WISCONSIN

Air Cooled

HEAVY DUTY ENGINES

INSTRUCTION BOOK AND PARTS LIST

MODEL ADH - AE - AEH - AEHS

ISSUE MM 246

WORLD'S LARGEST BUILDERS OF HEAVY DUTY AIR COOLED ENGINES

IMPORTANT

Since there is a right way, and many wrong ways to operate an engine, it is important that this manual be read carefully before you start your engine. This will avoid unnecessary delays and expense which might be caused by improper operation.

The various bearing surfaces in a new engine have not been glazed, as they will be with continued operation, and it is in this period of "running in", that special care must be exercised, otherwise the highly desired glaze will never be obtained. A new bearing surface that has once been damaged by carelessness will be ruined forever.

THEREFORE READ INSTRUCTIONS CAREFULLY

A copy of this manual is sent out with each engine. All points of operation and maintenance have been covered as carefully as possible but if further information is required, inquiries sent to the factory will receive prompt attention.

When writing the factory ALWAYS GIVE THE MODEL AND SERIAL NUMBER of engine referred to.

Extra copies of this manual are $1.00 each.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 14, WISCONSIN

BOOK OF INSTRUCTIONS

WISCONSIN
SINGLE CYLINDER ENGINES

MODEL ADH
2¾" Bore 3¼" Stroke
19.3 cu. in. Displacement

MODELS AE, AEH, AEHS
3" Bore 3¼" Stroke
23 cu. in. Displacement

MODEL AFH
3¼" Bore 4" Stroke
33.2 cu. in. Displacement

MODEL AGH
3½" Bore 4" Stroke
38.5 cu. in. Displacement

MODEL AHH
3⅝" Bore 4" Stroke
41.3 cu. in. Displacement

INDEX

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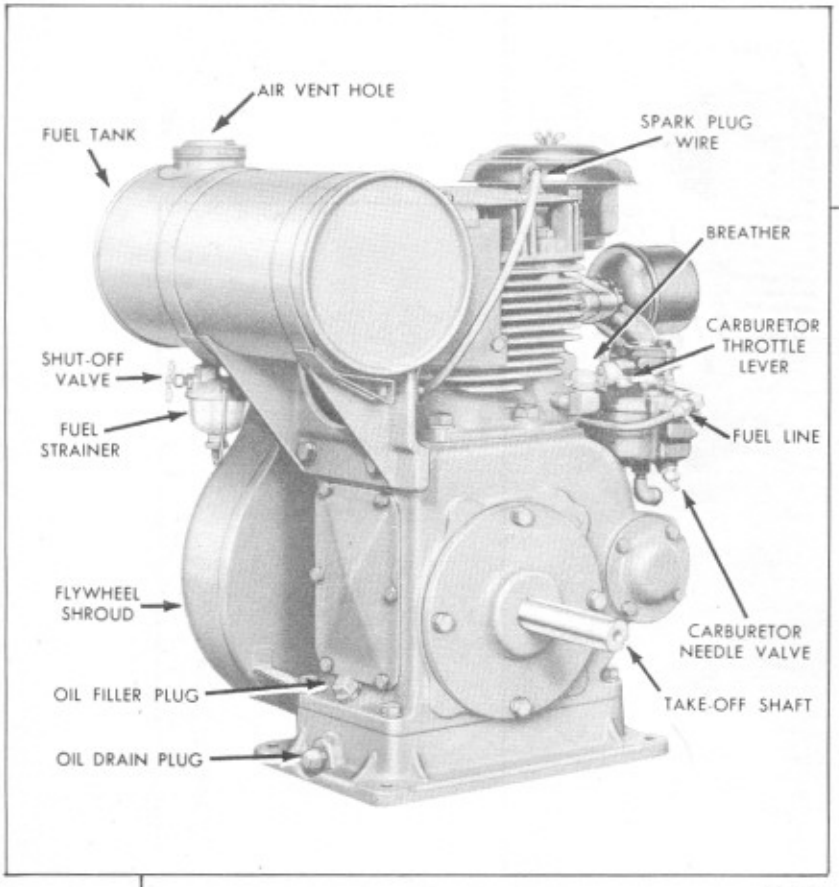
MODELS ADH, AE, AEH AND AEHS ENGINES



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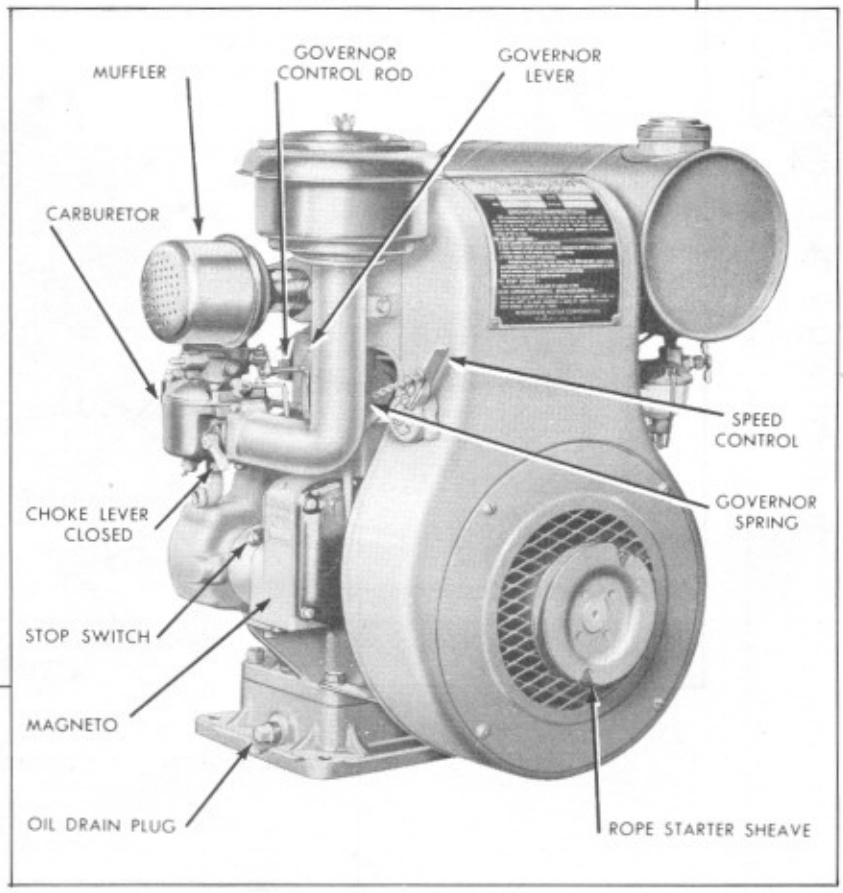

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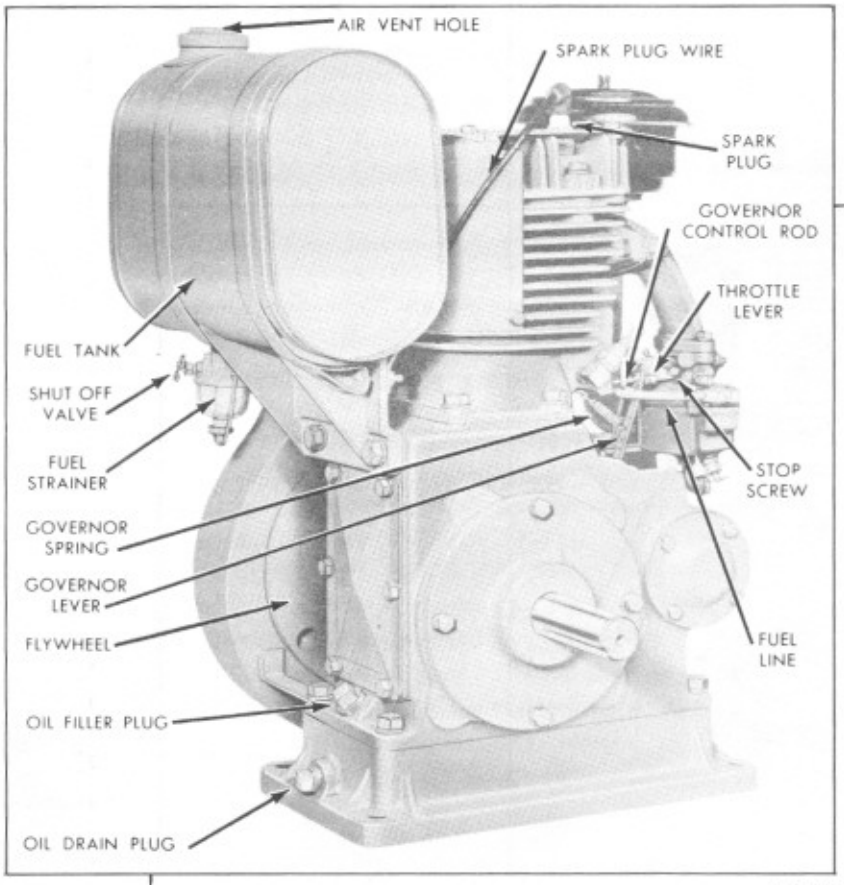
MODELS AFH, AGH AND AHH ENGINES



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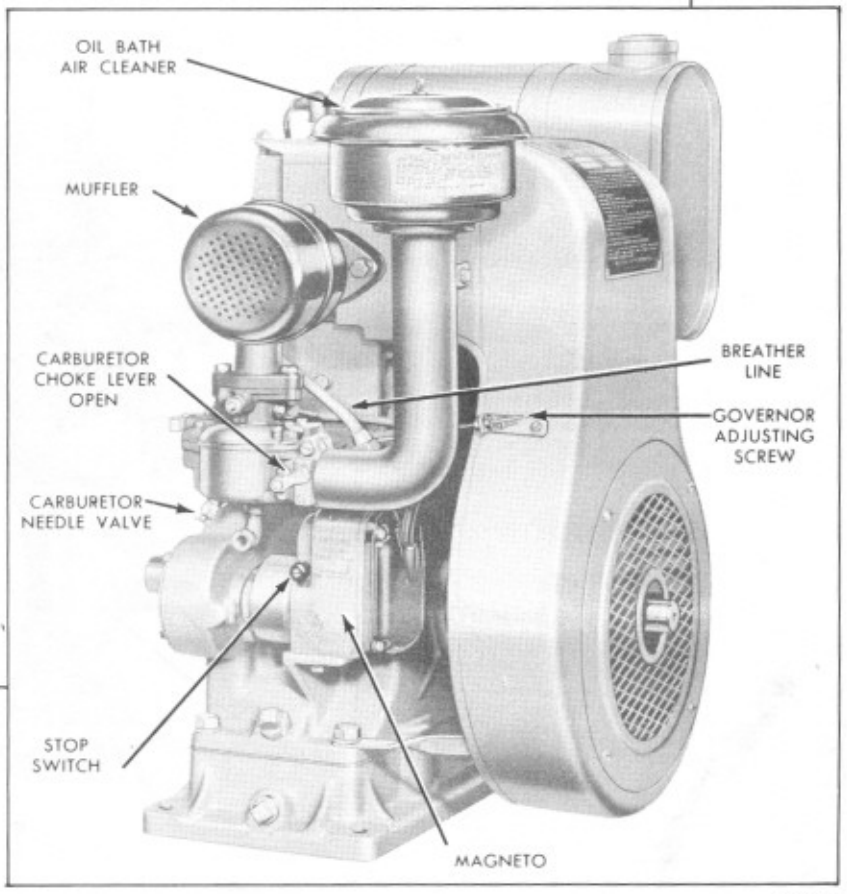

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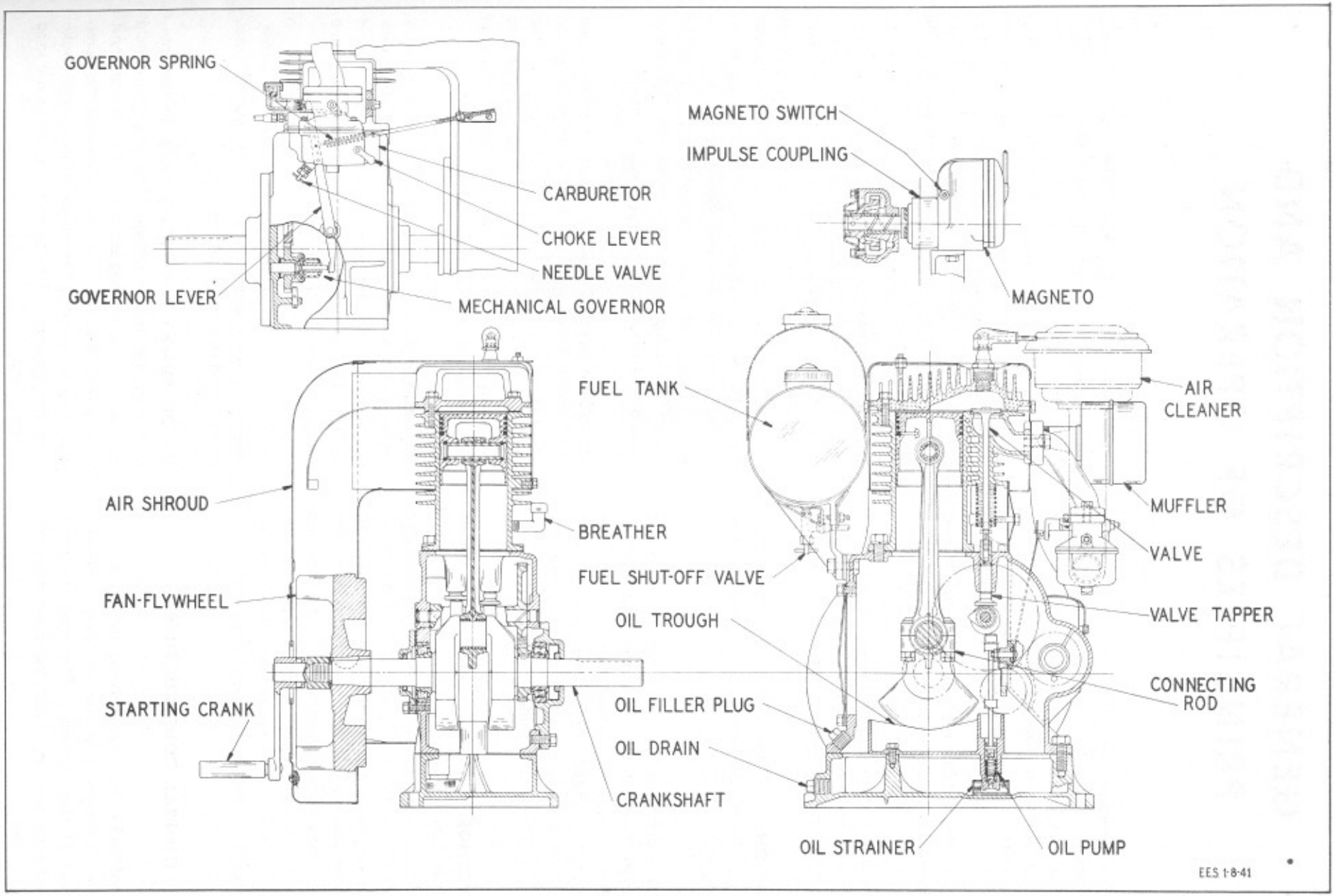


SECTIONAL VIEWS OF ENGINES — MODELS ADH, AE, AEH, AEHS, AFH, AGH, AHH

GENERAL DESCRIPTION AND PRINCIPLES OF OPERATION

WISCONSIN engines are of the four cycle type, in which each of the four operations of suction, compression, expansion and exhaust requires a complete stroke, or a total of two revolutions of the crankshaft.

The proper combustible mixture of gasoline and air is furnished by a carburetor.

The spark for ignition of the mixture is furnished by a high tension magneto, fitted with an impulse coupling, which makes starting very easy.

LUBRICATION is of the splash type. A plunger pump maintains the oil level in a trough under the connecting rod.

COOLING is accomplished by a flow of air, circulated over the cylinder and heads, by a combination fan-flywheel encased in a sheet metal shroud. The air is directed by ducts and baffle plates to insure uniform cooling of all parts. Never operate the engine with shrouding damaged or removed.

The **GOVERNOR** is of the centrifugal, or flyball type, and its function is to control the engine after it is started by varying the throttle opening on the carburetor to suit the load imposed on the engine. When the engine is at rest, the governor will hold the throttle valve wide open, but as soon as the engine is started, the governor will regulate the speed, at the predetermined revolutions per minute. In order to give close regulation, the governor spring must be suited to the speed required.

GENERAL CONSTRUCTION

The **CAMSHAFT** has the driving gear and the cams formed integral and the oil pump eccentric is also part of the camshaft. The shaft is bored throughout and runs on a stationary pin fastened in the crankcase.

On Models ADH, AE, AEH, AEHS the inlet and exhaust valves are Austenitic steel. On AFH, AGH, AHH the exhaust valve is made of Silchrome steel and the inlet of Chrome Nickel steel. Valve seat insert rings for both inlet and exhaust valves are made of Molybdenum iron pressed into the cylinder blocks. Mushroom type valve tappers are employed. These tappers are fitted with adjusting screws.

The **CRANKSHAFT** is carried on two Timken bearings. The cones are a tight press fit on the crankshaft. The outer race or cup of the Timken bearings, at the power take-off end of the engine, is carried in a plate bolted to the crankcase. Under this plate several shims are fitted for adjusting the bearings. The bearings are properly fitted at the factory and it is very seldom necessary to change this adjustment for wear, and then the work should only be done by an experienced man.

The **CONNECTING ROD** is made of drop forged steel, and is fitted with a bronze wrist pin bushing. The big end is direct babbitted. A dipper on the connecting rod cap strikes the oil in a trough and the spray thus formed provides ample lubrication for all internal parts of the engine.

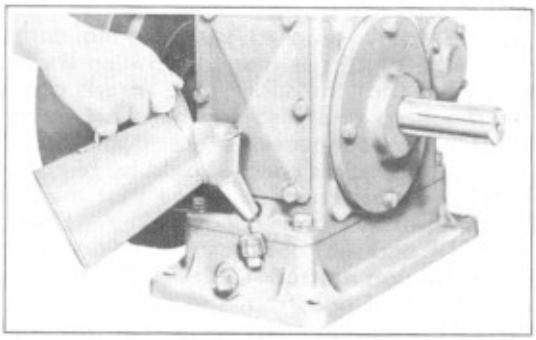
The **PISTONS** are heavy duty aluminum alloy castings. On Model ADH the piston is fitted with two compression and one oil regulating ring and on AE, AEH, AEHS, AFH, AGH, AHH with three compression and one regulating ring each.

The piston pin is a light press fit in the piston, and steel wire snap rings in the piston bosses prevent end movement of the pin.

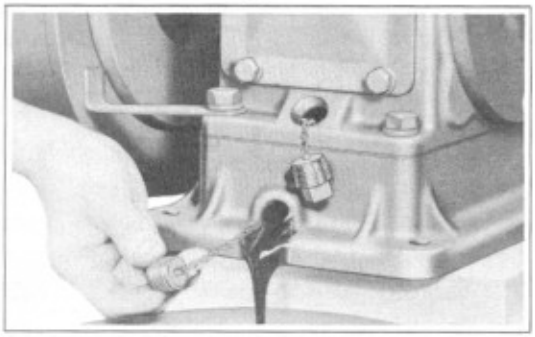
The **OIL PUMP** is of the plunger type, formed integral with the splash trough. The plunger is held up against the driving eccentric on the camshaft by a spring. The up, or suction stroke of the pump is by this spring and the down, or discharge stroke is by the eccentric. Two ball check valves are used in the pump.

HORSE POWER

R.P.M.	ADH	AE	AEH	AEHS	AFH	AGH	AHH
1400	2.7	3.25	3.3	—	5.3	6.4	6.8
1600	3.2	3.75	3.9	—	6.0	7.2	7.7
1800	3.6	4.15	4.4	—	6.6	7.8	8.5
2000	4.1	4.5	4.9	5.2	7.0	8.2	9.0
2200	4.5	4.8	5.4	5.9	7.2	8.4	9.2
2400	4.8	5.0	5.7	6.5	—	—	—
2600	5.1	5.1	6.1	6.9	—	—	—
2800	—	—	—	7.2	—	—	—
3000	—	—	—	7.4	—	—	—
3200	—	—	—	7.4	—	—	—



Adding Oil — Fig. 1 — 76209C



Draining Oil — Fig. 2 — 76213C

LUBRICATION CHART

CRANKCASE

Every 8 hours, check oil level and fill to level of oil filler plug.

Drain and refill every 50 hours with SAE grade as recommended below.

AIR CLEANER

Every 8 hours, drain and refill with same grade of oil as used in crankcase. Detailed instructions are printed on the air cleaner.

GRADE OF OIL

SEASON OR TEMPERATURE	GRADE OF OIL	EXAMPLE
Spring, Summer, or Autumn +120° F to +40° F	SAE 30	Mobiloil "A"
Winter +40° F to +5° F	SAE 20	Mobiloil "Arctic"
+5° F to —20° F	SAE 10W	Mobiloil "Arctic Special"
Crank Case Capacity		
ADH, AE, AEH, AEHS		1½ Qts.
AFH, AGH, AHH		2¼ Qts.

IMPORTANT: S. A. E. Viscosity numbers classify oils in terms of body only without consideration of quality or character, therefore we list certain grades of MOBILOIL as typical examples of lubricants possessing the qualities we believe desirable in oils for WISCONSIN engines. We plainly state that these grades of MOBILOILS are listed because of their recognized quality and world-wide distribution. THERE ARE OTHER HIGH QUALITY OILS ON THE MARKET THAT ARE EQUALLY SATISFACTORY FOR WISCONSIN ENGINES.

TABLE OF TOLERANCES

DESCRIPTION	ADH	AE	AEH	AEHS	AFH	AGH	AHH
Camshaft to pin	.001 to .0025	.001 to .0025	.001 to .0025	.001 to .0025	.001 to .0025	.001 to .0025	.001 to .0025
Connecting rod to crankshaft—dia.	.0007 to .002	.0007 to .002	.0007 to .002	.0007 to .002	.0007 to .002	.0007 to .002	.0007 to .002
Connecting rod to crankshaft—side	.004 to .011	.004 to .011	.004 to .011	.004 to .011	.004 to .011	.004 to .011	.004 to .011
Governor to shaft—dia.	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025
Main bearing end play	.002 to .004	.002 to .004	.002 to .004	.002 to .004	.002 to .004	.002 to .004	.002 to .004
Magneto drive shaft to bushing—dia.	.0020 to .0035	.0020 to .0035	.0020 to .0035	.0020 to .0035	.0020 to .0035	.0020 to .0035	.0020 to .0035
Magneto drive shaft end clearance	.004 to .005	.004 to .005	.004 to .005	.004 to .005	.004 to .005	.004 to .005	.004 to .005
Oil pump plunger in bore	.003 to .004	.003 to .004	.003 to .004	.003 to .004	.003 to .004	.003 to .004	.003 to .004
Piston clearance to bore at piston skirt	.004 to .0045	.004 to .0045	.004 to .0045	.0065 to .007	.0035 to .004	.006 to .0065	.0055 to .006
Piston pin bushing	.0005 to .0011	.0005 to .0011	.0005 to .0011	.0005 to .0011	.0005 to .0011	.0005 to .0011	.0005 to .0011
Piston ring gap	.012 to .022	.012 to .022	.012 to .022	.012 to .022	.014 to .024	.014 to .024	.014 to .024
Piston ring side clearance	.002 to .003	.002 to .003	.002 to .003	.002 to .003	.002 to .003	.002 to .003	.002 to .003
Valve stem clearance in guide	.003 to .005	.003 to .005	.003 to .005	.003 to .005	.003 to .005	.003 to .005	.003 to .005
Valve tapper clearance in guide	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025	.0005 to .0025
Valve tapper—cold	.010 to .014	.010 to .014	.010 to .014	.013 to .017	.010 to .014	.010 to .014	.010 to .014

STARTING AND OPERATING INSTRUCTIONS

PREPARATION FOR USE

FUEL TANK capacity, round tank, 1.3 gallons, oval tank, 2¾ gallons.

1. BEFORE STARTING ENGINE

Before starting engine, fill the base with a good gas engine oil corresponding in body to the SAE Viscosity numbers listed on Lubrication Chart, page 7.

Next, fill the fuel tank with a good quality gasoline free from dirt and water. We recommend gasoline with octane rating of 70 to 75. Then open the shut-off valve in the gasoline strainer.

Next, close the choke on the carburetor air inlet horn. The choke is closed by pushing the choke lever down. The carburetor needle valve should be turned to closed position and then opened approximately ¾ to 1¼ turns.

After the carburetor has once been adjusted, it should be left that way for all future operations.

SAFETY PRECAUTIONS

DON'T fill fuel tank while engine is in operation. Gasoline spilled on a hot engine will explode and injure the operator.

DON'T operate engine in a closed building unless exhaust gas is piped to the outside. The exhaust gases contain carbon monoxide which is colorless and odorless and a deadly poison.

DON'T tamper with any part of the engine or the machine which it drives without first disconnecting the spark plug wire. A slight movement of any part of the machine might start the engine.

2. HOW TO START

The magneto switch on Fairbanks-Morse and Wico should be turned clockwise as far as it will go. On Edison-Splitdorf a spring switch is always in the "ON" or running position except when depressed by hand for stopping.

The engine is now ready to be cranked. Engage the starting crank and crank briskly in a clockwise direction. As a matter of safety it is advisable to engage the starting crank so as to pull up on it instead of pushing down. In the latter case a backfire from the engine might injure the operator's arm. On engines with starting sheave the rope should be wound on the sheave in a clockwise direction after the knot in the end of the rope has been inserted in the notch in the sheave. Pull gently on the rope until increased resistance is felt on compression stroke. Now turn the sheave back one-half turn. Rewind the rope fully and pull briskly to turn the crankshaft over rapidly. If the engine does not start on the first application of the crank or rope, the operation should be repeated. If fuel begins to drip from the carburetor, choke should be opened.

3. FAILURE OF ENGINE TO START

If the engine will not start after repeated application of the starting crank, the following points should be checked.

Check the spark plug to see that no carbon or other foreign matter is lodged between the points. Check to see that the spark plug wire is connected to the magneto and also to the spark plug, and see that these connections are tight and clean. The magneto breaker cover should be removed and the breaker points checked to see that the opening on Edison Splitdorf and Wico is .015", Fairbanks-Morse .020" and see that these points are clean and free from foreign matter. (See Fig. 3.) Next, check to see if the fuel line from the fuel strainer is obstructed. If an obstruction is present, the fuel line should be blown out with compressed air.

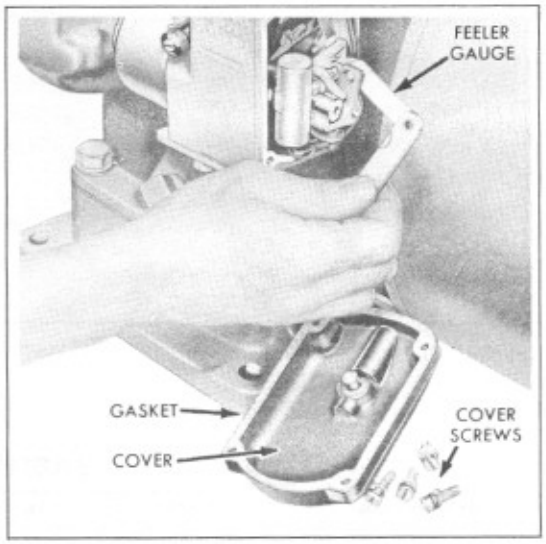


Fig. 3 77599C
Checking Point Clearance.

4. HOW TO STOP ENGINE

The Fairbanks-Morse and Wico magnetos are fitted with a "turn type" switch. To stop the engine, this button should be turned counter-clockwise as far as it will turn. On Edison-Splitdorf magneto the spring switch is to be depressed against the magneto housing and held there until the engine comes to a stop.

ADJUSTMENTS AND MAINTENANCE

The following adjustments and maintenance procedures should be followed carefully by the operator.

EVERY 8 HOURS

Stop engine and check oil level. Oil should be added to maintain the level of the oil filler plug. Please refer to Lubrication Chart on page 7.

ADJUSTMENTS

Carburetor—Idle or Low Speed.

Have the engine well warmed up so that the intake manifold is at least warm to the hand. Close the throttle until minimum steady idling speed is reached. Turn low speed adjustment gradually to the right or left until the engine runs as steady and as fast as this throttle position will permit. If after adjusting, the engine idles too fast or too slowly, the desired speed can be obtained by turning the throttle stop screw. (See Fig. 4.)

INTERMEDIATE AND HIGH SPEED

The mixture for intermediate or high speed is controlled by an adjustable metering jet, the adjustable needle for which is screwed into the carburetor body at the bottom.

For adjusting, follow this procedure: Set the throttle about ⅓ open, turn the adjustment in until the speed of the engine is noticeably cut down. Then turn out slowly until the fastest and steadiest speed for that throttle position is obtained.

TO PRIME THE ENGINE

The engine may fail to start due to difficulties in either the fuel system or the ignition system. To determine which is at fault make the following test: Remove the spark plug and pour about a half teaspoon of gasoline into the spark plug opening. Replace the spark plug and crank the engine. If it fires for three or four revolutions and then stops the trouble is in the fuel system. If engine does not fire at all, check the ignition system according to instructions on page 10 and 11

GOVERNOR

Correct Motor Speed

On this engine three different springs are required to give the full range of speeds and the spring must be hooked into the proper hole on the governor lever. Reference to figure 5 will show that the governor lever has 4 holes into which the governor spring can be hooked. We number these holes from the fulcrum toward the end of the lever as Nos. 1, 2, 3 and 4. In the tabulation following we show the "Load Speed," "Spring Number, "Free Length" and "Hole Number."

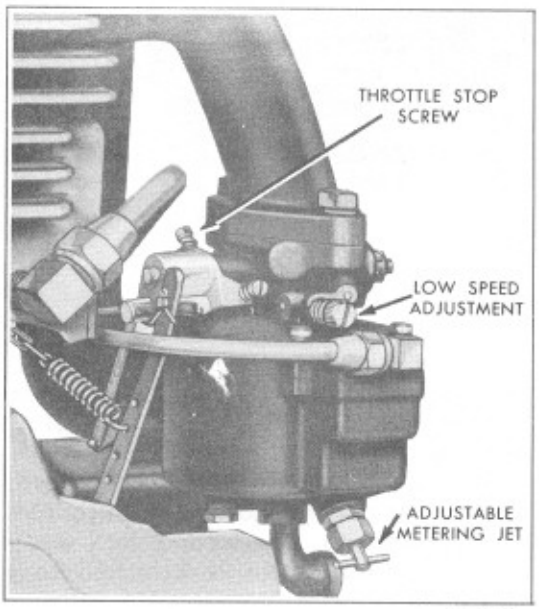


Fig. 4 72055C

Full Load Engine Speed	Spring Number	Free Length of Spring	Hole number in Governor Lever		
			ADH, AE, AEH	AEHS	AFH, AGH, AHH
1400	PM-140	1-9/32"	1	—	1
1600	PM-140	1-9/32"	2	—	3
1800	PM-141	1-9/16"	1	—	2
2000	PM-141	1-9/16"	2	2	3
2200	PM-141	1-9/16"	3	3	4
2400	PM-142	1-29/32"	2	2	—
2600	PM-142	1-29/32"	3	3	—
2800	PM-142	1-29/32"	—	3	—
3000	PM-142	1-29/32"	—	4	—
3200	PM-142	1-29/32"	—	4	—

After the spring has been hooked into the proper hole in the governor lever for the speed desired, the tension of the governor spring must be adjusted to give the exact speed. On standard models a small bracket is furnished which is attached to the side of the flywheel shroud. The governor spring adjusting screw is clamped to this bracket with 2 locknuts. The tension of the governor spring can be adjusted by means of this adjusting screw. Increasing spring tension increases governed speed. Decreasing spring tension of course decreases governed speed.

Some models are equipped with a variable speed control as shown in Figure 6. On this type adjustment is made by means of an adjustable bracket which is attached to the variable speed governor control. (See Fig. 6.) This control is attached to the left side of the air shroud when viewed from the flywheel end of the engine. The adjustable bracket is mounted on the governor control handle with two round head screws and lock-washers. The governor control chain is attached to this bracket by a cotter pin.

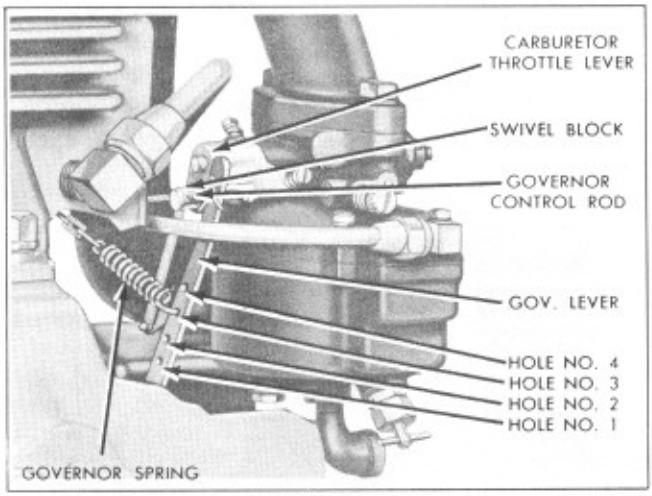


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Fig. 5

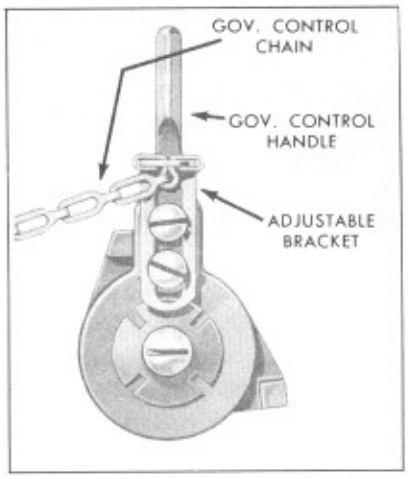

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Fig. 6

To increase the governed speed, the round head screws should be loosened and the bracket moved toward the end of the governor control handle. To decrease speed, the opposite procedure applies.

IGNITION

The spark for ignition of the gasoline and air mixture is furnished by a Fairbanks-Morse, Wico or Edison-Splitdorf magneto, fitted with an impulse coupling which makes starting very easy.

A. TO CHECK FOR SPARK (See Fig. 7.)

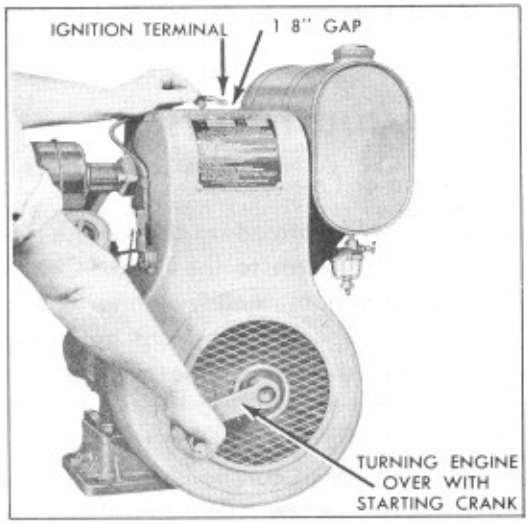

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Fig. 7

To prove that a satisfactory spark is being obtained from the magneto, remove the ignition wire from the spark plug.

Hold the ignition cable terminal about ⅛ inch from any metal part of the engine (Fig. 7). Keep hand on insulated part of cable to avoid a shock. Turn motor with starting crank or sheave and if spark jumps this gap, the entire ignition system is all right up to the spark plug.

B. SPARK PLUG ADJUSTMENT (See Fig. 8)

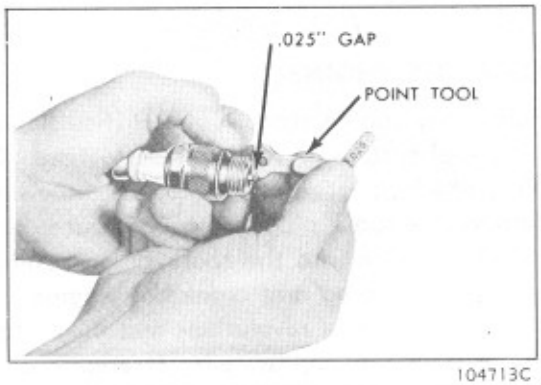

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Fig. 8

The spark plug gap should be maintained at .025". Approximately every 100 hours of operation, the plug should be removed and inspected. The spark plug points should be scraped clean and the plug thoroughly washed in alcohol. The points should then be reset to .025 inches. To set the points, a spark plug wrench or any similar tool should be used. (See Fig. 8.) Spark plug size 18 mm. metric equivalent to Champion No. 8.

C. IGNITION CABLE

When inspection of the spark plug is made, the ignition cable should also be inspected. If the cable shows signs of cracking insulation, it should be replaced.

D. MAGNETO TIMING

(Refer to Overhaul Instructions on Page 19.)

OIL PUMP

The oil pump in this engine is of the plunger type and is built into the engine base. An oil trough is provided and the pump body is a part of this trough. A push rod actuated from the camshaft operates the plunger of the pump against the tension of a spring in the pump bore.

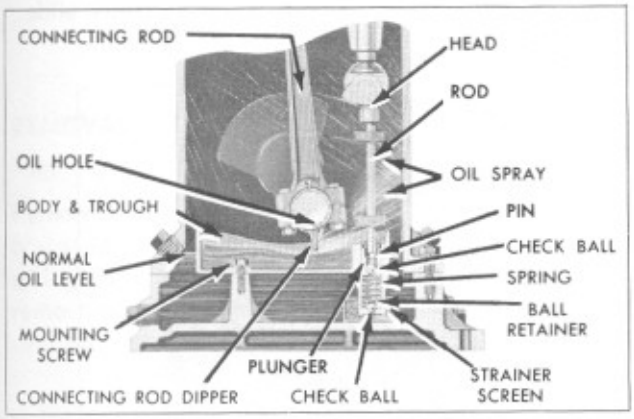

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Fig. 9

Two check balls are provided, one in the seat at bottom of the pump bore which is held in place by a retainer and one in the plunger itself. The upward stroke is the suction and the downward stroke is the discharge stroke. The plunger, through the action of check balls, draws oil from the bottom of the engine base through a screen and discharges into the oil trough. The connecting rod is provided with a dipper and this dipper strikes the oil in the trough and provides ample lubrication for all internal parts of the engine. (See Fig. 9.)

The action of this type of pump is positive at all times, providing dirty or gritty oil has not been allowed to wear out the plunger and bore. It is possible for small particles of dirt to be drawn through the oil filter screen and for these to lodge under one of the check balls.

If the oil pump has failed to operate, it should be disassembled and the seat thoroughly cleaned. If, after a thorough cleaning the pump will not operate satisfactorily by manual operation of the plunger with a screw driver, it should be replaced as a complete unit. (See Fig. 10.)

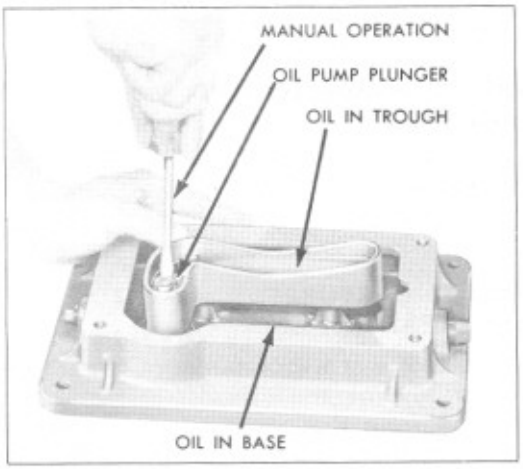

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Fig. 10
Priming Oil Pump

FUEL STRAINER

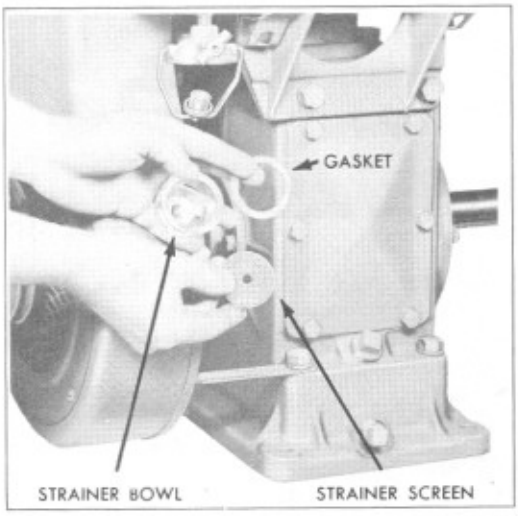

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Fig. 11
Servicing Fuel Strainer

The fuel strainer filters the gasoline before it enters the carburetor. A visual inspection should be made daily and if dirt is present in the cup, it should be emptied and the cup and screen thoroughly cleaned. (See Fig. 11.)

AIR CLEANER

The oil bath air filter should be serviced every 8 hours. In extremely dusty conditions two or three times a day. The oil in the cup with the collected dust should be emptied and the cup cleaned and refilled to the level mark shown. Use same grade of oil as used in engine crankcase. See Lubrication Chart Page 7. The filtering element should be washed in solvent if it shows signs of collected dust.

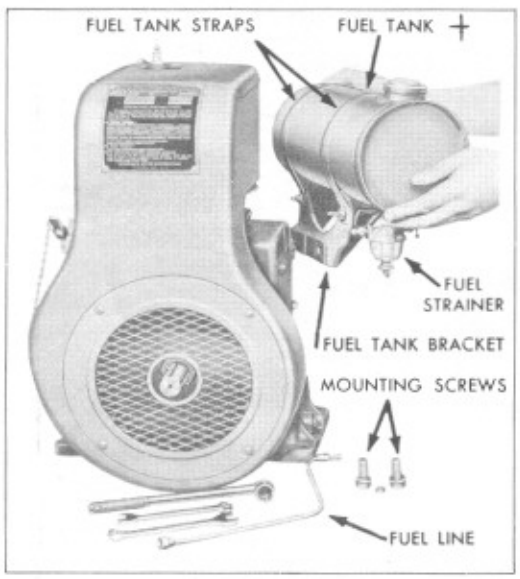
COMPLETE DISASSEMBLY PROCEDURE

REMOVAL OF MAGNETO AND COUPLING DISC

To remove the magneto, remove the 2 capscrews and lockwashers which secure the magneto to the pad on the crankcase.

REMOVAL OF CARBURETOR, MANIFOLD AND AIR CLEANER

Loosen the gas line at the carburetor. Next, loosen the breather line at the cylinder. Then remove the cotter pin from the governor control rod and pull the rod out of the governor control lever. Then loosen and remove the capscrew and lockwasher which holds the air cleaner bracket to the engine. Next, loosen and remove the 2 capscrews and lockwashers which clamp the manifold to the cylinder. The entire assembly of the manifold, carburetor, and air cleaner can then be removed.



80200C

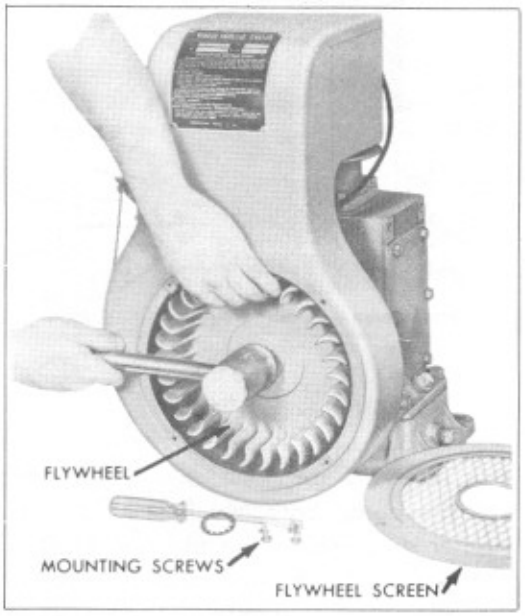
Fig. 12

REMOVAL OF FUEL TANK AND FUEL STRAINER

The gas line should be loosened at the strainer and it can then be taken off the engine. (See Fig. 12.) Then remove the capscrews and lockwashers which hold the fuel tank bracket to the crankcase. The assembly of the fuel tank, fuel strainer, and fuel tank straps and bracket can then be removed as an assembly. If it is desired to remove the straps this can be accomplished by the removal of the 2 clamp screws and nuts and lockwashers. The fuel strainer is mounted to the tank with a 1/8" close nipple and the strainer can then be removed by unthreading from this nipple.

REMOVAL OF FLWHEEL (See Fig. 13.)

On engines with starter sheave first remove this sheave which is threaded on the crank-shaft. Then remove the four round head screws which hold the flywheel screen to the shroud. The screen can then be lifted off the shroud. On engines with starting crank remove the starting nut which is threaded on crankshaft. The flywheel fits on a taper on the crankshaft and is easily removed. It should be grasped with the left hand and the end of the crankshaft should be struck several sharp blows with a babbitt hammer. (Avoid damaging thread on end of crankshaft.) The flywheel will then slide off the taper.



71677C

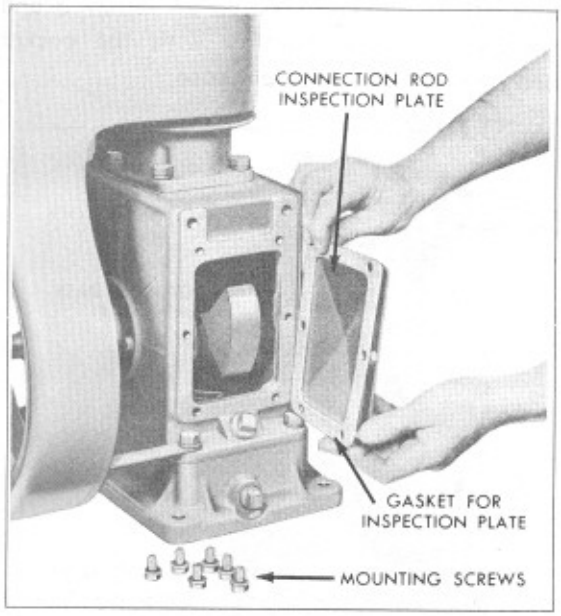
Fig. 13

REMOVAL OF CONNECTING ROD INSPECTION PLATE & GASKET

(See Fig. 14.)

This type of engine is fitted with a connecting rod inspection plate so that a visual inspection may be made of the lower connecting rod bearing, and if necessary, the rod can be adjusted. To remove the plate, remove the 6 capscrews and lockwashers

which secure the plate to the crankcase. The plate can then be pulled off the engine.



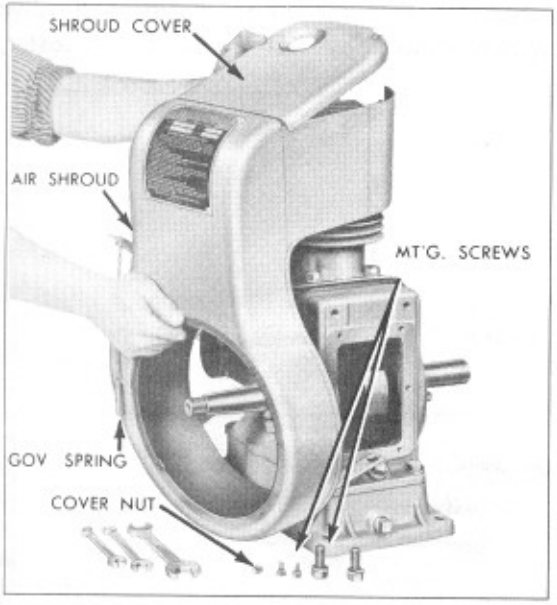
71664C

Fig. 14

REMOVAL OF AIR SHROUD AND COVER

(See Fig. 15.)

Remove the capscrews which hold the shroud support straps to the engine base. Loosen the governor spring at the governor lever. Next, loosen and remove the capscrew which holds the shroud to the cylinder (this is located above the manifold).



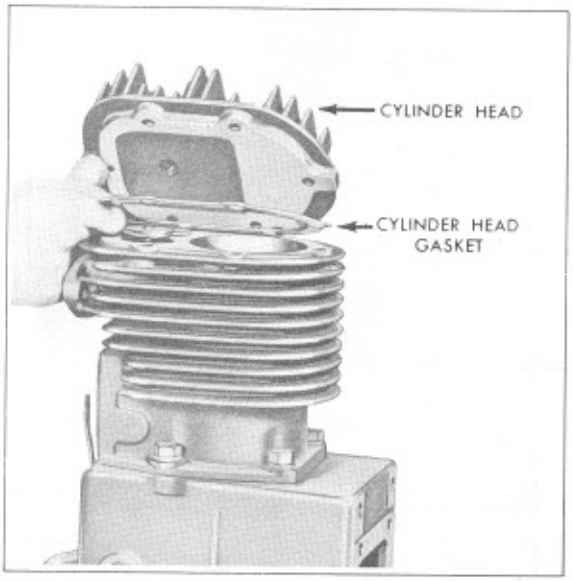
71680C

Fig. 15

Next, remove the nuts which hold the air shroud cover in place. Then, remove the capscrew and lockwasher which holds the rear of the shroud to the cylinder. The shroud and cover can then be pulled off the engine. Never operate the engine with any part of the shrouding damaged or removed.

REMOVAL OF CYLINDER HEAD (See Fig. 16.)

First, remove the spark plug from the head so that it will not be damaged. Next, loosen and remove all of the capscrews which hold the cylinder head to the cylinder and lift the head and gasket off the engine.



77516C

Fig. 16

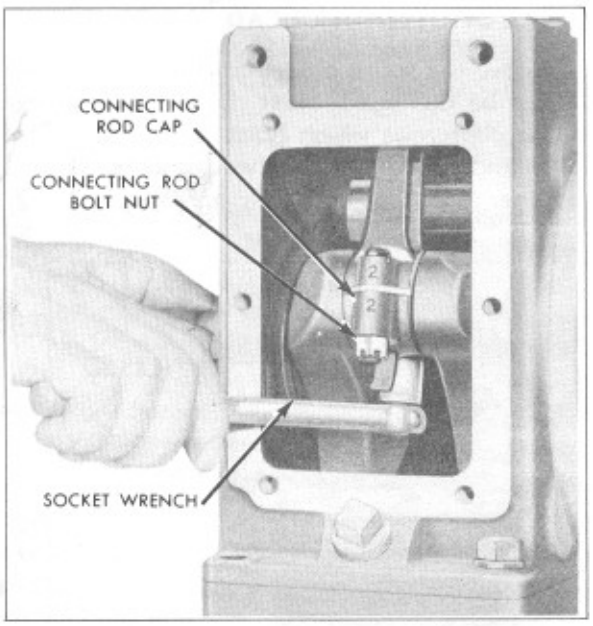
REMOVAL OF CONNECTING ROD AND PISTON ASSEMBLY (See Figs. 17 and 18.)

The connecting rod and piston assembly can be removed either through the connecting rod inspection plate opening, or after the engine is entirely disassembled, it may be removed from the bottom of the crankcase. In most cases it should not be necessary to remove the engine base and in the explanation following we list the procedure for removing the connecting rod and piston without first removing the engine base: First remove the cotter pins which lock the connecting rod bolt nuts in place. On later engines palnuts and plain hexagon nuts replaced the slotted nuts and cotter pins. Then, using a socket wrench, loosen and remove the connecting rod bolt nuts.

The connecting rod cap can then be removed. The removal of the cap is sometimes facilitated by

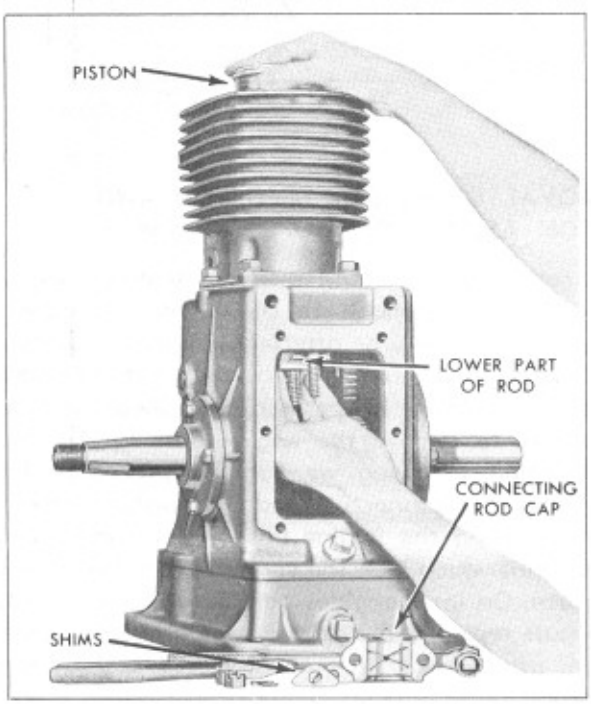
tapping the protruding end of the connecting rod bolts lightly with a babbitt hammer.

This will force the rod up and away from the cap and the cap and shims will drop into the hand. The piston and rod assembly should then be pushed upward out of the cylinder and pulled free.



71668C

Fig. 17

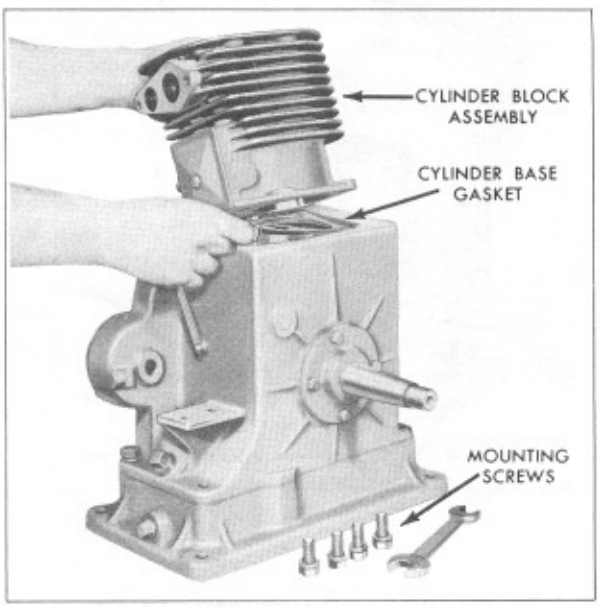


77514C

Fig. 18

REMOVAL OF THE CYLINDER (See Fig. 19.)

The 4 capscrews and lockwashers which secure cylinder to the crankcase should be removed and the cylinder assembly together with the gasket may then be lifted off the crankcase.

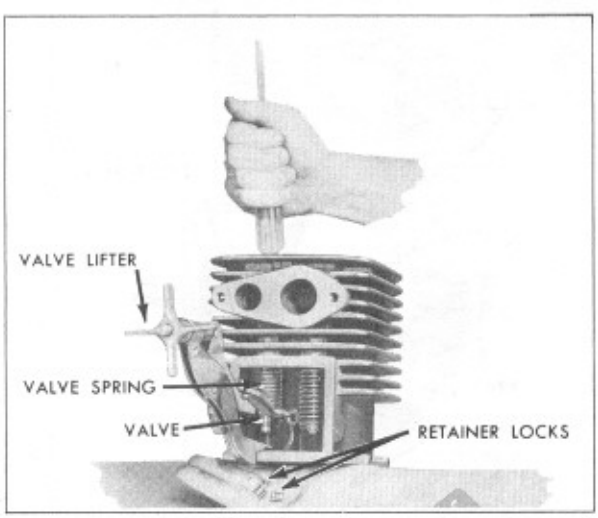


73854C

Fig. 19

REMOVAL OF VALVES (See Fig. 20.)

After the cylinder has been removed from the engine, a standard automotive type valve lifter may be used and the valve spring compressed. We recommend for this procedure a No. 358 valve lifter manufactured by KD Tools of Lancaster,



71662C

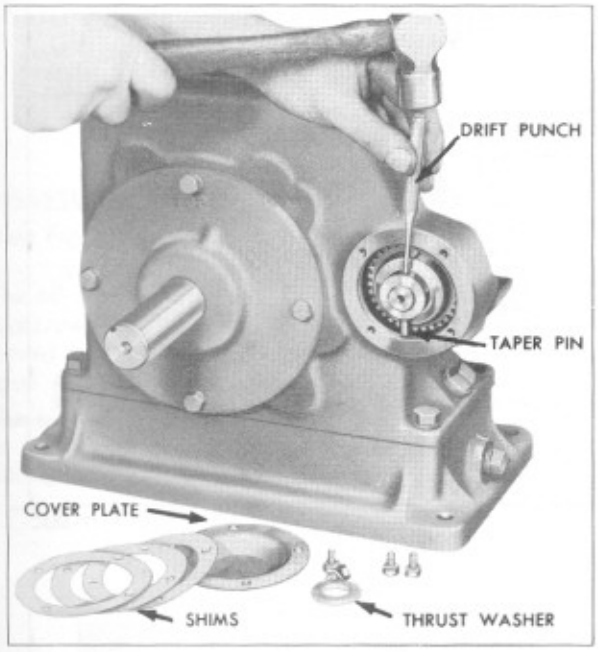
Fig. 20

Penn. With the handle of a screw driver or a hammer, the valve should be tapped downward and the 2 retainer locks will drop into the hand. The valves can then be pulled upward, out of the guides and the valve spring and seat will fall out of cylinder and can be pulled free.

REMOVAL OF MAGNETO DRIVE SHAFT AND GEAR (See Figs. 21 and 22.)

Remoye the 4 capscrews and lockwashers which hold the magneto drive cover plate to the crankcase.

The plate and gaskets may then be pried away from the case. The thrust washer should be removed from the end of the shaft and the pin



71692C

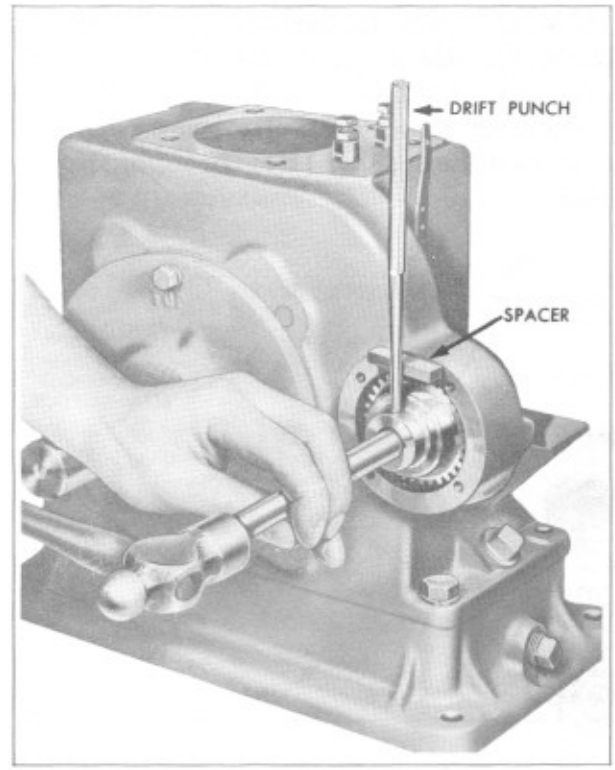
Fig. 21

which secures the gear to the shaft should be driven out with a drift punch. Then using a babbitt hammer drive the shaft flush with the gear.

Next insert a drift punch of the same approximate size as the pin which was removed. However, the punch must be inserted into the hub of the gear to a point where it will not interfere with the movement of the shaft when it is driven out of the gear. With the punch in this position, the entire magneto drive shaft and gear assembly should be pushed outward and away from the crankcase. A spacer should be placed between the crankcase and drift punch and the shaft should be driven about ¼" into the gear.

An additional spacer, should then be inserted to again bring the gear and shaft away from the crankcase, and the shaft again driven into the gear another ¼". This procedure should be repeated until the gear falls off the shaft. The reason for removing the gear in this manner is that in addition to being pinned to the drive shaft, the gear is also keyed to this drive shaft, with a Woodruff Key and caution must be taken that this key is not driven into the bushing in which the magneto shaft turns.

After the gear falls off the shaft, the Woodruff key should be removed from the shaft and the shaft can then be pulled out of the bushing from the magneto side.



71684C

Fig. 22

It is recommended that after the Woodruff key has been removed, the key-way in the shaft be filed to remove the burr which may have been caused by the removal of the Woodruff key.

The magneto drive shaft bushing need not be removed unless it is worn. If necessary, it can be removed by pressing out of the case with a piece of round brass bar stock of the approximate size of the outside dimension of the bushing.

REMOVAL OF THE MAIN BEARING PLATE

First, remove the Woodruff key which secures the flywheel to the crankshaft.

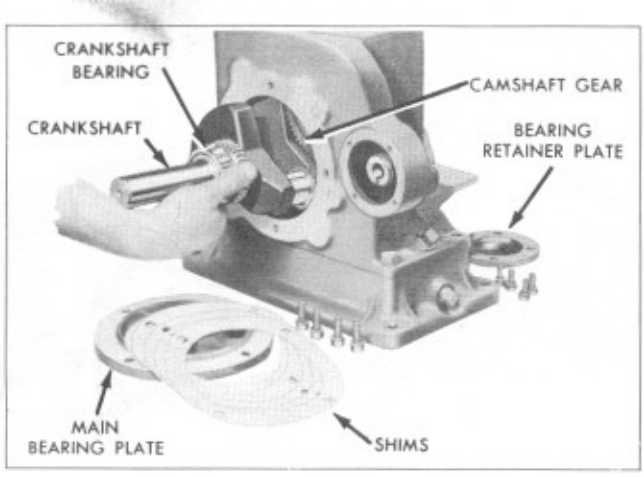
Then remove the 4 capscrews and lockwashers

which hold the main bearing plate to the crankcase. The main bearing plate together with the shims may then be pulled off the crankcase.

Next, remove the main bearing retainer plate on the flywheel end of the engine by removing the 4 capscrews and lockwashers which secure the plate to the crankcase.

REMOVAL OF CRANKSHAFT (See Fig. 23.)

After the removal of the bearing plates the crankshaft should be turned to a position where the counterweights clear the camshaft gear and should be withdrawn from the crankcase. Caution should be taken that the bearing surfaces are protected with the hand during removal so that the rollers of the Timken bearings are not scratched or marked.



71682C

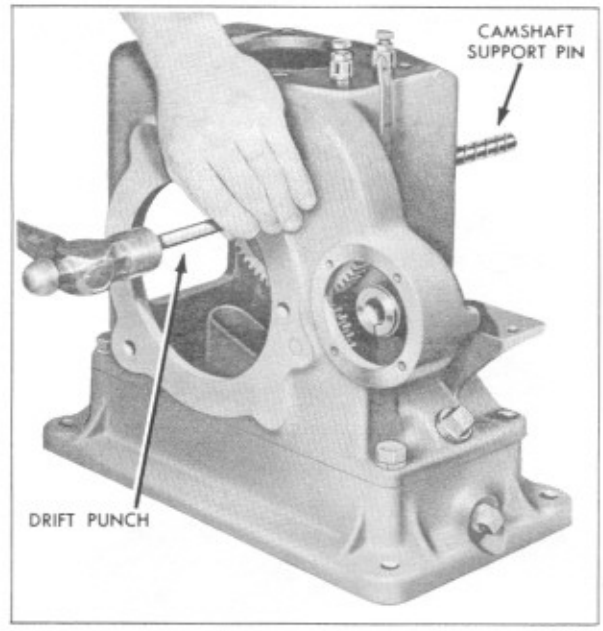
Fig. 23

REMOVAL OF GOVERNOR ASSEMBLY

To facilitate the removal of the governor assembly, the inner governor lever should first be removed. The inner governor lever is attached to a square on the shaft with a hexagon nut. This hexagon nut should be removed and the inner lever can then be pried off of the shaft. The outer lever with the shaft assembled may then be pulled out of the crankcase. The governor, together with the governor gear, is held in place in the crankcase by the governor gear stop pin. This pin should be removed by removing the two cotter pins which hold it in the case. The entire governor assembly including gear, can then be pulled off the governor shaft.

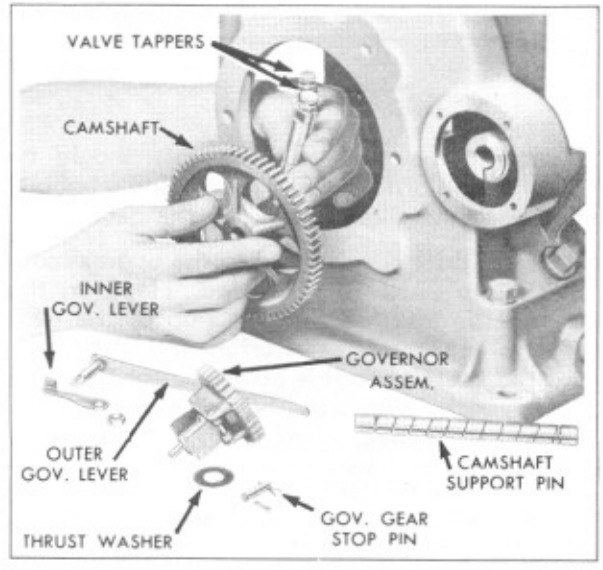
REMOVAL OF CAMSHAFT AND VALVE TAPPERS (See Figs. 24 and 25.)

The camshaft is held in the crankcase and revolves on a stationary pin which is known as the camshaft support pin. In order to remove the camshaft, the pin should be driven out of the crankcase, from the take-off end of the engine. This is accomplished by the use of a large drift punch or similar tool. As soon as the support pin is removed, the camshaft assembly, together with the tappers will drop out of the case.



71683C

Fig. 24

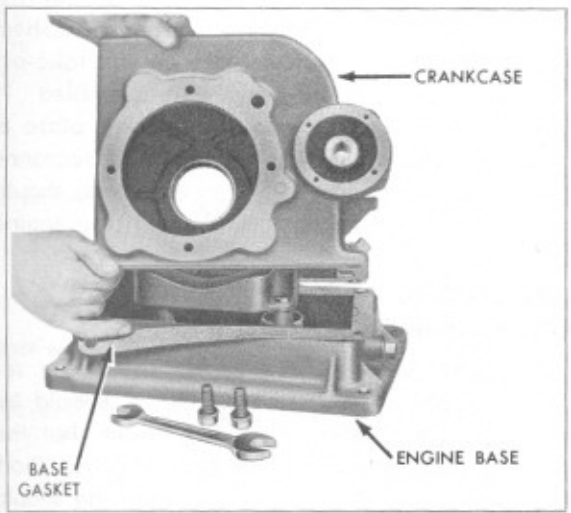


71672C

Fig. 25

REMOVAL OF ENGINE BASE (See Fig. 26.)

Remove the 2 remaining capscrews and lockwashers and lift the crankcase off the engine base.



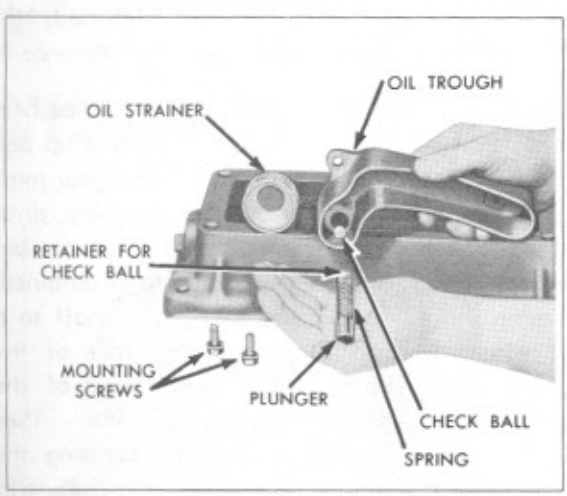
71670C

Fig. 26

DISASSEMBLY OF THE OIL PUMP
(See Fig. 27.)

The oil trough is secured to the engine base by 2 capscrews and lockwashers. These should be removed and the trough can be pulled free of the base.

The oil trough can be tipped to the side and the oil pump plunger, spring, retainer and check balls will fall out of the pump.



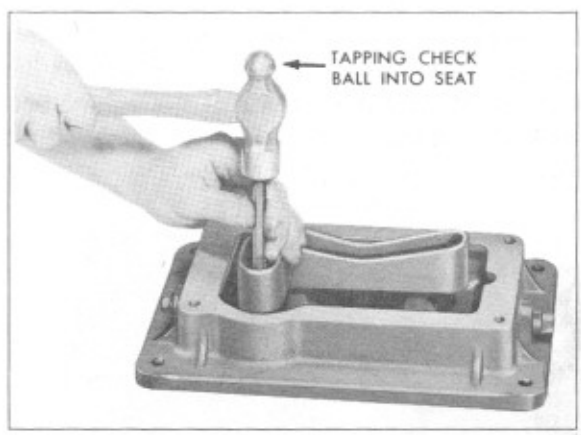
71678C

Fig. 27

REASSEMBLY

REASSEMBLY OF OIL PUMP—CLEANING AND TESTING (See Figs. 27 and 10.)

All parts of the pump should be thoroughly washed in solvent to remove all traces of thickened oil and sludge. The oil pump plunger should be fitted to the bore with a clearance (see table page 7). If the clearance is greater than .008", the plunger and oil pump body should be replaced. Inspect the check ball seat in the bottom of the pump cylinder. This seat must be cleaned perfectly, and must not be worn or pitted. The check ball should then be dropped into the cylinder and tapped into the seat lightly with a punch and hammer. The retainer should then be put in place and the spring lowered into the cylinder bore. The retainer is shown in Fig. 27. The other check ball should then be placed into the plunger and tapped lightly into place in the seat. The retaining pin should then be driven into place. Be sure to clean up any burr on the plunger which might be left by driving the retaining pin in place. The burrs can be removed by using a fine file. The plunger should then be inserted into the cylinder.



79024C

Fig. 28

Next, fill the base of the engine with about 1 pint of oil. With a screw driver, pump the plunger up and down to draw oil into the trough. (See Fig. 10.) If no oil is discharged into the trough, the body and plunger are worn, and should be replaced.

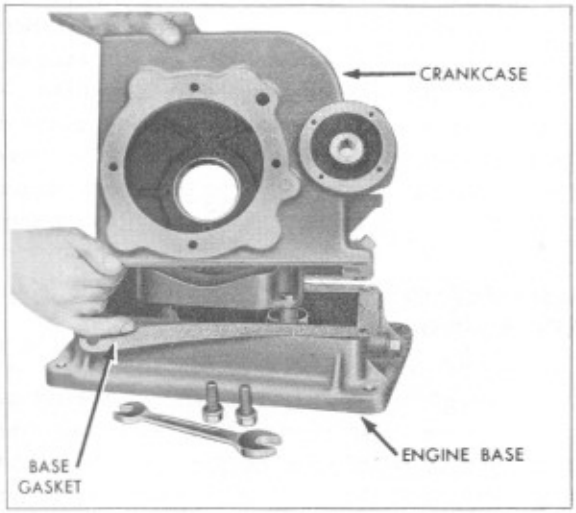
REASSEMBLY OF CAMSHAFT AND VALVE TAPPERS

The tappers are fitted to the guides in the cylinder with a clearance (see table page 7). The tappers should be held in place and the camshaft and gear assembly should be re-installed. The camshaft support pin should be driven through the case from the take-off side of the engine and should be tapped flush with the pad on which the main bearing plate mounts.

The camshaft plug on the flywheel end should be replaced to seal in the support pin.

REMOVAL OF ENGINE BASE (See Fig. 26.)

Remove the 2 remaining capscrews and lockwashers and lift the crankcase off the engine base.



71670C

Fig. 26

DISASSEMBLY OF THE OIL PUMP
(See Fig. 27.)

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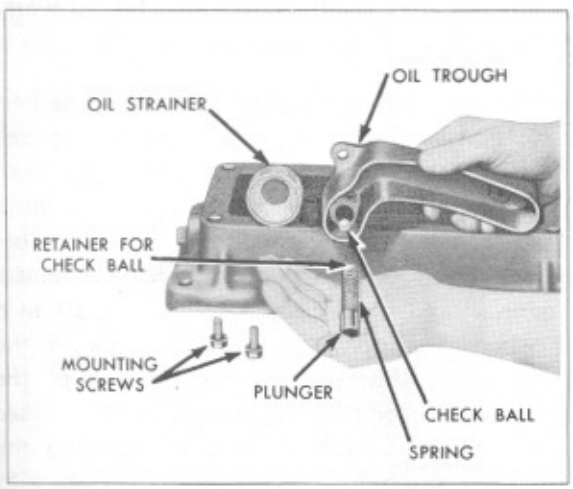

71678C

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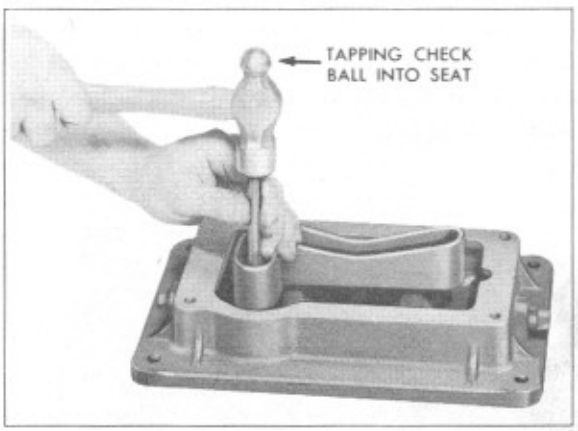

79024C

Fig. 28

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REASSEMBLY OF CAMSHAFT AND VALVE TAPPERS

The tappers are fitted to the guides in the cylinder with a clearance (see table page 7). The tappers should be held in place and the camshaft and gear assembly should be re-installed. The camshaft support pin should be driven through the case from the take-off side of the engine and should be tapped flush with the pad on which the main bearing plate mounts.

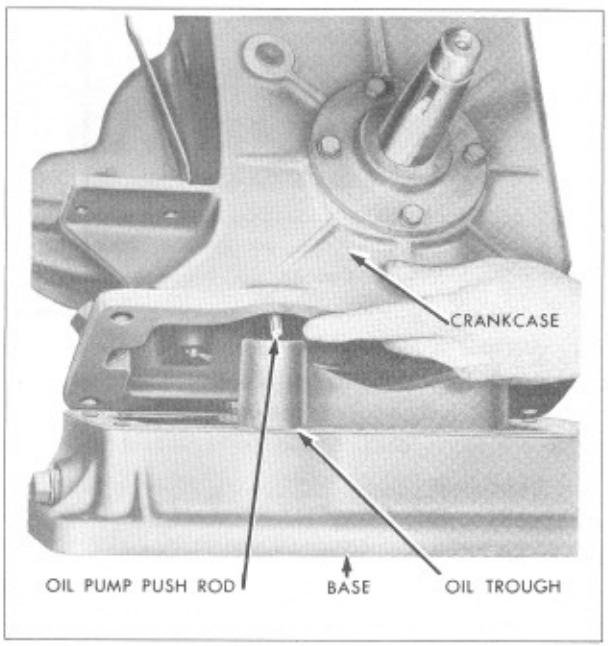
The camshaft plug on the flywheel end should be replaced to seal in the support pin.

REASSEMBLY OF THE GOVERNOR

The governor, together with the governor gear may now be re-installed. The bushing in the governor assembly is fitted to the governor shaft with a clearance of (see table page 7). After the governor has been placed on the shaft and meshed with the camshaft gear, the stop pin should be replaced. The outer lever with the shaft assembled, should be replaced and the inner governor lever attached with the hexagon nut provided.

REASSEMBLY OF ENGINE BASE (See Fig. 29.)

A new engine base gasket should be used and the crankcase should be lowered over the engine base. Extreme care should be taken that the oil pump push rod contacts the oil pump plunger. To facilitate lining up the oil pump push rod and the oil pump plunger, the hand may be inserted through the connecting rod inspection plate opening and the oil pump plunger held down in the bore until it is contacted by the push rod. The 2 screws and lockwashers at the take-off end of the engine base can then be replaced.



71686C

Fig. 29

REASSEMBLY OF CRANKSHAFT AND BEARING PLATE

The crankshaft should be inserted into the crankcase so that the one timing dot on the crankshaft gear lines up with the 2 timing dots on the camshaft gear and the main bearing plates replaced. (See Fig. 33.)

The main bearing retainer plate on the flywheel end should be tightened securely in place with a new gasket with the capscrew and lockwashers provided. The main bearing plate on the take-off end of the engine should now be reassembled. It should be noted that the main bearing plate is fitted with shims to obtain proper end clearance for the crankshaft bearings. This clearance should be adjusted to (see table page 7) with the engine cold.

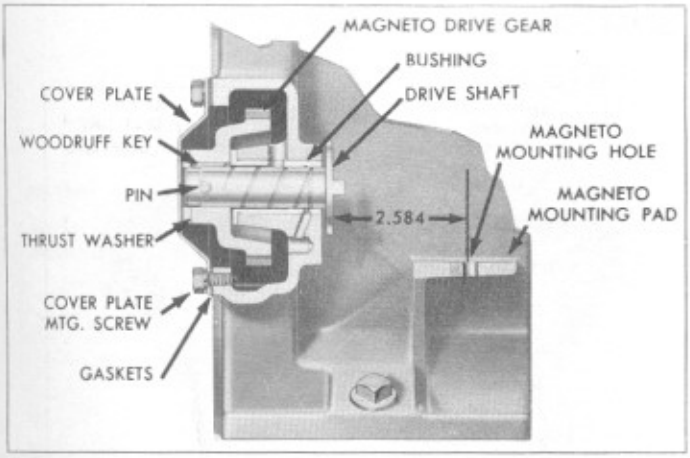
REASSEMBLY OF MAGNETO DRIVE SHAFT AND GEAR

The magneto drive shaft bushing should be replaced if it shows signs of wear. It should be pressed into the case in such a manner that the long oil groove is at the bottom and the short groove at the top. The holes in the bushing should also line up with the oil holes in the case. The magneto drive shaft should then be inserted from the magneto side of the case into this bushing with a clearance of (see table page 7). The Woodruff key which secures the magneto drive shaft gear should then be replaced and the gear pressed on the shaft.

CAUTION: As the drive shaft gear is pressed on the shaft, see that care is taken that the timing mark in the form of a chisel mark be lined up with the chisel mark on the camshaft gear. To facilitate this alignment, mark both timing marks with chalk so that they are easily visible.

The magneto drive shaft gear should then be held in a position where the timing marks line up and should be pressed on to the shaft. This gear must be positioned accurately on the magneto drive shaft so that the proper amount of clearance between the drive lugs on the magneto is obtained. The gear should be pressed on to the shaft to a point where the distance from the face of the magneto drive shaft to the center line of the mounting holes for the magneto is 2.584". (See Fig. 30.) This is accomplished by pressing the gear on until the magneto drive shaft is flush with end of the gear. Then the flange part of the magneto drive shaft should be grasped with the hand and pulled in the direction of the magneto mounting pad. The distance between the face of the magneto drive shaft to the center line of the mounting holes of the magneto should then be measured.

If the distance is less than 2.584", the gear should be pressed a little farther on to the shaft until the measurement is 2.584". The magneto drive shaft gear should then be pinned securely in place, the thrust washer slipped over the end of the shaft and the cover reassembled using enough gaskets so that an end clearance of (see table page 7) is obtained.



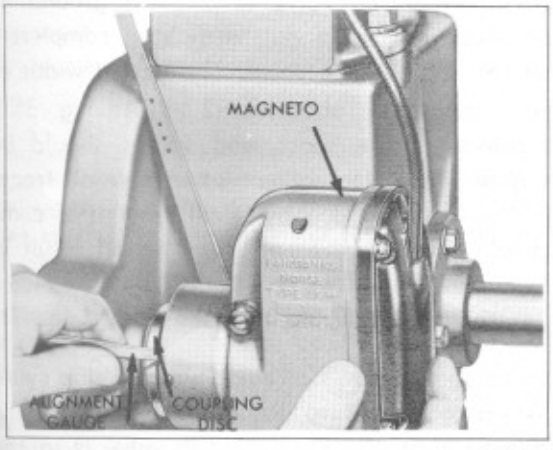
77523C

Fig. 30

REASSEMBLY OF MAGNETO (See Fig. 31.)

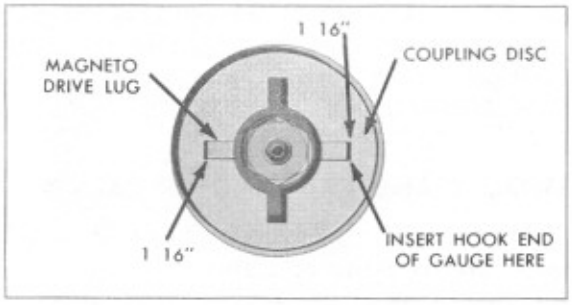
First, place the coupling disc on the lugs on the magneto drive shaft and turn the crankshaft so that the keyway is on top. The drive lugs on the magneto should then be turned counterclockwise until they engage the impulse. In turning the drive lugs counterclockwise, it will be found that a point of considerable resistance is met.

This is the point at which the impulse is contacted and it will be found that the lugs on the magneto will now line up with the slots in the coupling disc. The magneto should then be secured to the pad with the two capscrews and lockwashers provided and these should be drawn down loosely. Before tightening the screws, the magneto must be lined up as nearly as possible on the same center line as the magneto drive shaft.



77519C

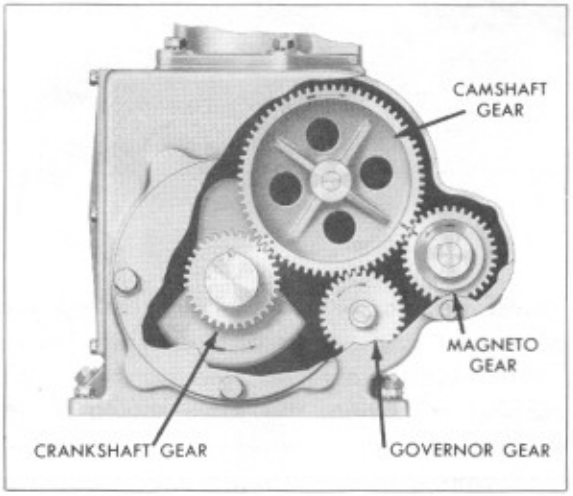
Fig. 31



78864C

Fig. 32

The purpose of the coupling disc is to take care of slight misalignment which may exist, but it is very important that this misalignment be kept at a minimum. If it is not, wear on the coupling will be quite rapid. The distance across the coupling slots is slightly more than the distance across the lugs on the drive shaft by 1/8". When this clearance is equally divided there will be about 1/16" clearance on each side of the disc. (See Fig. 32.) An alignment gauge may be made out of a piece of 1/16" thick metal. (See Fig. 31.) To get the exact alignment insert the hook end of the gauge into the side clearance slot. Then swing the magneto in the direction which will tend to pinch the gauge in this slot and tighten the mounting screws,



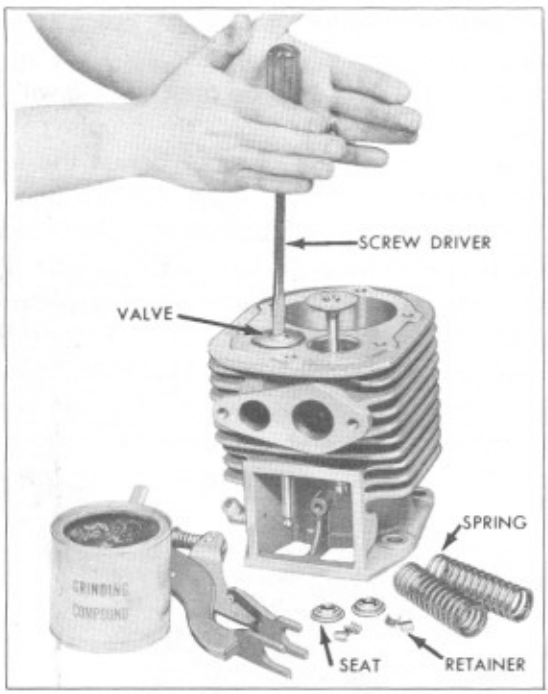
77522C

Fig. 33

in order to recheck the timing, the crankshaft should be turned over in a clockwise direction and it will be noted that the impulse coupling in the magneto will snap when the keyway in the crankshaft reaches the top. If the impulse coupling snaps before the keyway reaches the top, or after the keyway reaches the top, the magneto drive shaft cover should be removed and the gears should be checked to see if the chisel mark on the magneto gear lines up with the chisel mark on the camshaft gear. (See Timing Gear Detail, Fig. 33.) A SPARK ADVANCE OF 25° IS USED.

REASSEMBLY AND GRINDING OF VALVES

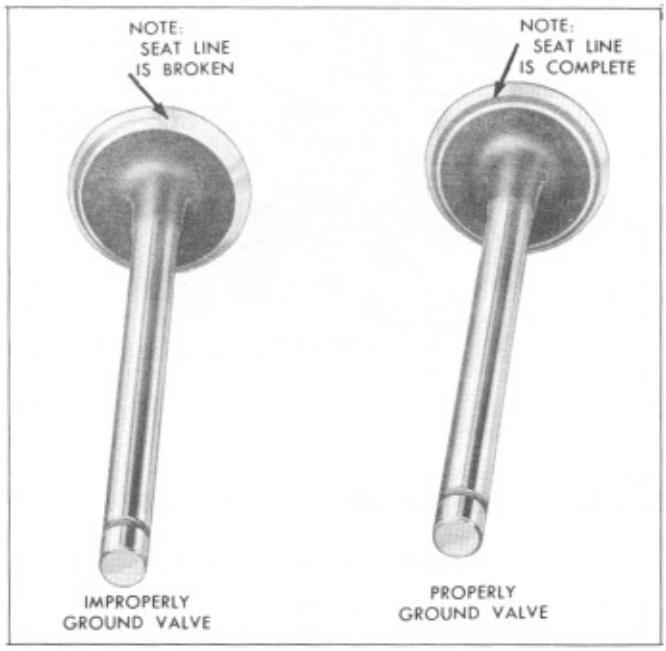
The valve seats in the cylinder block should be inspected and if signs of pitting or burning are present, should either be replaced or reground. If it is determined that the seat should be reground, a standard automotive type valve seat grinder should be used. The seat angle is 45 degrees.



71669C

Fig. 34

The valves should be thoroughly cleaned and scraped free of any deposit of carbon which may exist. If the seat of a valve shows signs of excessive burning or pitting, the valve should be replaced. The valves are now ready to be ground in. This is accomplished by putting a small amount of medium grade grinding compound on the seat of the valve. A small spring should then be placed on the stem of the valve and the valve placed in the guide. Using a screw driver, the valve should be twirled back and forth while applying pressure toward the valve seat in the cylinder. Occasionally allow the pressure of the spring to lift the valve away from the seat in the cylinder. This allows the grinding compound to spread evenly on the surface of the valve seat. (See Fig. 34.)



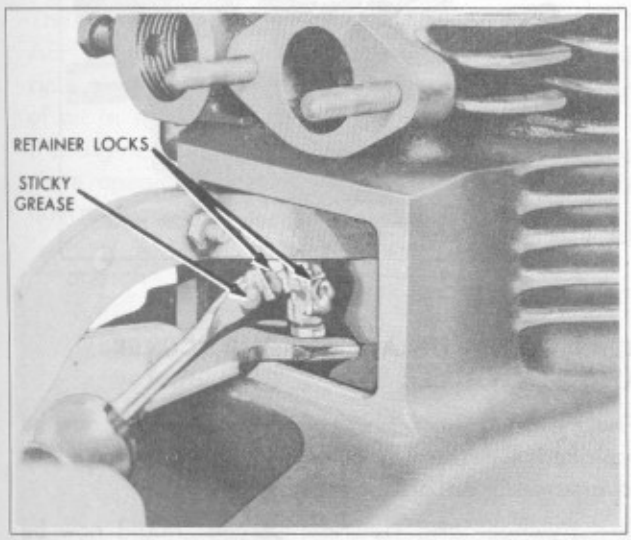
71815C

Fig. 35

Caution should be taken that an entire rotation or two of the valve is made in grinding as well as a back and forth motion. During the grinding operation, the valve seat should be inspected at intervals. When the valve is properly ground, it will be indicated by a dull gray ring completely around the seat of the valve. The actual width of this seat should be about 3/32". (See Fig. 35.) After grinding, the seats and valves should be thoroughly washed in solvent to remove all traces of grinding compound. Any small amount of compound left on the valves or stems would result in rapid wear of the valve stem and guide. The clearance in the guide should be (see table page 7).

The valve should now be reassembled in the cylinder. When reassembling, the spring should be held in place so that the stem of the valve is in the center of the spring. The valve spring seat should then be slipped over the end of the valve under the

spring and a valve lifter used to compress the valve spring and seat. A sticky grease should be used to coat the retainer locks and they can then be easily inserted with the help of a screw driver. The small end of the retainer lock should be up. The spring and seat should now be lowered over the retainer. (See Fig. 36.)



71400C

Fig. 36

REASSEMBLY OF CYLINDER

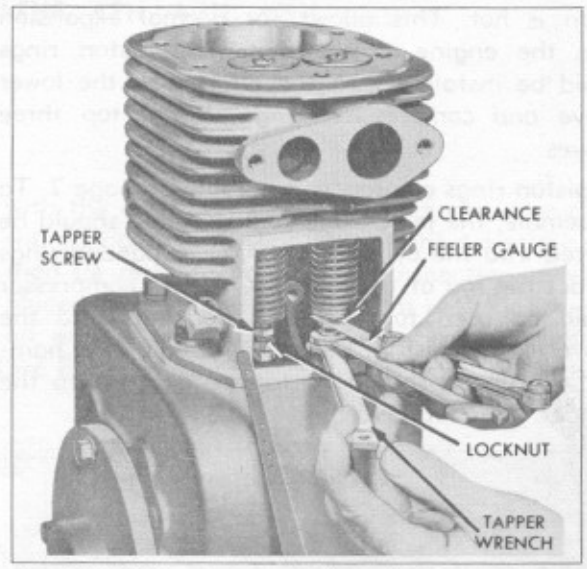
The fins on the cylinder should be carefully inspected and brushed free of all dust and dirt with a stiff wire brush. The cylinder can now be replaced using a new gasket.

TAPPER CLEARANCE

For correct tapper clearance see table on page 7. The clearance is obtained with the tapper adusting screw. (See Fig. 37.)

To adjust, turn the crankshaft over until the valve tapper is at the bottom of the stroke. Then turn crankshaft in same direction about ¼ turn to make absolutely sure that the tapper is not riding the cam nose which would give a false reading. With the tapper down, a ½" open end wrench should be used to hold the tapper from turning and the tapper screw should be threaded out until the clearance is proper as noted by the insertion of a feeler gauge. While holding the adjusting screw with a ½" wrench, the locknut should be tightened. The clearance should then again be checked with the feeler gauge. For heavy duty work use the greater clearance.

NOTE: When reassembling valves, the valve stem and guide should be thoroughly oiled.



71725C

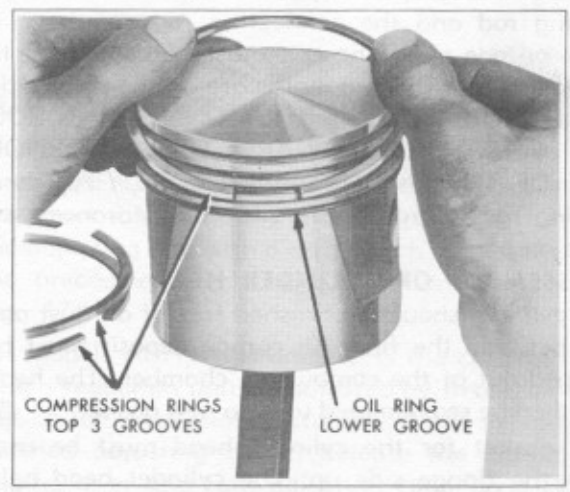
Fig. 37

REASSEMBLY OF CARBURETOR AND MANIFOLD

The manifold should first be assembled to the engine using a new gasket. The carburetor can then be assembled to the manifold and the fuel line reconnected.

REASSEMBLY OF CONNECTING ROD, PISTON AND PISTON RINGS (See Fig. 38.)

The piston should first be assembled to the connecting rod. The piston pin clearance in the connecting rod bushing is fitted at the factory with .001" clearance. An oversize pin should be installed if pin is loose. To get a proper fit, the pis-



71152C

Fig. 38

ton should be placed in hot water, then removed, and the pin fitted as a light press fit while the piston is hot. This allows for normal expansion when the engine is operated. The piston rings should be installed with the oil ring in the lower groove and compression rings in the top three grooves.

For piston rings clearances see table on page 7. To reassemble, the piston and rod assembly should be lowered into the cylinder until the expanded rings contact the top of the cylinder. A ring compressor should be used to compress the rings into the grooves of the piston. Using the handle of a hammer, the piston should be tapped gently into the cylinder. (See Fig. 39.)

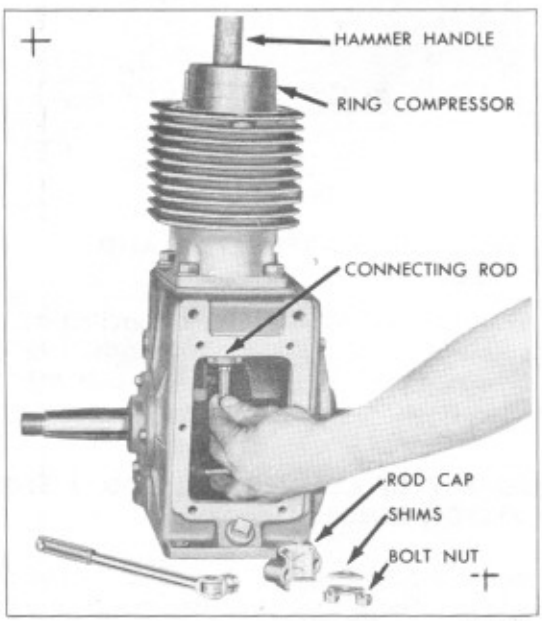


Fig. 39

It will be noted upon inspection that both the connecting rod and the connecting rod cap have a mark on one side. The cap must be assembled to the rod so that the two marks are on the same side and THE OIL HOLE IN THE CONNECTING ROD CAP MUST FACE TOWARD THE GOVERNOR SIDE OF THE ENGINE. (See Fig. 40.) For connecting rod to crankshaft and side clearances see table on page

REASSEMBLY OF CYLINDER HEAD

The cylinder should be brushed free of all dust and dirt between the fins. All carbon deposit must be scraped out of the combustion chamber. The head can then be reassembled using a new gasket.

The gasket for the cylinder head must be used with the flange side up. The cylinder head bolts should then be replaced and tightened alternately and securely.

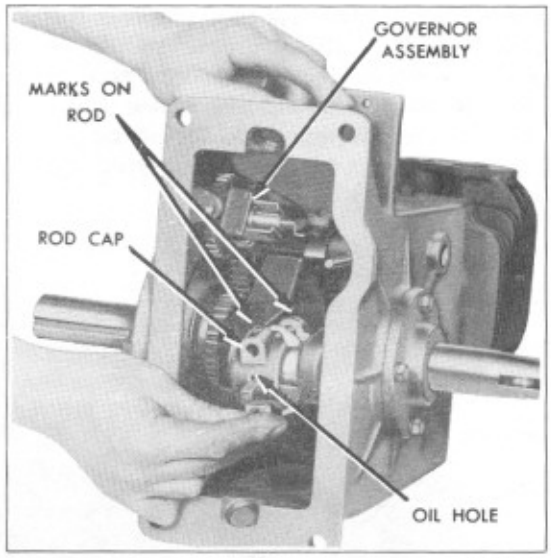


Fig. 40

REASSEMBLY OF AIR SHROUD, COVER AND FLYWHEEL

The cylinder shroud and shroud cover can now be replaced. Reassembly is accomplished in the exact reverse order of disassembly.

The flywheel and flywheel screen should now be replaced.

REASSEMBLY OF FUEL TANK AND FUEL STRAINER

The fuel tank, together with the bracket and fuel tank straps should be replaced by fastening the bracket to the crankcase with the capscrews and lockwashers provided. The fuel line should then be reconnected to the fuel strainer.

TESTING ENGINE

The engine is now ready to be tested. Fill the crankcase to the level of the oil filler hole with SAE 10W oil. Fill gas tank and run engine about ½ hour at idling speed, and then about 2 hours without load at governed speed. The oil should then be drained and replaced with oil of the recommended viscosity. (Refer to Lubrication Chart, Page 7.)

ELECTRIC STARTER

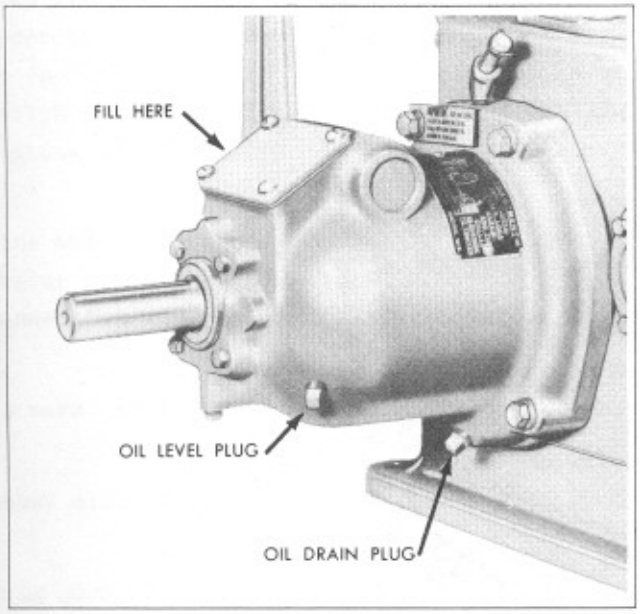
The electric starter is an optional accessory, furnished only upon request when engine is purchased. The starter and generator cannot be mounted in the field unless provisions were made when engine was purchased. The starter and generator are products of the Electric Auto-Lite Company, Toledo, Ohio, and it is recommended that all repairs for this accessory be done through their authorized Service Stations. Battery is not furnished by engine manufacturer.

CLUTCH AND REDUCTION GEAR

FOR MODELS ADH, AEH, AEHS, AFH, AGH, AHH

CLUTCH

The clutch furnished with Models ADH, AEH, AEHS, AFH, AGH and AHH engines is of the multiple disc type running in oil. Use the same kind of oil in the clutch as is used in the crankcase of the engine. The oil is filled through the inspection plate opening to the oil level plug; about three quarter pint of oil is required.(See Fig. 41.)

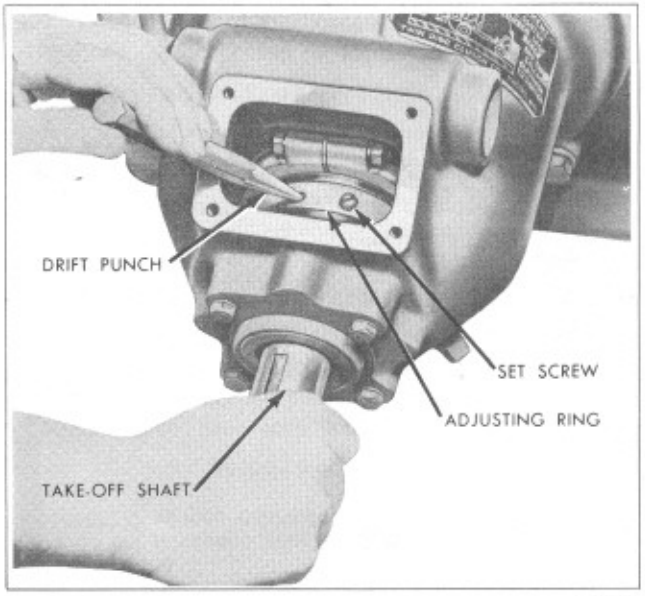


72770C

Fig. 41

CLUTCH ADJUSTMENT

If the clutch begins to slip it should be readjusted otherwise it will become overheated and damaged. First remove the inspection plate. This will expose the adjusting ring. Release the clutch lever and rotate the take-off shaft by hand until the set screw in adjusting ring is on top. Loosen the set screw, and then with a drift punch turn the ring, in a clockwise direction, a little at a time. The take-off shaft must be held in a stationary position. After each movement of the ring, engage the clutch with the lever. When properly adjusted the clutch will engage with a slight snap. The set screw must then be retightened and the inspection cover replaced. Be sure the gasket is not broken, otherwise oil will leak out and dust may enter the clutch. (See Fig. 42.)



72773C

Fig. 42

CLUTCH REDUCTION GEARS

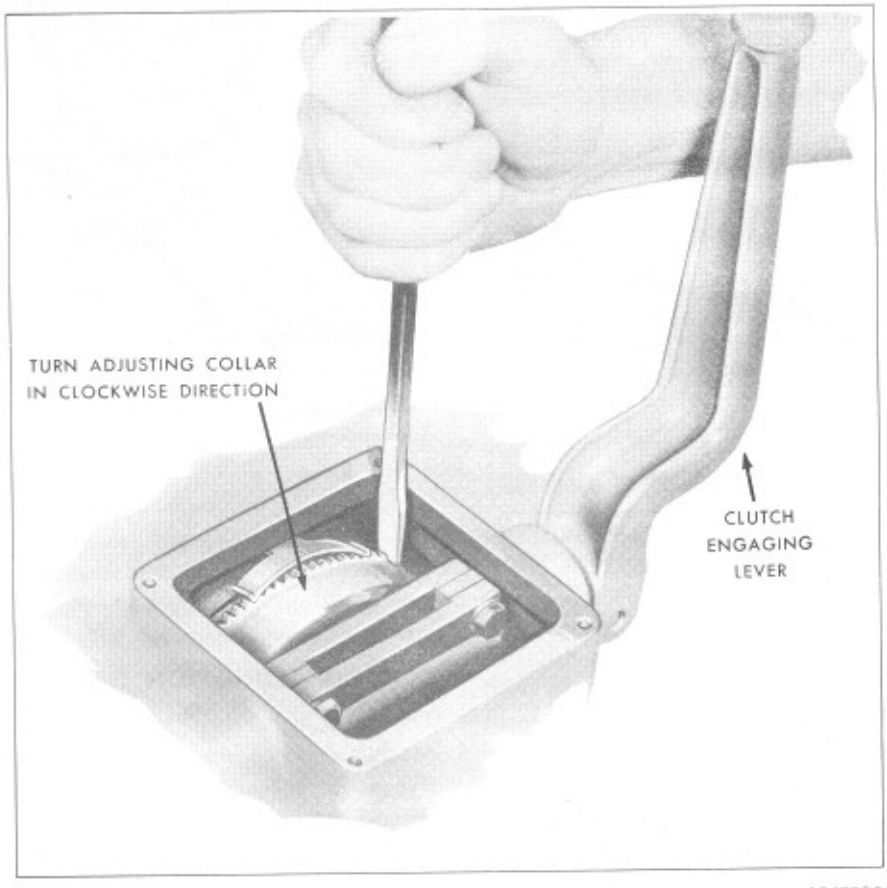
The clutch in the clutch reduction units on the Models AFH, AGH and AHH is the same as used in the power take-off units and is adjusted by turning the adjusting ring with a drift punch as explained in the preceding clutch adjustment paragraph. (See Fig. 42.)

On Models ADH, AEH and AEHS the clutch in the clutch reduction units is adjusted by first removing the clutch inspection plate which will expose the notched adjusting collar. Release the clutch engaging lever and turn adjusting collar in a clockwise direction with a screw driver or similar in-

strument. (See Fig. 43.) The collar should be turned one notch at a time until a definite pressure is felt on the clutch lever when clutch is being engaged. Replace inspection plate, being careful that the gasket fits properly and is not broken. See reduction gears for lubrication.

REDUCTION GEARS

Reduction gears are furnished with several different ratios, some with spur gears, others with chains. All are of the same general design, except that some are furnished with clutches others without. These reduction gears require the same grade of oil as is used in the crankcase of the engine. For various installations these gears are assembled to the engines in various positions. Several plugs are furnished on these reduction gears so that the lubrication may be properly taken care of regardless of the position of installation. For instance, there will always be one plug on top to be used for filling oil. There will always be one plug below for draining oil, and there will be one plug on the side, slightly above the bottom, to be used as an oil level plug. The oil should always be filled when the engine is at rest. When the oil becomes dirty it should be drained while the engine is hot, and fresh oil added. The frequency at which these oil changes should be made depends entirely on the kind of service in which these gears are used, but even with light service the change should be made at least once every five hundred hours of operation, adding sufficient oil between changes to keep the oil up to the oil level plug.



104572C1

Fig. 43

SPECIAL INSTRUCTIONS FOR LAYING UP ENGINE FOR WINTER

When the season's work is completed, the following instructions should be carried out very carefully to protect the engine over winter.

The outside of the engine, including the cooling fins on the cylinders and heads, should be thoroughly cleaned of all dirt and other deposits.

The air cleaner at the carburetor intake should be thoroughly cleaned of all oil and accumulated dust and sediment removed from the oil cup at the bottom of the cleaner.

To protect the cylinders, pistons, rings, and valves and keep them from rusting and sticking, a half and half mixture of kerosene and good gas engine oil, (the same kind of oil as used in the crankcase of the engine), should be injected into the pet cock on the intake manifold while the engine is warm and running at moderate speed. About a quarter of a pint is necessary on a four cylinder engine, or enough so that a heavy bluish smoke will appear at the exhaust. The ignition switch should then be shut off and the engine stopped. This operation will give a coating of oil on the above mentioned parts, protecting them from the atmosphere.

On engines where there is no pet cock on the intake manifold, the kerosene and oil mixture may be injected into the air intake on the carburetor while the engine is running, so the mixture will be drawn into the engine. The air cleaner connection will of course have to be disconnected from the carburetor to do this.

All old used oil should be drained from the crankcase while the engine is warm, as the oil will then flow much more freely than when cold.

All exposed unpainted metal parts should be coated with grease or heavy oil.

Before starting the engine again the next season, the crankcase drain plug should again be removed, so that any condensation, which may have collected during the winter, may be drained before new crankcase oil is added.

A good plan, and one that is recommended, is to remove the crankcase bottom cover or oil base in the spring before starting the engine for the new season, and scrubbing off all sediment which may have collected there.

When replacing the bottom cover, a new gasket should be used.

BE SURE TO FILL THE CRANKCASE WITH A GOOD QUALITY OF CRANKCASE OIL TO THE HIGH LEVEL POINT, BEFORE STARTING THE ENGINE. DO NOT USE ANY OIL HEAVIER THAN SAE NO. 30. ALSO BE SURE TO PUT OIL TO THE PROPER LEVEL IN THE AIR CLEANER.

It is also recommended to use new spark plugs at the beginning of the new season, especially if the engine has given considerable service.

It is highly recommended that machines be stored inside a building through the winter. If this is not possible, the engine should be protected from snow and ice by a proper covering.

REPAIR PARTS LIST

READ THESE INSTRUCTIONS BEFORE ORDERING PARTS

THE MODEL, SPEC AND SERIAL NUMBER OF YOUR ENGINE, SHOWN ON THE NAME PLATE ATTACHED TO THE AIR SHROUD, MUST BE GIVEN WHEN ORDERING PARTS

★

TO INSURE PROMPT AND ACCURATE SERVICE, THE FOLLOWING INFORMATION MUST BE GIVEN.

1. State exactly quantity of each part and part number.
2. State definitely whether parts are to be shipped by express, freight or parcel post.

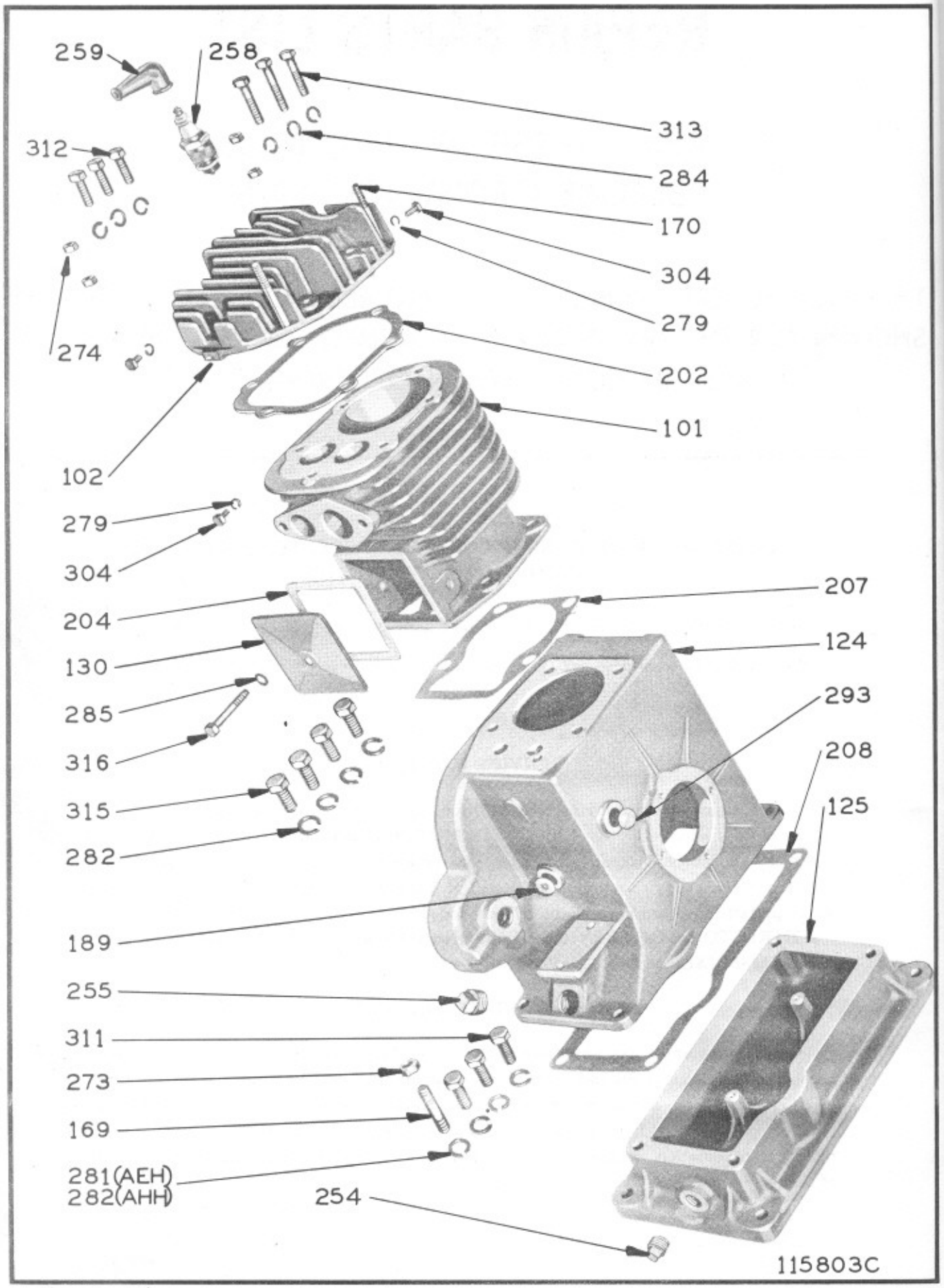
SERVICE FACILITIES

Approved engine service stations, located throughout the U. S. and foreign countries, have been carefully selected by the **WISCONSIN MOTOR CORPORATION** in order to assure complete and efficient repair and inspection service to owners of Wisconsin Air-Cooled Engines. These service stations, equipped and trained for complete engine repair, also stock parts to facilitate immediate delivery for all Wisconsin Air-Cooled Engines.

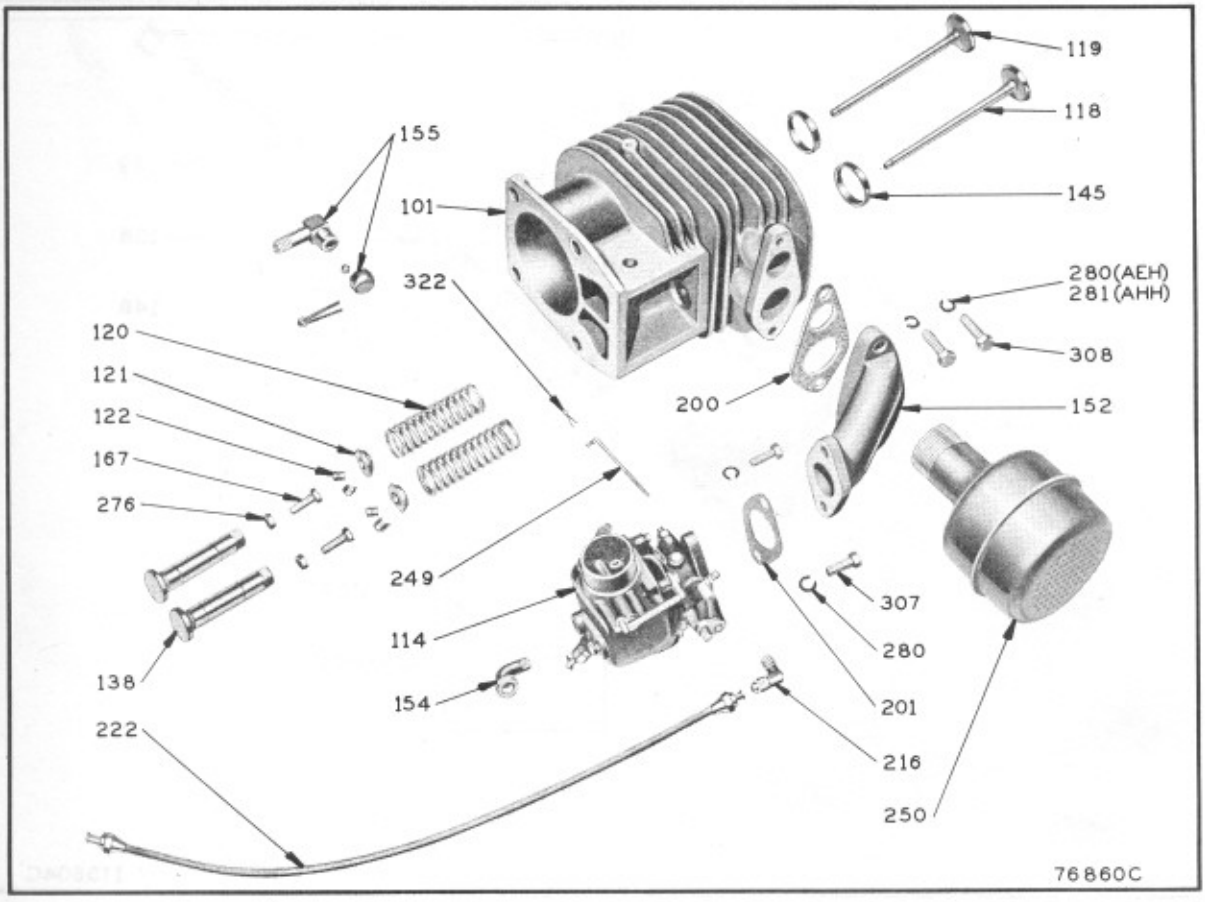
A DIRECTORY OF SERVICE STATIONS CAN BE FOUND IN THE BACK OF THIS MANUAL.

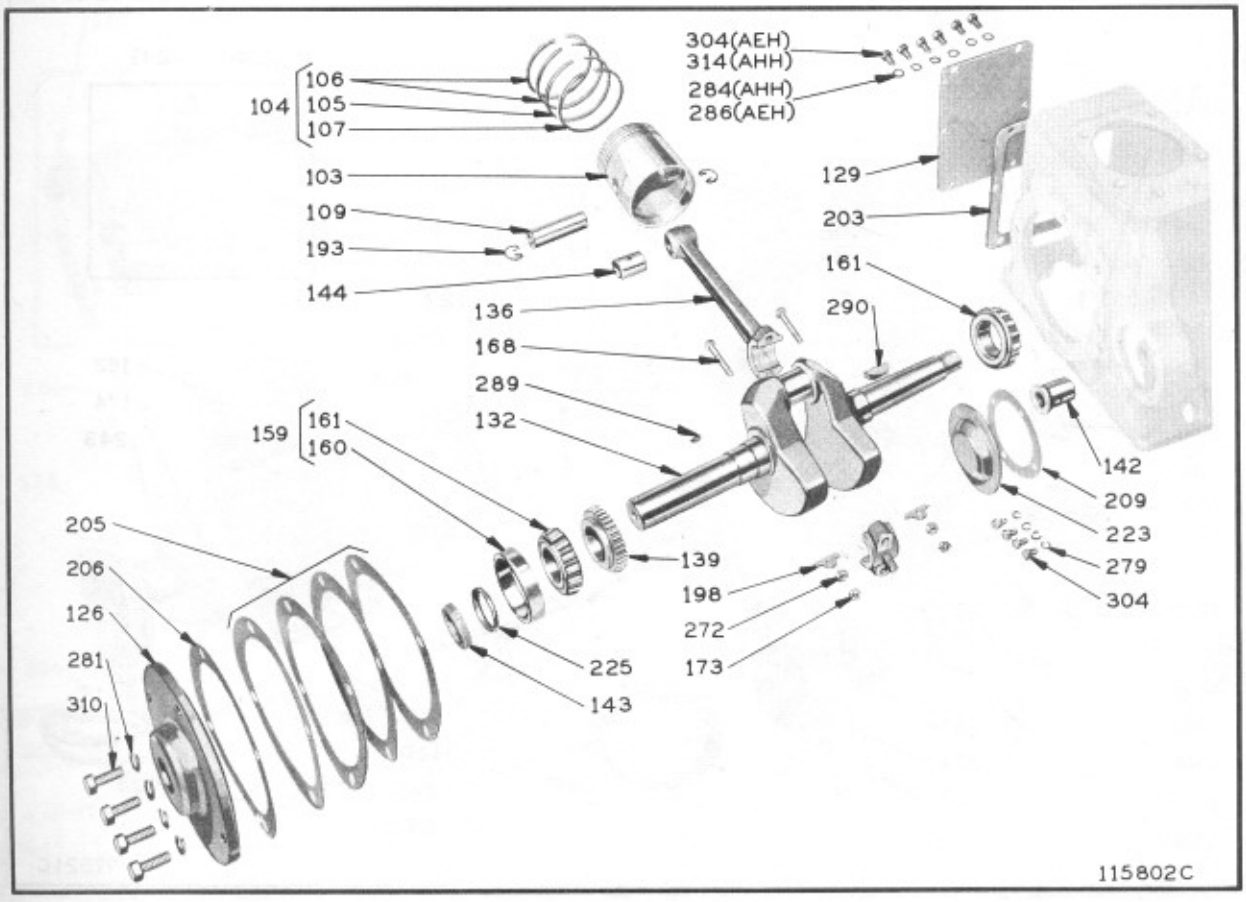
PARTS RETURNED FOR CREDIT

Before returning any parts, write a letter to the company from whom the parts were purchased, giving an exact list and description of the materials, why you wish to return them, whether for repairs, credit, or replacement, and also the model, specification and serial numbers of the engine from which the parts were taken. If authority is granted for their return, transportation charges must be prepaid and sender's name marked on the outside of the box or package.

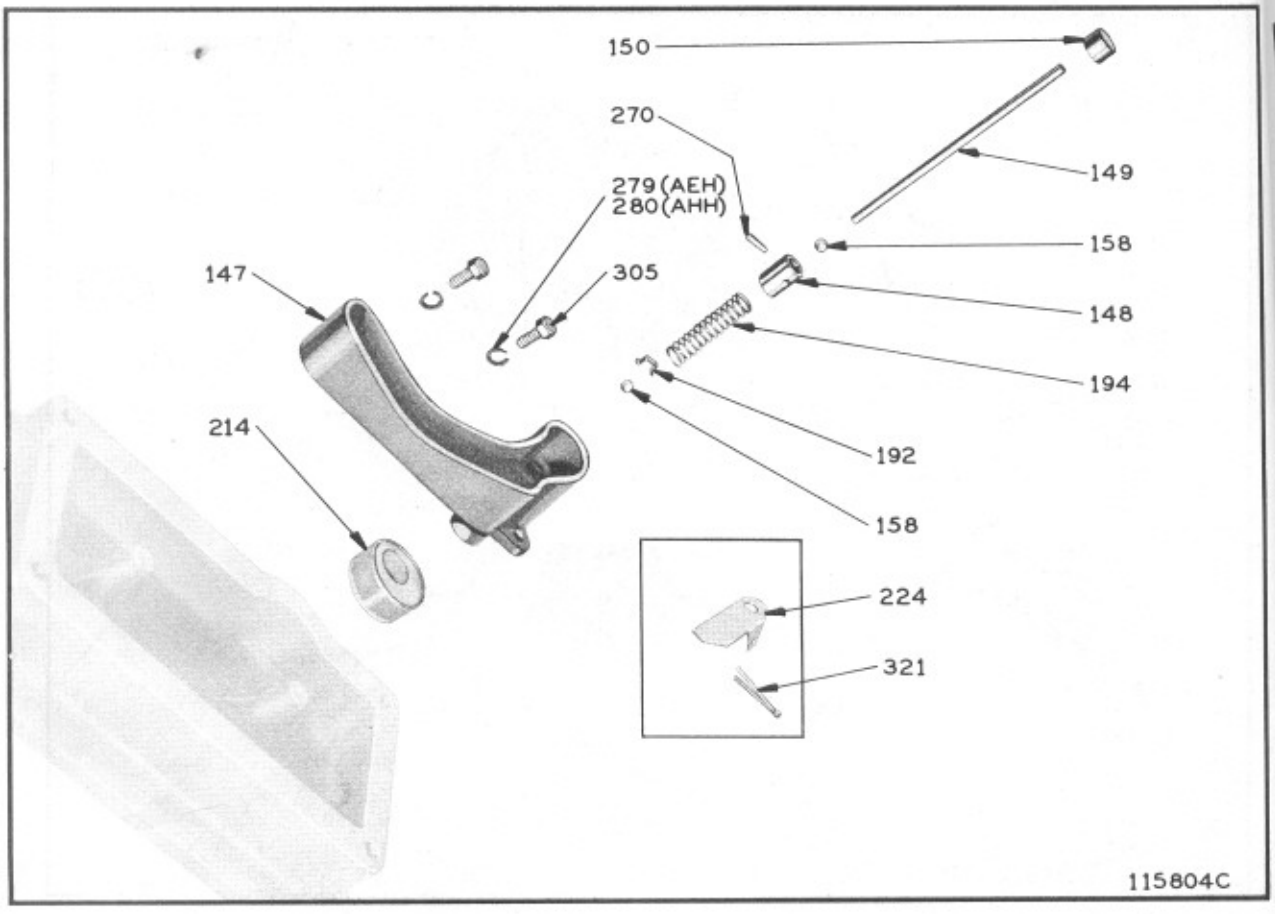


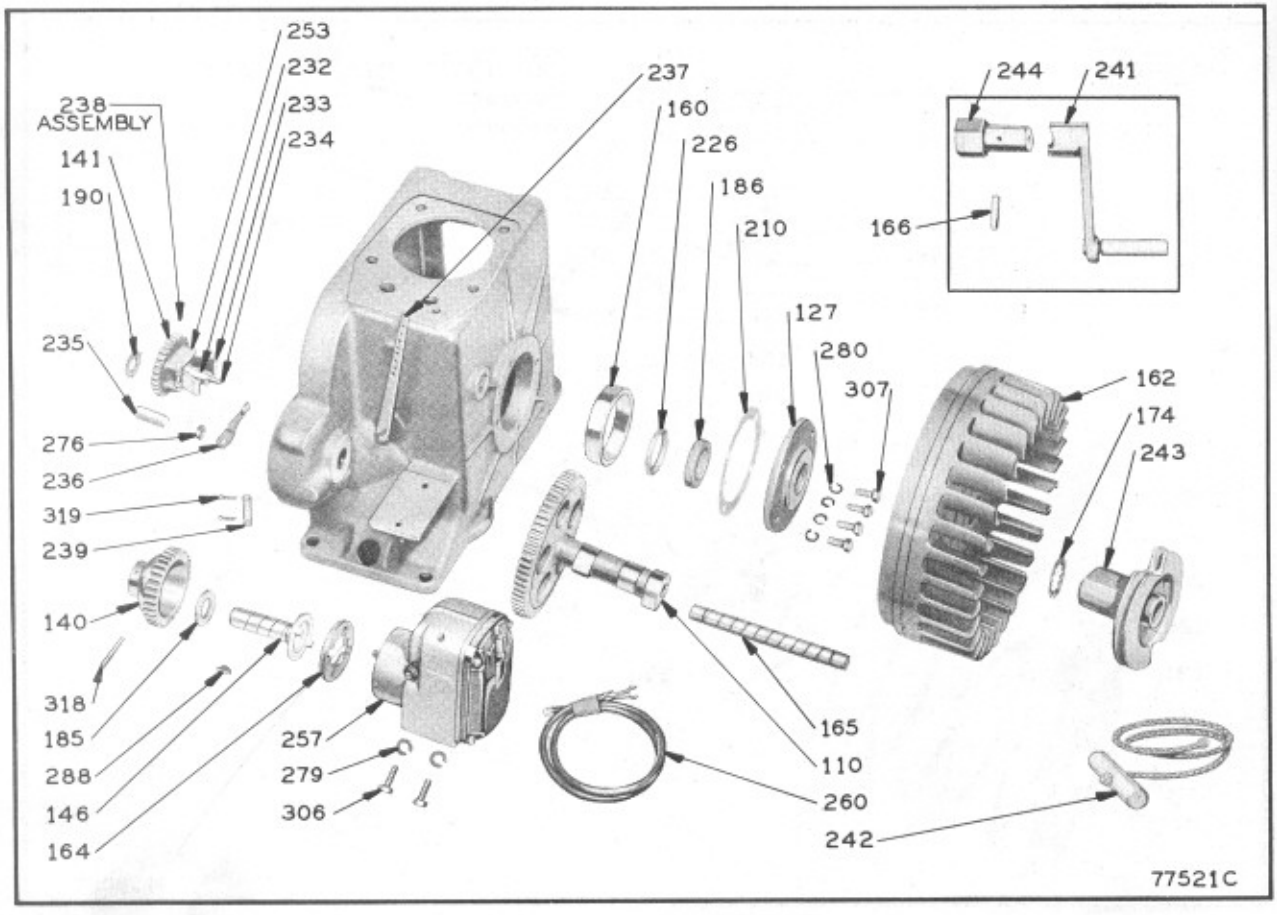
Parts are identified by reference number. See parts list for correct part number.





Parts are identified by reference number. See parts list for correct part number.





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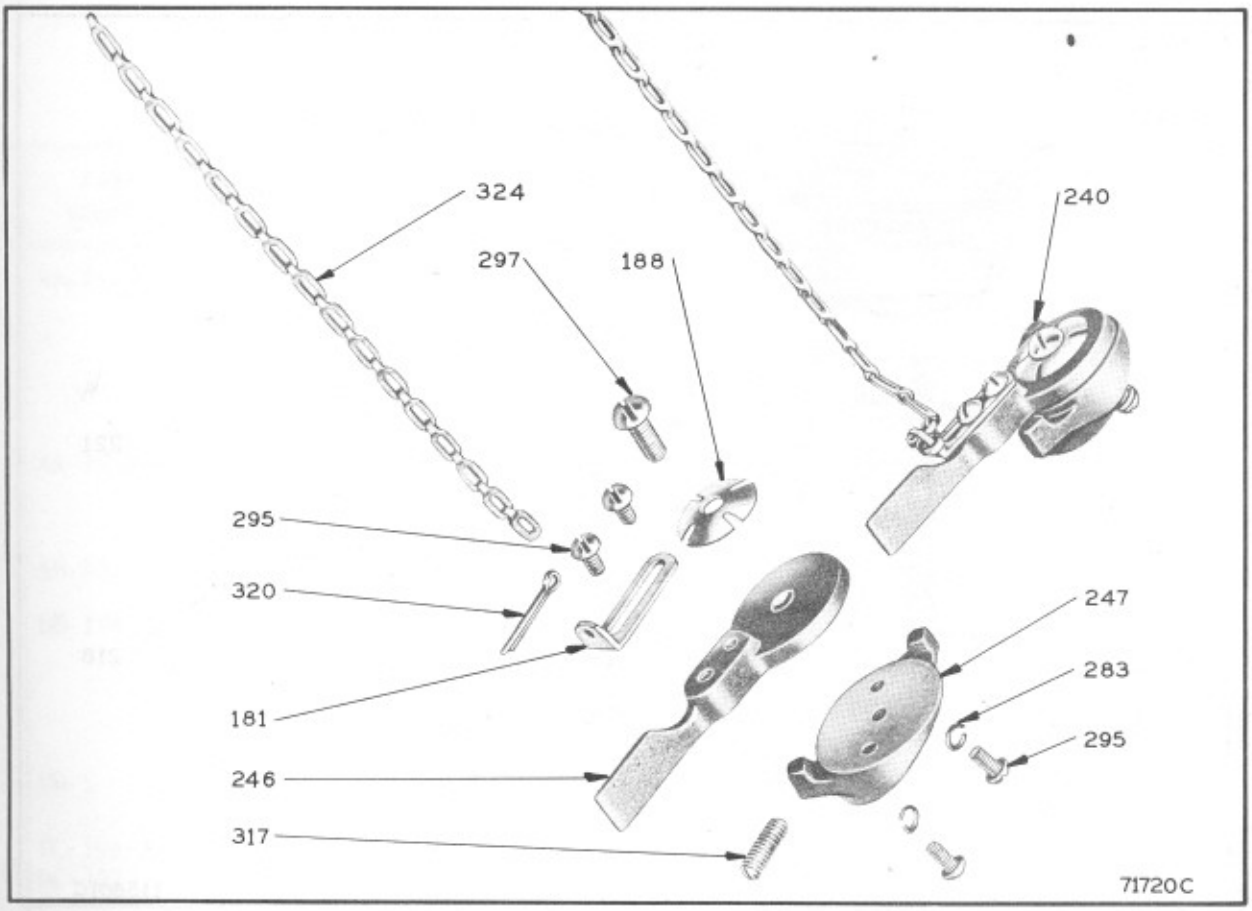

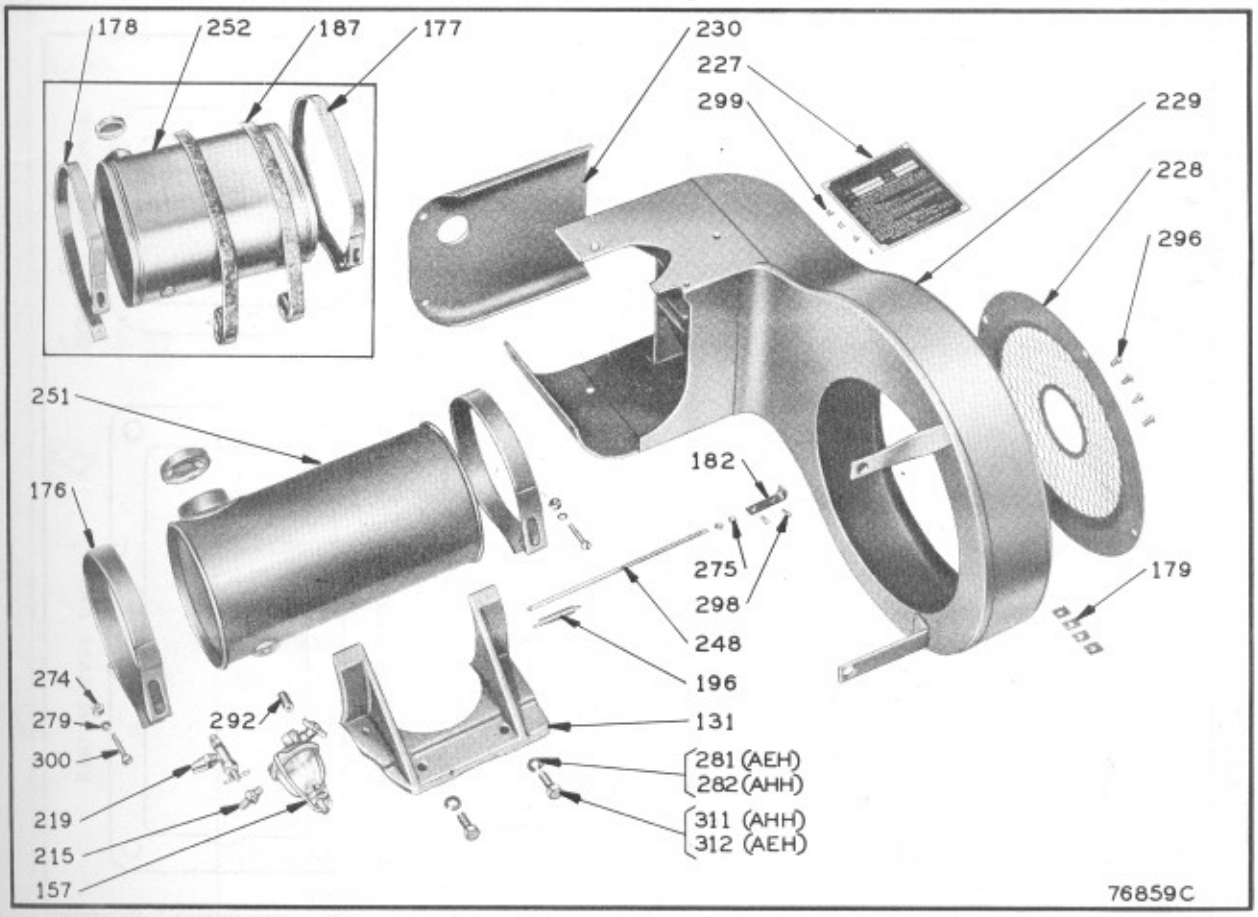

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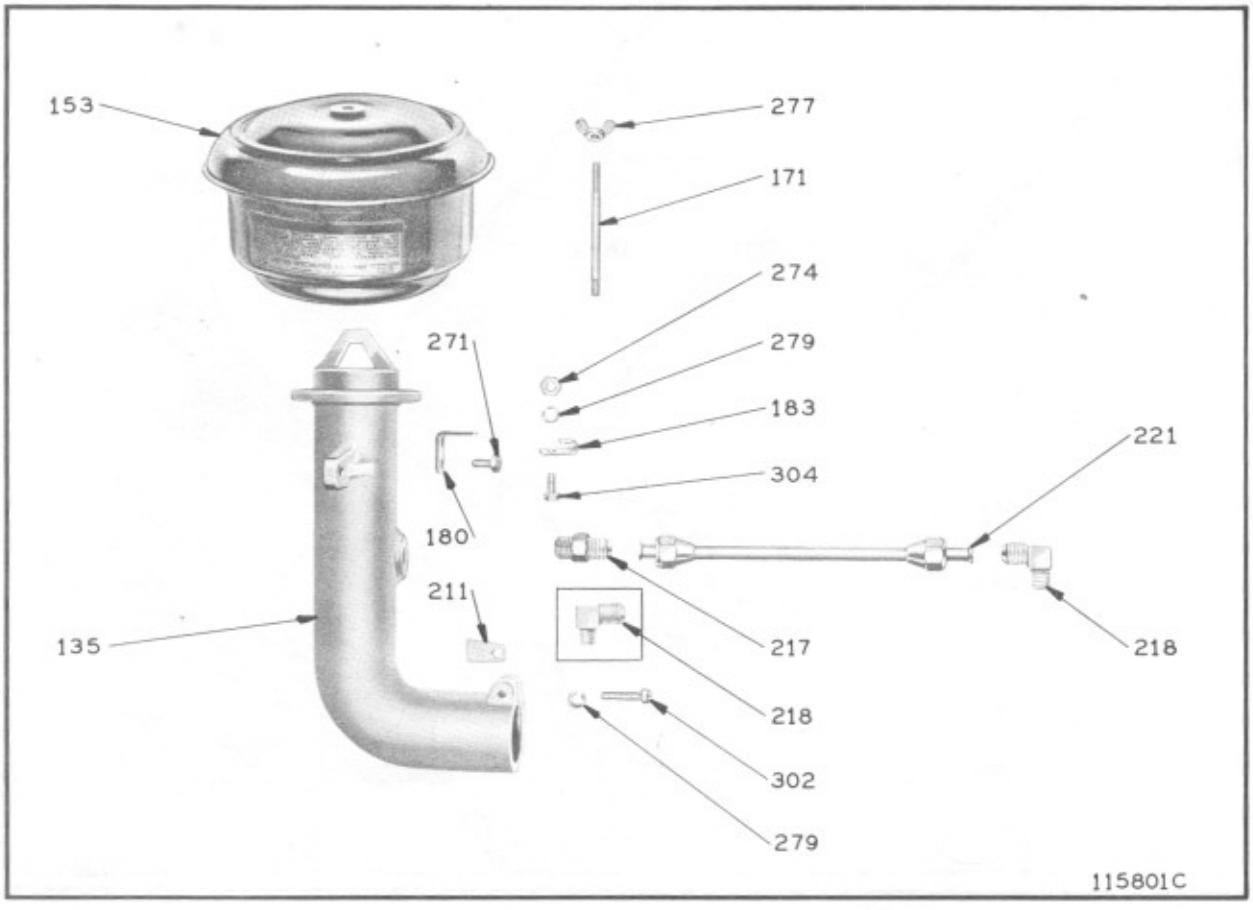
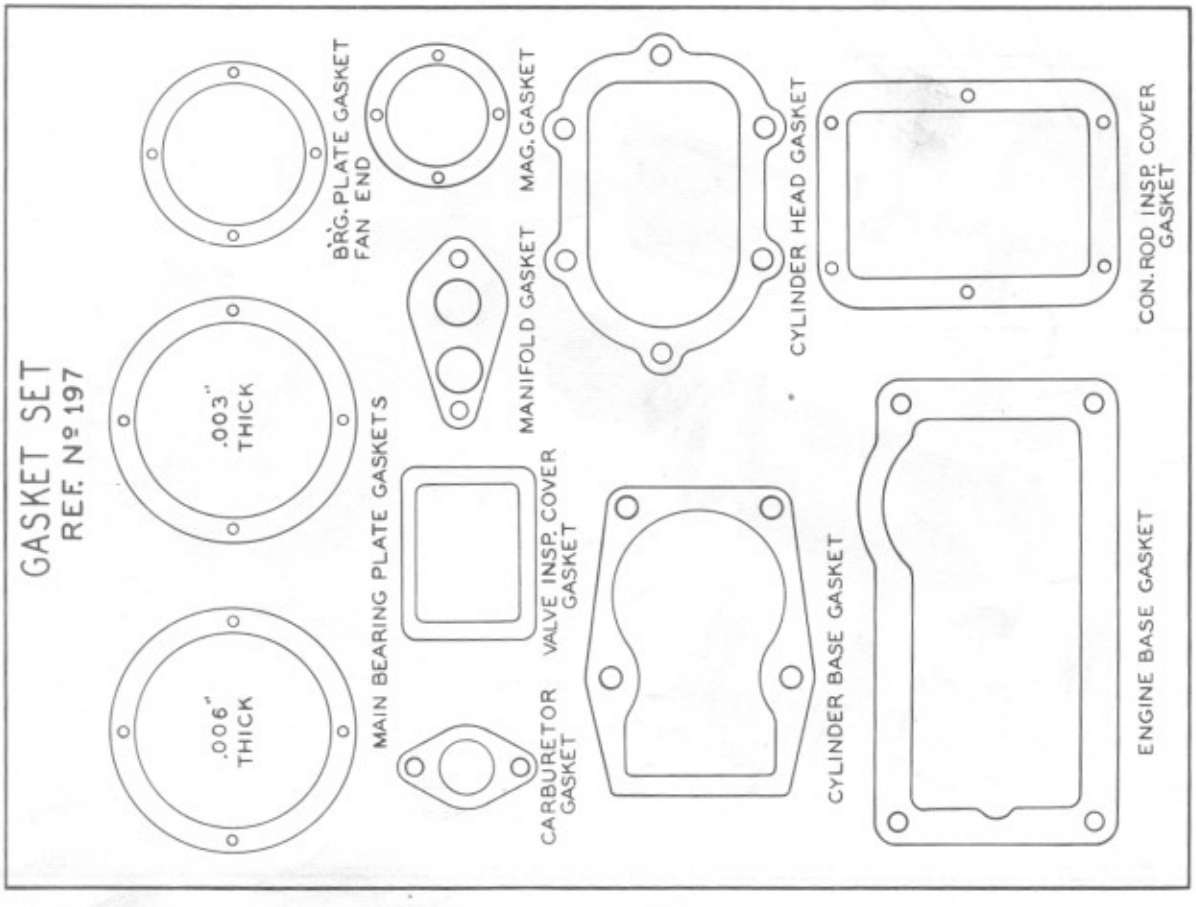
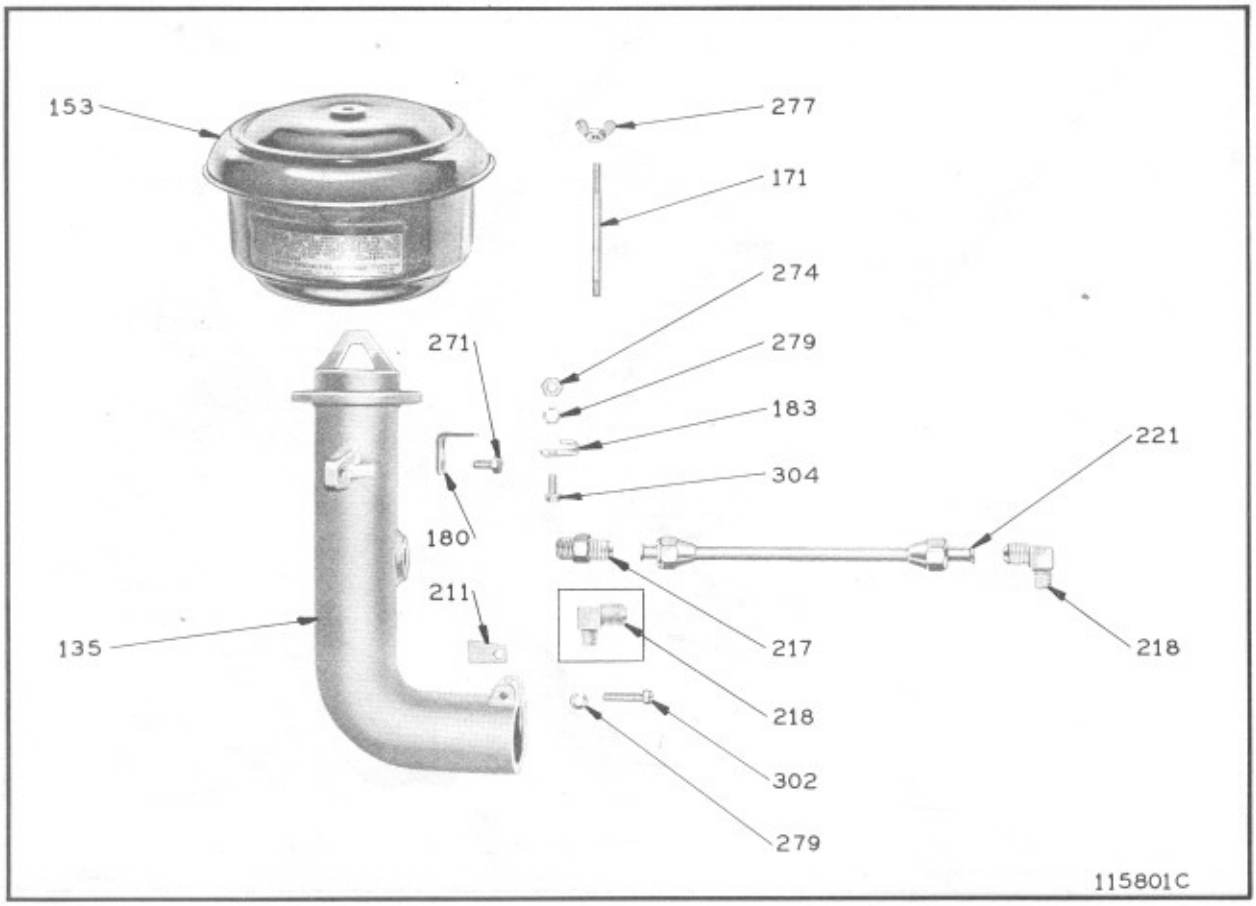
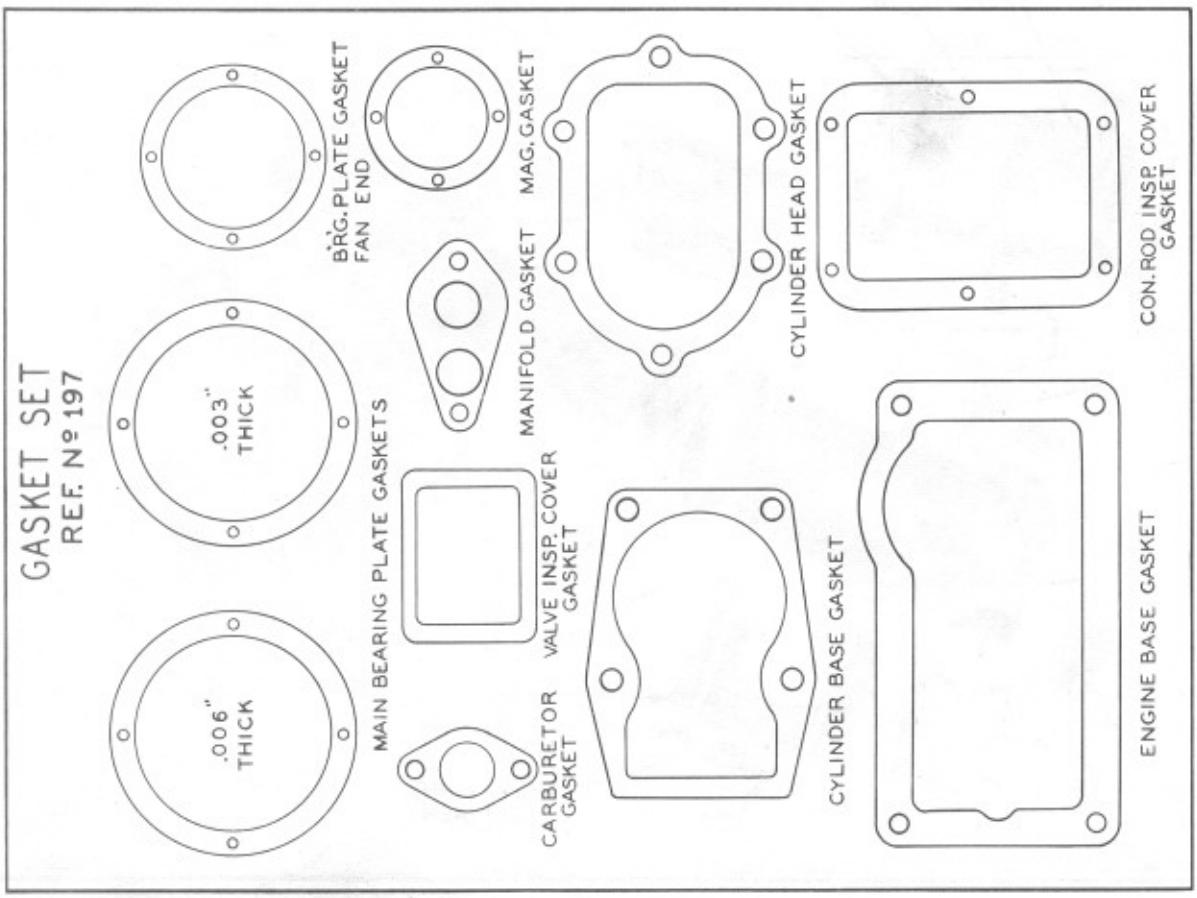




Parts are identified by reference number. See parts list for correct part number.





Parts are identified by reference number. See parts list for correct part number.

STANDARD PARTS LIST

MODEL ADH - 2-3/4" x 3-1/4"

SINGLE CYLINDER AIR-COOLED ENGINE

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
101	AA-72-B-S1	Cylinder Block Assembly - Complete Consisting of: 1 AA-72-B Cylinder Block 2 AE-75-B Valves 2 AF-49-A Springs 2 AG-26 Seats 2 AH-9 Locks 1 BH-105 Plate 2 HG-201 Inserts 1 PH-30 Washer 1 QD-486 Gasket 1 XD-136 Screw	1	13	
	AA-72-B-S2	Cylinder Block with Valve Seat Inserts only Consisting of: 1 AA-72-B Cylinder block 2 HG-201 Inserts		12	
102	AB-63-F	Cylinder Head	1	2	
103	DB-158-A	Piston - Standard Size DB-158 Piston - Replaced by DB-158-A Pistons are also furnished .005", .010", .020" and .030" oversize and semi-finished.	1		8
104	DR-5	Piston Ring Set - Standard Size Consisting of:	1		3
106	DC-106-A	Compression Ring	2		1
107	DC-107	Oil Ring Piston rings and ring sets are also furnished .005", .010", .020" and .030" oversize.	1		1
109	DE-60	Piston Pin - Standard Size Piston pins are also furnished .005", .010", .020" and .030" oversize.	1		3
110	EA-93A-S1	Camshaft and Gear Assembly-for cast iron crankcase Consisting of: 1 EA-93-A Camshaft and Gear Assembly 1 PA-218 Support Pin EA-93-S1 Camshaft Assembly - Replaced by EA-93A-S1	1	2	11
	EA-93A-S2	Camshaft and Gear Assembly - for aluminum crankcase Consisting of: 1 EA-93-A Camshaft and gear assembly 1 HF-327 Bushing 1 PA-128 Pin for bushing 1 PA-218 Support pin EA-93-S2 Camshaft assembly - Replaced by EA-93A-S2		2	13
114	L-45-B	Carburetor - Stromberg Model UC-3/4, #426019 (For engines beginning with Serial #144062) L-16-M-3 Stromberg Carburetor, Model UR-3/4, #425040 (To and including Serial #144061) NOTE: See carburetor sheets in back of manual for service replacement parts list.	1	3 4	10

(Continued on Page 2 - Interchangeable Parts for Models ADH, AE, AEH and AEHS.

STANDARD PARTS LIST

MODEL AE - 3" x 3-1/4"

SINGLE CYLINDER AIR-COOLED, PUMP ENGINE

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
101	AA-74-B-S1	Cylinder Block Assembly - Complete Consisting of: 1 AA-74-B Cylinder block — 1 BH-105 Plate 2 AE-75-B Valves — 2 HG-201 Inserts 2 AF-49-A Springs — 1 PH-30 Washer 2 AG-26 Seats — 1 QD-486 Gasket 2 AH-9 Locks — 1 XD-136 Screw	1	13	
	AA-74-B-S2	Cylinder Block with Valve Seat Inserts only Consisting of: 1 AA-74-B Cylinder block — 2 HG-201 Inserts		12	
102	AB-63-D	Cylinder Head	1	2	
103	DB-187-B-1	Piston - Standard Size DB-187-A Piston - Replaced by DB-187-B-1 DB-187-A-1 Piston - Replaced by DB-187-B-1 Pistons are also furnished .005", .010", .020" and .030" oversize and semi-finished.	1		15
104	DR-6	Piston Ring Set - Standard Size Consisting of:	1		4
106	DC-163	Compression Ring	3		1
107	DC-109	Oil Ring Pistons rings and sing sets are also furnished .005", .010", .020" and 030" oversize.	1		1
109	DE-65	Piston Pin - Standard Size Piston pins are also furnished .005", .010", .020" and .030" oversize.	1		3
110	EA-93A-S1	Camshaft and Gear Assembly-for cast iron crankcase Consisting of: 1 EA-93-A Camshaft and gear assembly 1 PA-218 Support pin EA-93-S1 Camshaft assembly - Replaced by EA-93A-S1	1	2	11
	EA-93A-S2	Camshaft and Gear Assembly -for aluminum crankcase Consisting of: 1 EA-93-A Camshaft and gear assembly 1 HF-327 Bushing 1 PA-128 Pin for bushing 1 PA-218 Support pin EA-93-S2 Camshaft Assembly - Replaced by EA-93A-S2		2	13
114	L-48-F	Carburetor - Zenith Model 161-7, #0-10457 Beginning with engine Serial #	1	2	15
		L-45-B-2 Stromberg Carburetor, Model UC-3/4, #426020 (For engine #144062 to and including #)		3	10
		L-16-M-3 Stromberg Carburetor, Model UR-3/4, #425040 (To and including Serial #144061)		4	
		NOTE: See carburetor sheets in back of manual for service replacement parts list.			
		(Continued on Page 2 - Interchangeable Parts for Models ADH, AE, AEH and AEHS.			

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

STANDARD PARTS LIST

MODEL AEH - 3'' x 3-1/4''

SINGLE CYLINDER AIR-COOLED ENGINE

REF NO.	PART NUMBER	DESCRIPTION	NO. REQ	NET WEIGHT lbs	NET WEIGHT oz
101	AA-74-B-S1	Cylinder Block Assembly - Complete Consisting of: 1 AA-74-B Cylinder block 2 AE-75-B Valves 2 AF-49-A Springs 2 AG-26 Seats 2 AH-9 Locks 1 BH-105 Plate 2 HG-201 Inserts 1 PH-30 Washer 1 QD-486 Gasket 1 XD-136 Screw	1	13	
	AA-74-B-S2	Cylinder Block with Valve Seat Inserts only Consisting of: 1 AA-74-B Cylinder Block 2 HG-201 Inserts		12	
102	AB-63-E	Cylinder Head	1	1	15
103	DB-187-B-1	Piston - Standard Size DB-187-A Piston - Replaced by DB-187-B-1 DB-187A-1 Piston - Replaced by DB-187-B-1 Pistons are also furnished .005", .010", .020" and .030" oversize and semi-finished.	1		15
104	DR-6	Piston Ring Set - Standard Size Consisting of:	1		4
106	DC-163	Compression Ring	3		1
107	DC-109	Oil Ring Piston rings and ring sets are also furnished .005", .010", .020" and .030" oversize.	1		1
109	DE-65	Piston Pin - Standard Size Piston pins are also furnished .005", .010", .020" and .030" oversize.	1		3
110	EA-93A-S1	Camshaft and Gear Assembly-for cast iron crankcase Consisting of: 1 EA-93-A Camshaft and gear assembly 1 PA-218 Support pin EA-93-S1 Camshaft assembly - Replaced by EA-93A-S1	1	2	11
	EA-93A-S2	Camshaft and Gear Assembly -for aluminum crankcase Consisting of: 1 EA-93A Camshaft and gear assembly 1 HF-327 Bushing 1 PA-128 Pin for bushing 1 PA-218 Support pin EA-93-S2 Camshaft assembly - Replaced by EA-93A-S2		2	13
114	L-48-F	Carburetor - Zenith Model 161-7, #0-10457 Beginning with engines Serial #	1	3	
		L-45-B-2 Stromberg Carburetor, Model UC-3/4, #426020 (For engine #144062 to and including #)		3	10
		L-16-M-3 Stromberg Carburetor, Model UR-3/4, #425040 (To and including Serial #144061)		4	
		NOTE: See carburetor sheets in back of manual for service replacement parts list.			
		(Continued on Page 2 - Interchangeable parts for Models ADH, AE, AEH and AEHS.			

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

STANDARD PARTS LIST

MODEL AEHS - 3" x 3-1/4"

SINGLE CYLINDER AIR-COOLED ENGINE

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ	NET WEIGHT lbs	NET WEIGHT oz
101	AA-74-B-S1	Cylinder Block Assembly - Complete Consisting of: 1 AA-74-B Cylinder block 2 AE-75-B Valves 2 AF-49-A Springs 2 AG-26 Seats 2 AH-9 Locks 1 BH-105 Plate 2 HG-201 Inserts 1 PH-30 Washer 1 QD-486 Gasket 1 XD-136 Screw	1	13	
	AA-74-B-S2	Cylinder Block with Valve Seat Inserts only Consisting of: 1 AA-74-B Cylinder block 2 HG-201 Inserts		12	
102	AB-63-E-2	Cylinder Head	1	1	14
103	DB-187B-5	Piston - Standard Size Pistons are also furnished .005", .010", .020" and .030" oversize and semi-finished.	1		15
104	DR-6-2	Piston Ring Set - Standard Size Consisting of:	1		4
105	DC-163-1	Scraper Ring	1		1
106	DC-163	Compression Ring	2		1
107	DC-165	Oil Ring Piston rings and ring sets are also furnished .005", .010", .020" and .030" oversize.	1		1
109	DE-65	Piston Pin - Standard Size Piston pins are also furnished .005", .010", .020" and .030" oversize.	1		3
110	EA-93-D-S1	Camshaft and Gear Assembly-for cast iron crankcase Consisting of: 1 EA-93-D Camshaft and Gear assembly 1 PA-218 Support pin EA-93-2-S1 Camshaft assembly-Replaced by EA-93-D-S1 EA-93-B-S1 Camshaft assembly-Replaced by EA-93-D-S1	1	2	11
	EA-93-D-S2	Camshaft and Gear Assembly-for aluminum crankcase Consisting of: 1 EA-93-D Camshaft and gear assembly 1 HF-327 Bushing 1 PA-128 Pin for bushing 1 PA-218 Support pin EA-93-2-S2 Camshaft assembly-Replaced by EA-93-D-S2 EA-93-B-S2 Camshaft assembly-Replaced by EA-93-D-S2		2	13
114	L-48-F	Carburetor - Zenith Model 161-7, # 0-10457 Beginning with engine Serial #	1	2	15
		L-45-B-2 Stromberg Carburetor, Model UC-3/4, #426020 (For engine #144062 to and including #)		3	10
		L-16-M-3 Stromberg Carburetor, Model UR-3/4, #425040 (To and including Serial #144061)		4	
		NOTE: See carburetor sheets in back of manual for service replacement parts list.			
		(Continued on Page 2 - Interchangeable Parts for Models ADH, AE, AEH and AEHS.			

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

PARTS INTERCHANGEABLE ON MODELS ADH, AE; AEH and AEHS

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
118	AE-75-B	Exhaust Valve	1		4
119	AE-75-B	Inlet Valve Valves are also furnished with .004" oversize valve stem.	1		4
120	AF-49-A	Valve Spring	2		2
121	AG-26	Seat for valve spring	2		1
122	AH-9	Lock for valve spring seat	2pr		1
124		Crankcase Assembly Consisting of: 1 Crankcase — 1 SA-13 Plug 1 HC-43 Bushing — 1 TC-373 Shaft 1 PH-310 Seal NOTE: The part number of the crankcase is stamped on the face of the magneto mounting pad. Order by this number and by giving the Model, Specification and Serial Numbers of the engine.	1	22	
125	BB-101-A	Engine Base	1	11	8
126	BG-106-7-S1	Main Bearing Plate Assembly - Take-off end Consisting of: 1 BG-106-7 Plate — 1 SD-31 Retainer 1 HF-238 Seal	1	4	
	BG-106-7-S2	Main Bearing Plate Assembly - Take-off end Consisting of: 1 BG-106-7 Plate — 1 ME-59-1 Bearing cup 1 HF-238 Seal — 1 SD-31 Retainer		4	4
127	BG-126-S1	Bearing Retainer Plate Assembly - Flywheel end Consisting of: 1 BG-126 Plate — 1 SD-39 Retainer 1 PH-193 Seal	1		14
129	BH-104	Connecting Rod Inspection Plate	1		6
130	BH-105	Valve Tapper Inspection Plate	1		3
131	BI-170-C-1	Fuel Tank Bracket	1	3	4
132		Crankshaft Assembly Consisting of: 1 Crankshaft — 2 ME-84 Bearings 1 GA-31 Gear — 1 PL-55 Key NOTE: The part number of the crankshaft is stamped on the cheek facing the take-off end of the engine. Order by this number and by giving the Model, Specification and Serial Numbers of the Engine.	1	12	
135	BI-268-S1	Air Cleaner Bracket Assembly Consisting of: 1 BI-268 Bracket — 1 XB-20 Screw 1 QD-647 Gasket	1	1	
136	DA-49-A-S1	Connecting Rod Assembly (Beginning with engine Serial #697597) Consisting of: 1 DA-49-A Rod — 2 PD-10 Nuts 1 HG-133-A Bushing — 2 PD-181 Palnuts 2 PB-148 Bolts — 2 QA-113 Shims	1	1	6

Order parts from nearest SERVICE STATION shown in directory following parts list.

IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

REF. NO	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
		DA-49-S1 Connecting Rod Assembly (For engines to and including Serial #697596)		1	6
		Consisting of: 1 DA-49 Rod — 2 PD-148 Nuts 1 HG-133-A Bushing — 2 QA-107 Shims 2 PB-148 Bolts — 2 XI-1 Pins			
		NOTE: DA-49-A-S1 and DA-49-S1 Connecting rods are interchangeable and either one is used for service.			
		A price allowance is made on connecting rods returned in which bearing has been burned out, but which are otherwise complete and in condition to be rebabbitted.			
		Connecting Rods are also furnished .010", .020" and .030" undersize.			
138	FA-40-C	Valve Tapper FA-40 Valve tapper - Replaced by FA-40-C	2		4
139	GA-31	Crankshaft Gear	1		8
140	GD-80	Magneto Drive Gear	1		11
141	GD-98	Governor Gear	1		8
142	HC-43	Bushing for magneto drive shaft	1		3
143	HF-238	Cork Oil Seal for bearing plate - take-off end	1		1
144	HG-133-A-1	Piston Pin Bushing HG-133 Bushing-Replaced by HG-133A-1 HG-133-A Bushing-Interchangeable with HG-133-A-1	1		1
145	HG-201	Valve Seat Insert	2		1
146	JD-335	Magneto Drive Shaft	1		8
147	KA-57	Oil Pump Body and Splash Trough (ADH, AE, AEH)	1	1	4
	KA-57-1	Oil Pump Body and Splash Trough (AEHS and ADH, AEH engines operating at 2600 R.P.M. or over)	1	1	4
148	KF-14	Oil Pump Plunger	1		2
149	KF-17-1	Push Rod for oil pump plunger	1		2
150	KF-19-A	Cap for oil pump plunger push rod	1		1
152	LD-232	Manifold (For engines beginning with Serial #144062)	1	1	9
		LD-197-C Manifold (For engines to and including #144061)		2	
153	LO-24	Air Cleaner, United Specialties Co. #H-55-7185	1	1.	12
154	LO-38	Carburetor Drip Plug Assembly	1		1
155	LO-67	Breather Assembly in cylinder block	1		3
157	LP-43	Fuel Strainer (small) Tillotson #OW-480	1		3
		LP-19 Strainer (large) Tillotson #OW-418			5
		NOTE: See illustrations in back of parts list for service replacement parts of fuel strainers.			

PARTS INTERCHANGEABLE ON MODELS ADH, AE, AEH and AEHS

REF NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT	
				lbs	oz
158	ME-38	Check Ball for oil pump, 5/16" dia. steel	2		1
159	ME-84	Main Bearing Assembly Consisting of:	2		12
160		1 ME-59-1 Bearing cup (Timken #14276)			5
161		1 ME-84-1 Bearing cone (Timken #14130)			7
162	NC-143	Flywheel	1	15	12
164	OA-130-B	Magneto Coupling Disc OA-130-A Disc - Replaced by OA-130-B	1		1
165	PA-218	Camshaft Support Pin	1		6
166	PA-239	Pin for starting crank nut	1		1
167	PB-147	Valve Tapper Adjusting Screw	2		1
168	PB-148	Connecting Rod Bolt	2		2
169	PC-133	Stud for mounting engine base - below governor housing	1		1
170	PC-316	Stud for air shroud cover to cylinder head	2		1
171	PC-372	Stud for mounting air cleaner to bracket	1		1
173	PD-181	Palnut for connecting rod bolt, 5/16"-24 NOTE: PD-181 Palnut and PD-10, 5/16"-24 Plain nut, replace PD-148 Slotted nut and Cotter pin.	2		1
174	PE-73	Lockwasher - 7/8" External Everlock For starting nut or sheave	1		1
176	PG-84	Fuel Tank Strap for WE-14-A round tank	2		4
177	PG-99	Fuel Tank Strap-flywheel end-for WE-37-C oval tank	1		7
178	PG-99	Fuel Tank Strap-take-off end-for WE-37-C oval tank	1		7
179	PG-315	Clip for flywheel screen mounting	4		1
180	PG-343	Brace for mounting air cleaner bracket to shroud	1		1
181	PG-358	Adjusting Strap for governor control chain	1		1
182	PG-412	Bracket for governor adjusting screw	1		1
183	PG-430	Clip for spark plug wire	1		1
185	PH-191	Thrust Washer for magneto drive shaft	1		1
186	PH-193	Cork Oil Seal for bearing plate - flywheel end	1		1
187	PH-244	Felt Packing for PG-99 fuel tank straps	2		1
188	PH-282	Friction Washer for governor control	1		1
189	PH-310	Oil Seal for governor fulcrum pin	1		1
190	PH-313	Shim for governor sleeve	1		1
192	PK-50	Retainer for oil pump check ball	1		1

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PARTS INTERCHANGEABLE ON MODELS ADH, AE, AEH and AEHS

REF NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
238	TC-378	Governor Flyweight Assembly Consisting of: 1 GD-98 Gear — 1 TC-372 Plunger 1 TC-370-B Sleeve — 2 XJ-45 Rivets 2 TC-371-A Flyweights	1		12
239	TC-379	Stop Pin for governor lever	1		1
240	TT-52	Governor Control Assembly Consisting of: 1 PG-358 Strap — 2 PE-14 Washer 1 PH-282 Washer — 4 XA-7 Screw 1 VB-145 Lever — 1 XA-35 Screw 1 VC-29 Disc — 1 XE-47 Screw 1 #9100G Chain — 1 XI-7 Pin	1		10
241	U-212	Starting Crank	1	1	7
242	U-218-A	Starting Rope	1		4
243	U-222	Rope Starter Sheave UC-70-A Sheave - Replaced by U-222	1	1	6
244	UC-74-S1	Starting Crank Nut Assembly Consisting of: 1 PA-239 Pin — 1 UC-74 Crank nut	1		10
246	VB-145	Governor Control Lever	1		3
247	VC-29	Friction Disc for governor control	1		4
248	VE-150-2	Governor Spring Adjusting Screw	1		1
249	VE-438	Control Rod to Carburetor	1		1
250	WD-35	Muffler (Standard for ADH, AE and AEH engines)	1		14
	WD-39	Automotive Type Muffler (Standard for AEHS engine)	1	3	
251	WE-14-A	Fuel Tank - round, 1.35 gallon capacity	1	2	7
252	WE-37-C	Fuel Tank - oval, 2.75 gallon capacity	1	3	5
253	XJ-45	Rivet for governor flyweight	2		1
254	XK-3	Pipe Plug, 3/8" square head, for oil drain	2		1
255	XK-4	Pipe Plug, 1/2" square head, for oil filler	2		2
257	Y-34-S1	Magneto with ignition wire "Fairbanks-Morse" #FM-J1A7	1	4	14
	Y-58	Magneto with ignition wire "Wico" #XH-150 Y-20-D "Wico" #C-150-C Magneto - Replaced by Y-58		5	
	Y-56	Magneto with ignition wire "Edison-Splitdorf" #03884		6	
	Y-28	Magneto with ignition wire "Eisemann" #AM-1		5	
		NOTE: These engines are equipped with any one of the magnetos listed above. See magneto bulletins in back of manual for service replacement parts list.			
258	YD-6	Spark Plug - Champion 18mm, #8 Com.	1		
259	YD-12	Spark Plug Safety Nipple	1		1
260	YL-83	Ignition Wire - for "Wico" magneto	1		2
	YL-120	Ignition Wire - for "Fairbanks-Morse" and "Eisemann" magnetos	1		2
	YL-159	Ignition Wire - for "Edison-Splitdorf" magneto	1		2

REF. NO.
270
271
272
273
274
27
2
2
2

Order parts from nearest SERVICE STATION shown in directory following parts list.
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PARTS INTERCHANGEABLE ON MODELS ADH, AE, AEH and AEHS

STANDARD HARDWARE

The following pins, nuts, capscrews, washers and etc. are of a common hardware variety and can be purchased from local plumbing, hardware or accessory stores.

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
270	PA-217	Straight Pin for oil pump plunger 3/16" dia. x 19/32" long, steel	1		1
271	PB-160	Screw, 1/4"-28 thread x 1/2" long, hexagon head For mounting air cleaner brace to bracket	1		1
272	PD-10	Nut, 5/16"-24 thread, hexagon steel For connecting rod bolts	2		1
273	PD-11	Nut, 3/8"-24 thread, hexagon steel For engine base stud	1		1
274	PD-77	Nut, 1/4"-20 thread, hexagon steel 4-for air shroud cover studs 2-for fuel tank straps 1-for spark plug wire clip 1-for air cleaner brace to shroud	8		1
275	PD-115	Nut, #10-32 thread, hexagon steel For governor spring adjusting screw	2		1
276	PD-141	Nut, 5/16"-24 thread, hexagon steel 2-for valve tapper adjusting screw 1-for governor lever	3		1
277	PD-147	Wing Nut, 1/4"-20 thread, for mounting air cleaner	1		1
279	PE-3	Lockwasher, 1/4" Positive 4-for magneto cover plate 2-for oil pump body and trough 1-for shroud to cylinder head 2-for mounting magneto 2-for fuel tank straps 1-for air shroud to cylinder block 1-for spark plug wire clip 2-for air cleaner brace and bracket	15		1
280	PE-4	Lockwasher, 5/16" Positive 4-for main bearing plate - flywheel end 2-for mounting manifold 2-for mounting carburetor	8		1
281	PE-5	Lockwasher, 3/8" Positive 4-for main bearing plate - take-off end 4-for mounting engine base to crankcase 2-for mounting fuel tank bracket	10		1
282	PE-7	Lockwasher, 1/2" Positive For mounting cylinder block to crankcase	4		1
283	PE-14	Lockwasher, #10 Positive For governor control friction disc	2		1

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PARTS INTERCHANGEABLE ON MODELS ADH, AE, AEH and AEHS

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT	
				lbs	oz.
284	PH-22	Plain Washer, 3/8" I.D. x 11/16" O.D. x 1/16" thick, steel For cylinder head bolts	6		1
285	PH-30	Plain Washer, 1/4" I.D. x 7/16" O.D. x 1/16" thick, copper For valve tapper inspection plate	1		1
286	PH-30-A	Plain Washer, 1/4" I.D. x 7/16" O.D. x 1/16" thick, steel For connecting rod inspection plate	6		1
288	PL-14	Woodruff Key, #5, for magneto drive gear	1		1
289	PL-55	Woodruff Key, #6, for crankshaft gear	1		1
290	PL-87	Woodruff Key, #22, for flywheel	1		1
292	RF-794	Pipe Nipple, 1/8" x 3/4" long For mounting fuel strainer	1		1
293	SA-13	Expansion Plug, 3/4", for camshaft pin hole	1		1
295	XA-7	Screw, #10-32 thread x 3/8" long, round head 2-for governor control friction disc 2-for governor adjusting strap to lever	4		1
296	XA-33	Screw, 1/4"-20 thread x 3/8" long, round head For mounting flywheel shroud screen	4		1
297	XA-35	Screw, 1/4"-20 thread x 5/8" long, round head For gov. control lever to friction disc	1		1
298	XA-65	Screw, Parker-Kalon #8 x 1/2" long, type A, self-tapping round head screw For governor adjusting screw bracket	2		1
299	XA-67	Screw, Parker-Kalon #4 x 1/4" long, type A, Self-tapping round head screw For mounting name and instruction plate	4		1
300	XA-88	Screw, 1/4"-20 thread x 1-5/8" long, round head For fuel tank straps	2		1
302	XB-20	Screw, 1/4"-20 thread x 1" long, fillister head For air cleaner bracket clamp	1		1
304	XD-4	Screw, 1/4"-20 thread x 1/2" long, hexagon head 4-for magneto drive cover 1-for air shroud to cylinder head 1-for shroud to cylinder block 6-for connecting rod inspection plate 1-for air cleaner brace to shroud	13		1
305	XD-5	Screw, 1/4"-20 thread x 5/8" long, hexagon head For mounting oil trough	2		1
306	XD-6	Screw, 1/4"-20 thread x 3/4" long, hexagon head For mounting magneto	2		1
307	XD-15	Screw, 5/16"-18 thread x 3/4" long, hexagon head 4-for bearing retainer plate - flywheel end 2-for mounting carburetor	6		1

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plat

PARTS INTERCHANGEABLE ON MODELS ADH, AE, AEH, and AEHS

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
308	XD-21	Screw, 5/16"-18 thread x 1-1/2" long, hexagon head For mounting manifold	2		2
310	XD-26	Screw, 3/8"-16 thread x 7/8" long, hexagon head For main bearing plate - take-off end	4		1
311	XD-28	Screw, 3/8"-16 thread x 1-1/8" long, hexagon head For mounting engine base to crankcase	3		1
312	XD-29	Screw, 3/8"-16 thread x 1-1/4" long, hexagon head 3-for mounting cylinder head 2-for mounting fuel tank bracket	5		2
313	XD-30	Screw, 3/8"-16 thread x 1-1/2" long, hexagon head For mounting cylinder head	3		2
315	XD-135	Screw, 1/2"-13 thread x 1-1/8" long, hexagon head For mounting cylinder block to crank case	4		2
316	XD-136	Screw, 1/4"-20 thread x 2-1/8" long, hexagon head For valve tapper inspection plate	1		1
317	XE-47	Set Screw, 1/4"-20 thread x 3/4" long, headless For governor control friction disc	1		1
318	XH-11	Taper Pin, #2 x 1-1/2" long For magneto drive gear	1		1
319	XI-1	Cotter Pin, 1/16" dia. x 1/2" long, steel For governor lever stop pin	2		1
320	XI-7	Cotter Pin, 3/32" dia.x 3/4" long, steel For mounting governor control chain to adjusting strap	1		1
321	XI-20	Cotter Pin, 1/8" dia.x 1-1/2" long, steel For oil pump trough cover	1		1
322	XI-32	Cotter Pin, 3/64" dia.x 3/8" long, steel For control rod to governor lever	1		1
324		#9100G Galvanized Furnace Chain (10 links) For governor control adjusting strap to governor spring	1pc		1

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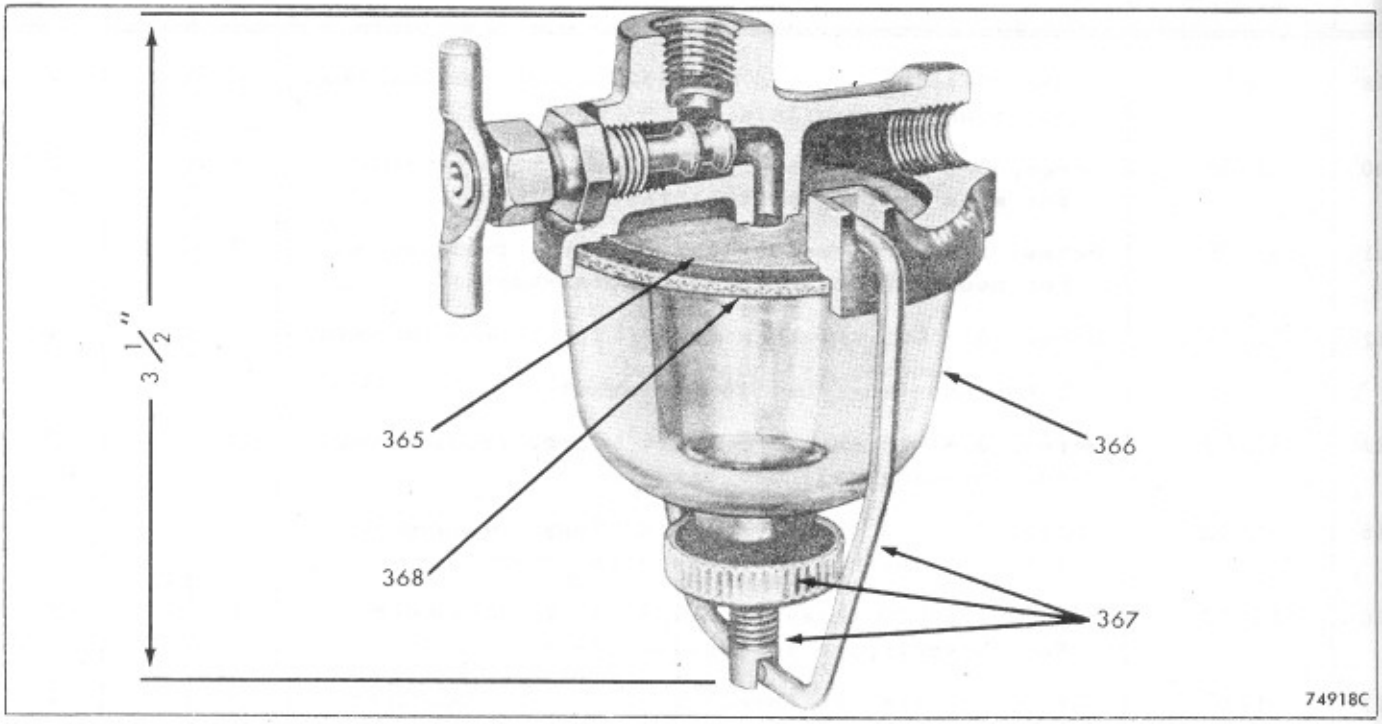
LP-19 AND LP-19-B FUEL STRAINER ASSEMBLIES



REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
	LP-19	FUEL STRAINER ASSEMBLY (With Shut-off valve in cover) Tillotson #OW-418	1		8
	LP-19-B	FUEL STRAINER ASSEMBLY (Without Shut-off valve in cover) Tillotson #OW-444	1		6
		THE FOLLOWING SERVICEABLE PARTS ARE INTERCHANGEABLE FOR BOTH FUEL STRAINERS.			
365	OW-352	FILTER SCREEN	1		1
366	OW-363	GLASS BOWL	1		2
367	OW-447	CLAMP WIRE AND THUMB NUT ASSEMBLY	1		1
368	QD-653	BOWL GASKET	1		1

Order parts from nearest SERVICE STATION shown in directory following parts list.
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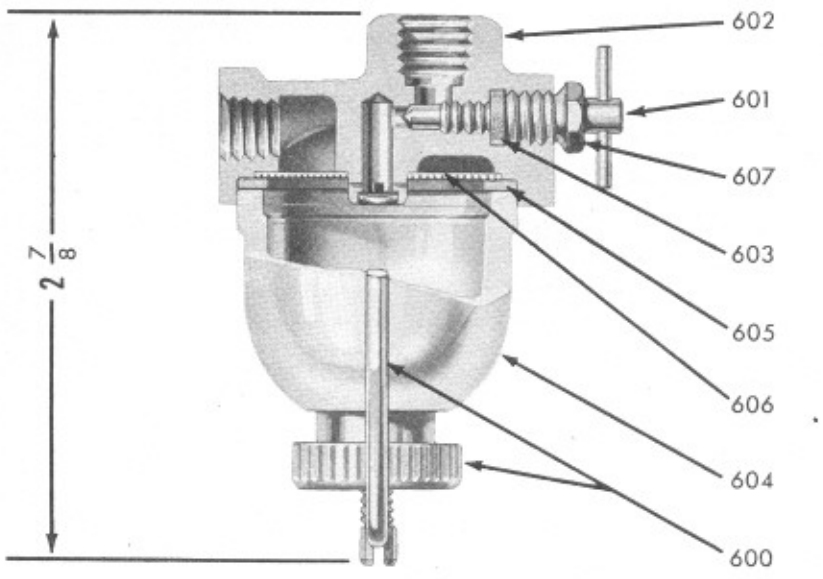
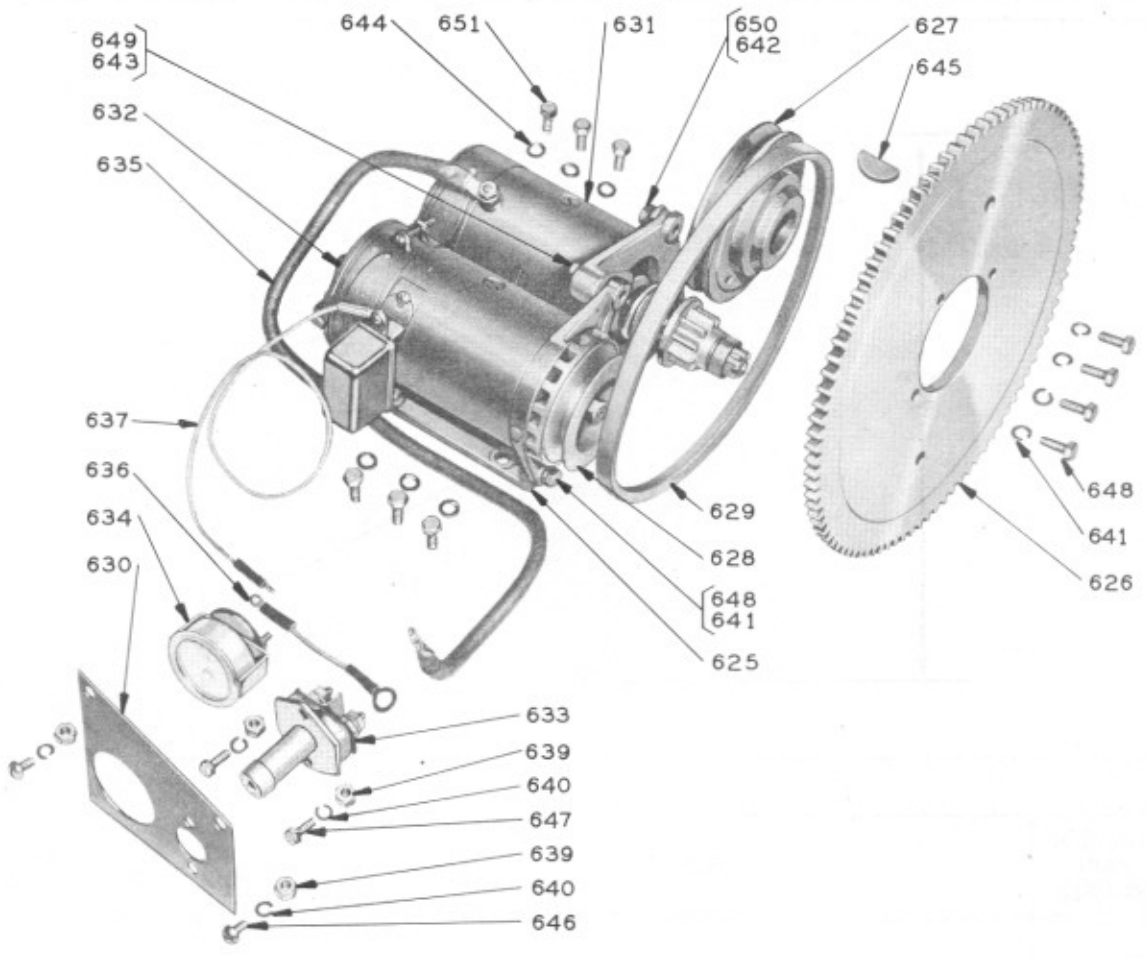
LP-43 FUEL STRAINER ASSEMBLY



REF. NO.	TILLOTSON PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
	OW-480	FUEL STRAINER ASSEMBLY, Wis. Motor #LP-43	1		6
600	07766	CLAMP WIRE AND THUMB NUT ASSEMBLY	1		1
601	07769	SHUT OFF VALVE	1		1
602	07770	COVER	1		2
	08055	REPAIR PARTS KIT	1		3
		Consisting of:			
603		0705 SHUT OFF VALVE PACKING	1		1
604		07759 GLASS BOWL	1		1
605		07761 GASKET	1		1
606		07762 STRAINER SCREEN	1		1
607		07768 SHUT OFF VALVE PACKING NUT	1		1

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

ELECTRIC STARTER AND GENERATOR
FOR ADH AEH AND AEHS ENGINES



75103C

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs.	NET WEIGHT oz.
625	BH-138	STARTER-GENERATOR SUPPORT BRACKET and CONNECTING ROD INSPECTION PLATE	1	4	2
626	GG-102-1	STARTER GEAR	1	9	
627	MD-308	DRIVE PULLEY and STARTER GEAR HUB	1	4	9
628	MD-309	GENERATOR DRIVEN PULLEY	1	1	
629	MH-143	GENERATOR DRIVE BELT, GATES #2280	1		3
		NOTE: On engines previous to Serial #212371 and on some later engines, an old style starter and generator drive was used which included 1 ea. GG-102 Gear, MD-272 or MD-272-A Pulley and MH-134 Sect. "A" Belt. To replace the gear or pulley for service, a complete set of new parts should be ordered. The old and new parts are interchangeable only as a unit. Order the following parts:-1 ea. GG-102-1 Gear, MD-308 Drive Pulley, MD-309 Gen. Pulley and MH-143 Sect. "B" Belt.			

(continued)

Order parts from nearest *SERVICE STATION* shown in directory following parts list.

IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate

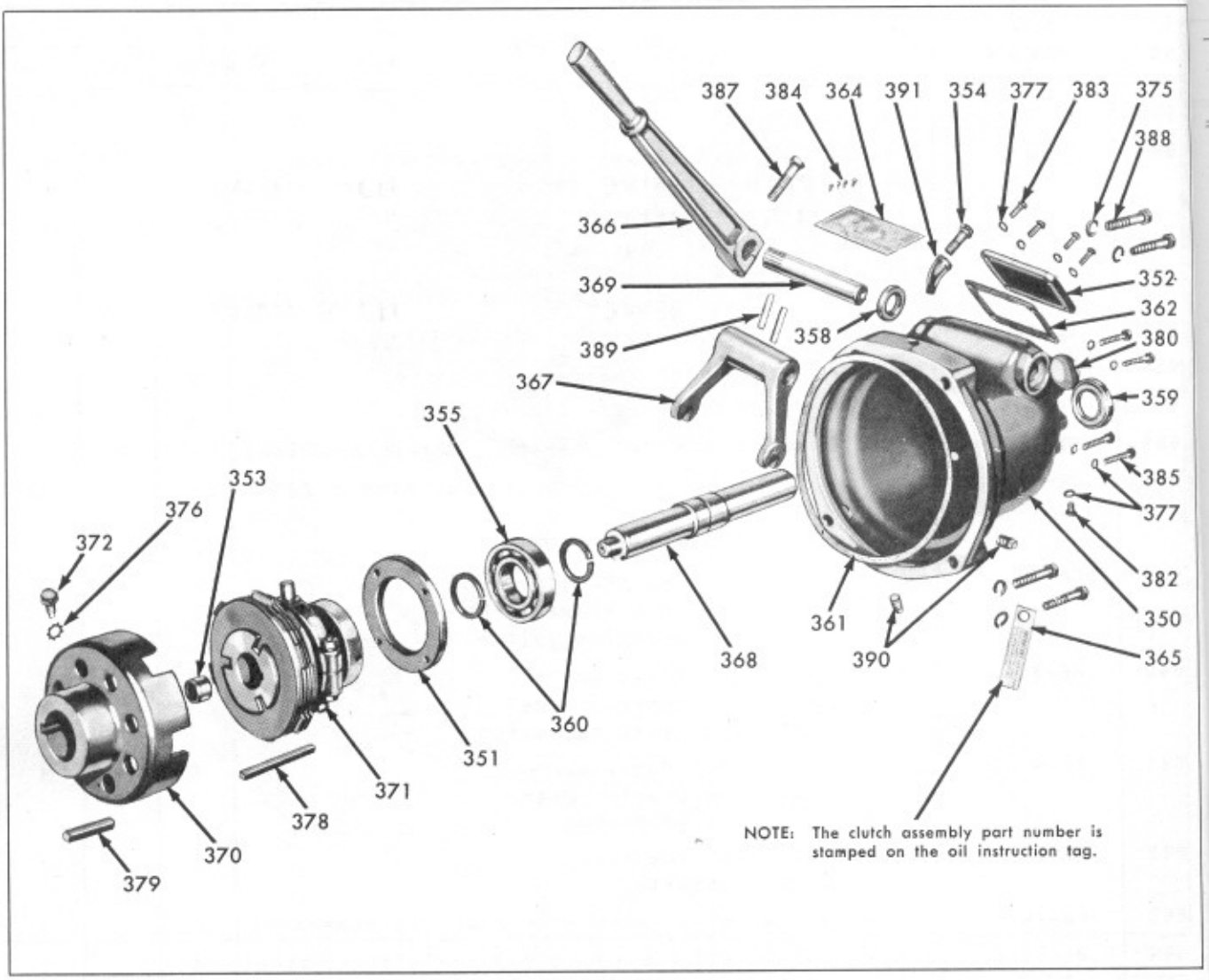
ELECTRIC STARTER AND GENERATOR
FOR ADH AEH AND AEHS ENGINES

REF. NO.	PART NUMBER	DESCRIPTION	NO. REQ.	NET WEIGHT lbs	NET WEIGHT oz
630	VE-262	CONTROL PANEL	1		4
631	YA-5-B	ELECTRIC STARTER (6 volt) Auto-Lite #MAK-4008 For all repairs contact the Electric Auto-Lite Co. at Toledo, Ohio, or their nearest Service Station.	1	10	12
632	YB-14-H	GENERATOR (6 volt) Auto-Lite #GAS-4177 For all repairs contact the Electric Auto-Lite Co. at Toledo, Ohio, or their nearest Service Station.	1	11	
633	YC-10	STARTING SWITCH, Auto-Lite #SW-4001	1		4
634	YE-2	AMMETER, Moto-Meter #5722A	1		6
635	YL-104	STARTER CABLE ASSEMBLY - 25" long	1		5
636	YL-131	IGNITION WIRE ASSEMBLY, Ammeter to switch-5" long	1		1
637	YL-134	IGNITION WIRE ASSEMBLY, Ammeter to generator-22" long	1		2
		STANDARD HARDWARE			
639	PD-77	NUT, 1/4"-20 thread, hexagon steel 2-for mounting control panel 2-for mounting starting switch	4		1
640	PE-3	LOCKWASHER, 1/4" Positive 2-for mounting control panel 2-for mounting starting switch	4		1
641	PE-4	LOCKWASHER, 5/16" Positive 4-for mounting starter gear 3-for mounting generator	7		1
642	PE-5	LOCKWASHER, 3/8" Positive For mounting starter	2		1
643	PH-14-D	PLAIN WASHER, 5/16" steel-for mounting generator	1		1
644	PH-30-A	PLAIN WASHER, 1/4" I.D. x 7/16" O.D. x 1/16" thick, steel For starter generator bracket	6		1
645	PL-61	KEY, No. 28 Woodruff For mounting starter drive pulley	1		1
646	XA-34	SCREW, 1/4"-20 thread x 1/2" long, round head For mounting Control Panel	2		1
647	XD-5	SCREW, 1/4"-20 thread x 5/8" long, hexagon head For mounting starter switch	2		1
648	XD-15	SCREW, 5/16"-18 thread x 3/4" long, hexagon head 4-for mounting starter gear 2-for mounting generator	6		1
649	XD-19	SCREW, 5/16"-18 thread x 1-1/4" long, hexagon head For mounting generator	1		1
650	XD-25	SCREW, 3/8"-16 thread x 3/4" long, hexagon head For mounting Starter	2		1
651	XD-6	SCREW, 1/4"-20 thread x 3/4" long, hexagon head For mounting starter-generator bracket	6		1

Order parts from nearest *SERVICE STATION* shown in directory following parts list.

IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate of engine

WW-25-14 CLUTCH AND POWER TAKE-OFF ASSEMBLY FOR, ADH AND AEH ENGINES



NOTE: Engines equipped with a clutch and power take-off assembly require a special main bearing plate, crankshaft and crankcase as follows:

BG-106-8-S1 MAIN BEARING PLATE (not illustrated) consisting of:

1—BG-106-8 Bearing plate
1—QD-546 Cork strip
1—HF-238 Oil seal
1—SD-31 retainer

CA-48C-22-S3 CRANKSHAFT ASSEMBLY (not illustrated) consisting of:

1—CA-48C-22 Crankshaft
2—ME-84 Bearings
1—GA-31 Gear
1—PL-55 Key
1—HG-152-A Bushing

THE PART NUMBER OF THE CRANKCASE CAN BE FOUND STAMPED ON THE FACE OF THE CRANKCASE MAGNETO MOUNTING PAD.

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

WW-25-14 CLUTCH AND POWER TAKE-OFF ASSEMBLY FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
	WW-25-14	CLUTCH AND POWER TAKE-OFF ASSEMBLY	1	35	
350	BG-155E-2	CLUTCH HOUSING	1	16	
351	BG-156	PLATE—bearing retainer	1		8
352	BH-115	COVER—inspection hole	1		8
353	HG-152-A	BUSHING—crankshaft	1		1
354	LO-44	BREATHER	1		1
355	ME-79-A	BEARING—take-off shaft, N. D. #7507	1		10
358	PH-234-A	OIL SEAL—shifter lever shaft	1		2
359	PH-280	OIL SEAL—take-off shaft	1		3
360	PK-56	LOCK SPRING—bearing retainer	2		1
361	QD-546	CORK SEAL—bearing plate	1		1
362	QD-551	GASKET—inspection hole cover	1		1
364	SD-59	INSTRUCTION PLATE—clutch adjusting	1		1
365	SD-79	TAG—oil instruction	1		1
366	VB-55-1	SHIFTER LEVER	1	2	
367	VB-64-A	SHIFTER YOKE	1	1	4

(continued)

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

WW-25-14 CLUTCH AND POWER TAKE-OFF ASSEMBLY FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
368	WA-48-4	TAKE-OFF SHAFT	1	3	
369	WA-61	SHIFTER SHAFT	1	1	
370	WC-219	HUB—clutch drive	1	3	8
371	WC-220-2	CLUTCH, twin disc 4½" Model "V" #4937 NOTE: See twin disc illustration and parts price list for clutch parts.	1	6	15
372	XD-14-2	SET SCREW—clutch drive hub	1		1
		STANDARD HARDWARE			
375	PE-6	LOCKWASHER, 7/16" positive For housing mounting.	4		1
376	PE-46	LOCKWASHER, 5/16" external everlock For drive hub set screw.	1		1
377	PH-30	WASHER, 1/4" I.D. x 7/16" O.D. x 1/16" thick plain copper 1—For oil return hole screw. 4—For bearing retainer plate. 4—For inspection hole cover.	9		1
378	PL-91	KEY, 1/4" square x 2 1/8" long For clutch mounting.	1		1
379	PL-102	KEY, 1/4" square x 1 5/8" long For clutch drive hub mounting.	1		1
380	SA-58	PLUG, 1 3/8" expansion, for clutch housing	1		1
382	XA-32	SCREW, 1/4"-20 thread x 5/16" long, round head To plug oil return hole.	1		1
383	XA-35	SCREW, 1/4"-20 thread x 5/8" long, round head For inspection hole cover.	4		1
384	XA-68	SCREW, #2 x 1/4" round head metallic drive For clutch adjustment plate.	4		1

(conti

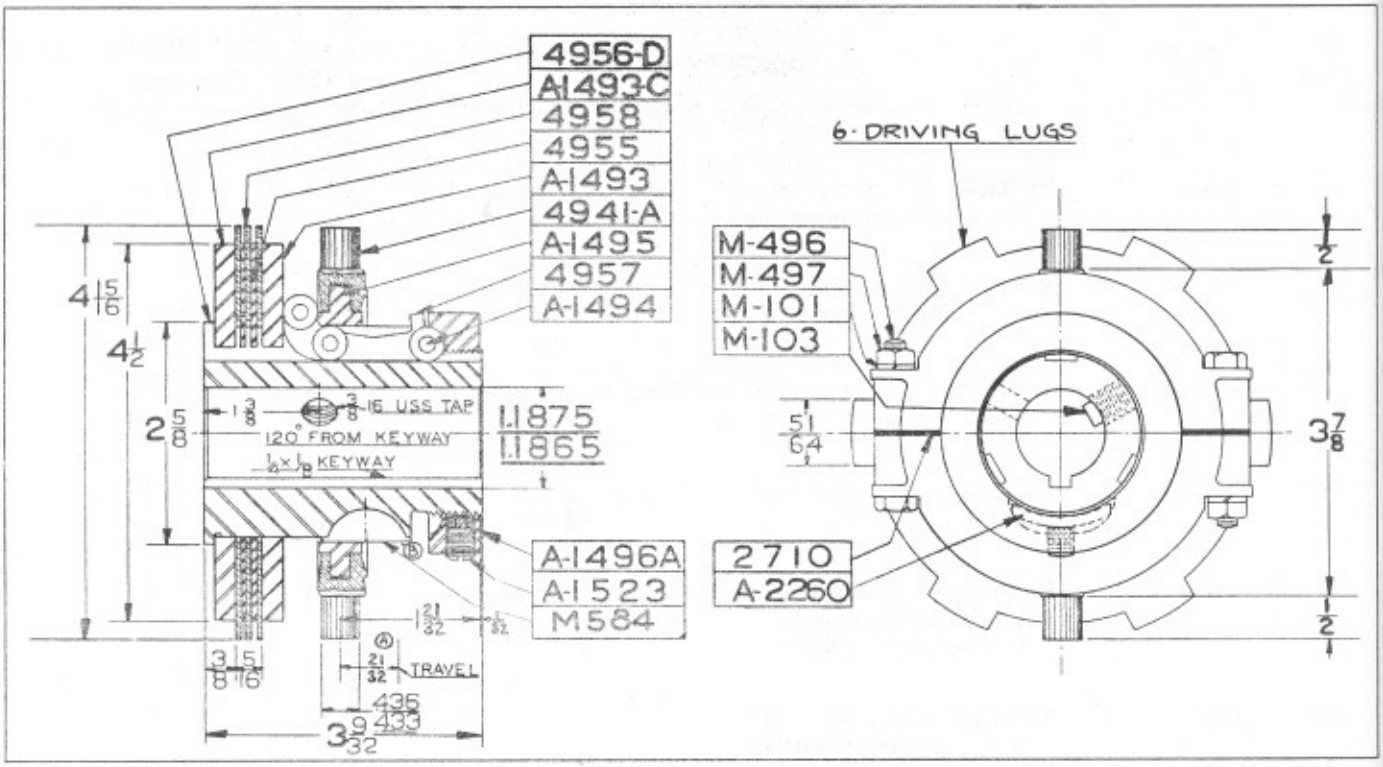
WW-25-14 CLUTCH AND POWER TAKE-OFF ASSEMBLY FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
385	XD-9	SCREW, 1/4"-20 thread x 1 1/2" long, hexagon head..... For bearing retainer plate.	4		1
387	XD-30	SCREW, 3/8"-16 thread x 1 1/2" long, hexagon head..... For clamping shifter lever.	1		1
388	XD-130-1	SCREW, 7/16"-14 thread x 2 1/8" long, hexagon head..... For mounting housing.	4		2
389	XH-26	PIN, #4 x 1 3/8" long, taper..... For shifter yoke.	2		1
390	XK-2	PLUG, 1/4" square head pipe..... 1—For oil drain hole. 1—For oil level hole.	2		1
391	XK-77	STREET ELL, 1/8" x 45°..... For mounting breather.	1		1

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

TWIN DISC CLUTCH COMPANY

RACINE, WISCONSIN



WISCONSIN MOTOR PART NO. WC-220-2

Repair Parts List for X4937 Model V3045 Clutch, Specification 13853

4956D	1	Hub Bore 1.1875-1.1865, Ky. 1/4 x 1/8
M1327	1	Cup Pt. Set Screw (3/8-16NC x 5/8)
X-341	1	Miscellaneous Clutch Parts
	4941A 1	Sleeve Collar Assembly Comprising:
	M496 2	Hex. Hd. Cap Screws (1/4-28NF x 1-7/8)
	M101 2	Regular Lock Washers (1/4 x 3/32 x 1/16)
	2710 2	Shims
	M497 2	Light Nuts (1/4-28NF x 7/32)
	A1495 1	Wedge Sleeve
	A1493 1	Clamping Plate
	4957 6	Levers
	A1494 9	Lever Rollers
	A1496A 1	Lock Nut
	A1523 1	Adjusting Nut Screw
	4958 3	Driving Plates
	4955 2	Driven Plates
	A2260 1	Lock Wire
	A1493C 1	Back Clamping Plate
	*1711 1	Key
	A1791 1	Instruction Plate
	M422 4	Drive Screws

*Replaced by:
M584 1 Hi-Pro Key (141 Special)

Note: The 1711 Key was formerly used on this unit. However, on March 21, 1946 it was replaced by our M584 Hi-Pro Key which is now being used. As these parts are not interchangeable, it will be necessary for you to specify the number of the key required when ordering repair parts.

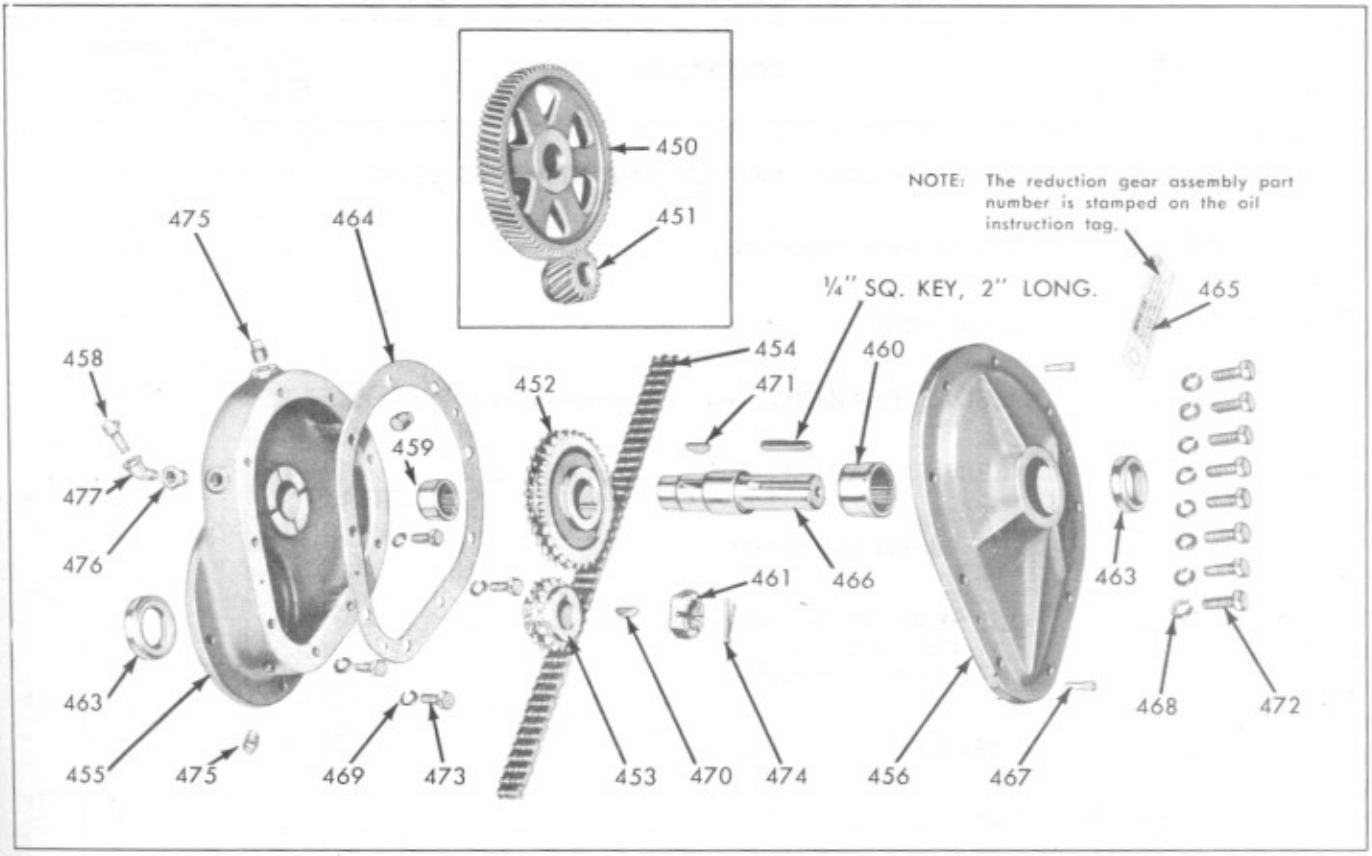
When ordering parts kindly advise the specification number.

We reserve the right to make such substitutions in materials specified in our data bulletins as may be required to support the defense program and as otherwise may be necessary under present and probable future conditions.

Under present circumstances all shipping dates are subject to revision in accordance with United States Government priorities which may be asserted on behalf of you or other customers having orders with us for similar articles.

Should you, for any reason, hold up this work or defer shipment thirty days over the regular schedule, we reserve the right to render our invoice for the cost of labor and material to date, payment to be made in accordance with terms on which the order is entered.

WW-64, WW-64-1 AND WW-64-2 REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES



Assembly Part Number	Reduction Ratio	Rotation at Take-off Shaft	Net Weight Lbs.	Net Weight Oz.
WW-64	4 to 1	Counter Engine-Wise	25	
WW-64-1	2.076 to 1	Counter Engine-Wise	25	
WW-64-2	3.4 to 1	Engine-Wise (chain drive)	24	

NOTE: Engines equipped with these reduction units require a **CA-48C-63-S1 CRANKSHAFT ASSEMBLY** (not illustrated) consisting of:

1—CA-48C-63 Crankshaft
2—ME-84 Bearings
1—GA-31 Gear
1—PL-55 Key

Ref. No.	Part Number	Description	Assembly Used in	No. Req.	Net Weight Lbs.	Net Weight Oz.
450	GG-119-1	**Driven Gear**—64 teeth	WW-64	1	5	2
450	GG-122-3	**Driven Gear**—54 teeth	WW-64-1	1	4	4
451	GG-120-1	**Driver Gear**—16 teeth	WW-64	1		8
451	GG-121-2	**Driver Gear**—26 teeth	WW-64-1	1	1	11
452	GG-122-1	**Driven Sprocket**—34 teeth	WW-64-2	1	3	1
453	GG-123	**Driver Sprocket**—10 teeth	WW-64-2	1		5
454	GJ-15	**Chain**—½" pitch—40 pitches long	WW-64-2	1	1	6

(continued)

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

INTERCHANGEABLE PARTS OF WW-64, WW-64-1 AND WW-64-2 RED. GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
455	BG-218	MAIN HOUSING AND ENGINE BEARING PLATE	1	11	8
456	BH-144	COVER FOR HOUSING	1	5	12
458	LO-44	BREATHER	1		1
459	ME-92	NEEDLE BEARING—inner (Torrington #B-1816X)	1		3
460	ME-93	NEEDLE BEARING—outer (Torrington #B-2420X)	1		4
461	PD-62-2	NUT—driver gear mounting	1		2
463	PH-265	OIL SEAL (Victor #60320) 1—For crankshaft. 1—For take-off shaft.	2		3
464	QD-623	GASKET—cover to housing	1		1
465	SD-79	TAG—oil instruction	1		1
466	WA-69	TAKE-OFF SHAFT	1	2	2
		STANDARD HARDWARE			
467	PA-289	TAPER PIN, 3/16" dia. x 5/8" long, half taper For cover to housing mounting.	2		1
468	PE-4	LOCKWASHER, 5/16" positive For mounting cover to housing.	8		1
469	PE-5	LOCKWASHER, 3/8" positive For housing to crankcase mounting.	4		1
470	PL-16	KEY, #11 Woodruff For drive gear mounting.	1		1

(continued)

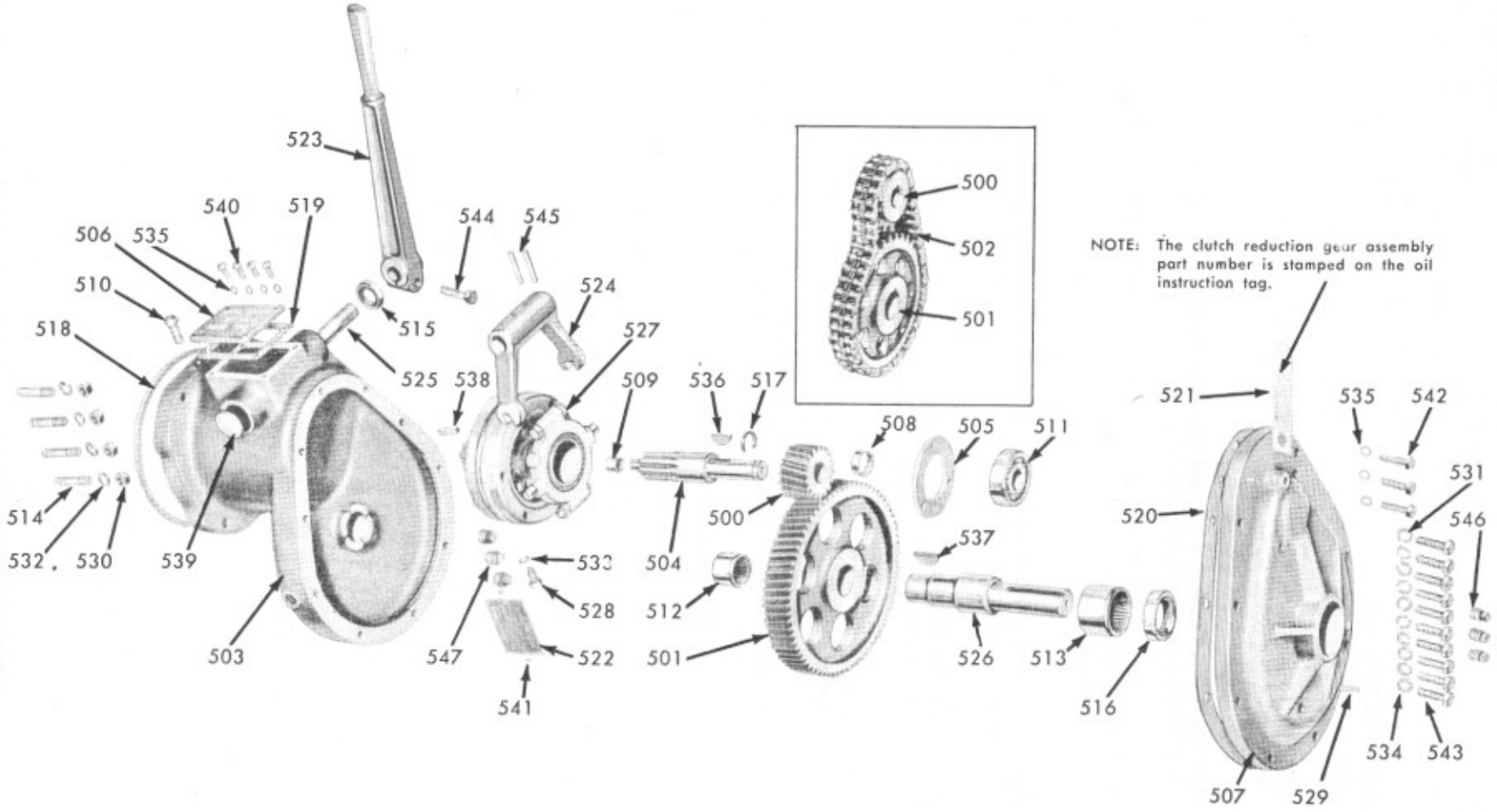
Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

INTERCHANGEABLE PARTS OF WW-64, WW-64-1 AND WW-64-2 RED. GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

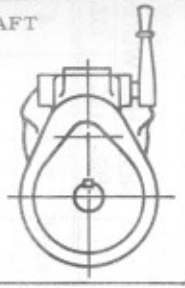
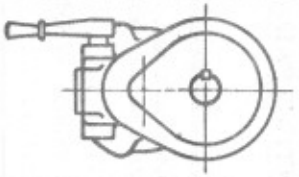
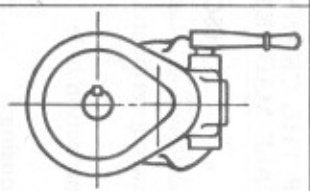
REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
471	PL-50	KEY, #16 Woodruff..... For driven gear mounting.	1		1
472	XD-17	SCREW, 5/16"-18 thread x 1" long, hexagon head..... For mounting cover to housing.	8		1
473	XD-27	SCREW, 3/8"-16 thread x 1" long, hexagon head..... For housing to crankcase mounting.	4		1
474	XI-25	COTTER PIN, 3/32" Dia. x 1 1/2" long..... For drive gear nut.	1		1
475	XK-2	PLUG, 1/4" square head, pipe..... For oil filler, drain and level holes.	4		2
476	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe..... For breather mounting.	1		1
477	XK-77	STREET ELL, 1/8" x 45°..... For breather mounting.	1		1

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES



WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

Position of Take-Off Shaft is Determined When Viewed From Cranking End of Engine	Assembly Part Number	Reduction Ratio	Rotation of Take-off Shaft	Ref. No. 500 Driver Gear Part No.	Ref. No. 501 Driven Gear Part No.	Ref. No. 502 Chain Part No.	Ref. No. 503 Housing Part No.	Ref. No. 504 Clutch Shaft Part No.
TAKE-OFF SHAFT BELOW 	WW-79	2.12 to 1	Engine-Wise	GG-138	GG-137	GJ-19	BG-232	WA-95
	WW-79-1	3.08 to 1	Engine-Wise	GG-133	GG-132	GJ-20	BG-232	WA-95
	WW-79-2	4.00 to 1	Engine-Wise	GG-123	GG-132	GJ-19	BG-232	WA-95
	WW-79-3	2.03 to 1	Counter Engine-Wise	GG-139	GG-119-2	.....	BG-232	WA-95
	WW-79-4	2.96 to 1	Counter Engine-Wise	GG-140	GG-136	.....	BG-232	WA-95
	WW-79-5	4.06 to 1	Counter Engine-Wise	GG-141	GG-135	.....	BG-232	WA-95
	WW-79-6	5.06 to 1	Counter Engine-Wise	GG-142	GG-134-1	.....	BG-232	WA-95
	WW-79-7	6.00 to 1	Counter Engine-Wise	On Shaft	GG-134	.....	BG-232	WA-95-A
 TAKE-OFF SHAFT ON LEFT HAND SIDE WHEN VIEWED FROM CRANKING END	WW-79-8	2.12 to 1	Engine-Wise	GG-138	GG-137	GJ-19	BG-232-1	WA-95
	WW-79-9	3.08 to 1	Engine-Wise	GG-133	GG-132	GJ-20	BG-232-1	WA-95
	WW-79-10	4.00 to 1	Engine-Wise	GG-123	GG-132	GJ-19	BG-232-1	WA-95
	WW-79-11	2.03 to 1	Counter Engine-Wise	GG-139	GG-119-2	.....	BG-232-1	WA-95
	WW-79-12	2.96 to 1	Counter Engine-Wise	GG-140	GG-136	.....	BG-232-1	WA-95
	WW-79-13	4.06 to 1	Counter Engine-Wise	GG-141	GG-135	.....	BG-232-1	WA-95
	WW-79-14	5.06 to 1	Counter Engine-Wise	GG-142	GG-134-1	.....	BG-232-1	WA-95
	WW-79-15	6.00 to 1	Counter Engine-Wise	On Shaft	GG-134	.....	BG-232-1	WA-95-A
 TAKE-OFF SHAFT ON RIGHT HAND SIDE WHEN VIEWED FROM CRANKING END	WW-79-16	2.12 to 1	Engine-Wise	GG-138	GG-137	GJ-19	BG-232-2	WA-95
	WW-79-17	3.08 to 1	Engine-Wise	GG-133	GG-132	GJ-20	BG-232-2	WA-95
	WW-79-18	4.00 to 1	Engine-Wise	GG-123	GG-132	GJ-19	BG-232-2	WA-95
	WW-79-19	2.03 to 1	Counter Engine-Wise	GG-139	GG-119-2	.....	BG-232-2	WA-95
	WW-79-20	2.96 to 1	Counter Engine-Wise	GG-140	GG-136	.....	BG-232-2	WA-95
	WW-79-21	4.06 to 1	Counter Engine-Wise	GG-141	GG-135	.....	BG-232-2	WA-95
	WW-79-22	5.06 to 1	Counter Engine-Wise	GG-142	GG-134-1	.....	BG-232-2	WA-95
	WW-79-23	6.00 to 1	Counter Engine-Wise	On Shaft	GG-134	.....	BG-232-2	WA-95-A
 TAKE-OFF SHAFT ON TOP	WW-79-24	2.12 to 1	Engine-Wise	GG-138	GG-137	GJ-19	BG-232-3	WA-95
	WW-79-25	3.08 to 1	Engine-Wise	GG-133	GG-132	GJ-20	BG-232-3	WA-95
	WW-79-26	4.00 to 1	Engine-Wise	GG-123	GG-132	GJ-19	BG-232-3	WA-95
	WW-79-27	2.03 to 1	Counter Engine-Wise	GG-139	GG-119-2	.....	BG-232-3	WA-95
	WW-79-28	2.96 to 1	Counter Engine-Wise	GG-140	GG-136	.....	BG-232-3	WA-95
	WW-79-29	4.06 to 1	Counter Engine-Wise	GG-141	GG-135	.....	BG-232-3	WA-95
	WW-79-30	5.06 to 1	Counter Engine-Wise	GG-142	GG-134-1	.....	BG-232-3	WA-95
	WW-79-31	6.00 to 1	Counter Engine-Wise	On Shaft	GG-134	.....	BG-232-3	WA-95-A

See Following Page

WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

Part Number	Net Weight Lbs.	Net Weight Oz.	Part Number	Net Weight Lbs.	Net Weight Oz.
BG-232	20		WW-79-5	54	8
BG-232-1	20		WW-79-6	54	8
BG-232-2	20		WW-79-7	54	8
BG-232-3	20		WW-79-8	53	8
GG-119-2 (61 teeth)	4	14	WW-79-9	53	8
GG-123 (10 teeth)		5	WW-79-10	53	
GG-132 (40 teeth	3	13	WW-79-11	54	
GG-133 (13 teeth)		11	WW-79-12	55	
GG-134 (78 teeth)	7	1	WW-79-13	54	8
GG-134-1 (76 teeth)	6	12	WW-79-14	54	8
GG-135 (73 teeth)	6	8	WW-79-15	54	8
GG-136 (68 teeth)	6	4	WW-79-16	53	8
GG-137 (36 teeth)	3	8	WW-79-17	53	8
GG-138 (17 teeth)	1	5	WW-79-18	53	
GG-139 (30 teeth)	1	15	WW-79-19	54	
GG-140 (23 teeth)	1	8	WW-79-20	55	
GG-141 (18 teeth)		12	WW-79-21	54	8
GG-142 (15 teeth)		5	WW-79-22	54	8
GJ-19 (23" long)	1	9	WW-79-23	54	8
GJ-20 (23½" long)	1	10	WW-79-24	53	8
WA-95	1	3	WW-79-25	53	8
WA-95-A	1	8	WW-79-26	53	
WW-79	53	8	WW-79-27	54	
WW-79-1	53	8	WW-79-28	55	
WW-79-2	53		WW-79-29	54	8
WW-79-3	54		WW-79-30	54	8
WW-79-4	55		WW-79-31	54	8

INTERCHANGEABLE PARTS OF WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES

NOTE: Engines equipped with a clutch reduction gear assembly require a special main bearing plate, crankshaft and crankcase as follows:

BG-106-8-S1 MAIN BEARING PLATE ASSEMBLY (not illustrated) consisting of:

1—BG-106-8 Bearing plate
1—HF-238 Oil seal
1—QD-546 Cork strip
1—SD-31 Retainer

CA-48C-83-S3 CRANKSHAFT ASSEMBLY (not illustrated) consisting of:

1—CA-48C-83 Crankshaft
1—GA-31 Gear
1—HG-182 Bushing
2—ME-84 Bearings
1—PL-55 Key

THE PART NUMBER OF THE CRANKCASE CAN BE FOUND STAMPED ON THE FACE OF THE CRANKCASE MAGNETO MOUNTING PAD.

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
505	BG-233	PLATE—bearing retainer	1		4
506	BH-115	COVER—inspection hole	1		9
507	BH-157	COVER—housing	1	9	

(continued)

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

INTERCHANGEABLE PARTS OF WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
508	HF-230	SPACER—clutch shaft bearing	1		1
509	HG-182	BUSHING—clutch shaft pilot	1		1
510	LO-44	BREATHER	1		1
511	ME-10	BEARING—clutch shaft	1		6
512	ME-92	NEEDLE BEARING—inner (Torrington #B-1816X)	1		3
513	ME-93	NEEDLE BEARING—outer (Torrington #B-2420X)	1		4
514	PC-392	STUD HOUSING to crankcase mounting	4		2
515	PH-234-A	OIL SEAL—shifter lever shaft	1		2
516	PH-265	OIL SEAL—take-off shaft	1		3
517	PK-76	RETAINING RING—clutch shaft bearing	1		1
518	QD-546	CORK STRIP around bearing plate	1		1
519	QD-551	GASKET—inspection hole cover	1		1
520	QD-651	GASKET—cover to housing	1		1
521	SD-79	TAG—oil instruction	1		1
522	SD-132	PLATE—clutch adjustment instruction	1		1
523	VB-55-1	SHIFTER LEVER	1	2	
524	VB-64-A	SHIFTER YOKE	1	1	4
525	WA-61	SHIFTER SHAFT	1	1	
526	WA-69	TAKE-OFF SHAFT	1	2	2
527	WC-280-B	CLUTCH, Rockford Model 4½ L O C, #CLA-1761-A **Note:** See Rockford illustration and parts price list for clutch parts.	1	8	6
528	XD-14-2	SET SCREW—clutch drive hub	1		1

(continued)

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

INTERCHANGEABLE PARTS OF WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
		STANDARD HARDWARE			
529	PA-289	TAPER PIN, 3/16" dia. x 5/8" long, half taper For cover to housing mounting	2		1
530	PD-12	NUT, 7/16"-20 thread, hexagon For housing to crankcase studs	4		1
531	PE-4	LOCKWASHER, 5/16" positive For cover to housing—above oil level.	7		1
532	PE-6	LOCKWASHER, 7/16" positive For housing to crankcase studs.	4		1
533	PE-46	LOCKWASHER, 5/16" external everlock For drive hub set screw.	1		1
534	PH-14	WASHER, 5/16" I. D. x 19/32" O. D. x 1/16" thick, plain copper For cover to housing—below oil level.	3		1
535	PH-30	WASHER, 1/4" I. D. x 7/16" O. D. x 1/16" thick, plain copper 4—For inspection hole cover. 3—For bearing retainer plate.	7		1
536	PL-16	KEY, #11 Woodruff For driver gear mounting.	1		1
537	PL-50	KEY, #16 Woodruff For driven gear mounting.	1		1
538	PL-86	KEY, 1/4" square x 1" long For drive hub mounting.	1		1
539	SA-58	PLUG, 1 3/8" expansion For shifter shaft hole.	1		1
540	XA-35	SCREW, 1/4"-20 thread x 5/8" long, round head For inspection hole cover.	4		1

(continued)

Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

INTERCHANGEABLE PARTS OF WW-79 Etc. CLUTCH REDUCTION GEAR ASSEMBLIES FOR ADH AND AEH ENGINES

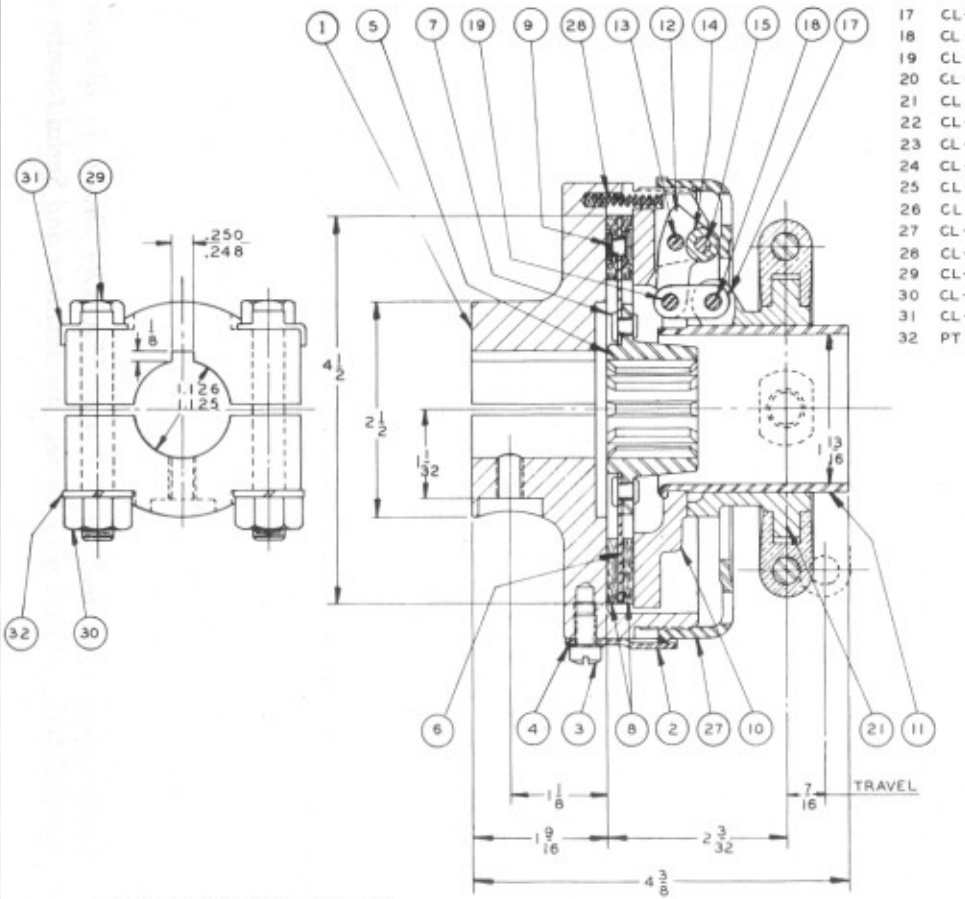
REF. NO.	PART NO.	DESCRIPTION	NO. REQ.	NET WEIGHT LBS.	NET WEIGHT OZ.
541	XA-68	SCREW, #2 x 1/4" long, round head metallic drive ..... For clutch instruction plate.	2		1
542	XD-7	SCREW, 1/4"-20 thread x 1" long, hexagon head ..... For bearing retainer plate.	3		1
543	XD-17	SCREW, 5/16"-18 thread x 1" long, hexagon head ..... For cover to housing mounting.	10		1
544	XD-30	SCREW, 3/8"-16 thread x 1 1/2" long, hexagon head ..... For clamping shifter lever.	1		1
545	XH-26	PIN, #4 x 1 3/8" long, taper ..... For shifter yoke.	2		1
546	XK-1	PLUG, 1/8" square head, pipe ..... For oil level holes.	3		1
547	XK-3	PLUG, 3/8" square head, pipe ..... For oil drain holes.	3		1

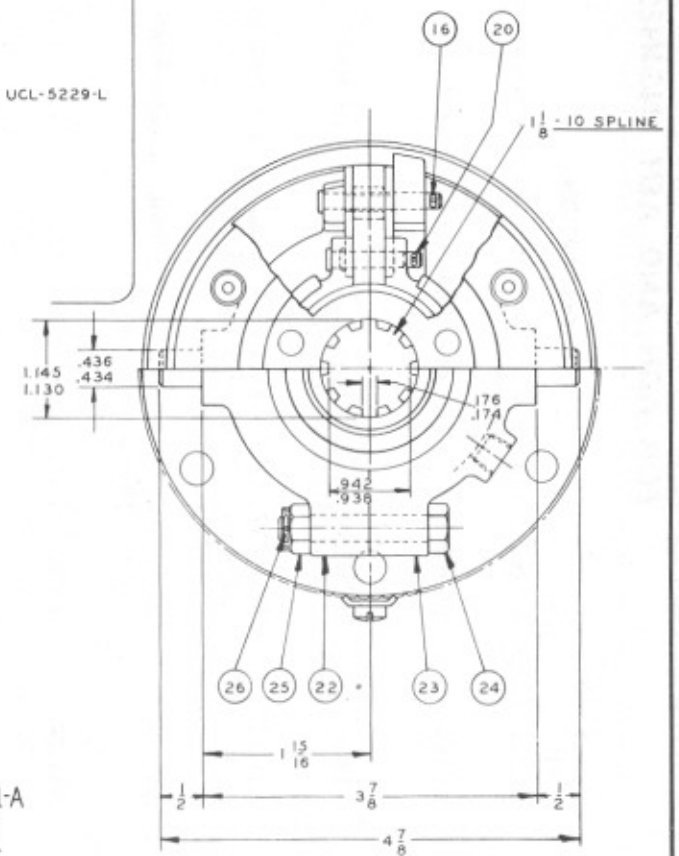
Order parts from nearest SERVICE STATION shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers shown on name plate.

WC-280-B CLUTCH ASSEMBLY
ROCKFORD PART NO. CLA-1761

1	CL-7248-1	1	
2	CL-5522	1	
3	CL-3917-1	1	
4	CL-3468	1	
5	CL-5230	1	UCL-5230
6	CL-5231	1	
7	CL-5234	5	
8	CL-4096-1	2	
9	CL-1011	6	
10	CL-5228-1	1	UCL-5228-1
11	CL-7070	1	
12	CL-5543	6	UCL-5228-1A
13	CL-5156	3	
14	CL-4775	3	
15	CL-4971	3	
16	CL-5092	6	
17	CL-4776	6	
18	CL-5153	3	
19	CL-5152	3	
20	CL-5092	6	
21	CL-5229	1	UCL-5229-L
22	CL-4966	1	
23	CL-4966-1	1	UCL-4966
24	CL-3335	2	
25	CL-3336	2	
26	CL-3923	2	
27	CL-4964	1	
28	CL-5087	3	
29	CL-5318	2	
30	CL-5319	2	
31	CL-5211	2	
32	PT-353	2	

CLA-1761-A





ROCKFORD CLA-1761-A
CLUTCH ASSEMBLY
MODEL 4-1/2 LOC.

WIS. MOTOR Nº WC-280-B

ZENITH CARBURETOR SERVICE

61 and 161 Series Carburetors

To properly repair the Zenith 61 and 161 series carburetors we suggest the following routine:

1. Loosen lever clamp screw and remove lever.
2. Remove idling adjusting screw (6 Figure 1) and spring.
3. Remove throttle body to bowl assembly screws with a screwdriver. (There are four assembly screws and lockwashers.)
4. Raise the throttle body slightly and loosen the gasket from the bowl assembly so you may
5. Lift the throttle body and gasket clear of the bowl assembly, being careful to avoid damaging the float.
6. Remove the venturi (1 Figure 1).
7. Remove the float axle using a screwdriver to push the axle from the slotted end of the bracket, and the fingers to remove it the rest of the way.
8. Remove the float assembly and the fuel valve needle.
9. Remove the throttle body to bowl gasket.
10. Remove the fuel valve seat and gasket using C161-85 Service Tool.
11. Remove idling jet (5) using a small screwdriver (3/16" blade).
12. BEFORE removing the throttle plate READ NOTE A following section "Parts to be Replaced," then proceed to remove the throttle plate screws, plate and shaft assembly.
13. Remove stop lever taper pin using a small punch and a hammer.
14. Remove the throttle shaft packing retainers and packings using a screwdriver or a small pair of pliers to lift out the retainers. (Some models use a shaft hole plug which can be removed with a small drift and a light hammer.)

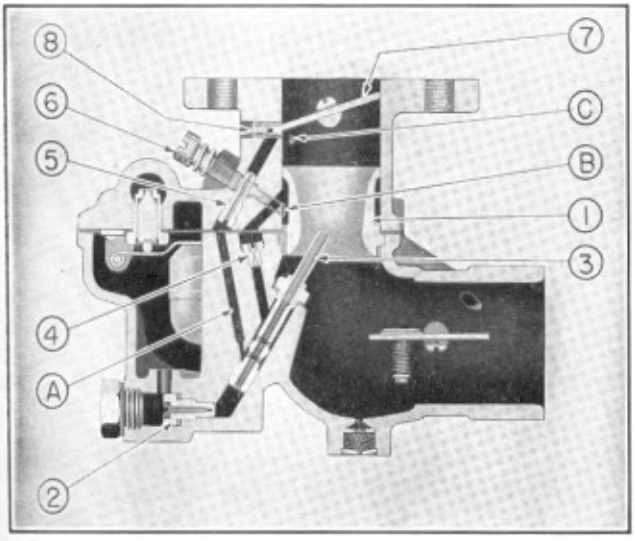


Figure 1

NOTE: Do not remove the identification disc which is riveted to the bowl cover (See note B) the priming plug (8), the throttle stop pin, the float hinge bracket, or the brass channel plugs.

15. Remove the well vent (4 Figure 1) using a small screwdriver (3/16" blade).
16. Remove main discharge jet (3) and gasket using C161-25 Service Tool.
17. Remove main jet adjustment assembly (or plug) and gasket using a 1/2" open-end wrench.

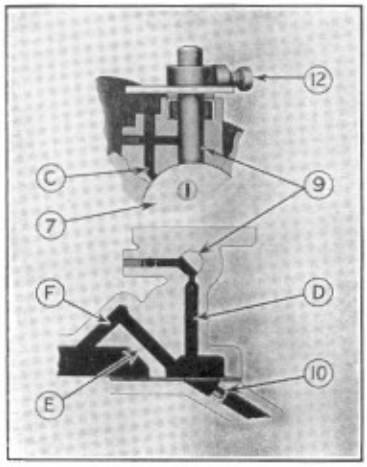


Figure 2

18. Remove main jet (2) and gasket using C161-1 Service Tool (or a suitable screwdriver).
19. Remove air shutter lever retainer nut and lockwasher using C161-25 Service Tool (or a 5/16" wrench). (For marine model, use 11/32" wrench.)
20. Remove air shutter lever assembly. (See Note F.)
21. Remove air shutter bracket retainer screw and bracket using a 1/2" wrench.
22. Remove air shutter shaft hole plug and gasket using a 1/2" wrench.
23. Remove air shutter screws and lockwashers to
24. Remove air shutter plate and shaft.

NOTE: Do not remove air vent channel bushing (10, Fig. 2), air shutter stop pin, air shutter bracket locating pin, or drip plug. (For marine carburetors—do not remove pick-up tube shown at 11 in Figure 4.)

25. Clean the bowl and throttle body casting in gasoline or other solvent and blow through each channel with compressed air to make sure that all channels are clean.
26. Refer to section titled "Parts to be Replaced" for list of parts which we recommend replacing when overhauling this type of carburetor. (See note G.)

RE-ASSEMBLE CARBURETOR AS FOLLOWS:

1. Place air shutter shaft in position and
2. Install air shutter plate screws and lockwashers. Be sure air shutter valve is in correct position as shown in Figure 1 and that the air shutter plate is properly centered before tightening the screws securely.
3. Install air shutter shaft hole plug and gasket using a ½" wrench.
4. Hold air shutter bracket in position and
5. Install retainer screw using a ½" wrench.
6. Install air shutter lever assembly as follows:
   (a) Hold the air shutter in wide-open position.
   (b) Place the lever on the shaft and against the stop pin in the direction to open.
   (c) Install retainer nut and lockwasher using C161-25 Service Tool (or a 5/16" wrench). (For Marine models use 11/32" wrench.)
   (d) Check operation to make sure the air shutter opens and closes fully.
7. Replace main jet (2) and new gasket using C161-1 Service Tool.
8. Install main jet adjustment (or plug) and new gasket using a ½" open-end wrench.
9. Replace main discharge jet (3) and new gasket using C161-25 Service Tool.
10. Replace well vent (4) using a small screwdriver (no gasket required).
11. Place new throttle shaft packing in new packing retainer ring and
12. Install packing retainer ring (with packing) in both throttle shaft bosses using a light hammer.
13. Place new throttle shaft in position and
14. Install throttle plate (See Note A). The throttle plate should be properly centered before tightening the screws and lockwashers securely.
15. Install stop lever assembly on the throttle shaft.

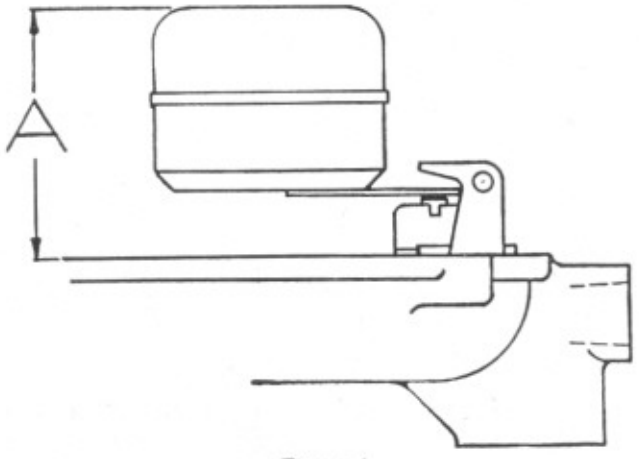


Figure 3

NOTE: When the throttle plate is straight up and down in the barrel (wide open) the stop lever should be against the stop pin, then

16. Drill and pin the stop lever assembly and shaft using a #45 drill and CT63-2 taper pin.
17. Replace idling jet (5) using a small screwdriver (no gasket required).
18. Replace fuel valve seat and new gasket using C161-85 Service Tool.
19. Place new throttle body to bowl gasket in position.
20. Place fuel valve needle in position followed by the float assembly and
21. Install float axle using the handle end of a screwdriver to strike the end of the axle to force it into the slotted end of the bracket. The float should move freely on the axle.
22. Check position of float to obtain correct fuel level, as shown in Figure 3. The A dimension should be 15/32" plus or minus 3/64". (Move the gasket to one side while making the measurement.)
23. Place the venturi (1) in position in the throttle body. NOTE: 161 Series venturi has a locating boss that fits into a groove in the throttle body.
24. Place the bowl assembly in position on the throttle body being careful to avoid damaging the float.
25. Install assembly screws and lockwashers. Be sure to tighten the screws evenly and securely.
26. Install idling adjusting screw (6) and spring.

NOTE: As a preliminary adjustment, set the idling adjustment (6) and the main jet adjustment at one full turn open and adjust the throttle stop screw to hold the throttle just slightly open.

27. Install throttle lever and tighten the clamp screw using a C161-25 Service Tool.

TOOL LIST

To properly service the 61 and 161 series carburetor we recommend the following Service Tools (See Form 2021-C for prices and complete tool listing):

C161-1 Main Jet Wrench.

C161-25 Main Discharge Jet Wrench.

C161-85 Fuel Valve Seat Wrench.

PARTS TO BE REPLACED

In most cases the following parts should be replaced when overhauling this type of carburetor. All Gaskets, **C181-66** gasket kit contains them; **C81-17** Fuel Valve and Seat Assembly, (use same size as was removed); Main Jet (See Note C); **C55-6** Idling Jet; Main Discharge Jet (See Note D); **C52-2** Well Vent; **C85-28** Float Assembly; **C120-4** Float Axle; Throttle Shaft (See Note E); Air Shutter Shaft (See Note F); **CR37-1x1** Throttle Shaft Hole Plug; **C131-4-2** Packing Cap (2 required); **CT57-4** Packing Washer (2 required); **CT62-1** Cotter; **CT63-2** Taper Pin; **T15B5-3** Plate Screw (4 required).

The THROTTLE PLATE for the 61 Series 5 size is **C21-99**, for the 7 size is **C21-47**, and for 161 Series 7 size is **C21-88**.

The VENTURI for the 61 Series 5 size is **C38-35** and for the 7 size is **C38-21**; for 161 Series 7 size is **C38-51** except where venturi and tube assembly **C38-50A** is used, as in Divco-Twin O-9676 and J. I. Case O-9667.

NOTE A: The location of the priming hole plug in relation to the throttle plate is extremely important for uniform idling and part throttle operation. To maintain a uniform relation between the priming hole plug and the throttle plate, our factory assembles the throttle shaft and plate in the throttle body before drilling the body for the priming hole plug, locating the hole in a definite relation to the throttle plate in each case. It is readily apparent from the above that throttle plates and throttle bodies cannot be interchanged indiscriminately. When it becomes necessary to replace the throttle shaft or throttle plate, we suggest the following routine:

1. Unscrew the throttle stop screw to permit complete closing of the throttle plate.
2. Hold throttle in tightly closed position and mark the inside of the throttle body close to the throttle plate with a steel scriber.
3. Using this scribed line as a guide, replace the throttle shaft or plate. If new plate used shows a noticeable variation from old one, select another new plate to get one that fits very close to the scribed line when installed.
4. If throttle body has to be replaced, we recommend obtaining a complete throttle body assembly including shaft, plate, priming hole plug, etc., built to the outline number which appears on the identification disc on the bowl cover.

NOTE B: A round aluminum identification disc riveted to the carburetor bowl cover specifies the assembly outline number to which the carburetor was originally built. When ordering special parts such as throttle bodies, throttle lever and stop lever assemblies, etc., be sure to specify outline number of the carburetor to prevent errors in selecting parts required.

NOTE C: C52-6 Main Jet (sizes #23 and up) or **C52-6-1** Main Jet (sizes up to #22) is used except on Massey-Harris outlines 8757 and 8759 and Fate-Root-Heath O-8933, which use **C52-7** Main Jet. C52-7 is a short-type jet and should not be replaced by the longer type jet. When ordering jets be sure to specify the size required.

NOTE D: C66-26-1, C66-26-2, and **C66-26-3** Main Discharge Jets are used in the 61 series. The dash (—) number and the size are stamped on the jet body. Be sure to use same type as removed.

C66-46 and **C66-47** Main Discharge Jets are used in the 161 series and are not interchangeable with C66-26– as the assembly threads are located in the central section, while the C66-26– threads are at the lower end.

C66-46 has a restriction at the lower end while C66-47 has no restriction. C66-46 is used in Divco Twin O-9676 and J. I. Case O-9667.

NOTE E: C23-203 Throttle Shaft is for the standard 5 size 61 Series carburetor. **C23-211** Shaft is special for the American Bantam O-9321 and Gravely Motor Plow O-9572 but can be made from C23-203 shaft.

C23-113 shaft is for the standard 7 and X7 sizes which do not have the economizer feature built in; **C23-193** shaft is special for Wood Bros. O-9136; **C23-205** shaft assembly is for Continental Motors O-9280; **C23-212** shaft is for Hercules Motors O-9322 and John Deere O-9519; all other special shafts for these models can be made from C23-113.

C23-130 shaft is for the standard J7 and JX7 sizes (with economizer). **C23-116** shaft is special for Oliver Farm O-8627; **C23-144** shaft is for Spang Baking Co. O-8739; all other special shafts for these models can be made from C23-130.

NOTE F: C105-60 Air Shutter Shaft, which has a threaded end to hold the lever in place, is used except as follows: **C105-135** Air Shutter Shaft which is longer on the threaded end than C105-60 is used on standard replacement outlines O-9673 and O-9674; **C105-69** shaft is used on Massey-Harris outlines 8757 and 8759, Hercules O-9246 and Ready Power O-9544; **C105-71** shaft is used on LeRoi replacement outlines 8794 and 8861; **C105-88** is used on Avery O-9088, John Deere outlines 9519 and 9532, J. I. Case O-9667 and Waukesha O-9623.

The following air shutter shaft and lever assemblies are riveted together and should be replaced as an assembly; **C108-36** air shutter shaft and lever assembly is used on Pioneer O-8619, Buffalo Springfield outlines 8629 and 9320, U. S. Motors O-8900 and Fate-Root-Heath O-8933; **C108-36-1** shaft and lever assembly is used on Novo outlines 8895, 8935, 9179 and 9186; **C108-42** assembly is used on Allis-Chalmers outlines 8561, 8691, 8781 and I.H.C. 8808; **C108-73** assembly is used on Allis-Chalmers outlines 8979, 9492, 9507 and 9707; **C108-72** assembly is used on Allis-Chalmers outlines 9535, 9636, 9705 and 9706; **C108-57** assembly is used on I.H.C. outlines 8928, 9167, 9318, 9567, 9748, 9749, 9750, 9751 and 9752; **C108-61** assembly is used on J.I. Case outline 9667.

NOTE G: REBUSHING THE THROTTLE SHAFT BEARINGS is an operation that should not be attempted unless the shop is properly equipped for such work.

We suggest consulting the nearest Zenith Distributor regarding special tool equipment for this operation, or replacing the throttle body assembly with a new one built to the outline number shown on the identification disc.

61 Series—Marine

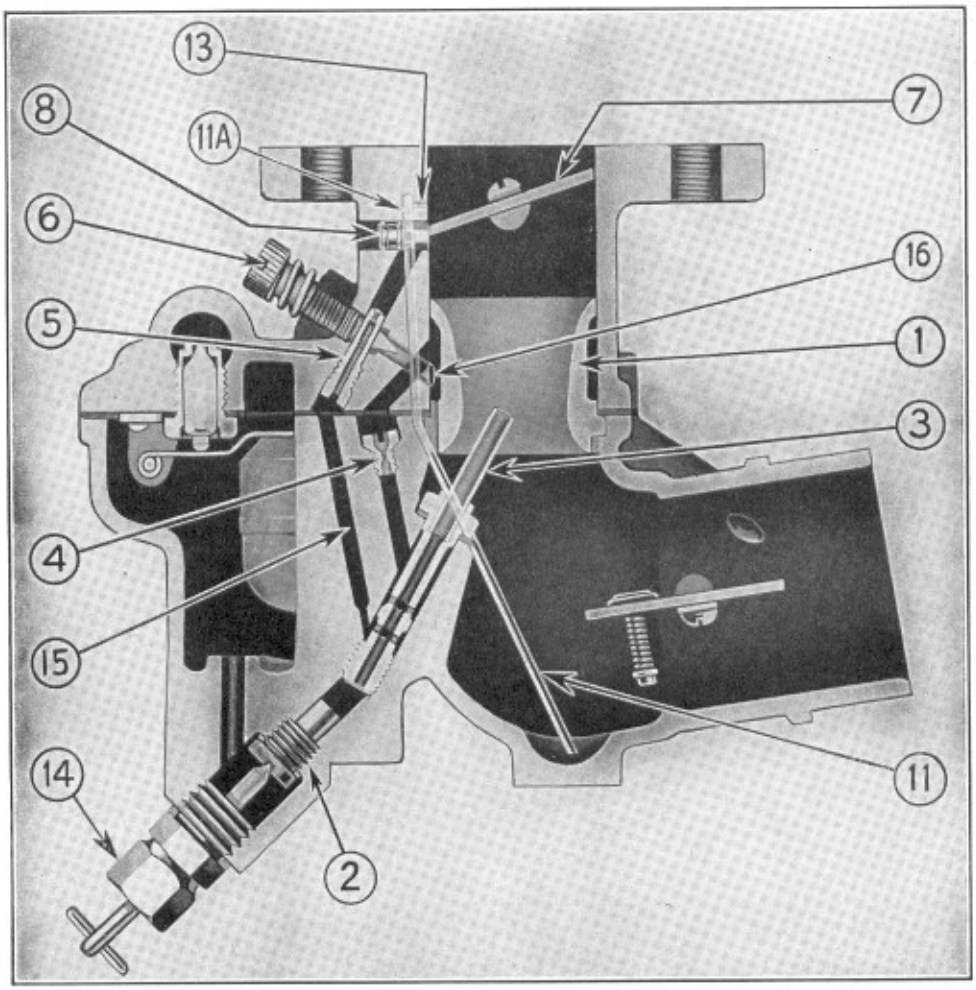


Figure 4

Parts indicated in illustration above are as follows:

*1. Venturi
*2. Main Jet
*3. Main Dis. Jet
*4. Well Vent
*5. Idling Jet
6. Idling Needle Valve
7. Throttle Plate
*8. Idle Discharge Plug
9. Throttle shaft
10. Restriction Bushing
11. & 11A. Pick-up Tube
12. Throttle Stop Screw (not illustrated)
13. Pick-up Tube Metering Orifice
14. Main Jet Adjustment
15. Idle Fuel Channel
16. Idle Air Channel

*IMPORTANT: When ordering parts marked with asterisk *, specify the size which is stamped on each of these parts, also give number on identification tag located on float chamber, and make and model of your engine.

ZENITH CARBURETOR DIVISION

696 HART AVENUE — DETROIT 14, MICHIGAN

Bendix AVIATION CORPORATION

Manufacturers of Zenith Carburetors and Filters

December, 1947

Printed in U.S.A.

Ref. No.	Part No.	Part Name	List Price Each
15	CT91-3	Plug—Fuel Inlet (⅛" pipe) (for all except L-48-F)	$ .11
16	C111-9	Spring—Adjusting Needle	.11
17	†C46-25	Needle—Idle Adjusting	.33
18	†C55-6	Jet—Idle (specify size #12)	.55
19	†T56-20	Washer—Fuel Valve Seat	.05
20	†C81-17	Valve & Seat—Fuel (specify size #35)	.83
21	C85-28	Float	1.11
22	†C120-4	Axle—Float	.11
23	†C142-16	Gasket—Bowl to Body	.11
24	C38-51	Venturi (specify size #19, except for L-48-D & L-48-F specify #16; & for L-48-C specify #18)	1.22
25	†C66-47	Jet—Discharge (specify size #60 for L-48 & L-48-1; #50 for L-48-2, L-48-3 & L-48-B; #40 for L-48-C & L-48-D)	.66
25	C66-50	Jet—Discharge (specify #40 for L-48-F)	.83
26	†T56-52	Washer—Discharge Jet Fibre	.05
27	†C77-18	Jet—Well Vent (specify size #13 for L-48 & L-48-1; #22 for L-48-2, L-48-3 & L-48-B; #17 for L-48-C & L-48-F; #15 for L-48-D)	.28
28	C109-2	Bracket—Choke (for all except L-48-F)	.39
28	C109-31	Bracket—Choke (for L-48-F only)	.33
29	T21S8	Nut—Tube Clamp Screw (for all except L-48-F)	.05
30	C110-1	Clamp—Bracket Tube (for all except L-48-F)	.05
31	T1S8-10	Screw—Tube Clamp (for all except L-48-F)	.05
32	T45-8	Lockwasher—Shaft Nut (for all except L-48-F)	.05
32	T41-10	Lockwasher—Shaft Nut (for L-48-F)	.05
33	T22S8	Nut—Choke Shaft (for all except L-48-F)	.05
33	T22S10	Nut—Choke Shaft (for L-48-F)	.05
34	T8S8-7	Screw—Lever Swivel (for all except L-48-F)	.05
35	C106-104	Lever—Choke (for all except L-48-F)	.33
35	CR106-157	Lever—Choke (for L-48-F)	.40
36	C140-2	Screw—Bracket Assembly	.05
37	C112-6	Spring—Lever Return (for all except L-48-F)	.11
37	C112-11	Spring—Lever Return (for L-48-F)	.28
40	C105-60	Shaft—Choke (for all except L-48-F)	.94
40	C108-107	Shaft & Lever—Choke (for L-48-F)	1.00
41	†T41-5	Lockwasher—Plate Screw	.05
42	†T15B5-3	Screw—Choke Plate	.05
43	C101-17	Plate—Choke	.55
44	C138-24	Plug—Choke Shaft Hole (for all except L-48-F)	.39
45	†T56-23	Washer—Shaft Hole Plug Fibre (for all except L-48-F)	.05
46	†CT52-7	Washer—Intake Drain	.05
47	†CT57-12	Washer—Drain Felt	.05
48	†CT93B-50	Retainer—Felt Washer	.05
49	B3-85A	Bowl—Fuel (for L-48; L-48-1; L-48-2; L-48-3 & L-48-B)	5.55
49	B3-85L	Bowl—Fuel (for L-48-C & L-48-D)	5.55
49	B3-85R-1	Bowl—Fuel (for L-48-F)	5.55
50	CT91-3	Plug—Bowl Drain (⅛" pipe)	.11
51	†T41-10	Lockwasher—Bowl to Body Screw	.05
52	†T1S10-10	Screw—Bowl to Body Assembly	.05
53	†T56-24	Washer—Main Jet Fibre	.05
54	C52-6	Jet—Main (specify size #22 for L-48; #24 for L-48-1; #26 for L-48-2; #28 for L-48-3 & L-48-B; #20 for L-48-C; #18 for L-48-D; & #30 for L-48-F)	.83
55	†T56-23	Washer—Passage Plug (or Adjustment) Fibre	.05
56	C71-21	Adjustment—Main Jet (for L-48-1; L-48-3; L-48-B, and L-48-F)	1.00
57	C138-23	Plug—Main Jet Passage (for L-48; L-48-2; L-48-C & L-48-D)	.39
58	†C141-4-5	Gasket—Flange (not in gasket kit C181-66)	.11
	C181-66	Kit—Gasket	.33
	K560	Kit—Repair Parts (for L-48 & L-48-1)	3.85
	K562	Kit—Repair Parts (for L-48-2; L-48-3 & L-48-B)	3.85

NOTE: Repair kits include items marked †.

ZENITH CARBURETOR DIVISION

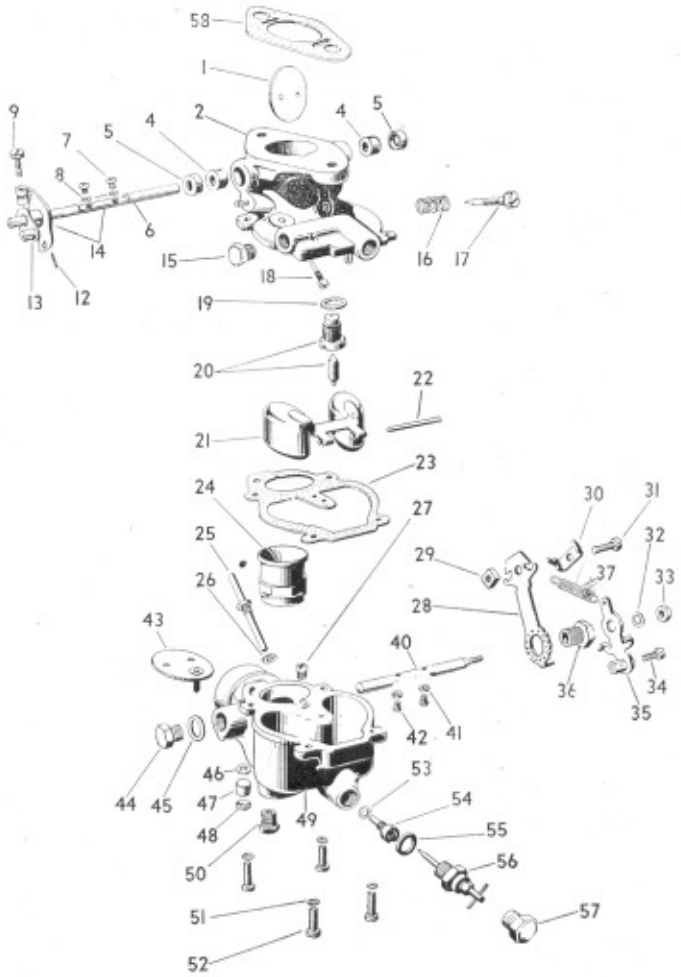
696 HART AVENUE — Bendix AVIATION CORPORATION — DETROIT 14, MICHIGAN

Manufacturers of Zenith Carburetors and Filters

December, 1947 — Prices subject to change without notice — Printed in U. S. A.

ZENITH 161-7 SERIES CARBURETORS

(FOR WISCONSIN MOTOR CO.)



Parts Price List for Zenith Model 161-7 Carburetors

ZENITH NO.	WISCONSIN NO.	ZENITH NO.	WISCONSIN NO.
O-10034	L-48	S-1164	L-48-B
S-717	L-48-1	S-1329	L-48-C
S-632	L-48-2	S-1548	L-48-D
S-732	L-48-3	O-10457	L-48-F

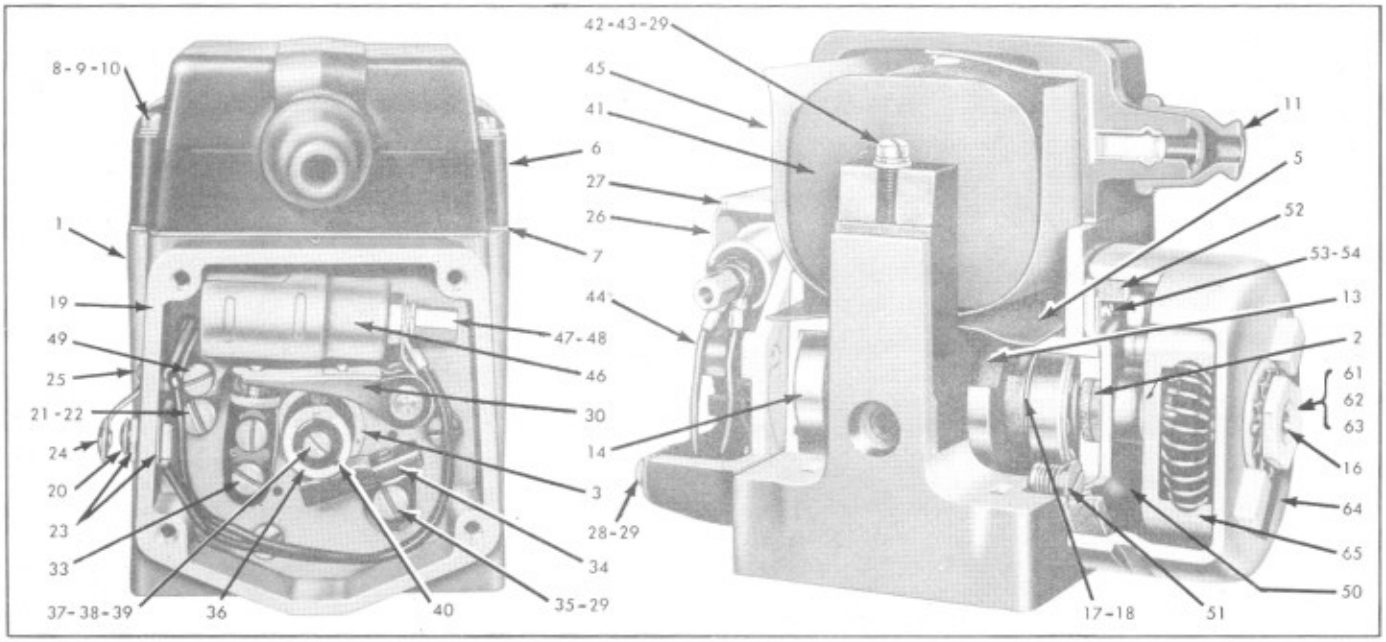
Ref. No.	Part No.	Part Name	List Price Each
1	C21-88	Plate—Throttle	$ .77
2	B2-140B-5	Body—Throttle (for L-48; L-48-1; L-48-2; L-48-3 & L-48-B)	4.42
2	B2-140J-1	Body—Throttle (for L-48-C & L-48-D)	4.98
2	B2-140J-2	Body—Throttle (for L-48-F)	4.98
4	†CT57-4	Washer—Shaft Packing	.05
5	†C131-4x2	Retainer—Shaft Packing	.05
6	C23-186	Shaft—Throttle (part of C29-491, item 14)	.55
6	C23-392	Shaft—Throttle (part of C29-858, item 14)	.55
7	†T15B5-3	Screw—Throttle Plate	.05
8	†T41-5	Lockwasher—Plate Screw	.05
9	T1S8-10	Screw—Throttle Stop (part of item 14)	.05
12	CT63-9	Pin—Lever Taper (part of item 14)	.05
13	CR27-163	Lever & Stop—Throttle (part of C29-491, item 14)	.83
13	CR27-201	Lever & Stop—Throttle (part of C29-858, item 14)	.85
14	C29-491	Shaft & Lever—Throttle (for all except L-48-F)	1.44
14	C29-858	Shaft & Lever—Throttle (for L-48-F)	1.45

SERVICE INSTRUCTIONS

EDISON-SPLITDORF RM-1 Magneto--Spec. No. 03884--Wis. Motor No. Y-56

FOR

WISCONSIN ENGINES ADH, AEH, AFH, AGH, AHH



SEE OTHER SIDE FOR DESCRIPTION

RM-1 MAGNETO FIELD SERVICE PRACTICES

SPARK TEST:

There are two methods of testing the ignition spark without removing the magneto from the engine.

TEST 1: Remove the high tension cable from the spark plug. Provide an added ⅛" gap to the terminal of the spark plug and attach the high tension cable to this gap. This set-up makes the ignition spark jump the ⅛" gap and the spark plug gap at the same time. Run the engine to observe the regularity of the spark at the ⅛" outside gap. If the engine starts and continues to run, the spark has sufficient strength. However, the test is of little value unless the spark plug is in good condition.

TEST 2. Remove the high tension cable from the magneto block. Using a piece of stiff wire, insert one end in the housing cover socket and fix the other end ⅛" from the magneto housing. Now crank the engine. When the impulse starter releases, a spark should jump from the wire to the magneto housing. If the spark is not apparent after several releases of the impulse starter, the circuit breaker mechanism, coil, condenser, or magneto timing may be faulty.

REMOVING and RE-INSTALLING MAGNETO ON ENGINE:

Before removing the bolts from the plate which holds the magneto to the engine, scribe a line horizontally across the magneto coupling, float and engine coupling. The magneto may now be removed.

When re-installing the magneto on the engine, re-align the scribed line on the couplings and float. The magneto will then be automatically re-positioned with the correct and original timing.

CIRCUIT BREAKER MECHANISM:

Remove the front cover Ref. No. 26 and note the position of the wire terminals on the condenser post. All terminals must be clear of the housing to prevent short circuiting of the primary.

Examine the surfaces of the contact points on the contact bracket and breaker bar, Ref. No. 30. If there is evidence of pitting or pyramiding, a fine stone or tungsten file should be used to recondition the surface. This operation can best be accomplished by removing the contact bracket and breaker bar. Before re-assembling these parts, remove all grease or oil from the contact surfaces with unleaded gasoline or carbon tetrachloride. If stoning or filing the contact points fails to make a satisfactory surface, or if the micarta bumper on the breaker bar is defective, replace the entire set. Excessive play in the breaker bar bushing on the stud and improper functioning of the tension spring would also call for replacement. When reconditioning points, care must be taken to keep surfaces true and flat so that points meet evenly and squarely.

INTERNAL TIMING OF MAGNETO:

When the contact points have been removed, the internal timing of the magneto has been disturbed. To re-adjust, proceed as follows:

Turn the impulse coupling clockwise until the line staked on the spring case just passes the corresponding R mark on the frame, then turn it anti-clockwise until these marks just match. This is the normal firing position of the magneto and the contact points should be adjusted so that they just begin to open at this setting. The adjustment is made by raising or lowering the contact bracket until the desired result is accomplished. After having tightened the bracket fastening screws Ref. No. 33 securely, recheck the timing. If this operation has been done correctly, the total contact point clearance with the breaker bar on the highest point of the cam lobe should be approximately .015".

COIL AND CONDENSER REPLACEMENT:

Coil Ref. No. 41 and condenser Ref. No. 46 testing is normally a function of a magneto overhaul shop; however, these parts may be replaced if prior checks have not uncovered the source of spark difficulty.

The following steps are necessary to replace a coil. Remove the four screws Ref. No. 8 holding the molded magneto cover Ref. No. 6 to the magneto housing. In

prying off the cover do not destroy the cork gasket. Remove the two screws Ref. No. 42 holding the coil to the magneto housing. Back off the hexagon nut Ref. No. 47 from the condenser post and take off the coil primary lead. Replace the coil. Make sure all terminals of the condenser clear the housing. Install the magneto cover and the breaker cover.

The following steps are necessary to replace a condenser. Remove the long hexagon nut and two leads from the condenser post. Lift out the breaker bar and take out the condenser fastening screw Ref. No. 49. Replace the used condenser with a new one by placing the small lug on the rear side of the condenser into the hole in casting at top center, and fasten. Assemble two leads and breaker bar and tighten nut so that the leads do not ground out the primary circuit.

To check the performance of the newly installed coil or condenser, follow the procedure stated in TEST 2 of the SPARK TEST.

IMPULSE STARTER:

If the magneto has been removed from the engine, the operation of the impulse starter should be checked. Turn the magneto counter-clockwise until the lever locks the rotary motion of the coupling. At this point the spring winds up and greater effort must be applied until the lever releases and revolves the magneto shaft and rotor very fast. This action will occur once every revolution since there is only one engaging lever. If for any reason the spring does not wind up, or the lever locks fast and does not release, the coupling should be sent to an approved magneto service station for further check and repair.

INSTALLING MAGNETO ON ENGINE:

If the adjustable coupling on the engine shaft has not been disturbed, it is only necessary to line up the lines originally scribed on this coupling, the float and starter case when re-installing magneto on the engine. If the adjustable coupling has been disturbed or when installing a new magneto, the Wisconsin engine timing specification must be followed. Keep in mind that the normal firing position of the magneto is indicated by the line-up of the staked line on the coupling spring case with the R mark on the magneto frame. When re-installing magneto on engine great care must be exercised in the alignment of the various coupling members so that no binding takes place. Be particularly careful that the float between engine and magneto couplings has always some end play, so that at no time will it bind against the face of the impulse starter and prevent it from operating freely. If this should happen, the automatic retard given by that coupling would not take place, causing the engine to back-fire when attempting to start it.

LUBRICATION:

All bearings are grease-packed and further lubrication is not necessary until overhaul time. However, during field service inspections, the cam, cam felt Ref. No. 34 lubricator and circuit breaker bar stud should be checked for the presence of oil. If necessary use SAE 40 oil and wipe a slight film of oil on the cam, apply a drop of oil to circuit breaker bar stud, and add three or four drops of oil to the cam felt lubricator pad.

CAUTION: Never get oil on the contact points or apply oil so freely as to flow over the interior of the magneto.

CONCLUSION:

If after following the foregoing procedure, it is suspected that the magneto is not functioning properly, or necessitates a complete overhaul, send it back to an approved Edison-Splitdorf Service Station for further check.

PARTS ILLUSTRATED

REF. No.	PART No.	DESCRIPTION	NO. REQ.
1	6571	MAGNETO HOUSING (Incl. Items 2 and 3)	1
2	7524	WASHER — FELT (1 at Breaker end, 2 at Drive end)	3
3	6352	RETAINER — FELT WASHER	2
5	6399	COVER — ROTOR TUNNEL	1
6	6431	MAGNETO HOUSING COVER ASSEMBLY (Includes Gasket)	1
7	6354	GASKET — HOUSING COVER	1
8	6440	SCREW	4
9	6522	WASHER	4
10	6640	WASHER — SEALING	4
11	6219	NIPPLE — H. T. CABLE	1
13	6379	ROTOR ASSEMBLY	1
14	6339	BEARING — ROTOR	2
16	73	KEY — DRIVE	1
17	63399	SHIM .002 THICK	
18	63400	SHIM .003 THICK	
19	7199-A	BEARING PLATE ASSEMBLY (Includes Items 23, 24, 25.)	1
20	6538	SCREW — GROUND TERMINAL	1
21	29281	SCREW — BEARING PLATE	3
22	29760	LOCKWASHER	3
23	6641	GROUND TERMINAL GROUP (Includes Item 20)	1
24	6536	GROUND SWITCH ASSEMBLY (Includes Item 25)	1
25	E103027	RIVET	1
26	6371	COVER ASSEMBLY — BREAKER (Includes Item 27)	1
27	6424	GASKET	1
28	6949	SCREW — BREAKER COVER	4
29	23149	LOCKWASHER	8

REF. No.	PART No.	DESCRIPTION	NO. REQ.
30	6598	BREAKER BAR AND BRACKET SET	1
33	51272	SCREW — CONTACT BRACKET	2
34	6455	CAM WIPER ASSEMBLY	1
35	70131	SCREW (Includes Item 29)	1
36	6425	CAM	1
37	16792	SCREW — CAM RETAINING	1
38	16319	LOCKWASHER	1
39	6340	WASHER	1
40	6402	KEY — CAM	1
41	6435	COIL ASSEMBLY (Includes Primary Coil)	1
42	16766	SCREW	2
43	29621	WASHER (Includes Item 29)	2
44	6376	LEAD ASSEMBLY — PRIMARY (on end view)	1
45	6401	INSULATOR COIL	1
46	6285	CONDENSER (Includes nut and washer)	1
47	6384	NUT — CONDENSER TERMINAL	1
48	32368	LOCKWASHER	1
49	35251	SCREW	1
50	7323	STOP PIN PLATE COMPLETE (Includes Item 51)	1
51	7340	SCREW	3
52	7362	SEAL HOLDER ASSEMBLY	1
53	35207	SCREW	2
54	16319	LOCKWASHER	2
61	7343	WASHER	1
62	30537	LOCKWASHER	1
63	7344	NUT	1
64	7123-A	DRIVE MEMBER — CL W. ROT.-30°	1
65	7334	MAGNETO MEMBER ASSEMBLY	1

EDISON-SPLITDORF CORPORATION — WEST ORANGE, NEW JERSEY

Printed by Wisconsin Motor Corp. Form MY-11

WARRANTY

We guarantee each new engine sold by us to be free from defects in material and workmanship for six (6) months from date of shipment, but not to exceed ninety (90) days of service. The obligation under this Warranty, statutory or otherwise, is limited to the replacement or repair at our Milwaukee, Wisconsin factory, or at a point designated by us, of such part as shall appear to us, upon inspection at such point, to have been defective in material or workmanship.

This Warranty does not obligate us to bear the cost of labor or transportation charges in connection with the replacement or repair of defective parts, nor shall it apply to an engine upon which repairs or alterations have been made unless authorized by us.

We make no Warranty in respect to trade accessories, such being subject to the Warranties of their respective manufacturers.

We shall in no event be liable for consequential damages or contingent liabilities arising out of the failure of any engine or parts to operate properly.

No express, implied or statutory Warranty other than herein set forth is made or authorized to be made by us.

THIS MANUAL IS FOR MY WISCONSIN MODEL.....ENGINE

SPEC. No..... SERIAL No.....

THE ABOVE INFORMATION, WHICH WILL BE FOUND ON THE INSTRUCTION PLATE ATTACHED TO THE AIR SHROUD OF THE ENGINE, SHOULD BE FILLED IN. YOUR PROMPT ATTENTION TO THIS MATTER WILL MAKE IT CONVENIENT FOR YOU IN THE FUTURE, AS THIS INFORMATION MUST BE GIVEN WHEN ORDERING ENGINE REPAIR PARTS.

**For Your Own Record, Do Not Cut Out and Return to Factory.*

WISCONSIN MOTOR CORPORATION
MILWAUKEE 14, WISCONSIN

WISCONSIN

Air Cooled

WISCONSIN MOTOR CORPORATION - - MILWAUKEE 14, WISCONSIN