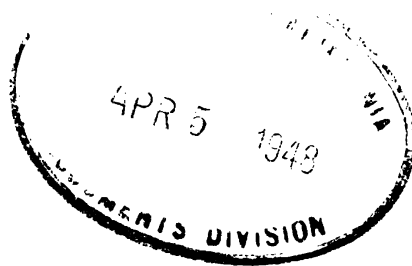


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The U.S. Army  
**TM5-1074**

**WAR DEPARTMENT  
MAINTENANCE MANUAL  
AND PARTS CATALOG**

**MIXER, CONCRETE, GASOLINE ENGINE DRIVEN,  
TRAILER MOUNTED, 7 CU. FT., MODEL 7S DANDIE,  
with LE ROI ENGINE MODEL XRPI**

**KOEHRING COMPANY  
MILWAUKEE 10 WISCONSIN  
JULY 15, 1943**



# TM5-1074

## WAR DEPARTMENT

TM5-1074, Maintenance Manual and Parts Catalog, Mixer, Concrete, Model 7-S Dandie, published by the Koehring Company, is furnished for the information and guidance of all concerned.

(AG 300.7 (15 June 1943) PC (C), June 10, 1941.)

By order of the Secretary of War:

G. C. MARSHAL,  
*Chief of Staff.*

Official:

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

**OPERATION  
AND  
MAINTENANCE MANUAL  
AND  
PARTS CATALOG**

**7-S KOEHRING  
DANDIE MIXER**

**for  
CORPS OF ENGINEERS**

<b>P. O. NUMBER</b>	<b>SERIAL NUMBERS</b>	<b>ENGINE SERIAL NUMBERS</b>
<b>C-3399</b>	<b>19982 through 20241</b>	<b>LOWEST 162377 HIGHEST 166750</b>

**U. S. REGISTRATION NUMBERS 0567829 THROUGH 0568088**

<b>P. O. NUMBER</b>	<b>SERIAL NUMBERS</b>	<b>ENGINE SERIAL NUMBERS</b>
<b>23-1436</b>	<b>20600 through 21001</b>	<b>LOWEST 164361 HIGHEST 180990</b>

**U. S. REGISTRATION NUMBERS 0741811 THROUGH 0742212**

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<b>MAINTENANCE SECTION</b>	<b>PAGES 39 TO 104</b>
<b>PARTS SECTION</b>	<b>PAGES 105 TO 164</b>

**KOEHRING COMPANY**  
3026 WEST CONCORDIA AVE.  
MILWAUKEE 10, — WISCONSIN



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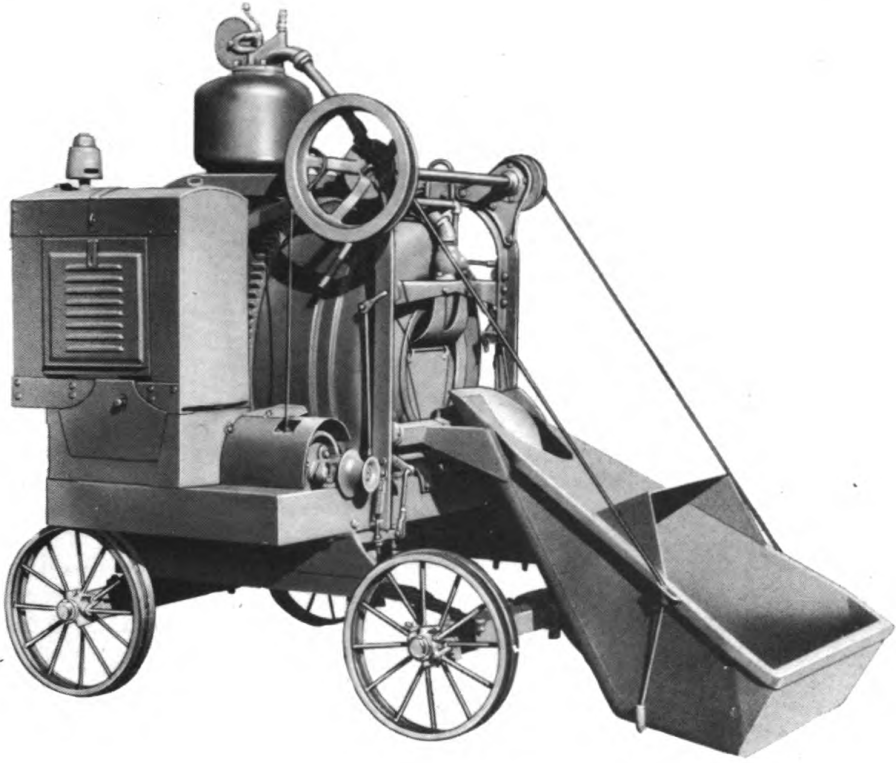
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7-S KOEHRING DANDIE CONCRETE MIXER (Charging Side)



7-S KOEHRING DANDIE CONCRETE MIXER (Discharge Side)

## GENERAL DESCRIPTION

The Koehring 7-S Dandle End Discharge Concrete Mixer is spring mounted on four steel tired wheels and is provided with a draw bar for use in moving the mixer to job locations. The draw bar is removed when the machine is working.

The power unit is a LeRoi four cylinder engine with a displacement of 90.8 cu. in. and develops 10 H.P. at 1000 R.P.M. Power is transmitted to the drum drive shaft by three "V" belts.

The power unit is mounted on one side of the main frame. It is completely enclosed in a metal house with removable sides. The fuel tank is located in the engine house and is fastened to the underside of the house top.

The mixing drum rotates at 18 R.P.M. on four chilled beveled edge rollers. It is driven through an external band type clutch. The drum has eight buckets and four blade extensions bolted in position which can be easily removed for replacement.

The controls consist of a drum clutch lever, a discharge swing chute lever and the charging skip operating lever. The charging skip lever controls both the raising and lowering of the skip. The discharge swing chute locks in either the closed or open position.

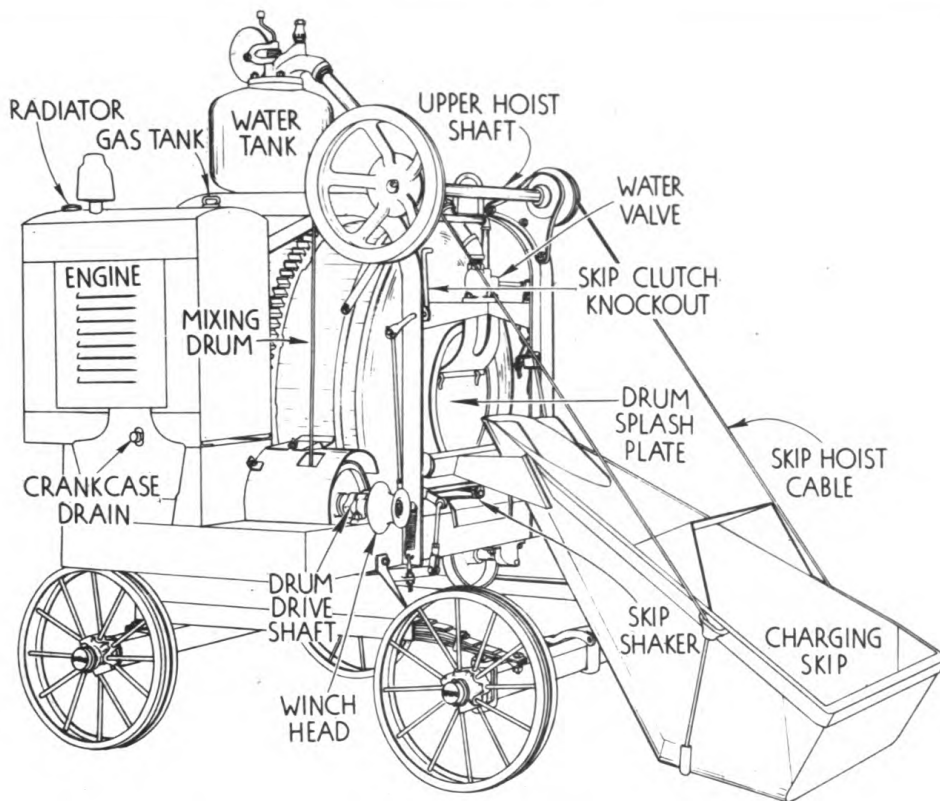
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IDENTIFICATION AND ADDRESSES OF  
MANUFACTURERS OF ACCESSORIES  
AND EQUIPMENT USED ON  
KOEHRING 7S MODEL 5A DANDIE  
CONCRETE MIXERS

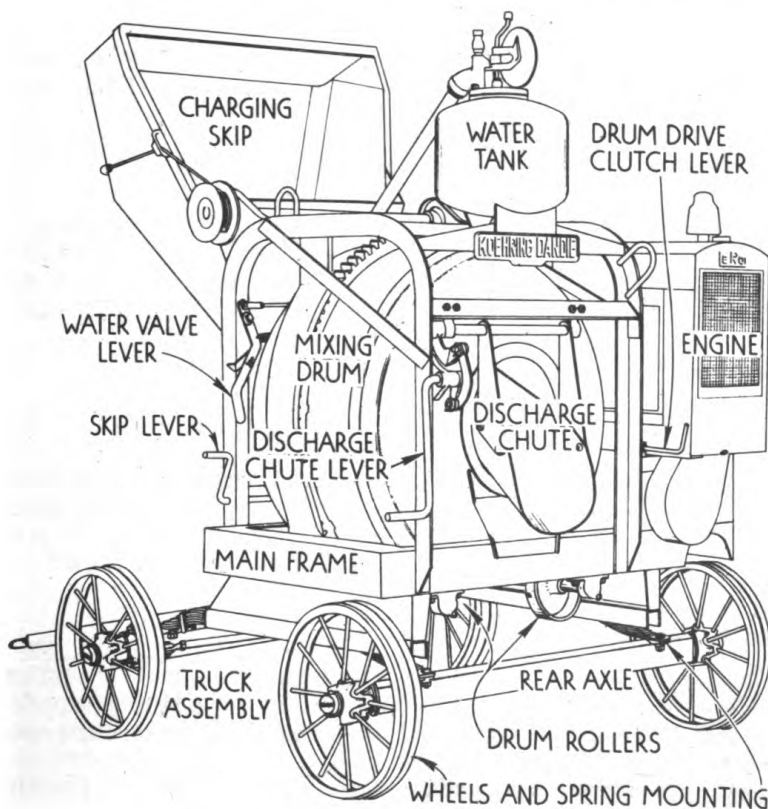
LeRoi XRPl Gasoline Engine	- LeRoi Company Milwaukee, Wisconsin.
Zenith Carburetor, Model 193 $\frac{1}{2}$	- Zenith Carburetor Div., General Motors Corp., Detroit, Michigan.
Eiseman Magneto - AM4 - Flange Type	- Eiseman Corporation, 60 E. 42nd St., New York
Air Maze Cleaner, Model No.1C-OBKNH	- Air Maze Corporation, Cleveland, Ohio.
Tillotson Gasoline Filter, Model OW-419	- Toledo, Ohio.

# **OPERATION SECTION**





CHARGE SIDE OF MIXER WITH UNIT ASSEMBLIES NAMED



DISCHARGE SIDE OF MIXER WITH UNIT ASSEMBLIES NAMED

## SPECIFICATIONS

7-S, MODEL 5-A - KOEHRING DANDIE

## TABLE OF APPROXIMATE WORKING CAPACITIES

This table of estimated working capacities is approximate, and the mixed concrete rating shown on the rating plate for the mixer is the only guaranteed capacity.

Proportions of Material by Volume	1-1½-3	1-1½-3½	1-2-3	1-2-3½	1-2-4	1-2½-4	1-2-5	1-2½-5	1-3-5	1-3-6
Bags of Cement	2	1	1	1	1	1	1	1	1	1

The above table is based on the use of coarse aggregate with not less than 30% void. Does not cover proportions of bank run gravel.

Drum:

High carbon steel - water tight welded construction - pressed steel heads - 8 mixing buckets with 4 blade extensions - 18 R.P.M. - center drive drum gear.

Drum Rollers:

Chilled and ground - 10" x 2.5" pinned to shaft. Shaft turns in double row self-aligning SKF bearings.

Power Transmission:

3 flexible "V" belts to gear reduction. Heat treated cut gears, ball bearing mounted, fully enclosed and running in oil - 1.5 pins SAE 90.

Charging Skip:

High carbon steel butt welded for smoothness - 7 seconds raising time - automatic shaker - splash plate - no sub-chute.

Cable Lengths:

Skip Cable - 5/16" x 22'-0"  
Hoist Cable - 5/16" x 28'-0"

Discharge Chute:

High carbon steel - self locking in either mixing or discharge position. Extends into drum over half way in discharging position.

Wheels:

4 steel - 24" x 4" on full length roller bearings.

Frame:

Welded 6" channels. Mounted on 5/16" x 2.5" 7 leaf half springs, front and rear.

Lubrication:

High pressure automotive type - Zerk fittings on all bearings.

Water Measuring Tank:

Accurate automatic syphon vertical type. Positively accurate when not level. Self cleaning. Non-bypassing balanced valve. Capacity 14 U.S. gallons. Dial calibrated in pounds and gallons.

Clutches:

Adjustable, external band type. Bands interchangeable.

Overall Dimensions:

Length skip down 111"; length skip up 80"; width 78"; height skip down 94.5"; height skip up 97.5"; height w/o water tank 83". Weight - approx. 3100 pounds.

Power:

LeRoi gasoline engine - XRP-1; Cylinders 4; horsepower 10; bore 2-7/8"; stroke 3.5"; displacement 90.8 cu. ins.; R.P.M. 1000.

Magneto:

Eiseman AM-4; breaker point caps .012 to .014". Spark plug gap .028"; valve clearance hot .008" to .011".

Carburetor:

Zenith-Venturi 15, main jet 14, comp. jet 16, idle jet 10.

Fuel Tank:

5 U.S. gallons.

Water Cooling System:

Radiator 2-3/4 gallons; oil pan 7 pints - above 32° Fahr. OE-30; below 32° Fahr. OE-10.

Belts:

Drive belts - 3 "V" Allis-Chalmers B-46.

Outside circumference 48-3/4"

Inside circumference 46"

Width 21/32"

Thickness 7/16"

Angle 38° "V"

Fan Belt - 1 "V" Gilmer #4365

Outside circumference 36-1/2"

Inside circumference 34"

Width 21/32"

Thickness 3/8"

Angle 38° "V"



## GENERAL INFORMATION

The 7-S Koehring Dandie Concrete Mixer is a self contained, portable unit designed and built to mix sand, gravel or crushed stone and cement to produce concrete. The function of a concrete mixer is carried out by the mixing drum which is equipped with combination bucket-blade extensions so arranged in the interior of the drum as to thoroughly and quickly mix the various aggregates with water into concrete of proper consistency as the mixing drum revolves. The buckets pick up the material, dump or cascade it on the blade extensions which turn it over as it drops into the buckets for repeated mixing. This continuous action goes on until the finished concrete is ready for discharge.

Operating Position:

Place the mixer as level as possible and block the wheels. Stabilizer is NOT required. Leaf spring mounted frame reduces transport and operating shocks. Remove tow bar.

Operating Cycle:

When the mixer is ready for operation, start the engine and engage the drum drive clutch to rotate the mixing drum. Then load the skip and engage the skip hoist clutch to raise the charging skip for the charging of the aggregates or batch into the mixing drum. Lower the empty charging skip immediately. The water valve is opened automatically at the proper time by the action of the skip. Close the water valve by hand as soon as the measured quantity of water from the tank is in the drum. This allows the water tank to refill before the skip is raised for the next batch. After the proper mixing interval, open the discharge swing chute to allow the concrete to be discharged into wheelbarrows, buckets or forms.

Loading The Skip:

Proper charging or loading the skip is important. By first loading the stone or gravel, followed by the cement and then the sand, you keep the skip well polished to insure a quick and uniform flow of each batch of aggregates into the drum. Do not overload the mixing drum. (Refer to Capacity Table Page 8.) After skip is properly loaded, it is raised to a position permitting the flow of the batch into the drum by means of the drum drive clutch which is engaged by the clutch lever as shown on Page 11.

Safety Lock For Skip:

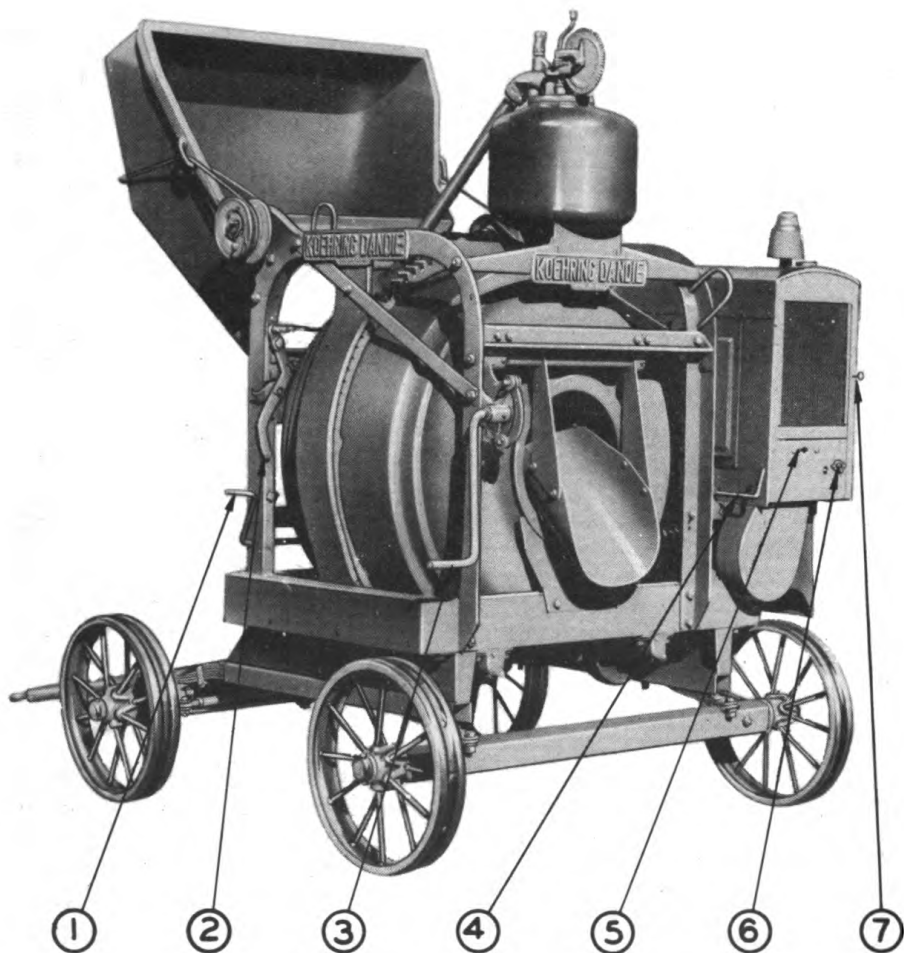
Attached to the "U" upright member of the frame and directly below the skip hoist sheave is a bent rod, cotter key locked, which is used to hold the skip in raised position. This is a safety measure to be used when moving the machine.

Water Volume Control:

It is important that the proper volume of water is used for each batch. The amount discharged into the drum is accurately controlled by a vertical syphon measuring tank and can be adjusted to a fraction of a pint. In actual practice the materials do not consistently have the same moisture content due to weather conditions and methods of stock-piling thus making it necessary to change the measuring tank adjustment as required.

Care of Mixer:

No machine, and especially a mixer, can be any better than the care it receives. Jobs and operators are judged by the appearance of their equipment. A clean machine usually is properly lubricated. If concrete is allowed to accumulate on the mixer it eventually will obstruct the lubrication fittings, retard the action of the working parts and cause excessive wear. It is common practise to coat the working parts and especially the drum with FORM Oil (as used for coating concrete forms) or waste oil, such as is drained from the motor. This will prevent concrete from sticking to the paint or bare steel. To clean the mixer after the day's operation, wash it well with hose pressure water. Knock off such portions of concrete not affected by the washing action. Do not pound the skip or drum shell. Scour the mixing drum with gravel or stones and water before shutting down at noon and night. Allow the scouring action to continue for at least five minutes. Discharge the gravel or stones and flush the drum interior with water.



- (1) Skip Hoist and Brake Lever. (2) Water Control Operating Lever. (3) Discharge Swing Chute Operating Lever. (4) Drum Drive Clutch Lever. (5) Starting Crank Socket. (6) Ignition Switch. (7) Choke Control Rod.

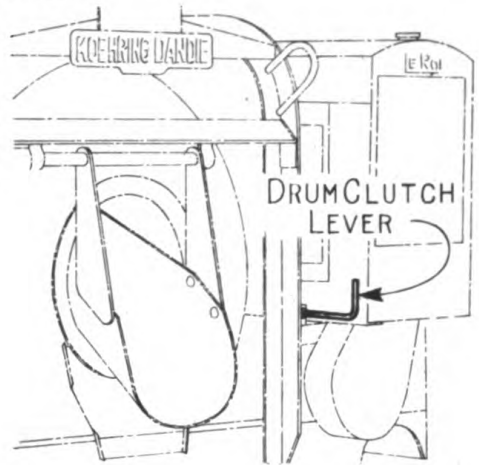
OPERATING CONTROLS

DRUM CLUTCH:

The drum clutch lever is located on the discharge side of the mixer between the drum and motor. The clutch is of the external band type. The lever is pushed in to engage the clutch.

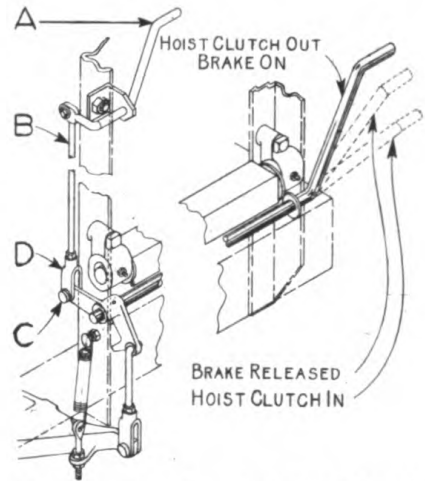
CAUTION

THIS LEVER MUST BE IN RELEASE POSITION BEFORE STARTING THE MOTOR-



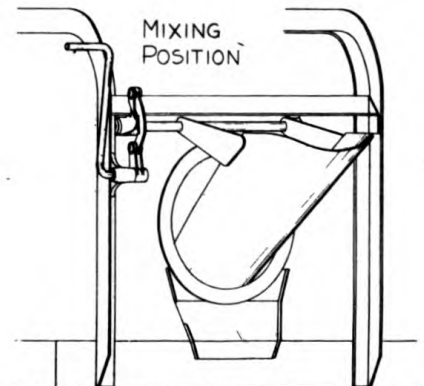
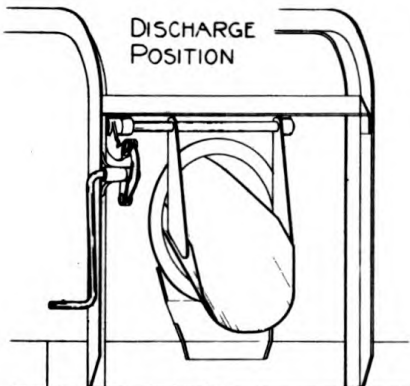
CHARGING SKIP OPERATING LEVER:

The skip operating lever engages the clutch and controls the brake. To raise the skip move the lever away from the drum, being sure to move the lever far enough to lock into position. The action of the skip - just before it reaches the top elevation - will automatically disengage the clutch and apply the brake. This same lever controls the skip brake and is used to lower the skip to the charging position. The combined clutch and brake has a neutral range between either action. To lower the skip to the charging position, move the lever to neutral then ease the skip down by allowing the brake to drag slightly. Do not drop abruptly. The skip hoist clutch is disengaged and the brake automatically applied when the skip contacts lever "A". To increase the discharge angle of the skip, remove pin "C" and shorten rod "B" by adjusting clevis "D". To decrease the discharge angle of the skip, lengthen rod "B".



DISCHARGE SWING CHUTE LEVER

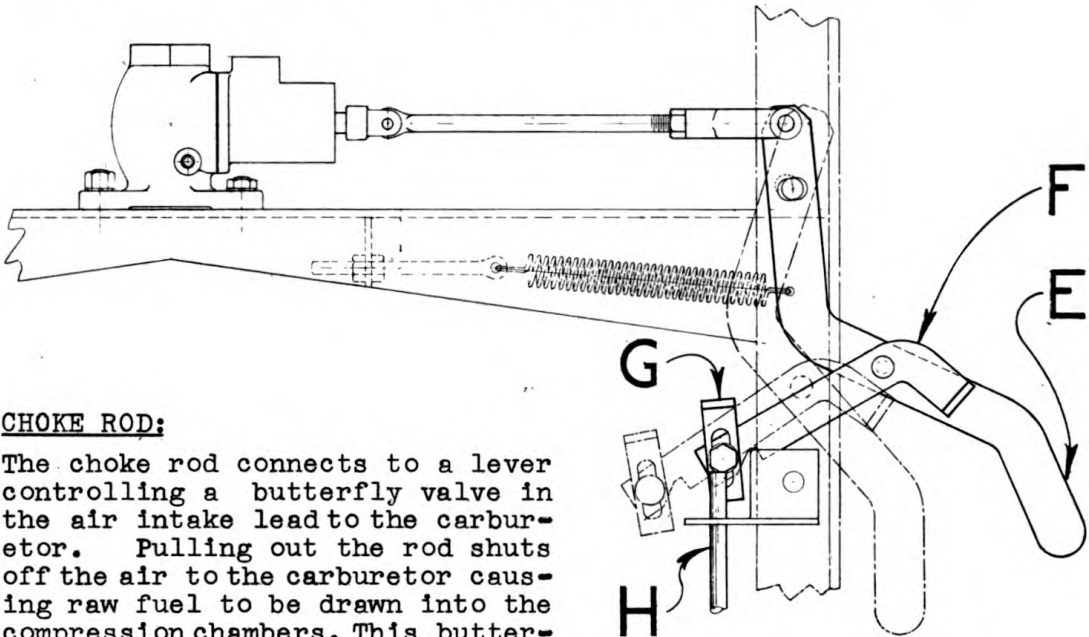
The discharge swing chute is controlled by a lever with an over center link arrangement that locks in either position as shown in the illustration below.



## OPERATING CONTROLS (Cont'd.)

WATER CONTROL LEVER:

The action of the skip automatically trips the water valve lever by releasing latch lever "F" which allows the spring to open the valve and allows the water to discharge into the drum. The valve is closed by hand. Pull lever "E" far enough to permit latch lever "F" to fall into lock position. Part "G" is an adjustable lug which is set to control the desired time that the skip trips the lever. Part "H" is the rod actuated by the skip to trip the water lever. Lever shown in dotted line is the open position.

CHOKE ROD:

The choke rod connects to a lever controlling a butterfly valve in the air intake lead to the carburetor. Pulling out the rod shuts off the air to the carburetor causing raw fuel to be drawn into the compression chambers. This butterfly valve is spring controlled and will return to the open position when released. Use the choke only enough to start the engine and keep it running. The choke is primarily a cold weather starting aid and may not be needed for hot weather, or when engine is warm.

IGNITION SWITCH:

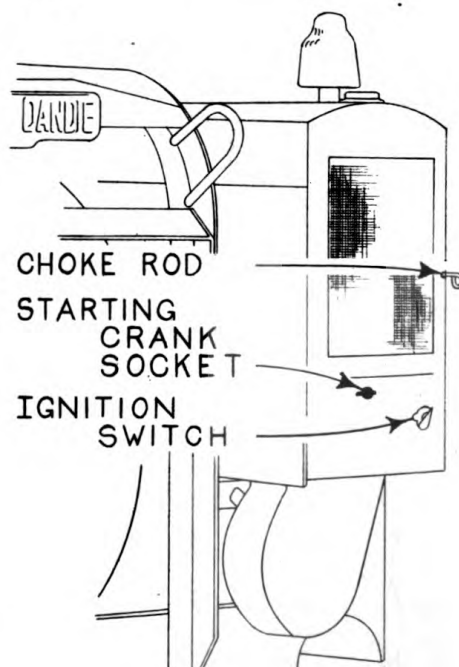
The ignition switch is of the fixed key type which is turned to the "ON" or "OFF" position. The "ON" and "OFF" position is clearly marked on the switch base.

THROTTLE:

No lever. Full governor control.

STARTING CRANK:

The starting crank is removable. It is stored in a compartment under the motor.



## PRECAUTIONS

DO NOT RACE A COLD ENGINE.IMPORTANT:

Do not tamper with the engine governor. The governor is correctly set at the factory. Do NOT remove the grease cup on the water pump and install pressure type grease gun fittings. It is very important that this cup, with its reserve supply of grease, be turned down snug daily. Use water pump grease ONLY. Investigate the cause of back-firing or mis-firing immediately.

STARTING MIXER:

Check oil level in gear reduction case. Close the water valve. Set the water indicator to the required amount. Connect the water supply hose to the water tank pipe line and fill the tank. Set the discharge chute to the mixing or closed position. Release the mixing drum clutch and the charging skip clutch. Start the engine. Engage the mixing drum clutch. Load the charging skip.

STORING THE MIXER:

At the end of the season, or between jobs, the mixer should be stored in a dry protected place. Never leave the machine exposed to the elements. The following procedure is to be followed if the mixer is to be stored for thirty days or more. The lubrication precautions should be repeated every three months thereafter. Knock off accumulations of concrete and wash down thoroughly. Lubricate all bearings. Cover bare steel parts with oil or grease. The charging skip and charging skip hoist cables must be thoroughly and carefully covered with grease or heavy oil. Drain the water measuring tank and valve. Make sure all water is removed from the drum. Drain water from engine cooling system which has two drain cocks; one located at the lower right hand corner of the radiator and the other in engine block on mixer drum side. Drain the fuel system - tank, lines, carburetor and strainer. A gummy substance will form if the gasoline is allowed to stand in these parts. This gum accumulates in the carburetor, in the carburetor jets and passage, and will result in serious trouble. When necessary these gum deposits can be dissolved with a solution of one part alcohol and one part benzol, or acetone. After the engine has cooled, remove the spark plugs and pour 1/4 pint of lubricating oil into each cylinder. Crank the engine (with switch in OFF position) two or three revolutions to distribute the oil over the cylinder walls. Replace the spark plugs. Cover the exhaust pipe and air intake to prevent moisture from entering the engine.

STARTING MIXER THAT HAS BEEN IN STORAGE:

The mixing drum and its related parts usually require little attention. However, there are certain precautions that need to be followed in regard to the engine. Remove the spark plugs and pour a mixture of one part gasoline and one part light lubricating oil into each cylinder - one tablespoonful per cylinder is enough. Crank the engine rapidly for several revolutions - this will blow excess oil out of the spark plug holes and wash old oil from the valves and pistons. This also tends to loosen any tight piston rings. Install spark plugs. Fill the crankcase with the correct amount of the specified lubricating oil. Remove covers from exhaust pipe and carburetor air inlet. Fill the water cooling system with clean water. Fill the fuel tank with clean gasoline.

## PRECAUTIONS (Cont'd)

LUBRICATION:

Be certain that the mixer is properly and thoroughly lubricated. Oil all clevis pins and joints with lubricating oil. Check the oil level in the engine crankcase. See that it is filled to the correct level with the correct grade of oil. Check the oil level of the gear reduction case. Complete lubrication instructions and chart on Page (34).

COOLING SYSTEM:

This engine is water cooled - fill the radiator. Capacity of cooling system is approximately 2-3/4 U.S. gallons. Do not use an oily or dirty container when filling or adding water. Avoid alkali water. The water available may deposit an insoluble scale on the walls of the water jackets and radiator, and cause overheating of the engine. In such instances use rain water or a suitable water softener to prevent this deposit. After scale has once formed it is almost impossible to remove. When the temperature is 32° F. or lower, there is danger of the water freezing. To prevent this condition, either drain the water from the system after each day's operation, or use the following recommended anti-freeze percentages to add to the water.

NOTE: Alcohol must be added from time to time as its rate of evaporation is much higher than that of water.

## ANTI-FREEZE PERCENTAGES

Freezing	Ethylene Glycol (Prestone) Per Gallon	G.P.A.*. Radiator Glycerine Per Gallon	Denatured Alcohol Per Gallon
10° F.	2 pt.	4 pt.	2-1/2 pt.
0° F.	2½ pt.	5½ pt.	3 pt.
-10° F.	3 pt.	6 pt.	3-1/2 pt.
-20° F.	3½ pt.	7 pt.	4 pt.
-30° F.	4 pt.	8 pt.	5 pt.
-40° F.	4½ pt.	-	5-1/2 pt.
-50° F.	4¾ pt.	-	6 pt.
-60° F.	5 pt.	-	6-1/2 pt.

\* G. P. A. denotes Glycerine Producers Association.

## DRAINING

The engine has two drain locations - one for the radiator, located on the lower right hand side and the other, for the block, located on the side of the engine nearest the mixing drum.

## PRECAUTIONS (Cont'd)

FUEL SYSTEM:

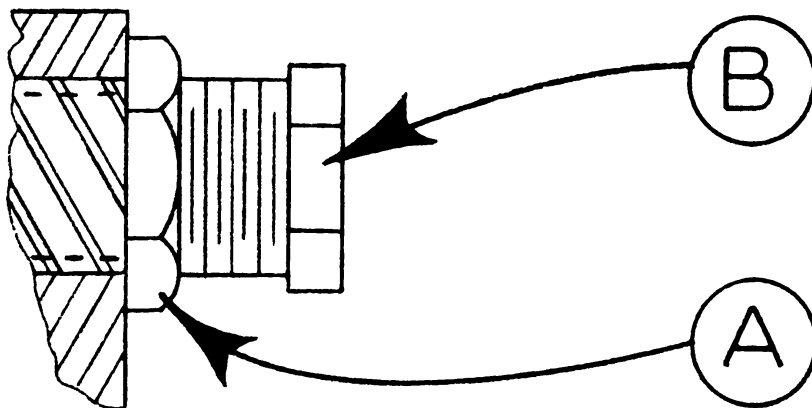
The capacity of the gasoline tank is approximately 5 U.S. gallons. Because the tank is located above the motor the gasoline flows to the carburetor by gravity. This motor does NOT have a gasoline pump.

CAUTION: Never fill the gasoline tank with the engine running, when near an open flame, or when smoking. When filling the tank keep the funnel in contact with the tank to avoid the possibility of a static spark igniting the gas. Do not light matches or use flame lanterns near the gasoline. The vapor, within a radius of several feet, is strong enough to be highly explosive.

STARTING ENGINE:

Fill the tank with clean gasoline--approximately 5 U.S. gallons. Fill the cooling system with clean water -- approximately 2-3/4 U.S. gallons. Fill the crankcase with oil to the proper level - see lubrication instructions and chart on Page 36. (Be sure crankcase has been drained before filling with fresh oil.) The drain pipe is on right hand side of engine. Grease the water pump by turning down the grease cup. Use water pump grease only. One or two turns of the cup is sufficient. Add one pint of light cylinder oil to the gasoline in the fuel tank. Do this for the first two fillings only. Remove the spark plugs and pour about one tablespoonful of a mixture of half oil and half gasoline into each cylinder to insure lubrication of the pistons and cylinders when the engine first starts. Open the valve in the gasoline line and allow the carburetor float chamber to fill. Check to see that the drum drive clutch and skip hoist clutch are disengaged. The engine is now ready to start. With the ignition switch in the "OFF" position, hold the choke control out as far as possible and crank the engine over two or three half turns. Release the choke control and turn the ignition switch to the "ON" position. DO NOT do this with a WARM engine; ONLY WHEN THE ENGINE IS COLD.

## GOVERNOR ADJUSTMENT



Loosen governor adjusting lock nut (A). Turn governor spring adjusting nut (B) in to increase engine speed (R.P.M.) turn nut (B) out to decrease speed. After proper adjustment has been made tighten nut (A).

(For cross sectional view of governor see page 138)

## PRECAUTIONS (Cont'd.)

Remove the valve housing covers. Start engine and let run at idle speed. Check to see if any valves are sticking. If so, pour a small quantity of penetrating oil on the offending valve stem until it is loose. Assemble the valve housing cover. DO NOT RACE A COLD ENGINE.

COLD WEATHER OPERATIONS:

If the mixer is to be operated outside in temperature of 32° F. or lower the precautions noted below should be followed;

MIXER WATER SYSTEM:

Special care should be taken that the water measuring tank, the valve, and the water pipe line do not freeze. Drain the tank, the valve, the line, and the drum each evening, or when necessary to shut down for any length of time during the day.

DO NOT fill the mixer water system at the start of the day until the mixer is absolutely ready to start work.

LUBRICANTS:

For complete lubrication instructions and chart see Page (34).

ENGINE FUEL SYSTEM:

Use a high test winter grade of gasoline for easy starting and economy of operation. Fill the fuel tank at the end of each day's run. This is important. Condensation will form on the walls of the empty portion of the tank and the resultant moisture will freeze in the gasoline and carburetor. Clean the gas strainer frequently.

COOLING SYSTEM:

If there are indications that the temperature will be 32° F. or lower, follow instructions as recommended under "ANTI-FREEZE PERCENTAGES", - Page (14). Always be safe - Do not take any chances.

CAUTION: Never operate the engine after it is warm with the choke control pulled out, as this will cause an excess of raw gasoline to be drawn into the cylinders, resulting in dilution of the crankcase oil or probably stopping the engine due to an over-rich mixture. In extremely cold weather, when starting might be difficult, crank the engine for a few revolutions with the choke control pulled out. It might be necessary to pour a small quantity of gasoline into each cylinder through the spark plug holes. Wait a few moments for the gasoline to vaporize, turn on the switch and proceed as before.

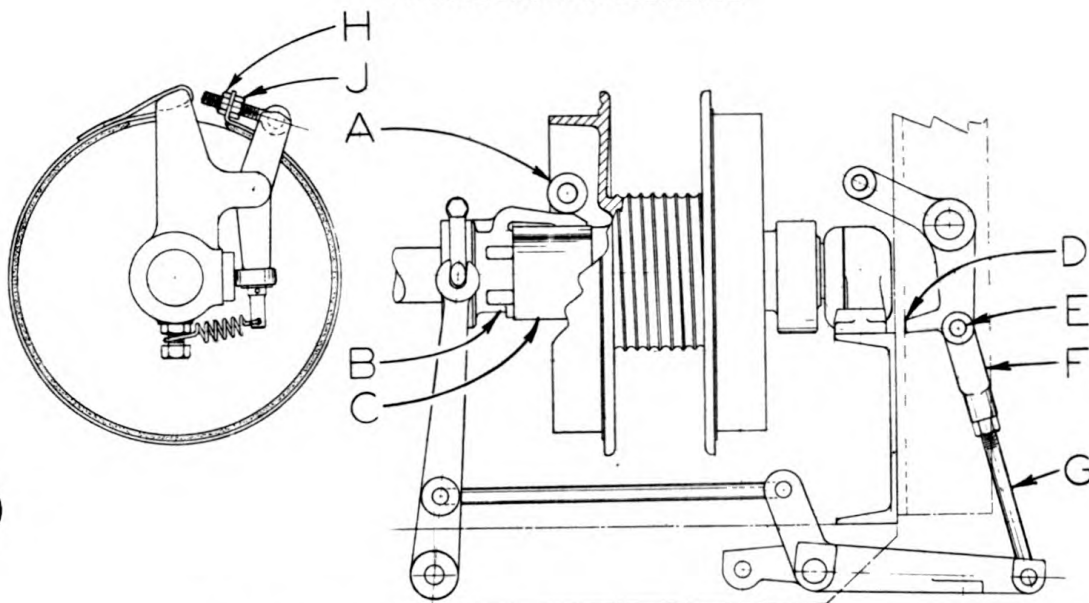
Check the air cleaner for correct oil level. Fill to line marked on sump with correct lubricant. See lubrication instructions and chart on Page 36.

STOPPING ENGINE:

Turn ignition switch to "OFF" position. In extremely cold weather, after stopping the engine at the end of the day's run, it is advisable to drain the oil into a clean container. This oil is to be kept in a warm place or heated before being poured into the engine again. This will insure easy starting and proper lubrication at once.



OPERATING ADJUSTMENTS

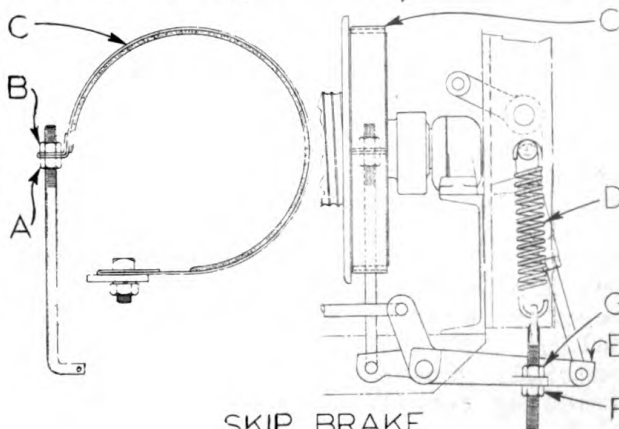


CHARGING SKIP CLUTCH AND DRUM DRIVE CLUTCH

To adjust the clutch band for wear of the lining, disengage the clutch, loosen nut "H" and take up the nut "J". Be careful to keep the band aligned with the drum. If the clutch does not work properly after the band has been adjusted, check the clutch mechanism. Be sure that the clutch can be fully engaged. To determine if the clutch is fully engaged, observe the following: Roller "A" must ride on top of the flat surface of the extension of the clutch sleeve "B". The hub of clutch sleeve "B" must bear against the hub of the clutch spider "C". The face "D" must bear against the main frame channel as shown in the illustration. These adjustments are obtained by removing clevis pin "E" and turning the clevis "F" to shorten or lengthen rod "G" as desired. (For skip clutch only)

SKIP BRAKE:

To adjust the charging skip brake band "C" for wear of the lining, release the brake band by fully engaging the charging skip hoist clutch; then loosen nut "A" and take up nut "B". Be careful not to twist the band when jamming the nuts. The action of the brake band is spring controlled. This spring "D" is located on the side of the mixer. The lower end of the spring is attached to the brake lever "E" by an adjusting bolt. The spring adjustment must be strong enough to apply the brake and hold it when the charging skip clutch is released. To increase the tension of the brake spring, loosen nut "G" and take up on nut "F".



SKIP BRAKE

## OPERATING ADJUSTMENTS (Cont'd)

DRIVE BELTS:

The slack of the drive belts should be checked frequently to assure maintenance of the correct tension. The tension is correct when the belt can be depressed with a slight thumb pressure, approximately  $\frac{3}{4}$  inch midway between the two pulleys as shown in the illustration. To take up any slack in the multiple "V" belts, loosen nut "B" and take up on nut "A". Taking up on nut "A" moves the gear reduction case, which pivots on the drive shaft, in the direction of the arrow (as shown in the illustration). Move sufficiently to get the proper tension on the belts.

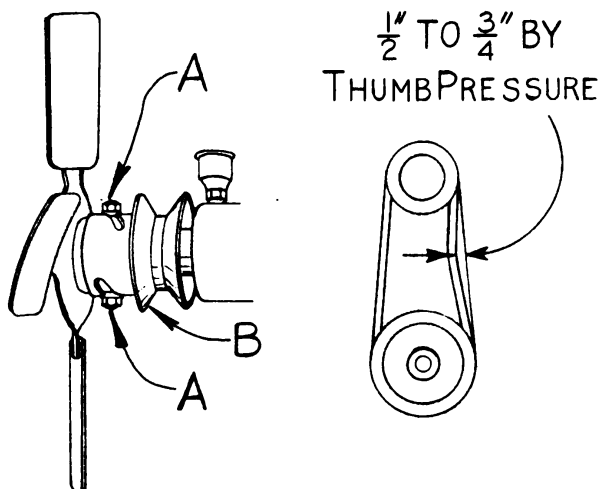
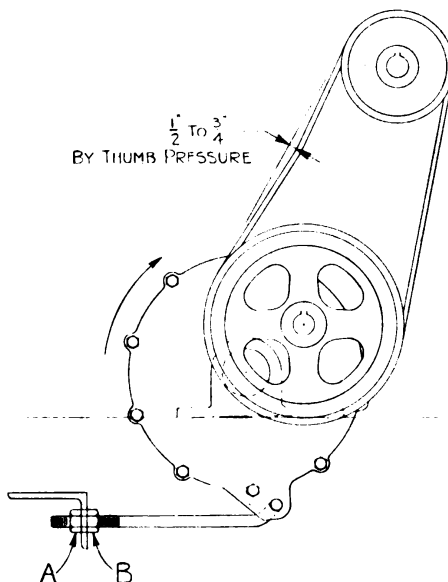
When replacing worn out or broken belts, loosen nut "A" and take up on nut "B". This action rotates the gear reduction case toward the motor and shortens the distance between the two pulleys - this will allow sufficient slack to install new belts. With new belts in place proceed to adjust as mentioned in the preceding paragraph.

"V" belts tighter than specified tension will wear rapidly.

FAN BELT:

The slack of the fan belt should also be checked frequently to assure maintenance of the correct tension. The tension is correct when the belt can be depressed approximately  $\frac{3}{4}$  inch midway between the two pulleys as shown in the illustration. The tension of the fan belt is adjusted by changing the width of the pulley groove.

To change the width of the pulley groove, loosen nuts "A", then turn the pulley flange "B" in toward the belt to tighten it and out to loosen it. Retighten the nuts "A" after the correct belt tension is obtained. A tight "V" belt will wear rapidly. Also allowing the belt to contact the bottom of the pulley groove will cause excessive wear. Adjust the pulley to the narrowest possible groove without increasing specified belt tension.

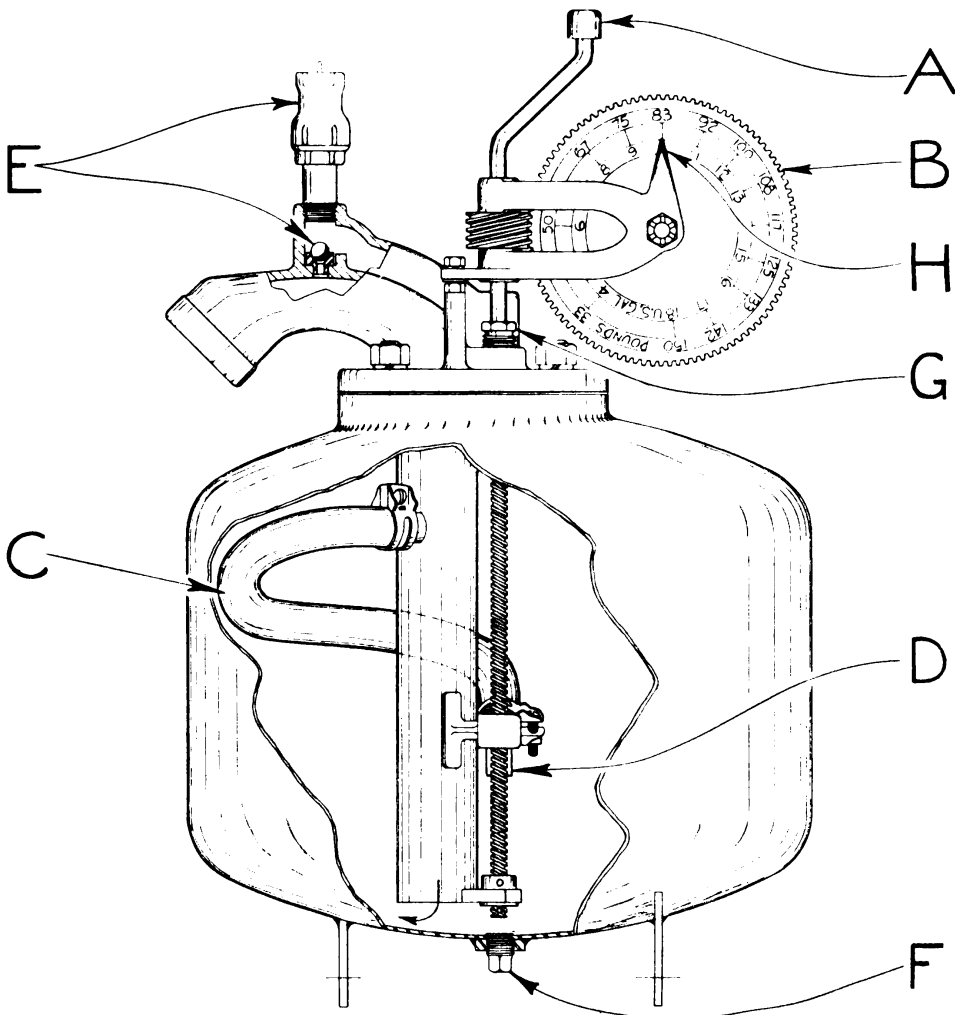


## OPERATING ADJUSTMENTS (Cont'd)

To remove and replace the fan belt refer to Engine Maintenance, Page 96.

WATER VOLUME AND SETTING:

The capacity of the water tank is 14 U.S. gallons. It is a syphon type tank. The water enters and leaves through the top of the tank. The crank "A", on the top of the tank is turned to control the amount of water discharged. Dial "B", calibrated in gallons and pounds, indicates the amount of water being used. Turning the crank "A", which also revolves the dial "E", moves the traveling nut "D" up or down on the center threaded control rod. The traveling nut "D" has an opening on the bottom side. One end of the syphon hose "C" is attached to the traveling nut. When the water syphons out of the tank to the level of the opening on the lower side of the traveling nut "D" the syphon action is broken by the entrance of air. This syphon action is positive and constant. The quantity of water discharged is not affected by the tank being set at an angle because the traveling nut "D" is located exactly in the center of the tank. Two check valves "E" are provided to eliminate the possibility of air pockets when the tank again fills with water.



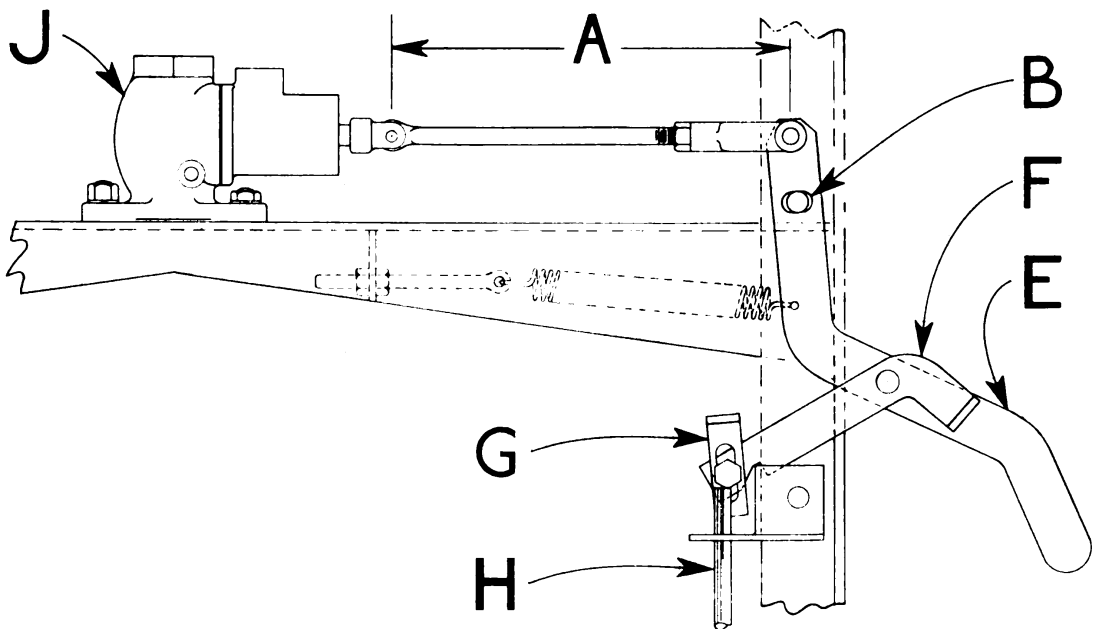
## OPERATING ADJUSTMENTS (Cont'd)

To set the indicator dial "B" so that the measured amount of water will correspond with the setting on the dial, check as follows:

Turn the control crank "A" to place the traveling nut "D" either in the extreme top or bottom position. The pointer "H" should now be on the line which is slightly to the left of 33 pounds on the face of the indicator dial "B". If the indicator dial does not stop on this line, then proceed as follows:

DO NOT change the position of the traveling nut "D". Remove the indicator dial "B" and replace it so that the pointer "H" is on the line which is slightly to the left of 33 pounds. The indicator dial is now properly set and will correctly measure any amount of water that is required. (See illustration Page 19)

## Water Control Valve and Lever

WATER CONTROL VALVE & LEVER

The measuring tank is automatically discharged through the control valve by raising action of the charging skip moving rod "H", which strikes lug "G", causing lever "F" to unlatch. This action allows the control valve "J" (which is spring controlled) to open.

When the measured quantity of water has been discharged into the mixing drum, the control valve "J" is closed by pulling lever "E" by hand far enough for lever "F" to latch. This action closes the opening into the mixing drum and allows the water from the supply line to again fill the measuring tank.

To adjust the control valve operating lever, set the hand lever "E" in the latch position. Set distance "A" so that the spring pull is transmitted to the valve stem. There must be clearance at both ends of the slot "B" when the lever is in the latched position.

OPERATING ADJUSTMENTS (Cont'd)

WATER CONTROL VALVE POSITIONS

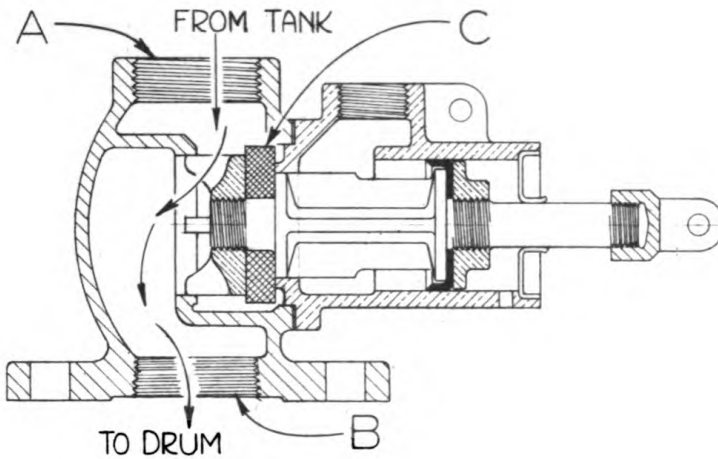


Fig. 1 - Valve Open From Supply Line to Measuring Tank.  
Closed To Mixing Drum.

Illustration #1 shows the control valve opening into the mixing drum. "A" is the lead from the measuring tank which is now open, allowing the water to be discharged through "B" into the mixing drum. "C" is the rubber disc in position against the seat which shuts off the water from the supply line. Part "F" is the leather cup which balances the pressure against the disc. It also seals the closed end of the valve when the full pressure of the supply line is held in this end of the valve due to the valve being shut off to the tank during the interval that the water is discharging into the mixing drum, or when the valve is open to the tank (closed to the drum), and the tank is completely full. Illustration #2 shows the rubber disc "C" against the seat which seals the opening to the mixing drum. The valve is now open from the supply line "D" to the measuring tank.

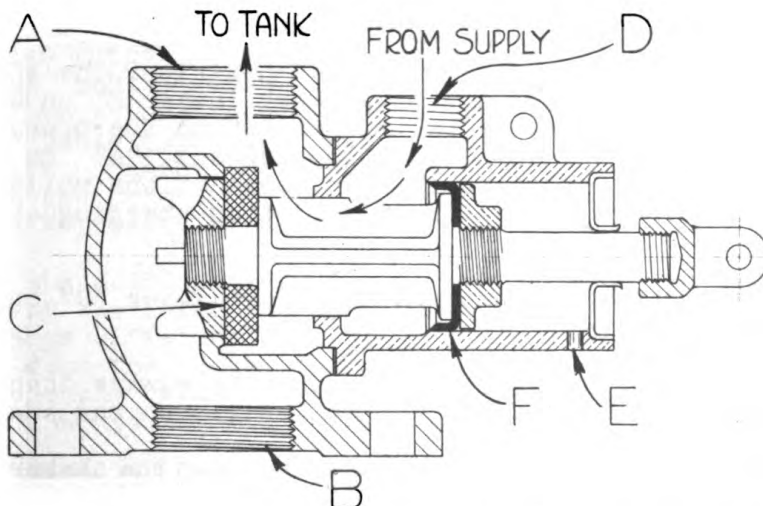
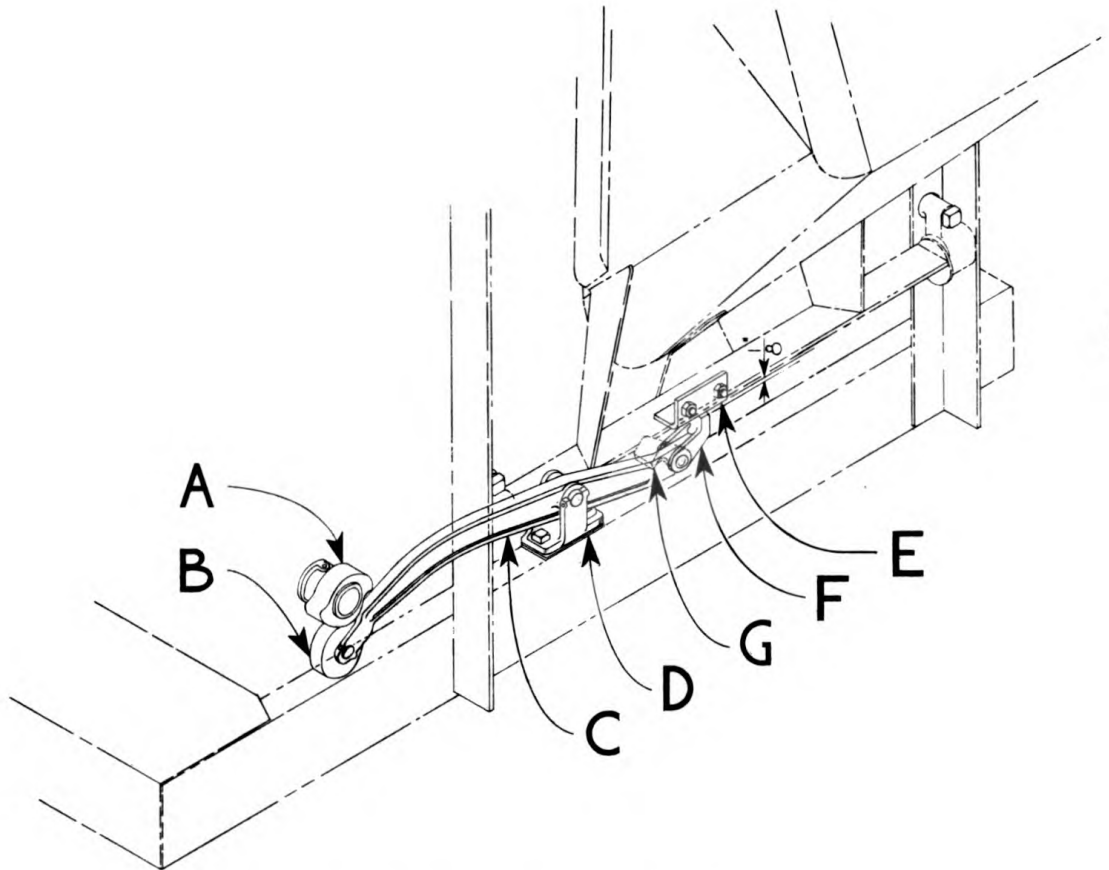


Fig. 2 - Valve Open From Measuring Tank To Mixing Drum.  
Supply Line Closed

## OPERATING ADJUSTMENTS (Cont'd)

## SKIP SHAKER



## OPERATION OF THE SKIP SHAKER

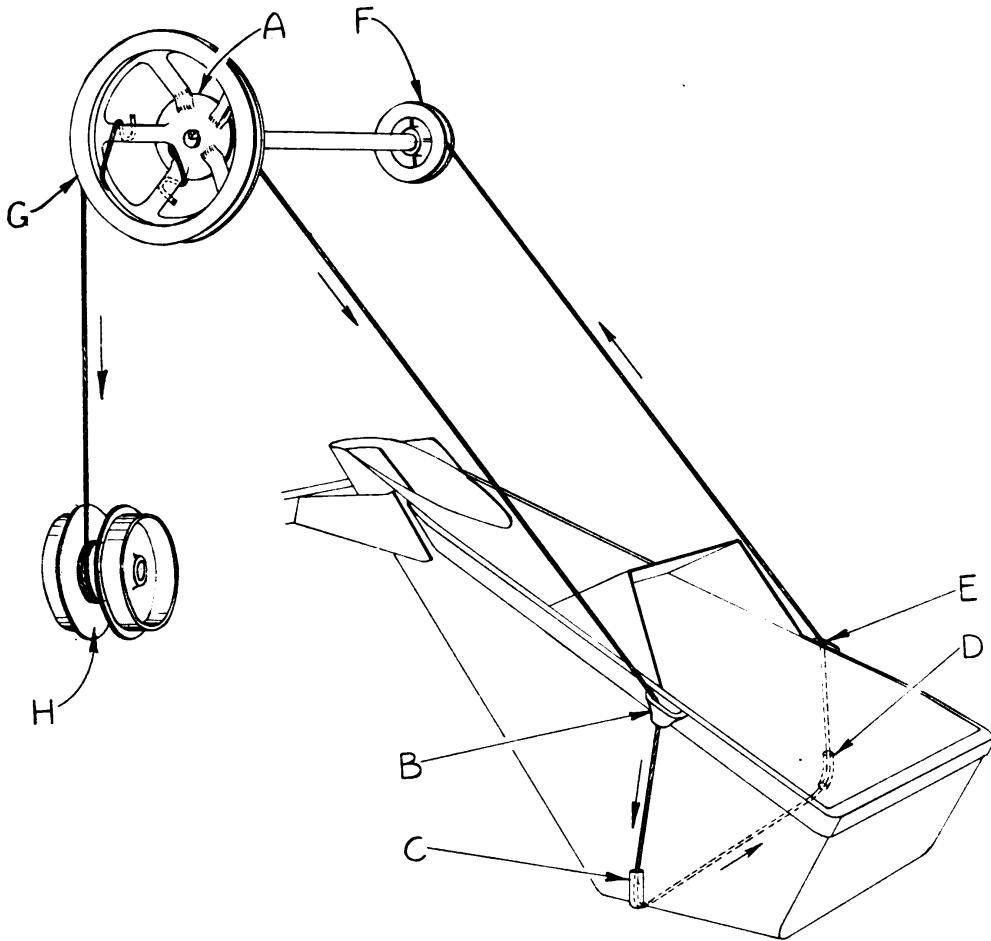
When the charging skip reaches the raised position, the shaker pad "E" on the skip pivot contacts the throwout lever "F" on the shaker arm "C". This action brings the roller "B" on the opposite end of the shaker arm up into the path of the cam "A" on the drum drive shaft. The rotation of the cam against the roller raises the skip and allows it to fall in the slotted charging skip pivot bearings.

To disengage the shaker, swing the throwout lever "C" up on the back of the shaker arm.

When the charging skip is down the shaker is always inactive regardless of the position of the throwout lever on the shaker arm.

To adjust, there must be 1/8" clearance between the shaker pad "E" and the lever (engaged position "F") when the charging skip is DOWN. This clearance is obtained by inserting shims "D" below the shaker arm support.

SKIP CABLE REEVING



To reeve a new SKIP cable, uncoil and straighten the cable. Be sure all of the twist is taken out. Start by anchoring one end to the small differential skip drum "A". Thread the other end of the cable through skip cable guide "B" and then through the tubular guide "C" on the edge of the skip; now bring the cable across the bottom side of the skip, then through the tubular guide "D" on this edge of the skip, then through guide "E" and up to the cable drum "F" on the right hand end of the skip hoist shaft. Anchor the cable to this drum. Wind up the slack cable on the drums. (The cable leads over the outside top of the large differential drum.)

To reeve the HOIST cable, uncoil and straighten the cable. Be sure all of the twist is taken out. Anchor one end of the cable to the large differential drum "G"; wrap the cable on the drum "G", leading down the edge of the drum "G" towards the mixing drum, leaving enough cable to lead down to the hoist drum "H" and to have 1-1/2 wraps. Anchor the end of the cable to the hoist drum.

CABLE LENGTHS		
Skip Cable	-	5/16" x 22'0"
Hoist Cable	-	5/16" x 28'0"

## ENGINE ACCESSORIES

## IGNITION SYSTEM

MAGNETO:

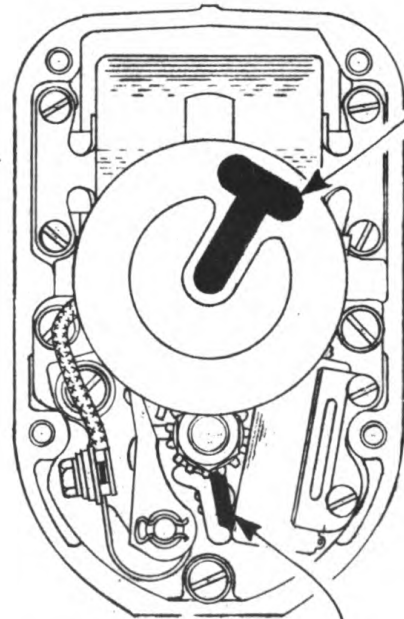
Ignition or spark, to ignite the charge of fuel, is produced by a high tension magneto. The exact time the spark occurs in relation to the position of the piston in the cylinder is very important. If the spark occurs too soon, the engine will knock, probably overheat and will be dangerous to crank. If the spark occurs too late, the engine will overheat and will not develop its full power. This engine is equipped with an Eiseman Model AM-4 magneto. It has 2 lobe cam and two pawl impulse starter, carbon brush spark distribution and is driven at engine speed.

TIMING MAGNETO:

This magneto has a fixed spark and should be timed to the engine with the flywheel in the firing position as follows:

Before mounting the magneto on the engine, rotate flywheel to firing mark on compression stroke in cylinder #1. Then turn magneto rotor by hand in the reverse of operating direction (to avoid impulse starter engagement) until metal insert "A" in distributor disc is at No. 1 cable position. Engage impulse starter lugs in slot with magneto slightly off vertical, if necessary.

METAL INSERT "A"



FELT WICK

**LUBRICATION**

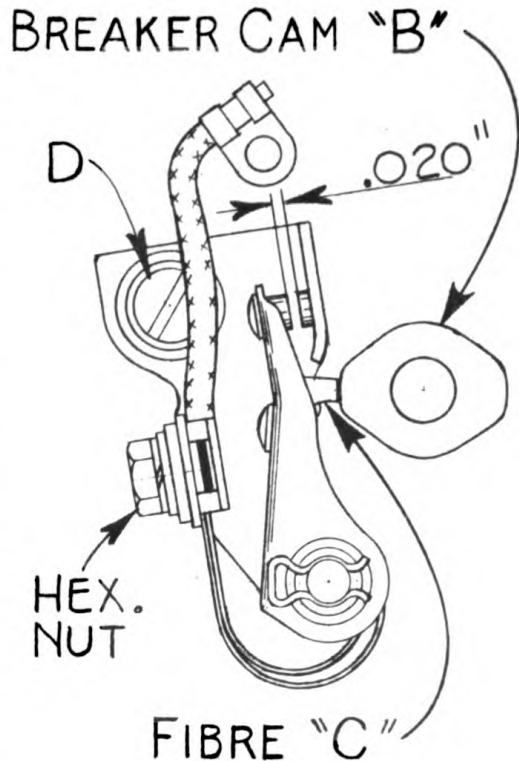
All the ball bearings used in the magneto are grease packed and should last for at least two years. The large oil-impregnated distributor shaft bearing contains adequate reserve lubricant. A SINGLE drop of medium grade crankcase oil may be applied to the felt wick after each 512 hours.



## ENGINE ACCESSORIES (Cont'd)

SETTING CONTACT POINTS:

Check the contact point opening after every 1024 hours of operation. Use a .020" feeler gauge. The gap between the contacts, at full separation, should be within .019" and .021" limits. Rotate the flywheel slowly in reverse of normal operating direction (to avoid impulse starter engagement) until breaker lever Fibre "C" rests on nose of breaker cam "B", and then insert the .020" feeler gauge. If the gap between contact points requires a adjustment, loosen (but do not remove) breaker plate fastening screw "D", and move the entire breaker assembly in either direction -- toward the breaker cam "B" to increase gap, or away from "B" to decrease gap. Recheck point gap after tightening breaker point fastening screw. Do not disturb hexagon nut, holding breaker tension springs.

DISTRIBUTOR CAP:

Both the inside and outside of the distributor cap should be kept free of dust and oil. To assure long life care must be taken to keep the ventilator holes open at all times. The distributor rotor must also be kept clean. To clean these parts use a soft cloth, dampened with pure high grade gasoline to remove any carbon dust that may be deposited on the inner surfaces. Allow to dry and re-assemble. NEVER use emery cloth, sand paper, or other abrasive material. Do not remove the lubricant from the breaker cam. Do not use a steel file on the contact points. A carborundum stone can be used to clean or dress their surfaces when necessary.

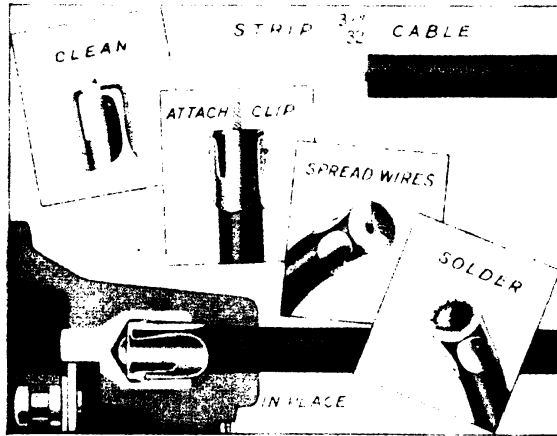
SPARK PLUGS:

Careful tests have been made to select the proper spark plugs for this engine. When necessary to make a change, replace with the same make and size or its exact equivalent. The spark plugs should be removed every 256 hours for cleaning and checking. Clean the spark splugs and set the gap between the electrodes at .025". When making an adjustment of the electrodes always bend the outer electrode. NEVER bend the center electrode, as this might damage the insulator. If the gap between the electrodes is too large due to burning or improper setting, the engine will be hard to start and will misfire and probably cause failure of the magneto. The recommended method of cleaning spark plugs is sand blasting. NEVER scrape or clean the insulator with anything that injures it. A rough, scratched porcelain collects carbon and dirt.

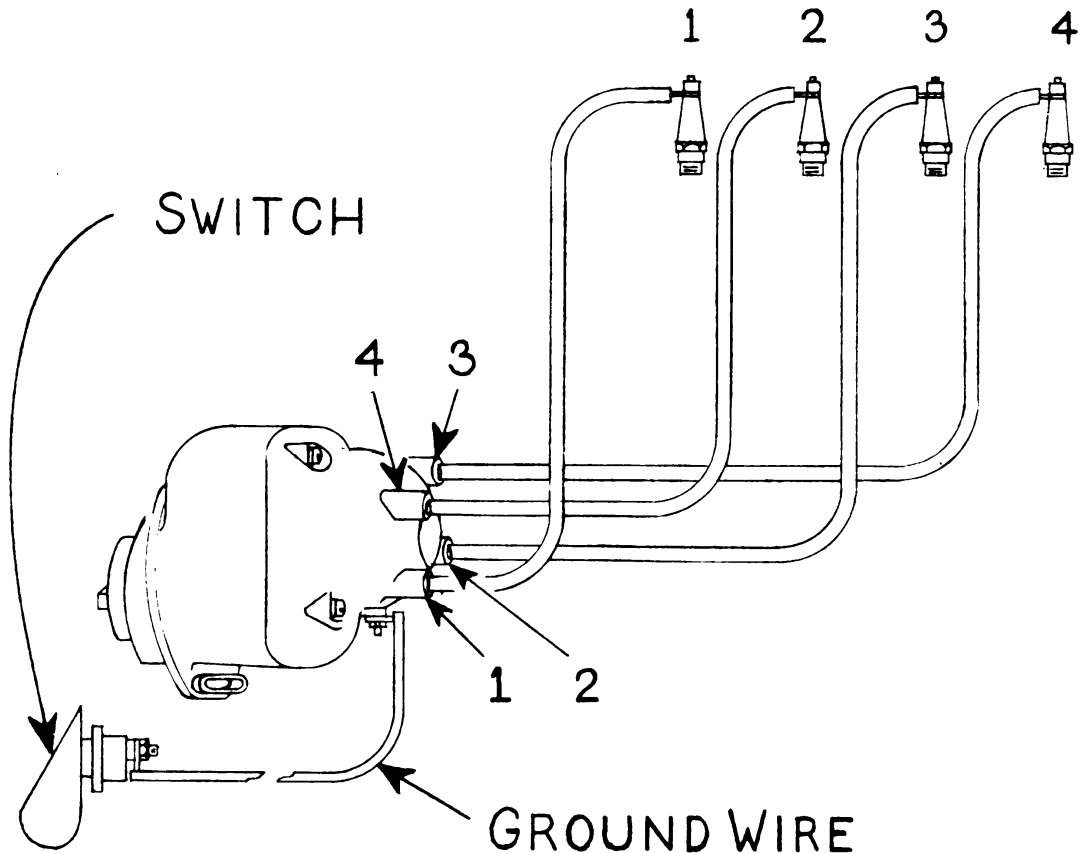
ENGINE ACCESSORIES (Cont'd.)  
IGNITION SYSTEM (Cont'd.)

SPARK PLUG CABLES:

Promptly replace cracked or chafed cables. Illustration shows proper method of installing the cable clips. If the spark plug cables are removed for any reason, note the position so that they can be returned to the proper places as indicated by name plates on each cable. Be careful that the cables do NOT come in contact with the engine head - the heat of the engine head will ruin the cable insulation, causing the spark plug to be shorted out.



FIRING ORDER - 1-3-4-2



CORRECT SPARK PLUGS

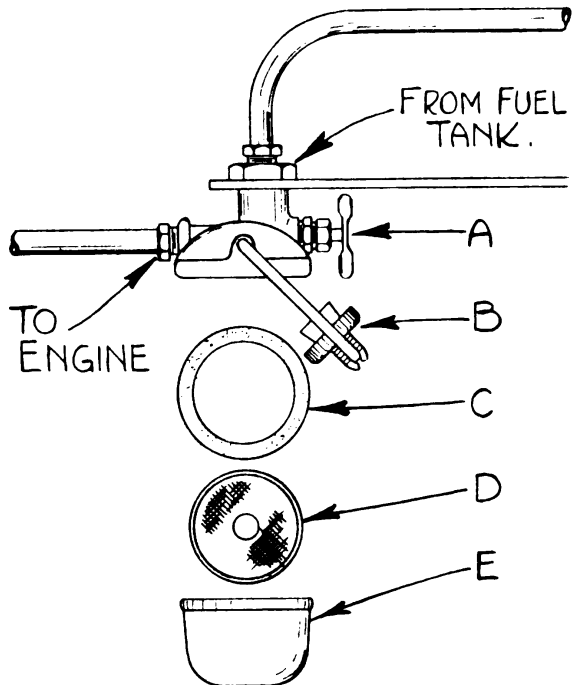
Size	Make	
18 MM	Champion	A.C.
	C-7	87-S

## ENGINE ACCESSORIES (Cont'd)

GASOLINE FILTER:

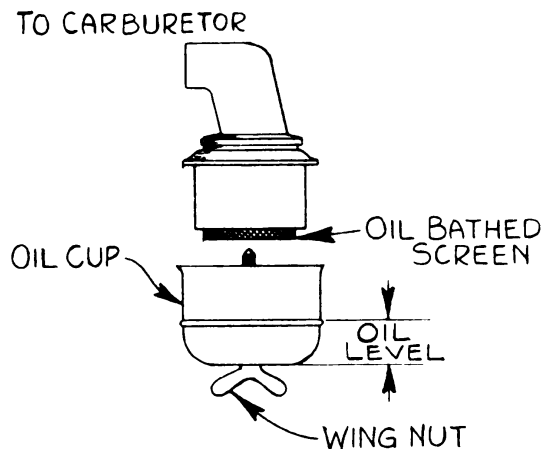
The gas strainer should be cleaned when the bowl shows traces of sediment, dirt or water. The strainer must be disassembled to be cleaned. Proceed as follows:

1. Close the shut off valve "A".
2. Take strainer apart by loosening thumb wheel "B" enough to swing the bail to one side.
3. Clean the sediment bowl "E" and also the screen "D" if necessary. Be careful of the cork gasket "C".
4. Reassemble the strainer - be careful that the cork gasket "C" is properly placed.
5. Open shut-off valve "A". Check to see that cork gasket "C" does not leak.

AIR CLEANER:

This is an oil bath type of air cleaner. The air is first taken into the oil cup where it passes through a bath of oil. The air next, on its way to the intake manifold, must pass through several oilbathed screens where all the fine dust is removed. The oil from the screen continually drains back into the oil cup carrying any dirt along with it. This dirt settles in the bottom of the oil cup. Also some of the oil is being lost through this process. The oil cup must be thoroughly cleaned and refilled at regular intervals with a new, clean oil. The normal life span of any engine is almost entirely dependent upon the care and attention given to the air cleaner.

Service the air cleaner every eight hours regularly - oftener if necessary. To service proceed as follows: Remove the oil cup; throw away the oil it contains and wash the cup. Refill the cup to the oil level mark with the same grade of oil used in the engine crankcase, and reassemble. Approximately every 64 hours remove the whole air cleaner from the engine. Take it completely apart and wash all pieces thoroughly in gasoline - especially the screens. After all parts have been thoroughly cleaned, reassemble; fill with oil to proper level in cup, and attach to carburetor.



ENGINE ACCESSORIES (Cont'd)  
CARBURETORCARBURETOR SYSTEM: (See Figures 1 and 2, Page 29.)

The mixing and proportioning of air and fuel is called carburetion. The carburetor prepares the mixture of fuel and air for burning in the cylinder. If too much air is admitted the mixture burns slowly and continues burning through the exhaust stroke, igniting the next incoming charge which pops back through the carburetor. Too little air causes incomplete combustion which wastes fuel. It is necessary to have these proportions accurate.

CARBURETOR ADJUSTMENT:

Before starting any adjustments be sure they are required. Check the fuel supply, the fuel line, the fuel strainers, and make sure the flow has not been obstructed. Drain the carburetor to be sure no water has collected there. If fuel does not flow freely from this opening, the valve on the gasoline strainer is closed, the gasoline strainer is clogged or the pipe lines are clogged. If the carburetor continuously drips, the float or float valve may be leaking or the float level is set too high.

LOW SPEED ADJUSTMENT:

Carburetor adjustments are made usually to obtain better pulling power. This does not necessarily mean the highest or lowest speeds for best economy of the engine. This carburetor was correctly set before it was shipped from the factory but if these settings have been disturbed, proceed as follows: The idling adjustment (5) should be made first, with the gas control (1) nearly closed. Before making any adjustment, close the idling adjustment screw (5) (screwed all the way in), and reset to about 1 or 1-1/2 turns open as a starting point. If the engine loads up or seems loggy, it is an indication that the mixture is too rich (the adjusting screw (5) is out too far and needs to be turned in.) If the engine slows down and pops in the carburetor, the mixture is too lean (the adjusting screw (5) is in too far and needs to be turned out.)

HIGH SPEED ADJUSTMENT:

In making the high speed adjustment (6), hold the gas throttle (1) about 1/4 open (1/4 away from close position). The high speed adjustment (6) should then be turned either right or left until the engine runs smoothly. Make this adjustment with the engine under load (drum clutch engaged and batch in drum.) Now release the throttle (1) and allow the engine to idle for at least a minute. When this is done, quickly open the throttle (1) about 1/3 and quickly close it. If the mixture is too lean it will pop back through the carburetor - open the adjustment (6) slightly. If the mixture is too rich a popping noise will come from the exhaust outlet - the adjustment (6) should be closed slightly.

IDLE THROTTLE ADJUSTMENT:

Do not expect a new engine to "rock" on compression when stopped, or idle well at low speed. Set the stop screw on the throttle lever so that the engine will run sufficiently fast to keep it from stalling and that the impulse coupling stays out (does not trip continually.)

CARE OF CARBURETOR:

The flange nuts which hold the carburetor to the intake manifold should be checked for tightness. Check the screws that hold the fuel bowl to the fuel bowl cover. These screws must be kept tight to prevent leakage of air past the gasket. Remove nut (9) a fuel screw can then be taken out to be cleaned.

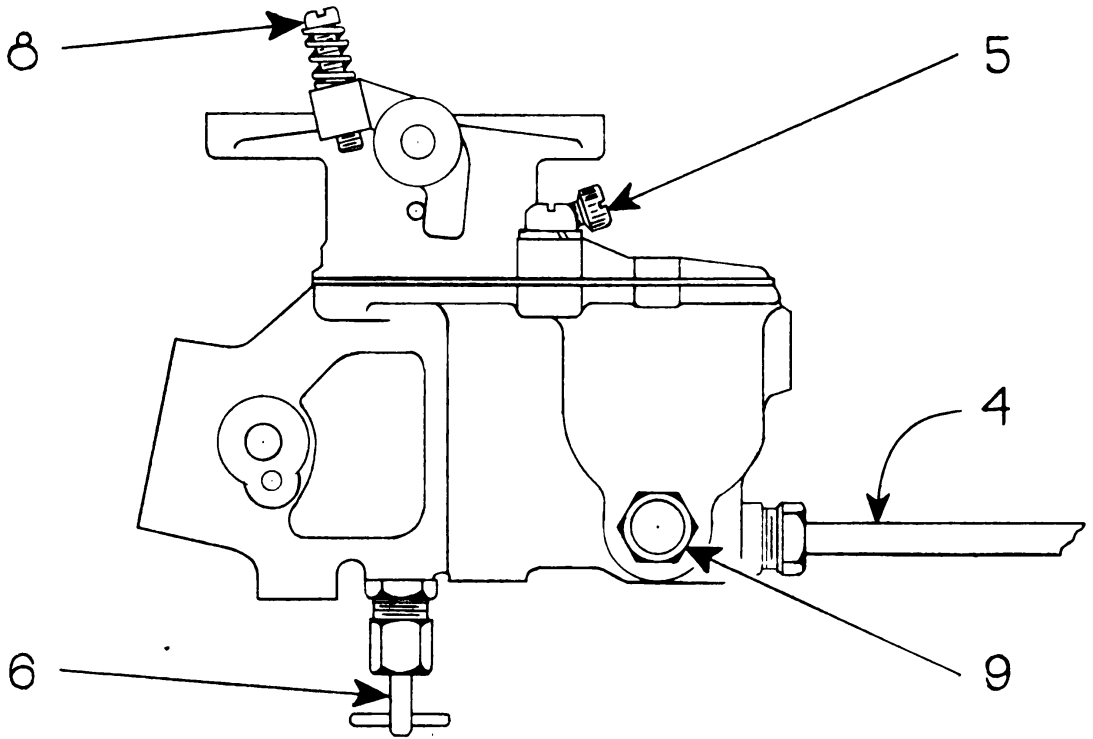


FIG. 1 - ZENITH CARBURETOR - MODEL 193 1/2

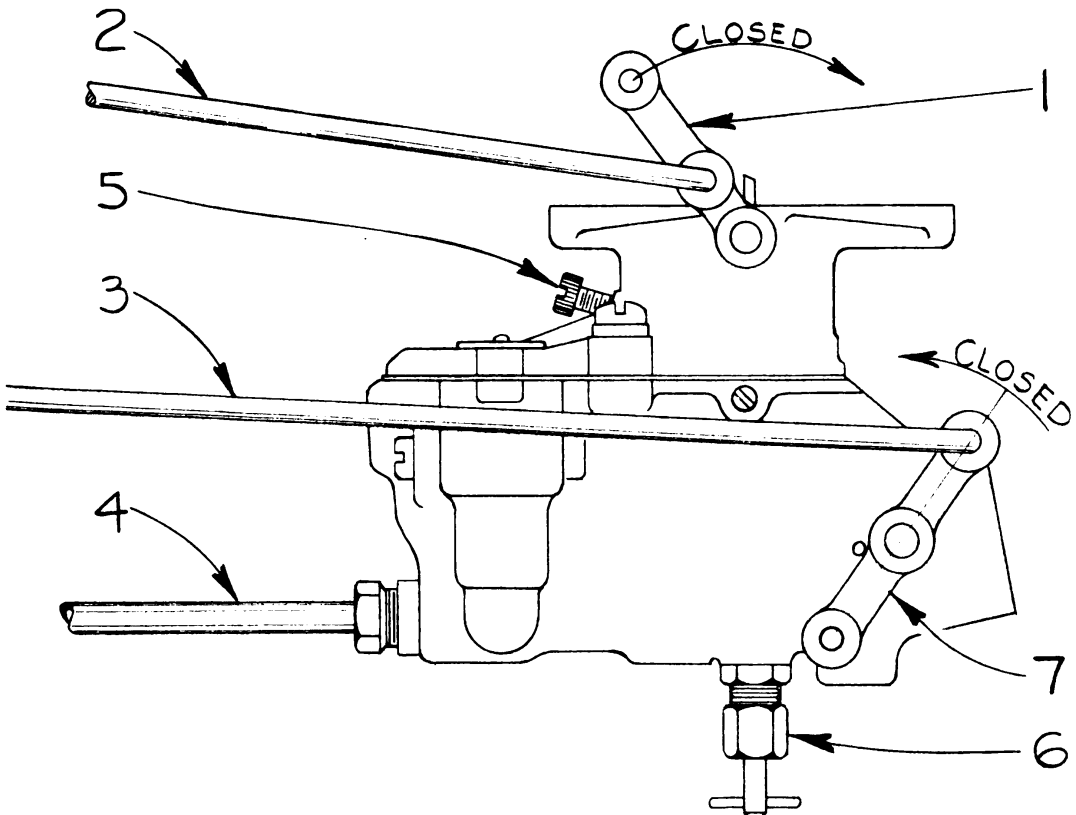


FIG. 2 - ZENITH CARBURETOR - MODEL 193 1/2

THINGS TO REMEMBER

1. STUDY THIS MANUAL CAREFULLY.
2. KEEP YOUR MIXER CLEAN. OLD CONCRETE WILL CLOG LUBRICATION FITTINGS, THROW OPERATING LEVERS OUT OF ADJUSTMENT AND DAMAGE BUCKET BLADE EXTENSIONS.
3. KEEP ALL CLUTCH AND BRAKE BANDS FREE OF GREASE AND OIL.
4. SEE THAT BOLTS AND CONNECTIONS ARE ALWAYS TIGHT.
5. KEEP THE ENGINE CLEAN.
6. ALWAYS BE SURE THE RADIATOR IS FILLED WITH CLEAN SOFT WATER.
7. NEVER ADD WATER WHEN ENGINE IS HOT.
8. USE ONLY OIL AND GREASE OF RECOMMENDED SPECIFICATIONS.
9. THE CHOKE IS A STARTING AID - USE IT MORE THAN NECESSARY AND IT BECOMES A PUMP TO DILUTE THE LUBRICATING OIL WITH GASOLINE AND BRINGS ON SERIOUS TROUBLE.
10. WHEN ENGINE IS NOT NEEDED, LET IT IDLE OR, IF THE SHUT-DOWN PERIOD IS PROLONGED, STOP IT EXCEPT IN FREEZING WEATHER.
11. NEVER RACE A COLD ENGINE.
12. ALWAYS KEEP AIR CLEANING SYSTEM CLEAN.
13. MAKE A VISUAL INSPECTION OF MIXER, ENGINE AND ACCESSORIES DAILY.
14. NEVER TRY TO OPERATE WITH TROUBLE DEVELOPING - A STITCH IN TIME SAVES NINE.

CHECKING MIXER TROUBLES

TROUBLE	CAUSE
SKIP DOES NOT RAISE	Clutch too loose. Clutch band lining coated with oil or grease. Skip brake too tight.
SKIP DOES NOT LOWER	Brake band too tight. Clutch band too tight.
WATER LEAKS INTO DRUM AFTER CONTROL VALVE IS CLOSED	Rubber disc is worn or damaged. Foreign matter on the valve seat.
VARIATION IN THE AMOUNT OF WATER	Check valves full of sand, dirt or oil. Remove the upper check valve and pipe nipple to get at check valve inside the cast elbow. Check valves that do not work properly - cause air to be trapped in the tank while it is filling. This trapped air will not allow the tank to fill fully and consequently the next batch of water will be short. End of syphon hose attached to traveling nut may be loose or off entirely.
SYPHON FAILS	Syphon hose leaks, is loose or detached from upper end. Check valve not working. Tank full of sand or dirt.
CONCRETE SPILLS OUT OF DRUM WHILE MIXING	Batch is too large - drum overloaded or mixer not setting level.
MIXER DRUM CLOGS	Water is not being discharged into drum at proper time. Water must begin to enter mixing drum ahead of the material.
ENGINE HARD TO START	<p>FUEL SYSTEM:                      No fuel in tank.                      Flow obstructed by foreign matter in tank or line, or carburetor screen.                      Fuel valve closed.                      Air vent in fuel tank filler cap plugged.                      Too much fuel (carburetor flooded).                      Improper fuel mixture.                      Water in fuel supply.</p> <p>IGNITION:                      Magneto grounded (switch in OFF position.)</p> <p>WEAK SPARK                      OR NO SPARK {                      Worn brushes.                      Oil or water soaked.                      Coil damaged.                      Brushes sticking.                      Magnets weak.                      Condenser bad.                      Points worn or pitted.                      Points sticking.                      Point clearance not right.                      Dirty distributor block disc.</p>

## CHECKING ENGINE TROUBLES

TROUBLE	POSSIBLE CAUSES
ENGINE HARD TO START (Cont'd. from Page 31)	<p style="text-align: center;">WEAK SPARK OR NO SPARK</p> <p>Cracked distributor cap. Breaker arm not free on bearing or the breaker arm spring weak or broken. Magneto not timed correctly with the engine. Impulse coupling dirty, dry or sticking with heavy oil. Spark plugs - wrong kind, burned electrodes, cracked porcelain, fouled, shorted by external dirt.</p> <p>MISCELLANEOUS: Loose or defective wiring. Cables connected to wrong plugs. Intake manifold or gaskets leaking. Valves leaking. Muffler clogged.</p>
EXCESSIVE SMOKE FROM EXHAUST	<ol style="list-style-type: none"> <li>1. Too much oil in crankcase.</li> <li>2. Carburetor needle valve open too far.</li> <li>3. Carburetor float sticking or leaking.</li> <li>4. Lubricating oil too thin to seal piston rings.</li> <li>5. Worn bearings, rings, cylinders and valve guides.</li> </ol>
EXPLOSIONS IN CARBURETOR OR INTAKE MANIFOLD	<ol style="list-style-type: none"> <li>1. Carburetor setting too lean.</li> <li>2. Valves or tappets sticking.</li> <li>3. Intake valve springs weak or broken.</li> <li>4. Intake valve warped or broken.</li> <li>5. Intake tappets set too close.</li> <li>6. Incorrect timing of ignition or valves.</li> <li>7. Intake manifold or gaskets leaking.</li> <li>8. Cylinder head gasket leaking.</li> </ol>
EXPLOSIONS IN MUFFLER	<ol style="list-style-type: none"> <li>1. Weak spark.</li> <li>2. Valves not seating or out of time.</li> <li>3. Exhaust valves warped.</li> <li>4. Missing on one or more cylinders.</li> </ol>
ENGINE MISSING	<ol style="list-style-type: none"> <li>1. Spark plugs fouled.</li> <li>2. Spark plug cracked or shorted by external dirt.</li> <li>3. Improper spark plug gap.</li> <li>4. Defective wiring.</li> <li>5. Ignition breaker points sticking.</li> <li>6. Improper breaker point gap.</li> <li>7. Cylinder head gasket leaking.</li> <li>8. Valves warped or broken.</li> <li>9. Intake manifold or gaskets leaking.</li> <li>10. Valves or tappets sticking.</li> <li>11. Valve tappets improperly adjusted.</li> <li>12. Valve springs weak or broken.</li> <li>13. Dirt or water in the fuel system.</li> <li>14. Engine not warmed up.</li> </ol>



## CHECKING ENGINE TROUBLES

TROUBLE	POSSIBLE CAUSE
ENGINE KNOCKS	<ol style="list-style-type: none"> <li>1. Excess carbon in cylinders.</li> <li>2. Loose connecting rod bearing.</li> <li>3. Loose main bearing.</li> <li>4. Valve tappet clearance too great.</li> <li>5. Valve sticking.</li> <li>6. Worn pistons, piston pins or cylinder.</li> <li>7. Engine overheated.</li> <li>8. Tight pistons or pins.</li> <li>9. Loose flywheel.</li> <li>10. Low on oil or water.</li> <li>11. Wrong kind of fuel.</li> </ol>
ENGINE LACKS POWER	<ol style="list-style-type: none"> <li>1. Belts slipping.</li> <li>2. Exhaust pipe clogged.</li> <li>3. Governor out of adjustment.</li> <li>4. Air cleaner pipe clogged, or air cleaner needs cleaning.</li> <li>5. Improper fuel mixture.</li> <li>6. Fuel not suited to engine.</li> <li>7. Governor or throttle levers loose on shaft.</li> <li>8. Oil badly diluted.</li> <li>9. Improper timing.</li> <li>10. Piston rings weak, worn, sticking or broken.</li> <li>11. Valves sticking or warped.</li> </ol>
POOR COMPRESSION	<ol style="list-style-type: none"> <li>1. Sticky, dirty or warped or pitted valves - weak springs.</li> <li>2. Valves set too close.</li> <li>3. Valves not timed right.</li> <li>4. Piston rings stuck, worn or broken.</li> <li>5. Loose or cracked spark plugs.</li> <li>6. Cylinder head gasket leaking.</li> <li>7. Oil too thin to seal rings.</li> <li>8. Scored or worn pistons or cylinders.</li> </ol>
ENGINE OVERHEATING	<ol style="list-style-type: none"> <li>1. Low on water or oil.</li> <li>2. Fan belt slipping.</li> <li>3. Water hose obstructed or collapsed.</li> <li>4. Excess carbon in cylinders.</li> <li>5. Carburetor improperly adjusted.</li> <li>6. Radiator or cylinder block passages clogged with dirt or limes.</li> <li>7. Outside of radiator core covered with dirt or cement.</li> <li>8. Improper ignition timing.</li> <li>9. Oil badly diluted.</li> </ol>
EXCESS FUEL CONSUMPTION	<ol style="list-style-type: none"> <li>1. Air cleaner dirty or clogged.</li> <li>2. Incorrect amount or wrong grade of oil.</li> <li>3. Leaks at fuel line connections or fuel valve.</li> <li>4. Carburetor adjustment too rich.</li> </ol>
IRREGULAR SPEED	<ol style="list-style-type: none"> <li>1. Governor sticking or out of adjustment.</li> <li>2. Throttle shaft bent or out of alignment.</li> </ol>

## MIXER LUBRICATION

1. Gear Reduction Case - Capacity 1-1/2 Pints
  - Every 64 hours - Check level plug
  - Every 1024 hours - Drain and refill with GO-SAE 90.
2. Fittings - Use CG for lubricating fittings on which the hand gun is applied.
  - Every 1024 hours - Lubricate all cables with OE; Keep all cables well lubricated.

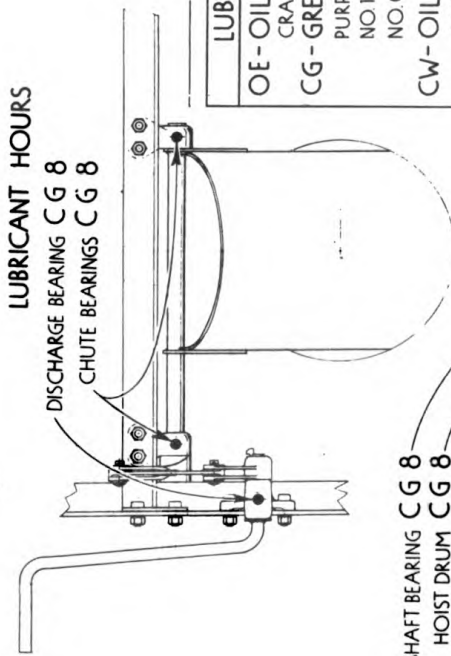
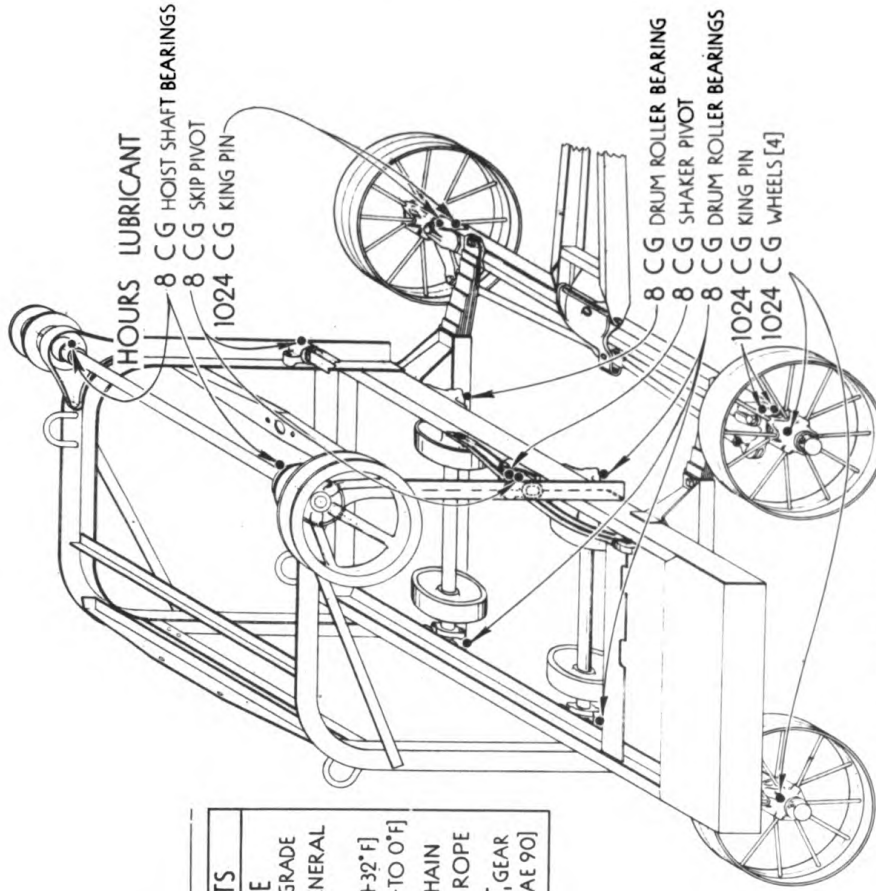
DO NOT lubricate drum runways. Keep free of oil and grease at all times.

CAUTION: When lubricating the drum drive pinion and hoist drum, be careful not to force lubricant out of the bushings. An excessive amount of lubricant leaking out of these bearings will get on the clutch bands.

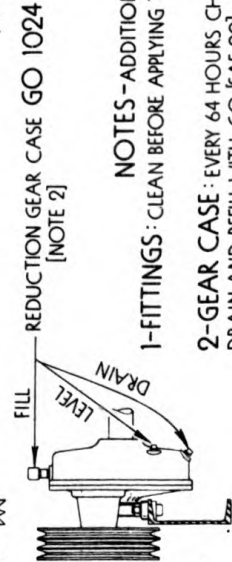
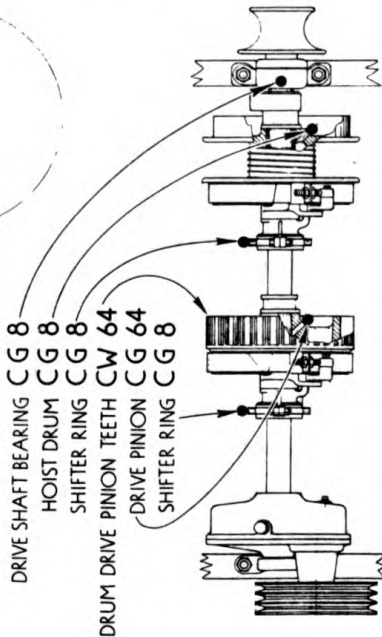
When lubricating fittings close to the brake and clutch bands, be careful to keep all bands free of oil and grease.
3. Every 8 hours - Lubricate with CG:
  - Discharge bearing
  - Shifter rings
  - Drum shaft bearing
  - Hoist drum
  - Drum roller bearing
  - Shaker pivot
  - Charging skip pivot bearings
  - Hoist shaft bearings
4. Every 64 hours - Lubricate with CG:
  - Drum drive pinion
5. Every 4 hours - Lubricate with OE:
  - Charging skip hoist clutch roller
  - Shaker roller
6. Every 8 hours - Lubricate with OE:
  - All lever connections
  - Clevis pins and pivots
7. Every 64 hours - Lubricate with CW:
  - Drum drive gears

TABLE OF CAPACITY AND LUBRICANT TO BE USED

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		Above 32°F.	32° to 0°F.	Below 0° F.
		GO	GO	Refer to
Gear Reduction Case	1-1/2 Pts.	SAE - 90	SAE - 90	EFSB 1-1000-D



KEY	
LUBRICANTS	
OE	OIL, ENGINE CRANKCASE GRADE
CG	GREASE, GENERAL PURPOSE
NO. 1	[ABOVE +32° F]
NO. 0	[+32° F-TO 0° F]
CW	OIL, LUB. CHAIN AND WIRE ROPE
GO	LUBRICANT, GEAR UNIVERSAL [SAE 90]



- NOTES - ADDITIONAL LUBRICATION AND INSTRUCTIONS ON INDIVIDUAL UNITS AND PARTS - NOTES
- 3-OIL CAN POINTS: EVERY 4 HOURS LUBRICATE CLUTCH ROLLERS AND PIVOT POINTS WITH OE. EVERY 8 HOURS LUBRICATE ALL OTHER PIVOT POINTS WITH OE.
  - 4-CABLES: KEEP ALL CABLES WELL LUBRICATED WITH OE.
- 1-FITTINGS: CLEAN BEFORE APPLYING THE LUBRICANT GUN
- 2-GEAR CASE: EVERY 64 HOURS CHECK LEVEL. EVERY 1024 HOURS DRAIN AND REFILL WITH GO [SAE 90]

## ENGINE LUBRICATION

OIL SYSTEM:

Pump splash circulating system: In those models employing ball bearings on the crankshaft and camshaft, the pump delivers oil directly to the splash troughs. Otherwise lubrication of the various parts, including the ball bearings, is accomplished by the splash from rods and crankshaft. Efficiency of the splash circulating system of lubrication employed in LeRoi "L" head engines is largely dependent upon the oil being rapidly picked up from the oil troughs and finely atomized by the whipping action of the connecting rod dippers.

FILLING:

Every 8 hours - check crankcase oil level and fill to full mark on gauge if oil is below that level. CAUTION: The motor must NEVER be operated with the oil below the HALF-FULL mark. Never fill the oil pan while the engine is running. Before checking the oil level allow the oil, which has accumulated in the engine, to drain back into the oil pan.

DRAINING:

Every 64 hours - REFILL oil pan with OE. The oil gradually accumulates small particles of dirt, grit and metal, which will cause wear, and it is also diluted by unburned fuel which passes by the pistons. Drain only when engine is thoroughly warm.

CLEANING THE OIL PAN:

Every 1024 hours - remove the oil pan for inspection of bearings, etc. At that time the oil pan should be washed thoroughly with gasoline and a stiff brush. Do not use cotton or wool waste, as fibers from it may stick to rough surfaces, eventually causing stoppage of the oil screen and oil lines in the LUBRICATING system.

SLUDGE:

Sludge is very detrimental, and if, when draining oil, it appears to be thick and congealed, the oil pan should be thoroughly cleaned.

GOVERNOR:

The governor is LUBRICATED automatically from the crankcase oil supply.

WATER PUMP AND FAN SHAFT:

The water pump casting is fitted with a grease cup. Every 8 hours - LUBRICATE WITH WP - turn cup in one FULL TURN. REFILL with WP when necessary.

CAUTION: Do not remove the grease cup and install pressure type grease gun fitting.

AIR CLEANER:

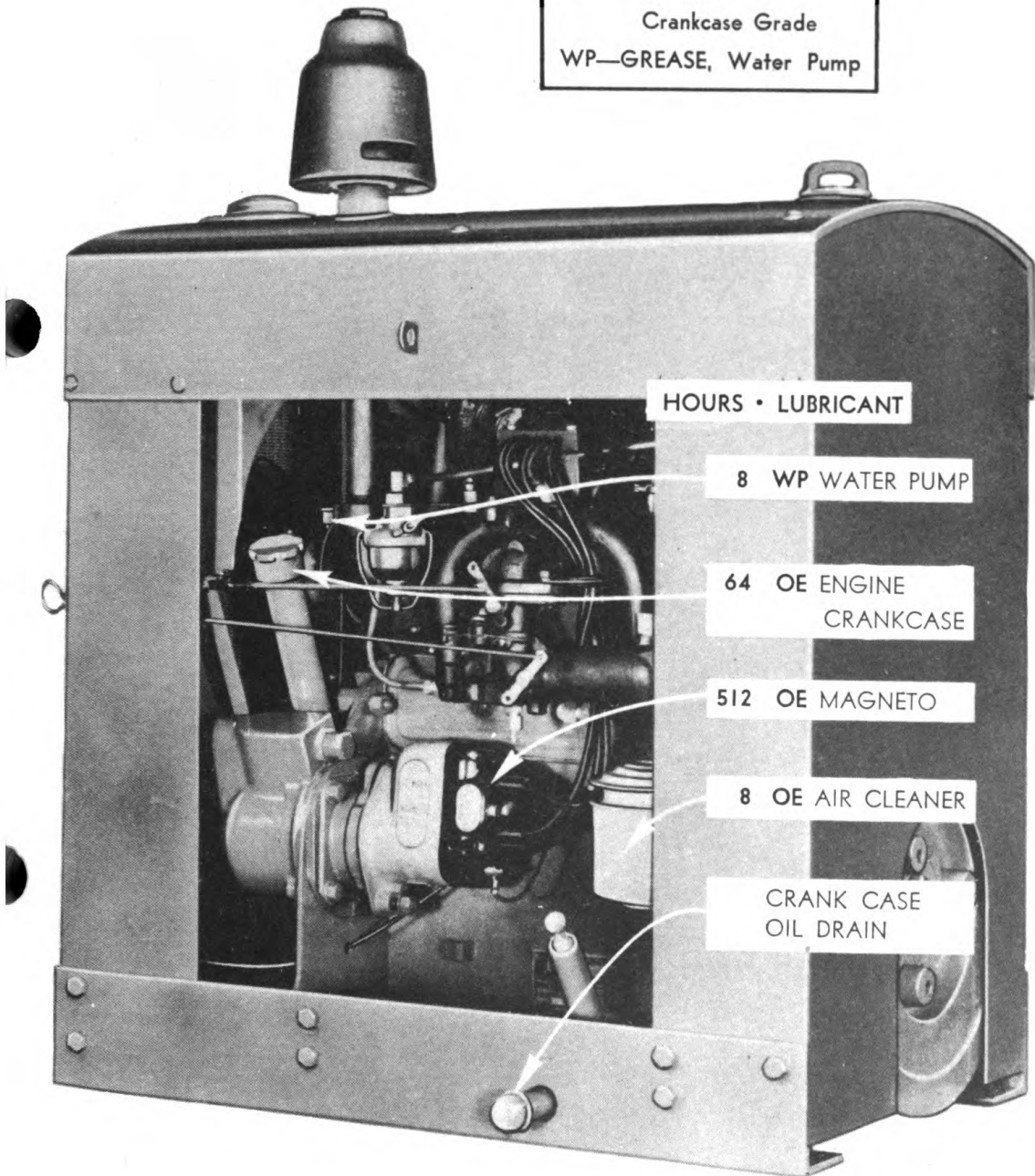
Every 8 hours - Clean and REFILL the oil cup to circular level mark with OE LUBRICANT. Every 8 hours to 256 hours - depending on operating conditions disassemble entire assembly and clean thoroughly.

TABLE OF CAPACITY AND LUBRICANT TO BE USED

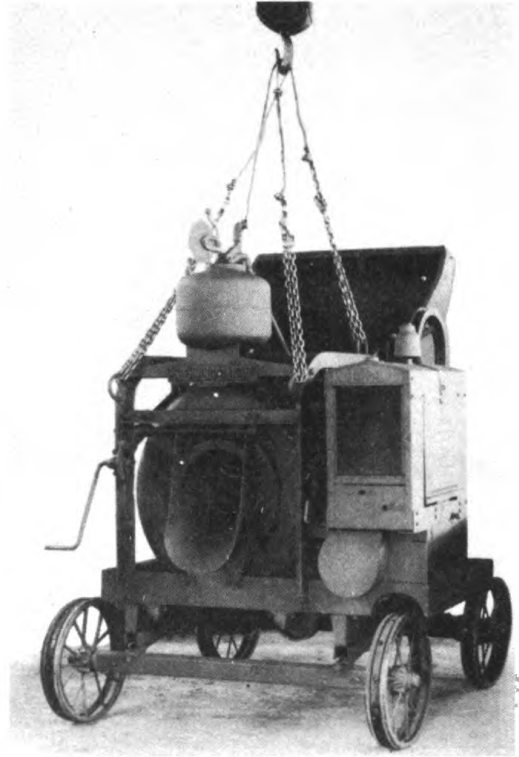
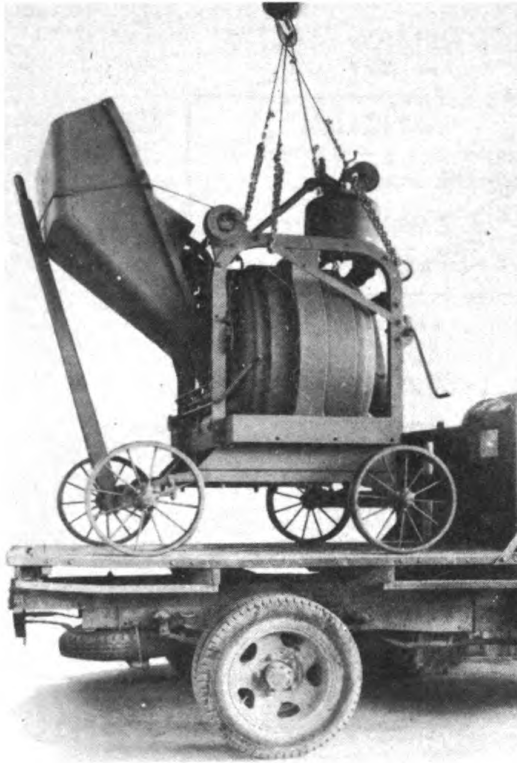
UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		Above 32°F.	32° to 0°F.	Below 0° F.
Crankcase	3-1/2 Quarts	OE SAE - 30	OE SAE - 10	Refer to EFSB L-1000-D

— KEY —

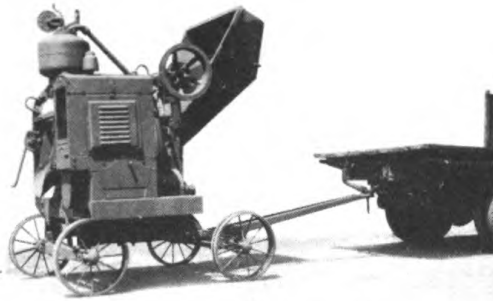
LUBRICANTS
OE—OIL, Engine Crankcase Grade
WP—GREASE, Water Pump



ENGINE LUBRICATION CHART



HANDLING MIXER WITH CRANE FOR LOADING ON TRUCK OR OTHER CONVEYANCE. SLING LUGS ARE PROVIDED



TOWING WITH TRUCK



LOADING WITH RAMP & WINCH



◀ LOADED ON FLAT CAR

METHODS OF HANDLING AND TRANSPORTING KOEHRING MODEL 7-S MIXER

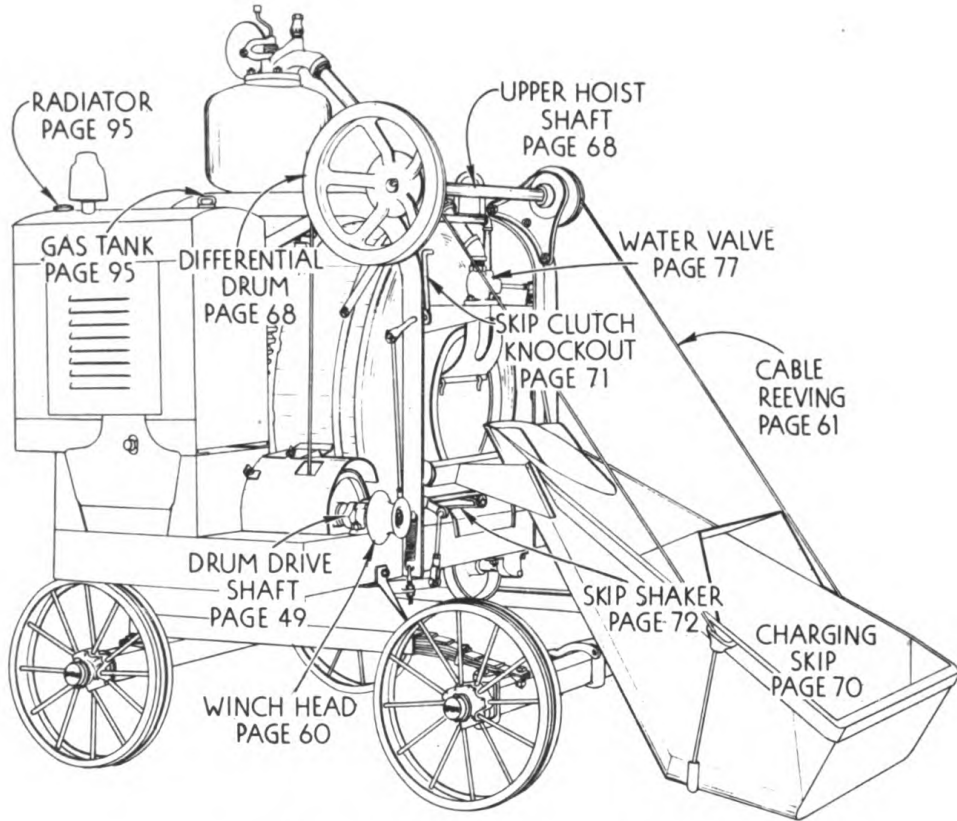
# **MAINTENANCE SECTION**



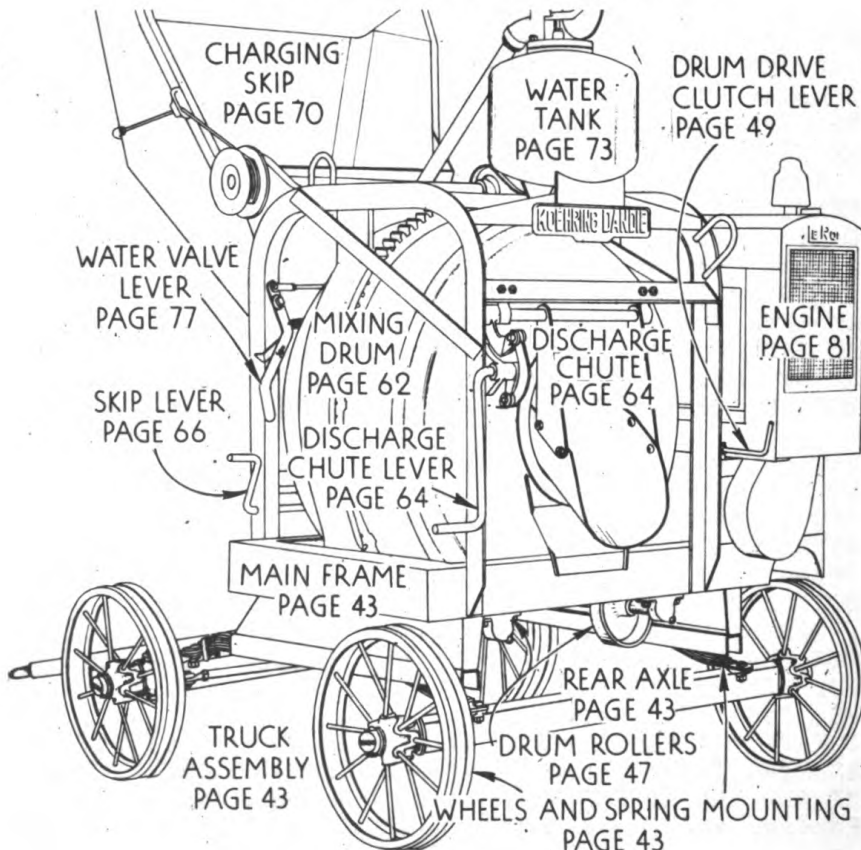


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PAGE REFERENCES FOR ASSEMBLIES



7-S CONCRETE MIXER BEARING TOLERANCES

Location of Bearing	Type and Size	Tolerances	
		Shaft	Housings
Reduction Case-Pinion	New Departure Ball #1207	.0001" ) .0007 )	Tight .0000" ) .001 ) Loose
Reduction Case-Pinion	New Departure Ball #3205	.0000 ) .0006 )	Tight .000 ) .001 ) Loose
Reduction Case Gear Shaft	New Departure Ball #3205	.0000 ) .0006 )	Tight .000 ) .001 ) Loose
Reduction Case Gear Shaft	New Departure Ball #1208	.0001 ) .0008 )	Tight .000 ) .001 ) Loose
Hoist Drum	Bronze Bush. 1-3/4"	.005 ) .007 )	Loose No Housing
Drive Shaft Skip End	S.K.F. #1207 Self-aligning	.0001 ) .0007 )	Tight .000 ) .001 ) Loose
Drum Roller Shaft	S.K.F. #1205 Self-aligning	.0000 ) .0006 )	Tight .000 ) .001 ) Loose
Upper Hoist Shaft	C.I. Bushings Self-aligning 1-3/4"	Cored Hole 1/16" Loose	No Housing
Discharge Hand Lever	C.I. Solid Bearing 7/8"	.002 ) .004 )	No Housing
Discharge Chute Swing Shaft	C.I. Solid Brg. 1-1/4"	Cored Hole 1/16" Loose	No Housing
All pin holes are 1/64" loose.			

LEROI MODEL XRPl-23 ENGINE CLEARANCES AND TOLERANCES

Magneto Point Gap.....	.012 to .014
Spark Plug Gap.....	.025 to .030
Piston Skirt Clearance.....	.0025 to .0040
Compression Rim Gap.....	.007" to .015"
Free Fit to Piston.....	.0005 to .0015 loose
Connecting Rod Bearing, Running Clearance..	.001 to .0025
Connecting Rod Bearing, End Clearance.....	.010 to .014
Crankshaft End Clearance.....	Locked at front brg.
Crankshaft Bearing Journal Diameter.....	1.9682
Crankshaft Gear Back Lash.....	.003
Camshaft Journal Diameter.....	.9842
Valve Stem Clearance in Guide.....	.001 to .003 Intake
Valve Adjustment, Hot.....	.008 to .010
Water Pump Bushing, Diameter, Front I.D....	.6255" to .6260
Water Pump Bushing, Clearance.....	.001
Water Pump Bushing, Diameter, Rear, I.D....	.6255 to .6260
Water Pump Running Clearance.....	.0005

Note - Lubrication symbols as used in this section are defined on page 35, operation section.

WHEELS, AXLES AND SPRING ASSEMBLIES

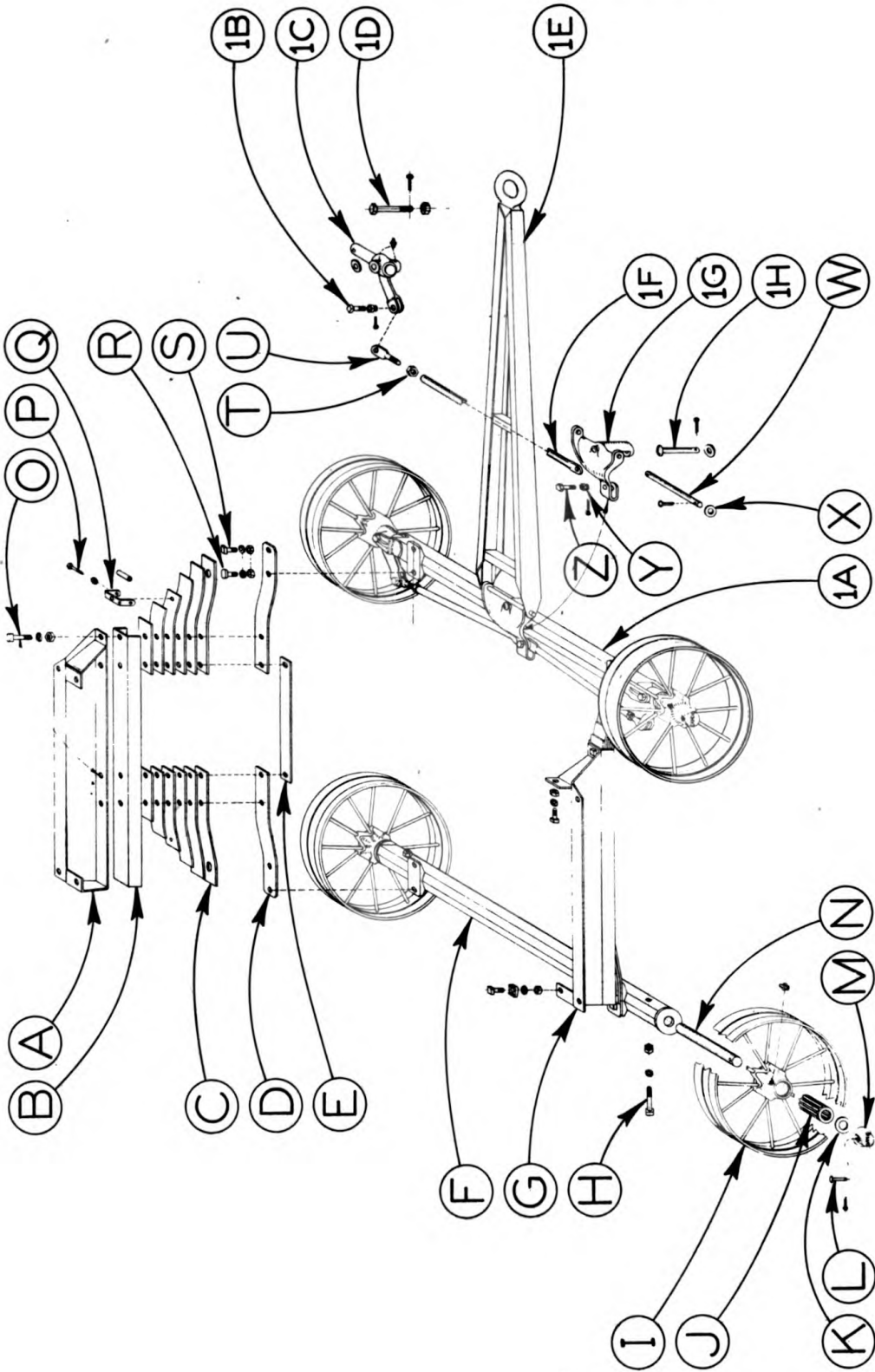


FIGURE I  
MAINTENANCE TEXT ON PAGES 43, 44, 45, 46 AND 47

WHEELS, AXLES AND SPRING ASSEMBLIES: (See Figure 1, Page 42)

WHEELS:

A wobbly wheel will indicate worn wheel bearings or spindles, or both.

To Remove:

All four wheels are removed in a like manner, therefore, to remove one wheel, place the machine on level ground, jack or pry up the corner of the machine, and place blocking under the axle.

Close and pull cotter from the button head pin (L). Take off the hub cap (M); slide the wheel (I) off the spindle (N) or (1C). From the back side of the hub, using a punch and hammer, drive out the special flat washer (K) which fits into the recess of the wheel hub. This washer acts as a retainer for the wheel bearing (J) and as a seal. Slip the bearing out of the wheel hub. If the bearing is to be used again keep it clean - wrap it in clean paper or cloth until ready to be used again. If it is to be destroyed throw it away immediately.

To Inspect:

Wash the bearings thoroughly in a clean solvent and blow off with air if available. Inspect for wear. If the bearings can be used again, pack them with clean grease and wrap them in clean paper or cloth until ready to be installed.

Wash spindles thoroughly and check for wear.

Wash old grease out of wheel hubs and repack with clean grease. For lubrication use CG.

To Replace:

Insert the bearing (J) into the wheel hub up against the hub flange. Put the special flat washer (K) in position in the hub recess and drive it into place. Slide the wheel on the spindle, washer side of the hub toward the outside. Place hub cap (M) in position. Line up the hole in the hub cap with the hole in the spindle. Insert button head pin (L); insert and open cotter. Remove blocking from under the axle.

Lubricate the wheel bearings through the grease fittings with CG.

REAR AXLE ASSEMBLY:

To Remove:

The rear axle (F) is fastened to the leaf spring assembly by two bolts on each end of the axle. These bolts tie the main spring leaf (D) directly to the axle pad. The heads of the two bolts on the inner side of the axle are under the second spring leaf, therefore, proceed as follows;

Place the machine on level ground. Take the nuts and lock-washers off all four bolts (R) and (S) (the two outer bolts can be removed). Jack up the rear end of the machine high enough for the two inner bolts to be clear of the axle. Block up the machine in this position and roll the axle assembly in the clear. Place the axle assembly on blocks high enough for the wheels to be clear of the ground and remove the wheels as described under (Wheels, Page 43). Remove bolts (H) holding the rear axle spindle (N) in the axle. Remove axle spindle (N). Other end of the axle is exactly the same.

To Inspect:

Check for bent or worn spindles or bent axles.

To Replace:

Insert the axle spindle (N) (end with large hole) into the axle (F). Place the bolt (H) and tighten. Do the same on the other end of the axle. Replace wheels as described under (Wheels, Page 43). Roll the axle assembly in place under the machine, with the pads up; line up the holes and let the machine down on the axle. Replace the two outer bolts (S). Tighten all four bolts.

Remove blocking and jacks.

FRONT AXLES:

To Remove:

The front axle assembly is fastened to the machine in exactly the same manner as the rear axle assembly. It is removed in the same manner as the rear axle assembly.

With the assembly free of the machine remove the draw bar (1E) by closing and pulling cotter. Take off flat washer (X) and slip on pivot pin (W).

Place the axle assembly on blocks, high enough for the wheels to be clear of the ground and remove the wheels as explained under (Wheels, Page 43). Next remove both steering links (1F) by taking out the special bolt (Z) through the draw bar yoke (1G) and both dead ends of the steering links (1F). Then take out the bolt (1B) holding the other ends of steering links to each spindle (1C). Next remove the special bolts (1D) used as king pins and the spindles (1C) are free. To remove the draw bar yoke (1G) close and pull cotter. Take off flat washer (X) and pull blank bolt (1H). Lift off yoke.

To Inspect:

Inspect for bent axle, bent steering links or worn pin holes at end of links.

Check for worn or bent spindles.

Check bolts and pins for wear.

To Replace:

Place the draw bar yoke (1G) in position on the axle (1A); line up the holes and insert a blank bolt (1H). Place flat washer (X); insert cotter and open. Place the spindles (1C) in position on each end of the axle, with the arm toward the rear. Line up the holes; place the king pin and special bolts (1D); draw the nuts up snug (not too tight) allowing spindles free movement without end play; insert cotter and open. Next place dead ends of both steering links (1F) in slot of draw bar yoke (1G) - it does not matter which over-laps the other - line up the holes; insert the special bolt (Z); draw the nut up snug but not too tight, allowing sufficient clearance for steering links to be moved easily; insert and open cotter.

Place the adjustable ends of the steering links (1F) between the clevis ends of the arms on the spindles (1C); line up the holes and place the bolts (1B) but not the nuts. Assemble the wheels to the spindle shafts as explained under (Wheels, Page 43.) These wheels now need to be adjusted for a 1/4" tow-in, meaning that the horizontal distance between the front edges of the wheels is 1/4" less than the distance between the rear edges. This adjustment is obtained by lengthening or shortening the steering links (1F) as required. The steering links can be lengthened or shortened by loosening the jam nut (T) and turning the eye bolt in to shorten and out to lengthen the rod. Both steering links must always be kept at the same length. When proper adjustment has been made turn the castellated nuts (Y) on the bolts (1B); insert and open the cotters.

Next place the draw bar (1E) in position with the draw bar yoke (1G) and line up the holes. With the cotter and flat washer (X) in pivot pin (W), place pivot pin through lined up holes in draw bar and draw bar yoke; place flat washer on pivot pin; insert and open cotter. Roll the axle assembly under the machine. Line up the inner holes of the axle pads with the bolts (R) in the springs (D). Lower the machine to the axle. Line up the other two holes and insert the bolts (S). Put on all four lock washers and nuts and tighten. Remove blocking. Lubricate all pins and joints with OE. Lubricate the wheels and spindles with CG.

FRONT SPRING:

The mixer has four point spring suspension. At each corner of the machine is a spring assembly of seven leaves. The two front spring assemblies have one spring clip each. The two rear spring assemblies need no clips as they are located farther back in the "U" shaped spring cover which controls any lateral shift of the leaves.

To Remove:

Jack up a corner of the machine with the jack placed under the frame. Loosen and remove the two spring bolts (H) attaching the spring to the spring cover (B) and support (A).

Loosen but do not remove the rear bolt (H) of the rear spring assembly to release the pressure of the spring tie bar (E) and make assembly alignment easier. Free the spring clip (Q) by removing bolt (P). Raise the corner of the machine a trifle more to permit all but the main spring leaf to be removed. Loosen and remove the two bolts (R) and (S) through the main spring leaf and the axle pad.

To Inspect:

Check for broken, flat or cracked spring leaves.

To Replace:

Place the main leaf (D) in position on the axle pad. Line up the holes; insert the bolts (R) and (S) with the special bolt (R) to the inside; put on the lock washers and nuts. Leave the nuts loose on the bolts; slide the other six leaves in place, starting with the largest leaf (C) first. Line up the holes in the butt end of the spring assembly with the holes in the spring cover (B) and support (A) including the spring tie bar (E). Place the bolts (H) and tighten; also tighten the bolts through the front end of the spring. Replace spring clip (Q) and draw bolt (P) snug. Tighten rear bolt to the rear spring assembly. Release and remove jack.

REAR SPRING:

To Remove:

Jack up the corner of the machine with the jack placed under the main frame. Jack the machine just high enough to release the weight. Loosen and remove the two spring bolts (H). Loosen but do not remove the rear bolt (H) of the front spring - to release the pressure of the spring tie bar (E) and make assembly alignment easier. Now slide the six leaves out of position. Loosen and remove the two bolts (R) and (S) through the main leaf (D) and axle pad.

To Inspect:

Check for broken, flat or cracked spring leaves.

To Replace:

Place the main leaf (D) in position on the axle pad. Line up the holes; place the bolts (R) and (S) and put on the lock washers and nuts. Leave the nuts loose on the bolts. Slide the other six leaves into place, starting with the larger leaf (C). Line up the holes in the butt end of the spring assembly with the holes in the spring support cover (A) and (B) including the spring tie bar (E). Place the bolts (H) and draw up tight. Now tighten the two bolts (R) and (S) through the front end of the spring. Tighten the rear bolt (H) of the front spring. Release and remove the jack.

SPRING MOUNT ASSEMBLY:

There are two spring mount assemblies. Each spring mount assembly



consists of a support, cover and two springs. The "U" shaped cover is fastened to the spring support. One spring is fastened to each end of the support and cover. These springs in turn are attached to the front and rear axles. Each of the front springs has only one spring clip.

To Remove:

Loosen and take out the bolts holding the main frame to the spring support (G). Use jack against the main frame and lift the machine about 2" off the mount. Take the nuts off the four bolts attaching the springs to the front and rear axles. Remove the two bolts (S) that are free. Lift the spring mount assembly off the axles and take it clear of the machine. Loosen and remove the four bolts which attach the spring leaves and spring tie bar (E) to the spring cover (B) and support (G).

To Inspect:

Inspect to see that parts are straight.

To Replace:

Assemble the spring leaves in proper order. Be sure to place the special bolt (R) in the second hole from the end of the main leaf; the second spring entirely covers the head of this bolt. Line up the holes; insert the bolts through the spring support (G) and cover first, then through the assembled spring leaves. Run the nut up loosely on the outer bolt first, to hold the loose spring leaves. Then put the spring tie bar (E) in place with the hole in each over the inner spring bolts (H). Run these nuts up but do not tighten. Fit the spring mount assembly in place across the axle. The two bolts (R) held in place by the second spring leaf fit through the inside holes of the axle pads. Line up the outer holes; insert the bolts (S) and tighten. Lower the main frame to the spring mount; line up the holes; insert the bolts and tighten. Tighten the other four bolts to the butt ends of the springs. Remove the jack.

**DRUM ROLLER ASSEMBLY:** (See Figures 1 & 2)

There are two drum roller assemblies, each consisting of a shaft, two rollers and two self-aligning bearings. These assemblies are attached to the lower side of the frame. The mixer drum rests directly on them and rotates on them.

To Remove: (See Fig. 1, Page 47 and Fig. 2, Page 48.)

With the engine not running, engage the drum drive clutch to keep the drum from turning while raising it clear of the rollers. Next place a jack on the ground directly under the drum. Place a piece of board between the top of the jack and the

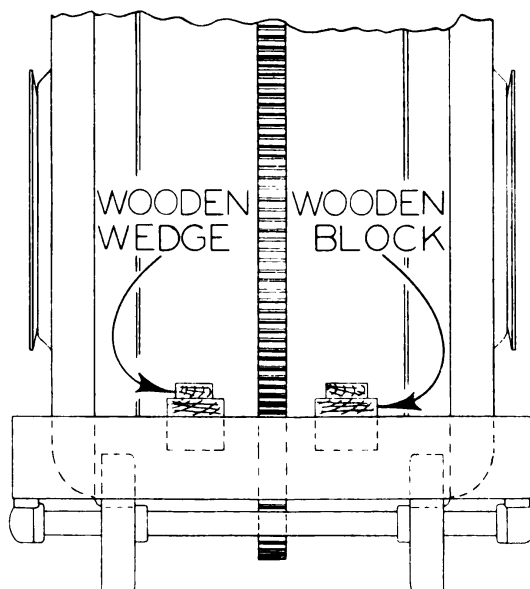


FIGURE I.  
METHOD OF BLOCKING DRUM

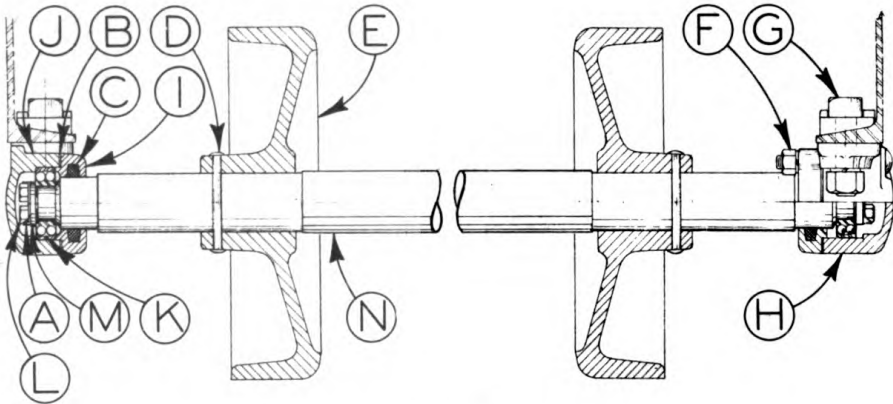


FIGURE 2

drum; raise the drum just high enough to clear the rollers. On the side of the drum opposite the drum drive shaft, force sufficient blocking between the drum shell and the main frame to help hold the drum in this position. The blocking method can also be used to raise the drum if a jack is not available. Place blocking between the drum shell and the main frame on both sides of the ring gear; drive wooden wedges between the blocking and the drum shell. The action of the wedges being forced in will cause the drum to be raised.

Loosen and remove the two bolts (G), attaching the bearing on each end of the shaft assembly to the frame. Lower the assembly and move it clear of the machine.

#### To Disassemble:

Loosen and remove the two carriage bolts (F) holding the self-aligning bearings together. Take off the bearing cages (J) being careful of gaskets (B). Straighten the capscrew lock plates (A) and remove the cap screws (L), then the keeper flat washer (M) will come off immediately. The bearings (K) can be removed by tapping lightly on the back side of the retainer (I). If the bearing (K) is too tight on the shaft to be removed in this manner then use a bearing puller. Slide the retainer off the shaft. Remove the felt seal (C) from the retainer (I). All four of the drum roller bearings are disassembled in the same manner.

The drum rollers (E) are fastened to the shaft (N) with drive pins (D) - one for each roller. File or cut off with a chisel one of the peened ends of the pins and drive it out. The roller is now free and can be taken off the shaft. All four rollers are removed in the same manner.

#### To Inspect:

Check bearings for wear or damage. Carefully clean them and repack with CG. Wrap in clean paper or cloth until ready to use again.

Discard felt seals if new ones are available.

Check rollers for fit on shaft-should be a light press fit.

Inspect roller surface for wear or flat spots.

Check shaft for straightness.

To Reassemble:

CAUTION: Each roller hub has three sets of pin holes which vary in distance from the face of the roller. This is done to allow the rollers to be located on the shaft for proper drum clearance.

Place drum roller (E) on shaft, long hub out, and line up correct hole in hub with hole through shaft. Fit drive pin (D) through holes and peen both ends.

Next place new felt seal (C) in groove of retainer (I); saturate the felt with oil. Place the retainer on the shaft with the machined shoulder surface facing out. Place the bearing (K) on the shaft either side facing out. Put the keeper in position; line up the holes; place the lock plate (A) on the capscrews (L); enter through the holes in the keeper and tighten. Place the gasket (B) in position on the retainer (I); line up the holes; shoulder on retainer will hold gasket in place.

Place the bearing cage (J) or (H) in position against the retainer (I); line up the holes; insert the carriage bolts (F), heads out, and tighten.

NOTE: The bearing cages differ in that two of them (H) have deeper bearing recesses than the other two (J). The purpose of this is to permit the cage assemblies with the deep bearing cage (H) to be shifted slightly on the shaft when remounting the drum roller assembly to the frame. This is done to take care of any slight variance in the distance between the holes in the main frame when mounting the roller assembly.

Fill bearing cages with CG.

To Replace:

Place the roller shaft assembly up against the lower side of the frame, with the deep bearing cages (H) toward the charging skip. Line up the holes in the bearing cage flanges with the holes in the lower side of the frame; insert the bolts and tighten. Remove blocking used between drum shell and frame; release jack from under drum. Release drum drive clutches.

DRUM DRIVE SHAFT ASSEMBLY (Complete Assembly, Page 50)

DRUM DRIVE CLUTCH BAND: (See Figure 2, Page 55)

The lining on this band should be replaced when worn or if it becomes glazed or soaked with oil or grease.

To Remove:

The band must be removed from the shaft for relining or replacing.

First disconnect the clutch control rod (N) at the shifter fork (M) by taking out the cotter. This will allow the clutch

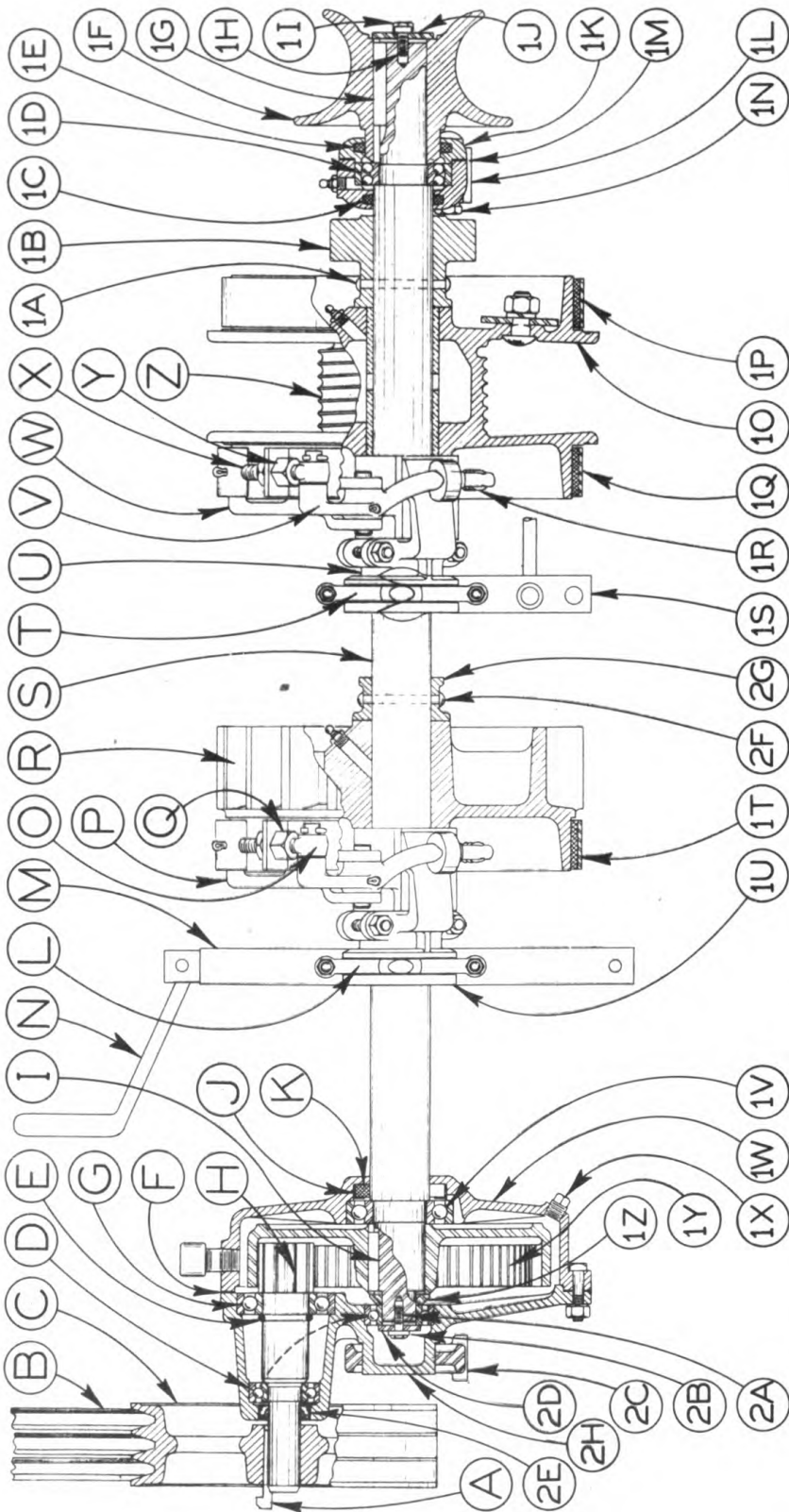


FIGURE 3  
SKIP HOIST CLUTCH  
DETAILS PAGE 60

FIGURE 2  
DRUM DRIVE CLUTCH  
DETAILS PAGE 55

FIGURE 1  
ENGINE END  
DETAILS PAGE 53

VIEW OF COMPLETE ASSEMBLY OF DRUM SHAFT

sleeve (1U) to be moved back out of the way. Next take out the cotter at the dead end of the band (1T) and the clutch spider arm (P). Then loosen and take off the jam nut (Q) from the eye bolt (O). Now slip the live end of the band (1T) off the eye bolt and move it to the side over the drive pinion (R), far enough to be clear of the spider arm. Bring the band back toward the open part of the shaft to remove.

To Inspect:

Inspect the band for worn lining, loose rivets or sprung band.

To Replace:

Place the band (1T) over the open space of the shaft (between the clutch drum and the gear reduction case), then bring the band forward and over the clutch drum and on the drum pinion (R). The loop of the dead end of the band can now be slipped over the clutch spider arm (P) as the band (1T) is brought back into position on the clutch drum (R) - at the same time hold the live end of the band down far enough to clear the eye bolt (O). With the hole in the live end of the band in line with the eye bolt, allow the band to expand in place over the eye bolt. Put jam nut (Q) on eye bolt. Line up hole in dead end of band with hole in spider arm; insert and open new cotter.

Attach the clutch control lever (N) to the shifter fork (M) and lock in place with new cotter. Adjust the clutch band. Refer to Operation Section, Page 17.

SKIP HOIST CLUTCH BAND: (See Figure 3, Page 60)

To Remove:

Lower the skip to loading position. With the clutch band (1Q) and brake band (1P) both released, unwind by hand several feet of cable off the hoist drum (Z). The clutch and hoist drum guard are one piece. Free it by taking off nut to the motor base frame and the bolt to the frame cross member. Move the hoist drum guard to one side of the slack hoist cable. Free the end of the link attached to the shifter fork (1S) by removing cotter and flat washer from the hook end of the rod. Now move the clutch sleeve (U) as far back away from the clutch spider (W) as possible. Next remove spring (1R) from the clutch lever (V). Loosen spider set screw jam nut and back out the spider set screw until it is free of the hole in the shaft. Slide the clutch spider clear of the drum. Take out the cotter through the dead end of the band (1Q) and spider arm. Take the adjusting nut (Y) from the eye bolt (X) and remove the band (1Q).

To Inspect:

Check lining for wear or damage, loose rivets or sprung band.

To Replace:

Place band (1Q) in position on clutch spider (W) with looped dead end of the band over the spider arm and the hole in the live end of the band over the eye bolt (X). Screw the adjusting nut (Y) on the eye bolt - do not tighten. Line up the hole in the dead end of

the band and the spider arm; insert and open new cotter. Slide the spider and band assembly back into place against the hub of the hoist drum (Z). Tighten the spider set screw in the hole for it in the shaft (S); tighten the spider set screw jam nut. Attach the end of the link to the shifter fork. Adjust the band - refer to Operation Section, Page 17. Replace the clutch and hoist drum guard. Use power to wind the hoist cable slack.

SKIP BRAKE BAND: (See Figure 3, Page 60)

To Remove:

Take out the bolt attaching the dead end of the band (1P) to the frame cross member. Unscrew the adjusting nut from the operating rod and remove band.

To Inspect:

Check lining for wear or damage, loose rivets or sprung band.

To Replace:

Place the band (1P) around the brake drum (Z), opening toward the mixing drum, straight or dead end down. Fasten dead end of band to the frame cross member with bolt. Place other end over operating rod and screw on adjusting nut. To adjust the band refer to Operation Section, Page 17.

PIVOT BEARING - ENGINE END: (See Figure 1, Page 53)

The gear reduction (motor end) of the shaft assembly is supported on the frame by a trunnion or pivot bearing. This type of bearing does not require lubrication.

To Remove:

Remove the drive belt guard by taking out the two bolts to the motor support. Release the tension on the drive belt (B) - refer to Operation Section, Page 18. Pull gib key (A) holding the pulley (C) and remove pulley. Block up this end of the shaft assembly; use a board and wedge between it and the frame. Take off the two bolts holding the pivot bearing (2C) to the frame and remove pivot bearing.

To Inspect:

Inspect for wear or damage.

To Replace:

Coat the inner surface of the pivot bearing (2C) with grease; place in position on the gear case; line up holes in bearing base with holes in frame and insert bolts. Remove wedge and board used between shaft and frame. Tighten the bearing bolts. Place multiple pulley on shaft; line up keyway with multiple pulley in line with engine pulley; coat gib key with white lead or grease; place in keyway and drive home.

Replace and adjust belts as per Operation Section, Page 18. Replace belt guard; line up bolt holes; insert bolts and tighten.

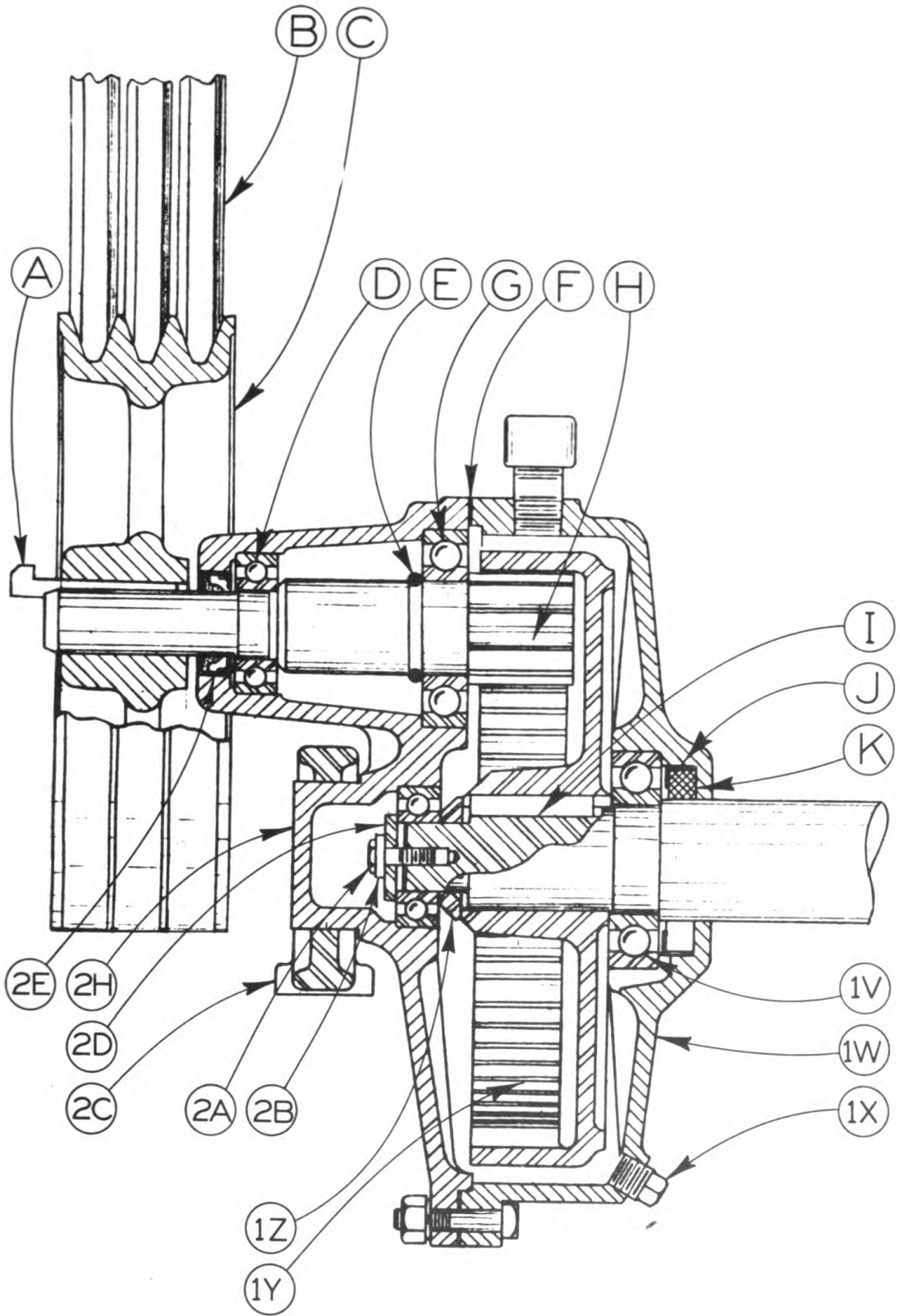


FIGURE 1  
ENGINE END PIVOT BEARING  
AND REDUCTION GEARS

BEARING - SKIP END: (See Figure 3, Page 60)

This is a double row, self-aligning type of ball bearing.

To Remove:

Straighten lock plate (1H); take out capscrews and remove the flat washer keeper (1J). Slide the winch head spool (1F) off the shaft and remove the straight key (1G). Block up this end of the shaft assembly with a board and wedge between shaft and frame. Remove the bolts holding the bearing cage (1L) to the frame and slide the bearing assembly off the shaft.

To Disassemble:

Remove the two carriage bolts (1N). This allows the bearing retainer to come off and the double row self-aligning bearing (1D) can be taken out. Remove the felt seals (1C) and (1E) from the bearing retainer (1K). If the bearing is to be used again be careful to keep it packed with clean lubricant and wrap in clean paper or cloth.

To Inspect:

Inspect the ball bearing for wear or damage.

Use new felt seals.

Check bearing retainer and cage for damage. Use new gasket.

To Reassemble:

Fit new felt seals (1C) and (1E) into groove in the bearing cage (1L) and bearing retainer (1K). With the felt seals in place saturate them with OE. Be sure that the bearing (1D) is clean. Pack the bearing with clean CG; place the bearing in the bearing cage (1L); the bearing can face either way. Place the retainer (1K) and gasket (1M) in position; line up the holes and insert the carriage bolts (1N) from the retainer side and tighten.

To Replace:

Slide this assembly on the shaft, retainer side out. Slide the winch head spool (1F) on the shaft; line up the key-ways and place the straight key (1G). Place the flat washer keeper plate (1J) in position on end of the shaft; attach lockplate (1H) to end of shaft with one capscrew; line up holes in the washer (1J) with holes in the shaft; insert other capscrew and tighten both of them. Place the one capscrew through the lock plate (1H) and washer (1J) and screw it tight. Bend the corners of the lock plate around the head of the capscrews.

Line up the holes in the bearing flange with the holes in the frame and insert the bolts. Remove the board and wedge support used between the shaft and the frame. Put the lockwashers and nuts on the bolts and tighten.

Lubricate the bearing with CG.



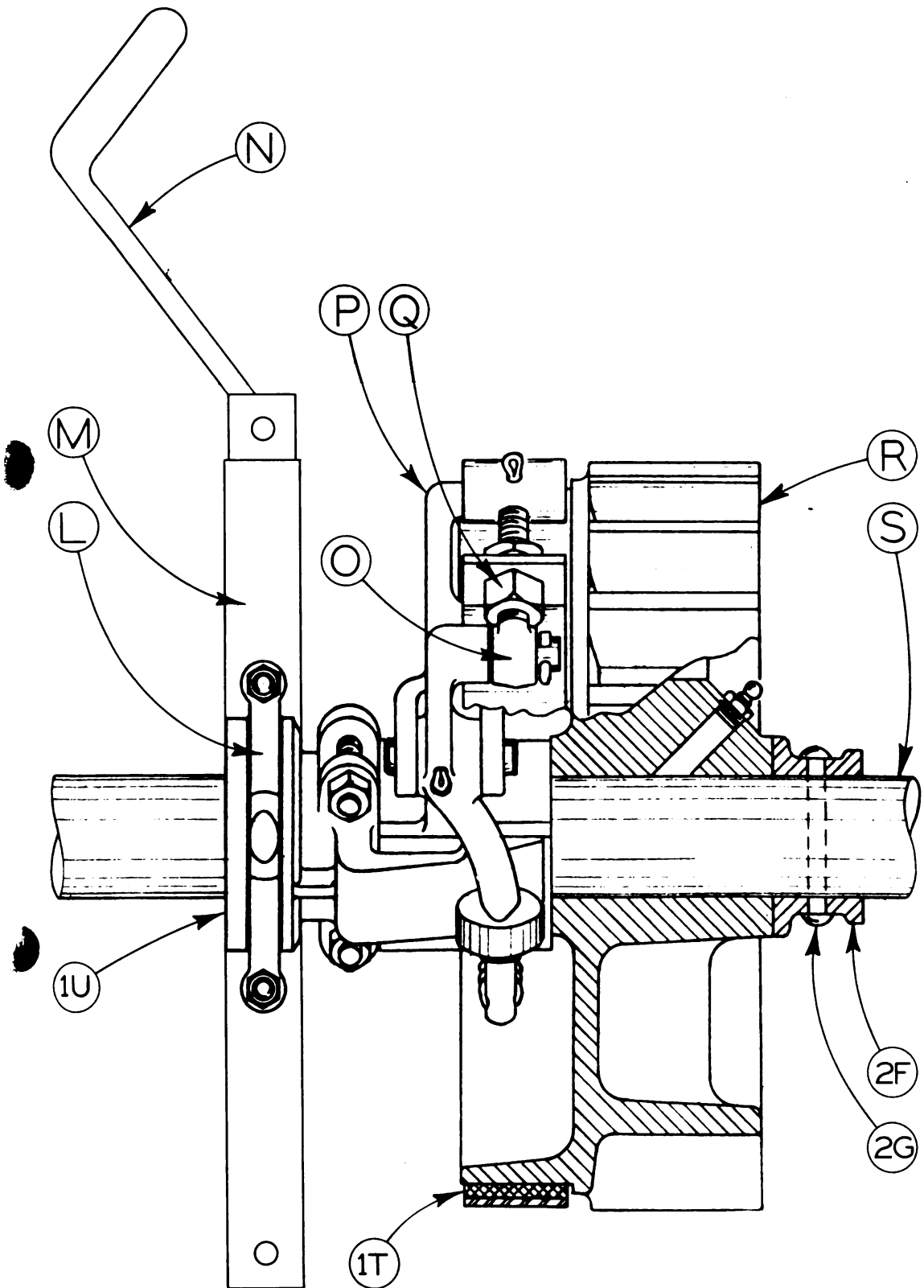


FIGURE 2  
DRUM DRIVE CLUTCH

SHAKER CAM: (See Figure 3, Page 60)

To Remove:

To remove the shaker cam (1B) proceed exactly as with the bearing removal at skip end, but do not disassemble the bearing. File or cut one of the peened ends off the pin (1A) and drive it out. Slide the shaker cam off the shaft.

To Inspect:

Inspect for wear.

This part, which can be checked without removal from machine, is subject to considerable wear and should be inspected frequently.

To Replace:

Slide the shaker cam (1B), on the shaft, long end of the hub first. Line up the hole in the cam hub with the hole in the shaft and insert pin (1A). If pin (1A) which was removed is too short it will have to be replaced with a new pin. Peen the ends of the pin. Replace the bearing assembly and winch head as explained under BEARING-SKIP END.

REMOVING DRUM DRIVE SHAFT ASSEMBLY: (See Figures 1, 2, 3, Pages 53, 55, and 60)

To completely disassemble the drum drive shaft it must be removed from the machine.

To Remove:

Remove the drive belt guard and the drive belt (B). Refer to Operation Section, Page 18. Next remove the skip clutch guard for which refer to SKIP HOIST CLUTCH BAND. Disconnect the hoist cable from the hoist drum (Z). Disconnect the drum drive clutch operating rod (N) by removing cotter at shifter fork. Then remove the complete engine as an assembly. To include the motor base, take out the four bolts attaching the base to the frame and the one bolt connecting the horizontal base support angle to the upright frame member. Remove the skip brake band (1P) for which refer to SKIP BRAKE BAND.

It is advisable at this time to also remove the drum drive clutch band (1Q) and the skip hoist clutch band (1Q) for inspection for which refer to DRUM DRIVE CLUTCH BAND and SKIP HOIST CLUTCH BAND. Disconnect the drum drive clutch shifter fork pivot bolt from the frame lower cross member. Take out the two bearing bolts on the skip end, and on the other end of the shaft, pull the gib key (A) and remove the pulley. Take out the two bolts holding the pivot bearing (2C). Lift the assembly off the machine.

To Disassemble: Clutch Parts.

To disassemble the hoist drum end of the shaft proceed as in BEARING - SKIP END and SHAKER CAM. With these parts off the shaft, the hoist drum (10) can be pulled off.

Next slip off the hoist clutch spider which was loosened when the band (1Q) was removed. Take out straight key holding spider to shaft. Then slide off the clutch sleeve (U) and yoke (T) assembly.

Both the sleeve and yoke are of two parts and can be removed from the shaft without further disassembling.

File or cut one peened end of pin (2F) and drive out. Slide off retainer collar (2G). Then the drum drive pinion (R), which is free on the shaft, can come off next. Then remove the drum clutch spider (P); disconnect the spring (1R) from the clutch lever (V) and spider set screw. Loosen spider set screw jam nut and back out the spider set screw clear of the hole in the shaft. Slide spider off shaft. Remove straight key. The drum drive clutch sleeve (U) and yoke (L) can be taken off. Each of these are in two parts and can be removed from the shaft at any time.

The two piece closed shifter fork (M) was left on this sleeve assembly as it is in two pieces. It can be disassembled now or could have been removed at any other time. The shaft is now free of all parts except the gear reduction assembly.

#### To Inspect:

Inspect the hoist drum for worn bushings, and the hoist drum surface and skip brake drum surface for wear or score marks.

Inspect the yokes and sleeves and shifter forks for wear.

Check shaft to see that it is straight.

#### To Reassemble:

Place the two sleeve halves (U) together; line up the holes; insert bolts and tighten. Place the two yoke halves (L) in the groove of the sleeve (U); insert the bolts and tighten. Yoke must turn freely in sleeve groove. Slide this sleeve and yoke assembly on the shaft with the sleeve extension to the outside. Fit the spider key into the keyway nearest the gear case assembly; coat the keyway with white lead or grease; slide the clutch spider (P) on the shaft with the arm toward the end of the shaft; line up the spider keyway with the key in the shaft and place in position. The hole in the spider hub for the spider set screw must line up with the hole in the shaft. Run the jam nut all the way on the spider set screw; turn the set screw through the spider hub and into the hole in the shaft; tighten it and then set the jam nut. Assemble the clutch band (1T) to the spider; place the loop of the dead end of the band over the spider arm; line up the holes; insert and open new cotter. Place clutch lever eye bolt (O) through hole in live end of the band and screw on adjusting nut (Q). Do not tighten adjusting nut.

Slide the drum drive pinion (R) on the shaft (clutch drum surface first) against the spider hub; now slide the spacer collar (2F) against the hub of the drum drive gear; line up the holes through the spacer collar and shaft; insert pin (2G) and peen the ends.

Assemble the shifter sleeve (U) and yoke (T) and slide on the shaft in position.

Fit key in keyway of shaft; coat key with white lead or grease. Slide the hoist clutch spider on the shaft; line up the keyway with the key and slide the spider over the key into position. Line up and place spider set screw the same as in the other spider.

Assemble hoist clutch band (1T) to spider. Follow same method as used for drum drive band.

Assemble the hoist drum (Z), shaker cam (1B), bearing assembly and winch head spool (1F) as per instruction under (Bearing Skip End, Page 54) and (Shaker Cam, Page 56).

To Disassemble - Gear Reduction Assembly: (Figure 1, Page 53)

Before starting this disassembly, be sure that the oil has been drained from the case. Start by taking out the ten bolts holding the gear case cover assembly in place. Remove the cover assembly and be careful of the pressed cork gasket. The cover assembly consists of the cover and the pinion shaft with the bearings.

Remove the lock plates which act as keepers for the pinion shaft assembly by removing the cap screws and washers. The pinion shaft assembly can now be taken out of the cover. Remove the smaller bearing (D) by bumping the end of the shaft on a piece of wood or using a puller if one is handy. Next remove the snap ring (E) holding the larger bearing (G) and bearing will come off easily. The pinion shaft and pinion are one piece. Take special care in driving out the leather seal (2E) from the inner side toward the outside.

Straighten the lock plate (2A) for the two capscrews (2B) and remove these capscrews holding the keeper plate (2D) for the internal gear. The small bearing (D) is first to come off. This bearing may be tight enough to require a puller-if puller is not available then the bearing may be forced off by driving against the back side of the case hub (use a soft hammer or block of wood and hammer - being very careful not to break the case). The tapered spacer (1Z) slips off next. The internal gear (1Y) is next and it will come off easily. Remove the straight key (I). Next remove the case (1W) which may require light tapping on the hub to start the bearing (1V) mounted on the shaft. Place the case open side down and drive out the ball bearing (1V). Keep the bearing clean. Next carefully force out the pressed steel seal retainer (J) and then remove the felt seal (K).

To Inspect:

Inspect the cork gasket - if worn or damaged use a new one.

Inspect all bearings for wear or damage. KEEP CLEAN.

Inspect snap ring for distortion.

Check pinion shaft for straightness and pinion for wear.

Inspect leather seal carefully; if damaged even slightly, replace.

Inspect internal gear for wear.

Inspect pressed steel seal retainer for distortion.

Always use new felt seal.

Clean all parts thoroughly.

To Reassemble:

Set the gear case (1W) open side up. Fit a new felt seal (K) in the pressed steel retainer; saturate the felt with oil and drive this assembly into its recess in the hub of the case with the closed side of the retainer up. Pack the clean bearing (1V) with clean CG and drive it into place in the hub of the case; bearing may face either way. Place the case with the seal and bearing in position on the shaft; open side of the case out. It may be necessary to tap the bearing (1V) in place - use a piece of pipe (diameter same as inner race of bearing) as the driver. Fit the straight key (I) in the keyway of the shaft and coat it with white lead or grease. Line up the keyway in the internal gear (1Y) with the key in the shaft and slide into place; open side of gear out. The tapered spacer (1Z) goes on next, taper to the outside. The small bearing (D) is driven on the end of the shaft. Pack this bearing with CG. Line up the holes in the bearing keeper (2D) with the holes in the shaft; place the lock plate (2A) on one of the capscrews (2B) and start the capscrew into the shaft. Start the other capscrew and then tighten bolt. Bend the lock plate around the heads of the capscrews. Next assemble the gear case cover. Place large bearing (G) on the pinion shaft (H) and put the snap ring (E) in the groove against the bearing. Pack this clean bearing with CG. Now drive the smaller bearing (D), which has been packed with CG, on the pinion shaft up against the shoulder. Place this shaft assembly in the cover (2H); then using the shaft assembly washer, lock plates and capscrews, lock the assembly into position.

Soak the leather seal (2E) with OE; carefully place it over the outer end of the pinion shaft, open end first. Slide it against the opening in the cover and drive it in until it is flush with the outer edge of the cover.

Coat the cork gasket (F) lightly with CG and place in position on the case - the light coating of lubricant will hold the gasket to the case. Put the cover assembly in position; line up the holes, and start the ten bolts. After all these bolts are in place tighten them evenly.

To Replace:

Coat bore of pivot bearing (2C) with CG and place on gear case pivot. Place assembled shaft in position on frame with both bearing bases pressing on the side channels. While placing the shaft, be careful to line the yoke (T) of the hoist clutch shifter sleeve with the shifter fork. Line up the holes in the bearing bases with the holes in the frame channels; insert the bolts and tighten. Place the pulley (C) on the pinion shaft, short machined hub toward the gear case; line up the keyways; coat the gib key (A) with white lead or grease and drive it into place. Assemble the two piece closed shifter fork to the yoke (M) for the drum drive clutch. Bolt the lower or pivot end to the frame cross member.

To assemble the fork, place the two halves, one on each side of the yoke, with the yoke prongs through the slotted hole of each piece. One piece of the fork is longer than the other and this longer end must be up. Bolt the top ends together; place the longer

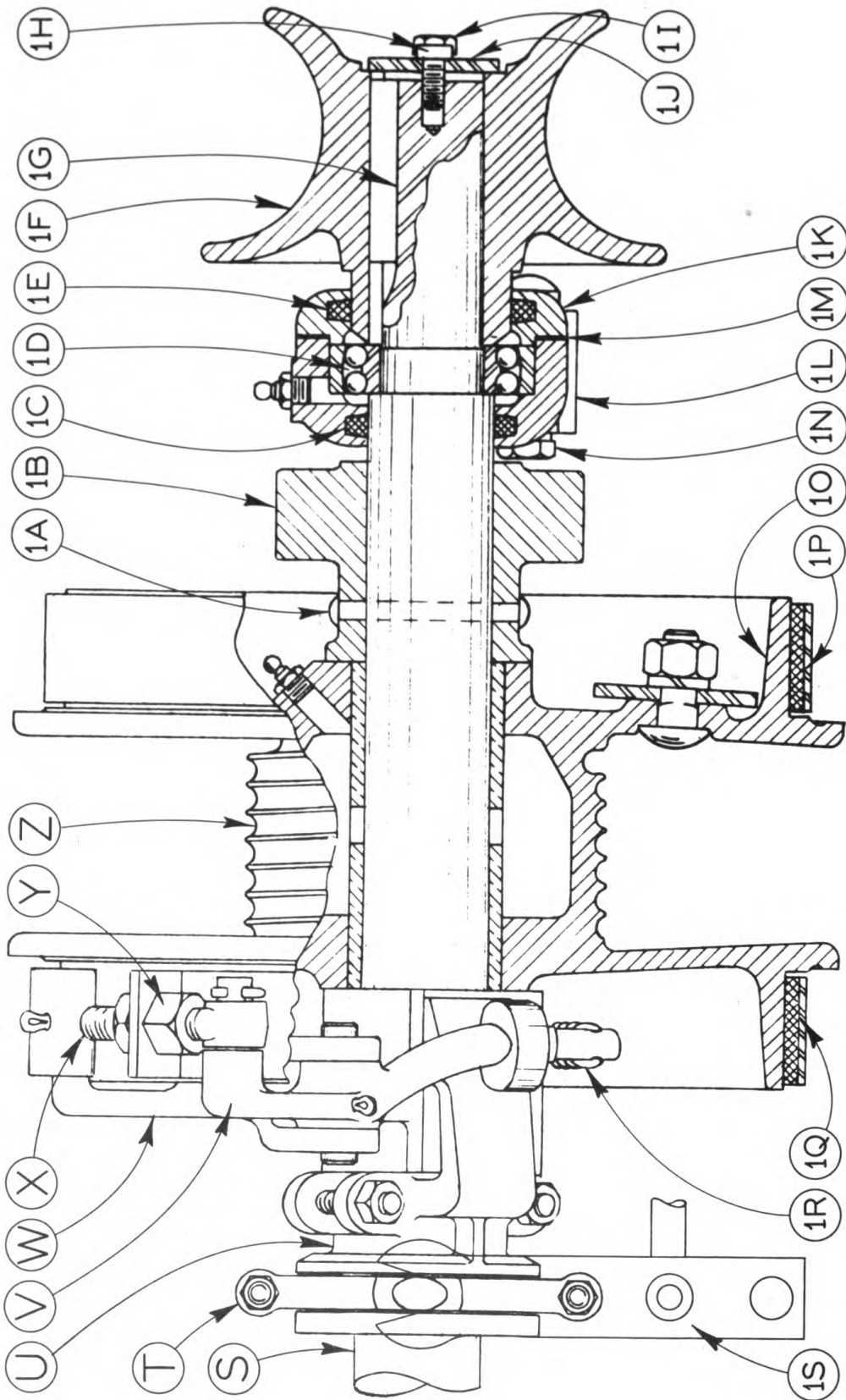


FIGURE 3  
SKIP HOIST CLUTCH

pivot bolt in the holes in the lower ends; run the jam nut against the fork—allow enough clearance for the fork to turn freely. Now place the pivot bolt through the hole in the frame cross member. Screw the jam nut on and tighten.

Mount the assembled engine and engine base on the frame; line up the holes through the base and the mixer frame; insert the bolts but do not tighten. Line the face of the engine pulley with the face of the gear case drive pulley. Tighten the engine base bolts. Be careful that the engine does not shift while doing so. Insert and tighten bolt through the horizontal engine support through the up-right "U" member.

Install and adjust drive belts (B) and belt guard—refer to Operation Section, Page 18.

Place drum drive clutch operating rod through guide hole in horizontal engine support. Enter bent handle through hole so that "stop shoulder" on the lever comes against the inside of the support. Attach hook end of the rod to the clutch shifter fork; insert and open cotter.

Thread the hoist cable through the hoist clutch guard, then through the hole in the surface of the hoist drum—using just enough cable to go around the clamp bolt between the clamp washer and the end surface of the drum. Tighten the clamp. Fasten the guard in place, one nut to the engine base and one bolt to the frame cross member.

Use power to take up the hoist cable slack.

Lubricate the shaft bearing, the hoist drum, the drum drive gear and the two shifter sleeve yokes with CG.

Lubricate all pivot points with OE.

Replace drain plug (1X) in the gear reduction case and fill with 1-1/2 pints of GO-90

#### MIXING DRUM: (Figure 3, Page 62)

The assembled drum consists of two pressed steel heads welded to a center section called a shell. Lugs, with one hole each, are welded to the inner surface of the shell and charging side of the head. The eight buckets and four blade extensions are fastened to these lugs with machine bolts. Drip rings, interchangeable, are welded to both openings. A ring gear is bolted to the shell around the center of the drum.

Due to normal wear, the drip rings, buckets and blades should be replaced from time to time. The interval between replacements depends on the size, hardness and texture of the aggregates used.

#### DRIP RINGS: (A) (Figure 3, Page 62)

Worn drip rings cannot be repaired and must be replaced. This is to be done when the concrete drips or leaks in excessive amounts from the drum openings. They can be removed and replaced without removing any other parts from the machine and while the drum is in place.

To Remove:

The drip rings are spot welded to the drum head. They can be knocked loose easily with a hammer and chisel. A cutting torch can be used if necessary, without damaging the drum heads. Split the rings with a cutting torch and remove. If a cutting torch is not available the loose rings can be pried out of position.

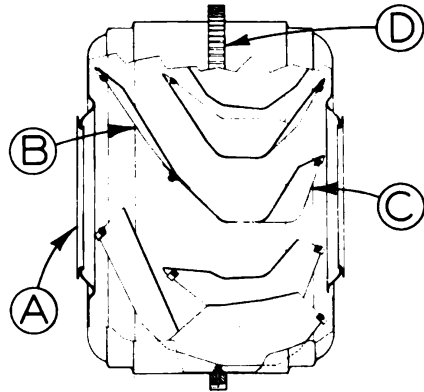


FIGURE 3

To Install:

Start one end of the split drip ring on the edge of the drum opening. Then work the ring around the inside of the drum opening until it snaps into place. Butt weld the ends and spot weld the ring to the drum head to prevent the ring from turning.

BUCKETS: (C) & (B) (Figure 3, Page 62)

The buckets and blades should be replaced when wear at edges exceeds 1-1/2 inches or have been accidentally bent by foreign material. To replace these parts proceed as follows.

To Remove:

For room to work inside of the drum, remove the discharge swing chute. (See page 64). Next remove the one-half inch machine bolts holding the buckets and blades to the lugs on the inside of the drum. The parts will then be free and can be removed.

To Replace:

When installing new buckets and blades, be sure to use new bolts. The blades or extensions are located on the charging side of every other bucket. One end of the blade fastens to the bucket with the same bolts used to hold the bucket to the lug. The other end of the blade fastens to a similar lug on the head of the drum on the charging side.

Replace the discharge swing chute. (See page 64).

DRUM RING GEAR: - (D) (Figure 3, Page 62)

To replace the ring gear it will be necessary to remove the drum from the machine. The quickest way to do this is to remove the "U" shaped frame uprights as an assembly, with the water tank, valve, skip hoist shaft and other parts in place. To do this proceed as follows:

To Remove:

First remove the skip. Release the hoist cable from the hoist drive drum; wrap it around the hoist differential, and wire the end to the differential - do this so that the cable cannot unwind from the differential. Remove the interior splash shield and hanger and then the water inlet pipe. Remove the reach rod from the knockout



arm to the clutch and brake lever, and then release the tension of the skip brake spring and remove it. Disconnect the water supply line. This clears the skip side of the machine.

On the opposite side of the machine it will be necessary to remove only the discharge swing chute from the hanger.

Before continuing, rig a hoist or other lifting equipment to the upright assembly so as to support it for removal of the bolts.

Next remove the eight machine bolts which hold the uprights to the main frame, the bolts fastening the motor supports to the upright and also the bolt holding the lower end of the ring gear guard to the main frame. The upright assembly can now be lifted off.

The drum assembly is now free and can be removed from the frame. When the drum is out of the machine take out the nine 1/2" plow bolts and the ring gear can then be removed. Be careful not to lose the shims between the gear and the drum shell.

#### To Inspect:

Inspect the ring gear for wear. Inspect the plow bolts for wear. If these are worn they must be replaced. If the drum has been removed with the drip rings, buckets and blades in place, inspect these parts.

When the drum is out of the machine, inspect the drum roller assemblies for loose rollers on the shafts, the bearings for wear and the bearing cages to see that they are tightly bolted to the frame.

#### To Replace:

Reassemble the ring gear to the drum using new plow bolts. Be careful to use the right amount of shims, equally placed around the drum, between the ring gear and the drum shell. The shims should be a snug fit between the ring gear and shell, being equally placed, usually two in each position.

Replace the assembled drum on the rollers in the frame with the blade extension side toward the skip. Now mount the upright assembly, holding it suspended until all eight bolts are placed and tightened. Also replace bolts and tighten the lower end of the ring gear guard. Attach the swing chute to the hanger with the four carriage bolts with nuts to the outside. Next attach the skip brake tension spring and the reach rod which connects the knockout arm and clutch and brake lever.

Adjust the skip brake tension spring sufficiently to set the brake. Refer to Operation Section, Page 17.

Install the water inlet pipe and interior splash shield and hanger. Now remove the wire holding the loose end of the skip hoist cable on differential. Unwind enough cable to reach the hoist drive drum plus 1-1/2 wraps and attach. Refer to Operation Section, Page 23.

Next assemble the skip and cables to the frame uprights and upper hoist shaft. Connect the water supply line.

Start the mixer and check to see that the drum has sufficient clearance all around. Raise and lower the skip several times to check its operation and automatic adjustment.

With the drum slowly turning over, coat the ring gear teeth evenly with an external gear compound. Use CW gear compound.

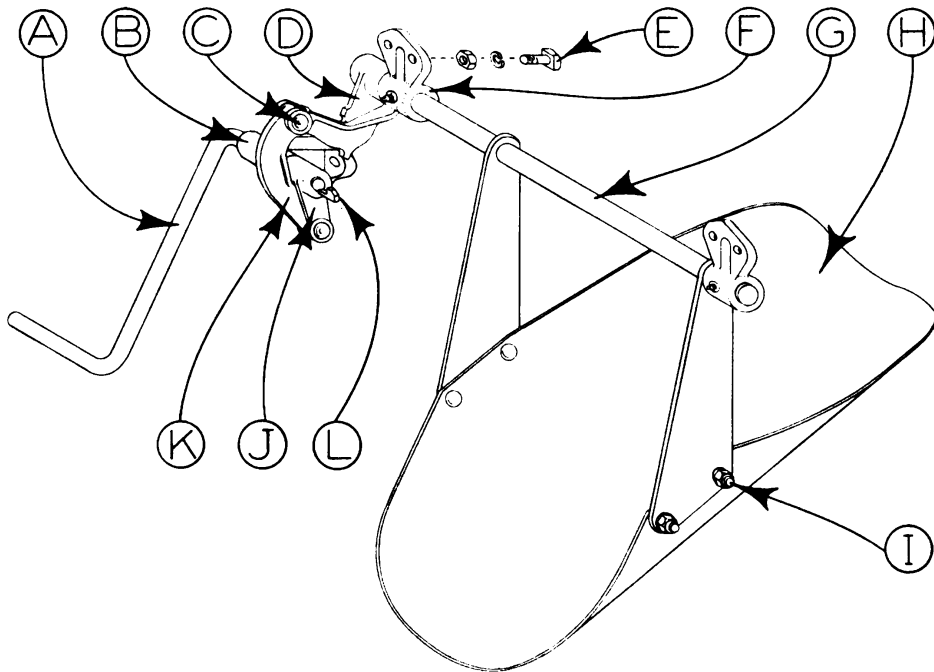


FIGURE 4

DISCHARGE SWING CHUTE AND LEVERS: (See Figure 4, Page 64)

The discharge swing chute (H) when in the discharge position extends well into the drum and diverts the flow of concrete to the outside of the drum. This action will naturally result in wear. With the discharge swing chute in a closed position the chute is completely outside of the drum. This part must be replaced periodically because of wear.

Discharge Swing Chute (H)

To Remove:

To remove the chute take out the four 1/2" carriage bolts (I) that fasten the chute to the hanger (G). The chute is now free to be removed from the machine.

To Inspect:

Inspect the chute for wear. The end which extends into the drum in the discharge position will show the greatest amount of wear. Excessive amount of wear on this end of the chute will result in slow discharge.

To Replace:

Reassemble the chute to the hanger. Place chute between the two hanger arms; line up the holes; insert the carriage bolts (I) from the inner side; place the lockwasher and 1/2" nuts, then tighten. CAUTION! Nuts must be on the outside.

SWING CHUTE SHAFT ASSEMBLY: (See Figure 4, Page 64)

The swing chute shaft assembly consists of the necessary shafts and levers to lock the discharge swing chute in either the closed or discharge position.

To Remove:

Take out the pins (C) connecting the swing chute shaft lever (D) and the link (K). Next take out the four bolts (E), two for each bearing, holding the bearings (F) to the support angle. The assembly is now free and can be removed. This can be done with the discharge swing chute in place. The bearing opposite the lever end can be slipped off the hanger shaft as soon as it is free of the support angle.

The shaft (G) is held in place with a tapered key which is flush with the end of the shaft. This key cannot be pulled. To remove this part place the opposite end of the shaft against something solid. Place a block of wood against the hub of the lever and drive it farther on the shaft until it is free of the key. Remove the key - then the lever and bearing can be pushed off the shaft.

To Inspect:

Inspect the pin (C), the shim holes in the shaft lever and the link (K) for wear. Inspect the bearings (F) for wear.

To Replace:

Place bearing (F) on the long end of the shaft so that with flange in an upright position, the grease fitting will face outward. Place the lever (D) on the shaft with the arm extending outward. Line up the keyway; coat the key with white lead or grease and drive it into position. The lever (D), hanger shaft (G) and key should be flush. Place the other bearing on the short end of the shaft; hold the assembly in position on the machine; line up the holes and insert the bolts (E) with the nuts outward. Tighten the bolts. Insert the pin (C) holding lever (D) and link (K).

Lubricate the bearings with CG and lubricate the lever pin with OE.

HAND OPERATING LEVER ASSEMBLY: (See Figure 4, Page 64)To Remove:

Take out clevis pin (C) to free link (K). Pull the gib key (L) and slide the lever clevis (J) off the rod. The rod slips out of the bearing bracket (B). Next loosen and remove bolts holding the bearing bracket (B) to the "U" upright.

To Inspect:

Inspect bearing bracket (B) and clevis bracket pin (C) for wear. Always discard used cotters and lockwashers and replace with new ones.

To Replace:

Place bearing bracket (B) in position on the "U" upright. Line up the holes and insert the bolts with nuts toward the outside and tighten. Place the hand operating lever (A) through the bearing, then place the lever clevis (J) on the rod with the long end of the hub toward the outside. Line up the keyway. Coat the gib key (L) with white lead or grease and drive it home. Face the head of the gib key toward the center of the rod. The lever clevis should be fitted as close as possible against the bearing bracket (B) with just enough clearance for the rod to swing free. Next attach the link (K) with the short end toward the top; line up the holes and insert the clevis pin (C), flat washers, and cotter. Use new cotter. Lubricate the bracket with CG and lubricate the clevis pin with OE.

SKIP BRAKE AND CLUTCH LINKAGE: (See Figure 5, Page 66.)To Remove:

Place the skip on the ground. Release the tension on the load spring (C) by loosening adjusting nut. Remove the spring by unhooking one end from the anchor bolt and the other from the ad-

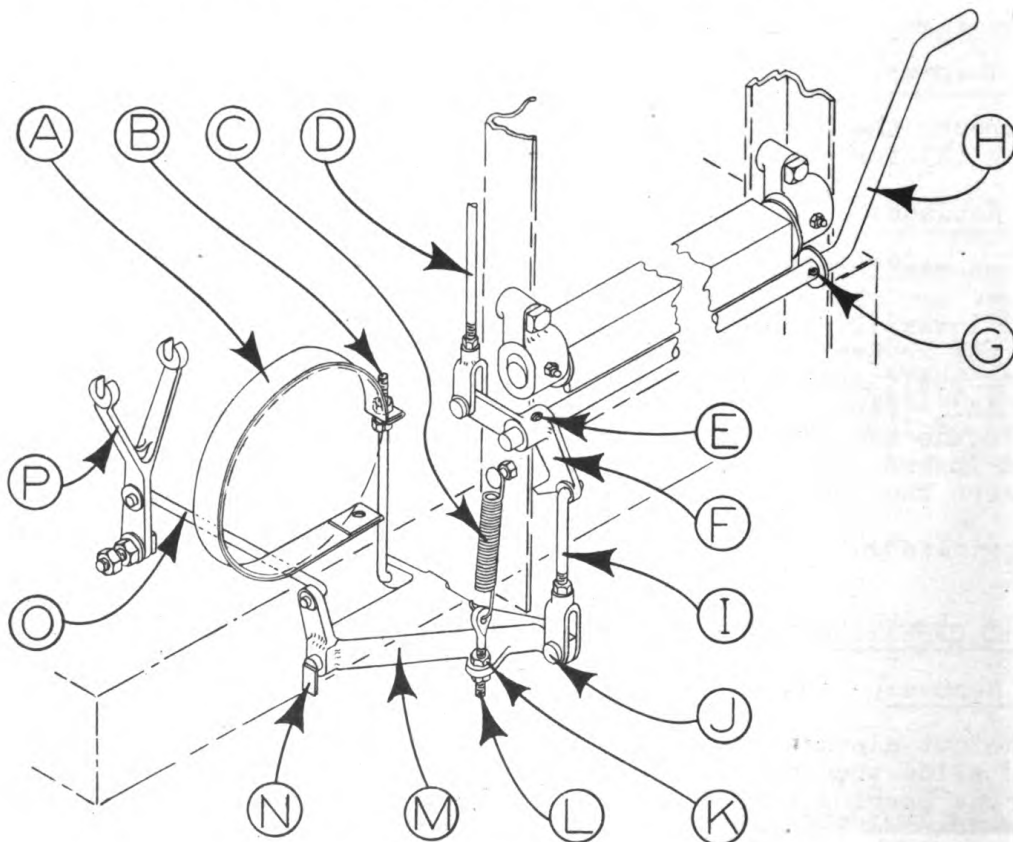


FIGURE 5

justing eye bolt (L). Remove the eyebolt. Next take out the cot-  
ters from the hooked ends of the link (O) and remove the link.  
Pull the cotter from the hooked end of the brake rod (B) that ties  
to the clutch and brake lever and disconnect the rod. The other  
end of the rod (B) may be left attached to skip brake band (A).  
Remove cotter and pull clevis pin (J) from clevis end of toggle  
lever rod (I); take out cotter from hooked end of toggle lever rod  
and remove rod. The clutch and brake lever pivots on a full float-  
ing pin (N) which is supported in holes through two frame cross  
members. One end of the pivot pin has a lug welded on and the  
other end is drilled for a cotter. Close and pull the cotter and  
remove pivot pin (N). The clutch and brake lever (M) is now free.

To Inspect:

Check clevis pins and rod for wear.

To Replace:

Place the clutch and brake lever (M) in position between the two  
frame cross members; line up the holes and push the pivot pin (N)  
through the holes toward the mixing drum. Insert and open cotter.  
Place hooked end of toggle lever rod (I) through hole in toggle  
lever (F) end of hook toward skip. Place flat washer; insert and  
open cotter. Place clevis end of rod over the lever (M); line up  
the holes and place clevis pin (J); insert and open cotter. Place  
hooked end of skip brake rod (B) through hole in lug of lever (M)  
end of hook toward mixing drum; place flat washer; insert and open  
cotter. Next place link (O) with two hooked ends in position, con-  
necting the lever (M) and the shifter fork (P); place flat washer;  
insert and open cotter. Hook the spring adjusting eye bolt (L)  
on one end of the spring (C). Place end of eyebolt through hole  
for it in lug of lever (M) and hook other end of spring on anchor  
bolt. For adjustment refer to Operation Section, Page 17.

Lubricate all clevis pins and pivot points with OE.

SKIP CLUTCH AND BRAKE OPERATING ROD: (See Fig. 5, Page 66)

To Remove:

Disconnect the knockout reach rod (D) from the toggle lever (F) by  
removing clevis pin (J). Disconnect the hooked end of the toggle  
lever rod (I) by pulling cotter. Next file or cut off with chisel  
one end of the peened pin (E) which holds toggle lever (F) to  
operating lever (H). Drive out pin. At the other end of the op-  
erating lever (H), close and pull out cotter. This releases the op-  
erating lever.

Pull the operating lever partly out until it is clear of the upright  
supporting the toggle lever end. Take toggle lever off operating  
lever. Pull operating lever through other upright and flat washer  
(G).

To Inspect:

Check toggle lever for worn pivot holes, operating lever for worn  
parts and straightness, and clevis pins for wear.

To Replace:

Start long end of operating lever (H) through upright and place flat washer (G) on operating lever. Continue pushing lever until it is past the skip. Now place the toggle lever (F) on the operating lever with stop lug on toggle lever unit toward the outside and facing down. Line up holes through toggle lever (F). Insert pin (E) and peen ends. Continue operating lever through hole in other upright until against the toggle lever. Place flat washer against other upright. Insert and open cotter. Flat washer must be between cotter and upright.

Place hooked end of toggle lever rod (I) to hold toggle lever (F); put on flat washer; insert and open cotter. Place clevis end of knockout reach rod (D) over end of toggle lever; line up holes; fasten with clevis pin; insert and open cotter.

Lubricate all pivot points with OE. For adjustment refer to Operation Section, Page 17.

CHARGING SKIP HOIST SHAFT ASSEMBLY: (See Figure 6, Page 68.)

The charging skip hoist shaft assembly consists of a shaft mounted in self-aligning bearing with a single skip cable drum on one end and a skip cable drum and differential drum on the other. The skip cable is fastened to the skip cable drums and the hoist cable leads from the large differential drum to the hoist drum on the drum drive shaft.

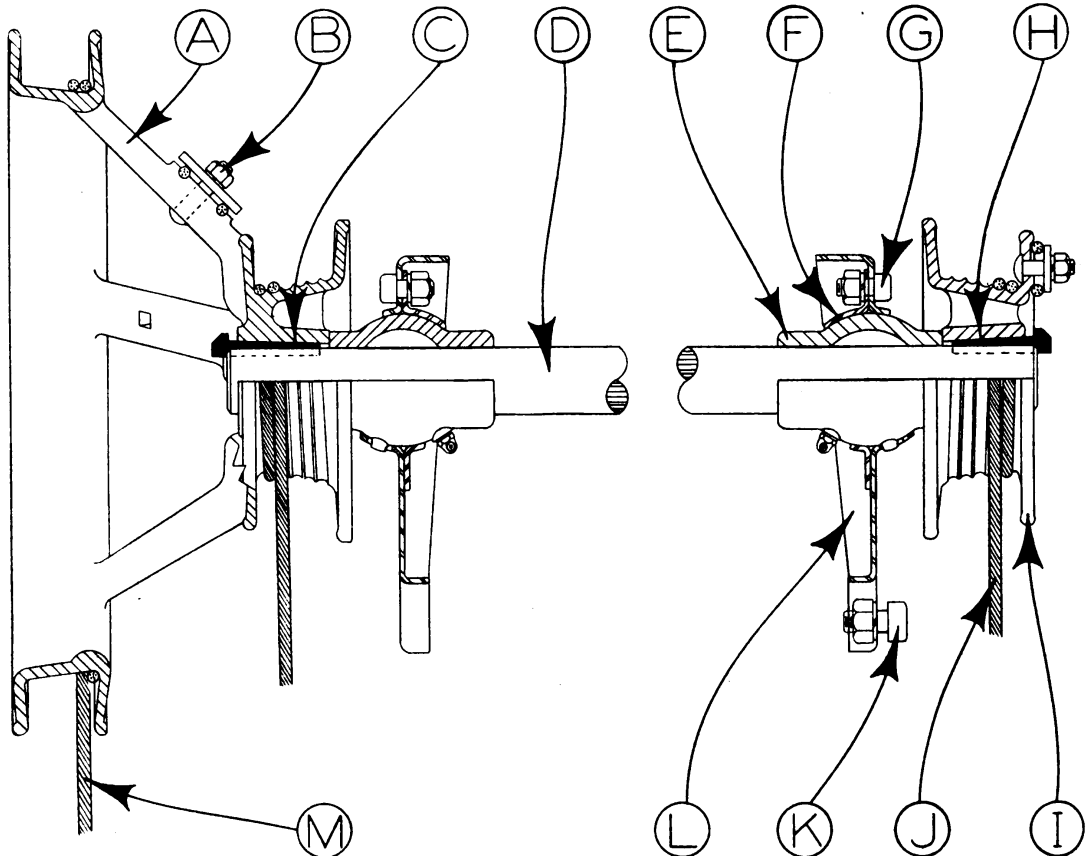


FIGURE 6 (For exploded view see page 120)

To Remove and Disassemble:

With the charging skip resting on the ground, remove the skip cable (J). Refer to Instructions on Removing Skip, Page 70. Next free the end of the hoist cable (M) anchored to the large differential skip drum by loosening the cable clamp (B). Unwind the cable from the differential skip drum (A) and remove it. The hoist shaft assembly can now be removed as a unit by taking out the three bolts (G) that fasten each bearing bracket (F) to the "U" uprights, or it can be dismantled in place on the machine. Two men can handle this assembly.

The usual method is to dismantle the assembly in place on the machine, as follows:

Beginning at the single skip drum end of the shaft, pull the gib key (H) and slide the skip drum (I) off the shaft (D). Next with the differential skip drum (A) still keyed to the shaft slide the shaft out of the bearings. Place it on the ground and pull the gib key (C). Pull the shaft out of the differential skip drum (A). Take out the three bolts (G). To dismantle these self-aligning bearing assemblies take out the four bolts (K). This frees the self-aligning bearing retainer (F) and releases the universal bearing (E). The other bearing assembly is an exact duplicate and is dismantled in the same manner.

To Inspect:

Check the shaft for straightness. Place the shaft on "v" blocks and use a dial indicator. Also inspect this part for wear at the bearing surfaces.

Check the self-aligning bearings (E) for wear.

To Replace:

Place the self-aligning bearing in position in the bearing bracket (L); then place the bearing bracket retainer (F); line up the holes and insert the bolts and tighten. Follow the same procedure with the other bearing and bracket assembly. Place the bearing assembly and bearing bracket on the "U" upright; line up the holes; put in the three bolts (G) and tighten. Replace the other bearing bracket assembly in a similar manner.

Fit one end of the hoist shaft into the differential skip drum (A); line up the keyways; coat the gib key (C) with white lead or grease and drive it in place. Slide the shaft through the two self-aligning bearings (E), starting from the engine side of the mixer. Place the skip drum (I) on the free end of the shaft (D); line up the keyways; coat the gib key (H) with white lead or grease and drive it into place. Place one end of the hoist cable (M) through hole in face of the differential skip drum (A); pull enough cable through to make a half wrap around the drum spoke and to loop the end of the cable around the clamp bolt (B) between the clamp washer and spoke. Tighten the clamp. Wrap the cable on the large diameter differential drum (A), leaving enough to lead down to the hoist drum on the power shaft and have 1-1/2 wraps. The cable is wrapped on the differential drum in a direction leading down on the side of the drum toward the machine. Lead the loose end of the cable through the hole in the guard for the hoist

drum on the power shaft and then lead the cable through the hole in the face of the hoist drum. Loop the end around the clamp bolt between the clamp washer and the drum. Tighten the clamp.

Next attach the skip cable to the upper skip hoist shaft drums. Refer to Instructions on Replacing Skip, Page 71.

Use power to take up the cable slack - be careful to have the cable follow properly on the drums. Lubricate the two universal bearings with CG.

CHARGING SKIP AND KNOCKOUT: (See Figure 7, Page 70)

To Remove:

Lower the skip (L) to the ground; release skip brake and unwind the cable from the upper hoist shaft drums. Disconnect the ends of the cable from the drums by loosening the clamps. Pull the cotter locking the water lever trip rod and remove the rod. Next take out the single bolt (J) that holds each skip pivot bearing (K) to the "U" uprights. The skip is now free and can be pulled or tipped away from the machine.

To Inspect:

Inspect the skip for wear. The greatest amount of wear will show in the skip throat. If worn, weld a liner to the inner surface.

The skip pivot bearings are loose on the skip pivot shafts. These bearings have an oversize oval bore which permits the shaker action of the skip. Inspect these bearings for wear. However, it is seldom necessary to replace them.

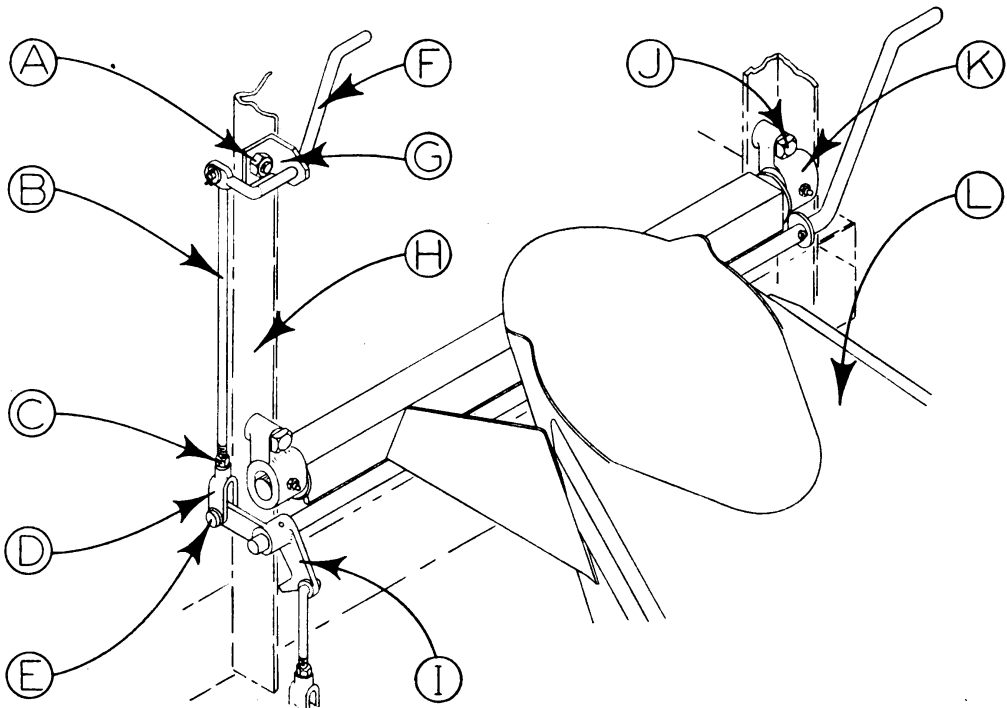


FIGURE 7



Inspect the skip pivot shafts for wear and check to see that they are straight.

Inspect the skip cable for wear, kinks or any broken strands. If condition of the cable is questionable replace it immediately with a new one. The cable size is 5/16" by 22 feet.

#### To Replace:

Place the skip pivot bearings (K) on the skip pivot shafts with the bolt holes toward the top. Move the skip into position; line up the bolt holes and insert and tighten the bolts (J). Broken or sprung lock washers must be replaced. Install the water lever trip rod - using a new cotter to lock it in place.

Lead the new cable through the cable guides on the skip and anchor the ends to the drums. On the single drum end of the hoist shaft the cable end is threaded through a hole in the face of the drum. Make a short loop of the cable around the clamp bolt between the clamp bar and the outer edge of the drum. The cable should extend about an inch past the bar. Tighten the clamp bolt. To anchor the other end of the cable, thread it through the hole in the face of the drum - more cable is needed here as the clamp is midway up one of the spokes of the large diameter differential drum. Give the cable a half wrap around the spoke; loop the end around the clamp bolt between the clamp bar and the drum spoke, with about one inch of the cable extending past the edge of the clamp bar. Tighten the clamp bolt. Lubricate the cable with OE. Lubricate the skip pivot bearing with CG.

#### SKIP KNOCKOUT: (See Figure 7, Page 70)

The skip knockout consists of an arm (F) and a rod (B). The knock-out arm is contacted by the skip when the skip is in full charging position. When the skip contacts the knockout arm the force is carried to the clutch control mechanism by the knockout reach rod, disengaging the clutch and automatically applying the skip brake. The skip remains in this upright position until released.

#### To Remove:

Take out cotter and remove clevis pin (E). Remove reach rod. Take out bolt (A) and remove knockout arm and bracket (G). Then slide bracket off arm.

#### To Inspect:

Check the reach rod for straightness. Check the knockout arm bracket to be sure it is not bent and thus bind the arm. Check clevis pin and clevis for wear.

#### To Replace:

Place the bolt in the knockout arm bracket with the head toward the position of rod (B). The bolt must face this way for clearance of the rod. Slide the bracket with the bolt in it on the knockout rod with the flange toward the skip. This assembly can then be mounted on the "U" upright. Engage the hook end of the reach rod through the eye of the knockout arm; replace the flat

washer and lock into position with a new cotter. Place the clevis end of the reach rod in position with the toggle lever (I); insert the clevis pin and lock into position with a new cotter.

Adjust the knockout rod to disengage the skip hoist clutch when the charging skip reaches a full upright position. If the charging skip does not come high enough the reach rod (B) should be shortened. If the charging skip passes a full upright position the reach rod (B) should be lengthened. To shorten or lengthen the reach rod loosen lock nut (C), remove cotter and pin, then turn clevis (D) to the right to shorten the reach rod or to the left to lengthen the reach rod. After reach rod has been adjusted to desired length replace clevis pin and cotter. Tighten lock nut. Lubricate all pins with OE.

#### CHARGING SKIP SHAKER: (See Figure 8, Page 72)

The skip shaker is an arm with a throwout lug on one end and a hardened roller on the other. The arm pivots on a bracket mounted on the upper side of the frame in such a manner that the roller extends under the shaker cam and the end with the throwout lug is directly beneath the skip shaft support.

#### To Remove:

To remove the assembly with the charging skip attached to the machine, take off the drip guard for clearance by removing the two bolts attaching it to the side of the frame member.

Take out the two bolts holding the pivot bracket to the top side of the frame. Remove the shims (G) located between the pivot bracket and the frame if any are used. Slide the assembly along the frame away from the drum drive shaft until the roller end is free. Remove from machine.

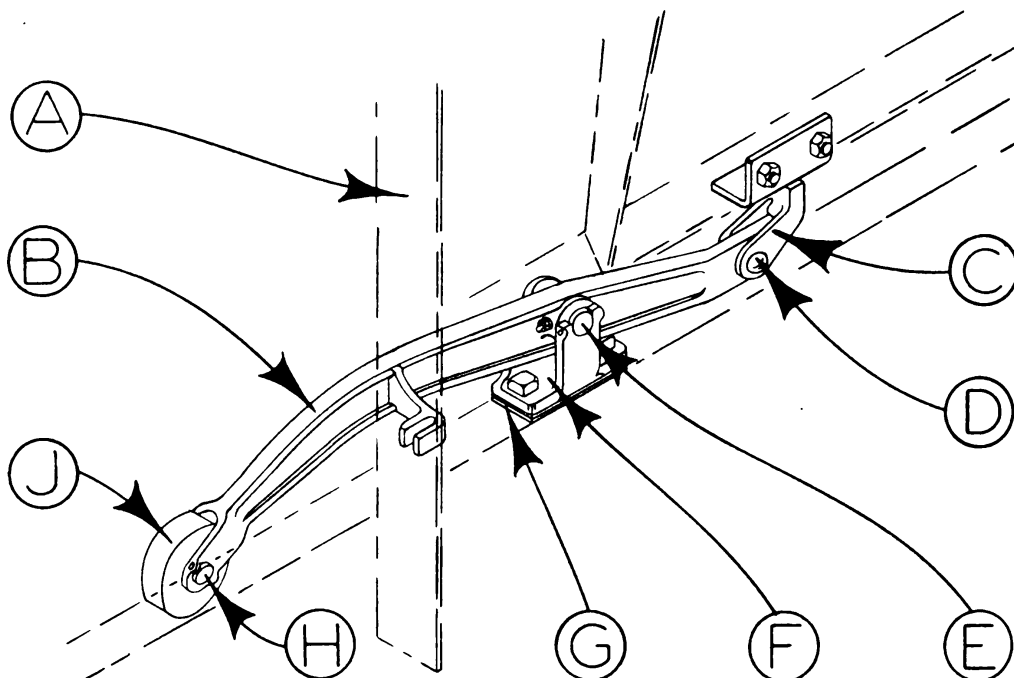


FIGURE 8

To Disassemble:

Close and pull the cotter holding the pivot pin (E). Remove the pivot pin and the pivot bracket (F) is free. Flat washer may be placed on pivot pin (H), at inner side of shaker arm (B) to eliminate any side play.

Next close and pull the cotter holding the cam roller pin (H); remove cam roller pin (H) and the cam roller (J) is free. Now close and pull the cotter locking the blank bolt (D) holding the throwout lug (C). Remove the blank bolt and the throwout lug is free.

To Inspect:

Inspect all pins, cam roller surface and bore for wear.

To Reassemble:

Place the throwout lug (C) in position at the end of the shaker arm (B); line up the holes and insert the blank bolt (D). Insert and open cotter. Place the cam roller (J) in the forked end of the shaker arm; line up the holes and insert the cam roller pin (H). Line up the holes through the cam roller pin and the forked arm. Insert and open cotter. Place pivot bracket (F) in position on shaker arm; line up holes and insert pivot pin (E); use flat washers on inner side of arm if required. Insert and open cotter.

To Replace:

Place the assembly in position on the frame - roller end toward the drum drive shaft. Slide the assembly toward the drum drive shaft with the cam roller under the shaker cam. The shaker arm (B) has a cast guide fork which must straddle the upright angle (A). If any shims (G) are used under the bracket (F), line up the holes through the bracket, shims and frame; place bolts and tighten.

Lubricate shaker arm pivot with CG.

Lubricate other pivot points with OE.

For adjustment refer to Operation Section, Page 22.

WATER MEASURING TANK: (See Figure 9 Page 74)

The water measuring tank is of the syphon type. The capacity is 14 gallons. The water enters and leaves at the top of the tank through the same pipe. The amount of water discharged is determined by the position of the traveling nut inside of the tank which is controlled by a hand crank at the top of the tank. Turn the crank to the right for more water and to the left for less.

The quantity of water discharged is not affected by the tank being set at an angle, because the traveling nut is located exactly in the center of the tank. When the level of the water being syphoned out of the tank reaches the position of the traveling nut, air enters the system and breaks the syphon. Two check valves are provided to eliminate the possibility of air pockets.

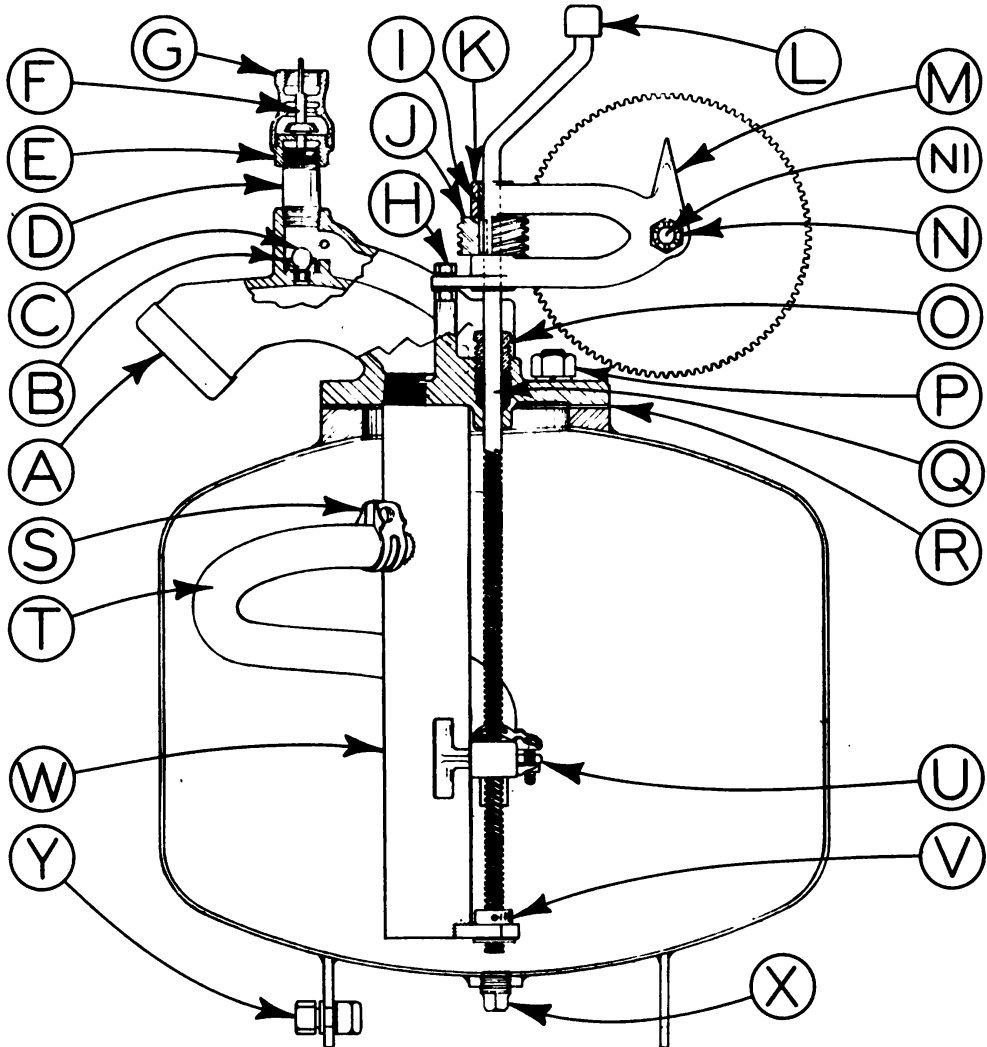


FIGURE 9

To Remove Tank Assembly:

Shut off the water tank supply. Drain the tank by removing the pipe plug (X) from the bottom of the tank. Open the control valve to drain the pipe. Uncouple the pipe union connecting the control valve to the tank. Take out the three bolts (Y) which hold the tank to the upper frame structure. The tank can now be lifted off by hand.

To Replace:

Place the assembled tank in position on top of the machine. Line up the holes in the tank base lugs with the holes in the upper structure. Insert the bolts and tighten. Connect the pipe union and tighten. Coat the pipe plug (X) with white lead and screw into place at bottom of the tank. Close the water control valve. Turn on the water supply.

ALL NECESSARY REPAIRS AND REPLACEMENTS CAN BE MADE WITHOUT REMOVING THE TANK FROM THE MACHINE.

In normal service there are two common causes that result in the water not discharging properly. They are:

Sticky or dirty check valves. This condition will result in the unequal delivery of water. Check valves in this condition cause air pockets in the tank when it fills from the supply line because the checks cannot open to allow the air to escape. The amount of air trapped each time will vary, resulting in different quantities that can be syphoned from the tank. Small sticks, pieces of leaves or dirt may become lodged in the check valves due to an unclean source of supply.

Stickey valves due to an oil coating on the ball checks and seats (the commonest fault) are caused by drawing water from an oily container or pipe lines that have a trace of oil in them, or by excessive use of lubricants on the pipe joints when making the installation. Oil can also be injected into this system through some types of water pumps.

The second cause is a loose or broken syphon hose. One end of the hose is attached with hose clamps to the traveling nut; the other end is attached in the same manner to the upper end of the syphon pipe.

(FOR DIAGRAM OF WATER MEASURING CYCLE SEE PAGES 103 AND 104).

#### To Disassemble:

Shut off the water supply. Open the control valve to drain the pipe. Remove the drain plug (X) from the bottom of the tank. Uncouple the union between the valve and the tank. Turn the control crank (L) to the right as far as it will go. This moves the traveling nut (V) to the bottom of the tank and straightens the hose, which will allow sufficient clearance to pass through the tank opening when removing the syphon assembly. Next take off the four stud nuts (P). The syphon assembly can now be lifted out of the tank. Be careful of the gasket (R) and do not damage the hose on the side of the tank opening. Unscrew the pipe from the syphon head (A). Remove the ball (C) and the check ball seat (B). Dismantle the vertical check valve (E, F, G); unscrew the pipe nipple (D). The valve body unscrews into two pieces (G) and (E). The valve stem (F) can now be slipped out of the main seat (G).

Next remove the indicator dial; take out the counter key; unscrew the castle nut (N) and remove the special bolt (N1).

Loosen the hose clamps (S) and remove the syphon hose.

Then dismantle the control rod (L) assembly. First take out the brass cotter at bottom of rod through the set collar (V) and the retainer washer will be released. Now remove the capscrew (H) holding the gear bracket (M) to the syphon head (A). Turn the control rod (L) to the right and the traveling nut (U) will be run off the lower end. The set collar (V) is a loose fit and will come off ahead of the traveling nut. Loosen the gland nut completely and take the control rod out of the flange. Remove the packing (Q). The worm gear (J) is keyed to the control rod (L). Hold the gear bracket (M) and carefully drive on the lower end of the control rod (L). This will cause the key (I) to force the

bushing (K) out of the upper bearing of the gear bracket. Pull the control rod completely out of the gear bracket. The worm gear bracket will also be free. Take the feather key bracket out of the control rod and slide off the bushing (K). Use a pipe wrench to unscrew the syphon pipe from the syphon head.

#### To Inspect:

Check the vertical check valve and also the ball check for dirt, grease or wear. Clean these parts carefully. Inspect the syphon hose for wear or weak spots and for tight fit on the traveling nut and syphon pipe. Also inspect the worm gear and indicator dial for wear. Inspect the control rod threads for wear and check to see that rod is straight.

Clean sediment out of tank. Inspect gasket, replace if necessary.

#### To Reassemble:

Screw the syphon pipe into the syphon head. Tighten it in position so that the hole in the lug at the bottom of the pipe is aligned with the hole for the control rod in the flange.

Slide bushing (K) on control rod (L). Place key (I) in keyway in control rod. Place worm gear (J) between the bearings of the gear bracket (M), then start the end of the control rod (L) through the largest bore of the gear bracket; continue through the worm gear (J) and the other bearing of the gear bracket. Line up the keyway in the worm gear (J) with the key (I) in the control rod and fit them together. The top end of the key (I) must be flush with the top side of the worm gear (J). Drive the bushing (K) into place in the gear bracket. Place a packing gland (O) head up, on the control rod and insert the end of the control through the hole in the flange of the syphon head (A). Start the traveling nut (U) on the thread of the control rod, opening down. Do this by holding the nut and turning the control rod. Place the collar (V). Line the hole in the collar with the upper hole in the control rod; insert and open the brass cotter. Put end of the control rod through the hole in the lug of the syphon pipe; put special washer in place; insert brass cotter through bottom hole of control rod and open.

Wrap new packing (Q) (four pieces) around the control rod at a point between the packing gland (O) and the upper side of the flange. Slide the packing into place in the opening in the flange and screw the packing gland down on the packing tight enough to compress it around the shaft. Attach one end of the syphon hose (T) with a hose clamp (S) to the lead on the syphon pipe. Fasten the other end of the syphon hose with clamp (S) to the traveling nut. Be careful not to have a twist in the hose.

Turn the control rod crank so that the traveling nut (U) is at the extreme bottom position. Place the gear dial between the arms of the gear bracket (M) and mesh with the worm gear (J) so that the line on the gear dial, slightly to the left of 33 pounds, lines up with the pointer. Insert the special bolt (N1); screw on the castle nut (N); insert and open cotter.

Put the ball check seat in position in the syphon head (A) and place the ball check on the seat. Reassemble the vertical check valve; place the long stem of the valve (F) in the guide of the main body (G) of the valve; screw the base (E) of the valve into place. Screw the nipple (D) into the base of the valve and screw the assembly into position in the syphon head. Screw the 1-1/2" pipe into the elbow. Place gasket (R) in position on the tank.

With the traveling nut (U) turned down as far as it will go on the control rod (L), place the syphon assembly into the tank with the pipe in line with the lead from the water control valve. Connect the pipe union; screw the drain plug into the tank and tighten. Turn on the water supply and open the control valve to the tank by pulling the control valve lever outward until it latches into position.

WATER CONTROL VALVE: (See Figure 10, Page 77)

The water flow is controlled by a 1-1/2" balanced 3-way valve. The valve body and head has three openings - 3/4" inlet, 1-1/2" to the measuring tank and 1-1/2" to the mixing drum. Assembled on the plunger rod is a leather cup against which the water pressure acts as a balance against the valve disc. The valve disc is of rubber and is attached to the end of the plunger rod. This disc acts to close the outlet to the mixing drum or to shut off the

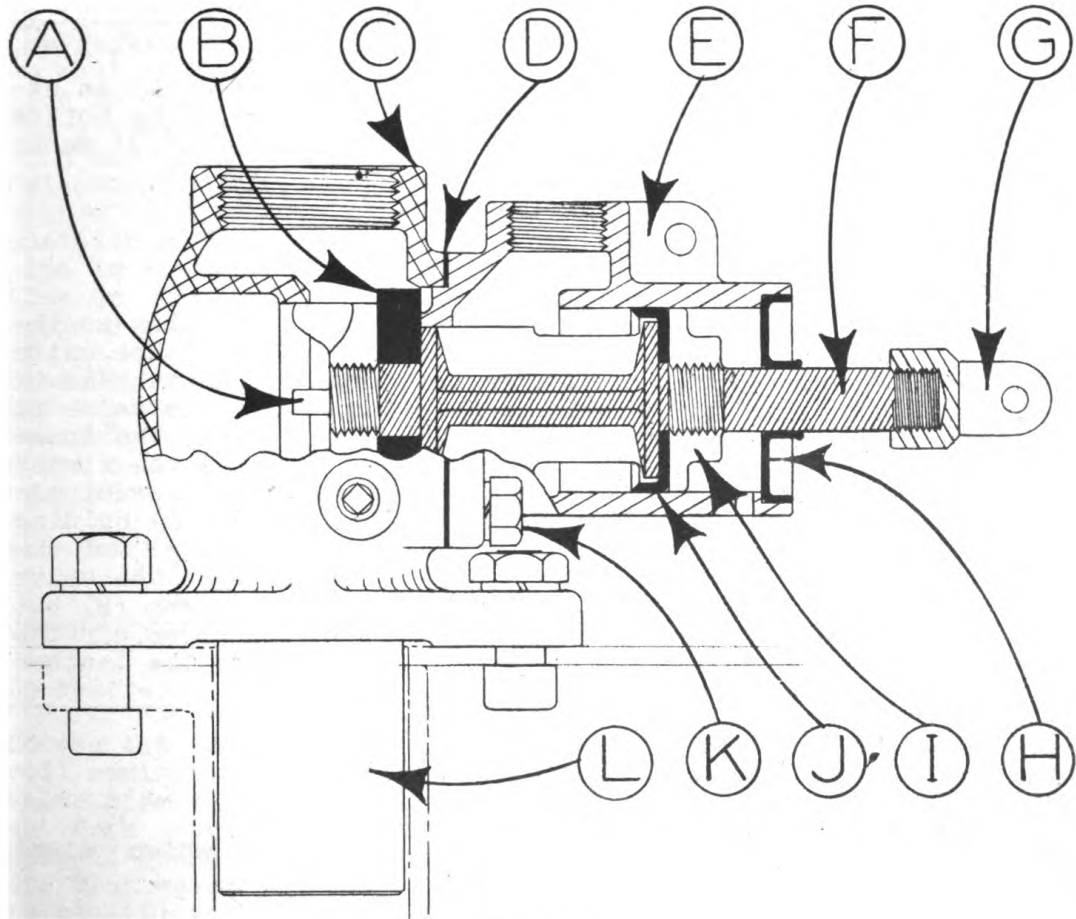


FIGURE 10

flow from the water supply. The lever attached to the end of the plunger rod is spring controlled and when unlatched automatically shuts off the water supply and opens the valve to the mixing drum. The water enters the valve through the 3/4" opening and with the valve in the closed position (opening to mixing drum closed), it flows up into the measuring tank. When the raising action of the skip automatically trips the valve lever, the valve is open; this action shuts off the supply and opens the valve to the mixing drum, which allows a measured amount of water to flow from the tank into the drum.

#### To Check the Valve Operation:

If water dribbles with the valve in a closed position any one of the following can be the reason:

First - Determine if sufficient pressure is applied when the valve is latched in a closed position. Insufficient pressure of the valve disc against the valve seat will allow water to pass.

Second - Foreign matter on the face of the valve disc or seat will not allow the disc to seat properly and water can leak by - one or two openings of the valve are usually sufficient to flush the disc and seat clean.

Third - A mutilated rubber disc cannot seat properly and will leak.

Water leaking past the leather cup will be indicated by an excessive amount running out of the drain hole located on the bottom side of the valve cylinder near the end. A small amount of water dripping from this drain hole may be considered normal.

#### To Remove:

Take out the clevis pin, attaching the valve lever link to the clevis (G) on the end of the valve stem (F). Break the pipe union to the water tank. Remove the 3/4" water supply line attached to the valve body. Remove the two bolts which fasten the valve to the frame upright cross member. This will also release the inlet pipe. The valve is now free to be removed. Unscrew the street ell, with nipple attached, from the valve body. Unscrew nipple (L) from flange opening. Take out the four capscrews (K) holding the valve cylinder (E) and body (C) together - be careful of the gasket (D). Unscrew clevis (G) from valve stem (F). Push the valve stem (F) through the cylinder (E) forcing the steel cover (H) out of position in the valve cylinder. Slide the steel cover off the valve stem. Unscrew the retainer nut (I) and remove the leather cap (J).

#### To Inspect:

Inspect the rubber disc for damage or foreign matter which might be sticking to it.



Inspect the leather cup for damage or wear. Check steel cover for wear in the guide hole and be sure it is a snug fit in the valve cylinder.

Check the drain hole in the valve cylinder. This hole must be kept open.

Inspect gasket used between valve cylinder and valve body.

#### To Replace:

Place the long end of the valve stem (F) through the hole in the leather cup (J). Place the leather cup so that the lip of it will fit over the retainer on the plunger shaft. Screw the retainer nut (I) down snug against the leather cup, but not too tight to distort the leather cup. Place the valve stem (F) through the valve cylinder (E), short threaded end first. Be careful not to turn or cut the edges of the leather cup (J) when making entry into the valve cylinder. Place the steel cover (H) over the long end of the valve stem (F), with the edge turned out, and drive into place in recess of the valve cylinder (E). Screw clevis (G) to this end of the valve stem. Now place the rubber disc (B) over the other end of the stem against the retainer; screw the wing nut (A) snug against the rubber disc (B). CAUTION: Do not draw the wing nut (A) too tight as this will result in distortion of the rubber disc. Next place the gasket (D) in position on the valve cylinder (E), then place the valve body (C) in position against the gasket on the cylinder; line up the holes for the cap screws so that the 1-1/2" pipe opening, without flange, is on the same side as the 3/4" pipe opening in the valve head. Put in the four cap screws (K). No lock washers required. Screw the street ell with the pipe and union assembled into the 1-1/2" pipe opening (without flange), so it will face toward the tank. Screw the pipe nipple (L) into the 1-1/2" flange opening. Place the valve in position on the upright frame cross member. Place the water inlet pipe in position against the lower side of the same cross member. Line up the flange holes with the holes in the cross member and replace the bolts and nuts and draw up tight.

Line up holes in clevis (G) with the holes in operating lever link and replace clevis pin. Lock clevis pin in place with cotter. Assemble the 3/4" pipe line to the 3/4" pipe opening in the valve body. Line up the 1-1/2" pipe with the pipe from the measuring tank and connect with the union.

Lubricate pins and joints with OE.

WATER CONTROL OPERATING LEVERS: (See Figure 11, Page 80)

#### To Remove:

Loosen the spring adjusting eye bolt (L) sufficiently to remove coil spring (K). Pull cotter and take out clevis pin holding the valve stem clevis and water lever link (B). Loosen and take off nut from pivot bolt (F). Lever assembly can now be removed from upright frame member. Unscrew other nut from pivot bolt (F); take off flat washer and remove the bolt holding lever (G). Remove clevis pin (D) and the link (H) is free of lever (G). To detach the lever (H) from the control lever (G) pull cotter and remove.

To Inspect:

Inspect all clevis pins, holes, links and rods for wear.

Also straighten any universal rods that are bent.

To Replace:

Place the latch lever (G) in position against the control lever (H), on the side of the control lever facing the upright; insert and open the cotter. Place the link (C) in position at hole end of the control lever (H); line up the holes; place the clevis pin (D); insert and open the cotter. Place flat washer (E) on pivot bolt (F); put bolt (F) through slotted hole of control lever (H), head toward drum; place other flat washers on bolt (F) and now run nut down on bolt (F) leaving only enough play between the flat washers (E) and the control lever (H) for lever to swing freely. Now place the bolt (F) through the hole in the upright frame member; put on the nut and draw up tight. Place the free end of the link in position in relation to the water control valve stem clevis; line up the holes; place the clevis pin (B); insert and open the cotter. Make the link (C) between the valve and the control lever the right length so that the pivot slot in the control lever (H) has play when the valve is cocked or open from the supply line to the tank. Put one end of the coil spring (K) through the hole provided for it and located just above the top end in the lever, and attach the other end of the spring to the eye bolt (L). Take up on the spring adjusting eye bolt until the spring has enough tension to hold the valve open when the latch lever (G) is tripped. Jam the nuts on the adjusting bolts. Lubricate all pins and joints with OE, also coat the threads of the adjusting eye bolt with a lubricant.

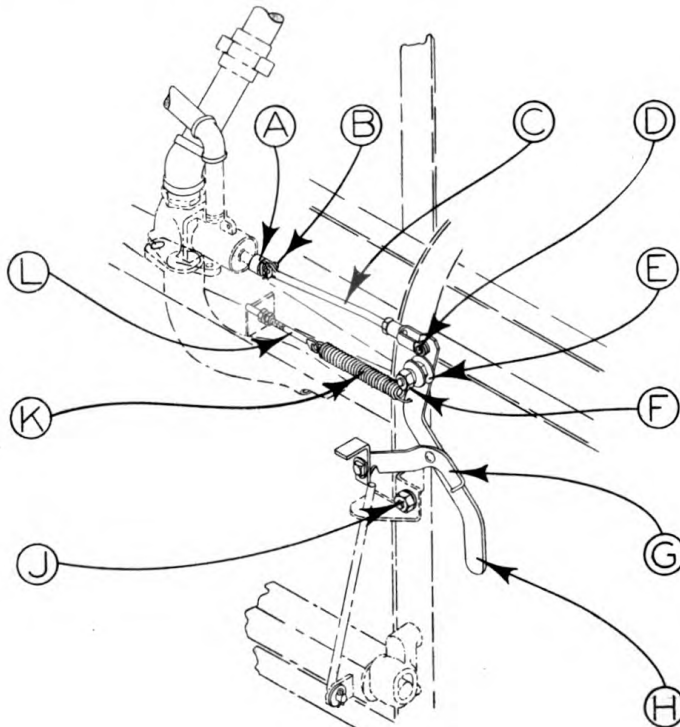
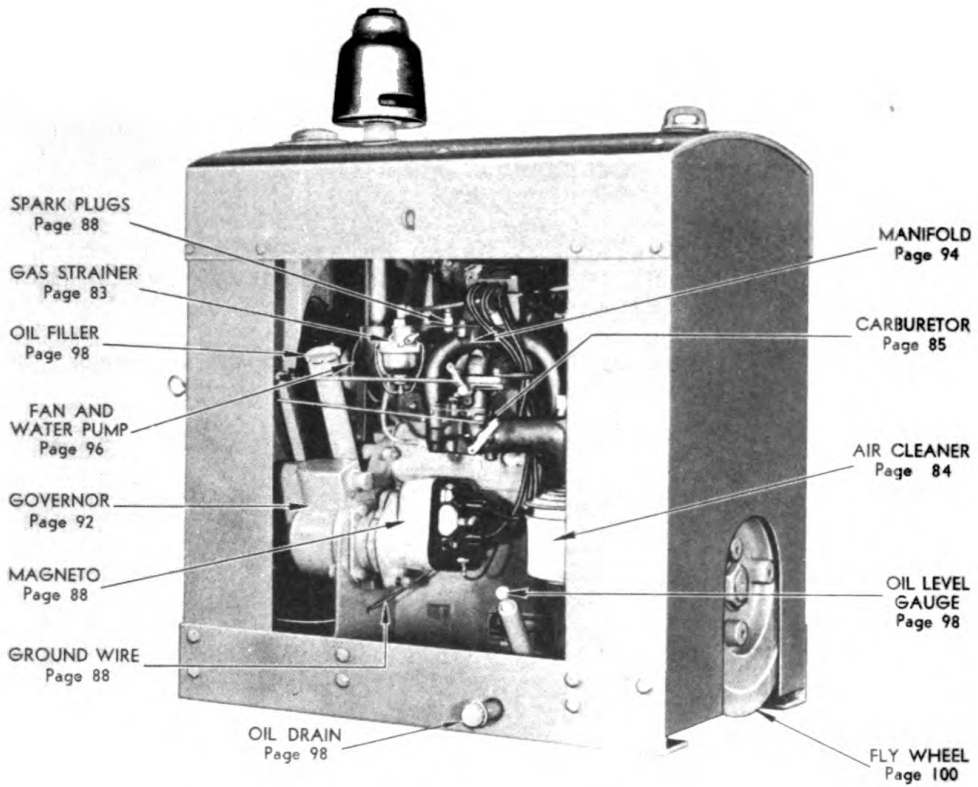
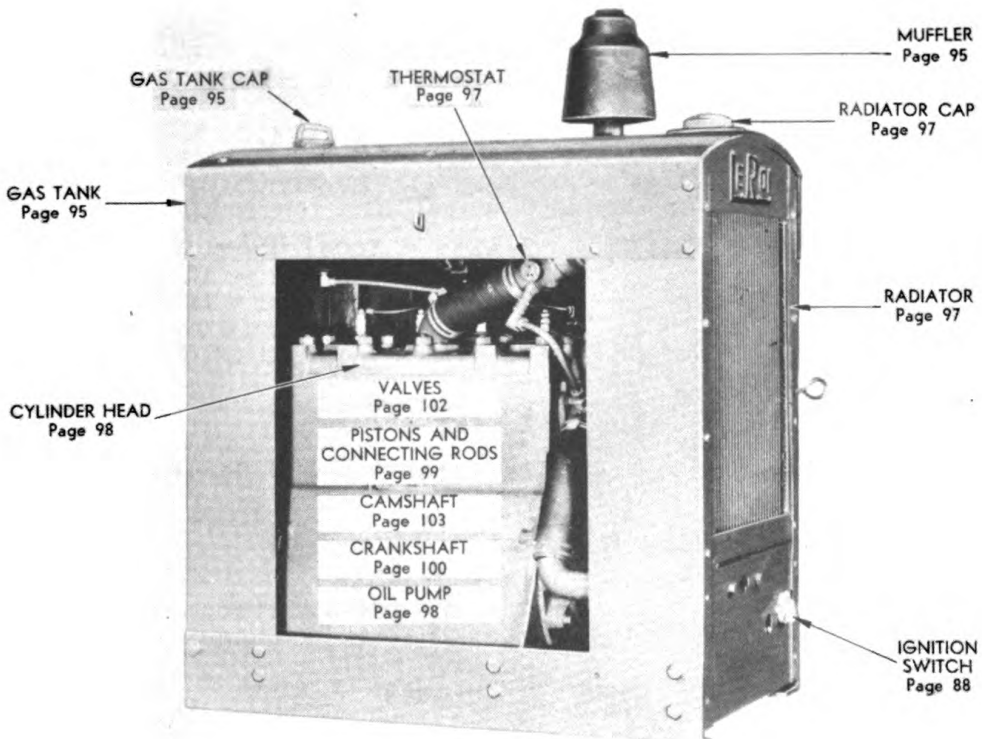


FIGURE 11



RIGHT HAND VIEW OF LEROI MODEL XRPl-23 ENGINE



LEFT HAND VIEW OF LEROI MODEL XRPl-23 ENGINE

PRECAUTIONS

Before removing any inspection hole plugs or covers clean all dirt from such parts.

Keep all fuel and oil containers, when not in use, well covered, clean and free from any foreign materials.

When servicing or replacing any parts or assemblies of this unit, make certain all lockwires, cotters, lockwashers, springs, etc. are in proper places and secure.

If any part of the engine has to remain open or exposed for any length of time it must be kept well covered.

Do not use a gasket over again if its serviceability is at all questionable. Make certain serial numbers of engine and mixer are specified when ordering spare parts or in correspondence.

SPECIFICATIONS

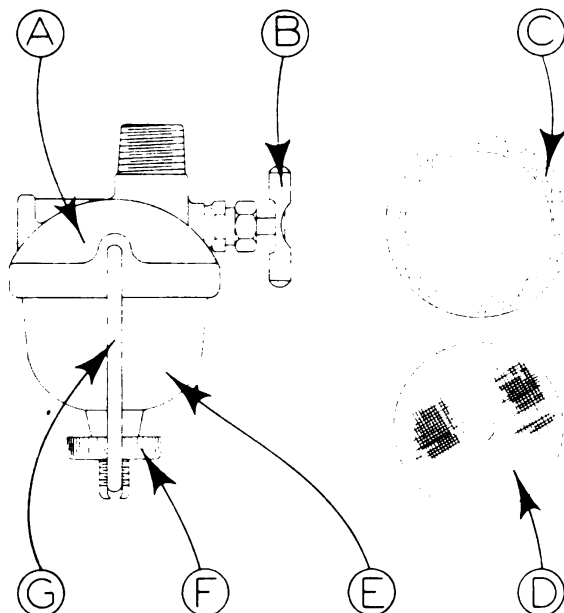
Cylinders	4
Horsepower	10
Bore	2-7/8"
Stroke	3-1/2"
Displacement	90.8 cu. ins.
R.P.M.	1000
Magneto	Eiseman AM-4 Breaker point gaps = .012" to .014"
Spark Plug	Champion C7 or A.C. 875 Gap .028"
Valve Clearance - hot	.008" to .010"
Carburetor	Zenith - Model 193-1/2 Venturi - 15 Main Jet - 14 Comp. Jet - 16 Idle Jet - 10
Fuel Tank	5 U.S. Gallons
Water Cooling System	Radiator - 2-3/4 Gallons
Oil Pan	7 Pints
Fan Belt	Gilmer #4365 Outside circumference = 36-1/2" Inside circumference = 34" Width = 21/32 Thickness = 3/8" Angle = 38° "V"
Air Cleaner	Air Maze - No. 1C-OBKNH

TILLOTSON GASOLINE STRAINER ASSEMBLY

The gasoline strainer is located between the fuel tank and the carburetor. It is mounted on the manifold group and is the only shut-off between the fuel tank and the carburetor.

TO REMOVE:

Drain the gasoline tank. Close the shut-off cock in the gas strainer - disconnect the gas line at the carburetor and loosen the other end of this line at the strainer just enough to swing it to one side. Open the shut-off cock and drain the fuel into a clean container. Close the container.



Disconnect and remove the gas line from the strainer to the carburetor. Disconnect the gas line leading from the fuel tank at the strainer. Remove the gas line fitting from the strainer cover. Remove the jam nut and the strainer is free.

TO DISSASSEMBLE:

Loosen the thumb wheel and cup assembly (F); swing the clamp wire (G) to one side. The bowl (E) is now free and can be removed. Be careful of the cork gasket (C). Remove the screen from the bowl. The clamp wire (G) can be sprung out of place in the cover (A). Back out the gland nut and remove the shut-off cock (B).

TO INSPECT:

The screen (D) must be clean and not have any broken wires. Inspect gasket (C) and replace if condition is questionable. Shut-off cock must be clean and not worn.

TO REASSEMBLE:

Place the gland nut on stem of shut-off cock (B) and screw into position in cover (A). Set gland nut. Put clamp wire in position in cover (A). Place screen in recess in opening of glass bowl. Place gasket on top of screen. Place bowl in position in cover and swing the wire clamp assembly around underneath the bowl and tighten the thumb wheel and cup assembly, using fingers only. Place the strainer in position in its bracket (bowl suspended); place and tighten jam nut with the shut-off cock of the strainer facing toward the rear end of engine. Insert and tighten female gas line fitting

and attach the fuel tank gas line. Attach short gas line from strainer to carburetor. Be certain that all fittings are tight. Fill the fuel tank with gasoline and check for leaks.

#### AIR CLEANER - AIR MAZE - NO. 1C-OBKNH:

This is an oil bath type of air cleaner. Service it every 8 hours - oftener if necessary. Approximately every 64 hours remove the whole air cleaner assembly from the engine. Take it completely apart and wash all the parts thoroughly in gasoline.

#### TO REMOVE:

Disconnect the copper breather line to the valve chamber, at the fitting (A) on the top of the cleaner elbow (B). Next take out the capscrew connecting the elbow to the strap support. The cleaner assembly is now free to be removed.

#### TO DISASSEMBLE:

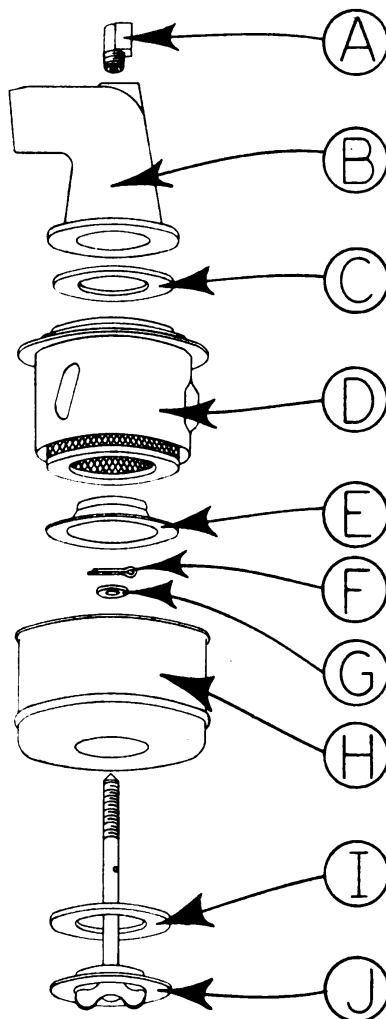
The wing nut is pinned to the stem (J) which holds the assembly together. Turn the wing nut to the left - this will release the lower bowl assembly from the top skirt assembly (D) and elbow (B). The top skirt and elbow will come apart now - be careful of the gasket (C). The filter screen is fastened to the top inner surface of the skirt. Next close and remove the cotter (F) through the stem - the lower bowl assembly will now come apart. Be careful of the cork gasket (I) between the bottom plate and the bowl (H). The bottom plate is attached to the stem. The stem assembly consists of the stem, wing nut and bottom plate - it is not intended that these three pieces be taken apart.

#### TO INSPECT:

Check all gasket surfaces - they must be straight. Replace both cork gaskets. Clean all parts thoroughly - paying special attention to the screen.

#### TO REASSEMBLE:

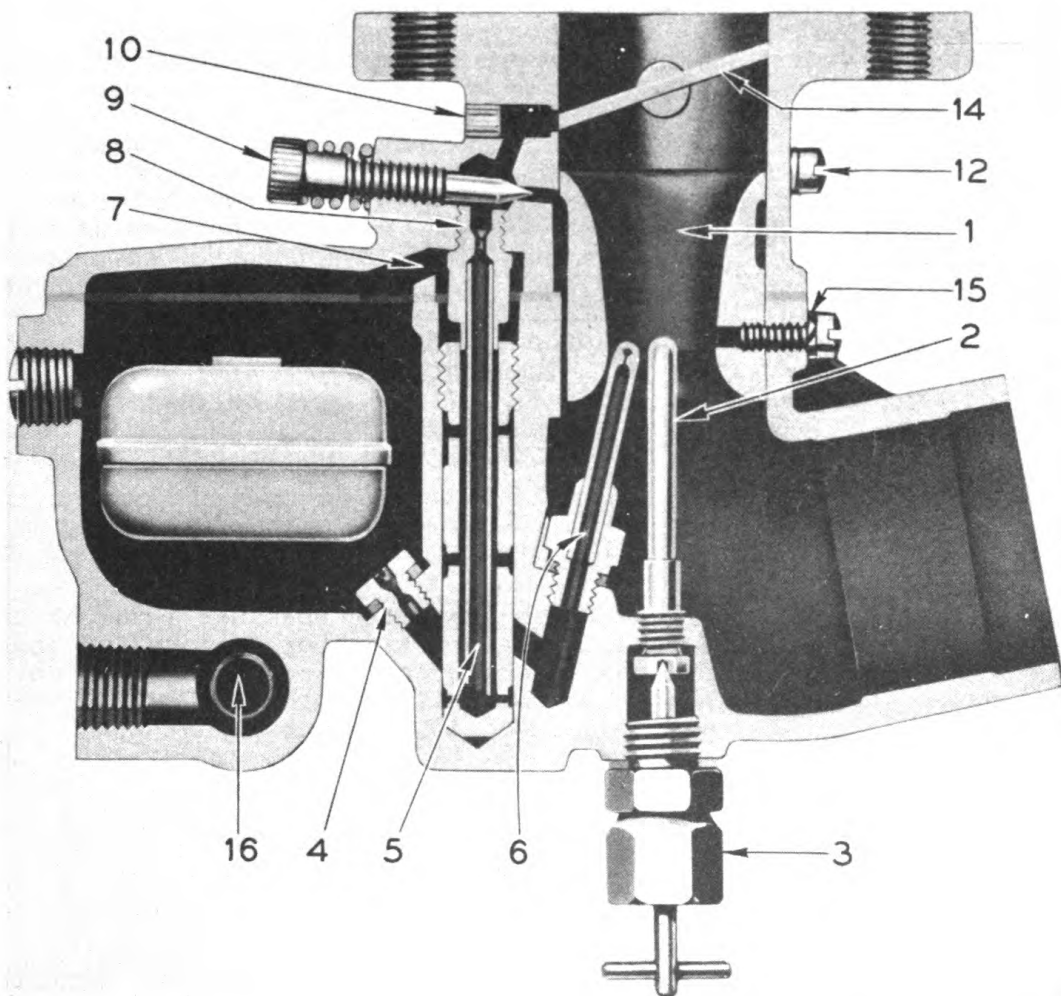
Place the elbow (B) in position with the carburetor and attach to strap support with capscrew. Attach copper breather line to fitting (A) in elbow. Place cork gasket on stem assembly, in position on the bottom plate. Next place the bowl in position on the stem and then the baffle plate (E). Insert and open the cotter. Fill the bowl to the level mark with OE30 if the temperature is above 32° F., or OE10 if the temperature is below 32° F. Place the skirt (D) with gasket (C) in position on the stem and assemble to the elbow by screwing the stem into the elbow.



**CAUTION:** Be careful that the cork gaskets are properly placed before tightening the stem.

**NOTE:** It is permissible in reassembling the air cleaner to coat only one side of the gaskets with an adhesive substance to hold them in position.

CARBURETOR (ZENITH, 193-1/2 - 193-1/2X; LEROI, A84-313-3)



**Operation:**

The removable venturi (1) adjusts the air capacity to the size of the engine. The fuel from the bowl is fed directly into the air stream through the main jet (2). The flow of this jet being directly controlled by suction, is greater at high speed than at low speed. Thus this jet is sometimes referred to as the "high speed" jet. The main jet adjustment (3) controls the amount of fuel passing through the main jet (2). Turning the adjustment out (counter-clockwise) will increase the amount of fuel passing through the main jet while turning the adjustment in (clockwise) will decrease the amount of fuel passing through the main jet. The fuel from the bowl also flows through the compensator (4) into the well (5) and discharges into the air stream through the cap jet (6).

As the well (5) is open to air, through channel (7), the compensator (4) is not subject to direct suction. Its flow of fuel is constant, being determined by the size of the jet and the fuel level in the bowl. It is most effective at low speeds. The cap jet (6) is subject to suction but, of course, can flow only as much fuel as is supplied by the compensator.

#### Idling:

The idling system functions only on starting and idling. When the throttle plate (14) is opened past the idling position, the fuel reverses and discharges through the cap jet. The idling jet (8) receives its fuel through the well (5) from the compensator (4). After being measured by the idling jet, the fuel is mixed with air, the amount of air being regulated by the idling adjusting needle (9). At idling speeds, this emulsion is discharged into the air stream through the priming hole (10) when the throttle plate (14) is closed far enough to cause a strong suction at this point. The idling speed is adjusted by the throttle stop screw (12). To adjust the idle, set stop screw on throttle lever so that engine will run sufficiently fast to keep it from stalling. Turn the idle adjusting needle in or out, until engine hits evenly, without rolling or skipping. Then back off on stop screw until desired engine speed is obtained. It may then be necessary to readjust the idle adjusting needle. The correct idle adjustment is usually found between 1 and 3 turns open of the idle adjusting needle.

#### Fuel Level:

Correct setting of the float which controls the fuel level is of utmost importance. The fuel level is set at the factory for regular engine gasoline and a pump pressure of 2 lb. per square inch. Fuel valve and collar assembly as received is set for proper level when installed with new seat and should not be changed.

#### To Remove:

1. Close shut-off cock in fuel strainer.
2. Disconnect fuel line.
3. Remove air cleaner and connection.
4. Disconnect governor and choke controls.
5. Loosen and remove 2 capscrews holding carburetor to manifold and remove carburetor.

#### To Disassemble:

1. Remove idling adjusting screw (9) and spring, using the fingers only.
2. Remove body to bowl assembly screws and lockwashers using a screw driver.
3. Remove upper body being careful to avoid damaging the idling jet, then remove body to bowl gasket.
4. Remove idling jet (8) using a 3/16" open-end wrench.
5. Hold the throttle in closed position while you remove throttle plate screws using a screw driver.
6. Remove throttle plate using fingers only.
7. Remove throttle shaft and lever assembly and return spring.



8. Remove main jet adjustment assembly (3) and fibre washer using a 1/2" open-end wrench.
9. Remove main jet (2) and fibre washer using C161-1 Zenith service tool (or a screw driver with 5/16" blade.)
10. Remove venturi screw (15) and lockwasher, using a screw driver.
11. Remove venturi using fingers only.
12. Remove cap jet (6) and fibre washer using Zenith service tool C161-25 (or 5/16" hex. thin-walled socket wrench that is at least 1-1/4" deep).
13. Remove metering (secondary) well (5) using C161-1 tool (or a 5/16" screw driver).
14. Remove float axle and fibre washer using a screw driver.
15. Turn bowl upside down to permit float and fuel valve needle to fall out.
16. Remove compensator jet (4) and fibre washer using a screw driver.
17. Remove fuel screen (16) and plug using a 3/8" wrench.
18. To remove the fuel valve seat, proceed as follows:
  - a. Insert tapered-thread end of C161-21 service tool (or other suitable extractor) into the fuel valve seat and screw in counter-clockwise until the tool is firmly attached, then
  - b. Strike the bent end of the tool squarely and sharply with a hammer to pull the seat out.
19. Hold the air shutter in closed position while you remove the air shutter screws and lockwashers using a screw driver.
20. Remove air shutter.
21. Remove air shutter shaft and lever and return spring.
22. Clean the parts in gasoline or other suitable solvent and blow through each channel with compressed air to complete the cleaning operation.

To Reassemble:

1. Install air shutter shaft and lever assembly with return spring in position to hold the air shutter open.
2. Install air shutter, screws and lockwashers. Be sure the air shutter is properly centered and that it closes completely and opens freely.
3. Install new fuel valve seat using C161-2 service tool and a light hammer to drive the seat into place.
4. Install new fuel screen and plug using a 3/8" wrench.
5. Install compensator jet and new fibre washer using a screw driver.
6. Place new fuel valve needle and collar assembly into the fuel valve seat; then start the float yoke into place in the needle collar, so it engages the flat sides in the collar; then hold the float in position while you install new float axle and new fibre washer, using a screw driver.

NOTE: The fuel valve needle and collar are assembled at the factory in the correct relation to give the correct fuel level in the bowl.

7. Install metering well (5) using C161-1 tool (or screw driver).
8. Install cap jet (6) and new fibre washer using C161-25 service tool.

9. Hold venturi (1) in position while you install venturi screw (15) and lockwasher using a screw driver.
10. Install main jet (4) and new fibre washer using C161-1 tool.
11. Install main jet adjustment (3) and new fibre washer using a 1/2" open-end wrench.

NOTE: As a preliminary adjustment, turn the needle in (clockwise) until it "bottoms" gently, then unscrew the needle 1 to 1-1/2 full turns. Tighten the packing nut just enough to cause a slight "drag" on the needle.

12. Install throttle shaft and lever assembly with return spring in position. Be sure the stop screw (12) is unscrewed so it cannot hold the plate open.
13. Install throttle plate, and when it is properly centered so the beveled edges fit the carburetor barrel snugly, install the throttle plate screws.
14. Re-set the stop screw (12) to hold the throttle plate just slightly open, (about 1-1/2 turns from where the throttle plate is fully closed.)
15. Install idling jet (8) using a 3/16" open-end wrench.
16. Place new body to bowl gasket in position on the bowl followed by the upper body, being careful to avoid damaging the idling jet.
17. Install bowl to body assembly screws and lockwashers using a screw driver to tighten them evenly and securely.
18. Install idling adjusting screw (9) and spring using fingers only.
19. Set idling adjustment at one full turn open as a preliminary adjustment.

#### To Install:

1. Inspect gasket between carburetor and manifold and replace if damaged.
2. With gasket in place, install 2 capscrews and tighten securely.
3. Install air cleaner and connections.
4. Install governor and choke controls.
5. Clean and install fuel line.
6. Make necessary adjustments as outlined under Operation, Page 85
7. Open fuel shut-off cock.

#### EISEMAN MAGNETO - MODEL AM-4

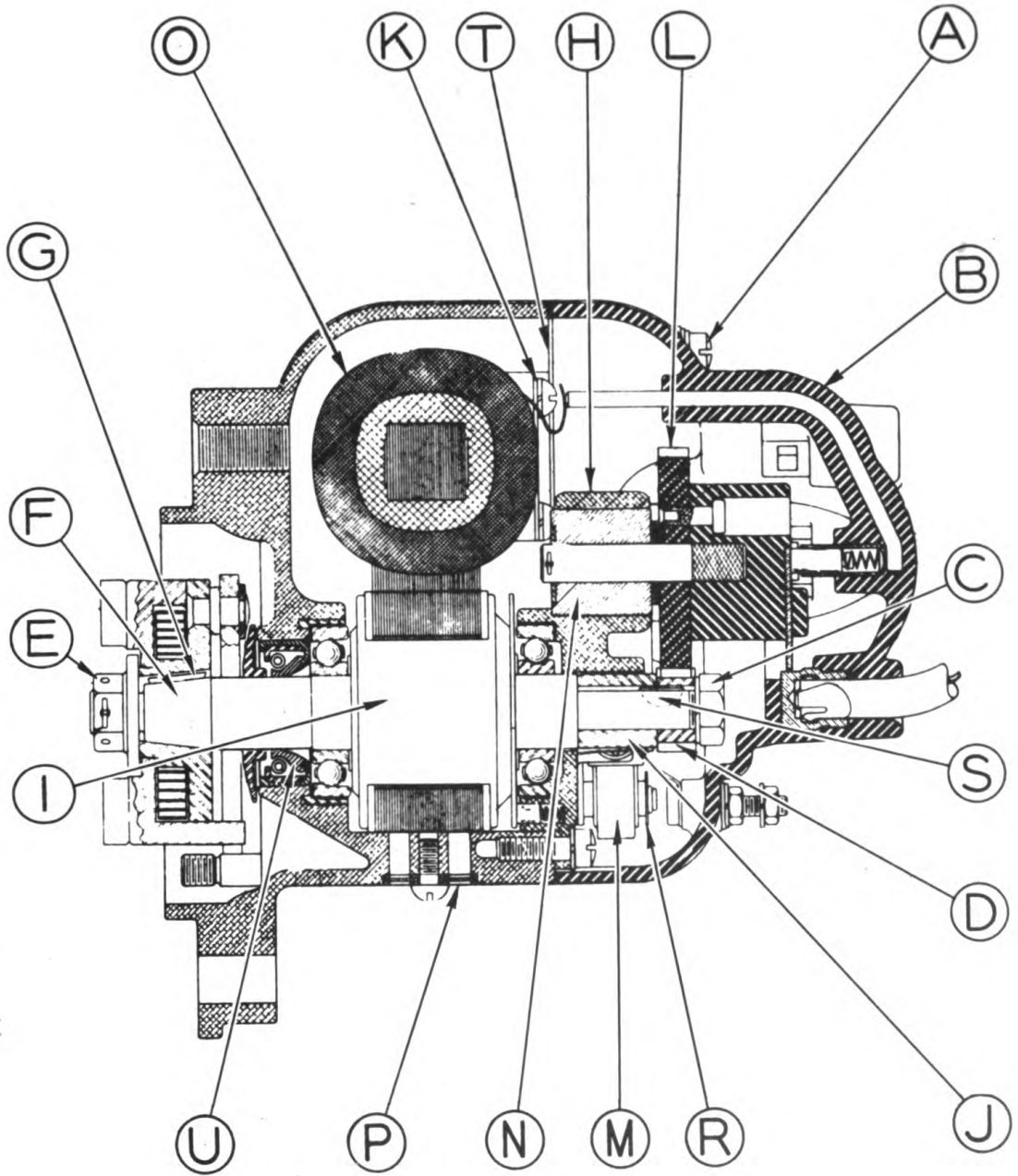
#### SAE VERTICAL FLANGE: (see Cross Section Page 89)

Facing the cap the lower left outlet is used for #1 wire and is marked No. 1.

#### TO REMOVE:

NOTE: Set motor on #1 compression flywheel before removing magneto for easier installation.

Disconnect the ignition wires at the magneto. This is done simply by pulling them out of the cap. All of the wires have their individual tags with the numbers stamped on them. Disconnect the ground wire at the magneto. Remove the two nuts fastening the magneto to the governor body. One stud is fastened in the upper lobe of the magneto flange and the other stud is fastened to the lower



CROSS SECTION  
MODEL AM-4 EISEMAN MAGNETO  
MAINTENANCE TEXT, PAGES 88,90,91,92

lobe of the governor housing flange. The magneto is free and can be removed.

TO DISASSEMBLE:

1. Remove four screws and washers (A), fastening distributor plate (B) to housing.
2. Remove nut (C) and pinion gear (D) from rotor shaft.
3. Remove cotter and nut (E) from drive shaft.
4. Pull impulse starter from rotor shaft (F). Make sure jaws do not engage on cup or pawls but engage on solid edge of flange.
5. Remove impulse starter as a unit, then remove Woodruff key (G) from shaft.
6. Remove outer round nut on condenser post and winding leads from condenser.
7. Remove three screws and washers that fasten end plate (H) to housing.
8. Remove end plate assembly (H).
9. Remove magnet rotor (I) from housing, taking off breaker cam (J) and key at the same time.
10. Remove two clamps (K) holding winding, first taking off washers and screws.
11. When removing winding from housing, DO NOT PRY WITH SCREW DRIVER in the event it sticks. Tapping outer edge of housing against wood block will loosen winding.
12. To disassemble end plate (H), remove cotter and slide out distributor rotor and gear assembly (L).
13. Remove condenser by taking out screws and washers.
14. Remove spring clip and washer from breaker (M).
15. Remove screws and washers and cable clips. This will permit removal of breaker complete. It is inadvisable to disassemble breaker.
16. Distributor bearing (N), being oil-impregnated, should not be washed in any cleaning solutions. If shaft binds or fits loosely, replace with new bearing.

TO ASSEMBLE:

Before assembling, clean all parts thoroughly in gasoline with exception of condenser and winding (O) and oil-impregnated bearing (N) and cam (J). Filter screens (P) should be dismantled and cleaned. Dry all parts thoroughly with lint free cloth. Examine magnet rotor (I) and housing tunnel in which rotor revolves making sure both

are free from metal particles, chips and foreign matter.

Test winding and condenser on test instruments designed for the purpose. Insulation on breaker cam can be tested on a split lamp circuit. MANUFACTURER ADVISES AGAINST DISASSEMBLING BREAKER. If fiber bumper block or points are worn, insulation cracked or springs broken, replace entire breaker assembly.

1. Seat winding (O) firmly in seat with leads on right hand side by means of clamps (K), lockwashers and screws. The lead on winding, with pear shaped connection should be placed under upper right hand clamp and screw to insure perfect ground connection.
2. Insert magnet rotor (I) in housing, ball bearings on each end should be packed with high melting acid free grease. Due to the high retentivity of magnets, no attempt should be made to re-charge magnet rotor.
3. Assemble condenser to end plate (H) with screws and lock-washer. Place complete breaker (M) on end plate pivot pin, secure with washer and spring clip (R) and fasten to end plate with washers and screw. Assemble distributor rotor with riveted gear (L) to end plate, securing with cotter. Rotor assembly should be free of end play which can be eliminated by using washer on both sides of bearing (N).
4. Secure end plate assembly to housing with screws and lock-washers. Before tightening screws fully, rotate magnet rotor several turns to seat ball bearings.
5. Place spacer bushing on condenser post to which primary connections from winding and breaker are attached. Fasten the latter securely.
6. Insert key (S) in shaft keyway, breaker end. Facing breaker end, revolve shaft until key is in upward position. Hold cam with lobes vertical; cam keyway is to the left of upper lobe. Press cam on shaft over key in this position, for magneto driven in clockwise direction. If cam is put on from opposite end it would be for counter-clockwise rotation. Care should be exercised when installing breaker cam.
7. The distributor rotor gear (L) is inscribed with two marks near edge of teeth. "C" with line through it designates clockwise rotation. "A" with line through it designates counter-clockwise rotation. Slip pinion nut (C) on shaft, with punch mark on latter facing outward. Mesh tooth with punch mark on pinion gear, with tooth marked on distributor gear (L). Seat pinion gear fully, making sure key (S) and pinion gear keyway are properly engaged. Install washer and fasten nut (C) on shaft.
8. Adjust contact point opening. Rotate magnet rotor (I) slowly in reverse of normal operating direction (to avoid impulse starter engagement) until breaker lever (M) fiber rests on highest point of cam (J) lobe. Check gap between points with .020" feeler gauge. The correct gap opening should be .019" to .021". If gap requires adjustment, loosen breaker plate fasten-

ing screw and move the entire breaker assembly in either direction - toward cam to increase gap, or away from cam to decrease gap. Tighten screw when adjusted to proper opening. Re-check gap after tightening breaker fastening screw.

9. Place two dowel pins in holes drilled in housing. Examine gasket (T). Replace if cracked or torn. Fasten distributor plate (B) to housing with screws and washers.
10. Ball bearings for inner and outer races on distributor should be examined for pitting and balls for burning and wear. Replace entire bearing, inner and outer race and ball assembly as these parts are matched to each other.

Ball bearings are insulated from their recesses to prevent current passages with resultant pitting and electrolysis. Old insulation washers and strips should be removed and replaced with new parts of the proper thickness. A tight seal is essential and washers and strips vary in thickness. Press race into insulated recess. If insulation paper crimps, repeat operation. When properly seated, excess insulation paper will protrude above race. Cut off with sharp knife or tip of screw driver.

11. To assemble inner races on magnet rotor shafts replace any spacing washers that might have been removed on shaft. Put ball cages on races, install rotor in housing with end plate fastened to housing. Test rotor for end play which, if present, requires additional spacing washers or, if binds, removal of washer. In the event dust seal is worn or damaged it should be removed and replaced.

#### TO INSTALL:

Place the #1 cylinder of the engine on compression (flywheel marking D. C. - dead center). Snap #1 magneto impulse by hand and back up the coupling to fit the slots in the coupling on the governor. Place the magneto in position against the governor flange and tighten the nuts. (The #1 position of the magneto can be quickly determined by placing a wire in the #1 lead in the cap and turning the magneto coupling by hand past the different positions until this wire sparks.) The upper flange lobe of the governor and the lower lobe flange of the magneto are slotted, which allows for a retard or advance adjustment of the magneto as may be required. Facing the magneto cap, the direction of rotation is counter-clockwise. Therefore, the proper placing of ignition wires will be as follows:

Wire from #1 spark plug, lower left hand corner magneto cap.

Wire from #3 spark plug (so marked) is next; #4 wire next and #2 wire last.

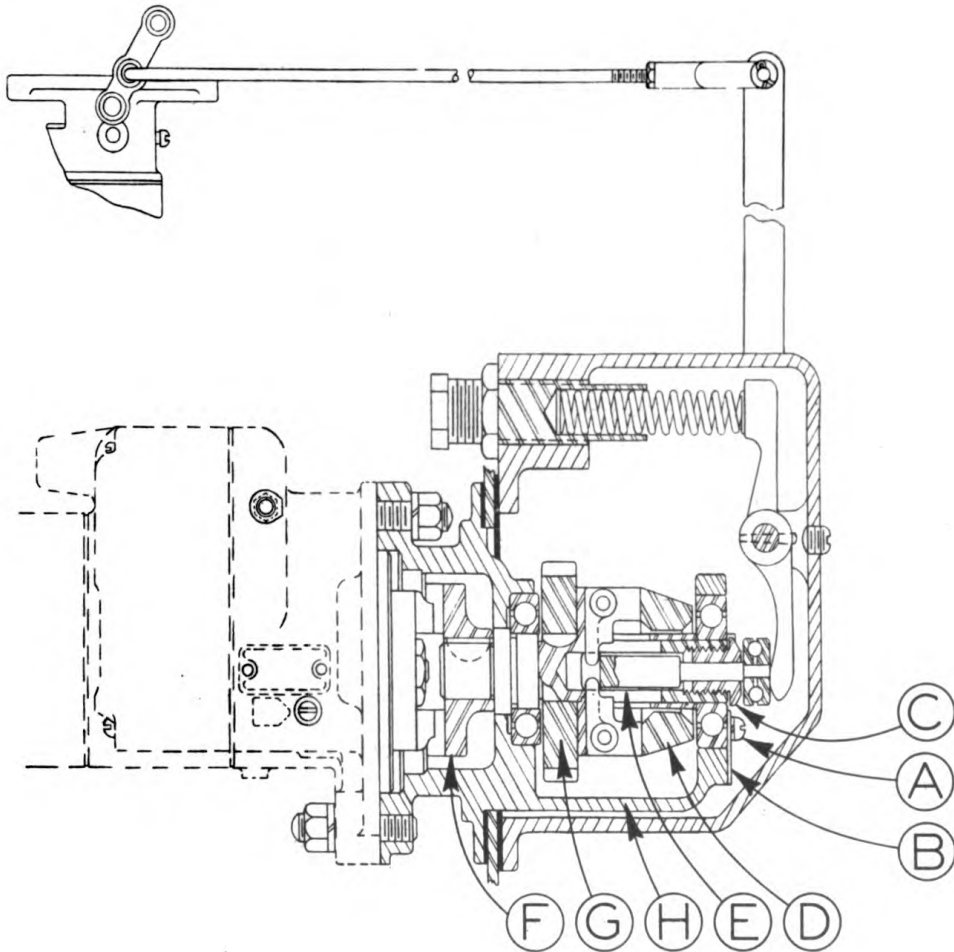
#### GOVERNOR ASSEMBLY

Set the engine on #1 compression stroke (DC - dead center).

Remove the Magneto:

Observe the position of the governor coupling. (Mark position of slot and governor housing so that coupling will be in ex-

actly the same position when the governor is re-installed.) The governor is held to the front engine support by three capscrews and one stud. The stud is located in the upper right hand corner. When removing capscrews and stud nut be careful of the lead flat washers located between the standard flat washers and the governor body. The governor assembly is now free and can be removed. Be careful of gasket.



CROSS. SECTION OF GOVERNOR ASSEMBLY

TO DISASSEMBLE:

Take out the two round head screws (A) and remove the bearing retainer (B). Release the plunger and nut lockwasher and loosen the governor operating nut (C), and the plunger assembly can be removed. The thrust bearing, nut and the plunger are one assembly.

Tip the governor weights (D) to the full extended position and drive the governor shaft (E) out of the bearings. Use a brass rod 3/8" in diameter; place it in the recess from which the plunger assembly was removed and use a hammer to drive the shaft out of the gear. The magneto drive coupling (F) is keyed to the shaft with a Woodruff key and will come out as part of the shaft. The governor drive gear (G) is also keyed to the shaft with a Woodruff key. The sleeve and weight assembly will be free to be removed from the governor body (H) when free of the shaft.

Remove the bearings from the housing. Be careful not to lose the light governor shaft washer. Carefully clean and inspect bearings for wear. If they are to be used again, carefully coat them with oil and wrap them in paper or clean cloth until ready for reassembly. Inspect thrust bearing carefully after cleaning and if it is to be used again, coat it with lubricant and wrap in a protective covering until reassembly. Check governor drive gear teeth for wear.

#### TO REASSEMBLE:

Place governor shaft washer in recess for it in governor housing. Next press bearing into position in housing. Next start governor shaft with drive coupling keyed in place on shaft through bearing already in position in housing. (Before starting shaft into position place Woodruff key for drive gear in keyway - there is sufficient clearance to do this.) Start the shaft through far enough to place the gear and the weight assembly. Line up the keyway in the gear with the key in the shaft and press into position.

The governor weight yoke is notched to fit over the key that extends through the governor gear. Place the sleeve with the small slot over the key which will automatically line up the long slots. This sleeve also acts as a spacer to hold the weight assembly in position. The notch will fit over the key extending through the weight yoke. Next press bearing into position in housing and on the shaft.

Place the keyed lockwasher in position - close the weights and place the plunger assembly in position in the bore of the shaft. The plunger is notched and will fit over both the governor arms when in correct position. Tighten the governor operating nut and lock the washer. Place the governor retainer in position, line up the holes; insert and tighten the round head screws.

#### TO INSTALL:

1. Lubricate bearings, gear teeth and weight assemblies with OE.
2. If the old gasket is not in perfect condition replace with new one.
3. Locate #1 piston on compressor and at top dead center.
4. With the drive coupling in line with the mark on the housing, place the governor assembly in position, being careful not to damage the gasket. Install the governor in place with the three capscrews and the one nut. Place the lead flat washers between the standard flat washers and the governor housing flange and fasten.

#### INSTALL MAGNETO:

Refer to Governor Adjustments under Governor Adjustment, Page 15.

#### MANIFOLDS:

The intake and exhaust manifolds are independent pieces and are attached to the engine block with the same four studs.



TO REMOVE:

Remove the fuel strainer assembly and ignition wire brackets. Remove the air cleaner and breather tube. Remove exhaust pipe, muffler, governor and choke controls. Remove the carburetor. Take off the four stud nuts and remove the intake and exhaust manifolds.

Be careful of the gaskets between the exhaust manifold and block and the gaskets between the intake and the exhaust manifold. These gaskets should be replaced if damaged.

TO INSPECT:

Inspect manifolds for small cracks or holes - this pertains especially to intake manifolds. Inspect gaskets.

TO INSTALL:

Place long manifold gasket over studs. Place exhaust manifold in position. Place center gasket in bore in exhaust manifold and end gaskets over studs against exhaust manifold. Install intake manifold, lockwashers and nuts and tighten alternately and securely. Install exhaust pipe and muffler. Replace carburetor assembly, and governor and carburetor controls. Next replace air cleaner, breather tube, ignition brackets and fuel strainer.

HOOD AND FUEL TANK ASSEMBLY:TO REMOVE:

Drain the fuel tank. Disconnect the fuel line at the tank. Remove the muffler and exhaust pipe assembly. Take out the ten bolts, attaching the hood to the front and rear supports. Lift off the hood and tank assembly.

TO DISASSEMBLE:

The tank is held to the inside of the hood with two straps, one bolt for each strap. Loosen and remove the bolts and the tank is free to be removed.

TO INSPECT:

Inspect hood to see that gas tank support straps are riveted tightly into position. Flush out tank if necessary with gasoline and repair leaks if any.

**CAUTION!** If heat is to be applied to tank when repairing break first fill tank with water. All water must be removed from tank before using again.

TO REASSEMBLE:

Locate tank in position in hood and fasten the straps.

TO INSTALL:

Place hood and tank assembly in position on front and rear

supports. Insert the ten bolts and fasten. Connect gas line at tank. Fill tank with gasoline and check for leaks. Install muffler and exhaust pipe.

#### WATER PUMP AND FAN ASSEMBLY:

To remove this assembly quickly and efficiently remove the radiator. See Page 97.

#### TO REMOVE:

Drain the cooling system.

Remove fan belt. Refer to Adjustments. (Operation Section, Page 18)

Disconnect and remove by-pass line.

Disconnect and remove water hose.

Remove capscrews.

Remove water pump assembly from engine.

Be careful of gasket.

#### TO DISASSEMBLE:

Remove fan blade and pulley.

Mark body and cover flanges so that they may be reassembled in same position.

Take out the three capscrews and separate the cover and housing. Be careful of the gasket and do not lose the spring and thrust button

Remove fan hub by driving out pin.

Remove impeller shaft assembly.

Remove rubber washer and carbon seal.

#### TO INSPECT:

If carbon seal shows excessive wear or damage it must be replaced. Examine spring for breakage. Examine seal face on bronze bushing for possible scratches, etc. which cause leakage. Seal face must be smooth and square with bearings. Examine shaft bushings and if worn excessively, replace. Replace any broken or damaged parts.

#### TO REASSEMBLE:

Make certain all parts are free from dirt. Assemble seal and washer to shaft. Remove all dirt and dust from seal facing and assemble seal and shaft assembly into pump cover. Place spring into pump body in proper position with thrust button in place and assemble cover to body as marked.

**CAUTION:** Place capscrew in position in cover as this bolt cannot be placed after the pump is assembled. Install fan hub on shaft and pin in place. Install pulley and blade assembly with lockwashers and capscrews, being sure they are tightened securely.

#### TO INSTALL:

Place gasket in position on body and locate pump on engine and fasten securely in place. Install fan belt and adjust to proper tension (Operation section, Page 18). Connect water by-pass line. Install and fasten water pump hose. Refill cooling system.

RADIATORTO CLEAN OUT DIRT AND SLUDGE:

Drain the cooling system by opening drain cock in lower radiator tank and in cylinder block. Allow system to drain and close cocks. Fill the cooling system with a solution of 1-1/4 pounds of ordinary washing soda mixed with 4 U.S. gallons of water.

Leave the radiator filler cap off and run engine after water is hot (for approximately 30 minutes) then drain and flush the system with clean water.

Refill with clean soft water.

RADIATOR CORE:

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

TO REMOVE:

Drain the cooling system. Remove the hood and gas tank assembly. Disconnect upper and lower hoses at engine. Disconnect magneto ground wire at switch on radiator. Disconnect carburetor choke rod. Take out four bolts, two on each side, and remove radiator.

TO DISASSEMBLE:

Take top and bottom hoses off radiator connections. Top hose assembly consists of short hose, "Dole" adjustable thermostat and a longer hose. Remove drain pet-cock which is located at the bottom of the lower right hand section. Radiator shell is fastened to the radiator proper with 8 round head screws.

TO INSPECT:

Inspect radiator hoses to see that they have not collapsed or are ragged inside. Check thermostat to see that it is unobstructed and working properly; it may be checked by immersing in hot water and noting opening temperature. Check radiator drain cock to see that it is not obstructed and also that it does not leak. Check radiator for leaks.

TO REASSEMBLE:

Attach radiator to front hood support. Screw pet cock in place in bottom of radiator. Assemble the short and long hose and thermostat which make up the upper hose assembly. The thermostat has an arrow on it marking the flow of water from the block to the radiator. Install the thermostat so that the arrow points toward the radiator. Install bottom hose connection.

TO INSTALL:

Place the radiator assembly in position between the two engine side members. Line up the holes, place the bolts but do not fasten securely as yet. Attach the hoses to the engine connections. In-

stall hood and fuel tank assembly and tighten all bolts including the four radiator bolts which were left loose when radiator was first put in position on engine. Connect magneto ground wire to switch. Install and attach carburetor choke rod. Refill cooling system. Re-fill the gas tank.

### CYLINDER HEAD

#### TO REMOVE:

Drain the cooling system and disconnect water connections. Drain the gasoline. Disconnect the ignition wires at spark plugs and remove spark plugs. Take off 14 stud nuts and remove the head. Be careful of the gasket.

#### TO INSPECT:

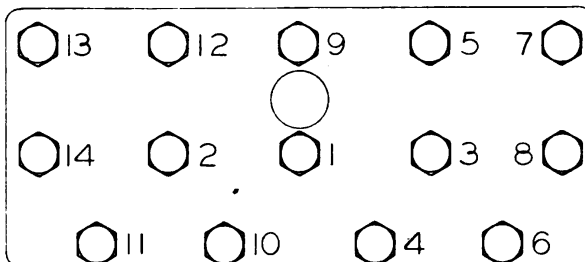
Examine the combustion chambers for carbon deposits and clean if necessary. Examine cylinder head gasket for possible damage and replace if condition is least bit questionable.

#### TO REPLACE:

Clean the engine block and cylinder head gasket faces. Place head gasket in position on engine block beaded side up. Install cylinder head and tighten the nuts as per chart below.

**NOTE:** Check nuts for tightness after engine is hot.

Install hose connections and fill cooling system. Install spark plugs and hook up ignition wires to proper terminals. Replace hood and gas tank assembly. Connect gas line and fill gas tank. Check for water and gasoline leaks.



CYLINDER HEAD NUT  
TIGHTENING ORDER

#### OIL PAN:

It is necessary to take the engine from the mixer to remove the oil pan.

#### TO REMOVE:

Remove the drive belts; refer to Operation Section, Page 18. Drain cooling system and lubricating oil. Take out the four bolts holding the engine to mixer frame. The engine is now free to be lifted off. Set the engine on boards on the ground or on the platform on the flywheel end of the house. Remove the engine skid. Remove bayonet and drain pipe assembly being careful of gasket. Remove oil pan capscrews (16 total). Be careful of pan gasket. The oil pump body and troughs are one unit and are sold only as such. This assembly is fastened to the pan with four screws (two fillister head and two round head.)

**CAUTION:** The oil pump plunger which is engaged at the center of the cam shaft will pull out of the pump body when the pan is removed. The plunger will remain engaged to the camshaft. Be careful not to bend the plunger. The plunger can be removed by rotating the camshaft to a position to obtain sufficient clearance.

The plunger assembly is serviced and replaced as a complete unit. Therefore do not further disassemble these parts.

#### TO INSPECT:

Inspect the oil pump plunger and pump body for wear. Check oil pump plunger and body ball checks for leaks. Clean the oil pan thoroughly. Clean oil screen thoroughly and check for damage. Inspect the pan gasket and if the least bit questionable replace with a new one.

#### TO REASSEMBLE:

Put the oil pump body and trough assembly in position on the oil pan. Place the pan gasket in position on the pan, using "Permatex" compound. Engage oil pump plunger to camshaft. Lubricate the oil pump plunger and body well with OE. Place the oil pan in position on the engine block, being careful not to bend or distort the oil pump plunger when inserting it into the oil pump body.

Start all capscrews loosely before tightening any of them. (The two long capscrews are located at the position of the oil drain.)

**NOTE:** Some engines were furnished with lead washers which later were found to be unnecessary. Discard any you remove. Tighten all capscrews alternately, securely and equally, starting at the center and proceeding towards the end and opposite sides. Install bayonet gauge and oil drain. Install skid.

#### TO REPLACE:

Place engine assembly on mixer engine. Place the engine base bolts and only partially tighten them. Line up the mixer drive pulleys with the engine crankshaft pulleys and securely fasten the four engine base pulleys. Install drive belts and guards. (See operation section, Page 18). Refill cooling system with water. Refill oil pan to proper level with correct OE. Start engine and check for oil pan leaks.

#### PISTON AND CONNECTING ROD ASSEMBLIES:

1. The piston and connecting rod assemblies are not removable from top of block.
2. Remove the engine from the mixer.
3. Remove the oil pan.
4. Remove connecting rod bolt nuts and caps and disconnect connecting rods 1 and 4 from crankshaft.
5. Rotate crankshaft until clearances can be gained to withdraw connecting rod and piston assembly from the cylinder. **NOTE:** Connecting rods numbered with number of cylinder bore. No. 1 starts at timing gear end of engine.
6. Disconnect and remove connecting rods Nos. 2 and 3 - these are removed in a similar manner after rotating crankshaft.
7. Loosen and remove piston pin screw.
8. Push out piston pin.

TO INSPECT:

Check connecting rod bearings for excessive wear. Check rod bolt and nut threads.

NOTE: Connecting rod bearings are spun babbitt and are adjusted by adding or removing shims as required from both sides equally. The clearance may be checked by placing a piece of paper .002" (cigarette paper is approximately .002") thick on the bearing and tighten connecting rod bolt nuts. When proper clearance is obtained there should be a slight binding of the rod on the crankshaft with the paper on the bearing. When paper is removed the rod should rotate freely on the crankshaft.

Examine the piston rings for breaks and excessive wear and replace where necessary. If any ring needs replacement, the entire set per piston should be replaced for best results. If new rings are to be installed, fit the rings to the cylinder bore before assembling them to the piston. The ring gap width should be .008" to .010". When assembling rings on the piston, make sure they are free in ring grooves.

TO REASSEMBLE:

Assemble lockwasher and screw into position and tighten securely.

When reassembling pistons and rods in the engine, rod marked 1 is to be placed in cylinder #1. (#1 cylinder is at timing gear end.) NOTE: Connecting rods are also numbered with manufacturer's series number which should be disregarded.

Assemble rod and cap to crankshaft so that numbers on both pieces correspond, the piston pin locking screw being toward the timing gear end of engine. NOTE: Disregard all stamped or forged numbers other than those designating cylinder number or cap and rod matching numbers.

Tighten all connecting rod bolt nuts securely and lock in place. Install oil pan. Replace engine on mixer mount.

CRANKSHAFTTO REMOVE:

Drain cooling system. Drain the crankcase oil. Remove engine from mixer. Remove house and radiator from engine. Remove spark plugs. Lay engine on side (accessory side up). Remove the oil pan.

Disconnect the piston rod assemblies from the crankshaft and swing clear to one side (it is not necessary to remove the piston rod and connecting rod assemblies from the block). Remove starting jaw nut. Remove the crankshaft pulley. Remove the timing gear cover. Be careful not to damage the oil retainer. Remove camshaft gear.

CAUTION: The "X" on these gears is the mark that is used.

Take the square key out of crankshaft (for pulley) and pull crankshaft gear. Remove the narrow ring spacers and take out the four capscrews holding the front bearing retainer lock. Take out the two capscrews holding the front bearing retainer to the block. Remove the flywheel. The flywheel fits on a tapered hub and is keyed to this shaft and can be replaced in only one position. Remove crankshaft.

NOTE: Rear bearing retainer need not be removed except for servicing.

TO INSPECT:

Inspect crankshaft ball bearings for wear or damage and replace if necessary. Clean these parts thoroughly. Coat them with clean OE and wrap them in clean cloth or paper until ready to be used again. Check crankshaft journals for wear, rough or flat spots. Check crankshaft for straightness. Inspect timing gears for wear and fit on shafts. Inspect timing gear cover gasket and replace if damaged. Check oil retainers for wear or damage.

TO REASSEMBLE:

Assemble front bearing retainer over shaft. Assemble front bearing to shaft and slide front retainer over the bearing. Assemble rear bearing to shaft. Install crankshaft assembly in cylinder block. Assemble rear retainer over rear bearing and into rear end of cylinder block and bolt in place with four capscrews. Bolt front locking retainer in place with four capscrews and lockwashers. Assemble bearing spacers and crankshaft gear (marked side "X" up.) Assemble flywheel to crankshaft over the key with locking washer and nut; tighten securely and bend up edge of washer.

Replace camshaft gear, marked side up. Be careful to have the gears in such a position that the teeth marked with "X's" mesh. Place timing gear cover gasket in position and replace timing gear cover. Line up the holes and replace all the bolts but do not tighten. Coat the hub of the crankshaft pulley with OE and place it in position over the crankshaft. BE CAREFUL OF THE OIL RETAINER IN THE TIMING GEAR COVER. Line up the keyways in the pulleys and the crankshaft and place the key in position. Bore in gear cover to be concentric with crankshaft.

With the crankshaft pulley in position the timing gear cover may now be tightened securely. Replace the starting jaw nut. Connect the piston rod assemblies. Replace oil pan; replace spark plugs; replace radiator and house; replace engine on mixer; fill the oil pan to the proper level with correct OE; refill the cooling system with water. Start engine and check for oil and water leaks.

VALVE AND TAPPET ASSEMBLYTO REMOVE:

Drain the cooling system. Drain the fuel. Remove hood and fuel tank assembly. Remove cylinder head. Remove air cleaner and breather line. Remove valve cover - be careful of gasket and the lead gaskets under the head of the capscrews. Rotate the engine crankshaft until valve tappet clears end of the valve stem. Compress the valve springs and remove the valve keepers. Remove valve and spring. Valve tappets and guides can be removed by taking out the two capscrews and withdrawing the complete guide with four tappets out to the valve opening.

TO INSPECT:

Remove all carbon deposits with scraper making certain the valve seats and stems are not scratched. Examine the valve stems, heads and seats for wear, warpage or pitting. It will be necessary to reface the valves if they are too badly pitted, or not seating. If valve stems are warped the valve must be replaced. Inspect tappets and replace any broken or badly worn parts. Check valve guides for wear.

NOTE: When the valves are removed from the block they should be marked so that they are reassembled in the same position. Inspect valve cover gasket.

TO REASSEMBLE:

NOTE: The intake and exhaust guides carry the same part number, however when installing new guides proceed as follows: Intake valve stem guide - to be reamed to  $.3145" + .005"$  or  $-.005"$ . Exhaust valve stem guide - to be reamed to  $.3155" + .0005"$  or  $-.0005"$ . Assemble the valve tappets into the guides with the large end down and replace assembly and tighten the capscrews securely. Place valves in proper position; assemble springs to valve stem by compressing spring and installing washer and keeper, adjusting the valves. Valve adjustment is provided for by an adjusting screw in the tappet assembly. Be accurate; use an accurate feeler gauge for this adjustment. Lock the lock nut securely.

- A. If no grinding machine is available, valve may be resealed by using a grinding compound and screw driver and rotating the valve in its seat.
- B. Remove all traces of grinding compound before reassembling valve.

NOTE: Each valve must be brought to the closed position before the adjustment is made.

Lubricate the valve tappet and guide assembly, valve stems and guides with proper OE. Replace valve inspection cover. Do not forget the lead gaskets used between flat washers and the cover on the two capscrews. Replace the air cleaner and breather line. Replace cylinder head and all related parts. Refill the cooling system.



**CAMSHAFT:**

**TO REMOVE:**

Drain the cooling system. Remove the radiator. Remove the drive belts. Remove the crankshaft pulley. Remove timing gear cover - be careful of oil retainer seal. Rotate shaft until timing gear marks are together ("X" - "XX") and not position of #1 piston. Block up under engine and remove front engine supports (has two dowel pins). Remove valve cover - be careful of gaskets. Remove the valve tappet assemblies. Remove camshaft.

**TO INSPECT:**

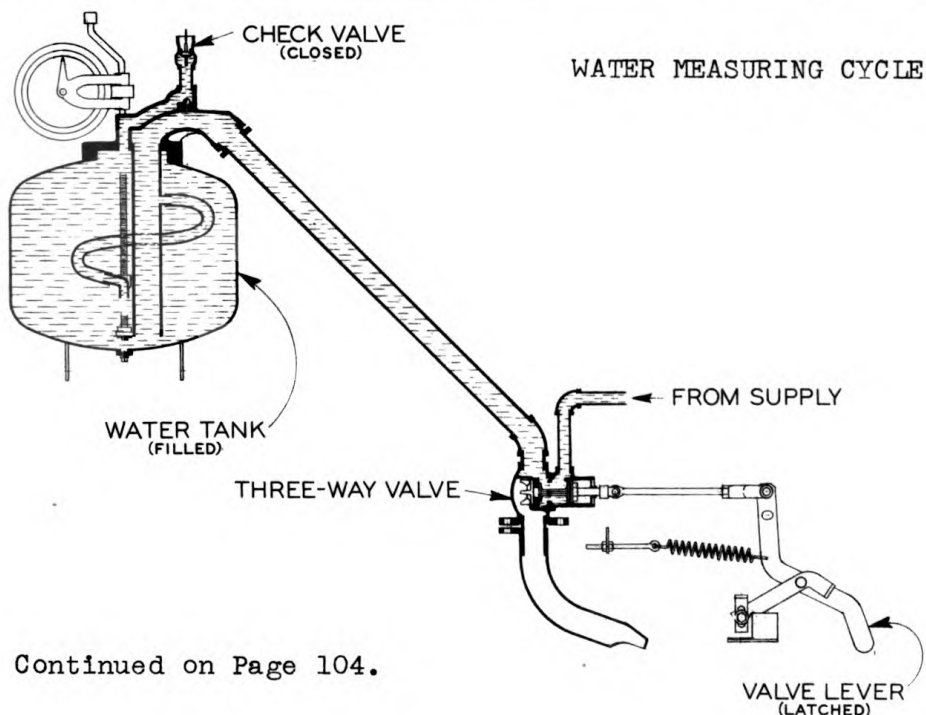
Inspect camshaft bearings for wear. Inspect timing gear teeth for wear and fit on shaft. Inspect all gears. Inspect camshaft for warped or worn cams. Wash bearings thoroughly-coat with clean OE and wrap in clean paper or cloth until ready to be used.

**TO REASSEMBLE:**

Mount ball bearings on camshaft and place in position in engine block. Replace front engine support and gasket - fasten securely.

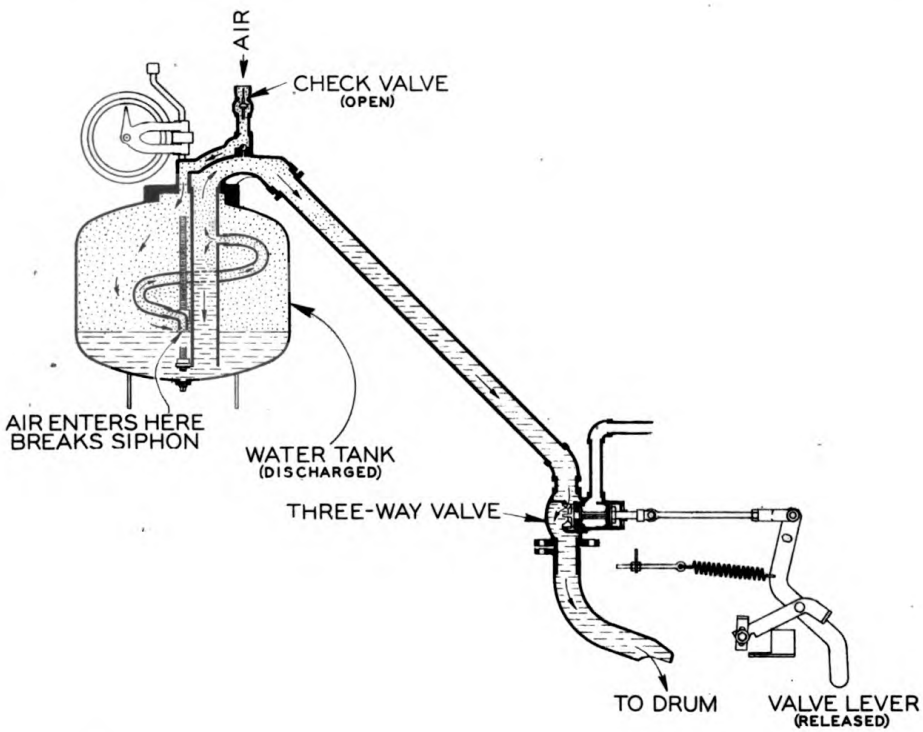
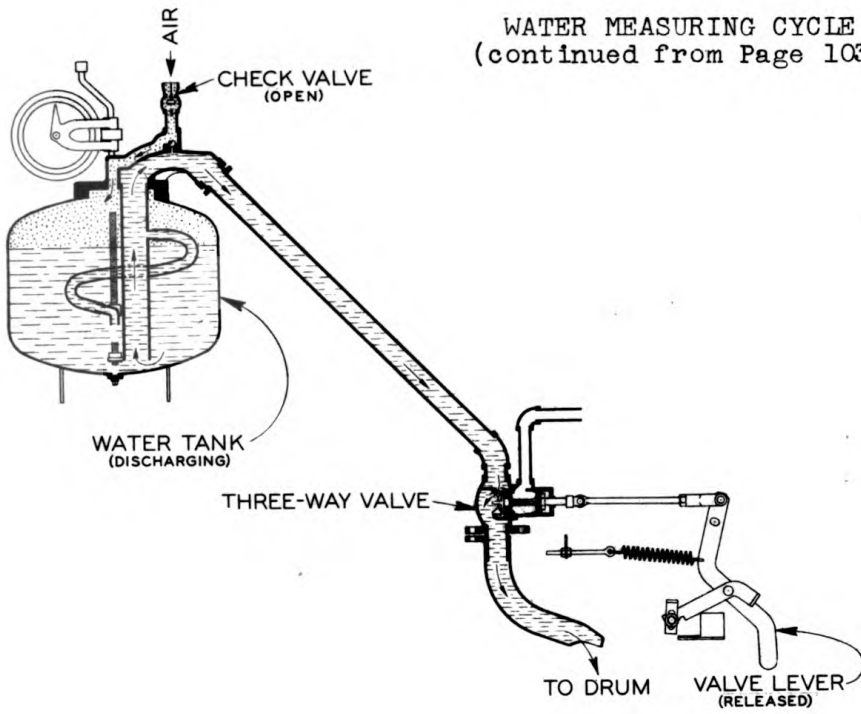
REMOVE BLOCKING FROM UNDER MOTOR.

Replace camshaft gear, lockwasher and nut (line up the timing gear marks). Replace timing gear cover and gasket. Place all bolts in holes but do not tighten. Coat flywheel pulley hub with OE and install on crankshaft. Be careful of oil retainer seal and timing gear cover. Tighten timing gear cover in position. Replace valve tappet assemblies. Adjust valves. Replace valve cover. Replace drive belts and guard. Replace radiator and fill cooling system with water. Run engine and check for oil and water leaks.



Continued on Page 104.

WATER MEASURING CYCLE  
(continued from Page 103)



# **PARTS SECTION**

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# PREPARATION OF REQUISITIONS

## SAMPLE COPY FOR USE IN THE PREPARATION OF REQUISITIONS

State **PERIOD** designation by use of one of the following terms:

- (1) **"INITIAL"** - first requisition of authorized allowances.
- (2) **"REPLENISHMENT"** - subsequent requisitions to maintain authorized allowances.
- (3) **"SPECIAL"** - requisitions for necessary repairs not covered by allowances.

Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)"

Prepare a separate requisition for each different machine. Type **"SPARE PARTS"** in upper right hand corner of requisition form.

Give complete shipping instructions. Special instructions for packing, marking, routing, etc. should be given at the end of the requisition.

State proper nomenclature of machine, and make, model, serial number and registration number.

State basis or authority, and date delivery is required, immediately below description of machine.

State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations

Group parts required under group headings as shown in manufacturers' parts catalogs.

Double space between items.

(SAMPLE)

SPARE PARTS

**WAR DEPARTMENT**  
G. M. C. Form No. 200  
Issued April 2, 1943

### REQUISITION

To: Engineer Supply Officer, Columbus Quartermaster Supply Depot, COLUMBUS, OHIO. Sheet No. 1

Requisition No. E-742-5-41 Date May 2, 1943 Period Special

SHIP TO Engineer Property Officer, Pine Camp, New York.

MARVED FOR: Engineer Supply Officer, 802nd Eng. Battalion, Pine Camp, N.Y.

Recommended By (show Signature, Rank, Organization, Destination. If different from "SHIP TO" include address):  
Robert E. Roe,  
Robert E. Roe,  
Major, C. E.,  
Engineer Property Officer,

Approved John E. Doe For the Commanding Officer:  
John E. Doe,  
Col., C. E.,  
Executive Officer.

MFG. NO.	NOMENCLATURE & UNIT	AUTHORIZED ON HAND		DUE IN	REQUIRED	APPROVED
		MAXIMUM LEVEL	LEVEL			
<b>PARTS FOR MIXER, CONCRETE, PORTABLE, KOEHRING 7S, MODEL 5A</b>						
SERIAL NO. <u>U.S.A. REG. NO. W-9371</u>						
Basis: Repair of Disabled Equipment						
Delivery is requested by May 17, 1943.						
<b>KOEHRING 7-S MIXER GROUP</b>						
<b>MIXING DRUM</b>						
KB161	Wing, Bucket Extension ea.	0	0	0	4	
KB165	Bucket ea.	0	0	0	8	
<b>DRUM DRIVE SHAFT</b>						
<b>SKIP CLUTCH BANDS</b>						
KB107	Lining ea.	0	0	0	1	
KB108	Band ea.	0	0	0	1	
FB106	Rivets for Same ea.	0	0	0	10	
<b>LEROI ENGINE GROUP</b>						
Model <u>XRP-1</u> , Serial No. <u>48735</u>						
<b>CRANK CASE</b>						
KB405	Support, Front Engine ea.	0	0	0	1	
KB412	Stud, Intake & Exhaust manifold ea.	0	0	0	4	

\*Nonexpendable items such as tools must be accounted for, when requisitioned, by a statement that they have been placed on REPORT OF SURVEY or STATEMENT OF CHARGES.

# PREPARATION OF REQUISITIONS

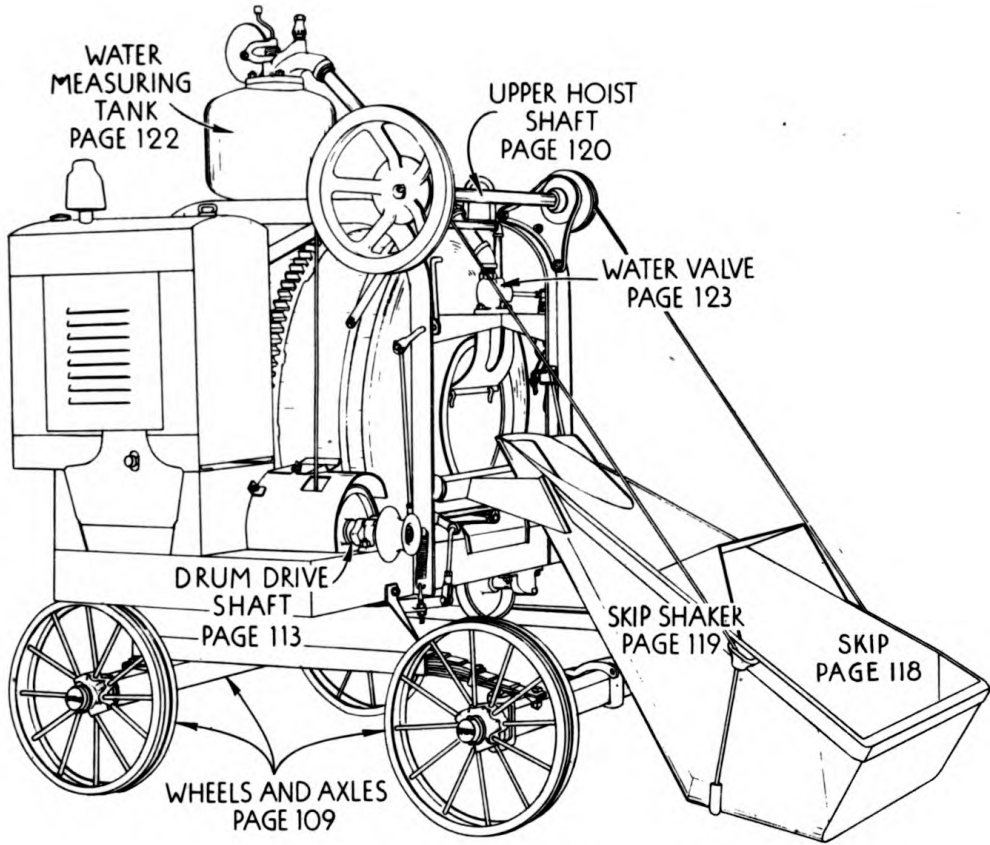
A Sample requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS.

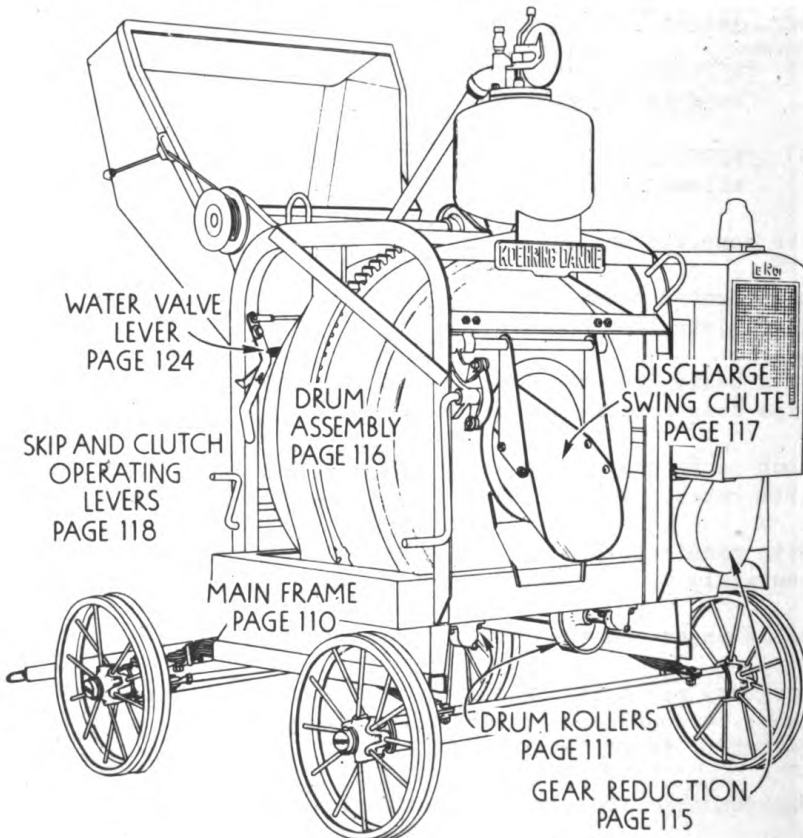
In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY IN PREPARING REQUISITIONS FOR SPARE PARTS:

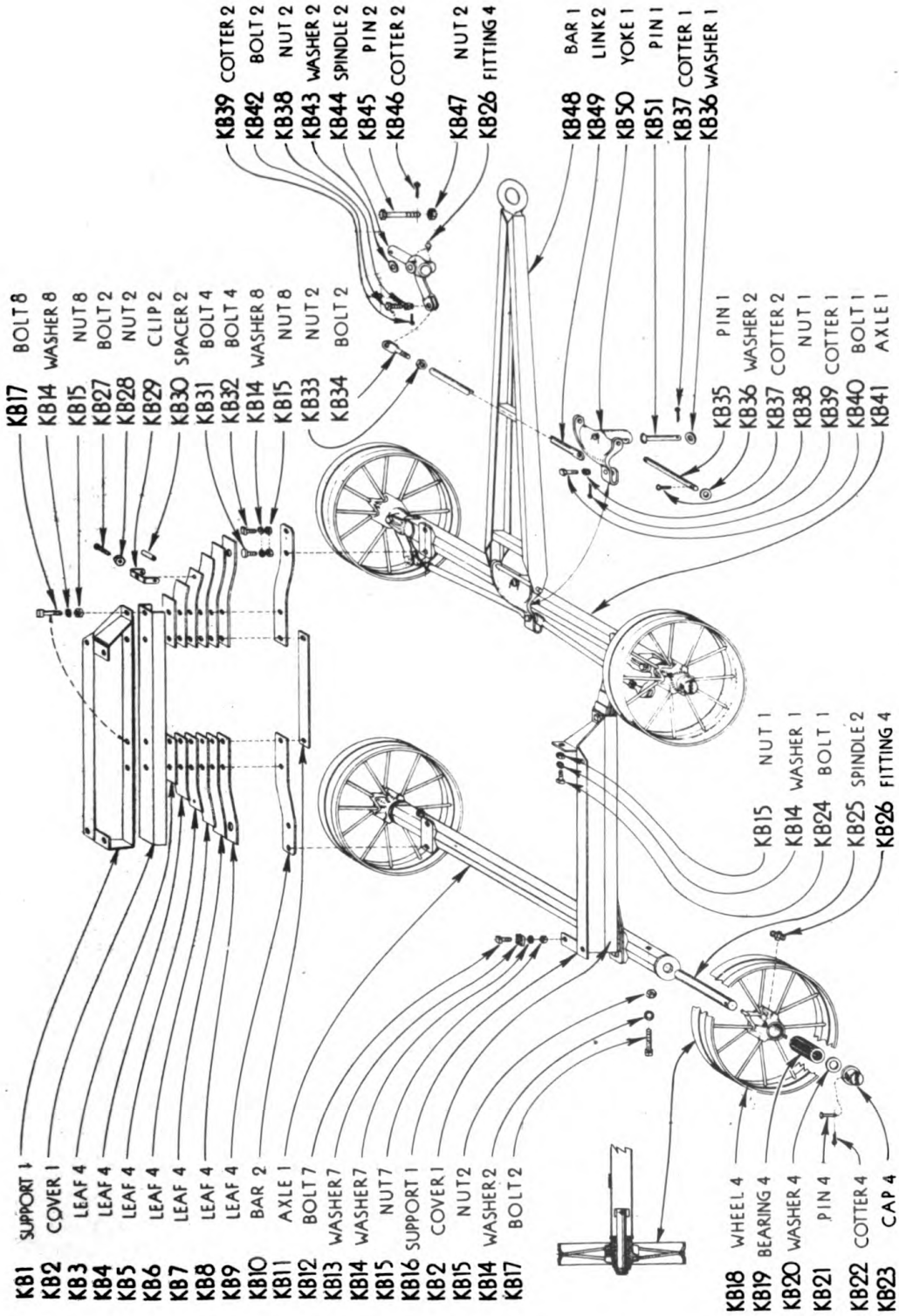
- a. Prepare a separate requisition for each different machine.
- b. Type "SPARE PARTS" in upper right hand corner of requisition form.
- c. State PERIOD designation by use of one of the following terms:
  - (1) "INITIAL" - first requisition of authorized allowances.
  - (2) "REPLENISHMENT" - subsequent requisitions to maintain authorized allowances.
  - (3) "SPECIAL" - requisitions for necessary repairs not covered by allowances.
- d. Give complete shipping instructions.
- e. State proper nomenclature of machine, and make, model, serial number and registration number.
- f. State basis or authority, and date delivery is required, immediately below description of machine.
- g. Group parts required under group headings as shown in manufacturers' parts catalogs.
- h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.
- i. Double space between items.
- j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)".
- k. Nonexpendable items must be accounted for.



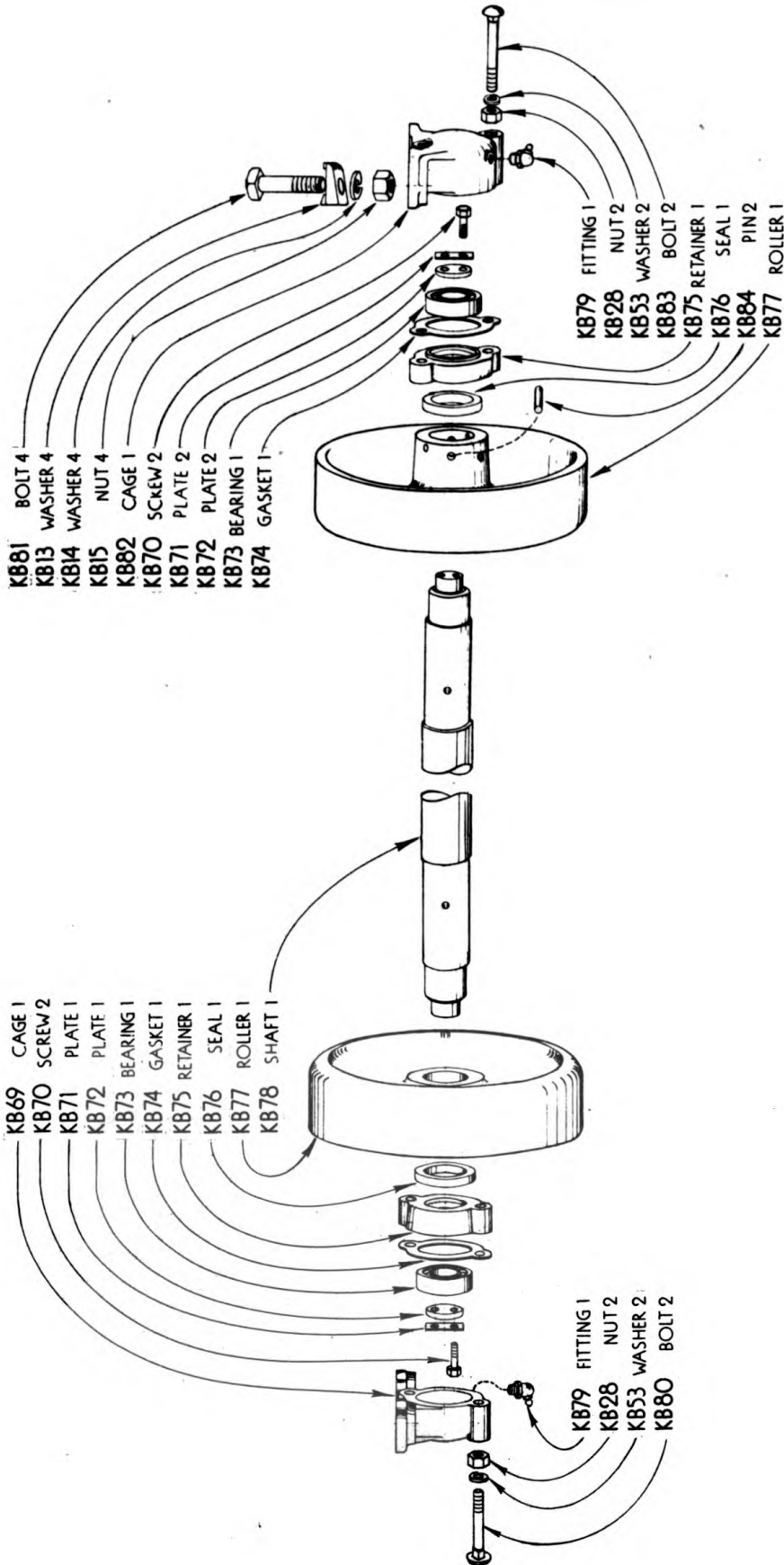
PAGE REFERENCES FOR ASSEMBLIES



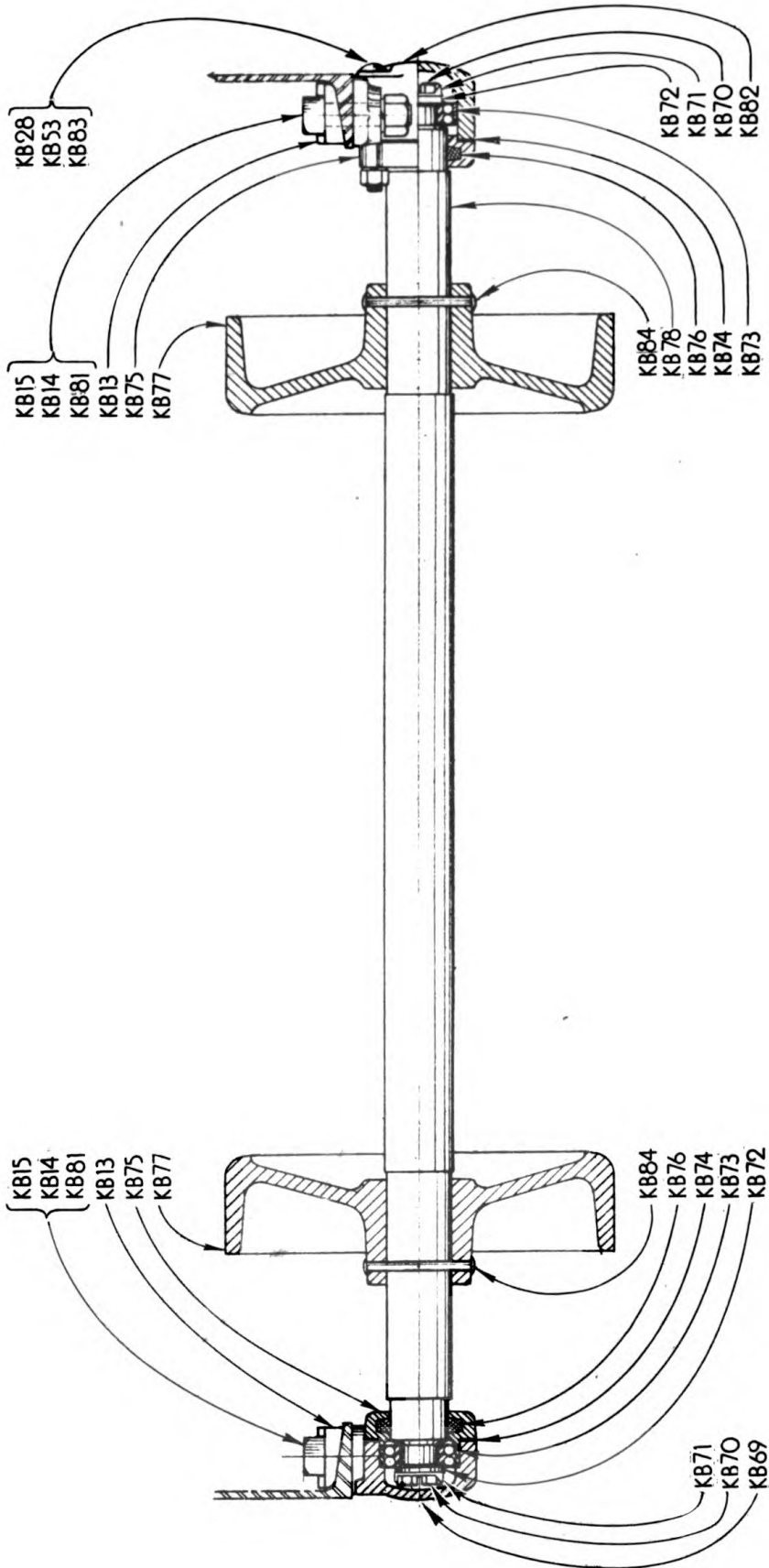




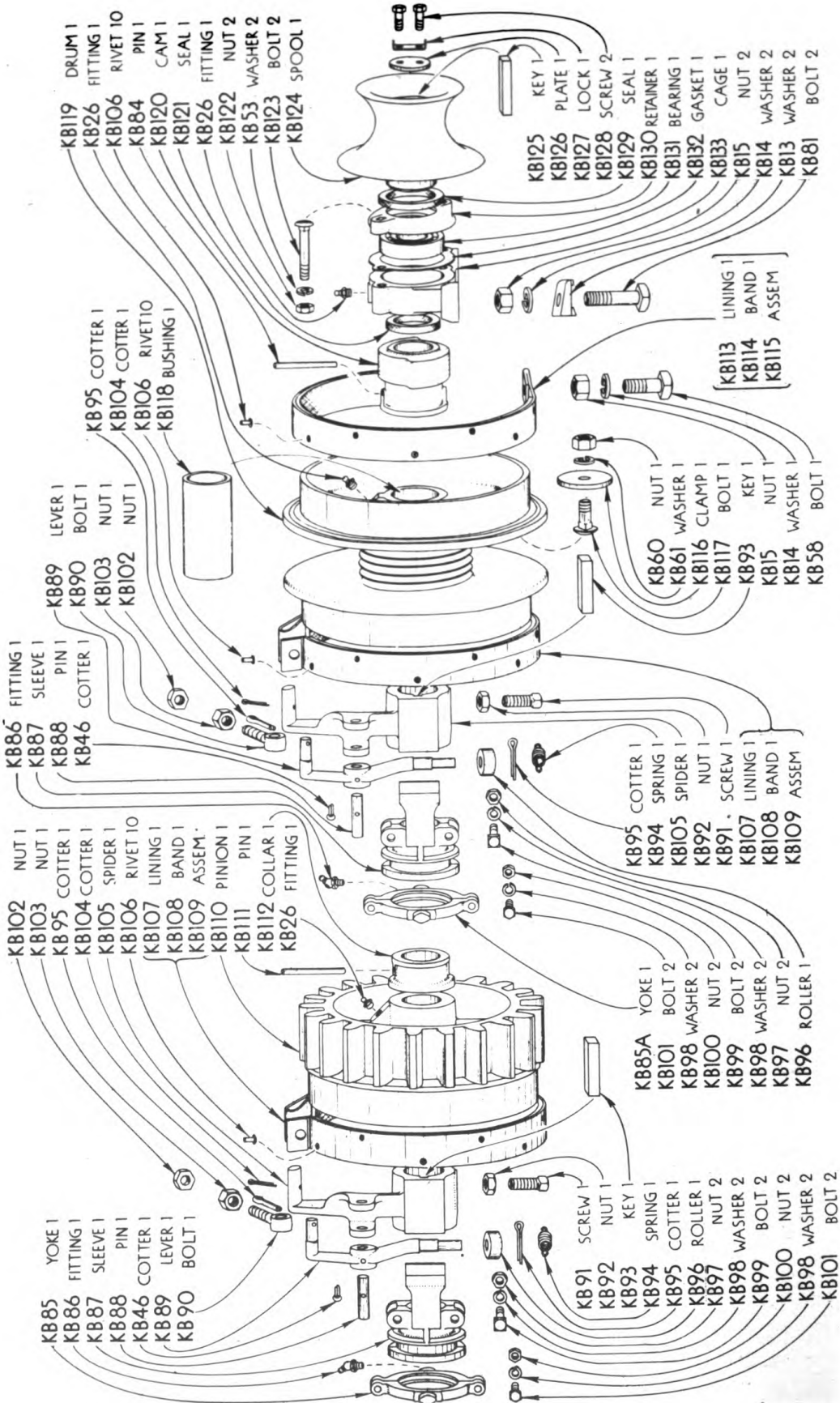
WHEELS AXLES AND SPRINGS



DRUM ROLLER PARTS

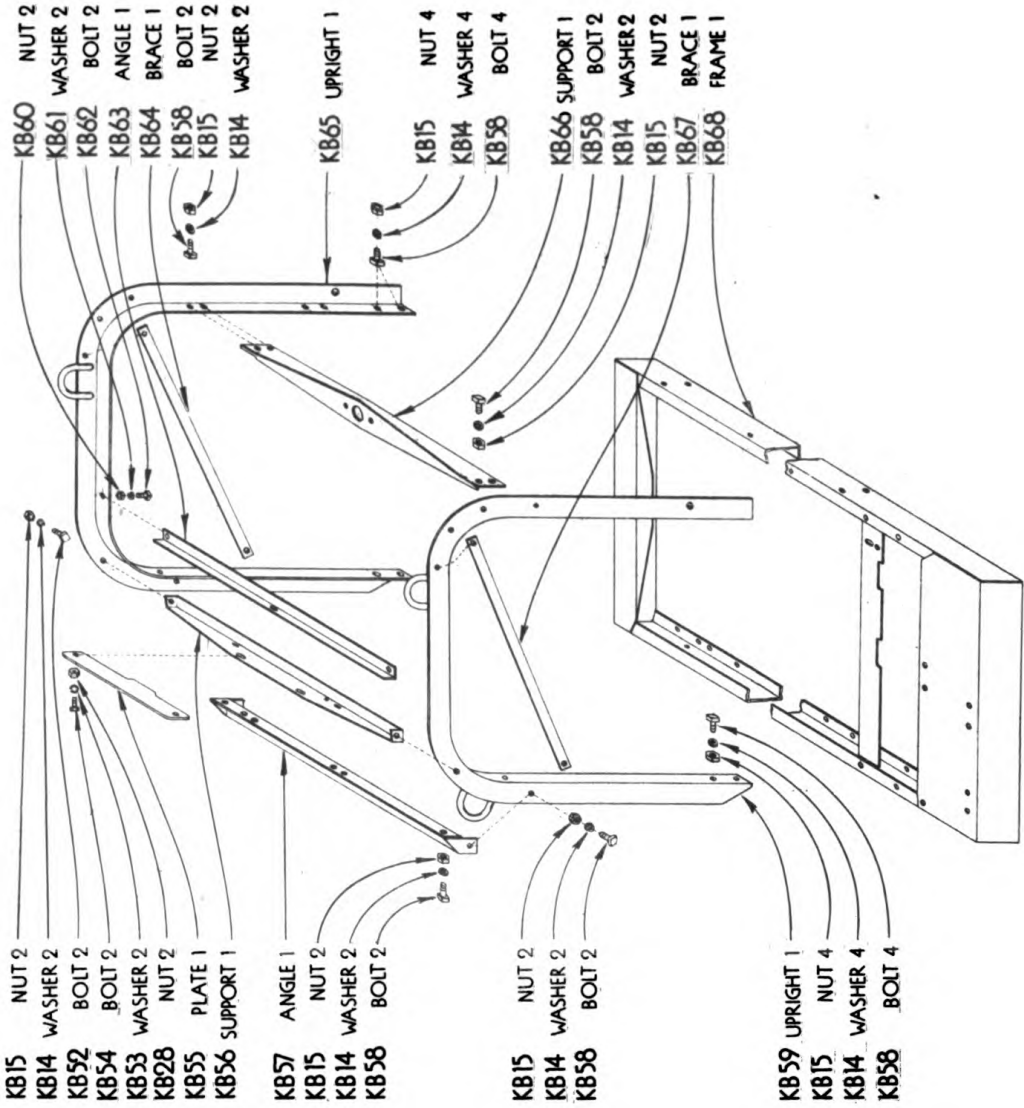


DRUM ROLLER ASSEMBLY

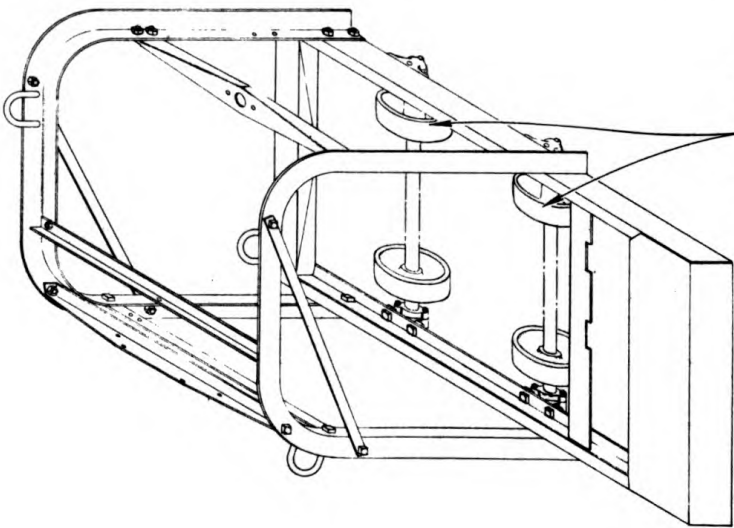


DRUM DRIVE SHAFT PARTS



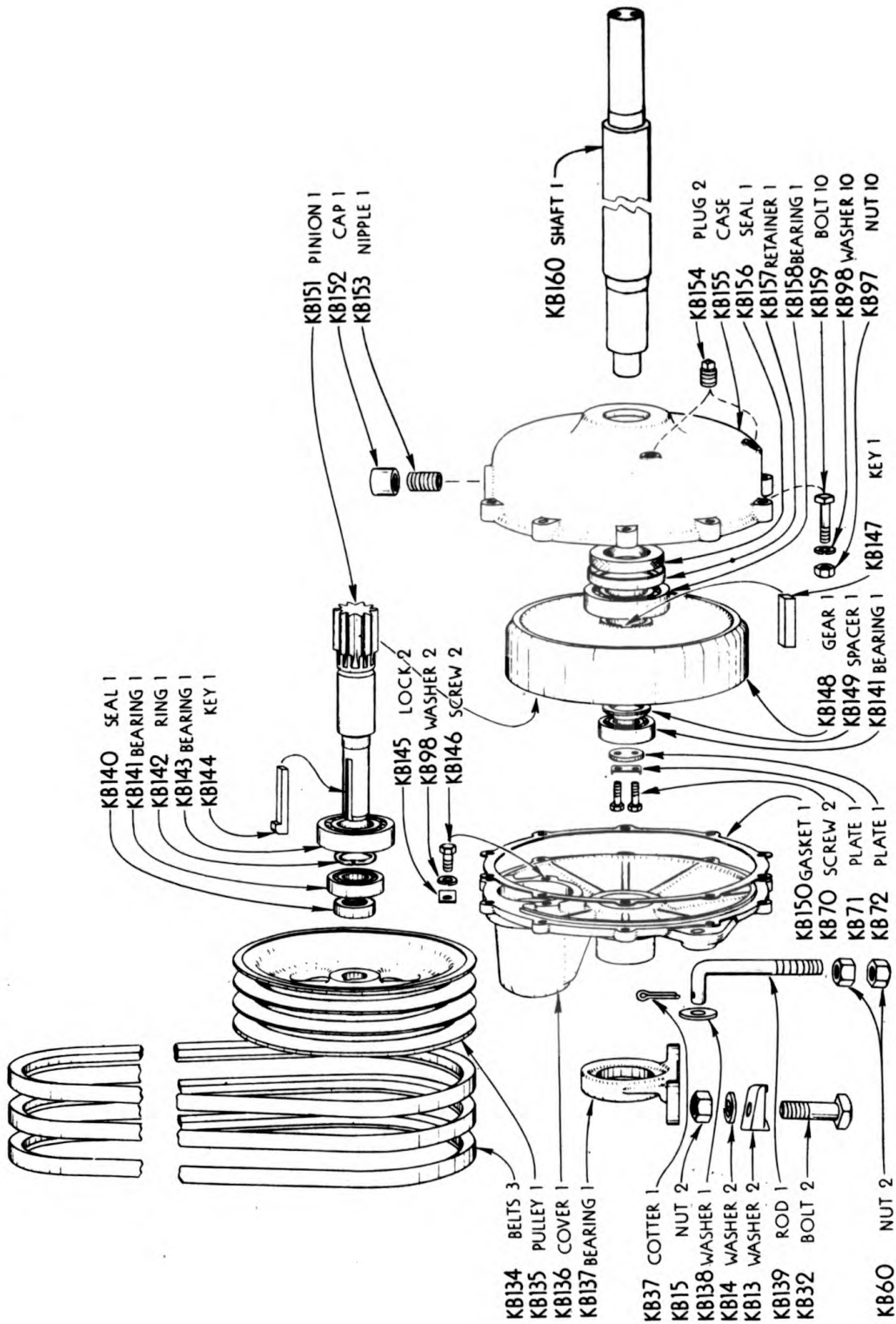


FRAME

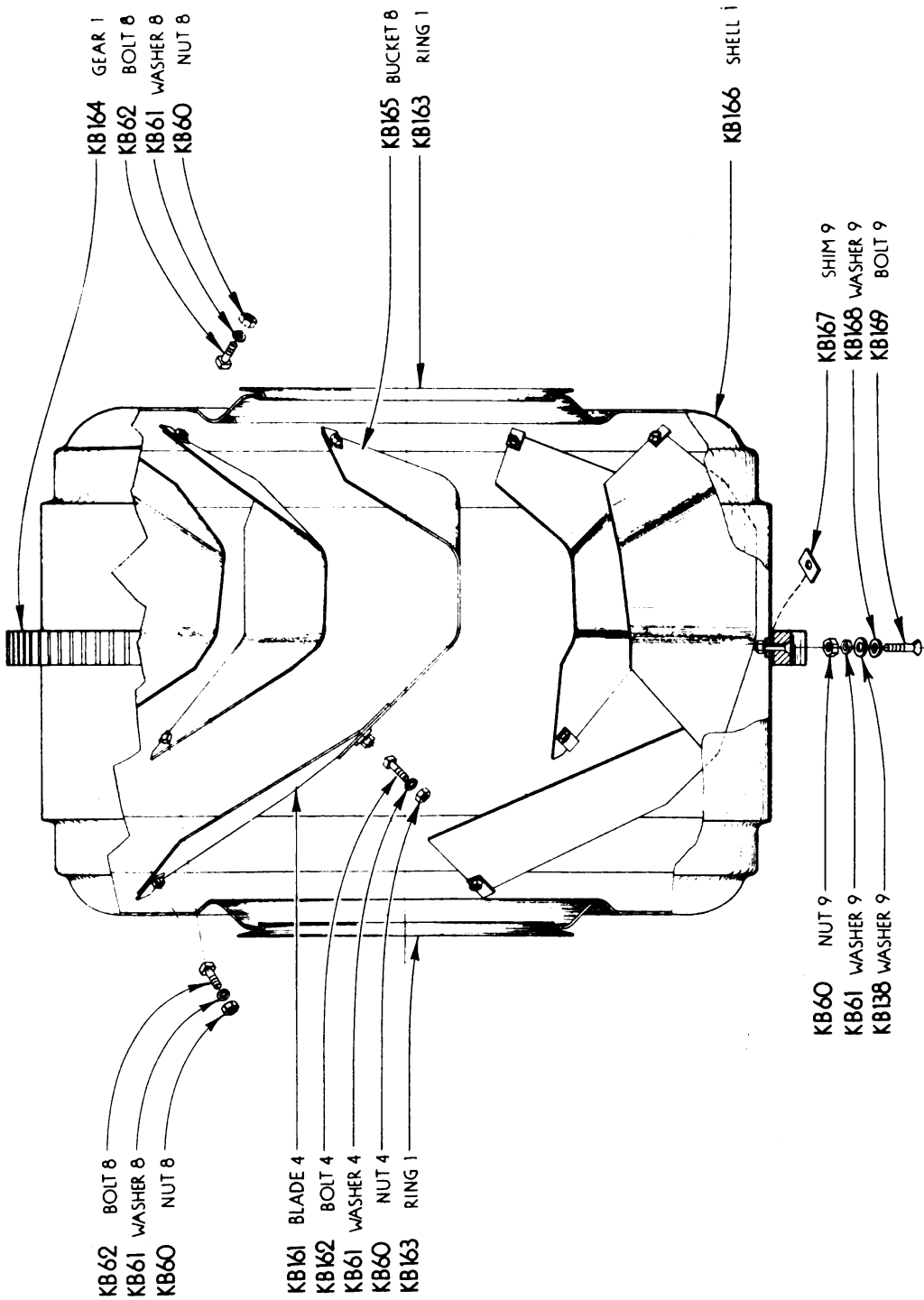


FOR DRUM ROLLERS SEE PAGE 47



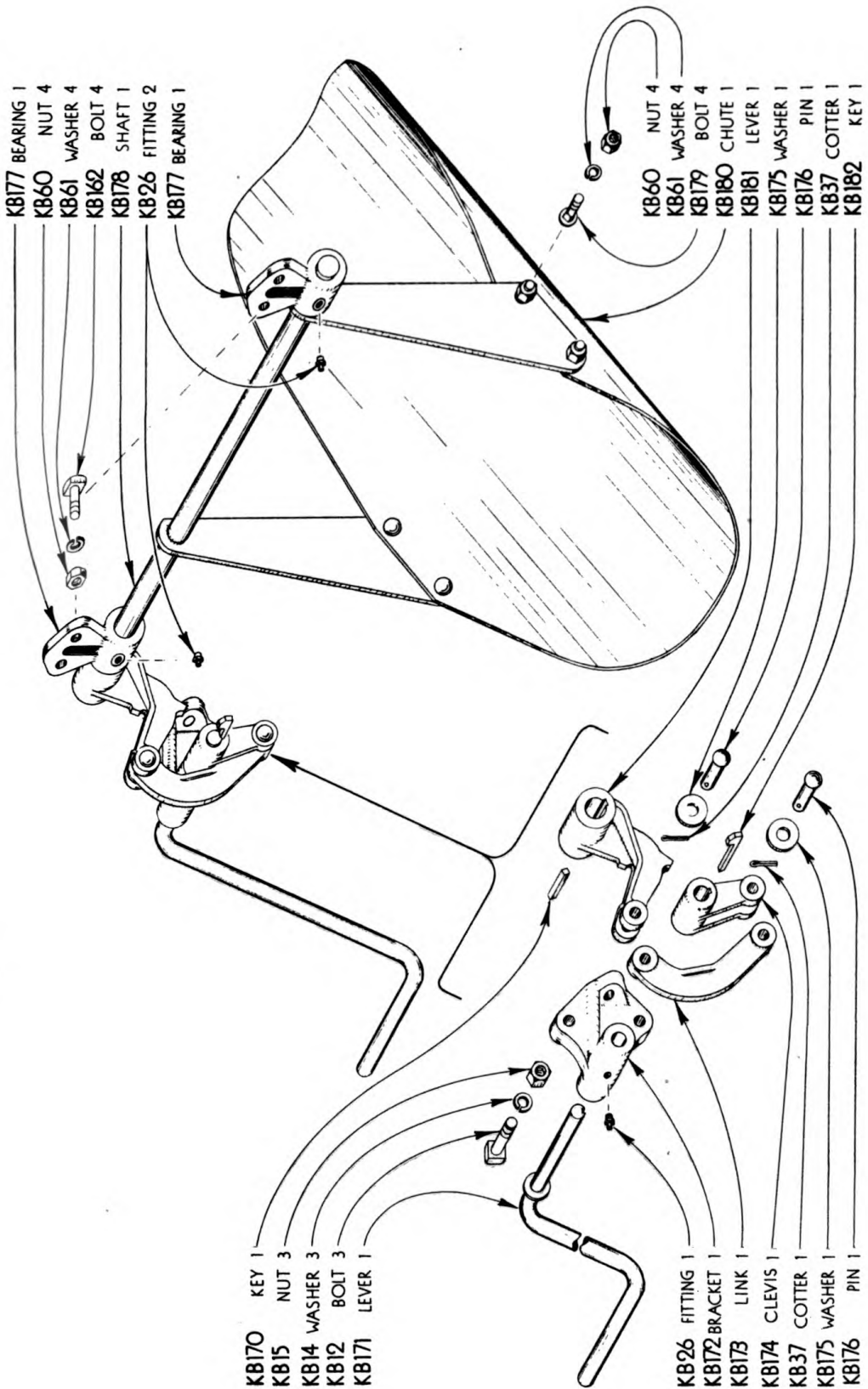


GEAR REDUCTION PARTS (See page 113 for assembly)

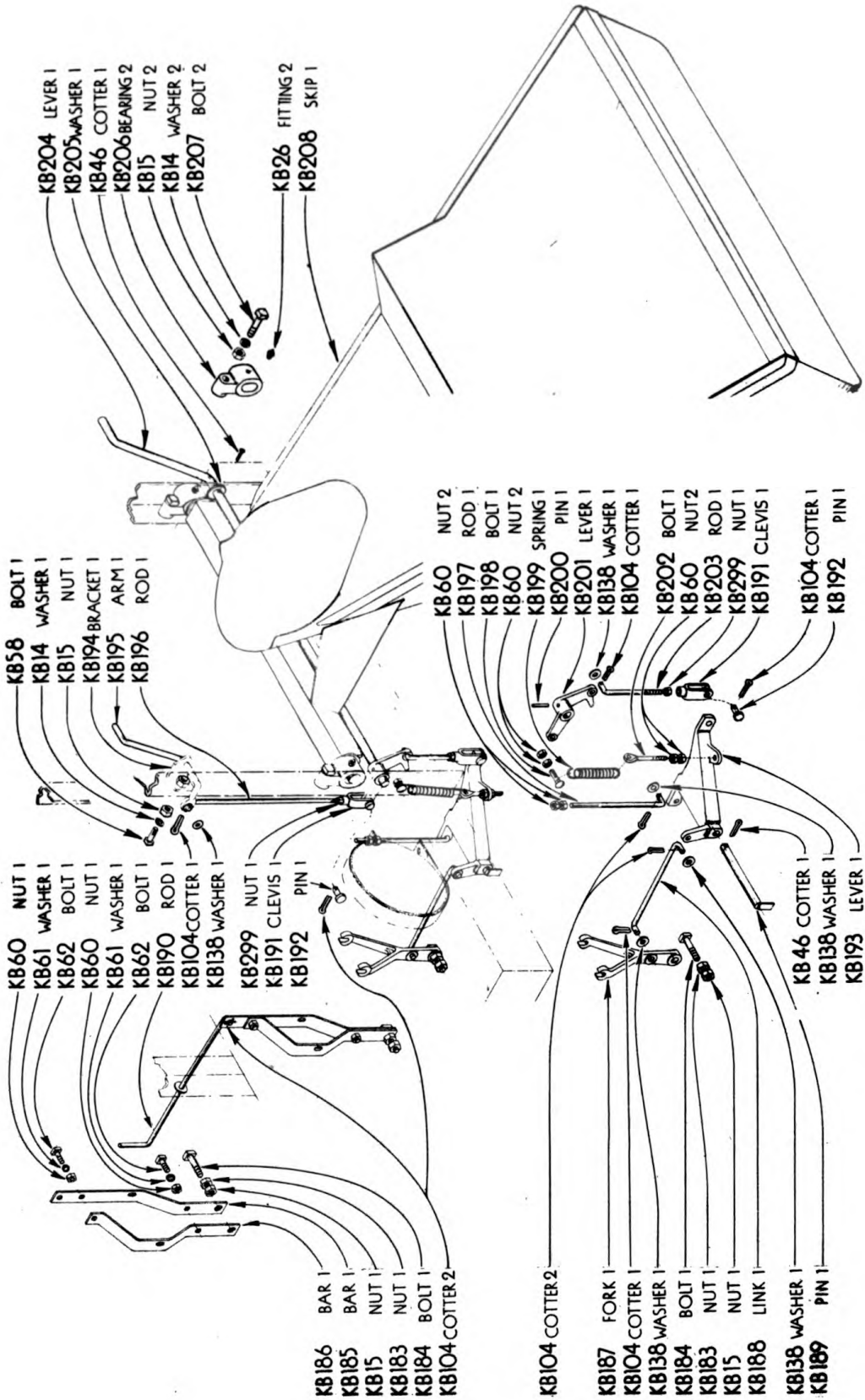


MIXING DRUM ASSEMBLY



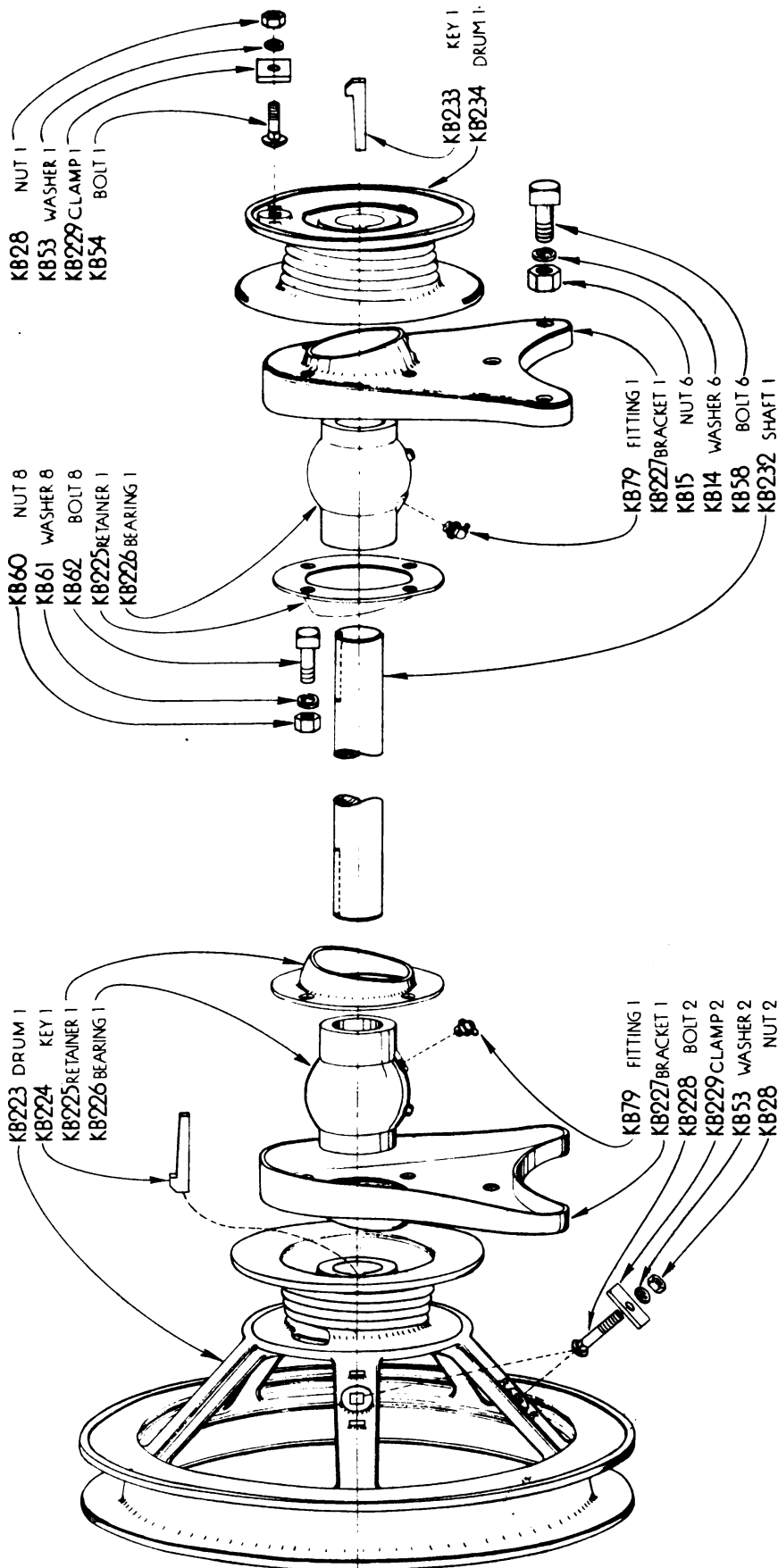


DISCHARGE SWING CHUTE PARTS

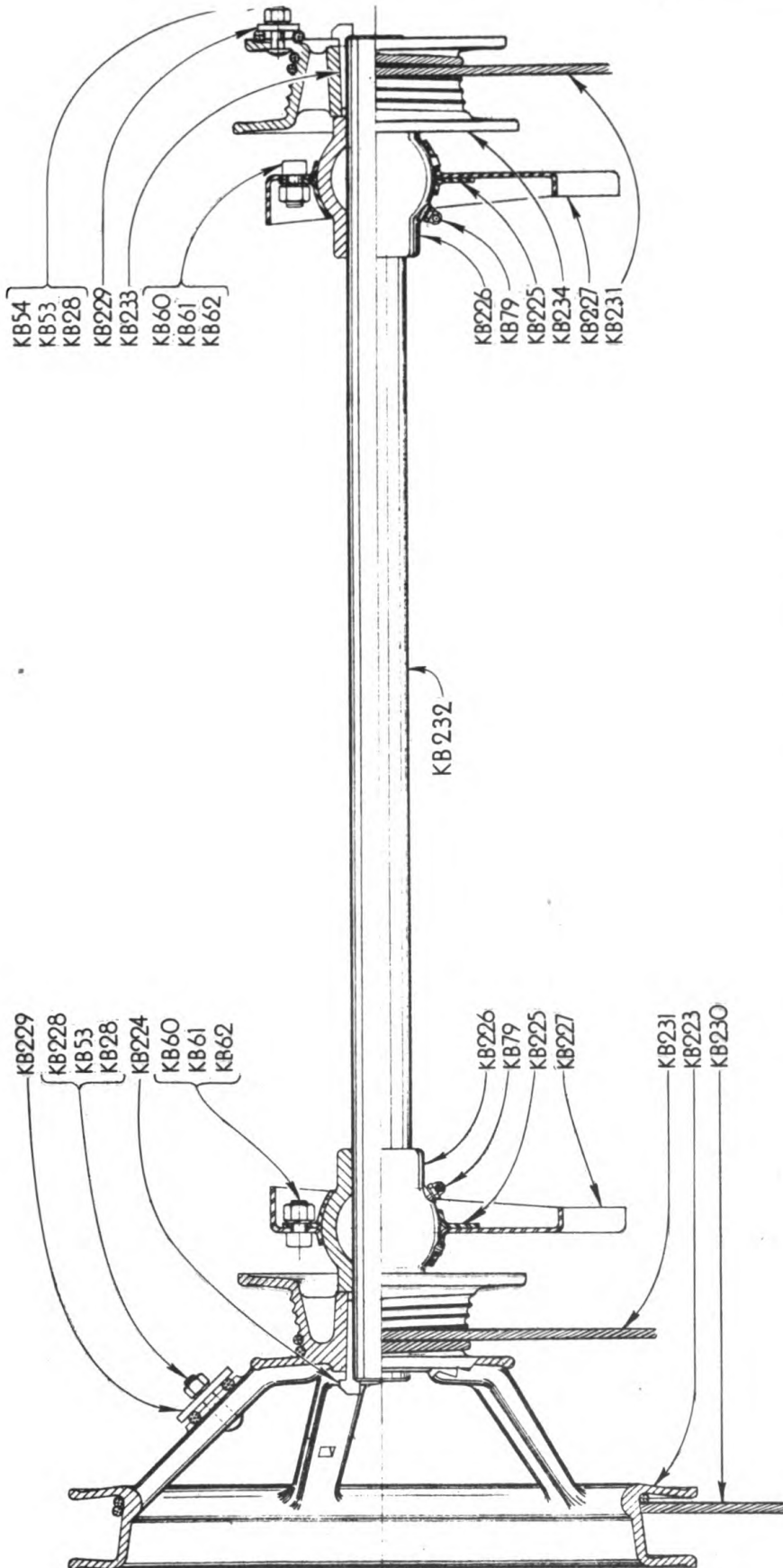


SKIP AND CLUTCH OPERATING LEVERS (PARTS AND ASSEMBLY)

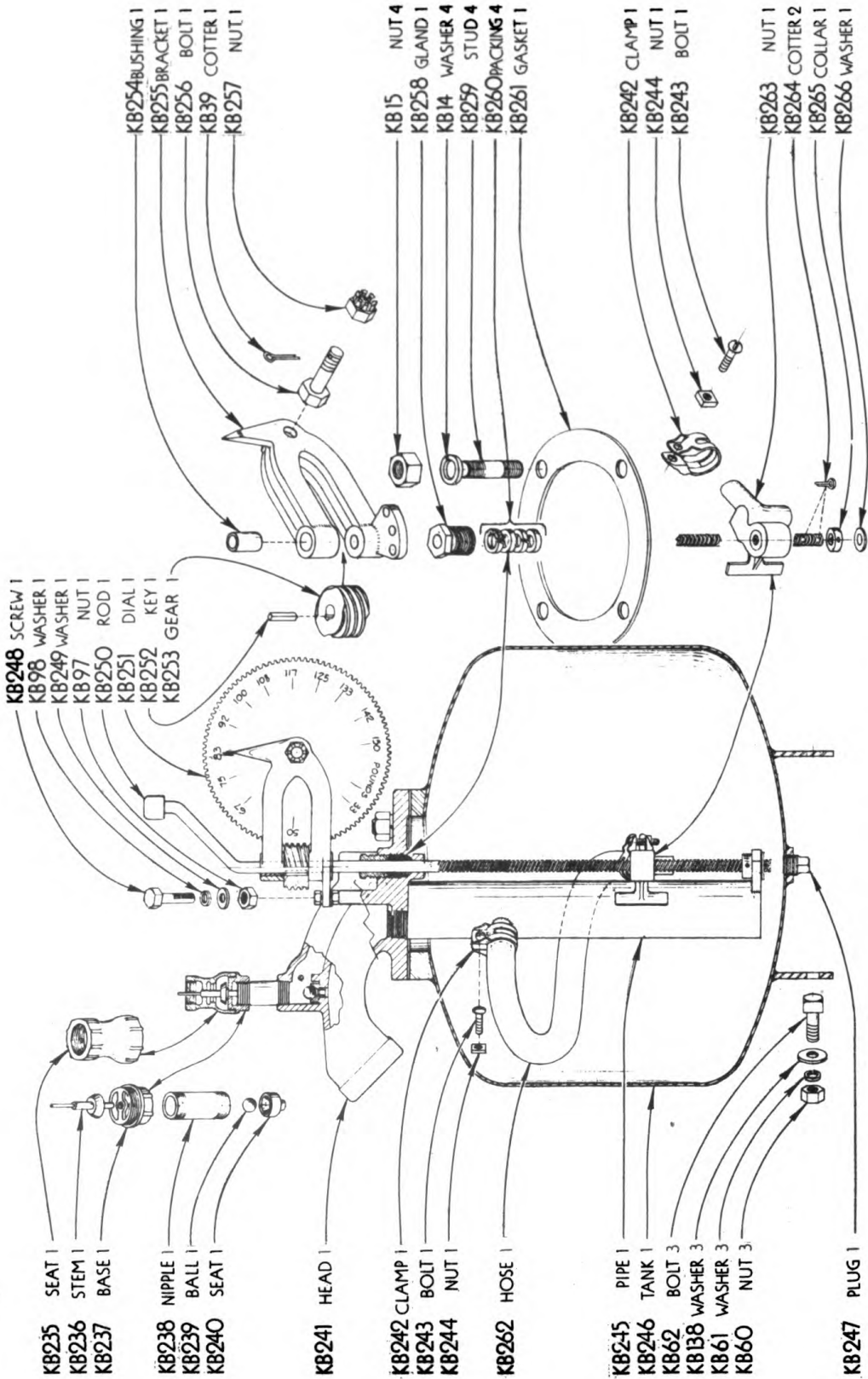




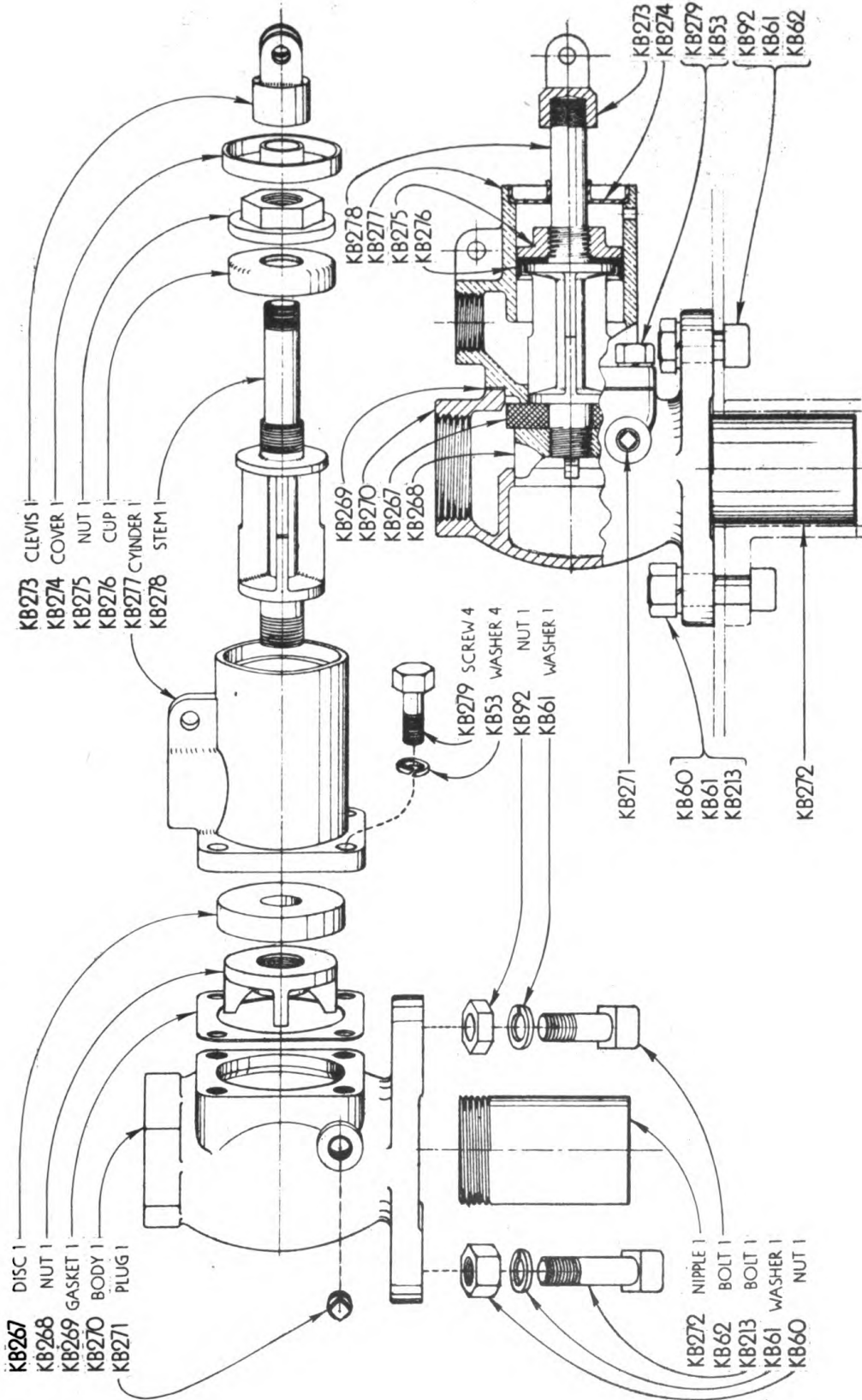
CHARGING SKIP HOIST SHAFT PARTS



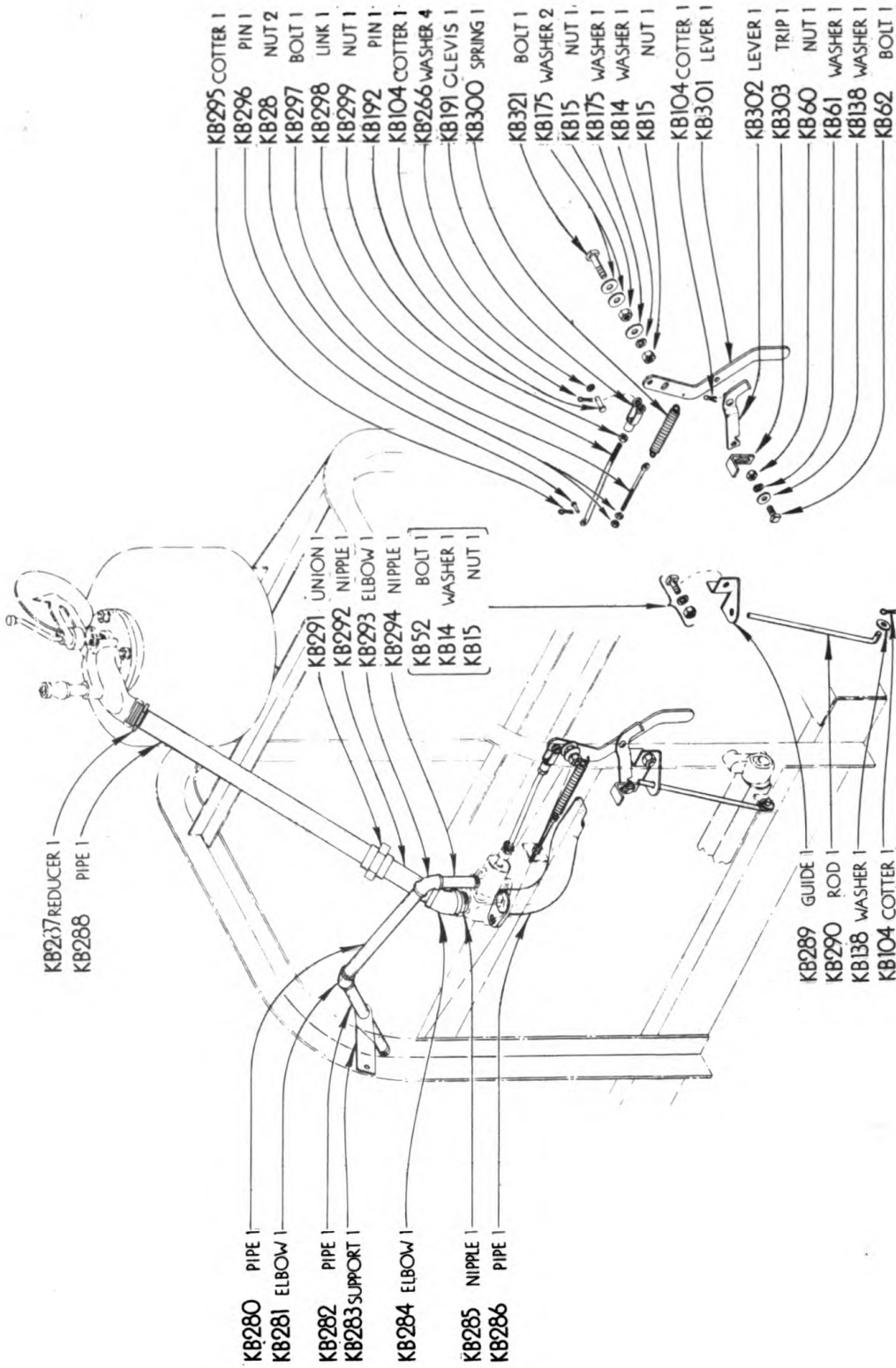
CHARGING SKIP HOIST SHAFT ASSEMBLY



WATER MEASURING TANK (PARTS AND ASSEMBLY)

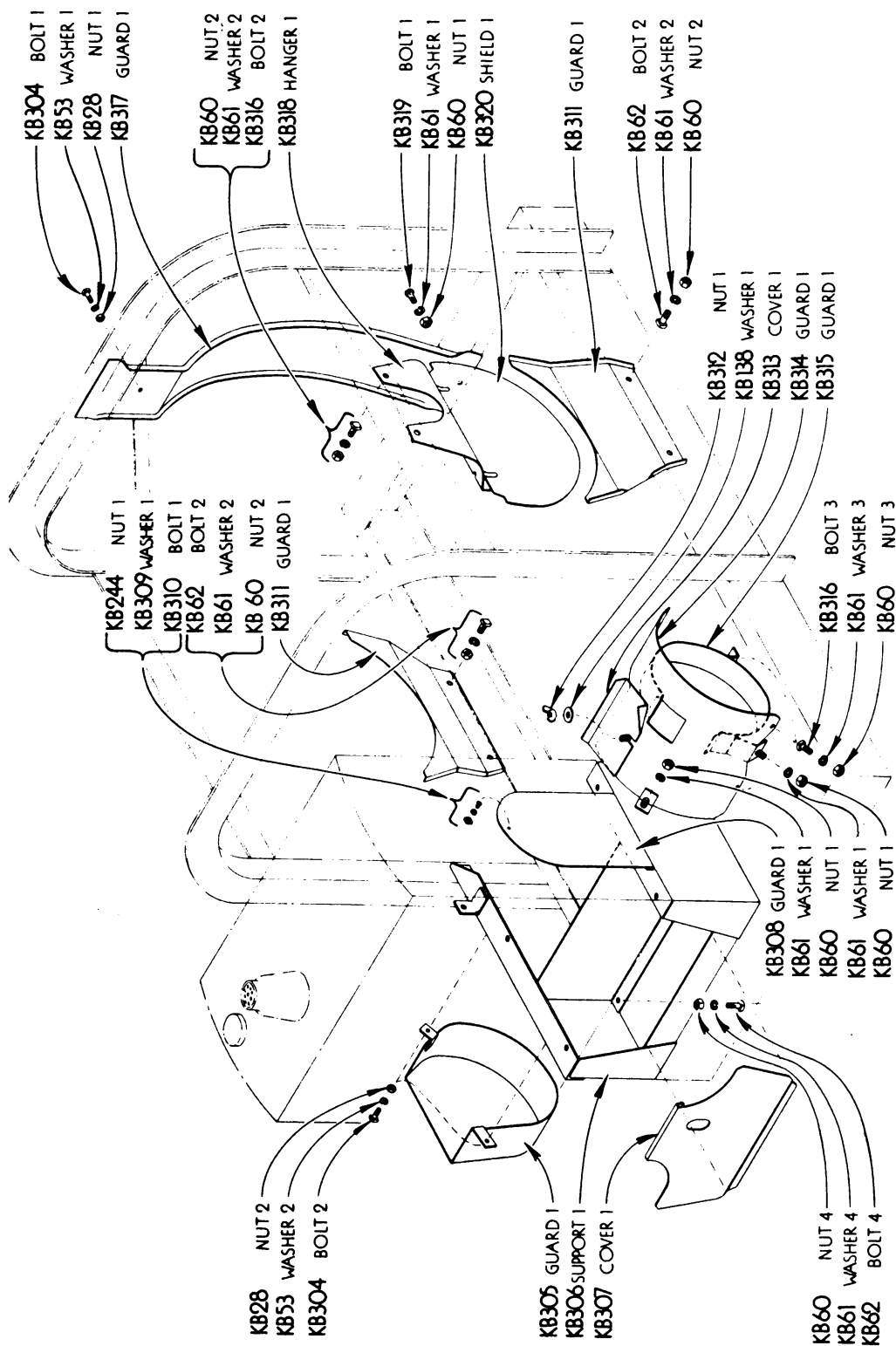


WATER VALVE (PARTS AND ASSEMBLY)

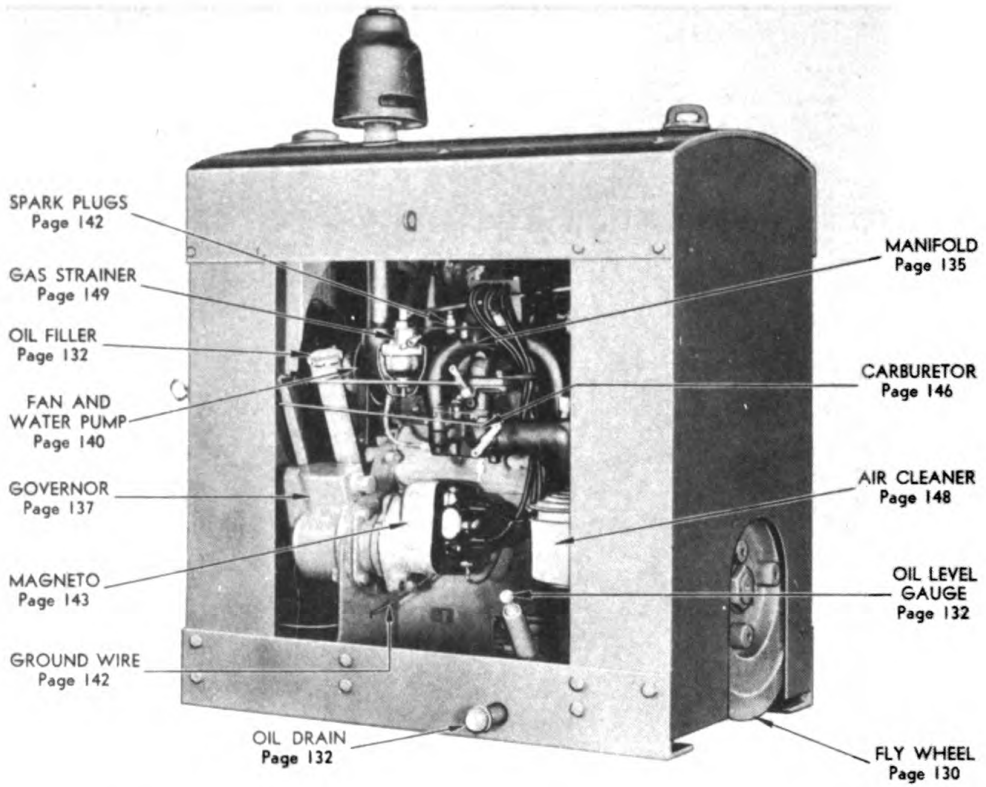


WATER VALVE OPERATING LEVERS (PARTS AND ASSEMBLY)

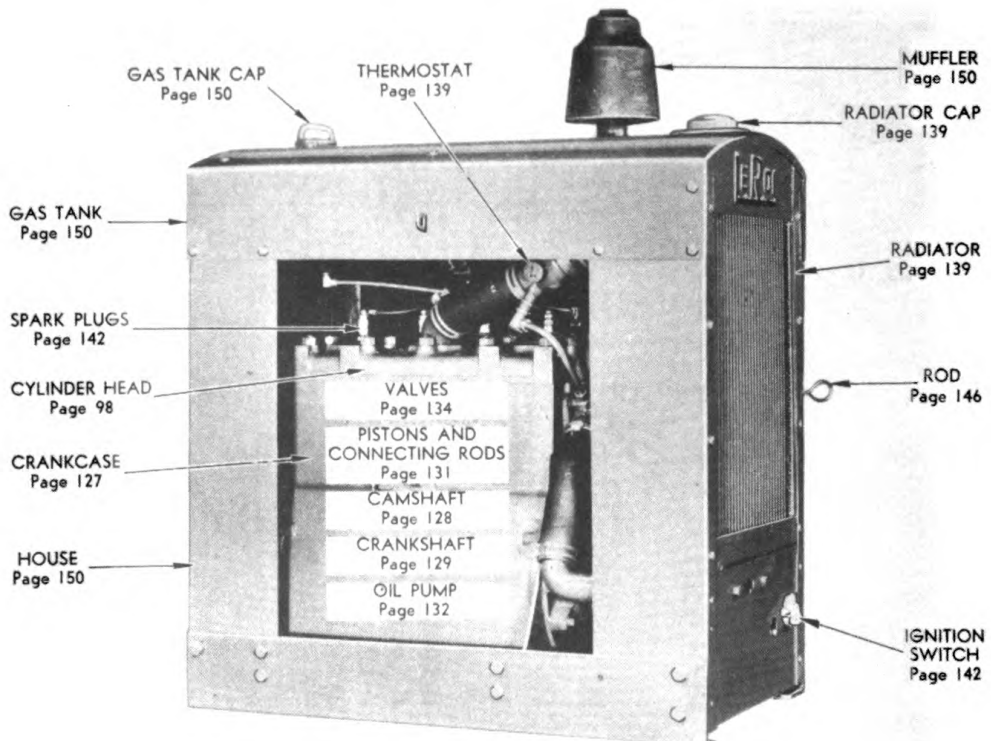




ENGINE SUPPORT AND GUARDS (PARTS AND ASSEMBLY)

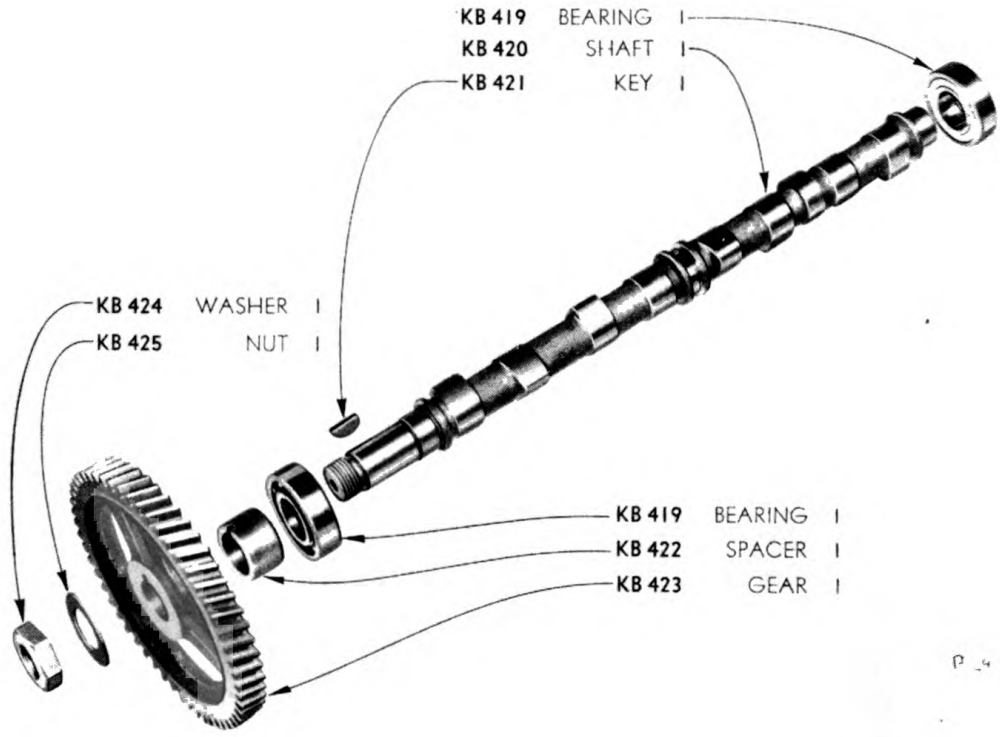


RIGHT HAND VIEW OF LEROI MODEL XRPl-23 ENGINE

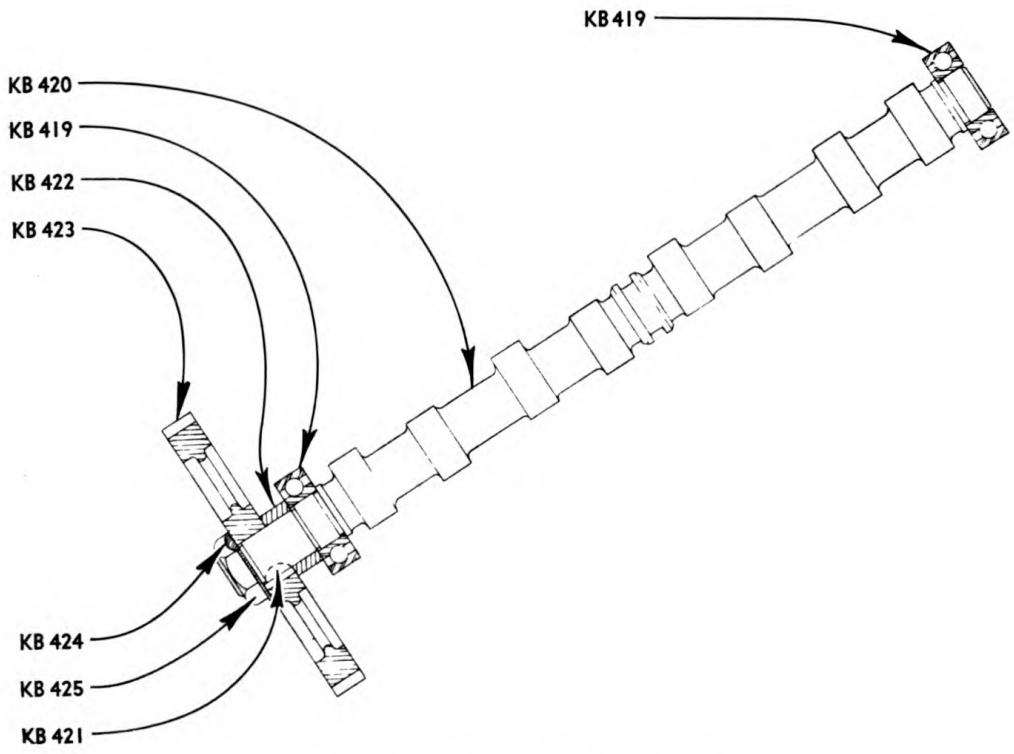


LEFT HAND VIEW OF LEROI MODEL XRPl-23 ENGINE



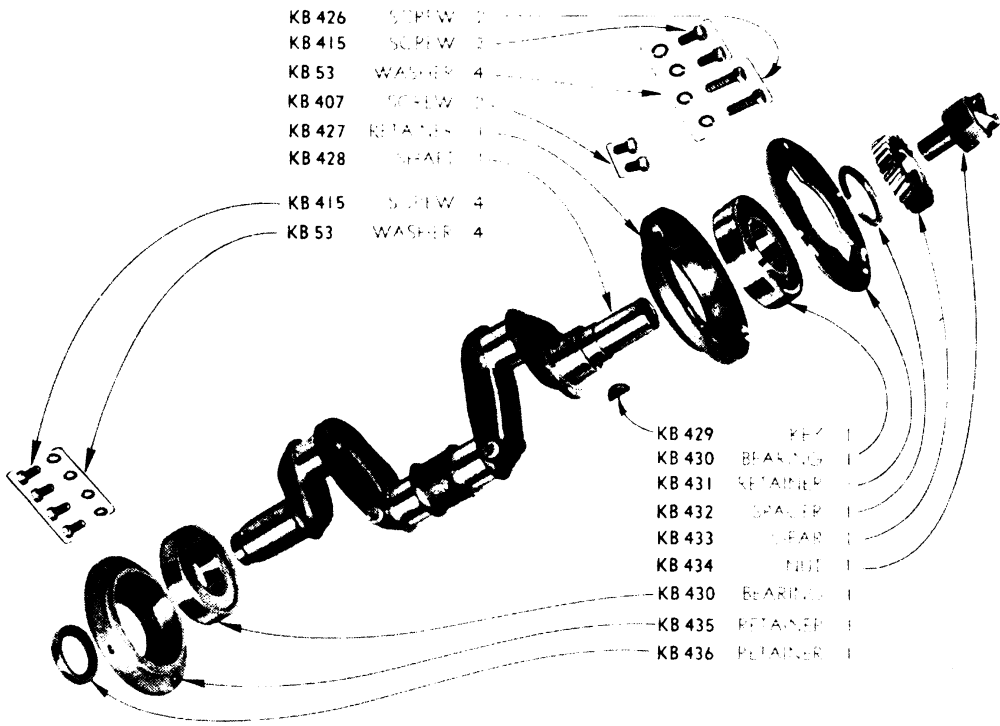


EXPLODED VIEW OF CAMSHAFT

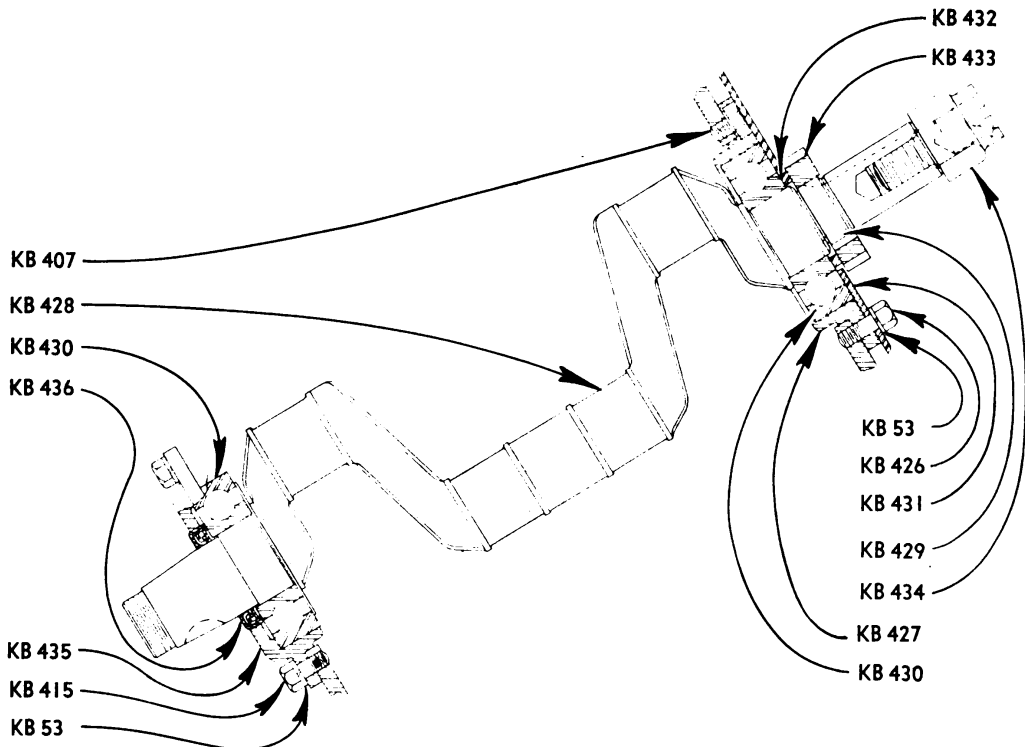


CROSS SECTION OF CAMSHAFT

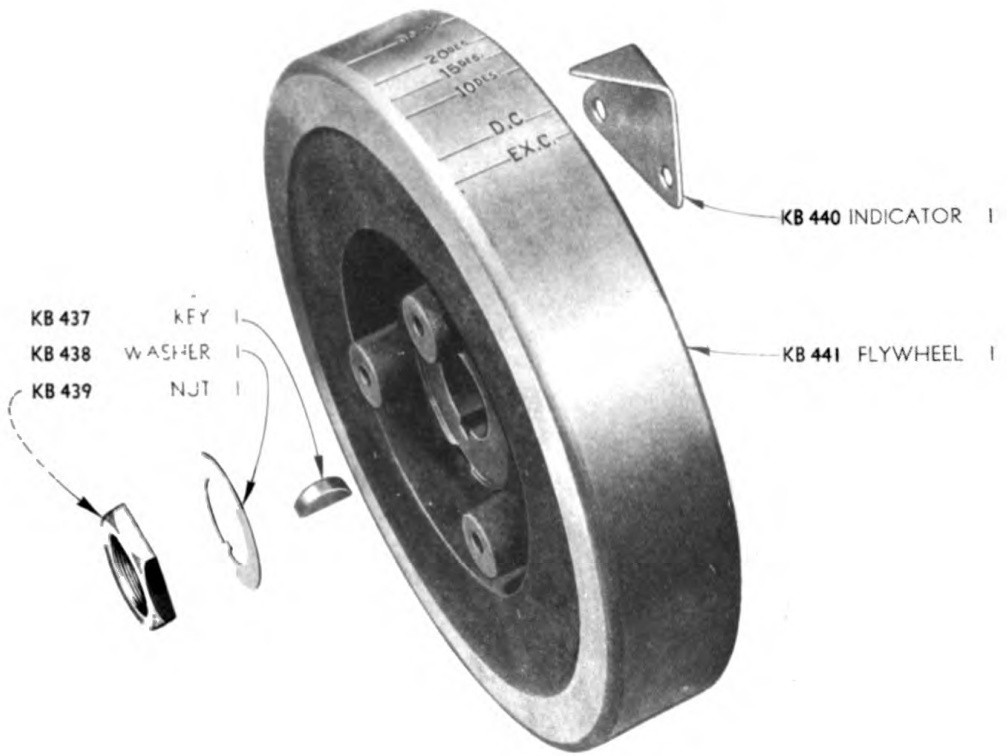
P 43



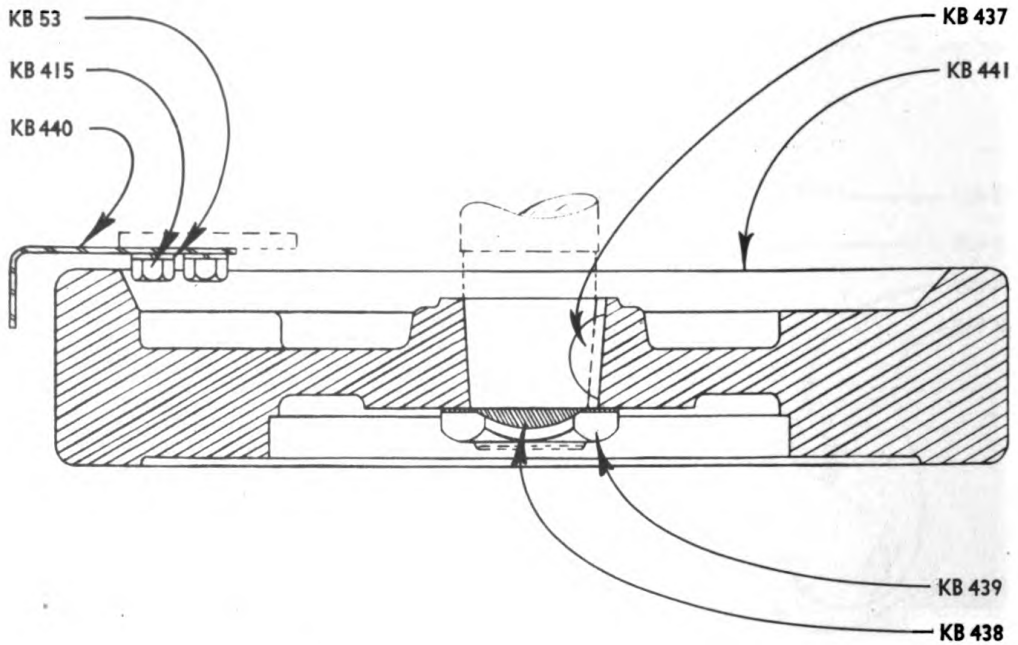
EXPLODED VIEW OF CRANKSHAFT



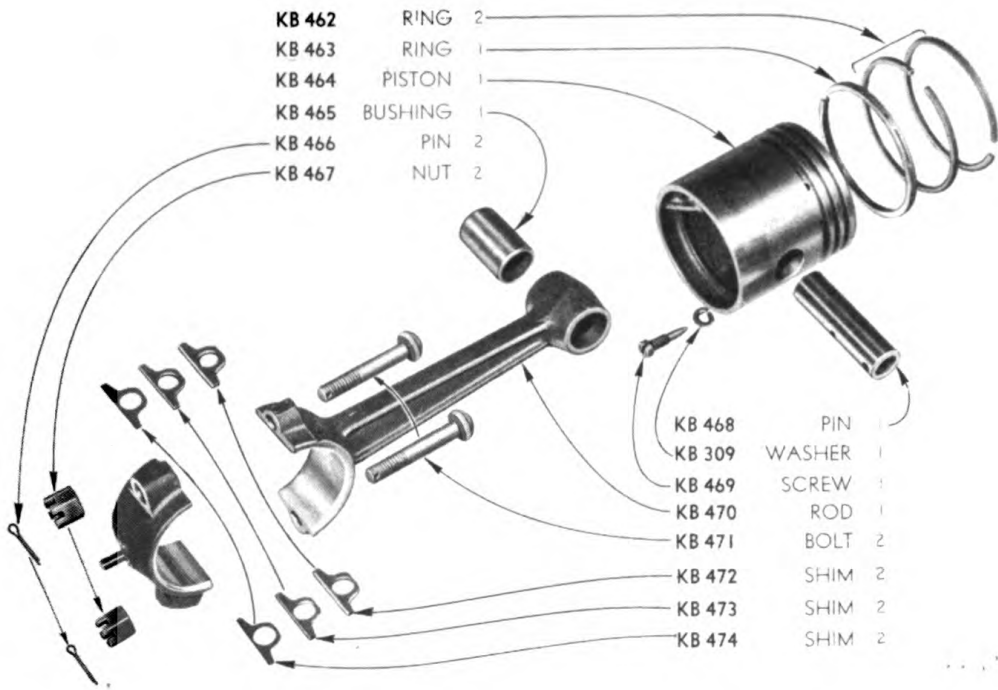
CROSS SECTION OF CRANKSHAFT



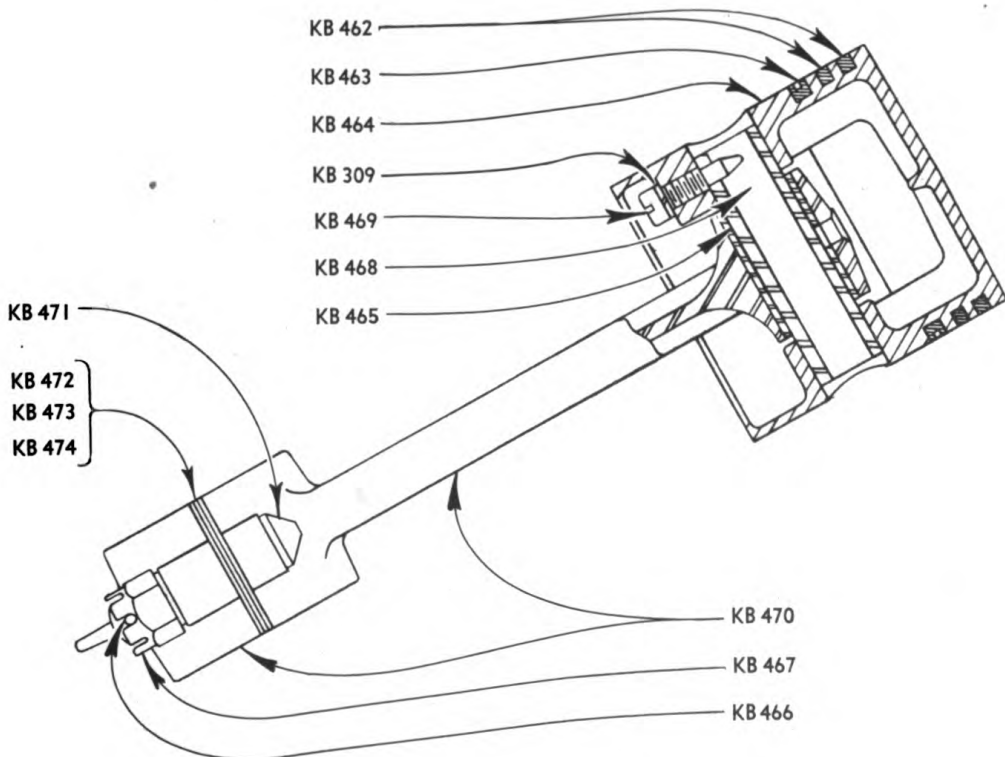
EXPLODED VIEW OF FLYWHEEL



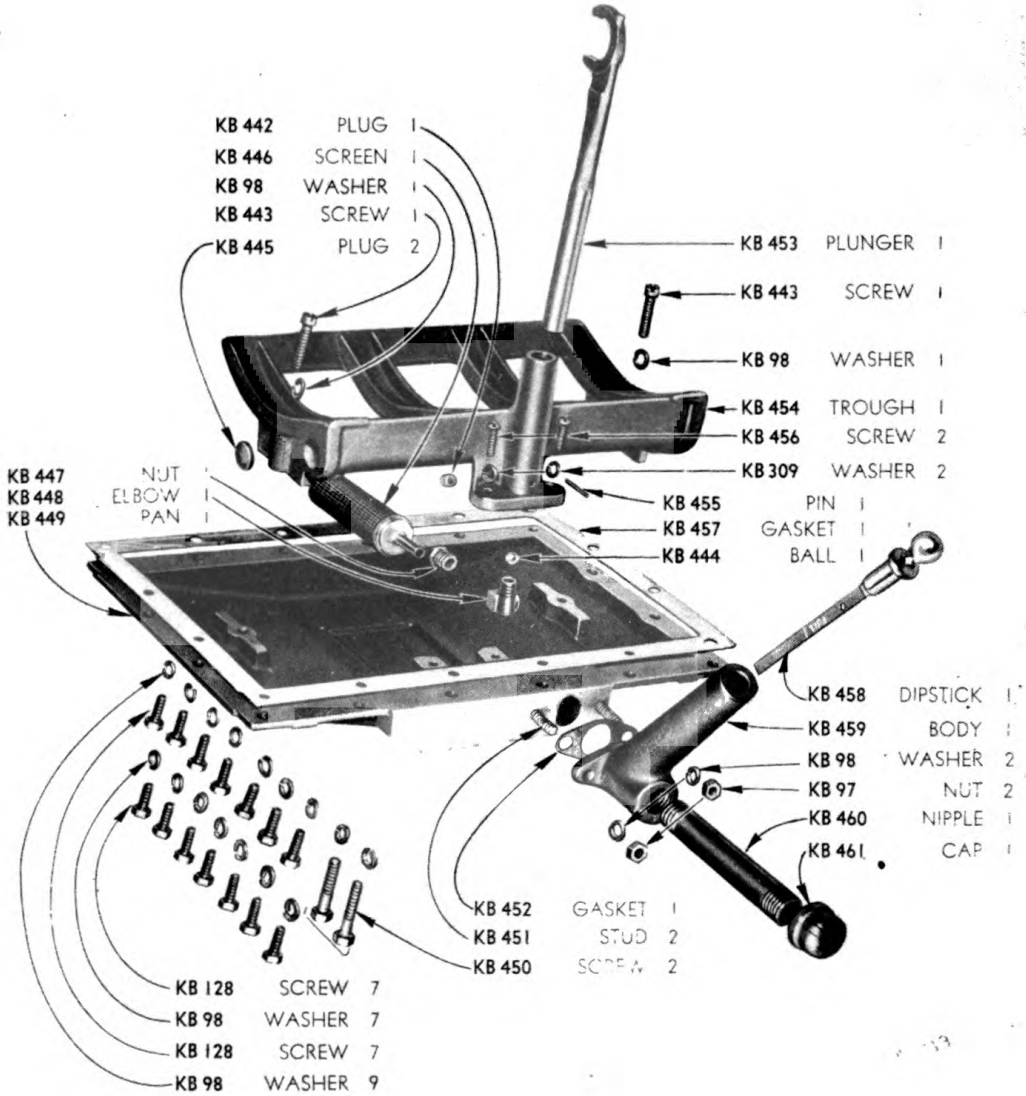
CROSS SECTION OF FLYWHEEL



EXPLODED VIEW OF PISTON AND CONNECTING ROD

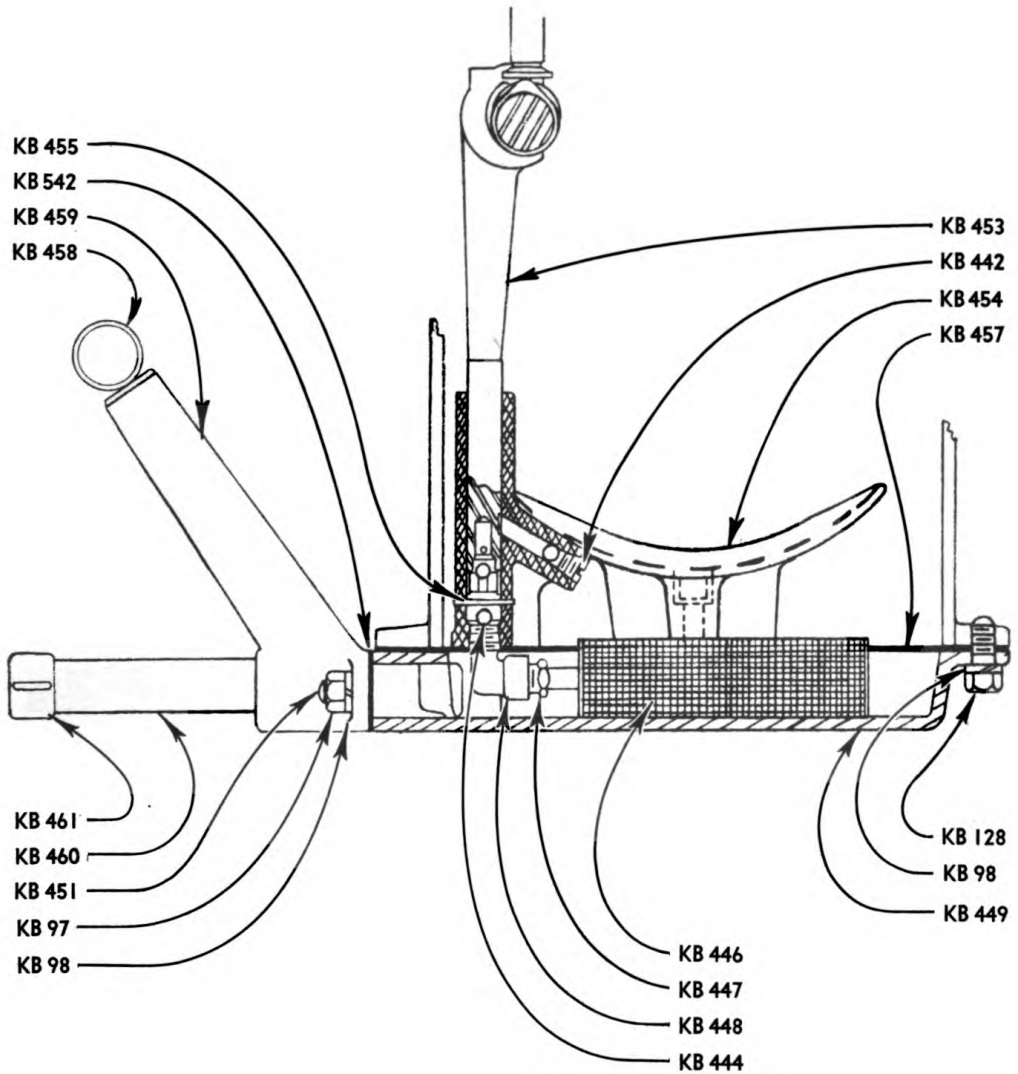


CROSS SECTION OF PISTON AND CONNECTING ROD

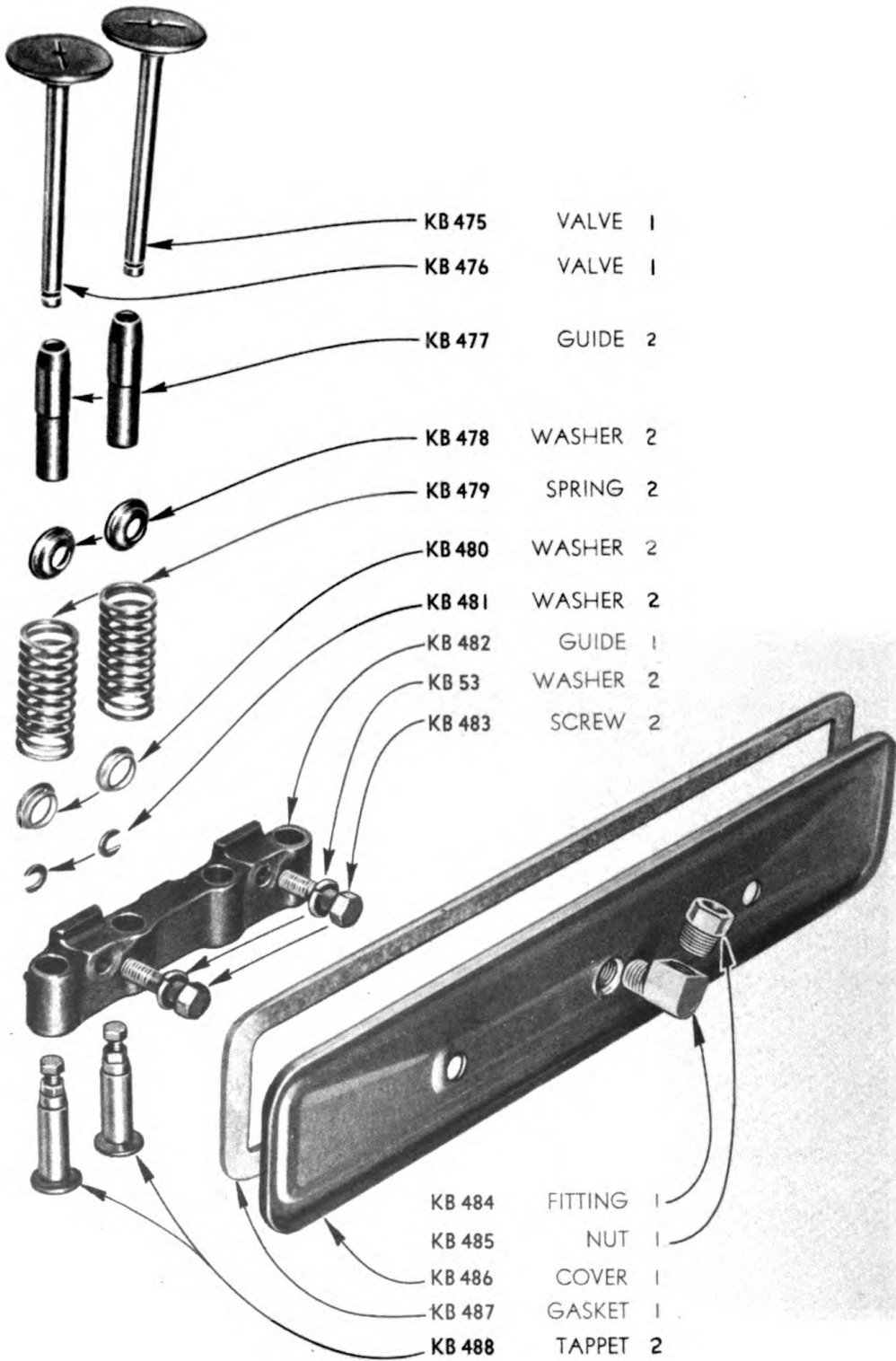


EXPLODED VIEW OF OIL PUMP, PAN, TROUGH AND SCREEN

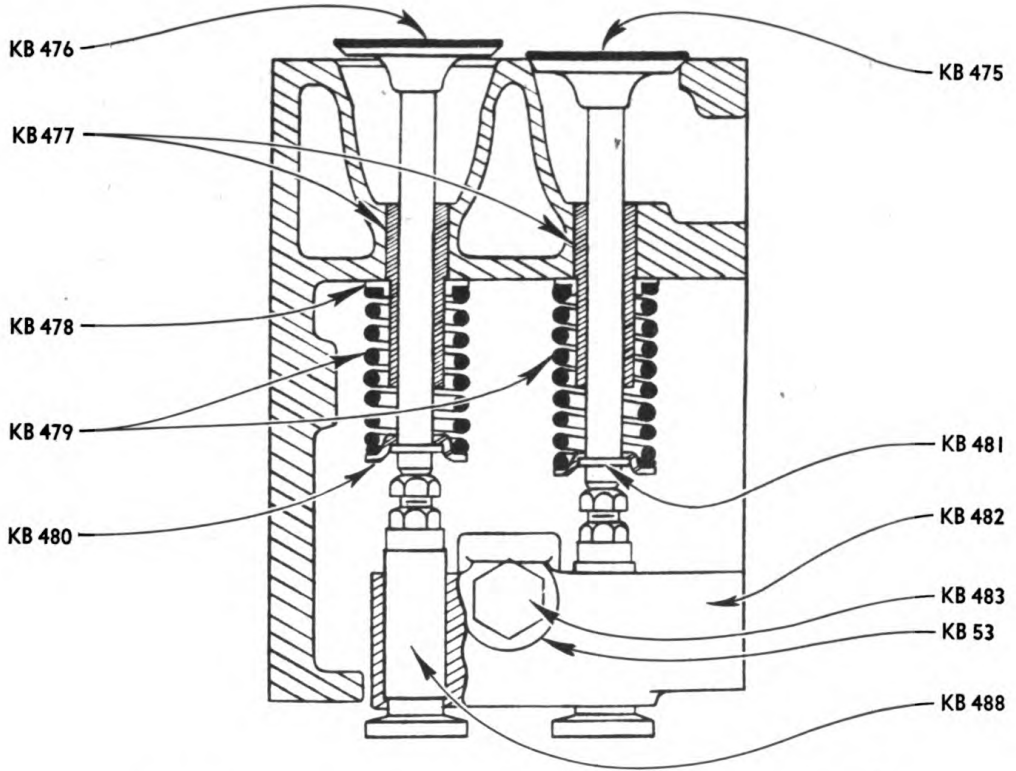




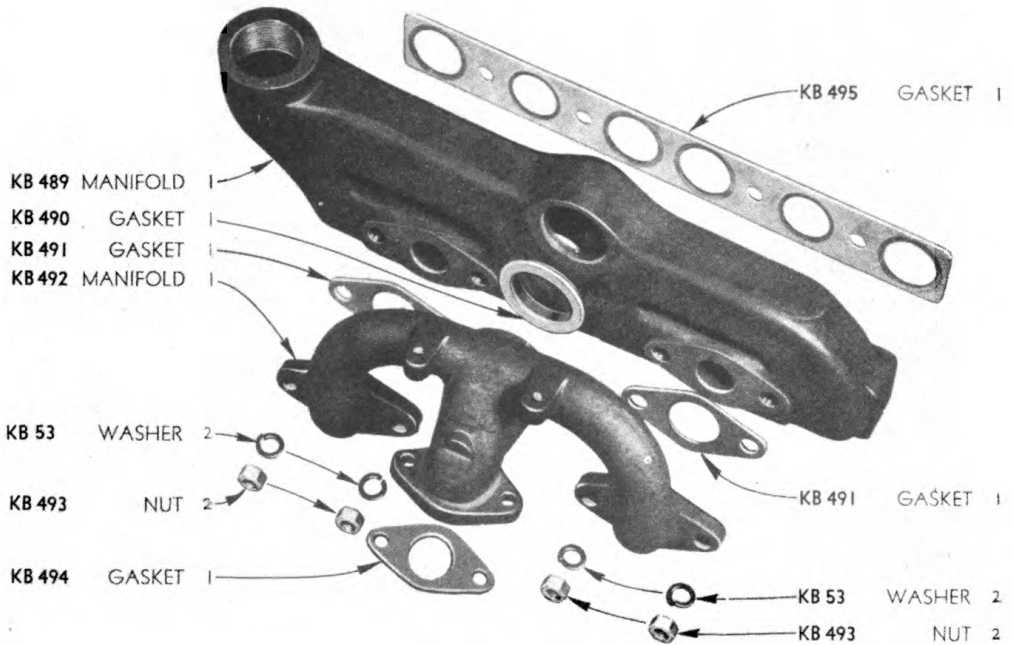
CROSS SECTION OF OIL PUMP, PAN, TROUGH AND SCREEN



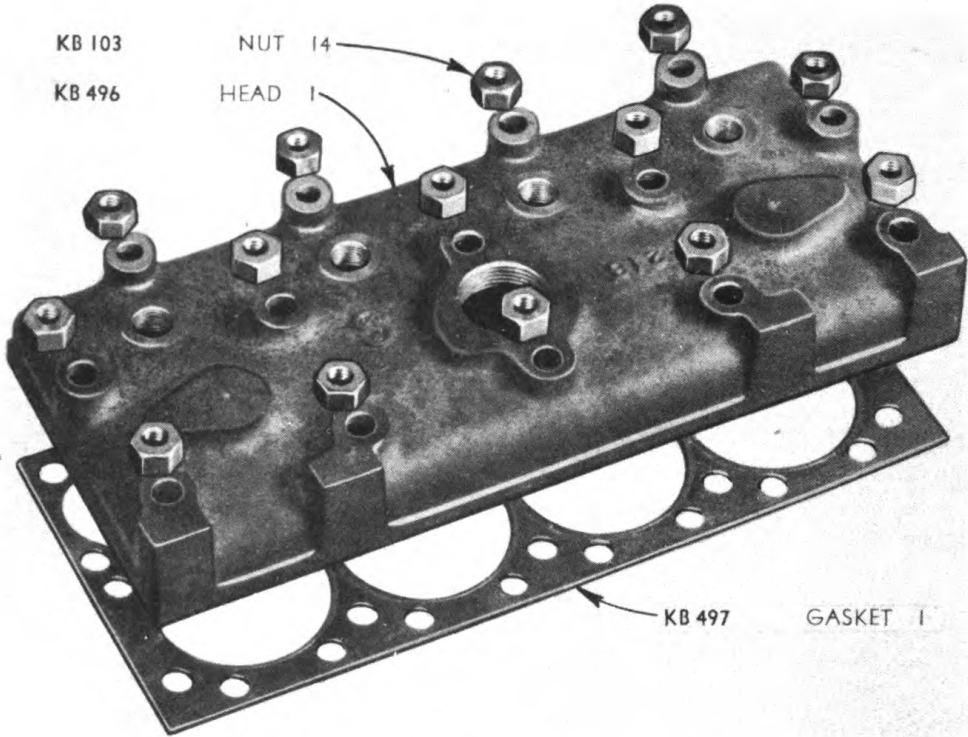
EXPLODED VIEW OF VALVE AND TAPPET ASSEMBLY



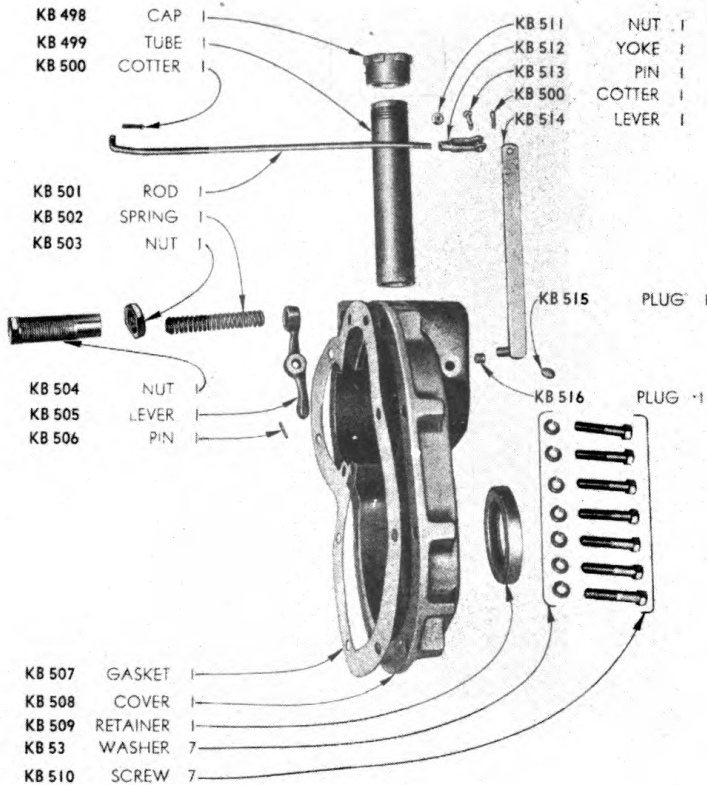
CROSS SECTION OF VALVE AND TAPPET ASSEMBLY



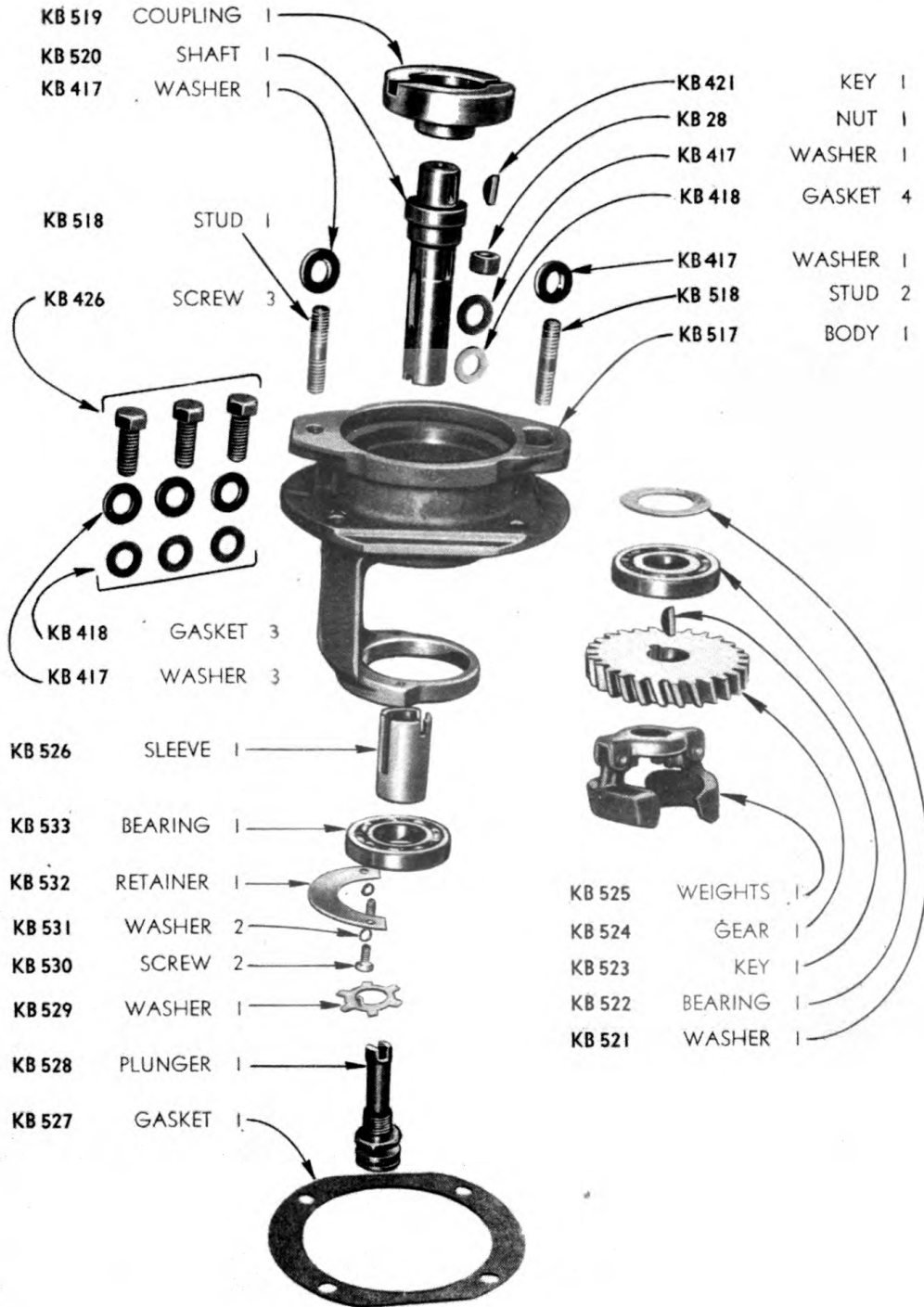
EXPLODED VIEW OF MANIFOLDS



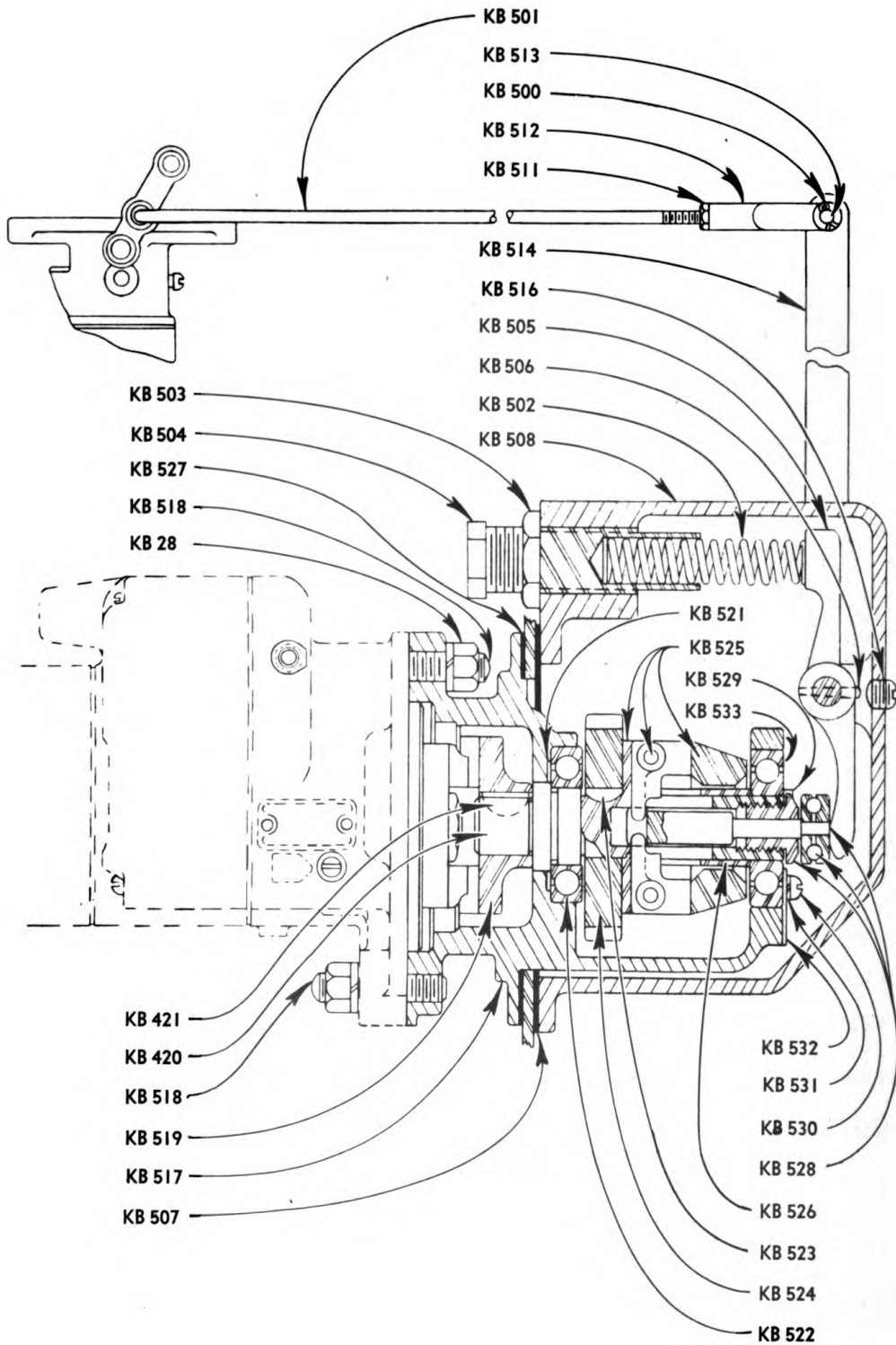
EXPLODED VIEW OF CYLINDER HEAD



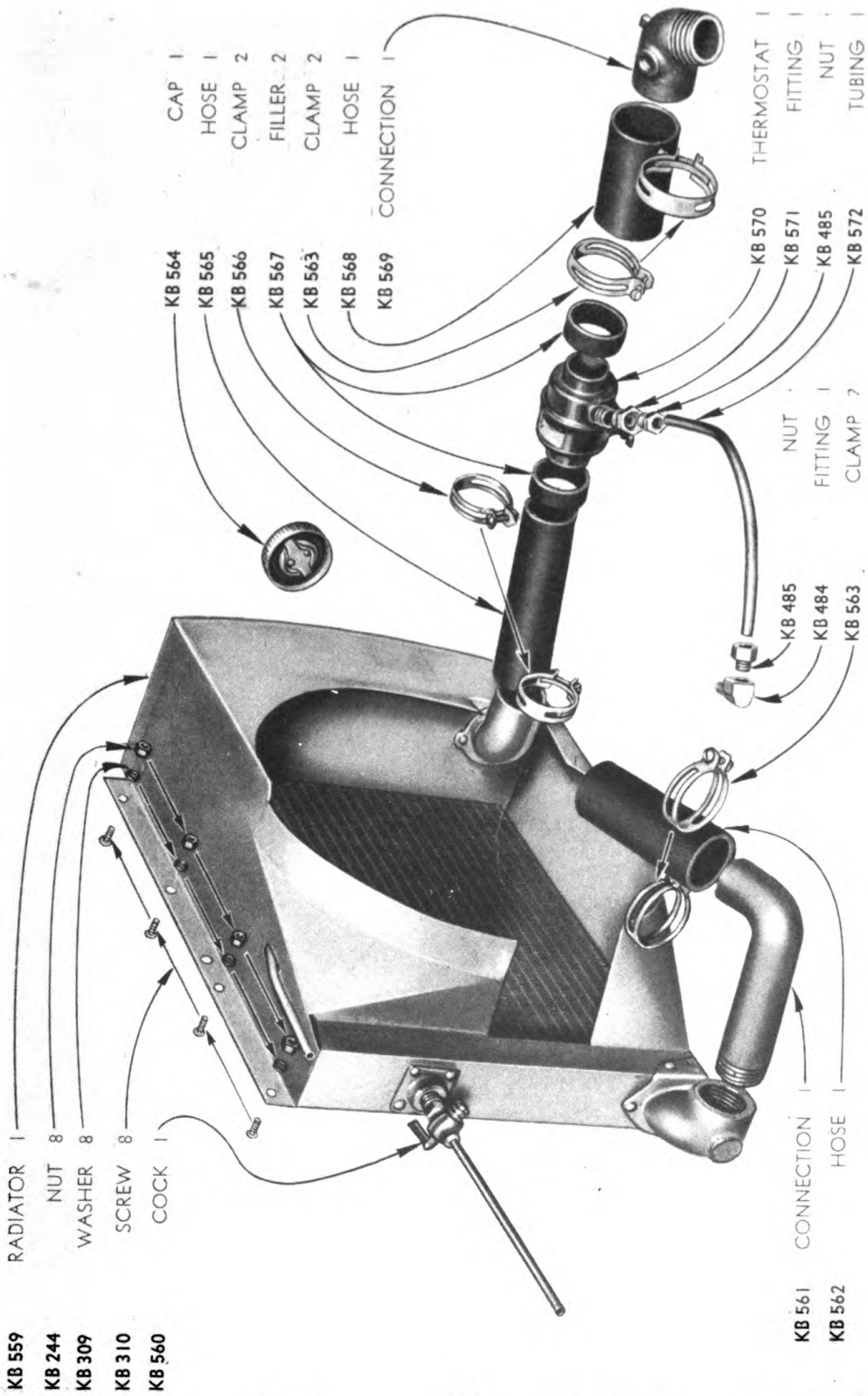
EXPLODED VIEW OF GEAR COVER



EXPLODED VIEW OF GOVERNOR (CROSS SECTION PAGE 38)

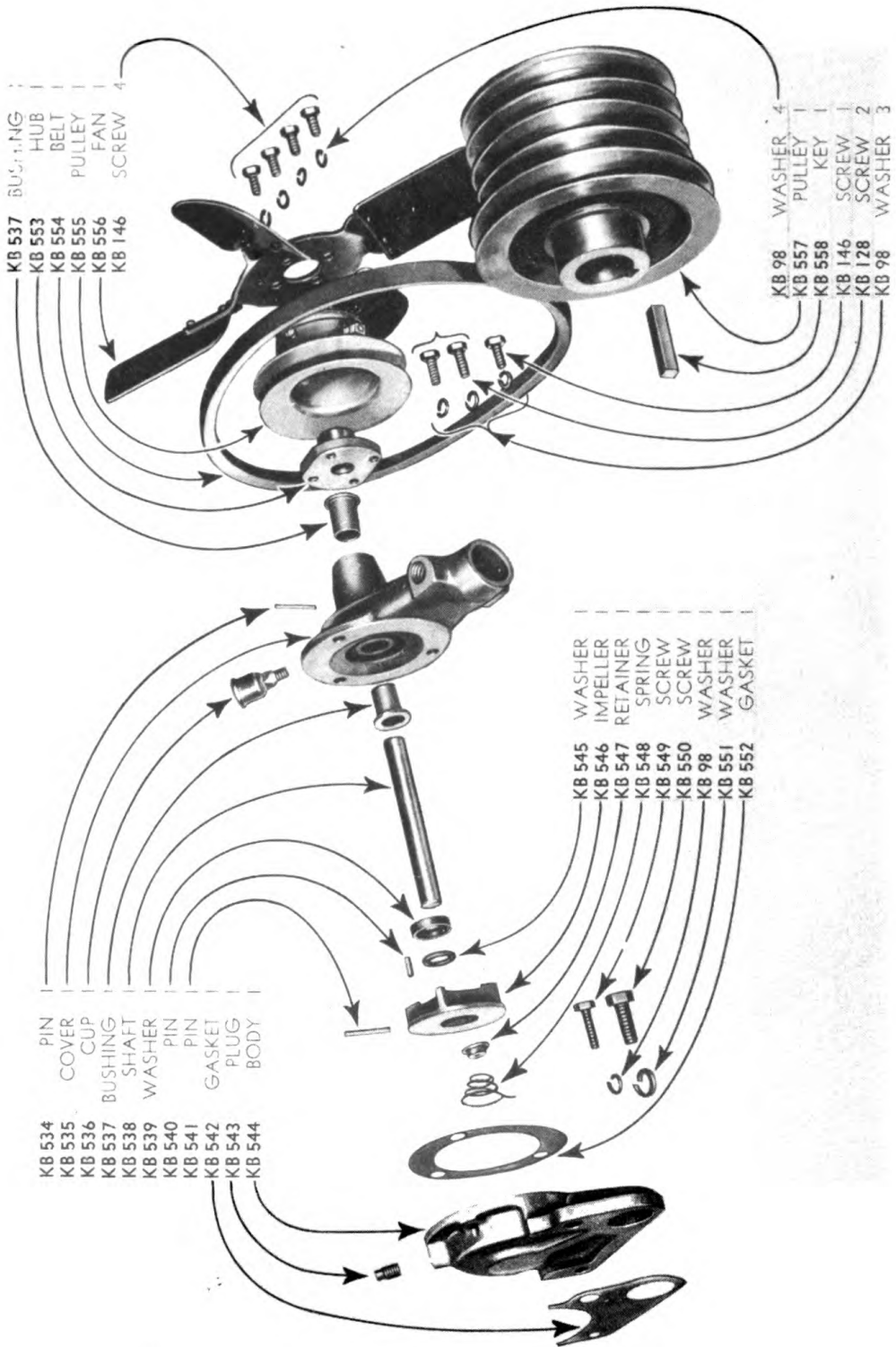


CROSS SECTION OF GOVERNOR



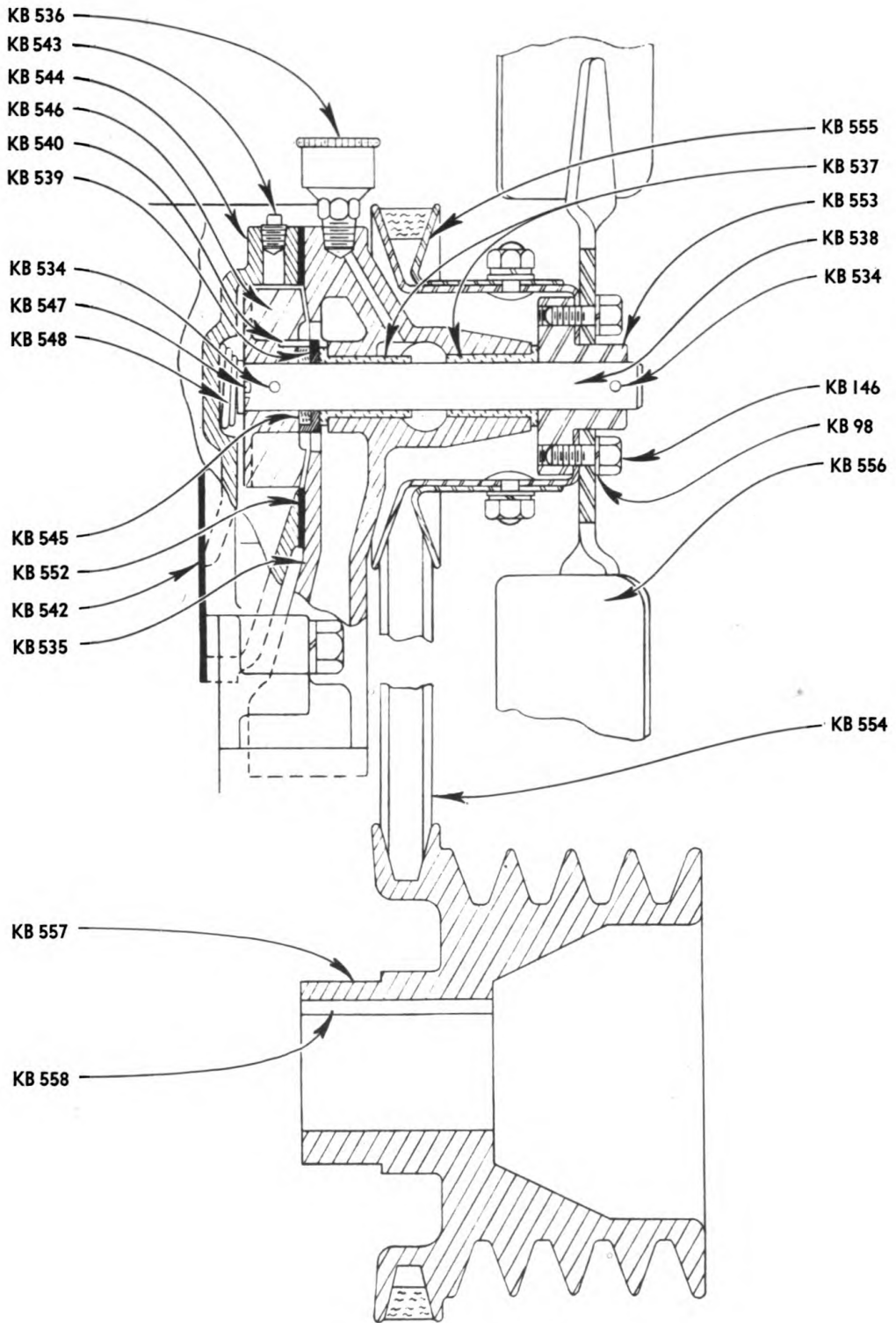
EXPLODED VIEW OF RADIATOR





EXPLODED VIEW OF FAN AND WATER PUMP

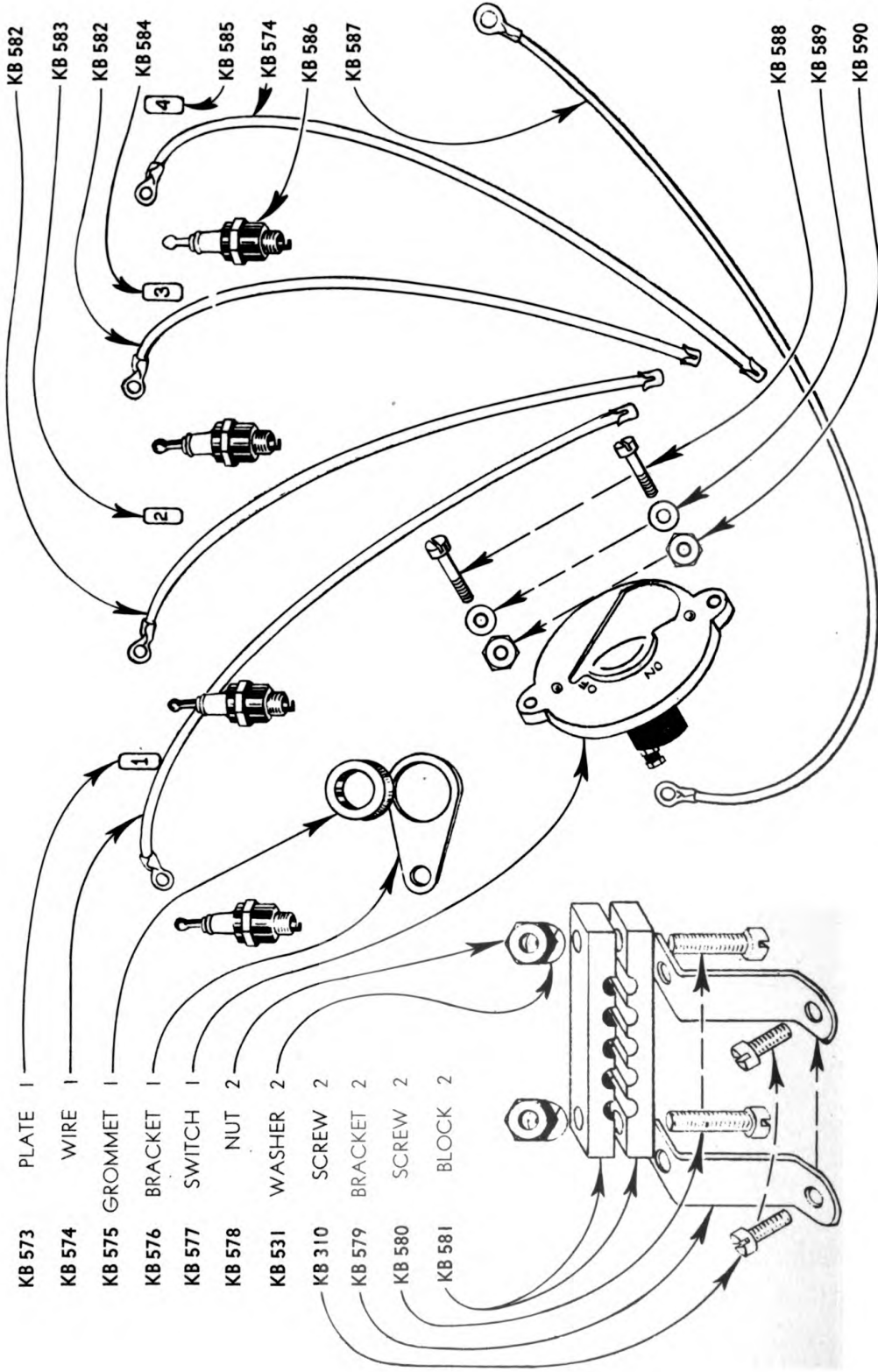




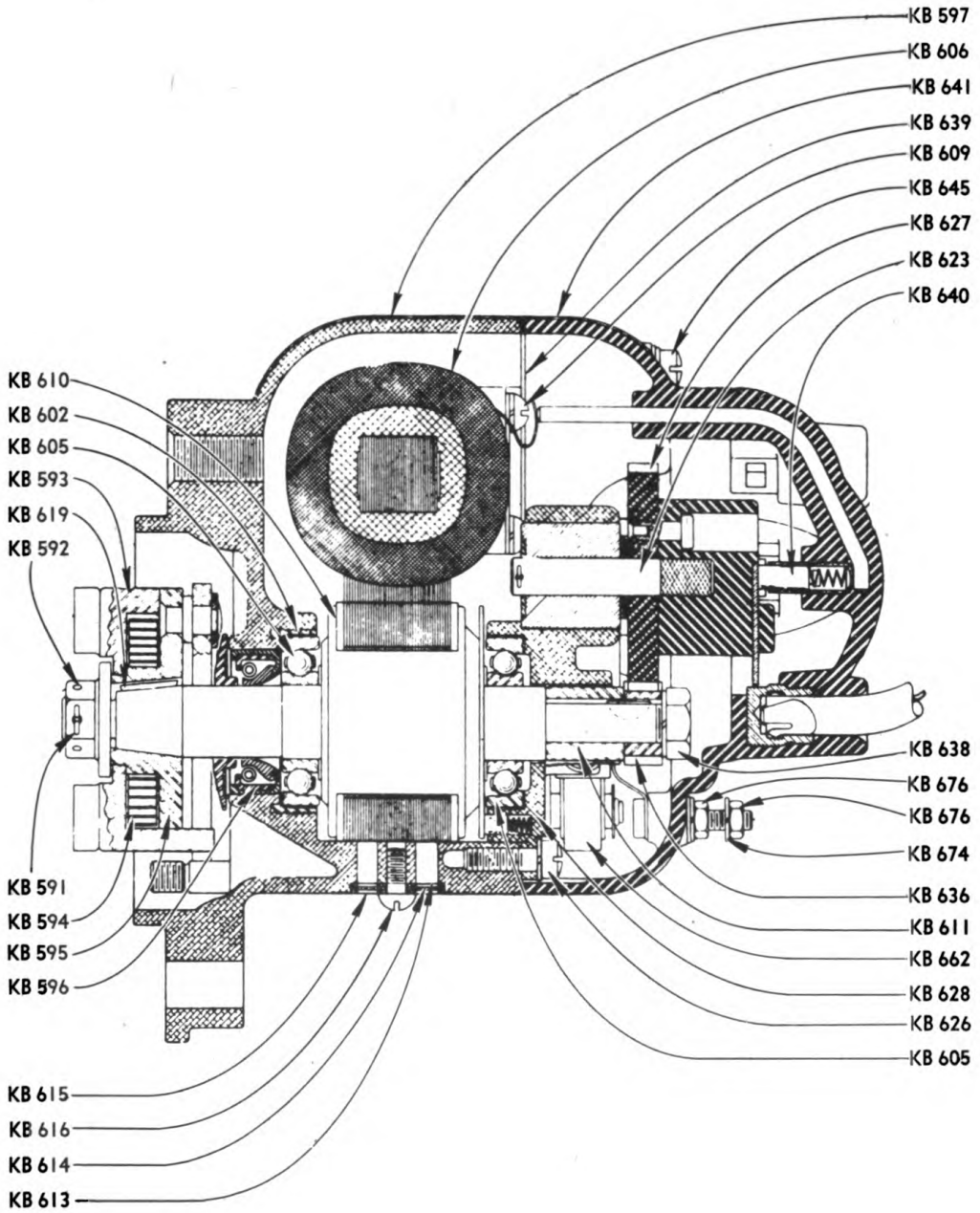
CROSS SECTION OF FAN AND WATER PUMP

- KB 573 PLATE 1
- KB 574 WIRE 1
- KB 575 GROMMET 1
- KB 576 BRACKET 1
- KB 577 SWITCH 1
- KB 578 NUT 2
- KB 531 WASHER 2
- KB 310 SCREW 2
- KB 579 BRACKET 2
- KB 580 SCREW 2
- KB 581 BLOCK 2

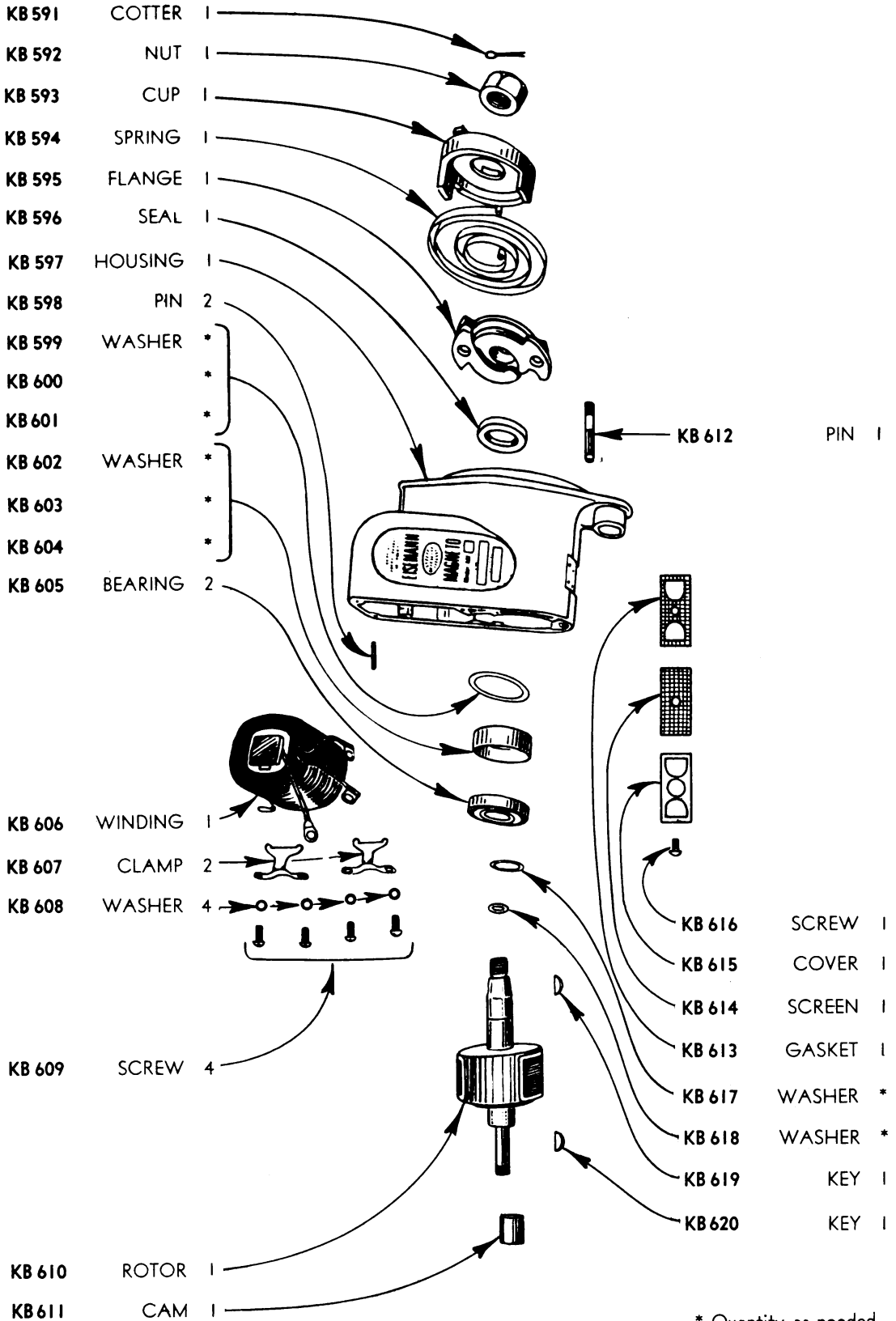
- KB 582 WIRE 1
- KB 583 PLATE 1
- KB 582 WIRE 1
- KB 584 PLATE 1
- KB 585 PLATE 1
- KB 574 WIRE 1
- KB 586 PLUG 4
- KB 587 WIRE 1
- KB 588 SCREW 2
- KB 589 WASHER 2
- KB 590 NUT 2



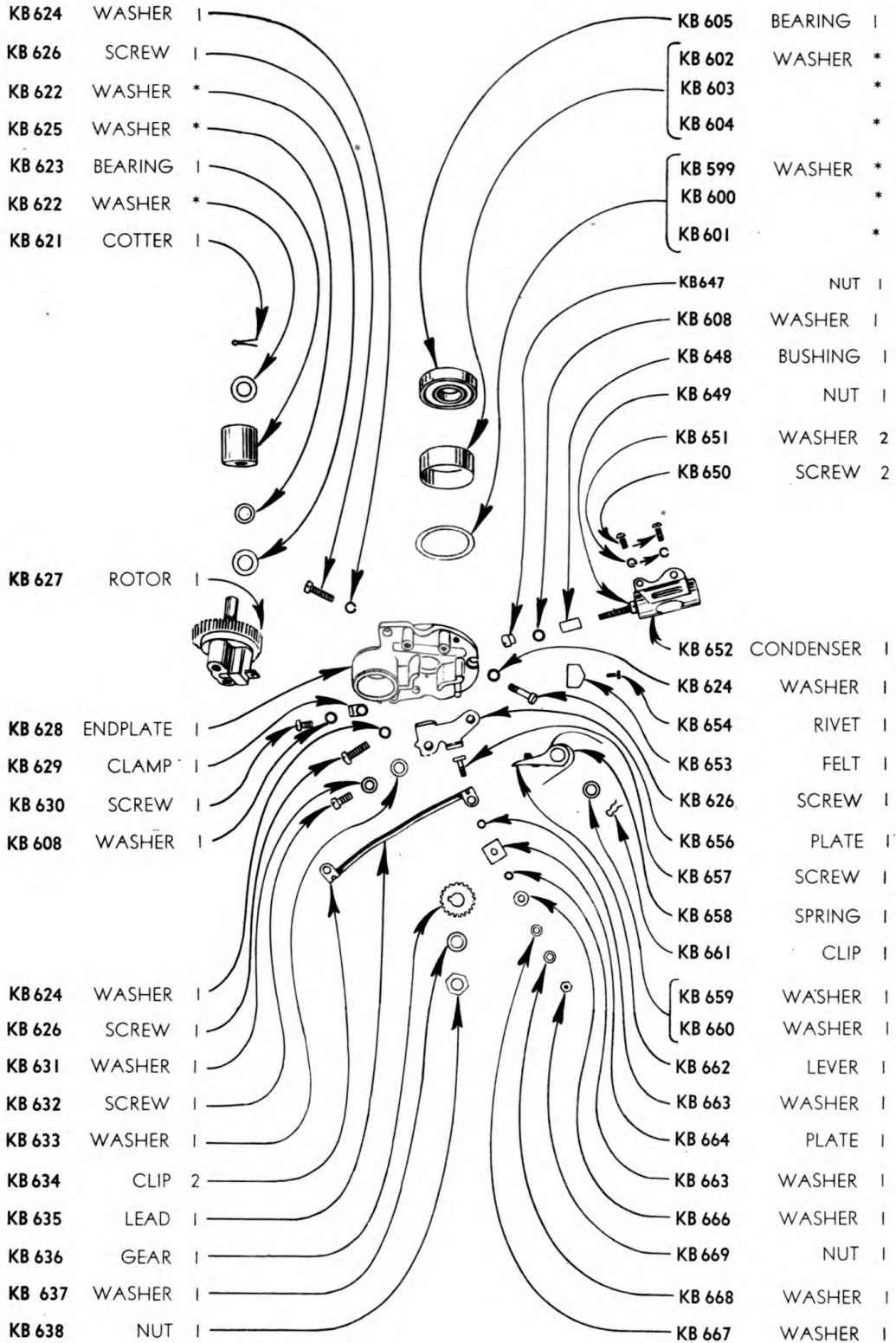
EXPLODED VIEW OF WIRING SYSTEM



CROSS SECTION OF MAGNETO

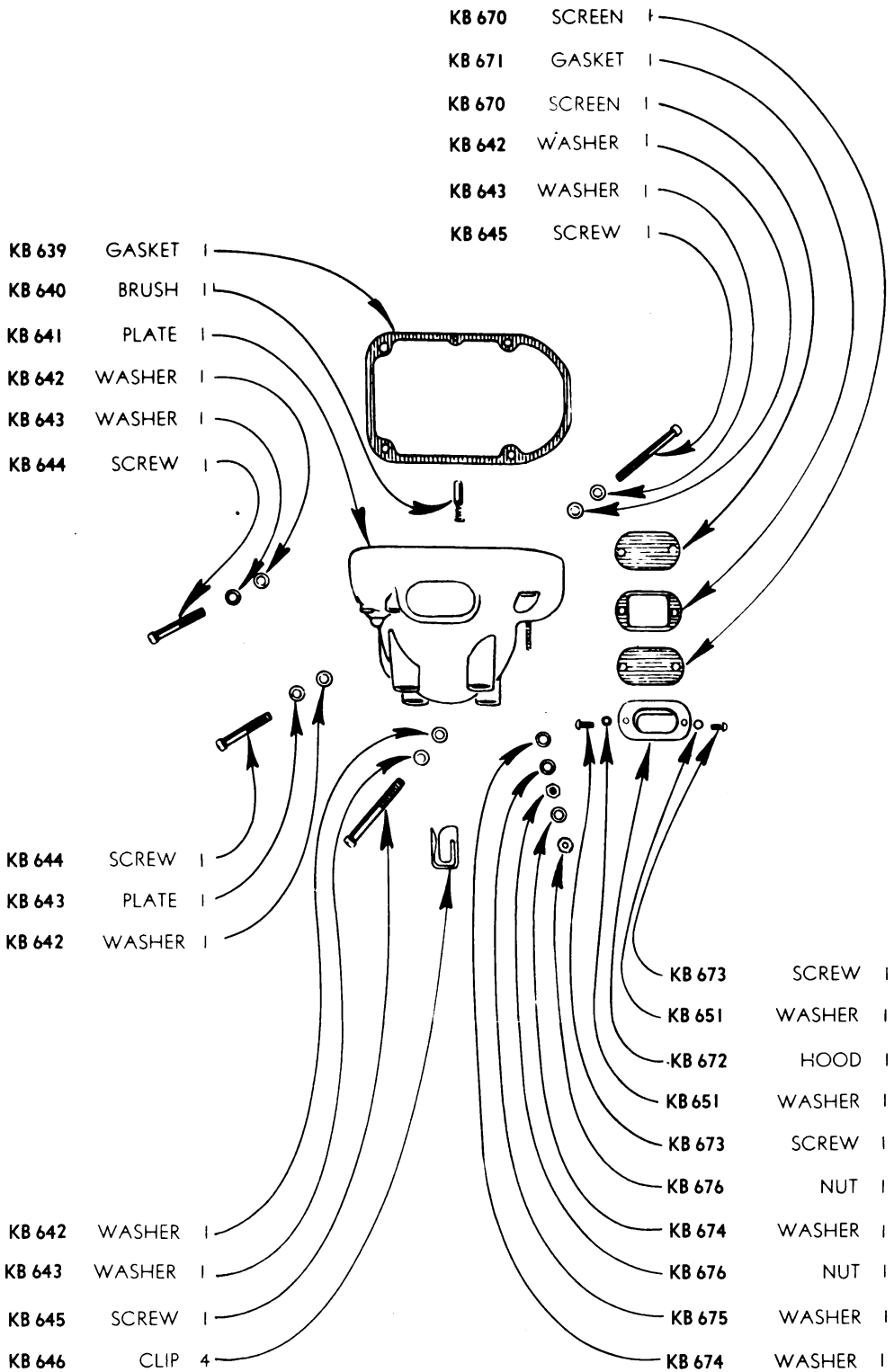


EXPLODED VIEW OF MAGNETO (CONTINUED PAGE 145)

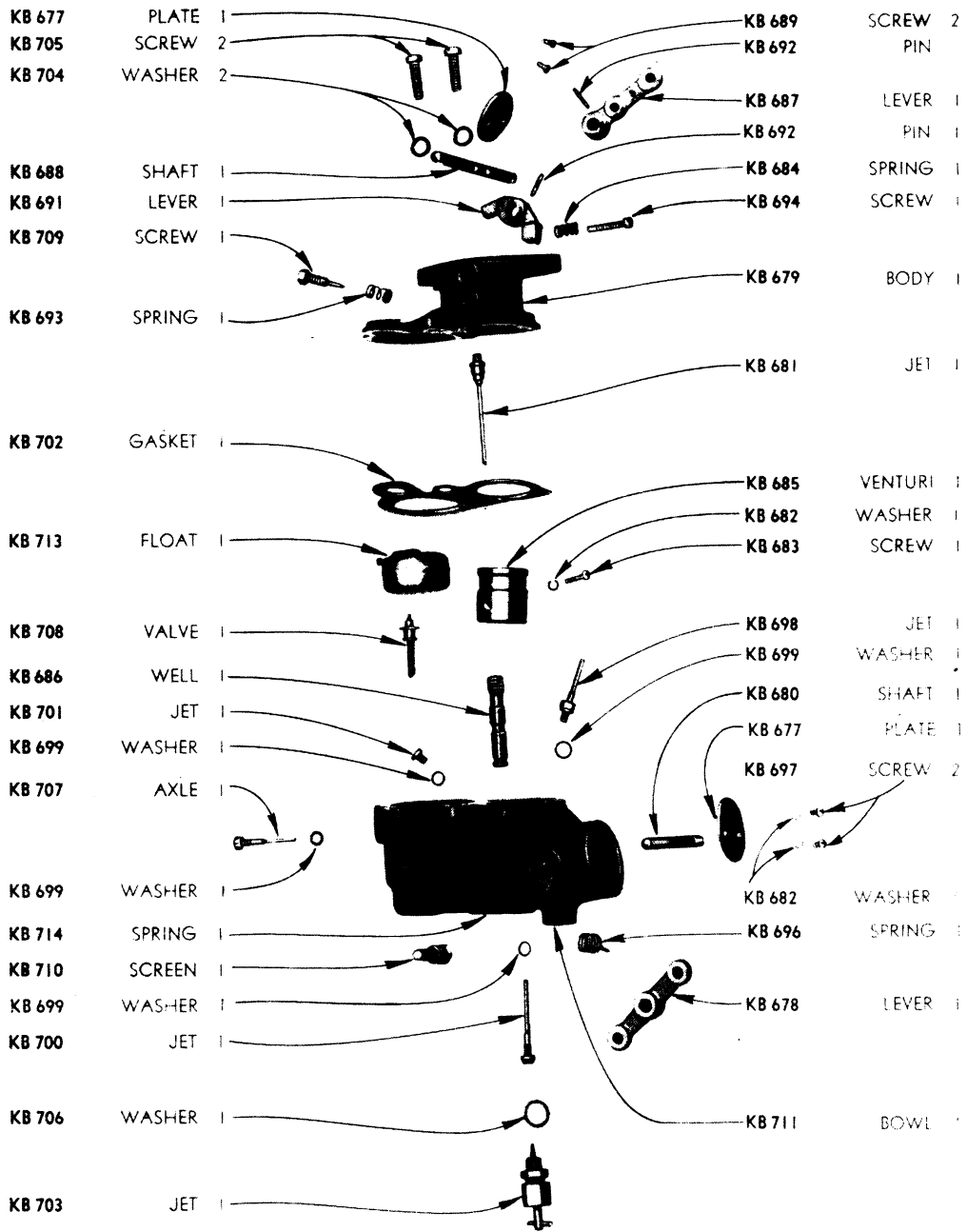


\* Quantity as needed.

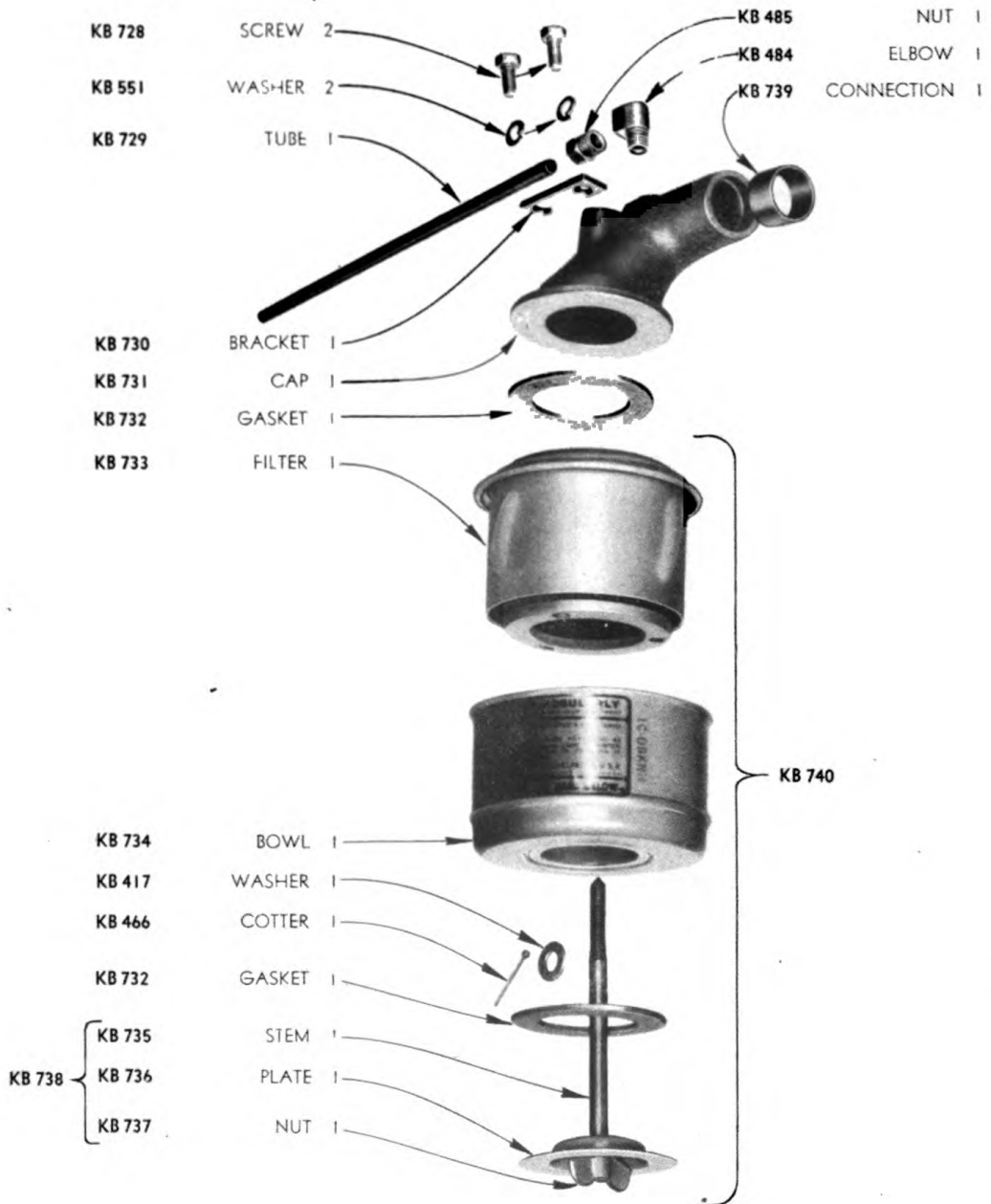
EXPLODED VIEW OF MAGNETO (CONTINUED PAGE 146)



EXPLODED VIEW OF MAGNETO

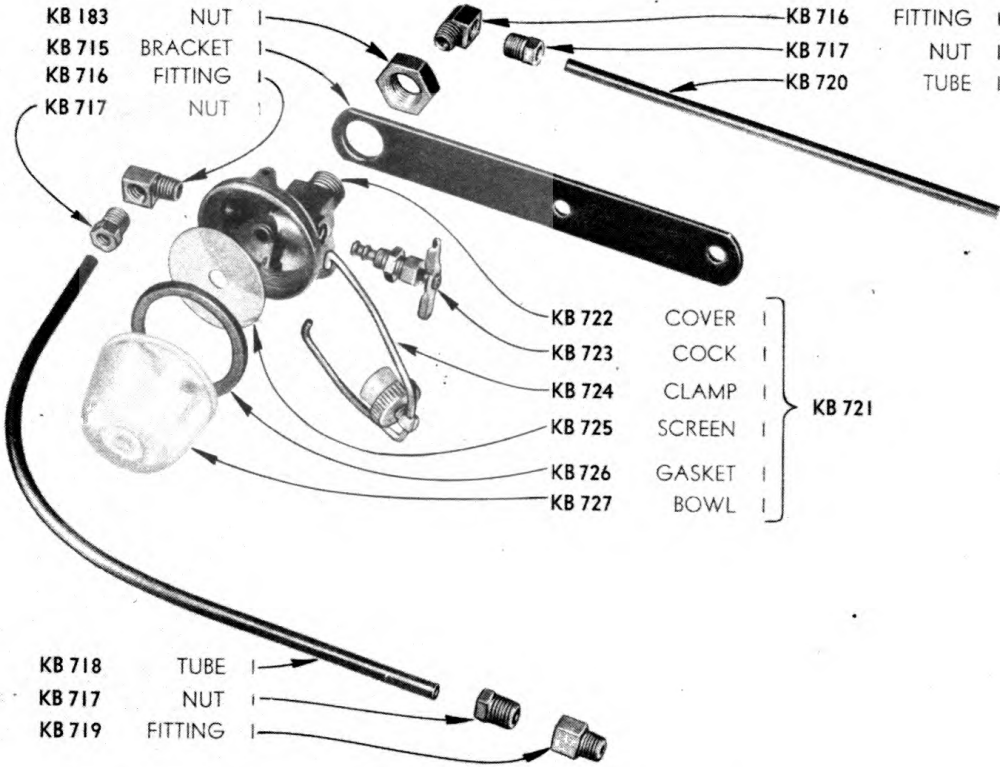


EXPLODED VIEW OF CARBURETOR



EXPLODED VIEW OF AIR CLEANER





EXPLODED VIEW OF FUEL FILTER

**LUBRICATION INSTRUCTIONS**

**GEAR CASE**  
 O. A. E. 50/50  
 Capacity: 2 quarts  
 Change oil every three months when the machine is in operation.

**GASOLINE ENGINE**  
 Refer to the engine instruction book.

Always grease wheels before and at intervals during loading of machine. Grease drum drive pinion and mixing drum gear frequently. Lubricate rollers with roller compound. Check drum mixing drum runways, and keep grease off clutch and track bands.

**LUBRICATE WITH PRESSURE GREASE**  
 TRACK ROLLERS  
 Drum drive shaft bearing  
 Drum roller bearings (front)  
 Charging slip clutch roller  
 Mixing drum clutch roller

**DRUM**  
 All other pressure grease gun connections.

**OIL TWICE DAILY**  
 Charging slip clutch roller  
 Mixing drum clutch roller

**OIL DAILY**  
 All other connections.

KOEHRING COMPANY - MILWAUKEE, WIS.

KB 324 PLATE 1

KB 325 PLATE 1

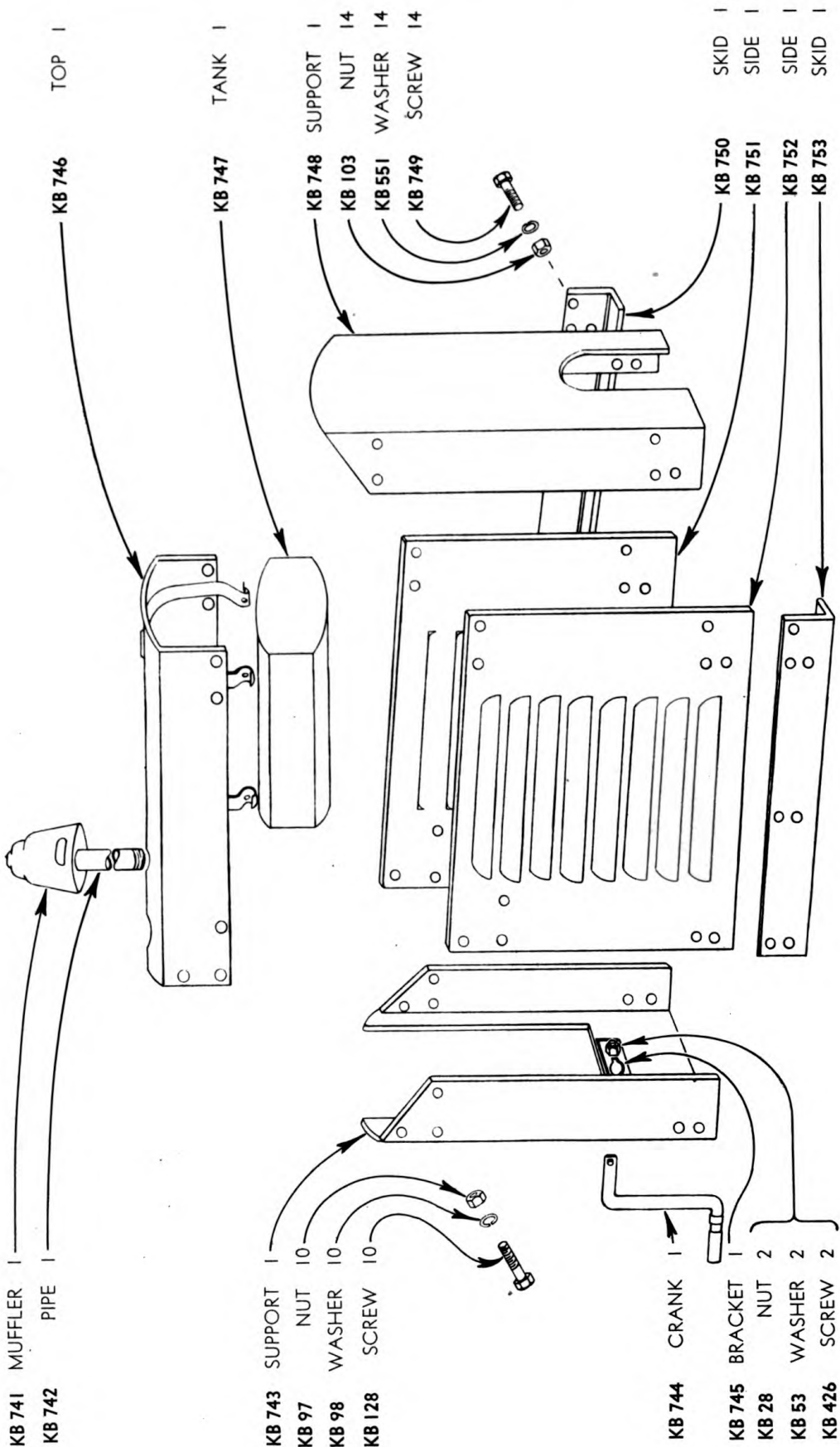


KB 323 SCREW 4      KB 322 PLATE 1      KB 323 SCREW 2



KB 323 SCREW 4

NAME PLATE



EXPLODED VIEW OF HOUSE AND GASOLINE TANK

## Symbol Identification

AM - Air Maze (Air cleaner)  
 E - Eiseman (Magneto)  
 LR - LeRoi (Motor)  
 ND - New Departure (Bearing)  
 SKF- SKF (Bearing)  
 T - Tillotson (Gas strainer)  
 Z - Zenith (Carburetor)

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 1	Support, Spring Oper. End	1	25 lbs.	\$6.40	109
KB 2	Cover, Spring	2	17 lbs.	2.50	109
KB 3	Leaf, Spring	4	1 $\frac{1}{4}$ lbs.	.40	109
KB 4	Leaf, Spring	4	2 $\frac{1}{4}$ lbs.	.50	109
KB 5	Leaf, Spring	4	2 $\frac{1}{4}$ lbs.	.60	109
KB 6	Leaf, Spring	4	3 $\frac{1}{4}$ lbs.	.80	109
KB 7	Leaf, Spring	4	3 $\frac{1}{4}$ lbs.	.85	109
KB 8	Leaf, Spring	4	4 lbs.	.90	109
KB 9	Leaf, Spring	4	4 $\frac{1}{2}$ lbs.	1.00	109
KB 10	Bar, Tie	2	2 $\frac{1}{2}$ lbs.	.55	109
KB 11	Axle, Rear	1	29 lbs.	15.50	109
KB 12	Bolt, Mach. 5/8 x 1 $\frac{3}{4}$ " NC	10	5 pcs.1#	.07	
KB 13	Washer, Bevel 5/8"	15	13 pcs.1#	.06	
KB 14	Washer, Lock 5/8"	71	36 pcs.1#	.01	
KB 15	Nut, Hex 5/8" NC	74	8 pcs.1#	.022	
KB 16	Support, Spring engine end	1	24 lbs.	6.05	109
KB 17	Bolt, Mach. 5/8 x 3 $\frac{1}{4}$ " NC	10	3 pcs.1#	.09	109
KB 18	Wheel, Steel	4	39 lbs.	13.00	109
KB 19	Bearing, Roller	4	1 $\frac{3}{4}$ lbs.	1.85	109
KB 20	Washer, Bearing Seal	4	4 pcs.1#	.30	109
KB 21	Pin, Button Head	4	11 pcs.1#	.08	109
KB 22	Cotter 1/8 x 3/4"	4	**	.10*	109
KB 23	Cap, Axle	4	1 $\frac{1}{2}$ lbs.	.40	109
KB 24	Bolt, Mach. 5/8 x 1 $\frac{1}{4}$ " NC	1	7 pcs.1#	.07	109
KB 25	Spindle, Rear Axle	2	7 $\frac{3}{4}$ lbs.	2.70	109
KB 26	Fitting, Alemite 1/8" #1720	16	50 pcs.1#	.06	
KB 27	Bolt, Hex Hd. Mach. 3/8x3 $\frac{1}{2}$ " NC	2	8 pcs.1#	.04	109
KB 28	Nut, Hex 3/8" NC	22	28 pcs.1#	.80*	
KB 29	Clip, Spring	2	2 pcs.1#	.12	109
KB 30	Spacer, Clip	2	16 pcs.1#	.03	109
KB 31	Special Bolt	4	4 pcs.1#	.30	109
KB 32	Bolt, Mach. 5/8 x 2" NC	6	4 pcs.1#	.07	109
KB 33	Nut, Jam 7/8" NF	2	12 pcs.1#	.07	109
KB 34	Bolt, Eye	2	5 pcs.1#	2.30	109
KB 35	Pin, Draw Bar	1	1 $\frac{1}{4}$ lb.	.60	109
KB 36	Washer, Wrought 3/4"	3	8 pcs.1#	.01	109
KB 37	Cotter 3/16 x 1 $\frac{1}{4}$ "	8	80 pcs.1#	.10*	
KB 38	Nut, Castle 5/8 NF	3	14 pcs.1#	.03	109

\* Price Per 100 Pieces

+As Required

\*\*Over 200 Pcs. per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 39	Cotter 1/8" x 1 1/4"	5	180 pcs.1#	\$.10*	
KB 40	Bolt, Hex Hd. Cap 5/8 x 2 3/4 NF	1	2 pcs.1#	.16	109
KB 41	Axle, Front	1	30 lbs.	20.00	109
KB 42	Bolt, Hex Hd. 5/8 x 2" NF	2	2 pcs.1#	.50	109
KB 43	Washer, Special	2	100 pcs.1#	.19	109
KB 44	Spindle, Front Axle	2	10 3/4 lbs.	9.50	109
KB 45	Pin, King	2	1 lb.	1.80	109
KB 46	Cotter 3/16 x 1 1/2"	3	66 pcs.1#	.20*	
KB 47	Nut, Hex 3/4" NC	2	5 pcs.1#	.034	109
KB 48	Bar, Draw	1	53 lbs.	13.50	109
KB 49	Link, Steering	2	3/4 lb.	2.00	109
KB 50	Yoke, Draw Bar	1	8 1/2 lb.	6.75	109
KB 51	Pin, Draw Bar Yoke	1	1 1/4 lb.	1.10	109
KB 52	Bolt, Mach. 3/8 x 1 1/4" NC	2	7 pcs.1#	.07	114
KB 53	Washer, Lock 3/8"	58	143 pcs.1#	.50*	
KB 54	Bolt, Carriage 3/8 x 1 1/4"	3	18 pcs.1#	.03	
KB 55	Plate, Name	1	6 1/2 lbs.	1.50	114
KB 56	Support, Tank	1	7 lb.	1.80	114
KB 57	Angle	1	18 lb.	3.80	114
KB 58	Bolt, Mach. 5/8 x 1 1/2" NC	24	7 pcs.1#	.07	
KB 59	Upright, Angle - Eng. Side	1	60 lbs.	18.00	114
KB 60	Nut, Hex. 1/2" NC	83	14 pcs.1#	.014	
KB 61	Washer, Lock 1/2"	76	80 pcs.1#	.60*	
KB 62	Bolt, Mach. 1/2 x 1 1/4" NC	41	10 pcs.1#	.04	
KB 63	Angle, Tank Support	1	6 lbs.	.90	114
KB 64	Brace, Upper Frame	1	2 3/4 lbs.	.85	114
KB 65	Upright, Angle - Oper. Side	1	59 lbs.	18.00	114
KB 66	Support, Water Valve	1	13 lbs.	4.15	114
KB 67	Brace, Upper Frame	1	2 1/2 lbs.	.85	114
KB 68	Frame, Main	1	161 lbs.	30.00	114
KB 69	Cage, Bearing (Disch. Side)	2	2 3/4 lbs.	2.80	110
KB 70	Screw, Cap Hex. Hd. 1/4x3/4NF	10	66 pcs.1#	.01	110
KB 71	Plate, Lock	4	16 pcs.1#	.24	110
KB 72	Plate, End	4	16 pcs.1#	.24	110
KB 73	Bearing, Ball SKF 1205	4	4 pcs.1#	2.15	110
KB 74	Gasket, Bearing Retainer	4	**	.06	110
KB 75	Retainer, Bearing	4	3/4 lb.	1.90	110
KB 76	Seal, Felt	4	100 pcs.1#	.18	110
KB 77	Roller, Drum	4	22 lbs.	6.60	110
KB 78	Shaft, Drum Roller	2	23 1/2 lbs.	13.00	110
KB 79	Fitting, Alemite #1723	6	33 pcs.1#	.03	
KB 80	Bolt, Carr. 3/8 x 2 3/4" NC	4	10 pcs.1#	.04	110
KB 81	Bolt, Mach. 5/8 x 2 1/4" NC	10	4 pcs.1#	.07	
KB 82	Cage, Bearing (Charg. Side)	2	3 1/4 lbs.	3.40	110
KB 83	Bolt, Carr. 3/8 x 3 1/4" NC	4	8 pcs.1#	.04	110
KB 84	Pin, Drum Roller	5	4 pcs.1#	.14	
KB 85	Yoke, Spool	1	1 1/4 lbs.	1.65	112
KB 85A	Yoke, Spool	1	1 1/4 lbs.	1.65	112
KB 86	Fitting, Alemite 1/4" NF 1652	2	33 pcs.1#	.04	112
KB 87	Sleeve, Clutch	2	3 lbs.	3.90	112
KB 88	Pin, Pivot	2	8 pcs.1#	.24	112
KB 89	Lever, Clutch	2	1 lb.	3.30	112
KB 90	Bolt, Eye for Clutch Band	2	4 pcs.1#	.90	112
KB 91	Screw, Set 1/2 x 1 1/2" Sq. Hd.	2	10 pcs.1#	.14	112
KB 92	Nut, Half Hex. 1/2" NC	3	25 pcs.1#	.016	112
KB 93	Key, 3/8 x 3/8 x 2 1/4"	2	5 pcs.1#	.15	112

\* Price Per 100 Pcs. + As Required

\*\*Over 200 Pcs. per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 94	Spring, Clutch Lever	2	16 pcs.1#	\$ .40	112
KB 95	Cotter 3/16 x 1"	4	100 pcs.1#	.10*	
KB 96	Roller, Clutch Lever	2	5 pcs.1#	1.80	112
KB 97	Nut, Hex. 5/16" NC	26	50 pcs.1#	.70*	
KB 98	Washer, Lock 5/16"	57	**	.30*	
KB 99	Bolt, Mach. 5/16 x 2 $\frac{1}{4}$ " NC	4	18 pcs.1#	.025	112
KB 100	Nut, Hex. 5/16" NF	4	66 pcs.1#	.70*	112
KB 101	Bolt, Hex. Hd. 5/16 x 1 $\frac{1}{2}$ " NF	4	25 pcs.1#	.021	112
KB 102	Nut, Hex. Half 7/16" NC	2	28 pcs.1#	.011	112
KB 103	Nut, Hex. 7/16" NC	30	20 pcs.1#	.011	
KB 104	Cotter, 1/8 x 1"	13	**	.10*	
KB 105	Spider, Clutch	2	4 $\frac{5}{4}$ lbs.	9.60	112
KB 106	Rivet, Clutch and Brake Lining #30 x 7/16	30	**	.01	112
KB 107	Lining, Clutch	2	2 pcs.1#	1.00	112
KB 108	Band, Clutch	2	1 $\frac{1}{2}$ lbs.	2.30	112
KB 109	Clutch, Band Assembly	2	2 lbs.	4.80	112
KB 110	Pinion, Drum Drive	1	32 lbs.	15.00	112
KB 111	Pin Collar	1	16 pcs.1#	.14	112
KB 112	Collar, Pinion	1	1 lb.	1.70	112
KB 113	Lining, Brake	1	2 pcs.1#	1.10	112
KB 114	Band, Brake	1	1 $\frac{1}{2}$ lbs.	2.30	112
KB 115	Brake, Band Assembly	1	2 lbs.	5.70	112
KB 116	Clamp, Cable	1	4 pos.1#	.12	112
KB 117	Bolt, Carr. 1/2 x 1 $\frac{1}{2}$ "	1	8 pcs.1"	.04	112
KB 118	Bushing, Hoist Drum	1	1 $\frac{3}{4}$ lbs.	4.80	112
KB 119	Drum, Hoist w/Bushing	1	33 lbs.	21.00	112
KB 120	Cam, Shaker	1	3 $\frac{5}{4}$ lbs.	2.20	112
KB 121	Seal, Felt	1	100 pcs.1#	.25	112
KB 122	Nut, Hex. Half 3/8" NC	2	36 pcs.1#	.80*	112
KB 123	Bolt, Carr. 3/8 x 2 $\frac{1}{2}$ " NC	2	12 pcs.1#	.03	112
KB 124	Spool, Winch Head	1	8 $\frac{5}{4}$ lbs.	6.00	112
KB 125	Key, 3/8 x 3/8 x 2 $\frac{1}{2}$ "	1	8 pcs. 1#	.15	112
KB 126	Plate, End	1	5 pcs. 1#	.24	112
KB 127	Plate, Lock	1	32 pcs.1#	.12	112
KB 128	Screw, Hex Hd. Dap 5/16x3/4NF	28	50 pcs.1#	.01	
KB 129	Seal, Felt	1	100 pcs.1#	.22	112
KB 130	Retainer, Bearing	1	1 $\frac{1}{4}$ lbs.	2.20	112
KB 131	Bearing, Ball SKF 1207	1	3/4 lbs.	3.60	112
KB 132	Gasket, Bearing Retainer	1	**	.06	112
KB 133	Cage, Bearing	1	3 $\frac{3}{4}$ lbs.	3.30	112
KB 134	Belt, "V", B46 Texrope	3	2 pcs.1#	1.85	115
KB 135	Pulley, Drum Drive	1	14 lbs.	14.00	115
KB 136	Cover, Gear Case	1	11 lbs.	24.00	115
KB 137	Bearing, Gear Case Pivot	1	1 $\frac{5}{4}$ lbs.	3.10	115
KB 138	Washer, 1/2" Flat	21	25 pcs.1#	.50*	
KB 139	Rod, Belt Take Up	1	5/8 lb.	.95	115
KB 140	Seal, Oil, Gits OS938	1	16 pcs.1#	.90	115
KB 141	Bearing, Ball-N.D. 3205	2	25 pcs.1#	2.10	115
KB 142	Ring, Snap	1	30 pcs.1#	.70	115
KB 143	Bearing, Ball - N.D. 1207	1	3/4 lb.	3.60	115
KB 144	Key Gib, 1/4 x 1/4 x 2"	1	20 pcs.1#	.09	115
KB 145	Plate, Lock	2	100 pcs.1#	.18	115
KB 146	Screw, Cap 5/16x5/8" Hex. Hd.	7	44 pcs.1#	.02	
KB 147	Key, 3/8 x 3/8 x 1 $\frac{3}{4}$ "	1	6 pcs.1#	.15	115
KB 148	Gear, Internal Reduction	1	12 lb.	35.00	115

\*Price Per 100 Pcs.

+ As Required

\*\*Over 200 Pcs. per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 149	Spacer, Bevel	1	10 pcs.1#	\$.70	115
KB 150	Gasket, Reduction Case	1	50 pcs.1#	.18	115
KB 151	Pinion, with Shaft	1	2 $\frac{1}{4}$ lbs.	12.00	115
KB 152	Cap, Pipe 3/8"	1	12 pcs.1#	.08	115
KB 153	Nipple, Pipe 1/8 x 1 $\frac{1}{2}$ "	1	12 pcs.1#	.04	115
KB 154	Plug, Pipe 1/4"	2	32 pcs.1#	.03	115
KB 155	Case, Gear	1	14 lb.	12.00	115
KB 156	Seal, Felt	1	80 pcs.1#	.30	115
KB 157	Retainer, Felt Seal A31-101 Kickhaefer	1	16 pcs.1#	.18	115
KB 158	Bearing, Ball N.D. 1208	1	1 lb.	4.20	115
KB 159	Bolt, Mach, 5/16 x 1 $\frac{1}{2}$ "	10	25 pcs.1#	.021	115
KB 160	Shaft, Drum Drive	1	24 lbs.	16.00	115
KB 161	Blade, Extension	4	4 lbs.	.85	116
KB 162	Bolt, Mach. 1/2 x 1 $\frac{1}{2}$ "	8	8 pcs.1#	.04	
KB 163	Ring, Drip	2	7 lbs.	2.50	116
KB 164	Gear, Ring	1	120 lbs.	33.50	116
KB 165	Bucket, Mixing	8	9 lbs.	2.00	116
KB 166	Shell, Drum	1	450 lbs.	180.00	116
KB 167	Shim, Ring Gear	9	25 pcs.1#	.12	116
KB 168	Washer, Lead Seal	9	16 pcs.1#	.06	116
KB 169	Bolt, Flow	9	8 pcs.1#	.08	116
KB 170	Key 3/8 x 3/8 x 1-5/8	1	8 pcs.1#	.10	117
KB 171	Lever, Disch. Oper.	1	5 lbs.	2.05	117
KB 172	Bracket, Disch. Oper. Lever	1	4-3/4 lbs.	3.00	117
KB 173	Link, Discharge Chute	1	1 $\frac{1}{2}$ lbs.	1.30	117
KB 174	Clevis Lever	1	1 $\frac{1}{4}$ lbs.	3.50	117
KB 175	Washer, Flat 5/8"	5	12 pcs.1#	.60*	
KB 176	Pin, Button Head 5/8"	2	2 pcs.1#	.14	117
KB 177	Bearing, Disch. Shaft	2	2 $\frac{3}{4}$ lbs.	.70	117
KB 178	Shaft, Disch. Chute	1	16 lbs.	5.50	117
KB 179	Bolt, Carriage 1/2 x 1 $\frac{1}{4}$ "	4	8 pcs.1#	.04	117
KB 180	Chute, Discharge	1	38 lbs.	12.00	117
KB 181	Lever, Discharge Chute	1	3 $\frac{1}{2}$ lbs.	4.30	117
KB 182	Key, Gib 1/4 x 1/4 x 1 $\frac{1}{4}$ "	1	100pcs.3 $\frac{1}{2}$ #	.08	117
KB 183	Nut, Hex. Jam 5/8" NC	3	100 pcs.7#	.022	118
KB 184	Bolt, Spec. 5/8 x 2 $\frac{1}{4}$ "	2	4 pcs.1#	.12	118
KB 185	Bar, Clutch Lever Half Yoke	1	2 lb.	1.20	118
KB 186	Bar, Clutch Lever Half Yoke	1	2 lb.	1.20	118
KB 187	Fork Shifter	1	1 $\frac{3}{4}$ lbs.	3.00	118
KB 188	Link, Connecting	1	3/4 lb.	.90	118
KB 189	Pin, Clevis	1	1 lb.	.60	118
KB 190	Rod, Clutch Lever Oper.	1	1 $\frac{1}{4}$ lb.	2.10	118
KB 191	Clevis, Reach Rod	3	4 pcs.1#	.50	118
KB 192	Pin, Clevis	3	16 pcs.1#	.05	118
KB 193	Lever, Clutch & Brake	1	5 $\frac{3}{4}$ lbs.	5.70	118
KB 194	Bracket, Knockout	1	2 pcs.1#	.35	118
KB 195	Arm Knockout	1	1 $\frac{3}{4}$ lb.	1.50	118
KB 196	Rod, Knockout	1	1 $\frac{1}{4}$ lb.	1.30	118
KB 197	Rod, Brake Adjusting	1	2 pcs.1#	.95	118
KB 198	Bolt, Carriage 1/2' x 2"	1	11 pcs.1#	.05	118
KB 199	Spring, Brake	1	2 pcs.1#	.65	118
KB 200	Pin, Drive	1	16 pcs.1#	.12	118
KB 201	Lever, Toggle	1	1 $\frac{1}{4}$ lb.	4.50	118
KB 202	Bolt, Spring Eye	1	5 pcs.1#	.90	118
KB 203	Rod, Adjusting	1	3 pcs.1#	.90	118

\*Price Per 100 Pieces    †As Required    \*\*Over 200 pcs. per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 204	Lever, Operating	1	9 $\frac{3}{4}$ lbs.	\$ 3.60	118
KB 205	Washer, Flat 7/8"	1	6 pcs.1#	.02	118
KB 206	Bearing, Skip Pivot	2	3 $\frac{1}{4}$ lbs.	1.10	118
KB 207	Bolt, Mach. 5/8 x 2 $\frac{1}{2}$ " NC	2	4 pcs.1#	.07	118
KB 208	Skip, Charging	1	235 lbs.	118.00	118
KB 209	Hook, Skip	1	1 lb.	1.20	119
KB 210	Roller, Cam	1	2 $\frac{1}{2}$ lbs.	1.90	119
KB 211	Pin, Roller	1	4 pcs.1#	.50	119
KB 212	Cotter, 1/2 x 2"	1	130 pcs.1#	.20*	119
KB 213	Bolt, Mach. 1/2 x 1 $\frac{3}{4}$ "	5	7 pcs.1#	.04	
KB 214	Plate, Wearing	1	1 $\frac{1}{2}$ lbs.	.40	119
KB 215	Lug, Shaker Throw-out	1	3/4 lb.	.65	119
KB 216	Pin, Lug	1	8 pcs.1#	.12	119
KB 217	Arm, Shaker	1	8 $\frac{1}{2}$ lbs.	9.30	119
KB 218	Bracket, Pivot	1	2 $\frac{1}{4}$ lbs.	3.90	119
KB 219	Pin, Pivot	1	2 pcs.1#	.40	119
KB 220	Cotter, 3/16 x 2 $\frac{1}{2}$ "	1	44 pcs.1#	.40*	119
KB 221	Shim, 2" x 16 Ga. x 4-7/8"	3	3 pcs. 1#	.30	119
KB 222	Washer, Bevel	2	4 pcs.1#	.02	119
KB 223	Drum, Differential	1	53 lbs.	19.00	120
KB 224	Key, Gib 7/16 x 7/16 x 3"	1	5 pcs. 1#	.18	120
KB 225	Retainer, Bearing	2	1 lb.	.85	120
KB 226	Bearing, Universal	2	4 $\frac{1}{2}$ lb.	1.10	120
KB 227	Bracket, Bearing	2	4 $\frac{1}{4}$ lb.	2.30	120
KB 228	Bolt, Carr. 3/8 x 2"	2	12 pcs.1#	.03	120
KB 229	Clamp	3	3 pcs.1#	.12	120
KB 230	Cable, Hoist 5/16" x 28 ft.	1	4 $\frac{1}{2}$ #	2.24	121
KB 231	Cable, Skip 5/16" x 22 ft.	1	3 $\frac{3}{8}$ #	1.76	121
KB 232	Shaft, Hoist	1	32 $\frac{1}{2}$ lbs.	6.00	120
KB 233	Key, Gib 7/16 x 7/16 x 2 $\frac{1}{4}$ "	1	5 pcs.1#	.15	120
KB 234	Drum, Cable	1	12 lbs.	6.00	120
KB 235	Seat, Check Valve 3/4" Vert.	1	2 pcs.1#	1.25	122
KB 236	Stem, Check Valve 3/4" Vert.	1	8 pcs.1#	1.25	122
KB 237	Base, Check Valve 3/4" Vert.	1	4 pcs.1#	1.25	122
KB 238	Nipple, 3/4 x 2"	1	8 pcs.1#	.06	122
KB 239	Ball, Brass 1/2" Dia.	1	48 pcs.1#	.35	122
KB 240	Seat, Ball	1	26 pcs.1#	.60	122
KB 241	Head, Syphon	1	17 lb.	12.50	122
KB 242	Clamp, Ideal - Hose 3/4"	2	8 pcs.1#	.05	122
KB 243	Bolt, Stove Rd. Hd. 1/4x1"	2	33 pcs.1#	.01	122
KB 244	Nut, Square 1/4"	11	80 pcs.1#	.40*	
KB 245	Pipe, Syphon	1	5 lb.	3.00	122
KB 246	Tank, Water	1	67 lb.	25.00	122
KB 247	Plug, Pipe 1/2"	1	12 pcs.1#	.03	122
KB 248	Screw, Hex. Hd. Cap 5/16x1 $\frac{1}{4}$ "	1	25 pcs.1#	.01	122
KB 249	Washer, Flat 1/4"	1	125 pcs.1#	.10*	122
KB 250	Rod, Control	1	1 $\frac{3}{4}$ lbs.	7.80	122
KB 251	Dial, Regulating	1	2 $\frac{1}{4}$ lb.	6.10	122
KB 252	Key, 1/8 x 1/8 x 3/4"	1	**	.30*	122
KB 253	Gear, Worm	1	3/4 lb.	6.90	122
KB 254	Bushing, Bracket	1	19 pcs.1#	.40	122
KB 255	Bracket, Gear	1	2 $\frac{1}{4}$ lb.	4.20	122
KB 256	Bolt, SAE 1/2 x 1 $\frac{1}{4}$ " NF	1	8 pcs.1#	.12	122
KB 257	Nut, Castle 1/2" NF	1	25 pcs.1#	.02	122
KB 258	Gland, Packing	1	4 pcs.1#	1.45	122

\*Price Per 100 pcs. +As Required

\*\*Over 200 pcs. per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 259	Stud, 5/8 x 2 1/4" NC	4	5 pcs.1#	\$ .10	122
KB 260	Packing, -Garlock Ring 1/2" ID x 15/16" OD	4	200 pcs.1#	.03	122
KB 261	Gasket, Syphon Head	1	5 pcs.1#	.70	122
KB 262	Hose, 3 ply - 3/4 x 24"	1	1 lb.	.50	122
KB 263	Nut, Traveling	1	1 lb.	1.80	122
KB 264	Cotter, Brass 1/8 x 1"	2	200 pcs.1#	.10*	122
KB 265	Collar, Control Rod	1	5 pcs.1#	.40	122
KB 266	Washer, Control Rod	5	144 pcs.1#	.04	122
KB 267	Disc. Rubber	1	16 pcs.1#	.35	123
KB 268	Nut, Bronze Wing	1	4 pcs.1#	1.90	123
KB 269	Gasket, Water Valve	1	98 pcs.1#	.30	123
KB 270	Body, Valve	1	4 1/2 lb.	8.85	123
KB 271	Plug, Pipe 1/8" Sq. Hd.	1	57 pcs.1#	.03	123
KB 272	Nipple, Pipe 1 1/2 x 3"	1	2 pcs.1#	.12	123
KB 273	Clevis, End	1	8 pcs.1#	.60	123
KB 274	Cover, Valve	1	16 pcs.1#	.15	123
KB 275	Nut, Retainer	1	4 pcs.1#	1.25	123
KB 276	Cup, Leather	1	72 pcs.1#	.55	123
KB 277	Cylinder, Bronze Valve	1	2 1/2 lbs.	9.00	123
KB 278	Stem, Valve	1	1 lb.	4.35	123
KB 279	Screw, Cap - Brass 3/8x7/8"	4	17 pcs.1#	.02	123
KB 280	Pipe, 3/4 x 15"	1	2 pcs.1#	.50	124
KB 281	Elbow, 3/4 x 45 degrees	1	3 pcs.1#	.16	124
KB 282	Pipe, 3/4 x 17"	1	2 pcs.1#	.65	124
KB 283	Support, Pipe	1	3/4 lb.	.70	124
KB 284	Elbow, 1 1/2" x 45 degrees	1	3/4 lb.	.36	124
KB 285	Nipple, 1-1/2"	1	4 pcs.1#	.06	124
KB 286	Pipe, Water Inlet	1	6 1/2 lbs.	3.00	124
KB 287	Reducer, Bushing 2 x 1 1/2"	1	3 pcs.1#	.40	124
KB 288	Pipe, 1 1/2 x 26 1/2"	1	6 1/2 lbs.	.85	124
KB 289	Guide, Trip Rod	1	3/4 lb.	.60	124
KB 290	Rod, Trip	1	1 lb.	.50	124
KB 291	Union, Ground Joint 1 1/2"	1	1 1/2 lb.	1.25	124
KB 292	Nipple, 1 1/2 x 5 1/2"	1	1 lb.	1.10	124
KB 293	Elbow, 3/4" x 90 deg.	1	4 pcs.1#	.10	124
KB 294	Nipple, 3/4 x 5"	1	2 pcs.1#	.80	124
KB 295	Cotter, 1/16 x 1"	1	**	.10*	124
KB 296	Pin, Rivet	1	32 pcs.1#	.08	124
KB 297	Bolt, Eye	1	5 pcs.1#	.60	124
KB 298	Link, Lever	1	2 pcs.1#	.75	124
KB 299	Nut, 1/2" NF	3	14 pcs.1#	.014	
KB 300	Spring, Water Valve	1	3 pcs.1#	.50	124
KB 301	Lever, Operating	1	3/4 lb.	2.70	124
KB 302	Lever, Latch	1	1 lb.	2.70	124
KB 303	Trip, Latch Lever	1	4 pcs.1#	.35	124
KB 304	Bolt, Mach. 3/8 x 1" NC	3	25 pcs.1#	.025	125
KB 305	Guard, "V" Belt	1	4 1/2 lb.	3.50	125
KB 306	Support, Engine	1	29 lb.	11.00	125
KB 307	Cover, Tool Box	1	3 lbs.	1.55	125
KB 308	Guard, Engine	1	3 3/4 lb.	.90	125
KB 309	Washer, Lock 1/4"	15	**	.20*	
KB 310	Screw, Rd. Hk. Stove 1/4x1/2"	11	100 pcs.1#	.012	
KB 311	Guard, Drip	2	3 lb.	2.70	125
KB 312	Nut, Wing 1/2"	1	12 pcs.1#	.014	125
KB 313	Cover, Clutch Guard	1	4 1/2 lb.	.70	125

\*Price per 100 pcs.    +As Required    \*\*Over 200 pcs. per Lb.



## PARTS SECTION

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Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 314	Guard, Hoist Clutch	1	8 $\frac{3}{4}$ lb.	\$ 4.50	125
KB 315	Guard, Hoist Drum Cable	1	3 $\frac{1}{4}$ lb.	3.30	125
KB 316	Bolt, Mach. 1/2 x 1" NC	5	12 pcs.1#	.04	125
KB 317	Guard, Ring Gear	1	7 lb.	3.00	125
KB 318	Hanger, Splash Shield	1	4 lb.	1.80	125
KB 319	Bolt, Carriage 1/2 x 1" NC	1	9 pcs.1#	.04	125
KB 320	Shield, Splash	1	6 $\frac{1}{2}$ lb.	2.40	125
KB 321	Bolt, Special 5/8 x 2 $\frac{1}{2}$	1	25 pcs.1#	.07	124
KB 322	Plate, Name	1	5 pcs.1#	2.20	149
KB 323	Screws, Name Plate	12	**	.01	149
KB 324	Plate, Instruction	1	5 pcs.1#	.60	149
KB 325	Plate, A.G.C. Standards	1	10 pcs.1#	1.45	149
KB 400	Plug, Pipe (LR.011-107)	1	3 pcs.1#	.16	127
KB 401	Stud, Cylinder Hd. (LR105-4)	14	8 pcs.1#	.08	127
KB 402	Block, Cylinder (LR4A1-165)	1	78#	44.00	127
	NOTE: Not sold separately includes parts KB410, KB403, KB 477 (intake valve guides) and KB477 (exhaust valve guides)				
KB 403	Plug, Cylinder End Welch LR-019-17	2	43 pcs.1#	.04	127
KB 404	Gasket, Front Eng. Support LR-16-222	1	26 pcs.1#	.10	127
KB 405	Support, Front Eng. LR39-363-1	1	6 $\frac{1}{2}$ #	2.50	127
KB 406	Pin, Front Eng. Taper LR010-80	2	52 pcs.1#	.04	127
KB 407	Screw, Cap 3/8" x 5/8"	4	28 pcs.1#	.04	127
KB 408	Pin, Escutcheon #14 - 3/8"	4	**	.01	127
KB 409	Plate, Name LR 62-48	1	16 pcs.1#	.16	127
KB 410	Plug, Manifold Side Pipe LR 011-102	2	50 pcs.1#	.08	127
KB 411	Cock, Drain LR 52-1	1	8 pcs.1#	.28	127
KB 412	Stud, Intake and Exhaust Manifold LR-105-87	4	8 pcs.1#	.08	127
KB 413	Gasket, Rear Eng. Support LR-16-226	1	23 pcs.1#	.10	127
KB 414	Support, Rear Eng. LR 39-312	1	5 $\frac{5}{8}$ #	2.80	127
KB 415	Screw, Cap - 3/8 x 3/4"	13	11 pcs.1#	.04	127
KB 416	Screw, Valve cover plate cap 3/8 x 3"	2	8 pcs.1#	.04	127
KB 417	Washer, Plain 3/8" (LR 06-4)	9		.01	
KB 418	Gasket, Lead 3/8" (LR 16-24)	6	102 pcs.1#	.02	
KB 419	Bearing, Camshaft Ball LR181-37	2	3 pcs.1#	2.10	128
KB 420	Shaft, Cam LR 6-115)	1	4#	10.00	128
KB 421	Key, Camshaft Gear & Magneto Coupling LR 09-6	1	200 pcs.1#	.02	
KB 422	Spacer, Camshaft LR 66-98	1	8 pcs.1#	.28	128
KB 423	Gear, Camshaft LR 26-4-2	1	2 $\frac{1}{4}$ #	2.40	128
KB 424	Washer, Lock LR 20-130	1	62 pcs.1#	.04	128
KB 425	Nut, Camshaft Gear LR 53-73	1	12 pcs.1#	.12	128
KB 426	Screw, Brg. Retainer Cap 3/8" x 1 $\frac{1}{4}$ "	7	16 pcs.1#	.04	
KB 427	Retainer, Front Brg. LR 31-193	1	2 $\frac{5}{8}$ #	3.50	129
KB 428	Shaft, Crank LR 5-134-35	1	24 $\frac{1}{4}$ #	26.00	129
KB 429	Key, Crankshaft Gear LR 91-20	1	68 pcs.1#	.06	129
KB 430	Bearing, Front or Rear Crankshaft LR 181-124	2	2 $\frac{3}{4}$ #	8.50	129
KB 431	Retainer, Brg. Lock LR 31-194	1	3/4#	.18	129
KB 432	Spacer, Brg. LR 66-180	1	5 pcs.1#	.30	129
KB 433	Gear, Crankshaft LR 26-2-11	1	3/4#	1.50	129

\*Price Per 100 Pcs.

+As Required

\*\*Over 200 Pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 434	Nut, Starting Jaw LR 53-133	1	3/4#	\$ 1.50	129
KB 435	Retainer, Rear Brg. LR 31-112	1	3#	3.90	129
KB 436	Retainer, Oil LR 125-2	1	7 pcs.1#	.70	129
KB 437	Key, Flywheel LR 09-27	1	27 pcs.1#	.04	130
KB 438	Washer, Crankshaft Lock LR20-19	1	24 pcs.1#	.08	130
KB 439	Nut, Lock LR 53-47	1	4 pcs.1#	.30	130
KB 440	Indicator, Timing LR 57-11	1	5 pcs.1#	.10	130
KB 441	Flywheel LR 9-173-1	1	65#	12.00	130
KB 442	Plug, Oil trough slotted LR 19-13	1	80 pcs.1#	.02	132
KB 443	Screw - Fillister Head 5/16# x 1 1/4"	2	34 pcs.1#	.06	132
KB 444	Ball, Oil Pump Body LR B30-1	1	96 pcs.1#	.04	132
KB 445	Plug, Welch	2	40 pcs.1#	.04	132
KB 446	Screen, Oil Strainer LR 43-10	1	8 pcs.1#	.40	132
KB 447	Nut, for Elbow Fitting 5/16" tubing	1	40 pcs.1#	.08	132
KB 448	Elbow - 5/16" Tubing, Oil screen LR 182-36	1	36 pcs.1#	.16	132
KB 449	Pan, Oil LR 10A 3-105	1	2#	8.00	132
KB 450	Screw, Cap 5/16" x 1 1/2"	2	25 pcs.1#	.04	132
KB 451	Stud, Oil Gauge LR 105-8	2	40 pcs.1#	.08	132
KB 452	Gasket, Oil gauge body LR16-263	1	**	.02	132
KB 453	Plunger, Oil Pump LR 25-18	1	2 pcs.1#	4.20	132
KB 454	Trough, Oil LR A140-1	1	2 1/2#	4.30	132
KB 455	Pin, Oil Pump Body LR 17-19	1	160 pcs.1#	.04	132
KB 456	Screw, Rd. Hd. 1/4" x 3/4"	2	80 pcs.1#	.01	132
KB 457	Gasket, Oil Pan LR 16-219	1	60 pcs.1#	.08	132
KB 458	Dipstick, Oil Gauge LRA60-43-40	1	5 pcs.1#	.50	132
KB 459	Body, Oil Gauge LR 13-125	1	1 1/2#	1.10	132
KB 460	Nipple, 1/2" x 5" LR 013-116	1	3 pcs.1#	.10	132
KB 461	Cap Pipe 1/2" LR 013-964	1	8 pcs.1#	.08	132
KB 462	Ring, Piston Compression LR 18-152	8	24 pcs.1#	.30	131
KB 463	Ring, Piston LR 18-176	4	24 pcs.1#	.50	131
KB 464	Piston LR 1A8-123-1	4	1# 3 oz.	2.40	131
KB 465	Bushing, Conn. Rod LR 21-11	4	12 pcs.1#	.40	131
KB 466	Pin, Cotter, 3/32" x 3/4"	9	**	.01	
KB 467	Nut, Conn. Rod Bolt LR 53-74	8	45 pcs.1#	.08	131
KB 468	Pin, Piston LR 17-69	4	6 pcs.1#	.60	131
KB 469	Screw, Piston Pin LR 106-34	4	74 pcs.1#	.06	131
KB 470	Rod, Conn. LR A7-26	4	2#	5.70	131
KB 471	Bolt, Conn. Rod LR 35-12	8	15 pcs.1#	.20	131
KB 472	Shim, Conn. Rod LR 22-83	8	**	.04	131
KB 473	Shim, Conn. Rod LR 22-84	8	**	.03	131
KB 474	Shim, Conn. Rod LR 22-85	8		.04	131
KB 475	Valve, Intake LR 15-34	4	15 pcs.1#	.44	134
KB 476	Valve, Exhaust LR 15-181	4	15 pcs.1#	.76	134
KB 477	Guide, Valve Stem LR 11-51	8	18 pcs.1#	.20	134
KB 478	Washer, Valve Spring Retainer LR 20-12	8	**	.04	134
KB 479	Spring, Valve LR 24-114	8	16 pcs.1#	.08	134
KB 480	Washer, Valve Spring Retainer Lower LR 20-1	8	80 pcs.1#	.04	134
KB 481	Washer, Valve Spring Retainer Horseshoe LR 20-2	8	241 pcs.1#	.02	134

\* Price Per 100 Pcs. + As Required \*\*Over 200 Pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 482	Guide, Valve Tappet LR 58-15	2	1#	\$ .70	134
KB 483	Screw, Valve Guide Cap LR 106-117	4	18 pcs.1#	.06	134
KB 484	Fitting, Elbow LR 182-37	3	10 pcs.1#	.18	
KB 485	Nut, Tube 3/8"	4	12 pcs.1#	.08	
KB 486	Cover, Valve LR A14-231-1	1	3/4#	.50	134
KB 487	Gasket, Valve Cover LR16-221	1	48 pcs.1#	.08	134
KB 488	Tappet, Valve LR A23-6	8	12 pcs.1#	.72	134
KB 489	Manifold, Exhaust LR10-142-2	1	11#	6.80	135
KB 490	Gasket, Exhaust Manifold LR 16-217	1	8 pcs.1#	.20	135
KB 491	Gasket, Intake Manifold LR16218	2	66 pcs.1#	.08	135
KB 492	Manifold, Intake LR 10-272	1	3 <sup>3</sup> / <sub>4</sub> #	3.50	135
KB 493	Nut 3/8 SAE 24-04-603	4	70 pcs.1#	.01	135
KB 494	Gasket, Carburetor LR 16-12	1	200 pcs.1#	.02	135
KB 495	Gasket, Intake and Exhaust LR 16-533	1	57 pcs.1#	.04	135
KB 496	Head, Cylinder LR 2-218	1	17 <sup>3</sup> / <sub>4</sub> #	9.00	136
KB 497	Gasket, Cylinder Head LR16-316	1	4 pcs.1#	.70	136
KB 498	Cap, Breather LR 3A4-28	1	3 pcs.1#	1.00	136
KB 499	Tube, Breather LR A49-37	1	3/4#	1.00	136
KB 500	Cotter, 1/16 x 1/2	2	160 pcs.1#	.01	136
KB 501	Rod, Governor Operating LR47146	1	10 pcs.1#	.35	136
KB 502	Spring, Governor LR 24-110	1	16 pcs.1#	.12	136
KB 503	Nut, Governor Adjusting Lock LR 53-77	1	20 pcs.1#	.12	136
KB 504	Nut, Governor Spring Adjusting LR 53-76	1	3 pcs.1#	.24	136
KB 505	Lever, Governor Speed Adjusting LR 48-247	1	1 <sup>1</sup> / <sub>2</sub> #	.60	136
KB 506	Pin, Taper LR 010-2	1	160 pcs.1#	.02	136
KB 507	Gasket Gear Cover LR 16-220	1	32 pcs.1#	.16	136
KB 508	Cover Gear LR 14-232-2	1	15 <sup>1</sup> / <sub>2</sub> #	9.00	136
KB 509	Retainer, Oil LR 125-22	1	3 pcs.1#	1.40	136
KB 510	Screw Cap - 3/8" x 2	7	24 pcs.1#	.04	136
KB 511	Nut Lock #10 x 32	1	**	.01	136
KB 512	Yoke, Governor Operating Rod LR 031-1	1	32 pcs.1#	.20	136
KB 513	Pin, Yoke LR 031-61	1	68 pcs.1#	.04	136
KB 514	Lever, Governor LR A27-433	1	4 pcs.1#	.80	136
KB 515	Plug, Welch LR 019-8	1	176 pcs.1#	.04	136
KB 516	Plug, Gear Cover LR 106-19	1	80 pcs.1#	.04	136
KB 517	Body Governor LR 13-264	1	3#	6.00	137
KB 518	Stud LR B105-8	2	16 pcs.1#	.08	137
KB 519	Coupling, Magneto LR 28-154	1	3/4#	.75	137
KB 520	Shaft, Drive LR 27-859	1	2 pcs.1#	3.00	137
KB 521	Washer, Governor Shaft LR20140	1	66 pcs.1#	.01	137
KB 522	Bearing, Rear Ball LR 181-35	1	4 pcs.1#	2.20	137
KB 523	Key, Governor shaft LR 09-5	2	34 pcs.1#	.02	137
KB 524	Gear, Drive LR 26-179	1	3/4#	1.80	137
KB 525	Weights, Yoke Assembly Governor LR 2A45-14	1	3/4#	1.50	137
KB 526	Sleeve, Governor Shaft LR 63-21	1	8 pcs.1#	.50	137
KB 527	Gasket, Governor Body LR-16265	1	122 pcs.1#	.04	137
KB 528	Plunger, Governor Operating LRA25-57	1	10 pcs.1#	1.84	137

\* Price Per 100 Pcs. + As Required

\*\*Over 200 Pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 529	Washer, Lock LR 20-60	1	126 pcs.l#	.04	137
KB 530	Screw, Fillister Head #10-24 x 3/8"	2	**	.01	137
KB 531	Washer, Lock 3/16	4	**	.01	
KB 532	Retainer, Governor LR 31-128	1	48 pcs.l#	.02	137
KB 533	Bearing, Front Ball LR181-31	1	4 pcs.l#	2.60	137
KB 534	Pin, Taper LR 010-42	1	72 pcs.l#	.02	140
KB 535	Cover, Water Pump LR A14-616 (This coupling comes only with bushings. Bushings may be bought separately.)	1	3#	4.00	140
KB 536	Cup, Grease 1/8"	1	16 pcs.l#	.12	140
KB 537	Bushing, Water Pump Cover LR-11-127	2	23 pcs.l#	.15	140
KB 538	Shaft, Impeller LR 27-809	1	2 pcs.l#	.80	140
KB 539	Washer, Thrust LR 20-235	1	68 pcs.l#	.14	140
KB 540	Pin LR 17-16 1/8" x 3/8"	1	110 pcs.l#	.05	140
KB 541	Pin, Taper LR 010-42	1	72 pcs.l#	.02	140
KB 542	Gasket LR 16-588	1	160 pcs.l#	.06	140
KB 543	Plug, Pipe LR 011-1	1	32 pcs.l#	.02	140
KB 544	Body, Water Pump LR 13-321	1	2 1/2#	4.10	140
KB 545	Washer, Rubber LR 20-236	1	**	.04	140
KB 546	Impeller LR 101-17	1	3 pcs.l#	.80	140
KB 547	Retainer, Shaft LR 31-312	1	48 pcs.l#	.12	140
KB 548	Spring, Retainer LR 24-210	1	**	.12	140
KB 549	Screw, Cap - 5/16" x 1"	1	33 pcs.l#	.04	140
KB 550	Screw, Cap - 7/16" x 1"	1	16 pcs.l#	.01	140
KB 551	Washer, Lock - 7/16"	17	16 pcs.l#	.01	
KB 552	Gasket, Cover LR 16-710	1	160 pcs.	.04	140
KB 553	Hub, Fan LR 132-70	1	1#	.80	140
KB 554	Belt, Fan LR 41-113	1	3 pcs.l#	1.30	140
KB 555	Pulley, Fan LR 1A36-234	1	1#	1.20	140
KB 556	Fan, LR 42-39-2	1	1 1/2#	2.00	140
KB 557	Pulley, Fan Drive LR 36-161	1	12 1/2#	9.00	140
KB 558	Key, Fan Drive Pulley LR09-143	1	10 pcs.l#	.08	140
KB 559	Radiator LR A71-297	1	21#	31.00	139
KB 560	Cock, Drain LR 52-7	1	3 pcs.l#	.50	139
KB 561	Connection, Radiator LR12-410	1	7 3/4#	2.20	139
KB 562	Hose 1 1/2" x 1 1/4" long LR73-5-16	1	4 pcs.l#	.10	139
KB 563	Clamp Hose LR-83-93	4	18 pcs.l#	.06	139
KB 564	Cap, Radiator LR 4-105	1	4 pcs.l#	.70	139
KB 565	Hose LR 73-26-9	1	3 pcs.l#	.32	139
KB 566	Clamp, Hose LR 83-110	2	18 pcs.l#	.04	139
KB 567	Filler, Hose LR 73-26-15	2	20 pcs.l#	.06	139
KB 568	Hose 1 1/4" x 5" LR 73-5	1	2 pcs.l#	.30	139
KB 569	Connection - LR 12-148	1	3/4#	.70	139
KB 570	Thermostat "Dole" LR 116-74	1	3/4#	3.75	139
KB 571	Fitting, Straight 3/8" tubing LR 182-176	1	12 pcs.l#	.34	139
KB 572	Tubing - 3/8" x 10" LR55-48-6	1	16 pcs.l#	.20	139
KB 573	Plate, #1 Name LR 62-36	1	**	.04	142
KB 574	Wire, Ignition 24" LR2A61-1-3	2	16 pcs.l#	.50	142
KB 575	Grommet, Rubber LR 150-1	1	86 pcs.l#	.04	142
KB 576	Bracket, Grommet LR 40-426	1	54 pcs.l#	.04	142
KB 577	Switch, Ignition LR 1A76-4	1	4 pcs.l#	1.20	142
KB 578	Nut, Hex. #10-24	2	**	.01	142

\* Price Per 100 Pcs. + As required

\*\*Over 200 pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 579	Bracket, Ignition wire holder LR 40-17	2	28 pcs.l#	\$.04	142
KB 580	Screw, Fillister Head #10-24x1"	2	125 pcs.l#	.01	142
KB 581	Block, Ignition Wire Holder LR 40-19	2	55 pcs.l#	.50	142
KB 582	Wire, Ignition - 22½" LR 3A61-1-6	2	30 pcs.l#	.40	142
KB 583	Plate, #2 Name LR 62-36-1	1	**	.04	142
KB 584	Plate, #3, Name LR 62-36-2	1	**	.04	142
KB 585	Plate, #4 Name LR 62-36-3	1	**	.04	142
KB 586	Plug, Spark LR 86-9 18 MM AC-87S or Champ C7	4	4 pcs.l#	.60	142
KB 587	Wire, Ground LR A61-10-1	1	55 pcs.l#	.30	142
KB 588	Screw, Fillister Head #8-32x5/8	2	175 pcs.l#	.01	142
KB 589	Washer, Lock for #8-32	2	**	.01	142
KB 590	Nut, Hex. #8-32	2	**	.01	142
KB 591	Cotter, Pin - E24228	1		.05	145
KB 592	Nut, Castle - E23695	1	40 pcs.l#	.25	145
KB 593	Cup, Drive, - E23812	1	3 pcs.l#	2.00	145
KB 594	Spring, Compression - E23816	1	25 pcs.l#	.50	145
KB 595	Flange - E23772	1	3 pcs.l#	3.25	145
KB 596	Seal, Oil - E24120	1	45 pcs.l#	.50	145
KB 597	Housing, Vertical Flange E24150	1	1½#	8.00	145
KB 598	Pin, Dowel - Eiseman E22577	2	150 pcs.l#	.05	145
KB 599	Washer, Insulation - Eiseman E3568 .008"	+	**	.05	
KB 600	E21563 .010"	+	**	.05	
KB 601	E21656 .012"	+	**	.05	
KB 602	Washer, Insulation-E3569.010"	+	**	.05	
KB 603	E21241 .008"	+	**	.05	
KB 604	E21242 .012"	+	**	.05	
KB 605	Bearing, Ball - E3507	2	14 pcs.l#	1.00	145
KB 606	Winding, Complete - E23670	1	10 oz.ea.	5.00	145
KB 607	Clamp - E23692	2	175 pcs.l#	.15	145
KB 608	Washer, Lock No. 8 3/64"	6	**	.05	145
KB 609	Screw No. 8 x 32	4	120 pcs.l#	.05	145
KB 610	Rotor, Magnet - E24150	1	1#	9.75	145
KB 611	Cam. Breaker - E23690	1	35 pcs.l#	1.50	145
KB 612	Pin, Catch - E23810	1	60 pcs.l#	.25	145
KB 613	Gasket - E20686	1	**	.10	145
KB 614	Screen, Filter - E20684	1	**	.10	145
KB 615	Cover - E20685	1	50 pcs.l#	.10	145
KB 616	Screw - E20558	1	80 pcs.l#	.05	145
KB 617	Washer, Shim - E6982	+	**	.05	145
KB 618	Washer, Shim - E6980	+	**	.05	145
KB 619	Key, Woodruff - E9179	1	**	.05	145
KB 620	Key, Woodruff - E23724	1	**	.05	145
KB 621	Cotter - E23702	1	**	.05	144
KB 622	Washer, Spacer - E22871	+	**	.05	144
KB 623	Bearing, Oil Impregnated E23727	1	100 pcs.l#	.50	144
KB 624	Washer, Lock No. 10 - 3/64"	3	**	.05	144
KB 625	Washer, Spacing - E24986	+	**	.05	144
KB 626	Screw - E21163	3	150 pcs.l#	.05	144
KB 627	Rotor, Distributor - E24295	1	7 pcs.l#	3.00	144
KB 628	End Plate - E24193	1	10 oz.ea.	10.50	144

\* Price per 100 Pcs. + As required

\*\*Over 200 lbs. Per Lb.

## KOEHRING COMPANY

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 629	Clamp, Condensor - E26487	1	Not sold separately		144
KB 630	Screw No. 8 x 32 - Fill. Hd.	1	120 pcs.1#	.11	144
KB 631	Washer, Lock No. 10-3/64"	1	**	.05	144
KB 632	Screw - E21032	1	200 pcs.1#	.05	144
KB 633	Washer, Spacer - E22654	1	**	.05	144
KB 634	Clip, Solder - E22214	2	**	.05	144
KB 635	Lead, Wire - E24229	1	150 pcs.1#	.15	144
KB 636	Gear, Pinton - E23683	1	25 pcs.1#	1.00	144
KB 637	Washer, Lock - E14199	1	**	.05	144
KB 638	Nut, Hex. - E23696	1	135 pcs.1#	.05	144
KB 639	Gasket, Distributor Plate - E23691	1	175 pcs.1#	.15	146
KB 640	Brush, Carbon - E9922	1	**	.10	146
KB 641	Plate, Distributor - E24923	1	2 pcs.1#	3.00	146
KB 642	Washer, Plain - E9980	4	**	.05	146
KB 643	Washer, Lock - E6767	4	**	.05	146
KB 644	Screw, Fill. Head - E21082	2	75 pcs.1#	.10	146
KB 645	Screw, Fill. Head - E21033	2	50 pcs.1#	.15	146
KB 646	Clip, Cable - E21961	4	**	.05	146
KB 647	Nut, Outer Round - E22936	1	200 pcs.1#	.10	144
KB 648	Bushing, Spacer - E23697	1	125 pcs.1#	.10	144
KB 649	Nut, Hex. - E20131	1	**	.05	144
KB 650	Screw, Condensor - E17183	2	**	.65	144
KB 651	Washer, Lock - E15126	4	**	.05	144
KB 652	Condensor, E23651	1	14 pcs.1#	1.25	144
KB 653	Felt, Lubrication - E23714	1	**	.10	144
KB 654	Rivet, Split - E23711	1	**	.03	144
KB 656	Plate, Breaker - E23507	1	40 pcs.1#	.75	144
KB 657	Screw, Primary Breaker-E23514	1	**	.10	144
KB 658	Spring, Tension - E23510	1	**	.10	144
KB 659	Washer, Shim .016"-E20547	1	**	.05	144
KB 660	Washer, Shim .006"-E20486	1	**	.05	144
KB 661	Clip, Retainer - E20476	1	**	.05	144
KB 662	Lever, Breaker - E23501	1	80 pcs.1#	1.25	144
KB 663	Washer, Bakelite - E22985	2	**	.10	144
KB 664	Plate, Square Bakelite-E23509	1	**	.10	144
KB 666	Washer, Bakelite - E22986	1	**	.10	144
KB 667	Washer, Plain No. 6-E18058	1	**	.05	144
KB 668	Washer, Lock No.6-1/32" E22615	1	**	.05	144
KB 669	Nut, Hex. No. 6-E22944	1	**	.05	144
KB 670	Screen, Filter - E24910	2	**	.10	146
KB 671	Gasket, Filter - E24909	1	**	.05	146
KB 672	Hood, Filter - E23142	1	50 pcs.1#	.10	146
KB 673	Screw, No. 6 - E15123	2	**	.05	146
KB 674	Washer, Plain - E17186	2	**	.05	146
KB 675	Washer, Lock - E9407	1	**	.05	146
KB 676	Nut, Hex. - E20131	1	**	.05	146
KB 677	Plate, Air Shutter-ZC102-4	1	62 pcs.1#	.15	147
KB 678	Lever, Air Shutter ZCR106-54AX2	1	40 pcs.1#	.55	147
KB 679	Body, Upper - ZB2-92C-1	1	2#	2.50	147
KB 680	Shaft, Air Shutter-ZC105-71	1	29 pcs.1#	.40	147
KB 681	Jet, Idling #1 Size-ZC054-15	1	**	.55	147
KB 682	Washer, Lock - ZT43-6	3	**	.05	147
KB 683	Screw, Venturi - ZT11S6-6	1	**	.05	147
KB 684	Spring, Air Shutter Lever-ZC117-27	1	**	.10	147

\* Price Per 100 Pcs. + As Required \*\*Over 200 Pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 685	Venturi, Size #15 - ZC38-41	1	7 pcs.l#	\$1.20	147
KB 686	Well, Secondary - ZC76-22	1	48 pcs.l#	.75	147
KB 687	Lever, Throttle - ZD5665	1	25 pcs.l#	.60	147
KB 688	Shaft, Throttle - ZC23-367	1	32 pcs.l#	.60	147
KB 689	Screw, Throttle Plate-ZC136-3	2	**	.05	147
KB 690	Plate, Throttle - ZC21-108	1	**	.95	147
KB 691	Lever, Throttle Stop-ZCR28-30B	1	25 pcs.l#	.60	147
KB 692	Pin, Taper-ZCT-63-2	2	**	.05	147
KB 693	Spring, Idling Adj.-ZC111-9	1	95 pcs.l#	.10	147
KB 694	Screw, Throttle Plate Adj. - ZTIS8-14	1	**	.05	147
KB 695	Spacer, Throttle Stop Lever ZC130-11	1	**	.10	147
KB 696	Spring, Throttle Lever-ZC11725	1	**	.20	147
KB 697	Screw, Air Shutter Plate - ZC15B5-3	2	**	.05	147
KB 698	Jet, Cap - Size #32 - ZC57-3	1	**	.40	147
KB 699	Washer, Cap Jet - ZT56-24	4	**	.05	147
KB 700	Jet, Main-Size #14-ZC51-18	1	**	.75	147
KB 701	Jet, Compensating-Size #16 ZC52-3	1	**	.45	141
KB 702	Gasket, Bowl to Body ZC142-32	1	175 pcs.l#	.10	147
KB 703	Jet, Main Adj. #13-ZC71-9	1	128 pcs.l#	1.20	147
KB 704	Washer, Lock-ZT43-25	2	**	.05	147
KB 705	Screw - ZT11S25-10	2	**	.05	147
KB 706	Washer (M.J. Adj.) -ZT56-23	1	**	.05	147
KB 707	Axle, Float & Screw Assembly ZC89-1	1	**	.25	147
KB 708	Valve, Fuel & Collar Assembly ZC83-19	1	37 pcs.l#	.90	147
KB 709	Screw, Idling Adj.-ZC46-25	1	95 pcs.l#	.30	147
KB 710	Screen, Filter Assembly - ZC150-11	1	64 pcs.l#	.50	147
KB 711	Bowl, Fuel -ZB1958X1	1	2 $\frac{1}{4}$ #	5.50	147
KB 712	Seat, Fuel Valve - Size #35 ZCR82-7	1	37 pcs.l#	.45	147
KB 713	Float, Assembly - ZC85-55	1	26 pcs.l#	1.00	147
KB 714	Spring, Stop Screw-ZC111-4	1	95 pcs.l#	1.00	147
KB 715	Bracket, Gas Filter LR40-543	1	4 pcs.l#	.20	149
KB 716	Fitting, Elbow LR 182-33	2	32 pcs.l#	.25	149
KB 717	Nut, Elbow & Straight Fitting for 1/4" Tube	3	67 pcs.l#	.05	149
KB 718	Tube, Gasoline 1/4" x 11 $\frac{1}{2}$ "	1	8 pcs.l#	.16	149
KB 719	Fitting, Straight LR 182-13	1	50 pcs.l#	.20	149
KB 720	Tube, Gasoline 1/4" x 15 $\frac{1}{2}$ "	1	15 pcs.l#	.20	149
KB 721	Gas Strainer Assembly LRA77-23	1	2 pcs.l#	.90	149
KB 722	Cover - TOS-349	1	4 pcs.l#	.50	149
KB 723	Cock, Shut-off - TOW-432	1	20 pcs.l#	.25	149
KB 724	Clamp, Assembly - TOW-447	1	18 pcs.l#	.30	149
KB 725	Screen - TOW-447	1	128 pcs.l#	.15	149
KB 726	Gasket, Bowl - TOW-222	1	128 pcs.l#	.05	149
KB 727	Bowl, Glass Sediment T-OW-363	1	10 pcs.l#	.15	149
KB 728	Screw, Cap 3/8"x1 $\frac{1}{2}$ " NC	2	36 pcs.l#	.04	148
KB 729	Tube, Copper Breather - 3/8	1	14 pcs.l#	.06	148
KB 730	Bracket-Air Cleaner LR40-1076	1	14 pcs.l#	.40	148
KB 731	Cap, Air Cleaner LR 4-137	1	2 $\frac{3}{4}$ #	3.20	148

\* Price Per 100 Pcs. +As Required

\*\*Over 200 Pcs. Per Lb.

Part Number	Name and Description of Part	Qty.	Approx. Weight	Price Each	Page
KB 732	Gasket, Air Cleaner LR16-838	2	170 pcs.1#	.06	148
KB 733	Filter Assembly-AM AR1198-N	1	14 oz.	2.50	148
KB 734	Bowl - AM AR131	1	3/4#	1.00	148
KB 735	Stem - AM AR16K	1	5 pcs.1#	.25	148
KB 736	Plate, Bottom - AM AR35	1	16 pcs.1#	.25	148
KB 737	Nut, Wing AM AR15	1	16 pcs.1#	.25	148
KB 738	Stem Assembly includes 734, 735 and 736	1	3 pcs.1#	.75	148
KB 739	Connection Air Cleaner LR65-67	1	21 pcs.1#	.20	148
KB 740	Air Cleaner Assembly-LRA77-185	1	2#	4.50	148
KB 741	Muffler LR 1A78-51	1	6-3/4#	2.50	150
KB 742	Pipe, Exhaust LR 013-182	1	2-1/4#	.60	150
KB 743	Support, Housing for Gear Cover End LR-39-718	1	11 <sup>5</sup> / <sub>8</sub> #	4.40	150
KB 744	Crank, Starting LR 50-23	1	2 <sup>1</sup> / <sub>2</sub> #	1.00	150
KB 745	Bracket, Starting Crank LR 40-417	1	1#	.70	150
KB 746	Top, Hood LR 1A68-320	1	13 <sup>1</sup> / <sub>2</sub> #	6.00	150
KB 747	Tank, Gasoline - with cap LRA69-157	1	8#	6.00	150
KB 748	Support, Housing for Flywheel end LR 39-583	1	14 <sup>5</sup> / <sub>8</sub> #	4.50	150
KB 749	Screw, Cap - 7/16"	14	14 pcs.1#	.04	150
KB 750	Skid, L. H. LR 7C-1045	1	12#	3.80	150
KB 751	Side, L.H. Hood LR 68-171-3	1	5 <sup>1</sup> / <sub>2</sub> #	3.00	150
KB 752	Side, R.H. Hood LR 68-171	1	6 <sup>1</sup> / <sub>2</sub> #	3.00	150
KB 753	Skid, R.H. LR 70-1044	1	16 <sup>1</sup> / <sub>2</sub> #	3.40	150

\* Price Per 100 Pcs.      As Required      \*\*Over 200 Pcs. Per Lb.





