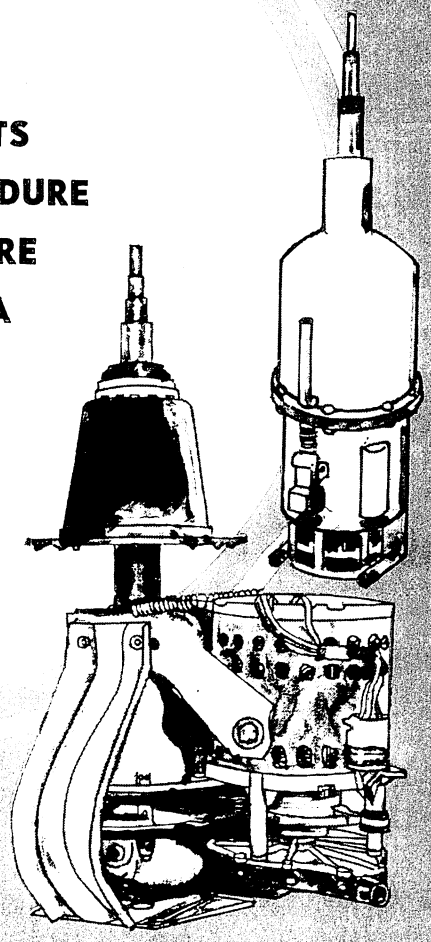
REPAIR-MASTER® for

FRIGIDAIRE

AUTOMATIC WASHERS

UNIMATIC AND PULSAMATIC DESIGN

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



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Appliance Repair Guide For

FRIGIDAIRE

UNIMATIC AND PULSIMATIC DESIGN

AUTOMATIC WASHERS

FOREWORD

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

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

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

IMPORTANT SAFETY NOTICE

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

SAFE SERVICING PRACTICES

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

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

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

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

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

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

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

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

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

TABLE OF CONTENTS

TABLE OF CONTENTS

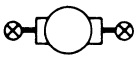
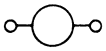
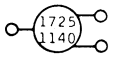
PRODUCT: ALL LAUNDRY PRODUCTS

SUBJECT: WIRING DIAGRAM SYMBOLS

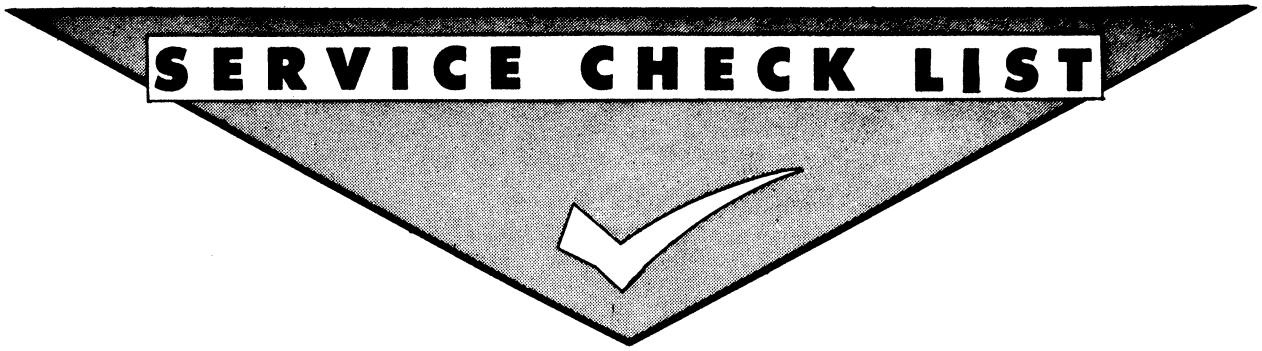
In order to standardize on wiring diagram symbols, all manufacturing divisions will use symbols as established by the American Standards Association. This standardization will result in a reduction of the total number of symbols which a service technician must learn to recognize. This change becomes 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		B
Adj. Stat		
Thermocouple		
Warp Switch		
Neon Light	NONE	
Transformer	NONE	
Rectifier (Controlled)	NONE	
Relay	Coil & Switches separate in circuit.	

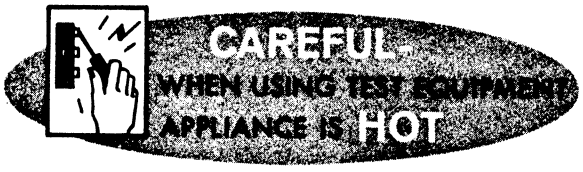
SECTION 1



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. If a voltmeter or test lamp is being used for testing, the power cord must be plugged into a live receptacle, however.



condition	possible cause	remedy
MOTOR DOES NOT RUN	On-off contact in timer not closing.	Repair or replace timer.
	Timer contacts defective.	Replace timer.
	Start winding contacts on motor centrifugal switch not closing.	Replace motor.
	Motor or capacitor defective.	Replace motor or capacitor.
	*Spin solenoid to motor leads or timer leads to spin solenoid broken or disconnected.	Repair or replace leads.
	Motor protector kicked out.	Reset protector; check for cause.
	*Binding condition in mechanism.	Take mechanism to shop for repair.
	Foreign object obstructing water pump.	Remove obstruction.
WASHER WILL NOT PULSATE	Timer inoperative.	Replace timer.
	Broken wires in wiring harness.	Check for continuity; repair as necessary.
	Capacitor defective.	Replace capacitor.
	*Spin solenoid to motor leads or timer leads to spin solenoid broken or disconnected.	Repair or replace leads.
	*Mechanism stuck or binding.	Take mechanism to shop for repair.
	#Mechanism stuck or binding.	Disassemble mechanism and make necessary repairs.
	Motor inoperative.	Replace motor.
	Foreign object obstructing water pump.	Remove obstruction.
	*Binding or broken trip shaft.	Replace trip shaft and O-ring assembly.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
NO WATER IN WASH OR RINSE PERIOD	Hose kinked.	Reposition hose.
	Broken wires in wiring harness.	Check for continuity; repair as necessary.
	Leads disconnected at solenoids or timer.	Reconnect and tighten leads.
	Open inlet valve solenoid.	Replace solenoid.
	Water valve thermal element corroded or defective.	Repair or replace inlet valve.
	Valve screens clogged.	Clean or replace screens.
	Wash temperature selector switch defective.	Replace switch.
	Timer contacts defective.	Repair or replace timer.
WATER DOES NOT SHUT OFF	Wiring harness shorted	Check for continuity; repair as necessary.
	Timer contacts defective.	Repair or replace timer.
	Water inlet valve dirty, or defective diaphragm.	Repair or replace inlet valve.
WATER LEVEL TOO LOW	Water system restricted.	Check for dirty screens, kinked hoses, or defective flow washer; make repairs as necessary.
	Water pressure too low.	Install larger flow washer in inlet valves. Check water pressure at water faucet and advise customer if too low. Use longer fill timer.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
WATER LEVEL TOO HIGH	Flow washer defective or wrong size.	Replace flow washer if defective. If wrong size, replace with one having lower flow rate.
	Pressure from water supply too high.	Partially close water faucets to reduce pressure. Or have water company install pressure regulator in water line.
WILL NOT DRAIN	Drain clogged.	Check for obstruction in water pump and drain hose. Remove washer top and check for obstruction in drain opening.
	Defective suds saver valve or solenoid.	Replace valve assembly or solenoid.
WASHER MOTOR PROTECTOR OR FUSES BLOW IN SPIN PERIOD	Too many suds.	Customer education.
	Improper fuse.	Use 15 amp fusetron in place of quick-acting fuse.
	Other appliances on same circuit.	Washer should be installed on separate circuit.
	Low voltage.	Check supply with voltmeter and advise customer if too low.
	Motor protector defective.	Replace protector.
	Capacitor open or shorted.	Check capacitor according to instructions under "Motor" in the Electrical Section of this manual. Replace if defective.
	Too much drag caused by water in outer tub.	Unkink hose, or disassemble pump and remove obstruction. Check in this Section under "will not drain."
	#Mechanism binding.	Disassemble mechanism and make necessary repairs.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
INCORRECT WASH WATER TEMPERATURE	Temperature selector switch in wrong position.	Customer education.
	Insufficient water heater capacity.	Space wash time to allow water heater recovery.
	Water heater thermostat not set high enough.	Adjust water heater thermostat to higher temperature.
	Inlet hoses reversed.	Connect hoses properly.
	Selector switch wired wrong.	Rewire according to machine wiring diagram.
	Mix valve solenoids wired wrong.	Rewire according to machine wiring diagram.
	Water valve thermal element corroded or defective.	Repair or replace inlet valve.
IMPROPER RINSE WATER TEMPERATURE	Rinse temperature selector switch in wrong position.	Customer education.
	Insufficient water heater capacity.	Space wash time to allow water heater recovery.
	Kinked hoses.	Reposition hoses.
	Hot and cold water supply not the same pressure.	Adjust faucets until proper temperture is obtained.
	Rinse temperature selector switch inoperative.	Replace switch.
	Open inlet valve solenoid.	Replace solenoid.
	Inlet valve solenoids or timer not wired correctly.	Rewire according to machine wiring diagram.
	Water valve screens clogged.	Clean or replace screens.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
UNBALANCE MECHANISM ACTIVATES DURING SPIN	Load unbalanced.	Redistribute clothes in tub. Check adjustment of trip mechanism.
TIMER MOTOR NOT RUNNING	Timer contacts defective.	Repair or replace timer.
	Timer motor defective.	Replace timer motor.
LEAKING OIL	*Mechanism support gasket leaking.	Replace lockwasher and gasket.
	*Leaking gasket between housing and base of mechanism.	Take mechanism to shop for repair.
	*Oil leaking from trip shaft lever.	Replace O-ring seal.
	*Oil pump seal leaking.	Replace oil cap seal assembly.
	Oil leaking from drain plug.	Replace plug gasket and tighten plug.
	*Leak at bottom of vent tube.	Solder bottom of vent tube.
TUB SPINS DURING WASH PERIOD	Timer wired incorrectly.	Rewire according to machine wiring diagram.
	Timer contacts defective.	Repair or replace timer.
	*Trip shaft spring broken.	Replace spring.
	#Brake torque spring broken.	Replace spring.
	#Weak or missing tension clips on brake plate.	Replace clips.
	#Brake linings worn or broken.	Replace brake plate and cup.
	*Brake linings worn.	Take mechanism to shop for repair.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
WASHER PULSATES INSTEAD OF SPINNING OR PULSATES AND SPINS IN SPIN PERIOD	Wiring defective.	Check for continuity; repair as necessary.
	*Trip shaft lever disconnected from solenoid.	Check for broken or missing cotter pin; repair or replace as necessary.
	#Clutch torque spring tang not engaging spring collar.	Disassemble mechanism and position spring tang to engage spring collar.
	#Clutch torque spring broken.	Replace spring.
	*Clutch torque spring broken.	Take mechanism to shop for repair.
CLOTHES TWIST OR TANGLE	Not enough water.	Refer to "water level too low" in this Section of the manual.
	Clothes incorrectly loaded.	Customer education.
	Excessive wash time.	Customer education.
	Pulsator clearance incorrect.	With pulsator in its down position, distance from pulsator to tub should be 1-1/4" on pulsamatic mechanisms or 11/16" on unimatic mechanisms.
TIMER MOTOR OPERATES BUT DOES NOT CHANGE CYCLE	Timer leads loose.	Tighten connections.
	Timer contacts defective.	Repair or replace timer.
	Escapement assembly in timer defective.	Replace timer escapement.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
WASH PERIOD NOISY	#Spherical bearing.	Adjust spherical bearing according to instructions in the Mechanical Section of this manual.
	#Upper mechanism housing bearing damaged.	Replace bearing.
WASHER ODOR	Deposits of soap scum caused by hard water.	Fill spin tub with water and dissolve 1 lb. of Calgon in the water. Plug end of drain hose so water will not pump out. Spin Calgon water into outer tub. Stop machine and let it stand for one hour. Unplug drain hose and run machine through entire normal cycle. If deposit is too heavy to be removed by this method, remove washer top and scrub deposit from outer tub with a stiff brush. Replace top and repeat above Calgon treatment.
TUB DOES NOT BRAKE AT END OF SPIN	#Brake linings worn.	Replace brake plate and cup.
	*Brake linings worn.	Take mechanism to shop for repair.
	#Clutch torque spring broken.	Replace spring.
	*Clutch spring damaged.	Take mechanism to shop for repair.
	#Weak or missing tension clips on brake plate.	Replace clips.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
SLOW PULSATION OR SPIN SPEED	Other appliances on same circuit.	Washer should be installed on separate circuit.
	Low voltage.	Check supply with voltmeter and advise customer if too low.
	#Drive belts loose.	Replace or adjust belts.
	#Drive belt oily.	Find and repair leak; replace belt or belts.
	#Mechanism binding.	Disassemble mechanism and make necessary repairs.
SPIN PERIOD NOISY	Suds saver valve chatter.	Replace valve assembly.
	*Water pump impeller or fan loose.	Tighten impeller screw; replace fan if hub is loose on motor shaft.
	Tub assembly mounting nut loose.	Tighten nut.
	Worn or defective spin shaft bearings.	Replace spin shaft if lower bearings defective; replace bearings under mechanism support nut if upper bearings defective.
	Mounting screws loose on cross-brace.	Tighten screws.
	*Mechanism noisy.	Take mechanism to shop for repair.
	#Loose snubber bracket bolts or loose snubber plate screws.	Tighten as necessary.
	#Weak or broken motor counterbalance spring causing snubber stop pin to strike.	Replace spring.
	#Oily snubber causing snubber stop pin to strike.	Clean snubber with suitable solvent and wipe dry.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
MACHINE VIBRATES DURING SPIN	Weak floor.	Normal solidity of floor necessary.
	Uneven floors cause washer to shift and become unbalanced.	Install two foot cups and level machine.
	Feet adjusted out too long, or feet not adjusted properly.	Level washer feet as close to cabinet as possible.
	Crossbrace bowed.	Replace crossbrace.
	Tub improperly balanced.	Replace tub.
	Loose mechanism support.	Tighten mounting screws on support.
	Broken or damaged mechanism support.	Replace support.
	Snubber clearance improper.	Replace snubber pad spring. On models with draw rods, adjust rods for proper clearance.
	Snubber pad or plate dirty.	Remove dirt and oil by cleaning pad and plate with solvent. Place No. 400 sandpaper on flat surface and polish snubber pad surface on sandpaper, using figure 8 motion. Wipe clean with a dry cloth.
	Timer trip mechanism not set properly.	Set trip mechanism as explained under "Trip Mechanism" in the Mechanical Section of this manual.
REVERSED WASH AND SPIN PERIODS	#Leads reversed on motor or timer.	Reconnect leads according to machine wiring diagram.

*Unimatic Mechanism #Pulsamatic Mechanism

condition	possible cause	remedy
WATER LEAKS	Dislocated fill nozzle.	Remove top and position nozzle.
	Dislocated overflow nozzle in outer tub.	Remove top and position nozzle.
	Fill tube and fill nozzle not aligned correctly.	Remove top and shim tube away from top.
	Fill tube defective.	Replace fill tube.
	Hose connections leaking.	Replace hose or tighten clamp.
	Top seal leaking.	Reposition or replace seal.
	Hole in bottom of spin tub.	Replace spin tub.
	Damaged pump gasket.	Replace gasket.
	Impeller mounting bolt loose.	Tighten bolt and use Loc-Tite.
	Damaged or unclamped water seal bellows.	Reposition clamp or replace bellows.
	Motor shaft seal broken or worn.	Replace seal.
	Mechanism support leaking.	Tighten screws or replace mechanism support.

SECTION 2

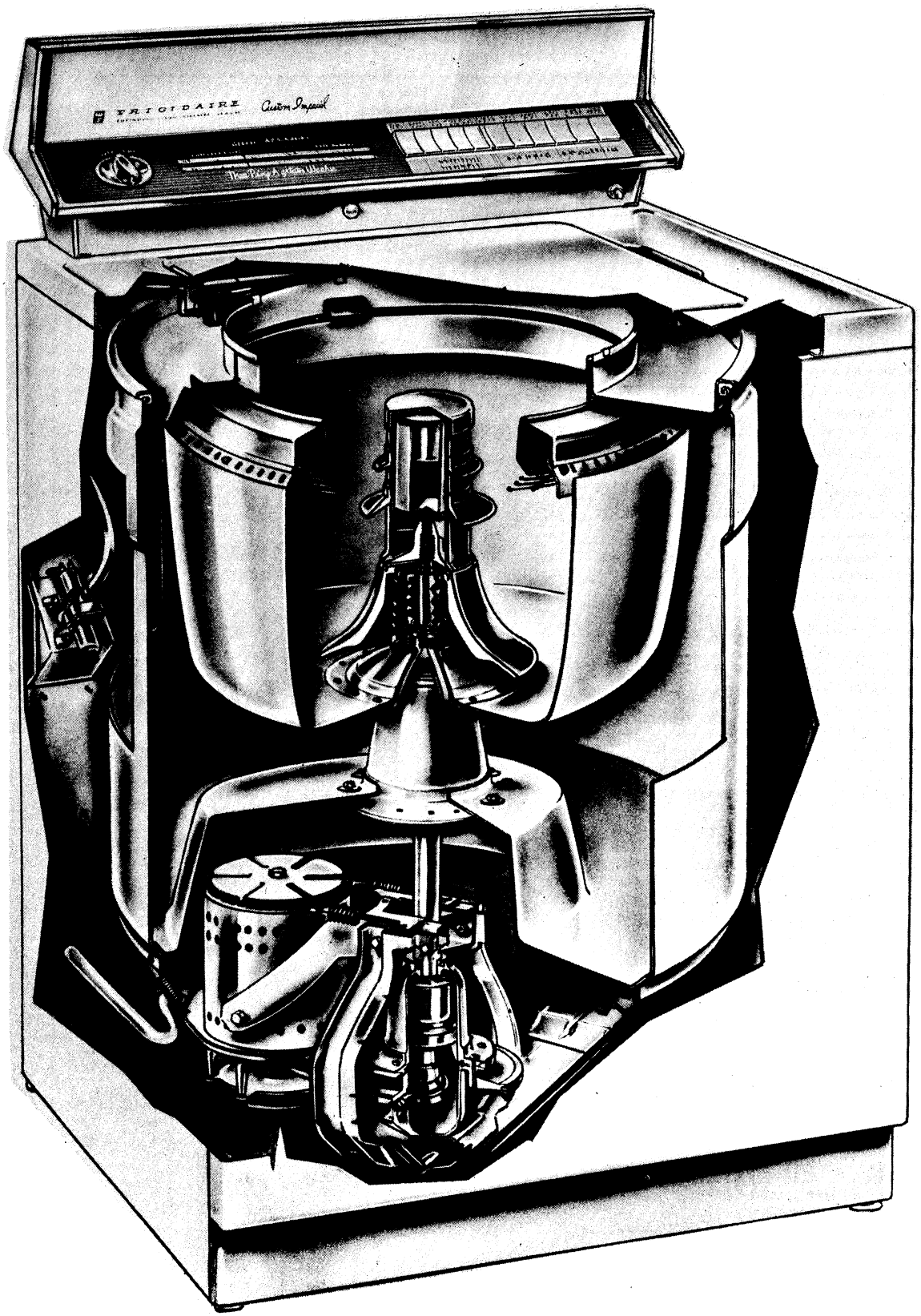
SERVICE PROCEDURE AND COMPONENT DESCRIPTION

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 ohm-meter, 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.

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.



Construction Detail Cutaway

PULSAMATIC MECHANISM

Cabinet Service

CABINET

The cabinets used on Frigidaire washers are a one piece-wrap-around type, constructed of steel and coated with either a durable porcelain or a baked enamel finish. The 1957 models have a removable front panel for service accessibility.

Early model machines use the cabinet as the outer tub or water container. The water in the spin tub is spun directly into the cabinet shell where the drain outlet is located.

Late model washers have a wider cabinet, giving the machine a more stable operation and minimizing vibration. On these machines, a separate outer tub or water container is installed within the cabinet shell.

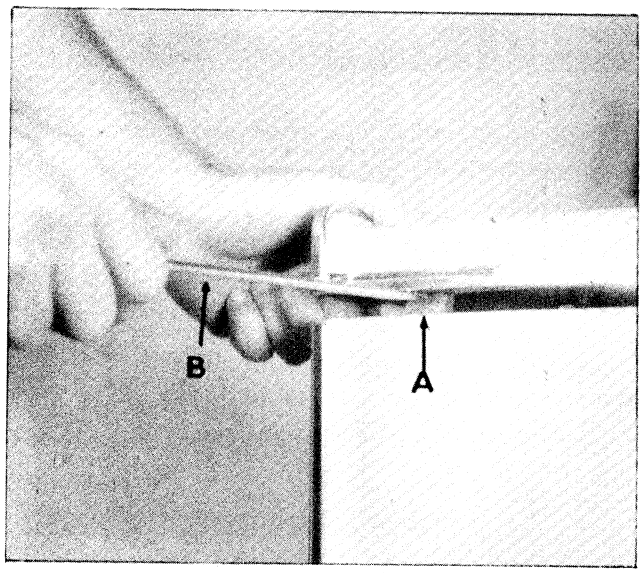
CABINET TOP

On early model machines the cabinet top is of one-piece construction. To provide a watertight seal, the top is held firmly against the top seal either by two sheet metal screws on each front corner or by two solid clips located on the top front edge. The back corners are held down either by two bolts or by two sheet metal screws, depending on the model involved.

In later production the cabinet top is designed to give the serviceman an easier method of removal and to facilitate servicing. The top is held to the cabinet by two spring clips located on the cabinet front edge. The rear of the top is held down by two nylon hooks.

To remove the top on later production washers, release the front of the top first by pressing in on the front clips with a thin-bladed screwdriver, *Figure 1*, and at the same time lift up on the top with the other hand.

CAUTION: *Be careful not to chip or scratch the finish. Use a piece of cloth or heavy paper to protect the finish from the screwdriver.*

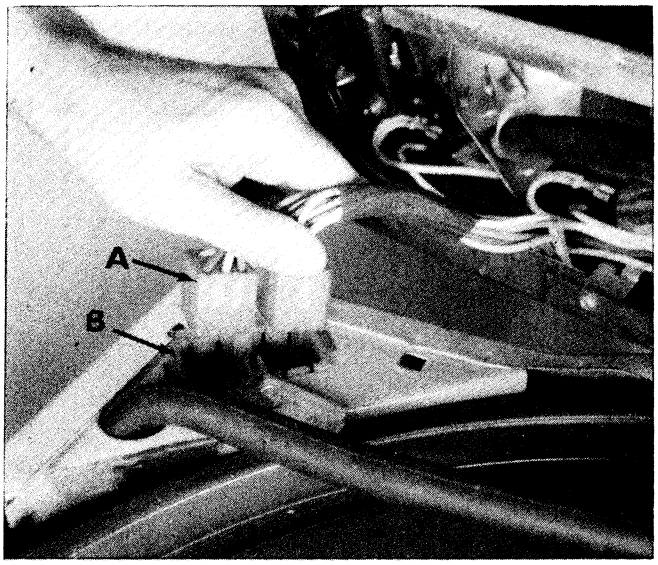


A. RETAINING CLIP B. SCREWDRIVER

Figure 1 — Releasing Top Retainer Spring

Lift the front of the top approximately two inches and bring it forward enough to clear the rear retainers. Now lift the entire top and bring it forward enough to remove the cabinet wiring plug located in the right rear corner, *Figure 2*, Remove the wiring connector and lift the top from the machine. If a wiring plug is not used, pull the top forward enough to clear the wiring, etc.

With the edge of the top resting on the washer, lean the top against the wall or cabinet in back of the machine, being careful to protect the top against damage.



A. WIRING PLUG B. RECEPTACLE

Figure 2 — Removing Top Wiring Harness Plug

Timers

Timers used on all automatic washers are similar in basic principal 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 clock. A small pinion drives a gear in the escapement, *Figure 3*.

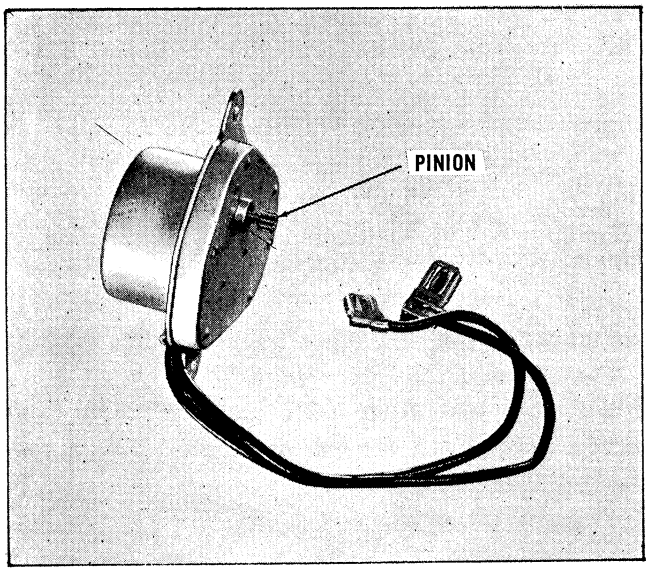


Figure 3 — Timer Motor

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

Other machines use separate switches for many of these variations. The basic operation and purpose of the timer remains the same however.

All timers consist of three basic components assembled into one unit, *Figure 4*. The components are the timer motor, the timer escapement, and the multiple circuit cam switches.

Timer motors, *Figure 5*, 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 timer motor can be tested by applying probes of a "live" test cord to the two wire leads connected to the motor. The shaft rotation can be observed for an indication that the motor is functioning properly. In quiet surroundings the motor can be left on the timer, and the faint whirring noise of the motor, with the test cord attached, can be heard if the motor is operating properly.

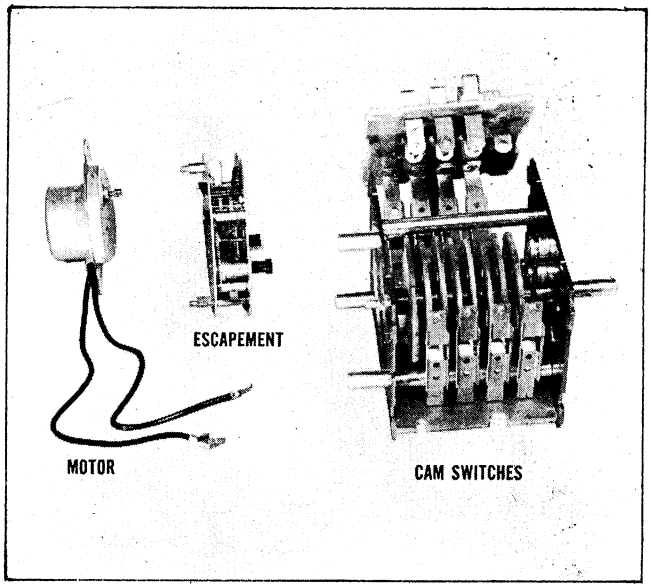


Figure 4 — Component Parts of Timer

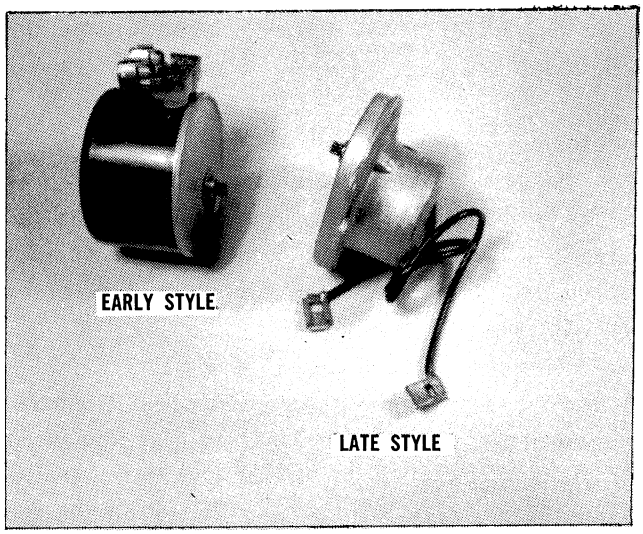


Figure 5 — Two Styles of Timer Motors

The escapement is a spring-powered mechanism wound by the timer motor. It releases to advance

the timer cam shaft a set number of degrees every set number of seconds, depending on the particular design of the timer.

On some timers (used on WV-35 models), the escapement is designed to control the water temperature when warm or tempered water is desired. This is accomplished by means of a cam extending into the timer and operating a cam switch. This cam makes one revolution every 30 seconds. Every 15 seconds this cam opens and closes two sets of contacts that control the inlet valve solenoids. Consequently, if the temperature switch is set on the warm position, the hot water will run for 15 seconds and then will shut off. Immediately the cold water enters for 15 seconds and then shuts off. This continues until the timer advances out of the fill period.

The escapement on some Frigidaire timers also controls the level of the water fill by means of a manual switch or an electrical solenoid that moves an arm connected to the escapement, changing the gear ratio inside the escapement.

When the load selector is set to "Partial Load", the gear ratio in the escapement is changed to advance the timer out of the fill period when the water level is approximately two-thirds full.

If the timer motor is operating but the timer dial does not advance properly, the escapement is defective.

The timer should not be repaired in the field other than to replace the timer motor. If the timer motor is defective, it can be replaced without replacing the timer. For any defect other than the timer motor, the entire timer should be replaced.

TRIP MECHANISM

The trip mechanism is a device used to cut off power to the washer should an extreme off-balance condition occur.

The trip mechanism is actuated by the spin tub contacting an arm or lever extending into the outer tub or water container. The arm or lever is connected by linkage to a bracket or finger on the timer.

When an off-balance condition occurs, the lever mechanically pulls the timer knob out, thus opening the main line contacts in the timer. Should this condition occur, the user has merely to redistribute the load of clothes and push the timer knob back in. Washer operation will resume where it left off.

On the 1957 or "pedestal" model Frigidaire washers, the trip mechanism releases a lever on the lid switch bracket, cutting off power to the machine. Raising the washer lid to redistribute the clothes automatically resets the switch.

Provision is made to adjust the trip mechanism on all models. Some models have the adjustment at the back of the machine, and adjustment is made with an Allen screw and locknut, *Figure 6*.

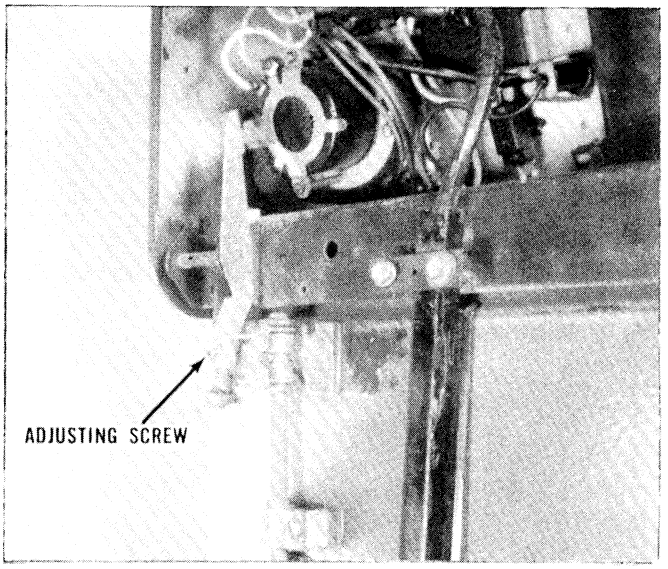


Figure 6 — Early Style Trip Mechanism

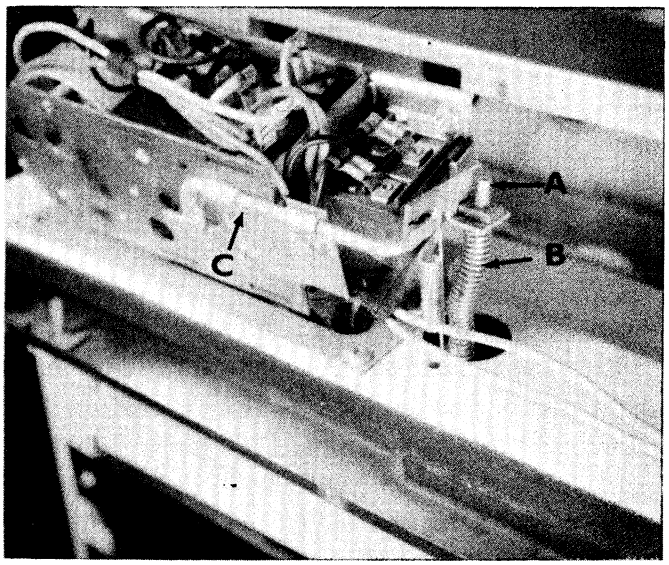
Later models have a rod from the trip lever up to the timer bracket, also on the rear of the machine, *Figure 7*. Adjustment is made by raising or lowering a collar or link on this rod. Raising the collar prevents premature tripping. The rod is indexed with notches, and the adjustment should be made one notch at a time, tightening the set screw securely when the adjustment is completed.

On some later model washers, the adjustment is in the console and is accessible by removing the rear housing cover, *Figure 8*. Others of these later models were introduced with an adjusting screw

accessible through a hole in the top at the left-hand rear corner. Adjustment is made with a screwdriver inserted in this hole and turning a screw. Counter-clockwise rotation of this screw prevents premature tripping.

Proper adjustment for all models is made when a 2½ pound weight placed in the spin tub will continue to spin, but a 5 pound weight will trip the mechanism.

Figure 7 — Trip Mechanism with Adjusting Collar



A. TRIP ARM ADJUSTING SCREW
B. TRIP ROD
C. TRIP LEVER

Figure 8 — Trip Mechanism Adjustment in Console

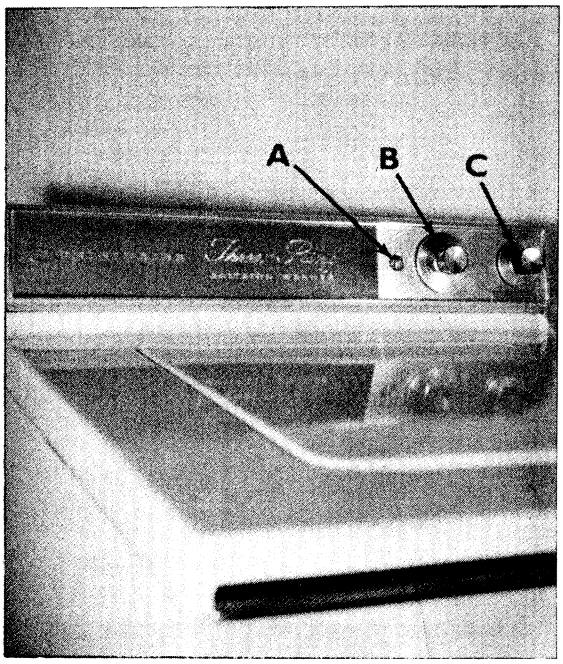
NOTE: *A 5432199 agitator diaphragm weighs 2½ pounds, thus one can be used for the minimum and two for the maximum weights. If these are not available, a small load of clothes or a sandbag may be used.*

MOTOR PROTECTOR

The motor is protected by a manual reset thermal overload located on the backsplash panel, *Figure 9*. An overload on the motor caused by low voltage, binding mechanism, etc., will cause the protector to trip and thus open and disconnect the electrical circuit to the washer.

To reset the protector, wait at least one minute and firmly push in the button marked *"Push to Reset"*. The cycle will resume where it stopped. If the protector continues to trip, locate and correct the cause.

To test the protector, remove the two leads and check across the protector terminals with a continuity checker.. A jumper wire may also be put across the two terminals with leads connected. If the machine performs satisfactorily, the protector is defective and must be replaced.



A. MOTOR PROTECTOR
B. TIMER KNOB
C. WATER TEMPERATURE CONTROL KNOB

Figure 9 — Washer Control Housing

NOTE: *Always replace the protector with one having the identical part number. The different part numbers denote different ampere ratings, and motor damage may result if the wrong protector is used.*

Switches

FABRIC SELECTOR SWITCH

The fabric selector switch on single speed washers controls the wash and rinse water temperatures. On two speed machines it also controls pulsate and spin speeds. Some models have multiple temperature selection plus individual selections of pulsate and spin speeds.

To check the fabric selector switches, refer to machine wiring diagram and test with a continuity checker as the switch is moved to its various positions.

AUTOMATIC ADVANCE SOAK SWITCH

In late production a single-pole single-throw switch is used to bypass the "Off" position between the soak cycle and the wash-fill period. The switch energizes the timer motor during the "Off" position to automatically advance the timer to the wash period.

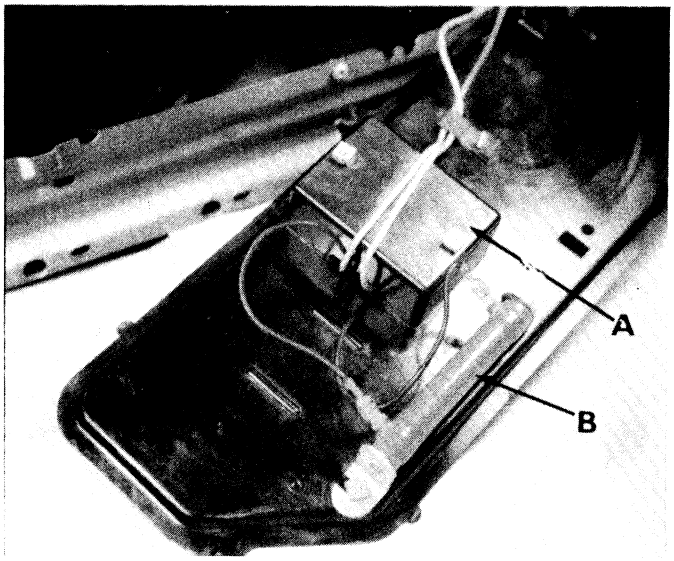
NOTE: *The speed and water temperature selections made during the soak cycle will remain the same through the complete wash and rinse cycle, unless the user changes these selections before the timer advances into the wash-fill period.*

TIME DELAY RELAY

Two speed mechanisms of some models are provided with a time delay relay, *Figure 10*. The washer circuit is designed to begin the spin cycle with a low speed spin and then increase to a high speed spin. To obtain this operation, a time delay relay is used.

After the mechanism has reached a full low speed rpm, the relay closes a set of contacts which supply electrical power to the clutch solenoid mounted to the clutch assembly. This solenoid, when energized, gives the washer its high speed spin.

The main purpose of this relay is to prevent the mechanism from reaching a high speed spin in one stage of operation. If the lid is opened or an off-balance load occurs, the mechanism stops; consequently, when the washer starts again, the stage of operation starts over.



A. TIME DELAY RELAY B. RESISTOR

Figure 10 — Time Delay Relay Mounted on Rear Service Panel

The time delay relay is constructed of a bimetal that heats and warps out, causing a set of contacts within the relay to close after a period of from 5 to 15 seconds. This completes the circuit to the clutch solenoid.

Hooked in series with the relay is a 50 ohm resistor that lowers the voltage to the spin solenoid, thus keeping the solenoid from being energized until the relay contacts close.

When the time delay relay contacts close, full line voltage is applied to the spin solenoid. After the solenoid is closed, electrical power is reduced from the solenoid and relay. When this happens, the relay contacts open, and the resistor maintains

the circuit to keep the solenoid closed.

The solenoid will not close with the low voltage supplied by the resistor, but it will remain closed with this low voltage.

The solenoid does not open until one minute after the machine has stopped, in order to keep the clutch pulley from engaging until the motor and tub have come to a full stop.

Control Solenoids

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

A solenoid is a device used as a means for converting electrical energy into mechanical motion. It consists of a coil of enamel-coated wire wrapped around a non-metallic bobbin and supported by a laminated iron field or a steel frame of some type, *Figure 11*.

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 or 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 predesignated 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.

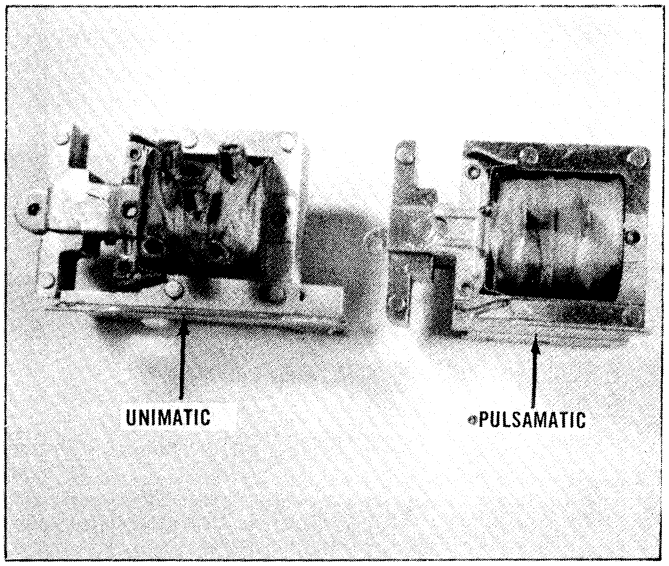


Figure 11 — Spin Solenoids

There are several different types of solenoids used on automatic washers. These will be covered in more detail in the following paragraphs.

WATER CONTROL SOLENOIDS

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

The *open type* solenoid, *Figure 12*, is used primarily with brass bodied valves and is anchored to the valve by means of a coil tension spring. The coil is cradled in a steel frame, and a bushing is inserted in each end of the coil, leaving a space between them to help center the plunger or armature and to prevent noisy operation.

The terminal connections are on the side of the coil. The plunger is located in a cover or shield over which the solenoid is assembled. This plunger is spring-loaded to provide positive sealing action when the solenoid is not energized.

The *sealed type* solenoid, *Figure 13*, functions in exactly the same manner as the open type, but is secured to a nylon valve body by screws. Instead on being cradled in a steel frame, the solenoid coil is completely sealed in a can-like container

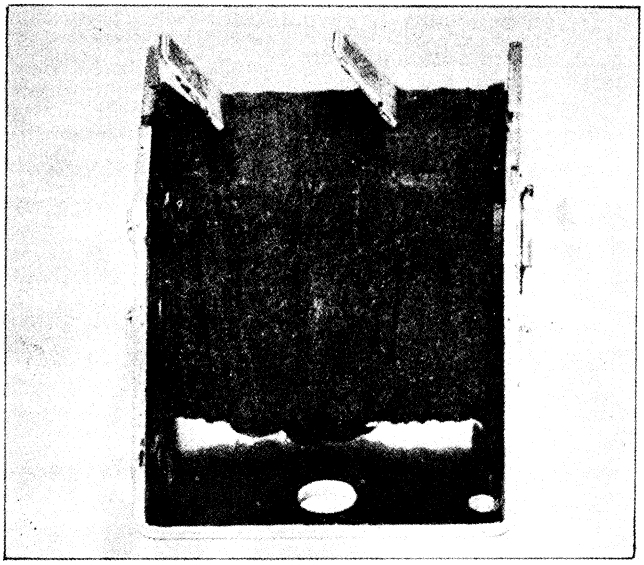


Figure 12 — Open Type Water Valve Solenoid

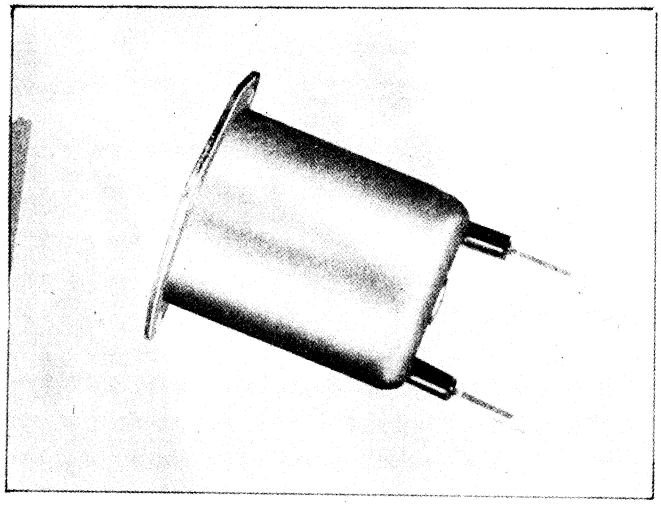


Figure 13 — Sealed Type Water Valve Solenoid

to further protect the wire from the corrosive effects of water and detergents. The spade terminals are mounted on the outer end of this solenoid.

Single-port inlet valves require only one solenoid, which acts merely as a means of permitting either cold or hot water, or both, to enter the valve when energized.

Double-port mixing valves require the use of two solenoids, one to permit hot water to enter the valve and the other to permit both hot and cold water to enter.

SPIN SOLENOID

The spin shaft solenoid, *Figure 11*, controls the spin action on the unimatic mechanism. It is connected to the motor by four bolts.

The energized solenoid pulls down on a spring and guide that is hooked to the trip shaft lever. The lever holds the clutch spring inside the mechanism to make the unit spin.

On the pulsamatic mechanism, the spin solenoid is is connected to the motor mounting plate. This solenoid controls the high speed spin by changing a ratio within the clutch pulleys. An adjustable clutch tension spring is used between the solenoid and the clutch arm.

LOAD LEVEL CONTROL SOLENOID

On some models of washers a variable speed escapement is used to determine the amount of water to be used, depending on the size of load to be washed (small or large load).

The escapement is controlled by a manual knob that changes a gear in the escapement. It also reduces the complete wash cycle by one-third.

On the later model washers a solenoid is used to change the gears in the escapement. This solenoid is controlled by the timer in the wash-fill period only, and does not affect any other part of the cycle.

SUDS SAVER SOLENOID

The suds saver solenoid is mounted to the top of the suds valve. The solenoid remains de-energized until the start of the first spin cycle. At this point it moves a lever to close one valve and open another, until the complete suds saver cycle is finished. This is an optional device found only on suds saver models. When replacing the solenoid, use identical replacement parts.

Machine Motors

UNIMATIC MOTORS

The motor on all unimatic mechanisms is a 1/3 hp single phase motor with a capacitor in the start winding. It is protected by a manual reset protector located on the washer backsplash.

The motor provides a direct drive for the mechanism by the splined shaft on the end of the rotor. The opposite end drives the pump and fan.

The speed of the motor is 1140 rpm.

A ball bearing, located on the pump end of the motor shaft, can be replaced by removing the pump and motor end bell. This bearing should be checked and replaced if necessary, at the time of motor removal.

The capacitor can be checked by placing a 150 watt 115 volt lamp in series with the capacitor after it has been disconnected from the washer circuit. If the lamp dims somewhat, the capacitor should be good.

However, if the lamp does not dim, it will indicate a shorted capacitor. If the capacitor is open, the lamp will not light. If such indications exist, the capacitor must be replaced.

The following list gives the no-load maximum wattages for the unimatic mechanism motor:

Agitation	225 watts
Spin (without solenoid)	260 watts
Spin (with solenoid)	285 watts

PULSAMATIC MOTORS

Washers with the pulsamatic mechanism are equipped with a 1/3 hp 1725 rpm singlephase reversible motor, either single speed or two speed. Both motors are protected by a manual reset protector located in the washer backsplash.

A clutch assembly is connected to the motor shaft to drive the transmission by the use of belts. At the lower clutch end of the motor, a permanently lubricated ball bearing is used. To replace this bearing, remove the pump and clutch assemblies and the motor end bell. The upper bearing is a sleeve bearing lubricated by an oil wick.

The capacitor, wired in the start winding can be checked in the same way as the capacitor on the unimatic mechanism.

Maximum wattages for the single speed motor, with a water load, are:

Agitation	460 watts
Spin	550 watts

Maximum wattages for the two speed motors are:

	Normal	*Slow*
Agitation	460	380
Spin	550	380

SUDS SAVE PUMP MOTOR

The suds saver pump motor is used on suds saver model washers only. It is a small motor that operates the suds return pump. The motor and pump are fastened together as as assembly and the pump impeller is direct-driven by the motor.

The motor is tested by applying probes of a "live" test cord to the two wire leads connected to the motor. It the motor hums but does not turn, disassemble the pump and check for an obstruction. Also check for binding motor bearings.

Inlet Valves

The inlet valves used on Frigidaire washers are either thermostatic or non-thermostatic valves. The non-thermostatic valve body is primarily made of nylon.

SINGLE SOLENOID

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

TWO SOLENOID

The two solenoid type water inlet valves, ***Figure 14***, are called mixing valves because they mix the hot water with the cold water enabling the user to select hot, warm or cold water for the wash and rinse fills.

Figure 15 shows the non-thermostatic mixing valve in the off position. Since neither solenoid is energized, all diaphragms are sealed to prevent water from flowing through the valve. When the water temperature selector switch is set on hot, the hot water solenoid on the left is energized, ***Figure 16***, This allows hot water to flow out the left side of the valve. Since pressure from the cold water is being applied to the check valve disc in the mixing chamber, no hot water can enter this chamber.

On the warm setting, ***Figure 17***, the solenoid on the right is energized, allowing cold water to pass by the diaphragm on the right. This relieves the pressure against the check valve in the mixing chamber, resulting in a warm water mixture entering the machine.

The thermostatically controlled mixing valves are somewhat more complicated since they employ a thermal element to control the temperature of the water. ***Figure 18*** shows the action at the valve ports when the temperature selector is set on hot. The hot solenoid is energized, opening the diaphragm to permit hot water to flow. The flow pattern arrows show the course of water through the valve. Hot water will continue to flow until the hot solenoid is de-energized.

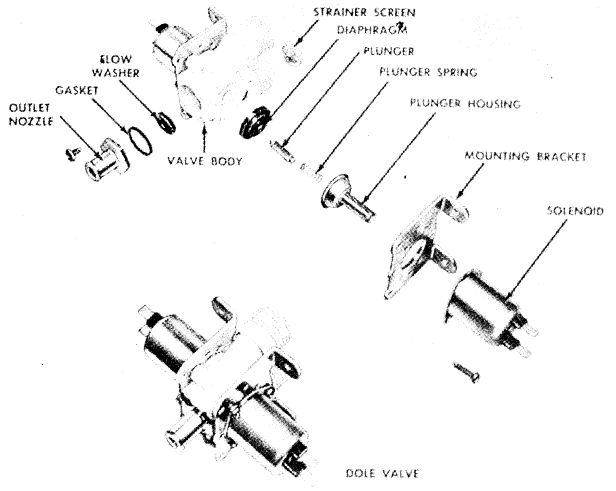


Figure 14 — Two-Solenoid Water Inlet Valve

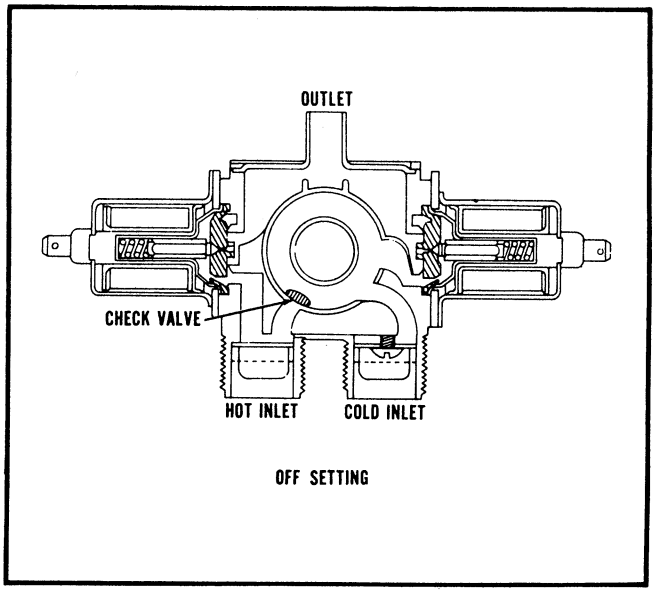


Figure 15 — Non-Thermostatic Valve — "Off" Setting

In ***Figure 19*** we see the valve ports in the mixed water position, as they are when the temperature selector is set at the warm position. The mixed water solenoid only is energized, raising the armature and diaphragm so that the water is allowed to pass.

The flow pattern arrows show how water from the hot and cold inlets flow over the element unit. It expands and contracts according to the temperature of water passing over it.

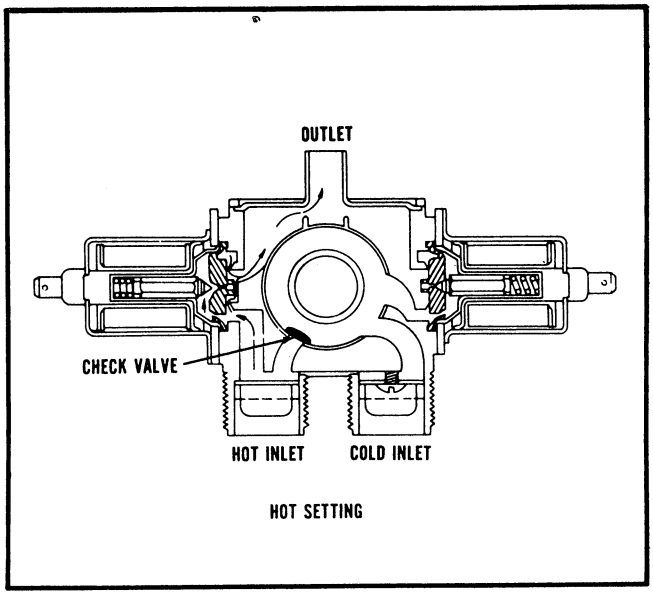


Figure 16 — Non-Thermostatic Valve — "Hot" Setting

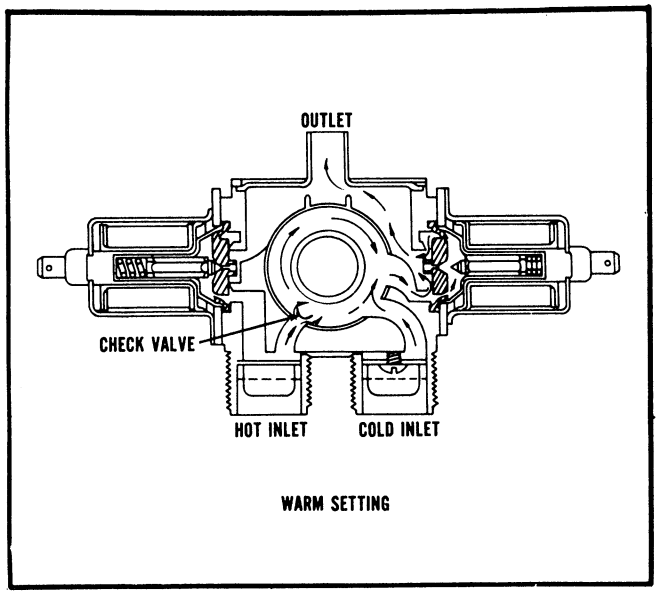


Figure 17 — Non-Thermostatic Valve — "Warm" Setting

As shown in *Figure 20,* the expanding and contracting of the thermal element carries a cylinder up and down to mix hot and cold water properly so as to obtain a flow of water from the valve outlet at a temperature of 97° ± 5°.

When the temperature is set at medium, both the hot and mixed water solenoids are energized, *Figure 21.* This permits an equal amount of hot and 96° water to flow from the valve outlet, thus if the water heater temperature is 150°, the water leaving the valve will be approximately 124°.

The water control valve shown in *Figure 22* is somewhat of a thermostatic valve. Similar to the other valves, it also employs a hot and cold water solenoid. In addition, it has a bimetal collar that fits around the outlet of the valve.

A microswitch mounted to the valve is energized by the expanding and contracting of the bimetal collar, when the temperature selector switch is in the warm position. Thus as the bimetal collar expands and contracts from the water temperature, the microswitch supplies power to either the cold or hot solenoid.

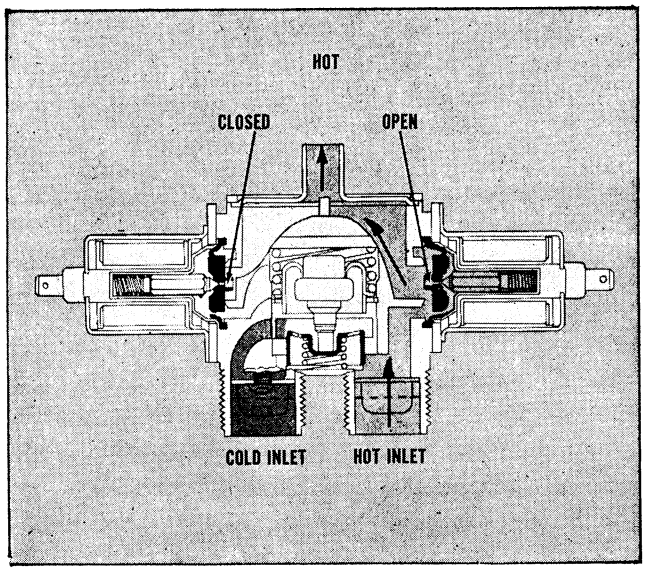


Figure 18 — Thermostatic Valve — "Hot" Setting

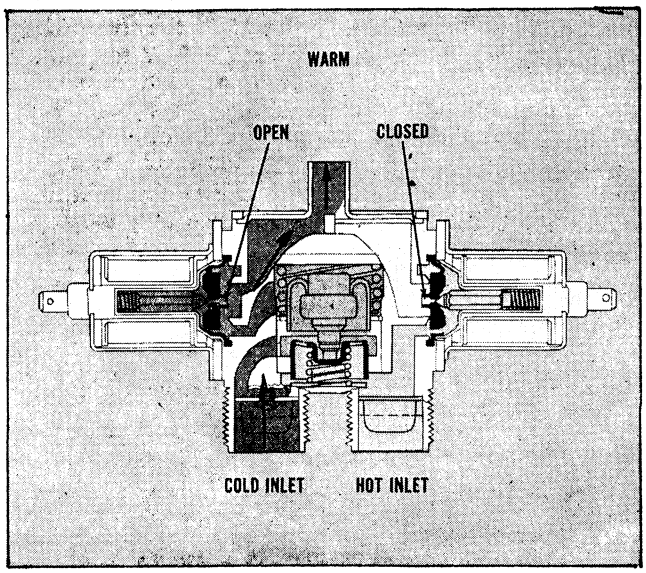


Figure 19 — Thermostatic Valve — "Warm" Setting

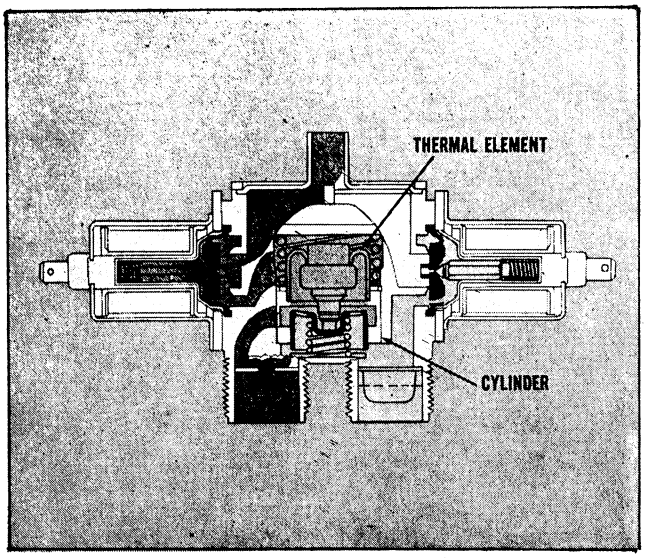


Figure 20 — Thermostatic Valve Showing Thermal Element

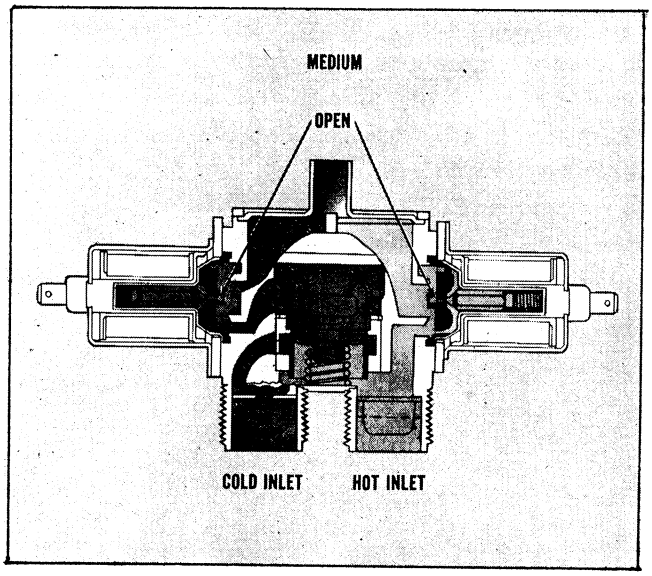


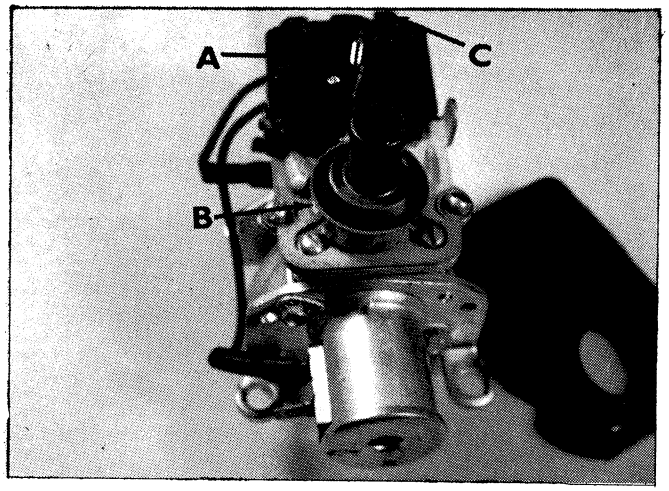
Figure 21 — Thermostatic Valve — "Medium" Setting

The time element of this change from hot to cold water depends on the supplied water temperature to the valve. Under normal conditions, if the hot water supply is set at normal (150° to 160°), this change will occur about every 15 to 25 seconds.

Under these circumstances the incoming water temperature cannot be checked accurately at the valve nozzle. It should be checked after the water has been mixed in the tub.

THREE SOLENOID

The three solenoid valves have a third solenoid permitting cold water to enter the machine. With the three solenoid valve, the user can select hot, medium, warm, cool and cold water, thus permitting a very wide choice of temperature combinations for various fabric types and degrees of soil.



A. MICROSWITCH B. BIMETAL COLLAR C. TERMINALS

Figure 22 — Water Inlet Valve with Microswitch Control

Three solenoid valves function in much the same manner as the two solenoid valves and are also either thermostatic or non-thermostatic, according to model application.

FLOW WASHER

The flow washer, *Figure 14*, controls the flow of water into the washer. It regulates the water flow with any incoming water pressure between 20 and 120 psi.

For water pressures greater than 120 psi, a regulator should be installed in the water system to reduce the pressure to within the operating limits of the flow washer.

For water pressure lower than 20 psi, a timer with a longer fill period can be installed on the washer.

The 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.

When replacing the water valve, always check the water fill to be certain the proper flow washer is in the valve.

NOTE: *Do not attempt to rework the flow washer. A damaged flow washer will not properly regulate the water flow.*

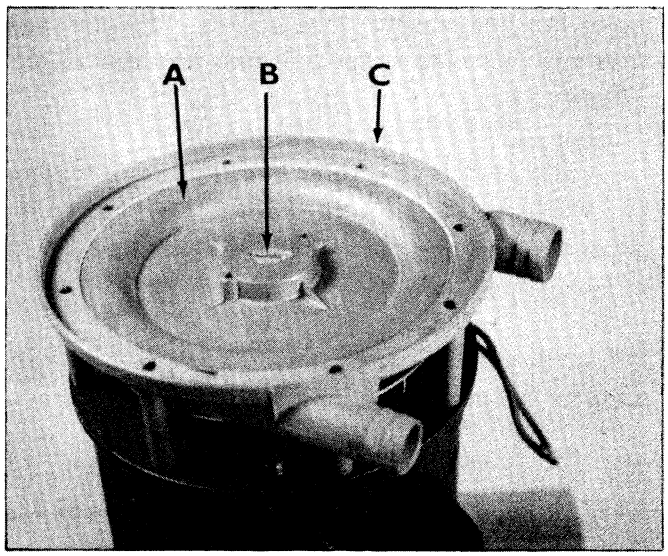
Pumps

WATER PUMP – UNIMATIC

The pump on the unimatic mechanism consists of a pump housing, carbon seal, and pump impeller. The pump housing is mounted to the motor end bell by eight screws that protrude through the snubber plate or pump bottom. The impeller connects to the motor shaft, held by a flat head screw, *Figure 23*.

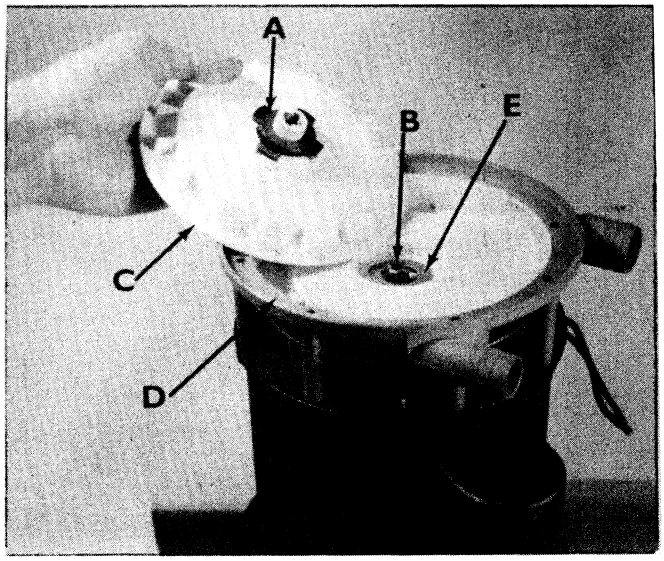
The carbon seal and seal face are located around the motor shaft between the pump housing and the impeller, *Figure 24*.

To remove the pump, remove the eight screws holding the snubber plate and pump housing to the motor. Remove the impeller screw holding the impeller to the motor shaft. An impeller puller tool is used to remove the impeller from the shaft, *Figure 25*. The pump housing can now be lifted off the motor.



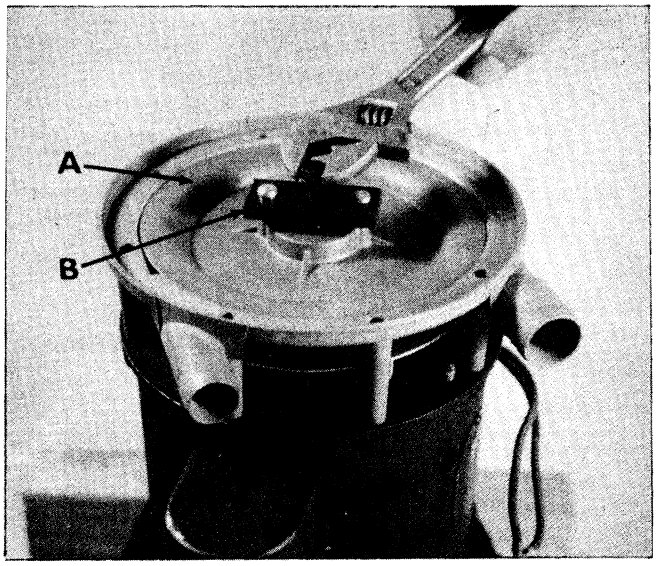
A. PUMP IMPELLER
B. IMPELLER RETAINING SCREW
C. PUMP HOUSING

Figure 23 — Unimatic Water Pump



A. CARBON SEAL
B. MOTOR SHAFT
C. WATER PUMP IMPELLER
D. WATER PUMP HOUSING
E. WATER PUMP SEAL WASHER

Figure 24 — Water Pump Disassembled — Unimatic Mechanism



A. PUMP IMPELLER
B. IMPELLER TOOL

Figure 25 — Using Special Tool to Remove Pump Impeller

To install the pump, place the motor fan on the shaft with fins facing the motor. Install the pump housing. Insert seal kit by gluing the rubber gasket and seal face to the pump housing. Place the carbon seal on the seal face and install the impeller. Make certain when aligning the impeller to the carbon seal that the ears on the seal go into the notches in the impeller. After the impeller screw has been tightened, stake the screw to the impeller. Install the snubber plate and check for leaks.

NOTE: *The pump housing and snubber plate screws are not evenly spaced. The pump can only be installed in one position.*

WATER PUMP – PULSAMATIC

The water pump on the pulsamatic model washers is driven directly by the motor in the same manner as on the unimatic models. Though the two pumps operate the same, their appearance and construction is entirely different. The basic parts of the pulsamatic pump are the housing, cover, seal and impeller.

The pump housing is mounted to the motor mounting plate by three brackets that extend below the clutch mechanism, *Figure 26*.

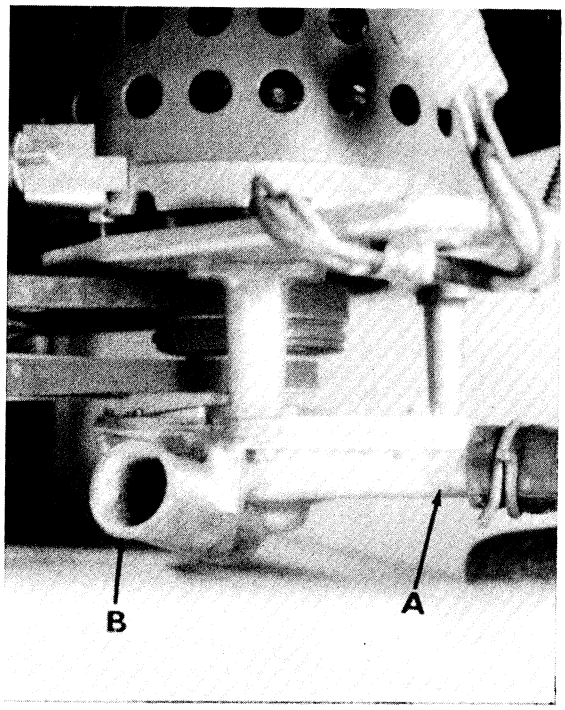
The carbon-face seal is pressed into the housing and can be replaced separately.

The four-bladed impeller is held on the motor shaft with a bolt and a lockwasher. The lockwasher is cut so that it locks on the blades of the impeller and has ears that bend against the hexagon head of the bolt, *Figure 27*. Original impellers were made of metal, and single speed pumps had a "keyed" shaft, while the two speed pumps had a flat or "D" shaped shaft. A kit, #6590572, is available to replace the metal impeller on all pumps with a plastic cover and a flat motor shaft. It consists of a rubber impeller, bolt and lockwasher. The rubber impeller aids in preventing water from seeping up the motor shaft between the shaft and impeller. It also is quieter and less susceptible to clogging.

The pump cover has the inlet and outlet ports molded onto it and is fastened to the housing by seven screws.

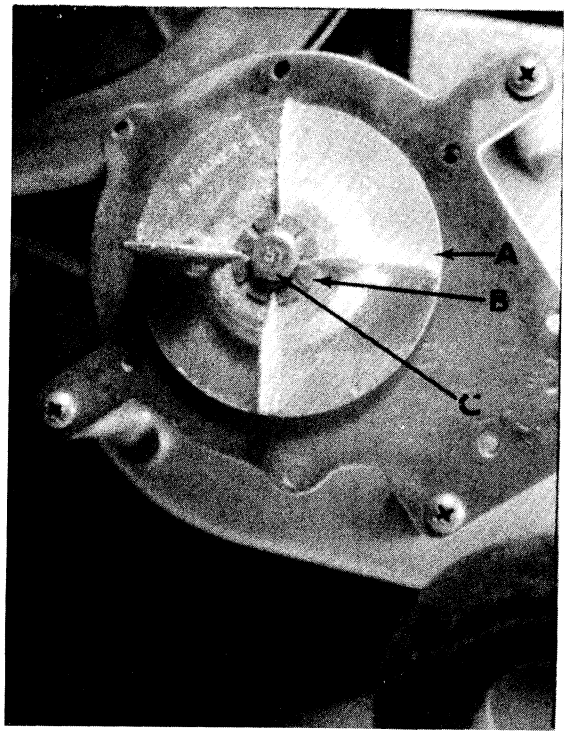
The pump used on two speed motors is larger than the one for single speed motors. The greater capacity of the larger pump allows the pump to maintain its efficiency when the motor is running at the low or 1140 rpm speed.

Like the unimatic pumps, the pulsamatic pumps must be disassembled in order to remove them. All parts are individually replaceable.



A. PUMP OUTLET B. PUMP INLET

Figure 26 — Pulsamatic Mechanism Water Pump

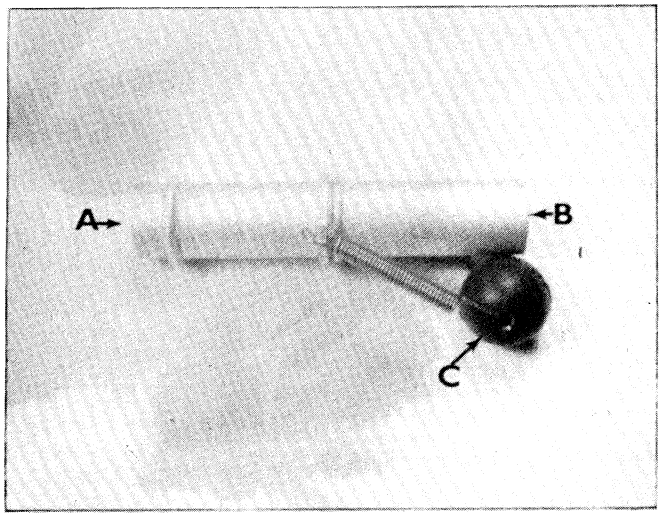


A. PUMP IMPELLER
B. LOCKWASHER
C. IMPELLER RETAINING SCREW

Figure 27 — Water Pump Impeller — Pulsamatic Mechanism

Suds Valves

Suds valves are used only on "suds saver" models. However, an accessory type of suds valve can be purchased to use on any Frigidaire washer that was not manufactured with a suds saver on it. It consists of a spring-loaded ball that snaps over the end of the drain hose, *Figure 28*.



A. INLET — CONNECTS TO DRAIN HOSE
B. OUTLET TO DRAIN
C. SPRING-LOADED BALL

Figure 28 — Spring and Ball Suds-Saver on Drain Hose

In effect, this clogs the drain hose so that the water can not drain from the outer tub or water container.

While this type of suds saver works quite well, it is not as handy as an automatic suds saver. In use, the ball is snapped over the end of the drain hose as the first load of clothes is started in the machine. When the water is spun out of the clothes in the first spin, the machine must be stopped and the clothes removed. The ball is now snapped off the end of the drain hose. The end of the drain hose is then hung over the inside edge of the spin tub.

Put in a second load of clothes and turn the timer to the number of minutes desired for the wash period. Next push in on the timer knob and advance it until the machine starts pulsating. The saved water will pump back into the spin tub from the outer tub.

The drain hose with the ball still off is now put back into the drain and the machine allowed to go through the entire wash cycle. After completion of this cycle, the clothes are removed and the first load of clothes put back into the machine. Start the machine at the rinse-fill period and the first load of clothes will then be rinsed and spun damp-dry.

While this suds saver requires the attention of the user to stop and start the machine at the proper time, it does not require a separate storage tub for the sudsy water.

The suds saver models have the suds save and return system built in the machine. This system requires a separate laundry or storage tub for the saved water and a separate drain for the rinse water. It consists of a separate motor and pump to return the saved water and a solenoid operated valve. The solenoid operated valve directs the wash water into the storage tub, the rinse water into the drain, and the saved water back into the machine. *Figure 29* shows the schematic operation of this valve assembly.

With the built-in suds saver assembly, for the second load the user puts the clothes in the washer and sets the suds switch to "on" Next turn the timer dial to the number of minutes desired for the wash period and push in on the knob. The suds return pump will then return the saved suds water to the machine. During the wash-fill period, with the switch set at "on", the fill valve solenoids are de-energized and the suds return pump is energized.

Since the suds water will be returned to the machine before the timer fill period is through, there is enough time before the end of the timer fill period to add hot water to the returned suds water. This sometimes is desired in order to raise the level, or to raise the temperature of the returned suds water.

Set the wash water temperature switch to hot or, if the temperature is determined by a timer cycle, set the timer dial to "White–Colorfast" and push

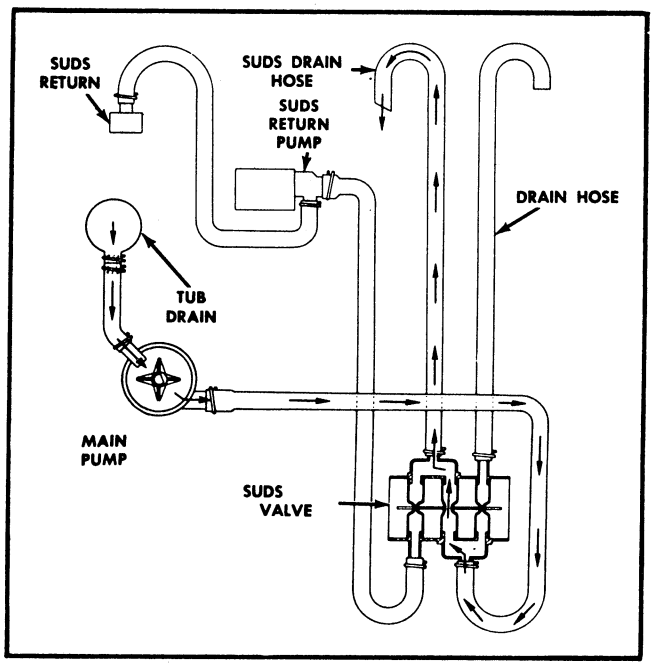


DIAGRAM A —Suds to Set Tub

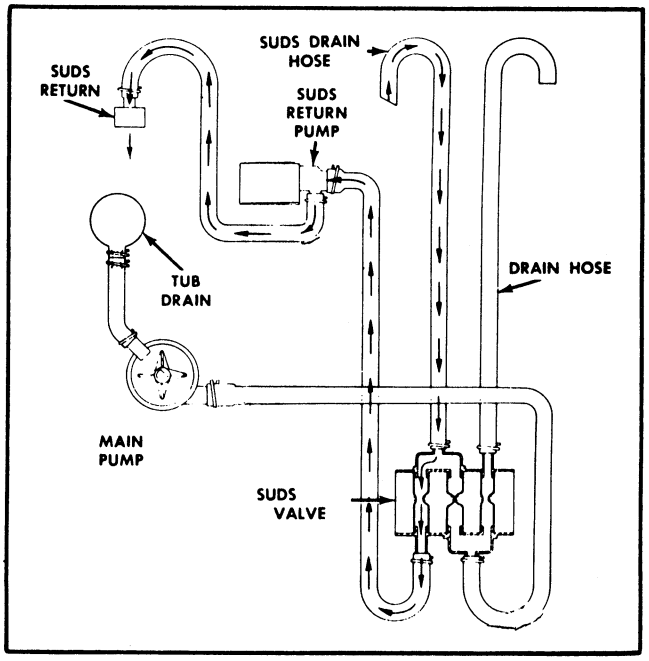


DIAGRAM C —Suds Return

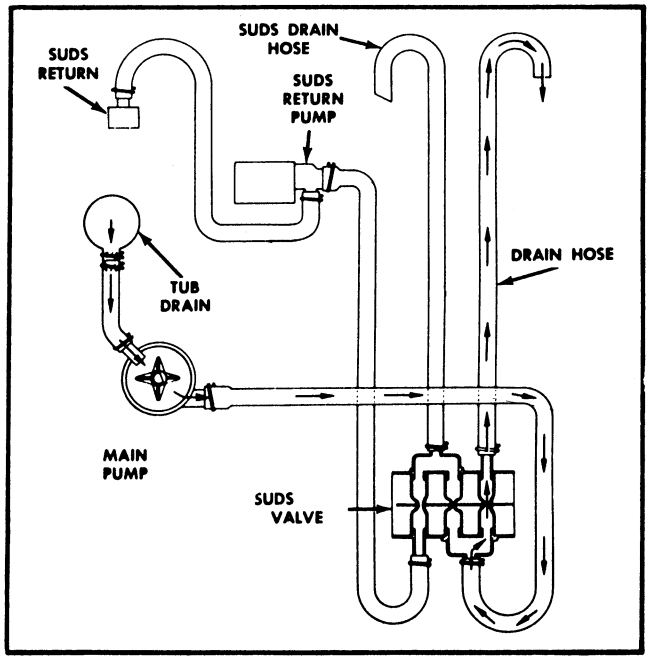


DIAGRAM B —Rinse Water to Drain

DIAGRAM A—Solenoid is energized from half way through the first overflow rinse until the subsequent spin period is completed.
Arrows indicate the flow of sudsy water into water container.

DIAGRAM B—Solenoid is de-energized from end of the first spin period until the end of the complete cycle.
Arrows indicate the flow of rinse water into the drain.

DIAGRAM C—Solenoid is de-energized and suds-return pump is energized.
Arrows indicate the flow of the returned water from the suds water container back to the spin tub.

Figure 29 — Suds-Saver Valve Operation

in on the timer knob. Turn the suds saver switch to "off" This energizes the hot water solenoid and de-energized the suds return pump. Usually two or three gallons of hot water can be added to the returned suds water in this way.

It is also recommended that a small amount of detergent be added to the water.

Dispensers

BLEACH DISPENSER

The bleach dispenser for Frigidaire automatic washers consists of a plastic cup with elongated holes in the upper portion, *Figure 30*. The cup is located in the top of the agitator column, held in position by a rubber cap.

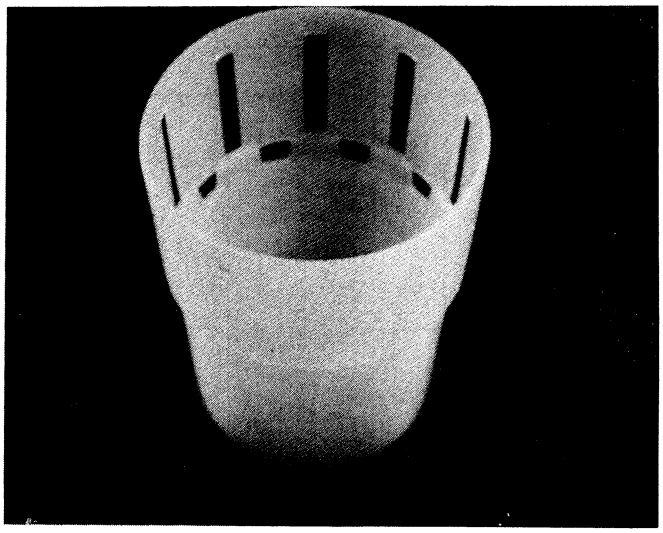


Figure 30 — Bleach Dispenser Cup

When bleach is added to the cup, the pulsating motion of the agitator column causes the bleach to be dispensed, and thus mixed with the wash water.

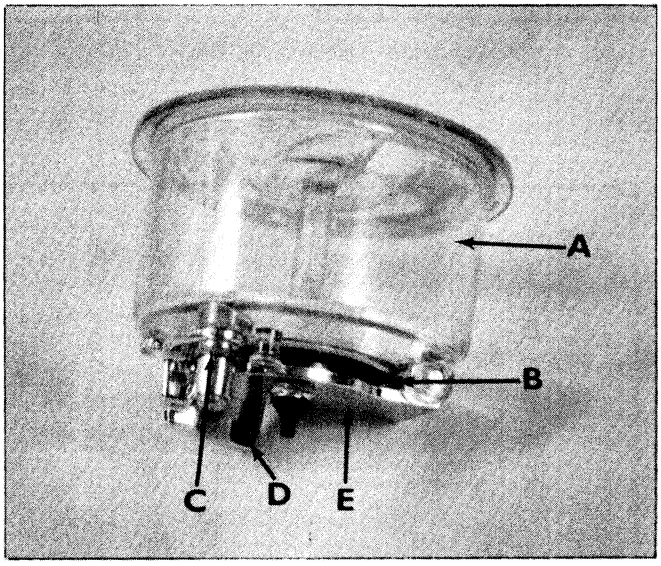
RINSE DISPENSER

The rinse dispenser is a glass bowl, *Figure 31*, located in the center agitator column. Like the bleach dispenser, it is held in position by the agitator cap.

After the conditioner has been added and the dispenser placed in position, the wash cycle is started.

The lid remains closed until the first spin. At this point when the basket is spinning, centrifugal force causes the lid to open, but does not release the conditioner. Centrifugal force holds the solution up and around the bowl.

When the spin cycle stops, the lid remains open and the solution drops into the tub where it is mixed with the rinse water.



A. DISPENSER CUP
2B. LID SPRING
C. LATCH SPRING
D. LID LATCH
E. DISPENSER LID

Figure 31 — Rinse Conditioner Dispenser

Transmission

Two styles of transmissions are used in Frigidaire automatic washers. The unimatic mechanism was used from 1947 through 1958, and late in 1954 the pulsamatic mechanism was introduced.

The unimatic mechanism is so named because the transmission, motor and water pump are all assembled as one unit. The transmission and water pump are direct-driven by the motor, thus no belts are used on this mechanism. The complete assembly can be removed from the washer cabinet and taken to the shop for repair without removing the entire machine.

The pulsamatic mechanism differs from the unimatic mechanism in that it is belt-driven. However, the water pump is still direct-driven by the motor. The motor for the pulsamatic mechanism is a reversible motor, turning in one direction for the spinning action and reversing for the pulsating action. All re-operation procedures on the pulsamatic mechanism can be made at the machine location without taking it into the shop.

The operation of these two different mechanisms will be explained in more detail in the following paragraphs.

UNIMATIC MECHANISM – OPERATION

The unimatic mechanism consists of the transmission, motor, and water pump assembled into one unit. At one end of the single speed motor is assembled the motor fan and water pump. The pump is direct-driven by the motor. At the other end of the motor is assembled the transmission, which is also direct-driven by the motor.

Pulsating and spinning action of the unimatic mechanism are determined by the action of the clutch assembly, located inside the mechanism. The drive shaft torque plate, the clutch spring assembly, and the clutch spring bushing are the parts making up the clutch assembly.

The clutch spring is seated in the mechanism base hub and is located on the drive shaft by the clutch spring bushing. The drive shaft torque plate is located on the clutch spring bushing by a finger that indexes on the top of the bushing. On top of the drive shaft torque plate is a sleeve that holds the complete clutch assembly onto the drive shaft. The sleeve is pinned to the drive shaft with a pin. A retainer ring around the sleeve holds the pin in the sleeve.

The trip shaft extends through the mechanism base to the bottom end of the clutch torque spring. The half-round end of the trip shaft is used to release or to hold the end of the clutch torque spring for the desired action.

When the trip shaft solenoid is de-energized, the end of the clutch torque spring is caught and held from turning. This causes the torque spring to expand against the internal walls of the mechanism base hub and, at the same time, to release its grip on the drive shaft. This holds the spin cage and spin tub from turning but, since the pressure is released from the drive shaft, it is allowed to turn freely.

The drive shaft, being free to turn within the clutch spring, will now supply power to the crankshaft and pulsator assembly, thus giving the machine its pulsating action.

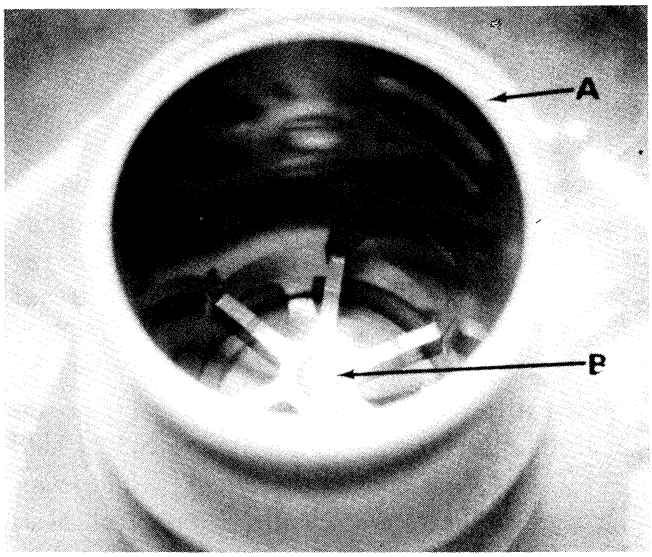
When the trip shaft solenoid is energized, the trip shaft turns so that the end of the clutch torque spring is now released. As this happens, the clutch spring grasps the drive shaft. The rotation of the drive shaft causes the torque spring to tighten its grasp on the shaft until it turns with the shaft.

Spinning action of the torque spring is transmitted to the torque plate since it is indexed to the torque spring hub. The torque plate transmits the spinning action through the cage drive pins, through the spin cage, and to the spin tub. Brake plates on each side of the torque plate bring the spin tub to a smooth stop at the end of each spin period.

UNIMATIC MECHANISM – REMOVAL

Remove the cabinet top as covered under "Cabinet

Top'' in the cabinet service section of this manual. Remove the rubber cap on the pulsator column to expose the retainer screw holding the pulsator column to the mounting nut, *Figure 32*. Remove



A. SOAP DISPENSER B. DISPENSER MOUNTING SCREW

Figure 32 — Pulsator Mounting Detail

this screw and lift off the pulsator column. Now remove the pulsator mounting nut, *Figure 33*, and remove the pulsator diaphragm from the mechanism shaft.

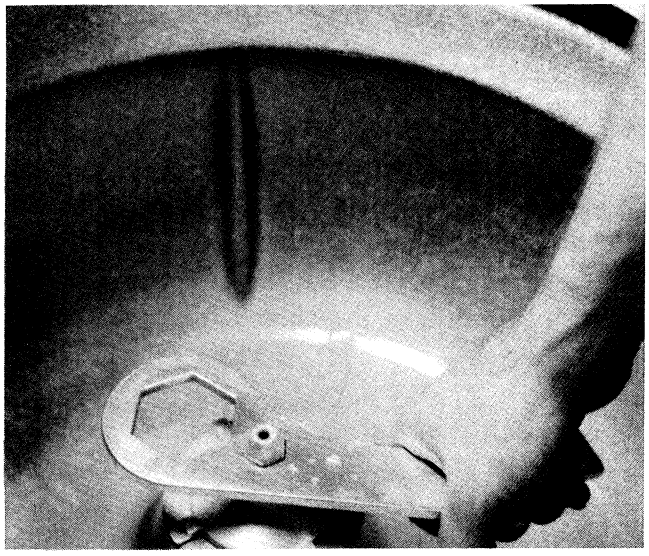


Figure 33 — Pulsator Nut Removal

The water and oil seal bellows, *Figure 34*, consist of two separate bellows, one inside the other, and held to the spin tub by two lock-ring clamps. To remove the bellows, place the clamp ring tool around the clamp with the clamp opening facing

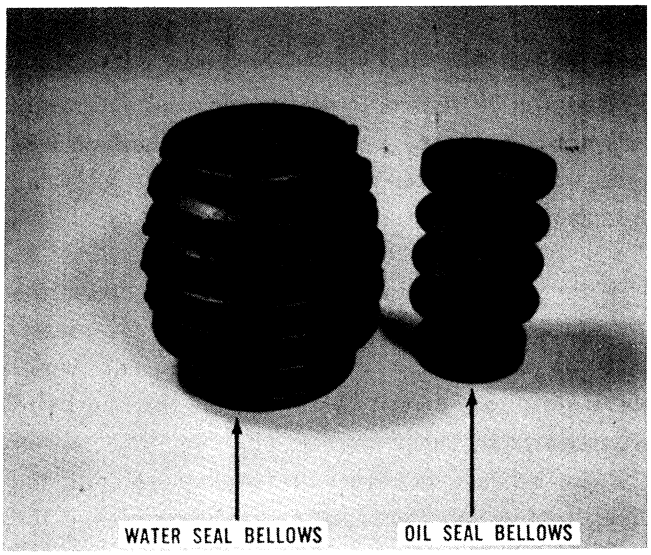


Figure 34 — Water and Oil Seal Bellows

the open section of the clamp ring tool, *Figure 35*. Release the clamp and lift from its position. Remove the water bellows and proceed with the oil bellows in the same manner, but using a smaller clamp ring tool, *Figure 36*.

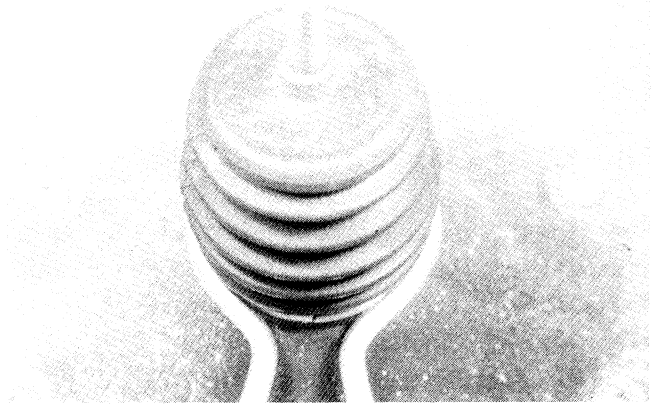


Figure 35 — Removing Bellows Clamp Ring

The spin tub mounting nut, *Figure 37*, is locked in position by a copper lockwasher. To remove the nut, place a punch or screwdriver on the lockwasher tab and bend it down to the open position. Remove the spin tub mounting nut with a special tool, *Figure 38*, and lift the tub from the cabinet.

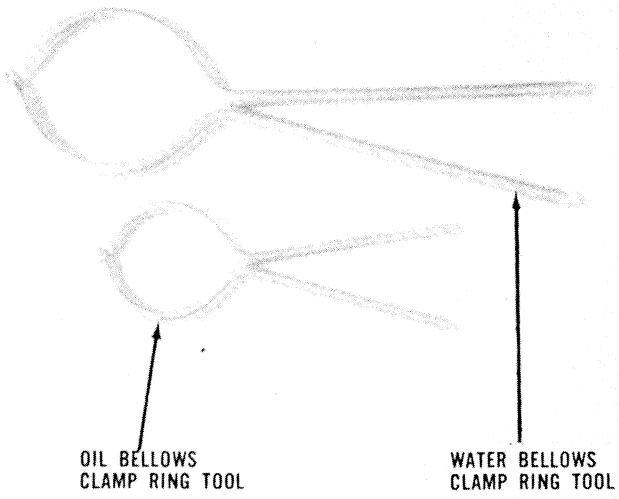
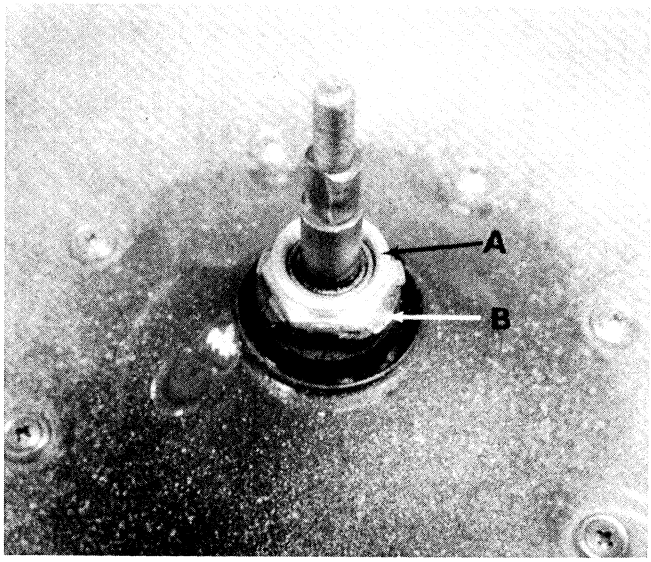


Figure 36 — Oil and Water Bellows Clamp Ring Tools



A. MOUNTING NUT B. LOCKWASHER

Figure 37 — Spin Tub Mounting Nut

CAUTION: *When removing the mounting nut, it may become damaged where the oil bellows fit around the top portion. If so, it must be replaced to prevent oil from leaking into the tub.*

After the spin tub is removed, proceed as shown in *Figure 39*, removing mechanism support screws. When the support is loose from the outer tub, remove the washer back service panel and disconnect the harness wires and pump hoses from the mechanism. By grasping the outer edges of the mechanism support, lift the mechanism free of the cabinet, *Figure 40*.

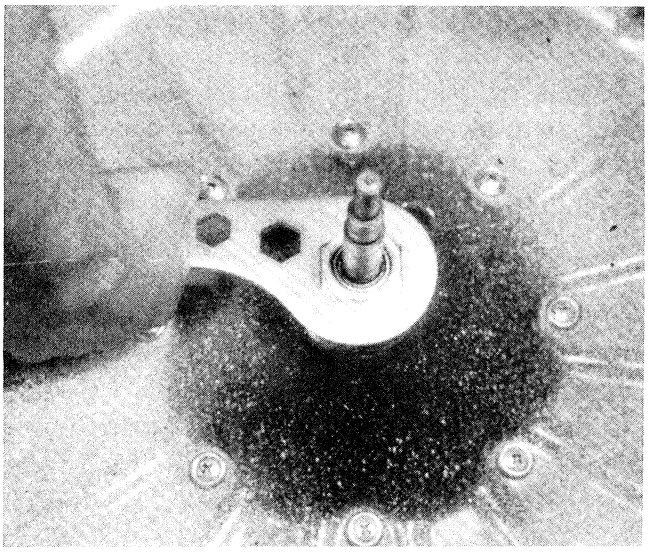
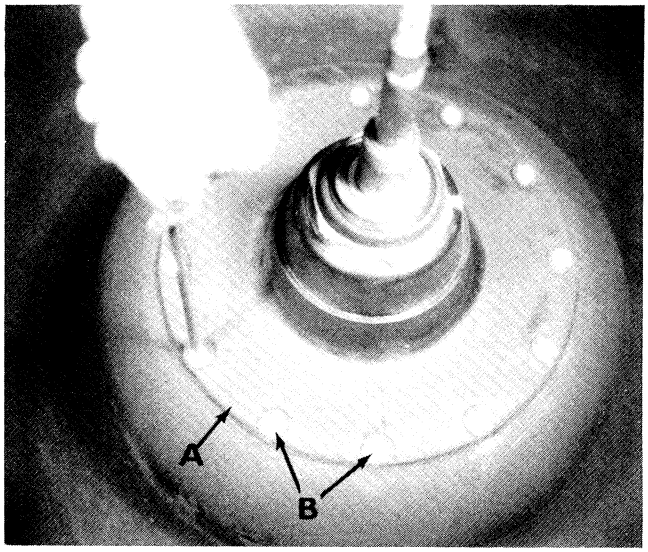


Figure 38 — Tub Nut Removal



A. MECHANISM SUPPORT B. SUPPORT SCREWS

Figure 39 — Removing Mechanism Support Screws

Figure 40 — Lifting Mechanism from Cabinet

UNIMATIC MECHANISM – DISASSEMBLY

Remove the mechanism from the cabinet as previously explained. The mechanism can be taken to the shop for reoperation without the washer cabinet.

With the mechanism in the shop, start the disassembly procedure with the nut and seal assembly.

The zinc lockwasher that is bent around a portion of the nut must be bent down before the nut and seal is removed. Remove the nut and seal assembly, using a special tool, *Figure 41*. The mechanism support, lockwasher, and support gasket can now be lifted from the mechanism.

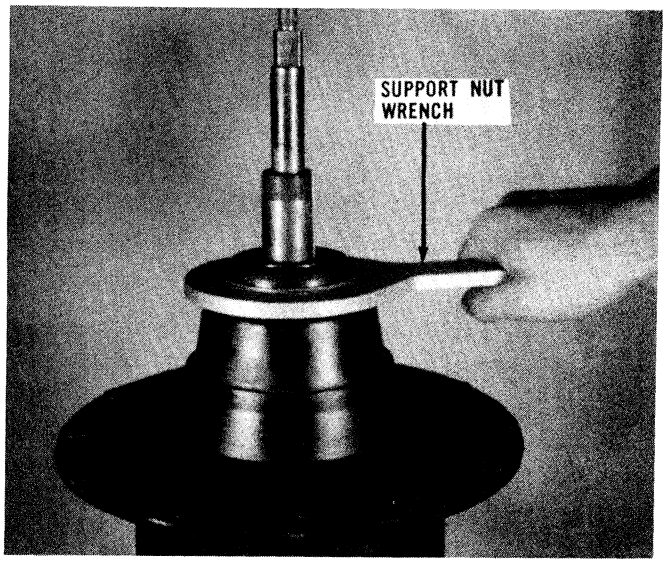
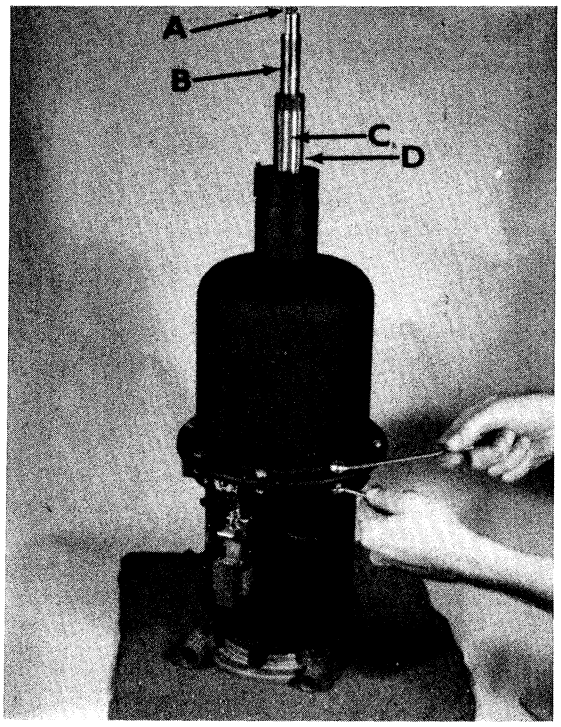


Figure 41 — Removing Support Nut Assembly

The spin cage housing can be removed by removing the eight nuts and bolts around the base of the mechanism, *Figure 42*. When the housing is removed, check for water in the oil and for rust or moisture on the inside of the housing.

If it is necessary to replace the spin bearing located in the top of the housing, a special tool is used to remove the bearing retainer. *Figure 43,* after the housing is removed from the mechanism.

Lift the cage and spin shaft assembly from the drive pins, *Figure 44*. To remove the brake plate, *Figure 45,* first remove the retainer clip from the top portion of the sleeve. Push the pin, located under the retainer clip, through the sleeve and



A. PULSATOR MOUNTING STUD
B. PULSATOR SHAFT
C. TUB MOUNTING KEYWAY
D. SPIN SHAFT

Figure 42 — Removing Base Mounting Bolts

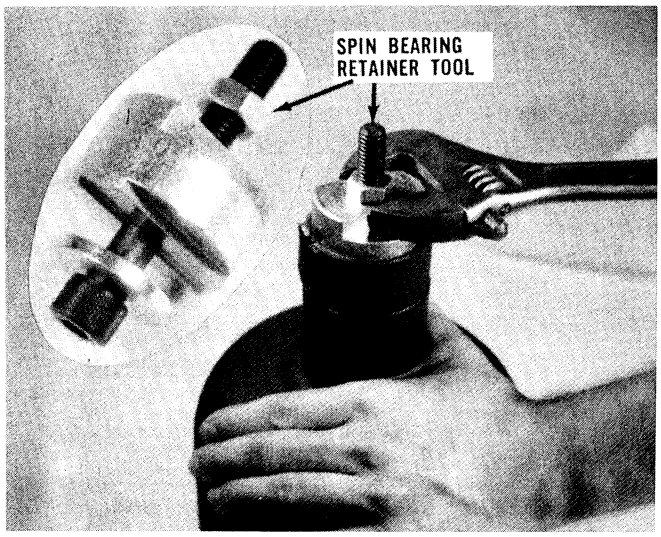


Figure 43 — Removing Spin Bearing and Retainer

drive shaft, *Figure 45*. Now lift the sleeve, spacer washer(s), and brake plate assembly from around the drive shaft.

The clutch torque spring assembly, *Figure 46,* is removed by grasping the spring hub and lifting it over the drive shaft. At this point, if the spring is broken, it will come out in two parts. If the spring will not lift out, turn the drive shaft counterclockwise, lifting and holding the spring assembly at

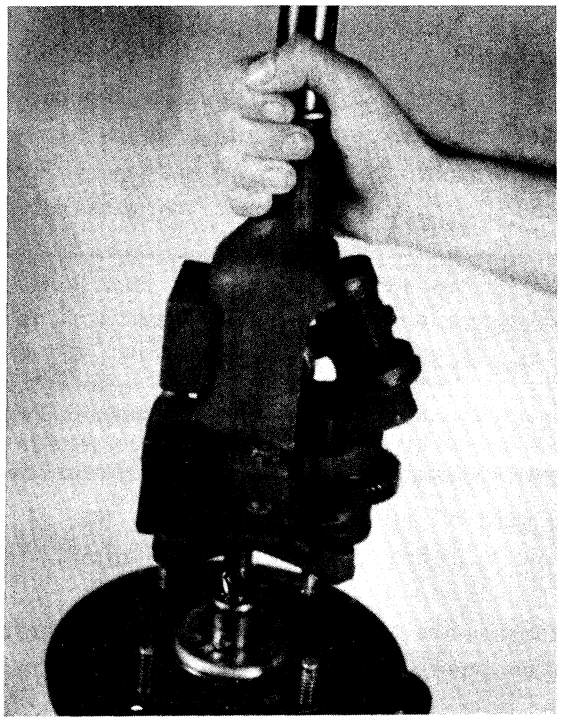
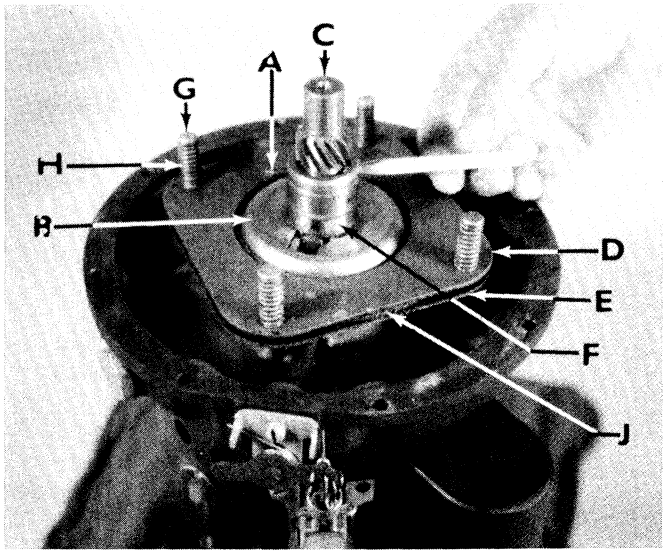


Figure 44 — Removing Spin Cage Assembly from Drive Pins

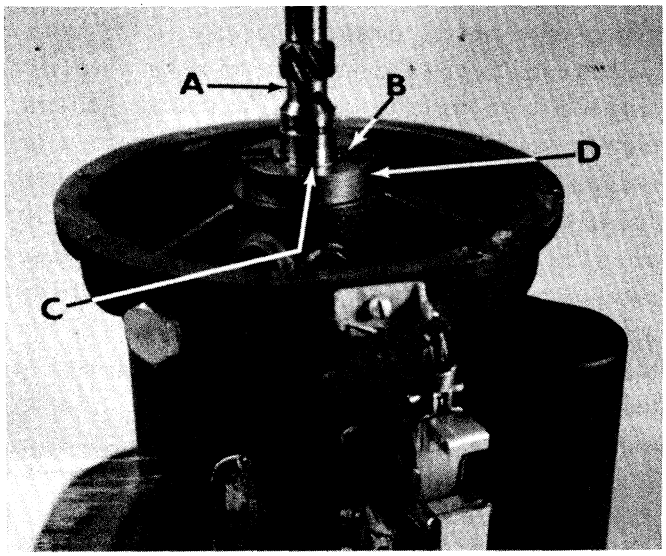


A. RETAINER PIN
B. TORQUE PLATE
C. DRIVE SHAFT
D. UPPER BRAKE PLATE
E. LOWER BRAKE PLATE
F. SLEEVE
G. CAGE DRIVE PIN
H. BRAKE TENSION SPRING
J. BRAKE LINING

Figure 45 — Removing Brake Retainer Pin

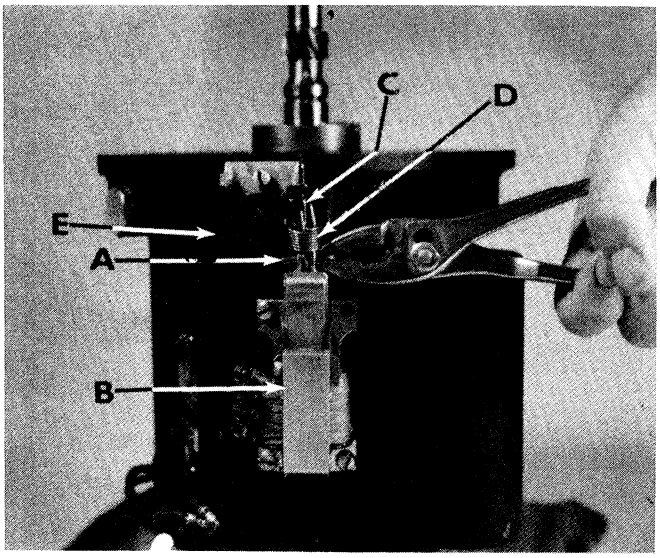
the same time. This procedure releases the spring from the shaft.

Figure 47 shows the trip shaft mechanism cotter pin. Before removing the cotter pin, check the relation between the spring and link assembly in order to put them together properly upon reassembly. Remove the cotter pin from the solenoid.



A. DRIVE SHAFT
B. CLUTCH SPRING LUG
C. CLUTCH SPRING
D. TORQUE PLATE HUB

Figure 46 — Clutch Assembly



A. COTTER PIN
B. SPIN SOLENOID
C. TRIP SPRING LINK
D. TRIP SPRING
E. TRIP SHAFT LEVER

Figure 47 — Removing Cotter Pin from Solenoid Linkage

Then remove the trip shaft by removing the screw from the retainer plate.

The mechanism base is removed by placing two wooden blocks under the base as shown in *Figure 48*. Remove the pump assembly as covered under "Pumps" in the water section of this manual. Remove the motor fan by lifting it from the motor shaft, *Figure 49*. The four motor bolts that hold the motor together and to the mechanism base can now be removed.

Tap the mechanism base lightly with a mallet,

taking care not to damage the centrifugal motor switch mounted on the motor frame base when sliding the rotor from the frame. The end of the rotor that is splined into the drive shaft has an anti-backlash spring fitted to it. This spring will cause the rotor to stay splined to the drive shaft when the motor frame is removed and, consequently, sharp edges on the rotor can damage the centrifugal switch or the motor windings. Be careful not to lose the spacer washers on the switch end of the rotor shaft. These washers must be used on reassembly.

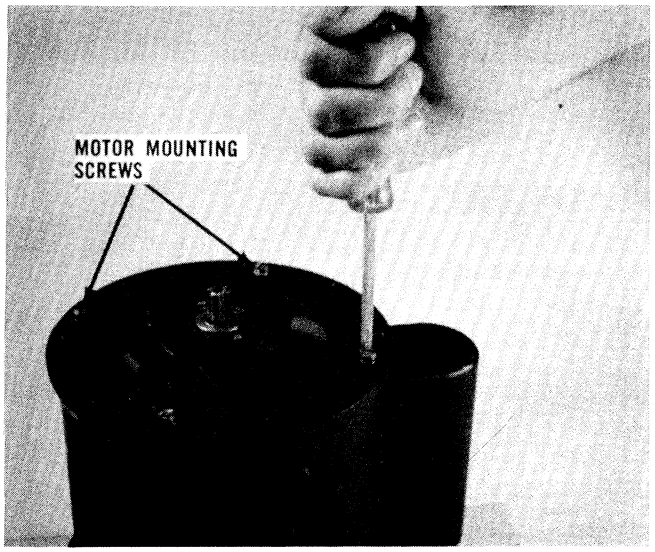


Figure 48 — Unscrewing Motor Mounting Screws from Mechanism Base

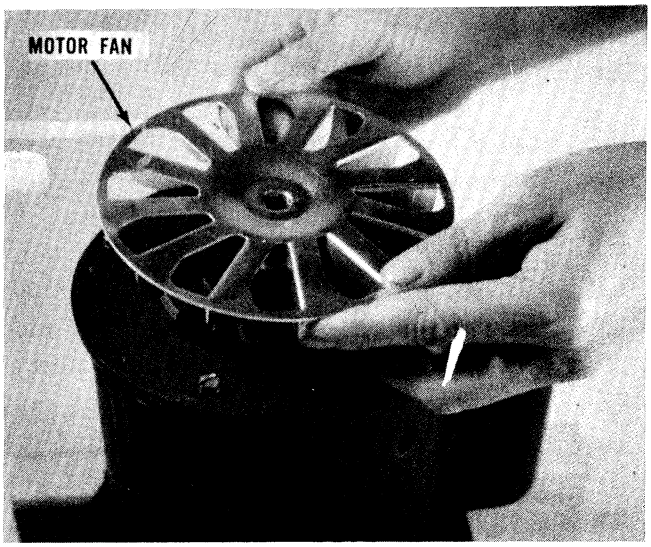


Figure 49 — Lifting Fan off of Motor Shaft

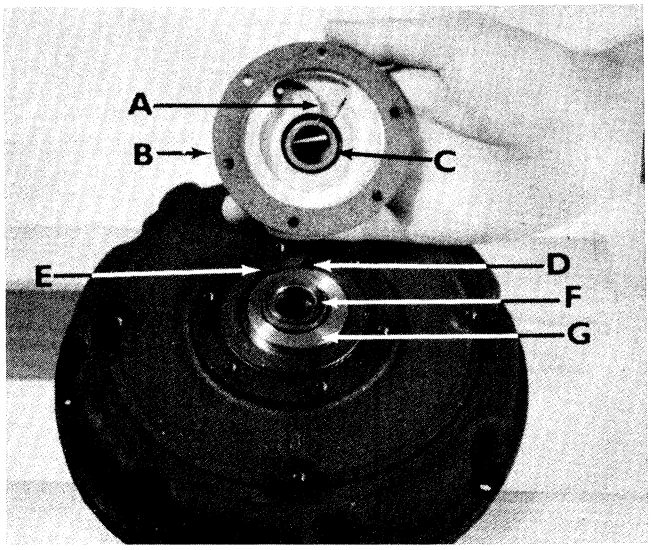
UNIMATIC MECHANISM – REASSEMBLY

Before reassembly, all parts must be cleaned and checked for wear. If the motor assembly is in operating condition, remove dirt and lint with compressed air. Do not wash motor parts in solvent.

> NOTE: *Do not use solvent on motor parts. Also, any oil impregnated surfaces, such as seal facings, should be wiped clean with a dry lint-free cloth. After washing the mechanism with a non-toxic solvent, use compressed air to dry. DO NOT DRY PARTS WITH RAGS.*

Make sure all oil passage holes are free of dirt and lint to assure maximum oil circulation.

On reassembly, the oil pump located on the mechanism base, *Figure 50*, should always be replaced as a complete assembly. The seal facings should be wiped clean and lubricated with a light film of oil.



A. OIL PUMP FINGER
B. OIL PUMP CAP
C. LOWER SEAL
D. OIL INTAKE
E. OIL OUTLET
F. UPPER SEAL
G. OIL PUMP ECCENTRIC

Figure 50 — Removing Oil Pump Cap

When checking for wear of the drive shaft and bearing surfaces, make a visual check for a scored shaft or worn bearings. If this is not apparent, use a new shaft and base to compare the play between the two, *Figures 51* and 52. If a new needle bearing is to be installed in the base, a special

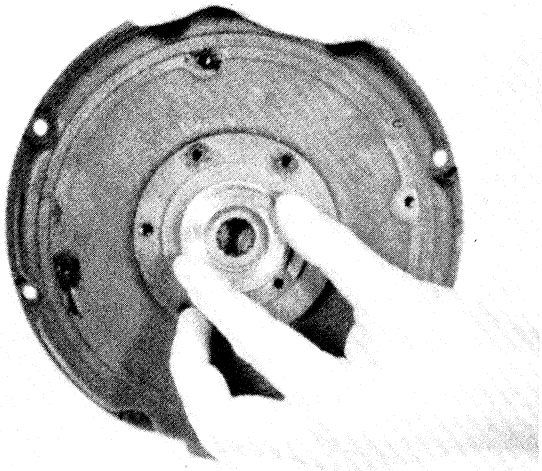


Figure 51 — Checking Play between Drive Shaft and Mechanism Base

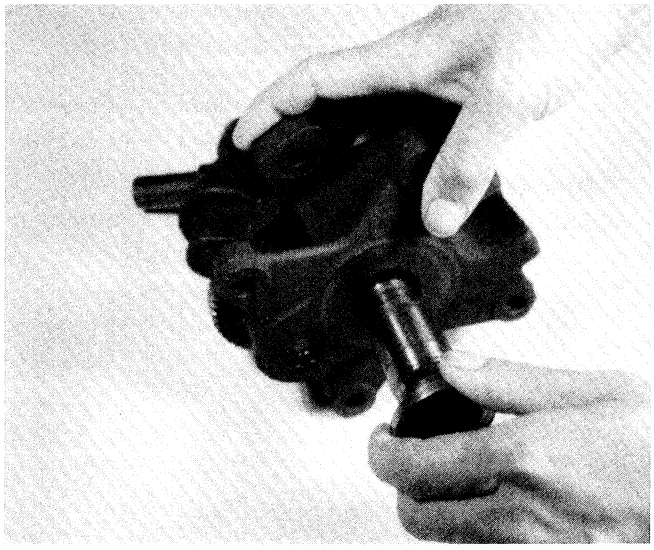


Figure 52 — Testing for Play in Drive Shaft and Spin Cage Base

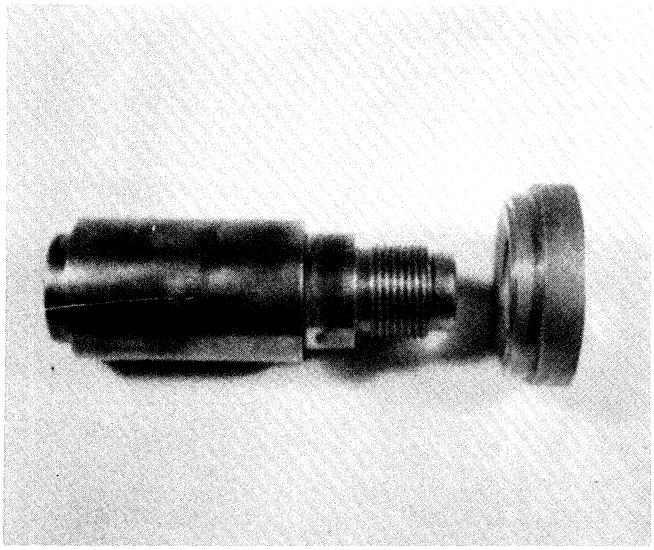


Figure 53 — Needle Bearing Tool for Bearing in Mechanism Base

tool is used, *Figure 53*. Place the drive shaft through the bearing and install the oil pump assembly, *Figure 54*, making sure the seals are in place and that all surfaces are clean. When installing the oil pump, be sure the end of the pump finger is located properly on the outer periphery of the eccentric end of the drive shaft.

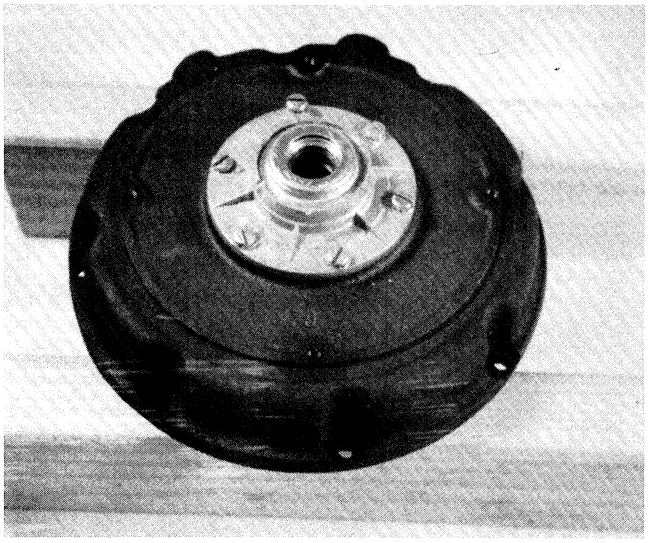


Figure 54 — Oil Pump Mounted on Mechanism Base

All moving parts including bearing surfaces and O-ring seals should be oiled prior to reassembly.

Mount the mechanism base to the motor and set the assembly on two wooden blocks. Place the motor fan on the shaft, making sure it fits the splined shaft snugly, *Figure 55*. This is important as a loose fitting fan will produce a noisy operation.

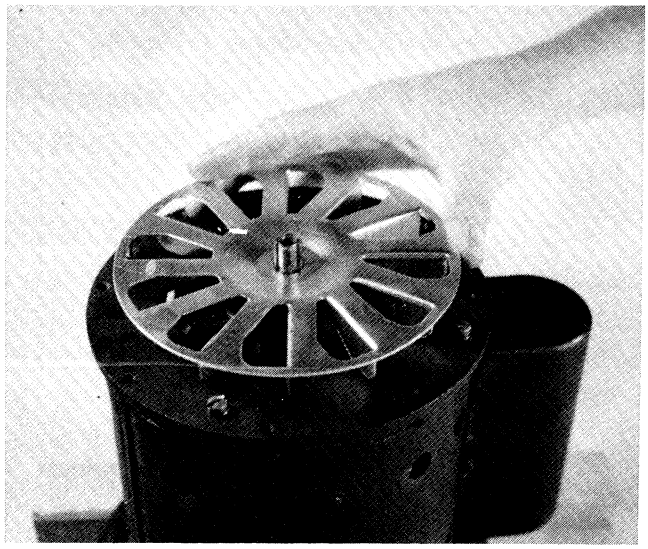


Figure 55 — Testing for Play between Motor Fan and Motor Shaft

Place the water pump housing over the fan and install a new seal kit. Set the pump impeller on the motor shaft and make certain that the carbon seal is aligned with the impeller. Tighten the impeller mounting screw and stake both ends of the screw slot to the impeller with a center punch. Be sure the screw is well staked so that it does not loosen and cause a noisy operation.

Clean the gasket surface of the pump housing and the snubber plate and install a new gasket. Place the snubber plate on the pump, aligning the screw holes, and tighten the screws, making sure that the screw heads are below the surface of the snubber plate and free of burrs. If the snubber plate is damaged, it must be replaced in order to gain the proper snubbing action required.

NOTE: ***The screw holes on the pump housing and snubber plate are not evenly spaced. The housing and plate can only be installed in one position.***

Place a clean dry cloth on the bench and invert the assembly. Check the end of the trip shaft for wear where it engages the torque spring. Install a new O-ring seal on the shaft and assemble it to the mechanism base.

Check the clutch torque spring for breakage and wear. Also check the end of the spring where the trip shaft engages. If there is no apparent wear, place the spring and hub assembly in the mechanism base, turning it in a clockwise direction, pressing it down until the spring hub meets the surface of the mechanism base, ***Figure 46***.

A close observance of the brake plate assembly will determine the condition of the parts. Replace these parts if necessary.

The brake assembly is now installed on the torque spring hub with the torque plate tang in the hub groove opposite the torque spring tang. Next, install the spacer washers, followed by the drive shaft sleeve and retainer pin.

Using a feeler gauge, check the clearance between the brake torque plate and the spacer washers, ***Figure 56***. If this clearance is not between .003 in. and .010 in., it can be adjusted by the use of different spacer washers. Thicknesses of .018 in., .0025 in., and .035 in. are obtainable.

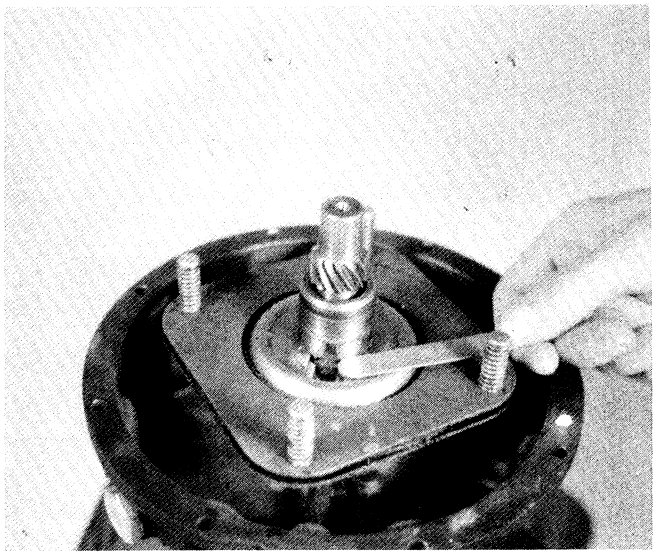
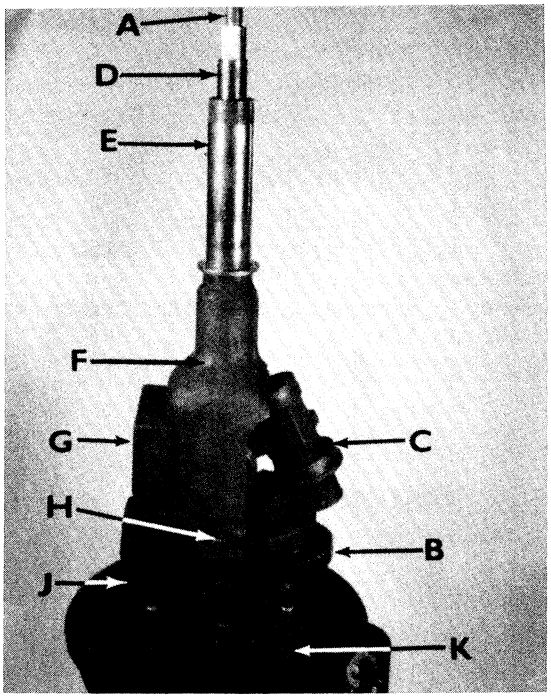


Figure 56 — Checking Clearance between Sleeve and Brake Torque Plate

The mechanism spin cage assembly, ***Figure 57***, must be disassembled in the event it is frozen or excessive wear is apparent. If the assembly is not stuck or binding, it can be rotated by lifting up and and pushing down on the pulsator shaft.



A. PULSATOR MOUNTING STUD
B. CRANKSHAFT DRIVE GEAR
C. CRANKSHAFT
D. PULSATOR SHAFT
E. SPIN SHAFT
F. SPIN CAGE
G. SPIN CAGE BALANCE WEIGHT
H. SPIN CAGE MOUNTING NUTS
J. SPIN CAGE BASE
K. BRAKE ASSEMBLY

Figure 57 — Spin and Pulsating Mechanism

The crankshaft sleeve is checked with a feeler gauge, *Figure 58*. This clearance should not exceed .008 of an inch on all sides of the sleeve. If it is more than .008", install a new crankshaft and sleeve assembly.

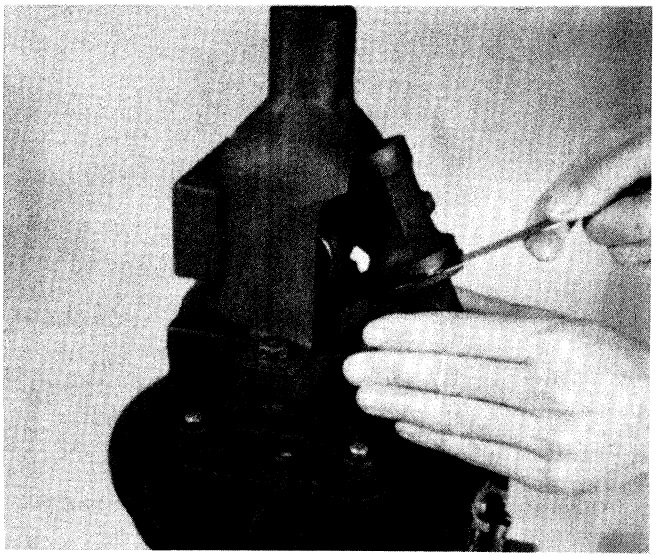


Figure 58 — Testing End Play in Crankshaft Sleeve

The crankshaft gear assembly, *Figure 59*, is checked for side play by moving the gear from side to side while holding it in a fixed position. If there is excessive side play, these parts should be replaced as needed. *Figure 60* shows a new spin cage base being used as a gauge to check the crankshaft wear.

The bearings in the spin cage base can be checked with the use of a new crankshaft.

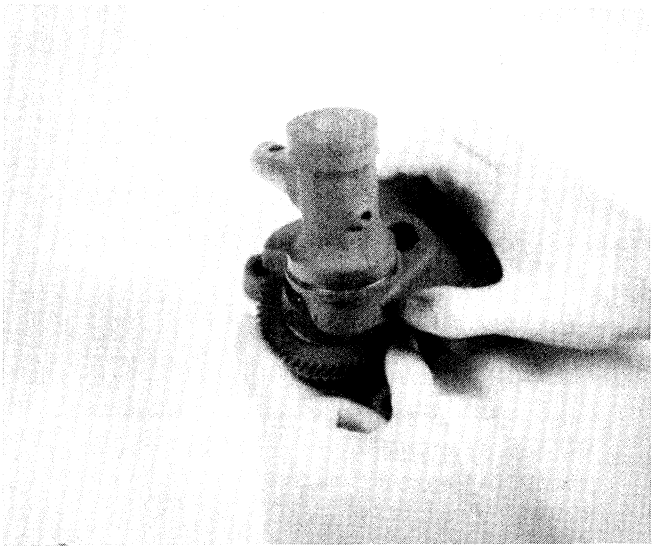


Figure 59 — Testing Play in Crankshaft

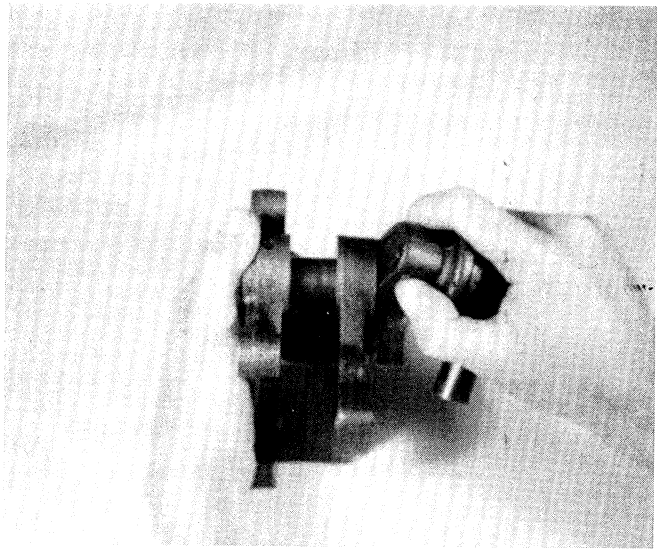
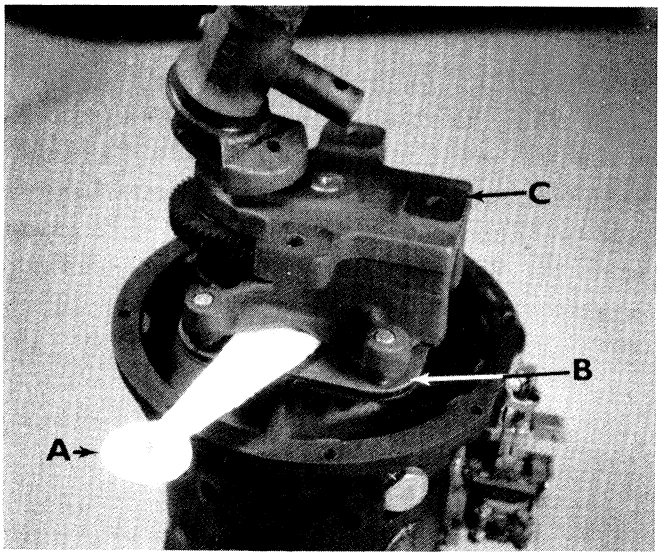


Figure 60 — Testing Crankshaft Wear

To check the crankshaft gear for backlash, install the spin cage on the brake assembly and using a spacer tool, *Figure 61*, rotate the complete spin cage clockwise until it stops. Now turn it counter-clockwise ½ turn. In this position hold the cage with one hand and check the backlash with the other.



A. SPACER TOOL B. BRAKE ASSEMBLY C. SPIN CAGE BASE

Figure 61 — Using Spacer Tool

Now, check the end play of the crankshaft, using a feeler gauge shown in *Figure 62*. Anything over .005" clearance on all sides should be shimmed.

To change the crankshaft gear, place the spin cage base in a vise. Remove the tapered pins holding the crankshaft and gear in place. Since

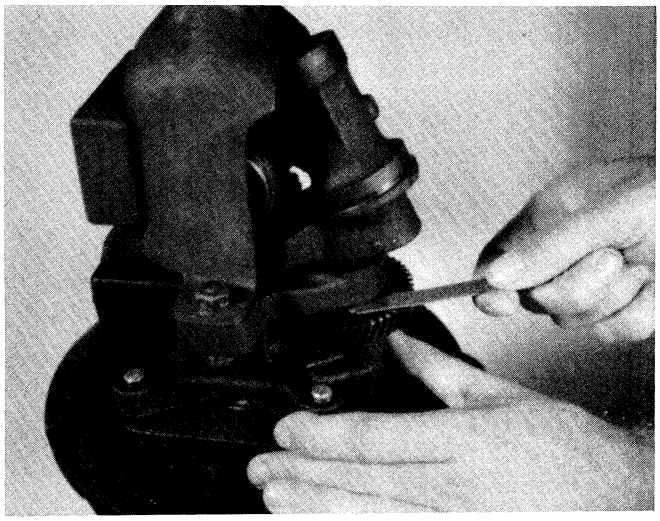


Figure 62 — Testing Crankshaft End Play

the pins are tapered, they must be driven out from the small end with a flat punch. Remove the shaft and gear, and wash all parts with a non-toxic solvent.

NOTE: *These parts should be washed and then dried with compressed air. DO NOT DRY PARTS WITH RAGS.*

Clean all oil holes with air to make sure there is no lint that will slow down the circulation of oil. After cleaning the parts, a larger pitch diameter gear (5433261) should be used. This gear supersedes the old gear, and is the only one that can be purchased. Its purpose is to correct the backlash of the gear with the mating gear.

Place the new gear in position with the tapered holes aligned with the crankshaft.

NOTE: *Make sure that the holes have the larger diameters facing in the same direction.*

Ream the tapered holes for the new taper pin with a #3 taper reamer and tee tap wrench, ***Figure 63.*** Use a 3" x 1½" taper pin and ream the hole sufficiently so the pin can be driven 1/8" below the gear hub surface.

After the tapered hole has been reamed, wash the parts again with solvent.

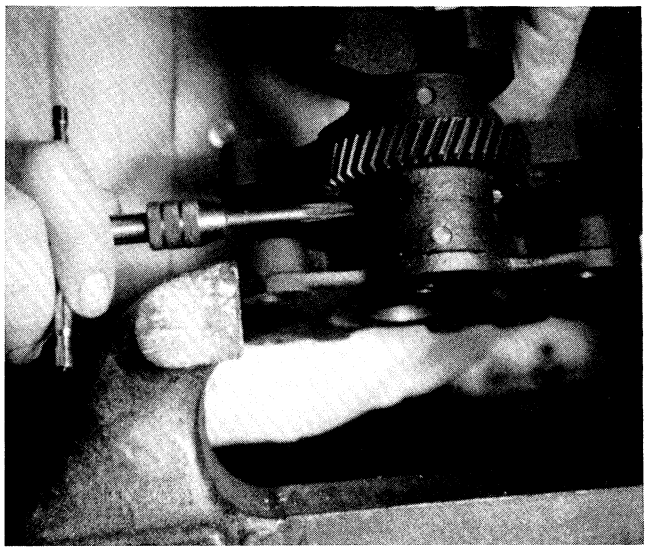


Figure 63 — Tapering Crankshaft Gear Pin Hole

CAUTION: *Before reassembly, the oil holes must be blown out with air to remove the reamer shavings.*

Before driving the taper pin in position, check the crankshaft end play. If it exceeds .005" clearance all the way around the shaft, a spacer washer of .004" should be used (5873044), ***Figure 64.***

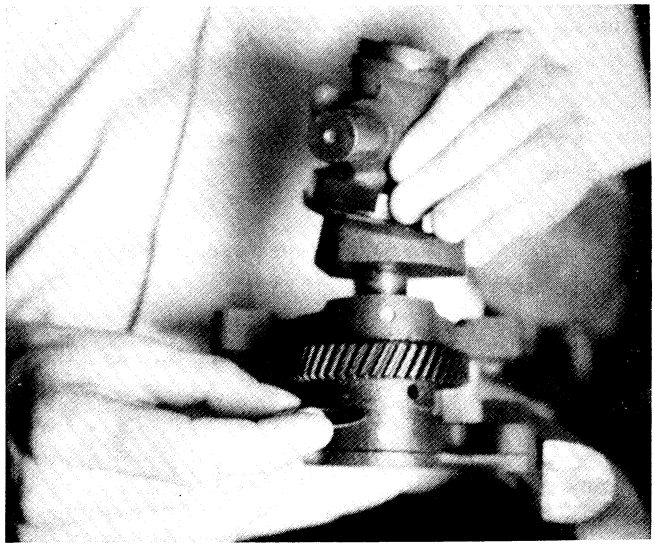


Figure 64 — Shimming Crankshaft Gear

After the end play has been checked and corrected, assemble the gear, shaft, and base. Drive the taper pin into the hole, making sure it is tight.

NOTE: *The crankshaft gear hub should be staked on two sides opposite each other with a center punch to hold the pin in place, Figure 65.*

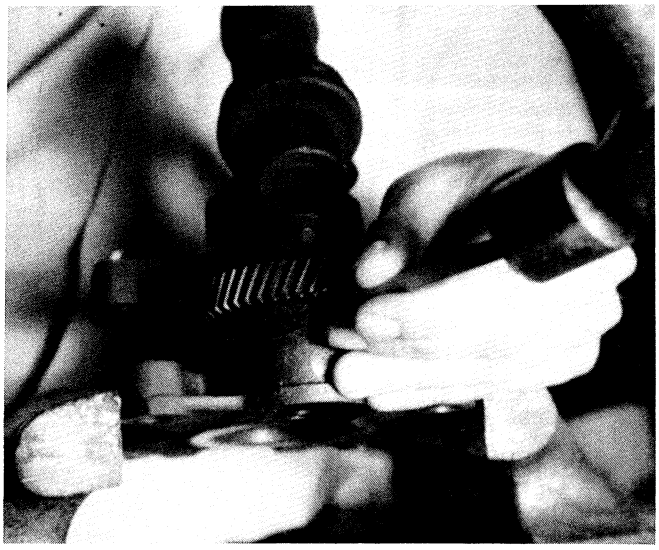


Figure 65 — Peening Crankshaft Gear Hub to Hold Pin

The trunnion block, *Figure 66*, is a close tolerance part and should be checked for binding conditions and wear. If these conditions exist, it will be necessary to disassemble the trunnion from the pulsator assembly and correct the problem.

End play in the trunnion could be caused by wear on the trunnion block or the trunnion retaining rings. If the retaining rings are worn, reverse each ring. If this does not correct the problem, they should be replaced.

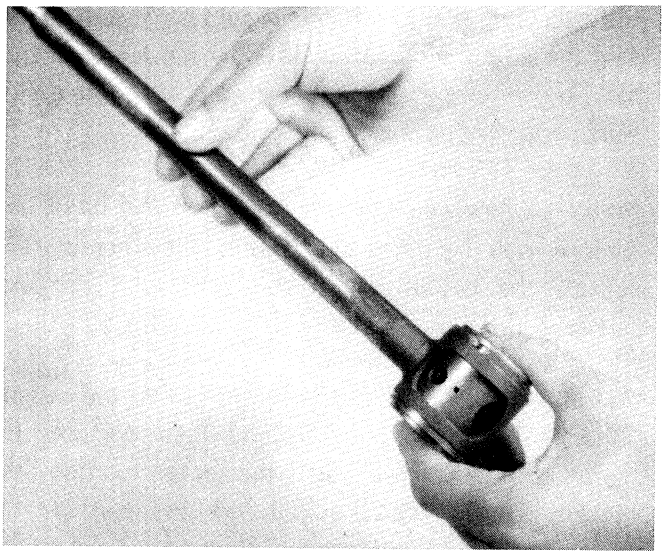


Figure 66 — Testing Pulsator Trunnion for Wear

To check the pulsator shaft for a bent condition, move the shaft up and down in the spin cage bearings, *Figure 67*.

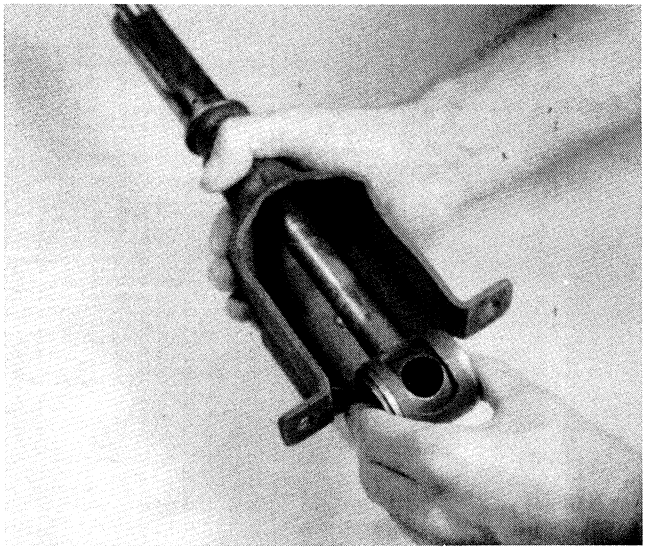


Figure 67 — Testing Pulsator Shaft for Binding

If the shaft does not move freely in the bearings, the shaft is no doubt bent and must be replaced. If only the pulsator mounting stud is bent, it can be straightened by the use of a special tool obtainable for this purpose.

Carefully check the bearings in the spin cage. The spin cage must be replaced if the bearings are badly worn.

The spin cage shaft can be checked for a bent condition by inserting a new pulsator shaft in the bearings. Move the shaft up and down. If it binds in the bearings, the spin cage should be replaced.

If the spin cage counterbalance weight is loose on the spin cage, it can be tightened by re-riveting the old rivets. If this does not tighten the weight, replace the rivet with a 5/16" x 24 x 1-1/8" bolt and nut with a lockwasher.

Install the spin cage base assembly on the brake plate, *Figure 68*.

> NOTE: ***When placing the base assembly on the brake plate, very gently lower the base and rotate the crankshaft gear until the base bottoms on the brake plate. This is to prevent damaging the gear teeth.***

Lift the base just enough to install the spacer tool, *Figure 69*. This position simulates the actual height affected by the lift of the tub mounting nut.

Rotate the mechanism by turning the motor fan and checking the clearance at all points. After the clearance check, reassemble the spin cage and pul-

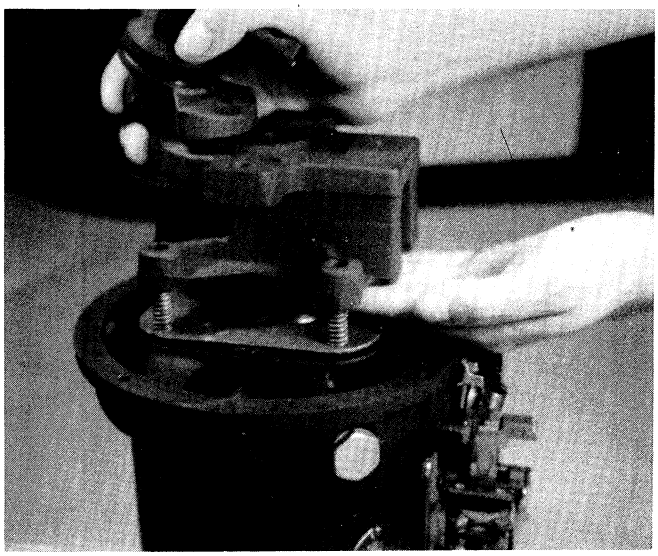


Figure 68 — Lowering Spin Cage Base on Brake Assembly

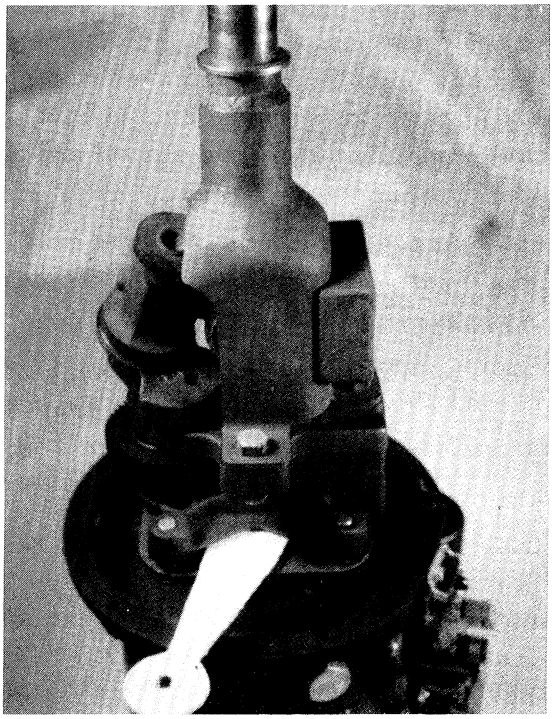


Figure 69 — Spacer Tool between Spin Cage and Brake

sator shaft assembly.

NOTE: *When reassembling the spin cage, observe the two oil holes on the pulsator trunnion. Make certain they are in the "Up" position and the small hole is in the front, Figure 70.*

Oil all moving parts with an oil can. Make sure the trip shaft lever is in the pulsating position.

With the spacer tool in position, connect a test cord to the motor leads and check the mechanism

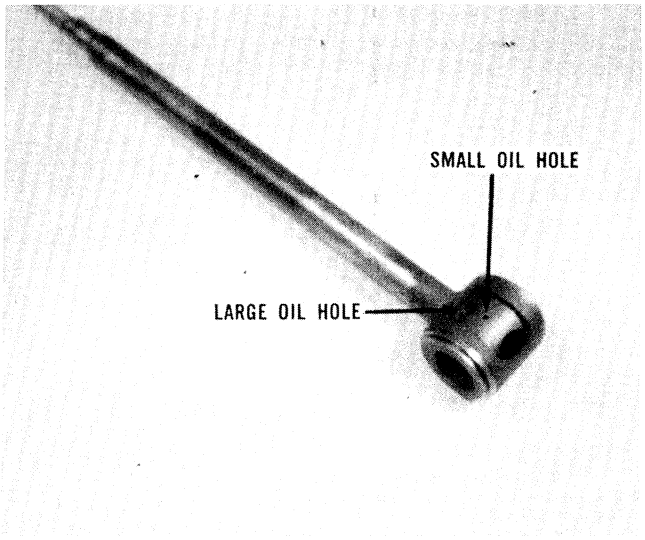


Figure 70 — Position of Oil Holes in Pulsator Trunnion for Installation

for noisy conditions. If it is noisy, the gear teeth are more than likely at fault. To correct this problem, the gear teeth can be satisfactorily stoned to remove burrs and nicks.

After all the mechanism checks have been completed, wash the mechanism housing with solvent to remove rust and old oil.

Some models use a support washer, *Figure 71*, for the spin bearing located in the neck of the mechanism housing. Located on a machined shoulder on the spin cage, this washer regulates the distance that the spin cage can be lifted by the tub mounting nut. If this washer is not reinstalled, the result will be a very noisy mechanism.

Install a new mechanism gasket on the base and charge with 1½ pints of Frigidaire mechanism oil. Install the housing with the vent tube centered between the water pump outlet and inlet.

At this time it is a good idea to put in only every other bolt in the housing and then connect the motor to a test cord. With the motor running, the mechanism can be checked for noise. Also, the oil pump should put a good flow of oil up to the spin bearing, and the pulsator shaft should show oil coming out between it and the top spin cage bearing. If these tests prove satisfactory, the remaining housing bolts can now be installed.

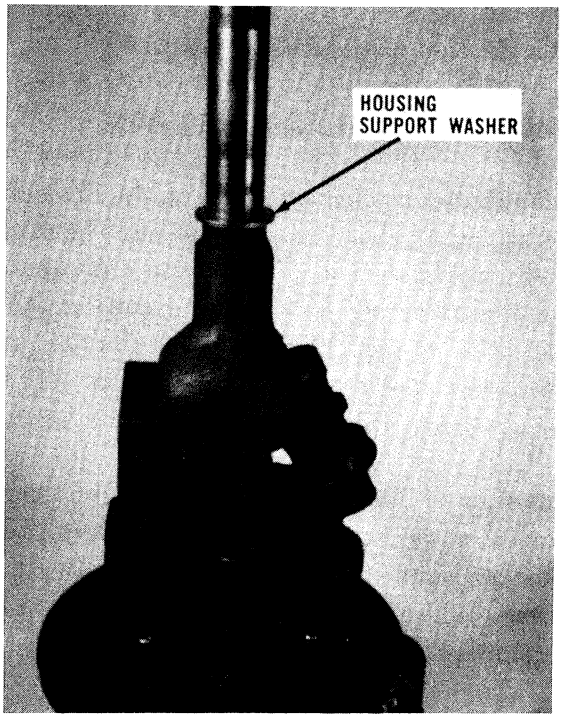


Figure 71 — Housing Support Washer on Spin Shaft

Before installing the mechanism support, a new gasket should be used. Position it on the housing tang and place the mechanism support over the gasket, lining up the housing tang with the hole in the support. Install a new support lockwasher with the tang protruding through the slot in the washer.

NOTE: *Mark the position of the tang and the edge of the lockwasher, Figure 72. This is for checking the position of the lockwasher while tightening the support nut.*

Check the spin shaft spacer for rust, corrosion and wear. If this is apparent, replace the spacer.

Three types of nut and seal assemblies are used on unimatic mechanisms. Prior to 1957 the nut and seal assembly was a lip type seal. The sealing action was accomplished by a rubber lip that surrounded the spin shaft spacer.

When this seal is removed from models prior to 1957, it should be replaced with a new nut and seal, *Figure 73*, and a mechanism support gasket and lockwasher. This nut and seal package (5876864) uses a carbon-faced seal and will give a better sealing action than the lip type seal.

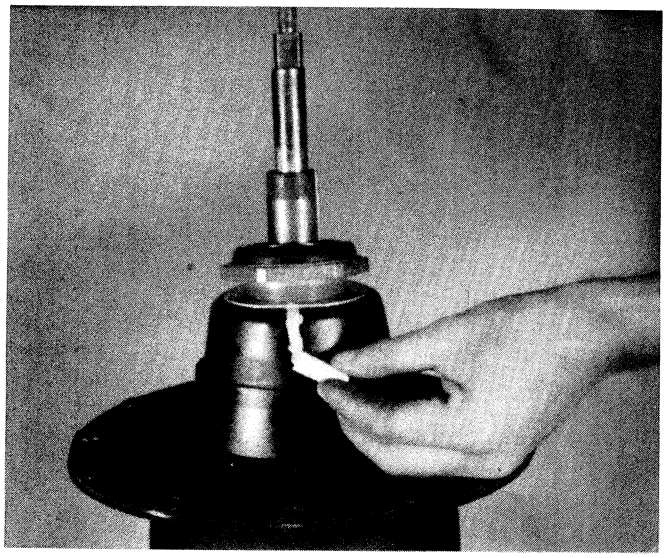
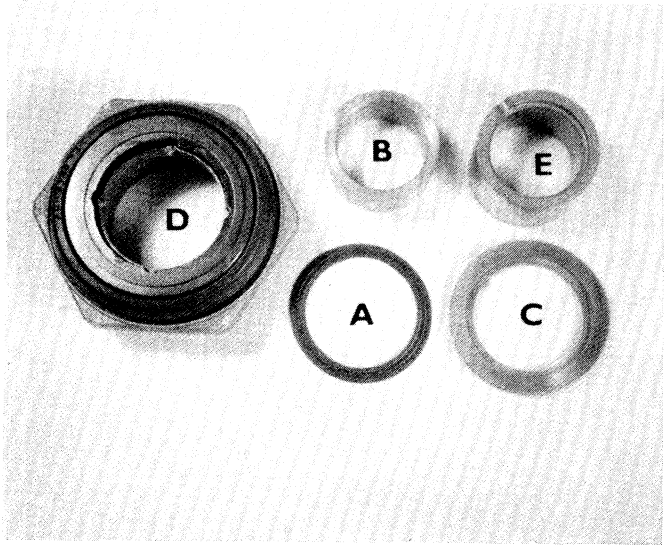


Figure 72 — Chalking Mechanism Support at Tang Location



A. GASKET
B. BUSHING
C. RING
D. NUT & SEAL
E. SPACER

Figure 73 — 5876864 Nut and Seal Assembly

To install this seal package, remove the spin shaft bushing and spacer. If the bushing and spacer is of one piece, it must be replaced with a spacer (5433856). Clean the carbon seal and the bronze seal face. Coat the seal with a drop of oil. Put the ring on the seal with the grooved face down. Insert the bushing in the ring. Center the rubber gasket on the ring with the ribbed side up, surrounding the bushing.

On the later model mechanisms, an improved nut and seal is used, *Figure 74*. The appearance of this assembly is similar to the seal used on prior models, but it is not interchangeable.

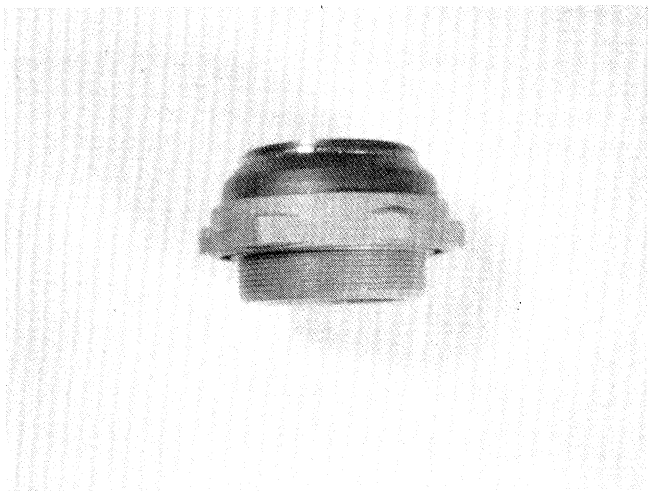


Figure 74 — 5879002 Nut and Seal Assembly

When rebuilding any mechanism, the nut and seal should be replaced to insure against any possible leaks.

To install the seal, place it over the lockwasher and tighten with the special tool. Use a mallet to draw the seal down tight, making sure the lockwasher does not shift from its position. Bend the lockwasher up flat against the nut opposite the housing tang, *Figure 75*.

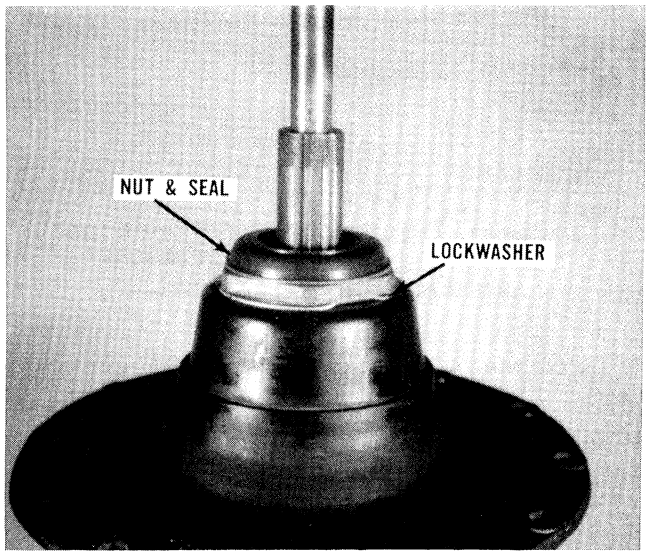


Figure 75 — Lockwasher Bent Up Against the Nut and Seal

When installing the mechanism in the cabinet, make sure the water pump inlet and outlet are in the proper positions in relation to the pump hoses, before tightening the support screws. If this is not done, the pump hoses will not reach the pump outlets.

Tighten the support screws and install the tub, using the reverse procedure for removal.

PULSAMATIC MECHANISM-OPERATION

The pulsamatic mechanism, unlike the unimatic mechanism, is a belt-driven mechanism. The motor drives the mechanism in a clockwise direction to produce the pulsating action and a counterclockwise direction to produce the spinning action. All rotation directions given in this account will be looking upward at the mechanism from the bottom.

The housing of the mechanism is in two parts, held together by screws. At this juncture, both sections are mated together to form a pulley that drives the mechanism in a counterclockwise direction to produce spinning action.

As the motor revolves and turns the mechanism housing, the housing support mounted at the dividing point turns with the assembly. The clutch torque spring tightens on the mechanism support flange and drives the spin shaft through the keyed clutch spring collar. As the clutch spring tightens on the clutch spring collar, it relieves the tension from the sides of the brake torque spring collar. This relieves the braking action to let the mechanism spin freely.

In other words, since the brake spring and clutch spring operate in opposite rotating directions in the spin period, the brake spring tension is relieved to let the brake spring collar rotate.

The agitator shaft is splined to the spin shaft, so in the counterclockwise rotation both shafts spin together. Thus the action of the wobble plate assembly no longer exists, and therefore pulsating action is stopped.

Around the mechanism housing, just below the flanged pulley, a larger pulley is mounted to the mechanism housing. When this pulley is rotated in a clockwise direction, it produces the pulsating action.

Inside the mechanism, mounted on the end of the agitator shaft, a wobble plate bearing assembly is

used. An arm protruding from the wobble plate assembly is connected to a spherical bearing located on the side of the inner lower mechanism housing.

Clockwise rotation of the Mechanism moves the wobble plate assembly around the pulsator shaft. Since the spherical bearing, mounted in the housing, is rotating around the pulsator shaft, and the wobble plate is mounted on the pulsator shaft at an angle, the pulsator shaft is forced to move up and down, producing pulsating action.

As the pulsating action occurs, the pulsator shaft would normally spin in the spin shaft but, as previously explained, the two shafts are splined on the lower end to prevent this. Also, to keep the spin tub from turning in the agitation period, the torque action is held by the brake assembly.

The clutch torque spring collar and the brake torque spring collar are keyed to the spin shaft by the same key. This holds the clockwise rotation by gripping of the brake assembly from the spin shaft to the brake spring collar and, finally, the brake assembly.
Since the brake plate assembly is a stationary device located around the spin shaft, its action holds the spin shaft and allows the pulsating action to occur.

After the motor is de-energized at the end of the spin period, the clutch torque spring is de-energized from the collar and moves out against the inner wall of the brake torque spring collar. This energizes the brake plate assembly and brings the mechanism and tub to a stop.

Also, the decelerator shoes mounted on the brake cup are forced out against the mechanism housing by centrifugal force when the brake assembly starts rotating with the spin shaft. This prevents excessive agitation in the brake period by driving the mechanism and tub together at the same speed.

PULSAMATIC MECHANISM—DISASSEMBLY

The pulsamatic mechanism can be repaired on location without removing the mechanism from the washer cabinet. However, if it is necessary to repair or replace the pulsator shaft or the spin shaft, the pulsator column, the spin tub and the mechanism support nut must be removed before laying the machine down for repairs.

Use protective padding and place the machine on the floor, front down. To prevent oil from running out of the top of the mechanism, the top edge must be elevated approximately 4 inches high with a padded block.

Next, remove the rear service panel and remove the four screws holding the crossbrace to the cabinet, *Figure 76*. Remove the crossbrace by sliding it towards the lower left-hand corner gusset. The upper end is now free for removal of the crossbrace. While removing the crossbrace, hold the snubber pad and spring to prevent them from falling.

Remove the two mechanism support bracket bolts ***NEAREST*** the motor and loosen the other two bolts but do not remove them. The mechanism support bracket can now be swung to the left to gain access to the mechanism. It is not necessary to remove the bracket.

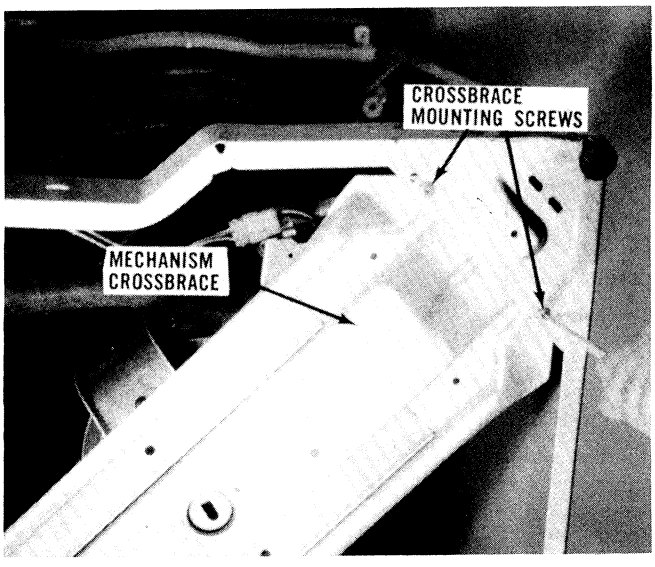


Figure 76 — Crossbrace Removal

Place a can or other suitable container under the mechanism. Turn the mechanism until the drain plug is at the bottom and remove the plug to allow the oil to drain into the can, *Figure 77*. Carefully check the oil for traces of water. If water is pre-

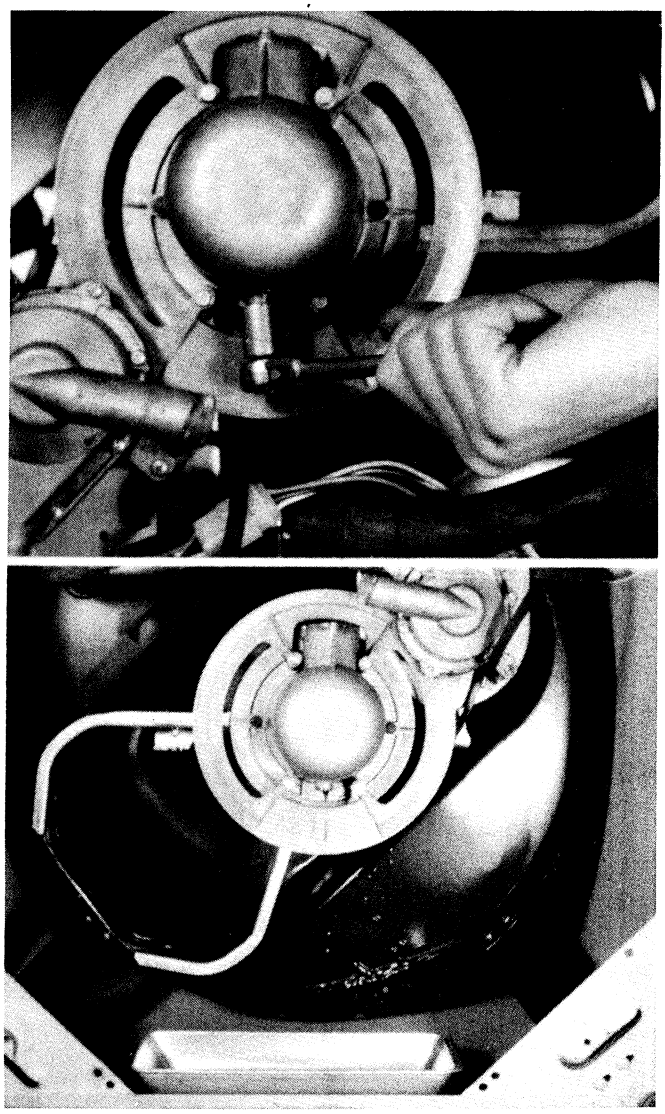


Figure 77 — Draining Oil from Mechanism

sent, the water seal bellows, the oil seal bellows or the nut and seal assembly is leaking and must be replaced.

Remove the lower belt and the lower pulley from the mechanism. Next, remove the upper belt and the two screws holding the upper and lower mechanism housings together.

Lift out on the lower housing at the side across from the spherical bearing. Slide the housing toward the bearing side to free the wobble plate arm from the spherical bearing, *Figure* 78. The housing can now be removed.

The spherical bearing, located in the lower housing, must be carefully adjusted. If it is too tight, it will cause the mechanism to bind with a resultant stalling of the washer motor. If it is too loose, it will produce a knocking noise during the pulsating action

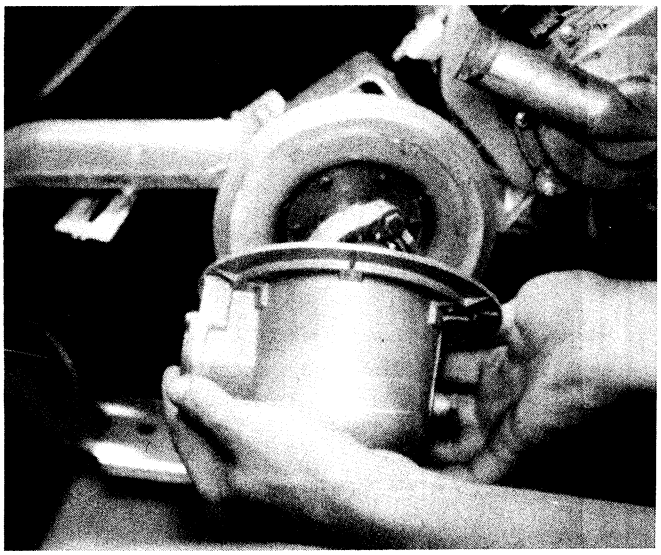


Figure 78 — Removing Lower Mechanism Housing

A means of adjustment is provided to get the proper fit of the spherical bearing. A 5/8" steel dowel is placed in the bearing, *Figure* 79. Rotate the bearing with the dowel to "feel" the fit of the bearing. The bearing should not bind but still be snug enough that a slight pressure must be exerted to turn the bearing.

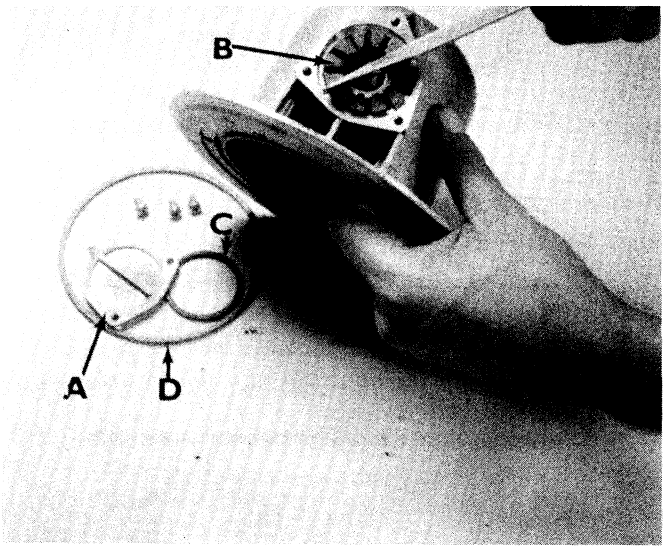
Figure 79 — Testing Adjustment of Spherical Bearing

The spherical bearing on the early model pulsamatic mechanisms is adjusted by the use of shims under the bearing cap. The shims are obtainable

in .008", .010", .012" and .014" thicknesses, and a combination of any of them are used to obtain the proper bearing fit.

> NOTE: *To obtain the correct fit, the shimming process should be done without the ring gasket. After the correct fit is obtained, coat the gasket with oil and install it with the desired shims.*

Late style pulsamatic mechanisms have an adjustable retainer to obtain this adjustment. The cover plate has a retainer lock on it that holds the retainer from turning, *Figure 80*. After the bearing adjustment is made, the cover plate is installed with the retainer lock in the slots of the bearing retainer.



A. RETAINER LOCK AND COVER PLATE B. BEARING RETAINER C. BOSS GASKET D. HOUSING GASKET

Figure 80 — Adjusting Late Style Spherical Bearing

Remove the wobble plate bearing, *Figure 81*, by first bending the ear on the lockwasher away from the nut. Remove the nut and slide the assembly from the shaft. The bearing will slide out with the assembly.

Before removing the wobble plate bearing from the wobble plate, check the position of the bolts. On some early mechanisms, the bolt opposite from the extended arm has the head in the opposite direction from the other two bolts. Make sure these bolts are located in the same position on reassembly to allow for proper clearance. Remove the bolts and press the bearing from the wobble plate.

After the bearing is removed, check for any looseness, galling, or binding action. On reassembly make sure the retaining bolts are tight.

> NOTE: *This is a tight fit bearing and is identified by a "T" marked on the outer ring face following the bearing number. Make certain that this bearing is replaced with the proper bearing and installed with the marked face exposed.*

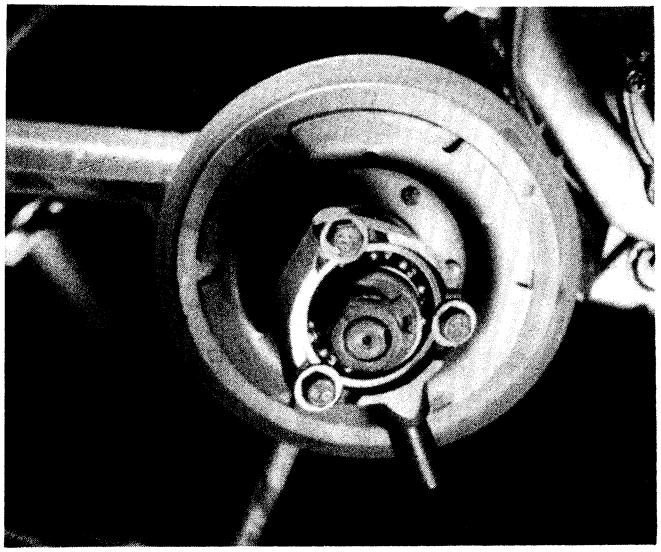


Figure 81 — Wobble Plate Bearing Nut

To remove the mechanism housing support nut, first bend the ear of the lockwasher from around the mounting nut. Then remove the nut with the special tool, *Figure 82*. At this time the mechanism housing support assembly can be removed from the upper housing. Since the upper mechanism housing is held in position by the housing support, it can be removed by pulling it from the shaft along with the complete brake assembly and clutch parts, *Figure 83*.

Pull the clutch torque spring from the brake assembly. If the spring is broken or damaged, all mating parts must be checked for damage and wear. If the spring is not damaged, place it on the shaft and rotate it in both directions. In one direction it should be impossible to rotate it by hand. If the spring does move in both directions, it must be replaced.

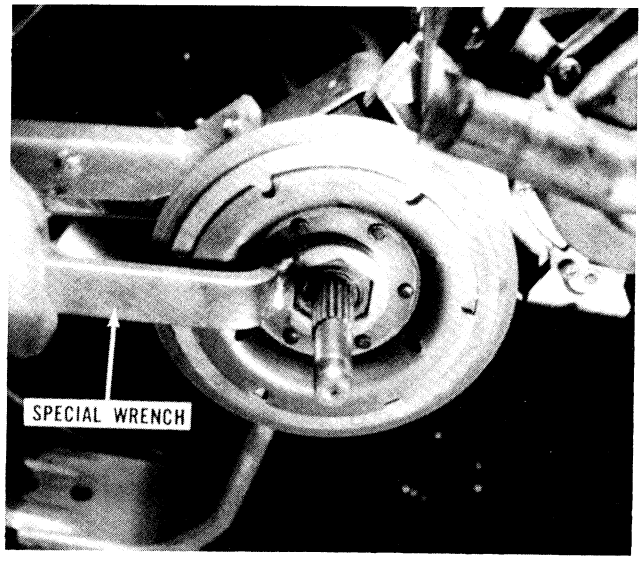
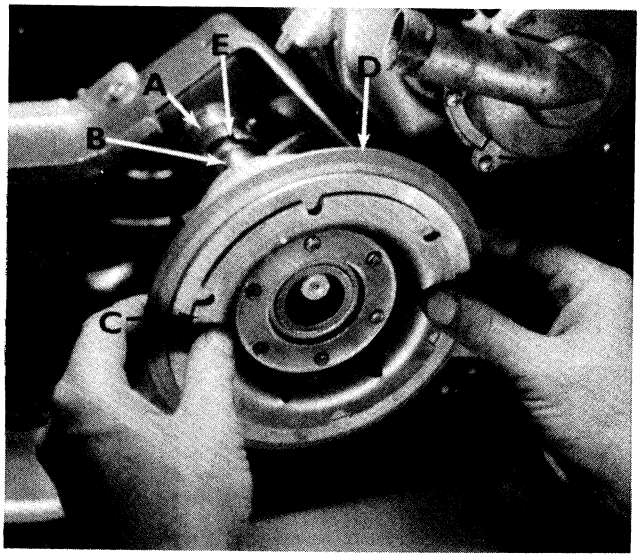


Figure 82 — Taking Off Mechanism Housing Support Nut

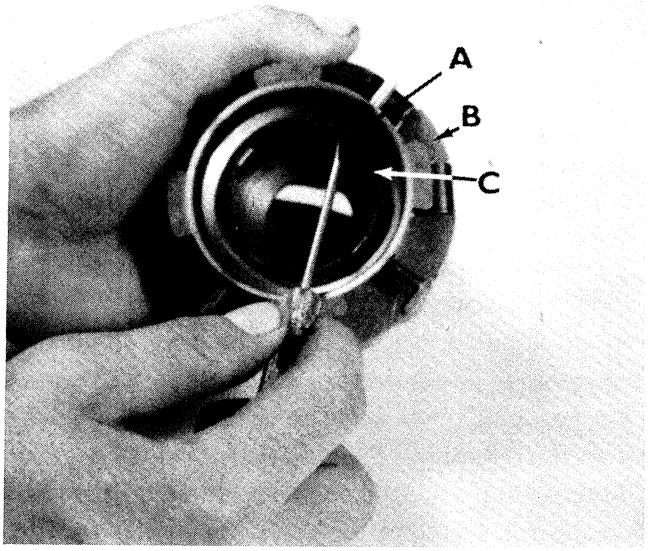


A. SPIN HOUSING
B. LOWER SPIN SHAFT BEARING
C. HOUSING SUPPORT
D. MECHANISM UPPER HOUSING
E. BRAKE LOCATING SHOULDER

Figure 83 — Taking Off Upper Mechanism Housing and Brake Assembly

Inspect the torque spring leveler washer, located on the inside of the brake cup, for wear. On reassembly the high points on this washer must be facing the torque spring.

On the later model mechanisms with decelerator shoes, the decelerator shoe bracket can be removed, shown in *Figure 84*. Place the bracket on a flat surface and check for a warping condition. Install the decelerator shoes on the bracket and check for binding and wear. If any of these



A. DECELERATOR SHOE BRACKET
B. BRAKE ASSEMBLY
C. RETAINER RING

Figure 84 — Taking Off Decelerator Shoe Bracket from Brake Cup

conditions exist, replace the parts as necessary.

With a small screwdriver, remove the brake tension clips, *Figure 85*.

NOTE: *It is important that the gap at the open end of the tension clips not be over 1/16'' as this could cause the tub to spin in the agitation period.*

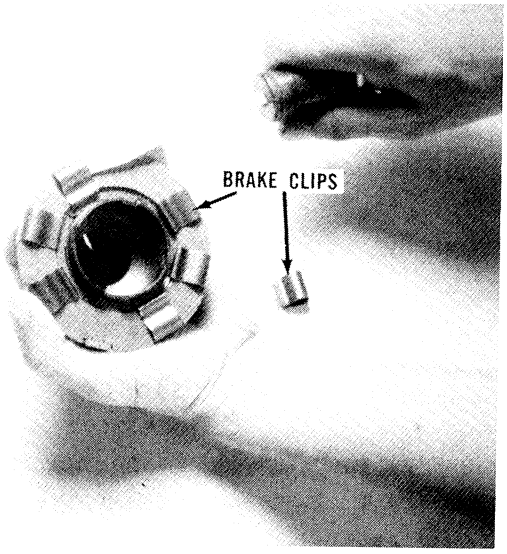


Figure 85 — Taking Off Brake Tension Clips

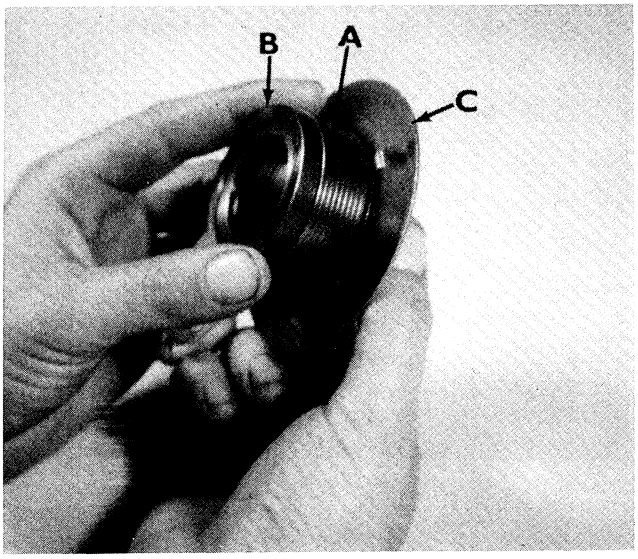
Inspect the brake lining and brake cup for wear. If there is any apparent wear, these parts must be replaced. Also if there is any slippage between

the brake torque spring and collar, and the spring and the brake hub, or any apparent wear, these parts must be replaced.

These parts can be checked by assembling the mating parts together as shown in *Figure 86*. First turn the collar in both directions..It should be impossible to turn it in one direction, and the other direction should turn very easily. If the brake spring is slipping, it should be determined which part is faulty and replace as necessary.

> NOTE: *Check the brake cup for any possible wear or dents that might have been caused by breakage of the torque spring or excessive wear of the brake assembly parts, as this could cause many malfunctions of the mechanism operations, such as a high wattage condition, spin in the agitation period, or a possible binding mechanism or noisy operation.*

Before reassembly of this mechanism, all parts should be thoroughly cleaned and dried with compressed air to eliminate any possible change of lint and dirt accumulating.

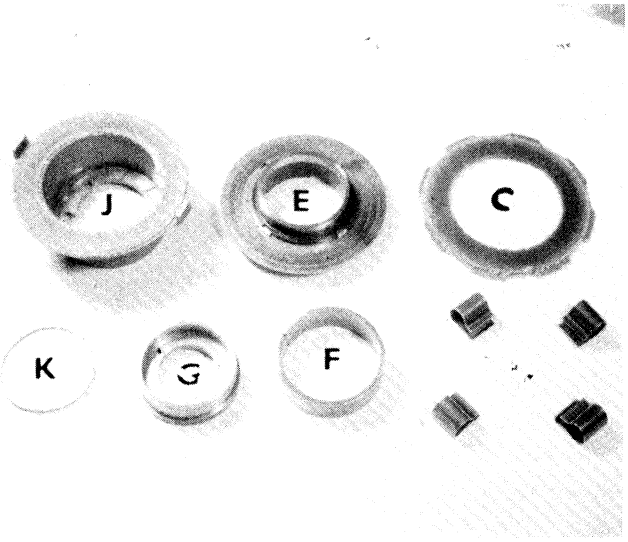


A. BRAKE TORQUE SPRING
B. TORQUE SPRING COLLAR
C. BRAKE DISC

Figure 86 — Checking Brake Torque Spring Collar and Brake Disc

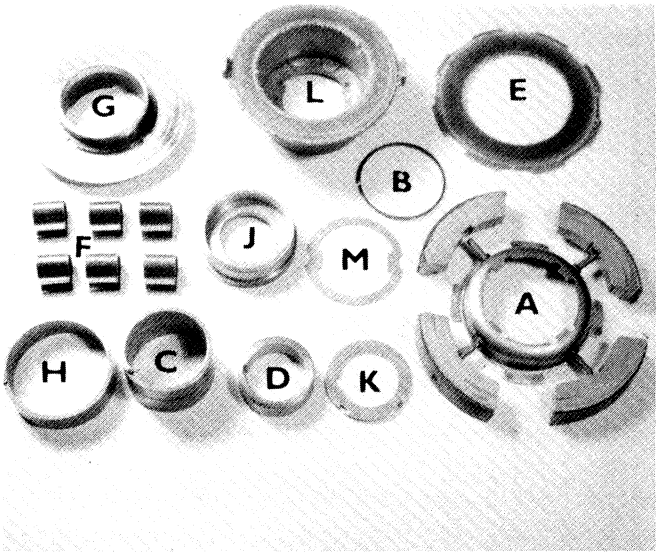
PULSAMATIC MECHANISM—REASSEMBLY

There are two different styles of brake assemblies: the early 1957-58 style shown in *Figure 87*, and the later style shown in *Figure 88*.



A. CLUTCH TORQUE SPRING
B. TORQUE SPRING COLLAR
C. BRAKE PLATE
D. BRAKE TENSION CLIPS
E. BRAKE DISC
F. BRAKE TORQUE SPRING
G. BRAKE TORQUE SPRING COLLAR
H. TORQUE CLUTCH SPRING LEVELER WASHER
J. BRAKE CUP
K. BRAKE CUP SPACER WASHER

Figure 87 — Early Style Brake Assembly



A. DECELERATOR SHOES AND MOUNTING BRACKET
B. DECELERATOR SHOE BRACKET RETAINING RING
C. CLUTCH TORQUE SPRING
D. TORQUE SPRING COLLAR
E. BRAKE PLATE
F. BRAKE TENSION CLIPS
G. BRAKE DISC
H. BRAKE TORQUE SPRING
J. BRAKE TORQUE SPRING COLLAR
K. CLUTCH TORQUE SPRING LEVELER WASHER
L. BRAKE CUP
M. BRAKE CUP SPACER WASHER

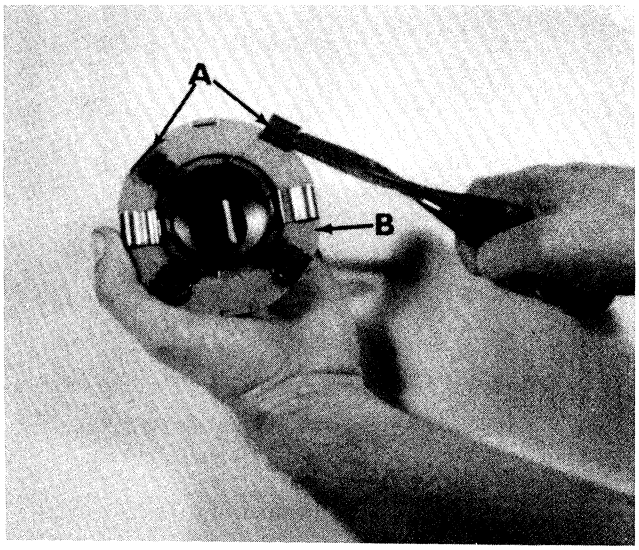
Figure 88 — Late Style Brake Assembly

The later style brake assembly is different in that it has two extra brake tension clips and a decelerator shoe assembly. The decelerator shoe

assembly consists of a bracket, mounted on the brake cup with a retainer ring. The four shoes are placed around the bracket to make contact with the mechanism upper housing. Except for these added improvements both mechanisms can be assembled in the same manner.

After all parts are cleaned, put the spacer washer in the brake cup. Assemble the brake torque spring and the brake spring collar in the brake disc and install the assembly in the brake cup. Place the brake plate on the bottom of the assembly and hold it down flat on a smooth surface, *Figure 89*.

Figure 89 — Gaging Tolerance between Brake Spring Collar and Spacer Washer



A. BRAKE TENSION CLIPS **B. BRAKE DISC**

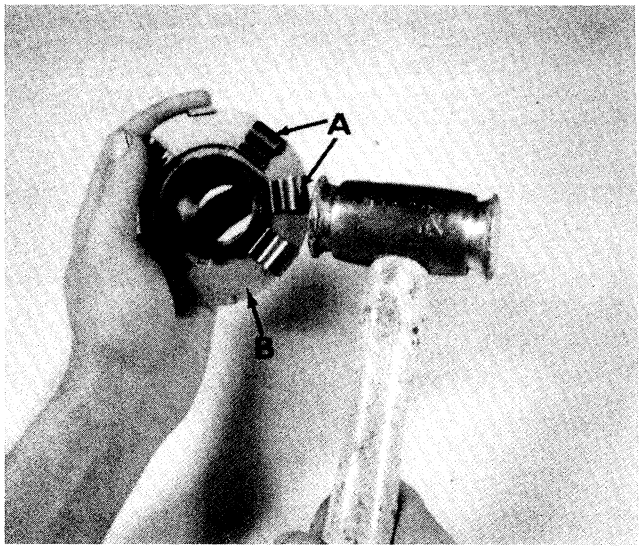
Figure 90 — Using Snap Ring Pliers to Install Brake Tension Clips

On later style brake assemblies, check the clearance with a feeler gauge between the torque spring collar and the spacer washer. If this clearance is more than .006 or less than .002, a thicker or thinner spacer washer should be used.

After making the necessary corrections, line up the two smallest notches on the brake plate with the two ears on the brake cup. Install the tension clips in the notches around the assembly, *Figure 90*.

NOTE: *When installing the tension clips, hold the clip against the edge of the brake assembly and expand it just enough to let it slide over the plate. DO NOT OVER-EXPAND. Over-expanding causes the spring tension of the clips to weaken.*

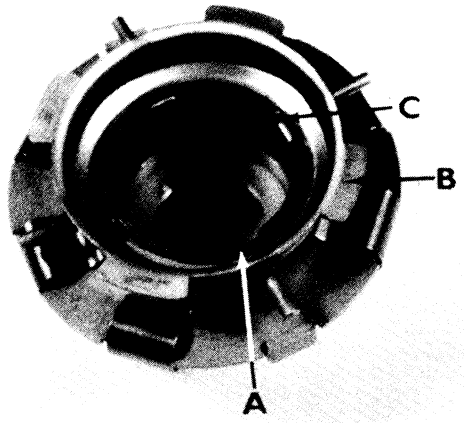
Figure 91 shows the use of a mallet to center the parts inside the brake cup after the tension clips have been mounted.



A. BRAKE TENSION CLIPS **B. BRAKE DISC**

Figure 91 — Centering Internal Brake Assembly Parts with Mallet

Place the decelerator shoe bracket on the brake assembly. Install the retainer ring with the open portion between the mounting bracket locating notches. In other words, do not place the ring gap on the locating notches. Also, the decelerator shoe bracket must be installed with the inner concave portion facing up, *Figure 92*.



A. DECELERATOR SHOE BRACKET RETAINING RING
B. DECELERATOR SHOE BRACKET
C. DECELERATOR SHOE BRACKET LOCATING NOTCHES

Figure 92 — Installing Decelerator Shoe Mounting Bracket

Place the clutch torque spring leveler washer in the brake cup, with the raised points facing up, *Figure 93*.

Install the clutch torque spring, locating the tang of the spring down against the leveler washer.

Place the notched end of the mechanism assembly tool inside the clutch torque spring and insert the tang on the end of the spring in the notch on the assembly tool.

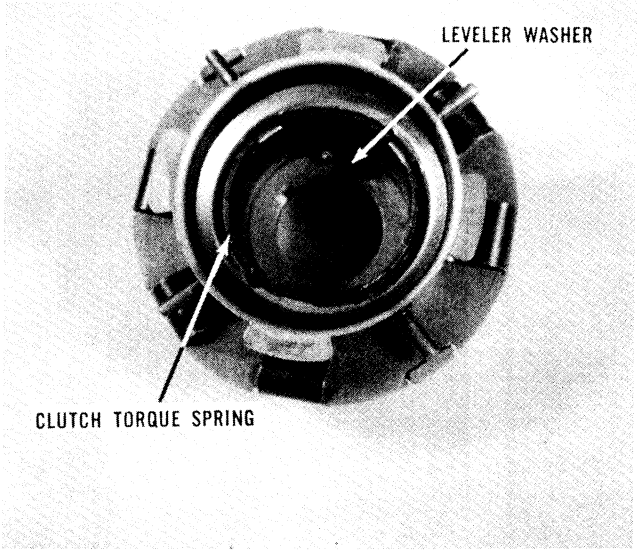
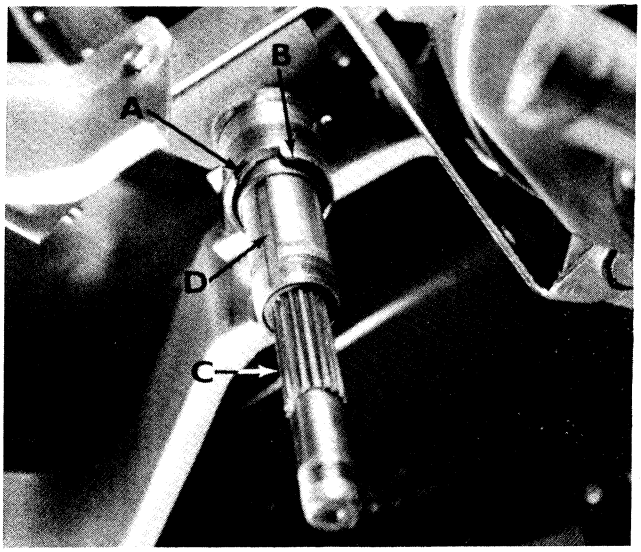


Figure 93 — Clutch Spring Leveler Washer Installed

As shown in *Figure 94*, the center of the slot in the spin shaft housing must be aligned with the keyway on the spin shaft. Also check to make certain that the gap of the brake assembly retainer ring is positioned opposite from the keyway of the spin shaft.

After checking the seal in the end of the upper mechanism housing, place the housing on the spin shaft housing.



A. SPIN SHAFT HOUSING NOTCH
B. BRAKE LOCATING SHOULDER
C. PULSATOR SHAFT
D. LOWER SPIN SHAFT BEARING KEYWAY

Figure 94 — Spin Shaft Keyway Aligned with Spin Shaft Housing Notch

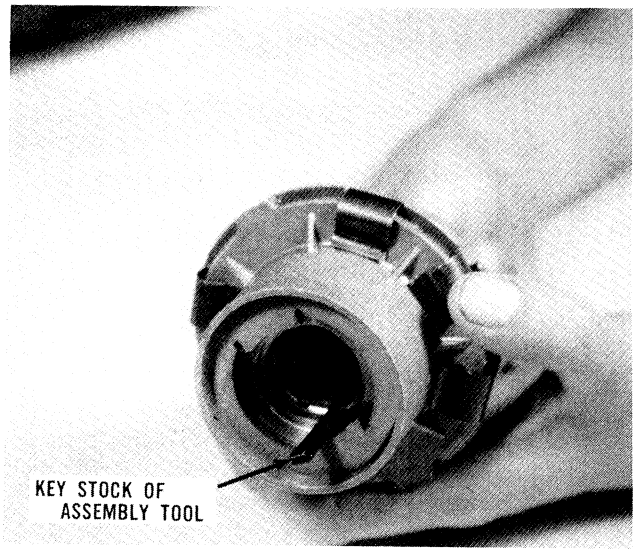
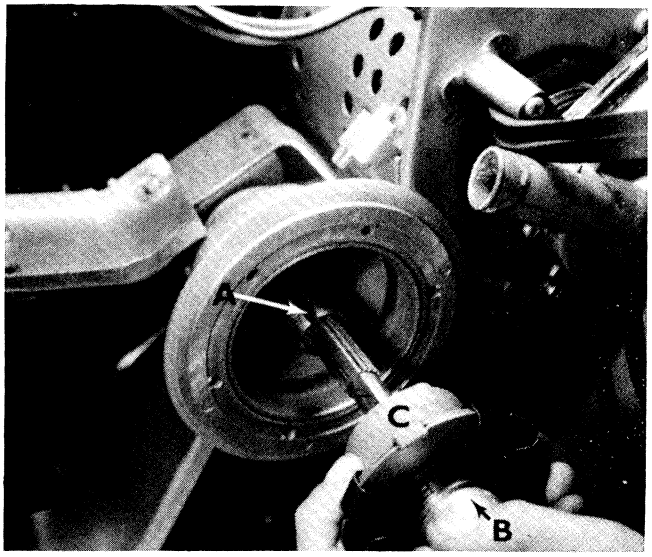


Figure 95 — Alignment of Keyways between Brake Assembly and Mechanism Assembly Tool

Align the keyway in the brake spring collar with the keyway of the mechanism assembly tool. Also line up the keyway on the clutch spring leveler washer with the key stock of the assembly tool. Place the key stock of the assembly tool in the keyways of the brake assembly, to hold the assembly in line, *Figure 95*.

While holding the brake assembly and mechanism assembly tool with the keyways aligned, slide the assembly on the spin shaft, using the key stock protruding through the end of the brake assembly as a guide, *Figure 96*. When the key stock bottoms on the brake assembly retaining ring, push the assembly in and, with a rocking motion, make sure the brake assembly bottoms on the retaining ring and engages in the slots of the spin shaft housing.



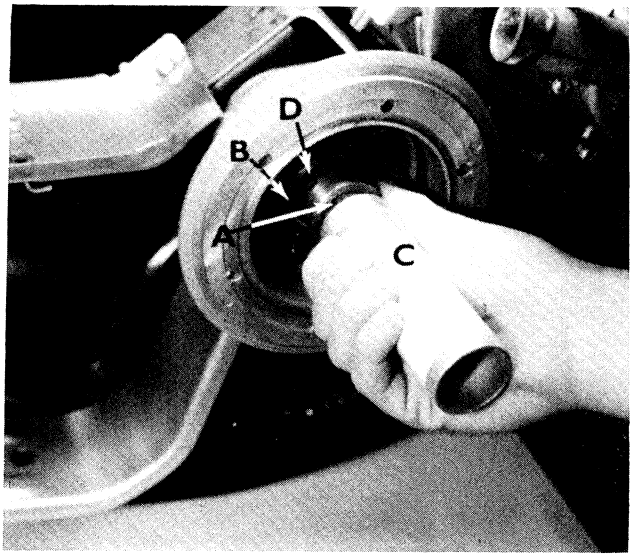
A. KEY STOCK
B. MECHANISM ASSEMBLY TOOL
C. BRAKE ASSEMBLY

Figure 96 — Using Tool to Install Brake Assembly

While holding the key stock in position, remove the assembly tool and place the clutch spring collar on the shaft. Make sure the collar bottoms by using the assembly tool, *Figure 97*.

> NOTE: ***Position the clutch torque spring collar on the shaft to engage its notch with the tang on the torque spring.***

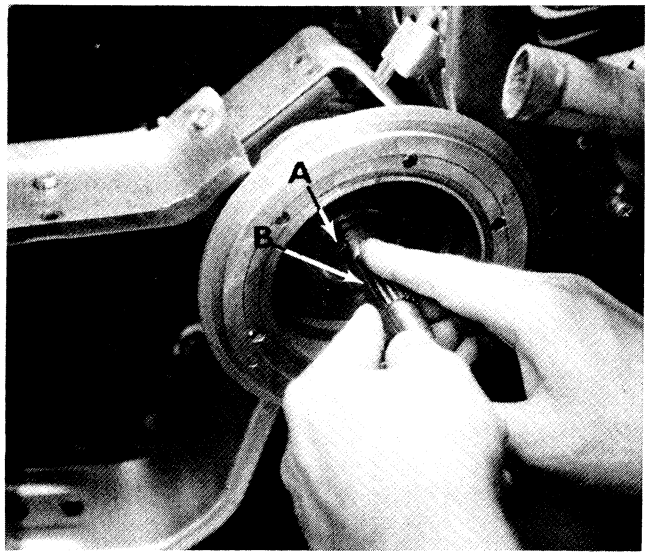
While using the mechanism assembly tool to hold the brake assembly in place, remove the key stock of the assembly tool and then carefully pull the



A. KEY STOCK
B. BRAKE ASSEMBLY
C. MECHANISM ASSEMBLY TOOL
D. NOTCH IN CLUTCH SPRING COLLAR

Figure 97 — Clutch Torque Spring Collar Installation

assembly tool from the shaft. Using the key stock of the assembly tool, install the spin shaft key, *Figure 98*, making certain it bottoms on the brake assembly retaining ring.

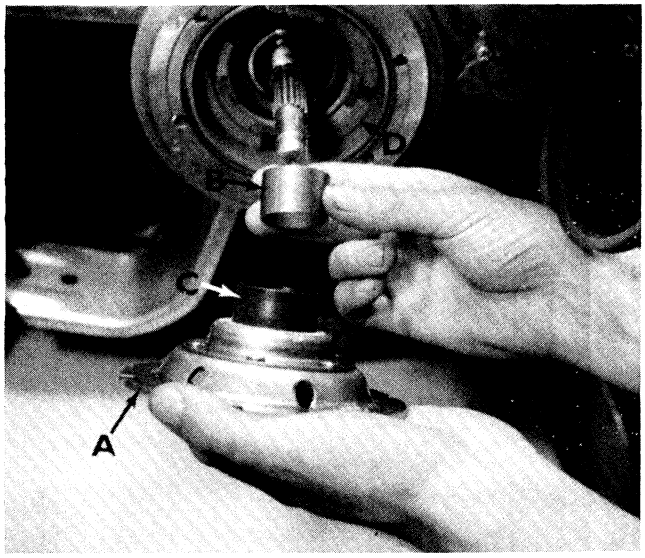


A. SPIN SHAFT KEY
B. KEY STOCK OF ASSEMBLY TOOL

Figure 98 — Using Key Stock to Install Key in Brake Assembly

Place the mechanism housing support spacer on the shaft followed by the housing support and lockwasher, *Figure 99*. Tighten the support nut on the shaft with the rounded end facing the lockwasher. Tighten this nut as tight as possible by

hand and then use a mallet to complete the tightening process. Bend an ear of the lockwasher up against the support nut to keep the nut from loosening.



A. MECHANISM HOUSING SUPPORT
B. MECHANISM HOUSING SUPPORT SPACER
C. MECHANISM HOUSING SUPPORT HUB
D. DECELERATOR SHOES

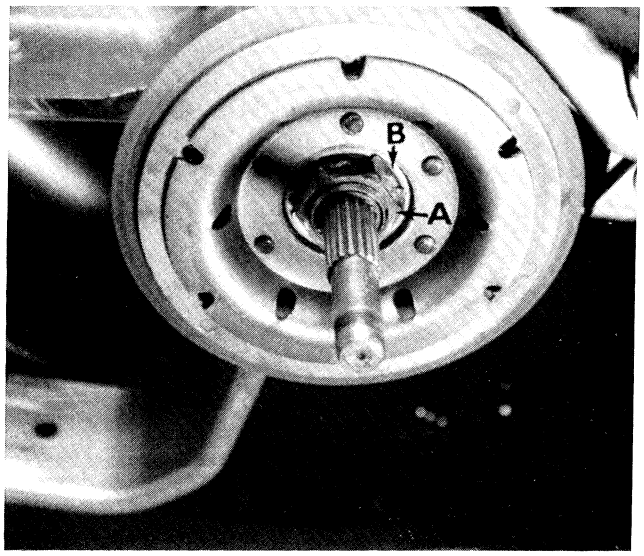
Figure 99 — Mechanism Housing Support and Spacer — Installation Sequence

After the support nut has been tightened, the spin shaft should extend approximately 3/32'' from the end of the nut, ***Figure 100***. If it does not, there is a misalignment between the spin shaft housing slots and the upper brake assembly or the clutch torque spring is not aligned with the notch in the collar. In any case, the mechanism must be disassembled and then reassembled in the proper manner to attain the correct alignment.

Place the wobble plate hubs and wobble plate bearing assembly on the agitator shaft, aligning the keyways of the hubs with the keyways on the agitator shaft. Install the key and assemble the lockwasher and nut. After the nut is tightened, bend an ear of the lockwasher against the nut, ***Figure 101***.

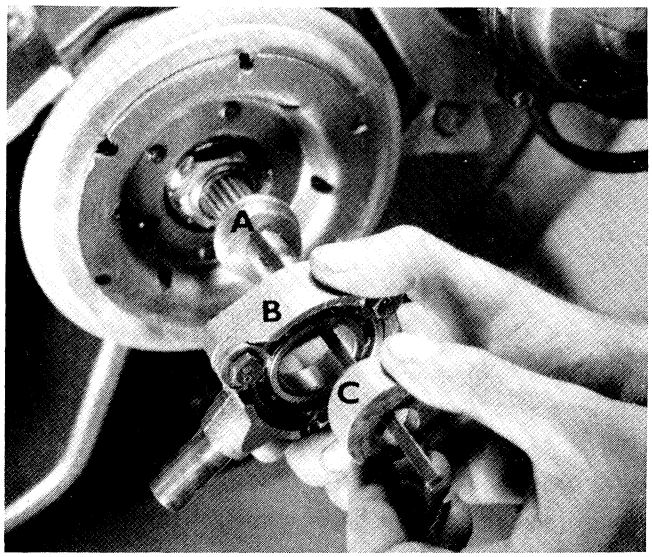
Place a new gasket on the lower mechanism housing and set the wobble plate shaft in the spherical bearing located in the lower mechanism housing. Slide the lower housing up to meet the upper housing, and align the screw holes of the two housings and the housing support. Place in the housing the two screws that do not hold the lower pulley in place.

Place the upper belt on the clutch and mechanism housing flange, and install the lower pulley with the remaining screws.



A. MECHANISM HOUSING SUPPORT NUT
B. LOCKWASHER

Figure 100 — Mechanism Housing Support Nut Installed



A. UPPER WOBBLE PLATE HUB
B. WOBBLE PLATE
C. LOWER WOBBLE PLATE HUB

Figure 101 — Wobble Plate Bearing Assembly — Installation Sequence

NOTE: *The oil should be added at this time using only 26 ounces of Frigidaire mechanism oil, No. 525 viscosity. DO NOT USE ANY OTHER TYPE OIL.*

Place the lower belt in position and install the lower belt in position and install the two screws in the mechanism support bracket.

NOTE: *Before tightening the support bracket screws, the belt adjustment must be made at this time. Refer to ''Belts.''*

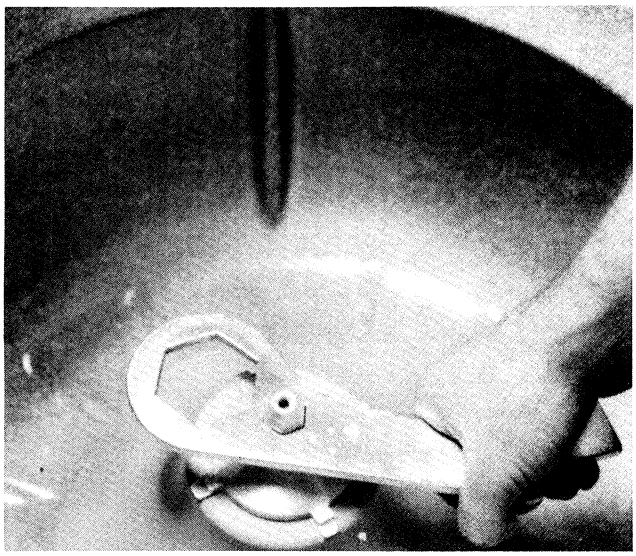


Figure 102 — Taking Off Pulsator Nut

PULSATOR SHAFT

To remove the pulsator shaft, first remove the pulsator assembly, *Figure 102.* Remove the bellows with the clamp ring tool shown in *Figure 103.*

Lay the machine on its front with the top end of the cabinet raised approximately 4 inches to prevent oil running out the top of the mechanism.

Disassemble the mechanism as explained in the preceding paragraphs under ''Pulsamatic Mechanism Disassembly.''

With the mechanism disassembled, the pulsator shaft can be pulled through the spin tube from the top.

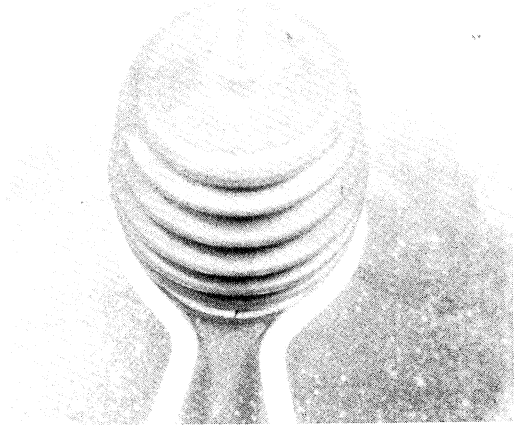


Figure 103 — Taking Off Bellows Clamp Ring

SPIN SHAFT

To remove the spin shaft, remove the pulsator assembly and the bellows. Next, unstake the lockwasher under the tub mounting nut and remove the mounting nut with the special tool, *Figure 104.* Remove the tub from the cabinet and complete the mechanism disassembly procedure outlined under "Pulsamatic Mechanism Repair."

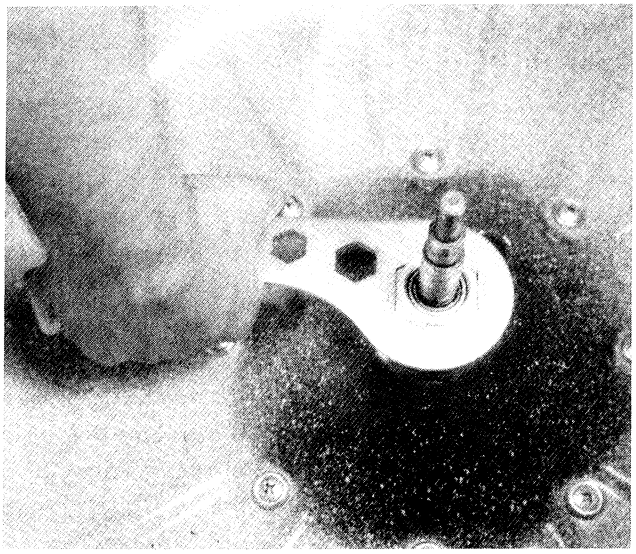


Figure 104 — Taking Off Tub Mounting Nut

Bend the ear down on the lockwasher under the mechanism support nut and seal. Remove the support nut and seal with the special tool shown in *Figure 105.*

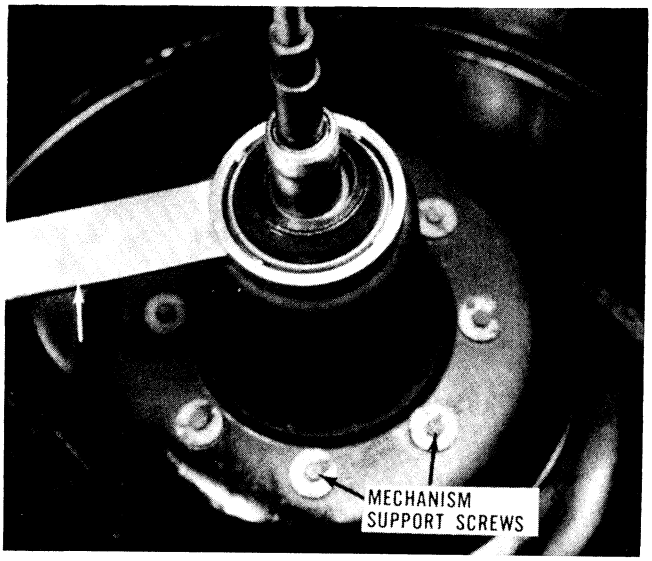


Figure 105 — Taking Off Nut & Seal Assembly

With a small screwdriver, remove the spin shaft bearing retainer, *Figure 106*. Pull the spin shaft and spin shaft bearing from the shaft housing. This is done from the top, through the outer tub.

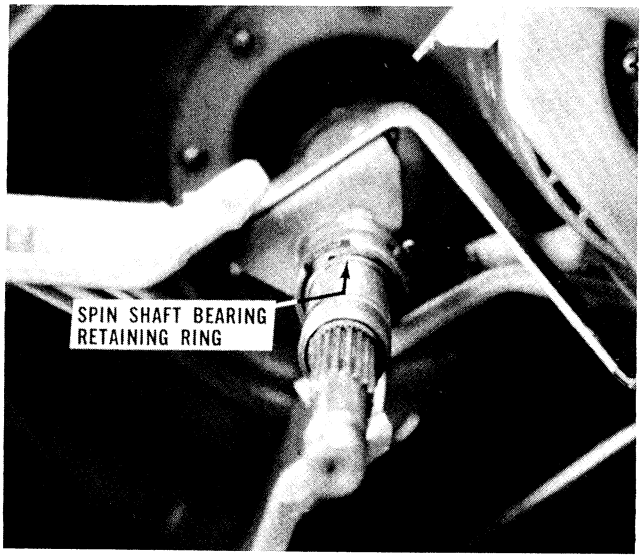
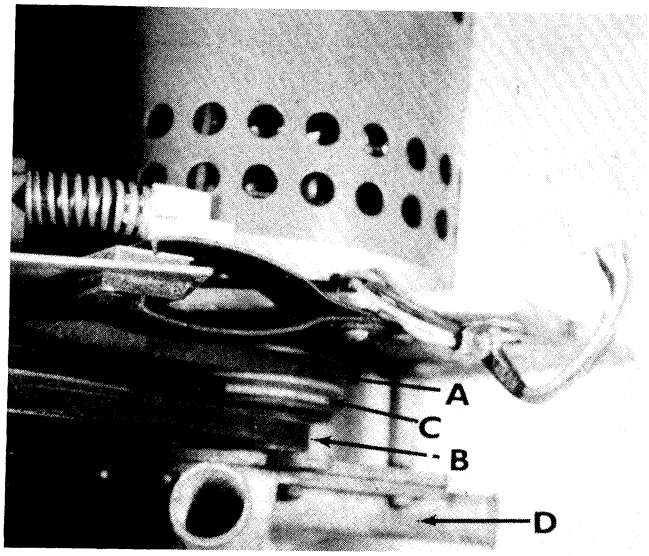


Figure 106 — Spin Shaft with Housing and Brake Assembly Removed

Clutch

EARLY TWO SPEED MODELS

The early two speed models use a single speed 1/3 hp reversible motor. The clutch, mounted on the motor shaft, *Figure 107*, consists of two pulleys mounted on bearings and a screw-type clutch assembly keyed to the motor shaft.



A. UPPER PULLEY
B. LOWER PULLEY
C. CLUTCH
D. WATER PUMP

Figure 107 — Single Speed Mechanism Drive Components

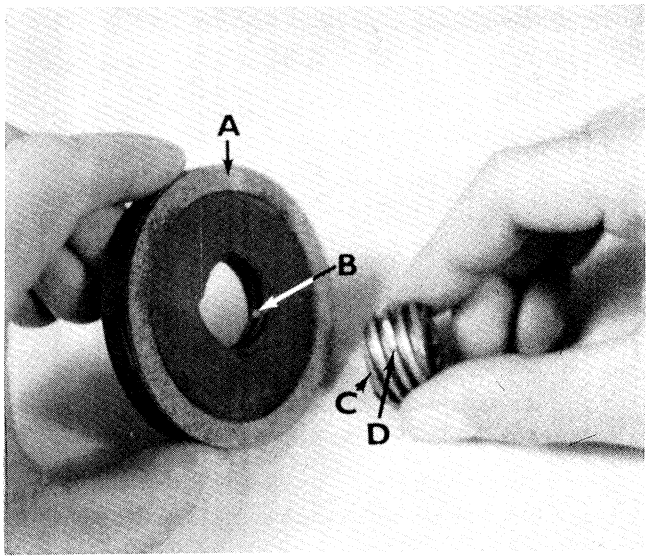
The screw-type clutch assembly, *Figure 108*, produces agitation or spin by moving up or down to make contact with the pulleys, depending on the direction of the motor rotation. A frictional type material is used on both sides of the clutch face to drive the pulleys.

When the motor is rotating in a clockwise direction, centrifugal force drives the clutch down the screw, contacting the lower pulley and producing agitation.

The spin cycle is accomplished in the same manner, except the clutch is driven up against the upper pulley by the counterclockwise rotation of the motor.

As the motor slows at the end of the spin period, the clutch drops to a neutral and centered position. It is held in this position by a spring-loaded ball inside the clutch and a notch in the thread of the screw assembly. This stops the clutch from dropping to the lower pulley, which would cause a high speed agitation action before the spin tub stops. This same action will occur throughout the spin period if the clutch is stuck on the lower pulley due to rust or burrs on the clutch screw.

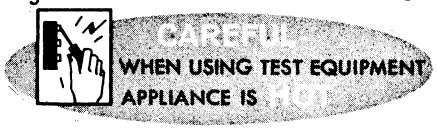
The later model mechanisms that use a two speed motor function with basically the same type clutch as the earlier models. Both the single speed and two speed mechanisms use the same clutch. On two speed models, the different speeds are controlled electrically through the motor windings.



A. CLUTCH PLATE
B. SPRING-LOADED CHECK BALL
C. CLUTCH SCREW
D. NEUTRAL DETENT

Figure 108 — Clutch and Screw Assembly

The clutch assembly is connected to the motor shaft, consisting of a larger upper pulley and a small lower pulley, with a screw-type clutch assembly keyed to the motor shaft, ***Figure 109***. The difference of structure to that of the old style clutch is the clutch drag shoes, ***Figure 110***. This clutch does not have the spring-loaded ball and notch within the clutch and screw assembly. The drag shoes are spring-loaded to provide enough drag on the clutch to keep it from dropping to the lower pulley and causing high speed agitation before the spin tub stops. The drag shoes also keep the clutch from disengaging from the upper pulley during the normal motor switching action.



EARLY FOUR SPEED MODELS

The four speed mechanisms use a two speed 1/3 hp reversible motor. The clutch consists of two pulleys mounted on bearings and a clutch assembly keyed to the motor shaft.

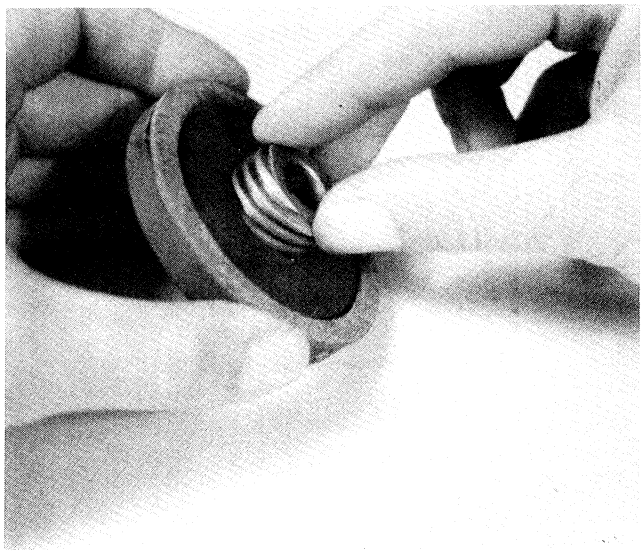
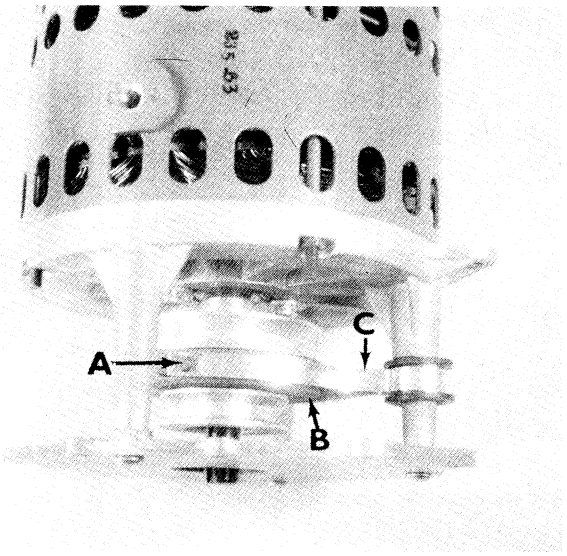


Figure 109 — Clutch and Screw Assembly Method



A. CLUTCH DRAG SHOES
B. SCREW CLUTCH
C. DRAG SHOE SPRING

Figure 110 — Late Style Clutch Assembly
Single and Two Speed

The larger pulley, when in contact with the clutch, produces a high speed spin. The small pulley on the bottom, when engaged, gives a normal agitation and slow agitation and a slow spin speed.

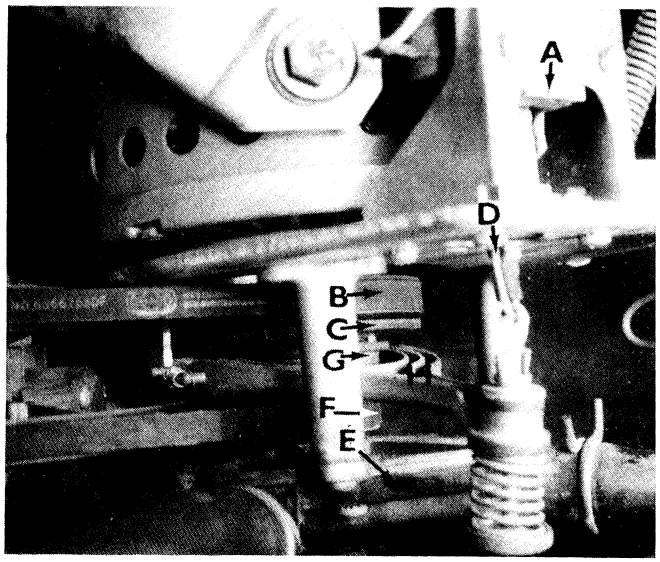
With the motor rotating in a ***clockwise*** direction with a speed of 1725 rpm, the clutch produces a normal agitation. Also, when the motor is rotating in the same direction at 1140 rpm, the clutch produces a slow speed agitation.

With the motor rotating in a ***counterclockwise*** di-

rection at 1725 rpm, the clutch produces a slow speed spin, and a high speed spin when energized by a high speed spin solenoid.

	Clockwise	*Counterclockwise*
1140 rpm	Slow agitation	
1725 rpm	Normal agitation	Slow speed spin
		High speed spin

A detailed explanation of the clutch assembly, *Figure 111*, is given in the following paragraphs, beginning with the portion closest to the motor end bell.



A. SPIN SOLENOID
B. UPPER PULLEY
C. CLUTCH
D. SPIN SOLENOID CONNECTING LINK
E. WATER PUMP
F. LOWER PULLEY
G. CLUTCH BEARING
H. YOKE ARM

Figure 111 — Four Speed Mechanism Drive Components

To hold the clutch assembly away from the motor end bell, a lock-ring is assembled to the shaft with a shouldered washer. Next to the washer, spacer washers are used to control the position of the yoke. These washers can be added or removed to position the yoke parallel with the pump mounting plate, *Figure 112*.

To check the yoke position, lift up on the extended arm until the surface of the clutch is in full contact with the upper pulley. At this point, the yoke should be parallel with the pump mounting plate.

The upper pulley, or high speed spin pulley, is placed on the motor shaft after the spacer washers. The grooved face of the pulley must be facing the motor end bell. Next to the pulley, another washer is used, with the large shoulder on the washer facing the pulley.

A tension spring is now placed on the shaft, followed by the clutch drive assembly, Kit No. 659-0450. This kit is made up of the tension spring, drive collar, lock-ring, clutch plate, and bearing and hub assembly.

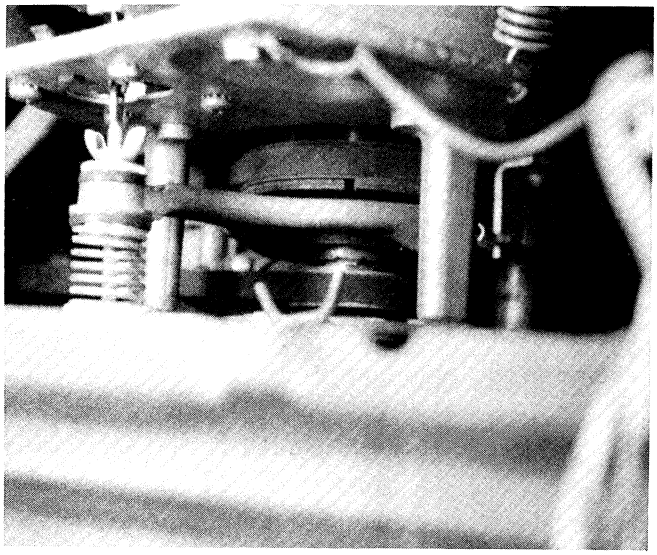


Figure 112 — Yoke Arm Parallel to Pump Mounting Plate — Solenoid Energized

Before placing this assembly on the motor shaft, it should be assembled as follows: the clutch plate is assembled to the bearing and hub by the lock-ring, with the friction material of the plate facing toward the upper pulley. The drive collar is now inserted in the bearing hub.

NOTE: ***The drive collar is splined to engage in the bearing hub, with the splines spaced closer to one end of the collar, thus giving a shorter section between the spline and one end of the collar. This shorter section of the collar must be placed at the bottom of the hub assembly. The longer section should be pointing toward the upper pulley.***

After the clutch drive assembly has been assembled, place it on the motor shaft with the clutch

plate facing toward the upper pulley.

The yoke assembly is now placed in position with the two pins placed in the slots on the brackets protruding from the pump mounting plate. Two small springs help retain the position of the yoke, *Figure 113*. The arm of the yoke is then connected to the spin solenoid linkage. Next, the small lower pulley is placed on the motor shaft.

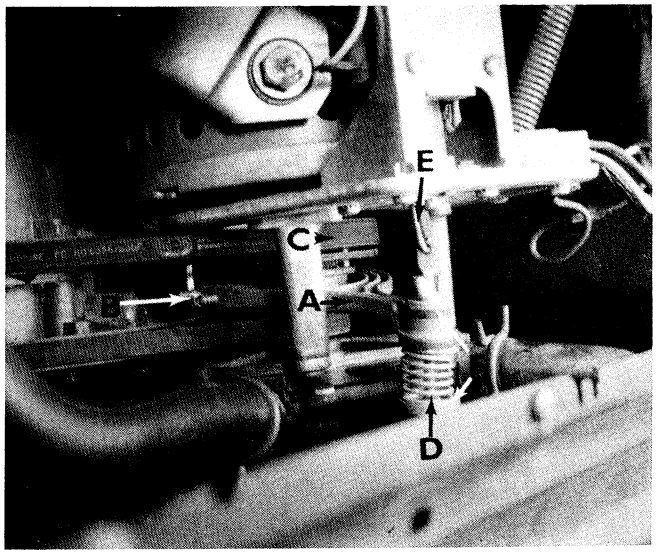
> NOTE: *On the lower end of the bearing and hub, are two raised surfaces or projections, made to engage with the lower pulley except when the high speed solenoid is energized. When placing the small lower pulley on the shaft, make sure that the projections on the pulley are facing the bearing and hub assembly.*

The bearing and hub assembly and the lower pulley are engaged and locked together to drive all the operations except the high speed spin, which is driven by the upper pulley and clutch plate when energized by the high speed spin solenoid connected to the yoke arm.

The pump assembly is mounted to the pump mounting plate and the impeller rides on the protruding motor shaft. The clearance between the pump impeller and the upper pump body is 1/8''. It is determined by the spacer washers between the impeller and the lower clutch pulley.

The high speed spin solenoid and bracket assembly are mounted to the pump mounting plate, with the tension spring linkage fastened to the solenoid armature. The arm of the yoke is pinned to the solenoid linkage, *Figure 113*. When the solenoid is energized, the linkage pulls up the yoke, engaging the clutch plate with the upper pulley and producing the high speed spin. At the same time the bearing and hub assembly is disengaged from the lower pulley.

There are two adjustment screws on the clutch linkage, *Figure 113*, to control the clutch operation on the washers. The upper screw is used to adjust the clearance from the solenoid frame to the inside of the solenoid armature. This clearance should be 1/8'' to 3/16'' with the yoke lifted in the up position and without compressing the spring. In other words, lift the yoke until the clutch makes contact with the upper pulley and stop at this point to check the clearance.



A. CLUTCH YOKE
B. SPRINGS
C. UPPER PULLEY
D. CLUTCH TENSION SPRING
E. CLUTCH LINKAGE
F. ADJUSTING SCREWS

Figure 113 — Four Speed Clutch Yoke Mounting Detail

The other screw, at the lower end of the linkage, is for the adjustment of the clutch tension against the upper pulley. To make this adjustment, lift the solenoid armature to the closed position and adjust the screw so the linkage spring will be 3/4'' long, *Figure* 114.

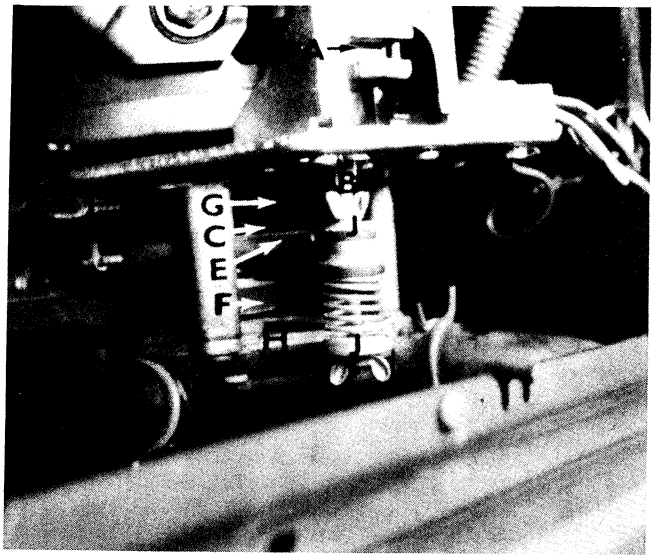
After these adjustments have been made, a wattage check should be made to assure the proper adjustment. The following table gives maximum wattages at full spin speeds with no load, and the agitation wattage with a water load.

	Normal	*Slow*
Spin	825	450
Agitation	575	380

(Editor Note: This style clutch was used on early 1959 models. Later production four speed mechanisms use the clutch explained in the following paragraphs. For this reason, Figure 114 was not available and therefore omitted.)

In later production the clutch linkage is somewhat different and can be identified by the wing-nuts

on the top and bottom of the linkage spring, *Figure 115.*



A. SPIN SOLENOID CONNECTING LINK
B. SPIN SOLENOID LINKAGE
C. CLUTCH
D. CLUTCH BEARING
E. YOKE ARM
F. LOWER PULLEY
G. UPPER PULLEY
H. WATER PUMP
J. ADJUSTING NUTS

Figure 115 — Clutch Assembly — Four Speed Mechanism

To adjust the solenoid gap, hold the solenoid in the energized position, adjust the top wing nut and bushing, so the clearance will be 1/8'' between the rubber grommet on the yoke arm, and the bushing below the wing nut, *Figure 116.*

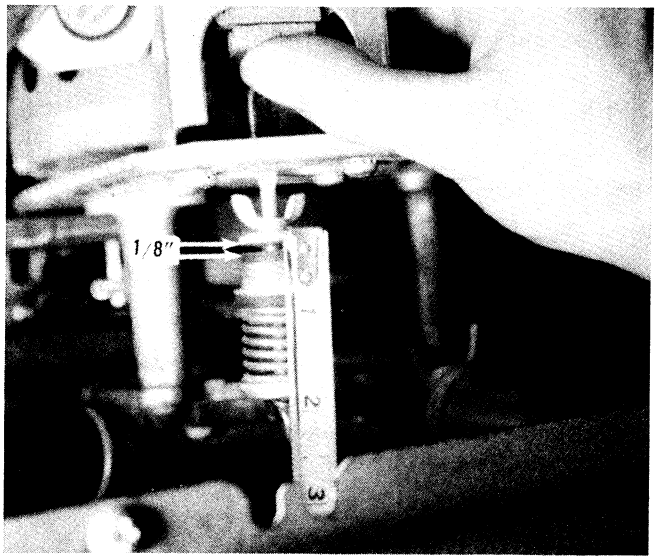


Figure 116 — Adjusting Solenoid Gap

To adjust the clutch tension, hold the solenoid in the closed position. Adjust the lower wingnut and adjusting nut so the spring measures 3/4'' between the bottom of the rubber grommet and the center of the adjusting nut, below the spring cup, *Figure 117.*

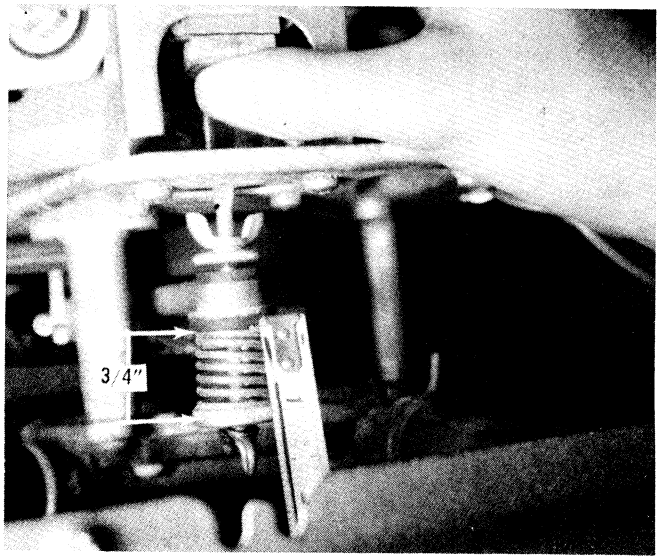


Figure 117 — Adjusting Solenoid Spring

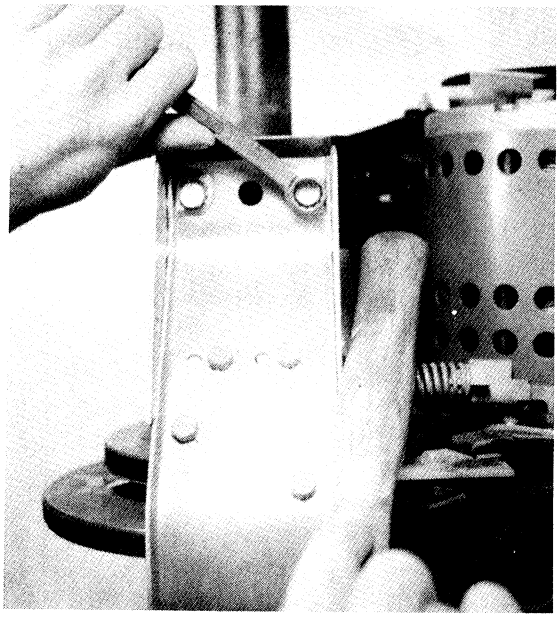
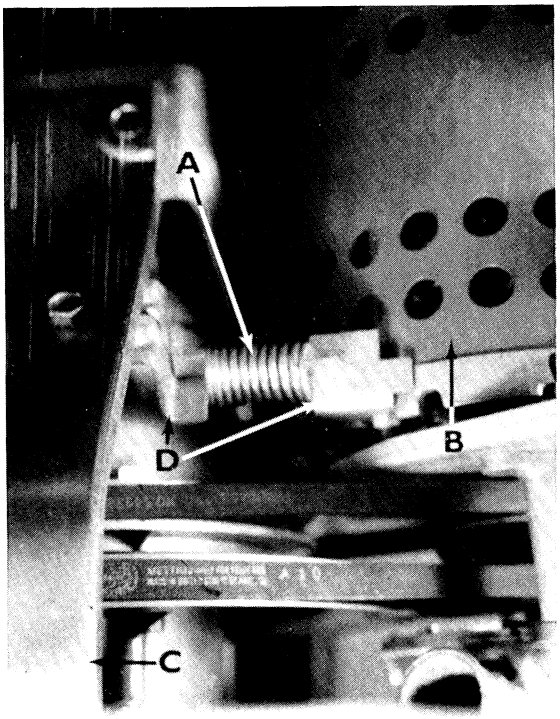


Figure 118 — Adjusting Belt Tension

Belts

On the early single belt driven mechanism, the belt adjustment is made by first loosening the motor mounting bracket bolts. Place a hammer handle between the mechanism and motor, *Figure*



A. BELT TENSION SPRING
B. MOTOR
C. MECHANISM SUPPORT BRACKET
D. TENSION SPRING BRACKETS

Figure 119 — Automatic Belt Tightener — 1959 Models

118. Pry out until the belt is snug and tighten the mounting bolts. Halfway between the pulleys, use a scale to pull a 10 pound pressure on the belt. The belt should move ¼ inch from its original position with a 10 pound pull.

The 1959 models have an automatic belt tightener to keep the proper tension on the belts. The belts are sold as a matched pair and should never be replaced singly or with an unmatched pair.

On these machines, a bracket is installed on the mechanism snubber bracket which aligns with a bracket on the motor. Between these two brackets is a tension spring which keeps the proper tension on the belts, ***Figure 119.***

Adjustment of these brackets can be made by loosening the two bolts holding the tension bracket to the snubber bracket, ***Figure 119,*** and using a punch to pry the bracket towards the motor, ***Figure 120.***

Proper adjustment is made when the distance between the brackets is 1-1/8'' on single speed models and 1-1/4'' on two speed models, ***Figure 119.***

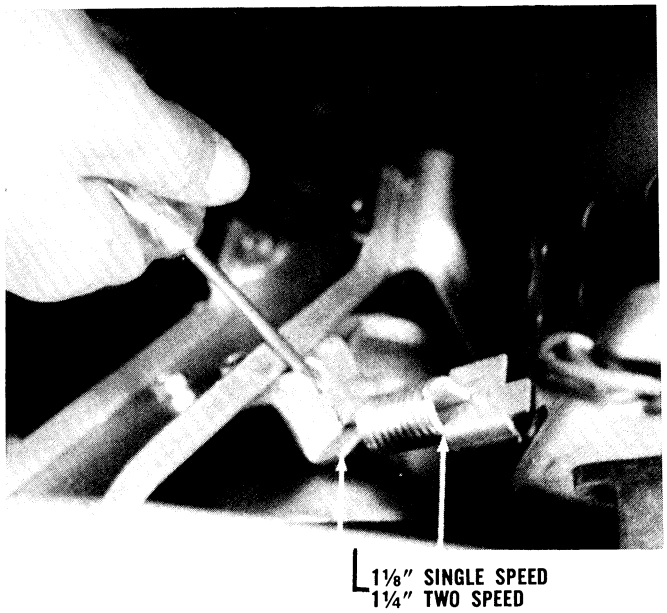


Figure 120 — Adjusting Belt Tension Brackets — 1959 Models

A wattage check should be taken to double check the tension. Single speed models should have a reading of 400 watts in agitation, 460 watts maximum, and in the spin period 550 run watts. Two speed models should have readings of 400 watts in agitation, 2000-2500 watts in spin start, and 300-380 watts run after the motor is up to full speed.

On 1960-64 models that do not have a solenoid actuated clutch, after a new set of belts have been installed, set the belt tension springs in the center hole of the brackets on the motor, ***Figure 121.*** With the motor mounting brackets loose, slide the brackets out until both belts fit snug in the pulleys and are of equal tension. Tighten the brackets and start the machine. Let the machine run in the final spin for five minutes. Place the wattmeter in the line and check the wattage to assure the proper adjustment.

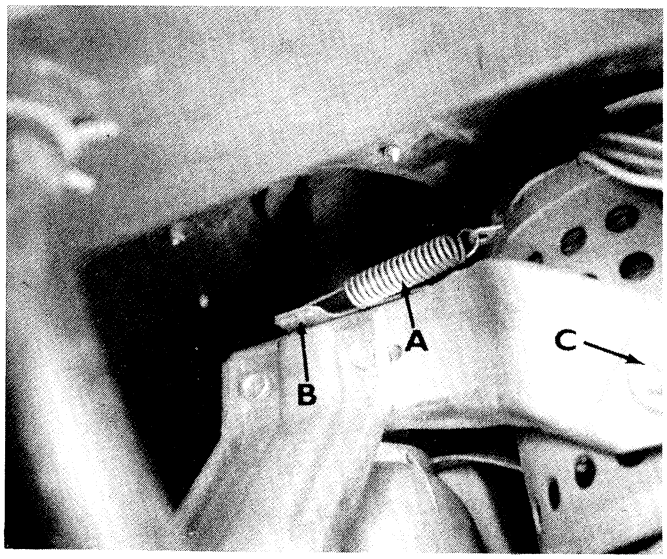
> NOTE: ***On the solenoid actuated clutch models, the lower belt should be adjusted with less tension than the upper belt. This keeps the motor switch from switching back into the start winding at the start of the spin period. If this switching action occurs, readjust the motor mounting bracket to tighten the upper belt.***

The following table gives the agitation and spin wattages with a water load:

1960-61 Single Speed		*1960-61 Two Speed*	
Spin Start	2000-2500	Spin Start	2000-2500
Spin Run	500-550	Spin Run	300-380
Agitation	400-460	Agitation	400-460

1962-64 Single Speed		*1962-64 Two Speed**	
Spin Start	2000-2500	Spin Start	2000-2500
Spin Run	500-550	Spin Run	500-550
Agitation	400-460	Agitation	400-460

*NOTE: *On some 1962 two speed models, the early style solenoid actuated clutch is used. Its wattages are the same as the 1960-61 two speed models.*



A. BELT TENSION ADJUSTING SPRINGS B. MOTOR MOUNTING SCREW C. BELT TENSION ADJUSTING SPRING HOLES

Figure 121 — Belt Tension Springs — Late Models

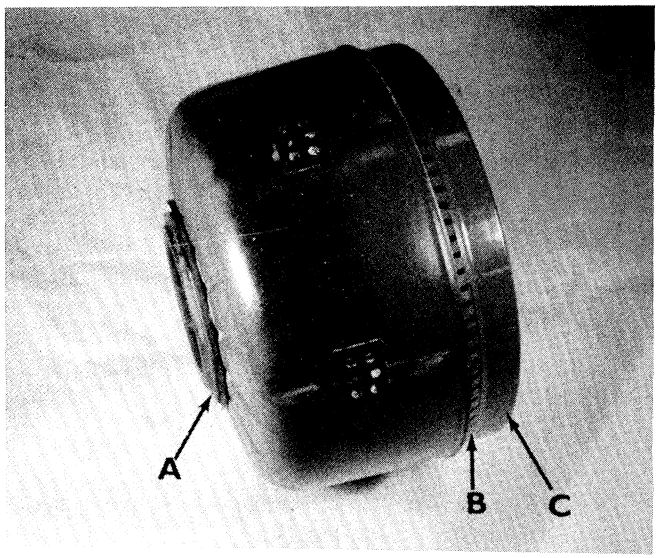
Suspension

The suspension of the mechanism and tub is important to all automatic washers in that during the spin period it allows flexibility of movement of the mechanism without transmitting undesirable vibration to the washer cabinet. Without this suspension system, the washer would have to be bolted to the floor.

The snubber assembly and the mechanism support are the main suspension parts of the Frigidaire washer. However, the spin tub also plays an important part since it does help control vibration. The purpose of these three suspension components are explained in more detail in the following paragraphs.

TUB

The porcelain finished, one piece spin tub, *Figure 122*, holds the clothes and water during the wash and rinse periods.



A. HUB B. LOUVERS C. BALANCE RING

Figure 122 — Spin Tub and Hub Assembly

The top part of the tub has an inward flange; around the top of the flange is an enclosed channel filled with a ballast material. This ballast-filled channel acts as a ''balance ring'' and, along with the mechanism support and the snubber, helps to control vibration during the spin period.

Directly below the channel are louvers around the entire periphery of the flange. These louvers are to allow the water to escape when it is spun from the tub.

The tub is mounted to a hub and both can be removed or installed as an assembly by removing the tub mounting nut. It is not necessary to separate the two, unless either one is being replaced separately.

MECHANISM SUPPORT

The mechanism support, *Figure 123*, has two functions on the Frigidaire washer. The unimatic me-

chanism support is different from the pulsamatic mechanism support in appearance and size. Their functions remain the same however.

First they provide a water seal between the outer tub and that portion of the mechanism extending into the outer tub. Second, they allow a flexibility of movement for the mechanism at the start of the spin period and also help control vibration in the spin period without transmitting the vibration to the washer cabinet. A weak or torn mechanism support can cause excessive vibration and therefore should always be checked, if leveling the washer, etc., fails to correct a vibration complaint.

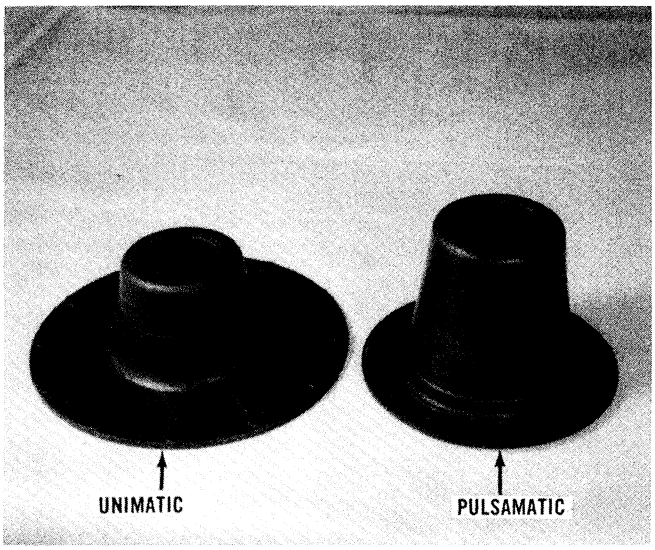
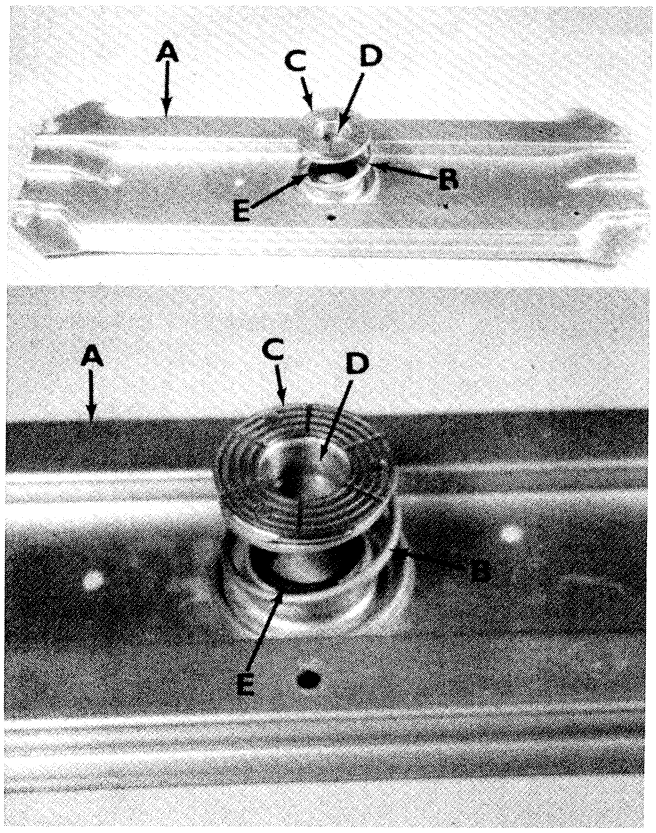


Figure 123 — Unimatic and Pulsamatic Mechanism Supports

SNUBBER ASSEMBLY

The snubber assembly consists of three parts, *Figure 124*: a friction pad riveted to a guide cup, a conical spring that holds the friction pad firmly against the mechanism snubber plate, and a crossbrace that centrally locates the spring and pad.

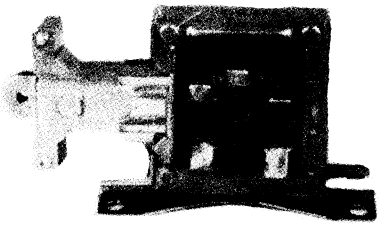


A. CROSSBRACE
B. SNUBBER SPRING
C. SNUBBER PAD
D. GUIDE CUP
E. SNUBBER BUSHING

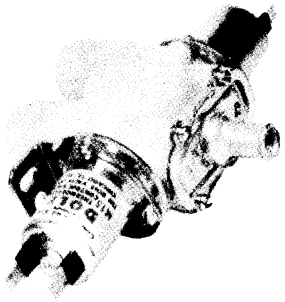
Figure 124 — Snubber and Crossbrace Assembly

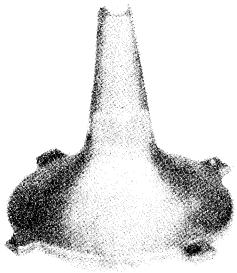
As the tub reaches its full speed, any vibration from an unbalanced load, causes the snubber plate to move on the snubber pad. This movement is dampened by the snubber without transmitting vibration to the washer cabinet.

Grease or dirt on the snubber can cause excessive vibration from lack of proper snubbing action. The snubber plate and the friction pad should be washed clean of grease and dirt in a suitable solvent. The friction pad can be polished by placing a piece of No. 400 sandpaper on a flat surface and polishing the friction pad on it using a figure 8 motion.

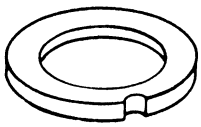


PARTS LISTS

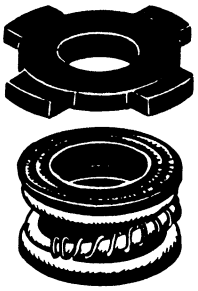




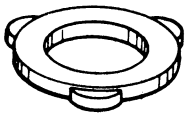
5433974
Seal Gasket
rubber



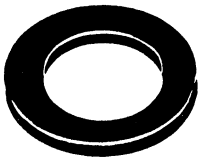
5433973
Seal Face
bronze



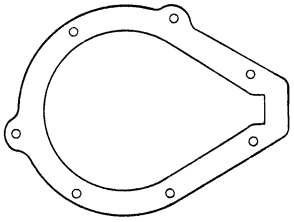
5430580
Seal Assm.
for pump



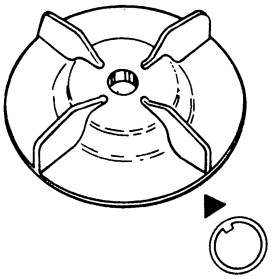
5433119
Seal Face Washer
bronze



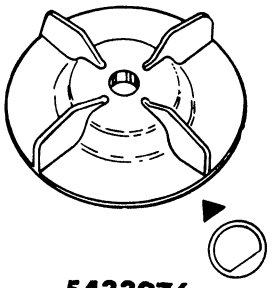
5433295
Seal Gasket
rubber



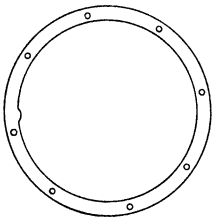
5433979
Pump Gasket
cork



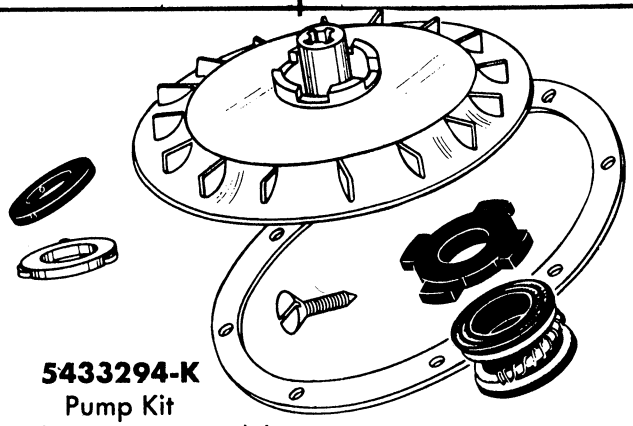
5438818
Pump Impeller
keyway style



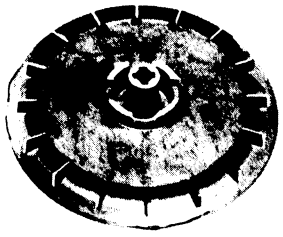
5433976
Pump Impeller
flat hole



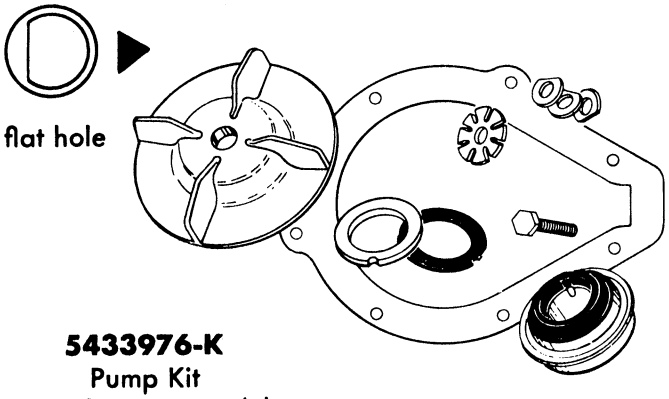
5433298
Gasket
cork for pump cover



5433294-K
Pump Kit
for unimatic models

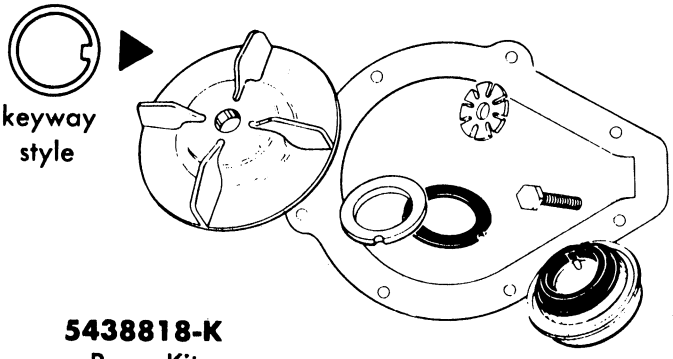


5433296
Impeller



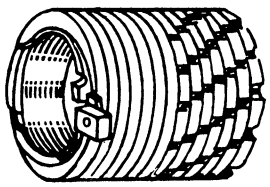
flat hole

5433976-K
Pump Kit
for pulsamatic models



keyway
style

5438818-K
Pump Kit
for multimatic models



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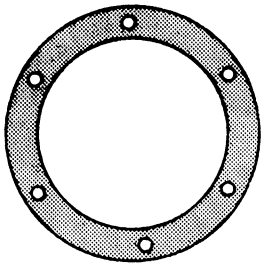
Spring



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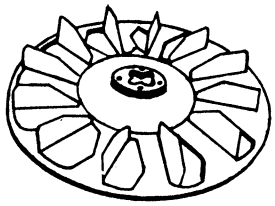
Gasket



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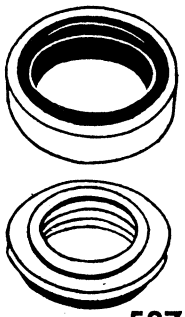
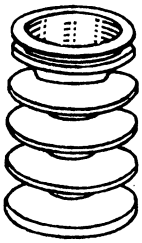
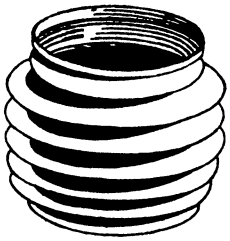
Fan



5876608
Seal



5433572
Bellow



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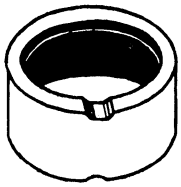
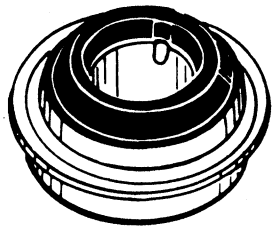
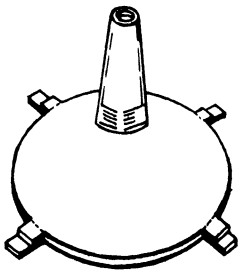
Bellow



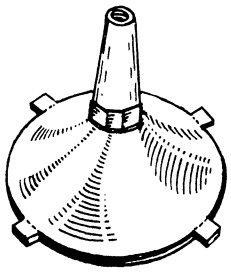
5433856
Spacer



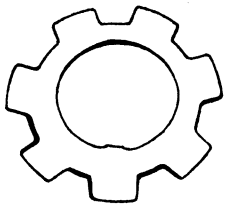
5431073
Carbon Face Seal



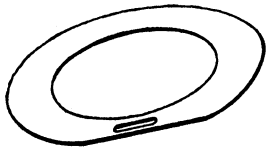
5433639
Nut



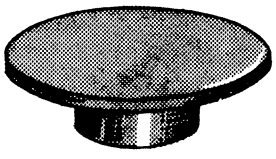
5433560
Nut



5433366
Washer

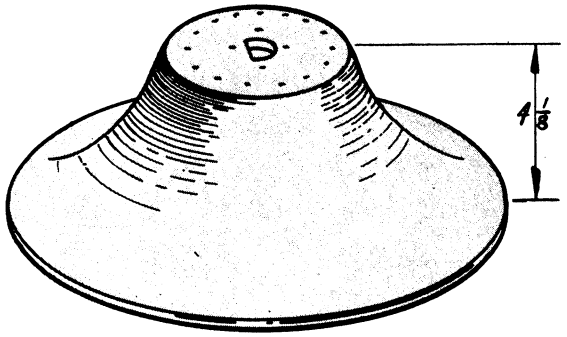


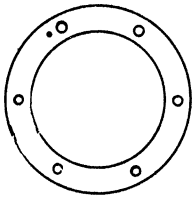
5433471
Gasket



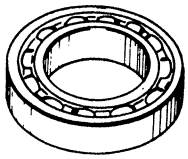
5433707
Cap

5432199
Pulsator Diaphragm
for models WS - WD -
WDS-56, WV-65, W1-56,
WS - WSA - WD - WDU -
W1-57, WS - WD - WDP
W1 - WC1 - WC1R-58 etc.

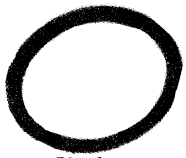




5433244
Gasket
for oil pump cap



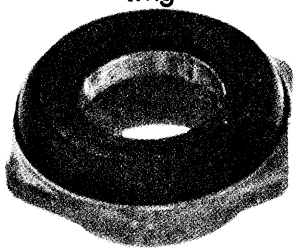
5433051
Ball Bearing
transmission



Gasket

Bushing

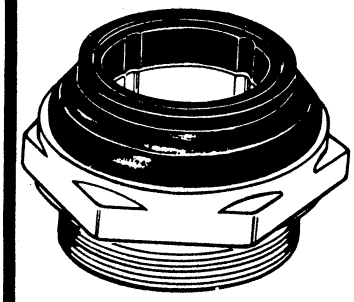
Ring



5876864
Nut & Seal Assm.

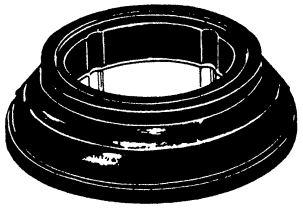
5433233
Gasket — Upper Seal

5433237
Gasket — Lower Seal

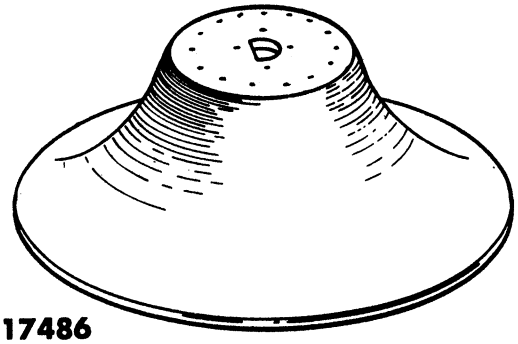


5879002
Nut & Seal Assm.
for 1957-58 models and
commercial unimatic
models.

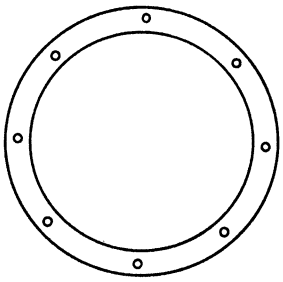
Note: Use 5876864 - all
models prior to 1957



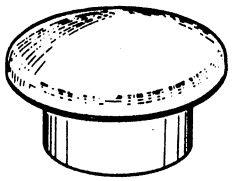
5439025
Spin Shaft Seal Assm.
for 1957-58 pulsamatic
mechanism and 1959
multi-speed mechanism.



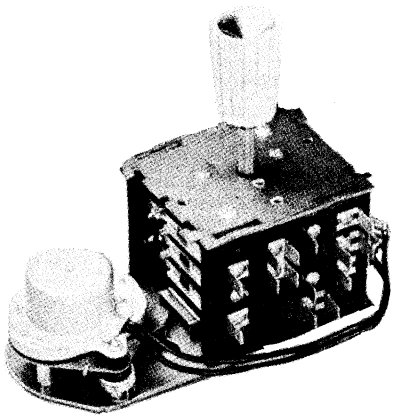
5417486
Pulsator
steel reinforced



5433291
Gasket
cork - transmission



5435204
Pulsator Cap
rubber - gray



TIMERS

Washer Model	Normal Pressure	Low Pressure
WJ-60	5876727	
WK-60	5876727	
WL-60-64	5876727	
WO-65	5430706	5431299
WO-65-2	5430777	5431300
WV-35	5431209	5876644
WV-45	5431209	5876644
WV-65	5431386	5431881
WS-56	5432311	5439226
WD-56	5432314	5439227
WDS-56	5432314	5439227
WI-56	5432315	5439228
WS-57	5439235	5439780
WSA-57	5439776	5439784
WD-57	5439258	5439781
WDU-57	5439281	5439782
WI-57	5439281	5439782
WS-58	5439986	6561386
WD-58	5439986	6561386
WDP-58	5439986	6561386
WI-58	5439998	6561387
WCI-58	5439998	6561387
WCIR-58	6560903	6561388
WS-59	6561692	6563108
WD-59	6562106	6563109
WCD-59	6561733	6563110
WDR-59	6562360	6563249
WCI-59	6590114	
WI-59	6590114	
WCIR-59	6590115	

Washer Model	Normal Pressure	Low Pressure
WS-60	6563393	
WD-60	6590316	
WCD-60	6563471	
WCDR-60	6563592	
WI-60	6563529	
WCI-60	6563529	
WCIR-60	6563615	
WDA-61 (a)	7520169	
WDA-61 (b)	7521009	7521938
WS-61	7521624	7521938
WD-61	7520005	7521939
WDAP-61	7521441	7521938
WDR-61	7520950	7521940
WCD-61	7520182	7521941
WIA-61	7520050	7521942
WIAR-61	7520180	7521942
WI-61	7520181	7521943
WCI-61	7520091	7521944
WCIR-61	7520101	7521944
WD-62	7520776	7521939
WDA-62	7521441	7521938
WDR-62	7520950	7521940
WCD-62 (c)	7520182	7521941
WCD-62 (d)	7521876	7523295
WIA-62 (e)	7522127	7523297

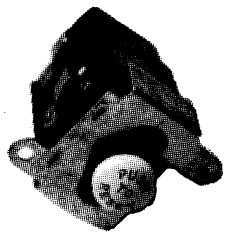
(a) before serial 26E30230
(b) after serial 26E30229
(c) before serial 28E84100
(d) after serial 28E84099
(e) before serial 28E89941

TIMERS-Continued

Washer Model	Normal Pressure	Low Pressure	Washer Model	Normal Pressure	Low Pressure
WIA-62 (f)	7521877	7523296	WCIR-63	7523306	7524359
WIAR-62 (g)	7522128	7523297	WD-64	7525229	7526151
WIAR-62 (h)	7522618	7523296	WDR-64	7525229	7526151
WI-62	7522127	7523297	WDP-64	7525229	7526151
WCI-62 (i)	7522130	7523298	WDA-64	7525226	7526148
WCI-62 (j)	7523306	7523298	WCD-64	7525230	7526149
WCIR-62 (k)	7522130	7523298	WCDA-64	7525227	7526150
WCIR-62 (l)	7523306	7523298	WCDAR-64	7523951	7524357
WD-63	7523315	7524356	WCDAP-64	7525227	7526150
WDR-63	7523515	7524356	WIA-64	7525232	7526152
WDP-63	7523515	7524356	WIAR-64	7525232	7526152
WDA-63	7521441	7521938	WCI-64	7525233	7526156
WCD-63	7523517	7524358	WCIR-64	7525233	7526156
WCDA-63	7522769	7523299			
WCDAR-63	7523951	7524357			
WCDAP-63	7522769	7523299			
WIA-63	7521877	7523296			
WIAR-63	7522618	7523296			
WCI-63	7523306	7524359			

(f) after serial 28E89940
(g) before serial 29E10905
(h) after serial 29E10904
(i) before serial 29E94026
(j) after serial 29E94025
(k) before serial 29E73630
(l) after serial 29E73629

MOTOR PROTECTORS



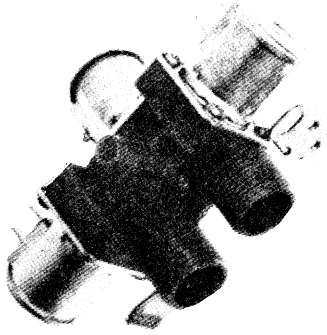
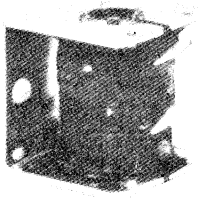
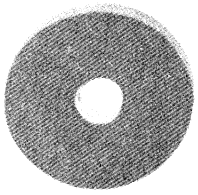
Washer Model	Part Number
WJ-60	5850845
WK-60	5850845
WL-60-64	5850845
WO-65	5850845
WO-65-2	5850845
WV-35	5890928
WV-45	5890928
WV-65	5890939
WS-56	5900824
WD-56	5900824

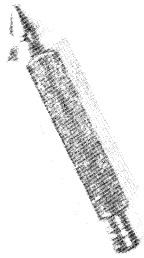
Washer Model	Part Number	Washer Model	Part Number
WDS-56	5900824	WCD-59	5901126
WI-56	5890939	WDR-59	5901126
WS-59	5900964	WI-59	5901065
WSA-57	5900964	WCI-59	5901065
WD-57	5900964	WCIR-59	5901065
WDU-57	5900965	WS-60	6563422
WI-57	5900965	WD-60	6563422
WS-58	5901064	WCD-60	6544185
WD-58	5901064	WCDR-60	6544185
WDP-58	5901064	WI-60	6563582
WI-58	5901065	WCI-60	6563582
WCI-58	5901065	WCIR-60	6563582
WCIR-58	5901065	WDA-61	6564938
WS-59	5901126	WS-61	6564938
WD-59	5901126	WD-61	6564938

MOTOR PROTECTORS-Continued

Washer Model	Part Number	Washer Model	Part Number	Washer Model	Part Number
WDAP-61	6564938	WCI-62	7520099	WDR-64	7525198
WDR-61	6564938	WCIR-62	7520099	WDP-64	7525198
WCD-61	7520051	WD-63	6564938	WDA-64	7525198
WIA-61	7520051	WDR-63	6564938	WCD-64	7525199
WIAR-61	7520051	WDP-63	6564938	WCDA-64	7525199
WI-61	7520051	WDA-63	6564938	WCDAR-64	7525199
WCI-61	7520099	WCD-63	7520051	WCDAP-64	7525199
WCIR-61	7520099	WCDA-63	7520051	WIA-64	7525199
WD-62	6564938	WCDAR-63	7520051	WIAR-64	7525199
WDA-62	6564938	WCDAP-63	7520051	WCI-64	7525199
				WCIR-64	7525199
WDR-62	6564938	WIA-63	7520051		
WCD-62	7520051	WIAR-63	7520051		
WIA-62	7520051	WCI-63	7520099		
WIAR-62	7520051	WCIR-63	7520099		
WI-62	7520051	WD-64	7525198		

INLET VALVES



Washer Model	Valve	Solenoid	Flow Washer	Diaphragm	Plunger
WJ-60	5876529	5883749	5433583	5430644	5433487
WK-60	5876529	5883749	5433583	5430644	5433487
WL-60-64	5876529	5883749	5433583	5430644	5433487
WO-65	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WO-65-2	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WV-35	5431200	5431215	5433583	5874018	5874009(fs) 5873811(d)
WV-45	5431200	5431215	5433583	5874018	5874009(fs) 5873811(d)
WV-65	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)

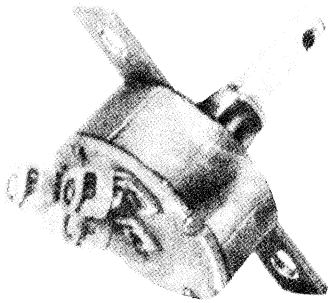
INLET VALVES-Continued

Washer Model	Valve	Solenoid	Flow Washer	Diaphragm	Plunger
WS-56	5432306	5874737	5433583	5874018	6590305
WD-56	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WD-56	5432358	6592006	5874132	5874598	6590305
WD-56	5439117	6592006	5874132	5874598	6590305
WDS-56	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WDS-56	5432358	6592006	5874132	5874598	6590305
WDS-56	5439117	6592006	5874132	5874598	6590305
WI-56	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WI-56	5432358	6592006	5874132	5874598	6590305
WI-56	5439117	6592006	5874132	5874598	6590305
WS-57	5432306	5874737	5433583	5874598	6590305
WSA-57	5439774	5874395(fs) 6592006(d)	5433583	5874598	5874009(fs) 5873811(d)
WD-57	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WD-57	5439117	6592006	5874132	5874598	6590305
WD-57	5439820	5874395		5874756	5874411
WD-57	5432358	6592006	5874132	5874598	6590305
WDU-57	5430698	5431215	5433583	5874018	5874009(fs) 5873811(d)
WDU-57	5439117	6592006	5874132	5874598	6590305
WDU-57	5439820	5874395		5874756	5874411
WDU-57	5432358	6592006	5874132	5874598	6590305
WI-57	5439380	5874395		5874756	5874411
WS-58	5432306	5874737	5433583	5874756(fs) 5874598(d)	6590305
WD-58	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
WDP-58	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
WI-58	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305

INLET VALVES-Continued

Washer Model	Valve	Solenoid	Flow Washer	Diaphragm	Plunger
WCI-58	6560506	5874857	5874132	5874598	6590305
WCIR-58	6560506	5874857	5874132	5874598	6590305
WS-59	5432306	5874737	5433583	5874756(fs) 5874598(d)	6590305
All 1959 except WS-59	6562306	6592006	5874132	5874756(fs) 5874598(d)	5874411(fs) 6590305(d)
All 1959, except WS-59	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
WS-60	5432306	5874737	5433583	5874756(fs) 5874598(d)	6590305
All 1960, except WS-60	6562306	6592006	5874132	5874756(fs) 5874598(d)	5874411(fs) 6590305(d)
All 1960, except WS-60	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
WS-61	5432306	5874737	5433583	5874756(fs) 5874598(d)	6590305
All 1961, except WS-61	6562306	6592006	5874132	5874756(fs) 5874598(d)	5874411(fs) 6590305(d)
All 1961, except WS-61	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
All 1962	6562306	6592006	5874132	5874756(fs) 5874598(d)	5874411(fs) 6590305(d)
All 1962	6561194	5874395(fs) 6592006(d)	5874132	5874756(fs) 5874598(d)	6590305
All 1963	7523414	6592006	6592572(dc) 6592465(d)	5874598	5879963(dc) 5874595(d)
All 1964	7523414	6592006	6592572(dc) 6592465(d)	5874598	5879963(dc) 5874595(d)

(fs) Fulton Sylphon
(d) Dole
(dc) Detroit Controls



SELECTOR SWITCHES

Washer Model	Wash Temp.	Cycle	Rinse Temp.	Load	Agitate	Spin	Fabric	Suds
WJ-60	5419975							
WK-60	5419975							
WL-60-64	5419975							
WO-65	5419975							
WO-65-2	5419975							
WV-35	5431212							
WV-45	5431212							
WV-65	5431388							
WD-56	5439816							
WDS-56	5439816							
WI-56	5439816	5432370						
WSA-57		5439816						
WD-57		5439384						
WDU-57		5439384						
WI-57		5439384	5439383					
WD-58	6560500							
WDP-58	6560500							
WI-58	6560646		6560647	6590640				
WCI-58	6560652		6560651	6560660				
WCIR-58	6560902		6560651	6560660				
WD-59	6560500							
WCD-59	6561734		6561735	6590640				
WDR-59	6562361							
WI-59	6561955		6561956	6562003	6562333	6561953		
WCI-59			6562004	6562003			6561863	
WCIR-59			6562004	6562003			6561863	6562080
WD-60	6563426							
WCD-60	6563472		6563473	6590640				
WCDR-60	6563593		6563473	6590640				
WI-60	6563532			6563531			6563533	
WCI-60	6563532	6563566		6563531			6563567	
WCIR-60	6563532			6563531			6563567	6563616

SELECTOR SWITCHES-Continued

Washer Model	Wash Temp.	Cycle	Rinse Temp.	Load	Agitate	Spin	Fabric	Suds
WDA-61	7520170							
WD-61	7520006		7520007					
WDAP-61	7520170							
WDR-61	7520951		7520007					7520951
WCD-61	7520006		7520007		7520275			
WIA-61	7520052			6590640			7520053	
WIAR-61	7520052			6590640			7520053	7520102
WI-61	7520052			7520185			7520186	
WCI-61							7520094	
WCIR-61							7520094	7520102
WD-62	7520006		7520007					
WDA-62	7520170							
WDR-62	7520951		7520007					7520951
WCD-62	7520006		7520007		7520275(a) 7521883(b)			
WIA-62	7520052			7521249			7520053(c) 7521884(d)	
WIAR-62	7520052			7521249			7520053(e) 7521884(f)	7520102
WI-62	7520052			7521249			7521833	
WCI-62							7521568	
WCIR-62							7521568	7520102
WD-63	7520006		7520007	7521249				
WDR-63	7520951		7520007	7521249				7520951

(a) before serial 28E84100
(b) after serial 28E84099
(c) before serial 28E89941
(d) after serial 28E89940
(e) before serial 29E10905
(f) after serial 29E10904

SELECTOR SWITCHES-Continued

Washer Model	Wash Temp.	Cycle	Rinse Temp.	Load	Agitate	Spin	Fabric	S.S.
WDP-63	7520006		7520007	7521249				
WDA-63	7523525							
WCD-63	7520006		7520007	7521249				
WCDA-63	7523525							
WCDAR-63	7523952							7523952
WCDAP-63	7523525							
WIAR-63	7523829			7521249			7523307	7520102
WCI-63							7523526	
WCIR-63							7523526	7520102
WD-64	7520006		7520007	7521249				
WDR-64	7520951		7520007	7521249				7520951
WDP-64	7520006		7520007	7521249				
WDA-64	7525197							
WCD-64	7520006		7520007	7521249				
WCDA-64	7525197							
WCDAR-64	7525197							7525225
WCDAP-64	7525197							
WIA-64	7523829			7521249			7525327	
WIAR-64	7523829			7521249			7525327	7520102
WCI-64							7525328	
WCIR-64							7525328	7520102

INDEX

INDEX

NOTES