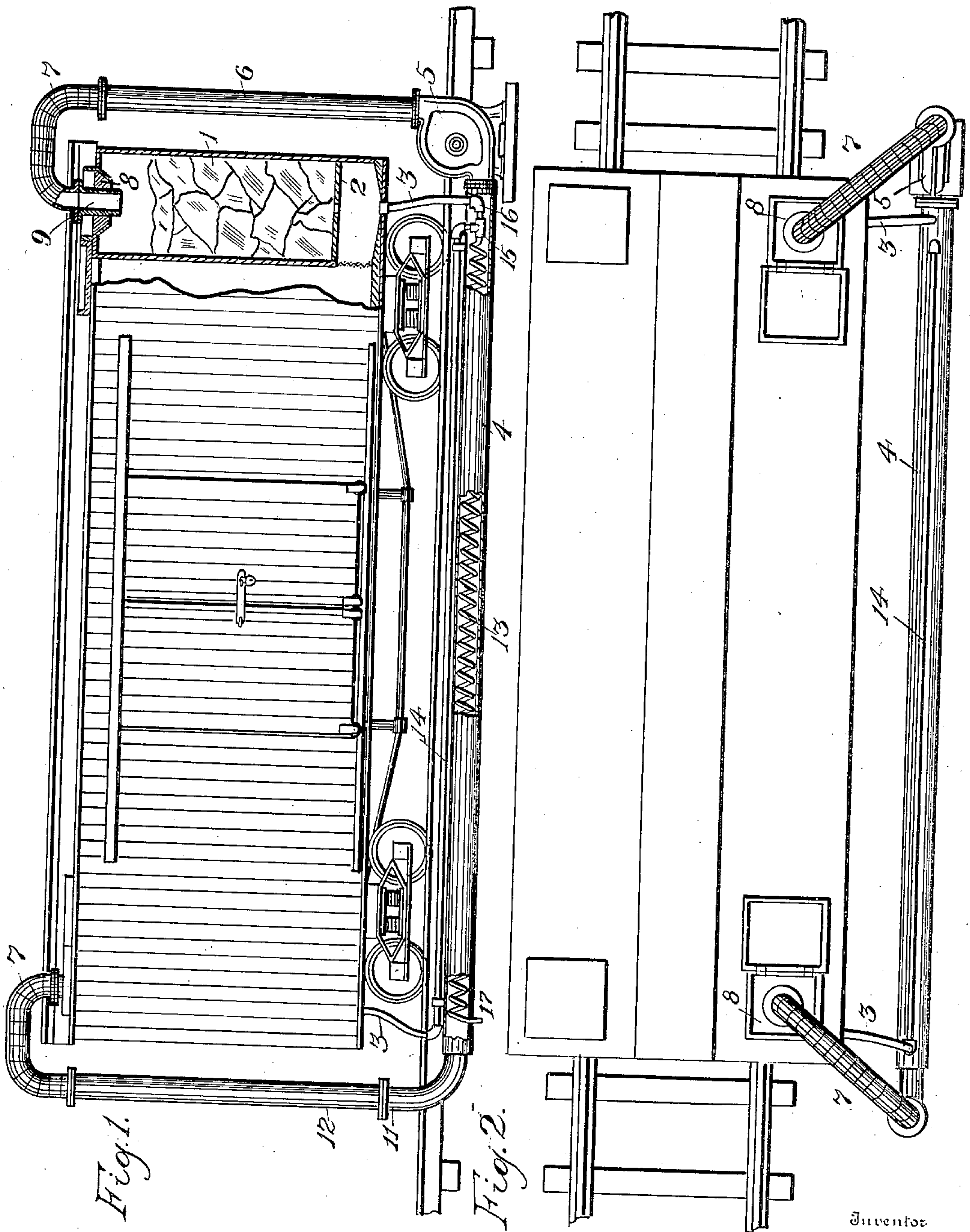


No. 890,809.

PATENTED JUNE 16, 1908.

A. R. SPRAGUE.
REFRIGERATING APPARATUS.
APPLICATION FILED JUNE 29, 1905.



Witnesses
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UNITED STATES PATENT OFFICE.

ALMERIN RATIO SPRAGUE, OF SACRAMENTO, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO L. A. ROY, OF CHICAGO, ILLINOIS.

REFRIGERATING APPARATUS.

No. 890,809.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed June 29, 1905. Serial No. 267,654.

To all whom it may concern:

Be it known that I, ALMERIN RATIO SPRAGUE, a citizen of the United States, residing at Sacramento, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Refrigerating Apparatus, of which the following is a specification.

My invention relates to the refrigeration of perishable substances in cooling rooms, such as storage chambers, refrigerator cars and the like.

It relates more particularly to apparatus for carrying out a method or process described in an application filed by me upon the same date as the present case. In that application my system was shown in its adaption to a refrigerator car, as an excellent illustration of its practical use. In the present application I show a like illustration of its use, it being understood however that substantially similar apparatus operated upon the same principle can be applied to other cold storage chambers. As a matter of fact the refrigerator car illustrated is a stationary cold storage chamber during the operation of my system, since at that time it is at rest.

An apparatus embodying my invention is shown in the accompanying drawings, in which:—

Figure 1, is a side elevation of a refrigerator car broken away at one end to show connections to and from an ice tank; Fig. 2, is a plan view.

The illustrative apparatus shown in the drawing and embodying my invention is a refrigerator car of a well known type, having an ice tank 1 at each end. Only one of these tanks is shown in the drawing as the constructions of both are alike and well understood in the art. The ice tanks are closed at the top by proper plugs and by hinged lids, there being generally two ice holes for each tank as indicated in Fig. 2. At the bottom of each ice tank is a floor composed of bars 2 which form a grating upon which the ice rests, and which permits the melted ice to pass into the bottom of the car and then escape by a suitable outlet in the floor. Lengths of hose 3 are adapted to be coupled to these outlets, so that the melted ice shall be conveyed to a positive destination and usefully employed as hereinafter described.

So far I have described an ordinary and well known type of car.

At a station where a car is loaded with fruit or other perishable substances, is located a blower main 4 generally of about the length of a car and of suitable capacity. Into one end of this main is connected the discharge nozzle of a blower 5 driven by any suitable power. The intake of the blower is connected to a vertical pipe 6, to the upper end of which is coupled a flexible hose 7. This hose is adapted to enter the ice tank of the car through one of the ice holes, the blower main and pipe 6 being located preferably adjacent to the loading siding, and the car being brought up on the siding to the proper position for receiving the air hose. For making the actual connection with the interior of the tank various means can be employed in order to obtain a substantially air tight entrance. I prefer to remove the usual ice plug from the ice hole and substitute a similar ice plug 8 having a tube 9 extending downwardly through it. The hose 7 is then connected to the tube 9. At the other end of the blower main is a coupling 11 connected with a pipe 12, similar to the pipe 6, and also connected in the same manner as that pipe, by flexible hose, with the ice tank at the other end of the car. Thus the blower both draws air from, and forces air into and through the interior of the car. Within the blower main and extending for substantially its entire length, is a coil 13, which, at one end, receives cold water from the melting of ice in both ice tanks. Thus the discharge hose 3 from the tank at one end is connected to a pipe 14 which extends along outside the main, and at the other end, enters such main and is connected to the coil at 15. The hose 3 from the other ice tank is connected through the wall of the main and into the coil at 16. The final end of the coil extends through the wall of the main as shown at 17, to permit the water to escape.

The car having been loaded, ice placed in the tanks, and the various parts connected up as described, the operation will be as follows: On starting the blower, a strong draft is forced through the main and into the car, while the intake of the blower receives air from the car. All the air forced into the car is compelled to pass through the ice tank at that end, is cooled, and then displaces the

warm air in the car and penetrates throughout the interior and the load contained therein. The warm air displaced is drawn out of the other end of the car, passing through the
 5 ice tanks where, first, it is cooled, and secondly, the moisture with which it is charged is condensed so that it commences in a short time to enter the blower intake as cold dry air, and in that condition to circulate through
 10 the blower main and the car. After the process of circulating cold air by this forced draft has continued for a sufficient time, the air circulating in the car and its entire contents will have been cooled down to a proper initial degree of refrigeration—say 40°; and
 15 the car will be filled with dry cold air, previous to starting upon its journey, instead of containing a body of dead, moist warm air which must be slowly cooled from the ice tanks, and which, in present practice, never
 20 does arrive at the proper preservative condition. When my system is employed, the air being in the proper condition at starting will be maintained afterward in such condition
 25 by the ice alone.

It will be observed that I utilize the melted ice from both tanks for keeping the air in the blower main cool; so that there is practically no rise in the temperature of the
 30 air while it is passing, externally to the car, through the said main. All the melted ice as it escapes from both ice tanks is carried into the coil 13 and is used to keep the air in such main at about the temperature at which
 35 it leaves the car.

When the air in the car has received its thorough initial cooling according to my system, the waste pipes 3 are disconnected from the waste openings in the ice tanks, the flexible connections and the temporary ice plugs
 40 are removed from the ice holes, the permanent ice plugs are placed in position, and the ice hole lids are closed down. The car can

now proceed to its destination under ordinary conditions of permanent refrigeration. 45

It is evident that where stationary refrigerating or cooling rooms for storage purposes are provided with ice chambers for permanent refrigeration, my system can be employed for forcing air into such chambers, 50 and for withdrawing it through the ice, with the same effect as to producing a rapid refrigeration and drying of the air, which is thus rendered of such a character and quality that the permanent refrigerating means can 55 be used to the best advantage.

I do not limit myself to the exact constructions and arrangements herein described and shown in the accompanying drawings, as I desire to avail myself of such 60 modifications and equivalents as fall properly within the spirit of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:— 65

A device for circulating the air in cold storage chambers comprising a horizontal blower main, a flexible pipe having connection with one end thereof, a blower having its discharge nozzle connected to the other 70 end, a flexible pipe connected to the intake of the blower, a coil in said main, a pipe 14 carried on the said main and having one end connected to the coil near the blower and extending substantially the full length of the 75 main, a flexible pipe having connection with the other end of said pipe 14 and a pipe 3 also connected to the coil near the blower.

In testimony whereof I affix my signature, in presence of two witnesses, this 80 twenty first day of June 1905.

ALMERIN RATIO SPRAGUE.

Witnesses:

LONNIE GAUME,
 F. J. FITCH