

Raker

Appliance Repair Professionals, Inc.

Automatic Washers

(Maytag, GE, Amana, Speed Queen, Frigidaire, &
Westinghouse)

Manual 3

Harry D. Raker

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WARNING

SAFETY PRECAUTIONS

Safety is very important when working on any appliance .

Disconnect power before servicing any appliance.

Always keep the work area and your shoes dry.

All appliances have sharp edges and should be handled carefully.

Before working on any gas appliance extinguish all open flames and before attempting any gas associated repair, cut off the gas feed.

Always sniff for gas leaks and soap bubble test any parts that may have been disturbed by repair work.

To minimize any potential buildup of gas in case there is a leak, always have the room open to the outside.

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Introduction

We have now extensively studied both designs of Whirlpool washers and learned a lot about general washer design. Unfortunately, the drive system design on the old belt-driven Whirlpool is unique and doesn't help very much in understanding other designs. Likewise the direct-drive design is unique. Neither design is very helpful in understanding other designs.

However, it is interesting that nearly all others including GE and Maytag use very similar drive systems. All utilize a belt drive and reverse the motor to switch from wash to spin. Most have a simple separate reversing pump and have large centrally mounted oil filled transmissions. (A few models incorporate a separate electric drain pump.) Once the reversing motor design is mastered, all brands but Whirlpool become easy because their operating logic is identical.

GE is the next most popular design after Whirlpool and the next that we will study.

General Electric

Fortunately for us, until very recently, GE has stayed with a standard design. As you will recall from the appliance trees, washers made by GE also appear as Hotpoint and J. C. Penny. Except for the console design and agitator, they are all identical.

It is a reliable washer that is simple to diagnose and repair. The top folds back for basket access, exactly like the Whirlpool belt-driven model. After removal of a Masonite cover, the entire back is open for service. Instead of placing a paint can under a front leg like we do on Whirlpool, it is frequently helpful to place one under a back leg. Many repairs are done from the rear and the top.

Typical GE Washer (Fig. 031-01)

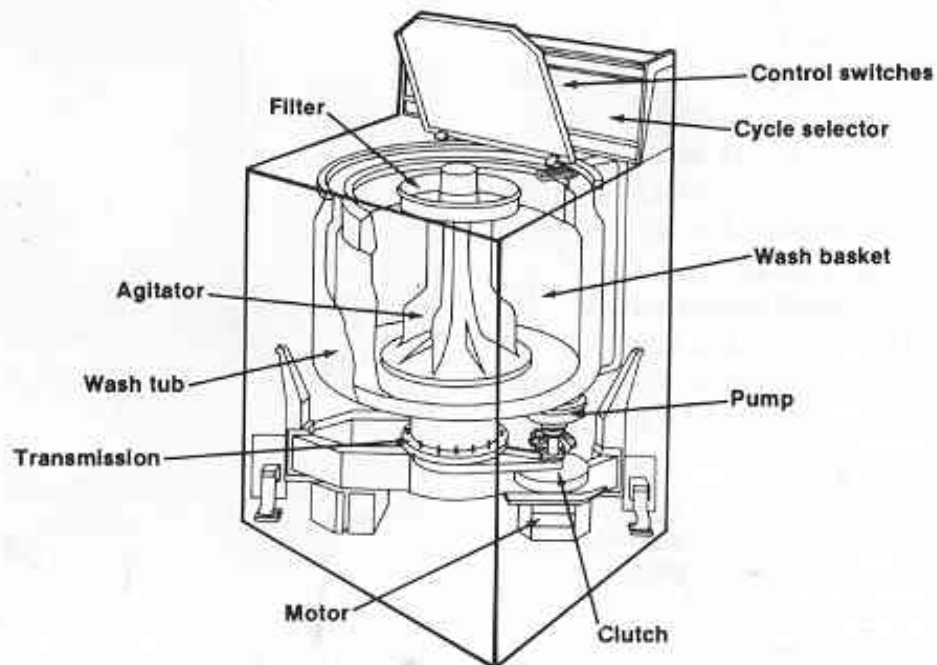


The Drive System Overview

The GE washer is different in mechanical layout from either the Whirlpool belt-driven or the Whirlpool direct-drive. However, the basic theory is similar to that of the Whirlpool direct-drive. The motor reverses between wash and spin. The pump design is also basically the same. The timer does not pause during spin like Whirlpool. Instead the clutch slips, providing a slow spin during the early part of the spin cycle. The clutch gradually brings the clothes basket up to full speed, as all the water is pumped out.

Looking at the exploded view, you will see that the motor is mounted in the right rear of the washer. The clutch is mounted on top of the motor and both are removed as one unit. The top of the clutch casting is a drive pulley. A belt couples the clutch pulley and the large transmission pulley. The pump is mounted directly above the motor and clutch unit and is connected by a flexible canvas coupling to the top of the clutch.

**GE Washer Exploded View
(Fig. 031-02)**



The Sequence of Operation

To understand the way these components interact, it is informative to go through the sequence of operation.

1 As with all automatic washers, when the machine is on, in the agitate cycle, it begins to fill while the motor and drive system sit idle.

2 Once the washer is full of water and has satisfied the water level switch, the motor starts and simultaneously the wash cycle begins. Part of the pump recirculates water back into the wash basket.

3 The washer agitates until the timer reaches the end of the wash cycle.

4 At the end of the wash cycle, the motor pauses.

5 The spin cycle begins by pausing and reversing and restarting the motor. The pump begins draining the clothes basket, as the clutch slowly spins the heavy basket.

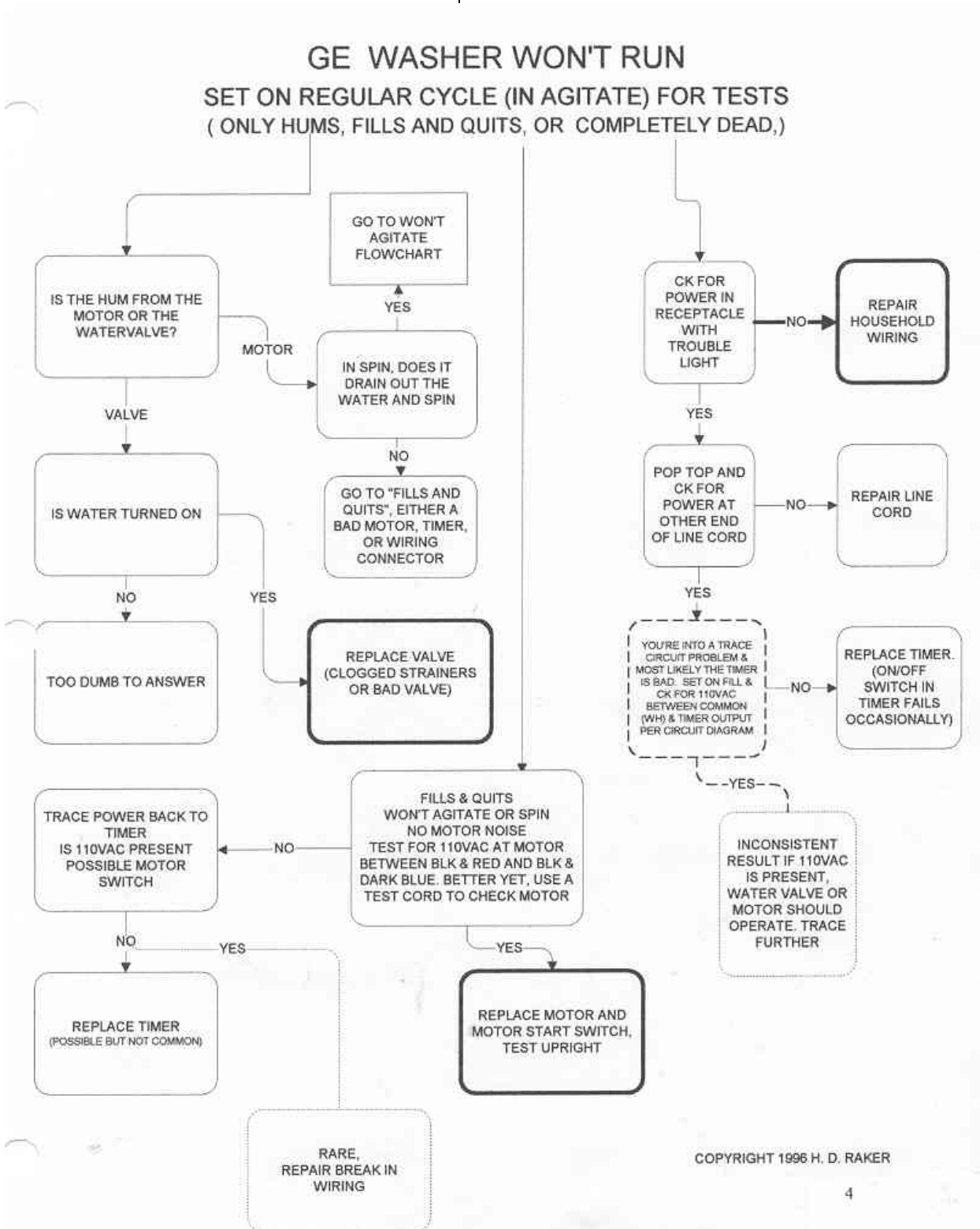
(Note: If you lift the lid on a GE, the spinning will stop because the lid safety switch disengages the circuit to the motor.)

Gradually the spin speed increases and the water gets drained out. As the speed of the basket increases, more and more water is squeezed out of the clothes. It goes down into the pump system and is pumped into the sink.

The same sequence repeats for the rinse cycle and then the long spin.

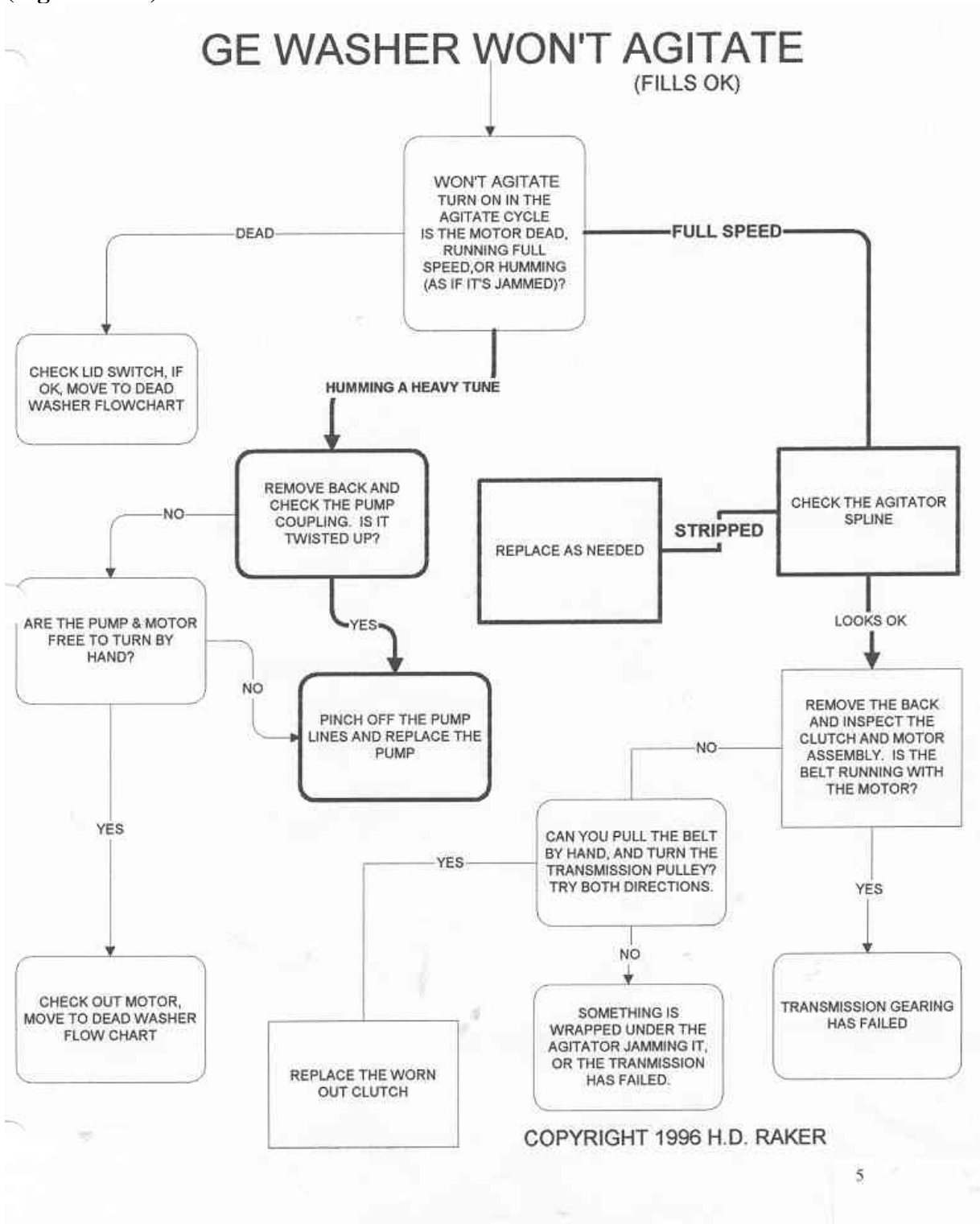
Following are *Uncle Harry's* GE flowcharts for quick diagnosis:

(Fig. 031-02a

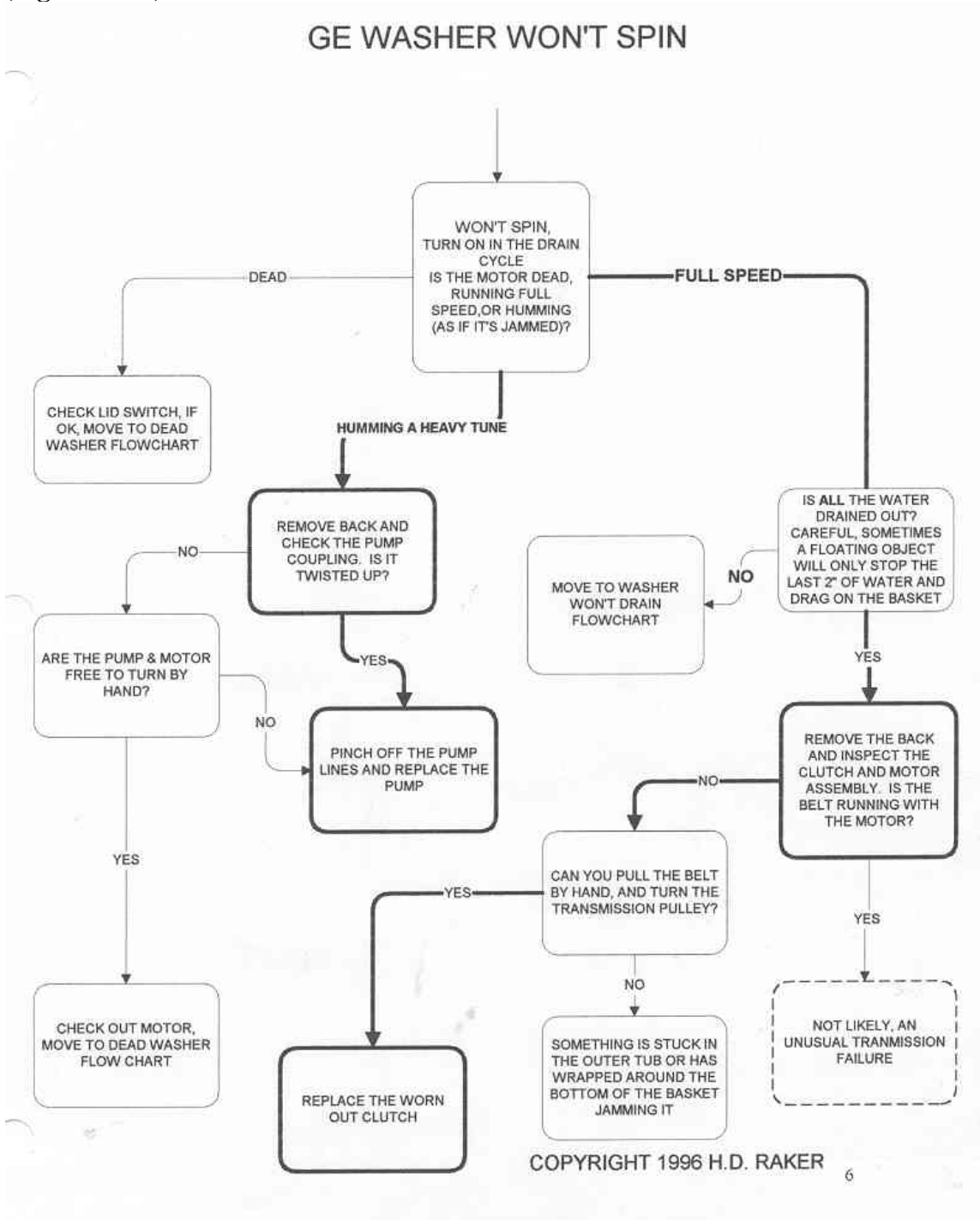


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(Fig. 031-02b)

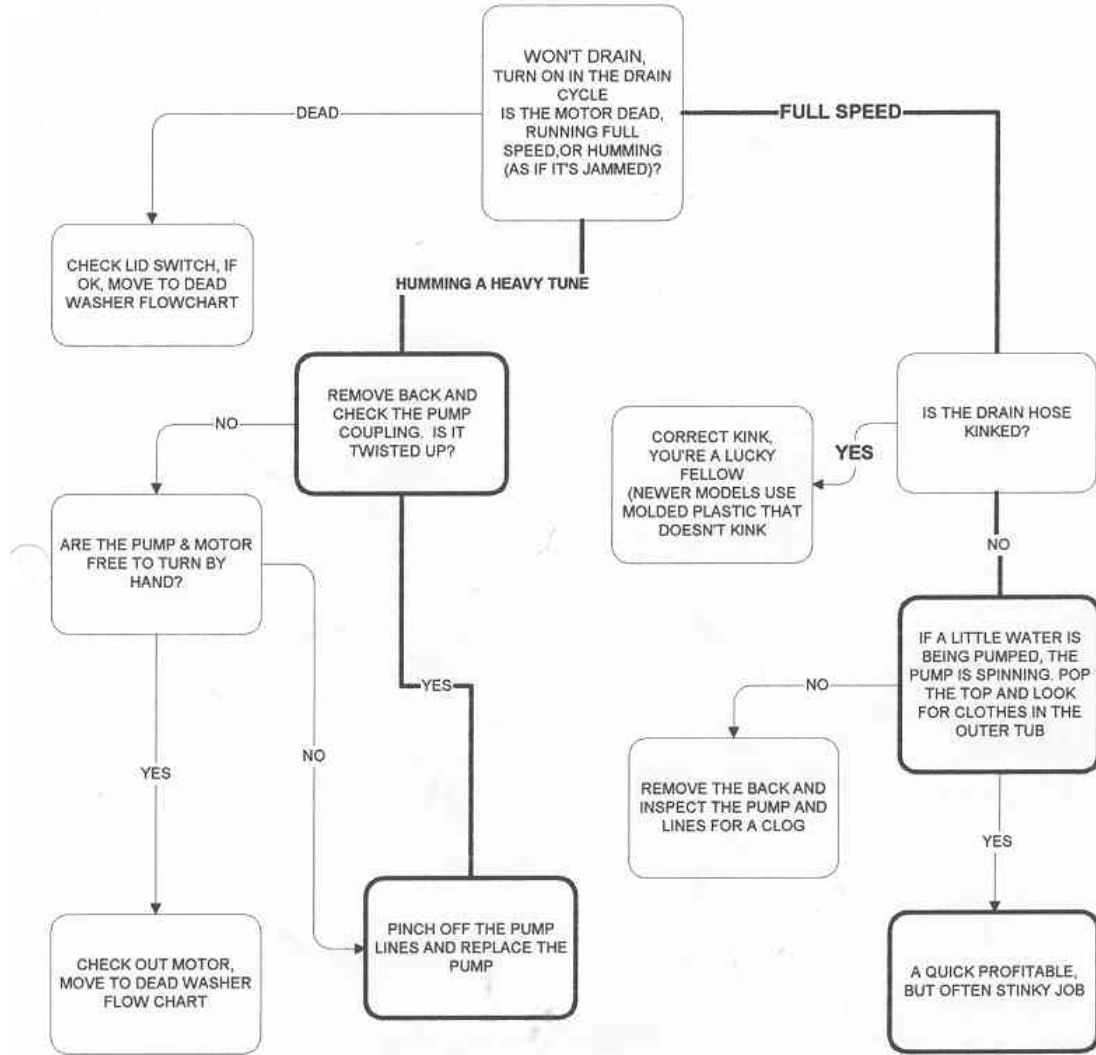


(Fig. 031-02c)



(Fig. 031-02d)

G. E. WASHER WON'T DRAIN



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Component by Component

We'll go through the individual components one at time, like we did before, attacking the weak spots first. But first, let's look at a few of the problems that are common only to GE. Learning these helpful hints will make you sound like a GE. expert

I can here you at the supply house now.

"Oh, yeah, those GE's, I can't tell you how many socks I've pulled out of those babies."

GE Problem Spots

1. Oversudsing.

"My washer is leaking."

If the customer uses too much of a foamy soap like Ivory or a sudsy detergent, a GE may overflow around the left front foot. The washer's overflow line empties about 6" back from the left front foot. If such a situation is suspected, fill the washer at least twice to the highest water level. If no other leak is evident, carefully question your customer. Check for the brand of detergent used and the quantity. If no leak is evident, advise the customer to use less soap. Always be suspicious of oversudsings.

2. Socks Over the Top.

"My washer won't drain."

The GE design allows socks to go over the top of the wash basket and get into the outer tub. They will lodge in the hole that channels water from the outer tub to the pump, or they may get sucked all the way into the pump and jam there.

3. Noisy Clutches.

"My washer works, but it is very noisy."

GE is famous for noisy clutches. As the clutch wears, it begins making rapid rattling and banging noises.

4. Oil Leaks

"My clothes have brown stains on them that I can't get out," or,

"There is a puddle of oil under my washing machine."

Oil leaks from the transmission and shows up in three places,

1. On the floor under the washer.
2. Splattered all over the inside surfaces of the washer cabinet.
3. As spots on clothes, from leaks through the main tub seal under the clothes basket.

The Water Pump

GE uses a plastic centrifugal pump much like a direct-drive Whirlpool, Maytag and many other brands. It drains the tub in one rotation and sucks water from the drain hose in the other. The pump pulley is connected to the clutch assembly by a flexible webbed canvas coupling. GE has a second smaller pump built on top of the same body as the main pump. The smaller pump recirculates water into a lint filter sitting on top of the agitator.

GE Pump and Pump Web (Fig 031-03)



Pump Failures

Water pumps fail in two ways:

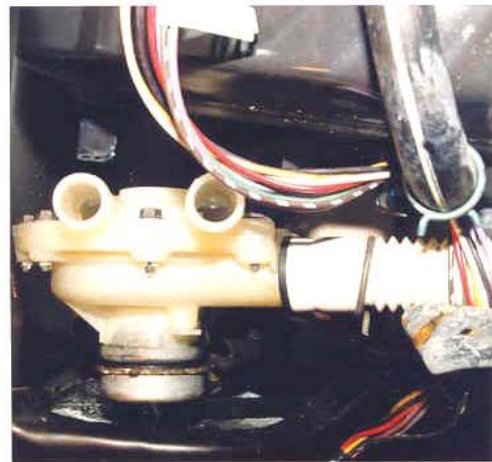
1. Leaking

They leak water in two places. First they leak through the pump weep hole. (A small hole just above the pump drive pulley.) Second, they leak around the pump drive shaft.

2. Jamming

They will jam with socks, or other clothing that escape over the top of the wash basket.

Replacing a GE Pump (Fig. 031-04)



Uncle Harry's

Trick of the Trade # 3-1

Don't try to remove clothing from the pump. Replace the entire pump.

Clothes spin around and knot up on the impeller. It's very difficult and time consuming to get them out. Usually, the jamming debris damages the pump seals.

Sometimes the pump will spin freely and the washer still will not drain. Clothes are no doubt caught in the pump inlet hose. In contrast to pump problems, clothes caught in the inlet hose to the pump can be easily removed without even pulling out the washer.

Uncle Harry's

Trick of the Trade # 3-2

1. Pop the top of the washer and fold it back.

2. Pull the basket forward and jam your arm behind the basket down, all the way to the bottom. Slightly to the rear left, at about 11 o'clock, is the outlet to the pump hose. Grab the clothes stuck in the hose and pull. *Uncle Harry* knows that sometimes the water stinks, and the job can be a bit unpleasant. However, \$75.00 is not bad for five minutes work.

Pump Replacement

A GE pump can be replaced while the machine is completely full of water. The procedure is fairly simple.

1. Tilt the washer forward. Access is easier, if you place a paint can under a rear leg.
2. Clamp off the two inlet water hoses with clamping pliers.
3. Remove the pump web from the pump drive pulley.
4. Remove three long 5/16" sheet metal screws that bolt the pump to the outer tub. The inner bolt is the only hard part.

Uncle Harry's

Trick of the Trade # 3-3

Reach around the pump with both hands. Hold a stubby nut-driver in one hand; use your other hand to line up and position the tool on the bolt head. You might as well close your eyes as you remove it, because you won't be able to see a thing. Remove the hardest bolt first and reinstall it last. The easier bolts will help line up the pump position.

Sometimes replacing the pump web can be a little bit tricky. Make sure that you get it back evenly onto the pump drive pulley. Otherwise, it may fly off when you start up the motor. With a little bit of patience, the whole job can be accomplished in less than 30 minutes.

The Clutch Assembly

The clutch mechanism is mounted on top of the motor and is accessible by pulling the motor and clutch out together. The clutch on most GE washers is two-speed. An arm operated by a small solenoid mounted on the side of the clutch shifts it from high speed to low speed. The machine runs at high speed when the solenoid is off.

GE Motor and Clutch Assembly (Fig. 031-05)



Clutch Diagnosis

Strange noises are the usual indicator of a bad clutch. The main wearing point of the clutch are the primary shoes. These shoes are the heart of the single and two-speed clutch. Worn out primary shoes make a lot of noise as they grind against the cast iron clutch drum. The washer will make noise in wash and even more noise in spin. If you hear a high speed rattling or grinding noise, suspect the clutch. Take off the cardboard back of the washer and push it to the side. It's not necessary to remove it completely.

Uncle Harry's

Trick of the Trade # 3-4

On many older models the fill lines are threaded through the back cover. Don't bother removing and replacing the hoses. Just break off the corner of the cover that is in the way and chuck it!

Look at the clutch during the spin cycle. Listen to it operate. Most of the time the failure is obvious. Usually there will be powdered metal and clutch lining all over the top of the motor.

A Set of Primary Clutch Shoes (Fig. 031-06)



Removal of a Clutch and Motor Unit

Uncle Harry's

Trick of the Trade # 3-5

Be prepared for a dirty job. Pull up your sleeves and lay some large rags on the floor. There is **always** some oil on the motor assembly of a GE washer. *Uncle Harry* has been there too!

1. Removal of the clutch and motor unit can be accomplished by tilting the machine forward, just like the procedure for pump replacement.
2. Remove the web from the top of the clutch.
3. Get your arms under the motor unit and remove the three 7/16" nuts that hold the motor mount against the frame of the machine. Slip it forward, toward the center of the machine, so that the belt will easily come off. Carefully, drop the unit down into your hands.

The motor assembly is easy to re-install; the only hard is holding it up while getting the first nut back on. Let it dangle by one and then tilt it to get to the second and third. Put the belt on and slide the motor back to snug the tension, before tightening the three positioning bolts.

Single-Speed Clutch

Many mechanics avoid clutch repair. Instead they replace the clutch and motor assembly as one whole unit. The entire unit is only about \$20.00 more than the two-speed clutch alone. As long as you don't lose the job because of price, changing the entire unit is certainly the simplest option.

Uncle Harry's

Trick of the Trade # 3-6

There is a second option. Remove the two-speed clutch and install a very simple and cheap **single-speed** clutch.

A single-speed clutch costs around \$20-\$25.00 as opposed to \$80-\$90.00 for a two-speed clutch. The entire motor assembly is over \$100.00. Most customers could care less whether they have high and low speed on their washing machine. This is especially true, when keeping the slow speed will cost them an extra \$75.00. The chances are the low speed has been missing for the last 2 or 3 years anyway.

A single-speed clutch is much simpler; it is used on coin-operated and other durable models. It actually is just the core of the two-speed clutch.

Rebuilding a Two-Speed Clutch

1. Lay the assembly on to its side and drive the pulley pin out with a drive pin. A 1/8" drift pin is the best tool for this job, but really a good 8 penny common nail filed off flat at the end will work fine.

2. Once the pulley is taken off the top of the clutch, the clutch will then disassemble, one piece at a time. Carefully line up the various pieces in the order they come off. Sometimes the top bearing of the clutch is rusty and a rust buster may be required to loosen it.

Uncle Harry's

Trick of the Trade # 3-7

Do not bang directly on the top of the clutch shaft in order to push the shaft through the top of the clutch. The clutch shaft is very soft material. With only the lightest banging, it will swell and jam. You will then need to file it down to get it through the top of the clutch. If you can't get it apart any other way and have to bang on it, make sure to use a piece of wood in between to protect the motor shaft.

If all else fails, a pulley puller will always work.

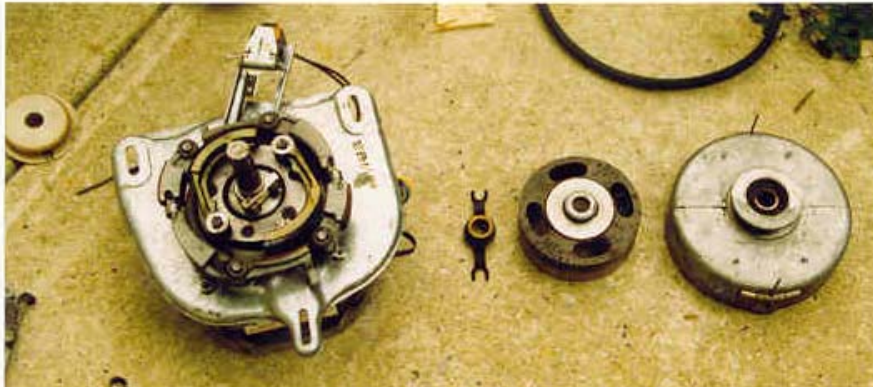
Once the old clutch is off, reassembly is straightforward. A new two-speed clutch comes with locking pins to ease the reassembly. (Note the nails used as locking pins in the puller photo. They release pressure inside the clutch, making it easy to disassemble.) Remove the clearly marked pins before you finish.

A second problem that arises when switching clutches. Often the motor shaft extension is stuck on the motor shaft. Tap the edges of the shaft extension and try to twist it on the motor shaft. Again a rust buster is effective. The weight of the rotor on the motor is usually enough to break loose the shaft extension. If you are still having problems, a large screwdriver carefully positioned into the motor rotor from the bottom will help hold the motor shaft steady. Once the extension begins to twist, it will come loose. Rust is your only enemy. As a last resort, apply heat from a propane torch to the stuck parts..

As usual, even allowing time for stuck parts, this job should take less than an hour. If the whole assembly is replaced, \$250.00 or even \$300.00 is a competitive price. Converting to a single-speed can be done for \$180.00. The overall profit is the same. Converting takes a little more practice, but it will sell more jobs. Also converting the clutch will likely save a second trip. Stocking a two-speed clutch is expensive, but a single-speed clutch is cheap enough to stock.

Rebuilding a Two-Speed Clutch

(Fig. 031-07)



The Transmission Boot

GE washers have a unique large accordion boot sealing the transmission top to the bottom of the outer wash tub. It looks like a big rough rubber donut. When the basket is wobbling, the boot flexes back and forth. It acts as a shock absorber and a snubber.

GE Boot
(Fig. 031-08)

Boot Failure

As you would expect, the boot will stiffen, crack, and leak as it gets older. As the rubber gets old and hard, it will become stiff and pull loose from its clamps. A leaking boot is a common problem on GE washers. Water will dribble down the side of the transmission and onto the floor. If the boot is only cracked, the leak will be minor; if the clamps have come loose, the leak will become a flood.



Boot Replacement

A boot is surprisingly easy to replace.

1. Fold back the top of the tub. In doing so, be sure to relieve the pressure on the recirculating suds inlet on the rear right-hand corner of the washing machine. As with Whirlpool belt-driven washers, two sharp strikes with a screwdriver under the left and right side of the top will release the clips that hold the top down.

2. Once the top is folded back, the agitator must be pulled off. Nothing holds the agitator down but a slip-fit rubber spline. Make sure that you can get the agitator off without damage, before pricing a boot repair. In most cases, it pulls off easily by hand; but every now and then it will really be stuck (see agitators). It may be necessary to destroy the agitator in order to get it off. If so, price a new agitator before quoting the job; GE agitators are expensive.

3. Below the agitator is a plastic bearing. Snap it off the top of the basket mount

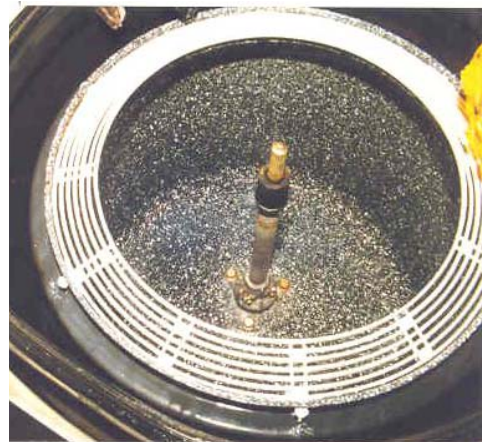
4. Remove the three 1/2 " star-looking" bolts. They are standard bolts, but they require a **12 point socket** instead of a standard 6 point socket. (Note: A few students consider this a special tool.)

5. Lift the clothes basket out of the machine. With the basket out, the transmission top, boot and outer tub are exposed.. Dry out the area with rags or towels and inspect the boot to find the break.

6. Remove the two large stainless steel clamps that hold it and remove the boot. The clamps seldom rust up but be careful not to twist them. Use a nut driver on one side and pliers to hold the other.

Be sure to clean carefully before mounting a new boot. Take a little extra time to bolt the boot securely. Make sure to fill the machine all the way to the top when testing it. Carefully replace the recirculating inlet back into the splash shield in the washer top.

GE Clothes Basket Showing 12 Point Bolts (Fig. 031-09)



Hole in the Outer Tub

Occasionally a small rust hole will appear in the outer tub. It is possible to successfully repaired holes as large as a quarter with a piece of rubber and a patch of brown glue.

Uncle Harry's

Trick of the Trade # 3-8

Use a Whirlpool bolt kit. Drill a hole large enough to fit a 1/4" bolt. Use the large steel and rubber washers from the kit and bolt them against the hole. Of course this technique can be used on any washing machine.

GE With Boot and Transmission Removed (Fig. 031-10)



Make sure, when you're re-installing the tub boot, that the surfaces you're clamping are clean and dry. It's a little bit upsetting to put the thing together and have it leak. You can leak test the washer with the basket out and the top up.

Uncle Harry's

Story Time

When I was young, and setting speed records, I would turn on the washer once the boot was clamped or a hole patched. As it was filling, I would race the water to the top as the washer was reassembled. In doing so, about five minutes was saved. The washer was being leak tested, at the same time it was being reassembled.

Agitators

There are several methods of getting off a stuck agitator.

Uncle Harry's
Trick of the Trade # 3-9

Weave heavy baling wire through the agitator and make a homemade sling. Put two wooden blocks on top of the washing machine. Climb on top with a crowbar and thread it through the sling. Pull up on the sling with the crowbar, prying against the wood. As the sling stretches, tighten it by turning the crowbar in circles.

If removing the agitator intact seems hopeless, crush the top section of the agitator with a large pair of channel locks. If you are able to crack the top, it will be possible to remove the agitator without removing the rubber spline.

Agitator Spline (Fig. 031-11)



If all else fails use a hacksaw or a chisel and break off part of the top of the agitator. There are various pullers sold for removing stuck agitators. Agitators, unfortunately, are all different sizes, shapes and configurations.

Recently, a water operated remover has been marketed. It is a rubber bladder that slides under the agitator and expands with water pressure. It sounds good but we haven't tried it. If you use one successfully, please give us a report.

Agitator Spline

Occasionally, the rubber spline will strip inside the agitator. The spline can be driven out and replaced without replacing the entire agitator. If the washer sounds normal, but it will not agitate, remove the agitator cap and observe the drive shaft during agitate. If the shaft is moving normally and the agitator is still, the spline is bad.

Transmission Failure

GE transmissions fail in various ways:

1. The most common problem is an oil leak. Oil leaks from the places mentioned before.
- 2.. The drive pulley shaft seal leaks and a puddle will form on the floor or the oil will splatter all over the inside of the cabinet.
3. The main tub seal will fail and oil will leak into the washtub and soil the clothes.
4. The gears will wear inside the transmission and begin making thumping and clunking noises during agitate.
5. The gears may fail and agitation will cease during wash or braking will cease.
6. The top of the agitator drive shaft (the splined section) will rust out and not drive the agitator spline.

All of these failures require a new transmission.

GE Boot and Transmission Hub (Fig. 031-12)



Transmission Replacement

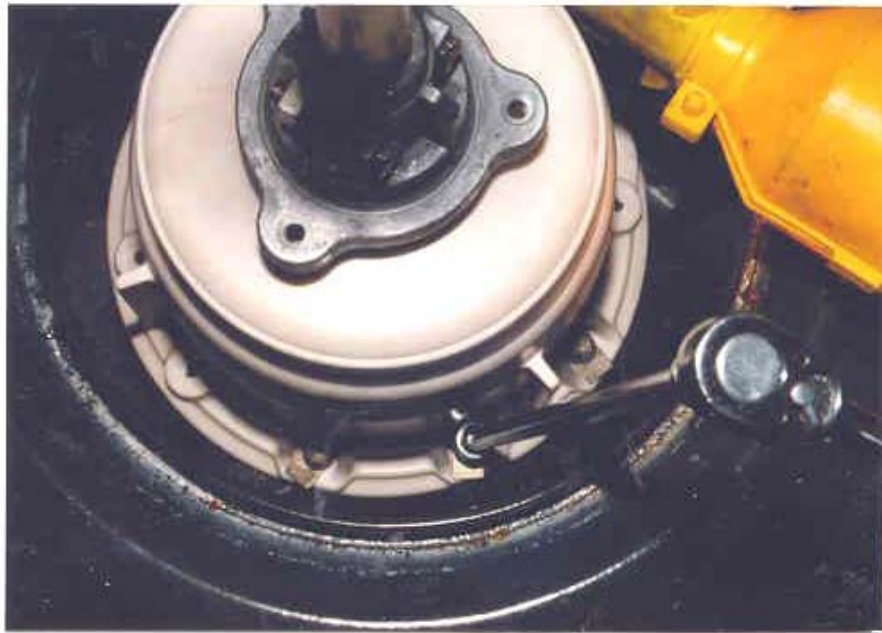
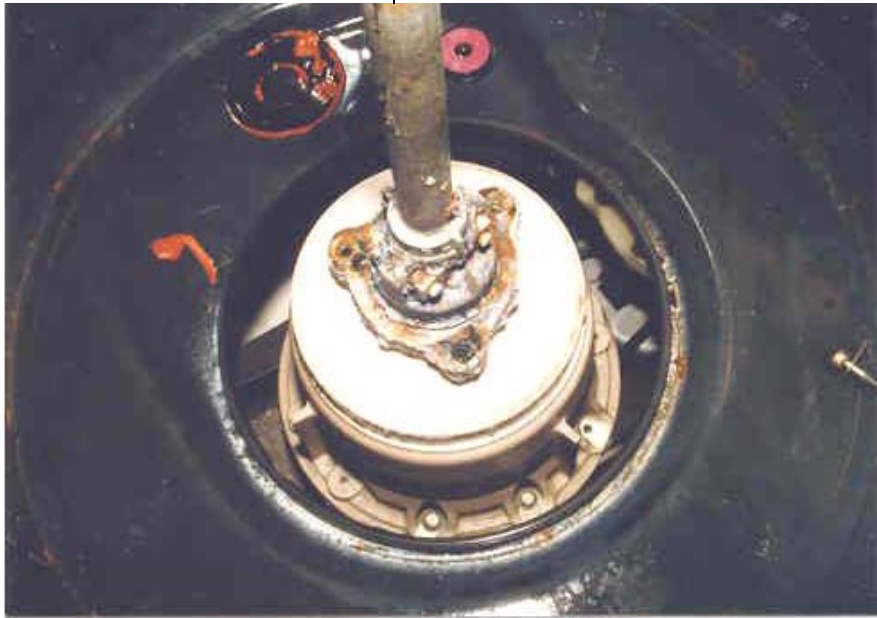
The GE transmission is the easiest transmission of all to replace. It is a five minute extension of a boot replacement. Once the boot is removed the transmission bolts are accessible from the top.

1. Using a long 3/8" socket wrench, remove the transmission bolts and lift the transmission right out through the top of the machine. It is not necessary to take the back off the machine.
2. Continue working from top, replace the new transmission and thread the belt onto the drive pulley,
3. Replace the six transmission bolts and then reassemble the machine as described on the boot replacement.

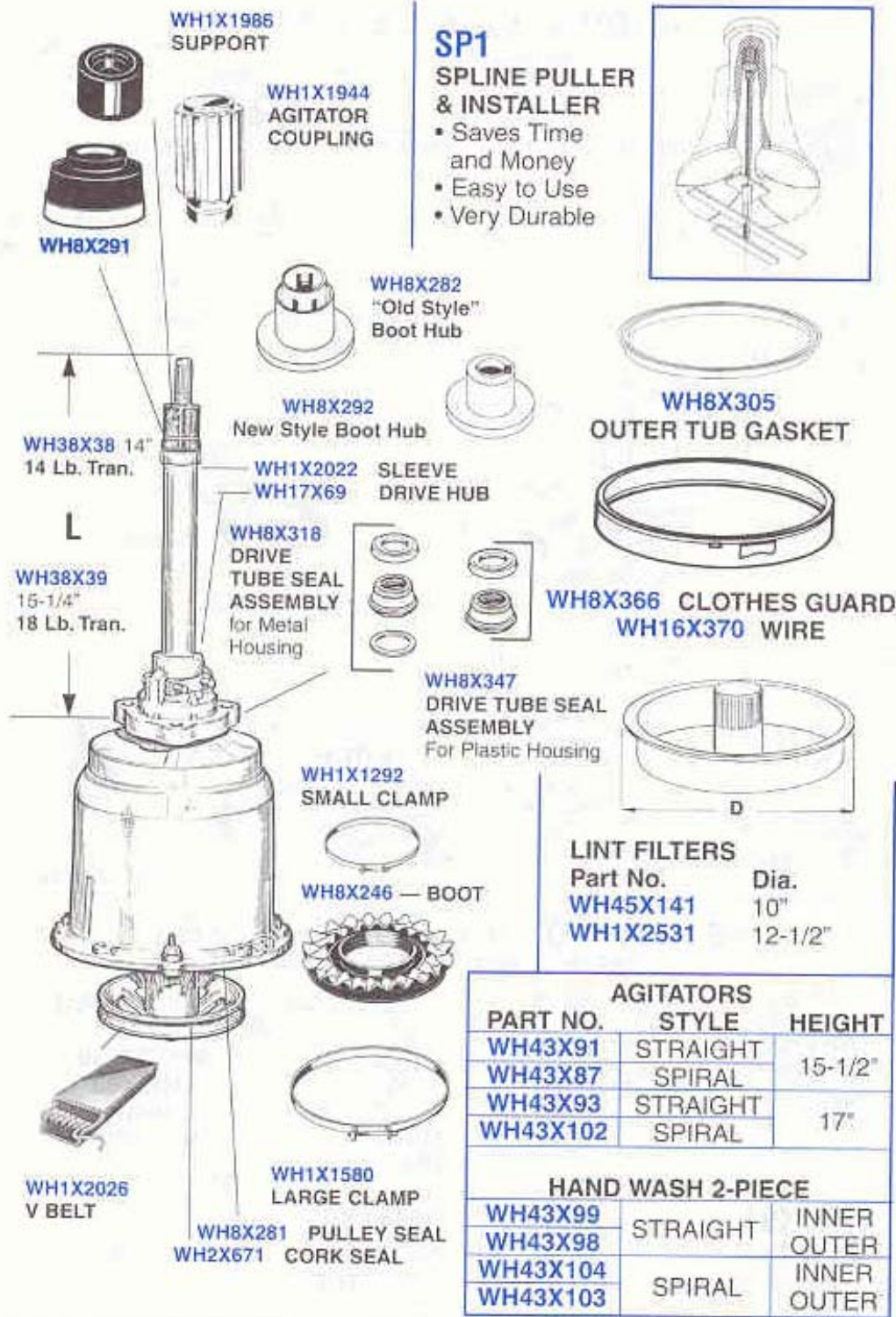
The whole transmission replacement process can be done in one-half an hour (assuming no agitator problems). Prices vary on GE transmissions. Usually they are available on an exchange basis, and the job can be done for a little over \$200.00.

*Uncle Harry's
Story Time*

I remember back in the early 70's watching a GE pro change a transmission (the same design as today). I was amazed and very impressed at how fast he did it. It was a few years later before I found out how easy it really was.



**GE Exploded View
(Fig. 031-14)**

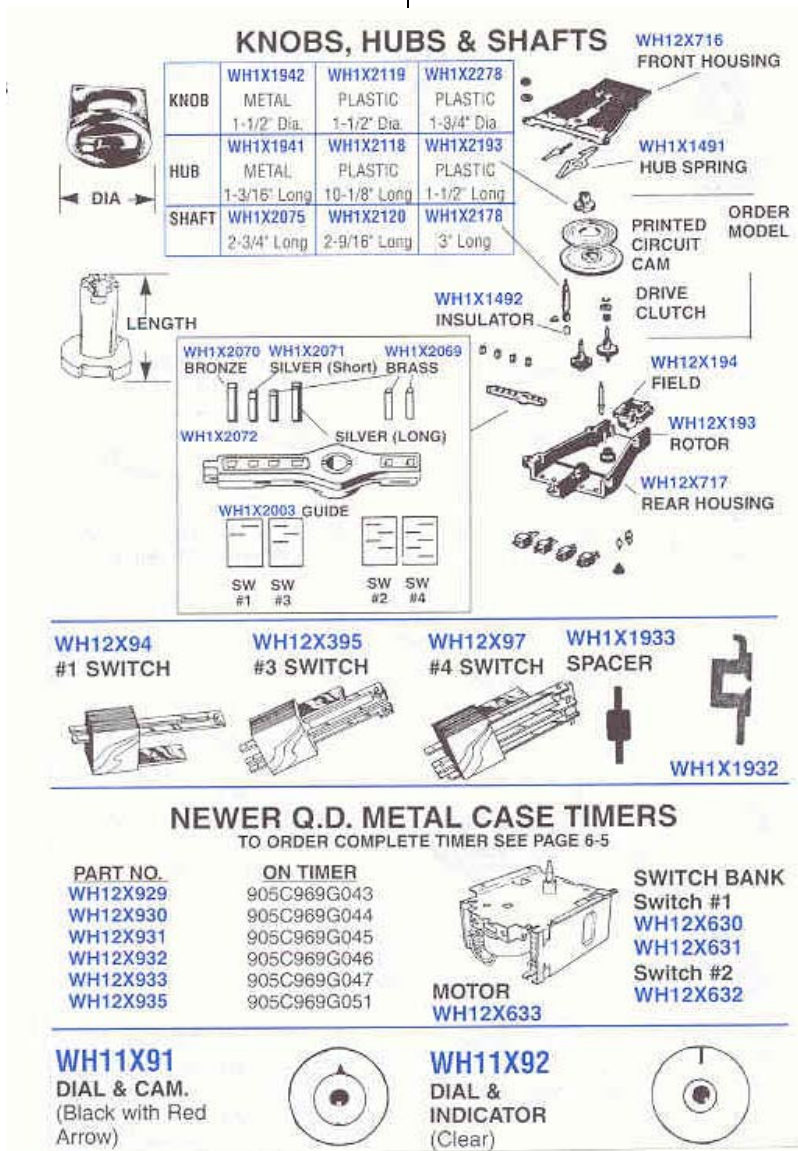


The Timer

GE washers have very reliable timer systems. Chances are you will not encounter a bad one. Prior to 15 years ago, the GE timer was made to be rebuilt in the field. It was a tricky job.

Technicians used to carry the contacts on the trucks. That style of timer is very rarely seen anymore. Timer diagnosis follow the same patterns as earlier described on Whirlpool.

Various Timers and Parts (Fig. 031-15)



The Suspension System

Occasionally the suspension system wears out on a GE washer. It will bang and make a racket in agitate or spin as the suspension arms hit the cabinet. The noise is easily distinguished from a clutch failure. It is timed with the swinging of the wash basket, instead of the motor speed. The problems usually are in the snubber arms mounted in each corner. There are three sets of sliding plates that are bolted to the frame of the washing machine. Replacement is simple enough once the correct parts are ordered.

GE Snubber Arm Assembly (Fig. 031-16)



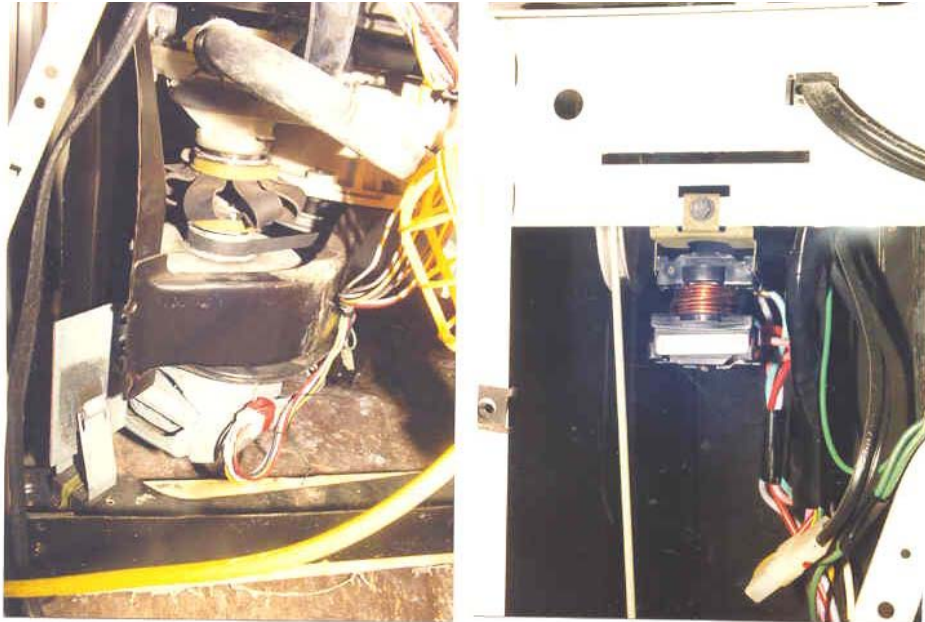
GE Snubber Arm Parts (Fig. 031-17)



The Drive motor

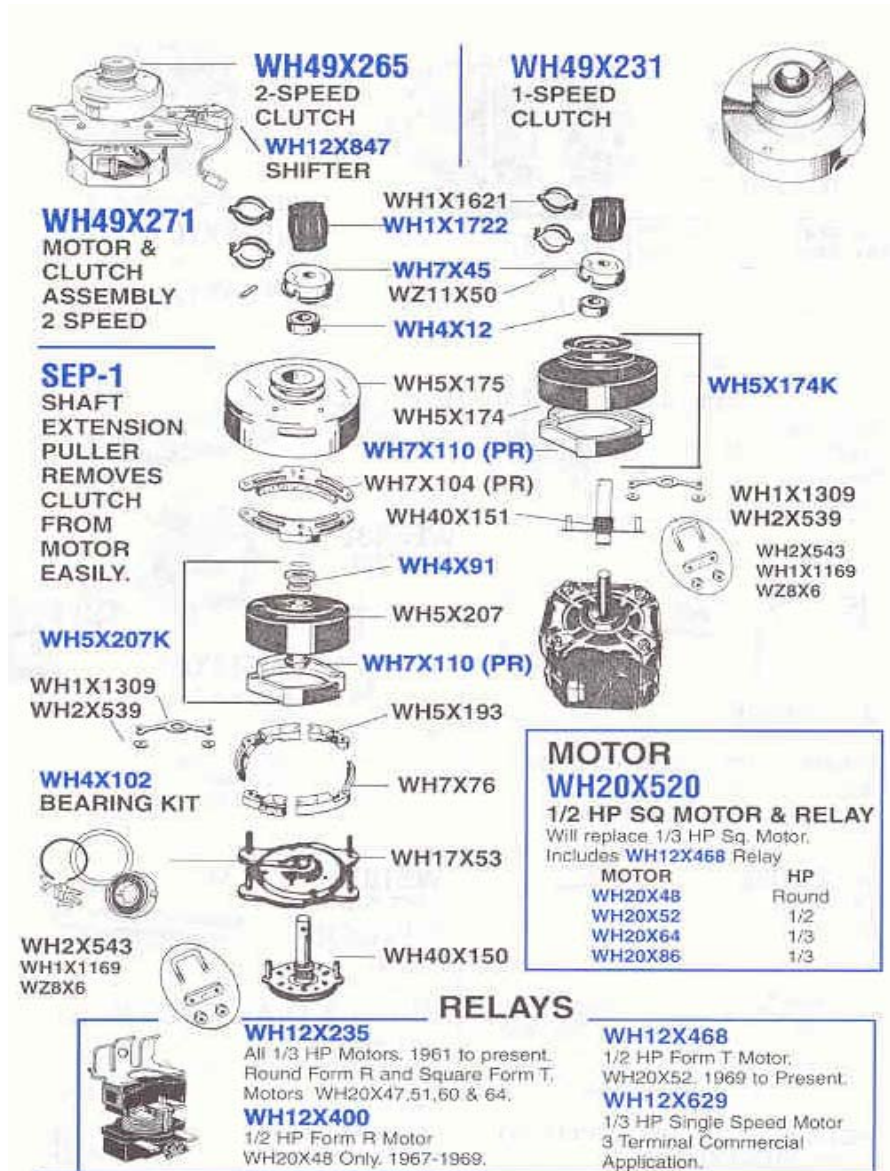
The drive motor on a GE is a reversing single-speed motor. It has a remote start switch that is bolted up near the timer on the back panel. Motor replacement requires the same procedure that was described for the motor and clutch assembly repair.

GE Motor and Remote Starting Switch (Fig. 031-18)



**GE Drive Motor and Clutch
(Exploded View)**

(Fig. 031-19)



Motor Diagnosis

Sometimes, it's obvious that the motor has burned up on the washer. For instance, it may have filled the room with smoke or the windings may be all charred and smell burned. Before replacing a motor, run a few simple tests. Make sure that you can turn the transmission pulley both ways by hand. Also, test the pump for a jam.

Uncle Harry's

Tricks of the Trade # 3-10

Take the belt and the web off the motor. Try it when it is sitting free. Does it spin freely by hand? Does it run in one direction - agitate for instance - but not in the other? Guess what, the problem is **not** in the motor, the problem is in the timer or the lid switch.

For one reason or another the timer is not reversing the start winding wires that make the motor go in the other direction.

The remotely mounted starting switch can also cause problems. It can be replaced separately. A bad starting switch is indicated if the motor hums instead of starting and will start up with a little push. Having a test switch in stock is the easiest diagnostic method.

Uncle Harry's

Tricks of the Trade # 3-11

If a motor will run one rotation, it will run the other rotation.

The surest motor test is trying out another motor. This can be done in minutes on a GE. It only requires switching the motor connector to a spare uninstalled motor. First chance you get, strip a good motor off a junk washer for testing.

A free running motor has no way of differentiating one direction from the other. (There are a few rare exceptions to this concept covered in lessons where they apply. None exist in washing machines)

In any case, always suspect the power supply, rather than the motor itself. If when the belt is hooked back up, the motor is sluggish, the problem is probably motor bearings. Worn bearings cut down the horsepower of the motor.

Conclusion

This completes our study of GE washers. No other areas in the design are worth mentioning. The clutch, boot, pump and transmission are the main source of service calls.

Maytag Automatic Washers

For years, Maytag washers have been *Uncle Harry's* own personal favorite. For a long time, he owned and operated a Maytag Home Center and sold hundreds of Maytag washers, dryers and dishwashers. Dozens were purchased for outfitting the Laundromats that he owned. All were purchased at a premium price over other brands.

Its design has been the same for over twenty-five years. During that time it has been thoroughly de-bugged. The equipment is well made, and deserves the reputation of reliability that is advertised on TV.

Typical Maytag Washer (Fig. 032-20)



Uncle Harry's Story Time

Maytag products are manufactured in Newton, Iowa. Years ago, I toured the manufacturing facility and watched them being made. I spent time with the Maytag management and the employees. Maytag has a proud, multi-generation strong employee base that still has the traditional, proud old way of doing things. Only recently have a few flaws appeared in the Maytag armor. No doubt this has been a result of their rapid expansion into Magic Chef, Jenn-Aire, and Norge. But, aside from my personal sales pitch, let's talk about the Maytag washer.

Traditionally, Maytag has been a high priced product, and, consequently, has never represented a large share of the washer market. It is found most often in upper income homes.

The Drive System Overview

In theory, Maytag is very similar to GE. The motor reverses to switch from wash to spin; it's a belt-driven machine; and, it has a large central transmission. However it does not use a clutch like a GE. **Clutch action is accomplished by spring loading a slipping drive belt.** Maytag is designed for ease of service. It is a front-service washer.

Hidden Cabinet Screws (Fig. 032-21)



Two screws near the bottom of the front panel allow access to the whole front of the machine. Two 3/8" bolts allow the top of the machine to flip back. Virtually anything that's wrong can be serviced without pulling it out from the wall or even disconnecting the water and drain lines.

Top Flipped Back (Fig. 032-22)

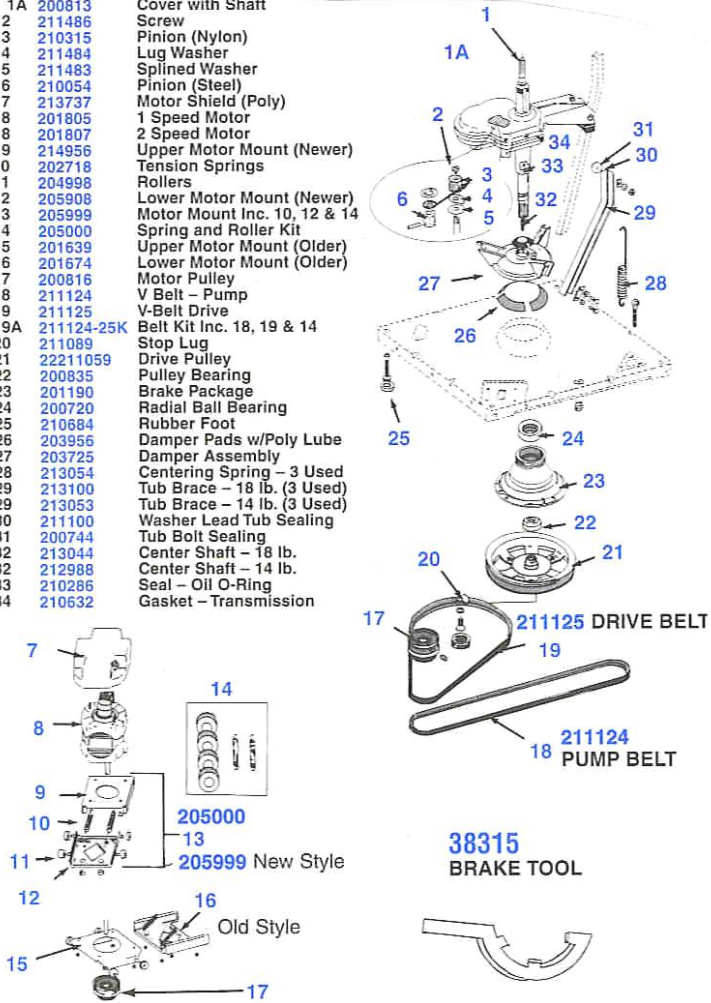


(Fig. 032_23)

**Removing the Front Panel and
Maytag Exploded Views
(Fig. 3-23)**



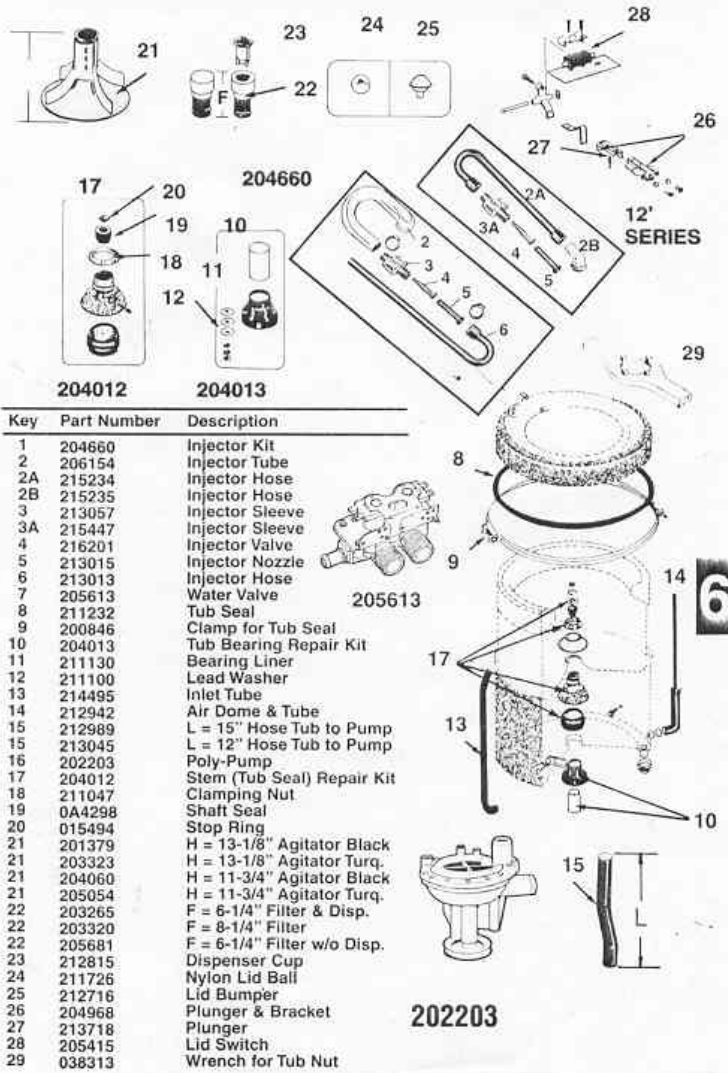
Key	Part Number	Description
1	200730	Agitator Shaft
1A	200813	Cover with Shaft
2	211486	Screw
3	210315	Pinion (Nylon)
4	211484	Lug Washer
5	211483	Splined Washer
6	210054	Pinion (Steel)
7	213737	Motor Shield (Poly)
8	201805	1 Speed Motor
8	201807	2 Speed Motor
9	214956	Upper Motor Mount (Newer)
10	202718	Tension Springs
11	204998	Rollers
12	205908	Lower Motor Mount (Newer)
13	205999	Motor Mount inc. 10, 12 & 14
14	205000	Spring and Roller Kit
15	201639	Upper Motor Mount (Older)
16	201674	Lower Motor Mount (Older)
17	200816	Motor Pulley
18	211124	V Belt - Pump
19	211125	V-Belt Drive
19A	211124-25K	Belt Kit inc. 18, 19 & 14
20	211089	Stop Lug
21	22211059	Drive Pulley
22	200835	Pulley Bearing
23	201190	Brake Package
24	200720	Radial Ball Bearing
25	210684	Rubber Foot
26	203956	Damper Pads w/Poly Lube
27	203725	Damper Assembly
28	213054	Centering Spring - 3 Used
29	213100	Tub Brace - 18 lb. (3 Used)
29	213053	Tub Brace - 14 lb. (3 Used)
30	211100	Washer Lead Tub Sealing
31	200744	Tub Bolt Sealing
32	213044	Center Shaft - 18 lb.
32	212988	Center Shaft - 14 lb.
33	210286	Seal - Oil O-Ring
34	210632	Gasket - Transmission



Maytag Exploded Views (cont.)
(Fig. 032_24)

Maytag Exploded Views (cont.)
(Fig. 3-24)

FOR MAYTAG WASHER TUB & SEALS



The sequence of operation

With the front removed, all of the components are easily viewed.

To understand the way these components interact, it is informative to go through the sequence of operation. The logic sequence is almost exactly the same as for a GE.

1. As with all automatic washers, with the machine on, in the agitate cycle, it begins to fill while the motor and drive system sit idle.
2. Once the washer is full of water and has satisfied the water level switch, the motor starts and simultaneously the wash cycle begins.
3. The washer agitates until the timer reaches the end of the wash cycle.
4. At the end of the wash cycle, the motor pauses. During the pause the timer reverses the motor start wiring.
5. The spin cycle begins with the motor reversed. The pump begins draining the clothes basket. The motor sits in a spring loaded carriage that gradually slides back and speeds up the heavy basket.

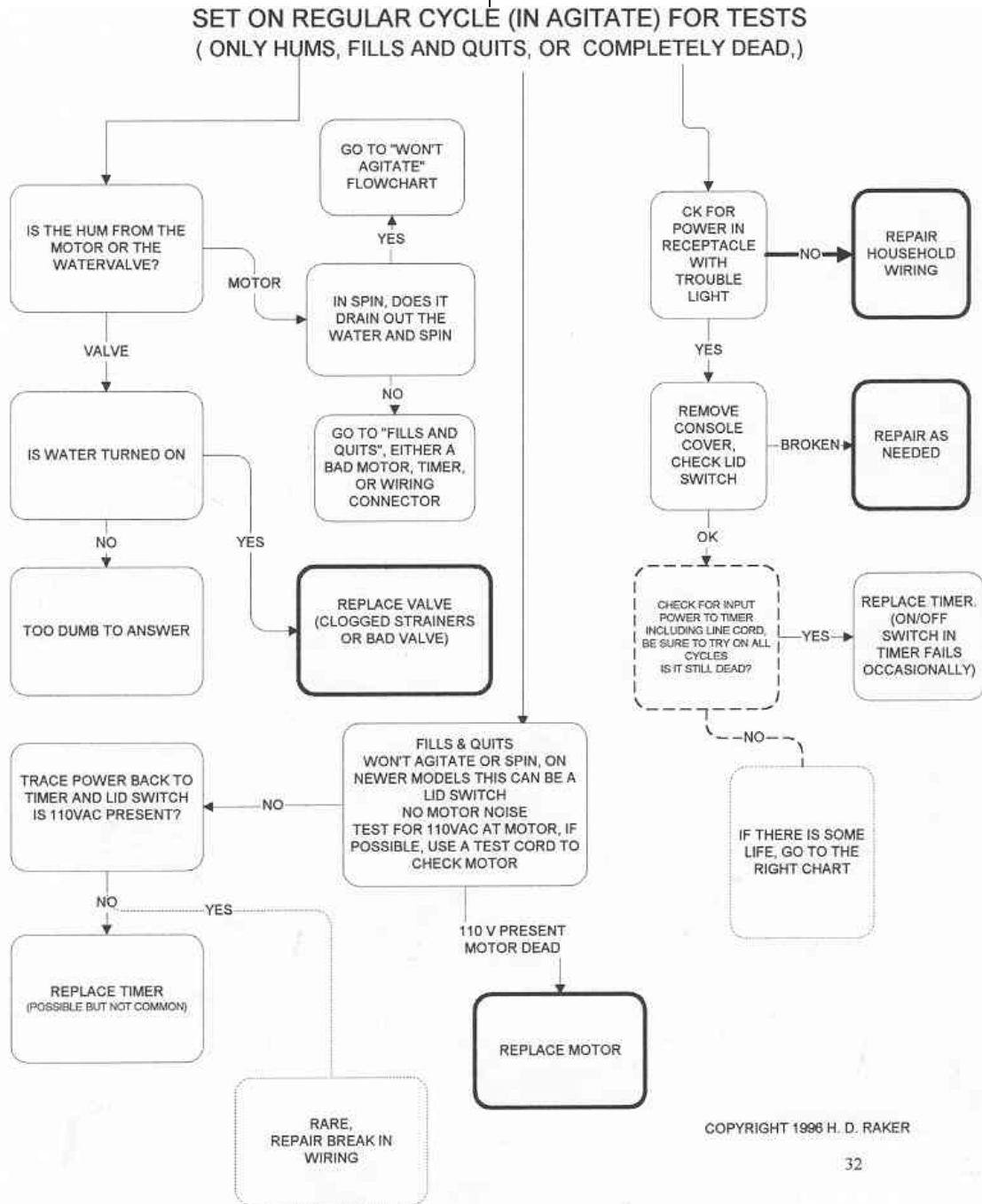
(Note: If you lift the lid on a Maytag washer, spinning will stop. The lid safety switch breaks the circuit to the motor. **In fact older models (prior to about 1990), will not even fill or agitate with the lid raised.**)

The motor slowly moves back in its carriage putting more tension on the belts and gradually the spin speed increases and the water gets drained out. As the speed of the basket increases, more and more water is squeezed out of the clothes. It goes down into the pump system and is drained into the sink.

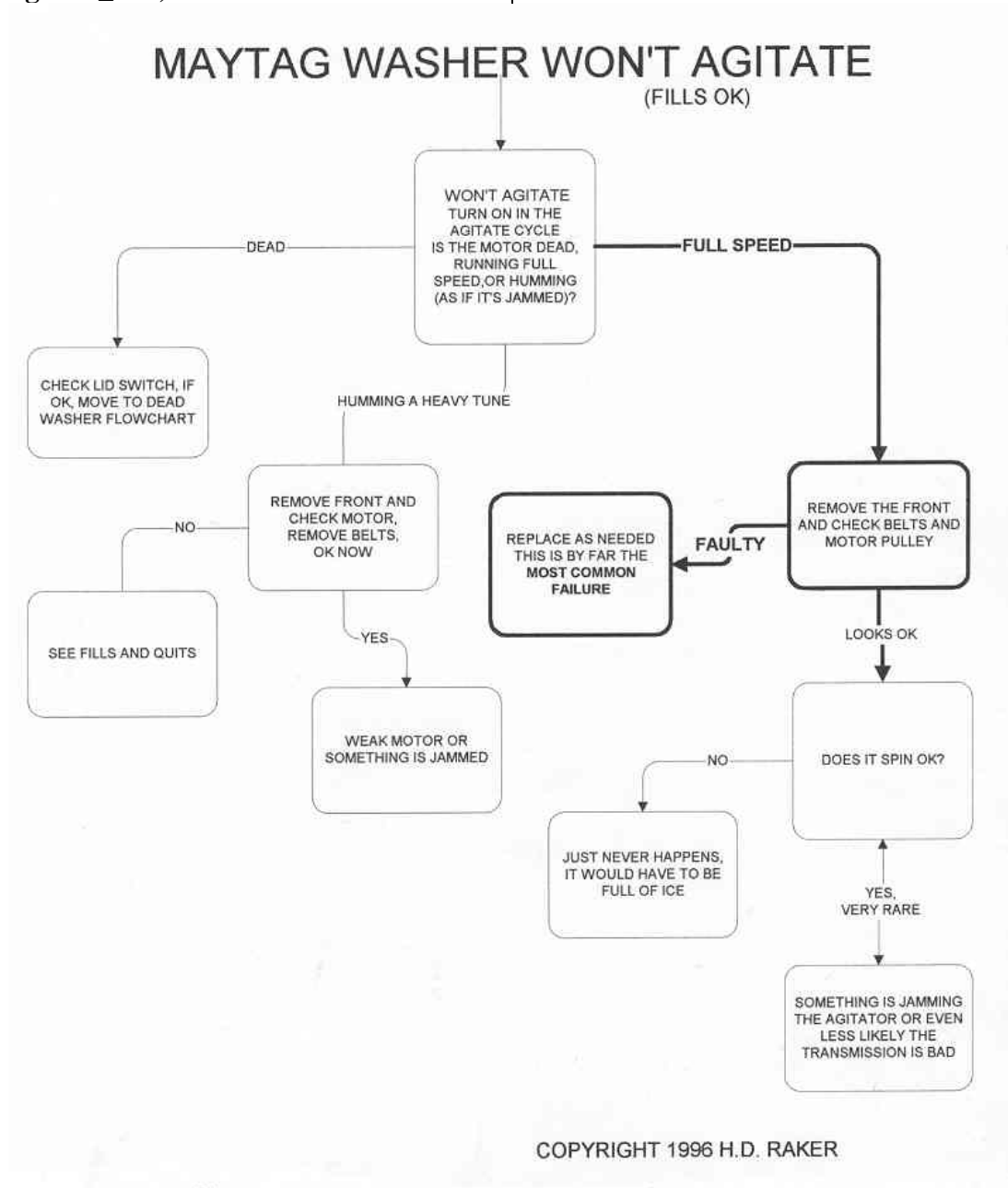
The same sequence repeats for the rinse cycle and then the long spin.

Following are *Uncle Harry's* Maytag flowcharts for quick diagnosis:

**(Fig. 032_24a) Flowchart
Maytag Washer Won't Run**

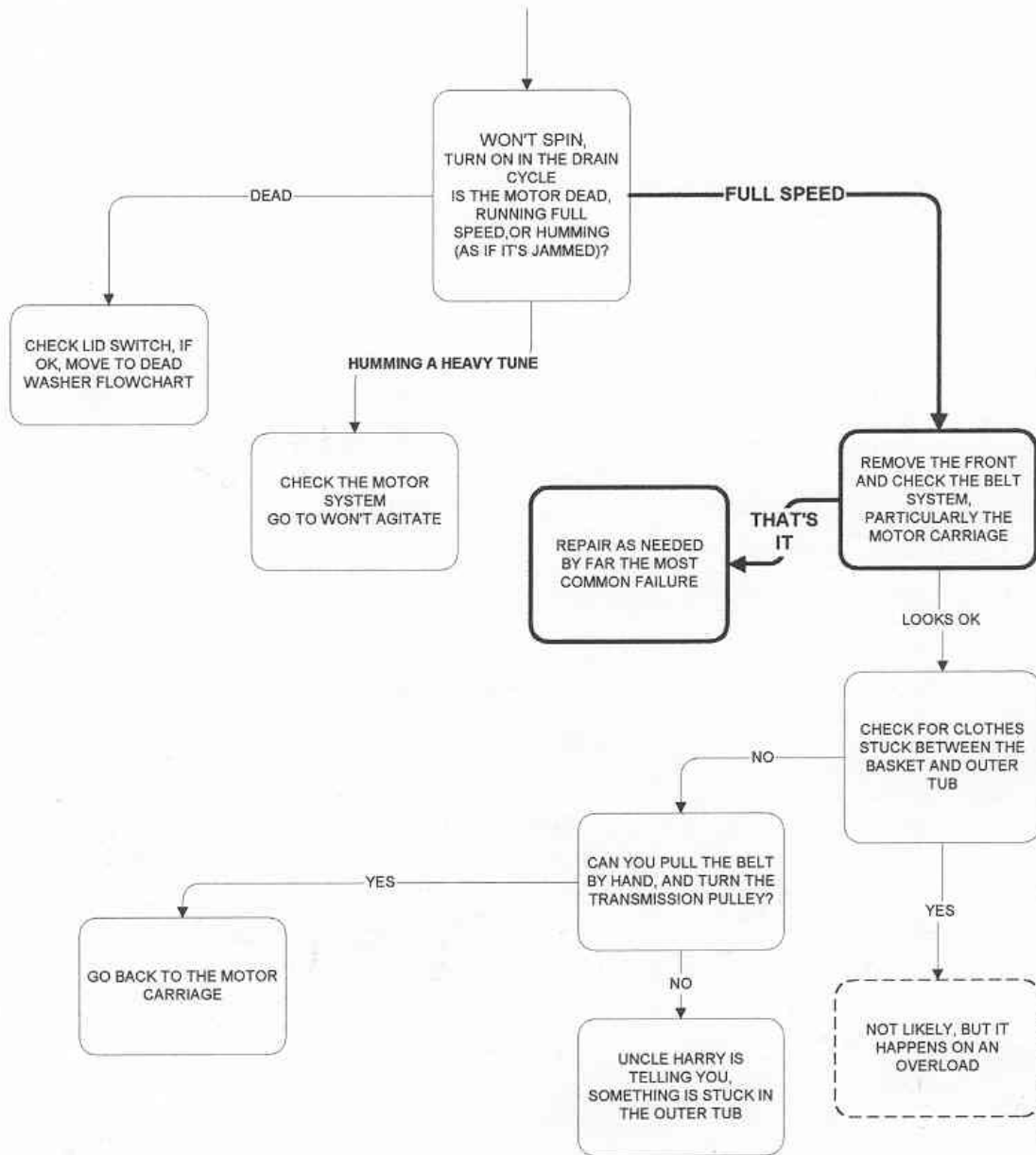


(Fig. 032_24b) Flowchart



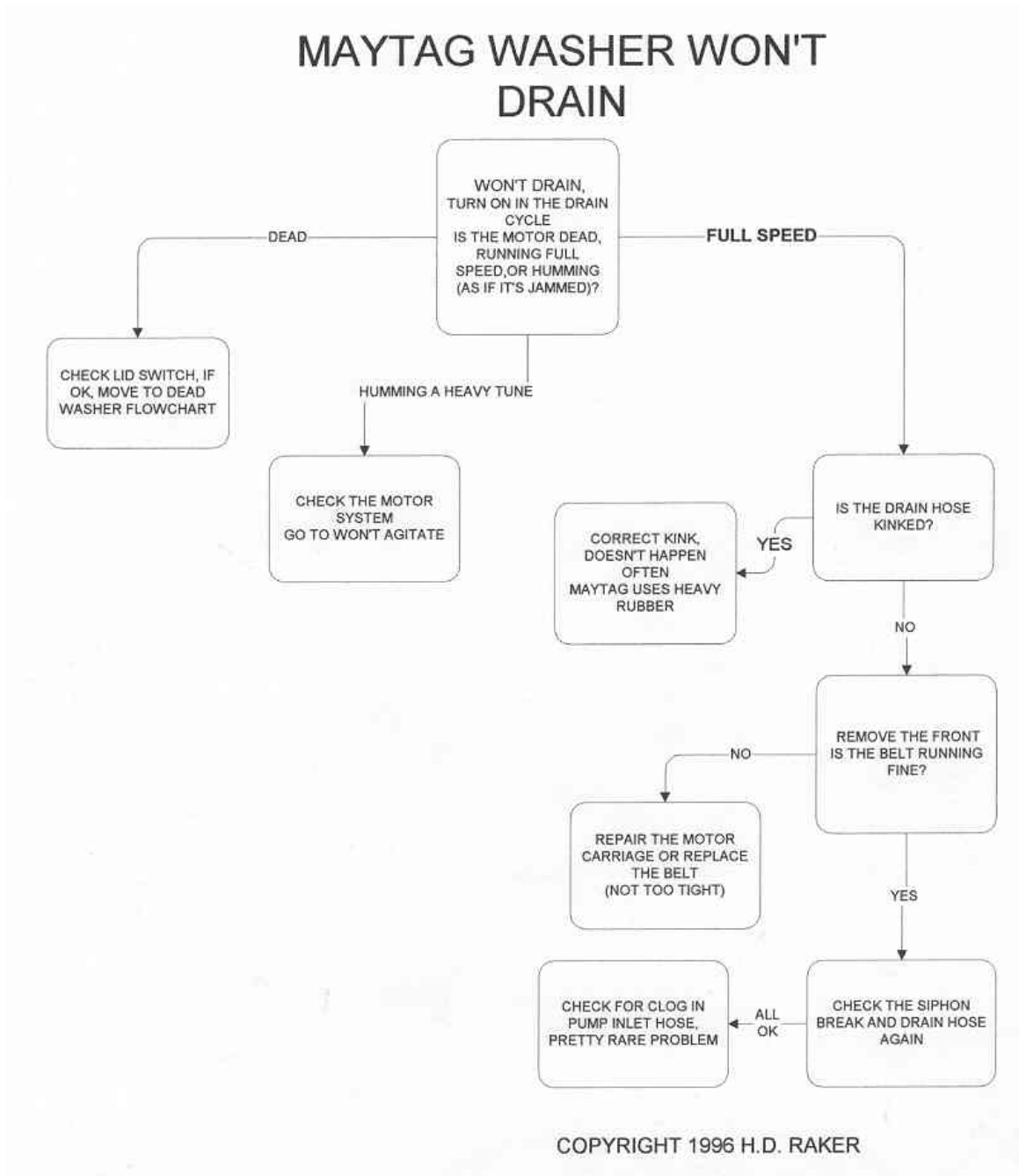
(Fig. 032_24c) Flowchart

MAYTAG WASHER WON'T SPIN



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(Fig. 032_24d) Flowchart



Component by Component

As has been our pattern, first we'll go over a few of the common Maytag problems and then discuss the individual components one by one.

Maytag Weak Spots

“My washer smoked, and now it makes a thumping sound. Gee, yes, I did run a big load.”

Maytag has only one real weak spot, the drive belt fails on a heavy load. The symptoms will be a thumping noise, smoke, no wash, or no spin. Any of these symptoms indicate that the wash belt has burned up.

Out of Balance Problems

Maytag does not have automatic adjusting feet as are on GE and Whirlpool products. Consequently, it will get out of balance if one of the feet are loose or not adjusted correctly. The feet need to be adjusted up close to the bottom of the washer. Leave enough clearance so that the lock nut can be snuggled up against the bottom frame. The easiest method is to set the back legs first, and then adjust the two front to fit the floor.

The Drive and Pump Belt

A new Maytag belt looks like a dull black canvas. The drive belt and pump belt are designed to act as a clutch and slip during the early parts of spin. A worn drive belt will be shiny and slick or have lump in one spot. Any washer over seven years old will work more efficiently with new belts

Uncle Harry's
Trick of the Trade # 3-12

Always replace Maytag belts as a set.

To replace a Maytag belt set, remove the front from the machine and tilt it back against the wall and put the old paint can underneath a front leg. The belts can be rolled off with finger pressure very easily and the new set installed.

However, there is one critical thing, carefully described on the belt bag. The pump belt runs loose, **so loose that it looks like it might fall off.**

Don't tighten it up.

This looseness allows the motor to ride back on the motor rollers and slowly bring the spin speed to the designed maximum. The Maytag has no clutch shoes, the clutching action takes place on the belt. A typical novice (not you) will tighten up the pump belt and then complain that the washer won't spin properly.

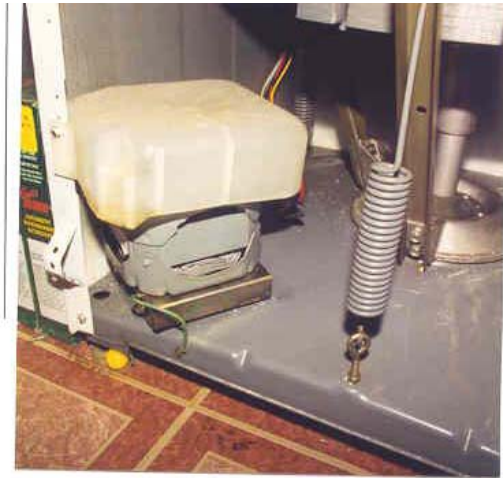
Uncle Harry's

Trick of the Trade # 3-13

Testing for full spin speed.

Bypass the lid switch with a small screwdriver, and set the timer on spin. At full speed, with an empty basket, you should hear a faint siren sound coming from the holes in the basket.

**Motor, Carriage and Protective Cover
(Fig. 032_26)**



**Installing a Belt Set and Motor Pulley
(Fig. 032_25)**



The Motor Drive Pulley

“My washer is making a funny noise that’s hard to describe.”

On early models, the drive pulley on the end of the motor shaft was a machined steel pulley. About ten years ago, Maytag went to a crimped, stamped, sheet metal pulley. This money saving move has caused problems. When the sheet metal begins to wear, parts of the pulley shake as it spins. It makes a metallic, tinging noise. If the customer puts up with the noise long enough, the bottom half of the pulley will actually fall off. As a result the pump belt will fall off. Usually they call about the noise.

Typical Inside View of an Old Model (Fig. 032_27)

Replacing the motor drive pulley is an extension of a belt job. An Allen screw that is very, very tight holds on the drive pulley. Once the Allen screw is cracked loose with a long Allen wrench, the job is very straightforward.

Uncle Harry's

Trick of the Trade # 3-14

If the Allen screw is difficult, use a large set of channel lock pliers and gloves. They will add leverage to the job. Careful, it is easy to hurt your hands when the screw breaks loose or the wrench slips.



The Motor Roller System

As mentioned, the motor sits on the carriage which enables the motor to move back and forth about 3/4". The springs add tension to the drive belt during the wash and spin cycle. The rollers in the carriage are plastic. When they get old, they may crack. Sometimes bleach will spill down on the front left corner of the machine from the bleach dispenser and rust up the carriage. It will rust in one position and fail to tension the belt properly.

Motor and Carriage Assembly (Fig. 032_28)



In either case, replacement of the motor carriage is necessary. Proceed just as described on a pulley replacement. After removing the motor pulley, remove the four 3/8" nuts holding the carriage in place. Lift the motor assembly out of the machine. The carriage and "square" rollers, come as a kit. If the carriage is not badly rusted, you can buy just the rollers, grease and springs and rebuild the carriage. Most of the time, it's advisable to replace the whole carriage kit.

New carriages mount differently from the old, with sheet metal screws rather than bolts and nuts holding it to the washer base plate.

A Carriage Kit (Fig. 032_29)



The Maytag Water Pump

The Maytag pump is a very reliable, simple design that very, very rarely fails. On occasion, the drive teeth on the impeller will wear down from excessive use. Even rarer, the drive impeller will break loose from the drive shaft. Occasionally a pin or other object may get caught in the pump. However, Maytag is designed better than GE and such clogs are rare.

Typically, problems that first appear to be a pump failure, turn out to be something else. Few mechanics even carry Maytag pumps in stock.

Uncle Harry's
Trick of the Trade # 3-15

Once in a while, a nickel or a dime will plug up the tub outlet. The coin will flip back and forth at the outlet and cause intermittent draining. It's a hard problem to diagnose and it may require pulling the clothes basket out to find it. It's possible to feel the coin by sticking your finger up the tub outlet from the bottom.

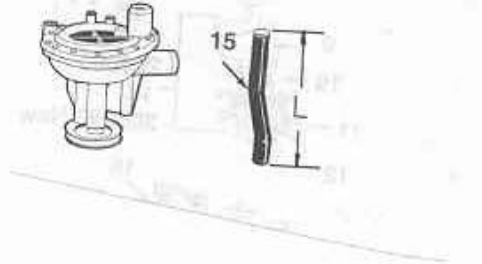
The S-Shaped Hose

The hose that comes down from the outer tub to the pump is a source of occasional leaks. It leaks up at the fitting on the outer tub.

Uncle Harry's
Trick of the Trade # 3-16

If you ever find the S-shaped hose torn off, replace it with a new one. The hose hardens with age and pulls loose during an off-balanced load. Reclamping the old one will not solve the problem.

Maytag Pump and S-Shaped Hose (Fig. 032_30)



The Brake Package

The brake package operates whenever the lid is raised during spin. It also operates at the end of each spin cycle. The brake slows the basket to a stop in less than ten seconds.

Two problems occur in the brake package.

1. When the lid is lifted or the machine is coming to a stop, there will be a tremendous squealing noise
2. The washer will not stop quickly. It will slowly drift to a stop.

The squealing noise is more common. It can be repaired in two ways. Of course a new brake package will solve the problem. However there is an alternative.

Oiling a Noisy Brake (Fig. 032_31)

Uncle Harry's
Trick of the Trade # 3-17

Carefully squirt oil into the area where the brake shoes have dried and the noise will cease for a long time.. The repair can be accomplished without any disassembly whatsoever. Tilt the washer backward to gain access to the bottom. Any long necked oiler can be pushed through the transmission drive pulley holes and into the brake. Once the oiler is in place, squirt in about a teaspoon of oil.



Brake Replacement

If the brake fails to stop at all, it requires replacement.

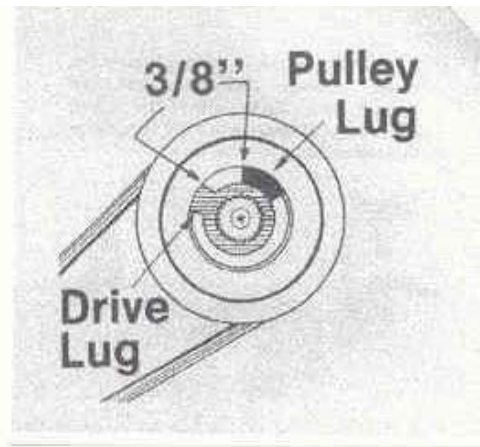
1. Tilt the washer, back toward the wall, and remove the belt set.
2. Remove the transmission pulley. Note the position of the drive lug on the transmission input shaft
3. Remove the hex-bolt and clip locking the brake threads
4. Using a Maytag special tool, # 38315, unscrew the brake assembly. A hammer and chisel may work, but it could ruin the old or new brake. The brake is usually very tight. Be careful.

Brake Wrench (Fig. 032_32)



5. Remove the spin bearing from the top of the brake and begin reassembly

On Reassembly, Reinstall the Pulley as Sketched (Fig. 032_33)



The Snubber Package

Beneath the bottom of the triangular sub-frame and the top of the base plate are glued three foam rubber pads. These pads act as snubbers when the machine is spinning. They help to minimize shaking. When they wear out, the machine will get off balance easily and make a lot of noise in spin.

Uncle Harry's

Trick of the Trade # 3-18

Diagnosing a bad snubber

Look for black powdery material scattered around the center of the base plate. You might even find a small gray segment of an old, disintegrated snubber pad.

At first glance, this repair seems to be a very difficult task, but it is not as bad as it seems.

Uncle Harry's

Trick of the Trade # 3-19

After loosening the tensioning springs and removing the belts, put a 4" spacer (wood or anything strong) under the washer. When the washer is up righted the spacer will lift up the entire tub assembly enough to glue in new snubber pads.

A Sample Snubber Pad Next to the Housing
(Fig. 032_34)



The Brake Package Bearing

Nestled in the top of the brake package is a large bearing. This bearing supports the transmission during the spin cycle. Failure of this bearing results in a loud, roaring sound during spin. For replacement, see the instructions for replacing the brake package. The procedure is the same.

The Transmission

Transmission failure is very rare, but it still follows a predictable failure pattern.

1. Oil on the floor:

In the very bottom of the transmission, there is a small “O”-ring. Failure of that “O”-ring will allow oil to leak onto the floor. If it is a small puddle of oil, which forms over a long period, there is no reason for concern. However, a large amount that actually fills the area underneath the washing machine is serious. Replacement of the “O” ring is a very time-consuming task.

Uncle Harry's

Trick of the Trade # 3-20

Condemn a Maytag that is leaking oil.
Trust your *Uncle Harry*.

Replacing the 25-cent “O”-ring requires total disassembly of the transmission and at least 8-10 hours of hard work.

2. *“My washer is making a muffled knocking noise.”*

An old transmission will sometimes begin to wear internally and knock during agitate. Either a shaft is coming loose in the base of the transmission or the gears are wearing out. Don't try to fix it unless there is 12" of snow on the ground and you don't have anything better to do.

If you must try, attempt to find another old Maytag first, and pirate the transmission from it. There are only two sizes, short and long. *Uncle Harry* has been there a few times.

3. "My washer only agitates slowly and my clothes don't seem to be getting clean."

An interesting phenomenon will occur if a Maytag washer is operated in a cold room. If the temperature is less than 40 °F., the oil will become thick and drag. The machine will agitate slowly. Advise the customer that there's nothing really wrong. The washer is just too cold.

Year's back, Maytag had a problem with bad oil. When the machine got old, the oil thickened and dragged even under normal conditions.

Uncle Harry's

Trick of the Trade # 3-21

Rather than attempting to replace the transmission oil, it's possible to add a **third** spring on the motor carriage. The additional tension will snug up the drive belt and compensate for the extra drag. The same trick can be used to pump water to a higher than normal level.

**Maytag Transmission
(Fig. 032_35)**



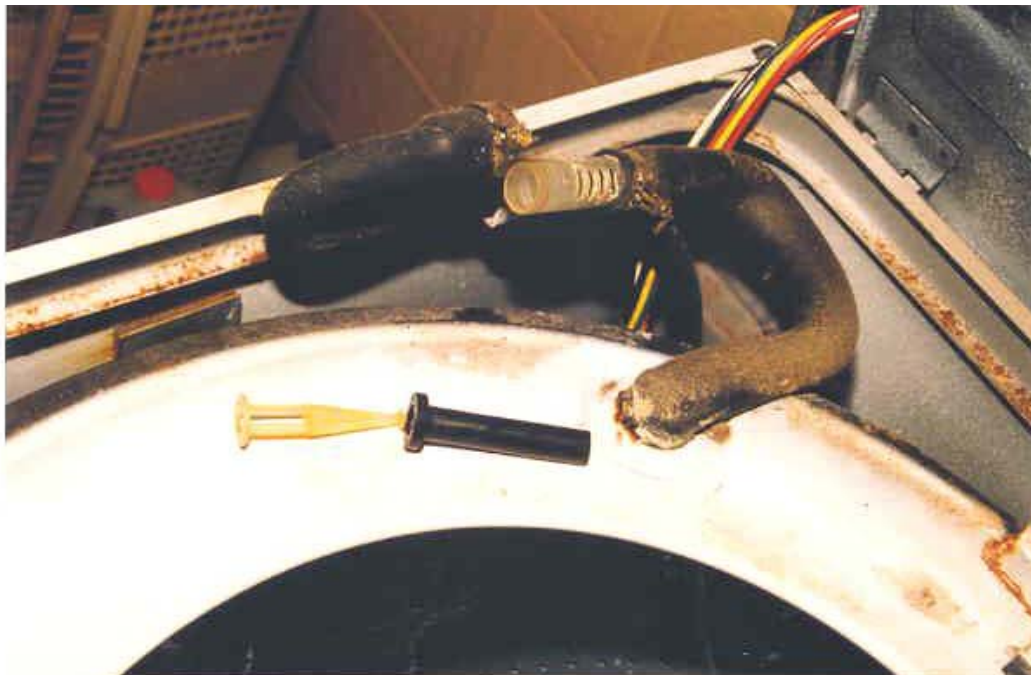
The Water Inlet System

All washers have a backflow restriction in the water inlet system. Maytag uses a small black rubber bladder mounted in a plastic sleeve. As the bladder ages, it may split or distort and cause dripping on the left side of the machine. All of the inlet parts can be purchased separately. Also there is a kit available that rebuilds that inlet system.

Uncle Harry's
Trick of the Trade # 3-22

Under very high water pressure a new bladder may still leak. Remove the entire unit and splice in a piece of copper tubing.

Water Inlet System (Fig. 032_36)



The Bleach Dispenser

Over the years Maytag bleach dispensers have probably caused more damage than their worth. The dispenser is mounted directly above the motor and eventually leaks onto the motor. Bleach is very corrosive and rusts the motor, the

carriage, and the base plate. Off balance loads also pull the bleach hose loose from its fitting.

Washer Damaged by Leaking Bleach and a Loose Hose (Fig. 032_37)



The Horseshoe Hose

A frequent repair is the horseshoe-shaped inlet hose that connects the bladder unit to the basket itself. The horseshoe-shaped hose wears as the washer shakes. It will tear or break loose.

Sometimes the hose is pushed loose by a large load of clothes or clothes that lodge between the outer and inner tub.

Horseshoe Shaped Hose (Fig. 032_38)



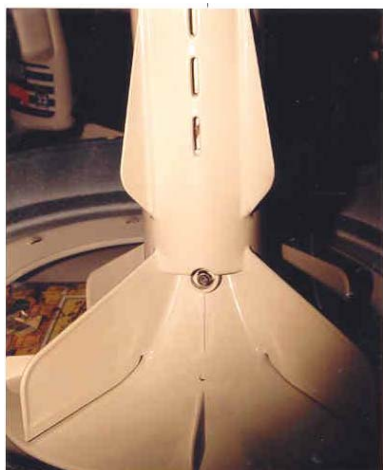
The Stem Seal and Boot Kit

“My clothes have brown stains on them, that I can’t get out.”

Transmission oil on the clothes is caused by a failure of the top transmission seal. The seal is beneath the agitator and seals the agitator shaft. The replacement part is called a stem seal and boot kit. Replacement requires the following steps:

1. Remove the front and fold back the top of the washer.

New Style Agitator (Fig. 032_38a)



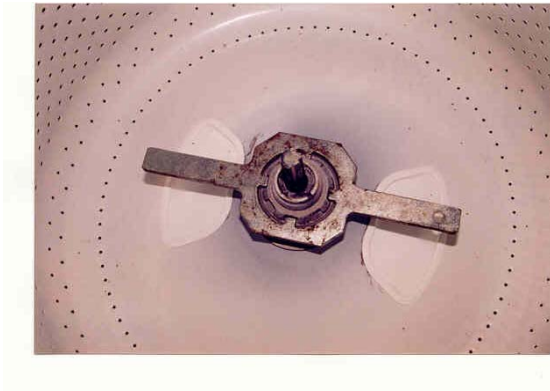
2. Remove the agitator. The older style Maytag’s had an “O”- ring built into the bottom of the agitator. It hardens with age and making it very difficult to pull the agitator off the top of the agitator drive shaft. When this becomes a problem, follow the technique that was described on the GE washers. Use baling wire and make a sling. Use a crowbar against the top of the machine with a wooden block for protection. Pull up on the agitator to get it loose. Wind up the temporary sling to tighten it.

More recently a stainless steel 1/4” screw holds the agitator that’s tucked underneath. It needs to be loosened in order to pull the agitator off. So far this seems to be a better system than the old “O”- ring method.

3. Remove the tub ring and tub top.
4. Remove the spanner nut holding down the clothesbasket. Loosening the spanner nut requires a special four-pointed tool, #38313, available from Maytag and shown in the picture. You can chisel it off if you choose. A new nut comes with the seal kit

Keep in mind it's a left-handed thread.

**Tub Nut Wrench
(Fig. 032_39)**



5. Upon lifting out the washtub, you will see the casting on which the washtub rests. A setscrew locks in the tub mount threads. On the older models the screw is an Allen, on newer models it is a #15 torx screw. After removal of that locking screw, unscrew the tub mount with the same wrench.

Again, it is a left-handed thread.

6. Remove the rubber and carbon seal below the casting. The rubber accordion seal beneath, is the second half of the seal and squeezes against the basket mount. This completes the disassembly process.

**Replacing a Boot and Stem Kit
(Fig. 032_40)**



Clean the outer tub and either wet it with your fingers a little oil. The new boot will slip easily in place. Prior to installing that boot, the long bearing that supports the top transmission was exposed. This large sleeve bearing very rarely goes bad. At this point, if you proceed and remove the outer tub, the entire transmission and upper bearing could be removed.

The reassembly process. Replacing the stem and boot kit, is straightforward with one exception. When re-installing the outer tub top, the clearance between the top of the clothesbasket and the tub top is critical. It must be adjusted so that the basket doesn't rub. There is not a great deal of clearance.

Tub Ring
(Fig. 032_40a)



Uncle Harry's

Trick of the Trade # 3-23

Install the tub ring and tub ring seal loosely around the outer tub. Slip two of your fingers between the top of the basket and the tub top. Wiggle around the circumference of the top of the clothesbasket. Use your fingers as a clearance gauge. Doing it this way, you will wind up with about 3/8" or 1/2" clearance between the top of the basket and the top tub ring. This is just right for the clearance adjustment. Tighten up the outer ring and ring seal.

Make sure that you haven't folded the triangular seal. Finish any other reassembly and water test the machine.

The outer ring and outer ring seal occasionally leak or rust off causing a leak. To test the top ring, fill the washer to the maximum and set it to spin.

The Siphon Break

On newer models, a siphon break is mounted on the back of the washing machine in the drain hose. Its purpose of it is to eliminate problems caused by a low drain line. It also prevents the machine from sucking dirty water back out of the drainage system when the machine is in the agitate cycle. Occasionally the siphon break will clog or leak.

Siphon Break (Fig. 032_40b)



The Timer

Over the years, Maytag timers have been made by two companies, Kingston and Mallory. The Maytag Company is one of the few, perhaps the only one that supplies the timer motor as a separate part. It costs about 1/3 the cost of a new timer. If your customer base includes a lot of Maytag washers consider stocking the two common timer motors. Timer motors are the most common timer failure. Salvage timer motors off of old timers that have other failures. Keep them handy in case you're in a bind.

It's best to keep all sorts of junk. Junk parts on the truck can often get you out of a pinch.

Replacing a Timer (Fig. 032_41)

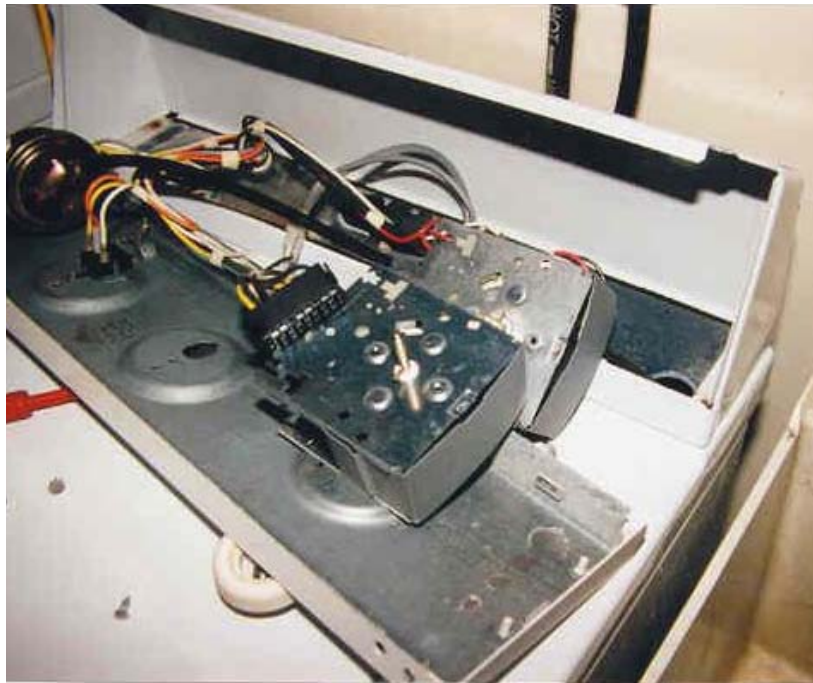
An Odd Timer Problem

"My washer runs right through the off position, I'm sure my timer is bad."

If for any reason the washer reaches the end of the spin cycle **while full of water**, the timer will advance through the "off" position. Strange behavior, wouldn't you say? What is the first quick conclusion if it goes through the "off" position? The timer is bad.

It just isn't so. If it is full of water the washer will run through off and pick up on the next agitate and keep on truckin'. In fact, it will run 24 hours a day until someone stops it.

Repair the drain problem or punch in one of the control buttons, not the timer!



Console Controls

Maytag washers have a flaw in the console switches. They have dead spots in between settings. For instance, the motor speed switch. If neither the normal speed, nor the gentle speed button are depressed, the motor will not run. Customers bump up against the selector switches putting them in the "dead" position without ever knowing it. Needless to say, a quick check of all selector positions, is first order of business on a washer diagnosis.

The same check is good policy on all equipment. Improperly operated appliances are common.

A Cracked Air Line on a 1965 Model (Fig. 032_42)

The Water Level Switch

Maytag is similar to GE and Whirlpool in that the water level switch is a rare source of failure. However, it is possible to have the air dome clogged or the air tube pinched or clogged.

Uncle Harry's

Trick of the Trade # 3-24

An easy way to check a water level control.

Pull the airline off of the control and blow into the control with your mouth. You should hear it click "full" and click "empty" as you blow and release air pressure through the pinhole. If it clicks back and forth, the chances are 99 out of 100 that the level switch is fine. The problem is elsewhere. This quick test is effective on any brand



The Drive Motor

The motor on the Maytag washer reverses like the GE, and the direct-drive Kenmore. It's only unusual in that it always starts on the high speed, even if slow is selected. It drops to the selected speed as soon as the motor switch operates. Listen to one sometime and see if you can detect the speed change on slow.

Direct diagnosis of a bad motor on all reversing motor systems can be difficult without adequate preparation. A bad timer, as well as a bad motor can cause a dead or humming motor. It's depressing to install a new motor and then have the same irritating hum when you try out the machine. *Uncle Harry* has been there and you want to avoid the experience.

Here are a few tricks of the trade, so that you can minimize that risk. First, remember, suppose a motor will work in wash, but not in spin, or perhaps the reverse. The chances are almost 100% that the motor is fine. The timer is not reversing the start winding wires internally and the timer is at fault. Be sure to remove the belts during this test.

Of course, sometimes the motor will only hum. It won't run on wash or on spin.

Uncle Harry's

Trick of the Trade # 3-25

Take the front cover off the machine and give the motor a **good healthy kick**. Sometimes it will spring into life. This will miraculously fix the problem, if the switch within the motor is jamming. A new motor is necessary./

Sniff the motor for burned wiring.

Of course, you haven't really fixed it, but you have correctly diagnosed it. The motor is bad, replace it. The humming problem will surely return after the motor stops and starts a few more times.

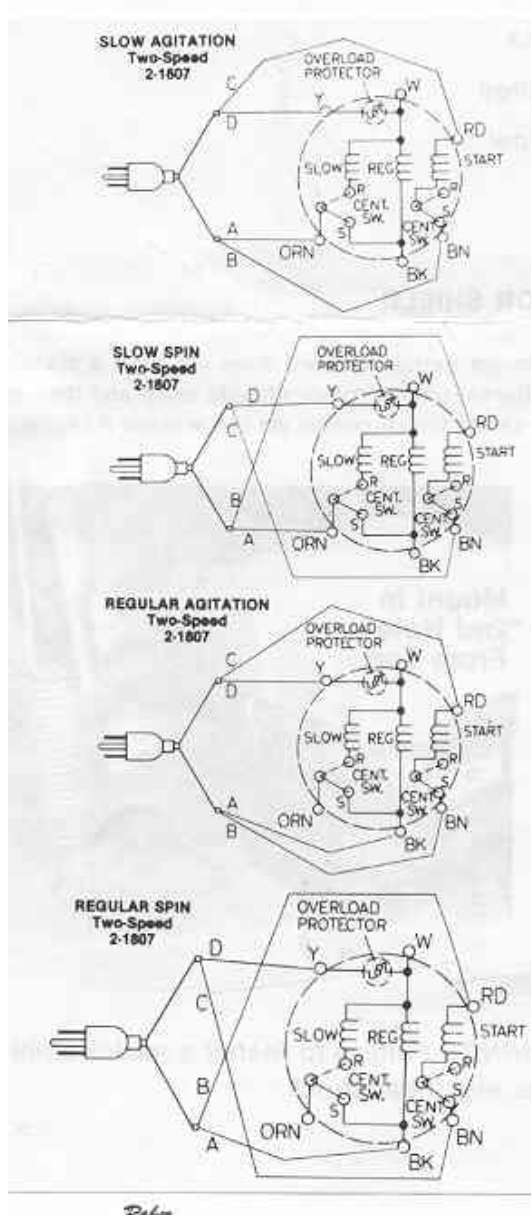
But suppose today is not your lucky day and none of the easy tricks work. The motor still hums, and the kick method doesn't spring it into life, what is the next step? At this point, there are three options.

1. Buy a Maytag motor test cord, #38183. Using the test cord you can hook up the motor directly to your trouble light and try it. This bypasses all the machine wiring.

2. Following the attached instructions make up your own wiring kit to test the motor.

3. Any good, new or used motor can be quickly wired in for a test.. This will definitely diagnose it. These three are the old-pro methods.

Making a Test Cord (Fig. 3-43)



Of course you can always replace the motor and the timer. Success is guaranteed.

The theoretical way is by testing the motor with your voltmeter. Unfortunately, this is a difficult task and often misleading. *Uncle Harry* recommends a test cord instead.

Don't forget to carefully question the customer for any clues. The machine may have quit a few times on mid-cycle, and then started later. This would indicate a weak motor and overheating. The customer may have smelled an electrical burning odor, also indicating overheating.

The motor may work, if you give it a spin, or if you take the belts off. This indicates badly worn bearings and means a new motor.

Lid Balls

The lid on a Maytag does not have standard hinges. Rather it has two nylon balls wedged into the corners. As they age, sometimes they break in half. To replace the balls hold the lid upright. Grease the balls and slowly push them into position.

Lid Switch

Maytag has a lid safety switch like all other washers and it is prone to failure. It is a standard micro switch. The linkage causes more trouble than the switch itself. Off balance loads frequently damage it.

The lid switch is a likely suspect on a dead washer.

Conclusion

Maytag and GE are very similar in logic and easy to understand. The following off-brands are virtually copies of these two. Each may have a few quirks but nothing really tricky.

The Off-Brands

So far, we've covered Whirlpool, GE and Maytag washer products. This group represents the vast majority of all laundry equipment. However, occasionally, you will run into what many technicians to as the off-brands.

A Magic Chef by Norge
(Fig. 033_44)

Norge

We'll begin the off-brands by completing the Maycor appliance tree with the Norge washing machine. Back in the 60's and 70's, Norge was an independent company that manufactured equipment for Montgomery Wards. Norge had a reasonable market share, much greater than it is today. Maytag bought the brand in the early 90's. Today, the Norge design appears with Admiral name, Magic Chef, and occasionally even Amana.



The current style Norge washing machine is similar in theory to the Maytag. It is the reversing motor style washer with 2-hose drain pump. It also has a spinning. The significant differences are:

1. Norge has a single belt operating on three pulleys, instead of two belts like Maytag.
2. The clutching action is provided by a spring mechanism inside the transmission rather than a slipping belt as is the Maytag, or an external clutch like GE.

The Weak Spots

The Norge design will occasionally tear off belts, as will any washing machine. Once in a while, it will even tear the rubber hub out of the motor drive pulley. The primary weak spot is the two-hose pump that resembles a Mickey Mouse face with the two ears sticking up. The pump is accessible and replaced from the rear. It is prone to clogging with clothes, leaking, and making noise when the bearing goes bad.

Water valves, pumps, and drive belts on the Norge fail in patterns similar to most brands.

A Clogged Norge Pump (Fig. 033_45)



Uncle Harry's
Story Time

Norge has a weak spot that is important to understand. For decades Norge has had a spin problem. Sluggish spin on the Norge can be very misleading, particularly when you know that the clutching operation takes place inside the transmission. As a novice, I can still remember vividly dismantling the entire Norge transmission, replacing the clutch spring inside, and re-assembling the machine. It worked a little better, but it still wasn't right.

It was some years later before I found out what a dummy I was. A sluggish spin problem on the Norge washer has nothing to do with the clutch spring inside the transmission. No, instead it has everything to do with the main water seal. Between the outer tub and the top of the transmission is a very large rubber seal with slipping surfaces of carbon and ceramic. This water seal keeps water inside the tub, but allows the transmission to spin the basket during the spin cycle. Around 8 or 10 years of age, the water seal begins to collapse and drags. The low torque supplied by the transmission at the beginning of the spin cycle is not sufficient to reach full speed. As the failure progresses, the seal allows water to leak by. Eventually the upper transmission bearing fails and the machine makes a roaring noise in the spin cycle.

The repair for this failure includes removing the front, the top, and the inner tub and the support castings on which the tub mounts. These castings are set-screwed to hub and made of white metal that gradually disintegrates as years go by. It makes for a miserable repair job that takes between two and three hours. It generally requires a lot of hammering and chiseling and heat from a propane torch in order to get it apart.

Uncle Harry's

Trick of the Trade # 3-26

Don't even consider a Norge Main Seal Repair! The only exception would be as a pure learning experience.

After completing a Norge water seal repair, you will be worthless the rest of the day. It can even get worse. If the bearing below the seal is roaring or rusted up, it's necessary to pull the outer tub in order to knock out that bearing and replace it. This requires another hour.

The Norge has another large bearing on which the transmission sits. This bearing is in the hub of the drive pulley and it occasionally fails. It's not nearly as difficult to replace as the top bearing.

Older Norges were of a similar design, but they had some significant differences. The original ones had a solenoid brake locking system mounted at the base of the transmission. This brake arm kept the transmission from rotating until 2/3 of the water was out of the big tub. The solenoid energized and allowed the washing machine to spin. The heavy brake system also provided an emergency stop when the lid was lifted.

**An Old Norge Washer
(Fig. 033_46)**



Brake Failures

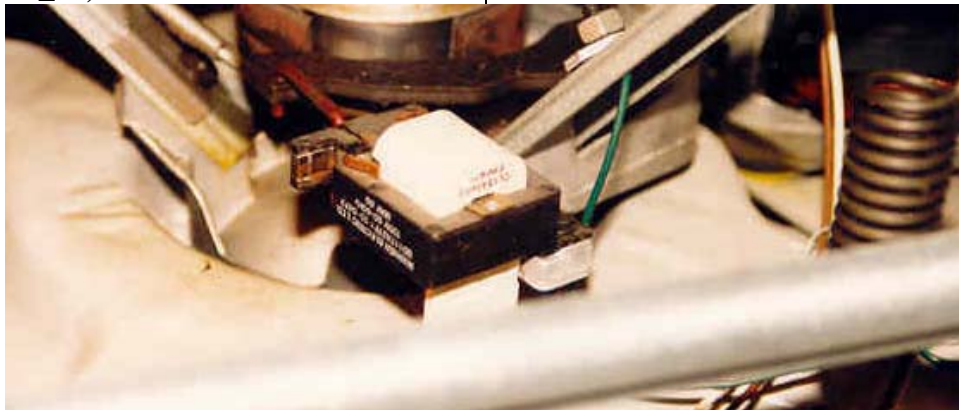
These older design are easily distinguished by the loud "clunk" noise heard when the lid is lifted during spin. The system had its own set of failures

1. The brake lining wears out.
2. The brake arm comes loose from the base plate.
3. The brake arm rounds off with use and allows the machine to spin slowly, even though the solenoid is de-energized.
4. The solenoid fails.
5. The solenoid sticks closed even though it is de-energized.

All of these failures cause a leak. The leak is the result of water flowing over the side of the main tub during the wash cycle. The machine spins during wash.

These machines are now too old and most customers refuse repairs Internal transmission failures are a common problem and usually the machine is discarded.

Norge Brake Solenoid (Fig. 033_47)



In all fairness to Norge, the machine has an enormous capacity. It's amazing that it holds up as long as it does.

Norge has a peculiar flaw in the timer dial. The timers had the knob and dial set-screwed to the timer shaft. The setscrews had a habit of working loose, allowing the dial to spin on the shaft. The user is then unable to tell which cycle the washer is in.

Uncle Harry's

Trick of the Trade # 3-27

Setting a Norge Timer Dial

Close your eyes and rotate the timer until you were able to tell which cycle you were in. Use the stop positions as a guide. Looking at the dial will only confuse the issue.

Unfortunately, the Norge washer is not a moneymaker because the failures tend to either be simple or very expensive. It is often necessary to condemn the washer.

Amana

Amana has never made a washing machine or a dryer. Their expertise has always been in refrigeration. Consequently equipment with the Amana name on is going to be purchased from another manufacturer. Typically either Norge or Speed Queen makes them.

Amana Name on a Speed Queen Washer (Fig. 033_48)



Speed Queen

Speed Queen, like Norge had it's heyday back in the 60's. In fact, it enjoyed a quality name in laundry equipment. Speed Queen specialized in stainless steel washtubs and dryer baskets and made very dependable equipment. Speed Queen equipment was used by a lot of coin laundry owners because of its durability. However, those days are long gone. Speed Queen drastically modified its design years ago and introduced a lot of bugs. It wound up losing the bulk of its market share.

It is rare today to see a Speed Queen washer or dryer. However, there are a few areas in the country, particularly the mid-west where Speed Queen is still popular.

Current Speed Queen Layout (Fig. 033_49)

The overall design of a Speed Queen washer is a close copy of the Maytag design. The layout of the components and the operating methods are the same. The manufacturing quality, however, is not and the machines don't hold up for very long.



Speed Queen Main Seal

The main bearing and seal design on Speed Queen are very similar to that of the old Norge and just as difficult to repair.

Replacing a Main Seal (Fig. 033_50)



Uncle Harry's Story Time

Recently, I diagnosed a Speed Queen with a bad main seal and condemned the washer. The customer, retired and handy, decided to do the repair himself. I carefully outlined the procedure for him and left. He worked on it for two days and finally called me back for help. He was unable to remove the main seal housing. At this point, I believe he realized why I had declined to perform the repair.

As a friendly gesture and in order to get the following pictures, I returned to help him out. Using a propane torch and a heavy maul, I finally broke the housing into pieces. He bought the necessary parts and eventually finished the job.

Frigidaire and White-Westinghouse

For many years, Westinghouse & Frigidaire have been considered the black sheep of the laundry family. Knowledgeable servicemen like to stay away from serious repairs on any Frigidaire or White-Westinghouse equipment. Customers become enemies instead of friends.

A Rare Maytag Stackable (Looks Like a Skinny-Mini Frigidaire (Fig. 033_51)



Uncle Harry's Story Time

For many years Frigidaire has made a stackable washer and dryer, known in the trade as a Skinny-Mini. The Skinny-Mini is virtually impossible to keep in good repair. For years my company simply refused to repair them. We referred people to the manufacturer.

John Reese was a repairman of stature and vast experience in Baltimore for many decades. Sunny was his partner. I knew that John would repair just about anything. One day I happened to ask him if he repaired Skinny-Mini's.

He paused and said "No"

I looked at him questioningly.

He continued, "I let Sunny fix them, there's no reason for both of us to be in a bad mood."

Frigidaire

The Frigidaire top load design is not nearly as bad as the Skinny Mini.

However it is still no pleasure to work on. Here is a typical example. In order to replace the drive belt on many older Frigidaire designs, it is necessary to remove the entire pump mechanism first. The pump mounts on the end of the motor shaft and any leakage that occurs causes the shaft to rust in the pump impeller. The rust make it very difficult to disassemble. In addition, the screws on the pump are hard to get to. Overall, the job takes about 40 minutes, twice as long as any other brand.

Current Frigidaire Washer (Fig. 033_52

Uncle Harry's

Trick of the Trade # 3-28

The rearmost pump bolt is extremely hard to get to on Frigidaire. There is a hole drilled in the base plate that allows access with a long socket wrench. Tilt the washer enough to get to the hole in the bottom.



More recent models have changed the design making belt replacement much easier. Also the pump can now be replaced without difficulty.

**Belt and Pump Replacement on a Current Frigidaire
(Fig. 033_53)**



Westinghouse

Prior to the 80's, Westinghouse, Frigidaire, and Gibson all had their own manufacturing plants and their own unique designs. Hopefully you will not be unlucky enough to encounter one of these in your service work. If you do draw on the knowledge gained from other designs and apply it to the unfamiliar design.

Westinghouse Front Loader (Fig. 033_54)



Conclusion

Without exception, on the odd brands that we've just covered, consider only the simple and obvious pump, belt, and water problems. For anything else, it is wise to price the job high enough to pay for learning time. The second option is to condemn the equipment and advise the customer to buy new.

The designs that you have already studied prepare you well for any unfamiliar design. If by chance your area has a concentration of off-brand equipment, you will soon develop speed in working on their particular faults.

Our next lesson will cover all brands of automatic dryers. It is long enjoyable and easy to understand. By the end you will be ready to repair any laundry equipment.

Sample Flat Rate

Following is *Uncle Harry's* suggested pricing for typical washer repairs. A complete set of flat rates is in the Flat Rate Book.

General Electric Washers

(GE & Hotpoint)

Description of the Job	Price
1) Unjam pump (from inside tub)	\$79.00
2) Unjam pump (by opening up pump)	98.00
3) Replace pump (WH23X42)	148.00
4) Replace belt (WH1X2026)	95.00
5) Replace drive web	95.00
6) Replace tub boot (WH8X246)	145.00
7) Repair outer tub leak	135.00
8) Replace timer	195.00
9) Replace two-speed clutch with a single speed (WH49X231)	189.00
10) Install a two-speed clutch (WH49X265)	240.00
11) Install a new motor and switch (WH20X52 and others)	235.00
12) Replace water valve (CW151)	98.00
13) Replace agitator drive spline (WH1X1944)	98.00
14) Replace upper tub gasket (WH8X305)	130.00
15)	
16)	
17)	

Maytag Washers

Description of the Job	Price
1) Replace set of belts (211124 & 211125)	\$98.00
2) Replace pump (202203)	140.00
3) Replace injector hose or nozzle (206145), (22213057 sleeve)	115.00
4) Replace motor pulley (200816)	115.00
5) Rebuild motor carriage (205999)	128.00
6) Replace set of lid balls (211726)	65.00
7) Replace main seal (204012)	189.00
8) Replace main seal and bearing kit (204013)	250.00
9) Replace snubber pads (203956)	165.00
10) Replace hose from tub to pump (212989)	98.00
11) Replace drive motor (1-sp, 201805 & 2-sp, 201807)	225.00
12) Replace lid safety switch (205415)	115.00
13) Replace timer	189.00
14) Replace console switches or water level control	135.00
15) Replace water valve (CW151)	105.00
16) Replace lid check switch 9207166)	115.00
17)	

Frigidaire Washers

(Kelvinator, Frigidaire, Westinghouse,)

Description of the Job

Price

Top Loaders

1) Replace direct drive pump (131208500)	\$145.00
2) Replace belt (13123400,131686100)	145.00
3) Replace idler pulley and spring with belt	170.00
4) Replace pump (Norge style, L107)	155.00
5) Brake solenoid (Norge style)	145.00
6) Replace transmission (not advised)	350.00
7) Replace motor and pump assembly (not advised)	295.00
8) Rebuild seal and bearing housing (Norge)	290.00
9) Replace water valve	115.00

Westinghouse Front Loaders

1) Replace belt set	\$160.00
2) Replace pump	150.00
3) Replace door boot (5303261132)	138.00
4) Replace eccentric pulley	165.00
5) Rebuild main bearings and seals (not advised)	325.00
6) Replace motor	290.00
7) Unjam pump	98.00
8) Replace pump or spin solenoid	148.00

Examination

Manual 3

Automatic Washers (cont.)

(Note: More than one answer maybe correct.)

The following apply only to GE.

1. The G. E. design has
 - A. changed numerous times.
 - B. not changed at all.
 - C. changed twice.
 - D. generally been poor.
2. The theoretical design is similar to a
 - A. Kenmore direct-drive.
 - B. Westinghouse front loader.
 - C. Kenmore belt-drive.
 - D. Maytag.
3. The clutch action
 - A. is in the transmission.
 - B. is a slipping belt.
 - C. is in a separate clutch unit.
 - D. mounts on the transmission.
4. The pump is
 - A. driven by a flexible coupling.
 - B. direct-drive.
 - C. attached below the motor.
 - D. belt driven.
5. A sock jammed in the pump
 - A. never happens.
 - B. is a common problem.
 - C. is easily removed.
 - D. stops the wash action, but not spin.
6. To remove a sock caught in the outer tub
 - A. jam your hand between the tub and the basket.
 - B. remove the agitator.
 - C. remove the basket.
 - D. use a coat hanger.
7. Pump replacement
 - A. is simple.
 - B. should not be attempted.
 - C. is very difficult.
 - D. is simple, except for one bolt.
8. The clutch and motor assembly
 - A. can be replaced as a unit.
 - B. is a clean job.
 - C. takes about two hours.
 - D. is not a moneymaker.
9. A water leak will not usually be caused by
 - A. a split boot.
 - B. a leaking pump.
 - C. a hole in the tub.
 - D. a bad level switch.
10. A transmission replacement
 - A. is easiest on G. E..
 - B. should be avoided.
 - C. is too expensive .
 - D. takes many hours.

Questions 10-17 apply only to Maytag.

11. Maytag has always been
A. a low-end product.
B. cheap, but good.
C. hard to repair.
D. high quality and high priced.
12. Maytag and G. E. in theory are
A. very similar.
B. completely different.
C. both cheap washers.
D. both hard to fix.
13. A smoking Maytag means
A. a jammed pump.
B. probable cancer.
C. bad timer.
D. burned belts.
14. An empty Maytag at full speed makes
A. a faint siren noise.
B. no noise.
C. a rubbing noise.
D. a racket.
15. If a motor carriage is rusted up it will cause
A. stains on the clothes.
B. slow spinning.
C. a lot of noise.
D. rust on the floor.

16. A Maytag pump
A. fails frequently.
B. rarely fails.
C. should be stocked.
D. often leaks.
17. Oiling the brake package to suppress noise
A. often works well
B. never helps
C. is pointless.
D. helps sometimes
18. When replacing a Frigidaire pump
A. tilt the washer to get to the bottom.
B. remove the motor.
C. center the basket.
D. you need a tub wrench.
19. For years Norge has
A. had main seal problems.
B. dominated the market.
C. been very reliable.
D. been a joy to work on.
20. Service calls on Frigidaire stackable
A. should be encouraged.
B. should be avoided.
C. are few.
D. generally hold up.

Extra Credit Question:

What happens if a Maytag stem and seal kit fails?

Examination Answers

Manual 3

Automatic Washers (cont.)

1. C. The GE design, stable for 25 years, remained unchanged until recently. A redesigned machine entered the market about 1996.

2. A or C. Theoretically, all older design GE washers function like Maytag or Kenmore direct drive. All 3 reverse the motor between wash and spin.

3. C. The GE clutch is in a separate unit mounted on top of the motor. Maytag, Frigidaire and Norge, but not GE use a slipping belt.

4. A. A flexible coupling drives the pump on all GE's except the brand new design. On the new design, the pump has a separate drive motor.

5. B. A sock jammed in the pump will often jam the motor in both wash and spin. It is best to replace the pump rather than try to remove it when it is jammed in the pump vanes.

6. A. A sock caught in the outer tub on its way to the pump can be removed quickly after lifting up the top of the washer.

7. A or D. The innermost bolt is difficult to see during pump replacement, but can be done easily by feel.

8. A. Clutch and motor assembly is a profitable, but dirty job that can be done in less than an hour.

9. A, B or C. A bad water level switch is very rare on all washers. On a GE, a leaking pump and a split boot occur with about equal frequency with a rusted hole in the tub following close behind.

10. A. Replacing a transmission on a GE washer is amazingly easy and with experience, can be done in under 30 minutes.

11. D. Maytag washers are not cheap and are relatively easy to repair.

12. A. With the exception of the slipping belt on a Maytag versus a slipping clutch on a GE, the two washers are very similar.

13. D. Old, worn out belts or an overload will cause a burning odor and require belt replacement.

14. A. A faint siren noise is normal on most washers at full spin speed.

15. B. A rusted motor carriage will not slide the motor back and increase belt tension. This will result in slow spin speed and weak agitation.

16. B. Maytag water pumps are highly reliable and seldom leak or fail.

17. A. Oiling the brake package with a zoom spoiler will eliminate brake squeal in nearly all cases.

18. A. A hole is stamped in the bottom plate of a Frigidaire washer to allow access to one of the pump bolts.

19. A. Norge main seal problems have plagued the Norge washer for decades.

20. B. Frigidaire stackables are known as "Skinny-Minnies" and are seldom encountered and require specialized knowledge. Service calls should be avoided and referred to others.