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A Simple Hot and Cold Water System for the Kitchen.

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A Simple Hot and Cold Water System for the Kitchen.

By J. B. KELLEY and EARL G. WELCH.

A hot and cold running water system in the farm home lightens the housework, improves sanitary conditions and adds to the comfort and health of the family. Many farmers feel the need and realize the value of a water supply system, but think that it is too expensive, not knowing that successful, simple, inexpensive systems can be obtained.

In Kentucky only one out of every fifty-two farms has water piped into the house. There is need for a simple hot and cold water system at a cost that will make its use possible in the great majority of rural homes that now have no running water; a system that can be easily installed in houses already built and used in kitchens in which water may freeze.

The system described in this circular has been used successfully in Kansas, Missouri, Minnesota, Ohio and other states. It is a step between the pitcher-pump system (see Circular 125, College of Agriculture, Univ. of Ky.) and the attic tank system. It is intended to be used in connection with a cistern or a shallow well near the house.

Most of the articles of plumbing needed in this system as shown in Figure 1 can be bought at the local plumber's and can be installed by the farmer if necessary. The total cost of materials is about sixty-five dollars.

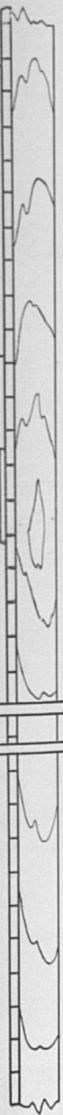


Fig. 1. A simple hot and cold water system.

DESCRIPTION OF THE SYSTEM

Cistern or Well: The system provides for the protection of the well or cistern from surface pollution. All cistern water should be filtered. The filter suggested is a porous brick wall across the center of the cistern. Rain-water enters on one side of the wall and is removed from the other. A cut-off or waste spout in the line leading from the roof of the house to the cistern should be provided in order that the roof and gutters may be washed clean before turning the water into the cistern.

The Pump: Any house force-pump may be used which will successfully pump water from a cistern or well near the house and force it thru the range boiler. The type of pump shown in Fig. 1 has the cylinder in the stock. It should be placed at a vertical distance of not more than 20 feet above the surface of the water. There is nothing unusual about the pump with the exception of the spout which is made of pipe fittings. The pump may be mounted on a base or wall bracket and should be placed high enough above the sink to admit a bucket under the outlet. The lower end of the suction pipe should not touch the bottom of the cistern. All the pipe joints should be coated with red lead and screwed tight. The horizontal pipe between cistern and pump should not be over 50 feet long and should be placed in the ground deep enough to prevent freezing. It should drain towards the cistern. Before installing the pump, soak the stock in water to expand the cup leather.

Range Boiler: The only storage tank required is a thirty gallon or larger size common standard form of galvanized steel range boiler. The method of connecting the boiler to the pump and water-back in the kitchen stove is shown in Fig. 1. The cold water supply pipe *G* should extend to within 2 or 3 inches of the bottom of the boiler. In regular installations this pipe is tapped near the top with a small hole to prevent the water siphoning out of the tank should a break occur in the house water supply pipe, but in this system the hole should be omitted because the siphoning is controlled by the air cocks *D* and *E*. A $\frac{1}{4}$ inch hole should be drilled in the pipe at *E* one foot from

the bottom of the boiler to prevent danger from siphoning too much water out of the boiler when there is a fire in the stove. Where the height of the ceiling will permit, the bottom of the boiler should be placed on a level with the top of the sink. The outlet of the hot water pipe *H* is always open at *I*, thus preventing any danger of the boiler bursting from excessive pressure.

The Water-Back: The water-back used can be purchased at any hardware store. It is a hollow cast-iron piece that is made to take the place of the back fire-box lining of the range and is used for heating the water for the range boiler. It is connected to the boiler by means of the cold water pipe *J* and the hot water pipe *K* as shown in Fig. 1.

Three-Way Cock: The flow of water to and from the range boiler is regulated by a three-way stopcock. It is not commonly used in house plumbing but it can be bought from a plumbing supply house which handles steam fittings. It is a stopcock having three openings called ports. The handle can be moved so as to close any one of the ports leaving two open. Cross-sectional drawings showing the three positions of the handle and openings are shown in Fig. 2.

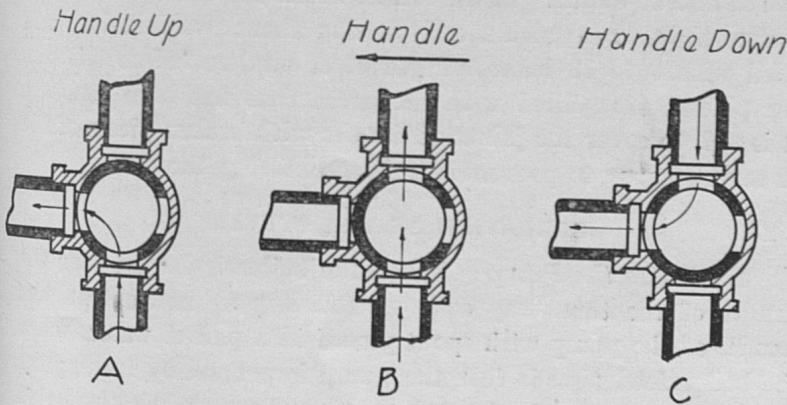


Fig. 2. Positions of three-way cock.

- A. 1. To pump cold water from cistern to sink.
- 2. To prime pump from pail in sink.
- 3. Position of stopcock between operations.
- B. 1. To prime pump from boiler.
- 2. To pump hot water to sink.
- 3. To drain water from boiler to cistern.
- C. 1. To siphon water from boiler to sink.

The Sink: A substantial kitchen sink should be used. It should be fastened securely to the wall. A drain board at one end of the sink and a "sink back" to protect the wall from water improve the installation. A trap should be connected to the sink to prevent gases from the drain from working back into the kitchen. The height of the bottom of the sink above the floor should be from 30 to 36 inches, depending on the height of the person using it.

The Disposal System: The disposal system is made of 1½ inch galvanized pipe, leading from the trap at the sink to the underground drain and 50 to 100 feet of 4-inch agricultural drain tile laid with open joints from 12 to 18 inches below the surface of the ground. By placing a "T" pipe fitting in the end of the horizontal length of the drain pipe at the point where the trapped pipe enters, it is possible to clean out the drain without disconnecting any pipe, should it ever become clogged. The fall of the pipe line should be not less than one inch in ten feet and the drain tile should have a fall not greater than two inches per 100 feet so that water will soak into the soil thru the tile joints of the whole line. The end of the tile line should be closed. If the soil in which the drain tile are laid is very tight, the trench should be dug about two feet deep and filled with 8 to 10 inches of gravel or cinders before the tiles are placed, then filled with the earth that has been removed. It is well to cover the joints of the tile with broken pieces of tile or tarred paper to prevent soil from entering the line.

OPERATION OF THE SYSTEM

To Prime the Pump: When the boiler is empty, turn the handle of the three-way cock up (A. Fig 2) and operate the handle of the pump with spout placed in a pail of water. When the boiler feed pipe is full, the pump is primed by turning the handle of cock to a horizontal position, B, permitting water to siphon into it from boiler.

To Pump Cold Water from cistern to sink, turn the three-way cock handle up to position A, closing the upper opening, and then operate the pump.

To Pump Hot Water, place handle of cock in horizontal position, *B*, closing the front opening, and then pump cold water into the boiler, thus forcing out the hot water thru pipe *H*, the end of which is always open.

To Siphon Water from Boiler to Sink, turn the cock handle to position *C*, with the lower opening closed, and open the air cock *D* on the hot water pipe.

To Siphon Water from Boiler Back Into Cistern, place the cock handle in position *B* and raise the pump-handle. What water remains in the tank below hole *F* in pipe *G* can be drained out thru the drain cock. It may be necessary to drain the boiler in order to repair the system or to prevent freezing in very cold weather.

To Drain Pipes But Not Boiler, open air cock *E*, place the handle of stopcock in position *B*, and raise handle of pump.

Position of Stopcock Between Operations: Between operations, always place stopcock handle in position *A*, closing the boiler feed pipe, thus preventing the water from siphoning out of the boiler.

MATERIAL REQUIRED FOR AVERAGE INSTALLATION

- 1 2½" or 3" force pump and wall bracket.
- 1 ¾" three-way stopcock.
- 1 ¾" hydrant nozzle threaded for hose connections.
- 2 ⅜" air cocks.
- 1 30 to 60-gal. range boiler and tube.
- 1 boiler stand.
- 1 ½" drain cock.
- 1 water front or water back.
- 1 kitchen sink and trap with fittings.
- 3 ¾" galvanized close nipples.
- 2 ¾"x2½" galvanized nipples.
- 1 ¾"x3" galvanized nipple.
- 2 ¾"x3½" galvanized nipples.
- 1 ¾"x4" galvanized nipple.
- 1 ¾"x5" galvanized nipple.

- 9 $\frac{3}{4}$ " galvanized elbows.
- 2 $1\frac{1}{4}$ " galvanized elbows.
- 2 $1\frac{1}{2}$ " galvanized elbows.
- 1 $\frac{3}{4}$ " galvanized tee.
- 1 $\frac{3}{4}$ "x $\frac{3}{4}$ "x $\frac{1}{2}$ " galvanized tee.
- 2 $\frac{3}{4}$ "x $\frac{3}{4}$ "x $\frac{3}{8}$ " galvanized tees.
- 4 $\frac{3}{4}$ " galvanized unions.
- 30 ft. $\frac{3}{4}$ " galvanized pipe.
- 45 ft. $1\frac{1}{4}$ " galvanized pipe.
- 20 ft. $1\frac{1}{2}$ " black drain pipe.
- 50 to 100 ft. of 4-inch drain tile.

Note.—The number of feet of $\frac{3}{4}$ ", $1\frac{1}{4}$ " and $1\frac{1}{2}$ " pipe will vary in different installations according to the arrangement of fixtures in kitchen and the location of cistern.