REPAIR-MASTER® for

WHIRLPOOL-KENMORE

AUTOMATIC WASHERS

- DIAGNOSIS CHARTS
- CHECKING PROCEDURE
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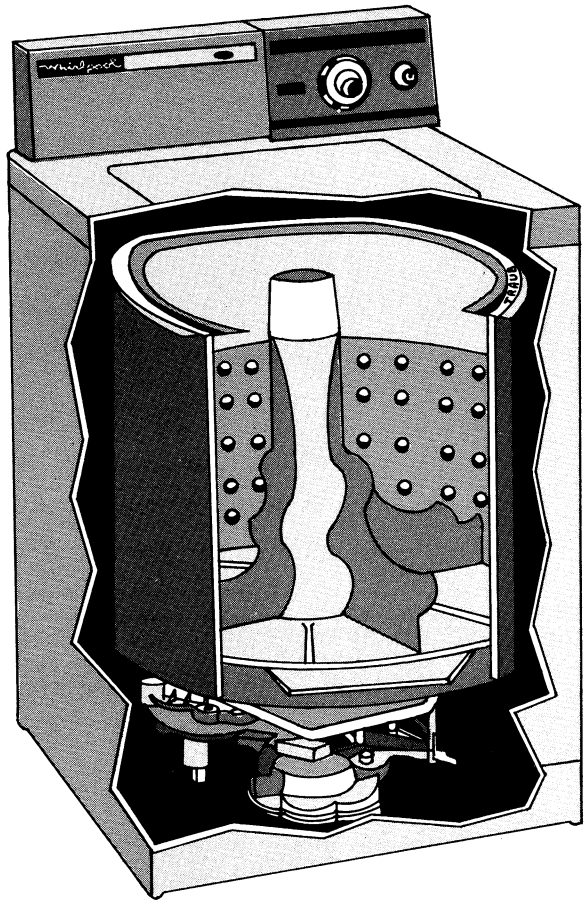

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REPAIR-MASTER for..

WHIRLPOOL-KENMORE

AUTOMATIC

WASHERS

FOREWORD

This Repair Master contains information and service procedures to assist the service technician in correcting conditions that are not always obvious.

A thorough knowledge of the functional operation of the many component parts used on appliances is important to the serviceman, if he is to make a proper diagnosis when a malfunction of any part occurs.

We have used many representative illustrations, diagrams and photographs to portray more clearly these various components for a better over-all understanding of their use and operation.

IMPORTANT SAFETY NOTICE

You should be aware that all major appliances are complex electromechanical devices. Master Publication's REPAIR MASTER® Service Publications are intended for use by individuals possessing adequate backgrounds of electronic, electrical and mechanical experience. Any attempt to repair a major appliance may result in personal injury and property damage. Master Publications cannot be responsible for the interpretation of its service publications, nor can it assume any libility in connection with their use.

SAFE SERVICING PRACTICES

To preclude the possibility of resultant personal injury in the form of electrical shock, cuts, abrasions or burns, etc., that can occur spontaneously to the individual while attempting to repair or service the appliance; or may occur at a later time to any individual in the household who may come in contact with the appliance, Safe Servicing Practices must be observed. Also property damage, resulting from fire, flood, etc., can occur immediately or at a later time as a result of attempting to repair or service — unless safe service practices are observed.

The following are examples, but without limitation, of such safe practices:

1. Before servicing, always disconnect the source of electrical power to the appliance by removing the product's electrical plug from the wall receptacle, or by removing the fuse or tripping the circuit breaker to OFF in the branch circuit servicing the product.

NOTE: If a specific diagnostic check requires electrical power to be applied such as for a voltage or amperage measurements, reconnect electrical power only for time required for specific check, and disconnect power immediately thereafter. During any such check, ensure no other conductive parts, panels or yourself come into contact with any exposed current carrying metal parts.

2. Never bypass or interfere with the proper operation of any feature, part, or device engineered into the appliance.

3. If a replacement part is required, use the specified manufacturers part, or an equivalent which will provide comparable performance.

4. Before reconnecting the electrical power service to the appliance — be sure that:

   a. All electrical connections within the appliance are correctly and securely connected.
   b. All electrical harness leads are properly dressed and secured away from sharp edges, high-temperature components such as resistors, heaters, etc., and moving parts.
   c. Any uninsulated current-carrying metal parts are secured and spaced adequately from all non-current carrying metal parts.
   d. All electrical ground, both external and internal to the product are correctly and securely connected.
   e. All water connections are properly tightened.
   f. All panels and covers are properly and securely reassembled.

5. Do not attempt an appliance repair if you have any doubts as to your ability to complete it in a safe and satisfactory manner.

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SECTION 1

SERVICE CHECK LIST

A considerable amount of time and money can be saved if a serviceman will take time to analyze the probable cause for a malfunction of a machine before proceeding to remove any parts. Always be sure, first, that the machine is properly installed and its power cord is plugged into a live receptacle that is properly fused. Be sure that the hot and cold water faucets are turned all the way open. Also, make certain that the operator of the machine knows how to properly set the controls.

Many times a serviceman will be called by an irate housewife with a complaint that her automatic washer is malfunctioning and the serviceman can find nothing wrong with the machine itself. It is of vital importance that the serviceman completely understands the normal operating conditions of every model and readily diagnose the cause for the customer's complaint.

Always make a visual check first, before using any testing equipment, such as test lamps, voltmeters or ohmmeters. Before attempting to remove any electrical part from the machine, disconnect the power cord from the live receptacle. If a voltmeter or test lamp is being used for testing, the power cord must be plugged into a live receptacle, however.

In order to help you to quickly make a thorough diagnosis of the most likely type of complaints, we have prepared a quick reference Trouble Diagnosis Chart. Following this chart is more detailed information for actual checking procedure.

The Trouble Diagnosis Chart is to be used as follows:

(1) Read across the top of the chart to locate the nature of the particular complaint that is being experienced by the customer. You will note that these complaints are numbered 1 through 16.

(2) Read down the numbered column for the first check mark appearing opposite the first possible cause. The possible causes are lettered A through Z.

(3) Turn to the page under CHECKING PROCEDURE where the particular letter selected appears and read the information after the numbered paragraph for checking procedure to follow to determine whether that is the cause for the malfunction. If not, go to the next check mark down in the numbered column of the chart for the next step to follow.

TROUBLE DIAGNOSIS CHART

Locate nature of complaint in the first line across the top — 1 through 16.
Read down the numbered column for first √ appearing opposite the first possible cause — A through Z.
Use the letter and the number to locate the method of test in the following checking section.

READ DOWN FOR POSSIBLE CAUSE	READ ACROSS FOR NATURE OF COMPLAINT							
	Water Will Not Enter Tub 1	Motor Will Not Run 2	Machine Will Not Agitate 3	Water Does Not Drain from Tub 4	Basket Will Not Spin 5	Machine Will Not Spray Rinse 6	Machine Will Not Shut Off 7	Suds Will Not Return to Machine 8
POWER SUPPLY A	√	√						
WATER SUPPLY B	√					√		
TIMER C	√	√	√		√	√	√	√
WATER LEVEL CONTROL D	√	√	√		√	√		
TEMPERATURE SELECTOR E	√							
LID SWITCH F					√			
SOLENOIDS G	√		√	√	√	√		√
MACHINE MOTOR H		√	√	√				√
WIRING HARNESS I	√	√	√		√	√	√	√
WATER INLET VALVE J	√					√		
WATER PUMP K				√				√
TWO-WAY VALVE L				√				√
HOSES M	√			√		√		√
BELT N			√	√	√			√
PULLEYS O			√	√				√
GEAR CASE P			√					
BASKET DRIVE Q					√			
BRAKE LININGS R							√	
AGITATOR S			√					
TUB T				√				√
BASKET U								
SNUBBER V								
SUSPENSION RODS W								
LEVELING FEET X								
LUBRICATION Y								
IMPROPER USE OR CARE Z								

READ DOWN FOR POSSIBLE CAUSE		READ ACROSS FOR NATURE OF COMPLAINT							
		Excessive Vibration or Machine Walks 9	Abnormal Noises 10	Machine Damages Clothing 11	Water Not Hot Enough 12	Water Will Not Shut Off 13	Machine Leaks Water 14	Machine Leaks Oil 15	Clothes Do Not Get Clean 16
POWER SUPPLY	A								
WATER SUPPLY	B				√	√			√
TIMER	C					√			
WATER LEVEL CONTROL	D					√	√		
TEMPERATURE SELECTOR	E				√				
LID SWITCH	F								
SOLENOIDS	G		√		√	√			
MACHINE MOTOR	H								
WIRING HARNESS	I					√			
WATER INLET VALVE	J				√	√			
WATER PUMP	K		√				√		
TWO-WAY VALVE	L						√		
HOSES	M				√		√		
BELT	N		√						√
PULLEYS	O		√						√
GEAR CASE	P		√					√	
BASKET DRIVE	Q								
BRAKE LININGS	R		√						
AGITATOR	S		√	√					√
TUB	T						√		√
BASKET	U		√	√					
SNUBBER	V	√	√						
SUSPENSION RODS	W	√	√						
LEVELING FEET	X	√	√						
LUBRICATION	Y		√					√	
IMPROPER USE OR CARE	Z	√		√					√

CHECKING PROCEDURE

A. POWER SUPPLY

1. Be sure the power cord is plugged into a live receptacle. Check for a defective power cord by testing for voltage between terminals "A" and "C" on the timer with a test lamp or a voltmeter.

2. Be sure there is voltage between terminals "A" and "C" on the timer as outlined under item "1". Be sure that the supply line is properly fused and no other major appliances are on the same line. Check the voltage at the receptacle where the machine power cord is plugged in. This voltage should be within 10% of the rating on the serial number plate on the machine. Disconnect the machine power cord from its receptacle for at least five minutes to allow the thermal overload protector in the motor to cool and close its contacts in the event these contacts were opened due to high wattage. Again plug cord back into its receptacle and see if motor tries to run. If it does, then make wattage checks for overloads.

B. WATER SUPPLY

1. Be sure that the main water supply line is not shut off and that both the hot and cold water faucets to the washer are turned all the way on. Be sure that the hose connected to the hot water faucet is connected also to the HOT side of the water inlet valve on the washer. Check for obstructions in the filter screens at the faucet end of each hose and be sure the hoses are not kinked.

6. Follow the same procedure as outlined in item "1".

12. If a complaint is received that the "water is not hot enough", it is very likely that the hot water supply tank does not have great enough capacity to supply the needs of the washer or the temperature setting of the supply tank is not high enough to maintain the required temperature of the water at the valve inlets of the washer. Adjust the setting on the supply tank to maintain a temperature of at least 140 degrees at the water inlet to the washer. The temperature setting on the tank, therefore, will probably have to be set at 160 degrees or above to overcome the heat loss in long lengths of pipe leading from the tank to the washer.

13. Excessively high water pressure could cause malfunctioning of the water inlet valve. If the water pressure is over 100 pounds, a pressure reducing device must be installed in the initial supply line.

16. Check the temperature of the water entering the machine to be sure it is high enough to permit good washability. It should be between 140 and 160 degrees.

C. TIMER

At any time that the timer fails to advance after the water level control has shut off the water supply, a check should be made between the two terminals on the timer to which the timer motor leads are connected. These terminals will be either "M–10" and "C–10" or "A–10" and "C" or "A–2" and "C" depending on the particular timer. Always refer to the wiring diagram covering the particular model on which the failure occurs. If there is voltage at these terminals, the timer knob should advance automatically. If the knob does not advance, replace the timer motor. If there is no voltage between these terminals, then the timer itself is probably at fault and should be replaced as a complete unit.

1. Turn the timer knob to any position in the FILL portion of the timer dial and push the knob down. There should then be voltage between terminals "C" and "4" on the timer. If none, replace timer. If voltage is present between these terminals, then check for voltage between terminals "C" and "7". If none, the water level control switch or the wiring harness is probably defective.

If voltage is present between terminals "C" and "7" on the timer, then check for voltage between terminals "C" and "A3" or between terminals "C" and "A5". If no voltage is present, then the timer should be replaced. (On machines equipped with two-position water temperature switches or with no temperature selector switch, this voltage check should be made between terminals "C" and "B7" instead of terminals "C" and "A3".)

2. Turn the timer knob to any position in the WASH portion of the timer dial beyond the FILL period. Check to see if the timer motor is running by watching the movement of the timer dial or check for voltage between terminals "C" and "A2" on the timer. Since the timer motor and machine motor are connected in parallel between terminal "A2" and terminal "C", the timer is probably not the source of the trouble if the timer motor is running. Check the terminal connection from the motor to terminal "A2" on the timer.

On machines equipped with two speed motors, it will be necessary to check for voltage between timer terminals "B2" and "C" when the timer knob is set for WASH in the Normal Action Cycle and between terminals "A2" and "C" when the timer knob is set for WASH in the Gentle Action or Delicate Fabrics Cycle.

3. Turn the timer knob to any position in the WASH portion of the timer dial beyond the FILL period. The motor must run in order for the agitator to move. If it doesn't, follow checking procedure under MOTOR WILL NOT RUN. If the motor does run then check for voltage between terminals "C" and "A6" on the timer. No voltage would indicate a defective timer.

5. Turn the timer knob to any position in the DAMP DRY portion of the timer dial. The motor must run in order for the basket to spin. If it doesn't, advance the timer knob clockwise to see if the motor runs in any other portion of the cycle. If not, follow the checking procedure under MOTOR WILL NOT RUN.

If the motor does not run with the timer knob set in DAMP DRY, then check for voltage between terminals "C" and "A1" on the timer. No voltage reading would indicate a defective timer or an inoperative water level switch. Before replacing the timer, follow the checking procedure in item "5" under WATER LEVEL CONTROL.

6. Turn the timer knob to the third minute or increment of RINSE. Then allow the timer to advance automatically through the fourth and fifth minutes of rinse. There should be two seven second sprays in each of these two minutes. Check for voltage with a test lamp between terminals "B7" and "C" on the timer. There should be an increase of voltage present between these terminals for two periods of seven seconds each, during the fourth and fifth minutes of RINSE. If not, check for voltage between terminals "C" and "7". If voltage is present between these terminals, but not between terminals "C" and "B7", then replace timer.

7. If the machine does not shut off automatically at the end of the DAMP DRY period, it may be due to one or more of the switch contacts sticking. Check for voltage between terminals "C" and "A2" with the timer knob set in the OFF period. On machines equipped with a two speed motor, check between terminals "C" and "A–10" instead of between terminals "C" and "A–2". there should be no voltage. If there is, first be sure the knob is not out of calibration with the timer before replacing the timer with a new one.

8. Be sure that the timer knob is positioned correctly on the timer shaft and that it is set in the SUDS RETURN portion of the timer dial. Check with test lamp for voltage between timer terminal "A–4" and terminal "C". If there is no voltage present, but there is voltage present between terminals "4" and "C", then the timer should be replaced.

13. If the timer switch contacts to the mixing valve solenoids have become fused or stuck together, the solenoids would be energized during extraction periods. A continuity check will determine whether this is the case or not.

D. WATER LEVEL CONTROL

1. If there is voltage between terminals "C" and "4" on the timer but no voltage between terminals "C" and "7", it is very possible that the water level control switch is at fault. On machines equipped with pressure switches, extreme care should be taken in making a voltage check, however, since a short circuit may damage the switch. Either disconnect the wire from terminal "1" and check for voltage between this terminal and the terminal connector on the wire or check for continuity with an ohmmeter across terminals "17" and "18" with the wiring disconnected, and the tubing disconnected from the neck of the switch. If no continuity, the switch is defective and should be replaced.

If there is voltage, however, between terminal "18" and the terminal connector on the wire, it would indicate that the switch is good. No voltage would indicate either a defective switch, a broken wire or defective timer. The continuity check is most practical from this standpoint.

A float switch can be checked by checking for voltage across terminals "17" and "18". Voltage at this point would indicate a defective switch or a dirty float chamber which would cause the float switch to stick in its upper position.

2. Set the timer knob at any position in the FILL portion of the dial and allow the tub to fill until the water level switch stops the flow of water. The motor should then start. If not, advance the timer knob to a position just past the FILL period. If the motor then runs, it would indicate that the water level switch is the cause of the failure.

3. Follow the instructions in item "2" above. Since the agitator will not operate unless the motor is running, the same testing procedure should be followed to determine if the water level control is the source of the trouble.

5. The water level switch must complete a circuit between terminals "4" and "7" on the timer in order for the extractor solenoid to be energized. Therefore, there must be continuity between terminals "17" and "18" on the water level switch. Either remove the power supply from the machine and check for continuity across these two terminals or check for voltage between terminals "C" and "7" on the timer with the power cord plugged into a live receptacle. On machines equipped with the two-level float switch, always check the water level control switch also.

6. Make the same check as in item "5" above.

13. If the machine is equipped with a float type water level switch, check the float to see if it could be stuck in the down position in the chamber. If so, clean the chamber thoroughly. Also check the switch to be sure that it makes contact between terminals "17" and "19" when the pre-selected water level has been reached in the tub.

If the machine is equipped with a pressure switch, check the tubing running to the switch to be sure that there are no leaks or that it is not clogged.

14. Check the water level control to be sure that it is shutting the water off at the correct level in the tub. Overfilling may allow water to splash over or run over the top of the tub ring.

E. WATER TEMPERATURE SELECTOR

1. On machines equipped with a two position temperature selector switch, if voltage is present between terminals "C" and "A5" on the timer, then set the temperature switch on HOT and check for voltage between terminals "A5" on the timer and "M5" on the hot water solenoid. There should be no voltage present unless the switch is defective or there is an open wire between terminals "A5" and "M5". Set the selector switch on

WARM and make the same check between terminals "B7" and "M3". Only an open circuit should indicate voltage present between these terminals.

On machines equipped with a three position temperature selector switch, a similar check can be made by setting the switch on MEDIUM and checking for voltage between terminals "11" and "13" and terminals "12" and "14". If the switch is good, there should be voltage indicated at either of these two checks.

12. Be sure the selector knob is set on HOT and check for continuity between terminals "11" and "13". If the switch is not making proper contact between these terminals, the hot water solenoid would not open the hot water side of the inlet valve to permit hot water to enter the machine.

F. LID SWITCH

5. On machines equipped with a spin-stop lid switch, if the motor runs during the DAMP-DRY period but the basket does not spin, check to be sure the lid is closed and that the lid switch button is actuated by the lid. Press the button to see if the basket will start to spin. If not, disconnect lead "LS2" and make contact with lead "LS1". If the basket starts to spin, then the lid switch should be replaced.

G. SOLENOIDS

1. If previous checks show that the power supply, timer water level control switch and temperature selector switch are all good, then the source of the trouble may be one or both of the water inlet valve solenoids. Set the timer knob on FILL and the temperature selector at HOT. If the hot water solenoid is being energized, there should be a buzzing noise. The same should be true of the warm water solenoid when the temperature selector is set on WARM. If there is voltage between "C3" and "M3" of the warm water solenoid with the selector knob set on warm, test the solenoid by pushing the timer knob in and out. The mixed water solenoid plunger should actuate accordingly. If it does not, replace the solenoid.

The hot water solenoid can be tested in the same manner by setting the selector on HOT and testing for voltage between terminals "C5" and "M5".

When the temperature selector knob is set on MEDIUM, both the hot water and the mixed water solenoids should operate simultaneously.

3. Check with test lamp for voltage between terminals "M6" and "C6" on the agitator solenoid. If there is voltage between these terminals, then test the solenoid by moving the timer knob in and out. The solenoid plunger should actuate accordingly. If it does not, then the solenoid should be replaced. If it does, inspect the pin through the bottom of the plunger.

Replace the pin with a cotter pin, if broken. Refer to Gear Case and Superstructure in the parts list for correct numbers.

If there is no voltage present between terminals "M6" and "C6" on the agitator solenoid, check for possible causes other than a defective solenoid.

4. The pump is controlled by the mechanical action of the agitator cam bar. A short in the agitator solenoid or a broken pin in the agitator solenoid plunger could keep the agitator gear engaged. Under normal conditions the machine will not pump out when the agitator is in operation.

5. With the timer knob set in the DAMP-DRY period, make a check for voltage between terminals "M81" and "C81" on the extractor solenoid. (Be sure the lid is closed if the machine is equipped with a spin-stop lid switch.) If there is voltage between these terminals, then test the solenoid by moving the timer knob in and out. The solenoid plunger should actuate accordingly. If it does not, then the solenoid should be replaced. If it does, inspect the pin through the bottom of the plunger. Replace the pin with the correct size cotter pin, if broken.

If there is no voltage between terminals "B81" and "C81" on the extractor solenoid, check for possible causes other than a defective solenoid.

6. Set the timer knob at the third minute of RINSE and allow the timer to advance automatically through minutes four and five of RINSE. During these two minutes, check with a test lamp between mixed water solenoid terminals "M3" and "C3". There should be voltage between these terminals for two periods of seven seconds each in the fourth and fifth minutes of RINSE. When the test lamp turns on and off while across these terminals, the solenoid plunger should actuate. If it does not, replace the mixed water solenoid.

8. With the timer knob set in the SUDS RETURN position, check for voltage between the two way valve solenoid terminals "M4" and "C4". If there is voltage between these terminals, test the solenoid by pushing the timer knob in and out. The solenoid plunger should actuate accordingly. If it does not, replace the solenoid.

10. A poor connection to a solenoid or a dirty or corroded plunger could cause excessive noise or chatter.

12. Check hot water control solenoid on water inlet valve as per procedure in item "1".

13. Make a voltage check across the terminals of each mixing valve solenoid to be sure there is no voltage present at times when there shouldn't be. If there is voltage present, check for shorts or wires connected to incorrect terminals.

If there is no voltage present across the terminals of either mixing valve, but the valve does not shut off the water; then refer to the checking procedure in item "13" under WATER INLET VALVES.

H. MOTOR

2. Allow sufficient time for the motor to cool if it feels warm or hot to the touch. Then, if it still doesn't run, check for voltage between the terminal connectors "M2" and "C2". On a two speed motor it will be necessary to check between "C2" and "M2H" with the timer knob set in the NORMAL ACTION CYCLE at a position where the motor should run and between terminal connectors "C2" and "M2L" with the timer set in the GENTLE ACTION CYCLE, past the FILL period. No voltage at these terminals would indicate something other than the motor is at fault. If there is voltage and the motor fails to run and the overload protector has been given time to cool, then the motor should be replaced.

Before installing a new or rebuilt motor on the machine, however, try to locate the cause for the motor failure and correct it so that another failure is not likely to occur. Check for low voltage, high wattage, tight gearcase, short circuits and other abnormal conditions that might put undue strain on the motor.

3. The agitator will not operate if the machine motor is not running. If the motor is not running, follow the checking procedure in column 2 of the Trouble Diagnosis Chart.

4. The machine motor must be running in order for the machine to pump out. If the motor does not run when the timer knob is set in the first two minutes of the RINSE period, follow the checking procedure in column 2 of the Trouble Diagnosis Chart.

8. The machine motor must run in order for the pump to bring the suds water back into the machine. If it does not run, follow instructions in item "2" above.

I. WIRING HARNESS

Although each terminal end of every wire in the wiring harness carries an identifying number or letter or both to match the terminal number to which it is to be connected, it is possible occasionally to find wires crossed. Also, occasionally a wire may break inside its insulation and it is not possible to locate the break by a visual check. Therefore, an ohmmeter or other continuity tester can prove a very valuable tool to be used in electrical

trouble shooting. It is of the utmost importance that the electrical supply to the machine be disconnected before making such continuity tests.

When checking a wire, it is wise to disconnect one end of the wire from its terminal to prevent picking up continuity through other wiring circuits. Always refer to the wiring diagram when making continuity checks on any machine.

1. There should be continuity indicated on each check, if not, look for a loose terminal connector or a broken wire on any check where no continuity is shown.

If no voltage was present on any of the checks covered under item "1" of "C", "D", "E" or "F" and the electrical components do not appear to be defective, then check for continuity from each terminal on the water level switch, the water temperature control switch and the water control solenoids to the terminal connector on the opposite end of the wire as shown in the wiring diagram. For example, check from terminal "B" on the water temperature control switch to the terminal connector on the opposite end of the wire that is connected to terminal "A5" on the timer.

2. Check for continuity between terminals "A2" and terminal connector "M2" or "M10" on machines equipped with two speed motors. On machines equipped with two speed motors, check for continuity between terminal "M2L" on the motor, and terminal connector "A2" and terminal "M2H" on the motor and terminal connector "B2".

3. Check first to see if machine motor is running. If not, follow procedures above. If the machine motor runs and the timer is good, but there is no voltage across terminals "M6" and "C6" of the agitator solenoid, then a defective wiring harness or loose terminal connection can be suspected between terminal "A6" on the timer and "M6" on the agitator control solenoid or between "C6" on the solenoid and "C" on the timer.

5. If the machine motor runs and the timer is all right, but there is no voltage across terminals "M81" and "C81" of the extractor solenoid; then a broken wiring harness lead or a loose terminal connection may be the cause for the failure. Disconnect wire lead "M81" from the extractor solenoid and check continuity between its terminal connector and terminal "A1" on the timer. Also, check in the same manner for continuity between terminal connector "C81" and terminal "LS1" on the lid switch or terminal "C" on the timer.

6. If there is no voltage across terminals "M3" and "C3" of the mixed water solenoid and the timer checks out OK, then check for a broken wire or a loose connection between terminals "B7" on the timer and "M3" on the mixed water solenoid.

7. If the machine does not shut off at the end of the cycle and the timer does not appear to be at fault, check for wires that are shorting together or wires that are crossed.

8. If there is no voltage across terminals "M4" and "C4" of the two-way valve solenoid as per the testing procedure in item "8" under SOLENOIDS, and the timer is not defective; then check for a broken wire or a loose connection between terminals "A4" on the timer and "M4" on the two-way valve solenoid.

13. If voltage is present across the mixing valve solenoid terminals and the timer contacts are not closed, check for shorted wiring or wire leads that are connected to the improper terminals.

J. WATER INLET VALVE

1. Check for clogged strainers in water inlet valve. Clean or replace. Valve may have been exposed to freezing temperatures, forming ice that will block passages and may require replacement of diaphragms or even the housing.

Too great a variation between the water pressure on the hot and cold side of the valve can cause water to stop flowing when the temperature switch is set on WARM.

6. Follow checking procedure in item "1" above.

12. If the water temperature at the inlet to the valve appears to be hot enough, but it seems to be considerably cooler when entering the tub even though the selector is set on HOT, then check the plunger and diaphragm on the cold side of the valve to see if there is an abnormal condition which would permit cold water to enter the valve body and mix with hot water.

13. If there is no voltage to the solenoids but water is still passing through the valve, take the valve apart and thoroughly inspect for corrosion that would prevent the solenoid plunger from closing. Dirt particles under the diaphragms or check valves and holes in the diaphragms will also permit water to pass through. Make sure good screens are properly placed in the valve inlets.

K. WATER PUMP

4. If the belt is riding deep in the pump pulley and the belt tension is good but the pump does not operate, try freeing the pump by alternately turning the timer knob to PUMP OUT and to SUDS RETURN. This should free the impeller or the flapper valve sufficiently to drain the tub. After the tub is empty, clean the pump.

If the pump does not appear to be clogged and the impeller shaft is free to turn, lower the drain hose (or suds return hose on machines equipped with a two way valve) to see if water runs out. If it does, then suspect a broken or loose impeller.

8. If the machine is equipped with a bi-directional pump, be sure that the pump pulley is engaged with the tire on the agitator drive pulley. If the agitator is operating, then check for improper adjustment. If the agitator is not running, check for a defective agitator solenoid.

The agitator must also be operating during SUDS RETURN on machines equipped with a uni-directional pump. Be sure that the flapper valve in the pump has actuated properly and is making a good seat.

Be sure that the pump is not clogged with foreign matter.

10. When all of the water has drained out of the tub, the pump will suck in air which will increase the noise level. Some pumps will be noisier than others, but worn bearings or an impeller that is rubbing would be about the only cause for an abnormal noise in the pump.

14. If water is leaking from the pump, inspect the gasket between cover and pump body or recirculation housing. Be sure all screws are tight. If water is leaking around the impeller shaft, inspect and replace the seal in the pump housing.

L. TWO-WAY VALVE

4. If the machine is operating in the pump out period at the end of WASH and the pump impeller shaft seems to turn freely, yet no water will come out the suds return hose when the hose is lowered below the level of the bottom of the tub, then the two-way valve may be clogged. Remove one of the hoses from the two-way valve outlet and inspect the interior of the valve.

8. If the washer is equipped with a two-way valve actuated by the control magnet, carefully check the linkage mechanism to see that the valve is being actuated properly. If there is any question about these parts, replace the assembly with the proper two-way valve conversion kit.

Be sure the valve is not clogged, and that the diaphragm or flapper valve is seating properly, so that the suds water does not leak out the drain hose.

14. Check for a hole in the diaphragm, loose screws or a bad gasket if water appears to be leaking on the floor from the two-way valve.

M. HOSES

1. Inspect the screens in the water inlet hoses to be sure that they are not clogged. Also, inspect the hose leading from the water inlet valve to the tub ring to be sure that it is not kinked or clogged.

4. The hose running from the pump to the two-way valve or the suds return hose may be clogged or kinked. Disconnect the gooseneck section of the suds return hose (or on non-suds models, the drain hose) at the first connection and run water through it from the faucet. Check each hose section by disconnecting it from the machine if a clogged condition is suspected.

6. Follow the procedure in item "1" above.

8. Check to see if the suds return hoses are kinked or clogged.

12. Inspect the screen in the water inlet hose connected to the hot water faucet to be sure it is not restricting the flow of hot water to the machine.

14. Check all hose connections to be sure they are tight. Inspect all hoses to be sure there are no slits or pin holes in them. Also check hose alignment to the water inlet on the tub ring to be sure the water is all passing into the tub.

N. BELT

3. If the motor runs and the agitator control solenoid checks out as OK, the belt may be badly worn or even broken. This can be checked quickly either by visual check or by advancing the timer knob to the DAMP-DRY position. If the basket spins satisfactorily, then the belt must be good.

4. Be sure that the belt is firmly seated in the pump pulley and that the tension is sufficient to drive the pump if all other conditions are normal.

5. If the motor runs but the basket does not spin, the belt may be broken or too loose. Check to see if the agitator operates satisfactorily when the timer knob is set in the WASH period.

8. Check to see that the belt is firmly seated in the pump pulley and that the tension is sufficient to drive the pump.

10. A badly frayed or loose belt may be the cause for excessive noise. Replace the belt if it is badly worn or stretched.

O. PULLEYS

3. If the basket spins, then the motor pulley must be all right, but the large pulley on the gear case may be loose on the main drive pinion. Tighten the pulley set screw.

4. On machines equipped with bi-directional pumps inspect the pump pulley to see that it is anchored securely to the impeller shaft.

8. Follow instructions after item "4" above.

10. A badly worn basket drive pulley bearing would cause the pulley to wobble excessively on the basket drive tube, and would be exceptionally noisy when the pulley is idling. This bearing can be replaced. Always fill the cavity behind the bearing with the proper lubrication, however, before reinstalling the pulley on the basket drive tube

P. GEAR CASE

3. If the agitator cam bar has been pushed far enough forward to allow the agitator gear fork and shaft assembly to drop down, but the shaft has not dropped down, it is possible that the fork is causing a bind on the agitator gear preventing free action and engagement with the agitator shaft pin. Or the pin in the agitator shaft may be bent so as to cause poor engagement with the slots in the gear.

The gear case may be misaligned so that it causes the agitator to bind with the gear sector or fork assembly. Realign gear case by shimming.

10. Check all three mounting nuts that hold the gear case to the base assembly. Tighten if loose.

If the abnormal noise appears to be coming from inside the gear case, it may be caused from a loose mesh between the main drive pinion and gear. Check the eccentric stud adjustment.

If adjustment to the main drive gear eccentric stud does not eliminate the abnormal noise, it may be necessary to replace gears or other internal parts that show signs of wear or defect. Be sure to clean the gear case thoroughly and add new oil if it is necessary to remove the gear case cover.

15. Check for a defective cover gasket or loose screws around the cover. Also, be sure the jam nut is tight on the main gear eccentric stud. If this jam nut is tight but the oil appears to be leaking around the eccentric stud, install a new "O" ring. Early models did not have an "O" ring on this stud, but an oil seal kit, number S–1281, is available to correct oil leaks on these models. This is an external repair and an instruction sheet is shipped with each kit. If oil appears to be pumping out of the drive pinion bearing, check the air vent in the gear case cover. This vent may have become clogged with grease and dirt.

Q. BASKET DRIVE

5. Check for a loose spanner nut. Before tightening the spanner nut, however, be sure the ears on the top of the basket drive tube are engaged with the notches in the basket drive block.

Also, check the basket drive clutch clearance. This should be about 1/16 inch. See instructions for adjusting in Section 2, Part B under Servicing Mechanical Components.

R. BRAKE LININGS

7. If the basket continues to revolve after the timer has advanced out of the SPIN period, it may be due to oily or badly worn brake linings which fail to stop the basket.

10. Oil on the braking surfaces or scored surfaces can cause abnormal noise when the basket is supposed to stop revolving.

S. AGITATOR

3. Remove the agitator and check to see if the agitator shaft is turning. If so, the drive lug may be broken or its corners rounded off. The agitator cap may not have been tightened down securely and allowed the agitator to rise sufficiently so that proper driving engagement is lacking under load.

10. A loose fitting drive lug will cause a knocking noise. If the drive lug was not properly heated before driving it on the shaft, the hot water used during the WASH period may cause the lug to expand and cause this noise.

Be sure that the agitator cap is screwed down securely on top of the agitator.

11. A broken or chipped vane on the agitator or a rough edge may cause clothes damage. If the roughness cannot be buffed out, replace the agitator.

16. Be sure the agitator is operating properly with the tub filled with water and a normal load of clothes. Improper agitation can result in poor washability though overloading, incorrect use of detergents or washing in water that is not hot enough are more likely to be the cause.

T. TUB

4. If after checking all other items listed in column 4 of the Trouble Diagnosis Chart and no abnormal condition can be found, then remove the basket and inspect the drain opening in the tub

bottom. Be sure that it is not clogged and that the tub outlet baffle is properly seated and in good condition.

8. If after checking all other items listed in column 8 of the Trouble Diagnosis Chart, the cause for the suds water not being returned cannot be determined, disconnect the outlet hose from the pump and run a wire through it to see if the tub outlet might be clogged. If so, remove the basket and clean out the tub.

14. Loose tub screws or improper alignment of the tub outlet hose can cause water to leak around the drain outlet.

16. Installing the aluminum tub baffle in the incorrect location can permit heavy particles of soil to collect in the tub bottom and become redeposited on the clothes in subsequent washings. This baffle should be anchored by the tub screw that is located about 160 degrees from the polyethylene baffle in the drain hole.

In certain areas where peculiar types of soils are present that adhere to the tub surfaces, it is necessary to thoroughly rinse the tub with clear water after the clothes have been removed to prevent a buildup of this scum deposit which can later be dislodged and redeposited on the clothes. Special instructions to the user are necessary in those areas.

U. BASKET

10. Check to see if the basket is loose on the spin tube. If so, it will cause excessive noise. Tighten spanner nut.

11. Run your hand over the inside of the basket to be certain that there are no sharp edges on any of the perforations that might cause clothes damage. If so, sand or buff off.

V. SNUBBER

9. If the washer is level and the self-leveling mechanism is installed correctly, but the machine still vibrates excessively, check the tension of the snubber pad against the top of the tub ring. The snubber should be able to control a 4 1/2 pound off-balanced clothes load, without permitting the mechanism to strike the cabinet.

Proper adjustment can be made by turning the nuts on the snubber stud.

10. If the snubber adjustment is too loose, abnormal noises may be caused by the tub banging against the cabinet. Also, check the bottom of the snubber pad to be sure that it is not worn through.

W. SUSPENSION RODS

9. Check the ball and socket joints on each end of all three suspension rods to see that they are fastened securely.

10. Loose socket joints on the suspension rods may cause abnormal noise.

X. LEVELING FEET

9. One of the most common causes of excessive vibration, especially to the extent of causing the machine to walk, is improperly adjusted front leveling feet. Check the adjustment of these feet to be sure the machine is setting solidly on the floor and is as level as possible. After proper adjustment is made, be sure to tighten the lock nuts. Also check the rear leveling mechanism to make sure that it was properly installed and that the pins are properly driven into the feet. Be sure that the rear leveling feet are free to move up or down in the leveling mechanism slots.

10. Improper installation of the leveling feet can cause abnormal noises. Follow the checking procedure in item 9 above and also be sure that the rubber pads are properly seated on all 4 feet and that the friction washers on the rear leveling feet are properly lubricated.

Y. LUBRICATION

10. Although there are no parts on the machine that require regular oiling on the part of the user,

abnormal noises can be attributed to improper lubrication at various places on the machine. Refer to Lubrication Instructions for the type and amount of lubricant to be used on various assemblies in the machine.

15. Excessive amounts of oil in the gear case or water pump can result in oil leaks. Also check to be sure oil has not been added at points where it is not required.

Z. IMPROPER USE OR CARE

9. Overloading or a large bulky item of clothing being washed alone is often found to be the cause for excessive vibration. Instruct the user on the proper quantity of clothes to be washed in one load and show her how such items as bed spreads and shag rugs can be rinsed and damp dried in the washer by proper balancing of the clothes load by adding smaller items to counter-balance the weight of the bulky item being washed.

11. Placing clothes in the washer before the suds water has been returned to the machine, too many clothes for the amount of water being used and improper use of bleaching agents are all contributing factors to clothes damage. Always instruct the user on the proper methods for using the RCA Whirlpool Automatic Washer. Urge her to follow, carefully, the instructions in her owner's manual.

16. Overloading, incorrect settings of the water temperature selector and water level switch, misuse of detergents, improper cleaning of the machine after use can cause poor washability. Demonstrate the proper care and use of the machine to the user and refer to the owner's manual for the important instructions to be followed.

TERMINAL CODE MARKINGS

The following chart shows terminal code markings currently being used on automatic washer timers and other components. After each is the color that the code represents as well as the old style numerical code and terminal code. This manual uses the old style markings which can be converted to later model machines by use of the following chart:

Terminal Color Code	Harness Lead Color	Old Terminal Designations		Terminal Function
		Timer	Component	
BK	Black	A or AA		"Hot" side of line.
BR	Brown	A 5	M 5	Timer to hot water solenoid when no temperature switch is used.
BR-R	Brown with Red Tracer	11	M 5	Temperature switch to hot water solenoid.
BU	Blue	A 2	M 2	Timer to motor when single speed motor is used.
BU	Blue	B 2	M 2 H	Timer to hi-speed motor when two speed motor is used.
LBU	Light Blue	A 4	M 4	Timer to two-way valve solenoid.
BU-R	Blue with Red Tracer	None	None	Push button switch to buzzer and latch solenoid.
BU-Y	Blue with Yellow Tracer	S 4	A 4	Suds switch to timer.
G-BK	Green with Black Tracer	A 3	14	Timer to temperature switch warm and/or cold wash.
OR	Orange	A 2	M 2 L	Timer to lo-speed motor when two speed motor is used.
O-BK	Orange with Black Tracer	None	None	Timer to rinse conditioner dispenser.
P	Pink	7	18	Water level switch to timer - empty side.
P-G	Pink with Green Tracer	B 7	M 3	Timer to warm water solenoid when no temperature switch is used.
R	Red	A 1	M 81	Timer to extraction solenoid.
T	Tan	A 1 D	19	Timer to water level switch - full side.
V	Violet	4	17	Timer to level switch.
W	White	C or CC Also LG		"Ground" side of line.
Y	Yellow	A 6	M 6	Timer to agitator solenoid.
Y-G	Yellow with Green Tracer			Timer to rinse temperature switch warm and/or cold rinse.
Y-R	Yellow with Red Tracer	B 7		Timer to cold solenoid.

LUBRICATION INSTRUCTIONS

Each RCA Whirlpool Automatic Washer is thoroughly lubricated at the time of assembly and should not require further lubrication under normal operating conditions for a period of several years. If called on to service a machine that seems to be excessively noisy or one that has been in use for several years, it is advisable to lubricate such items as the rear leveling mechanism, the agitator shaft bearings, the water pump, the lid hinges, slide controls and control magnet.

If a machine is brought in for a complete overhaul or it is necessary to dismantle the gear case and superstructure, then a complete relubrication of the machine is desirable.

Read the following paragraphs for information on where and when to lubricate, type of lubrication recommended and how much lubricant to use.

TO LUBRICATE –

Agitator Shaft Bearings and Upper Center Post Bearing, remove the stud from the top of the drive lug. Fill the cavity in the agitator shaft to within 1/2 inch of the top with a special turbine type oil, available in capsule form under Whirlpool Part No. 10943 or in pint cans under Whirlpool Part No. 99243. This oil is the same as that used for lubricating exhaust fans on RCA Whirlpool Dryers.

Water Pump, soak the oil wick in heavy nonpareil turbine oil, Gulf Crest "C", or Part No. 10943 oil capsule, whenever the pump requires service. On machines equipped with a bi-directional pump, S:A.E. No. 40 machine oil may be added through the oil cap whenever it is needed. When the pump is disassembled, the cavity between the bearings should be fifty to sixty percent filled with water pump grease.

Rear Leveling Link Mechanism, use a heavy-bodied lubricant such as Lubriplate 905 on the fibre washer at the time the rear leveling feet are installed.

Control Magnet Assembly, pour a few drops of a mixture of three parts of S.A.E. No. 10 light machine oil and one part of amber petrolatum in the two holes above the plungers and around the pivot stud. This should be done only after the machine has been used for some time or when servicing the control magnet assembly.

Lid Hinge and Slide Controls, rub on the moving parts a small amount of Lubriplate 905.

Gear Case, disassemble and clean all internal parts thoroughly. Replace broken and worn parts. Pour in 12 ounces of Standard Oil Company's product No. 12788 turbine oil which has an 85 minimum viscosity index, or its equivalent.

Cam Bar Slots, brush with Master Lubricant's Lubriko M31 after reassembly of the gear case.

Splines on the Brake Drums, lightly cover with Lubriko M31 when reassembling the superstructure.

Lower Center Post Bearing, use Stanolith 42 before pressing in the lower seal.

Basket Drive Pulley, fill the cavity behind the basket drive pulley bearing with Stanolith 42 before assembling the pulley on the basket drive tube.

SECTION 2

SERVICE PROCEDURE AND COMPONENT DESCRIPTION

Before attempting to service an automatic washer of any make, the serviceman should be equipped with the proper tools. Many of these are special tools designed to do a particular job quickly and to protect various parts from damage. Special tools used to service all makes include a test lamp or voltmeter, a continuity tester or ohmmeter, and a wattmeter. Proper use of these special tools will help make fast, efficient diagnosis and service much easier.

As a safety precaution, ALWAYS disconnect electrical power from the Automatic Washer before attempting to remove any parts from the machine. For testing purposes, the power cord can again be plugged into a live receptacle after the necessary parts are removed.

Also, it is advisable to make certain that the water supply faucets or valves are closed and the washer is drained of all water, if any parts are to be removed or disconnected in the water system.

Due to the large number of models covered in this manual, no attempt will be made in this section to give a complete detailed step-by-step procedure on disassembly of each individual model. Instead, we will give the service procedure and functional description of the various components as used on most models. In a few cases these components may not be identical to the machine being serviced, but their function, as well as service procedure, will be the same.

Cabinet Service

Use the wiring diagram pertaining to the particular model being serviced when installing any electrical component on the machine. Wiring Diagrams will be found on the back of each model. Also, be sure that the number stamped on the wiring harness lead matches the number on the terminal to which it is to be connected. If the number is obliterated, refer to the Wiring Diagram and make continuity checks where necessary to be certain that the proper connection is being made.

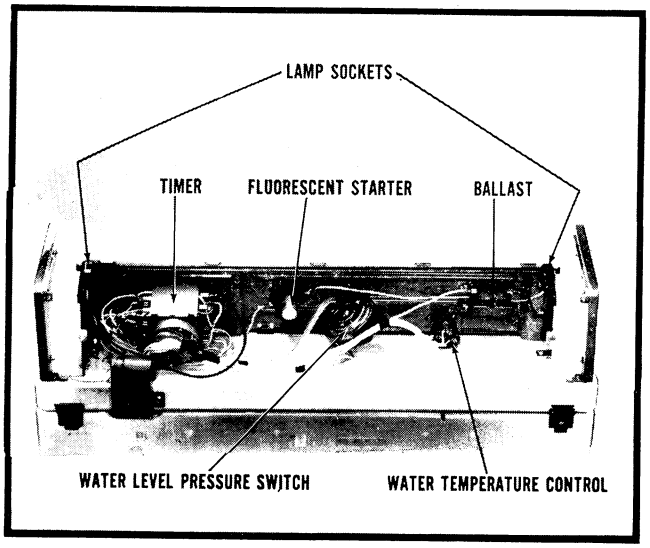


Figure 1

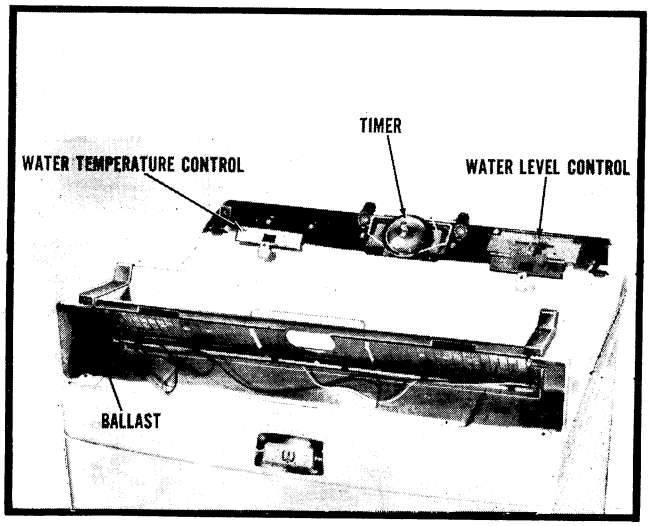


Figure 2

On many models equipped with a separate console on the top, many of the electrical components, such as the timer, water temperature control, water level pressure switch and fluorescent lighting components can be serviced by removing the rear console panel, *Figure 1,* the console housing, *Figure 2,* or the console top, *Figure 3.*

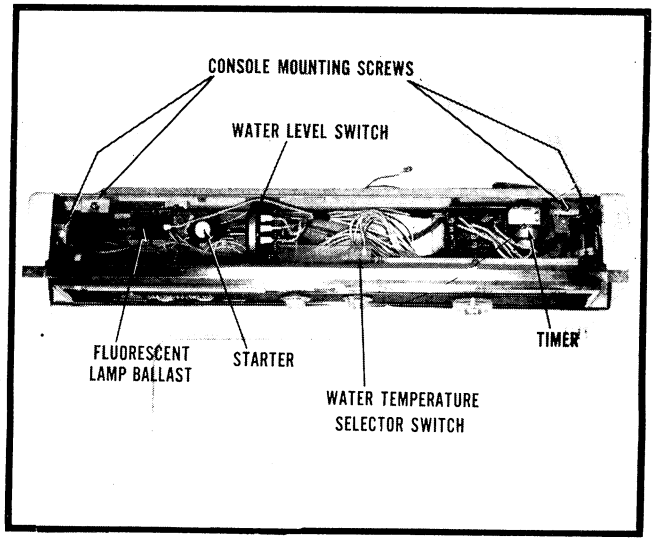


Figure 3

On other models, it will be necessary to remove or raise the top to obtain access to electrical components, *Figure 4.*

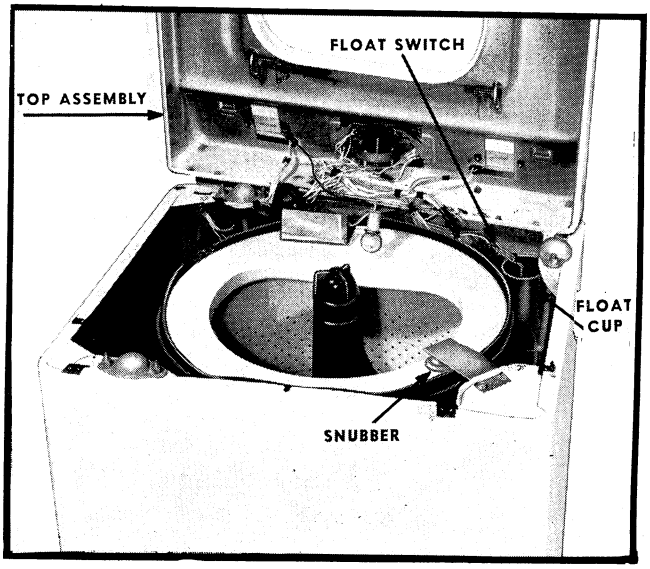


Figure 4

Other electrical components, such as the machine motor, the two-way valve solenoids, the control magnet are accessible through the rear service panel, *Figure 5.*

To remove the one piece, wrap-around Console housing used on many models, first, remove the

Console top cover, *Figure 6.* Then remove the five console mounting screws as shown in *Figure 3.* Remove the timer knob by turning in a counter-clockwise direction and the other control knobs by pulling straight forward. Lift the console up and off, *Figure 7.*

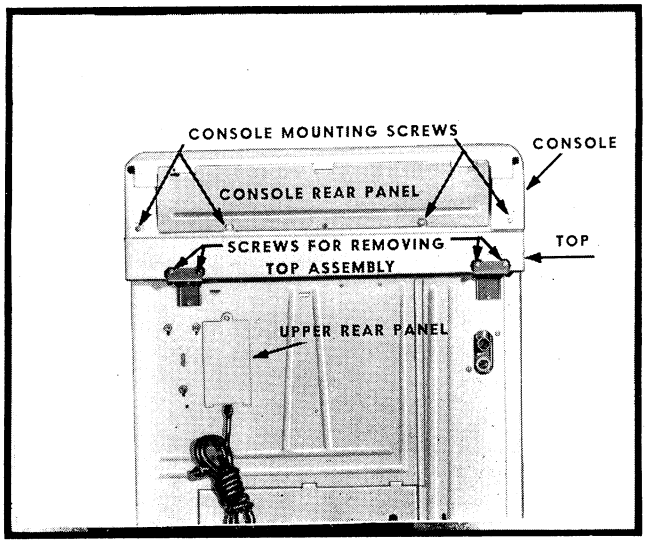


Figure 5

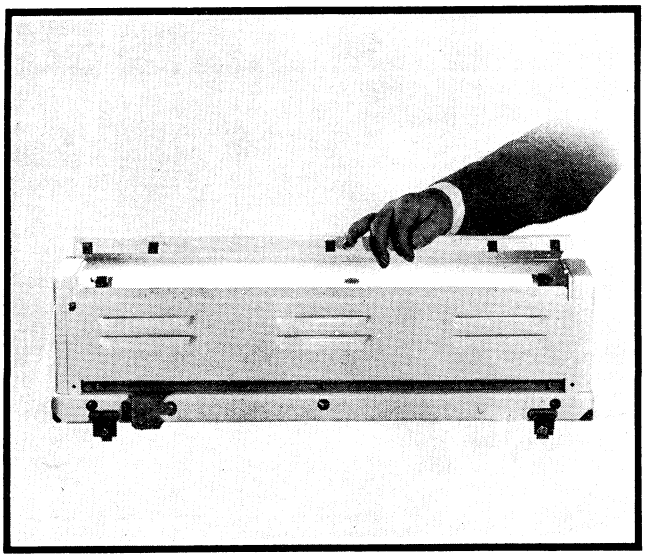


Figure 6

The timer, and various other electrical components as shown in *Figure 8* will be accessible for servicing after the wrap-around console case has been removed.

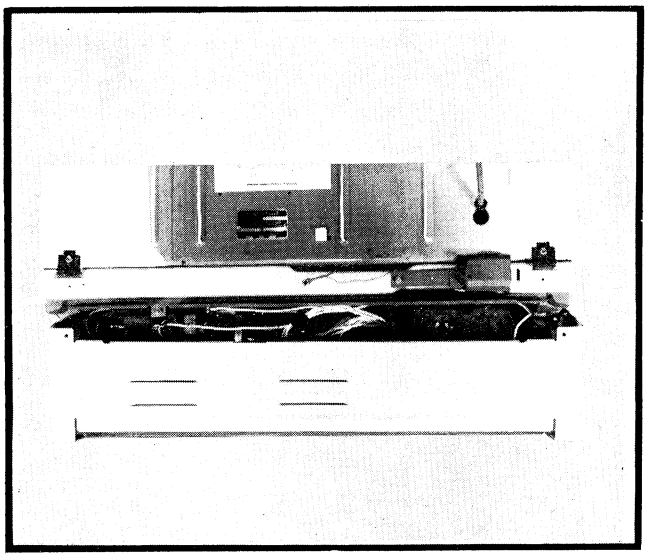


Figure 7

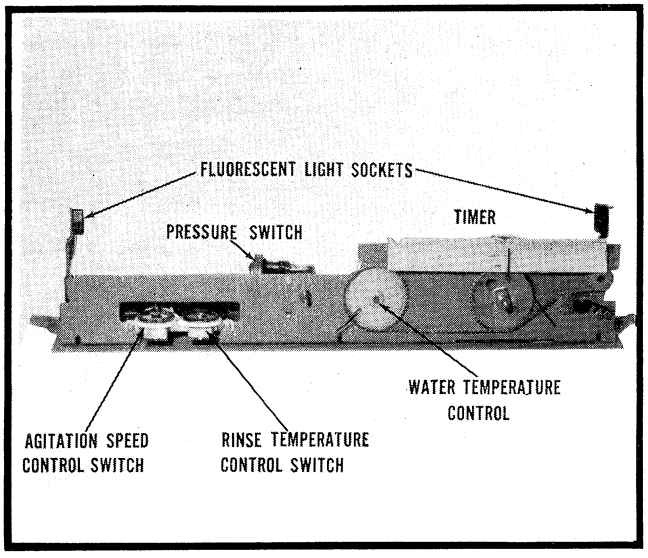


Figure 8

Timers

Timers used on Automatic Washers are similar in basic principle of operation and design. They are somewhat different in appearance due to different sources of manufacture.

There are also differences in complexity due to the variations in functions and features of the various models.

All automatic timer washer timers are driven by a synchronous-type motor, similar to those in electric clocks. A small pinion drives a gear in the escapement, *Figure 9.*

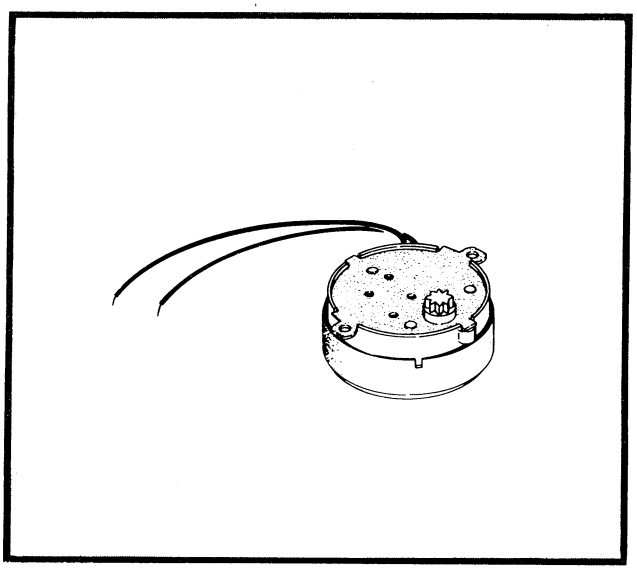


Figure 9

The timer and push-button assembly used on some model automatic washers consists of the machine timer as well as a push-button and stop-pin device, *Figure 10.*

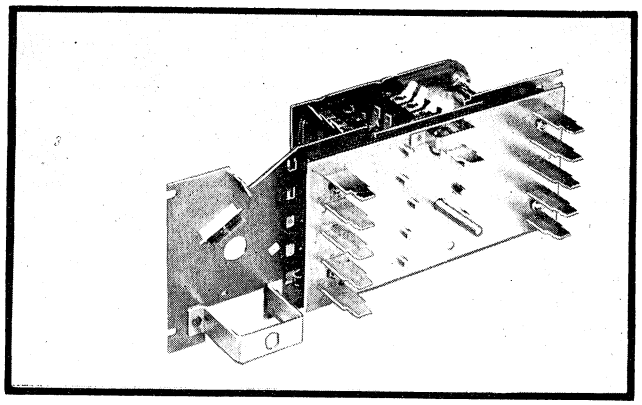


Figure 10

All cycle variables, such as wash and rinse water temperatures, agitation and spin speeds, are preset in the timer when the desired cycle variation is chosen. The necessity of switches for these purposes is eliminated and the proper washing conditions for the particular fabric is assured.

When any one of the cycle selection push buttons is depressed, a corresponding stop-pin is *"cocked".* The pin is forced, under spring tension, against a perforated disc on the timer. When the knob is turned, the disc turns with it.

At the same time the timer cams are in position to furnish the desired cycle, a hole in the disc passes under the *"cocked"* stop-pin and the pin drops into it. This prevents further rotation of the timer knob.

Pushing in on the timer knob closes the line switch on the master cam and starts machine operation. It also disengages the stop-pin from the perforated disc so that the timer can advance.

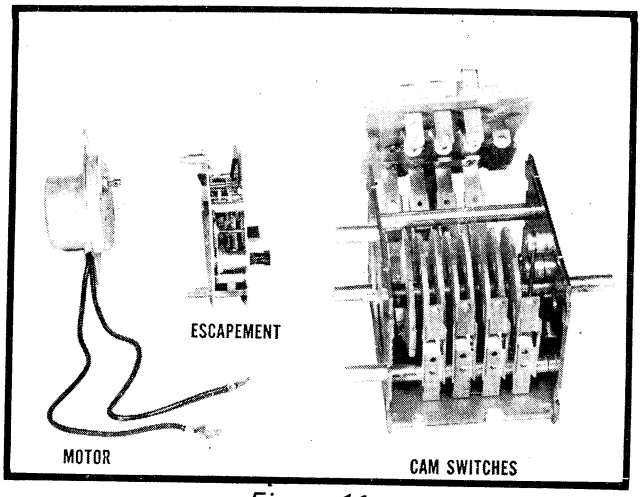


Figure 11

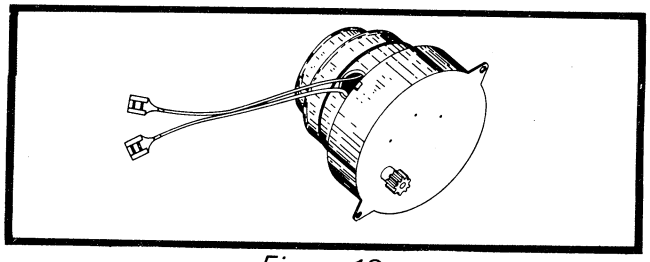


Figure 12

All timers consists of three basic components assembled into one unit, *Figure 11* . The components are the motor, the escapement and the multiple circuit cam switches.

Timer Motors, *Figure 9,* may vary slightly in appearance due to the various sources of manufacture, but regardless of the differences in appearance, each functions in the same manner as the other. It is a synchronous-type motor, similar to those used in electric clocks, with a small pinion which drives a gear in the escapement, *Figure 12.*

The Escapement is a spring-powered mechanism that advances the timer cam shaft a set number of degrees every set number of seconds depending on the particular design of the timer.

On timers from one source of manufacture, *Figure 13,* the motor winds up a music wire torsion spring to a pre-determined force. After the required time lapse, this spring unwinds abruptly, causing a chain of gears to advance the timer cam shaft the pre-determined number of degrees.

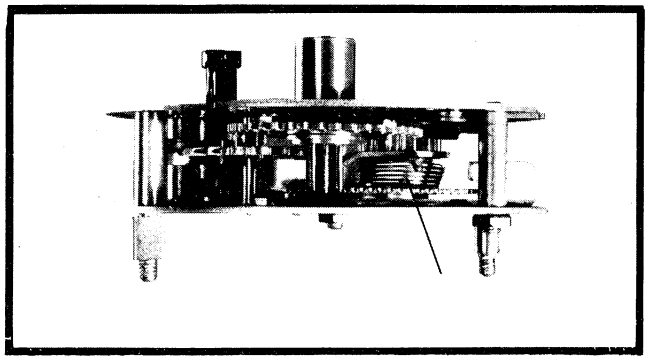


Figure 13

On timers from another source of manufacture, *Figure 14,* this same function is accomplished by means of a coil spring and eccentric cam in the escapement. *Figure 15* illustrates a later model escapement from the same manufacturer which is known as a direct drive escapement.

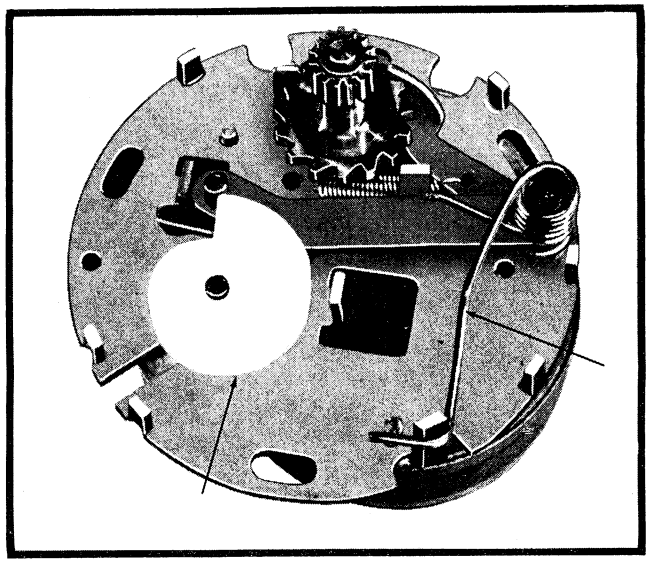


Figure 14

This cam also serves a dual function of opening and closing small switch contacts to permit the intermittent power sprays and cycle end buzzer signal. A cam is also used for this purpose on the escapement shown in *Figure 16*, but in a different manner, which will be covered in more detail in following paragraphs.

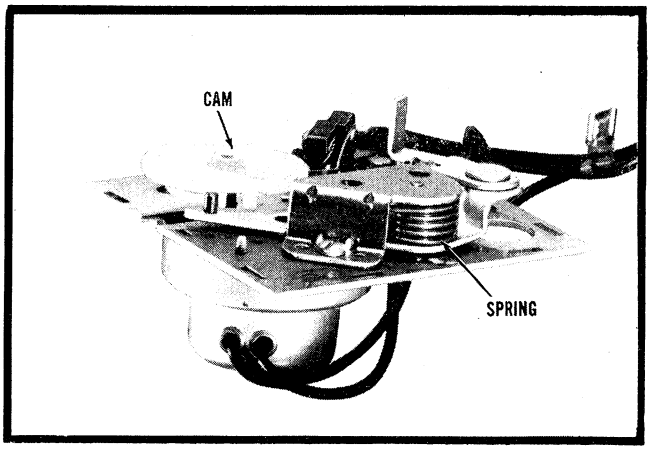


Figure 15

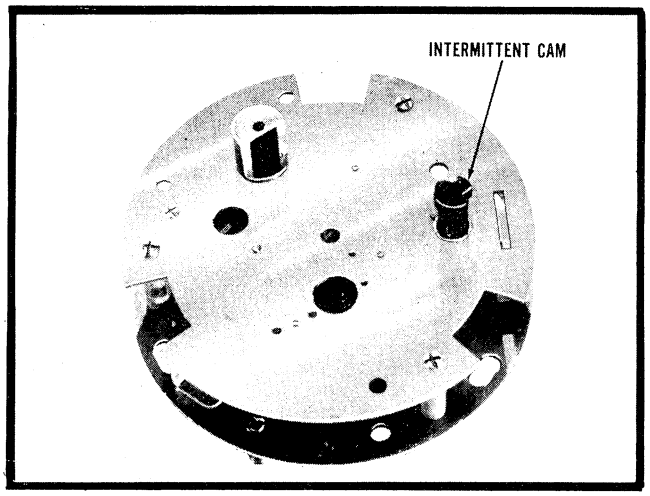


Figure 16

To permit the timer cam shaft to be advanced manually, a rachet mechanism is used in connection with the output gear of the escapement.

Since the timer used on the Automatic Washer is a precise instrument and it is easy to get it out of adjustment, we strongly recommend that this unit is not disassembled in the field, other than the timer motor being removed from the rest of the timer. If it is determined that the timer motor is faulty, then it should be removed from the timer and replaced with a new one. If any other part of the timer is found to be defective, the entire unit, including motor, should be replaced. After a new timer has been installed on a machine, always check to see that the correct positioning of the timer knob to the timer dial exists. Turn the knob to the *OFF* position, push it in and gradually turn it until the machine starts. If the indicator does not line up properly with the dial, loosen the set screw and reset the knob.

On page 20, reference is made to *Figure 10* with a **precedent paragraph above the** illustration. The following paragraphs will more precisely cover the push-button or program type of timer. This timer gives the least amount of trouble yet it is the first component to be condemned when all else is supposedly checked out.

Use the following procedure to correctly check the timer.

A. Refer to wiring diagram. By removing the wiring from the timer and bypassing the timer each component can be checked separately and accurately.

B. Look closely for discolored or burnt spade connectors at terminal board this indicates a loose connection. Replace with new spade terminal.

C. The spring retainer clips that hold the buttons down often break. These can be replaced in the field. In depressing a pin-stop button, if button fails to remain in down position, look for a broken retaining clip.

Figure 17 shows a typical pin-stop timer. There are auxilliary switches mounted on the timer. Check these switches carefully by removing the wires first and check for continuity.

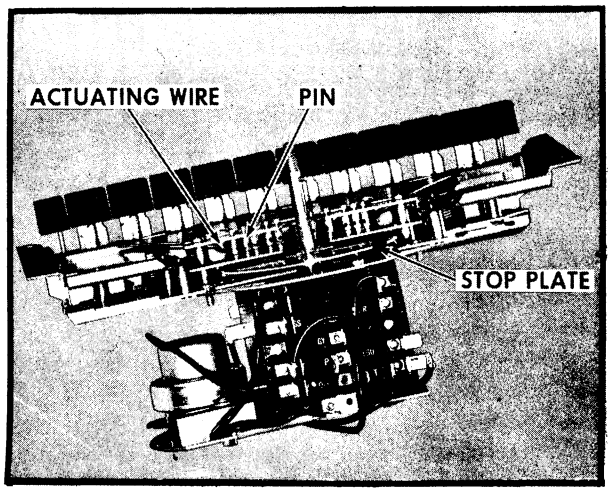


Figure 17

The timer can generally be removed from the front of the console.

1. Unscrew control knob and remove pointer
2. Remove all other control knobs.
3. Remove screws at end of bezel.
4. Remove control panel screws.
5. Remove timer and push-button assembly.
6. Disconnect all wiring.
7. Remove remaining screws securing timer to push-button assembly.

D. To synchronize the timer to push-button assembly.

1. Assemble stop plate to timer hub. It will fit only one way.

2. Align locater slots shown in *Figure 18* and secure timer to mechanism with four screws. Do not tighten. Rotate the timer counterclockwise (rear view) as far as possible and tighten one screw.

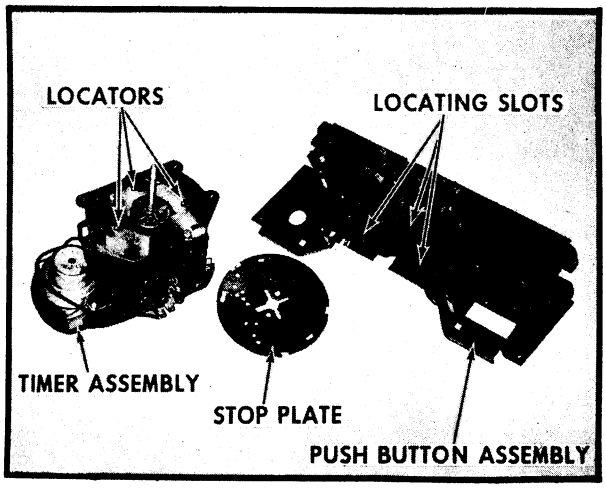


Figure 18

3. Depress button #2 of mechanism and rotate timer shaft to cycle two, starting point with knob pulled out. The point of stop pawl as viewed through the inspection hole on back plate must fit the gear tooth which is visible, *Figure 19.* You may have to readjust by rotating timer slightly with respect to mechanism, and recheck by slowly rotating timer knob to #2 starting point, *Figure 19.*

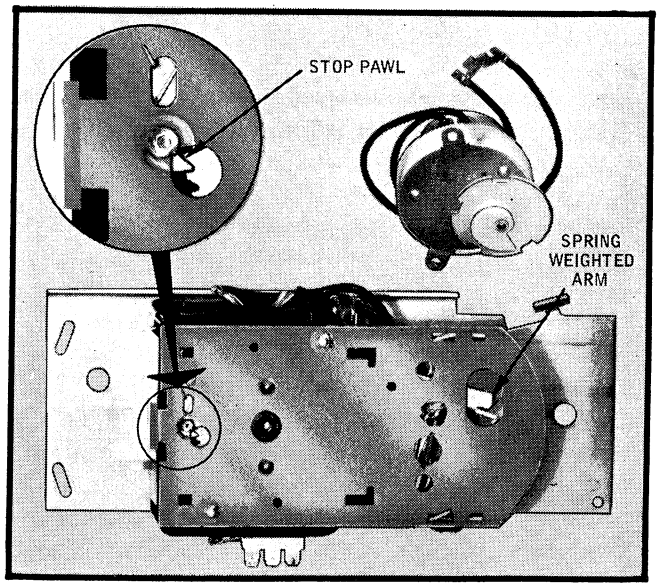


Figure 19

4. Depress button #8 and recheck as above.

5. Firmly tighten remaining screws.

6. Assemble to console control center.

D. To remove defective timer motor.

1. Remove timer from machine console.

2. Remove timer motor wires and hex head screws. Carefully slide motor out of slot provided for removal.

3. With a small screwdriver, hold spring loaded arm back so replacement motor can be positioned on timer.

4. Replace screws and wiring.

5. Reassemble to console control center.

E. Auxiliary timer switches mounted to rear of push-button mechanism are actuated when certain cycles are selected. A prong on the back side depresses the leaf spring closing or opening the switches as predetermined.

F. To position the timer pointer to the timer dial.

1. Place small nylon sleeve shoulder end first over *"D"* shaft. Engage sleeve with pin.

2. Fit pointer over nylon sleeve pointing in desired position.

3. Fit metal clip over the threaded shaft so it rests against the pointer.

4. Turn knob on shaft until it contacts the pointer. Normal rotation will tighten assembly.

Switches

WATER TEMPERATURE CONTROL

Automatic washers equipped with single inlet hoses are not equipped with water temperature control switches since no provision is made in the water inlet valve for controlling the temperature of the water. Therefore, on these machines the temperature of the water entering the machine is controlled by adjusting the flow of the hot and cold water at the *tap.*

Each machine that is equipped with a double solenoid inlet valve is also equipped with either a two-position or three-position temperature control switch. The two-position switch is a single-pole, double-throw, toggle action type switch which closes the circuit to the warm water solenoid in one position and closes the circuit to the hot water solenoid in the other position, *Figure 20.*

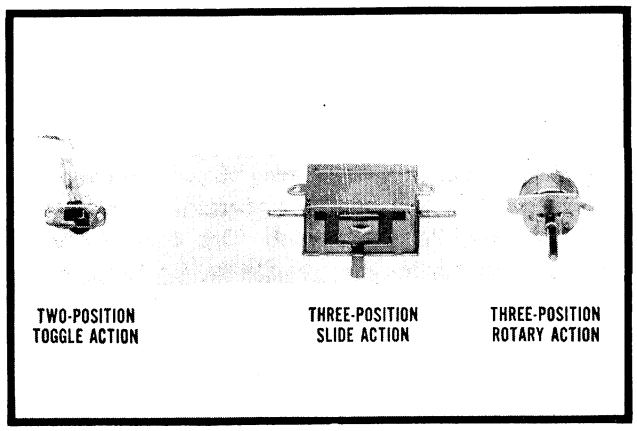


Figure 20

The three-position temperature switches used on these automatic washers are either the slide action type or the rotary type, *Figure 20.* The slide action type is composed of two single-throw switches

which are normally both closed. The slide lever opens the switch contact that controls the hot water control solenoid when set on *WARM*. When set on HOT the circuit to the mixed water control solenoid is broken and when the lever is set on *MED* both switches are closed, thus closing the circuits to both the hot and mixed water control solenoids on the mixing valve.

Beginning with the 1958 Mark XII Model, the rotary temperature switch was slightly modified to incorporate five positions. This switch, in conjunction with the new three solenoid mixing valve, enables the operator to initially fill the machine and to wash with either *COLD, COOL, WARM, MEDIUM* or *HOT* water.

When the switch is set on *HOT*, a circuit is completed to the hot water solenoid only. When the temperature switch is set on *WARM*, a circuit is completed to the warm water solenoid only and when the selector switch is set on *COLD*, a circuit is completed to the cold water solenoid only. In the *MEDIUM* position, the switch completes a circuit to both the hot water and warm water solenoids, giving a temperature approximately halfway between 97°F. and the temperature of the water supplied by the hot water tank. In the *COOL* position, the switch closes its contacts so as to energize both the cold water and warm water solenoids, giving a water temperature approximately halfway between 97°F. and the temperature of the water supplied at the cold inlet.

During *RINSE,* the five-position water temperature selector switch is bypassed, but the operator may select the temperature of the rinse water by setting a rotary rinse temperature control switch.

The Rinse Temperature Control Switch has been added to permit the operator to choose either a warm water rinse of approximately 95°F. temperature or a cold water rinse (tap water temperature). On the *WARM* setting, a circuit is completed to the warm water solenoid only and when it is set on *COLD* a circuit is completed to energize the cold water solenoid only. It should be noted that this switch is operative in any of the three timer cycles.

Remove wires before checking switches - switches are checked by placing a continuity testing lamp in series with the switch. If the switch is defective, it must be replaced

WATER LEVEL CONTROL

Regardless of the particular type of water level switch used on the RCA Whirlpool Automatic Washer, its main function is to control the amount of water that enters the tub. As soon as the correct water level is reached in the tub, this switch completes a circuit to the timer motor, machine motor and agitator solenoid. During *SPIN* periods, it completes a circuit to the extractor solenoid.

During the *FILL* portion of the cycle, a circuit is completed through the switch contacts of the water level switch to either one or both of the water control solenoids on the water inlet valve, permitting water to enter the machine. Since the timer motor does not operate until the proper water level is reached, no operating time is lost during the filling process.

Although their basic functions are the same, two basically different types of water level switches are used on RCA Whirlpool Automatic Washers. These are the float-type switch and the pressure-type switch. The variations of the two basically different types of switches will be covered in the following paragraphs.

If water fails to enter machine on initial wash period note if water has entered tub while machine was not in use. Often a mechanically stuck open water valve will allow enough water into the tub to activate the water level switch opening the circuit to the water valve. If water is found to be in the tub turn control to spin dry cycle. After water is removed, try the fill period again. If water comes into machine water valve should be cleaned or replaced.

FLOAT TYPE

These switches are activated by a plastic float anchored to the end of the float switch arm. This float is located in a float chamber mounted at the side of the tub. As the water enters this chamber the float begins to rise, moving the switch arm upward until it trips the switch and stops the flow of water into the tub. As the water drains out of the tub the float gradually moves downward and again trips the switch.

There are two types of float switches used on the RCA Whirlpool Automatic Washers. The single-level type and the two-level type.

The Single-Level Float Switch, *Figure 21,* is a single-pole, double-throw, toggle action switch mounted on a bracket at the top of the float chamber. The chamber is welded to the side of the tub near the top, so the water does not begin to enter the float chamber until the tub is over half full of water or

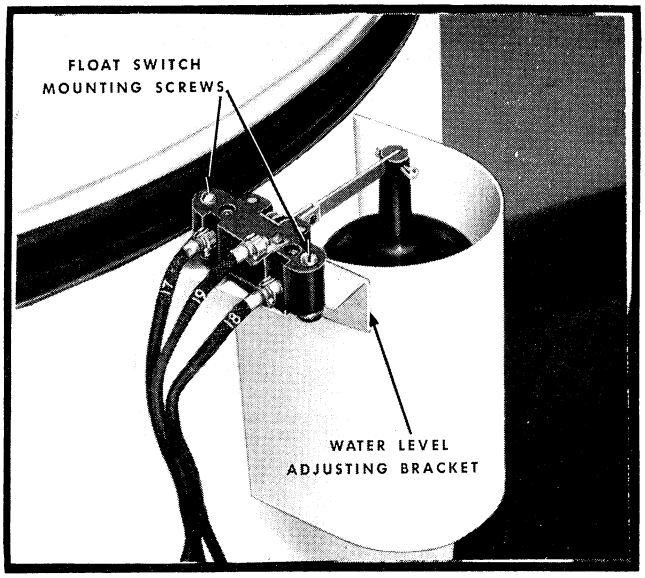


Figure 21

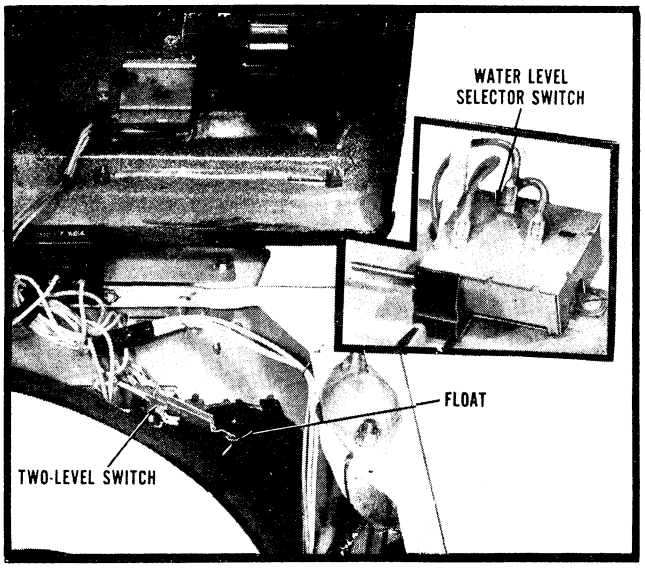


Figure 22

approximately nine inches deep. The float switch should shut off the water at approximately the 11 to 11 1/4 inch level. This level can be adjusted slightly by adjusting the switch mounting bracket up or down on the float chamber.

The Two-Level Float Switch, *Figure 22,* requires the use of a separate water level control switch in conjunction with it to permit the operator to select either a *HIGH* or *LOW* water level. This float switch consists of two single-pole, double-throw switches built into one unit and actuated by one arm.

When the water level switch is set on *LOW* the circuit to the water control solenoids is broken as soon as the float switch arm actuates the bottom switch contact. However, the circuit to the water control solenoids is not broken until the top switch contact is actuated by the float switch arm, when the water level control switch is set on *HIGH.*

At the high setting approximately 17 gallons of water are permitted to enter the washer, and approximately 14 gallons on the low setting.

On machines using this float switch, the float chamber is a separate Bakelite container which is mounted to the back of the cabinet rather than being an integral part of the tub. A hose connects this float chamber to the tub at about two inches from the bottom. Some adjustment of the water level can be accomplished by shifting the float chamber up or down in the slotted holes in the rear of the chamber.

PRESSURE TYPE

This is a single-pole, double-throw switch activated by a diaphragm. A 3/16 inch transparent plastic tube connects this switch to the tub by means of a reducer coupling and an elbow hose, *Figure 23.*

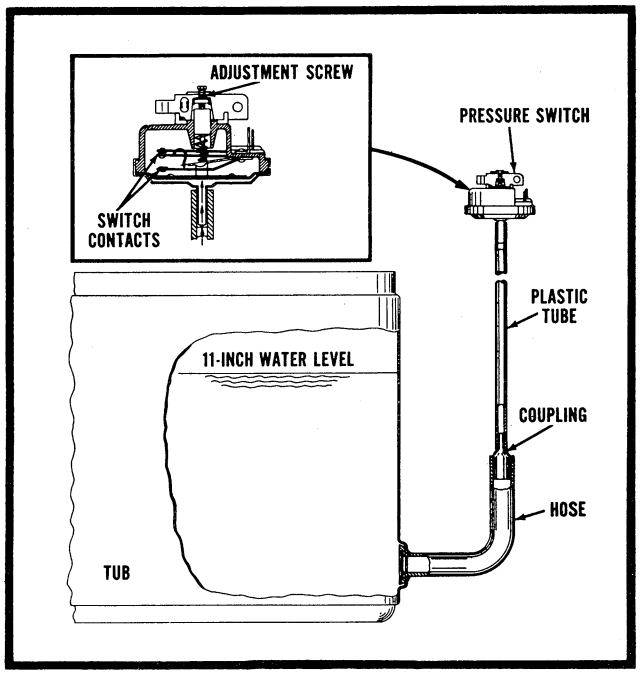


Figure 23

As the tub fills with water, an air pocket is formed in the plastic tube. As the water rises in the tub, the air pressure in this tubeincreases until it is sufficient to cause the diaphragm to actuate the switch contacts; thus, opening the circuit to the water control solenoid and stopping the flow of water into the tub. As the water drains out of the tub the air pressure in the tube decreases gradually allowing the diaphragm to reset the switch contacts.

There are three styles of pressure switches used on RCA Whirlpool Automatic Washers; the Single-Level Pressure Switch, the Three-Level Switch and the Infinite-Level Switch.

The Single-Level Pressure Switch is calibrated to 11 inches plus or minus 1/2 inch of water in the tub, *Figure 23.* Although it is equipped with an adjustment screw, this screw should not be changed in the field since it is pre-set at the factory and sealed. A very slight adjustment will increase of decrease the water level in the tub quite noticeably and is, therefore, not recommended.

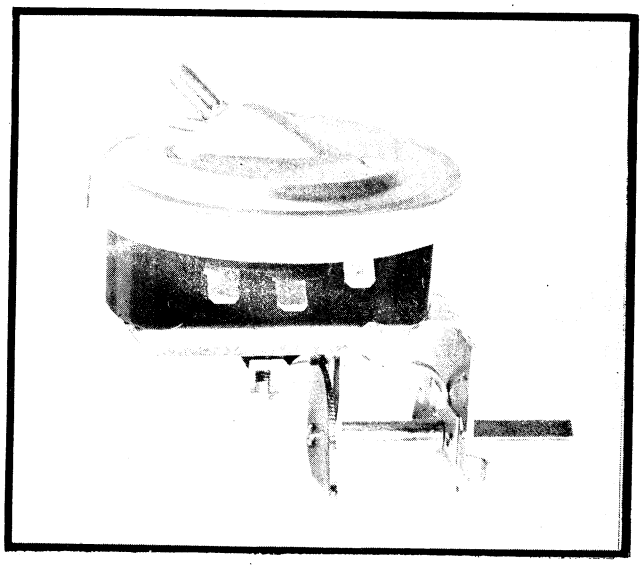


Figure 24

The Three-Level Pressure Switch, *Figure 24,* is the same as the single-level switch except that it has three positions which are actuated by a slide lever and crank. The various water levels for *LOW, MEDIUM* and *HIGH* settings are as shown in *Figure 25.*

The Infinite-Level Pressure Switch, *Figure 26,* is very similar to the single-level and three-level pressure switches except that it has a crank or control segment that will allow an infinite number of settings between the minimum *LOW* position and the maximum *HIGH* position.

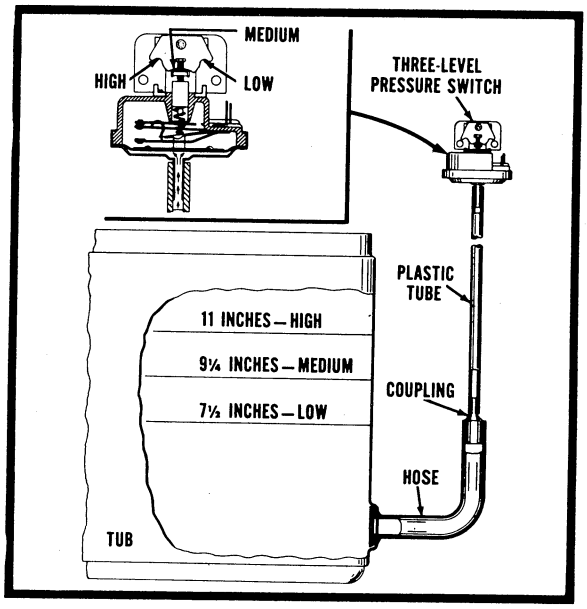


Figure 25

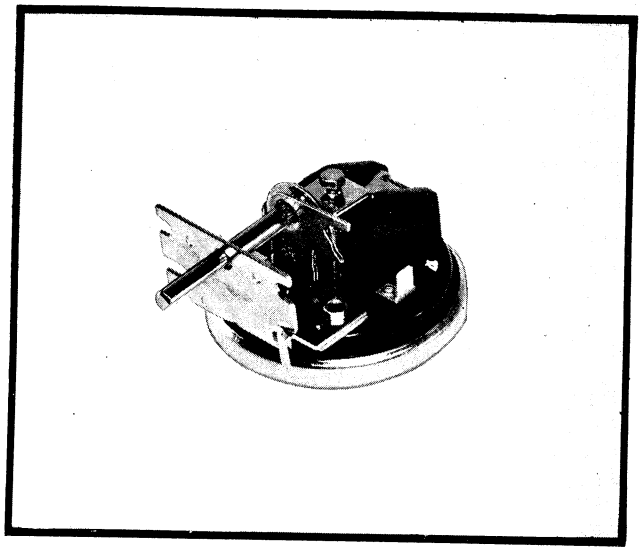


Figure 26

On 29 inch machines, when the selector knob is set on *LOW* about 11 gallons of water will enter the tub at a level of about 7 inches. When set at *HIGH,* the tub will fill to about 11 inches or approximately 17 gallons of water. By setting the selector knob at any position between *LOW* and *HIGH*, the amount of water entering the tub will vary between 11 to 17 gallons depending on the setting.

This switch also has a *RESET* position so that the user can add additional water if the first setting did not supply the desired water level. To do this, the operator merely turns the selector knob to the *RESET* position, then to any higher position than the original setting.

LID RELEASE SWITCH

This is a single-pole, double-throw switch located to the right of the lid release button at the top of the cabinet, *Figure 27*, It is mounted in a bracket with a lever which trips the switch button when the lid release button is pressed. This is a momentary action since the switch arm is spring-loaded and

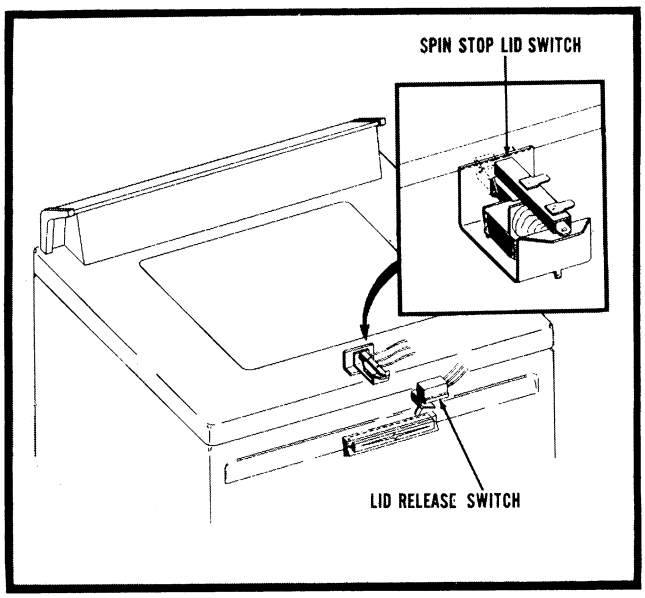


Figure 27

returns to its original position as soon as the lid release push-button is released. This momentary contact energizes the lid switch solenoid which trips the latch, and causes the lid to open.

The lid release switch design was changed for the 1958 models, *Figure 28.* Now the switch mechanism is centered directly above the lid release button. When this button is pressed, the complete switch mechanism pivots on a hinge clip against the inside front of the cabinet, depressing a nylon plunger against the cabinet to actuate the switch contacts.

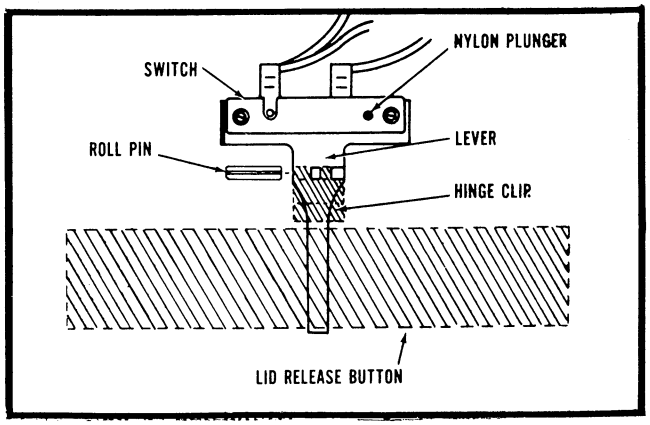


Figure 28

SPIN STOP LID SWITCH

This is a single-pole, single-throw switch which is combined in the lid switch solenoid and buzzer assembly and is actuated by the lid latch, *Figure 29.* This assembly is mounted underneath the top, near the front of the machine. The purpose of this switch is to break the circuit to the extractor solenoid when the lid is opened.

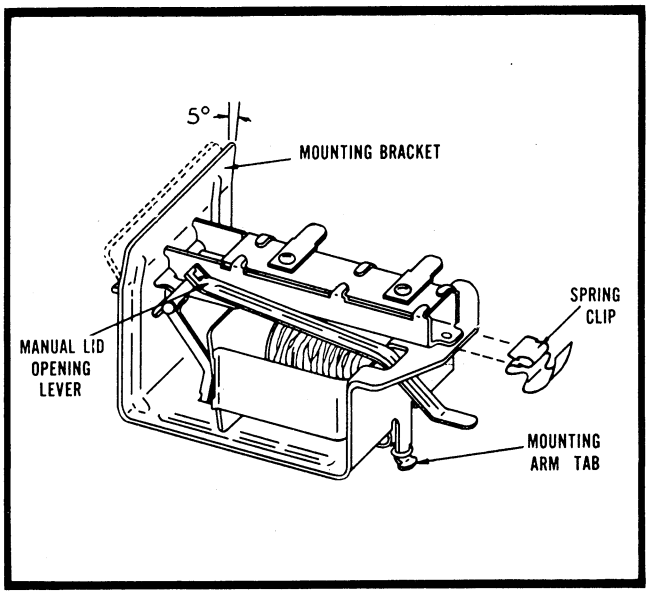


Figure 29

A manual lid release lever has been included as an integral part of this switch, *Figure 30.* This lever permits opening of the lid even though the machine is not connected to a power supply. The tip of this lever protrudes approximately one-fourth inch from between the cabinet and top at the switch location.

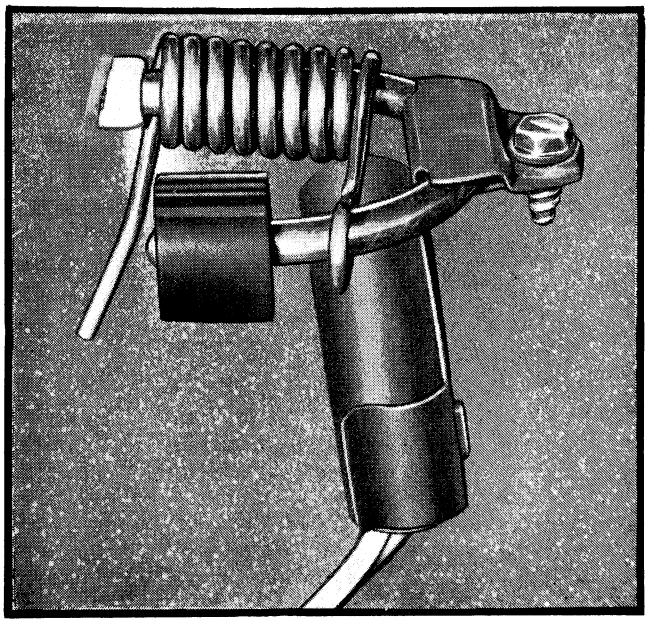


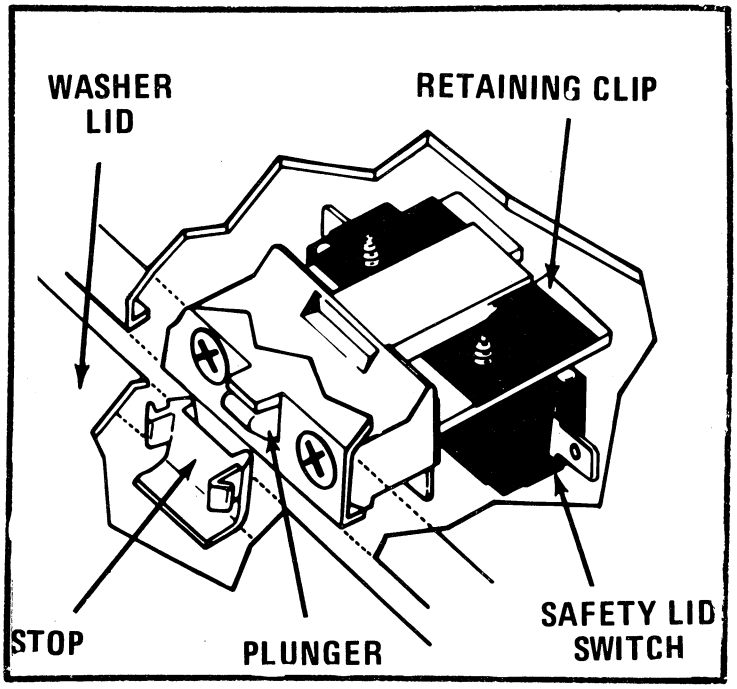
Figure 30

A revised and relocated safety lid switch assembly is being phased into production. The new assembly is mounted to the rear center of the washer top, adjacent to the serial plate.

The revised assembly uses a mounting block that mounts to the washer top with two mounting screws. (See *Figure* below). The safety lid switch (the current production microswitch) is mounted to the block with two screws and a retaining clip. A plastic water shield is fastened by the same screws to the mounting block.

A plunger is located in the center of the mounting block. This plunger is actuated by a stop that snaps into the washer lid. As the lid is closed, the stop depresses the plunger, which closes the safety lid switch.

When servicing the new safety switch assembly, make sure that the microswitch is pushed as far forward as it will go before tightening the safety lid switch mounting screws. If the safety lid switch is not mounted properly, improper operation will



Mercury-type switches are used on all models, since 1960, specified with a spin-stop switch, *Figure 30.* The switch is mounted by a bracket to the right lid hinge. Electrically, it is connected in series between the spin solenoid and the timer.

Solenoids

Solenoids, like switches, are checked by placing a continuity testing lamp in series with the subject solenoid. Defective solenoids must be replaced.

A solenoid is a device used as a means for converting electrical energy into mechanical motion. It consists of a coil of enamel-coated wire wrapped around a non-metallic bobbin and supported by a laminated iron field or a steel frame of some type, *Figure 31.* Some solenoids have a metal core in one end of the bobbin and some have metal bushings in each end with a space in between them. The particular application for which a solenoid is designed accounts for these variances.

When electric current flows through a coil of wire, a magnetic field is produced in the center of the coil. Therefore, when a solenoid is energized, it acts like a magnet positioned so as to attract a pre-designated metal object.

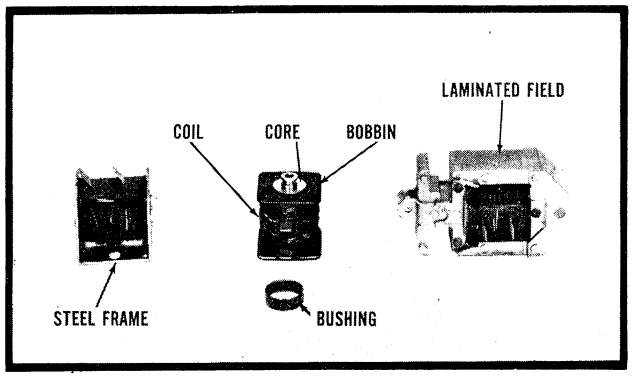


Figure 31

Some solenoids are equipped with a free moving armature or plunger which is so assembled that it can be easily moved in and out of the center of the coil. When the solenoid is energized, this plunger is pulled into the center of the coil by the magnetic attraction. When electrical current stops flowing through the coil, the magnetic force ceases and the plunger moves back to its original position by gravity or by spring-action. Other solenoids are equipped with a stationary core which pulls a metal leaf or plate against the end of the solenoid when electric current flows through the coil. There are several different types of solenoids used on RCA Whirlpool Automatic Washers. These will be covered in more detail in the following paragraphs.

WATER CONTROL SOLENOIDS

Three different types of solenoids are used to control the water inlet valves used in the manufacture of RCA Whirlpool automatic washers. These are the open-type and the sealed type.

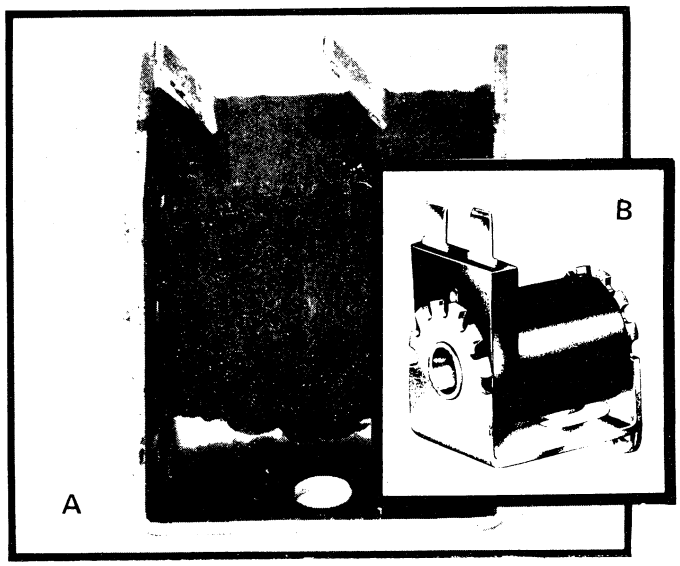


Figure 32

ENCAPSULATED SOLENOID COIL *Figure 32*B

The encapsulated coil was produced to prevent water damage and physical damage to the coil. The coil is encapsulated with an epoxy type resin. It is not vulnerable to dampness, ambient temperature changes, grease or grime. This type of coil is used on all of the new type water valves, the solenoid switches, and many components that use an electromagnetic control principle.

The Open-Type Solenoid, *Figure 32*A,is used primarily with brass bodied valves and is anchored to the valve by means of a coil tension spring. The coil is cradled in a steel frame and a bushing is inserted in each end of the coil, leaving a space between them to help center the plunger or armature and to prevent noisy operation. The space terminal connections are on the side of the coil. The plunger is located in a cover or shield over which the solenoid is assembled. This plunger is spring-loaded to provide positive sealing action when the solenoid is not energized.

The Sealed-Type Solenoid, *Figure 33,* functions in exactly the same manner as the one above but is secured to a nylon valve body by screws. Instead of being cradled in a steel frame, the solenoid coil is completely seated in a can-like container to further protect the wire from the corrosive effects of water and detergents. The space terminals are mounted on the outer end of this solenoid.

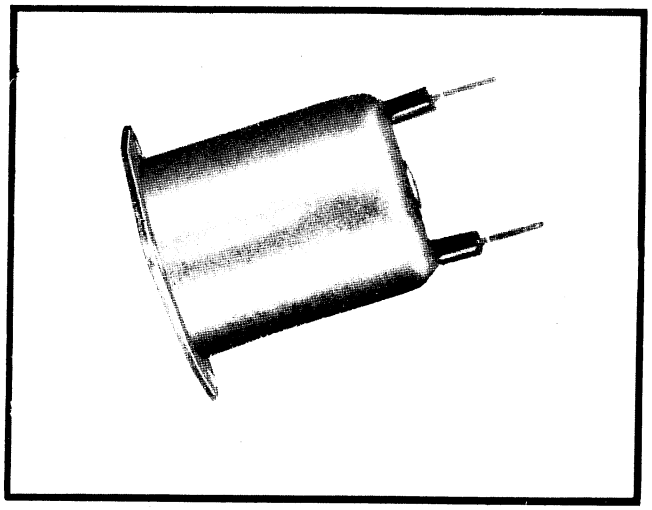


Figure 33

A single-port inlet valve requires only one solenoid which acts merely as a means of permitting either cold or hot water or both to enter the valve when energized. All double-port mixing valves require the use of two solenoids, one to permit hot water to enter the valve and the other to permit both hot and cold water to enter.

AGITATOR AND EXTRACTOR CONTROL SOLENOIDS

The Agitator and Extractor Control Solenoids used on all RCA Whirlpool Automatic Washers are identical and are mounted paralled in a vertical position in the same bracket.

The function of the Agitator Control Solenoid is to raise a plunger which moves the agitator cam bar in such a manner as to engage the agitator and change the direction of the flow of water through the pump.

The Extractor Control Solenoid raises a plunger which moves the extractor cam bar in such a manner as to cause the basket drive disc to come into contact with the basket drive pulley, thus causing the basket to spin. Each of these solenoid coils consists of a plastic bobbin with enamelled wire wrapped around it with spade terminals mounted on one side. The coil of wire is covered with a treated tape to protect the coil from moisture.

A short brass sleeve is inserted in the bottom of each solenoid coil and a steel core is inserted in the top of each coil and anchored to the mounting bracket with a hair pin retaining clip. The coils themselves are held in place by a support spring slipped in above each coil before the cores are inserted. When these parts are completely assembled, the unit is called a control magnet assembly *(wigwag), Figure 34,* and is mounted on the gear sector shaft so that it turns back and forth whenever the machine motor is running.

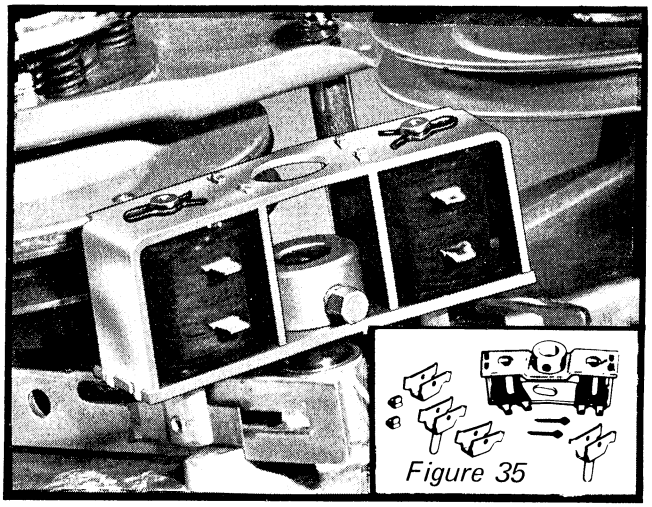


Figure 34

When either of these solenoids is energized, its plunger, which is anchored at the bottom to one of the cam bars, is pulled up quickly by magnetic force against the bottom of the steel core mounted in the top of the solenoid coil and held there until the circuit to the solenoid is broken. The plunger then drops down by gravity and moves the cam bar in the opposite direction. Later model washers use a new improved Wigwag assembly. The plungersor armatures and guide are of a one piece construction, are smaller in diameter and ride in a teflon cylinder . A teflon insert is used in the guide for a lasting and smoother operation. Older machines can be modified by using this new assembly, *Figure 35.*

TWO-WAY VALVE SOLENOIDS

Only the Suds Miser machines require the use of a two-way valve solenoid. This solenoid is used to provide an automatic method for closing the drain port and opening the suds port on the two-way valve, so that the wash water can be directed into a suds storage tub or returned from the suds storage tub to the machine for reuse.

Here, again, two different types of solenoids have been used; 1) On models equipped with the dia-

phragm type two-way valve, a heavy duty *"T"* solenoid is used, *Figure 36*. This is an armature type solenoid with the armature made of laminated steel in the shape of a *"T"*. The solenoid coil is also supported by a laminated steel field. The particular design of this solenoid provides a very efficient magnetic circuit to give good holding force for more than the required time to drain the tub or return the wash water to the machine and helps to eliminate residual magnetism when the solenoid is deenergized.

The bottom end of this solenoid pivots on the two-way valve body, while the top of the armature is anchored to the valve operating lever which is spring-loaded. When the solenoid is deenergized, this spring-loaded lever quickly pulls the armature out of the center of the solenoid coil, closing the suds port and opening the drain port of the valve.

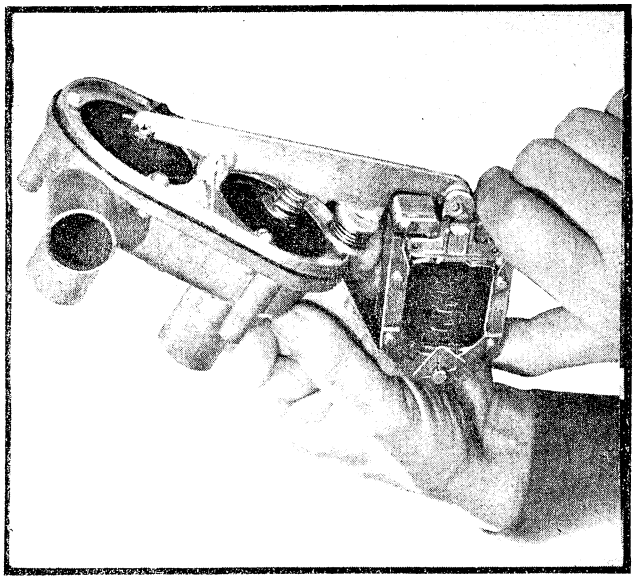


Figure 36

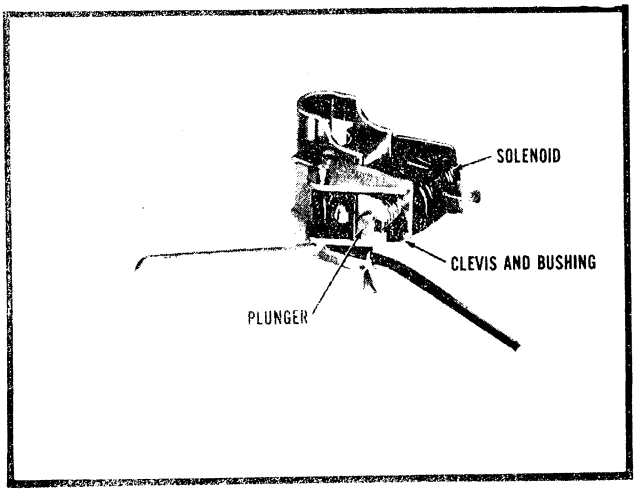


Figure 37

2) On the initial production of the 1957 models, a completely redesigned two-way valve was incorporated on some Suds Miser machines. Since the valve lever is actuated by the control magnet assembly on top of the gear case, an additional heavy duty solenoid is not required. The design of this solenoid is basically the same as the agitator or extractor control solenoid, except that it is considerably smaller. It is mounted in a control lever, assembly *Figure 37*, which pivots on a stud in the top of the gear case. When this solenoid is energized, a plunger pulls a spring-loaded clapper which causes a link that is secured to a clevis and bushing assembly on the other end to move in the cam plate slot. The control magnet then pivots the control lever assembly so that it trips the valve lever from one position to the other, thus, closing the drain port and opening the suds port

Motors

The machine motor used on older standard domestic models of RCA Whirlpool Automatic Washers is a 1/3 H.P., 115 volt, 60 cycle capacitor start, single extension shaft motor—either General Electric, Packard Electric or Emerson, *Figure 38*.

The capacitor, located under a metal shield on the side of the motor, increases the starting torque of the motor to enable the motor to operate at lower starting voltages. In addition, each motor is equipped with a built-in automatic reset thermal overload protector.

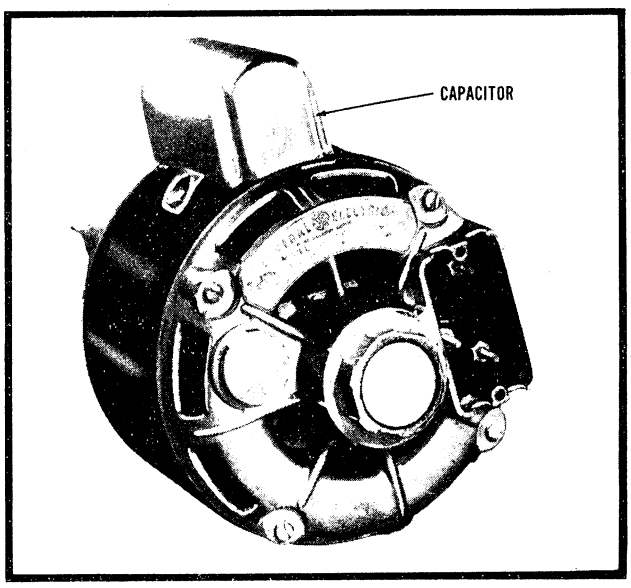
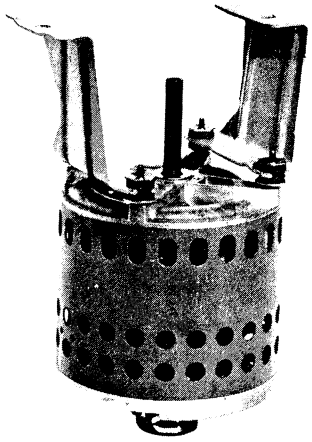
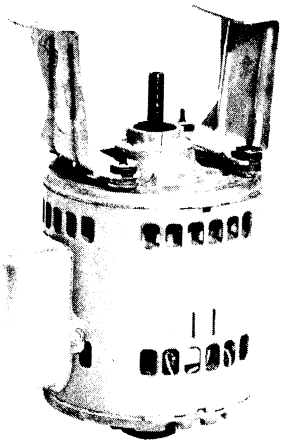


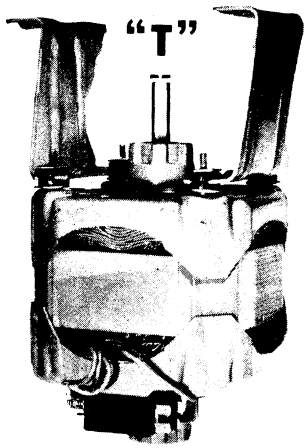
Figure 38.



SPLIT PHASE MOTOR



CAPACITOR MOTOR



EXTERNAL CENTRIFUGAL SWITCH

Machines with only one operating cycle are equipped with a single-speed motor that has the standard running speed of 1725 R.P.M. The full current rating of this motor of 115 volts is 6.5 amperes. The maximum no-load wattage rating is 170 watts. This single-speed motor is equipped with two standard terminal connections. See *Figure 39* for an internal schematic wiring diagram covering the single-speed motor.

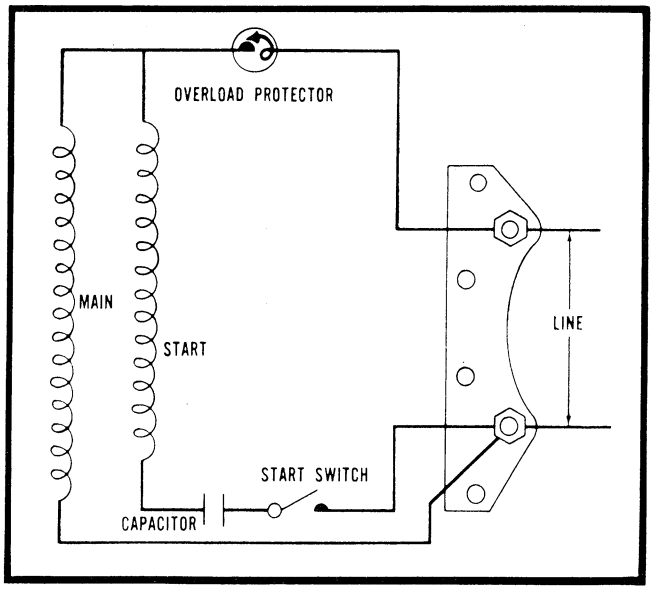


Figure 39

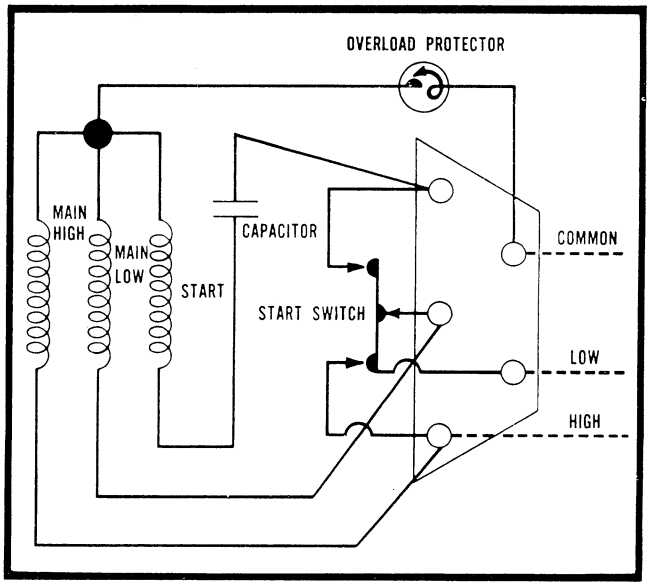


Figure 40

On later model RCA Whirlpool Automatic Washers with two separate operating cycles are equipped with two-speed motors. These motors have two running windings in addition to the starting winding, *Figure 40.* When the washer is operating in the *NORMAL ACTION* cycle, the motor runs at regular speed of 1725 R.P.M., while during the *GENTLE ACTION* cycle the motor runs in the low-speed winding at 1140 R.P.M. The full-load current rating of this motor at 115 volts is seven amperes. The maximum no-load wattage rating of the motor

when running idle in the high-speed winding is 175 watts and in the low-speed winding, it is 200 watts. Since the motor pulls a higher wattage load during low speed than during high speed and since the motor cannot develop sufficient power to free a stiff gear case when in the low-speed winding, it is recommended that a machine equipped with a two-speed motor should always be started for the first time in the *NORMAL ACTION* cycle.

This is especially important if the machine has been in stock for a considerable length of time. Starting the machine for the first time in the *GENTLE ACTION* cycle may put undue strain on the motor.

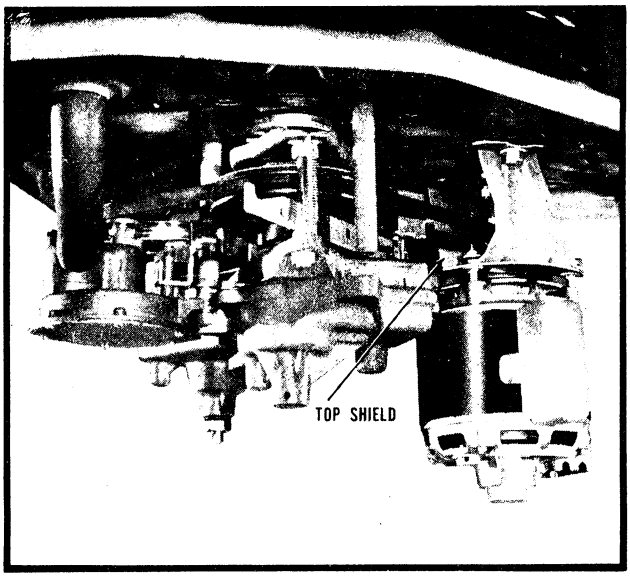


Figure 41

Two-speed motors are equipped with three terminals for connecting the harness leads. The terminals are lettered *"C"* for common, *"H"* for high, and *"L"* for low, *Figure 43*.

Late models use a three-speed capacitor start motor. The motor centrifugal switch is mounted on the outside of the motor and is readily accessible for replacement. Before condemning a motor remove and check the centrifugal switch. Th e three-speed motor is of conventional design and is identical to the two-speed motor with the exception of an added running coil, *Figure 43,* for extra low speed (840 R.P.M.) and a three-pole single-throw centrifugal switch handles the speed variation. *Figure 44* shows the speed switch and motor hook-up schematic, also take note of *Figure 45,* the internal motor switching arrangement.

Before the motor is discarded as being faulty, a test should be made of the motor with the centrifugal switch removed from the motor and the internal wires exposed for testing, *Figure 46*.

Remove belt for a no-load wattage test. For the standard capacity washer the watt reading should be a maximum of 165 watts for single speed motors, 210 watts for two-speed in high speed position. Motors for large capacity washers will average 225 watts. With belts replaced refer to chart below. The three-speed motor is best checked out for proper wattage reading with belt on and washer in spin cycle. In high speed position this puts maximum load on motor. At the start of the spin watt reading should be no higher than 630 and should drop below a maximum of 410 watts within 18 to 20 seconds.

Speed	Load	Std. Capacity Max. Watts	Large Capacity Max. Watts
500-525	None	360	380
Spin with locked basket		800	910
Idle	None	425	490

Three new type of motors are shown opposite *Figure 39* and *Figure 40,* they are 1/2 horsepower motors as compared with the earlier model washers that used 1/3 horsepower motors, *Figure 38.*

The "T" frame motor is not repairable. All three motors have a replaceable centrifugal switch, that can be readily changed from the outside, without disassembling the motor, and in some cases the motor will not have to be removed to install a new switch.

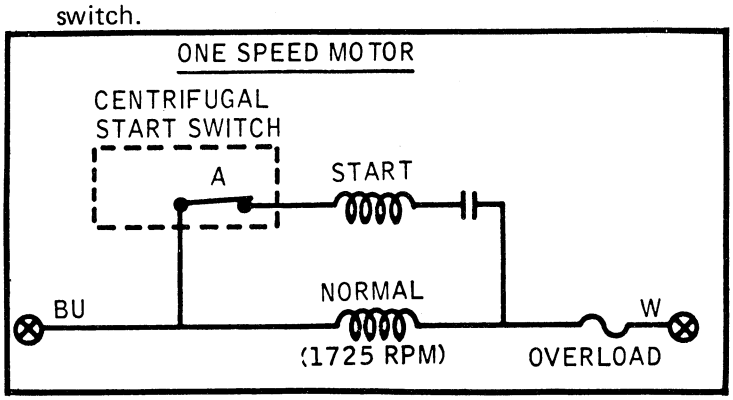


Figure 42

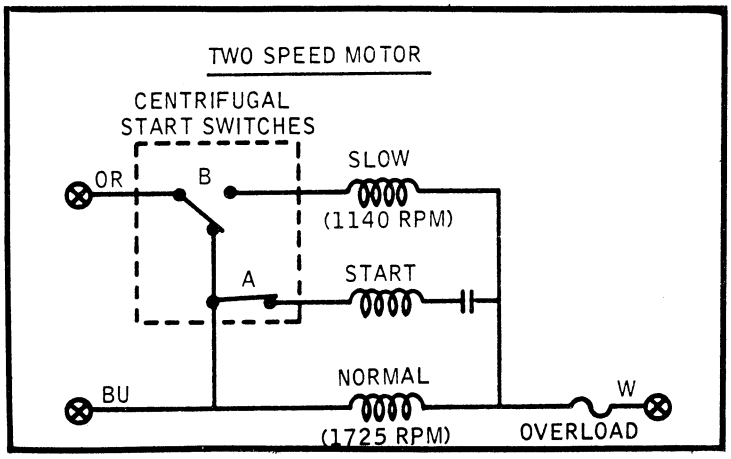


Figure 43

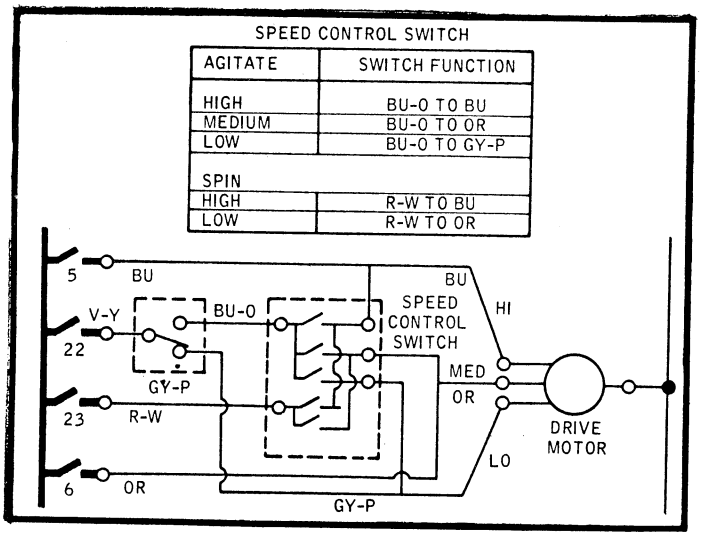


Figure 44

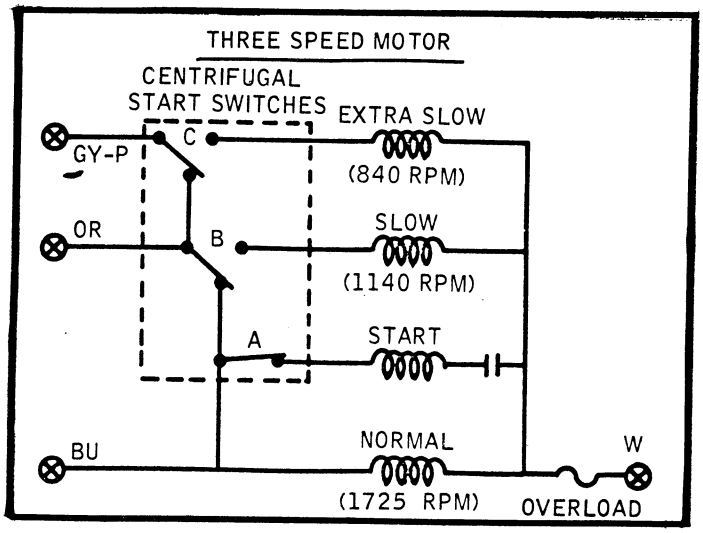


Figure 45

The earlier motors, single-speed, *Figure 42,* used an internal centrifugal switch, making it necessary to dismantle the motor to replace or repair the switch. Later motors have an external centrifugal switch, with an isolated switch built into the same unit. The centrifugal switch can be replaced in the field without removing or dismantling the motor.

Some later and current models washing machines use a *"T"* frame motor (cube shaped). The *"T"* style motor is a throw-away motor. When it is determined the motor is at fault, and failure of the motor to start or run is not because of a defective centrifugal switch, the *"T"* motor must be discarded and replaced.

To test motor with a test cord such as a Gemline No. TC-6 test cord, if a watt meter is not available, a simple method of testing the motor is outlined in the

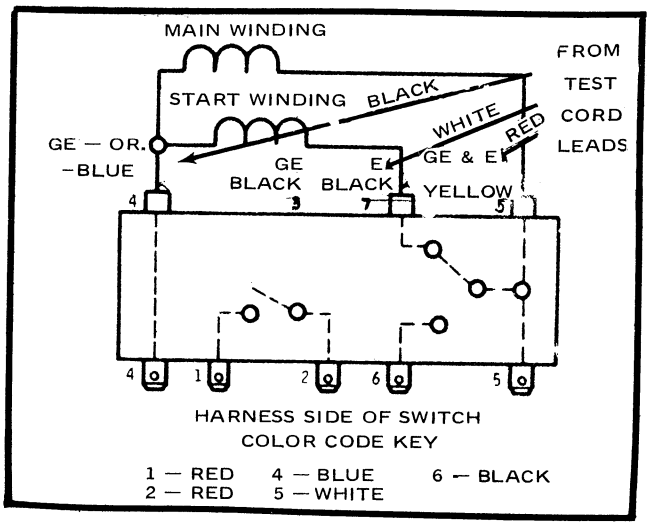


Figure 46

following paragraphs. This test is applicable to any fractional horsepower split phase motor. It can be used on multi-speed motors but unless you understand fully the internal winding of the motor, caution must be taken, a wrong hook-up could damage the motor windings.

The test cord is available thru your local appliance parts distributor.

Single-speed motor, test with centrifugal switch removed.

TEST LEADS		MOTOR LEADS
White lead	(S or Start)	Black
Black lead	(Common)	Orange (on G.E. motors) Blue (on Emerson motors
Red	(Run)	Yellow

Plug test cord into wall receptacle, press button switch on test cord, if motor starts immediately release button, motor should continue to run.

CAUTION: Allowing motor to run with button depressed for more than a few seconds could seriously damage motor windings.

If motor fails to start of if motor does not continue to run when button is released, motor should be replaced. If motor runs and sounds normal after button has been released a defective centrifugal switch is indicated and switch should be replaced. To apply this test to other washers or dryer motors refer to the machine wiring diagram.

To test other speeds, remove the *red* wire of the test cord from the *yellow* motor lead and connect the *red* test cord to either of the remaining leads from the motor.

All automatic washers motors are mounted vertically with the shaft end up, and rotate in a clockwise direction looking down on the top of the shaft. A protective shield is installed on the motor to prevent water from coming in contact with the motor windings in the event the pump or one of the hoses should spring a leak, *Figure 41.* Beginning with the production of the 1957 models, another shield was added to protect the capacitor and bottom of the motor in the event of a pump or hose leak, *Figure 47.* and to prevent sparks from drooping on the floor.

Also, on the machine equipped with the long, slow stroke gear case, a slightly larger diameter pulley is used on the motor shaft. This pulley is identified by a 1/16 inch groove around its outer periphery.

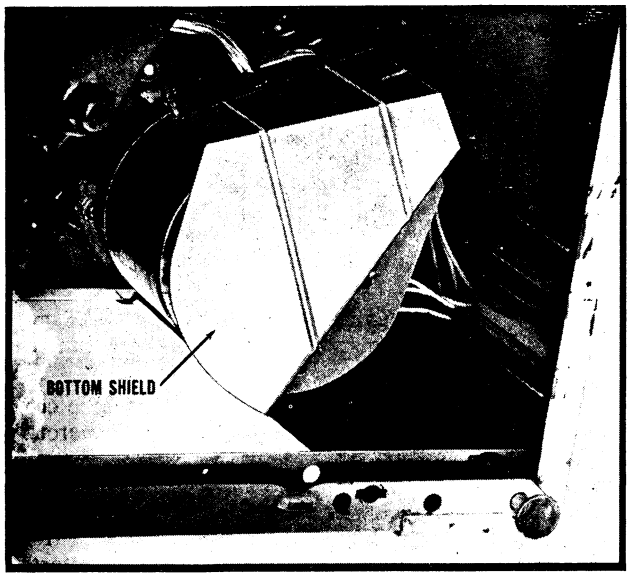


Figure 47

Before installing a new motor or a motor that has been repaired on an automatic washer, a complete check should be made to locate the cause of the original motor failure and, of course, it is vitally important that the proper remedies be taken to prevent additional motor failures. The main causes for motor failures are extremely low voltage conditions, poor connections and foreign matter in bearings or switch mechanism of the motor.

WATTAGE CHECKING

This is an accurate and convenient method of determining proper automatic washer operation. Covered in the following are the maximum permissible wattages for normal operation at 110-120 volts. Also covered are methods and procedures for performing a wattage check and some diagnosis hints.

No-Load Motor Wattage

Since both single-speed and two-speed motors are used in automatic washers, the Wattage Chart does not include *no-load motor wattage.* Therefore, before making a wattage check, the *no-load motor wattage* must be determined. This is done by slipping the belt from the motor pulley and taking a wattage reading with only the machine motor in operation.

Factory specifications allow a maximum wattage of 165 watts for single-speed-motors and 210 watts for two-speed motors in the hi-speed winding.

A typical determination of allowable wattage limits for a 29 inch machine operating at 120 volts is as follows.

1) Determine the wattage of the motor by checking it with the belt off.

2. Rewind the belt on the pulleys and check wattage in accordance with the chart.

The *no-load motor wattage* must be subtracted from the total wattage readings taken during various phases of operation before comparison with the recommended maximum wattages shown in the chart below can be made.

AGITATION		
SPEED	LOAD	WATTAGE
68 + 2 5PM	Basket empty	200 Watts Max.
	11" Water only	300 Watts Max.
	Normal load*	360 Watts Max.

PUMP OUT (Against 34" Head)		
TIME	LOAD	WATTAGE
120 Seconds Max.	Tub empty	250 Watts Max.
	Tub fill	325 Watts Max.

SPIN			
SPEED	LOAD	ACCELERATION	WATTAGE
500 RPM	Basket empty	15 Seconds Max.	300 Watts.Max.
	Normal load*	20 Seconds Max.	375 Watts. Max.
	Basket locked	----	600 Watts Max.

* *A normal load is considered to be nine pounds of medium sized cotton items for a 29" machine with an eleven inch water level while operating during the NORMAL ACTION CYCLE. The same is true in a 24" machine except with eight pounds of medium-sized cotton items.*

To determine proper spin operation, use a wattmeter in the same manner as outlined above in the typical determination of agitation wattage.

Proper clutch operation is to be analyzed by comparison of maximum allowable wattage, acceleration time, and spin speed as determined with the use of a tachometer.

For example, using a normal load, wattage . . . . . .

1. Should not exceed 630 watts plus motor watts at start of spin.
2. Should drop below a maximum of 410 watts plus motor watts within 20 seconds.

Wattages in excess of these maximums or longer acceleration time will indicate an additional load on the motor.

NOTE: Basket speeds can be determined only with the use of a tachometer. Tape the agitator drive lug to the basket center post or stuff a towel under the edge of the agitator so the agitator drive lug will spin at basket speed. Tachometer readings should be made from the drive lug or from the agitator cap. Speed should read no less than 500 R.P.M.

Factors Which May Result In High Wattage

1. *Gear Case.* Eccentric Adjustment too tight.
2. *Drive Belt.* Too tight.
3. *Pump.* Impeller shaft tight in bearings. Foreign material in pump housings.
4. *Spin Tube.* Misaligned with centerpost bearings or bearings too tight. Misalignment can usually be corrected by loosening the three gear case mounting bolts with the machine standing upright and then retightening them. This will allow the assembly to realign itself in the centerpost.
5. *Centerpost.* Lack of Lubrication. System should be lubricated at least once a year with the recommended turbin type oil.

Facators Which May Result in Slow Spin Speed

1. *Drive belt* bottoming in motor pulley. The counter edge of the belt should rideslightly above the edge of the pulley. If the belt bottoms, replace belt.
2. *Loose belt.* Tighten by adjusting motor mount Belt should have a deflection of 1/2" in each direction, 1" overall.
3. *Oil on belt.* Replace belt.
4. *Oil on clutch lining.* Clean or replace
5. *Improperly adjusted brake yoke.* Yoke is to be adjusted so a maximum of 1/16" clearance exists between clutch and basket drive pulley facing.

Water Mixing Valves

There are three basic types of water inlet valves used on RCA Whirlpool Automatic Washers. These are the single-solenoid type shut-off valve, the two-solenoid type mixing valve and the three-solenoid type mixing valve.

SINGLE SOLENOID TYPE

There are two types of single-inlet valves, *Figure 48,* used on *deluxe models* only. The nylon bodied valve comes equipped with a solenoid enclosed in a metal container as an integral part. The brass bodied valve has an open-type solenoid which is not considered as part of the valve itself. Both valves function in the same manner.

The valve body has a standard garden hose threaded inlet and a smaller non-threaded outlet. A monel screen is inserted in the inlet to prevent rust particles, and other foreign matter often found in water, from entering the valve and clogging its small passageways.

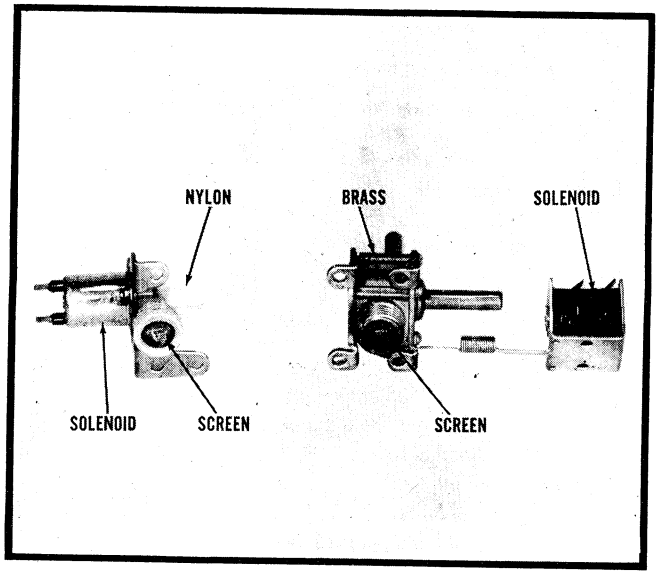


Figure 48

One side of the valve body is open so that a diaphragm can be inserted. A spring-loaded armature, inserted in a solenoid guide, is secured to the valve body by a mounting bracket and screws, *Figure 49.* A solenoid coil is then inserted over the solenoid guide and when energized pulls the armature away from the diaphragm permitting water to escape through the diaphragm orifice and balance water pressure through the bleeder hole in diaphragm. This allows full flow of water to lift diaphragm from its seat and water to enter the washing machine. There is no thermal control incorporated in this type of valve.

The single inlet valve is mainly a shut-off valve for controlling water entering the machine. It requires only one inlet hose which is generally attached to a "Y" hose. The "Y" hose connects to both *Hot* and *Cold* faucets which allows adjustment of the water temperature entering the machine.

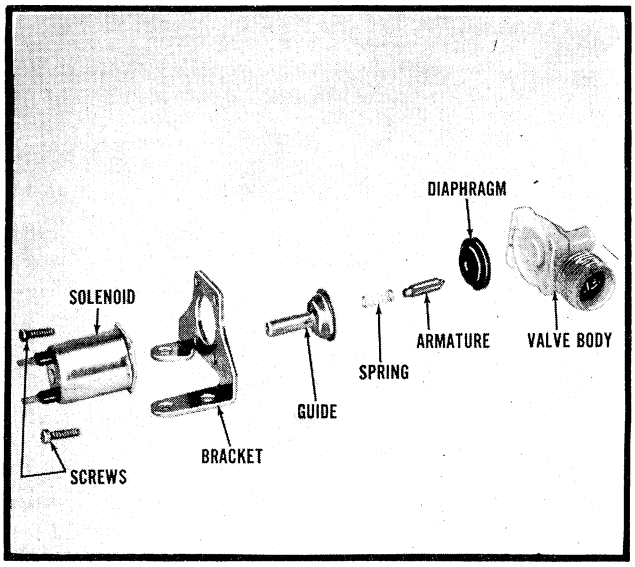


Figure 49

TWO-SOLENOID TYPE

Water inlet valves equipped with two inlets are called mixing valves because they actually mix the cold water with the hot water. There have been two basic types of two-solenoid mixing valves used on the RCA Whirlpool Automatic Washers. They are almost identical in appearance on the outside though they differ considerably on the inside. These two types are non-thermostatic valve and the thermostatically controlled valve.

The Non-Thermostatic Mixing Valve was first used on the 1957 *Custom models.* This valve may be one of three different types as far as outward appearance is concerned, since the valve body may be made from either nylon or brass and may be made either one of three manufacturers.

One style, *Figure 50,* is composed of two sections secured together; a hot water inlet and a cold water inlet. The cold water section is larger to provide a chamber for mixing the incoming hot water with the incoming cold water when the water temperature selector switch is set on *WARM.* The solenoids on this valve are the open-type and are secured by means of a tension spring. The valve in *Figure 51* has a one-piece body with metal sealed solenoids, but both valves operates in the same manner. *Figure 52 shows* the latest style of this type valve.

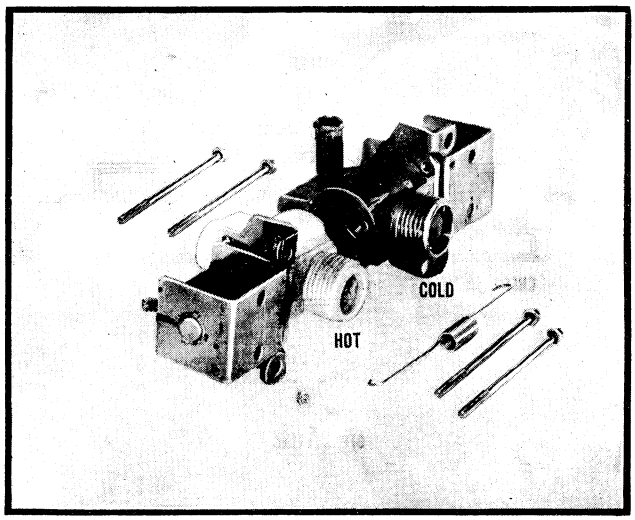


Figure 50

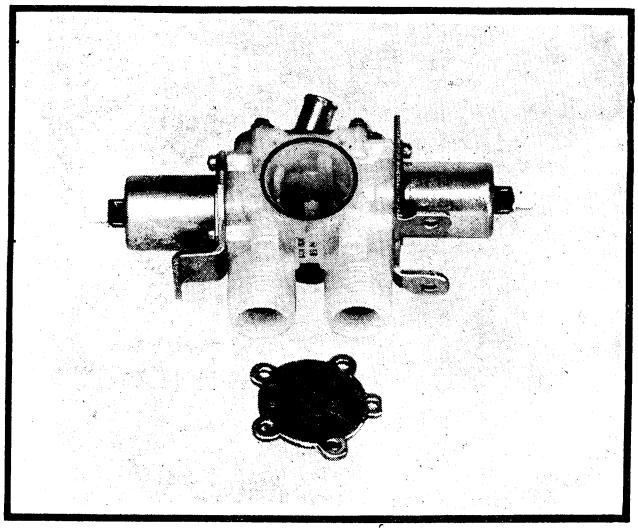


Figure 51

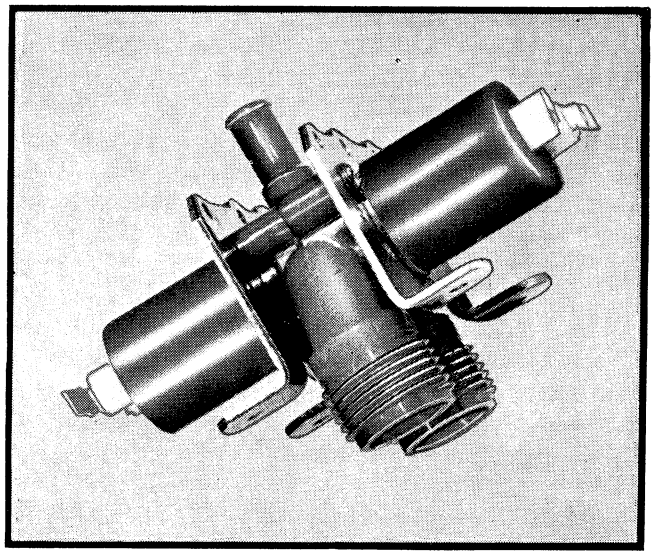


Figure 52

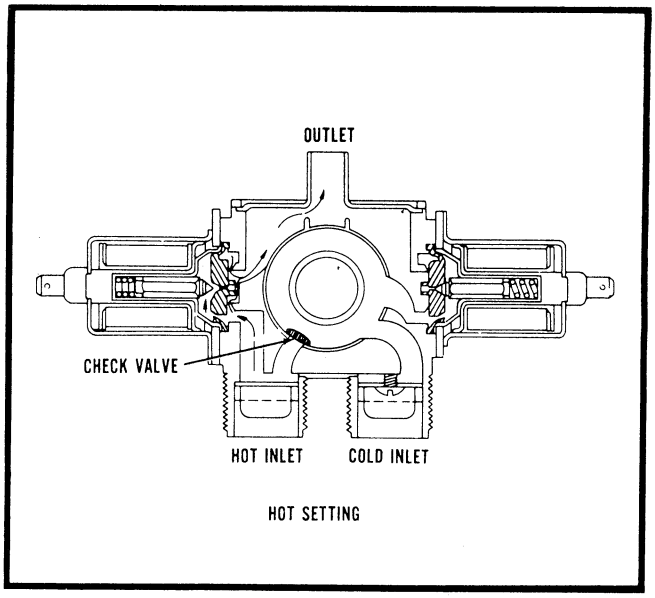


Figure 53

On the two-solenoid mixing valve, three temperatures of water are available; *HOT, WARM,* and *COLD.* When the hot water solenoid is energized. only hot water is permitted to enter the machine. Energizing of the cold water solenoid permits only cold water to enter the machine. To obtain warm water, both the hot and cold water solenoids are energized. When the temperature control switch is set in the *HOT* position, the solenoid on the hot water side of the valve only is energized, permitting only hot water to enter the machine. When the switch is set in the *WARM* position, only the mixed water solenoid is energized, but some hot water will be allowed to mix the incoming cold water in the cold water side of the valve.

Since the non-thermostatic valve has no thermal element to control the temperature of the water on the *WARM* setting, the temperature of the water entering the machine will vary from time to time depending on the differential in pressures and temperatures of the water entering the valve.

In view of these wide variations in the temperature of water entering a machine equipped with one of these non-thermostatic valves due to variances in pressure on the inlet side, it is very important that the pressure on the hot and cold sides be equalized as much as possible. For example, a dirty screen in one of the mixing valve inlets or at one of the faucet hose connections can greatly reduce the pressure of water entering the side of the valve. Or if the user fails to turn both faucets all the way open, variances in pressure can occur on either the hot or cold side.

Figure 53 shows the non-thermostatic mixing valve in the *OFF* position. Since neither solenoid is energized, all diaphragms are seated to prevent water from flowing through the valve.

When the water temperature selector switch is set on *HOT*, the hot water solenoid on the left is energized, *Figure 54.* This allows hot water at tank temperature to flow out the left side of the valve. Since pressure from the cold water is being applied to the check valve disc in the mixing chamber, no hot water can enter this chamber.

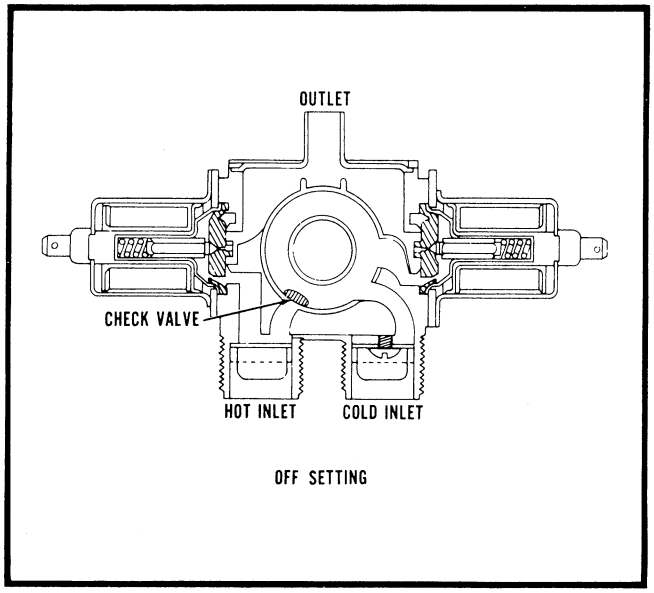


Figure 54

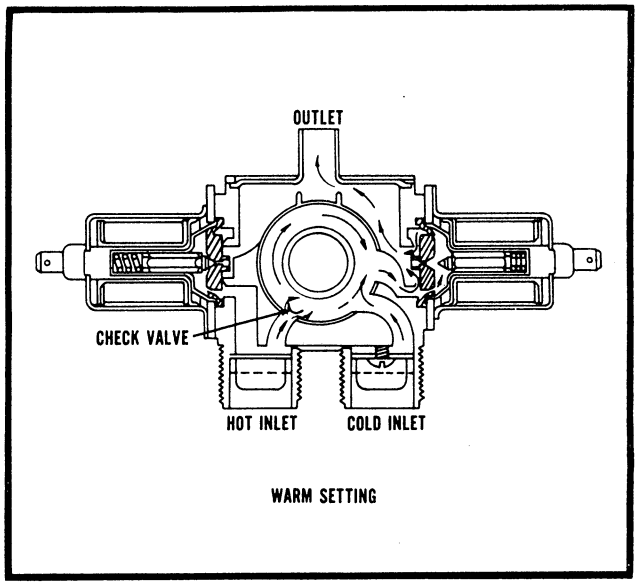


Figure 55

On the *WARM* setting, *Figure 55*, the solenoid on the right is energized, allowing cold water to pass by the diaphragm on the right. This relieves the pressure against the check valve in the mixing chamber. Thus, hot water will also enter the mixing chamber, resulting in a warm water mixture entering the machine.

The Thermostatically Controlled Two-Solenoid Mixing Valves are more complicated since they employ a thermal element to control the temperature of the water. Again these valves may differ in appearance due to the different sources of manufacture, *Figure 56,*

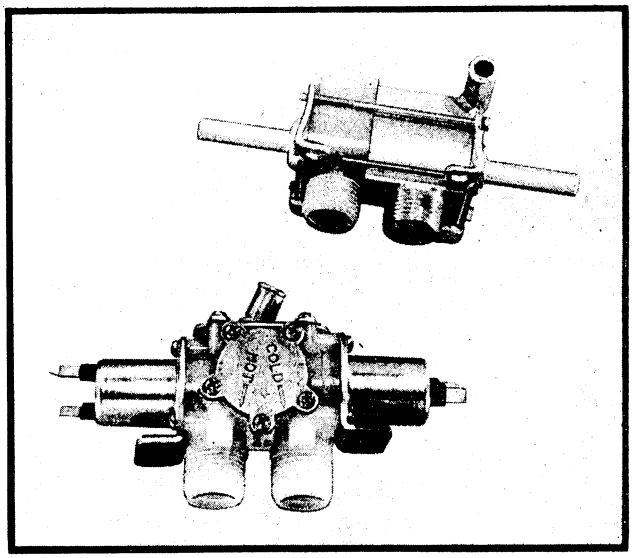


Figure 56

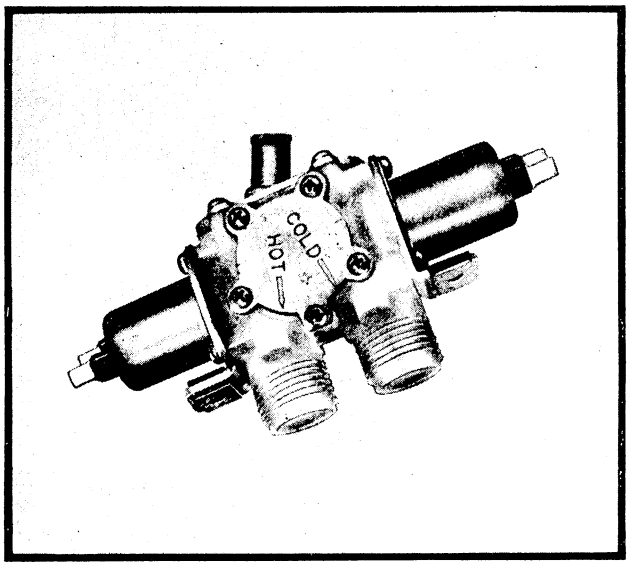


Figure 57

In the following paragraphs we will describe the parts making up the one-piece nylon-bodied valve, *Figure 57,* by its working principles. The two-piece valve functions in the same manner, however *Figure 58* shows the mixing valve in the shut-off position. Both the mixed water solenoid on the left, and the hot water solenoid on the right, are deenergized. The diaphragms are seated to prevent water flow through the valve.

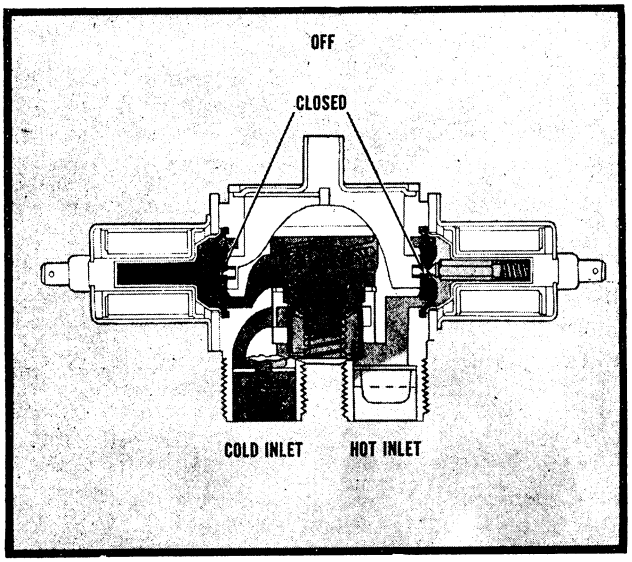


Figure 58

Figure 59 shows the action at the valve ports when the temperature selector is set on *HOT.* The hot solenoid is energized, opening the diaphragm to permit hot water to flow.

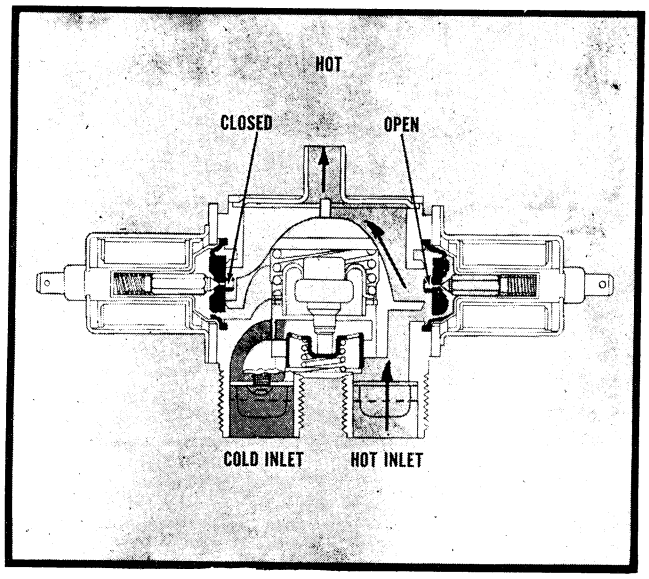


Figure 59

The flow pattern arrows show the course of water through the valve. Hot water of the temperature being delivered by the water heater will continue to flow until the hot solenoid is deenergized.

In *Figure 60* we see the valve ports in the mixed water position, as they are when the temperature selector is set at *WARM*. The mixed water solenoid only is energized, raising the armature and diaphragm so that the water is allowed to pass.

The flow pattern arrows show how water from the hot and cold inlets flow over the element which is a granular-filled thermal unit that has the property of expanding and contracting according to the temperature of the water passing over it.

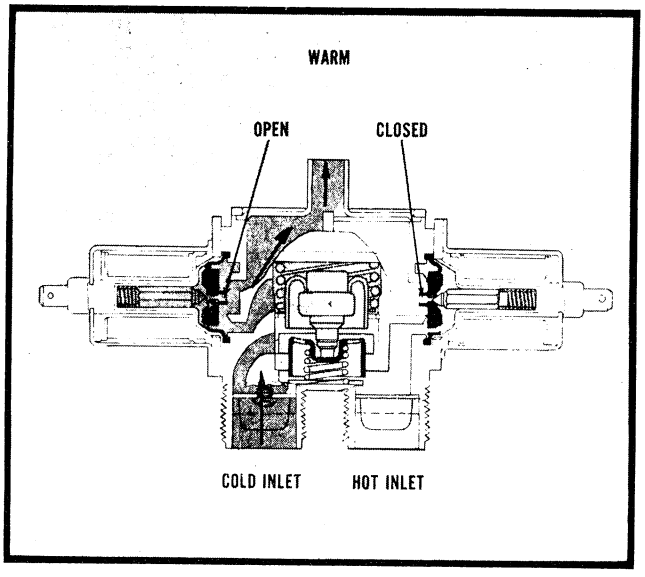


Figure 60

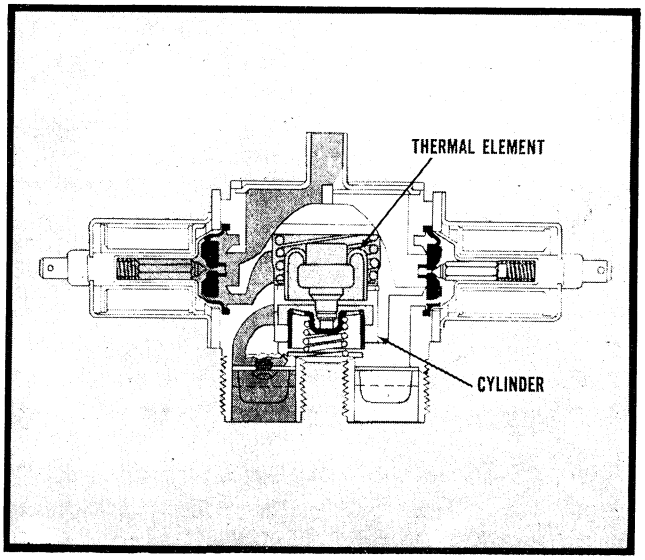


Figure 61

As shown in *Figure 61*, the expansion and contraction of the thermal element carry a cylinder up-and-down to mix hot and cold water properly so as to obtain a flow of water from the valve outlet at a temperature of 97° plus or minus 5°.

When the temperature selector is set at *MEDIUM*, both the hot and mixed water solenoids are energized, *Figure 62*. This permits an equal amount of hot and 97° water to flow from the valve outlet; thus, if the water heater temperature is 150°, the water leaving the mixing valve will be approximately 124°

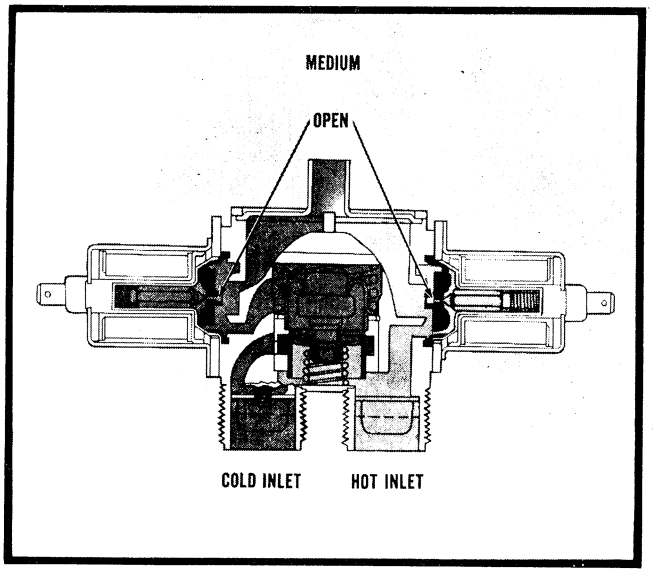


Figure 62

THREE-SOLENOID TYPE

The Three-Solenoid Non-Thermostatic Type Mixing Valve provides four different water temperatures; *HOT, MEDIUM, WARM* and *COLD.* The body of this valve is different in that it has a separate chamber for mixing the incoming hot water with the incoming cold water when the warm water solenoid is energized, *Figure 63.*

Figure 64 shows the non-thermostatic mixing valve in the *OFF* position. Since neither solenoid is energized, all diaphragms are seated to prevent water from flowing through the valve.

Figure 65 shows only the hot water solenoid energized. This allows hot water at tank temperature to flow only out the right side of the valve, since pressure from the cold water is being applied to the check valve disc in the mixing chamber.

In *Figure 66* only the warm water solenoid is energized, allowing cold water to pass by the diaphragm. This relieves the pressure against the check valve in the mixing chamber. Thus, hot water will also enter the mixing chamber, resulting in a warm water mixture entering the machine.

The temperature of the warm water entering the machine will depend on the hot water tank temperature, the cold water tap temperature and differential of water pressures between hot and cold. For example, if the water pressure is equal, tank temperature is 160°F., and cold tap temperature is 60°F., the warm temperature entering the machine would be half of the difference or 110°F.

Medium water is obtained by opening both the hot and warm solenoids, *Figure 67.* Mixture here is also controlled by water temperatures and water pressures. If again, the pressures are equal, the hot water is 160°F., and the warm is 110°F., the medium temperature would be half of the difference of 135°F.

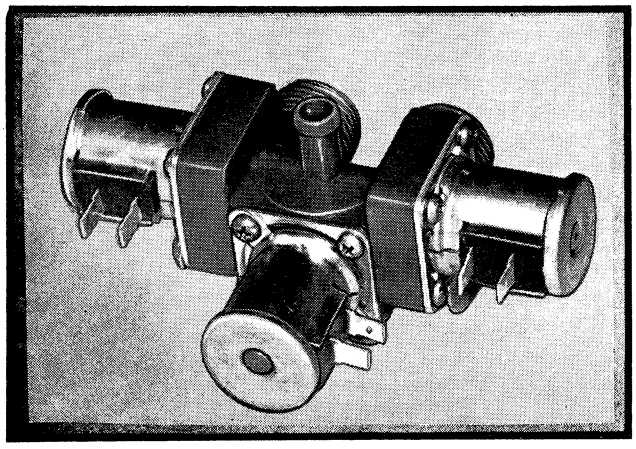


Figure 63

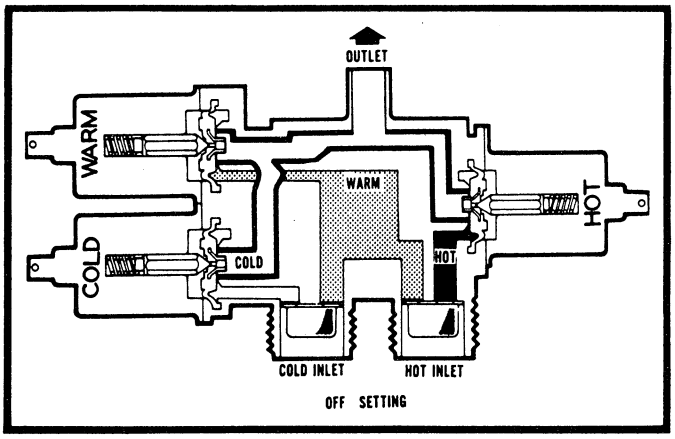


Figure 64

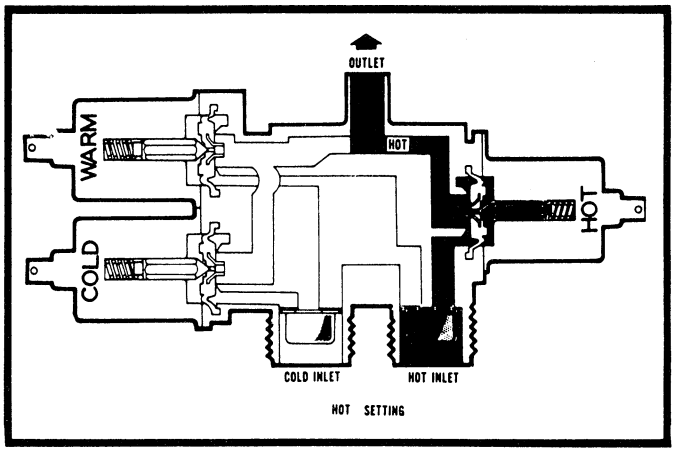


Figure 65

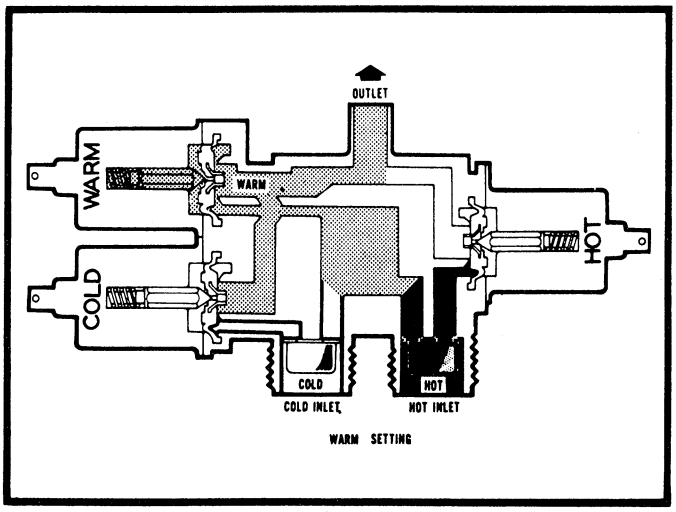


Figure 66

Opening of the cold water solenoid allows cold tap water to enter the washer, *Figure 68.*

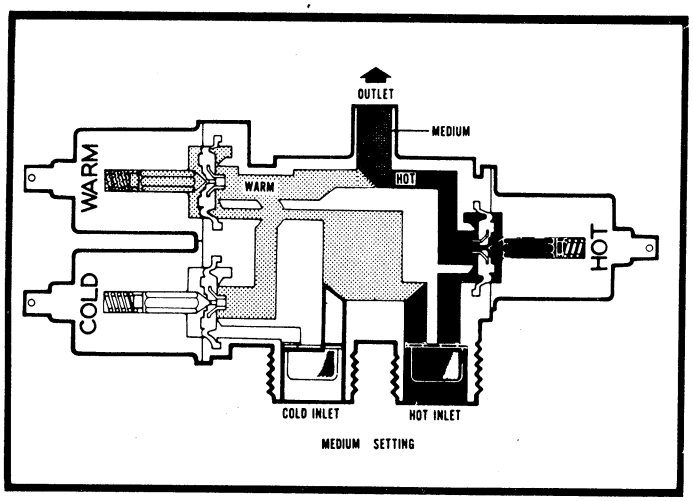


Figure 67

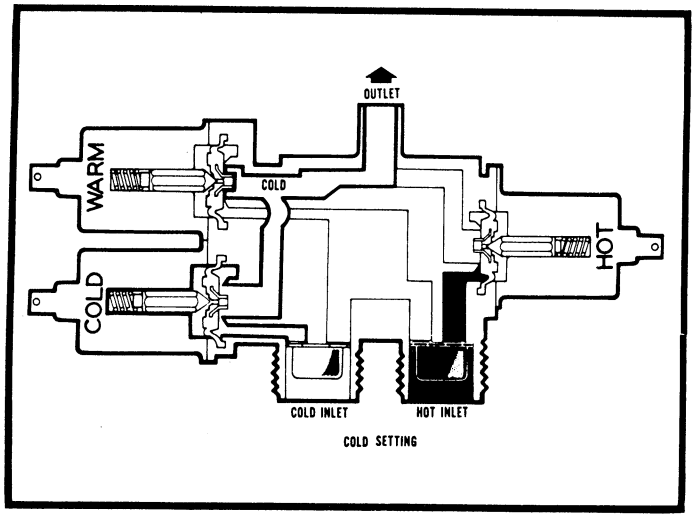


Figure 68

The Three-Solenoid Thermostatic Type Mixing Valve, *Figure 69,* operates basically in the same manner as the two-solenoid thermostatic mixing valve. However, it differs in that it incorporates an additional solenoid to provide cold water, and is controlled by a five-position temperature switch.

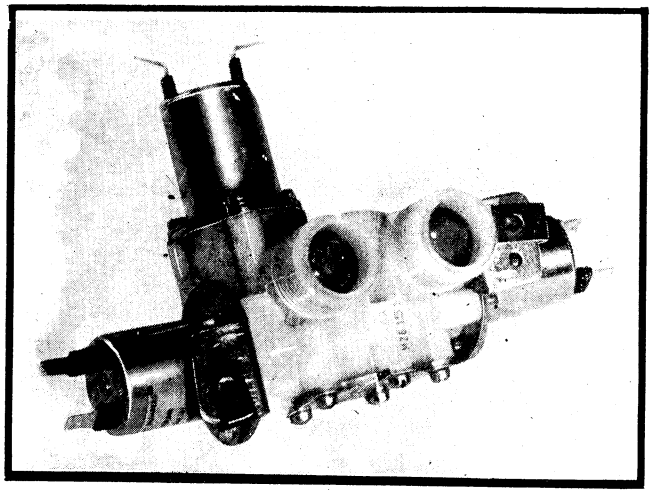


Figure 69

The following paragraphs and illustrations describe the operational functions of this valve.

With the temperature selector switch set on *HOT, Figure 70,* only the hot solenoid is energized, opening the diaphragm to permit hot water to flow. Hot water of the temperature being delivered by the water heater will continue to flow until the hot solenoid is deenergized.

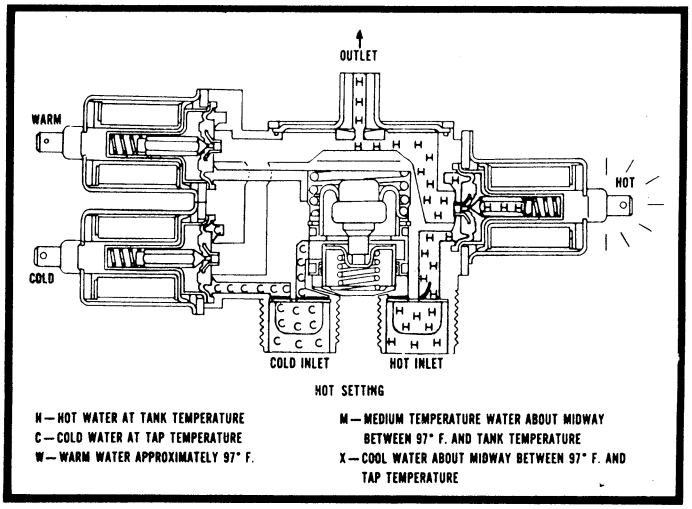


Figure 70

With the temperature selector switch set at *MEDIUM, Figure 71,* both the hot and mixed water solenoids are energized, allowing an equal amount of hot and 97°F. water to flow from the valve outlet.

With the temperature selector switch set at *WARM, Figure 72,* only the warm water solenoid is energized, allowing water from the hot and cold inlets to flow over the thermal unit in the valve chamber. Water temperature of the outlet will be approximately 97°F.

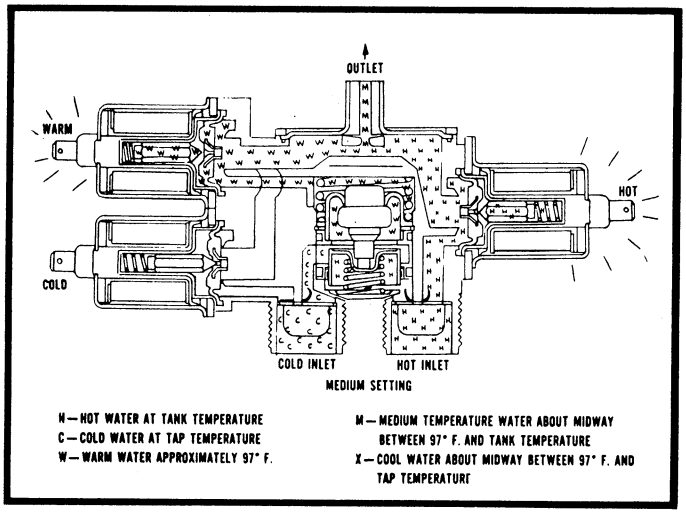


Figure 71

With the temperature selector switch set at *COOL, Figure 73,* both the warm and cold water solenoids are energized allowing warm water (97°F.) and cold water (tap temperature) to mix, resulting in a cool temperature of water entering the washer.

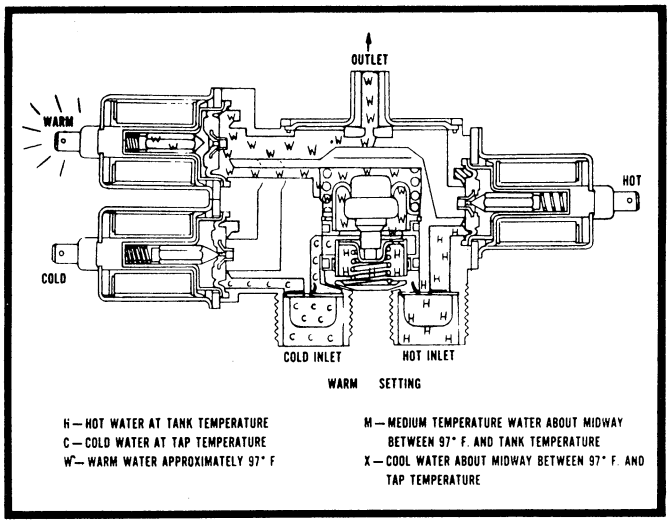


Figure 72

With the temperature selector switch set at *COLD, Figure 74,* only the cold water solenoid is energized. This allows the flow of only tap temperature water through the mixing valve.

Always be sure the correct part for the particular valve being repaired is used, since there are very slight variations in some of the parts, which, if incorrectly used, may cause malfunctions. Also always make certain that all valve parts are clean before reassembly and that no foreign particles are left in the valve that might lodge under the diaphragms or check valve causing leaks, or that might clog any of the water passages.

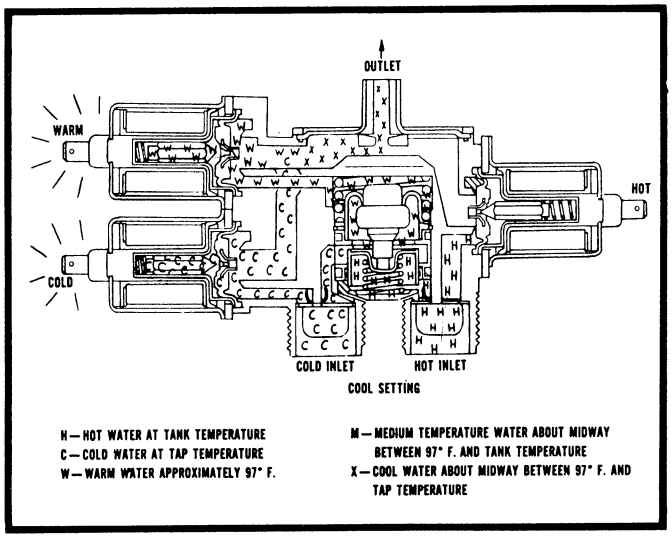


Figure 73

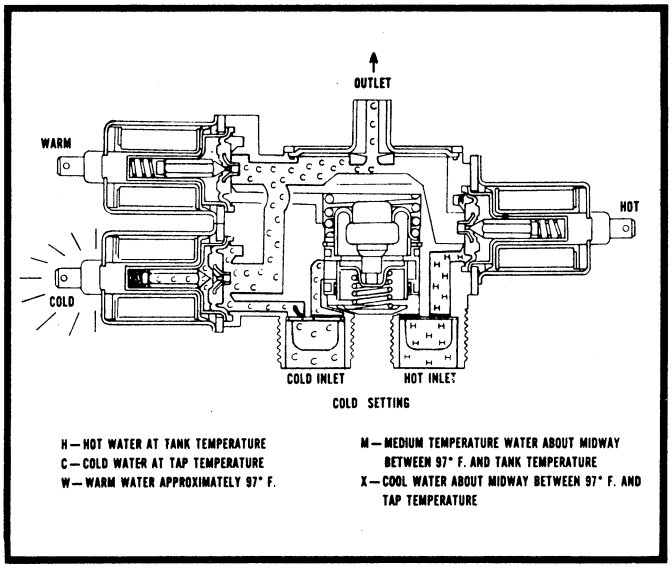


Figure 74

Hoses

When installing any hose on the washer, be sure that it is not twisted or kinked or positioned in such a manner that it might kink in the future and stop the proper flow of water through it.

Most hoses used inside the automatic washers are secured on each end by *Corbin* hose clamps, and easily removed and replaced by using the special *Corbin* hose clamp pliers.

WATER INLET HOSES

Extreme care should be taken when attaching the water inlet hoses to the inlet valves with nylon bodies. Cross threading of these hose couplings on the valve inlets can cause leaks and can damage the threads on the valves.

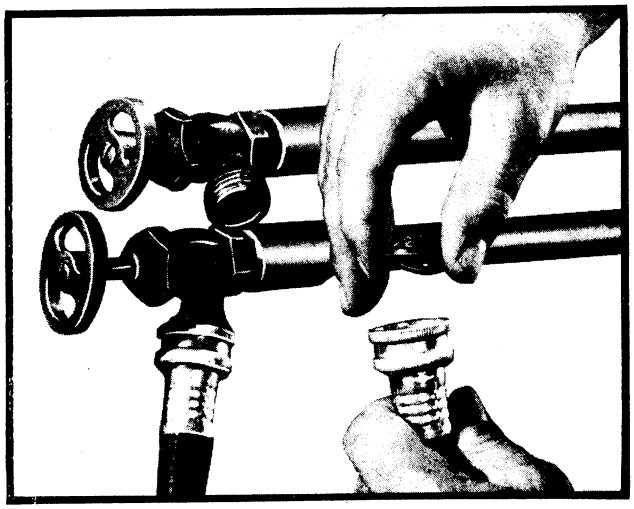


Figure 75

A filter washer is provided for each hose and is to be installed cup side up in the hose end that is to be attached to the faucet, *Figure 75.* A standard rubber washer is provided for use in the end that attaches to the valve.

A 3/8 inch inside diameter rubber molded hoses is used to carry the water from the outlet valve to a water inlet funnel or nozzle, *Figure 76.* This nozzle provides an air gap or vacuum break to prevent the wash water from being siphoned back into the water supply.

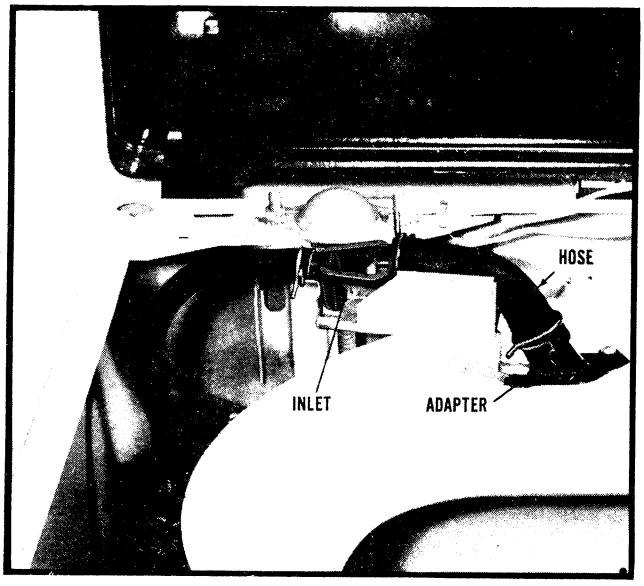


Figure 76

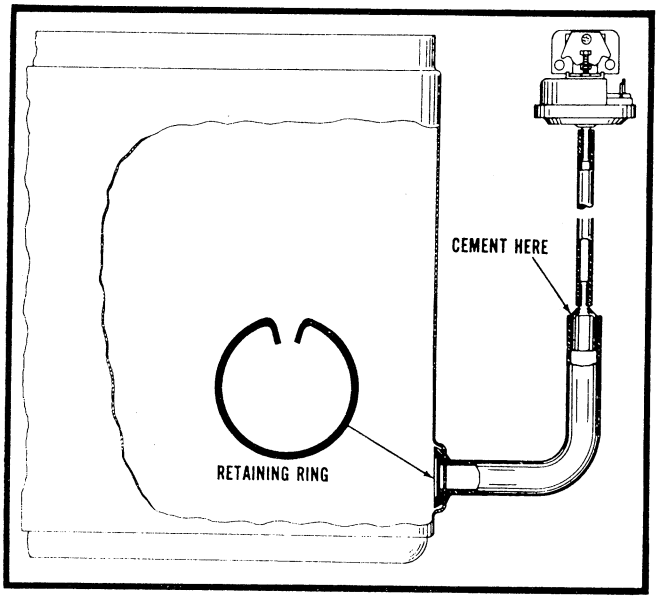


Figure 77

FILL CONTROL HOSE

The fill control hose and recirculating inlet hose are secured to the tub by special internal retaining rings, *Figure 77,* that can be removed by use of regular or needle-nose pliers.

The reducing connector that couples the fill control hose to the plastic tubing should be tightly secured to the inside of the fill control hose by an application of rubber cement.

RECIRCULATING HOSES

There are two hoses used to recirculate the water from the outer tub through the recirculating pump and through the filter at the top of the tub.

The hose between the tub and the pump is attached to a plastic side outlet assembly which is secured to the tub side by a locking ring.

The other hose runs from the outlet of the recirculating pump to the filter housing. Because the filter housing is secured to the top, the recirculating hose must be removed to raise the top for servicing.

PUMP OUTLET HOSE

On machines that do not have a two-way valve, the hose runs from the pump outlet to a hole in the rear of the cabinet and is secured to a hose coupling by a *"Corbin"* hose clamp.

On machines equipped with a two-way valve, the hose runs from the pump outlet to the inlet on the two-way valve.

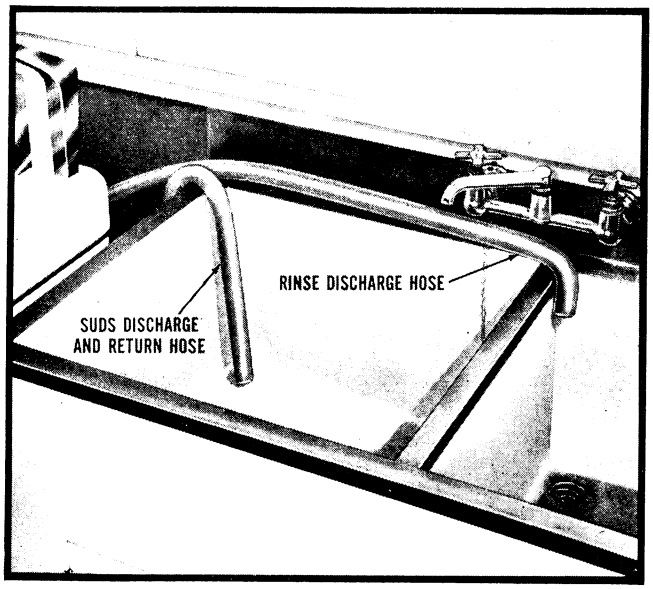


Figure 78

In all instances the pump outlet hose is secured on both ends by *"Corbin"* hose clamps.

DRAIN AND SUDS RETURN HOSES

On non-suds machines there is no suds return hose provided. The drain hose comes in two sections with a coupling in between. This provides a means of shortening the drain hose to fit the particular drain being used. The base section has an "L" shaped elbow on one end which slips over the coupling protruding from the rear of the cabinet. It is anchored by means of a *Corbin* hose clamp. Another coupling is then slipped into the opposite end of this hose and the gooseneck section of the drain hose is then slipped on and attached to the opposite end of the coupling.

The suds return hose also comes in two sections. The base section is the same as that used with the gooseneck drain hose, while the other section has a much deeper gooseneck which will extend to the bottom of the standard suds storage tub, *Figure 78.*

The end that is inserted into the tub is beveled and has a hose strainer in it to prevent heavy soil deposits and raveling from being drawn back into the machine.

TUB OUTLET HOSE

The tub outlet hose fits directly under the drain hole in the outer tub. It has a flange 2 3/4 inches in diameter which fits the sump of the base plate assembly.

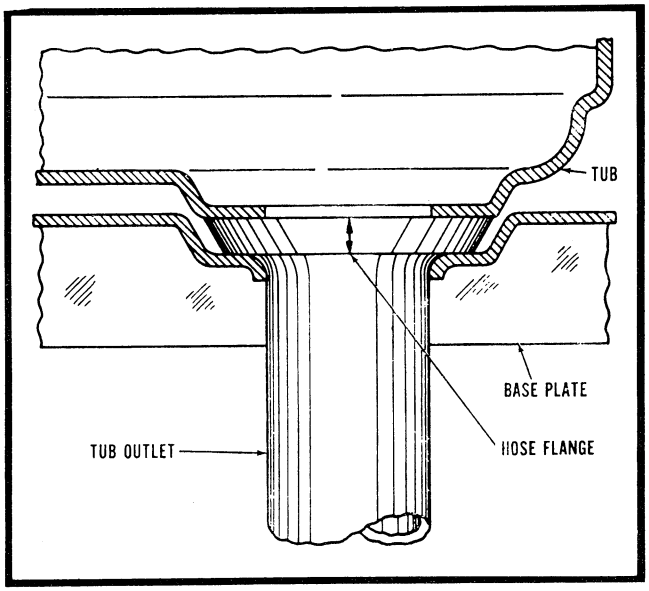


Figure 79

The tub outlet hose is held in place by the weight of the tub and the pressure of the tub screws which compress the hose flange between a boss on the tub bottom and a depression in the base plate, *Figure 79*. Be sure that this hose flange is properly seated in the sump or depression in the base plate before tightening the screws.

The tub is then assembled on the base plate and tightened down snugly with four screws. This squeezes the flange of the tub outlet hose sufficiently to provide a tight seal thus preventing leaks.

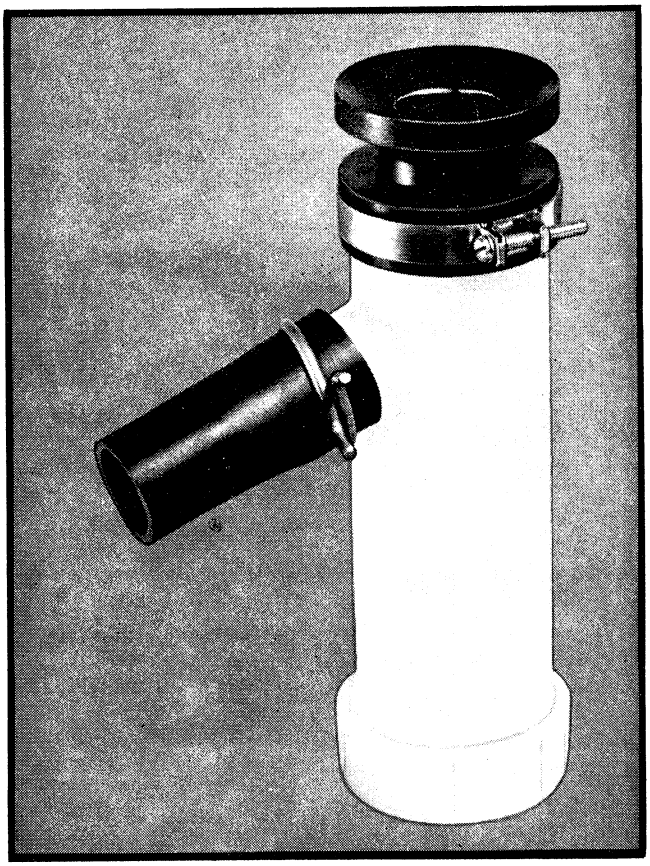


Figure 80

On 1960 and later models, a Pump Guard or Manifold and Trap Assembly is used, *Figure 80.* Attached between the tub outlet hose and the pump is the manifold and Trap assembly. This assembly is made of plastic and has a removable cap at the bottom for the cleaning of any foreign objects which may be trapped. The baffle molded in the center reduces the sucking noise made by the pump during operation.

The hose used with the pressure type water level switch is coupled to a 3/16 inch inside diameter vinyl plastic tube by means of a reduce coupling, *Figure 81.* The other end of the coupling has an outside diameter of 27/32 inch at the lower end and 1/8 inch at the upper end. This permits very

litter water to pass into the plastic tube but does build up sufficient air pressure in this tube to actuate the switch at a pre-established water level.

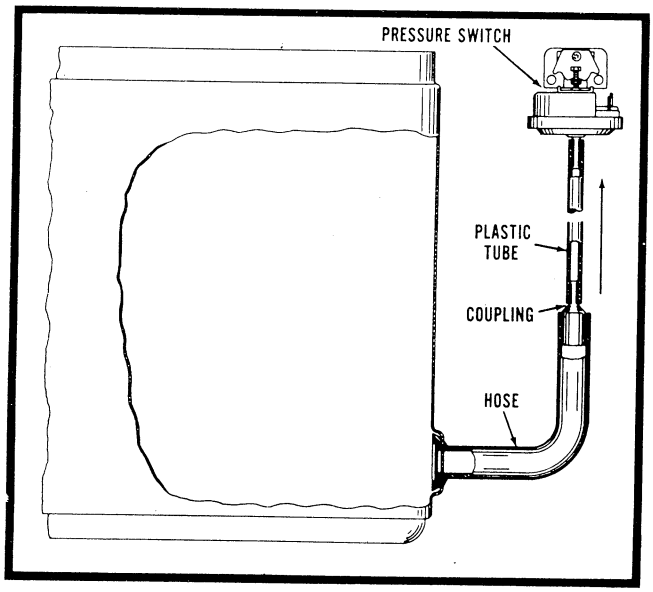


Figure 81

Pump

The water pump used on the RCA Whirlpool Automatic Washer serves two functions. It acts as a means of discharging the water from the tub on all machines, and on Suds Miser machines, it performs the dual function of drawing the suds water from the suds storage tank back into the machine for reuse.

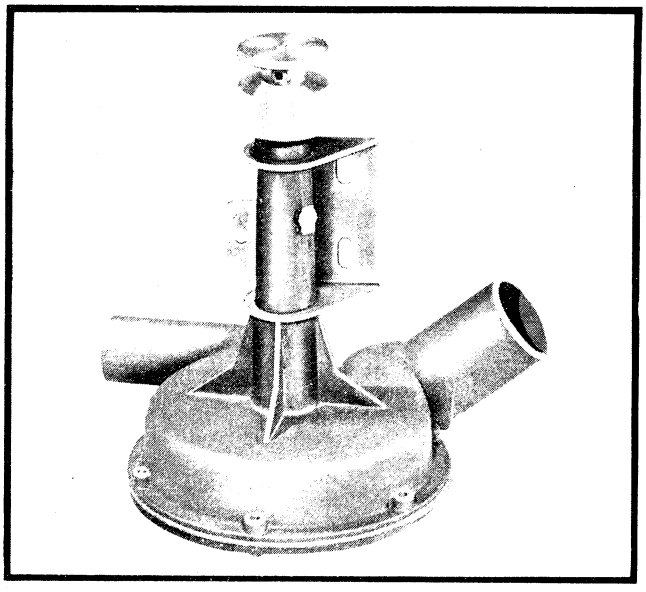


Figure 82

Two basically different types of water pumps have been used on RCA Whirlpool machines. These are the bi-directional pump and uni-directional pump.

The Bi-Directional Pump, *Figure 82,* was used on only a few of the early models of RCA Whirlpool Automatic Washers, although it has been used for two years previously on Whirlpool Automatic Washers. It derives its name from the fact that during the discharge operation its impeller turns in one direction and during suds return it turns in the opposite direction.

This change in direction is made possible through the mounting and linkage on the pump. The complete pump assembly pivots in a bracket mounted to the gear case with linkage attached so that the agitator cam bar can act as the controlling force for pivoting the pump.

Whenever the machine is in agitation, the cam bar pivots the pump so that its pulley engages the drive tire on the bottom of the agitator pulley, *Figure 83.* This causes the impeller to turn in the direction to pump water from the suds storage tank into the washer tub. However, it is important to note here that no water can be returned to the machine unless the two-way valve solenoid is energized, opening the suds port. This will occur only during the suds return portion of the cycle of operation. During the deep-rinse agitation, for instance, the impeller will be turning in the direction of suds return, but no water will be returned, because the suds port on the two-way valve is closed.

Since the impeller used in this pump is a turbine type, it will pull just as much water when turning

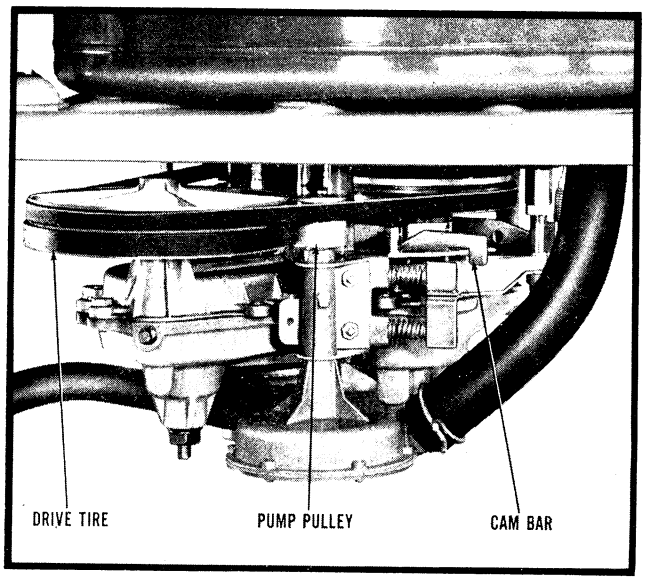


Figure 83

in one direction as it will in the other. Therefore, when the agitator solenoid is deenergized, the cam bar pulls the pump away from the drive tire and pivots it in such a manner so as to bring the pump pulley into contact with the drive belt, *Figure 83.* This causes the impeller to run in the opposite direction for discharging the water from the bottom of the wash tub into a drain or storage tank.

Figure 84 shows the component parts of the bi-directional pump after it has been completely disassembled.

This pump may be disassembled by removing the pump cover and gasket and sliding off the pulley

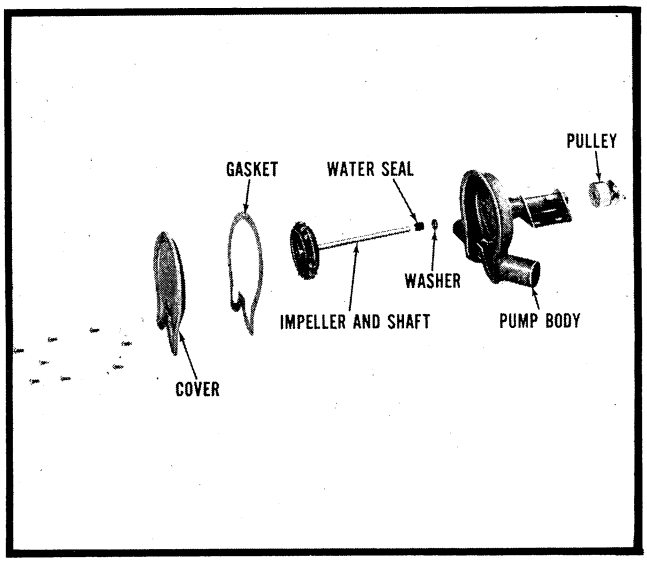


Figure 84

after having loosened the set screw sufficiently. The impeller and shaft assembly can then be pulled out of the bottom of the pump body.

When reassembling the pump, be sure the water seal and washer make a good seat on the bottom bearing in the pump body. The cavity between the two bearings should also be fifty to sixty precent filled with water pump grease. When installing the pulley make sure that the set screw is seated in the hole in the impeller shaft and tightened securely.

After the pump has been replaced on the gear case, carefully align the drive pulley with the belt. This is done by loosening the lock nuts on the pump mounting bracket, and sliding the bracket up or down on the pivot assembly are required.

When supplementary lubrication is required, it is recommended that a few drops of S.A.E. No. 40 motor oil be added through the oil cap provided in the pump body.

If the compression springs have fallen out during disassembly, it may be difficult to replace them unless the pivot arm is disengaged from the slot on the agitator cam bar. Then place the two springs in their proper positions between the pivot assembly and the upper and lower toggle bases and swing the pivot arm into the slot of the cam bar. It may then be necessary to move the cam bar to the extreme opposite direction of its travel to hold the springs securely.

On non-suds models, a 1/4—20 self-tapping screw is inserted in a hole in the pump mounting bracket with lock nut, for the purpose of adjusting the pump travel so that it will not hit the drive pulley. Non-suds models have the standard main drive pulley rather than the double recess pulley with pump drive tire.

The Uni-Directional Pump, *Figure 85,* used on all late production models, derives its name from the fact that its impeller turns in one direction only, at all times, yet it performs both the functions of discharge and suds return.

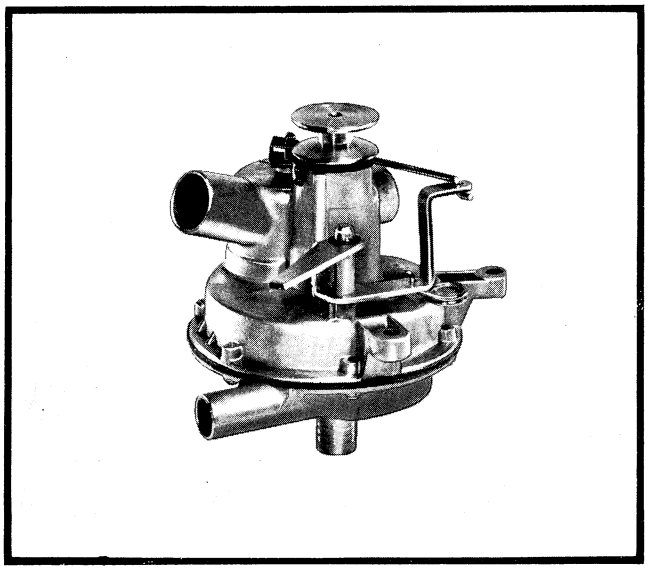


Figure 85

The direction of flow is controlled by the flipping action of a flapper valve, *Figure 86,* actuated by the agitator cam bar. An off-center toggle spring holds the valve in either of its two positions. This pump is mounted in a fixed position on the gear case, *Figure 87,* thus, no additional parts such as compression springs, pivot assembly and mounting brackets are needed. The pump receives its driving power from the main drive belt at all times.

The uni-directional pump is disassembled by removing the cover and gasket, and unscrewing the

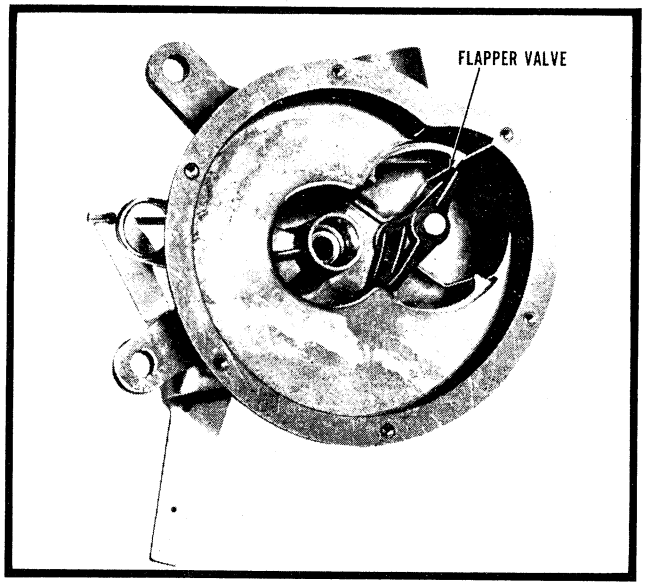


Figure 86

drive pulley from the impeller shaft. Then the impeller and shaft assembly and water seal and washer may be pulled out through the bottom of the pump body, *Figure 88.*

Lift the insert out of the pump body, *Figure 88.* Remove the screw holding the valve lever to the shaft and remove the valve from the pump body.

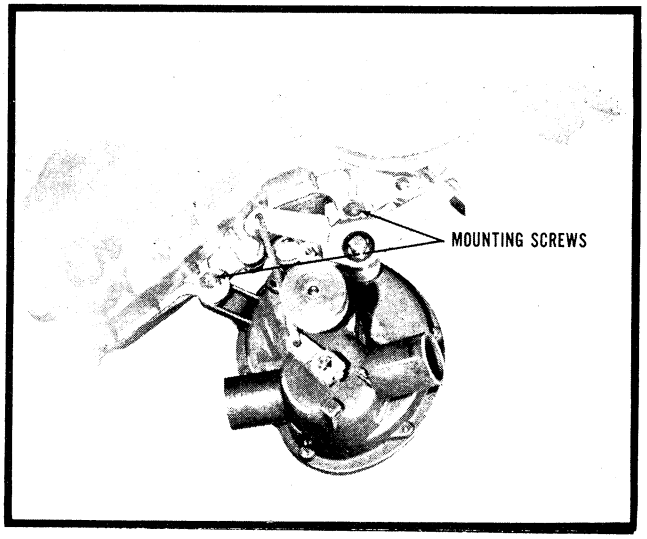


Figure 87

Pry off the stud clips from the top of the control lever and the toggle spring and remove all control parts from the top of the pump body.

Before reassembling the pump, always inspect all parts carefully. If corroded or badly worn, replace them with new parts. Remove all foreign matter that might prevent tight seating of the valve and install a new "O" Ring on the valve shaft, *Figure 88,*

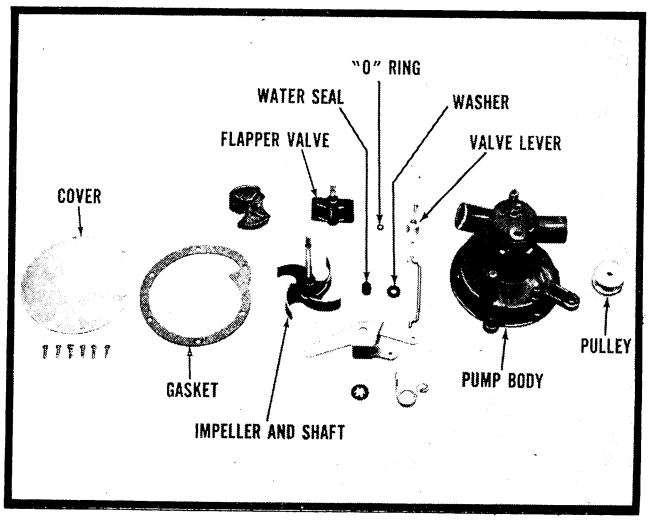


Figure 88

Also check the felt wick in the pump body. If this wick appears to be too dry, it should be soaked in heavy turbine oil, or its equivalent for about two hours. Part No. 10943 oil capsule is recommended for this purpose.

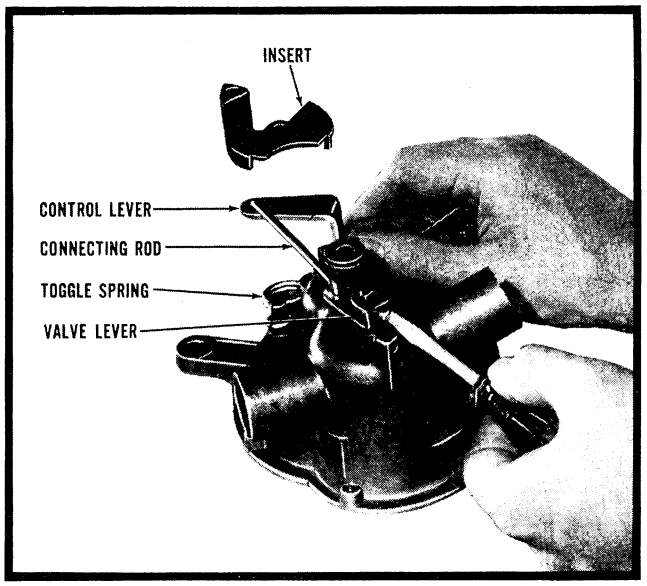


Figure 89

Care should be taken when installing the valve in the pump body to be sure it is positioned properly, *Figure 90.* Place the insert in the proper position as shown in *Figure 91.*

Install the pulley on the impeller shaft with the thick flange down. The retaining rings (stud clips), which are used to keep the control lever and the toggle spring from working up on their studs, should be pressed on as far as possible without coming into actual contact with the spring or lever.

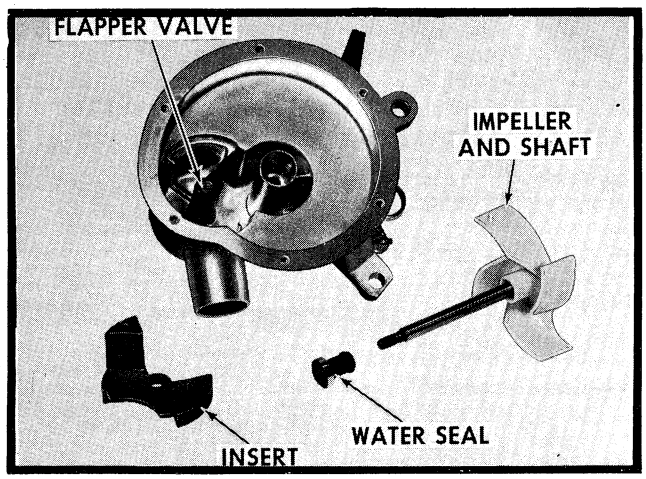


Figure 90

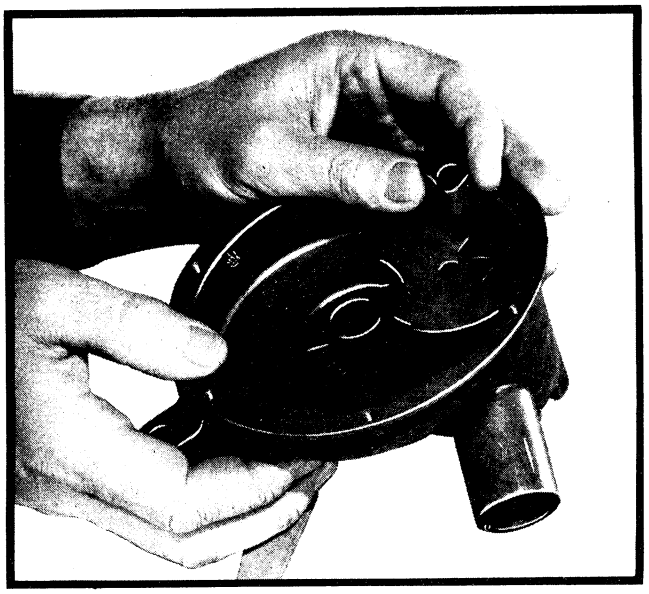


Figure 91

Pushing these clips too tightly may cause the valve shaft to bind so that the valve does not seat properly.

On machines equipped with the recirculation pump system, remove the housing and gasket and unscrew the recirculation impeller, then follow the disassembling instructions as described above under the *"Uni-Directional Pump"*

A Combination Uni-Directional and Recirculation Pump, *Figure 92,* was incorporated on most of the late models. The recirculation section of the pump is used in conjunction with the built-in lint filter. In addition to discharging both the wash and rinse water from the tub and returning the suds water to the machine, this pump will also recirculate the water from the bottom of the tub to the top of the machine, where lint and soil deposits can be filtered out of the water as the clothes are being washed and rinsed.

The additional parts required for this new function of recirculation are another impeller, which screws onto the bottom of the same impeller shaft on which the regular pump impeller is mounted, a recirculation pump housing and another gasket.

A small hole has been added to the pump cover, so as to prevent even a small amount of water from being recirculated during the *DAMP-DRY* phase of the cycle, *Figure 93.* Since the suction is greater in the upper portion of the pump than the lower portion, this water will be drawn into the upper portion and out the drain rather than being recirculated back on the clothes.

On later production of 1957 models, a new diecast housing was used in place of the bakelite housing. A comparison of *Figure 93* and *94* will readily show the additional changes made in the two recirculating pumps. The size and location of the bleeder hole was changed. The recirculating port on the new housing was relocated to a point about 180° from the inlet port. The recirculating impeller was changed from a two-blade butterfly type to a six-vane turbine type.

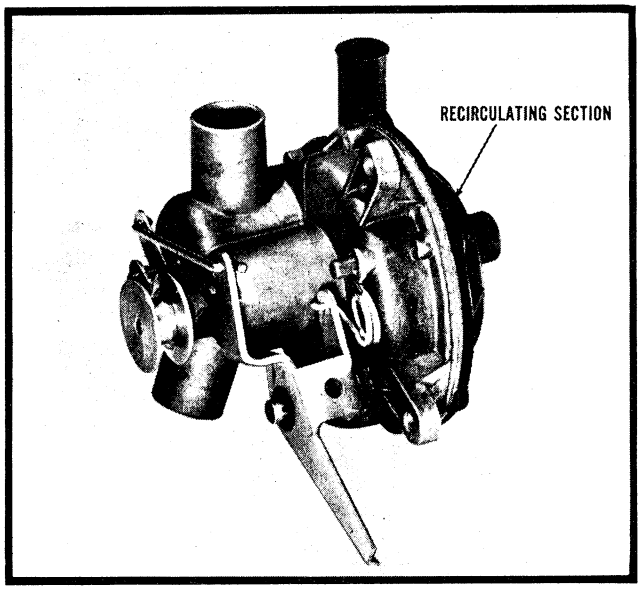


Figure 92

The height of the impeller blade in the main pump section has been increased from 3/4 inch to 7/8 inch to increase the pumping efficiency.

Reassembly of the Pump

1) Inspect all parts carefully. Replace all worn or corroded parts.

2) Clean the valve to remove all foreign particles that might prevent proper seating of the diaphragm.

3) Install a new O-ring on the valve shaft.

4) Check the felt wick on the pump body. If the wick is dry, soak it in heavy turbine oil. Part No. 10943, oil capsule, is recommended for this purpose.

5) The valve should then be installed. Care should used in positioning the valve correctly.

6). Place the insert in the proper position.

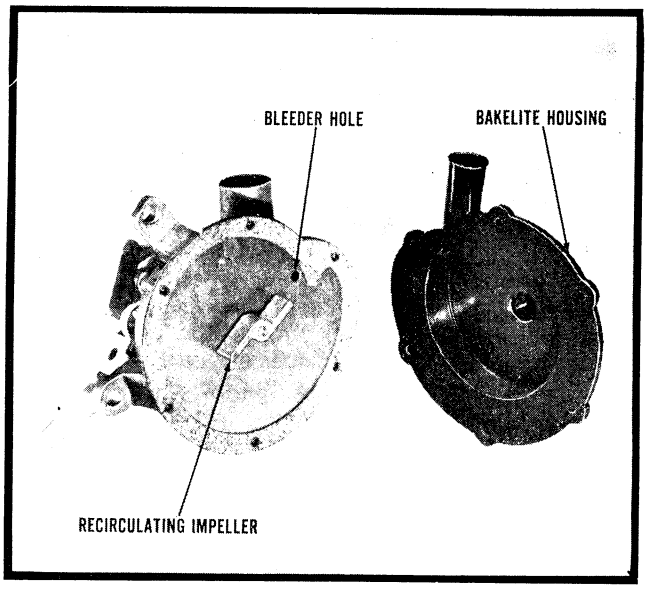


Figure 93

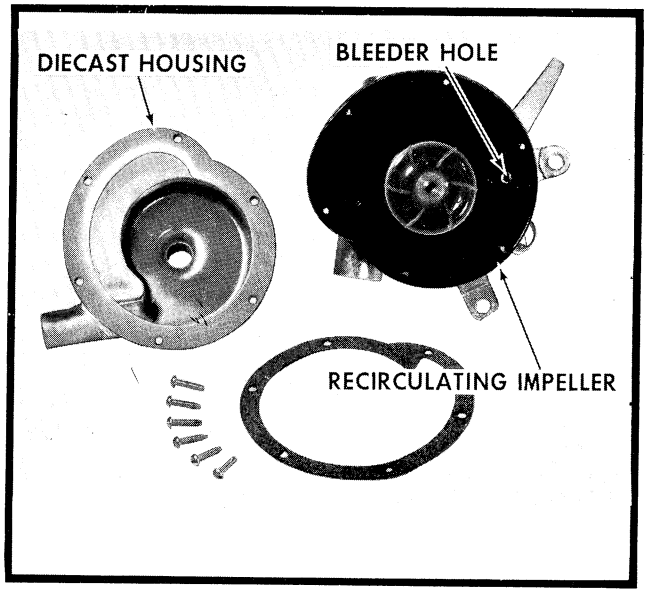


Figure 94

7) Install the pulley on the impeller shaft with the thick flange down.

8) Press the retaining rings (stud clips) on top of control arm. The ring should be pressed as far as possible without coming in contact with the spring or lever.

Replacement of Pump Bearings:

1) Remove pump and disassemble as previously described.

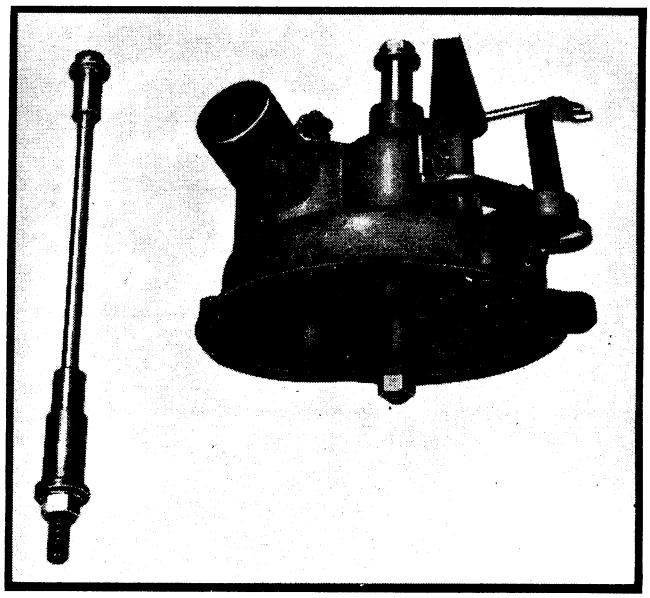


Figure 95

2) Drive out the old bearings with a drift punch or any suitable tool that will fit through the bearing shaft opening.

3) Use the bearing inserter tool to press the upper and lower bearings into the pump body, *Figure 95.*

4) Soak the oil wick in heavy turbine oil, or its equivalent. Part No. 10943, Oil Capsule, is recommended for this purpose.

LATE MODEL PUMP

A new type of Uni-Directional pump was introduced in 1966. As with its predecessor the impeller rotates in one direction only, yet it performs the functions of discharge, recirculation and suds return. The pump is mounted in a fixed position as shown in *Figure 95A* secured by two mounting bolts. The pump has a plastic body, *Figure 95B* as well as the cover, insert and impeller. It is made of asbestos filled polypropylene and is resistant to bleaches and other laundry aids. Pump operation is also much quiter. The bolts that mount this pump are of special design and are used in conjunction

with a special type of washer. These special bolts must be used with this pump. The previous mounting bolts should be discarded.

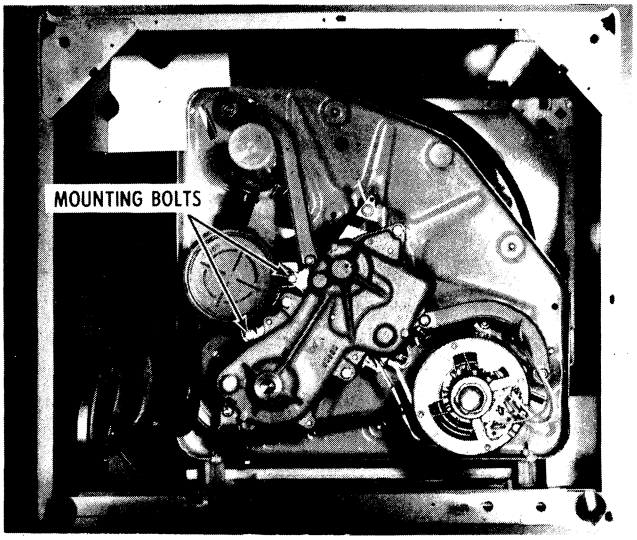


Figure 95A

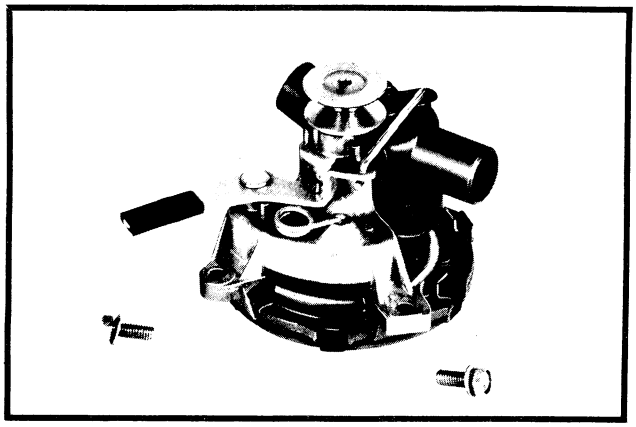


Figure 95B

DISASSEMBLY OF THE PLASTIC PUMP

A. Remove the spring clips (6) that hold the cover to the pump body, *Figure 95C.*
B. Carefully clamp pump pulley in a vice and unthread the shaft by turning the impeller counterclockwise, remove shaft from pump body.
C. Remove seal face by prying it from body. Be careful not to damage seal cavity, *Figure 95D.*
D. Remove the insert, *Figure 95E.* by lifting it out of the body. Applying pressure to the top of the flapper valve shaft will facilitate removal. The flapper valve will lift out of the body if the bracket and linkage is first removed. The "O" ring on the shaft of the flapper valve should be replaced.

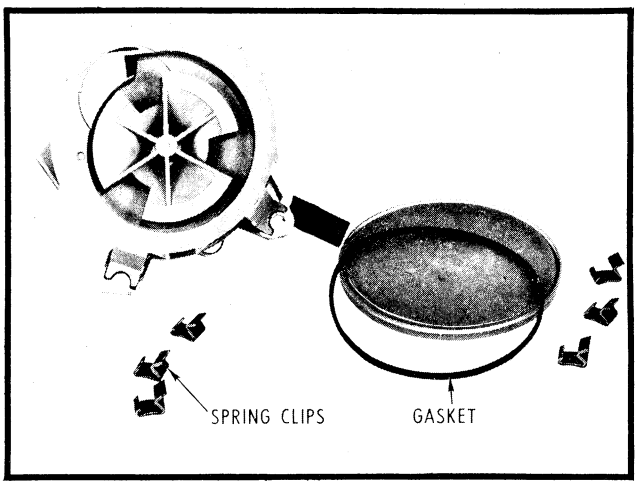


Figure 95C

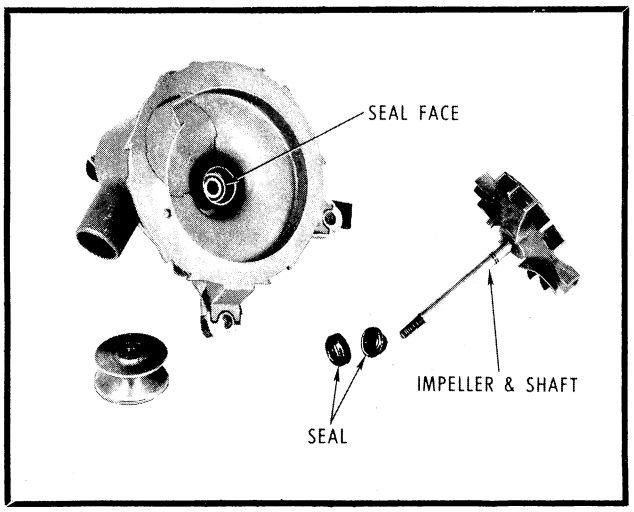


Figure 95D

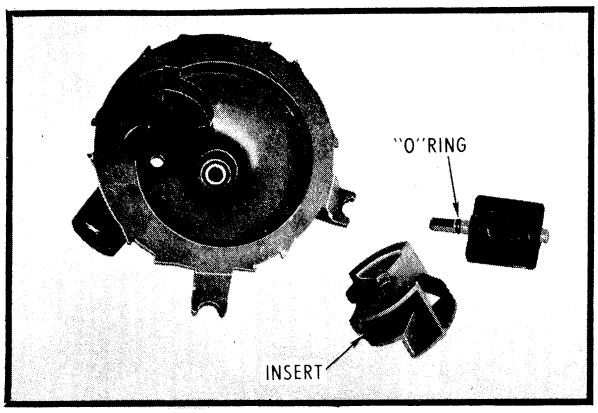


Figure 95E

Pump kits are available to recondition this pump. In 1969 and 1970 this pump was phased into production. There have been some improvements to this pump since. Pump components that incorporate these changes are not interchangeable with the previous blue grey pump assembly, *Figure 95F.*

These changes have been made to prevent accumulation of lint and foreign material that may gather in the impeller shaft and seal area, *Figure 95G.*

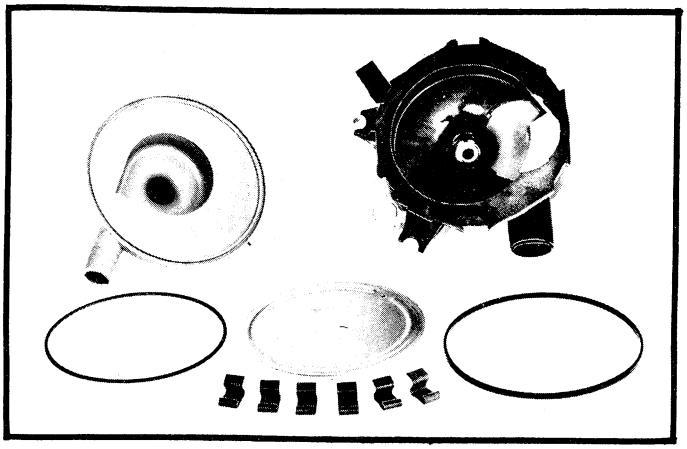


Figure 95F

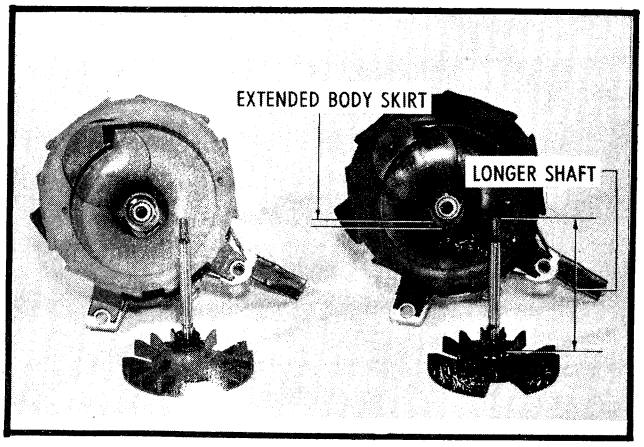
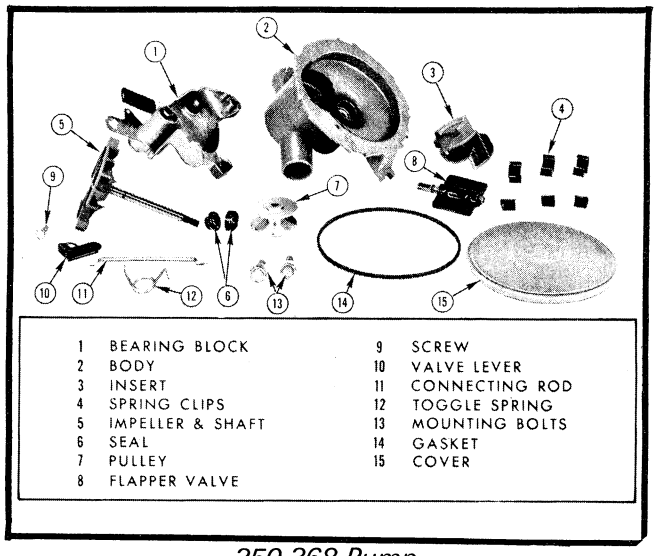


Figure 95G



350 368 Pump

Suds Valves

The two-way valve is used only on machines with suds return system. The purpose of this valve is to open and close the suds port and drain port during the cycle of operation of the automatic washer.

When the solenoid which controls the operation of the drain port closed. When the solenoid is de-energized, the suds port is closed and the drain port is opened, *Figure 96.*

The two different types of two-way valves have been used on the Whirlpool Automatic Washers. The oldest one is the *diaphragm* type and the latest one is the *butterfly type.*

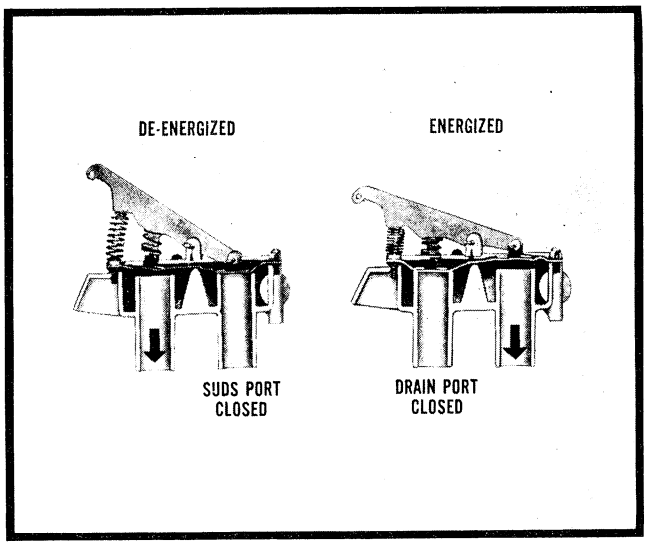


Figure 96

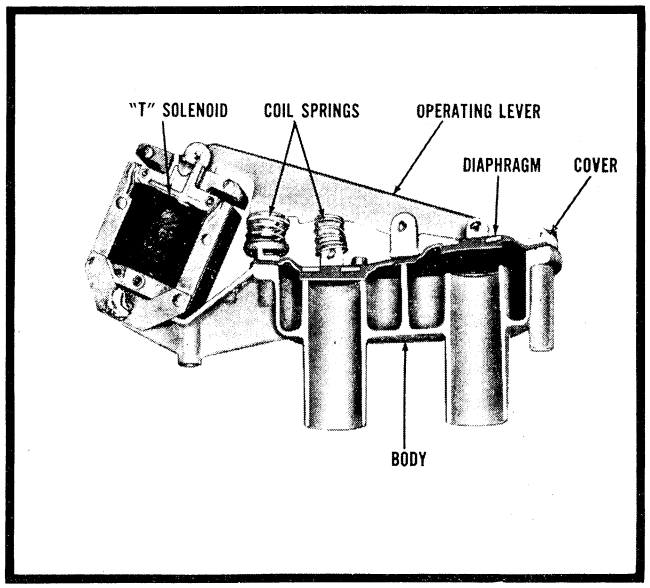


Figure 97

DIAPHRAGM TYPE

This type of two-way valve was used on most models. Its main component parts are a "T" solenoid, an operating lever, two coil springs, a die cast metal cover, a rubber diaphragm and a die cast metal body, *Figure 97.* It is mounted in a vertical position in the lower right corner of the back of the cabinet, *Figure 98.*

It can be easily removed by removing the rear panel of the machine, disconnecting the three hoses from the valve body and the two wiring leads from the

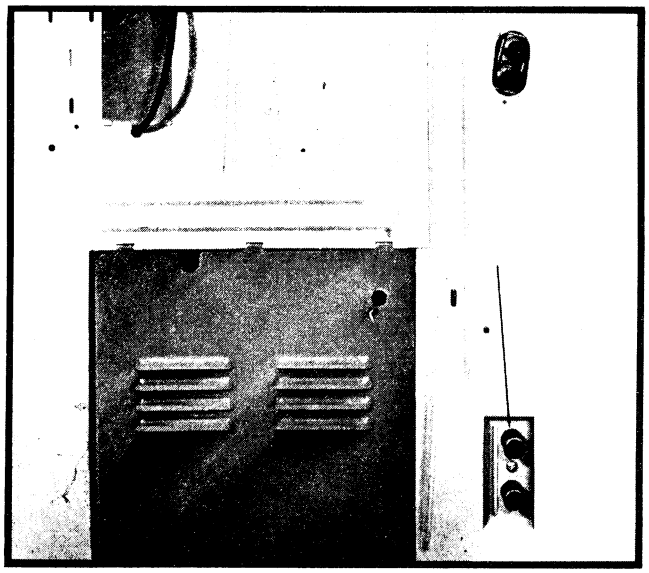


Figure 98

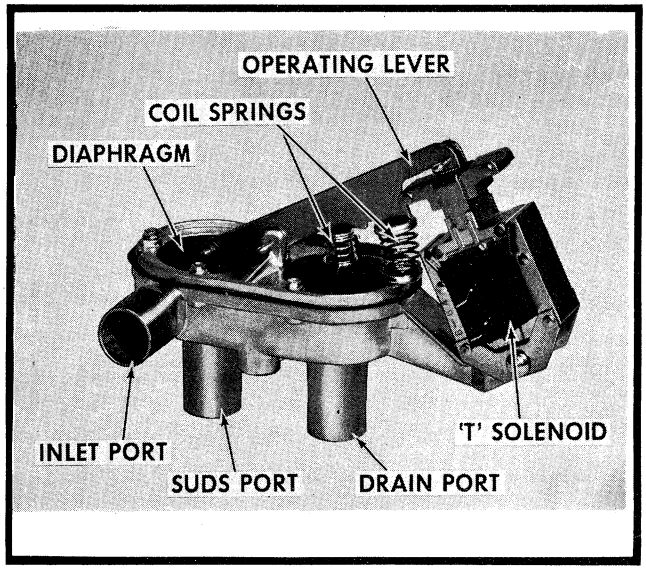


Figure 99

valve solenoid. Then remove the mounting screw and lift out the valve.

When a complaint is received that the rinse water is draining into the suds storage tank or the suds water is syphoning back into the machine after completing the cycle, it may be due to the diaphragm not seating properly. Check to see if the upper spring is in place and has sufficient tension to close the suds port, *Figure 99.*

Usually, when this two-way valve fails to function properly, the trouble is caused by foreign matter on the seating surfaces or on the diaphragm. Clean these parts throughly as shown in *Figure 100,* and replace the diaphragm, if damaged.

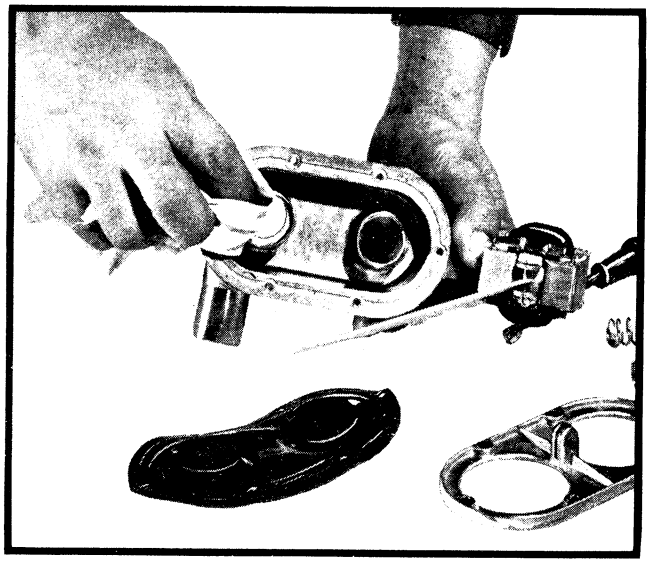


Figure 100

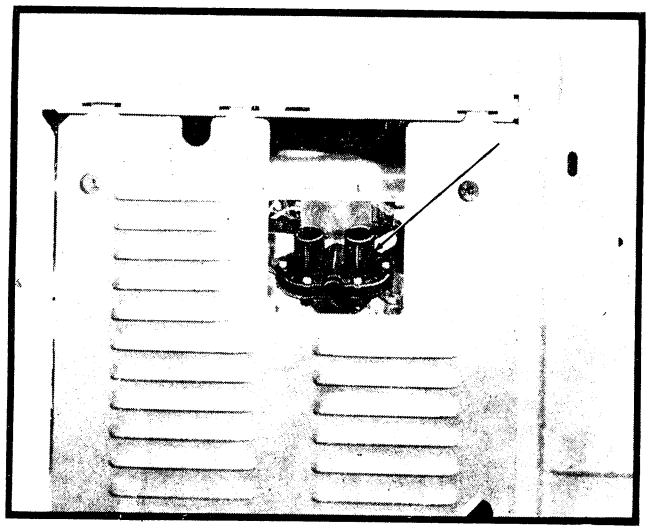


Figure 101

BUTTERFLY TYPE

On some 1957 models a new type two-way valve was incorporated. The location was changed to the center of the rear of the cabinet just above the rear service panel, *Figure 101.* This unit is mounted to the base plate and is indirectly controlled by a cam plate mounted on top of the control magnet.

A more complete description of the control mechanism for this valve will be found in *Division A, "Electrical Components"* under *"Solenoids.*

Figure 102 shows the individual parts making up the valve. The valve body is made in two sections from a durable plastic material.

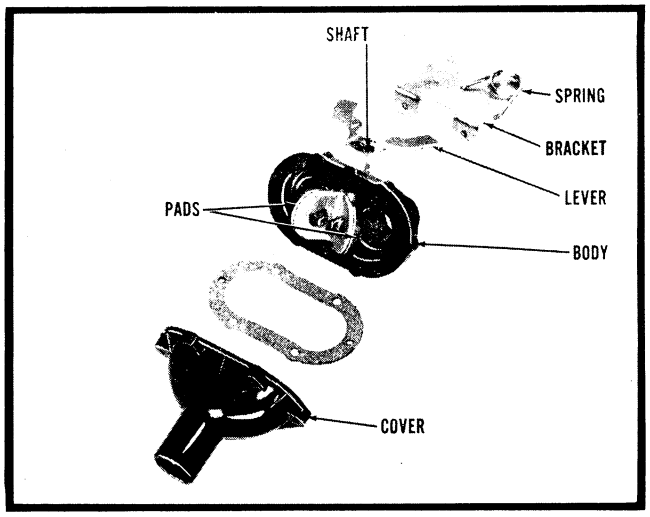


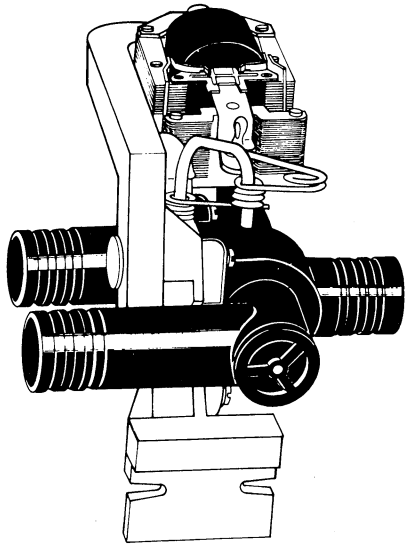
Figure 102

If you are called upon to service a machine with this two-way valve on it and the valve is not functioning properly, it should be replaced by the diaphragm type valve unit. A special kit has been prepared for this conversion.

NEW POLYPROPYLENE TWO-WAY SUDS MISER VALVE, PART #363921

This valve will soon phase into production and as soon as supply will permit, new valve will be used 100%.

Valve function will remain the same as the die case two-way valve. It should be noted that only "T" solenoid and related parts will be available as separate service items. The valve body and diaphragm will be made available as an assembly only.



Valve Assembly #363921 is not interchangeable with the #75618 die case valve assembly.

Filters

This filter assembly is mounted directly above the tub ring, and extends over the gasket opening. Its function is to remove the lint and large soil particles from the water as it is being recirculated by the pump.

The main components of the filter assembly, *Figure 103,* are the filter housing, which is fastened to a filter bracket, and a filter handle and element assembly with a rubber gasket to provide a snug fit when the filter is slipped into the filter housing.

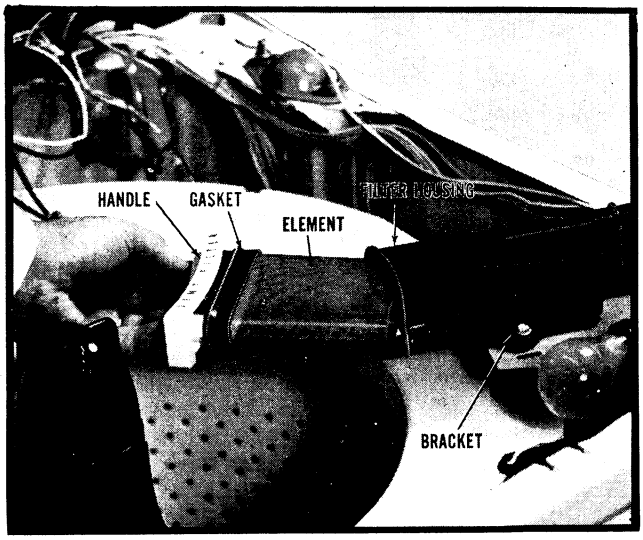


Figure 103

The filter element is made of a monel metal, medium mesh screen to prevent rust and corrosion.

Figure 104 shows the path of the water as it is being recirculated through this device.

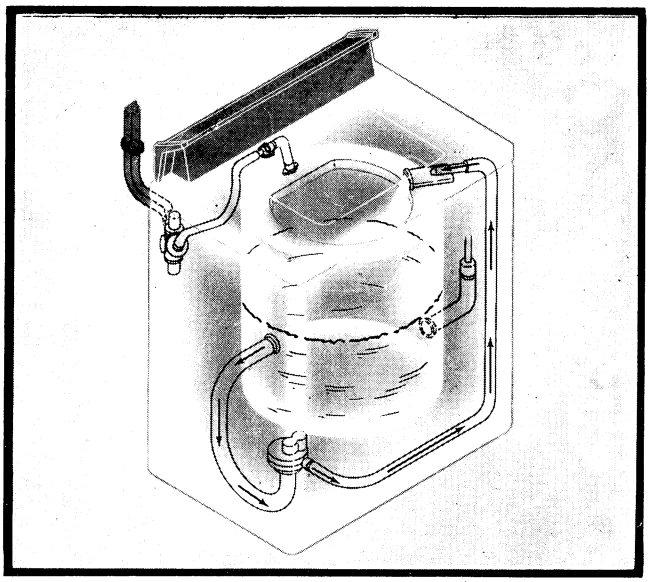


Figure 104

A new brush-type filter is used on 1960 and later automatic washers, *Figure 105.* This is a full time filter which can also be used as a detergent dispenser. The filter housing is attached to the top with the opening for the filter in the lid well.

The filter housing can be removed by either of the following methods:

A. Apply pressure on the housing, with the filter in place, and push the gasket down through the top.

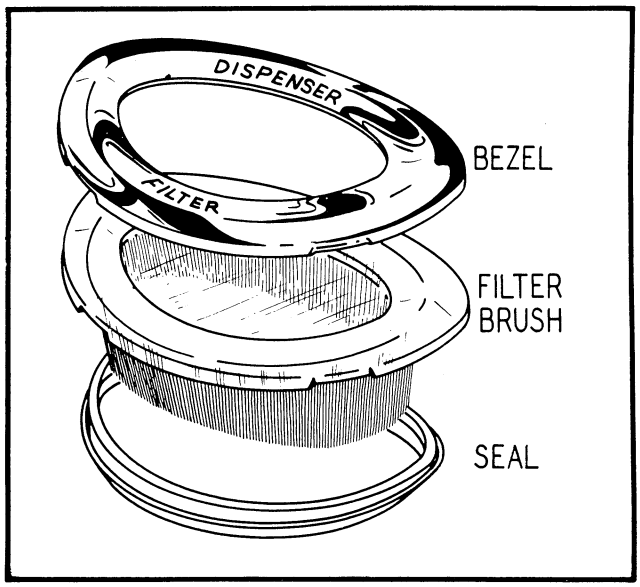


Figure 105

B. Remove the filter and carefully dislodge the gasket around the housing with a screwdriver, then push the gasket through the top.

To install, soak the gasket and insert one end into place, then work housing from side to side. To fully raise the top assembly, the recirculating hose must be removed from the filter housing.

MAGIC CLEAN FILTER SYSTEM

At the start of 1968 a new filtering system was introduced, in the then current models, and are in use to the present time.

The filter is composed of a screen maze and diaphragm to effectively catch and dispose of the lint. Also built into this system is a flapper check valve, the body of the valve is made of a plastic material. This valve is attached to the tub with a threaded extension, and positioned in the same area on the tub that previous models connected the recirculating drain funnel. The check valve allows water to flow from the tub during recirculation, and prevents water from entering the tub during the pump-out period, *Figure 106.*

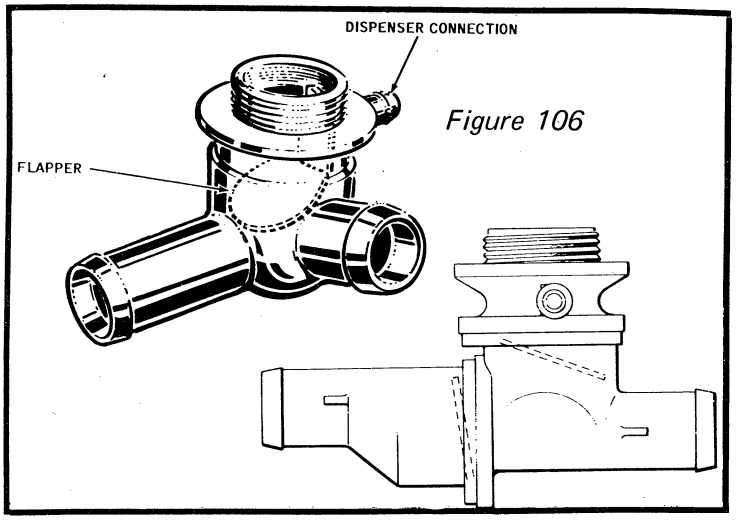


Figure 106

Machines using a suds-return employ a bracket attached to the lower rear cabinet channel rail for mounting the two-way valve.

Recirculation takes place during wash and rinse cycles. During these periods a light indicating that filtering is taking place lights up on the console backboard. During agitation water is pumped from the tub, through the check valve and enters the bottom of the filter, flowing through the maze and collecting and retaining lint. Water leaves the filter at the top, and flows through the drain port of the two-way valve, then to the pump and returns to the bottom of the tub, completing the cycle, *Figure 107.*

MAGIC CLEAN EDGE FILTER

Figure 113A illustrates the magic clean edge filter. This filter replaces the magic clean filter on some 1971 models automatic washers. During the recirculation, water will enter at the top port and flow into the ribs of the element. The lint is collected in the element and the filtered water then flows out the bottom port. At this time there is no pressure on the filters and the diaphragm and spring hold the element in a closed position. The filter is flushed free of lint during pump out in the same manner as the magic clean filter. Water enters the bottom port thus creating a pressure which compresses the spring and forces the diaphragm and element outward. This provides a space between the element and the housing and allows the lint to be flushed out the drain. The water flow is the same as illustrated for the magic clean filter page 54 and *55*.

The disassembled filter is shown in *Figure 113B* for illustration purposes only. Actually the diaphragm is spun welded to the housing which makes disassemble impossible. The coil spring and retaining spring are replaceable components.

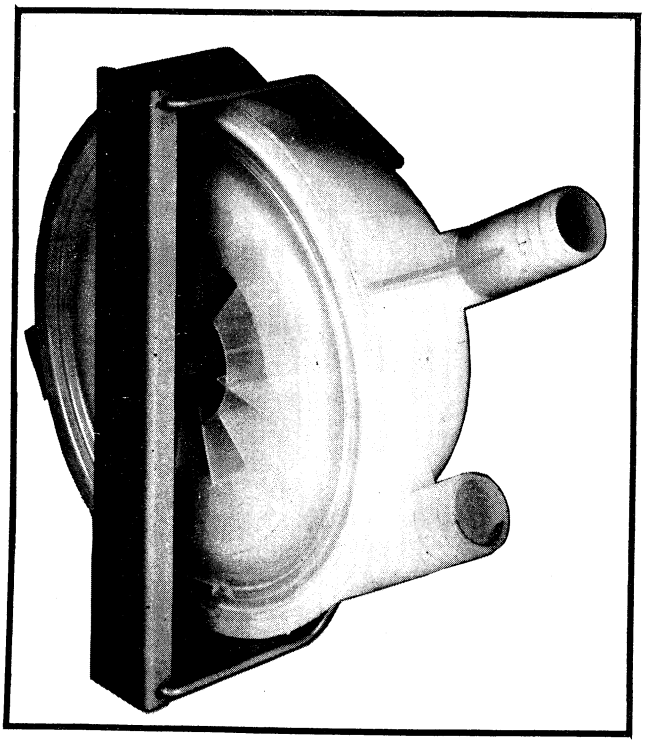


Figure 113A

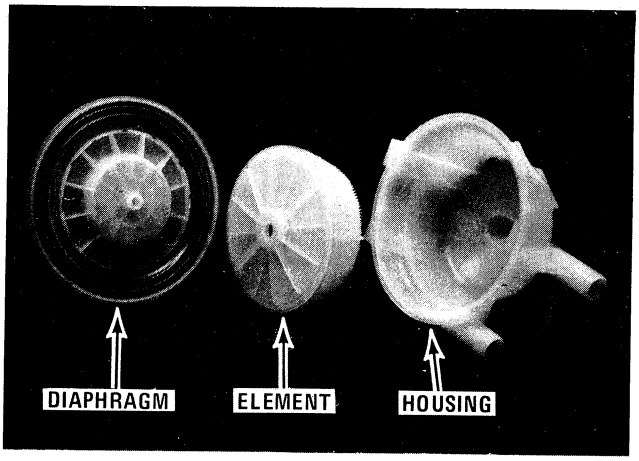


Figure 113B

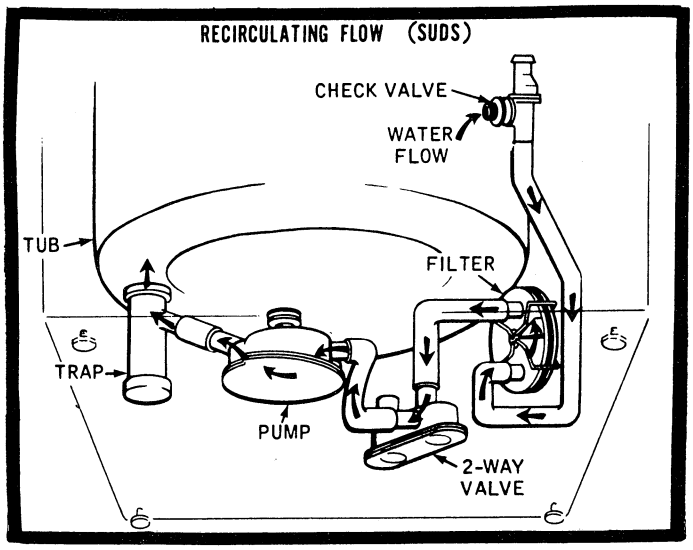


Figure 107

During suds storage, water flow is from the tub drain to the manifold, through the pump and suds side of the valve, then out the suds-save discharge hose. The filter is bypassed during this operation, *Figure 108.*

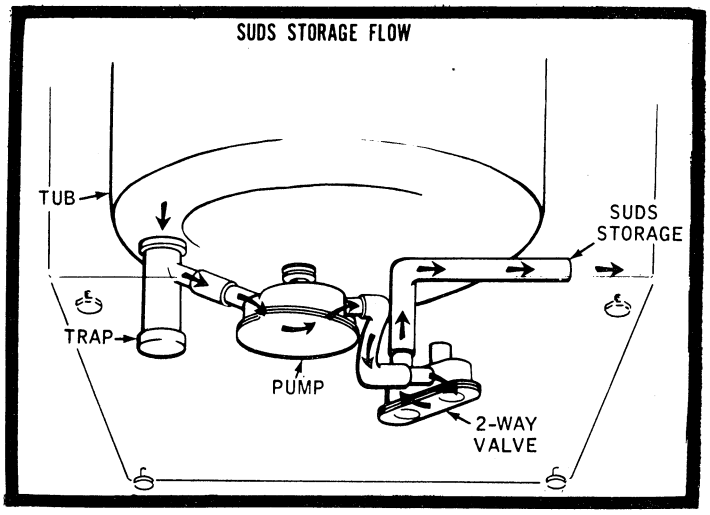


Figure 108

In looking for leaks (water under machine) a good place to start is at the check valve. Because of the type of construction and the mounting, it is susceptible to breakage at the threaded portion. To reach this valve for replacement or examination the cabinet cover must first be removed.

During pump-out drain on *Suds Models,* the lint collected in the filter is removed. This is accomplished by water flowing from the tub through the manifold and pump, then on through the drain side of the two-way valve and into the top of the filter. water passing through the top of the filter, causes the diaphragm to expand, freeing the lint and flushing it out the bottom of the filter, through the check valve and out the drain discharge hose, *Figure 109.*

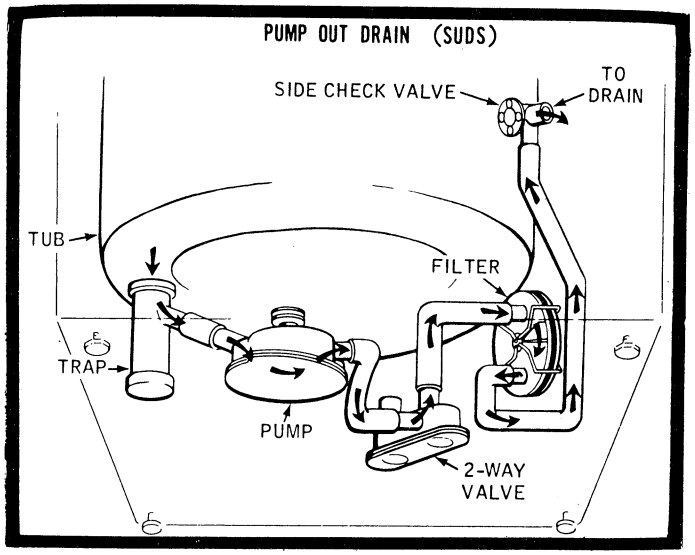


Figure 109

In the suds return sequence, suds are drawn through the suds hose and the two-way valve into the pump, then discharged into the bottom of the tub. Water flow bypasses the filter at this time, *Figure 110.*

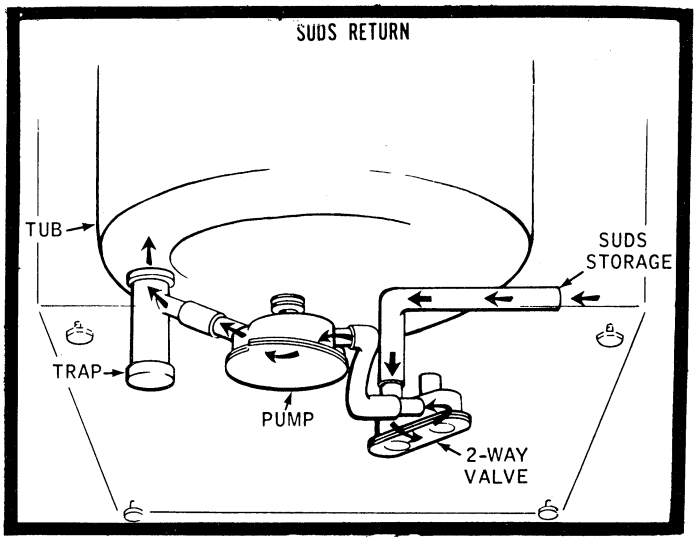


Figure 110

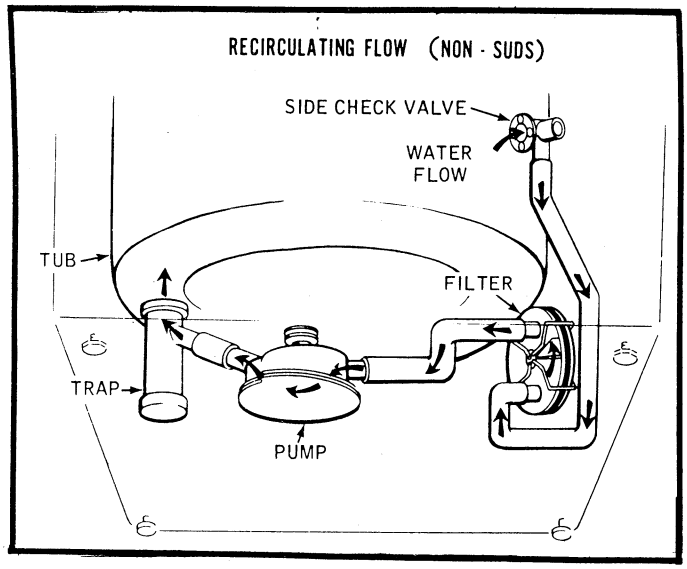


Figure 111

On non-suds models recirculating flow is accomplished in much the same manner as during wash and rinse, but in this instance the water flows directly from the top of the filter into the pump since the two-way valve is not in use, *Figure 111.* Pump-out drain (non-suds models) is handled in the same manner as suds models. In this case water flows directly from the pump into the top of the filter. The two-way valve is not used during this period , *Figure 112.*

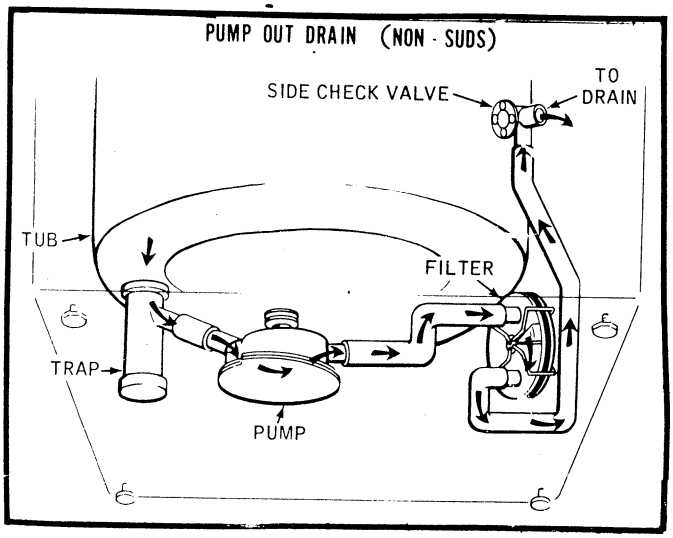


Figure 112

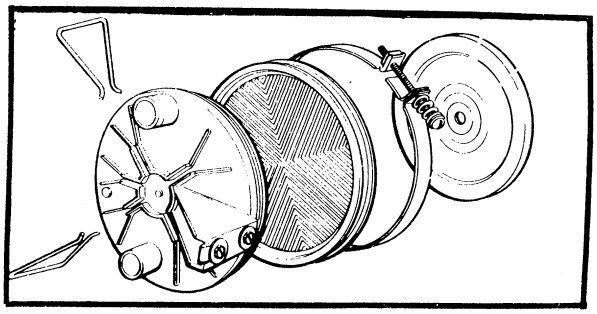


Figure 113

To Remove Filter for Disassembly

1. Remove rear panel.
2. Remove screws securing filter to cabinet.
3. Remove two hoses being careful to catch, in a bucket, any water remaining.
4. Remove four clip springs.
5. Loosen screw securing ring clamp.
6. Separate parts (note sequence for re-assemble) see *Figure 113.*

Dispensers

The rinse conditioner dispenser used on some 1959 machines is a solenoid operated device, *Figure 114.* When the solenoid is energized, a diaphragm type closure in the dispenser outlet hose is opened. The rinse conditioner flows out of the dispenser and enters the machine recirculating system at the point at which it leaves the tub.

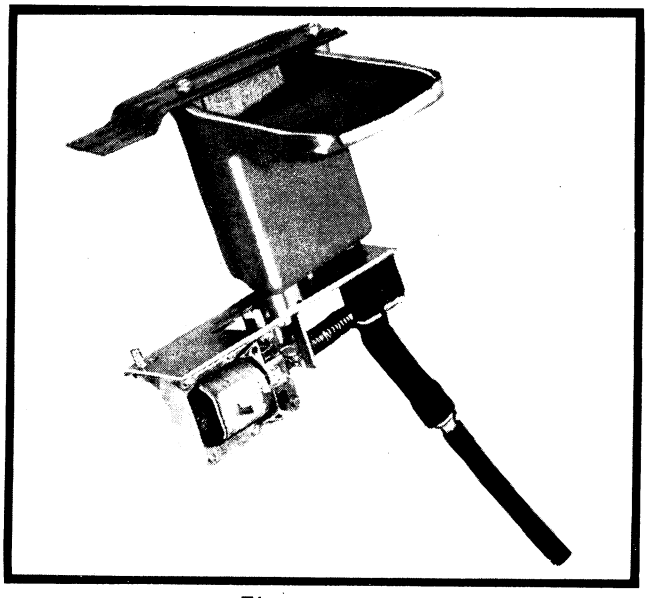


Figure 114

It can be called a *"one-shot"* dispenser since its entire content is dispensed each time the solenoid is energized. This occurs during deep-rinse fill in each cycle. It has a ten ounce maximum capacity.

The combination rinse conditioner and bleach dispenser is used on the 1960 and later *Mark XII Series* automatic washer. The *Imperial Series* uses the same assembly, however utilizes only the bleach dispenser, *Figure 115.*

The rinse conditioner and bleach dispensers are located at the left front corner of the machine

under the lid and are single load dispensers. When rinse conditioner or bleach is to be used, pour the measured amount of liquid from a cup into the proper dispenser at the time when clothes are being added to the machine. The dispensers are electrically controlled to add the liquid through the recirculating water system into the wash load at the proper time during the machine cycle.

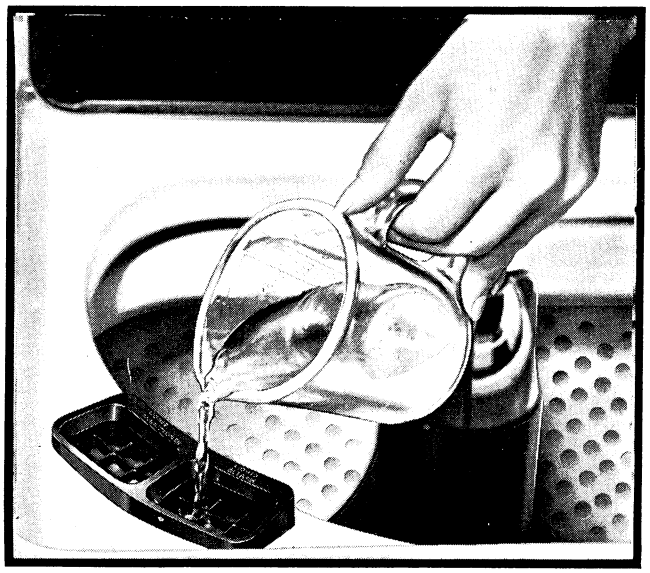


Figure 115

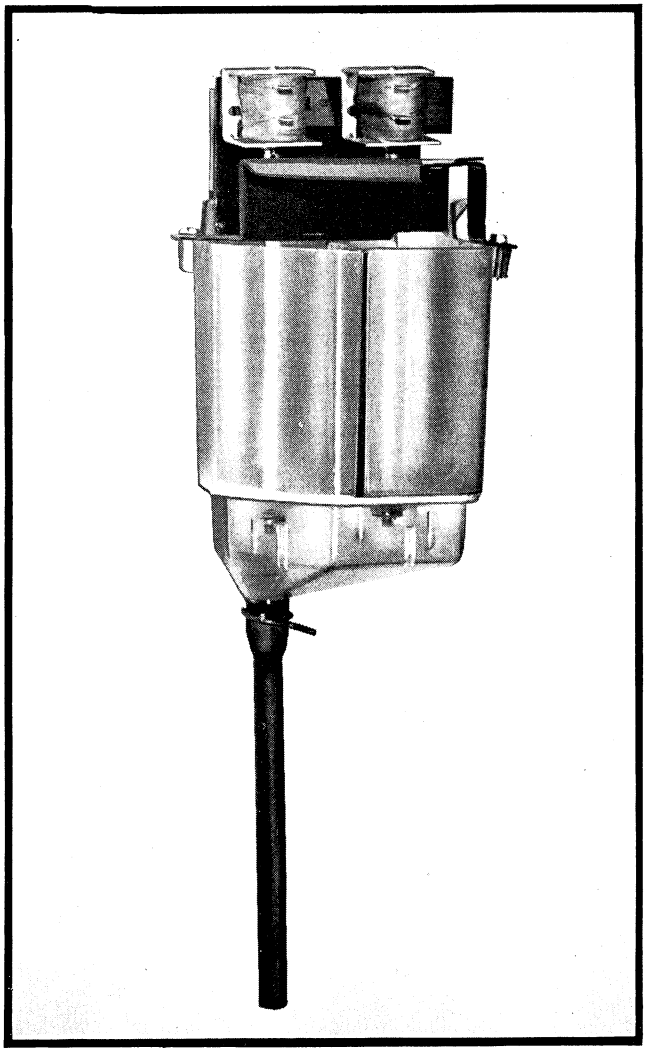


Figure 116

CAUTION: Use only liquid bleach in bleach dispenser. Dilute rinse conditioner before pouring into rinse conditioner dispenser.

A reservoir for holding the liquids is divided into two cavities. Each dispenser is operated by an independent solenoid which raises a plunger type plug, releasing liquid into the recirculating system, *Figure 116.*

Bleach is dispensed two increments (or four minutes) before the end of the wash period. The rinse conditioner is dispensed during deep rinse fill.

The dispenser is accessible at the left front corner of the machine when the top is raised. Whenever a machine equipped with a rinse conditioner or bleach dispenser is to be laid on its side for service, besure to check the dispenser beforehand. If the dispenser is full, it must be emptied first, removing the outlet hose from the connection at the recirculating outlet. Then, holding a cup or similar container under the hose, manually actuated the solenoid to open the diaphragm closure.

Gear Case

For purposes of describing the construction and functions of this major mechanical assembly, it will be divided into two major operating units; the gear case assembly and the basket drive and brake assembly.

Both of these units are driven by the machine motor by means of a flexible V Belt which is notched to provide a deep, non-slip drive in the pulleys.

The functions of these two units are controlled by the control magnet assembly and two cam bars mounted on top of the gear case, *Figure 117.*

GEAR CASE ASSEMBLY

The main function of the gear case assembly is to provide a means for driving the agitator, first in one direction, then in the other, to provide the necessary washing action. The size of the arc in which the agitator travels in each direction and the number of oscillations it makes per minute is

determined by the particular design of the gears in this gear case assembly and the size of the pulleys which drives these gears. Whirlpool Automatic Washers are equipped with a normal stroke gear case which drives the agitator in a 195° arc, *Figure 118,* approximately 68 oscillations (or strokes) per minute.

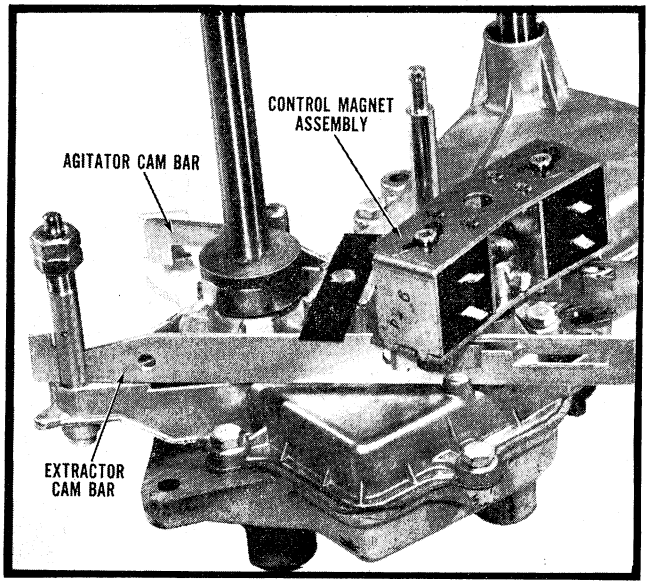


Figure 117

The gears in the gear case are driven by a large pulley secured to the top of the main drive pinion by means of a self-locking set screw, *Figure 119.* This pulley is known as the agitator drive pulley.

The main drive pinion meshes with the main drive gear which is mounted on an eccentric stud, *Figure 120,* A means of adjusting this eccentric stud is provided at the bottom of the gear case to give a closer mesh between the teeth of the main drive pinion and gear so that quiet operation can be obtained. Instructions for making this adjustment will be found later in this section.

The main drive gear is coupled to a sector gear by means of a connecting rod, *Figure 121.* Therefore, when the main drive gear turns, the connecting rod moves the sector gear back and forth. Since this sector gear meshes with the agitator gear, *Figure 122.* This gear will turn first in one direction and then in the other. An agitator gear fork and shaft assembly engages and disengages the agitator gear with the agitator shaft.

When the agitator gear fork moves the agitator gear downward, two of the slots on the bottom of the gear slip over a horizontal swedged drive pin in the agitator shaft, *Figure 122.* This causes the shaft to

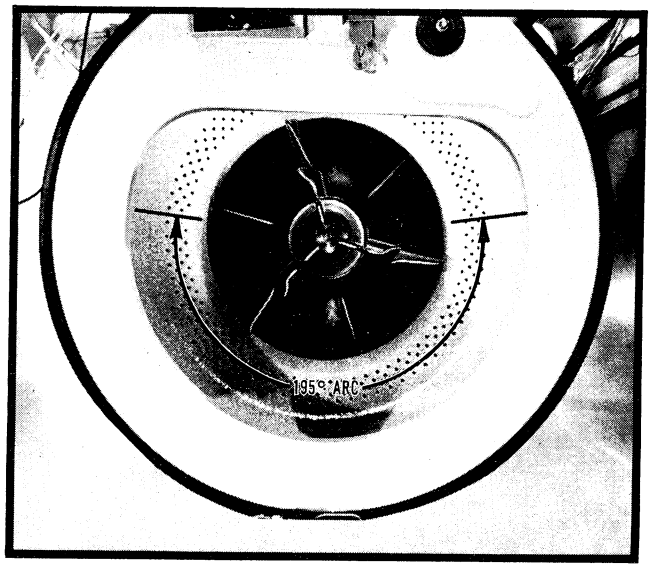


Figure 118

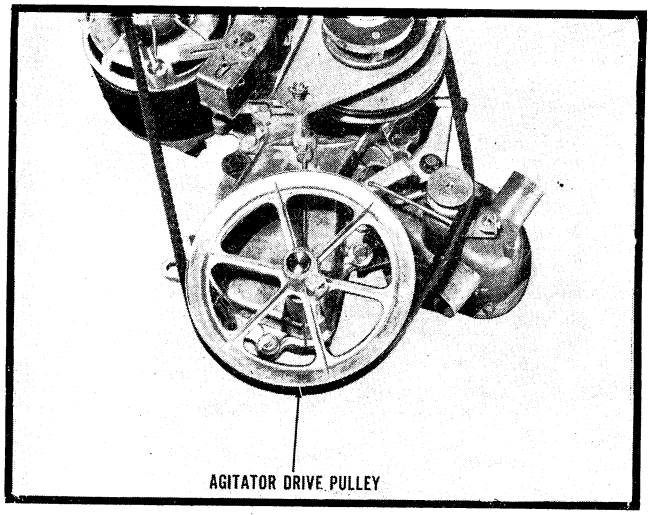


Figure 119

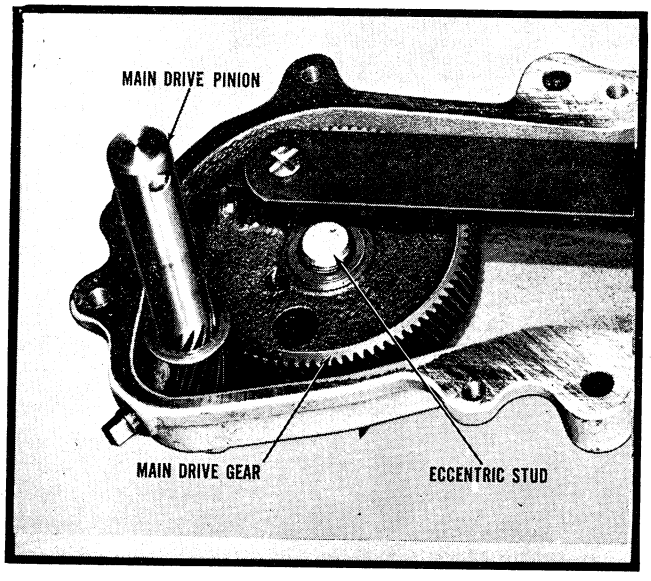


Figure 120

turn first in one direction and then in the other to provide the washing action in the Automatic Washer.

LARGER CAPACITY GEAR CASE

Several changes have been made in the newer larger capacity washing machines, it should be noted that few of the parts of the standard capacity washer can be used on the larger washer. *Figure 123.* The spin tube and agitator shaft are longer to accommodate the deeper tub and basket. Another change is the pinion bearing outside diameter has been increased to reduce sound level and longer bearing life. For identification purposes the four brake springs are colored blue. The spring rate has been increased size is the same.

Some later models of washers will use a new type of belt, motor pulley, and modified motor mounts. The whole concept is engineered to reduce high sound level during operation. The motor pulley is built around a cushion of rubber, which greatly reduces belt noise and vibration that otherwise would resonate throughout the machine. Vibration is reduced to a minimum and cabinet noises are non-existent. The new type belt is also used on the larger capacity washer.

The agitator shaft assembly and agitator gear is equipped with a compression spring which constantly exerts a pressure downward. The agitator gear fork is pulled upward by means of the agitator cam bar which slips into a slot in the shaft on which the agitator gear folk is mounted, *Figure 124*

An assembly of washers, seal , cotter pin and spring positioned on the agitator shaft, and a spring placed on the agitator gear fork was used on earlier models. These parts were replaced by a spring and seal placed

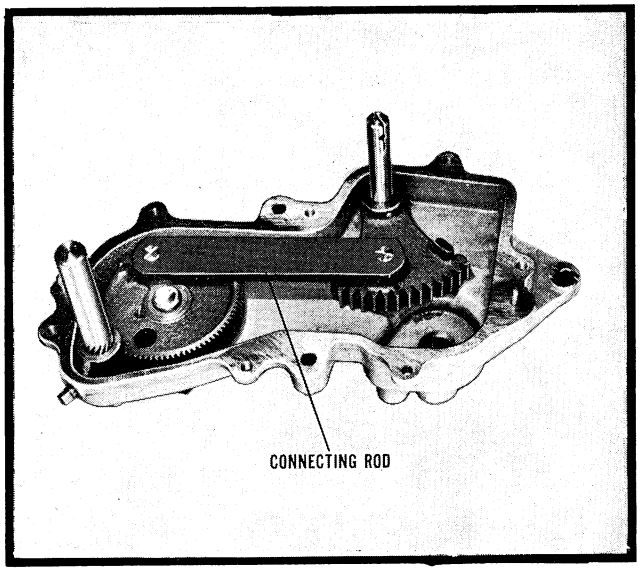


Figure 121

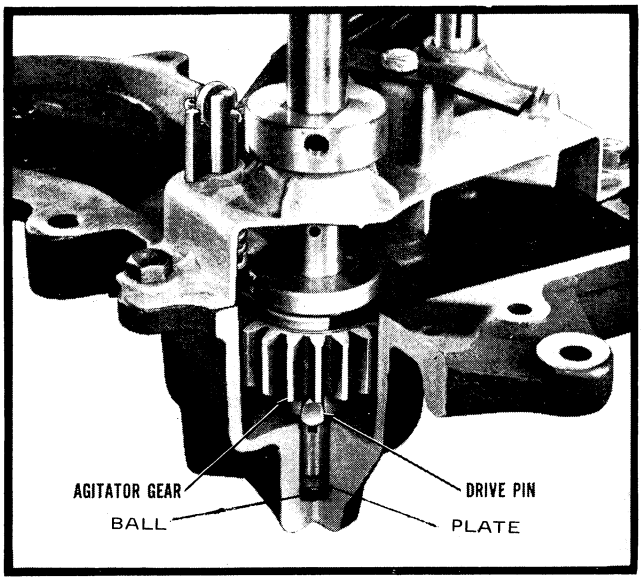


Figure 122

over the agitator shaft on top of the agitator gear. All gear case overhauls should be equipped with the improved parts. These parts are completely adaptable to all gear cases which have been produced, *Figure 124.*

The agitator cam bar is a part of the gear case assembly which is mounted on top of the gear case and is controlled by the plunger which moves up and down in the agitator solenoid. The agitator control solenoid is a part of the control magnet assembly and is mounted on top of the sector gear shaft which turns back and forth with the sector gear, *Figure 125.*

BASKET DRIVE AND BRAKE ASSEMBLY

Other parts making up the superstructure on top of the gear case are associated with the spin or basket drive on the machine.

The same belt and motor pulley that supplies the power to the agitator drive pulley also drives the basket drive pulley. The basket drive pulley is a part of the basket drive and brake assembly, *Figure 126,* which slips over the agitator shaft and rests on the basket support collar on top of the gear case assembly.

The basket drive pulley is always revolving in a clockwise direction whenever the machine motor is running. This pulley turns freely, however, on the basket drive tube. Mounted directly above the basket drive is the basket drive disc. Mounted on the drive pulley is a clutch lining which makes contact with the basket clutch plate during *SPIN.* The brake yoke exerts pressure downward on the

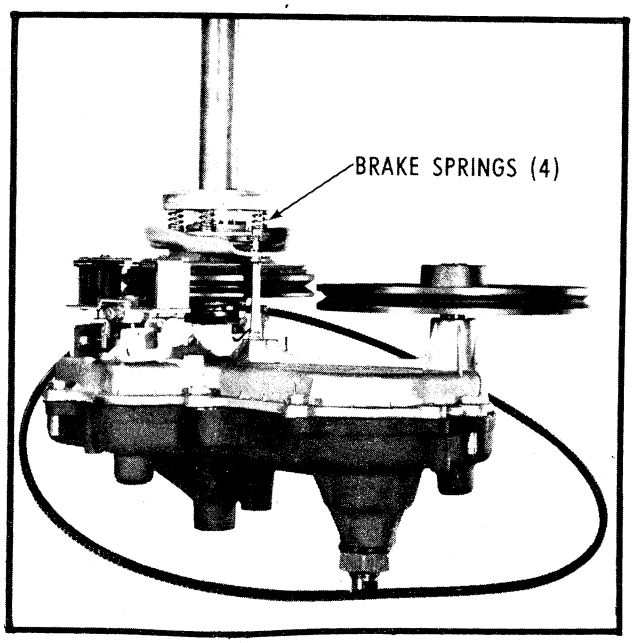


Figure 123

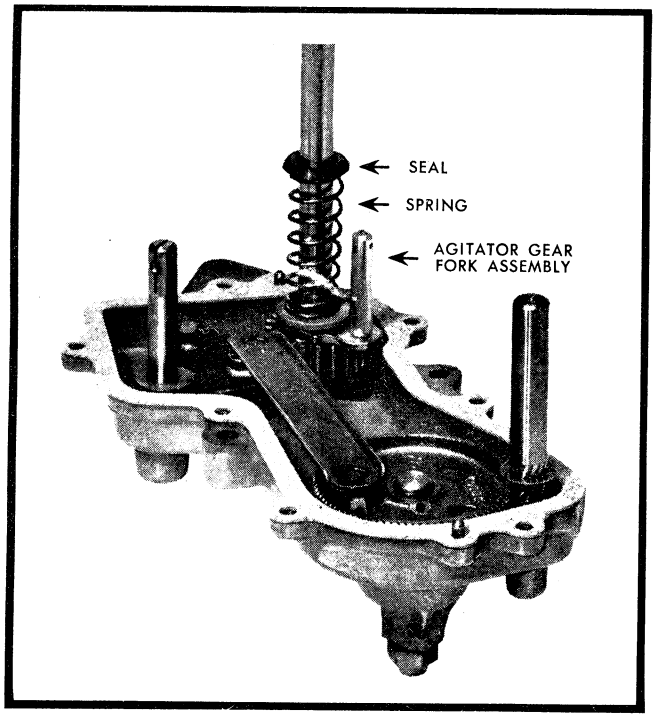


Figure 124

basket drive plate by virtue of a tension spring hooked between the brake yoke and the gear case cover.

When the extractor solenoid is energized, its plunger is pulled upward by magnetic attraction into the center of the solenoid coil. The bottom end of this plunger straddles the extractor cam bar. A horizontal pin through the fork of this plunger rides in the slot in the cam bar. A cam bar guide also

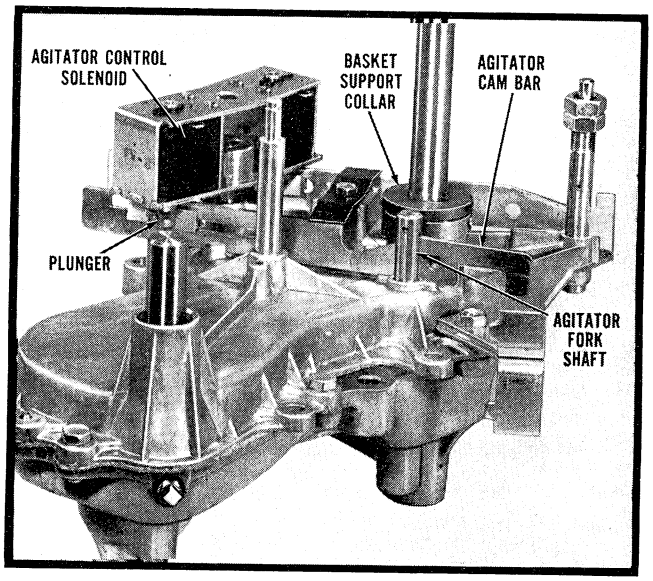


Figure 125

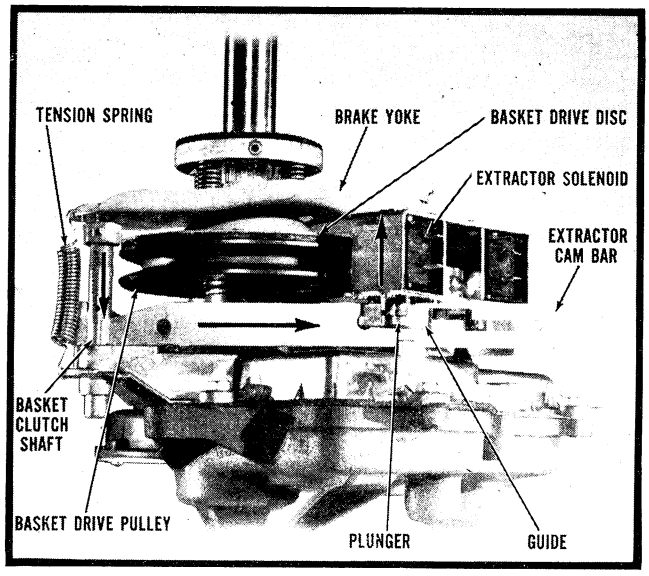


Figure 126

Rides on each side of the cam bar, held in place by the horizontal pin. The horizontal pin in the plunger rides in the upper portion of the slot of the cam bar when the extractor solenoid is energized. Since the control magnet assembly is moving back and forth with the gear sector, this pin pulls the cam bar backward. Since the opposite end of the cam bar is inserted in a slot in the basket clutch shaft, this shaft pulls the brake yoke downward as the cam bar moves backward. This allows the bottom of the basket clutch plate to come into contact with the top facing of the revolving basket drive pulley lining.

The upper and lower brake drum assemblies turn with the basket drive disc since they are splined to fit its hub, *Figure 127.* However, when the ex-

tractor solenoid is energized, the brake linings do not come into contact with their brake surfaces since the brake yoke is pulled down away from the brake drums.

Since the upper brake drum is secured to the basket drive tube by a self-locking screw, this tube always turns when the basket drive is engaged with the basket drive pulley.

The basket drive tube, *Figure 128,* extends through the top of the center post of the base plate. There are two ears of teeth on the top surface of this drive tube which engages with notches inside the basket drive block. The basket drive block is split vertically to permit a tight fit on the top of the tube when the basket is set down over it and the spanner nut is tightened down against the top of the basket center post. This action locks the basket to the drive tube so that it turns with the drive tube.

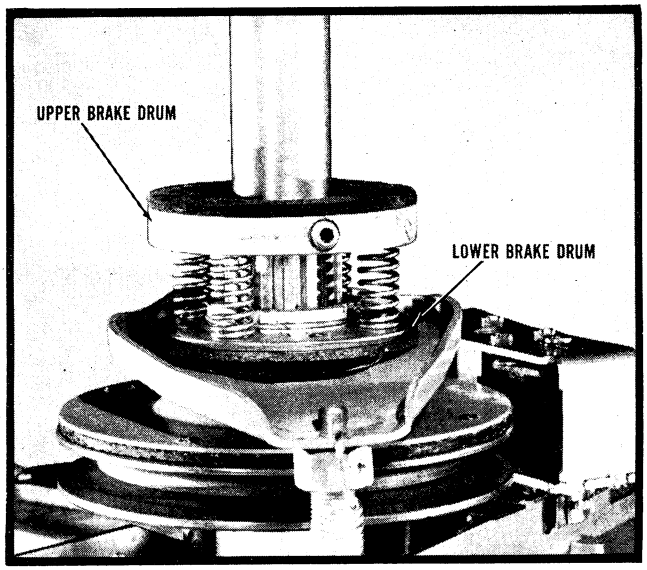


Figure 127

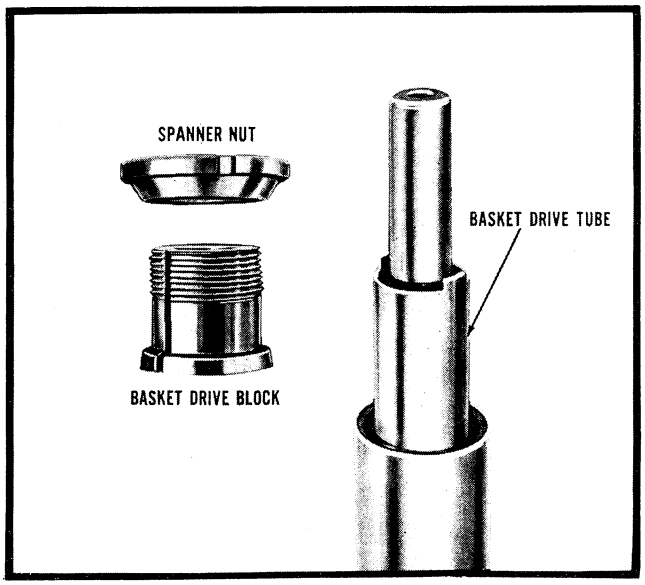


Figure 128

At the end of each *SPIN* period in the cycle, the timer switch contacts break the circuit to the extractor solenoid. When this action occurs, the plunger in the extractor solenoid slides down since there is no longer any magnetic force pulling it upward, *Figure 129.* The horizontal pin in this plunger then rides in the lower portion of the slot in the extractor cam bar and thus pushes the cam bar forward, lifting the basket clutch shaft. This action forces the brake yoke upward, pulling the basket clutch plate away from the basket drive pulley lining so that there is about 1/16 inch clearance between the two facings.

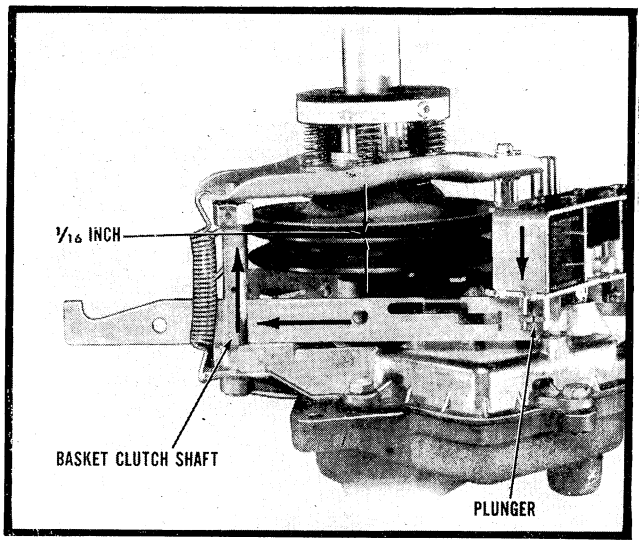


Figure 129

At the same time, the upward force of the brake clutch shaft brings the top surface of the brake yoke in contact with the brake lining that is located between the lower brake drum and the brake yoke. This lining in the past was secured to the lower brake drum, but is now permitted to float, giving a braking surface on both of its sides. In addition, the lining secured to the upper brake drum comes in contact, at the same time, with the bottom surface of the base plate assembly, *Figure 130.* These two simultaneous braking actions bring the basket to a fast, smooth stop. Four compression springs between the two brake drums provide the necessary

force for both an upper and lower braking action at the same time.

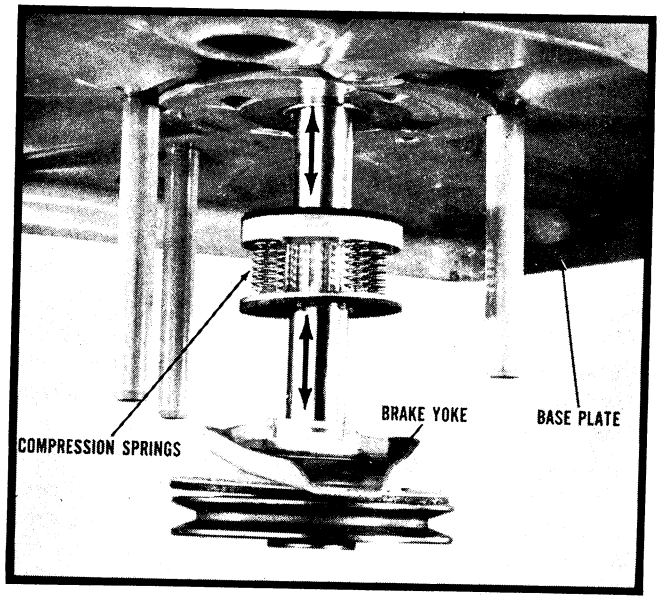


Figure 130

TO REMOVE THE GEAR CASE AND SUPER-STRUCTURE:

1) It is not necessary to remove the top, basket or tub, but the agitator must first be removed.

2) Unscrew the insert from the top of the agitator drive lug and remove the drive lug from the agitator shaft using the special drive lug puller, *Figure 131.* Heating drive lug with a torch will make removal much easier.

3) Remove the spanner nut with the special wrench, *Figure 132.*

4) After disconnecting the water inlet hoses from the faucets or water inlet valve, lay the washer over on its side on a padded surface to protect the finish on the cabinet top and console.

5) Remove the belt from the motor pulley and disconnect the hoses from the pump.

6) Disconnect the lead wires from the control magnet solenoids on top of the gear case.

7) Remove the cap screws and spacer that fasten the gear case and superstructure assembly to the base plate, *Figure 133.*

8) Remove the three gear case support braces which are attached to both the gear case and base plate.

NOTE: It is important for proper machine function that these braces be reinstalled.

9) The complete assembly can then be pulled out from the bottom of the machine.

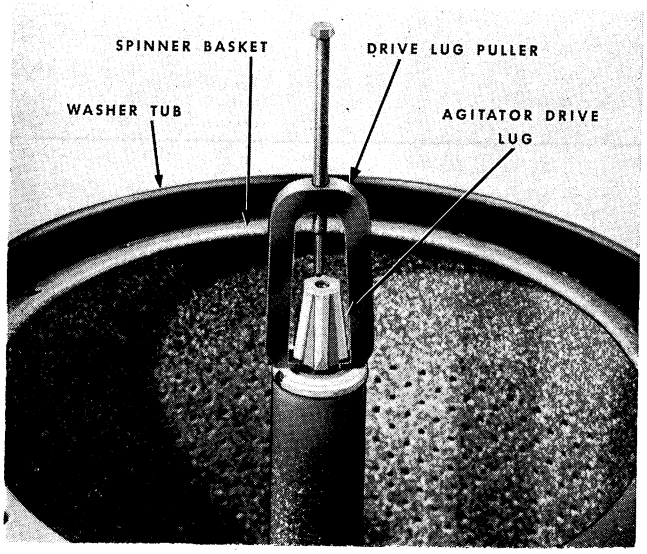


Figure 131

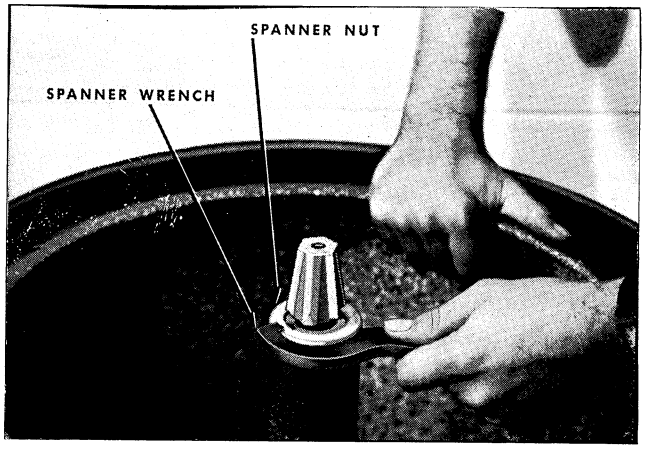


Figure 132

Before reinstalling the gear case and superstructure assembly, carefully inspect both of the upper and lower seals and both bearings in the center post. If they should be badly worn, replace them. Use the special tools for this purpose and follow instructions. Scored bearings will cause the basket drive tube to wear excessively. Worn seals will allow water and detergents to enter and cause the bearings to wear excessively.

Be sure that the drive belt is on the proper side of the gear case support studs before bolting the assembly in place. Also be sure that the ears on the basket drive tube align with the recesses in the basket drive block.

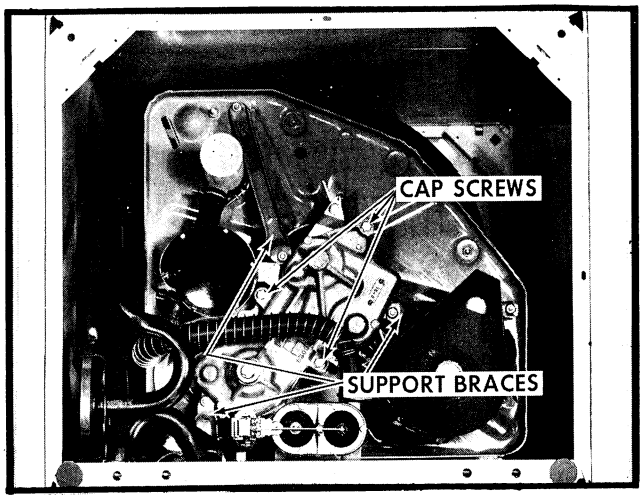


Figure 133

After the gear case and superstructure has been re-installed and the spanner nut has been tightened down on the basket center post, a new agitator drive lug should be replaced on the agitator shaft. However, before doing so, heat the drive lug carefully with a torch until the lug can be positioned with two or three light taps of a hammer. The drive lug should fit the shaft very tightly to prevent noisy operation. Heating it will expand the metal and a tight fit will result when it cools. Be sure the key in the drive lug is properly lined up with the groove in the shaft before positioning the lug onto the shaft.

The drive block or lug on later model washing machines is made of a hard plastic material. The new shaft has a splined end rather than a slot key as in previous models. Before installing the new spline type of drive block it should be placed in a pot of boiling hot water. Driving the block into the shaft could break the new part if this caution is not heeded.

TO REMOVE THE BASKET DRIVE AND BRAKE ASSEMBLY FROM GEAR CASE ASSEMBLY: See Figure 134.

1) Remove the gear case and superstructure assembly from washer as per the preceding instructions.
2) Remove the hairpin retaining spring from brake shoe yoke support.
3) Lift the control rod spring off.
4) Unhook the brake shoe yoke spring.
5) Lift the complete basket drive and brake assembly off over end of agitator shaft.

NOTE: To further disassemble the basket drive and brake assembly, remove the set screw from the upper brake drum assembly and slide this assembly, as well as the lower brake drum assembly, off over end of basket drive tube. By prying the retaining ring out of the groove of the basket drive tube, the basket drive pulley and thrust washer may then be lifted off.

The basket drive system has been changed as follows: (See *Figure 134).*

1) Lubrication-oil holes as formerly found at the top of the agitator shaft *(G)* and spin tube *(R)* have been removed. Tests proved that burrs which would sometimes occur at these holes caused scoring of the bearing and would also collect foreign material to the extent that added lubrication was entirely ineffective. By removal of the holes and the use of oil seals properly positioned, we can effectively create an oil reservoir for each bearing to run in. If additional oil supply is needed, remove seals at top of the spin tube and center post and fill to a point which covers the bearing and reseal with new seals.
2) The basket drive pulley *(L)* incorporates the use of a cast iron pulley with a round hub. An alternate pulley as used is fabricated of pressed steel which has an octagon hub.
3) The clutch lining *(M)* is a free floating member (on the cast iron pulley) between the drive disc and basket drive pulley. The alternate pressed steel pulley engages the lining to the pulley hub. The lining has an octagon hole which indexes itself on the hub of the basket drive pulley.
4) The basket drive disc *(N)* is free to slip on the lining during the start of spin operation and no longer has a riveted lining as used on previous designs.
5) Later model machines have a spline end for the agitator drive block insert, while the 16 lb. washing machines have a longer spin tube. When replacing the spin tube be sure you install the correct part. See insert *Figure 134* agitator spline. When replacing spin tube in 16 lb. washer, the new 96384 basket drive block should be used.

TO REMOVE THE GEAR CASE COVER (See Figure 134)

1) Remove the basket drive and brake assembly from the gear case assembly as per preceding instructions.

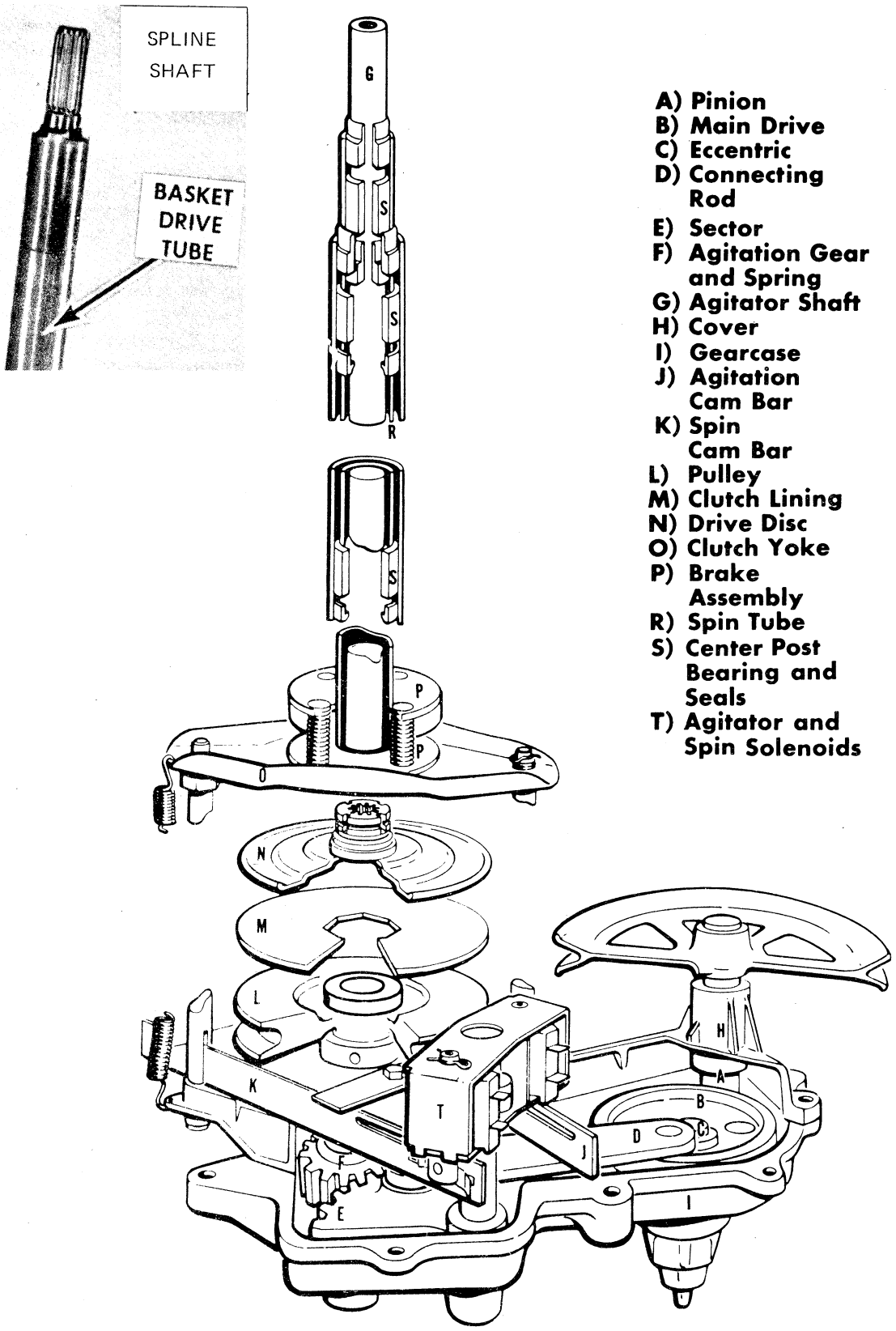

SPLINE
SHAFT
BASKET
DRIVE
TUBE
G
S
S
S
R
S
P
P
O
N
M
L
K
T
H
A
B
C
D
J
I
E
F
A) Pinion
B) Main Drive
C) Eccentric
D) Connecting Rod
E) Sector
F) Agitation Gear and Spring
G) Agitator Shaft
H) Cover
I) Gearcase
J) Agitation Cam Bar
K) Spin Cam Bar
L) Pulley
M) Clutch Lining
N) Drive Disc
O) Clutch Yoke
P) Brake Assembly
R) Spin Tube
S) Center Post Bearing and Seals
T) Agitator and Spin Solenoids

Figure 134

2) Remove the cap screw holding cam bar brake spring.

3) Lift the cam bar brake spring off.

4) Remove the screw holding the control magnet to gear sector shaft.

5) Lift the control magnet and cam bars off, sliding cam bars through the agitator control shaft and the basket clutch shaft.

6) Remove the set screw from the agitator drive pulley. Lift the pulley off.

7) Remove the set screw from the basket support collar and slide collar off over the agitator shaft.

8) Remove roller pin and roller from the agitator gear fork shaft.

9) Pull the basket clutch shaft assembly out.

10) Remove the cap screws holding the cover to gear case. Lift gear case cover off. Careful prying may be necessary since the cover may bind slightly on the dowel pins.

11) Clean out and refill the gear case with 12 ounces of a good grade of S.A.E. No. 60 non-foaming, non-detergent motor oil or the oil recommended in *"Lubrication Instructions"* before reinstalling the cover.

12) *CAUTION: Do not lose small steel ball and plate in base of gear case located in agitator shaft recess. If these parts are left out, machine will skip in agitation, refer to Figure 122 for correct location and positioning.*

TO COMPLETELY REBUILD A GEAR CASE, THE FOLLOWING PROCEDURE IS RECOMMENDED:

1) Ordinarily, it it not necessary to replace a complete set of gears. Carefully examine parts and replace only those that warrant changing.

2) Tear down gear case and clean all parts in a solution of suitable solvent.

3) Wire-brush gears and follow with compressed air drying for visual inspection.

4) Clean gear case bottom. Blow out pinion, sector, agitator and fork shaft holes to remove any metal particles. It is important that the case be as clean as possible. Also remember to remove the agitator shaft thrust washer and ball.

5) Drill or ream the gear case mounting holes to 7/16 inch. This will provide better alignment when reinstalling gear case.

6) Visually examine the following. See *Figure 134.*

a) Pinion Gear. It is important that there is no wear other than polish in the area of the cover bearing or at the journal. A slight scoring at the journal is acceptable as long as the area is not undersized. Teeth areas should appear to have uniform wear and be free of sharp nicks.

b) Main drive gear. Teeth area should appear to have uniform wear and be free of destructive pitting, broken areas and sharp nicks

c) *Connecting rod.* Be sure studs are securely staked to the bar. The stud diameter can be checked for wear by mating part with a new sector.

d) *Sector gear.* Teeth areas should have uniform wear and be free of destructive pitting and sharp nicks. Check connecting rod hole with a new connecting rod. Slight amount of play is acceptable but the hole should not be egg shaped. Check shaft to be sure it is properly secured to the gear.

e) *Agitator gear.* The new No. 92815 spring and No. 92814 seal are recommended for all gear case overhauls. If the No. 16027 cast iron gear is badly rounded in the pin engagement area, it should *NOT* be reused with the new spring. This also applies to the No. 17553 copper infilterated gear. A small amount of wear will not affect the gear operations.

f) *Agitator shaft.* Plating should not be scored or damaged in the upper seal or bearing area. If the gear has not been jumping prior to overhaul, the shaft pin should not have excessive wear.

g) *Gear case cover.* Check cam bar slots for broken ears. If the pinion bearing is worn, only the bearing need to be replaced. If the cover is worn by the cam bar in the area of the gear torque, a special hardening steel washer No. 19054 should be used. The washer fits over the fork shaft between the cam bar and cover.

h) *Miscellaneous Items.* No. 16018 Agitator Thrust Washer (Nickel) – check for cracking or deformation. No. 85529 Ball (Agitator Shaft) – check for flat spots. Inspect cam bars, cam bar pins and plungers for wear.

7) *Reassembly procedure:* (This pertains mainly to the pinion and main drive gears)

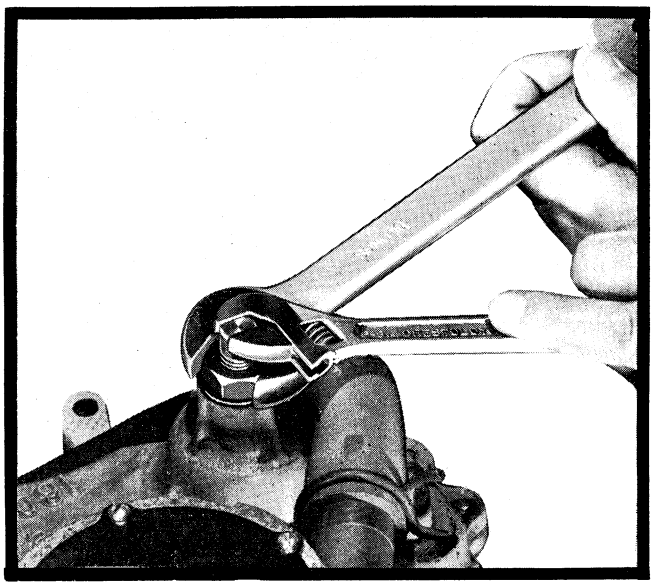


Figure 135

a) Only used gears that are mated should be re-used. Never mate used gears from separate gear cases.

b) A new pinion or main drive gear can be used in conjunction with comparable good used parts.

c) If sufficient eccentric adjustment between the main drive gear and pinion cannot be obtained, a new stud should be used.

d) Fill the gear case with 12 ounces of SAE No. 60W, non-foaming, non-detergent oil. (If 60W is not available, 40W could be used although gear case operation will be somewhat noisier.

8) *Adjustment procedure:*

a) With the eccentric turned to the low side, check the pinion for freeness. Prior to securing the cover bolts, make sure that the pinion has at least 1/8" vertical travel. This will insure adequate clearance between the pinion bearing and pinion washer after the cover bolts are tightened.

b) Eccentric adjustment (Shop procedure). To adjust the eccentric stud, hold the jam nut with one wrench and turn the stud with another wrench, *Figure 135.* Adjust the stud until the main drive pinion pulley has a slight drag when turned by hand.

CAUTION: Do not cause excessive bind or drag between the pinion and main drive gear by over-adjusting the stud.

It is recommended that a wattmeter be installed in series with each test stand motor. Because of wattage variances, the *"no-load) motor wattage"* must be substracted from the total reading. If you have an adjustable wattmeter, adjust the needle to zero with motor operating. If your wattmeter is not adjustable, paint or mark a line on the glass at the wattage reading with the motor running. Add 200 watts to this reading and make another line on the glass.

With a meter adjusted to zero, the operating wattage of a gear case should not exceed 200 watts. With a non-adjustable meter, the wattage should not exceed the *"no-load motor wattage",* plus 200 watts.

After the gear case has been adjusted, allow it to operate for at least 1/2 hour before checking noise level. Use a large screwdriver as a stethoscope in the cover area of the pinion to check for any unusual noise.

c) Eccentric adjustment *(Home Procedure).* To check the eccentric adjustment in the home fill the washer with water and let it operate in any agitation period of the *NORMAL ACTION* cycle. With the machine agitating under a full load of water, there will be a knocking sound in the gear case if the adjustment is too loose. If this occurs, readjust the eccentric stud until the knocking stops. Ease off as much as possible without permitting a knock. Then tighten jam nut.

NOTE: It is not recommended that the gear case be carried or handled by the agitator shaft. A new spring between the agitator gear and cover allows more upward travel of the shaft. If the shaft is pulled up too far, the No. 16018 thrust washer may cock out of position and not allow the shaft to properly reseat itself.

TO REPLACE THE CENTER POST BEARINGS AND SEALS, Figure 134

(See " Spin Tube Bearing and Agitator Shaft Bearing Quick Kit" information, Pages - 88,89).

1) Remove the gear case and superstructure assembly as per instructions in *Item 4.*

2) Remove the spin basket.

3) Using the special center post bearing puller tool, pull out the lower bearing and seal from the top of the center post, see *Figure 136.*

4) Using the special bearing inserter tool, press a single lip seal (with the seal lip up) and a new bearing into the top of the center post, also a new bearing into the bottom of the center post See *Figure 137.*

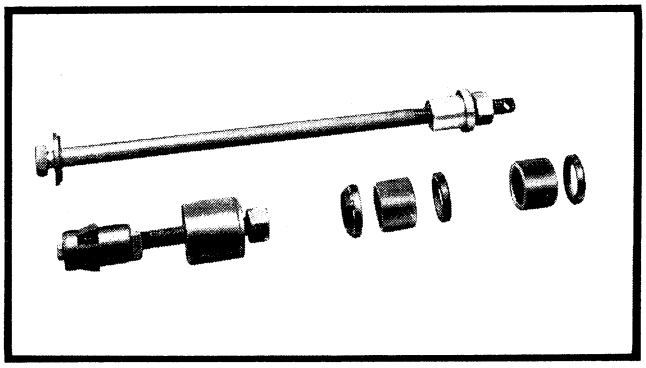


Figure 136

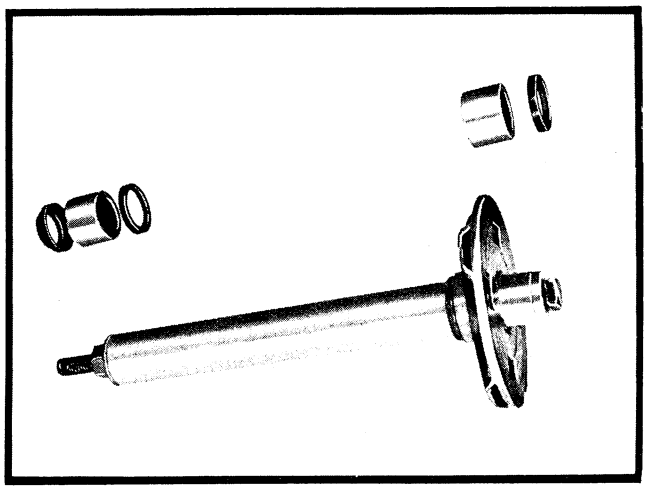


Figure 137

NOTE: Before installing new center post bearings and seals, it is IMPORTANT that the inner wall of the entire center post be cleaned. Use a wire brush or similar tool as there is no seal directly above the lower bearing. Any foreign matter left in the center post could fall into the bearing area. Use extreme care if resillent bushings are removed to assure that the outer steel shield has not separated from the rubber cushion and the steel shield is still in the tube. If this is so, the steel shield must be removed and discarded before new bushings are installed. Failure to heed this precaution will result in binding of the new spin tube and perhaps destroying the new bushing.

Proper installation of new bearings and seals is most important to insure long life. Prime factors affecting proper installation are:

1) Good alignment, (2) Proper seal design, (3) Bearing material and (4) Lubrication.

5) Press a new single lip seal into the bottom of the center post beneath the bearing, being sure that the lip of the neoprene seal is up. Add approximately 1/2 oz. of rypon No. 2 grease in the lower center post bearing section before installing the gear case and superstructure.

6) Install the gear case and superstructure. Be careful to protect the new center post seal from damage when inserting the top of the basket drive tube through it.

7) Before installing both the agitator shaft seal and centerpost seal add turbine oil in each cavity to an oil level just above the bearings. Each cavity has a seal installed just below the bearing to retain the oil.

8) Install the top center post seal and spin tube seal with the lid up after the gear case and superstructure have been reinstalled and oil added.

Improper spin operation will occur when the base plate mounting of the gear case is not properly aligned. If this problem should occur, loosen the belt tension and the three gear case mounting stud screws two turns. This allows the agitator shaft and spin tube to properly align in the center post bearings. Retighten the three gear case mounting stud screws evenly and readjust belt to proper tension.

After machine has been operated in agitation cycle a moment, turn off and turn basket by hand. Basket should turn freely and without drag. If drag is evident, misalignment can be corrected by loosening one gear case mounting stud at a time until misalignment is relieved. If misalignment occured at gear case mounting stud where support spacer is inserted, replace spacer. However, if condition takes place on one of the two other gear case mounting studs, shim out as needed with one or two .010" horse shoe shim washers, Part No. 16385. Misalignment is also readily detected by pushing down on the bottom of the basket. If basket does not readily move up and down, correct problem as indicated above.

NOTE: The misalignment problem has no relation to the use of the currently employed floating lining clutch assemblies which have been in use since 1960. Wattage specifications have not been altered and currently used clutches will produce the same results as the former design when bearing to spin tube alignment is correct.

TO REPLACE THE DRIVE BELT WITHOUT REMOVING THE GEAR CASE AND SUPERSTRUCTURE

1) Remove rear service panel.
2) Loosen the nut holding motor mounting bracket and slide the motor over to relieve belt tension.
3) Remove the belt from pulleys.
4) Remove the gear case mounting stud and take out the spacer.
5) On machines from 1961 on, remove the nuts which secure the support braces to the gear case. Loosen or remove the braces where they attach to the base plate:

NOTE: It is important for proper machine function that these braces be reinstalled.

6) Unhook the brake shoe yoke spring. Slide the extraction cam bar out of the slot in the clutch yoke stud. (Push up on the bottom of the stud to free pressure on the cam bar.
7) After the cam bar is free, the stud can be dropped down so that the belt will slip out between the clutch yoke and the top of the stud.
8) Disconnect hoses from the pump. The belt is now free to be slipped down over the pump and the gear case.

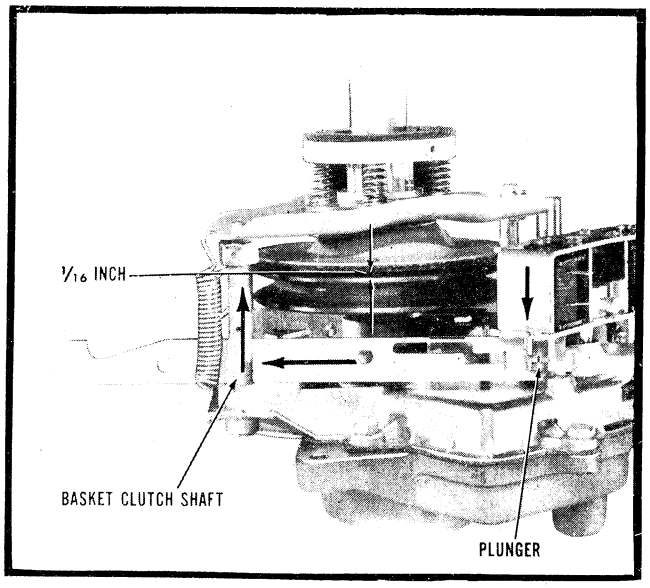


Figure 138

A new Phenolic *"T"* bearing replaces the former bronze bearing. This change has taken place to reduce sound level.

The new three point clutch uses three separate asbestos pads spaced equally apart and are riveted to the clutch drive disc.

Adjustment of the clutch remains the same, 1/16" measured at the clutch shaft location.

To measure for proper spacing, turn the drive disc so one of the pads is in line with the clutch shaft.

TO ADJUST THE BASKET DRIVE CLUTCH

1) Set the timer so that the clutch is disengaged (in agitation).
2) Lay the washer on its side on a padded surface to prevent damaging the finish.
3) Adjust the nut on the basket clutch shaft to obtain a clearance of 1/16 inch with the clutch disengaged, *Figure 138.*

Agitators

The agitators used on the Whirlpool Automatic Washers are moulded from a black mineral-filled bakelite material. They come in two basic designs: the straight-vane type usually found on the Deluxe and Custom Models and the undulated vane type as is used on the Supreme and Imperial Models, *Figure 139.* The undulated vane type agitator has a slightly larger base diameter than the straight-vane type, but the two agitators are inter changeable as far as proper fit is concerned.

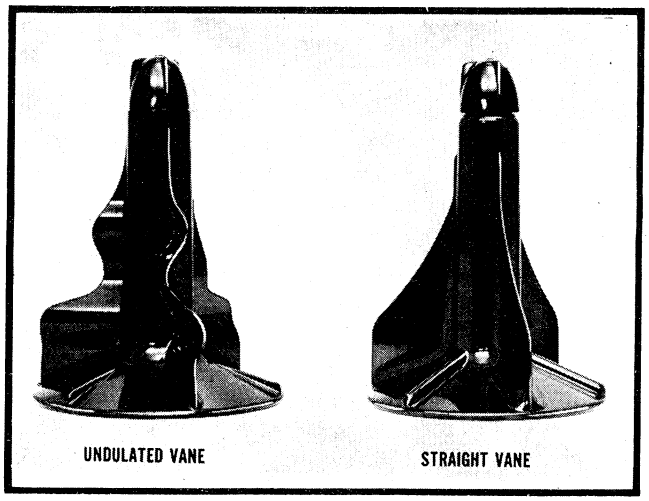


Figure 139

Either of these agitators is driven by a hexagon tapered drive lug, *Figure 140,* pressed on top of the agitator shaft. A stud, with hex head, screws into the top of the agitator shaft and further helps

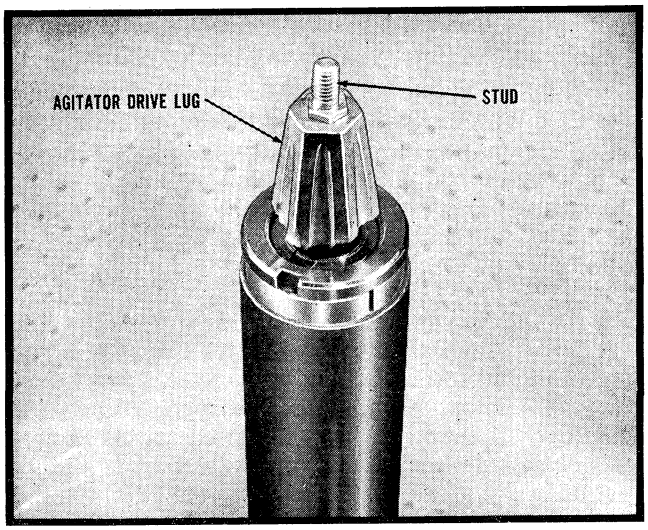


Figure 140

to hold the drive lug down. The agitator cap screws onto the top of this stud and holds the agitator down. The air escape hole that was formerly located in the side of the agitator has been removed. The removal of this hole permits an air pocket to be created in the top of the agitator when the tub is full of water. This air pocket prevents water, bleaches or detergents from contaminating the area around the top of the basket drive tube and center post seals.

Basket

The porcelain lined basket, *Figure 141,* is perforated to allow free-flow draining and has a conical shaped bottom with a high center post to provide a clean smooth surface that does not trap sediment and soil deposits.

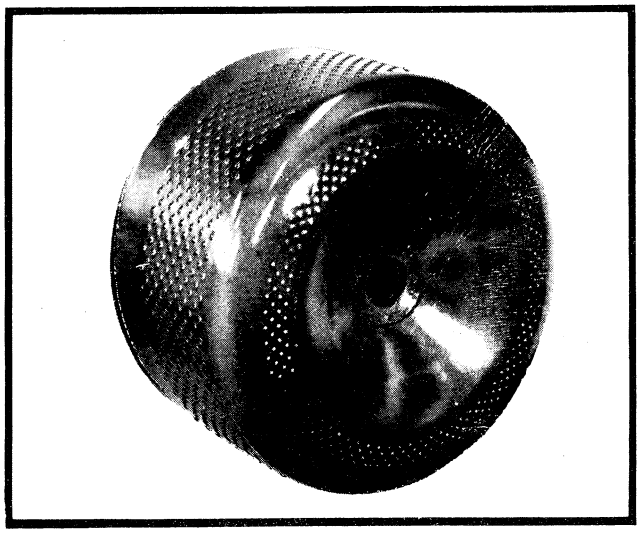


Figure 141

The basket on the 24 inch cabinet machines is 19 3/4 inches in diameter and 13 1/4 inches deep. Machines with 29 inch cabinets have a basket which is 21 inches in diameter and 18 7/8 inches deep. Due to its larger size it has approximately 80 more holes in its periphery than does the smaller basket.

The agitator, snubber assembly, tub ring, basket and tub can all be removed or replaced from the top of the machine. The agitator, of course, can be removed by lifting the lid of the machine, but when removing the other items, it will be necessary to lift or remove the top.

TO REMOVE THE TOP ASSEMBLY

Hinge Top Models

A. Raise the lid, grasp the top assembly at the front of the lid opening, pull slightly forward and jerk upward.

B. Pivot the top assembly back on its hinges and carefully rest it against a wall. To prevent paint or porcelain damage, it is recommended that padding be used between the top and the wall.

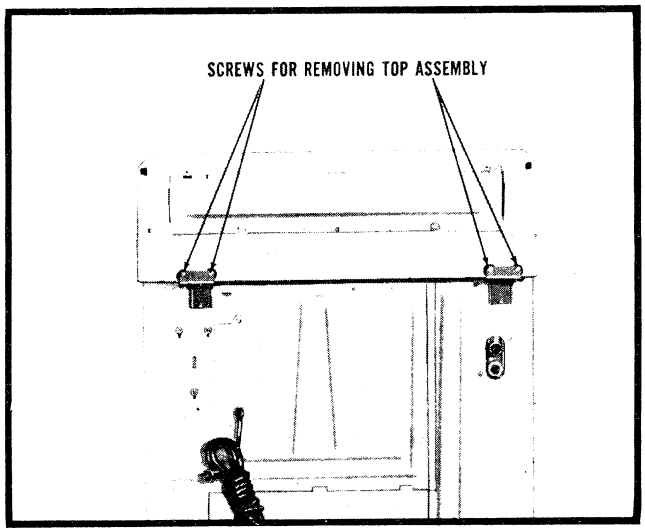


Figure 142

Models Without Hinged Tops

A. Remove the top mounting screws at the rear of the machine, *Figure 142.*

B. Slide the top assembly forward to disengage the top from the front mounting clips. (It is not necessary to disassemble the console from the top).

C. Tilt the top assembly back onto the top mounting brackets, being careful to protect the lid assembly from snapping open and causing

damage. Lean the top assembly against the wall behind the machine, again protecting it from possible damage.

Figure 143

To Remove the Basket

A. Take out the agitator.

B. Remove top assembly as per instructions above and remove germicidal bulb, if any.

C. Disconnect water inlet hose from water inlet vacuum breaker or funnel on tub ring and remove snubber spring assembly.

D. Pull tub ring up and off on models equipped with pitcher spout tub ring, push retaining clips away from tub ring before attempting to remove it.

E. Use the special wrench to unscrew the spanner nut from the top of the basket center tube, *Figure 143.* If necessary, tap the wrench lightly with hammer to start the nut.

F. Lift the basket out of the tub.

Tub

The smaller basket fits into a tub, which is 21 3/32 inches in diameter and 15 1/4 inches deep, while the 21 inch basket fits into a tub that is 22 1/8 inches in diameter and 15 1/2 inches deep. Both of these tubs are coated with a porcelain enamel and, with the exception of the tubs used on one of two of the early Whirlpool models, have conical bottoms, *Figure 144.* The conical bottom permits faster drainage and lessens the chance for rust and dirt depositing in the bottom.

Baffles are provided in the tub bottom to create a turbulence and to prevent an air lock in the tub outlet hose. On earlier models, one aluminum baffle was located about 60 degrees from the drain outlet. Later this aluminum baffle was relocated approximately 160° from the drain and a polyethylene baffle was added to the drain opening, *Figure 145.*

On 24 inch cabinet models equipped with float switches, a float chamber is welded to the side of the tub. All other tubs have a hole in the side to provide a means of attaching a fill control hose or tube. On machines equipped with the recirculating lint filter system, another hole has been added in the opposite side of the tub for the recirculating hose.

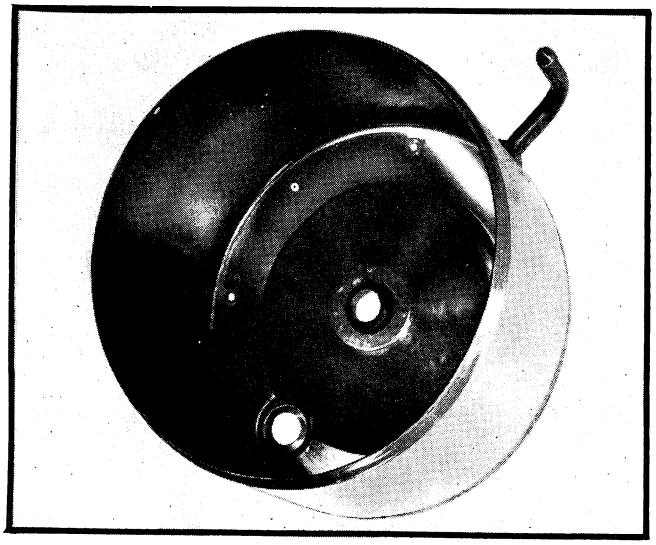


Figure 144

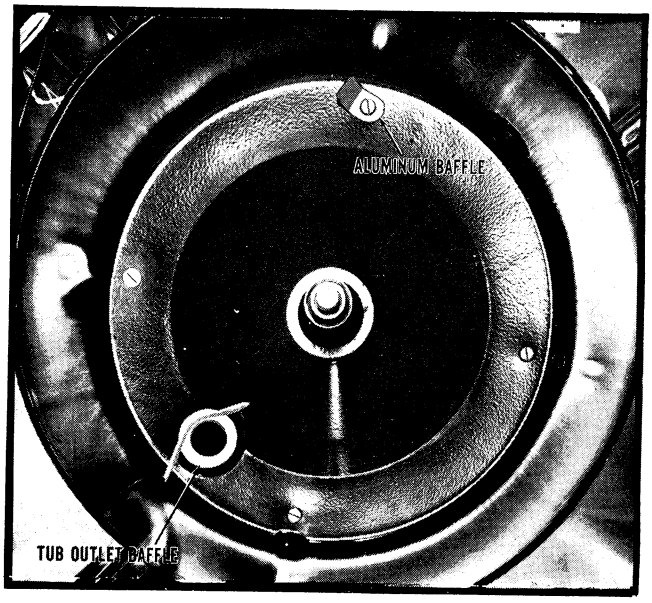


Figure 145

To Remove The Tub (After The Basket Has Been Removed)

A. On models equipped with a float switch chamber on the side of the tub, disconnect the wiring from the float switch, so that the switch can be removed with the tub.

On models equipped with float switch mounted on back of cabinet, disconnect fill control hose from bottom of float chamber.

On models equipped with water level pressure switch, disconnect plastic tube from connector in fill control hose.

B. Remove water baffles and screws from tub bottom and lift tub out of cabinet. On machines equipped with the flat bottom tub it will also be necessary to remove the center post plate, *Figure 146.*

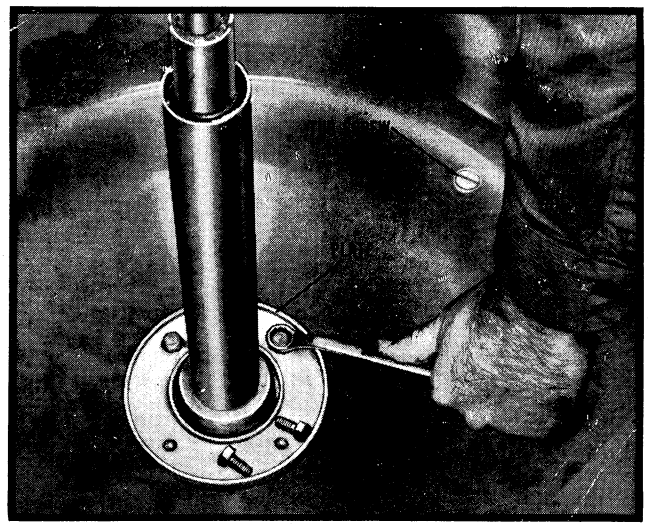


Figure 146

C. Before installation of a conical bottom tub, make certain that the rubber tub gasket is properly inserted in the center hole of the tub.

D. Make a pilot, or guide, by forming a sheet of heavy paper into a cone shape, and slip it over the top of the agitator shaft and spin tube, *Figure 147.* This will protect the tub gasket from damage when installing the conical bottom tub in the cabinet.

E. After the tub has been installed on the machine, be sure the baffles have been properly placed, *Figure 145*. Then test the tub for water leaks before replacing the basket.

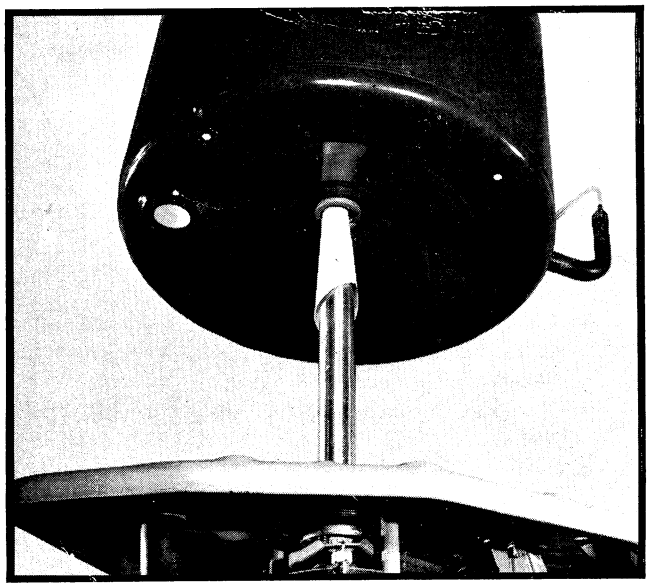


Figure 147

Base Plate

The base plate, *Figure 148*, which supports most of the mechanical units of the water, is made of a heavy gauge steel, and has a strong center flange or hub welded to it. The center post that houses the spin tube and agitator shaft is pressed into this flange.

The gear case, pump and machine motor are fastened to the bottom of the base plate and the washer tub is secured to its top surface, *Figure 149*. In connection with the new cabinet design, three braces have been added between the gear case and base plate. Purpose of these braces is to further stabilize the center post, gear case and base plate during spin, especially with off balance loads, *Figure 150.*

NOTE: It is important that these braces be retained on the machine to obtain maximum performance.

These braces are secured between the base plate and gear case. The benefits received by their addition are:

1. Reduced flexing of the base plate during spin.
2. Reduced cabinet movement during spin.

Performance with an off-balance load is improved from approximately three pounds without braces to five pounds with the braces.

The braces must be removed in order to replace the belt or gear case.

The gear case is interchangeable except that two longer cover screws are required to mount the braces. These screws can be removed from the gear case being replaced and used.

The new braces are not adaptable to previous models where welded base plate bolts are required for mounting.

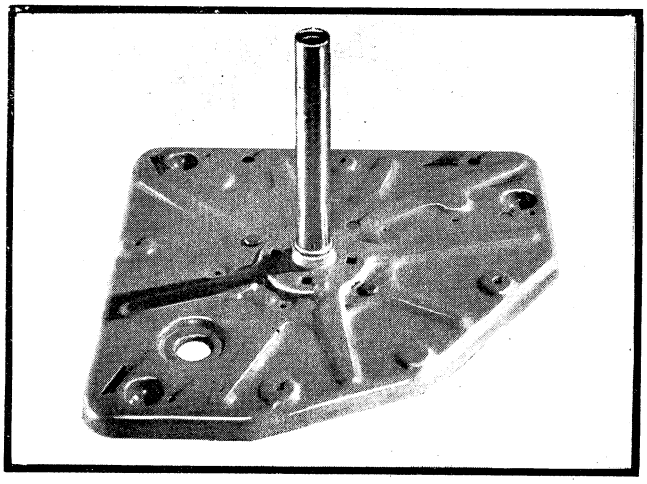


Figure 148

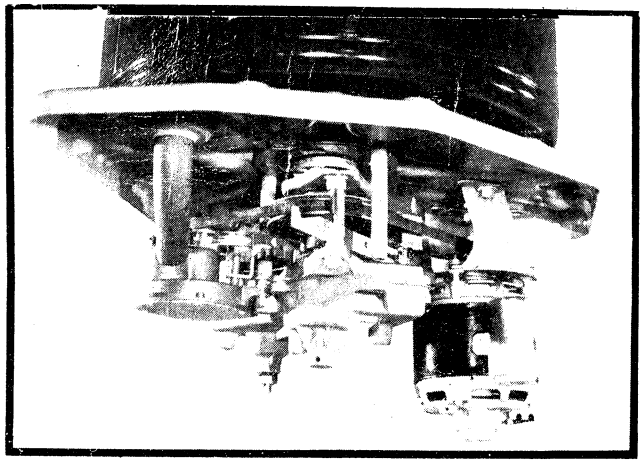


Figure 149

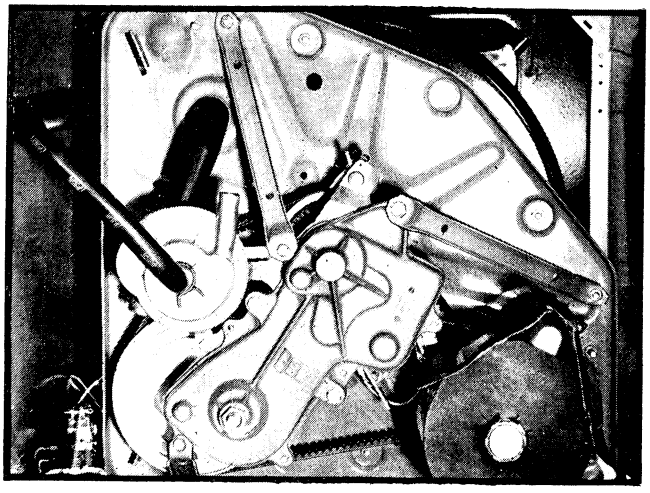


Figure 150

Snubber

A snubber, *Figure 151,* is used on each machine to reduce the oscillations of the base and tub assembly during the spinning operation. This snubber should be able to control a 4 1/2 pound unbalance load without permitting the mechanism to strike the cabinet.

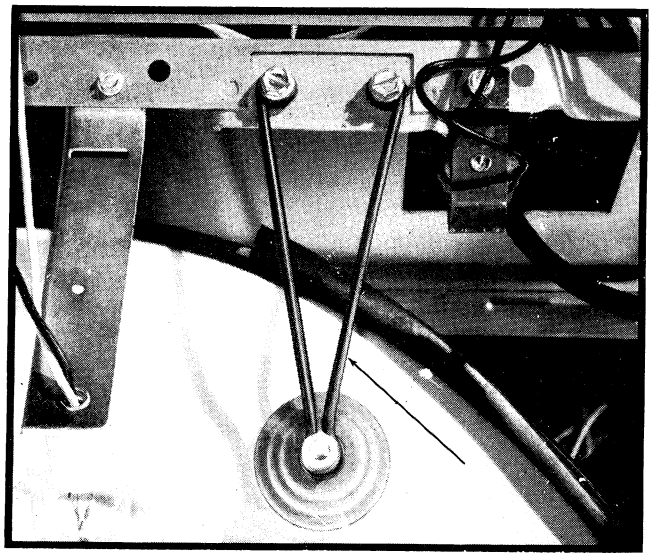


Figure 151

The snubber assembly consists of a tempered steel wire snubber spring secured to the back of the cabinet by two screws; and adjustment screw, which is secured to the opposite end of the spring by two nuts and lock washers, and a metal insert fitted into a snubber pad for the head of the adjusting screw to ride in. On later production, the insert and rubber pad were molded together as one unit. The snubber pad presses against the top of the tub ring.

A newly designed snubber pad is not being used on current models, eliminating the need for an adjustment screw and nuts, *Figure 152.*

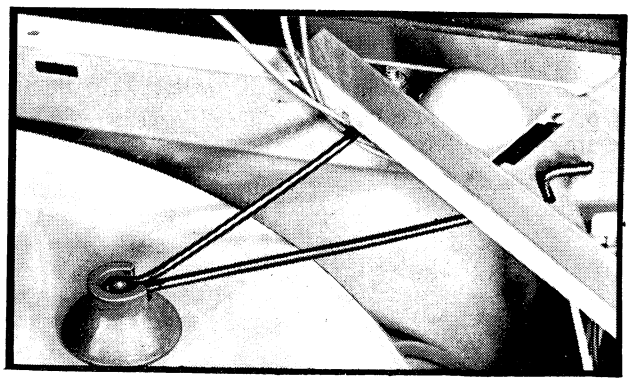


Figure 152

PROCEDURE FOR CHECKING THE SNUBBER:

1) If there is excessive noise or vibration due to a worn, loose or oily snubber, the snubber must be replaced.

TO REPLACE SNUBBER:

1) Unlatch and raise the top assembly.
2) Lift up on the snubber spring and remove. snubber.
3) Remove the nut and bolt securing one leg of the spring to the right rear suspension gusset.
4) Turn the spring to the right until the end of the other leg releases into the slot of the gusset.

Tub Ring

The tub ring is seated on top of the tub. A rubber gasket is used to provide a cushion between this tub ring and the tub, *Figure 153.* It gives a tight seal around the top rim of the tub to prevent water from going out over the top of the tub during the spinning operation and helps to prevent water from splashing over during agitation.

This tub ring also provides a flat surface for the snubber to press against and a means for anchoring the water inlet funnel or adapter.

On 1957 models, a spout was provided in the design of the tub ring to direct the water away from the motor and other electrical components in the event the water level control should fail, *Figure 153.* Water splashed on the top of the tub ring during agitation should run back into the tub since the top of the tub ring slopes to the center.

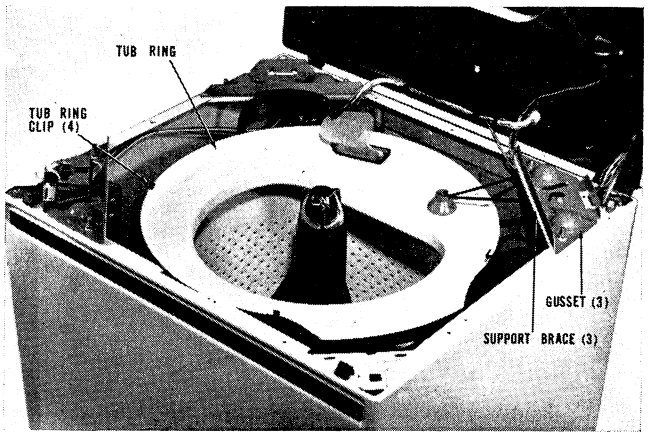


Figure 153

On later production, this tub ring has been notched at the four points where the tub ring clips make contact with it. This has been done to prevent rotary slippage during an extreme off-balance load.

Suspension Rods

Three strong suspension rods, *Figure 154,* support the base plate in the cabinet. These rods are mounted to permit limited movement of the mechanism without transmitting vibrations to the cabinet.

Each suspension rod is fitted with a ball and socket joint at its upper and lower ends. These rubber ball halves are under tension when enclosed between the socket and cap, *Figure 155.* The flexing of the ball permits a limited amount of movement to the base plate.

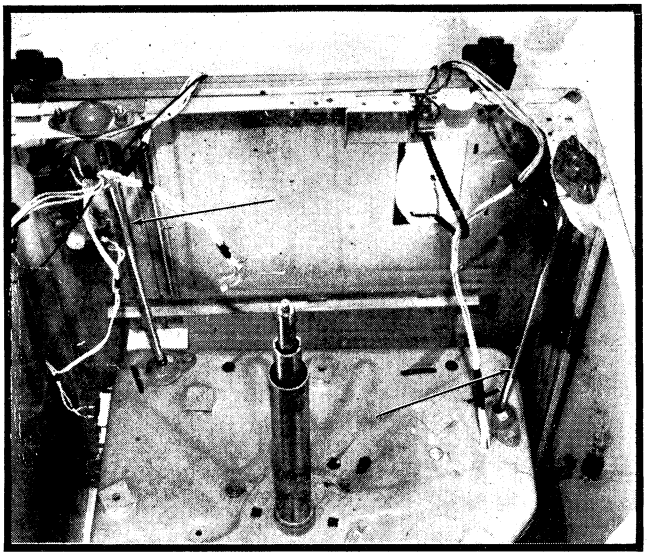


Figure 154

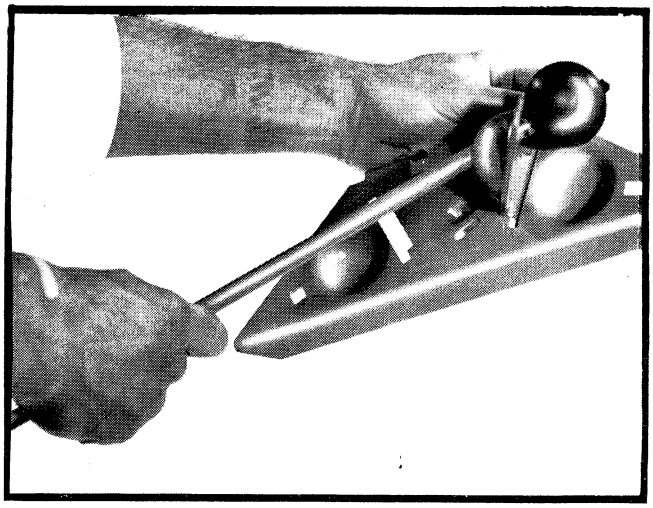
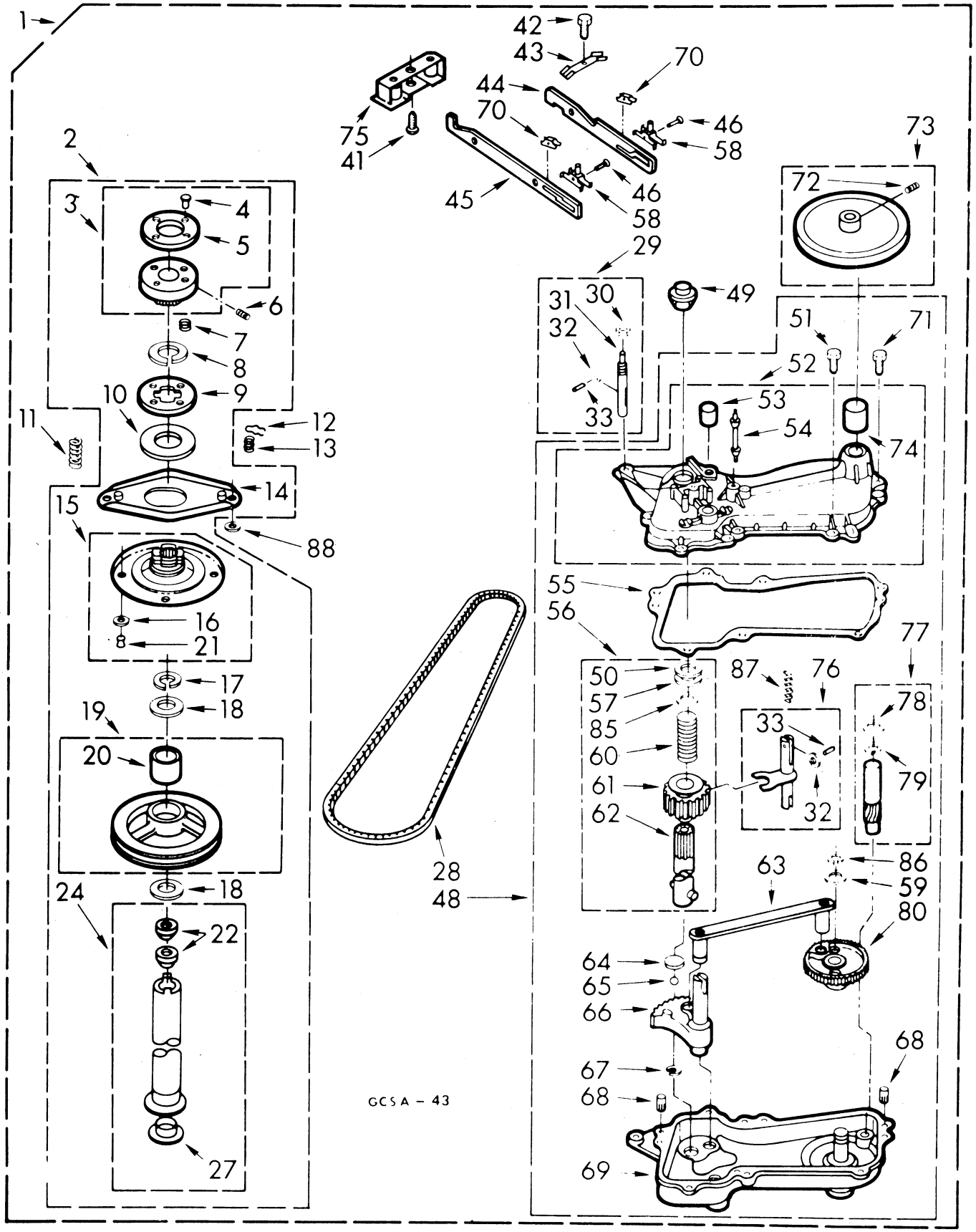


Figure 155

363082 GEAR CASE AND SUPERSTRUCTURE



Order parts through your normal parts distribution source and by model number.

363082 GEAR CASE AND SUPERSTRUCTURE

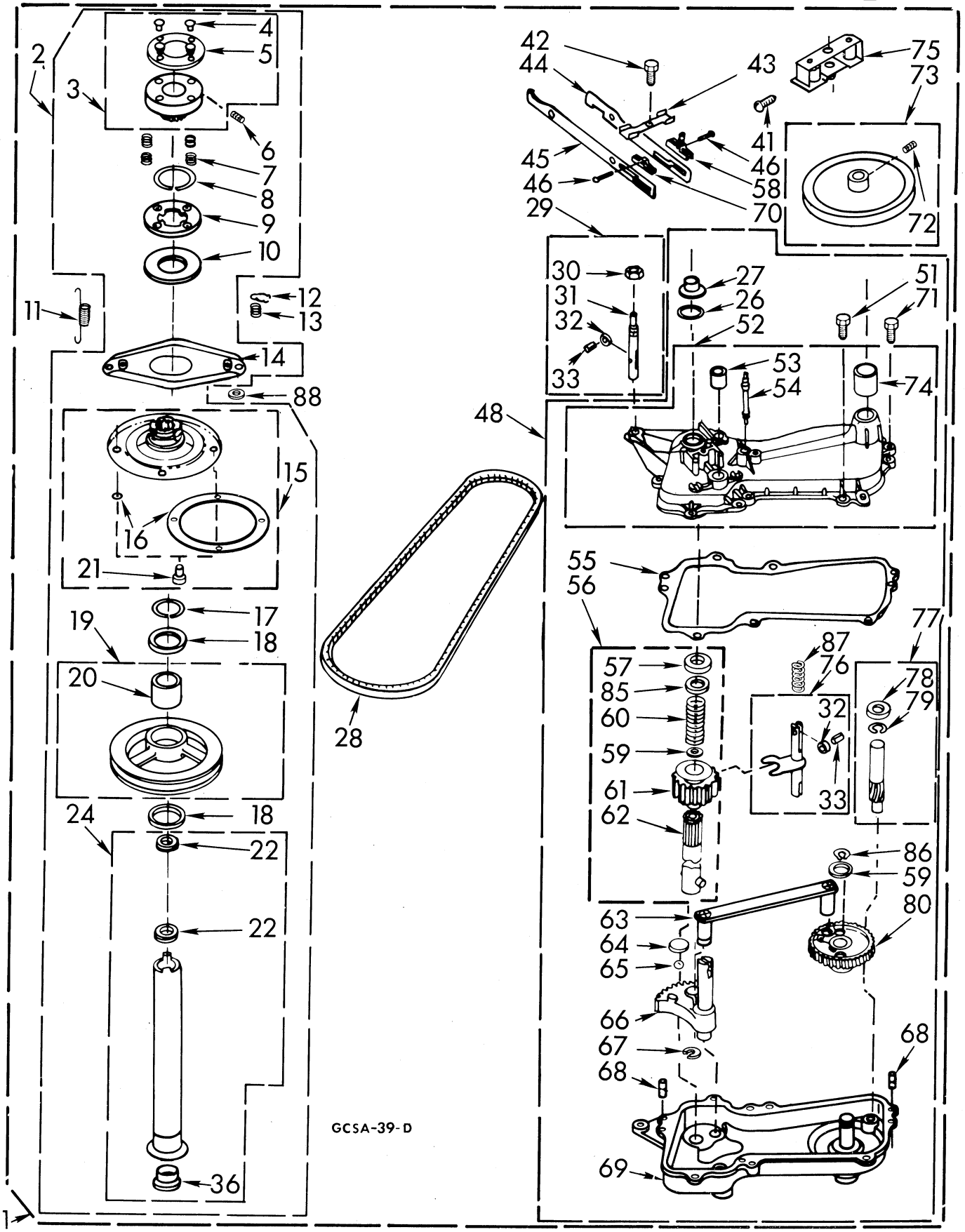
GEAR CASE
AND SUPERSTRUCTURE ASSEMBLY

1	GEAR CASE AND SUPERSTRUCTURE ASSEMBLY
2	BASKET DRIVE AND BRAKE ASSEMBLY
3	BRAKE DRUM ASSEMBLY
4	RIVET (4)
5	LINING, BRAKE
6	SCREW, 5/16-18 x 3/4 SET
7	SPRING, DRIVE (4)
8	RING, SNAP
9	DRUM, LOWER BRAKE
10	LINING
11	SPRING
12	RETAINER, SPRING
13	SPRING, CONTROL ROD
14	YOKE, BRAKE
15	DISC AND LINING ASSEMBLY
16	LINING (SET OF 3)
17	RING, RETAINER
18	WASHER, THRUST
19	DRIVE PULLEY ASSEMBLY
20	BEARING
21	EYELET (3)
22	SEAL, OIL
24	DRIVE TUBE AND BEARING ASSEMBLY
27	BEARING, THRUST
28	BELT, "V"
29	SHAFT ASSEMBLY
30	NUT, 1/2-20 SELF-LOCKING
31	SHAFT, CLUTCH
32	ROLLER, SHAFT (ALTERNATE)
	ROLLER, SHAFT (ALTERNATE)
33	PIN, ROLLER
41	SCREW, TAPER END
42	SCREW, 1/4-28 x 1/2
43	SPRING, BRAKE
44	CAM, AGITATOR AND PUMP
45	CAM, BAR-SPIN
46	RIVET
48	GEAR CASE ASSEMBLY
49	SUPPORT-SPIN TUBE
50	RING, RETAINING
51	BOLT, 5/16-24 x 3/4
52	GEAR CASE COVER ASSEMBLY
53	BEARING-7/8" O.D.
54	SUPPORT, BRAKE SHOE YOKE
55	GASKET, GEAR CASE
56	AGITATOR SHAFT ASSEMBLY
57	SEAL
58	PLUNGER
59	WASHER, RETAINER
60	SPRING
61	GEAR, AGITATOR SHAFT
62	SHAFT, AGITATOR
63	ROD, CONNECTING
64	BEARING, THRUST
65	BALL, THRUST
66	GEAR, SECTOR
67	RING, SNAP
68	PIN, DOWEL
69	GEAR CASE AND STUD ASSEMBLY
70	GUIDE, CAM BAR
71	BOLT, 5/16-24 x 1 1/8
72	SCREW, 5/16-18 x 5/16 SET
73	PULLEY, AGITATOR DRIVE
74	BEARING, UPPER
75	MAGNET
76	FORK, AGITATOR GEAR
77	DRIVE PINION ASSEMBLY
78	WASHER, TENSION
79	RING, RETAINING (ALTERNATE)
	RING, RETAINING (ALTERNATE)
80	GEAR, DRIVE
85	SHIELD, AGITATOR SPRING
86	RING, RETAINING
87	SPRING
88	WASHER

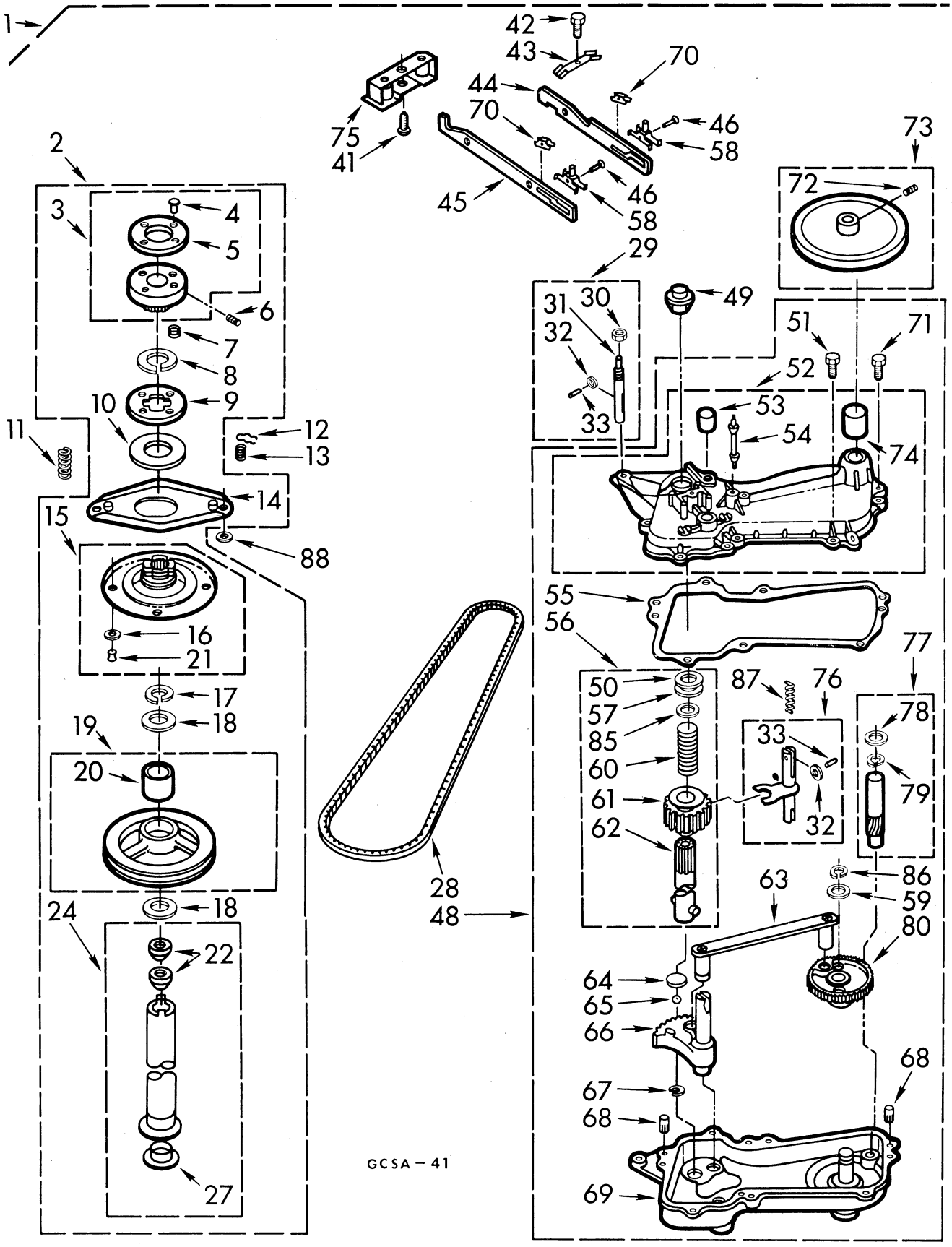
FOLLOWING PART NOT ILLUSTRATED

OIL, GEAR CASE (PINT CAN)

362101 - GEAR CASE AND SUPERSTRUCTURE



363000 GEAR CASE AND SUPERSTRUCTURE



362101 - GEAR CASE AND SUPERSTRUCTURE

Illus. No.	Part No.	DESCRIPTION
1	362101	GEAR CASE AND SUPERSTRUCTURE ASSEMBLY
2		BASKET DRIVE
3		BRAKE DRUM ASSEMBLY
4		RIVET
5		LINING, BRAKE
6		SCREW, 5/16-18 x 3/4 SET
7		SPRING, DRIVE
8		RING, SNAP
9		DRUM, LOWER BRAKE
10		LINING
11		SPRING
12		SPRING, RETAINER
13		SPRING, CONTROL ROD
14		YOKE
15		ASSEMBLY
16		LINING
		5-1/4" DIA
		3/4" DIA (SET OF 3)
17		RING, RETAINER
18		WASHER, THRUST
19		DRIVE PULLEY ASSEMBLY
20		BEARING
21		RIVET
22		SEAL, OIL
24		DRIVE TUBE AND BEARING ASSEMBLY
26		RING, RETAINING
27		SUPPORT
28		BELT, "V"
29		SHAFT ASSEMBLY
30		NUT, 1/2-20 SELF LOCKING
31		SHAFT, CLUTCH
32		ROLLER, SHAFT (ALTERNATE)
		ROLLER, SHAFT (ALTERNATE)
33		PIN, ROLLER
36		BEARING, THRUST
41		SCREW, TAPER END
42		SCREW, 1/4-28 x 1/2
43		SPRING, BRAKE
44		CAM, AGITATOR AND PUMP
45		CAM BAR SPIN
46		RIVET
48		GEAR CASE ASSEMBLY
51		BOLT, 5/16-24 x 3/4
52		GEAR CASE COVER ASSEMBLY
53		BEARING, 7/8" O.D.
54		SUPPORT, BRAKE SHOE YOKE
55		GASKET, GEAR CASE
56		AGITATOR SHAFT ASSEMBLY
57		SEAL
58		PLUNGER
59		WASHER, RETAINER
60		SPRING
61		GEAR, AGITATOR SHAFT
62		SHAFT, ASSEMBLY AGITATOR
63		ROD, CONNECTING
64		BEARING, THRUST
65		BALL, THRUST
66		GEAR, SECTOR
67		RING, SNAP
68		PIN, DOWEL
69		GEAR CASE AND STUD ASSEMBLY
70		GUIDE, CAM BAR
71		BOLT, 5/16-24 x 1-1/8
72		SCREW, 5/16-18 x 1/2 SET (USE W/360840 PULLEY)
		SCREW, 5/16-18 x 5/16 SET (USE W/75528 PULLEY)
73		PULLEY, AGITATOR DRIVE (ALTERNATE)
		PULLEY, AGITATOR DRIVE (ALTERNATE)
74		BUSHING, DRIVE PINION
75		MAGNET ASSEMBLY
76		FORK, AGITATOR GEAR
77		DRIVE PINION ASSEMBLY
78		WASHER, TENSION
79		RING, RETAINING (ALTERNATE)
		RING, RETAINING (ALTERNATE)
80		GEAR, DRIVE
85		SHIELD, AGITATOR SPRING
86		RING, RETAINING
87		SPRING
88		WASHER

FOLLOWING PART NOT ILLUSTRATED

89122	OIL, GEAR CASE (PINT CAN)

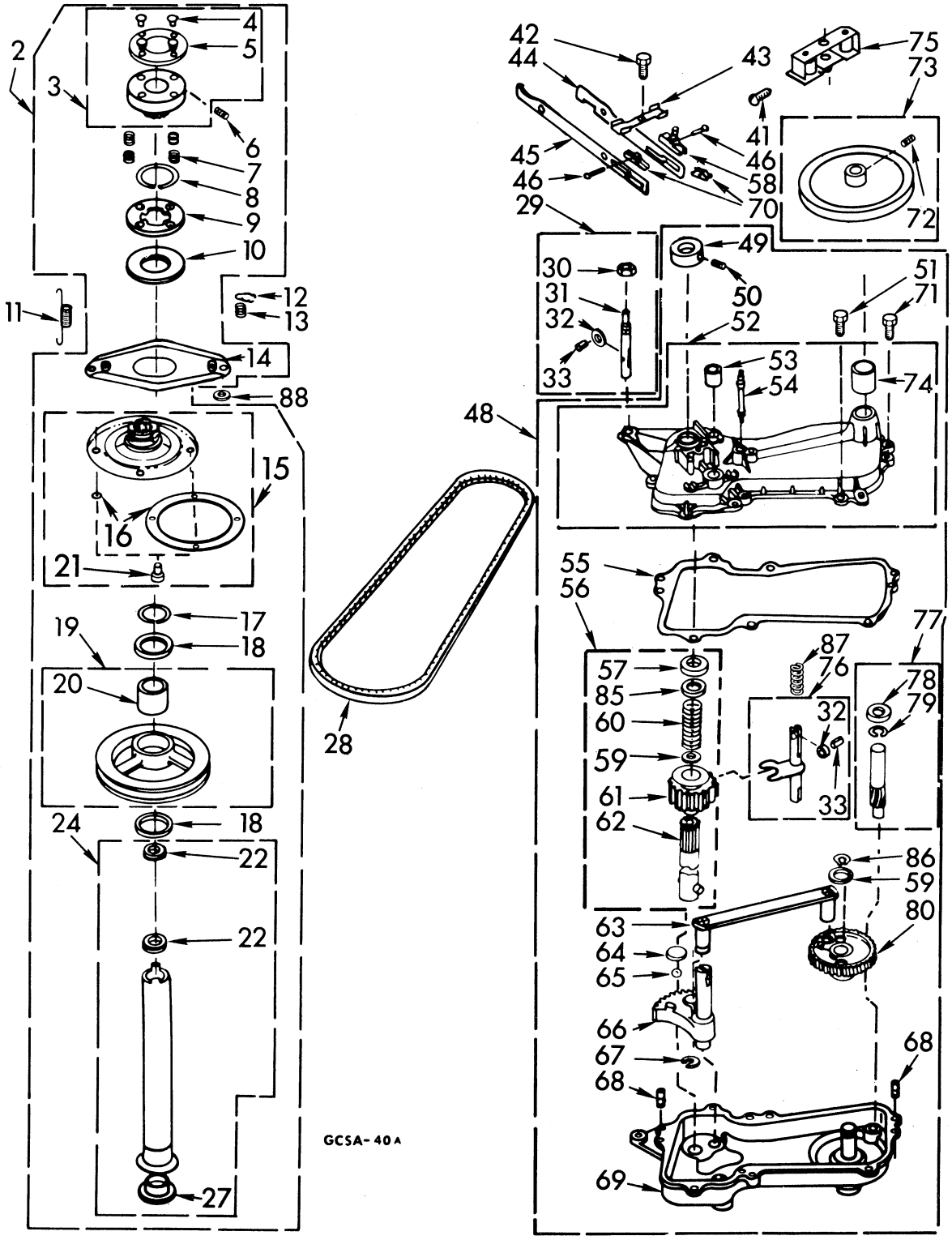
363000 - GEAR CASE AND SUPERSTRUCTURE

Illus. No.	Part No.	DESCRIPTION
1	362140	GEAR CASE AND SUPERSTRUCTURE ASSEMBLY
2		BASKET DRIVE
3		BRAKE DRUM ASSEMBLY
4		RIVET
5		LINING, BRAKE
6		SCREW, 5/16-18 x 3/4 SET
7		SPRING, DRIVE
8		RING, SNAP
9		DRUM, LOWER BRAKE
10		LINING
11		SPRING
12		SPRING, RETAINER
13		SPRING, CONTROL ROD
14		YOKE
15		ASSEMBLY
16		LINING
		5-1/4" DIA
		3/4" DIA (SET OF 3)
17		RING, RETAINER
18		WASHER, THRUST
19		DRIVE PULLEY ASSEMBLY
20		BEARING
21		RIVET
22		SEAL, OIL
24		DRIVE TUBE AND BEARING ASSEMBLY
27		BEARING, THRUST
28		BELT, "V"
29		SHAFT ASSEMBLY
30		NUT, 1/2-20 SELF LOCKING
31		SHAFT, CLUTCH
32		ROLLER, SHAFT (ALTERNATE)
		ROLLER, SHAFT (ALTERNATE)
33		PIN, ROLLER
41		SCREW, TAPER END
42		SCREW, 1/4-28 x 1/2
43		SPRING, BRAKE
44		CAM, AGITATOR AND PUMP
45		CAM BAR SPIN
46		RIVET
48		GEAR CASE ASSEMBLY
49		COLLAR, SUPPORT
50		SCREW, 5/16-24 x 1/2 SET
51		BOLT, 5/16-24 x 3/4
52		GEAR CASE COVER ASSEMBLY
53		BEARING, 7/8" O.D.
54		SUPPORT, BRAKE SHOE YOKE
55		GASKET, GEAR CASE
56		AGITATOR SHAFT ASSEMBLY
57		SEAL
58		PLUNGER
59		WASHER, RETAINER
60		SPRING
61		GEAR, AGITATOR SHAFT
62		SHAFT, ASSEMBLY AGITATOR
63		ROD, CONNECTING
64		BEARING, THRUST
65		BALL, THRUST
66		GEAR, SECTOR
67		RING, SNAP
68		PIN, DOWEL
69		GEAR CASE AND STUD ASSEMBLY
70		GUIDE, CAM BAR
71		BOLT, 5/16-24 x 1-1/8
72		SCREW, 5/16-18 x 1/2 SET
73		PULLEY, AGITATOR DRIVE (ALTERNATE)
74		BUSHING, DRIVE PINION
75		MAGNET ASSEMBLY
76		FORK, AGITATOR GEAR
77		DRIVE PINION ASSEMBLY
78		WASHER, TENSION
79		RING, RETAINING (ALTERNATE)
		RING, RETAINING (ALTERNATE)
80		GEAR, DRIVE
85		SHIELD, AGITATOR SPRING
86		RING, RETAINING
87		SPRING
88		WASHER

362140 - GEAR CASE AND SUPERSTRUCTURE

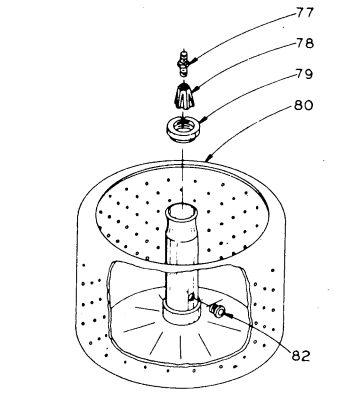
GEAR CASE AND SUPERSTURCTURE ASSEMBLY

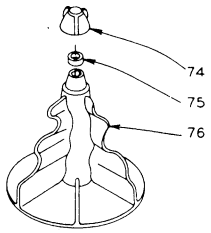
1 GEAR CASE AND SUPERSTRUCTURE ASSEMBLY
2 BASKET DRIVE AND BRAKE ASSEMBLY
3 BRAKE DRUM ASSEMBLY
4 RIVET (4)
5 LINING, BRAKE
6 SCREW, 5/16-18 x 3/4 SET
7 SPRING, DRIVE (4)
8 RING, SNAP
9 DRUM, LOWER BRAKE
10 LINING
11 SPRING
12 RETAINER, SPRING
13 SPRING, CONTROL ROD
14 YOKE, BRAKE
15 DISC AND LINING ASSEMBLY
16 LINING (SET OF 3)
17 RING, RETAINER
18 WASHER, THRUST
19 DRIVE PULLEY ASSEMBLY
20 BEARING
21 EYELET (3)
22 SEAL, OIL
24 DRIVE TUBE AND BEARING ASSEMBLY
27 BEARING, THRUST
28 BELT, "V"
29 SHAFT ASSEMBLY
30 NUT, 1/2-20 SELF LOCKING
31 SHAFT, CLUTCH
32 ROLLER, SHAFT (ALTERNATE) ROLLER, SHAFT (ALTERNATE)
33 PIN, ROLLER
41 SCREW, TAPER END
42 SCREW, 1/4-28 x 1/2
43 SPRING, BRAKE
44 CAM, AGITATOR AND PUMP
45 CAM, BAR-SPIN
46 RIVET
48 GEAR CASE ASSEMBLY
49 SUPPORT-SPIN TUBE
50 RING, RETAINING
51 BOLT, 5/16-24 x 3/4
52 GEAR CASE COVER ASSEMBLY
53 BEARING–7/8" O.D.
54 SUPPORT, BRAKE SHOE YOKE
55 GASKET, GEAR CASE
56 AGITATOR SHAFT ASSEMBLY
57 SEAL
58 PLUNGER
59 WASHER, RETAINER
60 SPRING
61 GEAR, AGITATOR SHAFT
62 SHAFT, AGITATOR
63 ROD, CONNECTING
64 BEARING, THRUST
65 BALL, THRUST
66 GEAR, SECTOR
67 RING, SNAP
68 PIN, DOWEL
69 GEAR CASE AND STUD ASSEMBLY
70 GUIDE, CAM BAR
71 BOLT, 5/16-24 x 1-1/8
72 SCREW, 5/16-18 x 5/16 SET
73 PULLEY, AGITATOR DRIVE

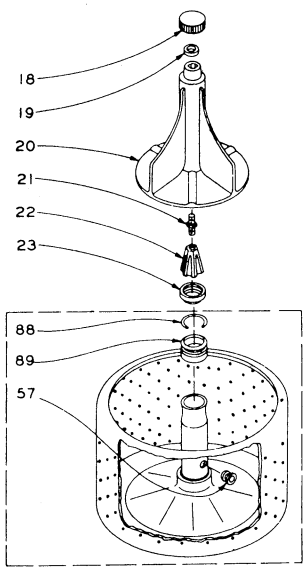


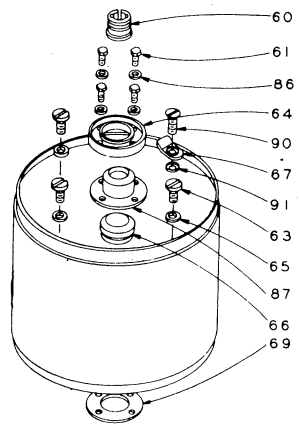
74 BEARING - UPPER
75 MAGNET
76 FORK, AGITATOR GEAR
77 DRIVE PINION ASSEMBLY
78 WASHER, TENSION
79 RING, RETAINING
80 GEAR, DRIVE
85 SHIELD, AGITATOR SPRING
86 RING, RETAINING
87 SPRING
88 WASHER

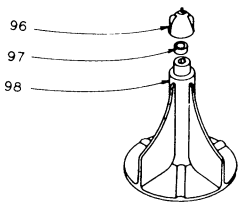
MACHINE SUB-ASSEMBLY

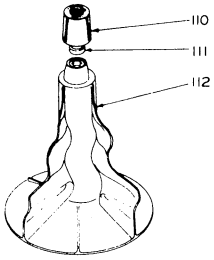


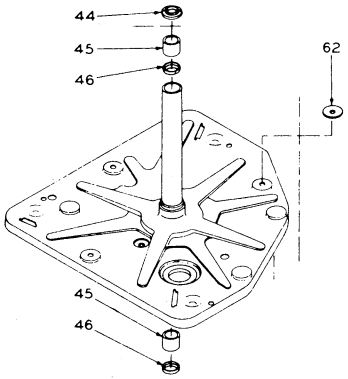








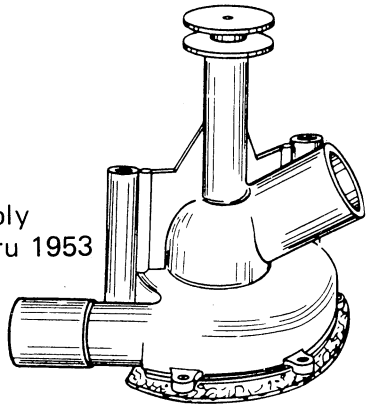


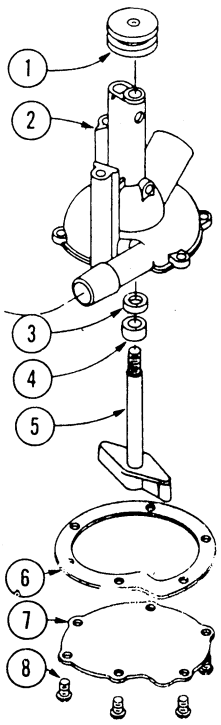


18.	Cap
19.	Sleeve
20.	Agitator
21.	Stud
22.	Drive Block
23.	Basket locknut
44.	Seal
45.	Bearing
46.	Seal
57.	Stopper
60.	Basket drive block
62.	Gasket
64.	Tub clamp ring
66.	Center post gasket
67.	Baffle
69.	Gasket (2 req'd.)
74.	Cap
75.	Sleeve
76.	Agitator
78.	Drive block
79.	Basket locknut
82.	Stopper
87.	Gasket
88.	Ring
89.	Block
96.	Cap
97.	Sleeve
98.	Agitator
110.	Cap
111.	Sleeve
112.	Agitator

PUMP ASSEMBLY

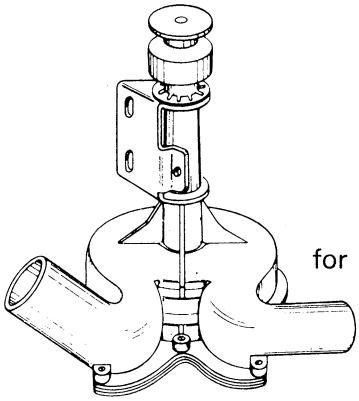
75093
Pump Assembly
for models 1949 thru 1953

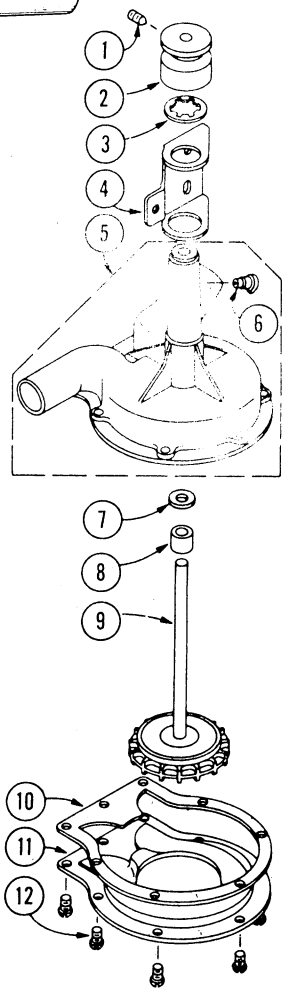




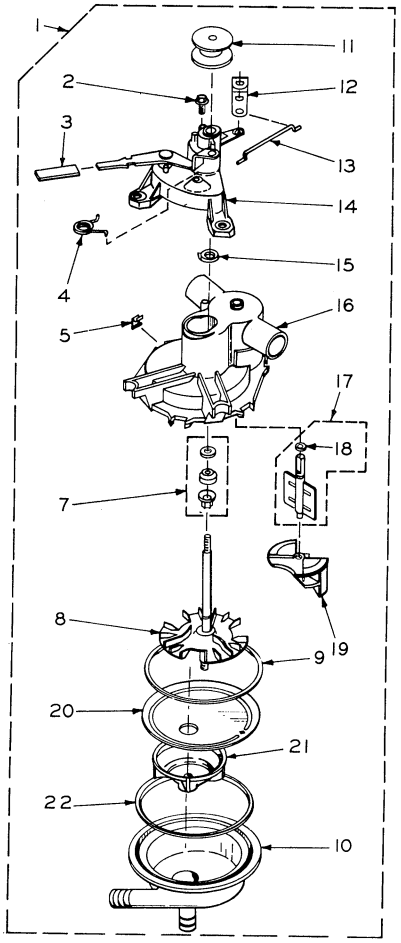
1. Pump pulley
2. Pump body & bushing assy.
3. Water seal washer
4. Water seal
5. Pump shaft & impeller assy.
6. Cover gasket
7. Pump cover
8. Screw

76064
Pump Assembly
bi-directional
for models 1954 thru 1956



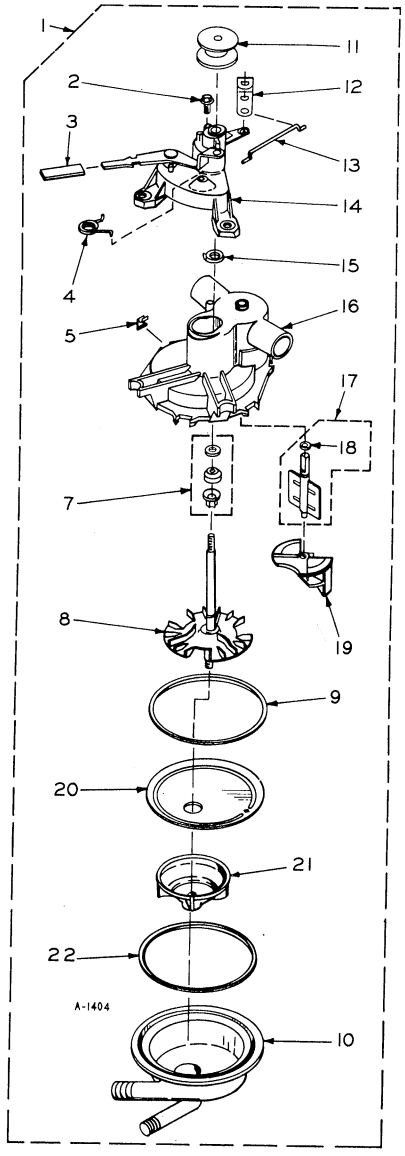


1. Set screw 1/4 - 28 x 5/16"
2. Pump pulley
3. Retaining ring – self-locking
4. Pump mounting bracket
5. Pump body & bushing assy.
6. Oiler cap
7. Water seal washer
8. Water seal tube
9. Impeller shaft assy.
10. Pump cover gasket
11. Pump cover plate
12. Self-tapping screw



87659 PUMP ASSEMBLY

Illus. No.	DESCRIPTION
1	Pump Assembly
2	Screw, 10-16 x 3/4
3	Sleeve
4	Spring, Toggle
5	Clip, Retainer
7	Seal Assembly Alternate Alternate Alternate
8	Impeller and Shaft Assembly
9	Gasket
10	Housing
11	Pulley
12	Lever, Valve
13	Rod, Connecting
14	Bearing Block Assembly
15	Wick, Oil
16	Body, Pump
17	Valve and "O" Ring Assembly
18	Ring, "O"
19	Insert
20	Plate, Divider
21	Impeller
22	Gasket

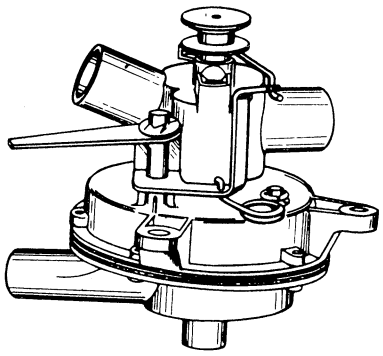


361500 PUMP ASSEMBLY

Illus. No.	DESCRIPTION
1	Pump Assembly
2	Screw, 10-16 x 3/4
3	Sleeve
4	Spring, Toggle
5	Clip, Retainer
7	Seal Assembly Alternate Alternate Alternate
8	Impeller and Shaft Assembly
9	Gasket
10	Housing
11	Pulley
12	Lever, Valve
13	Rod, Connecting
14	Bearing Block Assembly
15	Wick, Oil
16	Body, Pump
17	Valve and "O" Ring Assembly
18	Ring, "O"
19	Insert
20	Plate, Divider
21	Impeller
22	Gasket

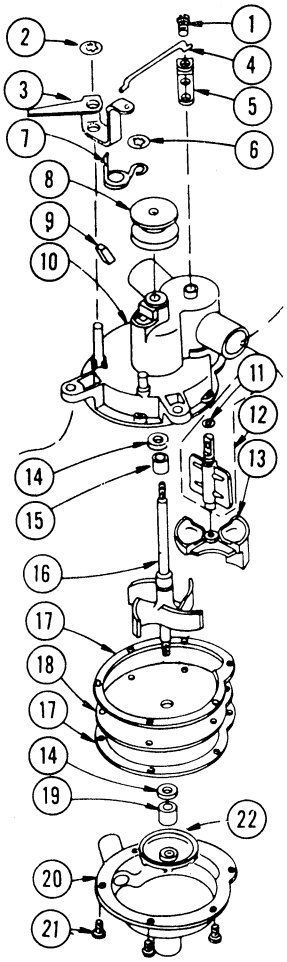
ORDER PARTS BY MODEL NUMBER

PUMP ASSEMBLY

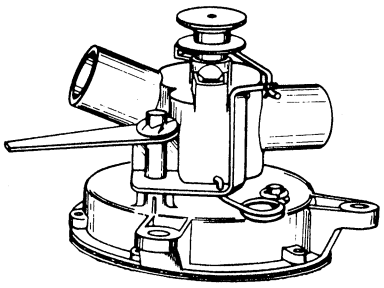


80745

Pump Assembly
Recirculating
for Models
1956 thru 1962

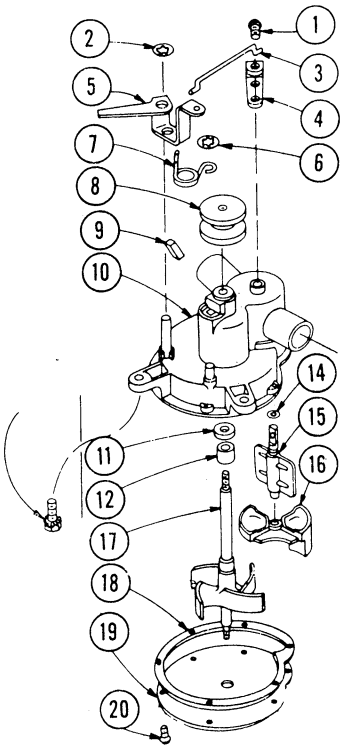


1.	Self-tapping screw
2.	Stud clip
3.	Lever
4.	Connecting rod
5.	Valve lever
6.	Retaining ring
7.	Toggle spring
8.	Pump pulley
9.	Oil wick
10.	Pump body & bushing assy.
11.	"O" ring
12.	Flapper
13.	Insert
14.	Water seal washer
15.	Water seal face
16.	Impeller & shaft assy.
17.	Pump cover gasket
18.	Pump cover plate
19.	Water seal tube
20.	Pump housing
21.	Self-tapping screw
22.	Impeller



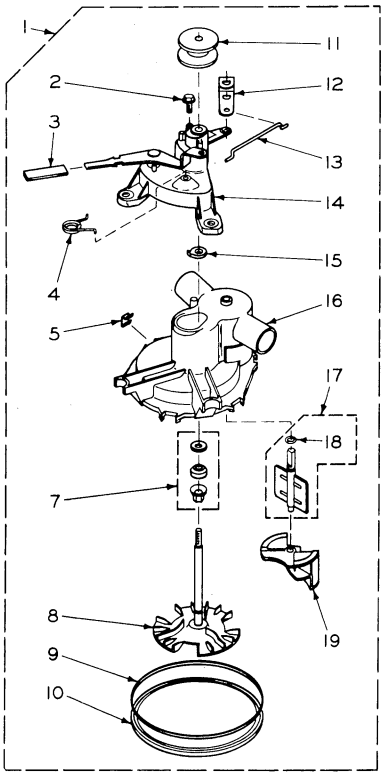
76505

Pump Assembly
Uni-Directional
for Models
1956 thru 1962



1.	Screw
2.	Stud clip
3.	Connecting rod
4.	Valve lever
5.	Lever
6.	Retaining ring
7.	Toggle spring
8.	Pump pulley
9.	Oil wick
10.	Pump body & bushing assy.
11.	Water seal washer
12.	Water seal
13.	Screw, hex hd., self locking 5/16 - 18 x 1"
14.	"O" ring
15.	Flapper
16.	Insert
17.	Impeller & shaft assy.
18.	Pump cover gasket
19.	Pump cover plate
20.	Screw

88434-87393 PUMP ASSEMBLY



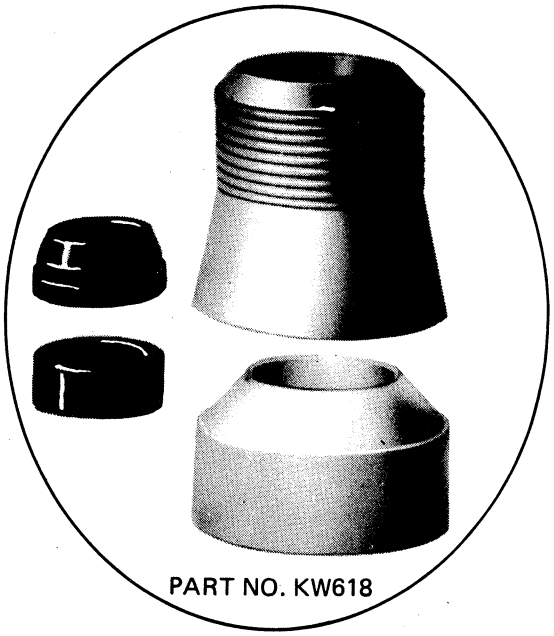
Illus. No.	Part No.	DESCRIPTION
1		Pump Assembly
2		Screw
3		Sleeve
4		Spring, Toggle
5		Clip, Retainer
7		Seal Assembly Alternate Alternate Alternate
8		Impeller and Shaft Assembly
9		Gasket
10		Cover
11		Pulley
12		Lever, Valve
13		Rod, Connecting
14		Bearing Block Assembly
15		Wick, Oil
16		Body, Pump
17		Valve and "O" Ring Assembly
18		Ring, "O"
19		Insert

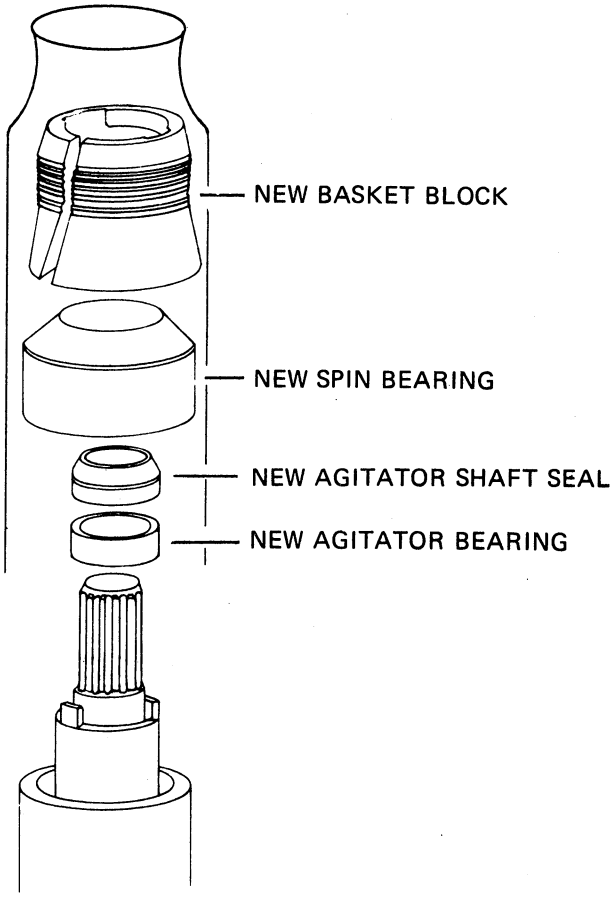
360873 - 362371 PUMP ASSEMBLY

INDEX

SPIN TUBE BEARING AND AGITATOR SHAFT BEARING KIT

Takes less than an hour to install in most cases and cuts high labor costs.





For a quick inexpensive repair job that has been proven successful in over 10,000 applications, the KW 618 kit has eliminated the expensive spin tube and bearing overhaul on Whirlpool-Kenmore washing machines. Also included in this kit is an agitator shaft bearing. The cabinet top of the washer must first be removed and just follow these simple, easy directions that will give you the same results as an overhaul job that may cost from $90.00 to $120.00.

FIGURE A

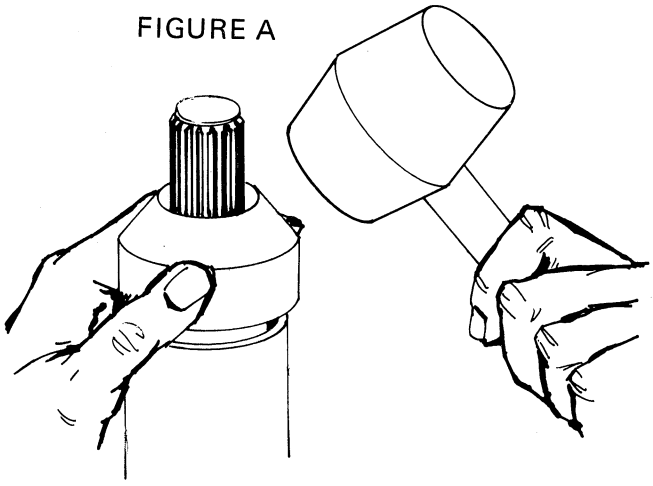
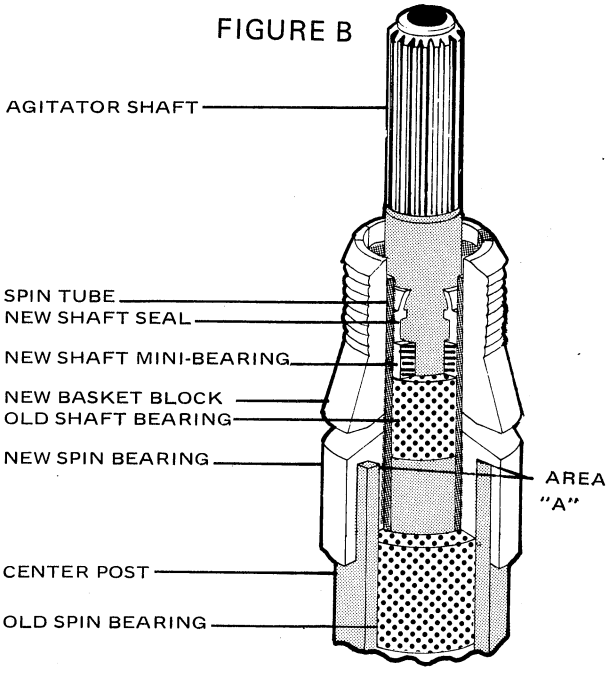


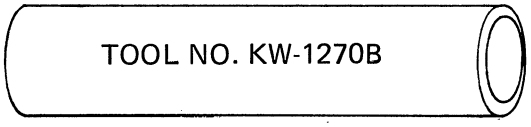
FIGURE B



INSTRUCTION FOR INSTALLING
KW-618 QUICK KIT

* Always disconnect power cord to machine for electrical safety.
* Machine should be moved away from wall far enough to clear back splash when top is hinged back.
* Raise the top of machine. (Pull forward and up.) Hold or tape lid in place until positioned back.
* Disconnect the inlet water hose. (Valve to Air Gap.)
* Remove snubber pad and spring.
* Remove top ring from outer tub assembly.
* Remove agitator and drive block that agitator rides on.
* Remove spin block nut.
* Lift the inner basket out of machine.
* Remove old basket block that inner basket rides on. (Discard.)
* Remove the agitator shaft seal. (Discard. Kit contains new seal.)
* Remove the upper spin tube seal. (Discard. Not needed with new bearing assembly.
* Clean area around seals and outer area of stationary spin bearing housing down from the top to about 3/4" with emery cloth. Air may be used to remove any loose material after cleaning.
* The old spin bearing will be left in place.
* Lubricate the new spin bearing lightly with silicone lube or vaseline and position (taper up) over agitator shaft, spin tube and onto top of stationary center post. Drive in place over stationary center post with plastic or rubber mallet, Figure A. IMPORTANT: THE NEW SPIN BEARING MUST BE SEATED FIRMLY AGAINST THE TOP OF THE CENTER POST. (AREA "A" FIGURE B.)
* If the agitator shaft bearing is also worn, remove old agitator seal, drop the enclosed bronze bearing over agitator shaft and drive down against top of old agitator bearing. Agitator bearing driver tool No. KW-1270B as illustrated in Figure C.
* Clean agitator seal area and install new agitator seal furnished in kit.
* Using the new basket drive block furnished in kit, reassemble machine and test.

SHAFT BEARING
DRIVER TOOL



AVAILABLE SEPARATELY
PURCHASE FROM YOUR
PARTS WHOLESALER'

FIGURE C