rotor shaft after it is completely assembled with the mounting flange in place and the mounting screws (1), *Illust. 24,* tightened up (end play should be checked with no grease on the bearings). The end play may then be checked with a dial indicator or by making a device as shown in *Illust. 28.* Then check the end play between the fixture (3), and the end (1) of the rotor shaft (5) with a feeler gauge (2).



Illust. 27
Inner Race Puller Tool SE-839, 1--Bearing race adapter; 2--Puller.



Illust. 26
Rotor Magnet with Keeper, Bearings, and Shims. 1--Forward bearing; 2--Rotor shims; 3--Inner oil flinger; 4--Bearing inner race; 5--Bearing retainer with balls.



Illust. 28
Checking Rotor End Play. 1--Checking position; 2--Feeler gauge; 3--Fixture end piece; 4--Fixture mounting bolt; 5--Rotor shaft.

ELECTRICAL SYSTEM - Continued

ROTOR - Continued

Take two readings of the feeler gauge, one with the rotor as far one way as it will go, and the other with the rotor moved as far in the opposite direction as it will go. The difference in these two readings will be the actual end play. Add .001 inch to the difference between the two readings, which should be the thickness of the additional shims to be added.

Remove the mounting flange, slide the rotor into the keeper, pull the race from the shaft and then add the required number of shims (2), *Illust. 26,* in the proper location. Grease bearings, reassemble the rotor and the mounting flange, and check the rotor for free turning. Be careful not to overfill the bearings with grease; just fill the spaces between the balls of the bearings with magneto grease. The preloading of the bearing should not cause binding of the rotor.

IMPORTANT: Be sure to keep the rotor and bearings clean during this operation. Do not drop the magnet or hit it with any sharp instrument, because it is very brittle and will chip readily.

Extreme care must be exercised to assure that the rotor is free from metal chips before it is assembled into the magneto, as chips may jam the rotor. The magnet is highly magnetized and will draw all magnetic metals to it. Using compressed air is one of the best methods to clean the rotor.

Replacement of the magneto rotor assembly and mounting flange is covered above.

Then replace the impulse coupling, distributor body, distributor rotor and distributor cap as directed under those subjects.

MAGNET

As stated before, the magnet is part of the rotor and is the revolving member of the magneto. The magnet, made of a new alloy known as Alnico (an aluminum, nickel, cobalt and iron alloy), is cast directly into sand moulds. After it is once thoroughly magnetized, this magnetic material should never lose its magnetism if carefully handled.

It cannot be stressed too emphatically the importance of being careful to guard against metal chips adhering to the magnet. The use of compressed air is one of the best methods of cleaning the magnet and rotor before assembly into the main frame of the magneto. The clearance of the magnet and the pole pieces of the magneto is so close that any chips adhering to the magnet may cause the rotor to become jammed.

BEARING OUTER RACE AND OIL SEALS

The front bearing outer race and oil seal are assembled in the mounting flange (2), *Illust. 24;* they are accessible after removing the impulse coupling and mounting flange as directed under those subjects. The purpose of the oil seals is to keep lubricating oil out of the magneto body.

The rear bearing outer race and oil seal are assembled in the main frame. The magneto rotor, distributor cap, distributor rotor, and distributor body assembly as well as the above mentioned must be removed.

The rotor shaft leather seal (4), *Illust. 24,* and the two retaining members (3) and (5) are held in place by the press fit of the rotor ball-bearing outer race (6). The rotor bearing races (6) can be removed with a puller, item (1), *Illust. 29.* Races may be replaced with a tool, such as item (2).

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

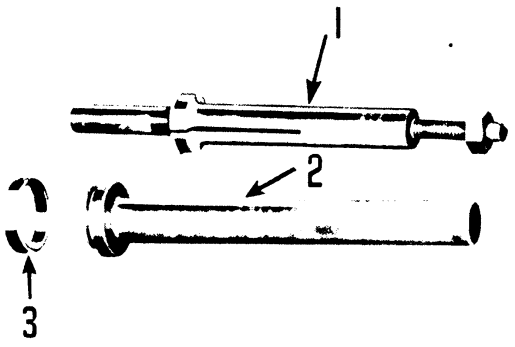
BEARING OUTER RACE AND OIL SEALS - Continued

The magneto outer bearing race in both the housing and magneto mounting flange can be readily removed. Loosen the expander and insert the tool into the bearing race. Manipulate the split sleeve flange through the bearing race and hold it against the felt retainer. Now draw up on the expander by applying a wrench to flats on the threaded end of the expander and turning in a counterclockwise direction until a definite pressure is felt. Then tighten the hexagon nut, and carefully drive the bearing race from place.

Illust. 24 shows the sequence of assembly of the bearing race and oil seal. The internal taper side of the leather oil seal (4) faces the bearing race (6), and the bulged side of the oil seal retainer (5) faces the oil seal (4). Careful centering and proper arrangement of the oil seal produces maximum compression and efficiency.

Before replacing the outer bearing races, make sure the felts and retainers are correctly assembled in place. Set the bearing race on the end of the tool (2), *Illust. 29*. A small amount of clean grease will hold the race on the tool. Carefully line up the tool over the hole and drive the race in place.

If a new bearing race has been installed, the recommended procedure is to remove the complete rotor and bearings and reassemble all parts as covered under *"Rotor" (including checking magneto rotor shaft end play)*.



Illust. 29
Tools Used for Removing and Replacing Magneto Outer Bearing Races. 1--Magneto bearing race puller tool SE-1020; 2--Magneto bearing race replacer tool SE-1021; 3--Outer bearing race.

GENERATOR AND RELAY

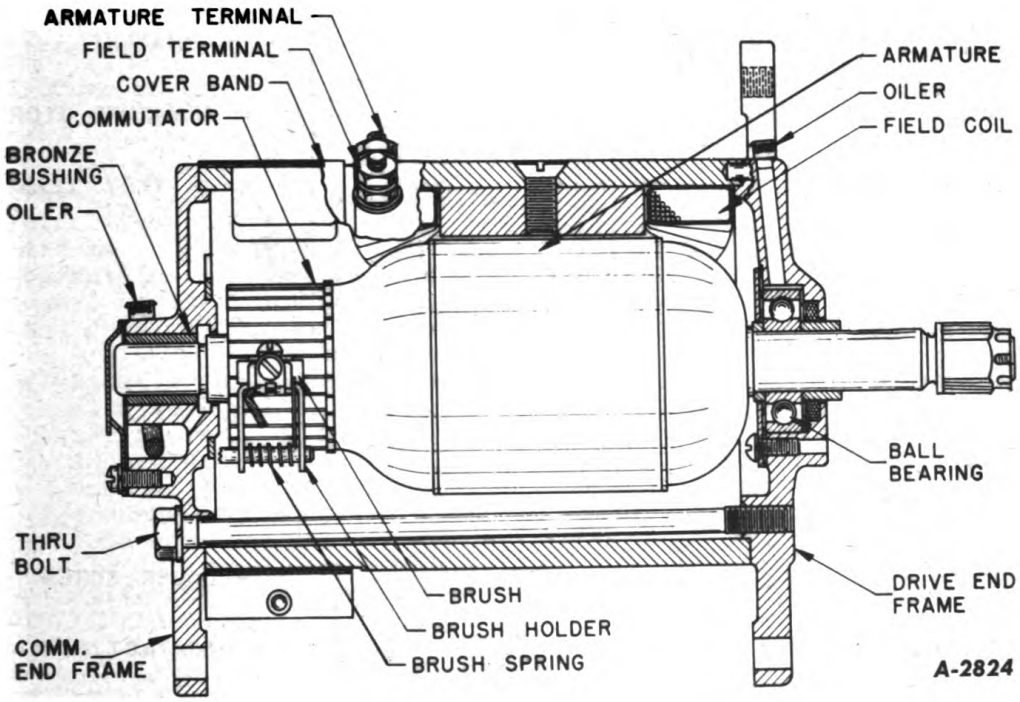
GENERATOR SPECIFICATIONS

Rotation - clockwise, viewing drive end.
Brush spring tension - 14 to 18 ounces (swivel type; 24 to 28 ounces (box type).
Maximum cold output - 13 to 16 amperes at 7.7 to 8.1 volts at 1800 R.P.M.
Maximum hot output - 9 to 11 amperes at 7.3 to 7.6 volts at 1900 R.P.M.
Field current - 3.5 to 4.5 amperes at 6 volts.

CUT-OUT RELAY SPECIFICATIONS

Air gap - .022 inch to .026 inch.
Point opening - .014 inch to .018 inch.
Closing voltage - 7.10 to 7.40 volts.

ELECTRICAL SYSTEM - Continued



Illust. 30
Cross Section of Generator.

GENERATOR AND RELAY

The Delco-Remy Model 1101358 Generator is a 6 volt, third brush unit with a ball bearing in the drive end and a bronze bushing in the commutator end. A Model 1116807 Cut-Out Relay is mounted on the generator frame.

MAINTENANCE OF THE GENERATOR

General maintenance may be divided into two sections, *normal maintenance* required to assure continued operation of the generator and the *checking and repair of inoperative generator.*

NORMAL MAINTENANCE OF THE GENERATOR

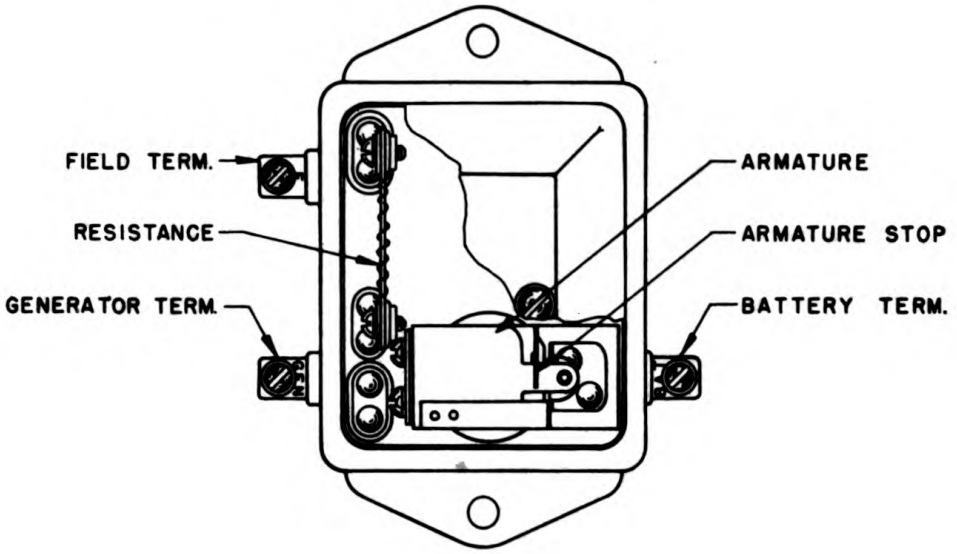
Lubrication: The two hinge cap oilers should be supplied with 8 to 10 drops of light engine oil every 60 hours of operation. Do not oil excessively. *Never oil the commutator.*

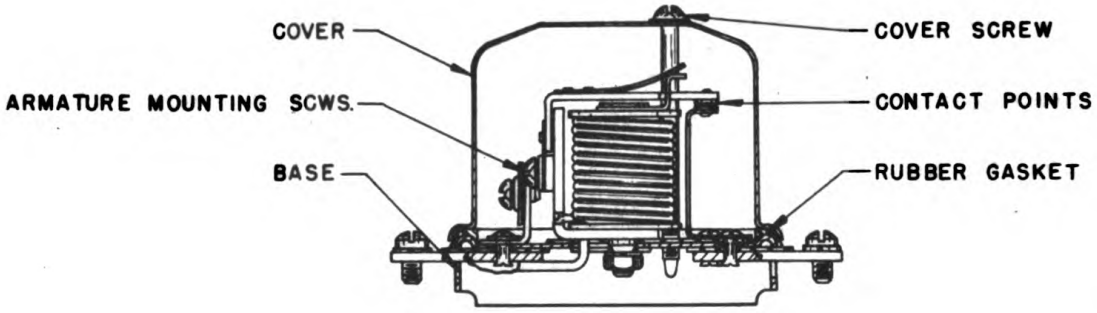
Inspection: The cover band should be removed and the commutator and brushes inspected at regular intervals. If the commutator is dirty, it may be cleaned with No. 00 sandpaper. Blow out dust. *NEVER USE EMERY CLOTH TO CLEAN COMMUTATOR.* If the commutator is rough, out of round, or has high mica, it should be turned down in a lathe and the mica undercut.

Worn brushes should be replaced. They can be seated with a brush seating stone. The brush seating stone is an abrasive material which, held against the revolving commutator, carries under and seats the brushes in a few seconds. Blow out the dust. *NEVER USE EMERY CLOTH.*

REPAIR SECTION

ELECTRICAL SYSTEM - Continued





Illust. 31
Cross Section of Generator Cut-Out Relay.

DISASSEMBLY OF THE GENERATOR

At regular intervals, the actual mileage or time depending on the type of operation, the generator should be disassembled for a thorough cleaning and inspection of all parts. Never clean the armature or fields in any degreasing tank, or with grease dissolving materials, since these may damage the insulation. The ball bearing should be cleaned and repacked with a good grade of ball bearing grease. The commutator should be trued in a lathe and the mica undercut if necessary. All wiring and connections should be checked. Rosin flux should be used in making all soldered connections. Acid flux must never be used on electrical connections.

CHECKING AN INOPERATIVE GENERATOR

Several conditions may require removal of the generator from the engine and further checking of the generator, as follows:

1. No output.
2. Unsteady or low output.
3. Excessive output.
4. Noisy generator.

ELECTRICAL SYSTEM - Continued

CHECKING AN INOPERATIVE GENERATOR - Continued

1. No Output.

   Remove cover band and check for sticking or worn brushes and burned commutator bars. Burned bars, with other bars fairly clean, indicate open circuited coils. If brushes are making good contact with commutator and commutator looks okay, use test leads and light and check as follows:

   a. Raise grounded brush, check with text points from "A" terminal to frame. Light should not light. If it does, the generator is grounded; raise other brush from commutator and check field, commutator and brush holder to locate ground.
   b. If generator is not grounded, check field for open circuit.
   c. If the field is not open, check for shorted field. Field draw at 6 volts should be 3.5 to 4.5 amperes. Excessive current draw indicates shorted field.
   d. If trouble has not yet been located, remove armature and check on growler for short circuit.

2. Unsteady or Low Output.

   Check as follows:

   a. Check drive.
   b. Check brush spring tension and brushes for sticking.
   c. Inspect commutator for roughness, grease and dirt, dirt in slots, high mica, out of round, burned bars. With any of these conditions, the commutator must be turned down in a lathe and mica undercut. In addition, with burned bars which indicate open circuit, the open circuit condition must be eliminated or the armature replaced.

3. Excessive Output.

   Excessive output usually results from a grounded generator field - grounded either internally or externally. Opening the field circuit disconnecting lead from "F" terminal of generator) with the generator operating at a medium speed will determine if the generator is at fault. If the output drops off, the field is grounded externally. If the output remains high, the field is grounded in the generator, either at the pole shoes, leads, or at the "F" terminals.

4. Noisy Generator.

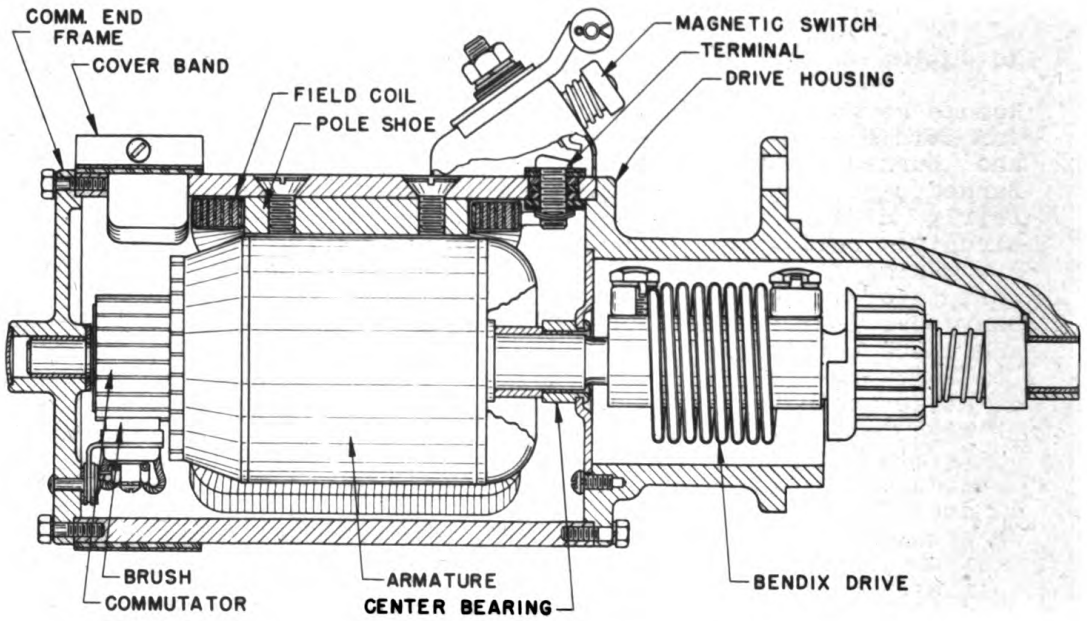
   Noisy generator may be caused by loose mounting, drive unit, worn, dry or dirty bearings, or by improperly seated brushes. Brushes may be seated by using brush seating stone, referred to above.

INSTALLATION CAUTION: After the generator is reinstalled on the engine, or at any time after leads have been disconnected and tnen reconnected to the generator, a jumper lead should be connected MOMENTARILY between the BATTERY and GENERATOR terminals of the cut-out relay, *before starting the engine.* This allows a momentary surge of current from the battery to the generator which correctly polarizes the generator with respect to the battery it is to charge.

REPAIR SECTION

ELECTRICAL SYSTEM - Continued

STARTING MOTOR



Illust. 32
Cross Section of Starting Motor.

STARTING MOTOR SPECIFICATIONS

Clockwise rotation viewing the pinion end.

Brush spring tension . . . . . 2.25 to 2.50 lbs.

No load. . . . . 3000 R.P.M. - 70 amperes - 5 volts.

Lock torque. . . . . 19 ft.-lbs. - 500 amperes - 3 volts.

The Delco-Remy Model 1108920 Starting Motor is a 6-volt unit. There is a bronze bushing at the commutator end, and an oilless center bearing and oilless bushing, and an oilless bearing in the pinion housing. The Bendix drive, keyed to the drive shaft, automatically engages the cranking pinion with the flywheel ring gear when the armature begins to revolve. When the engine fires, the over-running effect of the flywheel on the pinion disengages it from the flywheel.

MAINTENANCE OF THE STARTING MOTOR

Starting motor maintenance may be divided into two sections, *normal maintenance* required to assure continued operation of the motor and the *checking and repair of an inoperative starting motor.*

ELECTRICAL SYSTEM - Continued

NORMAL MAINTENANCE OF THE STARTING MOTOR

Inspection: The cover band should be removed periodically and the brushes and commutator inspected. If the commutator is dirty, it may be cleaned with No. 00 sandpaper. **NEVER USE EMERY CLOTH TO CLEAN COMMUTATOR.** If the commutator is rough, out of round, or has high mica, it should be turned down in a lathe and the mica undercut. The mica should be cut away to the depth of 1/32-inch. Worn brushes should be replaced. If brushes wear with excessive rapidity, check for excessive brush spring tension, roughness or high mica of the commutator.

DISASSEMBLY OF THE STARTING MOTOR

At regular intervals, depending on the type of service, the starting motor should be disassembled for cleaning and inspection of all parts. The Bendix drive should be cleaned and oiled with a penetrating oil, as any accumulation of dirt on the drive might restrict the free movement of the pinion. Never clean the armature and field coils in a degreasing tank, or with grease dissolving materials since these may damage the insulation. The commutator should be trued in a lathe and the mica undercut if necessary. Replace all parts showing excessive wear. All wiring and connections should be checked. Rosin flux should be used in making soldered connections. Acid flux must never be used on electrical connections. Submit reassembled unit to NO LOAD and LOCK TORQUE TESTS.

CHECKING OF IMPROPERLY OPERATING STARTING MOTOR

If the starting motor does not develop rated torque and cranks the engine slowly or not at all, check the battery, battery terminals and connections and the battery cables. Corroded, frayed or broken cables should be replaced and loose or dirty connections corrected. The starting motor control switch should be checked for burning contacts and the switch contacts cleaned or the switch replaced if necessary. If all these are in order, remove the cover bank of the starting motor and inspect the brushes and commutator. The brushes should form good contact with the correct brush spring tension. A dirty commutator can be cleaned with a strip of No. 00 sandpaper held against the commutator with a stick while the starting motor operates. **NEVER USE EMERY CLOTH TO CLEAN COMMUTATOR.** If the commutator is very dirty, or burned, or has high mica, remove the armature from the starting motor and take a cut off the commutator in a lathe. The mica should be undercut to a depth of 1/32-inch.

ELECTRICAL SYSTEM - Continued

CHECKING OF IMPROPERLY OPERATING STARTING MOTOR - Continued

If there are burned bars on the commutator, it may indicate open circuited armature coils which will prevent proper cranking. Inspect the soldered connections at the commutator riser bars. An open armature will show excessive arcing at the commutator bar which is open, on the no-load test.

Tight or dirty bearings will reduce armature speed or prevent the armature from turning. A worn bearing, bent shaft, or loose field pole screws will allow the armature to drag on the pole shoes, causing slow speed or failure of the armature to revolve. Check for these conditions.

If the brushes, brush spring tension and commutator appear in good condition, the battery and external circuit found satisfactory, and the starting motor still does not operate correctly, it will be necessary to remove the starting motor for no-load and torque checks.

NO LOAD TEST

Connect the starting motor in series with a battery of the specified voltage and an ammeter capable of reading several hundred amperes. If an R.P.M. indicator is available, read the armature R.P.M. in addition to the current draw.

TORQUE TEST

It is advisable to use in the circuit a high current carrying variable resistance, so that the specified voltage at the motor can be obtained. A small variation of the voltage will produce a marked difference in the torque developed.

Interpreting results of NO LOAD AND TORQUE TESTS

1. Rated torque, current draw and no load speed indicates normal condition of starting motor.

2. Low free speed and high current draw with low developed torque may result from:

   a. Tight, dirty, or worn bearings, bent armature shaft or loose field pole screws which would allow the armature to drag.

   b. Shorted armature. Check armature further on growler.

   c. A grounded armature or field. Check by raising the grounded brushes and insulating them from the commutator with cardboard and then checking with a test lamp between the insulated terminal and the frame. If test lamp lights, raise other brushes from commutator and check fields and commutator separately to determine whether it is the fields or armature that is grounded.

ELECTRICAL SYSTEM - Continued

Interpreting results of NO LOAD AND TORQUE TESTS - Continued

3. Failure to operate with high current draw:

   a. A direct ground in the switch, terminal or fields.

   b. Frozen shaft bearings which prevent the armature from turning.

4. Failure to operate with no current draw:

   a. Open field circuit. Inspect internal connections and trace circuit with a test lamp.

   b. Open armature coils. Inspect the commutator for badly burned bars. Running free speed, an open armature will show excessive arcing at the commutator bar which is open.

   c. Broken or weakened brush springs, worn brushes, high mica on the commutator, or other causes which would prevent good contact between the brushes and commutator. Any of these conditions will cause burned commutator bars.

5. Low no-load speed, with low current draw indicates:

   a. An open field winding. Raise and insulate ungrounded brushes from commutator and check fields with test lamp.

   b. High internal resistance due to poor connections, defective leads, dirty commutator and causes listed under 4.c. above.

6. High free speed with low developed torque and high current draw indicates shorted fields. There is no easy way to detect shorted fields, since the field resistance is already low. If shorted fields are suspected, replace the fields and check for improvement in performance.

REPAIR SECTION

MEMORANDA

REPAIR SECTION

ENGINE

SPECIFICATIONS

Bore and stroke, in.	4.4 x 5.5
No. of Cylinders	4
Type of Cylinders	Dry Liner
Displacement, Cu. In. per Rev.	334.5
Governed R.P.M.	1400
High Idle Speed, R.P.M.	1540
Governed Low Idle Speed, R.P.M.	900
Piston Speed, Ft. per Minute at 1500 R.P.M.	1375
Compression Pressure, Pounds	127
Compression Ratio.	5.4 to 1
Fuel	Gasoline

AIR CLEANER

Donaldson 8-inch "oil washed" air cleaner with an oil cup is used on this tractor. The intake is provided with a screen to prevent large particles such as chaff, leaves, etc., from entering the air cleaner. The air passes through the screen down the center into the oil cup and up through screens to the intake manifold. Reversal of air flow at the base separates dust from the air. The oil carried upward with the air as a mist is separated from the air by crimped screen elements returning the oil to the base and washing the crimped screens.

The oil cup should be removed for periodical cleaning and refilling with fresh oil to the proper level. Screens should be washed with solvent, dry-cleaning; kerosene; or Diesel fuel. Joints, rubber connections, etc.,should be air tight to prevent entrance of dirt particles. Refer to the *"Operations Section"* for complete servicing of the air cleaner.

Proper functioning of the air cleaner is important to obtain maximum power from an engine. A restricted air cleaner will cause a loss of power.

MANIFOLDS

Both the intake and exhaust manifolds are combined in one casting. The same gasket is used for both front and rear sections; each gasket covers three ports. Be sure to draw tight all six nuts holding the manifold to the head; tighten them to 40 ft.-lbs. torque. A leaky gasket will admit dirt into the engine. The manifold can be removed after disconnecting the carburetor and taking off the nuts in the manifold.

LUBRICATION

Capacity U.S. Quarts	11
Full Pressure System	Yes
Oil Filter, Model	Motor Improvement P-20
Oil Pressure, Pounds	60-70
Oil Pressure Valve	In Purolator Base

REPAIR SECTION

ENGINE - Continued

LUBRICATION - Continued

Full force feed of the oil lubricates the crankshaft bearings, camshaft bearings, connecting rod bearings, piston pins, valve mechanism, and timing gears.

OIL PRESSURE

Oil pressure is controlled by a plunger-type regulating valve located in the Purolator base set at 60 to 70 lbs. pressure. The oil regulating spring should test 38 lbs. at 2-3/32 in. while the free length is 3-19/32 in.

The pressure valve O.D. is .900 in. to .901 in., and the bore in the Purolator base is .905 in. to .906 in., or the clearance for the valve is .004 in. to .006 in. Be sure the valve slides freely and that the spring does not cock the valve in the bore, seating improperly.

Valve springs take a set after continued use, hence their free length may be somewhat shorter than the dimensions listed in the engine specifications. The best way to check these springs is to load them with the weight specified and measure their length at this load which is equivalent to the conditions existing when the valve spring is in the operating position. Valve springs falling below this standard should be replaced.

OIL FILTER

A Motor Improvement P-20, paper renewable-type lubricating oil filter is accessibly located on the engine. A quantity of oil is bypassed from the main circulatory system, through the cleaning element to the crankcase. Filter elements should be renewed every time the oil is changed, or oftener if necessary. Be sure the end of the element marked "Top" is toward the top of the filter case.

CIRCULATION

The path of lubricating oil is from the sump and through the "Floto" oil screen from where it is pumped under pressure to the Purolator filter base. A passage leads from the base to the filter and is known as the "bypass". A portion of the oil is bypassed through the filters, the amount depending upon the cleanliness of the filter element. A pressure release valve is located in the base. This valve maintains the proper pressure on all bearings and at the same time protects the system and pump mechanism when thick oil, caused by severe weather conditions, builds up high pressures in the oil lines. The oil passed through the filter is returned to the sump, as is the oil that is bypassed by the pressure relief valve. Oil from the filter base is discharged into rifle-drilled passages in the crankcase from where it is directed to the main bearings.

Oil from the main bearings passes through drilled passages in the crankshaft to the connecting rod bearings from where it is directed through the drilled passages in the connecting rod to the piston pins and the cylinder walls.

Passages from the main bearings also lead to the camshaft bearings and timing gears. Another passage leads from the center camshaft bearing and extends upward through the crankcase to the valve rocker mechanism. The valve lever shaft is hollow and distributes oil to valve rockers, valve stems, and starting mechanism. The oil is drained back to the sump through the valve push rod holes in the crankcase, and in so doing it lubricates the valve tappets and cams.

OIL PUMP

This is a two-stage, double-gear type of pump which operates off the worm gear at the center of the camshaft. The upper or main set of gears supplies oil to the lubricating system; the auxiliary set of gears pumps oil from the shal-

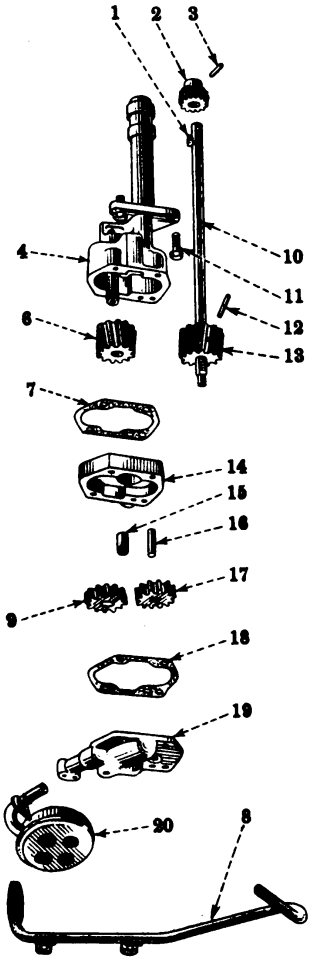
REPAIR SECTION

ENGINE - Continued

OIL PUMP - Continued

low end of the oil pan back to the sump when the tractor is operating on an upgrade.

Removal of the oil pump requires taking off the crankcase guard, moving the equalizer spring forward, and removing the oil pan. The oil pump is held to the crankcase with two cap screws. A pipe (8), *Illust. 1,* extending to the rear of the crankcase is held with one cap screw.



Illust. 1
Exploded View of
Lubricating Oil Pump.

The oil pump may be disassembled for inspection of parts by removing cap screws in the cover (19), lifting off the auxiliary drive gear (17), the idler gear (9), the auxiliary gear housing (14), and the main idler gear (6). The drive shaft (10) may be removed after taking the pin (3) from the drive pinion (2) (worm) and pulling the pinion from the shaft.

The idler shaft is a press fit in the body (4). The gaskets (7) and (18) used are .006" thick and are to be used to give .005 in. to .010 in. end clearance for the drive shaft and .003 in. to .005 in. end clearance for the auxiliary gears. The gears can have .004 in. to .006 in. backlash and .003 in. radial clearance with the body or housing.

The idler shaft should be concentric with the body bore and square with the bottom of the gear chamber within .001 in. The drive (13)

Ref. No.	Description
1	Key.
2	Pinion.
3	Pin.
4	Body.
6	Idler gear.
7	Gasket.
8	Return pipe.
9	Auxiliary idler gear.
10	Shaft.
12	Pin.
13	Body gear.
14	Auxiliary gear housing.
15	Inlet tube.
16	Dowel.
17	Auxiliary body gear.
18	Gasket.
19	Cover.
20	Intake screen (Floto).

REPAIR SECTION

ENGINE - Continued

OIL PUMP - Continued

and idler gear (6) should have .003" clearance between the body bore and the outside diameter of the gear. Use a 1/2 in. wide feeler gauge between the body and the gear; turn the pinion several revolutions when doing so. The drive shaft and gears should turn freely when assembled. Be sure to lubricate the drive pinion when reassembling a repaired pump to the engine. The "Floto" oil screen should turn freely in the bottom cover; it takes the cleaner oil from the top of sump.

CYLINDER HEAD

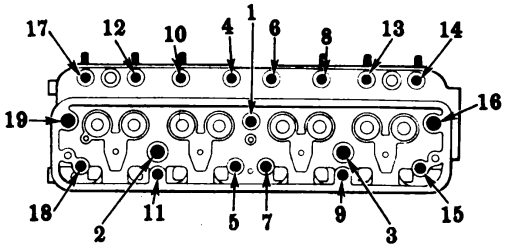
Removal of the Cylinder Head

Remove the valve housing (2) *Illust. 4*, breather tube (4), heat indicator connection, nuts from the valve rocker mechanism at the brackets (17), and lift of the rocker mechanism. Withdraw the valve push rods (34), and remove the nuts from the head stud. Disconnect the spark plug wires. Remove cap screws from the thermostat housing (4), *Illust. 1, "Cooling System"*, Section 1. Remove the heat shield, intake and exhaust manifold with carburetor, complete, and lift off the cylinder head (35), *Illust. 4*. The valve seat insert (43), is standard for the exhaust port. Inserts cannot be installed for the intake valves. When replacing the head, use a new gasket and draw down the cylinder head to 120 ft.-lbs. torque with torque wrench SE-1137.

Replacement of the Cylinder Head

Be sure to clean the lower surface of the cylinder head (35) before placing it over the gasket (44) and the crankcase. Both the crankcase and gasket should be clean and smooth. Use a new gasket when replacing the cylinder head and be sure the word "Top" on the gasket faces the head. Grease the gasket on both sides and place it carefully over the studs.

When the head is in place, put all the cylinder head nuts on the studs and run them up by hand or with a speed wrench. Starting with the center nut, follow the pattern indicated on the nut tightening sequence chart, *Illust. 2*, and snug up each nut. After easily and



Illust. 2
Cylinder Head Nut Tightening Sequence.

uniformly drawing down all nuts in gradual steps, go over them again with a torque wrench, and again by gradual steps draw them all down to 160 ft.-lbs. torque. Torque wrench SE-1137 (0-100 ft.-lbs.) and extension bar SE-1137-1 (60-175 ft.-lbs.) are available.

VALVES

SPECIFICATIONS

Valve Seat Width	3/32 in.
Valve Seat Angle	45°
Stem Guides (Replaceable).	Grey Iron
Stem Diameter.	.4015 in.-.4025 in.
Stem Clearance in Guide . . .	.002 in-.004 in.
Tappet Clearance, Hot . .	.017 in.
Valve Spring, Free-Length . .	2-7/8 in.

ENGINE - Continued

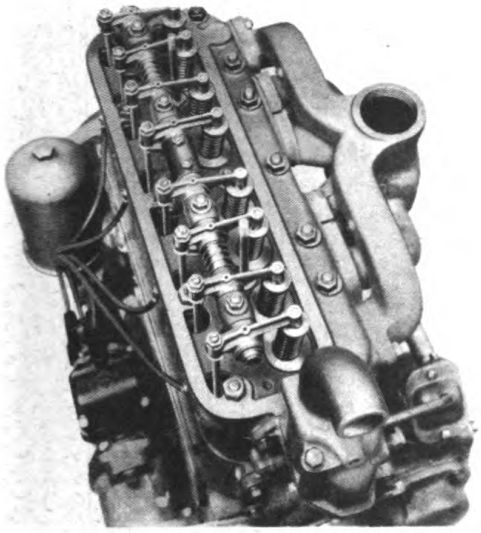
VALVES - SPECIFICATIONS - Cont'd

Valve Spring Test. . 50-56 lbs. at 2-1/2 in.

Valve Lever Shaft, Diameter . . .872 in.-.873 in.

Valve Lever Clearance in . . . busning . . .002 in.-.004 in.

Valve Lever Bushing, Length . . 1-3/16"



Illust. 3
Engine Valve Assembly

INTAKE VALVES SPECIFICATIONS

Material MD-3140

Head Diameter . . . 2-3/32 in.

Port Diameter. . . . . 1.875 in.

Lift . . . . . 15/32 in.

Valve Opens. . . . . 5° after TC

Valve Closes . . . 41° after LC

EXHAUST VALVES SPECIFICATIONS

Material . . . . . Sil. "XCR"

Head Diameter . . . . 1-29/32 in.

Port Diameter . . . . . 1.688 in.

Lift . . . . . 7/16 in.

Valve Opens. . . . . 42° before LC

Valve Closes . . . . . 10° after TC

Valve stem guides (33), *Illust. 4*, are furnished as service parts reamed to size. It is only necessary to press them in place with the sharp chamfered end up and 1-3/16 in. above the counterbore in the head. The valve guide bore and the valve seat should be concentric within .002 in.

When reassembling valves to the cylinder head, replace the safety retainer (31) in the groove closest to the head of the valve (41) before assembling valve springs (32), spring seats (24), and keys (22). Be sure the end of the spring (32) with the coils close together (damper coils) contact the cylinder head.

The bushing (20) in the valve levers (7), (8), (10), and (11) can be replaced. They should be reamed to the sizes listed in the specifications. Be sure that the hole in the bushing lines up with the hole in the lever. The larger assemblies can be removed as outlined under the "Cylinder Head" in this section.

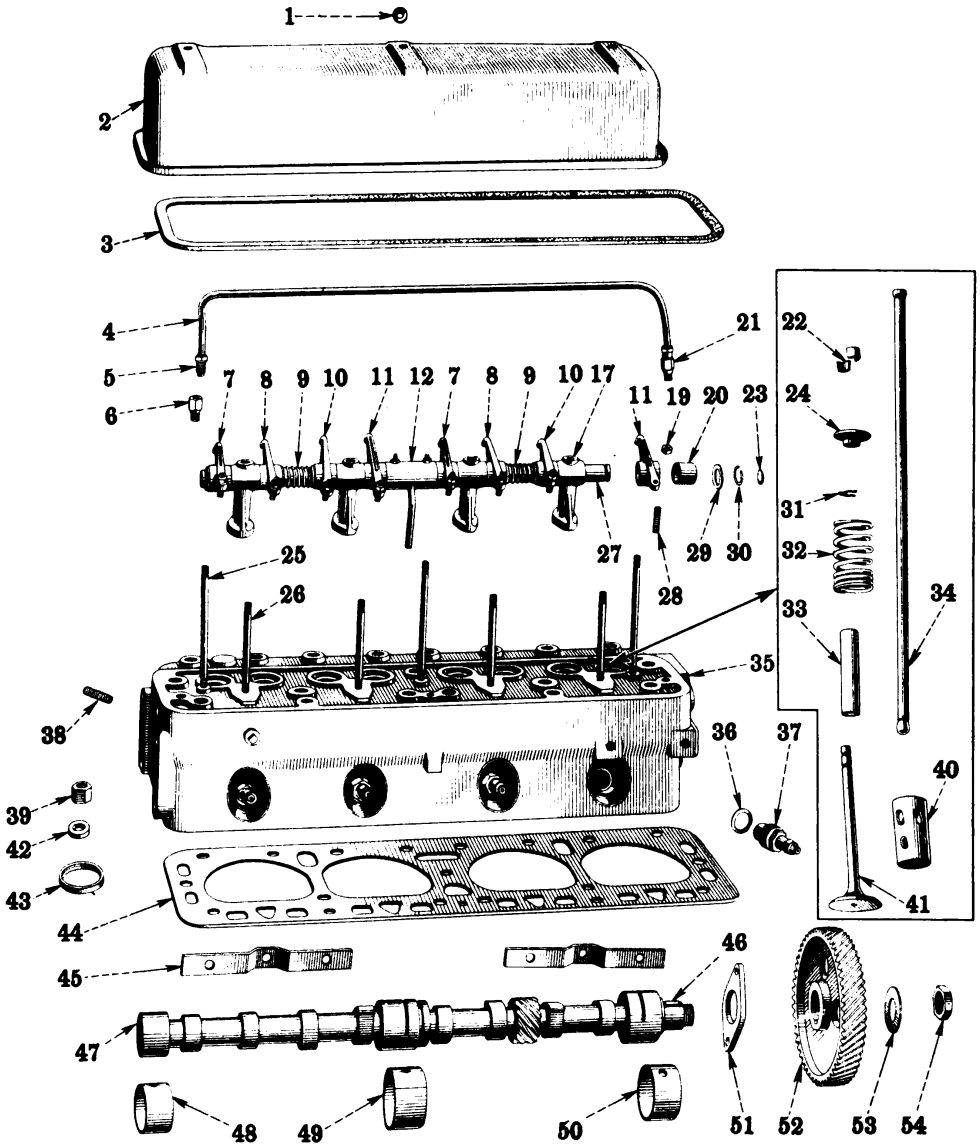
The exhaust valve seat inserts (43) are available as service parts. When replacing the seat, be sure to assemble the insert with the side marked "M" to the outside. Peen over the cylinder head metal after installing, and grind the seat at a 45° angle. Inserts are .007 in. to .001 in. tight in the cylinder head.

(Continued on page 8)

REPAIR SECTION

ENGINE - Continued

CYLINDER HEAD, VALVES, ETC.



Illust. 4
Exploded View of Cylinder Head,
Valve Mechanism and Camshaft Assembly.

REPAIR SECTION

ENGINE - Continued

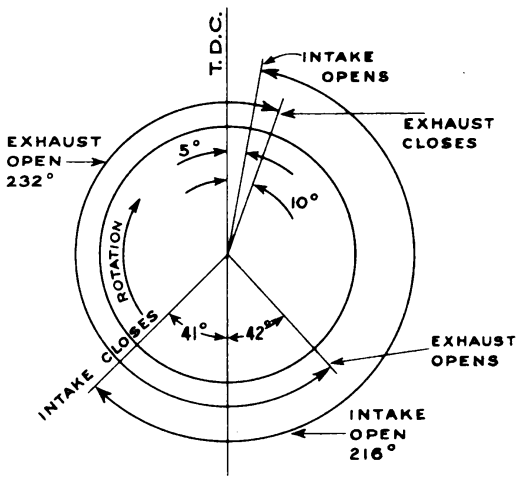
CYLINDER HEAD, VALVES, ETC. - Continued

Ref. No.	Description
1	Washer.
2	Valve housing.
3	Gasket.
4	Breather tube.
5	Nut.
6	Connector.
7	Valve lever with bushing, exhaust, right hand.
8	Valve lever with bushing, intake, left hand.
9	Spring.
10	Valve lever with bushing, intake, right hand.
11	Valve lever with bushing, exhaust, left hand.
12	Oil sleeve assembly.
17	Bracket.
19	Adjusting lock nut.
20	Bushing.
21	Connector with nut.
22	Seat key.
23	Plug.
24	Upper spring seat.
25	Stud.
26	Stud.
27	Shaft with end plugs.
28	Adjusting screw.
29	Washer.
30	Snap ring.
31	Retainer.
32	Valve spring.
33	Valve guide.
34	Push rod.
35	Cylinder head
36	Spark plug gasket.
37	Spark plug.
38	Manifold stud.
39	Cylinder head nut.
40	Tappet.
41	Intake valve. Exhaust valve.
42	Washer.
43	Valve seat insert.
44	Head gasket.
45	Tappet stop.
46	Key.
47	Camshaft.
48	Bearing, rear.
49	Bearing, center.
50	Bearing, front.
51	Thrust plate.
52	Gear (54 teeth).
53	Nut lock.
54	Nut.

REPAIR SECTION

ENGINE - Continued

VALVES - Continued



Illust. 5
Engine Valve Timing Diagram

When replacing the valve assembly, be sure the oil sleeve in the center enters the reamed hole; this is the source of oil for the valve rocker mechanism. Recheck the valve tappet settings after retightening the rocker mechanism on the head.

Push rods (34), *Illust. 4,* are steel tubing with solid steel end inserts.

Tappets (40) are fitted in the crankcase and can be removed from the top after taking off the crankcase side cover plates and tappet stops (45). The lubrication of the tappets is provided by splash and return oil from the rocker mechanism.

VALVE SERVICE TOOLS AVAILABLE

(EXHAUST)

SE-1236, 45° Valve Seat Reamer, Finish

SE-691-1, 45° Valve Seat Reamer, Rough

SE-1225, 45° Valve Seat Reamer, Rough

SE-691-2, 45° Valve Seat Reamer, Rough

(INTAKE)

SE-1234, 45° Valve Seat Reamer, Finish

SE-1223, 45° Valve Seat Reamer, Rough

SE-1229, 75° Valve Seat Reamer, Rough

SE-1227, 15° Valve Seat Reamer, Rough

SE-1230, Valve Seat Reamer Pilot

SE-1242, Valve Guide Reamer

(VALVE LEVER BUSHINGS)

SE-944, Reamer Body

SE-944-2, Reamer Blades

SE-944-11, Reamer Pilot Bushing

REPAIR SECTION

ENGINE - Continued

CAMSHAFT

Bearings, Number	3
Bearing Material (Steel Back)	Babbitt
Bearing Journal Diameter, Front	2.3055 in.-2.3065 in.
Bearing Journal Diameter, 2nd	2.1805 in.-2.1815 in.
Bearing Journal Diameter, Rear	1.8680 in.-1.8690 in.
Running Clearance	.0015 in.-.0035 in.
Bearing Length, Front	1-11/16 in.
Bearing Length, 2nd	1-25/32 in.
Bearing Length, Rear	1-3/16 in.
Thrust Plate Material	Phosphor Bronze
End Clearance	.003 in.-.011 in.
Service Bushings	Reamed to Size
Camshaft Drive	Helical Gear
Number of Teeth in Gear	54
Pressure Lubricated	Yes

The camshaft of the engine actuates the valve tappets and times the opening of the valves in the cylinder head. It is driven by a gear fastened to its forward end which meshes with the idler gear of the timing gear train.

To remove the assembly from the engine, the crankcase front cover must be removed as outlined under that heading in this section. Then remove the cap screw which retains the idler gear, and slide the idler gear and retainer off. Now turn the camshaft gear (52), *Illust. 4*, to make accessible the two cap screws holding the thrust plate (51) to the crankcase front plate. Remove the valve housing cover (2) and back off the set screws (28) to relieve valve spring tension on the push rods (34) and the valve tappets (40). The camshaft assembly, items (46) to (54) inclusive, can then be pulled from the engine crankcase. If the engine is standing upright, the valve tappets will fall into the oil pan, requiring removal of the oil pan also. Valve tappets (40), however, can be removed through the covered holes in the side of the engine crankcase after removing the valve mechanism on top of the cylinder head, the push rods (34), and the tappet stops (45) attached to the side of the crankcase inside the openings in the side of the crankcase.

After removing the nut (54) and the lock (53), the gear (52) may be pulled from the camshaft (47), freeing the thrust washer (51).

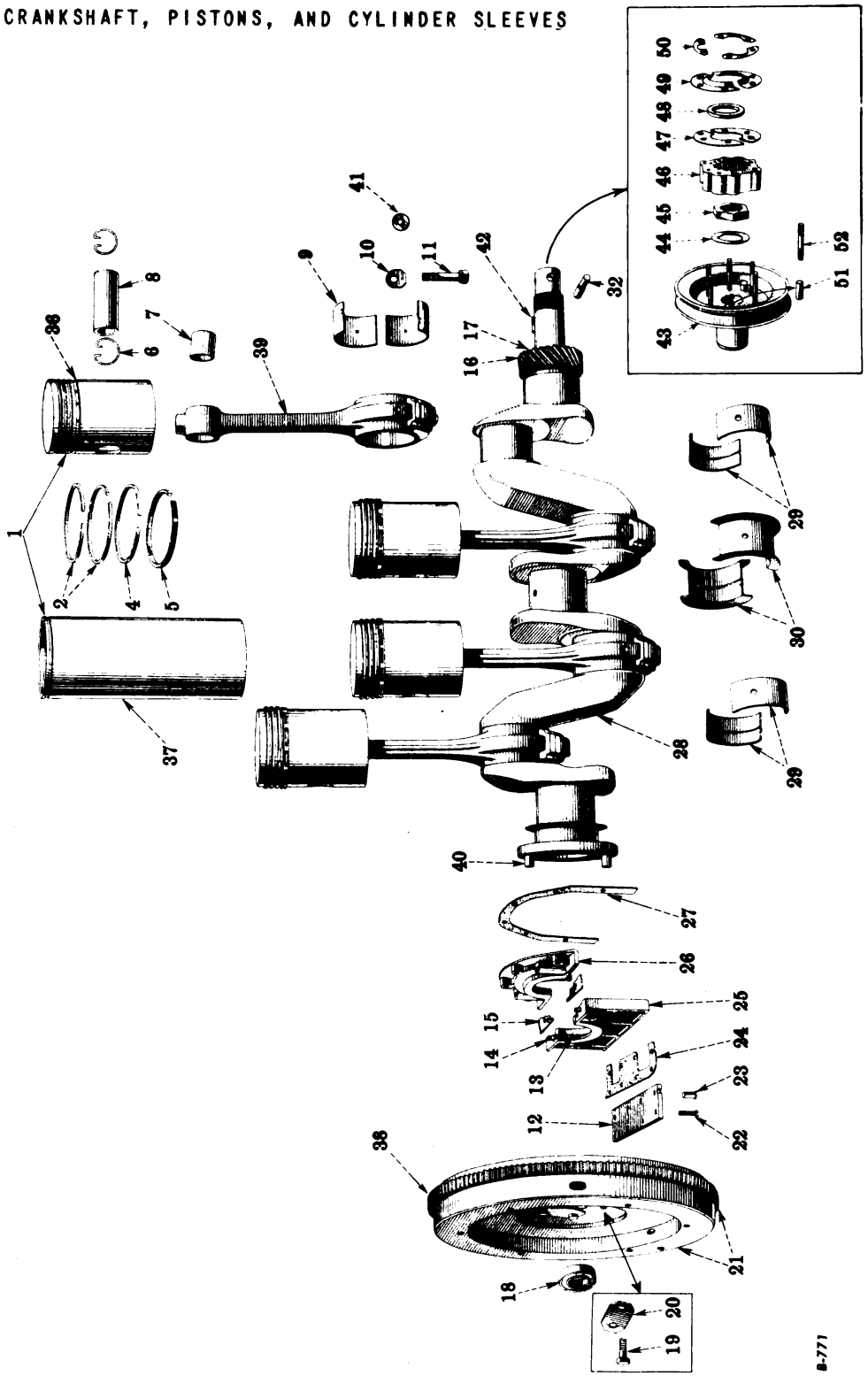
The camshaft (47), *Illust. 4*, runs in three bearings (48), (49), and (50). For replacement, these Babbitt-lined steel back bearings are furnished reamed to size. It is only necessary to press them into place. Be sure to line up the

(Continued on page 12)

REPAIR SECTION

ENGINE - Continued

CRANKSHAFT, PISTONS, AND CYLINDER SLEEVES



Illust. 6
Exploded View of Crankshaft and Piston Assemblies.

ENGINE - Continued

CRANKSHAFT, PISTONS, AND CYLINDER SLEEVES - Continued

Ref. No.	Description
1	Cylinder sleeve with piston.
2	Piston ring, 5/32" plain compression.
4	Piston ring, 5/32" taper face compression.
5	Piston ring, 1/4" oil regulating.
6	Retainer ring.
7	Bushing.
8	Piston pin.
9	Bearing (two halves).
10	Bolt lock.
11	Bolt.
12	Plate.
13	Oil seal felt.
14	Dowel.
15	Gasket.
16	Pinion (27 teeth).
17	Key.
18	Clutch pilot bearing.
19	Bolt.
20	Bolt lock.
21	Flywheel with ring gear.
22	Stud.
23	Felt plug.
24	Gasket.
25	Oil seal retainer, lower.
26	Oil seal retainer, upper.
27	Gasket.
28	Crankshaft.
29	Bearing (two halves).
30	Bearing (two halves).
32	Starting crank pin.
33	Pulley.
34	Nut lock.
36	Piston.
37	Cylinder sleeve.
38	Ring gear (149 teeth).
39	Connecting rod.
40	Dowel.
41	Washer.
42	Fan drive pulley key.
43	Fan drive pulley.
44	Fan drive pulley nut lock.
45	Fan drive pulley nut.
46	Coupling.
47	Shaft retainer.
48	Shaft felt washer.
49	Shaft felt washer retainer.
50	Coupling stud nut lock.
51	Drive pin.
52	Coupling stud.

REPAIR SECTION

ENGINE - Continued

CAMSHAFT *(Continued from page 9)*

holes in the bushing with the oil supply holes in the crankcase. The camshaft drives the lubricating oil pump and also the magneto drive gear.

In order to complete the assembly of the camshaft, place the thrust plate (51) on the snaft, put the key (46) in the shaft and press the gear (52), 54 teeth, on the shaft. Then put on the nut lock (53) and the nut (54). The camshaft assembly is held to the crankcase by two cap screws (3/8 x 7/8 in.) with lock washers. These are accessible through the holes in the flange of the gear (52). To replace the camshaft in the engine, push the assembly into place. Then turn the gear over so that the holes in the gear hub line up with the bolt holes in both the crankcase and the thrust washer (51). When installed, check the face of the gear for runout. The slot in the center camshaft bearing journal gives the alternating supply of oil to the valve rocker mechanism, while the slot in the front camshaft bearing journal gives the governor an alternating supply of oil.

Valve tappets (40) can be removed and replaced when the camshaft is removed or they can be replaced through the opening in the side of the crankcase. The idler gear between the camshaft and the crankshaft gears can now be replaced. The magneto gear with the bracket and magneto can also be replaced and timed.

CONNECTING ROD

Length (Center to Center)	11 in.
Crank Pin Diameter	2.9965 in.-2.9975 in.
Bearing Material (Steel Back)	Babbitt
Bearing, Length (Total)	1-31/32 in.
Bearings, Running Clearance	.002 in.-.003 in.
Rod, End Clearance	.008 in.-.015 in.
Bolts, Number	2
Bolts, Material	Nickel Steel
Bolts, Size	1/2 in. x 2-13/32 in.
Bolts, Tension, Ft.-Lbs.	65
Bearing Cap, Angle of Split	45°
Removable from Top of Block	Yes

ENGINE - Continued

CONNECTING ROD - Continued

Connecting rods (39), *Illust. 6*, should be straight, free from twist, and parallel with the pistons. The cylinder numbers are stamped on the rod and cap -- No. 1 starts at the front end of the engine. Assemble the numbered side toward the camshaft. Clearance may be checked by placing a .003 in. brass shim (1/4 in. x 1-1/2 in. long) lengthwise between the lower bearing and crankshaft. If clearance is not excessive, there should be a slight drag when turning the crankshaft with the spark plugs removed.

When installing bearings (9), be sure that the bearing backs and rod surfaces are absolutely clean, smooth, and free from oil. The bearings have a nib engaging the milled notch in the rod and cap.

The connecting rods must be removed from the top of the crankcase on account of the counterweights on the crankshaft. Remove cylinder head and oil pan, disconnect bearing caps and push piston and rod assembly out of top of cylinder. Bearing caps are held to the rods with four bolts. A torque wrench should be used to tighten the nuts of these bolts to 65 ft.-lbs. Soft metal washers (10) below the heads of the bolts (11) are used to lock the connecting rod bolt when the washers are bent up against the flats on the bolt head.

PISTON ASSEMBLY

Piston Material	Grey Iron
Clearance (at bottom of skirt)	.006 in.-.007 in.
"Go" Gage (1/2 in. wide)	.0055 in.
Light Pull	4-6 lbs.
"No Go" Gage (1/2 in. wide)	.0065 in.
Tight Pull	11-14 lbs.

PISTON RINGS

Total Required	4
Compression	3
Oil Control	1
Width 1st Compression	.1550 in.-.1545 in.
Width 2nd Compression	.1550 in.-.1545 in.
Width 3rd Compression	.1550 in.-.1545 in.
Width Oil Control	.2490 in.-.2485 in.
Gap	.010 in.-.020 in.
Clearance in Groove, 1st Compression	.004 in.
Clearance in Groove, 2nd and 3rd Compression	.003 in.
Clearance in Groove, Oil Control	.003 in.

REPAIR SECTION

ENGINE - Continued

PISTON PIN

Type	Full Floating
Retainers	Snap Rings
Length	3.707 in.
Diameter	1.5000 in.-1.5003 in.
Clearance in Rod Bushing	.0003 in.-.0005 in.
Clearance in Piston Bore	.0001 in.-.0003 in.

The replaceable dry liner sleeves (37), *Illust. 6,* are selective fitted to pistons to give normal measured clearances as listed in these specifications. The third compression ring (4) from the top of the piston is tapered and should be assembled with the word "Top" toward the top of the piston. An oil regulating ring (5) is above the piston pin.

When replacing rings, stagger the ring gaps around the piston. The ring grooves should be clean and free from carbon and the oil holes in the oil control grooves should be drilled out. Fit the rings to the smallest section of the sleeve. Bathe the piston in oil before replacing it in the engine. Piston pins (8) are of the full-floating type, secured in the piston bosses by retainer rings (6). Heat the piston in hot water to remove or install the pins. An oversize piston pin (.005") is available marked +5 on one end or on one side. The piston bore should be reamed to give the clearances listed in the specifications.

Service Tools Available

Reamer Body	SE-949
Reamer Blades	SE-949-3
Pilot Busning	SE-949-13
Hone Blades	SE-949-8
Burnishing Bar	SE-1032

CRANKCASE OIL PAN

To remove the crankcase oil pan with the engine mounted in the tractor, it is necessary to remove the crankcase guard first. Then remove all the accessible cap screws in the oil pan except the one at the front end. Jack the tractor up at the front to take the load off the equalizer spring, *"Frame"* Section 6. Remove the cap screws in the equalizer spring retainer (7), *Illust. 7, "Frame"*, Section 6, and pivot shaft (17) and move the equalizer spring far enough forward to make the remaining four cap screws accessible. Then lower the tractor and remove the pan.

Reassembly is the reverse of the above.

CYLINDER SLEEVES

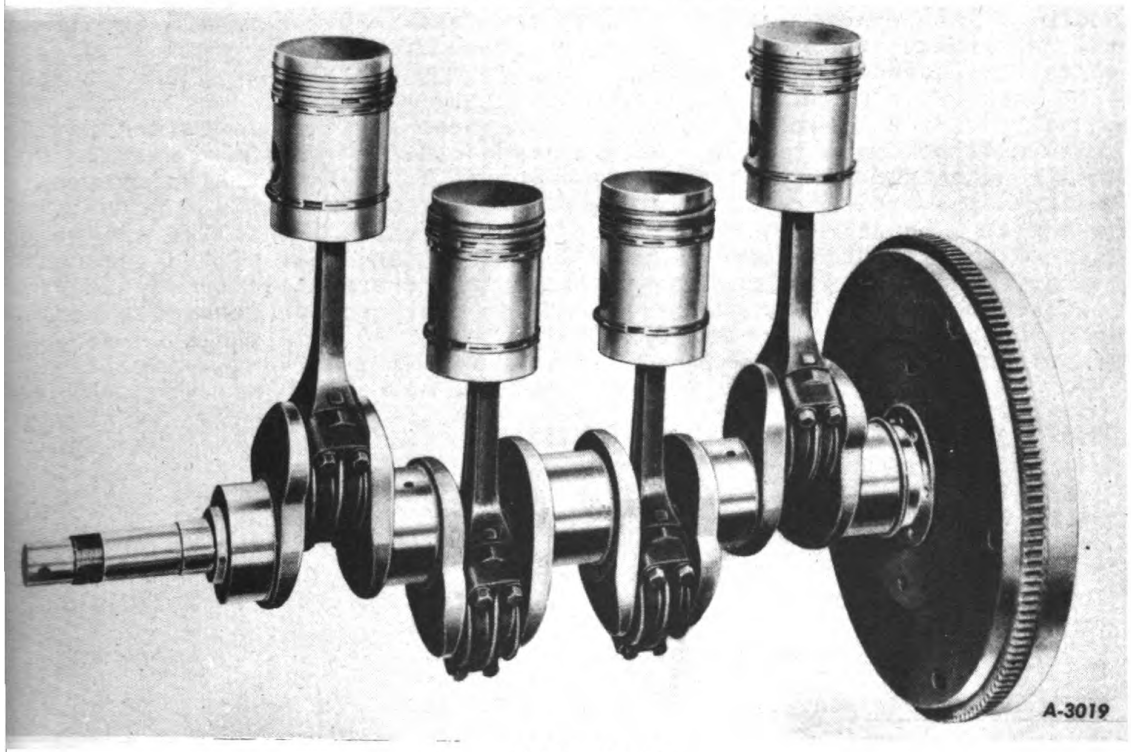
Dry liner type sleeves (37), *Illust. 6,* are used in this engine. They can be removed and replaced easily. They require no honing or boring after assembly. Standard replacement piston and sleeve sets are available for service replacement. Sleeve puller SE-1213 is available for removal of the sleeves.

Coat the outside of the sleeve with a light film of oil for easy installation. Where necessary, a wooden block held firmly across the top of the sleeve should be used when it is necessary to tap

ENGINE - Continued

CYLINDER SLEEVES - Continued

the sleeve into the bore. The engine need not be removed from the tractor to perform this operation. The sleeve should not be below the top surface of the crankcase; the top of the sleeve should be flush to .006 in. above the surface of the crankcase.



Illust. 7
Engine Crankshaft Assembly

CRANKSHAFT

Counterbalanced	Yes
Drilled for Pressure Lubrication	Yes
Bearing Journal, Diameter	3.2475 in.-3.2485 in.

The crankshaft (28), *Illusts. 6 and 7,* has Tocco-hardened bearing journals and is drilled for pressure lubrication of connecting rod bearings. The crankshaft is counterbalanced, the counterbalances being the integral part of the crankshaft. Bolts (5/8") hold the main bearing caps to the crankcase. Each bearing cap carries a number which corresponds to a number stamped on the camshaft side of the the crankcase. A torque wrench should be used when pulling down the main bearing cap nuts. The amount of torque is 125 ft.-lbs.

Replacement crankshafts with bearings are available in 1/32 in. undersize.

For servicing connecting rod and main bearings with the engine in the tractor, the oil pan removal calls for a special procedure as outlined under "Crankcase Oil Pan" in this section. However, when the engine is removed from the tractor the crankshaft is easily

REPAIR SECTION

ENGINE - Continued

CRANKSHAFT - Continued

removed. Take off the front cover as described under that heading, in this section. Remove the bolts from the flywheel (21) *Illust. 6,* and pull the flywheel from the shaft. Then remove the oil pan, the cap screws from the retainer plate (12), and the rear oil seal (25) and (26), and disconnect the connecting rods, remove the oil pump and the main bearing caps. When replacing, be sure that the bearing caps, bearings, crankshaft, journals, and crankcase are all clean and absolutely dry. When replacing the flywheel, draw the bolts up to 65 ft.-lbs. torque. Be sure the bolt locks cover the dowel pins.

Crankshaft Oil Seals

Front and rear oil seals are provided. The front seal is a combination felt and leather, located in the crankcase front cover. When assembling this seal, be sure that the felt side is toward the front of the crankcase.

The rear oil seal is the split type and the flywheel must be removed to replace this oil seal. When the oil leaks behind the flywheel, check the fit of the welch plug at the rear of the camshaft, replace the felt and check the rear main bearings for excessive wear.

CRANKSHAFT BEARINGS (STEEL BACK PRECISION)

Number	3
Material (Steel Back)	(Babbitt)
Total Length, Front and Rear	1-7/8 in.
Total Length, Center Thrust	2-3/4 in.
Running Clearance	.002 in. to .003 in.
End Clearance	.004 in. to .008 in.

When bearing clearance is excessive, replacement is necessary. The clearance may be checked by placing a .003 in. brass shim (1/4 in. x 1-1/2 in. long) lengthwise between the lower bearing and the crankshaft. If the clearance is not excessive, there should be a slight drag when turning the crankshaft with the spark plugs removed.

Check the end play by driving a wooden wedge between the crankshaft and the rear of the crankcase, forcing the shaft to the front with the front crankshaft thrust surface tight against the front thrust flange of the center bearing. Remove the wedge and measure the thrust flange clearance on the upper and lower bearing flanges.

Each bearing can be replaced without removing the crankshaft. To remove the upper half of the bearing shell insert a cotter pin, or its equivalent, which has had the rounded head flattened to form a "T", in the crankshaft journal oil hole. Then rotate the crankshaft to push out the bearing liner. The cap and bore are milled to receive the projection on the back of the bearing liner. The projection end is removed first. When replacing, rotate the shaft so that the projection enters last. The bearing backs, crankcase bore, and cap bore should be absolutely clean and dry when replacing shells.

ENGINE - Continued

CRANKCASE FRONT COVER

When the engine is removed from the tractor the crankcase front cover (43), *Illust. 8*, can be taken off after taking out the crank pin (32), *Illust. 6*, in the crankshaft, removing the nut (35) and nut lock (34) from the crankshaft, removing the fan belt, pulling the fan drive pulley (33), and removing key (17) from the crankshaft and the bolts from around the front cover (43), *Illust. 8*.

The crankshaft front oil seal (45) is located in the front cover and the leather lip of the seal is assembled away from the crankcase. The cover is doweled to the front plate (37) of the engine. The front crankcase support (46) may be left in place on the front cover when removing the cover.

The hour meter attachment fits through the plug hole on the right side of the cover.

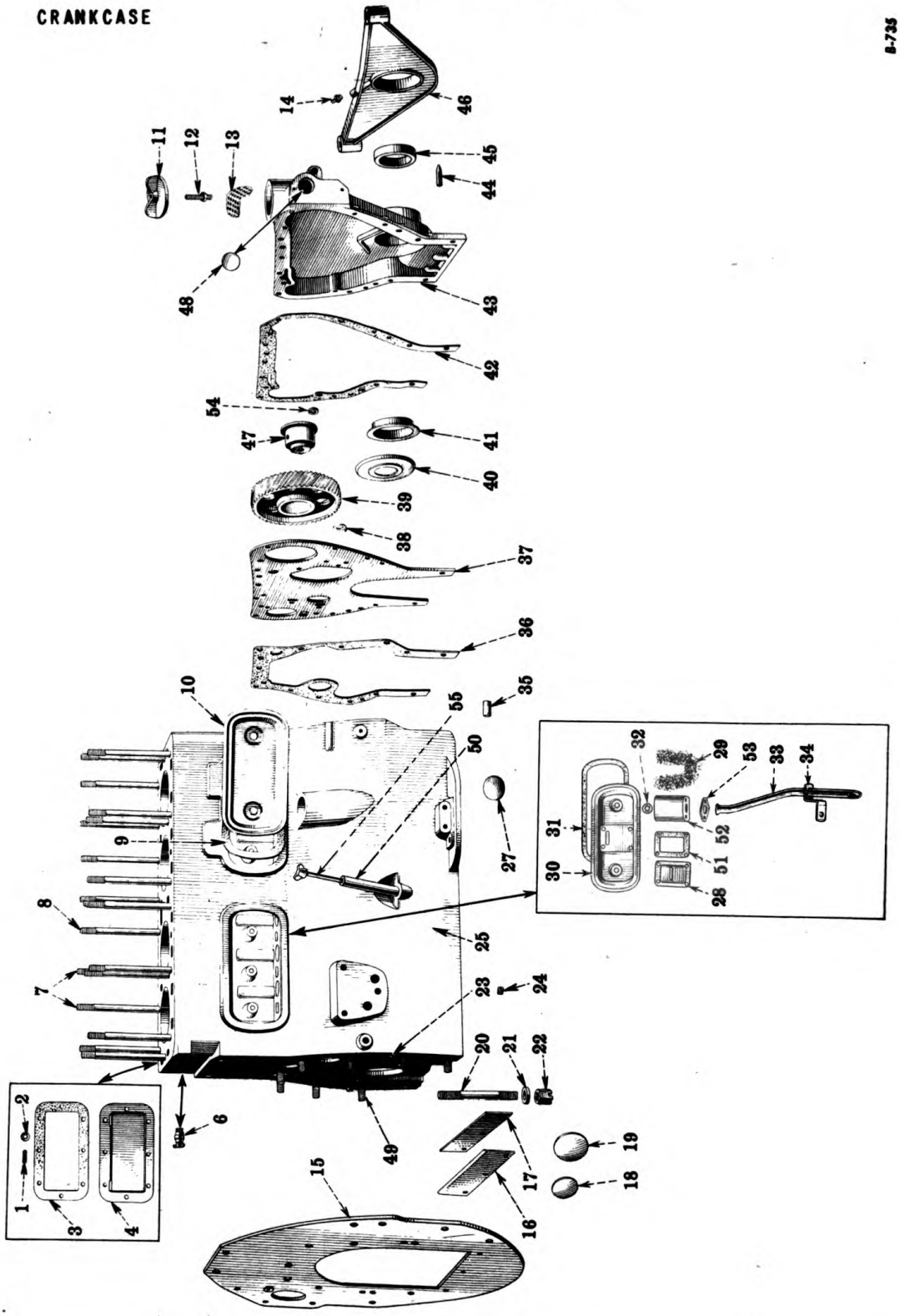
TIMING GEARS

The timing gear train is accessible when the crankcase front cover is off. These gears must be in their proper place to have the engine timed correctly. Have the crankshaft set for No. 1 top dead center. Line up similarly marked teeth for the magneto and camshaft gear and push the idler gear (39), *Illust. 8*, into place, matching the marked teeth on both the camshaft and crankshaft gears. The idler gear has a bushing which turns on the idler shaft. This shaft has a pin which is located in front of the engine block and prevents the shaft from turning. The tooth on the opposite side of the single punch mark of the idler gear is beveled for easy assembly.

REPAIR SECTION

ENGINE - Continued

CRANKCASE



Illust. 8
Exploded View of Crankcase.

ENGINE - Continued

CRANKCASE - Continued

Ref. No.	Description
1	Stud.
2	Washer.
3	Gasket.
4	Water header.
5	Starter pad cover.
6	Drain cock.
7	Stud, long.
8	Stud.
9	Gasket.
10	Side plate, front.
11	Oil filler cap.
12	Stud.
13	Screen.
14	Lubricator.
15	Rear engine support.
16	Gasket.
17	Dust seal.
18	Plug.
19	Plug.
20	Stud.
21	Washer.
22	Nut.
23	Dowel.
24	Oil header plug, 1/8". Oil hole clean out plug, 1/8".
25	Crankcase.
27	Distributor hole plug.
28	Breather baffle.
29	Breather element.
30	Side plate, rear.
31	Gasket.
32	Washer.
33	Breather pipe.
34	Clip.
35	Dowel.
36	Gasket.
37	Front plate.
38	Bolt lock.
39	Idler gear and bushing.
40	Oil flinger.
41	Oil deflector.
42	Gasket.
43	Front cover.
44	Timing pointer.
45	Oil seal.
46	Front support.
47	Idler gear shaft.
48	Hour meter pad plug.
49	Stud.
50	Oil gauge sleeve.
51	Breather body gasket.
52	Breather body.
53	Breather pipe flange.
54	Idler gear shaft lock washer.
55	Oil level gauge.

REPAIR SECTION

MEMORANDA

REPAIR SECTION

ENGINE CLUTCH

ENGINE CLUTCH

Size	13 inches
Manufacturer	Rockford
Type	Single-plate, over-center
Torque Capacity, Ft.-Lbs.	502
Throwout Bearing, Type	Ball
Pilot Bearing, Type	Ball

The hand-operated over-center type clutch, with ball bearing release, has two rollers in each release cam to prevent wear and binding.

The release mechanism has a clutch brake which facilitates faster shifting of the transmission gears. No adjustment of this brake is necessary.

Pins on the release carrier have bushings (8), *Illust. 1,* which fit into the release fork (12), reducing wear and friction to a minimum at this point. When replacing a fork, be sure to engage the bushings in the fork and have the ridged end of the bushings on the inside.

The clutch can be removed through the top of the main frame without disturbing the engine or transmission. It is necessary to remove the clutch when the transmission has to be removed.

REMOVAL OF THE CLUTCH

Before removing the engine clutch, lock the steering brake pedals forward, and tie back the steering clutch levers for additional clearance. Take out the cap screws around the edge of the floor plate to remove the plate. Engage the clutch.

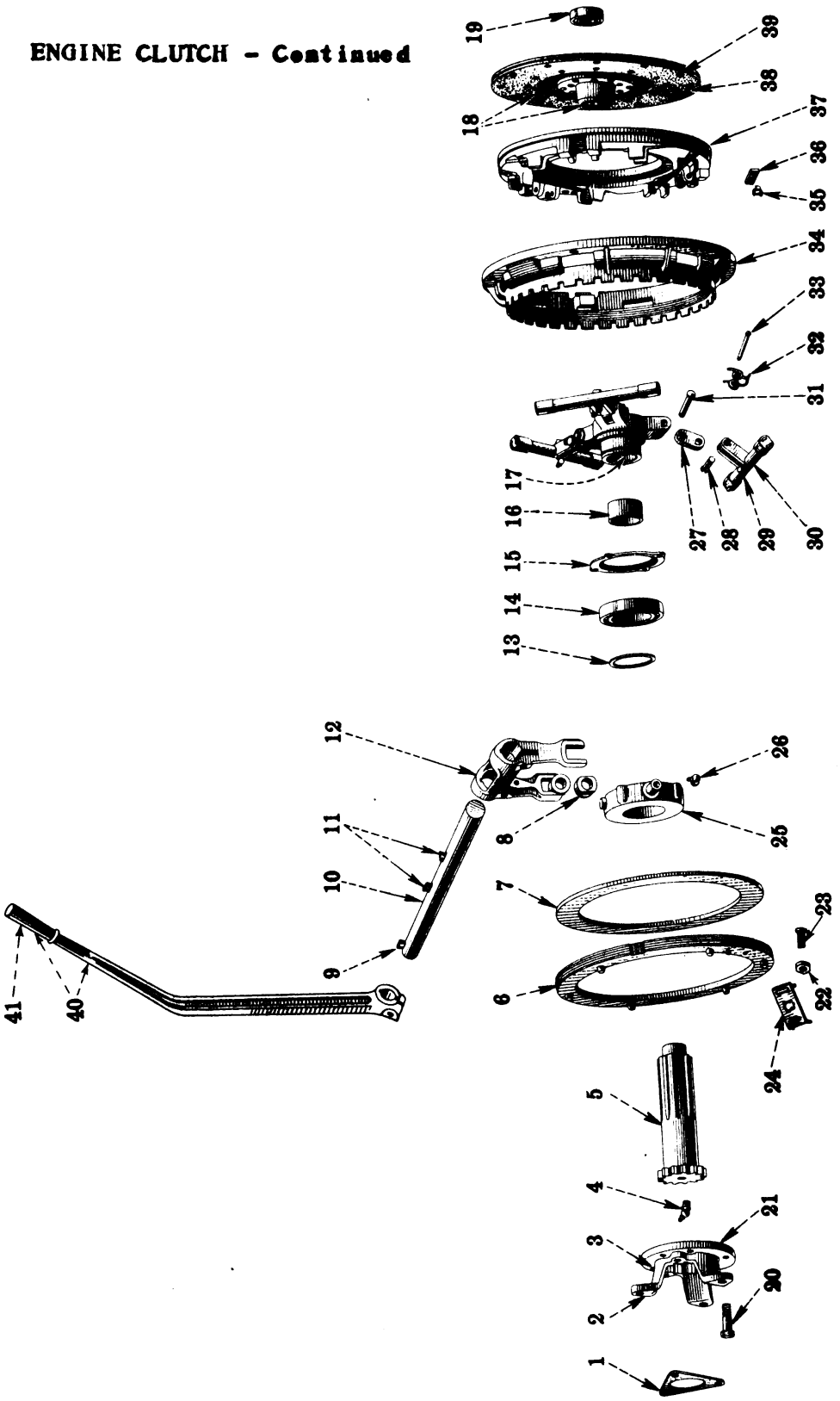
Remove the lock bolt from the engine clutch hand lever and two bolts from the release fork (12). Then drive the hand lever off the release shaft (10) and remove the lever key (9) with a small punch. With a bar through the holes provided in the fender side sheet, drive the release shaft (10) out of the fork until the fork keys (11) in the release shaft are accessible. Then revolve the shaft with pliers and drive the keys out with a small punch. Drive the release shaft clear out through the main frame. Lift the release fork (12) from the carrier and remove the bushing (8). Remove the bolts from the brake disk and clutch coupling (2), and move the coupling as far forward as possible. Then pry the shaft (5) forward as far as possible.

Run off the retaining screw from the transmission coupling (67), *Illust. 1, "Transmission" Section 12,* to permit removal of the coupling from the main frame. Run out the cap screws that hold the back plate (34), *Illust. 1,* to the flywheel. With a pinch bar, pry back the shaft (5) sufficiently to clear the pilot bearing (19).

The entire clutch assembly can then be lifted out of the tractor. The pilot bearing can be pulled out of the flywheel with a puller tool.

REPAIR SECTION

ENGINE CLUTCH - Continued



Illust. 1
Exploded View of Engine Clutch.

REPAIR SECTION

ENGINE CLUTCH - Continued

Ref. No.	Description	Ref. No.	Description
1	End plate.	22	Lock screw nut.
2	Coupling (13 teeth).	23	Lock screw.
3	Rivet.	24	Adjusting lock.
4	Lubricator.	25	Bearing carrier.
5	Shaft.	26	Release bearing lubricator.
6	Adjusting ring assembly.	27	Link.
7	Adjusting ring plate.	28	Link pin, short.
8	Release pin bushing.	29	Cam lubricator.
9	Lever key (Woodruff No. 18).	30	Camshafts.
10	Release shaft.	31	Link pin, long.
11	Fork key (Woodruff No. 13).	32	Return spring.
12	Release fork.	33	Return spring pin.
13	Snap ring.	34	Back plate.
14	Bearing.	35	Screw lock.
15	Clutch release bearing plate.	36	Cam block (set of 6).
16	Bushing.	37	Pressure plate.
17	Sleeve.	38	Facing package (2 woven facings).
18	Driven member with linings.		
19	Pilot bearing.	39	Tubular rivet.
20	Dowel bolt.	40	Clutch lever.
21	Clutch brake facing.	41	Handle.

REPAIR SECTION

ENGINE CLUTCH - Continued

REMOVAL OF THE CLUTCH - Continued
From Page 1

The shaft (5) can be pulled out, releasing the driven member (18), and the clutch coupling (2). If the clutch facing shows considerable wear or is rough and oil soaked, it should be replaced, providing the driven member plate is in good condition. When installing new facing, be sure that all rivets are well countersunk. If the plate is heat checked, scored, or warped, replace it with an entire new unit.

DISASSEMBLY AND REPAIR OF THE CLUTCH

To disassemble the clutch, remove the adjusting lock (24). Unscrew the adjusting ring (6) and take out the adjusting ring plate (7). By removing three return spring pins (33), the return springs (32) are released. The pressure plate assembly (37) is now free to come out. If this plate shows considerable heat discoloration, it should be replaced. Pull out the pins to free the camshaft assembly. If the links or pins show considerable wear, they should be replaced. Be sure the cams in the camshaft are in good condition.

Run out the cap screws in the clutch release bearing plate (15) and revolve this plate so that a punch can be inserted into the cap screw holes. Then the bearing carrier (25) can be driven off the sleeve. Pry out the snap ring (13) and pull the bearing off the release sleeve (17). Sleeve bushings (16) are replaceable. They are furnished to size and need only be pressed into place. The shaft diameter is 1.745-inch to 1.747-inch. The running clearance between the shaft and bushings is .003-inch to .007-inch. Replace the bushings if the clearance is excessive. The ends of the bushings should be flush with the ends of the sleeve (17).

Cam blocks (36) ir the pressure plate are also replaceable.

REASSEMBLY OF THE CLUTCH

Clean out all grease fittings and the drilled shaft. To reassemble the clutch, follow this procedure: With the clutch release bearing plate (15) assembled to the sleeve (17), press the bearing (14) onto the sleeve. Replace the snap ring (13) and the bearing carrier (25) over the bearing and replace the cap screws in the bearing plate. Then engage the camshaft assembly, link, and sleeve and place the camshafts in the pressure plate.

Put the back plate (34) into position and replace the three return springs and return spring pins in the pressure plate (37). The springs bear against the drive studs in the back plate. Slip the adjusting ring plate (7) into the back plate and screw in the adjusting ring (6).

Replace the driven member (18), which should be free to move on the shaft but not loose. If the splines on either the shaft (5) or the driven member are damaged, the units should be replaced.

To facilitate final adjustment of the clutch, the distance from the face of the back plate to the face of the driven member should be 9/16-inch with the clutch in the engaged position. The face of the flywheel should be checked. If it is rough, it should be removed and smoothed either with emery cloth or on a lathe.

ENGINE 'CLUTCH - Continued

REPLACEMENT OF THE CLUTCH

To replace the clutch in the tractor, drive the pilot bearing (19) into the flywheel first. Lower the clutch assembly into the main frame. Push the shaft (5) into the pilot bearing. Line up the cap screw holes in the back plate with those of the flywheel and then run in the cap screws.

Set the clutch release fork (12) into position so that the bushings at the bottom line up correctly with the pins of the carrier. Be sure the bushings are replaced with the flange facing the sleeve (17), and the lubricator (26) facing the top of the tractor in order to be accessible.

Then slide the release shaft (10) through the main frame into the release fork (12). The fork keys (11) should be inserted into the release shaft and the shaft driven into position in the fork. Assemble the clutch hand lever to the end of the shaft. Replace the cap screw and put the two cap screws in the release fork. Be sure that the fork is centered over the carrier.

Push the clutch all the way forward in order to replace the coupling (2). Pry the shaft forward as far as possible, replace the transmission coupling, place the clutch coupling (2) in position, and replace the dowel bolts (20) at the rear of the clutch coupling. Pry back the shaft so that the teeth on the shaft and coupling completely engage. Bring up the coupling end plate (1) and tighten the bolts in the coupling.

Adjust the clutch according to instructions in the *"Operations Section"*. Then replace the floor plate.

REPAIR SECTION

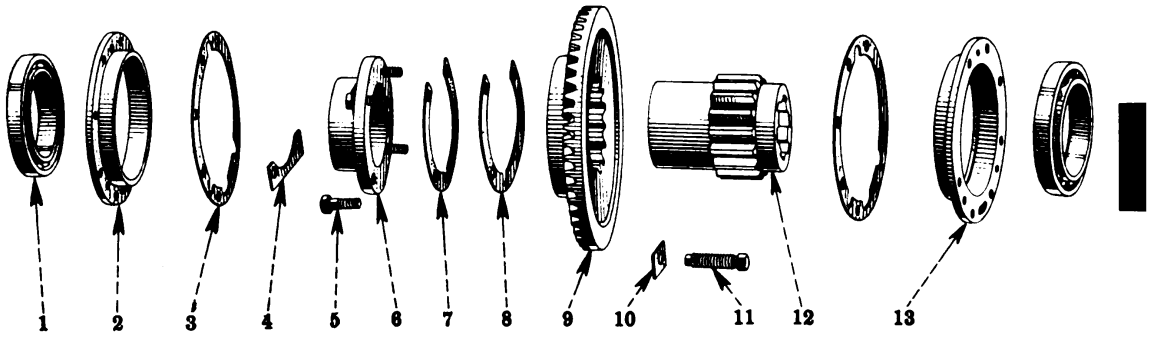
MEMORANDA

REPAIR SECTION

FINAL DRIVE

DRIVE BEVEL GEAR

The drive bevel gear assembly is located in a separate compartment directly behind the transmission and between the two steering clutch compartments. A single pinion and bevel gear transmit the engine torque from the transmission to one spur gear reduction, driving the track drive sprockets. The bevel gear and pinion are lubricated from the transmission compartment; two leather oil seals, spring-loaded, with the lips turned in, prevent oil from entering the steering clutch compartment. The assembly can be removed after the steering clutches have been taken out.



Illust. 1
Exploded View of the Drive Bevel Gear.

Ref. No.	Description
1	Bearing.
2	Bearing cage, left hand.
3	Gasket.
4	Lock.
5	Dowel bolt.
6	Spacer.
7	Shim, heavy.
8	Shim, light.
9	Drive bevel gear with bevel pinion and shaft.
10	Nut lock.
11	Set screw.
12	Hub.
13	Bearing cage, right hand.

PREPARATION FOR REMOVAL OF THE DRIVE BEVEL GEAR

Remove the seat and fuel tank. Then drain the oil from the transmission.

Pull the steering clutch return springs from the steering clutch release levers, run out the lock bolts from the release levers and pry the levers off the release shaft fork. Then run out the cap screws from the release shaft bearings and remove the cap screws from the steering clutch lubricators. Remove the main frame cover. Remove the steering clutches as outlined under *"Steering Mechanism," Section 10.*

REMOVAL OF THE DRIVE BEVEL GEAR

Back out the bevel gear set screw (11), *Illust. 1* in the main frame. Run out the cap screws in the spacer (6). Assemble puller cap screws in the right-hand bearing cage (13) and run them in evenly. The right-hand bearing and gasket come out with the cage. Drive the hub (12) out of the right side of the bevel gear compartment.

Then assemble the puller cap screws in the left-hand bearing cage (2) and run them in evenly. The left-hand bearing and gasket come out with the cage. Lift out the gear (9) and the spacer (6).

REPAIR OF THE DRIVE BEVEL GEAR

If the bevel gear is to be replaced with a new one, the bevel

DRIVE BEVEL GEAR - Continued

pinion should also be replaced at the same time. These parts are furnished in matched pairs.

REPLACEMENT OF THE DRIVE BEVEL GEAR

Assemble the right-hand bearing to the bearing cage (13). The outer race of the bearing is narrower than the inner race. The flush side of the bearing is always to the right side *as shown in the Service Chart, Section 13.* Press this unit onto the hub (12). Then assemble the clutch coupling (13), *Illust. 1, "Steering Mechanism," Section 10,* to this assembly.

Lower the gear into the compartment. Insert the hub and bearing assembly into the gear bore from the right steering clutch compartment. Then line up the splines of the hub and gear and drive the hub and bearing cage assembly into the main frame. Be sure to line up the bolt holes and have the gasket assembled to the bearing cage. The oil drain in the bearing cage must be at the bottom.

Assemble the bearing cage cap (18), *Illust. 1, "Steering Mechanism," Section 10,* to the right bearing cage and draw up the cap screws and nuts tight.

Slide the spacer (6), *Illust. 1* over the hub from the left steering clutch compartment. Then place the approximate number of required shims between the spacer and gear and turn the bolts, with their locks, loosely into place.

Assemble the left bearing (1) to its bearing cage (2). This cage does not have a ledge to stop the bearing, as does the right one. This bearing also has a narrow outer race. The flush side of the bearing faces to the right and must be assembled to the bearing cage this way. Then drive the bearing cage and bearing into the main frame and over the bevel gear hub. Be sure to have the gasket in place and line up the oil drain holes in the bottom. Now assemble the clutch coupling (13), *Illust. 1, "Steering Mechanism," Section 10,* to the left end of the hub. Then assemble the bearing cage cap (18) to the left bearing cage and draw up the cap screws and bolts tight.

Tighten the bolts which were assembled when the shims were placed between the spacer and gear.

ADJUSTMENT OF THE DRIVE BEVEL GEAR

Check the backlash of the gears. This can be done by wedging the pinion and then rocking the bevel gear. A dial indicator touching the face of one of the teeth in the ring gear will give the exact backlash which should be .010" to .012". If the backlash does not measure up to these specifications use more, or less, shims between the spacer and the hub of the gear to obtain this setting.

If a new bevel gear and pinion have been installed, the pinion must be adjusted for the proper cone setting of the pinion teeth with those of the gear. This is done before replacing the transmission and main frame covers. Do not draw up the bolts tight in the spacer and gear, and omit the instructions in the preceding paragraph.

Place a .625" gauge between the toe end of the pinion and the machined diameter of the bevel gear's hub (9). Drive the bevel pinion shaft to the rear so that this gauge can be held in place. This gauge may be made from 5/8" key stock, 5/8" drill rod, or any narrow object about 6" long, measuring .625" in diameter. Since there are slight variations in key stock and drill rod, select a piece exactly to size.

With the pinion held firmly against the gauge and gear hub, insert the proper number of shims between the bevel pinion bearing cage and the main frame. The shims will hold the gauge in place after drawing the cap screws tight in the bearing cage. The gauge must not contact the spacer.

DRIVE BEVEL GEAR - Continued

Now adjust the shims to give the backlash required as outlined previously. There is apt to be a slight run-out present on the machined surface of the bevel gear's hub. Do not place the gauge at the tightest point or at the loosest point, but at some point half way between the two.

As an extra check, apply red lead or Prussian blue to the teeth of the pinion. Powdered red lead mixed with a small amount of oil can be formed into a cake and applied to the pinion teeth with a stencil brush. Revolve the gears in the forward direction, using the pinion to drive the gear. Inspect the teeth of the pinion where the paint has been removed. The tooth bearing resulting will be on the toe end of the teeth and should be centered up and down on the active portion of the tooth profile. If necessary, readjust the bevel pinion bearing cage shims to produce this result.

Set the bevel gear deflection set screw (11), *Illust. 1,* to .020" clearance between the end of the screw and the back side of the bevel gear. Bend the lock (10) after making the adjustment.

Bearing cage caps (18) and clutch couplings (13), *Illust.1, "Steering Mechanism," Section 10,* can now be removed so that the steering clutches can be assembled.

Assemble the steering clutches, transmission, and main frame covers and other items removed. Be sure to refill the transmission case with the proper grade of lubricant.

SPROCKETS AND SPROCKET DRIVE

The power is transmitted through the steering clutches to the sprockets and sprocket drives. The sprocket-drive gears and sprockets are ball-bearing-mounted on the stationary pivot shaft. These bearings are sealed with labyrinth bracket seals and two self-adjusting, floating, diaphragm-type seals. Each sprocket is reversible. It can be removed from its hub, reversed, and placed back on the same side of the tractor, thereby utilizing both sides of the teeth.

REMOVAL OF SPROCKETS AND SPROCKET DRIVE

Lock the steering brakes and support the steering clutches when removing the sprocket drive parts. Take off the track chain, jack up the tractor, and remove the track frame. After the track frame is removed, run off the cap screws in the bracket cap (46), *Illust. 2,* to free the cap. The shield (47) is removed when the track frame is taken off. Take out the cap screws from the end of the pivot shaft (15) and pull the pivot bearing (44), the pivot bracket (43), the guard (42), the gasket (41), and the oil seal (40) off the shaft. The guard can be separated from the bracket by running out the cap screws, and the oil seal can also be loosened from the bracket if the pegs stick in the bracket. Run out the cap screws that hold the dirt deflector (39) to the sprocket carrier (29) so that the bearing retainer (38) and gasket (37) can be removed.

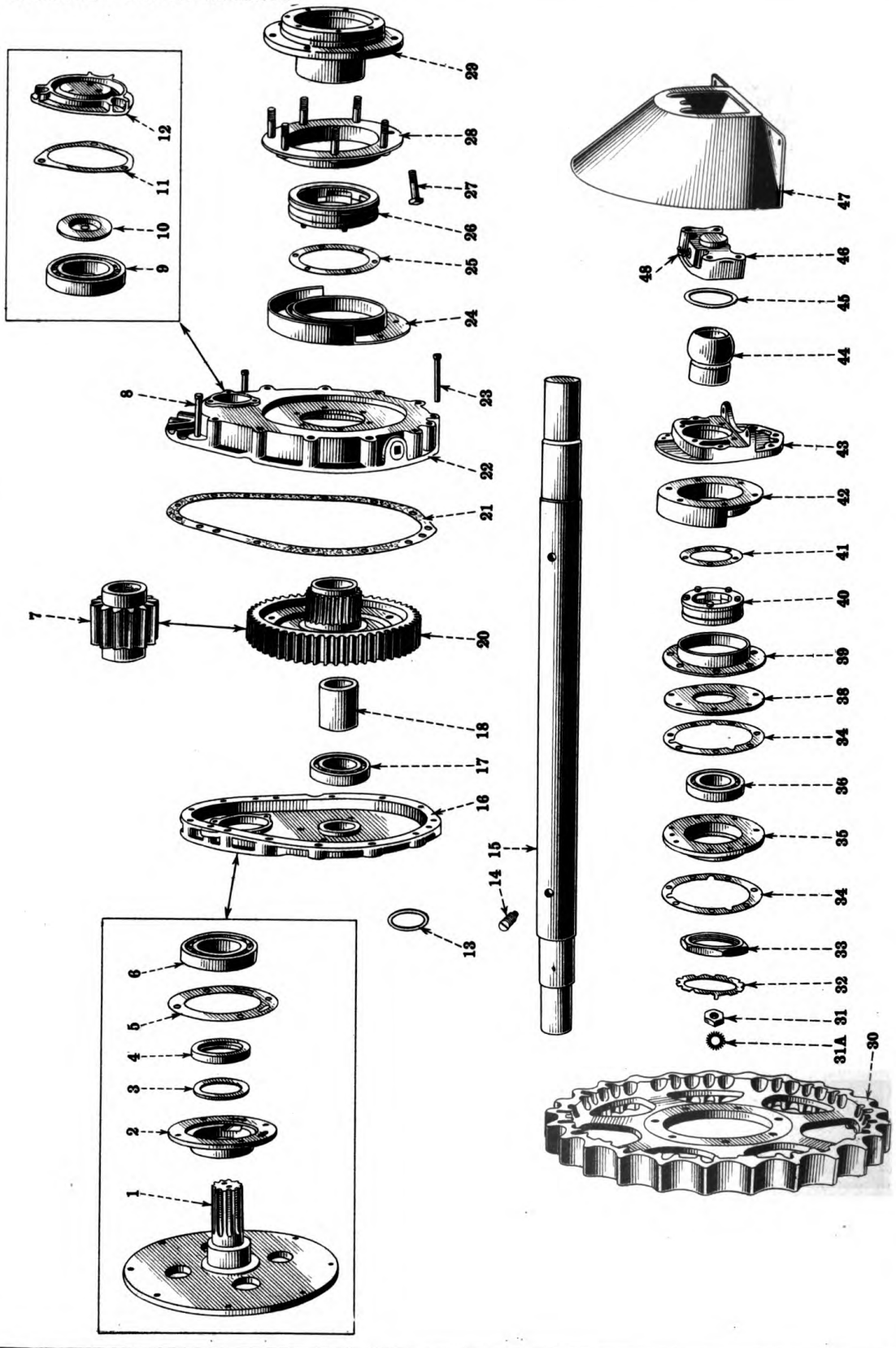
Run in the puller cap screws evenly on the bearing cage (35) and remove it with the bearing (36) and the gasket (34). The bearing can then be removed from the cage. Bend back the nut lock (32) and run out the carrier nut (33) with a box wrench. Then pry off the sprocket (30) with the carrier (29) and dirt deflector (28) from the drive gear (20). The carrier can be taken off the sprocket by bending back the bolt locks and removing the bolts. This also frees the dirt deflector.

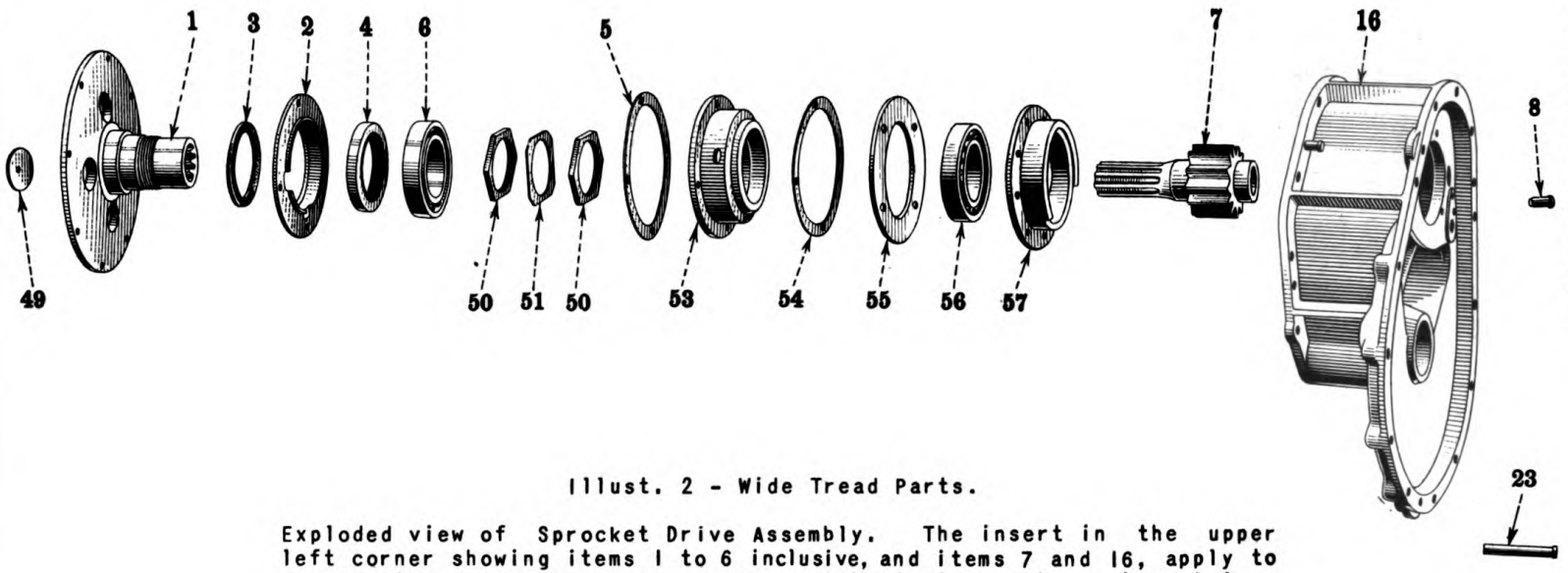
Run out the cap screws in the guard (24) and remove the guard from the labyrinth oil seal (26). The spacer (18) can also be re-

(Continued on page 6)

REPAIR SECTION

SPROCKET DRIVE ASSEMBLY





Illust. 2 - Wide Tread Parts.

Exploded view of Sprocket Drive Assembly. The insert in the upper left corner showing items 1 to 6 inclusive, and items 7 and 16, apply to regular tread tractors only. Items with similar numbers shown below, as well as items 49 to 57 inclusive, apply only to wide tread tractors.

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
1	Pinion shaft.	15	Pivot shaft.	29	Carrier.	44	Pivot bearing.
2	Bearing retainer.	16	Gear housing.	30	Sprocket (27 teeth).	45	Gasket.
3	Felt washer.	17	Bearing.	31	Bolt nut.	46	Bracket cap.
4	Oil seal.	18	Spacer, long.	31A	Bolt lock washer.	47	Shield.
5	Gasket.	20	Drive gear (57 teeth), complete with hub.	32	Nut lock.	48	Pivot lubricator.
6	Bearing.			33	Carrier nut.	49	Plug.
7	Pinion (12 teeth).			34	Gasket.	50	Nut.
8	Dowel, upper.	21	Gasket.	35	Bearing cage.	51	Nut lock.
9	Outer bearing.	22	Gear housing, outer.	36	Bearing.	53	Bearing cage.
10	Retainer washer.	23	Dowel, lower.	38	Bearing retainer.	54	Gasket.
11	Gasket.	24	Guard assembly.	39	Dirt deflector.	55	Bearing retainer.
12	Bearing cap.	25	Gasket.	40	Oil seal.	56	Bearing.
13	Pivot shaft oil seal ring.	26	Oil seal.	41	Gasket.	57	Bearing cage.
		27	Bolt.	42	Guard assembly.		
14	Pivot shaft set screw.	28	Dirt deflector.	43	Pivot bracket.		

REPAIR SECTION

SPROCKETS AND SPROCKET DRIVE - Continued

moved. Run out the cap screws in the pinion bearing cap (12) to remove the cap and the gasket (11). Then run out the two cap screws and remove the retainer (10). Remove all cap screws around the outside of the sprocket drive gear housing (22). Then assemble the puller cap screws and run them up evenly to remove the cover. The sprocket drive gear (20) can then be pried off the pivot shaft (15). Pinion (7) can now be removed.

To remove the carrier or gear housing (16) take out the cap screws and pull the unit off. The bearing retainer (2), felt washer (3), oil seal (4), gasket (5), and the bearing (6) all come out with the carrier. The pivot shaft oil seal ring can now be replaced.

To replace the pinion shaft (1) remove the steering clutches before removing the carrier (16). Take cap screws out of bearing retainer (2) through holes in the pinion (1). The carrier can then be removed and pinion with parts lifted from main frame.

REPLACEMENT OF SPROCKETS AND SPROCKET DRIVE

NOTE: Be sure to use all new oil seals, gaskets, and oil seal ring.

Put a new oil seal ring over the pivot shaft (15), *Illust. 2,* against the main frame. Be sure this is in the proper position to prevent leakage of oil. Then assemble the carrier (16) to the main frame, drive in the dowel pins, and secure with cap screws.

Assemble the felt washer (3) to the bearing retainer (2), and then press the oil seal (4) into the retainer. The lip of the leather oil seal faces the outside of the tractor. Press bearing (6) into the retainer (2). Shellac the gasket (5) to the retainer and assemble the unit over the pinion shaft (1). Insert the assembly into the main frame through the steering clutch compartment and secure it to the carrier (16). Be sure that the oil holes in the bearing retainer are at the bottom.

The steering clutches can now be replaced as outlined in the *"Steering Mechanism" Section 10.*

Where the carrier casting has not been removed, proceed as follows:

Drive the inner bearing (17) on the pivot shaft (15), slide the spacer (18) on the pivot shaft and bring the drive gear (20) into place. Then drive the gear over the bearing. Place the outer gear housing (22) and the gasket (21) in position with the dowel pins (8) and run in the cap screws. Drive the outer bearing (9) into position over the pinion shaft (1). Then replace the retainer (2), the gasket (5), and the bearing cap (12).

Now replace the gasket and the oil seal and the guard (24) to the outer gear housing (22). The oil seal should be placed with the smooth side out and the anchor pins engaging the holes in the housing. Assemble the carrier (29) and the dirt deflector (28) to the sprocket (30) with the bolts and bolt locks. Slide the sprocket carrier over the pivot shaft. Engage the spline of the sprocket carrier on the spline of the gear and push in until the hub seats on the drive gear. Then run in the carrier nut (33) and bend back the nut lock (32).

Assemble the outer bearing (36) to the bearing cage and drive the assembly on the pivot shaft, being sure to line up the holes on the bearing cage with those in the carrier.

Secure the dirt deflector (39), the bearing retainer (38), and the gasket (37) to the carrier. Replace the oil seal (40) with the smooth side facing the retainer. Replace the pivot bracket (43) and guard (42), making sure that the holes in the bracket engage the anchor pins on the oil seal. With the bearing in

SPROCKETS AND SPROCKET DRIVE - Continued

position, secure it to the pivot shaft with cap screws. Secure the bracket cap (46), with the gasket, to the bracket.

Replace the track frame and the track chain.

REMOVAL OF SPROCKETS AND SPROCKET DRIVE FOR THE WIDE TREAD TRACTOR

Before removing the carrier (16), *Illust. 2,* remove the steering clutches. Then turn the pinion shaft (1) so that the cap screws in the bearing retainer (2) and the bearing cage (53) are accessible. Assemble puller cap screws to the carrier (16) after taking out the bolts which hold it to the main frame. Run up the puller cap screws evenly to withdraw the assembly.

The pinion shaft (1) and the parts attached to it are removed through the steering clutch compartment.

The bearing cage (53) may come out with the carrier (16). If it does not, pull the cage from the bearing (6). Bend back the nut lock (51) and unscrew the two nuts (50) (3-3/4" across flats). The bearing (6), retainer (2), oil seal (4), and felt washer (3) can then be removed.

The pinion (7) may be pried out of the carrier (16) as is done on the regular tread tractor if so desired. If the carrier is to be removed anyway, allow the pinion to remain assembled until the carrier is pulled from the main frame. Then run off the cap screws holding the bearing retainer (55) and the bearing cage (57) to the carrier. Puller cap screws can be used to pull the bearing cage (57), bearing (56), and the pinion (7) from the carrier.

REASSEMBLY OF THE CARRIER FOR THE WIDE TREAD TRACTOR

Press the bearing (56) into the bearing cage (57) and then press this unit on the pinion (7). The assembly can then be pressed into the carrier (16) and the bearing retainer (55) can be secured with the cap screws. Press the bearing cage (53) with gasket (54) into the carrier. Be sure that the oil drain hole in the bearing cage lines up with the hole in the carrier.

Then fasten the carrier to the main frame.

Assemble the felt washer (3) to the bearing retainer (2) and press in the oil seal (4), being sure that the lip of the oil seal faces the outside of the tractor. Put this assembly on the pinion shaft (1) and then press in the bearing (6). Replace the nuts (50) with their lock (51) between them. Be sure to bend the lock over each nut.

Insert this assembly into the main frame through the steering clutch compartment and secure the assembly to the carrier (16). Turn the pinion shaft (1) so that the bolt holes line up with the holes in the flange on the pinion shaft.

REPLACEMENT OF SPROCKETS AND SPROCKET DRIVE FOR THE WIDE TREAD TRACTOR

The rest of the replacement procedure for the wide tread model is identical with that used for the regular tread as described previously.

REPAIR SECTION

MEMORANDA

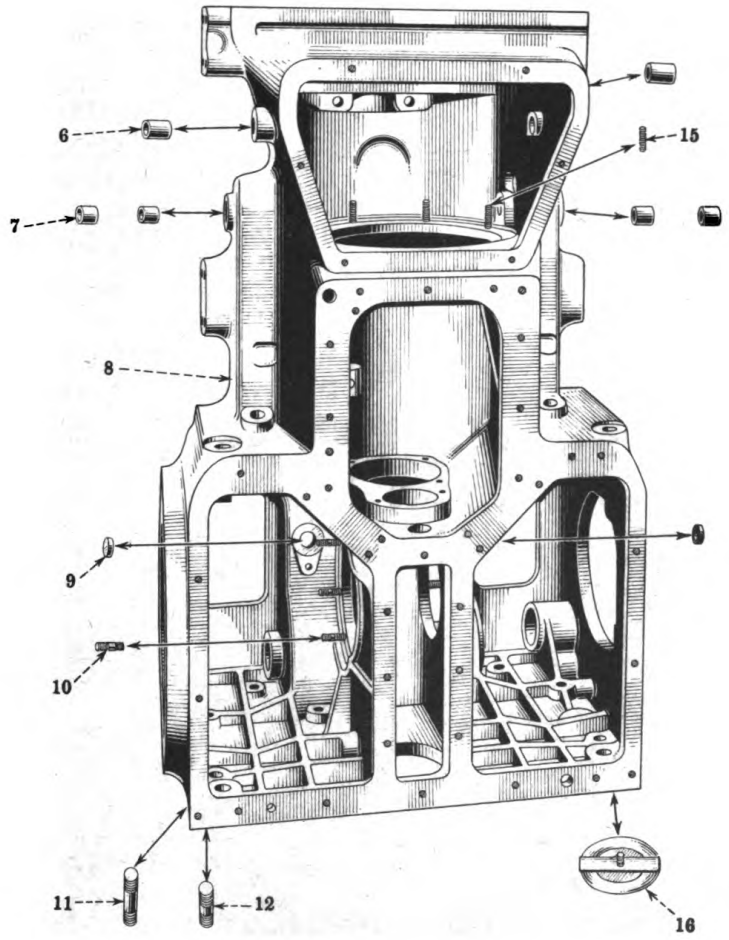
REPAIR SECTION

FRAME

MAIN FRAME

A heavy reinforced casting houses the transmission, bevel gear and pinion, steering clutches, and steering brakes.

Heavy channels of steel are securely bolted to the main frame casting and tied in front by the heavy radiator base. This rugged foundation absorbs stresses and strains.



Illust. 1
Exploded View of the Main Frame Showing
Plugs, Studs, and Bushings.

Ref. No.	Description	Ref. No.	Description
6	Clutch shaft bushing.	11	Drawbar guide stud, lower.
7	Brake shaft bushing.	12	Drawbar guide stud, upper.
8	Main frame, complete.	15	End cover stud.
9	Pivot shaft cup plug.	16	Steering clutch lubricating port cover.
10	Bevel gear bearing cage stud.		

REPAIR SECTION

TRACK FRAME

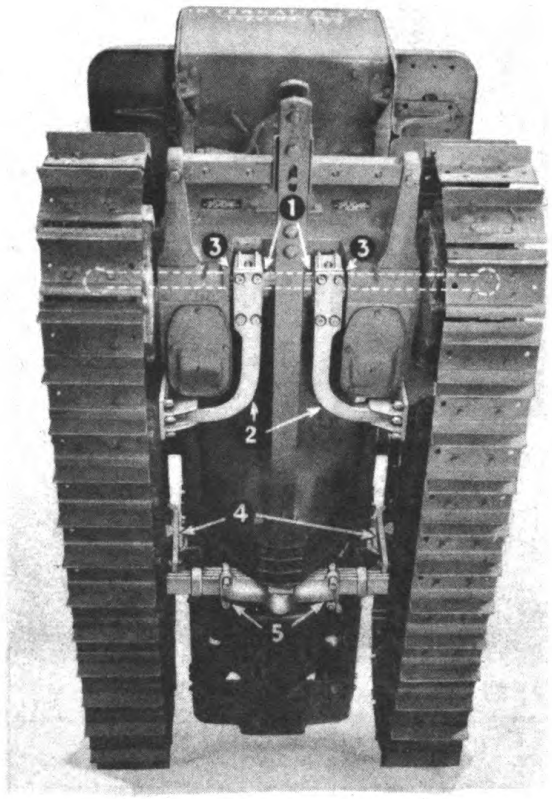
The front idler, track idlers, and track rollers are attached to heavy welded-steel channel-constructed track frames. They are pivoted by a ball-and-socket on the ends of the pivot shaft. Each track is free to oscillate vertically independent of one another. This prevents leverage strains being imposed on the pivot shaft due to the slight lateral deflection of the track frame. The equalizer spring (5), *Illust. 2,* contacts the track frame and the roller-type stabilizers (4) maintain the track spacing (the roller is attached to the main frame side channels and the guide is attached on top of the frame). Heavy steel diagonal braces are bearing-mounted at the center of the pivot shaft. They keep the track frame in upright position but allow vertical oscillation.

REMOVAL OF THE TRACK FRAME

Take off the track chain, jack up the tractor. Remove the sprocket shield (47), *Illust. 2, "Final Drive," Section 5,* pivot cap (46) and bracket (43), the front stabilizer roller guide (4), *Illust. 5,* and the bolts in the diagonal brace (7), *Illust.6,* at the pivot shaft.

DISASSEMBLY OF THE TRACK FRAME

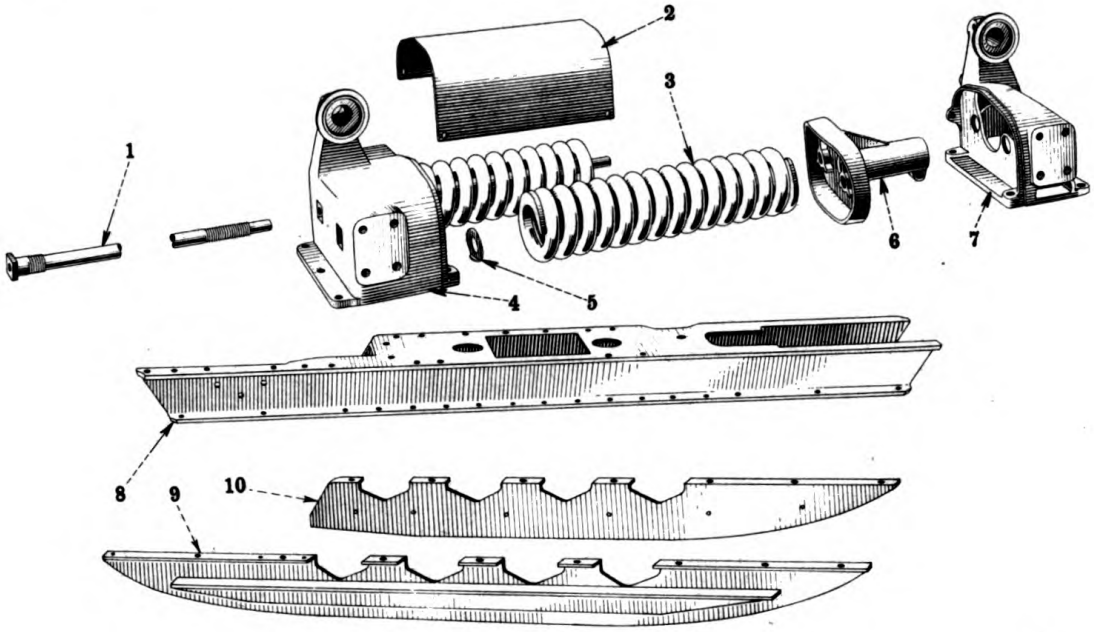
After the outer (9), *Illust. 3,* and inner (10) track shields are removed, the track rollers can be freed by running out the cap screws in each side. Then remove



Illust. 2.- Track Stabilizer Construction
1. Track Frame Pivot
2. Diagonal Brace
3. Pivot Bearings
4. Stabilizer Roller Guide
5. Equalizer Spring

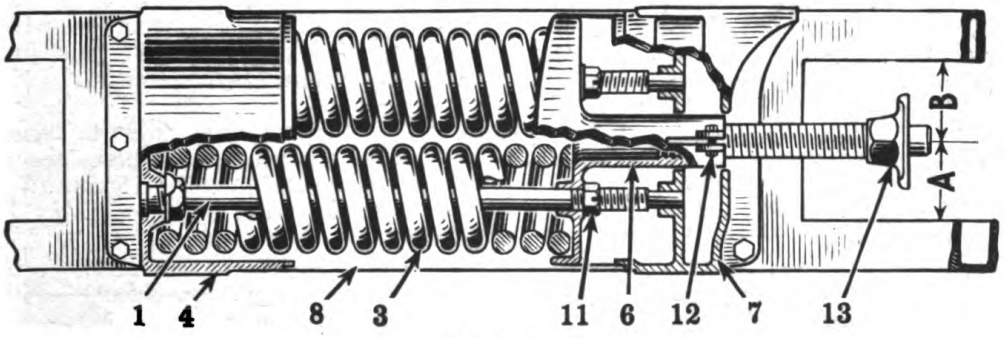
REPAIR SECTION

TRACK FRAME AND SPRING



Illust. 3
Exploded View of Track Frame with Recoil Spring.

(1) Spring adjusting rod.
(2) Spring guard.
(3) Recoil spring.
(4) Spring retainer, rear.
(5) Lock washer.
(6) Spring retainer, front.
(7) Recoil spring guide.
(8) Track frame.
(9) Shield, outer.
(10) Shield, inner.



Illust. 4

Cross Section of Track Front Idler Recoil Spring Assembly. 1. Spring Adjusting Rod. 3. Recoil Spring. 4. Rear Spring Retainer. 6. Front Spring Retainer. 7. Recoil Spring Guide. 8. Track Frame. 11. Castellated Nut. 12. Adjuster Rod Lock Bolt. 13. Adjuster Rod.

the spring guard (2). Unscrew the cap screws in the adjuster rod cross plate (16), *Illust. 6, "Track," Section 11,* and slide the front idler off the track frame (8), *Illust.3.* Run out the cap screws in the spring guide (7) to remove the guide. Run out the adjusting nuts evenly on the adjusting rod (1), after which the front spring retainer (6) and the springs (3) can be slid off the

REPAIR SECTION

TRACK FRAME AND SPRING - Continued

adjusting rod. Then run out the cap screws holding the spring retainer (4) to the track frame (8). The adjusting rods can be freed inside the spring retainer by removing the hexagonal jam nuts.

REASSEMBLY OF THE TRACK FRAME

Reassembly is the reverse of disassembly. Be sure to run up the adjusting nuts evenly until the cotter keys can be inserted in the adjusting rod. The dimensions "A" and "B", *Illust. 4*, should be equal. Adjust nuts on the rods to do so. This is necessary to prevent the front idler from cocking to the side when it is replaced on the tractor. The springs allow the front idler to recoil under shock but exert no tension on the track when in normal operating position.

REPLACEMENT ON THE TRACTOR

The track frame assembly is replaced on the tractor in the reverse order of removal.

TRACK FRAME PIVOT

A heavy pivot shaft (15) *Illust. 2 in the "Final Drive," Section 5*, extends through the rear of the tractor from track to track. The driving sprockets (30) revolve around this stationary axle. The track frames are mounted on this same axle through a ball and socket joint (43), (44) and (45), thus eliminating any twisting or leverage loads at this point. Heavy steel diagonal braces (7), *Illust. 6*, are bolted to the track frames and pivoted at mid-point of this shaft.

The pivot shaft needs replacement only in case of breakage. To remove the pivot shaft, it is advisable to pull the pin from the front end of the drawbar and remove it, remove the cap screws from each diagonal brace at the pivot shaft, jack up the tractor at the rear end, remove the sprocket drive gears and housings down to the main frame, remove the diagonal brace bearings (4) and (6) from the pivot shaft, remove the drawbar braces, remove the pivot shaft locating pins (14), *Illust. 2, "Final Drive," Section 5*, and scrape the paint away from the pivot shaft.

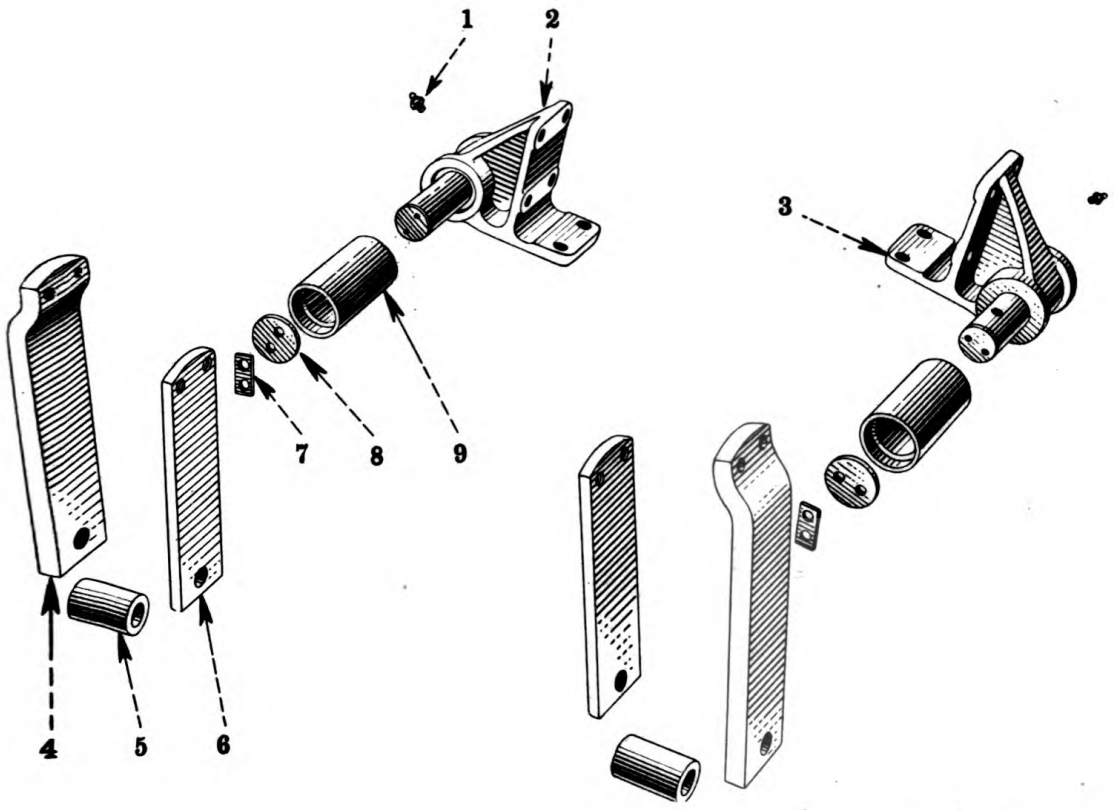
When replacing the pivot shaft, be sure to install new rubber rings between the main frame and the carrier casting.

TRACK FRAME GUIDE

The track frame guides which maintain the track spacing consist of rollers attached to brackets bolted to the main frame side channels, and outer and inner plates attached to the track frame. Outer and inner plates (4) and (6), *Illust. 5* should be removed whenever the track frame is removed. Two bolts in the retainer washer (8) limit the travel of the rollers (9) on the pivot of the brackets (2) and (3).

REPAIR SECTION

TRACK FRAME GUIDE - Continued



Illust. 5
Exploded View of the Track Frame Guide.

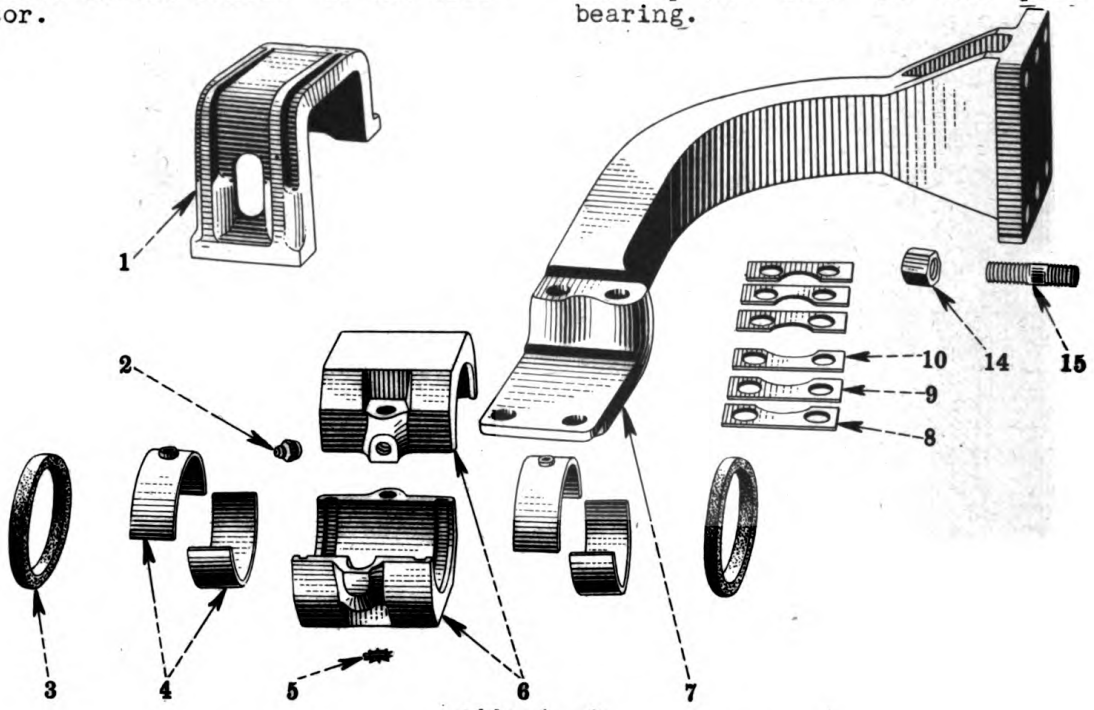
Ref. No.	Description	Ref. No.	Description
1	Lubricator.	6	Plate, inner.
2	Bracket, complete, L. H.	7	Bolt lock.
3	Bracket, complete, R.H.	8	Retaining washer.
4	Plate, outer.	9	Roller.
5	Spacer.		

REPAIR SECTION

TRACK FRAME DIAGONAL BRACE

The diagonal brace (7), *Illust. 6* keeps the tracks in vertical alignment and extends from a fixed position on the track frames to a pivot bearing (6) on the pivot shaft in the center of the tractor.

Remove the cap screws from the diagonal brace clamps (1) to take off the diagonal brace when removing the track frame. Shims (8), (9) and (10) are used to take up the wear in the pivot bearing.



Illust. 6
Exploded View of the Diagonal Brace.

Ref. No.	Description	Ref. No.	Description
1	Clamp.	7	Diagonal brace, L.H. Diagonal brace, R.H.
2	Lubricator.		
3	Felt.	8	Shim, light.
4	Bushing (set of 4).	9	Shim, medium.
5	Washer.	10	Shim, heavy.
6	Bearing.	14	Nut.
		15	Stud.

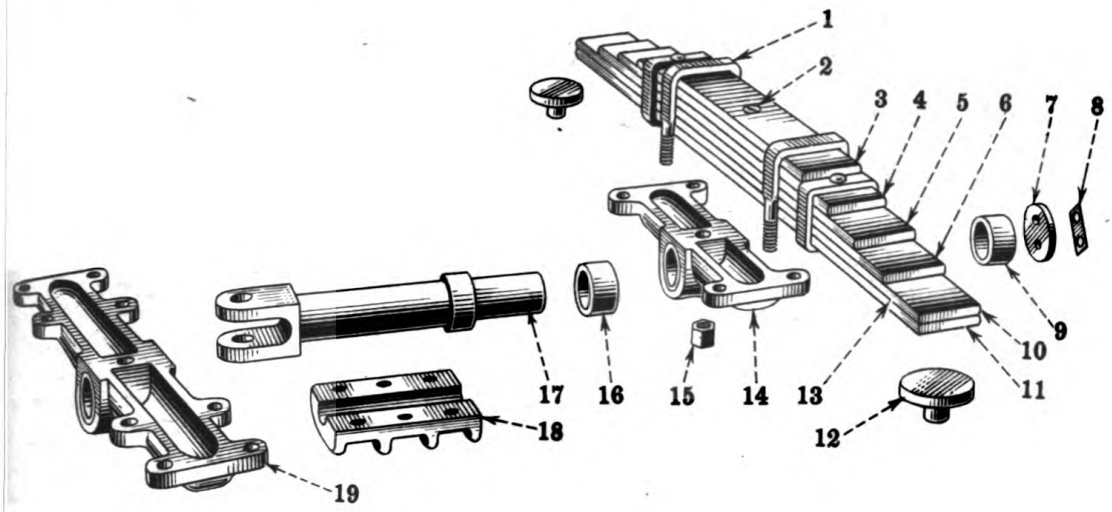
EQUALIZER SPRING

The equalizer spring (13), *Illust. 7*, is removed from the tractor by jacking up the front end of the tractor, removing the cap screws from the front end of the pivot shaft (17), removing the cap screws from the pivot shaft cap (18), and pushing the shaft (17), and drawbar to the rear as far as possible. Then slide the spring to one side to free the opposite end and pull forward on it. Pads (12) rest in the track frames.

Steel bushings (9) and (16) are replaceable. They are furnished finished to size and need only be pressed in place, flush with the outside surfaces of the saddle (14). The spring (13) may be separated from the saddle (14) by removing the nuts (15) from the clips (1). The saddle (19), is used for wide tread tractors to accommodate the longer spring used on this type tractor.

REPAIR SECTION

EQUALIZER SPRING - Continued



Illust. 7
Exploded View of the Equalizer Spring.

Ref. No.	Description	Ref. No.	Description
1	Clip.	11	Leaf, No. 1.
2	Center bolt.	12	Guide pad.
3	Leaf, No. 6.	13	Spring (6 leaves).
4	Leaf, No. 5.	14	Saddle (Standard tread).
5	Leaf, No. 4.	15	Clip nut.
6	Leaf, No. 3.	16	Saddle bushing.
7	Retainer.	17	Pivot shaft.
8	Bolt lock.	18	Pivot shaft cap.
9	Saddle bushing.	19	Saddle (Wide tread).
10	Leaf, No. 2.		

EXTENDED TRACK FRAME

(Used in place of regular Track Frame when tractor is equipped with Cranes and Similar Equipment.)

Removal of the track frame is completed as a unit. The track rollers (5 instead of 4), track idlers (2), and front idler, described under those headings in *Section 11 - Track*, are all individual units and are removed as such. Rigid and extended track frames, like the regular track frames, attach to the pivot bearing at the rear. A rigid cross bar (in most cases replaces the equalizer spring), is bolted to the track frames, and uses the standard saddle mounting to attach it to the main frame.

To remove the track frame jack up the front end of the tractor, remove the "U" bolts from the rigid track frame cross bar (if so equipped), jack up the rear of the tractor, disconnect the track frame at the pivot bearing, remove the track chain, and pry the track and chain to the side to clear the cross bar. With the front idler removed, the track can be rolled to the rear on the track chain, if the rear of the tractor is also jacked up hign enough to clear the sprocket.

Removing the rigid cross bar is described under the *"Rigid Frame"* heading in this section.

Replacement of the unit is the reverse of the removal procedure.

REPAIR SECTION

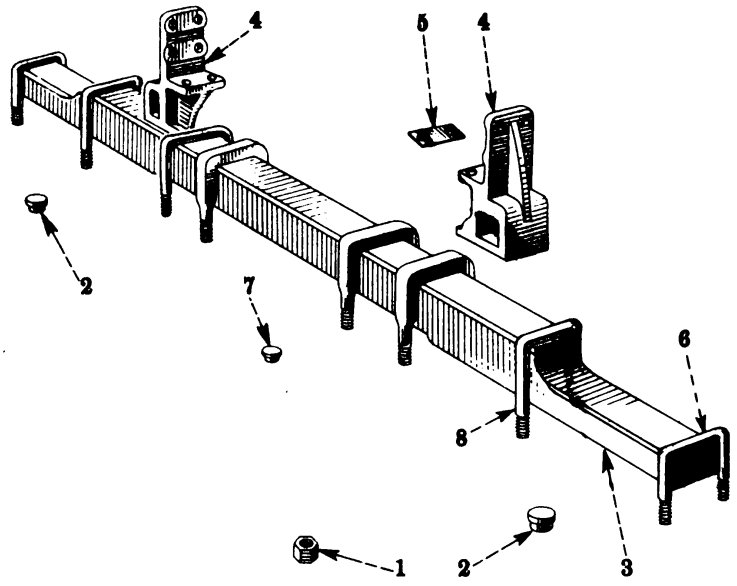
RIGID TRACK FRAME
(Used in place of Equalizer Spring, etc., when Tractor is equipped with Cranes, Pipe Booms and Similar Superimposed Equipment)

On tractors equipped with a rigid track frame, the removal procedure is very much the same as that for the equalizer spring. It must be moved forward to make the cap screws at the rear end of the oil pan accessible.

To remove the rigid frame cross bar (3), *Illust. 8*, jack up the front of the tractor, remove the bolts from the retainer on the front end of the pivot shaft for the cross-bar saddle; remove the pivot shaft cap attached to the main frame and push the pivot shaft out of the saddle and to the rear; remove the cross bar brackets (4) with shims from the main frame side channels; remove the "U" bolts (8) holding the cross bar to the track frame; lift up and push the cross bar to one side and then slide it out the front. If it is desired to remove the saddle, the cross bar can be removed by sliding it directly to one side.

The replacement procedure is the reverse of the above. Be sure the same number of shims are used on both sides between the cross bar bracket and the main frame side channels. Steel bushings with file-hard bearing surface can be pressed in the saddle. The shaft diameter is 2-1/2" with about 1/64" clearance in the bushing.

"U" bolts must be removed from the track frame to permit removal of the track frame.



Illust. 8 - Exploded View of Rigid Track Frame Cross Bar

Ref. No.	Description	Ref. No.	Description
1	"U" bolt nut.	5	Bracket shim, heavy. / Bracket shim, light.
2	End button.	6	"U" bolt, short.
3	Rigid track frame cross bar with pad.	7	Center button.
4	Cross bar bracket.	8	"U" bolt, long.

REPAIR SECTION

FUEL SYSTEM

FUEL PUMP

The fuel pump delivers a variable volume of gasoline to the carburetor, engine speed constant, without using a return line to the gasoline tank. Starting with no fuel in the pump, the rocker arm (37), *Illust. 1,* pushes link (18) down through a full stroke of the rocker arm. As the link is pushed down it pulls the pull rod (31) and diaphragm (28), depressing the rocker arm spring (41) and spring (32). The rocker arm is held against the push rod (1) by the spring (41) directly under the rocker arm. As the chamber above the diaphragm fills with gasoline the diaphragm will be lower, exerting pressure on the springs (41) and (32). With the link (18) depressed, the rocker arm does not contact the link until it is near the bottom of its stroke, thereby drawing a smaller volume of gasoline into the pump.

As the load on the engine increases, more gasoline is demanded of the pump, resulting in a decrease in the volume of gasoline in the chamber above the diaphragm. The diaphragm raises and is pulled through a longer stroke by the rocker, increasing the amount of gasoline drawn into the pump.

Inspection of the Fuel Pump

Insufficient fuel at the carburetor is not necessarily proof of an inoperative fuel pump. If it is known, however, that fuel is in the tank; fuel lines and strainers are free from dirt, leaks, or kinks; and that the carburetor inlet valve and float assembly are operating properly, the fuel pump should be investigated. The following procedure is recommended.

Shut off the fuel. Unscrew the inlet valve plug (8); take out the valve spring (10) and fiber inlet valve (11). The valve should be flat and free from cracks, and there should be no dirt on the seat. Reinstall the valve assembly or renew if required. The spring must be centrally located.

Remove the air dome (19). Inspect the valve spring (21) and outlet valve (22) for defects listed above, and replace. Attach a pressure gauge and make proper connections. The fiber outlet valve (22) and spring (21) must be in place during the pressure test.

Start the engine, operate at governed speed, and observe the fuel pressure. Average pressure may be as low as 1 pound. Maximum pressure should not exceed 3 pounds. Pressure on the fuel is controlled by the pump diaphragm (28) and the spring (41). If the pressure is satisfactory, then remove the gauge and reassemble the air dome and gasket; if the maximum pressure reading is less than 1 pound, dismantle the pump and inspect the diaphragm and springs.

Disassembly of the Fuel Pump

Take the pump off the engine. Mark the pump top cover (23) and the pump body (35) before taking the pump apart so that reassembly can be quickly made with the fuel inlet and outlet in the proper position.

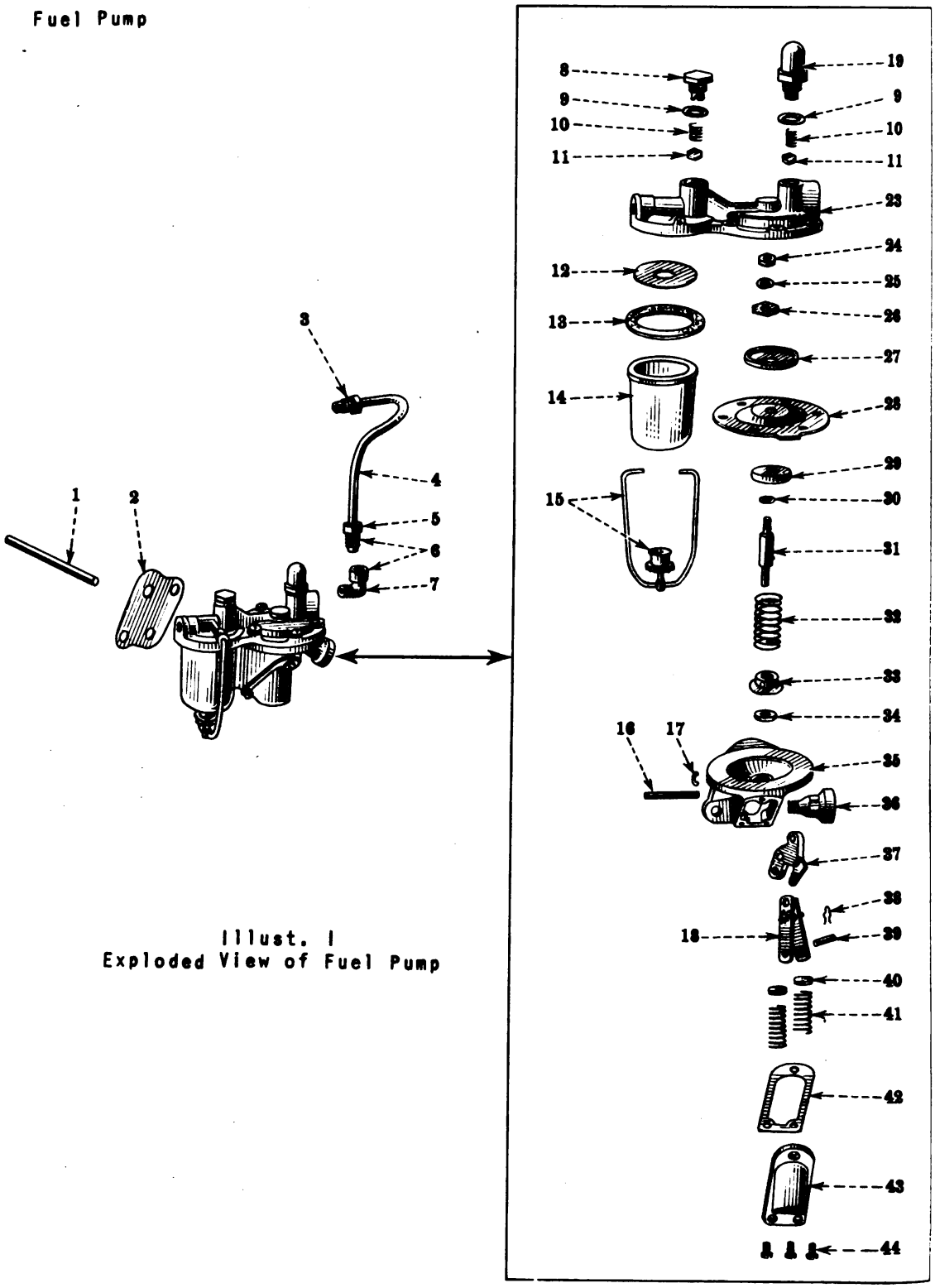
Renew the diaphragm (28) if it is cracked, broken, or excessively worn. (See last three paragraphs under reassembly). If the diaphragm passes inspection, the rocker arm springs (41) may have to be renewed to obtain normal pressure.

A defective diaphragm can be removed from the pull rod by taking off the jam nut (24), lock washer (25), diaphragm washer (26), upper diaphragm protector (27), and the diaphragm (28). If it is unnecessary to renew the diaphragm, time is saved by removing the pull rod assembly complete. The bottom cover (43) must first be taken off and pull rod (31) disconnected from link (18).

REPAIR SECTION

FUEL SYSTEM - Continued

Fuel Pump



Illust. 1
Exploded View of Fuel Pump

REPAIR SECTION

FUEL SYSTEM - Continued

Fuel Pump - Continued

Ref. No.	Description
1	Push rod.
2	Gasket.
3	Connector nut.
4	Fuel pipe (pump to carburetor).
5	Connector nut.
6	Outlet elbow with nut.
7	Outlet elbow.
8	Valve plug.
9	Valve plug gasket.
10	Valve spring.
11	Valve.
12	Gas strainer screen.
13	Strainer gasket.
14	Strainer bowl.
15	Strainer bail assembly.
16	Rocker arm pin.
17	Rocker arm pin washer.
18	Link.
19	Air dome.
23	Top cover and valve seat assembly.
24	Hex. jam nut, 1/4" N.F.
25	Lock washer, 1/4", light.
26	Diaphragm washer.
27	Diaphragm protector, upper.
28	Diaphragm.
29	Diaphragm protector, lower.
30	Pull rod gasket.
31	Pull rod.
32	Spring.
33	Oil seal gasket retainer.
34	Oil seal gasket.
35	Body.
36	Breather.
37	Rocker arm.
38	Link pin clip.
39	Link pin.
40	Rocker arm spring cap.
41	Spring.
42	Bottom cover gasket.
43	Bottom cover.
44	Bottom cover screw.

REPAIR SECTION

FUEL SYSTEM - Continued

Disassembly of the Fuel Pump - Continued

Check the oil seal gasket (34) for wear and replace if necessary.

When the bottom cover (43) is removed, springs (41) and spring caps (40) will come off with the cover. One of the springs (41) holds the rocker arm (37) against the push rod (1); the other serves as a metering spring, building up pressure at the diaphragm by pushing on the pull rod (31).

Remove the link pin clip (38) and pull out the link pin (39). Remove the rocker arm pin washer (17) and push out the rocker arm pin (16). The link (18) and rocker arm (37) can now be removed from the body (35).

Reassembly of the Fuel Pump

Place the rocker arm (37) between the two arms of the link (18), so that the hole in the rocker arm lines up with the holes in the link and the rocker arm notch engages over the short pin holding the two pieces of the link together.

Place the link (18) and rocker arm (37) in the body (35), with the pointed end of the rocker arm toward the bottom of the body. Replace the rocker arm pin (16) and rocker arm pin washer (17).

Replace the link pin (39) connecting the link (18) to the pull rod (31) and fasten with link pin clip (38).

Place the springs (41) on the bosses in bottom cover (43), place the caps (40) on the springs, and the bottom cover gasket (42) on the cover.

Place the assembled parts on the body (35) and secure with screws. One of the spring caps engages the end of the pull rod (31), and the other the pointed end of the rocker arm (37).

Place the oil seal gasket (34) on the pull rod (31), then the oil seal gasket retainer (33) with the outer edge on the bottom of the pump body (35). Replace the spring (32).

Particular care is required to install a new diaphragm properly. Clamp one flange of the pump body (35) into a bench vise. Assemble the diaphragm parts exactly as described in the following steps: Diaphragm cloths should be dipped in clean kerosene or gasoline just before assembly.

First assemble the parts loosely. Line up the holes in the diaphragm cloths with the cap screw holes in the pump body (35), using a locating ring. Then use an offset wrench to hold the hexagonal diaphragm washer (26) stationary, and prevent the diaphragm (28) from turning. With the locating ring still in place, tighten the jam nut (24) securely. Then remove the tools.

These instructions must be carefully followed. If the diaphragm should become twisted or distorted its life is considerably shortened and the length of stroke reduced.

Lay the top cover (23) on the pump in position as determined by marks made before disassembling. Diaphragm (28) must be in the extreme "up" position. If the bottom cover (43) has been removed, it is better to assemble it before installing the top cover (23), as the springs (41) will automatically hold the diaphragm in the required "up" position. Insert the top cover cap screws and draw the cover down evenly. Then tighten in alternate order.

Make a simple check of the pump suction and pressure by holding fingers over the inlet and outlet openings and manipulating the rocker arm (37) by hand.

REPAIR SECTION

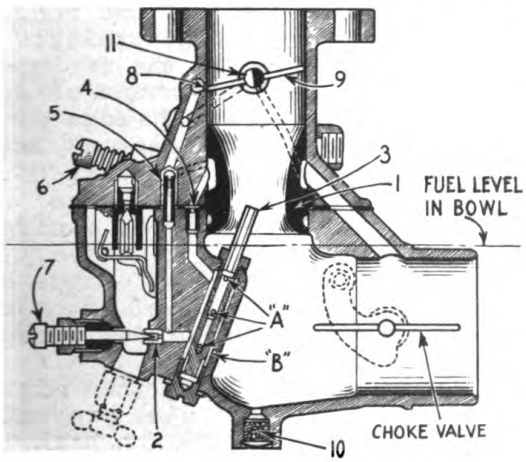
FUEL SYSTEM - Continued

Replacement of the Fuel Pump

Install the pump on the engine and test it with a gauge as outlined under the "Inspection" heading. The pump should prime itself as the engine is cranked. If the pump fails to operate properly, the diaphragm has probably been installed incorrectly or the springs do not have the proper tension. Disassemble the pump and reinstall the diaphragm correctly as outlined above. Replace the linkage springs if this has not been done.

1-3/8" UPDRAFT CARBURETOR

The functions of a carburetor are: (1) To discharge the desired amount of fuel into the air stream entering the engine, (2) to atomize the fuel and, (3) to make a homeogenous air-fuel mixture. The air to fuel ratio is not constant for all loads and speeds. The carburetor should vary that ratio to give the best operating performance for all conditions. The carburetor is calibrated to meter the correct amount of fuel for smooth operation throughout the operating range. The function of the carburetor cannot extend beyond the proportionate mixing of fuel and air.



Illust. 2
Cross Section of the Carburetor. 1. Venturi; 2. Main Jet; 3. Discharge nozzle; 4. Main air bleed; 5. Idling jet; 6; Idle air adjusting needle; 7. Main jet adjusting screw; 8. Idling slot; 9. Throttle butterfly; 10. Drip hole filler; 11. Economizer slot; "A" - Holes in discharge nozzle; "B" - Accelerating well.

The carburetor used on this tractor is a plain tube, single venturi type, having an air-bleed-well method of compensation. *Illust. 2* shows the removable venturi (1) which measures the volume of air allowed to pass through the carburetor. The piston descending in the cylinder sucks air through the venturi. This suction or partial vacuum is increased by the shape of venturi (1). This suction or metering vacuum draws a mixture of fuel and air from main discharge nozzle (3), fuel from main jet (2), and air from the main air bleed (4).

The main jet (2) allows a difinite amount of fuel to enter discharge nozzle (3), from where it is drawn into air stream at the point of greatest suction. This definite amount of fuel corresponds to a definite amount of suction for any given engine speed.

The main jet (2) is calibrated to meter the maximum amount of fuel necessary for full load. The main jet adjustment (7) reduces this amount to that required for economical operation for certain operating conditions.

The metering vacuum in the venturi does not increase in direct proportion to the increase in engine speed or velocity of air through the venturi. Doubling the engine speed or doubling the velocity of air in the venturi would more than double the vacuum in the venturi. This means more fuel would be drawn from the discharge nozzle for the same amount of air, or the fuel-to-air mixture would be richer. Because of this condition, air is admitted to the discharge nozzle to thin out the mixture at higher speeds. The amount of air

REPAIR SECTION

FUEL SYSTEM - Continued

1-3/8" UPDRAFT CARBURETOR - Continued

admitted to the discharge nozzle is determined by the main air bleed (4) which meters the amount of air in quite the same way as the main jet does for fuel.

When the engine is not running, the level of fuel in the bowl maintains a similar level in the discharge nozzle (3). When the engine is operating, this level is reduced in the discharge nozzle and decreases as the engine speed increases. As level of the fuel is lowered below hole (A) in the discharge nozzle, air is admitted. Reduction of the fuel level still further exposes more of these holes and increases the amount of air bled into the discharge nozzle. Three of these holes are labeled (A) in the illustration. The main air bleed is connected to the groove around the outside of the venturi which is connected to the air intake below the choke valve. Space (B) around the discharge nozzle and the passage to the main air bleed is known as the well or accelerating well.

Idling System

When the throttle butterfly valve is nearly closed for idling operation, the velocity of air through the venturi is insufficient to provide the proper amount of fuel. An idling system, therefore, is introduced which admits gasoline to the engine above the butterfly valve, at which point suction is greatest. Passages of the idling system start with the idling slot (8) and continue downward to the idling jet (5) and on down to accelerating well near the main jet (2). On top of the idling jet chamber (5), there is a drilled hole extending into the air passage around the venturi, shown by dotted lines in the illustration. The suction above the butterfly valve draws air from this passageway and at the same time draws fuel from the idling jet. Unde such conditions the idling syste is a carburetor in itself. T idle air adjusting needle (6) con trols the amount of air that i admitted from behind the venturi In this way, the mixture ratio o air to gas for idling speeds i definitely controlled.

The idle system is operating fro slow idle speed to approximatel 3/4-load. As soon as the throttl is opened for load conditions, th effect of the system is reduce almost to nothing. At wide ope throttle, the greatest suction ex ists in the venturi. Because o this condition, the flow of air i reversed and air from the spac above the butterfly valve flow down through the idling system t the passage in front of the mai jet (2) and acts as another ai bleed.

The idle slot is made elongated t control the mixture ratio throug the range from slow idle to fas idle. This part of the range i important for good governing. T slot is machined in the carburet to give a certain amount of open ing below and above the edge of th throttle butterfly when set in th idle position. The top part of th slot is subjected to the hig vacuum existing in the manifol As the throttle is opened, th amount of slot exposed to the hig vacuum is increased, allowing mo fuel mixture to be delivered t the increased amount of air ad mitted, maintaining the mixtu ratio desired. As a preventiv for a surging engine on high id speed, keep this slot, venturi and throttle body clean of dir and gum; carefully fit the butte fly valve to the throttle bod with the side marked 12° up. I edges are damaged, it is advisab to replace with a new one.

Economizer

As previously mentioned, main j (2), with the main jet adjust

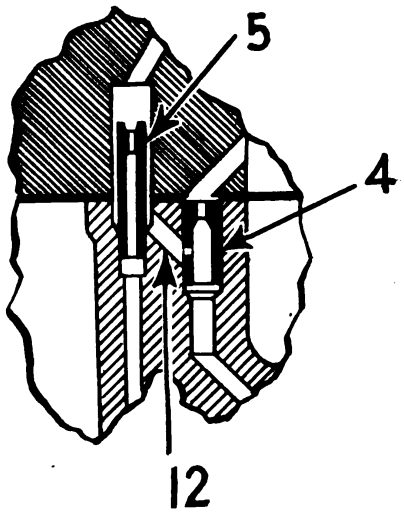
REPAIR SECTION

FUEL SYSTEM - Continued

onomizer - Continued

) and main air bleed (4) provide e proper ratio mixture of air to s for full load conditions. When e tractor is operating at only rtial load, the throttle butter- y valve is closed considerably d the idle system is supplying el as well as the main fuel sys- m. For economy of operation, it desirable to lean out the mix- re ratio; only full load condi- ons require the mixture ratio pplied with the wide open throt- e.

is combination (main fuel system ıs idle system) requires the in- ɔduction of more air to lean out e mixture. When butterfly valve in part-load position, a slot L) in the valve shaft is open, ınecting a passage from the idle stem (above the adjusting needle) the air space around the ven- ri. The slot is 1/8" wide half- y through the shaft. With this ɔt open, the air admitted de- ɔoyes any effect of the idle stem to richen up the mixture. ıs slot is closed when the but- fly valve is in the idle posi- ɔn as shown in *Illust. 2,* and ens up as the throttle is opened.



Illust. 3
1 Reload Bleed Construction.

Well Reload

The well reload bleed construction is shown in *Illust. 3.* Its purpose is to reload the accelerating well quickly during operation where power requirements fluctuate rapidly. It consists of an additional hole (12) in the fuel bowl and a countersunk portion around the idle jet (5) and a new main air bleed. The drilled passage (12) extends from the space around the idle jet (5) to a hole in the side of the main air bleed (4) connecting idle air and mixture passage to the accelerating well (B), *Illust. 2.*

The vacuum at the idling system increases as the throttle is closed. The hole in the air bleed and passage to the idle system allows a portion of this vacuum to exert its force on the accelerating well (B). Suction on the discharge nozzle (3) has been materially reduced by the partial closing of the throttle; additional vacuum introduced from the idle system will aid in drawing fuel into the well (B). The flow of fuel from the main jet (2) is always increased by any suction exposed to it. With this arrangement, the well (B) will be reloaded more rapidly than by the normal flow of fuel, hence the name "Well-reload bleed". Fuel will then be available sooner for acceleration purposes.

Removal of the Carburetor

Shut off the fuel at the fuel tank and drain the carburetor by removing the drain cock (29), *Illust. 4.* The carburetor can be removed after disconnecting choke and governor controls, fuel line, air cleaner connections, and stud nuts in the manifold.

Disassembly of the Carburetor

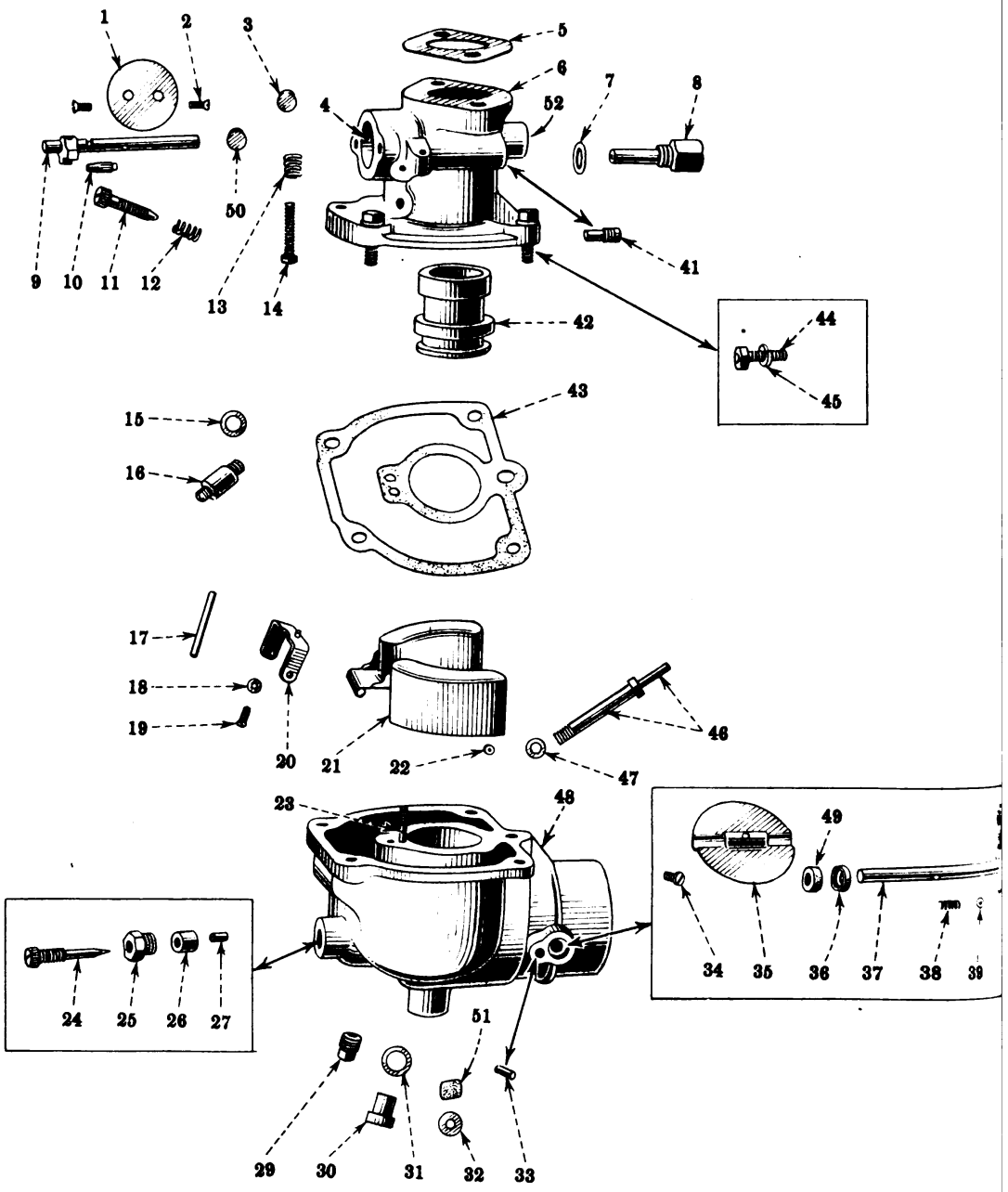
The throttle body (6), *Illust. 4,* can be separated from the bowl (48) by running out four quarter-

(Continued on page 10.)

REPAIR SECTION

FUEL SYSTEM - Continued

CARBURETOR



Illust. 4
Exploded View of the Carburetor.

REPAIR SECTION

FUEL SYSTEM - Continued

RBURETOR - Continued

Ref. No.	Description
1	Butterfly.
2	Butterfly screw.
3	Plug, 3/8".
4	Throttle shaft bushing (economizer).
5	Gasket.
6	Throttle body with stop pin, plugs and bushings.
7	Gasket.
8	Screen retainer.
9	Throttle shaft assembly.
10	Stop pin.
11	Idle adjusting screw.
12	Screw retainer spring.
13	Screw retainer spring.
14	Screw, No. 10 - 32 x 1-1/8".
15	Gasket.
16	Valve cage assembly.
17	Pivot.
18	Lock washer, No. 4.
19	Screw, No. 4 - 40 x 5/16".
20	Lever support.
21	Float and lever assembly.
22	Main air bleed.
23	Idle jet.
24	Adjusting screw.
25	Packing nut.
26	Screw packing.
27	Fuel adjusting screw seat.
29	Cadmium plated pipe plug, 1/8".
30	Clamp nut.
31	Gasket.
32	Drip hole plug.
33	Groove pin.
34	Screw, No. 6 - 32 x 3/8".
35	Shutter.
36	Retainer.
37	Shaft and lever.
38	Spring.
39	Spring ball.
41	Idle outlet plug.
42	Venturi.
43	Gasket.
44	Cap screw, 1/4" - 20 x 7/8".
45	Lock washer, 1/4".
46	Metering nozzle, complete.
47	Gasket.
48	Fuel bowl with dust seal, metering jet, bleed and plug.
49	Dust seal.
50	Throttle shaft expansion plug, 7/16".
52	Throttle shaft bushing.

REPAIR SECTION

FUEL SYSTEM - Continued

Disassembly of the Carburetor - Continued

inch cap screws (44). The venturi (42) can be lifted out of the throttle body. The gasket (43) can then be removed.

Slide the pivot pin (17) from the float lever support (20). The pin is more easily withdrawn if a screwdriver is inserted in the slot in the end of the support. The float and lever assembly is than free. The lever support (20) is freed by running out two screws (19) with a screwdriver.

The valve cage assembly (16) can then be unscrewed from the throttle body (6). Lift out the fuel valve, and the gasket (15) can then be removed. Run out the idle adjusting screw (11) and the screen retainer (8). The spring screw retainer (12) and the gasket (7) can be lifted off.

The throttle shaft (9) can be pulled out after butterfly screws (2) have been run out of the butterfly (1), and the butterfly is removed from the slot in the throttle shaft (9).

The idle jet (23) can be unscrewed from the fuel bowl (48). The top of the jet is slotted to receive a screwdriver.

The hexagonal head on the metering nozzle (46) may be held while the screw-head clamp nut (30) is turned off. Gaskets (31) and (47) will then come off.

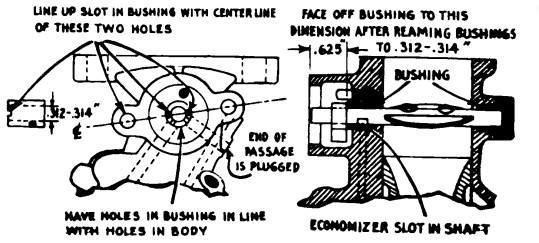
Run out the packing nut (25) and remove the screw packing (26). The main jet or fuel adjusting screw seat (27) is pressed in the fuel bowl (48). The adjusting screw (24) comes out with packing nut (25).

The choke shaft (37) can be removed after running out screws (34) in the choke butterfly or shutter (35). The poppet spring ball (39) and spring (38) are freed when the choke shaft (37) is removed. The dust seal (49) with its retainer (36) can then be removed.

Service of the Carburetor

If the valve cage assembly (16) is to be replaced, *never* replace the seat or valve individually. Service parts are furnished in pairs only. The fuel lever should be checked if a new valve assembly is installed.

If the throttle shaft bushings (4) and (52) have too much end play or are worn excessively, they can be replaced. The expansion plug on the strainer side of the carburetor must be removed to replace the bushings on that side (bevel first). A different bushing (4) is used on the control end of the shaft. Both may be driven in with a service tool and driver and line-reamed to .312" to .314" with a reamer.



Illust. 5
Diagram for Installing Butterfly Valve Shaft Bushings.

The replacement bushing on the control side has a 3/32" slot, 1/16" deep in the outside end. This slot must be lined up with the holes in the face of the governor attaching the flange, and the two holes in the bushing must be on the same side as the two economizer holes in the throttle body. *Illust. 5* shows the proper position. After lining up the bushing, press it in place with a service tool. Check the position of the slot in the bushing after it is in place.

FUEL SYSTEM - Continued

ervice of the Carburetor - Continued

hen line ream the bushing to ize.

ow remove the slot on this bush- ng with a piloted-end mill or utter so that the thrust surface or the shaft is .625" from the utside face of the body. This imension is important since it rovides the end play for the shaft nd also centers the butterfly alve in the throat of the carbure- or to prevent it from binding on he sides.

heck the openings in the bushing, aking sure they line up with oles in the body by passing a ire through them. The position f these holes determines the oint at which the economizer comes nto action. Error in locating hese holes will increase the fuel onsumption or interfere with the ction of the idling system. Be ire to clean all passages with ir after replacing these bush- ngs.

lth the butterfly closed, a .025" eeler gauge, but not a .031" auge, can be inserted in the idling lot. When replacing the butter- ly valve in the shaft, insert it om the top of the body with the ort end of the valve down (meas- ed from holes) and with the side rked 12° on the top. Be sure e valve is not damaged while re- acing. Turn the shaft to insert rews from the top. Center the rews in the holes of the valve that when the valve is closed ere is minimum clearance possi- e between the valve and body all e way around the throat. When e valve is in this position ghten the screws; lock them in sition by upsetting the threaded d. Be careful not to bend the aft during this operation.

e main air bleed (22) *Illust. 4* d the main jet or fuel adjusting rew seat (27) are pressed into e bowl. Both are replaceable but must be drilled out before doing so. The top of the main air bleed (22) should be pressed in flush with the bowl (48). The small hole should give clear passage into the idle jet (23). The screw seat (27) should be pressed in until it sets against the bowl.

Clean the entire carburetor thoroughly. A solution of one part alcohol and one part benzol or acetone can be used as a solvent for gum accumulation in the carburetor or fuel system. *Observe fire precautions when using these liquids.*

Reassembly of the Carburetor

Replace the throttle butterfly (1) *Illust. 4*, and the throttle shaft (9) as described under the "Service" heading.

Run in the idle adjusting screw (11) with the screw retainer spring (12) assembled and the screen retainer (8) with the gasket (7) assembled.

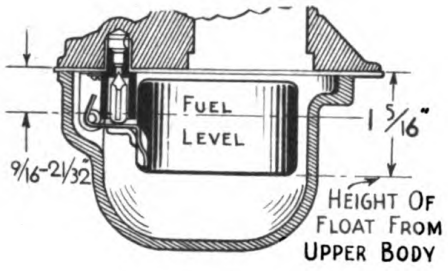
Replace the valve cage assembly (16) with the gasket (15). Use the slot in the head of the valve body to turn it tight. Secure the lever support (20) with screws (19) and the lock washer (18). Insert the pivot pin (17) through the float and lever assembly (21) and the lever support (20). See the second paragraph under "Disassembly" above.

The float (21) should now be checked for level. Invert the throttle body (6); the bottom of the float should be 1-5/16" from the surface of the throttle body as shown in *Illust. 6*. Adjust both halves of the float so that they are the same distance from the throttle body. The best way to check the float level is with a glass tube and hose connected to the drain cock in the fuel bowl when the carburetor is assembled. See the last paragraph of this subject following.

REPAIR SECTION

FUEL SYSTEM - Continued

Reassembly of the Carburetor - Continued



Illust. 6
Carburetor Fuel Level

Place the venturi (42), *Illust. 4,* in the throttle body. Then insert the clamp nut (30) with the gasket (31) in the fuel bowl (48). Turn in the metering nozzle (46) with the gasket (47). Tighten by holding the nozzle and turning the nut (30).

Insert the screw packing (26), packing nut (25), and the adjusting screw (24). Unscrew the adjusting screw (24) several turns before tightening the packing nut (25). This will prevent possible damage to the screw seat (27). The adjusting screw (24) should be hard to turn in the packing.

Run in the idle jet (23). Screw the choke shaft (37) in position with the choke butterfly or shutter (35) using the screw (24). In doing so, make sure that the spring (38) and the poppet ball (39) are in position over the grooved pin (33). The choke butterfly will fit only one way. In the closed position, it must entirely shut off the flow of air into the carburetor. Then upset the threaded end of the screw to prevent it from loosening.

Replace the gasket (43) and secure the throttle body (6) to the fuel bowl (48). Be sure to use a new gasket. The larger of the two smaller holes near the center of the gasket is assembled over the air bleed and over the idle jet (23) which sticks up from the surface of the fuel bowl.

Check the fuel level; it should be 3/16" to 21/32" below the surface of the throttle body as shown in *Illust. 6.* To change the fuel level, use various thicknesses of washers (15), *Illust. 4,* under the valve seat or bend the tang on the floats. If a glass tube with a hose is connected to the fuel bowl under a normal head of fuel and held next to the carburetor, the distance from the top of the fuel in the tube to the bottom of the throttle body can then be measured.

Replacement of the Carburetor

Replacement of the carburetor is in reverse order of removal from the tractor.

Adjustment of the Carburetor

There are only two external places where operation of the carburetor can be adjusted. These are the idle air adjusting needle (6) and main jet adjuster (7). The idle speed, however, is limited by adjustment of the idle stop screw (13) described under the "Governor" in this section, and shown in *Illust. 10,* which sets the position of the throttle butterfly valve for idling purposes.

The carburetor is correctly set when shipped from the factory. If the setting has been disturbed, the following procedure should be followed:

1. Before starting the engine, set the main fuel adjusting screw (7), *Illust. 2,* 2-1/2 to 3 turns open, and the idle fuel adjusting screw (6) 1 to 1-1/2 turns open.

2. After starting, allow the engine to run about 20 minutes with the governor control hand lever fully advanced. When the engine is thoroughly warmed up, turn the

FUEL SYSTEM - Continued

Adjustment of the Carburetor - Continued

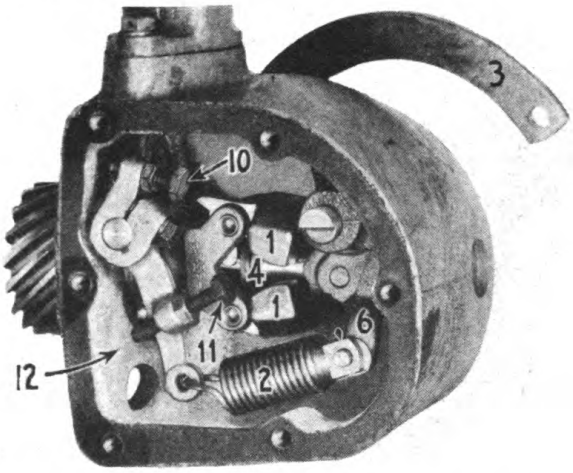
main fuel adjustment (7) in until the engine starts to miss or operate unsteadily. Then unscrew until steady running is obtained. This setting can be made more accuretely when tractor is under load. For best operation, keep the adjustment as lean as possible. Turn in the adjustment for leaning, and turn out for richening the mixture.

3. (a) Retard the governor control hand lever to about 1/4 advance. (b) Turn in the idle throttle stop-screw (13), *Illust. 10,* until the engine speed increases slightly. (c) Then turn the idle fuel adjusting screw (6) in or out until the engine runs steadily. (d) Place the governor control hand lever in the full retard position. (e) Turn out the idle throttle stop-screw until the engine idles at the desired speed. (f) Readjust screw (6) for the smoothest operation with the highest idle speed. The idle adjusting screw turns in for rich and out for lean mixture.

GOVERNOR

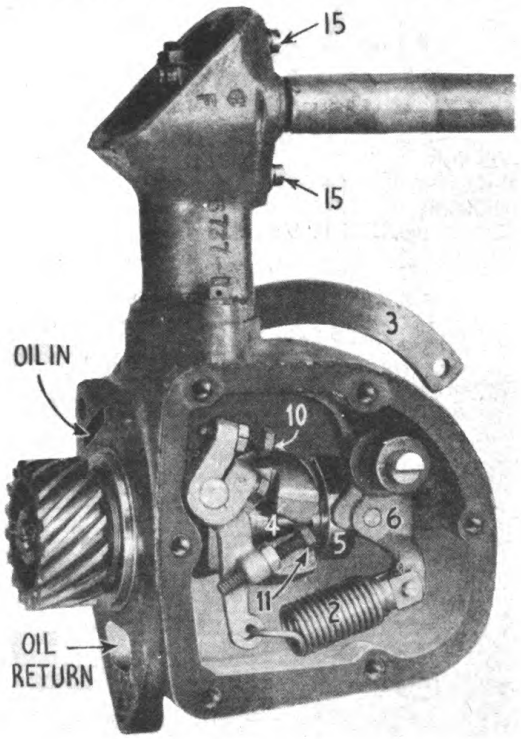
The centrifugal flyweight, variable-speed type governor is located in a separate housing attached to the front plate on the left side of the engine. The timing-gear train drives the flyweight shaft about twice the crankshaft speed. The speed control is affected by connecting the flyweight action with the carburetor butterfly valve. The engine operates under governor control from 950 R.P.M. to high idle speed.

The governor is designed to maintain a selected engine speed R.P.M.) within reasonably constant limits (10%) under varying load conditions by proportioning the fuel to the load. The governor depends on flyweights (1) *Illust.* , rotating about a shaft driven by the engine and is kept from spreading outward by the governor spring to proportion the fuel to the load.



Illust. 7
Right-Hand View of Governor.

As the engine speed increases above that set by the control lever, the tension or force of the spring (2) is overcome, and the weights move

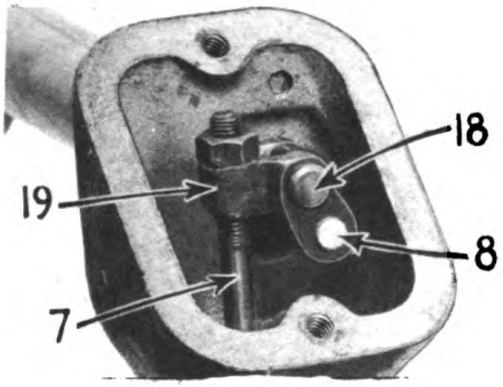


Illust. 8
Left-Hand View of Governor

REPAIR SECTION

FUEL SYSTEM - Continued

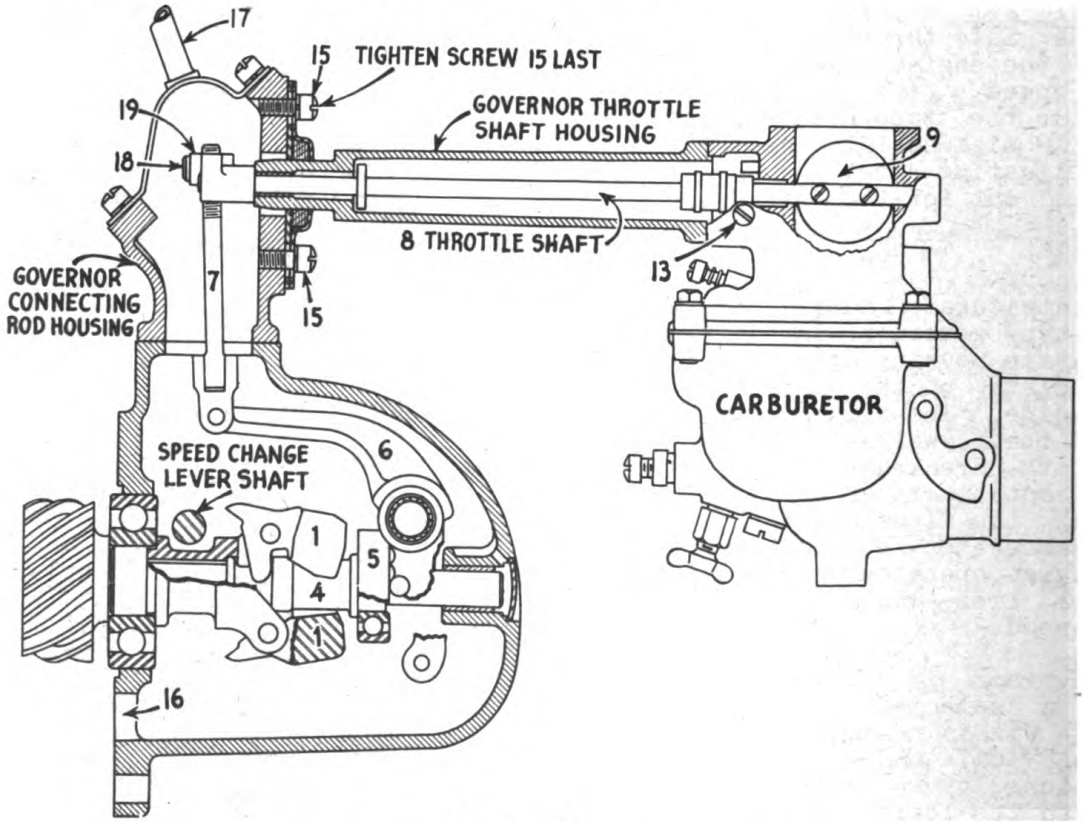
GOVERNOR - Continued



Illust. 9
Throttle Shaft Connection

outward until the fuel is cut down, then the spring tension is reduced to a balance with the outward action of the weights. The more tension on the spring (controlled by the speed change lever (3)), the greater will be the speed of the engine. The motion of the governor weights (1) moving outward, is transmitted by sleeve (4) on the governor shaft through ball bearing (5), *Illust. 8,* to the lever (6), to the governor connecting rod (7), *Illust. 9,* and then to the throttle shaft (8) which operates the butterfly (9).

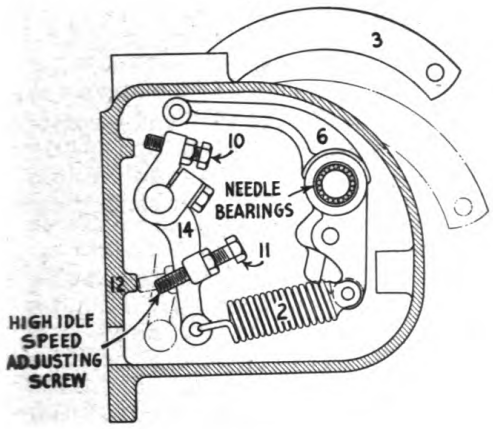
When the governor weights are together with tension on governor spring (2), *Illust. 11,* and the engine stopped, the carburetor butterfly should be in the wide open position (vertical to the carburetor).



Illust. 10
Section through Governor showing Weights and Control Linkage to Carburetor Butterfly.

FUEL SYSTEM - Continued

GOVERNOR - Continued



Illust. 11
Governor Adjusting Screws and Spring. Parts shown in medium speed position.

Removal of the Governor

Take off the front governor control rod (11) *Illust. 12*, and remove the breather tube assembly after running out the two cap screws that secure it to the housing (14).

After taking out the adjusting pin (6), run out the cap screws that secure the throttle-shaft housing (22) to the carburetor.

Then remove the cap screws that secure the housing (14) to the governor housing (39), and the cap screws from the felt retainer (20).

Now work the throttle-shaft housing (22) forward until it and the housing (14), with their contained assemblies, can be removed from the tractor. The throttle-shaft housing assembly can be pulled away from the housing (14). Take out the cap screw and bolts that secure the governor housing (39) to the front plate, and remove it with its contained assemblies.

Disassembly of the Governor

Take out cap screws and remove the cover (54) with the gasket (55). Remove the cotter key and pull out pin (46) to remove the governor spring (45). Run out the lock bolt in the governor spring lever (43) and pull it off the speed-change lever (12). With the key (13) removed from the shaft, the speed-change lever and seal (42) can be removed from the governor housing.

Drill a hole in plug (53), remove it, and drive the entire governor shaft assembly out the front end of the governor housing.

After removing nut (26), the gear (27), and bearing, the governor weight carrier (29) can be pulled off the shaft (34).

The bearing (28), *Illust. 12* can be pressed off the weight carrier (29). The sleeve (27), with bearing (38) and washer (35) can be slid off the rear end of the governor shaft (34). The bearing (38) can be pressed off sleeve (37).

Remove the expanding plug and press the rockshaft (50) out the snap ring side of the governor housing. This will free the rockshaft lever (48). The rockshaft bearings (49) can be driven out of the rockshaft lever.

When the pin (23) is driven out, the lever (18) can be pulled off the throttle shaft (24) and the shaft pulled out of its housing. The felt washer (19) and felt retainer (20) can be pulled from the throttle-shaft housing.

Repair and Reassembly of the Governor

Check to see that the oil hole in the front of the governor housing and two in the rear are clean. Press the rockshaft bearings (49), *Illust. 12*, into the rockshaft lever (48). Place the rockshaft lever in the housing and press the

REPAIR SECTION

FUEL SYSTEM - Continued

Repair and Reassembly of the Governor - Continued

rockshaft (50) into the governor housing, with the cut-out half of the shaft on the bottom side and parallel to the governor shaft (34). The arc is cut out of the shaft to allow bearing (38) to clear it. The arc should center directly over the governor shaft (34) (outside end .010" to .030" outside the governor housing on which the cover (54) fits). Be sure that the rockshaft lever bearings turn freely on the shaft. Secure the connecting rod (8) to the rockshaft lever with the pin (10) and replace the cotter key.

Press the bushing (52) into the governor housing flush with the front end of the bore. Burnish to .5035" to .5045". The governor shaft (34) has a diameter of .501" to .502", giving a running clearance of .0015" to .0035".

Press bearing (38) into sleeve (37). The wide thrust face of the bearing should be on the side away from the sleeve flange. Slide the washer (35) onto the shaft (34) and then replace the sleeve, with the bearing end last. The sleeve diameter is .5045" to .5060", which gives a running clearance of .002" to .005" with the shaft. Press the bearing (28) onto the weight carrier (29). Replace the key (32). Now push the carrier (29) over the shaft.

Place this assembly in the governor housing (39) and press the bearing (28) into the housing until it seats against the snap ring of the bearing. Now replace the gear (27) and secure it with nut (26). Replace the cotter pin through the governor shaft.

Replace the oil seal (42) in the governor housing, with the leather lips facing the governor shaft (34). Then replace the speed change lever (12) and insert key (13). Drive on the governor spring lever (43) and secure it firmly to the shaft with the lock bolt provided.

Hook the governor spring (45) in the spring lever (43) and secure it to the rockshaft with pin (46). The pin and cotter key can be inserted in the outer spring fork and the rockshaft lever.

The bushing (21) in the throttle shaft (22) is replaceable, and is furnished reamed to .2545" to .2555" in diameter. The throttle shaft (24) has a diameter of .248" to .250". Place the throttle shaft in the throttle shaft housing (22). Slide the felt retainer (20), and a new felt (19) over the end of the throttle shaft housing, and secure lever (18) to the throttle shaft with the pin (23). Use a new expanding plug (29) in housing (32).

Replacement of the Governor

Replace the governor housing (39), *Illust. 12,* with its container assembly, on the tractor and secure it with cap screws. The gasket (25) fits only one way between the governor housing and the front plate. Place housing (14), with the gasket (15), on the governor housing (39). Replace the gasket (17) and assemble the throttle shaft housing assembly loosely to the housing (14). Now engage the end of the throttle shaft (24) with the lug provided in the carburetor throttle shaft. *This operation is important.*

Secure the felt retainer (20) to the housing (14), the throttle shaft housing (22) to the carburetor, and the housing (14) to the governor housing (39) with cap screws. Be absolutely sure all parts are lined up and there is no binding whatsoever, as well as no perceptible play in the linkage.

FUEL SYSTEM - Continued

Replacement of the Governor - Continued

Replace pin (6) and the cotter key. The pin diameter is .243" to .248". The adjusting block is threaded and provided with .249" to .251" holes through which pin (6) is inserted.

Replace the gasket (5) and the breather tube assembly (4). Secure the breather tube to the housing (14). Replace the governor control rod (11), and secure gasket (55) and cover (54) to the governor housing. The upset portion of the cover should rest in the cut-out portion of the rockshaft (50).

Adjustment of the Governor

To adjust the governor, remove the cover from the side of the governor housing which gives free access to the adjusting screws. Screw (11), *Illust. 11,* controls the maximum high idle speed. Screw (10) limits the travel of lever (14). The maximum high idle speed is defined as the speed at which the engine will run without load, with the speed control hand lever in the wide open position. At this setting, (engine stopped) the butterfly valve in the carburetor is in the vertical or wide open position. The butterfly valve will also be in the same position when the engine is operating under its rated load and at rated R.P.M.

When the low idle screw (13), *Illust. 10,* in the carburetor is adjusted for correct low idle speed (450 R.P.M.), the upper stop screw (10), *Illust. 11,* on the governor control lever should be adjusted to touch its stop. At this setting, the governor spring (2) should be free; it will not be possible to set the low idle speed of the engine when screw (10) is adjusted so there is tension in spring (2).

Place the speed-control lever of the unit in the wide open position; the adjusting screw (11) on speed change lever (14) should be contacting stop (12). Make the necessary adjustment in the control linkage to make this possible.

The engine high idle speed can be obtained by adjusting the screw (11). Turn it in to increase the speed to the rated R.P.M., and turn it out to decrease the speed.

The low idle speed (450 R.P.M.) can be obtained by turning screw (13), *Illust. 10* at the carburetor in or out. If screw (10), *Illust, 11,* is set in too far, the low idle speed cannot be obtained.

It is very important that the linkage connection the governor weight movement to the carburetor butterfly be correctly adjusted and not worn excessively. To check this adjustment, remove the governor connecting-rod housing cover and ventilating tube (17), *Illust. 10.* Set the speed control lever at the wide open position and remove pin (18) from the connecting-rod adjusting block (19). Pull the throttle shaft lever (8) and the governor connecting-rod adjustment block (19) up as far as they will go. With these two parts in this position, pin (18) should slide freely in place. If the pin does not, adjust the governor connecting-rod adjusting block so that the pin does slide freely in place.

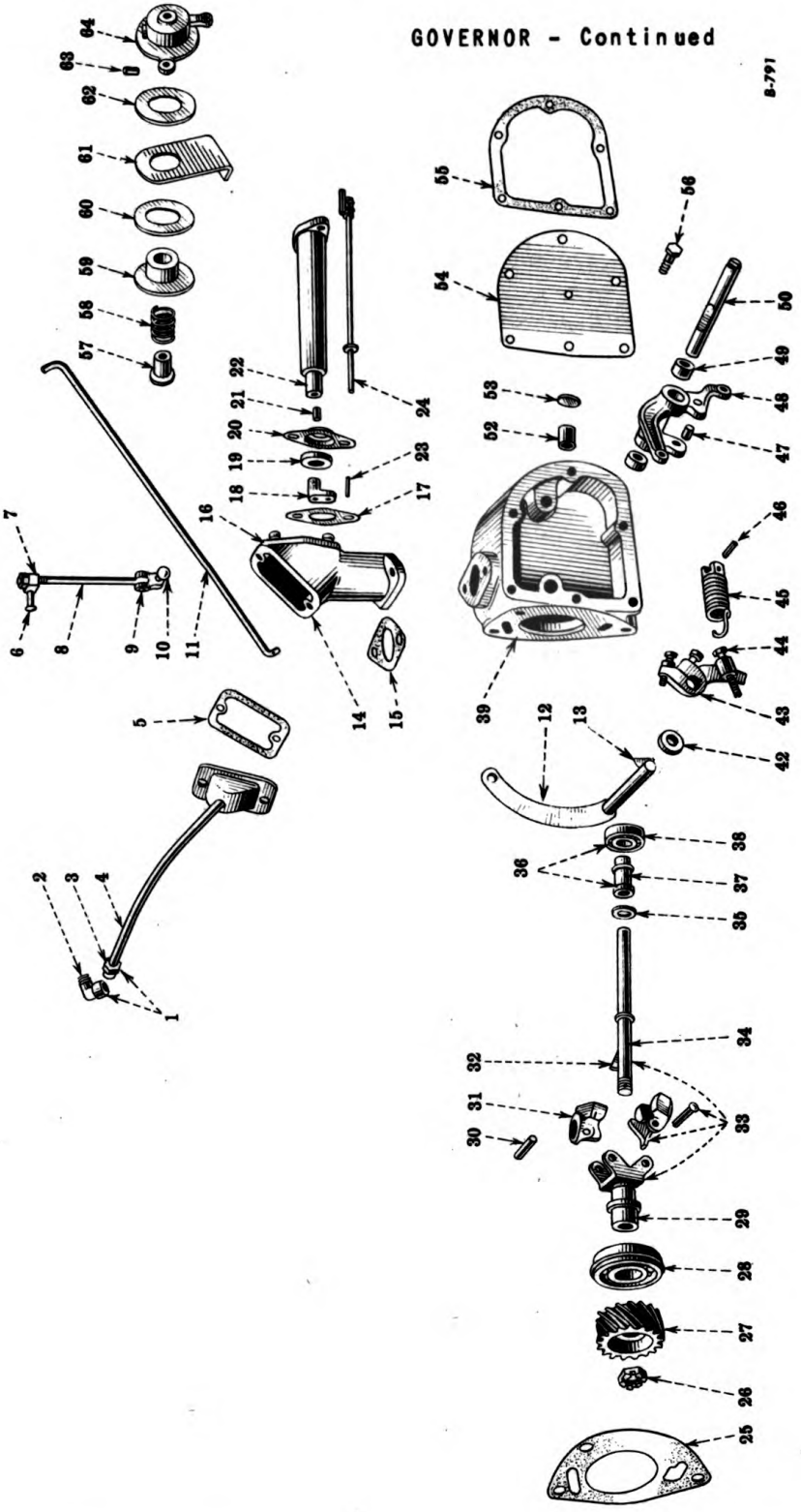
GOVERNOR FRICTION CONTROL

The linkage from the speed control lever on the dash to the governor speed change lever is provided with a friction device to hold the throttle at any position selected and thereby eliminate the play in the linkage from interfering with the speed regulation of the engine.

(Continued on page 20.)

REPAIR SECTION

FUEL SYSTEM - Continued



Illust. 12
Exploded View of the Governor Assembly.

REPAIR SECTION

FUEL SYSTEM - Continued

GOVERNOR - Continued

Ref. No.	Description
1	Breather tube elbow with nut.
2	Elbow.
3	Nut.
4	Breather tube assembly.
5	Gasket.
6	Pin.
7	Adjusting block.
8	Connecting rod with block.
9	Pin.
10	Pin.
11	Governor control rod, front.
12	Speed change lever.
13	Key (Woodruff No. 3).
14	Housing.
15	Gasket.
16	Throttle shaft housing felt retainer plate.
17	Throttle shaft housing felt retainer gasket.
18	Lever.
19	Felt washer.
20	Felt retainer.
21	Bushing.
22	Throttle shaft housing.
23	Pin.
24	Throttle shaft.
25	Gasket.
26	Nut, 9/16" N.F.
27	Gear (15 teeth).
28	Bearing.
29	Governor weight carrier.
30	Pin.
31	Governor weight.
32	Key (Woodruff No. 7).
33	Carrier with weights and shaft.
34	Governor shaft.
35	Washer.
36	Governor sleeve with bearing.
37	Sleeve.
38	Bearing.
39	Governor housing.
42	Seal.
43	Governor spring lever.
44	Bolt, long.
45	Spring and fork.
46	Pin.
47	Pin.
48	Rockshaft lever.
49	Rockshaft bearing.
50	Rockshaft.
52	Bushing.
53	Plug, 7/8".
54	Cover.
55	Gasket.
56	Governor housing cover bolt. Governor connecting rod housing bolt.
57	Spring retainer.
58	Spring.
59	Disc retainer.
60	Friction disc.
61	Bracket.
62	Friction disc.
63	Lever pin.
64	Friction control lever with pin.

REPAIR SECTION

FUEL SYSTEM - Continued

GOVERNOR FRICTION CONTROL - Continued

This unit is located on a bracket on the left side of the engine on top of the cylinder head. It consists of a spring-mounted cup and several friction discs cross-sectioned in the *"Engine Service Chart"*, Section 13, and exploded in *Illust. 12.*

The bracket (61) is the stationary disc. Friction discs (60) and (62) fit between (59) and (64) and sandwich the bracket (61). Both disc retainer (59) and lever (64) turn as a unit because the pin (63) in the outer control engages the retainer (59). The long bolt (1/2" x 2-3/4") fits against the spring retainer (57) and holds the spring (58) against the retainer (59), while the nut on the bolt contacts lever (64). Tightening the nut increases the spring tension and makes the unit harder to turn. The control is properly adjusted when 10 to 11 ft.-lbs. of torque are required to turn the control lever when the pull is applied to the arm of the control lever (64).

SPARK PLUGS

The gap should be .028" to .032". Fouling or sooting of plugs may be remedied by using a hotter (light service) plug. Burning the electrodes or pre-ignition may be remedied by installing a colder (severe service) plug. Clean and adjust spark plug gaps at least every 200-300 hours. Use sand-blasting method of cleaning whenever possible. Check the gap when hard starting is encountered.

REPAIR SECTION

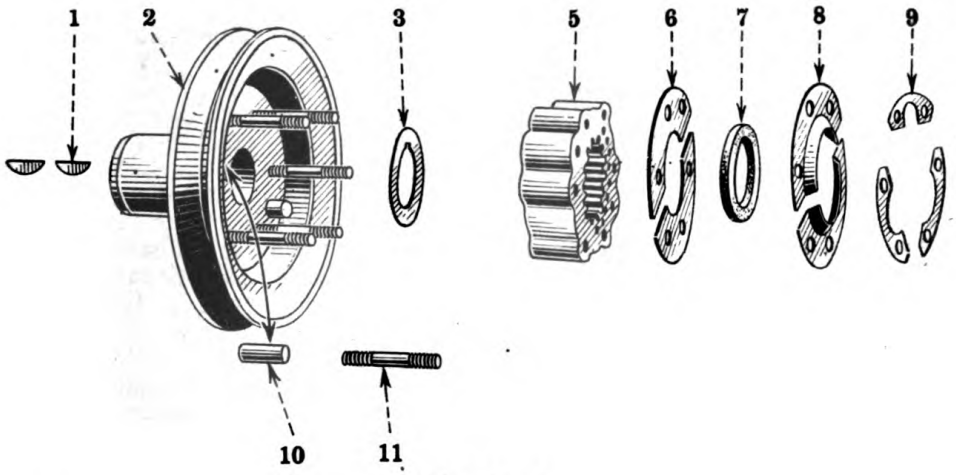
POWER TAKE-OFF

FRONT POWER TAKE-OFF

After taking the driven member from the end of the front power take-off shaft, remove the six 3/8" hex. nuts from the studs (11), *Illust. 1* in the fan drive pulley (2). Lift off the nut locks (9), felt washer retainers (8), felt washer (7), shaft retainers (6) and pull out the front power take-off shaft. The front power take-off shaft coupling can be slid from the studs on the fan drive pulley.

Reassembly of this unit is the reverse of the removal procedure.

When the radiator complete is removed on a tractor equipped with the front power take-off, the replacement procedure necessitates special steps so that the lower radiator water tank will be aligned with the engine crankshaft and the front finished face will be square with center line of the crankshaft. After replacement of radiator is made, loosen the bolts holding the lower radiator water tank to the main frame side channels. Bolt an alignment gauge coupling similar to that sketched in *Illust. 2* to the front power take-off coupling. Screw the alignment gauge coupling shaft into the coupling. Slip the alignment gauge bearing on the shaft and insert it into the bore of radiator tank. The gauge bearing should enter readily and the outer flange should fit all around against the machined face of the water tank. Use a feeler gauge for this purpose. If necessary, slightly slot the bolt holes in the main frame side channels to facilitate alignment. When the alignment is perfect, tighten the bolts in the water tank and side channels.



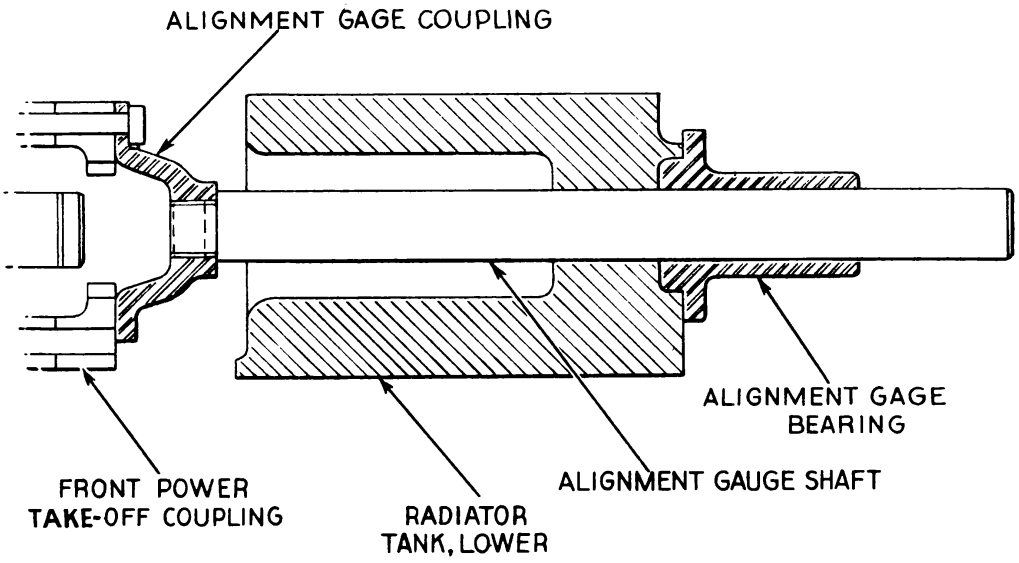
Illust. 1
Exploded View of Front Power Take-Off Coupling Assembly.

Ref. No.	Description	Ref. No.	Description
1	Fan drive pulley key.	6	Shaft retainer.
2	Fan drive pulley.	7	Shaft felt washer.
3	Fan drive pulley nut lock.	8	Shaft felt washer retainer.
4	Fan drive pulley nut (regular pulley nut).	9	Coupling stud nut lock.
		10	Drive pin.
5	Coupling (14 teeth).	11	Coupling stud.

REPAIR SECTION

FRONT POWER TAKE-OFF - Continued

In order to eliminate the necessity for going through the aligning procedure on future removals of the radiator, two 1/2" dowels may be assembled to the side of the tank by drilling two 15/32" holes through the main frame side channels and into the water tank when alignment is secured and both parts are tightly bolted together. Finish ream the holes to .497". Space the holes conveniently near the bolts to avoid interference and use 1-1/8" to 1-3/8" length dowels.



Illust. 2
Cross Section of Gage to be Used for Checking Alignment of Lower Radiator Water Tank with Respect to the Crankshaft.

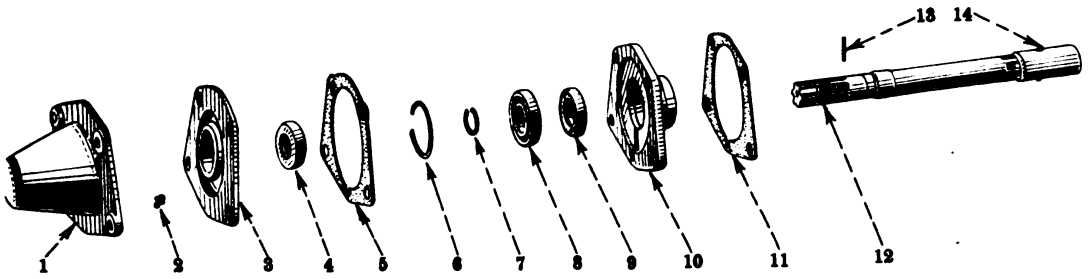
REAR POWER TAKE-OFF

Tractors equipped with a rear power take-off require removal of the unit before the drive bevel gear assembly can be removed. Removal of the unit can be accomplished after taking the attached equipment from the rear end of the shaft, sliding off the bearing retainer (3), *Illust. 3,* with gasket (5), and oil seal (4), and pulling out the bearing cage (10). This removes the power take-off shaft (12), coupling (14), gasket (11), bearing cage (10), oil seal (9), bearing (8), snap ring (7) and snap ring (6). The bearing cage (10) can be pulled from the shaft, after removal of the snap ring (7). Removal of the snap ring (6) allows the bearing (8) and oil seal (9) to be removed from the bearing cage (10).

When replacing parts in the reverse order of the disassembly, be sure the lips of the oil seals face the rear or outside of the tractor. Be sure the seal (9) bottoms against the flange in the bearing cage (10). The same holds true for the oil seal in the bearing retainer (3).

REPAIR SECTION

REAR POWER TAKE-OFF - Continued



Illust. 3
Exploded View of the Rear Power Take-Off.

Ref. No.	Description	Ref. No.	Description
1	End cover.	8	Bearing.
2	Lubricator.	9	Oil seal, inner.
3	Bearing retainer and oil seal cage with oil seal.	10	Bearing cage with oil seal.
		11	Bearing cage gasket.
4	Oil seal, outer.	12	Shaft with coupling and groov-pin.
5	Oil seal cage gasket.		
6	Retaining snap ring, outer.	13	Groov-pin.
7	Retaining snap ring, inner.	14	Coupling.

REDUCED SPEED POWER TAKE-OFF (ATTACHMENT)

The reduced speed power take-off rotates in the same direction as the driving power take-off shaft. The construction of the driving shaft is identical to the standard power take-off shaft with the exception that the oil seal cage is eliminated and an oil slinger is located between the snap ring on the shaft and the bearing. A clutch located in the upper part of the housing is used to engage and disengage the unit.

REMOVAL

Drain the lubricant and remove whatever driven equipment may be necessary from the protruding end of the shaft (44), *Illust. 4.* Remove the shifter lever rod (30) from the shifter lever (29). Engage the shifter coupling by pulling to the rear on the shifter lever (29) and remove the bolts holding the housing (6) to the main frame. The housing spacer (28) will drop out when the bolts are removed. The entire unit can now be slid off the end of the power take-off shaft (13). Shaft (13) with items (9) to (18) inclusive may be pulled from the TracTracTor as a unit.

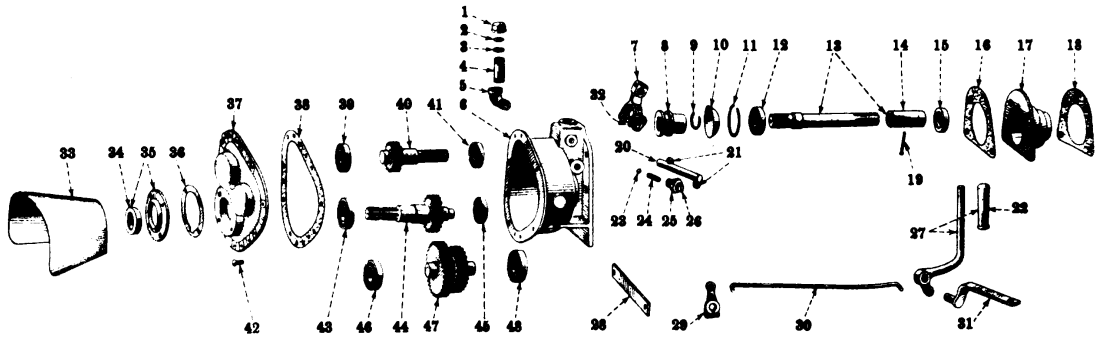
DISASSEMBLY

The reducing unit may be disassembled after removing the guard (33), oil seal retainer (35) with oil seal (34) and gasket (36), and housing cover (37). Dowel pins (42) in the cover may be removed and puller cap screws applied to the tapped holes in the cover. Running cap screws up evenly will withdraw the cover. Ordinarily all shafts in the unit will remain intact. The pinion (40) with bearings (39) and (41) may be pulled from the housing or driven out from the hole in the front side of the housing. The idler gear (47) with bearings (46) and (48) can now be pulled out of the housing. The same procedure applies to the gear and shaft (44) with its bearings (43) and (45).

REPAIR SECTION

REDUCED SPEED POWER TAKE-OFF - Continued

The shifter mechanism may be removed before or after pinion (40) is removed. After the pinion is removed, the shifter coupling will fall out of place. To remove the shifter shaft (20), remove the cap screw in the shifter fork (7) and pull on the shifter lever (29). After the round key (21) clears the end of the fork (7), it may be removed and the shaft withdrawn from the housing. With-



Illust. 4
Exploded View of the Reduced Speed Power Take-Off.

Ref. No.	Description	Ref. No.	Description
1	Iron pipe cap (1" standard).	24	Shifter poppet spring.
2	Breather screen.	25	Lock nut.
3	Breather felt.	26	Shifter poppet bushing.
4	Breather pipe.	27	Shifter hand lever with handle.
5	Street ell (1" standard).	28	Housing spacer.
6	Housing.	29	Shifter lever.
7	Shifter fork.	30	Shifter lever rod.
8	Shifter coupling.	31	Shifter hand lever bracket with pin.
9	Bearing retainer snap ring, small.	32	Shifter pin.
10	Oil slinger.	33	Safety shield.
11	Bearing retainer snap ring, large.	34	Gear and shaft oil seal.
12	Power take-off shaft bearing.	35	Retainer with oil seal.
13	Power take-off shaft (with coupling, Ref. No. 17).	36	Oil seal retainer gasket.
14	Power take-off shaft oil seal, inner.	37	Housing cover.
15	Housing gasket.	38	Housing cover gasket.
16	Bearing cage with oil seal.	39	Pinion bearing, rear.
17	Coupling.	40	Pinion (18 teeth).
18	Bearing cage gasket.	41	Pinion bearing, front.
19	One round head rivet, 5/16 x 2-5/8".	42	Housing cover dowel pin.
20	Shifter shaft.	43	Gear and shaft bearing, rear.
21	Shifter fork key. Shifter lever key.	44	Gear and shaft (24 teeth).
22	Shifter hand lever handle.	45	Gear and shaft bearing, front.
23	Shifter poppet.	46	Idler gear bearing, rear.
		47	Idler gear (23 - 30 teeth).
		48	Idler gear bearing, front.

REPAIR SECTION

REDUCED SPEED POWER TAKE-OFF - Continued

drawing the shaft releases the fork (7) with its shifter pins (32), the shifter poppet (23) and the shifter poppet spring (24). The shifter poppet (23), spring (24), poppet bushing (26), and lock nut (25) may be removed before or after removing the shifter shaft.

Taking the snap ring (11) from the bearing cage (16) allows the bearing cage to be pulled from the bearing (12). Bearing (12) can be pulled from the shaft (13) after removing the snap ring (9) and oil slinger (10).

REASSEMBLY:

In reassembling the reduced speed power take-off unit, make assemblies of the three shafts (40), (44) and (47), and press them into the housing as such. Before pressing the pinion (40) into the housing it is advisable to assemble the shifter fork (7) complete with pins (32), and have the shifter coupling (8) in position when the pinion is inserted into the housing. Replacing the remainder of the unit is the reverse of the disassembly procedure. The oil seal (14) in the bearing cage (16) must be assembled before attaching the cage to the bearing (12). The lip of this seal faces the front of the Trac-TracTor. Oil seal (34) should be pressed into the retainer (35) after the retainer is assembled to the housing. The lip of this seal faces the inside of the housing (6) and is flush with the outer surface of the oil seal retainer (35). The set screw in the housing on the opposite side from the shifter lever (29) is used to centralize the shifter fork (7) over the coupling (8). Increasing spring tension with the bushing (26) makes the shifter fork retain the position to which it is shifted.

BELT PULLEY

The belt pulley attaches to the main frame of the tractor over the end of the power take-off. After removing the mounting bolts from the carrier (34), *Illust. 5*, the entire unit can be slid from the end of the power take off shaft (56).

DISASSEMBLY:

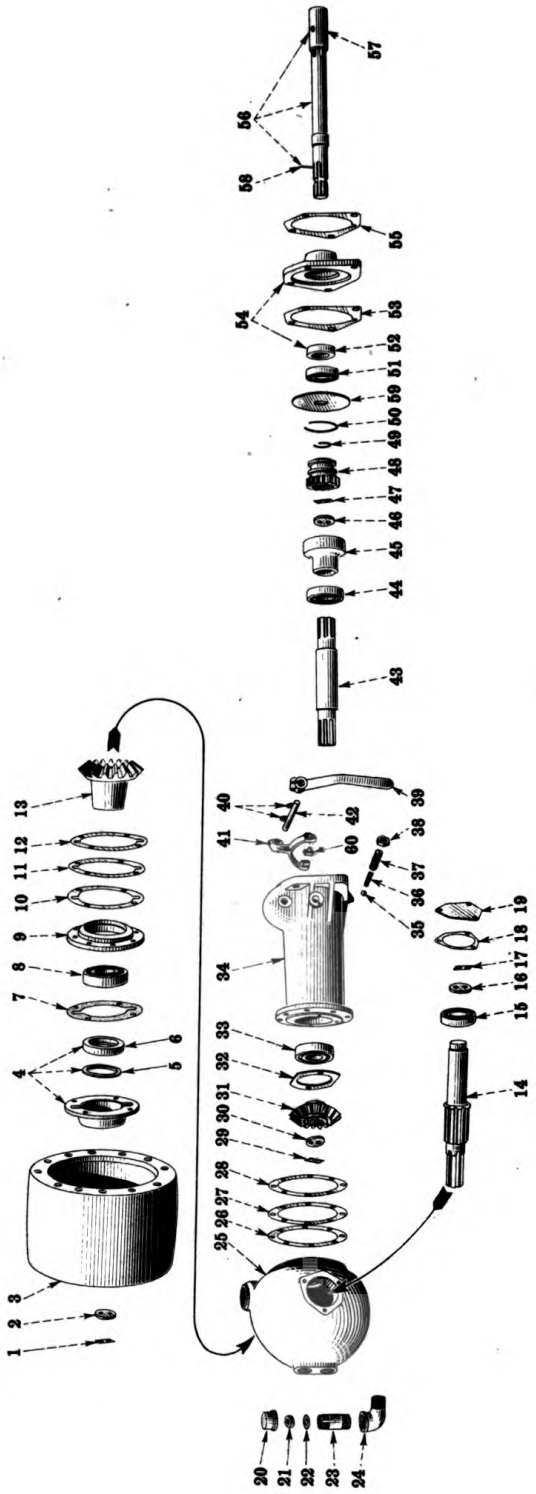
The pulley (3) may be pulled off after taking out two 3/8" cap screws. First bend back the cap screw lock (1) between the cap screws and the retainer (2). Items (4) to (28) inclusive may be removed as a unit after taking out eight 7/16" cap screws holding the gear box (25) to the carrier (34). The shims (26), (27) and (28) are used to properly set the gears for tooth contact. With the pulley removed, the shaft (14) may be removed after taking out the cap screws in the retainer (4). Puller cap screw tapped holes are provided in the bearing cage (9). The gear bearing cover (19) may be removed and the assembly forced out from that side. Oil seal (6) and felt washer (5) may be removed from the retainer (4) if their replacement is desirable. The bearing (8), bearing cage (9), and the gear (13) (17 teeth) may all be pressed from the shaft (14) as a unit. With the bearing and the bearing cage removed from the shaft, the gear will slide off easily since it is splined to the shaft. Unit removal is the easier way. The shims (10), (11) and (12) are of varying thickness and are used to obtain the proper running clearance or backlash between the gears. Two cap screws in the bearing retainer (16), hold the bearing (15) on the shaft (14).

The shifter coupling (48) can be removed by disengaging it from the coupling (45). The shifter pins can also be removed. The shaft (43) may be removed from the carrier (34) after taking the cap screws from the bearing retainer (32), from the pinion retaining washer (30), and from the

Continued on page 8

REPAIR SECTION

BELT PULLEY - Continued



Illust. 5

Exploded View of the Belt Pulley Assembly.

Ref. No.	Description	Ref. No.	Description
1	Washer bolt lock.	30	Pinion retaining washer.
2	Retaining washer.	31	Pinion (16 teeth).
3	Belt pulley (11" dia. x 8-1/2" face).	32	Pinion shaft rear bearing retainer.
4	Retainer with oil seal and felt washer.	33	Pinion shaft bearing.
		34	Carrier.
5	Felt washer.	35	Shifter poppet.
6	Oil seal.	36	Shifter poppet spring.
7	Oil seal retainer gasket.	37	Shifter poppet bushing.
8	Bearing.	39	Shifter lever.
9	Bearing cage.	40	Shifter fork key. Shifter lever key.
10	Bearing cage shim (heavy).		
11	Bearing cage shim (medium).	41	Shifter fork.
12	Bearing cage shim (light).	42	Shifter shaft.
13	Gear (17 teeth).	43	Pinion shaft.
14	Shaft.	44	Pinion shaft bearing, front.
15	Gear bearing.	45	Coupling (16 teeth).
16	Gear bearing retaining washer.	46	Coupling retaining washer.
17	Gear bearing retaining washer bolt lock.	47	Coupling retaining washer bolt lock.
		48	Shifter coupling (16 teeth).
18	Gear bearing cover gasket.	49	Bearing retaining snap ring, small.
19	Gear bearing cover.	50	Bearing retaining snap ring, large.
20	1-inch standard iron pipe cap.	51	Power shaft bearing.
21	Breather felt.	52	Power shaft oil seal, inner.
22	Breather screen.	53	Carrier gasket.
23	Breather pipe.	54	Bearing cage with oil seal.
24	1-inch standard iron street ell.	55	Power shaft bearing cage gasket.
25	Gear box.	56	Power shaft with pin and coupling.
26	Carrier shim (heavy).	57	Power shaft coupling.
27	Carrier shim (medium).	58	Power shaft groove-pin.
28	Carrier shim (light).	59	Bearing cage baffle.
29	Pinion retaining washer bolt lock.	60	Shifter pin.

REPAIR SECTION

BELT PULLEY - Continued

coupling retainer washer (46). Slide the coupling (45) off the splined end of the shaft, and the pinion (31) from the opposite end. Press the shaft with bearing (44) out of the front end of the carrier (34). Bearing (33) can then be removed from the carrier.

The shifter mechanism can be removed after taking the cap screw from the shifter fork (41) and pulling on the shifter lever (39). When the round key (40) clears the shifter fork it may be lifted out and shaft (42) withdrawn from the carrier. The poppet ball (35), poppet spring (36) and the fork (41) can all be taken out of the carrier.

The power take-off may be disassembled after taking the snap rings (49) and (50) from the assembly.

REASSEMBLY

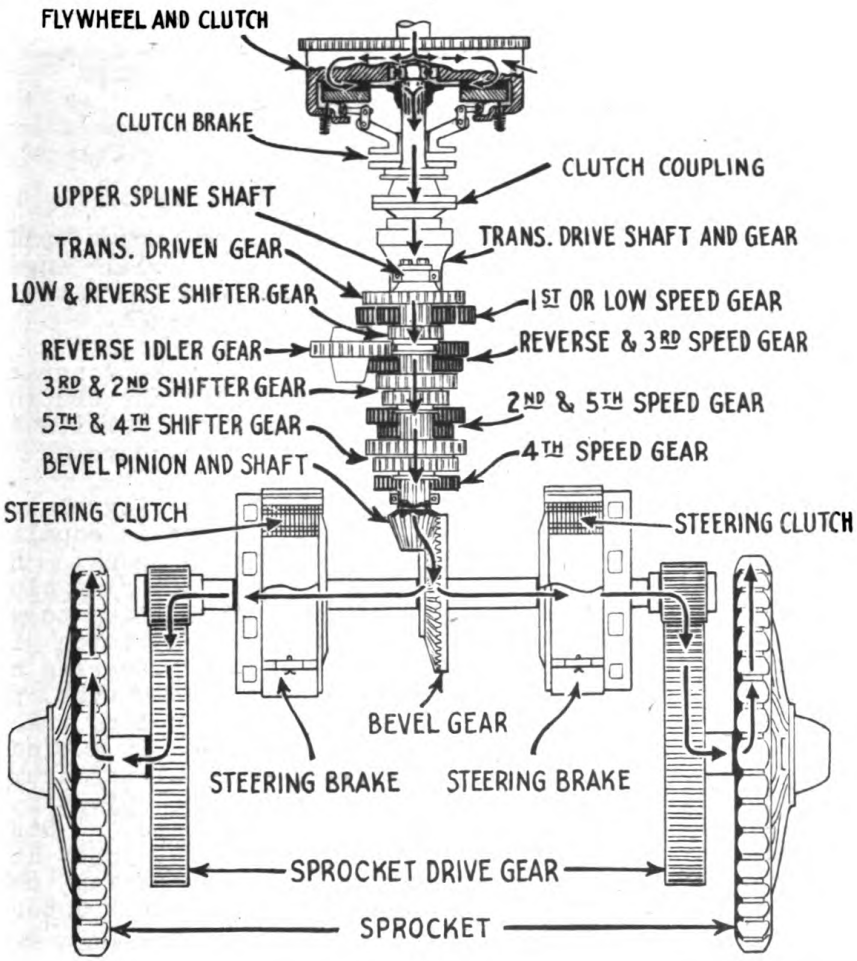
Reassembly of the units is practically the reverse of the removal procedure. Assemble the carrier unit and the gear box units separately. The carrier assembly can be completed by pressing bearings (33) and (44) on the shaft (43). Put bearing retainer (32) in position with cap screws in the retainer, attach pinion (31) and bolt it securely with retainer (30) in place. Then attach coupling (45) in the same way. Assemble shaft unit to the carrier and bolt bearing retainer (32) to the carrier (34). Make an assembly of bearing (15) on shaft (14) and bolt with retainer (16). Attach gear (13) and bearing (8) in the bearing cage (9) on to the shaft. The shaft unit can now be assembled to the gear box with the shims (10), (11) and (12) in place.

Connect the gear box to the carrier with the shims (26), (27) and (28) in place. Test the gears for proper backlash. The heels of gears should be flush as observed through the opening in the top of the gear box when lighted through the other holes in the gear box. Backlash of the gears should be .004" to .008". Rearrange shims (10), (11) and (12) to obtain this figure. Replace the remainder of the assembly in the reverse of the disassembly procedure.

REPAIR SECTION

POWER TRAIN

LINE OF POWER



Illust. 1
Schematic Drawing Tracing the Line of Power from the Engine Through the Engine Clutch, Transmission, Bevel Gear, Steering Clutches, Sprocket Drives and Sprockets to the Track.

The line of power from the engine is through the flywheel and engine clutch to the transmission and bevel gears. The power is distributed to both sides through the steering clutches to the sprocket drive gears, sprockets, and track chains on each side of the tractor.

The transmission has five forward speeds and one reverse speed.

LINE OF POWER - Continued

Shifting to these various speeds is accomplished by a conventional shift lever and use of the engine clutch. The reverse idler on its own shaft revolves constantly whenever the engine clutch is engaged. The engine-clutch coupling rotates the transmission drive gear which engages the gear on the upper spline shaft. The shifting of any one of three sliding gears located on the upper spline shaft will transmit power from the upper shaft to the bevel-pinion shaft. When the shifter lever is pushed forward and to the left, the first sliding gear on the upper shaft moves back to engage the reverse idler gear. At this time the line of power is from the transmission drive gear to the upper shaft, to the reverse idler gear, and back down to the bevel-pinion shaft. Moving the shifter lever to any other shifting position moves the sliding gears on the upper spline shaft so that they will engage with their respective mates on the bevel-pinion shaft.

The clutch brake operates automatically when the clutch is fully disengaged, facilitating faster shifting of gears.

When both steering clutches are engaged, power is equally transmitted to each track. By disengaging one steering clutch all the power is applied to one track. If one steering clutch is disengaged and the steering brake applied on the same side, the tractor pivots on its track. The steering brake is a band around the steering clutch drum and is used only for pivot turns and parking purposes. Disengaging both steering clutches at the same time, or disengaging the engine clutch, stops the tractor.

REPAIR SECTION

STEERING MECHANISM

STEERING CLUTCHES

There are two 14 inch multiple dry-disc, spring-loaded type steering clutches. They are located in separate compartments, one on each side of the bevel gear compartment at the rear of the main frame. They can be removed individually with their release mechanism without disturbing the bevel-pinion adjustment of sprocket drive assembly.

REMOVAL OF THE STEERING CLUTCHES

To remove either steering clutch proceed as follows:

1. Drain oil from the transmission.

2. Remove the seat frame, fenders, fuel tank, and battery. Be sure to disconnect all fuel lines and any electrical wiring.

3. Remove the steering clutch controls, lubricator (11), *Illust. 1*, the release shaft bearing (3), and the foot rest.

4. Remove the main frame cover.

5. Remove the release pivot lock (9), and nut lock (41), and lock nut (8) from the bottom of the main frame and turn out the pivot as far as possible.

6. Remove the release fork (5) and bushings from the compartment.

7. Remove the grease tube (12) from the collar.

8. Remove the upper brake joint pin (46), *Illust. 2* and fold the bands (45) out of the way. Then back off the brake band set screw (19), *Illust. 4*.

9. Remove all cap screws but two from the steering clutch drum (34) *Illust. 1* and the pinion flange. Revolve the drum so that these two remaining cap screws are at the top. Be sure to mark both the drum and the flange of the pinion shaft (47), *Illust. 2*, so the parts will be reassembled in the same position. Both parts will fit but one way. It will save time if the parts are marked.

10. Use the clutch compressing angle tool 58920-DAX to compress the clutch.

11. Remove cap screws and nuts from the bearing cage cap (18), *Illust. 1*.

12. Slide the bearing cap (18) back into the clutch and remove lock and cap screws from the coupling (13).

13. Put a sling around the steering clutch.

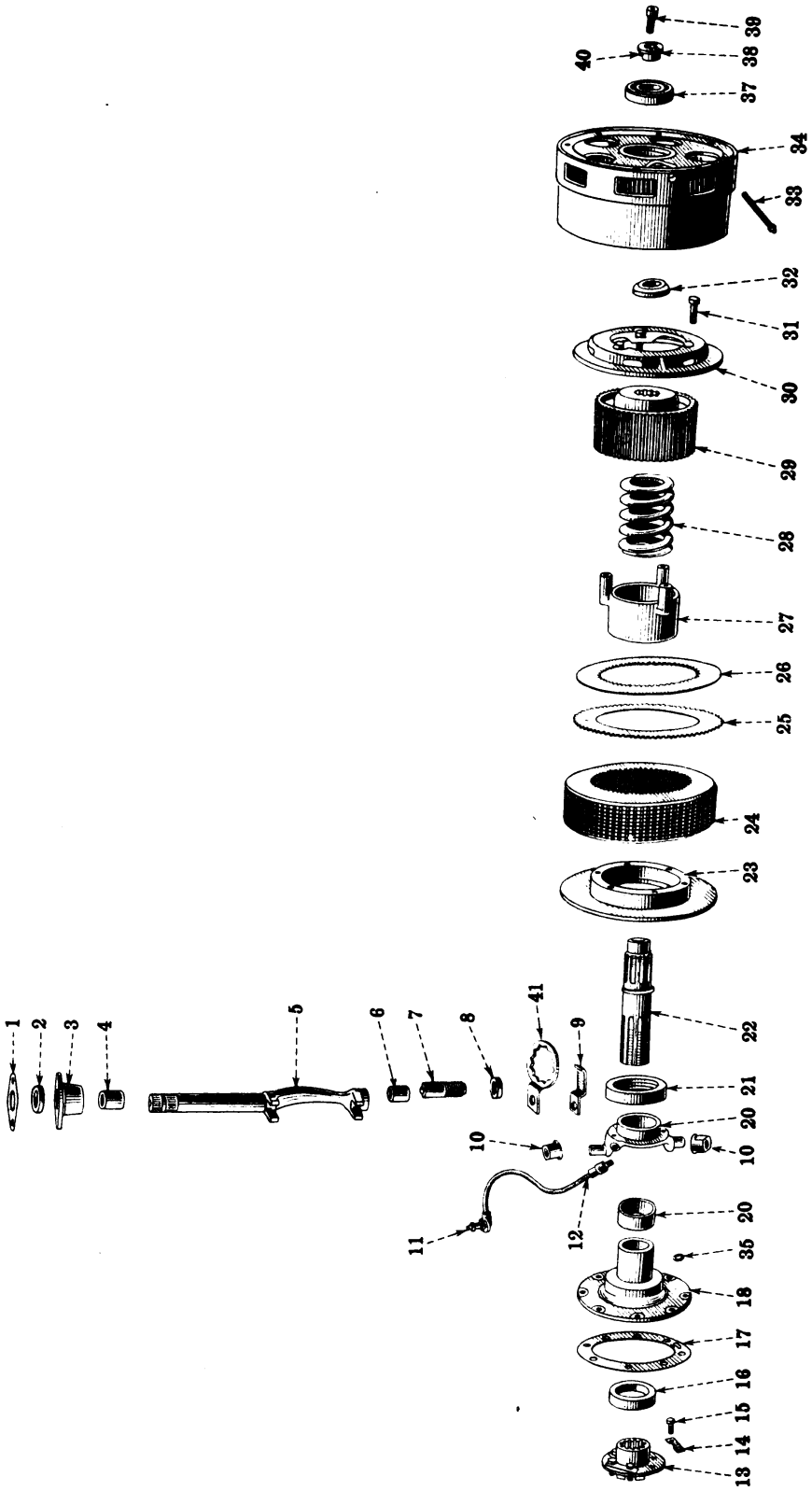
14. Remove the remaining cap screws from the drum flange, pry the coupling (13) into the bearing cap (18), then rock the assembly from the flange and remove the drum from the clutch compartment.

REPLACEMENT OF THE STEERING CLUTCHES

Steering clutches can be replaced by reversing the above procedure. The upper brake joint pin (46), *Illust. 2*, can most easily be inserted through the lubricating hole in the back of the main frame. When reassembling the release fork (5), *Illust. 1*, secure the release fork pivot (7) by only a few threads or it will not be possible to insert the release fork. Grease the end of the pivot.

REPAIR SECTION

STEERING MECHANISM - Continued



Illust. 1
Exploded View of Steering Clutch and Release Fork.

STEERING MECHANISM - Continued

Ref. No.	Description
1	Felt retainer.
2	Felt washer.
3	Release shaft bearing.
4	Bushing.
5	Release fork.
6	Pivot bushing.
7	Release fork pivot.
8	Lock nut.
9	Pivot lock.
10	Release pin bushing.
11	Lubricator.
12	Grease tube.
...	Release bearing.
13	Coupling (6 teeth).
14	Bolt lock.
15	Coupling bolt.
16	Oil seal.
17	Gasket.
18	Bearing cage cap.
20	Release collar.
21	Release bearing.
22	Clutch shaft.
23	Hub plate.
24	Disc assembly (Ref. Nos. 25 and 26).
25	Disc (external teeth).
26	Disc (internal teeth).
27	Spring retainer.
28	Pressure spring.
29	Steering clutch hub.
30	Plate.
31	Dowel bolt.
32	Bearing spacer.
33	Lubricator.
34	Steering clutch drum.
35	Cage cap lock washer.
37	Pilot bearing.
38	Pilot bearing retainer.
39	Pilot bearing retainer bolt.
40	Pin.
41	Pivot nut lock.

REPLACEMENT OF THE STEERING CLUTCHES - Continued

Extreme caution should be used when replacing oil seals (16) in the bearing cap and reassembling them to the coupling. The oil seals should not be soaked in oil for an extended period. This makes the leather too pliable and easier to turn over when assembling, resulting in oil leaks at this point. Soak the seals for a minimum time--the leather should be as hard as possible consistent with ease of reassembly. Never use an old oil seal and be sure the lips are formed in the right direction.

Be sure to use the special coupling bolts (15) for fastening the coupling (13) to the bevel gear hub. These can be identified by the punch mark in the center of the heads.

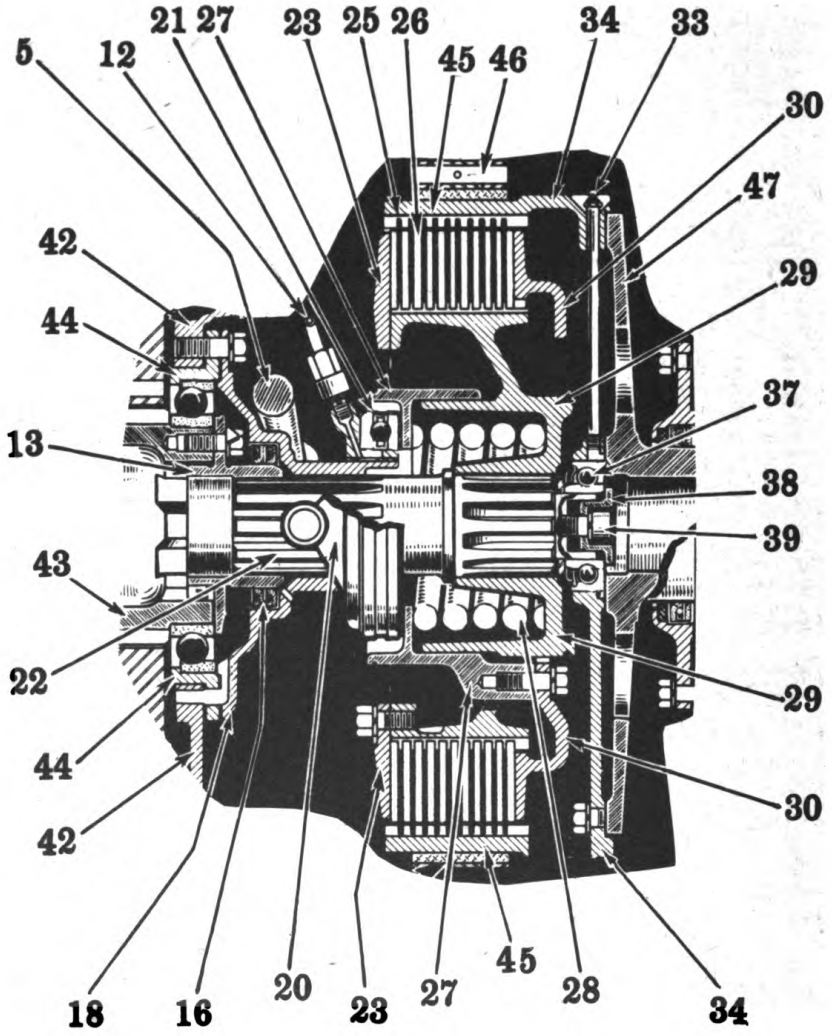
When replacing the steering clutch controls, apply a coating of oil to the inside of the release collar (20), pins and pin bushings (10), release shaft bearing (3), pivot bushing (6), pivot (7), and the 90° end of the operating rod. This will aid easy release. Check all of the above parts for nicks and roughness before reassembly. The shaft should be just as easy to move before replacing the bearing as it is with the bearing in place. Soak the felt washer (2) with oil before replacing the retainer (1).

The prongs on the release fork (5) should be smooth and parallel. Adjust the pivot (7) to give equal vertical clearance for both bushings. The outside and inside of the bushings are smooth and should be free on the release collar pin when the release fork is assembled.

The clutches can be adjusted according to instructions in the *"Operations Section"*.

REPAIR SECTION

STEERING MECHANISM - Continued



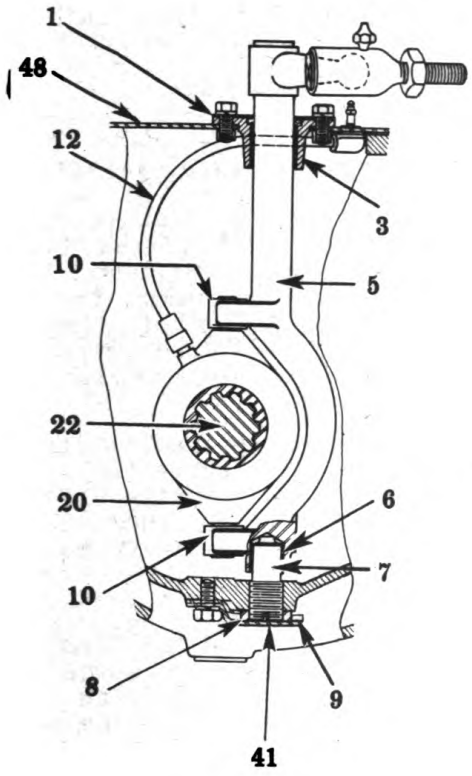
Illust. 2

Cross Section of Steering Clutch Assembly.

5--Release Fork; 12--Release Bearing Grease Tube; 13--Clutch Shaft Coupling; 16--Double Leather Oil Seal; 18--Bearing Cage Cap; 20--Release Collar; 21--Release Bearing; 22--Steering Clutch Shaft; 23--Hub Plate; 25--Disc (external teeth); 26--Disc (internal teeth); 27--Spring Retainer; 28--Pressure Spring; 29--Steering Clutch Hub; 30--Pressure Plate; 33--Pilot Bearing Lubricator; 34--Steering Clutch Drum; 37--Pilot Bearing; 38--Pilot Bearing Retainer; 39--Pilot Bearing Retainer Bolt; 42--Main Frame Wall which Supports the Drive Bevel Gear; 43--Drive Bevel Gear Hub; 44--Drive Bevel Gear Bearing Cage; 45--Steering Brake Band; 46--Steering Brake Band Joint Pin; 47--Sprocket Drive Pinion Shaft.

REPAIR SECTION

STEERING MECHANISM - Continued



Illust. 3

Cross Section of Steering Clutch Release Fork Assembly.

1--Release Fork Shaft Felt Retainer; 3--Release Fork Shaft Bearing; 5--Release Fork and Shaft; 6--Release Fork Pivot Bushing; 7--Release Fork Pivot; 8--Release Fork Pivot Lock Nut; 9--Release Fork Pivot Lock; 10--Release Collar Pin Bushing; 12--Release Bearing Grease Tube; 20--Release Collar; 22--Steering Clutch Shaft; 41--Lock for Release Fork Pivot Lock Nut; 48--Main Frame Cover.

REPLACEMENT OF THE DISCS

When the discs require replacement the steering clutches need only be partially disassembled as follows:

Remove the coupling (13), *Illust. 1,* the bearing cap (18), and the release collar (20) from the clutch shaft (22).

Assemble three puller cap screws (between the spokes in the back of the steering clutch drum) into the three tapped holes in the pressure plate (30). Then remove the cap screws from the front hub plate (23) to take out the plate. This will free the fiber and steel discs (24).

Discs (25)(external teeth), should fit freely on the teeth of the clutch drum (34), and the discs (26) (internal teeth) should fit freely on the teeth of the hub (29). When reassembling the clutch, be sure the Allen head bolt (39) holds the pilot bearing retainer (38) tightly against the pilot bearing (37) inner race and the clutch shaft (22).

With the steering clutch disassembled, it may be well to inspect the other parts for wear and alignment. When the clutch is in the disengaged position, the spring retainer (27), hub (29), hub plate (23), pressure-plate (30), and discs (26) all spin around freely without transmitting any power to the sprocket drive.

Disengaging the steering clutches moves the release collar (20) to the right and pushes the spring retainer (27) before it, thus compressing the spring (28). The pressure plate (30) secured to the spring retainer (27) likewise moves to the right and releases

REPAIR SECTION

STEERING MECHANISM - Continued

REPLACEMENT OF THE DISCS - Continued

the pressure on the discs (25) and (26), allowing them to slip. Letting go of the handle allows the spring (28) to push the retainer (27) and the release collar (20) to the left. The pressure plate (30) attached to the spring retainer (27) moves to the left and imposes the pressure of the spring (28) on the discs (25) and (26), transmitting power from the disc (25) splined to the drum (34).

Because of this function of the parts, it is important that the spring retainer (27) slides freely in the hub (29). The prongs on the spring retainer (27) must be perfectly centered in oblong holes in the hub. There should be 7/32 inches of clearance between the prongs and the holes in the central position.

The internal teeth of the pressure plate (30) mesh with the external teeth of the hub (29) and locate the prongs of the spring retainer (27) in the oblong holes in the hub. Fitted cap screws accurately locate the spring retainer on the hub. With two cap screws assembled to the retainer and plate, the cap hole should line up perfectly with the third hole reamed in the plate. Any force used to assemble these parts will spring the retainer (27) and cause it to bind on the hub (29). The assembled clutch should be compressible at least 1/2 inch. The free length of the spring is 5-15/32 inches. The assembled clutch drum should run true and the bearing cap outside diameter should be concentric with the outside diameter of the drum.

STEERING BRAKES

A steering brake is provided for each steering clutch. Its purpose is to stop the clutch drum from rotating after the steering clutch has been disengaged. Depressing one brake locks the track on that side and forms a pivot point for short turns. The brakes can also be used for parking purposes. Each can be locked in position. Pedals for each brake are adjustable to suit the operator. The brakes are simple and readily accessible, contracting on the steering clutch drums.

The bands can be relined after removing them through convenient holes in the bottom of the main frame. No other part of the tractor need be removed.

REPLACEMENT OF BRAKE LININGS

Loosen the bolts that hold the adjuster lock (24) *Illust. 4* to the brake pedal (26) and brake pivot shaft. Then remove the hand hole covers on top of the main frame and the brake inspection covers under the steering clutches.

Reach between the track chain and back out the set screw (19). The brake band anchor spring (12) can be removed through the hole in the bottom of the main frame.

Remove the adjusting bolt (36); take the shaft stud (35) from the pivot shaft (34) and slide the shaft far enough into the main frame to remove it from the pivot lever (33). The shaft is notched so that a screwdriver may be used to push it to one side.

Pull the pivot lever (33) down and remove the front band pin (9).

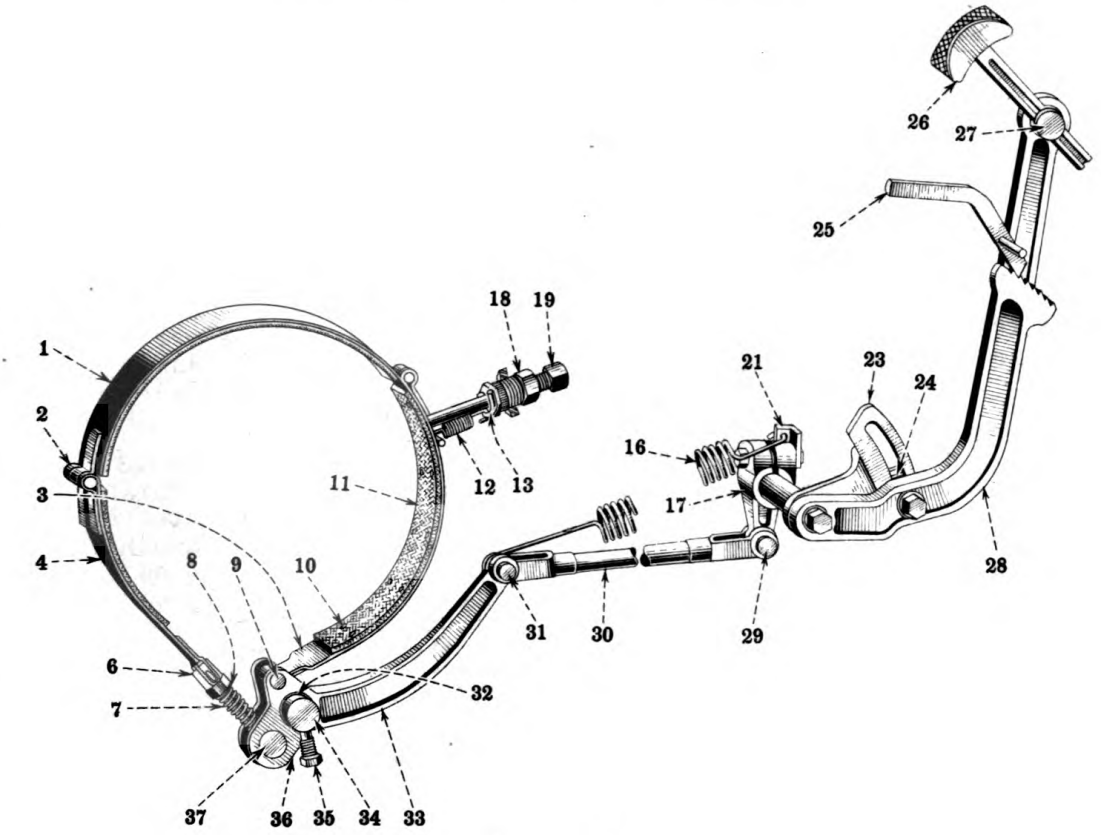
Pull the rear band down through the bottom brake band inspection holes in the main frame.

Reline the bands, being sure to countersink the rivets well.

The bands can be replaced in the tractor by reversing the above procedure.

REPAIR SECTION

STEERING MECHANISM - Continued



Illust. 4

Steering Brake Assembly Complete.

Ref. No.	Description	Ref. No.	Description
1	Band with lining and rivets, center.	21	Spring anchor.
2	Joint pin.	23	Shaft and adjuster, left hand. Shaft and adjuster, right hand.
3	Bank with lining and rivets, front.	24	Adjuster lock.
4	Band with lining and rivets, rear.	25	Pawl, left hand. Pawl, right hand.
6	Spacer.	26	Pedal pad and rod.
7	Release spring.	27	Swivel.
8	Release spring washer.	28	Brake pedal, left hand. Brake pedal, right hand.
9	Pin.	29	Pin.
10	Lining rivet (3/8" short). Lining rivet (1/2" long).	30	Brake rod and yoke.
11	Lining.	31	Pin.
12	Anchor spring. Spring with hook.	32	Bushing.
13	Spring hook.	33	Pivot lever with bushing.
16	Spring.	34	Pivot shaft.
17	Lever.	35	Shaft stud.
18	Spring anchor.	36	Bolt.
19	Set screw.	37	Adjusting pin.

STEERING MECHANISM - Continued

REPLACEMENT OF MAIN FRAME BRAKE SHAFT BUSHINGS

To replace these bushings (7), *Illust. 1,* in the *"Frame"* Section 6, in which the adjuster assembly operates, the engine support side channels must be removed as follows:

Place a support tightly under the equalizer spring and under the front of the engine. Also support the radiator. Then remove the large cap screws and small ones holding the side channel to the main frame. Remove the bolt in the front engine support and the cap screws from the side channel to the radiator, and run out the cap screws from the rear engine sheet to the main frame.

Then remove the crankcase guard, radiator guard, and radiator brace. Remove the side channels. The brake pedal can be removed after running out the cap screws.

Now remove the engine clutch cover, attach a wire to the spring (16), *Illust. 4,* and disconnect it from the anchor (21). A hole is provided inside the main frame through which the adjuster assembly lock bolt in the lever (17) and spring can be removed. Then lift out the spring anchor (21).

The adjuster assembly (23) is free to be pulled out. This assembly is the shaft and slotted arc which are welded to one another. The round key can be lifted out.

Knock out the cap on the inside of the main frame and drive out the bushings (7), *Illust. 1,* in the *"Frame"* Section 6.

The dust seals in the main frame can be replaced.

Replace the bushings by pressing them in. The brake shaft bushings are furnished reamed to size. The shaft diameter is .998 inch to 1.000 inch; clearance is .002 inch to .006 inch.

Replace the dust seals.

The remaining steering brake assembly can be removed as previously described, after which the pivot lever (33), *Illust. 4,* brake rod (30), and brake rod lever (17) can be pulled out through the bottom of the main frame.

REPAIR SECTION

TRACK

ACK CHAIN

e left and right tracks are in-
rchangeable.

e track links (1), (2), and (9), *llust. 1*, are drop-forged, heat-
eated steel. The track pins) and bushings (8) are machined, rburized, and hardened steel, rced into the links under great essure. The pins move freely the bushings but the ends are ess-fit in the links.

MOVAL OF THE TRACK CHAIN

e track chains are easily re-
ved. Each chain has a master 1 (10) identified by a locking re (3). Have this pin at the ont for easy removal. Take out e wire and drive the pin out of e links. Then back up the trac-
to shed the track.

PLACEMENT OF THE TRACK CHAIN

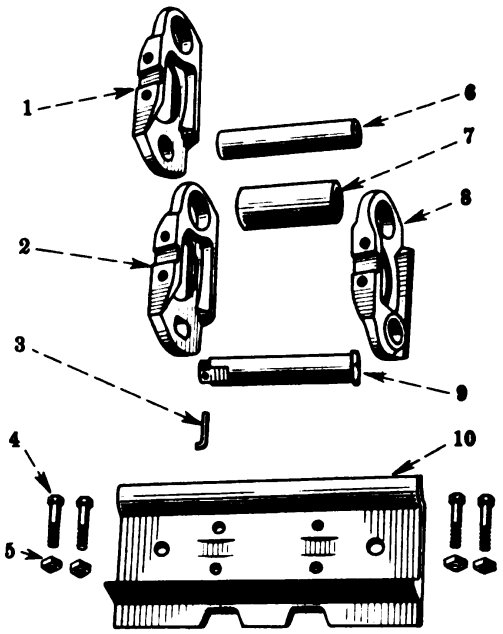
the replacement track in line ch the track being removed. re the link, without the bush-
, toward the tractor. Run the ctor forward on the new track. n pick up the end of the new ck and engage the bushings in sprocket teeth. Guide the ck around the sprocket and over idlers as the tractor moves ad. Line up the link and the hing with the bar. Install the ter pin and replace the lock e.

AIR OF THE TRACK.

n parts can be replaced by one two methods both of which re-
re a hydraulic press with a cial adapter head and fittings.

The pin diameter is 1.372 inch to 1.375 inch and the clearance is .005 inch to .018 inch.

The track can be repaired when the shoes (11) are on or off the chain.



Illust. 1

Exploded View of Track Link, Pin, and Shoe Assembly.

Ref. No.	Description
1	Link, right hand.
2	Master link.
3	Lock wire.
4	Bolt.
5	Nut.
6	Pin.
7	Bushing.
8	Link, left hand.
9	Master link pin.
10	Shoe, 13 inch.

REPAIR SECTION

TRACK - Continued

REPAIR OF THE TRACK - Continued

The following procedure should be followed when the track shoes are assembled to the track: Remove the track chain. Then press pin (7), *Illust. 1*, all the way out of each link which needs repairing, replacement, or rebuilding. Drive the old bushing (8) out and the new bushing in during the same operation when a bushing needs replacement. Place the links in relation to the track and push pin (7) into the assembly, joining the links into a chain. If link (1) or (9) needs replacement, push out the old bushing only. Then the link can be replaced.

To repair the track when the shoes are removed from the chain, follow this procedure:

Remove the track chain. Push pin (7) just out of the "first link" (9).

> NOTE: Carry each of the operations to completion for the entire length of the track to be repaired before proceeding to the rest of the operation.

> The words "first link" imply that link (9) is removed separately.

> The words "second link" imply that link (1) is removed with one pin (7) and one bushing (8) assembled to it.

Push the bushing (8) just out of the "first link" (9). After the pin and the bushing are out of the "first link" the sections of the track being repaired are composed of several loose links and several three-piece assemblies (1), (7), and (8) consisting of the one link (1), one track pin (7), and one bushing (8). These assemblies can be separated from the chain by sliding the pin out of the next bushing.

The following steps pertain to the dismantling of these three-piece assemblies and reassembling them with new pins and new bushings:

Push bushing (8) out of the "second link". Push pin (7) out of the "second link". Push the new bushing (8) into the "second link".

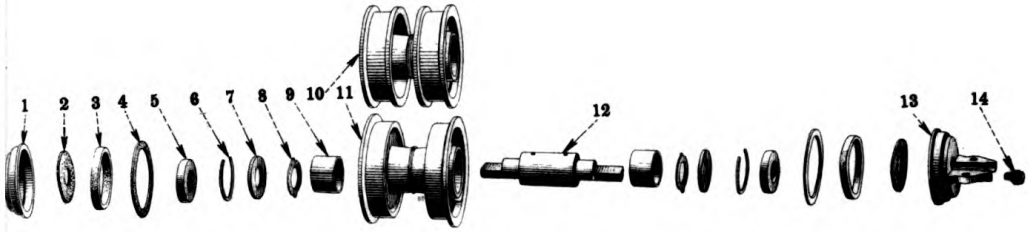
Then push new pin (7) into the "second link". Push bushing (8) into "first link" (1) while assembling section of track to track chain. Push the pin into the "first link".

TRACK ROLLERS

Four track rollers on each side carry the weight of the tractor. These rollers are welded, heat-treated, steel forgings fitted with bronze bushings. They rotate on heat-treated, hardened steel shaft. They are effectively sealed at each end by three individual felt washers and a spring loaded double leather seal. The rollers are gravity-lubricated from the oil well within the steel shaft.

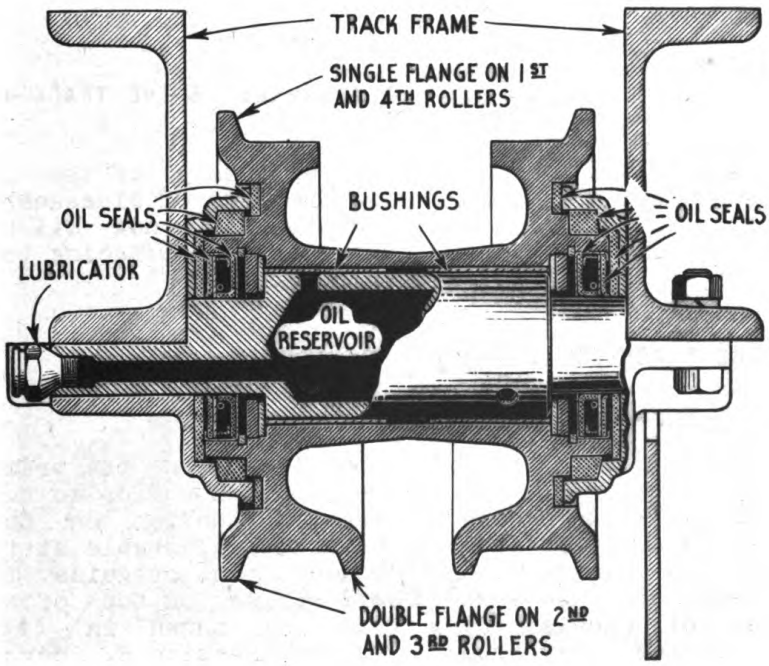
REPAIR SECTION

TRACK - Continued



Illust. 2. Exploded View of the Track Roller.

Ref. No.	Description	Ref. No.	Description
1	Bracket, inner.	8	Thrust washer set.
2	Felt washer, outer.	9	Bushings (set of 2).
3	Felt washer, center.	10	Roller (double flange).
4	Cork washer, inner.	11	Roller (single flange).
5	Oil seal.	12	Shaft.
6	Snap ring.	13	Bracket, outer.
7	Retainer.	14	Lubricator.



Illust. 3. Cross Section of Track Roller.

REPAIR SECTION

TRACK - Continued

REMOVAL OF THE TRACK ROLLERS

This is described in the *"Frame"* Section 6 under *"Disassembly of the Track Frame"*.

DISASSEMBLY OF THE TRACK ROLLERS

With the track rollers removed from the tractor, each can be disassembled as follows:

The inner (1), *Illust. 2,* and outer (13) brackets can be slipped from the shaft (12) and the outer and center felt washers (2) and (3), the cork washers (4) can also be removed. Pry out the oil seals (5) and snap rings (6). The retainers (7), the thrust washers (8) and the shaft are now free for removal.

The bushings (9) are replaceable, reamed to size, and need only be pressed in place, bevel first, until they are flush with the outside edge where the thrust washer (8) rests against the track rollers. Be sure all oil holes are clean.

REASSEMBLY OF THE TRACK ROLLERS

Reassembly is the reverse of disassembly. The shaft (12) is placed in the roller, then the thrust washers (8) (being sure washers are properly engaged with the roller), retainers (7), snap rings (6), new oil seals (5) (leather lips facing away from the roller), cork washers (4), felt washers (2) and (3), and finally brackets (1) and (13).

TRACK IDLERS

The upper section of the track chain between the sprocket and the front idler is supported by two grey iron idlers with chilled outer faces (increased hardness). They are mounted on the front and the rear spring retainers. To remove them, lift up the track, take off the cap (8), *Illust. 4,* and the two cap screws holding the thrust washer (5) to the idler shaft (1).

DISASSEMBLY OF THE TRACK IDLER

With the track idlers removed from the tractor each can be disassembled as follows:

The felt washer (2) and the oil seal (3) can be removed. The shaft (1) can be forced out after driving out the retainer bolt (10), *Illust. 5,* in the support (11).

REASSEMBLY OF THE TRACK IDLERS

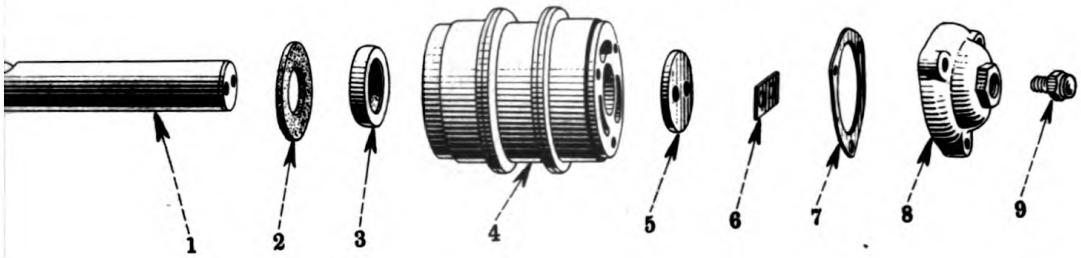
The reassembly of the idlers is the reverse of disassembly. Be sure to use a new oil seal with the leather lip facing toward the tractor.

FRONT IDLER

Front idlers for the track chains are slide-mounted to the track frames. Tension on the track chains is adjustable at the idler sliding mount or guide. Two heavy coil springs on top of the track frame as shown in *Illust. 4, "Frame"* Section 6, permit the idlers to recoil under shock but exert no tension on the track when in the normal operating position.

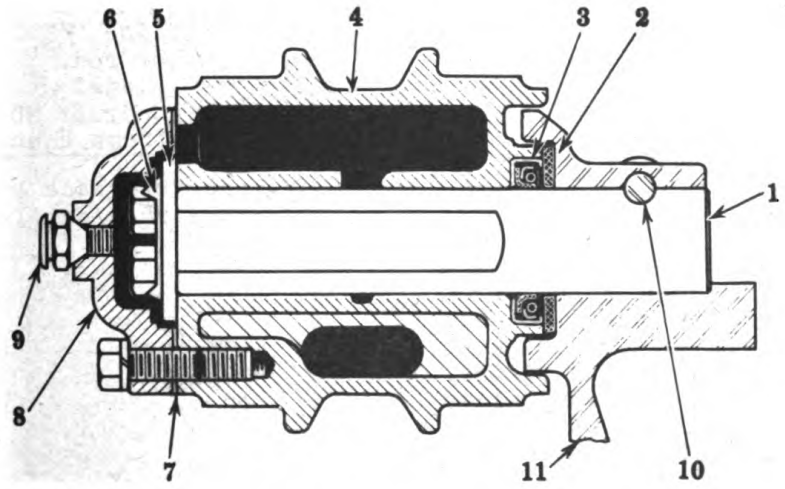
TRACK - Continued

RACK IDLER



Illust. 4. Exploded View of Track Idler.

Ref. No.	Description	Ref. No.	Description
1	Shaft.	6	Screw lock.
2	Felt washer.	7	Gasket.
3	Oil seal.	8	Cap.
4	Idler.	9	Lubricator.
5	Thrust washer.	10	Retainer bolt.
		11	Idler support.



Illust. 5. Cross Section of Track Idler.

REPAIR SECTION

TRACK - Continued

REMOVAL OF THE FRONT IDLER

It is not necessary to remove the track frame assembly to take off the front idlers. Remove the track chain. Then remove the cap screws from the adjuster (15), *Illust. 6*, after which the entire front idler assembly can be slid off the track frame (18), *Illust. 7*.

DISASSEMBLY OF THE FRONT IDLER

Bend back the nut locks (2), *Illust. 6*, and run out the nuts (1) and (13). Remove the grease fitting (14) before removing nut (13). Then run out the cap screws that secure the cross plate (16) to the guides (3) and (12). Remove the inner and outer guides and remove the key (17) from the shaft (11). Lift out the felt washers (4) and pry out the oil seals (5). After the snap rings (6) are removed, the retainers (7) and thrust washers (8) are free.

The shaft can then be pulled out. The shaft diameter is 2.624 inches to 2.625 inches. Bushings (9) are replaceable, reamed to size. They should be pressed into the idler, bevel first, until they are flush with the inside diameter.

REASSEMBLY OF THE FRONT IDLER

Reassembly is in the reverse order of disassembly. Be sure that the lips of the oil seals (5) face the outside of the idler on each side. The thrust washers (8) must engage the slots in the idler. Assemble the shaft with the drilled oil hole facing out. A special nut (13) is provided for the lubricator side.

REPLACEMENT OF THE FRONT IDLER

Replacement on the tractor is the reverse of removal. Be sure the proper adjustments are made after the idlers are on the tractor to prevent them from cocking and also to prevent the tractor from creeping to one side.

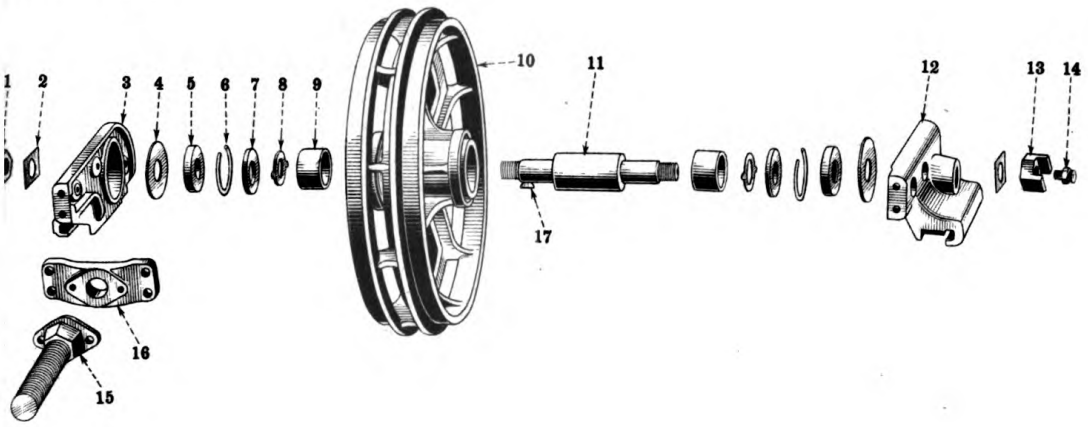
Ref. No.	Description
1	Nut, inner.
2	Nut lock.
3	Guide.
4	Felt washer.
5	Oil seal.
6	Snap ring.
7	Retainer.
8	Thrust washer.
9	Bushing.
10	Idler, with bushings and oil seals.
11	Shaft.
12	Guide.
13	Nut, outer.
14	Lubricator.
15	Adjuster rod.
16	Cross plate.
17	Key (Woodruff No. G).
18	Track frame channel.

The above reference numbers and descriptions are for Illusts. 6 and 7 on page 7.

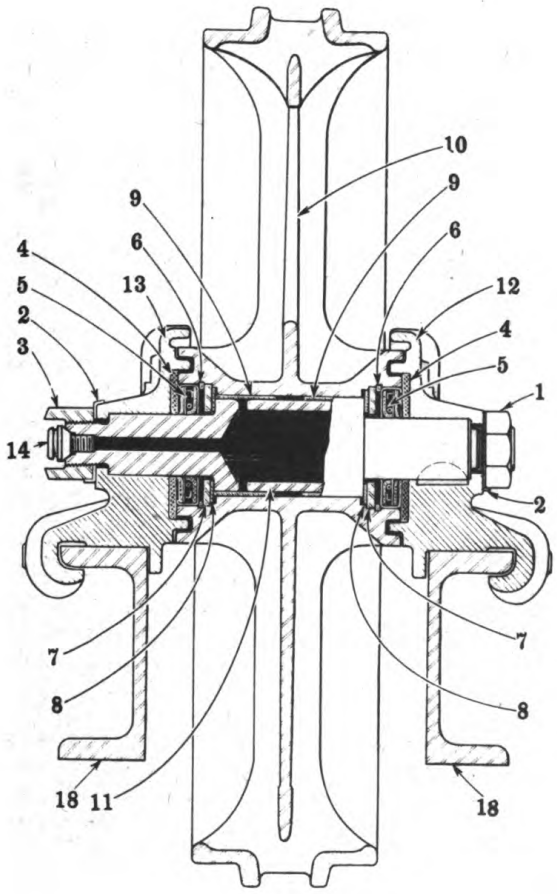
REPAIR SECTION

TRACK - Continued

RONT IDLER



Illust. 6. Exploded View of Front Idler.



Illust. 7. Cross Section of Front Idler.

REPAIR SECTION

TRANSMISSION

Gear	M.P.H.	F.P.M.	Gear Ratio
1st	1.5	132	75.1
2nd	2.2	194	53.0
3rd	3.2	282	36.2
4th	3.9	343	30.1
5th	5.3	466	22.0
Reverse	1.7	150	66.9

The transmission is of the selective spur-gear type, having five speeds forward and one reverse. Standard shifting is controlled by one lever for all speeds. Gears are mounted on three shafts: the upper spline shaft (30), *Illust. 1*, revolves on ball bearings in bearing cages; the bevel gear and pinion shaft (splined) (41) rotates on ball bearings and is shimmed for cone setting of the bevel gear and pinion at the rear-end bearing cage (47) adjacent to the pinion; the bushing (25) in the reverse idler gear (29) rotates on a shaft (21) stationary in the main frame mounted independent of the transmission front cover (34).

The front end of the bevel gear and pinion shaft (41) is supported with a ball bearing (59) inside of the transmission driving and gear shaft (57); this gear rotates on ball bearings (59) and (63) located on the transmission front cover. An oil slinger (58) is attached to the transmission drive gear and takes oil from directly underneath. The details of this transmission can be seen by referring to *"Service Charts," Section 13.*

Splash lubrication is used through the transmission and bevel gear compartments - 20 quarts of oil are required.

PREPARATION FOR REMOVAL OF TRANSMISSION

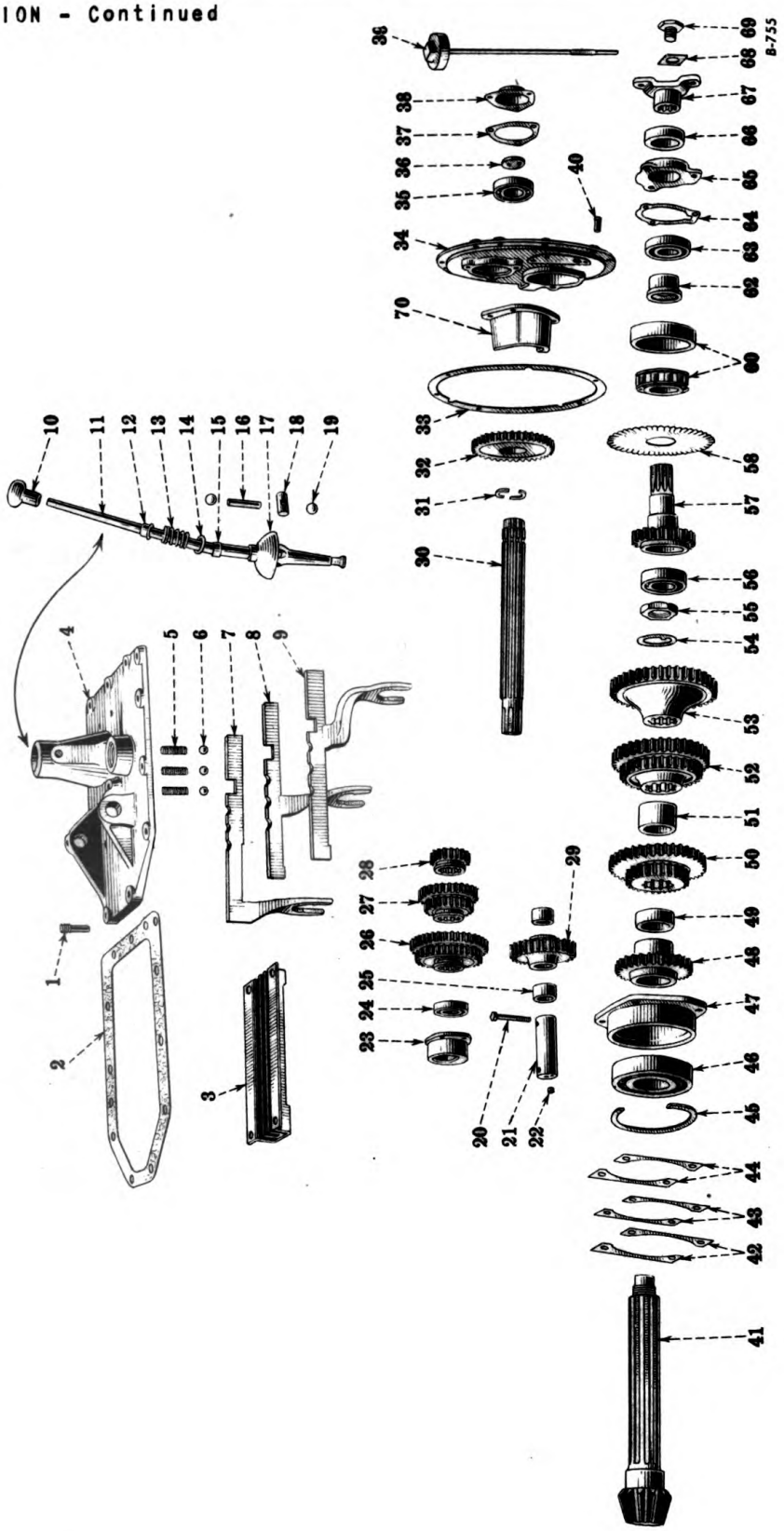
The transmission can be worked on without removing the seat and fuel tank but their removal is described below because it may be found more convenient to have them off the tractor for this job.

Drain the fuel tank and disconnect the fuel line. Remove the seat cushions. Remove the bolts that hold the fender side sheets to the seat side sheets, main frame, dash, and clutch cover. Then remove the bolts from the fuel tank support braces on each side and lift out the fuel tank, seat, and fenders as a unit. Either hoist the fuel tank out or slide it out from the rear.

(Continued on page 4)

REPAIR SECTION

TRANSMISSION - Continued



Illust. 1 - Exploded View of the Transmission

REPAIR SECTION

TRANSMISSION - Continued

Ref. No.	Description
1	Dowel
2	Gasket
3	Rail guide assembly
4	Housing
5	Poppet spring
6	Poppet ball
7	Shifter rail - 4th and 5th
8	Shifter rail - 2nd and 3rd
9	Shifter rail - 1st and reverse
10	Lever ball
11	Gear shift lever
12	Spring stop, upper
13	Spring
14	Spring stop, lower
15	Shield bushing
16	Swivel shaft, small
17	Swivel housing shield, complete

Ref. No.	Description
18	Swivel shaft, large
19	Plug
20	Bolt
21	Reverse idler shaft
22	Plug
23	Bearing cage
24	Bearing, rear
25	Bushing
26	4th and 5th speed gear, (33 and 38 teeth)
27	2nd and 3rd speed gear, (24 and 30 teeth)
28	1st and reverse speed gear (19 teeth)
29	Reverse idler
30	Spline shaft
31	Split collar, complete
32	Driven gear (39 teeth
33	Gasket

Ref. No.	Description
34	End cover
35	Bearing, front
36	Bearing retainer washer
37	Gasket
38	Bearing retainer
39	Oil level rod
40	Dowel
41	Bevel pinion and shaft with drive bevel gear
42	Shim, heavy
43	Shim, medium
44	Shim, light
45	Snap ring
46	Bearing, rear
47	Bearing cage
48	4th speed gear (32 teeth)
49	Spacer, short
50	2nd and 5th speed gear (27 and 41 teeth)
51	Spacer, long
52	3rd and reverse speed gear (35 and 41 teeth)

Ref. No.	Description
53	1st speed gear (46 teeth)
54	Lock washer
55	Lock nut
56	Bearing
57	Driving shaft and gear (26 teeth)
58	Oil slinger
60	Bearing, complete
62	Spacer
63	Bearing
64	Gasket
65	Retainer
66	Oil seal
67	Coupling
68	Lock
69	Retaining screw
70	End cover oil pocket

REPAIR SECTION

TRANSMISSION - Continued

REMOVAL OF THE TRANSMISSION

Drain the oil from the transmission. Remove the steering clutch levers. Then disconnect the return springs from the release levers and the spring anchors. *(See Illust. 2, "Clutches" Section 3 in the "Operations Section."* Loosen the set screws in the steering clutch lever support on the housing and push out the hand lever shaft. Then lift up the levers and push out the eye pins and remove the levers. Loosen the cap screws in the release levers and remove them. Force the dowel pin (1), *Illust. 1* out of the housing (4) by running down a nut on it. Remove the cap screws from the housing. The housing (4), shifter lever assembly (10) to (19) inclusive, and shifter rails (7), (8) and (9) come out as a unit.

Remove the engine clutch to work on any part of the transmission except the reverse idler gear. Removal of the clutch is described in the *"Engine Clutch" Section 4.*

Take out three cap screws from the bearing retainer (38) and take off the retainer and gasket (37). Then run out cap screws in the spline shaft (30) and remove the bearing retainer washer (36). Take out the cap screws in the end cover (34) and assemble puller cap screws in the holes from which the set screws were removed. By running them up evenly the entire end cover assembly can be removed. Then the gasket (33) can be taken off.

The spline shaft (30) and gear assembly on it can be removed through the engine clutch end of the transmission after removing the cap screws from the bearing cage (23) at the rear. Take out the cap screws and lock washers from the bearing cage (47). The bevel pinion and shaft (41), with the entire lower shaft assembly (42) to (55) inclusive, can be removed through the front end of the transmission. To free the reverse idler gear (29) remove the cotter key and nut from the bolt (20) and withdraw the bolt. Push out the reverse idler shaft (21) and lift out the idler gear.

DISASSEMBLY AND REPAIR OF THE TRANSMISSION

Bushings for the reverse idler gear (29) are replaceable, reamed to size. They should be pressed in place, bevel first. The outside end should be flush with the inside of the bevel in the gear hub. The shaft diameter is 1.561" to 1.562", which gives a running clearance of .003" to .006". Be sure the bore in the gear is concentric with the pitch line of the gear teeth.

When the driven gear (32) is pulled off the spline shaft (30), the split collar (31) is freed. The gears can then be slid off the shaft. Press the spline shaft out of the bearing (24) and remove the bearing from the cage. If the splines on the shaft or in the gears are worn, replace the worn parts with new ones.

Press the bearing (56) off the bevel pinion and shaft (41). Unlock the lock washer (54) and remove the lock nut (55). Then all of the gears can be removed from this shaft. Remove the snap ring (45) from the bearing cage (47) and press the cage off the bearing (46). Then press the bearing off the shaft.

Unlock the lock (68) and remove the retaining screw (69) in the end cover to release the transmission coupling (67). Remove the cap screws and washers from the bearing retainer (65), remove the gasket, and remove the oil seal (66) from the bearing retainer. Press the driving shaft and gear (57) from the end cover (34). The bearing (63) will be removed from the shaft and the spacer (62) is free to be removed from the cover. Pull the inner bearing (59) from the driving shaft (57) to free the oil slinger (58), and press the bearing (63) from the end cover.

TRANSMISSION - Continued

Inspect all parts for wear and be sure that the bearings fit tight in their cages and in the shaft.

The rail guide assembly (3), and (5) to (9) inclusive, can be removed by running out cap screws that secure the assembly to the housing. This will then free the shifter rails (7), (8), and (9). The shifter lever (11) can be lifted out of the housing after the expanding plugs (19) and the small swivel shaft (16) are driven out. When replacing, this swivel shaft must pass through the large swivel (18).

REASSEMBLY OF THE TRANSMISSION

Place the reverse idler gear (29) between the two supports on the main frame, with the longer hub to the rear of the tractor. Then push the reverse idler shaft (21) in place. Note that the shaft bolt hole is off center so that the bolt can be inserted through the support and shaft in only one way. Replace the nut and cotter key on the bolt.

To assemble the bevel pinion and shaft, press the bearing cage (47) onto the bearing (46) and place the snap ring (45) onto the cage and press the assembly onto the shaft. Place the 4th speed gear (48) on the shaft with the shorter hub toward the bearing, and place the short spacer (49) on the shaft. Place the 2nd and 5th speed gear (50) on the shaft with the smaller gear toward the bearing, and slide the long spacer (51) into position. Place the 3rd and reverse speed gear (52) on the shaft with the smaller gear toward the bearing end. Then slide the first speed gear (53) on the shaft with the long hub toward the bevel gear. Place the lock washer (54) and nut (55) on the shaft, tighten, and lock, and press the bearing (56) onto the shaft.

To reassemble the spline shaft (30), press the bearing (24) on the rear end of the shaft and place the bearing cage (23) on the bearing. To replace the gears, refer to *"Service Charts," Section 13,* for their relative positions. The collars of the gears should face the rear of the tractor. The gears and spline are selectively fitted; the punch mark on the gear spline should match the punch mark on the shaft spline. Place the split collar (31) in the groove on the shaft and slip the driven gear (32) on the shaft with the longer hub toward the front end of the shaft.

To assemble the end cover (34), place the oil slinger (58) on the driving shaft and gear (57), and press the bearing (59) onto the shaft. Press this unit into the end cover, slide on spacer (62) with the flare toward the rear end, and press the bearing (63) into the front of the end cover. Place the oil seal with the leather lips toward the bearing side of the retainer (65) and press the seal (66) into the retainer. Assemble the retainer and gasket, replacing the lock washers and cap screws. Replace the coupling, and secure the shaft with the lock and retaining screw.

To reassemble the housing and shifter lever unit, turn the housing with the bottom side up, and replace the poppet springs (5) and the poppet balls (6) in the holes provided for them. Then replace the shifter rails (7), (8), and (9) in the rail guide so that the proper rails engage the proper gears. The square notches in the shifter rails should line up. Secure the rail guide assembly to the housing with cap screws. Place the swivel snaft (18) in the shift lever (11) and insert the lever in the housing. Drive in the small swivel shaft (16) and replace the expanding plugs.

REPLACEMENT OF THE TRANSMISSION

Lift the assembled bevel pinion and shaft (41) into position and force the bearing cage into the main frame. If the bevel pinion and bevel gear have not been replaced by new ones, replace the

REPAIR SECTION

TRANSMISSION - Continued

same number of shims between the bearing cage and the main frame. Run in the cap screws to secure the bearing cage (47) to the main frame.

If a new bevel pinion and bevel gear have been put into the tractor see the *"Final Drive" Section 5*, for proper adjustment.

Place the bearing cage (33) with the spline shaft assembly in the main frame, run in the cap screws, and secure the bearing cage to the frame.

Replace the assembled end cover and gasket in the main frame. The bearing (56) on the bevel pinion and shaft should go into the driving shaft and gear (57). Be sure that the dowel pins (40) are in place, then replace the cap screws and the lock washers and nuts on the studs.

Drive the bearing (35) onto the spline shaft (30) and secure it with cap screws, lock washers, and the bearing retainer (36). Replace the gasket, retainers (38), and tignten the cap screws with their lock washers.

Replace the engine clutch as outlined in the *"Engine Clutch" Section 4*.

Clean the assembly and the engine clutch and transmission cases before replacing the covers and housing. Replace the seat and fuel tank.

Place the transmission housing assembly on the main frame, making sure that the shifter rails engage the gears properly. Drive in the dowel pins (1) and secure the housing (4) to the main frame with cap screws and lock washers. Replace the hand control levers, steering clutch turnbuckles, and springs.

Fill the transmission with the proper grade and amount of oil.

REPAIR SECTION

TOLERANCES AND CLEARANCES

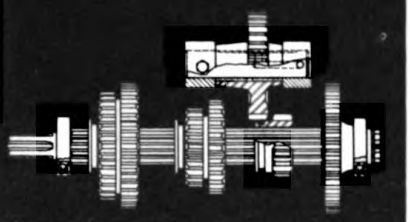
NOTE: All tolerances and clearances not found in the Service Charts will be found in the text under the various headings.

OIL SEALS

NOTE: Whenever an oil seal is removed from the tractor, always replace it with a new seal.

When installing new oil seals, check to see that the leather is pliable and the edges are in good condition to assure a tight fit, preventing oil leakage. Inspect the metal surfaces in contact with the oil seal to make sure they are smooth; roughness will cause rapid wear of the seal and consequent oil leakage.

TOP VIEW OF TRANSMISSION



TRANSMISSION: To remove, clear top of main frame including seat, remove engine clutch and transmission front cover, take out capscrews in bearing retainers at rear of transmission, and pull out both upper and lower shafts. Idler shaft on side of main frame can be removed after taking out retaining bolt and driving idler shaft from main frame. Gears can be slid off top shaft. Gears can be removed from lower shaft after pulling bearing and removing retaining nut.

When reassembling, the above procedure can be reversed. Shims at rear bearing cage of lower shaft should be adjusted so that a .625" gauge will be a snug fit between end of pinion and ground portion of the bevel gear adjacent to the bevel gear spacer. Shims in bevel gears should be adjusted for approximately .012" backlash or clearance. Be sure shifter forks engage grooves of shifter gears when replacing gear shifter housing.

RELEASE FORK: Remove by taking off attaching parts on top of main frame cover, remove main frame cover, take out pivot from bottom of main frame, and lift out release fork. When replacing, adjust pivot for equal space above and below release collar pin bushings. Fork should turn freely, before and after tightening capscrews on release bearing in main frame cover.

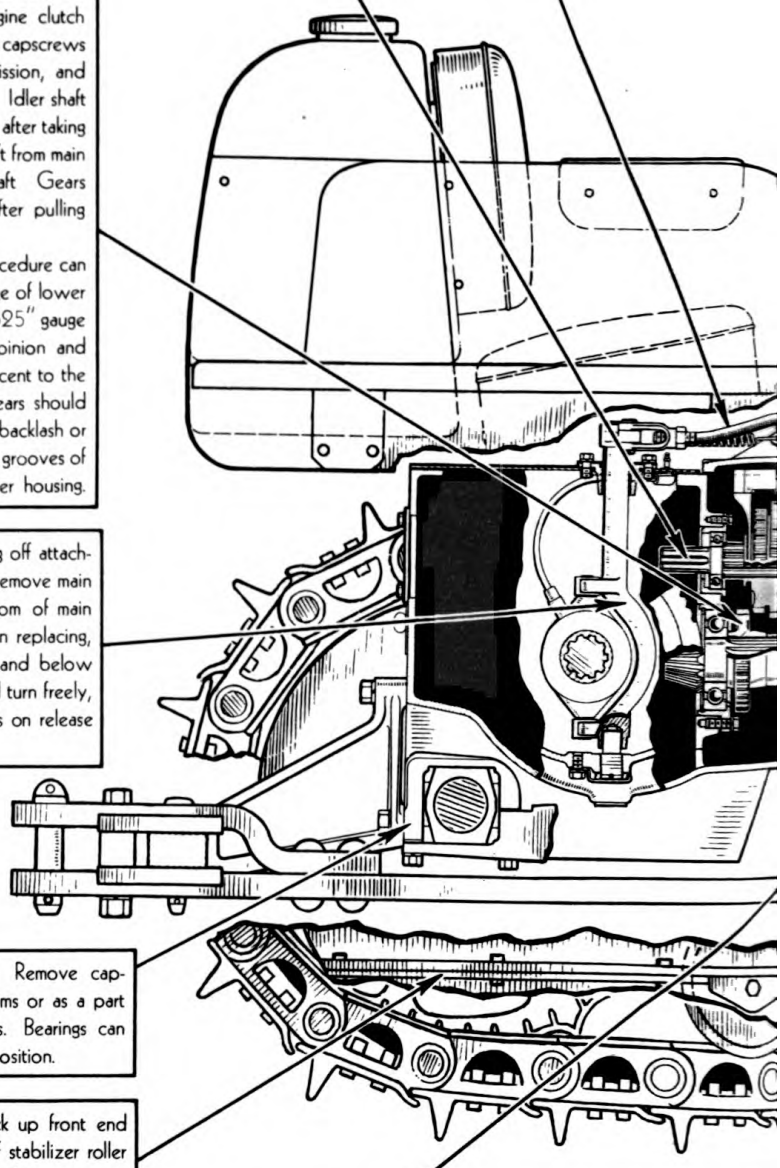
DIAGONAL BRACE CLAMP: Remove capscrews in clamp to gain access to shims or as a part of removal procedure for track frames. Bearings can be removed with diagonal brace in position.

TRACK FRAMES: To remove, jack up front end of tractor, remove track chain, take off stabilizer roller guide, take out bolts in diagonal brace clamp at pivot bearing, support rear of tractor at drawbar, take off sprocket shield, remove bolts from pivot bracket cap and bracket, and pull frame to the side to clear equalizer spring. Equalizer spring may be removed, if so desired, as well as diagonal brace where it bolts to the track spring guide. Track frame can then be rolled forward on track.

STEERING CLUTCH ADJUSTER: To obtain 4" free travel of hand lever, turn the turnbuckle. Shorten linkage to increase free travel. Move release lever on release fork for additional adjustment.

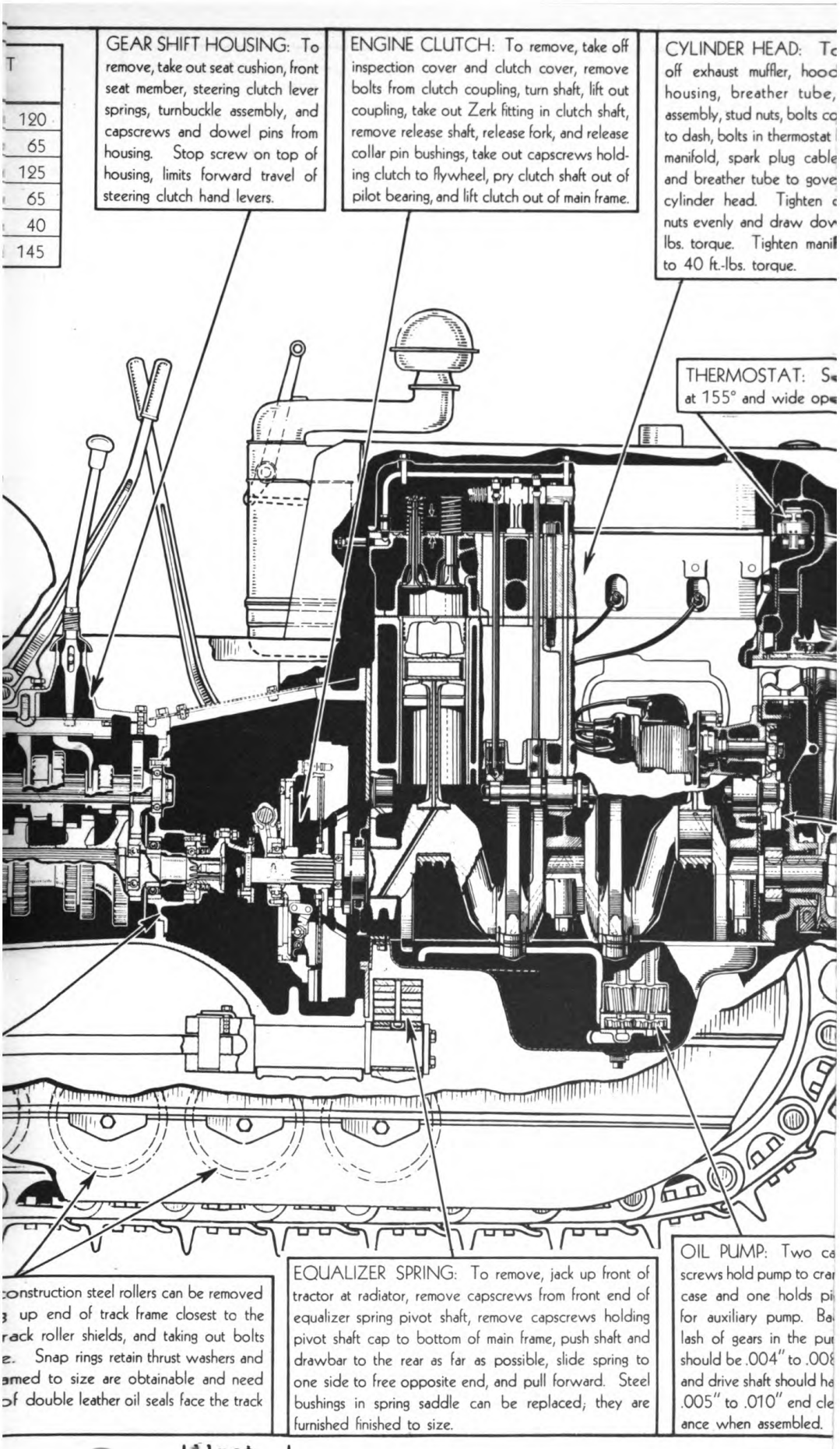
POWER TAKE-OFF: Shaft attaches to rear end of upper splined shaft. Bearing in bearing cage at rear of main frame supports shaft.

TORQUE CHA (Ft.-Lbs. Torqu
Cylinder Head Nut
Conn. Rod Bolt
Main Bearing Nut
Flywheel Bolt
Manifold Nut
Track Shoe Bolt

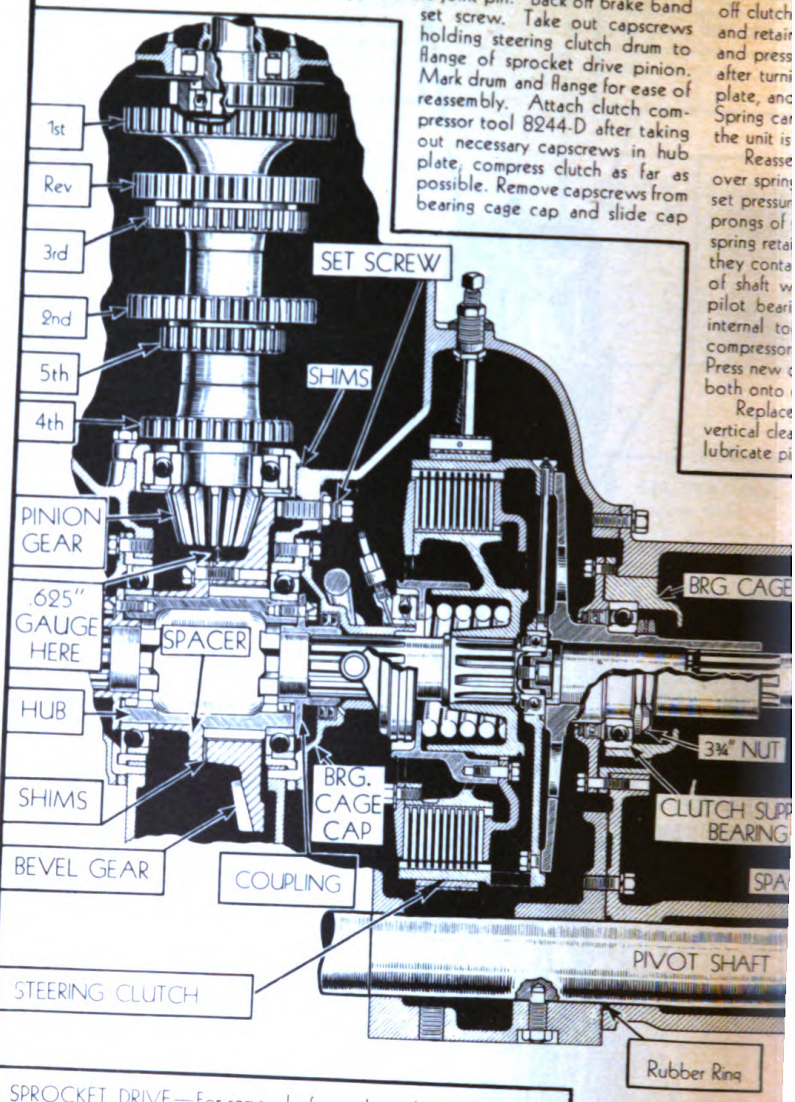


TRANSMISSION END COVER: Can be removed after taking out engine clutch, and cap and retainer from upper shaft; remove set screws from tapped holes, and use $\frac{3}{8}$"—16 capscrews to pull cover assembly.

TRACK ROLLERS: Welded after taking off track chain, jacki roller to be removed, removing holding brackets to the track fra shaft in track rollers. Bushings only be pressed in place. Lips roller brackets.



STEERING CLUTCHES—Removal—Take off seat frame, fenders, fuel tank, battery, steering clutch controls, release fork shaft bearing, and main frame cover from top of main frame. Remove release fork pivot locks and lock nut and turn out pivot as far as possible. Take out release fork, release collar pin bushings, release collar lubricating tube, and upper brake joint pin. Back off brake band set screw. Take out capscrews holding steering clutch drum to flange of sprocket drive pinion. Mark drum and flange for ease of reassembly. Attach clutch compressor tool 8244-D after taking out necessary capscrews in hub plate; compress clutch as far as possible. Remove capscrews from bearing cage cap and slide cap back into



Put sling off flange

Disass off clutch and retair and press after turni plate, and Spring ca the unit is

Reasse over spring set pressur prongs of spring reta they conta of shaft w pilot beari internal to compressor Press new both onto

Replace vertical clea lubricate pi

SPROCKET DRIVE—For removal of sprocket, take off track chain, place a jack under tractor on the side to be repaired, remove diagonal brace from pivot shaft on same side, remove track frame from pivot bearing, jack up tractor and remove sprocket shield and pivot bracket cap. Take off pivot bearing and pivot bracket with oil seal. Remove bearing retainer with dust seal and use 7/16" puller capscrews to remove sprocket bearing cage with bearing. Service tool SE-1184-1 may be used to turn off sprocket carrier nut. Sprocket can now be pried off hub of sprocket drive gear. Replacement is the reverse.

To remove sprocket drive gear, remove the sprocket as above, remove the pinion bearing cap, and the pinion bearing retainer. Use puller capscrews to remove outer gear housing. Sprocket drive gear can now be removed. Spocket drive pinion may be pried out if necessary. When replacing outer gear housing, have dowel pins in place before tightening bolts.

To remove inner gear housing, take out the steering clutches, turn flange of pinion shaft to make capscrews in pinion shaft bearing retainer accessible, and remove pinion shaft with bearing retainer, dust seal, oil seal, bearing, and bearing cage. Use puller capscrews to remove inner gear housing. Rubber pivot shaft oil seal ring between housing and main frame can now be replaced. Pinion can also be removed from the inner gear housing by removing capscrews in bearing cage. After pulling bearing cage from pinion shaft, the 3¼" nuts holding the bearing in place may be removed using wrench 2388-D with 11472-D. Reassembly is the reverse of the disassembly. Have dowel pins in place before tightening inner gear housing to the main frame.

BEVEL GEAR AN HUB—Removal Take out steeri clutches, bolts hol ing spacer to be gear, and back deflection set scre Use puller capscre main frame. Use main frame. Slide

Reassembly—P has an outer race to the right. Pres steering clutch cou Slide hub through Assemble right ha left side, assemble frame. Be sure rig left clutch coupling of shims between or insert shims to

When reassem bevel gear and en bearing cage and Be sure backlash o adjust deflection s face of bevel gea

TracTracTor Model T-9

SPARE PARTS CATALOG

The major units of the tractor are arranged alphabetically, in sections, in this parts list and are numbered consecutively, as shown at the right.

Each section has a black tab which lines up with the corresponding section at the right. The black tabs are quickly located by bending this book back.

The contents of each section can be determined at a glance by referring to the index on the other side of this page.

SPARE PARTS CATALOG

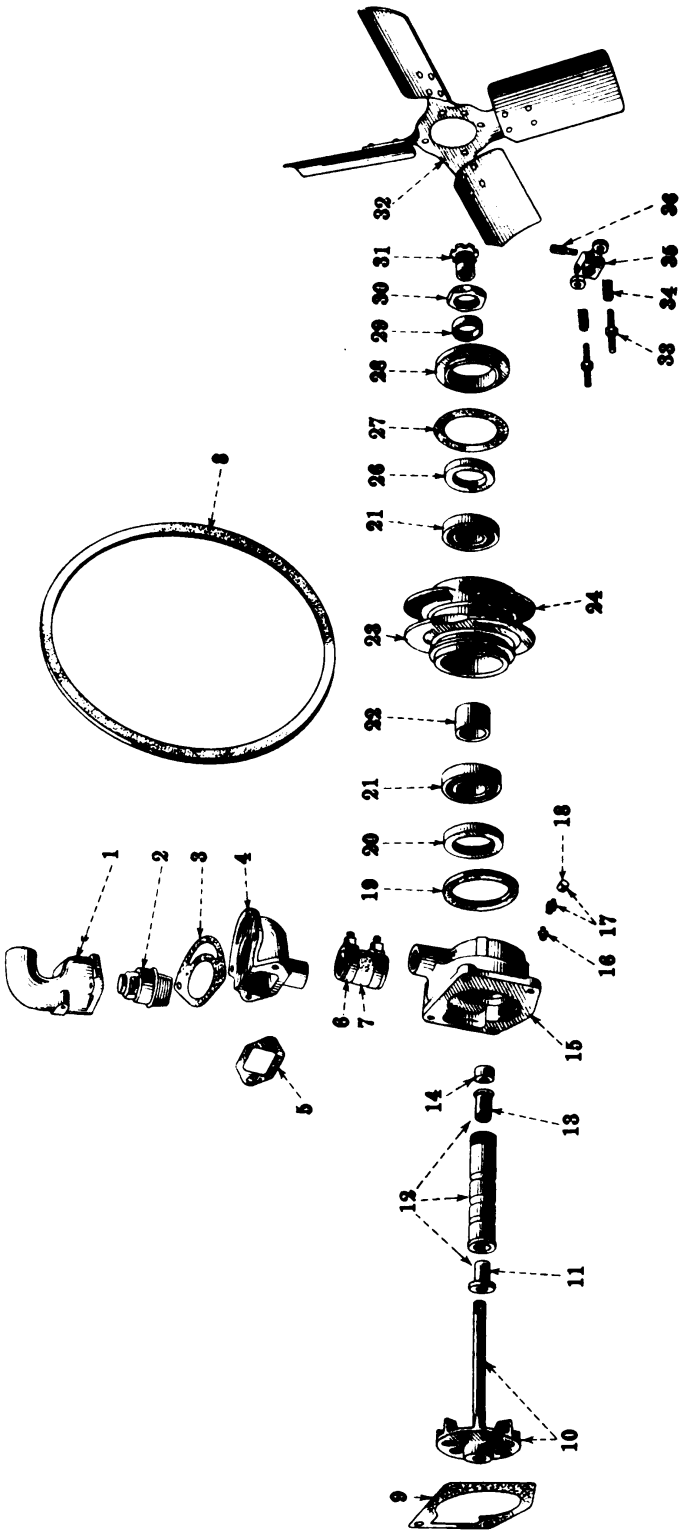
CONTENTS

(Continued on next page.)

CONTENTS—Continued

SPARE PARTS CATALOG

WATER PUMP, FAN, AND THERMOSTAT



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

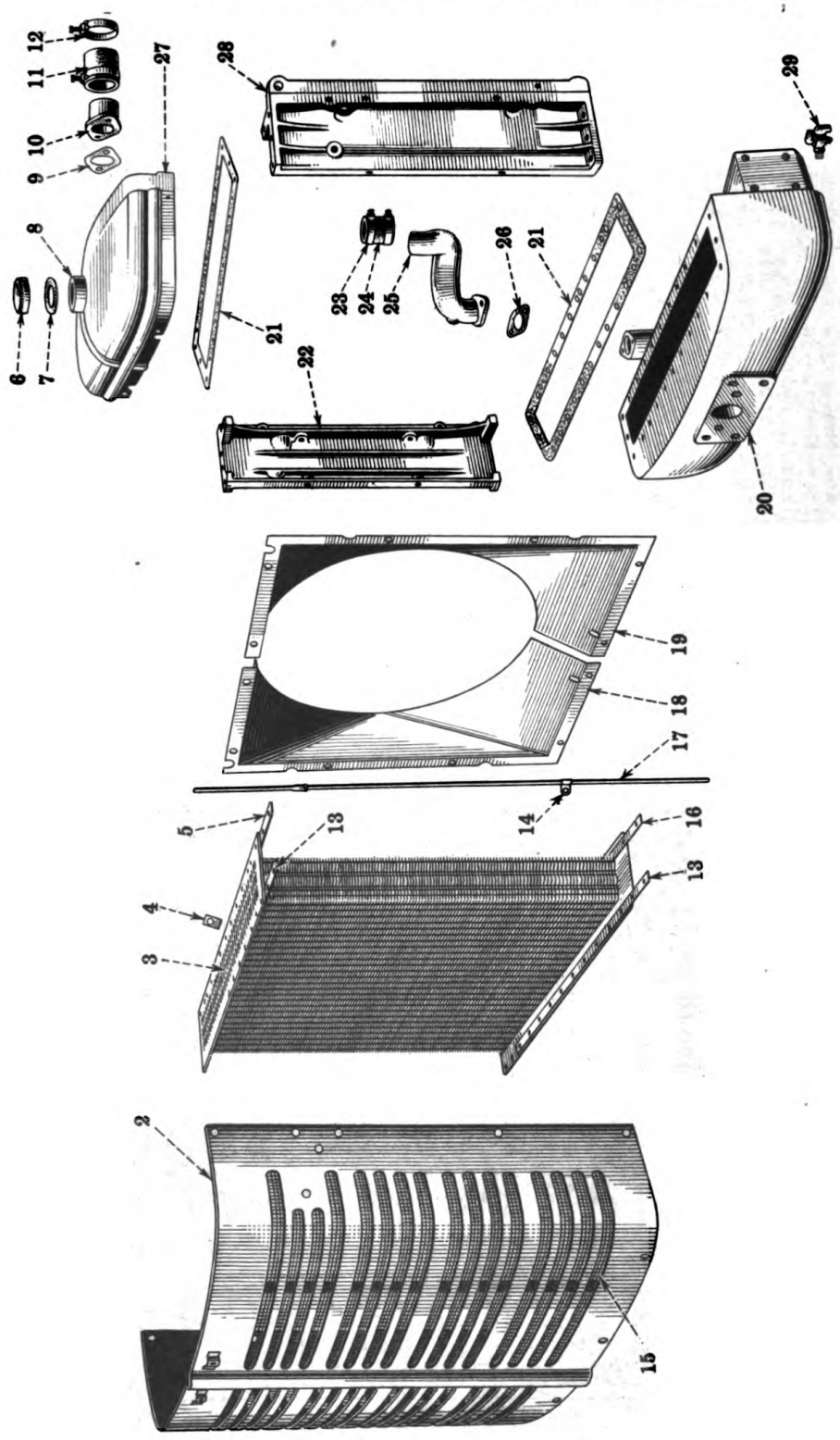
SPARE PARTS CATALOG

WATER PUMP, FAN, AND THERMOSTAT - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	57041 D	Fan and water pump assembly (includes Ref. Nos. 10 through 36). .	1		17	QA 3628	Lubricator with cap (Lincoln No. 5575) . .	1	.03
					18	Q 3659	Lubricator cap (Lincoln No. 5560).	1	.01
1	8313 DAX	Thermostat housing with pipe plug.	1	4.375	19	20300 D	Felt washer	1	.062
					20	20290 D	Oil seal, rear.	1	.437
...	Q 1802	Cap screw, 3/8" N.C. x 1"	2	.05	21	20308 D	Bearing (optional) (New Departure No. 3207). .	2	.62
...	.....	Pipe plug, 1/4"	1	.025		ST 205A	Bearing (optional) (IHC).	2	.62
...	Q 1920	Lock washer, 3/8" . . .	2	.005	22	45993 D	Spacer.	1	.312
	37634 D	Thermostat (165° to 190°) (optional)	1	.375	23	8023 DX	Fan and generator pulley hub with oil seal. . .	1	5.781
2	33814 D	Thermostat (165° to 190°) (optional)	1		24	2370 DAX	Pulley flange with set screw.	1	1.75
3	45984 D	Gasket.	1	.007	...	.....	Headless set screw, 5/16" N.C. x 7/8". .	1	.012
4	9356 D	Outlet elbow.	1		...	.....	Hex. jam nut, 5/16" N.C.	1	.01
...	Q 1802	Cap screw, 3/8" N.C. x 1"	2	.05	...	.....	Oil seal, front	1	.312
...	.....	Lock washer, 3/8" . . .	2	.005	26	20289 D	Gasket.	1	.005
5	45986 D	Gasket.	1	.01	27	21839 D	Retainer with oil seal.	1	1.06
6	91406 HA	Hose clamp.	2	.07	28	20306 DX	Lock sleeve	1	.083
7	45985 D	Hose, 1-1/2" I.D. x 2-3/8" long.	1	.11	29	20293 D	Clamp nut	1	.218
8	48042 D	Fan belt.	1	.75	30	20299 D	Packing gland	1	.281
9	47955 D	Gasket.	1	.01	31	20296 D	Fan blades and carrier.	1	2.50
10	6518 DAX	Shaft and impeller. . . .	1	1.875	32	21259 D	Cap screw, 5/16" N.C. x 1"	2	.03
11	20303 D	Thrust bushing.	1	.062	...	Q 1776	Lock washer, 5/16". . .	2	.003
12	45982 DX	Sleeve, with bushings . .	1	.562	...	Q 1919	Round head rivet, 3/16" x 1/2"	16	.005
13	24017 D	Bushing	1	.062	...	.....	Driving stud.	2	.062
14	50790 D	Packing . . . . . As req'd		.03	33	20301 D	Lock washer, 5/16". . .	2	.003
15	68315 D	Body (includes Ref. No. 12).	1	9.00	...	.....	Spring.	2	.007
...	Q 1842	Cap screw, 7/16" N.C. x 2-1/2"	3	.13	34	G 3792	Driver.	1	.250
...	Q 1832	Cap screw, 7/16" N.C. x 1-1/4"	1	.08	35	20585 D	Pin	1	.125
...	.....	Lock washer, 7/16". . .	4	.015	36	20586 D	Hex. nut, 5/16" N.F.	1	.01
	14186 DA	Lubricator (optional) (Alemite No. 1610) . .	1	.015	...	Q 1903	Lock washer, 5/16". . .	1	.003
16	Q 3615	Lubricator (optional) (Lincoln No. 5000) . .	1	.03	...	Q 1919			

SPARE PARTS CATALOG

RADIATOR AND CONNECTIONS



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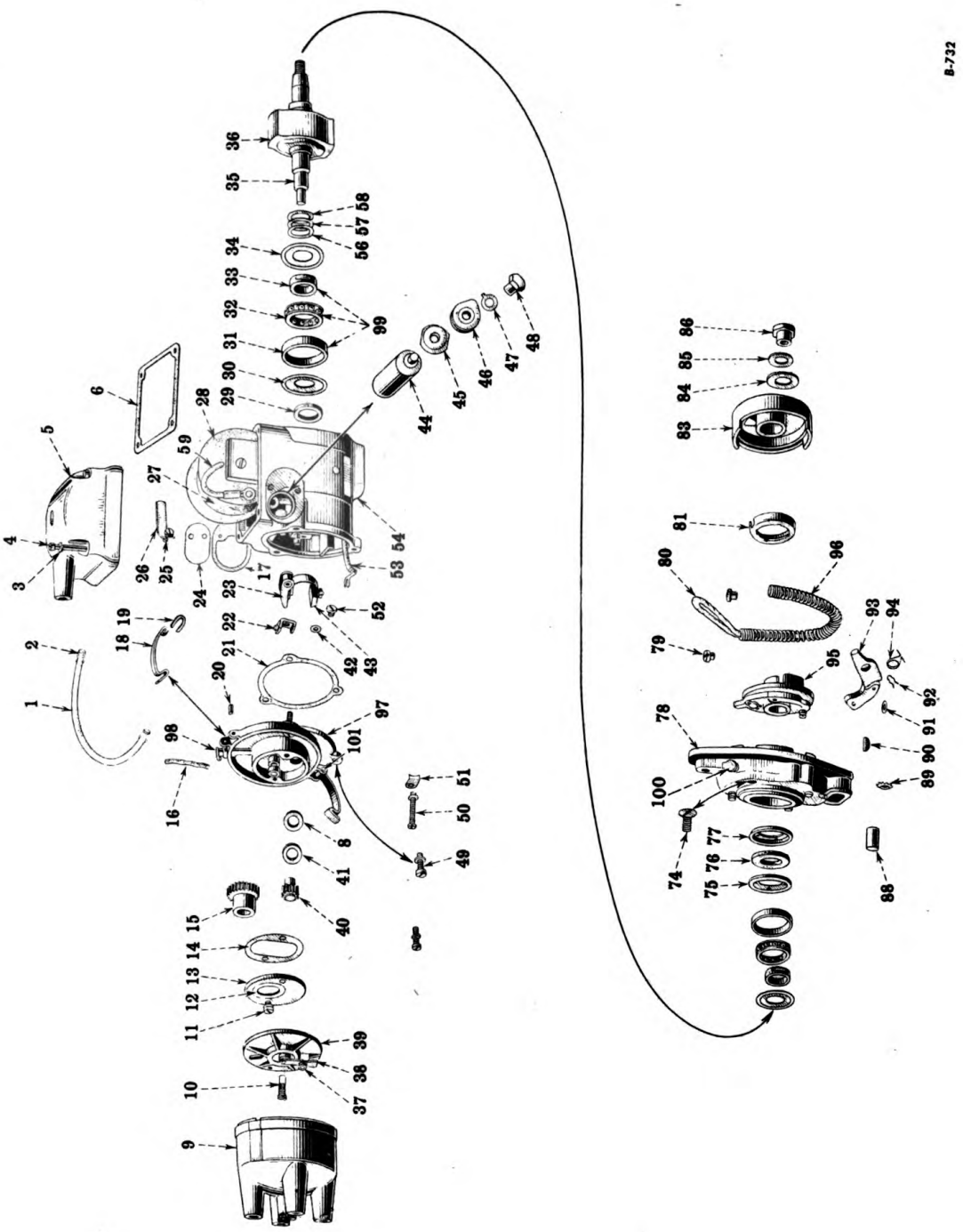
SPARE PARTS CATALOG

RADIATOR AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	48150 DC	Radiator.	1	275.00	17	48157 DX	Overflow pipe	1	.25
2	48151 DA	Grille.	1	13.00	18	54502 D	Fan housing sheet, right hand	1	2.50
...	Q 4012	Cap screw, 5/16" N.C. x 5/8". . . .	14	.03	...	Q 4012	Cap screw, 5/16" N.C. x 5/8". . . .	6	.03
...	Q 1919	Lock washer, 5/16".	14	.003	...	Q 1919	Lock washer, 5/16".	6	.003
...	.....	Washer, 11/32" I.D. x 3/4" O.D. x 16 ga.	14		...	54501 D	Fan housing sheet, left hand.	1	2.50
3	48165 DA	Core.	1	50.00	...	Q 4012	Cap screw, 5/16" N.C. x 5/8". . . .	6	.03
4	52033 D	Overflow pipe gasket.	1	.00	...	Q 1919	Lock washer, 5/16".	6	.003
5	48158 D	Core stiffener, upper, rear	1	1.12	20	6627 DA	Lower water tank. . .	1	100.00
...	Q 4013	Cap screw, 5/16" N.C. x 7/8". . . .	6	.05	21	68074 D	Gasket.	2	.05
...	Q 1919	Lock washer, 5/16".	6	.003	22	6625 DA	Spacer, right hand. .	1	19.75
6	43983 D	Cap	1	.25	...	Q 1832	Cap screw, 7/16" N.C. x 1-1/4". . .	6	.08
7	43984 D	Gasket.	1	.01	...	Q 1834	Cap screw, 7/16" N.C. x 1-1/2". . .	2	.09
8	43891 DA	Radiator filler neck.	1	.09	...	Q 1921	Lock washer, 7/16".	8	.01
9	22383 D	Gasket.	1	.01	23	91406 HA	Hose clamp.	2	
10	6297 D	Inlet pipe.	1	1.25	24	16077 D	Hose, 2-1/8" I.D. x 2-3/4" long. . . .	1	.21
...	Q 1802	Cap screw, 3/8" N.C. x 1". . . .	2	.05	25	8560 D	Outlet elbow. . . .	1	6.25
...	Q 1920	Lock washer, 3/8".	2	.005	...	Q 1802	Cap screw, 3/8" N.C. x 1". . . .	2	.05
11	55175 D	Hose, 2-1/8" I.D. x 2-3/4" long. . . .	1	.15	...	Q 1920	Lock washer, 3/8".	2	.005
12	97406 HA	Hose clamp.	2	.05	26	22383 D	Gasket.	1	.01
13	48160 D	Core stiffener, front	2	1.25	27	6626 DX	Upper water tank. . .	1	53.50
...	Q 4013	Cap screw, 5/16" N.C. x 7/8". . . .	16	.05	28	6624 DA	Spacer, left hand . .	1	20.43
...	Q 1919	Lock washer, 5/16".	16	.003	...	Q 1832	Cap screw, 7/16" N.C. x 1-1/4". . .	6	.08
14	26143 D	Clip.	1	.01	...	Q 1834	Cap screw, 7/16" N.C. x 1-1/2". . .	2	.09
...	Q 1774	Cap screw, 5/16" N.C. x 3/4". . . .	1	.03	...	Q 1921	Lock washer, 7/16".	8	.01
...	Q 1919	Lock washer, 5/16".	1	.003	29	42605 D	Drain cock.	1	.37
15	49076 D	Grille screen	1	.50	...	48168 D	Radiator repair tube . . . . . As req'd		.12
16	48159 D	Core stiffener, lower, rear. . . .		1.00					
...	Q 4013	Cap screw, 5/16" N.C. x 7/8". . . .	6	.05					
...	Q 1919	Lock washer, 5/16".	6	.003					

SPARE PARTS CATALOG



Don't order parts from the illustrations only; refer to the list also.

MAGNETO - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	53176 DA	Magneto (IHC - H-4). . .	1	
...	Q 1806	Cap screw, 3/8" N.C. x 1-1/2".	1	.07
...	.....	Cap screw, 3/8" N.C. x 1-7/8".	1	.08
...	Q 1920	Lock washer, 3/8". . .	2	.005
1	49125 D	Cable with terminal. . .	1	.03
2	37291 D	Terminal	2	
3	38609 DA	Washer	4	
4	49791 D	Screw.	4	.01
5	47449 DAY	Cover.	1	.53
6	47453 D	Gasket	1	
8	49424 D	Felt retainer.	1	.003
9	47413 DX	Cap.	1	.40
	47413 DY	Cap with brush and spring.	1	.40
	21350 DXA	Brush and spring (optional).	1	
10	32032 DXA	Brush and spring (optional).	1	
11	.....	Cadmium plated round head screw, No. 8 - 32 x 1/2"	2	.01
...	.....	Cadmium plated lock washer, No. 8	2	.001
12	49417 D	Felt retainer.	1	.003
	49418 D	Felt	1	.001
13	49416 DX	Cover with seal retainer and gasket.	1	.09
14	49419 D	Gasket	1	
15	49420 DX	Spindle.	1	.07
16	E4-216	Oil well felt.	1	
17	48472 D	Condenser hole cover gasket.	1	
18	51666 D	Spring	2	.01
19	55855 D	Spring stop pin.	1	
20	47424 D	Pin.	1	
21	47408 D	Gasket	1	
22	21388 DBX	Point with support . . .	1	.01
23	47431 DB	Breaker arm.	1	.01
24	55015 D	Hole cover	1	.02
...	.....	Cadmium plated round head screw, No. 8 - 32 x 3/8"	2	.006
...	.....	Cadmium plated lock washer, No. 8	2	.001
25	E4A-546	Screw.	1	
...	.....	Cadmium plated lock washer, No. 4	1	
26	47452 D	Secondary lead-out . . .	1	
27	57926 DX	Coil with end insulators	1	.50
	47439 DAX	Coil with end insulators, core and screws . . .	1	.75
	.....	Flat head screw, No. 8 - 32 x 5/8"	2	.015
	21314 DX	Coil core.	1	.25
28	49593 D	Insulator.	2	
29	E4-226	Felt	1	
30	47454 D	Retainer, inner.	1	.03
31	E4A-352	Bearing outer race . . .	2	.04
32	E4A-353	Retainer with balls. . .	2	.06
33	E4A-351	Bearing inner race . . .	2	.03
34	E4A-324	Oil flinger.	2	.03
35	60094 D	Breaker cam.	1	.09
36	49090 DXR	Rotor with bearings and keeper.	1	1.37
37	47427 D	Nut.	1	
...	.....	Cadmium plated lock washer, No. 6	1	
38	47428 D	Arm.	1	.08
39	47425 DX	Rotor.	1	.09
	47425 DY	Rotor with arm	1	.09
40	47417 DX	Pinion and plug.	1	.01
41	49423 D	Felt seal.	1	
42	21394 D	Washer	1	
43	47432 D	Spring anchor.	1	
...	.....	Cadmium plated flat head slotted screw, No. 8 - 32 x 3/8" . .	1	.006
...	.....	Cadmium plated hex. nut, No. 8 - 32 . . .	1	.004
...	.....	Cadmium plated lock washer, No. 8	1	.001

(Continued on next page)

SPARE PARTS CATALOG

MAGNETO - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
44	21409 DB	Condenser	1	.07	89	46785 D	Lock washer (Shakeproof No. 1514)	4	.00
45	47438 DA	Washer, inner.	1	.00					
46	48341 D	Washer, outer.	1	.00	90	4167 T	Rotor shaft key.	1	.00
47	48342 DA	Lock washer.	1	.00	91	47461 D	Washer	2	.00
48	48340 DA	Terminal	1	.00	92	47462 D	Snap ring.	2	.00
49	47409 D	Screw.	3	.01	93	54033 D	Pawl	1	.062
...	.....	Cadmium plated lock washer, No. 10. . .	3	.001	94	54034 D	Pawl spring.	2	
50	.....	Screw, 8 - 32 x 1-1/4" . .	1	.031	95	54035 DX	Magneto member and pawl pins.	1	.25
51	48339 D	Clip	1	.00		54035 DY	Magneto member (includes Ref. Nos. 91 to 95) .	1	.375
...	.....	Cadmium plated lock washer, No. 8	1		96	47822 D	Spring	1	.04
52	21393 D	Screw.	1	.00		6483 DY	Distributor body, includes oiler, gasket, locating pin, felt seat and retainer, and cap spring with pins (optional) . . .	1	.47
53	47433 DX	Primary lead-out and terminal.	1	.00					
54	6482 DAY	Frame includes bearing felt, retainer, outer race, condenser cover and gasket.	1	1.75		9411 DX	Distributor body, includes oiler, gasket, locating pin, felt seat and retainer, and cap spring with pins (optional) . . .	1	
56	E4A-305	Shim, light. . . . . As req'd		.00					
57	E4-212	Shim, medium . . . . . As req'd		.00					
58	E4A-372	Shim, heavy. . . . . As req'd		.00	97				
59	47442 D	Primary to condenser lead-out tube	1	.00					
74	.....	Screw, 1/4" - 20 x 9/16"	4	.005		56066 D	Distributor body, includes 6483 DY and Ref. Nos. 13, 15 and 40 (optional)	1	
75	47474 D	Retainer, inner.	1	.02					
76	47475 DA	Oil seal	1	.00					
77	47473 D	Retainer, outer.	1	.00		9411 DY	Distributor body, includes 9411 DX and Ref. Nos. 13, 15 and 40 (optional)	1	.50
78	6783 DX	Mounting flange (includes Ref. Nos. 31, 75, 76, 77, 88 and 100).	1	1.43					
...	.....	Slotted flat head screw, 1/4" - 20 x 9/16"	4	.005	98	E4-295	Oiler.	1	.00
					99	E4-294	Bearing (New Departure No. 15)	2	.08
79	47465 D	Button	2	.01	100	27311 D	Oiler.	1	.00
80	47464 D	Wick	1	.00	101	51667 D	Spring pin	1	.00
81	47294 D	Felt retainer.	1	.03	...	21342 D	Breaker cam key.	1	.00
83	49093 DX	Drive member and spring stop.	1	.50	...	54035 DZ	Rotating unit (includes Ref. Nos. 79 to 83 and 91 to 96)	1	.906
84	24603 D	Washer	1	.03					
85	.....	Light lock washer, 1/2".	1	.013	...	57314 D	Magnet keeper.	1	.37
86	47470 D	Nut.	1	.03	...	57755 D	Breaker point gage . . .	1	.001
88	47468 D	Stop pin	1	.09					

SPARE PARTS CATALOG

MAGNETO AND DRIVE

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	62493 D	Washer	1	.01
2	4167 T	Key (Woodruff No. 3)	1	.01
3	62493 D	Washer	1	.01
4	53176 DA	Magneto *(see Detail List, pages 1 and 2*	1	8.62
...	Q 1806	Cap screw, 3/8" N.C. x 1-1/2" . .	1	.07
...	.....	Cap screw, 3/8" N.C. x 1-7/8" . .	1	.08
...	Q 1920	Lock washer, 3/8".	2	.005
5	55780 DA	Gasket	1	.00
6	45001 D	Shaft.	1	1.44

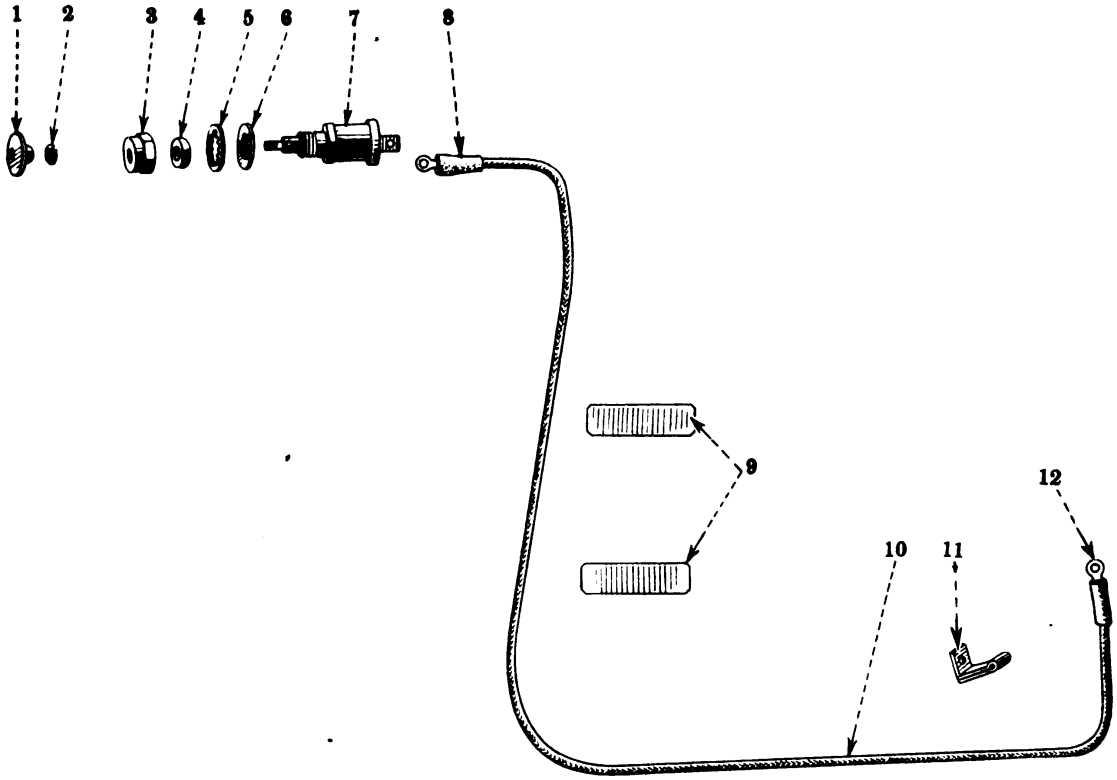
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
7	24473 D	Bushing.	1	.15
8	8082 DX	Bracket with bushing and washers . . .	1	7.00
...	.....	Cap screw, 3/8" N.C. x 1-3/8" . .	4	.06
...	Q 1920	Lock washer, 3/8".	4	.005
9	51773 DA	Gear (27 teeth) . . .	1	1.19
10	45003 D	Nut lock	1	.06
11	.....	Hex. jam nut, 5/8" N.F.	1	.12
12	51775 D	Gasket	1	.01

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

MAGNETO IGNITION SWITCH



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

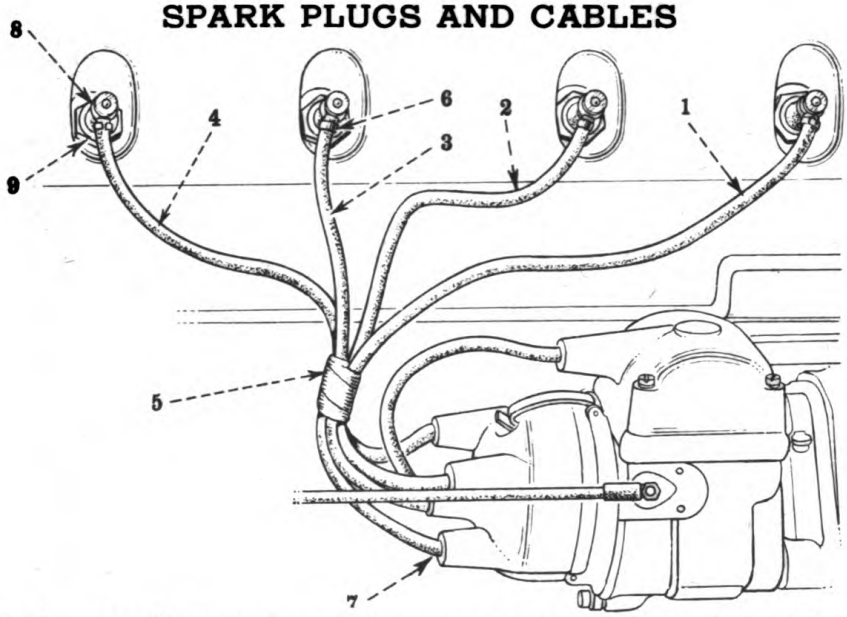
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	8732 D	Switch knob	1	.012
2	.....	Cadmium plated lock washer, No. 10.	1	.001
3	56517 D	Switch mounting nut	1	.025
4	56519 D	Switch plunger dust seal.	1	.002
5	55440 D	Switch mounting nut lock washer	1	.006
6	56507 D	Switch spacer	1	.015
7	54207 D	Ignition switch (includes Ref. Nos. 1, 2, 3, 4, 5 and 7)	1	.25
...	.....	Cadmium plated round head screw, No. 8 - 32 x 1/4".	2	.006
...	.....	Cadmium plated lock washer, No. 8	2	.00
8	28500 H	Cable insulating sleeve	2	
9	28428 D	Cable clamp (bend in assembly).	2	.031
10	59116 D	Switch cable, with terminals and insulating sleeves.	1	.062
...	.....	Cadmium plated fillister head screw, No. 10 - 32 x 5/16".	1	.003
...	.....	Cadmium plated lock washer, No. 10. . . .	1	.001
11	55471 D	Switch cable clip	1	.022
12	38433 D	Cable terminal.	2	.004

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

SPARK PLUGS AND CABLES



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

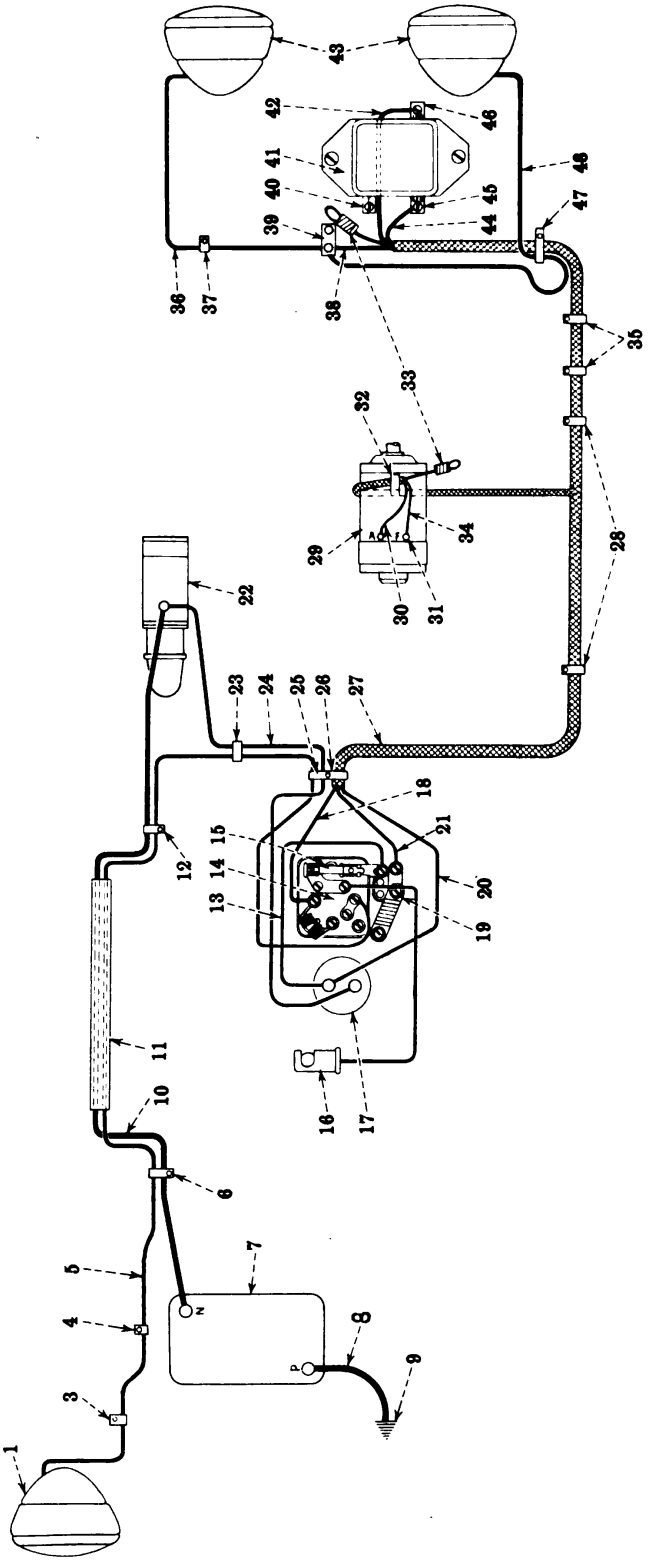
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	49359 D	Cable No. 1, with terminals	1	
2	30083 D	Cable No. 2, with terminals	1	.062
3	28589 D	Cable No. 3, with terminals	1	.093
4	28591 D	Cable No. 4, with terminals	1	
5	52794 D	Cables, set of four with terminals.	1	
6	27618 D	Reinforcement	4	.012
7	37291 D	Terminal (Push type).	4	.01
8	59424 D	Spark plug (Champion-O-Commercial)(optional)	4	.25
	98681 H	Spark plug (AC-75) (optional)	4	
9	3405 H	Gasket.	4	

SPARK PLUGS FOR SPECIAL SERVICE

I H C Part No.	Description	No. Used	Wt. Lbs.
	Light or Moderate Service		
36985 DA	Spark plug (Champion No. 1 Commercial A).	4	.25
61594 DA	Spark plug (AC-77).	4	.218
	Normal Service		
59424 DA	Spark plug (Champion-O-Commercial).	4	.25
98681 H	Spark plug (AC-75).	4	
	Severe Service		
59424 DA	Spark plug (Champion-O-Commercial).	4	.25
98681 H	Spark plug (AC-75).	4	
	Extremely Severe Service (Cold Plug) *(Be sure to make a careful investigation before using these plugs. Consult the proper maintenance personnel.)*		
59424 DA	Spark plug (Champion-O-Commercial).	4	
107047 H	Spark plug (AC-73).	4	

SPARE PARTS CATALOG

WIRING DIAGRAM FOR STARTING AND LIGHTING UNIT



Ref. No.	I H C Part No.	Description
1	47926 D	Rear lamp.
3	27386 D	Clip - on fender mounting carriage bolt in rear bracket.
4	10789 V	Clip - on fender mounting bolt, second from fuel tank.
5	57277 D	Cable - to rear lamp.
6	57275 D	Clip - on shifter fork housing cover corner bolt.
7	53505 VE 55463 D	Battery.

Ref. No.	I H C Part No.	Description
27	57285 D	Cable harness.
28	27385 D	Clips - on side angle. Use 3/8" N.C. x 1" cap screw, nut and lock washer.
29	47880 D	Generator.
30	.....	Cable - "A" terminal on generator to "GEN" terminal on relay - natural with black cross tracer (order 57285 D).
31	.....	"F" terminal on generator.

*Don't order **parts from the illustrations** only; refer to the list also.*

SPARE PARTS CATALOG

WIRING DIAGRAM FOR STARTING AND LIGHTING UNIT

8	49242 D	Cable - battery to ground.	32	49572 D	Clip - on generator brace bolt.
9	.....	Ground cable on main frame cover bolt, second from right side.	33	.....	Cable - "F" terminal on generator to "F" terminal on relay - natural in color (order 57285 D). Insulate terminal and fasten securely against cable as shown, using friction tape. The same cable harness is used for both starting and lighting attachments. This cable is used for starting attachments only.
10	57283 D	Cable - battery to starting switch.			
11	.....	Foot rest.			
12	57276 D	Clip - on engine clutch cover, second bolt from rear. Form clip in assembly to fit cable and bend it to hold cable rigidly against main frame.			
13	52030 DX	Cable - ammeter to switch.	34	.....	Cable - "F" terminal on generator to switch cable - natural with black tracer (order 57285 D).
14	57310 DX	Switch.			
15	10815 VA	Fuse.			
16	59175 D	Dash lamp.			
17	42383 D	Ammeter.			
18	.....	Cable - switch to junction block, color, black (order 57285 D).	35	57146 D	Clips - on fan shroud bolts.
			36	57062 DX	Cable - left head lamp to junction block cable.
19	.....	A good electrical connection must be established between switch and switch mounting to complete generator field circuit.	37	27385 D	Clip - on lower bolt of gasoline tank.
			38	.....	Cable - switch to junction block - black. (Order 57285 D).
			39	42917 D	Junction block.
20	.....	Cable - relay to ammeter, color natural with black and red cross tracers (order 57285 D).	40	.....	"F" terminal on relay.
			41	47885 D	Relay.
			42	.....	Cable - relay to ammeter cable - natural with black and red cross tracers (order 57285 D).
21	.....	Cable - generator field to switch - natural with black tracer (order 57285 D).	43	47926 D	Head lamp.
			44	.....	Cable - "A" terminal on generator to "GEN" terminal on relay - natural with black cross tracer (order 57285 D).
22	54871 DA	Starting motor.			
23	28428 D	Clip.			
24	57286 DX	Cable - starting switch to ammeter.			
25	27387 D	Clip - on dash { Use 3/8" N.C. x 3/4" cap screw, nut and lock washer.	45	.....	"GEN" terminal on relay.
26	29325 D	Clip - on dash	46	.....	"BAT" terminal on relay.
			47	57143 D	Clip - under relay mounting stud.
			48	57062 DX	Cable - right head lamp to junction block cable.

(For ordering parts, see the following pages)

SPARE PARTS CATALOG

STARTING UNIT (60486 DA)

I H C Part No.	Description	No. Used	Wt. Lbs.
6745 D	Generator pulley hub.	1	
6746 DX	Generator pulley flange.	1	
.....	Headless dog point set screw, 1/4" N.C. x 7/8"	1	
.....	Hex. jam nut, 1/4" N.C.	1	.004
17685 D	Loom clip, 1/4" for 3/8" bolt	3	.01
Q 1803	Cap screw, 3/8" N.C. x 1"	2	.052
Q 1906	Hex. nut, 3/8" N.C.	2	.031
Q 1920	Lock washer, 3/8"	2	
27386 D	Rear lamp cable clip.	1	.03
29325 D	Loom clip, 3/8" for 3/8" bolt	1	.09
38815 D	Cable harness clip.	1	
42383 D	Ammeter	1	.21
47861 D	Starting switch lever	1	
*47880 D	Generator (Delco-Remy No. 1101358).	1	
.....	Cotter, 3/32 x 1"	1	
*47885 D	Generator relay (Delco-Remy No. 1116807). . .	1	.017
Q 4000	Cap screw, 1/4" N.F. x 5/8"	2	
Q 1901	Hex. nut, 1/4" N.F.	2	.007
Q 1918	Lock washer, 1/4"	2	
49572 D	Loom clip, 11/32" for 5/16" bolt.	1	
53226 D	Starting switch rod rear holder	1	
53227 D	Starting switch rod rear holder spring. . . .	1	
54858 D	Starting switch rod	1	
.....	Cotter, 3/32 x 3/4"	1	
52272 D	Choke control rod and button assembly	1	
.....	Cotter, 1/16 x 3/8"	1	
54863 D	Generator brace	1	
Q 1774	Cap screw, 5/16" N.C. x 3/4".	2	.033
Q 1919	Lock washer, 5/16".	2	
54867 D	Generator belt.	1	
*54871 DA	Starting motor (Delco-Remy No. 1108920) . . .	1	
.....	Cap screw, 3/8" N.C. x 1-1/8"	2	.060
Q 1806	Cap screw, 3/8" N.C. x 1-1/2"	1	.068
Q 1920	Lock washer, 3/8"	3	
†55463 D	Battery (6 Volt) - Willard No. SW5-153 (optional with 53505 VE)	1	
†53505 VE	Battery (Auto-Lite No. 0C-17-AR) (6 Volt) (optional with 55463 D).	1	
56504 D	Generator relay bracket	1	
Q 1755	Cap screw, 1/4" N.F. x 3/4"	2	.09
Q 1918	Lock washer, 1/4"	2	
67081 D	Generator relay bracket spacer.	2	
Q 1919	Lock washer, 5/16".	2	
57146 D	Cable harness and head lamp cable clip. . . .	2	
57276 D	Battery and rear lamp cable clip, long. . . .	1	
57285 D	Cable harness	1	
60488 D	Generator bracket	1	
.....	Cap screw, 5/16" N.F. x 1-1/8".	2	.041
Q 1778	Cap screw, 1/2" N.C. x 1-1/4"	2	.120
Q 1903	Hex. nut, 5/16" N.F.	2	.015
Q 1919	Lock washer, 5/16".	2	
Q 1922	Lock washer, 1/2"	2	

* *All service and replacement parts should be referred to the Delco-Remy Co. or an authorized United Motors Service Station or Branch.*

† *Order batteries from the battery manufacturer.*

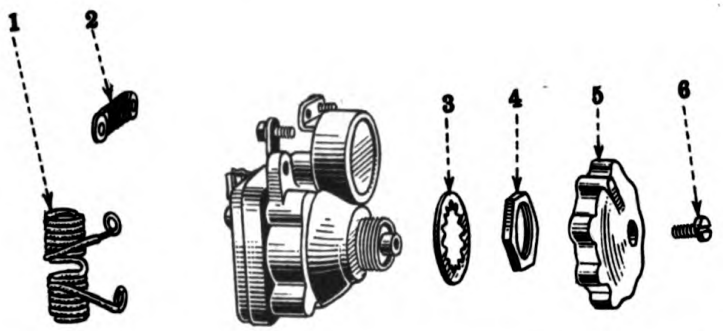
LIGHTING UNIT

I H C Part No.	Description	No. Used	Wt. Lbs.
27383 D	Cable clamp, long	2	.03
27387 D	Double loom clip, 1/4" for 3/8" bolt	1	.03
28428 D	Cable clamp, short	2	.03
29325 D	Loom clip, 3/8" for 3/8" bolt	1	.09
Q 1800	Cap screw, 3/8" N.C. x 3/4"	1	.045
Q 1906	Hex. nut, 3/8" N.C.	1	.031
Q 1920	Lock washer, 3/8"	1	
42915 D	Head lamp junction block	1	.01
.....	Round head screw, No. 10 - 24 x 1/2"	1	
.....	Hex. nut, No. 10 - 24	1	
Q 1916	Lock washer, No. 10	1	
42916 D	Head lamp junction block bracket	1	.01
42917 D	Head lamp junction block and bracket assembly	1	.06
57143 D	Cable harness and head lamp cable clip	1	
57310 DX	Lighting switch (see detail list)	1	
59175 D	Dash lamp	1	
7494 H	Dash lamp bulb	1	
10789 V	Loom clip, 7/16" for 3/8" bolt	1	
10815 VA	Fuse	1	
	DETAIL PARTS OF CABLES		
49242 D	Battery to ground cable, includes one bolt with nut 26453 HX and one terminal 38778 D	1	
52030 DX	Ammeter to lighting switch cable, includes two cable terminals 38433 D, one cable loom 38092 D, and two cable loom clamp rings 27618 D	1	.035
57062 DX	Junction block to head lamp cable, includes two terminals 38433 D, loom 57963 D and two clamp rings 27618 D	2	
57277 D	Lighting switch to rear lamp cable, includes 2 cable terminals 38433 D, one cable casing 57278 D, 2 cable insulating sleeves 28500 H, and two cable insulating fibres 63297 D	1	
57283 D	Battery to starting switch cable, includes terminal 23431 D, terminal 26376 H and terminal bolt 26453 HX	1	
57286 DX	Starting switch to ammeter cable, includes two clamp rings, terminal 38433 D, terminal 38937 D and loom 39779 D	1	

SPARE PARTS CATALOG

DETAIL PARTS OF LIGHT SWITCH (57310 DX)

(Delco-Remy No. 1994019)



Ref. No.	I H C Part No.	Delco-Remy No.	Description	No. Used	Wt. Lbs.
1	47889 D	814545	Dimmer resistance coil	1	
2	47891 D	1878070	Generator field resistance coil. .	1	
3	49425 H	.....	Lock washer (Shakeproof No. 1230).	1	
4	57312 D	1882012	Mounting nut	1	
5	57313 D	1882013	Knob	1	
6	43038 D	1864099	Mounting screw	1	

HEAD LAMP AND REAR LAMP UNIT

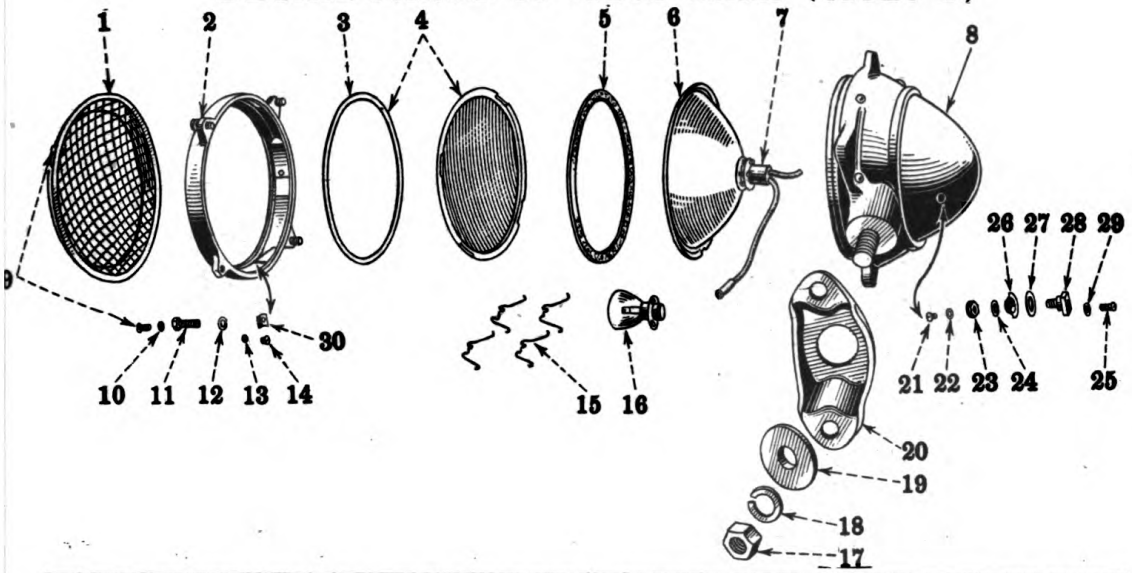
I H C Part No.	Description	No. Used	Wt. Lbs.
42921 D	Head and rear lamp bracket.	3	
Q 1848	Cap screw, 1/2" N.C. x 1"	6	.106
Q 1922	Lock washer, 1/2"	6	
.....	Hex. nut, 1/2" N.F.	2	
47926 D	Lamp, left and right front, also rear (Guide Lamp Co. No.534 G) *(see detail list on next page)*.	3	

BATTERY MOUNTING UNIT

I H C Part No.	Description	No. Used	Wt. Lbs.
20903 D	Battery bottom support spacer	2	
37976 D	Battery bottom rest spring.	4	
41827 D	Battery bottom mounting spacer.	4	
50234 D	Battery hold-down rubber, short	2	
50235 D	Battery hold-down rubber, long.	4	
53215 D	Battery cover clamp bolt, inner	2	
.....	Wing nut, 5/16" N.C.	2	.034
53216 DAX	Battery box cover	1	
54769 D	Battery cover clamp bolt, outer	2	
Q 1904	Hex. nut, 5/16" N.C.	4	.015
54864 DX	Battery bottom support.	1	
Q 1858	Cap screw, 1/2" N.C. x 2-1/4"	2	.175
Q 4025	Cap screw, 7/16" N.C. x 2-3/4".	2	.137
.....	Washer, 17/32" I.D. x 1-1/4" O.D. No. 14 gage	4	
57275 D	Battery and tail lamp cable clip, short	1	

SPARE PARTS CATALOG

DETAIL PARTS OF HEAD LAMP (47926 D)



Ref. No.	I H C Part No.	Guide Lamp Co. No.	Description	No. Used Per Lamp	Wt. Lbs.
...	51888 D	923754	Door and guard assembly with lens	1	2.50
...	51895 D	924021	Terminal plate assembly	1	.01
1	51891 D	923756	Guard assembly.	1	.50
2	51889 D	923775	Door only	1	1.50
3	51970 D	921636	Gasket.	1	.03
4	50784 D	921634	Lens with gasket.	1	.75
5	51892 D	921638	Door gasket	1	.07
6	51894 D	924079	Reflector	1	.37
7	51893 D	924023	Socket assembly with wire . . .	1	.06
8	51887 D	921627	Body assembly	1	3.50
9	.....	121839	Screw, No. 6 - 32 x 3/8". . . .	4	
10	41229 H	.....	Lock washer, No. 6 (Shakeproof No. 1206).	4	
11	Q 4001	121893	Cap screw, 1/4" N.C. x 7/8" . .	4	.02
12	Q 1918	.....	Lock washer, 1/4"	4	
13	Q 1915	106495	Lock washer, No. 6.	1	
14	.....	132684	Screw, No. 6 - 32 x 3/16" . . .	1	
15	50539 H	914255	Spring.	4	
16	66339 H	.....	Bulb - 6 volt (Mazda No. 2320).	1	
17	.....	103030	Hex. jam nut, 5/8" N.F.	1	
18	Q 1925	.....	Lock washer, 5/8"	1	
19	36273 D	234869	Washer.	1	.17
*20	42921 D	.....	Bracket	1	.75
21	.....	115598	Screw, No. 8 - 32 x 1/4". . . .	1	
22	48716 H	138530	Lock washer, (Shakeproof No. 1208).	1	
23	37063 D	134556	Nut	1	.01
24	Q 1919	112723	Lock washer, 5/16".	2	
25	.....	115548	Screw, No. 8 - 32 x 1/2". . . .	1	
26	37072 D	918652	Cup	1	.01
27	37075 D	918653	Insulating washer	1	.00
28	37064 D	918651	Terminal plate.	1	.00
29	48716 H	138530	Lock washer, (Shakeproof No. 1208).	1	
30	51898 D	924753	Clip.	1	.04

* - Not included in lamp assembly 47926 D

COMPLETE ENGINE REPLACEMENT

68266 D - Engine complete; also includes accessories shown in column 1.
68272 D - Engine complete; also includes accessories shown in column 2.
68267 D - Engine complete; also includes accessories shown in column 3.
68268 D - Engine complete; also includes accessories shown in column 4.

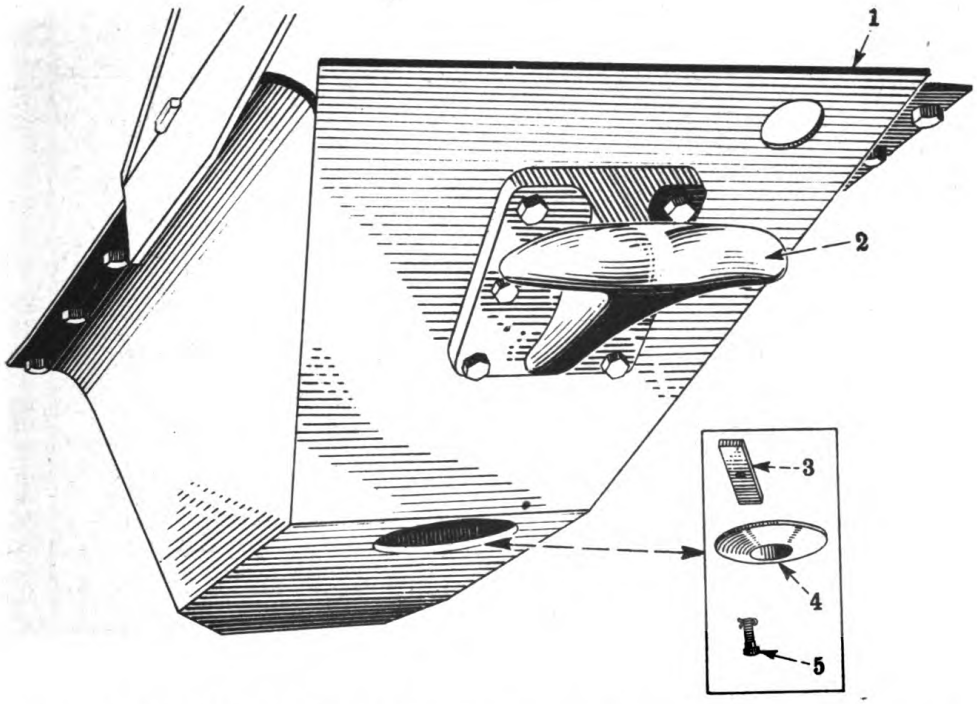
NOTE: The following standard parts are used to attach the above complete engines:

			No. Used	Wt. Lbs.
Q	1850	Cap screw, 1/2" N.C. x 1-1/4".	6	.120
Q	1861	Cap screw, 1/2" N.F. x 2-3/4".	2	.25
Q	1874	Cap screw, 5/8" N.C. x 2".	2	.259
Q	4017	Cap screw, 3/8" N.C. x 7/8".	1	.046
Q	1909	Hex. nut, 1/2" N.F.	2	.069
Q	1922	Lock washer, 1/2".	8	.031
Q	1925	Lock washer, 5/8".	2	
Q	1920	Lock washer, 3/8".	1	

ACCESSORIES	1	2	3	4
Cylinder head, complete with valves and spark plugs.	x	x	x	x
Oil level gage	x	x	x	x
Manifolds	x	x	x	x
Fan drive pulley and nut lock.	x	x	x	x
Flywheel	x	x	x	x
Water outlet elbow and thermostat.	x	x	x	x
Rear engine support, dowel pins and mounting bolts	x	x	x	x
Front engine support with shims and mounting bolts	x	x	x	x
Carburetor	x	x	x	-
Magneto and wiring	x	x	x	-
Lubricating oil filter	x	x	x	-
Water pump with fan and fan belt	x	x	x	-
Starting motor	x	x	-	-
Generator with belt, pulley hub, flange, brace and bracket .	x	x	-	-
Engine clutch.	x	-	-	-

SPARE PARTS CATALOG

CRANKCASE GUARD UNIT (54038 D)
AND
FRONT PULL HOOK UNIT (5961 DX)



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	54037 D	Crankcase guard.	1	88.00
...	.....	Cap screw, 5/8" N.F. x 1-3/8".	8	.216
...	.....	Cap screw, 5/8" N.F. x 1-7/8".	6	.259
...	Q 1911	Hex. nut, 5/8" N.F.	14	
...	Q 1925	Lock washer, 5/8".	14	
2	5961 DX	Front pull hook.	1	.12
...	Q 1873	Cap screw, 5/8" N.F. x 2". . .	6	.259
...	Q 1911	Hex. nut, 5/8" N.F.	6	.127
...	Q 1925	Lock washer, 5/8".	6	
3	42877 D	Hand hole cover support. . . .	1	1.12
4	5977 D	Hand hole cover.	1	2.00
5	42879 D	Hand hole cover bolt	1	2.25
...	.....	Cotter, 1/8 x 3/4"	1	
...	48764 D	Crankcase guard spacer	2	1.75

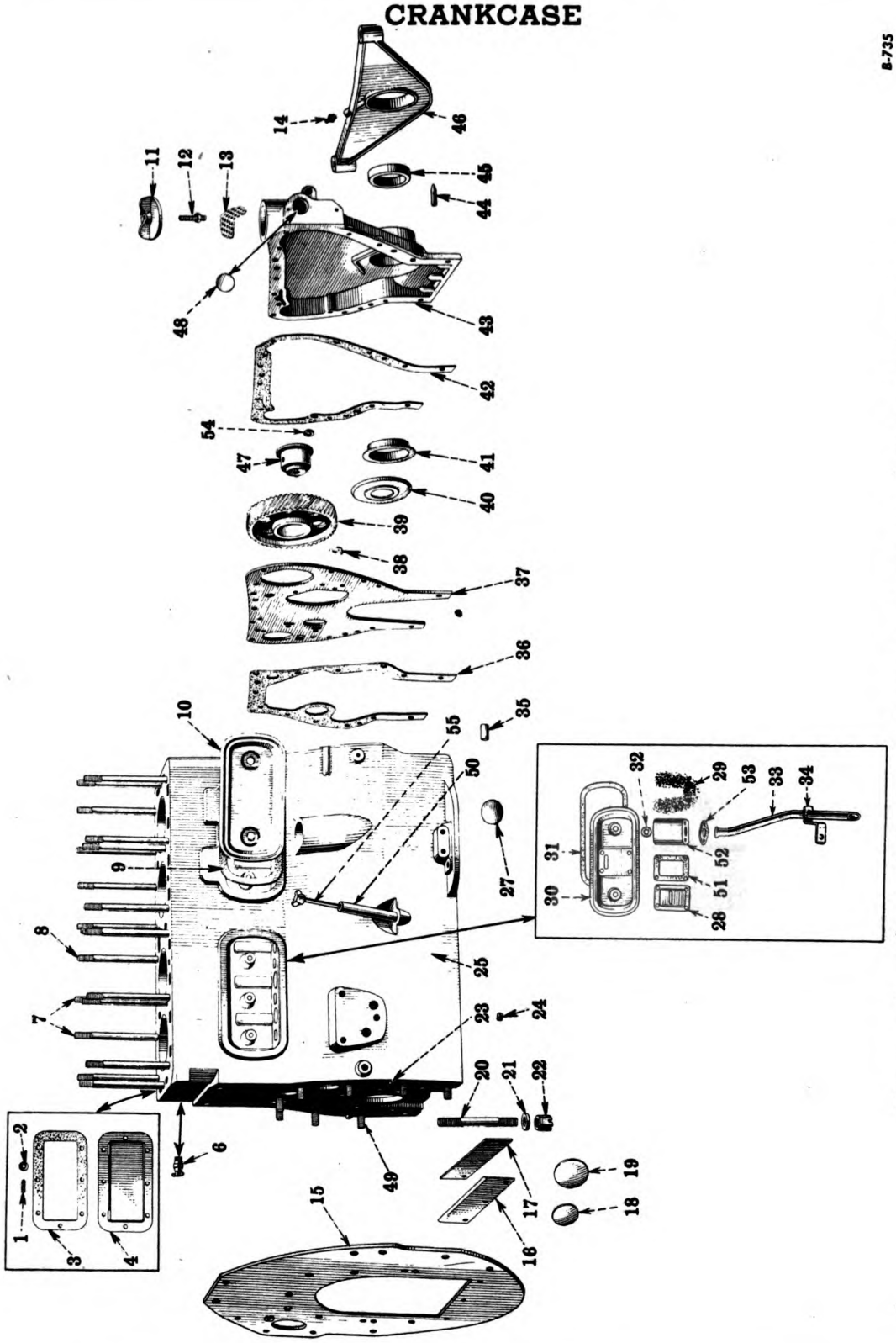
When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

CRANKCASE

B-735



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

When ordering, always use I H C Part Nos.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	29070 D	Stud.	3	
...	Q 1903	Hex. nut, 5/16" N.F.	3	.015
2	28950 D	Washer.	16	.07
3	51316 D	Gasket.	2	
4	51313 D	Water header. . . .	2	
...	Q 4012	Cap screw, 5/16" N.C. x 5/8". . .	13	.033
6	31729 D	Drain cock.	1	.08
7	52790 D	Stud, long.	6	
8	52789 D	Stud.	13	
9	68037 D	Gasket.	1	
10	51324 D	Side plate, front .	1	
...	.....	Cap screw, 3/8" N.C. x 1-1/8". .	2	.060
11	4819 D	Oil filler cap. . .	1	.50
12	24517 D	Stud.	1	.041
...	Q 1906	Hex. nut, 3/8" N.C.	1	.031
13	55627 D	Screen.	1	
14	14186 DA	Lubricator (optional).	1	.015
	Q 3615	Lubricator (optional).	1	.015
15	51336 DX	Rear engine support	1	
...	Q 1911	Hex. nut, 5/8" N.F.	9	.127
...	Q 1925	Lock washer, 5/8"	9	.013
16	46137 D	Gasket.	1	.05
17	46136 D	Dust seal	1	.75
...	Q 4017	Cap screw, 3/8" N.C. x 7/8". . .	3	.048
...	Q 1920	Lock washer, 3/8"	3	.005
18	13231 D	Plug.	4	.05
19	13439 V	Plug.	1	.08
20	47840 D	Stud.	6	
...	.....	Cotter, 1/8 x 1-3/8"	6	.006
21	46246 D	Washer.	6	
22	43598 V	Nut	6	
23	25086 DA	Dowel	2	.06
24	50410 DA	Oil header plug, 1/8"	3	.01
	50410 DA	Oil hole clean out plug, 1/8" . . .	1	.01
25	8323 DCX	Crankcase, includes camshaft bearings, dowel pins, studs and hole plugs.	1	375.00
	8323 DCXA	Crankcase, includes 8323 DCX with cylinder sleeves, pistons, pins and rings. . . .	1	450.00
...	.....	Ctsk. head pipe plug, 3/8" . . .	2	.062
...	.....	Round head machine screw, 5/16" N.C. x 1/2"	2	.031
...	.....	Parker-Kalon drive screw, No. 14 x 1/2". . . .	1	

(Continued on next page)

SPARE PARTS CATALOG

CRANKCASE - Continued

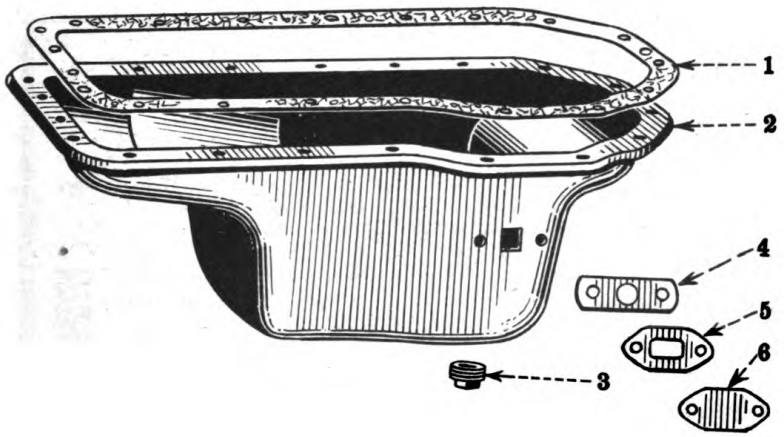
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
27	13231 D	Distributor hole plug	1	
28	59480 D	Breather baffle . .	1	
29	59482 D	Breather element. .	1	
30	59488 D	Side plate, rear. .	1	
...	.....	Cap screw, 3/8" N.C. x 1-1/8". .	2	.060
31	60570 D	Gasket.	1	
32	49387 D	Washer.	4	
33	59489 D	Breather pipe . . .	1	
34	59487 D	Clip.	1	
35	52605 D	Dowel	2	
36	52799 D	Gasket.	1	
37	52798 DX	Front plate	1	
...	Q 4017	Cap screw, 3/8" N.C. x 7/8". . .	4	.048
38	46251 D	Bolt lock	4	.06
39	52758 DX	Idler gear and bushing.	1	.12
40	36796 DA	Oil flinger	1	.09
41	46129 D	Oil deflector . . .	1	
42	52800 D	Gasket.	1	
43	8303 DX	Front cover with oil seal, oil deflector, timing pointer, and hole plug .	1	
...	.....	Cap screw, 3/8" N.C. x 1-3/8". .	9	.068
...	Q 1802	Cap screw, 3/8" N.C. x 1". . . .	2	.052
...	Q 1920	Lock washer, 3/8"	11	.005
44	55628 D	Timing pointer. . .	1	
45	53872 D	Oil seal.	1	.25
46	48296 D	Front support . . .	1	15.00
47	6392 DX	Idler gear shaft. .	1	1.33
...	Q 1852	Cap screw, 1/2" N.C. x 1-1/2". .	1	.134

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
48	13806 D	Hour meter pad plug	1	.06
49	53560 D	Stud.	9	.16
50	51325 D	Oil gauge sleeve. .	1	.62
...	18585 DA	Rear engine support dowel pin (in main frame). . .	2	.125
...	48117 D	Front engine support shim, heavy	2	.015
...	48118 D	Front engine support shim, light. . . .	As req'd	.01
51	59481 D	Breather body gasket	1	
...	8959 D	Breather body (optional) . . .	1	
52	9258 D	Breather body (optional) . . .	1	
...	.....	Round head screw, No. 10 x 1/2". .	4	
...	.....	Lock washer, No. 10	4	.001
53	59484 D	Breather pipe flange	1	
...	Q 4013	Cap screw, 5/16" N.C. x 7/8". . .	2	.033
...	Q 1919	Lock washer, 5/16"	2	.003
54	41634 H	Idler gear shaft lock washer. . .	1	
55	52774 DX	Oil level gauge . .	1	
...	13806 D	Water jacket plug (side)	2	.06
...	60599 D	Side plate and breather (includes Ref. Nos. 28, 29, 30, 33, 34, 51, 52, 53).	1	
...	54909 H	Crankcase machine screw gasket . .	2	

When ordering, always use I H C Part Nos.

SPARE PARTS CATALOG

OIL PAN, ETC.



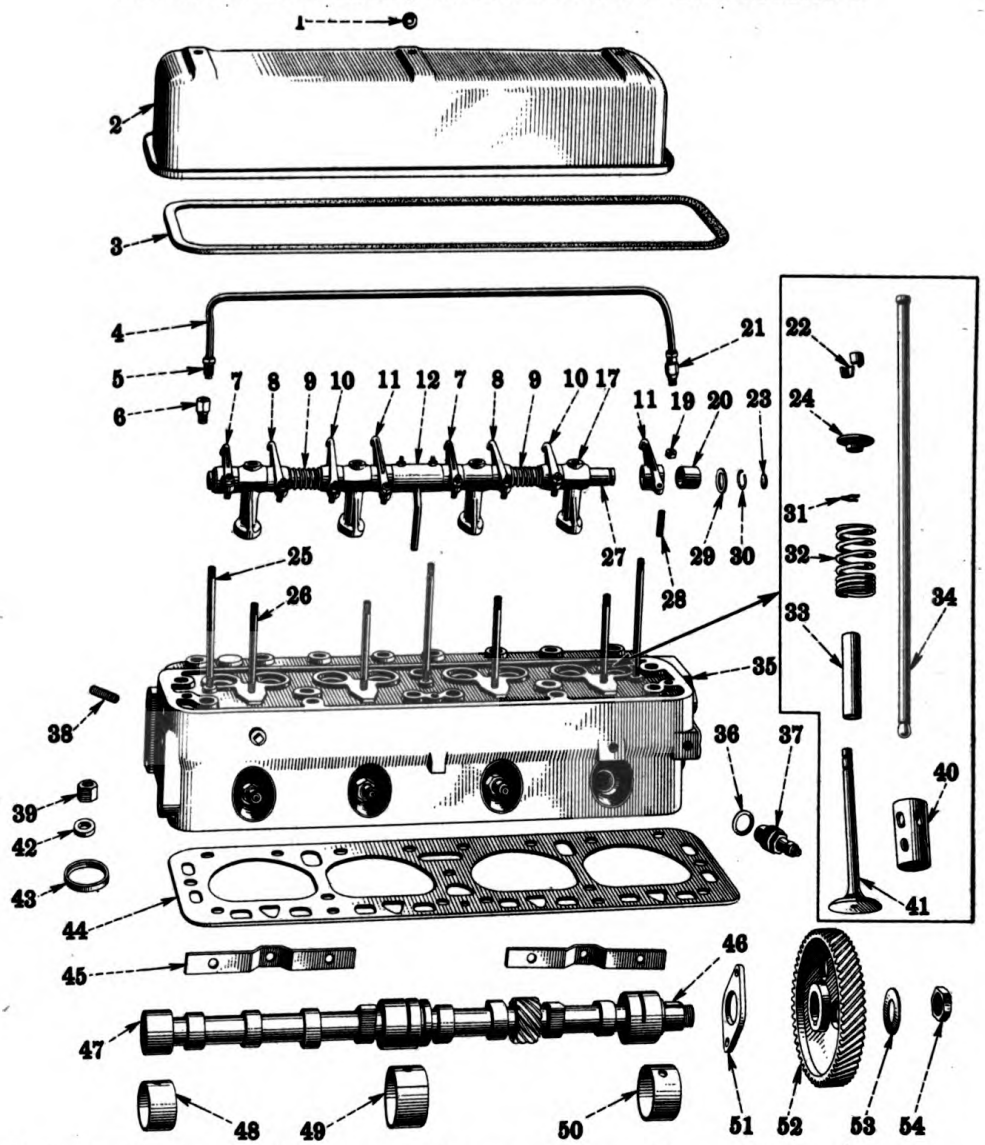
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	54947 D	Gasket.	1	
2	60478 D	Crankcase pan	1	
...	Q 1804	Cap screw, 3/8" N.C. x 1-1/4" . . .	2	.060
...	Q 1802	Cap screw, 3/8" N.C. x 1"	21	.052
...	Q 1920	Lock washer, 3/8"	23	.013
3	58997 D	Square head pipe plug, 3/4"	1	.077
4	31281 D	Side drain cover nut lock	1	.046
...	Q 1906	Hex. nut, 3/8" N.C.	2	.031
5	52808 D	Side drain gasket	1	.007
6	52806 DX	Side drain cover assembly	1	.17

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

CYLINDER HEAD, VALVES AND CAMSHAFT



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	62866 D	Washer	3	.002
2	52791 DX	Valve housing	1	9.00
3	68041 D	Gasket	1	
4	52788 DX	Breather tube	1	
5	37165 D	Nut	2	
6	38026 DM	Connector	2	
7	46224 DAX	Valve lever with bushing, exhaust, right hand	2	.41
8	46221 DAX	Valve lever with bushing, intake, left hand	2	

(Continued on next page)

Don't order parts from the illustrations only; refer to the list also.

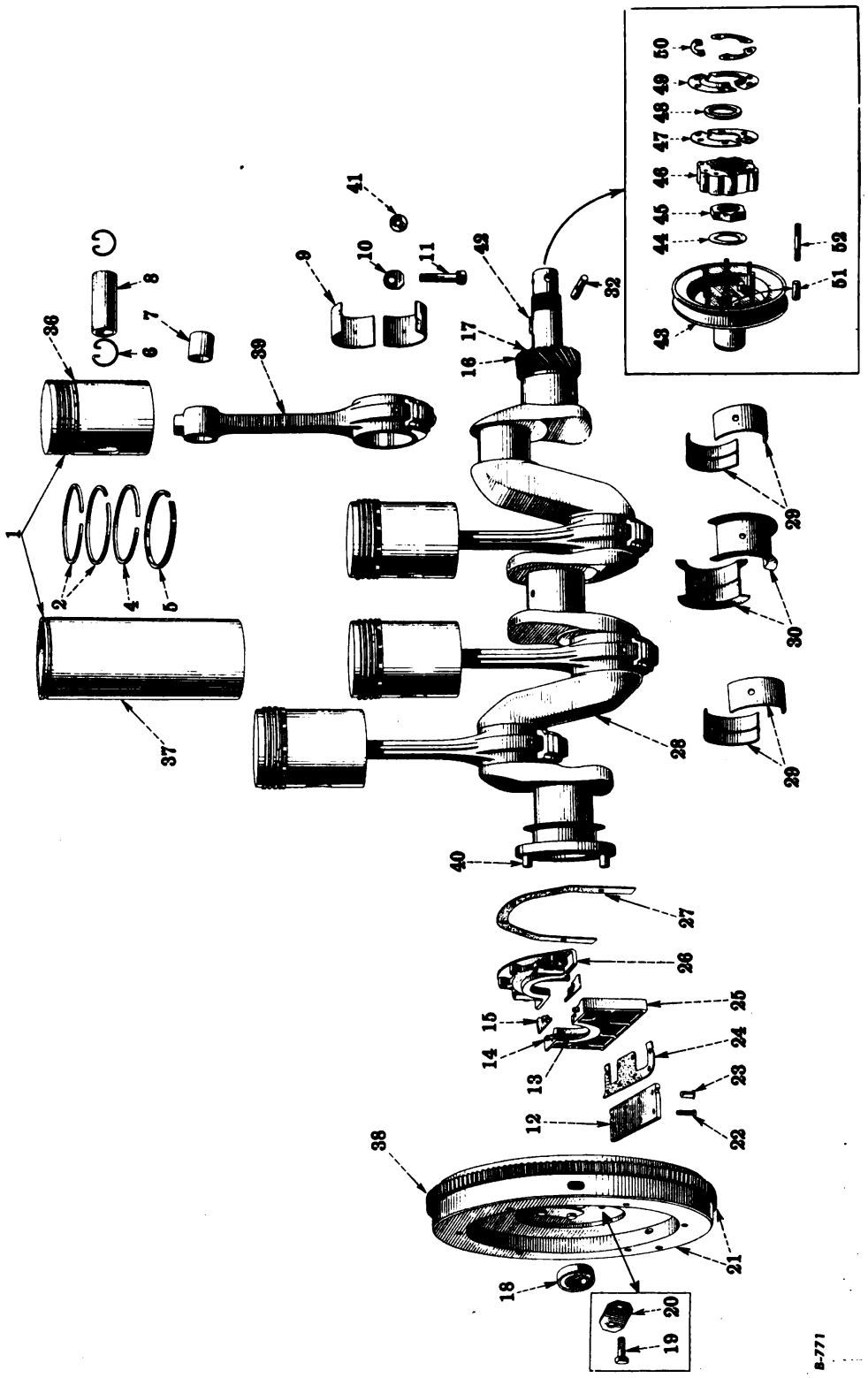
SPARE PARTS CATALOG

CYLINDER HEAD, VALVES AND CAMSHAFT - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
9	52786 D	Spring	2	
10	46222 DAX	Valve lever with bushing, intake, right hand.	2	.37
11	46223 DAX	Valve lever with bushing, exhaust, left hand.	2	.40
12	52784 DX	Oil sleeve assembly.	1	
...	.....	Headless cone point set screw, 1/4" N.C. x 5/8".	2	
...	Q 1902	Hex. nut, 1/4" N.C.	2	.007
17	8294 D	Bracket.	4	
19	38763 H	Adjusting lock nut	8	.01
20	46225 D	Bushing.	8	.06
21	38026 DMX	Connector with nut	2	
22	48057 D	Seat key	16	.01
23	27080 H	Plug	2	
24	48056 D	Upper spring seat.	8	.50
25	52780 D	Stud	3	
...	Q 1905	Hex. nut, 3/8" N.F.	3	.031
26	50338 D	Stud	4	
...	Q 1905	Hex. nut, 3/8" N.F.	4	.031
27	52783 DX	Shaft with end plugs	2	
28	16067 D	Adjusting screw.	8	.03
29	52787 D	Washer	2	
30	49950 D	Snap ring.	2	.01
31	48055 D	Retainer	8	.00
32	61808 D	Valve spring	8	.50
33	8322 DR	Valve guide.	8	
34	52822 DX	Push rod	8	
35	8320 DBX	Cylinder head - includes valve inserts, valve guides, studs and stud sleeves.	1	140.00
	8320 DBY	Cylinder head - includes 8320 DBX with valves, valve springs, seats, keys and retainers	1	145.00
36	3405 H	Spark plug gasket.	4	
37	59424 DA	Spark plug, Champion-O-Commercial (optional).	4	.25
	98681 H	Spark plug (AC 75) (optional).	4	
38	52778 D	Manifold stud.	6	
39	61316 D	Cylinder head nut.	19	
40	45956 D	Tappet	8	
41	52824 D	Intake valve	4	
	52825 DA	Exhaust valve.	4	
42	61317 D	Washer	4	
43	8292 D	Valve seat insert.	4	
44	52795 DD	Head gasket.	1	
45	51790 D	Tappet stop.	2	.06
...	Q 4016	Cap screw, 3/8" N.C. x 5/8".	2	.041
...	Q 1920	Lock washer, 3/8".	2	.005
46	7235 T	Key.	1	.03
47	52761 D	Camshaft	1	14.50
48	51308 DAR	Bearing, rear.	1	.12
49	52797 DAR	Bearing, center.	1	
50	52796 DAR	Bearing, front	1	
51	50948 D	Thrust plate	1	.50
...	Q 4017	Cap screw, 3/8" N.C. x 7/8".	2	.048
...	Q 1920	Lock washer, 3/8".	2	.005
52	50949 D	Gear (54 teeth).	1	5.00
53	16025 D	Nut lock	1	
54	24569 D	Nut.	1	.125

SPARE PARTS CATALOG

CRANKSHAFT AND PISTONS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

CRANKSHAFT AND PISTONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	56253 DA 56254 DA	Cylinder sleeve with piston, piston pin, retainers and rings. . . . . Set of (4) cylinder sleeves with pistons, piston pins, retainers and rings.	4 1	
2	50956 D	Piston ring, 5/32" plain compression.	8	
4	52754 D	Piston ring, 5/32" taper face compression	4	
5	67812 D	Piston ring, 1/4" oil regulating.	4	
6	31194 H	Retainer ring	8	
7	47640 DR	Bushing	4	
8	52608 DA	Piston pin (.005" oversize)	4	
9	52752 DAX 52757 DAX 64363 D	Bearing (two halves) . . . . . Bearing (two halves) (.030" undersize) . . . . . Bearing (two halves) (.003" undersize)	4 4 4	
10	47507 DA	Bolt lock	8	
11	63121 D	Bolt.	8	
12	52762 DX	Plate	1	
...	Q 1802	Cap screw, 3/8" N.C. x 1"	4	.052
...	Q 1920	Lock washer, 3/8"	4	.005
13	47697 DA	Oil seal felt	2	
14	25076 D	Dowel	2	
15	47696 D	Gasket.	2	
16	47629 D	Pinion (27 teeth)	1	2.50
17	13055 D	Key	1	
18	23681 D ST 211	Clutch pilot bearing (New Departure No. 7506) (optional) . . . . . Clutch pilot bearing (IHC) (optional)	1 1	
19	43832 D	Bolt.	6	.12
20	47628 D	Bolt lock	3	
21	6526 DAX	Flywheel with ring gear	1	150.00
22	46135 D	Stud.	2	
...	Q 1905	Hex. nut, 3/8" N.F.	2	.031
...	Q 1920	Lock washer, 3/8"	2	.005
23	25093 DA	Felt plug	2	
24	51312 D	Gasket.	1	
25	6534 DAX 9268 DX	Oil seal retainer, lower (optional) . . . . . Oil seal retainer, lower (optional)	1 1	
...	.....	Cap screw, 3/8" N.C. x 1-3/8"	2	.068
...	.....	Washer, 13/32" I.D. x 3/4" O.D. x 16 ga.	2	.006
...	Q 1920	Lock washer, 3/8"	2	.005

(Continued on next page)

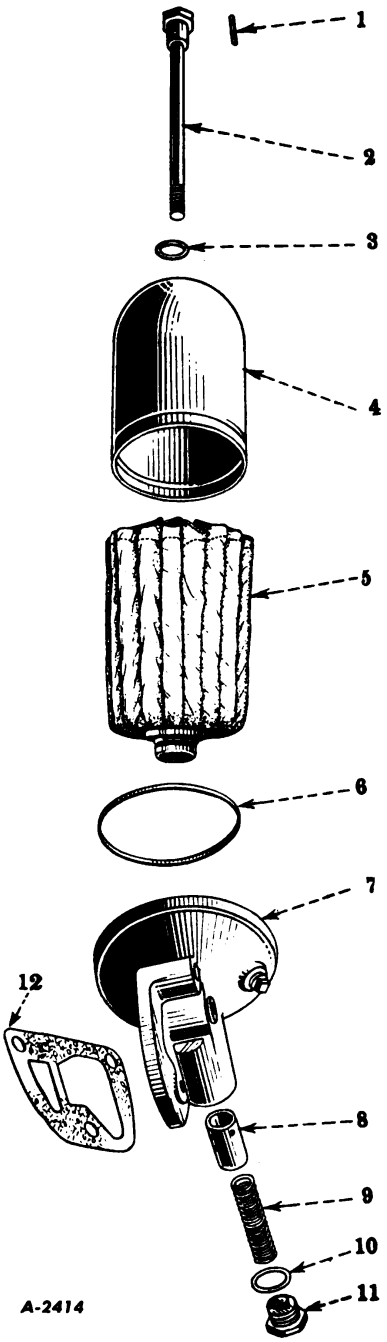
SPARE PARTS CATALOG

CRANKSHAFT AND PISTONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
26	{6533 DA {9267 D	Oil seal retainer, upper (optional)	1	
		Oil seal retainer, upper (optional)	1	
...	Q 1820	Cap screw, 3/8" N.C. x 3"	2	.115
...	.....	Cap screw, 3/8" N.C. x 1-3/8"	4	.046
...	.....	Washer, 13/32" I.D. x 3/4" O.D. x 16 ga.	6	.006
...	Q 1920	Lock washer, 5/8"	6	.005
27	47698 D	Gasket	1	
28	{52809 DBX	Crankshaft with gear nut and flywheel dowels	1	140.00
	{52826 DBX	Crankshaft with gear nut and flywheel dowels (.030" undersize)	1	
29	{52818 DX	Bearing (two halves)	2	
	{52819 DX	Bearing (two halves) (.030" undersize)	2	
	{64364 DX	Bearing (two halves) (.003" undersize)	2	
	{52820 DX	Bearing (two halves)	1	
30	{64365 DX	Crankshaft bearing (two halves) (.003" undersize)	1	
	{52821 DX	Bearing (two halves) (.030" undersize)	1	
32	10319 D	Starting crank pin	1	
...	.....	Set screw, 5/16" N.C. x 1/2" (headless) (cup point)	1	.062
36	8286 DR	Piston (not supplied separately; order 56253 DA)	4	
37	8287 DR	Cylinder sleeve (not supplied separately; order 56253 DA)	4	
38	33817 DA	Ring gear (149 teeth)	1	6.00
39	{52750 DAX	Connecting rod with bushing	4	
	{52750 DAY	Connecting rod with bushing and bearing	4	30.50
40	46923 D	Dowel	2	
41	63122 D	Washer	8	
42	13055 D	Fan drive pulley key	1	.062
43	8527 DAX	Fan drive pulley, complete with coupling	1	10.00
44	18767 D	Fan drive pulley nut lock	1	.06
45	4253 D	Fan drive pulley nut (regular pulley nut)	1	.50
46	8505 D	Coupling (14 teeth)	1	2.50
47	51268 D	Shaft retainer	2	.01
48	51269 D	Shaft felt washer	1	.00
49	51271 D	Shaft felt washer retainer	2	.12
50	47244 D	Coupling stud nut lock	3	.18
51	47490 D	Drive pin	2	.08
52	57714 D	Coupling stud	6	.08
...	Q 1905	Hex. nut, 3/8" N.F.	6	.03

SPARE PARTS CATALOG

LUBRICATING OIL FILTER



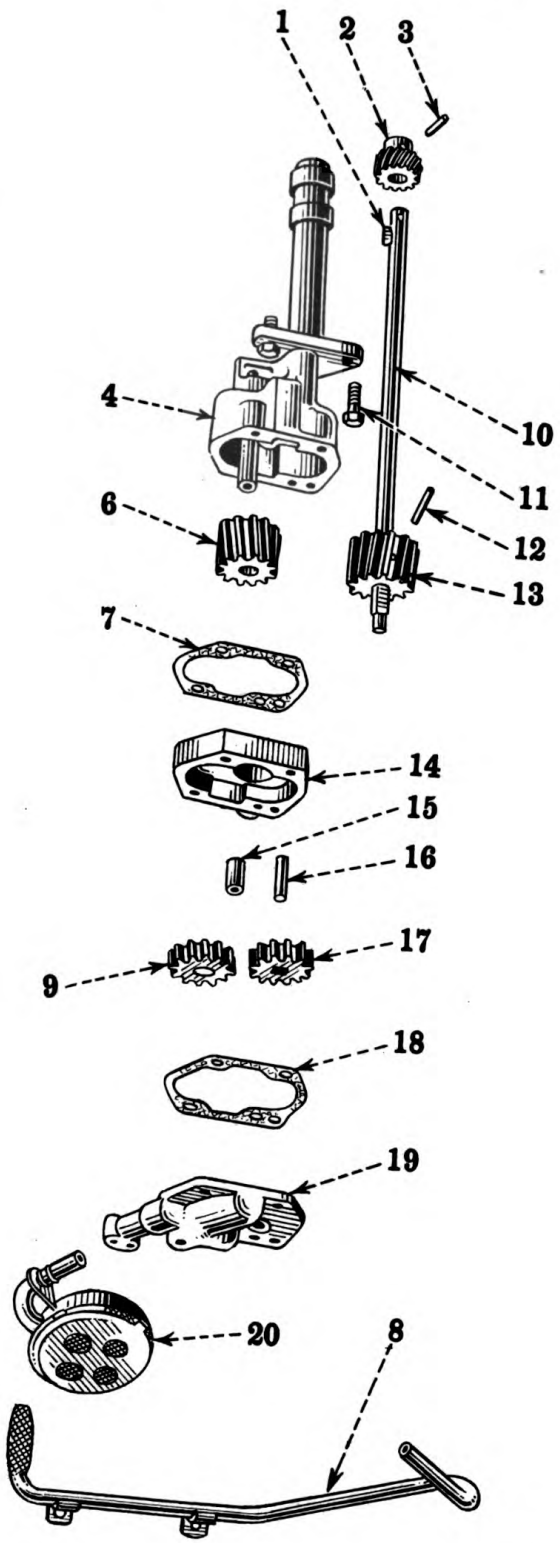
When ordering, always use I H C Part Nos.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	52773 DB	Oil filter, complete.	1	
1	G6579-1/3	Retaining bar pin	1	
2	46606 DX	Retaining bar . .	1	1.03
3	13839 D	Gasket.	1	.00
4	13842 D	Case.	1	3.00
5	63884 D	Element	1	1.43
6	13841 D	Gasket.	1	.00
7	8113 DAX	Base, complete. .	1	6.00
...	Q 1841	Cap screw, 7/16" N.C. x 2-1/2"	2	.137
...	Q 1834	Cap screw, 7/16" N.C. x 1-1/2"	1	.094
...	Q 1921	Lock washer, 7/16"	3	
...	.....	Countersunk pipe plug, 3/8"	1	.041
...	.....	Pipe plug, 1/4"	1	.027
8	45285 DA	Valve	1	.108
9	48695 D	Spring.	1	.062
10	28781 D	Valve nut gasket.	1	.003
11	51205 D	Valve nut	1	.125
12	51204 D	Gasket.	1	.002

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

LUBRICATING OIL PUMP



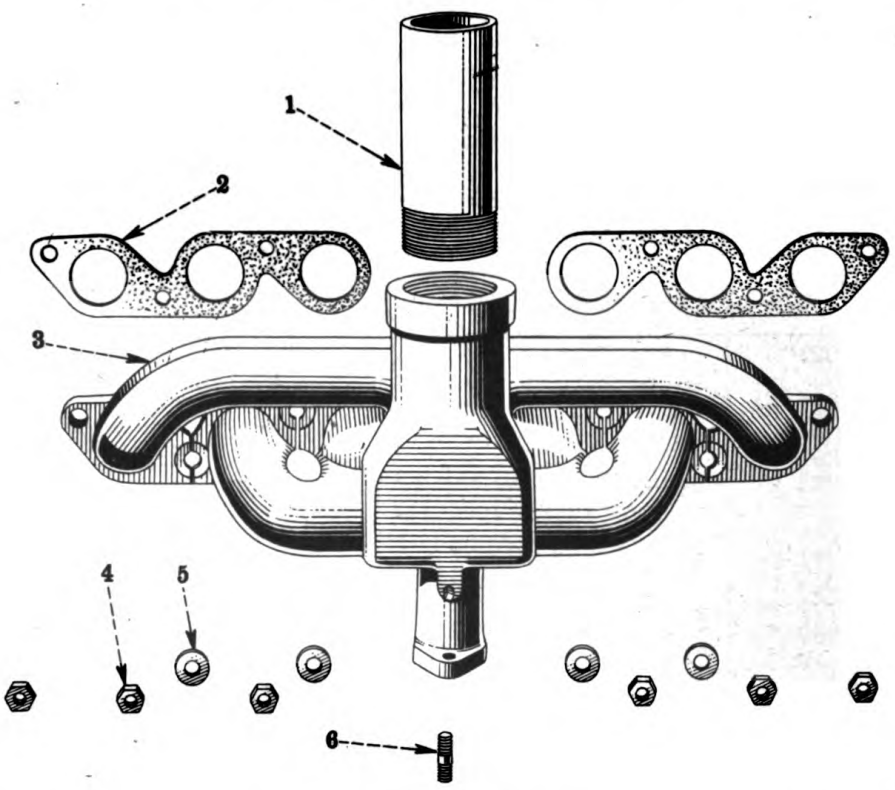
Don't order parts from the illustrations only; refer to the list also.

LUBRICATING OIL PUMP - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	61412 D	Lubricating oil pump	1	
1	13021 D	Drive pinion key, Woodruff No. 6, 5/32 x 5/8".	1	.00
2	46595 DA	Pinion	1	.75
3	32316 D	Pin.	1	.062
4	8291 DX	Body	1	
	8291 DY	Body with drive shaft, pinion and body gear (includes Ref. Nos. 1, 2, 3, 4, 10, 11, 12 and 13).	1	10.00
6	52771 D	Idler gear	1	
7	51044 D	Gasket	1	.001
8	52772 DX	Return pipe.	1	
...	Q 4017	Cap screw, 3/8" N.C. x 7/8".	2	.048
...	Q 1920	Lock washer, 3/8".	2	.005
9	51047 D	Auxiliary idler gear	1	
10	52769 D	Shaft.	1	
11	10961 D	Cap screw.	2	.120
...	Q 1922	Lock washer, 1/2".	2	.013
12	32319 D	Pin.	1	.062
13	52770 D	Body gear.	1	
14	8089 DAX	Auxiliary gear housing	1	2.50
15	46157 D	Inlet tube	1	.125
16	46053 D	Dowel.	1	.007
17	51046 D	Auxiliary body gear.	1	.625
18	51044 D	Gasket	1	.001
19	8210 D	Cover.	1	2.000
...	Q 1816	Cap screw, 3/8" N.C. x 2-3/4".	1	.107
...	Q 1810	Cap screw, 3/8" N.C. x 2".	3	.084
...	Q 1920	Lock washer, 3/8".	4	.005
20	56108 D	Intake screen (floto).	1	.45
...	.....	Cotter, 1/8 x 1-1/4"	1	.004
...	13021 D	Body gear key, Woodruff No. 6, 5/32 x 5/8".	1	.005

When ordering, always use I H C Part Nos.

MANIFOLD AND EXHAUST PIPE



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

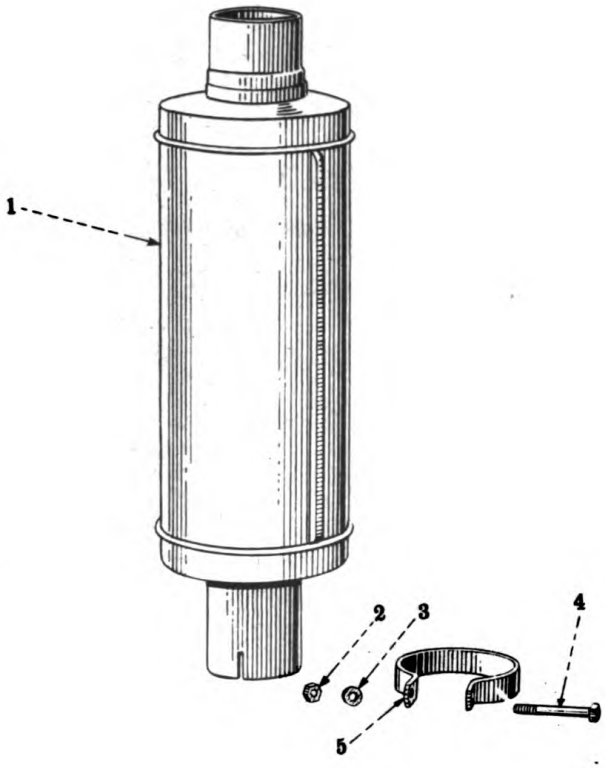
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	58095 DA	Exhaust pipe.	1	3.75
2	52755 DA	Gasket.	2	
3	8321 DX	Manifold.	1	12.00
...	.....	Square head pipe plug, 1/8"	1	.012
4	19963 D	Nut	6	.046
5	52823 D	Washer.	4	
6	12215 D	Carburetor stud	2	.062
...	Q 1905	Hex. nut, 3/8" N.F.	2	.031
...	Q 1920	Lock washer, 3/8"	2	.005

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

EXHAUST MUFFLER UNIT (50918 D)



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

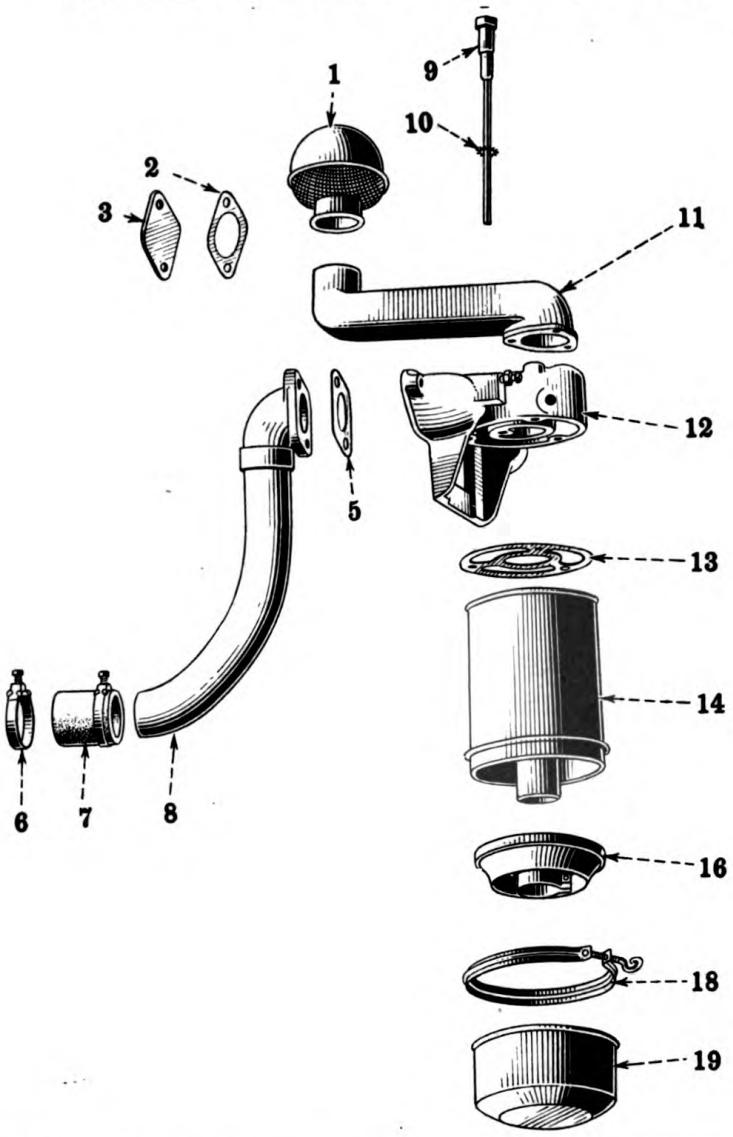
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	50917 D	Muffler	1	7.50
2	Q 1904	Hex. nut, 5/16" N.C.	1	.015
3	Q 1919	Lock washer, 5/16".	1	.003
4	Q 1786	Cap screw, 5/16" N.C. x 2-1/4". . .	1	.063
5	23132 D	Clamp	1	.33

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

AIR CLEANER AND CONNECTIONS



Ref. No.	I H C Part No.	Donaldson Part No.	Description	No. Used	Wt. Lbs.
...	55868 DX	.....	Air cleaner (includes Ref. Nos. 13 through 19) (Donaldson - 8")	1	14.50
...	.....	.....	Cap screw, 1/2" N.C. x 3-3/8". .	3	.245
...	Q 1922	.....	Lock washer, 1/2".	3	.013
1	56508 D	.....	Cap.	1	1.00
2	51939 D	.....	Gasket	1	.02
3	51941 D	.....	Top cover.	1	.75
...	Q 1848	.....	Cap screw, 1/2" N.C. x 1". . . .	2	1.06
...	Q 1922	.....	Lock washer, 1/2".	2	.013
5	51939 D	.....	Gasket	1	.02

(Continued on next page)

Don't order parts from the illustrations only; refer to the list also.

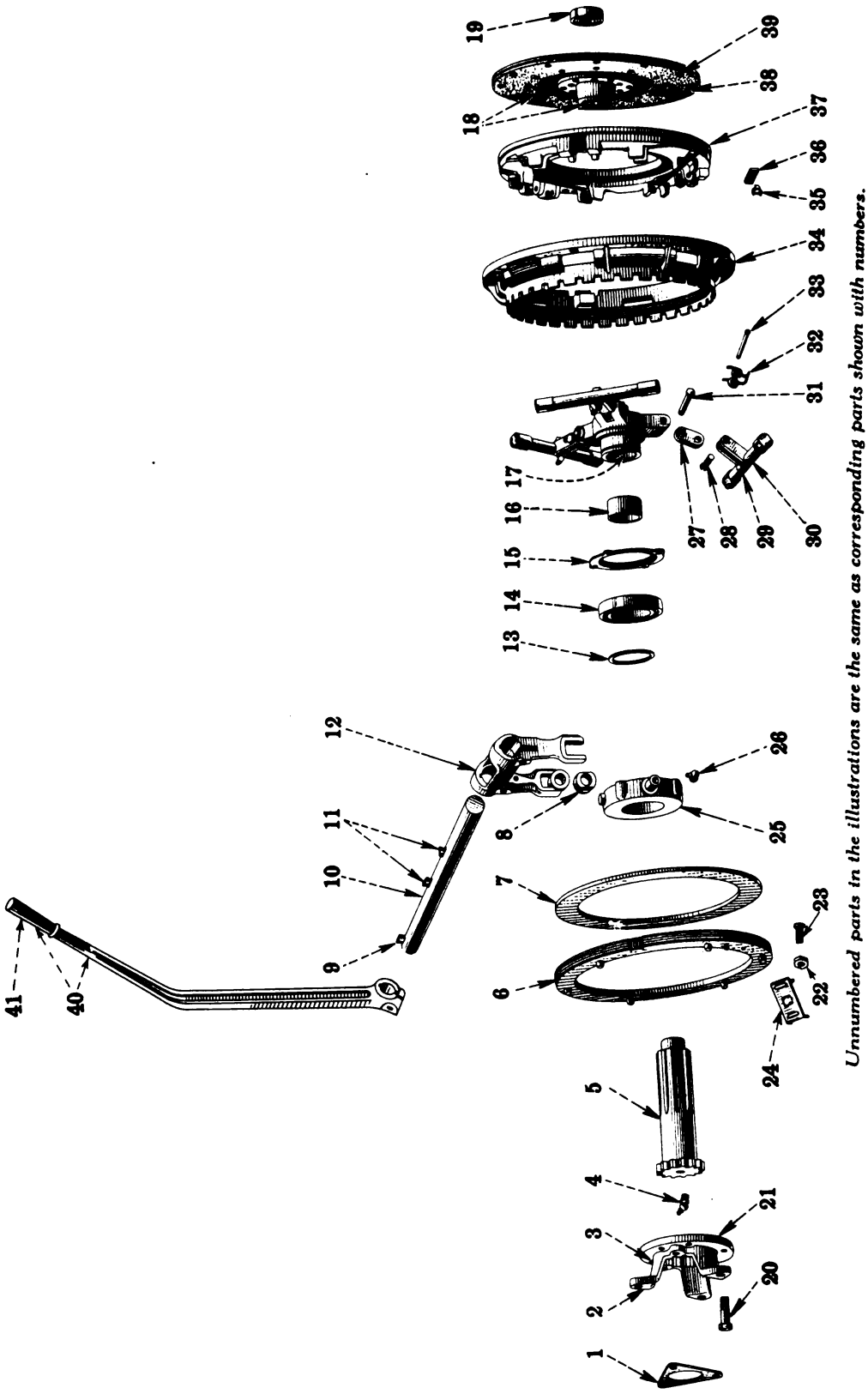
SPARE PARTS CATALOG

AIR CLEANER AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Donaldson Part No.	Description	No. Used	Wt. Lbs.
6	45813 D	.....	Hose clamp	2	.10
7	45822 D	.....	Hose, 2-1/4" x 2-1/4" long	1	.125
8	52250 DX	.....	Pipe	1	3.25
...	Q 1850	.....	Cap screw, 1/2" N.C. x 1-1/4". .	2	1.20
...	Q 1922	.....	Lock washer, 1/2".	2	.013
9	55746 DAX	.....	Breather tube extension.	1	.31
10	47415 H	.....	Lock washer (Shakeproof No. 1128).	1	.013
11	8722 DA	.....	Air pipe (to intake)	1	7.437
...	Q 4019	.....	Cap screw, 3/8" N.C. x 3-3/4". .	1	.138
...	Q 1802	.....	Cap screw, 3/8" N.C. x 1". . . .	2	.052
...	.....	.....	Lock washer, 3/8".	3	.005
12	8482 D	.....	Control housing and air cleaner top	1	24.00
...	Q 1852	.....	Cap screw, 1/2" N.C. x 1-1/2". .	2	.134
...	Q 1848	.....	Cap screw, 1/2" N.C. x 1". . . .	2	.106
...	Q 1910	.....	Hex. nut, 1/2" N.C.	2	.069
...	Q 1922	.....	Lock wasner, 1/2".	4	.013
...	Q 1802	.....	Cap screw, 3/8" N.C. x 1". . . .	1	.052
...	Q 1906	.....	Hex. nut, 3/8" N.C.	1	.031
...	37165 D	.....	Cylinder head breather tube connector nut.	2	.03
...	37323 D	.....	Cylinder head breather tube elbow (cylinder head end)	1	
...	37323 DX	.....	Cylinder head breather tube elbow (cylinder head end with nut). .	1	
...	55378 DAX	.....	Cylinder head breather tube. . . .	1	.062
...	55379 D	.....	Cylinder head breather tube elbow (air cleaner end)	1	.125
...	55379 DX	.....	Cylinder head breather tube elbow (air cleaner end with nut). . .	1	.125
			Following are Detail Parts of Air Cleaner:		
13	11917 DC	.....	Gasket	1	.08
14	56480 D	2P-3647	Body assembly.	1	10.50
16	67118 D	2P-4887	Housed screen and baffle assembly.	1	1.00
...	.....	.....	Fillister head screw, 1/4" N.C. x 1".	1	.015
...	.....	.....	Square nut, 1/4" N.C.	1	.012
18	56482 D	P-2823	Oil cup retaining clamp assembly .	1	.25
19	56481 D	P-3655	Oil cup assembly	1	1.75

SPARE PARTS CATALOG

ENGINE CLUTCH AND CONNECTIONS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

ENGINE CLUTCH AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Rockford Clutch Co. No.	Description	No. Used	Wt. Lbs.
...	51225 DD	CL-1361-AC	Engine clutch (13" overcenter). For detail parts, see Ref. Nos. marked (*)	1	60.00
...	.....	.....	Cap screw, 1/2" N.C. x 1-3/8"	6	.134
...	Q 1922	.....	Lock washer, 1/2"	6	
...	55228 DD	UCLA-6-4539	Engine clutch (less driven member - Ref. No. 18)	1	51.25
1	47593 D	.....	End plate	1	.12
...	Q 1773	.....	Cap screw, 5/16" N.F. x 3/4"	3	.033
...	Q 1919	.....	Lock washer, 5/16"	3	.003
2	6492 DX	.....	Coupling (13 teeth)	1	2.00
3	21407 H	.....	Rivet	6	
4	Q 3673	.....	Lubricator (Lincoln No. 5245)	1	.03
5	47589 D	.....	Shaft	1	4.50
*6	55371 DAX	UCL-4815-1	Adjusting ring assembly	1	4.50
*7	31238 D	CL-3461	Adjusting ring plate	1	3.00
8	51227 D	.....	Release pin bushing	2	.12
9	10430 V	.....	Lever key (Woodruff No. 18)	1	.03
10	53494 D	.....	Release shaft	1	6.25
11	13054 D	.....	Fork key (Woodruff No. 13)	2	.00
12	8247 D	.....	Release fork	1	2.25
...	Q 1805	.....	Cap screw, 3/8" N.F. x 1-1/2"	2	.068
...	Q 1920	.....	Lock washer, 3/8"	2	.005
*13	29780 D	CL-3302	Snap ring	1	.05
*14	31240 D	CL-3353	Bearing (New Departure No. 3115)	1	14.50
*15	31242 DA	CL-3401-4	Bearing plate	1	.25
...	.....	CL-3994	Cap screw, 5/16" N.C. x 5/8"	4	.033
...	Q 1919	CL-3920	Lock washer, 5/16"	4	.003
*16	26039 DA	CL-3110	Bushing	2	.09
*17	55229 DAXA	UCL-4840-1	Sleeve with bushing	1	3.43
	55230 DB	UCL-4840-1A	Sleeve and bearing assembly (includes Ref. Nos. 13 through 17, and 25)	1	6.75
*18	51524 D	UCL-4541	Driven member with linings	1	8.75
19	23681 D	.....	Pilot bearing (New Departure No. 7506) (optional)	1	.44
	ST 211	.....	Pilot bearing (IHC) (optional)	1	.44
20	54969 D	.....	Dowel bolt	3	.09
...	Q 1907	.....	Hex. nut, 7/16" N.F.	3	.047
...	Q 1921	.....	Lock washer, 7/16"	3	.01

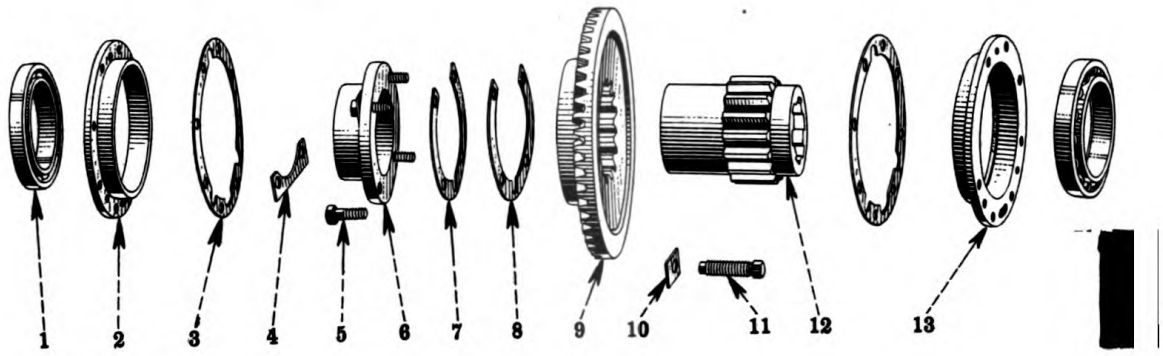
SPARE PARTS CATALOG

ENGINE CLUTCH AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Rockford Clutch Co. No.	Description	No. Used	Wt. Lbs.
21	47591 D	.....	Clutch brake facing	1	.11
*22	27166 H	CL-1608	Lock screw nut	2	.01
*23	61115 D	CL-5215	Lock screw	2	.01
*24	61127 D	CL-5223	Adjusting lock	1	.05
*25	55232 DA	CL-4649	Bearing carrier	1	1.25
26	Q 3626	.....	Release bearing lubricator (Lincoln No.5400)	1	.03
*27	43207 D	CL-4639-1	Link	3	.12
*28	N 32202	CL-4341	Link pin, short. Washer, 3/8" I.D. x 7/8" O.D. x No. 16 gauge	3	
...	.....	CL-4347	Cotter, 1/16 x 5/8"	3	
...	.....	CL-4397	Cam lubricator (Lincoln No. 5318)	3	.01
*29	Q 3627	CL-5028	Set of three camshafts, includes rollers, felt plugs, with lubricators and cam blocks	1	4.00
30	55231 DYA	UCL-1-4262-S3-A	Link pin, long	3	.00
*31	43211 D	CL-4340	Washer, 3/8" I.D. x 7/8" O.D. x No. 16 gauge	3	
...	.....	CL-4347	Cotter, 1/16 x 5/8"	3	
...	.....	CL-4397	Back plate	1	13.00
*32	50431 D	CL-4351	Return spring	3	.03
*33	50430 D	CL-4350	Return spring pin. Cotter, 1/16 x 1/2"	3	.02
...	.....	CL-3923		3	
*34	50433 D	CL-4539	Screw lock	6	.00
*35	54953 D	CL-4799	Cam block (set of 6)	1	.30
*36	43248 D	UCL-3478-S6	Fillister head screw, 1/4 - 20 x 1/2"	6	
...	.....	.....	Pressure plate with cam blocks	1	.00
*37	51521 D	UCL-4349	Facing package (2 woven facings)	1	3.75
*38	55233 DX	CL-4175(2 pieces)	Tubular rivet.	24	.00
*39	50413 D 8442 DAX	CL-1011-5	Engine clutch lever with rubber handle (see 9652 D)	1	6.25
40	9652 D	.....	Engine clutch lever, complete (with steel handle) (optional in place of 8492 DAX and 41957 D)	1	
...	Q 1859	.....	Cap screw, 1/2" N.F. x 2-1/2"	1	.189
...	Q 1909	.....	Hex. nut, 1/2" N.F.	1	.069
...	.....	.....	Lock washer, 1/2"	1	
41	41597 D	.....	Clutch lever handle (rubber) (see 9652 D, Ref. No. 40)	1	.15

SPARE PARTS CATALOG

DRIVE BEVEL GEAR



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

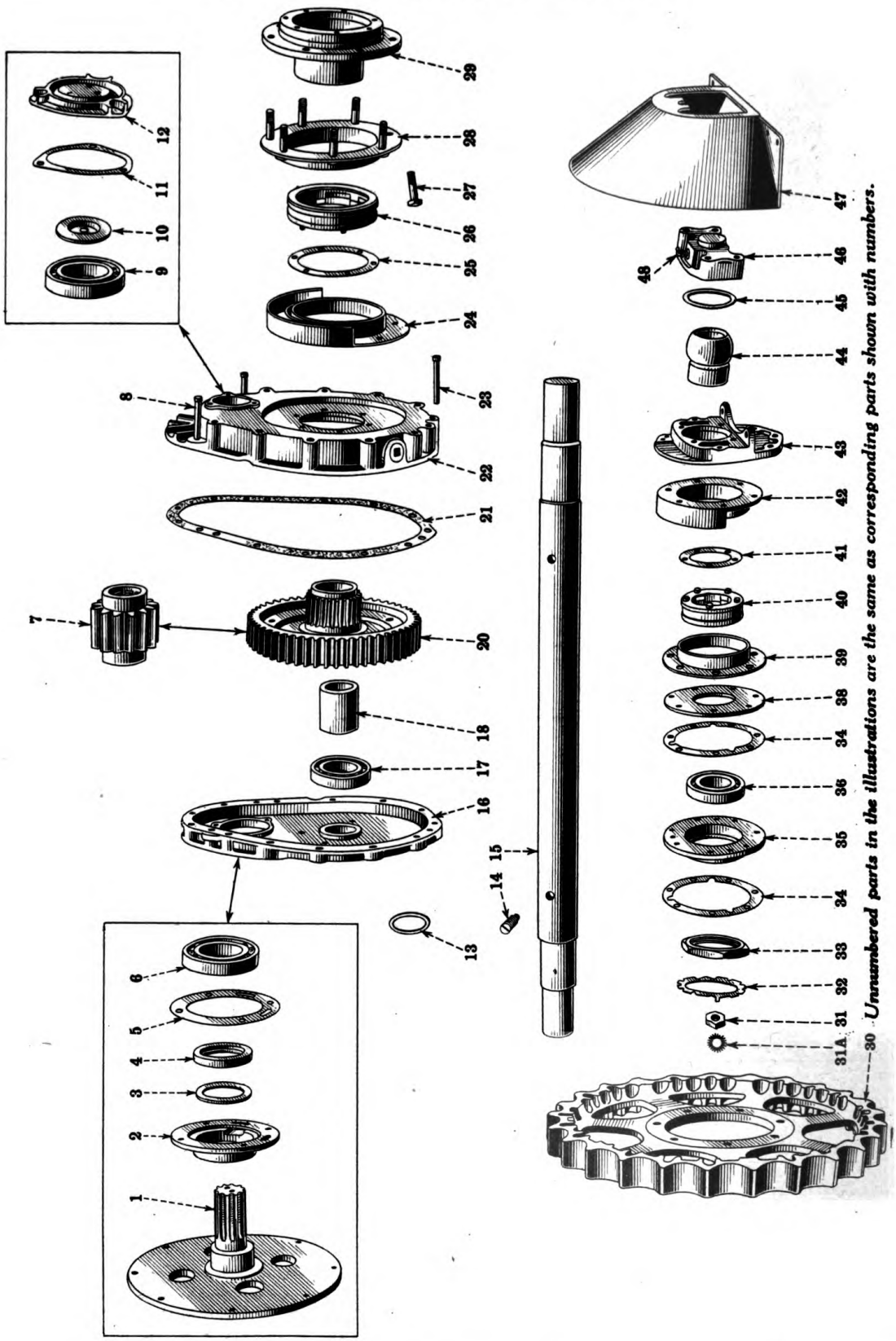
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	53548 D	Bearing.	2	4.62
2	8455 D	Bearing cage, left hand.	1	4.00
3	51661 D	Gasket	2	.02
4	53551 DA	Lock	2	.08
5	53544 D	Dowel bolt	4	.12
6	53553 D	Spacer	1	6.18
7	53549 D	Shim, heavy.	4	.06
8	53550 D	Shim, light. . . . . .As req'd		.03
9	60405 D	Drive bevel gear with bevel pinion and shaft	1	54.00
10	56613 D	Nut lock	1	.01
11	46849 D	Set screw.	1	.125
...	.....	Hex. jam nut, 3/4" N.C.	1	.125
12	8457 D	Hub.	1	15.75
13	8456 D	Bearing cage, right hand	1	4.37

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

SPROCKET DRIVE ASSEMBLY



Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

SPROCKET DRIVE ASSEMBLY - Continued

Wide Tread Parts

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
1	52209 D	52210 DAX	Pinion shaft.	2	30.50	2	34.31
2	8510 DX	.....	Bearing retainer.	2	4.50	...	
...	Q 1802	.....	Cap screw, 3/8" N.C. x 1"	4	.05	...	
...	Q 1920	.....	Lock washer, 3/8"	4	.005	...	.005
2	.....	8508 DX	Bearing retainer.	...		2	5.75
...	.....	.....	Cap screw, 3/8" N.C. x 1-3/8"	...		4	.06
...	.....	Q 1920	Lock washer, 3/8"	...	.005	4	.005
3	54011 D	54008 D	Felt washer	2	.02	2	.02
4	53770 D	54005 D	Oil seal.	2	.50	2	1.25
5	54009 D	54004 D	Gasket.	2	.02	2	.02

(Continued on next page)

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

SPROCKET DRIVE ASSEMBLY - Continued

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
6	41470 D	42239 D	Bearing (New Departure No. 7215) (New Departure No. 7516)	2	2.82	2	3.25
7	64487 D	64488 D	Pinion (12 teeth)	2	9.00	2	17.50
8	54006 D	.....	Dowel, upper	4	.01	...	
8	.....	22977 DA	Dowel, upper	...		4	.09
9	ST 228	ST 228	Outer bearing (optional) (IHC)	2	2.75	2	2.75
	41513 V	41513 V	Outer bearing (optional) (New Departure No. 1215)				
10	46821 D	46821 D	Retainer washer	2	2.75	2	2.75
...	Q 1831	Q 1831	Cap screw, 7/16" N.F. x 1-1/4"	2	.93	2	.93
...	Q 1921	Q 1921	Lock washer, 7/16"	4	.09	4	.09
11	46823 D	46823 D	Gasket	4		4	.01
12	8232 D	8232 D	Bearing cap	2	.01	2	.01
...	Q 1850	.....	Cap screw, 1/2" N.C. x 1-1/4"	2	2.50	2	2.50
...	Q 1922	Q 1922	Lock washer, 1/2"	6	.12	6	.12
13	46810 D	46810 D	Pivot shaft oil seal ring	6		6	.013
14	46809 D	46809 D	Pivot shaft set screw	2	.03	2	.03
...	.....	.....	Hex. jam nut, 5/8" N.C.	2	.09	2	.09
15	52291 D	52292 D	Pivot shaft	2	.12	2	.12
16	8512 DAX	.....	Gear housing with pipe plugs, inner	1	109.00	1	141.00
...	.....	.....	Cap screw, 1/2" N.C. x 1-3/8"	2	55.00	...	
...	Q 1922	.....	Lock washer, 1/2"	16	.13	...	
...	.....	.....	Ctsk. head pipe plug, 1-1/2"	16	.013	...	
...	.....	.....	Ctsk. head pipe plug, 3/4"	2	.437	...	
16	.....	8511 DAX	Carrier, with plugs	2	.093	...	
...	.....	.....	Cap screw, 1/2" N.C. x 1-3/8"	...		2	150.00
...	.....	.....	Lock washer, 1/2"	...		32	.13
...	.....	Q 1922	Ctsk. head pipe plug, 1-1/2"	...		32	
...	.....	.....	Ctsk. head pipe plug, 3/4"	...		2	.437
...	.....	.....	Bearing (New Departure No. 1217-75)	...	.093	2	.093
17	46746 D	46746 D	Spacer, long	2	5.00	2	5.00
18	52225 D	52225 D	Drive gear (57 teeth), complete with hub	2	4.50	2	4.50
20	64490 D	64490 D	Round head rivet, 1/2 x 1-7/8"	2	97.00	2	97.00
...	.....	.....	Gasket	20		20	
21	54012 D	54012 D	Gear housing, outer	2	.06	2	.06
22	8513 DA	.....	Cap screw, 1/2" N.C. x 3-1/2"	2	53.00	...	
...	Q 4044	.....		16	.24	...	

SPARE PARTS CATALOG

SPROCKET DRIVE ASSEMBLY - Continued

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
...	Q 1862	.....	Cap screw, 1/2" N.C. x 2-3/4"	18	.25	...	
...	Q 1922	.....	Lock washer, 1/2"	34	.013	...	
22	.....	8513 DA	Gear housing, outer	...		2	53.00
...	.....	Q 1861	Cap screw, 1/2" N.F. x 2-3/4"	...		18	.25
...	.....	Q 1851	Cap screw, 1/2" N.F. x 1-1/2"	...		16	.134
...	.....	Q 1909	Hex. nut, 1/2" N.F.	...		34	.069
...	.....	Q 1922	Lock washer, 1/2"	...		34	
23	54007 D	.....	Dowel, lower	2	.15	...	.15
23	.....	54007 D	Dowel, lower	...		2	
24	52231 D	52231 D	Guard assembly	2	4.00	2	4.00
...	Q 1800	Q 1800	Cap screw, 3/8" N.C. x 3/4"	12	.045	12	.045
...	Q 1920	Q 1920	Lock washer, 3/8"	12	.005	12	.005
25	68081 D	68081 D	Gasket	2	.01	2	.01
26	53537 D	53537 D	Oil seal	2	2.37	2	2.37
27	52226 DA	52226 DA	Bolt	16	.50	16	.50
...	.....	.....	Hex. nut, 5/8" N.F.	16		16	
28	52222 D	52222 D	Dirt deflector	2	2.00	2	2.00
29	52229 D	52229 D	Carrier	2	27.25	2	27.25
30	8575 D	8575 D	Sprocket (27 teeth)	2	103.00	2	103.00
31	32454 D	32454 D	Bolt nut	16	.125	16	.125
31A	47415 H	47415 H	Bolt lock washer	16	.00	16	.00
32	46795 D	46795 D	Nut lock	2	.18	2	.18
33	46794 DA	46794 DA	Carrier nut	2	.93	2	.93
34	54513 D	54513 D	Gasket	4	.02	4	.02
35	8566 DA	8566 DA	Bearing cage	2	4.62	2	4.62
36	23276 H ST 223	23276 H ST 223	Bearing (optional) (New Departure No. 1214) Bearing (optional) (IHC)	2	2.75 2.625	2	2.75 2.625
38	54514 D	54514 D	Bearing retainer	2	3.75	2	3.75
39	54515 D	54515 D	Dirt deflector	2	1.25	2	1.25
...	Q 1833	Q 1833	Cap screw, 7/16" N.F. x 1-1/2"	14	.094	14	.094
...	Q 1921	Q 1921	Lock washer, 7/16"	14	.01	14	.01
40	53538 D	53538 D	Oil seal	2	1.75	2	1.75
41	68079 D	68079 D	Gasket	2	.01	2	.01
42	46800 D	46800 D	Guard assembly	2	2.43	2	2.43
...	Q 1800	Q 1800	Cap screw, 3/8" N.C. x 3/4"	12	.04	12	.04
...	Q 1920	Q 1920	Lock washer, 3/8"	12	.005	12	.005

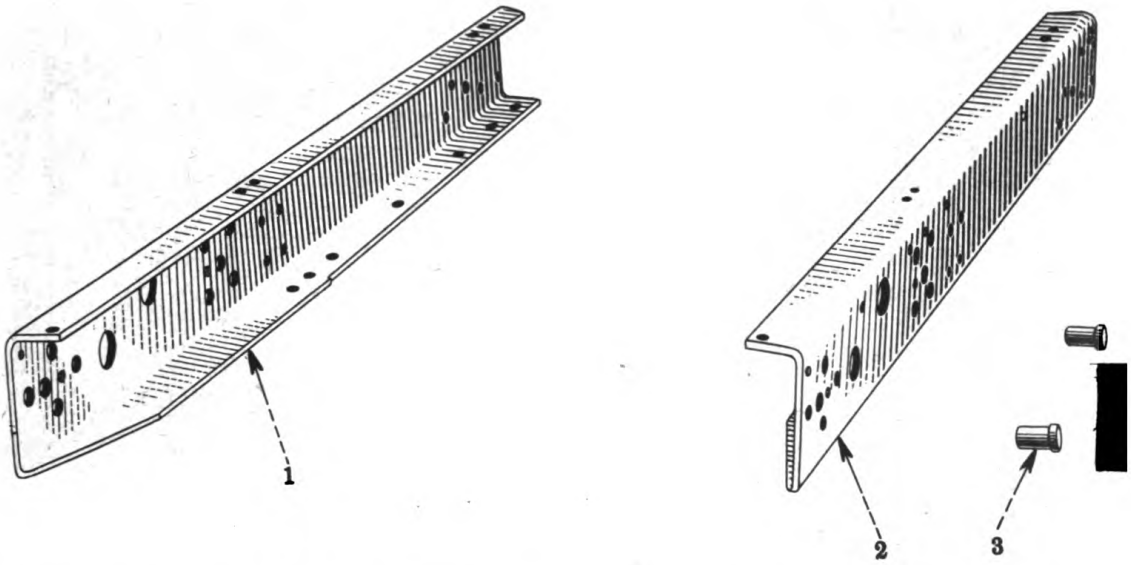
SPARE PARTS CATALOG

SPROCKET DRIVE ASSEMBLY - Continued

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
43	8451 DA	8451 DA	Pivot bracket	2	14.25	2	14.25
...	Q 1871	Q 1871	Cap screw, 5/8" N.F. x 1-3/4"	4	.07	4	.07
...	.....	.....	Cap screw, 5/8" N.F. x 1-5/8"	6	.23	6	.23
...	Q 1911	Q 1911	Hex. nut, 5/8" N.F.	10	.127	10	.127
...	Q 1925	Q 1925	Lock washer, 5/8"	10	.013	10	.013
44	6458 D	6458 D	Pivot bearing	2	5.25	2	5.25
...	Q 1851	Q 1851	Cap screw, 1/2" N.F. x 1-1/2"	8	.134	8	.134
...	Q 1922	Q 1922	Lock washer, 1/2"	8	.013	8	.013
45	53627 D	53627 D	Gasket	2	.00	2	.00
46	8461 DAX	8461 DAX	Bracket cap	2	.45	2	.45
...	.....	.....	Cap screw, 5/8" N.C. x 1-5/8"	8	.238	8	.238
...	Q 1925	Q 1925	Lock washer, 5/8"	8	.013	8	.013
47	53539 DAX	53539 DAX	Shield	2	10.75	2	10.75
...	Q 1849	Q 1849	Cap screw, 1/2" N.F. x 1-1/4"	8	.07	8	.07
...	Q 1909	Q 1909	Hex. nut, 1/2" N.F.	8	.06	8	.06
...	Q 1922	Q 1922	Lock washer, 1/2"	8	.013	8	.013
...	Q 1836	Q 1836	Cap screw, 7/16" N.C. x 1-3/4"	4	.12	4	.12
...	Q 1921	Q 1921	Lock washer, 7/16"	4	.01	4	
48	Q 3673	Q 3673	Pivot lubricator (Lincoln No. 5245)	2	.03	2	.03
49	.....	42687 V	Plug	...		2	.10
50	.....	54013 D	Nut	...		4	.37
51	.....	54016 D	Nut lock	...		2	.07
53	.....	8507 D	Bearing cage, left hand	...		1	13.25
	.....	8516 D	Bearing cage, right hand	...		1	13.25
54	.....	54003 D	Gasket	...		2	.02
55	.....	54010 D	Bearing retainer	...		2	1.12
...	.....	Q 1804	Cap screw, 3/8" N.C. x 1-1/4"	...		4	.06
...	.....	Q 1920	Lock washer, 3/8"	...		4	.005
56	.....	ST 228	Bearing (optional) (IHC)	...		2	2.78
	.....	41513 V	Bearing (optional) (New Departure No. 1215)	...		2	2.78
57	.....	8509 B	Bearing cage	...		2	2.62

SPARE PARTS CATALOG

FRAME SIDE CHANNELS



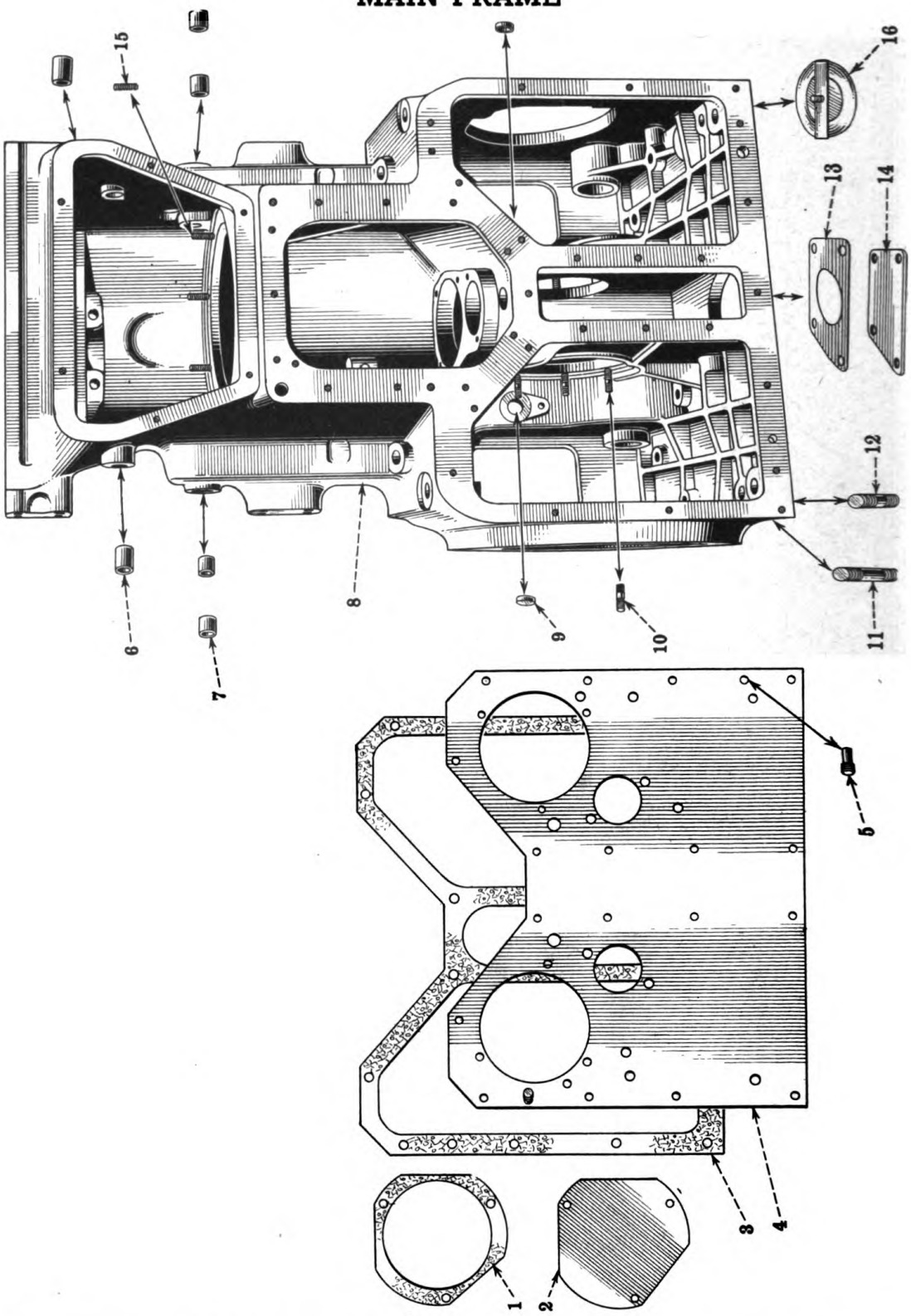
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	53894 D	Side channel, left hand.	1	56.00
...	Q 4146	Cap screw, 7/8" N.C. x 2".	4	.539
...	Q 1929	Lock washer, 7/8".	4	
...	Q 1888	Cap screw, 3/4" N.C. x 1-3/4". . .	4	.352
...	Q 1927	Lock washer, 3/4".	4	
...	Q 1870	Cap screw, 5/8" N.C. x 1-1/2". . .	4	.216
...	Q 1925	Lock washer, 5/8".	4	
2	53895 D	Side channel, right hand	1	56.00
...	Q 4146	Cap screw, 7/8" N.C. x 2".	4	.539
...	Q 1929	Lock washer, 7/8".	4	
...	Q 1888	Cap screw, 3/4" N.C. x 1-3/4". . .	4	.352
...	Q 1927	Lock washer, 3/4".	4	
...	Q 1870	Cap screw, 5/8" N.C. x 1-1/2". . .	4	.216
...	Q 1925	Lock washer, 5/8".	4	
3	48074 D	Dowel.	4	.25

When ordering, always use I H C Part Nos.

SPARE PARTS CATALOG

MAIN FRAME



Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

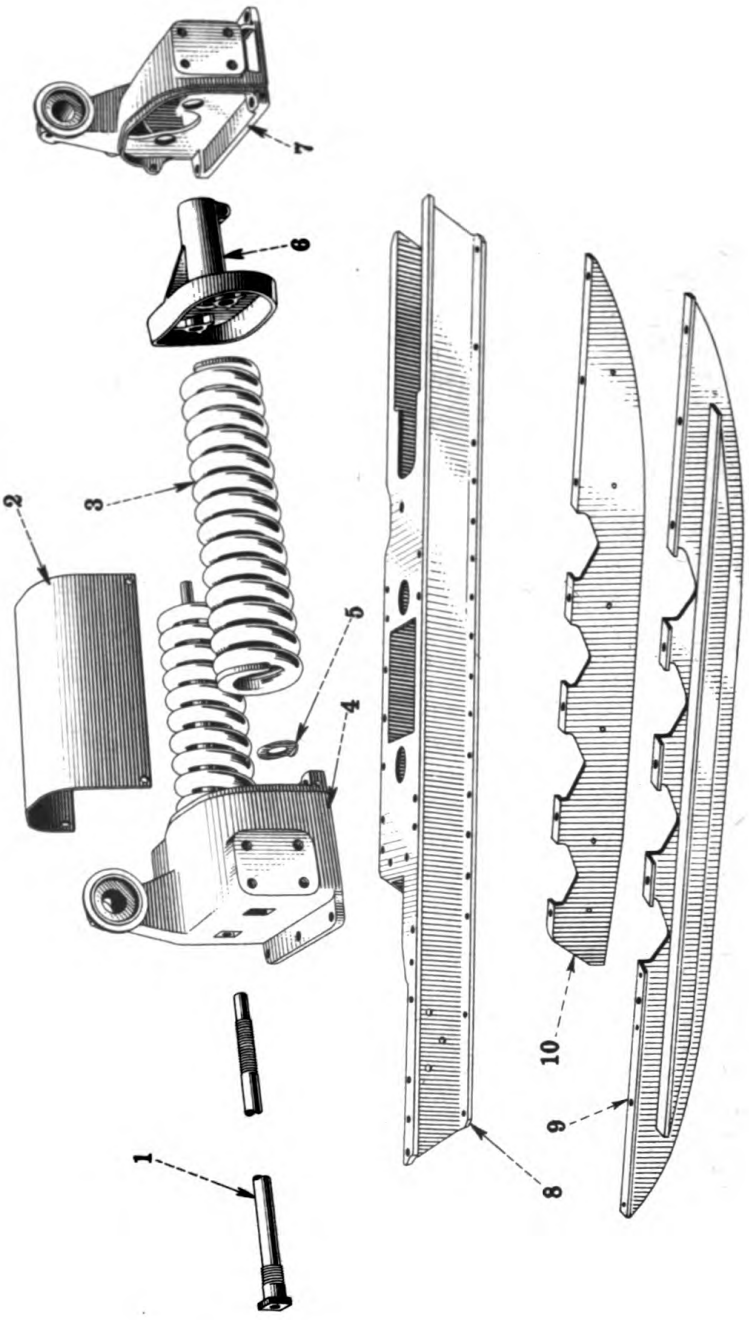
MAIN FRAME - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	53714 D	Gasket	2	.01
2	53559 D	Inspection cover	2	.81
...	Q 1771	Cap screw, 5/16" N.F. x 1/2"	6	.025
...	Q 1919	Lock washer, 5/16"	6	.003
3	52256 D	Gasket	1	.15
4	52255 DX	Main frame cover, complete	1	28.56
...	Q 1846	Cap screw, 1/2" N.C. x 3/4"	4	.092
...	Q 1922	Lock washer, 1/2"	4	.013
...	Q 1830	Cap screw, 7/16" N.C. x 1"	20	.073
...	Q 1921	Lock washer, 7/16"	20	.01
5	18585 DA	Dowel pin	2	.12
6	45120 D	Clutch shaft bushing	2	.11
7	46332 D	Brake shaft bushing	4	.06
8	8514 DBX	Main frame, complete	1	867.00
...	.....	Socket head pipe plug, 1"	2	.218
...	.....	Socket head pipe plug, 1/2"	1	.062
...	.....	Socket head pipe plug, 1-1/4"	1	.25
9	48075 D	Pivot shaft cup plug	2	.02
10	55539 D	Bevel gear bearing cage stud	8	.06
11	57382 D	Drawbar guide stud, lower	4	.25
12	57383 D	Drawbar guide stud, upper	2	.50
13	48073 D	Gasket	1	.05
14	48072 D	Power take-off cover	1	2.50
...	Q 4092	Cap screw, 5/8" N.C. x 1"	4	.172
...	Q 1925	Lock washer, 5/8"	4	.013
15	53715 D	End cover stud	4	.18
16	42297 D	Steering clutch lubricating port cover	2	2.75
...	46304 D	Engine clutch inspection cover	1	2.75
...	Q 4016	Cap screw, 3/8" N.C. x 5/8"	3	.041
...	Q 1920	Lock washer, 3/8"	3	.005
...	53491 DX	Engine clutch cover	1	12.50
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	6	.045
...	Q 1920	Lock washer, 3/8"	6	.005

When ordering, always use I H C Part Nos.

SPARE PARTS CATALOG

TRACK FRAME AND SPRING



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

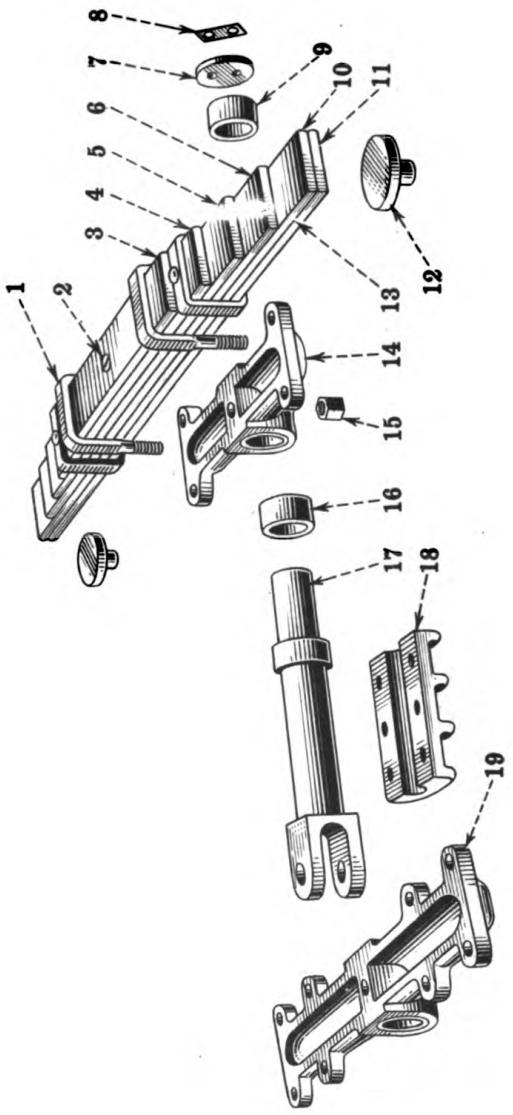
SPARE PARTS CATALOG

TRACK FRAME AND SPRING - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	55442 D	Adjusting rod . . .	4	.08	7	8487 DAX	Spring guide, left hand	1	56.00
...	.....	Castle hex. nut, 1" N.F.	4	.264		8488 DAX	Spring guide, right hand	1	56.00
...	.....	Cotter, 1/8 x 2". .	4	.05	...	Q 4051	Cap screw, 1/2" N.F. x 3-1/4". .	2	.231
2	49586 D	Spring guard. . . .			...	.....	Cap screw, 3/4" N.C. x 1-5/8". .	12	.352
...	Q 1800	Cap screw, 3/8" N.C. x 3/4". . .	8	.045	...	.....	Hex. nut; 1/2" N.F.		
...	Q 1920	Lock washer, 3/8"	8		...	Q 1909	Lock washer, 1/2"	2	.069
3	48038 DA	Track spring. . . .	4	62.00	...	Q 1922	Lock washer, 3/4"	12	
4	6601 DDX	Spring retainer, rear, left hand.	1	68.00	...	Q 1927	Track frame, left hand	1	225.00
	6602 DDX	Spring retainer, rear, right hand	1	68.00	8	53222 DA	Track frame, right hand	1	225.00
...	Q 4051	Cap screw, 1/2" N.F. x 3-1/4". .	2	.231		53223 DA	Shield, outer, left hand	1	38.00
...	.....	Cap screw, 3/4" N.F. x 1-7/8". .	12	.384	9	58294 DAX	Shield, outer, right hand	1	38.00
...	Q 1909	Hex. nut, 1/2" N.F.	2	.069		58295 DAX	Cap screw, 1/2" N.F. x 1-5/8". .	18	.148
...	Q 1922	Lock washer, 1/2"	2		...	.....	Hex. nut, 1/2" N.F.	18	.069
...	Q 1927	Lock washer, 3/4"	12		...	Q 1909	Lock washer, 1/2"	18	
5	55443 D	Lock washer . . .	4	.03	...	Q 1922	Shield, inner, left hand	1	34.00
...	.....	Hex. jam nut, 1-1/4" N.F. . .	4	.580	...	58296 DAX	Shield, inner, right hand	1	34.00
6	6605 DA	Spring retainer, front.	2	13.75	10	58297 DAX	Cap screw, 1/2" N.F. x 1-5/8". .	14	.148
...	Q 1857	Cap screw, 1/2" N.F. x 2-1/4". .	2	.175	...	.....	Hex. nut, 1/2" N.F.	14	.069
...	Q 1909	Hex. nut, 1/2" N.F.	2	.069	...	Q 1909	Lock washer, 1/2"	14	
...	Q 1922	Lock washer, 1/2"	2		...	Q 1922			

SPARE PARTS CATALOG

EQUALIZER SPRING



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

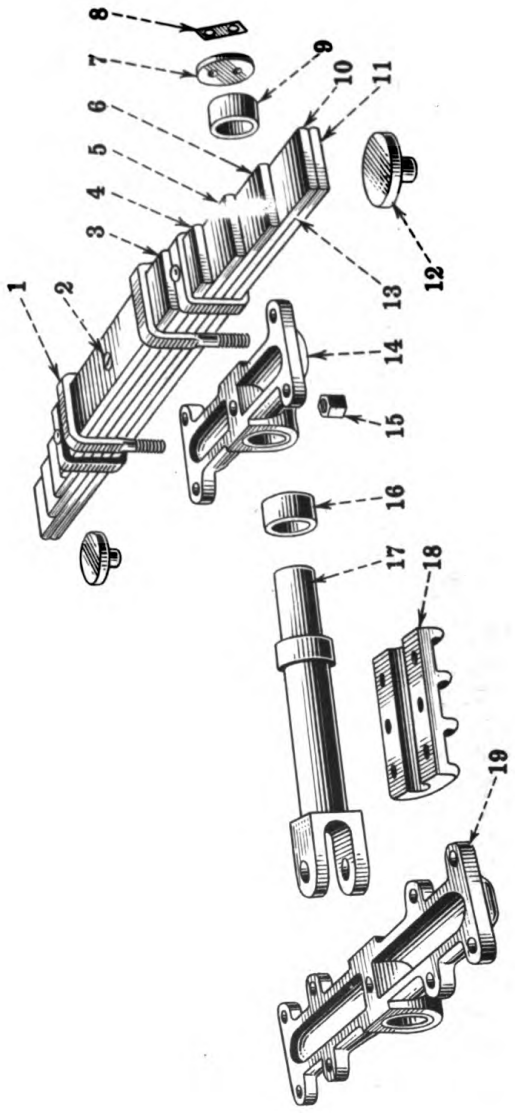
SPARE PARTS CATALOG

DIAGONAL BRACE - Continued

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
1	8471 DA	8471 DA	Clamp.	2	8.00	2	8.00
...	Q 1872	Q 1872	Cap screw, 5/8" N.C. x 1-3/4".	4	.238	4	.238
...	Q 4095	Q 4095	Cap screw, 5/8" N.C. x 3-1/2".	4	.388	4	.388
...	Q 1925	Q 1925	Lock washer, 5/8".	8		8	
2	Q 3615	Q 3615	Lubricator (Lincoln No. 5000). .	2	.01	2	.01
3	53656 D	53656 D	Felt	4	.02	4	.02
4	57239 D	57239 D	Bushing (set of 4)	2	1.06	2	1.06
5	18942 D	18942 D	Washer	4	.00	4	.00
6	57235 D	57235 D	Bearing set, includes bushings, felts, and lock washers . .	2	9.50	2	9.50
...	Q 4035	Q 4035	Cap screw, 7/16" N.F. x 3" . .	4	.158	4	.158
...	Q 1907	Q 1907	Hex. nut, 7/16" N.F.	4	.047	4	.047
	53657 DA	.....	Diagonal brace, left hand. . . .	1	60.00	...	
	53658 DA	.....	Diagonal brace, right hand . . .	1	60.00	...	
7	.....	53659 DA	Diagonal brace, left hand. . . .	...		1	80.00
	.....	53660 DA	Diagonal brace, right hand . . .	...		1	80.00
8	47780 D	47780 D	Shim, light.	8	.01	8	.01
9	47779 D	47779 D	Shim, medium	4	.02	4	.02
10	47778 D	47778 D	Shim, heavy.	4	.03	4	.03
14	45293 D	45293 D	Nut.	12	.18	12	.18
...	Q 1927	Q 1927	Lock washers, 3/4"	12		12	
15	63265 D	63265 D	Stud	12	.31	12	.31

SPARE PARTS CATALOG

EQUALIZER SPRING



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

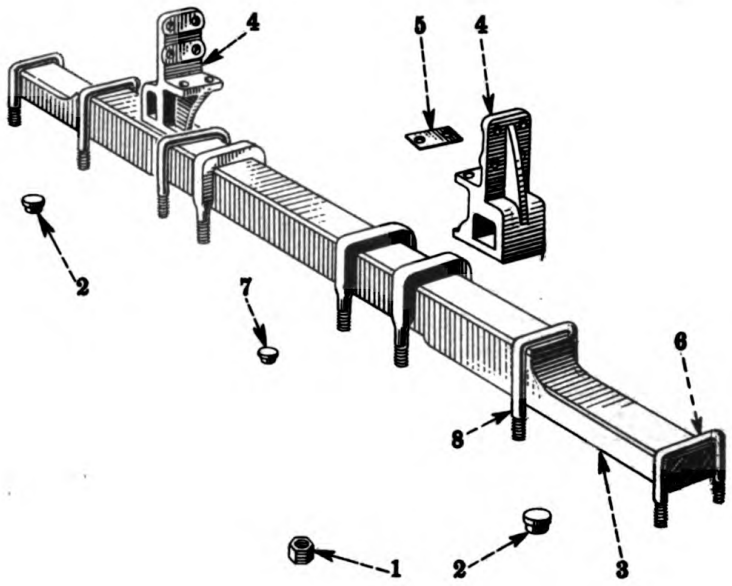
EQUALIZER SPRING - Continued

Ref. No.	IHC Part No.		Description	Standard		Wide Tread	
	Standard	Wide Tread		No. Used	Wt. Lbs.	No. Used	Wt. Lbs.
* 1	53898 DA	53898 DA	Clip	2	2.50	4	2.50
* 2	55311 DX	55311 DX	Center bolt.	1	.37	1	.37
...	Q 1909	Q 1909	Hex. nut, 1/2" N.F.	1	.069	1	.069
* 3	54027 D	54029 D	Leaf, No. 6.	1	11.00	1	20.50
* 4	47605 D	47610 D	Leaf, No. 5.	1	16.50	1	24.50
* 5	47604 D	47609 D	Leaf, No. 4.	1	16.50	1	24.00
* 6	47603 D	47608 D	Leaf, No. 3.	1	18.56	1	30.00
7	47596 D	47596 D	Retainer	1	.87	1	.87
...	Q 1849	Q 1849	Cap screw, 1/2" N.F. x 1-1/4".	2	.120	2	.120
8	40974 DA	40974 DA	Bolt lock.	1	.03	1	.03
9	47594 DA	47594 DA	Saddle bushing	1	.75	1	.75
*10	54026 D	54028 D	Leaf, No. 2.	1	23.50	1	30.00
*11	47602 D	47607 D	Leaf, No. 1.	1	22.00	1	29.00
*12	8493 D	8493 D	Guide pad.	2	2.25	2	2.25
*13	53897 D	53896 D	Spring (6 leaves)	1	107.00	1	153.00
14	47598 DAXA	.....	Saddle	1	28.25	...	
15	41842 D	41842 D	Clip nut	4	.25	8	.25
16	47594 DA	47594 DA	Saddle bushing	1	.75	1	.75
17	47595 D	47595 D	Pivot shaft.	1	30.00	1	30.00
18	6612 D	6612 D	Pivot shaft cap.	1	13.75	1	13.75
...	Q 4147	Q 4147	Cap screw, 7/8" N.C. x 2-1/4".	6	.581	6	.581
...	Q 1929	Q 1929	Lock washer, 7/8".	6		6	
19	.....	47599 DAXA	Saddle	...		1	50.00

* - *If the tractor is equipped with a Rigid Track Frame, these parts are not used (see page 12).*

When ordering, always use I H C Part Nos.

RIGID TRACK FRAME



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	59528 D	Rigid track frame attachment	1	
1	41842 D	Cross bar "U" bolt nut	8	.25
2	59523 D	Cross bar end button	2	.375
3	59520 DX	Cross bar with pad	1	188.00
4	8961 D	Cross bar bracket.	2	10.50
5	59526 D	Cross bar bracket shim, heavy.	2	.046
	59527 D	Cross bar bracket shim, light.	4	.02
6	59525 D	Cross bar "U" bolt, short.	2	2.093
7	59522 D	Cross bar center button.	1	.187
8	59524 D	Cross bar "U" bolt, long	2	2.625

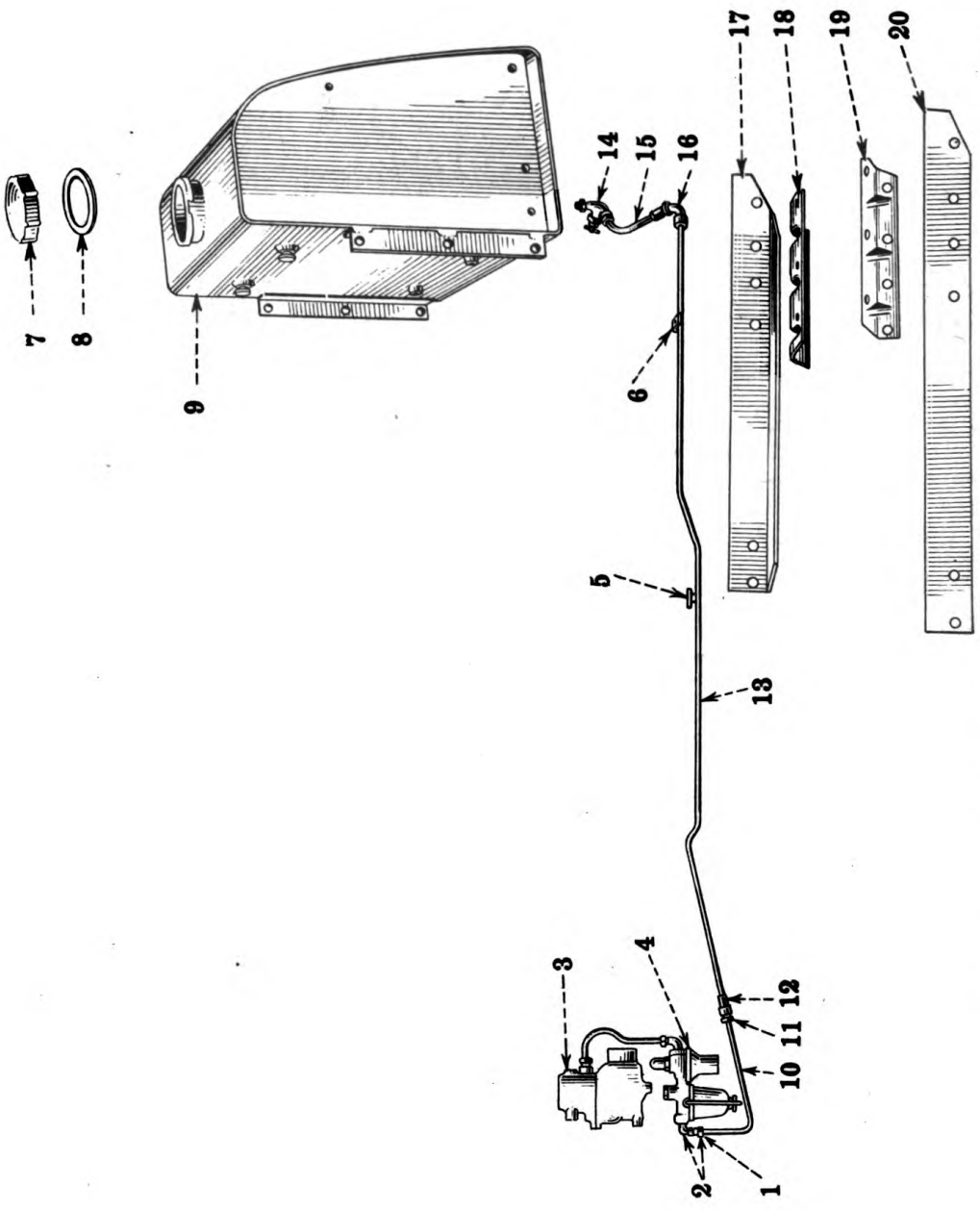
Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

FUEL SYSTEM

SPARE PARTS CATALOG

FUEL TANK AND CONNECTIONS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

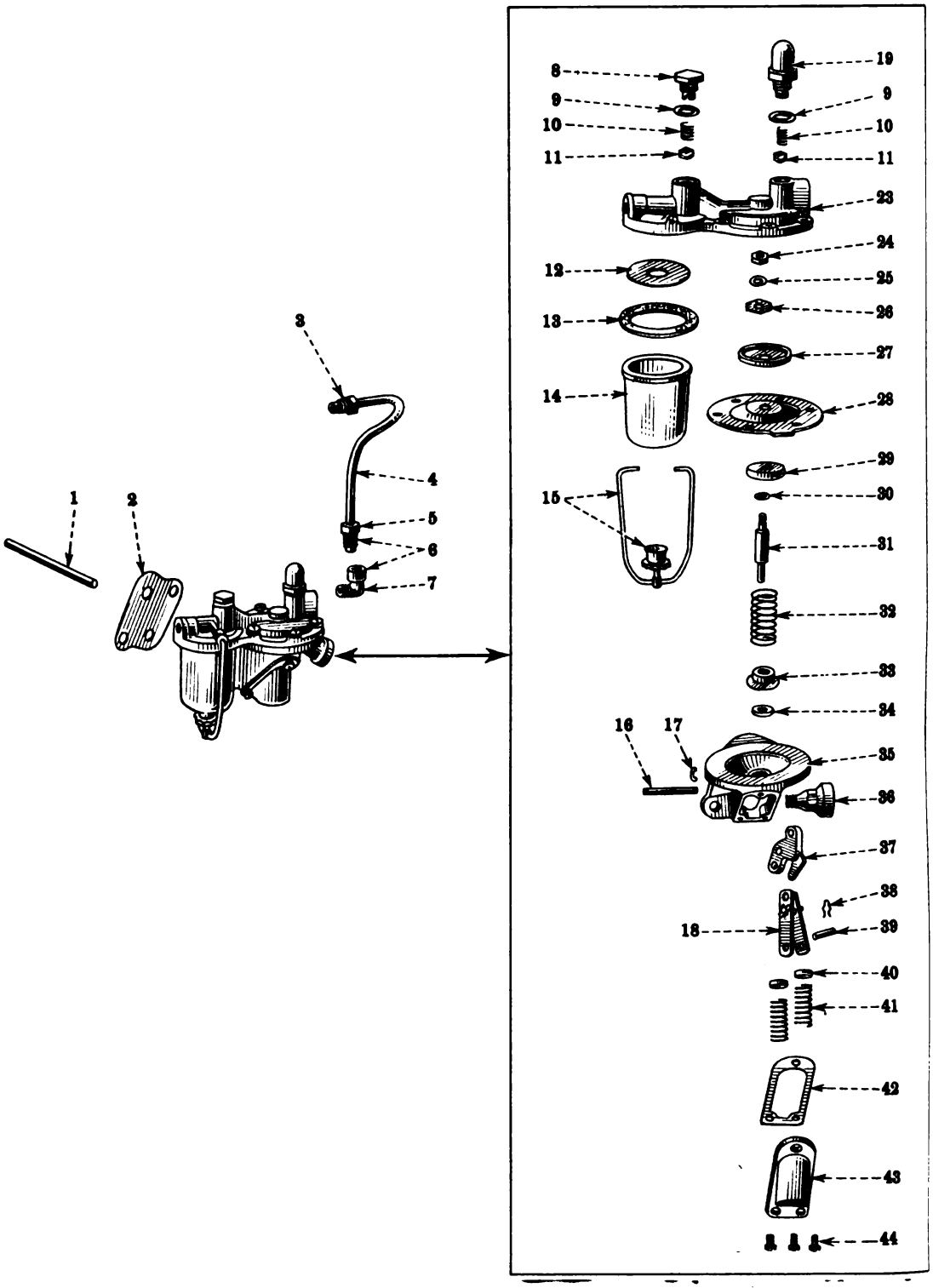
SPARE PARTS CATALOG

FUEL TANK AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	29899 D	Coupling nut. . . .	1		14	53953 D	Fuel tank shut-off valve.	1	.50
	29900 DX	Fuel pump inlet elbow with nut .	1		15	61248 D	Fuel tube	1	
2	29900 D	Fuel pump inlet elbow.	1		16	48232 D	Pipe elbow.	1	
3	.....	Carburetor (see Detail List, page 7)	1		17	53882 D	Tank support, right hand	1	
4	.....	Fuel pump (see Detail List, page 6)	1		...	Q 1848	Cap screw, 1/2" N.C. x 1". . . .	3	.106
5	56151 D	Fuel pipe bolt spacer	2		...	Q 4042	Cap screw, 1/2" N.C. x 7/8". . .	1	.099
...	Q 1805	Cap screw, 3/8" N.F. x 1-1/2".	1	.068	...	Q 1922	Lock washer, 1/2".	4	
...	Q 1905	Hex. nut, 3/8" N.F.	1	.031	18	56070 DX	Support bracket, right hand . .	1	
...	Q 1920	Lock washer, 3/8".	1	.005	...	Q 1848	Cap screw, 1/2" N.C. x 1". . . .	3	.106
6	50149 D	Fuel pipe clamp, outer.	1		...	Q 1922	Lock washer, 1/2".	3	
7	42387 D	Cap	1		19	56069 DX	Support bracket, left hand. . .	1	
8	42495 D	Gasket.	1		...	Q 1848	Cap screw, 1/2" N.C. x 1". . . .	3	.106
9	60188 DX	Fuel tank	1		...	Q 1922	Lock washer, 1/2".	3	
...	.....	Pipe plug, 1/4" . .	1		20	53881 D	Tank support, left hand	1	
...	.....	Pipe plug, 1/2" . .	1		...	Q 1848	Cap screw, 1/2" N.C. x 1". . . .	3	.106
10	61509 DX	Fuel tube	1		...	Q 1922	Lock washer, 1/2".	4	
11	29899 D	Coupling nut. . . .	2						
12	57050 D	Coupling.	1						
	57050 DX	Coupling with nut .	1						
13	53988 D	Fuel pipe	1						
...	.....	Square head plow bolt, 3/8" N.C. x 1"	2						
...	Q 1906	Hex. nut, 3/8" N.C.	2	.031					
...	Q 1920	Lock washer, 3/8".	2						

SPARE PARTS CATALOG

FUEL PUMP (28659 HA) AND CONNECTIONS



***Unnumbered** parts in the illustrations are the same as corresponding parts shown with numbers.*

Don't order parts from the illustrations only; refer to the list also.

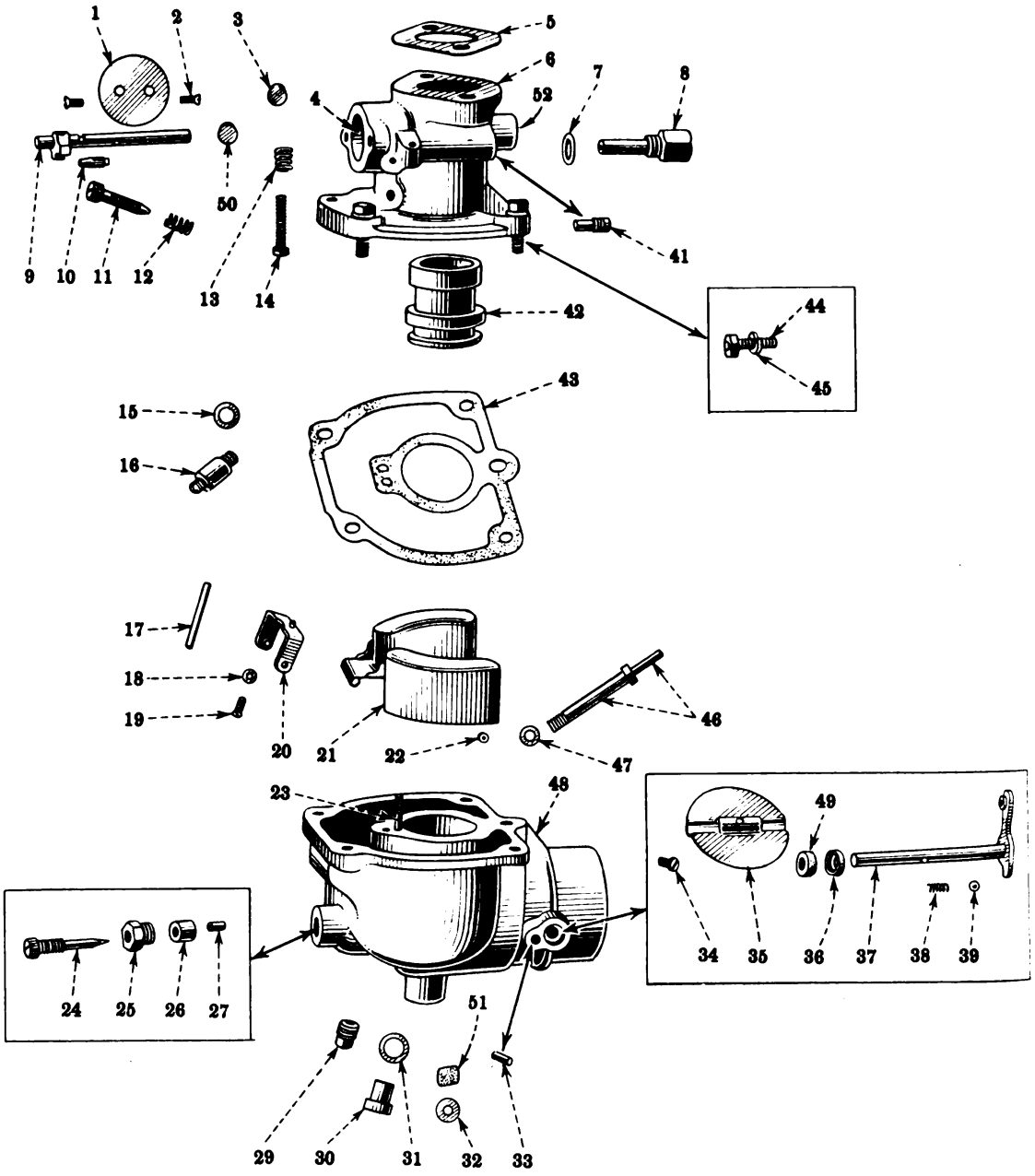
SPARE PARTS CATALOG

FUEL PUMP (28659 HA) AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Description	A-C Spark Plug Co. No.	No. Used	Wt. Lbs.
...	28659 HA	Fuel pump (includes Ref. Nos. 8 through 44)	1521676	1	2.25
...	Q 1776	Cap screw, 5/16" N.C. x 1".	.....	2	.036
...	Q 1919	Lock washer, 5/16".	.....	2	.003
1	56692 D	Push rod.	.....	1	
2	24524 D	Gasket.	.....	1	.002
3	29899 D	Connector nut	.....	1	.012
4	56693 DAX	Fuel pipe (pump to carburetor)	.....	1	
5	29899 D	Connector nut	.....	1	.012
6	29900 DX	Outlet elbow with nut	.....	1	.062
7	29900 D	Outlet elbow.	.....	1	.056
8	23525 D	Valve plug.	855135	1	
9	23526 D	Valve plug gasket	855136	2	
10	26095 D	Valve spring.	856270	2	
11	23518 D	Valve	855003	2	
12	23516 D	Gas strainer screen	854009	1	
13	51346 V	Strainer gasket	854003	1	
14	51344 V	Strainer bowl	854004	1	
15	51348 VA	Strainer bail assembly. . . .	854054	1	
16	36350 D	Rocker arm pin.	1521289	1	
17	36351 D	Rocker arm pin washer	1521288	1	
18	23537 D	Link.	855374	1	
19	23545 D	Air dome.	855789	1	
23	60129 D	Top cover and valve seat assembly	1523358	1	
...	.....	Fillister head screw, No. 10 - 32 x 5/8"	.....	6	.02
...	Q 1916	Lock washer, No. 10	.....	6	.001
24	.....	Hex. jam nut, 1/4" N.F. . .	.....	1	.004
25	Q 1918	Lock washer, 1/4", light. .	.....	1	.002
26	23522 D	Diaphragm washer.	855029	1	
27	28827 D	Diaphragm protector, upper. .	1521194	1	
28	23523 D	Diaphragm	855035	1	
29	23524 D	Diaphragm protector, lower. .	855078	1	
30	23520 D	Pull rod gasket	855012	1	
31	60128 D	Pull rod.	1523172	1	
32	26097 D	Spring.	856309	1	
33	25590 D	Oil seal gasket retainer. . .	856308	1	
34	25589 D	Oil seal gasket	856307	1	
35	28825 D	Body.	1521721	1	
36	39624 HA	Breather.	1521736	1	
37	28824 D	Rocker arm.	1521745	1	
38	23521 D	Link pin clip	855017	1	
39	23539 D	Link pin.	855016	1	
40	23541 D	Rocker arm spring cap	855532	2	
41	23530 D	Spring.	855253	2	
42	23528 D	Bottom cover gasket	855229	1	
43	23527 D	Bottom cover.	855228	1	
44	31760 D	Bottom cover screw.	132108	3	

SPARE PARTS CATALOG

CARBURETOR



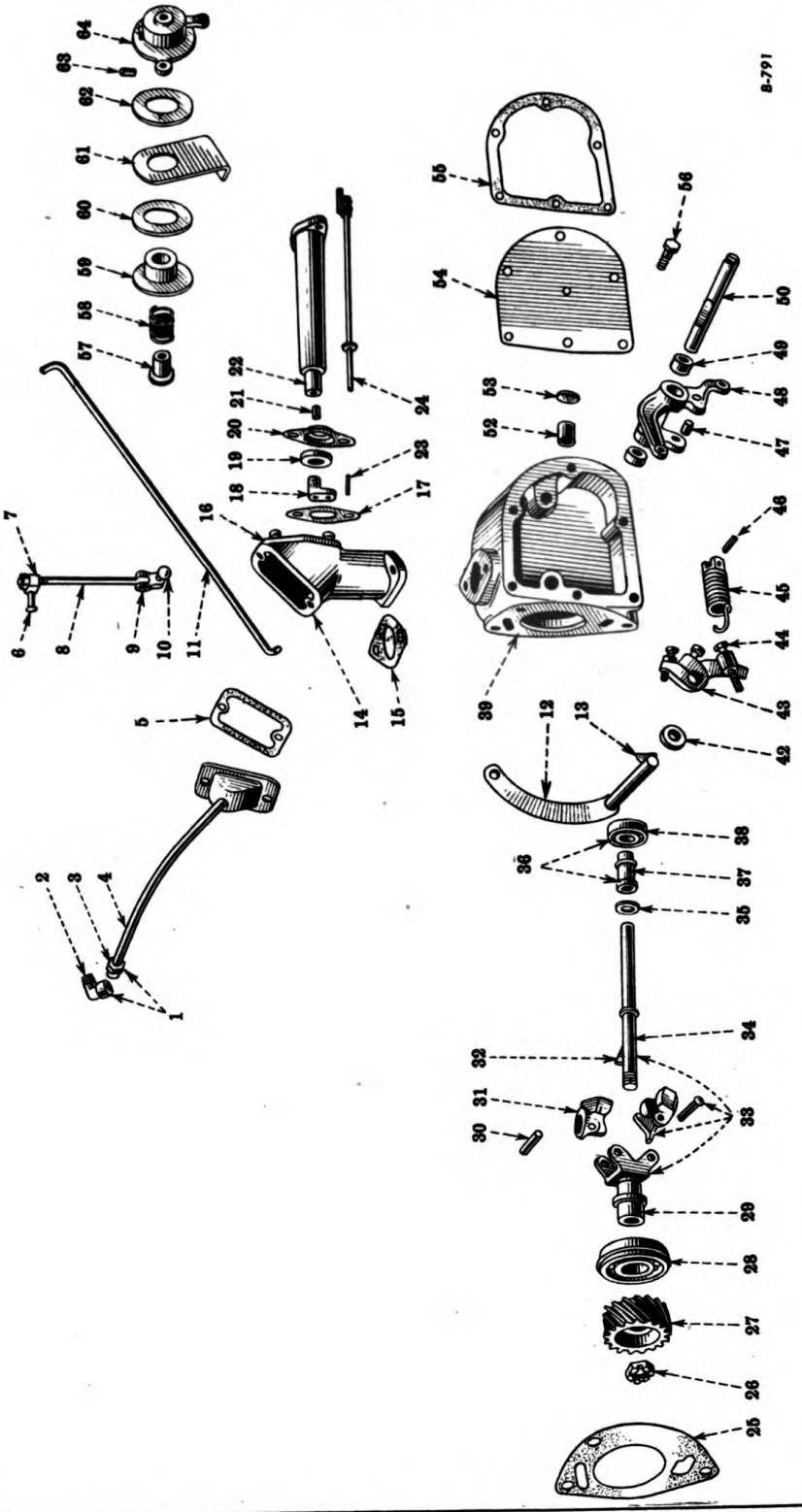
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

SPARE PARTS CATALOG

CARBURETOR - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	52815 D	Carburetor, complete, without gasket (Ref. No.5)(IHC - 1-3/8" Updraft)	1	
1	54489 D	Butterfly.	1	.046
2	47392 D	Butterfly screw.	2	.00
3	24805 D	Plug, 3/8"	1	.001
4	49223 D	Throttle shaft bushing (economizer).	1	.012
5	31336 D	Gasket	1	.01
6	8557 DX	Throttle body with stop pin, plugs and bushings.	1	2.50
7	18377 D	Gasket	1	.00
8	29902 DX	Screen retainer.	1	.046
9	54488 DX	Throttle shaft assembly.	1	.062
10	45110 D	Stop pin	1	.108
11	24689 D	Idle adjusting screw	1	.02
12	24685 D	Screw retainer spring.	1	.003
13	25484 D	Screw retainer spring.	1	.003
14	.....	Screw, No. 10 - 32 x 1-1/8". . . .	1	.006
15	25948 D	Gasket	1	.00
16	47396 DX45	Valve cage assembly.	1	.031
17	47395 D	Pivot.	1	.006
18	.....	Lock washer, No. 4	2	.00
19	.....	Screw, No. 4 - 40 x 5/16".	2	.002
20	47394 D	Lever support.	1	.01
21	47398 DX	Float and lever assembly	1	.728
22	59173 D	Main air bleed	1	.015
23	49798 D-70	Idle jet	1	.031
24	47404 DA	Adjusting screw.	1	.093
25	24687 DA	Packing nut	1	.077
26	24703 DA	Screw packing (optional)	1	.012
	67266 DX	Screw packing (optional)	1	
27	59172 D	Fuel adjusting screw seat.	1	.002
29	.....	Cadmium plated pipe plug, 1/8" . . .	1	.014
30	47402 D	Clamp nut.	1	.02
31	32615 D	Gasket	1	.00
32	57957 D	Drip hole plug	1	.004
33	46185 D	Groove pin	1	.002
34	.....	Screw, No. 6 - 32 x 3/8"	1	.002
35	47406 D	Shutter.	1	.046
36	45148 D	Retainer	1	.001
37	47405 DXA	Shaft and lever.	1	.093
38	46059 D	Spring	1	.001
39	46184 D	Spring ball.	1	.005
41	24693 D	Idle outlet plug	1	.012
42	47407 D-30	Venturi (optional)	1	.25
	64987 D-30	Venturi (optional)	1	.25
43	47388 DA	Gasket	1	.008
44	Q 4001	Cap screw, 1/4" - 20 x 7/8". . . .	4	
45	Q 1918	Lock washer, 1/4".	4	.002
46	54485 DX	Metering nozzle, complete.	1	.062
47	47401 D	Gasket	1	.00
48	59221 D	Fuel bowl with dust seal, metering jet, bleed and plug	1	3.187
49	45149 D	Dust seal.	1	.001
50	57956 D	Throttle shaft expansion plug, 7/16"	1	.003
52	47390 D	Throttle shaft bushing	1	.015
...	60947 D	Drip hole filler replacement package	1	.005

GOVERNOR AND CONNECTIONS



Don't order parts from the illustrations only; refer to the list also.

GOVERNOR AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	54988 D	Variable speed governor	1	
...	Q 1804	Cap screw, 3/8" N.C. x 1-1/4"	3	.060
...	Q 1920	Lock washer, 3/8"	3	.005
1	37323 DX	Breather tube elbow with nut	1	
2	37323 D	Elbow	1	
3	37165 D	Nut	1	
4	50366 DX	Breather tube assembly.	1	
...	.....	Fillister head screw, 1/4" N.C. x 1/2"	2	.012
...	Q 1918	Lock washer, 1/4"	2	.002
5	48501 D	Gasket.	1	
6	14611 H	Pin	1	.014
...	.....	Cotter, 1/16 x 1/2"	1	.001
7	6289 D	Adjusting block	1	
8	52810 DX	Connecting rod with block.	1	
...	Q 1901	Hex. nut, 1/4" N.F.	1	.007
9	48496 DA	Pin	1	.014
10	14611 H	Pin	1	.001
...	.....	Cotter, 1/16 x 1/2"	1	
11	52813 D	Governor control rod, front.	1	
...	.....	Washer, 11/32" I.D. x 3/4" O.D. x 16 ga.	2	.009
...	.....	Cotter, 3/32 x 3/4"	2	.002
12	48842 DAX	Speed change lever.	1	
13	4167 T	Key (Woodruff No. 3).	1	.003
14	8305 D	Housing	1	
...	Q 1776	Cap screw, 5/16" N.C. x 1"	1	.036
...	Q 1919	Lock washer, 5/16".	1	.003
15	48489 D	Gasket.	1	
16	53876 D	Throttle shaft housing felt retainer plate.	1	
17	53877 D	Throttle shaft housing felt retainer gasket	1	
18	6288 D	Lever	1	
19	48493 D	Felt washer	1	
20	48492 D	Felt retainer	1	
...	.....	Fillister head screw, 1/4" N.C. x 3/4"	2	.015
...	.....	Washer, 17/64" I.D. x 5/8" O.D. x 18 ga.	2	.002
...	Q 1918	Lock washer, 1/4"	2	.002
21	45696 D	Bushing	1	
	8306 DAX	Throttle shaft housing (optional)	1	
22	9277 DX	Throttle shaft housing (optional)	1	
...	.....	Round head screw, 1/4" N.C. x 3/4".	2	.015
...	Q 1918	Lock washer, 1/4"	2	.002
23	24772 D	Pin	1	
24	52811 DXA	Throttle shaft.	1	
25	45685 D	Gasket.	1	
26	.....	Slotted hex. jam nut, 9/16" N.F.	1	.031
27	54970 D	Gear (15 teeth)	1	
28	45774 D	Bearing (New Departure No. 43305)	1	
29	48256 DA	Governor weight carrier	1	
30	45656 D	Pin	2	
31	45655 D	Governor weight	2	
32	13085 D	Key (Woodruff No. 7).	1	
33	48256 DAX	Carrier with weights and shaft.	1	
34	48255 D	Governor shaft.	1	
...	.....	Cotter, 1/8 x 1-1/4".	1	.004
35	45653 D	Washer.	1	

(Continued on next page.)

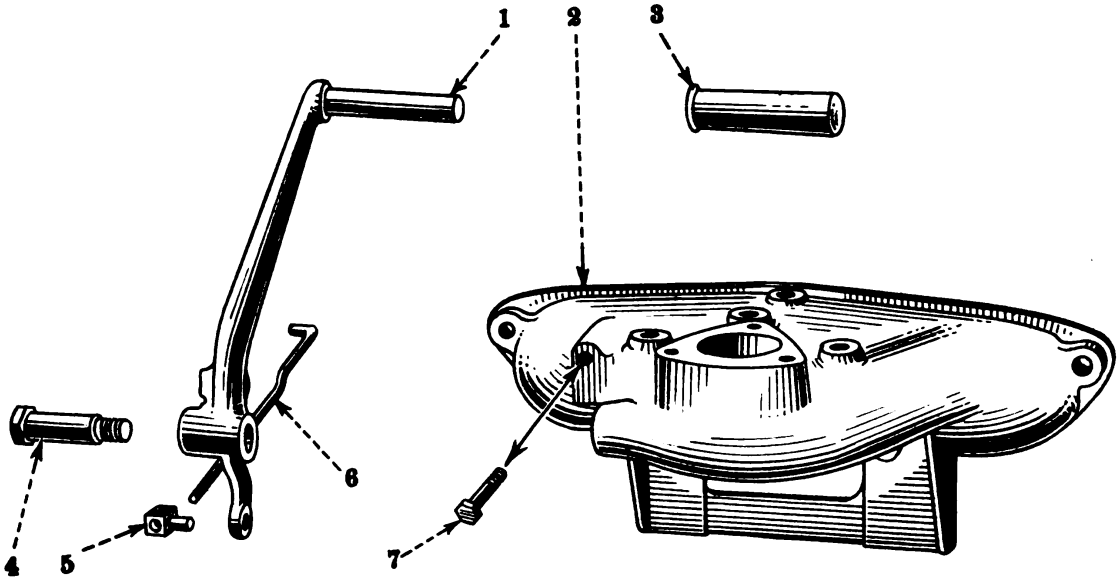
SPARE PARTS CATALOG

GOVERNOR AND CONNECTIONS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
36	48250 DX	Governor sleeve with bearing.	1		55	49108 D	Gasket.	1	
						10958 D	Governor housing cover bolt	2	.02
37	48250 D	Sleeve.	1		56	10958 D	Governor connecting rod housing bolt	1	.02
38	36151 D	Bearing (New Departure No. 20203 A)	1			Q 1919	Lock washer, 5/16". .	3	.003
39	8363 DAX	Governor housing. . . .	1		...	50248 D	Spring retainer . . .	1	
42	45667 D	Seal.	1		57	Q 1862	Cap screw, 1/2" N.C. x 2-3/4"	1	.203
43	6676 DA	Governor spring lever .	1		...	Q 1910	Hex. nut, 1/2" N.C. .	1	.069
...	Q 1758	Cap screw, 1/4" N.C. x 1"	2	.016	...	48358 D	Spring.	1	.17
...	Q 1902	Hex. nut, 1/4" N.C. .	2	.007	58	6649 D	Disc retainer	1	.875
...	Q 1918	Lock washer, 1/4" . .	1	.002	59	48356 D	Friction disc	2	.05
44	49528 D	Bolt, long.	1		60	52812 D	Bracket	1	
45	49407 DAX	Spring and fork	1		61	48356 D	Friction disc	2	.05
46	48251 D	Pin	1	.00	62	25115 D	Lever pin	1	.01
...	.....	Cotter, 1/16 x 3/4" .	1		63	8517 DAX	Friction control lever with pin	1	
47	48254 D	Pin	2		64	21362 D	Governor rockshaft snap ring	1	.001
48	6633 DBX	Rockshaft lever	1		...	66272 D	Throttle shaft housing to carburetor gasket	1	
49	45775 D	Rockshaft bearing . . .	2						
50	48253 DA	Rockshaft	1						
52	48227 D	Bushing	1						
53	13090 D	Plug, 7/8".	1						
54	49107 D	Cover	1						
...	Q 1774	Cap screw, 5/16" N.C. x 3/4"	4	.033					
...	Q 1919	Lock washer, 5/16". .	4	.003					

SPARE PARTS CATALOG

ENGINE CONTROL AND CONNECTIONS



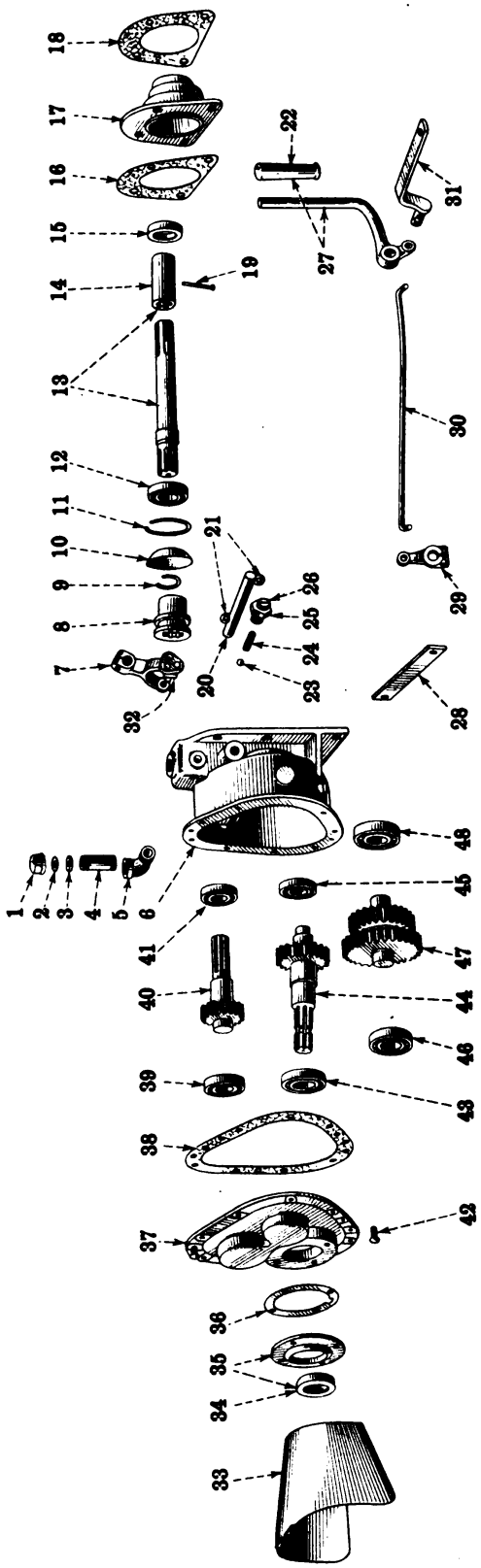
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	8484 DAX 9644 D	Governor control lever with rubber handle (see 9644 D).	1	2.50
		Governor control lever (steel) (optional in place of 8484 DAX and 41597 D)	1	3.156
2	8482 D	Control housing and air cleaner top .	1	24.00
...	Ç 1852	Cap screw, 1/2" N.C. x 1-1/2" . . .	2	.134
...	Ç 1848	Cap screw, 1/2" N.C. x 1"	2	.106
...	Ç 1910	Hex. nut, 1/2" N.C.	2	.069
...	Ç 1922	Lock washer, 1/2"	4	.013
...	Ç 1802	Cap screw, 3/8" N.C. x 1"	1	.045
...	Ç 1906	Hex. nut, 3/8" N.C.	1	.031
3	41597 D	Governor control lever handle (rubber) (see 9644 D)(Reference No. 1)	1	.156
4	53907 D	Shaft	1	.375
5	41958 DA	Adjusting block	1	.062
...	.....	Cotter, 3/32 x 5/8"	1	.001
6	53902 D	Governor control rod.	1	.562
...	Ç 1905	Hex. nut, 3/8" N.F.	2	.031
...	.....	Cotter, 1/8 x 5/8".	1	.003
7	55748 D	Lever stop screw.	1	.25
...	Ç 1906	Hex. nut, 3/8" N.C.	1	.031
...	Ç 5015	Lever lubricator (Lincoln No. 5030) .	1	.006

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

REDUCED SPEED (535 R.P.M.) REAR POWER TAKE-OFF ATTACHMENT (58093 D)



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

SPARE PARTS CATALOG

REDUCED SPEED (535 R.P.M.) REAR POWER TAKE-OFF ATTACHMENT (58093 D) - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	.....	Iron pipe cap, 1" standard	1	.37
2	27048 D	Breather screen	1	.00
3	27046 D	Breather felt	1	.00
4	27044 D	Breather pipe	1	.39
5	.....	Street ell, 1" standard	1	.62
6	8811 DX	Housing	1	38.75
...	Q 1870	Cap screw, 5/8" N.C. x 1-1/2"	1	.21
...	Q 1878	Cap screw, 5/8" N.C. x 2-1/2"	5	.30
...	Q 1925	Lock washer, 5/8"	6	.02
...	.....	Square head pipe plug, 3/4"	2	.12
...	.....	Cap screw, 3/4" N.C. x 1-3/4"	1	.35
...	Q 1888	Hex. nut, 3/4" N.C.	1	.20
...	Q 1914	Square head pipe plug, 1"	1	.15
7	.....	Shifter fork	1	.75
...	8809 DA	Cap screw, 3/8" N.F. x 1/2"	1	.03
...	Q 1797	Lock washer, 3/8"	1	.00
...	Q 1920	Shifter coupling	1	1.31
8	58073 DB	Bearing retainer snap ring, small	1	.01
9	48512 D	Oil slinger	1	.12
10	58069 D	Bearing retainer snap ring, large	1	.02
11	48514 D	Power take-off shaft bearing (New Departure No. 1207) (optional)	1	.75
12	4452 D ST 204	Power take-off shaft bearing (IHC) (optional)	1	.75
13	58090 DBX	Power take-off shaft (with coupling, Ref. No. 14 and rivet No. 19)	1	8.00
14	49548 D	Coupling	1	1.25
15	53968 D	Power take-off shaft oil seal, inner	1	.25
16	58068 D	Housing gasket	1	.02
17	8808 DX	Bearing cage with oil seal	1	.10
18	58068 D	Bearing cage gasket	1	.01
19	.....	Round head rivet, 5/16 x 2-5/8"	1	.05
20	58070 D	Shifter shaft	1	.50
21	45532 DA 45532 DA	Shifter fork key	1	.01
22	41597 D	Shifter lever key Shifter hand lever handle	1	.01 .15
23	4596 D 13722 D	Shifter poppet (optional) Shifter poppet (optional)	1	.03 .01
24	64163 D	Shifter poppet spring	1	.01
25	Q 1914	Hex. nut, 3/4" N.C.	1	.20

(Continued on next page)

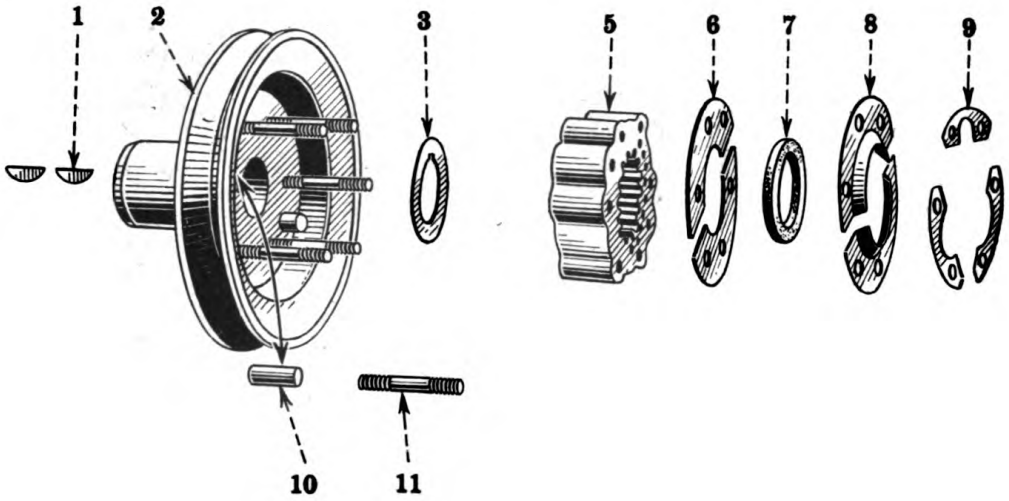
SPARE PARTS CATALOG

REDUCED SPEED (535 R.P.M.) REAR POWER TAKE-OFF ATTACHMENT (58093 D) - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
26	49105 D	Shifter poppet bushing	1	.12
27	8814 DX	Shifter hand lever with handle	1	1.25
28	58072 D	Housing spacer	1	1.12
29	8813 D	Shifter lever	1	.37
...	Q 1920	Cap screw, 3/8" N.C. x 1-3/8"	1	.04
...	.....	Lock washer, 3/8"	1	.00
30	58088 D	Shifter lever rod	1	.75
...	.....	Cotter, 1/8 x 3/4"	2	.00
...	.....	Hex. nut, 3/8" N.F.	2	.01
31	58089 DX	Shifter hand lever bracket with pin	1	2.00
...	.....	Cap screw, 7/16" N.C. x 2-1/8"	2	.12
...	.....	Cotter, 3/16 x 1-1/4"	1	
32	45533 DA	Shifter pin	2	.06
33	58064 DXA	Safety shield	1	4.00
...	Q 1776	Cap screw, 5/16" N.C. x 1"	4	.04
...	Q 1919	Lock washer, 5/16"	4	.00
34	58065 D	Gear and shaft oil seal	1	.50
35	8810 DX	Retainer with oil seal	1	1.43
36	58080 D	Oil seal retainer gasket	1	.01
37	8812 D	Housing cover	1	13.25
...	Q 1803	Cap screw, 3/8" N.F. x 1-1/4"	9	.06
...	Q 1905	Hex. nut, 3/8" N.F.	9	.03
...	Q 1920	Lock washer, 3/8"	9	.00
38	58081 D	Housing cover gasket	1	.04
39	18575 H ST 214	Pinion bearing, rear (New Departure No. 1208) (optional) Pinion bearing, rear (IHC) (optional)	1 1	1.00 1.00
40	58086 DA	Pinion (18 teeth)	1	5.66
41	20308 D ST 205 A	Pinion bearing, front (New Departure No. 3207) (optional) Pinion bearing, front (IHC) (optional)	1 1	.68 .68
42	45442 D	Housing cover dowel pin	1	.05
43	13176 D ST 201	Gear and shaft bearing, rear (New Departure No. 1209) (optional) Gear and shaft bearing, rear (IHC) (optional)	1 1	1.00 1.00
44	58087 DA	Gear and shaft (24 teeth)	1	8.75
45	10693 V ST 210	Gear and shaft bearing, front (New Departure No. 1306) (optional) Gear and shaft bearing, front (IHC) (optional)	1 1	.81 .81
46	20308 D ST 205 A	Idler gear bearing, rear (New Departure No. 3207) (optional) Idler gear bearing, rear (IHC) (optional)	1 1	.69 .69
47	58084 D	Idler gear (23 - 30 teeth)	1	8.75
48	10691 V ST 200	Idler gear bearing, front (New Departure No. 1307) Idler gear bearing, front (IHC) (optional)	1 1	1.00 1.00

SPARE PARTS CATALOG

FRONT POWER TAKE-OFF COUPLING UNIT (54116 D)

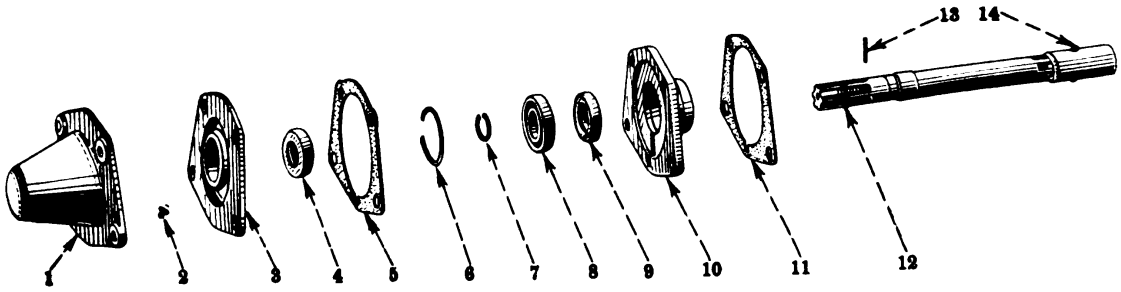


Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	33681 D	Fan drive pulley key	2	.01
2	8527 DAX	Fan drive pulley, complete with coupling.	1	10.00
3	18767 D	Fan drive pulley nut lock.	1	.06
5	8505 D	Coupling (14 teeth).	1	2.50
6	51268 D	Shaft retainer	2	.01
7	51269 D	Shaft felt washer.	1	.00
8	51271 D	Shaft felt washer retainer	2	.12
9	47244 D	Coupling stud nut lock	3	.18
10	47490 D	Drive pin.	2	.08
11	57714 D	Coupling stud.	6	.08
...	Q 1905	Hex. nut, 3/8" N.F.	6	.03
...	54115 D	Fan drive pulley nut	1	
...	56698 D	Starting crank adapter	1	

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

REAR POWER TAKE-OFF ATTACHMENT (53962 DA)

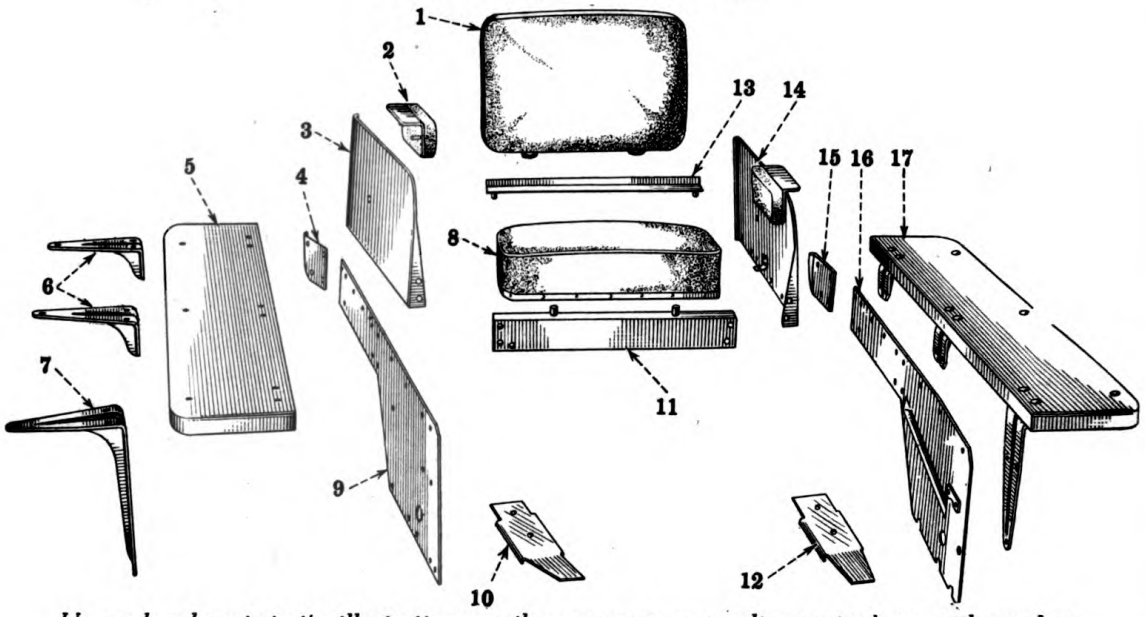


Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	6843 D	Power shaft end cover (not belt pulley)	1	4.50
...	Q 1874	Cap screw, 5/8" N.C. x 2"	4	.25
...	Q 1925	Lock washer, 5/8"	4	.013
2	Q 3615	Power shaft bearing lubricator.	1	.01
3	8391 DX	Power shaft bearing oil seal cage with oil seal	1	3.312
4	53967 D	Power shaft bearing oil seal, outer	1	.25
5	49547 DA	Power shaft bearing cage gasket	1	.015
6	48514 D	Power shaft bearing retaining snap ring, outer.	1	.02
7	48512 D	Power shaft bearing retaining snap ring, inner.	1	.01
8	20308 D	Power shaft bearing (New Departure No. 3207) (optional)	1	.62
	ST 205A	Power shaft bearing (IHC) (optional).	1	.62
9	53968 D	Power shaft oil seal, inner	1	.25
10	8392 DAX	Power shaft bearing cage with oil seal.	1	6.00
11	49547 DA	Power shaft bearing cage gasket	1	.015
12	53966 DAX	Power shaft, complete	1	9.875
13	21249 D	Power shaft groov-pin *(Tractor Serial Nos. TCB 501 to 3519).*	1	.015
14	49548 D	Power shaft coupling.	1	1.25
...	.....	Steel rivet, 5/16 x 2-5/8", round head	1	.062

SEAT AND FENDERS

SPARE PARTS CATALOG

SEAT AND FENDERS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	53731 D	Seat cushion, back.	1	14.50
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	2	.045
...	Q 1920	Lock washer, 3/8"	2	.005
2	52390 D	Seat cushion, side.	2	2.50
...	.....	Carriage bolt, 5/16" N.C. x 5/8". . . .	4	
...	Q 1904	Hex. nut, 5/16" N.C.	4	.015
...	Q 1919	Lock washer, 5/16".	4	.003
3	54096 DXA	Seat side sheet, right hand	1	17.00
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	2	.045
...	Q 1799	Cap screw, 3/8" N.F. x 3/4"	2	.045
...	Q 1905	Hex. nut, 3/8" N.F.	2	.031
...	Q 1920	Lock washer, 3/8"	4	.005
4	53757 D	End piece, right hand	1	.75
...	Q 1845	Cap screw, 1/2 x 3/4" N.F.	1	.092
...	Q 1800	Cap screw, 3/8 x 3/4" N.C.	1	.045
...	Q 1909	Hex. nut, 1/2" N.F.	1	.069
...	.....	Washer, 17/32" I.D. x 1" O.D. x 14 ga.	1	.007
...	.....	Washer, 13/32" I.D. x 7/8" O.D. x 16 ga.	1	.005
...	Q 1922	Lock washer, 1/2"	1	.013
...	Q 1920	Lock washer, 3/8"	1	.005
5	53753 D	Fender, right hand.	1	23.00
...	.....	Carriage bolt, 3/8" N.C. x 5/8"	9	.046
...	Q 1906	Hex. nut, 3/8" N.C.	9	.031
...	Q 1920	Lock washer, 3/8"	9	.005
6	53759 D	Bracket, center and rear.	4	2.43
...	Q 4050	Cap screw, 1/2" N.F. x 7/8"	6	.099
...	Q 1848	Cap screw, 1/2" N.C. x 1"	2	.106
...	Q 1909	Hex. nut, 1/2" N.F.	6	.069
...	Q 1922	Lock washer, 1/2"	8	.013

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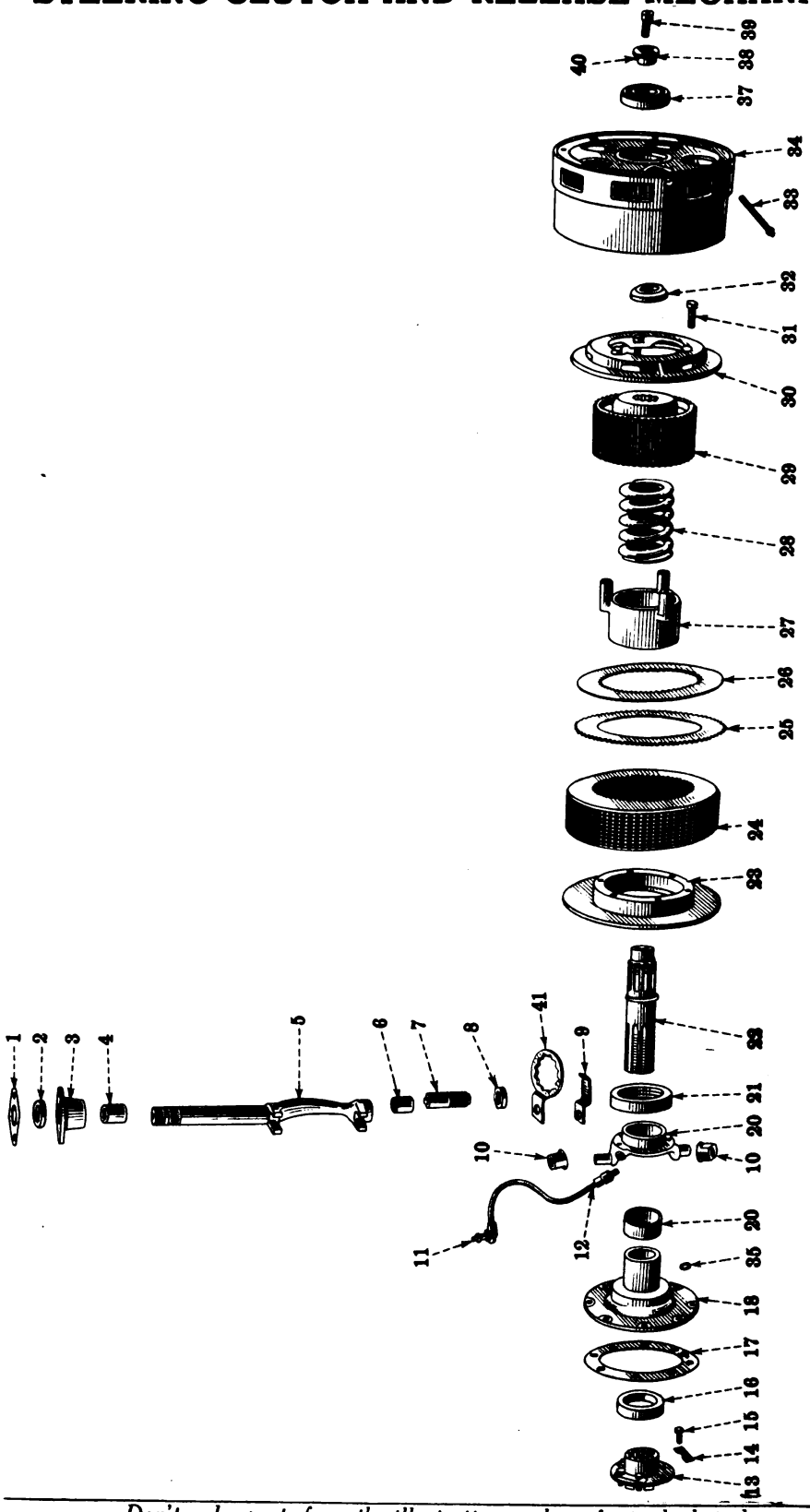
Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

SEAT AND FENDERS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
7	53760 D	Bracket, front.	2	3.50
...	.....	Cap screw, 1/2" N.C. x 1-1/8"	6	.120
...	Q 4020	Cap screw, 3/8" N.F. x 5/8"	4	.041
...	Q 1905	Hex. nut, 3/8" N.F.	4	.031
...	Q 1920	Lock washer, 3/8"	4	.005
...	Q 1922	Lock washer, 1/2"	6	.013
8	53730 D	Seat cushion, bottom.	1	14.18
9	53755 DX	Fender side sheet, right hand	1	8.50
...	Q 4016	Cap screw, 3/8" N.C. x 5/8"	3	.041
...	Q 1799	Cap screw, 3/8" N.F. x 3/4"	4	.045
...	Q 1846	Cap screw, 1/2" N.C. x 3/4"	1	.092
...	Q 1905	Hex. nut, 3/8" N.F.	4	.031
...	.....	Washer, 13/32" I.D. x 7/8" O.D. x 16 ga.	7	.005
...	.....	Washer, 17/32" I.D. x 1" O.D. x 14 ga.	1	.007
...	Q 1920	Lock washer, 3/8"	7	.005
...	Q 1922	Lock washer, 1/2"	1	.013
10	54100 DX	Foot rest, right hand, complete	1	6.25
...	Q 4016	Cap screw, 3/8" N.C. x 5/8"	1	.041
...	Q 1920	Lock washer, 3/8"	1	.005
11	54097 DAX	Seat support, front, complete	1	6.50
...	Q 4021	Cap screw, 3/8" N.F. x 7/8"	4	.048
...	Q 1905	Hex. nut, 3/8" N.F.	4	.031
...	Q 1920	Lock washer, 3/8"	4	.005
12	54099 DX	Foot rest, left hand, complete.	1	5.50
...	Q 1804	Cap screw, 3/8" N.C. x 1-1/4"	1	.060
...	Q 1920	Lock washer, 3/8"	1	.005
13	52201 DX	Support, rear	1	2.62
14	54095 DXA	Seat side sheet, left hand.	1	17.00
...	Q 1799	Cap screw, 3/8" N.F. x 3/4"	2	.045
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	2	.045
...	Q 1905	Hex. nut, 3/8" N.F.	2	.031
...	Q 1920	Lock washer, 3/8"	4	.005
15	53756 D	End piece, left hand.	1	.75
...	Q 1845	Cap screw, 1/2" N.F. x 3/4"	1	.045
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	1	.045
...	Q 1909	Hex. nut, 1/2" N.F.	1	.069
...	.....	Washer, 17/32" I.D.x1" O.D.xNo. 14 gage .	1	
...	.....	Washer, 13/32" I.D.x7/8" O.D.xNo. 14 gage .	1	
...	Q 1920	Lock washer, 3/8"	1	.005
...	Q 1922	Lock washer, 1/2"	1	.013
16	53754 DX	Fender side sheet, left hand.	1	9.00
...	Q 4016	Cap screw, 3/8" N.C. x 5/8"	3	.041
...	Q 1799	Cap screw, 3/8" N.F. x 3/4"	4	.045
...	Q 1846	Cap screw, 1/2" N.C. x 3/4"	1	.092
...	Q 1905	Hex. nut, 3/8" N.F.	4	.031
...	.....	Washer, 13/32" I.D. x 7/8" O.D. x 16 ga.	7	.005
...	.....	Washer, 17/32" I.D. x 1" O.D. x 14 ga.	1	.007
...	Q 1920	Lock washer, 3/8"	7	.005
...	Q 1922	Lock washer, 1/2"	1	.013
17	53752 DA	Fender, left hand	1	23.00
...	.....	Carriage bolt, 3/8" N.C. x 5/8"	9	.046
...	Q 1906	Hex. nut, 3/8" N.C.	9	.031
...	Q 1920	Lock washer, 3/8"	9	.005
...	54098 DA	Tool box support.	2	.50

STEERING CLUTCH AND RELEASE MECHANISM



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

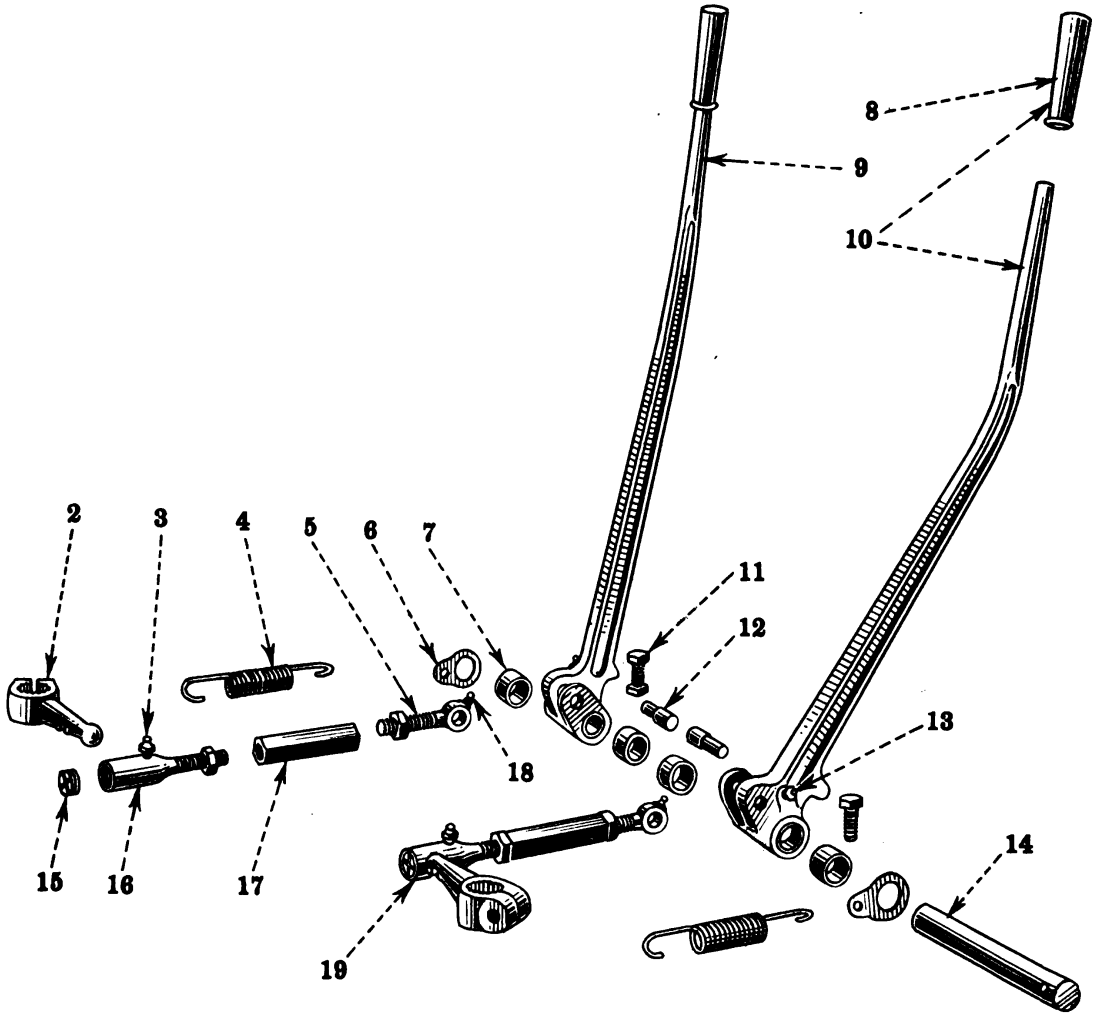
STEERING CLUTCH AND RELEASE MECHANISM - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	52242 DB	Steering clutch (includes Ref. Nos. 23 through 31). . .	1	100.00	20	52243 DAX	Release collar with bushing and pipe plug	2	3.06
					...	.....	Headless pipe plug, 1/8"	1	.014
1	46040 D	Felt retainer.	2	.078		47619 D	Release bearing (optional) (FAFNIR 1519). . .	2	2.75
...	Q 1832	Cap screw, 7/16" N.C. x 1-1/4" . . .	4	.084	21	55745 D			
...	Q 1921	Lock washer, 7/16" .	4	.01					
2	46038 D	Felt washer.	2	.00			Release bearing (optional) (AETNA-ED 2505). .	2	2.75
3	6376 DAX	Release shaft bearing with bushing. . . .	2	1.25	22	52240 DA	Clutch shaft.	2	9.00
4	53597 D	Bushing.	2	.12	23	6470 D	Hub plate	2	9.75
5	55959 DB	Release fork	2	5.125		Q 1830	Cap screw, 7/16" N.C. x 1". . . .	12	.073
6	55955 D	Pivot bushing.	2	.01	...				
7	55954 D	Release fork pivot . .	2	.62		Q 1921	Lock washer, 7/16".	12	.01
8	47726 D	Lock nut	2	.00	...		(See "Note" below)		
9	60095 D	Pivot lock	2	.06	24	.....	Disc (external teeth)	2	5.37
...	Q 1848	Cap screw, 1/2" N.C. x 1".	1	.106	25	46826 D	Disc (internal teeth)	20	1.75
					26	46825 DA		22	1.00
...	Q 1922	Lock washer, 1/2". .	1	.013	27	8236 D	Spring retainer . . .	2	7.25
10	42298 DB	Release pin bushing. .	4	.12	28	54610 DA	Pressure spring . . .	2	5.37
11	Q 3617	Lubricator (Lincoln No. 5003)	2	.03	29	8238 DA	Hub	2	29.00
					30	8237 DA	Plate	2	13.25
12	52244 DX	Grease tube, coupling and bracket . . .	2	.01	31	54969 D	Dowel bolt.	6	.09
...	.....	Square head bolt, 1/4" N.C. x 3/4". .	4	.012	...	Q 1921	Lock washer, 7/16".	6	.01
...	Q 1902	Hex. nut, 1/4" N.C.	4	.007	32	52239 D	Bearing spacer. . . .	2	.00
...	Q 1918	Lock washer, 1/4". .	4	.002	33	46831 D	Lubricator.	2	.12
...	.....	Pipe nipple, 1/8". .	2	.015	34	8235 D	Drum.	2	44.25
13	52241 D	Coupling (6 teeth) . .	2	3.25	...	.....	Cap screw, 7/16" N.F. x 1". . . .	16	.073
14	48230 DA	Bolt lock.	6	.25	...	Q 1921	Lock washer, 7/16".	16	.01
15	50398 D	Coupling bolt.	12	.12	35	41634 H	Cage cap lock washer.	16	.00
16	52869 D	Oil seal	2	.03	37	53389 D	Pilot bearing	2	1.03
17	46851 D	Gasket	2	.87	38	50098 DA	Retainer.	2	.18
18	8239 DX	Bearing cage cap with oil seal.	2	8.00	39	50098 DAX	Retainer with pin . .	2	.18
					...	50099 D	Retainer bolt	2	.12
...	Q 1852	Cap screw, 1/2" N.C. x 1-1/2".	8	.134	40	Q 1922	Lock washer, 1/2" .	2	.013
					41	57750 D	Pin	2	.00
...	.....	Hex. jam nut, 1/2" N.F.	8	.069		60096 D	Pivot nut lock. . . .	2	.12

NOTE: This assembly is made up of a group of discs (Ref. Nos. 25 and 26).

SPARE PARTS CATALOG

STEERING CLUTCH CONTROLS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

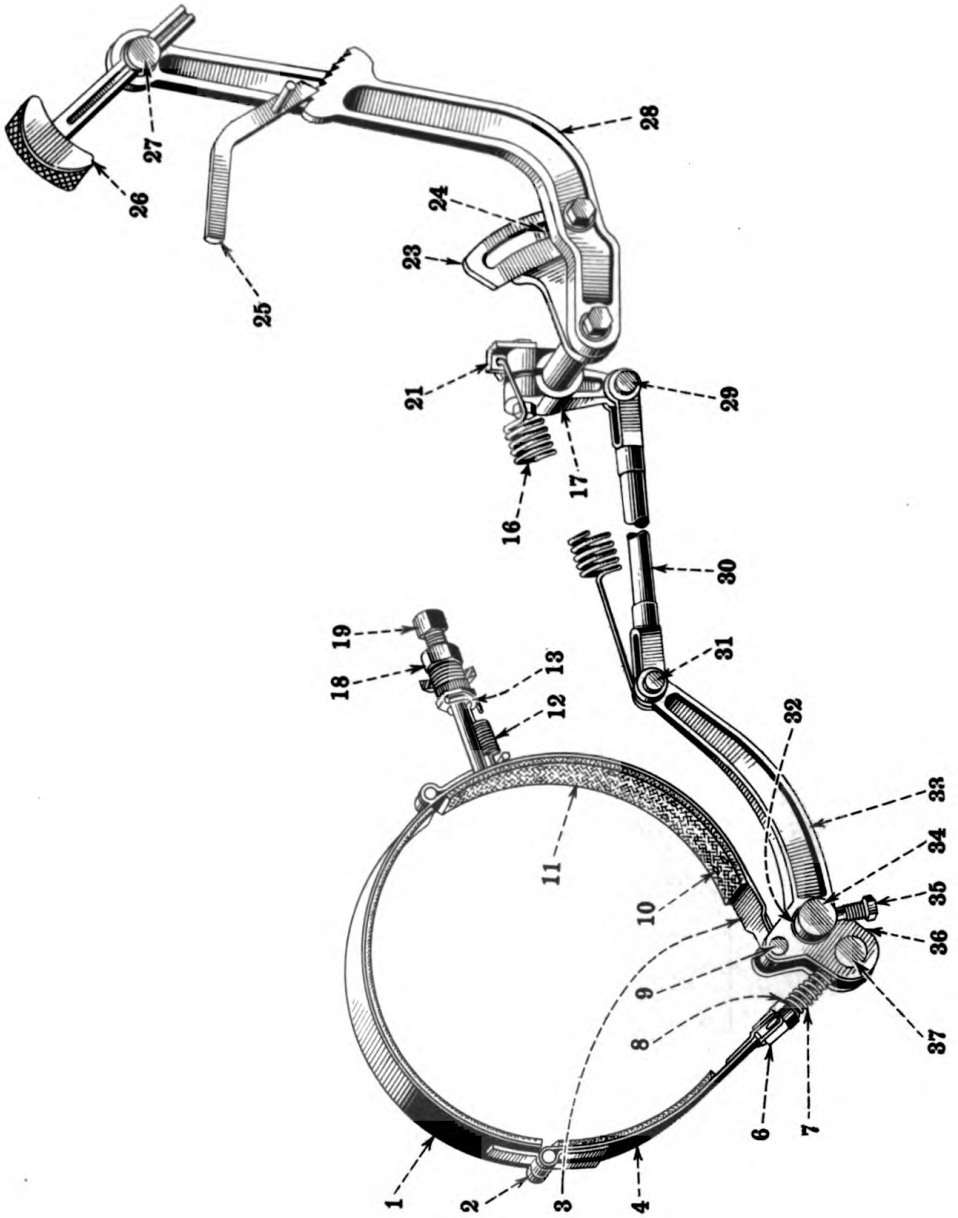
Don't order parts from the illustrations only; refer to the list also.

STEERING CLUTCH CONTROLS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
2	59317 D	Release lever	2	.12
...	Q 1857	Cap screw, 1/2" N.F. x 2-1/4"	2	.175
...	Q 1909	Hex. nut, 1/2" N.F.	2	.069
...	Q 1922	Lock washer, 1/2"	2	
3	14186 DA	Lubricator (Alemite No. 1610) (optional)	2	.01
	Q 3615	Lubricator (Lincoln No. 5000) (optional)	2	.01
4	59315 D	Return spring	2	.25
5	59309 DX	Turnbuckle eye.	2	.37
...	.....	Hex. jam nut, 5/8" N.F. left hand thread.	2	.078
6	53595 D	Spring anchor	2	.31
7	42175 D	Bushing	4	.06
8	41597 D	Engine clutch lever handle (rubber)	2	.15
9	8944 DX	Steering clutch hand lever, left hand, with bushings and rubber handle (see 9639 DX)	1	5.75
	9639 DX	Steering clutch hand lever, left hand, with bushings and steel handle (optional in place of 8944 DX and 41597 D).	1	
10	8945 DX	Steering clutch hand lever, right hand, with bushings and rubber handle (see 9640 DX)	1	5.50
	9640 DX	Steering clutch hand lever, right hand, with bushings and steel handle (optional in place of 8945 DX and 41597 D)	1	
11	Q 1850	Cap screw, 1/2" N.C. x 1-1/4"	2	.120
...	.....	Hex. jam nut, 1/2" N.C.	2	.046
12	59310 D	Eye pin	2	.18
13	14186 DA	Lubricator (Alemite No. 1610) (optional)	2	.01
	Q 3615	Lubricator (Lincoln No. 5000) (optional)	2	.01
14	53600 D	Hand lever shaft.	1	1.75
...	Q 1784	Cap screw, 5/16" N.C. x 2".	1	.259
...	Q 1919	Lock washer, 5/16".	1	
15	59314 D	Turnbuckle socket plug.	2	.06
...	.....	Cotter, 1/8 x 1-1/2".	2	
16	59312 D	Socket, left hand	1	.50
...	.....	Hex. jam nut, 5/8" N.F.	1	.078
17	59311 D	Turnbuckle.	2	.50
18	59318 D	Lubricator (Lincoln No. 5026) (optional)	2	
	59319 D	Lubricator (Alemite No. 1633) (optional)	2	
19	59313 D	Socket, right hand.	1	.50
...	.....	Hex. jam nut, 5/8" N.F.	1	.078

SPARE PARTS CATALOG

STEERING BRAKES AND CONTROLS



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

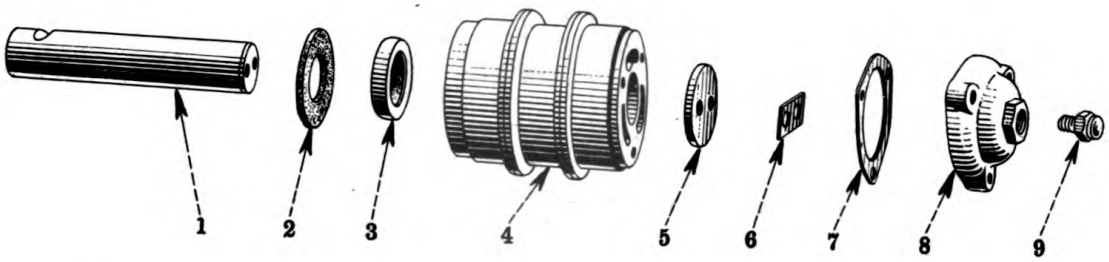
STEERING BRAKES AND CONTROLS - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	**53520 DA**	**Steering brake band assembly, includes Ref. Nos. 1,2,3,8, 9 and 10. . . . . .**	**2**	**6.75**	24	53514 D	Adjuster lock	2	1.50
					25	{53506 D 53507 D	Pawl, left hand . . . Pawl, right hand. . .	1 1	.75 .75
					...	.....	Cotter, 1/8 x 5/8".	1	
1	47958 DXA	Band with lining and rivets, center. . .	2	2.00	26	8625 D	Pedal pad and rod . .	2	2.00
					27	46275 D	Swivel.	2	.25
2	47962 D	Joint pin.	4	3.25	...	Q 1911	Hex. nut, 5/8" N.F.	2	.127
...	.....	Cotter, 3/32 x 1".	4		...	Q 1925	Lock washer, 5/8"	2	
3	53489 DXA	Band with lining and rivets, front . .	2	2.25	28	{8440 D 8441 D	Brake pedal, left hand . . . . . . Brake pedal, right hand	1	5.50
4	47959 DXA	Band with lining and rivets, rear. . . .	2	2.50	...	Q 1851	Cap screw, 1/2" N.F. x 1-1/2". .	2	.134
6	46028 D	Spacer	2	.03	...	Q 1863	Cap screw, 1/2" N.F. x 3". . . .	2	.217
7	46029 D	Release spring . . .	2	.01					
8	41509 D	Release spring washer.	2	.00	...	Q 1922	Lock washer, 1/2"	4	
9	57905 D	Pin.	2	.12	...	15041 H	Pin	2	.08
10	{21406 H short) {21444 H long)	Lining rivet (3/8"	76	.00	29	53508 DX	Brake rod and yoke.	2	1.87
					30	15041 H	Pin	2	
		Lining rivet (1/2"	8	.00	31	.....	Cotter, 1/8 x 3/4".	1	
11	47961 DA	Lining	6	.75	...	46023 D	Bushing	4	.05
12	{56475 D {56479 D	Anchor spring. . . .	2	.00	32	8439 DAX	Pivot lever with bushing.	2	3.00
13	56477 D	Spring hook.	4	.00	33	48045 D	Pivot shaft	2	1.50
16	53495 D	Spring	2		34	46025 D	Shaft stud.	2	.17
17	8444 D	Lever.	2	.62	35	Q 1922	Lock washer, 1/2"	2	
...	Q 1857	Cap screw, 1/2 x 2-1/4" N.F. . . .	2	.175	36	46027 D	Bolt.	2	.50
...	Q 1909	Hex. nut, 1/2" N.F.	2	.069	...	Q 1909	Hex. nut, 1/2" N.F.	2	.069
...	Q 1922	Lock washer, 1/2".	2		37	41508 D	Adjusting pin . . .	2	.50
18	46022 D	Spring anchor. . . .	2	.25	...	20841 D	Steering brake lever key.	2	.03
...	.....	Hex. jam nut, 1"N.C.	2	.262	...	41519 D	Steering brake pedal shaft dirt seal.	2	.01
...	.....	Lock washer, 1". . .	2						
19	53490 D	Set screw.	2	.50	...	48044 D	Steering brake inspection cover . .	2	6.00
...	Q 1912	Hex. nut, 5/8" N.C.	2	.127					
21	53497 D	Spring anchor. . . .	2	.09	...	Q 1802	Cap screw, 3/8" N.C. x 1". . . .	14	.052
	{53503 D left hand {53504 D right hand.	Shaft and adjuster, ...	1	.75	...	Q 1920	Lock washer, 3/8"	14	
23		Shaft and adjuster, ...	1	2.00					

MEMORANDA

SPARE PARTS CATALOG

TRACK IDLER



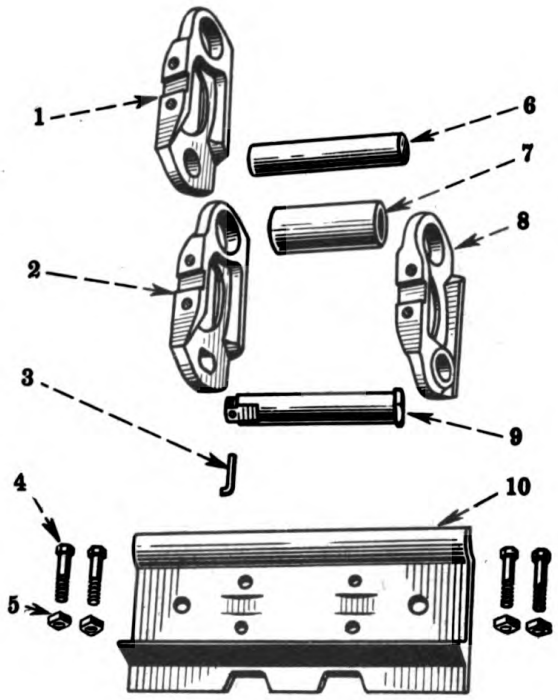
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	47558 D	Shaft.	4	5.75
2	47334 D	Felt washer.	4	.02
3	18558 D	Oil seal	4	.18
4	8403 DX	Idler, with oil seal	4	15.00
5	41431 D	Thrust washer.	4	.50
...	Q 1849	Cap screw, 1/2" N.F. x 1-1/4".	8	.120
6	35089 DA	Screw lock	4	.02
7	48229 D	Gasket	4	.01
8	6637 D	Cap.	4	2.75
...	Q 1852	Cap screw, 1/2" N.C. x 1-1/2".	12	.134
...	Q 1922	Lock washer, 1/2".	12	
9	37290 D	Lubricator (Lincoln No. 5750). .	4	.12

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

TRACK LINK PIN AND SHOE ASSEMBLY

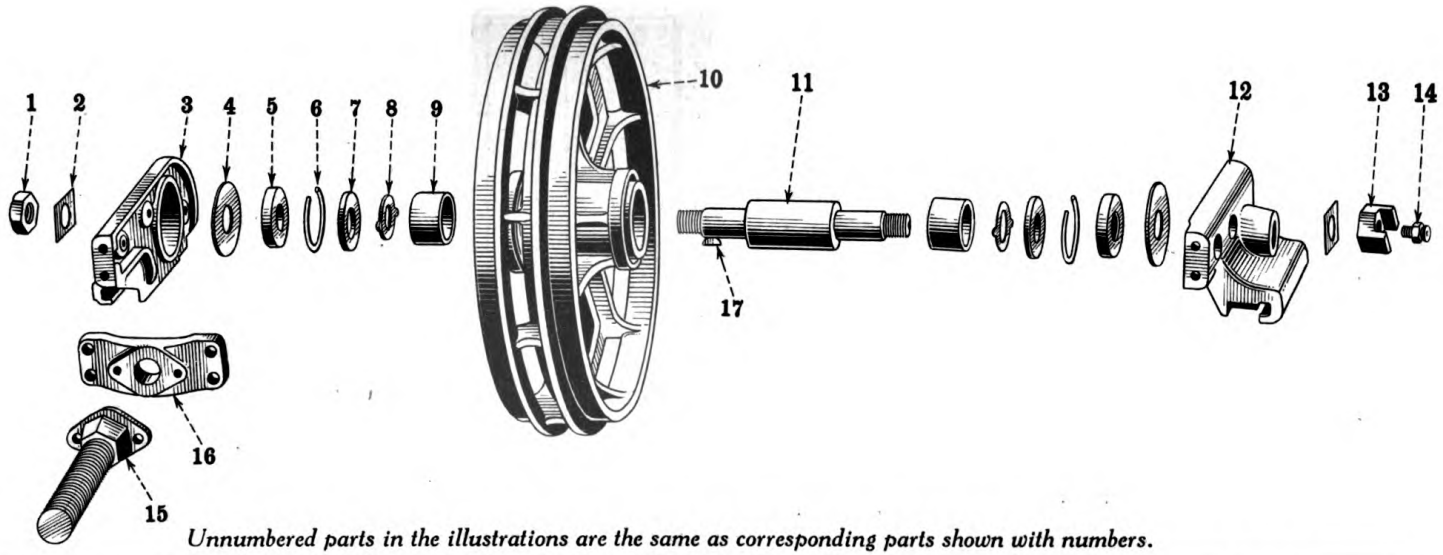


Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
...	65111 D	Track.	2	440.00
...	65113 D	Track with 16" shoes, complete .	2	1010.00
1	53246 DA	Link, right hand	64	4.25
2	53247 DA	Master link.	2	4.37
3	43712 DB	Lock wire.	2	.03
4	49362 D	Bolt	264	3.50
5	60221 DA	Nut.	264	.11
6	53249 DA	Pin.	64	2.75
7	53248 D	Bushing.	66	2.25
8	53245 DA	Link, left hand.	66	4.25
9	53250 D	Master link pin.	2	2.75
10	49467 DB	Shoe, 16".	66	15.00

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also:



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	15644 D	Nut, inner.	2	.56	12	8417 DB	Guide, outer (right hand).	1	24.00
2	45797 D	Nut lock.	4	.08		8417 DB	Guide, inner (left hand).	1	24.00
3	8415 DB	Guide, inner (right hand).	1	24.00	13	18573 DA	Nut, outer.	2	.68
	8415 DB	Guide, outer (left hand).	1	24.00	14	37290 D	Lubricator (Lincoln No. 5750).	2	.12
4	53360 D	Felt washer	4	.03	15	48040 DA	Adjuster and rod. . .	2	3.31
5	53358 DA	Oil seal.	4	.43	...	.....	Cadmium plated cap screw, 1/2" N.F. x 1-1/4"	4	.120
6	60573 D	Snap ring	4	.08	...	.....	Cadmium plated lock washer, 1/2" . . .	4	.013
7	53362 D	Retainer.	4	.50	16	53398 D	Cross plate	2	7.25
8	53369 DAX	Thrust washer (set of 2)	2	.09	...	Q 1874	Cap screw, 5/8" N.C. x 2".	8	.259
9	53400 DX	Bushing (set of 2). .	2	.39	...	Q 1925	Lock washer, 5/8" .	8	.013
10	8419 DX	Idler, with bushings and oil seals. . .	2	105.00	17	SA 3215	Key (Woodruff No. G).	2	.062
11	53395 DA	Shaft, complete . . .	2	9.12					

SPARE PARTS CATALOG

TRACK ROLLERS

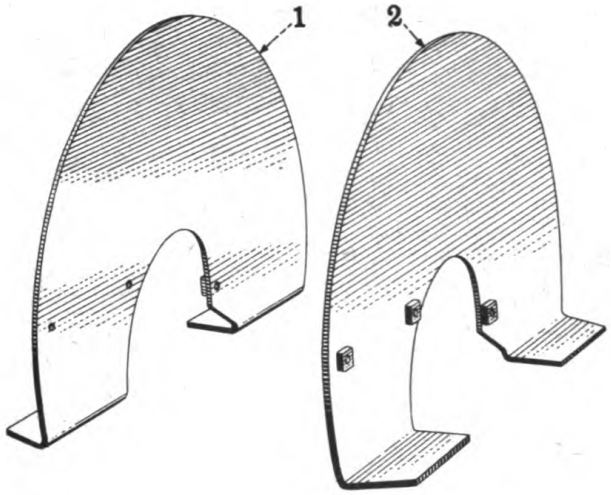
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.	Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	8404 D	Bracket, inner. . .	8	3.75		53365 DA	Roller (single flange)(includes Ref. Nos. 2 thru 9 and 12). . . .	4	43.00
...	.....	Cap screw, 1/2" N.F. x 1-5/8". .	16	.148					
...	Q 1909	Hex. nut, 1/2" N.F.	16	.069	11	53367 D	Roller (single flange)(includes Ref. Nos. 5 and 9)	4	34.00
...	Q 1922	Lock washer, 1/2"	16						
2	53360 D	Felt washer, outer.	16	.03					
3	53361 D	Felt washer, center	16	.03					
4	53359 D	Cork washer, inner.	16	.02	12	53370 D	Shaft	8	8.25
5	53358 DA	Oil seal.	16	.43	13	8405 D	Bracket, outer. .	8	4.37
6	60573 D	Snap ring	16	.08	...	.....	Cap screw, 1/2" N.F. x 1-5/8". .	16	.148
7	53362 D	Retainer.	16	.50	...	Q 1909	Hex. nut, 1/2" N.F.	16	.069
8	53369 DAX	Thrust washer set.	8	.09	...	Q 1922	Lock washer, 1/2"	16	
9	53372 DX	Bushings (set of 2)	8	.50	14	37290 D	Lubricator (Lincoln No. 5750). . . .	8	.12
	53366 DA	Roller (double flange)(includes Ref. Nos. 2 thru 9 and 12). . . .	4	52.00					
10	53368 D	Roller (double flange)(includes Ref. Nos. 5 and 9)	4	42.00					

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

FRONT IDLER SHIELD ATTACHMENT (53980 D)



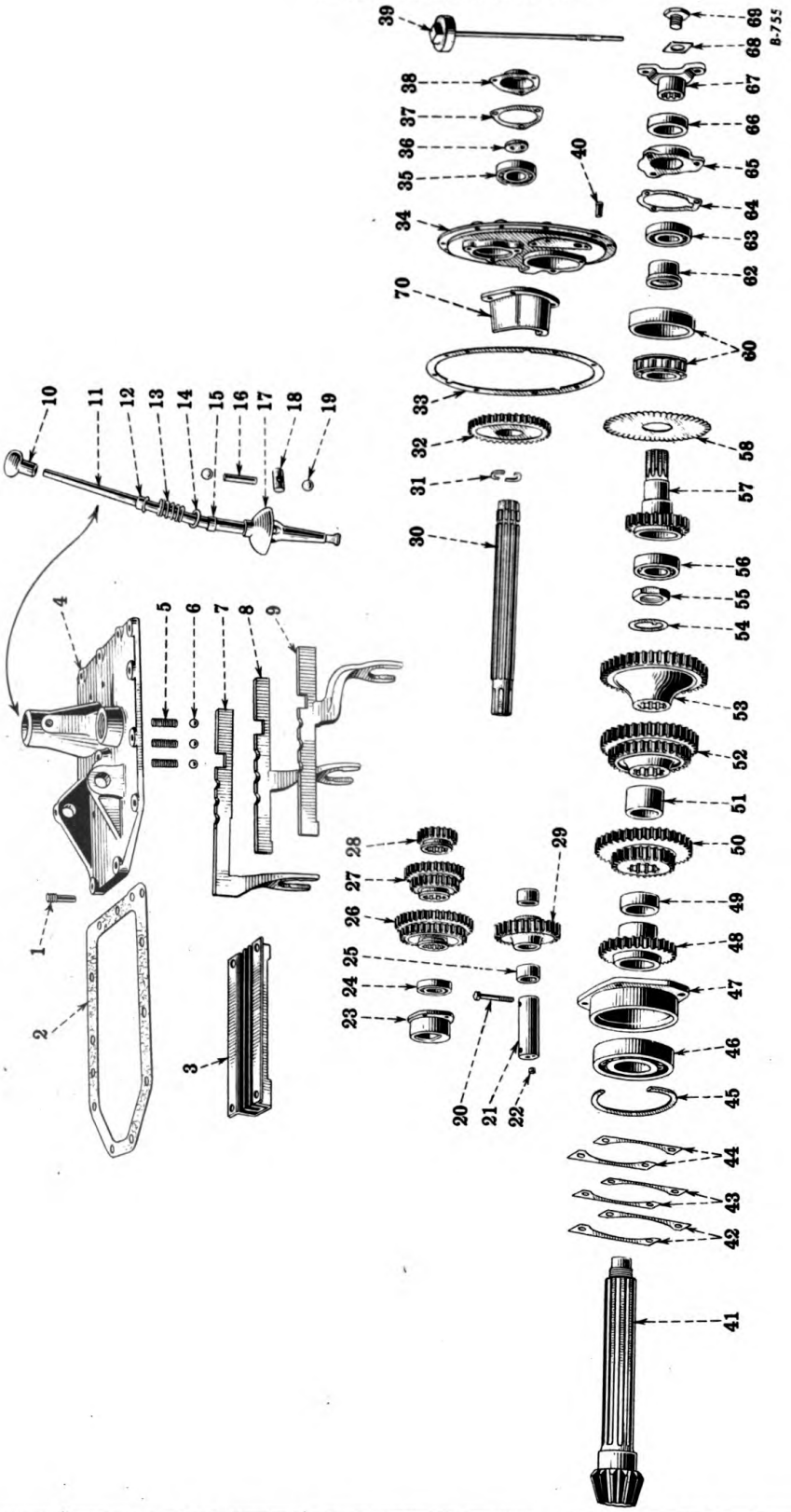
Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	53978 D	Front idler shield, left hand, outer, and right hand, inner .	2	15.62
...	Q 1833	Cap screw, 7/16" N.F. x 1-1/2".	6	.094
...	Q 1921	Lock washer, 7/16".	6	
2	53979 D	Front idler shield, right hand, outer, and left hand, inner. .	2	15.62
...	Q 1833	Cap screw, 7/16" N.F. x 1-1/2".	6	.094
...	Q 1921	Lock washer, 7/16".	6	

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

TRANSMISSION



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

TRANSMISSION - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	18585 DA	Dowel	2	.12
2	53486 D	Gasket	1	.07
3	63320 D	Rail guide assembly	1	1.25
...	Q 1800	Cap screw, 3/8" N.C. x 3/4"	4	.172
4	8438 DAX	Housing	1	24.56
...	Q 1836	Cap screw, 7/16" N.C. x 1-3/4"	5	.105
...	.....	Cap screw, 7/16" N.C. x 1-3/8"	4	.094
...	Q 1921	Lock washer, 7/16"	9	.01
5	64163 D	Poppet spring	3	.01
6	4596	Poppet ball (optional)	3	.01
	13722 D	Poppet ball (optional)	3	
7	53480 DA	Shifter rail - 4th and 5th	1	1.50
8	53491 DA	Shifter rail - 2nd and 3rd	1	1.43
9	63317 D	Shifter rail - 1st and reverse	1	1.50
10	53717 DA	Shifter lever ball (rubber) (used with 47585 DAX and 47585 DA) (see 67349 DX - Reference No. 11)	1	.18
	9637 D	Shifter lever ball (cast iron) (use with lever 67349 DX)	1	
11	47585 DA	Shifter lever (less rubber ball)	1	2.00
	47585 DAX	Shifter lever with plug (less rubber ball)	1	2.25
	67349 DX	Shifter lever with cast iron ball (optional in place of 47585 DAX and 53717 D)	1	
12	11373 D	Spring stop, upper	1	.031
...	.....	Rd. hd. rivet, 3/16 x 1-1/4"	1	
13	29547 D	Spring	1	.062
14	17700 D	Spring stop, lower	1	.01
15	20887 DA	Shield bushing	1	.01
16	40466 DX	Swivel shaft, small	1	.08
17	42496 DX	Swivel housing shield	1	.50
18	40465 DX	Swivel shaft, large	1	.15
19	13115 D	Plug	1	.005
20	4457 D	Bolt	1	.09
...	.....	Castle hex. nut, 3/8" N.F.	1	.016
...	.....	Cotter, 3/32 x 3/4"	1	.002
21	46905 DX	Reverse idler shaft	1	3.25
22	45361 D	Plug	1	.00
23	6477 D	Bearing cage	1	1.31
...	Q 4017	Cap screw, 3/8" N.C. x 7/8"	3	.048
...	Q 1920	Lock washer, 3/8"	3	.005
24	17767 D	Bearing, rear (New Departure No. 3208) (optional)	1	.812
	ST 215	Bearing, rear (IHC) (optional)	1	.812
25	46904 DR	Bushing	2	.18
26	56188 D	4th and 5th speed gear (33 and 38 teeth)	1	13.81
27	63256 D	2nd and 3rd speed gear (24 and 29 teeth)	1	21.50
28	52216 D	1st and reverse speed gear (19 teeth)	1	2.00
29	52237 DX	Reverse idler	1	7.50
30	52220 D	Spline shaft	1	13.00
31	53632 DX	Split collar	1	.09
32	52211 D	Driven gear (39 teeth)	1	6.50
33	46918 D	Gasket	1	.06
34	6480 DC	End cover	1	20.00
...	Q 1832	Cap screw, 7/16" N.C. x 1-1/4"	4	.084
...	Q 1907	Hex. nut, 7/16" N.F.	4	.047
...	Q 1921	Lock washer, 7/16"	8	.01

(Continued on next page)

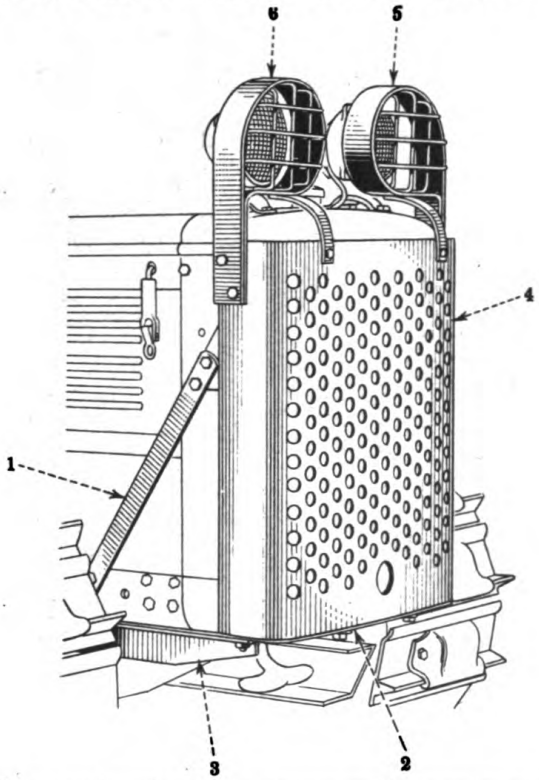
SPARE PARTS CATALOG

TRANSMISSION - Continued

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
35	17767 D	Bearing, front (New Departure No. 3208) (optional)	1	.812
	ST 215	Bearing, front (IHC) (optional)	1	.812
36	45357 D	Bearing retainer washer	1	.15
...	Q 1829	Cap screw, 7/16" N.F. x 1".	2	.073
...	Q 1921	Lock washer, 7/16".	2	.01
37	46913 D	Gasket.	1	.01
38	46912 D	Bearing retainer.	1	.50
...	Q 1800	Cap screw, 3/8" N.C. x 3/4".	3	.045
...	Q 1920	Lock washer, 3/8"	3	.005
39	53683 DA	Oil level rod	1	1.12
40	45132 D	Dowel	1	.06
41	60405 D	Bevel pinion and shaft with drive bevel gear	1	54.00
42	53635 D	Shim, heavy	2	.03
43	53636 D	Shim, medium.	2	.02
44	53637 D	Shim, light . . . As req'd		.01
45	53631 D	Snap ring	1	.12
46	21560 D	Bearing, rear	1	5.00
47	8465 D	Bearing cage.	1	4.37
...	Q 1852	Cap screw, 1/2" N.C. x 1-1/2".	4	.134
...	Q 1922	Lock washer, 1/2"	4	.013
48	56187 D	4th speed gear (32 teeth)	1	5.50
49	46857 D	Spacer, short	1	.75
50	52213 D	2nd and 5th speed gear (27 and 41 teeth)	1	11.00
51	46859 D	Spacer, long.	1	1.12
52	63255 D	3rd and reverse speed gear (35 and 41 teeth)	1	13.87
53	52215 D	1st speed gear (46 teeth)	1	10.25
54	46888 D	Lock washer	1	.12
55	46887 D	Lock nut.		.50
56	10691 V	Bearing (New Departure No. 1307) (optional)	1	1.07
	ST 200	Bearing (IHC) (optional).	1	1.07
57	52219 DB	Driving shaft and gear (26 teeth).	1	5.75
58	53633 DA	Oil slinger	1	.65
60	10733 V	Bearing (New Departure No. 1310) (optional)	1	
	ST 220	Bearing (IHC) (optional).	1	
62	6478 D	Spacer.	1	.84
63	17767 D	Bearing (New Departure No. 3208) (optional)	1	
	ST 215	Bearing (IHC) (optional).	1	
64	46916 D	Gasket.	1	.01
65	6479 DBX	Retainer.	1	.50
...	Q 1802	Cap screw, 3/8" N.C. x 1".	3	.052
...	Q 1920	Lock washer, 3/8"	3	.005
66	53634 D	Oil seal.	1	.31
67	52208 D	Coupling.	1	1.75
68	57792 DA	Lock.	1	.03
69	57793 D	Retaining screw	1	.37
70	8779 D	End cover oil pocket.	1	1.75
...	Q 4013	Cap screw, 5/16" N.C. x 7/8".	3	.033
...	Q 1919	Lock washer, 5/16".	3	.003
...	62779 D	Rail guide support bolt lock.	2	
...	62779 DX	Rail guide support bolt lock (set of 2)	1	.17

SPARE PARTS CATALOG

RADIATOR GUARD AND HEAD LAMP BRUSH GUARDS

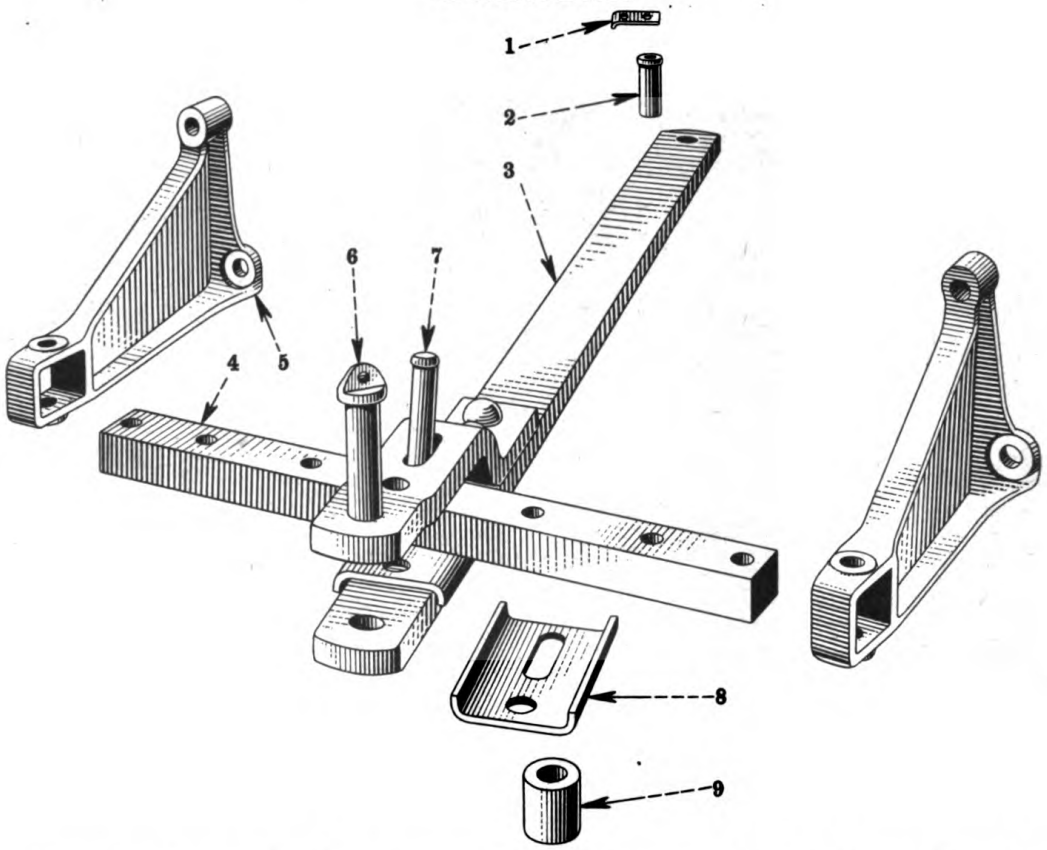


Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	48739 DX	Radiator guard brace.	2	4.25
...	Q 1851	Cap screw, 1/2" N.F. x 1-1/2" .	4	.134
...	Q 1853	Cap screw, 1/2" N.F. x 1-3/4" .	4	.148
...	Q 1909	Hex. nut, 1/2" N.F.	8	.069
...	Q 1922	Lock washer, 1/2"	8	
2	53942 D	Radiator guard support bracket, left hand.	1	11.50
...	Q 1867	Cap screw, 5/8" N.F. x 1-1/4" .	3	.194
...	Q 1911	Hex. nut, 5/8" N.F.	3	.127
...	Q 1925	Lock washer, 5/8"	3	
3	53943 D	Radiator guard support bracket, right hand	1	11.50
...	Q 1867	Cap screw, 5/8" N.F. x 1-1/4" .	3	.194
...	Q 1911	Hex. nut, 5/8" N.F.	3	.127
...	Q 1925	Lock washer, 5/8"	3	
4	62543 DX	Radiator guard.	1	80.00
...	Q 1857	Cap screw, 1/2" N.F. x 2-1/4" .	4	.175
...	Q 1922	Lock washer, 1/2"	4	
5	62530 D	Head lamp brush guard, left hand.	1	12.62
...	Q 1851	Cap screw, 1/2" N.F. x 1-1/2" .	3	.134
...	Q 1909	Hex. nut, 1/2" N.F.	3	.069
...	Q 1922	Lock washer, 1/2"	3	
6	62531 D	Head lamp brush guard, right hand	1	12.62
...	Q 1851	Cap screw, 1/2" N.F. x 1-1/2" .	3	.134
...	Q 1909	Hex. nut, 1/2" N.F.	3	.069
...	Q 1922	Lock washer, 1/2"	3	

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

DRAWBAR



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Description	No. Used	Wt. Lbs.
1	47772 D	Pivot pin lock.	1	.11
...	Q 1801	Cap screw, 3/8" N.F. x 1" . . .	1	.052
...	Q 1920	Lock washer, 3/8"	1	
2	47771 D	Pivot pin	1	2.00
3	53921 D	Drawbar	1	90.00
...	.....	Round head rivet, 1 x 4-3/8". .	1	
4	47773 D	Guide	1	38.00
...	Q 4173	Cap screw, 7/8" N.F. x 4-1/2" .	2	.964
...	.....	Hex. nut, 7/8" N.F.	2	.313
...	Q 1929	Lock washer, 7/8"	2	
5	52205 D	Guide bracket	2	23.00
...	Q 1913	Hex. nut, 3/4" N.F.	6	.201
...	Q 1927	Lock washer, 3/4"	6	
6	47776 D	Clevis pin.	1	3.00
7	47775 D	Stop pin.	1	1.25
...	.....	Cotter, 1/4 x 1-1/2".	1	
8	53925 D	Clevis wear plate	2	2.00
...	.....	Cap screw, 1" N.F. x 6-1/4" . .	1	
...	.....	Hex. nut, 1" N.F.	1	.442
...	.....	Lock washer, 1"	1	
9	53924 D	Jaw spacer.	1	1.00

When ordering, always use I H C Part Nos.

Don't order parts from the illustrations only; refer to the list also.

HOOD

I H C Part No.	Description	No. Used	Wt. Lbs.
51547 D	Engine side sheet	2	11.00
Q 1800	Cap screw, 3/8" N.C. x 3/4"	10	.045
Q 1920	Lock washer, 3/8"	10	.005
58322 DX	Hood sheet.	1	21.00
Q 1800	Cap screw, 3/8" N.C. x 3/4"	4	.045
.....	Slotted flat head bolt, 3/8" N.C. x 3/4"	2	
.....	Washer, 13/32" I.D. x 7/8" O.D. x 16 ga.	4	.005
Q 1906	Hex. nut, 3/8" N.C.	2	.031
Q 1920	Lock washer, 3/8"	8	.005
.....	Slotted flat head bolt, 3/8" N.C. x 1-3/8"	2	

OIL PRESSURE INDICATOR AND CONNECTIONS

I H C Part No.	Description	No. Used	Wt. Lbs.
29898 D	Indicator tube coupling nut	2	.015
29901 DX	Coupling half union with nut (in engine crankcase)	1	.062
29901 D	Coupling half union nut (in engine crankcase).	1	.031
41934 DB	Oil pressure indicator.	1	.50
57728 DX	Indicator tube (to engine) with coupling nuts	1	.37

DASH AND COWL ASSEMBLY

I H C Part No.	Description	No. Used	Wt. Lbs.
55754 D	Dash spacer	2	24.00
58318 DA	Dash and cowl assembly.	1	24.00
Q 1852	Cap screw, 1/2" N.C. x 1-1/2"	2	.134
Q 1922	Lock washer, 1/2"	2	.031

STARTING CRANK

I H C Part No.	Description	No. Used	Wt. Lbs.
55911 DX	Starting crank.	1	
6935 D	Starting crank ratchet.	1	.87
57925 D	Starting crank mounting bracket, complete	1	.41
Q 1836	Cap screw, 7/16" N.C. x 1-3/4".	2	.10
Q 1921	Lock washer, 7/16".	2	
.....	Round head rivet, 3/16 x 3/8"	4	
52823 D	Starting crank mounting bracket spacer. .	2	.03
G 3754	Starting crank ratchet pin.	1	.062

GASKET PACKAGES

I H C Part No.	Description	No. Used	Wt. Lbs.
68059 D	Engine overhaul gasket package.	1	4.50
68087 D	Chassis gasket package.	1	4.25

SPROCKET ROCK DEFLECTOR ATTACHMENT (54092 D)

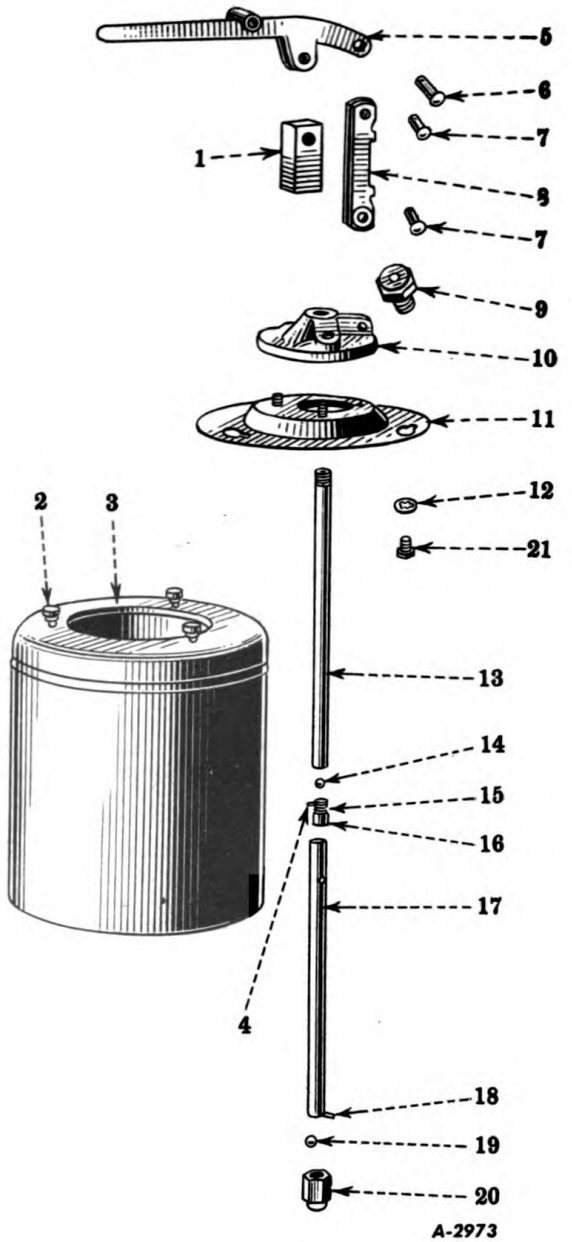
I H C Part No.	Description	No. Used	Wt. Lbs.
54089 DX	Sprocket rock deflector, complete, left hand	1	10.75
Q 1864	Cap screw, 1/2" N.C. x 3"	3	.217
Q 1922	Lock washer, 1/2"	3	
54090 DX	Sprocket rock deflector, complete, right hand	1	
Q 1864	Cap screw, 1/2" N.C. x 3"	3	.217
Q 1922	Lock washer, 1/2"	3	

TOOLS AND TOOL BOX

I H C Part No.	Description	No. Used	Wt. Lbs.
8244 D	Steering clutch compressor tool	1	3.00
11858 DA	Water pump wrench	1	.15
19289 D	Hexagon socket wrench, 9/16".	1	.22
19291 D	Hexagon socket wrench, 5/8"	1	.31
19292 D	Hexagon socket wrench, 3/4"	1	.43
19323 D	Socket wrench handle (combination offset and T)	1	1.375
19324 D	Hexagon socket wrench, 7/8"	1	.218
19325 D	Hexagon socket wrench, 13/16"	1	.183
19326 D	Hexagon socket wrench, 1"	1	.25
19327 D	Hexagon socket wrench, 1-1/8"	1	.375
19328 D	Socket wrench set carrying case	1	.906
19329 D	Socket wrench set, complete (in carrying case).	1	4.093
20156 D	Square drain plug socket wrench, 1/2" (for countersunk plugs).	1	.12
20157 D	Square drain plug socket wrench, 11/16" (for countersunk plugs).	1	.17
65064 D	Breaker point and spark plug gauge, complete.	1	.004
32941 D	Spark plug wrench, 15/16"	1	.25
51511 D	Lubricator, tank type, 25 lb. capacity (Lincoln No. 1261 H) *(see Detail List on pages 7 and 8)*.	1	17.00
52276 D	Steering clutch compressor tool cap screw	2	.17
51915 D	Tool box.	1	10.50
1326 E	End wrench, 3/4" - 7/8"	1	.56
H 156	Oil can	1	.94
Q 3794	Hand lubricator, 9 ounce (Lincoln No. 1020) *(see Detail List on page 9)* . . .	1	2.25
2583 T	Ball peen hammer (1-1/2 lb.).	1	1.87
2584 T	Monkey wrench, 21" (optional with 9533 D)	1	
2587 T	Combination slip joint pliers, 8"	1	.56
2588 T	Screw driver (5" wood handle)	1	.31
9533 D	Open end wrench, 2-1/4"	1	7.05

SPARE PARTS CATALOG

DETAIL PARTS OF BUCKET LUBRICATOR



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Don't order parts from the illustrations only; refer to the list also.

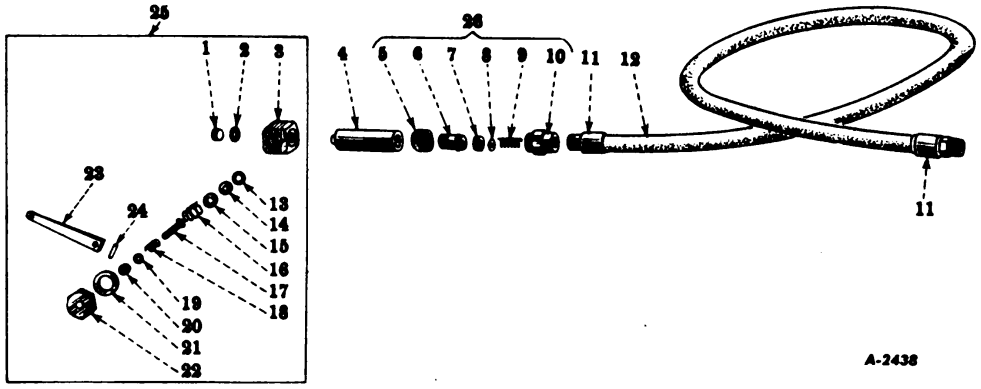
SPARE PARTS CATALOG

DETAIL PARTS OF BUCKET LUBRICATOR - Continued

Ref. No.	I H C Part No.	Lincoln Engr. Co. No.	Description	No. Used	Wt. Lbs.
...	51511 D	C-1261IH	Bucket lubricator (with hose and coupler) (Lincoln - 25 lb. capacity)	1	17.00
...	53208 D	A-81-240	Pump assembly (as illustrated less Ref. Nos. 2 and 3). .	1	3.00
...	55481 D	A-1260IH	Bucket lubricator, less hose and coupler (as illustrated)	1	14.50
1	53202 D	A-11-551	Pump outlet	1	.37
2	55479 D	A-11-225	Cover screw	3	.04
3	53209 D	A-81-241	Container	1	7.00
4	53200 D	A-11-174	Piston pin.	1	.04
5	55482 D	B-40-214	Lever handle.	1	1.75
6	40635 D	A-10-326	Handle pin.	1	.06
...	.....	.....	Cotter, 1/32 x 1/2"	1	
7	40638 D	A-10-472	Toggle pin.	2	.03
...	.....	.....	Cotter, 3/32 x 1/2"	2	
8	52123 D	A-45-604	Toggle.	1	.25
9	37290 D	5750	Giant button head fitting (1/4" I.P.T.)	1	.12
10	62158 D	B-40-228	Pump casting.	1	
11	62159 D	A-45-620	Cover plate	1	
12	52745 V	66-170	Cover plate screw washer (Shakeproof No. 1214) . . .	3	
13	53205 D	A-62-099	Piston rod.	1	.37
14	39659 D	A-66-011	Piston check ball, 7/32". . .	1	.00
15	53198 D	A-11-172	Piston.	1	.03
16	53203 D	A-34-078	Piston packing.	1	.00
17	53206 D	A-62-100	Pump tube	1	.43
18	53201 D	A-11-175	Foot valve pin.	1	.00
19	H 5476	A-66-030	Check ball, 7/16"	1	
20	53199 D	A-11-173	Foot valve body	1	.12
21	.....	50-037	Pump casting screw.	3	

SPARE PARTS CATALOG

HOSE ASSEMBLY AND COUPLER FOR BUCKET LUBRICATOR (51511 D)



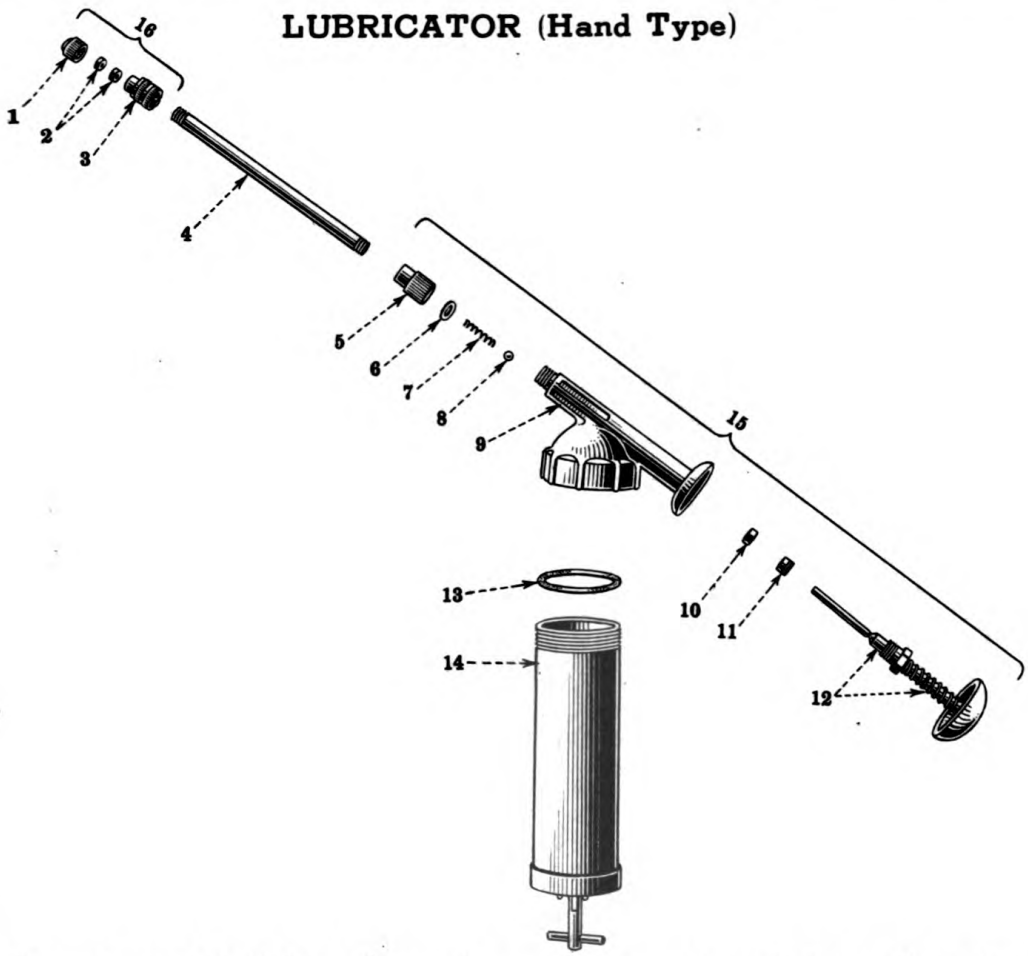
Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Lincoln Engr. Co. No.	Description	No. Used	Wt. Lbs.
...	53210 D	A-81-243	Hose assembly, complete as illustrated.	1	2.25
1	40649 D	A-10-618	Nozzle body plug.	1	.06
2	40657 D	A-31-016	Gasket.	1	.00
3	40648 D	A-10-617	Giant nozzle body	1	.31
4	53187 D	A-11-137	Coupler adapter	1	.37
5	40642 D	A-10-534	Swivel collar	1	.04
6	40641 D	A-10-533	Swivel stud	1	.09
7	40631 D	A-36-019	Cup leather	1	.00
8	40703 D	A-48-080	Swivel washer	1	.00
9	40713 D	A-56-014	Spring.	1	.00
10	40646 D	A-10-541	Swivel body	1	.10
11	40725 D	A-80-356	Hose fitting assembly	2	.15
12	53207 D	A-79-036	Hose (3 ft.).	1	1.12
13	40693 D	A-45-033	Washer.	1	.00
14	40661 D	A-34-037	Giant packing	1	.00
15	40636 D	A-10-450	Check seat.	1	.01
16	40712 D	A-55-067	Spring.	1	.00
17	40644 D	A-10-537	Plunger	1	.02
18	40711 D	A-55-063	Plunger spring.	1	.00
19	40700 D	A-48-077	Packing washer.	1	.00
20	40628 D	A-34-039	Packing	1	.00
21	40656 D	A-30-012	Gasket.	1	.00
22	40640 D	A-10-528	Packing gland	1	.09
23	53196 D	A-11-128	Handle.	1	.09
24	40647 D	A-10-551	Pin (for coupler plunger) . .	1	.00
25	40728 DA	A-81-219IH	Giant coupler (Ref. Nos. 1, 2, 3 and 13 through 24). .	1	.66
26	36947 D	A-80-353	Swivel (Ref.Nos. 5 through 10)	1	.26

Don't order parts from the illustrations only; refer to the list also.

SPARE PARTS CATALOG

LUBRICATOR (Hand Type)



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part No.	Lincoln Engr. Co. No.	Description	No. Used	Wt. Lbs.
...	Q 3794	No. 1020	Lubricator, complete (9 oz. capacity).	1	2.25
1	39653 D	A-10-733	Nozzle cap.	1	.01
2	39656 DX	A-34-050	Washer (set of 2)	1	.00
3	39652 D	10-539	Nozzle body	1	.02
4	.....	A-67-020	Standard pipe, 6"	1	
5	39875 D	A-10-453	Adapter	1	.03
6	39655 D	A-33-018	Gasket.	1	.00
7	39870 D	A-55-046	Check spring.	1	.00
8	39659 D	A-66-011	Check ball.	1	.00
9	39868 D	A-41-052	Pump body	1	.53
10	39665 D	A-34-034	Packing	1	.00
11	39651 D	A-10-492	Packing screw	1	.00
12	39663 D	89-975	Plunger assembly.	1	.22
13	39654 D	A-32-029	Gasket.	1	.00
14	39661 D	B-81903	Tube assembly	1	1.25
15	39662 D	89-974	Head assembly	1	.78
16	39800 D	A-5804-1	Nozzle, complete.	1	.05

Don't order parts from the illustrations only; refer to the list also.

LUBRICATION GUIDE KIT

(For Tractors used by the Corps of Engineers Only)

I H C Part No.	Description	No. Used
11232 GT	Kit holder bracket, front.	1
.....	Cap screw, 3/8" N.F. x 3/4".	1
.....	Hex. nut, 3/8" N.F.	1
.....	Lock washer, 3/8".	1
.....	Round head machine screw, 1/4" N.F. x 5/8" . .	3
.....	Hex. nut, 1/4" N.F.	3
.....	Lock washer, 1/4".	3
.....	Plain washer, 9/32" I.D. x 5/8" O.D. x No. 16 gage.	3
11233 GT	Kit holder bracket, rear	1
.....	Round head machine screw, 1/4" N.F. x 5/8" . .	3
.....	Hex. nut, 1/4" N.F.	3
.....	Lock washer, 1/4".	3
.....	Plain washer, 9/32" I.D. x 5/8" O.D. x No. 16 gage.	3
.....	*Lubrication Guide Kit (Consists of the following parts:).	1
.....	Metal bound lubrication guide.	1
.....	Lubrication check cards.	10
.....	Waterproof canvas holder	1

*Furnished by the Corps of Engineers.

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
D			
2370 DAX	1	1	$ 1.90
3723 DX	3	17	
4253 D	3	10	.55
4452 D	9	1	3.65
4457	13	1	.07
4596 D	9	1	.12
4596 D	13	1	.12
4819 D	3	3	.30
5961 DX	3	1	7.70
5977 D	3	1	.45
6288 D	8	1	.30
6289 D	8	1	.22
6297 D	1	3	.50
6376 DAX	11	1	1.00
6392 DX	3	4	1.30
6458 D	5	6	4.00
6470 D	11	1	3.55
6477 D	13	1	1.65
6478 D	13	2	.45
6482 DAY	2	2	6.60
6483 DY	2	2	1.75
6479 DBX	13	2	3.35
6480 DC	13	1	7.45
6498 DX	4	1	3.85
6518 DAX	1	1	2.05
6526 DAX	3	9	26.40
6534 DAX	3	10	1.65
6601 DDX	6	5	31.65
6602 DDX	6	5	31.65
6605 DA	6	5	4.30
6612 D	6	11	3.00
6624 DA	1	3	5.00
6625 DA	1	3	5.00
6626 DX	1	3	10.15
6627 DA	1	3	18.15
6633 DBX	8	2	1.20
6637 D	12	1	1.35
6649 D	8	2	.45
6676 DA	8	2	1.00
6745 D	2	8	1.75
6746 DX	2	8	1.10
6783 DX	2	2	2.20
6843 D	9	4	1.00
6935 D	14	4	1.00
8023 DX	1	1	7.45
8082 DX	2	3	3.30
8089 DAX	3	13	2.70
8113 DAX	3	11	3.85
8210 D	3	13	1.60
8232 D	5	4	.95
8235 D	11	1	17.35
8236 D	11	1	5.00
8237 DA	11	1	5.00
8238 DA	11	1	11.85
8239 DX	11	1	4.25
8244 D	14	5	1.50
8247 D	4	1	1.65
8286 DR	3	10	
8287 DR	3	10	6.00
8291 DX	3	13	5.00
8291 DY	3	13	11.00
8292 D	3	7	.35
8294 D	3	7	1.10
8303 DX	3	4	12.90
8305 D	8	1	2.10
8306 DAX	8	1	.65
8313 DAX	1	1	
8320 DBX	3	7	49.50
8321 DX	3	14	11.30
8322 DR	3	7	.95
8323 DCX	3	3	148.50
8323 DCZA	3	3	
8363 DAX	8	2	4.25
8391 DX	9	4	3.55
8392 DAX	9	4	4.65
8403 DX	12	1	$ 7.45
8405 D	12	4	3.00
8415 DB	12	3	8.30
8417 DB	12	3	8.30
8419 DX	12	3	34.65
8438 DAX	13	1	8.80
8439 DAX	11	5	3.00
8440 D	11	5	3.00
8441 D	11	5	3.00
8442 DAX	4	2	4.40
8444 D	11	5	.95
8451 DA	5	6	8.00
8455 D	5	1	2.10
8456 D	5	1	2.45
8457 D	5	1	12.65
8461 DAX	5	6	5.25
8465 D	13	2	2.45
8471 DA	6	9	2.75
8482 D	8	3	8.00
8482 D	3	17	8.00
8484 DAX	8	3	2.20
8487 DAX	6	5	28.00
8488 DAX	6	5	28.00
8489 DBX	6	7	8.00
8490 DBX	6	7	8.00
8491 DAX	6	7	6.00
8492 DAX	6	7	6.85
8493 D	6	11	.65
8505 D	3	10	5.35
8505 D	9	3	
8507 D	5	6	4.00
8508 DX	5	3	3.00
8509 D	5	6	2.45
8510 DX	5	3	3.00
8511 DAX	5	4	33.25
8512 DAX	5	4	15.65
8513 DA	5	4	13.25
		5	
8514 DBX	6	3	220.00
8516 D	5	6	4.00
8517 DAX	8	2	1.35
8527 DAX	3	10	17.00
8527 DAX	9	3	
8557 DX	7	7	5.00
8560 D	1	3	1.35
8566 DA	5	5	2.20
8575 D	5	5	
8625 D	11	5	.65
8722 DA	3	17	4.65
8732 D	2	4	.12
8779 D	13	2	.65
8808 DX	9	1	5.35
8809 DA	9	1	1.35
8810 DX	9	2	2.20
8811 DX	9	1	
8812 D	9	2	
8813 D	9	2	
8814 DX	9	2	1.35
8944 DX	11	3	4.65
8945 DX	11	3	4.65
8959 D	3	4	.65
8961 D	6	12	
9258 D	3	4	.65
9267 D	3	10	
9268 DX	3	10	
9277 DX	8	1	
9356 D	1	1	1.55
9411 DX	2	2	
9411 DY	2	2	
9533 D	14	5	2.00
9637 D	13	1	.20
9639 DX	11	3	4.65
9640 DX	11	3	4.65
9644 D	8	3	
9652 D	4	2	
10319 D	3	10	.07
10958 D	8	2	.09
10961 D	3	13	.12
11373 D	13	1	$ .12
11858 DA	14	5	.12
11917 DC	3	17	.40
12215 D	3	14	.12
13021 D	3	13	.01
13054 D	4	1	.021
13055 D	3	9	.032
		10	
13085 D	8	1	.009
13090 D	8	2	.033
13115 D	13	1	.022
13176 D	9	2	4.80
13231 D	3	3	.07
		4	
13722 D	9	1	.03
13806 D	3	4	.05
13839 D	3	11	.05
13841 D	3	11	
13842 D	3	11	2.45
14186 DA	1	1	.05
14186 DA	3	3	.05
14186 DA	11	3	.05
15644 D	12	3	.40
16025 D	3	7	.03
16067 D	3	7	1.00
16077 D	1	3	.12
17700 D	13	1	.17
17767 D	13	1	4.30
		2	
18377 D	7	7	.05
18558 D	12	1	1.00
18573 DA	12	3	.75
18585 DA	3	4	.12
18585 DA	6	3	.12
18585 DA	13	1	.12
18767 D	3	10	.40
18767 D	9	3	
18942 D	6	9	.008
19289 D	14	5	.25
19291 D	14	5	.25
19292 D	14	5	.35
19323 D	14	5	1.15
19324 D	14	5	.40
19325 D	14	5	.35
19326 D	14	5	.40
19327 D	14	5	.45
19328 D	14	5	.45
19329 D	14	5	4.40
19963 D	3	14	.12
20156 D	14	5	.40
20157 D	14	5	.45
20289 D	1	1	.85
20290 D	1	1	.90
20293 D	1	1	.17
20296 D	1	1	.95
20299 D	1	1	.35
20300 D	1	1	.17
20301 D	1	1	.05
20303 D	1	1	.40
20306 DX	1	1	1.75
20308 D	1	1	3.35
20308 D	9	2	3.65
		4	
20585 D	1	1	.95
20586 D	1	1	.12
20841 D	11	5	.17
20887 DA	13	1	.17
20903 D	2	10	.05
21249 D	9	4	.041
21259 D	1	1	1.90
21314 DX	2	1	.85
21342 D	2	2	.03
21350 DXA	2	1	
21362 D	8	2	.05
21388 DBX	2	1	.40
21393 D	2	2	.05
21394 D	2	1	.05
21409 DB	2	2	.85

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
21560 D	13	2	$15.25
21839 D	1	1	.05
22383 D	1	3	.03
22977 DA	5	4	.12
23132 D	3	15	.40
23516 D	7	5	.10
23518 D	7	5	.03
23520 D	7	5	.013
23521 D	7	5	.013
23522 D	7	5	.013
23523 D	7	5	.063
23524 D	7	5	.05
23525 D	7	5	.10
23526 D	7	5	.013
23527 D	7	5	.60
23528 B	7	5	.02
23530 D	7	5	.05
23537 D	7	5	.10
23539 D	7	5	.05
23541 D	7	5	.02
23545 D	7	5	.40
23681 D	4	1	3.25
23681 D	3	9	3.25
24017 D	1	1	.35
24473 D	2	3	.45
24517 D	3	3	.05
24529 D	7	5	
24569 D	3	7	.17
24603 D	2	2	.03
24685 D	7	7	.05
24687 DA	7	7	.10
24689 D	7	7	.12
24693 D	7	7	.05
24703 DA	7	7	.09
24772 D	8	1	.02
24805 D	7	7	.022
25076 D	3	9	.02
25086 DA	3	3	.09
25093 DA	3	9	.02
25115 D	8	2	.05
25484 D	7	7	.05
25589 D	7	5	.02
25590 D	7	5	
25948 D	7	7	.05
26039 DA	4	1	.35
26095 D	7	5	.003
26097 D	7	5	.10
26143 D	1	3	.03
27044 D	9	1	.50
27046 D	9	1	.05
27048 D	9	1	.03
27331 D	2	2	6.80
27383 D	2	9	.12
27385 D	2	6, 7, 8	.05
27386 D	2	6	.05
27387 D	2	7, 9	.05
27618 D	2	5	.005
28428 D	2	4, 7, 9	.12
28589 D	2	5	.30
28591 D	2	5	.35
28781 D	3	11	.05
28824 D	7	5	.60
28825 D	7	5	
28827 D	7	5	
28950 D	3	3	.02
29070 D	3	3	.12
29325 D	2	7, 8, 9	.17
29547 D	13	1	.12
29780 D	4	1	.12
29898 D	14	3	.06
29899 D	7	3, 5	.08
29900 D	7	3, 5	$ .17
29900 DX	7	3, 5	.30
29901 D	14	3	.17
29901 DX	14	3	.17
29902 DX	7	7	.35
30083 D	2	5	.30
31238 D	4	1	5.20
31240 D	4	1	6.80
31242 DA	4	1	.35
31281 D	3	5	.03
31336 D	7	7	.03
31729 D	3	3	.35
31760 D	7	5	.02
32032 DXA	2	1	.10
32316 D	3	13	.05
32319 D	3	13	.03
32454 D	5	5	.14
32615 D	7	7	.03
32941 D	14	5	.45
33681 D	9	3	.048
33814 D	1	1	4.40
33817 DA	3	10	3.45
35089 DA	12	1	.05
36151 D	8	2	1.80
36273 D	2	11	.20
36350 D	7	5	.20
36351 D	7	5	.007
36796 DA	3	4	.17
36947 D	14	8	1.25
36985 DA	2	5	.70
37063 D	2	11	.05
37064 D	2	11	.20
37072 D	2	11	.05
37075 D	2	11	.05
37165 D	3	6	.15
37165 D	3	17	.17
37165	8	1	.17
37290 D	12	1, 3, 4	.32
37290 D	14	7	.32
37291 D	2	1, 5	.015
37323 D	8	1	
37323 D	3	17	
37323 DX	10	2	.30
37634 D	1	1	4.40
37976 D	2	10	.12
38026 DM	3	6	.22
38026 DMX	3	7	.35
38433 D	2	4	.03
38609 DA	2	1	.014
38815 D	2	8	.03
39651 D	14	9	.15
39652 D	14	9	.20
39653 D	14	9	.25
39654 D	14	9	.10
39655 D	14	9	.03
39656 DX	14	9	.20
39659 D	14	7, 9	.03
39661 D	14	9	1.70
39662 D	14	9	2.25
39663 D	14	9	.75
39665 D	14	9	.08
39800 D	14	9	.50
39868 D	14	9	1.30
39870 D	14	9	.05
39875 D	14	9	.15
40465 DX	13	1	.17
40466 DX	13	1	.17
40628 D	14	8	.15
40631 D	14	8	.15
40635 D	14	7	.35
40636 D	14	8	.20
40638 D	14	7	.15
40640 D	14	8	.45
40641 D	14	8	$ .45
40642 D	14	8	.20
40644 D	14	8	.35
40646 D	14	8	.45
40647 D	14	8	.05
40648 D	14	8	3.00
40649 D	14	8	.10
40656 D	14	8	.05
40657 D	14	8	.03
40661 D	14	8	.25
40693 D	14	8	.05
40700 D	14	8	.05
40703 D	14	8	.03
40711 D	14	8	.05
40712 D	14	8	.05
40713 D	14	8	.05
40728 DA	14	8	5.00
40974 DA	6	11	.09
41431 D	12	1	.17
41470 D	5	4	11.35
41508 D	11	5	.17
41509 D	11	5	.05
41519 D	11	5	.03
41597 D	4	2	.15
41597 D	9	1	.15
41597 D	8	3	.15
41597 D	11	3	.15
41842 D	6	11, 12	.17
41958 DA	8	3	.17
41934 DB	14	3	1.35
42175 D	11	3	.17
42239 D	5	4	13.50
42297 D	6	3	.35
42298 DB	11	1	.45
42383 D	2	7, 8	1.10
42387 D	7	3	.55
42495 D	7	3	.40
42496 DX	13	1	.40
42605 D	1	3	1.00
42877 D	3	1	.22
42879 D	3	1	.12
42915 D	2	9	.12
42916 D	2	9	.09
42917 D	2	7, 9	.17
42921 D	2	10, 11	.30
43038 D	2	10	.05
43207 D	4	2	.65
43211 D	4	2	.10
43248 D	4	2	.70
43712 DB	12	2	.03
43832 D	3	9	.09
43891 DA	1	3	.30
43983 D	1	3	.30
43984 D	1	3	.17
45001 D	2	3	3.55
45003 D	2	3	.03
45110 D	7	7	.03
45120 D	6	3	.17
45132 D	13	2	.12
45148 D	7	7	.03
45149 D	7	7	.03
45285 DA	3	11	.30
45293 D	6	9	.14
45357 D	13	2	.09
45361 D	13	1	.03
45442 D	9	2	.14
45532 DA	9	1	.07
45533 DA	9	2	.55
45653 D	8	1	.05
45655 D	8	1	1.25
45656 D	8	1	.05
45667 D	8	2	.45
45685 D	8	1	.05
45696 D	8	1	.05
45774 D	8	1	

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
45775 D	8	2	$ .40
45797 D	12	3	.05
45813 D	3	17	.12
45822 D	3	17	.30
45956 D	3	7	.65
45982 DX	1	1	2.75
45984 D	1	1	.05
45985 D	1	1	.12
45986 D	1	1	.05
45993 D	1	1	.50
46022 D	11	5	.60
46023 D	11	5	.12
46025 D	11	5	.17
46027 D	11	5	.17
46028 D	11	5	.03
46029 D	11	5	.05
46038 D	11	1	.05
46040 D	11	1	.05
46053 D	3	13	.05
46059 D	7	7	.03
46129 D	3	4	.17
46135 D	3	9	.05
46136 D	3	3	.22
46137 D	3	3	.12
46157 D	3	13	.12
46184 D	7	7	.03
46185 D	7	7	.03
46221 DAX	3	6	1.75
46222 DAX	3	7	1.75
46223 DAX	3	7	1.75
46224 DAX	3	6	1.75
46225 D	3	7	.22
46246 D	3	3	.05
46251 D	3	4	.03
46275 D	11	5	.35
46304 D	6	3	.45
46332 D	6	3	.17
46595 DA	3	13	2.10
46606 DX	3	11	.35
46746 D	5	4	17.40
46785 D	2	2	.007
46794 DA	5	5	1.10
46795 D	5	5	.22
46800 D	5	5	2.10
46809 D	5	4	.17
46810 D	5	4	.17
46821 D	5	4	.55
46823 D	5	4	.05
46825 DA	11	1	3.00
46826 D	11	1	1.65
46831 D	11	1	.70
46851 D	11	1	.12
46857 D	13	2	.45
46859 D	5	1	.50
46859 D	13	2	.50
46887 D	13	2	.40
46888 D	13	2	.09
46904 DR	13	1	.30
46905 DX	13	1	3.85
46912 D	13	2	.22
46913 D	13	2	.05
46916 D	13	2	.05
46918 D	13	1	.30
46923 D	3	10	.05
47244 D	3	10	.03
47244 D	9	3	.03
47294 D	2	2	.12
47334 D	12	1	.35
47388 DA	7	7	.09
47390 D	7	7	.06
47392 D	7	7	.014
47394 D	7	7	.12
47395 D	7	7	.12
47396 DX45	7	7	.45
47398 DY	7	7	
47401 D	7	7	.03
47402 D	7	7	.09
47404 DA	7	7	.22
47405 DXA	7	7	$ .40
47406 D	7	7	.12
47407 D-30	7	7	.40
47408 D	2	1	.07
47409 D	2	2	.03
47413 DX	2	1	1.70
47415 D	5	5	
47417 DX	2	1	.55
47424 D	2	1	.03
47425 DX	2	1	.35
47425 DY	2	1	.40
47427 D	2	1	.03
47428 D	2	1	.05
47431 DB	2	1	1.00
47432 D	2	1	.12
47433 DX	2	2	.12
47438 DA	2	2	.12
47439 DAX	2	1	7.15
47442 D	2	2	.12
47449 DAY	2	1	.90
47452 D	2	1	.05
47453 D	2	1	.05
47454 D	2	1	.03
47461 D	2	2	.025
47462 D	2	2	.03
47464 D	2	2	.07
47465 D	2	2	.05
47468 D	2	2	.03
47470 D	2	2	.12
47473 D	2	2	.05
47474 D	2	2	.03
47475 DA	2	2	.17
47490 D	3	10	.17
47490 D	9	3	.17
47507 DA	3	9	.03
47558 D	12	1	2.45
47585 DA	13	1	
47585 DAX	13	1	2.65
47589 D	4	1	6.35
47591 D	4	2	.45
47593 D	4	1	.12
47594 DA	6	11	.65
47595 D	6	11	11.50
47596 D	6	11	.22
47598 DAXA	6	11	10.15
47602 D	6	11	4.85
47603 D	6	11	4.10
47604 D	6	11	3.65
47605 D	6	11	3.65
47607 D	6	11	6.40
47608 D	6	11	6.60
47609 D	6	11	5.30
47610 D	6	11	5.40
47619 D	11	1	17.00
47726 D	11	1	.12
47628 D	3	9	.09
47629 D	3	9	
47650 DR	3	9	
47696 D	3	9	.03
47697 DA	3	9	.30
47698 D	3	10	.09
47771 D	14	2	.75
47772 D	14	2	.05
47773 D	14	2	6.00
47775 D	14	2	.45
47776 D	14	2	.85
47778 D	6	9	.03
47779 D	6	9	.03
47780 D	6	9	.03
47822 D	2	2	.22
47840 D	3	3	.45
47861 D	2	8	.05
47880 D	2	6, 8	22.50
47885 D	2	7, 8	2.75
47889 D	2	10	.12
47891 D	2	10	.17
47926 D	2	10, 6, 7	$12.50
47955 D	1	1	.09
47958 DXA	11	5	2.30
47959 DXA	11	5	2.45
47961 DA	11	5	.90
47962 D	11	5	.05
47979 D	6	7	1.65
47990 D	6	7	.12
47991 D	6	7	.03
48038 DA	6	5	19.00
48040 DA	12	3	3.30
48042 D	1	1	2.20
48044 D	11	5	.90
48045 D	11	5	.65
48055 D	3	7	.006
48056 D	3	7	.17
48057 D	3	7	.06
48072 D	6	3	.35
48073 D	6	3	.10
48074 D	6	1	.22
48075 D	6	3	.03
48117 D	3	4	.03
48118 D	3	4	.03
48127 D	2	10	
48151 DA	1	3	9.35
48157 DX	1	3	.40
48158 D	1	3	.40
48159 D	1	3	.30
48160 D	1	3	.35
48165 DA	1	3	38.00
48168 D	1	3	.09
48227 D	8	2	.17
48229 D	12	1	.05
48230 DA	11	1	.03
48232 D	7	3	.55
48250 D	8	2	.22
48250 DX	8	2	2.20
48251 D	8	2	.03
48253 DA	8	2	.60
48254 D	8	2	.03
48255 D	8	1	.65
48256 DA	8	1	1.65
48256 DAX	8	1	5.00
48296 D	3	4	8.00
48339 D	2	2	.03
48340 DA	2	2	.05
48341 D	2	2	.12
48342 DA	2	2	.03
48356 D	8	2	.35
48358 D	8	2	.17
48472 D	2	1	.03
48489 D	8	1	.03
48492 D	8	1	.05
48493 D	8	1	.03
48496 DA	8	1	.03
48501 D	8	1	.03
48501 D	10	3	.03
48512 D	9	1, 4	.14
48514 D	9	1, 4	.17
48695 D	3	11	.30
48739 DX	14	1	1.50
48764 D	3	1	.50
48842 DAX	8	1	.55
49076 D	1	3	.90
49090 DXR	2	1	9.65
49093 DX	2	2	1.65
49105 D	9	2	.40
49107 D	8	2	.22
49108 D	8	2	.09
49125 D	2	1	.12
49223 D	7	7	.07
49242 D	2	7, 9	1.10
49359 D	2	5	.35

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
49362 D	12	2	$ .066
49387 D	3	4	.025
49407 DAX	8	2	1.25
49416 DX	2	1	.30
49417 D	2	1	.03
49418 D	2	1	.03
49419 D	2	1	.03
49420 DX	2	1	1.35
49423 D	2	1	.03
49424 D	2	1	.05
49467 DB	12	2	2.30
49493 D	2	1	1.65
49528 D	8	2	.03
49547 DA	9	4	.05
49548 D	9	1, 4	3.30
49572 D	2	7, 8	.03
49586 D	6	5	1.65
49587 D	6	7	.35
49791 D	2	1	.03
49798 D-70	7	7	.17
49950 D	3	7	.03
50098 DA	11	1	.30
50098 DAX	11	1	.35
50099 D	11	1	.22
50149 D	7	3	.14
50234 D	2	10	.08
50235 D	2	10	.08
50248 D	8	2	.22
50338 D	3	7	.08
50366 DX	8	1	.85
50398 D	11	1	.07
50410 DA	3	3	.09
50413 D	4	2	.011
50430 D	4	2	.06
50431 D	4	2	.18
50433 D	4	2	12.25
50784 D	2	11	.90
50790 D	1	1	.05
50917 D	3	15	4.15
50948 D	3	7	.85
50949 D	3	7	4.65
50956 D	3	9	.30
51044 D	3	13	.03
51046 D	3	13	1.90
51047 D	3	13	1.90
51187 D	2	11	
51204 D	3	11	.12
51205 D	3	11	.17
51226 DD	4	1	
51227 D	4	1	.30
51268 D	3	10	.35
51268 D	9	3	.35
51269 D	3	10	.12
51269 D	9	3	.12
51271 D	3	10	.22
51271 D	9	3	.22
51308 DAR	3	7	1.00
51312 D	3	9	.05
51313 D	3	3	1.25
51316 D	3	3	.12
51324 D	3	3	.40
51325 D	3	4	.55
51336 DX	3	3	10.45
51511 D	14	5, 7	21.00
51521 D	4	2	12.00
51524 D	4	1	20.80
51547 D	14	3	1.90
51661 D	5	1	.17
51666 D	2	1	.12
51667 D	2	2	.03
51773 DA	2	3	2.60
51775 D	2	3	.09
51790 D	3	7	.12
51888 D	2	11	3.00
51889 D	2	11	2.00
51891 D	2	11	.55
51892 D	2	11	$ .05
51893 D	2	11	.50
51894 D	2	11	1.00
51895 D	2	11	.20
51898 D	2	11	.05
51915 D	14	5	2.75
51939 D	3	16	.09
51941 D	3	16	.30
51970 D	2	11	.15
52030 DX	2	7, 9	.40
52033 D	1	3	.011
52123 D	14	7	.40
52201 DX	10	3	.65
52205 D	14	2	8.25
52208 D	13	2	2.75
52209 D	5	3	15.95
52210 DAX	5	3	23.65
52211 D	13	1	7.45
52213 D	13	2	10.75
52215 D	13	2	9.90
52216 D	13	1	5.25
52219 DB	13	2	14.85
52220 D	13	1	15.70
52222 D	5	5	.55
52225 D	5	4	1.60
52226 DA	5	5	.22
52229 D	5	5	10.75
52231 D	5	5	2.45
52237 DX	13	1	7.45
52239 D	11	1	.22
52240 DA	11	1	9.90
52241 D	11	1	6.35
52242 DB	11	1	74.25
52243 DAX	11	1	4.80
52244 DX	11	1	.70
52250 DX	3	17	3.00
52255 DX	6	3	14.85
52256 D	6	1	.45
52272 D	2	8	.35
52276 D	14	5	.09
52291 D	5	4	37.95
52292 D	5	4	54.45
52390 D	10	2	2.85
52605 D	3	4	.09
52608 DA	3	9	1.20
52750 DAX	3	10	9.65
52750 DAY	3	10	11.35
52752 DAX	3	9	
52754 D	3	9	.50
52755 DA	3	14	.20
52757 DAX	3	9	2.50
52758 DX	3	4	5.00
52761 D	3	7	20.65
52762 DX	3	9	1.05
52769 D	3	13	1.35
52770 D	3	13	2.55
52771 D	3	13	2.55
52772 DX	3	13	1.65
52773 DB	3	11	8.80
52774 DX	3	4	1.25
52778 D	3	7	.07
52780 D	3	7	.10
52783 DX	3	7	3.55
52784 DX	3	7	1.10
52786 D	3	7	.09
52787 D	3	7	.03
52788 DX	3	6	.90
52789 D	3	3	.45
52790 D	3	3	.30
52791 DX	3	6	3.85
52794 D	2	5	1.20
52795 DD	3	7	
52796 DAR	3	7	1.00
52797 DAR	3	7	1.00
52798 DX	3	4	5.00
52799 D	3	4	.30
52800 D	3	4	.30
52806 DX	3	5	.95
52808 D	3	5	$ .03
52809 DBX	3	10	
52810 DX	8	1	.65
52811 DXA	8	1	1.35
52812 D	8	2	
52813 D	8	1	.65
52815 D	7	7	16.50
52818 DX	3	10	2.20
52819 DX	3	10	3.00
52820 DX	3	10	5.50
52821 DX	3	10	9.00
52822 DX	3	7	.85
52823 D	3	14	.03
52823 D	14	4	.03
52824 D	3	7	1.55
52825 DA	3	7	2.10
52826 DBX	3	10	
52869 D	11	1	2.05
53176 DA	2	1, 3	
53187 D	14	8	.75
53196 D	14	8	.75
53198 D	14	7	.25
53199 D	14	7	.60
53200 D	14	7	.05
53201 D	14	7	.05
53202 D	14	7	1.20
53203 D	14	7	.15
53205 D	14	7	.80
53206 D	14	7	1.15
53207 D	14	8	4.50
53208 D	14	7	8.25
53209 D	14	7	5.65
53210 D	14	8	9.00
53215 D	2	10	.12
53216 DAX	2	10	1.65
53222 DA	6	5	47.50
53223 DA	6	5	47.50
53226 D	2	8	.12
53227 D	2	8	.05
53245 DA	12	2	1.05
53246 DA	12	2	1.05
53247 DA	12	2	1.05
53248 D	12	2	.70
53249 DA	12	2	.55
53250 D	12	2	1.35
53358 DA	12	3	1.25
53358 DA	12	4	1.25
53359 D	12	4	.22
53360 D	12	3, 4	.40
53361 D	12	4	.65
53362 D	12	3, 4	.55
53365 DA	12	4	21.85
53366 DA	12	4	25.85
53367 D	12	4	13.50
53368 D	12	4	15.70
53369 DAX	12	3, 4	.23
53370 D	12	4	9.65
53372 DX	12	4	2.45
53389 D	11	1	5.25
53395 DA	12	3	9.90
53398 D	12	3	2.20
53400 DX	12	3	1.75
53480 DA	13	1	2.30
53481 DA	13	1	2.30
53486 D	13	1	.17
53489 DXA	11	5	1.80
53490 D	11	5	.40
53491 DX	6	3	5.00
53494 D	4	1	1.65
53495 D	11	5	.30
53497 D	11	5	.05
53503 D	11	5	.95
53504 D	11	5	.95
53506 D	11	5	.30
53507 D	11	5	.30

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
53508 DX	11	5	$ .70
53514 D	11	5	.40
53520 DA	11	5	7.45
53537 D	5	5	6.00
53538 D	5	5	4.65
53539 DAX	5	6	4.40
53544 D	5	1	.07
53548 D	5	1	33.00
53549 D	5	1	.07
53550 D	5	1	.12
53551 DA	5	1	.05
53553 D	5	1	4.25
53559 D	6	3	.17
53560 D	3	4	.09
53595 D	11	3	.05
53597 D	11	1	.35
53600 D	11	3	.85
53627 D	5	6	.05
53631 D	13	2	.17
53632 DX	13	1	.17
53633 DA	13	2	.22
53634 D	13	2	1.20
53635 D	13	2	.05
53636 D	13	2	.05
53637 D	13	2	.05
53656 D	6	9	.14
53658 DA	6	9	26.40
53659 DA	6	9	26.40
53660 DA	6	9	26.40
53683 DA	13	2	.85
53714 D	6	3	.05
53715 D	6	3	.05
53717 D	13	1	
53730 D	10	3	12.95
53731 D	10	2	12.95
53752 DA	10	3	5.00
53753 D	10	2	5.00
53754 DX	10	3	1.75
53755 DX	10	3	1.75
53756 D	10	2	.30
53757 D	10	2	.30
53759 D	10	2	.70
53760 D	10	3	.85
53770 D	5	3	1.45
53872 D	3	4	1.05
53876 D	8	1	.17
53877 D	8	1	.05
53881 D	7	3	1.90
53882 D	7	3	1.90
53892 D	6	7	1.25
53893 D	6	7	.90
53894 D	6	1	11.00
53895 D	6	1	11.00
53896 D	6	11	34.10
53897 D	6	11	23.75
53898 D	6	11	1.20
53902 D	8	3	.35
53907 D	8	3	.45
53921 D	14	2	17.85
53924 D	14	2	.40
53925 D	14	2	.40
53942 D	14	1	2.75
53943 D	14	1	2.75
53953 D	7	3	1.55
53966 DAX	9	4	10.75
53967 D	9	4	1.05
53968 D	9	1, 4	1.10
53978 D	12	5	
53979 D	12	5	
53988 D	7	3	.85
54003 D	5	6	.12
54004 D	5	3	.08
54005 D	5	3	2.05
54006 D	5	4	.17
54007 D	5	5	.17
54008 D	5	3	.22
54009 D	5	3	.12
54010 D	5	6	.55
54011 D	5	3	$ .17
54012 D	5	4	.40
54013 D	5	6	.95
54016 D	5	6	.09
54026 D	6	11	5.20
54027 D	6	11	2.65
54028 D	6	11	6.80
54029 D	6	11	4.50
54033 D	2	2	.45
54034 D	2	2	.12
54035 DX	2	2	1.20
54035 DY	2	2	4.00
54035 DZ	2	2	6.35
54037 D	3	1	23.00
54089 DX	14	4	3.30
54090 DX	14	4	3.30
54095 DXA	10	3	4.15
54096 DXA	10	2	4.15
54097 DAX	10	3	1.75
54098 DA	10	3	
54099 DX	10	3	1.10
54100 DX	10	3	1.10
54115 D	9	3	1.10
54485 DX	7	7	.40
54488 DX	7	7	.85
54489 D	7	7	.12
54501 D	1	3	1.10
54502 D	1	3	1.10
54513 D	5	5	.12
54514 D	5	5	1.60
54515 D	5	5	.55
54610 DA	11	1	3.30
54769 D	2	10	.12
54858 D	2	8	.30
54863 D	2	8	.55
54864 DX	2	10	2.00
54867 D	2	8	1.10
54871 DA	2	7, 8	35.00
54947 D	3	5	.40
54953 D	4	2	.05
54969 D	4	1	.09
54969 D	11	1	.09
54970 D	8	1	1.35
54988 D	8	1	17.85
55015 D	2	1	.03
55175 D	1	3	.12
55228 DD	4	1	76.50
55229 DAXA	4	1	6.50
55230 DB	4	1	19.10
55231 DYA	4	2	14.85
55232 DA	4	2	4.40
55233 DX	4	2	7.50
55311 DX	6	11	.30
55371 DAX	4	1	10.80
55378 DAX	3	17	.60
55379 D	3	17	
55379 DX	3	17	.55
55440 D	2	4	.019
55442 D	6	5	2.00
55443 D	6	5	.05
55463 D	2	6, 8	
55471 D	2	4	.05
55479 D	14	7	.12
55481 D	14	7	12.00
55482 D	14	7	1.00
55539 D	6	3	.09
55627 D	3	3	.09
55628 D	3	4	.12
55745 D	11	1	16.50
55746 DAX	3	17	.85
55748 D	8	3	.07
55754 D	14	3	.03
55780 DA	2	3	.05
55855 D	2	1	.03
55868 DX	3	16	23.65
55911 DX	14	4	1.90
55954 D	11	1	1.20
55955 D	11	1	$ .17
55959 DB	11	1	7.15
56066 D	2	2	3.85
56069 DX	7	3	1.75
56070 DX	7	3	1.75
56108 D	3	13	.85
56151 D	7	3	.03
56187 D	13	2	7.70
56188 D	13	1	12.35
56253 DA	3	9	11.20
56254 DA	3	9	42.00
56475 D	11	5	.09
56477 D	11	5	.07
56479 D	11	5	.22
56480 D	3	17	16.00
56481 D	3	17	2.85
56482 D	3	17	.85
56504 D	2	8	.17
56507 D	2	4	.017
56508 D	3	16	1.50
56517 D	2	4	.05
56519 D	2	4	.03
56613 D	5	1	.03
56692 D	7	5	.45
56693 DAX	7	5	.45
56698 D	9	3	3.30
57050 D	7	3	
57050 DX	7	3	.35
57062 DX	2	7, 9	.85
57143 D	2	7, 9	.05
57146 D	2	7, 8	.05
57235 D	6	9	7.45
57239 D	6	9	3.00
57275 D	2	6, 10	.05
57276 D	2	7, 8	.09
57277 D	2	6	1.45
57283 D	2	7, 9	3.00
57285 D	2	6, 8	1.80
57286 DX	2	7, 9	.85
57310 DX	2	7, 9	
57312 D	2	10	.03
57313 D	2	10	.12
57314 D	2	2	.17
57382 D	6	3	.17
57383 D	6	3	.17
57714 D	3	10	.05
57714 D	9	3	.05
57728 DX	14	3	.60
57750 D	11	1	.03
57755 D	2	2	.05
57792 DA	13	2	.05
57793 D	13	2	.22
57905 D	11	5	.07
57925 D	14	4	.35
57926 DX	2	1	6.35
57956 D	7	7	.044
57957 D	7	7	.03
58064 DXA	9	2	3.55
58065 D	9	2	1.10
58068 D	9	1	.05
58069 D	9	1	.30
58070 D	9	1	.45
58073 DB	9	1	5.25
58080 D	9	2	.05
58081 D	9	2	.17
58084 D	9	2	12.25
58086 DA	9	2	7.70
58087 DA	9	2	8.25
58088 D	9	2	.65
58089 DX	9	2	1.25

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
58090 DBX	9	1	$ 9.00
58095 DA	3	14	.95
58294 DAX	6	5	
58295 DAX	6	5	
58296 DAX	6	5	9.65
58297 DAX	6	5	9.65
58318 DA	14	3	
58322 DX	14	3	10.10
58997 D	3	5	.55
59116 D	2	4	.30
59172 D	7	7	.08
59173 D	7	7	.12
59175 D	2	7, 9	.95
59221 D	7	7	4.00
59309 DX	11	3	.55
59310 D	11	3	.35
59311 D	11	3	.55
59312 D	11	3	1.35
59313 D	11	3	1.35
59314 D	11	3	.25
59315 D	11	3	.30
59317 D	11	3	1.50
59318 D	11	3	.05
59319 D	11	3	.06
59424 D	2	5	.70
59424 DA	2	5	
59424 DA	3	7	
59480 D	3	4	.17
59481 D	3	4	.05
59482 D	3	4	.17
59484 D	3	4	.20
59487 D	3	4	.05
59488 D	3	4	.35
59489 D	3	4	.35
59520 DX	6	12	110.00
59522 D	6	12	
59523 D	6	12	.35
59524 D	6	12	1.00
59525 D	6	12	.90
59526 D	6	12	.06
59527 D	6	12	.05
59528 D	6	12	
60094 D	2	1	.65
60095 D	11	1	.10
60096 D	11	1	.10
60128 D	7	5	.22
60129 D	7	5	1.15
60188 DX	7	3	36.30
60221 DA	12	2	.06
60405 D	5	1	34.10
60405 D	13	2	34.10
60478 D	3	5	8.25
60488 D	2	8	1.35
60570 D	3	4	.15
60573 D	12	3	.12
60573 D	12	4	.12
60599 D	3	4	2.45
60947 D	7	7	.06
61115 D	4	2	.07
61127 D	4	2	.15
61248 D	7	3	1.25
61316 D	3	7	.17
61317 D	3	7	.09
61412 D	3	13	25.30
61509 DX	7	3	.60
61594 DA	2	5	
61808 D	3	7	.70
62158 D	14	7	2.00
62159 D	14	7	.75
62493 D	2	3	.05
62530 D	14	1	16.50
62531 D	14	1	16.50
62543 DX	14	1	29.45
62779 D	13	2	.05
62779 DX	13	2	.10
62866 D	3	6	.10
63121 D	3	9	
63122 D	3	10	$ .03
63317 D	13	1	2.45
63255 D	13	2	12.40
63256 D	13	1	10.20
63265 D	6	9	.12
63320 D	13	1	.85
63639 D	13	2	
63884 D	3	11	.95
64163 D	9	1	.05
64163 D	13	1	.05
64363 D	3	9	
64364 DX	3	10	
64365 DX	3	10	5.50
64487 D	5	4	8.80
64488 D	5	4	16.75
64490 D	5	4	50.60
64987 D-30	7	7	
65064 D	14	5	.12
65111 D	12	2	111.00
65113 D	12	2	194.00
66272 D	8	2	.03
67081 D	2	8	.15
67118 D	3	17	3.80
67266 DX	7	7	
67349 DX	13	1	2.65
67812 D	3	9	1.00
68037 D	3	3	.15
68041 D	3	6	.35
68059 D	14	4	
68074 D	1	3	.22
68079 D	5	5	.12
68081 D	5	5	.17
68087 D	14	4	5.45
68315 D	1	1	6.00

E

1326 E	14	5	.40
E4-212	2	2	.05
E4-216	2	1	.05
E4-226	2	1	.05
E4-294	2	2	1.30
E4-295	2	2	.09
E4A-305	2	2	.05
E4A-324	2	1	.17
E4A-351	2	1	.35
E4A-352	2	1	.35
E4A-353	2	1	.60
E4A-372	2	2	.05
E4A-546	2	1	.05

G

G 3754	14	4	.02
G 3792	1	1	.12
G 6579 1/3	3	11	.02
11232 GT	14	10	
11233 GT	14	10	

H

H 156	14	5	.15
H 5476	14	7	.98
3405 H	2	5	.022
3405 H	3	7	.022
7494 H	2	9	.07
14611 H	8	1	.05
15041 H	11	5	.05
18575 H	9	2	
21406 H	11	5	.006
21407 H	4	1	.007
21444 H	11	5	.007
23276 H	5	5	10.00
27080 H	3	7	.022
27166 H	4	2	
28500 H	2	4	$ .02
28659 HA	7	5	6.50
31194 H	3	9	.05
38763 H	3	7	.033
39624 HA	7	5	.50
41229 H	2	11	.03
41634 H	11	1	.008
41634 H	3	4	.008
47415 H	5	5	.016
47415 H	3	17	.016
48716 H	2	11	.002
49425 H	2	10	.019
50539 H	2	11	.05
54909 H	3	4	.014
66339 H	2	11	.30
91406 HA	1	1	.08
97406 HA	1	3	.08
98681 H	2	5	.65
98681 H	3	7	.65
107047 H	2	5	.65

N

N 32202	4	2	.05

Q

Q 1755	2	8	.014
Q 1758	8	2	.016
Q 1771	6	3	.015
Q 1773	4	1	.017
Q 1774	1	3	.017
Q 1774	2	8	.017
Q 1774	8	2	.017
Q 1776	1	1	.019
Q 1776	9	2	.019
Q 1776	7	5	.019
Q 1776	8	1	.019
Q 1778	2	8	.021
Q 1784	11	3	.027
Q 1786	3	15	.029
Q 1797	9	1	.019
Q 1799	10	2	.021
Q 1799	10	3	.021
Q 1799	6	7	.021
Q 1800	2	9	.021
Q 1800	10	2, 3	.021
Q 1800	13	1, 2	.021
Q 1800	6	3, 5	.021
Q 1800	5	5	.021
Q 1800	14	3	.021
Q 1801	14	2	.023
Q 1802	13	2	.023
Q 1802	3	4, 5, 9, 17	.023
Q 1802	2	8	.025
Q 1802	1	1, 3	.023
Q 1802	8	3	.023
Q 1802	11	5	.023
Q 1802	5	3	.023
Q 1803	9	2	.025
Q 1804	3	5	.025
Q 1804	8	1	.025
Q 1804	5	6	.025
Q 1804	10	3	.025
Q 1805	4	1	.027
Q 1805	7	3	.027
Q 1806	2	1, 3, 8	.027
Q 1810	3	13	.033

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
Q 1816	3	13	$ .043
Q 1820	3	10	.065
Q 1829	13	2	.032
Q 1830	11	1	.032
Q 1830	6	3	.032
Q 1831	5	4	.035
Q 1832	1	1	.035
		3	
Q 1832	11	1	.035
Q 1832	13	1	.035
Q 1833	5	5	.038
Q 1833	12	5	.038
Q 1834	1	3	.038
Q 1834	3	11	.038
Q 1836	13	1	.041
Q 1836	14	4	.041
Q 1841	3	11	.053
Q 1842	1	1	.053
Q 1845	10	2	.047
		3	
Q 1846	6	3	.047
Q 1846	10	3	.047
Q 1848	2	10	.051
Q 1848	3	16	.051
Q 1848	7	3	.051
Q 1848	3	17	.051
Q 1848	10	2	.051
Q 1848	8	3	.051
Q 1848	11	1	.051
Q 1849	12	1	.055
Q 1849	5	6	.055
Q 1849	6	11	.055
Q 1850	3	13	.055
Q 1850	5	4	.055
Q 1850	3	17	.055
Q 1850	11	3	.055
Q 1851	11	5	.059
Q 1851	14	1	.059
Q 1851	5	6	.059
Q 1852	3	4	.059
Q 1852	8	3	.059
Q 1852	11	1	.059
Q 1852	12	1	.059
Q 1852	13	2	.059
Q 1852	14	3	.059
Q 1852	3	17	.059
Q 1853	14	1	.063
Q 1857	11	3	.072
Q 1857	11	5	.072
Q 1857	6	5	.072
Q 1857	14	1	.072
Q 1858	2	10	.072
Q 1859	4	2	.077
Q 1861	5	5	.082
Q 1862	8	2	.082
Q 1862	5	5	.082
Q 1863	11	5	.087
Q 1864	14	4	.087
Q 1867	14	1	.092
Q 1870	6	1	.098
Q 1870	9	1	.098
Q 1871	5	6	.104
Q 1871	6	7	.104
Q 1872	6	9	.104
Q 1873	3	1	.11
Q 1874	6	7	.11
Q 1874	12	3	.11
Q 1874	9	4	.11
Q 1878	9	1	.122
Q 1888	6	1	.149
Q 1888	9	1	.149
Q 1901	2	8	.007
Q 1901	8	1	.007
Q 1902	3	7	.007
Q 1902	11	1	.007
Q 1902	8	2	.007
Q 1903	3	3	.01
Q 1903	2	8	.01
Q 1903	1	1	.01
Q 1904	2	10	$ .01
Q 1904	3	15	.01
Q 1904	10	2	.01
		7	
		9	
Q 1905	3	10	.013
		14	
Q 1905	7	3	.013
Q 1905	9	3	.013
		3	
Q 1905	10	2	.013
		3	
Q 1905	8	3	.013
Q 1906	2	8	.013
		9	
Q 1906	3	3	.013
		5	
Q 1906	10	2	.013
		3	
Q 1906	8	3	.013
Q 1906	14	3	.013
Q 1906	7	3	.013
Q 1906	3	17	.013
Q 1907	4	1	.02
Q 1907	6	9	.02
Q 1907	13	1	.02
Q 1909	1	3	.025
Q 1909	10	2	.025
		3	
Q 1909	4	2	.025
Q 1909	12	4	.025
Q 1909	11	3	.025
Q 1909	11	5	.025
Q 1909	5	5	.025
		6	
Q 1909	6	5	.025
		11	
Q 1909	14	1	.025
Q 1910	8	2	.025
		3	
Q 1910	3	17	.025
Q 1911	3	1	.042
		3	
Q 1911	5	6	.042
Q 1911	6	7	.042
Q 1911	11	5	.042
Q 1911	14	1	.042
Q 1912	11	5	.042
Q 1913	14	2	.06
Q 1914	9	1	.06
Q 1915	2	11	.002
Q 1916	2	9	.002
Q 1916	7	5	.002
Q 1918	2	8	.002
		11	
Q 1918	7	5	.002
		7	
Q 1918	11	1	.002
Q 1918	8	1	.002
Q 1918	8	2	.002
Q 1919	1	1	.003
		3	
Q 1919	3	4	.003
		15	
		8	
Q 1919	2	11	.003
Q 1919	4	1	.003
Q 1919	6	3	.003
Q 1919	7	5	.003
Q 1919	9	2	.003
Q 1919	10	2	.003
Q 1919	8	1	.003
Q 1919	8	2	.003
Q 1919	11	3	.003
Q 1919	13	2	.003
Q 1920	1	1	.004
		3	
Q 1920	2	1	
		3	
		8	$ .004
		9	
		3	
		4	
		5	
Q 1920	3	7	.004
		9	
		10	
		13	
		14	
Q 1920	4	1	.004
Q 1920	5	3	.004
		5	
		6	
Q 1920	6	3	.004
		5	
Q 1920	7	3	.004
Q 1920	9	1	.004
		2	
Q 1920	10	2	.004
		3	
Q 1920	8	1	.004
Q 1920	11	5	.004
Q 1920	13	1	.004
		2	
Q 1920	14	2	.004
		3	
Q 1921	1	3	.004
Q 1921	3	11	.004
Q 1921	4	1	.004
Q 1921	5	4	.004
		5	
		6	
Q 1921	6	3	.004
Q 1921	11	1	.004
Q 1921	12	5	.004
Q 1921	13	1	.004
Q 1921	13	2	.004
Q 1921	14	4	.004
Q 1922	2	8	.005
		10	
Q 1922	3	13	.005
		16	
		17	
Q 1922	4	1	.005
Q 1922	5	4	.005
		5	
		6	
Q 1922	6	1	.005
		5	
Q 1922	7	3	.005
Q 1922	10	2	.005
		3	
Q 1922	8	3	.005
Q 1922	11	1	.005
		3	
		5	
Q 1922	12	1	.005
		4	
Q 1922	13	2	.005
Q 1922	14	1	.005
		3	
		4	
Q 1925	2	11	.01
Q 1925	3	1	.01
Q 1925	5	6	.01
Q 1925	6	1	.01
		3	
		6	
		7	
		9	
Q 1925	9	1	.01
		4	
Q 1925	11	5	.01
Q 1925	12	3	.01
Q 1925	14	1	.01

(Prices are subject to change without notice.)

NUMERICAL INDEX

Part No.	Section No.	Section Page	Price
Q 1927	6	1, 5, 9	$ .017
Q 1927	14	2	.017
Q 1929	6	1, 7, 11	.027
Q 1929	14	2	.027
Q 3615	1	1	.05
Q 3615	3	3	.05
Q 3616	6	7, 9	.05
Q 3615	11	3	.05
Q 3617	11	1	.15
Q 3626	4	2	.09
Q 3627	4	2	.15
QA 3628	1	1	.15
Q 3659	1	1	.05
Q 3673	4	1	.26
Q 3673	5	6	.26
Q 3794	14	5, 9	4.00
Q 4000	2	8	.014
Q 4001	2	11	.015
Q 4001	7	7	.015
Q 4012	1	3	.016
Q 4012	3	3	.016
Q 4013	1	3	.018
Q 4013	3	4	.018
Q 4013	13	2	.018
Q 4016	3	7	.02
Q 4016	6	3	.02
Q 4016	10	3	.02
Q 4017	3	3, 4, 7, 13	.022
Q 4017	13	1	.022
Q 4019	3	17	$ .068
Q 4020	10	3	.02
Q 4021	10	3	.022
Q 4025	2	10	.057
Q 4035	6	9	.062
Q 4042	7	3	.049
Q 4044	5	4	.098
Q 4050	10	2	.049
Q 4051	6	5	.092
Q 4092	6	3	.086
Q 4095	6	9	.15
Q 4146	6	1	.246
Q 4147	6	11	.258
Q 4148	6	1	.272
Q 4157	6	7	.43
Q 4173	14	2	.41
Q 5015	8	3	.05

S

Part No.	Section No.	Section Page	Price
SA 3215	12	3	.085
ST 200	9	2	4.80
ST 200	13	2	4.80
ST 201	9	2	4.80
ST 204	9	1	3.65
ST 205	1	1	3.65
ST 205A	9	2	3.65
ST 205A	9	4	3.65
ST 210	9	2	4.15
ST 211	3	9	3.25
ST 211	4	1	3.25
ST 214	9	2	2.85
ST 215	13	1, 2	4.30
ST 220	13	2	8.00
ST 223	5	5	10.00
ST 228	5	4, 6	10.95

T

Part No.	Section No.	Section Page	Price
2583 T	14	5	$ .90
2584 T	14	5	4.50
2587 T	14	5	.35
2586 T	14	5	.25
4167 T	2	2, 3	.007
4167 T	8	1	.007
7235 T	3	7	.022

V

Part No.	Section No.	Section Page	Price
10430 V	4	1	.036
10691 V	13	2	4.80
10691 V	9	2	4.80
10693 V	9	2	4.15
10783 V	13	2	8.00
10789 V	2	6, 9	.033
10815 VA	2	7	
10815 VA	2	9	.044
13439 V	3	3	.12
41513 V	5	4, 6	10.95
42687 V	5	6	.14
43598 V	3	3	.40
51344 V	7	5	
51346 V	7	5	
51348 VA	7	5	.20
52745 V	14	7	.003
53505 VE	2	6, 8	

(Prices are subject to change without notice.)