EXPERIMENT STATION

OF THE

Kansas State Agricultural College.

MANHATTAN.

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FARM DEPARTMENT.

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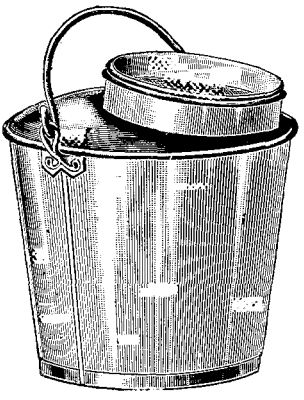
KEEPING MILK IN SUMMER.

DURING the summer of 1898 the milk from the college herd of 30 cows was sent to the Manhattan Creamery. Our object in sending the milk to the creamery instead of making butter was to test how cheaply milk could be handled and yet be delivered in good condition, and how few and cheap things could be used to keep milk sweet for a sufficient time so that Saturday night's and Sunday morning's milk could be delivered in good condition on Monday. Many creamery patrons are unable to keep milk sweet longer than 18 hours, and either feed the milk of Saturday night and Sunday morning or else set it and make butter for family use. They are not properly equipped for making butter, and most of them do not secure nearly all the butter fat from the milk, while at the same time, as it only comes once a week, the work is a nuisance.

If milk can be kept sweet at a reasonable cost from Saturday night until Monday morning, those who live at a distance from creameries can hold their milk and deliver every other day, saving half the expense of hauling. Creamery men told us that if we could make alternate-day delivery of milk practicable for farmers with little money, a large amount of milk could be secured for creameries and skimming stations in the newer dairy districts where the amount now secured is not sufficient to make the business profitable.

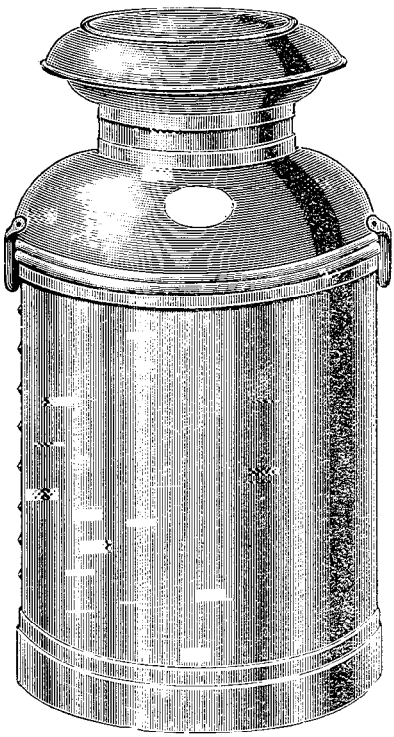


SANITARY MILK PAIL.

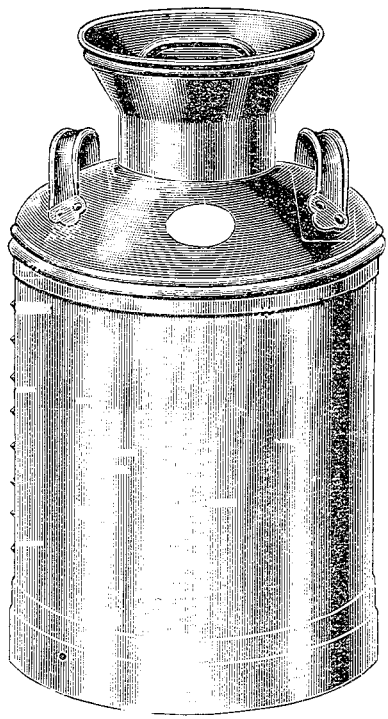
The Manhattan Creamery is 1½ miles from the college dairy, and our milk was hauled to the creamery by a neighboring farmer who handled a milk route, the college milk receiving exactly the same treatment while on the road as that given the milk from the neighboring farms. We had a creamery room which cost us $100 and was fitted with a cement floor and ice box: but farmers who had difficulty in keeping their milk said that they too could keep their milk if they had such a place but that the average farmer could not afford the expense. We therefore abandoned this room and built what one of our farmer boys called an "every-farmer-can-afford-it" milk house. We set some posts and nailed to them old fence boards making a room 10 by 10 by 10 feet, with a dirt floor. As the old boards could not be set close enough to keep out either sun or rain we covered them with building paper. This building, if made of new material, would not have cost over $10 and did not cost us over $5. The room was built around a well. We had a windmill, but did not use it as we wanted to keep milk under conditions where a farmer could not afford one. For tanks in which to set the cans of milk we used oil barrels, sawing them in two. We also took a half barrel and boxed it in, packing the spaces with wheat chaff. This box was covered with quilts made from bran bags. The accompanying plates give exterior and interior views of this milk house. The only apparatus used not generally found where milk is handled cheaply was a milk cooler. At different times we used the "Star" made by the Star Cooler Company, Haddonfield, N. J., and the "Champion," made by the Champion Cooler Company, Cortland, N. Y.

In handling this milk the care was taken that previous experience

had taught us was necessary for keeping milk under any conditions. Every utensil touched by the milk was thoroly washed and then sterilized with scalding water. If even a small quantity of dirt is left in the seams or corners of pail, strainer or can, it supplies an abundant source of the bacteria which cause milk to sour. No matter how clean the milker's hands seemed to be, they were washed in hot water just before milking to destroy all milk-souring germs that might be in the dust or dirt on them. The sanitary milk pail was used. This pail has a cover into which a 6 inch opening is cut. In this opening fits a removable strainer. The milk is milked directly into the strainer and the cover keeps out of the milk the fine dust which falls from the cow's body during milking. This dust is full of the bacteria which sour milk. When the milker sat



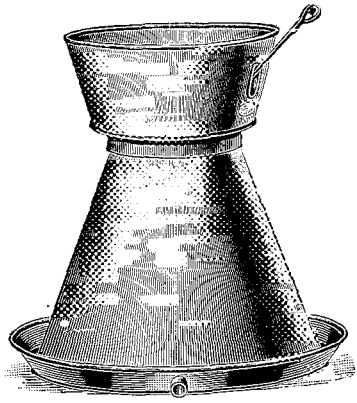
NEW YORK CAN.



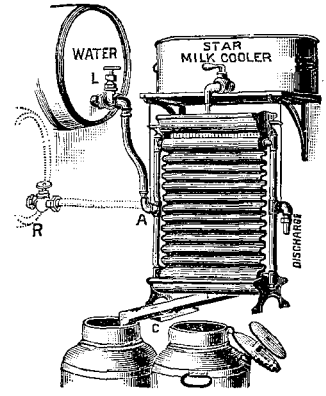
CHICAGO CAN.

down to milk, he wiped the cow's udder with a damp cloth to remove as much dirt as possible and dampen the rest so that it would adhere to the udder and not fall into the milk. The milk was strained into

40-quart cans, and as soon as a can was filled, it was taken to the milk room where it was immediately cooled to 60º to 62º by passing over a milk cooler. The cans containing it were then placed in the half barrels and these barrels filled with freshly pumped water and barrels and cans covered with bran bags. The water was changed morning and night. With this treatment and without ice, milk was kept and delivered regularly thru our hottest weather in good con-



CHAMPION MILK COOLER.



STAR MILK COOLER.

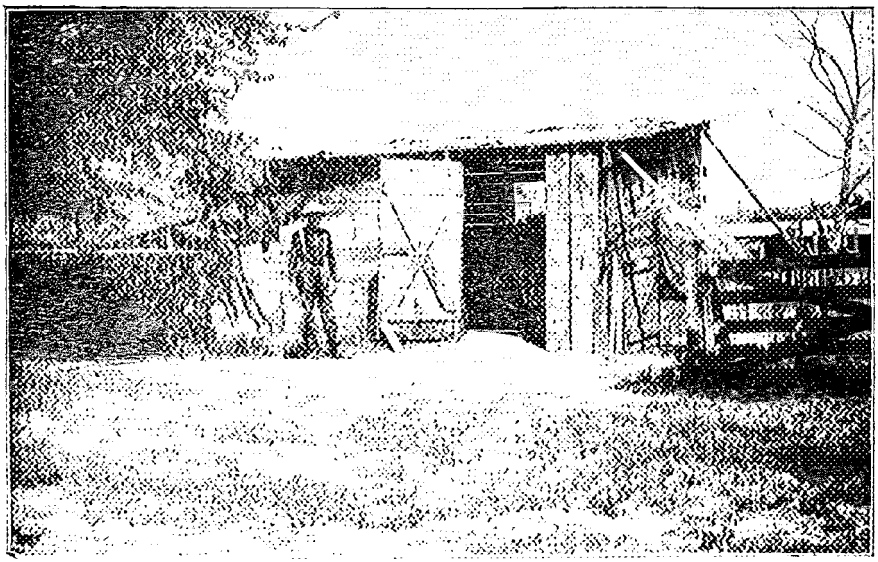
dition to the creamery when 40 hours old, the time required to hold Saturday night's milk for Monday's delivery at the creamery; and much of the time we were able to keep the milk in good condition 52 hours, the time required when Saturday morning's milk is kept for Monday's delivery.

We believe that this trial, extended thru the summer, proves that any farmer in the state can deliver milk in good condition to the creamery in the hottest weather, and deliver Sunday's milk as well as that of other days. Most farmers can afford very much better conveniences than we had, and those who can will be able to handle their milk with less labor than we had to use.

The souring of milk is caused by the growth of bacteria in it. The fewer the bacteria in the milk, and the slower they grow, the longer will the milk keep. If cleanliness be observed, the number of bacteria in new milk will be few. Bacteria double in number in new milk every twenty minutes when it is at blood heat. They grow slowly at 50º and not at all at 39º. The sooner milk is cooled after being drawn from the cow the longer it will keep. The usual way to handle milk is to set the cans containing it in a trough of cold water

and stir occasionally until the milk becomes cool. It may be an hour or two before the milk in the center of the can becomes thoroly cooled, and all this time the milk-souring bacteria are developing rapidly. It will pay any Kansas farmer to use a cooler. In these machines cold water flows thru the interior while the milk flows over the outside in drops, each drop being quickly and thoroly cooled. The saving in labor over the usual method of stirring will soon pay for the cooler, while the quality of the milk is made much better. With freshly pumped well water, the Star cooler will reduce milk in hot weather from blood heat to 62º as fast as the milk will flow over it. The Champion cooler will reduce the milk to within 10º of the temperature of the water by once passing over it, and a lower temperature can be secured by running the milk over the cooler a second time. With either cooler the milk is aërated while being cooled. This removes the "cowy" odors from it. Where a cooler is used we prefer to use the New York can instead of the Chicago can now generally used by Kansas dairymen. As is shown by the cut, the New York can has a raised cover. This can may be entirely covered with water in the cooling tank, yet it will not leak. When used for hauling milk it will not collect dirt, besides being easier to clean than the Chicago can.

We found in hot weather that the temperature of our milk rose 10º while on the road to the creamery, and that some farmers were delivering milk as high as 97º. Milk should be kept as cool as possible while on the road and ought not to be above 70º when delivered at the creamery. If it is, the quality of the butter from it will be injured and the creameryman will have to pay a lower price for butter fat.



EXTERIOR VIEW

INTERIOR VIEW

CHEAP MILK ROOM.