

(No Model.)

W. C. WREN.

REFRIGERATOR AND MEANS FOR PRODUCING ARTIFICIAL COLD.

No. 277,649.

Patented May 15, 1883.

Fig. 1.

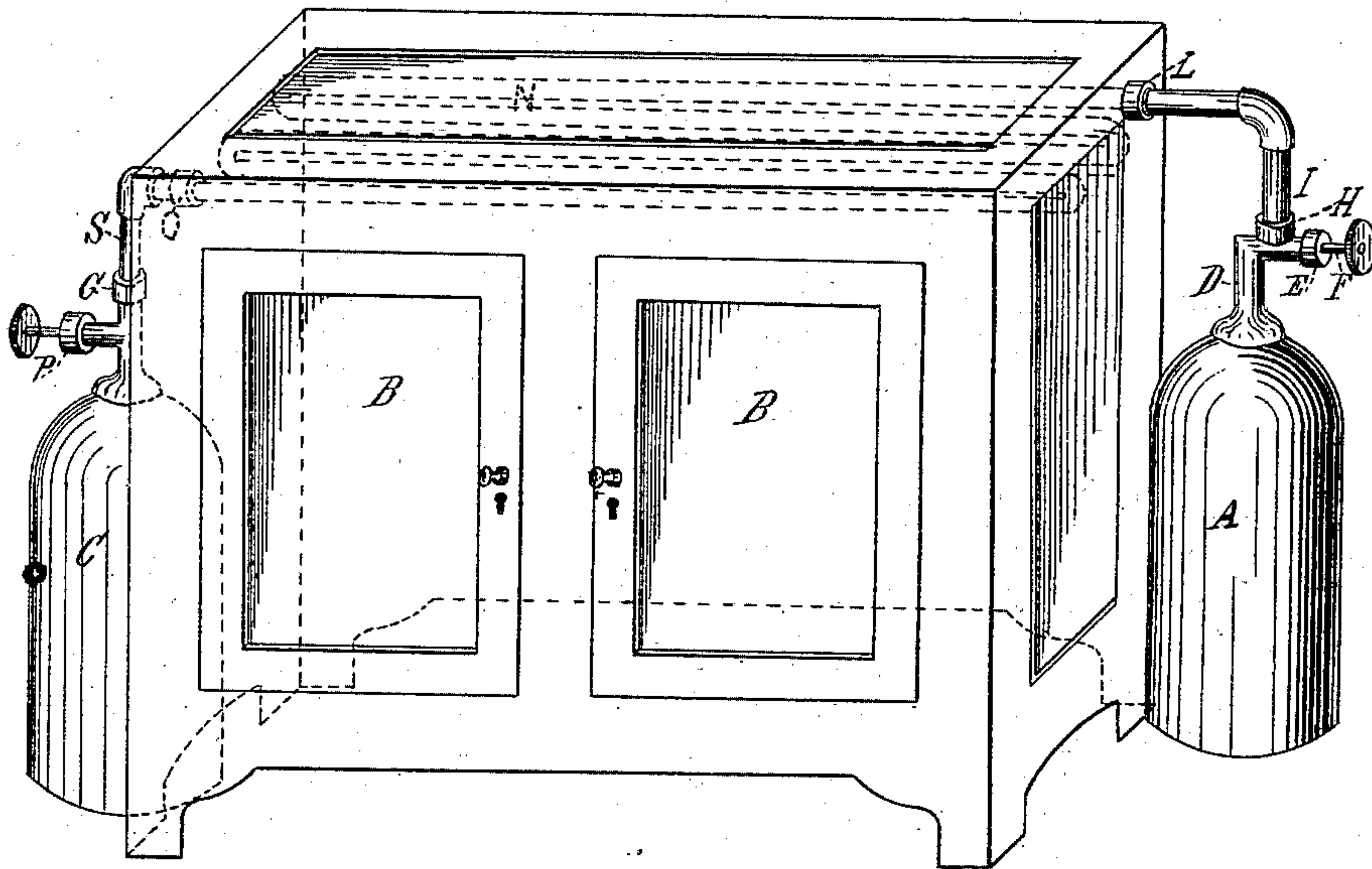


Fig. 2.

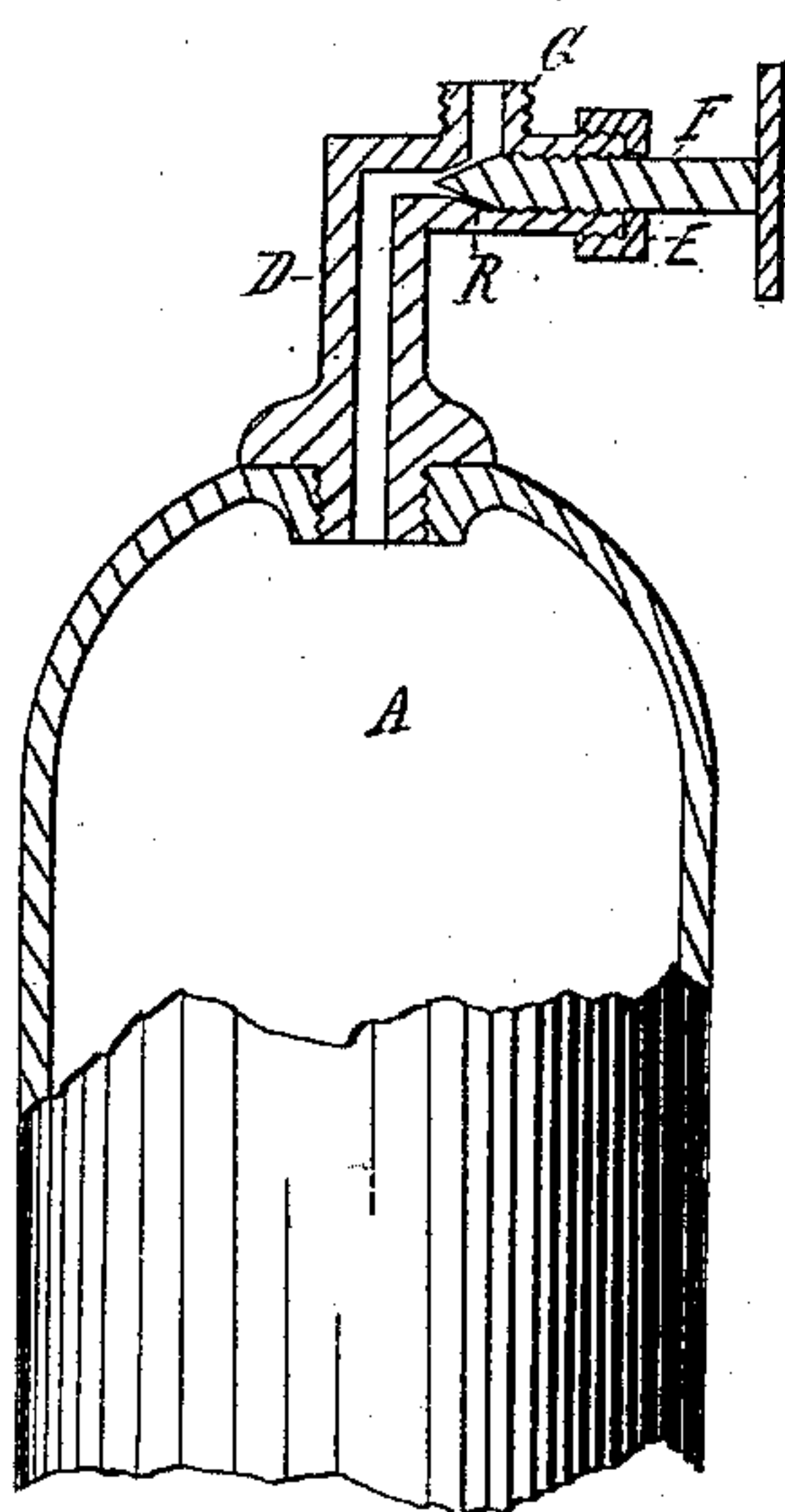


Fig. 3.

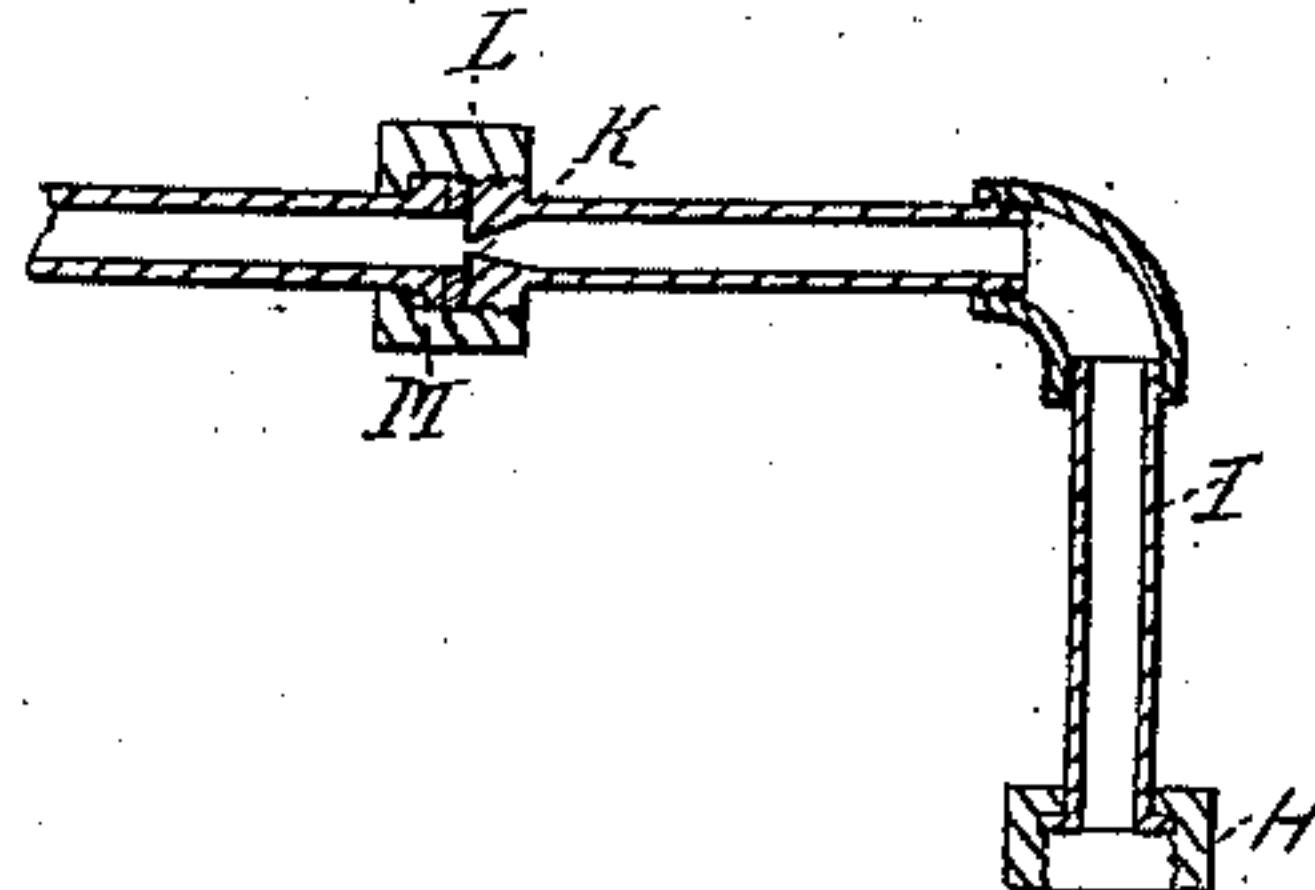
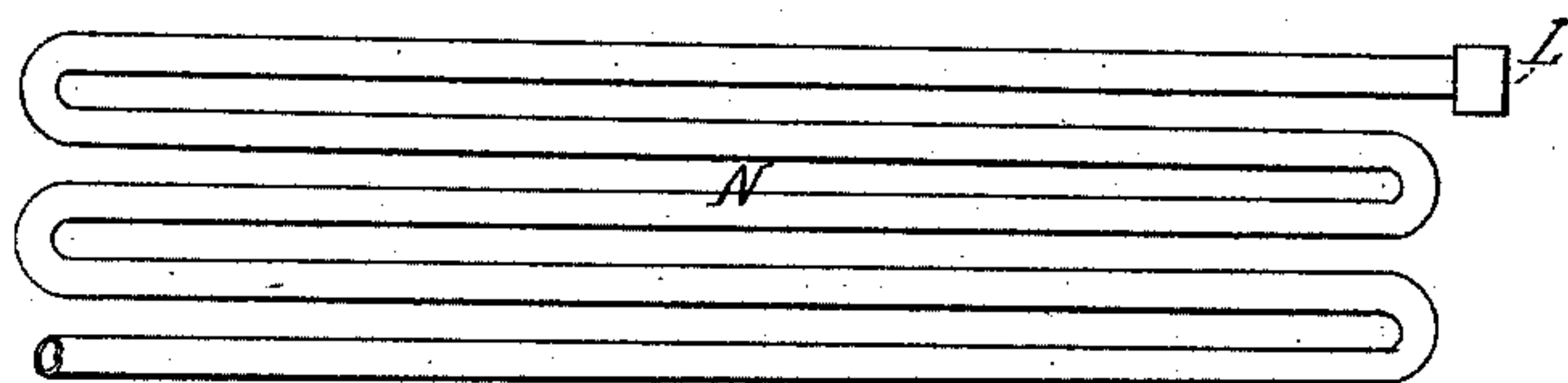


Fig. 4.



ATTEST-
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REFRIGERATOR AND MEANS FOR PRODUCING ARTIFICIAL COLD.

SPECIFICATION forming part of Letters Patent No. 277,649, dated May 15, 1883.

Application filed January 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. WREN, a citizen of the United States, residing at the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Refrigerators and Means for Producing Artificial Cold, of which the following is a specification.

My invention relates to refrigerators wherein the cold is produced by artificial means, and to the apparatus by means of which the cold is produced. I attain these objects by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a view in perspective of a refrigerator with my improvement attached. Fig. 2 is a vertical section of the cock or valve D and a portion of the cylinder A. Fig. 3 is a longitudinal section of the pipe I, coupling H, and coupling L. Fig. 4 is a top plan view of the coil of pipe N.

Similar letters refer to similar parts throughout the several views.

A is a cylinder into which any dry and elastic gas is pumped at a high pressure.

B is a refrigerator, inside of which, near the top, a coil of pipe, N, is placed.

N, Fig. 4, is a plan view of the coil of pipe or tubing which is placed inside of the refrigerator B, near the top, as shown by the dotted lines at the top of Fig. 1.

C is a cylinder containing a suitable absorbing material or fluid, and is connected to the outlet end of the coil N by the pipe S, as shown at O in Fig. 1.

D is a cock or valve attached to the cylinder A, and is connected to the pipe I by a coupling, H, which is readily detachable, so as to allow of the cylinder A being replaced by a full one when exhausted.

I, Figs. 1 and 3, is a pipe having on its lower end a coupling, H, to attach it to the cock D on the cylinder A, and having the outside circumference of its other end threaded, so that the same may be connected to the coupling L on the coil of pipe N. The inside of the pipe I, at the end where it is attached to the coil of pipe N, is reduced to a very small orifice, as shown at K in Fig. 3. The pipe I is also constructed in such a manner that the small ori-

fice K and the coupling L are close to the refrigerator B, as shown at L in Fig. 1.

P is a common valve, attached to the cylinder C, having a coupling, G, as shown in Fig. 1, the coupling G being for the purpose of readily detaching the cylinder when necessary.

The cock D has an orifice through it turning at right angles, as shown in the sectional view in Fig. 2, with an enlarged and beveled orifice at one part, as shown at R in Fig. 2, said beveled orifice forming a seat for the screw-threaded spindle F. To prevent the escape of gas between the threads formed inside of the cock D and the threads formed on the spindle F, the right-angled end of the cock D is threaded on its circumference and fitted with a coupling, E, through which the spindle F passes, thus forming a packing-gland between the end of the cock D and the coupling E, and when packed with a suitable packing and when the coupling E is screwed up tight an impervious joint is formed, thus preventing any escape of gas.

The method of operating the apparatus is as follows: Having constructed the parts as shown in the different views, and having connected the parts together, as shown in Fig. 1, a dry elastic gas is compressed at a high pressure into the cylinder A, and the cylinder C is filled with a proper absorbent material or fluid, so that when the contents of the cylinder A come in contact with the contents of the cylinder C the contents of the cylinder C will absorb and hold the gas from the cylinder A. When the cylinders A and C have been filled and attached as described, the cock or valve P, which is attached to the cylinder C, is opened to its fullest extent, and the cock or valve D, which is attached to the cylinder A, is slightly opened, which allows the gas in the cylinder A to escape into the pipe I. From thence the gas escapes in a very fine stream through the opening or small cone-shaped orifice K into the coil of pipe N, which is situated inside the refrigerator B, near its top. The gas, by the act of expansion after it leaves the small cone-shaped orifice K in its passage through the coil of pipe N, produces cold, thus cooling the refrigerator. After passing through the coil of pipe N, the gas, after having exhausted its

cold-producing properties, is absorbed into the cylinder C. When the cylinder A is exhausted, it may be replaced by a full one by detaching the exhausted cylinder from the pipe I at the coupling H, and when the cylinder C is full, or the contents of the cylinder C will absorb no more, it may be detached at the coupling G and a fresh one substituted for it.

It is a well-known fact that the expansion of gases will produce cold, and the object of having the small inlet-orifice K situated in the pipe I, near the outside of the refrigerator, is that the expansion or cold-producing power of the gas may not act until the gas reaches the point where it is wanted—viz., the inside of the coil N.

I am aware that by various means refrigeratory action has been and is produced in cooling-chambers of various kinds by a coil of pipe or connected series of tubes placed therein, the same being attached to and connected with receptacles containing anhydrous ammonia and other gases which by their expansion in the coil or tubes maintain refrigeratory action in the chambers; but in all apparatus heretofore used to produce cold by the discharge of a gas from a receptacle into a coil of pipe or connected series of tubes placed inside a refrigerating-chamber the expansion of the gas takes place immediately upon its release from the reservoir or receptacle containing the gas; but by my invention, as shown, the expansion of the gas will not take place, and consequently produce cold, until the gas has passed through the cone-shaped orifice, as shown and described, placed close to the refrigerating-coil, which is inside the refrigeratory chamber. Thus none of the heat is absorbed by the action of the gas on the outside of the cooling-chamber.

What I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in producing and maintaining refrigeratory action in refrigerators, consisting in having a small cone-shaped orifice situated in a pipe or tube connecting a cylinder containing compressed gas with a coil of pipe inside a refrigerator, for the purpose as shown and described.

2. With a refrigerator wherein artificial cold is produced by compressing and the storage of a gas in a cylinder and by the expansion and the passage of the gas through a coil of pipe inside the refrigerator, as described, the combination of a detachable connecting-pipe, I, having attached thereto on the interior a small cone-shaped orifice, K, as described, and a regulating-cock, D, all for the purpose as shown and described.

3. The combination, with a refrigerator wherein cold is produced and maintained artificially by means of the passage of a gas through and the expansion of a gas in a coil of pipe situated inside the refrigerator, having connected therewith a cylinder containing compressed gas and a receptacle containing a suitable absorbent to take up the gas after its passage through the coil, of a small cone-shaped orifice inside a connecting-pipe, I, situated near the coil N, inside the refrigerator, said pipe I having a coupling to attach to the cock D and coil N, together with the regulating cock or valve D, all for the purpose as shown and described.

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Witnesses:

F. W. HANAFORD,
WM. H. WEIGHTMAN.