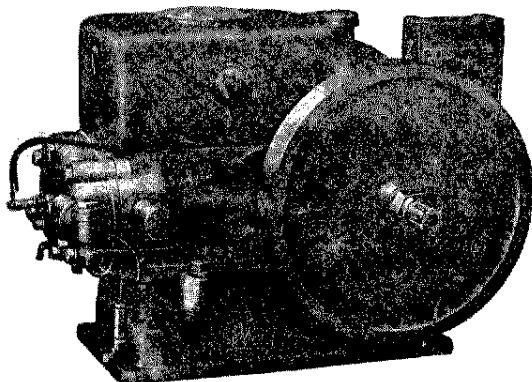


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**INSTRUCTION AND PARTS BOOK  
NOT FOR RESALE  
FOR THE**

**MODEL R ENGINES  
NOT FOR RESALE**



**Equipped with Wico Magneto**

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**THIS BOOK IS VALUABLE—KEEP IT FOR REFERENCE**

This book contains:

1. Complete parts list
2. Operating instructions
3. Maintenance manual

To obtain from your Model R Engine the benefit of all the quality, precision and perfection built into it by the manufacturer, be sure to follow the operating and maintenance instructions carefully.

Should you require replacement parts at any time be sure to order by the part numbers shown in this book. Also, furnish the engine and model numbers shown on the nameplate of your engine to insure that your order is filled accurately and promptly.

Should it ever be necessary for you to return a part for duplication or repair—please write us on the same day you ship the part . . . and tell us in your letter why the part is being returned. This will permit us to handle your order promptly and efficiently.

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**MASSEY-HARRIS CO., Limited  
TORONTO, CANADA**

**NOT FOR RESALE**

## NOT FOR RESALE FOREWORD

The Model R Engines are truly fine machines, sturdy, powerful, efficient, and easy to operate.

It is correct in design and manufactured from the finest materials by Master Engine Builders. The length and kind of service depends almost entirely on the operator.

The operator should read and memorize the following instructions and thoroughly familiarize himself with the engine to assure long and uninterrupted service.

## INSTRUCTION AND OPERATION

### BEFORE STARTING

#### Inspect the Engine for Any Damage in Transit

If the spark plug is not in the engine, it is in the package of supplies found in the crate. Inspect the points for damage in transit. The gap should be .025" or the thickness of a worn American dime. Screw the plug in the engine and attach the magneto wire.

Screw the governor tension nut No. 2-26 (see illustration page 6) about six turns in from the end of the screw. This opens the throttle. Work the governor line No. 3-39 to be sure it operates. If it binds, put a few drops of gasoline on the governor lever (No. 2-557) behind the flywheel to cut the paint at this point.

Fill the crank case to high level on the oil gauge with Gargoyle Mobiloil "A" (SAE 30) or with an oil of similar grade and body. Oil filler hole with gauge, is located in engine base under the magneto bracket and inspection plate.

Fill the hopper with clean water to within three inches of the top.

Fill the gasoline reservoir with clean gasoline. Use a clean container to fill from and strain the gasoline if possible. Don't use an old varnish can.

**TO START ENGINE**—Retard the spark by shifting the timing lever (No. 4-433) toward the magneto as far as it will go.

Close the mixer needle valve and then open  $1\frac{1}{4}$  turn. **NOT FOR RESALE**

Choke the engine by placing the hand over the air intake and crank the engine. It should start on the second or third turn.

After starting, advance timing lever (usually about one inch from the magneto) and adjust mixer needle valve, to suit load. Adjust governor tension nut to desired speed.

**TO STOP ENGINE**—Press "Stop" button located on side of the magneto.

**DUST AND DIRT**—The engine is not guaranteed against excessive wear due to dust and dirt. Engines operated in a dusty atmosphere should be equipped with an air cleaner.

### DUST CAN RUIN YOUR ENGINE IN A FEW HOURS

**LUBRICATION**—We recommend Mobiloil or high grade oil of similar body. Use "A" (SAE 30) in temperatures above 32° F. and "Arctic" (SAE 20) in temperatures below 30° F. Keep the oil level between the high low marks on the oil gauge. Always inspect the oil level before running the engine, especially if it is not used regularly.

Drain and refill every thirty to fifty hours running. If kerosene or distillate is used for fuel the oil should be changed every fifteen to twenty hours.

All moving parts are oiled from the crank case except four:

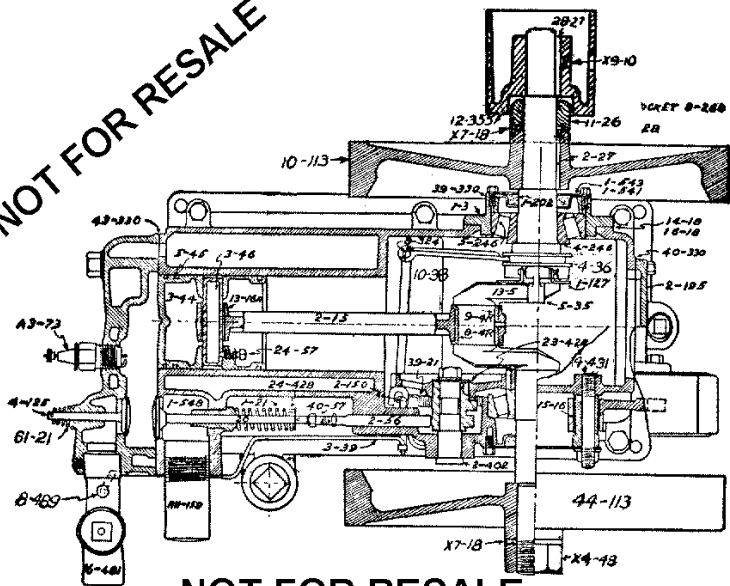
1. Oil the magneto on the side marked "oil". Do not use too much oil at this point as it tends to foul the points of the magneto. 1 drop daily.
2. Oil the magneto rocker arm daily.
3. Oil the exhaust valve stem through the oil hole in the valve cover plate. This plate should be removed occasionally and the valve inspected. If the valve is dry, oil more frequently. Fill the cup, which oils the intake valve stem, daily.
4. Oil intake valve stem through oiler daily.

The breather is located on the front of the cylinder block and covered with a metal cap. This is not an oil filter. If oil is blown out through the breather, remove the cap, screen and baffle and reseal the leather valve by light blows from a hammer, using a wood tool. See parts No. 2-145, 3-145, and 2-359 on the drawing, page 3. The (No. 2-145) leather valve sometimes loses its seat as a result of particles of carbon from the crank case. **NOT FOR RESALE**

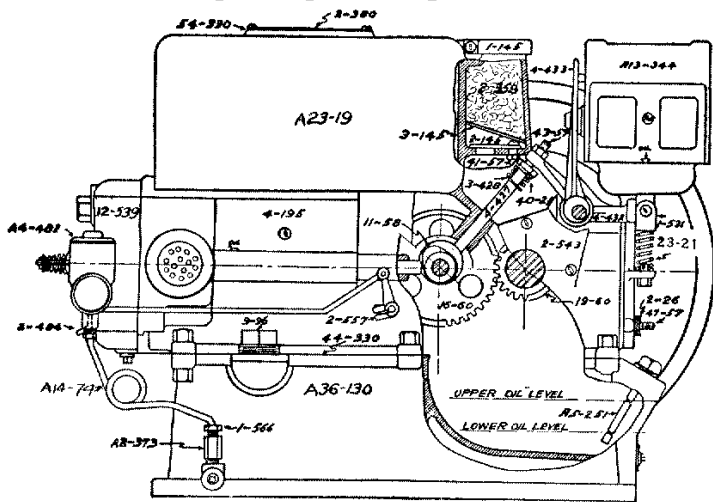
The crank shaft is oil sealed by a felt washer on either side. These can be replaced by removing the flywheel and felt retainer covers.

**IGNITION**—This Engine is equipped with the Wico EK magneto. Keep the magneto clean. The magneto wire is rubber insulated and should be replaced if the insulation becomes hard or oil soaked. The magneto should be timed to fire when the piston is on upper dead center with the timing lever in retard position. Adjustment is made with the adjusting screw 43-57 in the rocker arm. The spark plug is  $\frac{7}{8}$ " standard short type 1400° range. Keep the spark plug clean and the points adjusted at .025" gap. If timing lever wears so that it does not stay in position, tighten the nut on timing lever shaft.

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**VALVE AND TIMING**—The intake valve is seated in the cylinder head and is automatic. It can be cleaned and ground by removing the cylinder head. A leaking intake valve is indicated by a "blow back" in the mixer valve. The intake valve spring should be replaced if it loses its tension, because a weak spring will cause a loss of power.

The exhaust valve is seated in the cylinder block. The valve guide is removable and should be replaced when worn. The valve stem should be oiled through the oil hole in the valve cover plate. After several years service, the exhaust valve may gum slightly due to slight oil pumping. In such cases the valve can be washed with kerosene occasionally to remedy this trouble. The valve tappet clearance should be .015 inches. Adjustment is made with the adjusting screw (40-57) in the push rod.

The cylinder head should be removed and the valves ground every 500 hours operation.

The valve timing is governed by the timing of the cam shaft. The small timing gear on the crankshaft has two teeth, punch marked. These marked teeth are directly opposite the crank pin. The large timing gear on the cam shaft has the tooth punch marked which must mesh between the two marked teeth on the small timing gear. These marks are on the inside of the gears or next to the connecting rod. If the engine is disassembled these marks should be located before removing the gears. They must be reassembled in the same location or the engine will be out of time. (See illustration.)

**MIXING VALVE AND GASOLINE LINE**—The gasoline is drawn from the base by the suction stroke of the engine. The mixture is controlled by the needle valve which must be adjusted to the best running position. This adjustment varies somewhat with the load and climatic conditions. Tightness of the needle valve is adjusted with the needle packing nut.

The air flow through the mixer is regulated by the air valve and spring. These parts are subject to considerable wear and should be inspected occasionally and if worn should be replaced. The air valve should be assembled with the leather side down, and spring with large end down. These parts are removed by removing the mixer body cap.

Leakage of gasoline from air intake on the mixer indicates a leaky engine intake valve.

Keep the gasoline tube connections tight.

There is a check valve on the lower end of the gasoline line. This check valve may be fouled by dirty gasoline. This causes frequent stopping of the engine. Remove and clean thoroughly.

Just beneath the check valve is the gasoline strainer. This should be removed frequently and cleaned. The gasoline tank should be flushed to remove all sediment and water.

Keep air vent in the gasoline filler plug open.

**COOLING**—The hopper should be kept filled to within three inches of the top. The water boils under normal rated loads and is lost through evaporation. Keep the water replenished as necessary.

If the water foams, drain the hopper, flush well and fill with clean water. The drain plug is located in the under side of the cylinder head.

Drain the hopper in freezing weather.

Use a clean container to fill the hopper as all sediment stays in the hopper and clogs the circulation through the cylinder head.

**BEARINGS**—The main bearings are roller. They should need no adjustment until the engine needs reboring. If, however, the engine develops any end play in the crank shaft, the bearings should be taken up. This is done by removing one of the thinnest side plate liners on the pulley side of the engine. There should be no "drag" in the main bearings when adjusted.

The connecting rod babbitts are of a very fine bearing metal. Adjustment is made by removing a thin layer from the laminated shims. This can be done by removing the magneto bracket or inspection plate. Be sure to replace the cotters in the connecting rod bolts.

The wrist pin bushing is bronze and pressed in the connecting rod. When worn it must be replaced or reamed and fitted with oversize wrist pin which is furnished at regular price.

The cam shaft has no bushing. Both cam and cam pivot are hardened against wear.

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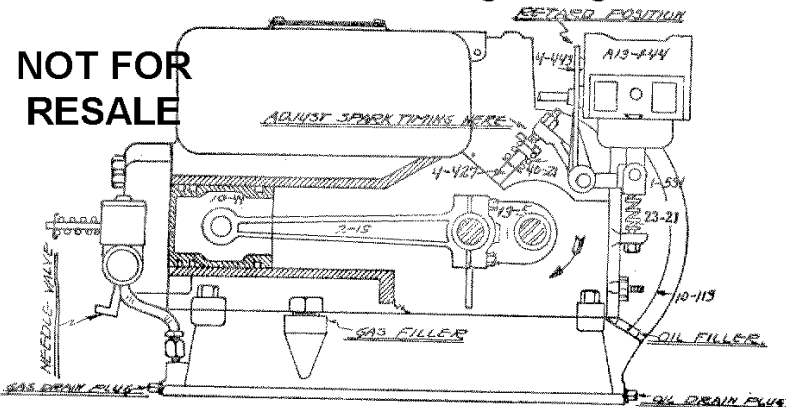
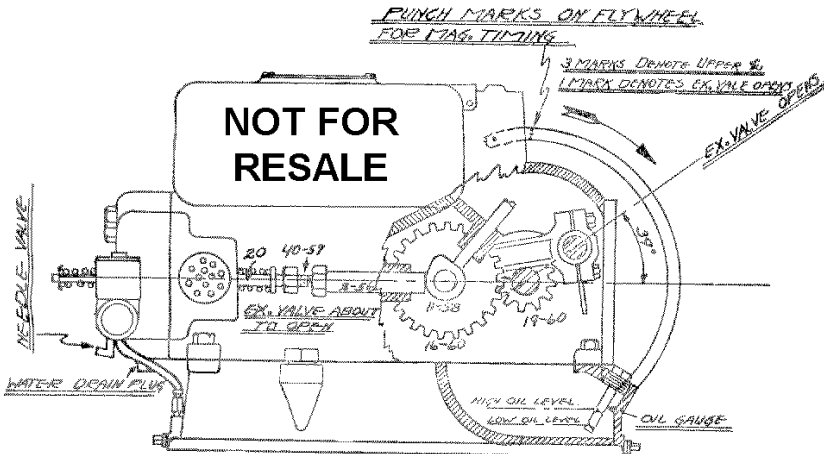
**FLYWHEEL AND PULLEYS**—Keep the flywheel nuts “tight”. A loose flywheel cannot always be located by rocking the wheel, but gives a heavy knock when engine is running. Tighten the nuts with a heavy wrench and hammer.

The older type pulley can be mounted on either side of the engine. The pulley is driven by the pulley washer which fits on the flywheel key. The pulley can be removed from the washer without taking off the washer by removing the three screws between the washer and flywheel. If the pulley washer is taken off, be sure that the flywheel key is not driven too far in. It must extend through the washer. See the repair list for various sizes of pulleys and special flywheel available.

The newer type pulleys are assembled on the crank shaft extension with key and set screw and can be used only on the pulley side.

**PISTON AND RINGS**—The first indication of worn piston rings is loss of power and oil pumping which causes fouled spark plug and sticking exhaust valve. We recommend that new piston rings be installed every five hundred hours of running. After approximately fifteen hundred hours running the cylinder should be rebored and fitted with an oversize piston.

To remove the piston, first remove the cylinder head and the inspection plate. Remove the connecting rod cap and push the piston out through the head end of the cylinder.



Remove the old rings and clean the carbon from the ring grooves. Fit the new rings to the cylinder leaving a .010" "gap" before assembling them on the piston. Replace the piston in the cylinder and reassemble the connecting rod cap. Be sure to replace the oil dipper and cotter keys in the connecting rod bolts.

After assembling the connecting rod, be sure the oil dipper does not strike the crank case.

**GOVERNOR**—The governor is enclosed with the crank case. The engine speed is adjusted by the knurled nut on the inspection plate below the magneto.

The governor is quite sensitive and all parts must work freely. If the engine does not govern and races, look for a binding or sticking of the governor link (3-39), throttle shaft (8-489) or the governor pivot (2-557). After the engine has been in service for several years the governor may fail to function due to wear on the governor shoe (3-37) at the point of contact with the governor collar (4-36). Replace this shoe when worn.

The surging from fast to slow speed is caused by an uneven supply of fuel and not by the governor. Follow instruction on page 4 regarding gasoline line.

The governor can be thrown out of adjustment by a blow or pressure on the governor link (3-39) which might bend and change its length. To check this adjustment, screw the knurled adjustment nut (2-26) toward the engine until there is tension on the governor spring (39-21). This puts the governor in the "wide open" position. Remove the mixer valve cap and note the position of the butterfly throttle valve disc (2-488). It should be in the "wide open" position or parallel with the sides of the mixer. To make the adjustment, bend or straighten governor link (3-39) using two pairs of pliers.

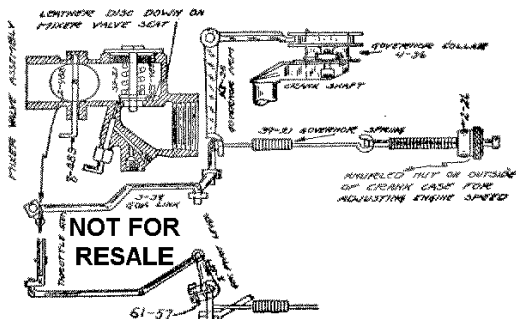
If the air valve is removed, be sure to replace it leather side down and the valve spring with the large end down. Before starting, unscrew the knurled nut (2-26) to prevent the engine from racing.

#### INSTRUCTIONS FOR OPERATING ON NATURAL GAS AND KEROSENE

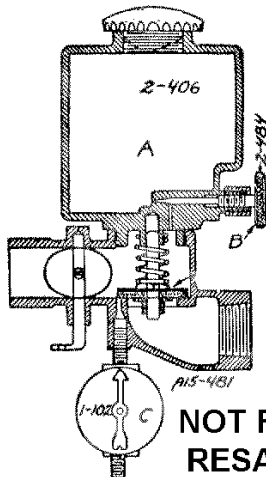
**NATURAL GAS**—The regular instructions apply except those regarding starting. To start, close valves "B" and "C". Fill the gasoline reservoir "A" two-thirds full of clean gasoline. Shift the timing lever toward the magneto to extreme position. Open needle valve "B" one-half turn and crank engine immediately to prevent flooding. Advance the timing lever to best running position and allow the engine to come up to speed with the load. Open gas valve "C" one-fourth to one-half turn and close valve "B". Adjust the timing lever and valve "C" to the best running position. When necessary to replace the spark plug use a "Cold" plug, Champion "C-1" or equivalent.

Any Model R Engine can be equipped to use Natural Gas. It is necessary to change the cylinder head and mixer valve. Write for prices.

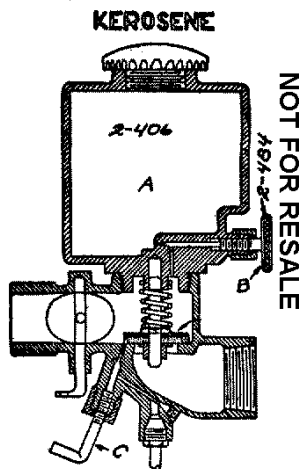
**KEROSENE OR DISTILLATE**—The regular instructions apply except those regarding starting and oiling. To start, close valve "B" and "C", fill the tank in base with kerosene or distillate. Fill gasoline reservoir "A" two-thirds full of clean gasoline. Shift the timing lever toward the magneto to the extreme position. Open needle valve "B" one-half turn and crank engine immediately to prevent flooding. Advance the timing lever to the best running position.



#### NATURAL GAS



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Allow the engine to run for five or ten minutes or until it is thoroughly heated up before changing to kerosene. To change to kerosene, open needle valve "C" and close valve "B". Adjust valve "C" to the best running position.

When these fuels are used, the oil is diluted much faster. The oil should be changed every 15 to 20 hours running.

Any Model R Engine can be equipped to burn kerosene by installing the part A2-406 gasoline bowl. This assembles on the standard engine mixing valve. When ordering specify part No. A2-406. Write for price.

### WHEN ENGINE FAILS TO START, OR LACKS POWER

There are three things to check whenever an engine does not give proper performance. These are: (1) Compression; (2) Spark; and (3) Fuel Supply. Anyone with average mechanical ability can check these points with little difficulty, and locate and repair the engine easily.

#### (1) COMPRESSION.

1. Crank engine over very slowly. Every other revolution as the piston comes up against compression, exert a steady pressure on the crank. The engine should rotate very slowly over compression, or not at all.

2. If compression is faulty, remove the valve cover plate. When the exhaust valve is closed, adjust the clearance between the valve stem (Part No. 20) and the push rod (Part No. 2-56) to .015", or thickness of a cardboard mailing tag.

3. Again test the compression. If it is still faulty, insert the blade of a screw driver between the valve stem and the push rod. Withdraw the screw driver in a manner that will allow the exhaust to snap shut. This will dislodge any particles of carbon or dirt on the valve seat.

4. If compression is not improved, remove the cylinder head and both valves. If the valves are not seating properly, grind them in with a "fine" grade of valve grinding compound until the seating surfaces are a uniform gray color. Clean off all grinding compound with gasoline. Replace the valves and install the cylinder head, drawing the bolts up evenly and gradually. Re-adjust the exhaust valve push rod screw.

5. If the compression remains unsatisfactory, worn rings, cylinder or piston is indicated. Rings should be replaced, and if necessary, the cylinder rebored and a new piston installed. Worn rings are sometimes indicated by excessive oil consumption, and fouling of the spark plug.

#### (2) SPARK PLUG.

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1. Remove the wire from the spark plug, and holding it about  $\frac{1}{4}$ " from the cylinder head, crank the engine over slowly (spark plug removed). If a good spark jumps across this gap, the magneto is operating properly.

2. If the magneto is in good order, have the spark plug tested at a filling station. The spark plug should check "good" when an air pressure of 80 lbs. is applied to the tester. Replace or clean the plug if necessary. Adjust gap to .020" to .030". (NOTE: If engines are used on very light duty, the standard Champion No. 1 Commercial plug may foul. If this is the case, replace it with a Champion "No. 3 Commercial" spark plug.)

3. Adjust the spark timing carefully. (See page 9 for Model R9.) With the spark plug removed, and the timing lever against the magneto, rotate the engine flywheel **VERY SLOWLY**. At the instant the magneto trips, cease turning the flywheel. Note the position of the center-punched timing marks on the flywheel rim. If they are not **exactly** at the top, adjust screw 43-57 at the end of the magneto rocker arm in or out, so that the magneto trips when the marks are at the top of the flywheel. Tighten the lock nut securely after proper adjustment is attained.

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4. If magneto drive spring (No. 40-21) is broken or weak, it must be replaced. The same is true of magneto return spring (No. 23-21). The drive spring must pull the yoke under the magneto poles rapidly from them, and the return spring must push the yoke back to the poles with considerable force. If either or both springs are replaced, re-adjust the timing as in No. 3.

5. If a satisfactory spark does not result from the above operations, consult magneto instruction sheet. If you are unable to repair the magneto easily, do not tamper with it. Take it to the nearest Wico repair station, or contact your nearest Massey-Harris representative, for further instructions.

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**(3) FUEL SUPPLY.****NOT FOR RESALE**

1. Be sure that there is gasoline in the tank.
2. Close the needle valve, then open  $1\frac{1}{4}$  turns. Choke the engine by holding the left hand over the air inlet of the mixer valve (or closing the choke if the engine is so equipped) as the engine is cranked over. After two or three revolutions thereafter, the engine should commence to run. After the engine is running (with spark lever in best running position), gradually close the needle valve until the engine starts to miss. Then open the needle valve  $\frac{1}{4}$  turn.
3. If engine fires only once or twice after choking, the gasoline line or check valve is leaking or clogged. Drain the gasoline tank and remove the gasoline line and check valve. Use good wrenches—not pliers. Clean check valve thoroughly. Hold it in its vertical operating position, and blow and suck through it with the mouth. Air must pass freely upward, and very little or none at all downward. Replace check valve and gasoline line, being sure that all connections are tight. Any leakage will prevent normal operation of the engine.
4. If engine fails to start, remove lid, spring, and leather faced washer from mixer valve. Remove needle valve. Clean all passages with shipping tag or other small wire. When reassembling mixer valve, see that the leather disc, and the pin on which it operates, are not worn. Install leather surface downward, and spring with large end downward. Adjust needle valve as outlined in No. 2.

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**OPERATING AND TIMING INSTRUCTIONS FOR MODEL R9 ENGINE**

**TO START**—Set the timing eccentric so that the pin in the end of the stud is in that portion of the quadrant marked with the letter "S". There is not an exact location for this pin setting.

Open mixer needle valve about  $1\frac{1}{4}$  turn. Crank engine over compression once or twice, at the same time hold hand over air opening in mixer valve to choke engine.

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After the engine is started advance the spark by moving the eccentric handle over until pin is in that section of quadrant marked with the letter "R". Be careful not to advance the spark too far or the engine will knock slightly. The best position will be determined by the speed at which the engine is running and the load it is pulling.

**STOP** engine by swinging the timing lever away from flywheel or toward the letter "S" as far as it will go. This will disengage the trip mechanism of the magneto and cause a discontinuance of spark.

**TIMING** of the engine is very simple if the operator will give it a little thought before starting to make adjustments. For starting, the spark should occur at about compression dead center.

If the timing appears to be incorrect proceed as follows: Place the timing lever so that the letter "S" is about opposite the pointer pin. Loosen the trip rod lock nut. Turn the flywheel slowly in a clockwise rotation toward compression dead center and note where magneto trips. If the crank shaft has passed dead center, screw the trip rod out of the eccentric strap about  $\frac{1}{2}$  turn and try again. If magneto trips before dead center, screw trip rod into eccentric strap. After adjustment has been made, tighten trip rod lock nut. If magneto does not trip when timing lever is in extreme retarded position timing is correct.



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## PARTS AND PRICE LIST

(For illustrations see pages 10 and 11)

WHEN ORDERING PARTS, BE SURE TO GIVE THE ENGINE MODEL AND SERIAL NUMBERS, GIVE PART NUMBERS AND DESCRIPTION AND SPECIFY HOW SHIPMENT IS TO BE MADE.

Repairs are handled on a cash basis. Send cash with order to save C. O. D. charges and include amount for postage. Any difference will be returned with your invoice.

C. O. D. shipments are insured. File claim with the carrier for any damage or loss.

Any parts returned for repair, duplication or exchange must be prepaid. Mark all shipments with your name and address.

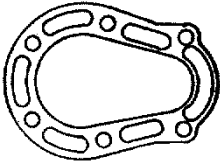
The following list covers parts for all Model R Engines. All models are similar in design and many parts are interchangeable on all models. When model symbol is not shown, the part is used on all models. For older models, use the following table:

- 2-H.P. Model R12B, order as R12
- 2-H.P. Model R9, order as R12, except items marked R9
- 2-H.P. Model R14, order as R12, except items marked R14
- 3-H.P. Models R2, R3, R5, R5B, R20B, order as R20
- 4-H.P. Models R4, R6, R6B, R30B, order as R30

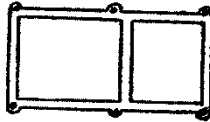
Prices subject to change without notice.

Part Number	DESCRIPTION	Model	Price Each
1-3	Side Plate .....	R20, R30	
9-3	Side Plate .....	R12	
8-4	Connecting Rod Bearing, Upper Half .....		
9-4	Connecting Rod Bearing, Lower Half .....		
13-5	Crankshaft, 20 $\frac{1}{16}$ " Long, 3-H.P. ....	R20, R30	
A13-5	Crankshaft, 20 $\frac{1}{16}$ " Long, 3-H.P., with Bearings and Governor .....	R20, R30	
17-5	Crankshaft, 19" Long, 2-H. P. ....	R12	
A17-5	Crankshaft, 19" Long, 2-H.P., with Bearings and Governor .....	R12	
A2-15	Connecting Rod Assembly .....		
13-16	Connecting Rod Bushing, P.E. ....		
15-16	Magneto Rocker Arm Bushing .....		
20-16	Magneto Drive Eccentric Bushing .....	R9	
5-18	Connecting Rod Shims, $\frac{1}{16}$ ", Solid .....		
14-18	Side Plate Shims, 0.005" Thick .....		
16-18	Side Plate Shim, 0.015" Thick .....		
19-18	Connecting Rod Shims, Laminated .....		
A18-19	Cylinder with Exhaust Valve and Hopper .....	R30	
A21-19	Cylinder with Exhaust Valve .....	R12, R14	
A22-19	Cylinder with Exhaust Valve .....	R9	
A23-19	Cylinder with Exhaust Valve .....	R20	
20	Exhaust Valve .....		
1-21	Exhaust Valve Spring .....		
16-21	Spring for Pawl in Hand Crank .....		
22-21	Magneto Drive Spring .....	R9	
23-21	Magneto Return Spring .....	R9	
26-21	Timing Eccentric Friction Spring .....		
33-21	Mixer Air Valve Spring .....		
39-21	Governor Spring .....		

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43-330



44-330



61-21



4-25

4-125 IN. VALVE-  
61-21 SPRING



A8-539 A12-539 A22-539



1-145



3-145



2-145



2-300



2-21



2-359

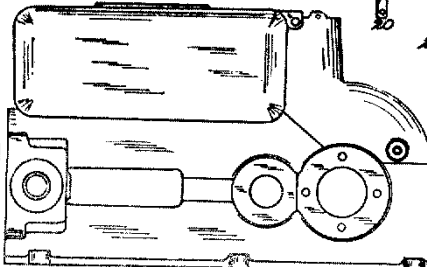


2-30



2-56

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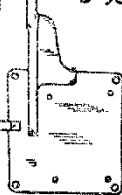
A13-19 FOR R20 FOR OTHER MODELS SEE LIST



60-530  
58-530



3-73



2-195



31-185



A4-150



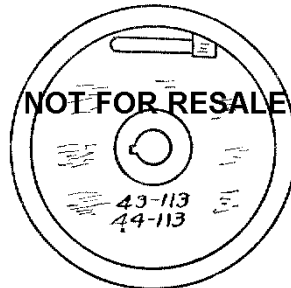
4-195



A5-257



76-21

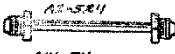


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43-113  
44-113



A2-584



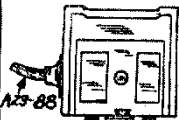
A4-74



A3-373  
A4-373



55-130



A13-88

A13-344



1-531



43-57



42-428



4-427



40-57



A12-98



15-46



4-433



40-21



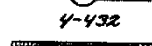
23-21



2-402



23-428



4-432



11-58

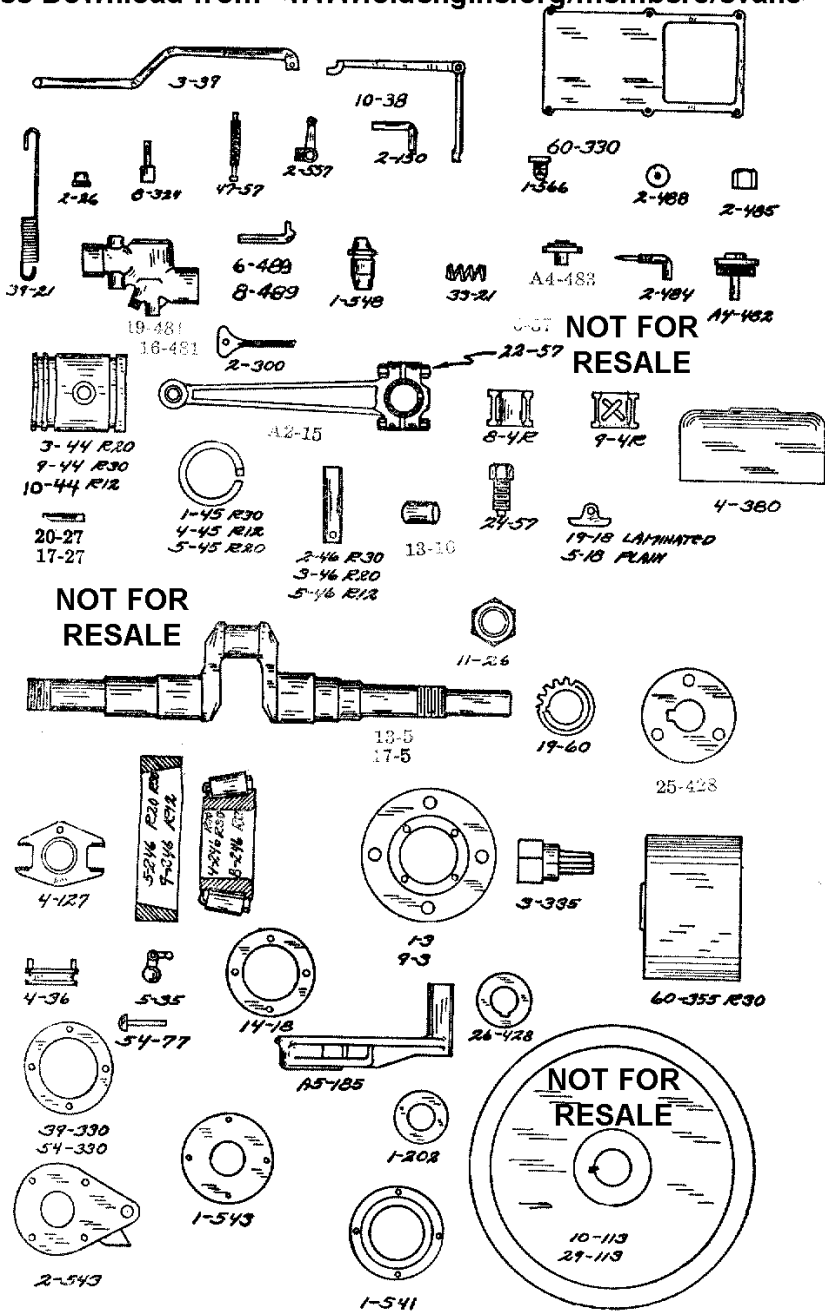


16-60



4-431

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Part Number	DESCRIPTION	Model
40-21	Magneto Drive Spring.....	R12, R14, R20, R30
23-21	Magneto Return Spring.....	R12, R14, R20, R30
61-21	Intake Valve Spring.....	
71-21	Intake Valve Washer Pin, Small Type.....	
76-21	Spring for Crank Handle in Flywheel.....	
87-21	Intake Valve Washer Pin, Large Type.....	
2-26	Governor Tension Screw Nut.....	
11-26	Flywheel Nut.....	
17-27	Flywheel Key, $\frac{5}{16}$ "x $\frac{3}{8}$ "x $1\frac{7}{8}$ ".....	
20-27	Flywheel Key, $\frac{5}{16}$ "x $\frac{3}{8}$ "x $1\frac{11}{16}$ ".....	
5-35	Governor Weight.....	
4-36	Governor Collar.....	
3-37	Governor Shoe after Engine No. 66000.....	
10-38	Governor Arm after Engine No. 66000.....	
	(NOTE—Parts 3-37 and 10-38 together replace part 5-38)	
3-39	Governor Link.....	
3-44	Piston, $3\frac{1}{2}$ " Dia.—Std.....	R20
005-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.005" Oversize.....	R20
010-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.010" Oversize.....	R20
020-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.020" Oversize.....	R20
030-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.030" Oversize.....	R20
040-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.040" Oversize.....	R20
050-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.050" Oversize.....	R20
060-3-44	Piston, $3\frac{1}{2}$ " Dia.—0.060" Oversize.....	R20
9-44	Piston, $3\frac{3}{4}$ " Dia.—Std.....	R30
005-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.005" Oversize.....	R30
010-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.010" Oversize.....	R30
020-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.020" Oversize.....	R30
030-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.030" Oversize.....	R30
040-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.040" Oversize.....	R30
050-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.050" Oversize.....	R30
060-9-44	Piston, $3\frac{3}{4}$ " Dia.—0.060" Oversize.....	R30
10-44	Piston, $3\frac{1}{4}$ " Dia.—Std.....	R12
005-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.005" Oversize.....	R12
010-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.010" Oversize.....	R12
020-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.020" Oversize.....	R12
030-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.030" Oversize.....	R12
040-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.040" Oversize.....	R12
050-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.050" Oversize.....	R12
060-10-44	Piston, $3\frac{1}{4}$ " Dia.—0.060" Oversize.....	R12
A3-44	Piston and Connecting Rod Assembly—Std.....	R20
005-A3-44	Piston and Connecting Rod Assembly— 0.005" Oversize.....	R20
010-A3-44	Piston and Connecting Rod Assembly— 0.010" Oversize.....	R20
020-A3-44	Piston and Connecting Rod Assembly— 0.020" Oversize.....	R20
030-A3-44	Piston and Connecting Rod Assembly— 0.030" Oversize.....	R20
040-A3-44	Piston and Connecting Rod Assembly— 0.040" Oversize.....	R20
050-A3-44	Piston and Connecting Rod Assembly— 0.050" Oversize.....	R20
060-A3-44	Piston and Connecting Rod Assembly— 0.060" Oversize.....	R20
A9-44	Piston and Connecting Rod Assembly—Std.....	R30
005-A9-44	Piston and Connecting Rod Assembly— 0.005" Oversize.....	R30
010-A9-44	Piston and Connecting Rod Assembly— 0.010" Oversize.....	R30
020-A9-44	Piston and Connecting Rod Assembly— 0.020" Oversize.....	R30
030-A9-44	Piston and Connecting Rod Assembly— 0.030" Oversize.....	R30

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Part Number	DESCRIPTION	Model
040-A9-44	Piston and Connecting Rod Assembly— 0.040" Oversize	R30
050-A9-44	Piston and Connecting Rod Assembly— 0.050" Oversize	R30
060-A9-44	Piston and Connecting Rod Assembly— 0.060" Oversize	R30
A10-44	Piston and Connecting Rod Assembly—Std.	R12
005-A10-44	Piston and Connecting Rod Assembly— 0.005" Oversize	R12
010-A10-44	Piston and Connecting Rod Assembly— 0.010" Oversize	R12
020-A10-44	Piston and Connecting Rod Assembly— 0.020" Oversize	R12
030-A10-44	Piston and Connecting Rod Assembly— 0.030" Oversize	R12
040-A10-44	Piston and Connecting Rod Assembly— 0.040" Oversize	R12
050-A10-44	Piston and Connecting Rod Assembly— 0.050" Oversize	R12
060-A10-44	Piston and Connecting Rod Assembly— 0.060" Oversize	R12
1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —Std.	R30
005-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.005" Oversize.	R30
010-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.010" Oversize.	R30
020-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.020" Oversize.	R30
030-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.030" Oversize.	R30
040-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.040" Oversize.	R30
050-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.050" Oversize.	R30
060-1-45	Piston Ring, $3\frac{3}{4}" \times \frac{3}{16}"$ —0.060" Oversize.	R30
4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —Std.	R12
005-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.005" Oversize.	R12
010-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.010" Oversize.	R12
020-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.020" Oversize.	R12
030-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.030" Oversize.	R12
040-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.040" Oversize.	R12
050-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.050" Oversize.	R12
060-4-45	Piston Ring, $3\frac{1}{4}" \times \frac{3}{16}"$ —0.060" Oversize.	R12
5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —Std.	R20
005-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.005" Oversize.	R20
010-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.010" Oversize.	R20
020-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.020" Oversize.	R20
030-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.030" Oversize.	R20
040-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.040" Oversize.	R20
050-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.050" Oversize.	R20
060-5-45	Piston Ring, $3\frac{1}{2}" \times \frac{3}{16}"$ —0.060" Oversize.	R20
10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ —Std.	R12
005-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.005" Oversize	R12
010-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.010" Oversize	R12
020-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.020" Oversize	R12
030-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.030" Oversize	R12
040-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.040" Oversize	R12
050-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.050" Oversize	R12
060-10-45	Piston Ring, Ventilated Oil, $3\frac{1}{4}" \times \frac{3}{16}"$ — 0.060" Oversize	R12
2-46	Piston Pin—Std.	R30
005-2-46	Piston Pin—0.005" Oversize.	R30
010-2-46	Piston Pin—0.010" Oversize.	R30
3-46	Piston Pin—Std.	R20
005-3-46	Piston Pin—0.005" Oversize.	R20
010-3-46	Piston Pin—0.010" Oversize.	R20

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Part Number	DESCRIPTION	Model
	<b>NOT FOR RESALE</b>	
5-46	Piston Pin—Std.	R12
005-5-46	Piston Pin—0.005" Oversize	R12
010-5-46	Piston Pin—0.010" Oversize	R12
2-56	Push Rod	
6-57	Connecting Rod Bolt, after Engine No. 66800	
22-57	Connecting Rod Bolt, before Engine No. 66800	
24-57	Piston Pin Set Screw	
40-57	Push Rod Adjusting Screw	
41-57	Breather Valve Bolt	
43-57	Magneto Trip Rod Adjusting Screw	
47-57	Governor Tension Screw	
61-57	Governor Pivot Lock Screw, after Engine No. 66000	
11-58	Cam	
A11-58	Cam and Gear Assembly	
16-58	Cam	R9
A16-58	Cam and Gear Assembly	R9
16-60	Cam Gear	
19-60	Crankshaft Gear	
3-73	Spark Plug, No. 1 Com.	
5-73	Spark Plug, No. 3 "Hot"	
A14-74	Gas Tube with Fittings	
54-77	Governor Pins	
60-77	Pin for Crank Handle in Flywheel	
A8-88	Magneto Cable, 10' Long	R9
A23-88	Magneto Cable, 24' Long	
A12-96	Gasoline Filler Plug	
10-113	Flywheel, 14"x2"	R20, R30
29-113	Flywheel, 12"x2"	R12
43-113	Flywheel, 12"x2", with Starter Crank in Rim	R12
44-113	Flywheel, 14"x2", with Starter Crank in Rim	R20, R30
4-125	Intake Valve	
4-127	Governor Frame	
21-130	Base (Open Type)	R20, R30
22-130	Base	R12
A36-130	Base (Closed Type)	R20, R30
55-130	Base (Closed Type)	R14
A20-143	Magneto Bracket with Stud	R9
1-145	Breather Cap	
2-145	Breather Leather Valve	
3-145	Breather Baffle Plate	
2-150	Governor Arm Pivot Shaft	
A11-158	Muffler	
21-184	Rocker Arm Oiler	R9
22-184	Eccentric Strap Oiler	R9
A5-185	Starter Crank	
31-185	Starter Crank in Flywheel	
1-190	Pawl for Starter Crank	
2-195	Crankcase Inspection Plate	
4-195	Valve Inspection Plate	
5-195	Crankcase Inspection Plate	R9
1-202	Main Bearing Felt Washer	
4-246	Main Bearing Cone with Rollers	R20, R30
5-246	Main Bearing Cup	R20, R30
8-246	Main Bearing Cone with Rollers	R12
9-246	Main Bearing Cup	R12
A5-251	Oil Gauge	
2-300	Oil Dipper	
8-324	Governor Arm Stud	
39-330	Main Bearing Felt Retainer Gasket	
40-330	Inspection Plate Gasket	
43-330	Cylinder Head Gasket	
S44-330	Cylinder to Base Gasket (Closed Type), after Engine No. 65917	
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54-380	Anti-splasher Gasket	
56-380	Hopper Gasket	R30
59-380	Cylinder Base Gasket, Recessed	

Part Number	DESCRIPTION	Model
60-330	Cylinder Base Gasket, Flat.....	
3-335	Starting Crank Nut.....	
A13-344	Magneto with Cable.....	
12-355	Belt Pulley, 4"x4".....	R12, R20
7-355	Belt Pulley, 5"x4".....	
60-355	Belt Pulley, 6"x4".....	R30
64-355	Belt Pulley, 7"x4".....	
65-355	Belt Pulley, 8"x4".....	
59-355	Belt Pulley, 9"x4".....	
2-359	Breather Screen.....	
A3-373	Check Valve.....	R14
A4-373	Check Valve.....	R20, R30
2-380	Anti-splasher.....	
4-380	Hopper Extension.....	R30
125-386	Spark Wire Bracket Support.....	
2-391	Magneto Adapter Plate.....	R9
2-402	Cam Pivot.....	
6-425	Eccentric Strap.....	R9
1-426	Magneto Trip Rod Sleeve.....	R9
3-426	Magneto Trip Rod Spring Bushing.....	
1-427	Magneto Trip Rod.....	R9
4-427	Magneto Trip Rod.....	R12, R20, R30
1-428	Magneto Trip Rod Washer—Large.....	R9
3-428	Magneto Trip Rod Washer— $\frac{1}{4}$ " Hole, Old Style.....	R12, R20, R30
18-428	Magneto Trip Rod Washer—Small.....	R9
23-428	Cam Retaining Washer.....	
24-428	Exhaust Valve Washer.....	
25-428	Pulley Washer.....	
26-428	Pulley Spacer Washer.....	
29-428	Intake Valve Washer.....	
42-428	Magneto Trip Rod Washer— $\frac{3}{8}$ " Hole, New Style.....	
85-428	Rubber Grommet.....	
1-431	Magneto Rocker Arm Stud.....	R9
4-431	Magneto Rocker Arm Stud.....	R12, R20, R30
1-432	Magneto Rocker Arm.....	R9
4-432	Magneto Rocker Arm.....	R12, R20, R30
1-433	Magneto Timing Eccentric.....	R9
4-433	Magneto Timing Eccentric.....	R12, R20, R30
6-435	Magneto Drive Eccentric.....	R9
6-481	Mixer Valve Body, before Engine No. 66000.....	
16-481	Mixer Valve Body, after Engine No. 66000.....	
A19-481	Mixer Valve Assembly, before Engine No. 66000.....	
A16-481	Mixer Valve Assembly, after Engine No. 66000.....	
A4-482	Mixer Body Cap.....	
A4-483	Mixer Air Valve Assembly.....	
2-484	Mixer Needle Valve.....	
2-485	Mixer Needle Valve Packing Nut.....	
2-486	Mixer Needle Valve Packing.....	
2-488	Mixer Throttle Disc.....	
6-489	Mixer Throttle Stem and Lever, before Engine No. 66000.....	
8-489	Mixer Throttle Stem and Lever, after Engine No. 66000.....	
A2-524	Gasoline Strainer Assembly.....	
1-531	Magneto Return Spring Yoke.....	
A8-539	Cylinder Head with Valve, before Engine No. 66000.....	
A12-539	Cylinder Head with Valve, after Engine No. 66000.....	
A22-539	Cylinder Head with Valve, after Engine No. 66000.....	R14
1-541	Main Bearing Felt Retainer.....	
4-541	Main Bearing Felt Retainer, Governor Side.....	R9
1-543	Main Bearing Felt Retainer, Pulley Side.....	
2-543	Main Bearing Felt Retainer, Cover Governor Side.....	
1-548	Exhaust Valve Guide.....	
A2-557	Governor Pivot Lever.....	
1-566	Gas Tube Nut.....	

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Part Number	DESCRIPTION	Model	
X1-1	Main Bearing Felt Retainer Screw $\frac{1}{4}$ "x $\frac{3}{8}$ "	R20 R30	8
X1-12	Inspection Plate Screw $\frac{1}{8}$ "x $\frac{1}{2}$ "	R9	4
X1-14	Inspection Plate and Side Plate Screw $\frac{1}{8}$ "x $\frac{3}{4}$ "	R20 R30	8
X1-16	Magneto Screws $\frac{1}{8}$ "x1"	R12 R20 R30	2
X1-26	Pulley Screw $\frac{3}{8}$ "x $\frac{3}{4}$ "		3
X1-30	Magneto Screw $\frac{3}{8}$ "x1 $\frac{1}{2}$ "	R9	2
X1-38	Cylinder Base Screw $\frac{1}{8}$ "x1"		5
X1-43	Hooper Extension Screw $\frac{1}{2}$ "x1"	R30	4
X1-51	Cylinder Head Screw $\frac{1}{2}$ "x3"		6
X1-69	Magneto Return Spring Screw $\frac{1}{8}$ "x $\frac{1}{2}$ "	R12 R20 R30	1
X1-72	Magneto Bracket Screw $\frac{1}{8}$ "x1"	R9	1
X1-76	Cylinder Base Screw $\frac{1}{8}$ "x1 $\frac{1}{2}$ "		1
X1-91	Cylinder Base Screw $\frac{1}{8}$ "x1 $\frac{3}{4}$ "		1
X1-93	Main Bearing Felt Retainer Screw $\frac{1}{4}$ "x $\frac{3}{8}$ "		4
X1-102	Valve Cover Screw $\frac{1}{4}$ "-20x $\frac{3}{8}$ "		1
X2-10	Anti Splasher Screws		4
X2-12	Governor Pilot Lever Screw		1
X2-16	Throttle Disc Screw		1
X2-21	Timing Eccentric Lock Screw 12-24x $\frac{5}{8}$ "	R9	1
X4-1	Connecting Rod Nut $\frac{1}{8}$ "		2
X4-12	Magneto Rocker Arm Stud Nut $\frac{1}{2}$ "	R12 R20 R30	1
X4-15	Push Rod or Trip Rod Adj. Screw Nut $\frac{1}{4}$ "	R12 R20 R30	1
X4-29	Trip Rod Lock Nut $\frac{3}{8}$ "	R9	1
X4-38	Breather Cap Screw $\frac{1}{4}$ "-20 Nut		1
X4-48	Fly Wheel Nut 1 $\frac{1}{4}$ "x1 $\frac{1}{8}$ "		1
X4-49	Cam Pivot Nut $\frac{1}{8}$ "		1
X4-49	Cylinder Base Screw Nut $\frac{1}{8}$ "		1
X7-1	Magneto Bracket Screw Lock Washer $\frac{1}{8}$ "	R9	2
X7-6	Magneto Rocker Arm Lock Washer $\frac{1}{2}$ "	R12 R20 R30	1
X7-7	Breather Cap Bolt Lock Washer $\frac{1}{4}$ "		2
X7-8	Cam Pivot Nut Lock Washer $\frac{1}{8}$ "		1
X7-10	Pulley Screw Lock Washer $\frac{3}{8}$ "		3
X7-18	Fly Wheel Lock Washer		1
X8-1	Breather Valve Bolt Cotter		1
X8-2	Connecting Rod Bolt Cotter		2
X8-6	Governor Arm Stud Cotter		1
X8-11	Exhaust Valve Cotter		1
X8-11	Trip Rod Cotter	R9	3
X9-9	Mixer Valve Set Screw $\frac{3}{8}$ "x $\frac{3}{8}$ "		2
X9-10	Mixer Valve Set Screw $\frac{3}{8}$ "x $\frac{1}{2}$ "		1
X9-15	Rocker Arm Stud Set Screw $\frac{1}{4}$ "x $\frac{3}{8}$ "	R9	1
X10-29	Breather Cap Bolt		1
X11-3	Governor Frame Rivet		1
X13-38	Oil Drain Plug $\frac{1}{4}$ "		1
X13-43	Cylinder Head Drain Plug		1
X13-74	Water Drain Plug $\frac{3}{8}$ "		1
X14-1	Breather Valve Washer		2
X15-2	Crank Shaft Gear Key No. 9, Woodruff		1
X15-4	Drive Eccentric Key No. 5, Woodruff	R9	2
X15-8	Cam Gear Key No. 3, Woodruff		1
X17-2	Expansion Plug 1 $\frac{1}{8}$ " in Cylinder		2

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