(No Model.) 2 Sheets—Sheet 1.

T. L. RANKIN.

HOUSE REFRIGERATING APPARATUS.

No. 316,292. Patented Apr. 21, 1885.

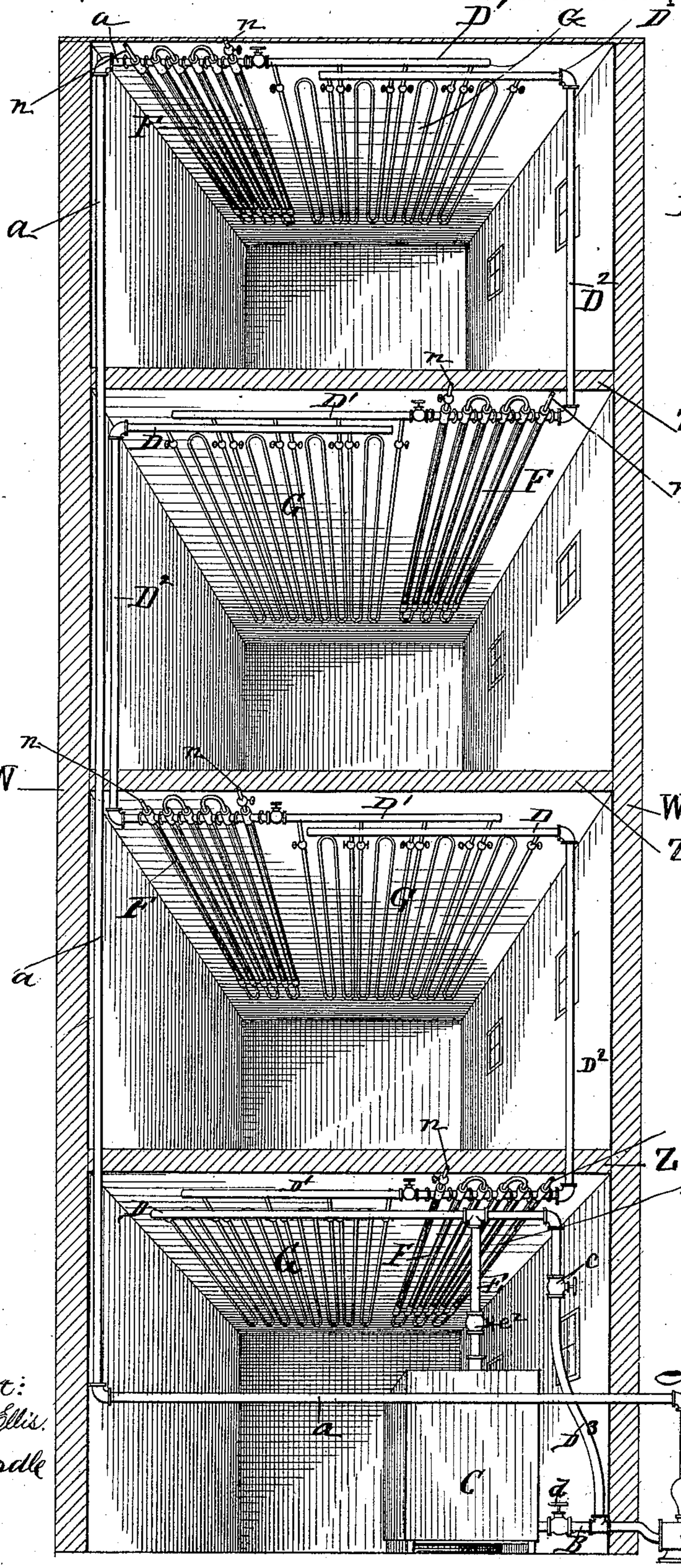

Fig. 1.

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Fig. 2.

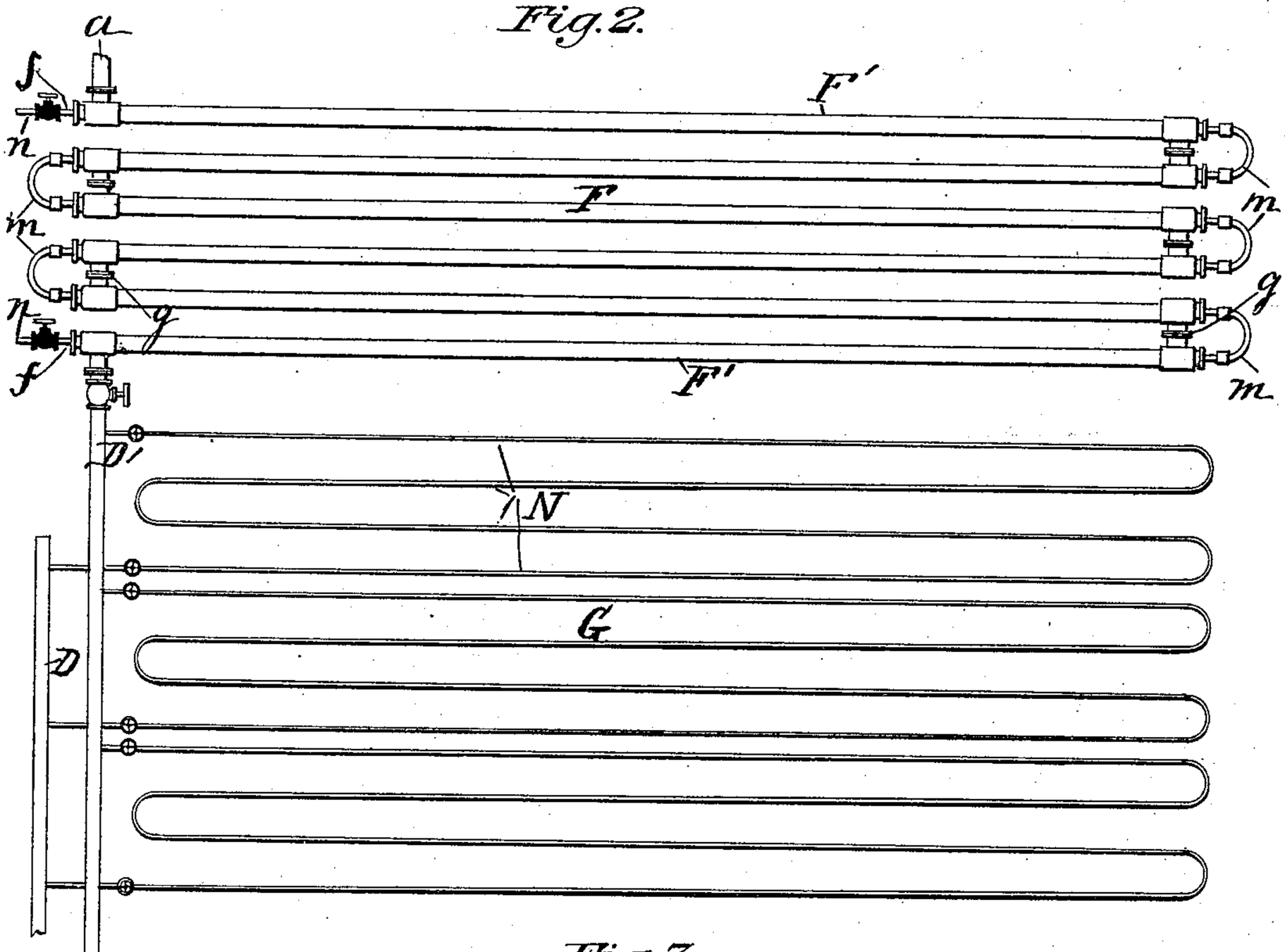
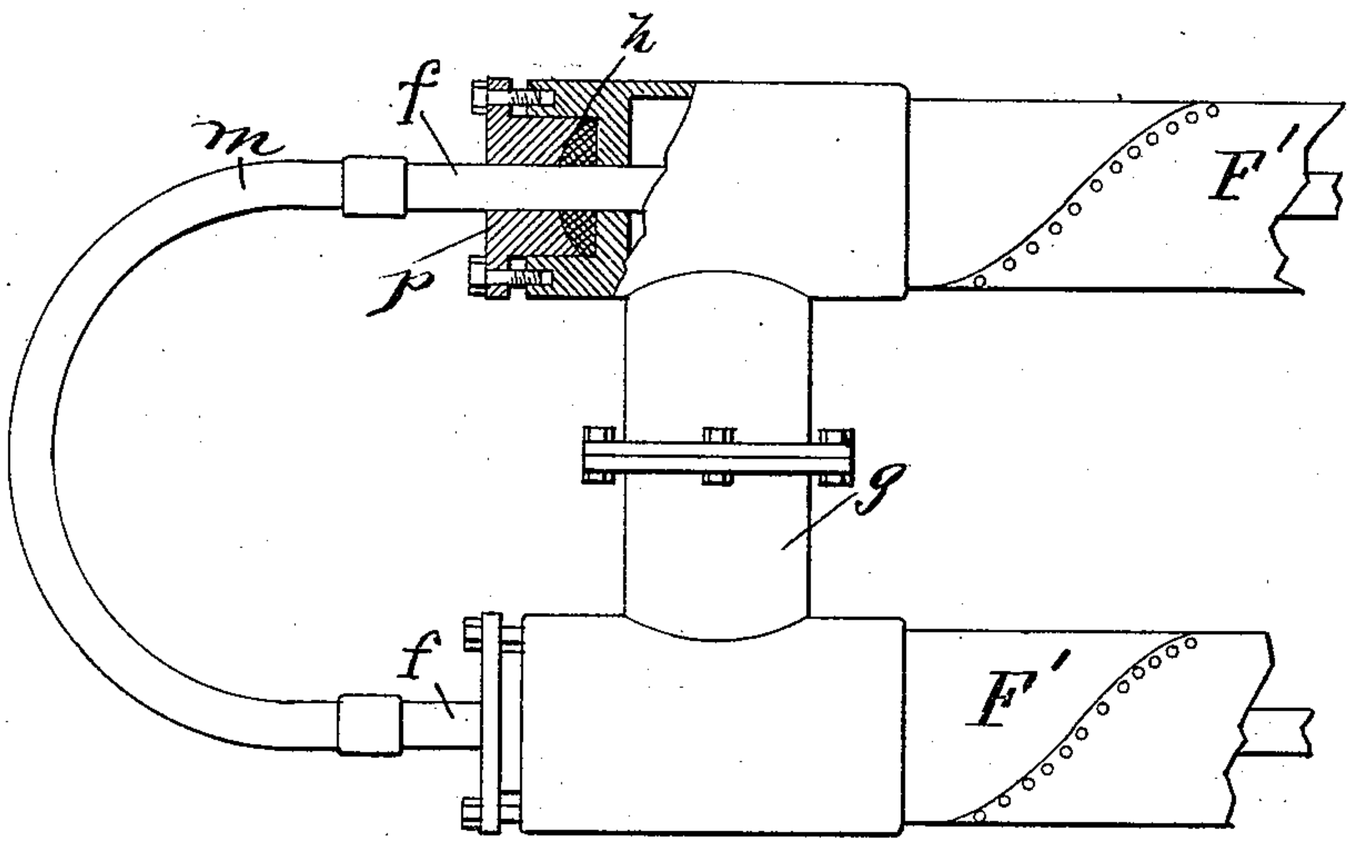


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS L. RANKIN, OF NEW YORK, N. Y., ASSIGNOR TO JACOB W. SKINKLE, OF CHICAGO, ILLINOIS.

HOUSE-REFRIGERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 316,292, dated April 21, 1885.

Application filed July 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, THOMAS L. RANKIN, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in House-Refrigerating Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to improvements in cooling apparatus for buildings or other structures composed of several compartments, and its object is to establish a thorough circulation of a refrigerating-fluid through the said compartments economically and in such manner as to expose any leakage, so the latter may be quickly stopped.

A further object of the invention is to provide means whereby any waste from the pipes of the refrigerating-fluid, whether from leakage or other cause, may be quickly and readily resupplied.

The invention consists in the construction and novel arrangement of parts hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a view, partly in section and partly in elevation, of a building showing my system of refrigeration applied thereto. Fig. 2 is a view showing a section of the refrigerating-coils and coils for the refrigerating-fluid to circulate in; and Fig. 3 is an enlarged view, partly in section, of the end of a portion of the refrigerating-coil sections.

Referring to the accompanying drawings by letter, W W show the outer walls of a house in section, and Z Z the respective floors and ceilings between the rooms of the same.

C indicates a tank in the lowest room, designed to contain a saline solution, preferably one of chloride of sodium—that is, common salt. From the lower part of said tank extends outward a pipe, B, provided with a valve, *d*, to the cylinder *e* of a pump, A, which pump may be driven by a reciprocating engine, f^2. The pipe B leads to the induction-port of the pump, and from the eduction-port of the same rises a pipe, *a*, which ascends to the highest room of the building, as shown, or to the compartment of any structure farthest from the tank C. At the top of the building the pipe *a* bends under the ceiling of the highest room and connects with the refrigerating-coil F, composed of the pipes F′, connected at their alternate ends by the couplings *g*, Fig. 2.

f f are small pipes, running through the pipes F′ and united by the alternate couplings *m*, as shown clearly in Fig. 2. The ends *n n* of the coupled pipes *f* are connected to an ammoniacal-gas apparatus in such manner that a current of said gas expanding from pressure is constantly kept up in the pipes *f*. As said apparatus forms no part of this invention, illustration and further description of the same are unnecessary.

The inner end of the refrigerating-coil F connects with a pipe, D′, which connects by the cooling-pipe coil G with a parallel pipe, D, from which a pipe, D^2, descends to a similar refrigerating-coil, F, pipe D′, cooling-coil G, and pipe D, secured to the ceiling of the next room below. A pipe D^2 similar to the former then carries the circulation to the next room below, and so on to the room in which is the tank C, the apparatus in each room being mere reduplications of each other. In the lowest room the pipe D connects, by a pipe, D^3, with the pipe B, which leads to the induction-port of the pump A. *c* is a valve of the pipe D^3, as shown.

E is a pipe rising from the tank C, coupled to the lowest pipe, D, and provided with the valve e^2.

In Fig. 3, *p* represents a stuffing-box, and *h* the packing between the tubes *f* and F′.

In operation, the tank C being charged with the refrigeration solution, the valves e^2, *d*, and *c* open and the pump A in operation, the fluid from the tank is drawn through the pipe B into the cylinder *e* and thence forced through the pipe *a* to the top of the building. It thus passes through the pipes F′ of the coil F, and is thoroughly chilled by the expanding gas in the tubes *f*. Thence it passes through the pipe D′, and then through the coil G, absorbing heat from the room. From the coil G it passes into the pipe D, and thence descends by a pipe, D^2, to the next lower room. It descends thus from room to room till it reaches the lowest one, and then passes both into the pipe D^3 and the pipe

E. The valves *d* and e^2 are then closed, and the circulation kept up by the fluid in the pipes only.

Should any leakage occur, the cocks *d* and e^2 are opened and the waste supplied directly from the tank C.

The coils G are compound coils, being formed of the secondary coils N N, each of which connects a pipe D′ with a pipe D. By this means the temperature of the fluid circulating through the coils G is rendered more equal in all parts of the coils, and no part of a room is rendered cooler than another. In practice all the pipes *f* of the different refrigerating-coils would communicate with the same ammoniacal-gas apparatus.

The whole system of pipes above described being in full view and readily accessible, any leakage therefrom will be easily discovered and readily repaired.

The tubes of which the coils N, Fig. 2, forming a coil G consist are of smaller diameter than the pipes D′ and D, so that as the medium passes from the former to the latter pipe equal portions of it will pass through each coil N of a coil G. By this arrangement the medium while cool is more equally distributed through the coils G, and will absorb heat more equally over the surface of the coil, rendering the temperature of all parts of the room more nearly equal. The coils N of a coil G are of such capacity that they will collectively deliver all of the medium from a pipe D′ to a pipe D.

Having thus described my invention, I claim—

1. The combination, with a tank for holding a saline solution and a pump connected therewith, of a system of pipes connected both with the tank and pump, extending through the rooms of a house or compartments of a structure, and provided with valves, in such manner that the saline solution may be circulated through the pump and pipes only, or through the tank, pump, and pipes, substantially as specified.

2. The combination, with the storage-tank, the saline-solution-circulating pipes, and the actuating-pump, of pipes extending through coils in said saline-solution pipes and adapted to have a highly-expansible gas passed through them and expanded within them from a compressed condition, substantially as specified.

3. In an apparatus to cool the rooms or compartments of a building, the combination, with the delivery pipe D′, and the receiving-pipe D, equal in capacity to the pipe D′, of the cooling-coil G, composed of the secondary coils N, the united capacities of which equal the capacity of the pipe D′ or D, so that the said coils N will deliver all of the cooling medium from the former to the latter pipe without checking the flow of said medium, substantially as specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOS. L. RANKIN.

Witnesses:
STEPHEN GERBER,
CHARLES J. F. MÜLLER.