Nov. 19, 1940. F. J. REILLY 2,221,927

APPARATUS FOR THE TREATMENT OF COMMODITIES

Filed Dec. 7, 1937 2 Sheets-Sheet 1

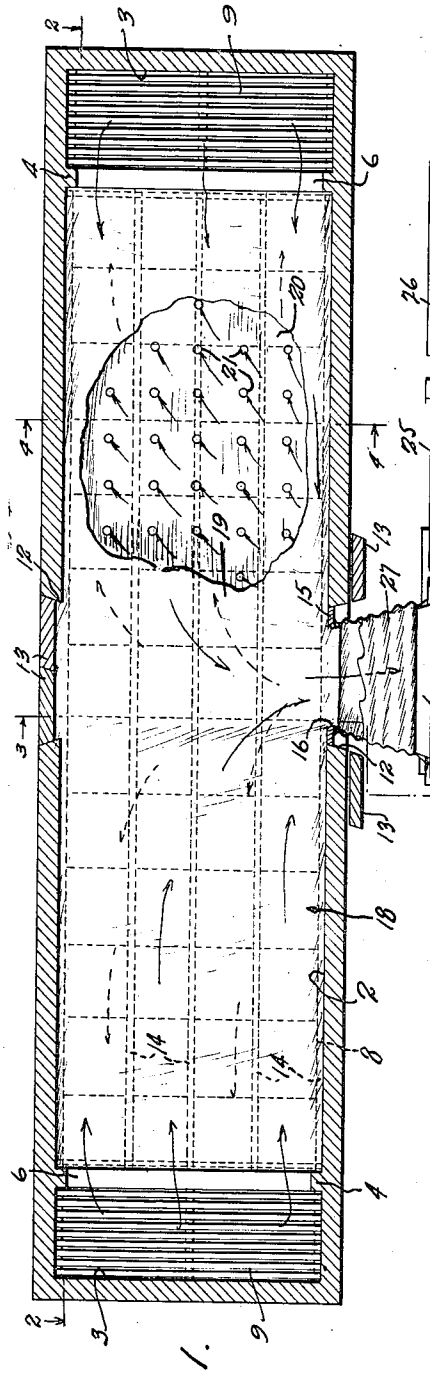


FIG. 1.

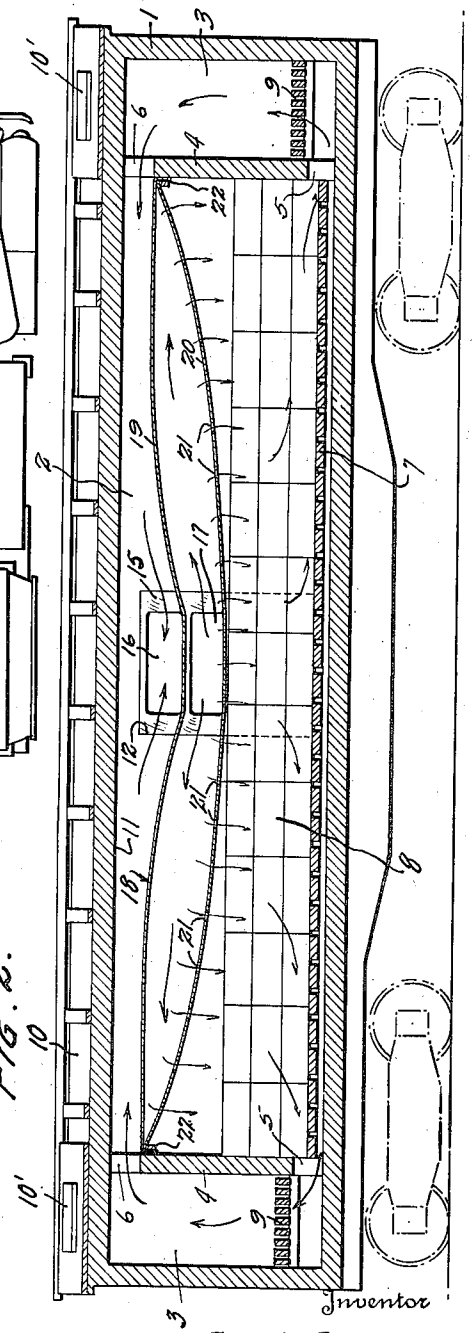


FIG. 2.

Inventor
Frank J. Reilly.

By Semmes, Keegin & Semmes,
Attorneys

Nov. 19, 1940. F. J. REILLY 2,221,927

APPARATUS FOR THE TREATMENT OF COMMODITIES

Filed Dec. 7, 1937 2 Sheets-Sheet 2

FIG. 3.

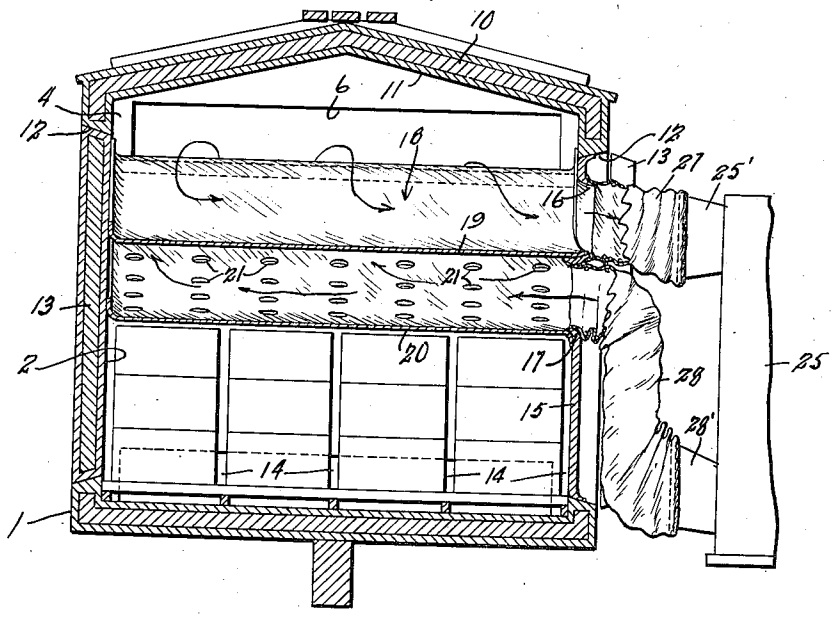
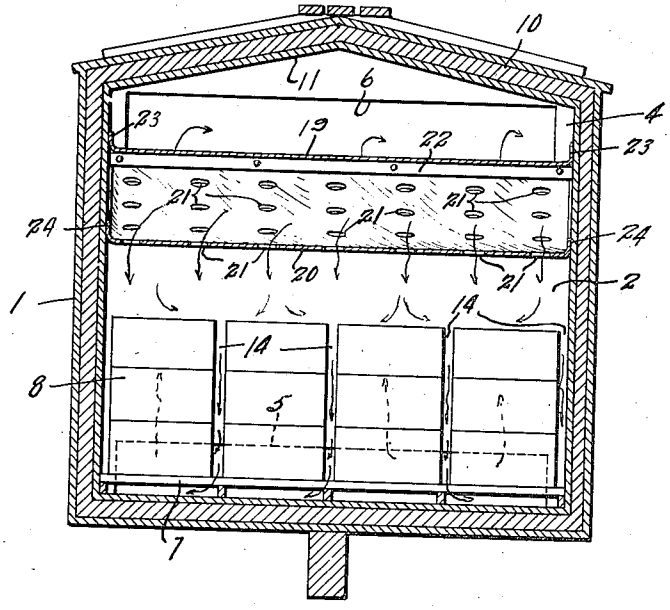


FIG. 4.



Inventor
Frank J Reilly

By Semmes, Keegin & Semmes
Attorneys

Patented Nov. 19, 1940 2,221,927

UNITED STATES PATENT OFFICE

2,221,927

APPARATUS FOR THE TREATMENT OF COMMODITIES

Frank J. Reilly, Miami, Fla., assignor to General American Precooling Corporation, Chicago, Ill., a corporation of Delaware

Application December 7, 1937, Serial No. 178,601

2 Claims. (Cl. 98—6)

My invention relates to air conditioning, and more particularly has reference to the conditioning of commodities in a car or other chamber. While, for means of illustration, my invention will be described with respect to the conditioning of the ladings of railway cars, it will be readily appreciated that the concept has a far greater application.

Prior to my invention, great difficulty has been encountered in securing and maintaining a proper circulation of air when a chamber is being air conditioned. This proper circulation of air assumes particular importance when commodities or produce are conditioned in a car because of the problems which are peculiar thereto.

One of the objects of this invention is to overcome such disadvantages.

Another object of this invention is to provide a process and apparatus for the effective conditioning of commodities or farm produce in a storage chamber.

Still another object of my invention is to provide a sheet material to be positioned within a storage chamber, so as to extend in a double layer above the stored commodities.

Yet another object of my invention is to provide the lower layer of this sheet material with a plurality of apertures.

A further object of my invention is to provide a method of conditioning a storage chamber, in which the sheet material has been positioned, which consists in introducing the conditioned air into the chamber at a point between the layers of the sheet material and withdrawing the air from the car after it has passed through the apertures in the lower layer of said sheet material.

To accomplish the above and other objects of my invention, this invention generally relates to the idea of positioning two layers of a sheet-like material within the interior of a chamber, the contents of which are to be air conditioned, by attaching the edges of both layers to the sides of the storage chamber. When properly positioned, these layers of material extend over and above the entire top surface of the lading, in the storage chamber, in superimposed relation to each other. The lower layer, however, differs from the upper layer in that it is provided with a pluarlity of apertures, which may be regularly spaced over the entire area of the material. Of course, it is obvious that instead of using two layers of material, an elongated bag may be used, the lower surface of which is perforated throughout its length.

After the elongated bag or the two layers of flexible material have been positioned within the chamber, conditioned air is introduced through an aperture in the chamber into the space between the layers of flexible material. The conditioned air passes through the apertures in the lower layer and then through the lading. After passing through the lading, it is withdrawn through an aperture in the wall of the chamber located above the top layer of the material. By regularly spacing the apertures in the lower layer of the sheet material, the conditioned air in escaping is distributed evenly over the top line of the entire lading.

In the accompanying drawings, there is shown one arrangement whereby this invention may be carried out, it being understood, of course, that various modifications may be made therein without exceeding the scope of the inventive concept.

In the drawings:

Figure 1 is a sectional view of a loaded freight car, with a conditioning unit in operative position at the side of the car.

Figure 2 is a view taken along line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a view taken along line 3—3 of Figure 1, looking in the direction of the arrows.

Figure 4 is a view taken along line 4—4 of Figure 1, and looking in the direction of the arrows.

While my invention relates generally to the conditioning of commodities or farm produce located in a chamber, it applies more particularly to the conditioning of perishable products after they have been loaded into a railway car preparatory to shipping. By "conditioning" is meant cooling, heating, hydrating, dehydrating, cleaning, or any other desired treatment.

In the drawings, a railroad car, generally designated by the numeral 1, is provided with a storage chamber 2 and ice bunkers 3 located at each end of the car. Bunker walls 4 are both of solid construction and provided with lower openings 5 and upper openings 6. The storage chamber 2 may be provided with a flooring 7, and a drain rack 9 may also be disposed at the bottom of the bunkers 3 to support the ice. The car is equipped with a roof 10 which contains hatches 10' located immediately above the ice bunkers 3, and the interior of the car is provided with a ceiling 11. At the center of the car is the usual doorway 12 having outwardly swinging doors 13 which are adapted to lie flush against the outside of the car when opened as shown in Fig. 1.

In practicing my invention, the lading 8 is preferably loaded into the freight car in spaced rows so as to provide longitudinal air passage ways 14 between the boxes or hampers which constitute the lading as shown in Figure 4. These air passages 14 allow air to circulate freely throughout the entire area of the lading.

As best shown in Figure 1, when the car is to be conditioned, the swinging doors 13 on one side of the car are opened and a false door 15 is positioned in the center doorway 12. This false door contains an upper aperture 16 and a lower aper-

ture 17. Before the false door is positioned in the doorway, the flexible sheet material, designated generally by the numeral 18, is positioned within the car above the lading 8.

This flexible sheet material 18 consists of an upper layer of material 19 and a lower layer 20, the lower layer 20 being provided with a plurality of apertures as indicated at 21. These apertures 21 are evenly spaced throughout the lower layer 20 so that when conditioned air is forced through these apertures, it will be distributed equally over the entire area of the lading. Both layers of the flexible sheet material 18 are attached to the bunker walls 4 at either end of the car as shown at 22 and are also secured to the side walls of the car as depicted at 23 and 24 in Figure 4. It should be noted that the upper layer 19 is positioned so that it will be disposed between the apertures 16 and 17 of the false door 15 at the point at which it passes the center doorway.

From this description it can be readily appreciated that, if air is introduced into the interior of the car through the lower aperture 17 of the false door, it will be directed between the layers 19 and 20 of the sheet material 18. From this location the air is forced through the apertures 21 in the lower layer 20, and is thereby distributed evenly over the top of the lading 8, and thence through the lading to opposite ends of the car by the air passages 14 and after passing around the surfaces of all the hampers is forced to escape through the lower openings 5 in the bunker walls 4. After passing through the ice bunkers 3, it escapes through the upper apertures 6, in the bunker walls, into the space within the storage chamber 2 formed by the upper layer 19 of the flexible sheet material 18 and the ceiling 11. From this position it may be drawn out through the upper opening 16 of the false door 15.

When the interior of the car is to be conditioned, a suitable air conditioning unit 25, which may be mounted on a truck 26, is driven alongside the center doorway. As shown in Figure 3, an extensible tube 27, which is mounted on the air conditioning unit 25 by means of the duct 25', is then attached to the upper aperture 16 of the false door 15. Another extensible tube 28, carried by duct 28', is also attached to the lower aperture 17 of the false door 15.

The hatches 10' are closed at this point, the air conditioning unit 25 is placed in operation and the air is forced through the extensible tube 28 into the car through the lower aperture 17. The air is then forced through the lading 8, in a manner which has been previously described, and after passing through the ice bunkers 3 is withdrawn from the car by way of the upper aperture 16 in the false door 15 and returns to the air conditioning unit 25 by way of the upper extensible duct 27. The air is now re-conditioned and the cycle repeated.

From the above description, it is obvious that I have provided an apparatus and method whereby every portion of the lading of a freight car may be conditioned in an effective manner. By the use of the two layers of sheet material, the conditioned air is evenly distributed by means of the apertures in the lower layer, and there is therefore no possibility of "dead spots" being created in the car. It should also be noted that as the edges of the sheet material are fastened not only to the ice bunker walls but also to both sides of the car that the conditioned air must pass through the lading before it can escape into the ice bunkers, and therefore there is no possibility of the air short circuiting to the return duct and thus failing to pass through the entire lading. However, by positioning both layers of the sheet material below the upper openings in the ice bunkers, the conditioned air may easily be drawn from the car after it has passed through the ice bunkers.

While the sheet material may be constructed of any material, I have found that a flexible material, such as canvas is especially suitable due to the ease with which it may be inserted and attached to the sides of the car.

It is believed apparent that by positioning two layers of this sheet material within the car, in the manner described, all parts of the lading are conditioned equally and effectively. After the lading has been thus properly conditioned, the false door is withdrawn from the center of the car and the doors 13 are closed and the car is then ready for shipment.

While I have described, for purposes of illustration, one form of my invention, it is obvious that I do not intend to be confined to the precise details of construction herein set forth. Neither is my process to be limited to the treatment of any particular type of commodity or to any special type of container.

I therefore intend that my invention be only limited by the prior art and the scope of the appended claims.

I claim:

1. In an apparatus for conditioning the load of a freight car having a bunker wall, provided with upper and lower openings, at each end of the car, said load being so disposed as to leave a space between the top of the load and the roof of the car, a substantially air-impervious, flexible, sheet-like member arranged in said space to extend the length and breadth of the storage compartment, a similar member spaced below the first member but provided with apertures therein, the edges of both of said members being attached to the walls of the car on a level below the upper openings in the bunker walls, an air conditioning unit located exteriorly of the car, means to convey air into the car between said sheet-like members, and means for conveying air from the space above the upper sheet-like member to the conditioning unit.

2. In an apparatus for conditioning the load of a freight car having a bunker wall, provided with upper and lower openings, at each end of the car, said load being so disposed as to leave a space between the top of the load and the roof of the car, a substantially air-impervious, flexible, sheet-like member arranged in said space to extend the length and breadth of the storage compartment, a similar member spaced below the first member and provided with a plurality of apertures spaced over its entire surface, the edges of both of said members being attached to the walls of the car on a level below the upper openings in the bunker walls in such a manner as to form an elongated bag, means to convey air into the car between said sheet-like members, and means for conveying air from the space above the upper sheet-like member to the conditioning unit.

FRANK J. REILLY.