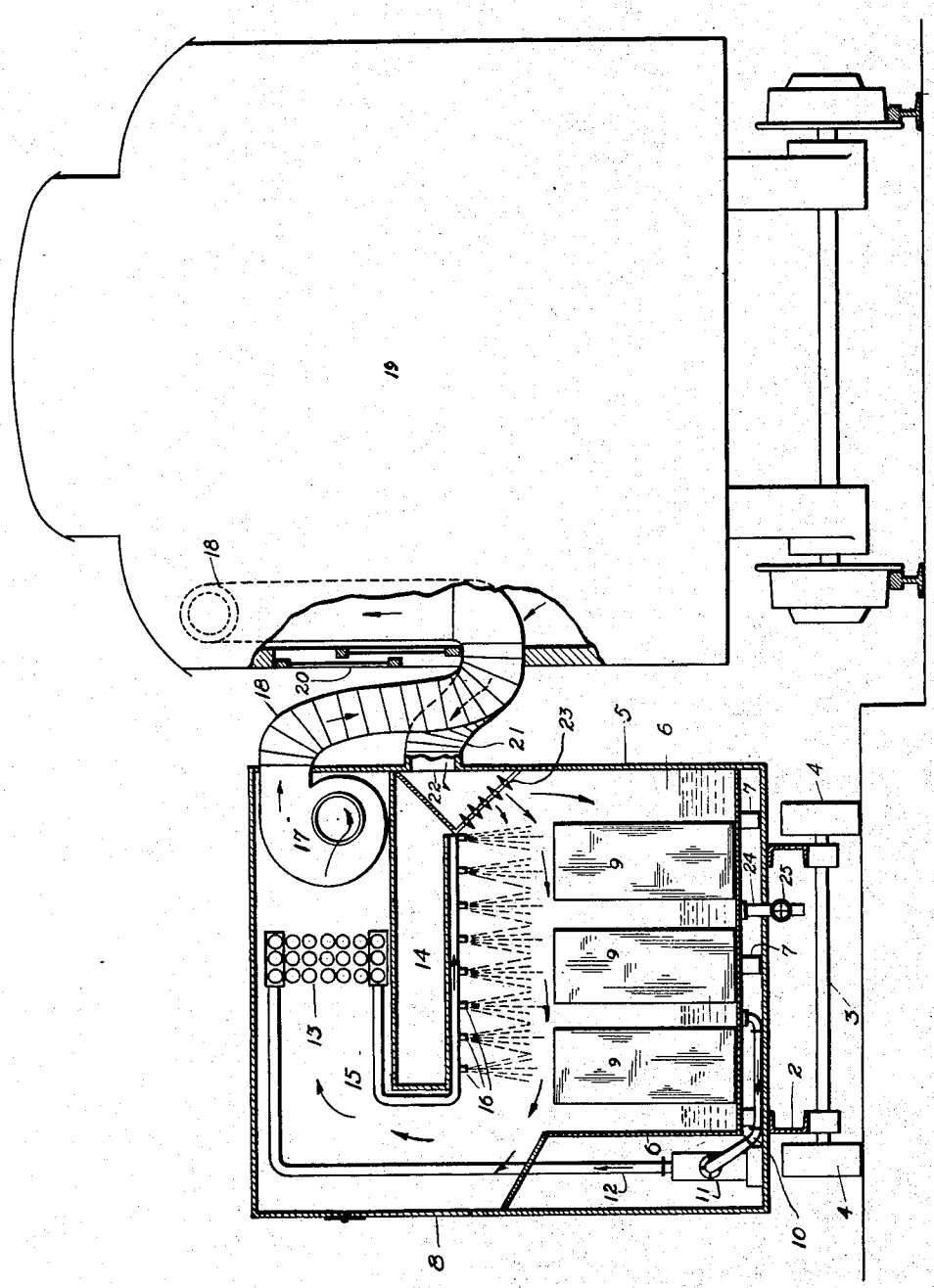
April 26, 1938. A. E. STACEY, JR 2,115,344

METHOD OF PRECOOLING ENCLOSURES

Filed June 14, 1932



INVENTOR
ALFRED EDWIN STACEY JR.
BY
ATTORNEY

Patented Apr. 26, 1938 2,115,344

UNITED STATES PATENT OFFICE

2,115,344

METHOD OF PRECOOLING ENCLOSURES

Alfred E. Stacey, Jr., Essex Fells, N. J., assignor, by mesne assignments, to Carrier Corporation, Newark, N. J., a corporation of Delaware

Application June 14, 1932, Serial No. 617,087

1 Claim. (Cl. 62—24)

This invention relates to an improved method employed in a system for precooling confined areas, more particularly the interiors of railroad cars.

The general object of the invention is to provide an improved method for lowering the temperature of a railroad car, prior to occupancy, and usually while it is standing in such places as railroad terminals, train sheds, or at way-stations. Under summer conditions, railroad cars, especially those made of metal, store up relatively large quantities of heat, due not only to prevailing high temperatures, but also to sun effect. When these cars, after standing exposed to the sun, are moved into a station and made into trains, this stored heat is given up. In the still air of a railroad terminal, for example, this heat does not freely escape and hence makes human occupancy of the car almost unbearable. This is particularly true of sleeping cars, in which the berths are usually made up before the passengers board the train. The berth arrangement, as well as the bedding, curtains and partitions, still further confines the heat and tends to lengthen the time during which this heat would be dissipated by radiation. If, however, cool air is forced through the cars, prior to occupancy, the stored up heat will be removed and the metal of the car itself will be cooled to a temperature below that of the surrounding atmosphere. Hence, a very comfortable condition will be established within the car which, even though the train is standing still, will be maintained for a period of several hours. Once the train gets under way, the motion of air through and over the cars will tend to keep them reasonably comfortable.

Further objects and features covering advantages in design, operation and making for maximum utility and flexibility under varying conditions, more especially in railroad car cooling, will be more apparent from the following description of a typical form of the invention to be read in connection with the accompanying drawing which shows a precooling apparatus, in section, in association with a railroad car, a portion of the latter being broken away to better show the connection therebetween.

Referring to the drawing, similar designations referring to similar parts, numeral 2 represents the side members of a truck mounted on axle 3, carried by wheels 4. Mounted on side members 2 is a casing or unit generally designated by numeral 5. Within casing 5 and cooperating with one side to form a part thereof is a tank 6 supported on blocks 7. The casing 5 may be suitably insulated by covering it with cork (not shown) or other material having similar properties. Ice may be loaded within the tank 6 through an entrance door 8 in the casing 5. For purposes of illustration, ice blocks 9 are shown, although it is obvious that cracked ice or similar cooling medium could be used with equal facility.

From the bottom of the tank 6, pipe 10 leads to the inlet of the pump 11, mounted in the space provided between the tank 6 and one side of the casing 5. From the discharge of the pump 11, a pipe 12 leads to a series of cooling coils 13. The coils 13, preferably having extended surface to promote heat transfer, are mounted on a bracket 14 attached to one side of the casing 5, which bracket cooperates with the top and sides of the casing to form a passageway for air over the coils. From the bottom of the coils 13, a pipe 15, in which is suitably positioned a series of nozzles 16, leads to a point above the ice in the tank 6.

A fan 17, driven by an electric motor or other suitable means (not shown), is mounted in the passageway formed between the top of the casing 5 and bracket 14. From the discharge opening of the fan 17, a conduit 18, preferably made of canvas, or other suitable fabric, sewed or otherwise attached to hoops, is provided for the purpose of conveying the air from fan 17 to the point of usage, namely, the interior of the car 19. Obviously, constructing the conduits of fabric is advantageous in overcoming the numerous difficulties encountered in using metal ducts. For example, this construction provides extreme flexibility with maximum simplicity. Further, the conduits do not require a covering of cork or felt to prevent "sweating" since the fabric itself has excellent heat insulating properties. According to applicant's preferred method, the conduit 18 will be led into the car 19 through a window 20, the lower sash being raised for this purpose. The conduit 18 will be suitably attached to the interior of the car, preferably at a point near its ceiling, and its outlet, which may be in the form of a nozzle, may be directed toward an end of the car.

A second conduit 21, similar in construction to conduit 18, leads from an opening 22 in the casing 5 to the window 20 or to an adjacent one, and into the car 19 for the purpose of conducting air from the car to the unit. If desired, conduit 18 may be laid on the floor and conduit 21 terminate at the window.

Assuming that the tank 6 has been charged

with ice, the cooling unit is rolled to a position adjacent a railway passenger car, the window 20 is opened, conduit 18 is inserted in and, if desired, attached to the upper part of the car 19 and conduit 21 is similarly inserted within the same or an adjacent window opening and suitably placed in position.

The pump 11 is placed in operation by starting its motor (not shown). Cold water from melting ice is, therefore, drawn through pipe 10 under the influence of pump 11, forced through pipe 12, cooling coils 13 and discharged through pipe 15 and nozzles 16 over the blocks of ice in the form of a spray.

Starting the fan 17 induces a circulation of air from the car 19 through conduit 21, opening 22, the sprays from nozzles 16, cooling coils 13, fan 17, and the conduit 18, back to the interior of the car, the path of the air being clearly indicated by the arrows on the drawing. The hot air from the car 19 through conduit 21, as above pointed out, first meets the sprays from nozzles 16. The large surface presented by the droplets of cold water accomplishes a great deal of preliminary cooling and dehumidifying. The air then passes over the coils 13, in which, obviously, is the coldest water, and its cooling and dehumidification satisfactorily completed before introduction to the car 19 through the agency of fan 17 and conduit 18.

The water, having absorbed the heat of the air in passing through the coils and the sprays, flows down over the ice, gives up its absorbent heat, and consequently melts the ice, thereby completing the cycle of heat transfer.

Dampers 23 are provided for controlling the volume of air admitted to the cooling unit from the car 19, if and as desired.

A pipe 24, in which is a hand valve 25, is provided in the bottom of the tank for draining off the melt.

Since certain changes in carrying out the above process and in the constructions set forth, which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A method of cooling a railroad car consisting in withdrawing air from the car at a point a considerable distance below the ceiling level, conveying the air from said point of removal to a point of conditioning located without the car, passing the air in direct heat exchange and in indirect heat exchange with a cooling medium at said conditioning point to effect desired cooling and dehumidification thereof, delivering the dehumidified air to the car at a point adjacent the point of withdrawal, and discharging the air within the car at a level other than that of the point of withdrawal, the flow of air discharged into the car being directed toward an end of the car.

ALFRED E. STACEY, Jr.