

(No Model.)

A. S. BENNER.

MILK COOLER.

No. 261,824.

Patented Aug. 1, 1882.

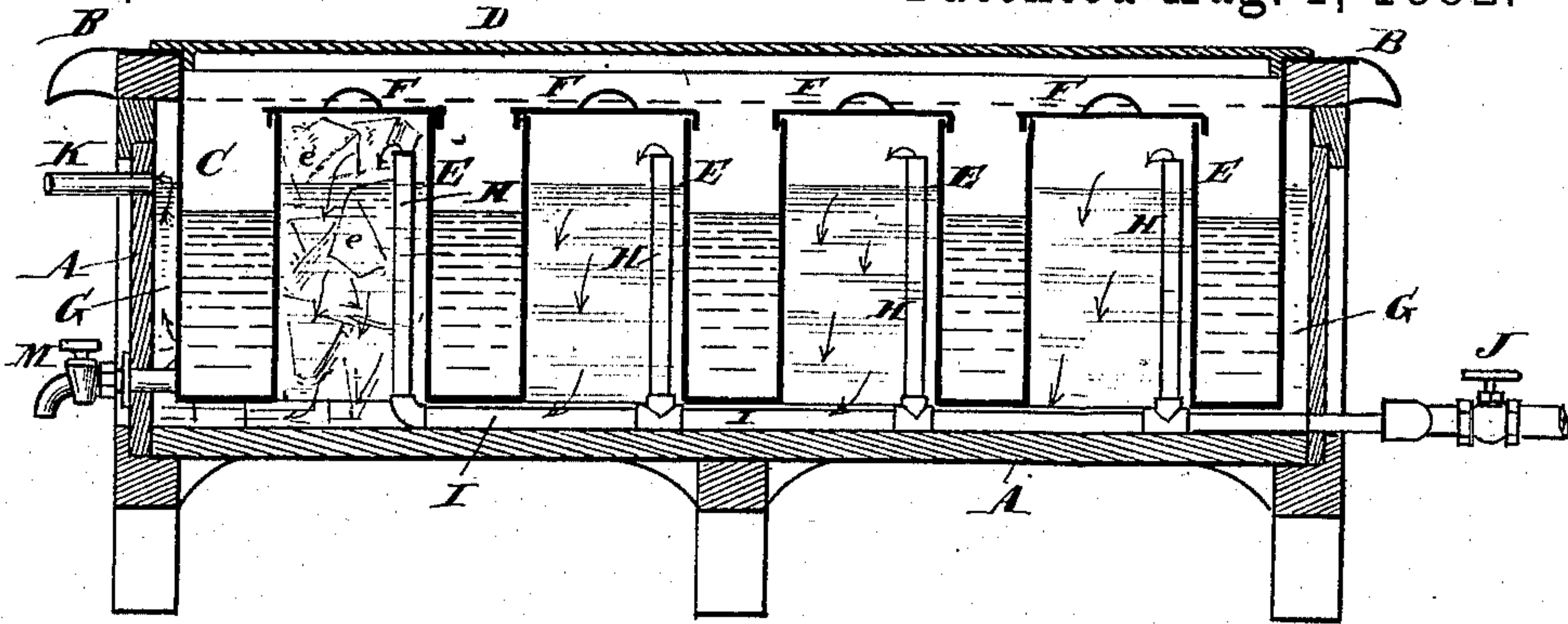


Fig. 1

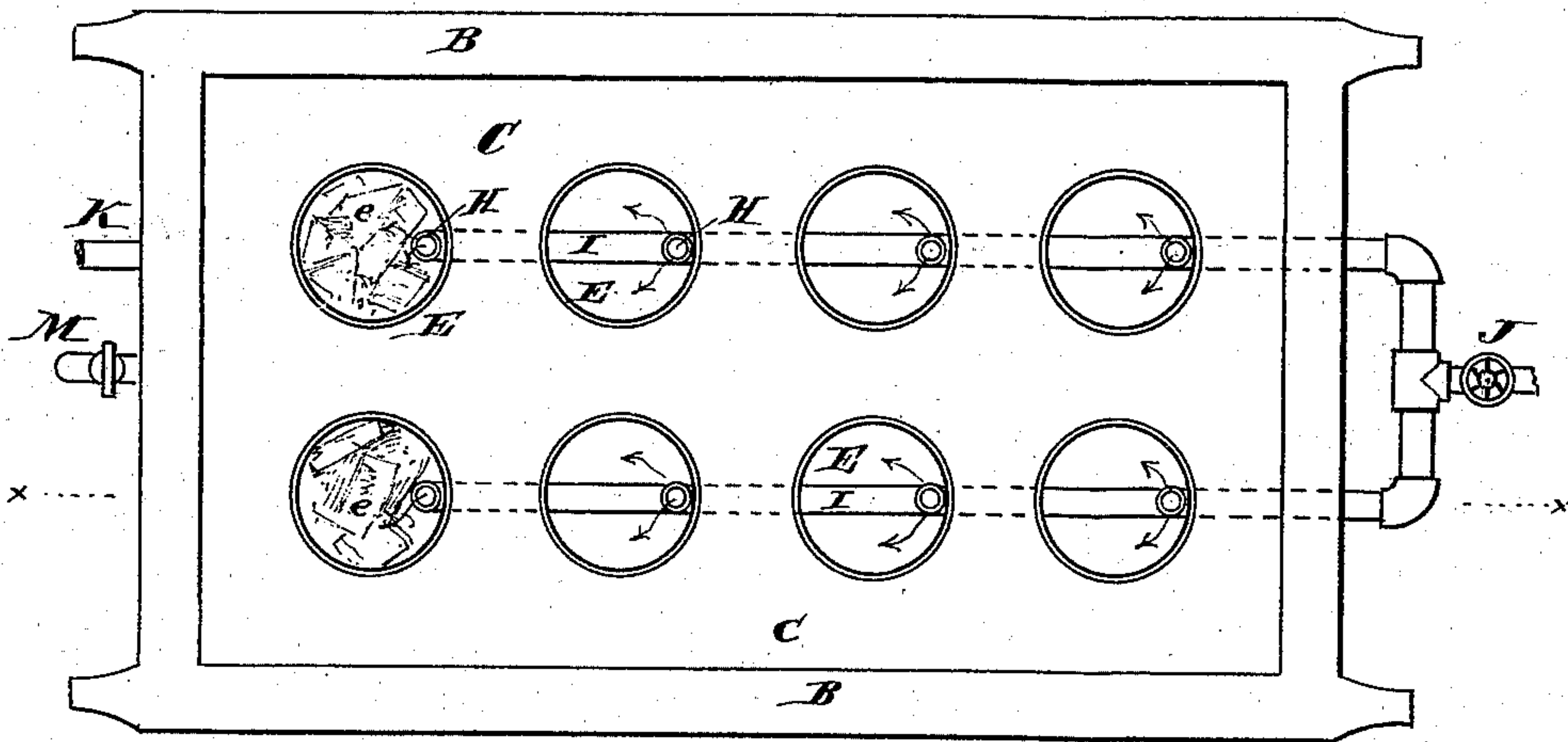


Fig. 2

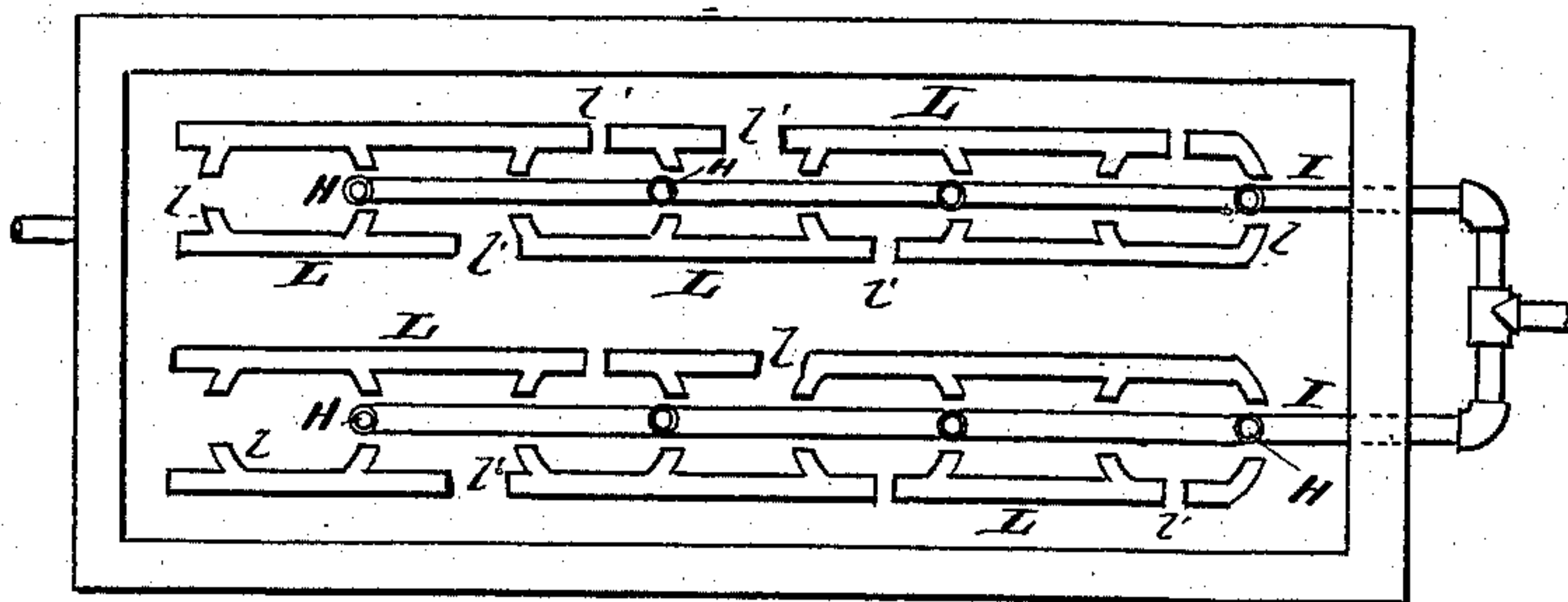


Fig. 3

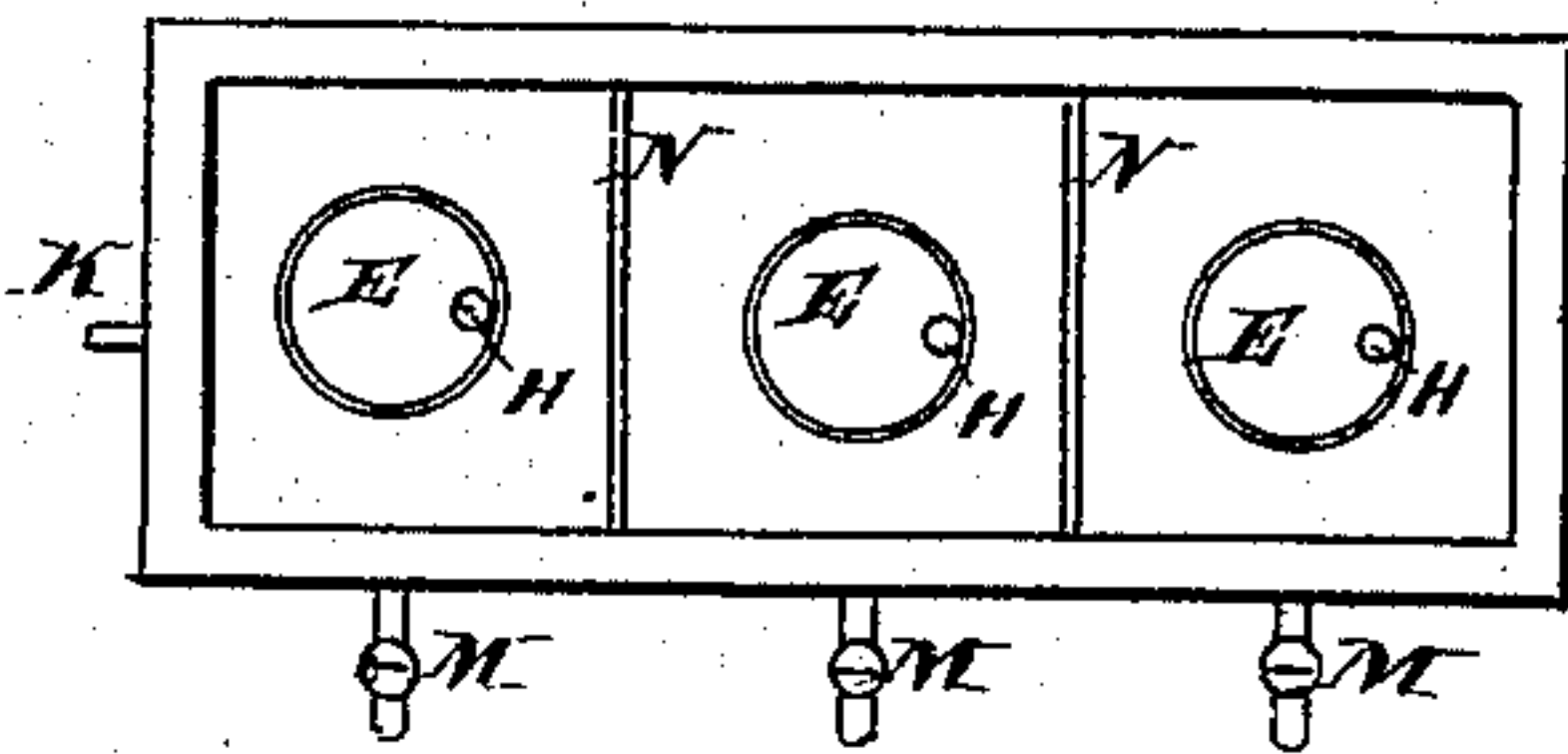


Fig. 4

Attests

*Wm. A. Hunter*

G. J. Harding

Inventor

Abraham S. Benner

By his atty.

*Wm. A. Hunter*



# UNITED STATES PATENT OFFICE.

ABRAHAM S. BENNER, OF PERKASIE, PENNSYLVANIA.

## MILK-COOLER.

SPECIFICATION forming part of Letters Patent No. 261,824, dated August 1, 1882.

Application filed March 15, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ABRAHAM S. BENNER, of Perkasia, in the county of Bucks and State of Pennsylvania, have invented an Improvement in Milk-Coolers, of which the following is a specification.

My invention has reference to milk-coolers; and it consists of a cold or hot water tank or vat in which a milk-vat provided with tubular projections extending from its bottom and opening through the same is suspended, said water-vat being provided with an overflow and cold-water supply or feed pipes which extend up one side of said tubular projections in the milk-vat, so as to discharge the cold water at or near the top, and yet allow a clear opening in which to place ice, and thereby obtain the great cooling effect by the contact of the ice with all of the metal tubes around the outside of which the milk flows, and also the passage of the cooling-water first through the ice and then around the milk-vat; and, further, in minor details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

In the drawings, Figure 1 is a sectional elevation of my improved milk-cooler on line *x x*. Fig. 2 is a plan of same with the top cover removed. Fig. 3 is a plan of the water-tank, showing the manner of arranging the feed-pipes; and Fig. 4 is plan view of a modified arrangement of my improvement for household purposes.

A is the water-tank. B is the milk-vat rail, to which the milk-vat C is secured, and by which it is suspended in the water-tank A. The milk-vat C is provided with one or more vertical tubes, E, which open at the bottom through the milk-vat into the water-tank, and may be covered at the top by caps F. For dairy purposes the greater the number of tubes E the greater will be the cooling effect. The milk from vat C is run off by valved outlet M. The top of the milk-vat may be covered, when in use, by a lid, D, to keep the milk clean. When the milk-vat is suspended in the water-tank there is a water-space, G, all around the same, except on top, as shown in Fig. 1.

K is the waste or overflow pipe from the wa-

ter-tank A, and I are the supply-pipes, the flow of water in which is controlled by a valve, J. The pipes I run longitudinally in the tank A, and at the bottom, and opening from them, are the vertical pipes H, which are so arranged that when the vat C is set in the tank A the pipes H will extend up into the tubes E, and close to one side thereof, as shown, so that a clear opening may be had in which to place ice *e*. The pipes H extend nearly to the top of tubes E and preferably above the level of the overflow K.

To prevent the tank or vat C from being bent or broken by the weight of the ice and milk, it may be supported on slats L, arranged on the water-tank bottom and on each side of the supply-pipes I, which slats may be in short lengths to leave water passage-ways *V*.

If desired, the tubes E may be further supported by pieces *l*; or any other arrangement of supports may be used.

For domestic or household purposes, and where only a small amount of cream is to be raised, two or three compartments or vats will be required, as fresh milk is put in one compartment before the other is emptied. Each of these compartments may be provided with one vertical tube E for ice, as above set forth, and the compartments may be made by divisions N, as shown in Fig. 4, or may be made separate and set in the one water-tank. The tubes E being filled with ice, cold water is admitted by valve J from the pump, (not shown,) and is discharged above the ice *e* in tubes E by pipes H. The water passes down through the ice and tubes, and circulates around and under the milk-vat, and runs off by overflow K, and is again returned by the pump. The milk is cooled by the large surface and close proximity of the ice, by the circulation of the water through the tubes, and by the cold water in circulation around the milk-vat.

In milk-vats having a single tubular projection and water-space between the milk-vat and water-tank the overflow was always to one side, and in practice circulation of cold water was only effective on one-half of the cooling-surface, and when a series of such defective vats were used, as would be required in creameries, the defective cooling-surface would be equal



to about one-third the entire surface. In my construction this defect is almost entirely overcome, the feed being in numerous places in each of the tubular projections, and the discharge being wholly at one end. The circulation of cold water from the feeds farthest from the discharge tends to cool all of the milk-vat between them and the said discharge, and so on with every one of the feeds. Consequently the only defective circulation is between the end feeds farthest from the discharge and the adjacent end of the tank, and this is insignificant in comparison with the great effective cooling-surface; but this defective circulation is far superior to that in the tanks or vats having a single central tube, inasmuch as the rapid current set up, due to the many feeds, will cause a certain amount of circulation of water at this part of the tank.

It is immaterial as to the shape of the tubular projections E, as they may be square, round, rectangular, or any other cross-section.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cold-water tank, in combination with a milk-vat suspended therein, said milk-vat being provided with a series of vertical tubular projections extending from the bottom upward and opening through the bottom into the water-tank, and feed or supply pipes which extend up into said tubular projections to feed the cold water into them near the top and allow of its downward circulation in a large number of places into the tank, an overflow, and means to force the water from the overflow

back through the feed-pipes, substantially as and for the purpose specified.

2. In a milk-vat, the combination of the water-tank A, milk-vat C, provided with a series of tubular projections, E, open at the bottom into the water-vat, overflow K, from space or compartment G, between tank A and vat C, and at one end supply-pipes I and vertical feed-pipes H, by which a constant circulation of cold water about the bottom and sides of the milk-vat is obtained from one end to the other, substantially as and for the purpose specified.

3. In a milk-cooler, the water-tank A, in combination with milk-vat C, secured to a rail or frame, B, and by which it is suspended in the tank A, making a water-space, G, all around, said vat being provided with tubular projections E, open at both top and bottom, and in which ice is placed, caps F, overflow K, and feed-pipes H, which extend up into said projections E nearly to the top, but close to the side thereof, substantially as and for the purpose specified.

4. In a milk-vat, the combination of water-tank A, milk-vat C, provided with tubular projections E, open on the top and bottom, feed-pipes H, extending up into said projections E and reaching nearly to the top, but located close to the side thereof, and cover D, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

ABRAHAM S. BENNER.

Witnesses:

R. M. HUNTER,  
R. S. CHILD, Jr.