Homestead Water Procurement

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Water is a vital element for any homestead.
This well bucket can be a god-send if the power goes out. By Robert Sulek

Whether natural or man-made, rips in the fabric of modern civilization can occur with devastating consequences. Disasters seem to be happening more often, in more places, and impacting more and more people. All too often too much water (flood, hurricane, tsunami) is the paramount problem, only to be followed by the profound lack of potable water. Municipal systems fail. Stored water can run out. Relief supplies may be delayed or even looted, or unevenly distributed.

Device with short piece of rope installed in handle

Countrysiders with a viable spring, well, or rainwater cistern are fortunate indeed, but a backup system may be needed if you are on-grid for that pump. A standby generator of ample capacity may be cost prohibitive. If the source is a shallow well, perhaps a pitcher pump is all that is needed. Or, consider a variation of the good old-fashioned well bucket.

In daily use in many remote places around the world, this generic item is thousands of years old. The earliest ones may have been made of animal hides, or maybe a short hollow log with a leather flap on the lower end and a length of cordage tied to the upper end for hoisting.

The following plans are for such an emergency water procurement device that can be assembled and tested way before a crisis arises, or one can be cobbled together with simple hand tools. It is based around a 30-inch length of Schedule 40 PVC pipe, four inches in diameter, which serves as the body of the device. Compared to some other bottom-filling well buckets, this one is quite hefty. The effort expended in the operation of this device can be roughly compared to using a clamshell-type posthole digger. Many of the small muscles will get a workout. The operator(s) of this device should be in good physical condition, for he or she will be hoisting, hand over hand, weight in excess of 20 pounds on a repetitive basis. Any known or suspected medical issues that may develop or become exacerbated by the use of this device must be addressed by the user(s) and their physician beforehand.

Top view shows handle installation; lifting rope simulated.

Due to its sheer size, this device is for dug wells or drilled wells of at least six inches in diameter that have had the submersible pump and related plumbing removed, or which never had same installed to begin with. In an emergency you may not have the option of pulling your pump from the well, but you may have an old well or two on your place or in the immediate vicinity that can still supply potable water. Perhaps there are abandoned farmsteads in your area, or even development lots with wells, but where houses were never built. Note what is in your area, and always ask permission beforehand when contemplating the use of a well not on your own property. (Ed. note: Also be aware that an abandoned well may not be in use for a very good reason-perhaps it's contaminated.) Also, several families or homesteads can

pool resources and talent.

Materials:

The parts list is comprised of off-the-shelf items found at a big-box home improvement center or well-stocked local hardware or plumbing outlet. The list includes:

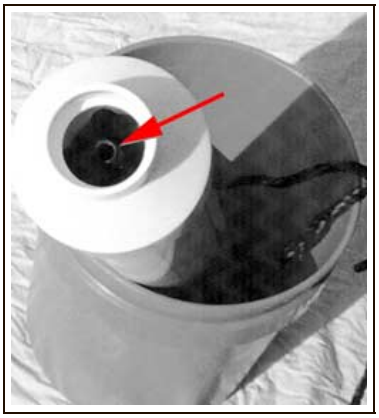
- 30″ section of Schedule 40 PVC pipe, 4″ diameter, which serves as the body
- 1 – 3″ x 1-1/2″ PVC reduce fitting
- 1 – 1-1/2″ PVC plug
- 1 – 4-1/2″ length of 1/2″ diameter PVC pipe, Schedule 40, which will serve as a handle
- 1 – self-aligning toilet tank ball with screw-in brass lifter rod (brand new, of course)
- 1 length of nylon or poly rope, 1/4″ diameter, of sufficient length to reach the water level in the well plus length to spare to secure upper end to secure object

The tools and miscellaneous supplies include:

2 or more clean 5-gallon plastic buckets (food grade is preferred. Do not use any that contained toxic or hazardous materials) A hand or electric drill with bit set through 3/4″

- Small hammer
- Fine nail punch
- Several rat-tail files
- Flat tile
- Steel wool
- Fine sandpaper
- Clean rags
- Rubber gloves
- Eye protection
- PVC cleaner
- Solvent and cement
- 12″ ruler
- Ballpoint pen or small fine-tip marker
- Clean towels
- Dishwashing liquid
- A source of clean water
- Work gloves
- 1 empty soup can with lid removed
- Several C-clamps and/or vise
- Clean, well-ventilated work area and surface
- A shop vacuum would be a plus for cleaning up.

Assembly:



Another bottom view: Tank ball visible in opening.

- Wash and dry all PVC parts. Be sure to remove price stickers and residual glue.
- Make sure ends of the body are square, smooth and free of debris. Secure body to the work surface.
- Measure 2-1/2″ from what will be the upper end of the device, and mark two points on the side of the body directly opposite each other. With hammer and punch, indent the marks.
- With a 1/8″ bit, drill through the body at both indentations. These will be starter holes, or pilot holes.
- Switch to a 3/4″ bit and then bore out the starter holes. Sight through both holes. With rat-tail files and sandpaper, clean shavings from in and around the holes.
- Attempt to fit the handle through both holes in the body. Chances are the handle will be too big, even taking into consideration minute variations between pipe producers.
- Using rat-tail files, carefully enlarge both holes as necessary while retaining their circular shape to accommodate the handle. Avoid making egg-shaped holes. File a bit, then refit as needed to have the ends of the handle nearly flush with the outer surface of the body. Don't worry if a bit of the handle extends beyond the curvature of the body. This can be filed down later to match the body's contour.
- Clean debris from the holes, the handle, and work surface. Put on eye protection

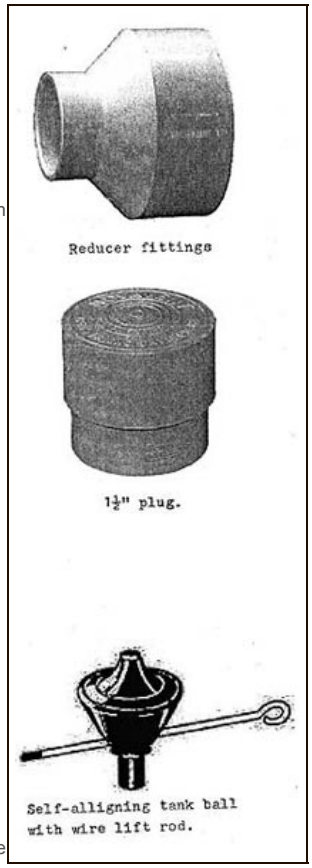
and gloves.
- Clean, prime and cement the handle in place. Remove excess cement. Set the body aside to allow the cement to set or cure per instructions on can label.
- Next, take the 3″ x 1-1/2″ reducer, large end down, and secure it to the work surface. Place 1/8″ bit back in the drill.
- Place the empty soup can over the 1-1/2″ end of the reducer fitting, bottom end up. Hold the can on the fitting so the edge of the can is equidistant from the outer edge of the fitting. Using the can as a template, trace a circle on the sloping surface of the fitting. This circle should be approximately 1″ from the edge of the fitting. If this attempt is unsuccessful, wipe off the circle and try again.
- Mark six points on the circle equidistant from each other at the 2, 4, 6, 8, 10 and 12 o'clock positions as viewed from above. The marks should be approximately 1-1/2″ apart on the scribed circle. Use hammer and punch to make a small indentation at each mark.
- With the drill, make a 1/8″ hole through the fitting at each indentation. These will be pilot holes.
- Switch to a 3/4″ drill bit and redrill the 1/8″ pilot holes.
- Clean debris from in and around the six holes. Wash and dry the fitting and set it aside.
- Secure the 1-1/2″ PVC plug to the work surface, open end down. Locate and mark the exact center of the closed end of the plug. With hammer and punch, make an indentation.
- From this center point, measure and mark six points halfway to the edge of the plug at the 2, 4, 6, 8, 10 and 12 o'clock positions as on the reducer fitting. Indent these points.
- Place the 1/8″ bit back in the drill and drill holes through the plug at these six points. Clean off the debris, wash and dry and set the plug aside. Do not enlarge these holes.
- Unpack the self-aligning toilet tank ball and lift rod. Wash and dry and set aside.
- Perform a trial fitting of the plug to the 1-1/2″ end of the reducer fitting. It should fit inside snuggly. If not, remove burrs, etc., and repeat attempt.
- When satisfied with the fit, put on the protective gear again and clean, prime and cement these two pieces together. Remove any excess cement and set aside to cure. Clean with soap and water and allow to dry, the longer the better to allow the odor of the cement to dissipate.
- Test fit the toilet tank ball, bottom end down, against the inner portion of the 2″ opening of the 4″ x 2″ reducer fitting. Remove any debris or burrs to assure a snug sealing of the opening.
- Retrieve the 3″ x 1-1/2″ fitting with attached plug. Insert the treaded end of the tank ball lift wire through the center hole of the plug from the top. Take the tank ball and place it under the 3″ end of the fitting and screw it onto the wire lift rod. Secure but do not over tighten to avoid stripping the threads. The wire lift rod should move smoothly through the hole in the plug when you grasp the eyehook end of the rod. Set this assembly aside.

Bottom end; tank ball visible in opening.

- Clean the interior surface of the bottom end of the body to a distance of several inches.
- Take the 3″ x 1-1/2″ assembly and carefully wrap the tank ball with a clean piece of cloth to protect it from future cement application. Test fit this assembly into the bottom edge of the assembly ensuring the end of the body is flush. Remove, clean, and repeat if necessary.
- When assembly and body mate properly, clean, prime and cement them together per test fitting. Do not allow the assembly to go beyond the point of being flush. The cloth-wrapped tank ball should be partially below the bottom of the body. Allow time to cure, then wash and dry.
- Remove the cloth used to protect the tank ball.
- Stand the body on its top end and secure it to the work surface.
- Test fit the 4″ end of the 4″ x 2″ reducer fitting over the bottom end of the body. Clean, and repeat if necessary to have the fitting mated fully onto the body. The tank ball should be resting against the 3″ x 1-1/2″ assembly.
- With the greatest degree of caution, clean, prime and cement the 4″ x 2″ reducer fitting over the end of the body without getting any cement on the tank ball. A little less cement is better than having too much oozing into the chamber containing the tank ball.
- Allow to cure, then wash and dry.
- File down the ends of the handle to conform to the curvature of the body, as

mentioned before.
- Perform final cleaning of the device with dishwashing soap and water. Rinse and allow to dry. Clean up work area and tools.

Operation:



Parts not to scale. Not pictured: pipe sections for body, handle.

Preparation for operation is simple. Uncoil a clean piece of rope of appropriate length into a clean bucket, leaving both ends accessible. Attach one end to a secure object. Pass the other end of the rope through the pipe that serves as a handle and tie it securely back upon itself approximately 2′ above the upper end of the device.

The operator(s) should remove loose items from shirt pockets as well as jewelry that you can't afford to lose, and perhaps do the same with loose-fitting eyewear. As mentioned before, the operator should be able to lift, hand over hand, 20 pounds, plus. It is desirable to have an assistant or two to procure large amounts of water, and to feed the rope in and out of the bucket thereby avoiding ground contact and/or becoming a problem underfoot. Now, put on a clean pair of work gloves.

The actual operation consists of lowering the device into the well slowly, letting out rope hand over hand. When the device contacts the water surface, it may remain buoyant. When you encounter the sensation that the device is floating, raise it several inches and allow it to drop abruptly onto the surface of the water. This will make the tank ball float or move upward, thereby allowing water to enter the device via the bottom opening. The device will slowly sink as it fills with water, again approximating a state of buoyancy or equilibrium.

Now is the time to raise the device slowly and, grasping the pipe handle, pour the water into another bucket or container. Repeat as needed.

Is this magic? No, just plain physics. As the device is raised, the weight of the water in the body will force the tank ball to seat in the bottom opening thereby retaining the water.

Since this device will be contacting the sides of the well, debris may be entering via the top opening; consider filtration. Have a lab test done on your sources before bad times strike. When push comes to shove, filter, boil and/or chemically treat your water during a disaster.

When not in use, stand the device on its top end, provide a sanitary cover, and avoid damaging the lower end of the tank ball since it may protrude slightly from the bottom of the device. A protective sleeve can be fashioned from a length of 6″ diameter PVC pipe with fine mesh screening on the ends held in place with long plastic ties. Clean and thoroughly dry the device and the rope after use and prior to storage.

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