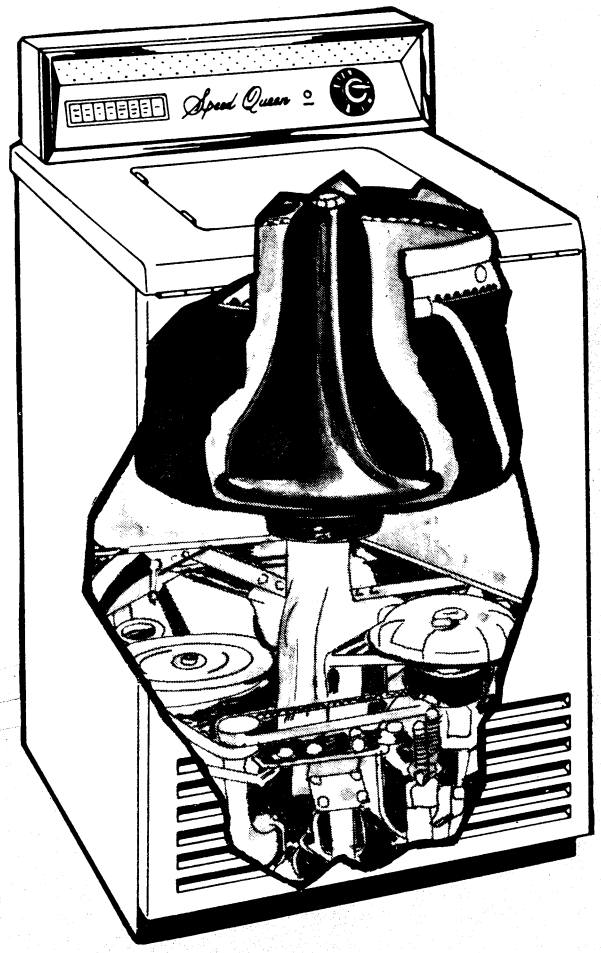
REPAIR-MASTER® for

SPEED QUEEN

AUTOMATIC WASHERS

- DIAGNOSIS CHARTS
- CHECKING PROCEDURE
- SERVICE PROCEDURE
- COMPONENT DATA
- PARTS LISTS



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REPAIR-MASTER for..

SPEED QUEEN

AUTOMATIC WASHERS

TABLE OF CONTENTS

SECTION 1

SERVICE CHECK LIST

The following diagnosis chart is intended to be only a starting point in proceeding with the servicing of automatic washers. The diagnosis chart can only deal in generalities; to effectively service any appliance, the serviceman must thoroughly understand the mechanical functions and electrical circuitry of the appliance.

A considerable amount of time and money can be saved if a serviceman will take time to analyze the probable cause of 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 and that the operator of the machine has properly set the controls.

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. However, if a voltmeter or test lamp is being used for testing, the power cord must be plugged into a live recepticle.

SYMPTOMS	CAUSE	REFERENCE AIDS
HOT OR COLD WATER DOES NOT ENTER MACHINE	Water faucets turned off.	Open both faucets.
	No power to washer.	Check wall outlet for proper power supply. Check timer contacts L1 and L2 to check power cord.
	No hot water from water heater.	Check water heater.
	Water valve solenoid defective.	Test water solenoids with 120 volt test cord. Replace if defective.
	Kinked hot or cold hose.	Move washer from wall, check hoses.
	Timer inoperative.	Continuity is checked between terminals L2 and H selecting wash water. Select rinse cycle and continuity is checked between L2 and C terminal.
	Water, rinse or selector switches defective.	Replace if defective.
	Loose electrical connector or break in wiring harness.	Repair loose electrical connector and use a continuity test to examine the wiring for breaks.
	Clogged screens in hose or valve.	Remove fill hose from the faucets and valve and clean or replace the screens.
	Shur-Fil Models: Water is still in reservoir. Check drain valve solenoid or clogged hose or drain valve.	Test solenoid with continuity tester. Clean valve and hoses.
	Pressure switch.	The pressure switch did not rise to the fill position. Check continuity of switch. Replace if defective.
	Power Relay.	The power relay solenoid is not energized during the fill cycle. Test power relay as described in this manual.
	Shur-Fil Models: Water Pressure Switch stuck open.	By pass switch for test.
	Water level switch.	Water level switch is a normally open switch. Test for continuity.
	Shur-Fil Models: Water Pressures switch hose is clogged.	Remove hose, clean or replace.
WATER DOES NOT SHUT OFF	Water valve not closing due to dirt and corrosion in valve.	Remove mix valve and repair or replace it.
	Broken or rusted valve armature spring.	Disassemble valve, replace spring. See text "Cleaning the water valve".
	Timer contacts not breaking circuit to selector switch.	Timer should have no continuity between terminal L2 and H when it is out of the wash fill cycle.
	Defective pressure switch.	Pressure switch fails to change the position of the contacts. Incorrect installation of drain hose could cause this problem.
	Shur-Fil Models: Filler hose on reservoir clogged or leaking.	Replace or readjust if kinked.

SYMPTOMS	CAUSE	REFERENCE AIDS
WATER DOES NOT SHUT OFF. (CONTINUED)	Power relay defective.	Power relay solenoid must close to cut off the water.
	Drain hose on pressure fill models incorrectly installed.	Drain hose must be a minimum of 20 inches high to maintain a proper water column.
	Shur-Fil Models: Reservoir drain valve or hose leaking.	Replace component if necessary.
	Clogged inlet screens.	Remove fill hose and clean or replace inlet screens in both the hose and the valve.
WATER LEVEL TOO LOW	Low water pressure.	Change flow washer to one having a larger flow rate or advise customer of plumbing condition.
	Erratic water valve solenoid.	Solenoid of water valve open intermittently causing water to start and stop. Test continuity at lead of solenoid while in operation.
	Inoperative Suds-Water Saver Switch.	Test switch, replace if necessary.
	Defective timer escapement.	Escapement may be advancing timer more than prescribed number of degrees. May have wrong escapement. Replace timer.
TUB SPINS AT ALL TIMES DURING CYCLE	Weak or broken disengaging spring.	Disengaging spring not opening solenoid. Replace the spring and check pivot bolt of shifter arm for binding.
	Inoperative timer.	Test timer, replace if necessary.
	Inoperative timer motor.	See Timer Motor Test.
	Improperly adjusted fluid drive.	Adjust correctly.
	Fluid drive bearing binding to the motor shaft.	Remove fluid drive and replace the fluid drive bearings or fluid drive. Clean motor shaft with fine crocus cloth and check motor shaft for straightness.
	Inoperative fluid drive.	Should only operate when motor runs in a clockwise direction, replace.
	Solenoid not properly aligned.	Adjust solenoid for proper alignment, also for armature sticking in the field.
	Defective timer.	If timer is defective, no continuity will be present when testing the lead to the solenoid. Replace if defective.
	Spin brake does not hold due to broken brake spring.	Disassemble main bearing assembly, check all components.

SYMPTOMS	CAUSE	REFERENCE AIDS
TIMER DOES NOT ADVANCE	Timer motor inoperative.	Test motor with a live test cord. If it does not run it must be replaced.
	Escapement defective.	Replace timer.
	On Shur-Fill models timer motor is phased out during the fill periods.	Advance the timer dial approximately 8 minutes to bypass the fill period.
	Incorrect wiring or lack of power.	Test for incoming power at terminals L1 and L2 of the timer. Check out wiring according to wiring diagram.
	Defective timer.	Replace defective timer.
	Inoperative motor.	Check motor with live test cord. Replace if defective.
MAIN DRIVE MOTOR DOES NOT RUN	Action or switch bank defective.	Test action and selector switch for continuity. Replace if defective.
	Timer defective.	Replace defective timer.
	Defect in the wiring.	Repair defect in wire harness. Use continuity to test for defect.
	Agitator solenoid inoperative.	Test at solenoid terminal for continuity. Remove lead and test solenoid with live test cord. Replace if defective.
	No continuity to agitator solenoid.	Check for poor connection at terminal or junction block, also at timer.
WASHER DOES NOT AGITATE	Loose or broken pump or transmission belt.	Correct belt tension if belts are loose or replace broken belt.
	Motor defective.	Replace motor, check first with live test cord.
	Timer defective.	Check timer between L2 and A terminal of the timer for continuity. If no circuit exists, replace timer.
	Inoperative wash time or selector switch.	Continuity test wash time switch and selector switch, replace if necessary.

SYMPTOMS	CAUSE	REFERENCE AIDS
WASHER DOES NOT AGITATE (Continued)	Engaging spring to shift arm.	Check engaging spring and pivot nut of shifter arm.
	Defective transmission.	Remove and repair as necessary.
	Shift clutch slipping.	Check shift clutch for wear or grease deposit.
	Loose thrust collar.	Slide thrust collar to correct position and tighten Allen screws.
	Solenoid stuck closed.	Check armature of solenoid for freedom of movement. If it is binding, replace it.
AGITATES AT ALL TIMES DURING CYCLE	Weak or broken disengaging spring.	Disengaging spring must have tension enough to open the solenoid.
	Loose belt on shift lever.	Pivot bolt on shift arm must not bind or be too loose.
	Defective timer.	Replace timer.
AGITATOR CLUTCH SLIPPING	Wear, oil or grease on drive surface of agitator shift clutch and transmission drive clutch.	Clean drive and shift clutch or replace if necessary. If clutches are greasy, check seal in transmission.
	Weak engaging spring.	Check solenoid engaging spring. Replace if weak.
	Loose electrical connections.	Check electrical wiring and connectors for positive continuity.
	Defective timer.	Replace timer.
AGITATOR OR SPIN SOLENOID CHATTERS OR HUMS	Misaligned solenoid.	Properly align solenoid.
	Loose solenoid laminations.	Replace solenoid.

SYMPTOMS	CAUSE	REFERENCE AIDS
TUB DOES NOT SPIN	Inoperative solenoid.	Replace solenoid.
	Disconnected engaging spring.	Check engaging spring to shift arm.
	Loose or broken spin belt.	Adjust or replace belt.
	Defective fluid drive.	Replace or repair fluid drive.
	Timer defective.	Test for continuity between L2 and S terminals of timer. If no continuity, replace the timer.
	Drip dry switch defective or improperly set.	Check setting of drip dry switch. It breaks the circuit to the spin solenoid. Test continuity of switch and replace if necessary.
	Improperly adjusted fluid drive.	Check alignment of fluid drive shifter arm. Shifter arm should be nearly parallel to the mounting plate.
	Worn cone clutch lining.	Replace cone clutch lining.
	Sheared tapered pin in cone clutch.	Replace the taper pin.
	Binding spin assembly.	Spin assembly should rotate easily and quietly. Check for signs of water leak at base of spin assembly.
	Lid switch.	Lid switch opens a circuit to spin solenoid. Test for continuity. If defective, replace it.
WATER NOT DRAINING FROM TUB	Kinked drain hose.	Check drain hose and tub to cabinet hose. Drain hose should not be excessive in length.
	Obstruction blocking outlet to pump or the pump itself.	Disassemble pump and remove obstruction.
	Loose impeller on pump shaft.	Check pump impeller for slipping on pump shaft.
	Loose pump belt.	Adjust pump belt for proper tension.
	Motor not running.	Test motor with live test cord and replace if necessary.

SYMPTOMS	CAUSE	REFERENCE AIDS
SPIN SPEED TOO SLOW	Unbalanced load in spin tub.	Open lid and rearrange load.
	Water not draining from collector tub.	Check for kinked drain hose, obstruction to or in pump, pump impeller slipping on shaft.
	Improperly adjusted pump or spin belt.	Adjust belts for proper tension.
	Binding in spin assembly.	Check spin assembly for binding condition and for water leaks.
	Sheared taper-pin or worn clutch lining of cone pulley.	Replace taper-pin and clutch lining of cone pulley.
	Fluid drive.	Rebuild or replace fluid drive.
	Improperly adjusted fluid drive.	Adjust fluid drive to parallel the shifter arm to the mounting plate.
SEDIMENT IN BOTTOM OF SPIN TUB	Plugged entrance to sediment tube.	Clean entrance to sediment tube and instruct user how to keep it clean.
	Blocked sediment tube.	Raise the cabinet top and run flexible wire down sediment tube and flush with water.
DISPENSER FAILS TO DISPENSE SOLUTION	Inoperative solenoids or bleach pump coil.	Test solenoid or coil for continuity with live test cord. Replace if needed.
	Defective timer.	Test timer for continuity per machine wiring diagram with timer set at proper time to complete circuit to solenoid or coil.
	Loose wire.	Check wiring at terminal of solenoid or coil for continuity.
	Sticking dispenser cup.	Free dispenser cup and clean excess detergents around them. Lubricate shafts with silicone.
	Defective rectifier.	Test rectifier as illustrated in this manual and replace if necessary.
	Obstructed bleach hose.	Clear bleach hose and protect against hose being kinked.

SYMPTOMS	CAUSE	REFERENCE AIDS
DOES NOT SAVE SUDS WATER	Kinked or obstructed return hose.	Return hose should be as short as possible to avoid kinking.
	Obstruction in suds valve.	Remove suds valve, clean and replace.
	Main pump not pumping.	Check pump for obstruction or loose impeller on pump shaft. Also check belt tension.
	Inoperative suds-valve solenoid.	Use live test cord to test solenoid and replace if necessary.
	Improperly set or defective suds switch.	Suds switch may be electrical tested with a live test lamp illustrated in this manual. Replace if defective.
	Defective wiring.	Test for continuity. Repair as necessary.
	Defective timer.	Replace defective timer.
DOES NOT RETURN SAVED SUDS WATER	Suds pump losing prime.	Pour water down return hose to prime suds pump.
	Defective suds saver assembly.	Dismantle and clean or replace necessary components. Reinstall suds saver assembly and check.
	Defective suds saver switch.	Replace if defective.
	Inoperative suds pump motor.	Test suds pump motor with live test cord. Be sure pump is not jammed or motor will only hum.
	Obstructed suds pump impeller.	Remove cover of pump and check for obstruction.
	Kinked return hose.	Return hose should be as short as possible to avoid kinks.
SAVES BOTH WASH AND RINSE WATER FROM WASHER	Defective timer.	Replace defective timer.
	Obstruction in suds-valve assembly.	Disassemble and clean suds-valve.

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.

Early Models

The cabinet used on Speed Queen Automatic Washers is constructed of steel with a durable baked enamel finish.

On the early model washers, the cabinet top, cabinet front panel, cabinet rear panel, and cabinet side panels may be removed in order to service the various components.

The later model washers have a hinged top and front panel to facilitate servicing. These later models also have a control hood or "console" which houses the different electrical controls.

When removing any of these panels, care must be taken in order to avoid scratching the finish.

CABINET FRONT PANEL

The front panel on the early model washers is removed by first taking out the three self-tapping screws located at the bottom of the panel, *Figure 1.* Now, while pulling slightly outward on the bottom of the panel, raise the panel upward and outward to clear the top cross brace, *Figure 2.* The panel may now be lowered for removal. *Figure 2* shows the washer with the front panel removed and the various components which can now be serviced.

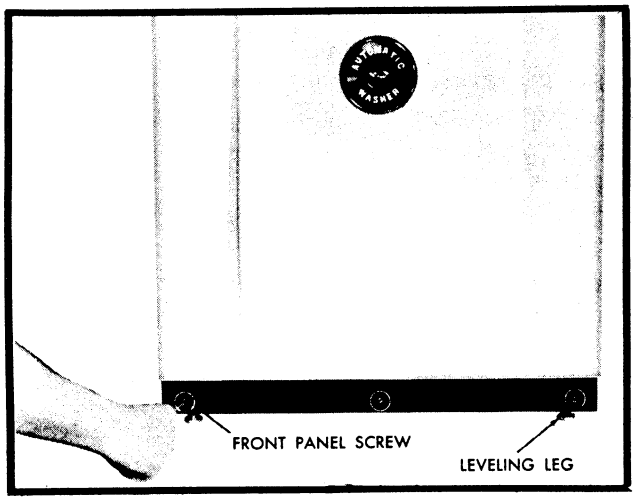
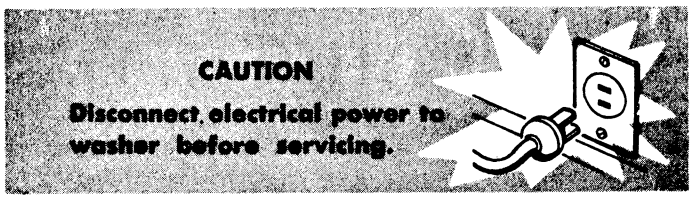


Figure 1—Removing Front Panel



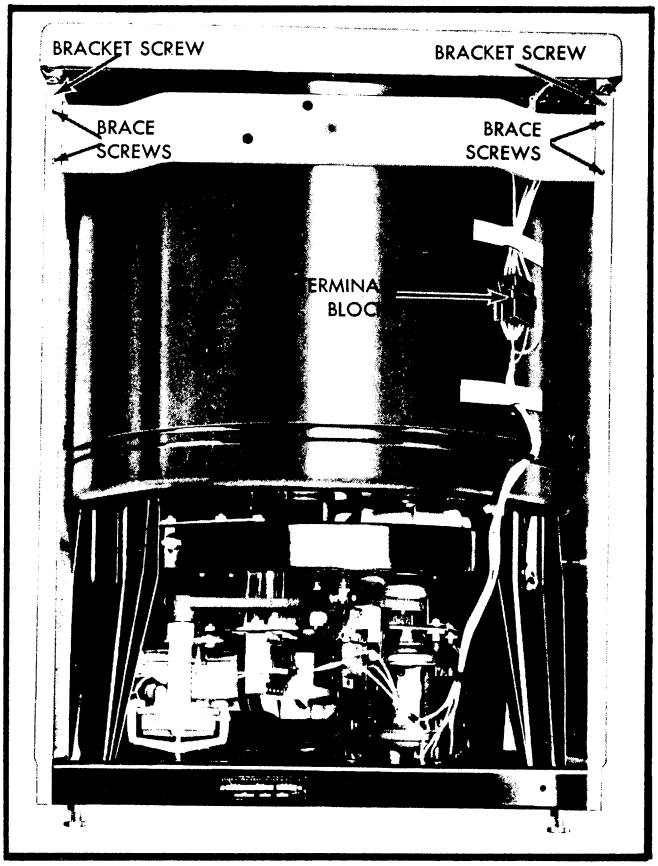


Figure 2—Front Panel Removed

On the later model Speed Queen Washers, a hinge is placed across the top front of the cabinet to facilitate servicing. On these models the cabinet front no longer needs to be removed. Simply remove the four self-tapping screws at the base of the panel and raise it on the hinge assembly as shown in *Figure 3.* Care must be taken to protect the panel from damage when it is raised into this position.

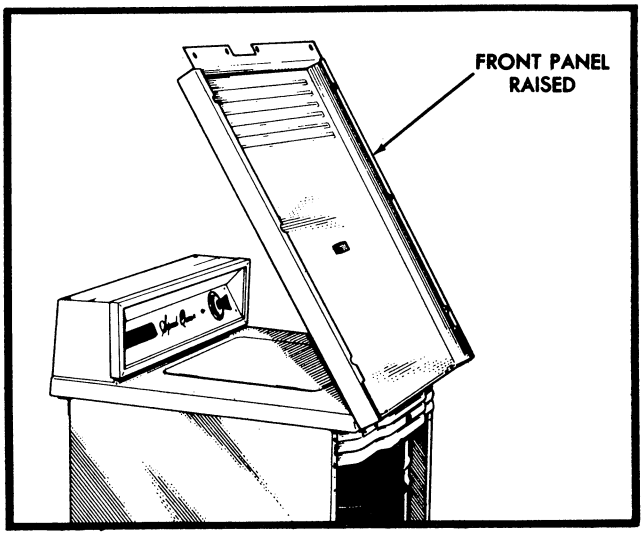


Figure 3—Front Panel in Raised Position

CABINET TOP

To remove the cabinet top on the early style washers, first remove the front panel and then the two bracket screws shown in *Figure 2.* Then loosen the set screw in the timer and lift the dial off of the timer shaft, *Figure 4.* The set screw is an Allen screw and requires a $^{5}/_{64}$" Allen wrench to loosen it.

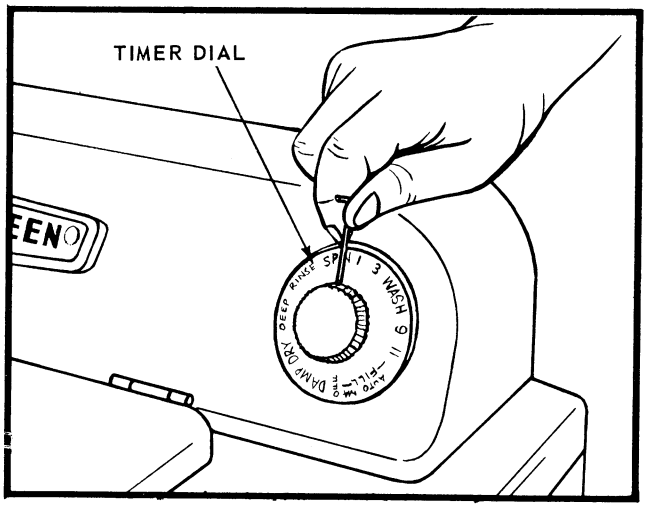


Figure 4—Loosening Set Screw in Timer Dial

Next, remove the two self-tapping screws marked (A) in *Figure 5* and loosen the screws marked (B). Raise the front of the cabinet top enough to clear the timer shaft and disconnect the two wires from the water temperature switch, *Figure 6.*

Separate the wiring harness at the terminal blocks, shown in *Figure 2,* and remove the tape securing the top portion of the wiring harness to the collector tub. The cabinet top can now be lifted completely off of the cabinet.

The location of the screws marked (A) and (B) in *Figure 5* may vary somewhat due to model variations but all are basically the same.

The cabinet top on the later model Speed Queen washers is hinged, using the same hinge across the top front edge as the front panel. The top on these machines is not removed but merely hinged out of the way for service.

The top is held down by two screws located in the rear corners and accessible through holes in the control hood. On the top of the control hood are two plug buttons which must be removed to gain access to the hold down screws.

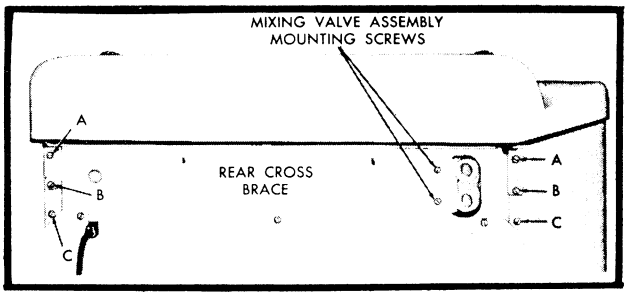


Figure 5—Upper Rear View of Washer

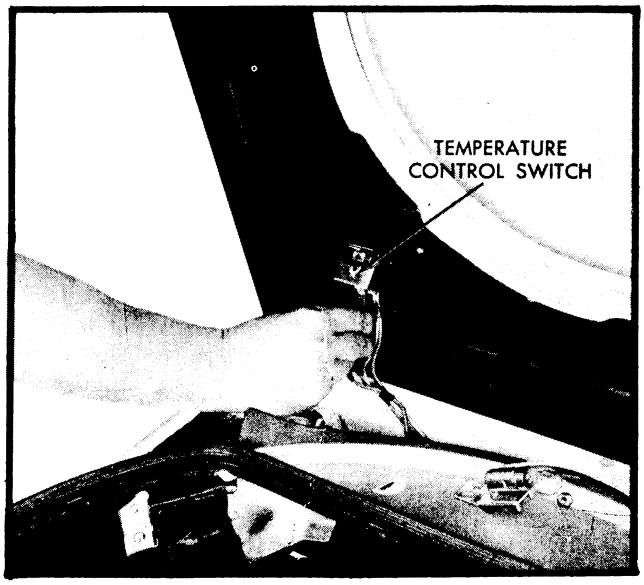


Figure 6—Disconnecting Wires from Temperature Switch

Remove the plug buttons with a knife blade, *Figure 7,* using a business card or piece of heavy paper between the knife blade and the painted surface of the control hood to prevent scratches.

Insert a screwdriver in the hole the plug buttons were in and remove the two hold down screws. The screws do not come all the way out of the top but only out of the brackets they are screwed into. The cabinet top may now be raised and hinged forward.

If the washer has a bleach dispenser as shown in *Figure 8,* the dispenser must be removed before raising the cabinet top. To remove the bleach dispenser, carefully lift the bleach cover assembly off of the bleach tube. Remove the plastic screen from the bleach dispenser, compress the bleach tube and push it down through the cabinet top.

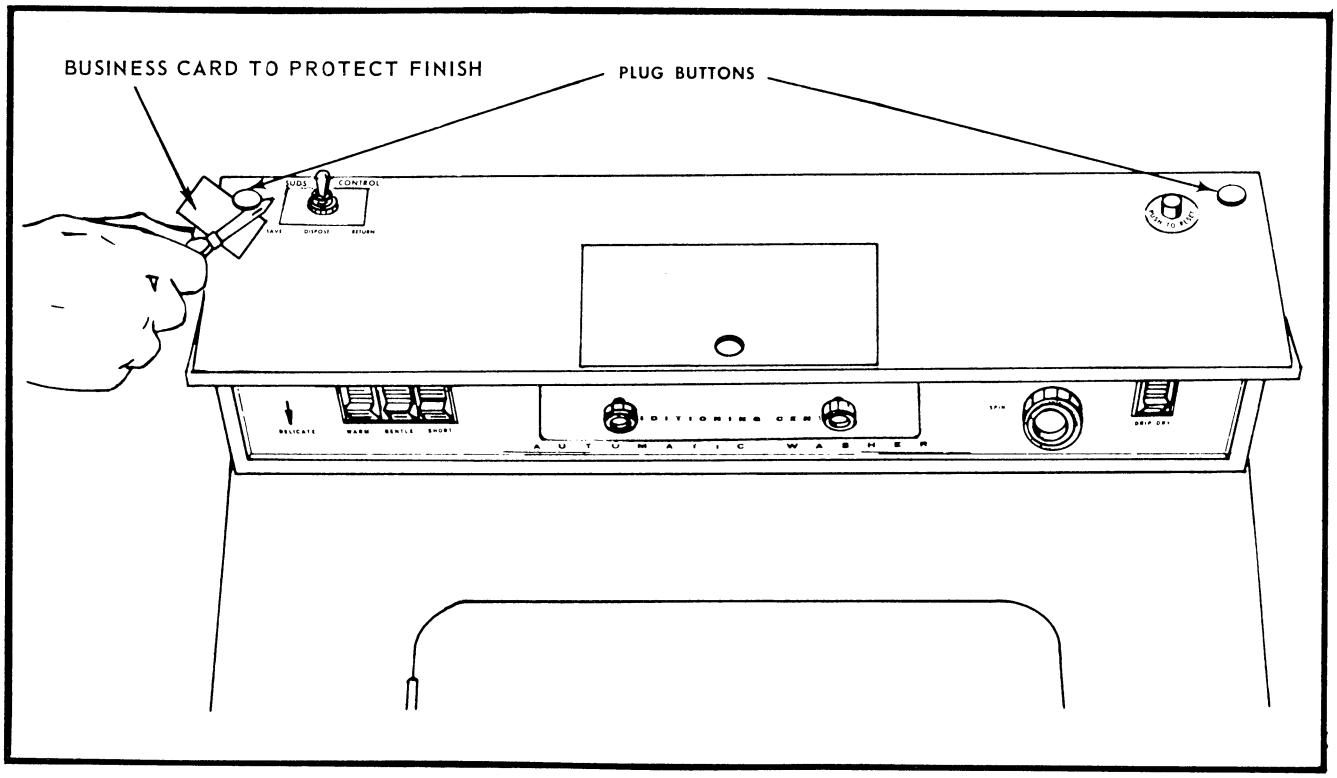


Figure 7—Removing Plug Button

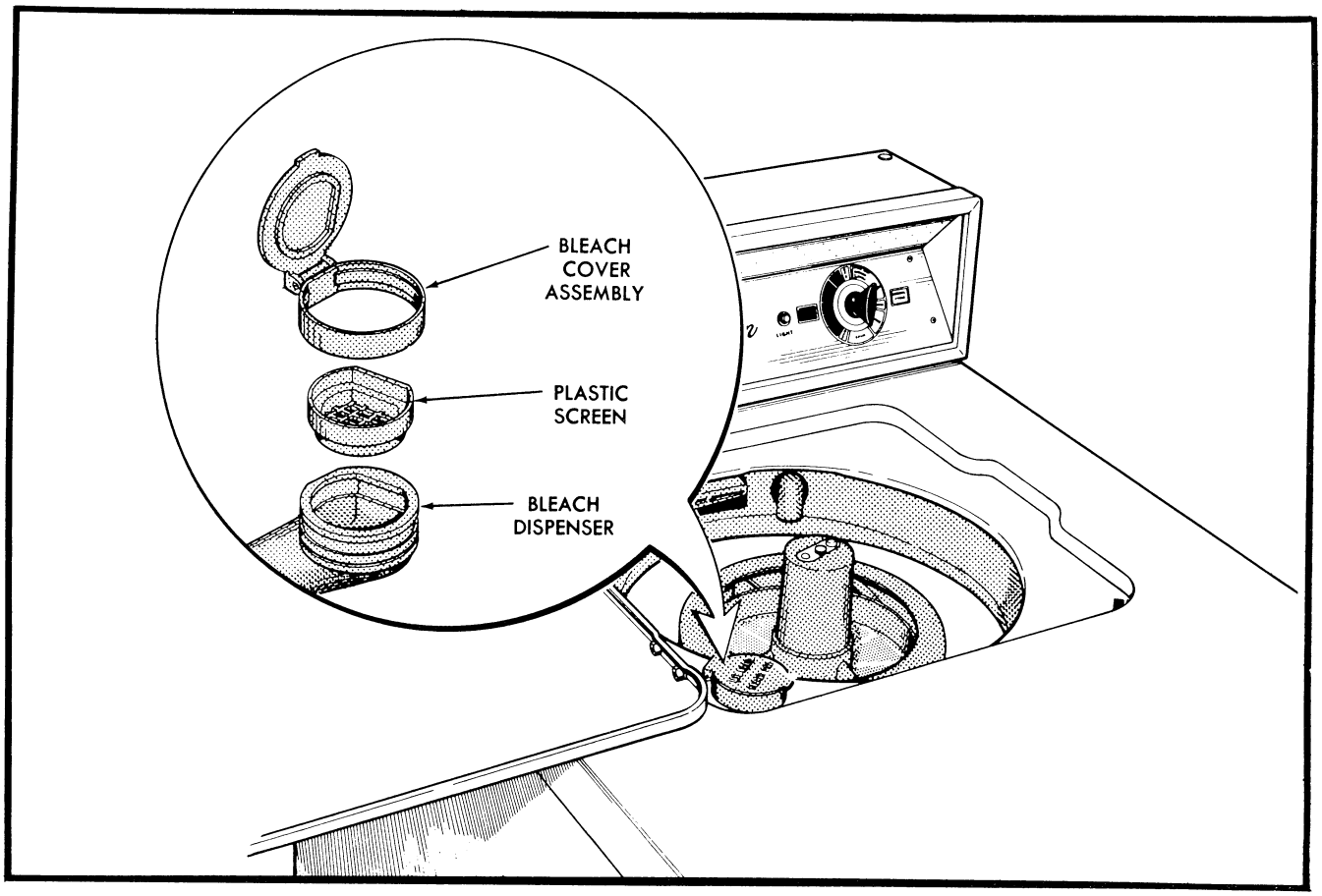


Figure 8—Bleach Dispenser

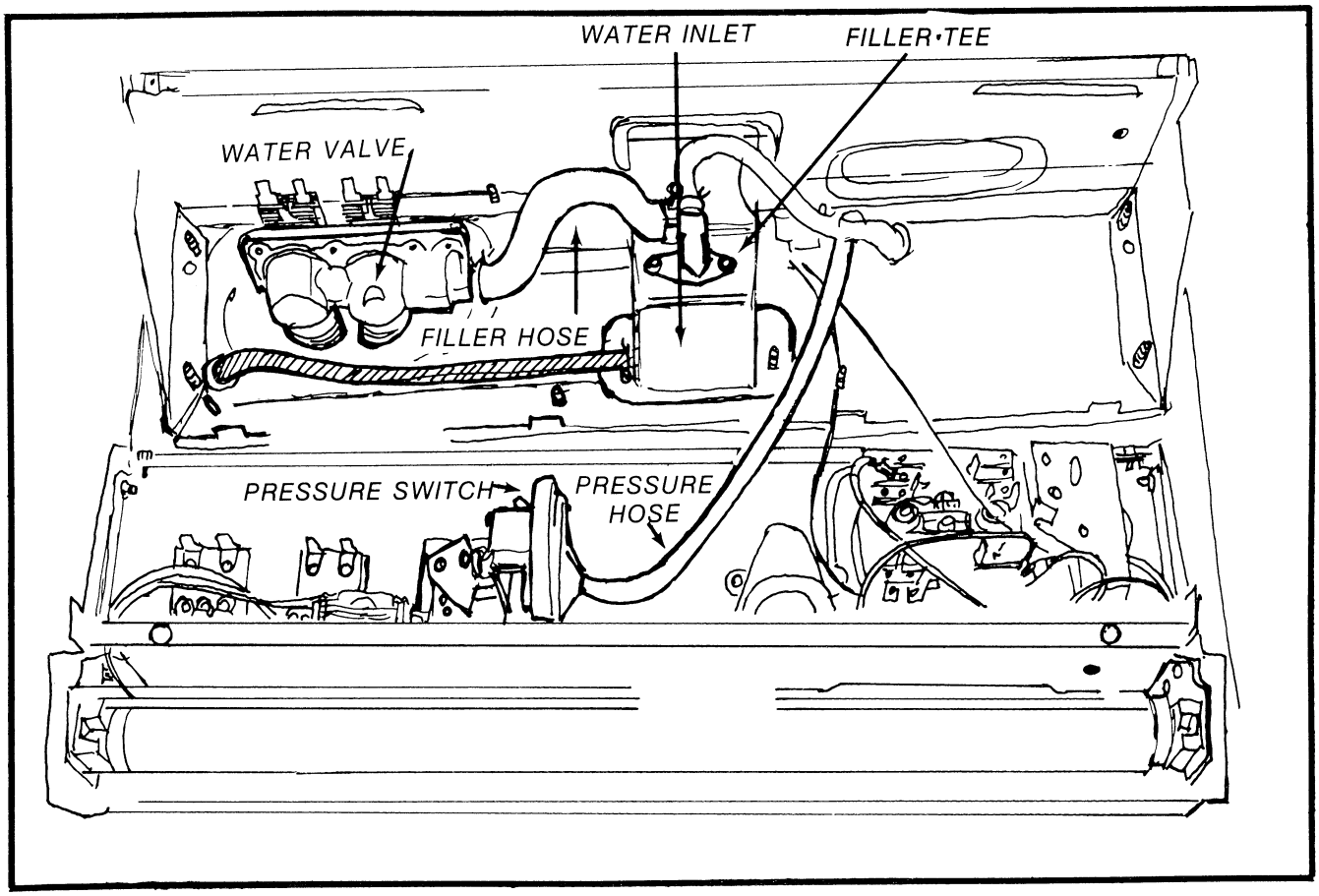


Figure 9 — Water Valve, Pressure Switch

CABINET TOP ASSEMBLY
Later and Current Models

1. Remove front panel, see text Cabinet Front Panel.
2. Water mixing valve inlet hose must be disconnected.
3. On Shur-Fil models, the control panel screws, *Figure 1,* must be removed and the control panel assembly lifted off of the panel support.
4. On Shur-Fil models the pressure hose should be removed from the pressure switch, *Figure 8.*
5. On Shur-Fil models install panel assembly temporarily to the control hood.
6. Open the loading door and lift the lid off of the bleach dispenser. Remove cover and compress dispenser, push dispenser down through the opening in the cabinet top, *Figure 9.*
7. Remove bleach hose from the top of bleach pump, *Figure 10.*

NOTE: Check to see if the shipping plugs have been previously removed. They are located on the lower edge of the cabinet top directly behind the rear hold down brackets. If they were not previously removed, they should be removed at this time.

When raising the cabinet top, carefully grasp the rear of the cabinet top and not the control hood. The control hood is designed only to house the electrical controls and should never be used to raise the cabinet top or to move the washer. Severe cabinet damage can result if the control hood is used to move the washer.

After the cabinet top is raised, it must be supported with a small chain or piece of heavy cord as shown in *Figure 10.* An alternate support can be used by hinging the cabinet top all the way forward and resting it on a padded support such as a chair, *Figure 11.*

When repositioning the cabinet top, check the drain tub gasket to make sure it is in place and properly located against the inside of the cabinet top, *Figure 12.* If the drain tub gasket is incorrectly installed as shown in *Figure 13,* a water leak will occur during the spin cycle. This occurs when the water is spun into the outer tub and against the gasket. Also, check to be sure the gasket is clear of any screw heads in the top.

Properly position the bleach dispenser tubes to avoid any kinks or pinching before tightening the cabinet hold-down screws.

NOTE: Do not tighten the cabinet hold-down screws so tight that the cabinet top comes in contact with the side panels. The hold-down screws should be tightened only enough to compress the rubber grommets at the top rear corners of the side panels.

CAUTION— Tape loading door with masking tape to prevent damage when raising cabinet top.

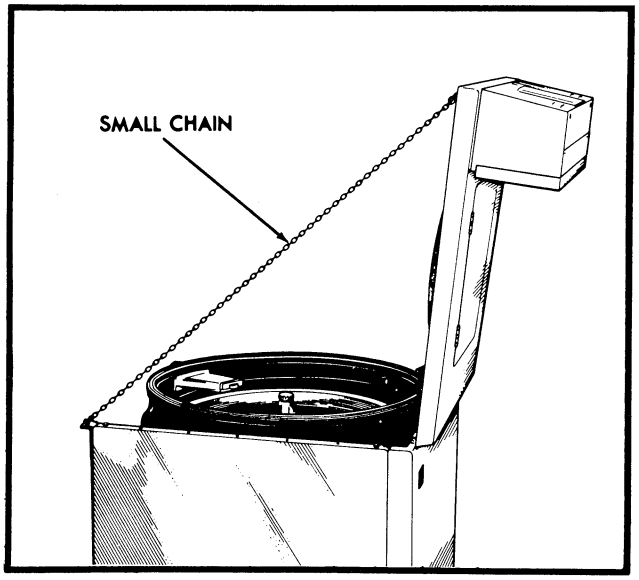


Figure 10—Cabinet Top in Raised Position

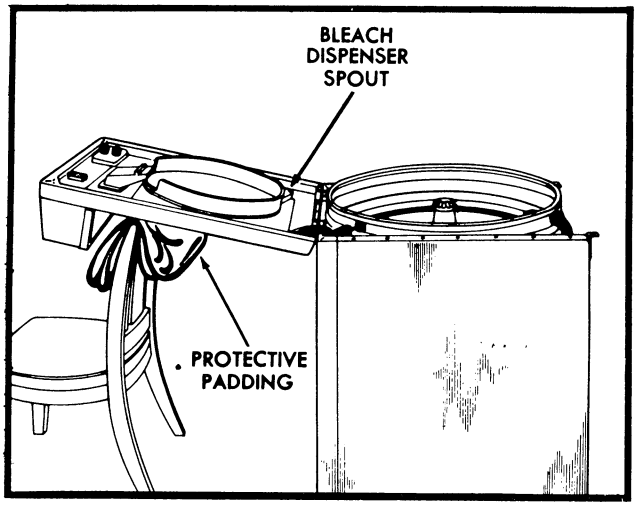


Figure 11—Cabinet Top on Padded Support

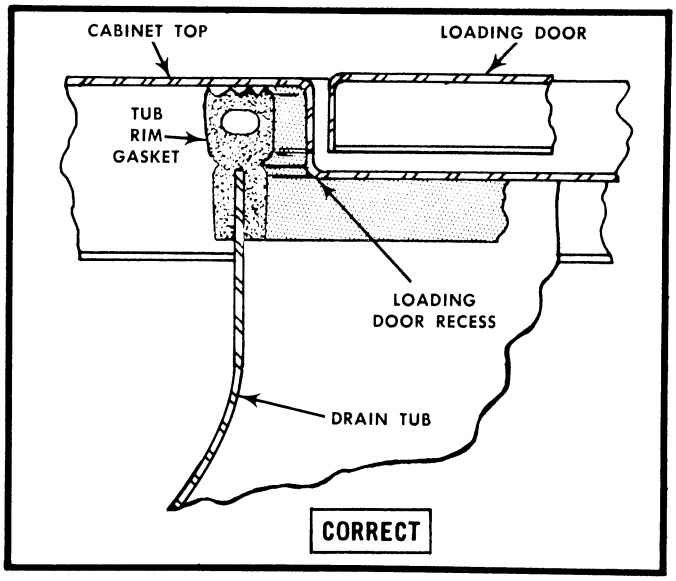


Figure 12

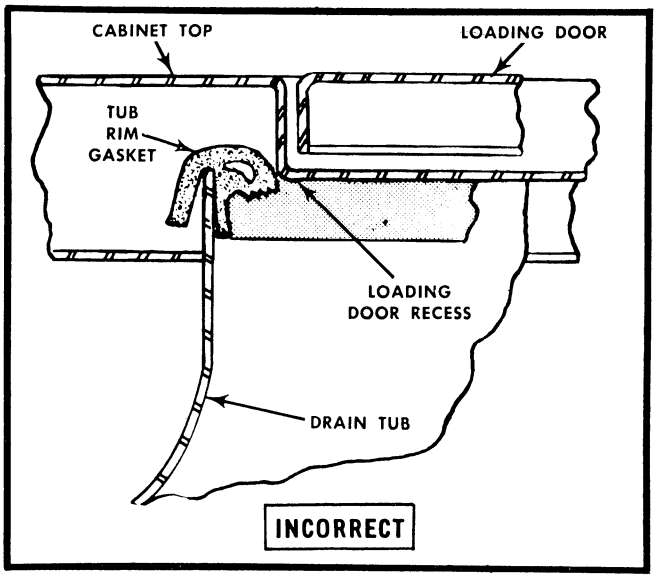


Figure 13

REAR PANEL

The rear panel on the Speed Queen Automatic Washers may be removed to facilitate servicing some of the components located at the rear of the machine.

To remove the rear panel, a series of self-tapping screws must be removed, *Figure 14.* When reinstalling the rear panel, be sure to secure the ground connector to the panel, using one of the rear panel retaining screws.

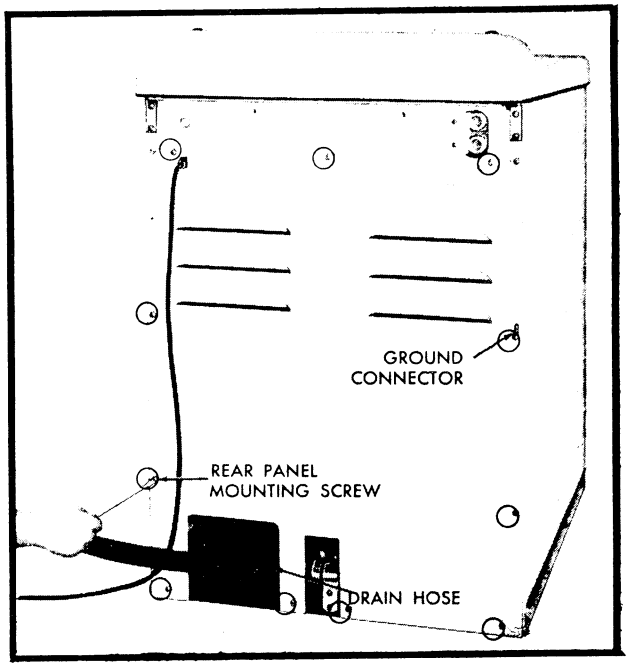


Figure 14—Removing Rear Panel

SIDE PANELS

The side panels are removed only when it is necessary to service components that cannot be readily serviced by removing the front panel, rear panel or the cabinet top.

To remove the side panels, the front and rear panels, as well as the front and rear cross braces, must be removed. Also, remove the four self-tapping screws located at the base of the side panels.

On later model cabinets, the side panel is removed by raising the front panel and then removing the two front screws and spacers from the front cross brace, *Figure 15.* Then remove the cabinet top hold-down screw located under the plug button in the control hood. Now remove the self-tapping screws from the base and the back edge of the panel. The panel can now be removed for service accessibility.

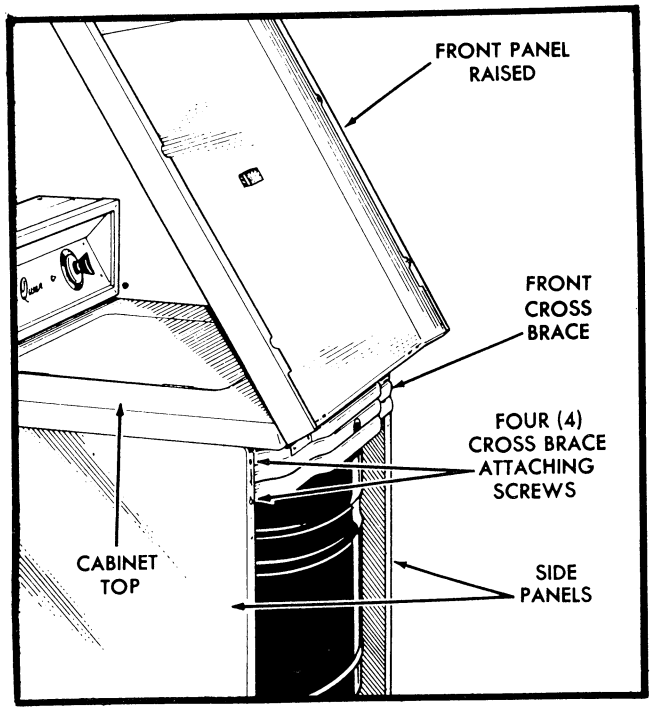


Figure 15

CONTROL HOOD

The control hood is mounted to the back of the cabinet top and is used to house the timer, switches and various other components. Aside from housing these components, the control hood also gives a decorative appearance to the machine.

By raising the top and removing the control hood back panel, the various components can be replaced or checked without moving the machine from the wall.

Speed Queen has now made the front panel of the control hood removable to gain access to these components, *Figure 16A.* It is removed by taking off the timer and switch knobs and removing two small screws located at the top corners of the control panel. Lift off and lay the control panel where it will not get damaged.

CONTROL PANEL

Late and Current Models, *Figure 16B*

There are basically three types of control panels used on the current models of Speed Queen washers. They all mount in a similar manner and removing the control panel will allow access to the controls.

1. Remove panel assembly screws and lift the assembly from panel support.
2. Remove end caps.
3. Loosen timer set screw and pull the timer knob off of the shaft.
4. Remove knobs from other controls and switches, also, remove the knurled nuts that mount the switches to the control panel.
5. Remove the screws securing the timer to the control panel.
6. If your washer is a Suds Saver model, remove the knurled nut that holds the Suds Saver switch to the control panel.

The control hood should never be used to move the machine as severe cabinet damage may result from pulling too hard on the hood.

LEVELING LEGS

All Speed Queen Automatic Washers are equipped with adjustable screw type leveling legs, *Figure 17.* These leveling legs are supplied with a lock nut that should be securely tightened against the washer base after the machine is leveled and all four legs are in good contact with the floor. Any time the washer is moved, the leveling legs should again be checked. Rock the washer diagonally from corner to corner, on all four corners, to make sure all four legs are resting solidly on the floor.

TIMERS

The "brain" of the automatic washer is the timer. It programs the entire laundry sequence — water fill, wash, drain, rinse, spin, and shutdown at the end. Not only does the timer eliminate the need of attention to the machine, but also it insures uniformly good washing by evenly timing each laundering step during each complete laundry cycle.

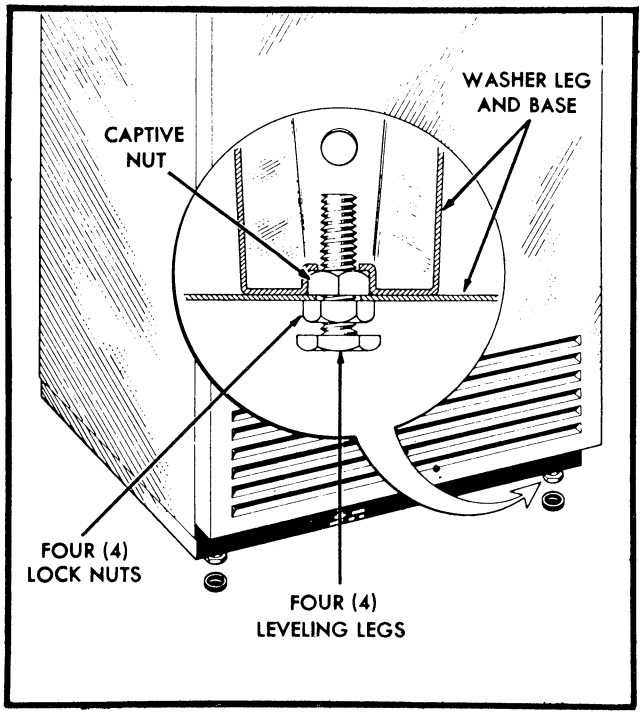


Figure 17—Adjustable Leveling Legs

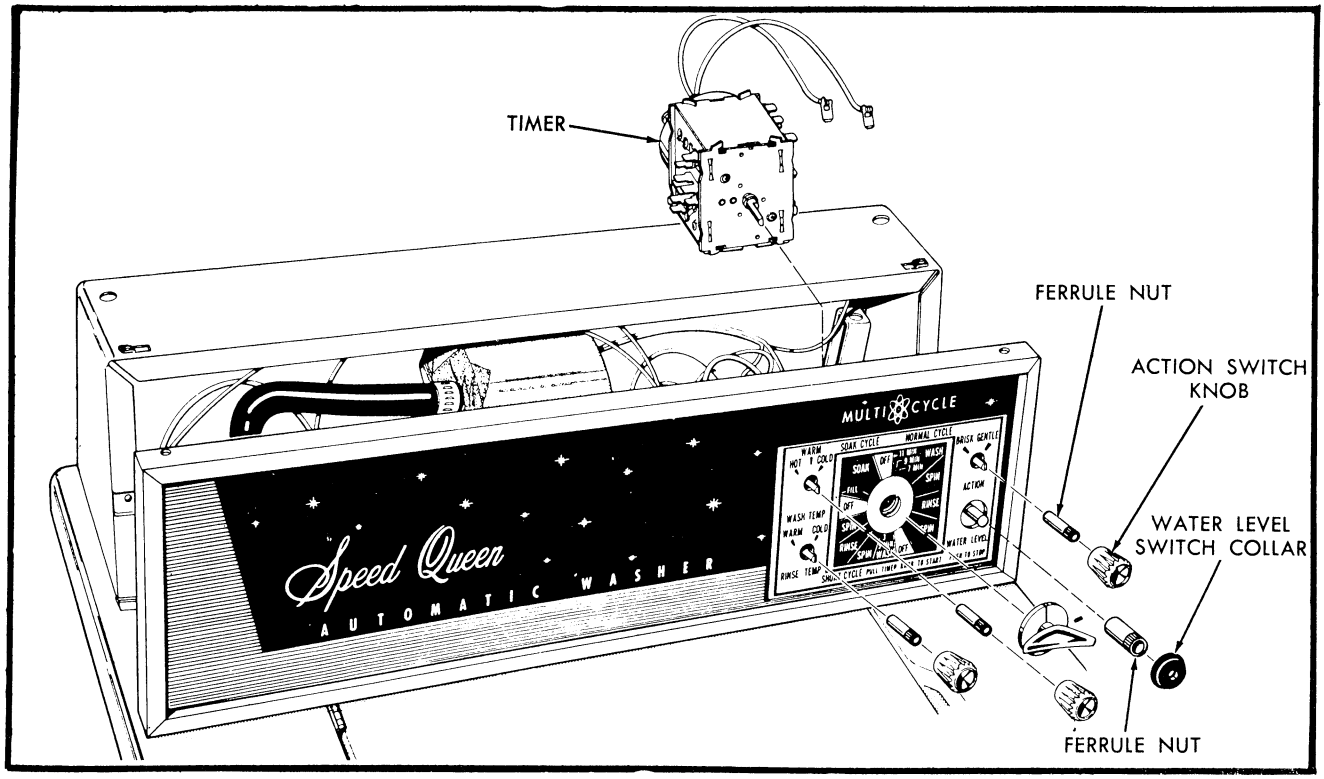


Figure 16A—Control Hood

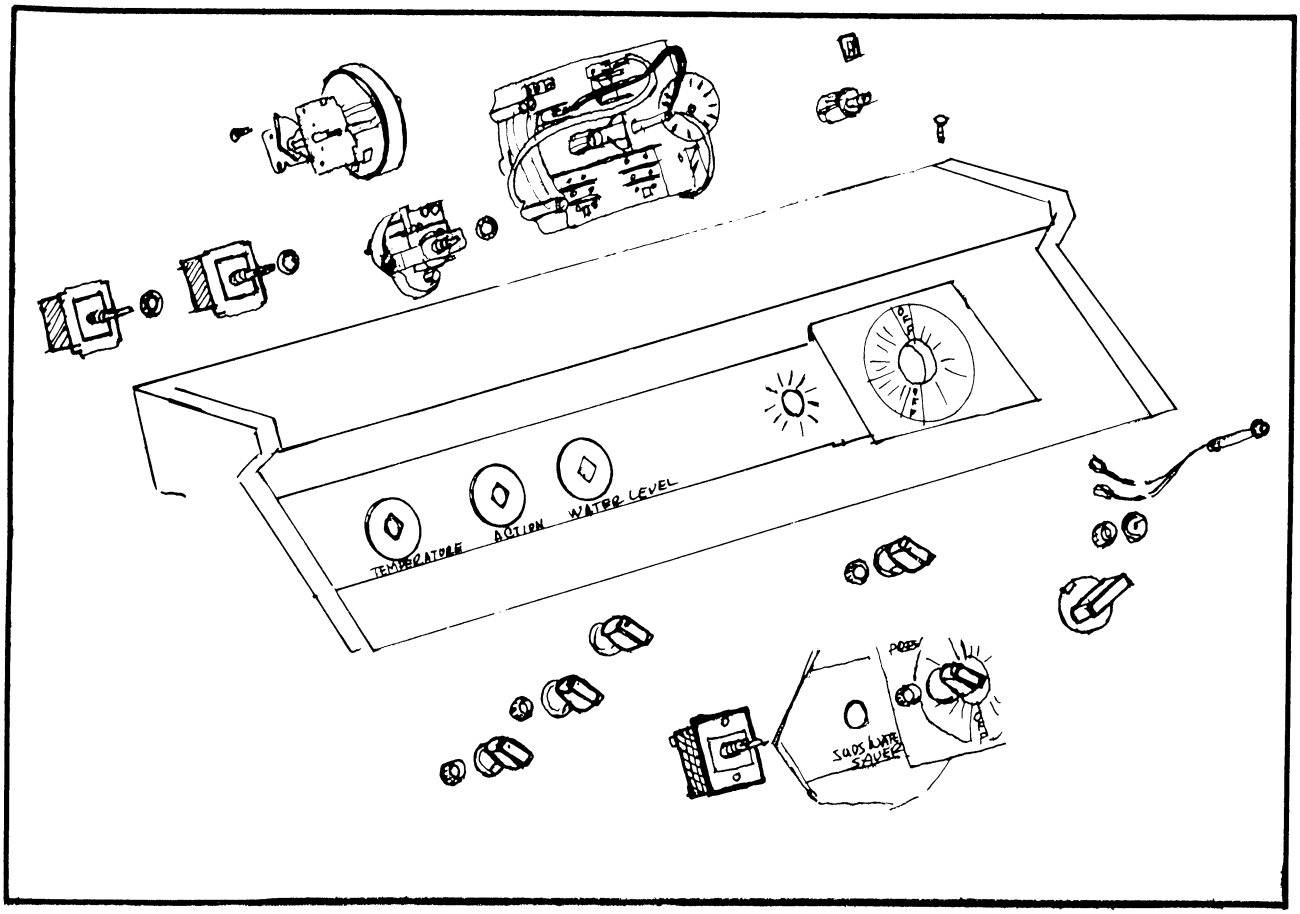


Figure 16B — Control Panel and Components

Timers are durably built and usually provide years of trouble-free service. Dirt, moisture and vibration are the main causes of timer failure.

Unfortunately, too often the timer is the "scapegoat" for many problems that are in fact the malfunction of some other component of the machine. For this reason, a timer should never be replaced or condemned until all other possibilities have been eliminated.

Timers used on all 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 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 18*.

All timers consist of three basic components assembled into one unit, *Figures 18A and 18B* The components are the motor, the escapement, and the multiple circuit cam switches.

TIMER KNOB INDICATOR, Adjustment

1. Turn the timer knob so the indicator points to the top "Off" position. Then pull timer knob out.

2. Slowly turn the knob clockwise until the fill cycle starts.

3. Push the knob in without turning the knob. Water should stop coming into the machine.

4. Be careful knob does not turn as you loosen the timer knob set screw. Then tighten the set screw just enough to hold the knob firmly to the timer shaft.

5. Holding the knob, carefully move indicator directly over the vertical line just right of the top "Off" position.

6. Tighten knob set screw securely.

NOTE: If indicator is hard to move, loosen timer knob set screw slightly.

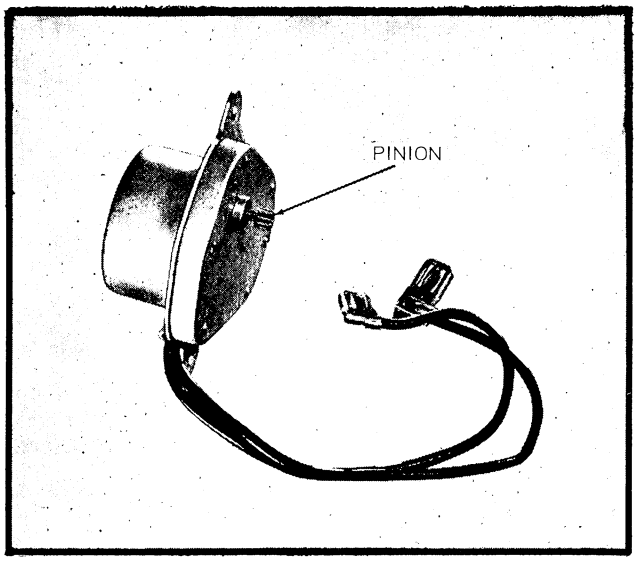


Figure 18—Timer Motor

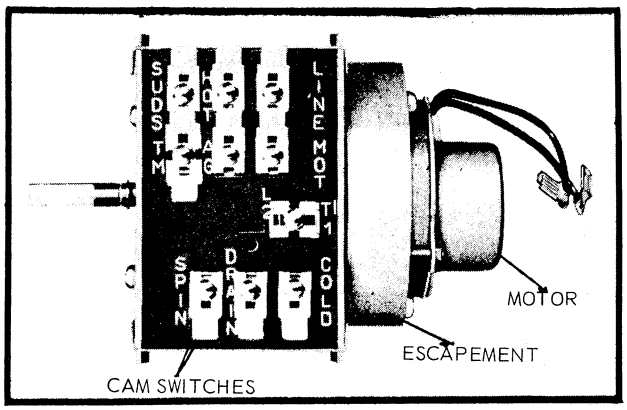


Figure 18A—Timer

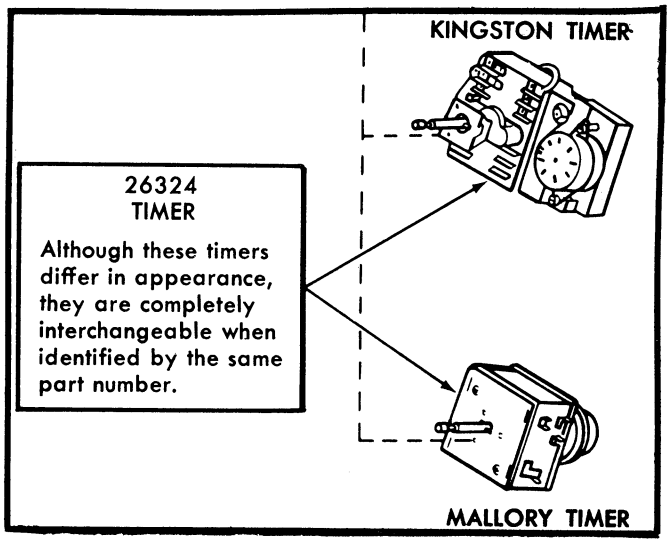


Figure 18B

TIMER MOTORS

Figure 18 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 others. It is a synchronous type motor, similar to those used in electric clocks, with a small pinion which drives a gear in the escapement.

THE ESCAPEMENT

This 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.

The motor winds up a music wire torsion spring to a predetermined force. After the required time lapse, this spring unwinds abruptly, causing a chain of gears to advance the timer cam shaft the predetermined number of degrees.

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

THE MULTIPLE CIRCUIT CAM SWITCHES

The switches ride on cams which cause contacts to make and break as the brass arms are raised and lowered by the cam profile. Since the cam shaft is quickly advanced in short steps by the action of the escapement, the switch contacts open and close with a snap action intended to reduce arcing damage.

Coin silver contact points are imbedded in the ends of the spring brass switch arms. (Silver is a favorite contact material because satisfactory electrical connection is made even through blackened and pitted contact points.)

The control knob fits on the shaft end of the timer. In addition to turning, the knob can be pushed in or pulled out a short distance. On some machines the "pulled-out" position and on others the "pushed-in" position closes a set of contacts, furnishing power to the timer motor and switch circuits.

The knob can be manually rotated from the front control panel, but only in the clockwise direction. If an attempt is made to rotate it the other way, the cam indents will jam against and damage the contact arms. Damage might also be done to the escapement as it is designed to ratchet in one direction only.

It is recommended that the knob be in the "off" position for manual rotation, otherwise, as it is turned with the power on, the washer motor, water valve, pump, and other accessories would damage the contact points by being switched on and off too abruptly.

TIMER Testing

Testing a timer is a combination of observing, listening and checking electrical continuity. In quiet surroundings, the faint whirring sound of the timer motor can be heard indicating that it is operating satisfactorily.

The motor also may be removed from the timer and with the use of a test cord as shown in *Figure 19,* the shaft rotation can be observed for positive indication that it is working. If the motor is defective, it can be replaced without replacing the timer.

If the escapement is working properly, it will advance the timer at evenly spaced intervals. These intervals may be 30, 45, 60, 75, 90 or 120 seconds, depending on the gearing in the escapement.

If the motor is turning but the escapement is not advancing, the trouble probably is a broken spring or a stripped gear in the escapement. No attempt should be made to repair the escapement and the entire timer should be replaced, since on many timers the escapement requires a very careful adjustment.

In checking the cam switches, make a visual check first, looking for burned terminal boards, badly burned points or points burned together. A continuity checker may be used across the points to test for proper operation. Adjustment or repair of the timer contacts should be done only by an experienced serviceman or a timer rebuilding shop.

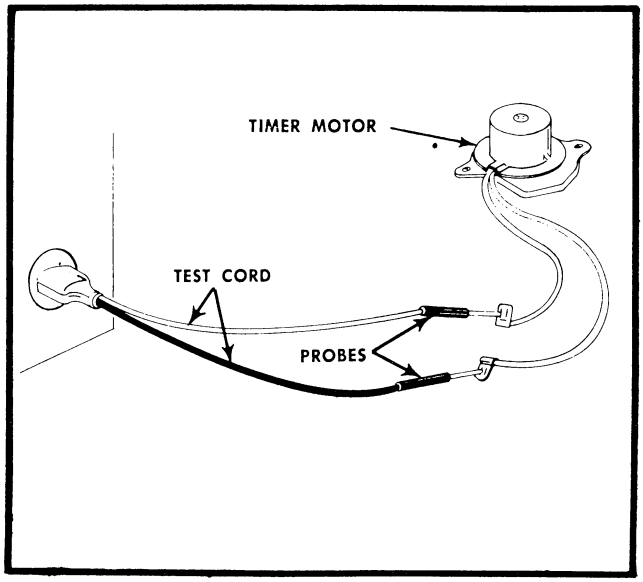


Figure 19—Testing Timer Motor

When removing the timer, always check the wiring to make sure that it is on the proper terminals, etc. If in doubt, make a simple diagram to be used when reinstalling the timer.

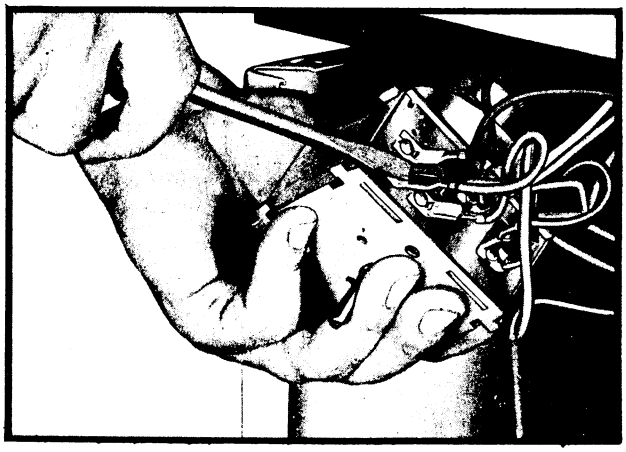


Figure 20—Removing Spade Connector from Timer

Always remove the wires from the timer with a pair of needle-nose pliers, gripping the terminal, or pry the connectors off with a screwdriver as shown in *Figure 20.* Do not pull on the wires as they may break off from the connectors.

Since the timer used on the automatic washer is a precise instrument and is easy to get out of adjustment, we strongly recommend that this unit not be disassembled in the field, other than removing the timer motor from the rest of the timer.

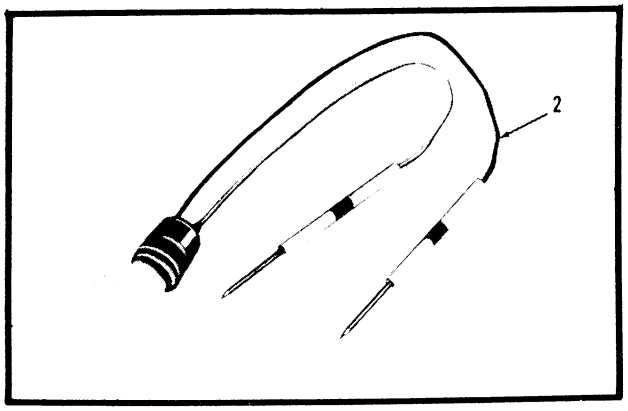


Figure 21—Test Lamp

A test lamp, *Figure 21,* may be used to check the timer while it is in the machine. On Speed Queen Automatic Washers, the timer terminal marked L2 is the COMMON terminal and therefore one test lamp probe is always applied to this terminal, no matter which circuit is being tested.

With the machine power cord plugged into the wall, apply one probe of the test lamp to the L2 timer terminal and the other probe to the L1 terminal. If the lamp lights, the power cord is good and power is being supplied to the timer.

Using the machine wiring diagram, locate the timer terminal supplying power to the malfunctioning component and turn the timer knob to the portion of the dial where the circuit should be completed to that component. Now, *push in* on the timer knob to close the line switch in the timer.

Place one test lamp probe to timer terminal L2 and the other probe to the suspect terminal. The lamp should light. If it does not, the timer is at fault.

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 the machine through an entire cycle to make certain all components are functioning properly.

TIMER MOTOR
Removal

a. Remove two nuts or two screws from motor mounting studs.

b. If escapement is a separate unit, remove it by removing three screws that mount escapement to timer.

TIMER MOTOR
Testing

a. With the aid of a test cord run motor direct.

b. If pinion gear hesitates or rocks back and forth, motor should be replaced.

c. Using the inside portion of a tweezer, place over pinion and gently and carefully move tweezer toward the pinion so the hinged part of the tweezer exerts some pressure against the pinion. If,with only a slight pressure,pinion gear hesitates or rotates back and forth, the motor should be replaced, *Figure 22.*

d. If the motor passes the above tests, look elsewhere, if a condition exists that the timer does not move through the cycles automatically.

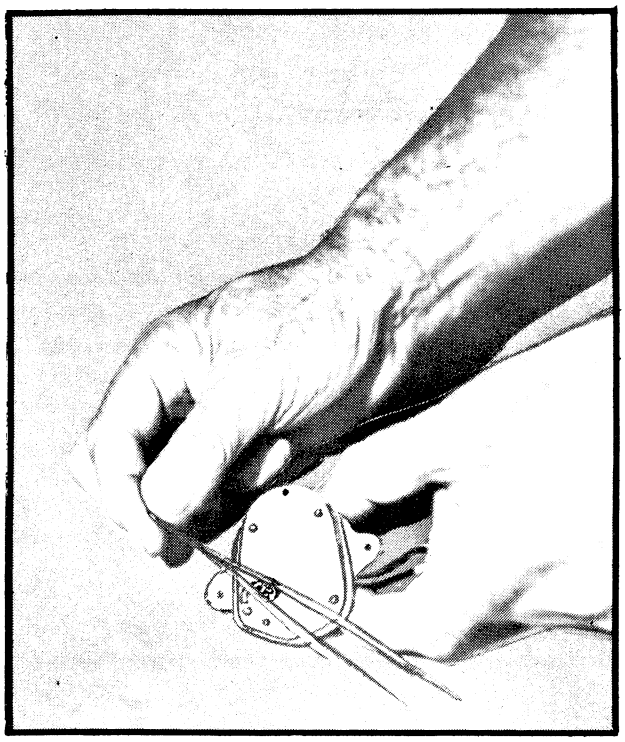


Figure 22 — Testing the Gear Train

ESCAPEMENT
Testing

NOTE: Older models had a separate escapement, Figure 23, this type of unit would "wind up" and at a predetermined time, the slide retainer would allow the gear to "unwind". Each of these wind and unwind periods are "Increments". If you want to watch the gear train, start at "a".

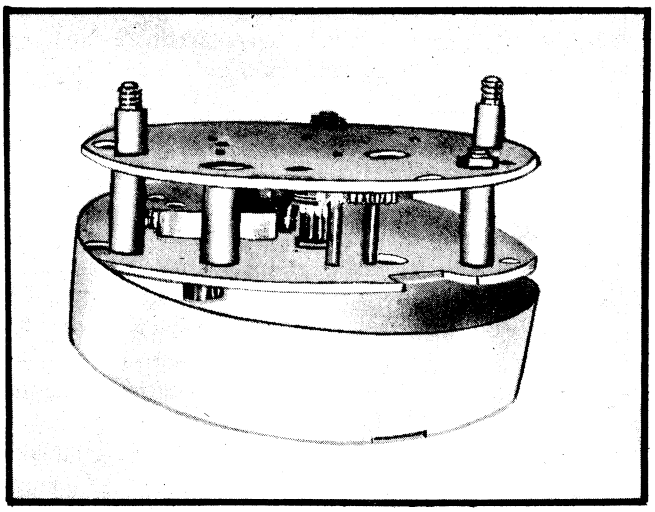


Figure 23

a. Remove cover from escapement by turning until grooves line up with the indents on the cover, then lift off.

b. Place tweezers over pinion as previously outlined, *Figure 24.*

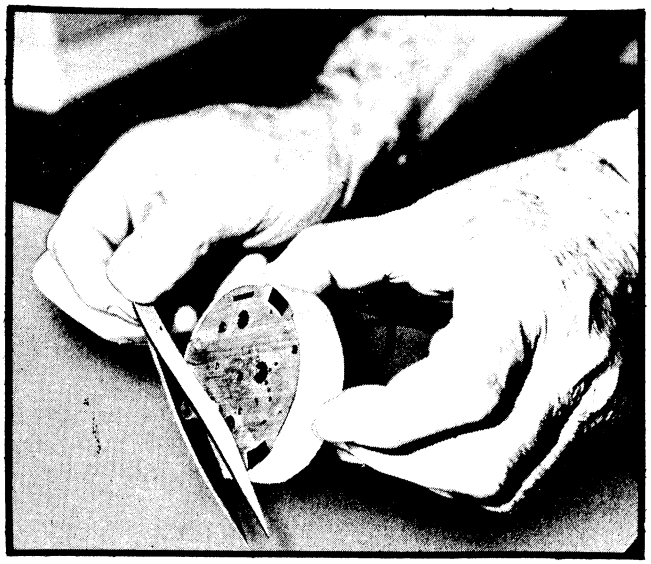


Figure 24

c. Wait for at least one minute for timer to act.

d. If pinion gear fails to move, escapement must be replaced.

e. The old style motor, as described above can be replaced with the new type motor. All old style motors were 8 RPM.

PRESSURE VALVE AND SWITCH ASSEMBLY

A small number of machines were produced with a *pressure valve and switch* system instead of a *pressure switch* system. These machines use a pressure valve and switch assembly, *Figure 25,* and an agitator solenoid switch, *Figure 26.*

In order for this switch to function properly, the drain hose must be installed at the proper height, *Figure 27.* This allows a column of water to rise in the hose as the spin tub overflows.

On these machines, the spin tub is filled with water until it overflows into the outer tub. The water in the outer tub goes through the pump and then starts to rise in the drain hose. When a water column of approximately 12 inches has risen in the drain system, the pressure switch is satisfied and the water fill stops and agitation begins.

To adjust the pressure switch, hold the locknut stationary and turn the adjusting screw as shown in *Figure 28.* Turning the adjusting screw clockwise RAISES the water column level and counterclockwise LOWERS it.

IMPORTANT

One complete turn of the adjusting screw is equal to approximately two water column inches.

WATER LEVEL CONTROLS

Some models of Speed Queen Washers do not have a *time fill* system to control the amount of water entering the machine, but instead, they have a water level control switch for this purpose.

Two types of water level control switches are used; the *pressure valve and switch assembly* that uses water pressure against a rubber diaphragm to actuate the switch, and the *pressure switch* that uses air pressure against a metal bellows to actuate the switch.

The pressure valve switch can be checked in or out of the machine with the use of the continuity cord or live test lamp shown in *Figure 29.*

To test the pressure switch, apply probes of a live test lamp to terminals L1 and A, *Figure 30;* test lamp SHOULD light. Next apply test lamp probes to terminals L1 and B, *Figure 31;* test lamp should NOT light.

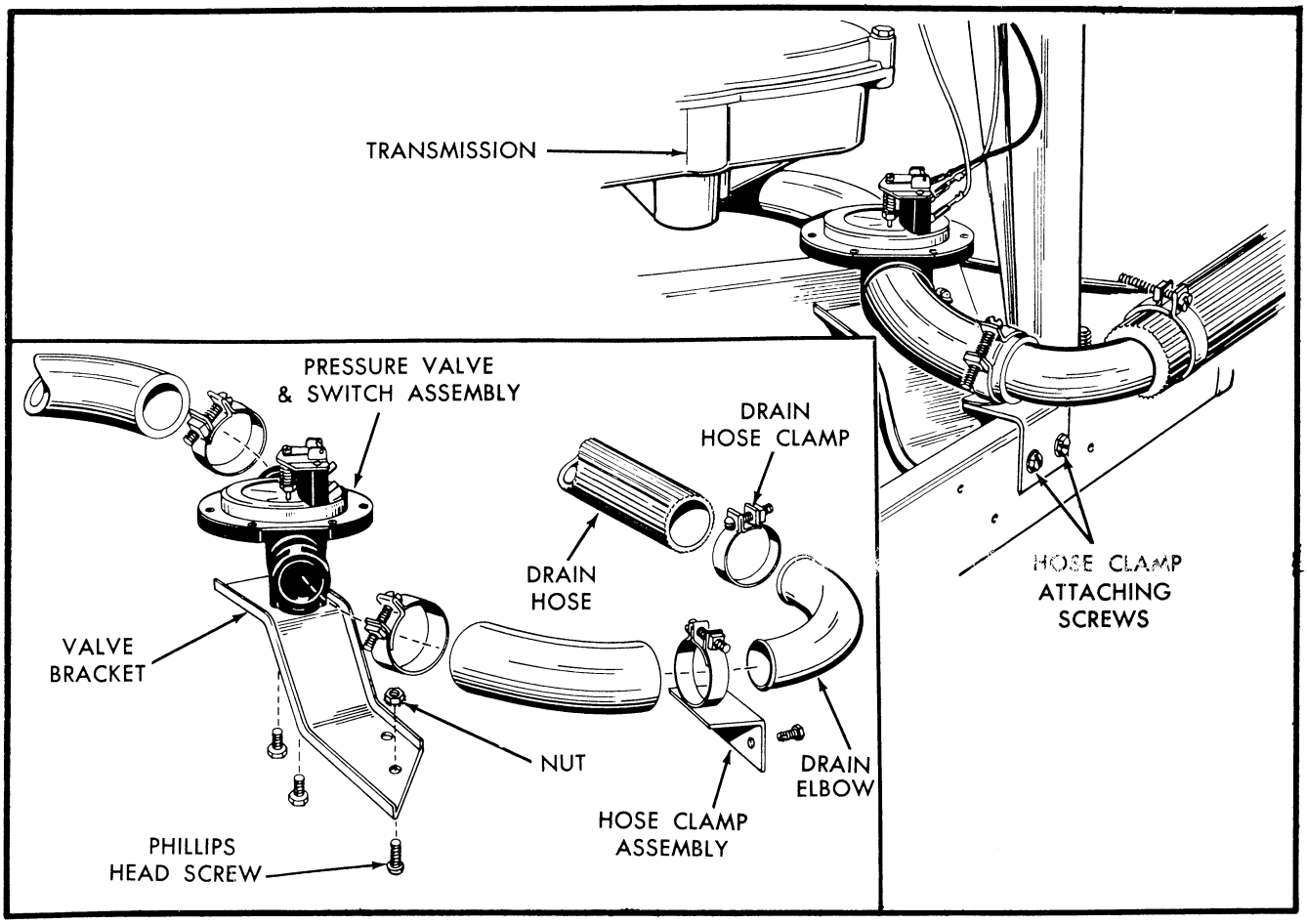


Figure 25—Pressure Valve and Switch Assembly

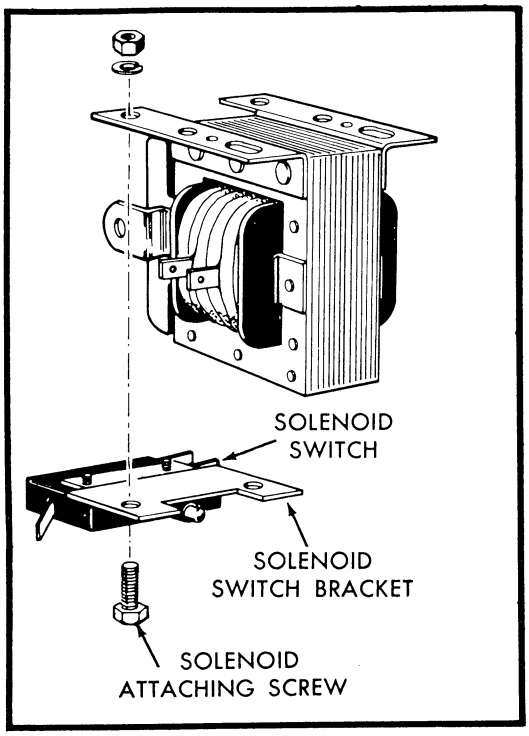
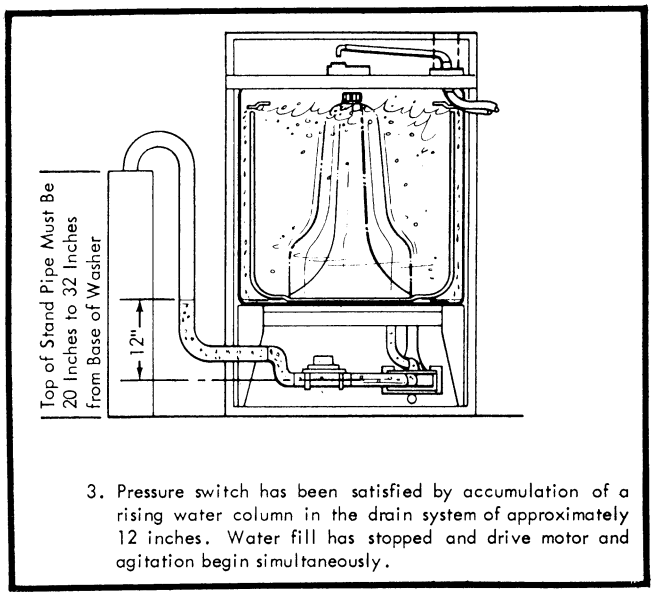


Figure 26—Solenoid and Switch



3. Pressure switch has been satisfied by accumulation of a rising water column in the drain system of approximately 12 inches. Water fill has stopped and drive motor and agitation begin simultaneously.

Figure 27

With the test probes still in this position, raise the adjusting screw bracket with a screwdriver until a distinct click is heard; test lamp SHOULD light.

To remove the pressure valve assembly, refer to *Figure 25.* Remove the rear panel and disconnect the wires, hose clamps and the screw attaching the valve assembly and the hose clamp assembly to the machine.

PRESSURE SWITCH

The pressure switch is used on Shur-Fil models and performs the same function as the pressure valve and switch assembly. That is, to shut off the water entering the machine and to start the agitation action.

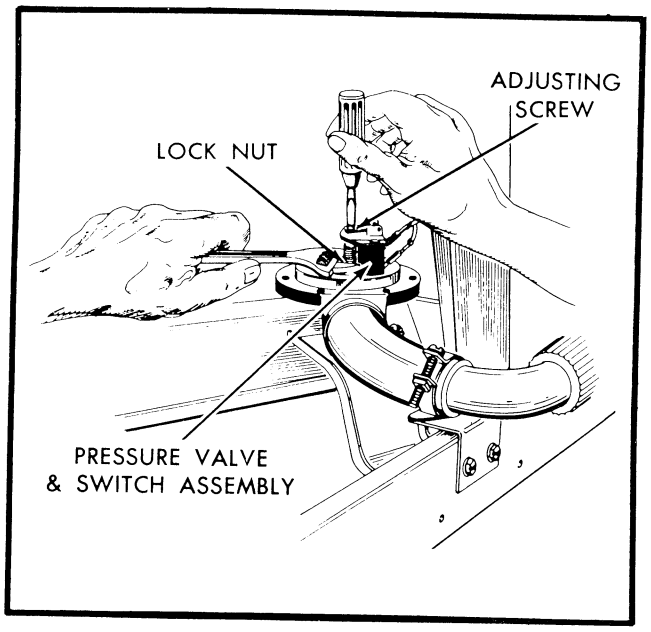


Figure 28—Adjusting Pressure Switch

Like the pressure valve, the pressure switch requires an overflow of water from the spin tub into the collector tub in order to satisfy the pressure switch and shut off the water.

In order to give the user control over the water level for partial loads, a water level button is placed in series with the pressure switch. When the desired water level is reached, the user pushes this button to bypass the pressure switch and start the agitation action. If the water level button is pressed in the rinse-fill period, the water will continue for one more timer increment before stopping.

When the pressure switch is satisfied, or the water level button has been pressed, the water fill stops and the drive motor, timer motor and agitation begin simultaneously.

The pressure fill system is composed of a water reservoir, pressure hose tube and pressure hose, *Figure 32,* the pressure switch, *Figure 33,* and the power relay and water level switch, *Figure 34.*

The function of these components is described in the following paragraphs. The timer dial is set to fill position completing a circuit to the panel lamp, the (COM) common terminals of the power relay and to the water valve circuit through the (N.C.) normally closed terminals of the power relay. When about half to three-quarters of a gallon of water is in the water reservoir, air is forced up the pressure hose against the bellows in the pressure switch, causing the pressure switch to close. This action causes the power relay to switch

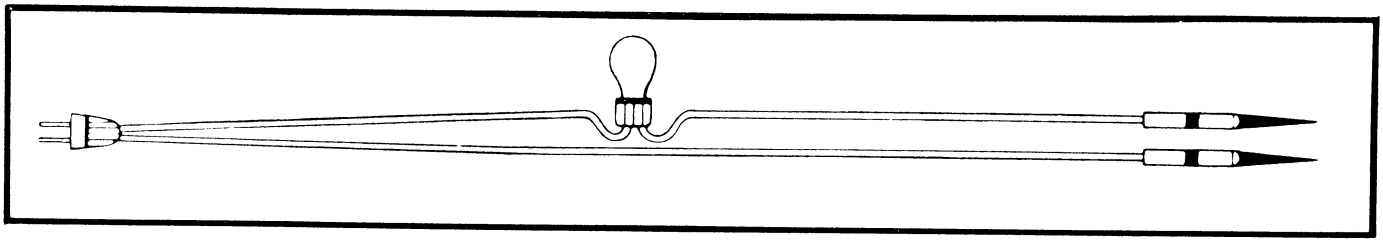


Figure 29—Live Test Lamp

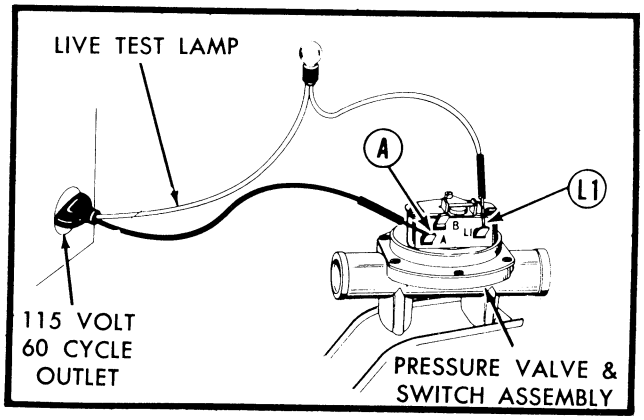


Figure 30

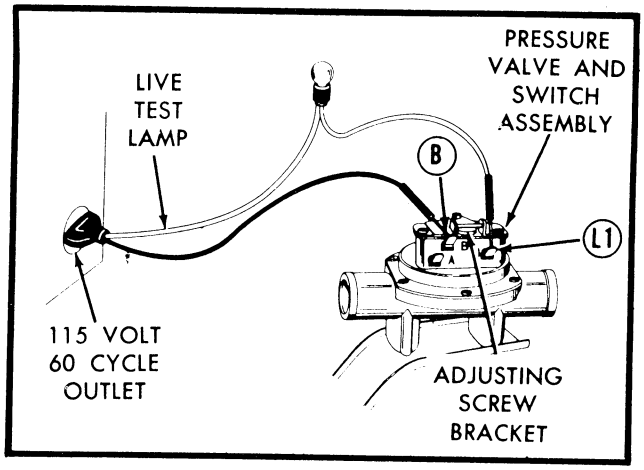


Figure 31

from N.C. to N.O. (normally open) position, thus completing a circuit back to the U terminal of the timer. As the U terminal is energized, a circuit is completed to the timer motor, main drive motor and agitation solenoid.

Simultaneously, the water circuit opens, shutting the water off. If the water level switch button is pressed instead of satisfying the pressure switch, the same circuits are completed as mentioned above. *Figure 35* illustrates the operation of the complete system.

Although there are three terminals on the pressure switch of the Speed Queen Washer, only two of these terminals are used. Remove the wires from the pressure switch and apply a live test lamp to the P1 and P3 terminals; the lamp should not light, *Figure 36.* Remove pressure hose from the pressure switch and blow into the pressure switch hose connection. A distinct click should be heard and then the lamp should light.

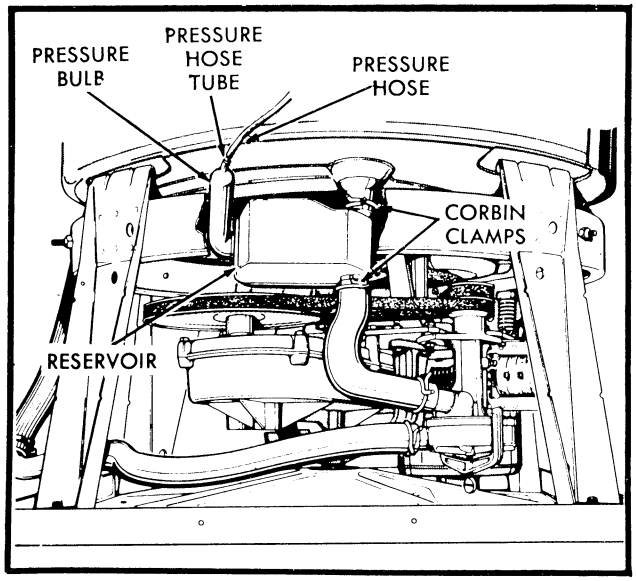


Figure 32—Pressure Fill System

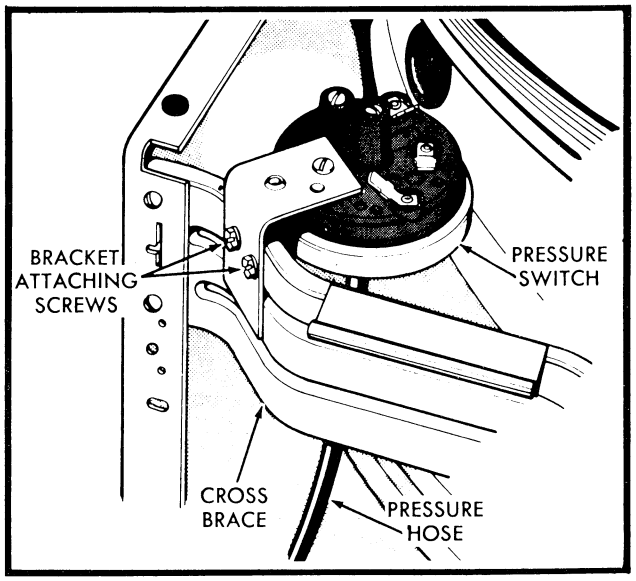


Figure 33—Pressure Switch

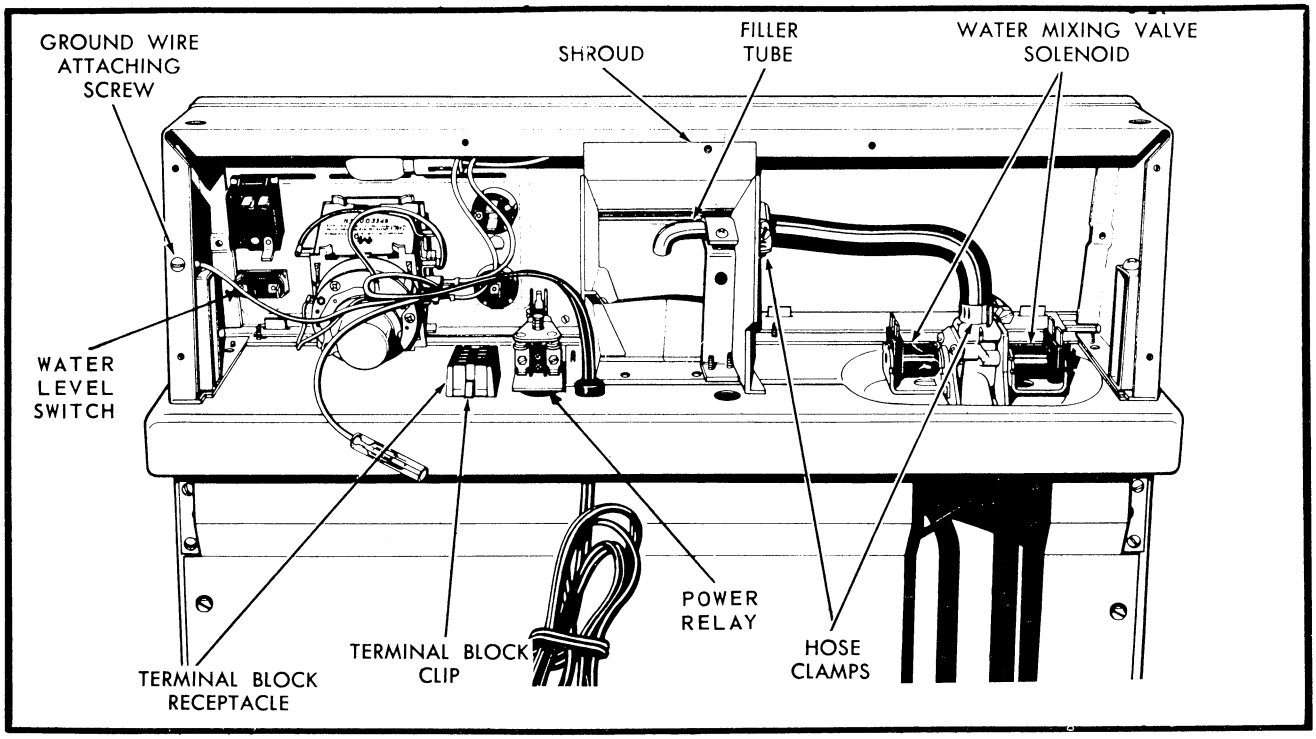
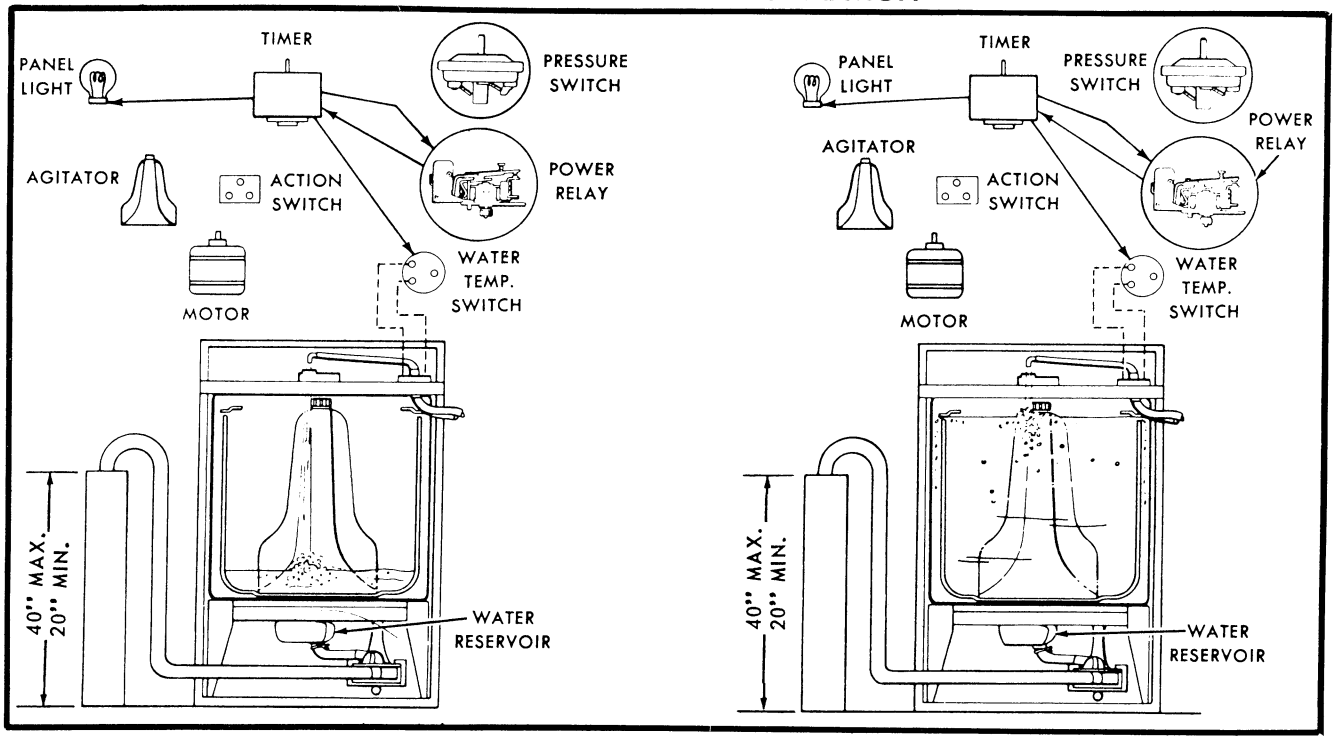


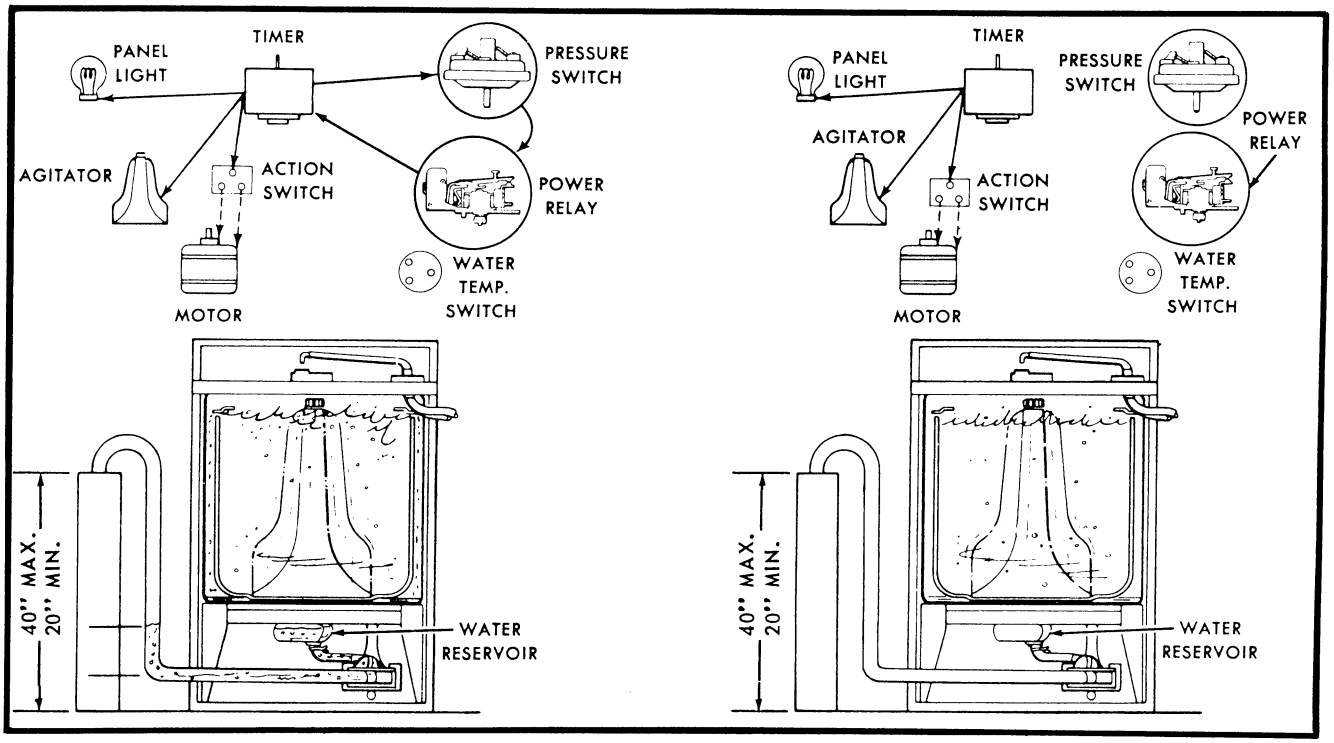
Figure 34

POSITIVE WATER FILL OPERATION



1. Start of cycle . . . control panel is illuminated and water fill starts.

2. Spin tub is filled to overflowing.



3 Pressure switch has been satisfied by accumulation of water in the water reservoir (or WATER LEVEL button has been pressed). Water fill has stopped and drive motor and agitation begin simultaneously. (If the WATER LEVEL button is pressed during the rinse fill phase of the cycle, the water fill will continue for one impulse of the timer escapement before stopping.)

4. Approximately eight minutes after the start of the cycle, the pressure switch and power relay are cammed out of the circuit.

Figure 35

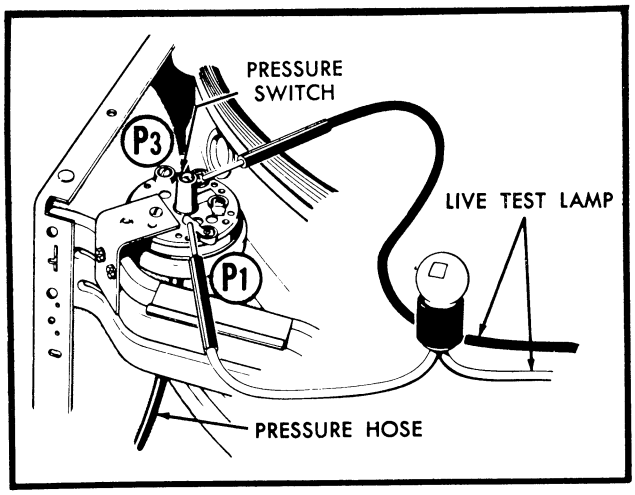


Figure 36—Checking Pressure Switch

WATER LEVEL SWITCH

The water level switch is a momentary *on* switch that can be tested with a live test lamp, *Figure 37.* Applying the clips of the test lamp to the switch, there should be no light. Pressing the plunger in should cause the lamp to light.

POWER RELAY

The power relay is secured to the cabinet top under the control hood, *Figure 34.* The power relay can be tested in the machine but to help clarify the testing procedure, it is shown removed, *Figure 38.* A live test cord is applied to the relay solenoid which causes the switches at each end of the power relay to open or close. In *Figure 38* the relay switch would be closed and continuity should be present. *Figure 39* shows the testing of the other relay switch in the power relay which is a double throw type, meaning that if a live test lamp is applied to terminals COM. and NO., there should be no light, unless power was supplied to the solenoid. With the power relay solenoid idle, continu - ity is observed between terminals COM. and N.C.

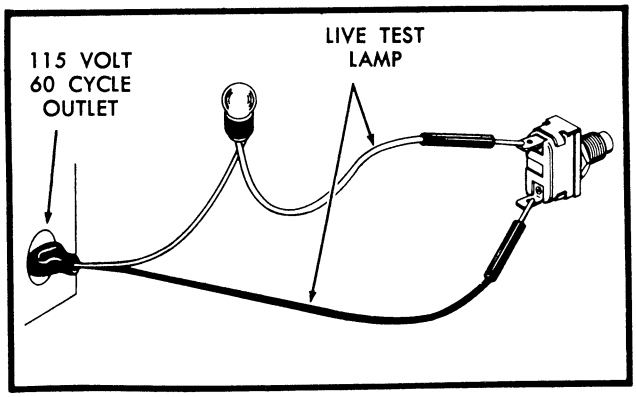


Figure 37—Checking Water Level Switch

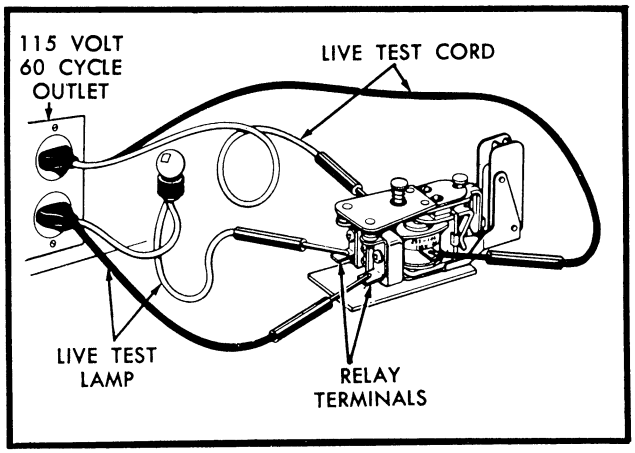


Figure 38—Checking Power Relay

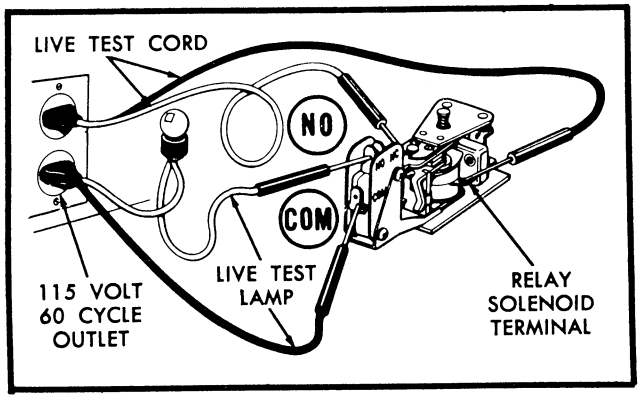


Figure 39—Testing Relay Switch

There are several methods used to test switches. When any water temperature switch is suspected of malfunction, the easiest way to test it is to set the timer dial at the beginning of the wash fill. With the switch set in the hot position and allowing enough water to run into the spin tub for the water to be hot, change the temperature switch to the warm or cold setting. A distinct difference in water temperature should be felt. If the water temperature changes, the switch is okay.

TEMPERATURE SWITCH

The water temperature switches change in shape and style with each different model. There are several types of temperature switches used on the Speed Queen Automatic Washers. These temperature switches are referred to as toggle, rotary, rocker, and bank switches. These switches serve many functions besides just controlling water temperature. Therefore, in testing these switches, keep in mind that the test procedure can also be used to test other like switches. These particular switches are designed to control the water temperature, allowing the user to select various water temperatures in both wash and rinse cycles.

If no water enters a machine, the problem could be the temperature switch. On machines with a hot-warm temperature setting, the switch is tested the same though it may be a toggle, rotary or rocker switch.

These are two position switches with only two terminals.

With the test lamp illustrated in *Figure 21,* see if a circuit is completed between the L2 and H terminal of the timer. If this circuit is present, then move the test probe from terminal H of the timer to the water temperature switch. On one terminal of the temperature switch the lamp should light and remain on regardless of the switch setting. This would indicate power is present at the switch, so move the test clip to the other terminal of the switch. The light should go on and off as you change selections of the switch. *Figure 40* shows a rinse temperature rotary switch. This switch is tested like any two terminal switches, toggle, rotary, or rocker. Simply attach the clips of a continuity test lamp to the terminals of the switch, and by selecting either temperature indicated, the lamp will light or not light as this is simply an on-off switch.

For testing a three terminal rotary or rocker switch, refer to *Figures 41, 42 and 43.* On the rotary switch the L terminal is common to the other terminals of the switch. Attach one test clip to the L terminal and the other probe to Number 3 terminal. With the switch in the hot position, continuity should be present. Rotate switch to the warm setting and the light should remain on. It should now stay on if the test probe is moved from terminal 3 to terminal 4. Reposition the switch to the cold selection and apply test probe to Number 4 terminal. The lamp should light, but should go out if the switch is moved to the hot selection.

On the rocker switch, *Figure 43,* the center terminal is the common terminal.

PROGRAM SELECTOR SWITCHES

Program selector switches are usually referred to as switch banks. These switch banks are a push button gang switch that not only control the water temperature, but also control motor speed and agitation action. We are concerned only with the water section of these switch banks at this time. *Figures 44, 45 and 46* illustrate the back of three different styles of these switches used on Speed Queen Washers. Although the figures show the switches removed from the machine, these switches can be checked while still in the machine.

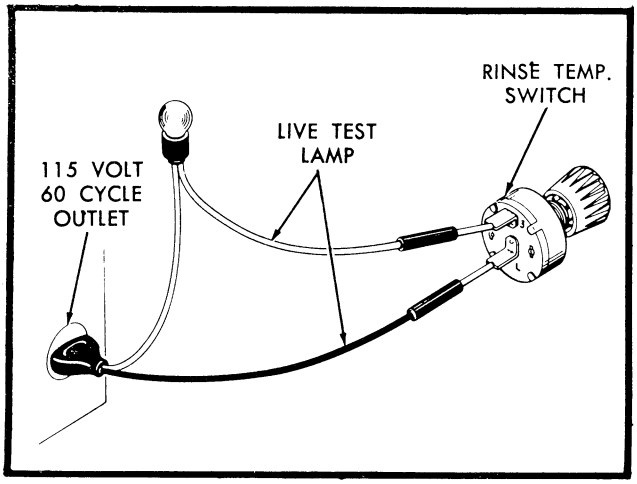


Figure 40

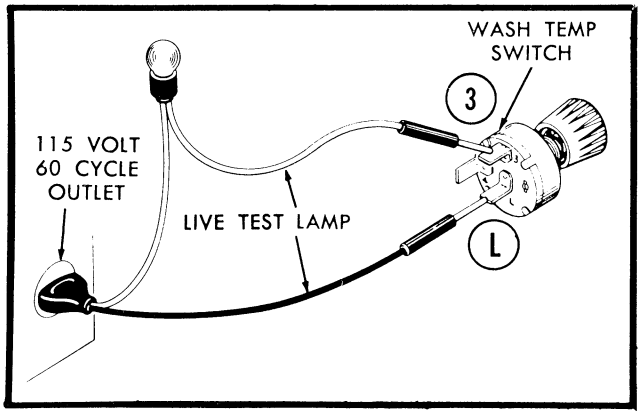


Figure 41

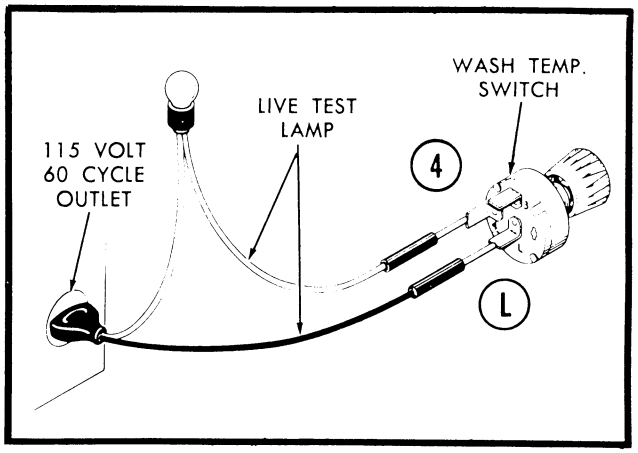


Figure 42

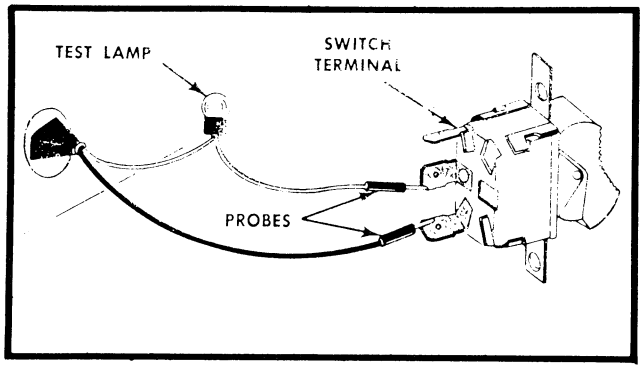


Figure 43

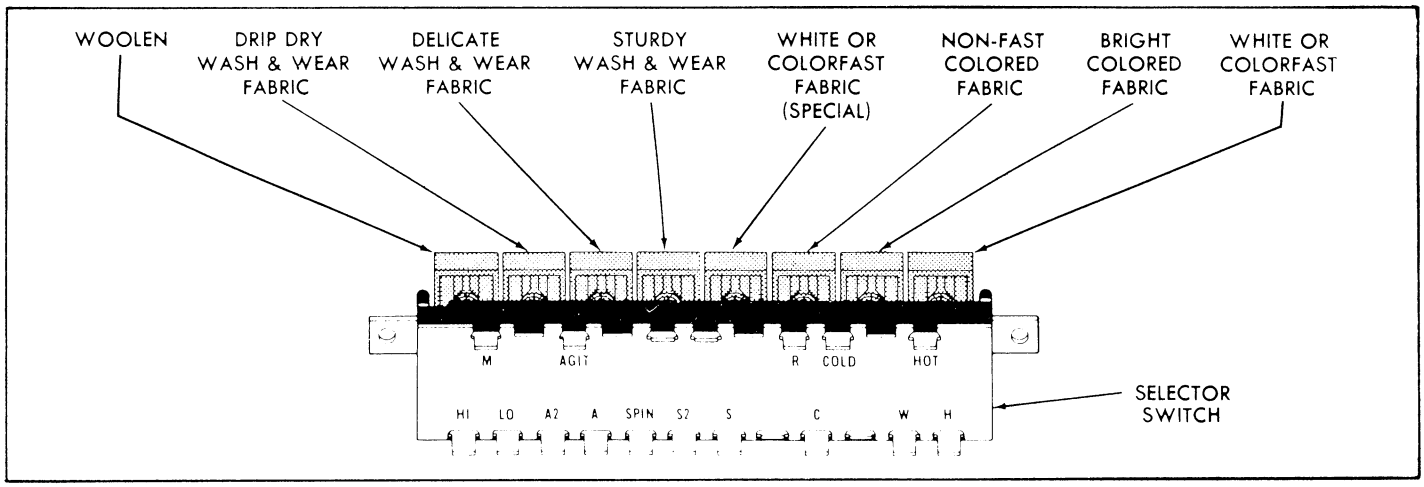


Figure 44

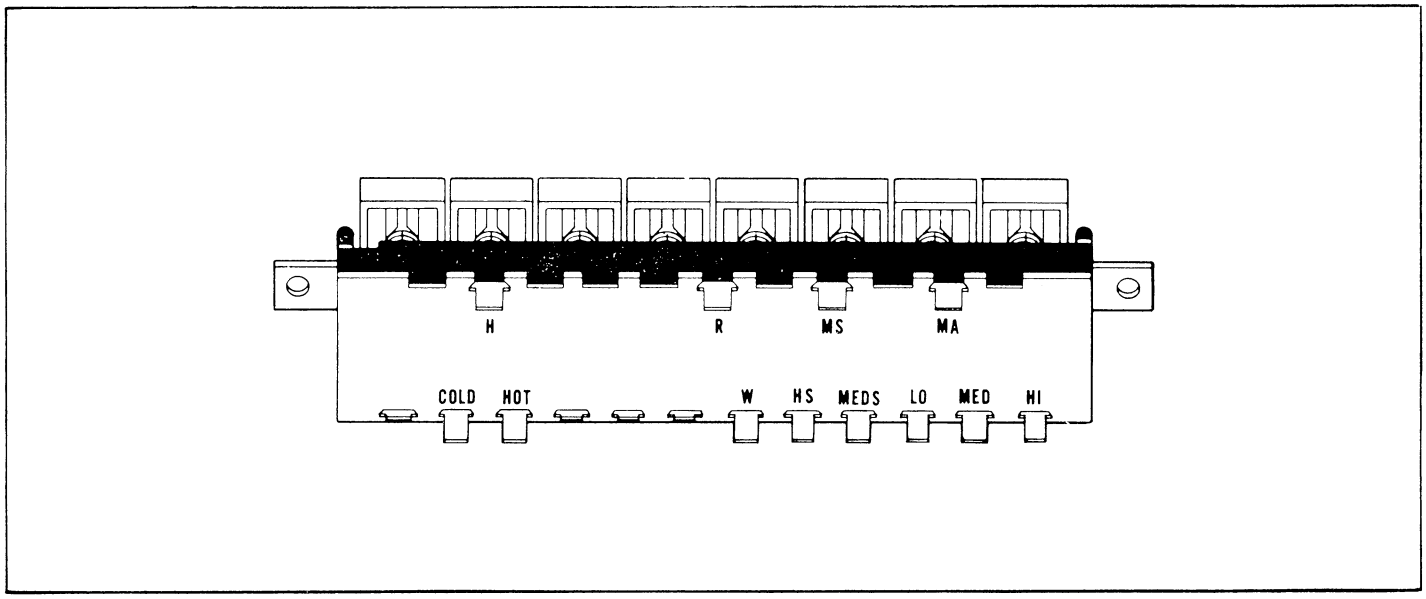


Figure 45

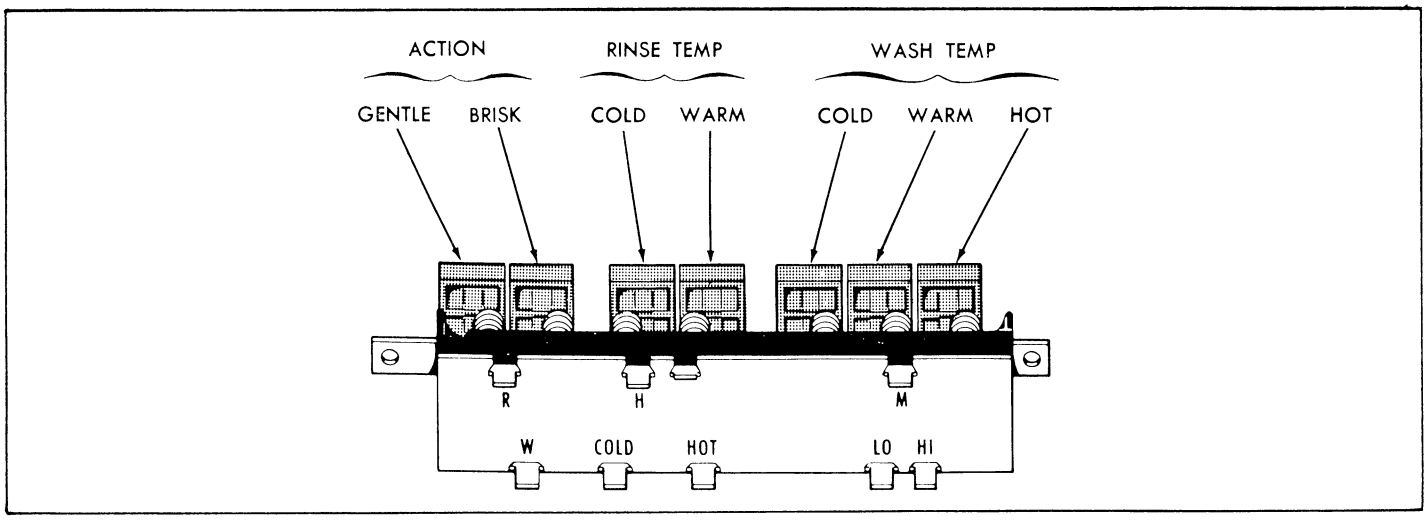


Figure 46

What would normally go wrong with a switch bank?

1. A jammed button is usually caused by lack of lubricant.
2. Lack of continuity, through a particular circuit of the switch.
3. A short circuit caused by an overload or moisture.

The first and easiest test for correct water temperature is made while the machine is still in operation. Set the timer to wash fill and press each button of the switch bank as described on the loading door of the washer. A distinct difference in water temperature should be felt.

If water does not enter the washer on any fill period or the water is not the correct temperature, the switch must be tested to see if it is the cause of the problem. First, attach one test clip of the test lamp shown in *Figure 21* to the L2 terminal of the timer. Set the timer dial to the wash fill period and use the other leg of the test lamp to check for a circuit at the W, C, and H terminals of the switch bank, *Figure 44.* If the test lamp lights on these terminals, the switch bank is being supplied with power. Now attach the test probe to the hot terminal of the switch bank and depress each switch button as described on the loading door. Do the same thing again with the test probe attached to the cold terminal. If the test lamp lights on these terminals the switch bank is okay. The problem could exist between the wiring of the switch bank and the water valve, or the water valve solenoids could be defective.

Further testing of the switch bank may be done by disconnecting the wires from terminals W, C, and Hot and Cold. With the live test cord shown in *Figure 29,* see if continuity exists between the W and Hot terminals when pressing the white or colorfast, bright colored, special, delicate and the drip dry buttons. Next, test between W and Cold and press the bright colored, sturdy, delicate and drip dry buttons. The lamp should light on each test.

The push button switch bank in *Figure 45* is somewhat easier to test. The test lamp shown in *Figure 21* is used to check the circuits. Attach one clip of the test lamp to the L2 terminal of the timer and set the timer dial to wash fill. Test for a completed circuit between the H and L2 terminals of the timer. Set the timer dial to wash fill and test for a circuit between the H terminal of the switch bank and the L2 terminal of the timer. If power is present at the H terminal, the timer is okay. Move the test clip to terminal Hot of the switch bank and press the hot button; the lamp should light but should be out on the cold terminal.

Press in on the warm button and a circuit should be present at both the Hot and Cold terminals. With the cold button pressed in, only the terminal marked cold should show a circuit.

On the rinse cycle, check between terminals L2 on the timer and C on the switch bank with the Cold button depressed. Check the switch bank for a circuit with the warm button pressed, between terminal L2 on the timer and R, W, and Hot terminals of the switch. The lamp should light on all these tests.

Figure 46 shows the back of the third switch bank. To test this switch bank, attach and leave one probe of the test lamp to the L2 terminal of the timer and check for a completed circuit at H and Hot terminals of the switch bank with the hot button depressed.

Depressing the warm button should cause the lamp to light between the L2 and Hot and the L2 and Cold terminals. Pressing the cold button, a circuit is completed between the L2 and Cold terminal only.

FOR RINSE WATER CHECK

With cold water button pressed, the circuit should be complete between terminal L2 of the timer and C of the switch bank.

With the warm button depressed, the circuit should be complete between the L2 terminal of the timer and the R, W, and hot terminal of the switch bank.

ACTION SWITCH

The action switches on the Speed Queen Washers may be tested in the same manner as the water temperature switches, or they may be tested using the terminal junction block, *Figure 47.* Most of the Speed Queen Washers have the terminal junction blocks and they may be used to simplify testing of various components.

The terminal junction blocks may be disconnected for continuity checking and for checking the individual circuits. In *Figure 47,* notice that the Number 1 receptacle of the terminal block is in a vertical position. This receptacle is common to all the other receptacles. To check the circuits at the junction block, use the test lamp in *Figure 21* with the power supplied to the machine. Attach one probe of the test lamp to Number 1 receptacle and use the other test lead as probe for reading circuits. The timer must start a circuit to the action or switch bank and is completed through these switches and the terminal block to various components. By using the terminal block for testing, not only the switch that is being tested, but also the timer circuit is checked.

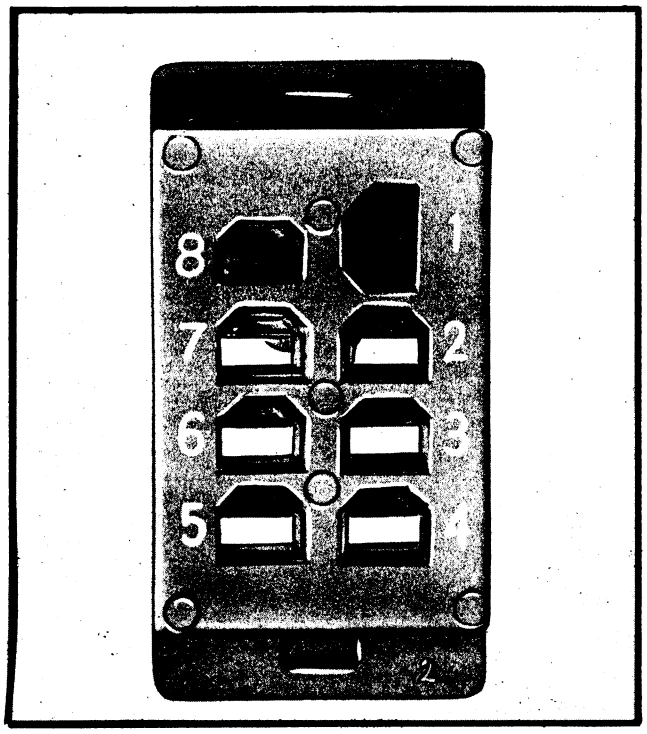


Figure 47—Terminal Block Plug

Since the toggle, rotary and rocker switches are basically the same, we will only explain the rotary. It is the most frequently used and functions very similar to the toggle and rocker switches.

For most electrical testing, it is best to refer to the wiring diagram on your washer. You will notice by looking at the wiring diagram that all power to the electrical components at the base of the machine is controlled through the terminal block.

If trouble is suspected in the action switches because the motor will not run, check the wiring to find the motor circuit. The diagram shows the circuit at the Number 2 and Number 5 receptacles. Therefore, a circuit should exist between receptacles 1 and 2 with the action switch set on brisk and between receptacles 1 and 5 with the switch set on gentle. If a completed circuit is present at these settings, both the timer and the switch are good. The problem could be a poor connection at the terminal block or the motor wiring or the motor.

Figure 48 shows the action switch being tested with a continuity test cord.

If the switch is checked in the machine with a continuity cord, the power cord must be removed from the wall outlet and the wires removed from the switch. With the switch set at *brisk,* continuity should exist between terminals L2 and C. With it set on *gentle,* continuity should exist between terminals L2 and 2. On the toggle and rocker type switches, the center terminal is common to the other two terminals and the L2 terminal of the rotary switch is common.

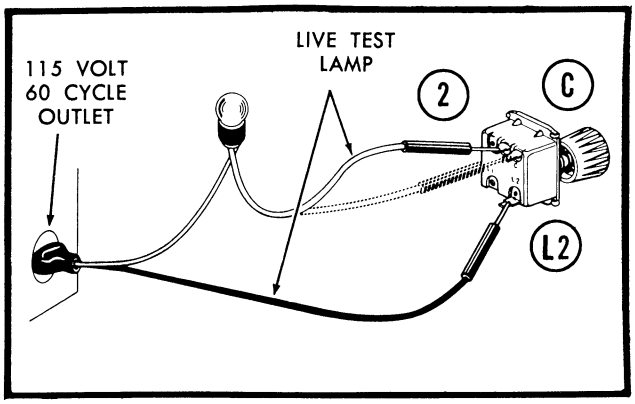


Figure 48—Action Switch

ACTION SWITCH — SWITCH BANKS

A test lamp is used to test the action switch portion of the switch banks. First, the timer must be set to select the component to be tested. A quick circuit test should be made between the L2 timer terminal and the motor circuit terminals of the switch bank. On the switch shown in *Figure 46,* a circuit should be present at terminal M and LO or HI depending on whether the *brisk* or *gentle* button is pressed.

The switch bank in *Figure 45* should have a circuit present between L2 on the timer and MA and the MS terminals of the switch bank. To better clarify the terminal MA, we will call it *motor for agitation* and the MS terminal *motor for spin.* Therefore, if the timer is selecting the agitation period, a circuit is completed between L2 timer terminal and the MA switch bank terminal. A completion of the circuit through the switch bank would be terminal HI, MED, or LOW, depending on which button is pressed. Pressing the *brisk* button, the HI should light the test lamp and no lamp should light on either of the other terminals. With the *gentle* button pressed, a circuit should be completed only at MED terminal. The LOW terminal will show continuity by pressing the delicate hand wash button.

For the spin action of this switch bank, a circuit is completed between L2 of the timer and MS of the switch bank. Pressing the *brisk* button should show a circuit being completed through the switch bank to terminal HS or *high speed* motor. The gentle and delicate hand wash buttons in the spin cycle will only energize the MED terminal of the switch bank.

The switch bank in *Figure 44* not only programs the motor speeds but also controls the agitation and spin solenoids as well as the water temperature. To check the circuit on the motor and agitation period, the timer must be set for this portion of the cycle. A circuit should be present between the L2 terminal of the

timer and the MO, A2 and A terminal of the switch bank. If a circuit is not present at these terminals, either the wiring from the timer to the switch or the timer itself is at fault and not the switch bank. If a circuit is present,then a circuit should be present for the motor at the HI and LO terminal depending on which button of the gang switch is pressed.

The buttons marked white or colorfast, bright colored, special and wash and wear should complete a circuit to the HI terminal of the switch. The same buttons would show continuity to the AGIT terminal, thus energizing the agitation solenoid and the main motor in high speed. The remaining button of the switch bank controls the slow speed motor on the LO terminal, thus giving a slow speed agitation cycle.

The spin solenoid is also controlled through the switch bank, which may or may not call for a spin period, depending on which button is pressed. To help clarify this portion of the switch, disconnect the power cord from the wall and remove the wires from terminals S, S2 and SPIN. Use the continuity test cord shown in *Figure 29,* and attach the probes to the S2 and SPIN terminals. Pressing the sturdy and delicate fabric button should cause the lamp to light. Move the probes to the S and SPIN terminals and press the remainder of the buttons; the lamp should light.

SUDS WATER CONTROL SWITCH

The suds control switch is used only on Suds-Saver models and may be electrically tested with a live test lamp. First, disconnect all the wires from the switch. Connect one probe from the test lamp to terminals 4 and 5 and set the switch to *save;* lamp should light. Now set the switch to *dispose* and the lamp should go out. With the probes on terminals 2 and 3, the lamp should light with the switch set on *return* and go out with the switch set on *dispose, Figures 49* and *50.* This switch, like other components in the washer, may be checked while still in the machine.

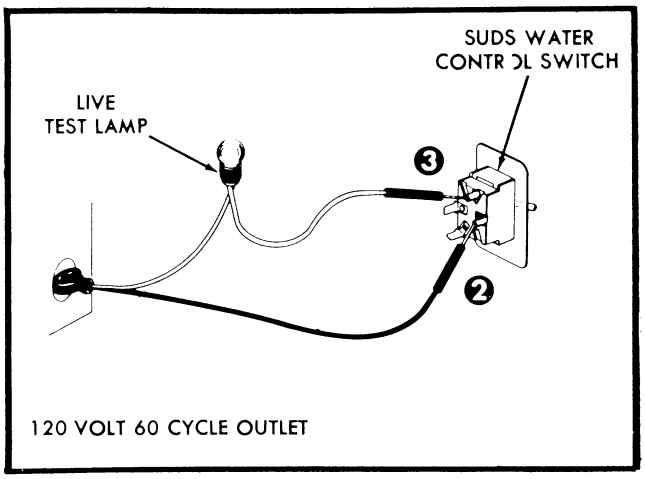


Figure 49

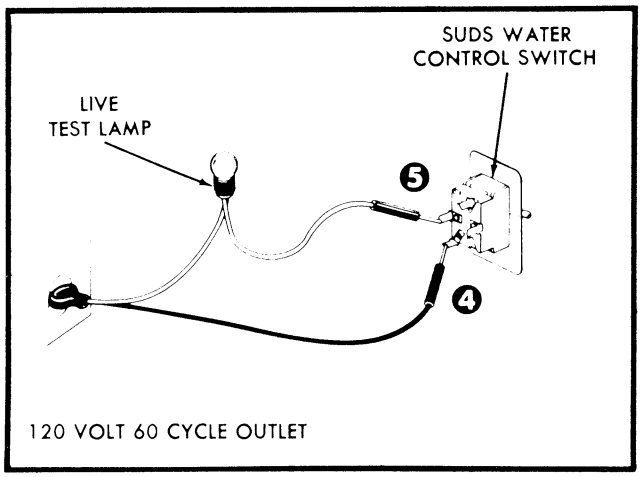


Figure 50

SAFETY LID SWITCHES

Some model washers in the Speed Queen line use a safety lid switch located in the front of the machine under the cabinet top and is actuated by closing the lid. *Figure 51* illustrates the location of this switch.

The function of this switch is to stop the spin action of the machine when the loading door is raised. The lid switch is connected in series with the spin solenoid so that the spin solenoid is deenergized when the loading door is raised. An easy method of testing a suspected faulty switch is to remove the two wires from the switch and connect them together. As a safety measure, disconnect the machine power cord when handling electrical components.

If connecting the two wires together corrects the spinning action, the lid switch is at fault. If this does not correct the trouble, further testing of other components is necessary.

Another method of testing the lid switch is illustrated in *Figure 52* with the use of a live test cord. With the cord connected on terminals 1 and 2, there should be no continuity. By depressing the plunger of the switch, the circuit should be completed and the lamp should light.

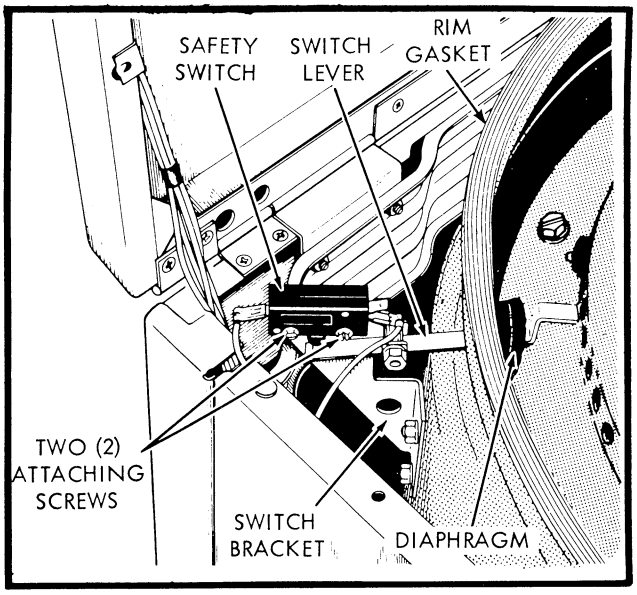


Figure 51—Safety Lid Switch

CIRCUIT BREAKER

The circuit breaker is a device used in an automatic washer to protect the motor and other components against an overload or a short circuit in the electrical system of the machine. The circuit breaker is not unlike the circuit breakers in your home.

The Speed Queen Washer uses two types of circuit breakers; one of which is marked as a reset button located in the console top, while the other is a motor protector located in the motor. *Figure 53* shows one location of the circuit breaker. It is a *manual reset* type of circuit breaker, which means it must be reset manually before the machine will resume operation once it has tripped.

This circuit breaker may be tested by removing the wires from it and applying a live test lamp to the terminals of the circuit breaker. The test lamp should light if the circuit breaker is good. If the test lamp does not light, depress the red reset button and hold it in for a few seconds. On releasing the button the lamp should light. If the lamp does not light when the button is released, the circuit breaker is defective and should be replaced.

Although a circuit breaker may show continuity, it does not necessarily mean that the circuit breaker is good. Due to repeated tripping, the circuit breaker could have badly pitted points or the bimetal strip may become overheated, thereby weakening the circuit breaker.

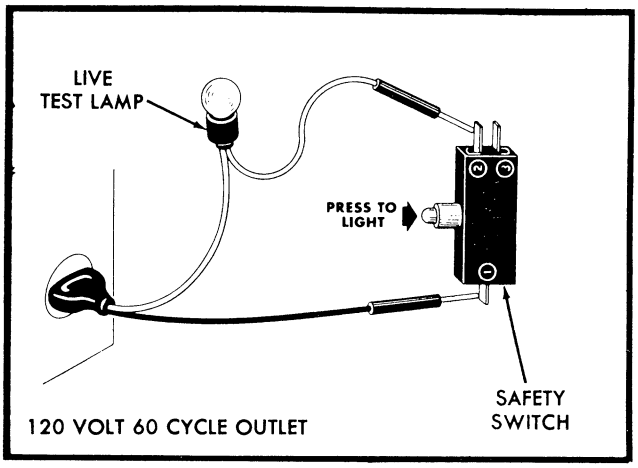


Figure 52

If a circuit breaker continually trips, a malfunction of the machine is very likely. An obstruction in the pump or the fluid drive bearings binding on the motor shaft could cause the motor to stay in the start windings, thus increasing the amperage and causing the circuit breaker to trip.

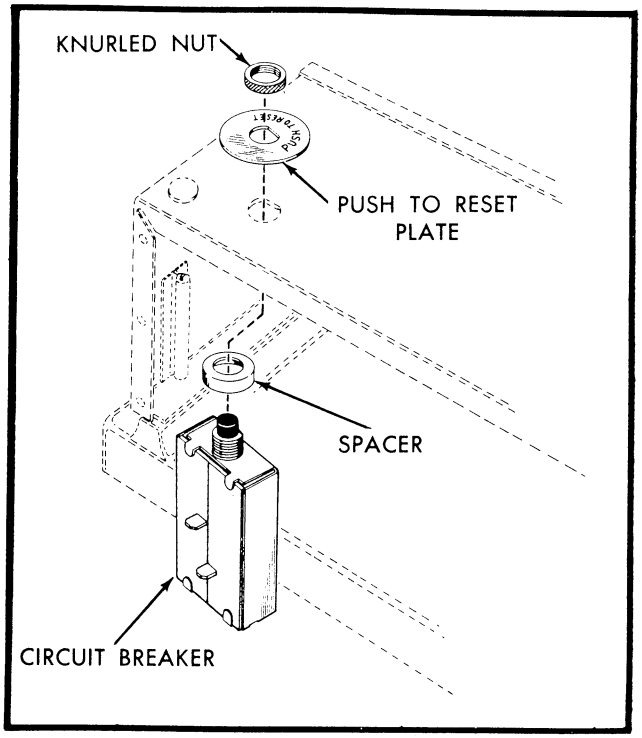


Figure 53—Circuit Breaker

A good instrument for checking amperage is the Amprobe. With this instrument, definite amperage can be read at either the circuit breaker or the motor. The running amps for the motor is on the nameplate of the motor and the amperage reading should not exceed this rating.

The motor protector in the motor is a little different than the circuit breaker in that it is *self-resetting.* The motor protector may cycle, shutting the motor off until the motor cools and then it will automatically reset. The machine will then start again and then repeat the off cycle as the overload protector is again opened due to the heat created. As you can see, the motor protector is subject to both amps and heat. Repeated tripping of the motor protector is a sure indication of a faulty component.

A continuity test of the motor protector may be made between the white and the red wires of the main motor. A test should also be made with an Amprobe to determine if the correct amperage is present. Although the motor protector may be purchased separately, it is advisable that the complete motor be replaced because it is very possible that the windings of the motor could be causing the trouble.

WASH TIME SWITCH

The wash time switch on Speed Queen Automatic Washers is used to give a regular (11 min.) or short (7 min.) wash period.

To test the *toggle* wash time switch, use the same procedure as described in the previous paragraphs for toggle action switches.

To test the *rocker* type wash time switch, push the switch to REGULAR and apply test lamp probes to the middle and lower switch terminals, *Figure 54;* test lamp SHOULD light. Next, push the switch to SHORT and apply the test lamp probes to the middle and upper switch terminals, *Figure 55;* test lamp SHOULD light.

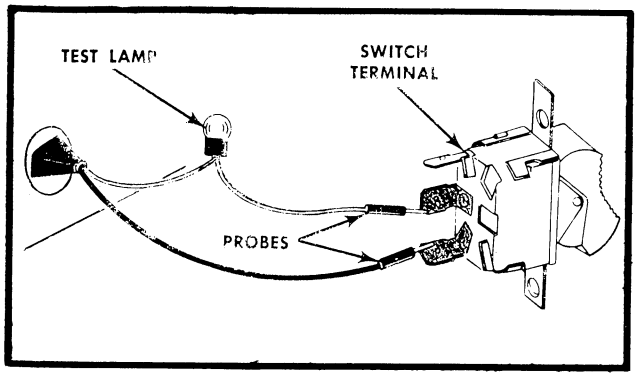


Figure 54

There are several variations of solenoids used in automatic washers. The method of testing them remains the same, even though the function they perform may be different. Although continuity may be read through the field coil of the solenoid, this is not a proper test. The solenoid should be tested with a live

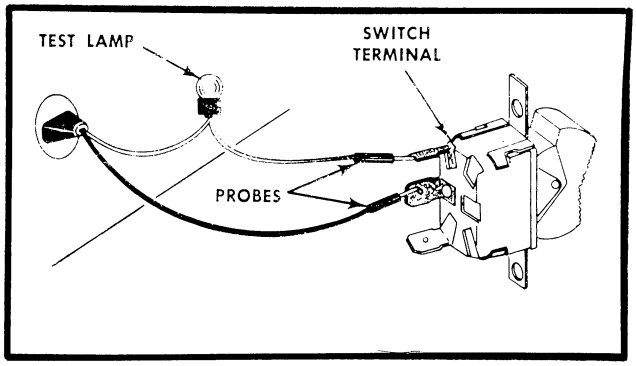


Figure 55

test cord supplying 120 volts to properly energize the field coil and allow the armature to enter the field. If the armature does not enter the field immediately, the power to the solenoid should be disconnected and the solenoid inspected for a binding condition. If the armature of the solenoid does not enter the field, the field coil will burn, making the solenoid inoperative. A defective solenoid 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. 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.

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 Speed Queen Automatic Washers. These will be covered in more detail in the following paragraphs.

WATER MIXING VALVE SOLENOIDS

The water mixing valve solenoids are used to control the flow of water into the washer. They may have different configurations due to the valve manufacturer, but they all operate in exactly the same manner. Fastened to the valve, around the plunger guide, they lift the plunger from the valve diaphragm, thus admitting water into the washer.

To test the solenoids, first remove the wires connected to them and place a live test cord to the terminals, *Figure 56.* The solenoid should hum or a distinct click should be heard as the plunger is pulled to the top of the plunger guide. If neither is heard, the solenoid is defective and must be replaced.

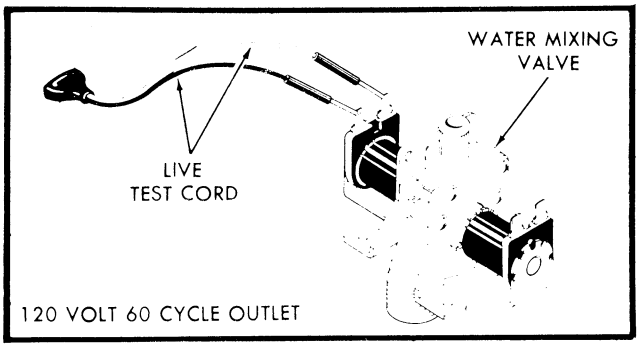


Figure 56—Mixing Valve Solenoid

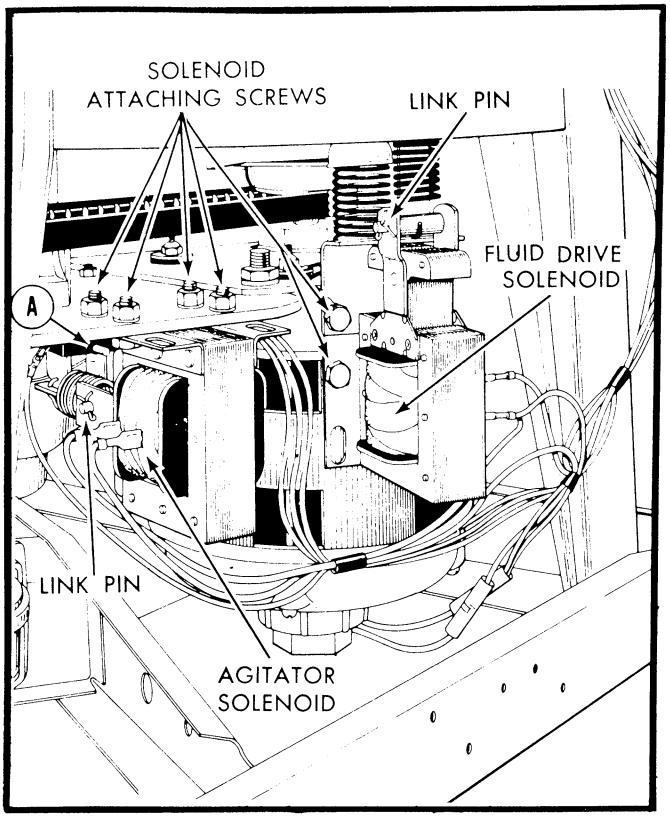


Figure 57

AGITATOR SOLENOID

When the agitator solenoid, *Figure 57,* is energized, it engages the agitator shift clutch with the transmission drive clutch, giving the machine its agitation action.

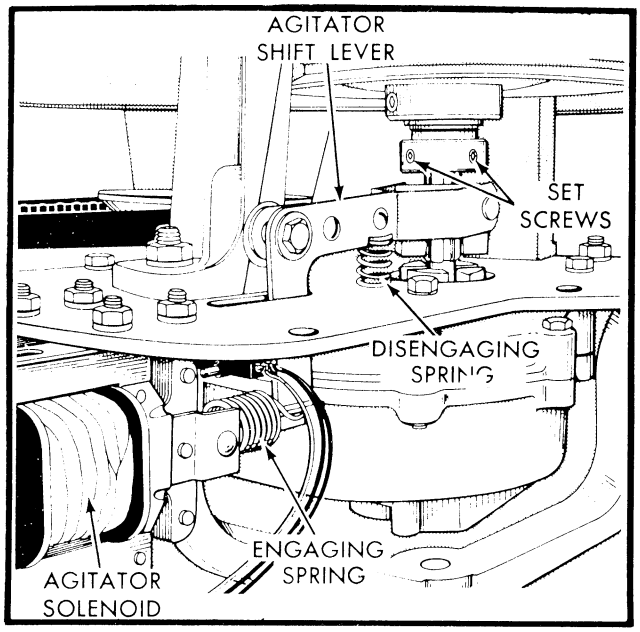


Figure 58—Engaging Spring

To remove the agitator solenoid, remove the front panel as explained under Cabinet Service in this manual. Next, disconnect the wires from the solenoid and remove the four cap screws holding the solenoid to the main mounting plate, *Figure 54.* Then disconnect the engaging spring from the agitator shift lever, *Figure 58.*

To test the agitator solenoid, disconnect the wires and apply live test cord probes to the terminals, *Figure 59.* The solenoid should close or engage. If it does not, it must be replaced.

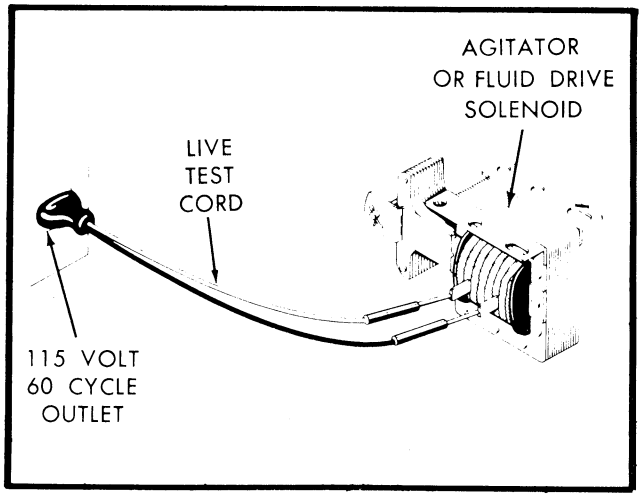


Figure 59—Checking Solenoid

If the solenoid chatters or hums when it is energized, check for dirt or foreign particles on contact surfaces of the solenoid.

If the contact surfaces are clean, loosen the four solenoid attaching bolts and shift the solenoid into proper alignment. Noise may also be caused by loose rivets holding the laminated field together on solenoid, in which case the solenoid should be replaced.

FLUID DRIVE SOLENOID

The fluid drive solenoid, *Figure 57,* when energized, engages the fluid drive to give the washer its spinning action.

To remove the fluid drive solenoid, first remove the front panel as explained under Cabinet Service and disconnect the wires from the solenoid. Next, remove the cotter key from the link pin and remove the link pin, *Figure 57.* Remove the four cap screws attaching the solenoid to the motor mounting plate, *Figure 57.*

To test the fluid drive solenoid, use the same test procedures given for the agitator solenoid. If the solenoid chatters or hums when energized, see the correction procedure under agitator solenoids.

RECIRCULATING VALVE SOLENOID

The recirculating valve solenoid is used only on those models using a recirculating or diverter valve to divert the water from the drain hose to the lint filter during the recirculation period.

The solenoid is accessible by removing the rear panel. To test the solenoid, disconnect the wires and apply test cord probes to the solenoid terminals, *Figure 60.* If the solenoid does not close, it is defective and must be replaced.

SUDS SAVER VALVE SOLENOID

The suds saver valve solenoid is used only on machines with the suds saver feature and controls the valve that diverts the water either into the save or the drain tub.

The solenoid is accessible by removing the back panel. It is tested by first disconnecting the wires to the solenoid and then placing test cord probes to the solenoid terminals, *Figure 61.* If the solenoid does not close, it is defective and must be replaced.

DISPENSER SOLENOIDS

The dispenser solenoids are used on those machines that have a bleach and rinse conditioner dispenser. When energized, they dispense the liquid bleach or rinse conditioner into the wash or rinse water.

The solenoids, *Figure 62,* are accessible by removing the control hood back cover. To remove them, disconnect the wires from the solenoid and remove the two solenoid attaching screws.

To test the dispenser solenoid, disconnect the wires and apply test cord probes to the solenoid terminals. The solenoid should pull the armature into the coil with a noticeable click. If it does not, the solenoid is defective and must be replaced.

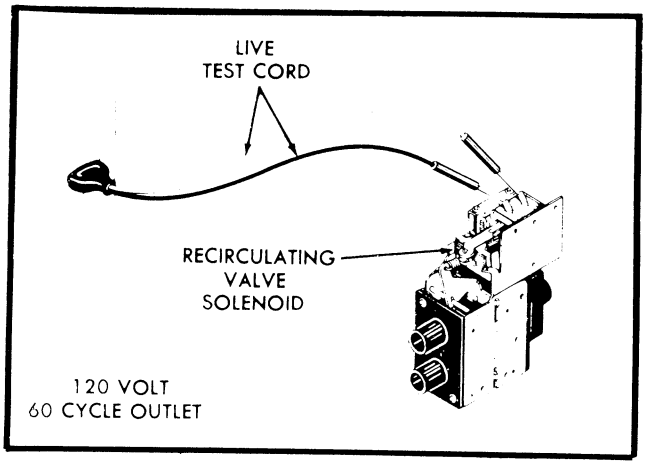


Figure 60—Recirculating Valve Solenoid

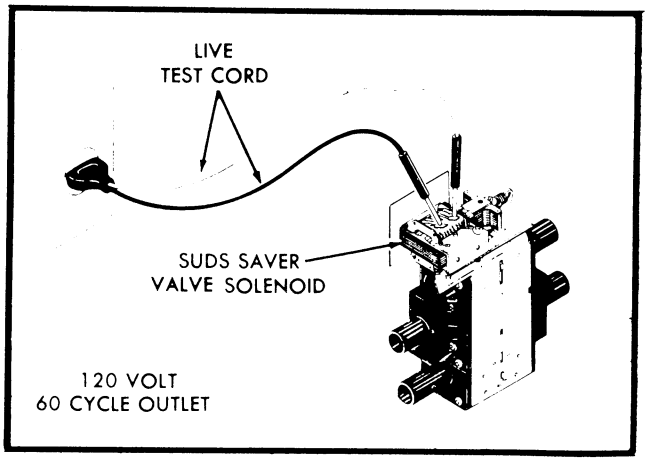


Figure 61—Suds Saver Valve Solenoid

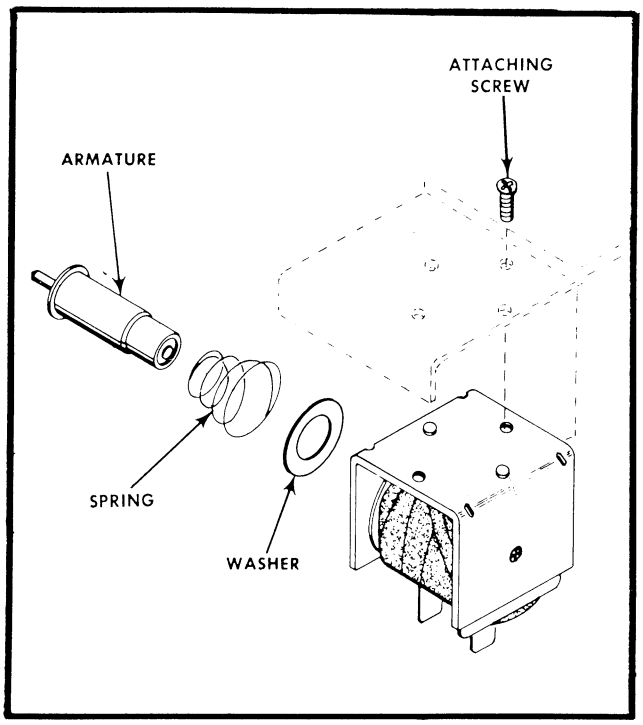


Figure 62—Dispenser Solenoid

LID LOCK SOLENOID

The lid lock solenoid, *Figure 63,* was used on some models to lock the washer lid during the spin period.

When energized, the solenoid pulls the lid lock latch, *Figure 63,* under the lip of the lid, holding the lid closed.

The solenoid is accessible by removing the top and is tested by using the same procedures as outlined for the previously discussed solenoids.

MAIN DRIVE MOTORS

All the main drive motors used on Speed Queen Automatic Washers run in a counterclockwise direction. The direction of rotation of the motor is determined by looking at the pulley end of the motor. A non-reversing motor is all that is needed because the agitation and spin cycles are controlled by solenoids. Although all the drive motors turn in only one direction, they may be a one, two or three speed motor according to model application. The motor speed on Speed Queen Washers is readily obtained by counting the number of terminals or lead wires to the motor.

1. Single speed motors have only two terminals.
2. Two speed motors have three terminals.
3. Three speed motors have four terminals.

When testing a motor regardless of how many terminals it has, only two terminals at the time are used for testing.

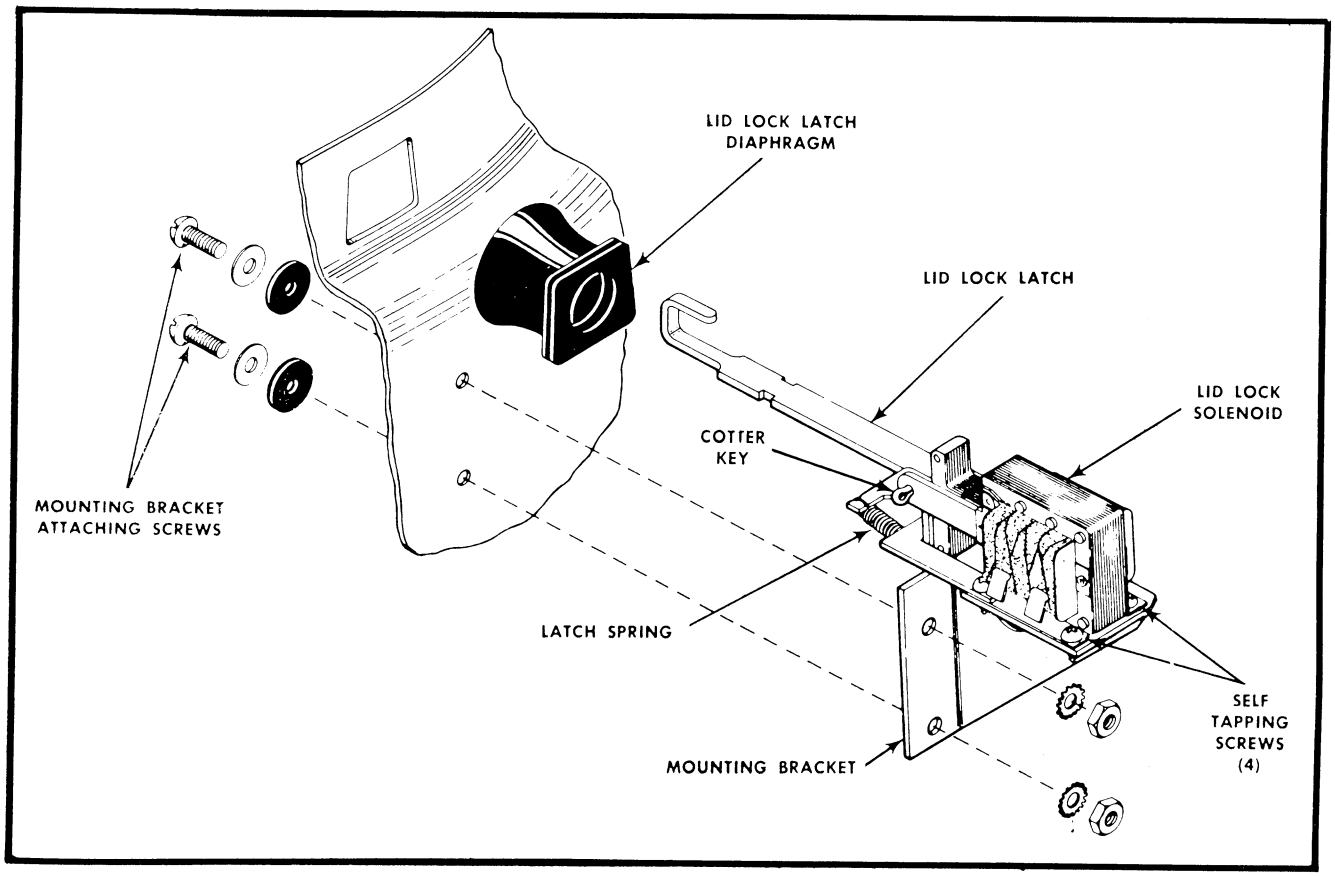


Figure 63—Lid Lock Solenoid

SINGLE SPEED MOTOR

Test the single speed motor with a live test cord using 120 volts by attaching the probes of the test cord to the white and red leads of the motor. When testing the motor, the power cord should be removed from the wall outlet and the motor leads separated at the connectors. It is a good idea to run the belt off of the pump pulley if the motor only hums, before preceding further. This eliminates a jammed pump which would prevent the motor from starting.

Suppose that with a test cord, the motor runs and drives the other components satisfactorily, but does not run using the power supplied to the machine. This would indicate a broken wire, a bad connection in the terminal block, a defective timer or a defective action switch. Notice all the testing possible is done with the motor still in the washer. The main reason for this is to save time and also be able to test the motor under operating conditions.

Suppose the motor is being tested with the live test cord and is running satisfactorily with no load. Closing the agitation solenoid by hand engages the transmission to check the agitation portion of the cycle. Close the spin solenoid manually to check the spin portion.

TWO SPEED MOTOR

Testing a two speed motor with a live test cord is illustrated in *Figures 64* and *65*. The white lead is common to the other two leads. Therefore, attaching 1 test clip to the white lead and the other clip to the red lead causes the motor to run at high speed. The motor will run at slow speed if the probes are connected to the white and white/orange motor leads.

THREE SPEED MOTOR

The three speed motor is a capacitor start motor and has four different windings. They are start, high, medium and low speed. When testing a three speed motor, the test probes of the live test cord should first be applied to the number 1 and 3 terminals of the motor, *Figure 66*. The motor should now run on the high speed winding. If the motor does not run, remove the cover of the capacitor and connect the two wires from the capacitor together. If the motor now runs, the capacitor is defective and should be replaced with the proper rated capacitor.

If the motor fails to run on the high speed winding it will not run on the low or medium speeds. This is because the start and high speed windings are

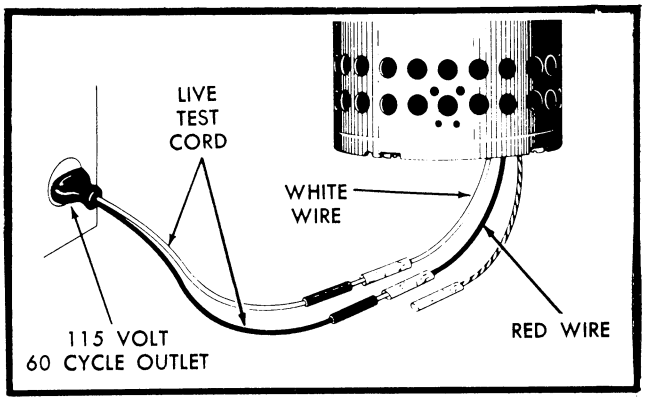


Figure 64

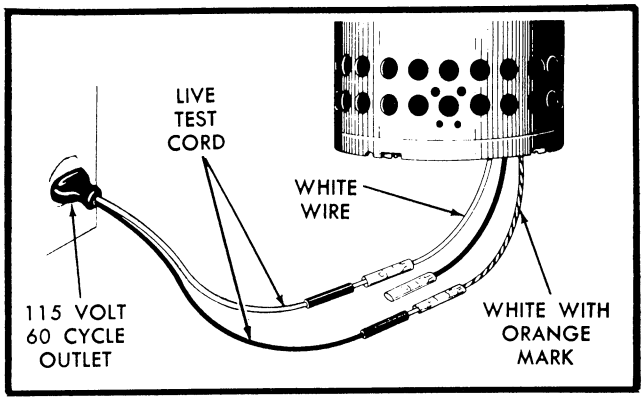


Figure 65

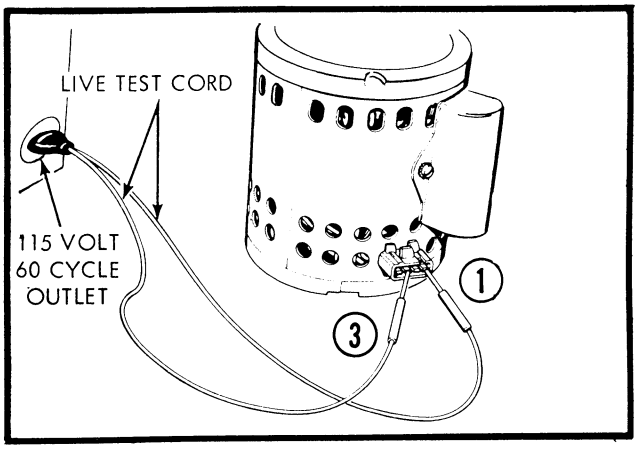


Figure 66

energized first through the starting switch and then switched to the proper selected operating speed by the starting switch. *Figure 67* better illustrates the function of the starting switch in the three speed motor. Notice the power is being supplied to the number 1 and 2 terminals of the motor, calling for the motor to run at medium speed. Now notice the start circuit in *Figure 67*. Power is supplied through the start and the high windings when the motor is in the start position. When the motor gets to the proper speed, a centrifugal switch switches the high speed

winding out of the circuit and simultaneously makes contact to the medium speed winding. *Figure 68* illustrates a live test cord applied to terminals 1 and 2, testing the motor for medium speed. To check the low speed of the motor, apply the test cord to terminals 1 and 4, *Figure 69.*

The capacitor on the three speed motor is only in the start circuit of the motor. When the motor reaches running speed, the capacitor is switched out of the circuit by the motor starting switch.

When removing the main drive motor, it is best to remove it and the fluid drive from the machine as an assembly. The fluid drive and motor assembly can be removed from the machine through the front without moving the washer. First, raise or remove the front panel and disconnect the wires from the motor lead connectors, agitator solenoid and spin solenoid. Grasp the agitator solenoid and use it as a lever to push the main mounting plate to the left as far as possible. Now, remove the motor pivot bolt, the number 1 bolt and *loosen* the number 2 bolt, *Figure 70.* Run the belts off of the pump pulley and the main spin pulley, *Figure 71,* and move the motor assembly to the right front corner of the washer.

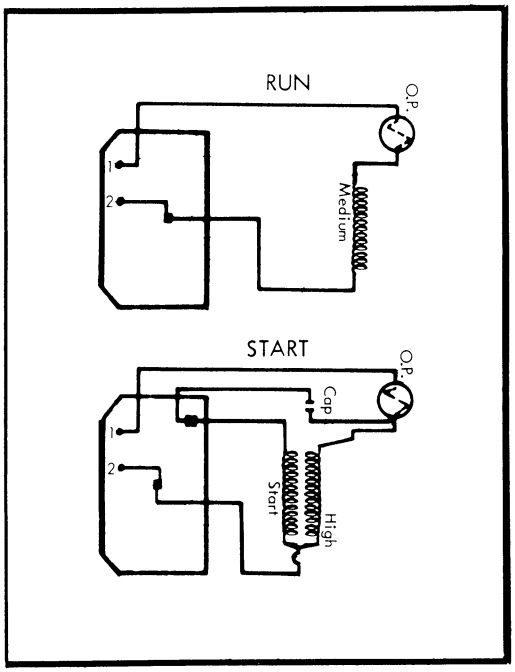


Figure 67

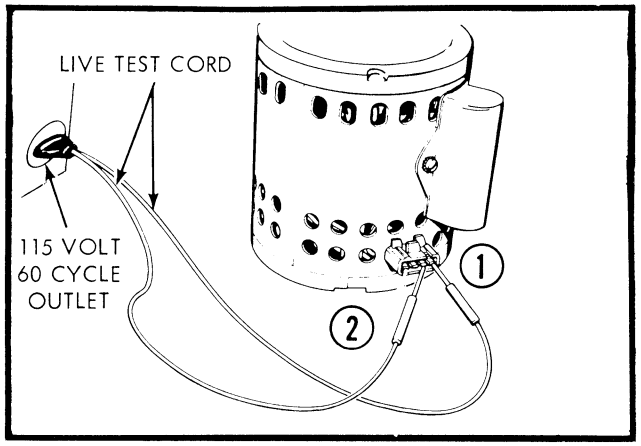


Figure 68

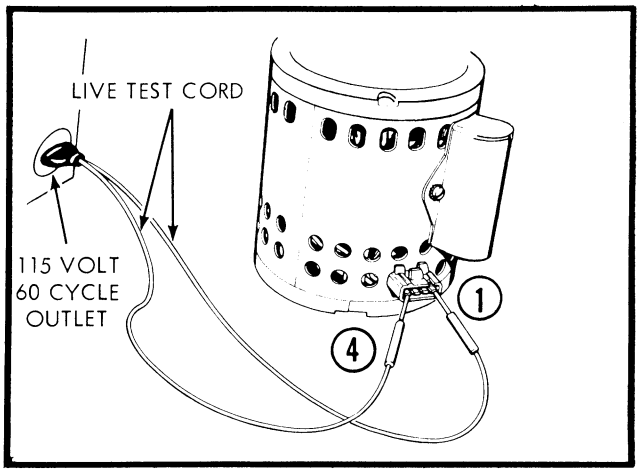


Figure 69

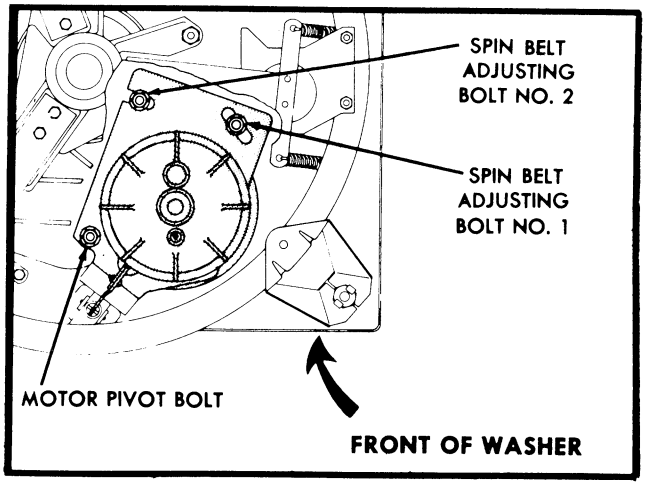


Figure 70

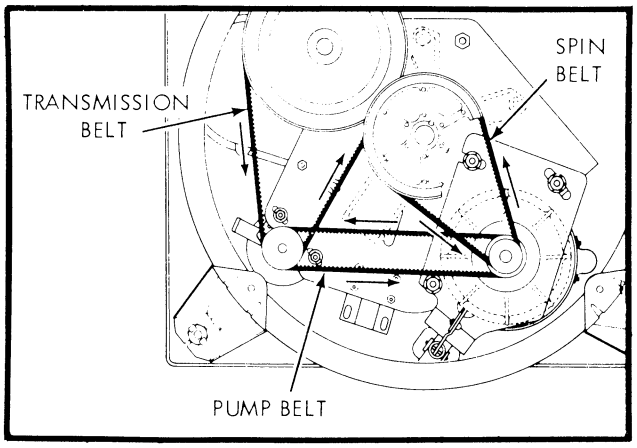


Figure 71

Move the motor assembly toward the center of the washer and remove the spin belt from the fluid drive. Position the motor assembly as shown in *Figure 72* and remove the motor assembly bottom first. Reverse the procedure to reinstall the motor and fluid drive assembly. After reinstalling the motor assembly be sure to properly adjust the tension of all three belts.

Figure 73 shows the assembly sequence of the washers and mounting plate to the motor. Remove the four mounting nuts and slide the motor from the mounting plate. Note the location of washers and take care to prevent loosing them. When exchanging a motor, the motor pulley must be removed from the motor shaft.

If the pulley assembly in *Figure 74* is to be removed, the motor shaft must be supported when driving the tapered pin out of the clutch pulley. The motor shaft also must be supported when reinstalling the taper pin. This is to prevent bending the motor shaft. A bent motor shaft could cause the fluid drive to chatter or rotate all the time. Speed Queen makes a special tool, part No. RT-5 to remove the motor pulley, *Figure 75.* This tool is also used to pull and reinsert the bearing of the fluid drive.

CAUTION

Extreme care must be used if pulley is removed from motor shaft to prevent bending shaft. A bent shaft will cause fluid drive to chatter or rotate at all times.

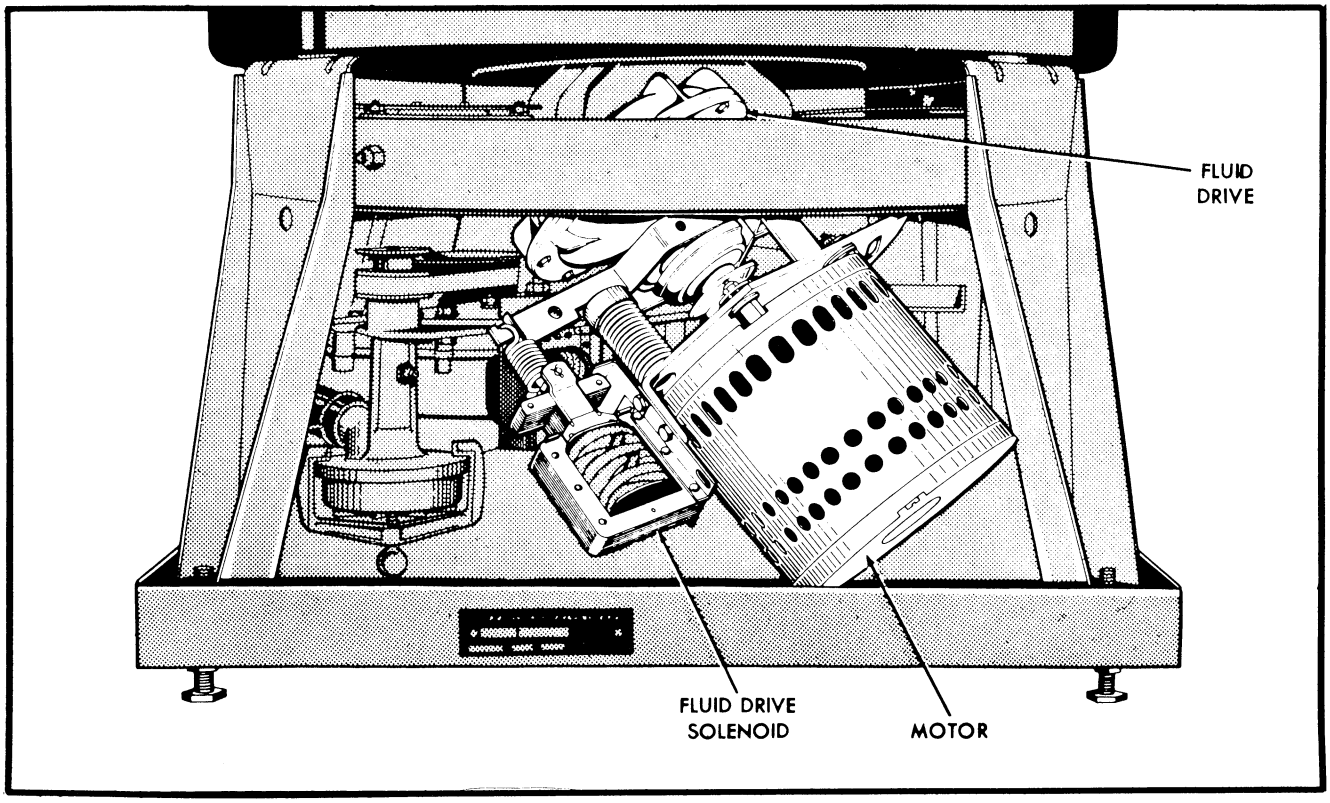


Figure 72—Removing Motor Assembly

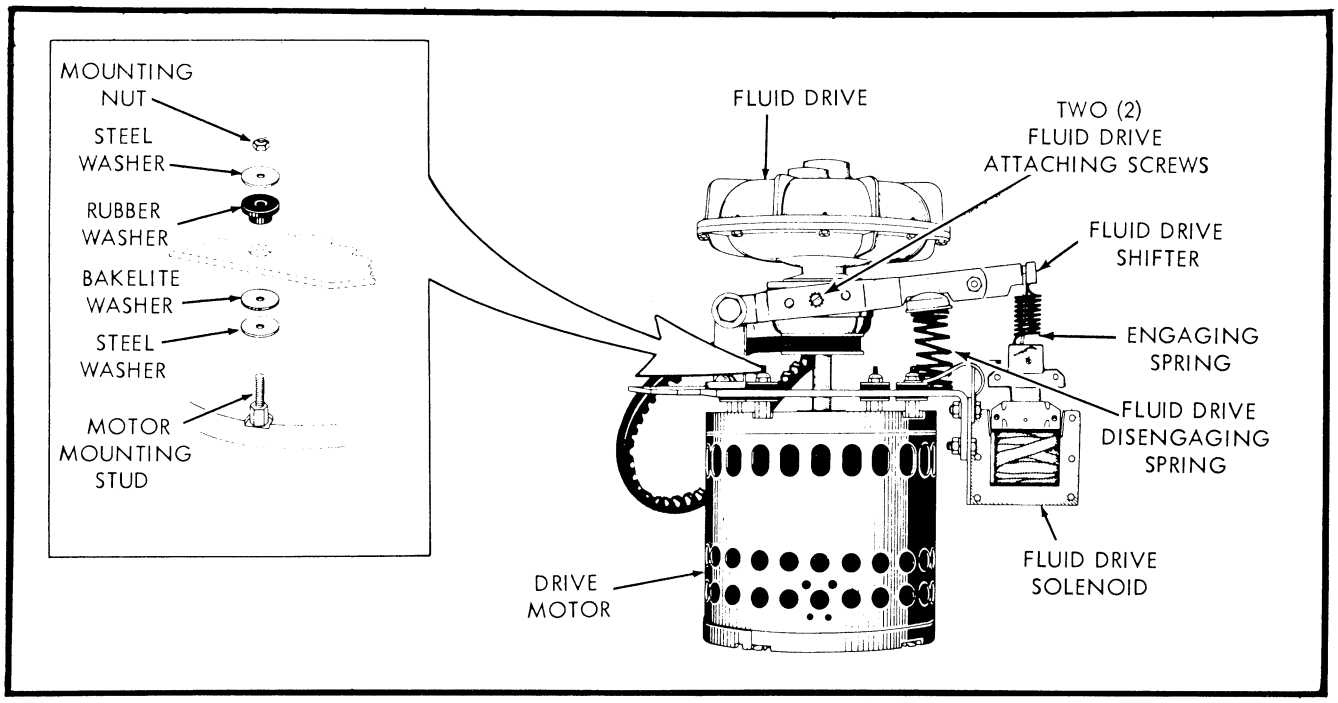


Figure 73

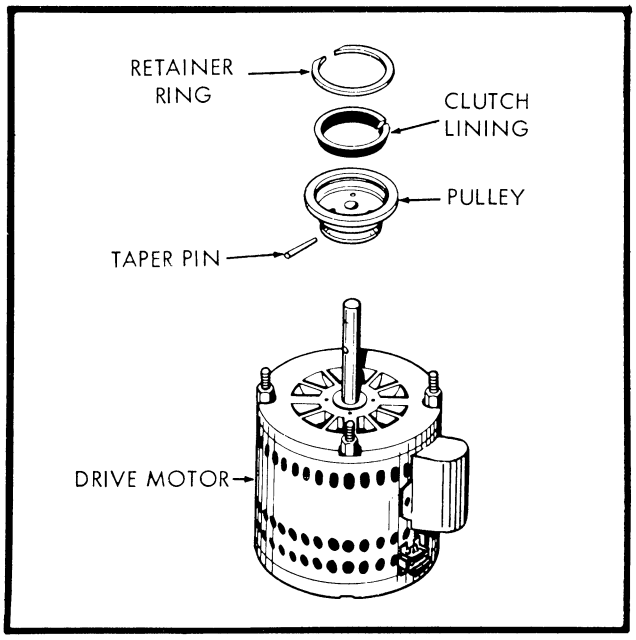


Figure 74—Clutch and Motor

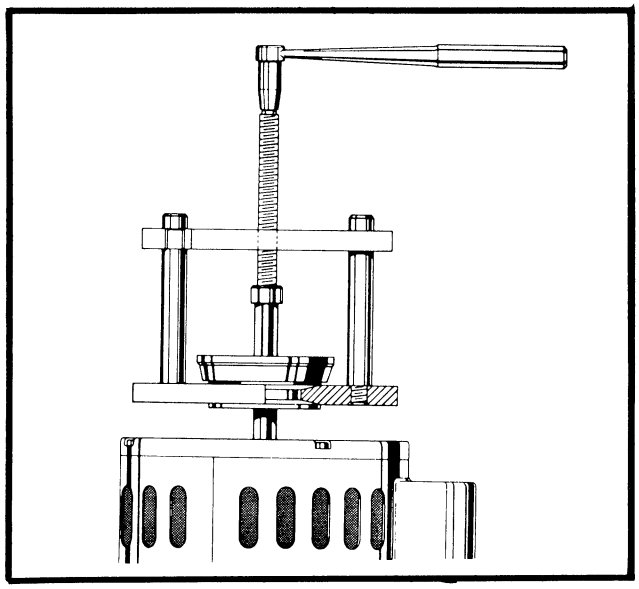


Figure 75—Removing Cone Pulley

CAPACITOR

A simple test cord for capacitors may be made as illustrated in *Figure 76.* Caution, cover the capacitor during test as a safety precaution. A capacitor test will show three things: open, shorted, or good capacitor.

1. Open Capacitor: The lamp will not light.
2. Shorted Capacitor: The lamp will light to normal brilliance.
3. Good Capacitor: The lamp will be half normal brilliance.

TESTING THE REVERSIBLE MOTOR

The reversible motor can be bench tested with a test cord such as the Gemline test cord TC-6 available at your appliance parts dealer or a test cord can be constructed.

TESTING THE MOTOR

(Running Direct With a Test Cord)

1. Construct a test cord as follows.

NOTE: A test cord such as Gemline TC-6 is available through your appliance parts dealer.

Parts required:
Cord and plug
Short length of No. 16 stranded wire.
Three alligator clips.
One momentary contact switch, pushbutton-type.

Refer to Figure 77 to assemble.

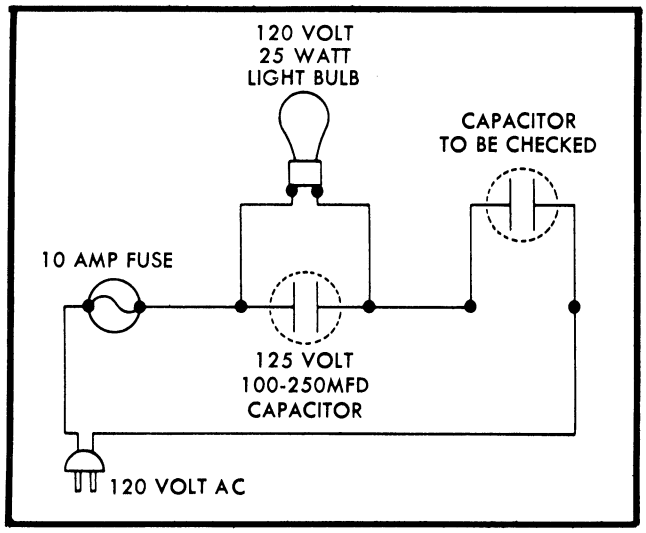


Figure 76—Capacitor Test Cord

All tests are with centrifugal switch removed from motor.

EMERSON MOTOR No. 26069 and 24723 Reversible two-speed motor.

Connect test cord leads as follows:

TEST CORD	To	MOTOR LEADS
Black	To	Yel. and Brown
White	To	Red
Red	To	Green for low speed
Red	To	Blue for high speed

Press switch button, have an assistant connect test cord.

If and when motor starts, immediately release button. Note direction of rotation.

To reverse direction exchange positions of the Red and Brown motor leads.

GENERAL ELECTRIC MOTOR No. 26069 Reversible two speed.

Connect test cord leads as follows:

TEST CORD	To	MOTOR LEADS
Black	To	Yel. and Red
White	To	Black
Red	To	White for low speed
Red	To	Blue for high speed

Press switch button, have an assistant connect test cord.

If and when motor starts, immediately release button. Note direction. To reverse direction exchange positions of the Black and Red motor leads.

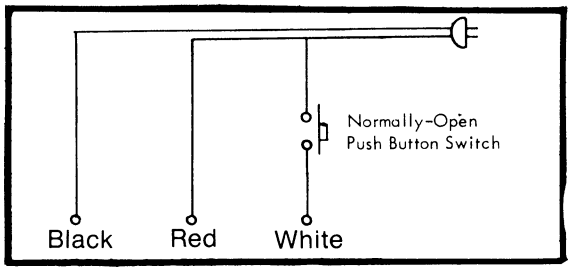


Figure 77

EMERSON MOTOR No. 24725 Reversible, single speed.

Connect test cord leads as follows:

TEST CORD	To	MOTOR LEADS
Black	To	Yel. and Brown
White	To	Red
Red	To	Blue

Press switch button, have an assistant connect test cord.

If and when motor starts, immediately release button. Note direction.

To reverse direction of rotation, exchange positions of the Red and Brown motor leads.

SUDS SAVER MOTOR

The suds saver motor and pump assembly is found only on Speed Queen Washers having the suds saving feature. This pump and motor assembly, *Figure 78,* are serviced by removing the back panel of the washer. An obstruction in the pump is the main problem that occurs, causing the motor to hum but not run. Therefore, when testing the suds motor, the pump should not be overlooked.

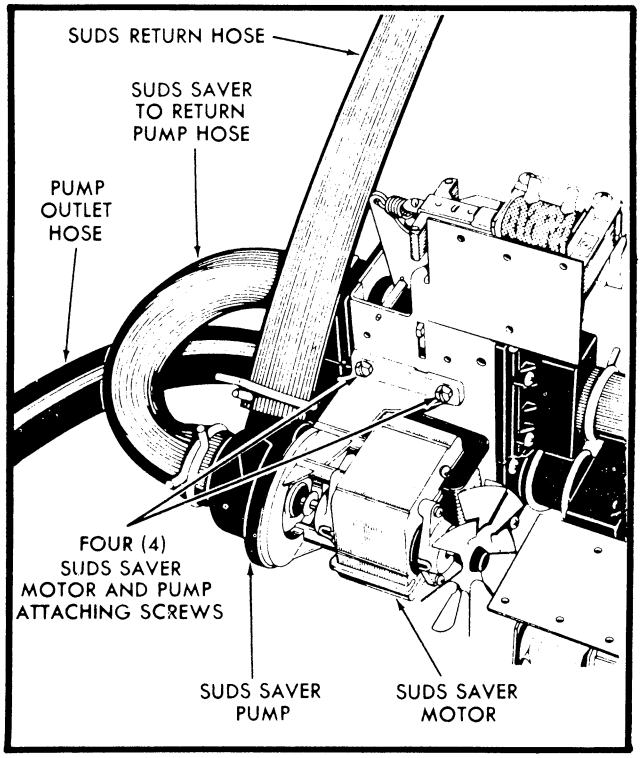


Figure 78—Pump and Motor Assembly

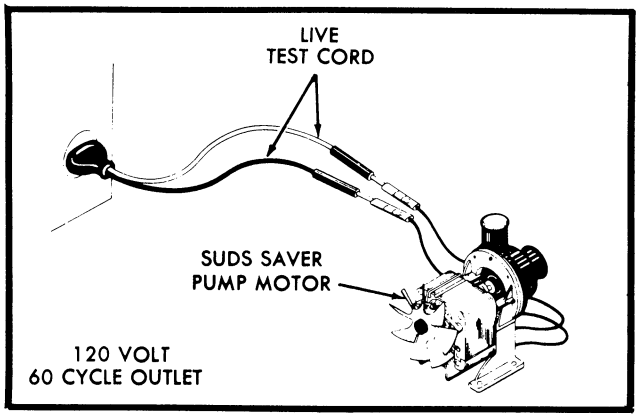


Figure 79—Motor, Testing

A live test cord supplying 120 volts may be attached to the leads of the suds motor for testing, as in *Figure 79.*

If the motor hums without turning, and the pump is free of any obstruction, check the motor bearings for lack of lubrication.

SUDS SAVER MOTOR, Testing, Repairing or Replacement

Removal, *Figure 80*

a. Disconnect wiring from motor.

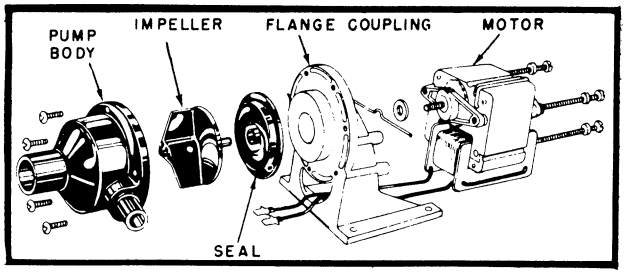


Figure 80—Suds Saver Motor, Exploded View

b. Remove four metal screws holding pump motor to bracket.

c. Remove pump.

Testing

a. Remove pump cover screws.
b. Remove pump cover.
c. Insert small screw driver, *Figure 81,* between rotor and the field laminations to keep rotor from turning.
d. Unscrew small impeller.
e. Remove diaphragm seal, being very careful not to tear.
f. With a fine grade of oil, lube both end bearing plates.
g. Note if shaft turns freely by hand.
h. Connect cord direct to motor and test motor.
i. If line (g) and (h) test good, the motor is still serviceable.
j. Check bearings for wear.
k. If pump motor is good and a condition exists that the seal leaks around the shaft, proceed as follows.

PUMP DIAPHRAGM SEAL REPAIR

If a new diaphragm is not available and the shaft seal leak is the problem, it can be repaired. If the diaphragm is torn, it is best to replace the component part, available at your appliance parts distributors.

a. Clean and polish shaft where lip seal rides.
b. Clean and wipe dry diaphragm, place it over shaft and align to groove in motor frame.
c. Carefully wipe some pliobond or rubber cement to the outer edge of lip seal, *Figure 82.*
d. Place a 1/4" diameter o-ring over extended edge of lip seal. (If you have the heavy shaft pump motor, a larger o-ring will have to be used), *Figure 83.*
e. Take note that the o-ring has tightened the shaft hole to prevent a leak.
f. Replace small impeller, note the impeller will hold the o-ring in place.
g. Reassemble pump cover to base.
h. Plug center outlet with a cork. Fill pump with water and test for leaks.
i. Reassemble to machine, connect wiring and hose.

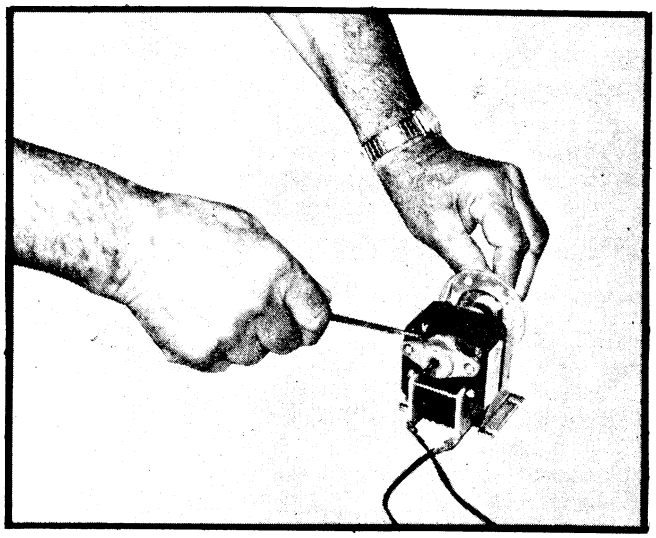


Figure 81

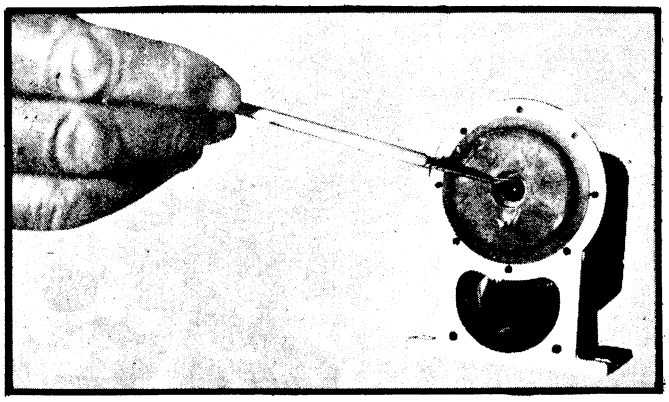


Figure 82

The wiring harness in an automatic washer is usually very durable and trouble free. On occasions a terminal may come off or a break develop inside the insulation of a wire. These troubles can be corrected by replacing the necessary terminal or splicing the broken wire. A break in the wiring harness usually shows up as an erratic operation of the component being energized by the defective wire.

To test any part of the wiring harness, the wire leads to the components of the section being tested should be removed. A single wire of the harness is then tested using a continuity test cord. With a clip of the test lamp connected to each end of the wire, the lamp will light if the wire is good. Try stretching the wire of the harness being tested to locate the break in the wire.

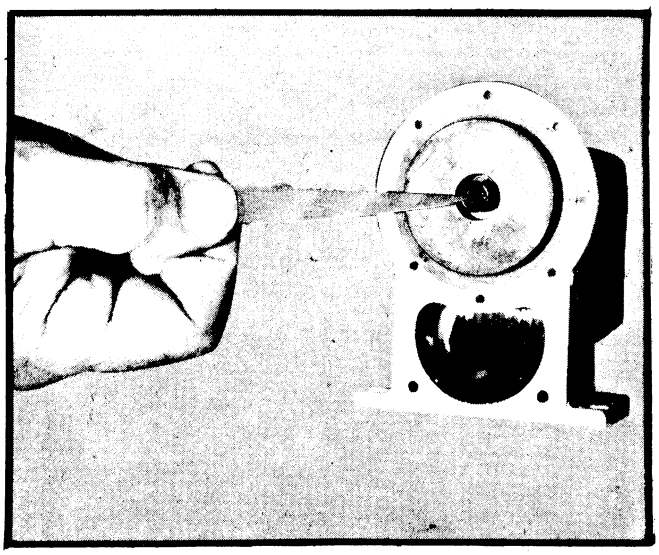


Figure 83

The water mixing valve controls the flow and the temperature of the water entering the washer. It is accessible on some models by removing the rear and top panels, *Figure 84,* and on others by removing the control hood back cover, *Figure 85.*

To remove the valve for servicing, disconnect the hot and cold water inlet hoses by unscrewing them from the valve. Disconnect the wires from the solenoids and the low pressure inlet hose from the valve outlet. Remove the two screws holding the valve to the rear of the cabinet or the washer top.

The water valve can be completely disassembled for cleaning when necessary. The valve plunger and plunger guides should be cleaned of all corrosion, rust and dirt. Special attention should be given to the valve diaphragm to be sure the small bleeder hole is open.

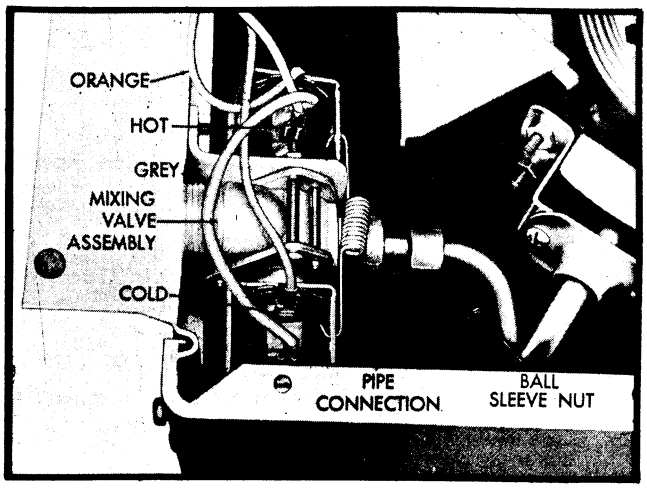


Figure 84—Installed View of Mix Valve Assembly

The valve reassembly sequence is shown in *Figure 86.* When reconnecting the fill hoses to a nylon valve, extreme care must be taken to prevent cross-threading the hoses on the valve. This can seriously damage the valve body.

The following explanation will help give you a better idea as to how the water mixing valve operates.

When the valve is in the closed position, *Figure 87,* the plunger is securely seated in the diaphragm pilot hole by spring compression. Water is allowed to enter the plunger housing through the diaphragm bleeder hole.

This build-up of water pressure above the diaphragm tends to hold the diaphragm down against the body seat, allowing no water to pass through the valve when it is closed. Pressure above the diaphragm remains the same as inlet water pressure as long as the pilot hole is closed by the plunger.

When the solenoid is energized to admit water into the washer, the plunger is lifted, compressing the spring, *Figure 88.* This opens the diaphragm pilot hole and allows the water above the diaphragm to escape through the outlet channel and into the washer.

The pilot hole is larger in diameter than the bleeder hole; therefore, pressure in the area above the diaphragm is quickly released.

Force of the inlet water surging against the diaphragm tends to raise it out of the body seat, *Figure 89.* A full flow of water is then allowed to pass under the diaphragm and through the valve.

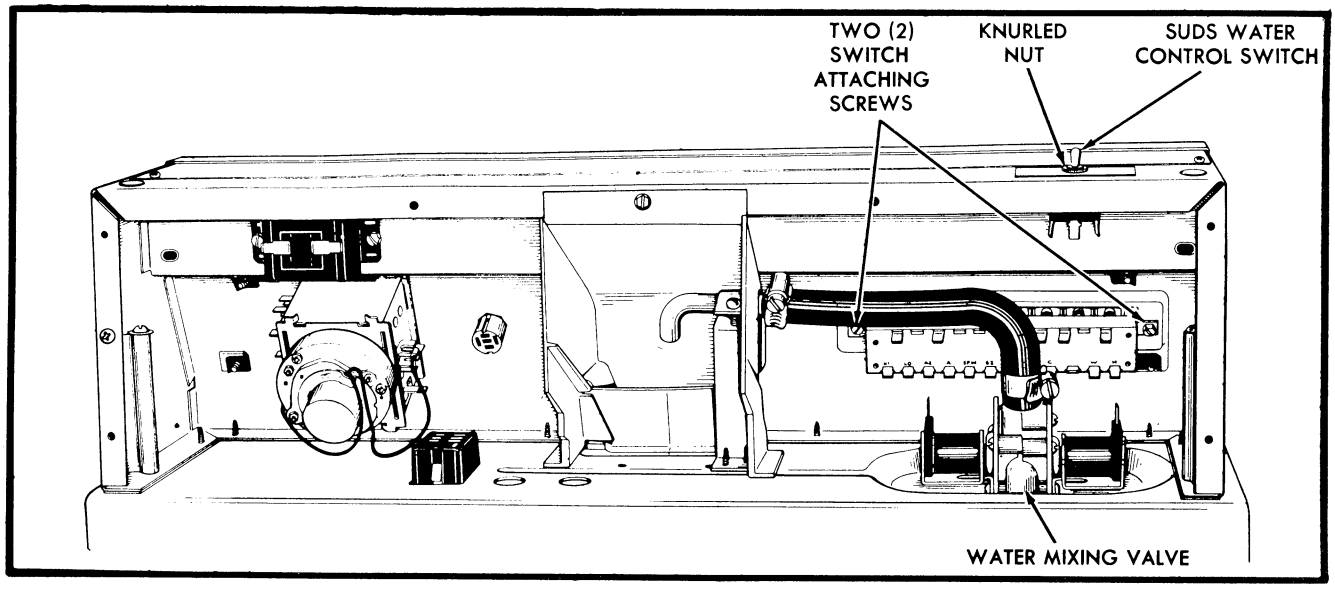


Figure 85

When the solenoid is deenergized, spring tension forces the solenoid plunger downward to seal the pilot hole in the diaphragm, *Figure 90.* Water may still pass upward through the small diameter bleeder hole, thus the increasing water pressure in the plunger housing causes the diaphragm to seat firmly on the valve seal. The water pressure above the diaphragm will remain the same as incoming water pressure, thereby maintaining a downward force against the top of the diaphragm.

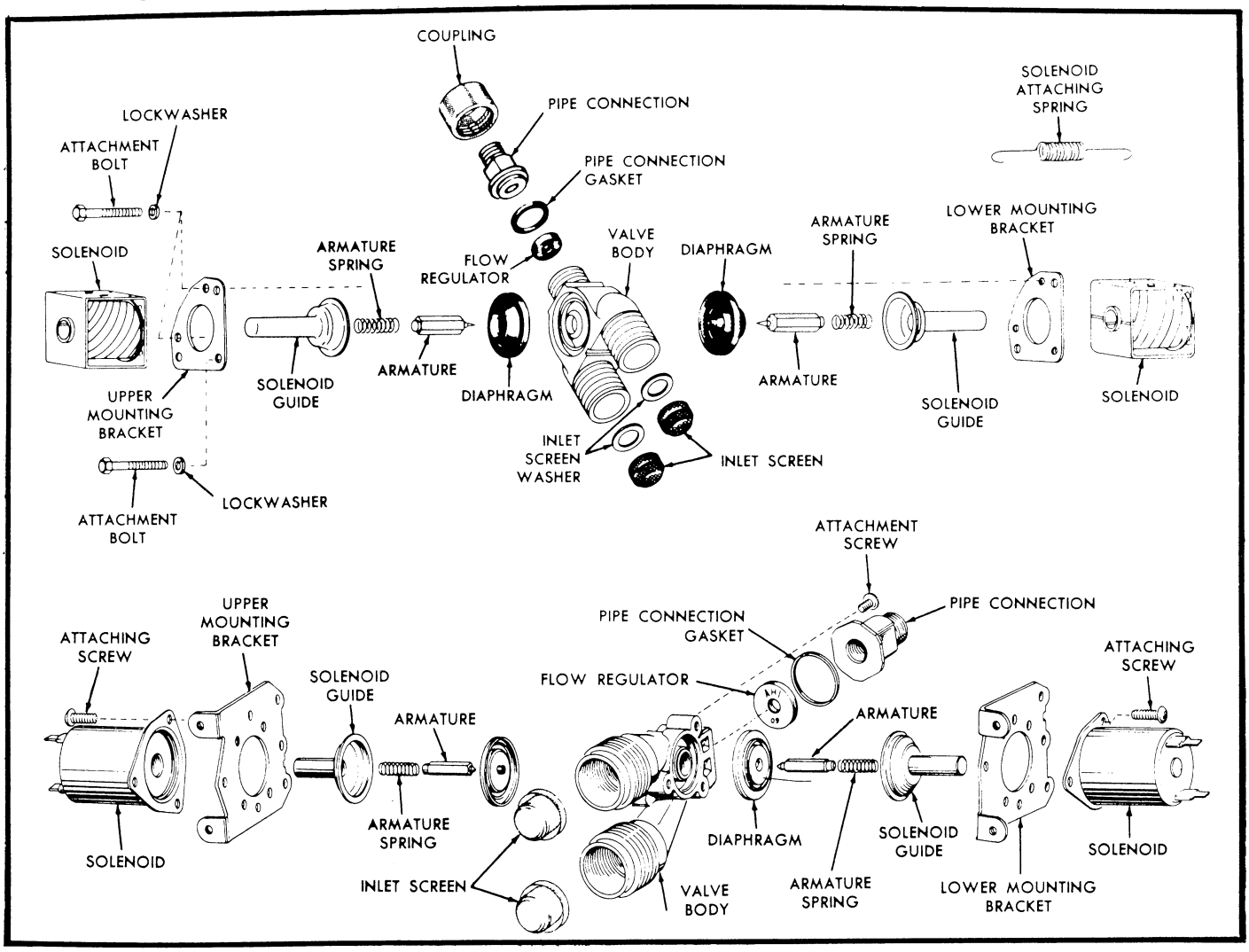


Figure 86—Exploded View of Mix Valve Assemblies

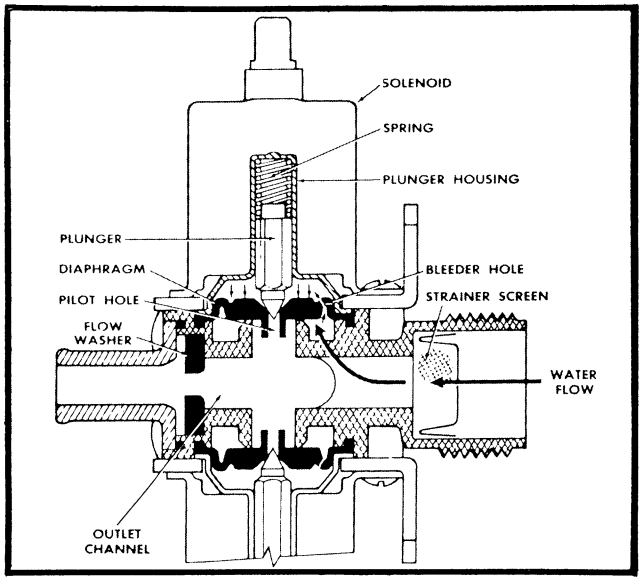


Figure 87—Inlet View Closed

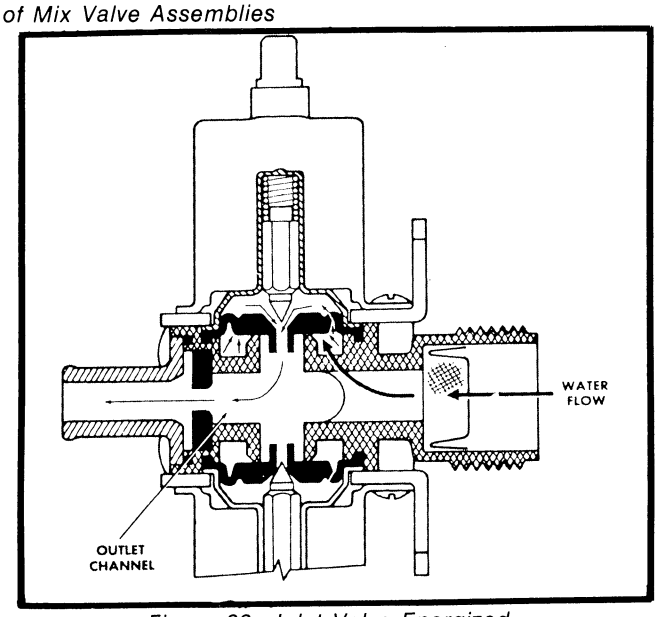


Figure 88—Inlet Valve Energized

The solenoid mounting screws pass through the solenoid base flange, through the valve mounting bracket, and thread into the nylon valve body, *Figure 86.* The solenoid and bracket thus support the following valve components:

Plunger Housing ..... Plunger
Plunger Spring ..... Diaphragm

The flow washer and outlet nozzle gasket are secured in place within the valve body by the four screws which hold the valve outlet nozzle to the body on some valves. On other valves it is held in the valve body under the mounting bracket, *Figure 86.*

The flow washer controls the rate of water flow through the valve. One side of the opening in the flow washer has a rounded edge. This rounded-opening side of the washer should face *against* the water flow.

Do not try to rework the flow washer as a damaged or misshaped flow washer will not regulate the water flow properly.

If water fails to enter the washer during the fill period, the problem could be an open solenoid. This can be checked with a live test cord shown in *Figure 91.*

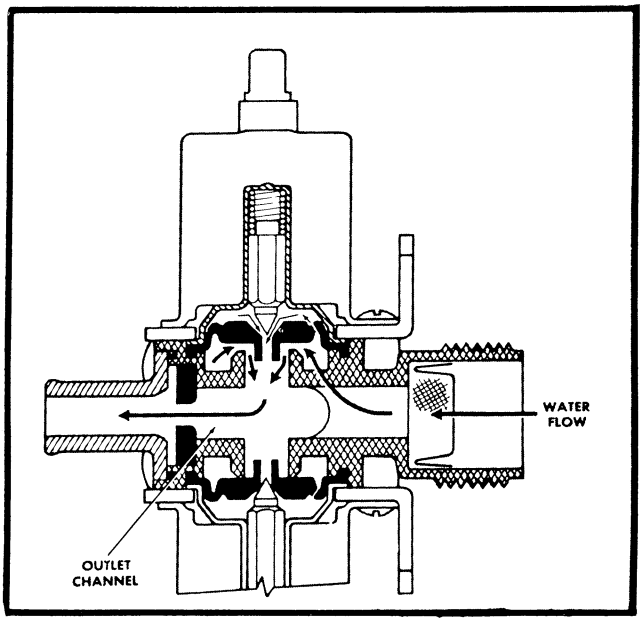


Figure 89 — Inlet Valve Fully Open

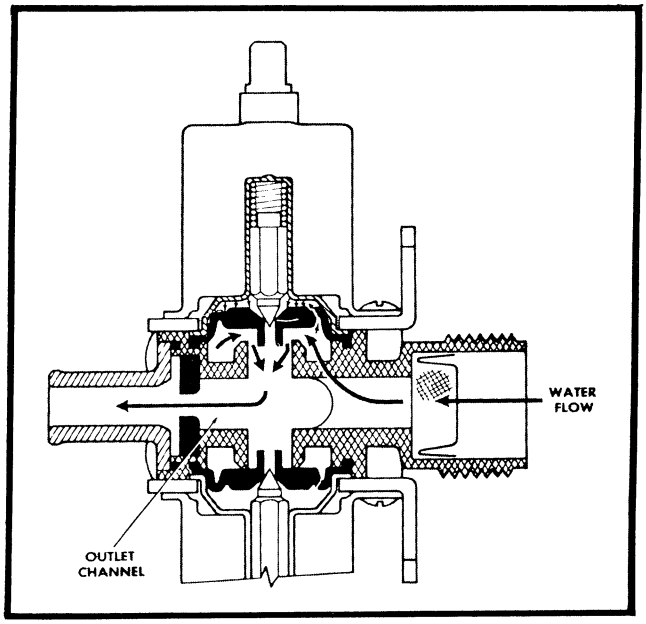


Figure 90—Inlet Valve Deenergized

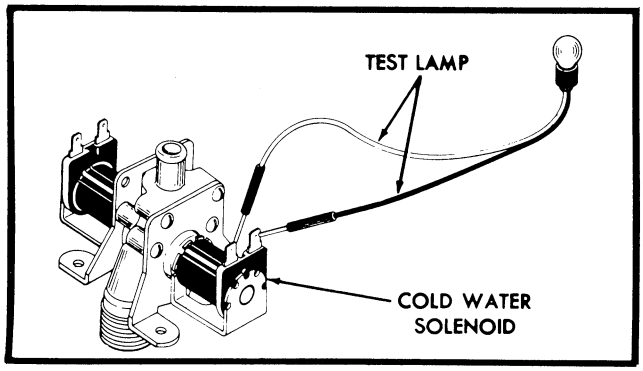


Figure 91—Checking Solenoid

If the solenoid is found to be good, a test lamp can be used to check the circuit to the solenoids, *Figures 92* and *93.* If the lamp fails to light, it would indicate a break in a wire, a defective water selector switch or a defective timer. These components must be checked separately to locate the fault.

The suds saver valve, *Figure 94,* is used on suds saver models only. It is used to save the wash water from a first load of clothes so that a second load may be washed in the same wash water.

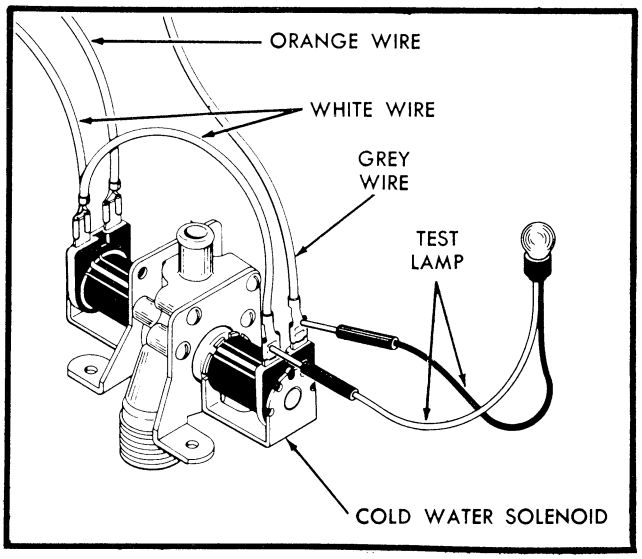


Figure 92

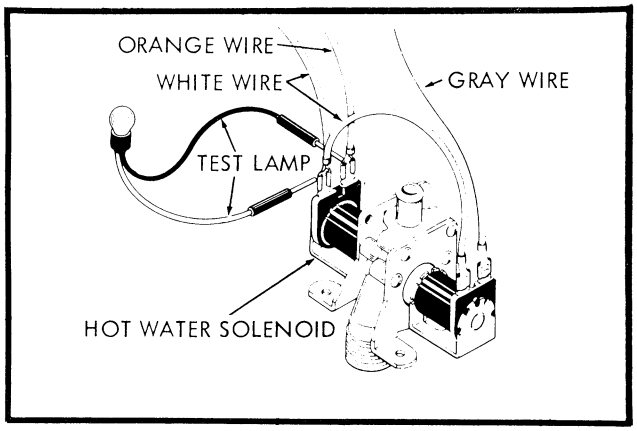


Figure 93

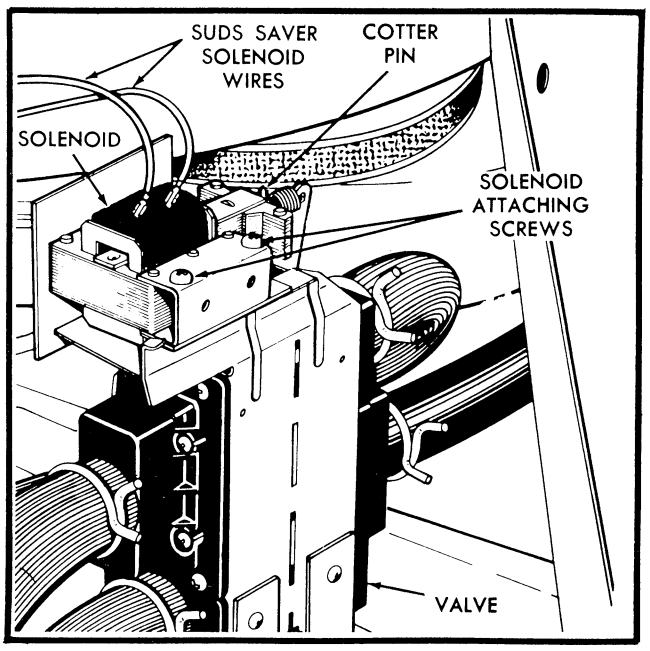


Figure 94—Suds Saver Valve

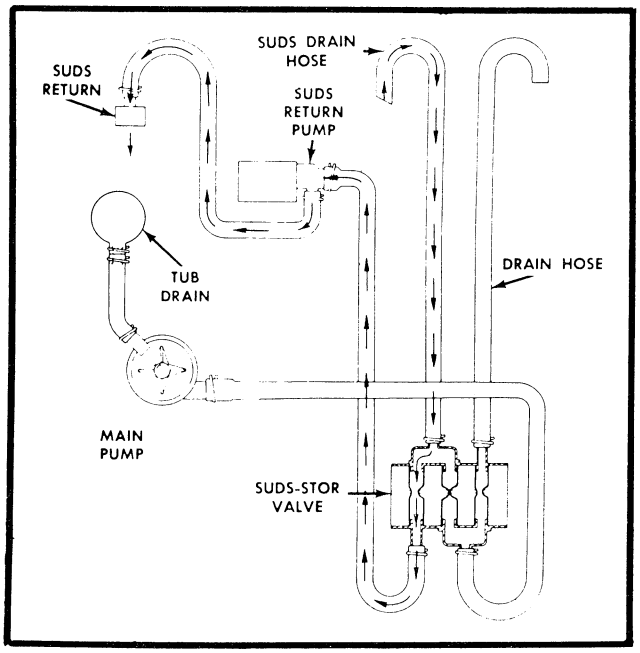


Figure 95—Suds Return

A separate storage tub is required to store the suds water. A drain is required for the rinse water and the wash water, if the user does not wish to save the wash water.

With the suds water control switch set at *save,* the wash water is diverted into the storage tub at the end of the wash period, and the rinse water is directed into the drain.

For the second load, the user sets the suds water switch to *return* and the timer dial to the start of the wash period. The suds saver pump returns the saved water back into the machine, *Figure 95.*

As the washing action begins, the user merely sets the suds water switch to *dispose.* With the switch in this position, the wash and rinse water both are directed into the drain.

Now, let's see how the valve has diverted the water to either the storage tub or the drain. As the valve solenoid is energized, two of the three rubber drain connections in the valve are closed off by a sliding jaw pulled into position by the solenoid, *Figure 96.*

As the wash water is discharged from washer pump through the drain pump hose, the wash water can pass only through the middle drain connection of the suds valve, *Figure 96.* As the wash water leaves the valve, it is carried through the suds saver hose into the set tub.

With the suds saver valve deenergized, the jaws within the valve are returned to their normal position by two springs. When this occurs, the middle drain connection within the valve is closed off and remains closed until the washer is again put through another wash cycle.

During the remaining part of the washer cycle, the rinse water is discharged through the outer drain connection of the suds saver valve to the drain, *Figure 97.*

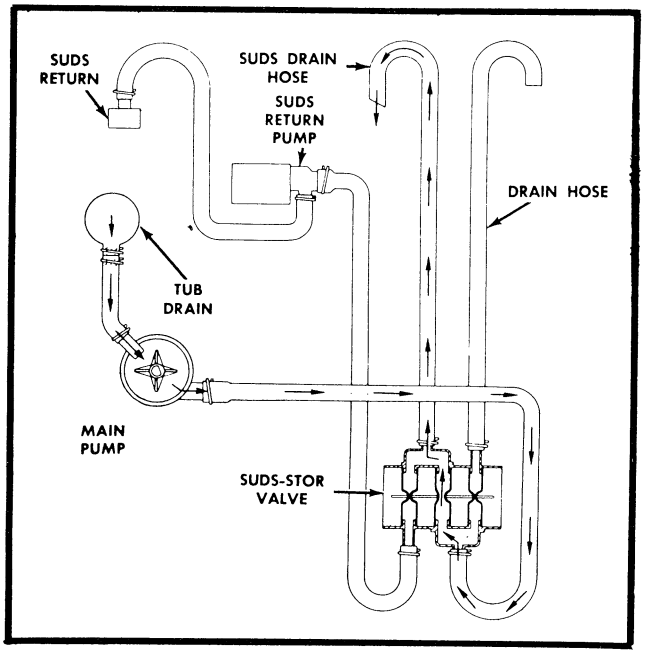


Figure 96—Suds to Set Tub

To remove the suds saver valve assembly, remove the rear panel. Remove the two screws holding the valve assembly bracket to the washer frame. Pull the valve assembly out from the rear of the washer as far as the hoses will permit. Disconnect the leads from the suds saver motor and solenoid. Remove the hoses from the suds saver pump and valve assembly, *Figure 98.* After the valve assembly has been removed, disassemble the motor and pump from the valve by removing the mounting screws, *Figure 98.*

A recirculating valve is used to provide a filtering system on some models of washers. The solenoid actuated valve is used to direct the flow of water either to the drain or to recirculate through the lint filter.

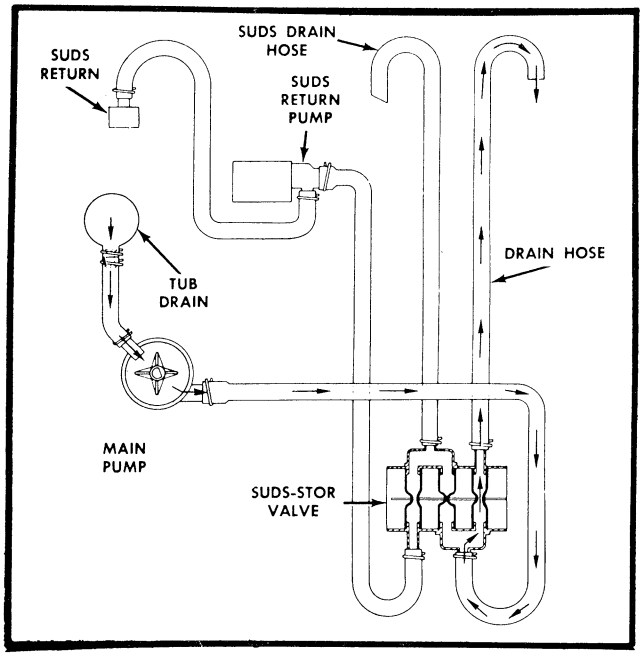


Figure 97—Rinse Water to Drain

An overflow of water from the spin tub is pumped through the valve, through the filter, and back into the spin tub. During the spin period, the valve directs the water to the drain hose and into the drain.

The recirculating valve is mounted at the rear of the cabinet supported by the base, *Figure 99.*

To remove the valve assembly, remove the back panel and disconnect the wires from the valve solenoid.

Remove the pump outlet hose, recirculating hose and drain hose from the recirculating valve, *Figure 99.*

Remove the one screw holding the valve bracket to the frame and lift the complete assembly from the cabinet.

After the valve is removed, remove the four Phillips screws holding the recirculating valve assembly to the bracket, *Figure 99.*

Figure 100 shows the components making up the entire recirculating system. *Figure 101 shows the recirculating valve mounted in a suds saver model washer.*

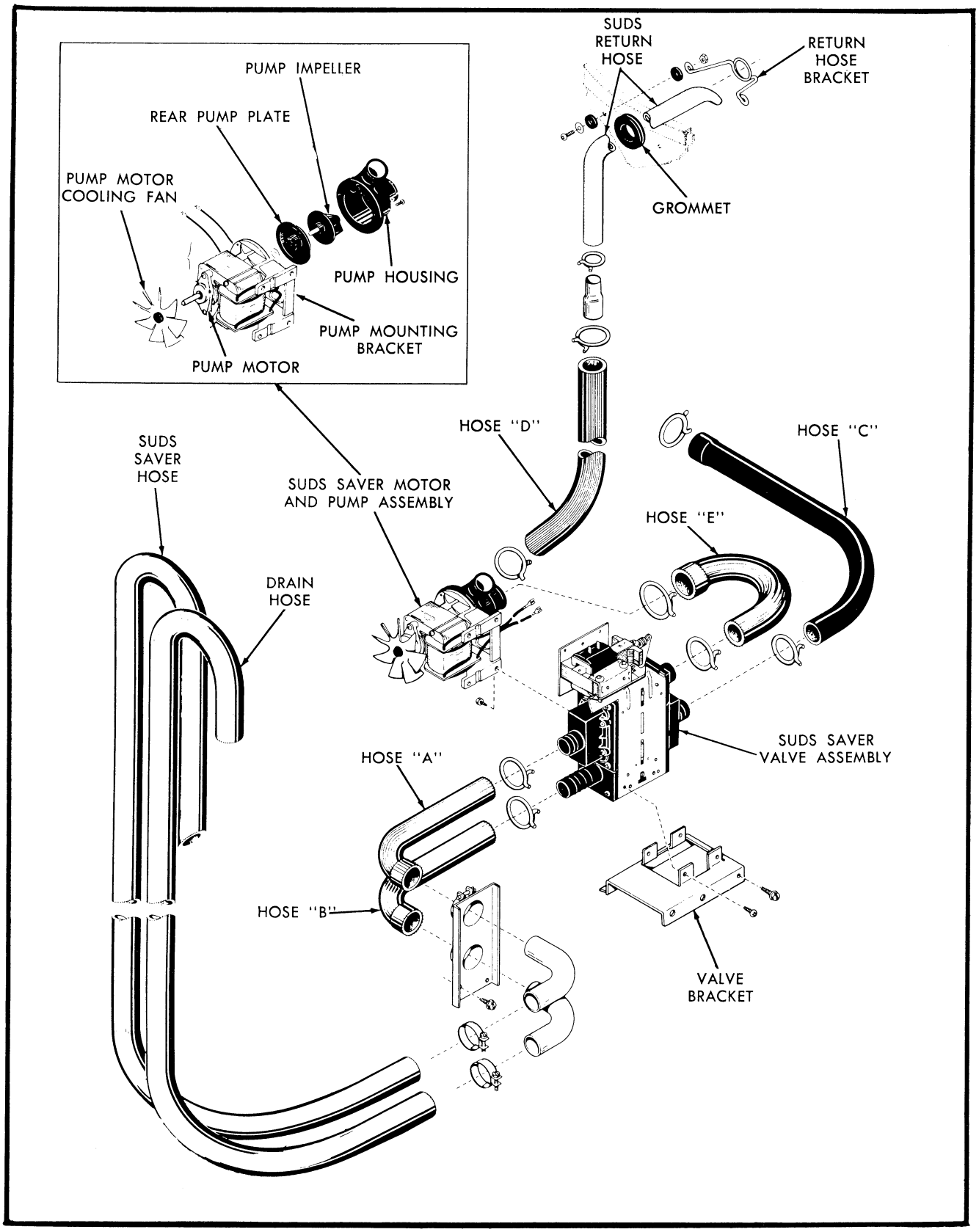


Figure 98—Suds Saver System Components

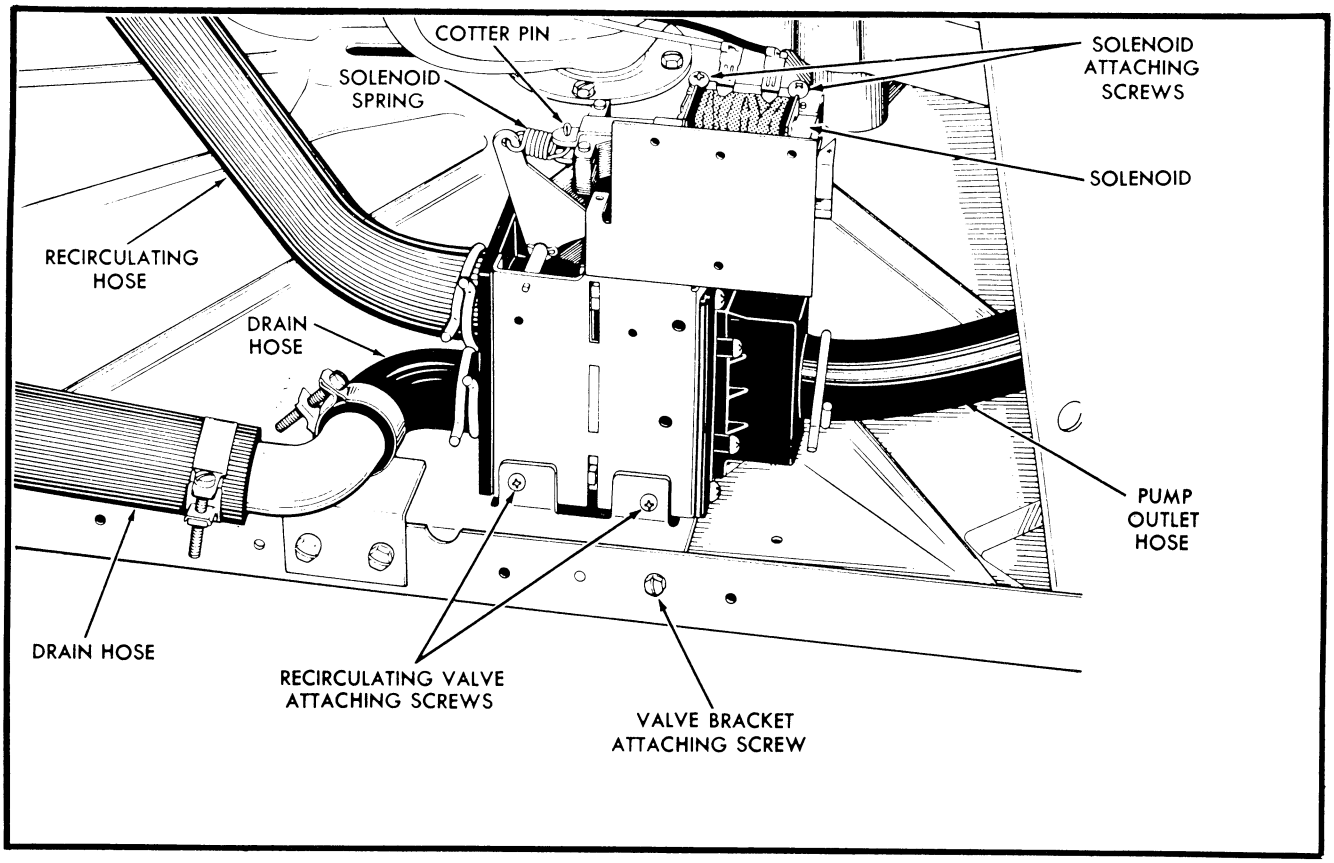


Figure 99—Recirculating Valve

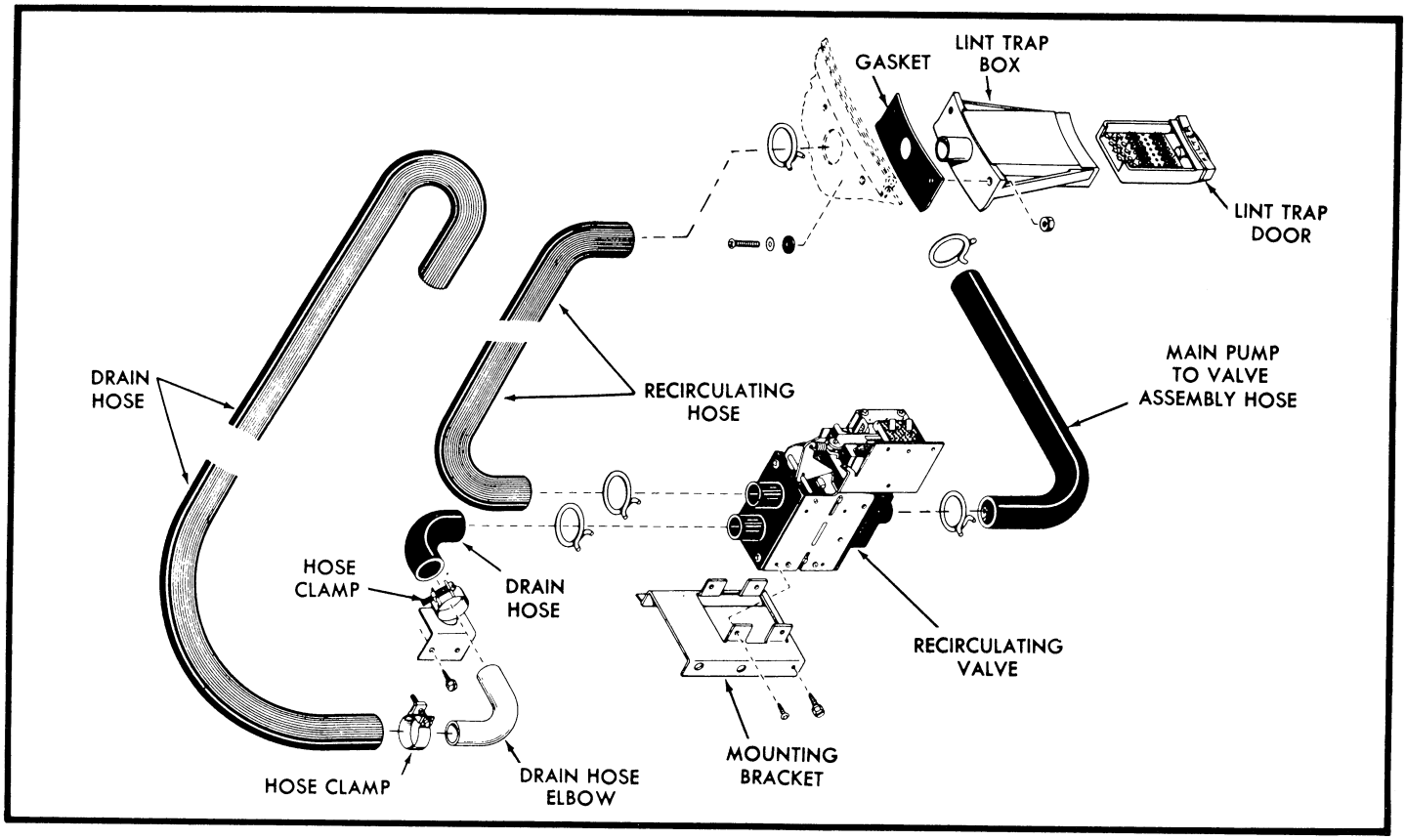


Figure 100—Recirculating System Components

PUMPS,
Early Models

The water pump of an automatic washer is often referred to as the heart of the washer, since it not only recirculates the wash water, but also removes the wash and rinse water from the washer. The pump in *Figure 102* is readily accessible by removing or raising the front panel. On the Speed Queen Washer, the water pump runs whenever the main motor is turning. It is driven by a belt from the motor pulley to the top groove of a two groove pulley of the pump.

The pump is easily removed by loosening the two bolts attaching the pump to the main mounting plate and sliding the two belts from the pulley. Then disconnect the two hoses by removing the two Corbin clamps and sliding the hoses from the pump. Slide the pump free from the two bolts and remove the pump from the machine.

Before removing the pump cover from the pump body note the location of the pump cover in relation to the pump body so that it can be correctly reassembled. When reassembling the pump,be sure to always use a new pump cover gasket. Also,never overtighten the pump cover thumbscrew,as the cover clamp, cover or the body itself may be damaged.

The pump cover may be removed without removing the pump from the machine, *Figure 103*. This is done to inspect the pump for an obstruction or a loose impeller blade on the impeller shaft.

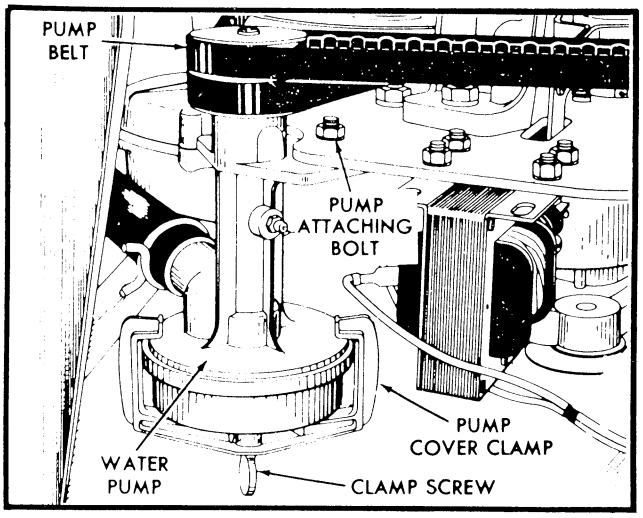


Figure 102

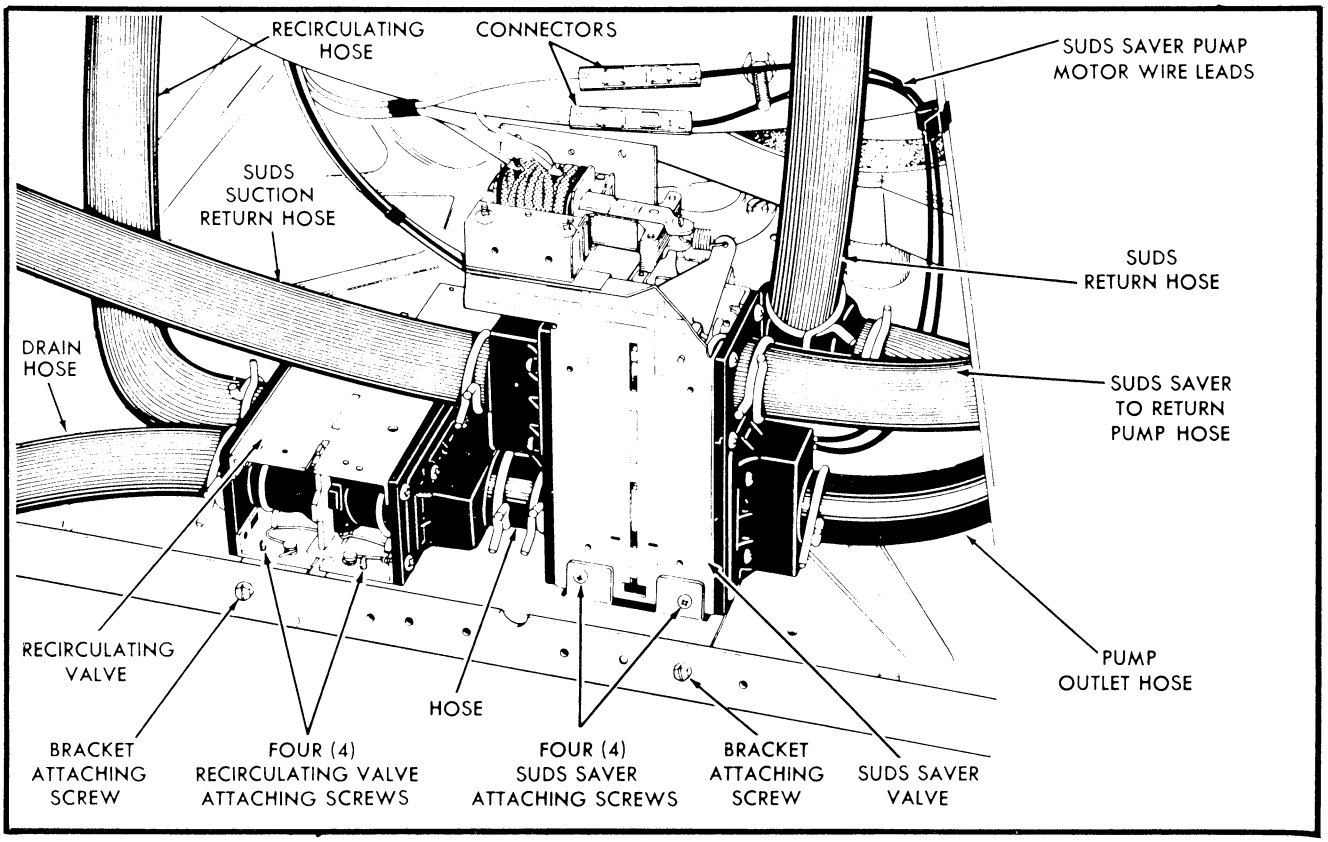


Figure 101—Recirculating Valve and Suds Saver Mounting

Any time garments are found blocking the pump, be sure the holes around the outer periphery of the spin tub are not blocked with lint. *Figure 104* shows the location of these holes. Further explanation of these holes will be found in the Mechanical Section of this manual under *Spin Tub.*

Figure 105 shows a parts breakdown of the pump assembly. Although these parts may be purchased separately, it is recommended that the pump be changed as an assembly. There are several reasons for a pump to fail to remove the water from the washer; such as a kinked hose, foreign matter in the pump, or the pump impeller slipping on the shaft. On the later model washers, the impeller screws onto the impeller shaft rather than being pinned.

When reinstalling the pump, always adjust the belt tension. This is done by loosening the two bolts which mount the pump, and sliding the pump in or out to get the proper belt adjustment. Tighten the two mounting bolts when the proper adjustment is obtained.

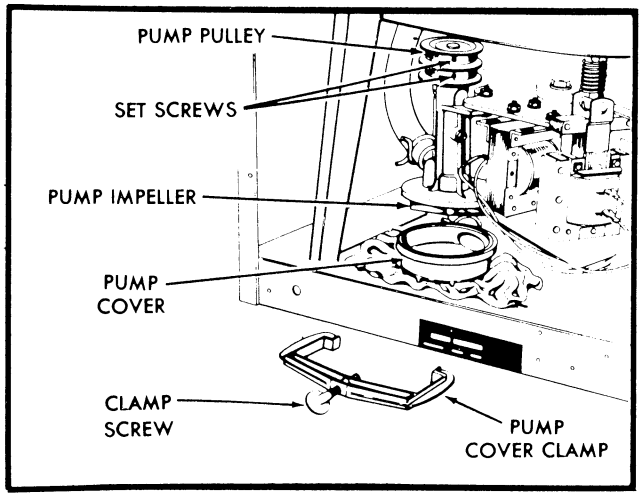


Figure 103

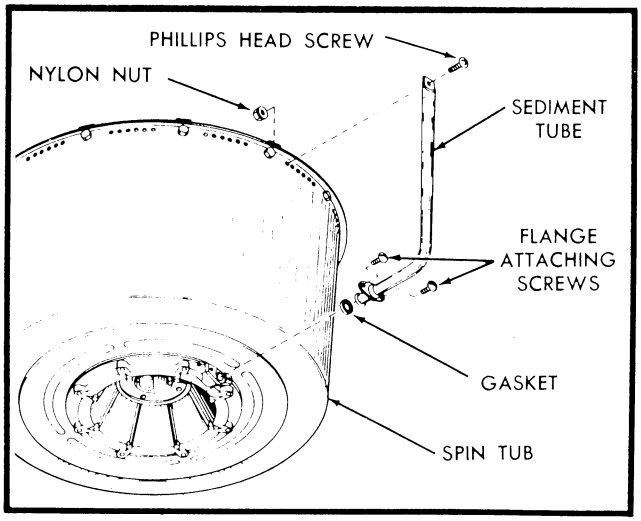


Figure 104—Spin Tub

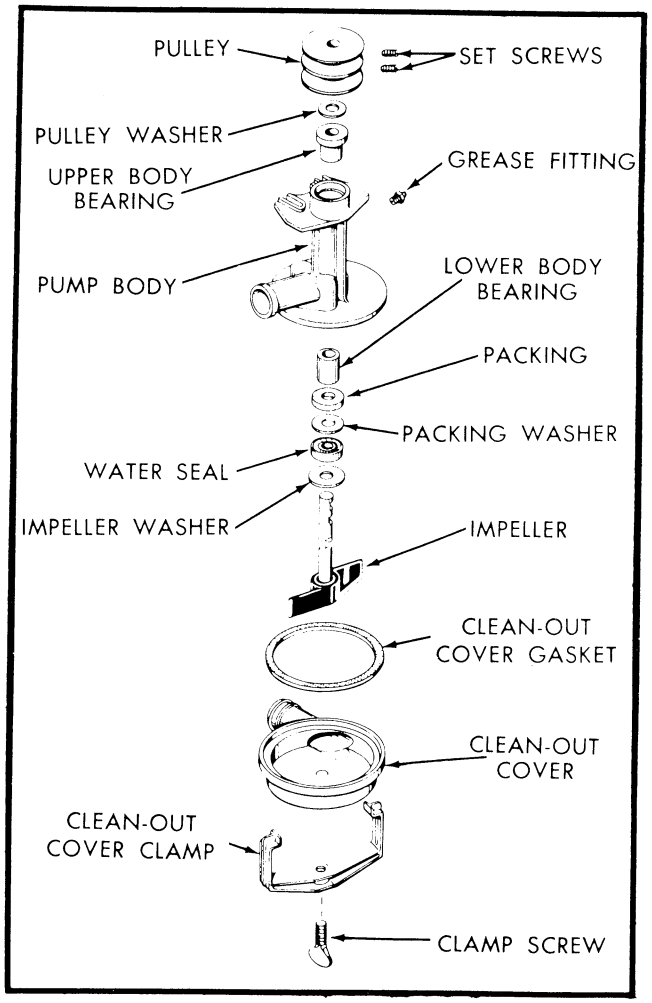


Figure 105—Exploded View of Pump, Early Model

PUMPS,
Late and Current Models, *Figure 106*

In recent years the pumps on the Speed Queen washers have been changed and modified. More recent pumps are much larger and have a much heavier and larger shaft and impeller. In replacing the pump it should be changed as a complete component, although the individual parts are available. It is secured to the machine in much the same manner as the early pumps.

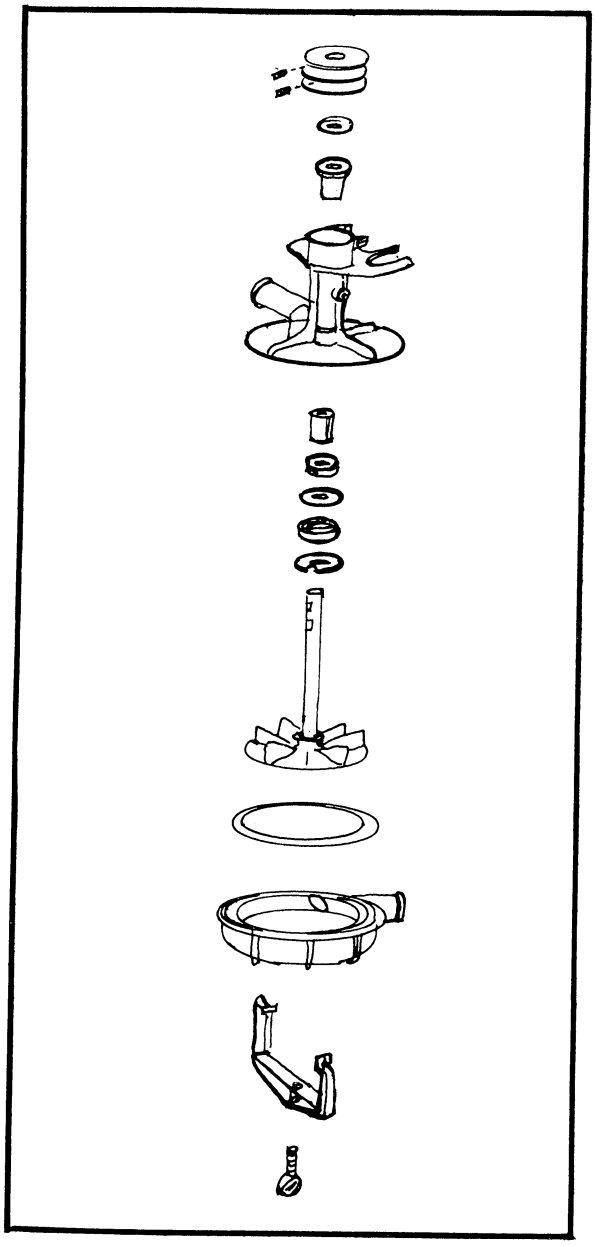


Figure 106 — Late Model Pump

The conditioning center, *Figure 107,* is used to dispense bleach or rinse solutions into the wash or rinse water at a predetermined time by the timer. Solenoids are used to drop the rinse and bleach solution from the dispenser cups into the flowing water passing through the inlet spout.

At the end of the final spin cycle, the dispenser cups are manually reset, *Figure 107,* by using the two knobs to swing the dispenser cups to a locked position. The dispenser housing may be removed by first removing the control panel hood and then removing the dispenser housing attached with four screws and washers to the cabinet top. The conditioner top may be removed by driving one groove pin out, *Figure 108.* A small piece of permagum placed on the back side of the pin will catch the pin from falling and prevent losing it.

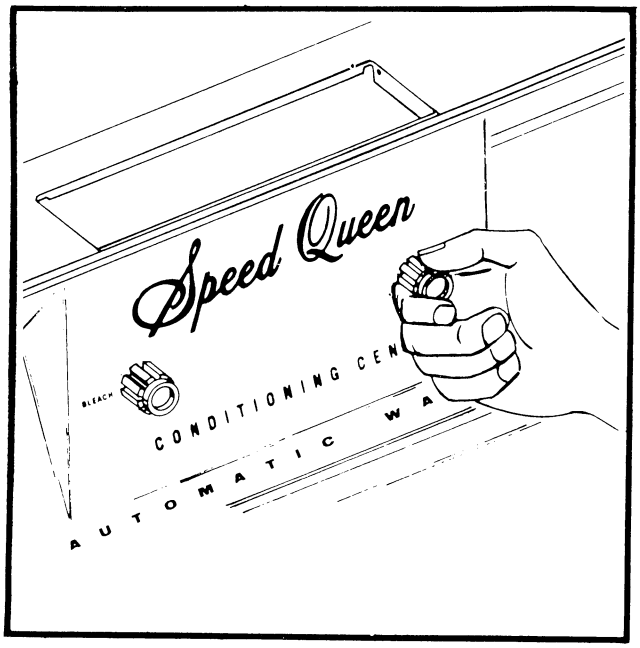


Figure 107

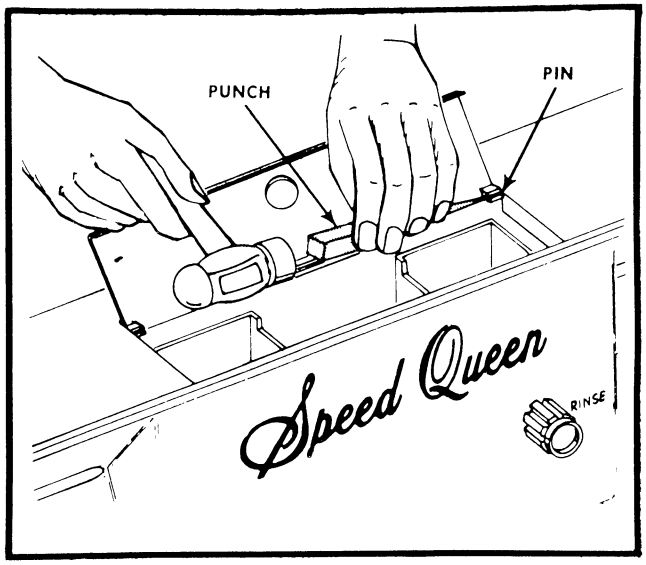


Figure 108—Removing Dispenser Cover

The dispenser cups are removed (after the conditioner center cover and control hood are removed) by depressing the dispenser solenoid plungers to trip the dispenser cups. Loosen the two Allen set screws on the bottom of the dispenser cup. Grasp the dispenser knob and pull the dispenser cup shaft from the dispenser cup and control panel. Then lift the dispenser cup from the control panel.

On the later model machines using a bleach dispenser located in the cabinet top, the dispenser must be disconnected before the cabinet top can be raised. This is done by first lifting off the bleach cover assembly and removing the plastic screen. Then compress the bleach tube and push it down through the cabinet top.

The bleach dispenser parts breakdown gives a fair idea of how the system works, *Figure 109.* Liquid bleach is poured into the plastic screen and held in the bleach tube reservoir, which is then forced into the inlet spout by the bleach pump at a predetermined time, controlled by the timer. As the bleach enters the inlet spout,it is mixed with water before it is fed into the clothes basket. The bleach pump is located behind the front panel near the main pump and may be tested using a live test cord, *Figure 110.*

There is also a rectifier placed in series with the bleach pump and it is located in the rear of the control hood, *Figure 111.* When testing the rectifier, a *neon* test lamp is used as a live test cord, *Figure 112.* One filament of the neon test lamp should light. If both the filaments light, replace the rectifier.

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 fixture and stop the proper flow of water through it.

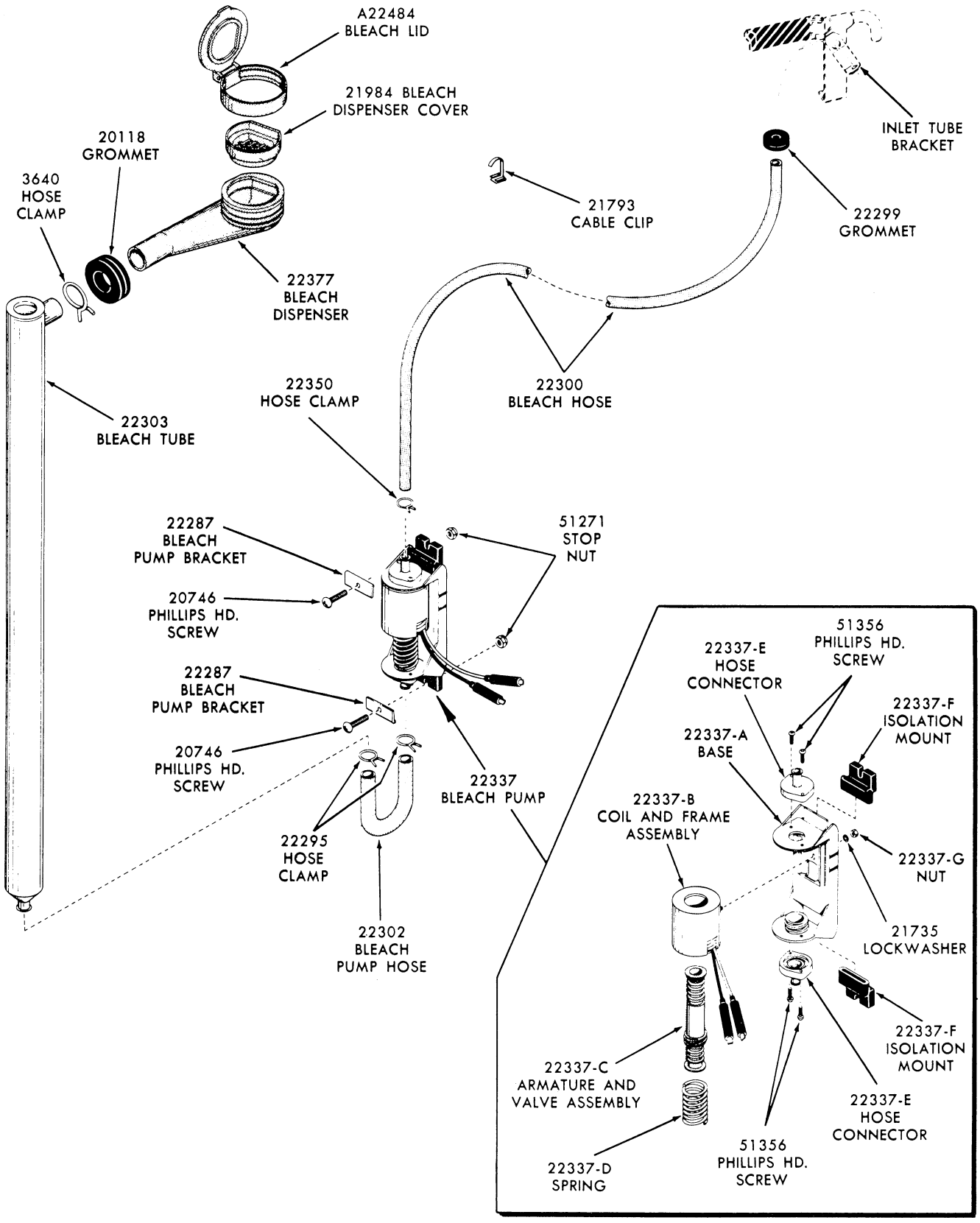


Figure 109—Bleach Dispenser Components

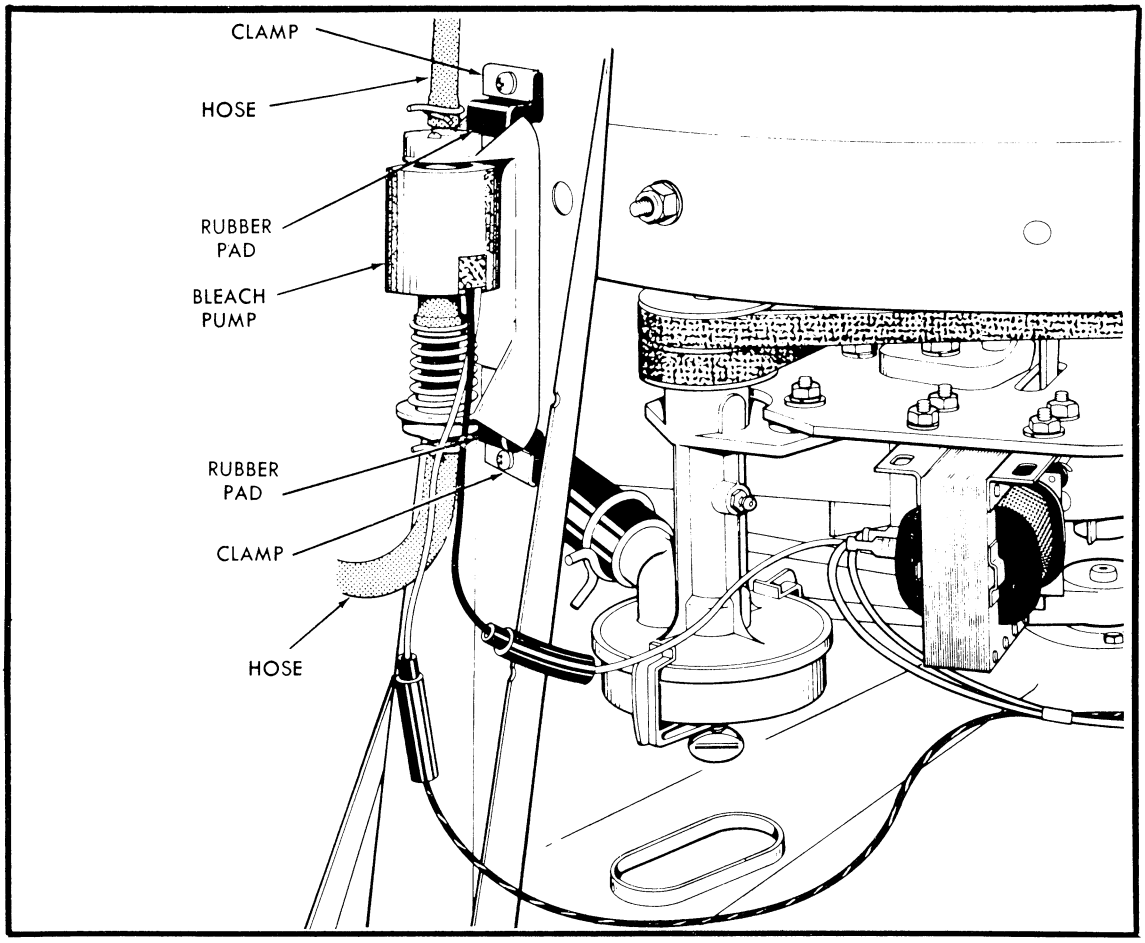


Figure 110—Bleach Pump

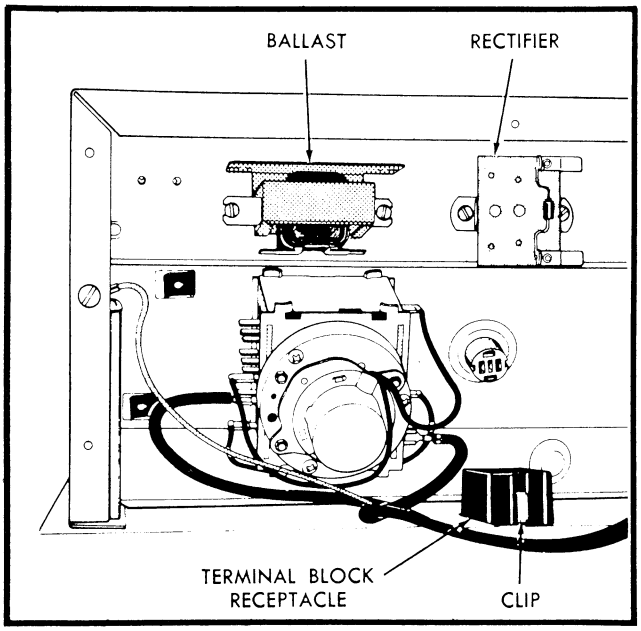


Figure 111—Rectifier Location

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

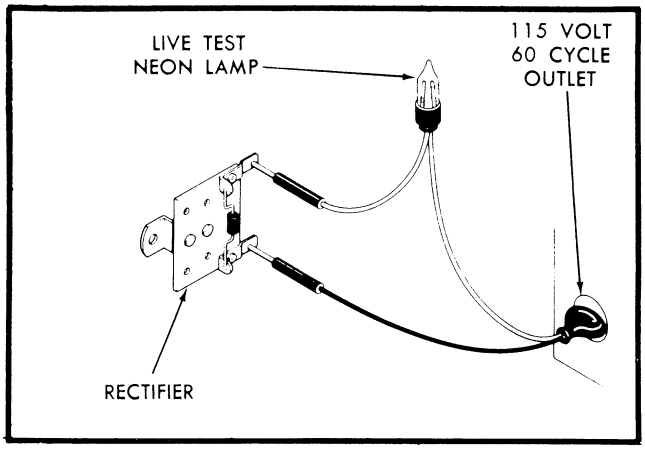


Figure 112—Testing Rectifier with Neon Lamp

Corbin hose clamp pliers. Do not attempt to use any other type pliers. They can slip and cause an injury.

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 damage the threads on the valve.

A filter washer should be used on each hose and installed with the cup side up in the hose end that is to be attached to the faucet. A standard rubber washer should be used in the end that attaches to the valve. Always use high pressure hoses made for automatic washers and do not use any hose with clamps used to hold the couplings on.

DRAIN HOSE

The drain hose (furnished with washer) must be within reach of drain facilities. Adjust the drain hose elbow at the rear of the washer as follows:

1. Remove the two screws holding the hose clamp assembly to the washer base.
2. Pull the hose clamp assembly out of the rear of the washer far enough to permit loosening of the elbow clamp screw.
3. Turn the elbow outlet up. (The elbow must turn freely). If the outlet hose is turned with the elbow, it will kink and restrict the drain.

The drain hose should run as straight as possible from the washer to the drain, with just enough slack to avoid tension. If too much slack is left in the hose, it may sag and cause the hose to kink.

WATER FILL TUBE, *Figure 113*

The water being supplied from the mix valve is directed into the fill spout by a small diameter rubber tube. This tube is attached to a nozzle directed at the fill spout. The fill water must jump an air gap or vacuum break before entering the fill spout. This vacuum break is a sanitary measure to prevent the wash water from being siphoned back into the water supply.

If the water sprays out of the nozzle sideways, it is usually caused by an accumulation of calcium at the tip of the nozzle. The calcium deposit must be carefully scraped from the nozzle, being careful not to cut rough edges on the nozzle itself.

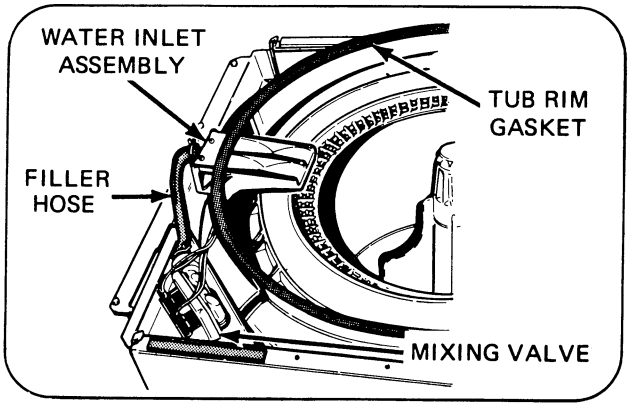


Figure 113

CLUTCH ASSEMBLY

The clutch or fluid drive assembly is an assembly consisting of the motor, cone pulley, brackets, mounting plate, shifter arm, fluid drive, engaging and disengaging springs, and the solenoid. If any of these parts are inoperative, the whole clutch assembly will be inoperative. The assembly is shown in *Figures 114* and *115.* The operation of this assembly will be explained in the following paragraphs.

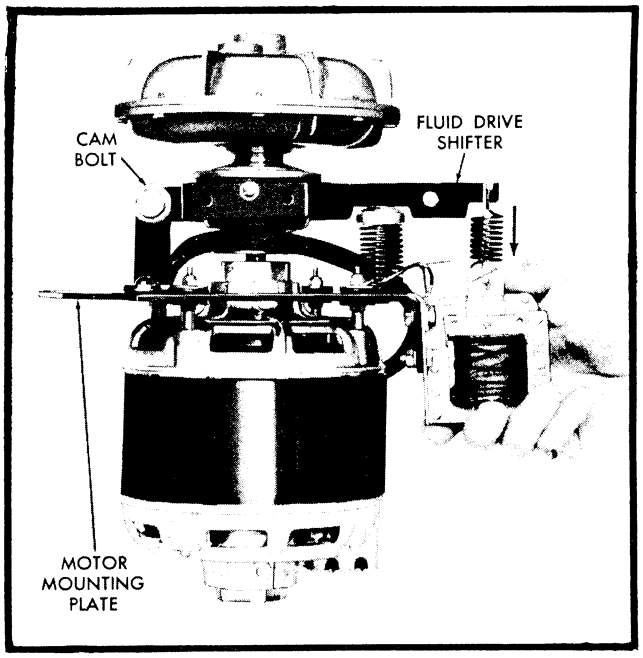


Figure 115—Fluid Drive Engaged

First we start with the motor, which has a cone pulley pinned to the shaft with a tapered pin. Inside the cone pulley is a clutch lining that is held in place by a retainer ring. On top of the motor mounting bolts is placed a motor mounting plate. To this plate a bracket is secured which incorporates a cam bolt to adjust the fluid drive shifter. The shifter is secured to the fluid drive by two attaching screws. At the far end of the shifting arm is a disengaging and engaging spring.

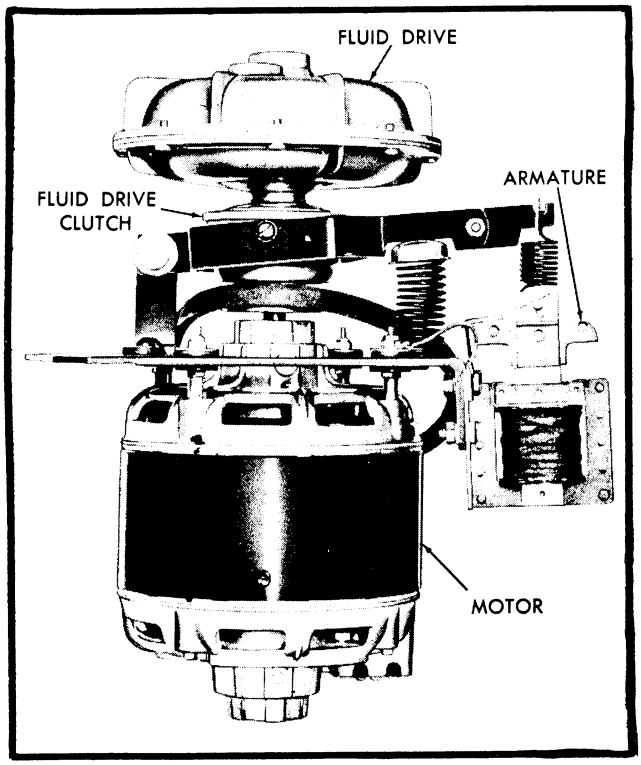


Figure 114—Fluid Drive Disengaged

The solenoid which is attached to the motor mounting plate causes the engaging spring to pull the shifter arm downward when energized. This moves the fluid drive into contact with the cone pulley lining, which in turn causes power to be applied to the spin belt. Now the spin basket starts to rotate. As the spin basket starts to rotate, the clutch action slowly brings the spin tub up to the proper speed. This allows the water to be spun out of the tub and the clothes to seek their own balance before the full load is placed on the motor.

To adjust the fluid drive clutch, loosen the self-locking nut of the cam bolt and hold the solenoid down to the engaged position, *Figure 116.* Now turn the cam bolt until the engaging spring is stretched to approximately $\frac{1}{8}$". At this time the shifter arm should be nearly parallel to the motor mounting plate. Do not tighten the self-locking nut of the adjustable cam bolt to a point of binding the shifter arm.

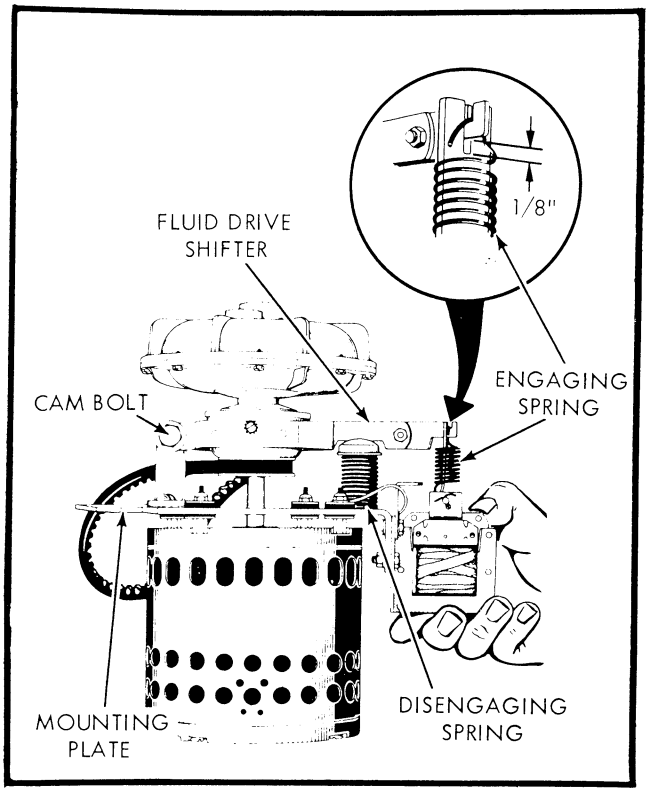


Figure 116—Checking Shift Arm Adjustment

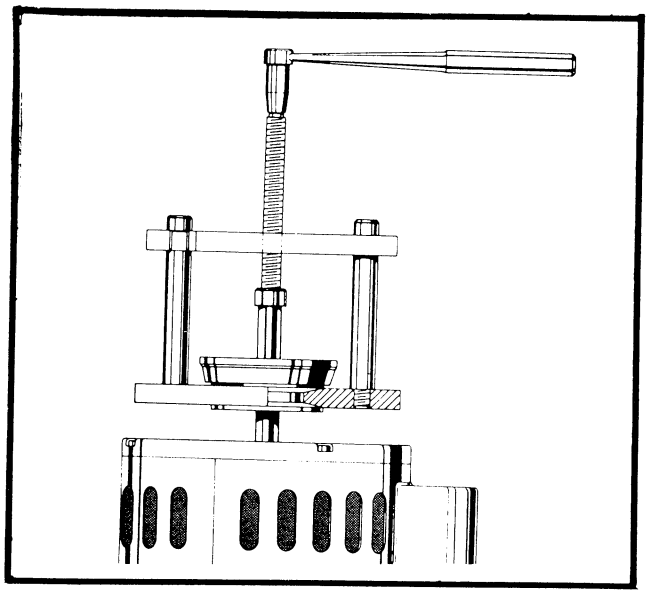


Figure 117—Removing Cone Pulley

When the solenoid is deenergized, the fluid drive disengages from the cone pulley and the motor shaft now rotates freely in the bushings of the fluid drive. The fluid drive now remains stationary and the cone pulley will drive only the belt to the pump.

To remove the fluid drive assembly, refer to Motor Removal in this manual. If the cone pulley is removed from the motor, care must be taken to prevent bending the motor shaft, since a bent motor shaft could cause the fluid drive to chatter or rotate at all times.

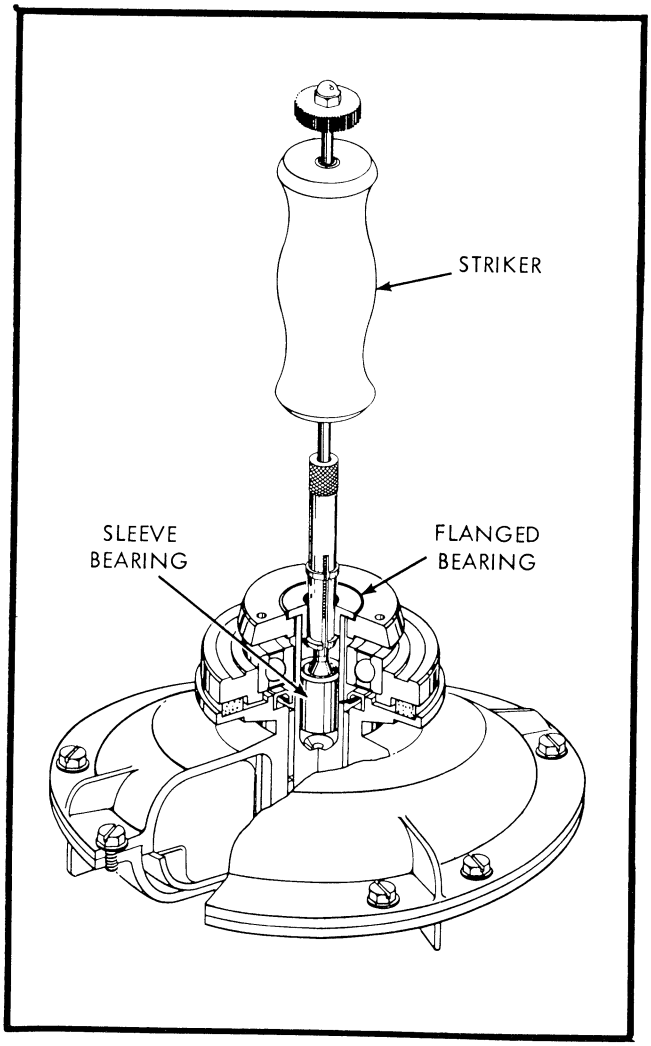


Figure 118—Removing Fluid Drive Bearings

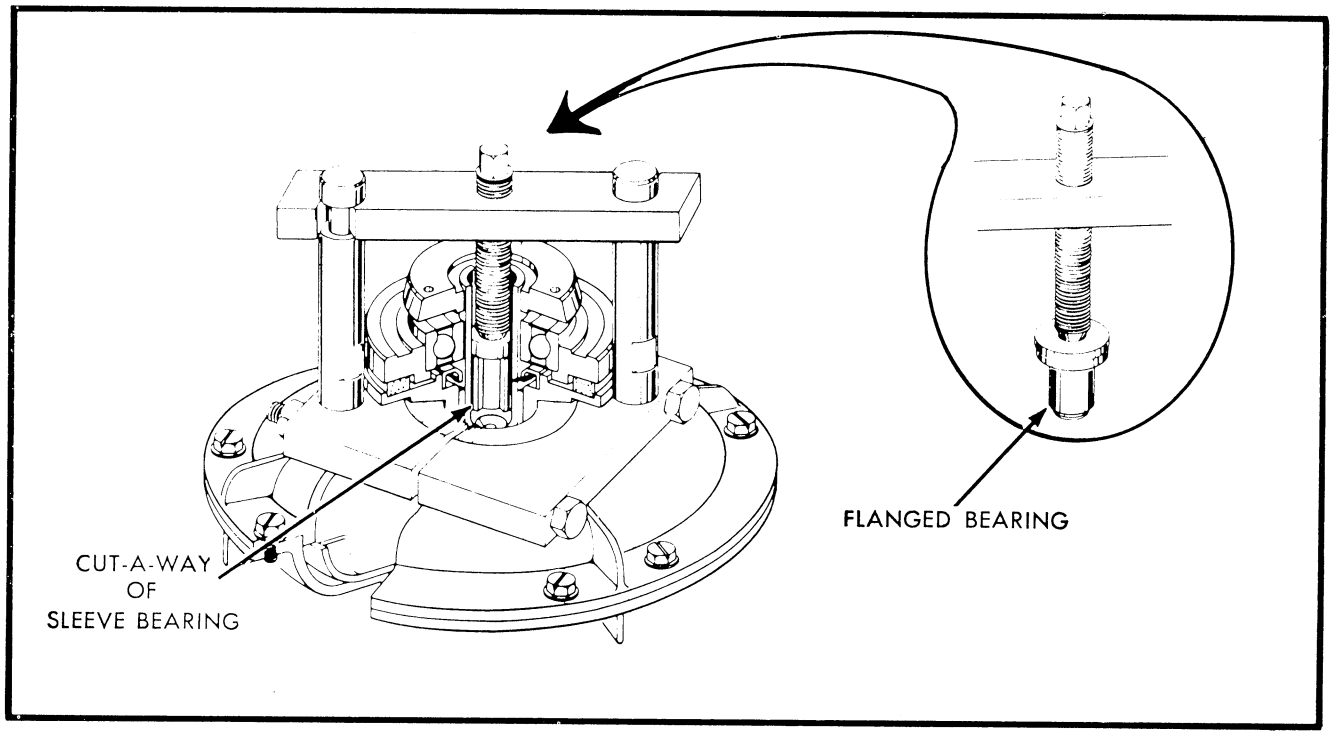


Figure 119—Inserting Fluid Drive Bearings

FLUID DRIVE

Usually, the only service problem encountered on a Speed Queen fluid drive is the two bearings that the motor shaft turns in. Speed Queen has available a special fluid drive tool, part number RT-5. This tool is used to remove and replace the fluid drive bearings and to pull the cone pulley from the motor shaft.

Figure 117 shows a portion of this tool being used to remove the cone clutch pulley from the motor shaft. This is done by first attaching the yoke part of the tool into the belt groove of the motor pulley. Thread the yoke pins into the yoke and attach the yoke brace to the yoke pins. Now thread the drive pin bolt through the yoke brace and place the motor shaft cap on top of the motor shaft. As the drive pin bolt comes into contact with the pilot hole of the shaft cap, pressure is applied against the motor shaft, causing the cone pulley to move upward until it is free of the shaft.

Although the bearings are the main source of trouble to the fluid drive, they may be easily replaced without disassembling the fluid drive with the use of this tool. With the fluid drive removed from the motor, insert the bearing puller through the bearings, *Figure 118.* The knurled nut above the striker is turned clockwise, which causes the flare rod to pull up into the expansion tube and locks the fingers of the expansion tube under the bearing lip. Hold the fluid drive down and move the striker sharply against the knurled nut until the flanged bearing is free of the fluid drive. Remove one bearing at a time. Do not try to pull them both at the same time.

To install new bearings, the yoke of the tool is attached to the belt groove of the fluid drive. Then place the sleeve bearing insert into the sleeve bearing and place the bearing in the hole of the fluid drive and thread the drive pin through the yoke until the point of the pin engages the pilot hole of the insert, *Figure 119.*

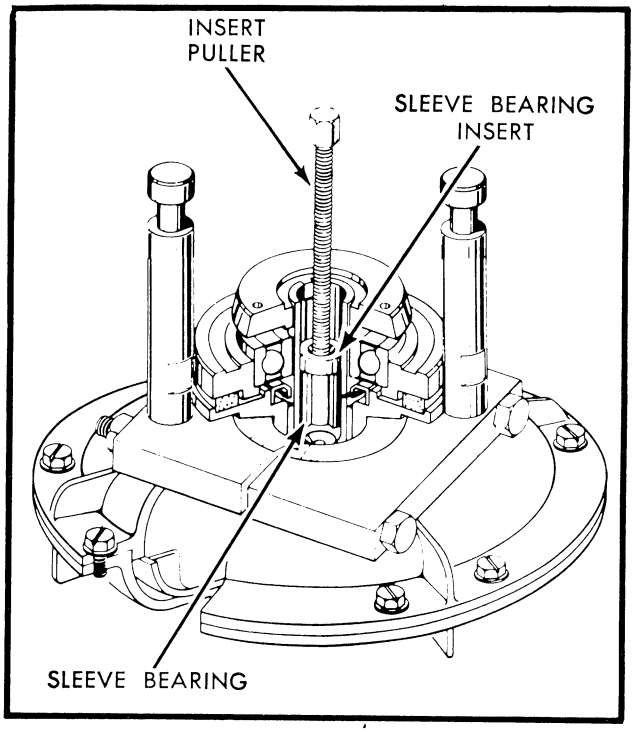


Figure 120—Removing Bearing Inserter

Continue to thread the drive pin against the insert until the bearing bottoms in the hole of the fluid drive. Then remove the drive pin and thread the inserter puller into the inserter used to push the sleeve bearing into the fluid drive. Remove the inserter from the fluid drive. These steps can now be repeated to install the flange bearing using the flange bearing inserter. *Figure 120* shows the inserter puller threaded into the inserter to easily remove the inserter from the bearing. The inserter sleeves must always be used to stop bearing collapse.

TRANSMISSION

To remove the transmission proceed as follows:

1. Remove the side panels as explained under CABINET SERVICE page 9.
2. Remove the belts from the transmission pulleys.
3. Loosen set screw in pulley and remove the transmission pulleys.
4. Block up transmission as illustrated in *Figure 121.*
5. Remove the four nuts and washers securing the transmission to the mounting plate. Refer to *Figure 121*
6. Remove the block and ease the transmission down and out of the washing machine.
7. On late models it is necessary to remove the clip and hold down pin from the yoke guide and bend the left ear toward the left rear leg for transmission removal.

Since the Speed Queen transmission is very durable it rarely needs service. The most common reason to remove the transmission is to replace the oil seals to stop an oil leak. Any time a transmission is opened, the cover gasket, seals and grease should be replaced. A measured fill of the correct grease is available from your local parts distributor or Speed Queen dealer. The transmission with the cover removed is illustrated in *Figure 123.*

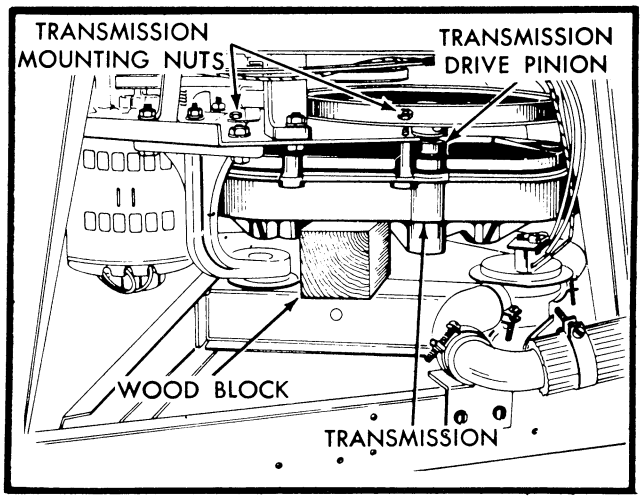


Figure 121

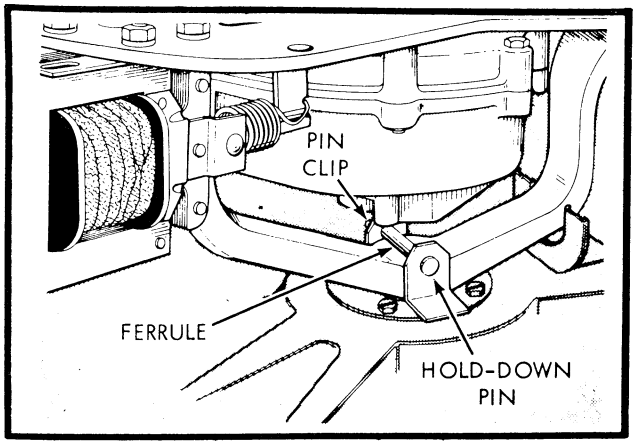


Figure 122

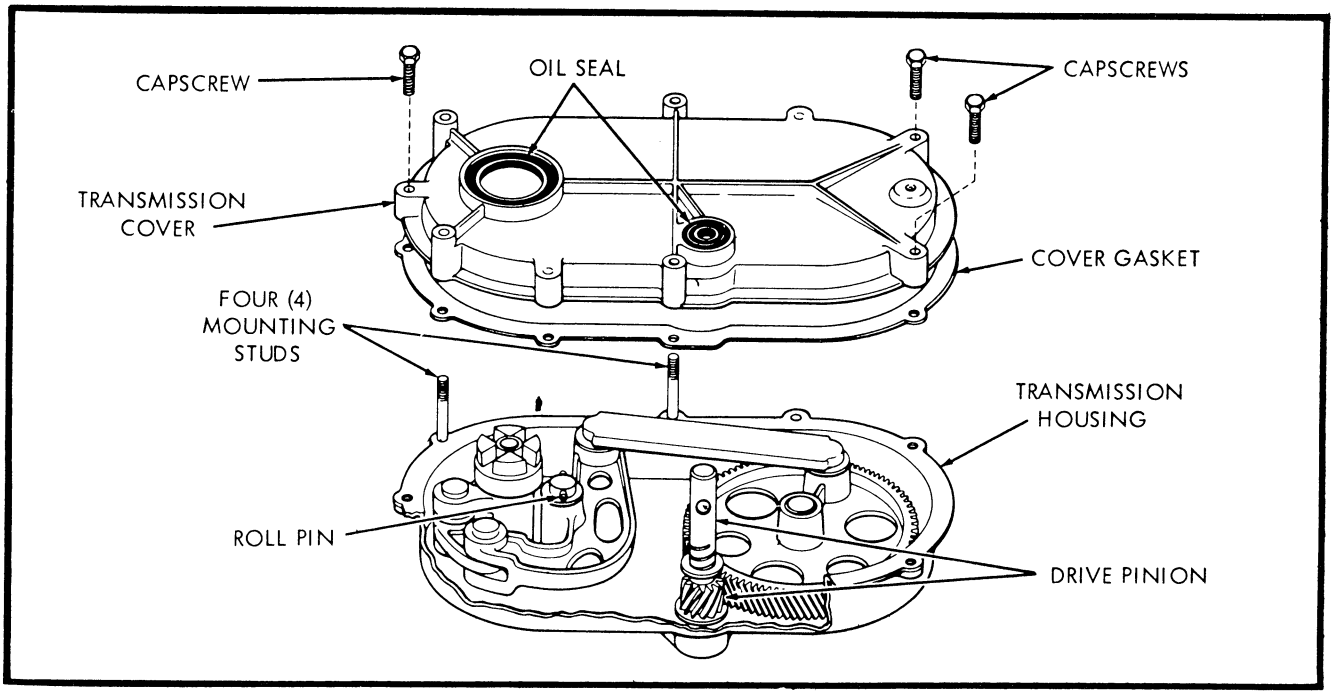
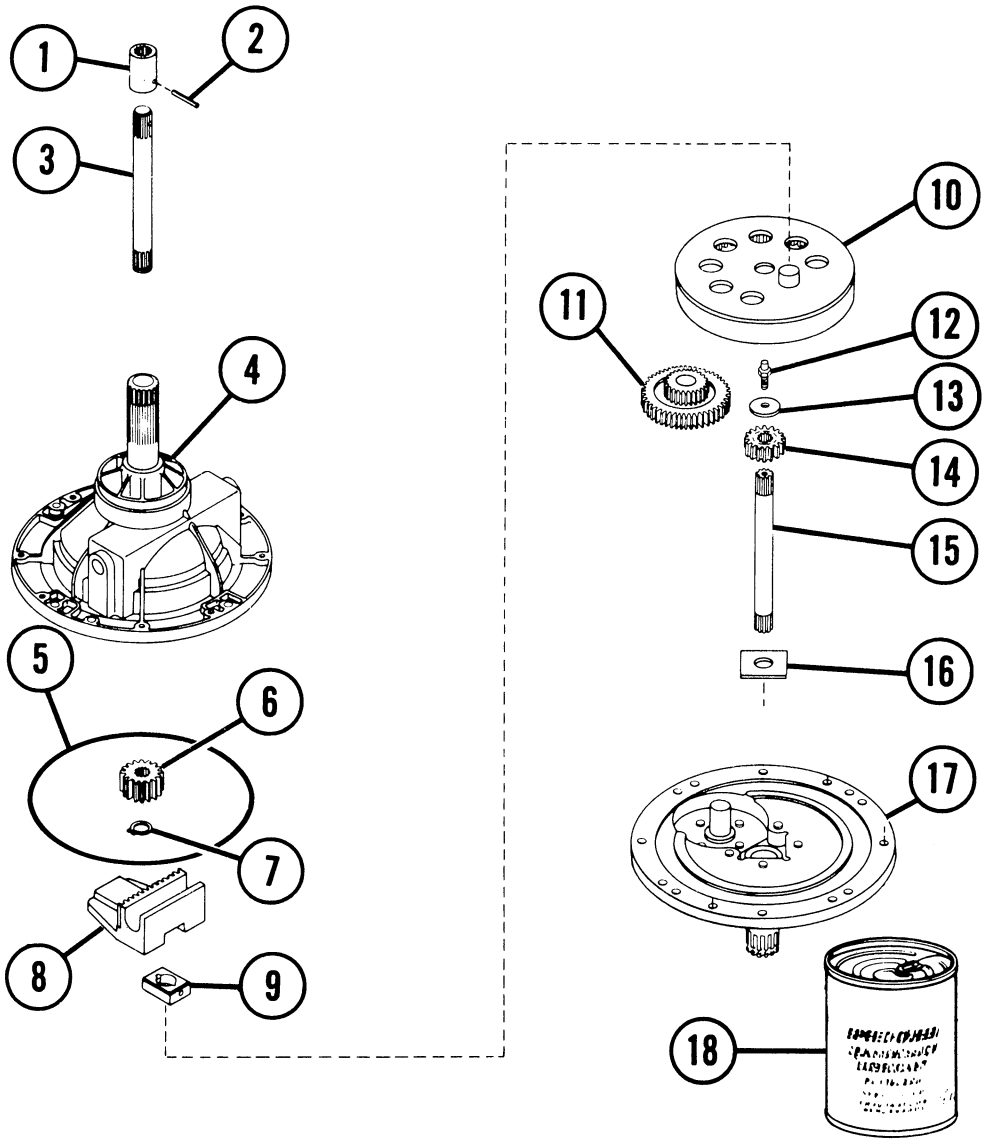


Figure 123



Number	Part Number	Description
1	27079	Coupler
2	27609	Roll Pin
3	27083	Shaft
4	27191	Transmission Case
5	27028	"O" Ring
6	27003	Agitator Pinion
7	27197	Retainer Ring
8	27001	Rack
9	26493	Slide
10	26577	Internal Gear
11	27002	Reduction Gear
12	27030	Special Screw
13	26509	Washer
14	27004	Drive Pinion
15	27081	Shaft
16	27016	Washer
17	27192	Transmission Cover
18	27243	Transmission Lube

Figure 123 A

TRANSMISSION, Late and Current Models.

Late model transmissions differ from the early transmission in many ways. The only similarity is the fact that neither of these transmissions have a segment gear. The early transmission did have a crank arm. This has been eliminated in the new transmission. Comparison can be made between the two transmissions by viewing *Figure 123 and Figure 123A.* Oil must be drained before disassembling transmission.

NOTE: Before attempting removal and disassembly of transmission check the following:

1. With the washing machine turned off, grasp the agitator with both hands and try to move it manually back and forth looking for excessive play. A worn agitator drive block will cause a very noisy operating washing machine.
2. Run the washing machine empty. Notice if there is any chatter between the upper shaft (3) and the transmission case post (4). This will signify a dry post bearing and can be corrected by lubrication.
3. Check the drive pulley, the motor and the belt.

Only after all the above checks are made and the problem has not been corrected, proceed with transmission disassembly.

NOTE: Oil must be drained from transmission before disassembly.

TRANSMISSION DISASSEMBLY,
refer to Figure 123A.

Remove transmission from machine and proceed as follows:

1. Remove roll pin (2) from coupler (1).
2. Remove bolts around periphery of transmission case (4).
3. Lift off transmission case (4). If transmission case is stuck place a thin blade between the upper and lower sections and pry up being careful not to damage either section. If you have never worked on this type of transmission before it would be best to punch mark both upper and lower section opposite each other to make reassembling easier.
4. Before removing upper shaft (3) check the shaft for side play to determine shaft and/or bearing wear.
5. Check for looseness of gear (6) on spline of shaft (3).
6. Check slide (9) in rack (8) for wear or nicks. Slide must fit snug and move freely.
7. Check gear (11) and internal gear (10) for excessive wear.
8. Check spline of shaft (15) in gear (14) for excessive wear.
9. Check thrust washer (16) for excessive wear.
10. Check shaft (15) in lower transmission cover for bearing wear.

TRANSMISSION REASSEMBLY

After worn parts have been replaced, install a new transmission gasket (5) ("O" ring) and reassemble transmission in reverse order. Properly align both sections of the transmission case with the punch marks. The upper and lower sections should mate properly if set on the alignment pins. Replace oil with a good grade of washer transmission oil or manufacturer's recommendation.

Before reinstalling the transmission, be sure all the grease is removed from the drive clutch of the transmission and the shift clutch on the agitation shaft. When reinstalling the transmission, start all four mounting nuts by hand and draw them up evenly. Replace the transmission pulley and tighten the set screws. Now rotate the pulley by hand to check.

TRANSMISSION PULLEY

The transmission drive pulley, often referred to as the transmission pulley, is much different in the later models of Speed Queen washers. In early models the transmission pulley is secured to the drive pinion of the transmission with an Allen set screw that is recessed into the drive pinion. On later models the transmission pulley is designed to allow the pulley to operate the agitation cycle through the use of a shifter yoke. This type of pulley eliminates the use of the agitator solenoid and the fluid drive solenoid, *Figure 124*. The drive pulley is made up of the following parts:

a. The stop; this mounts to the spline at the top of the drive pinion and engages the step at the top of the pulley.

b. The hub; is keyed to the shaft. The drive pinion has a flat side this flat is keyed to the flat inside the hub. The hub has a wide thread. There is also a thread inside the pulley, the hub threads into the pulley.

c. The retainer; this acts as a bottom stop for hub.

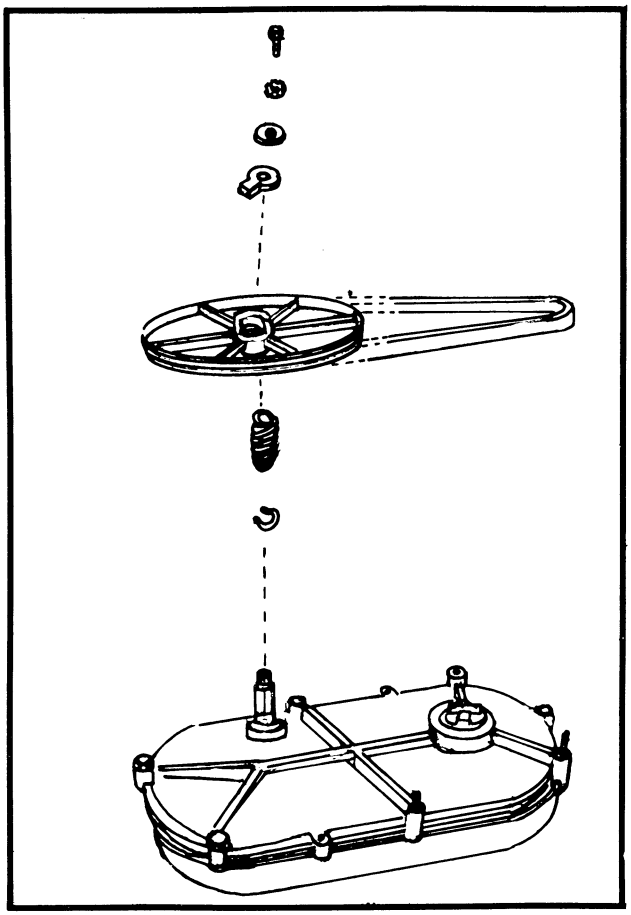


Figure 124

d. The cap screw, lock washer, and the flat washer secures the assembly to the pinion shaft, *see Figure 124.*

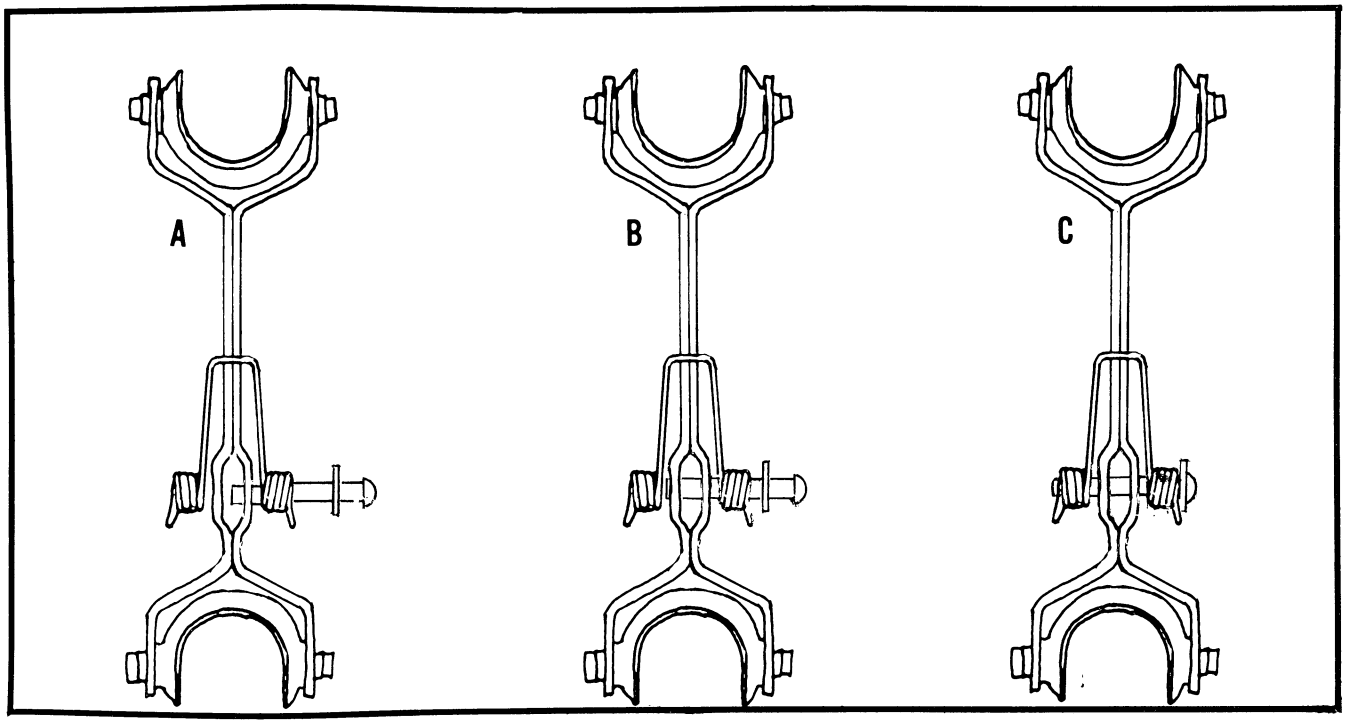


Figure 125

OPERATION OF THE TRANSMISSION DRIVE PULLEY

The drive pulley operates in conjunction with the Shifter Yoke, see *Figure 125*. The Shifter Yoke, *Figure 125*, is mounted to the mounting bracket with a pivot pin. The Collar (Transmission Pulley), illustration A in *Figure 125*, rests under the drive pulley; the other end engages the agitator shift clutch. As the motor turns in a clockwise rotation the pulley threads down on the hub and causes the Shifter Yoke to move the agitator shift clutch up and disengage the agitator shaft from the agitator drive clutch. This allows the agitator to free wheel and spin right along with the spin tub.

TRANSMISSION PULLEY, Removal and Replacement

1. Remove cap screw, lock washer, and the flat washer at the top of the drive pinion, *see Figure 126*, lift stop off of the pinion shaft.
2. Rotate the transmission pulley clockwise to lift the hub and pulley off of the pinion.

MAIN BEARING ASSEMBLY AND BRAKE

Figure 127 illustrates the newest main bearing assembly used in the Speed Queen washers. The main bearing assembly also includes a brake assembly. The brake is mounted to the spin tube. When the spin pulley rotates in a counterclockwise direction (looking down through the tub) the pulley will thread up on the hub and will effect a brake action.

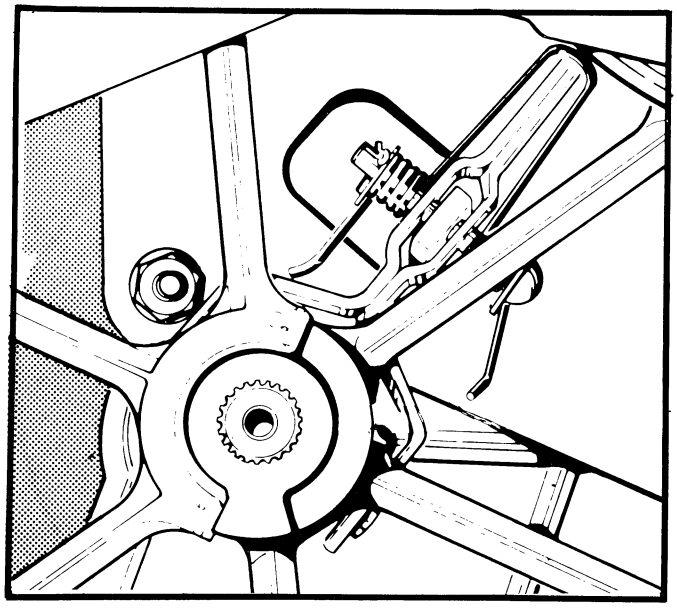


Figure 126

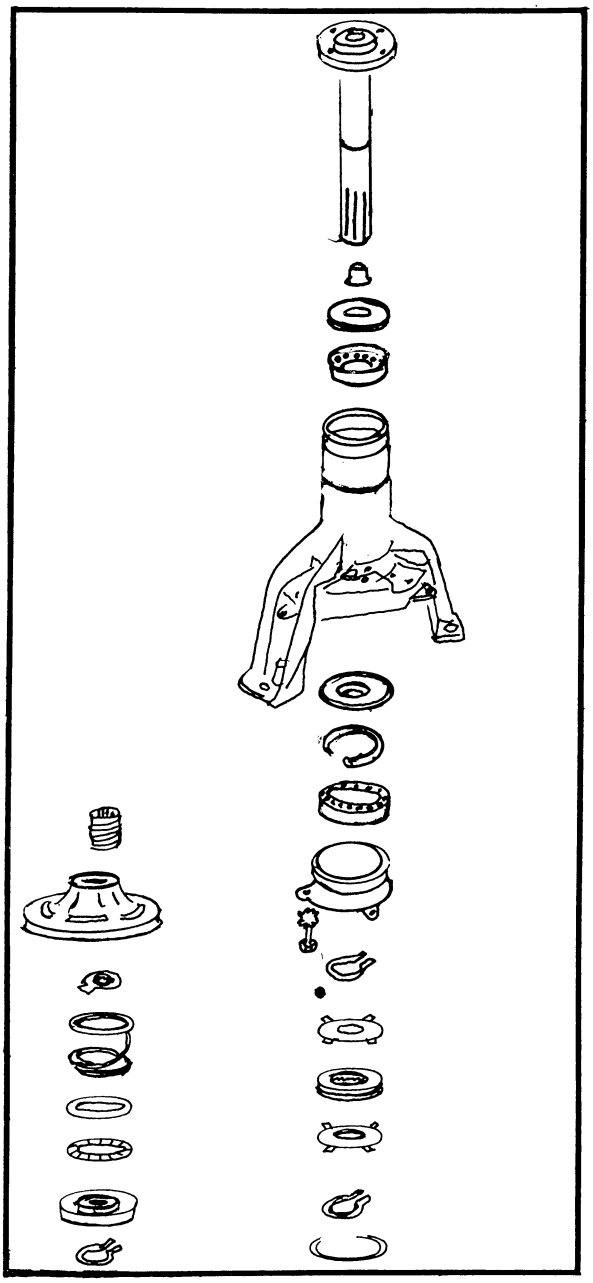


Figure 127 — Main Bearing Assembly, Late Model

DISASSEMBLY OF THE MAIN BEARING

1. Remove front panel as described in previous text.
2. Remove agitator shaft.
3. Remove cabinet top as previously described.
4. Remove agitator post and spin tube assembly.
5. Remove rear panel.
6. Remove the drain tub.
7. Remove the three snubbers.
8. Remove the bolts securing the counterbalance weight bracket to the main mounting plate, *Figure 128*.

9. Remove the spin belt by running it off the spin pulley.
10. Remove the three main bearing assembly mounting bolts. Remove the main bearing assembly from the mounting plate.
11. Turn spin pulley clockwise until the spin tube and tub flange turns.
12. Turn the main bearing assembly over and compress the brake spring.
13. Remove the retainer ring, be careful spring does not get away.
14. Remove spring retainer, needle bearing and race off the brake. Remove the brake spring from the spin pulley.
15. Remove the stop and spin pulley, including the hub from the spin tube.
16. Remove retainer ring from spin tube.
17. Remove wire retainer ring. Remove the brake discs and pad off of the spin tube.
18. Remove another retainer ring from spin tube. Take the spin tube out of the bearing housing.
19. Remove the cap screws and remove the lower bearing retainer.
20. Remove retainer ring and the drive bearing out of the retainer, using a hardwood dowel and a mallet.
21. Drive upper bearing and water seal out of the housing by the same method, *see Figure 144.*

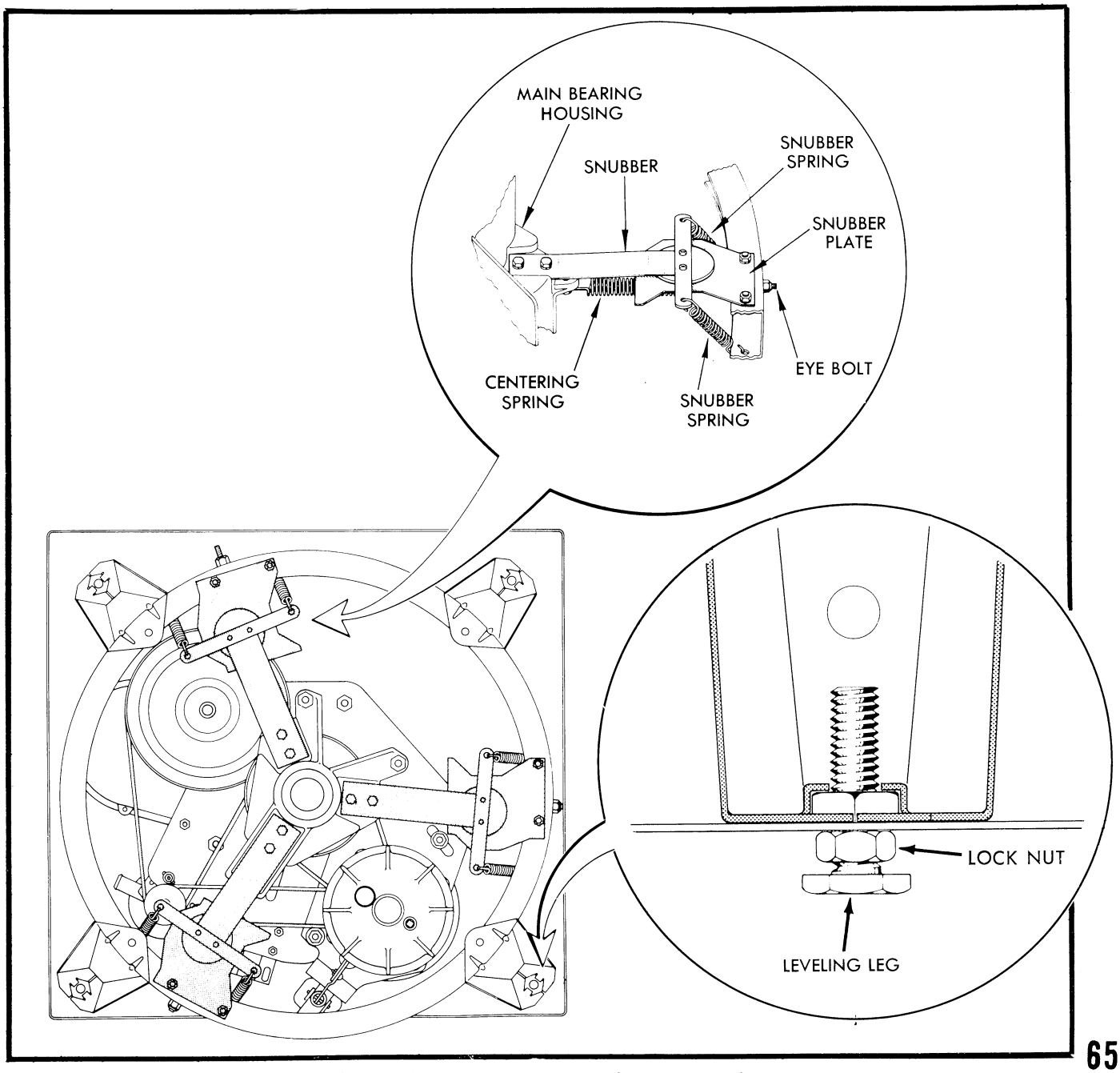


Figure 128 Snubbers and Components

**REASSEMBLY OF THE MAIN BEARING,
Late and Current Models**

Assembly sequence, *Figure 127:*

1. Drive the upper bearing into housing until it is even with the shoulder in the housing.
2. Grease the inside diameter of the seal and to the area above the upper bearing. The seal recess must be completely covered with grease.
3. Drive seal into recess, using a dowel that will rest on the outside diameter of the seal.
4. Inset spin tube through water seal and bearing in the housing.
5. Install water slinger.
6. Press the lower bearing into the recess of the bearing retainer and install retainer ring.
7. Install bearing retainer over the spin tube and install retainer ring. Sharp edge of the retainer ring must be away from bearing. The retainer must be secured to the housing with the three cap screws.
8. Clean brake discs and pad, then install into bearing housing. The tabs on the outside of the discs should align with the grooves in the housing.
9. Compress retainer ring, and install into the groove provided in bearing housing. The wire retainer ring should be positioned so the openings between the ends of the ring are not located directly over any of the brake disc tabs.

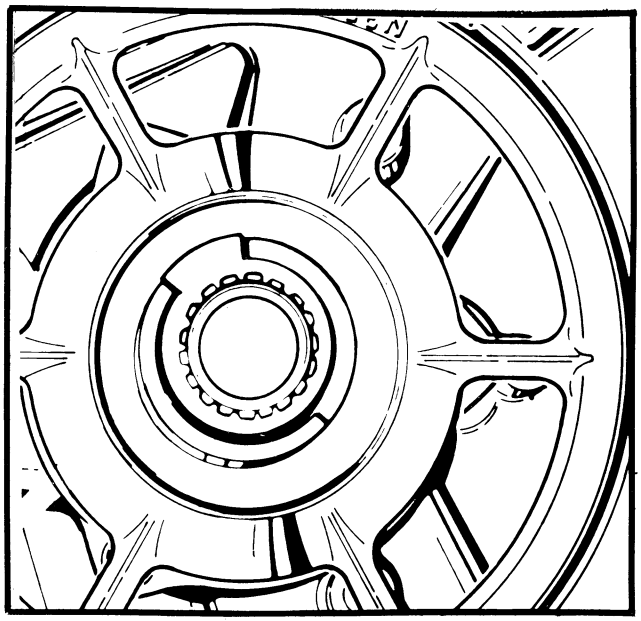


Figure 129

10. Install retainer ring on the spin tube so the sharp edges of the ring are toward the brake disc.
11. Clean all of the remaining parts with solvent and dry thoroughly. Grease the splines and the spin pulley hub, grease the threads inside the spin pulley. Thread the hub into the spin pulley until the top of the hub is at least ¼ of an inch below the top surface of the spin pulley.
12. Lubricate the needle bearing, align the splines on inside of the hub with the splines on the spin tube, and place on spin tube. Position in bearing housing. Rotate the spin pulley until the lower flat portion in front of raised half moon on pulley is even with the flat edge of the hub.
13. Refer to *Figure 129.* Looking down on the raised half moon on the spin pulley position stop tab. The tab should be next to the left side of raised half moon, turn stop away in a clockwise direction, one more spline.
14. Turn pulley in a clockwise direction until stop is dropped into position on the lower flat portion of the spin pulley. Looking down, with stop against the left side of the raised half moon, there should be at least .030 inch clearance but not more than .050 inch between pulley and the stop. If found to be over or under, realign, *Figure 130.*
15. Install brake spring into bottom of the spin pulley.
16. Place bearing in break spring retainer and place bearing race on top of the needle bearings. The smooth side of the race must be toward the needle bearing. If race or bearings show wear, they must be replaced.
17. Install spring retainer on spring, compress spring and lock with the retainer ring. Sharp edges of the retainer ring should be away from spring retainer. Make certain the retainer ring is in the groove provided before releasing the brake spring.

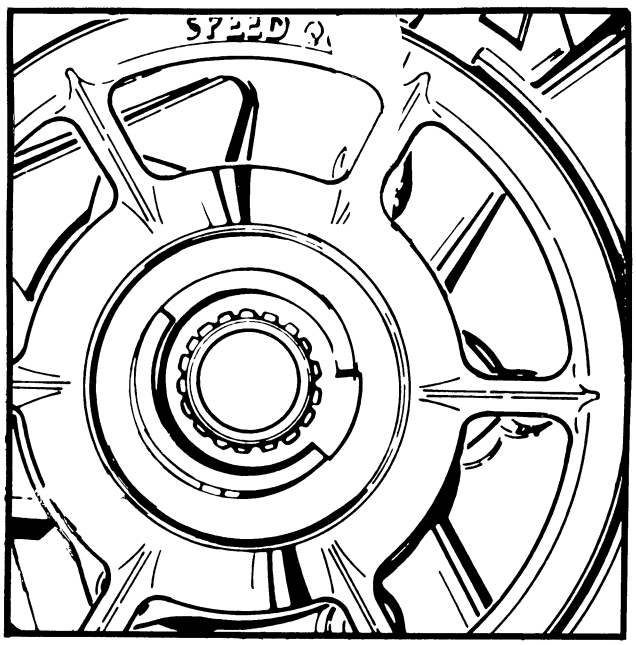


Figure 130

SHIFTER FORK ASSEMBLY, Removal and Replacement

Refer to *Figure 125.*

1. Remove the front panel.
2. Remove left side panel.
3. Remove belt from transmission.
4. Remove transmission pulley, see text, Transmission Pulley Removal.
5. Remove the cotter pin from the pivot pin, and remove pivot pin.
6. Lift shifter fork out of washer.

REPLACING SHIFTER FORK

Refer to *Figure 125.*

1. Place washer on pivot pin and insert the pin through one side of the spring and one side of the shifter fork as shown in *Figure 125A.*
2. Keep the right leg of spring up to put pressure against the pin so it does not slip out.
3. Install shifter fork into shift clutch. The transmission collar should be held flat while engaging the shift clutch.
4. Place shifter fork over mounting bracket and push pivot pin through the hole in the bracket and through the other side of the shifter fork, *Figure 125B.*
5. Lift left leg of spring, and press down onto mounting plate and push the pivot pin through the spring, *Figure 125C.*
6. Install washer and cotter pin on the pivot pin.
7. Reinstall the transmission pulley, and the left and front panels.

AGITATION SHAFT

There are two types of agitator shafts used in the Speed Queen Automatic Washer. The only difference between these two shafts is the bearing surface at the top of the shaft. Although these shafts may vary slightly in appearance, they are removed in the same manner. Loosen the two set screws in the thrust collar, *Figure 131,* and slide the thrust collar down. The agitator shaft can now be lifted out of the agitator post, *Figure 132.* A long $\frac{5}{64}$" Allen wrench shown in *Figure 133,* will facilitate loosening or tightening the set screws in the thrust collar. The reinstallation of the two agitator shafts is somewhat different.

On the early model washers the shaft is pushed through the new bearings and seal and held down tight against the agitator post. The thrust collar is then pushed up snug to the spin pulley, *Figure 131,* and the set screws are tightened. Excessive end play in the shaft can cause a knock and may allow clothes to lodge under the agitator.

When reinstalling the shaft used on the later model washers, *Figure 134,* be sure the stainless steel washer is in place. Use a .012 inch feeler gauge between the stainless steel washer and the bearing surface of the agitator post, *Figure 135.* While holding the shaft down against the feeler gauge, snug the thrust collar against the spin pulley and tighten the set screw in collar.

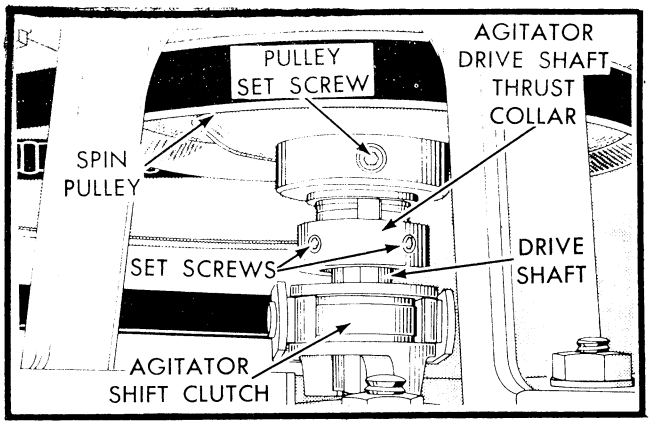


Figure 131

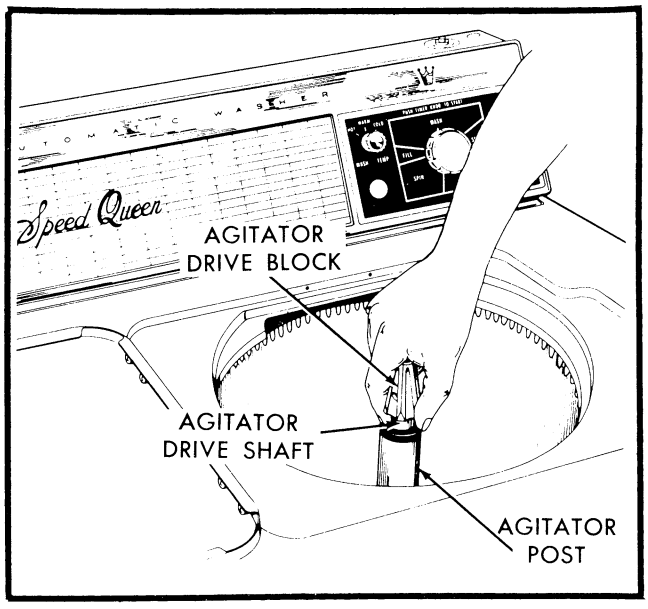


Figure 132—Removing Agitator Shaft

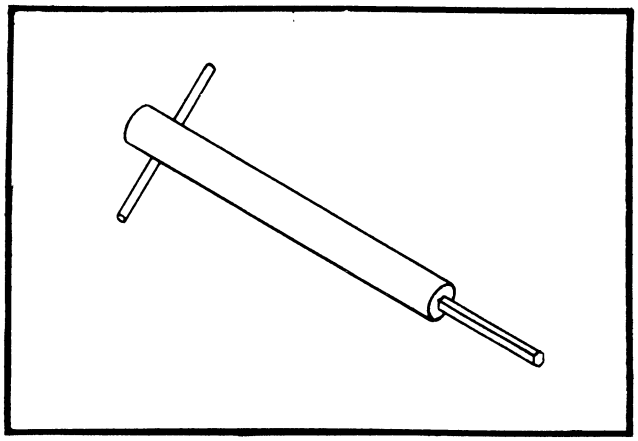


Figure 133—Special Allen Wrench

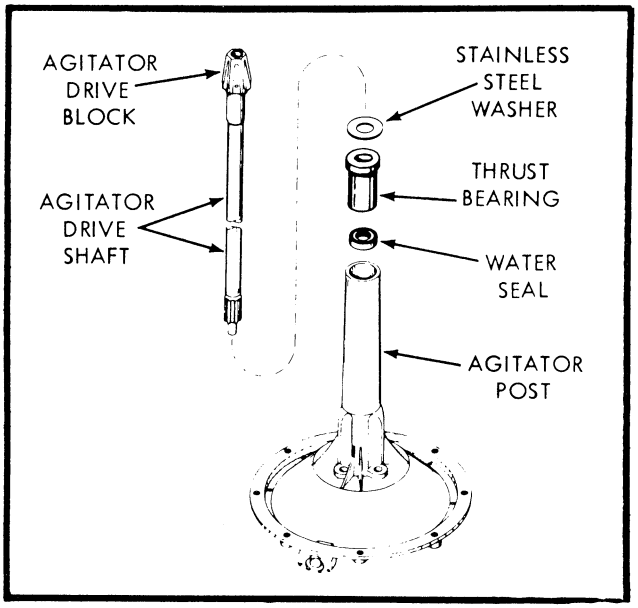


Figure 134—Late Style Center Assembly

CENTER POST AND SPIN TUB

The center post is constructed to serve a dual purpose; to hold the spin tub and to act as a bearing retainer for the agitator shaft. *Figures 134 and 137* show the early and later style center posts. To remove the bearing or seal from the post it is not necessary to remove the post from the machine, only the agitator shaft need be removed.

The spin tub does not need to be removed from the center post for normal service. It need only be removed when a defect exists in the center post other than the bearing or seal or a defect in the spin

CENTER POST REMOVAL

To remove the center post procede as follows:

1. Remove the four caps screws as illustrated in in *Figure 136.*
2. Loosen the set screws as shown in *Figure 136,* refer to text on page 65, AGITATOR SHAFT, and page 67.
3. Lift the spin tube assembly out of tub.
4. If spin tube is stuck to the center post, thread the cap screws back about half way.

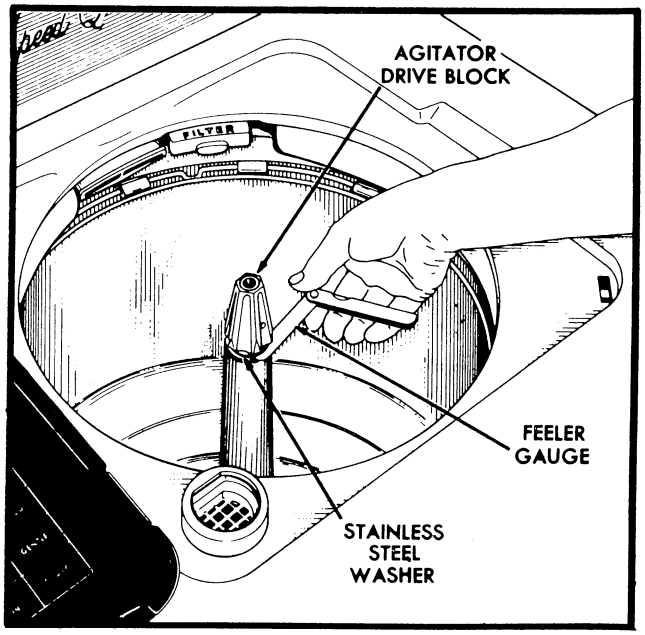


Figure 135

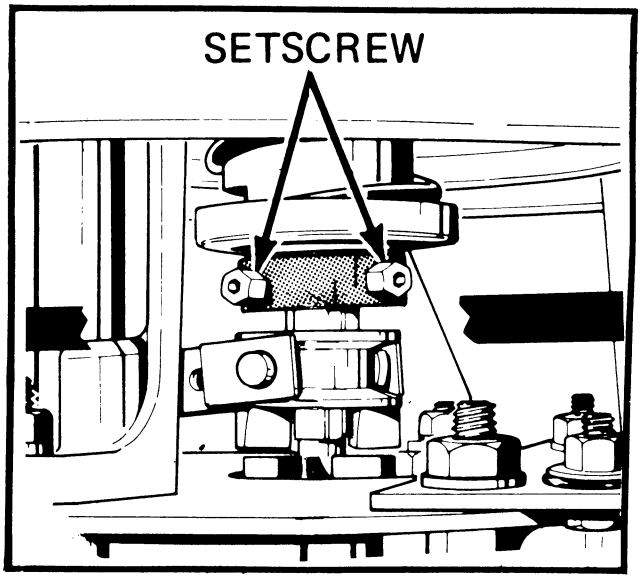


Figure 136

5. Pull up on the spin tube while gently tapping the cap screws with a mallet. Spin tube should pull free.
6. Clean lint accumulation and collected sediment around top tub after removal.

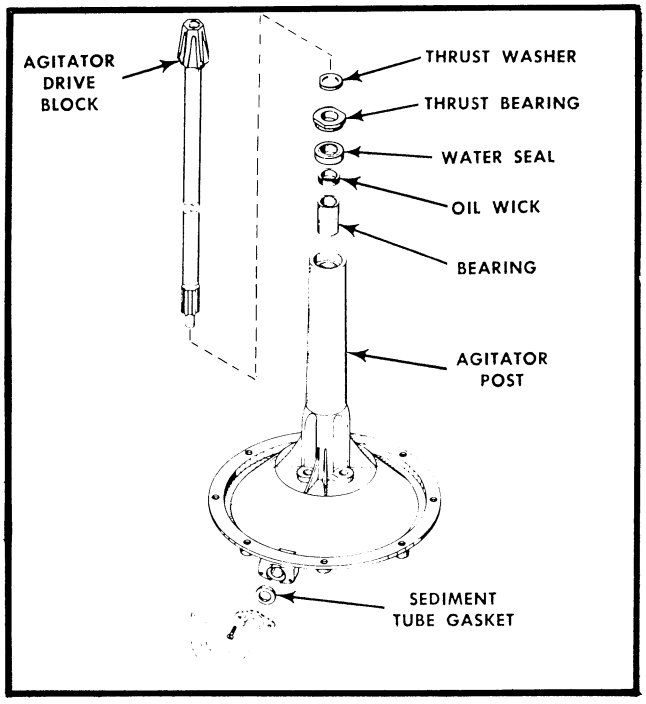


Figure 137—Early Style Center Assembly

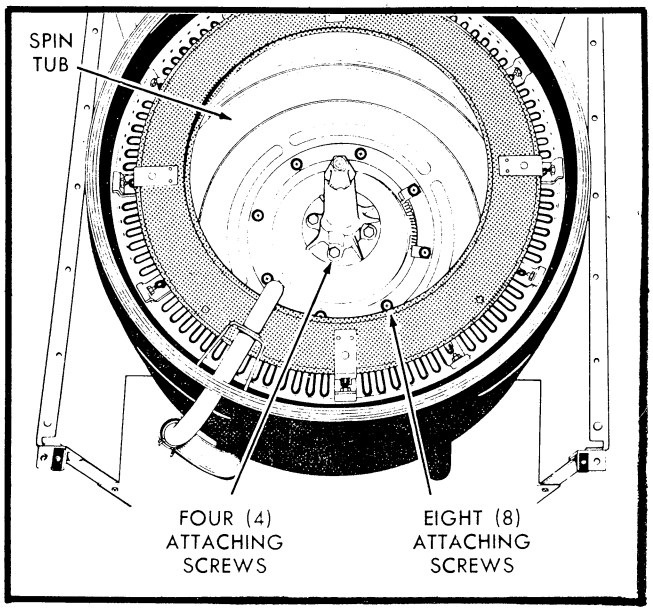


Figure 138—Tub Mounting Detail

The following explanation tells what happens during the wash and the spin cycles to the spin tub assembly and center post. In the wash period, while the agitator shaft is being driven by the transmission, the spin tub remains stationary since the agitator shaft is free to oscillate in the bearings of the spin tub and center post. If a bind exists between the bearing and the agitator shaft, the spin tub will move with each stroke of the agitator.

When the agitation clutch is disengaged and power is supplied to the spin pulley by the fluid drive belt, the spin tub starts to rotate, causing the water in the spin tub to be forced against the inside walls of the tub. Since the sand and sediment is heavier than water, it settles into the bottom groove of the agitator post during the wash period. As the speed of the spin tub increases, the water and the sediment both seek an exit. Since there is a tub rim on the spin tub to retain the water, it is forced up against the tub rim and is spun outward through the top openings of the spin tub and into the collector tub. The sediment trapped in the groove of the center post is forced into the opening of the sediment tube and up the tube to be deposited with the water in the collector tub, where both the sediment and water is removed by the pump to the drain.

AGITATOR SHAFT

Figure 136 illustrates the agitator thrust collar set screws. Early model can be seen in *Figure 131.* The agitator shaft can be removed by loosening the two screws and pulling the shaft up through the top of the washer. The new shifter fork can also be seen in *Figure 136,* as it engages the agitator shift clutch. The other end of the shifter fork engages the underside of the transmission pulley. See text "OPERATION OF THE TRANSMISSION DRIVE PULLEY."

TUB BOOT

The spin tub must be removed to inspect or replace the tub boot seal. When installing a new boot, do not stretch it taut. Allow the boot to resume its natural shape before securing the boot clamps, *Figure 139.*

SPIN ASSEMBLY

When removing the spin assembly, it is necessary to remove the spin tub assembly, the boot and the collector tub. The spin assembly is secured to the main mounting plate by three attaching screws, *Figure 140.* These screws, as well as the snubber arms and centering springs attached to the main bearing housing, *Figure 141,* must be removed before attempting to remove the spin assembly. Run the belt off the spin pulley and lift the spin assembly free of the machine.

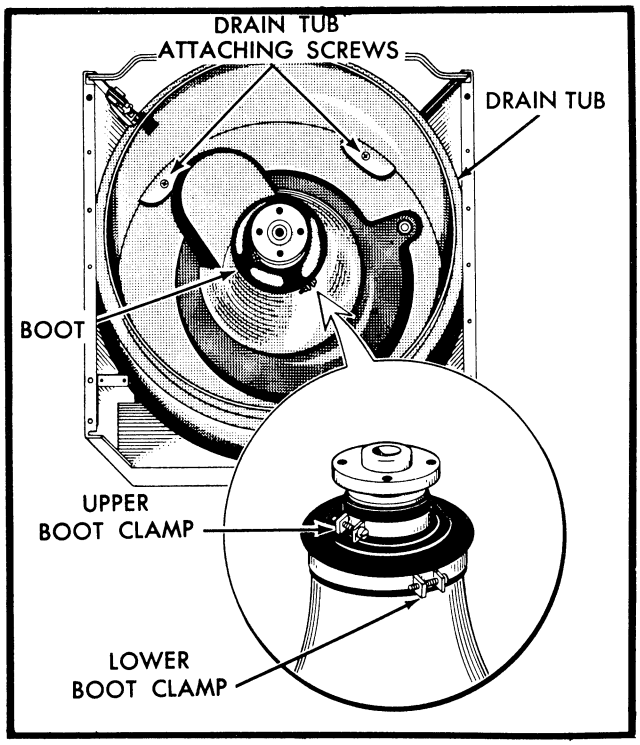


Figure 139—Tub Boot Mounting

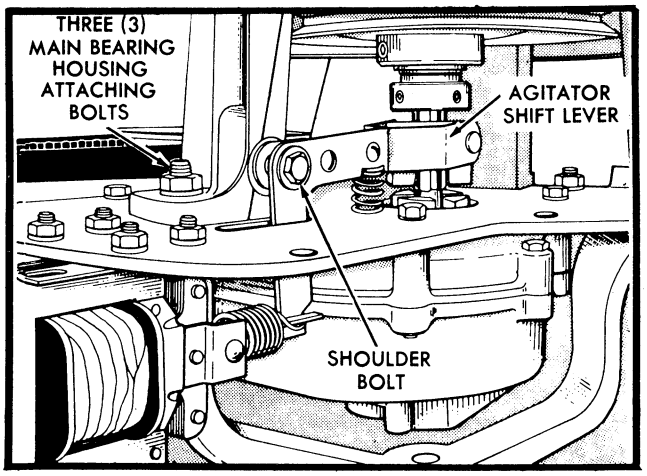


Figure 140

Figures 142 and 143 show a parts breakdown of both the early and later types of spin assemblies. Usually a spin assembly will give many years of trouble free service. Its main service problem is generally found to be a water leak causing the bearings to bind or to be noisy.

When disassembling a spin assembly, remove the lock ring from below the spin pulley allowing the spin pulley to be removed from the spin tube. There is a key that fits the key way of the spin tube that must be removed before the spin tube can be slid out of the spin housing. Remove the bottom bearing retainer to replace the bottom bearing of the spin housing. The top bearing of the spin assembly is removed by reaching through the bottom main bearing housing with a wood dowel and driving the top bearing free of the housing, *Figure 144.*

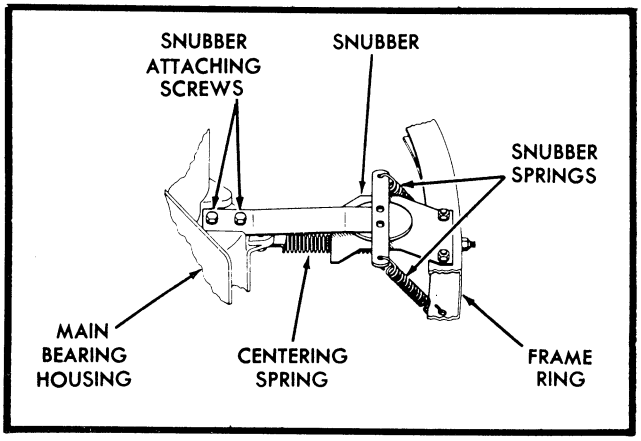


Figure 141

63

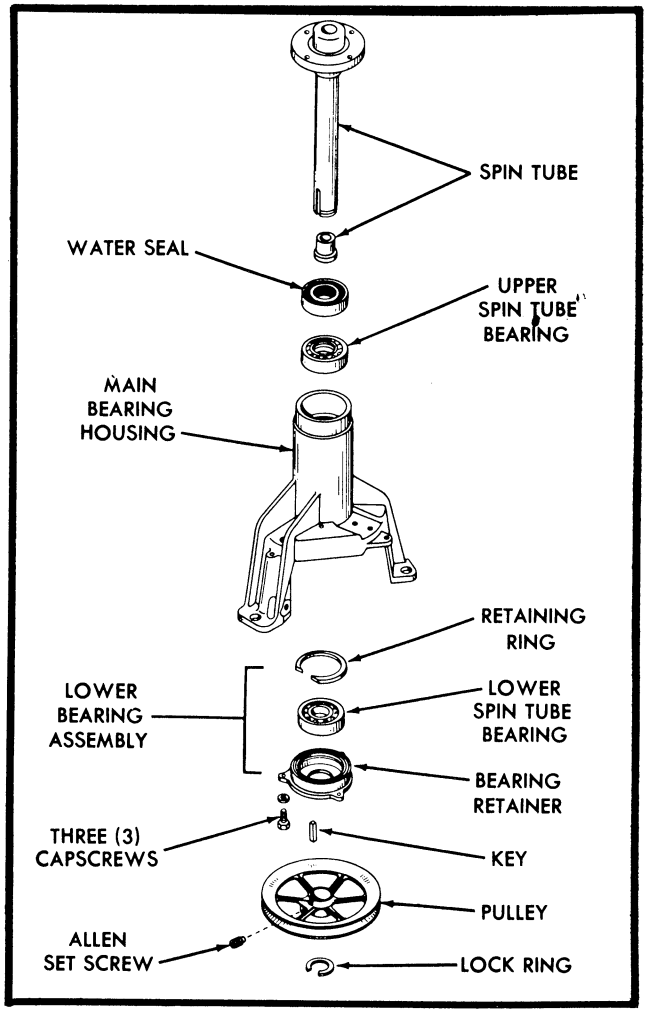


Figure 142—Early Style Spin Assembly

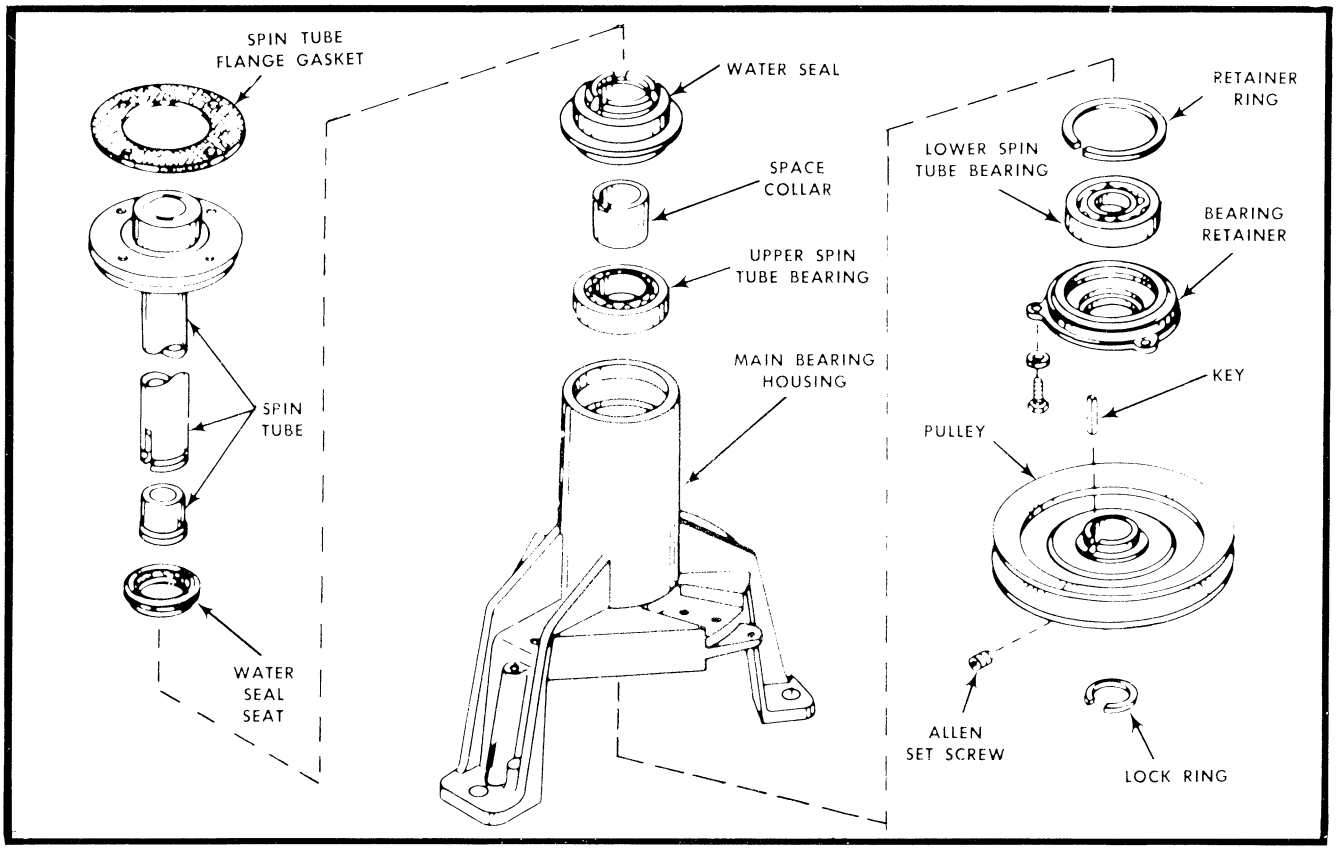


Figure 143—Late Style Spin Assembly

SUSPENSION SYSTEM

Like many other components of the Speed Queen Washer, due to redesign over the years, the suspension system can be called early style and late style. The early model suspension system, *Figure 145*, uses double snubber pad arrangement that grips both sides of a snubber plate which is secured to the frame ring of the base assembly. These snubber arms are attached with two bolts to the main spin assembly. The function of the suspension system is to maintain a friction on the snubber plates, thus helping to maintain proper balance of the spin basket and decreasing the vibration in the spin cycle. The snubber pads and snubber plate should be clean and free of grease.

Before moving the adjusting nut of the eye bolt, count or measure the threads extending through the adjusting nut. Now, note this information on the ring frame along side the adjusting nut. This is to help facilitate reinstalling the centering springs with the correct tension. The snubbers are adjusted to the snubber plate using a scale to pull the snubber plate, *Figure 146.* A scale reading of 7 pounds will be noted as the snubber plate starts to move between the snubber pads. The correct tension is arrived at by adjusting the snubber tension adjusting bolt, *Figure 145.* When adjusting the nuts of the eye bolt controlling the centering spring, the rear, front and right side panels are removed.

The late model Speed Queen suspension system, *Figure 147,* now uses only one snubber that has a preset tension applied to the snubber plate. This tension is held on the snubber plate by the use of two

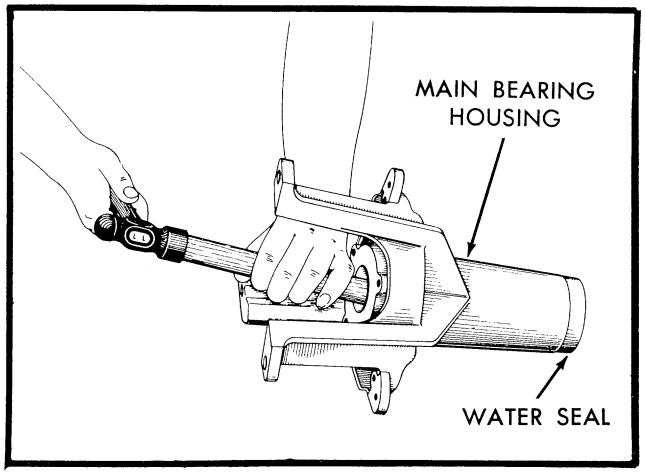


Figure 144—Removing Top Spin Bearing

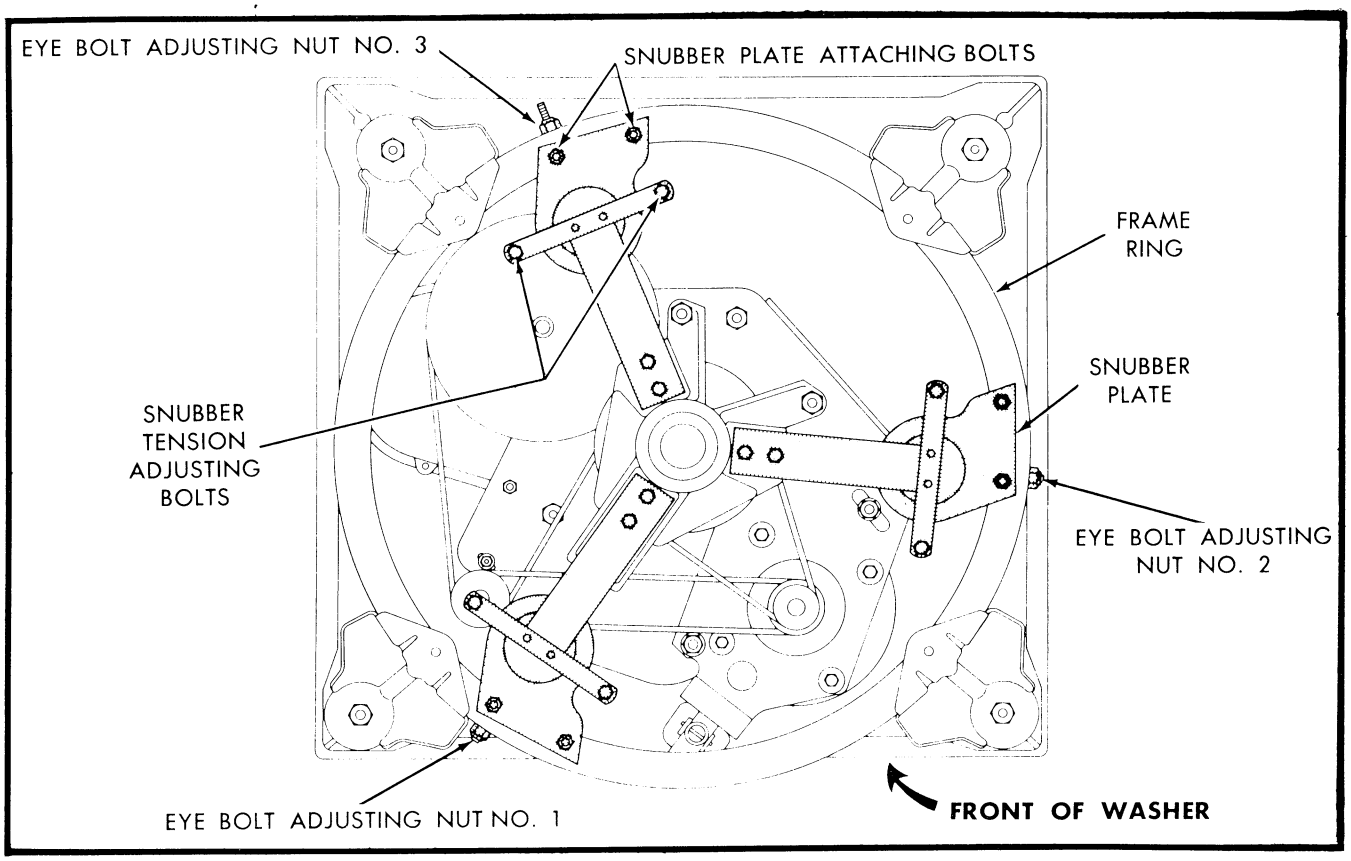


Figure 145—Suspension Components

springs connected to the frame ring and the snubber arm. The method of centering the spin assembly is still done by the adjusting nuts of the eye bolt controlling the centering springs. The approximate measurement of the thread extending through the adjusting nut of the eye bolt is: Bolt No. 1, ¼"; Bolt No. 2, ⅜". Now adjust Bolt No. 3 to center the spin tub.

BELTS

There are three belts used on the Speed Queen Automatic Washers. *Figure 148* shows the location of these belts and the components being driven by the belts. The location of the adjusting bolts are also shown. To remove or adjust the belts, remove or raise the front panel of the cabinet.

PUMP BELT

To change the pump belt, the main motor and fluid drive assembly should be removed. Refer to Motor Removal in this manual. Then the cam bolt, lock nut, and lock washer are removed from the fluid drive shifter arm. The fluid drive and shifter assembly is then lifted from the motor shaft by disconnecting the engaging spring from the shifter arm.

After the belt is replaced on the motor and fluid drive assembly, but before the motor and drive assembly is reinstalled into the machine, be sure to check the adjustment of the fluid drive shifter arm. This has been explained previously in this manual. Reinstall the motor and clutch assembly and adjust the pump and spin belts. The pump belt is adjusted by loosening the pump adjusting bolt, *Figure 148,* and pivoting the pump to get the correct tension, then tighten the adjusting bolt. The correct belt tension is made when the belt can be twisted one quarter of a turn, midway between the pulleys without too much pressure being applied.

SPIN BELT

To remove or replace the spin belt, it is not necessary to remove the motor and clutch assembly. Just run the belt off the spin pulley, loosen the two set screws in the agitator shaft thrust collar, and raise the agitator shaft enough to allow the belt to clear the bottom of the agitator shaft. Now lift the belt over the top of the fluid drive and the belt is removed. Reverse this procedure to reinstall the new belt. After completing the installation of the belt, adjust the belts for proper tension. To adjust the spin belt, loosen the motor pivot

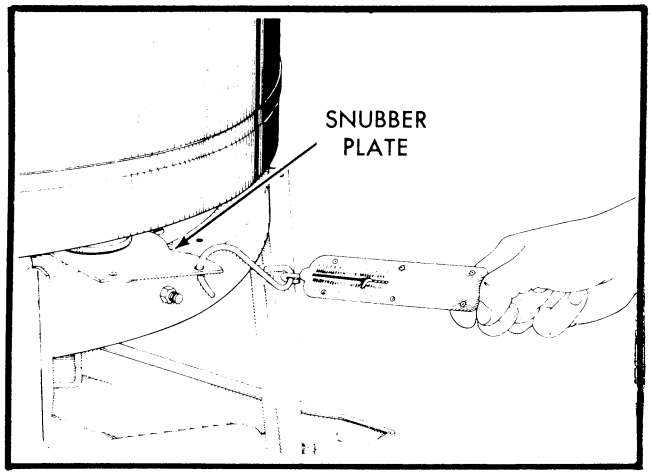


Figure 146

bolt, and the motor adjusting bolts, number 1 and 2, *Figure 148.* Shift the motor to obtain the proper tension of belt. Also check the pump belt tension.

TRANSMISSION BELT

To replace the transmission belt, first loosen the transmission and the pump belt adjusting bolts, *Figure 148.* Then remove the belts from the pump and the transmission pulley. Place the new belt into the groove of the transmission pulley and the bottom groove of the pump pulley. Replace the pump drive belt and adjust the belts for proper tension by shifting the pump and securing the adjusting bolts.

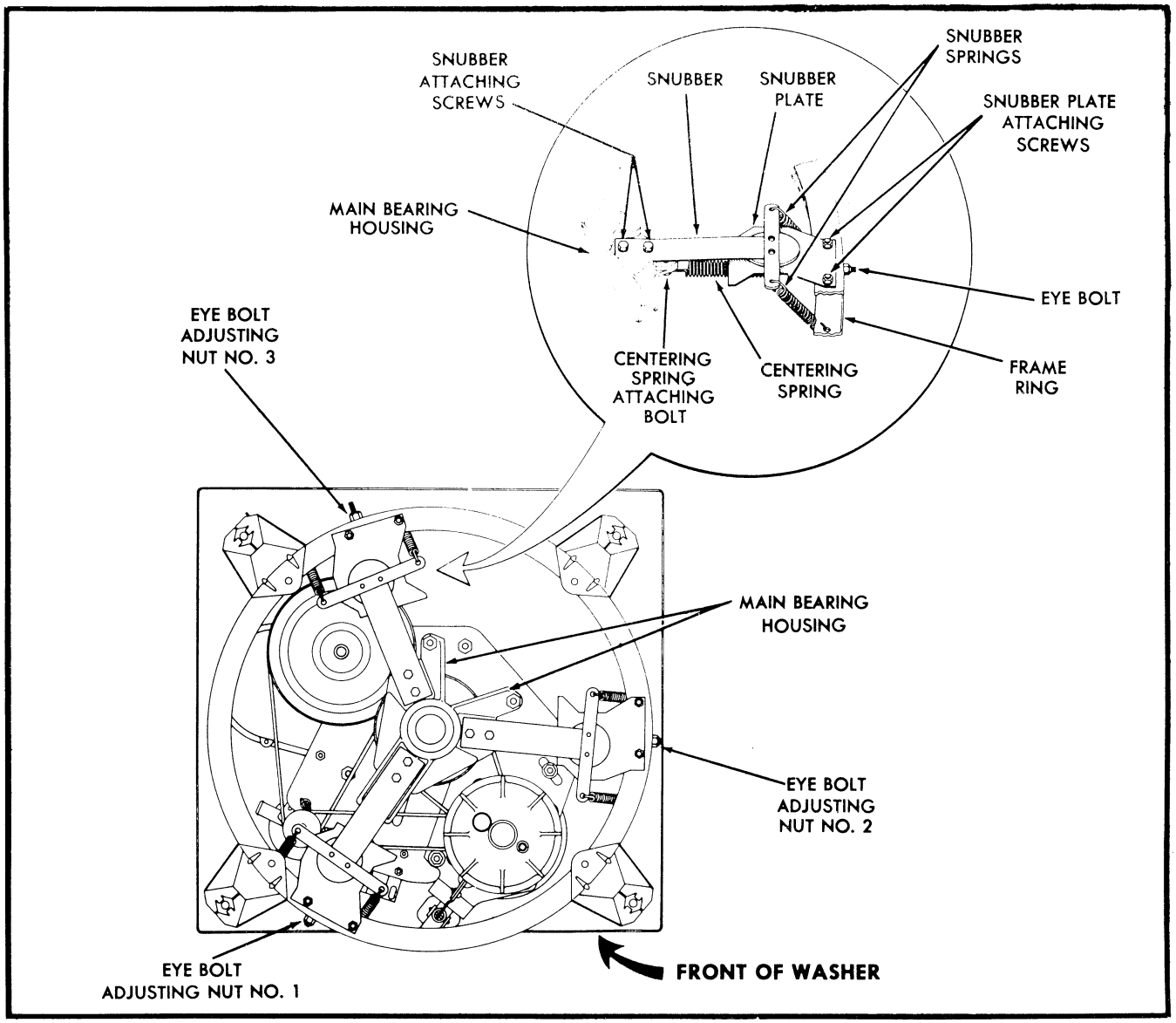


Figure 147—Late Style Suspension System

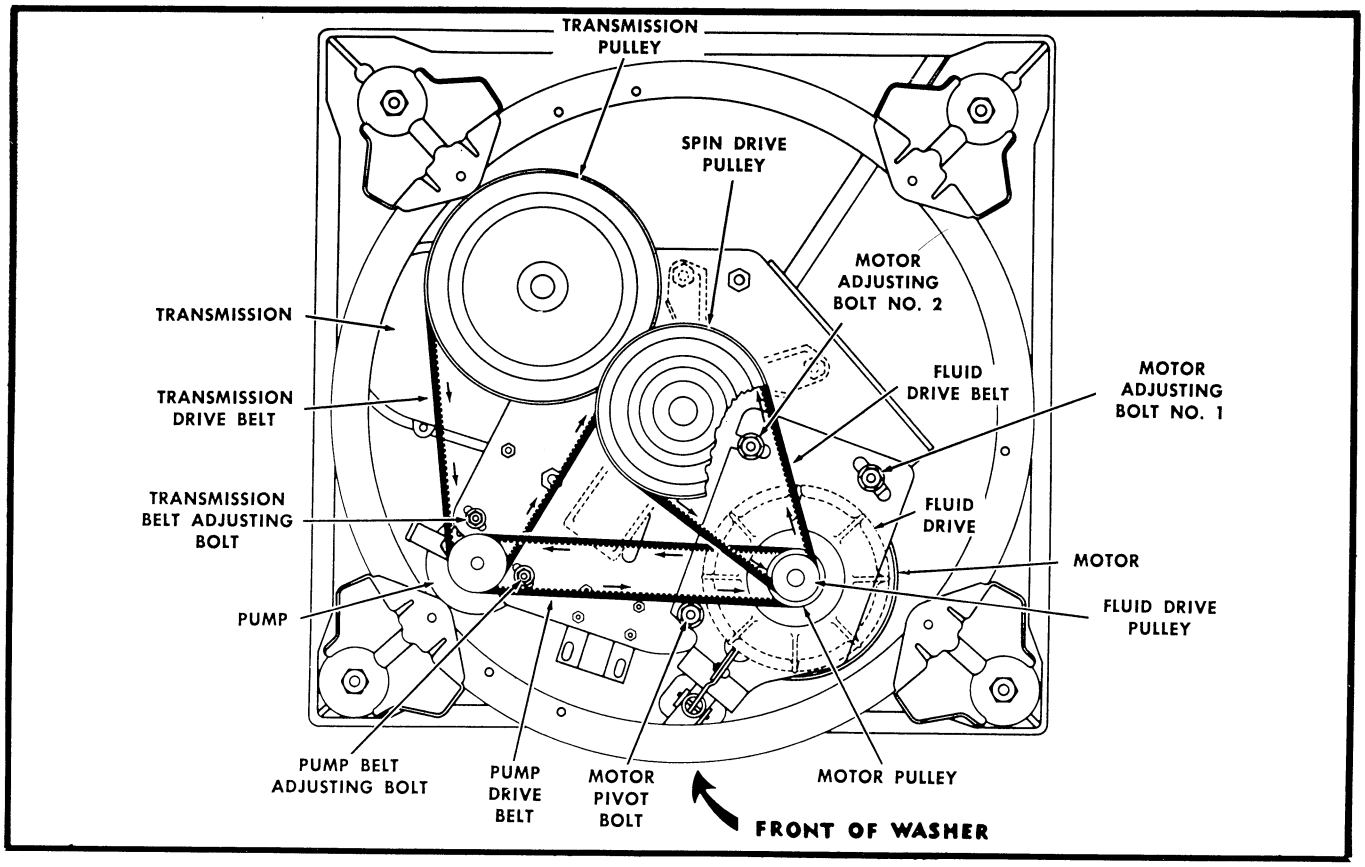
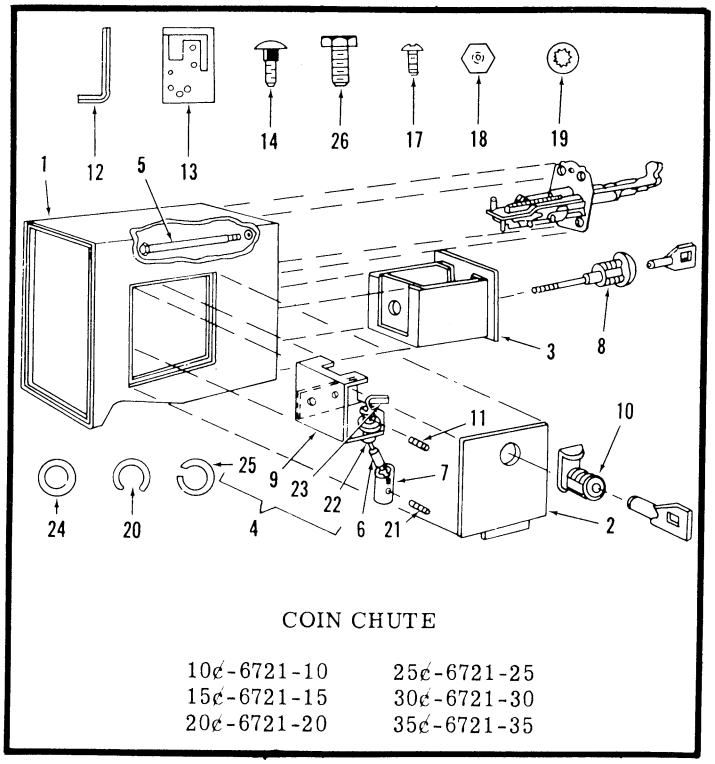


Figure 148 — Belts and Adjusting Bolts



COIN CHUTE

10¢-6721-10	25¢-6721-25
15¢-6721-15	30¢-6721-30
20¢-6721-20	35¢-6721-35

Figure 149 — Coin Meter Components

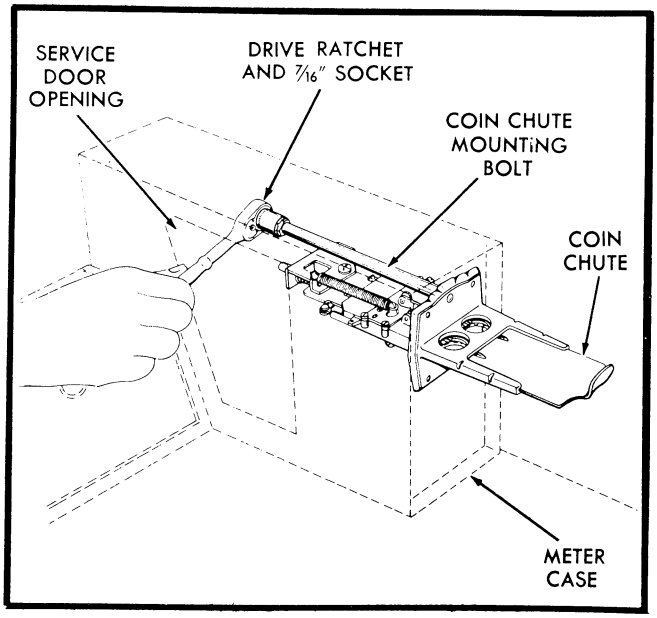


Figure 150—Removing Coin Chute

COIN METERS

The coin meters used on the Speed Queen commercial laundry equipment are usually a Greenwald series. Although there are several different meter cases used, the operation of the coin chute, against a clutch assembly mounted and adjusted to the timer, is pretty much the same. When the timer is allowed to go into the off position, a set of contacts in the timer is opened. These contacts are again closed by depositing a coin or coins in the receiver of the coin chute, and pushing the slide into its limit of travel. Then pull the chute out to the normal position. At this time, the pilot lamp should light, and the water should start to enter the machine. Provisions have been made in the clutch assembly for adjustment. This requires a bristol wrench or six point spline wrench to loosen and retighten a set screw in clutch assembly.

Figure 149 shows a parts breakdown of a typical coin meter. To remove the coin chute, reach through service door opening, *Figure 150,* and remove the coin chute mounting bolt.

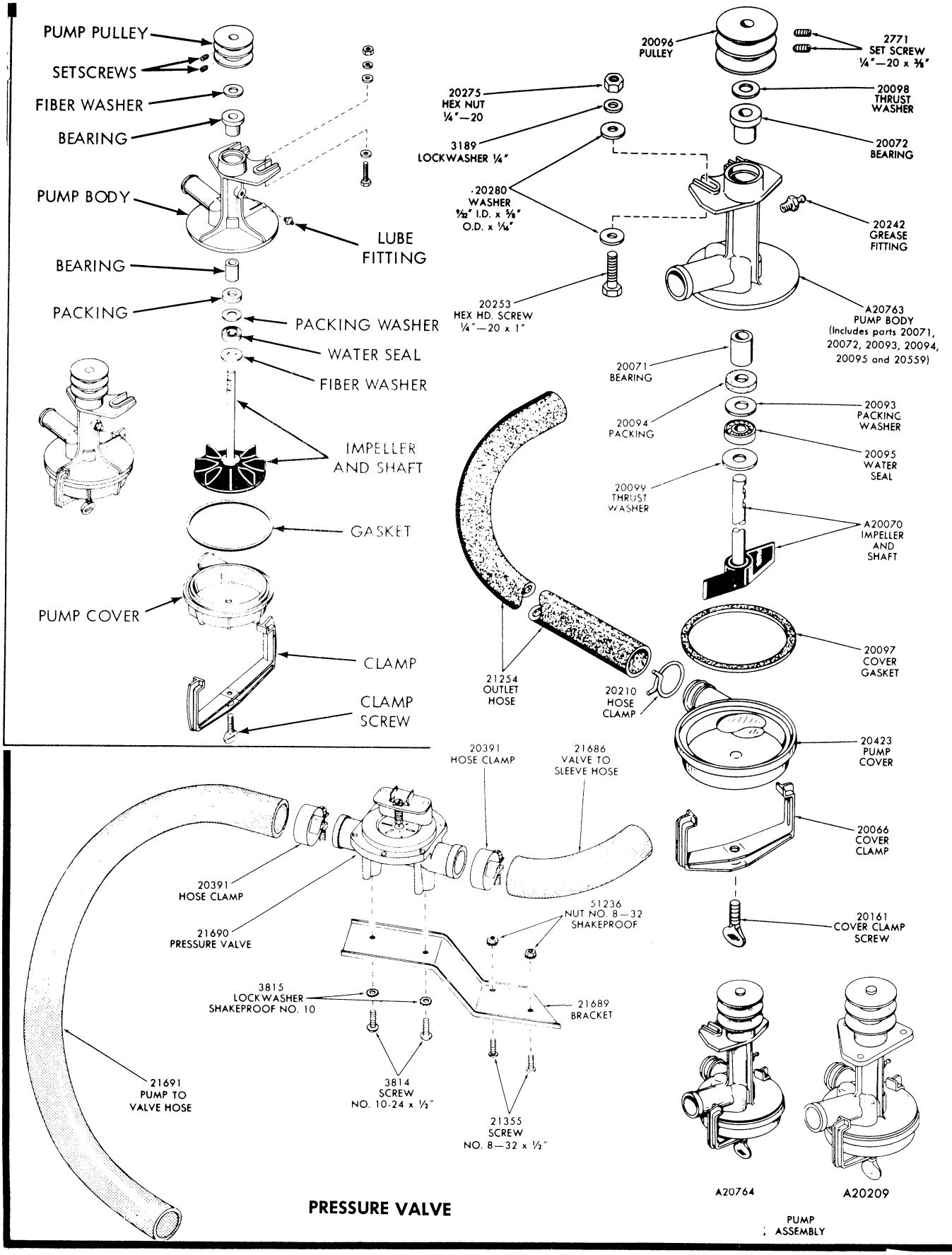
SECTION 3

PARTS LISTS

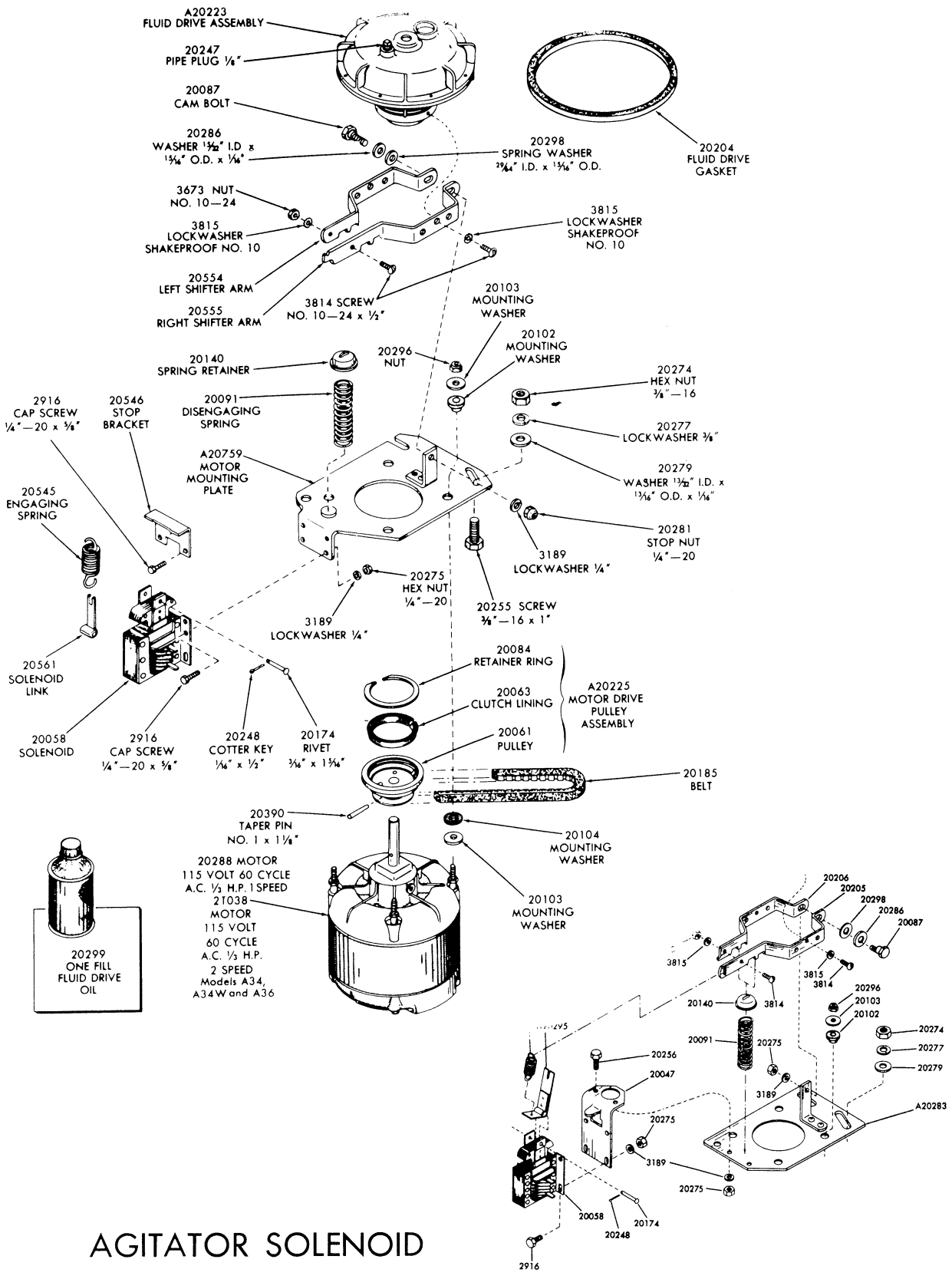
The following parts lists are representative of the majority of the more popular parts used in servicing Speed Queen Automatic Washers. Mainly they are shown as an aid in assembly sequence and to show the nomenclature of the various parts.

When ordering parts, always give the full model and serial number of the washer. These numbers are found on a metal identification plate on the front of the machine.

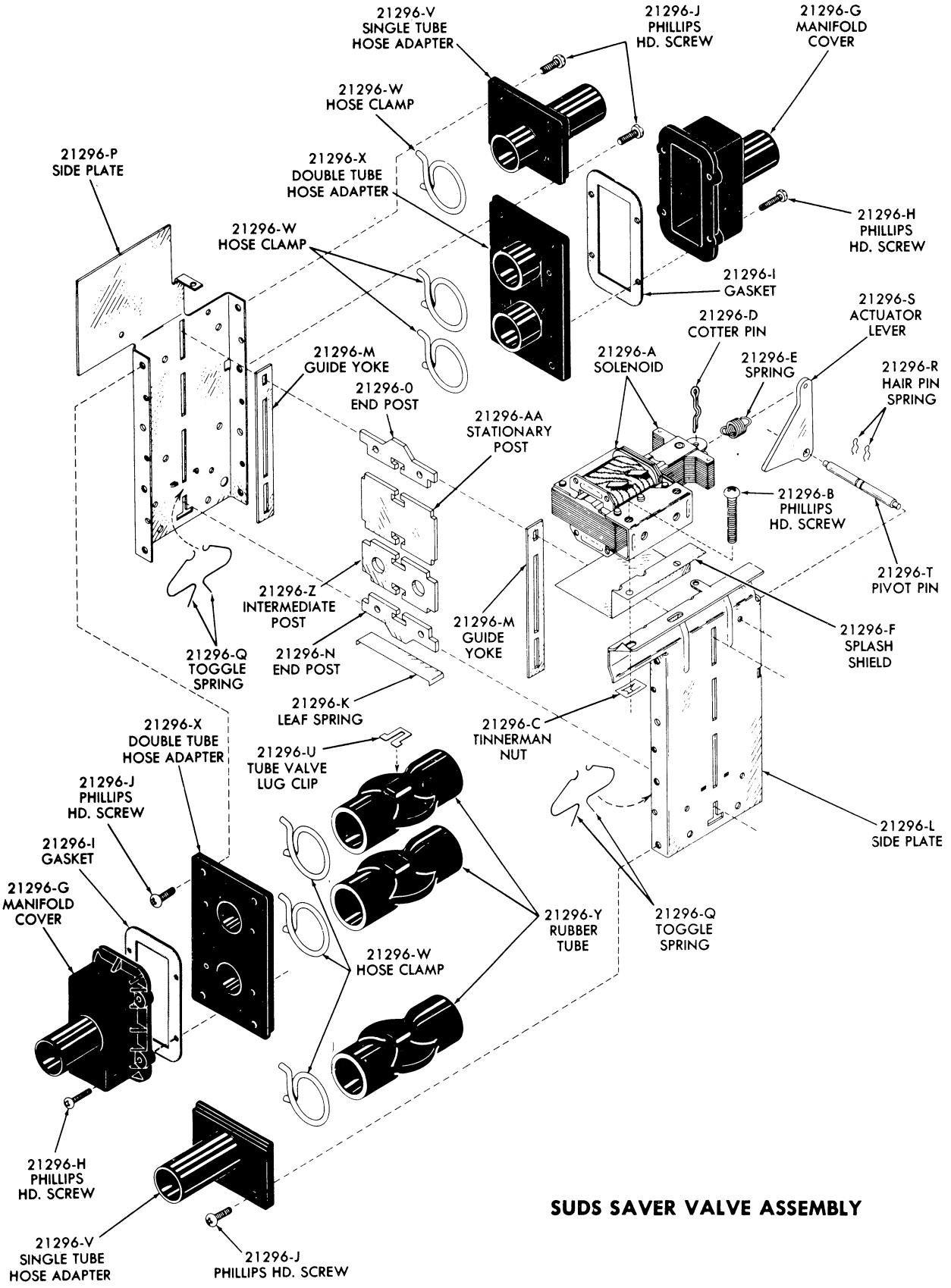
PUMP


PUMP PULLEY
SETSCREWS
FIBER WASHER
BEARING
PUMP BODY
LUBE FITTING
BEARING
PACKING
PACKING WASHER
WATER SEAL
FIBER WASHER
IMPELLER AND SHAFT
GASKET
PUMP COVER
CLAMP
CLAMP SCREW
20096 PULLEY
2771 SET SCREW ¼"—20 x ⅜"
20275 HEX NUT ¼"—20
20098 THRUST WASHER
3189 LOCKWASHER ¼"
20072 BEARING
20280 WASHER ½" I.D. x ⅝" O.D. x ⅛"
20242 GREASE FITTING
20253 HEX HD. SCREW ¼"—20 x 1"
A20763 PUMP BODY (Includes parts 20071, 20072, 20093, 20094, 20095 and 20559)
20071 BEARING
20094 PACKING
20093 PACKING WASHER
20095 WATER SEAL
20099 THRUST WASHER
A20070 IMPELLER AND SHAFT
20097 COVER GASKET
21254 OUTLET HOSE
20210 HOSE CLAMP
20423 PUMP COVER
20066 COVER CLAMP
20161 COVER CLAMP SCREW
20391 HOSE CLAMP
21686 VALVE TO SLEEVE HOSE
20391 HOSE CLAMP
21690 PRESSURE VALVE
51236 NUT NO. 8—32 SHAKEPROOF
3815 LOCKWASHER SHAKEPROOF NO. 10
21689 BRACKET
21691 PUMP TO VALVE HOSE
3814 SCREW NO. 10-24 x ½"
21355 SCREW NO. 8—32 x ½"
A20764
A20209
PRESSURE VALVE
PUMP ASSEMBLY

MOTOR AND FLUID DRIVE

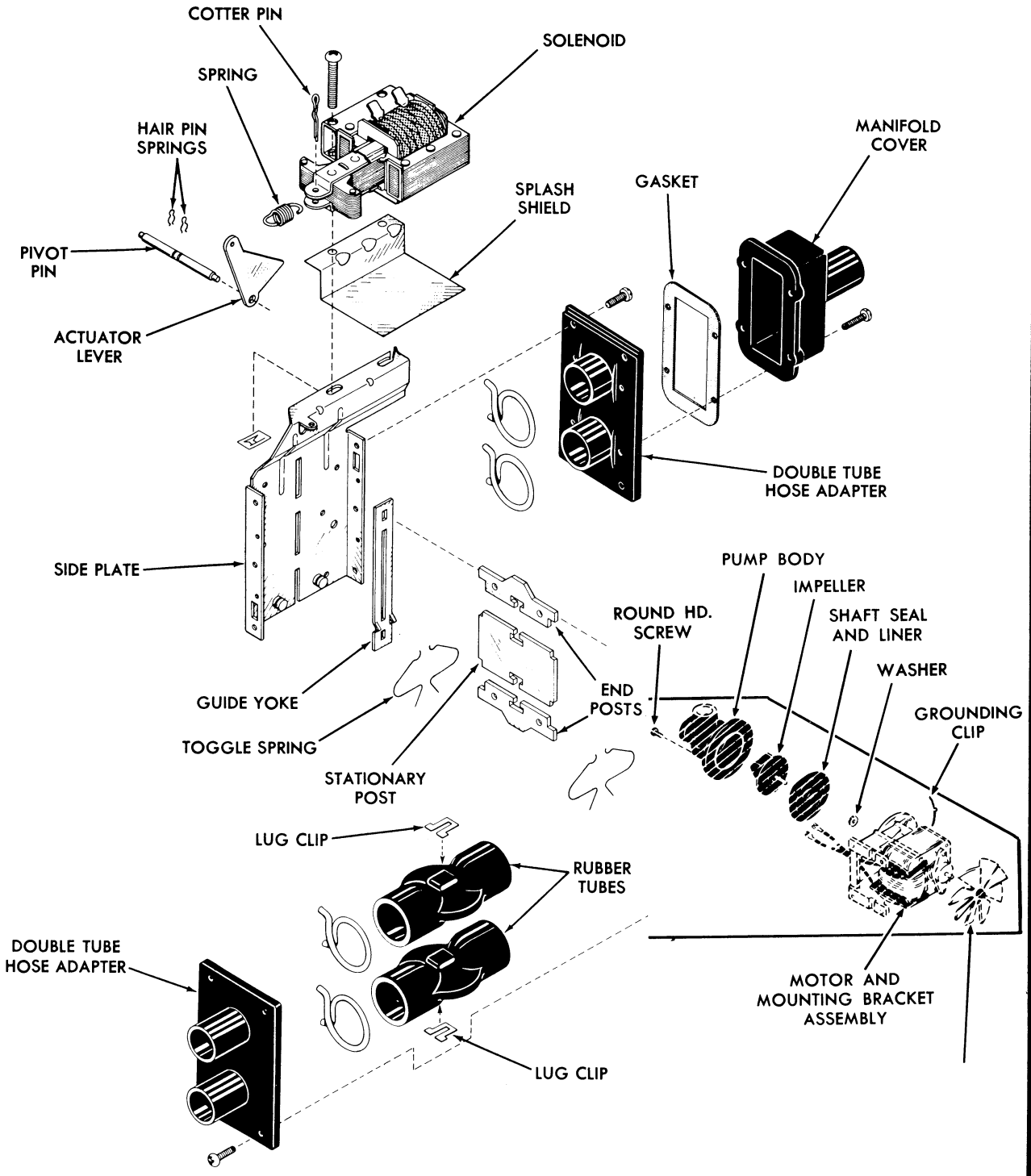


AGITATOR SOLENOID



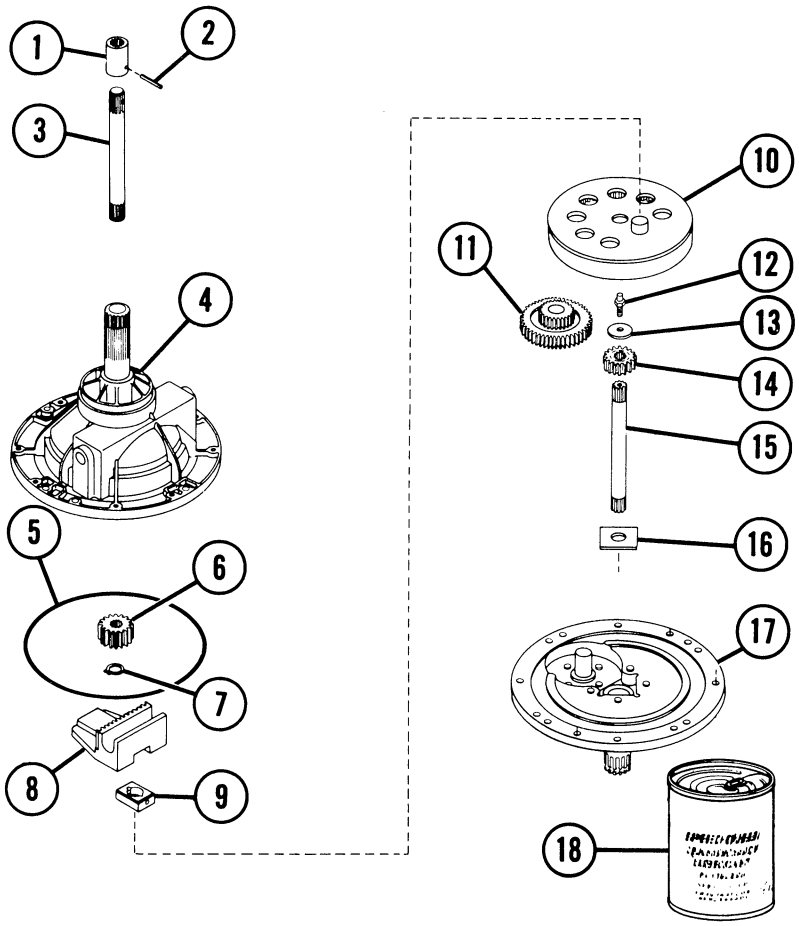
SUDS SAVER VALVE ASSEMBLY

RECIRCULATING VALVE



TRANSMISSION

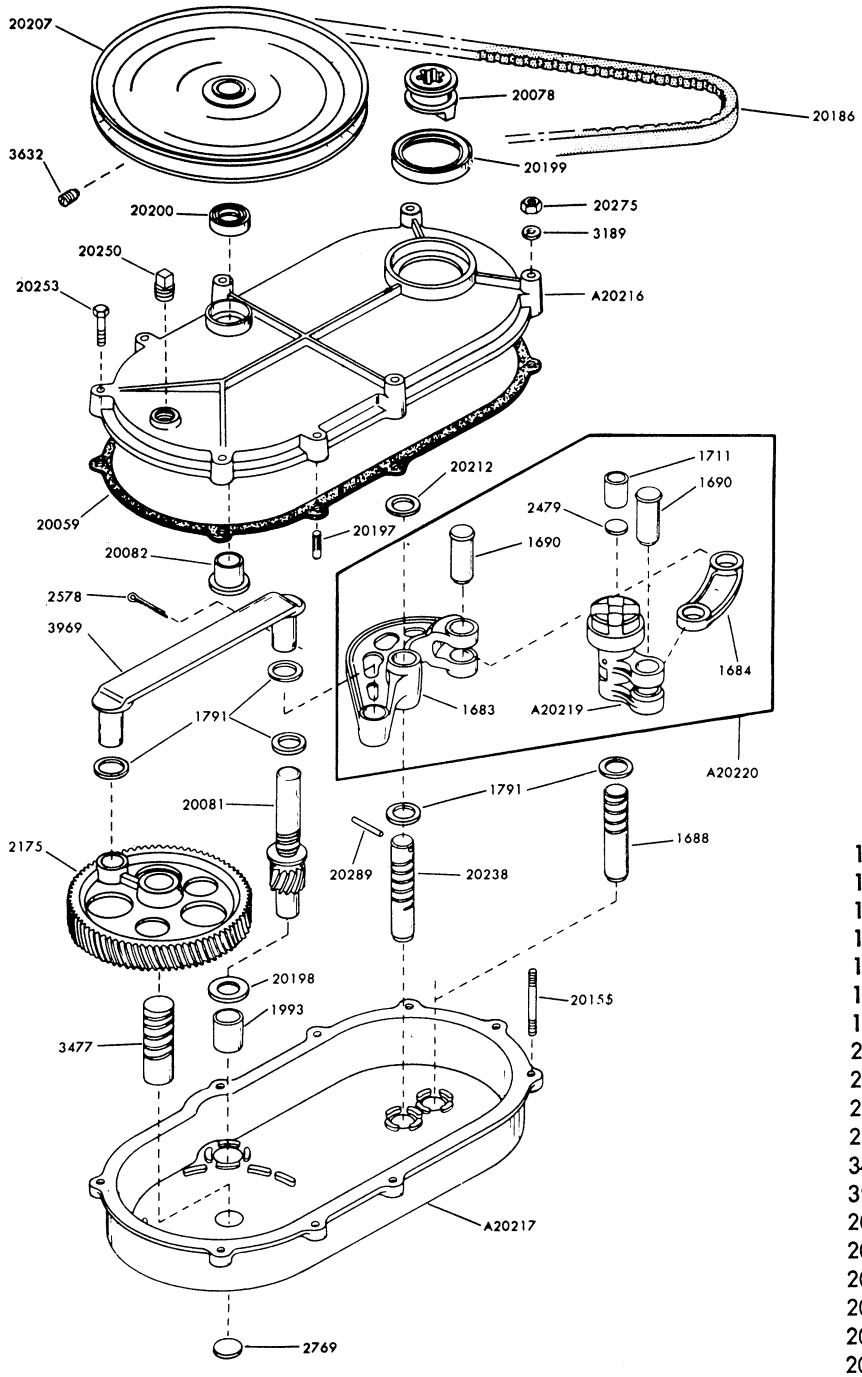
LATE AND CURRENT



Number	Part Number	Description
1	27079	Coupler
2	27609	Roll Pin
3	27083	Shaft
4	27191	Transmission Case
5	27028	"O" Ring
6	27003	Agitator Pinion
7	27197	Retainer Ring
8	27001	Rack
9	26493	Slide
10	26577	Internal Gear
11	27002	Reduction Gear
12	27030	Special Screw
13	26509	Washer
14	27004	Drive Pinion
15	27081	Shaft
16	27016	Washer
17	27192	Transmission Cover
18	27243	Transmission Lube

Part No. 27817R1

TRANSMISSION

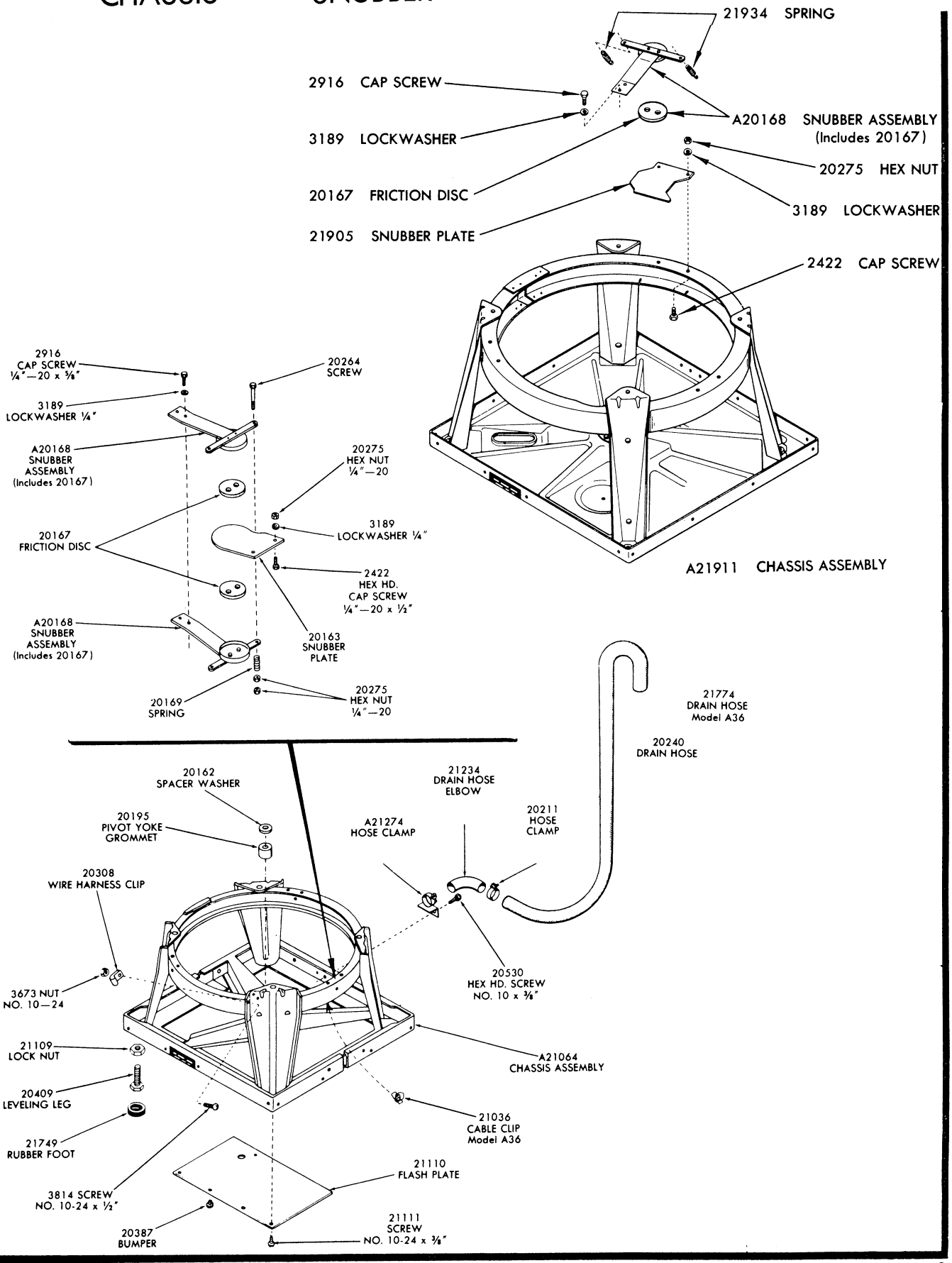


ASSEMBLIES

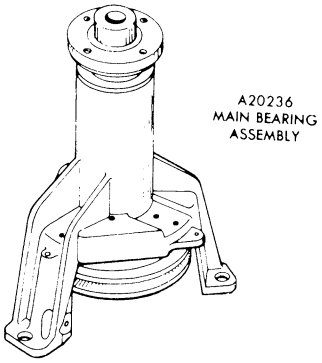
A20216	Transmission cover assembly (Includes parts 20082, 20197, 20199 and 20200)
A20217	Transmission case (Includes parts 1688, 1993, 2769, 3477, 20155 and 20238)
A20218	Transmission assembly (Includes assembly A20216)
A20219	Drive clutch (Includes parts 1711 and 2479)
A20220	Arc-cuate link assembly (Includes parts A20219, 1683, 1684 and 1690)

1683	Rocker arm
1684	Link
1688	Stub shaft
1690	Link pin
1711	Bearing
1791	Thrust washer
1993	Bearing
2175	Crank gear
2479	Expansion plug
2578	Cotter key
2769	Expansion plug
3477	Stub shaft
3969	Connecting rod
20059	Gasket
20078	Shift clutch
20081	Pinion
20082	Pinion bearing
20155	Mounting stud
20186	Belt
20197	Dowel pin
20198	Washer
20199	Clutch seal
20200	Pinion seal
20207	Transmission pulley
20238	Stub shaft
20289	Hold down pin

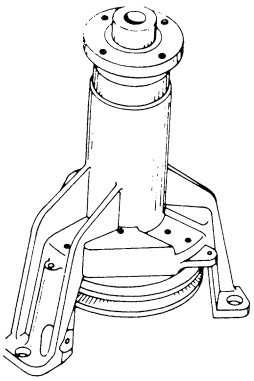
CHASSIS SNUBBER



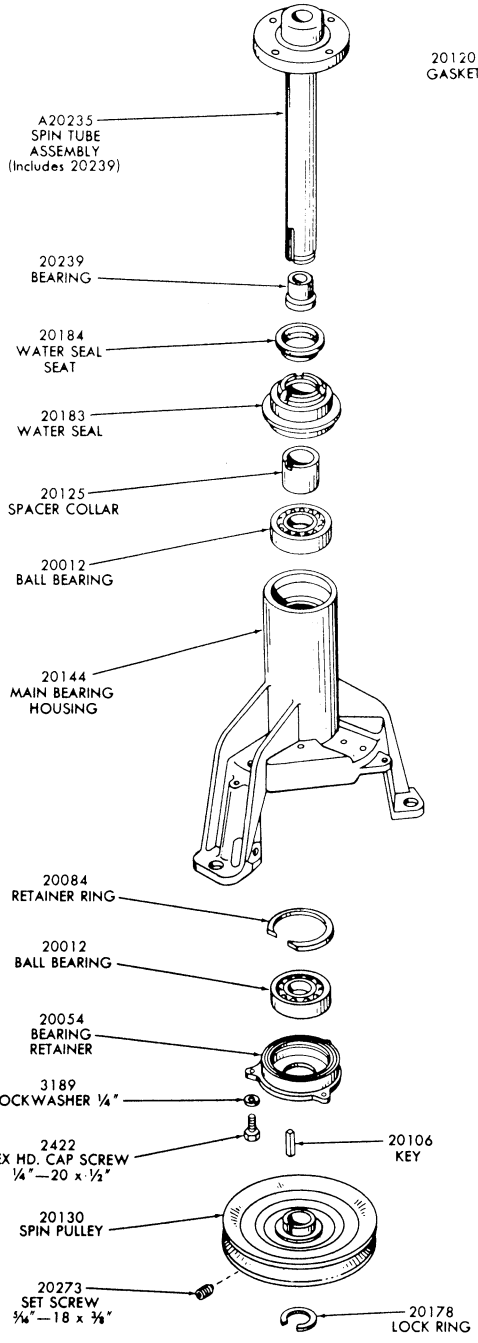
MAIN BEARING

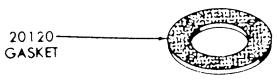


A20236
MAIN BEARING
ASSEMBLY

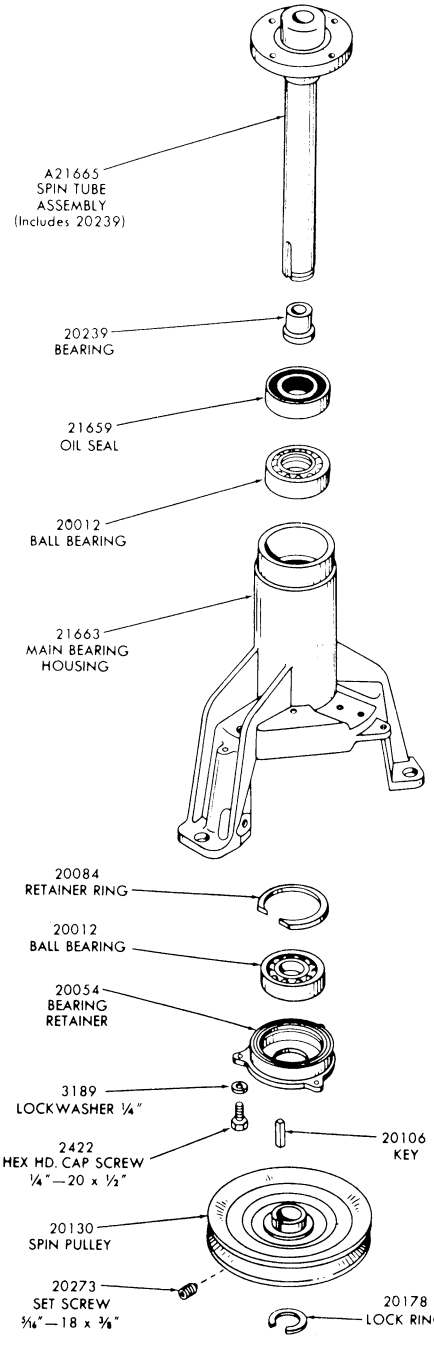


A21754
MAIN BEARING
HOUSING ASSEMBLY

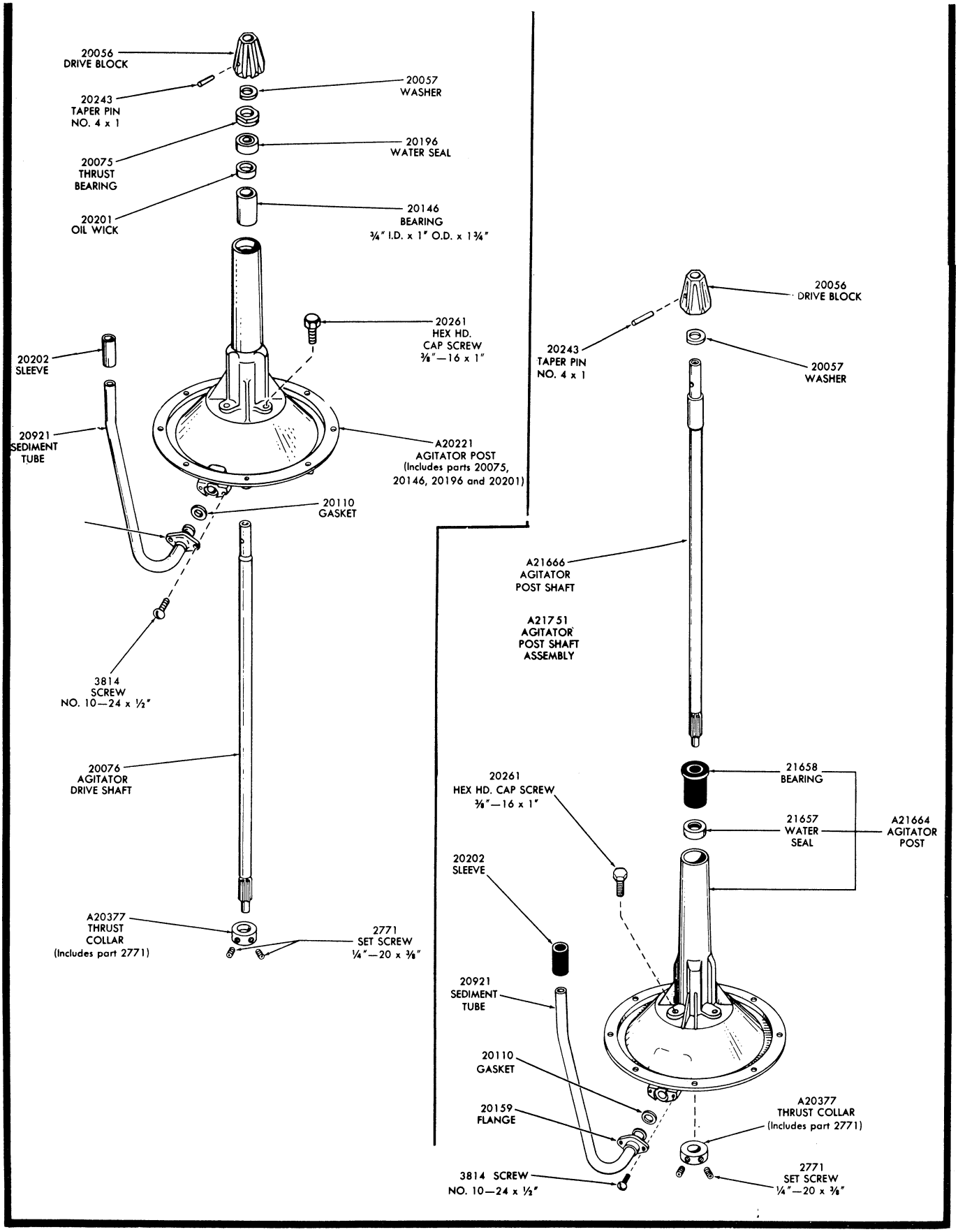


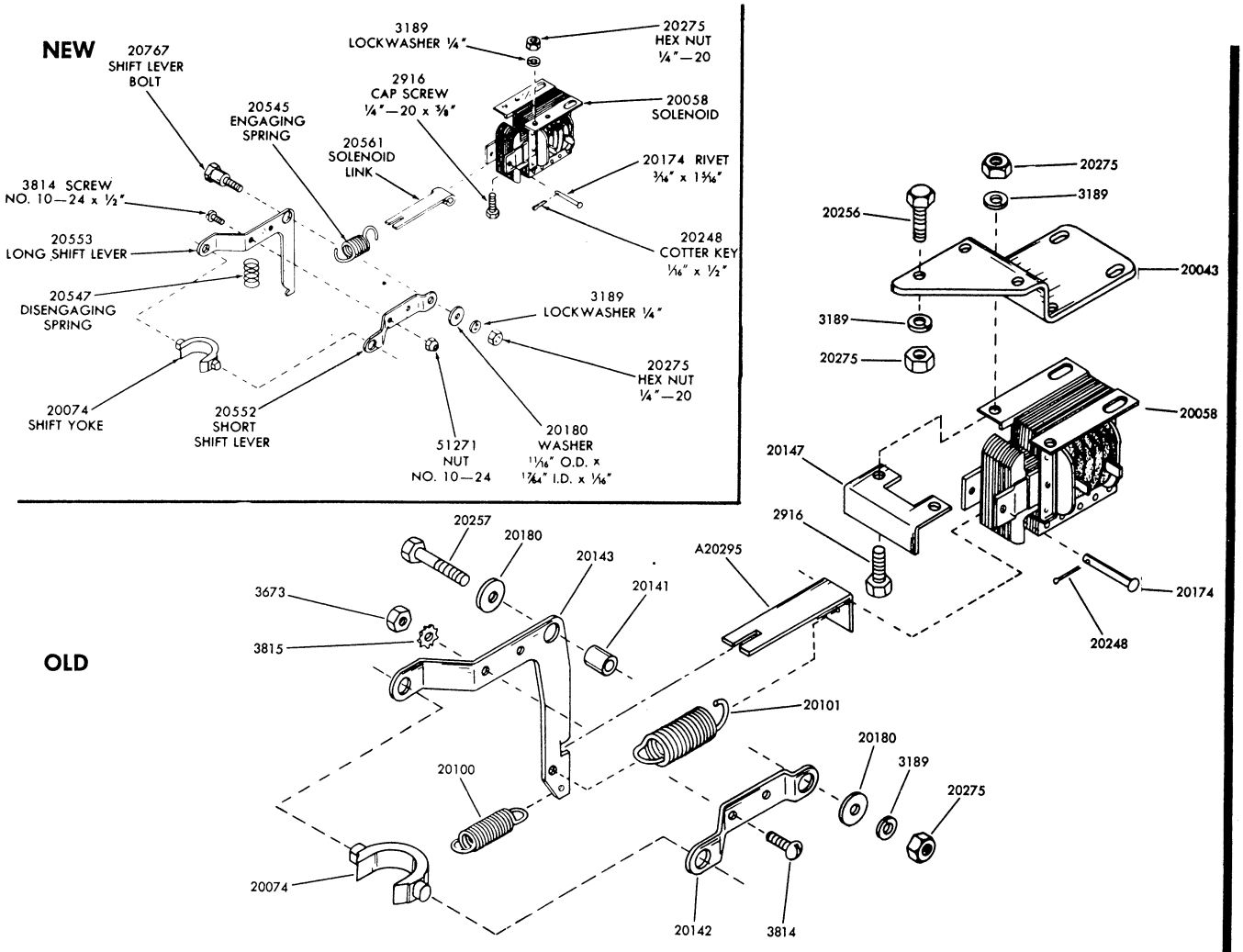


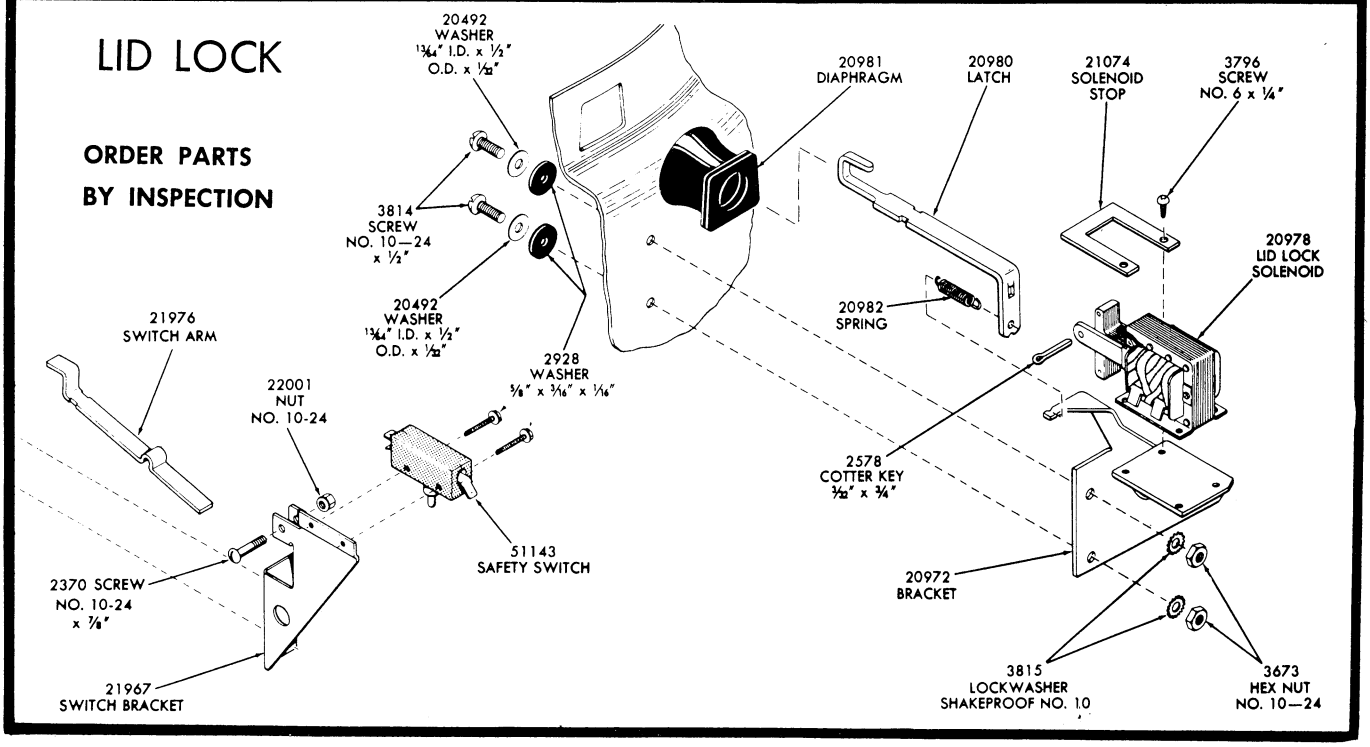
20120
GASKET



CENTER COLUMN




NEW
20767 SHIFT LEVER BOLT
3189 LOCKWASHER ¼"
20275 HEX NUT ¼"—20
2916 CAP SCREW ¼"—20 x ⅜"
20058 SOLENOID
20545 ENGAGING SPRING
20561 SOLENOID LINK
20174 RIVET ¾" x 1 5/16"
3814 SCREW NO. 10—24 x ½"
20248 COTTER KEY 1/16" x ½"
20553 LONG SHIFT LEVER
20547 DISENGAGING SPRING
3189 LOCKWASHER ¼"
20275 HEX NUT ¼"—20
20074 SHIFT YOKE
20552 SHORT SHIFT LEVER
51271 NUT NO. 10—24
20180 WASHER 1 1/16" O.D. x 17/64" I.D. x 1/16"
20275
3189
20256
20043
3189
20275
20058
20147
2916
20174
20248
OLD
20257
20180
20143
A20295
3673
20141
3815
20101
20180
3189
20275
20100
20074
20142
3814


LID LOCK
ORDER PARTS BY INSPECTION
20492 WASHER 13/64" I.D. x ½" O.D. x ½"
20981 DIAPHRAGM
20980 LATCH
21074 SOLENOID STOP
3796 SCREW NO. 6 x ¼"
3814 SCREW NO. 10—24 x ½"
20978 LID LOCK SOLENOID
20492 WASHER 13/64" I.D. x ½" O.D. x ½"
20982 SPRING
21976 SWITCH ARM
2928 WASHER ⅜" x 3/16" x 1/16"
22001 NUT NO. 10-24
2578 COTTER KEY 3/32" x ¾"
51143 SAFETY SWITCH
20972 BRACKET
2370 SCREW NO. 10-24 x ⅞"
3815 LOCKWASHER SHAKEPROOF NO. 10
3673 HEX NUT NO. 10—24
21967 SWITCH BRACKET

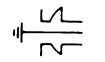
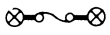
INDEX

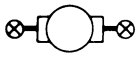
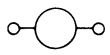
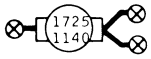
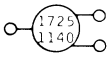
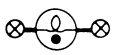
PRODUCT: ALL LAUNDRY PRODUCTS

SUBJECT: WIRING DIAGRAM SYMBOLS

In order to standardize on wiring diagram symbols, all manufacturing divisions will use symbols as established by the American Standards Association. This standardization will result in a reduction of the total number of symbols which a service technician must learn to recognize. This change becomes effective in the laundry division with the 1966 models.

The first column below indicates the wiring diagram item; the second column contains symbols currently in use; the third column contains the wiring diagram symbols to be used in future production.

ITEM	CURRENT LDRY. STD.	REVISED LDRY. STD.
Internal Conductor		
Harness Wire		
Permanent Connection		
Cross Over		
Ground		
Timer Switch		
Automatic Switch		
Manual Switch		
Double Throw		
3 Prong Plug		
Heater (Wattage Shown)	 2800	 2800W
Fuse		
Circuit Breaker		
Terminal		
Timer Motor		
Thermister	NONE	
Transistor	NONE	
Diode (Rectifier)	NONE	

Motor Single Speed		
Motor Multi Speed	 1725 1140	 1725 1140
NOTE: Internal motor wiring may be shown		
Light (Incandescent)		
Germ Lamp		
Pressure Switch		
Fluorescent		
Starter (Automatic)		
Coil		
Capacitor		
Resistor (Show Value)	500	500Ω
Plug Connector		
Centrifugal Switch		
Thermostat Show N.O. or N.C.		
Double Throw Stat		
Ballast		
Adj. Stat		
Thermocouple		
Warp Switch		
Neon Light	NONE	
Transformer	NONE	
Rectifier (Controlled)	NONE	
Relay	Coil & Switches separate in circuit.	

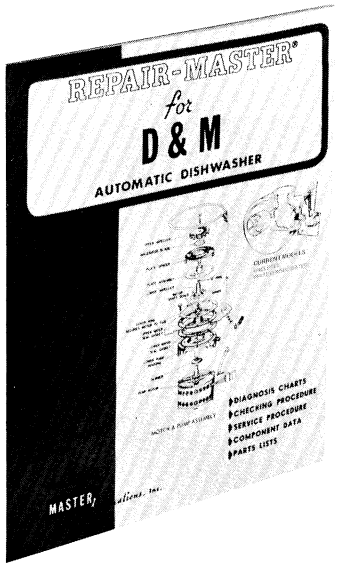
NOTES

NOTES

GEM PRODUCTS, INC. MASTER PUBLICATIONS

APPLIANCE REPAIR MANUALS

REPAIR-MASTER® For Automatic Washers, Dryers & Dishwashers



These Repair-Masters® offer a quick and handy reference for the diagnosis and correction of service problems encountered on home appliances. They contain many representative illustrations, diagrams and photographs to clearly show the various components and their service procedure.

Diagnosis and repair charts provide step-by-step detailed procedures and instruction to solve the most intricate problems encountered in the repair of washers, dryers and dishwashers.

These problems range from timer calibrations to complete transmission repair, all of which are defined and explained in easy to read terms.

The Repair-Masters® are continually updated to note the latest changes or modifications in design or original parts. These changes and modifications are explained in their service context to keep the serviceman abreast of the latest developments in the industry.

AUTOMATIC WASHERS

9001 Whirlpool
9003 General Electric
9005 Westinghouse Front Loading
9009 Frigidaire
9010 Maytag
9011 Philco-Bendix Front Loading
9012 Speed Queen
9015 Norge – Plus Capacity
9016 Frigidaire Roller-Matic
9017 Westinghouse Top Loading

DISHWASHERS

5552 General Electric
5553 Kitchenaid
5554 Westinghouse
5555 D & M
5556 Whirlpool
5557 Frigidare

CLOTHES DRYERS

8051 Whirlpool-Kenmore
8052 General Electric
8053 Hamilton
8055 Maytag
8056 Westinghouse
8057 Speed Queen
8058 Franklin
8059 Frigidaire

***The D & M Dishwasher Repair-Masters covers the following brands: Admiral — Caloric — Chambers — Frigidaire (Portable) — Gaffers and Sattler — Gibson — Kelvinator — Kenmore — Magic Chef — Magic Maid — Norge — Philco — Pioneer — Preway — Roper — Wedgewood — Westinghouse (Portable)**

The Repair-Masters® series will take the guesswork out of service repairs.