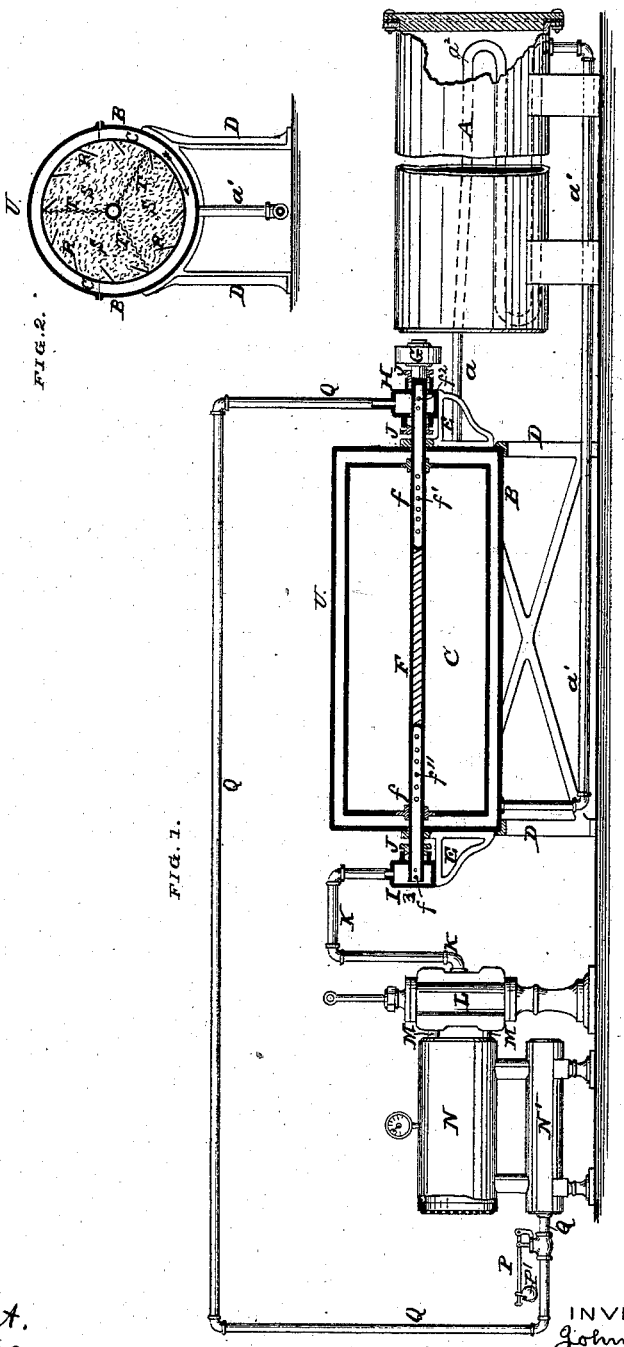
J. RING.

Cooling and Freezing Apparatus.

No. 205,419. Patented June 25, 1878.



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IMPROVEMENT IN COOLING AND FREEZING APPARATUS.

Specification forming part of Letters Patent No. **205,419**, dated June 25, 1878; application filed April 22, 1878.

To all whom it may concern:

Be it known that I, JOHN RING, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Cooling and Freezing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My improvement consists in the combination of a trough containing a liquid that retains its liquid condition at a low temperature with a refrigerating-chamber to receive the articles to be cooled or frozen, or from which air may be drawn to cool another chamber. The liquid in the trough is cooled by a revolving cylinder containing some fluid easily vaporizable at a low temperature; and this fluid is raised by troughs around the interior of the cylinder and poured over shavings or other suitable material loosely filling the cylinder, and adapted by its condition to retain the liquid and expose an extended surface thereof to evaporation. Various vegetable or animal fibers or metal turnings are evidently adapted for this purpose. The vapor is drawn from the cylinder by an air-pump and forced into a condenser, in which it is kept under pressure by a weighted valve similar to the safety-valve of a steam-boiler. In this condenser it is liquefied and cooled, and it then passes through the valve into a pipe, carrying it back to the opposite end of the cylinder from which it was drawn.

In the drawings, Figure 1 is a side elevation of the apparatus, showing parts in vertical axial section. Fig. 2 is a transverse section of the vaporizing-cylinder and the trough in which it revolves.

I do not confine myself to the particular relative position of the parts shown and described, as they may obviously be arranged differently without changing the principle of action or the essential features of the apparatus.

A is a tank or chamber. The chamber A communicates by pipes a^1 and a, respectively, with the upper and the lower part of the trough B, in which the cylinder C turns. Contained in the chamber A and the trough B is any suitable liquid (such as glycerine) that maintains its liquid condition at a low temperature, and which is cooled by its contact with the outside of the metallic cylinder C. As the pipe a communicates with the upper part of the trough B and chamber A, and the pipe a^1 communicates between the bottom of the trough B and the chamber A, it will be evident that there will be a downward flow of the colder liquid from the trough B to the chamber A through the pipe a^1, causing the warmer liquid in the chamber to return through the pipe a to the upper part of the trough, and thus a circulation of the liquid will be caused. If desired, this circulation may be assisted by mechanical means, such as a pump or equivalent well-known device. It is not necessary that the liquid should fill the whole lower part of the chamber A; but it may circulate through passages or pipes in said chamber, as shown at a^2, Fig. 1, said coils affording room for the introduction of pans, if water is to be frozen within the chamber A, or serving to cool air for use in cooling.

D D are the legs or supports of the trough. E E are the bearings in which the cylinder-shaft F turns. G is a pulley to receive a belt, by which the cylinder is revolved within the trough B. The ends f of the shaft F are tubular, and have orifices f' f'' extending from the hollow f into cylinder, and orifices f^2 f^3 extending from the hollow f into the interior of the chambers H and I, respectively, so that there is free communication between the interior of the cylinder and the chambers H and I. The shaft F is fast to the cylinder C, and passes through stuffing-boxes J in the walls of the chambers H and I, to prevent leakage of the vapor contained in the cylinder and chambers. From the upper part of the chamber I extends a pipe, K, leading to the air-pump L. The air-pump communicates by air pipe or pipes M with the condenser N, and discharges the vapor drawn from cylinder C into the same.

The condenser may be of any suitable form to allow the available application of air or liquid to cool the contents.

N′ is the receiver to receive the liquid resulting from the condensation of the vapor caused by compression and the abstraction of caloric

by water or air surrounding the condenser. Q is a pipe leading from the receiver N′, and guarded by a weighted valve, P. The weight P′ is arranged upon the lever to keep the contents of the condenser at the desired pressure, and when this is exceeded some of the liquid escapes through the valve, and passes through pipe Q to the receiving-chamber H, from which it passes through orifices f^2 into the hollow f of the pipe, and thence through the orifices f' into the cylinder C.

R R are a number of troughs at the side of the cylinder, extending from end to end, and formed to carry up the liquid as the cylinder revolves, as indicated by the arrow. As the buckets ascend they pour out their contents upon the mass of shavings or other loose matter, S, with which the cylinder is packed, and thus a large moistened surface is presented to increase the vaporization. T T are open-work partitions extending radially from the shaft, and dividing the space into three chambers, more or less. The number of partitions is immaterial. The partitions T are intended to prevent the shavings or other loose packing from collecting in a mass.

The trough B should be inclosed and covered with non-conducting material, so as to prevent the influence of atmospheric heat upon it, and form a chamber, from which cold air may be drawn, if desired. A suitable cover is shown at U. Any of the other parts may be covered with non-conducting material.

I am aware that a freezing apparatus has before been made with a cylindrical coil containing the non-freezing liquid and revolved in a chamber containing volatile liquid. By my construction I dispense with the revolving coil of pipe by using a plain cylinder to contain the volatile liquid, and a trough on the outside thereof, in which the non-freezing liquid is contained.

I claim herein as my invention—

1. In cooling and freezing apparatus, the combination of a cooling-vessel, A, the trough B, connected therewith, to contain a non-freezing liquid, which circulates between the said cooling-vessel and trough, the cylinder C, rotated within the trough B by means of shaft F, hollow and perforated near the ends, an air-pump, L, exhausting vapor from the cylinder C through a pipe, K, condenser N, and pipe Q, guarded by valve P, through which vapor is returned to the cylinder, substantially as herein described.

2. The combination of the trough B, the cylinder C, constructed with lifting-buckets R and charged with loose material S, the pump L, the condenser N, and the connecting-pipes K Q, substantially as and for the purpose set forth.

3. The cylinder C, provided with lifting-buckets R and open-work partitions T, in combination with the trough B, pump L, condenser N, and connecting-pipes K Q, substantially as and for the purpose set forth.

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Witnesses:
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