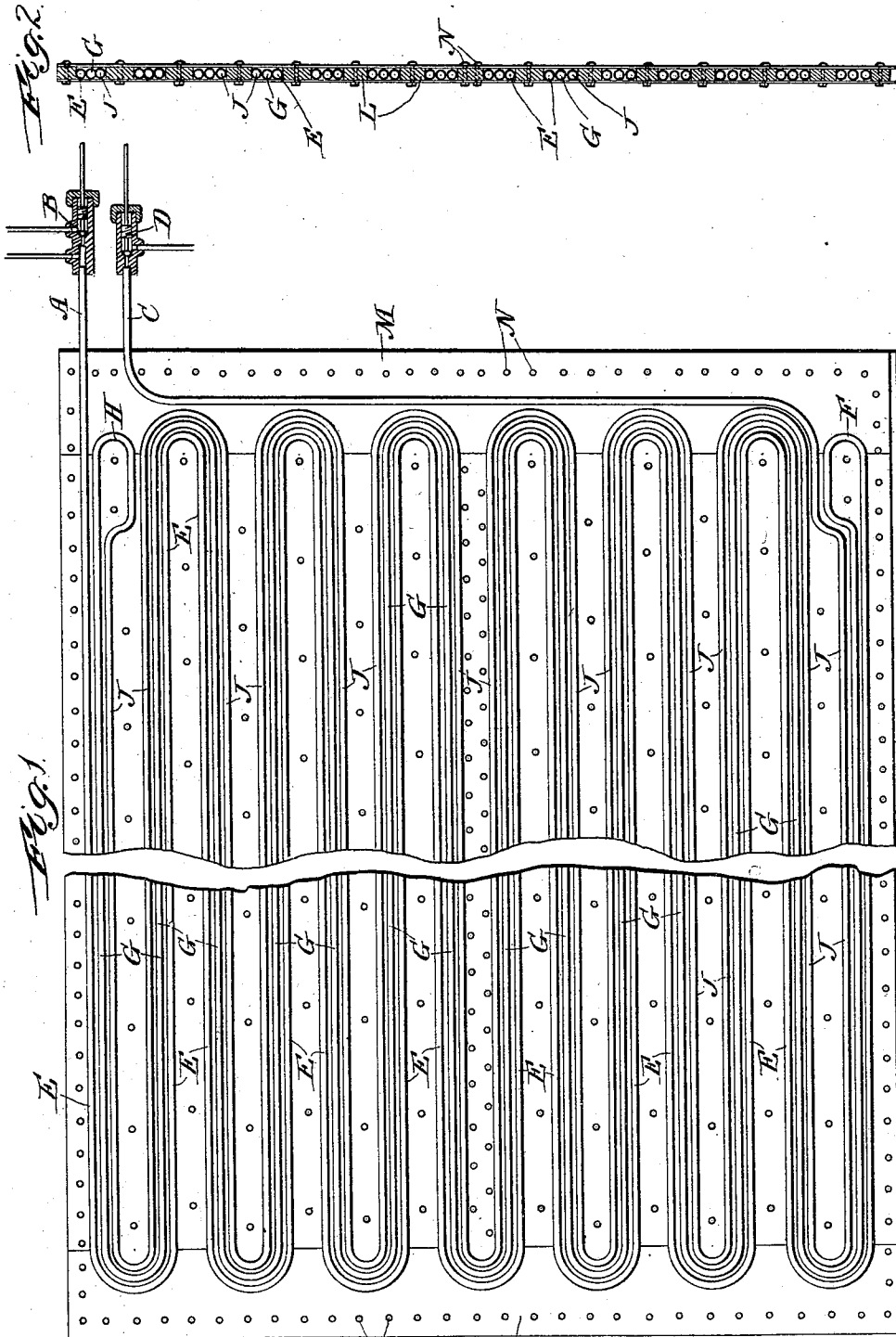


(No Model.)

J. LEVEY, T. H. BUTLER & C. A. MACDONALD.
REFRIGERATING MACHINE.

No. 520,930.

Patented June 5, 1894.



Witnesses:
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By Francis W. Parks Atty.

UNITED STATES PATENT OFFICE

JOHN LEVEY, THOMAS H. BUTLER, AND CHARLES A. MACDONALD, OF
CHICAGO, ILLINOIS, ASSIGNORS TO THE HERCULES IRON WORKS, OF
SAME PLACE.

REFRIGERATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 520,930, dated June 5, 1894.

Application filed November 16, 1892. Serial No. 452,208. (No model.)

To all whom it may concern:

Be it known that we, JOHN LEVEY, a subject of the Queen of England, and THOMAS H. BUTLER and CHARLES A. MACDONALD, citizens of the United States, residents of Chicago, Cook county, Illinois, have invented a new and useful Improvement in Refrigerating-Machines, of which the following is a specification.

Our invention relates to refrigerating or ice machines, and particularly to that portion of the apparatus in or by which the cooling effects are produced.

The object of our invention is to provide a great length of expansion pipe or coil in the least possible space, and also to arrange the expansion coils in the closest possible proximity to each other, and also to preserve the largest possible curves or bends in the coils or pipes which the circumstances of the case will permit.

One form of our device is illustrated in the accompanying drawings, wherein—

Figure 1. is a side view of a refrigerating plate or cell, with the coils exposed, and Fig. 2. is a vertical cross section through the same.

Like parts are indicated by the same letters in both figures.

A is the extremity of the coil at one end which connects with the induction valve B, and C is the other extremity of the coil which connects with the eduction valve D. For convenience the coil sections may be divided up into portions. E is that portion of the coil or coils which leads from the terminal A to the point F. Here the pipe is bent backwardly upon itself by the curve indicated at F, and then continues as the section or portion of the coil G to the point or curve H, where it is bent backwardly upon itself by the curve H, and then continues as the coil section or portion J, which connects with the terminal C. The sections E, G and J thus lie side by side and in close proximity to each other. By continuing such system of winding or coiling a still larger number of parallel pipe sections could be arranged together.

The inner curve of the sections E E and J J are the curves usually employed, and the smallest considered practicable. All other curves are therefore larger than these. By this means, therefore, we get any desired number of sections of the expansion pipe side by side and parallel with each other; we also have but one third of the curves of the usual curve employed in such coils, while the remaining two thirds of the curves are of a larger radius. These coils or pipes are arranged as indicated between freezing plates K K, and strips of insulating material L L are interposed between the coils. M M are end plates or strips, and all these parts are secured rigidly and firmly together by the transverse bolts N N. This freezing plate or cell may be used in any desired manner, but is perhaps best designed for freezing vertical plates of ice on its two sides, and the connections, as indicated, are adapted for use in cases where it is desired to send a hot or freezing gas or fluid through the coils to release the ice after it is frozen.

The use and operation of this device will be sufficiently understood from the explanation already given. It may be well to add, however, that the association of the coil as here bent or wound with the plate here shown is no part of the invention, for the coil formed as here shown or upon the principles here laid down could be used of course for any similar purpose in which variations in temperature are desired by means of such coils, and that too, whether the coils be used for heating or cooling, though the special object at which we aim is the application of this device to cooling or refrigerating purposes.

We claim—

1. A pipe coil consisting of a series of straight parallel sections in close proximity to each other, said sections connected in groups of two by curves which are substantially struck from a common center, the whole of said pipes lying in a single plane and constituting one continuous pipe or coil with two terminals.

2. In a coil of pipe the combination of a series of parallel straight sections in close proximity to each other, said sections connected in groups of two by curves at the ends of such sections, the whole connected so as to form a continuous passageway from one end of the coil to the other, all of said pipes or coils lying in the same plane and no part crossing any other portion.
3. In a cooling plate containing cooling coils therein, a distributing system of pipes for the cooling fluid associated with such plate, consisting of a series of coils arranged in groups of sections, each group having three or more parallel coils, and the whole forming a continuous passageway with two terminals.

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