

supply tank yet to be constructed. It costs, of course, but the money has been well invested all the same.

COST OF WATER SYSTEM

Galvanized tank for cooling milk	\$ 9.15
Other fittings and steamfitter's bill for labor (less a credit of \$6.00 for unused material on hand)	44.35
Cement and gravel for piers under tank.....	.95
Second-hand lumber, and nails	1.00
Three-inch tile, 240, at \$13 per M.....	3.12
All material	\$ 58.57
Labor, 68½ hours men's time, and a few hours by horses	13.05

Cost of water system (excepting cost of stock watering tank and cost of excavation and cement work in stable).....	\$ 71.62
Estimated cost of carrying water through stable (charged to stable account).....	20.00
Cost of cement stock-watering tank.....	16.40

Total cost of water system to date.... \$108.02

Our Stock Watering Tank.

A 470-gallon cement stock-watering tank was built in September, 1911, on "The Farmer's Advocate" farm. Its interior dimensions are 12 ft. 2 in. by 2 ft. 8 in., by 2 ft. 4 in. The walls are 6 inches thick, made of cement and clean, gritty gravel, mixed in proportion of 1 to 6. The whole tank, including foundation, required four barrels cement and two and a half loads of gravel. The equivalent of three days' time for one man was occupied in its construction.

LOCATION, SUPPLY, OVERFLOW AND WASTE.

The tank is located in an open yard on the south side of the barn, against the foundation wall of which it is built. It is supplied by a line of 1½-inch galvanized-iron pipe, laid in 3-inch cement tile, 2½ to 3 feet under the floor of the stable. Passing out through the foundation of the stable wall, the tile continues in a straight line to an outlet in a field, being intersected 50 feet from the tank by a similar drain from the silo foundation. The galvanized supply pipe turns with an elbow to the left after emerging through the stable wall, and leads by a spur to a hydrant six inches or so beyond the east end of the tank. This spur pipe is laid in tile, with a fall towards the main drain to carry into it waste water from the hydrant. A blind T at the hydrant provides that water may subsequently be carried on to a new horse stable intended to be built, and thence down the lane to the pasture fields.

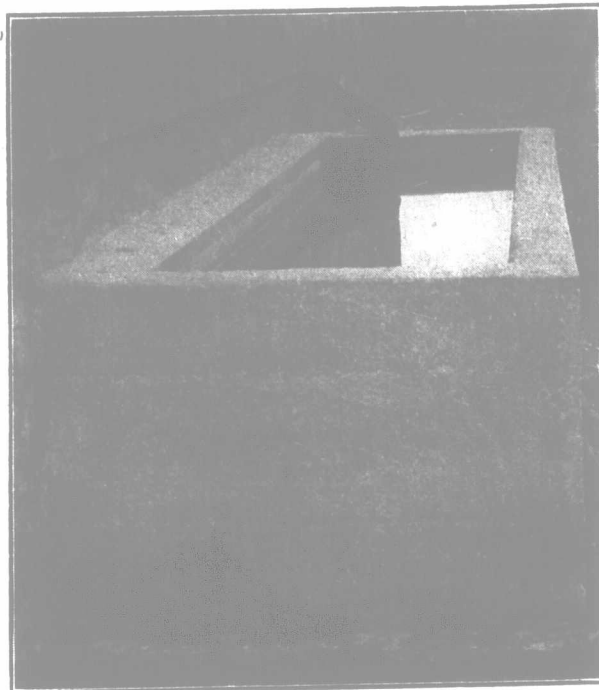
To provide both an automatic overflow and a means of draining out the tank upon occasion, an upright shank of 1½-inch pipe, threaded on the upper end, leads from a small basin-shaped depression in the floor of the tank at the north-east corner, down to an old four-inch drum under the tank bottom, which angles towards the main tile drain. On the threaded end of the upright an ordinary thimble screws, and into this another upright pipe, just long enough to come within an inch of the top of the tank. This upper end is protected with a 4 x 4-in. box, screened on one side to exclude litter. When it is desired to drain the tank to exhaust stale or discolored water, this upright shank is unscrewed, and as the tank is nearly emptied, the box screen may be placed over the projecting threaded end of the length below to exclude floating debris that might clog the drain.

The water pipes (see Fig. 1) having been laid at proper depth, and duly connected, further excavation was made for the foundation walls. A trench two feet deep and ten inches wide (except along barn wall where it was only 8 inches), was dug just inside a rectangle 13 ft. 8 in. x 4 ft., giving a broad, solid foundation for tank wall. It was filled up with cement and cobble stone. The cement was composed of one part cement to eight parts clean, sharp gravel, ranging from the size of coarse sand up to that of grains of wheat or corn. Proportions were gauged by filling a bottomless box, 3 ft. x 2 ft. 10 in. inside, and one foot deep, with gravel, raising the box and putting one sack cement on top. The cement was shovelled three times dry and three times during and after water was applied, as for the silo, but made somewhat moister. For details of mixing, etc., see article on silo construction, issue Feb. 1st, 1912.

The tile containing water pipes, and also the waste-water drum, were covered with cement concrete.

CRIB WORK

Foundation laid, the crib work necessary for building the part above ground was constructed. To support the inside cribbing, six 4-foot scantling, A A A, A A A, were set three on each side, each one two inches in from where inner surface of wall was to be (see Fig. 2). B B B were similar scantling set opposite A A A, spaced 10 inches from them. These uprights, A A A, A A A, B B B, were connected with six horizontal stays, three lengthwise and three crosswise, as shown in diagram, the ends of the cross-stays being tacked to the barn. Between opposite uprights, A A A, A A A, pieces of board sawn to fit were placed near the bottom, and also near the top, to prevent uprights being crowded together when curb



Cement Stock-watering Tank at Weldwood.

plank were filled. The first course of curbing was now set in position on the edges of the foundation, which had been finished level. For the inside of each course, two 12-foot plank were used, and for the outside a 14-foot plank. The inner and outer curb plank were held apart by dividers (small sticks with square ends, six inches long, this being the thickness that the wall was to be built). To each end of each inside curb plank, the lower end of an upright A strip, about three feet long was tacked in such a manner that the hypotenuse face would bevel the inside corner of the tank (see diagram). These A strips, cut from inch stuff, left an inch offset on the end of the two-inch plank, and this offset gave support

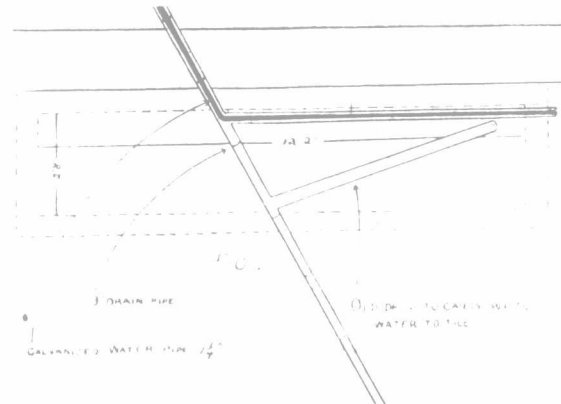
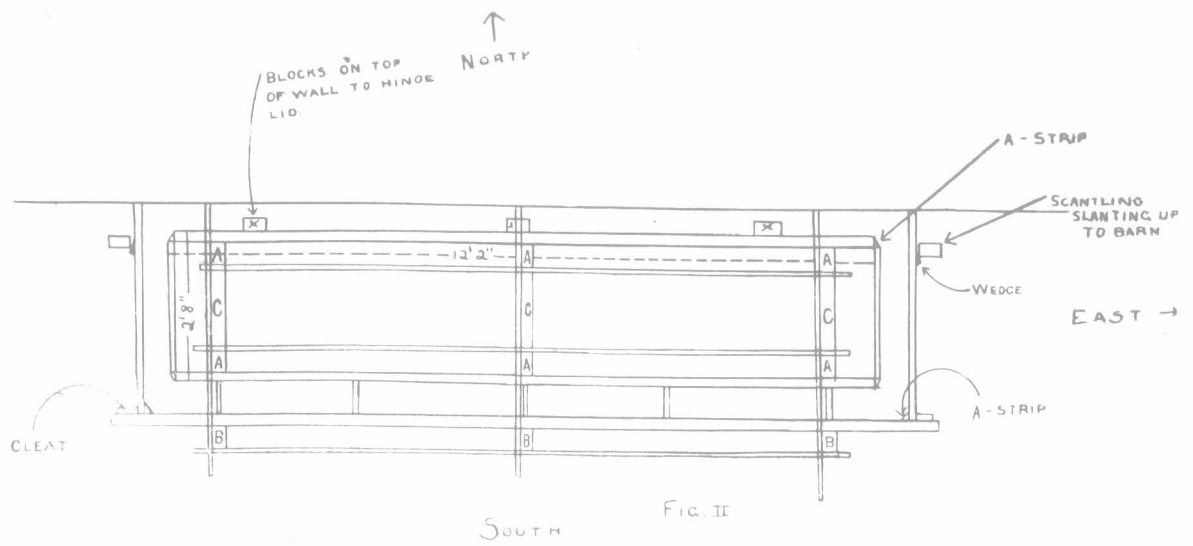


Fig. 1.—Supply over-flow and drainage pipes for stock-watering tank.



Plan of curbing for construction stock-watering tank at "Weldwood."

to the inch board used to curb the inner face of the end wall. The A strips thus fitted nicely into the corners, and made a very neat bevel. They projected two feet above the first plank, but were subsequently tacked to the second and third-course plank as these were put in place. On the outer curb plank, four inches from each end, cleats were tacked to hold the end of the inch board used to curb the outer face of the end wall. To hold the other end of this board, a scantling, planted firmly at the bottom, was inclined toward the barn wall and nailed to it. It being impracticable to locate this scantling to a nicety, a little space was allowed between it and the curb board, and wooden wedges were driven in between. Two more A strips, as shown in diagram, were used to bevel the south-east and south-west outer corners of the tank. All was now ready for filling, which was done with cement-concrete, 1 to 6, after manner described in article on construction of silo. The filling was very carefully done, a little cement being shoveled in all around the course and well tamped, then more all the way around, and so on till the first course was filled. One complete strand of plain, galvanized wire was imbedded in this course all around the tank, and one strand in each subsequent course, making three in all. A second and then a third course of curbing (each course 12 inches deep) was put on in the same manner, but the last course was filled only to within about six inches of the top. A nine-inch piece of board, about a foot long, was sawn two-thirds through at each end, and the sawn ends split off so as to give an offset, the six-inch block in the center fitting down between the parallel curbing, and serving to level the mortar all around the wall before it was trowelled. Along the top of back wall three 2 x 4 blocks were embedded, face flush with top of wall. These were to attach hinges for tank lid, which is also to be hinged along its center, so that only half of the lid need be thrown back for ordinary use. Top of wall was trowelled down and slightly rounded with trowel, care being taken to work down the corners neatly.

FLOOR.

When wall had set for two days, all curbing was carefully removed and any burr edges rubbed off. Floor was now laid, with two coats, bottom one three inches thick, composed of cement concrete mixed 1 of cement and 8 of gravel; top coat one inch thick, mixed 1 to 4. The whole tank, both walls and floor, was now washed inside and out with cement wash applied with a whitewash brush. The wash was composed of cement and water mixed as thick as it would work well with a brush.

Our photograph shows this tank before the lid was put on, and before it had been filled up properly with earth in front. It is, however, in use, and gives excellent satisfaction, having shown no slightest sign of leaking or checking. If building another, we would change nothing but the depth, which is six inches more than necessary, since the cattle cannot reach to the bottom.

The complete cost of the cement-concrete material and labor is as follows:

STOCK-WATERING TANK.

Cement, 4 barrels, at \$1.75, laid down.....	\$ 7.00
Gravel, 1 load, at \$1.44, laid down	1.44
Stone	.25
Wire	.31
	\$ 9.00
Labor, 20 hours, at 27c.	5.40
Labor, 10 hours, at 20c.	2.00
	\$ 7.40
	9.00
Total	\$16.40