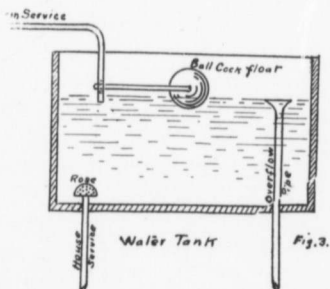


and is percolating through the soil spreading contamination for hundreds of feet around.

The problem of providing a continuous water supply for the country home is no longer a speculation. Many efficient systems may now be installed at a moderate cost. In every case it is desirable to have a regulating cistern or tank, Fig. 3, as a means of storing the water for distribution by pipes to every part of the homestead where it is required. An elevated tank may be used to deliver the water by gravity or a pneumatic tank by air pressure. The advantages of the pneumatic over the elevated tank are many. The tank and pipes can be easily made frost proof in winter, and the water is kept cooler in summer. It is closed to dust and light, and has the additional advantage of resting on the solid ground. The same means may be utilized to force the water into a pneumatic tank as used to elevate it to a gravity tank, that is, by a windmill, gasoline engine, hot air engine, hydraulic ram or by hand. Which will be the most convenient and economic will depend upon the situation, the source of supply, amount required, and the need of power for other purposes. The engines have the merit of being ready to pump whenever required and at the same time to perform some other work besides. The windmill and the hydraulic ram have the advantage of operating without fuel. The windmill unfortunately has to depend on atmospheric conditions which when water is most needed, there is "neither breath nor motion" in it. The hydraulic ram on the other hand is a machine which works continuously by day or night, in calm or storm steadily, uniformly, requiring neither supervision nor fuel.

A sectional view of this machine is given in Fig. 1, which will help to explain its operation. A is the supply pipe conveying water, which enters the ram at B, from the spring. The valve B opening downwards allows the water to escape, producing a current along the pipe A. The water increasing



in velocity closes the valve B, arresting the motion suddenly, causing a reaction of sufficient pressure to open the valve C which allows a portion of the water to enter the chamber D. Thereupon the valve B drops again by its own weight setting the water once more into motion towards that point, and so relieving the pressure at C, closing the opening. This process is repeated continuously, the valves B and C opening and closing in turn, forcing the water up the pipe E which discharges a constant stream of water. It is essential that the ram be placed at a lower level than the spring so that the supply pipe may have a fall into the ram, Fig. 2. The relation between the height of source of supply above the ram and the elevation to which the water is to be raised determines the proportion of water delivered to the water wasted, and the length of the drive pipe depends upon the fall to