

TM5-5060

100
400
U113
.2
7M
1942
U.S. Dept. of Army

**WAR DEPARTMENT
MAINTENANCE MANUAL
AND PARTS CATALOG**

**MOTORIZED AIR COMPRESSOR
MODEL 105 GA**

**LE ROI COMPANY
MILWAUKEE, WISCONSIN
NOVEMBER 30, 1942**

TM5-5060

WAR DEPARTMENT

TM5-5060, Maintenance Manual and Parts Catalog,
Motorized Air Compressor, Model 105GA, published by
the Le Roi Company is furnished for the information
and guidance of all concerned.

(AG 062.11 (4/26/41) PC (C), June 10, 1941.)

G. C. MARSHALL.
Chief of Staff.

Official:

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

*Doc will
get
non-cue*

TECHNICAL MANUAL

MAINTENANCE MANUAL AND PARTS CATALOG, MOTORIZED AIR COMPRESSOR MODEL 105 GA, LE ROI COMPANY

CHANGES }
No. 1 }

WAR DEPARTMENT,
WASHINGTON 25, D. C., 4 December 1944.



TM 5-5060, 30 November 1942, is changed as follows:

On page 47, below paragraph "Pressure Adjustments" add:

MAXIMUM AIR PRESSURE.

Many of the air compressors as furnished were adjusted for a maximum air pressure of from 100 to 105 pounds per square inch. As this pressure sometimes causes breakage of the smaller tools, the maximum pressure is to be adjusted to 90 pounds per square inch. (Complete instructions for the reduction of air pressure may be found on page 47 of TM 5-5060.)

[AG 300.7 (8 Nov 44).]

BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

J. A. ULIO
Major General
The Adjutant General

G. C. MARSHALL
Chief of Staff

DISTRIBUTION:

AAF (10); AGF (10); ASF (10); T of Opns (C of Engrs) (2); Dept (10); Base C (C of Engrs) (2); Arm & Sv Bd (2) except The Engr Bd (10); Def C (1); Tech Sv (2); except C of Engrs (20); Sv C (10); PE (Port Engr) (2); ASF Dep (Engr Sec) (2); Dep 5 (2) except Albany (Pub Off) (7) & Granite City Engr Dep (25); Dist O 5 (2) except Seattle Dist Engr (4); Div Engr (2); Gen & Sp Sv Sch (2); USMA (2); Library of Congress (2); ASF Tng Ctr (Engr Sec) (2); A (10); CHQ (10); D (2); T/O & F 5-247 (6); Two copies to following: T/O & E 5-157, 5-267, 5-357, 5-377, 5-567, 5-16, 5-17, 5-22, 5-26, 5-27, 5-36, 5-37, 5-66, 5-67, 5-87, 5-96, 5-97, 5-116, 5-136, 5-137, 5-138, 5-192, 5-216, 5-217, 5-236, 5-237, 5-238,

TM 5-5060

C 1 MAINTENANCE MANUAL AND PARTS CATALOG

5-252, 5-256, 5-257, 5-276, 5-277, 5-297, 5-327, 5-367, 5-412, 5-416, 5-417, 5-466, 5-467, 5-500, Composite Co, Map Det (Ca), Utilities Det (EA), Gas Generating Unit (GA), Model Making Team (MA), Dredge Crew, Floating Power Plant Det (NE), Port Rep Ship Crew (NF), Survey Liaison Det (OA) Foundry Team (PA), 5-510-1S, 5-512S, 5-516S, 5-517S, 5-526S, 5-527S, 5-536S, 5-537S, 5-538S, 5-539S, 5-547S, 5-627, Hq & Hq & Serv Co, Shore Regt, Hq & Hq Serv Co, Shore Bn, Shore Co.

For explanation of symbols see FM 21-6.

LE ROI
AIR COMPRESSOR MODEL 105GA
TECHNICAL MANUAL

Includes
 Independent Pneumatic "Thor" Air Tools

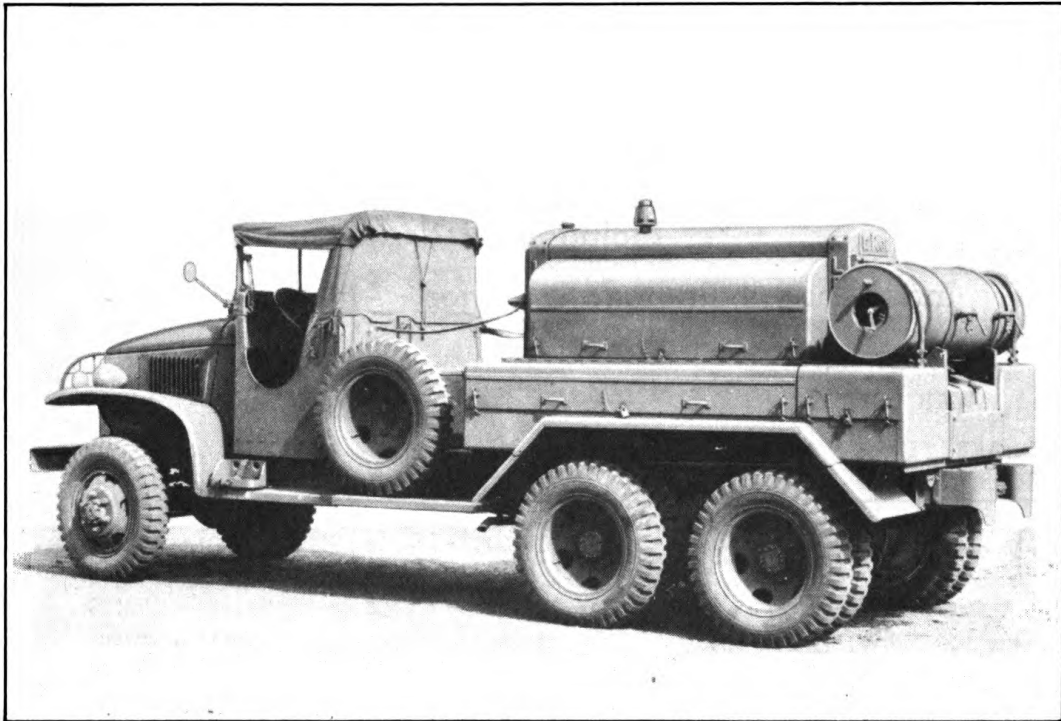
WAR DEPARTMENT		SERIAL NO. SPAN	
PURCHASE ORDER	CONTRACT NUMBER	ENGINE	COMPRESSOR
55861 } 55668 }	W978-Eng-3969	{ 157000 to 158998 160200 to 160274	157001 to 158999 160201 to 160275
57727	W978-Eng-5371	171500 to 172508	171501 to 172509
C23-1489	W1122-Eng-969	172510 to 177260	172511 to 177261
23-1432DA	W1122-Eng-972	177262 to 177488	177263 to 177489
23-1286	W1088-Eng-2067	177490 to 178888	177491 to 178889
C5260	W1088-Eng-2332	183900 to 184010	183901 to 184011
23-1296	W1088-Eng (MSP)-2751	189000 to 190212	189001 to 190213
23-1297	W1088-Eng (MSP)-2929	190214 to 192030	190215 to 192031
23-1439	W11-032-Eng (MSP)-38	194000 to 195556	194001 to 195557
23-3497	W47-013-Eng (MSP)-460	201004 to 204620	201005 to 204621
23-3467	W11-114-Eng-134	200560 to 201002	200561 to 201003

NOTE: Even numbers are all engines, odd numbers are all compressors. Compressor number is always next number higher than its respective engine.

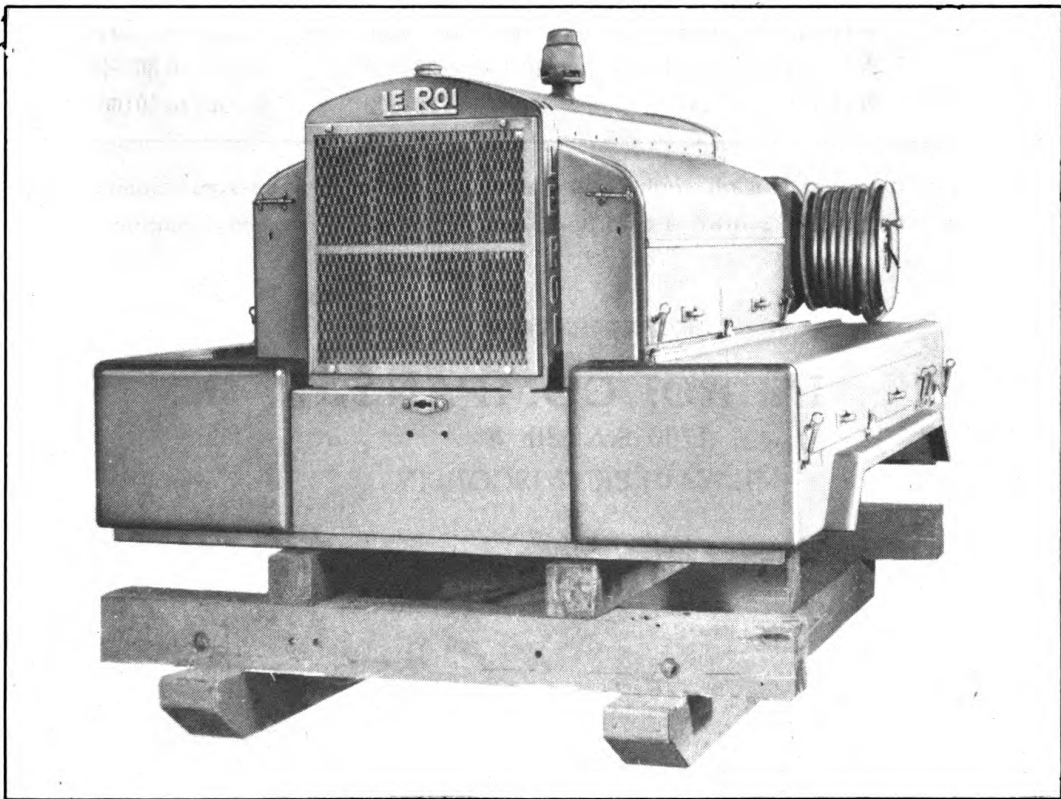
Manufactured by
LE ROI COMPANY
 1706 So. 68th St.
 MILWAUKEE, WISCONSIN

*All prices shown in this manual are
 subject to correction without notice.*

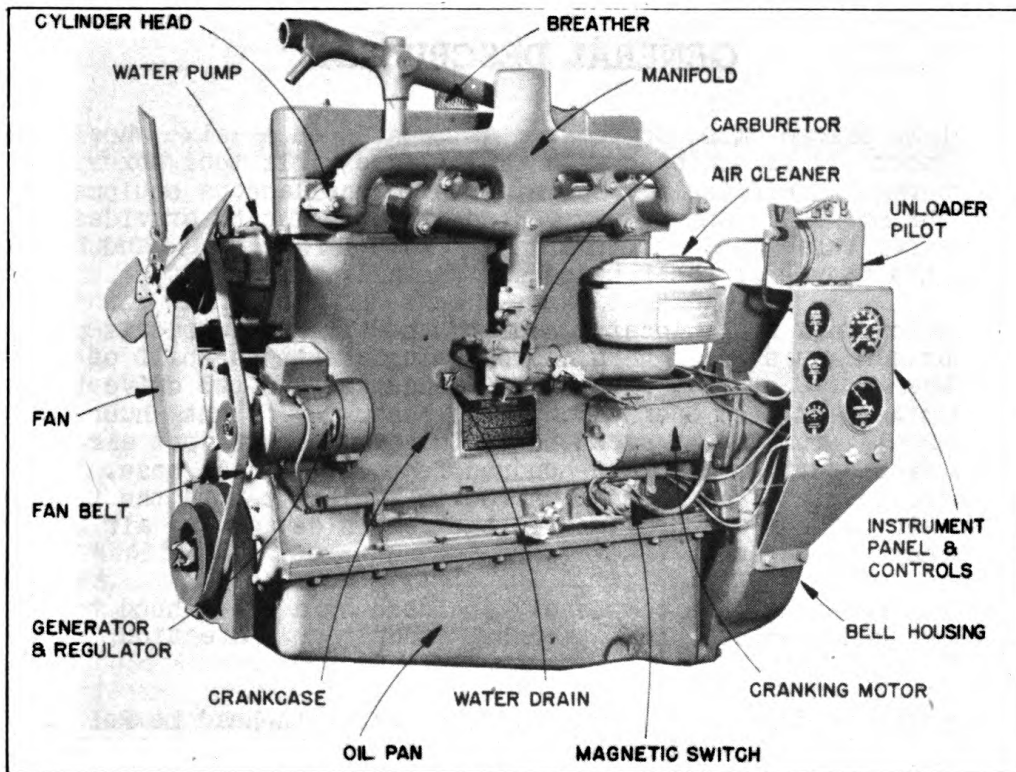
Copyright, 1944
 by
 LE ROI COMPANY
 Milwaukee, Wisconsin, U. S. A.



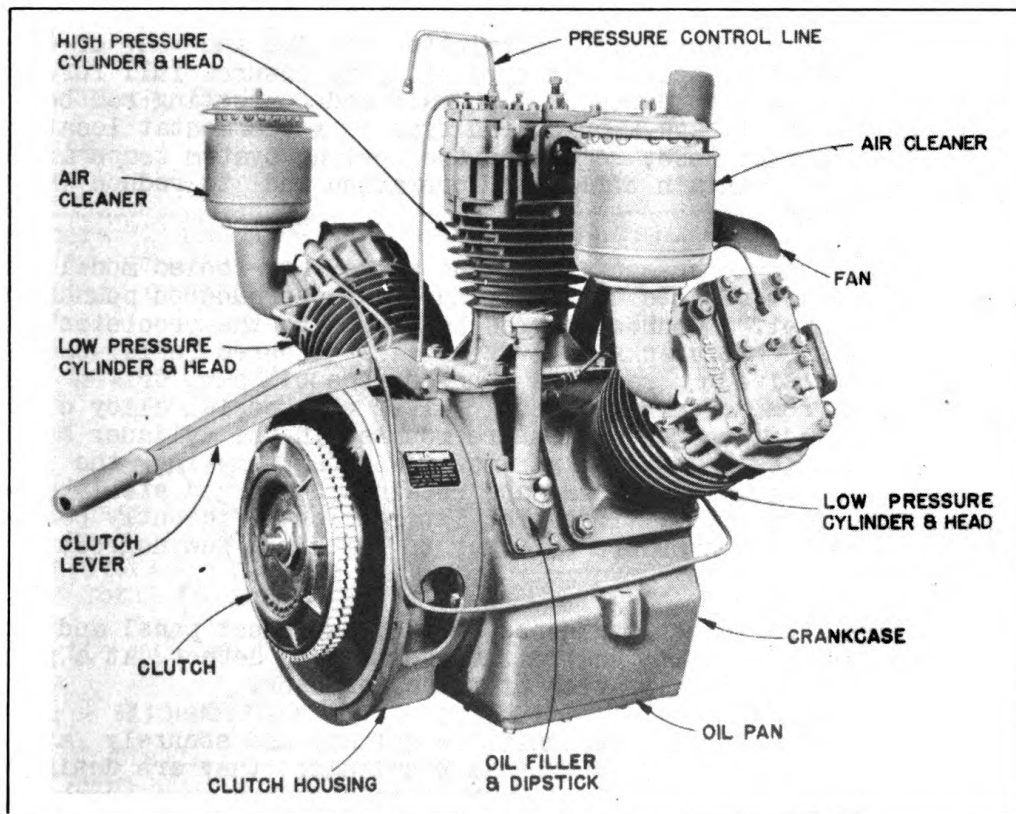
*Le Roi Air Compressor Model 105GA as Mounted on GMC,
2 1/2 Ton, 6X6 Ordnance Truck*



*Le Roi Air Compressor Model 105GA as mounted on Wood
Skids to be Mounted on any Convenient Vehicle*



Model D318, Gasoline Engine



Model 105, 2 Stage, Air Cooled, Air Compressor

GENERAL DESCRIPTION

The Le Roi Motorized Air Compressor is mounted on a six wheel General Motor's Truck. It is equipped with easily accessible tool boxes for convenient storage of air tools, spare parts, miscellaneous equipment, etc. The tool box mounted transversely behind the truck cab provides seating facilities for three men, and is arranged with safety straps and hand-rail to reduce the danger of their being accidentally thrown off.

A fifty gallon fuel tank, located beneath the air receiver, is partially shielded by a heavy steel guard, protecting about one-half of its contents. When full, this tank provides adequate fuel to drive the truck about 150 miles and also operate the compressor for eight hours. Two live hose reels, mounted at each end of the eight cubic foot air receiver tank, are each equipped with one-hundred feet of 3/4" air hose. A fifty foot reserve length of air hose is stored in toolbox behind the truck cab. Two fixed air outlets are provided in the rear side of the air receiver, for emergency connections.

The air compressor unit is completely enclosed by a steel hood top, hinged side panels, and a splash pan, thereby affording protection from the weather.

The compressor is driven by a four cylinder valve-in-head Le Roi gasoline engine coupled to the compressor through a manually operated Twin Disc Clutch. The clutch is the "spring loaded" type which affords a maximum of plate wear before adjustment is required. The engine has a displacement of 318 cubic inches and can develop a maximum of thirty-four horse power running at 865 R.P.M. The cylinders are removable wet sleeve type. Special steel inserts practically eliminate pitting and wear of exhaust valve seats. A large capacity gear type oil pump insures full force feed lubrication to all moving parts. Both main and connecting rod bearings are babbit lined, steel back, precision type. A thermostat located in the engine water outlet hose, regulates the cooling system temperature to at least 160° F. to maintain efficient operation and to reduce the tendency to form sludge.

The air compressor is a three cylinder two stage, air-cooled model and delivers 105 cubic feet of free air per minute, at one-hundred pounds gauge pressure at sea level. Connecting rod bearings are the precision type, same as in engine, but crankshaft mains are tapered roller bearings. Lubrication is positive by means of a plunger type oil pump driven through a connecting rod from the crankshaft. Valves are special alloy circular plate type assembled in cages which are mounted in the cylinder heads so that they may be quickly and easily removed without removing the heads. They rest on forged steel seats and are retained by forged steel bumpers. The tubular, sectional type, air cooled intercooler efficiently cools the air entering the high pressure cylinder to within a few degrees of the intake temperature.

All controls are conveniently grouped on the instrument panel and sufficient gauges are provided to enable the operator to detect, at a glance, any irregularities in the operation of the compressor.

The air tools furnished with each unit are quickly and securely attached to the hose ends by means of universal couplings; they are designed to give a maximum of service with a minimum of maintenance. A combination vise is attached to a rigid, portable work bench which is conveniently stored in the transverse tool box when not in use.

SPECIFICATIONS—ENGINE AND AIR COMPRESSOR

APPROX. CAPACITIES (U. S. MEASURE)

Fuel Tank.....	50 gals.
Cooling System.....	8 gals.
Crankcase (Oil Pan) Engine.....	14 qts.
Crankcase (Oil Pan) Compressor.....	8 qts.
Air Cleaner - Engine.....	1/2 pt.
Air Cleaner - Compressor, each.....	1 pt.

ENGINE

Model (Gasoline).....	D318
Cylinders.....	4
Bore.....	4-1/2"
Stroke.....	5"
Engine Speed (Governed).....	865 R.P.M.
Magneto (Fixed Spark) Clockwise Rotation American Bosch.....	MJC4C
Magneto Breaker Gap.....	.012" to .014"
Spark Plug Gap.....	.025" to .030"
Valve Clearance (Engine Hot).....	.015"
Carburetor (Zenith) Updraft.....	62A10
Firing Order.....	1-2-4-3

CLUTCH

Double Plate (Spring Loaded) Twin Disc Model SL-211.....	11-1/2"
--	---------

COMPRESSOR

Model.....	105G
Cylinders (2 low pressure - 1 high pressure).....	3
Bore (low pressure).....	5-3/4"
Bore (high pressure).....	5"
Stroke.....	5"
Stages.....	2
Capacity (cubic feet of air per minute delivered at 100 lbs. gauge pressure at sea level).....	105

GENERAL - TRUCK MOUNTED

Length Overall (Bumper to Bumper).....	254"
Width Overall (From outsides of fenders).....	90"
Height Overall (To top of muffler).....	93" *
Weight Total (Complete with all tools, fuel & oil).....	14,300#

*87" with muffler removed.

GENERAL - SKID MOUNTED

Length Overall.....	120"
Width Overall.....	90"
Height Overall.....	80"†
Weight Total (Complete with tools, fuel & oil).....	6700 lbs.

†74" with muffler removed.

**IDENTIFICATION AND INDEX TO MANUFACTURERS
OF ACCESSORIES AND EQUIPMENT USED ON LEROI
MODEL 105GA AIR COMPRESSOR**

ENGINE AND COMPRESSOR

<u>PART NAME</u>	<u>LE ROI NUMBER</u>	<u>MANUFACTURER NAME AND ADDRESS</u>	<u>MODEL, TYPE OR PART NO.</u>
AIR CLEANER (ENGINE)	A77-145-1	AIR MAZE CORP. CLEVELAND, OHIO	37L-0BF
AIR CLEANER (COMPRESSOR)	A77-166	AIR MAZE CORP. CLEVELAND, OHIO	V31-0B
BATTERY	A117-49	GLOBE-UNION, INC. MILWAUKEE, WISCONSIN	#134 6 Volt.
CARBURETOR	A84-546-2	ZENITH CARBURETOR DIVISION BENDIX AVIATION CORP. DETROIT, MICHIGAN	62A10
CLUTCH	A75-279	TWIN DISC CLUTCH CO. RACINE, WISCONSIN	SL-2-11½"
CRANKING MOTOR	A107-93	DELCO-REMY DIVISION GENERAL MOTORS CORP. ANDERSON, INDIANA	700
CYLINDER HEAD BREATHER	A77-137	AIR MAZE CORP. CLEVELAND, OHIO	ZOH
FUEL PUMP	A81-99-5	A.C. SPARK PLUG DIVISION GENERAL MOTORS CORP. FLINT, MICHIGAN	1537453
GENERATOR AND REGULATOR	A108-85	DELCO-REMY DIVISION GENERAL MOTORS CORP. ANDERSON, INDIANA	1101374
MAGNETIC SWITCH	A76-49	DELCO-REMY DIVISION GENERAL MOTORS CORP. ANDERSON, INDIANA	#1459
MAGNETO	A85-126-1	AMERICAN BOSCH CORP. SPRINGFIELD, MASS.	MJC4C-334 CW
OIL FILTER	A43-114	PUROLATOR PRODUCTS INC. NEWARK, NEW JERSEY	N1744 Assy. N-17 Element
UNLOADER PILOT	A76-81	PENN ELECTRIC SWITCH CO. GOSHEN, INDIANA	G-1

AIR TOOLS

CLAY DIGGER	A88-169-2	INDEPENDENT PNEUMATIC TOOL CO. CHICAGO, ILLINOIS	412
PAVING BREAKER	A88-168-1	INDEPENDENT PNEUMATIC TOOL CO. CHICAGO, ILLINOIS	25
SINKER ROCK DRILL	A88-167	INDEPENDENT PNEUMATIC TOOL CO. CHICAGO, ILLINOIS	75
WOOD BORING MACHINE	A88-170	INDEPENDENT PNEUMATIC TOOL CO. CHICAGO, ILLINOIS	62-WB

LE ROI COMPANY
MILWAUKEE, WISCONSIN

OPERATING INSTRUCTIONS

STARTING
MACHINE SHOULD BE SET APPROXIMATELY LEVEL TO INSURE EQUAL LUBRICATION TO ALL PARTS. SEE THAT THERE IS FUEL IN TANK. OPERATE FUEL PUMP LEVER BY HAND TO FILL CARBURETOR. SEE THAT ENGINE COOLING SYSTEM IS FULL OF WATER. CHECK OIL LEVEL IN ENGINE & COMPRESSOR CRANKCASES. SEE THAT COMPRESSOR CLUTCH IS DISENGAGED. PULL CHOKE OUT & CRANK ENGINE ONE REVOLUTION. PUSH CHOKE IN HALF WAY, PULL IGNITION SWITCH OUT, & CRANK ENGINE. IF ENGINE DOES NOT START IMMEDIATELY, PUSH IN CHOKE & CRANK UNTIL ENGINE FIRES.

IN EXTREME COLD WEATHER WHEN STARTING IS DIFFICULT, CRANK THE ENGINE WITH THE CHOKE ALL THE WAY OUT FOR A FEW REVOLUTIONS, OR IT MAY BE NECESSARY TO REMOVE SPARK PLUGS & POUR A SMALL AMOUNT OF GASOLINE INTO EACH CYLINDER. WAIT A FEW MINUTES FOR THE GASOLINE TO EVAPORATE. PULL OUT IGNITION SWITCH & START

ALLOW ENGINE TO WARM UP A FEW MINUTES BEFORE STARTING COMPRESSOR.

STOPPING
DISENGAGE CLUTCH TO STOP COMPRESSOR. ALLOW ENGINE TO IDLE A FEW MINUTES BEFORE CLOSING IGNITION SWITCH. OPEN RECEIVER DRAIN COCK.

For the operator's convenience, the simplified instruction plate is reproduced above. For detailed instructions covering care, operation and maintenance of Le Roi Motorized Air Compressor, please refer to section entitled Data.

LE ROI COMPANY
MILWAUKEE, WISCONSIN

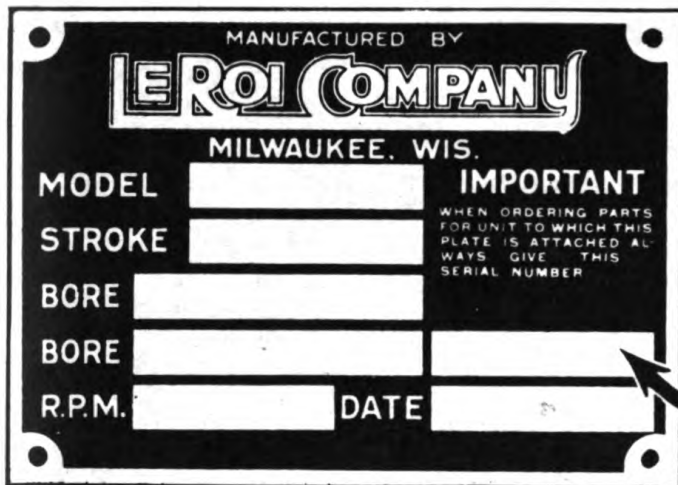
ENGINE OIL CAP 3 1/2 GALS.
USE: S.A.E. 30 ABOVE 32 DEG. F.
S.A.E. 10 BELOW 32 DEG. F.
CHANGE OIL EVERY 128 HRS.
KEEP OIL TO FULL MARK ON
BAYONET GAUGE.

This is a reproduction of the oiling instruction plate fixed to side of engine. For detailed lubrication instructions see section "Lubrication".

LE ROI COMPANY
MILWAUKEE, WISCONSIN

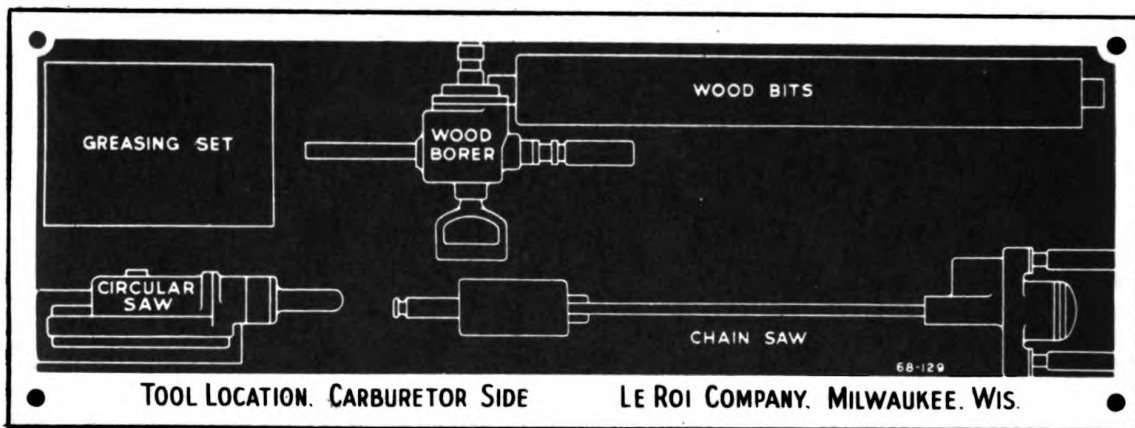
COMPRESSOR OIL CAP 2 GALS.
USE: S.A.E. 30 ABOVE 32 DEG. F.
S.A.E. 10 BELOW 32 DEG. F.
CHANGE OIL EVERY 256 HRS.
KEEP OIL TO FULL MARK ON
BAYONET GAUGE.

This is a reproduction of the oiling instruction plate fixed to side of compressor. For detailed lubrication instructions see section "Lubrication".

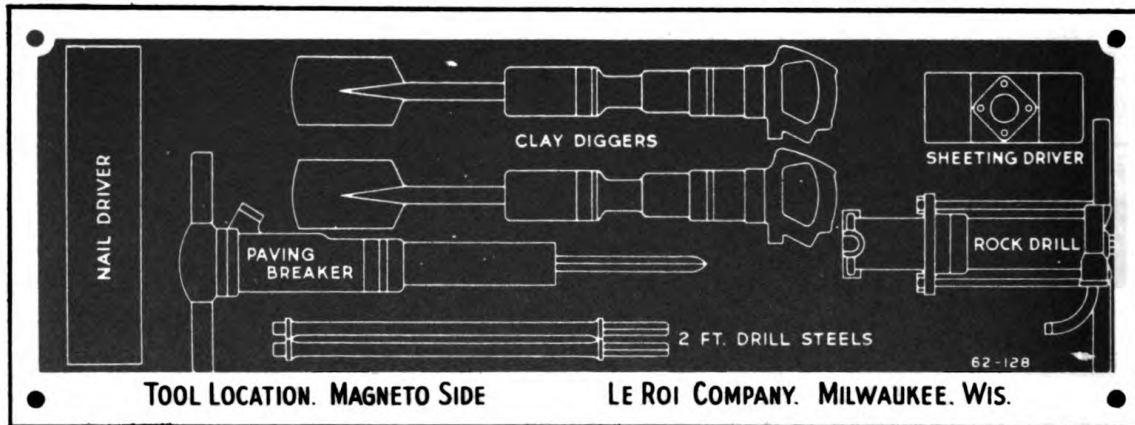


When ordering spare or replacement parts for this Motorized Air Compressor Unit or when corresponding with the factory regarding it, it is necessary this serial number be indicated.

THIS IS THE SERIAL NUMBER WE REQUIRE.



Above plate shows storage facilities provided for tools and equipment in Tool Box (Carburetor side).



Above plate shows storage facilities provided for tools and equipment in Tool Box (Magneto side).

TABLE OF CONTENTS

SECTION	PAGE
Introduction	I to X
General Description	IV
Specifications	V
Index to Manufacturers	VI
Name Plates	VII & VIII
Operator's Instructions . . . . .	.1 to 34
Data . . . . .	.1 to 6
Instruments and Controls . . . . .	.1
Before Starting a New Air Compressor . . . . .	.2
Starting the Engine . . . . .	.3
Stopping the Engine . . . . .	.4
Preparing Air Compressor for Storage . . . . .	.4
Starting Air Compressor that has been in Storage . . . . .	.5
Extreme Weather Conditions . . . . .	.6
Clutch . . . . .	.7
Compressor . . . . .	.8 to 12
Minor Service Operations . . . . .	.8
Cooling System . . . . .	.13
Electrical	15 to 21
Storage Battery	15
Battery Testing Chart	16
Magneto	15
Spark Plugs	18
Generator	18
Cranking Motor	20
Magnetic Switch	21
Engine	22 to 24
Minor Service Operations	22
Fuel System	25 to 28
Carburetor	25
Fuel Pump	26
Lubrication	29 to 33
Maintenance Schedule	31
Engine Lubrication	32
Compressor Lubrication	32
Maintenance Instructions . . . . .	.35 to 90A
Clutch	35
Compressor	37 to 50
Pressure Control System	46
Compressor Service Chart	49B
Cooling System	51 to 52
Water Pump	51
Electrical	53 to 66
Wiring Diagram	53
Magneto	54
Generator	57
Step Voltage Control Unit	59
Cranking Motor	62
Magnetic Switch	65
Engine	67 to 76
Engine Service Chart	76
Fuel System	77 to 85
Zenith Updraft Carburetor	77
AC Fuel Pump	83
Governor . . . . .	.86 & 87

TABLE OF CONTENTS (Continued)

SECTION	PAGE
Parts List	
Complete Engine and Compressor Unit . . . . .	.91 to 146
Spare Parts List. . . . .	.147
Air Tools	
Operator's Instructions	149 to 153
No. 62 Wood Boring Machine. . . . .	.149
No. 412 Clay Digger . . . . .	.150
No. 75 Sinker Rock Drill. . . . .	.151
No. 25 Paving Breaker . . . . .	.152
Maintenance Instructions.	154 to 166
No. 62 Pneumatic Piston Type Wood Boring Machines . . . . .	.155
No. 412 Clay Digger . . . . .	.159
No. 75 Sinker Rock Drill. . . . .	.161
No. 25 Paving Breaker . . . . .	.163
Parts List.	166 to 178
Air Tool Accessories. . . . .	.176-178

**INDEX
TO
OPERATOR'S
INSTRUCTIONS**

**DATA
OPERATING INSTRUCTIONS**

CLUTCH

COMPRESSOR

COOLING SYSTEM

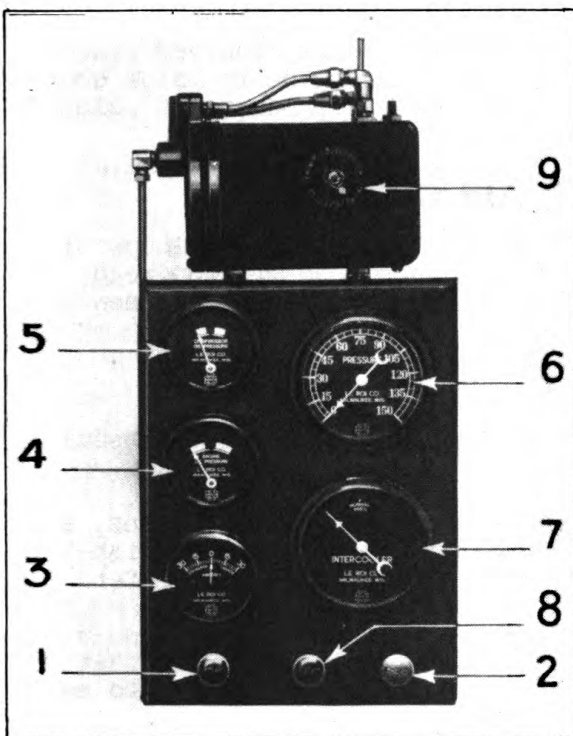
ELECTRICAL SYSTEM

ENGINE

FUEL SYSTEM

LUBRICATION

INSTRUMENTS AND CONTROLS



Instrument and Control Panel

1. **ELECTRIC STARTER BUTTON:** Pulling this button completes the electrical circuit between the battery and the cranking motor and causes the cranking motor pinion to engage the flywheel ringgear, thereby cranking the engine.
2. **CHOKE BUTTON:** Helps start the engine when the engine is cold. Pulling out the button shuts off air to the carburetor, giving a rich mixture. After the first revolution, push choke button in half way or to a point where engine runs without misfiring. Push choke button all the way in after engine has started and has warmed up sufficiently. NEVER run engine with choke all the way out. In hot weather it may not be necessary to choke the engine to start.

3. **AMMETER:** This is a check on the electrical system. It indicates whether the battery is being charged or discharged. When en-

gine is running at normal speed, ammeter needle should be in the "charge" range. If the ammeter shows discharge continuously, the cause should be investigated in order to avoid completely discharging the battery.

4. **OIL PRESSURE GAUGE-ENGINE:** This gauge indicates the pressure of the oil circulating through the engine. The indicator hand should hold in or slightly above the green section of dial when engine is running at operating speed. If indicator does not show pressure, stop engine immediately and investigate cause.
5. **OIL PRESSURE GAUGE-COMPRESSOR:** This gauge performs similar function as the engine gauge.

Caution: Neither the engine nor compressor oil pressure gauge indicate the condition of the oil; they indicate only the pressure.

6. **AIR PRESSURE GAUGE:** This gauge indicates the pressure of the air in the air receiver tank. In normal operation it should read 100 pounds maximum after engine and compressor have been thoroughly warmed up to operating temperatures.
7. **INTERCOOLER GAUGE:** This gauge indicates the functions of the compressed air system. When every part of the system is operating normally the indicator hand will ride in the center position. When the machine is not in operation and when the unit, in operation, unloads, the hand will drop to the left hand side. If the hand continuously rides in the left hand section of the dial it indicates a leak in the low pressure system somewhere, either in the valves or lines or connections. If the hand rides continuously in the right hand portion it indicates similar condition in the high pressure system.
8. **MAGNETO GROUND SWITCH:** When this button is pulled out magneto is in "on" position. Pushing this button in short circuits the magneto, thereby making it inoperative and stops engine.

9. **UNLOADER PILOT SWITCH:** This unit automatically regulates the air pressure in the air receiver tank. When pressure in receiver reaches 100 pounds it causes compressor to unload and engine to slow down. When pressure in receiver drops approximately 12 pounds it causes engine to accelerate and compressor to load.

BEFORE STARTING A NEW AIR COMPRESSOR

This air compressor was given a rigid operating test and final inspection before it was shipped from the factory, but we recommend that you read and follow the procedure outlined below before starting or operating a new air compressor.

LUBRICATION:

1. Lubricate the entire air compressor, using the "Maintenance Schedule" section as a guide.
2. Check the oil levels of the engine and air compressor crankcases, air cleaner to see that they are filled to the proper levels with the correct grades of oil for the prevailing temperature (refer to "Lubrication Chart" Section Data.
3. Before starting a new engine, remove the spark plugs and pour about two tablespoonfuls of mixture of half oil and half gasoline into each cylinder to insure lubrication of the pistons and cylinders when the engine first starts. This practice is recommended for engines that have been idle for the 30 days or more.
4. Add one pint of light engine oil to every 5 gallons of fuel in the tank, for the first two fillings only.

ENGINE COOLING SYSTEM

The capacity is approximately 8 gallons U.S.

1. Close drain cock in radiator bottom tank and close drain cock on right side of cylinder block near carburetor. Fill system with clean water (use soft or rain water if possible). Never pour cold water into an empty system if the engine is hot as it may cause the cylinder head of engine to crack.
2. If air compressor is to be operated in freezing temperatures (32°F. or lower) refer to "Cold Weather Operations".

FUEL SYSTEM

1. The air compressor engine is designed to operate on gasoline that has a maximum of 68 octane rating. To get the maximum efficiency we recommend you use the fuel for which the engine is designed and be sure the fuel used is clean and of good quality.
2. Fill the fuel tank with clean gasoline--The capacity of the fuel tank is approximately 50 gallons (U.S.)

Safety First. Never fill the fuel tank with an open flame near or when the engine is running. Keep funnel in contact with metal of fuel tank when filling to avoid the possibility of an electric spark igniting the vapors. See that vent hole in the fuel tank filler cap is kept open at all times to assure proper flow of the fuel.

STARTING THE ENGINE

PREPARATION FOR USE

1. It is advisable to locate truck so it will be as near level as possible to insure equal lubrication to all parts.
2. Check entire unit according to "Maintenance Schedule". Before starting a new engine or one that has been idle for any length of time, remove spark plugs and pour about two tablespoonfuls of mixture of half engine oil and half gasoline into each cylinder to insure lubrication of pistons and cylinder walls when engine first starts.
3. Check and make sure there is fuel in fuel tank. (Add one pint of light engine oil to every five gallons of fuel in tank for first two fillings only.)
4. Open valve in gasoline line located beneath fuel tank--operate hand priming lever of fuel pump to fill carburetor float chamber.
5. See that clutch is disengaged, (lever pulled away from engine).
6. Open drain cock in air receiver and allow any moisture to drain out--then close cock. NOTE: Repeat this every four to eight hours during operation, depending upon weather conditions.
7. With magneto ground switch in the "OFF" position (pushed in) and choke lever pulled all the way out, crank engine over one revolution. Push choke in half way and pull magneto ground switch to "ON" position and crank engine. It may not be necessary to choke a warm engine. If engine does not fire immediately, push in choke and continue to crank until engine fires. In extremely cold weather when starting is difficult, crank the engine with the choke all the way out for a few revolutions, or it may be necessary to remove spark plugs and pour a small amount of gasoline into each cylinder. Wait a few minutes for the gasoline to evaporate, pull ignition switch to "ON" position and crank.

Caution: Never operate cranking motor more than 30 seconds at a time without pausing to allow cranking motor to cool. Excessive cranking periods will cause cranking motor to overheat and fail.

8. After engine starts, allow to warm up a few minutes before starting the compressor.
9. When starting with pressure in receiver Tank, lift hand unloader lever on unloader pilot before starting compressor. See Ill. page 9.
10. To start compressor, engage the clutch by moving lever toward engine.
11. Trip hand unloader lever on unloader pilot after compressor reaches operating speed.
12. Trip intercooler and air receiver tank safety valves by hand to make certain of their operation.
13. If either engine or compressor oil gauge fails to show pressure, stop immediately and determine cause.

STOPPING THE ENGINE

1. Disengage clutch to stop compressor.
2. Allow engine to idle a few minutes, then push in magneto ground switch.
3. Open drain cock in air receiver tank.
4. It is advisable to close gasoline shut-off valve if the engine is to be stopped for any length of time.

PREPARING AIR COMPRESSOR FOR STORAGE

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

The following procedure should be followed when the unit is placed in storage for thirty days or more. Lubrication precautions should be repeated every six months thereafter.

1. Before shutting down air compressor, remove air cleaners and pour one-half cup of engine oil in each air intake, allow to run for approximately one minute and stop.
2. Wash, clean, and completely lubricate the engine and air-compressor. (Refer to "Maintenance Schedule".)
3. Drain both engine and compressor crankcases and refill to full mark with light engine oil. Run unit about five minutes to insure oil reaching all lines.
4. Drain water from cooling system, and leave drain cock open.
5. Disengage clutch by moving lever from engine.
6. Drain all fuel from tank, lines, pump and carburetor.

CAUTION: A gummy substance will form in the gasoline if it is allowed to stand in the tank, lines or carburetor. This gum accumulates in the carburetor jets and passages, causing serious damage.

7. When engine is cold, pour one-half cup of engine oil in each cylinder through spark plug holes. Then replace spark plugs but leave wires disconnected from plugs. Turn engine over several times to work oil in between pistons and cylinder walls. **REPEAT THIS OPERATION EVERY THIRTY DAYS.**
8. Open drain cock in air receiver allowing any water to drain and leave cock open.
9. Remove battery and store in a warm dry place. Make certain battery is filled to proper level and fully charged before storing.

CAUTION: Battery should be recharged every thirty days while it is in storage.

10. Inspect entire unit for worn or damaged parts which may later cause expensive repairs. While unit is in storage it is an excellent time to touch up any spots where paint has been removed.
11. Coat safety pop-valves with light grease to prevent corrosion.

STARTING AIR COMPRESSOR THAT HAS BEEN IN STORAGE

1. Remove spark plugs and pour about 2 tablespoonfuls of a mixture of half engine oil and half gasoline into each cylinder to insure lubrication of pistons and cylinder walls when engine first starts.
2. Install battery making certain connections are made to proper terminals. **NOTE:** This battery is grounded to positive terminal.
3. With magneto ground switch in "OFF" position (pushed in), crank engine over until the excess oil has been blown out of the spark plug holes. This operation will loosen any tight piston rings and wash the old gummy oil from the valves and pistons.
4. Drain engine and compressor oil pans and refill to full mark with proper grade of oil. (Refer to Lubrication Chart.)
5. Install spark plugs and connect cables to proper terminals.
6. Fill cooling system with clean soft water.
7. Fill fuel tank, open valve in gasoline line, operate hand priming lever of fuel pump to fill carburetor float chamber.
8. Close drain cock in air receiver tank.
9. Start engine and allow to run slowly until sufficiently warmed up before engaging compressor.

EXTREME WEATHER CONDITIONS

HOT WEATHER OPERATION

The Air Compressor will operate successfully in extreme temperatures without additional adjustments.

LUBRICATION

Particular care should be given that the engine and compressor are filled with proper grade of oil.

COOLING SYSTEM

Keep radiator filled with clean water. Radiator and Intercooler fins must be kept free of accumulated dirt, leaves, insects etc. Clean as described in Cooling System Page 13. Be sure fan belts are properly adjusted at all times.

EXTREME DUST CONDITIONS

Follow hot weather operation suggestions.

AIR CLEANERS

Check as often as necessary to insure against accumulation of dirt. **KEEP THEM CLEAN.**

COLD WEATHER OPERATION

If the Air Compressor is to be operated in temperatures of 32° F. or lower, observe the following precautions:

FUEL SYSTEM

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

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

LUBRICATION

Be sure to use the correct grade of lubricating oil in the engine and compressor crankcases, and air cleaners as specified in the "Lubrication Chart"

COOLING SYSTEM

When operating temperatures are 32° F. or lower, there is danger of the water freezing in the cooling system. To overcome this condition, use one of the recommended anti-freeze solutions shown below.

FREEZING POINT		® ANTI-FREEZE SOLUTIONS (32 U.S. QUART COOLING SYSTEM)								
		METHYL ALCOHOL			ETHYL ALCOHOL			ETHYLENE GLYCOL		
CENT.	FAHR.	APPROX. QUANTITY IN QUARTS (U.S.)	SPECIFIC GRAVITY	PER CENT BY VOLUME	APPROX. QUANTITY IN QUARTS (U.S.)	SPECIFIC GRAVITY	PER CENT BY VOLUME	APPROX. QUANTITY IN QUARTS (U.S.)	SPECIFIC GRAVITY	PER CENT BY VOLUME
-7°	20°	4	.9822	12.5%	5¼	.9796	16.5%	5¼	1.022	16.5%
-12°	10°	6½	.9726	20.5%	8¼	.9704	25.5%	8¼	1.034	25.5%
-18°	0°	9	.9638	28%	10¾	.9611	33.5%	10¾	1.044	33.5%
-23°	-10°	11	.9560	34.5%	13	.9511	40.5%	12½	1.051	39%
-29°	-20°	12½	.9493	39%	15¼	.9392	47.5%	14	1.058	44%
-34°	-30°	14	.9421	44%	17½	.9244	54.5%	15¼	1.062	47.5%
-40°	-40°	15¼	.9358	47.5%	20½	.9068	63%	16½	1.064	51.5%

® ABOVE FIGURES, COURTESY OF U.S. INDUSTRIAL CHEMICALS INC.

CAUTION: Do not use a solution of kerosene or other oils, calcium chloride, magnesium chloride, sodium silicate, or other inorganic salts, honey, glucose or sugar, or any alkaline solution, as they are injurious to metal or rubber parts.

COOLING SYSTEM CAPACITY IS 8 GALLONS, 32 QUARTS. (U. S.)

DRAINING THE SYSTEM

1. Open the drain cock located in cylinder block beneath carburetor.
2. Open the drain cock located in the radiator bottom tank.
3. Be certain that drain cocks are not plugged and system drains completely before closing cocks.

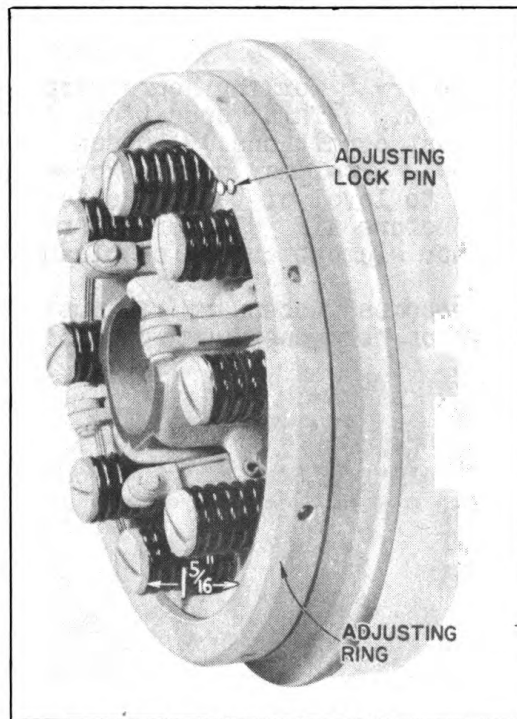
CLUTCH

The Air Compressor is equipped with an 11½" diameter, spring loaded, double plate, Twin Disc Clutch.

CARE OF THE CLUTCH

This type of clutch is designed to give long and continued service with very little adjustment. Due to the intermittent or shock loads common to this type of installation, the friction surfaces may wear and cause the clutch to slip sufficiently to overheat and damage the clutch plates and discs. This wear, which occurs while the clutch is in operation and carrying a maximum load, is automatically taken up by the heavy coil springs which bear against the pressure plate. When the clutch is new and is in "engaged" position, with the throwout collar assembly pulled away from the main clutch body, the pressure springs will measure approximately 1-5/16". As the friction discs wear these dimensions increase until the springs are extended as far as possible and can not automatically take up any additional wear. At this point the clutch will have to be adjusted in order to make use of the remaining life of the friction discs.

Lubrication is provided for by means of a grease cup which should be turned down snug at the start of each day and/or every eight working hours. When empty, refill the grease cup with WB-2 (Grease, general purpose No. 2) ball bearing grease, for operating temperatures of 200° F.



Twin Disc Clutch Adjustment

ADJUSTMENT

When adjustment becomes necessary pull out the adjusting lock pin and turn the adjusting ring to the right or clockwise about two and a half revolutions or until the springs are compressed to their original height in the "engaged" position of the clutch. **CAUTION** - Extreme care should be taken that when the clutch is disengaged the driving plates are "disengaged" and do not drag when the engine is idling. When the collar assembly is pushed out to engage the clutch, the pressure plate against which the springs bear should compress the springs to approximately 1-5/16".

MINOR COMPRESSOR SERVICE OPERATIONS

CYLINDER HEAD-COMPRESSOR

After a new compressor has been run a short time and is thoroughly warmed up it is advisable to check cylinder head stud nuts for tightness. Stop compressor and tighten all nuts a little at a time until all are tight. Go over all the nuts several times to make certain that all are uniformly tight.

AIR CLEANER

Clean air is assured in the compressor by the use of oil bath air cleaners. The air after entering the intake passes to the oil bowl where it goes through a bath of oil. As the air rises to the cleaner outlet it passes through a series of oil bathed screens where the fine dust is removed. As the oil from the screen works back down to the bowl, it carries with it the dust removed from the air. A relief valve is provided to by-pass the air returning from the cylinder heads when the compressor unloads eliminating the danger of the oil being forced out of the bowl. The air cleaner can work efficiently only so long as the bowl is free from accumulated dust. When dust accumulates in the bowl, the bowl must be removed and cleaned and refilled with new clean oil of the recommended viscosity.

OIL BOWL

Starting each day and/or every 8 working hours stop compressor and check bowl for accumulated dust. (This operation is advised at closer intervals under extreme dust conditions.) Loosen thumb screw and remove filter element and oil bowl. Bowl may now be cleaned by wiping with a rag and refilled with oil to level of bead. Relief valve felt should be brushed or wiped clean before air cleaner is reassembled. Every 100 working hours entire filter element should be cleaned thoroughly.

CAUTION: When cleaning becomes necessary it must be cleaned in light engine oil, not gasoline nor kerosene due to possibility of explosion in air receiver.

GENERAL PRECAUTIONS

As an added precaution against dirt entering compressor, inspect all connections and gaskets, making certain they are tight and in good conditions.

SAFETY VALVES

Safety valves are provided to prevent serious trouble if air pressure should rise above recommended limits.

AIR RECEIVER SAFETY POP VALVE

This valve is located in the air receiver tank and is set to trip at 125# pressure. Valve should be tripped by hand daily to prevent sticking. To trip, pull down lever on side of valve.

INTERCOOLER SAFETY POP VALVE

This valve located in the top tank of the intercooler performs the same function as the receiver safety valve except it is set to trip at 50#

pressure. Valve should be tripped by hand daily or every 8 hours to prevent sticking. To trip, pull down lever on side of valve.

CAUTION: If either the air receiver or intercooler safety pop valves trip when the compressor is set for normal operating pressure, it is an indication of trouble. The machine should be stopped immediately and the trouble corrected.

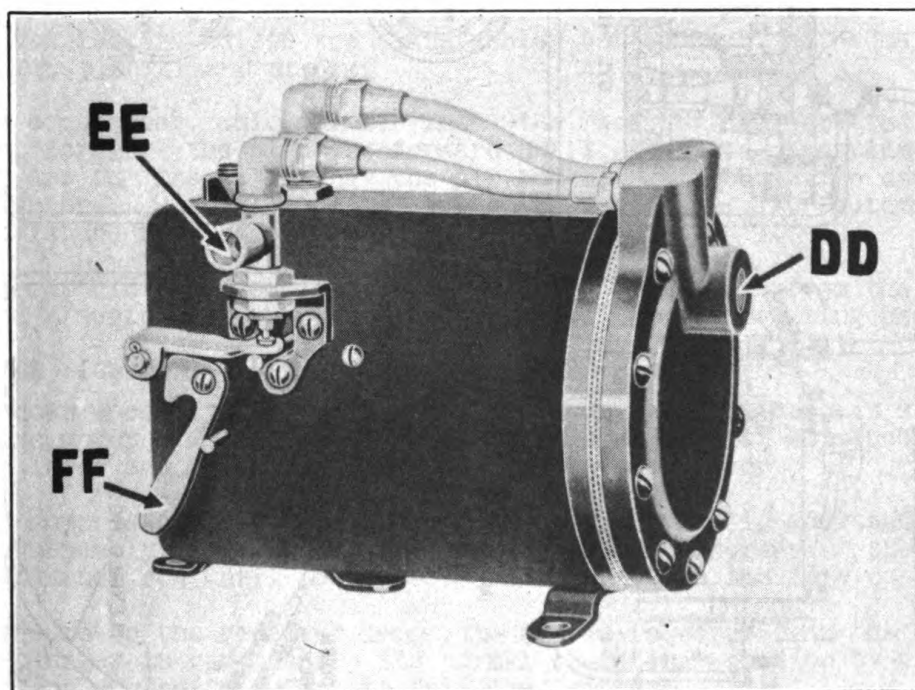
PRESSURE CONTROL SYSTEM (See Diagram next page)

OPERATION

The purpose of the control system is to regulate automatically the operating pressure of the compressor within set limits.

Regulation of pressure is accomplished in the following manner: When the pressure in receiver "A" reaches a predetermined maximum (approximately 100 lbs.) it causes the pilot unloading valve "B" to trip and admit air from the receiver to unloader valve "C", intercooler relief valve "D" and slowdown assembly "E", there unloading the compressor by holding the intake valves open, relieving the intercooler pressure to atmosphere and idling the engine by closing the carburetor butterfly valve.

When pressure in receiver "A" drops to a predetermined minimum, (approximately 88 pounds) the pilot unloading valve again trips and allows the air to escape from unloader "C" intercooler relief valve "D" and slowdown assembly "E" and pass through check and bleed valve "F". Check and bleed valve "F" is constructed so that air from the slowdown assembly can escape freely while air from the unloaders and intercooler relief valve is restricted, thereby causing a time delay and allowing the engine to attain normal operating speed before the compressor load comes on.



BACK VIEW TYPE GI UNLOADER PILOT
DD--Connection to air receiver
EE--Connection to cylinder heads
FF--Hand unloader lever

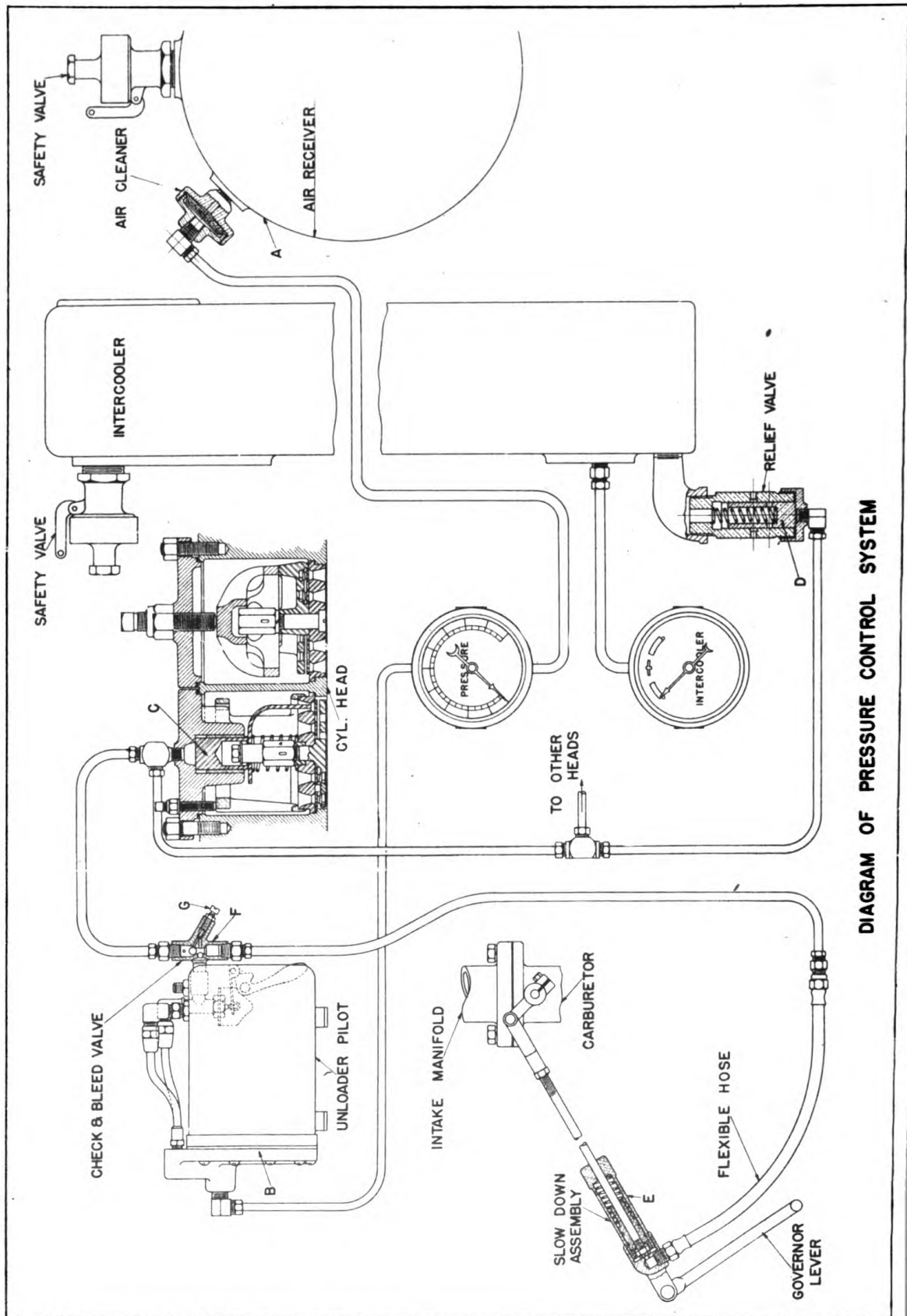


DIAGRAM OF PRESSURE CONTROL SYSTEM

UNLOADER PILOT SWITCH (PENN ELECTRIC SWITCH CO. TYPE GI)

The Penn Unloader Pilot automatically unloads and loads the compressor on the rise or drop in receiver pressure. The unloader pilot has been correctly set for pressure and sealed at factory. If adjustment becomes necessary consult a competent mechanic.

When starting compressor lift hand unloader lever "FF" (See figure) which places equipment in unloaded position relieving compressor of heavy starting load. When compressor reaches normal speed, move hand unloader lever "FF" to running position as shown.

SUCTION UNLOADERS

The suction unloaders are located in the cylinder heads directly over the suction valves. The purpose of these unloaders is to hold the suction valve open and unload the compressor when desired receiver pressure is reached. This is accomplished by admitting air from the receiver to the unloader, which forces the plunger down. When the plunger moves down it contacts a set of fingers which hold the valve open. While the suction valves are open, compression cannot take place in the cylinders.

When the pressure in the receiver drops, air is released from the unloader and a spring under the fingers returns the plunger to its original position, allowing the compressor to start pumping again.

The unloader bodies are fitted to very close tolerances. This eliminates the use of piston rings or other packing. Because of the close tolerances held between the body and plunger it is necessary to service the suction unloaders as a complete assembly.

INTERCOOLER RELIEF VALVE

This valve is located in the intercooler bottom tank. It consists of a cylinder, plunger and spring.

When the compressor unloads, air from the receiver is admitted to the cylinder, forcing the plunger forward until holes in the plunger and cylinder are in line, allowing the air in the intercooler to escape to the atmosphere. When the relief valve by-passes air, it automatically drains moisture from receiver.

When pressure in the receiver drops, air is released from the relief valve and a spring returns the plunger to its normal operating position.

CARBURETOR SLOWDOWN

The slowdown assembly is designed in such a way that it becomes a part of the engine governor rod. One end of this assembly is attached to the governor lever and the other end to the carburetor lever.

When the compressor unloads, air from the receiver is admitted to the slowdown assembly, forcing the plunger outward and increasing the length of the governor rod until the carburetor lever is in the idle position.

When pressure in the receiver drops, the air is released from the slowdown and the plunger is returned to its normal operating position by a spring, allowing the engine to return to full load speed.

CHECK AND BLEED VALVE

This valve is inserted in the control air line between the pilot unloading valve and the unloaders, intercooler relief valve and slowdown.

The purpose of this valve is to allow the air to flow freely into the unloaders, intercooler relief valve and slowdown when the compressor unloads and to restrict the escape of air from the unloaders and relief valve and at the same time allow air to escape rapidly from the slowdown when the compressor load is applied to the engine.

To change time delay, adjust screw "G" (Plate No. 2S-14-1) on side of valve. Turn screw inward to increase time delay and outward to decrease time delay.

This valve is adjusted for best performance. Do not change it unless it is absolutely necessary.

COOLING SYSTEM

GENERAL

The engine is equipped with an efficient bypass-type thermostatically controlled cooling system.

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

The air compressor is air cooled and requires no special attention.

TO CLEAN OUT DIRT AND SLUDGE

1. Drain the cooling system by opening drain cock in lower radiator connection and in cylinder block (located beneath carburetor). Allow system to drain and close cocks.
2. Fill the cooling system with a solution of $2\frac{1}{2}$ pounds of ordinary washing soda mixed with 8 U.S. gallons of water (cooling system capacity.)
3. Leave the radiator filler cap off and run engine until water is hot, then drain and flush the system with clean water.
4. 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.

INTERCOOLER CORE

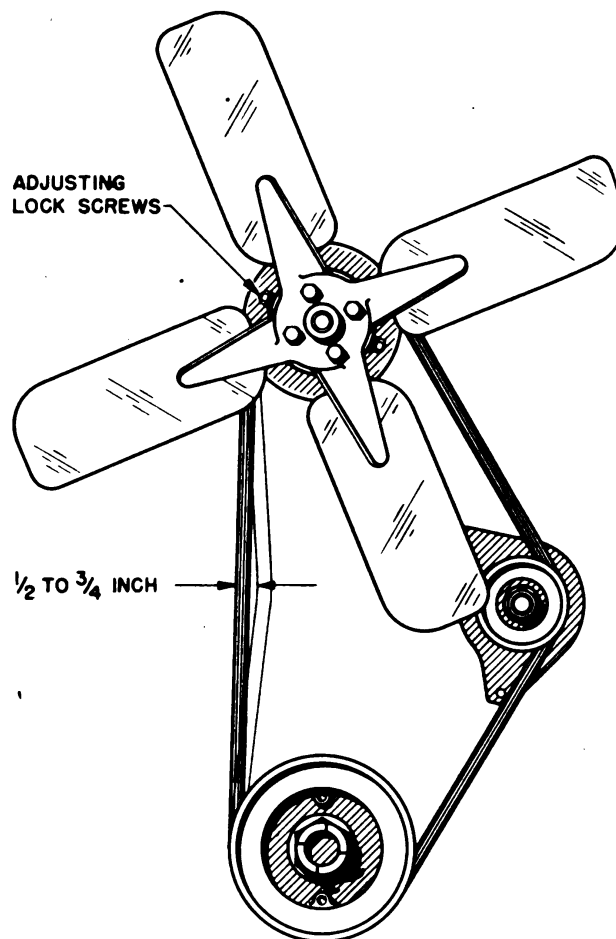
The intercooler core is similar to the radiator except air travels through the core instead of water. It requires no internal cleanings but fins should be cleaned as described in "Radiator Core".

FAN BELT TENSION

The adjustment of fan belts should be checked frequently to assure maintenance of the correct tension. The tension is correct when the belts can be depressed without effort, approximately $1/2$ to $3/4$ inch midway between the pulleys. (As shown in illustration).

ADJUSTING THE BELTS

Adjust the tension of a fan belt by changing the width of the groove in the fan pulley. To change the width of the pulley grooves loosen the lock screws and move pulley flanges together to tighten it and apart to loosen it. Retighten the lock screws after correct tension is obtained. After a new belt has been run approximately 64 hours check the tension and adjust it again if necessary. The belt should at no time contact the bottom of the pulley groove because this will cause the belt to wear rapidly. Adjust the pulley for a narrower groove, if this is possible, without increasing the tension more than allowable. Having a "V" belt tighter than the tension specified, will also result in excessive wear.



Correct "V" Belt Tension

REMOVING THE FAN BELTS

To remove a fan belt, loosen the set screw in the fan pulley flange and move flanges out as far as possible. Start the belt over the outer flange of the lower pulley and pry it out with a light bar or rod. Slowly crank the engine at the same time and the belt will work off over the top of the fan blades.

the pulleys. The belt can now be worked

REPLACING FAN BELTS

The fan belt should be replaced with a new one when it becomes soaked with grease, or when it becomes so badly worn that it does not drive the fan at the proper speed. When replacing the belt, reverse the procedure outlined under "Removing the Fan Belts" except the belt can be started on the lower pulley by hand, and, by slowly cranking the engine, the belt will find the correct position.

WATER PUMP

The water pump may leak, due to wear after considerable use. If this occurs see "Repair of Water Pump", Maintenance Section "Cooling".

ELECTRICAL EQUIPMENT**PRECAUTIONS**

Before working on any part of the Electrical System, disconnect the Battery ground cable. Do not reconnect this cable until all the connections have been made. This will avoid short circuiting and possible damage to any of the electrical units.

Be sure that all of the terminals are clean and securely fastened. Make certain there are no broken wires anywhere in the electrical circuit.

STORAGE BATTERY**GENERAL DESCRIPTION**

The battery is a 6 volt Globe-Union #134.

CARE OF BATTERY

To insure proper life of battery it is important that the electrolyte be kept at the proper level at all times. The water level in all cells should be at least 3/8" but not over 5/8" above the top of the separators. When the level is too high the electrolyte leaks through the vent plugs. When too low the separators and plates may be damaged due to drying and warping.

Only distilled water or water of known purity should be added to electrolyte. Impurities present in most natural waters can cause severe injury to the plates, decrease efficiency and materially shorten the life of the battery. In cold weather when the temperature falls to 32° F., water should be added immediately before the start of a run. This will permit the charging process to thoroughly mix the water and electrolyte and will prevent the added water from freezing.

Inspect the battery at the start of each day to maintain the water level and check the specific gravity every 64 hours. The specific gravity of the electrolyte should be tested with a reliable hydrometer. All cells will have an approximate gravity reading of 1.285 when fully charged and 1.150 when completely discharged. See Chart for the variations of specific gravity with temperature.

The battery cable terminals must be kept clean and tight. Corroded terminals may be cleaned by washing in pure ammonia or a saturated solution of soda bicarbonate. Cleaning solution must be rinsed away with clear water.

CAUTION: Scraping of terminals is not advisable due to danger of damaging the lead coating. After terminals have been cleaned a light coating of CG-(Grease, general purpose) will restrict the formation of this corrosion. Make certain battery is fastened securely to carrier frame.

MAGNETO**GENERAL DESCRIPTION**

The engine is equipped with a high-tension American Bosch Magneto Model MJC4C which is designed and built in accordance with the latest ignition practices. It is superior from the standpoint of performance, long life, and trouble-free operation.

BATTERY TESTING CHART

CONDITION	CAUSE	PROCEDURE	REMEDY
1. Hydrometer test shows all cells over 1.250 Sp. Gr. and readings practically equal (within 10 or 15 points).	Battery is probably in good condition.	Battery does not require a recharge in summer months, but may require a boosting charge in cold weather.	Examine battery terminals to see that they are tight and clean; ascertain charging rate of generator.
2. Hydrometer test shows all cells reading 1.250 or less and readings practically equal (within 10 or 15 points).	Demand from battery greater than input from generator.	Recharge battery.	Make a thorough check on electrical system for short circuits, loose connections, and charging rate of generator. Recommend an increase in charging rate to suit
3. Cells unequal (20 or more points variation) and highest reading over 1.225 Specific Gravity.	a. Short circuit in low cell or cells. b. Evaporation caused by overcharging. c. Unnecessary addition of acid. d. Loss of electrolyte by leakage.	Make momentary high rate test on each cell.	If high rate test shows all cells are within 1-10 volt of each other, recharge battery until gravity of electrolyte remains constant for 4 hours. Adjust gravity of all cells by adding water or small amount of acid (1.400 Sp. Gr. or less).
4. Cells unequal (20 or more points variation) and highest cell reading 1.225 or less.	a. Short circuit in low cell or cells. b. Evaporation caused by overcharging. c. Unnecessary addition of acid. d. Loss of electrolyte by leakage.	Recharge battery, if possible, and then make momentary high rate discharge test on each cell.	If battery takes a recharge and high rate test shows all cells within 1-10 volt, adjust gravity of all cells by adding water or small amount of acid (1.400 Sp. Gr. or less).
5. Hydrometer tests show cells with gravity readings over 1.300 at 80 deg. Fahr.	a. Unnecessary addition of acid to cells. b. Addition of battery compounds commonly known as battery "dope" solutions.	a. If battery has not been operated for a long period or at an excessively high gravity, this condition may be remedied by careful treatment. b. No positive assurance can be given that conditions arising from the use of battery compounds can be remedied. A number of battery manufacturers construe the use of battery "dope" solutions as grounds for cancelling their warranty.	a. Drain out all solution from cells. Refill with dilute (1.100 Sp. Gr.) electrolyte and charge at a low rate of current until gravity of electrolyte remains constant for 4 hours. Then drain cells again and refill with 1.285 Sp. Gr. electrolyte and after 3 hours charging adjust gravity to 1.285. Continue charge until the gravity of all cells is constant for a period of 2 hours. b. Treat as in preceding paragraph (a). UNDER NO CIRCUMSTANCES SHOULD BATTERY COMPOUND BE INTRODUCED INTO A BATTERY.
6. Battery is fully charged but hydrometer tests show gravity to be 1.265 or less at 80 deg. Fahr.	Excessive evaporation usually caused by overcharging.	Adjust gravity of electrolyte to proper limits by adding small amount of acid (1.400 Sp. Gr. or less).	Ascertain charging rate of generator and reduce the rate if necessary.

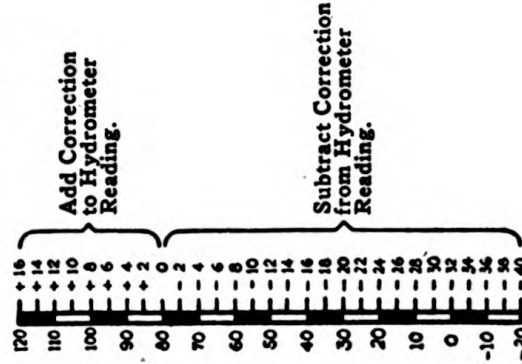
7. Frequent additions of water to all cells of battery.	Excessive overcharging.		Reduce charging rate of generator.
8. Container cracked causing frequent additions of water to one cell of battery.	a. Loose installation. b. Stone bruise. c. Frozen battery.		Replace with new container.
9. Bulge in battery container.	Excessive temperature probably caused by overcharging.	Same as for condition No. 3 or No. 4.	If high rate test indicates any weak cells, the battery probably is beyond repair. In all cases, ascertain charging rate and reduce the rate if necessary.
10. Corrosion on battery terminals.	a. Excessive charging rate causing spray of acid on terminals. b. Lead coating destroyed on terminals.	Remove terminals from posts. Clean posts and terminals thoroughly. Replace terminal cable if corroded excessively.	Grease terminals and posts thoroughly to prevent access of acid to terminals, bolts and nuts. Ascertain charging rate and reduce rate if necessary.
11. Broken terminal posts.	a. Loose battery installation. b. Terminal cable too short.	Remove battery and build up new terminal post.	Replace terminal cable with one of proper length; tighten battery in carrier and also battery terminals on posts.

To diagnose the conditions stated in the foregoing paragraphs the battery station must have the following tools:

1. A good, accurate hydrometer graduated to read from 1.100 to 1.325 with divisions to indicate differences in gravities within ten points.
2. A good, accurate thermometer graduated to read as high as 115 deg. F. Many batteries are damaged because of high temperatures; this condition can only be determined by means of a thermometer.
3. A good, single-cell type voltmeter having a 3-volt scale with division showing 1/10 of a volt (possibly an additional scale reading 15 volts to read total battery voltage).
4. A good, high-rate discharge tester; this instrument may be either a single-cell tester or a more elaborate type adapted to test the complete battery.

CHARGING INSTRUCTIONS. Regular starting and lighting batteries should be charged at a current rate not exceeding one ampere per positive plate. A rate of four or five amperes is usually suitable for the majority of batteries. During the charge, a thermometer should be used to check the temperature of the electrolyte in the cells. If the temperature exceeds 110 deg. F., reduce the charging rate immediately, or else discontinue the charge until the battery temperature is less than 90 deg. F. Charge the battery until all cells gas freely and the specific gravity of the electrolyte remains constant for 4 hours. Adjust

Corrections for Hydrometer Readings When Battery Temperature Is Above or Below 80 Deg. F.

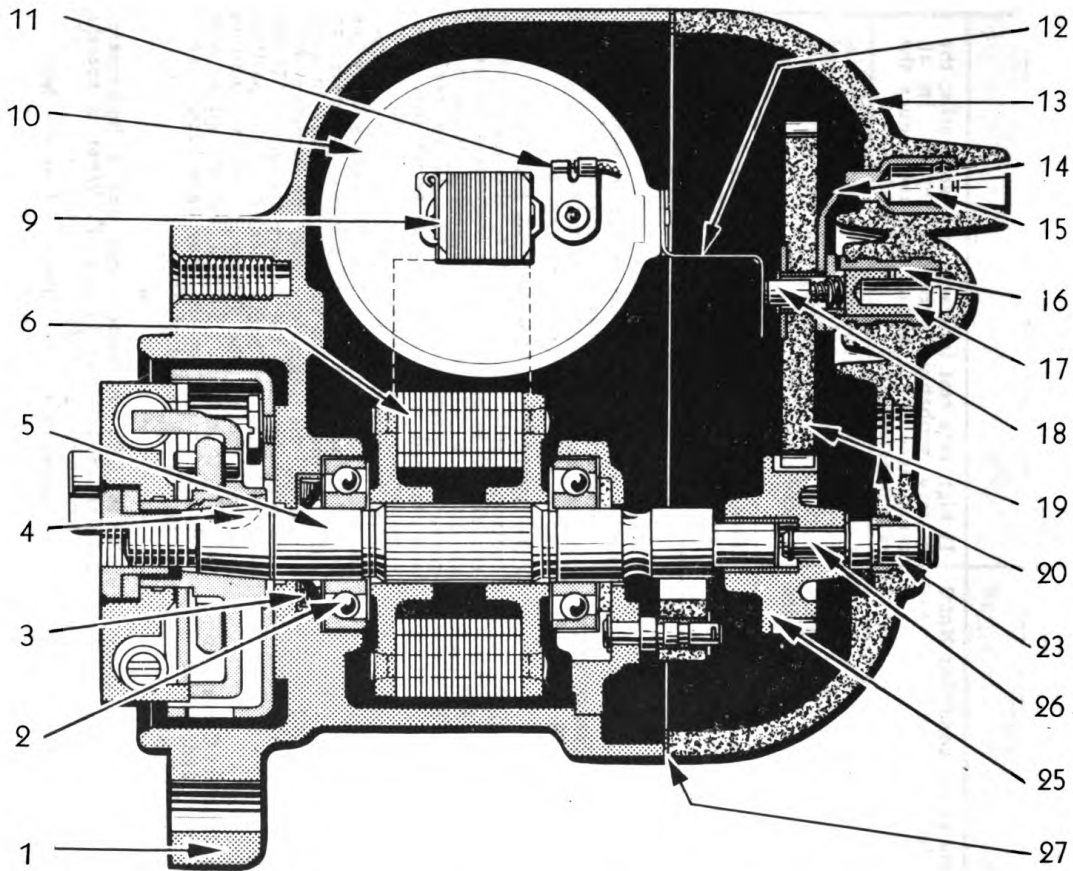


gravity of cells at end of charge to proper limits if necessary. The specific gravity of a fully charged battery should be between 1.275 and 1.295 at a temperature of 80 deg. F.

CONDITIONS WITHIN THE BATTERY. No battery should be returned to the manufacturer nor should it be opened for inspection before its condition is diagnosed in accordance with the procedure given in this chart. When readings are obtained with the high-rate tester that differ considerably more than 1/10 of a volt, as described in paragraph No. 3 or No. 4, it is proper to open the battery. The separators may be found to be worn thin in places, or broken, or split. If the plates in such a battery are in good condition, the separators may be replaced with new separators and the battery recharged. If the positive plates are badly buckled or the positive grids are broken, the battery is not in condition for further service. Such a battery either was badly overcharged or else may have been in service for a long period of time.

EXAMPLE: A battery cell has a hydrometer reading of 1.245 at 10 deg. F. What is specific gravity at 80 deg. F.?

From correction scale, illustrated at the left, we find that the correction is minus 28 points in gravity. Subtracting 28 points from hydrometer reading gives the correct specific gravity of the battery, 1.217 at 80 deg. F.



Longitudinal Section Thru Magneto

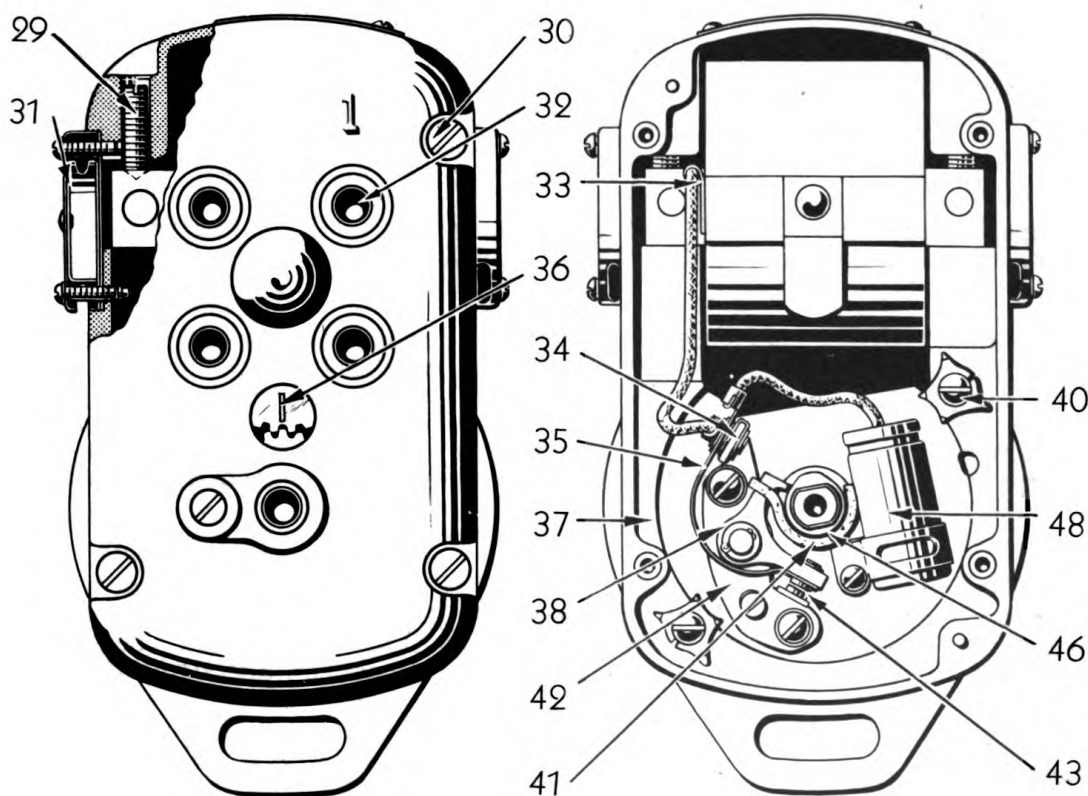
NOMENCLATURE

- | | |
|----------------------------|-------------------------------|
| 1. Magneto housing | 14. Electrode |
| 2. Ball bearings | 15. Cable clip |
| 3. Oil seal | 16. Distributor gear bearing |
| 4. Woodruff key | 17. Distributor gear shaft |
| 5. Magnet rotor shaft | 18. Dist. gear brush & spring |
| 6. Alnico magnet | 19. Distributor gear |
| 9. Coil core | 20. Observation window |
| 10. High tension coil | 23. Rotor gear shaft bearing |
| 11. Terminal clip | 25. Magnet rotor gear |
| 12. High tension conductor | 26. Magnet rotor gear shaft |
| 13. Distributor plate | 27. Distributor plate gasket |

The numerals contained in the following paragraphs are illustrated in the Magneto cross section drawings.

The MJC edition C series magnetos employ the induction principle of current generation, the coil windings (10) being stationary and magnet

(6) rotated between laminated pole shoes (37). The condenser (48) and interrupter are also stationary. Labrynth type ventilators (31) are mounted on either side of the magneto housing (1). Magnet rotor ball bearings (2), packed in high-temperature American Bosch U.S. 508 grease, require no additional lubricant for at least one year. Use WB-2 (Grease, general purpose No. 2). The distributor gear bearing (16) is of bronze, requiring lubrication only at yearly intervals. A single casting (1), the open end of which is covered by the distributor plate (13), encloses the magneto. An observation window (20) in the distributor plate (13)



Cross Section Thru Magneto

NOMENCLATURE

- | | |
|------------------------------|--------------------------------|
| 29. Coil mounting screw | 37. Pole shoes |
| 30. Dist. plate fast: screw | 38. Interrupter lever |
| 31. Ventilator | 40. Inter. holding brkt. screw |
| 32. Cable tower | 41. Cam felt wick |
| 33. Coil cable | 42. Adj. contact bracket |
| 34. Insulated bracket | 43. Contact points |
| 35. Inter. operating spring | 46. Cam |
| 36. Line on distributor gear | 48. Condenser |

with a line (36) on the distributor gear (19) facilitate timing the magneto to the engine.

The new type 1CA coupling used with this magneto represents an improved coupling design. The cushioned action of the coupling minimizes wear and eliminates the metallic click produced with previous designs.

LUBRICATION

Cam lubricating felt wick (41) is saturated with Mobile grease No. 2 at the factory and should be re-lubricated every 512 hours with OE-30 (oil, engine SAE30). The ball bearings are packed with American Bosch U.S. 508 grease and should be repacked with WB-2 (Grease, general purpose No. 2) every 2048 hours. Extreme care must be exercised so that contact points remain free from oil and grease. When a periodic repair of the engine is undertaken the magneto should be completely checked and overhauled if necessary by a competent mechanic. See page 54.

SPARK PLUGS

The spark plugs selected after careful tests as best suited for this engine are the Champion No. 6 Comm. or AC No. 83 Spec. and should be used ordinarily. Use only a full set of either type.

Remove spark plugs every 256 working hours, or oftener if necessary, for cleaning and checking the gaps between electrodes. A gap of .025" to .030" should be maintained at all times. When making this adjustment, always bend the outer electrode. Never bend the center electrode as it may damage the insulator. If the gap between electrodes is too great, due to improper setting or burning off the ends, the engine will misfire and be hard to start.

CLEANING SPARK PLUGS

The recommended method of cleaning spark plugs is sand-blasting. Never scrape or clean the insulator with anything which will scratch the porcelain, because scratched porcelain allows carbon and dirt to accumulate much faster.

SPARK PLUG CABLES

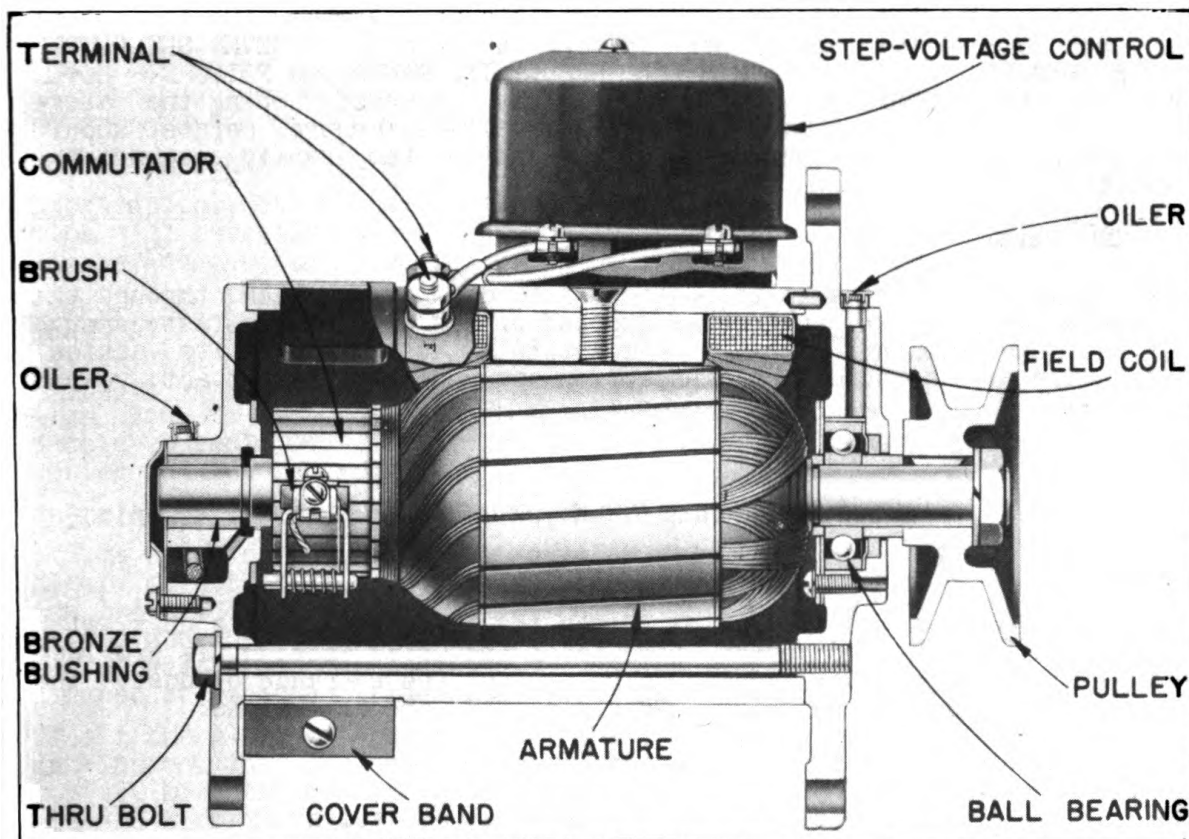
If the spark plug cables are removed for any reason, note the position of each cable on the magneto. (Wiring diagram (page 53) shows correct wiring.)

There should be 1/4" minimum clearance between the spark plug cables and the cylinder head; by maintaining this clearance, shorting-out the spark plug will be prevented, and the cable will be away from the extreme heat of the cylinder head. If a cable is allowed to touch the cylinder head, the heat of the engine will soon cause the rubber to become soft and the cable will be ruined.

DELCO-REMY MODEL 1101374 GENERATOR

GENERAL

Delco-Remy Model 1101374 Generator is a 2 pole, third brush, sealed type unit, with a ball bearing in the drive end and a bronze bushing in the commutator end to support the armature and is used in connection with a step-voltage control unit, Model 5889.



Longitudinal Section Thru Generator

LUBRICATION

The two hinge cap oilers should be supplied with 8 to 10 drops of OE (oil, engine) crankcase grade every 64 hours. Do not oil excessively. Never oil commutator.

CARE AND OPERATION

Inspection--The cover band should be removed and the commutator and brushes inspected at regular intervals. If the commutator is dirty, it may be cleaned with No. 00 sandpaper. Blow out dust.

CAUTION: NEVER USE EMERY CLOTH TO CLEAN COMMUTATOR.

If the commutator is rough, out of round, or has high mica, the generator must be removed from engine and referred to a competent mechanic.

Worn brushes should be replaced. They can be seated with a brush seating stone. The brush seating stone is an abrasive material which, held against the revolving commutator, carries under and seats the brushes in a few seconds. Blow out dust.

CAUTION: NEVER USE EMERY CLOTH.

ADJUSTMENT

The output of the generator may be adjusted by moving the third brush in the direction of armature rotation to increase the output and in the opposite direction to lower the output. Third brush generator output should be checked and adjusted at the voltage specified since the generator output increases with voltage. Normally, if the generator is checked with an accurate ammeter and a fully charged battery is not

available, connect a 1/4 ohm variable resistance into the circuit and cut in resistance until the proper voltage is obtained. NEVER SET OUTPUT ABOVE SPECIFIED SETTING AS THIS WILL RESULT IN GENERATOR FAILURE. NOTE: Make sure the generator field is directly grounded during the above check and adjustment--that is, either the voltage control points should be closed, or a jumper lead should be used to temporarily ground the generator "F" terminal.

CUT-OUT RELAY

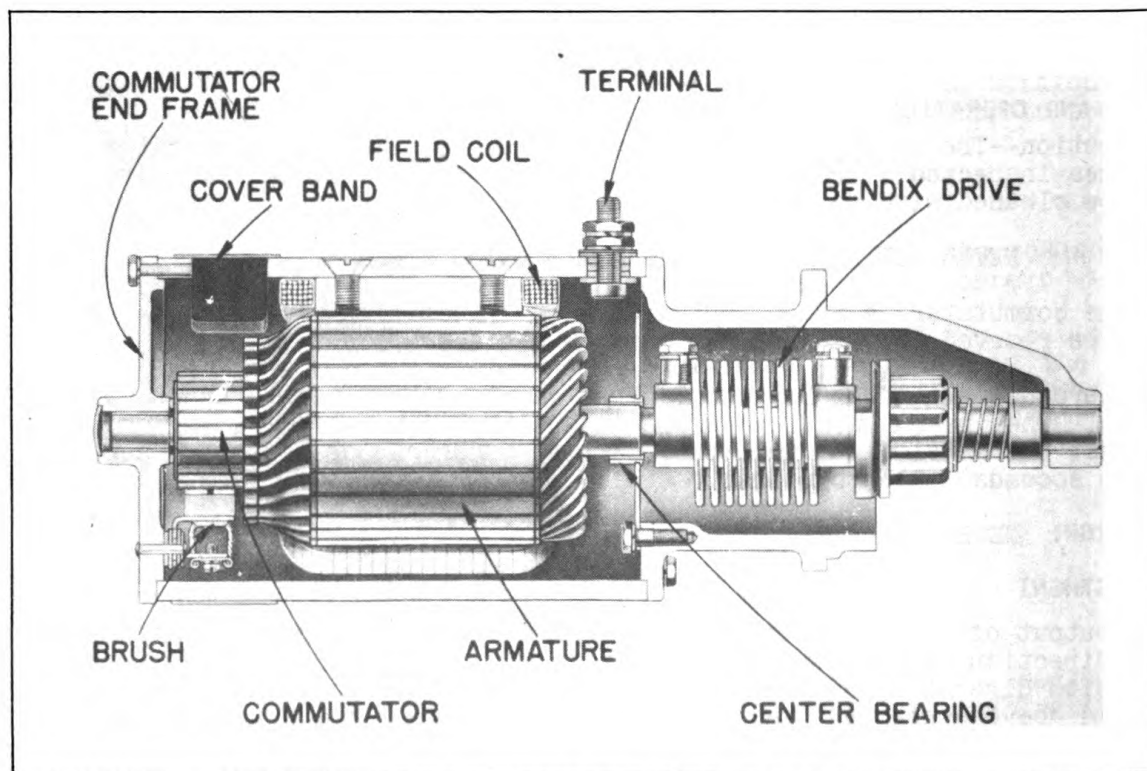
The cut-out relay prevents the battery from discharging back through the generator whenever the engine has stopped or is not running fast enough for the generator to charge. It is entirely automatic in its action, but should have an occasional inspection to see that the contact points are clean.

DELCO-REMY MODEL 700 CRANKING MOTOR

GENERAL

The Delco-Remy Model 700 Cranking Motor is a 6-volt, 6 pole unit with oilless bearings at the center, commutator and drive ends, and is provided with a sealed type cover band to guard against the entrance of dust. The motor uses a Bendix type drive. Specifications are as follows:

Clockwise rotation viewing drive end.
 Brush spring tension 36-40 ounces.
 No load--3000 r.p.m. at 70 Amperes at 5.0 volts
 Lock Torque test--19 lb. ft. at 500 amperes at 3.0 volts



Digitized by Google
 Original from
 UNIVERSITY OF CALIFORNIA

CRANKING MOTOR MAINTENANCE

Cranking motor maintenance may be divided into two sections, normal maintenance required to assure continued normal operation of the cranking motor, and the checks and repairs of an inoperative cranking motor.

NORMAL MAINTENANCE

Lubrication: Since the bearings are all of the oilless type, no lubrication will normally be required. A few drops of OE-10 (oil, engine SAE10) can be added to each bearing during the disassembly-assembly procedure.

Inspection: The cover band should be removed and the commutator and brushes inspected at regular intervals. If the commutator is dirty, it may be cleaned with #00 sandpaper. Blow out dust. Never use emery cloth to clean commutator. If the commutator is rough, out of round, or has high mica, it should be referred to a competent mechanic. Worn brushes should be replaced. If brushes wear rapidly, check for excessive brush spring tension and roughness or high mica on the commutator.

CHECKING OF IMPROPERLY OPERATING CRANKING MOTOR

If the cranking motor does not develop rated torque and cranks the engine slowly or not at all, check the battery, battery terminals and connections, and battery cables. Corroded, frayed, or broken cables should be replaced and loose or dirty connections corrected. The cranking motor switch should be checked for burned contacts and the switch contacts cleaned or replaced if necessary.

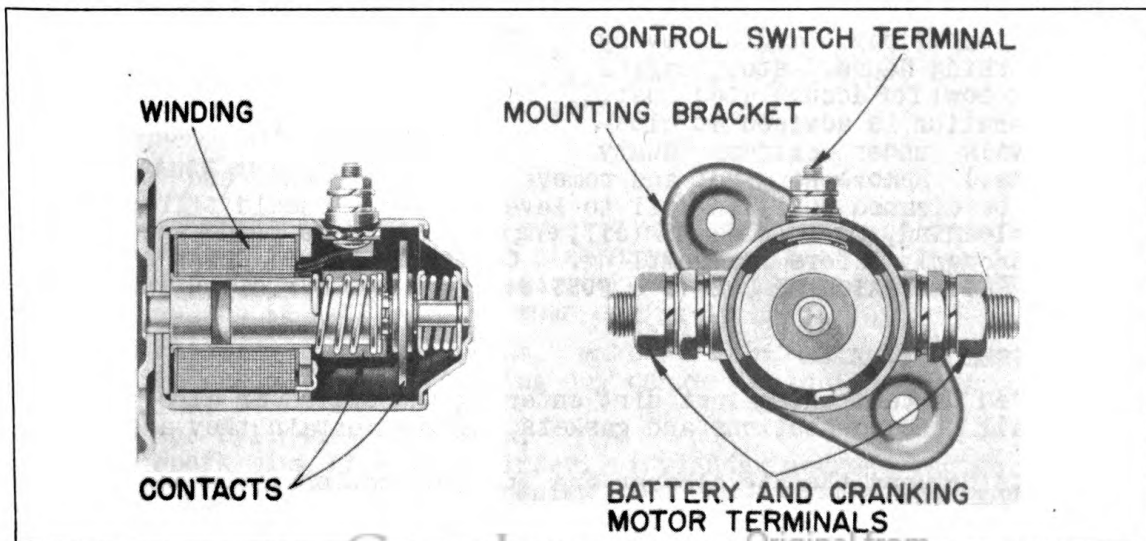
If all these are in order, remove the cover band of the cranking motor and inspect the brushes and commutator. The brushes should form good contact with the correct brush spring tension. A dirty commutator can be cleaned with a strip of No. 00 sandpaper held against the commutator with a stick while the cranking motor operates.

CAUTION: NEVER USE EMERY CLOTH TO CLEAN COMMUTATOR.

If the commutator is very dirty, or burned, or has high mica, the cranking motor should be removed and referred to a competent mechanic to take a cut off the commutator in a lathe.

DELCO-REMY MODEL 1459 MAGNETIC SWITCH

The Delco-Remy Model 1459 Magnetic Switch does not require servicing other than to check periodically to make sure the mounting and connections are tight and in good condition.

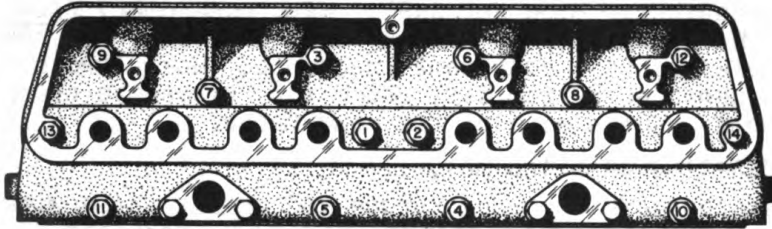


Longitudinal & Cross Section Thru Magnetic Switch

MINOR ENGINE SERVICE OPERATIONS

CYLINDER HEAD ENGINE

After a new engine has been run a short time and is thoroughly warmed up, it is advisable to check the cylinder stud nuts for tightness. Stop the engine and first tighten the center cylinder head stud nut, and then proceed as outlined in chart, putting an equal tension on all the nuts. Go over the nuts several times to make certain that all are uniformly tight before starting engine.



Sequence for Tightening Cylinder Head Nuts

CAUTION

Be sure to adjust the valve tappet clearance after retightening cylinder stud nuts. (See valve clearance adjustment).

AIR CLEANER

Clean air is assured in the engine by an oil bath air cleaner. The air after entering the intake passes to the oil bowl where it goes through a bath of oil. As the air rises to the cleaner outlet it passes through a series of oil bathed screens where the fine dust is removed. As the oil from the screen works back down to the bowl, it carries with it the dirt removed from the air. The air cleaner can work efficiently only so long as the bowl is free from accumulated dust. When this dust accumulates in the bowl, the bowl must be removed and cleaned and refilled with new clean oil of the recommended viscosity.

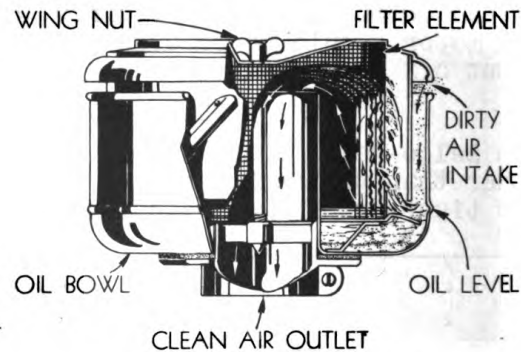
OIL BOWL

Starting each day and/or every eight working hours, stop engine and check bowl for accumulated dust. (This operation is advised at closer intervals under extreme dusty conditions.) Remove wing nut and remove filter element and oil bowl. Bowl may be cleaned refilling oil to level of bead. Should filter element require cleaning, dip in clean OE (oil, engine) crankcase grade and allow to drain thoroughly before reassembling. **CAUTION. DO NOT CLEAN COMPRESSOR AIR CLEANERS IN GASOLINE DUE TO A POSSIBILITY OF AN EXPLOSION IN AIR RECEIVER.**

GENERAL PRECAUTIONS

As an added precaution against dirt entering the engine or air compressor inspect all hose connections and gaskets, making certain they are tight.

All joints between the air cleaner and the connections between the manifold and the cylinders of the engine should be tight. All gaskets must be in good condition and the bolts should be drawn up tight.

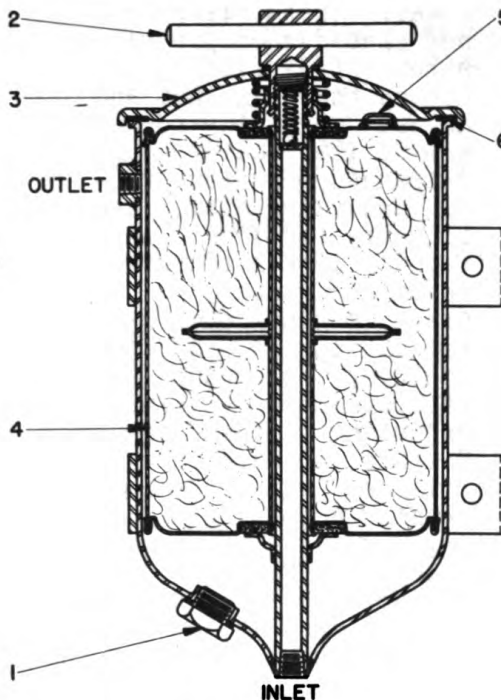


Air-Maze Air Cleaner

OIL FILTER

The life of the engine depends mainly upon clean oil being circulated to all bearings. Minute particles of foreign matter eventually accumulate in the engine crankcase and in the normal course of operation the lubricating oil undergoes changes which produce sludge, acids, gums, varnish and other harmful by-products.

The purpose of the oil filter is to separate and remove the dirt and other foreign substances from the oil thereby preventing these injurious materials from being circulated through the engine. This filter is efficient only so long as the element is not saturated with these foreign particles or substances. When the element becomes saturated to the point it can no longer remove foreign substances from the oil, it loses its efficiency and the element must be replaced. The interval between element replacements depends entirely upon operating conditions. After every hundred working hours when the crankcase oil is changed, if the oil removed was black and dirty, it is an indication that cartridge must be replaced.



N1744 Purolator Oil Filter

SERVICING INSTRUCTIONS

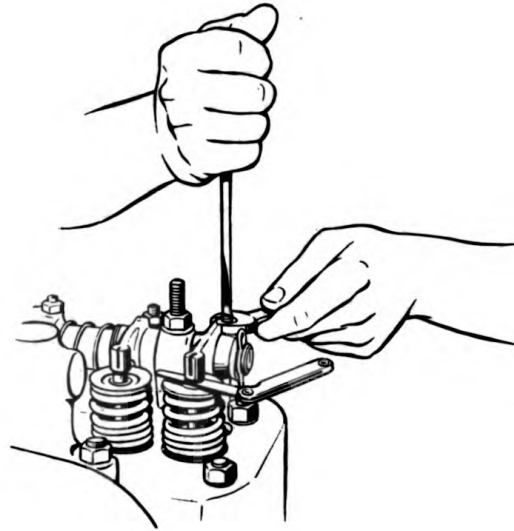
1. Stop engine.
2. Drain filter by removing drain plug. (1)
3. Turn handle (2) in counter-clockwise direction to remove cover. (3)
4. Lift out old element (4) by using handle (5) on top of element. (Element is the non-cleanable type and must be replaced.)
5. Insert new element and new cover gasket (6) making certain handle end is on top.
6. Replace cover making certain gasket is in good condition and turn handle in clockwise direction, until secure, **HAND TIGHT**.
7. After starting engine check for leaks.

VALVE CLEARANCE ADJUSTMENT

Check valve clearance every four hundred working hours of operation and adjust clearance if necessary. A clearance of .015 of an inch is necessary between valve stem ends and rocker arm tappets when valves are closed and engine is warm - .018" when engine is cold.

1. Before checking valve clearance, make certain magneto ground switch button is pushed in eliminating any danger of accidentally starting the engine.
2. Remove the cylinder head cover.
3. Remove spark plug from #1 cylinder. (Cylinder nearest radiator.)
4. Place thumb over spark plug opening and crank engine slowly until an outward pressure can be felt. Pressure indicates #1 piston is moving toward upper dead center of compression stroke.

5. Continue to crank slowly until top dead center position is indicated by timing pointer on fly-wheel. Both valves are now closed on compression stroke of #1 cylinder.
6. Loosen the lock nut and adjust screw in rocker arm so that feeler gauge slips snugly between tappet and valve stem. (See illustration.)
7. Tighten lock nut and re-check clearance.
8. Crank engine one half revolution at a time checking clearance of each cylinder's valves, adjusting if necessary. Do this on each set of cylinder valves in succession according to firing order of the engine which is 1-2-4-3.



Adjusting Engine Valves

9. Replace the cylinder head cover. Check to see that cylinder head cover gasket is in good condition and makes an oil-tight seal with cylinder head. Replace the gasket if necessary.

IMPORTANT Be accurate - use an accurate feeler gauge for checking valve clearance.

OPERATOR'S INSTRUCTIONS

CARBURETOR

GENERAL DESCRIPTION

The general purpose of the carburetor (Zenith Model 62A10) is (1) to discharge the desired amount of fuel into the air stream entering the engine; (2) to atomize the fuel, and (3) to make a homogenous air-fuel mixture. The air to fuel ratio is not constant for all speeds and loads. The carburetor varies that ratio to give the best operating performance for all conditions. The carburetor has been calibrated to meter the correct amount of fuel for smooth operation throughout operating range; the function of the carburetor can not extend beyond the proportionate mixing of fuel and air.

MAIN JET SYSTEM

The Main Jet (2), often referred to as the "high speed jet", exerts its principal influence at the higher engine speeds. Fuel from the bowl is metered through the Main Jet (2) and discharged into the air stream at the point of greatest suction, in the secondary Venturi (3) through the Main Discharge Jet (4).

The Main Jet (2) determines the maximum amount of fuel which may be obtained for high speed operations. The Main Jet Adjustment (8) reduces this amount if it is turned toward its seat. Ordinarily the main jet adjustment has no effect after it is two turns open.

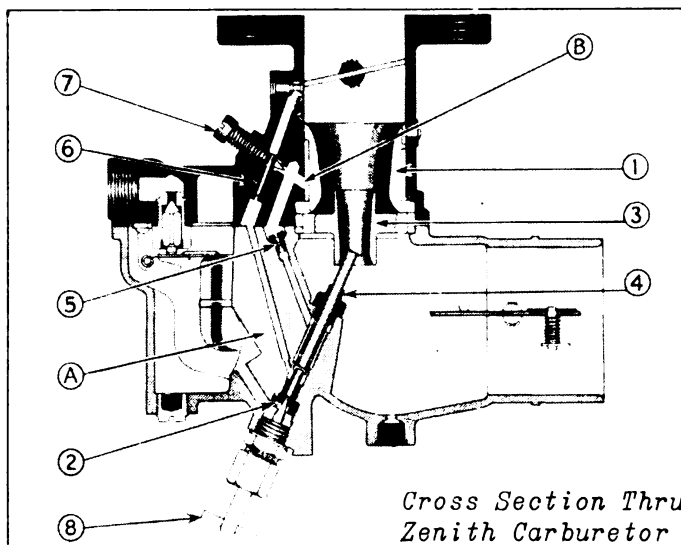
To set this adjustment, open the throttle to approximately 1/4 open. Turn the adjustment clockwise, shutting off the fuel until the engine speed decreases due to too lean mixture. Now open the adjustment until the engine speed decreases due to too much fuel. The adjustment should be set at a position half way between these two extremes.

COMPENSATING SYSTEM

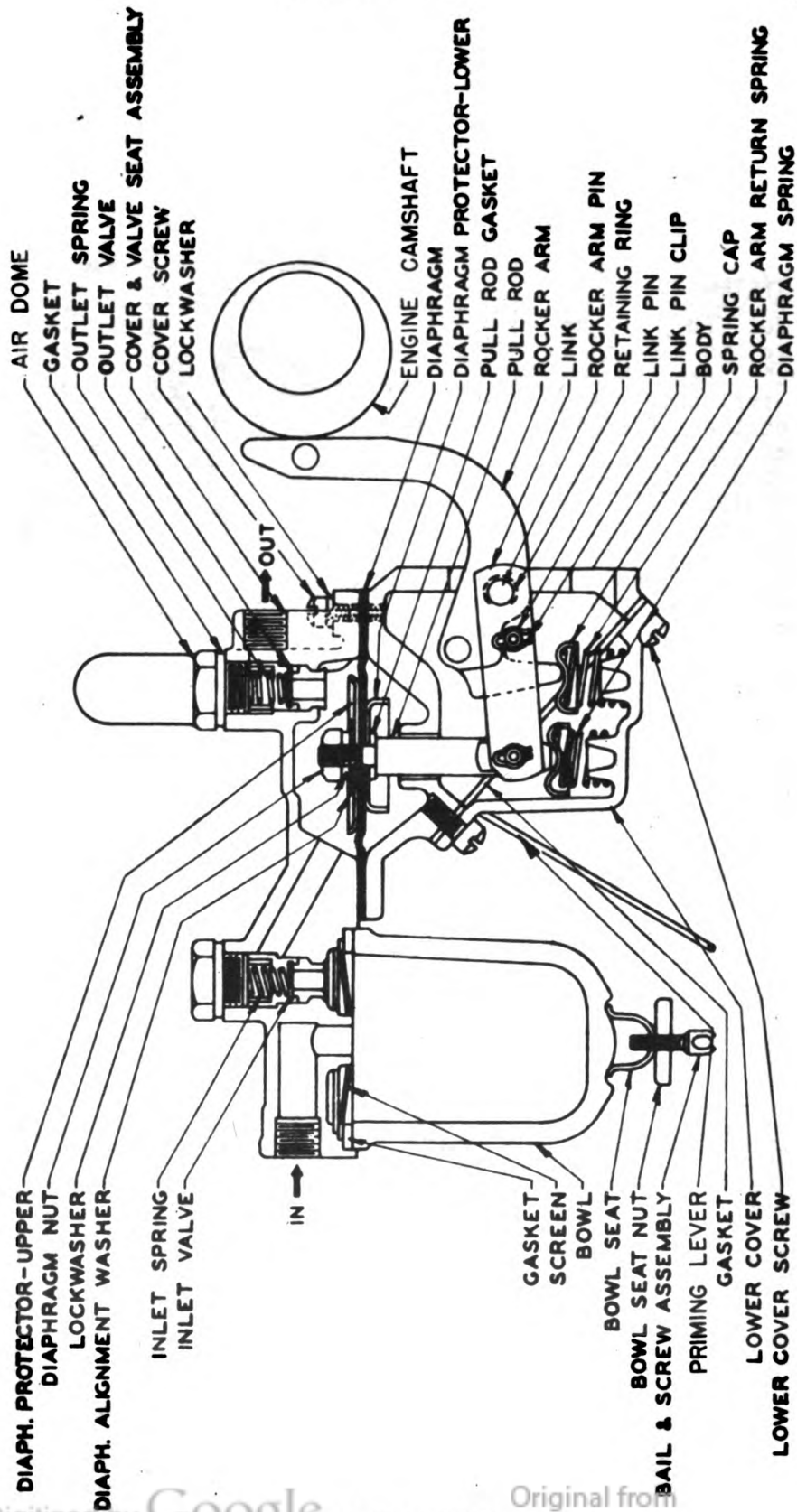
The compensating system consists of the Main Discharge Jet (4) and the Well Vent (5). The flow of fuel from the Main Jet (2) is controlled by the size of the Well Vent (5) and the size of the Main Discharge Jet (4). The mixture delivered through the Main Discharge Jet may be made richer by either increasing the size of the Main Discharge Jet or by decreasing the Well Vent. Conversely the mixture may be made leaner by either decreasing the size of the Main Discharge Jet or by increasing the size of the Well Vent.

IDLING SYSTEM

The Idling System consists of the Idling Jet (6) and the Idle Adjusting Needle (7). The Idling Jet (6) receives its fuel from the main Jet (2) through channel (A). The fuel is metered through the Idling Jet (6) and is mixed with air which is admitted, from behind the Venturi (1), through channel (B). The Idle Adjusting Needle (7) controls the amount of air which is admitted to the Idling System. The Idling System functions only at Idling and Low Speeds. At these speeds, the Throttle Plate is almost closed and there is a very strong suction past the edge of the Throttle Plate. This suction draws the mixture of fuel and air from the Idling Jet (6) which discharges into the air stream through the Priming Plug.



FUEL PUMP



OPERATOR'S INSTRUCTIONS

SYNOPSIS OF OPERATIONS

The rotation of the camshaft eccentric actuates the rocker arm, which pulls the link and the diaphragm and pull rod assembly downward against diaphragm spring pressure which creates a vacuum in the pump chamber.

On the suction stroke of the pump, fuel from the tank enters through the inlet into the sediment bowl, passes through the screen and on through the inlet valve into the pump chamber.

On the return stroke, the diaphragm spring pressure pushes the diaphragm upward forcing fuel from the pump chamber through the outlet valve and out through the outlet to the carburetor.

When the carburetor bowl is filled, the float in the carburetor will shut off the needle valve, thus creating a pressure in the pump chamber. This pressure will hold the diaphragm downward against the spring pressure where it will remain inoperative in the downward position until the carburetor requires further fuel and the needle valve opens. The rocker arm spring is merely for the purpose of keeping the rocker arm in constant contact with the cam shaft.

SERVICE ADJUSTMENTS & MINOR REPAIRS

If there is evidence of a lack of fuel in the carburetor or the carburetor is flooding, check the float and needle valve for proper functioning. Examine the gas line for leaks, kinks or obstructions.

LACK OF FUEL AT THE CARBURETOR

Check as follows:

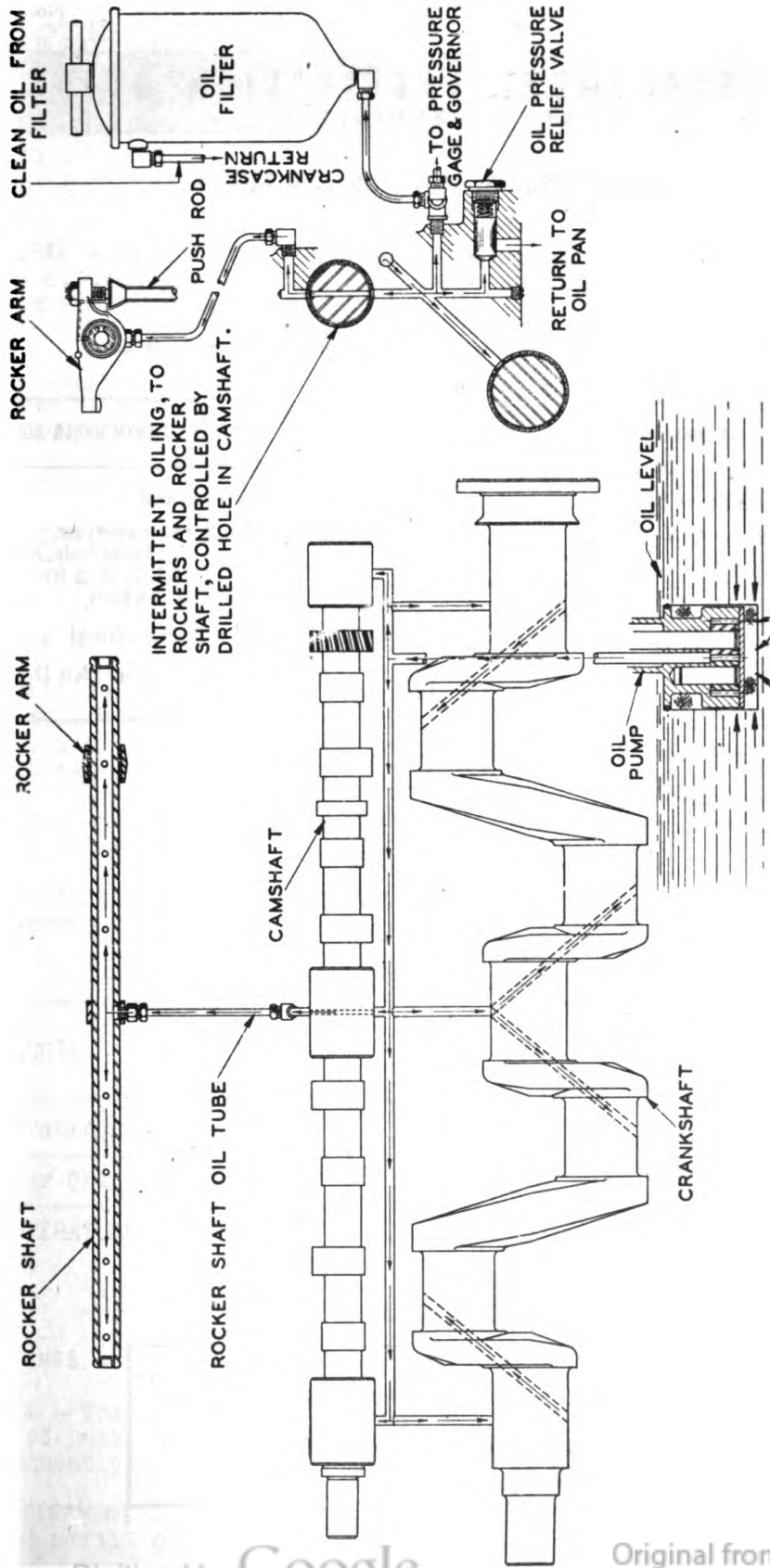
CAUSE	REMEDY
Gasoline tank empty	Refill
Leaky tubing or connections.	Replace tubing and tighten all pipe connections at the fuel pump and gasoline tank.
Loose Valve Plug	Tighten valve plug securely, replacing valve plug gasket if necessary.
Bent or kinked tubing	Replace tubing.
Dirty Screen	Clean the screen. Make certain that cork gasket is properly seated when reassembling.
Dirty or warped valves.	Remove valve plugs and valves. If valves are damaged or warped, replace them. Examine valve seats to make certain there are no irregularities which prevent proper seating of valves. Place valves in valve chambers. Reassemble valve plugs and springs making certain that springs are around the lower stems of the valve plugs properly. Use new gaskets under valve plugs if necessary.

Check as follows: FUEL LEAKAGE AT EDGE OF DIAPHRAGM

CAUSE	REMEDY
Loose Cover Screws	Tighten cover screws alternately and securely. Also check inlet and outlet pipe connections.

NOTE: Check if leak occurs at pipe fittings thus allowing fuel to run down pump to flange and appear to originate there. Do not use shellac or any other adhesive on diaphragm.

OPERATOR'S INSTRUCTIONS



OIL DIAGRAM

PLATE D318-1

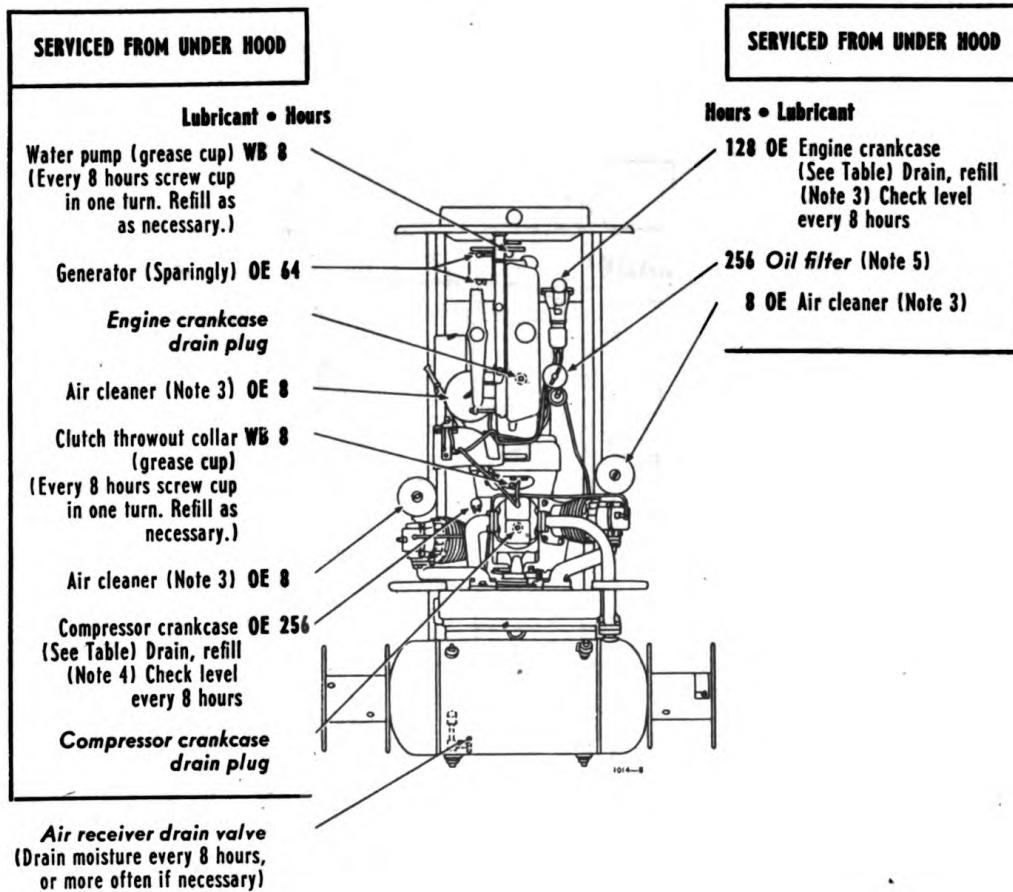
EFSB L-1014

No. 1014

WAR DEPARTMENT LUBRICATION GUIDE
CORPS OF ENGINEERS

**COMPRESSOR, AIR, 105 C. F. M.,
GASOLINE
(LE ROI MODEL 105 GA)**

MFR'S. SERIAL No. located on plates on engine and compressor crankcases.



KEY

LUBRICANTS	
OE—OIL, engine Crankcase grade (unless otherwise specified)	WB—GREASE, general purpose No. 2
CG—GREASE, general purpose No. 1 (above +32° F.) No. 0 (+32° F. to 0° F.)	

CHECK-CHART NO. 1014

OPERATOR'S INSTRUCTIONS

EFSB L-1014*

ENGINEERS FIELD SERVICE
BULLETIN NO. L-1014

WAR DEPARTMENT
Office, Chief of Engineers
Washington, D. C.

**LUBRICATION INSTRUCTIONS FOR
COMPRESSOR, AIR, 105 C.F.M., GASOLINE
(LE ROI MODEL 105 GA)**

1. GENERAL - The following lubrication instructions for the Compressor, air, 105 C.F.M., gasoline (Le Roi model 105 GA), are published for the information and guidance of all concerned, and supersede all previous instructions.

a. **References** - Lubricate equipment in accordance with the latest instructions contained in Engineer Field Service Bulletins. Reference is made to the General Instruction section (EFSB L-1000-A) for additional lubrication information, and to the Product Guide section (EFSB L-1000-F) for latest approved lubricants.

2. LUBRICATION GUIDE - Lubrication instructions for all points to be serviced are shown in Lubrication Guide published herein, which specifies the types of lubricants required and the intervals at which they are to be applied. Guides from which this information is reproduced are 10x15 in. and are an accessory of each piece of equipment.

3. REPORTS AND RECORDS - a. **Reports** - If lubrication instructions are closely followed, proper lubricants used, and satisfactory results are not obtained, a report will be made to the engineer officer responsible for the maintenance of the equipment.

b. **Records** - A complete record of lubrication servicing for this equipment will be kept on a Lubrication Check Card.

* Supersedes that part of EFSB L-1013 and EFSB L-1014 covering lubrication of Air Compressor.

TABLE OF CAPACITIES AND LUBRICANTS TO BE USED

UNIT	CAPACITY (Approx.)	LOWEST EXPECTED AIR TEMPERATURE		
		Above +32°F.	+32°F. to 0°F.	Below 0°F.
Engine Crankcase	14 qt.	OE SAE 30	OE SAE 10	Refer to EFSB L-1000-D
Compressor Crankcase	8 qt.			

HIGH TEMPERATURE: For Lubrication and Service above +90°F., refer to EFSB L-1000-E.

NOTES

1. FITTINGS - Clean before applying the lubricant gun.

2. HOURS - The hours indicated are for normal service. For extreme conditions of heat, water, snow, and dust, change crankcase oil and lubricate more frequently.

3. AIR CLEANERS - (Power Unit and Compressor) - Every 8 hours, remove, clean and refill oil cup to lower bead mark with OE. Every 8 to 256 hours.

depending on dust conditions, remove entire assembly and clean. CAUTION: Do not wash compressor air cleaners in gasoline or kerosene as vapors may collect in the air receiver causing an explosion. Pour 1 pt. OE through filter and drain. Clean entire air cleaner and air pipes. Keep all connections tight.

4. CRANKCASE - Every 8 hours, check and fill to level. Drain only when engine is thoroughly warm. Refill to FULL mark on gage. See Table. CAUTION: When running engine or compressor, be sure pressure gage indicates oil is circulating. For prolonged operation above 100°F., OE SAE 50 may be used in compressor. (Power Unit Crankcase Breather). Every 8 hours, remove breather caps and wash. Oil valve chamber breather with OE.

5. OIL FILTER - Every 128 hours, drain dirt and water. Every 256 hours, or as necessary, renew filter element. Use new cover gasket. Refill crankcase to FULL mark on gage. CAUTION: When running engine, be sure pressure gage indicates oil is circulating.

6. MAGNETO - Every 512 hours, remove distributor cover and lubricate cam felt with OE, SAE 30, sparingly. Every 2048 hours, remove, clean and repack rotor bearings, clean and coat distributor gear teeth with WB.

7. OIL CAN POINTS - Every 64 hours, lubricate throttle cross shaft, throttle and governor linkage with OE.

8. POINTS REQUIRING NO LUBRICATION - Fan, Governor, Power Unit Starter, Compressor Hose Reel Bearings.

9. BATTERY - Weekly, check level of water in battery. Add distilled, rain, or other clean fresh water to level of 3/8 in. above top of separators. Clean terminals, tighten snugly and coat lightly with CG.

AIR TOOLS

1. PAVING BREAKER (Thor model 25) - Every 2 hours of continuous operation, remove oil reservoir plug from end of back head handle and fill with OE. Every 64 hours, remove oil control felt on side of handle, wash, dry and replace; flush mechanism by pouring a small amount of cleansing solution into air inlet. Operate machine a few minutes and pour a small amount of OE, SAE 10, into air inlet.

2. SINKER ROCK DRILL (Thor model 75) - Every 2 hours of continuous operation, remove oil reservoir plug from side of cylinder and fill with OE. Every 64 hours, remove oil control plugs and felts from rear of cylinder, wash and dry. Clean oil holes and cylinder with compressed air before replacing felts. Pour a small amount of cleaning solution into air inlet, operate machine a few minutes and add a small amount of OE, SAE 10. If equipped with Thor line oilers, fill before operation with OE, SAE 10, and refill when necessary.

3. CLAY DIGGER (Thor model 412) - Every 4 hours, inject OE, SAE 10, through the exhaust holes. Every 64 hours, wash tool and thoroughly oil with OE, SAE 10.

4. WOOD BORING MACHINE (Thor model 62) - Every 4 hours, lubricate valve mechanism through live air handle reducer, with OE, SAE 10. Every 8 hours, fill 1/3 full through fitting with CG. Every 256 hours, remove crank chamber plates, wash tool, and fill crankcase and gear case 1/3 full with CG.

5. CIRCULAR SAW (Skilsaw model 2127) - Every 8 hours, lubricate rotor

shaft bearings and governor with CG or through oilers with OE. Every 4 to 8 hours, check air motor reservoir, located at top front of handle, through fill plug and fill with OE, SAE 10. Every 64 hours, flush motor by removing hose and pouring a small quantity of OE into air inlet. Replace hose and operate motor until oil is driven out exhaust port. Check level of lubricant in blade reduction gear case through plug in top front of saw housing. Fill to level of top of worm gear with GO. Every 1024 hours, drain, flush and refill.

6. PNEUMATIC NAIL DRIVER (Ingersol-Rand model 6CND) - Before operation and every hour of continuous operation, apply a small quantity of OE, SAE 10, through ball oiler located at base of handle. CAUTION: Do not lubricate with air turned on. Every 64 hours, disassemble hose connection strainer, clean and reassemble.

7. CHAIN SAW (Reed Prentice "Timberhog") - (Driven end) Keep oil tank filled with OE, SAE 10, and filler cap tight unless using gravity feed. Chain and cutter bar may be lubricated from tank by air pressure or gravity. Pump up pressure through gun connection in rear of tailstock with pump supplied. CAUTION: Close oil tank breather knob on filler cap before pumping. Turn 3-way valve to "ON" position and adjust petcock for rate of flow. (Driving end) Every 8 hours, fill rotor with OE, SAE 10. Every 512 hours, add 1 tablespoon CG through governor fill plug on side of motor cap. CAUTION: Do not fill completely. Every 256 hours, fill gear box through fill plug with CG above +32°F., and GO below +32°F. Keep air strainer in throttle handle clean.

8. SHEETING DRIVER - After using tool, clean and coat machined surfaces with OE to avoid rust.

**INDEX
TO
MAINTENANCE
INSTRUCTIONS**

CLUTCH

COMPRESSOR

COOLING SYSTEM

ELECTRICAL SYSTEM

ENGINE

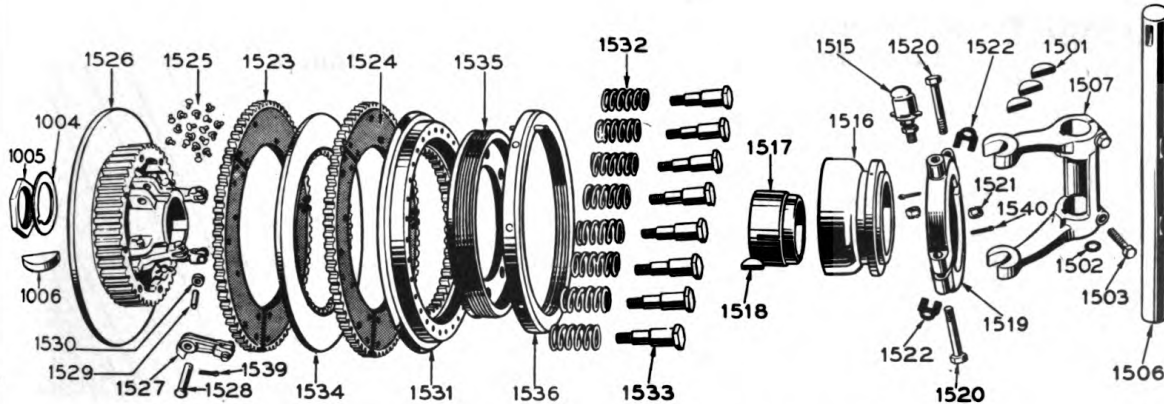
FUEL SYSTEM

GOVERNOR

CLUTCH

SPECIFICATIONS

Manufacturer.....Twin Disc Clutch Co.
 Type.....Spring Loaded, Dry Disc
 Double Plate
 Size.....11-1/2"
 Torque Capacity.....5840 Inch-pounds



Twin Disc Clutch Model SL-2-11 1/2"

ADJUSTMENT - MADE WITH CLUTCH DISENGAGED

After considerable wear the clutch may require adjustment to bring it into proper position. As the clutch wears, the springs 1532 taking up the wear, reach a limit of their expansion. When this occurs the clutch must be adjusted. Pull out lock-pin 1538 and rotate adjusting ring 1536 clockwise approximately 2-1/2 turns or until the pressure springs are compressed to their original height of 1-5/16". (This measurement is taken when clutch is in "engaged" position - lever towards engine).

DISASSEMBLY (See drwg. above also No. 2S-23C, Page 37)

Before clutch may be dismantled it is necessary to loosen engine at its mountings and move it forward to effect clearance. NOTE: Rear of engine must be blocked up before loosening it to prevent "jack-knifing" when engine is parted from compressor.

FRICITION DISCS: If friction discs only, are to be replaced, disengage clutch lever 1512 which will remove pressure. Old discs can be lifted out and replacements inserted. CAUTION: Friction discs are numbered and must be installed with numbers corresponding also gear teeth of both rows must line up to engage flywheel.

CLUTCH UNIT: If entire unit is to be disassembled proceed as follows:

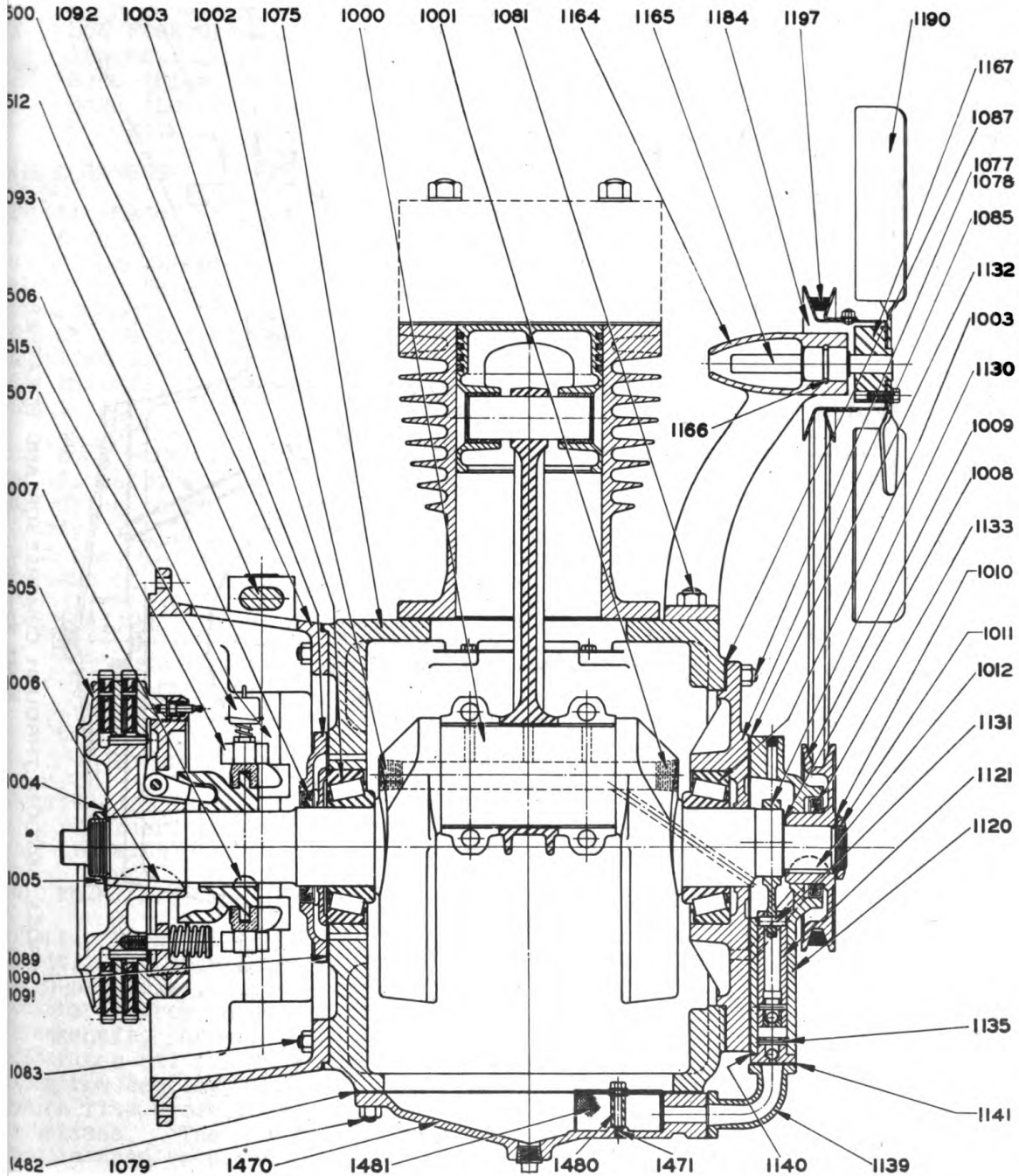
- (1) Make certain clutch lever is in "disengaged" position.
- (2) Remove lockwasher 1004 and nut 1005 from compressor crankshaft, and remove clutch assembly.
- (3) If throw-out cone 1516 is to be serviced it is necessary to remove lever 1512, rotate shaft 1506, and remove cone.
- (4) To dismantle clutch assembly loosen and remove lock ring 1536. With wrench, remove spring bolts 1533 and springs 1532. Entire unit can now be separated.

REASSEMBLY

- (1) Install clutch components in order removed.
- (2) Install springs and spring bolts making certain bolts are seated against their shoulders.
- (3) Install adjusting ring but do not make final adjustment.
- (4) Install throwout cone and clutch lever, keying in place.
- (5) Install clutch assembly on crankshaft, keying in place, tighten nut and lock securely.
- (6) Move engine into position and fasten to compressor.
- (7) Engage clutch and adjust as described in "Adjustment"

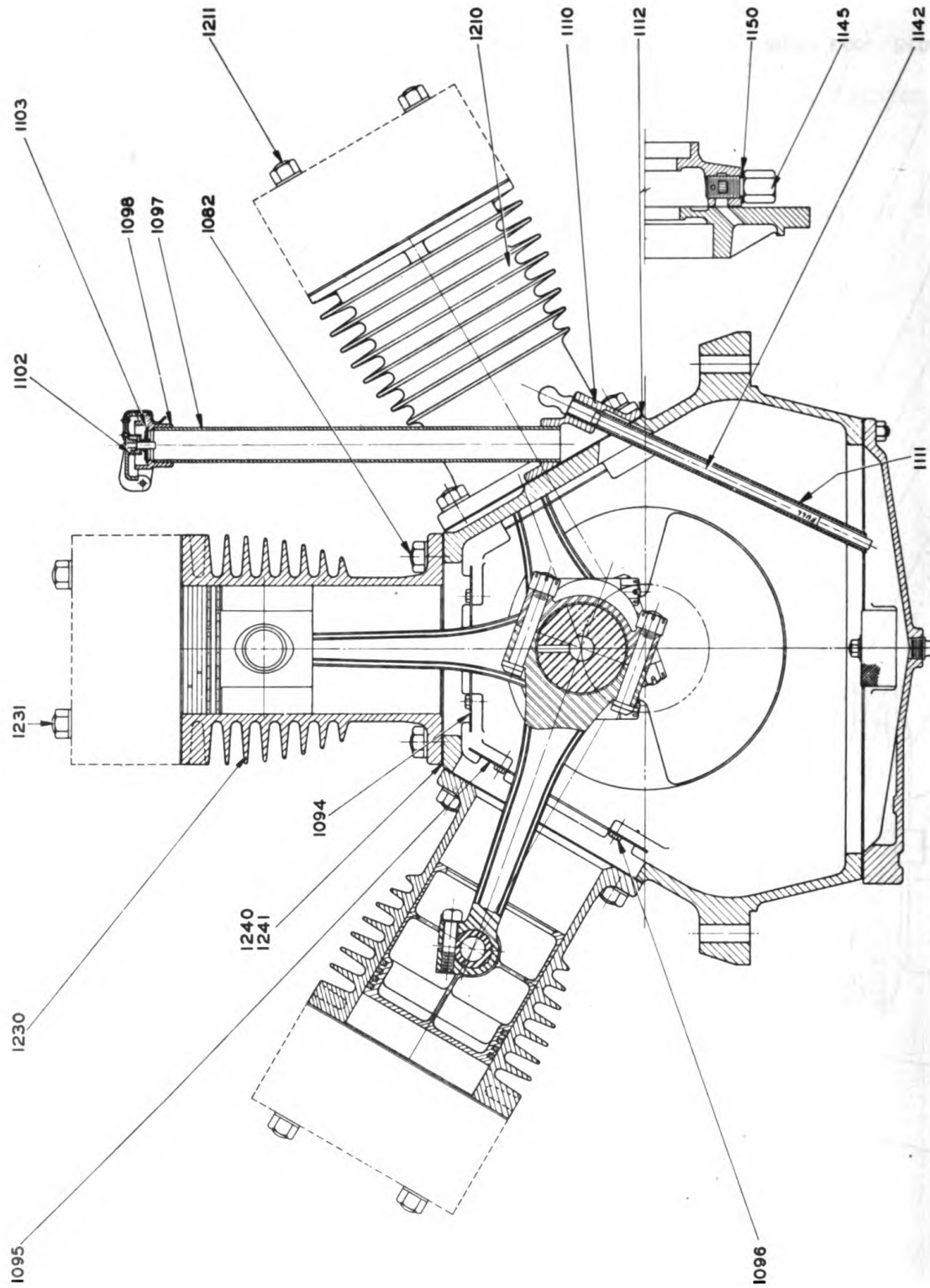
IMPORTANT: Whenever compressor is to be idle for any length of time, clutch must be left in "Engaged" position.

MAINTENANCE INSTRUCTIONS



LONGITUDINAL SECTION THROUGH COMPRESSOR

PLATE 2S-23C



CROSS SECTION THROUGH COMPRESSOR AND BREATHER
PLATE 2S-24C

AIR COMPRESSOR

SPECIFICATIONS

Cylinders.....3
 High Pressure.....1
 Low Pressure.....2
 Stages.....2
 Bore (High Pressure).....5"
 Bore (Low Pressure).....5-3/4"
 Stroke.....5"

AIR CLEANERS

Two Air-Maze "oil bath" air cleaners are attached to low pressure cylinder heads by means of cast iron connections. Air passes through the opening under the top, down through the bath of oil and upward through the filter element. Here the oil is removed and drains back into the bowl cleansing the element. The clean air passes on down through the cleaner unit and out at the bottom center to enter the cylinder head. A valve has been provided to allow the air, which returns to the cleaner when the compressor unloads, to by-pass to the atmosphere without passing through the oil bath.

Oil bowl must be kept filled to level of bead with clean engine oil of viscosity specified in "lubrication". Periodically, depending upon operating conditions, entire unit should be disassembled and cleaned thoroughly. **CAUTION:** (1) Do not allow felt valve washer to become saturated with oil. (2) Never clean compressor air cleaners in gasoline or fuel oil because of the possibility of an explosion in air receiver tank.

LUBRICATION

Pressure lubricated.....Yes*
 Oil pump type.....Plunger
 Capacity.....8 Quarts.

* Piston pins and bushings are splash lubricated.

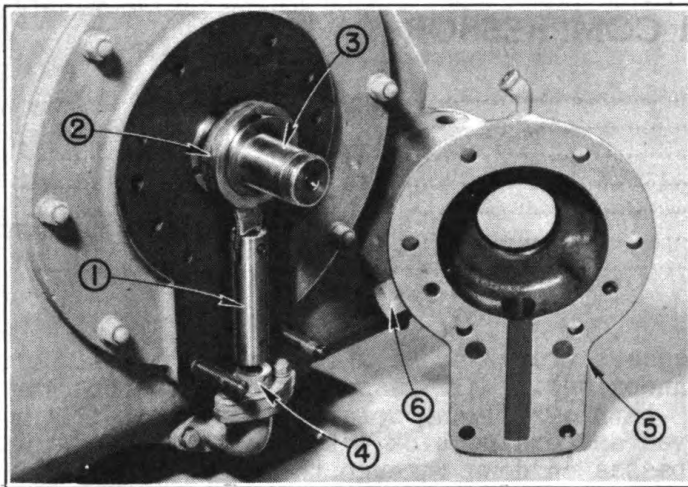
Lubrication is positive to tapered roller main bearings 1003 and connecting rod bearings by means of a plunger type oil pump 1121 driven directly off the crankshaft 1000. Piston pins and bushings are splash lubricated.

OIL PUMP (Also see Illustrations "2S-23C, 2S-24C")

Plunger type driven through a special connecting rod 1130 off the crankshaft. Oil travels through a screen 1481 which strains out the larger foreign particles, up through the pump plunger 1121 to the oil pressure chamber. From here part of the oil enters the drilled passages in the crankshaft, part of it passes past the close fitting circular baffle which separates oil pressure chamber from rear tapered roller bearing, lubricating the bearing, and part of it passes through the circular baffle 1008 which fits closely over the fan drive pulley hub, to be returned to the crankcase. The oil surplus is regulated by a pressure relief valve 1145 and is then returned to the crankcase. A special pipe plug 1002 with a 1/16" orifice, located in the front crankcheek sprays oil into the front bearing 1003. The oil pump screen should be cleaned of sludge and foreign particles whenever the oil pan 1470 is removed.

DISASSEMBLY:

Remove intercooler fan belt 1197, fan drive pulley nut 1011, and lockwasher 1010. Remove fan drive pulley 1009, being careful not to damage oil seal. Remove capscrews holding connection 1139 to oil pan 1470. Disconnect oil line from top of oil pump body at elbow. Remove capscrews and stud nut



Oil Pump Assembly

- | | | |
|---------------------|---------------------|------------------------------------|
| 1. Oil Pump Plunger | 3. Crankshaft | 5. Oil Pump |
| 2. Connecting Rod | 4. Check Valve Body | 6. Oil Pressure Relief Screw Assy. |

holding pump body to bearing retainer, 1085. Oil pump body with check valve assembly 1135 may now be removed from compressor. Connecting rod 1130 and plunger assembly 1121 can be withdrawn from pump body by turning and twisting. Connecting rod is easily separated from plunger assembly by driving out pin 1131. **NOTE:** Because of close tolerances maintained in the plunger assembly it must be serviced as a unit. Check valve assembly is removed from pump body by removing two nuts from studs. **NOTE:** Check valve assembly is serviced only as a unit.

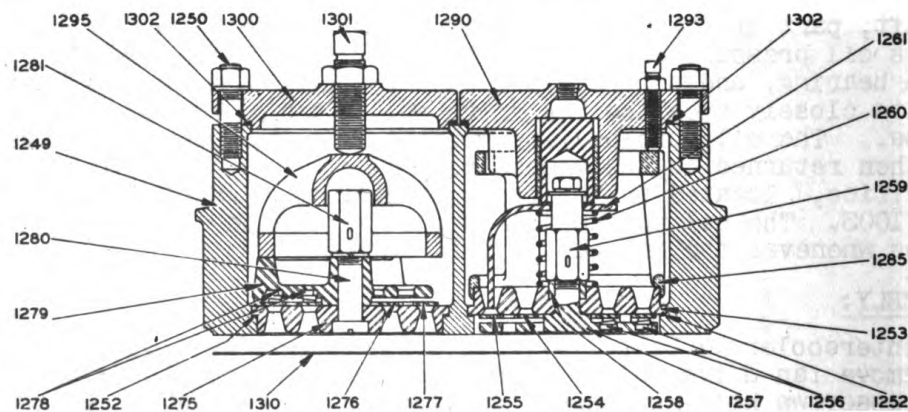
If connecting rod was dismantled from plunger assembly it should be connected and installed now. Make certain pin 1131 is in place and does not extend out beyond the diameter of the plunger assembly. **CAUTION:** Dip plunger in oil before assembling into pump body. Assemble check valve assembly to body and place body on compressor making certain connecting rod is in place on crankshaft. Install oil seal in body. **NOTE:** It is recommended that oil seal be replaced if it shows slightest irregularities. **CAUTION:** When installing oil seal be sure not to drive it beyond outside face of pump body. Clearance behind oil seal must be maintained for oil passage. Install capscrews holding pump body to compressor hand-tight, set dowels in place and tighten capscrews. Install fan drive pulley, nut and lock in place. Reconnect oil line and install intercooler fan belt.

CYLINDER HEADS

REMOVAL:

Removal is accomplished by removing intercooler and pressure control connection, cylinder head nuts and lifting cylinder head 1249 assembly off.

Before replacing cylinder head, make certain that the surfaces of the head and the cylinder, where the gasket 1310 rests, are absolutely clean. It



CYLINDER HEAD ASSEMBLY

MAINTENANCE INSTRUCTIONS

COMPRESSOR
Page 41

is important to securely tighten the cylinder head whenever it is replaced. This must be done carefully to prevent damage to the gasket between the cylinder head and the cylinder. Nuts should be drawn down snug with a wrench. Cylinder head stud nuts tightened when compressor is cold, be retightened when compressor is hot.

Cylinder head does not have to be removed to service the valves.

VALVES

The compressor valves are the circular plate type and are mounted in assemblies with their seats and guides (bumpers) for quick replacement in cylinder heads. There is no physical difference between suction and discharge valves, valve springs, or seats.

REMOVAL OF SUCTION VALVE ASSEMBLY FROM CYLINDER HEAD:

1. Disconnect air control line by loosening 1/4" tube nut;
2. Loosen three 5/16" setscrew locknuts several turns;
3. Loosen three 5/16" setscrews 1293 several turns;
4. Remove four nuts and washers that hold suction valve cover to cylinder head;
5. Remove suction cover 1290 being careful that unloader plunger does not drop out to be marred, as its operation depends on very close fit;
6. Remove suction valve assembly clamp 1285;
7. Remove suction valve assembly.

REMOVAL OF DISCHARGE VALVE ASSEMBLY FROM CYLINDER HEAD:

1. Loosen 5/8" setscrew locknut several turns;
2. Loosen 5/8" setscrew 1301 several turns;
3. Remove four nuts and washers which hold discharge valve cover to cylinder head;
4. Remove discharge valve cover 1300;
5. Remove discharge valve clamp 1295;
6. Remove discharge valve assembly;

The suction valve assembly has the bumper 1257 mounted on bottom and is provided with unloader push rod 1261 and spring 1260 which will hold the outer valve 1255 off its seat when compressor is unloaded.

The discharge valve assembly has the bumper 1279 mounted on top.

The valve lift in both suction and discharge valve assemblies is approximately 3/32".

When assemblies have been taken apart for close inspection and cleaning, care must be taken that the seats and the valves are not marred. When reassembling it is important that the valve plates 1254, 1255, 1276, 1277 be replaced in same position as before because the valve becomes tighter as it wears to a seat. See that springs 1256, 1278 are in an upright position with their large end in the pockets in the bumper. See that the valves are free; this can be checked by depressing them with a screw driver and letting them snap back into their seat. Damaged parts must be replaced, as the valves are the heart of the compressor and very serious damage will result if broken parts of the valve assembly falls on top of the piston.

ASSEMBLY OF SUCTION VALVE ASSEMBLY IN CYLINDER HEAD:

1. Make certain that copper gasket 1252 rests properly on shoulder in head 1249;
2. Insert suction valve assembly and rotate back and forth to insure that it seats properly on gasket;
3. Place suction valve assembly clamp 1285 and rotate back and forth to insure that it seats properly on suction valve;
4. Make certain that copper-asbestos gasket 1302 rests properly on cylinder head shoulder.
5. Carefully place suction valve cover, 1290 making sure that three nodes (nibs) on underside properly engage notches in clamp 1285, provided so that setscrews 1293 will clamp over staves;
6. Assemble four nuts 1250 and washers which hold suction valve cover 1290 to cylinder head, but tighten them alternately to prevent cover from tilting on one corner;
7. Tighten setscrews 1293 alternately to insure equalized clamping of valve assembly;
8. Tighten locknuts on setscrews;
9. Connect air control line;

Note: Make certain gaskets are in good condition--if damaged, replace.

ASSEMBLY OF DISCHARGE VALVE ASSEMBLY IN CYLINDER HEAD

1. Make certain that copper gasket 1252 rests properly on shoulder in head 1249;
2. Insert discharge valve assembly and rotate back and forth to insure that it seats properly on gasket;
3. Place discharge valve clamp 1295 in position;
4. Make certain that copper-asbestos gasket 1302 rests properly on cylinder head shoulder;
5. Carefully place discharge valve cover 1300 in position;
6. Assemble four nuts 1250 and washers which hold discharge valve cover to cylinder head, but tighten them alternately to prevent cover from tilting on one corner;
7. Tighten setscrew 1301;
8. Tighten locknut on setscrew;

Note: Make certain gaskets are in good condition--if damaged, replace. After installation of valve covers has been completed, and compressor has reached operating temperature, set screws 1293, 1301 should be rechecked for tightness.

PISTON (See special note after paragraph "Cylinder")

Material.....	Cast Iron
Clearance:	
High pressure lands.....	.010" to .021"
High pressure skirt.....	.0045" to .0065"
Low pressure lands.....	.013" to .024"
Low pressure skirt.....	.0055" to .0075"

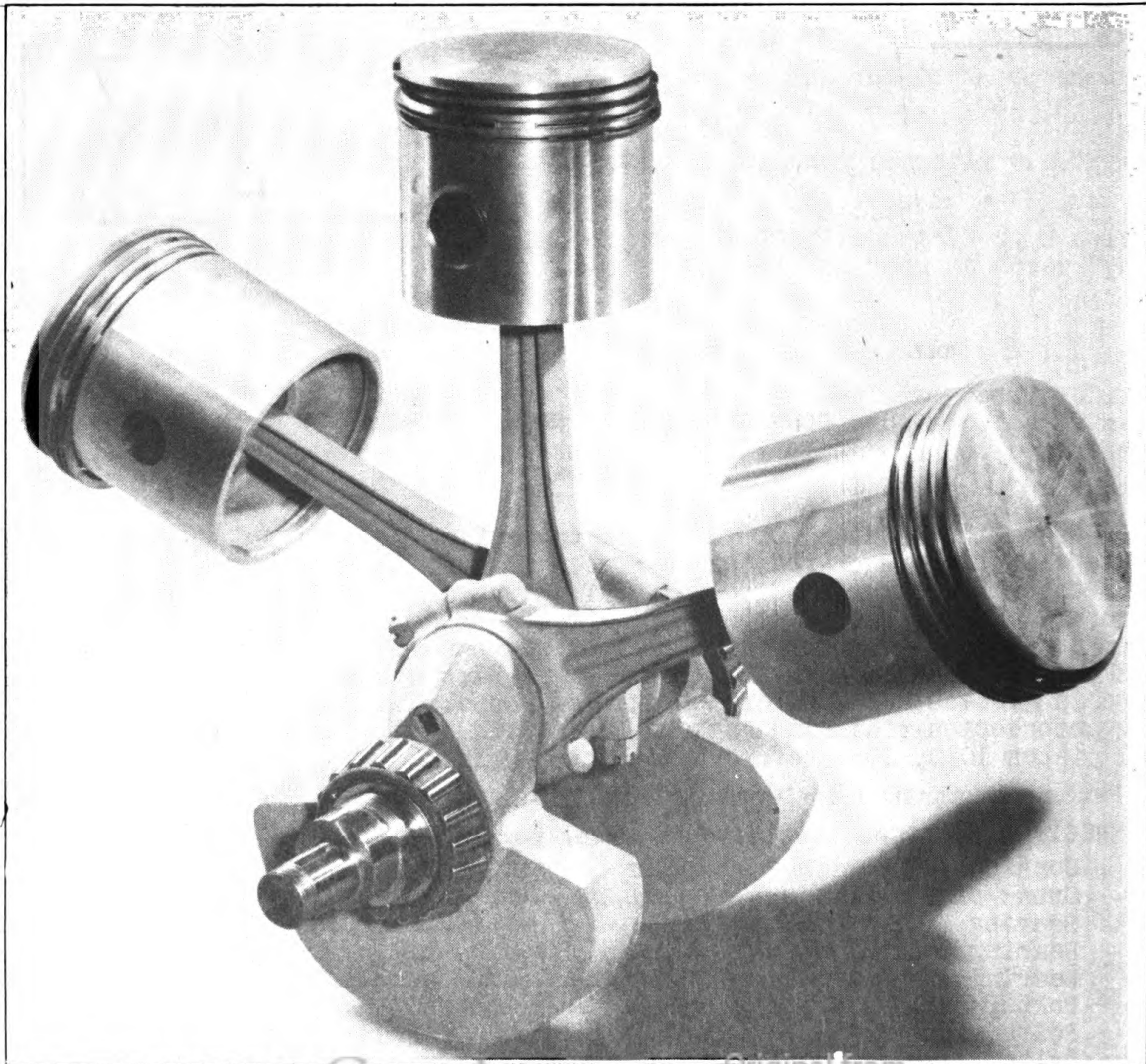
PISTON RINGS:

Total Required.....	4
Compression.....	2
Oil Control.....	2
Width.....	3/16"
Gap:	
High pressure compression.....	.010" to .020"
High pressure oil.....	.015" to .025"
Low pressure compression.....	.010" to .020"
Low pressure oil.....	.010" to .018"

Connecting rod bearings 1027 are not adjustable and when clearance becomes excessive, replacement is necessary. Connecting rods 1020 should be free from twist and parallel with pistons 1030, 1060. Connecting rods and caps are numbered and should be assembled with numbers corresponding. In the low pressure cylinders, numbered sides of connecting rods should be placed so they face upwards. It makes no difference which way they face in the high pressure cylinder. When installing bearings 1027 be sure bearing backs and rod surfaces are absolutely clean, smooth, and free from oil. Bearings have a nib or projection which prevents turning and should be assembled with nib engaging milled notch in rod and cap. CAUTION: Do not scrape shell bearings and do not file connecting rod or connecting rod cap parting faces. Adjustment is correct when nuts 1024 are tight and the crankshaft may be rotated by hand.

CYLINDERS (See Illustration 2S-24C, Page 38)

Cylinders 1210, 1230 must be removed in order to service rings, piston, connecting rod etc. **SPECIAL NOTE:** Upon replacing, bolt cylinder down tight and check to see that piston in T.D.C. position is from .005" below to flush with top of cylinder. "Spacing gaskets" as required, must be installed, under cylinder base flange, to maintain this clearance.



Crankshaft Assembly, With Connecting Rods & Pistons

MAINTENANCE INSTRUCTIONS

CRANKSHAFT (See special note after paragraph "Cylinders")

Drilled for pressure lubrication.....Yes
Bearing journal diameter.....3.500"

REMOVAL: (See Illustration 2S-23C, Page 37)

To remove crankshaft 1000 it is necessary to remove compressor from the frame, remove oil pan 1470 and disconnect connecting rods. Remove clutch assembly 1505 and attaching parts, front bearing cover 1092 with shims. Remove inter-cooler fan belt 1197 and fan drive pulley 1009, being careful not to damage oil seal 1133. Remove oil pump body 1120 with connection, noting position of tapered dowells. Block crankshaft up to support weight until ready to remove. Remove rear bearing retainer 1085 using extreme care not to damage rear main bearing 1003. Crankshaft may now be removed through rear opening of crankcase.

REPLACEMENT:

Enter crankshaft through opening in rear of crankcase, block up to hold weight and install rear main bearing retainer 1085. Remove blocks. Assemble front bearing cover 1092 with shims (see paragraph "Oil Seals") and check end clearance, as outlined in paragraph "Bearings". Install oil pump body 1120 making certain oil pump connecting rod 1130 is in proper position on crankshaft, replacing dowels. Replace fan drive pulley 1009, making certain gasket is in place, and oil seal 1133 is not damaged. Tighten crankshaft nut 1011 and lock in place.

BEARINGS:

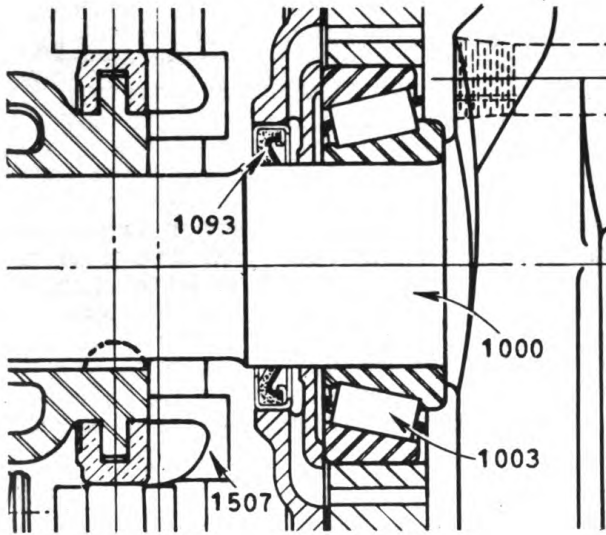
Number.....2
Type.....Tapered Roller
Manufacturer.....Timken #643-632

Main bearing cones are shrunk onto crankshaft; by heating in oil to not more than 500° F., rear main bearing cup is pressed into bearing retainer 1092. Front bearing cup is a push fit in crankcase 1075. Adjustment is obtained by adding or removing shims under bearing cover 1092. Correct end play of crankshaft is .003" to .006" as checked by indicator and must be maintained at all times.

OIL SEALS:

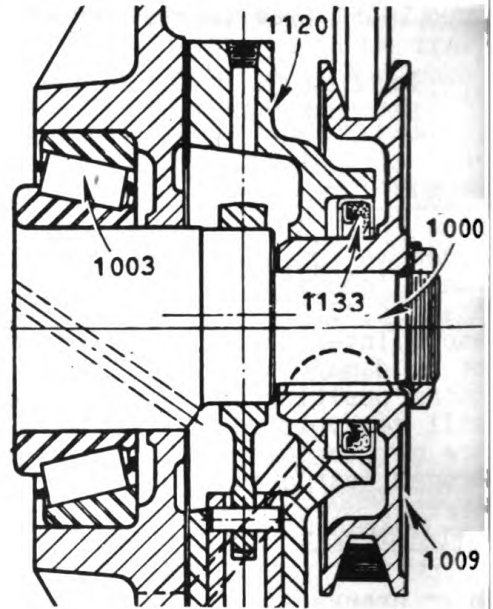
Oil seals 1093, 1133 are pressed into housings and must be installed with lip pointing inward as shown. CAUTION: Do not press oil seals in beyond face of housings as oil return passages behind oil seals must remain open.

After front oil seal 1093 is installed in retainer, installation to compressor should be made by aid of a metal sleeve. Insert sleeve into oil seal and slip retainer, seal and sleeve over crankshaft. After retainer is in place remove sleeve into oil seal and slip retainer, seal and sleeve over crankshaft. After retainer is in place remove sleeve. Sleeve can be made of shim stock that can be bent into position. Rear oil seal 1133 requires no special installation instructions. CAUTION: Make certain seals are not scratched or marred.



Front Oil Seal

- 1093. Oil seal
- 1003. Main bearing
- 1507. Clutch yoke
- 1000. Crankshaft



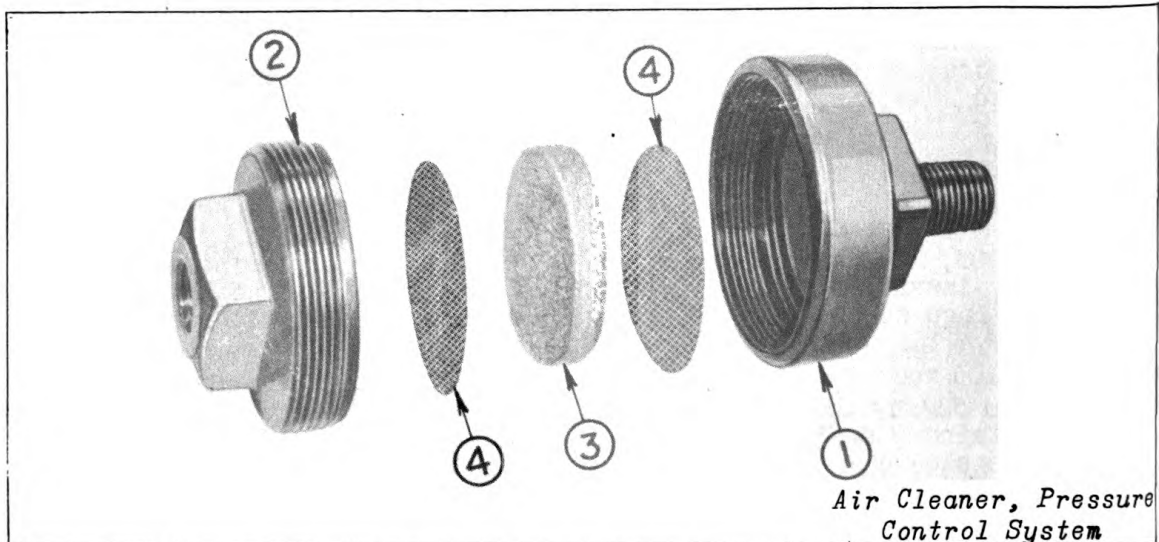
Rear Oil Seal

- 1133. Oil seal
- 1009. Fan drive pulley
- 1120. Oil pump body
- 1000. Crankshaft
- 1003. Main bearing

PRESSURE CONTROL SYSTEM (See "Diagram of Pressure Control System" Page 10)

AIR CLEANER:

Periodically the cleaner unit should be removed from the system for cleaning. Unscrew top from bottom and remove screens and felt, clean with air hose and replace. CAUTION: Make certain screens are not damaged in any way and felt is not saturated with oil.



Air Cleaner, Pressure Control System

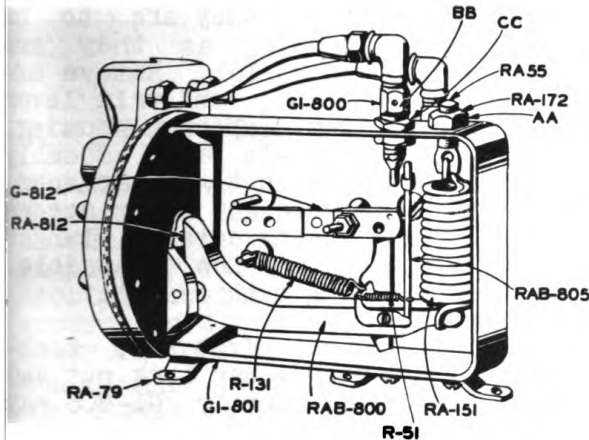
- 1. Cleaner bottom
- 2. Cleaner top
- 3. Felt
- 4. Screen

UNLOADER PILOT SWITCH:

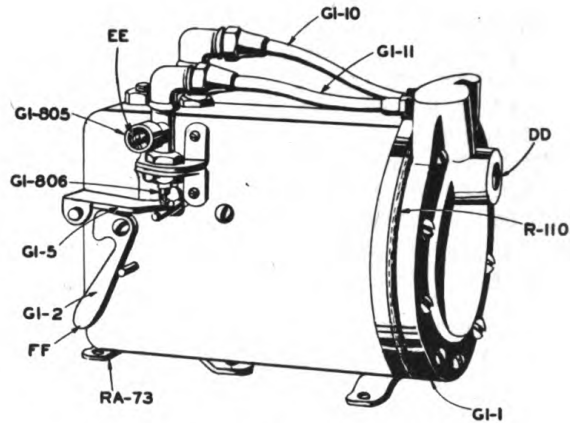
SPECIFICATIONS:

Manufacturer.....Penn Electric Switch Co.
Goshen, Indiana

Model.....GI



Front View Unloader Pilot



Rear view Unloader Pilot

GENERAL:

The Penn type GI unloader Pilot is designed for use in air compressors, equipped with unloading devices, to maintain close regulation of receiver pressure. It automatically unloads or loads the compressor on rise or drop in receiver pressure.

DIAPHRAGM CHAMBER:

Diaphragm casting is provided with 1/4" Female I.P.T. tapping (see "DD" in rear view) for pipe connection to air receiver.

UNLOADER VALVE:

Unloader valve "EE" (see rear view) is connected to check and bleed valve by means of 1/4" tube fittings. CAUTION: Clean all tubing and fittings thoroughly before connecting to prevent pipe scale, filings, metal chips, or other foreign matter from reaching valves.

PRESSURE ADJUSTMENTS:

Unloading pressure--approximately 100 lbs. Loading pressure--approximately 88 lbs. If for any reason these pressures must be changed they may be reset as follows: Turn adjusting nut "AA" (see front open view) to right (clockwise) to raise unloading pressure; turn to left (counter-clockwise) to lower unloading pressure. The pressure at which the compressor loads will be raised or lowered a corresponding amount.

DIFFERENTIAL ADJUSTMENT:

The differential pressure at which the control unloads or loads the compressor is set at factory and should not be changed. If for any reason

it becomes necessary to vary the differential pressure, it may be reset by changing position of valve "BB". Loosen lock nuts "CC" and raise valve "BB" to widen differential (lower loading pressure); lower valve "BB" to narrow differential (raise loading pressure). Note: Differential adjustment affects only loading pressure, unloading pressure remains constant. This is a delicate adjustment and differential should never be closer than 10 lbs. or "chattering" may result.

DISASSEMBLY

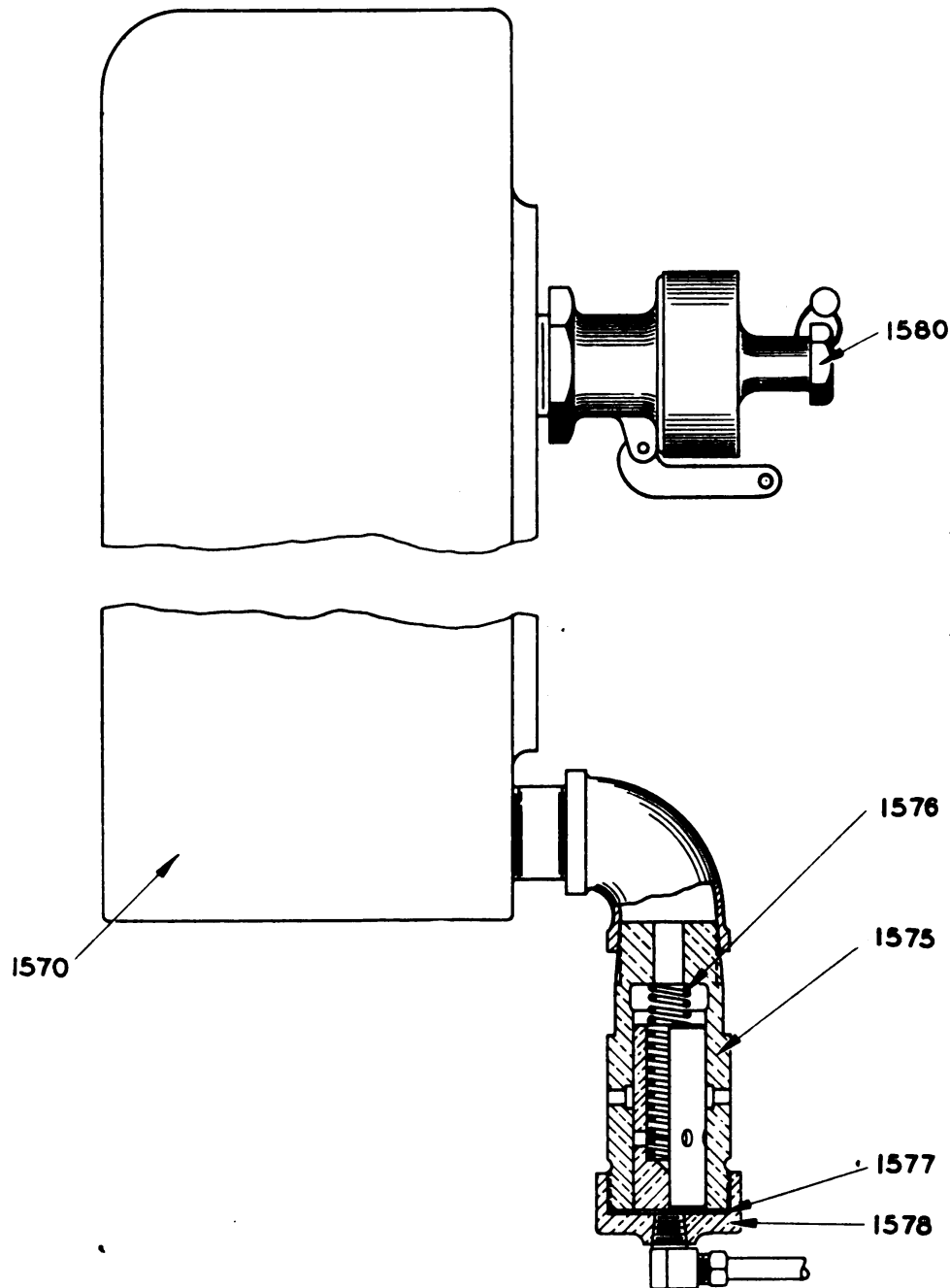
Loosen conveyor tubes (G1-10, 11) at elbows. Unless they are to be serviced do not break connections at diaphragm casting as they are soldered in place. Remove nut (RA-172) and spring RA-151. Remove extension spring R-51, kick off valve plunger rod RAB-805, and trip lever spring R-131. Remove top and bottom center screws from diaphragm housing. Diaphragm housing assembly with conveyor tubes and main arm assembly RAB-800 can be removed as a unit. If diaphragm only is to be replaced, further disassembly of unit is not required. Remove eight other screws from diaphragm housing and separate the two parts, being careful plunger disc does not drop out to become lost. Diaphragm is now accessible. NOTE: See "Reassembly" instructions before proceeding with assembly.

Main arm assembly RA8-800 may be removed by driving out pivot pin. Kick-off valve assembly, 91-800, may be removed by removing lower lock nut and withdrawing from main frame G1-801. Unloader valve assembly G1-805 may be removed from case by withdrawing 3 screws holding the bracket. Removing the lower lock nut will allow valve assembly to be serviced. Make certain valve plunger pin is not lost. NOTE: Service on other parts of unloader is infrequent and disassembly is obvious upon inspection. Because of close adjustments necessary in assembling valve assembly G1-805 and G1-800 they are serviced only as assemblies. If service becomes necessary entire units must be replaced.

REASSEMBLY:

Place rubber diaphragm R110 on lower casting, then place plunger disc into position so projection will fit through center hole of upper diaphragm casting. Install the eight screws (omitting the top and bottom center) and tighten firmly and evenly. Place main arm in channel on back of upper diaphragm casting and insert pivot pin in place. Assemble kick-off valve plunger rod to main arm and connect extension spring. Fasten valve bracket to back of main frame with 3 screws. Screw unloader plate pivot stud into main frame and place hand unloader plate on this stud and secure with cotter key. Place bushing through hand unloader handle and attach to frame. Insert trip lever and cover mounting screw from back of case, place trip lever bushing over screw, and place felt washer between the yoke of trip lever and mount over bushing. Install lock nut, then washer and other locknut in place. Attach diaphragm housing and main arm assembly in place installing 2 screws in holes left empty before. (1-1/2" screw in top and 1-1/8" screw in bottom.) Install main spring and tighten lock nut only enough to hold assembly in place. Install trip lever spring. Insert valve plunger pin, pointed end, into unloader valve assembly and mount in bracket as illustrated in Rear View B and lock in place. Adjust height of valve so there is a little clearance between plate G1-5 and end of plunger pin when switch is in loaded position, (trip lever down).

Attach conveyor tubes to elbows making certain connections are air tight. Make pressure adjustments and differential adjustments as described. CAUTION: Proper operation of the compressor depends upon the correct adjustments of this unloader pilot. Follow directions carefully.



INTERCOOLER AND RELIEF VALVE ASSEMBLY

INTERCOOLER RELIEF VALVE:

This valve, consisting of a cylinder, plunger 1575, and spring 1576, is located in the bottom of the intercooler 1570. When the compressor unloads, air from the receiver forces the plunger back until ports are uncovered and the air in the intercooler is released to atmosphere, at the same time blows condensate out of intercooler. The valve is easily dismantled for cleaning and service. DISASSEMBLY: Disconnect air line and unscrew cap 1578 from body 1575 being careful not to lose gasket 1577. Reassemble by installing spring 1576 and plunger, screw body into cap and connect air line.

COMPRESSOR SERVICE CHART

TROUBLE	CAUSE	REMEDY
Noise in Air Receiver or hot air breathing from intercooler relief valve when compressor is idling.	High pressure discharge valve not seating properly or valve is broken.	Remove valve assembly and examine. Check valve seats for low spots. Replace any parts necessary.
Air leaking from intercooler relief valve when compressor is pumping or intercooler relief valve failing to open and relieve intercooler pressure when compressor is idling.	Intercooler relief not functioning properly.	Remove intercooler relief valve assembly. Replace any parts necessary. Grease and replace.
Intercooler pressure shown on gauge is below normal.	Leaking low pressure valves.	Remove and examine valves. Clean and inspect. Replace any parts necessary.
Intercooler pressure shown on gauge is above normal.	Leaking high pressure valves.	Remove and examine valves. Clean and inspect. Replace any parts necessary. Remove intercooler relief valve assembly. Replace any parts necessary. Grease and replace.
Compressor failing to pump up to pressure and intercooler safety valve popping off.	Worn or broken high pressure valves.	Remove valves, clean and inspect. Replace any parts necessary.
Failure of compressor oil gauge to indicate pressure.	Restricted fitting to gauge plugged up or defective gauge.	Disconnect pipe leading to gauge, clean thoroughly, and replace. Make sure that all joints are tight. If gauge is defective, replace with a new one.
	Dirt under ball seat in oil pump or sticking pressure relief valve.	Dismantle oil pump and clean thoroughly. Examine balls, seats and relief valve. Replace any parts necessary.
	No oil in crankcase or oil pump screen plugged up.	Fill crankcase to "F" mark on bayonet gauge with oil. See lubrication. Clean oil pump screen if necessary.
Pilot unloading valve chattering.	Differential pressure set too close.	See instructions on Pilot Unloading Valve.
Knock in compressor.	Loose or worn connecting rod or piston wrist pin bearing.	Be sure that compressor crankcase is full of oil by checking on bayonet gauge. Remove cylinder and examine for damaged parts, such as piston, piston rings, scored cylinder bore or connecting rod bearings.