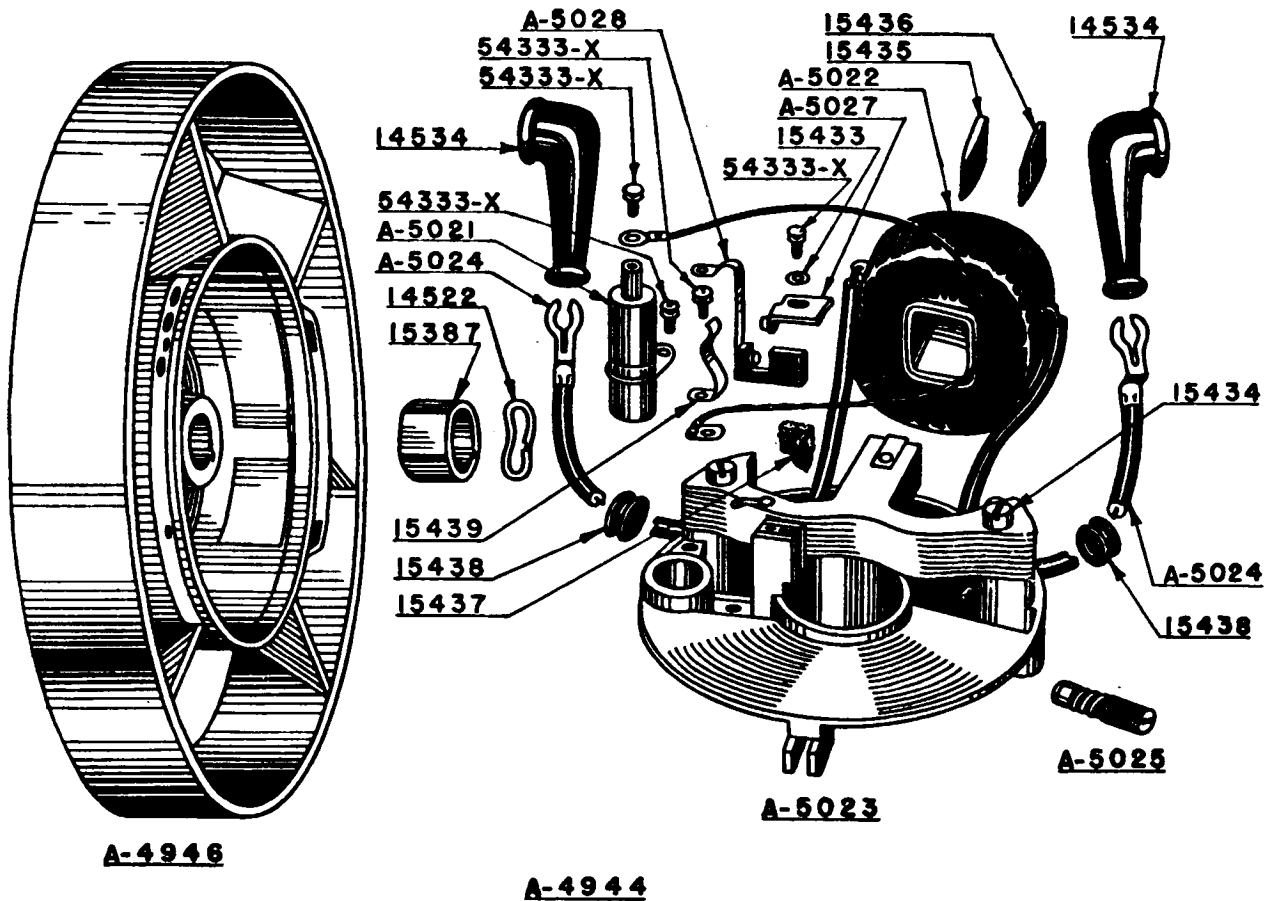


Maytag

Service Instructions

Service Instructions

Wico Magneto Model FW-1718, For Maytag Twin Cylinder Multi-Motors



1. Testing:

- (a) If there is any indication that the magneto is causing trouble, we recommend that a test be made before attempting to repair it.
- (b) If engine fails to start, check the spark by holding on of the high tension cables about 3/16" away from the cylinder and at the same time spinning the fly-wheel. A properly performing magneto should supply a spark which will jump this gap.
- (c) If engine misses while running, check the spark plugs at both cylinders by holding each high tension cable 1/16" away from the spark plug terminal. Disconnect only one cable at a time—leaving the other cable attached to the spark plug. A good spark plug, properly adjusted, should fire in this manner. Check and clean, or replace spark plugs as outlined in Part 9 - Section 4C of the Service Manual.

2. Magneto Adjustment:

- (a) **Breaker points.**
Remove fly-wheel as instructed in Part 1 - Section 4C, of Engine Service Manual. Turn the crankshaft in the direction it normally operates (clockwise on the magneto end of the shaft), until the breaker arm shoe is on the high point of the cam after passing the flat surface. Check the opening of the points with a feeler gauge. The correct opening is exactly .020". If points require adjusting, loosen the screw which locks the stationary contact plate (A-5027), and move the plate to give the proper point setting, then lock the plate securely again by tightening the screw. Construction of the breaker assembly assures proper alignment of the contact surface.
- (b) The breaker point setting should be adjusted in the manner described and at no time should the fixed contact plate be bent, or other alteration made, to provide adjustment.

3. Replacement of Parts:

- (a) The moving contact is an integral part of the breaker arm assembly. Should it be necessary to change either the breaker arm assembly (A-5028) or the fixed contact (A-5027), due to normal wear, both parts should be replaced. A contact replacement set would consist of both the fixed contact and the breaker arm assembly.
- (b) To replace the contacts, remove the condenser connection screw and the fixed contact clamp screw. The contacts can then be removed from the stator plate. If necessary, the breaker spring (15439) can be removed by taking out the breaker spring clamp screw.
- (c) To remove the condenser (A-5021), take out the screw in the end of the condenser which holds the connecting wire from the coil and the breaker connection strip, then remove the screw which fastens the condenser attachment bracket and the primary ground connection to the stator plate. Make sure all connections are clean and tight when replacing the condenser, and avoid bending the connecting strip to disturb alignment of the breaker arm.
- (d) To remove the coil assembly (A-5022), disconnect the primary connection and ground connection to the condenser and condenser clamp, then take out the two screws holding the coil assembly to the stator plate. Using a screw driver, pry up the core from the dowel pins which locate its position on the stator plate and detach the two spark plug cables.

(e) Replacement of coil winding.

With the coil assembly removed from the stator, bend up the coil locking lamination, and carefully pull the winding from the core. Remove the wedges from inside the coil. Slide the new winding over the core, using care to avoid damage, and drive the wedges between the coil and the core in the same position as when removed. Bend the locking lamination down, and install the coil on the plate by reversing the removal procedure. Make sure the core screws are securely tightened. Connect the primary coil lead to the condenser post and the stranded lead to the condenser clamp.

(f) Lubrication.

The cam wiper felt (15437) should be replaced as necessary, or re-oiled with a few drops of heavy oil.

4. General Information:

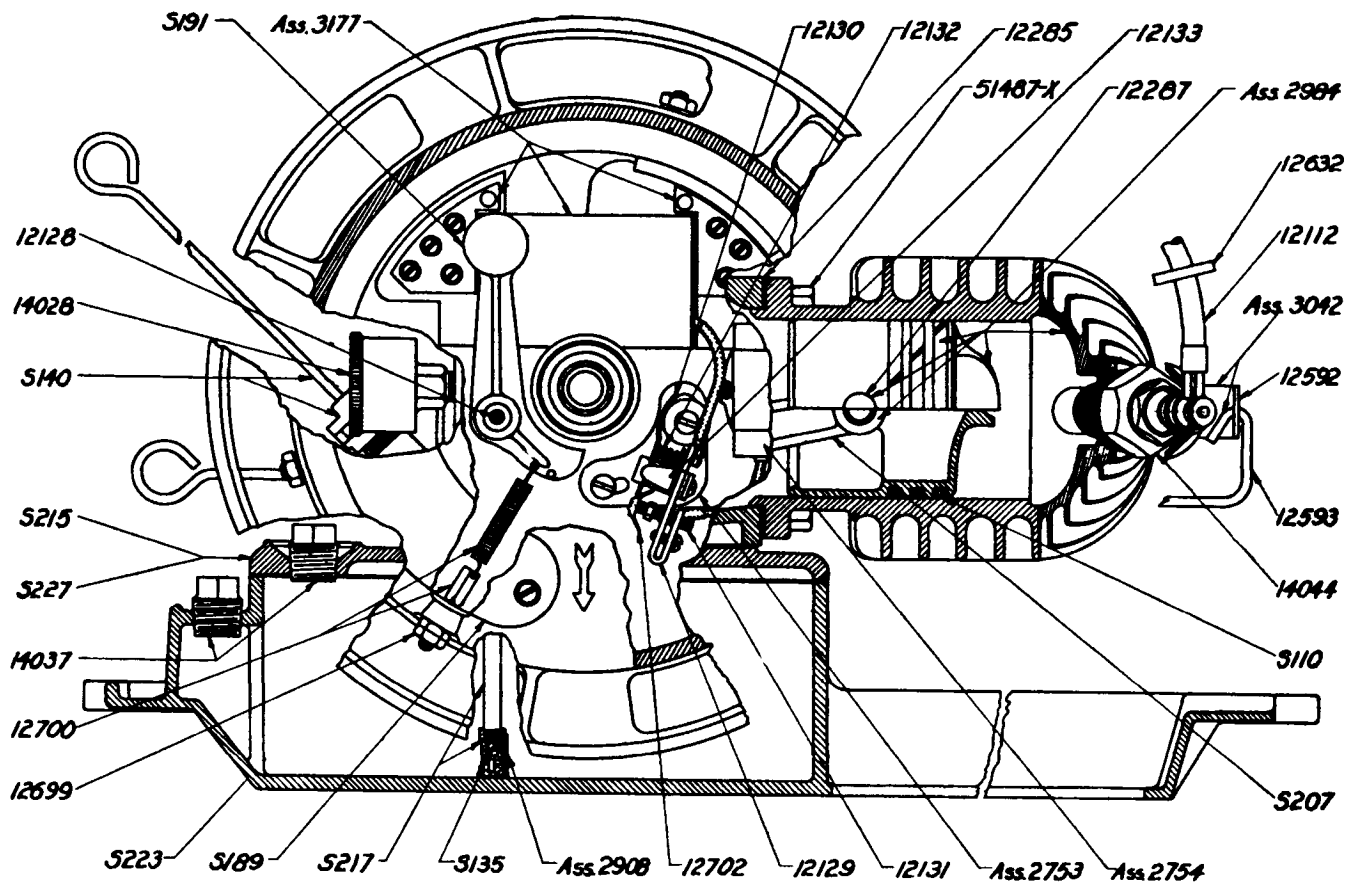
If the magneto fails to function after checking in accordance with the above instructions, we suggest writing The Maytag Company, Newton, Iowa, or your nearest branch office for further instruction - or returning the complete magneto for service.

Service Department

THE MAYTAG COMPANY
Newton, Iowa

Servicing Maytag Multi-Motors

Servicing Ass. 3023, the Model 82 Multi-Motor



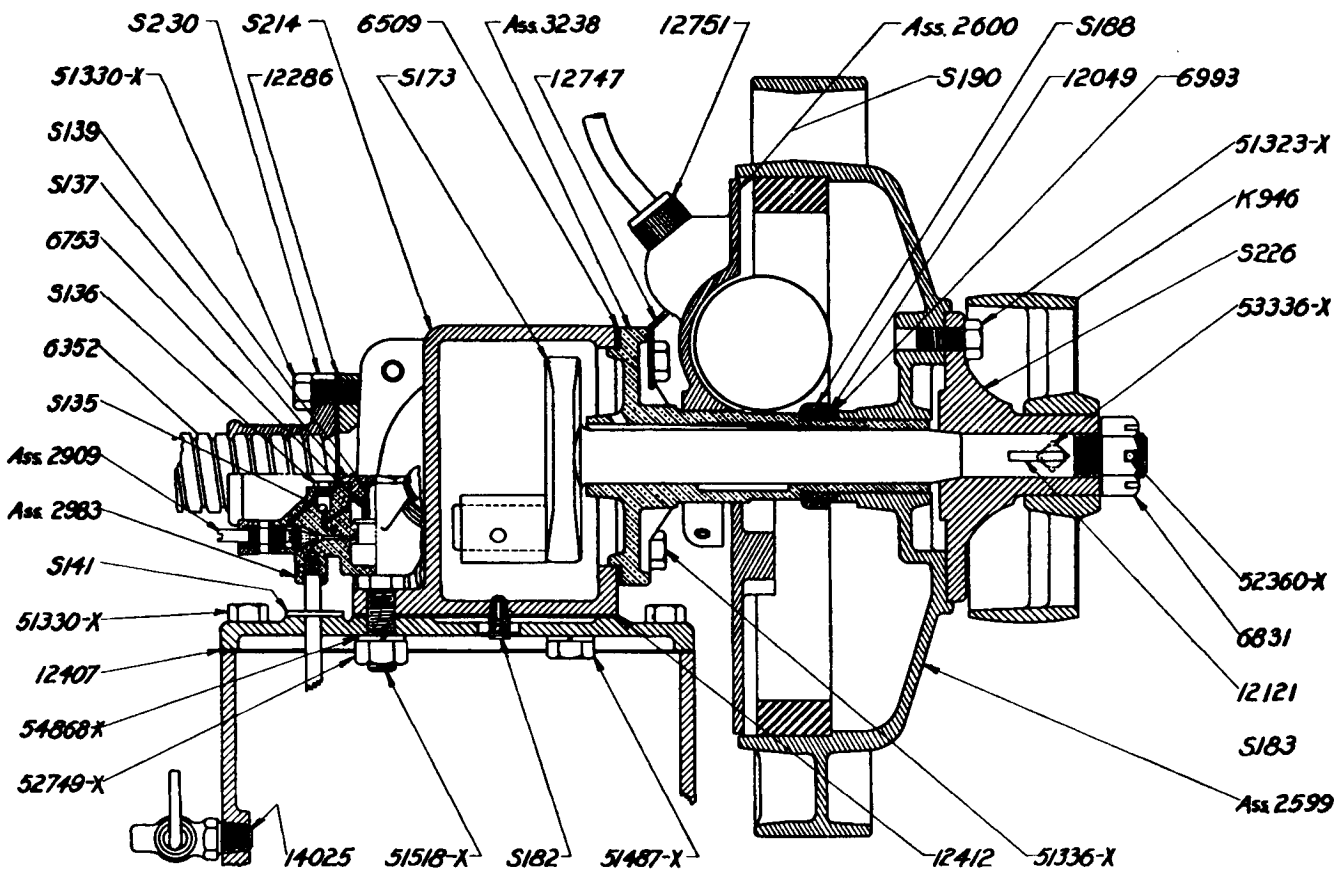
The Model 82 Multi-Motor

1. Dismantle as follows:

- (a) Remove cotter key and hex nut from crankshaft. To loosen flywheel, tap end of shaft with a fiber mallet.
- (b) Loosen clamp screw in armature plate and pull plate from bearing.
- (c) Crankshaft and bearing can be removed upon taking out the four bolts which hold bearing to crankcase.
- (d) Remove spark plug and switch rod No. 12593, then take out bolts holding cylinder to crankcase.
- (e) Detach carburetor from crankcase, then remove fuel tank cover so tank can be cleaned.

2. Cleaning and Inspecting Parts:

- (a) Piston, rings and cylinder should be thoroughly cleaned and the carbon removed from all parts, including the ring grooves. A broken piston ring filed to a sharp edge makes a good tool for cleaning grooves. Install new rings No. S-110 if old ones are worn and make certain they move freely when compressed. Wash all parts in a suitable solvent.
- (b) Remove all carbon from the four exhaust and intake ports of the cylinder with a narrow tool, being careful to avoid damaging the cylinder walls. Scrape all carbon out of cylinder head.
- (c) Wash fuel tank and crankcase thoroughly.
- (d) Clean and inspect flywheel, armature plate, spark plug and carburetor.



The Model 82 Multi-Motor

3. The following parts should be replaced if worn:

- S-182 Deflooder.
- S-186—Ass. 3238 Bearing for crankshaft.
- S-207 Connecting rod.
- S-110 Piston rings.
- S-139 Air valve in carburetor.
- 12121 Woodruff key for crankshaft.
- 12287 Wrist pin for piston.
- 12700
- 12127 Springs for governor.
- 12130 Breaker point, stationary.
- 12131 Breaker point, adjustable.
- 12112 Spark plug cable.
- Ass. 2909 Vapor nozzle for carburetor.
- Ass. 2983 Carburetor—If vapor nozzle or air valve is worn, it is advisable to install new carburetor.

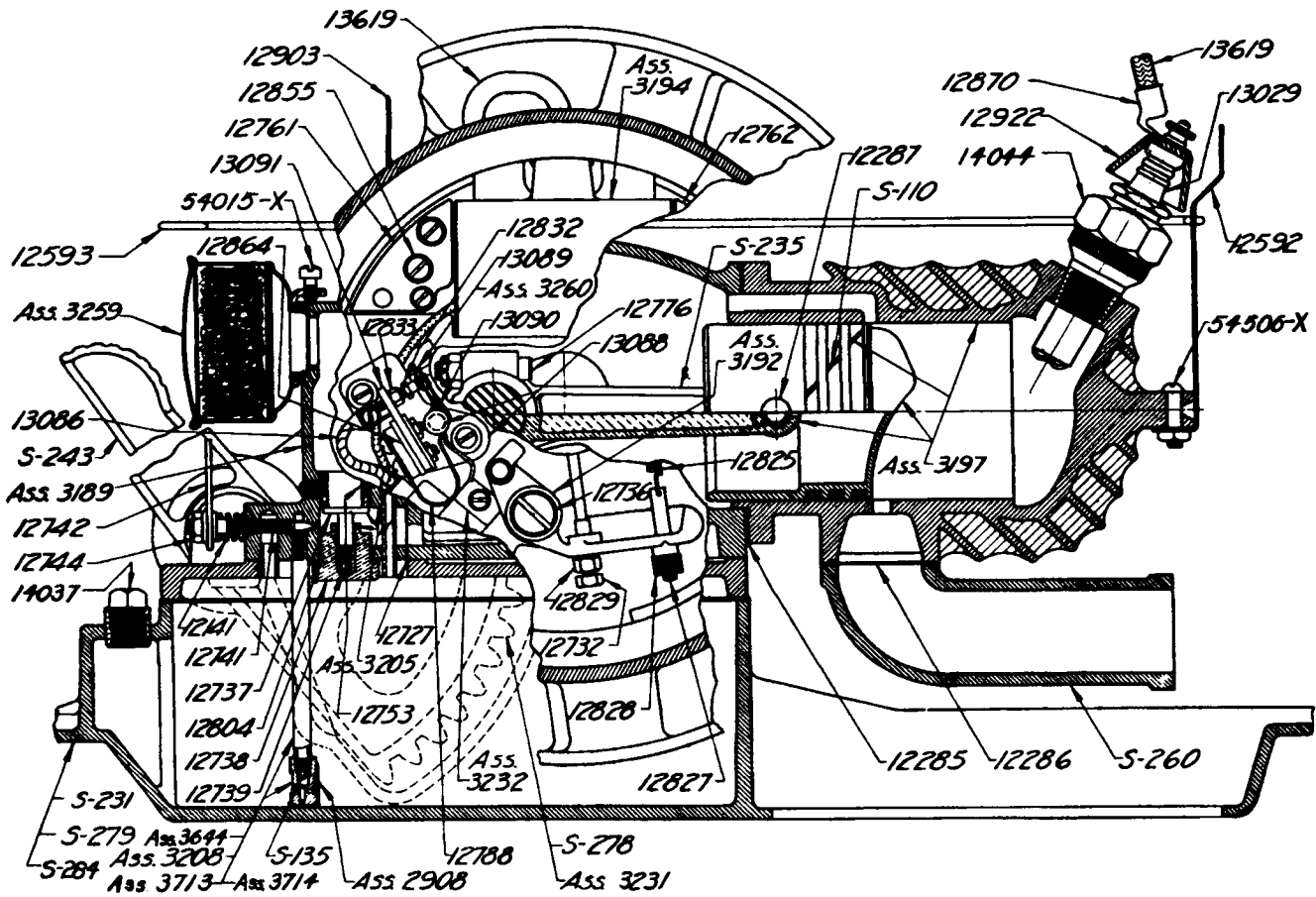
4. Reassemble and adjust—Crankshaft Bearing and Cylinder Assembly as follows:

- (a) Bolt crankcase to fuel tank, first inspecting the deflooder S-182 in the bottom of crankcase to make sure the check ball is not sticking.
- (b) Install the crankshaft S-173 in the bearing Ass. 3238, using care to avoid damaging the bearing

with the key in crankshaft. If key No. 12121 in crankshaft is worn, a new one should be used.

- (c) Apply gasket cement to both sides of bearing gasket No. 6509 and place it on bearing. Hold the crankshaft and bearing in position, slip the connecting rod of the piston over the crank, making certain that the deflector on piston is on the side nearest the spark plug, and tighten the bolts holding the bearing to the crankcase.
- (d) Place cylinder over piston, after oiling the rings liberally and adjusting so that the gaps of the rings are not in line and do not pass the exhaust or intake ports. Slide cylinder in position.
- (e) Before bolting the cylinder to the crankcase, turn the crankshaft and note whether or not the cylinder rests evenly while the piston completes the forward and back stroke. If it appears to move to the side with the motion of the piston, it is evident that the connecting rod is out of line. By grasping the cylinder firmly, the rod may be bent slightly in either direction to correct the trouble. After the connecting rod is adjusted so that the piston moves freely without binding, install the cylinder gasket, applying gasket cement on both sides, and bolt the cylinder securely in place. In a few cases it may prove necessary to install one or two extra gaskets to permit the intake to be

Servicing the Single Cylinder Multi-Motor as used on Models 92, B, 31, 33, G, 11, 16-26-111-19



Side View Late Type Single Cylinder Multi-Motor

1. Dismantle:

- (a) Use wheel puller S-237 to remove flywheel. Place puller over end of crankshaft after removing hex nut and pulley. Center set screw in depression in S-238 coupling disc, tighten large pilot screw until firmly locked, then give head of screw a sharp blow. If S-237 is not available, loosen hex nut until flush with end of shaft, then with heavy blunt end punch against shaft, strike punch a sharp blow.
- (b) Loosen clamp screw of mounting plate and slide plate from bearing.
- (c) Remove segment cover S-242, segment S-241 and ratchet S-240. Take care not to lose the four balls which are between ratchet pinion S-240 and ratchet wheel S-239.
- (d) Take off carburetor which is held to crankcase with four screws. Through opening in crankcase, take cotter pins from connecting rod bolts and with wrench No. 38050 remove connecting rod cap.
- (e) Take out spark plug, cylinder head bolts, and remove piston assembly.

- (f) Upon driving out taper pin No. 12803, the ratchet S-239 can be removed. Take hex bolts from bearing A-3188, thus completing the dismantling operation, except for removing fuel tank.

2. Clean and Inspect Parts:

- (a) Wash all parts, including fuel tank, in some suitable solvent.
- (b) Clean carbon from piston and cylinder. Make certain the ring grooves are clean. In the absence of anything better, file a broken piston ring to a sharp edge and use it to clean carbon from the grooves. Also make certain the four exhaust ports are free from carbon and that the intake ports are clean. Install new rings S-110 if old ones are worn.

3. Carburetor:

- (a) Remove needle valve, feed tube and strainer. Flatten lock washer No. 12804 for air valve cap. Tap air valve cap sharply with hammer and use special wrench No. 38053 to unscrew cap. Lift out air valve spring No. 12739 and air valve No. 12737.

- (b) **Air valve, air valve seat and spring:** Examine face of air valve No. 12737 and valve seat No. 12753 and if worn both should be replaced. The seat can be removed as follows: Loosen headless set screw 52908X, press seat into air chamber and remove through opening for air cleaner, Ass. 3259. Use tool 38449. Press new one from the bottom until it is $\frac{3}{4}$ " from the lower face. The machined end of the valve seat 12753 should be toward the bottom of the carburetor. See drawing. If the spring is weak or short, it should be replaced. The spring should never be stretched as its strength is calibrated to give the correct tension to permit the exact amount of air to enter the mixing chamber.
- (c) **Needle valve and seat:** Install new needle valve No. 12741 if old one is worn or bent. If seat is worn or damaged, it is necessary to replace complete carburetor body, Ass. 3189, or complete carburetor assembly.
- (d) **Feed tube and strainer:** If check ball is worn, install new ball S-135. If check ball seat is also worn, install new style disc type tube and strainer, Ass. 3713 for model 31, Ass. 3714 for models B-G-11-16-26-92-111.

4. Crankshaft and Crankshaft Bushings:

- (a) **Check crankshaft bushings** and, if badly worn, new ones will be required. Except in extreme cases, new bushings will not be needed, thus eliminating the necessity for removing the crankshaft and crankshaft bearing Ass. 3188.
- (b) **To install new bushings:** Observe location of the bushings as shown in the drawing. Press the No. 12720 in place in the crankcase from the inside. The bevel should be toward the inside and the slot up. Plain bushing No. 12752 should be pressed in the crankshaft bearing, Ass. 3188, casting S-234, with the bevel toward the crankcase. Press the other No. 12720 in the outer end of casting S-234 with the slot up. Run a $\frac{1}{8}$ " drill through the hole in the S-234 and drill through the bushing. Also drill a $\frac{1}{4}$ " hole in the outer bushing by passing drill through hole for ball oiler No. 13115.
- (c) **Bolt crank bearing, Ass. 3188,** in place and run a $\frac{1}{8}$ " straight shank reamer through bushings, then use line reamer No. 38005. This is important. After reaming, remove crank bearing and install crankshaft, using gasket No. 12726 between Ass. 3188 and crankcase.
- (d) **End play in crankshaft** can be reduced by using shim No. 12754 between starter ratchet S-239 and crankcase. When assembling the crankshaft, place the felt washer No. 12722 next to the crankcase, follow with fiber washer No. 12723, then sufficient number of shims No. 12754 to remove all excess play. After installing the S-239, the shaft should turn freely.

5. Connecting Rod S-235:

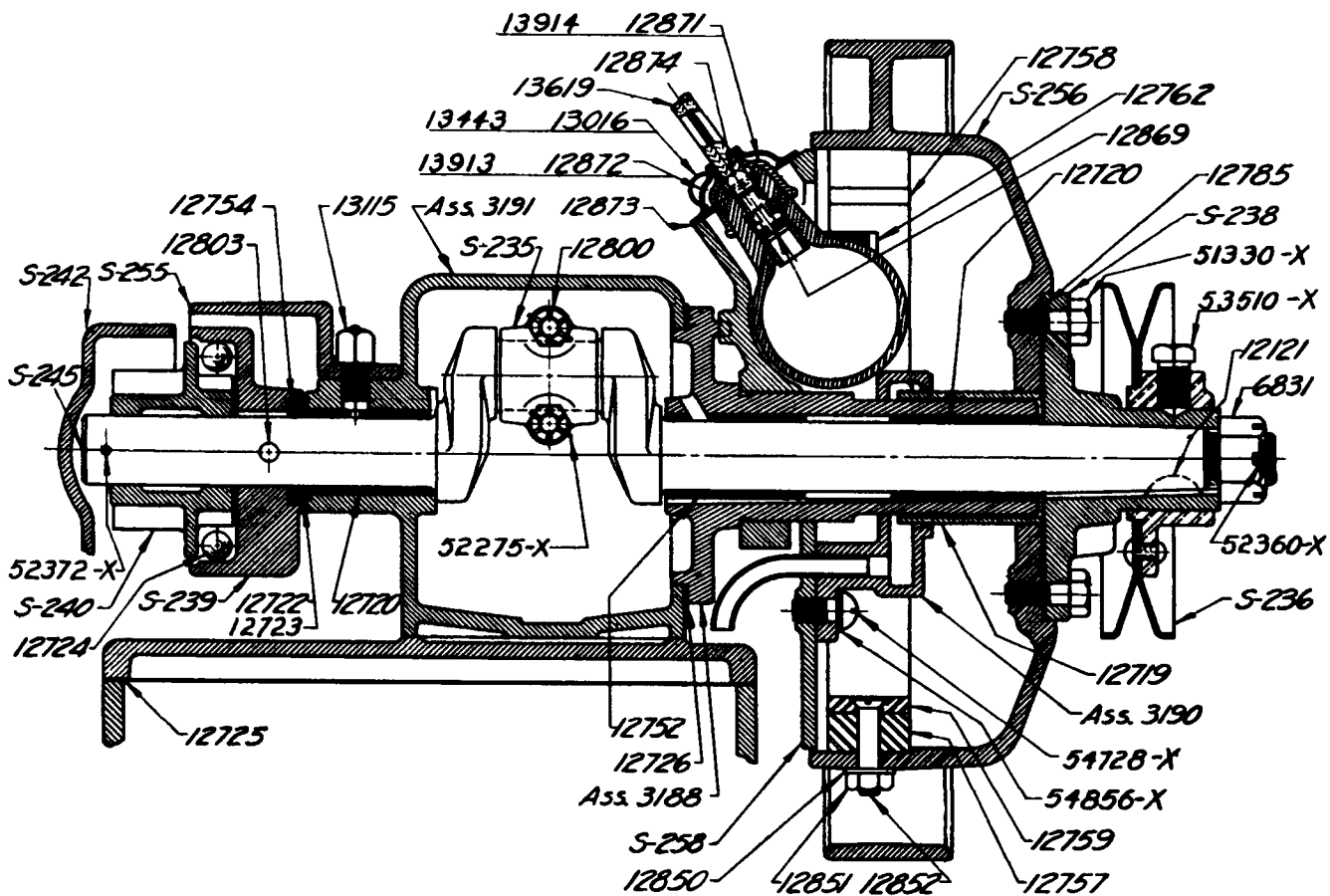
- (a) **If worn,** file face of cap, bolt together and ream with a $\frac{1}{8}$ " reamer. By reaming as outlined, shims are never required. The cap should be bolted tightly when installed on crankshaft. Use new cotter keys 52275X through castellated nuts.

6. Magneto:

- (a) **Wash flywheel and mounting plate** in a clean solvent.
- (b) **Examine mounting plate** for the following: Broken or loose wires, deteriorated spark plug cable, loose stud on interrupter plate, burned or pitted points and weak or broken spring No. 12788. If wires are broken or loose they should be replaced or soldered. If the spark plug cable is worn or insulation is rotten, a new cable should be installed. Points badly worn should be replaced and when replacing, it is necessary that the points make contact on the entire face. When replacing points, do not move the interrupter plate.
- (c) **If breaker assembly** has been moved, tool No. 38018 should be used for locating proper setting. See instructions for timing, paragraph 9-a. If this tool is not available, follow instructions in paragraph 9-b.

7. Assembling:

- (a) **Piston, cylinder and connecting rod:** If a new wrist pin is used, note that the connecting rod and piston are correctly assembled with the baffle plate up, and on the same side of assembly as groove in connecting rod. Use new piston rings if old ones are worn. Make certain that rings turn freely. Attach connecting rod to crankshaft. The groove in connecting rod cap should match with groove in rod.
Tighten bolts and replace cotter keys. Cover both sides of gasket No. 12285 with gasket cement, oil piston rings liberally, and place gaps so they are not in line and will not pass either the intake or exhaust ports, and install cylinder. Hold the cylinder in place and turn crankshaft to determine whether the piston is binding in cylinder. If there is a bind, grasp the cylinder, after raising, and bend the connecting rod slightly to line it with the piston. After piston is lined, tighten the cylinder bolts securely, then turn crankshaft again to make certain it turns freely.
- (b) **Starter assembly:** Assemble starter ratchet S-240 and balls No. 12724. It is important that the balls be free from grease and dirt. A chatter in a slightly worn S-240 can be corrected by placing some hard oil inside the hub. Attach foot tread S-243. If it will not stay in place, install new brake shoe No. 10008.



End View of Late Type Single Cylinder Multi-Motor

(c) Attach carburetor using gasket cement on gasket No. 12727 and lead washers No. 6023 beneath screw heads. Gasket No. 14096 is used beneath the carburetor of late type engines.

(d) **Magneto:** Slide mounting plate in position over crankshaft bearing with the lug on the back of the plate between the lugs on bearing. Tighten clamp screw and slide flywheel in position, lining key in crankshaft with key way in coupling disc.

(e) Tighten hex nut securely on crank shaft and install cotter key. **Note:** Observe instructions for testing and adjusting magneto, paragraph 8.

8. Testing and Adjusting Magneto:

(a) Remove inspection plate and turn flywheel until points are open. Adjust points by regulating stop screw No. 12732 in the governor. The points should open approximately .020". To increase opening of points, loosen lock nut and turn stop screw to right. To decrease opening, turn screw to left. Use the gauge on magneto wrench No. 12799.

(b) Hold spark cable $\frac{1}{4}$ " from cylinder and spin flywheel to test spark. If a spark results, it is evident that the magneto is all right. The strength

of the spark, though, may be increased by refining the adjustments on the points with the stop screw.

In case no spark appears, remove flywheel and again check wires leading to and from breaker assembly, spark plug cable and points. If the breaker assembly appears to be coated with oil that may not have been removed when cleaning, take out two screws holding plate for contact point and carefully wipe the plate, insulating strip and insulating bushings. Do not disturb the breaker plate when doing this.

(c) **Test coil and condenser** with a Hot Shot battery as follows: Connect positive terminal of battery to the stationary breaker point. Place a strip of paper between the points, and move wire from other terminal of battery back and forth over the breaker blade and at the same time hold spark cable $\frac{1}{4}$ " from plate. If a spark jumps from cable, the coil and condenser are evidently all right. If no spark appears, disconnect condenser and again test as described. If a spark now appears, the fault is in the condenser and a new one should be installed. However, if there is still no spark, disconnect coil, connect condenser and test again. This procedure is a definite method of testing for a dead coil or condenser.

9. Timing:

(a) Instructions for using tool No. 38018:

Tool No. 38018 has been developed to eliminate guess work in determining the proper location of the breaker assembly, without the aid of the flywheel. The advantage of the tool is that upon once determining the proper location of the complete breaker assembly, a more accurate adjustment of the governor stem screw and speed adjustment nut can be made, after the flywheel is installed. In other words, it is an accurate means of timing the Multi-Motor.

Remove the magneto plate and take off oil catch ring Ass. 3190. Press the central cylinder of the tool into the hole in the center of the magneto plate, with the long bent finger of the tool between the heels of the coil. Turn the tool until the finger is against the heel nearest the breaker assembly. Loosen the two screws that hold the breaker assembly to the mounting plate, and adjust the assembly so that when the tool is in this position the prong which contacts the breaker blade is just past the bulge on the breaker blade, but resting so that upon moving the finger clockwise the points immediately open to approximately .020".

Observe, when making the adjustments, that the other stud of the tool does not strike the pivot for the breaker blade. The two studs represent the path of the flywheel governor.

Upon locating the correct position of the breaker assembly, install the mounting plate and flywheel, then refine the adjustment of the points with the governor stem screw. It is quite obvious that if the breaker assembly was not properly located the stem screw would also be out of adjustment. Consequently, regulate the position of the stem screw in respect to the opening of the points. That is, turn the screw up or down until you reach the position at which the points open approximately .020".

The speed of the engine can be regulated by the adjusting nut on the screw to which the governor spring is attached. Turn the nut to the right to increase the speed, and to the left to decrease the speed. The speed should be approximately 1050 R.P.M.

- (b) If tool No. 38018 is not available, proceed as follows: With the flywheel in position, adjust stop screw so it is in the approximately correct position in the governor as determined by experience. Loosen screws holding breaker assembly plate and move plate so governor opens points approximately .020". Tighten screws, check spark and refine adjustment of points as necessary. This trial and error method is not recommended unless you are very familiar with the engine. In case the breaker assembly is out of adjustment and, without tool No. 38018 you are unable to make the adjustment, return the complete mag-

neto for repair to the nearest branch office or the factory.

10. Starting and Testing Repaired Engine:

- (a) **Examine spark plug** for cracks in porcelain. Clean and adjust points to .020". Attach plug to spark cable, lay plug on cylinder and spin flywheel. If spark goes through plug, install in cylinder.
- (b) **Fill tank** with "regular" or a good grade of low test gasoline properly mixed with genuine Maytag oil. Open needle valve and start in the usual manner.
- (c) **Check speed.** The Multi-Motor should operate at between 1050 and 1100 R.P.M. If necessary to change speed, turn adjusting nut on governor to right to increase and to left to decrease speed.
- (d) **If new rings and bushings** were installed, the engine should run idle for about 2 hours.
- (e) **After engine is adjusted and run in,** install the inspection plate, flywheel pulley, and check the nut on crankshaft making certain it is tight and that the cotter pin is in place.

SUMMARY

MOST COMMON COMPLAINTS AND METHODS OF CORRECTING:

1. Engine Overheats and Fires Rapidly:

- (a) **Excess carbon.** In most cases this results in one or more of the piston rings sticking, which will cause the engine to overheat. Increased friction, insufficient lubrication, or back pressure because of partially closed exhaust ports creates an overload and lowers the speed of the engine until the governor drops back, causing the engine to fire on every revolution. This gives the impression that the engine is running much faster than normal.
- (b) **Repair** by removing the cylinder and thoroughly cleaning all carbon from four exhaust and two intake ports, inside of cylinder head, piston, rings and ring grooves. Before assembling be sure that the rings turn freely and are oiled liberally. The gaps of the rings should not be in line and must not pass the ports. After repairing, instruct the operator to use only genuine Maytag Multi-Motor oil, mixed in the proportion of 1 part oil to 16 parts of good regular gasoline.

2. Engine Lacks Power and is Hard To Start:

- (a) **This condition** is usually due to the engine being dirty and badly carboned as outlined in 1-a, in addition to poor ignition. Poor or faulty ignition may result from a number of causes. The most common are:

Fouled spark plug or cracked porcelain.
High tension wire broken or not making connection.

Points burned and pitted, or incorrectly adjusted.

Broken wires or loose connections at coil, condenser, or interrupter assembly in armature plate.

- (b) **The condition and adjustment of the carburetor** is also an important factor to be considered when repairing an engine which shows such characteristics.
- (c) **Repair** by cleaning carbon from all parts as outlined in 1-b. Remove spark plug, clean and adjust or replace, whichever is necessary. Remove flywheel and armature plate, wash carefully in a clean solvent and inspect. Coil and condenser may be tested as instructed in paragraphs 8-b and 8-c. If breaker points are worn, they should be filed smooth or replaced. In filing or replacing the points, make certain that they make contact over the entire face of the point. After installing the flywheel and armature plate, adjust points to .020" at their widest break by means of the stem screw in the governor. See paragraph 8-a.
- (d) **To test spark through plug**, connect high tension wire and lay plug on engine base. Spin flywheel and note intensity of spark at points of plug. Points of plug should be adjusted so that the gap is .020".
- (e) **In checking the carburetor**, examine the needle valve, needle valve seat, air valve and air valve seat. If necessary, repair as outlined in paragraphs 3-a-b-c-d. Wash the air cleaner carefully in a solvent to remove any accumulation of lint or dirt which would interfere with the flow of air into the carburetor mixing chamber.

3. Engine leaking Gas and Oil through Crankshaft Bushings and around Carburetor Gaskets.

- (a) **This condition** can be caused by one or more of the following:

Running the engine with an excessively rich mixture.

Broken carburetor gaskets, loose bolts or gaskets not cemented properly.

Worn crankshaft bushings.
Broken or stuck piston rings.

- (b) **After the specific cause is determined** and if the bushings are worn, install new bushings as instructed in paragraphs 4-a-b-c-d. If gaskets are loose or broken, replace with new gaskets properly cemented. If engine is not at fault but is being operated with a rich mixture, instruct the user accordingly. If rings are broken or stuck, repair as outlined in paragraph 2-b.

4. Engine squeaks or makes howling noise:

- (a) **Usually caused by:**

Needle valve is adjusted so mixture is too lean, thus starving the engine.

Bushing No. 12720 for starter side of crankshaft not receiving lubrication.

Rings broken or carboned and stuck.

Starter ratchet pinion S-240 dry or worn.

- (b) **To repair:**

Ease needle valve open slightly thereby giving the engine more lubrication.

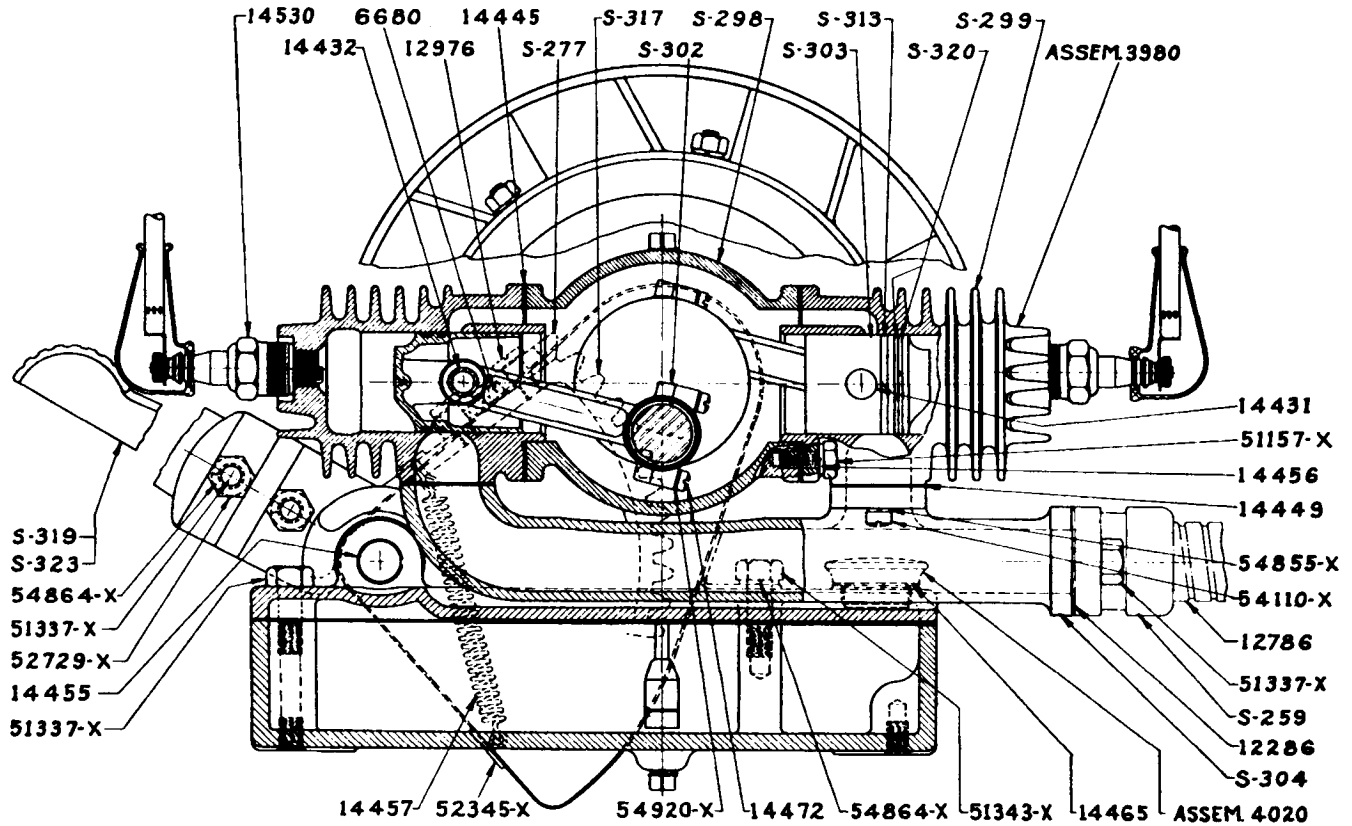
Oil liberally through ball oiler No. 13115 for No. 12720 bushing.

Remove cylinder and note condition of piston, rings and cylinder walls. Replace or clean rings as instructed in paragraph 2-b. If cylinder is scored, a new one will be required. In this case, we recommend that the entire piston and cylinder assembly be returned to the factory or branch office for inspection. The piston and cylinder are carefully matched and fitted at the factory and we do not recommend they be interchanged on the territory. If the ratchet pinion S-240 is found to be dry, remove and place a small amount of good cup grease in the groove around the inside. Do not oil or grease the balls or teeth of the ratchet. So doing would cause dirt to accumulate and the starter would not function properly. If badly worn, install a new one.

5. Starter stuck or jammed:

- (a) **This condition is not common.** If it does occur, examine the balls and teeth of the ratchet pinion S-239. If the balls are worn or broken, install new ones. This also applies to the ratchet pinion, S-240.

Servicing the Maytag Twin-Cylinder Multi-Motor



Side View of Twin Cylinder Multi-Motor

1. Dismantle:

- (a) **Remove fly wheel as follows:** Use wheel puller No. 38071. Take off hex nut, pulley, and washer; catch arms of puller on inside edge of wheel, tighten pilot screw until locked then give head of screw a sharp blow.
- (b) **If a wheel puller is not available** run nut back on shaft until flush with end after removing pulley, protect end of shaft with a wooden block and strike sharp blow to loosen wheel.
- (c) **Slide thrust washer 14522 and cam 14523** from shaft. Use cam puller No. 38060. Loosen set screw holding mounting plate then slide plate from bearing casting.
- (d) **Remove starter ratchet guard** Ass. 3957, segment S-317, ratchet pinion S-310, and ratchet wheel S-307. Use wrench No. 38081 to loosen $\frac{1}{4}$ " hollow head set screw.
- (e) **Take off cylinders**, then remove piston assembly by taking out filister head machine screws 14472 from connecting rods. Unscrew crank bearing Ass. 3967 and pull crankshaft S-301 from crankcase.

Note: It is not necessary to remove Ass. 3967, crank bearing, S-301, crankshaft, or S-307, starter ratchet wheel, if the work to be done is merely cleaning carbon, adjusting points, etc.

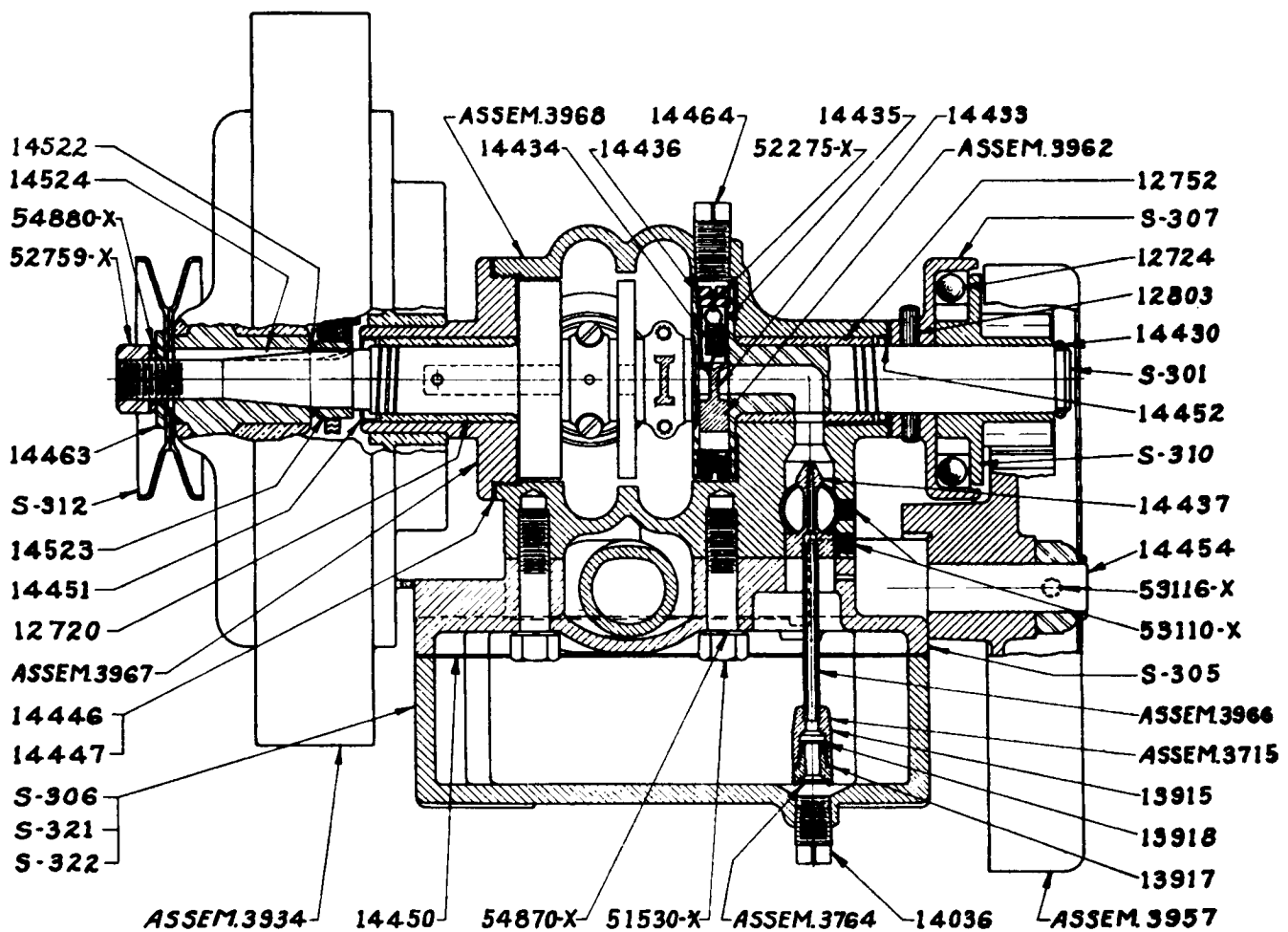
- (f) **Remove fuel tank and fuel tank cover** from crankcase then take off exhaust manifold. Take out set screw 53110X with wrench 38081 to remove carburetor jet and feed tube. Also take off air tube complete by loosening hollow head set screw.

2. Cleaning and inspecting parts:

- (a) **Remove all grease and dirt** by washing parts in a solvent. Carefully clean and dry inside of fuel tank.
- (b) **Clean carbon** from beneath piston rings, piston head, combustion chamber of cylinders and from exhaust ports. Also clean exhaust manifold. Check intake ports to make certain they are open.

3. Crankcase Ass. 3968 and Crank Bearing Ass. 3967:

- (a) **Except in very unusual cases** it will not be necessary to install new bushings 12752 in crankcase, 12720 in crankshaft bearing or tighten connecting rods. Should you find this necessary, press the new bushing in place, then run a $\frac{3}{8}$ " drill through bushing No. 12752, for intake. Ream the bushings with $\frac{7}{8}$ " SS reamer. **Place the same number of shim gaskets that were between the bearing flange and crankcase on bearing then screw bearing Ass. 3967 in position and line the**



End View of Twin Cylinder Multi-Motor

bushing by using line reamer No. 38005. Make certain the passage beneath the crankcase bushing that leads from the outer end to the intake chamber (note drawing) is open. If not, run a No. 50 drill through this passage.

The installation of new bushings would require the removal of the oil retainers. Therefore new ones should be installed—14451 for flywheel end and 14452 for starter end.

If connecting rods are worn, file face of cap, attach to rod with screws, then ream with $\frac{3}{8}$ " SS reamer.

4. Ass. 3980 — Cylinder, piston, connecting rod, and wrist pin:

- (a) Clean carbon from piston ring grooves, piston head, cylinder head, exhaust ports and intake ports.
- (b) Use new piston rings if old ones are worn—two S-320 in top groove and one S-313 in lower groove. The rings should move freely in grooves and should be set so when piston is assembled in cylinder the gaps are not in line and do not pass either the intake or exhaust ports.

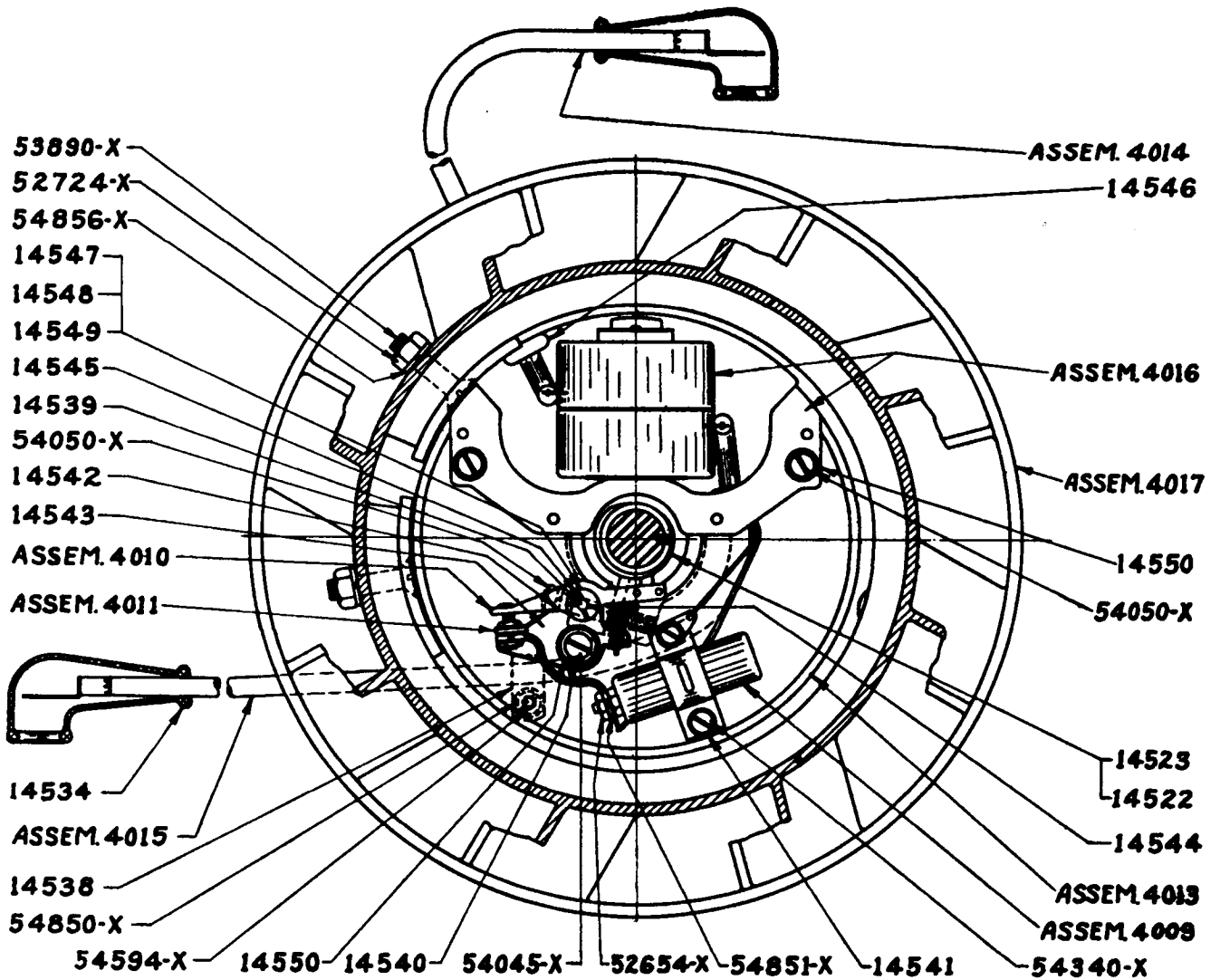
(c) The first twin connecting rods were not slotted. In those cases when repairing, attach the cap to the rod and file $\frac{1}{8}$ " notches on each side of rod at points where cap meets the rod.

(d) Attach connecting rod to crankshaft, making certain the groove in connecting rod cap matches with groove in rod. See that the aluminum wrist pin retainer plugs 14431 are in place. Cover cylinder gasket 14445 with gasket cement and place in position and slide cylinder in place. Before bolting cylinder to crankcase, hold cylinder and spin crankshaft. If the movement of the piston forces the cylinder to one side or the other, indications are that the rod is sprung. Correct by springing rod by moving cylinder in opposite direction.

NOTE: Make certain the cylinders are right side up. The sharp break in baffle should be toward intake ports. See drawing.

5. Carburetor jet 14437 and feed tube Ass. 3715:

- (a) Feed tube, strainer, and jet should be free from foreign matter that would obstruct the passage of gasoline. Clean jet with a No. 72 drill used by hand.



Flywheel Assembly Complete. Twin Cylinder Multi-Motor

(b) Carburetor jet 14437 is held in place by hollow head set screw 53110X. When assembling, the bottom of the jet should be flush with the bottom of crankcase (see drawing) and should be turned so set screw does not tighten against the groove.

6. Governor Ass. 3962:

- (a) The governor regulates the flow of fuel into the crankcase thereby controlling the speed of the engine.
- (b) The governor seldom requires adjustment. Generally, a variation in speed is the result of improper air adjustment, incorrect adjustment of spark plug or magneto points, excess carbon deposit, etc., rather than incorrect adjustment of governor.
- (c) Governor adjustment. The governor screw 14435 and limit screw in opposite end of hole through crankshaft are the same. The screw to adjust, however, can be distinguished since it holds the ends of the cotter pin to which the governor spring is attached. Turning the screw to the right

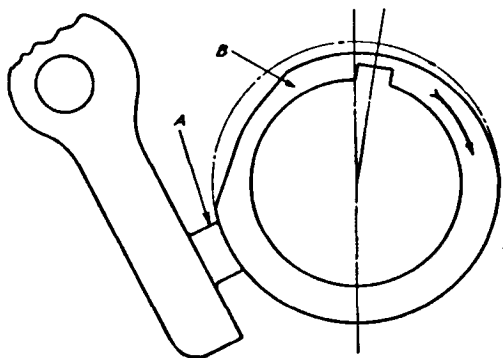
(clockwise) decreases the speed, while turning it to the left increases the speed.

7. End play of crank shaft:

- (a) Controlled by shim gaskets between bearing flange and crankcase. Part numbers of gaskets: 14446, .006" to .009" thick. and 14447, ".003" to .005" thick.

8. Magneto and Flywheel:

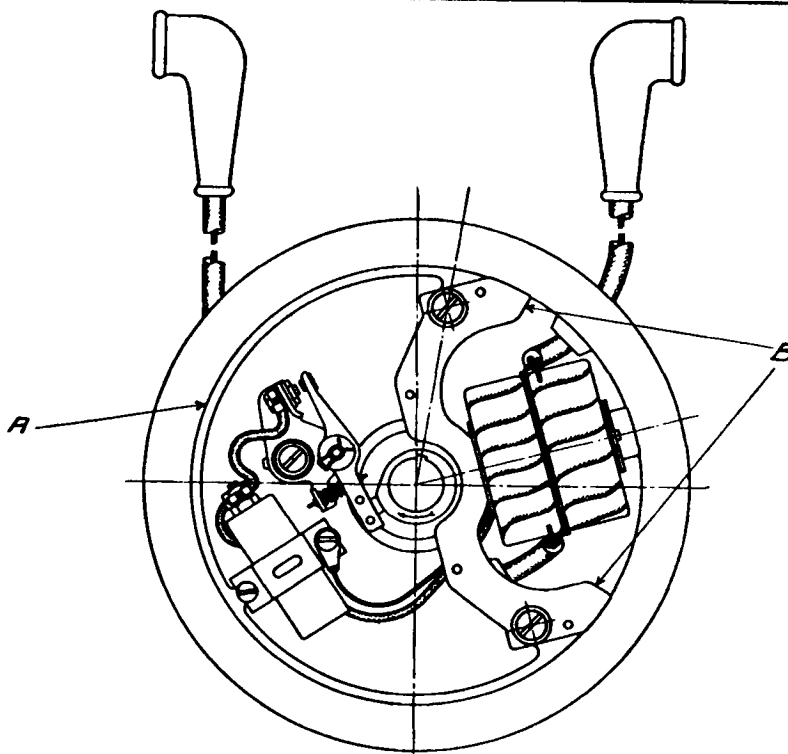
- (a) Wash flywheel and mounting plate, if dirty, with a clean solvent and wipe dry.
- (b) The points can be adjusted without the flywheel. Slide the mounting plate into position, tighten clamp screw and follow with cam 14523. Make certain the cam is installed with the arrow pointing toward the right, that is, the same direction the crankshaft rotates.
- (c) The cam is eccentric as shown in the drawing No. 1. To correctly adjust the points turn the crankshaft in the direction it normally operates until



Drawing No. 1

Drawing No. 1 is enlarged view showing eccentricity of cam "B" and correct position of breaker blade shoe "A" when adjusting points.

Drawing No. 2 shows complete mounting plate assembly with cam. This likewise indicates the correct position of cam when testing or adjusting points. The circular rib "A" serves as a guide when replacing winding core heads "B".



2
Drawing No. 2

the shoe of the breaker blade is against the heavy section of cam just past the breaking edge. The correct position is shown. Check the opening and if the gap is not exactly .020", loosen screw 54045X and move breaker bracket up or down as necessary to make the gap .020". After tightening the screw again check the opening to determine whether the action of tightening the screw moved the lower point. Use gauge No. 38070. Clean points with a carborundum stone or No. 240 grain emery cloth.

(d) **Replacement of windings.** The circular rib "A" as shown in drawing No. 2 serves as a guide for proper location of winding on stator plate, to insure a correct running clearance between winding core heads "B" and magnet pole shoes. Oversize holes are provided in winding core heads to permit accurate positioning of winding on stator plate before tightening the two (2) mounting screws securely. Both core heads "B" should be flush with the outside diameter of circular rib "A".

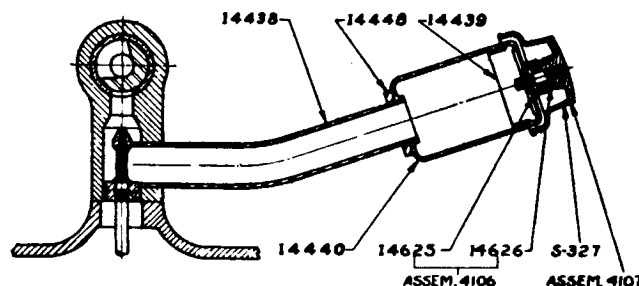
(e) **Testing.** When testing the spark always have the other spark wire attached to the spark plug or grounded. Too often when testing an engine, one wire is disconnected and held away from the engine, thus permitting the engine to run on one cylinder. This, however, should not be done since it breaks the circuit and does not permit a natural spark at the other plug. If you wish to demonstrate that the twin will run and operate a washer load on one cylinder, ground one spark plug wire

to the cylinder, then start the engine on one plug.

(f) **Slide 14522**, thrust washer for breaker cam, in place over crankshaft, install flywheel with steel washer and pulley, then tighten hex nut on crankshaft.

9. Spark plugs:

- Clean and check opening of points.** The points should be opened to .037". Use gauge of tool No. 38070.
- Test by laying the plug on engine** with spark cable attached and spin flywheel. A bad plug should be replaced with a new Maytag plug.



10. Ass. 3965 air intake with tube and cap:

- The air cap 14441 should be adjusted so that when the engine is running under normal conditions the word run is at the top. If for some reason

the engine runs best with the word run to either the right or left of top, adjust by loosening lock nut No. 14448, turn large intake shell 14440 with air cap No. 14441 to the correct position then re-tighten lock nut. Use sealer No. 55712X for air intake tube.

- (b) **The new metal air control with spring is known as Ass. 4107. The instructions given in (a) will apply.**

11. Finish — Black Crystal Enamel:

- (a) **Black crystal enamel is available.** The contents of can should be stirred thoroughly and strained through three thicknesses of cheese cloth before using. The enamel when received is thinned to proper consistency for use. If it is necessary to thin enamel of a can that has been opened, use naphtha.
- (b) **Drying.** To obtain crystal finish make an improvised oven out of a cardboard or wooden box just large enough to accommodate the engine. Cut hole in each side about one inch in diameter approximately two inches from the bottom to allow the fumes to escape. Cut hole in top of box large enough to use a reflector with 200 watt light globe. Place engine so spot painted is nearest the globe and leave for two hours.

If you have an oven on which you can control the temperature, leave engine in oven for about thirty minutes at about 260 degrees F., or for two hours if temperature is between 160 and 190 degrees F. **CAUTION—Do not leave engine in oven at 260 degrees F. longer than 30 minutes.**

- (c) **Refinishing engines** that were originally finished with black crystal enamel. Clean with naphtha, sand until smooth, spots from which enamel has been completely removed. Apply enamel with brush or spray to the spots to be touched up and immediately place engine in oven.

After touched up spots have dried thoroughly, spray on a light coat of black lacquer (not crystal finish) over entire engine. This will renew the crystal finish. It is not necessary to dry black lacquer in oven. **Do not attempt to completely repaint an engine with crystal enamel over the original black crystal—rather, proceed as described above.**

- (d) **To refinish a green engine with black crystal enamel:** Clean thoroughly with naphtha and let dry. Smooth down marred places, spray on an even coat of black crystal enamel, then place engine in oven and follow process described in No. 11-b.
- (e) **Cleaning.** Remove dust by brushing with a dry brush. If necessary, wipe engine with a brush using gasoline or naphtha.

12. Miscellaneous:

(a) Hard to start.

1. No gasoline in fuel tank; spark plugs dirty; water or an inferior grade of gasoline in the fuel tank; spark plug cable disconnected; or air control cap open one full turn.
2. Continuing to spin the flywheel with the air control nearly closed will result in a flooded condition. To start then it would be necessary to open the air cap by turning toward the left at least one full turn and spin the flywheel two or three times. As soon as the engine starts the air cap can be gradually turned to the right, to the word "run."
3. Air tube loose, permitting air to enter the crankcase. To repair, remove the tube, cover outside surface of the end which enters the casting with sealer, No. 55712X. Place the tube back in position and carefully tighten the set screw holding it.
4. No spark. Check the spark plug points, as well as breaker points, and adjust. See paragraph No. 8.
5. The most satisfactory results will be obtained by adding a fresh supply of fuel at the beginning of each washing.

(b) Engine hard to start when cold.

1. This objection is usually the result of the operator failing to follow instructions and closing the air control cap when stopping the engine. Closing the cap naturally draws an excess supply of fuel into the crankcase, and the engine cannot then be started immediately without going through the operation of deflooding by opening the control cap one full turn. **Always instruct the operator to stop the twin by opening the air control one full turn.** After the engine stops, close the air cap until ready to start the engine again.

(c) Coughs or back-fires.

1. Spark plug points too close. Use spark plug gauge No. 38070, and open points to .037". Also, if necessary, check and adjust the breaker points so that they open exactly .020". See magneto instructions paragraph No. 8.

(d) Lack of power.

1. This would result if the engine is firing on only one cylinder. Check and clean spark plugs. Use genuine Maytag plugs to replace those broken or damaged.
2. This may also be caused by the engine heating. Opening air control cap too far, thereby starving the engine, would cause the engine to heat and lose power. This would be particularly noticeable when the engine is new. In case of a new engine heating, add at least one

extra cup of genuine Maytag Multi-Motor oil to each measure of gasoline, and do not open the air control cap quite as far as usual. Use genuine Maytag Multi-Motor oil only.

3. Carburetor jet partly closed. Repair by removing the jet and carefully cleaning. Use a No. 72 (.025" in diameter) drill by hand for cleaning opening through jet. (See 5-a.)

(e) **Engine stops during washing.**

1. Out of gasoline.
2. Breather through side of fuel tank cover stopped.
3. Air cap incorrectly adjusted.
4. Breaker points out of adjustment. (See paragraph No. 8.)

(f) **Uses too much gasoline.**

1. The twin operating on only one cylinder uses approximately twice as much gasoline as it will if both cylinders are firing. Therefore, an objection of this kind indicates that the engine is only firing on one cylinder. Carefully clean the spark plugs, adjust the spark plug points, and as a further test switch the spark plugs from one cylinder to the other.

(g) **Insufficient speed.**

1. Carburetor jet partly clogged. Remove fuel tank cover, take out the carburetor jet, and clean the jet, as well as feed tube and strainer. (See 5-a.)
2. Make certain the air control is properly adjusted.

3. Governor. As a last resort, if the engine is apparently operating all right except running too slow, remove the pipe plug in the crankcase and adjust the governor. (See Par. 6.)

(h) **Magneto.**

1. Breaker points. Incorrect adjustment of the breaker points will cause the Multi-Motor engine: to be hard to start; start only in case one spark plug cable is grounded; spark plugs to foul; to stop during washing, then be very hard to start.

- (i) **Exhaust hose.** If on a new hose the ferrule is not sealed, liquid may seep around the S-259. Use sealer No. 55712X between ferrule and flexible tube.

- (j) **Starter ratchet guard Ass. 3957.** If noisy loosen set screw and press guard in to take up excess clearance between guard and segment, then tighten set screw.

- (k) **Gasoline.** Use the same grade gasoline in the Twin Multi-Motor that would be used in an automobile. We recommend using, under normal conditions, a good grade of "regular"; however, for easier starting in cold weather use high test or ethyl.

13. Tools. Suggested list of special tools for Twin Multi-Motor:

- 38060 Cam puller.
- 38061 Wrench to remove bearing Ass. 3967.
- 38062 Tool to remove governor.
- 38070 Spark plug and breaker point gauge.
- 38071 Wheel puller.
- 38081 Wrench for $\frac{1}{4}$ " hollow head set screw.
- 38115 No. 72 drill.

Special attention by salesmen in giving adequate instructions at the time the machine is sold, following directions enclosed with each new Maytag, will go a long way toward eliminating complaints. Always recommend the use of GENUINE MAYTAG MULTI-MOTOR OIL and a good grade of regular gasoline.