

types of separators. The bowl is driven by a jet of steam, directed at such an angle as to exert an upward pressure on the bowl. "It spins on air" is the claim of the inventor. The bearings are designed with a view to the least possible friction. The top bearing is a unique feature. It consists of a circular brush surrounding the top of the bowl. From a receptacle this brush is kept wet, so that a film of water surrounds and steadies the bowl without sensibly retarding its velocity. The bowl attains the almost incredible speed of 22,000 to 25,000 revolutions per minute. As centrifugal force increases with the square of the speed, we find by comparing the centrifugal force exerted, when the bowl is running at 4,000 revolutions with the force exerted at 24,000 revolutions, that it is multiplied just 36 times, which furnishes a clue to the closeness of skimming in this type of machine. The bowl being so light, little time is lost in getting it up to full speed, and it soon comes to rest on shutting off the steam pressure. The internal devices of the bowl are very simple, and the machine may be quickly and easily cleaned. Belt machines for creamery use are also manufactured.

The United States separator is manufactured and sold by the Vermont Farm Machine Co., Bellows Falls, Vermont. A variety of hand and power (belt and turbine) sizes are made. The effectiveness of skimming of this machine is due to the fact that the milk flows three times up and down the bowl, being subjected all the while to a constantly-increasing centrifugal force. The latest improvement consists in making the internal cups corrugated instead of smooth. This does away with the objection of the cream sticking to the surfaces of the bowls with which it comes in contact. In the turbine machine, one light pad lubricator supplies all the oil needed for the different bearings. The steam pressure regulator is a valuable attachment. In the hand sizes the gearing is enclosed in the best possible manner, so that there is no chance for dirt or milk to get in, and there is no danger of clothing or other obstruction likely to injure the mechanism getting into the gear. The gear cap may be easily removed by loosening two small set screws.

The so-called "aquatic" or "hydraulic" separators are no improvement over the common deep-setting cans. Being made entirely of metal, they conduct heat rapidly, and under ordinary conditions would be more wasteful than where the cans were set in troughs or tubs.

Most Useful Paper Published.

Messrs. B. S. Holdsworth & Sons, Port Hope, Ont., write: "Find enclosed \$1 to pay for FARMING for the year 1900. It is the most useful agricultural paper that is published to-day according to our opinion."

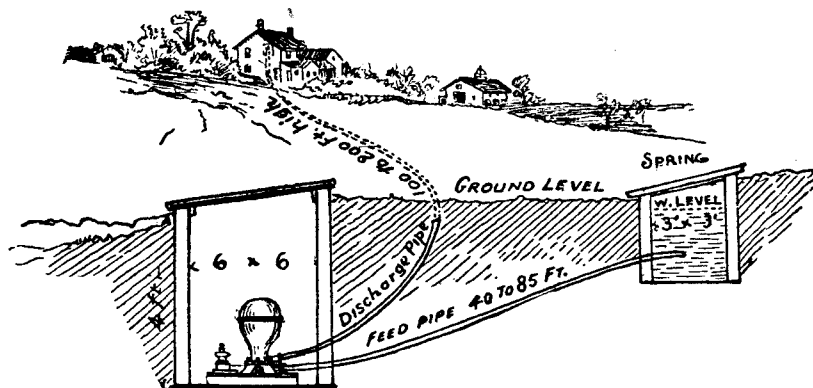
Hydraulic Rams.

Mr. O. J. Dunuth, Ohio, in writing on this topic in a recent issue of the *Ohio Farmer* says: "I have used one for five years and it has given the best satisfaction. It pumps water for my garden, green houses, and plant beds. Will fill a 100-bbl. tank at a height of 30 ft., 300 ft. from ram every 24 hours easily. The size I use takes 2 in. feed pipe with 1 in. discharge. Can get any size wanted from $\frac{3}{4}$ in. to 4 in. feed and $\frac{3}{8}$ in. to $2\frac{1}{2}$ in. discharge, and to use from 2 gals. to 150 gals. per minute and cost from \$5 up to \$65; the size I use, No. 5, will cost from \$11 to \$13. The small sizes use shorter feed pipes than the large ones, the smallest about 40 ft., the largest 85 ft.; there are 10 or 12 sizes. I use 60 ft. on No. 5. The cost of piping to where you want your water will depend on what you will have to pay for pipe which, by the way, is pretty high just now. The ram house and feed box can be built of wood, brick, or

getting out of order. Put a screen on feed box so that nothing can get in feed pipe or it will get in the ram and stop it. Take all the fall you can up to 10 feet although a ram will work on 3 feet fall, but not quite so well.

If the spring will not furnish water enough in a dry time to run the ram, build a tank or cistern on the hillside if you have one, and fill it when there is plenty of water, and pipe it from there to where wanted. Anybody can set the ram and lay the pipes just as well as a high-priced plumber. Just decide how you want it and get at it and do it. I have nearly 1,000 feet of pipe connected to the ram I use, and I did all the work myself and it worked all right from the start. Have your plans laid out first then "be sure you're right, and go ahead."

I think I can truthfully say that hydraulic rams are cheaper and more reliable than wind-mills or gasoline engines, etc. They are handy to get at when they need repairing (which is very seldom) and will run without any



Water Ram.

stone. I used brick for feed box cemented like a cistern, and the ram house is built of stone 6x6x4 deep. Feed box 3x3x3 deep. Put them down nearly level with ground so you can protect them from freezing in winter. Be sure to lay all pipes below freezing and make all joints tight. I would use galvanized pipe. It will cost a little more but will not clog up so soon and will last much longer. But each can use his own judgment about that. The common black pipe will do quite a while just as well.

To find how many gallons of water per minute can be raised by hydraulic rams, multiply the quantity supplied by the spring (in gal. per minute) by 65. Multiply this product by the "head" or number of feet in the fall (that is from spring to ram), then divide by 100 times the height to which the water is to be elevated. The result will give the quantity of water raised per minute in gallons or fractions of gallons. This rule will give some idea, but the smoothness of the pipe and size of pipe will make quite a difference. I would use a larger size than what you think you will need if you have enough water to run it, because the smaller the pipes and ram the more danger of

attention, and whether the wind blows or not.

It seems to me there are lots of farms throughout the country that have good springs with necessary fall and that could make use of a hydraulic ram at small cost, and furnish house and barn with water and save a good deal of backache from carrying water up hill or standing pumping water for a dozen thirsty cows on a hot summer evening when each cow seems to hold a tubful. The cut will make clear the principle on which the ram works.

Farm Tools and Carpentering.

TOOLS NECESSARY OR DESIRABLE ON A FARM.

There is hardly a servant of the farmer more indispensable to him, more secure in his employment, than that essentially practical personage, the general engineer, carpenter and jobber of the farm. Upon all farms, and more especially upon large holdings, it is absolutely necessary that a certain amount of skill and knowledge of this sort should be in the possession of the master, either in himself alone,