

No. 686,619.

Patented Nov. 12, 1901.

K. S. LEMSTRÖM.
COOLING APPARATUS.

(Application filed Jan. 22, 1901.)

(No Model.)

FIG. 2.

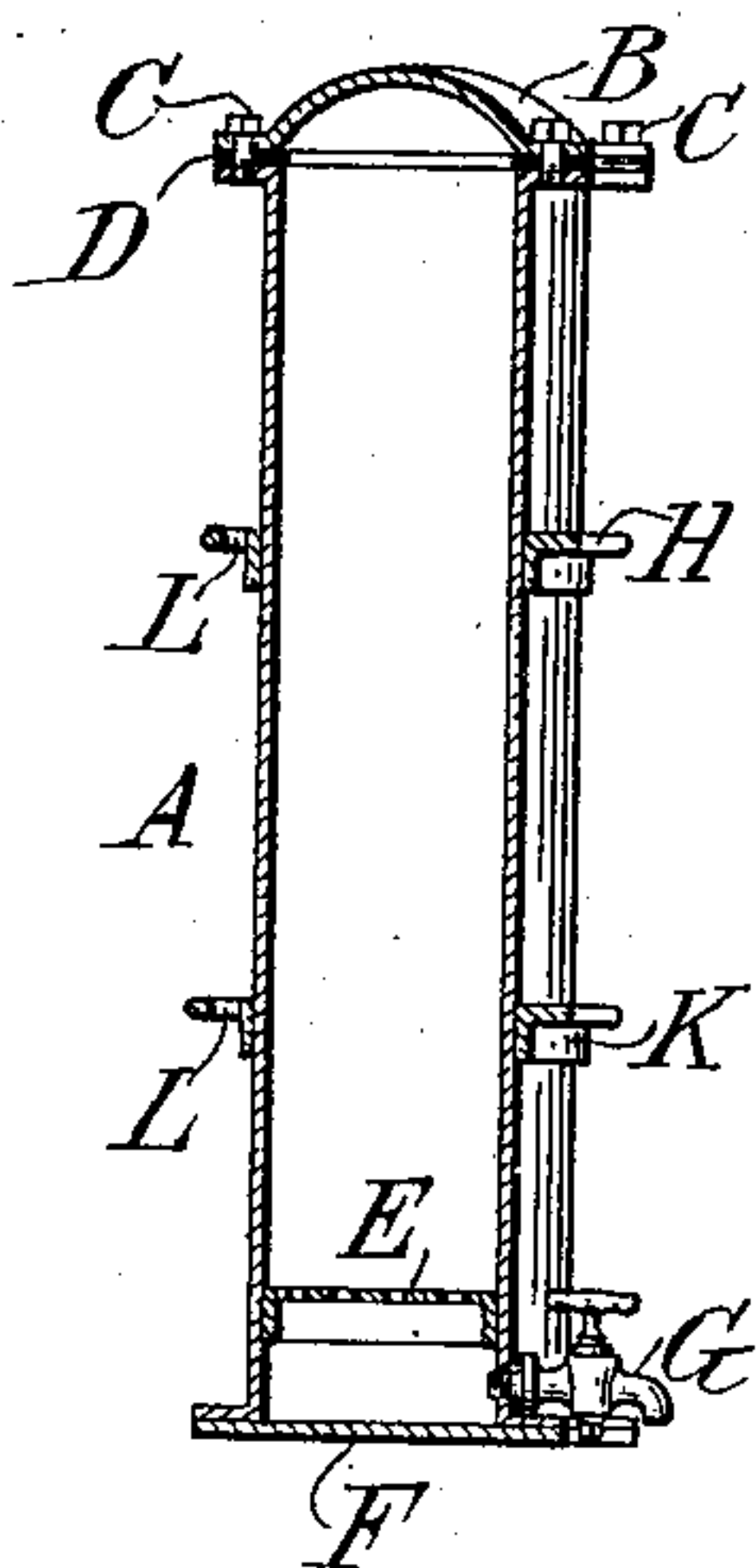


FIG. 1.

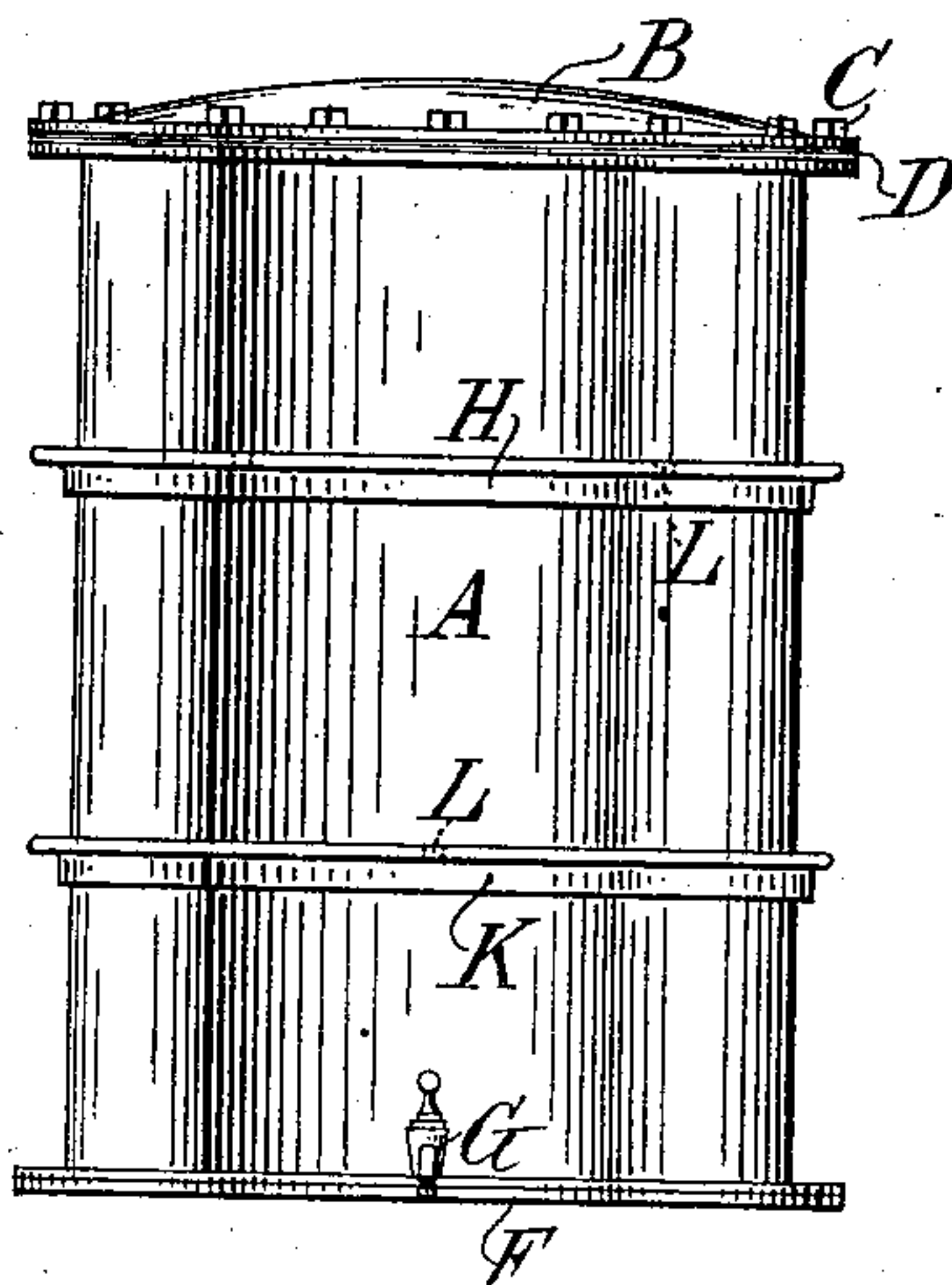


FIG. 3.

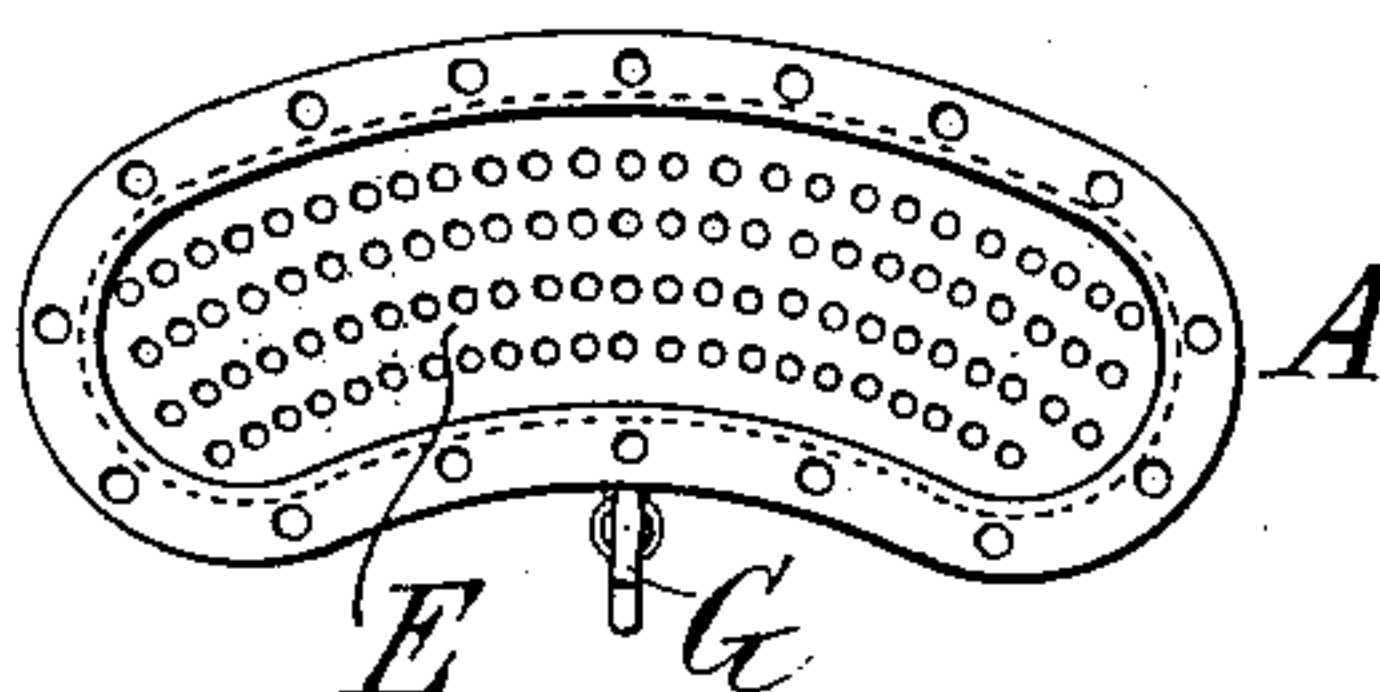
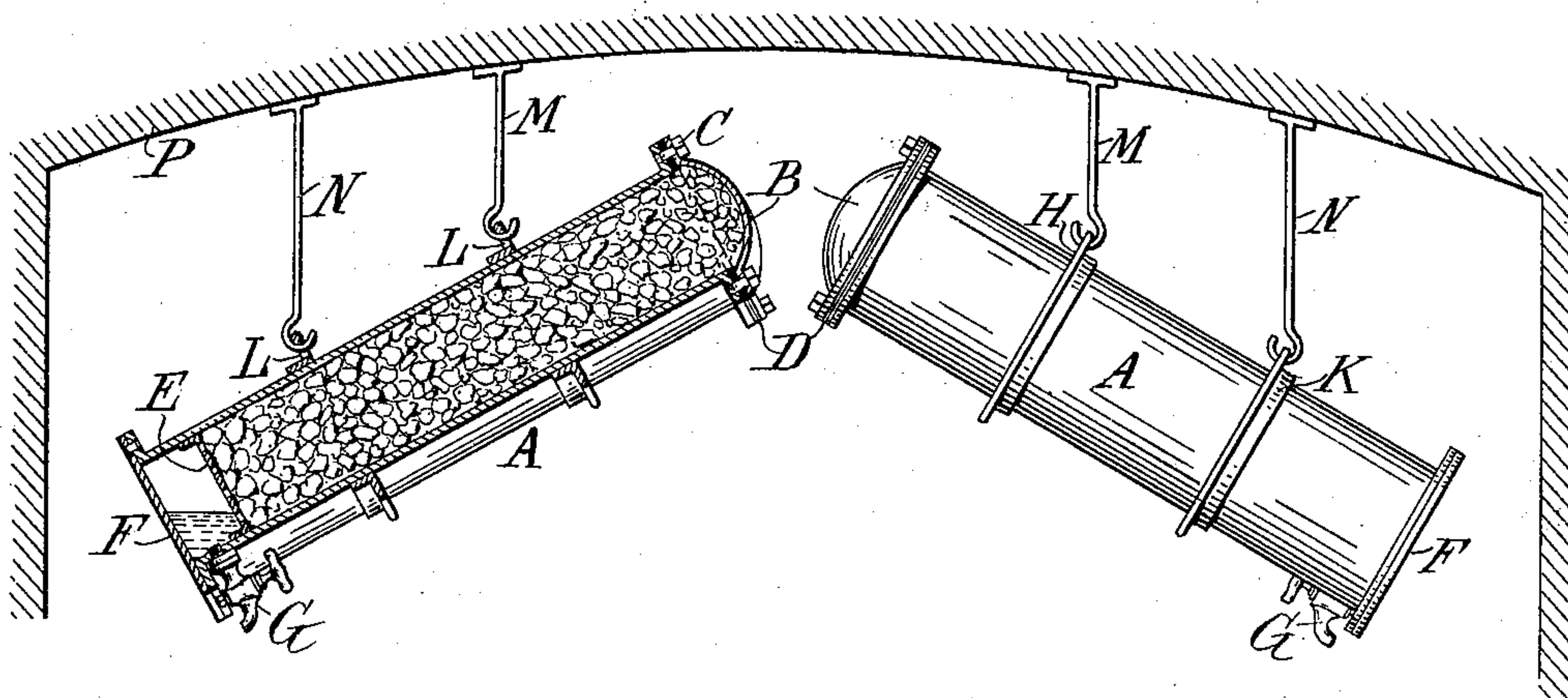


FIG. 4.



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COOLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 686,619, dated November 12, 1901.

Application filed January 22, 1901. Serial No. 44,275. (No model.)

To all whom it may concern:

Be it known that I, KARL SELIM LEMSTRÖM, a subject of the Emperor of Russia as Grand Duke of Finland, residing at Helsingfors, Finland, Russia, have invented certain new and useful Improvements in Cooling Apparatus, of which the following is a specification.

My invention provides an improved cooling apparatus specially adapted for use in railway-coaches and other similar small compartments.

My invention provides, further, for use in a cooling system a cooling-medium receptacle which is rapid and efficient and which establishes a circulation of cool air in the compartment.

It provides also a cooling-receptacle having various other advantages, all as hereinafter specified.

In the accompanying drawings, showing a practical embodiment of my invention, Figure 1 is an elevation of one of the receptacles of my system, showing the side of the receptacle which is adapted to be on the under side in use. Fig. 2 is a longitudinal section of the receptacle. Fig. 3 is an upper end view of the same, the cover being removed. Fig. 4 is a section showing the interior of a car fitted with my improved cooling system, one of the receptacles being in section.

My improved system comprises one or more receptacles adapted to be hung in the upper part of the car or compartment to be cooled—as, for example, from the ceiling thereof—and which being filled with a cooling medium, such as ice cracked and then pressed together in the receptacle, causes a stream of cold air to move downward as fast as the warm air of the compartment ascends, thus keeping up a constant circulation. The receptacles are preferably of metal, such as thin galvanized iron, which quickly takes the temperature of the cooling medium within and transmits it to the surrounding atmosphere. In their preferred form the receptacles are oblong in longitudinal section, being of but slight thickness, and are curved in cross-section, are provided with eyes on their convex side for hanging them in an inclined

position from hooks in the upper part of the car, and have an inner perforated partition and a cock between the partition and the bottom wall of the receptacle, whereby the melted ice is collected and drawn off. It is advisable to provide the car with an anteroom, so that the door of the inner room cannot open to the free air, and so that it can open to the anteroom only when the outer door thereof is shut. It is also advisable to have double roof, floor, and walls with insulating material between.

In the use of my cooling system the ice-filled receptacles of the construction and form specified are suspended immediately adjacent to the ceiling of the car, a circulation of air is quickly induced, the cold being transmitted continuously through the thin walls of the receptacle to the upper air, which then falls to the floor as the warm air rises. In a short time, depending on the material and construction of the car and the means for keeping the outer air from entering the inner room of the car, the temperature is brought down to 7° to 9° centigrade in the car with an outside temperature of 20° to 25° centigrade.

The receptacle should for convenience be made of such size that a man can carry one filled with ice. For example, they may be sixty-five to seventy centimeters long, fifteen centimeters wide, and one meter in height.

Referring to the drawings, Fig. 3 shows that the cross-section of the receptacle A has a peculiar long arched shape. For a receptacle of the above dimensions a radius of a curvature of one meter for the middle line would be suitable. The upper end is open and provided with a cover B, fastened on by means of screws or bolts C and made tight by a packing D. An inner perforated partition E is arranged near the bottom F (for a receptacle of the dimensions stated, say about ten centimeters above the bottom) and on the concave side at the bottom a small cock G is provided for drawing off the water. I provide also two stiffening-flanges H and K, which for the example given may be thirty centimeters from each end, respectively, and

which are provided on the convex side with eyes L, preferably two at the sides of the upper flange H and one at the center of the lower flange K, as shown in Fig. 1. Such a receptacle when carefully filled with cracked ice will have a cooling effect during sixty to sixty-eight hours.

For supporting the receptacles A, I show hooks M and N, Fig. 4, depending from the ceiling of the car P and adapted to engage the eyes L. The two hooks M which engage the two eyes of the upper flange H may be about fifteen centimeters long, and the one hook N which engages the eye of the lower flange K about thirty centimeters. The receptacles thus hang in an oblique position, and as the hooks are preferably fixed the receptacle is held against swinging.

A valuable feature of the invention as applied to railway-cars is its situation in the upper part of the car P, as shown in Fig. 4. The floor and lower space of the car, which usually are most used for receiving goods to be transported, remain free and can be used in any convenient way.

The suspension of the receptacles can be accomplished in various other ways than that shown. For example, rods may be extended across from one wall to the other adjacent to the roof, one end of each rod being hinged and the other end carried on a suitable support on the opposite wall. Each receptacle would be provided with two, three, or four eyes. The free ends of the rods would then be bent downward and the receptacles strung thereon one after another by passing the rods through the eyes. When a suitable number of receptacles is strung on the rods, the latter would be raised to their proper position and the free end fastened in any suitable way, or the two modes of suspension described might be used in combination with each other.

The filling of the receptacle with cracked ice is best carried on in the storage-room in which the ice is kept, so that the receptacle shall become ice-cold more quickly. After it is filled the cover can be screwed down with a slight pressure, so as to press the particles of ice against one another to cause them to begin freezing together again. The regelation of the particles avoids the attrition and rapid melting which would occur if the particles were loose. The water is then drawn out of the lower compartment through the cock and the receptacle kept standing in a cold room until the moment when it is to be used.

The number, size, and arrangement of the receptacles varies with the size of the car.

The most important advantages of my improved system are as follows: All the ice must melt before the receptacle will begin to get warm, and the water retains a lower temperature than the air in the room for a long

time after all the ice is melted. There is thus great economy in the amount of ice used. This saving of ice is further increased by the fact that the receptacle is surrounded on all sides by air which circulates freely about it. Any loss by direct transmission through the walls of the car is thus avoided. The exhausted receptacles are easily refilled. The receptacles occupy the space in the car in which they operate to the best advantage and which have the least value for purposes of transportation. By suspending the receptacles in the inclined position shown and by the use of the perforated partition the ice and water remain in their proper position against all tendency to motion caused by the rocking of the car sidewise. The curved shape of the receptacle steadies the contents similarly against movement during the starting and stopping or jolting of the car and facilitates considerably the automatic circulation of the air, since the air circulates more easily over a curved vessel without angles than over a vessel having angular corners.

My improved receptacles and system are useful for cooling either freight or other cars or for small rooms of any sort. The ice-receptacles may be laid on the goods which are to be kept cool and a cover laid on top of the receptacles, which thus forms a covering for both the receptacles and the goods. Sticks of wood should be placed between the receptacles and the cover, so that the latter may not come into direct contact with the receptacles. The cover should be large enough to come down to the bottom of the goods in order to prevent the entrance of air from outside.

It will be understood that I do not limit myself to the exact construction described. Various modifications may be made in proportions, construction, and arrangements of the different parts of the system or of the individual receptacles without departing from the spirit of my invention. For example, in a small compartment one receptacle is the equivalent of a number of receptacles in a larger compartment.

What I claim, therefore, and desire to secure by Letters Patent, are the following-defined novel features, each substantially as described:

1. A receptacle for use in cooling systems having a long, narrow, curved cross-section, means on its convex side adapted to suspend it convex side uppermost and in an inclined position from complementary attaching means such as rods or hooks in the upper part of a car, a perforated partition therein, and a cock between said partition and the floor for drawing off the melted ice.

2. A receptacle for use in cooling systems having a long, narrow, curved cross-section, means on its convex side adapted to suspend it convex side uppermost and in an inclined po-

5 sition from complementary attaching means such as rods or hooks in the upper part of a car, a perforated partition therein, a cock between said partition and the floor for drawing off the melted ice, a cover B and means for forcing said cover down to press the particles of cracked ice together in said receptacle to cause their regelation.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

KARL SELIM LEMSTRÖM.

Witnesses:

F. KOLSTED,
O. LAURIN.