

WISCONSIN

Air Cooled

HEAVY DUTY ENGINES

INSTRUCTION BOOK AND PARTS LIST

MODELS ACN, BKN

ISSUE MM-270-B

WORLD'S LARGEST BUILDERS OF HEAVY DUTY AIR COOLED ENGINES

IMPORTANT

STARTING AND OPERATION OF NEW ENGINES

Careful breaking in of a new engine will greatly increase its life and result in trouble-free operation. A factory test, which is possible to give a new engine, is not sufficient to establish the polished bearing surfaces, which are so necessary to the proper performance and long life of an engine. Neither is there a quick way to force the establishment of good bearing surfaces. These can only be obtained by running a new engine carefully and under reduced speeds and loads for a short time, as follows:

First, be sure the engine is filled to the proper level with a good quality of engine oil, see "Grade of Oil" chart.

Before a new engine is put to its regular work, the engine should be operated at low speeds (1000 to 1200 R.P.M.) for an hour without load. The speed should then be increased gradually for two hours until the engine is up to governor speed.

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 SERIES NUMBER of engine referred to.

Extra copies of this manual are \$1.00 each.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN

BOOK OF INSTRUCTIONS

WISCONSIN *Air-Cooled*

SINGLE CYLINDER ENGINES

MODEL ACN

2-5/8" Bore
2-3/4" Stroke
14.9 cu. in. Disp.

MODEL BKN

2-7/8" Bore
2-3/4" Stroke
17.8 cu. in. Disp.



NOTE: Engines having Stellite Exhaust Valves and Inserts
are designated as Models ACND and BKND.

INTRODUCTION

This manual has been compiled to suit the service requirements of the basic engine and accessories most commonly supplied with engines.

Wisconsin Motor Corporation adapts its engines to suit individual customer requirements whenever practical. It evidently would become too involved to include all variations in one manual; therefore, should any problems arise concerning engine servicing we advise that a Wisconsin distributor or authorized service station be contacted as they are capable of identifying all parts by the specification number stamped on the name plate of engine.

A listing of approved Wisconsin service stations appears in the back of this manual.

Wisconsin heavy duty air cooled engines are of the most approved design and are built in a modern factory, equipped with the latest machinery available. Only the best materials, most suitable for the particular part, are used. During production every part is subjected to the most rigid inspection, as are also the completely assembled engines. After assembly, every engine is operated on its own power for several hours. All adjustments are carefully made so that each engine will be in perfect operating condition when it leaves the factory.

Back of the Wisconsin Motor Corporation is fifty years of engineering experience in the design of gasoline engines for every conceivable type of service. The performance of these engines is proof of the long satisfactory service you too can expect from your engine.

Like all fine machinery the engine must be given regular care and be operated in accordance with the instructions.

SAFETY PRECAUTIONS

Precaution is the best insurance against an accident.

Never fill fuel tank while engine is in operation or hot, as danger from fire would be incurred.

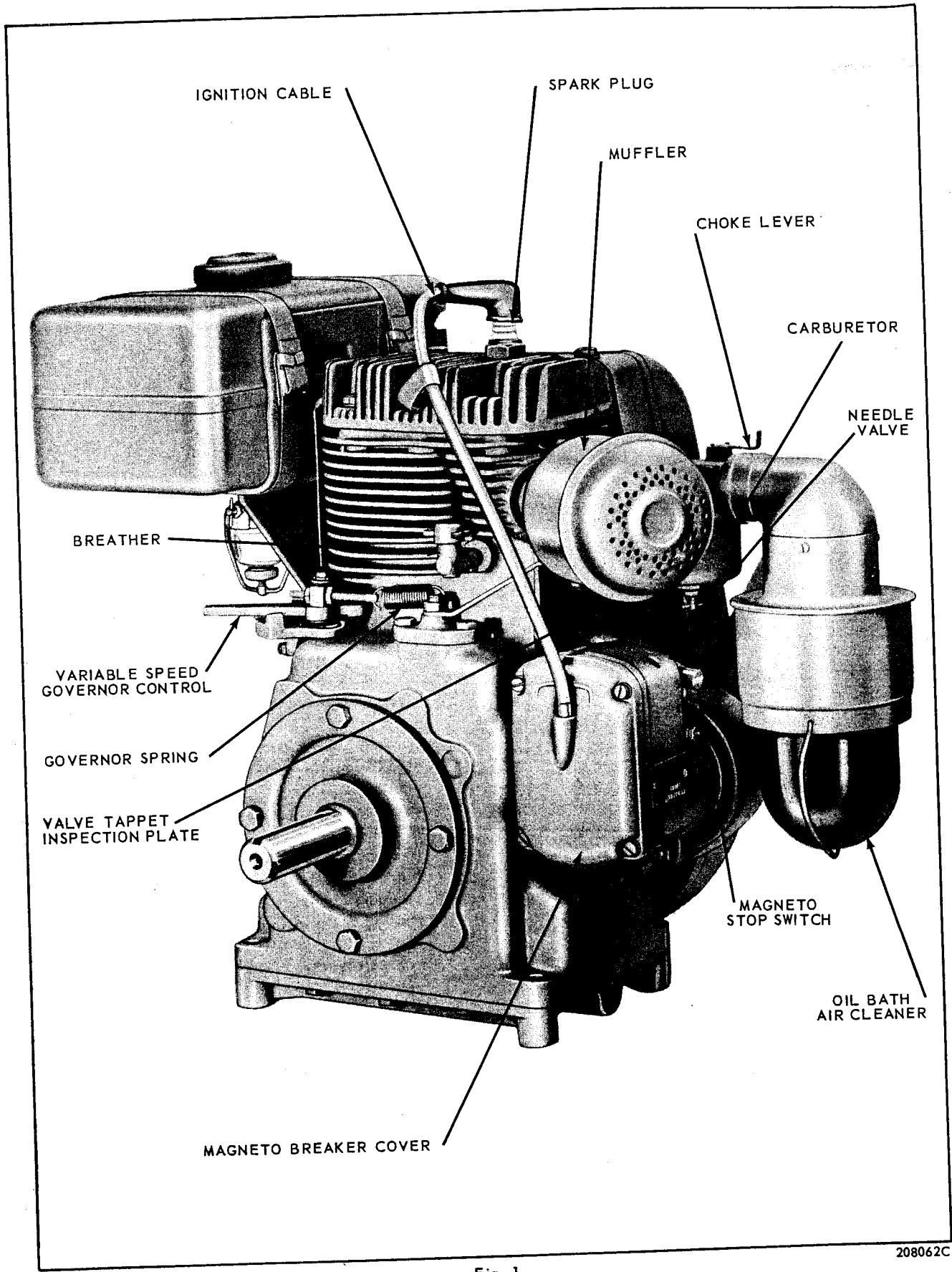
Never operate engine in a closed building unless the exhaust is piped outside. This exhaust contains carbon monoxide, a poisonous, odorless and invisible gas, which if breathed into the lungs would cause serious illness and possible death.

Never make adjustments on machinery while it is connected to the engine, without first removing the ignition cables from the spark plug. Turning over the machinery by hand during adjusting or cleaning might start the engine, and machinery with it, causing serious injury to the operator.

Keep this book handy at all times, familiarize yourself with the operating instructions.

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Fig. 1

CARBURETOR and MAGNETO side of ENGINE

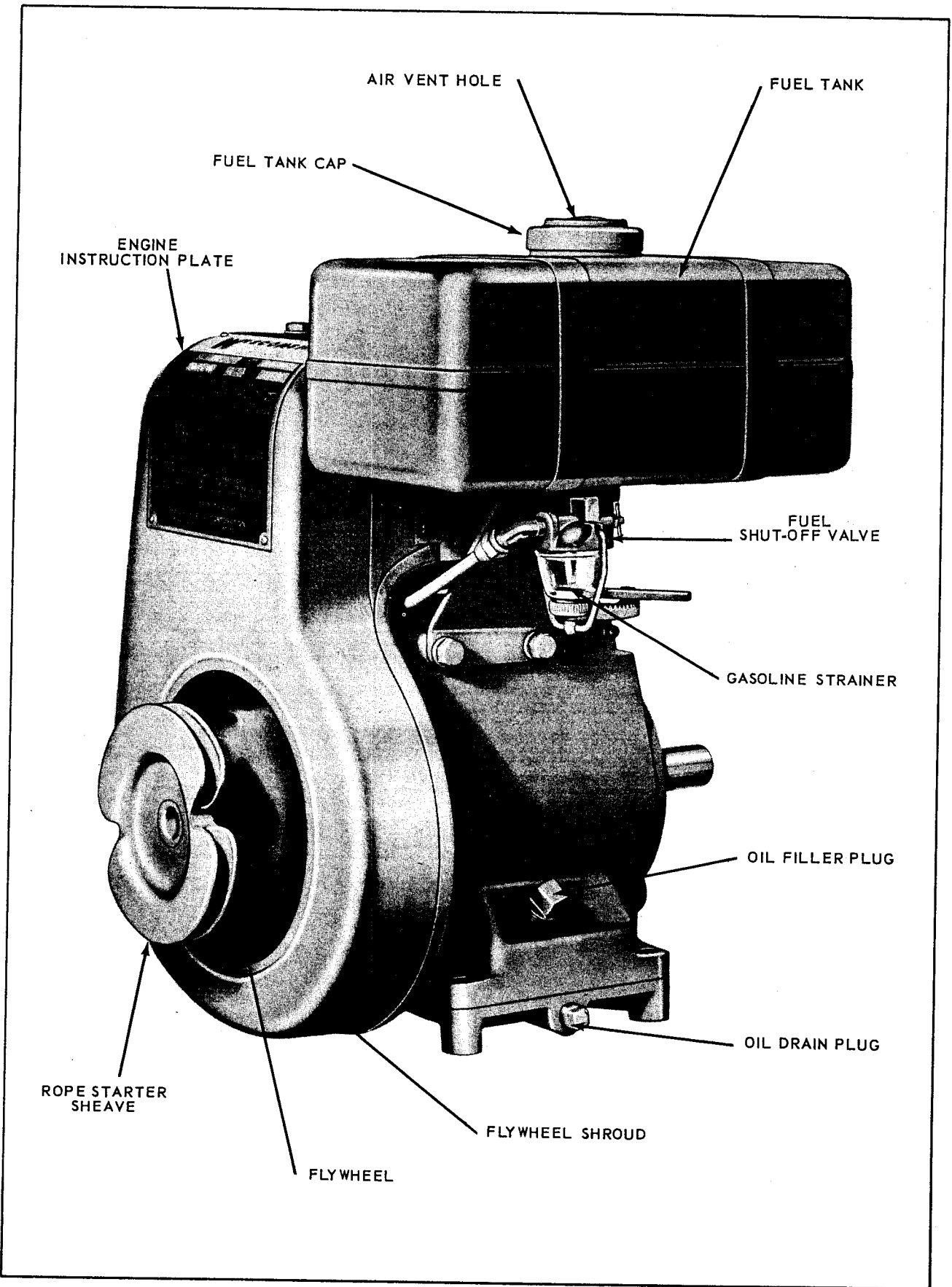


Fig. 2

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FUEL TANK and FUEL STRAINER side of ENGINE

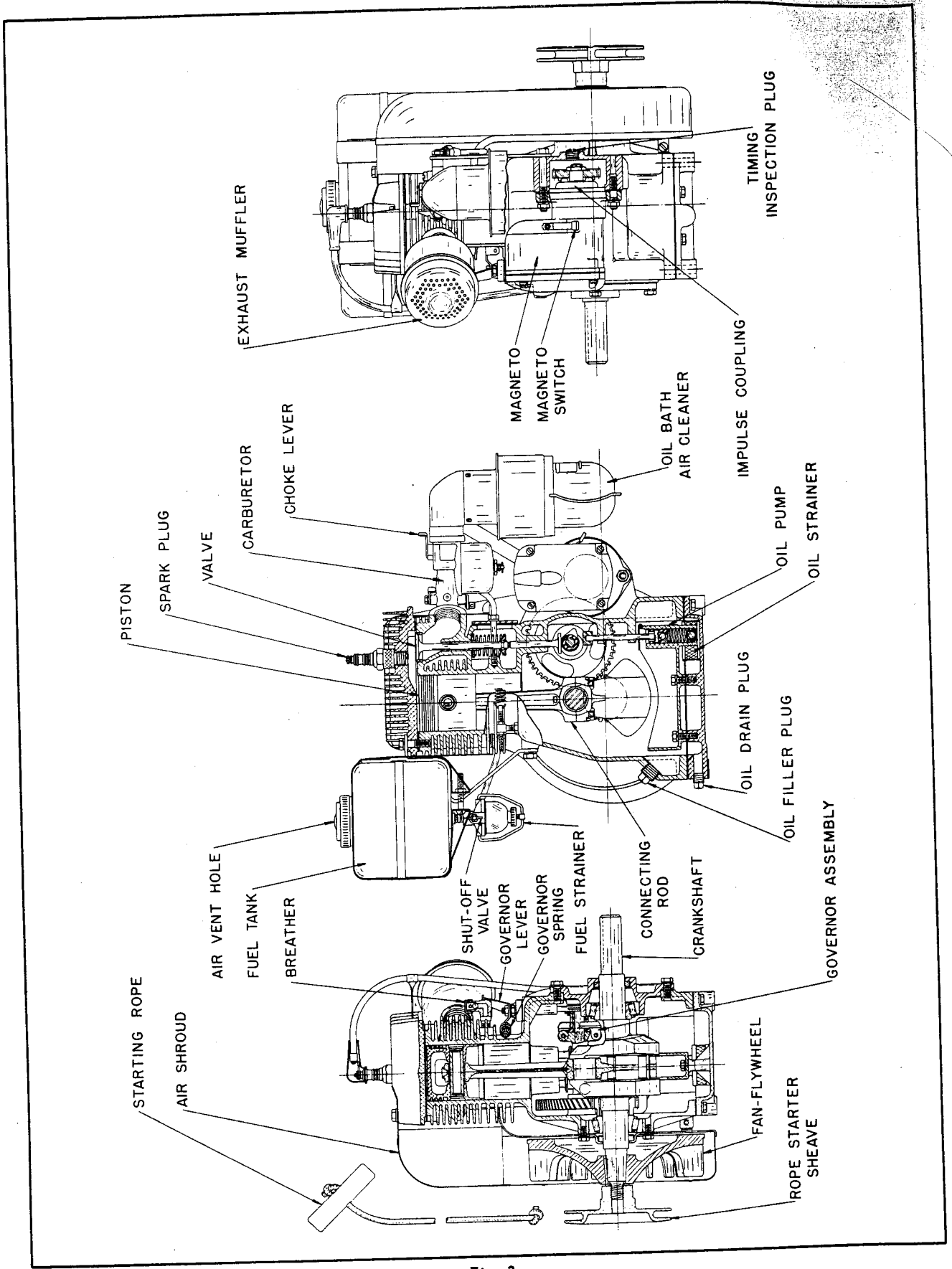


Fig. 3

SECTIONAL VIEWS OF ENGINE

GENERAL DESIGN

Wisconsin engines are of the four cycle type, in which each of the four operations of suction, compression, expansion and exhaust constitutes a complete stroke. This gives one power stroke for each two revolutions of the crankshaft.

COOLING

Cooling is accomplished by a flow of air, circulated over the cylinder and head of the engine, by a combination fan-flywheel encased in a sheet metal shroud. The air is divided and directed by ducts and baffle plates to insure uniform cooling of all parts.

Never operate an engine with any part of the shrouding removed, because this will retard the air cooling.

CARBURETOR

The proper combustible mixture of gasoline and air is furnished by a balanced carburetor, giving correct fuel to air ratios for all speeds and loads.

IGNITION

The spark for ignition of the fuel mixture is furnished by a high tension magneto, driven off the timing gears at crankshaft speed. The magneto is fitted with an impulse coupling, which makes possible a powerful spark for easy starting. Also, the impulse coupling automatically retards the timing of the spark for starting, thus eliminating danger of kickback.

LUBRICATION SYSTEM

Lubrication is of the constant oil level splash type. A plunger pump maintains the proper oil level in a trough under the connecting rod. The action of the dipper on the connecting rod, striking the oil in the trough, provides ample lubrication for all internal parts of the engine. See Fig. 4.

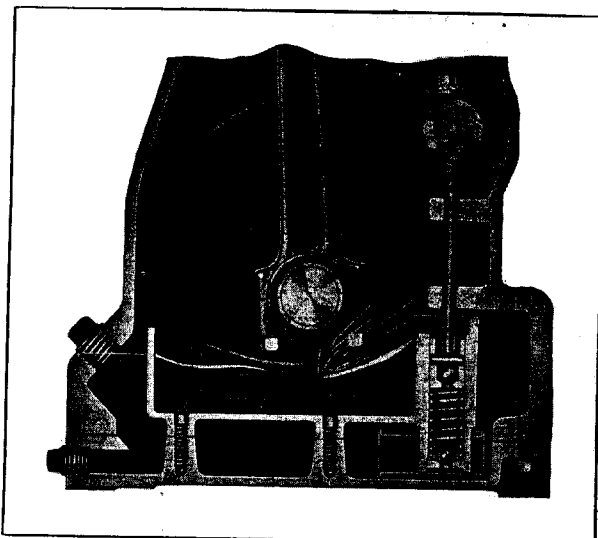


Fig. 4

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GOVERNOR

A governor of the centrifugal flyball type controls the engine speed by varying the throttle opening to suit the load imposed upon the engine.

ROTATION

The rotation of the crankshaft is clockwise when viewing the flywheel or starting end of the engine. This gives counter-clockwise rotation when viewing the power take-off end of the crankshaft.

HORSEPOWER

R.P.M.	Models	
	ACN	BKN
1600	2.5	3.5
1800	2.9	4.0
2000	3.5	4.4
2200	3.7	4.9
2400	4.2	5.4
2600	4.5	5.8
2800	4.8	6.2
3000	5.2	6.5
3200	5.6	6.7
3400	5.8	6.9
3600	6.0	7.0

The horsepower given in the accompanying chart is for an atmospheric temperature of 60° Fahrenheit at sea level and at a Barometric pressure of 29.92 inches of mercury.

For each inch lower the Barometric pressure drops, there will be a loss in horsepower of 3½%.

For each 10° temperature rise there will be a reduction in horsepower of 1%.

For each 1000 ft. altitude above sea level there will be a reduction in horsepower of 3½%.

The friction in new engines cannot be reduced to the ultimate minimum during the regular block test, but engines are guaranteed to develop at least 85 per cent of maximum power when shipped from the factory. The power will increase, as friction is reduced, during a few days of operation. The engine will develop at least 95% of maximum horsepower when friction is reduced to a minimum.

For continuous operation allow 20% of horsepower shown, as a safety factor.

INSTRUCTIONS FOR STARTING AND OPERATING

LUBRICATION

Before starting the engine, fill the base with good gas engine oil through the filler plug opening illustrated in Fig. 2. The oil should be filled to the level of the filler plug hole. This requires about 2 pints. Be sure the oil is clean, and also the funnels or measures used in filling.

Too much emphasis cannot be given to the matter of oil selection. High grade oil of the body suited to the requirements of your engine is the most important single item in the economical operation of the unit,

yet it is the cheapest item of operating cost. Select your oil solely on quality and suitability – never on price – for no one thing is so sure to bring about unsatisfactory performance and unnecessary expense as incorrect lubrication.

High-grade, highly refined oils corresponding in body to the S. A. E. (Society of Automotive Engineers) Viscosity Numbers listed below will prove economical and assure long engine life.

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.**

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 20-20W	Mobiloil Arctic
+ 5°F to - 20°F	SAE 10W	Mobiloil 10W
Crankcase Capacity		2 Pts.

Follow summer recommendations in winter if engine is housed in warm building.

Check oil level every 8 hours. The old oil should be drained every 50 hours of operation.

To drain oil, remove oil drain plug shown in Fig. 2. Oil should be drained while engine is hot, as it will then flow more freely.

FUEL

The fuel tank should be filled with a **good quality** gasoline free from dirt and water. The capacity of the tank is one gallon. Some of the poorer grades of gasoline contain gum which will deposit on valve stems, piston rings, and in the various small passages in the carburetor, causing serious trouble in operating, and in fact might prevent the engine from operating at all.

Use only reputable, well known brands of gasoline of the REGULAR GRADE.

Gasoline engines should not be operated on fuel with an octane rating below 74 (Research Method). Fuel with a lower octane rating will cause detonation, and if operation is continued under this condition, severe damage will result to the engine. The cylinder and piston will be scored, head gasket blown out, bearings will be damaged and etc.

Be sure to open the shut-off valve in the gasoline strainer below the fuel tank as shown in Fig. 2. Also be sure air vent hole in fuel tank cap is open, otherwise gas cannot flow to carburetor.

CHOKE

Before starting a cold engine, close the choke on the carburetor air inlet horn by turning the choke lever counter-clockwise. See Fig. 5. The choke will remain closed until the engine starts, at which time it will open automatically. If the choke should accidentally snap open before the engine starts, close it again. Less choking is necessary in warmer weather or when the engine is warm than when it is cold.

If after several unsuccessful attempts to start engine, gasoline begins to drip from carburetor, the choke

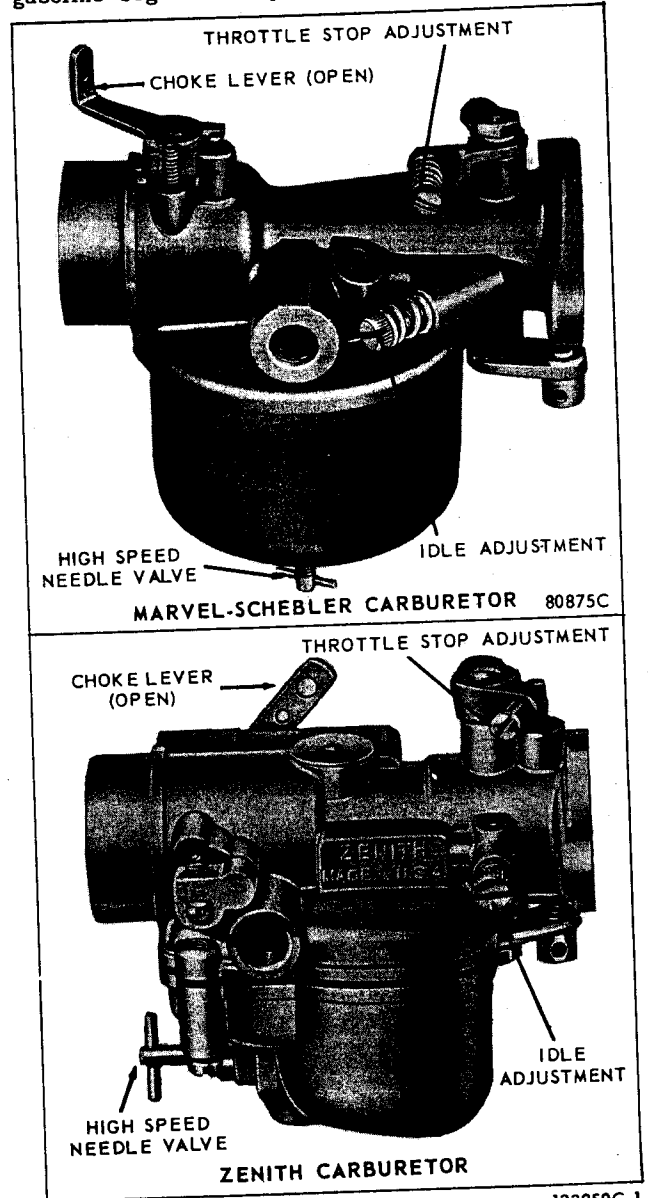


Fig. 5

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should be opened, otherwise the fuel mixture may become too rich to burn. The regular starting procedure should then continue as in paragraph on *Rope Starter*, Page 9, but with the choke open.

STARTING - ROPE STARTER

The engines are equipped with rope starters as shown in Fig. 6. These have an advantage over starting cranks in that a pull on the rope will give two full revolutions of the crankshaft, with the result, easier starting especially if direct connected loads are coupled to the engine, such as generator, compressors, or belted equipment, and when no clutch is used.

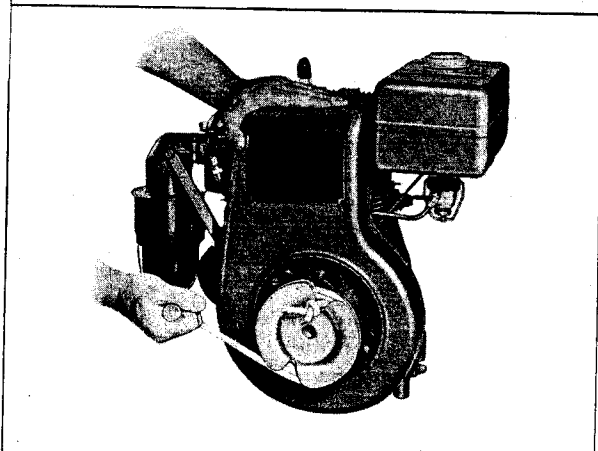


Fig. 6

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With the crankcase filled to the proper oil level and the fuel tank filled with a good quality of gasoline, close the choke on the carburetor. Open the high speed needle valve on the carburetor as described in CARBURETOR-ADJUSTMENT paragraph. If the engine is equipped with a variable speed governor control, have the throttle partially open when starting. On fixed speed engines, the governor spring will hold the carburetor throttle open for starting. Insert the knot into the notch on the sheave and wind the rope on the starting sheave in a clockwise direction.

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. If all conditions are right, engine will start promptly after one or two attempts. After engine starts, allow it to warm up a few minutes before applying load, as prescribed in WARM-UP PERIOD.

ELECTRIC STARTER

The electric starter is an optional accessory, furnished only upon request when engine is purchased. The starter, generator and timer cannot be mounted in the field unless provisions were made when engine was purchased. Starter, generator and timer 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. For wiring diagram, see Fig. 15. Battery is not furnished by engine manufacturer.

Engines equipped with electric starter and timer ignition are started by pulling out on the ignition switch, close the carburetor choke and then depress the starter switch. The engine should start within 2 or 3 crankshaft revolutions. If starting difficulty is experienced, do not 'grind away' at the starter, but rather attempt short intermittent starting cycles.

CARBURETOR - ADJUSTMENT

The Models ACN and BKN engines are equipped with either a Zenith 87B5 or Marvel-Schebler VH carburetor.

The high speed needle valve on these carburetors should be opened approximately $\frac{3}{4}$ to $1\frac{1}{4}$ turns.

After the engine is started and warmed up for several minutes, and running at normal operating speed, this needle valve should be readjusted for best operation. This adjustment need only be made the first time the engine is started. After that, the needle should be left in that position. In cold weather, starting may be facilitated by opening the needle valve slightly more, then readjusted to normal running position after engine is started. The idle needle should be adjusted for best low speed operation while carburetor throttle is closed by hand. See Fig. 5.

For further information on carburetor, see the Zenith or Marvel-Schebler instructions in back of this manual.

WARM-UP PERIOD

When starting a gasoline engine for its days work, the engine should be allowed to warm up to operating temperature, before the load is applied. This requires only a few minutes of running of the engine at moderate speed.

Racing an engine or gunning it, to hurry the warm-up period, is very destructive to the polished wearing surfaces on piston, rings, cylinder, bearings, etc., as the proper oil film on these various surfaces cannot be established until the oil has warmed up and become sufficiently fluid. This is especially important on new engines and in cool weather.

Racing an engine by disconnecting the governor, or by doing anything to interfere with the governor control of the speed of the engine, is extremely dangerous. Quite naturally the operator of the engine desires to get all possible power out of an engine, and the engine manufacturer does his best to supply this want, but if all of this power is used merely to speed up the engine, without any load being imposed upon it, dangerously high speeds will result.

The governor is provided as a means for controlling the engine speed to suit the load applied, and also as a safety measure to guard against excessive speeds, which not only overstrain all working parts, but which might cause wrecking of the engine, and possible injury to bystanders.

All parts of the engine are designed to safely withstand any speeds which might normally be required, but it must be remembered that the stresses set up in

rotating parts, increase with the square of the speed. That means that if the speed is doubled the stresses will be quadrupled, and if the speeds are trebled the stresses will be nine times as great.

Strict adherence to the above instructions cannot be too strongly urged, and greatly increased engine life will result as a reward for these easily applied recommendations.

TO STOP ENGINE

Magneto ignition is standard on these engines, with a lever type ground switch, on the side of the magneto, which is always in the **on** or running position. Depress magneto stop switch shown in *Fig. 1*, and hold down until engine stops. On engines with battery ignition, push in on the ignition switch on control panel.

If the engine has been running hard and is hot, do not stop it abruptly from full load, but remove the load and allow engine to run idle at 1000 to 1200 R.P.M. for three to five minutes, depending on how hot the engine has been. This will reduce the internal temperature of the engine much faster than stopping the engine, and of course the external temperature, including the fuel line and carburetor will also reduce faster, due to the air circulation from the flywheel.

Two main troubles resulting from abrupt shutting off a hot engine are **vapor lock** and **dieseling**. Vapor lock will prevent the flow of fuel in the fuel lines and carburetor passages, which will result in hard starting of the engine. This can be overcome by choking the engine when cranking or waiting until the engine has cooled off sufficiently to overcome the vapor lock.

Dieseling, is caused by the carbon and lead deposits in the cylinder head being heated up to such an extent that they continue to fire the engine and keep it running after the ignition has been shut off. By idling the engine, as previously mentioned, the carbon and lead deposits cool off, break up and will blow out thru the exhaust. If engine should continue to diesel, by suddenly opening up the throttle wide open and at the same time shutting off the ignition, the engine will stop.

AIR CLEANER

The air cleaner is an essential accessory, filtering the air entering the carburetor, and thereby prolonging the life of the engine. Remove the bowl from the air cleaner by snapping the spring wire bail from the bottom of the bowl. Fill bowl to oil level line on baffle, see *Fig. 7*, with about $\frac{1}{4}$ pint of the same grade oil as used in the engine crankcase.

The air cleaners must be serviced frequently, depending on the dust conditions where the engines are operated. When the oil in the bowl becomes dirty, clean out cup and baffle, and add new oil. The filtering element should not be removed from cleaner, but if it shows signs of collected dust, remove air cleaner body from bracket and wash in solvent. Detailed instructions are printed on the air cleaner.

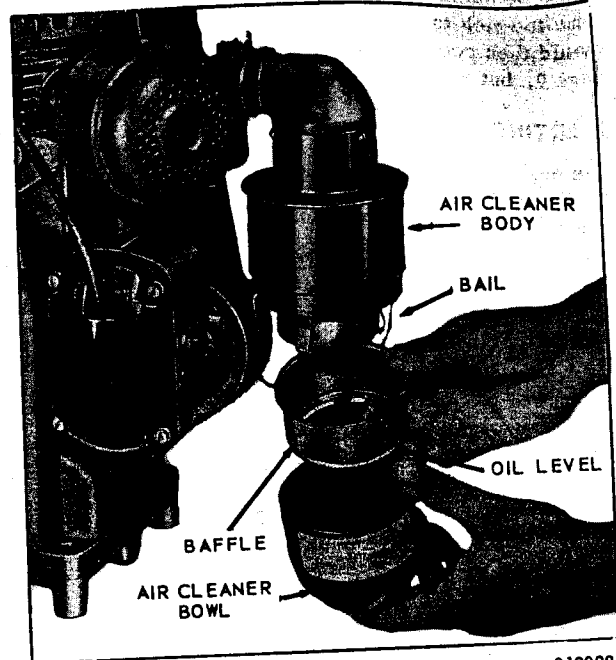


Fig. 7

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Operating the engine under dusty conditions without oil in the air cleaner or with dirty oil, may wear out cylinder, piston, rings and bearings in a few days time, and result in costly repairs.

Daily attention to the air cleaner is one of the most important considerations in prolonging engine life.

GASOLINE STRAINER

The gasoline strainer on the bottom of the fuel tank is very necessary to prevent sediment, dirt, and water from entering the carburetor and causing trouble, or even complete stoppage of the engine. The

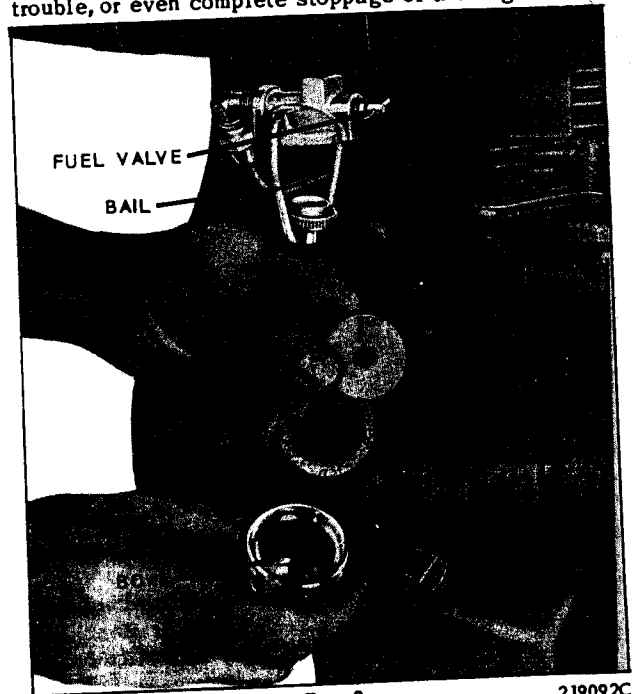


Fig. 8

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glass strainer bowl should be inspected frequently and cleaned if dirt or water is present. To remove bowl, first shut off fuel valve, then loosen the knurled nut below the bowl and swing the wire bail to one side. After cleaning the bowl and screen, replace the parts, being sure that the gasket is in good condition, if not, use a new gasket. See Fig. 8.

MAGNETO BREAKER POINT ADJUSTMENT

Magnetos are properly adjusted and timed before leaving the factory. The breaker points of the Fairbanks-Morse and Wico Magnetos should have an opening of .015" at full separation. If the spark becomes weak after continued operation, it may be necessary to re-adjust these points. To do this first remove the end cover on the magneto to expose the breaker points. The following instructions are for the Fairbanks-Morse magneto, but can be applied to the Wico magneto as well. For further information, see service instructions for the Fairbanks-Morse and Wico magnetos in the back of this manual. The crankshaft should be rotated by turning the starting rope sheave by hand, (this also rotates the magneto), until the breaker points are wide open. The opening or gap should then be measured with a feeler gauge as shown in Fig. 9.

To readjust points, first loosen the locking screws on the contact plate enough so that the plate can be moved. Insert the end of a small screw driver into the adjusting slot at the bottom of the contact plate and open or close the contacts by moving the plate until the proper opening is obtained. See Fig's. 9 and 10.

After tightening the locking screws, recheck breaker point gap to make sure it has not changed. If it is found that the breaker points have become rough, they should be resurfaced with a breaker point file before the above adjustments are made. Replace magneto end cover carefully so that it will seal properly. Do not force cover screws too tightly on the magneto as the cover may crack.

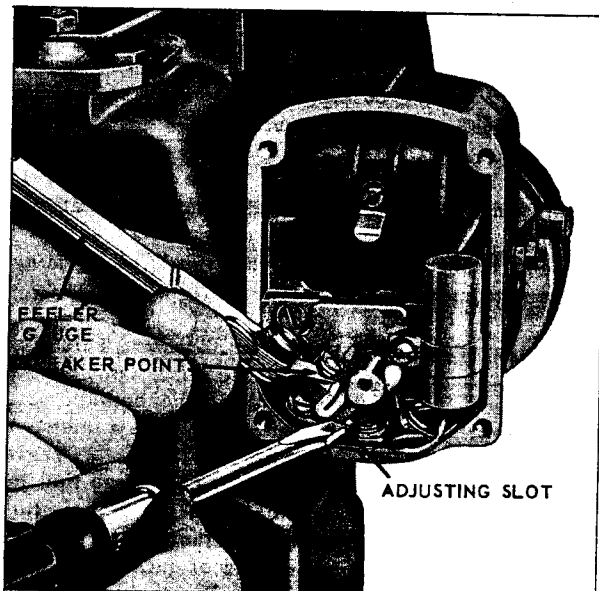
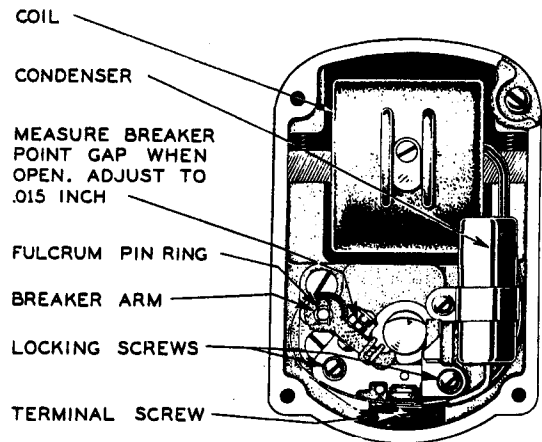


Fig. 9

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END VIEW OF FAIRBANKS-MORSE MAGNETO

Fig. 10

MAGNETO IGNITION SPARK

If difficulty is experienced in starting the engine or if engine misses firing, the strength of the ignition spark may be tested by removing the ignition cable from the spark plug and holding the terminal 1/8 inch away from the cylinder head. Turn the engine over slowly with starting rope sheave.

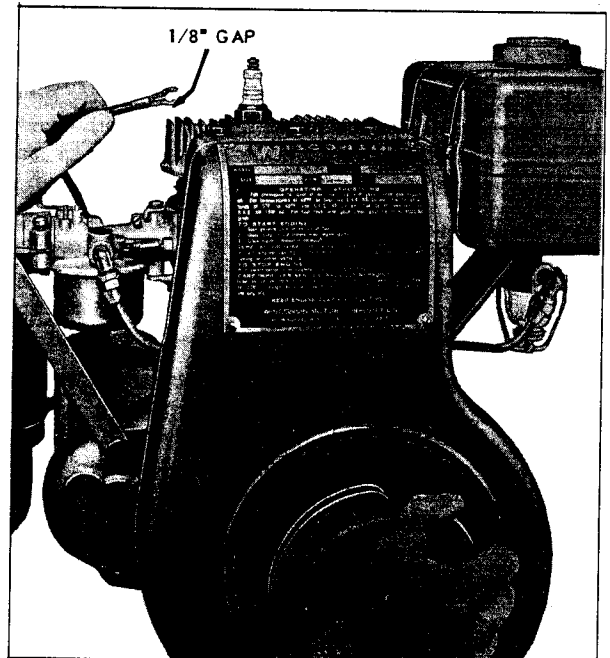


Fig. 11

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When the impulse coupling on the magneto snaps, there should be a good spark at the ignition cable terminal. If there is a weak spark, or none at all, first check breaker point opening as mentioned in preceding paragraph under 'Magneto'. If this does not remedy the trouble, it may be necessary to install a new condenser. See Fairbanks-Morse or Wico maintenance manual at the back of this book.

MAGNETO TIMING

If it is necessary to remove the magneto for cleaning or repairs, it is important that the magneto be reas-

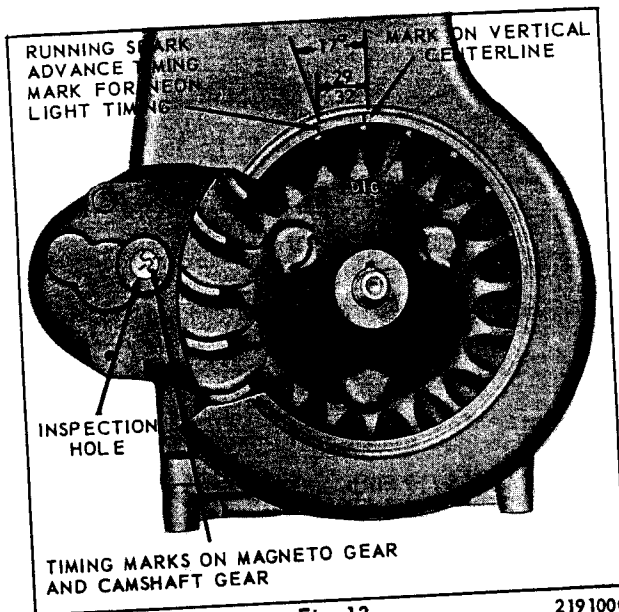


Fig. 12

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sembled properly so that it is timed correctly to the engine. Before removing magneto, first take off the flywheel shroud to get at the timing inspection hole plug. Remove plug, which will expose a portion of the magneto and camshaft gears. Turn the crankshaft over by hand until the *timing marks* of both the *magneto* and *camshaft gears* are visible thru the *inspection hole*, see Fig. 12. The crankshaft can be turned over more easily if the spark plug is removed. Leave the crankshaft in the above mentioned position and remove the magneto from the pad on the crankcase.

When replacing magneto, be sure that the timing marks on the magneto gear and camshaft gear match up as shown thru the inspection hole in Fig. 12, otherwise ignition spark will not occur at the proper time and engine will not operate properly or may not run at all.

The proper spark advance is 17° . For checking timing with a *neon light*, the running spark advance is indicated by a *mark* on the flywheel shroud 17° before *vertical centerline* of cylinder. See Fig. 12. The lower edge of the flywheel vane, in line with the *DC* mark, should be whitened with chalk or paint for this operation.

BATTERY IGNITION TIMING

When electric starter and generator is furnished, battery ignition is used instead of magneto ignition.

These engines are properly timed at the factory, but the following instructions are given as a help in re-timing, if this becomes necessary.

Remove the spark plug from cylinder and turn the engine over slowly by the rope starting sheave, at the same time holding a finger over the spark plug hole, so that the compression stroke can be determined by the air blowing out of the hole.

Upon reaching the compression stroke, continue turning the rope starting sheave until the *DC mark* on the flywheel is in line with the *vertical centerline mark* on the flywheel shroud. The piston is on top dead center. See Fig. 13. Keep flywheel in this position.

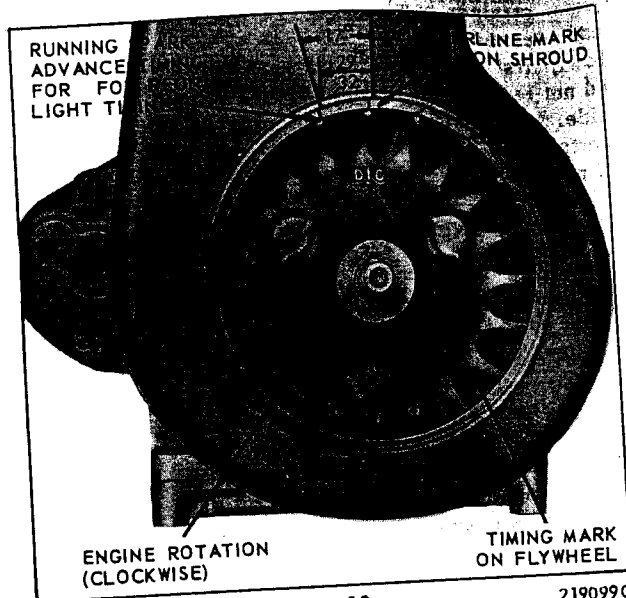


Fig. 13

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Assuming that the timer assembly is removed from the engine; with the breaker points firmly closed, turn the *cam*, by means of the *drive gear*, in a counter-clockwise direction until the *breaker points* are just beginning to open. A slight resistance can be felt as the rubbing block on the breaker arm begins to strike the high point of the cam. Mount timer assembly to engine, being sure that the *oil return hole* in the adapter is in the downward position. See Fig. 14 which also shows the position of the timer on the engine.

The running spark advance is 17° of crankshaft or timer rotation. The timer has an automatic advance of 15° , thus requiring an initial advance setting of 2° .

With the timer assembly mounted securely in place, loosen the *clamp lever screw*. To get the initial 2° advance required; with the *breaker points* just beginning to open, turn the *timer body* in a clockwise direction through an angle of 2° , which is equal to $3/64$ inch on the outside circumference of the timer body. Tighten *clamp lever screw*.

If care is exercised in the above operations, the spark timing should be accurate enough for satisfactory operation, however checking spark advance with a neon lamp, as described in 'Neon Lamp Timing', is recommended.

The breaker point gap should be $.020$ inch. This opening must be checked before the timer body is set, otherwise any adjustment made to the breaker point opening will change the ignition advance adjustment. To readjust the breaker point gap, turn the engine over by means of the rope starter sheave so that the ignition timer breaker arm *rubbing block* is on a high point of the *cam*. Loosen the *stationary contact locknut* and screw *fixed contact*, in or out, until correct gap of $.020$ inch is obtained. Tighten locknut and recheck gap. See Fig. 14.

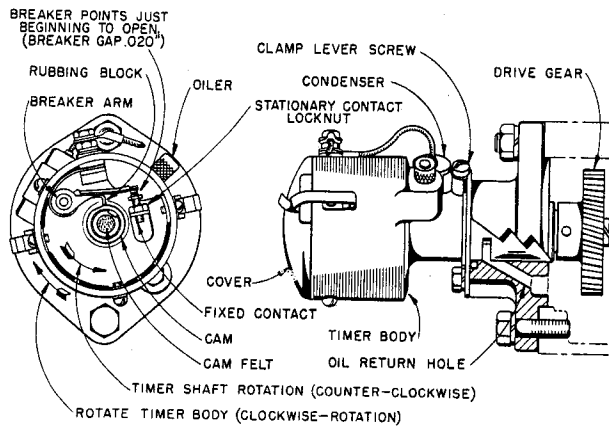


Fig. 14, IGNITION TIMER

NEON LAMP TIMING FOR TIMER IGNITION

The timing should be checked with a neon lamp connected in series with the spark plug. Chalk or paint the lower end of the DC marked vane on the flywheel, white. Then, with the engine operating at 1800 R.P.M. or over, allow the flash from the neon lamp to illuminate the whitened vane. At the time of the flash, the leading edge of the vane should line up with the *running spark advance timing mark* on the flywheel shroud. See Fig. 13. If it does not, the *clamp lever*

screw, shown in Fig. 14, should be loosened and the timer body turned slightly clockwise or counter-clockwise, as required, until the *advance timing mark* and the *white vane* coincide.

Be sure *clamp lever screw* is then carefully tightened. If the engine is running below 1800 R.P.M. when timing, the automatic advance in the ignition timer will not be fully advanced and the timing would not be accurate.

GENERATOR AND TIMER MAINTENANCE

This model of engine can be equipped with either a 12 volt combination *motor-generator* or separate 6 and 12 volt *starter and generator*.

The separate starter, timer and generator, as shown in Fig. 15, are products of the Electric Auto-Lite Company, Toledo, Ohio.

The combination *motor-generator*, shown in Fig. 15A, is manufactured by Delco-Remy of Anderson, Indiana.

It is recommended that all repairs for these accessories be done through their respective authorized Service Stations or Dealers. Battery is not furnished by engine manufacturer and the electrical accessories are wired for a *positive ground* circuit.

The generator, motor-generator, and ignition timer should be periodically lubricated and inspected for conditions which would affect their operation.

It is recommended that the generator and motor-generator oilers be given 3 to 5 drops of medium engine oil after every 50 hours of operation.

Inspect the brushes for wear, approximately every 200 hours of operation. If they are worn to less than half their original length, they should be replaced.

The *oiler* on the ignition timer base and the *cam felt* should have 3 to 5 drops of medium engine oil every 100 hours of operation. *Do not over lubricate.*

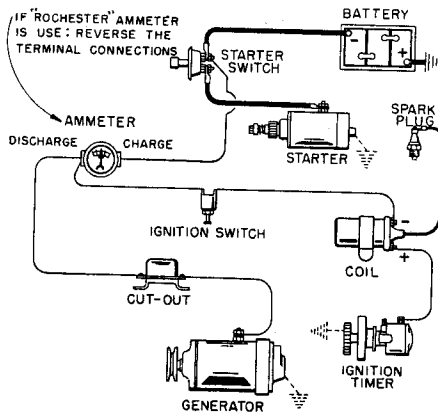


Fig. 15, STARTER AND GENERATOR WIRING

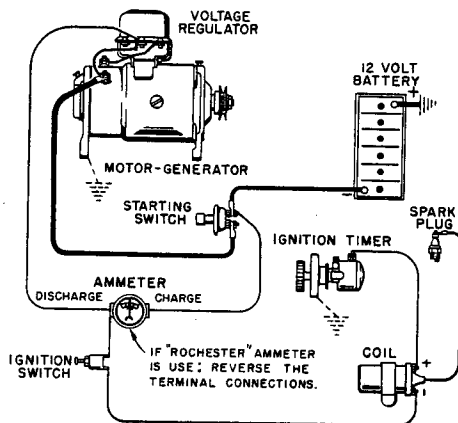


Fig. 15A, COMBINATION MOTOR-GENERATOR WIRING

SPARK PLUG

The spark plug gap should be thirty thousandths (.030) of an inch, and plugs should be kept clean both inside and out. See Fig. 16. If the porcelain insulator is cracked, replace with a new plug of correct heat range, like Champion No. D-16, AC No. C86 Commercial, or equal. The spark thread is 18 millimeter. Be sure to use a good gasket under the spark plug. Tighten spark plug 25 to 30 foot pounds torque.

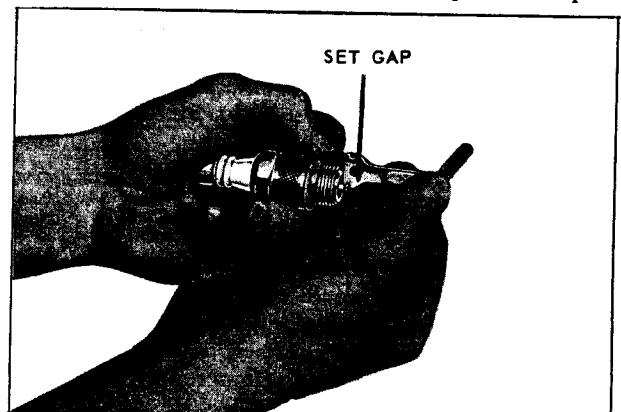


Fig. 16

104713C

RESTORING COMPRESSION

On a new engine or one which has been out of operation for some time, the oil may have drained off the cylinder so that compression will be weak. This may cause difficulty in starting. To remedy this condition, remove the spark plug and pour about a fluid ounce of crankcase oil through the spark plug hole. Turn the engine over several times with the rope starter to distribute the oil over the cylinder wall. Then replace the spark plug and compression should be satisfactory. When compression is proper, considerably more resistance will be felt in cranking on one stroke of the piston, the compression stroke, than on the other three strokes.

TROUBLES CAUSES AND REMEDIES

Three prime requisites are essential to starting and maintaining satisfactory operation of gasoline engines. They are:

1. **A proper fuel mixture** in the cylinder.
2. **Good compression** in the cylinder.
3. **Good spark, properly timed**, to ignite the mixture.

If all three of these conditions do not exist, the engine cannot be started. There are other factors which will contribute to hard starting; such as, too heavy a load for the engine to turn over at a low starting speed, a long exhaust pipe with high back pressure, etc. These conditions may affect the starting, but do not necessarily mean that the engine is improperly adjusted.

As a guide to locating any difficulties which might arise, the following causes are listed under the three headings: **Fuel Mixture, Compression, and Ignition**. In each case the causes of trouble are given in the order in which they are most apt to occur. In many cases the remedy is apparent, and in such cases no further remedies are suggested.

STARTING DIFFICULTIES

FUEL MIXTURE

No fuel in tank or fuel shut-off valve closed.

Carburetor not choked sufficiently, especially if engine is cold. See *'Choke'*, Page 8.

Water, dirt, or gum in gasoline, interfering with free flow of fuel to carburetor.

Poor grade or stale gasoline that will not vaporize sufficiently to form the proper fuel mixture.

Needle valve on carburetor insufficiently opened.

Carburetor flooded, caused by too much choking, especially if engine is hot. See *'Choke'*, Page 8.

Dirt or gum will hold float needle valve in carburetor open. This condition would be indicated if fuel continues to drip from carburetor while engine is idle. Often tapping the float chamber of the carburetor lightly with the wood handle of a screwdriver or sim-

ilar instrument will remedy this trouble. Do not strike with any metal tools, it may be damaged. Also if the mixture in the cylinder, due to flooding, is not too rich to start the engine, starting should be continued, as this will usually correct the trouble. In this case the choke should be left open.

If, due to flooding, too much fuel should have entered the cylinder in attempting to start the engine, the mixture will most likely be too rich to burn. In that case the spark plug should be removed from the cylinder and the engine then turned over several times with the starting rope, so the rich mixture will be blown out through the spark plug hole. The choke on the carburetor should of course be left open during this procedure. The plug should then be replaced and starting tried again.

To test for clogged fuel line, loosen fuel line nut at carburetor slightly. If line is open, fuel should drip out at loosened nut.

COMPRESSION

If the engine has proper compression, considerably more resistance will be encountered in the pull on the starting rope on one stroke of the piston, as compared with the other three strokes. If this resistance is not encountered, compression is faulty. Following are some reasons for poor compression:

Cylinder dry due to engine having been out of use for some time. See *'Restoring Compression'*, Page 14.

Loose or broken spark plug. In this case a hissing noise will be heard in cranking engine, due to escaping gas mixture on compression stroke.

Damaged cylinder head gasket or loose cylinder head. This will likewise cause hissing noise on compression stroke.

Valve stuck open due to carbon or gum on valve stem. Remove tappet inspection plate and note if valves are moving up and down as engine is turned over by hand. A stuck valve will not follow down. To clean valve stems, see *'Valves'*, Page 17.

Valve tappets adjusted with insufficient clearance under valve stems. See *'Valves'*, Page 17.

Piston rings stuck in piston due to carbon accumulation. If rings are stuck very tight this will necessitate removing piston and connecting rod assembly and cleaning parts. See *'Piston and Connecting Rod'*, Page 17.

Scored cylinder. This will require reboring of the cylinder and fitting with new piston and rings. If scored too severely an entirely new cylinder crankcase may be necessary.

IGNITION

See *'Magneto Ignition Spark'*, Page 11 or *'Battery Ignition Timing'*, Page 12. No spark may also be attributed to the following:

Ignition cable disconnected from magneto, timer, coil or spark plug.

Broken ignition cables, causing short circuits.

Ignition cable wet or oil soaked.

Spark plug insulator broken.

Spark plug wet or dirty.

Spark plug point gap wrong. *See Page 13.*

Condensation on spark plug electrodes.

Magneto or Timer breaker points pitted or fused.

Magneto or Timer breaker arm sticking.

Magneto or Timer condenser leaking or grounded.

Spark timing wrong. *See 'Magneto Timing', Page 11, or 'Battery Ignition Timing', Page 12.*

ENGINE MISSES

Spark plug gap incorrect. *See Page 13.*

Worn and leaking ignition cable.

Weak spark. *See 'Magneto Ignition Spark', Page 11, or 'Battery Ignition Timing', Page 12.*

Loose connections at ignition cable.

Magneto or Timer breaker points pitted or worn.

Water in gasoline.

Poor compression. *See 'Compression', Page 14.*

ENGINE SURGES OR GALLOPS

Carburetor flooding.

Governor spring hooked into wrong hole in lever, or governor rod incorrectly adjusted. *See 'Governor Adjustment', Page 20.*

ENGINE STOPS

Fuel tank empty.

Water, dirt or gum in gasoline.

Gasoline vaporized in fuel lines due to excessive heat around engine (Vapor Lock). *See 'To Stop Engine', Page 9.*

Vapor lock in fuel lines or carburetor due to using winter gas (too volatile) in hot weather.

Air vent hole in fuel tank cap plugged. Engine scored or stuck due to lack of oil.

Ignition troubles. *See 'Ignition', Page 14.*

ENGINE OVERHEATS

Crankcase oil supply low. Replenish immediately.

Ignition spark timed wrong. *See 'Magneto Timing', Page 11, or 'Battery Ignition Timing', Page 12.*

Low grade of gasoline.

Engine overloaded.

Restricted cooling air circulation.

Part of air shroud removed from engine.

Dirt between cooling fins on cylinder head.

Engine operated in confined space where cooling air

is continually recirculated, consequently becoming too hot.

Carbon in engine.

Dirty or incorrect grade of crankcase oil.

Restricted exhaust.

Engine operated while detonating due to low octane gasoline or heavy load at low speed.

ENGINE KNOCKS

Poor grade of gasoline or of low octane rating. *See 'Fuel', Page 8.*

Engine operating under heavy load at low speed.

Carbon or lead deposits in cylinder head.

Spark advanced too far. *See 'Magneto Timing', Page 11, or 'Battery Ignition Timing', Page 12.*

Loose or burnt out connecting rod bearing.

Engine overheated due to causes under previous heading.

Worn or loose piston pin.

ENGINE BACKFIRES THROUGH CARBURETOR

Water or dirt in gasoline.

Engine cold.

Poor grade of gasoline.

Sticky inlet valve. *See 'Valves', Page 17.*

Overheated valves.

Spark plug too hot. *See 'Spark Plug', Page 13.*

Hot carbon particles in engine.

DISASSEMBLING AND REASSEMBLING ENGINES

Engine repairs should be made only by a mechanic who has had experience in such work. When disassembling the engine it is advisable to have several boxes available so that parts belonging to certain groups can be kept together, such as, the cylinder head screws, etc. Capscrews of various lengths are used in the engine, therefore great care must be exercised in reassembly so that right screws will be used in the various places, otherwise damage may result.

Tighten the capscrews of the cylinder head, engine base, connecting rod, main bearing plate and the spark plug to the specified torque readings indicated in the following paragraphs of reassembly.

With the disassembling operations, instructions on reassembling are also given, as often it will not be necessary to disassemble the entire engine. If it is desired to disassemble the entire engine, the reassembly instructions can be looked up later under the headings of the various parts.

While the engine is partly or fully dismantled, all of the parts should be thoroughly cleaned. Remove all accumulated dirt between the fins on cylinder and head.

ACCESSORIES

On engines furnished with electrical equipment, clutch or reduction units, these should be removed first if the engine is to be completely overhauled. Also remove muffler and spark plug wire.

FUEL TANK AND AIR SHROUD

Disconnect fuel line at fuel strainer. Remove capscrews mounting the fuel tank bracket to the crankcase and cylinder head. The tank and bracket assembly can be removed as a unit as shown in *Fig. 17*.

Remove the three cylinder head capscrews which hold the air shroud in place. Take out the two lower round head screws holding the shroud to the lugs on the crankcase. The air shroud can then be removed as shown in *Fig. 18*.

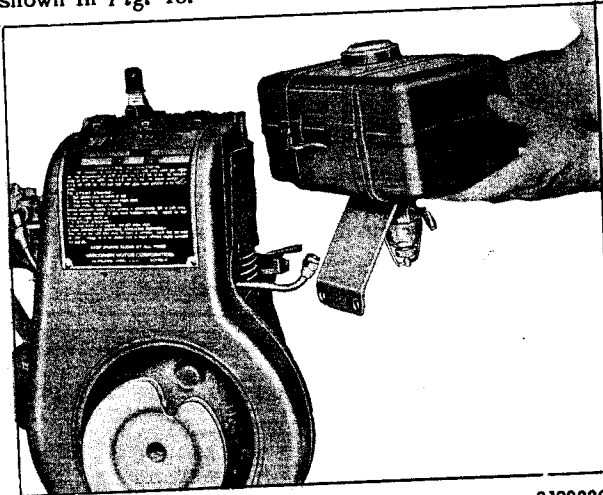


Fig. 17

219088C

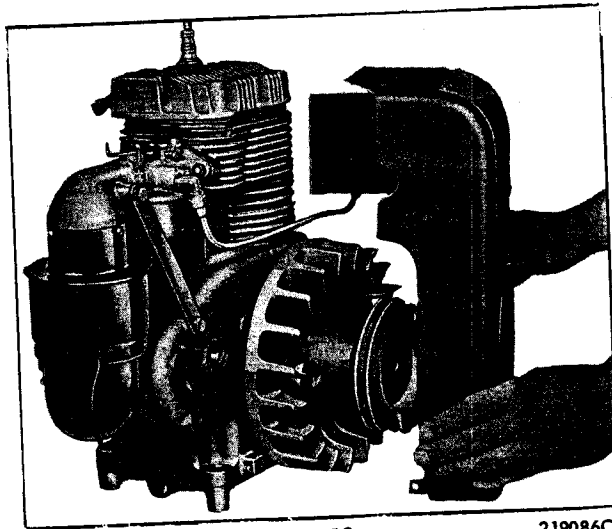


Fig. 18

219086C

FLYWHEEL

The flywheel is mounted to a taper on the crankshaft. Take a firm hold on the flywheel, pull outward and at the same time strike the end of the crankshaft with a babbitt hammer. See *Fig. 19*. The flywheel will slide off the taper of the crankshaft. Do not use a hard hammer as it may ruin the crankshaft and bearings.

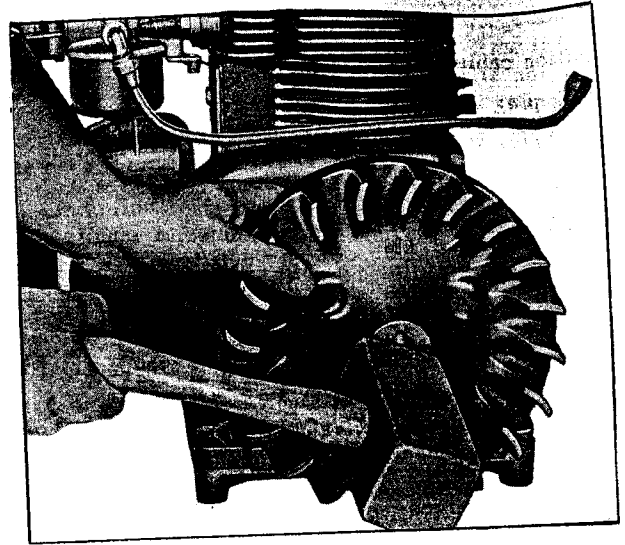


Fig. 19

219090C

When reassembling the flywheel, be sure the Woodruff key is in position on the shaft and that the keyway in the flywheel is lined up accurately with the key.

CYLINDER HEAD

The cylinder head must be removed if it is necessary to regrind valves or to do work on the piston rings or connecting rod. All of the cylinder head screws are plainly in view and can be easily removed. Screws of different lengths are used but these can be properly reassembled according to the various lengths of cylinder head bosses. Before reassembling the cylinder head, all carbon and lead deposits should be removed. It is recommended that a new cylinder head gasket be used in reassembly as the old gasket will be compressed and hard, and it may not seal properly. Tighten cylinder head screws 14 to 18 foot pounds torque.

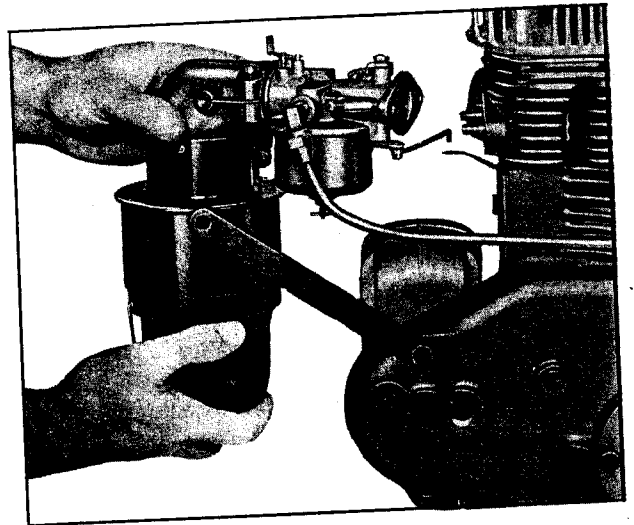


Fig. 20

219087C

CARBURETOR

The carburetor with the air cleaner should be removed.

ed, both to facilitate working on the engine and to prevent damage to these parts. See Fig. 20.

For carburetor overhaul and repair, refer to Zenith or Marvel-Schebler instructions in back of this manual.

VALVES

Assuming that the cylinder head has already been taken off, remove valve tappet inspection plate. Compress valve springs with a standard automotive type valve lifter. We recommend a No. 358 valve lifter manufactured by KD Tools of Lancaster, Penn., or equivalent. The valve spring retainer locks should then be removed from the valve stems. See Fig. 21. The valves can then be withdrawn from the top of the cylinder block. The valves should be cleaned of all carbon and gum deposits as well as the valve seats, ports and guides in the cylinder block.

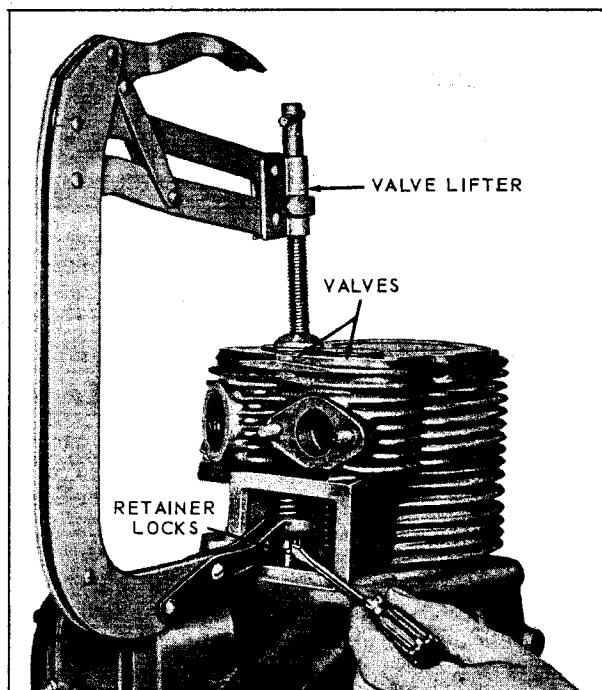


Fig. 21

219091C

If it is necessary to replace or regrind the valves, first grind the seats at a 45° angle. The valve face is also ground at a 45° angle. After grinding, valves and seats should be lapped with a suitable lapping compound or they will leak due to improper seating within the first few hours of operation. After valve seats have been cleaned, apply lapping compound to the valve face and put the valves back into their guides. Lap the valves by rotating them back and forth with a reciprocating advancing valve tool. Occasionally lift the valves and reseal them in a different position to insure a uniform seat which will show entirely around the valves. After valves have been lapped in evenly, remove them from the block and wash the valves and block thoroughly with gasoline or kerosene.

The valve stems should have a clearance of .003" to .005" in the guides. When the clearance becomes .007", the worn guides should be pressed out and new

guides fitted into the cylinder. Replaceable valve guides eliminate the necessity of using valves with oversize stems, as the worn guides can be driven out and replaced with new ones.

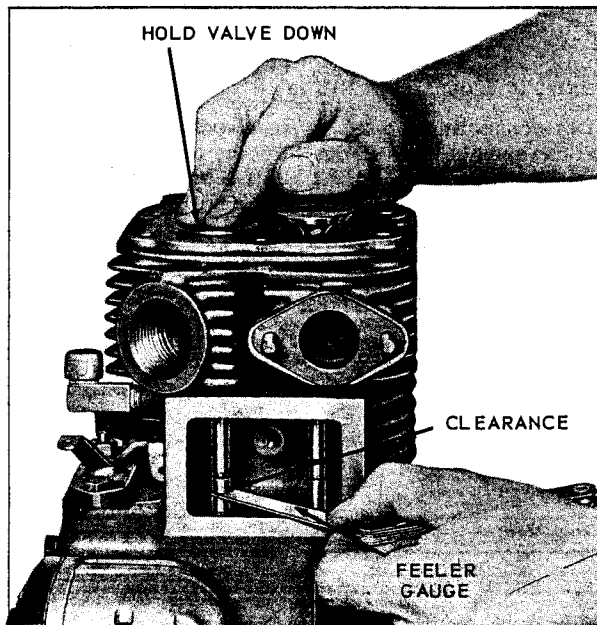


Fig. 22

219096C

Insert the valves in their respective positions in the cylinder block. Before springs are reassembled, the clearance between the ends of the valve stems and the tappets should be checked with a feeler gauge. See Fig. 22. Be sure the tappets are in their lowest positions, and hold the valves firmly down when checking. The clearance, engine cold, should be .008 inch for *inlet* and .014 inch for *exhaust*, with or without Stellite valves.

If the clearance is less than it should be, grind the end of valve stem a very little at a time and remeasure. Be sure the stems are ground square and flat. Replace the valve springs and valve spring seats, locking them in place with the retainer locks. Be sure the valve springs are seated properly in the valve spring locating cups lest they cock off to one side and hamper the valve action.

PISTON AND CONNECTING ROD

Drain all oil from engine, then remove engine base.

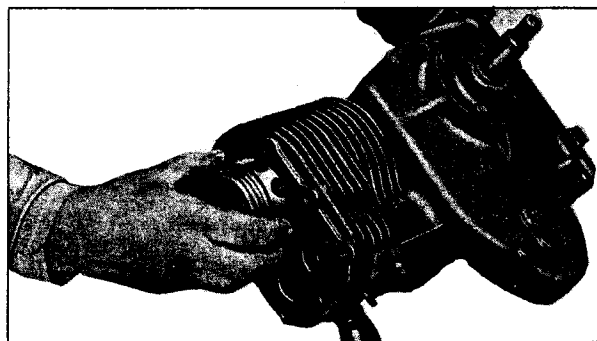


Fig. 23

71409C

In reassembly of engine base, tighten mounting screws, 6 to 8 foot pounds torque.

The two capscrews and lockwashers can be removed from the connecting rod while the engine is lying on its side. The connecting rod and cap both have an arrow cast on one side on the bolt boss. These must both be on the same side in reassembly. Tighten connecting rod capscrews, 14 to 18 foot pounds torque.

After connecting rod cap is removed, the piston and rod can then be pushed out thru the top of the cylinder, as shown in Fig. 23. Wash parts thoroughly in kerosene, after scraping off all carbon deposits.

PISTON, RING AND ROD CLEARANCE CHART

PISTON TO CYLINDER AT PISTON SKIRT	Model ACN .005 to .0055"	Model BKN .0055 to .006"
PISTON RING GAP		.012 to .022"
PISTON RING SIDE CLEARANCE IN GROOVES	TOP RING	.002 to .0035"
	2nd, 3rd RING	.001 to .0025"
	OIL RING	.0025 to .004"
CONNECTING ROD TO CRANK PIN	DIAMETER	.0007 to .002"
	SIDE	.006 to .013"
PISTON PIN TO CONNECTING ROD		.0002 to .0008"

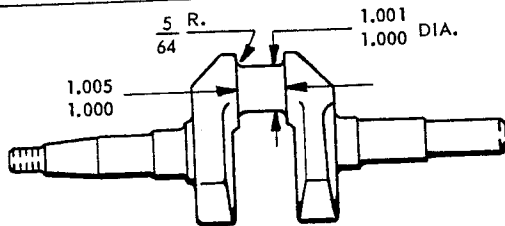


Fig. 24

71152C

PISTON RINGS

Install rings by placing the open end of the ring on the piston first, as shown in Fig. 24. Spread ring only far enough to slip over piston and into correct groove, being careful not to distort ring.

Models ACN and BKN engines have two plain compression rings, one in each of the two upper grooves, a scraper ring in the third groove and an oil control ring in the lower groove. Mount scraper ring with scraper edge down, otherwise oil pumping will result. See Fig. 25.

Use a suitable ring compressor in reassembly and stagger the piston ring gaps 90° apart around the piston. Oil the piston, rings, wrist pin, rod bearings

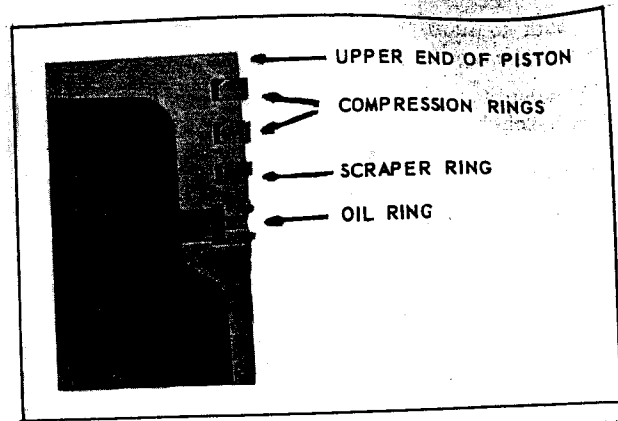


Fig. 25

92200C-1A

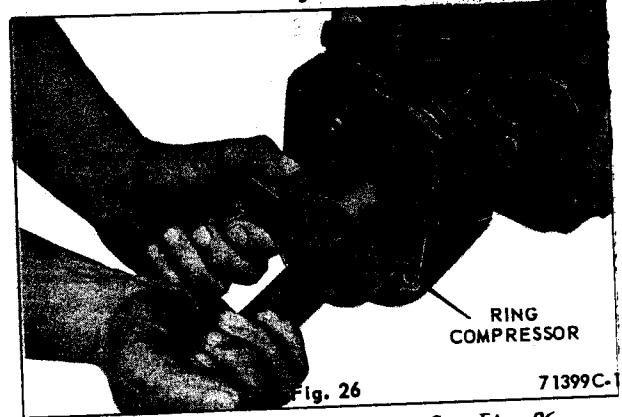


Fig. 26

71399C-

and cylinder wall before assembly. See Fig. 26.

CYLINDER

If cylinders are worn more than .005 inch over standard size, they should be reground and fitted with oversize piston and rings. This work should be done at an authorized service station.

CRANKSHAFT

To remove the crankshaft, first remove the four bolts in the main bearing plate on end of engine opposite

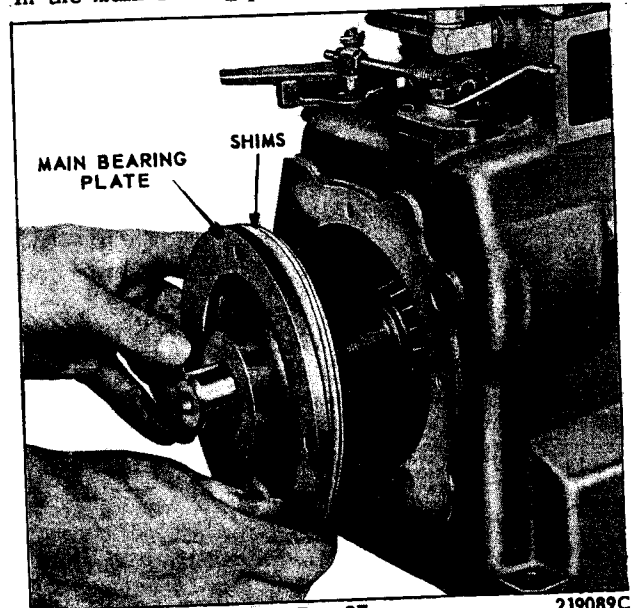


Fig. 27

219089C

flywheel. This plate can then be pried off, and crankshaft removed from that end of crankcase. Be sure to keep shims in place. See Fig. 27. The shims are used to give the proper end play to the Timken main bearings on the crankshaft. This end play should be .002 to .004 inch when engine is cold. There is practically no wear in these Timken bearings so that readjustment is seldom necessary after proper assembly.

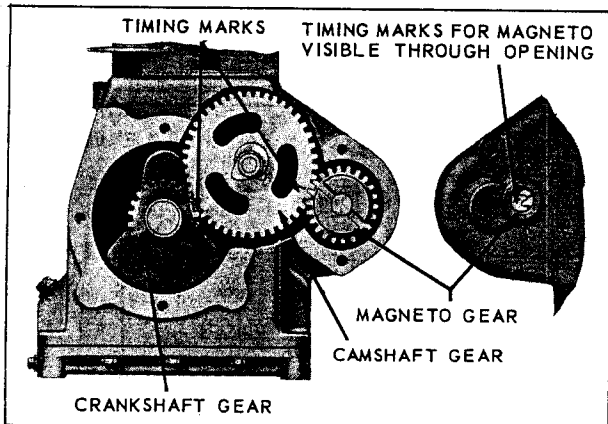


Fig. 28 92199C-A

When reassembling crankshaft, the *timing marks* on the crankshaft gear and the camshaft gear must be matched as shown in Fig. 28, otherwise engine will not operate properly or if timing is off considerably, engine will not run at all.

Tighten main bearing plate cap screws, 14 to 18 foot pounds torque.

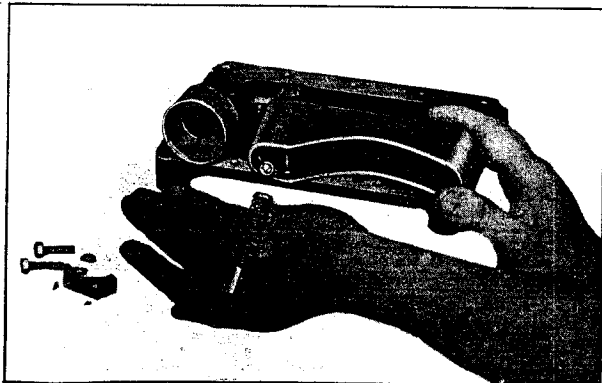


Fig. 29

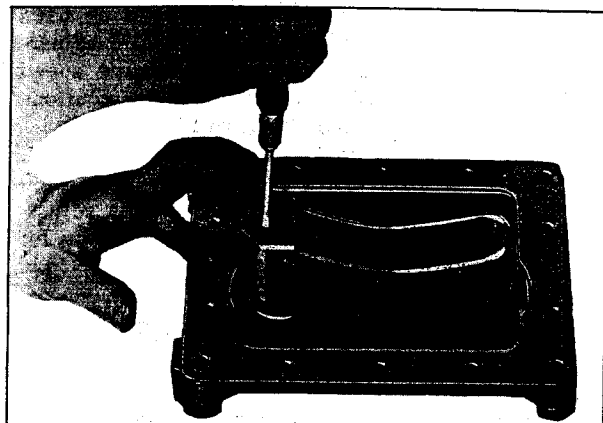


Fig. 30 79358C

OIL PUMP

The oil pump is contained in the oil trough, mounted to the engine base. If the pump is dismantled, be sure all check balls and other parts are reassembled in same position as when taken apart. See Figs. 4 and 29. The check ball at the bottom of the pump should be tapped lightly, with a punch and hammer, to seat properly.

After pump has been reassembled into base, fill base with oil and work pump plunger up and down with a screwdriver as shown in Fig. 30, to make sure pump is operating properly. As the plunger is worked up and down, the oil trough should fill with oil.

CAMSHAFT

The camshaft rotates on a pin driven into the crankcase. To remove, pry out expansion plug from crankcase as shown in Fig. 31. Then with a drift punch, drive camshaft pin, from flywheel end of case, out through opposite end of crankcase. See Fig. 32. The expansion plug at the opposite end will thus be driven out ahead of the camshaft pin. The camshaft will then drop out. When reassembling camshaft, drive camshaft support pin in from take-off end of crankcase. Use new expansion plugs in end holes.

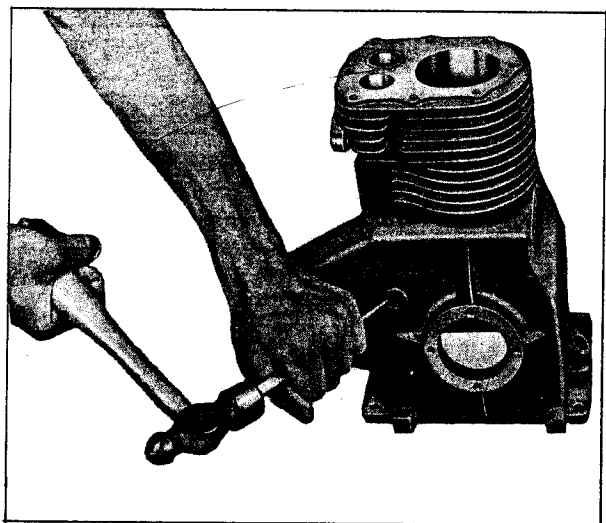


Fig. 31 71406C-1

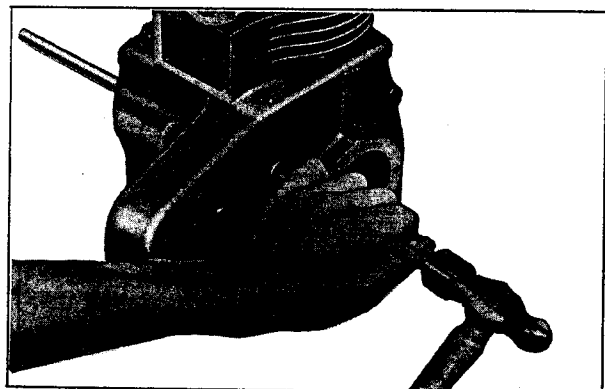


Fig. 32 71397C-1

GOVERNOR

The governor is assembled on to the camshaft. All wearing parts of governor are hardened so replacement is very seldom necessary.

In reassembling, the spacer is slipped on to the camshaft first. The flyweights are then separated far enough so that the thrust sleeve can be slipped between. By then sliding the thrust sleeve back, the flyweights will be closed down between the two flanges of the thrust sleeve. See Fig. 33.

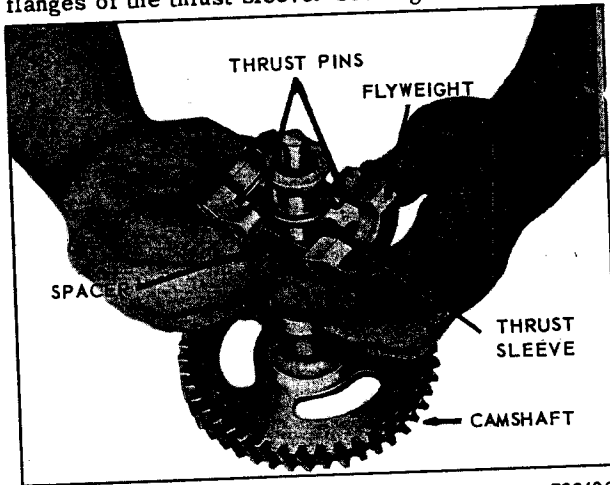


Fig. 33

79360C

GOVERNOR ADJUSTMENT

The governor rod connection to the carburetor must be very carefully adjusted for length, otherwise the governor will not function properly and may cause the engine to surge badly. The governor rod should be moved as far as possible toward the carburetor. This will open the carburetor throttle wide. See Fig. 34.

The governor lever should then be moved as far as possible in the same direction, all of this being done with the rod disconnected from the lever. Holding both parts in the above position, the rod should be screwed in or out of the swivel block on the carburetor.

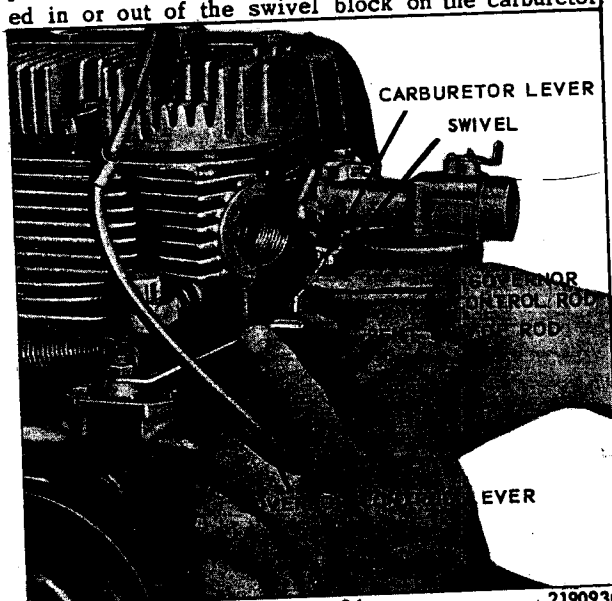


Fig. 34

219093C

until the bent end of the rod will exactly register with the hole in the lever. The rod should then be dropped into the lever and the cotter pin inserted to keep the rod in place.

The governor spring must be hooked into the proper hole in the governor lever, depending upon the speed at which the engine is to operate; see chart. After the spring has been hooked into the proper hole the spring tension must be adjusted by the adjusting nuts. More tension on the spring gives higher speeds and less tension lower speeds.

LOAD R.P.M.	NO LOAD R.P.M.	HOLE NO.	GOVERNOR LEVER	
1600	1930	1		
1700	2015			
1800	2060			
1900	2110			
2000	2180			
2100	2240			
2200	2340			
2300	2430	2		
2400	2535			
2500	2650			
2600	2750			
2700	2860	3		
2800	2950			
2900	3160			
3000	3200			
3100	3260			
3200	3445			
3300	3525	3		
3400	3595			
3500	3670			
3600	3735			

Fig. 35

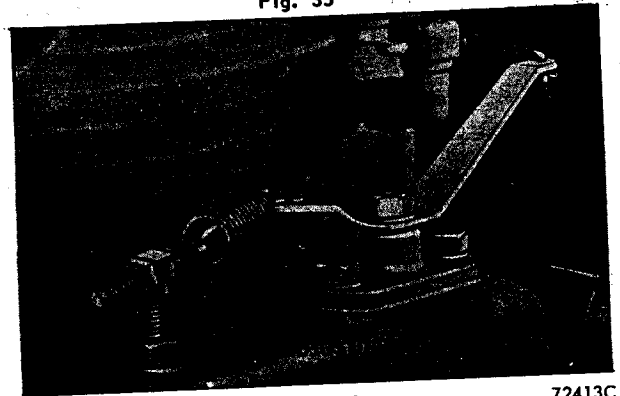


Fig. 36

72413C

A tachometer or revolution counter should be used against the crankshaft to check speed while adjusting the governor spring tension. The engine speed without load will vary, from 100 to 350 revolutions per minute higher than the speed with load. For instance, if the engine is to operate at 2000 R.P.M. under full load, the speed with no load will be 2180 R.P.M. and this should be kept in mind when adjusting the governor. Refer to the governor lever chart for the exact variation between load speed and no load (idle) speed.

CLUTCH AND REDUCTION GEARS

CLUTCH

The clutch furnished with Models ACN and BKN 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 should be filled to the height of the oil level plug in the clutch housing. The oil is filled through the inspection plate opening; about one half pint of oil is required. See Fig. 37.

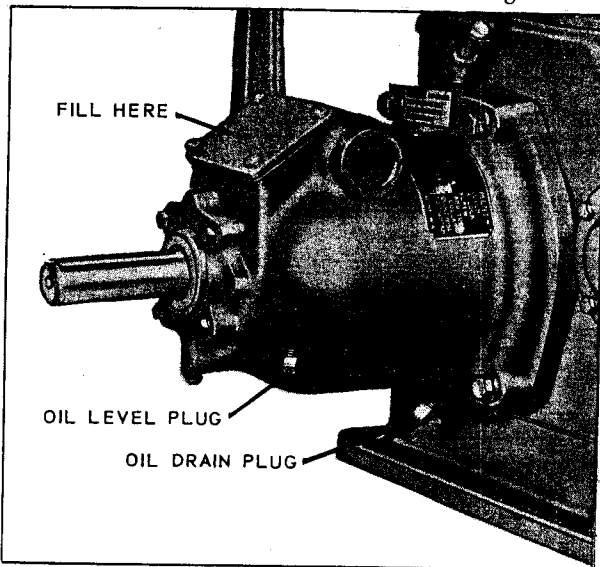


Fig. 37

72770C

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 collar. Release the clutch lever and rotate the take-off shaft by hand until the set screw in the collar is on top. Loosen the set screw, then with a drift punch turn the collar in a clockwise direction a little at a time. The take-off shaft must be held in a stationary position. See Fig. 38. After each movement of the collar, engage the clutch with the clutch 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.

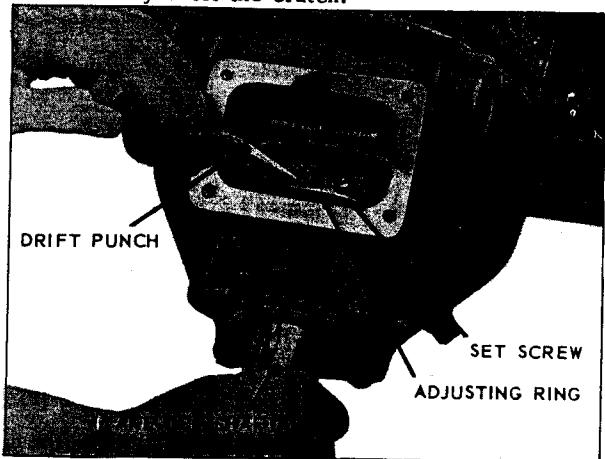


Fig. 38

72773C

REDUCTION GEAR

Reduction gears are furnished with several different

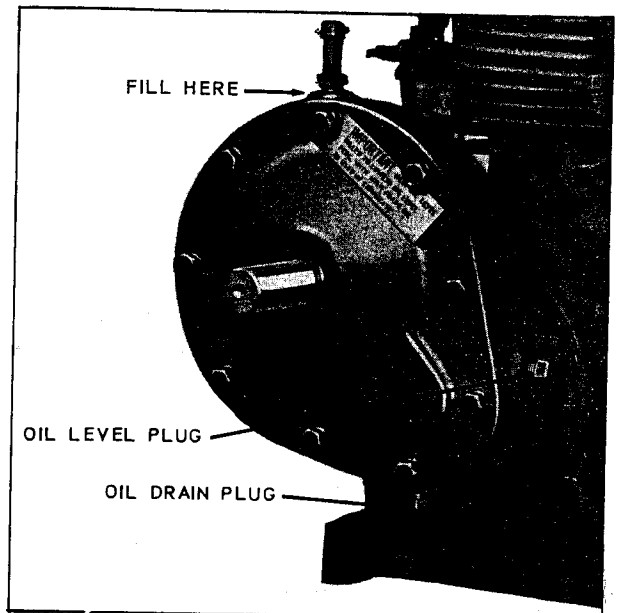


Fig. 39

76850C

ratios, some with spur gears, others with chains. All are of the same general design as shown in Fig. 39.

These reduction gears require the same kind of oil as is used in the crankcase of the engine. For different installations these gears are assembled to the engines in various positions. Several plugs are furnished on these reduction units so that the lubrication may be properly taken care of regardless of its position. 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. See Fig. 39. Approximately one pint of oil should be used, or until the oil reaches the height of the 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, adding sufficient oil between changes to keep the oil up to the oil level plug.

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 cylinder and head, 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 cylinder, piston, 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 air intake of the carburetor while the engine is warm and running at moderate speed. The air cleaner connection will of course have to be disconnected from the carburetor to do this. About an eighth of a pint is necessary, 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 fogging operation will give a coating of oil on the above mentioned parts, protecting them from the atmosphere. After the engine has stopped, turn the engine over slowly, by means of the rope starter sheave, until the flywheel key or take-off shaft keyway is up, or in the 12 o'clock position. Both valves will be closed and the piston will be on top in the cylinder bore, with the crankshaft in the described position. This will minimize rusting of the cylinder bore and help in retaining the oil fog previously injected into the engine.

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

Drain fuel system, including gasoline lines, carburetor, fuel pump and tank of all gasoline, to prevent lead and gum sediment interfering with future operation.

The air cleaner or carburetor intake, as well as the exhaust manifold opening, should be taped or otherwise sealed off, for the duration of the storage period.

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 engine 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 engine base, 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 next season, especially if the engine has given considerable service.

Refuel engine and follow starting instructions as shown on preceding pages of this manual.

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

FILL IN THE ABOVE INFORMATION ON THE PHOTO OF THE NAME AND INSTRUCTION PLATE SO THAT IT WILL BE AVAILABLE TO YOU WHEN ORDERING PARTS

WISCONSIN <i>air cooled</i>			
MODEL	<input type="text"/>	SERIAL NO.	<input type="text"/>
SIZE	<input type="text"/>	R.P.M.	<input type="text"/>
		SPEC. NO.	<input type="text"/>
OPERATING INSTRUCTIONS			
Fill crankcase to level of oil filler plug with good, clean gas engine oil. For temperatures of 40°F. or over use S.A.E. No. 30 oil. For temperatures of 5°F. to 40°F. use S.A.E. No. 20 oil. For colder weather use S.A.E. No. 10W oil. Fill fuel tank with good clean gasoline of the REGULAR GRADE.			
TO START ENGINE -			
1 - Open gasoline cock on bottom of tank.			
2 - Close choke; it will release when engine starts.			
3 - Crank engine. Repeat if necessary.			
Normal carburetor needle valve opening is approximately 3/4 to 1 1/4 turns. In cold weather opening 1/2 turn more facilitates starting. Adjust for best running as engine warms up.			
TO STOP ENGINE -			
Push switch button in on magneto - hold until engine stops.			
CARE IMPROVES SERVICE, REDUCES REPAIRS -			
Drain old oil and refill after every 50 hours of operation. Spark plug gap must be .030". Change oil in air cleaner daily to insure efficient engine operation and long life.			
KEEP ENGINE CLEAN AT ALL TIMES			
WISCONSIN MOTOR CORPORATION			
MILWAUKEE, WISC., U.S.A. SD-53-F			

193685C-1

TO INSURE PROMPT AND ACCURATE SERVICE, THE FOLLOWING INFORMATION MUST ALSO 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

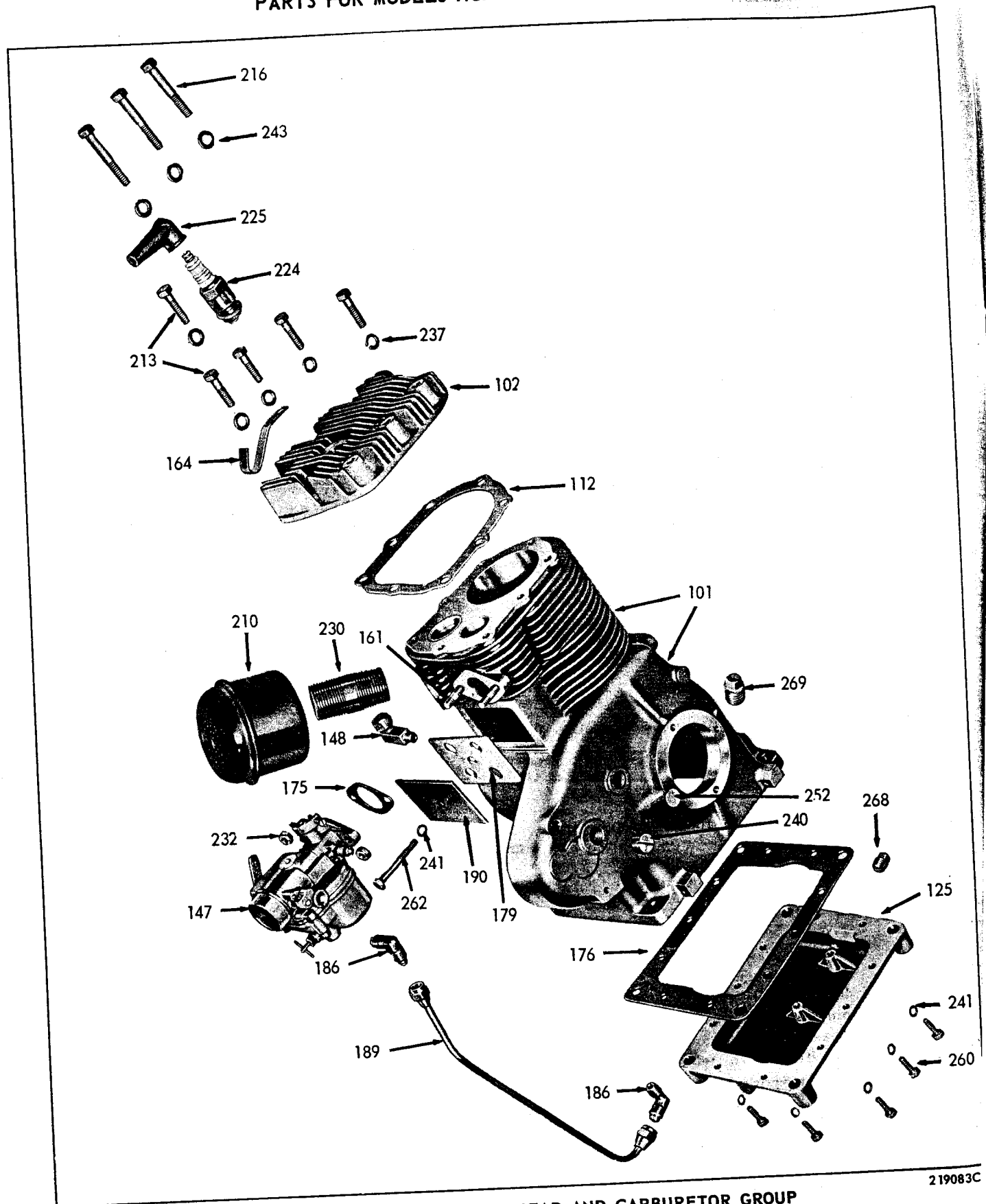
Approved engine service stations, located throughout the U.S. and foreign countries, have been carefully selected by the WISCONSIN MOTOR CORPORATION in order to assure complete and efficient repair and inspection service to owners of Wisconsin Air Cooled Engines. These service stations, equipped and 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.

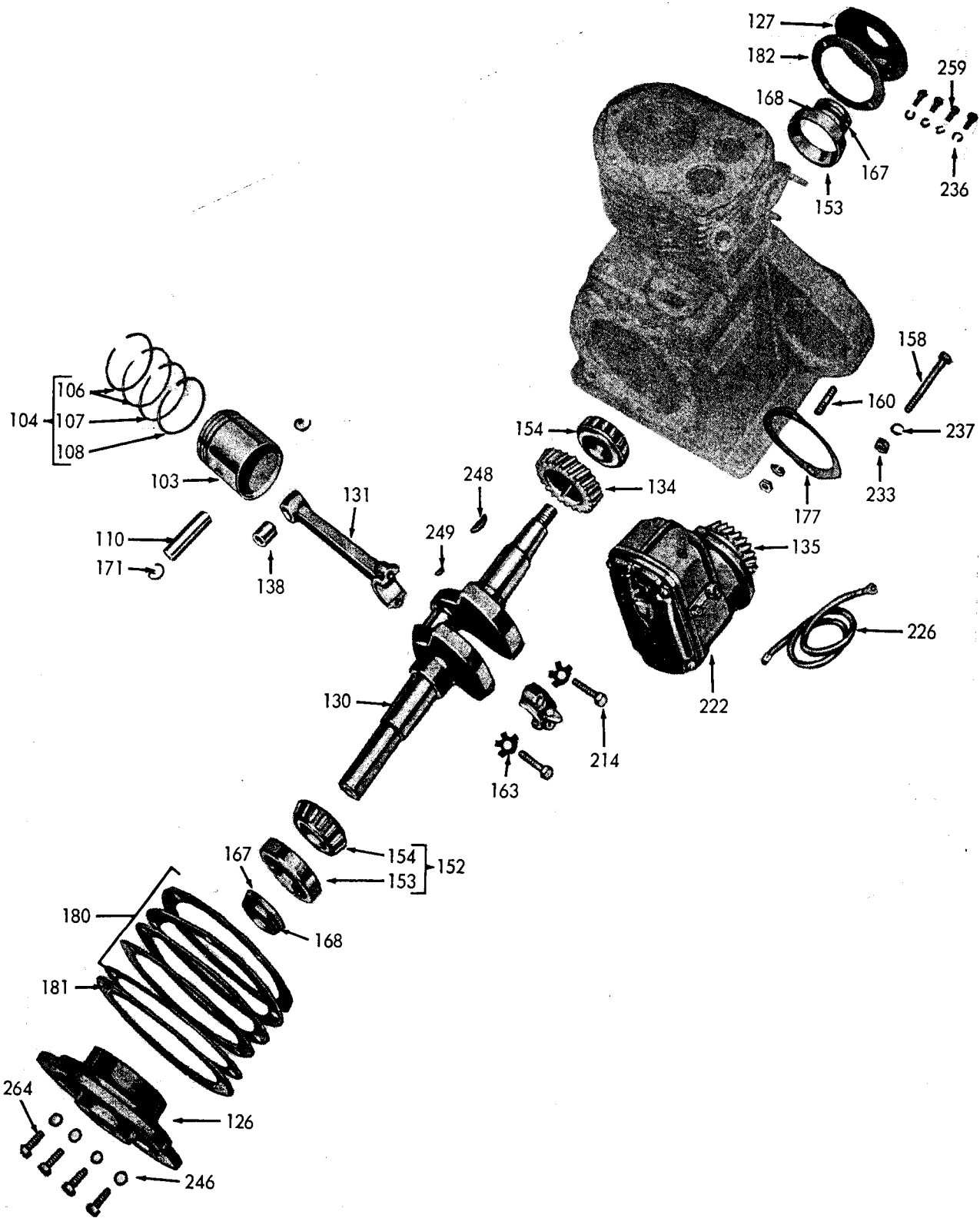
PARTS FOR MODELS ACN AND BKN ENGINES



CRANKCASE, BASE, CYLINDER HEAD AND CARBURETOR GROUP
 Parts are identified by reference number. See parts list for correct part number.

219083C

PARTS FOR MODELS ACN AND BKN ENGINES



BEARING PLATE, CRANKSHAFT, PISTON AND CONNECTING ROD GROUP

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

224140C

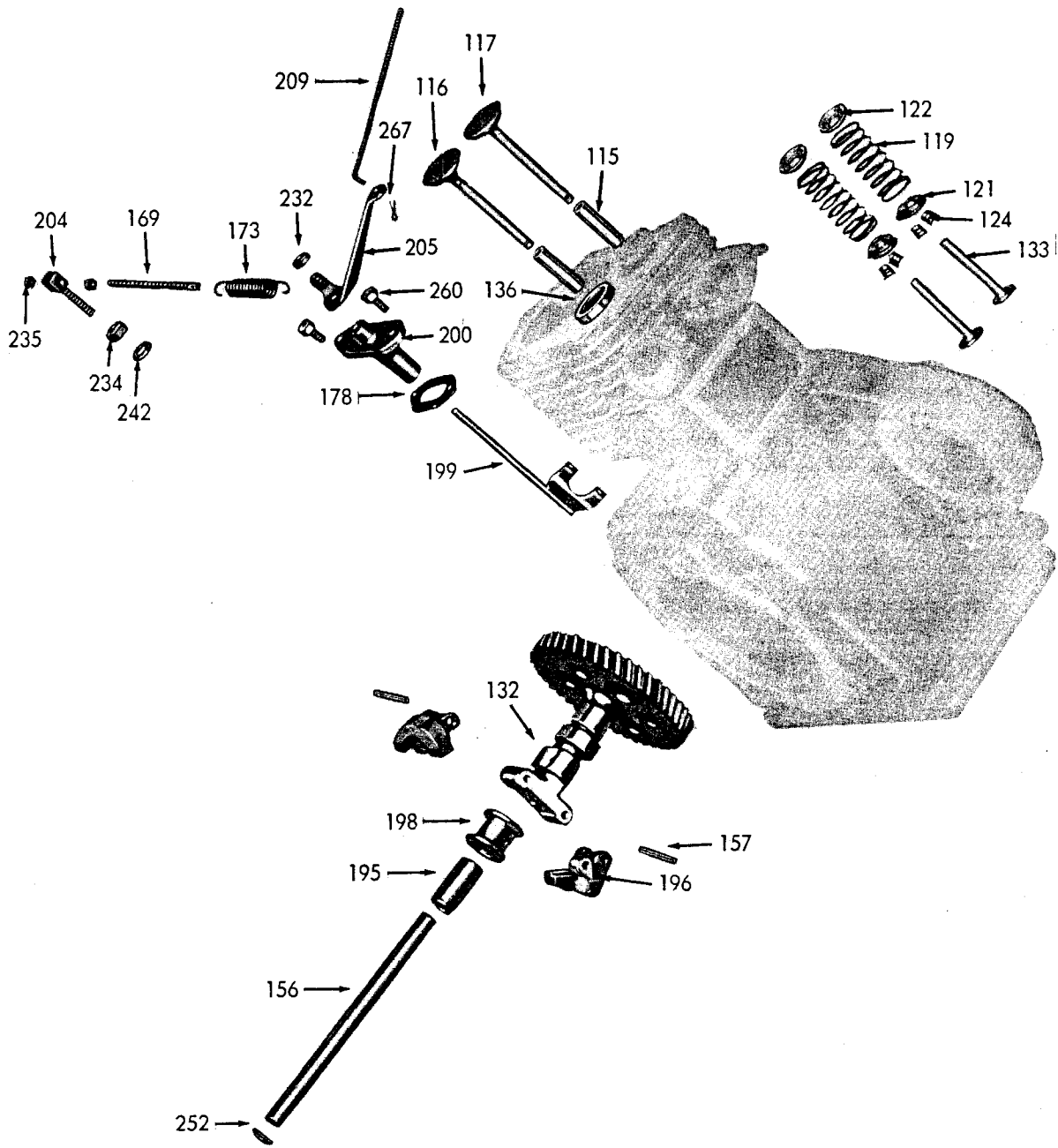
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19083C

PARTS FOR MODELS ACN AND BKN ENGINES

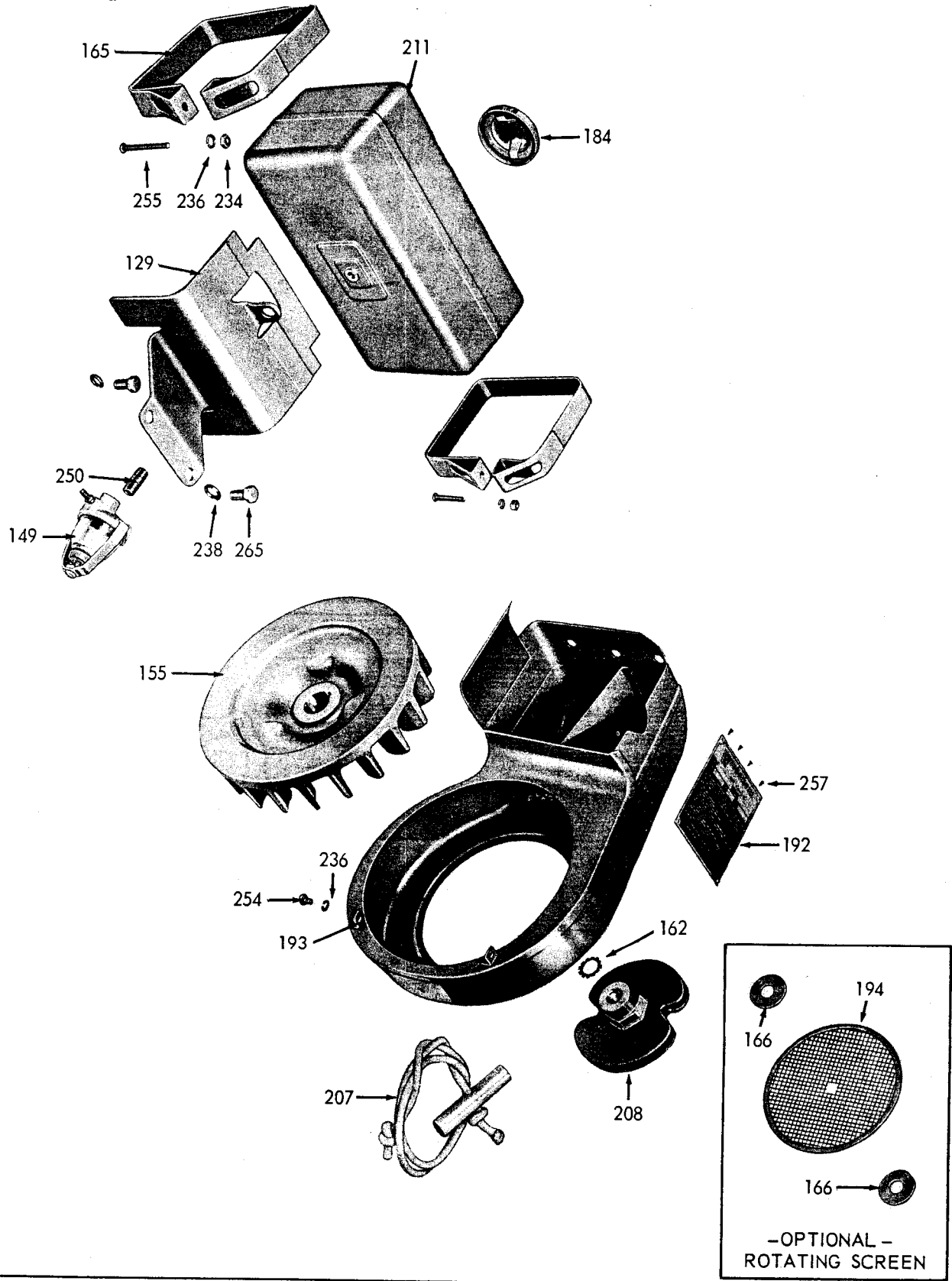


VALVES, GOVERNOR AND CAMSHAFT GROUP

224139C

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

PARTS FOR MODELS ACN AND BKN ENGINES

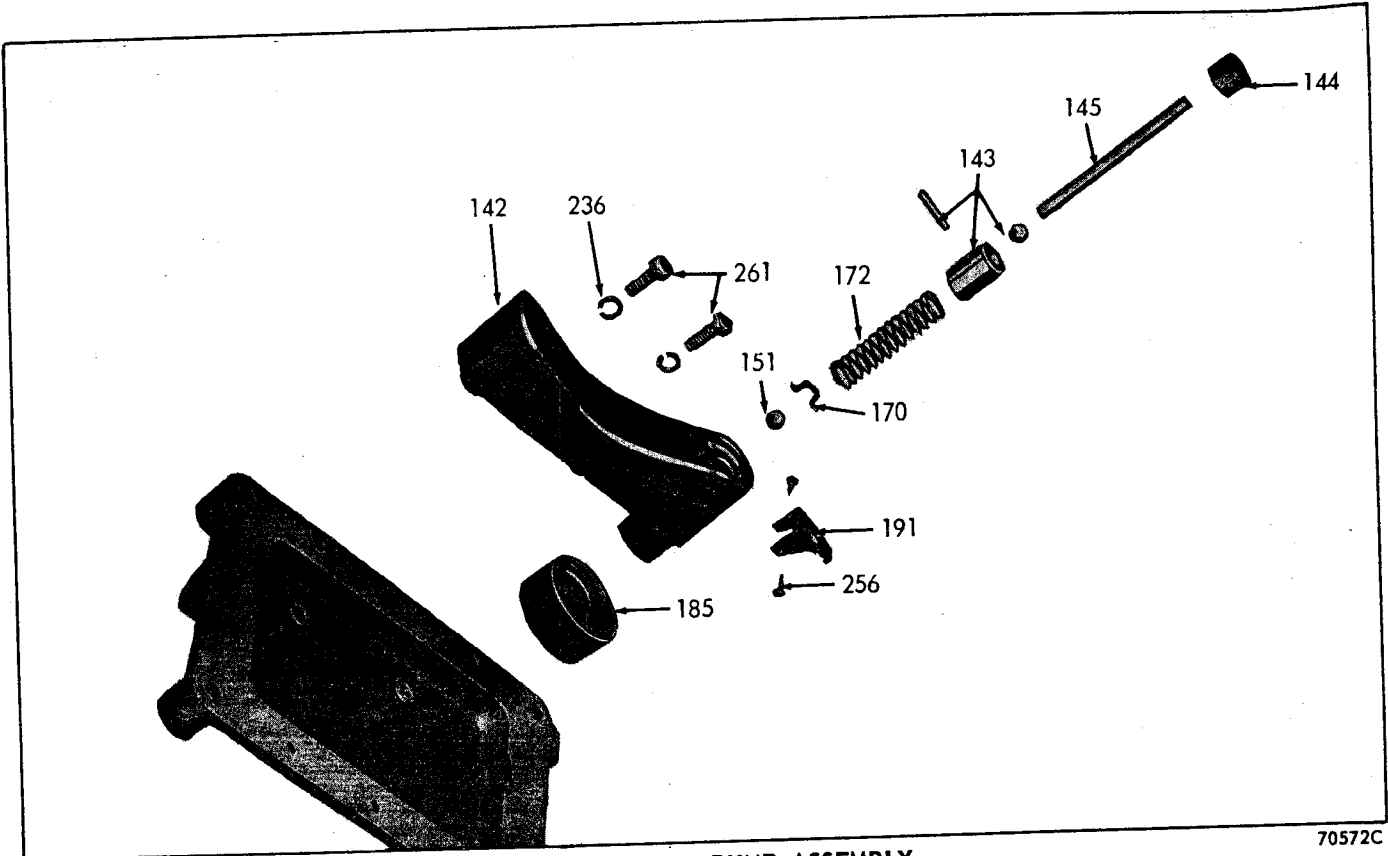


FLYWHEEL, AIR SHROUD AND FUEL TANK GROUP

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

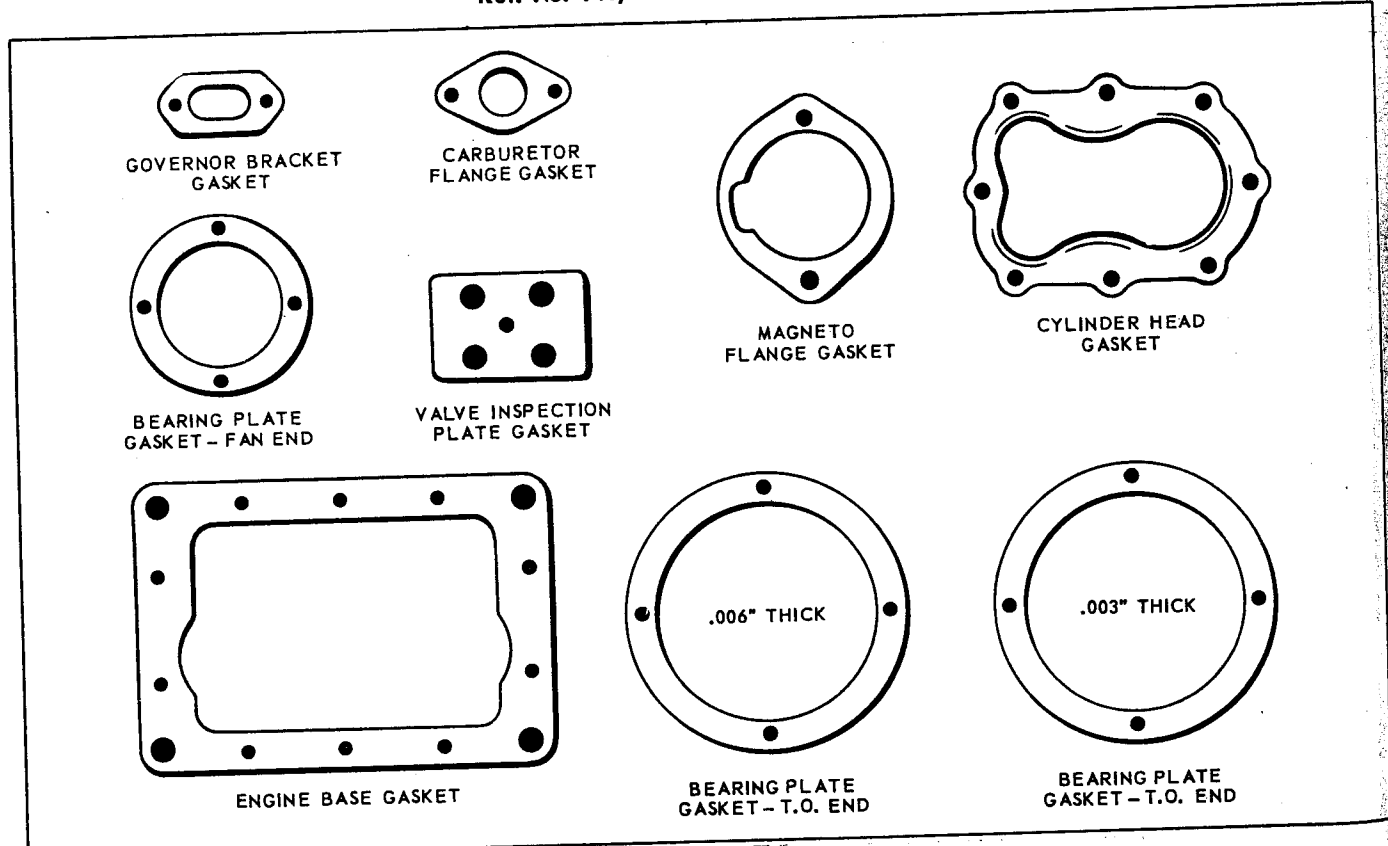
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PARTS FOR MODELS ACN AND BKN ENGINES



Ref. No. 141, OIL PUMP ASSEMBLY

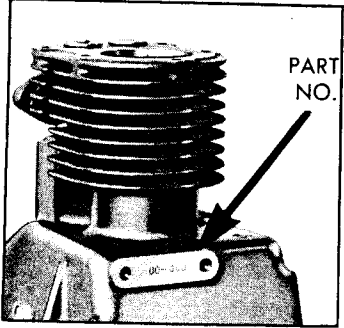
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Ref. No. 111, GASKET SET

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

STANDARD ENGINE PARTS LIST
MODELS ACN and BKN

REF. NO.	PART NUMBER		DESCRIPTION	NO. REQ.	NET WEIGHT	
	MODEL ACN	MODEL BKN			LBS	OZ
101	See Fig. 1 2-5/8" Bore	See Fig. 1 2-7/8" Bore	CYLINDER and CRANKCASE ASSEMBLY Complete with valves, springs, seats, locks, inserts, valve guides, cover and gasket.	1	28	
	See Fig. 1	See Fig. 1	CYLINDER and CRANKCASE With valve seat inserts and valve guides only.	1	27	
			<p>NOTE: The part number of the cylinder and crankcase is stamped on the case in the location shown in Fig. 1. ORDER BY THIS NUMBER and by giving Model, Specification and Serial Numbers of the engine. Also specify whether you want a cylinder and crankcase complete with valves, springs, seats and etc. or with just the valve seat insert and valve guide.</p>			
						
			90845C			
			Fig. 1			
102	AB-99-K	AB-99-P	CYLINDER HEAD , std., spark plug tap on top AB-99-B-1, replaced by AB-99-K (for ACN). AB-99-D and AB-99-L, replaced by AB-99-P (for BKN).	1	2	
103	DB-218	DB-186-A	PISTON , standard size Pistons are also furnished .005", .010", .020" and .030" oversize and semi-finished.	1		8
104	DR-29	DR-30	PISTON RING SET , Standard Size Consisting of:	1		4
106	DC-196	DC-198	COMPRESSION RING	2		1
107	DC-151-A-1	DC-161-1	SCRAPER RING	1		1
108	DC-197	DC-199	OIL RING Piston rings and ring sets are also furnished .005", .010", .020" and .030" oversize.	1		1
110	DE-67	DE-68	PISTON PIN , standard size Piston pins are also furnished .005", .010", .020" and .030" oversize.	1		2
111	Q-24	Q-2	GASKET SET	1		6
112	QD-718	QD-604-A	GASKET for cylinder head	1		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.

PARTS INTERCHANGEABLE ON MODELS ACN AND BKN

Ref. No.	Part Number	Description	No.		Net Wt.		Ref. No.	Part Number	Description	No.		Net Wt.	
			Req		Lb	Oz				Req		Lb	Oz
115	AD-41	VALVE STEM GUIDES.....	2		1		133	FA-42-A	VALVE TAPPET	2		2	
116	AE-74-C	EXHAUST VALVE, standard	1		4		134	GA-34-A	CRANKSHAFT GEAR.....	1		14	
	AE-74-D	STELLITE EXHAUST VALVE	1		4		135	GD-87-C	MAGNETO DRIVE GEAR	1		12	
117	AE-74-N	INLET VALVE.....	1		4		136	HG-214	VALVE SEAT INSERT (std) exhaust only	1		1	
119	AF-43	VALVE SPRING, standard.....	2		1			HG-201-D	STELLITE EXHAUST VALVE SEAT INSERT	1		1	
	AF-49-A	VALVE SPRING, exhaust..... For engines with Stellite exhaust valve.	1		1		138	HG-229-A	PISTON PIN BUSHING (obsolete)	1		1	
121	AG-26	VALVE SPRING SEAT	2		1				Used with DA-70A-S1 Connecting Rod for engines up to Serial No. 2,953,299. With DA-70B-S1 Connecting Rod, piston pin bushing not required.				
122	AG-34-A	VALVE SPRING LOCATING CUP..... AG-34, replaced by AG-34-A.	2		1		141	K-98	OIL PUMP ASSEMBLY COMPLETE	1	1	6	
124	AH-9	VALVE SPRING SEAT LOCK	2 pr		1				Consisting of:				
125	BB-116-B	ENGINE BASE	1	1	8				1 KA-59B-1 Body	1 PK-50A Retainer			
126	BG-170-S2	BEARING PLATE ASSEMBLY..... Take-off end. Consisting of: 1 BG-170 Plate 1 ME-88-1 Bearing cup 1 PH-254 Retainer 1 PH-256 Oil seal	1	2	12				1 KF-14 Plunger	1 PM-58 Spring			
127	BG-171-S1	BEARING RETAINER PLATE..... With oil seal, flywheel end.	1		4		142	KA-59B-1-S1	OIL PUMP BODY ASSEMBLY	1		14	
129	BK-97	FUEL TANK BRACKET	1	1	12				Consisting of:	1 KA-59B-1 Body	1 KF-30 Seat		
130	See Fig. 2	CRANKSHAFT ASSEMBLY..... Consisting of: 1 Crankshaft 1 GA-34-A Gear 2 ME-88 Bearings 1 PL-21 Key NOTE: The part number of the crankshaft will be found stamped on the cheek facing the flywheel end of the shaft as illustrated in Fig. 2. ORDER BY THIS NUMBER and by giving the Model, Specification and Serial Numbers of the engine.	1	10			143	KF-14-S1	OIL PUMP PLUNGER ASSEMBLY	1		2	
							144	KF-19-A	CAP for oil pump plunger push rod	1		1	
							145	KF-22	OIL PUMP PUSH ROD	1		2	
							147	L-51-E 11193 L-52-C VH-53	ZENITH CARBURETOR	1	1	4	
									MARVEL-SCHEBLER CARBURETOR..	1	1		
									See carburetor bulletins in back of manual for service replacement parts list.				
							148	LO-31-B	BREATHER for crankcase	1		3	
									LO-31-A, replaced by LO-31-B.				
							149	LP-43	FUEL STRAINER	1		5	
									NOTE: See illustrations in back of parts list for service replacement parts.				
							151	ME-38	CHECK BALL	1		1	
									For oil pump, 5/16" dia. steel.				
							152	ME-88	MAIN BEARING ASSEMBLY.....	2		10	
									Consisting of:				
							153		1 ME-88-1 Bearing cup (Timken 15250)			4	
							154		1 ME-88-2 Bearing cone (Timken 15118)			6	
							155	NC-137	FLYWHEEL	1	8	8	
							156	PA-264	CAMSHAFT SUPPORT PIN.....	1		4	
							157	PA-340	PINS for governor flyweights	2		1	
							158	PB-164	SCREW, 5/16"-24 thread x 2-5/8" long..	1		1	
									For mounting magneto, upper hole.				
							160	XD-17	SCREW, 5/16"-18 thread x 1" long, hexagon head.....	1		1	
									For mounting magneto, lower hole.				
									PC-362 Stud, replaced by XD-17.				
							161	PC-368	STUD for carburetor mounting	2		1	
							162	PE-37-A	LOCKWASHER, 5/8" Positive	1		1	
									For rope starter sheave.				
									PE-57, 5/8" 'External' tooth type, replaced by PE-37-A.				
							163	PE-82	LOCKWASHER, 5/16" (Special).....	2		1	
									For connecting rod capscrews.				
							164	PG-206	STRAP for ignition cable support	1		1	
131	DA-70-B-S1	CONNECTING ROD ASSEMBLY..... Consisting of: 1 DA-70-B Connecting rod 2 PE-82 Lockwashers 2 XD-19 Capscrews DA-70A-S1 (with piston pin bushing), replaced by DA-70B-S1. 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.	1		8								
132	EA-101-H-S1	CAMSHAFT ASSEMBLY	1	2	8								
		Consisting of: 1 EA-101-J Camshaft 1 GB-49 Gear 1 PA-264 Support pin 1 PL-21 Key EA-101-F-S1, replaced by EA-101H-S1.											

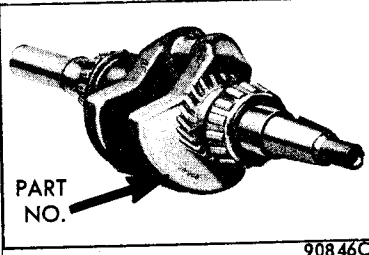


Fig. 2 90846C

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 ACN AND BKN

Ref. No.	Part Number	Description	No.		Net Wt.		Ref. No.	Part Number	Description	No.		Net Wt.	
			Req		Lb	Oz				Req		Lb	Oz
165	PG-733	FUEL TANK STRAP NOTE: Steel Binder Strapping and Seal for mounting fuel tank, on engines sent out from the factory, are not serviceable in the field. Order PG-733 straps with XA-52 screws, PD-77 nut and PE-3 lock washer.	2		6		205	TC-332	GOVERNOR CONTROL LEVER	1		1	
166	PH-243	WASHER for rotating screen.....	2		2		207	U-268	STARTING ROPE ASSEMBLY	1		8	
167	PH-254	RETAINER for main bearing oil seal	2		1				U-218-A, replaced by U-268.				
168	PH-256	OIL SEAL (cork) for main bearing.....	2		1		208	UC-103-A	STARTER SHEAVE , die cast.....	1	1		
169	PI-121	SCREW for governor spring adjusting	1		2		209	VE-304	GOVERNOR CONTROL ROD	1		1	
170	PK-50-A	RETAINER for oil pump check ball	1		1		210	WD-64	MUFFLER (Less pipe nipple).....	1		12	
171	PK-69	PISTON PIN RETAINING RING	2		1		211	WE-343-C	FUEL TANK with cap	1	2		
172	PM-58	SPRING for oil pump plunger	1		1				WE-343, replaced by WE-343-C. NOTE: Fuel tanks are mounted to the tank bracket with steel binder strapping, which is not serviceable in the field. When replacing fuel tank, be sure and order correct replacement straps.				
173	PM-74	GOVERNOR SPRING	1		2		213	XD-19	SCREW , 5/16"-18 thread x 1-1/4" long . For mounting cylinder head.	5		1	
175	QC-53	GASKET for carburetor flange	1		1		214	XD-19	SCREW , 5/16"-18 thread x 1-1/4" long, hexagon head	2		1	
176	QD-569-A	GASKET for engine base	1		1				For connecting rod. XD-19-A, replaced by XD-19.				
177	QD-570-A	GASKET for magneto flange.....	1		1		216	XD-23	SCREW (Special hardness) 5/16"-18 thread x 2" long.....	3		1	
178	QD-571	GASKET for governor yoke shaft bracket	1		1				For mounting cylinder head.				
179	QD-572	GASKET for valve tappet inspection plate.....	1		1		222	Y-109-S1	MAGNETO with gear, "FAIRBANKS- MORSE", No. FMXD1B7S	1	5	12	
180	QD-573	GASKET for main bearing plate, take-off end, .006" thick	5		1			Optional	Y-73B-S2, FMXD1B7, replaced by Y-109-S1.				
181	QD-573-A	GASKET for main bearing plate, take-off end, .003" thick	1		1			Y-111-S1	MAGNETO with gear, "WICO" XH-2477 Y-68A-S2, XH-1295-D, replaced by Y-111-S1.	1	5	4	
182	QD-574	GASKET for bearing retainer plate, fly- wheel end	1		1				See magneto bulletins in back of manual for service replacement parts list.				
184	RC-77	CAP for fuel tank.....	1		3		224	YD-6-S1 Optional	SPARK PLUG , 18mm, Champion No. D-16	1		3	
185	RD-107	STRAINER for oil pump	1		1			YD-6-S2	SPARK PLUG , AC No. C86 Commercial.				
186	RF-270	ELBOW for fuel line, for 1/4" tubing....	2		1		225	YD-12	RUBBER NIPPLE for spark plug.....	1		1	
189	RP-902	FUEL LINE , tubing with nuts and 2 RF-270 elbows	1		4		226	YL-118	IGNITION WIRE	1		2	
190	SA-61	PLATE for valve tappet inspection	1		4				STANDARD HARDWARE				
191	SA-80	COVER for oil pump body.....	1		1				NOTE: The following nuts, capscrews, and etc., are of a common hardware variety and can be purchased from local plumbing, hardware or accessory stores.				
192	SD-53-K	ENGINE INSTRUCTION PLATE	1		1		230	LJ-315	PIPE NIPPLE , 1" x 2-1/2" long	1		2	
		SD-53-F, replaced by SD-53-K. When ordering instruction plate, give Model, Specification and Serial Numbers for correct stamping.							For mounting muffler.				
193	SE-53A-S1	AIR SHROUD ASSEMBLY	1	2	8		232	PD-9	NUT , 1/4"-28 thread, hexagon steel	3		1	
194	SE-161-S1	ROTATING SCREEN with washers.....	1		6				2-for carburetor mounting. 1-for governor control lever.				
195	TC-321	SPACER for governor	1		2		233	PD-10	NUT , 5/16"-24 thread, hexagon steel ..	1		1	
196	TC-322-S1	FLYWEIGHT ASSEMBLY for governor ..	2		2-5				For magneto mounting, upper hole.				
		Consisting of: 1 TC-322 Flyweight 1 TC-328-D Pin					234	PD-77	NUT , 1/4"-20 thread, hexagon steel	3		1	
198	TC-323	SLEEVE for governor thrust.....	1		2				2-for fuel tank strap clamp screws. 1-for governor spring adjusting screw pin.				
199	TC-324-C	GOVERNOR YOKE and SHAFT	1		3		235	PD-115	NUT , No. 10-32 thread, hexagon steel ..	2		1	
200	TC-325	BRACKET	1		3				For governor spring adjusting screw.				
		For governor yoke shaft support.											
204	TC-330	PIN for governor spring adjusting screw	1		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.

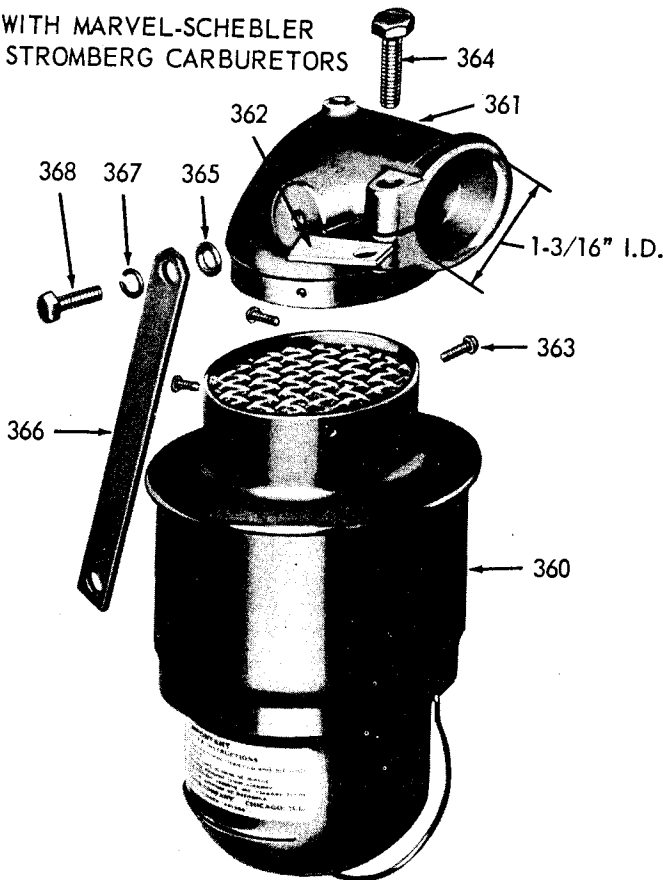
PARTS INTERCHANGEABLE ON MODELS ACN AND BKN

Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
236	PE-3	LOCKWASHER, 1/4" Positive 2-for air shroud to crankcase. 4-for main bearing plate, flywheel end. 2-for oil trough mounting. 2-for tank strap clamp screws.	10		1	262	XD-11	SCREW, 1/4"-20 thread x 2" long, hexagon head For valve tappet inspection plate.	1		1
237	PE-4	LOCKWASHER, 5/16" Positive 2-for magneto mounting. 1-for tank bracket to cylinder head mounting.	3		1	264	XD-15	SCREW, 5/16"-18 thread x 3/4" long, hexagon head For main bearing plate, take-off end.	4		1
238	PE-5	LOCKWASHER, 3/8" Positive For mounting fuel tank bracket.	2		1	265	XD-25	SCREW, 3/8"-16 thread x 3/4" long, hexagon head For mounting fuel tank support to crankcase.	2		1
240	PF-25	PLUG, 3/8" slotted steel pipe For timing inspection hole in crankcase	1		1	267	XI-32	COTTER PIN, 3/64" dia. x 3/8" long, steel For governor control rod.	1		1
241	PH-30	WASHER, 1/4" I.D. x 7/16" O.D. x 1/16" thick, plain copper 1-for valve inspection plate mounting. 10-for engine base mounting.	11		1	268	XK-2	PLUG, 1/4" square head pipe For oil drain.	1		2
242	PH-30-A	WASHER, 1/4" I.D. x 7/16" O.D. x 1/16" thick, plain steel For governor spring adjusting screw pin	1		1	269	XK-4	PLUG, 1/2" square head pipe For oil filler.	1		2
243	PH-77	WASHER, 5/16" I.D. x 5/8" O.D. x 1/16" thick, plain steel For cylinder head mounting.	7		1						
246	PH-412	WASHER, 5/16" I.D. x 1/2" O.D. x 1/16" thick, plain steel For main bearing plate, take-off end.	4		1						
248	PL-17	WOODRUFF KEY, No. 13 For flywheel mounting.	1		1						
249	PL-21	WOODRUFF KEY, No. 3 For crankshaft gear mounting.	1		1						
250	RF-934	NIPPLE, 1/8" x 1" long, pipe For fuel strainer mounting. RF-794, replaced by RF-934.	1		1						
252	SA-26	EXPANSION PLUG, 5/8" For camshaft support pin hole.	2		1						
254	XA-34	SCREW, 1/4"-20 thread x 1/2" long, round head For air shroud to case mounting.	2		1						
255	XA-52	SCREW, 1/4"-20 thread x 1-1/2" long, round head For fuel tank straps.	2		1						
256	XA-64	SCREW, Parker Kalon No. 2, Type 'Z', 3/16" long, self-tapping round head For oil trough cover mounting.	2		1						
257	XA-67	SCREW, Parker Kalon No. 4, Type 'A', 1/4" long, stove-head, self-tapping sheet metal For instruction plate mounting.	4		1						
259	XD-4	SCREW, 1/4"-20 thread x 1/2" long, hexagon head For bearing plate, flywheel end.	4		1						
260	XD-6	SCREW, 1/4"-20 thread x 3/4" long, hexagon head 10-for mounting engine base. 2-for governor shaft brackets.	12		1						
261	XD-7	SCREW, 1/4"-20 thread x 1" long, hexagon head For mounting oil trough.	2		1						

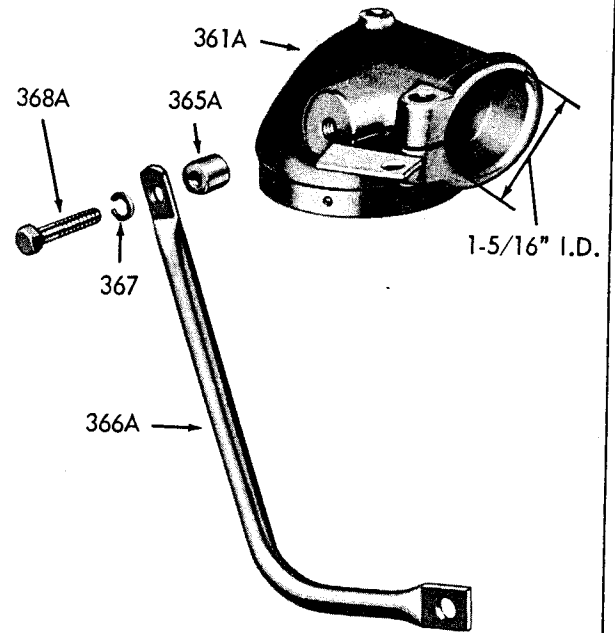
Order parts from nearest **SERVICE STATION** shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

STANDARD OIL BATH AIR FILTER FOR MODELS ACN AND BKN ENGINE

WITH MARVEL-SCHEBLER
OR STROMBERG CARBURETORS



WITH ZENITH
CARBURETOR

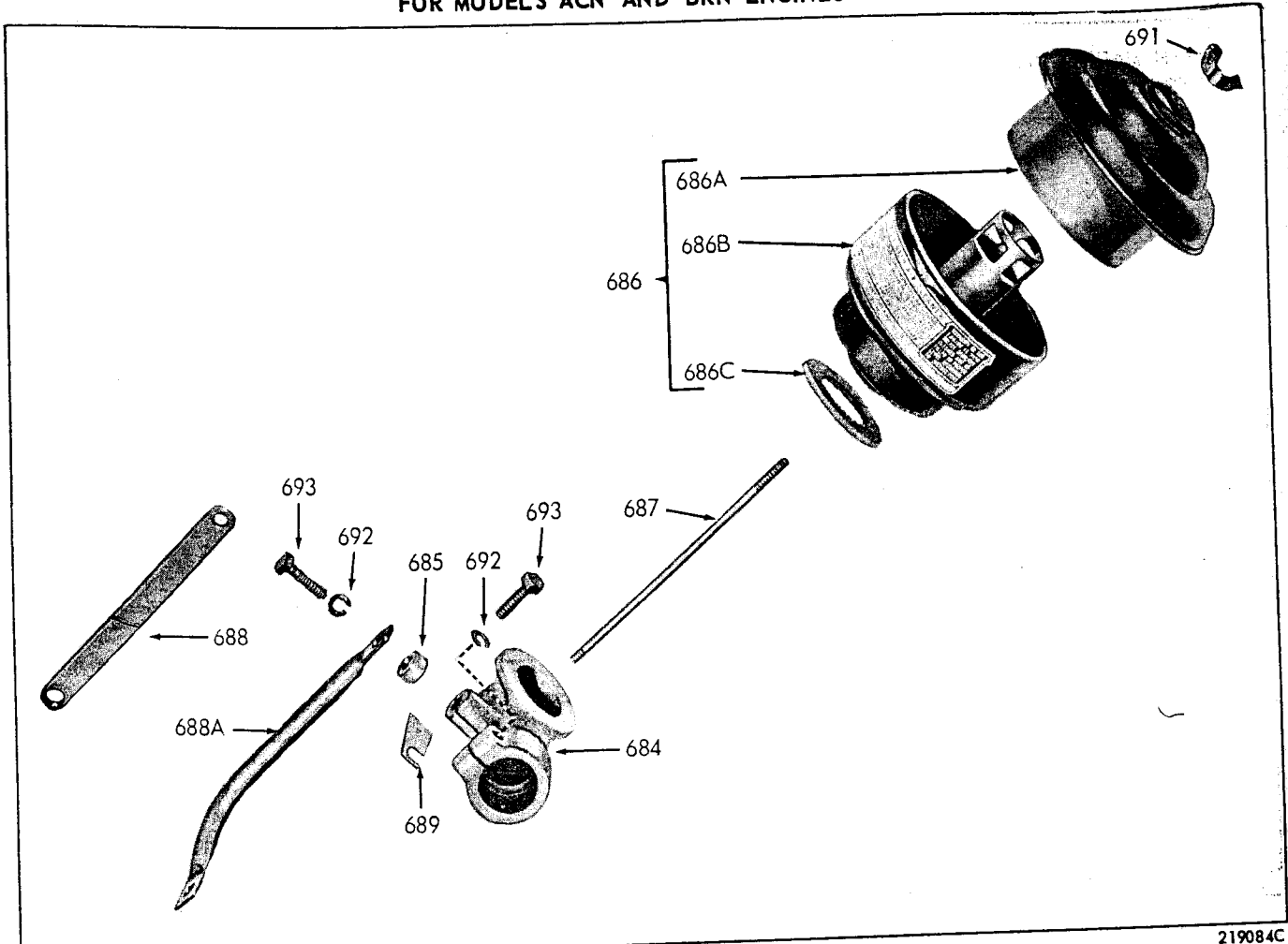


201269C

Ref. No.	PART NUMBER		Description	No. Req	Ref. No.	PART NUMBER		Description	No. Req
	With Marvel-Schebler or Stromberg Carburetors, 1-3/16" D. Air Horn	With Zenith Carburetor, 1-5/16" D. Air Horn				With Marvel-Schebler or Stromberg Carburetors, 1-3/16" D. Air Horn	With Zenith Carburetor, 1-5/16" D. Air Horn		
360	LO-113-S1	LO-113-S2	AIR FILTER and BRACKET ASSEMBLY - Complete	1	364	XB-20	XB-20	SCREW for bracket clamp 1/4"-20 thread x 1" long.	1
	LO-113	LO-113	AIR FILTER, United Specialties No. 76B1	1	365	PH-84		SPACER for support strap... 1/16" long.	1
			Service Parts:		365A		HF-363	SPACER, 9/16" long	1
			1316B1 Body assembly ..	1	366	PG-287		SUPPORT STRAP (flat).....	1
			417A1K10 Baffle	1	366A		PG-668	SUPPORT STRAP (tubular).	1
			1317B1 Oil cup assembly	1	367	PE-3	PE-3	LOCKWASHER for support strap, 1/4" Positive	1
			B6331 Cup fastener	1	368	XD-6		SCREW for support strap... 1/4"-20 x 3/4" long, hex. head.	1
			A6339 Decal	1	368A		XD-8	SCREW, 1/4"-20 thread x 1 1/4" long, hexagon head.....	1
361	BI-298-S1		BRACKET ASSEMBLY	1					
361A		BI-298-1-S1	BRACKET ASSEMBLY	1					
			Bracket Assembly includes the next 3 items:						
362	QD-647	QD-647	GASKET for bracket.....	1					
363	XA-86	XA-86	SCREW for air filter	3					
			Type 'Z' No. 6 x 3/8" long, self-tapping, round head.						

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.

UPRIGHT OIL BATH AIR CLEANER FOR MODELS ACN AND BKN ENGINES

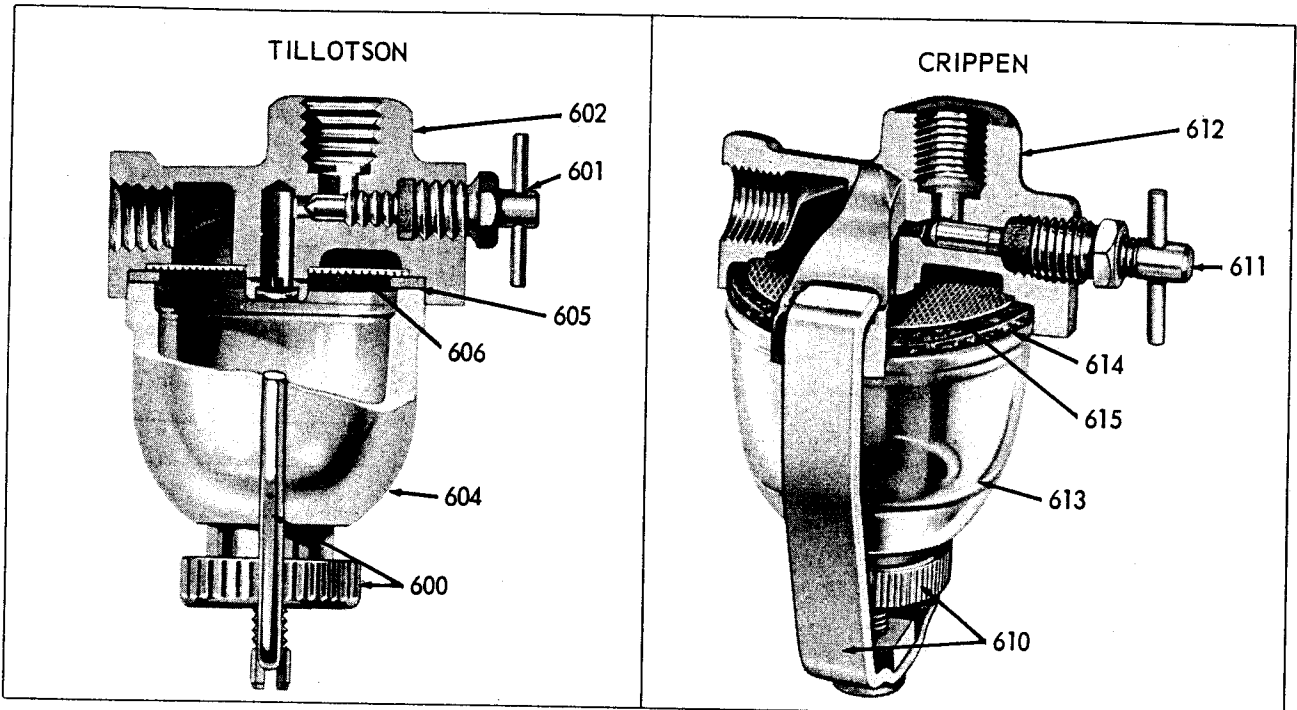


219084C

Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
684	BI-289-51 (1-3/16" Air Horn)	AIR CLEANER BRACKET ASSEMBLY.. For Marvel-Schebler Carburetor. Consisting of: 1 BI-289 Bracket 1 PC-445 Stud 1 PE-3 Lockwasher 1 QD-647 Gasket 1 XD-7 Screw	1		8	688	PG-287	SUPPORT STRAP (Flat)..... With Marvel-Schebler Carburetor.	1		2
	BI-289-1-51 (1-5/16" Air Horn)	AIR CLEANER BRACKET ASSEMBLY.. For Zenith Carburetor.			8	688A	PG-668	SUPPORT STRAP (Tubular)..... With Zenith Carburetor.			3
685	HF-52	SPACER for support strap With Zenith Carburetor.	1		1	689	QD-647	GASKET for bracket.....	1		1
686	LO-87	AIR CLEANER , United Specialties No. H-40-9385.....	1	1	8	STANDARD HARDWARE					
686A		A-12196 Upper half and decal assembly	1		13						
686B		A-10186 Body, center tube and decal assembly	1		10						
686C		A-10153 Gasket.....	1		1						
687	PC-445	STUD for mounting air cleaner.....	1		2	691	PD-147	WING NUT , 1/4"-20 thread For mounting air cleaner.	1		1
						692	PE-3	LOCKWASHER , 1/4" Positive 1-for clamp screw. 1-for mounting support strap.	2		1
						693	XD-7	SCREW , 1/4"-20 thread x 1" long, hexagon head 1-for mounting support strap to bracket. 1-for bracket clamp.	2		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.

LP-43 FUEL STRAINER ASSEMBLIES



107091C

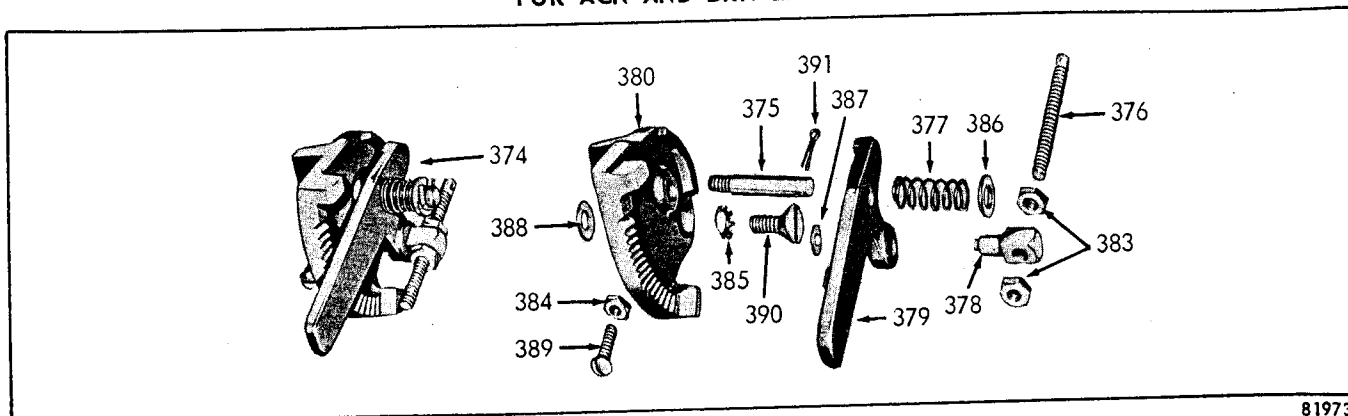
202405C

NOTE: The LP-43 small fuel strainer is furnished by either the TILLOTSON or CRIPPEN Companies. The strainers are interchangeable as complete units, but only the glass bowl, gasket and screen are interchangeable as service replacement parts.

Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
	OW-480-T	TILLOTSON FUEL STRAINER ASSEMBLY (Wisconsin No. LP-43).....	1	6							
600	07766	CLAMP WIRE and NUT ASSEMBLY	1	1							
601	07769	NEEDLE VALVE ASSEMBLY Includes 0705 Packing.	1	1	610	100-A	BAIL ASSEMBLY	1	2		
602	07770	COVER	1	2	611	100-6-7-8-9	NEEDLE VALVE ASSEMBLY..... Includes 100-9 Packing.	1	1		
	08322	REPAIR PARTS KIT	1	3	612	100-1	COVER	1	2		
		Consisting of:				100-19	REPAIR PARTS KIT	1	3		
601		07769 Needle Valve Assembly	1	1	611		100-6-7-8-9 Needle Valve Assembly.....	1	1		
604		07759 Glass Bowl.....	1	1	613		100-2 Glass Bowl	1	1		
605		08227 Thiokol Gasket	1	1	614		100-10N Neoprene Gasket.....	1	1		
606		07762 Screen	1	1	615		100-11 Screen.....	1	1		
- OPTIONAL -											
					830		CRIPPEN FUEL STRAINER ASSEMBLY (Wisconsin No. LP-43)	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.

**VE-363-A VARIABLE SPEED GOVERNOR CONTROL
FOR ACN AND BKN ENGINES**

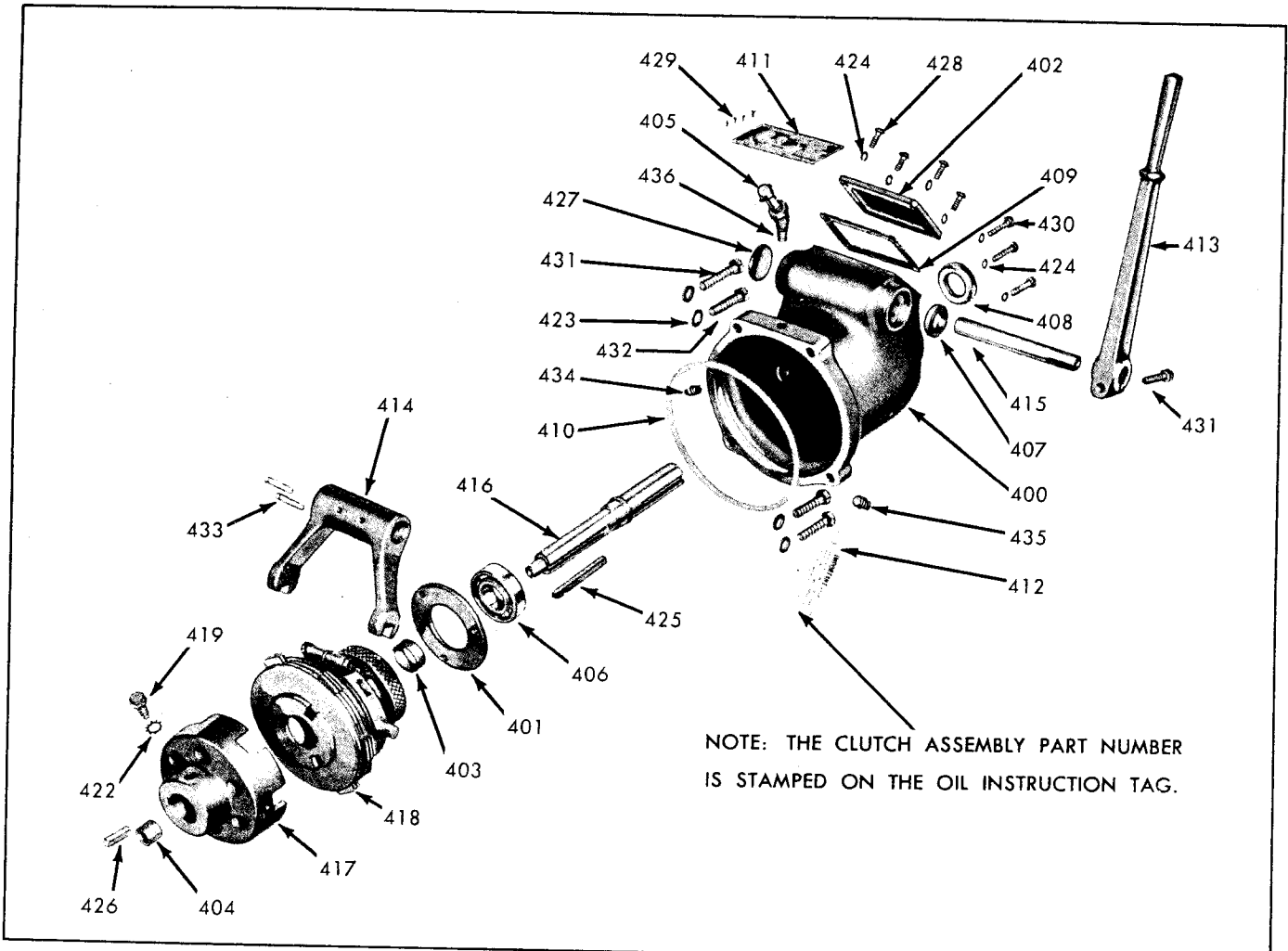


81973C

Ref. No.	Part Number	Description	No. Req.	Net Weight	
				Lbs.	Oz.
374	VE-363-A	CONTROL ASSEMBLY COMPLETE	1		8
375	PC-393-2	PIN for lever support	1		1
376	PI-121	SCREW for governor spring adjusting	1		1
		(engine part, and not considered as part of VE-363-A assembly).			
377	PM-117	SPRING for lever support pin	1		1
378	TC-301-3	BLOCK for adjusting screw connecting	1		1
379	VB-112	CONTROL LEVER	1		3
380	VC-22-C	CONTROL BRACKET	1		12
STANDARD HARDWARE					
383	PD-115	NUT , No. 10-32 thread, hexagon steel nut	2		1
		For governor spring adjusting screws.			
384	PD-153	NUT , No. 8-32 thread, hexagon steel nut	1		1
		For bracket mounting.			
385	PE-55	WASHER , 1/4" countersunk everlock lockwasher	1		1
		For bracket support screw.			
386	PH-84	WASHER , 1/4" I.D. x 1/2" O.D. x 1/16" thick, plain steel	1		1
		For support pin spring.			
387	PH-253	WASHER , 5/32" I.D. x 3/8" O.D. x 1/32" thick, plain steel	1		1
388	QD-695	WASHER , 1/4" I.D. x 1/2" O.D. x 1/16" thick, Vellumoid	1		1
		For bracket support screws.			
389	XA-6	SCREW , No. 8-32 thread x 5/8" long, round head	1		1
		For bracket support.			
390	XC-14	SCREW , 1/4"-20 thread x 5/8" long, flat head	1		1
		For bracket mounting.			
391	XI-1	COTTER PIN , 1/16" dia. x 1/2" long, steel	1		1
		For lever support pin.			

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.

WW-37 CLUTCH AND POWER TAKE-OFF ASSEMBLY



84070C

NOTE: Engines equipped with a Clutch and Power Take-off Assembly require a special Cylinder-Crankcase, Main Bearing Plate and Crankshaft as follows:

BG-170-8-S1 MAIN BEARING PLATE (not illustrated) consisting of:
 1 PH-593 Cork strip
 1 PH-294 Manufactured oil seal
 BG-170-1-S1 (with cork seal), replaced by BG-170-8-S1.

CA-51-6-S3 CRANKSHAFT ASSEMBLY (not illustrated) consisting of:
 1 GA-34-A Gear
 2 ME-88-1 Bearing cup
 1 PL-21 Key
 1 HG-182 Bushing
 2 ME-88-2 Bearing cone

THE PART NUMBER OF THE CYLINDER AND CRANKCASE CAN BE FOUND STAMPED ON THE FUEL TANK MOUNTING PAD OF THE CRANKCASE.

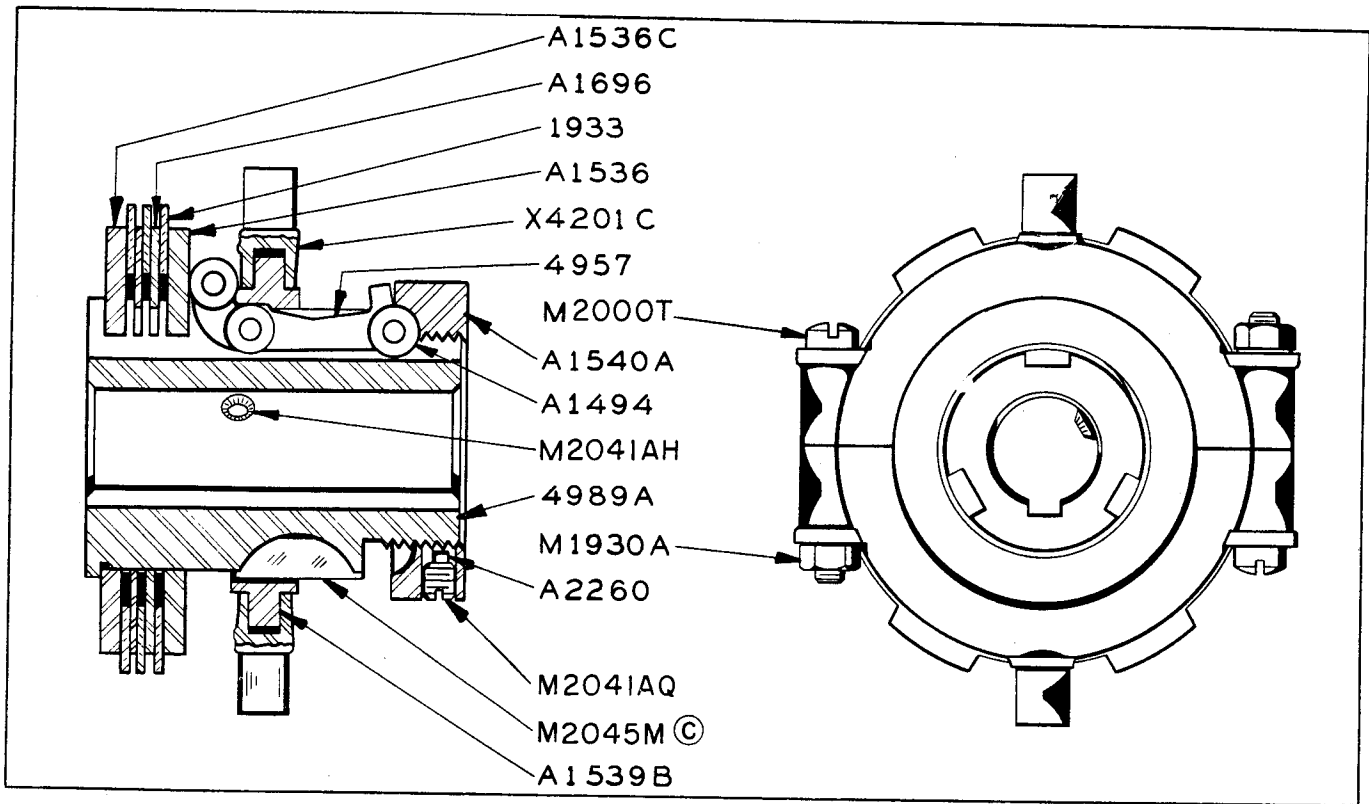
Order parts from nearest **SERVICE STATION** shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

**WW-37 CLUTCH AND POWER TAKE-OFF ASSEMBLY
FOR ACN AND BKN ENGINES**

Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz.					Lb	Oz.
	WW-37	CLUTCH and POWER TAKE-OFF ASSEMBLY Consisting of:		26		424	PH-30-A	WASHER, 1/4" I.D. x 7/16" O.D. x 1/16" thick, plain steel 3-for bearing retainer plate. 4-for inspection hole cover.	7		1
400	BG-185	CLUTCH HOUSING	1	10		425	PL-44	KEY, 1/4" square x 2-1/2" long For clutch mounting.	1		1
401	BG-186	PLATE for bearing retainer.....	1		5	426	PL-86	KEY, 1/4" square x 1" long For clutch drive hub mounting.	1		1
402	BH-115	COVER for inspection hole	1		8	427	SA-58	PLUG, 1-3/8" expansion	1		1
403	HF-330	SPACER for bearing	1		1	428	XA-35	SCREW, 1/4"-20 thread x 5/8" long, round head	4		1
404	HG-182	BEARING for shaft pilot	1		1			For inspection hole cover.			
405	LO-44	BREATHER	1		4	429	XA-100	SCREW, No. 4 x 1/4" round head metallic drive	4		1
406	ME-101	BEARING for take-off shaft.....	1		5			For clutch adjustment plate. XA-68, replaced by XA-100.			
407	PH-234-A	OIL SEAL for shifter lever shaft	1		1	430	XD-8	SCREW, 1/4"-20 thread x 1-1/4" long, hexagon head.....	3		1
408	PH-272-B	OIL SEAL for take-off shaft	1		2			For bearing retainer plate.			
		PH-272-A, replaced by PH-272-B.				431	XD-30	SCREW, 3/8"-16 thread x 1-1/2" long, hexagon head.....	4		1
409	QD-551	GASKET for inspection hole cover.....	1		1			3-for mounting housing. 1-for clamping shifter lever.			
410	QD-593	CORK SEAL for around main bearing plate of engine.....	1		1	432	XD-30-4	SCREW, 3/8"-16 thread x 1-3/8" long, hexagon head.....	1		1
411	SD-59	INSTRUCTION PLATE	1		1			For mounting housing, upper R.H. hole.			
		For clutch adjustment.				433	XH-26	PIN, No. 4 x 1-3/8" long, taper.....	2		1
412	SD-79	TAG for oil instruction.....	1		1			For shifter yoke.			
413	VB-55-1	SHIFTER LEVER	1		2	434	XK-1	PLUG, 1/8" square head pipe	1		1
414	VB-99	SHIFTER YOKE	1		8			For oil lever hole.			
415	WA-61-1	SHIFTER SHAFT	1		1	435	XK-2	PLUG, 1/4" square head pipe	1		1
416	WA-70	TAKE-OFF SHAFT	1		8			For oil drain hole.			
417	WC-238	CLUTCH DRIVE HUB.....	1		12	436	XK-77	STREET ELL, 1/8" x 45°	1		1
418	WC-239	CLUTCH..... Twin Disc Model 'V' 3 1/2 No. XA-3033.	1		14			For mounting breather.			
419	XD-14-2	SET SCREW for clutch drive hub	1		1						
		STANDARD HARDWARE									
422	PE-46	LOCKWASHER, 5/16" external everlock For drive hub set screw.	1		1						
423	PH-22	WASHER, 3/8" I.D. x 11/16" O.D. x 1/16" thick, plain steel	4		1						
		For clutch housing mounting.									

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.

WC-239 CLUTCH ASSEMBLY



WISCONSIN MOTOR PART NO. WC-239

REPAIR PARTS LIST FOR TWIN DISC XA3033 MODEL V3035 CLUTCH, SPECIFICATION 16251

4989A	1	HUB
		BORE .874, Ky. 1/4 x 1/8
M2041AH	1	CUP PT SET SCREW (5/16-18 NC x 1/2)
		M1360, replaced by M2041AH.
X-361	1	MISCELLANEOUS CLUTCH PARTS
		X4201C 1 Cone Collar Assembly
		Includes:
		M2000T 2 Fillister Head Cap Screws (1/4-28 NF x 2")
		M496, replaced by M2000T.
		M1930A 2 Hexagon Nuts (1/4-28 NF)
A1539B	1	Wedge Sleeve
A1536	1	Clamping Plate
4957	6	Levers
A1494	9	Lever Rollers
A1540A	1	Adjusting Nut
M2041AQ	1	Adjusting Nut Screw
		A1523, replaced by M2041AQ.
A2260	1	Lock Wire
A1536C	1	Back Clamping Plate
(C) M2045M	1	Hi-Pro Key (141 Special)
		M584, replaced by M2045M.
A1791	1	Instruction Plate (not illustrated)
M422	4	Drive Pins (not illustrated)
1933	3	Driving Plates
A1696	2	Driven Plates

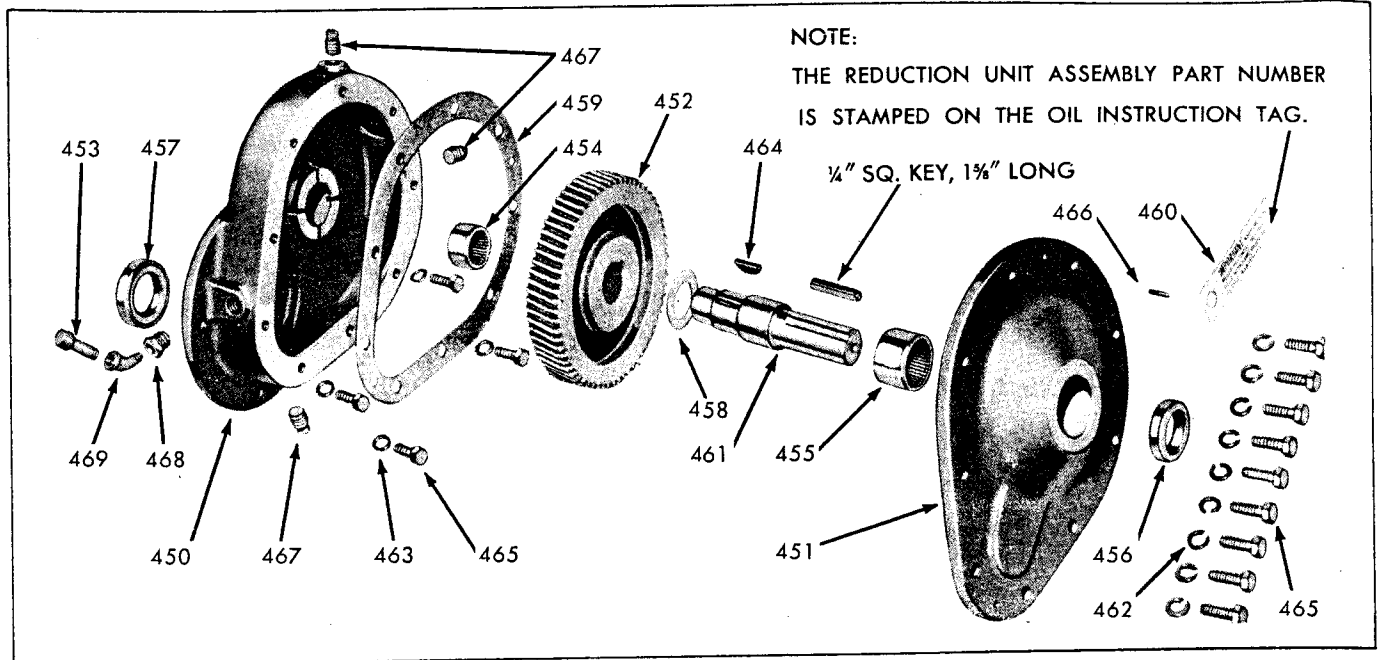
(C) Replaces 1711 Key

NOTE: The 1711 Key was formerly used on this unit. However, on March 21, 1946, it was replaced by M584 Hi-Pro Key which is replaced by M2045, 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.

TWIN DISC CLUTCH COMPANY
Racine, Wisconsin

**WW-35-C, 3/4 TO 1 GEAR REDUCTION UNIT ASSEMBLY
FOR ACN AND BKN ENGINES**



86144C-1

NOTE: Engines equipped with this reduction unit require a
CA-51-65-S1 Crankshaft Assembly (13 tooth Spiral Gear)
with bearings, gear and key (not illustrated)

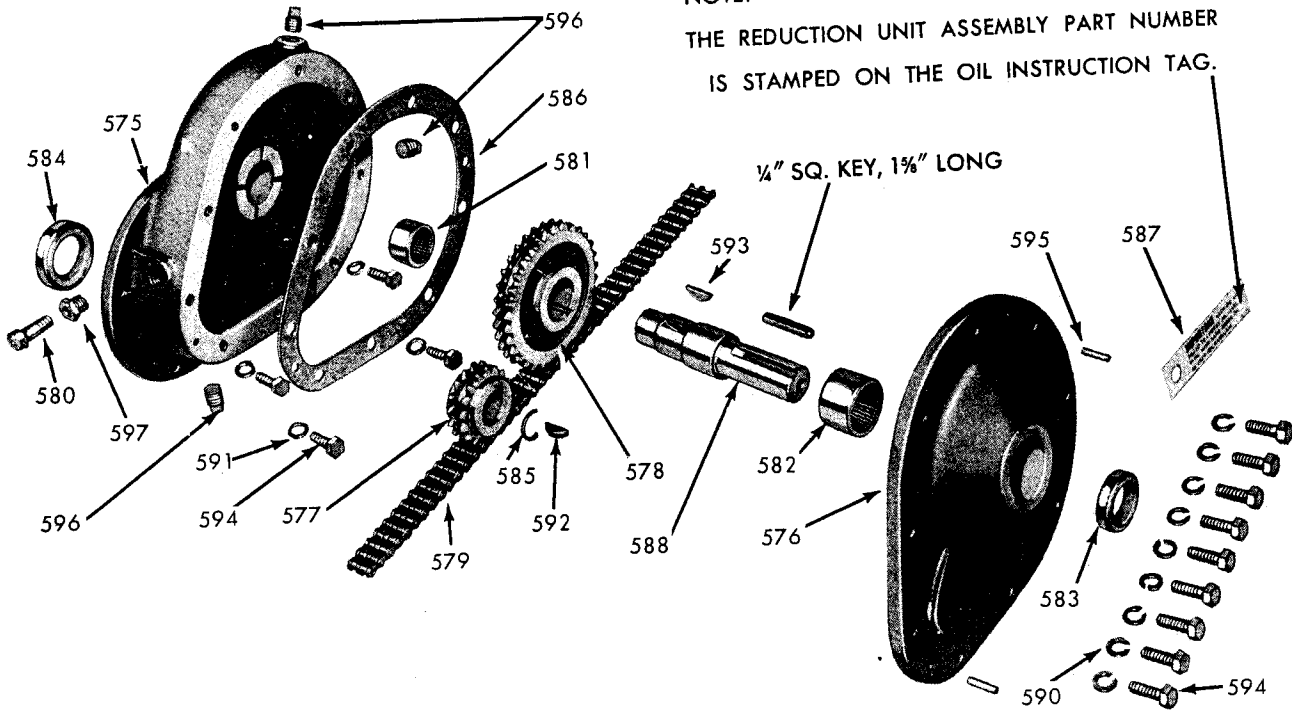
Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
	WW-35-C	SPIRAL GEAR REDUCTION UNIT..... Consisting of:		12				STANDARD HARDWARE			
450	BG-177-A-1	MAIN HOUSING and ENGINE BEARING PLATE	1	5	12	462	PE-4	LOCKWASHER, 5/16" Positive	7		1
451	BH-125	COVER for housing	1	1	10	463	PH-14-D	WASHER, 5/16" I.D. x 19/32" O.D. x 1/16" thick, plain steel	4		1
452	GG-87-1	DRIVEN SPIRAL GEAR, 42 teeth.....	1	2		464	PL-16	KEY, No. 11 Woodruff	1		1
453	LO-44	BREATHER	1		4	465	XD-16	SCREW, 5/16"-18 thread x 7/8" long, hexagon head	11		1
454	ME-90	INNER BEARING	1	1				7-for cover mounting, 4-for housing mounting.			
455	ME-91	OUTER BEARING	1	2		466	PA-289	PIN, No. 2 x 5/8" long, half length taper Groov-Pin cover to housing.....	2	1	
456	PH-264-A	OIL SEAL for take-off shaft	1	2		467	XK-2	PLUG, 1/4" square head pipe	3	1	
457	PH-280	OIL SEAL for crankshaft.....	1	2		468	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe For breather mounting.	1	1	
458	PH-333-A	THRUST WASHER for driven gear.....	1	1		469	XK-77	STREET ELL, 1/8" x 45°	1	1	
459	QD-582	GASKET for cover to housing	1	1				For breather mounting.			
460	SD-79	TAG for oil instructions	1	1							
461	WA-68	TAKE-OFF SHAFT.....	1	1	8						

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.

WW-45-B, 2.92 TO 1 CHAIN DRIVE REDUCTION UNIT ASSEMBLY FOR ACN AND BKN ENGINES

NOTE:

THE REDUCTION UNIT ASSEMBLY PART NUMBER IS STAMPED ON THE OIL INSTRUCTION TAG.



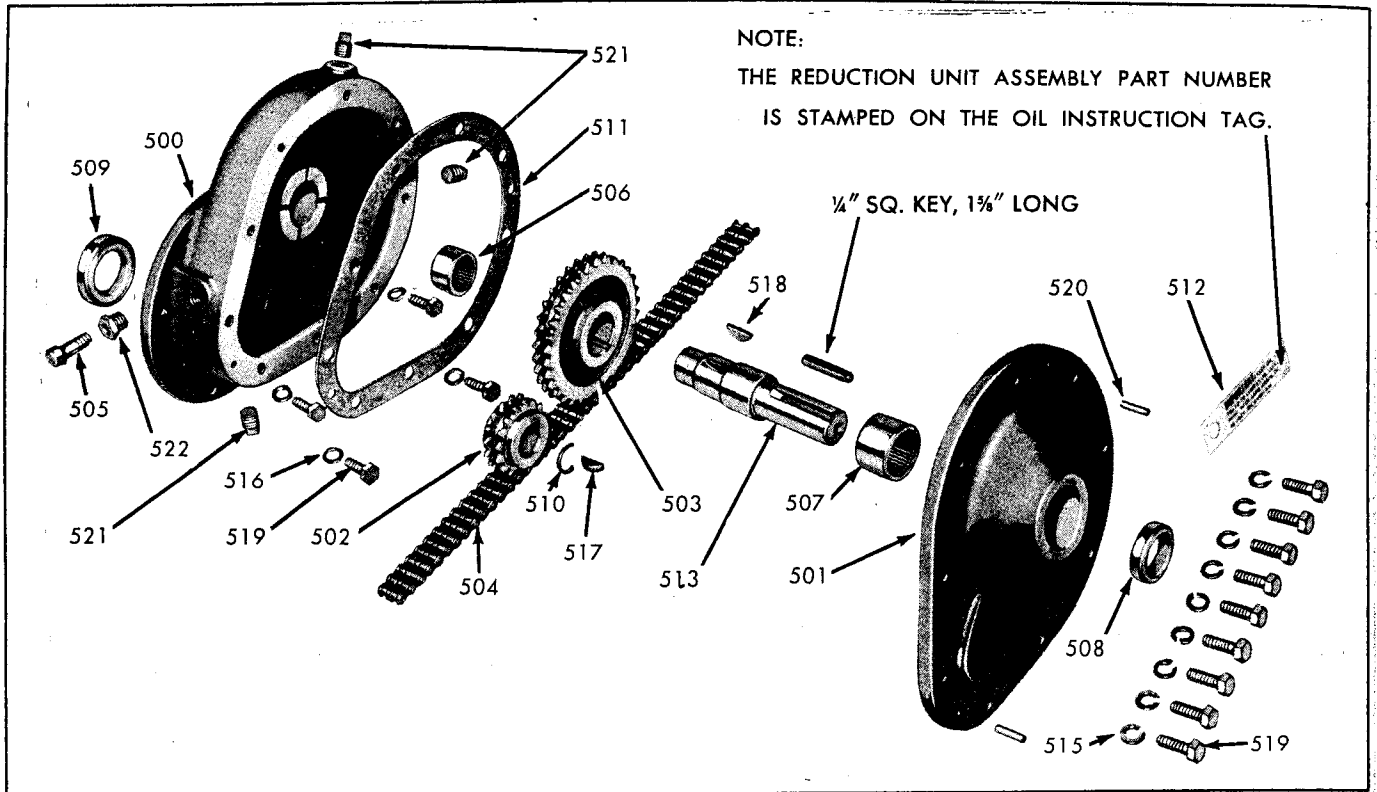
84071C

NOTE: Engines equipped with this reduction unit require a
CA-51-14-51 Crankshaft Assembly (not illustrated)
Consisting of:
1 GA-34-A Gear 2 ME-88-2 Bearing Cones
2 ME-88-1 Bearing Cups 1 PL-21 Key

Ref. No.	Part Number	Description	No.			Ref. No.	Part Number	Description	No.		
			Req	Lb	Oz				Req	Lb	Oz
	WW-45-B	REDUCTION UNIT ASSEMBLY Engine-wise rotation. Consisting of:		17				STANDARD HARDWARE			
75	BG-195-A-2	MAIN HOUSING and ENGINE BEARING PLATE	1	9	8	590	PE-4	LOCKWASHER, 5/16" Positive For cover mounting.	9		1
76	BH-131-A-2	COVER for housing	1	2	8	591	PH-14-D	WASHER, 5/16" I.D. x 19/32" O.D. x 1/16" thick, plain steel For housing to crankcase mounting.	4		1
77	GG-129	DRIVE SPROCKET, 13 teeth	1		9	592	PL-15	KEY, No. 9 Woodruff	1		1
78	GG-130	DRIVEN SPROCKET, 38 teeth	1	3	4	593	PL-16	KEY, No. 11 Woodruff	1		1
79	GJ-18	CHAIN, 3/8" pitch, 45 pitches long	1		1	594	XD-16	SCREW, 5/16"-18 thread x 7/8" long, hexagon head.....	13		1
80	LO-44	BREATHER	1		4			9-for cover mounting. 4-for housing mounting.			
81	ME-90	INNER BEARING	1	1	1	595	PA-289	PIN, No. 2 x 5/8" long, half length taper Groov-Pin, for cover to housing.	2		1
82	ME-91	OUTER BEARING	1		2			XH-41, No. 2 x 3/4" long, taper pin.....	2		1
83	PH-264-A	OIL SEAL for take-off shaft	1		2	596	XK-2	PLUG, 1/4" square head pipe	3		1
84	PH-280	OIL SEAL for crankshaft	1		1	597	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe For breather mounting.	1		1
85	PK-76	RETAINER RING for drive sprocket	1		1						
86	QD-596	GASKET for cover to housing	1		1						
87	SD-79	TAG for oil instructions	1		1						
88	WA-68	TAKE-OFF SHAFT	1	1	8						

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.

**WW-45-C, 2 TO 1 CHAIN DRIVE REDUCTION UNIT ASSEMBLY
FOR ACN AND BKN ENGINES**



NOTE: Engines equipped with this reduction unit require a
CA-51-14-S1 Crankshaft Assembly (not illustrated)
Consisting of
1 GA-34-A Gear 2 ME-88-2 Bearing Cones
2 ME-88-1 Bearing Cups 1 PL-21 Key

84071C

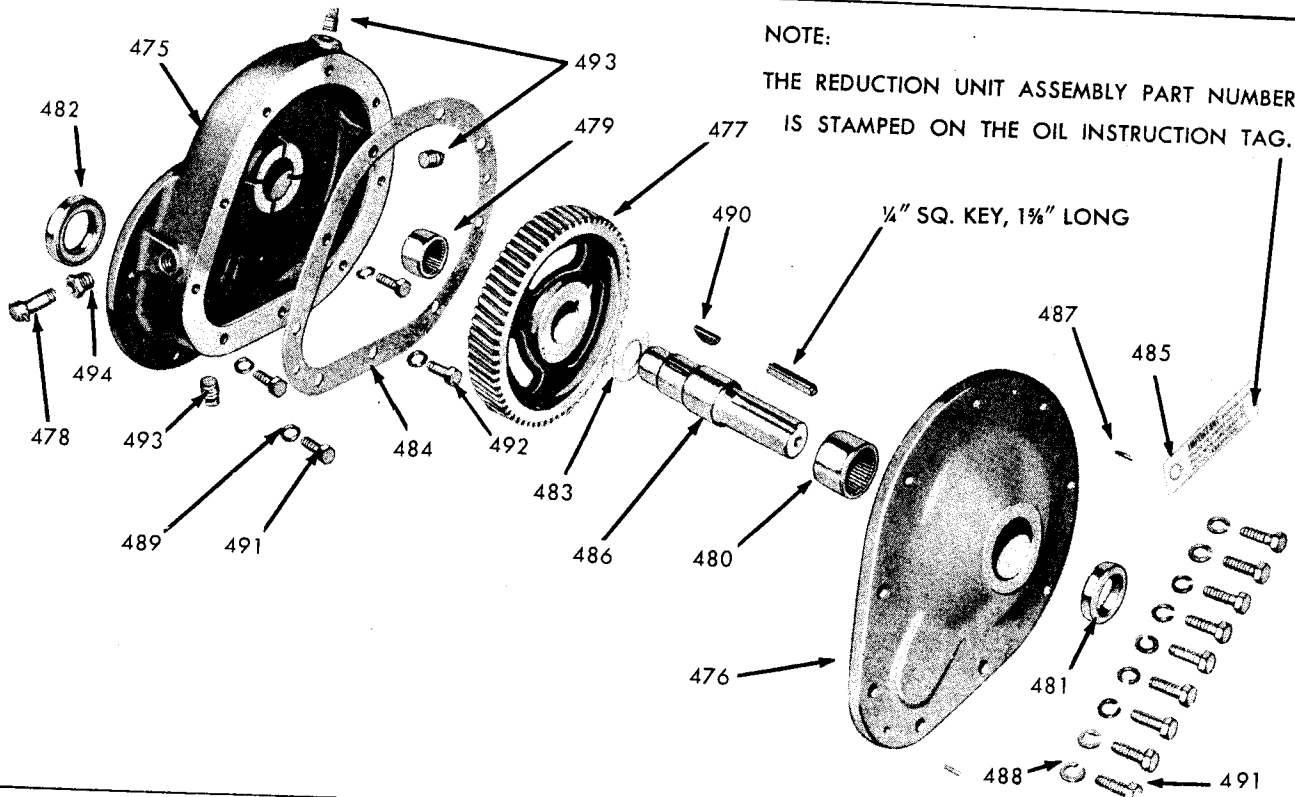
Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
	WW-45-C	REDUCTION UNIT ASSEMBLY Engine-wise rotation. Consisting of:		17				STANDARD HARDWARE			
500	BG-195-A-1	MAIN HOUSING and ENGINE BEARING PLATE	1	9	8	515	PE-4	LOCKWASHER, 5/16" Positive For cover mounting.	9	1	
501	BH-131-A-1	COVER for housing.....	1	2	8	516	PH-14-D	WASHER, 5/16" I.D. x 19/32" O.D. x 1/16" thick plain steel For housing to crankcase mounting.	4	1	
502	GG-104	DRIVE SPROCKET, 16 teeth.....	1		7	517	PL-15	KEY, No. 9 Woodruff..... For drive sprocket.	1	1	
503	GG-105	DRIVEN SPROCKET, 32 teeth	1		3	518	PL-16	KEY, No. 11 Woodruff..... For driven sprocket.	1	1	
504	GJ-13	CHAIN, 3/8" pitch, 42 pitches long.....	1		12	519	XD-16	SCREW, 5/16"-18 thread x 7/8" long, hexagon head	13		
505	LO-44	BREATHER.....	1		4	520	PA-289	PIN, No. 2 x 5/8" long, half length taper Groov-Pin for cover to housing	2	1	
506	ME-90	INNER BEARING	1		1			XH-41, No. 2 x 3/4" long, taper pin	2	1	
507	ME-91	OUTER BEARING	1		2	521	XK-2	PLUG, 1/4" square head pipe	3	1	
508	PH-264-A	OIL SEAL for take-off shaft	1		2	522	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe For breather mounting.	1		
509	PH-280	OIL SEAL for crankshaft	1		2						
510	PK-76	RETAINER RING for drive sprocket.....	1		1						
511	QD-596	GASKET for cover to housing.....	1		1						
512	SD-79	TAG for oil instructions	1		1						
513	WA-68	TAKE-OFF SHAFT	1		8						

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.

**WW-45-K, 5½ TO 1 GEAR REDUCTION UNIT ASSEMBLY
FOR ACN AND BKN ENGINES**

NOTE:

THE REDUCTION UNIT ASSEMBLY PART NUMBER IS STAMPED ON THE OIL INSTRUCTION TAG.



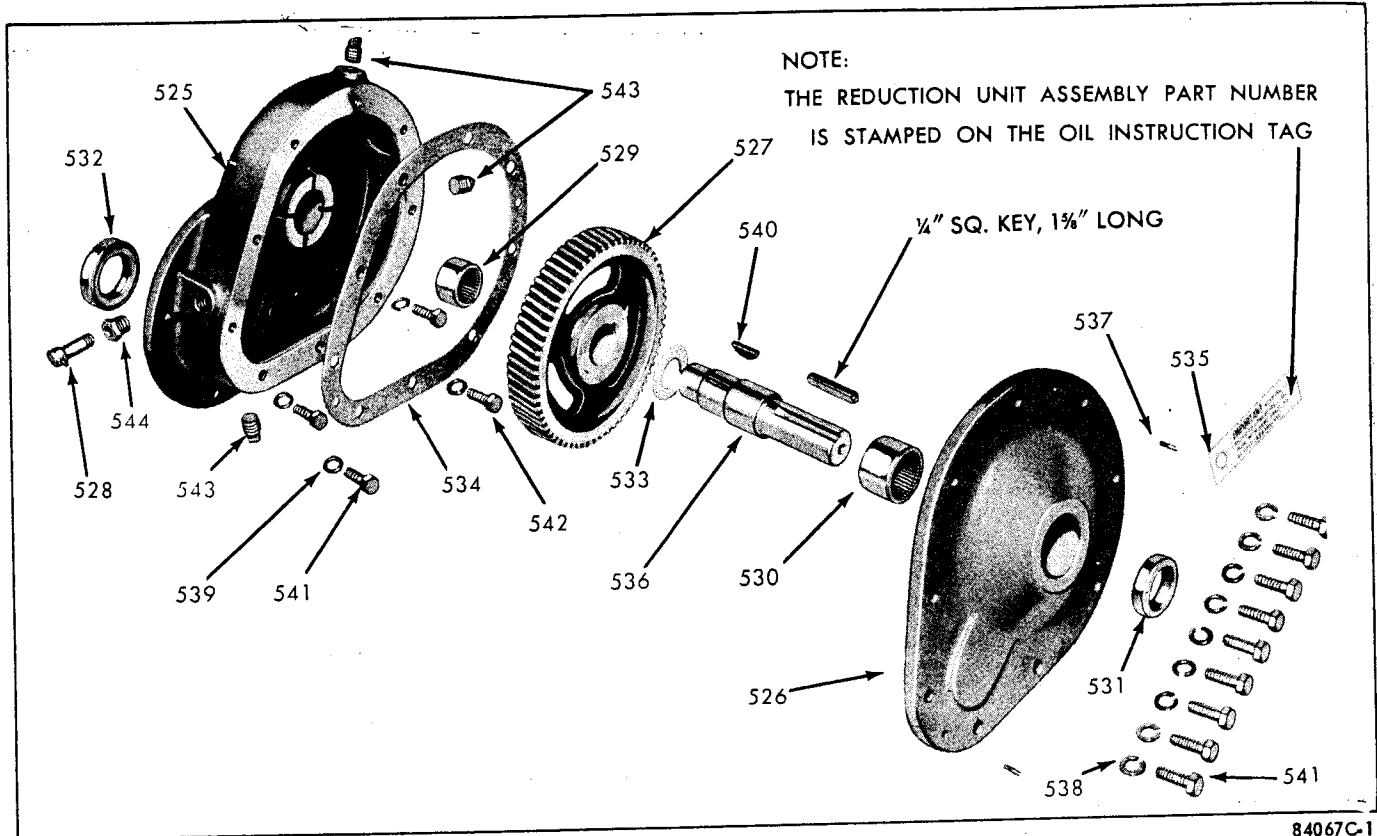
NOTE: Engines equipped with this reduction unit require a CA-51-65-S1 Crankshaft Assembly (13 tooth Spiral Gear) with bearings, gear and key (not illustrated)

84067C-1

Ref. No.	Part Number	Description	No. Req.	Net Wt.		Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz					Lb	Oz
	WW-45-K	SPIRAL GEAR REDUCTION UNIT Consisting of:		17				STANDARD HARDWARE			
1	75	BG-195-A MAIN HOUSING and ENGINE BEARING PLATE	1	9	8	487	PA-289	PIN, No. 2 x 5/8" long, half length taper Groov-Pin cover to housing	2		1
1	76	BH-131-A COVER for housing	1	2	8	488	PE-4	LOCKWASHER, 5/16" Positive	9		1
1	77	GG-90-8 DRIVEN SPIRAL GEAR, 71 teeth	1	4	8	489	PH-14-D	WASHER, 5/16" I.D. x 19/32" O.D. x 1/16" thick, plain steel	4		1
1	78	LO-44 BREATHER	1		4	490	PL-16	KEY, No. 11 Woodruff	1		1
1	79	ME-90 INNER BEARING	1		1	491	XD-16	SCREW, 5/16"-18 thread x 7/8" long, hexagon head	11		1
1	80	ME-91 OUTER BEARING	1		2	492	XD-17	SCREW, 5/16"-18 thread x 1" long, hexagon head	2		1
1	81	PH-264-A OIL SEAL for take-off shaft	1		2	493	XK-2	PLUG, 1/4" square head pipe	3		1
1	82	PH-280 OIL SEAL for crankshaft	1		2	494	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe	1		1
1	83	PH-333-A THRUST WASHER for driven gear	1		1			For cover mounting.			
1	84	QD-596 GASKET for cover to housing	1		1			For housing to crankcase mounting.			
1	85	SD-79 TAG for oil instructions	1		1			For driven gear.			
1	86	WA-68 TAKE-OFF SHAFT	1		8			For housing mounting, outer holes.			
								For housing mounting, inner holes.			
								For oil level and drain.			
								For breather mounting.			

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.

WW-45-L, 6 TO 1 GEAR REDUCTION UNIT ASSEMBLY FOR ACN AND BKN ENGINES



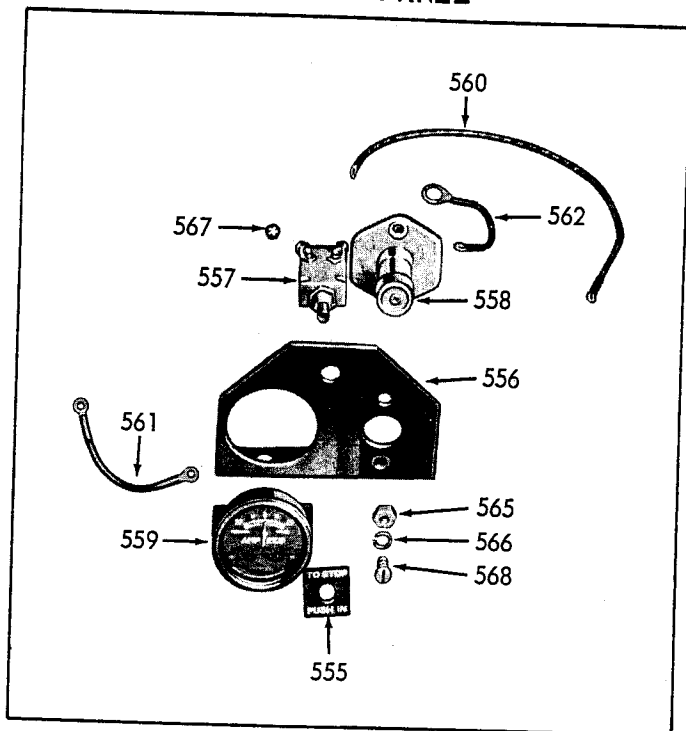
84067C-1

NOTE: Engines equipped with this reduction unit require a
CA-51-64-S1 Crankshaft Assembly (12 tooth, 22° 38' angle
Spiral Gear) with bearings, gear and key (not illustrated)

Ref. No.	Part Number	Description	No.		Net Wt.		Ref. No.	Part Number	Description	No.		Net Wt.	
			Req		Lb	Oz				Req		Lb	Oz
	WW-45-L	GEAR REDUCTION UNIT		17					STANDARD HARDWARE				
		Consisting of:											
525	BG-195-A	MAIN HOUSING and BEARING PLATE	1		9	8	537	PA-289	PIN, No. 2 x 5/8" long, half length taper Groov-Pin cover to housing	2			
526	BH-131-A	COVER for housing.....	1		2	8	538	PE-4	LOCKWASHER, 5/16" Positive	9		1	
527	GG-90-7	DRIVEN GEAR, 72 teeth	1		4	8	539	PH-14-D	WASHER, 5/16" I.D. x 19/32" O.D. x 1/16" thick, plain steel	4		1	
528	LO-44	BREATHER	1						For housing to crankcase mounting.				
529	ME-90	INNER BEARING	1		1		540	PL-16	KEY, No. 11 Woodruff	1		1	
530	ME-91	OUTER BEARING	1		2				For driven gear.				
531	PH-264-A	OIL SEAL for take-off shaft	1		2		541	XD-16	SCREW, 5/16"-18 thread x 7/8" long, hexagon head	11			
532	PH-280	OIL SEAL for crankshaft	1		2				9-for cover mounting, outer holes.				
533	PH-333-A	THRUST WASHER for driven gear	1		1		542	XD-17	SCREW, 5/16"-18 thread x 1" long, hexagon head	2			
534	QD-596	GASKET for cover to housing	1		1				For housing mounting, inner holes.				
535	SD-79	TAG for oil instructions	1		1		543	XK-2	PLUG, 1/4" square head pipe	3		1	
536	WA-68	TAKE-OFF SHAFT	1		1	8	544	XK-21	REDUCER BUSHING, 1/4" to 1/8" pipe For breather housing.	1		1	

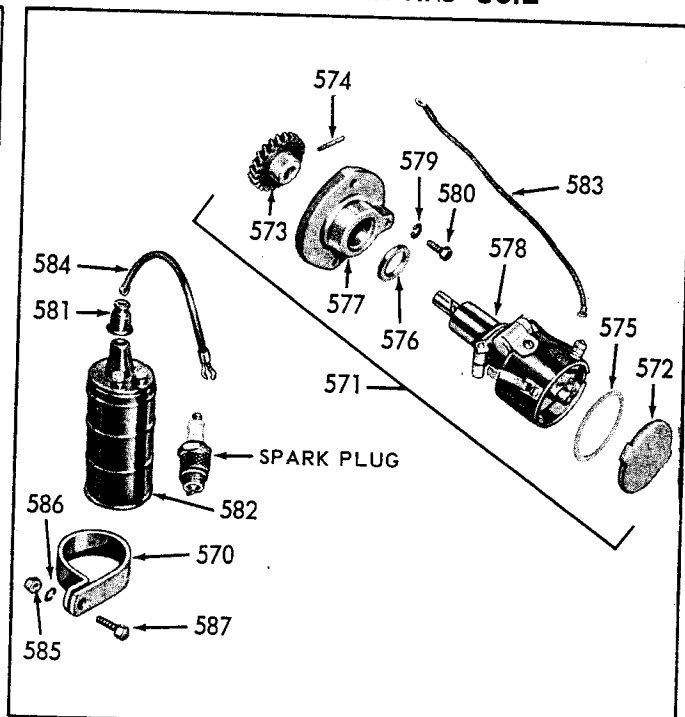
Order parts from nearest **SERVICE STATION** shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

ELECTRICAL EQUIPMENT FOR ACN AND BKN ENGINES
CONTROL PANEL



238934C

IGNITION TIMER AND COIL



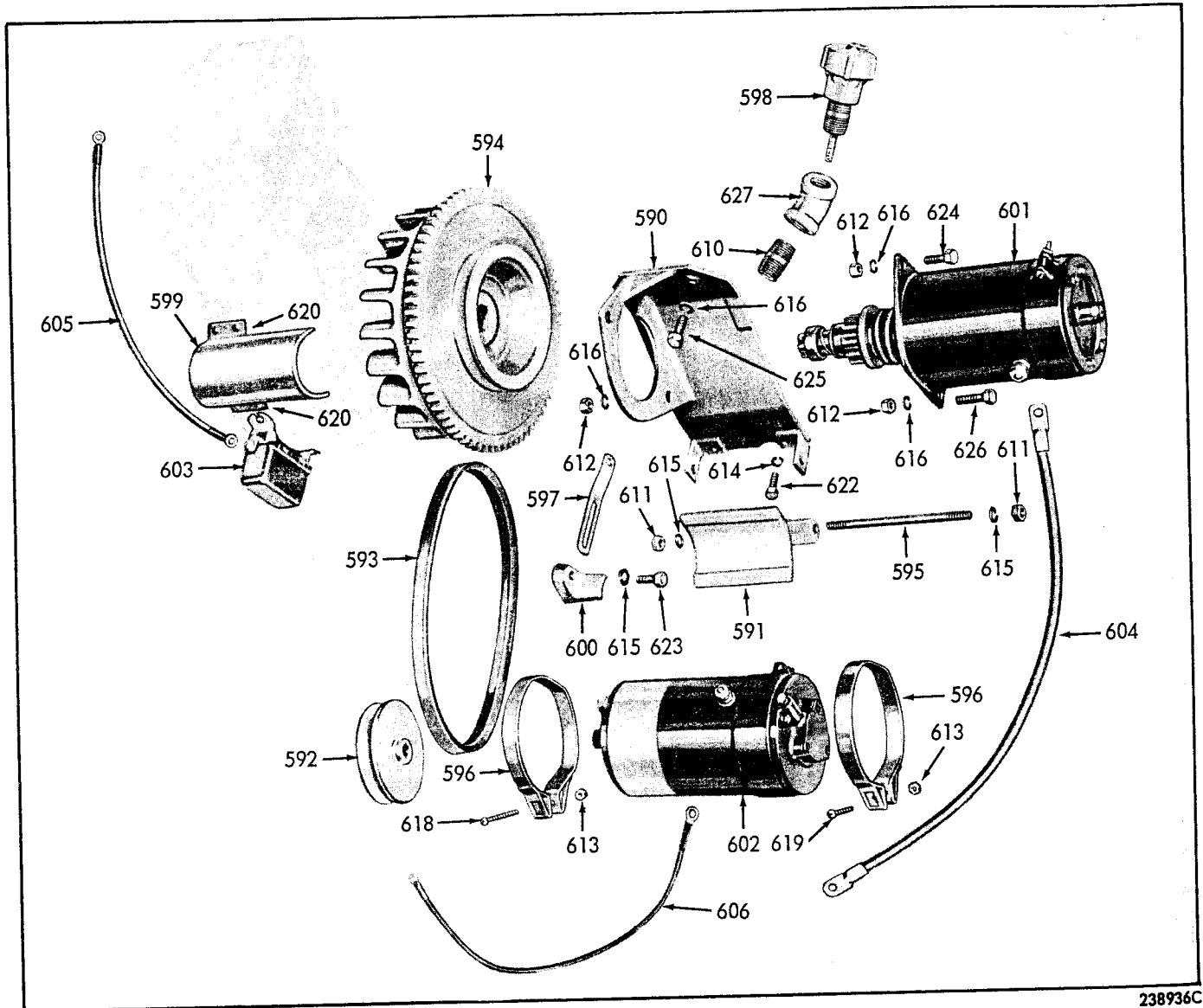
238935C

Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz.
555	SD-109	TAG for ignition switch	1	1	
556	VE-601-B	CONTROL PANEL	1	4	
		VE-601, replaced by VE-601-B.			
557	YC-9-B	IGNITION SWITCH	1	2	
558	YC-10	STARTING SWITCH	1	4	
559	YE-2	AMMETER	1	6	
560	YL-156	IGNITION WIRE ASSEMBLY, ignition switch to coil	1	1	
		No. 14 GA. cable 12" long w/terminals.			
561	YL-179	IGNITION WIRE ASSEMBLY, ammeter to ignition switch	1	1	
		No. 14 GA. cable 3" long with terminals.			
562	YL-184	IGNITION WIRE ASSEMBLY, ammeter to starting switch	1	2	
		No. 14 GA. cable 3 1/2" long w/terminals.			
		STANDARD HARDWARE			
565	PD-77	NUT, 1/4"-20 thread, hexagon steel ...	2	1	
		For starting switch.			
566	PE-3	LOCKWASHER, 1/4" Positive	2	1	
		For starting switch.			
567	PE-72	LOCKWASHER for ignition switch terminal	2	1	
568	XA-34	SCREW, 1/4"-20 thread x 1/2" long, round head	2	1	
		For starting switch.			

Ref. No.	Part Number	Description	No. Req.	Net Wt.	
				Lb	Oz.
570	PG-556	CLAMP for mounting coil	1	4	
571	TF-102	IGNITION TIMER ASSEMBLY	1	4	8
		Consisting of:			
572	BH-151	Cover	1	4	
573	GD-111	Drive gear	1	8	
574	PA-313	Pin for gear	1	1	
575	QD-711	Gasket for cover (not illustrated)	1	1	
576	JK-59	'O' ring seal for adapter	1	1	
577	TB-116	Adapter	1	1	6
578	YF-8-A	Timer, Auto-Lite No. IGW-4179 (less cover)	1	1	6
		(YF-8A-S1 Timer Assembly with cover and gasket).			
		NOTE: See Electric Auto-Lite illustration and parts list for Timer service parts			
579	PE-3	Lockwasher for advance arm	1	1	
580	XD-4	Screw for advance arm	1	1	
581	YD-20-A	RUBBER NIPPLE for coil terminal	1	1	
582	YF-11	IGNITION COIL (6 volt) AUTO-LITE No. CAL-4002	1	1	12
	YF-5-B	IGNITION COIL (12 volt) AUTO-LITE No. CAG-4003	1	1	12
583	YL-156	IGNITION WIRE ASSEMBLY, coil to ignition timer	1	1	
		No. 14 GA. cable 12" long w/terminals.			
584	YL-223	IGNITION CABLE, coil to spark plug ..	1	1	
		No. 7 MM cable 7 1/2" long with terminals.			
		STANDARD HARDWARE			
585	PD-78	NUT, 5/16"-18 thread, hexagon steel ..	1	1	
		For mounting ignition coil.			
586	PE-4	LOCKWASHER, 5/16" Positive	1	1	
		For mounting ignition coil.			
587	XD-15	SCREW, 5/16"-18 thread x 3/4" long, hexagon head	1	1	
		For mounting ignition coil.			

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.

6 VOLT ELECTRIC STARTER AND GENERATOR FOR ACN AND BKN ENGINES



238936C

Ref. No.	Part Number	Description	No.		Net Wt.		Ref. No.	Part Number	Description	No.		Net Wt.	
			Req	Lb	Oz	Req				Lb	Oz		
590	BI-299	BRACKET for mounting starter	1	2	4	599	SE-177	COVER for starter Bendix	1			4	
591	BI-301	CRADLE for mounting generator	1	1	8	600	VC-34	SUPPORT for generator adjusting strap	1			3	
592	MD-333	PULLEY for generator drive	1		14	601	YA-5-B	ELECTRIC STARTER (6 volt) AUTO-LITE No. MAK-4008	1	10		12	
593	MH-155 (Optional) MH-160-1	DRIVE BELT for generator, Gates 2270 VEELOS link 'V' belt, 25½" long.....	1		5			NOTE: For all repairs contact the Electric Auto-Lite Company at Toledo, Ohio, or their nearest service station. For starting motor service parts, refer to illustration immediately following this parts list.					
594	NC-137F-S1	FLYWHEEL with ring gear	1	20		602	YB-6-A	GENERATOR (6 volt) AUTO-LITE No. GAS-4103-1	1			11	
		Includes: 1 GH-49 Ring gear 3 XE-17 Set screws						NOTE: For all repairs contact the Electric Auto-Lite Company at Toledo, Ohio, or their nearest service station. For generator service parts, refer to illustration immediately following this parts list					
595	PC-454	STUD for mtg. gen. cradle to bracket	1		2	603	YJ-5	CIRCUIT BREAKER, AUTO-LITE No. CB-4008.....	1			6	
596	PG-117	STRAP for mounting generator.....	2		2								
597	PG-569	ADJUSTING STRAP for generator.....	1		4								
598	R-123-10	OIL FILLER and GAUGE ASSEMBLY .. LJ-310 Pipe Nipple, ½" x 1½" long RB-86 Body.....	1		7								
		RJ-152-6-S1 Oil Gauge and Cap Ass'y, with QD-715 gasket	1		3								

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.

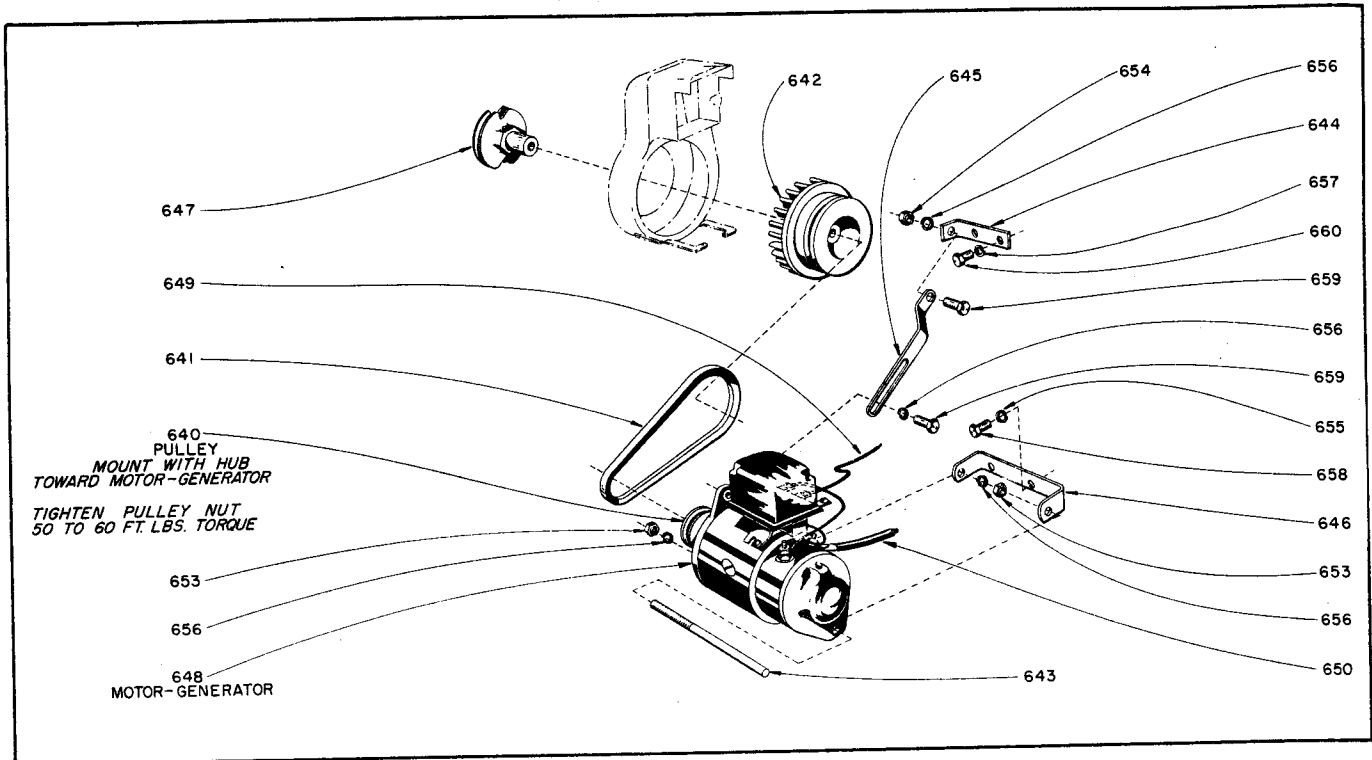
**6 VOLT ELECTRIC STARTER AND GENERATOR
FOR ACN AND BKN ENGINES**

Ref. No.	Part Number	Description	No.		Net Wt.		Ref. No.	Part Number	Description	No.		Net Wt.	
			Req		Lb	Oz				Req	Lb	Oz	
604	YL-115	STARTER CABLE ASSEMBLY , starter to starting switch No. 4 AWG. cable, 16" long, w/terminals.	1		8		615	PE-4	LOCKWASHER , 5/16" Positive..... 2-for generator cradle stud. 1-for generator adjusting strap.	3		1	
605	YL-180	IGNITION WIRE ASSEMBLY , ammeter to circuit breaker No. 14 GA. cable, 17½" long, w/terminals.	1		2		616	PE-5	LOCKWASHER , 3/8" Positive..... 2-for mounting starter to bracket. 2-for mounting starter brkt (upper holes) 1-for mounting generator adjusting strap to lower starter screw.	5		1	
606	YL-329	IGNITION WIRE ASSEMBLY , generator to circuit breaker No. 14 GA. cable, 19½" long, w/terminals. YL-112, replaced by YL-329.	1		1		618	XA-11	SCREW , No. 10-32 thread x 1½" long, round head. For generator strap	1		1	
STANDARD HARDWARE													
610	LJ-310	PIPE NIPPLE , ½" W.I. x 1½" long For oil filler and gauge to case.	1		3		619	XA-53	SCREW , No. 10-32 thread x 1" long, round head. For generator strap	1		1	
611	PD-10	NUT , 5/16"-24 thread, hexagon steel For generator cradle stud.	2		1		620	XA-73	SCREW , No. 7 x 3/8" long, self-tapping 2-for mounting circuit breaker. 4-for mounting starter Bendix cover.	6		1	
612	PD-79	NUT , 3/8"-16 thread, hexagon steel 2-for mounting starter. 1-for mounting generator adjusting strap to lower starter screw.	3		1		622	XD-6	SCREW , ¼"-20 thread x ¾" long, hex. hd. For mtg. starter bracket (lower holes).	2		1	
613	PD-115	NUT , No. 10-32 thread, hexagon steel For generator straps.	2		1		623	XD-15	SCREW , 5/16"-18 thread x ¾" long, hex.hd. For generator adjusting strap.	1		1	
614	PE-3	LOCKWASHER , 1/4" Positive For mtg. starter bracket (lower holes).	2		1		624	XD-26	SCREW , 3/8"-16 thread x 7/8" long, hex.hd. For mounting starter (upper hole).	1		1	
							625	XD-27	SCREW , 3/8"-16 thread x 1" long, hex. hd. For mtg. starter bracket (upper holes).	2		1	
							626	XD-30	SCREW , 3/8"-16 thread x 1½" long, hex.hd. For mounting starter (lower hole).	1		2	
							627	XK-105	PIPE ELBOW , 1/2" x 45°, W.I. For mtg. oil filler and level gauge.	1		4	

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.

936C
Wt.
Oz
4
3
12
1
6

12 VOLT MOTOR-GENERATOR EQUIPMENT FOR ACN AND BKN ENGINES

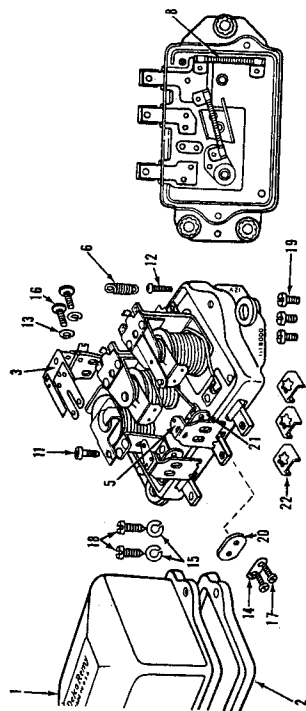


Ref. No.	Part Number	Description	No.			Ref. No.	Part Number	Description	No.		
			Req	Lb	Oz				Req	Lb	Oz
640	MD-367-C	DRIVEN PULLEY on motor-generator ..	1		4	STANDARD HARDWARE					
641	MH-170	DRIVE BELT, 3/8" wide, Industrial belt, 27" O.D.	1		2	653	PD-10	NUT, 5/16"-24 thread, hexagon steel.... For motor-generator stud.	2		1
642	NC-137-L	FLYWHEEL	1	22	12	654	PD-78	NUT, 5/16"-18 thread, hexagon steel.... For adjusting strap to bracket.	1		1
643	PC-511	STUD for mounting motor-generator	1		4	655	PE-3	LOCKWASHER, 1/4" Positive..... For motor-generator support bracket.	2		1
644	PG-751	BRACKET for adjusting strap.....	1		4	656	PE-4	LOCKWASHER, 5/16" Positive..... 2-for motor-generator stud. 2-for adjusting strap.	4		1
645	PG-752	ADJUSTING STRAP.....	1		4	657	PE-5	LOCKWASHER, 3/8" Positive..... For adjusting strap bracket.	2		1
646	PG-753-A	SUPPORT BRACKET	1		12	658	XD-5	SCREW, 1/4"-20 thread x 5/8" long, hexagon head	2		1
647	U-222-B	ROPE STARTER SHEAVE.....	1	1	8	659	XD-15	SCREW, 5/16"-18 thread x 3/4" long, hexagon head	2		1
648	YB-37-A-S1	MOTOR-GENERATOR, 12 volt-10 amp. Delco-Remy No. 1101927..... Includes: MD-367-C Pulley. NOTE: For all repairs contact Delco-Remy Div. of G.M.C., Anderson, Indiana. See Delco-Remy illustration and parts list for motor-generator service parts.	1		25	660	XD-27	SCREW, 3/8"-16 thread x 1" long, hexagon head	2		1
649	YL-180	IGNITION WIRE ASSEMBLY, ammeter to motor-generator current-voltage regulator. No. 14 GA. cable, 17" long w/terminals.	1		2						
650	YL-310	STARTER CABLE ASSEMBLY	1		12						
		No. 4 AWG., 20" long, w/terminals.									

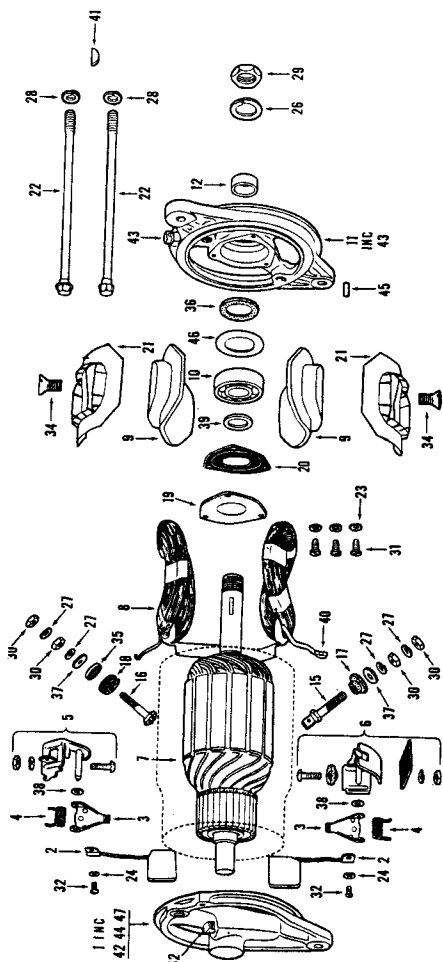
Order parts from nearest **SERVICE STATION** shown in directory following parts list.
IMPORTANT: Always give Model, Specification and Serial Numbers as shown on name plate.

12 VOLT MOTOR-GENERATOR WITH REGULATOR
 DELCO-REMY No. 1101927, WISCONSIN MOTOR No. YB-37-A

VOLTAGE REGULATOR



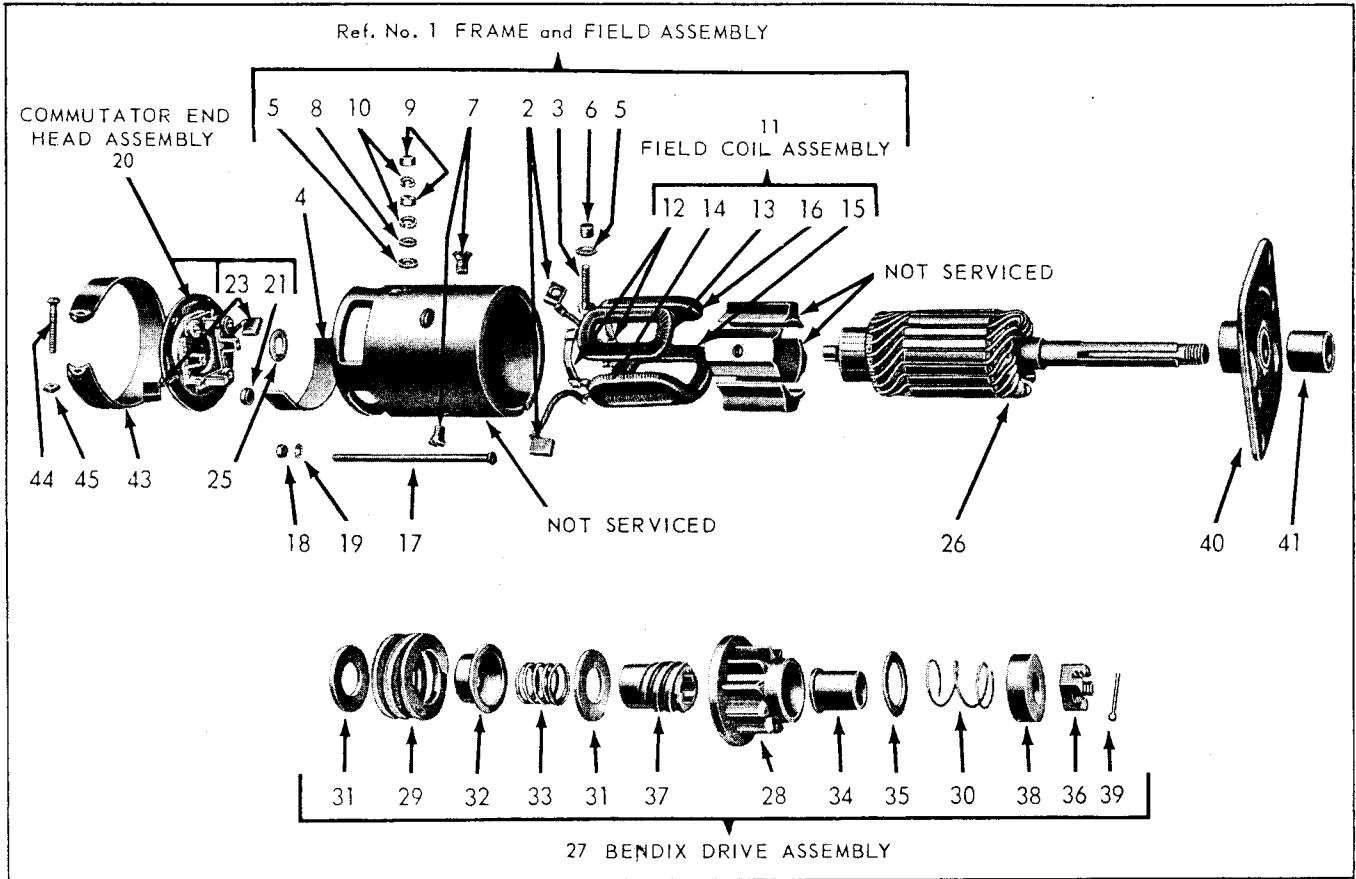
MOTOR-GENERATOR



Ref No	Delco-Remy Part No.	Description	No Req
1	1939908	FRAME, commutator end Includes: Ref. Nos. 42, 44, 47 and 48.	1
2	1906973	BRUSH	2
3	1878183	BRUSH ARM	2
4	1908829	BRUSH SPRING	2
5	1940421	GROUND BRUSH PACKAGE	1
6	1940422	INSULATED BRUSH PACKAGE	1
7	1939954	ARMATURE	1
8	1939952	FIELD COIL, R.H.	1
9	1939951	FIELD COIL, L.H.	1
9	1914618	POLE SHOE	1
10	1931258	POLE SHOE (notched end)	1
11	954378	BALL BEARING, D.E.	1
11	1873830	FRAME, D.E., Includes: Ref. No. 43	1
12	1858603	COLLAR, D.E.	1
15	1939891	STUD, armature terminal	1
16	1921860	STUD, field terminal	1
17	1921362	BUSHING, armature terminal	1
18	1885090	BUSHING, field terminal	1
19	1911263	PLATE, bearing retainer, D.E.	1
20	1912008	GASKET, bearing retainer plate	1
21	1914491	INSULATION, field coil	2
22	815018	THRU BOLT	2
23	1880781	LOCKWASHER, bearing retainer plate	3
24	1904377	LOCKWASHER, brush lead screw	2
26	804000	LOCKWASHER, shaft nut, D.E.	1
27	1904661	LOCKWASHER, terminal stud	4
28	120638	LOCKWASHER, Thru bolt	2
29	806915	NUT, shaft, D.E.	1
30	121743	NUT, terminal stud	4
31	1904370	SCREW, bearing retainer plate	3
32	141541	SCREW, brush lead	1
34	1843646	SCREW, brush lead	1
35	1858753	SCREW, pole shoe	2
36	809961	WASHER, insulating, field term. stud	1
37	1881409	WASHER, felt, D.E.	1
38	1857412	WASHER, plain, terminal stud	2
39	809945	WASHER, brush arm spacer	1
40	200346	WASHER, spacer, D.E.	1
41	124545	TERMINAL CLIP	1
42	125609	WOODRUFF KEY, D.E.	1
43	1880641	OILER, C.E.	1
44	809062	OILER, D.E.	1
45	809593	DOWEL PIN, C.E.	1
46	819104	DOWEL PIN, D.E.	1
47	954736	RETAINER, felt washer, D.E.	1
48	1929959	BALL BEARING, C.E. (not illustrated).	1
	1911480	BEARING CLAMP, C.E. (not illustrated).	1
	1911485	LEAD WIRE, arm. term. to regulator (not illustrated)	1
		LEAD WIRE, field term. to regulator (not illustrated)	1
1118985		VOLTAGE REGULATOR SERVICE PARTS LIST	1
1	1927980	COVER	1
2	1927981	COVER GASKET	1
3	1878780	ARMATURE RELAY	1
5	1878517	CONTACT, voltage regulator	1
6	1912176	SPRING	1
8	1910174	RESISTOR (65 OHMS)	1
11	1912159	ADJUSTING SCREW	1
12	1922408	ADJUSTING SCREW	1
13	1904377	LOCKWASHER, arm. screw relay	2
14	1878505	LOCKWASHER, contact screw	1
15	1938522	LOCKWASHER, cover screw	2
16	1924764	SCREW (with L.W.), arm. relay	2
17	1878516	SCREW, contact	2
18	1927982	SCREW, cover	2
19	1864099	SCREW, terminal	2
20	1922599	WASHER, insul., contact screw (outer).	3
21	1878507	WASHER, insul., contact screw (inner).	1
22	1868137	TERMINAL CLAMP	3

ELECTRIC AUTO-LITE MAK-4008 STARTING MOTOR PARTS LIST

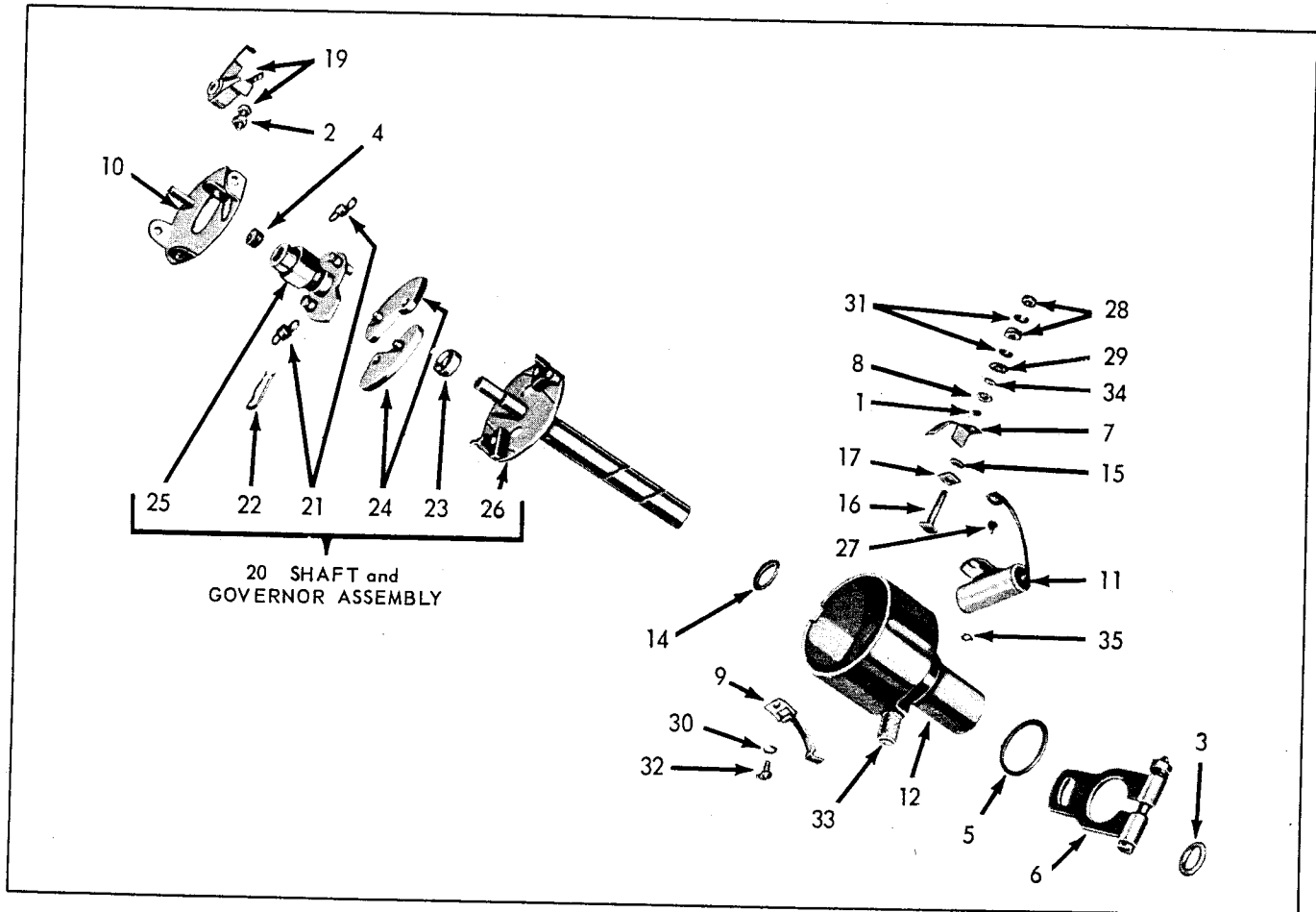
WISCONSIN MOTOR PART NUMBER YA-5-B



179860C

Ref No	Auto-Lite Part Number	Description	No Req	Ref No	Auto-Lite Part Number	Description	No Req
1	MAK-2001	FRAME and FIELD ASSEMBLY	1	26	MAK-2006	ARMATURE	1
		Consisting of:		27	EBA-10	BENDIX DRIVE ASSEMBLY	1
2	MAK-12 *	BRUSH	2			Consisting of:	
3	MAK-28	TERMINAL STUD	1	28	EB-6504S	PINION	1
4	MAK-30	INSULATION for field coils	1	29	EB-6505	DRIVE SPRING	1
5	MAK-49	INSULATING WASHER for terminal stud	2	30	EB-6513	ANTI-DRIFT SPRING	1
6	MAK-51	INSULATING BUSHING for terminal stud	1	31	EB-6823	THRUST WASHER	2
7	MZ-38A	SCREW for pole shoe	4	32	EB-6824	SUPPORT for drive spring	1
8	SSA-43	PLAIN WASHER for terminal stud	2	33	EB-6825	MESHING SPRING	1
9	8X-146	NUT for terminal stud, 1/4"-20 thread, hex.	2	34	EB-6826	SLEEVE for anti-drift spring	1
10	12X-199	LOCKWASHER for terminal stud, 1/4"	2	35	EB-6827	PINION WASHER	1
11	MAK-3005S	FIELD COIL ASSEMBLY	1	36	EB-6828	CASTELLATED NUT	1
		Consisting of:		37	EB-7101	SHAFT	1
12	MAK-44	CONNECTOR for field coil	2	38	EB-7902	DRIVE STOP	1
13	MAK-1007	FIELD COIL, U.R.	1	39	X-528	COTTER PIN	1
14	MAK-1008	FIELD COIL, L.R.	1				
15	MAK-1009	FIELD COIL, L.L.	1	40	MAK-1048	DRIVE END HEAD ASSEMBLY	1
16	MAK-1010	FIELD COIL, U.L.	1			Includes:	
17	MAK-20	THRU BOLT for frame	2	41	MAK-39	BRONZE BEARING	1
18	8X-173	NUT for thru bolt, No. 10-32 thread, hexagon ...	2	42	X-386	OILER for bronze bearing (not illustrated)	1
19	X-196	LOCKWASHER for thru bolt, No. 10	2	43	GAS-1024F	COVER BAND	1
20	MAK-3002	COMMUTATOR END HEAD ASSEMBLY	1	44	X-714	SCREW for cover band	1
		Includes:				No. 10-32 thread x 1/2" long, round head.	
21	MAK-19	BRUSH SPRING	4	45	8X-794	NUT for cover band	1
22	MAK-59	FELT (not illustrated)	1			No. 10-32 thread, square.	
23	MAK-1034S *	GROUNDING BRUSH	2				
24	MAK-54	THRUST WASHER for armature, drive end	1				
		(not illustrated)					
25	MAK-55	THRUST WASHER for armature, com. end	1				
						* BRUSH SET for service, MAK-2012AS.	

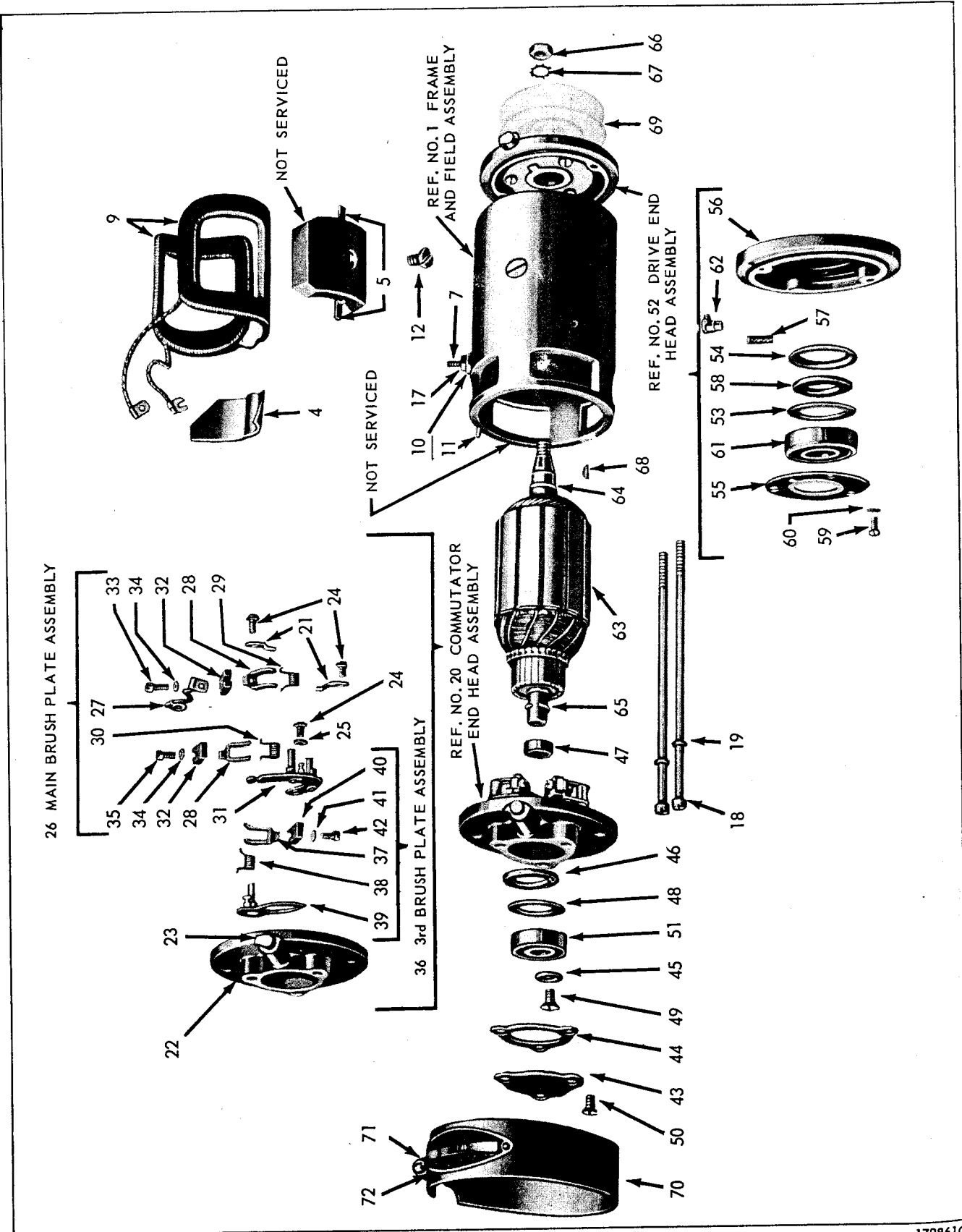
ELECTRIC AUTO-LITE IGW-4179 IGNITION TIMER PARTS LIST
WISCONSIN MOTOR PART NUMBER YF-8A-S1



179858C

Ref No	Auto-Lite Part Number	Description	No Req	Ref No	Auto-Lite Part Number	Description	No Req
1	CB-140	INSULATING BUSHING for terminal stud	1	19	IGW-3028S	BREAKER CONTACT SET	1
2	IB-23	LOCKNUT for contact screw	1	20	IGW-3103LA	SHAFT and GOVERNOR ASSEMBLY	1
3	IG-90	THRUST WASHER for drive shaft	1	21	IGB-301S	Consisting of:	
4	IG-495	FELT WICK for cam sleeve	1	22	IGW-37	SPRING SET for governor weights	1
5	IG-816A	THRUST WASHER for advance arm	1	23	IGW-92	CAM RETAINING SPRING	1
6	IG-1860A-1	ADVANCE ARM	1	24	IGW-1014LB	CAM SPACER	1
7	IGB-21	INSULATION for terminal stud	1	25	IGW-2100LAD	GOVERNOR WEIGHT	2
8	IGB-22	INSULATING WASHER for terminal stud	1	26	IGW-2103L	CAM and STOP PLATE	1
9	IGB-1007	CLAMP SPRING and HINGE for cap	2	27	8X-59	SCREW for condenser mounting	1
10	IGB-1010	BREAKER PLATE	1			No. 8-32 thread x 3/16" long, round head.	
11	IGB-1025	CONDENSER	1	28	8X-173	NUT for terminal stud	2
12	IGB-2176	BASE ASSEMBLY	1			No. 10-32 thread, hexagon.	
13	IG-579A	Includes: BRONZE BEARING (not illustrated)	2	29	8X-183A	WASHER for terminal stud, No. 10 plain	1
14	IGS-104	THRUST WASHER for drive shaft, upper	1	30	12X-195	LOCKWASHER for breaker plate, No. 8	3
15	IGW-38	INSULATING WASHER for terminal stud	1	31	12X-196	LOCKWASHER for terminal stud, No. 10	2
16	IGW-39	TERMINAL STUD	1	32	8X-304	SCREW for breaker plate mounting	3
17	IGW-54	WASHER for terminal stud	1			No. 8-32 thread x 5/16" long, round head.	
18	IGW-188	FELT WICK for oiler (not illustrated)	1	33	X-490A	OILER	1
				34	X-1270	WASHER for terminal stud	1
						Shakeproof No. 10.	
				35	X-1276	WASHER for condenser mounting	1
						Shakeproof No. 8.	

ELECTRIC AUTO-LITE GAS-4103-1 GENERATOR PARTS LIST
 WISCONSIN MOTOR PART NUMBER YB-6-A



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

ELECTRIC AUTO-LITE GAS-4103-1 GENERATOR PARTS LIST
WISCONSIN MOTOR PART NUMBER YB-6-A

Ref No	Auto-Lite Part Number	Description	No Req	Ref No	Auto-Lite Part Number	Description	No Req
1	GAS-2084	FRAME and FIELD ASSEMBLY	1	44	GAS-70	GASKET for commutator end cover	1
2	GAS-40	Consisting of:		45	GAS-71	BEARING RETAINER WASHER	1
3	GAS-41	INSULATING WASHER for terminal stud, inner (not illustrated).....	1	46	GAS-77	FELT WASHER	1
4	GAS-44	INSULATING BUSHING for terminal stud, (not illustrated).....	1	47	GAS-78	RETAINER for felt washer	1
5	GAS-45	INSULATION for field coil connection.....	1	48	IA-175	FELT RETAINING WASHER.....	1
6	GAS-81	HOLDER for field coil	4	49	8X-61	SCREW for bearing retainer	1
7	GBF-36	LEAD ASSEMBLY (not illustrated).....	1	50	8X-63	No. 10-32 thread x 7/16" long, flat head.	
8	X-1423	Includes:		51	X-293	SCREW for cover mounting	3
9	GAS-2005A	TERMINAL STUD	1	52	GAS-1075E	No. 8-32 thread x 3/8" long, flat head.	
10	GBF-55	TERMINAL (not illustrated).....	1	53	DB-13	BALL BEARING, S.A.E. No. 201, commutator end	1
11	MN-21	FIELD COIL ASSEMBLY complete	1	54	GAS-73	DRIVE END HEAD ASSEMBLY	1
12	MZ-38A	INSULATING WASHER for terminal stud, outer	1	55	GAS-74	Consisting of:	
13	X-140	DOWEL PIN.....	2	56	GAS-75B	FLAT RETAINER for felt washer.....	1
14	X-1274	POLE SHOE SCREW.....	2	57	IGP-34	CUPPED RETAINER for felt washer	1
15	X-1275	NUT for field ground screw	1	58	SC-127	BEARING RETAINER.....	1
16	X-1350	No. 6-32 thread, hexagon (not illustrated)		59	8X-55	DRIVE END HEAD.....	1
17	5X-1377	WASHER for terminal stud	2	60	X-195	FELT WICK	1
18	GAS-20A	Shakeproof No. 10 (not illustrated)		61	X-294	FELT WASHER	1
19	12X-196	WASHER for ground screw.....	1	62	X-489	SCREW for bearing retainer	3
20	GAS-2079C	Shakeproof No. 8 (not illustrated)		63	GAS-2076	No. 8-32 thread x 3/8" long, round head.	
21	GAS-51	FIELD GROUND SCREW, No. 6-32 thread x 7/16" long, flat head (not illustrated).....	1	64	GAS-53	LOCKWASHER for retainer screw, No. 8	3
22	GAS-79B	NUT for terminal stud	2	65	IA-158	BALL BEARING, S.A.E. 202, drive end	1
23	X-489	No. 10-32 thread, hexagon.		66	8X-160	OILER	1
24	8X-55	THRU BOLT for end head mounting	2	67	X-1278	ARMATURE ASSEMBLY	1
25	X-195	LOCKWASHER for thru bolt and terminal stud No. 10 Positive	3	68	X-1460A	Includes:	
26	GAS-2021R	COMMUTATOR END HEAD ASSEMBLY	1	69	-----	SNAP RING, D. E.....	1
27	GAL-31	Consisting of:		70	GAS-1024F	SNAP RING, C. E.....	1
28	GAS-15	SPRING RETAINER for 3rd brush plate	2	71	X-714	NUT for armature shaft.....	1
29	GAS-17	DRIVE END HEAD	1	72	8X-794	WASHER for armature shaft, 7/16" Shakeproof	1
30	GAS-18	OILER	1			KEY for drive pulley, No. 212 Woodruff.....	1
31	GAS-1021R	SCREW for brush plate mounting	3			DRIVE PULLEY Supplied by Wisconsin Motor Corp. Refer to Electrical Equipment in engine parts list for correct part number.	1
32	GEM-12 *	No. 8-32 thread x 3/8" long, round head.				COVER BAND	1
33	8X-122	LOCKWASHER for plate mounting, No. 8	1			SCREW for cover band	1
34	X-195	MAIN BRUSH PLATE ASSEMBLY	1			No. 10-32 thread x 1 1/4" long, round head.	
35	8X-1496	Consisting of:				NUT for band cover, No. 10-32 thread, square	1
36	GAS-2082RA	GROUND WIRE with terminals	1				
37	GAS-15	BRUSH HOLDER	2				
38	GAS-17	BRUSH SPRING	1				
39	GAS-1082RA	SPRING for grounded brush	1				
40	GEM-13 *	SPRING for insulated brush	1				
41	X-195	3rd BRUSH PLATE	1				
42	8X-878	3rd BRUSH	1				
43	GAS-69A	LOCKWASHER for 3rd brush screw, No. 8 ..	1				
		SCREW for insulated brush	1				
		No. 8-32 thread x 7/16" long, binding head.					
		3rd BRUSH PLATE ASSEMBLY	1				
		Consisting of:					
		BRUSH HOLDER	1				
		BRUSH SPRING	1				
		3rd BRUSH PLATE	1				
		3rd BRUSH	1				
		LOCKWASHER for 3rd brush screw, No. 8 ..	1				
		SCREW for 3rd brush	1				
		No. 8-32 thread x 7/16" long, fillister head.					
		COVER for commutator end head.....	1				

* BRUSH SET for SERVICE GEM-2012S

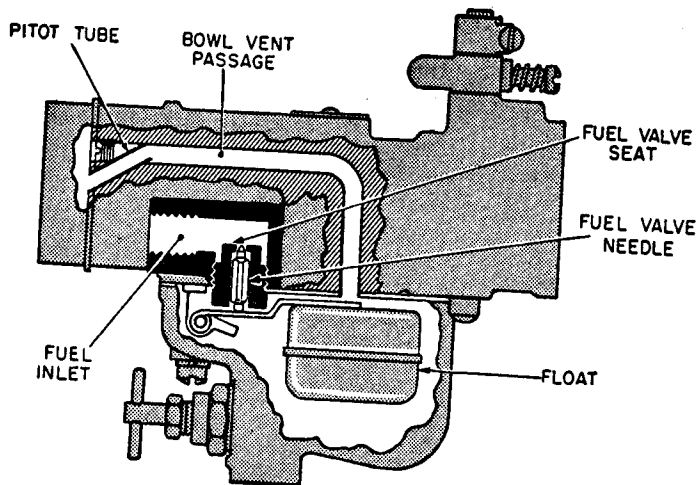
ZENITH 87-SERIES CARBURETORS

FOR WISCONSIN MOTOR CORPORATION

The Zenith 87-Series is a horizontal carburetor with a concentric fuel bowl. It is a "balanced" carburetor, because all air for fuel chamber and metering well ventilation and idling must come through the air cleaner. Air cleaner restrictions have a minimum influence on the fuel-air ratio when a carburetor is thus "balanced".

The main jet and discharge jet are centrally located. The metering well which completely surrounds the discharge jet is in the center of the fuel bowl assembly. This construction permits extremely high angle operation in any direction.

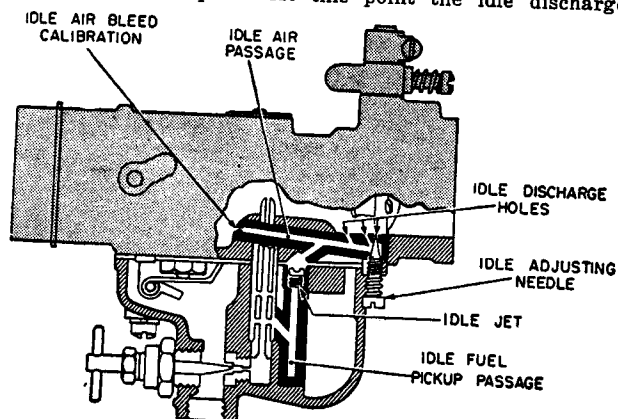
The venturi, which is part of the throttle body casting, measures the volume of air that passes through the carburetor. In selecting the venturi size, the smallest size that will permit full power development should be used.



FUEL SUPPLY SYSTEM

FUEL SUPPLY SYSTEM. Fuel under normal pressure entering the float chamber through the fuel valve seat is controlled by the twin float which, moving on its axle, closes the needle valve when the fuel reaches the proper level in the bowl.

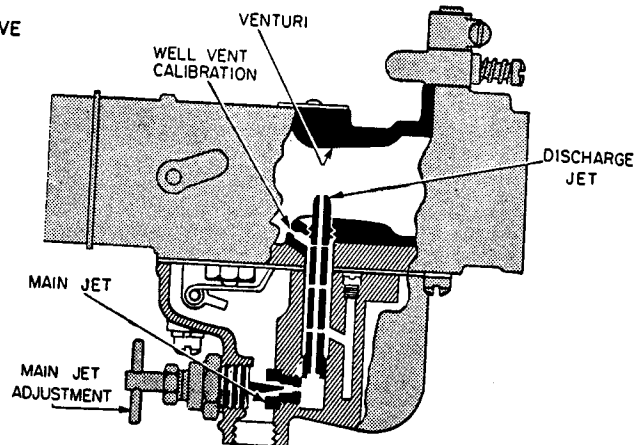
IDLING SYSTEM. At idling speeds the throttle plate is almost closed, thus a very high suction exists at the edge of the throttle plate. At this point the idle discharge



IDLING SYSTEM

orifices are located. All fuel for idling and part throttle operation is supplied through the main jet. Fuel from the float chamber flows through the main jet into the metering well. Fuel for idling is drawn from this well through the calibration, or metering orifice, in the center of the idling jet. As the fuel reaches the idling channel it is mixed with air which is admitted through a calibrated orifice in the channel from the inside of the air intake to form an emulsion. This emulsion is discharged into the air stream, to form the idling mixture, through two holes, one of which is controlled by the idle adjusting needle. Turning the adjusting needle counter-clockwise (out) permits more of the emulsion to reach the air stream and make the idling mixture richer while turning the needle in (clockwise) cuts off the amount of the emulsion reaching the air stream and makes the mixture leaner.

HIGH SPEED SYSTEM. As the throttle is opened, the suction on the idling system diminishes, but the increased volume of air entering the engine through the venturi creates sufficient vacuum (suction) on the discharge jet to draw an emulsion of fuel and air from the metering well which receives its fuel from the main jet and its air from the well vent. The flow characteristics of the discharge jet



HIGH SPEED SYSTEM

are influenced by the size, location, and number of holes in the sides of that part of the jet which is in the metering well, as well as by the sizes of the discharge jet orifice, the size of the main jet, and the size of the well vent. The well vent is located in the air intake and permits air to enter the top of the metering well around the outside of the discharge jet. The flow of fuel through the main jet is controlled by the main jet adjustment.

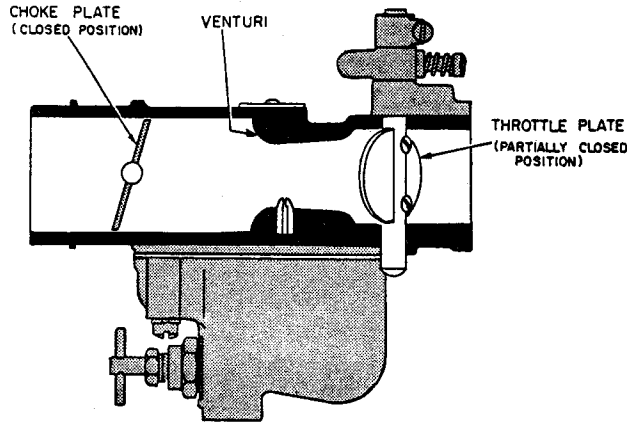
CHOKE SYSTEM. Starting a cold engine requires a much richer mixture of fuel and air. Moving the choke lever to close the choke plate restricts the air entering the carburetor, except at the pitot tube to the bowl vent, and increases the suction on the idling system which makes the mixture richer.

STARTING THE ENGINE. Before cranking the engine, the carburetor throttle should be opened a little to expose both idle discharge ports to suction. The choke should be fully closed until the engine starts, then opened a little to prevent stalling from being over-choked, then when the engine is fully warmed up the choke can be returned to wide open position and the throttle closed to the idling position.

ADJUSTMENTS. Adjust the throttle stop screw to obtain the desired idling speed by turning the screw in (clock-

wise) to increase the speed and out (counter-clockwise) to decrease the engine speed.

Adjust the idle adjusting needle to obtain smooth idling of the engine at idling speed. Turn the needle out (counter-



CHOKE SYSTEM

clockwise) to make the mixture richer, and in (clockwise) to make it leaner.

Adjust the main jet adjustment for full power of the engine while under a load. Turning the adjusting needle out (counter-clockwise) makes the mixture richer while turning the needle in (clockwise) cuts off the flow of fuel to make the mixture leaner.

NOTE: Do not try to operate on a very lean mixture; better performance and better fuel economy will be obtained if the mixture is not too lean.

DISASSEMBLY

A. IDENTIFY CARBURETOR

- (a) Check numbers on metal identification disk riveted to top of throttle body. The inside number next to the rivet is the Zenith assembly number and the one next to the outer edge of the disk is the vehicle manufacturer's.

B. DISASSEMBLED VIEWS

- (a) The disassembled view will identify the various component parts and show the relation to assembly. Use the disassembled view to identify and locate parts when performing the disassembly and re-assembly operations.

C. SEPARATE CARBURETOR BODIES

- (a) Remove the three bowl assembly screws (37 & 38) and lockwashers (36) and separate fuel bowl (30) from throttle body (9).

D. DISASSEMBLE FUEL BOWL

- (a) Remove the main jet adjustment (34) and fibre washer (33), using a $\frac{1}{8}$ " open end wrench.
- (b) Remove the main jet (32) and fibre washer (31), using Zenith Tool No. C161-83 main jet wrench.
- (c) Remove the Idle Jet (29), using a small screwdriver.
- (d) Remove the bowl drain plug (35).

E. DISASSEMBLE THROTTLE BODY

- (a) Remove the float axle (26) by pressing against the end with the blade of a screwdriver.
- (b) Remove the float (27).
- (c) Remove the fuel valve needle (25), using the fingers.
- (d) Remove the fuel bowl to throttle body gasket (28).
- (e) Remove the main discharge jet (23), using a small screwdriver.
- (f) Remove the fuel valve seat (25) and fibre washer (24), using Zenith Tool No. C161-85.
- (g) Remove the idle adjusting needle (11) and spring (10).

CLEAN AND INSPECT PARTS

A. CLEAN PARTS

- (a) Clean all metal parts thoroughly with cleaning solution and rinse in solvent.

- (b) Blow out all passages in the air intake assembly, fuel bowl assembly and throttle body. **NOTE:** Be sure all carbon deposits have been removed from throttle bore and idle discharge holes. It is advisable to reverse flow of compressed air in all passages to insure all dirt has been removed. Never use a wire or drill to clean out jets.

B. INSPECT PARTS

- (a) **Float Assembly.** Replace float assembly if loaded with gasoline, damaged, or if float axle bearing is worn excessively. Inspect top side of float lever for wear where it contacts fuel valve needle.
- (b) **Float Axle.** Replace if any wear can be visually detected on the bearing surface.
- (c) **Fuel Valve Seat & Needle Assembly.** Replace fuel valve seat and needle because both parts wear and may cause improper float level.
- (d) **Idling Adjusting Needle and Spring.** Inspect point of needle. This must be smooth and free of ridges.
- (e) **Gaskets and Fibre Washers.** Replace all gaskets and fibre washers every time the carburetor is disassembled.
- (f) **Check Specifications.** Verify the correctness of the following parts. Numbers will be found on the parts. Venturi; Main Jet; Idling Jet; and Fuel Valve Seat.

REASSEMBLY

A. REASSEMBLE THROTTLE BODY

- (a) Install the fuel valve seat (25) and fibre washer (24), using Zenith Tool No. C161-85.
- (b) Install the main discharge jet (23), using a small screwdriver.
- (c) Install fuel valve needle (25) in seat (25), followed by float (27) and float axle (26). **NOTE:** Insert tapered end of float axle (26) into float bracket on side opposite slot and push through the other side. Press float axle (26) into slotted side until the axle is centered in bracket.
- (d) **Fuel Level.** Check position of float assembly (27) for correct measurement to obtain proper fuel level using a depth gage. **NOTE:** Do not bend, twist, or apply pressure on the float body (27).
- (e) With bowl cover assembly (9) in an inverted position, viewed from free end of float (27), the float body must be centered and at right angles to the machined surface. The float setting is measured from the machined surface (no gasket) of float bowl cover (9) to top side of float body (27) at highest point. This measurement should be $\frac{11}{16}$ ", plus or minus $\frac{1}{32}$ ".
- (f) **Bending Float Lever.** To increase or decrease distance between float body (27) and machined surface (9) use long nosed pliers and bend lever close to float body. **NOTE:** Replace with new float if position is off more than $\frac{1}{8}$ ".
- (g) Install throttle body to fuel bowl assembly gasket (29) on machined surface of throttle body (9).
- (h) Install the idle adjusting needle (11) and spring (10).

B. REASSEMBLE FUEL BOWL

- (a) Install the main jet (32) and fibre washer (31), using Zenith Tool No. C161-83 main jet wrench.
- (b) Install the main jet adjustment (34) and fibre washer (33), using a $\frac{1}{8}$ " open end wrench.
- (c) Install the idle jet (29), using a small screwdriver.
- (d) Install the bowl drain plug (35).

C. REASSEMBLE CARBURETOR BODIES

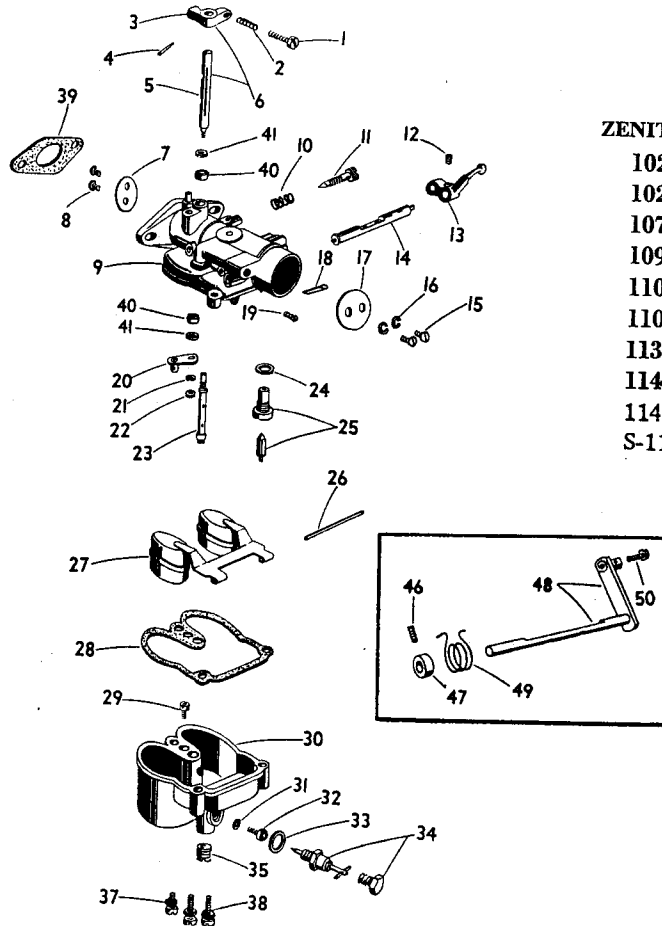
- (a) Install the three bowl assembly screws (38) and lockwashers (36) through the fuel bowl and into the throttle body and draw down firmly and evenly.

SPECIAL TOOLS

The special tools recommended for the 87-Series carburetors are:

1. C161-83 Main Jet Wrench.
2. C161-85 Fuel Valve Seat Wrench.

Parts List for Models 87B5 and 87BY6 Zenith Carburetors



ZENITH No.	WISCONSIN No.
10223	L-51
10258	L-51-A
10730	L-51-C
10956	L-51-G
11026 or 11193	L-51-E
11027 or 11194	L-51-F
11385	L-51-H
11412	L-51-J
11484C	L-51-K
S-1151	L-51-B

Ref. No.	Part No.	Part Name	Application
1	T18S6-10	Screw—Stop Lever	All
2	C111-12	Spring—Stop Screw	All
3	C28-100A	Lever—Stop	10223, 10730, 10956
3	C28-102	Lever—Stop	10258, 11026, 11027, S-1151, 11193, 11194, 11385, 11412, 11484
4	CT63-9	Pin—Taper	All
5	C23-448	Shaft—Throttle	10223, 10730, 10956
5	C23-574	Shaft—Throttle	10258, 11026, 11027, S-1151, 11193, 11194, 11385, 11412, 11484
6	C29-721	Shaft and Lever—Throttle	10223, 10730, 10956
6	C29-1120	Shaft and Lever—Throttle	10258, S-1151, 11026, 11027, 11193, 11194, 11385, 11412, 11484
7	C21-157	Plate—Throttle	10223, 10730, 10956
7	C21-159	Plate—Throttle	10258, S-1151
7	C21-182	Plate—Throttle	11026, 11027, 11193, 11194, 11385, 11412, 11484
8	†C136-1	Screw—Throttle Plate	10223, 10730, 10956
8	T315B5-3	Screw—Throttle Plate	10258, 11026, 11027, S-1151, 11193, 11194, 11385, 11412, 11484
9		Body—Throttle	Not serviceable. Purchase complete carburetor.
10	C111-155	Spring—Adjustment Needle	All
11	†C46-49	Needle—Idle Adjustment	All
12	CT10-11	Screw—Choke Lever Set	10258, 11026, 11027, S-1151, 11193, 11194, 11385, 11412, 11484
13	C106-152	Lever—Choke	10258, 11026, 11027, S-1151
13	C106-182	Lever—Choke	11193, 11194, 11385, 11412, 11484
14	C105-208	Shaft—Choke	10258, 11026, 11027, S-1151
15	†C140-47	Screw—Choke Plate	All

Ref. No.	Part No.	Part Name	Application
17	C102-87	Plate—Choke	10223, 10258, 10730, 10956, S-1151
17	C102-104	Plate—Choke	11026, 11027, 11193, 11194, 11385, 11412, 11484
18	C63-140	Tube—Bowl Vent	All
19	CT10-10	Screw—Vent Tube Set	All
20	C25-120	Lever—Throttle	10258, S-1151
20	C25-148	Lever—Throttle	11026, 11027, 11193, 11194, 11385, 11412, 11484
21	†T41-10	Lockwasher—Shaft Nut	10258, 11026, 11027, S-1151, 11412, 11484
22	†C158-4	Nut—Throttle Shaft	10258, 11026, 11027, S-1151, 11412, 11484
23	C66-69-1-26	Jet—Discharge	10223, 10730, 10956
23	C66-71-1-26	Jet—Discharge	10258, 11027
23	C66-89-1-26	Jet—Discharge	11026, 11193, 11385, 11412
23	C66-72-1-26	Jet—Discharge	S-1151, 11194, 11484
24	†T56-20	Washer—Fuel Valve Seat	All
25	†C81-17-35	Valve and Seat—Fuel	All except 10956
25	†C81-17-30	Valve and Seat—Fuel	10956
26	†C120-18	Axle—Float	All
27	C85-97	Float	All
28	†C142-55	Gasket—Bowl	All
29	†C52-2-11	Jet—Idle	All except 10956
29	†C52-2-10	Jet—Idle	10956
30	B3-98	Bowl—Fuel	All
31	†T56-24	Washer—Main Jet	All
32	†C52-7-20	Jet—Main	11385
32	†C52-7-21	Jet—Main	11412
32	†C52-7-22	Jet—Main	10223, 11484
32	†C52-7-24	Jet—Main	10258, 11026, 11193
32	†C52-7-26	Jet—Main	10730
32	†C52-7-23	Jet—Main	10956
32	†C52-7-27	Jet—Main	11027, S-1151, 11194
33	†T56-23	Washer—Main Passage	All
34	C138-23	Plug—Main Passage	10223, 10730, 10956, 11385, 11412, 11484
34	C71-21	Adjustment—Main	10258, 11026, 11027, S-1151, 11193, 11194
35	CT91-5	Plug—Bowl Drain	All
37	T301S8-9	Screw—Bowl to Body (short)	All
38	†T301S8-14	Screw—Bowl to Body (long)	All
39	†C141-4-17	Gasket—Flange	All
40	CT48-7 (2)	Seal—Throttle Shaft	All
41	CT52-13 (2)	Retainer—Shaft Seal	All
46	CT10-11	Screw—Thrust Collar Set	10223, 10730, 10956
47	C130-29	Collar—Shaft Thrust	10223, 10730, 10956
48	C108-92	Shaft and Lever—Choke	10223
48	C108-113	Shaft and Lever—Choke	10730, 10956
48	C108-134	Shaft and Lever—Choke	11412
48	C108-127	Shaft and Lever—Choke	11193, 11194, 11385, 11484
49	C117-58	Spring—Choke Lever	10223, 10730, 10956
50	T1S8-5	Screw—Swivel	10223, 10730, 10956
	CT75-3 (2)	Seal—Choke Shaft (not illus.)	11412
	C181-296	Gasket Kit	All
	K—*	Kit—Repair Parts	

†Parts in Repair Kit.

*Specify Carburetor Assembly Number.

NOTE—The Venturi, Idle Air Vent and Well Vent are calibrated parts of the Throttle Body (item 9) and are not readily removable.

Zenith service parts can be obtained promptly through our central and service distributors located in principal cities.

ZENITH CARBURETOR DIVISION

696 HART AVENUE

Bendix
AVIATION CORPORATION

DETROIT 14, MICHIGAN

Manufacturers of Zenith Carburetors and Filters

MARVEL-SCHEBLER CARBURETER

MARVEL-SCHEBLER VH-53	-	WISCONSIN MOTOR L-52-C
MARVEL-SCHEBLER VH-63	-	WISCONSIN MOTOR L-52-G
MARVEL-SCHEBLER VH-70	-	WISCONSIN MOTOR L-52-E
MARVEL-SCHEBLER VH-92	-	WISCONSIN MOTOR L-52-K
MARVEL-SCHEBLER VH-93	-	WISCONSIN MOTOR L-52-L

DESCRIPTION

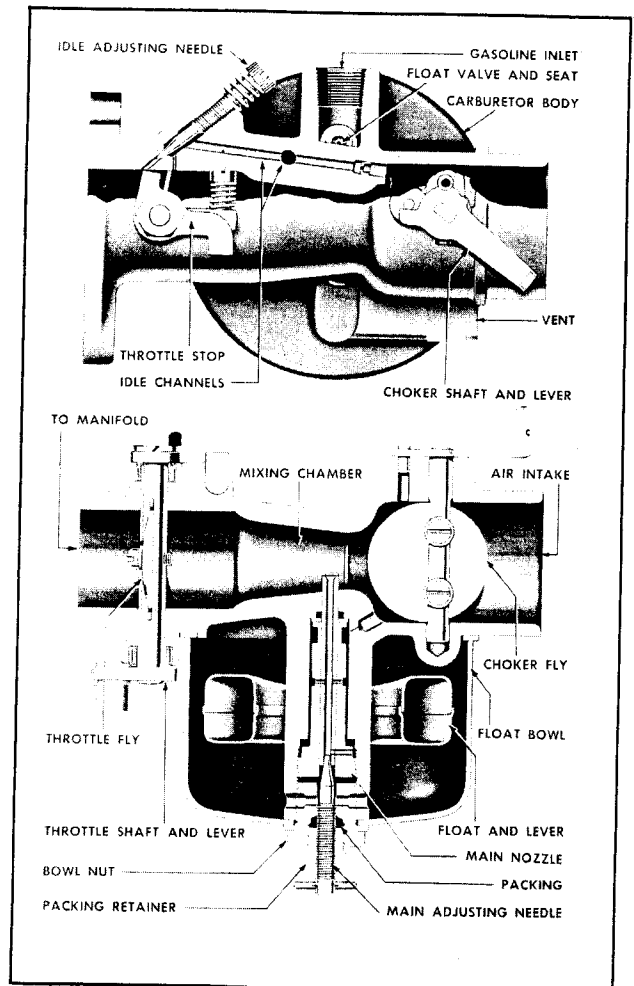
1. The Models VH-53 (Wis. No. L-52-C) and VH-92 (Wis. No. L-52-K) are float type carburetors with main fuel adjustment and idle adjustment, designed for use on Models AB, ABS, ABN, ABM, ACN, AK, AKS, AKN, AKM and BKN Wisconsin Air Cooled Gasoline Engines, and are made up of two major units - a cast throttle body and a stamped steel fuel bowl. The Models VH-70 (Wis. No. L-52-E) and VH-93 (Wis. No. L-52-L) are similar to the above carburetors except that they have a fixed main nozzle instead of an adjustable nozzle.
2. Model VH-53 replaces Model VH-12 (Wis. No. L-52-A) and Model VH-92 replaces Models VH-14 (Wis. No. L-52) and VH-63 (Wis. No. L-52-G) on above listed Wisconsin engines. Models VH-53, VH-63, VH-70, VH-92 and VH-93 carburetors have dust shields provided on the throttle shaft to eliminate dirt and other abrasive materials, thereby increasing throttle shaft life.
3. The model number is stamped on a square boss, provided for it on the body casting.

OPERATION

With the throttle fly slightly open from the closed position to permit idling, the main fuel nozzle may be delivering little or no fuel, as only a very small quantity of air passes through the mixing chamber at this time. An idle passage is provided to carry sufficient air and fuel to the engine side of the throttle fly where the suction is high. This passage takes the air from the inlet side of the venturi to the inter-section of the vertical idle fuel passage (which connects with the main nozzle assembly) and delivers the air-fuel mixture through an opening controlled by the idle adjusting needle to the throttle barrel just beyond or on the engine side of the throttle fly. The idle system is practically independent of the main nozzle system, and only controls the fuel metering at low engine speed. As air-flow increases with the opening of the throttle fly the main nozzle begins to deliver fuel, and the delivery from the idle system decreases until at full throttle, delivery is entirely from the main nozzle.

ADJUSTING CARBURETOR

1. Set the main adjusting needle from 1-1/2 to 1-7/8 turns open, (not applicable to VH-70 (L-52E) and VH-93 (L-52L) carburetors since these have a fixed main nozzle.)
Caution:
When setting the main adjusting needle in order to find its position, do not seat the needle too firmly, as this will damage the needle point and make satisfactory adjustment impossible.
2. To start the engine, close the choker fly. When the engine starts, the choker will automatically open to the proper warm-up position. After engine has warmed up, open choker fully.
3. After the engine has been thoroughly warmed up, make a final adjustment with the choker wide open by turning the main adjusting needle to that position at which the engine operates most smoothly with full load. This setting will also be satisfactory for starting a cold engine.
4. Close the throttle and adjust the throttle stop screw to give the proper idle speed. The idle adjusting needle should be in proper adjustment at about 1/2 to 3/4 turns open.

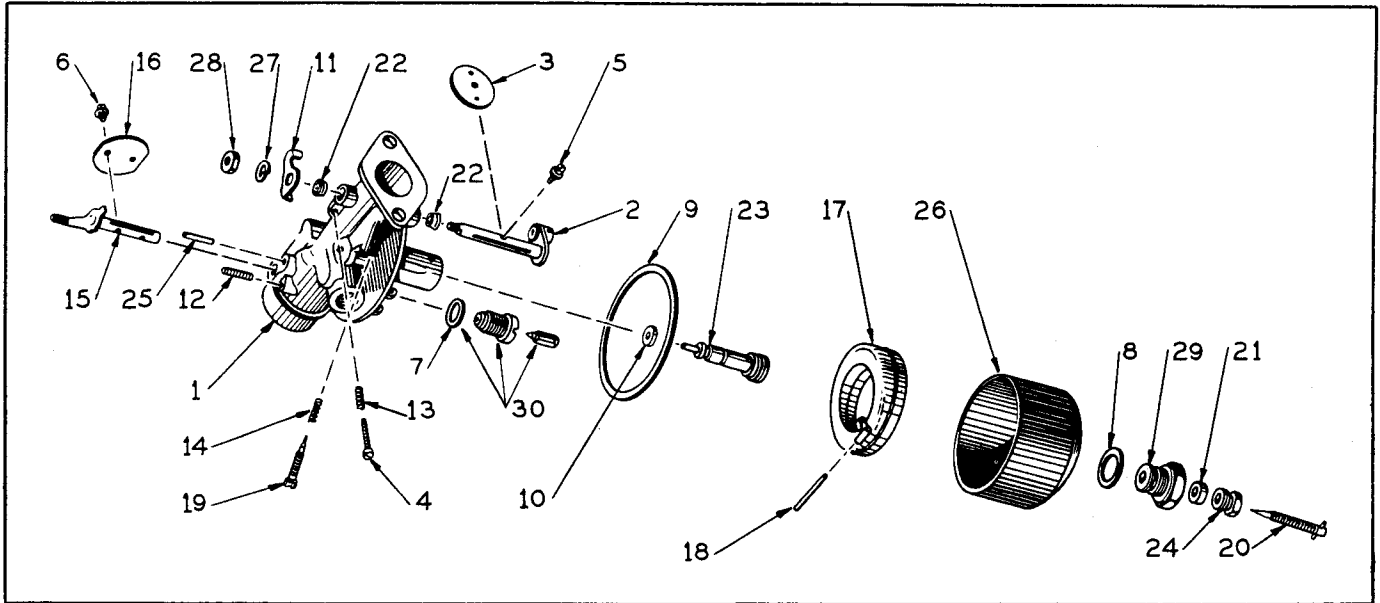


Turn the idle adjusting needle open until engine rolls from "richness." Then turn the needle towards the seat until the engine runs irregularly from "leanness." From the "lean" setting, open the idle adjusting needle to the richest mixture that will not cause the engine to "roll" or run unevenly. This adjustment will, in most cases, give a slower idling speed than a slightly leaner adjustment with the same throttle stop screw setting, but will give the smoothest idle operation. After the idle adjusting needle setting has been made, it may be necessary to revise the throttle stop screw setting to give the proper idling speed.

CAUTION:

Care should be taken not to damage the idle adjusting needle nor its seat by turning the idle adjusting needle too tightly against the seat, as damage to either of these parts will make a satisfactory idle adjustment very difficult.

MARVEL-SCHEBLER CARBURETOR DIVISION, BORG-WARNER CORPORATION
DECATUR, ILL., U.S.A.



SERVICE PARTS LIST

Ref No	Marvel-Schebler Part Numbers					Description
	Wisconsin L-52-C Marvel-Schebler VH-53	Wisconsin L-52-G Marvel-Schebler VH-63	Wisconsin L-52-E Marvel-Schebler VH-70	Wisconsin L-52-K Marvel-Schebler VH-92	Wisconsin L-52-L Marvel-Schebler VH-93	
1	10-3474	10-3687	10-3672	10-4236	10-4241	CARBURETOR ASSEMBLY - Complete
	10-3475	10-3688	10-3475	10-4246	10-4246	CARBURETOR BODY ASSEMBLY
2	13-924	13-849	13-924	13-924	13-924	THROTTLE SHAFT ASSEMBLY
3	14-216		14-216	14-216	14-216	THROTTLE FLY (12°)
		14-204				THROTTLE FLY (10°)
4	15-28	15-28	15-28	15-28	15-28	SCREW - No. 6-32 x 1/2" Fillister Head (Throttle Adj.)
5		15-A46				SCREW - No. 4-40 x 1/4" Sems (Throttle Fly)
	15-A47		15-A47	15-A47	15-A47	SCREW - No. 4-40 x 3/16" Sems (Throttle Fly)
6	15-A47	15-A47	15-A47	15-A47	15-A47	SCREW - No. 4-40 x 3/16" Sems (Choke Shaft - 2)
7	16-4	16-4	16-4	16-4	16-4	GASKET - Float Valve Seat
8	16-14	16-14	16-14	16-14	16-14	GASKET - Bowl Nut to Bowl
9	16-A83	16-A83	16-A83	16-A83	16-A83	GASKET - Body to Bowl
10	16-A95	16-A95	16-A95	16-A95	16-A95	GASKET - Nozzle
	16-638	16-638	16-638	16-638	16-638	GASKET ASSORTMENT
11	21-161	21-161	21-161	21-161	21-161	STOP - Throttle
12	24-A63	24-A63	24-A63	24-A63	24-A63	SPRING - Choke Lever Friction
13	24-A69	24-A69	24-A69	24-A69	24-A69	SPRING - Throttle Adjusting Screw
14	24-A136	24-A136	24-A136	24-A136	24-A136	SPRING - Idle Adjusting Needle
15	26-673	26-673	26-673	26-673	26-673	CHOKE SHAFT ASSEMBLY
16	27-185	27-185	27-185	27-185	27-185	CHOKE FLY
17	30-658	30-658	30-658	30-658	30-658	FLOAT and LEVER ASSEMBLY
18	32-16	32-16	32-16	32-16	32-16	SHAFT - Float Lever
19	43-129	43-129	43-129	43-129	43-129	NEEDLE - Idle Adjusting
20	43-604	43-604	43-604	43-604	43-604	MAIN ADJUSTING NEEDLE, PACKING NUT and RETAINER ASSEMBLY
21	44-51	44-51		44-51		PACKING - Main Adjusting Needle
22	44-86	44-86	44-86	44-86	44-86	PACKING (2) - Throttle Shaft
23	47-373	47-331	47-730	47-331	47-766	NOZZLE
24	55-285	55-285		55-285		RETAINER - Main Adjusting Needle Packing
25	62-61	62-61	62-61	62-61	62-61	PIN - Choker Stop
26	65-170	65-170	65-170	65-170	65-170	FLOAT BOWL
27	78-62	78-62	78-62	78-62	78-62	LOCKWASHER - Throttle Shaft (No. 8 Screw)
28	81-145	81-145	81-145	81-145	81-145	NUT - No. 8-32 - Throttle Shaft
29	81-150	81-150		81-150		BOWL NUT
			80-216		80-216	BOWL RETAINER and NOZZLE PLUG (Not illustrated)
30	233-536	233-536	233-536	233-536	233-536	FLOAT VALVE, SEAT and GASKET ASSEMBLY
	286-1024	286-1026	286-1051	286-1051	286-1051	REPAIR KIT - Service

WICO MODEL XH-1 FLANGE MOUNTED MAGNETO

WICO SPEC. No. XH-2477B, WISCONSIN No. Y-111 used on ACN, BKN

INSTRUCTIONS

TIMING

The magneto is properly timed to the engine at the factory. If it becomes necessary to retime the magneto to the engine, refer to the diagram and instructions in the engine instruction book.

LUBRICATION

The only lubricating point in the magneto is the cam wiper felt, (Ref. No. 19). This felt, which lubricates the breaker arm at point of contact with the cam, should be replaced whenever it is necessary to replace the breaker contacts.

IMPORTANT

Incorrectly adjusted spark plug gaps cause magneto failure more frequently than any other condition.

Spark plugs should be inspected at frequent intervals, the size of the gap should be carefully checked and adjusted and the plugs thoroughly cleaned.

All oil, grease, and dirt should frequently be wiped off the magneto, lead wires, and spark plug insulators. Keeping these parts clean and the spark plugs properly adjusted will improve the engine performance and at the same time will prolong the life of the magneto.

MAGNETO COVER

The magneto cover, (Ref. No. 50), can be removed by loosening the four screws (Ref. No. 36) which hold it in place. When replacing the cover be sure that the cover gasket (Ref. No. 35) is in its proper place.

BREAKER CONTACTS - REPLACEMENT AND ADJUSTMENT

The breaker contacts should be adjusted to .015" when fully opened. To adjust the contacts, loosen the two clamp screws (Ref. No. 40) enough so that the contact plate can be moved.

Insert the end of a small screw driver in the adjusting slot and open or close the contacts by moving the plate until the opening is .015", measuring with a feeler gauge of that thickness, tighten the two clamp screws.

To replace the contacts remove the breaker spring clamp screw (Ref. No. 43), the breaker arm lock and

washer (Ref. No. 18) and (Ref. No. 14), then lift the breaker arm from its pivot. Remove the aligning washer, 5717, and the two fixed contact clamp screws (Ref. No. 40). The breaker plate can then be removed.

If the contacts need replacing it is recommended that both the fixed contact and the breaker arm be replaced at the same time, using replacement breaker set X5996 (Ref. No. 42).

After assembly the contacts should be adjusted as described above. The contacts should be kept clean at all times. Lacquer thinner is an ideal cleaner for this purpose. Use WICO tool S-5449, to adjust the alignment of the contacts so that both surfaces meet squarely.

CONDENSER

To remove the condenser (Ref. No. 34), first disconnect the condenser lead by removing the breaker arm spring screw (Ref. No. 43), then remove the two condenser clamp screws (Ref. No. 22) and the condenser clamp (Ref. No. 30). When replacing the condenser make sure it is properly placed and that the clamp screws are securely tightened.

COIL AND COIL CORE

The coil and coil core must be removed from the magneto housing as a unit. Disconnect the primary wire from the breaker arm spring terminal by removing screw (Ref. No. 43), take out the two coil core clamp screws (Ref. No. 21) and remove the clamps (Ref. No. 38). The coil and core can then be pulled from the housing. When replacing this group make sure that the bare primary wire is connected under the core clamp screw and that the insulated wire is connected to the breaker arm spring terminal.

REMOVAL OF COIL FROM CORE

The coil (Ref. No. 52), is held tight on the core (Ref. No. 29) by two wedges, 10383. It will be necessary to press against the coil core with considerable force to remove it from the coil. The coil should be supported in such a way that there is no danger of the primary of the coil being pushed out of the secondary.

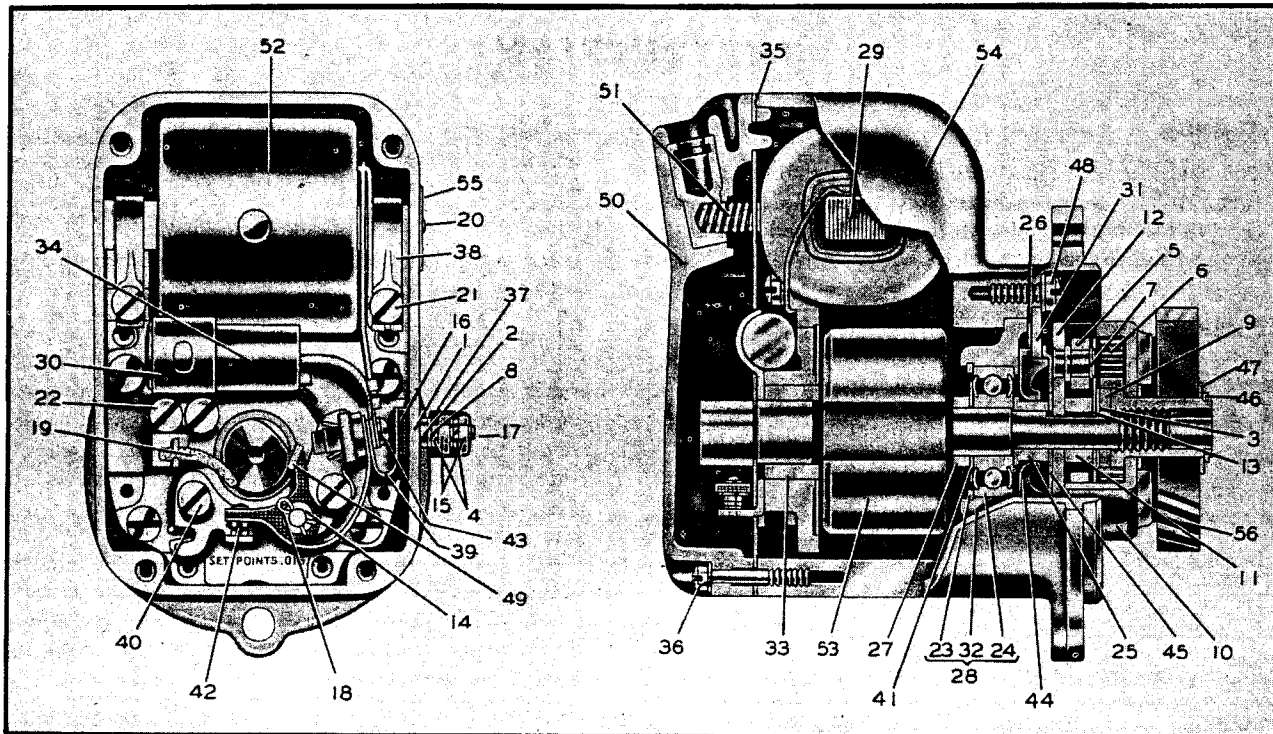
When replacing the coil on the coil core, slide it on then press in the two coil wedges, one on each end, until they are flush with the primary of the coil.

WICO ELECTRIC COMPANY WEST SPRINGFIELD, MASSACHUSETTS, U.S.A.

WICO MODEL XH-1 FLANGE MOUNTED MAGNETO

WICO SPEC. No. XH-2477B, WISCONSIN No. Y-111 used on ACN, BKN

PARTS LIST



Ref. No.	Wico Part No.	Description	No Req	Ref. No.	Wico Part No.	Description	No Req
1	M-34X	SPACING WASHER for ground stud (insul.)	2	35	5618	COVER GASKET	1
2	M-35X	WASHER for ground stud (insul.)	1	36	5622	SCREW for distributor cap (Sems)	4
3	M-42XA	SPACING WASHER for driven flange	1	37	X5632	STOP BUTTON GROUP	1
4	M-55XA	LOCKWASHER for ground stud	2	38	5633	COIL CORE CLAMP	2
5	11312	TRIP ARM	1	39	5635	GROUND CONNECTOR	1
6	15-186	DRIVE SPRING	1	**	X5654	GROUND CONNECTION UNIT (Incl. Ref. Nos. 1, 2, 4, 8, 15, 16, 17, & 39).	1
7	6585	TRIP ARM SPRING	1	**	5717	ALIGNING WASHER for breaker point	1
8	IXA-256	WASHER for ground stud (steel)	1	40	5900	CLAMP SCREW for fixed contact	2
9	IYA-583	SPACING WASHER for drive cup	1	41	5926	BALL BEARING SHIELD	1
10	2040	DRIVE CUP	1	42	X5996	BREAKER CONTACT SET	1
11	2122	DRIVEN FLANGE SPACER	1	43	5431	CLAMP SCREW for breaker spring	1
12	X6586	DRIVEN FLANGE GROUP	1	44	6199	OIL SEAL	1
13	2288	RETAINER for drive spring	1	45	6204	OIL SLINGER	1
14	3219	PIVOT WASHER for breaker arm	1	46	6424	IMPULSE LOCK RING	1
15	3230	NUT for ground stud	2	47	6425	THRUST WASHER	1
16	3539	INSULATING LOCK for ground stud	2	**	K6445	IMPULSE LOCK NUT KIT (Incl. Ref. Nos. 46, 47, & nut).	1
17	3945	GROUND STUD	1	**	X11129	IMPULSE COUPLING UNIT (incl. Ref. Nos. 3, 5, 6, 7, 9, 10, 11, 12, 13, 46, 47, & nut)	1
18	4210	BREAKER ARM LOCK	1	48	6465	CLAMP SCREW for impulse stop (Sems)	4
19	5077	CAM WIPER FELT	1	49	7644	BREAKER ARM FELT	1
20	5250	SCREW for name plate	2	50	X6533	COVER UNIT	1
21	5411	CLAMP SCREW for coil core (Sems)	2	51	5732	COIL CONTACT SPRING	1
22	5411	CLAMP SCREW for condenser (Sems)	2		X6762	COIL GROUP	1
23	5516	RETAINING RING for rotor bearing	1	53	Y7569	ROTOR	1
24	5517	ROTOR BEARING	1	54	X7265	MAIN HOUSING GROUP	1
25	5518	IMPULSE SPACER	1	55	8792	NAME PLATE	1
26	5519	GASKET for impulse stop	1	**	10407	BREAKER POINT ALIGNING WASHER (thin)	1
27	5520	SPACER for bearing cage group	1	56		DRIVE GEAR, Wis. Motor GD-87B	1
28	X5521	BEARING CAGE GROUP	1				
29	X5524	COIL CORE GROUP	1				
30	6924	CONDENSER CLAMP	1				
31	X11128	IMPULSE STOP GROUP	1				
32	5567	BEARING CAGE	1				
33	5610	BUSHING for breaker plate	1				
34	X6916	CONDENSER ASSEMBLY	1				
	X5614	CONDENSER	1				

** (Not illustrated)

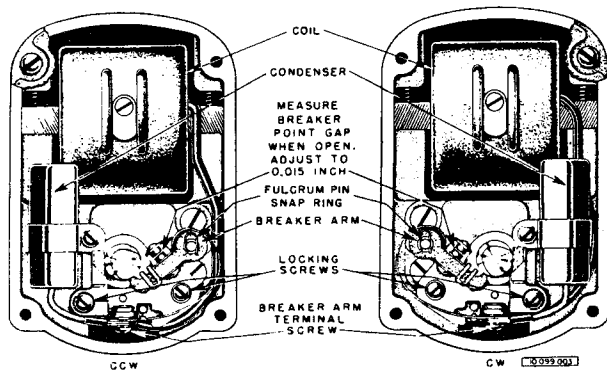


Fig. 1. End View Type FM-X Magnetos

horizontal slot at the bottom of the contact support and pivoted between the two small bosses on the bearing support. Lock the assembly in place by tightening the locking screws and make a final measurement of the breaker point gap after the locking screws are tightened.

SEALING MAGNETOS

Opening the magneto for breaker point adjustment or other service necessitates resealing the magneto upon reassembly. The surfaces between the magneto frame and the end cap should be thoroughly cleaned and a new gasket provided. Remove the vent hoods and clean the vent screens of all foreign material before final reassembly.

SPECIAL DRIVE GEAR

Flange mounting magnetos for Wisconsin motors require a drive gear fitted to the impulse coupling by means of an extended rotor shaft. To engage the slotted drive gear correctly with the drive lugs of the coupling, the magneto rotor should be turned by hand until the coupling pawl engages the stop pin in the flange, the coupling drive lugs then being in the position shown by A of Fig. 2. The drive gear should then be fitted to the coupling so that the marked tooth is on the upper edge of the gear as shown in B of Fig. 2. The tooth on gear GD-113, used on AENL and AEN engines, is marked with an X on the outer edge of the tooth and on gear GD-87-C, used on ACN and BKN engines, an I is stamped on the face of the tooth.

RADIO-SHIELDED MAGNETOS

Applications which require complete radio shielding of the ignition system are equipped with the Type FM-XDE magneto. These magnetos are similar to standard models except the plastic end cap is replaced by an all-

metal cover thru which the high-tension lead is conducted by means of a special insulated socket. Detailed information covering these units can be obtained upon inquiry.

GROUND SWITCHES

Magnetos for Wisconsin Motor Corporation one cylinder engines are furnished with either a push button or an insulated lever ground switch. Both designs function to ground the primary circuit of the magneto when the engine is to be stopped. The switch must be kept closed until the engine is completely at a standstill.

SPECIAL INSTRUCTIONS

The FM-XD1B7S and FM-XDE1B7S units are provided with a special impulse coupling with a 13° lag angle and a spring loaded coupling pawl for a 400-500 rpm throwout. The FM-XD1B7S and FM-XDE1B7S magnetos will replace previous FM-XD1B7 (Wisconsin Motor Y-73-B) and FM-XDE1B7P (Wisconsin Motor Y-83-A) magnetos on Wisconsin Motor engine models ACN and BKN, except those engines using a cylinder head with offset spark plug position. The FM-XD1B7 and FM-XDE1B7P magnetos must still be used on models ABN and AKN engines with the spark plug in the offset position.

The FM-XD1B7U and FM-XDE1B7U units are provided with an impulse coupling with a 20° lag angle and a spring loaded coupling pawl for a 400-500 rpm throwout. The FM-XD1B7U and FM-XDE1B7U magnetos are used on Wisconsin Motor models AEN and AENL engines. The FM-XD1B7U magneto replaces the FM-X1B7E (Wisconsin Motor Y-76) and the FM-XDE1B7U magneto replaces the FM-XDE1B7P (Wisconsin Motor Y-83-A).

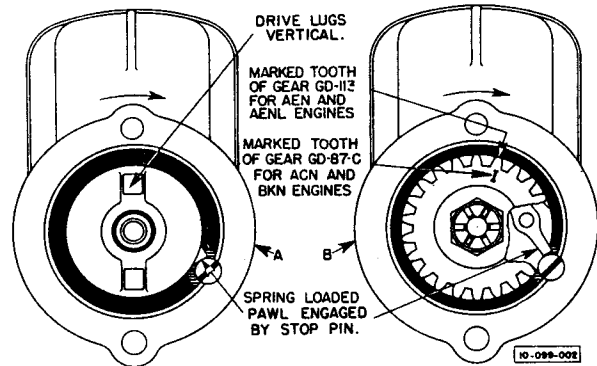
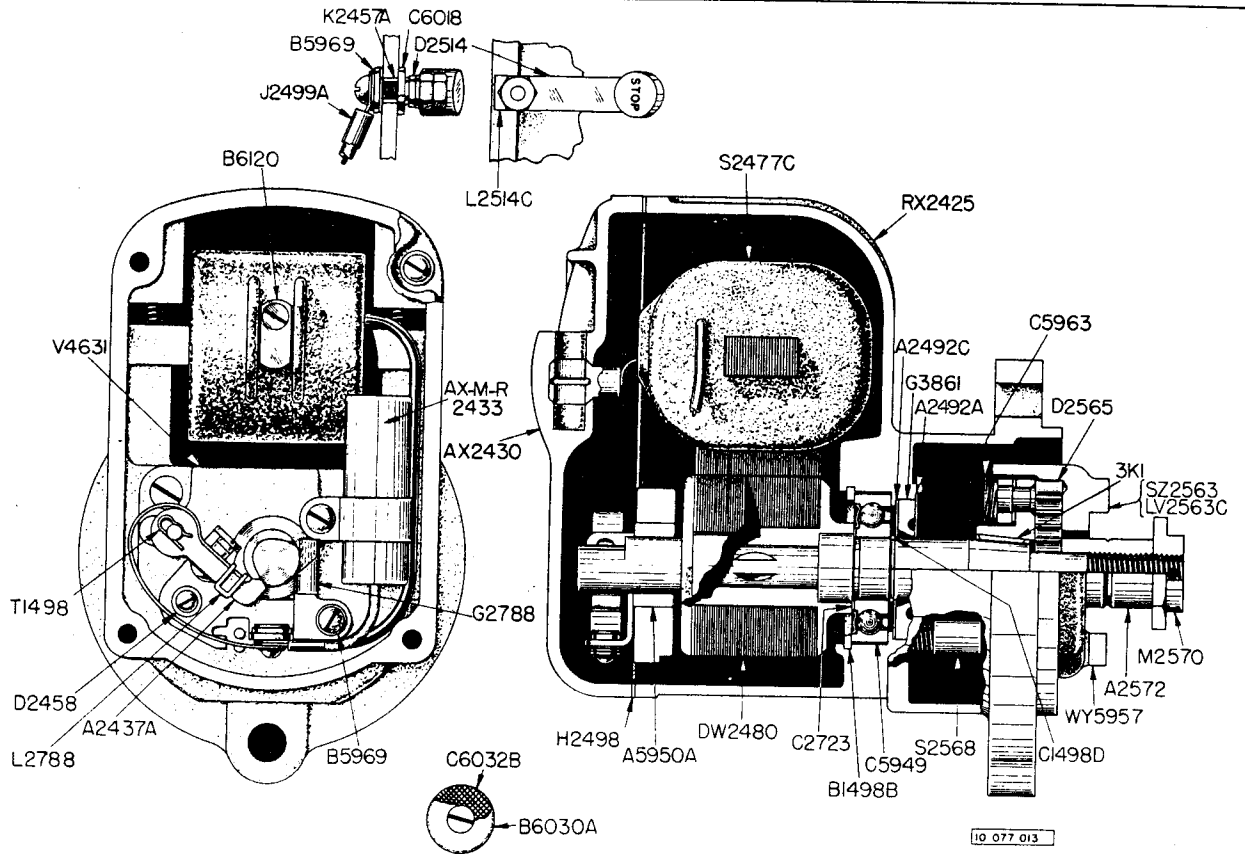
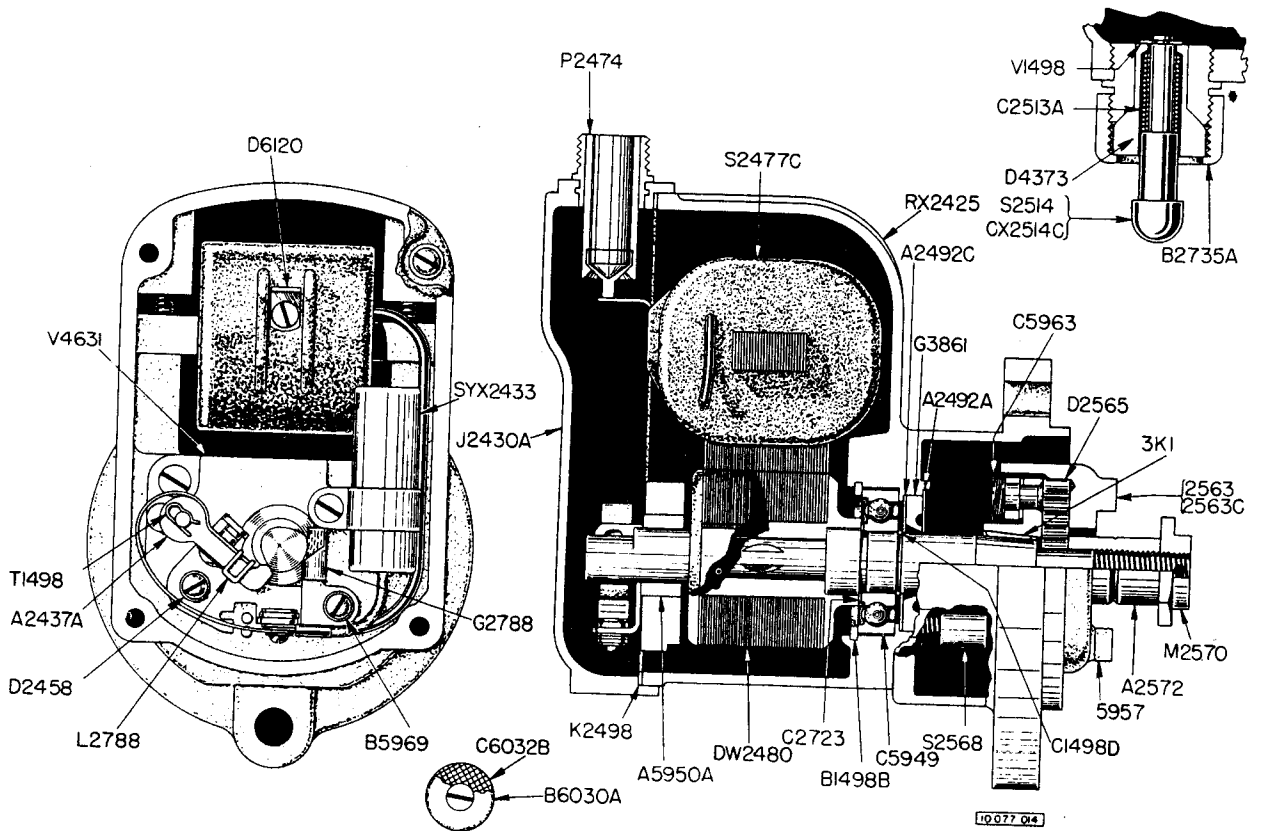


Fig. 2. Drive Mounting Gear



REPAIR CHART FOR FM-XD1B7S AND FM-XD1B7U MAGNETOS



REPAIR CHART FOR FM-XDE1B7S AND FM-XDE1B7U MAGNETOS

Order by Part Number	Name of Part	No. Used			
		FM XD1B7S	FM XDE1B7S	FM XD1B7U	FM XDE1B7U
T1498	Fulcrum Pin Snap Ring	1	1	1	1
V1498	Ground Switch Snap Ring	-	1	-	1
B1498B	Rotor Drive End Bearing Snap Ring	1	1	1	1
C1498D	Rotor Drive End Shaft Snap Ring	1	1	1	1
RX2425	Frame	1	1	1	1
BZ2430	End Cap	1	-	1	-
J2430A	End Cap Assembly	-	1	-	1
10S10D	End Cap Screw - #10-24x $\frac{5}{8}$ "	4	4	4	4
AX-M-R2433	Condenser - Bracket in "R" position	1	-	1	-
SXY2433	Condenser	-	1	-	1
8S4U	Condenser Mounting Screw - #8-32x $\frac{1}{4}$ "	1	1	1	1
A2437A	Breaker Arm, Support Bracket and Points	1	1	1	1
6S6U	Breaker Arm Terminal Screw and Lockwasher - #6-32x $\frac{3}{8}$ "	1	1	1	1
6S6U	Contact Support Locking Screw and Lockwasher - #6-32x $\frac{3}{8}$ "	1	1	1	1
8S6U	Contact Support Locking Screw and Lockwasher - #8-32x $\frac{3}{8}$ "	1	1	1	1
K2457A	Ground Switch Bushing	1	-	1	-
D2458	Contact Support Locking Screw Plate Washer - #6	1	1	1	1
P2474	High Tension Cable Outlet	-	1	-	1
S2477C	Coil	1	1	1	1
25SS14A	Coil Bridge Setscrew - $\frac{1}{4}$ -20x $\frac{5}{8}$ "	2	2	2	2
DW2480	Magnetic Rotor	1	1	1	1
A2492A	Rotor Drive End Seal Outer Washer	1	1	1	1
A2492C	Rotor Drive End Seal Inner Washer	1	1	1	1
H2498	End Cap to Frame Gasket	1	-	1	-
K2498	End Cap to Frame Gasket - Lead	-	1	-	1
J2499A	Primary Terminal Wire Assembly	1	-	1	-
C2513A	Ground Switch Button Spring	-	1	-	1
D2514	Ground Switch Insulated Lever	1	-	1	-
S2514	Ground Switch Button	-	1	-	1
L2514C	Ground Switch Complete - Lever Type	1	-	1	-
CX2514C	Ground Switch Complete - Push Button Type	-	1	-	1
8S12N	Ground Switch Screw - #8-32x $\frac{3}{4}$ "	1	-	1	-
8LW5	Ground Switch Lockwasher	1	-	1	-
8LW6	Ground Switch Shakeproof Lockwasher	1	-	1	-
8N1	Ground Switch Nut	2	-	2	-
SZ2563	Coupling Hub Assembly	1	1	1	1
L-V2563C	Impulse Coupling Complete	1	1	1	1
SV2563C	Impulse Coupling Complete	-	-	-	-
D2565	Impulse Coupling Drive Spring	1	1	1	1
S2568	Impulse Coupling Pawl Stop Pin	1	1	1	1
M2570	Impulse Coupling Nut	1	1	1	1
A2572	Impulse Coupling Bushing	1	1	1	1
C2723	Rotor Drive End Bearing Shim	2	2	2	2
B2735A	Ground Cable Outlet Nut	-	1	-	1
G2788	Cam Wick and Holder	1	1	1	1
L2788	Breaker Arm Wick	1	1	1	1
G3861	Rotor Drive End Seal	1	1	1	1
D4373	Ground Switch Bushing	-	1	-	1
V4631	Bearing Support	1	1	1	1
8S6G	Bearing Support Screw - #8-32x $\frac{3}{8}$ "	4	4	4	4
C5949	Rotor Drive End Bearing	1	1	1	1
A5950A	Rotor Cam End Bearing	1	1	1	1
ZX5957	Impulse Coupling Shell	-	-	-	-
WY5957	Impulse Coupling Shell	1	1	1	-
C5963	Impulse Coupling Pawl Spring	1	1	1	1
B5969	Ground Switch Plate Washer - #8	1	1	1	1
B5969	Contact Support Locking Screw Plate Washer - #8	1	1	1	1
C6018	Ground Switch Insulating Bushing	2	-	2	-
B6030A	Vent Cover	2	2	2	2
6S5N	Vent Cover Screw - #6-32x5/16"	2	2	2	2
C6032B	Vent Screen	2	2	2	2
B6120	Coil Clip	1	-	1	-
D6120	Coil Clip	-	1	-	1
6S3W	Coil Clip Screw	1	1	1	1
3K1	Key - Rotor Shaft to Impulse Coupling	1	1	1	1

FAIRBANKS, MORSE & CO.

MAGNETO DIVISION - БЕЛОIT, WISCONSIN

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 46, WISCONSIN



WISCONSIN

Air-Cool **ENGINES**

REG. U.S. PAT. OFF.

3 TO 56 H.P.

WISCONSIN MOTOR CORPORATION

MILWAUKEE 46, WISCONSIN

PRINTED IN U.S.A.