

No. 677,536.

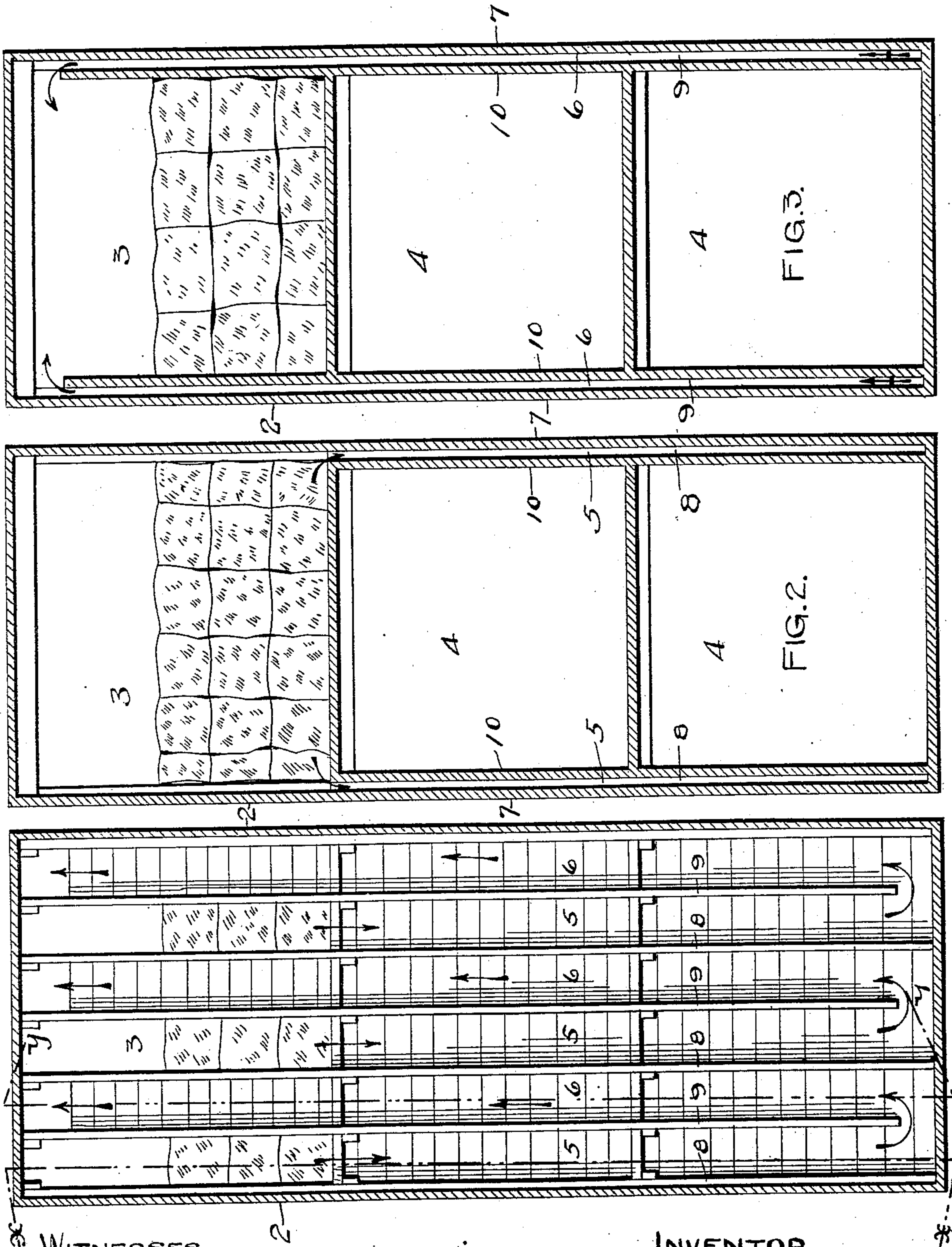
Patented July 2, 1901.

M. COOPER.

INDIRECT AIR CIRCULATING SYSTEM FOR COLD STORAGE APPARATUS.

(Application filed Nov. 19, 1900.)

(No Model.)



WITNESSES

E. G. Staude
M. B. Cooley

FIG. 1.

INVENTOR

MADISON COOPER

BY

Paul & Hawley
HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

MADISON COOPER, OF MINNEAPOLIS, MINNESOTA.

INDIRECT AIR-CIRCULATING SYSTEM FOR COLD-STORAGE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 677,536, dated July 2, 1901.

Application filed November 19, 1900. Serial No. 36,966. (No model.)

To all whom it may concern:

Be it known that I, MADISON COOPER, of the city of Minneapolis, Hennepin county, State of Minnesota, have invented certain new and useful Improvements in Indirect Air-Circulating Systems for Cold-Storage Apparatus, of which the following is a specification.

The object of this invention is to provide means for causing a circulation of cold air between the walls of a refrigerator or cold-storage apparatus, thereby decreasing the temperature of the inclosed buildings or apartments, thus making it possible to maintain the desired temperature within such buildings or apartments with a minimum cost for refrigerating material.

To this end the invention consists generally in a cold-storage apparatus or refrigerator provided with an ice-chamber or air-cooling room arranged above and separate and distinct from the storage rooms or apartments, with vertical ducts arranged side by side and in the same plane and extending from the bottom of the air-cooling room and between the inner and outer walls of the storage-rooms to the bottom of the lower storage-room and back to the top of the air-cooling room. The series of ducts thus arranged occupy all of the space between the inner and outer vertical walls of the storage rooms or apartments, and thus each of said rooms is inclosed on its four sides by the series of ducts referred to. The air of this indirect air-circulating system does not enter the storage rooms or apartments, but merely circulates around them in a thin sheet between the interior and exterior walls of the building. The penetration of outside heat during the summer is thereby effectually prevented, and even in extremes of hot weather no variation of temperature is noticeable in the rooms.

The invention consists, further, in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a cold-storage house or refrigerator embodying my invention, the outer wall being omitted from the drawings to show clearly the arrangement of the ducts. Fig. 2 is a transverse vertical section on line xx

of Fig. 1. Fig. 3 is a similar section on line yy of Fig. 1.

In the drawings, 2 represents a refrigerator or cold-storage house or a portion thereof provided with an ice-chamber or air-cooling room 3 and, at a lower level, with the storage or refrigerating rooms 4. The storage-rooms may be provided with any suitable direct refrigerating means or, if preferred, may be used without any direct refrigerating means. I prefer to use, however, as the direct refrigerating means for said rooms an apparatus such as that shown and described in Letters Patent No. 659,468, issued to me October 9, 1900, or that shown and described in my pending application for Letters Patent, filed July 3, 1899, Serial No. 722,633. Between the inner and outer walls of the storage-rooms are the vertical ducts 5 and 6, which are formed between said walls and are arranged side by side and in the same vertical plane. The ducts 5 extend from the bottom of the ice-chamber or air-cooling room to the bottom or floor of the lower storage-room. The duct 5 communicates at its lower end with the adjacent duct 6, and the duct 6 extends to a point near the top of the ice-chamber or air-cooling room, as shown in Figs. 1 and 3. The ducts 5 and 6 are arranged alternately side by side and in the same vertical plane, as illustrated in Fig. 1, and these ducts occupy all the space between the outer wall 7 and the inner wall 10. In constructing the apparatus I prefer to provide the vertical studs or strips 8 and 9 between the inner and outer walls and to which said walls are secured, and these strips or studs divide up the space between the walls, and thereby form said ducts. The studs 8 extend to the bottom of the lower storage-room and the studs 9 within a short distance of said bottom. The wall 10 extends between alternate studs nearly to the top of the ice-chamber, thereby extending the duct 6 nearly to the top of said chamber.

In operation the cold air passes downward through the duct 5, while the warmer air passes up through the duct 6 and out of the top thereof into the top of the room 3. By this means a continuous gravity circulation of air is maintained between the inner and outer walls of the storage-room, and said rooms are surrounded by a thin sheet of cold

air, which is continuously circulated between the inner and outer walls of the building. By this means the penetration of outside heat is effectually prevented. At least two-thirds of the cooling of the rooms is done by this indirect air-circulating system, and the only expense therefor is the cost of the ice that is consumed in the ice-chamber. Where this indirect air-circulating system is employed surrounding the storage-rooms, very much less cooling is required to be done by the more expensive direct air-circulating system in which the cold air is circulated directly through the rooms. A very material saving in the cost of refrigeration is thereby obtained. By constructing the building as shown the ducts are formed simply by the arrangement of the studding between the inner and outer walls without increasing the cost of the building.

I claim as my invention—

1. The combination, in a refrigerator or cold-storage apparatus, with a suitable ice-chamber or air-cooling room, of one or more storage-rooms arranged below said ice-chamber, and vertical ducts arranged side by side and in the same vertical plane, between the

walls of said storage-rooms, each pair of ducts being connected at their lower ends, and one duct of each pair communicating with the lower part of the ice-chamber, and the other with the upper part of the ice-chamber, substantially as described and for the purpose set forth.

2. The combination, in a refrigerator or cold-storage apparatus, with a suitable ice-chamber or air-cooling room, of one or more storage-rooms arranged below said air-cooling room, and provided with the outer wall 7 and the inner wall 10, the studs 8 and 9 arranged between said walls and forming, with said walls, the vertical ducts 5 and 6 arranged side by side and communicating at their lower ends, the duct 5 being connected with the lower part of the ice-chamber or air-cooling room, and the duct 6 with the upper part thereof, substantially as described.

In testimony whereof I have hereunto set my hand, this 16th day of November, 1900, at Minneapolis, Minnesota.

MADISON COOPER.

In presence of—

A. C. PAUL,
M. E. GOOLEY.