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intro: Hand-powered WASHING MACHINE

I have probably been washing clothes in this hand-powered washing machine for over 25 years. It has two funnels inside the tank that serve as plungers, agitating the water every time the handle is pumped.

The idea was originally for construction in wood. It came from a village technology handbook. I built mine out of iron and cement, and came up with the funnel plunger idea. The rectangular tank uses a special sheet metal with holes for plastering called Hi-rib. It is sealed with a cement-base sealer.

My method is to soak the clothes in detergent and water overnight, pump them for about 5 minutes in the morning, rinse them twice and hang them up on the clothesline.

It's good exercise, and it consumes no electricity.



Image Notes

1. One half of the PVC cover is removed.



step 1: Inside the Washer

The funnels go up and down. Shape-wise, the funnel is streamlined and cuts the water as it moves upward. Coming down, it creates more churning action because of the less streamlined bottom.

The funnels can be easily replaced if they eventually break, but they hold up quite well. The bright red funnel was recently replaced.





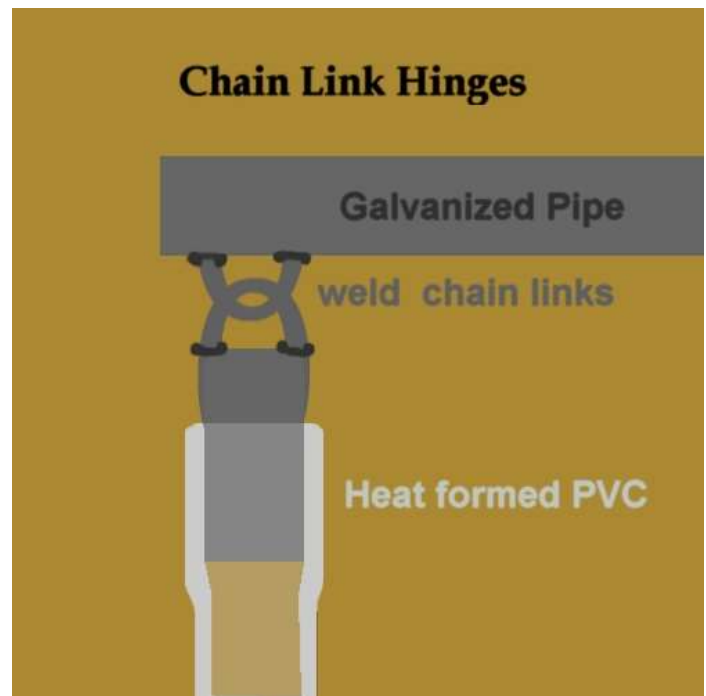
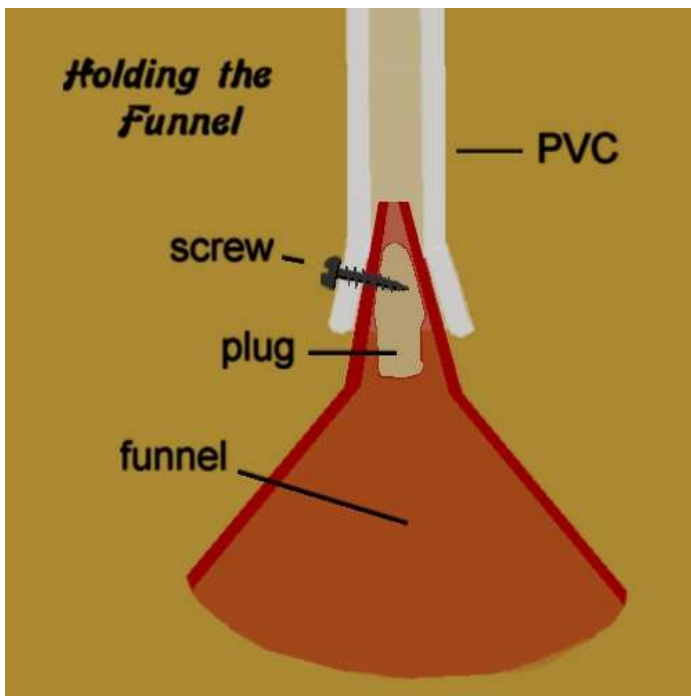
step 2: The Mechanism

One stands to the right of the machine and pumps the handle up and down. As the handle moves it raises and lowers the two red plastic funnels. That agitates the water and washes the clothes. The handle is of welded iron pipe. The cross bar in the middle acts like a hinge. The hinge pin which holds the handle to the washing machine body is a smaller diameter pipe. I used 3/4" EMT metal pipe for the handle and 1/2" EMT for the hinge pin.

The vertical pipes connecting the funnels and the handle are made of PVC pipe. They are heat formed at one end to conform to the funnel. A plug inside, made of wood or heat-formed PVC is secured by a sheet metal screw and holds the funnel in place.

The vertical PVC pipe is heat formed at the other end to conform to part of a hinge made of chain links. The chain links are welded to the handle and a stub of pipe that enters the vertical PVC pipes. See the diagrams.





step 3: The Hinge

The outer pipe used in the hinge for the handle is 3/4" EMT metal tubing. The "hinge pin" that runs inside it is 1/2" EMT.





Image Notes

1. The "hinge pin" pipe is being inserted.

step 4: The Plug

To make the drain hole I heated and flared out the end of the 1/2" PVC drain pipe. I did that by heating it over a gas stove to soften it and pressing it over a ball peen hammer. When the plastic cooled, the end had a tapering hole, ideal for receiving a rubber plug.

The plug is made of silicone rubber. As a mold for it, I used the actual drain pipe. I packed a wad of aluminum foil in the hole to form the bottom of the plug, and coated the foil and the pipe with a mold release agent, such as dish detergent, or Vaseline jelly.

I filled the space in the mold with clear silicone rubber from the hardware store. While it was fresh, I made a loop of nylon string, knotted it, and embedded the frayed ends of the strings in the silicone. The string is firmly held and can be used for pulling out the plug.

With that much silicone, it took about a day to harden up completely. It's a good plug and doesn't leak.



step 5: The Lid

The original 2-part cover for the washing machine was made of plywood. It rotted away, and was replaced with PVC plastic.

To make the cover, flatten some pipe material by cutting a section of large-diameter PVC pipe lengthwise on one side. Heat it over a gas stove until it gets soft and leathery. Put it on the floor with a flat piece of plywood on top to stand on until it cools.

Sketch out your design. Make long folds by heating the line with a propane torch and folding the plastic with a piece of wood. Cut holes in one side for the vertical pipes that hold the funnels. Fold the outside rim down over the edge of the washer. Folds like that give the flattened PVC more rigidity.

In the previous photos, I showed the lid pieces unwashed. (I like the candid feel of weathered things.) For those who may like to see things cleaner in order to better visualize their manufacture, I cleaned the lid for these photos.



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