Improving the Market Value of Milk and Cream

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Increased demand for high standard milk and cream products, by a discriminating buying public, has made it necessary that plants insist that all milk and cream delivered to them be of a uniformly high quality.

There has been considerable variation in the quality of milk delivered by farmers in various sections of the State. And, there is, oftentimes, much variation in the milk from one locality which goes to a single plant. In one month, one cheese plant noted that all the milk delivered on one route was sweet and in excellent condition. The milk from seven producing herds on another route was sour and not usable by the cheese factory.

In 1943, Oklahoma farmers milked 836,000 cows. These cows produced an average of 3,220 pounds each of 4.3 percent milk during the year. This milk had a total value of $66,677,000. Of this amount, $49,075,000 comes from cash sales and the balance from milk used in the home and fed to livestock on farms.

Butterfat in cream had an average yearly price of 47¢ per pound in 1943. This price is 2.9¢ per pound under the United States average price and is a discount of about $1,405,000 annually for Olahoma butterfat. The estimated loss to farmers for sour milk delivered to cheese factories and dry skim milk plants has been about one-half of one percent of the amount delivered during the summer months. One plant operator indicated that, "On one of the worst days I had nine cans." It is the purpose of this circular to suggest a few ways by which farmers might prevent low quality milk or cream being delivered to processing plants.

HIGH QUALITY INCREASES CONSUMPTION

Children refuse milk if it does not taste good. This lack of appetite for milk stays with them throughout life and lowers the possibilities for maximum use and health since milk should be in the diet. Poor quality butter appearing on the consumer's table results in the consumer eating less or turning to other "spreads." The same is true of cheese—when the customer

* Reprint and revision of "Cream Grading Increases Profits," Circular No. 342—1937, Oklahoma Extension Service.

calls for "good cheese" and a lower quality product is substituted, there are few repeat orders—the customer changes to other foods. Recently, the processing of dry skim milk powder has been undertaken by several processors in the State. Dry skim milk production and consumption has been on the increase, and the demand for quality products will probably remain high for a number of years. The quality of dry skim milk powder depends, to a great extent, upon the quality of skim milk used in its manufacture. It seems important, therefore, that high quality skim milk be produced. Much improvement in Oklahoma dairy products' quality can be brought about by more attention to:

1. CLEAN HEALTHY COWS. Milk only healthy cows which have been properly cleaned before milking.

2. CLEANLINESS. Utensils are the most important source of contamination on the average dairy farm. Every precaution should be taken to prevent bacteria, yeast, molds, and dirt from getting into the milk. Milking should be done in a clean place. The use of seamless milk pails which are easily cleaned is highly recommended. Use pail for milk and cream only. Wash and disinfect dairy equipment after each use.

3. COOLING OF MILK AND CREAM. Immediate cooling of milk or cream is essential for high quality products. Cooling and stirring reduces off flavor. In commercial milk, both the flavor and freedom from acidity are important considerations. Cool to as low a temperature as practical, as low temperatures retard bacterial, yeast, and mold growth and thus retard souring. A temperature of 60° or lower is most desirable.

COOLING WITH COLD WATER OR COLD AIR

The following table gives the relative value of the two methods as determined by experimental tests:[1]

Cooling Agent	Temperature of Cooling Agent	Temperature of Milk[2]	Temperature of Milk 1 hr. later	Degrees Cooled in 1 hr.
Water	50	92	62	30
Air	50	92	87	5

[1] Yapp and Nevens—Dairy Cattle—1930.
[2] At start of experiment.

This demonstration indicates that cold water, cooled milk as much in one minute as cold air did in six minutes.

TYPES OF COOLER TO CONSTRUCT

This depends upon: (1) Amount of milk or cream to cool, (2) Temperature of water supply, and (3) Permanency of need for equipment.

1. HOMEMADE BARREL COOLER. This type of cooler is easy to connect on to the water line from the well to stock tank. Fig. 1 shows methods of connection. It is best operated

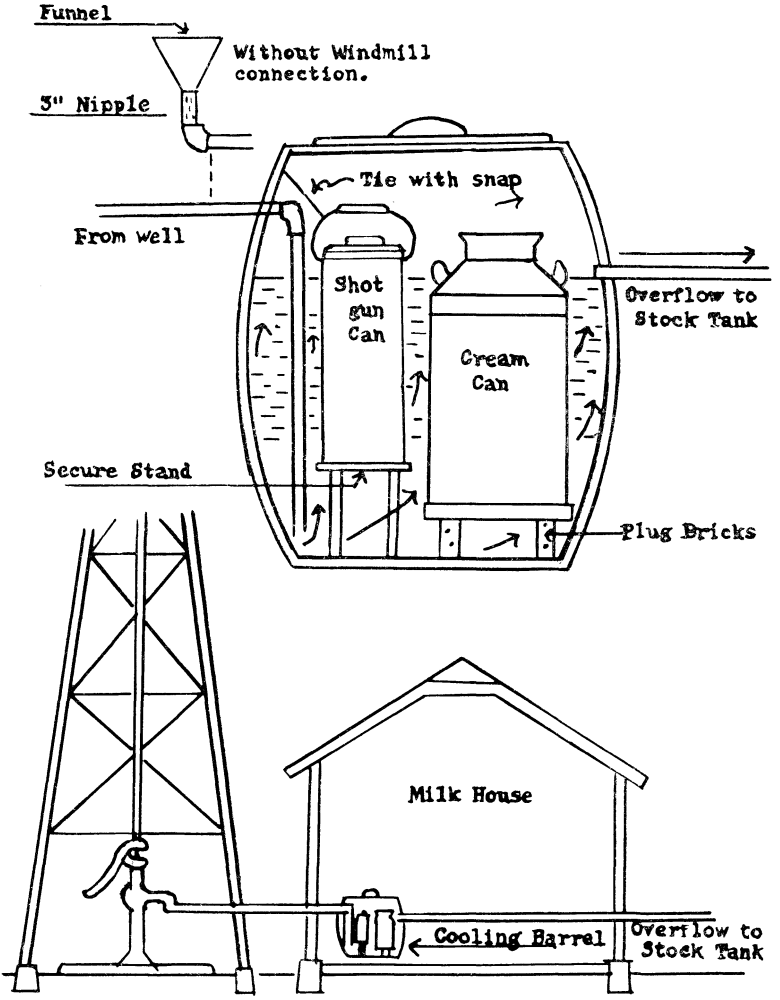

Fig. 1.

where a plentiful supply of water is available, using mechanical pumping force. However, it can be used effectively by using buckets of water in cases where it is not feasible to place the cooler on a water line. The overflow water can then be piped into a stock tank or used to irrigate the garden. Fig. 1 shows its use for cream, using two cans—the fresh cream being stored in the "shotgun can" and the older cream in the "cream can." To cool commercial milk, separate cans for fresh and older milk are not needed as the milk is marketed daily.

2. EVAPORATION COOLER. Fig. 2 shows this type of cooler. It is very effective for cream, or where a small quantity of milk is to be cooled, and where there is a current of air. It is also more effective with water of rather high temperature than is the cooler shown in Fig. 1.

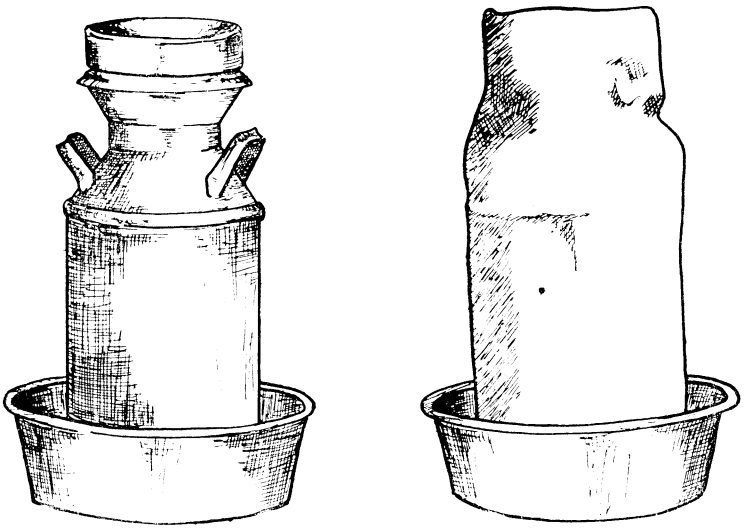

Fig. 2. An evaporation cooler for cooling cream on farms where a plentiful supply of cold water is not available. Two views showing (left) cream can with water pans in place; (right) same, except that the can is completely covered with a piece of light weight muslin which extends into both top and bottom pans. Almost any pan of suitable size and with vertical sides may be used. (From Oklahoma Experiment Station Bulletin No. 226, "Improving the Quality of Oklahoma Butter," by Fouts and Keith.)

The following discussion of an evaporation cooler is taken from the Oklahoma Experiment Station Bulletin No. 226:*

"Where only a small quantity of cream is produced, or in cases where the water temperature is quite high, the evaporation cooler (shown in Fig. 2) has been found to be more suitable than the barrel cooler. For this cooler, two shallow pans are needed. One should be about six inches larger in diameter than a five-gallon cream can, and the other should be about the same diameter as the lid of the can. A piece of light weight muslin is also needed. It should be large enough to wrap around the can and cover it completely and long enough to extend into each pan.

"After the cream has been separated, it should be pre-cooled in water for about an hour with frequent stirring before being placed in the evaporation cooler. It is advisable to have two cans for cream, one for the pre-cooling in water and the other one in which to hold the cream until it is ready to be taken to market.

"After the cream is pre-cooled the storage can should have the cloth and top pan removed, the fresh cream should be added, ... , and the pan and cloth replaced. Both pans should be kept supplied with water in order that the cloth surrounding the can will stay saturated with water. During extremely hot weather it will be necessary to replenish the water several times during the day."

3. INSULATED CONCRETE MILK COOLING TANK. The insulated tank affords advantages over the non-insulated tank because a more uniform temperature can be maintained, and if necessary ice can be used for cooling or a refrigeration unit can be installed later. Cork board or some other type of insulation board should be used. This will afford ease of construction and can readily be treated against moisture by applying hot tar or asphalt. For complete details of the milk can cooling tank (Fig. 3), write the Extension Agricultural Engineer, for Extension Blueprint No. 5180, sheets one and two. (Cost of blueprints, 22 cents.)

* Reference: "Improving the Quality of Oklahoma Butter," by E. L. Fouts and J. I. Keith, Bulletin No. 226, Oklahoma Experiment Station, Stillwater, Oklahoma, 1935.

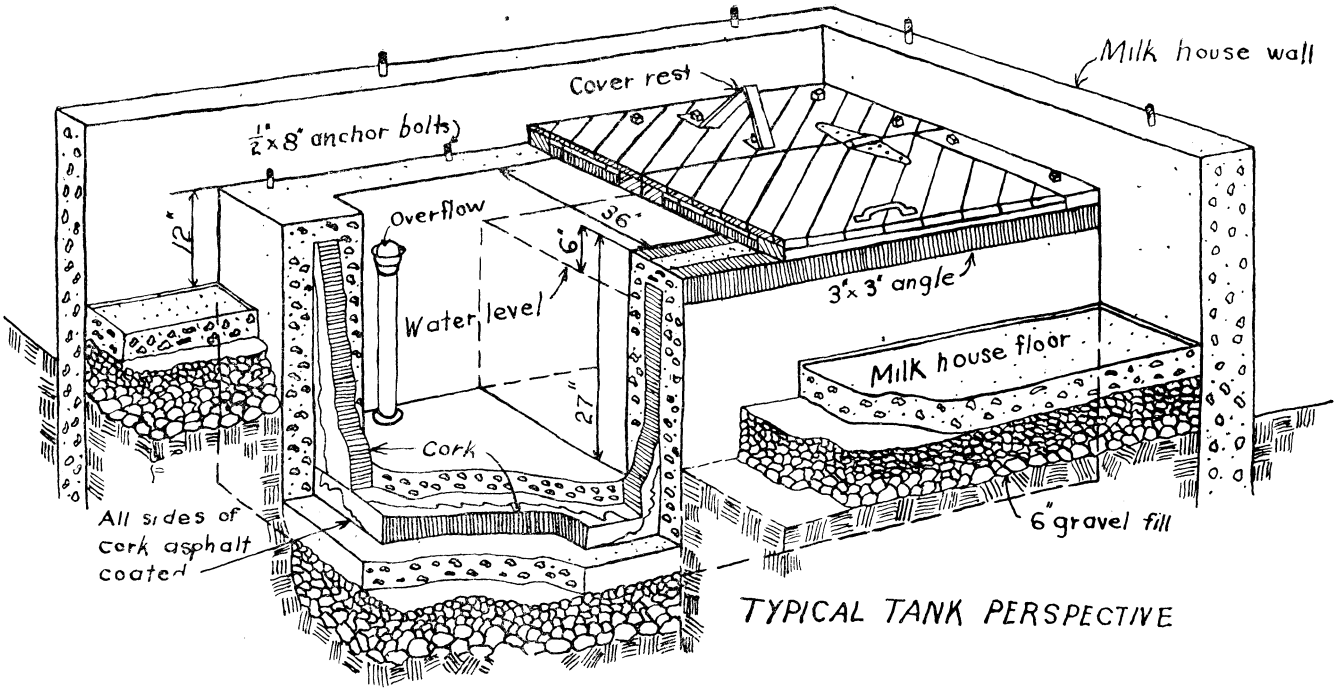
Milk house wall
Cover rest
½" x 8" anchor bolts
12"
Overflow
36"
6"
Water level
3" x 3" angle
Milk house floor
27"
Cork
All sides of cork asphalt coated
6" gravel fill
TYPICAL TANK PERSPECTIVE

Fig. 3.

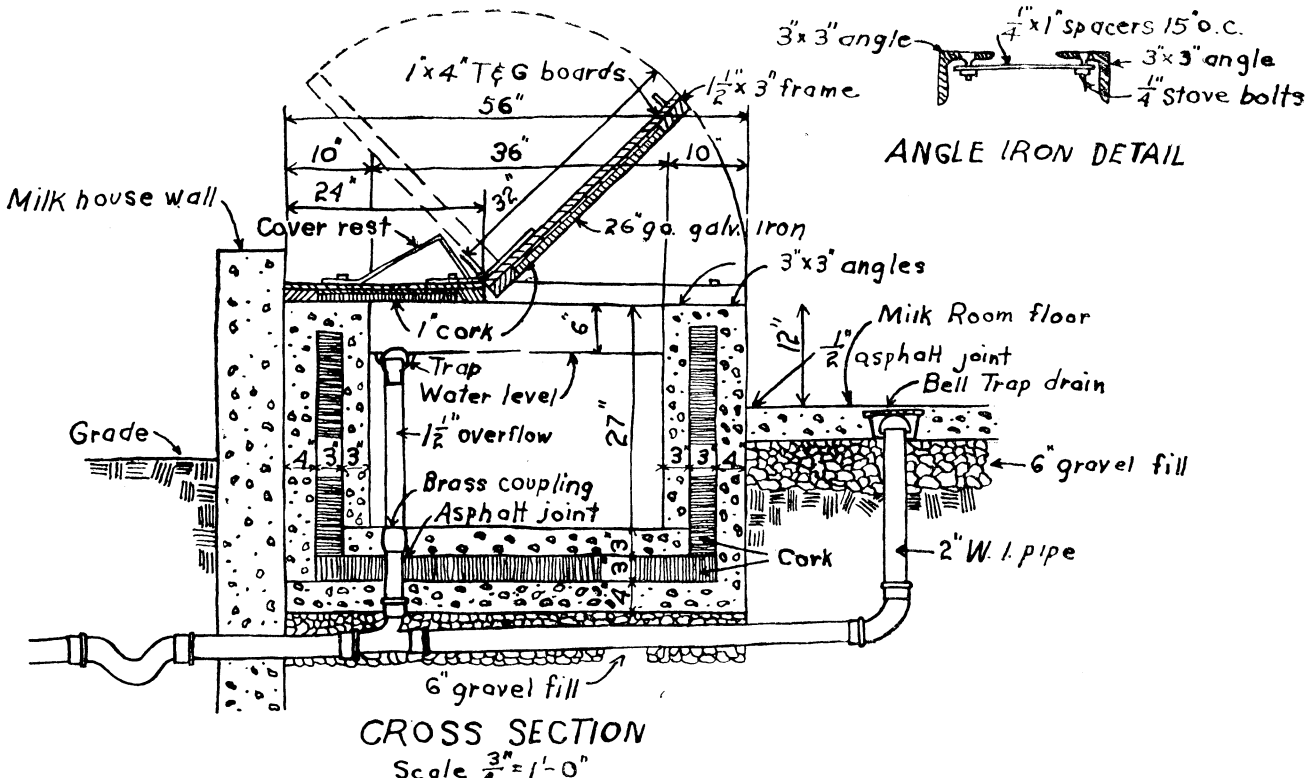
3"x 3" angle
1/4"x 1" spacers 15" o.c.
3"x 3" angle
1/4" stove bolts
ANGLE IRON DETAIL
1"x 4" T & G boards
1 1/2"x 3" frame
56"
10"
36"
10"
24"
32"
Milk house wall
Cover rest
26" ga. galv. iron
3"x 3" angles
1" cork
6"
Milk Room floor
12"
1/2" asphalt joint
Bell Trap drain
Trap
Water level
1 1/2" overflow
27"
Grade
4"
3"
3"
3"
3"
4"
6" gravel fill
Brass coupling
Asphalt joint
3"
3"
Cork
2" W. I. pipe
4"
6" gravel fill
CROSS SECTION
Scale 3/4" = 1'-0"

Fig. 3.

TRANSPORTAION OF MILK AND CREAM

MILK. Milk should be cooled and delivered to the processor at a low temperature and in a sweet condition. Daily delivery is essential to maintain quality. Milk should go to the processing plant by as direct a route as possible as usually conditions in transit are not too favorable in maintaining quality. Cans of milk should be protected from excessive heat or cold while in transit. They should be full, if possible, to prevent churning of the fat in transit.

CREAM. As cream should be delivered before it becomes sour, producers should have cream transported to the creamery before it is twenty-four hours old, where possible. En-route to the creamery it should be protected from heat and freezing temperatures. In some areas, the exchange hauling of cream between two or three neighbor producers has been effective in maintaining the quality of cream and reducing the number of trips to market by farmers. Some creameries maintain cream truck routes which make frequent and consistent delivery of high quality cream.

SPREAD BETWEEN OKLAHOMA BUTTERFAT AND 90 SCORE BUTTER PRICE

Butter is sold in the terminal market on grades and a check of the Oklahoma farm price for butterfat with the market at Chicago for 90 score butter indicates that the Oklahoma price for butterfat is nearer to the price of butter now, than it was 10 years ago. Since the higher score butter is made from better cream, it is assumed that a great amount of this narrowing of the spread can be contributed to the improvement of the quality of cream from which Oklahoma butter is manufactured, as there has been no material change in marketing costs during the period.

SUMMARY

1. Economical types of cream and milk coolers are now available for various sizes of dairy enterprises.
2. The evaporation cooler is effective with high temperature water where air circulation is provided.
3. When cream is purchased on grade, producers are properly encouraged to improve the quality of the cream sold.

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