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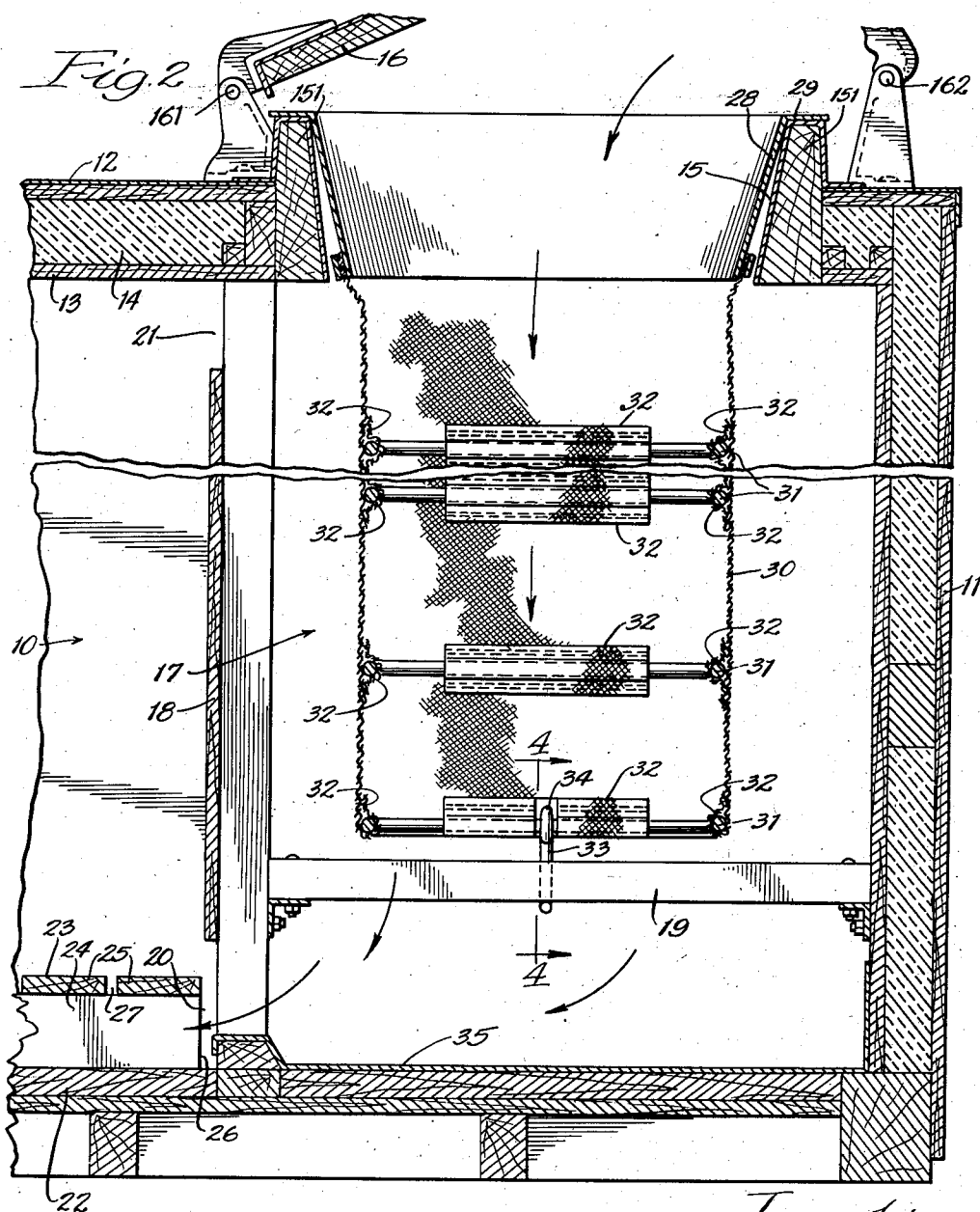
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PORTABLE VENTILATION DUCT FOR REFRIGERATOR CARS

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PORTABLE VENTILATION DUCT FOR
REFRIGERATOR CARS

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This invention relates to refrigerator cars and has for its object the provision of a portable ventilating duct for such cars.

Refrigerator cars are in wide use upon American railroads. Many of them employ ice refrigeration and are especially constructed to permit the ready circulation of ice-cooled air throughout the car and through the lading with which the car may be loaded. Frequently, and on some lines in as much as seventy-five per cent of the time the car is in use, it may be employed without refrigeration as an air-cooled or ventilated car.

While many of the features of construction of a refrigerator car render it especially suitable for ready ventilation, some of the features permit the air to pass readily over the lading without thoroughly circulating through the cargo and thus preclude complete ventilation of the car.

This invention is directed to the elimination of the difficulties in ventilating a refrigerator car when the car is operated as a ventilated car.

Objects of the invention are to provide a duct for refrigerator cars which is portable and light in weight, compact and foldable into small space, and which can be readily installed in and removed from refrigerator cars without the use of tools.

A further object of the invention is to provide a ventilating duct for refrigerator cars which will force air drawn into the car down to the car floor and thus insure more thorough dispersion of the circulating air through the car and the lading therein.

A further object of the invention is to provide a ventilating duct which will direct the air drawn into the car down to the floor of the car where the heavier particles of foreign materials, such as dust, cinders, soot, and snow will be deposited and the unladen air permitted to pass on into the car to be circulated through the lading.

Other objects, advantages and capabilities of the invention will appear from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings in which:

Figure 1 is a sectional longitudinal elevation of a refrigerator car showing the portable ventilating duct of this invention installed and indicating by arrows the path of the air drawn through the car;

Fig. 2 is a sectional elevation of an ice bunker of a refrigerator car with the portable ventilating duct of this invention installed;

Fig. 3 is a sectional elevation of the portable ventilating duct of this invention collapsed;

Fig. 4 is a fragmentary sectional elevation of the lower end of the portable ventilating duct of this invention showing one form of means by which the duct can be secured to the ice grate in the bunker; this section is taken on the line 4—4 of Fig. 2.

Referring to the drawings, the reference numeral 10 designates a conventional refrigerator car shown in Fig. 1 in sectional elevation. The car is mounted upon wheels and consists essentially of four walls, of which the two end walls 11 are shown. The roof 12 of the car is separated from the ceiling 13 by the space 14 which is customarily filled with insulating material.

At each end of the car the roof is provided with two hatches or openings 15, one mounted to one side of the center line of the car, the other in a corresponding position on the opposed side. Each hatch is provided with a hinged hatch-cover 16 which is customarily pivoted 161 at the side of the hatch toward the middle of the car, and provided with an adjustable bracket 162 by which the hatch cover can be held in open position to provide various sized openings.

Beneath the hatches at each end of the car is an ice-bunker 17 formed by the side walls of the car, the end wall 14, the bulkhead 18, and the ice-grate 19. The bulkhead 18 does not extend from the floor 22 to the ceiling 13 of the car, but is separated from the floor by the passage 20 and from the ceiling by the passage 21.

Beneath the ice grate 19 the ice bunker 17 is provided with a floor pan or tray 35 to collect drippings from the ice and any straw, sawdust or similar materials which may cling to the ice when it is loaded into the bunker.

Overlying the floor 22 of the car, and spaced therefrom by the air-space 24 is the floor rack 23, which is formed of transverse planks 25 mounted upon the stringers 26 and spaced apart to provide the fissures 27 for the passage of air through the floor rack.

When the car is used as a refrigerated car the ice-bunker 17 is loaded with ice and the cooled air moves by convection downward beneath the bulkhead 18 through the passage 20 and the space 24 between the floor 22 and the floor rack 23, through the fissures in the floor rack 23, through the lading borne by the floor rack, through the passage 21 above the bulkhead 18, and back through the ice.

When the car is operated as a ventilated car

not equipped with this invention, the two hatches 16 at each end of the car are swung open and set in open position by means of the adjustable brackets 162. As the car moves the hatches at the forward end of the car serve to scoop the air and direct it through the hatches 15 into the ice bunker 17. Simultaneously, the open hatch covers at the rearward end of the car serve to create areas of low pressure at the rear hatches and draw the air from the car. The most open path for the air is through the hatch 15, into the top of the bunker 17, over the front bulkhead 18 by means of the passage 21, over the lading borne by the floor rack 23, over the rear bulkhead by means of the rear passage 21, and out of the rear hatch.

The current of air drawn into the car is thus directed through the car without circulation along the bottom of the car and through the lading. The air drawn into the car is frequently laden with cinders, dust, soot, snow, rain and any other air-borne foreign matter, and as the air current within the car loses its velocity these foreign particles are dropped into the car and over the lading, with resultant damage to the contents of the car.

This invention is directed to these problems, and consists in the provision of a portable ventilating duct, wholly self-contained, readily collapsible, and capable of installation in and removal from a car without the use of tools. The invention is shown in greatest detail in Fig. 2, collapsed in Fig. 3, and as installed in a refrigerator car in Fig. 1.

The portable ventilating duct consists essentially in a collapsible tube or duct 30, suspended from the frame 28, which is flanged 29 about its mouth so that the frame may be suspended from the flange within a hatch 15. The frame is preferably made of a light stiff material such as sheet metal, and may be of any shape and size which may enter the conventional car hatch, and be suspended therein by resting the flange 29 upon the frame 151 of the hatch. The tube 30 may be made of any material that may be readily folded and flexed and that is not readily pervious to air, such as closely woven fabrics, rubber, leather, etc., and may be made rectangular or circular or polygonal in section.

At intervals along the length of the tube 30 are frame members or hoops 31 secured to the walls of the tube to maintain the tube in open or distended condition. These may be made of any rigid material, such as band iron or heavy wire or light metal rods. In the drawings they are shown secured to the walls of the tube 30 by fabric loops 32 stitched to the tube. They are preferably of a size that will permit them to rest within the frame 28, as shown in Fig. 3.

At the lower end of the tube 30 are shown a pair of hooks 33 secured to the hoops 31 by means of the rings 34 formed at the upper end of the hooks. The open ends of the hooks are swung under the bars 191 which form the ice-grate 19. Other means may be used to stretch the tube 30 within the ice-bunker 17, the essential requirement being that the tube be held fairly stationary within the car, both to insure that it remains open and distended, and to prevent it from flapping about and thus being subjected to unnecessary wearing action.

As may be seen in Fig. 3, the duct may be readily folded or collapsed, all the parts nesting within the frame 28 for carriage or storage.

To install the duct it is merely necessary to secure the hatch-cover 16 in open position and to drop the duct into a hatch of the car, so that the flange 29 rests upon the frame 151 of the hatch. The hooks 33 may then be secured to the bars 191 of the ice-grates 19, and the installation is complete. For removal, unfastening the hooks 33 and lifting the duct from the hatch is all that is necessary.

While only a single duct of this invention is shown in Fig. 1, a similar duct may be installed in any one or more of the four hatches with which the conventional refrigerator car is equipped. If the car may be run in either direction, a duct mounted in one hatch and another in the hatch located at the diagonally opposed corner of the car, with the remaining two hatches closed would insure best results. If a car is to be run continuously in a single direction, two ducts mounted under the open hatches at the forward end of the car, with the two rear hatches merely held open will give the best results.

As indicated in Fig. 1, with a duct of this invention installed in the forward end of the car (direction of motion of the car being indicated by the heavy arrow beneath the car), the air scooped into the car through the forward hatch will be directed through the duct down to the ice-grate 19, and will then pass beneath the front bulkhead 18 through the passage 20, along the floor of the car through the passage 24, a part of it upward through the fissures 27 in the floor rack 23 and through the lading borne thereon, over the rear bulkhead 18 by means of the rear passage 21, and out through the rear hatch 15. The air drawn into the car is thus given definite direction toward and through the passages designed to ventilate the lading.

In addition to the improved dispersion and circulation of the fresh air thus provided, the duct also serves to carry the air drawn into the car for some distance through the ice-bunker 17 but within the tube 30. The velocity of the moving air is thus checked while the air is still over the ice-grate 19, and any air-borne foreign materials, such as cinders, dust, soot and snow are dropped within the ice-bunker and into the floor pans or trays 35, from which they may be readily removed. In this way the air-borne dirt is separated from the circulating air before the air is brought into contact with the lading, and the lading thus kept in cleaner condition.

Although the invention has been disclosed in connection with the specific details of preferred embodiments thereof, it must be understood that such details are not intended to be limitative of the invention except insofar as set forth in the accompanying claims.

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

1. A portable ventilating duct for refrigerator cars comprising a collapsible duct, means to secure the upper end of said duct around a hatch opening in the roof of the car, and means on the lower end of the duct for connection with a part of the car adjacent the bottom thereof to secure said duct in distended condition within said car.

2. A portable ventilating duct for refrigerator cars comprising a frame, means upon said frame to support said frame in a hatch in the roof of a car, a collapsible duct of flexible material suspended from said frame and extending downwardly therefrom into the lower part of the car,

and a plurality of hoops in said duct to hold it open, the duct being open at its lower end to conduct air into the lower part of a car.

3. A portable ventilating duct for refrigerator cars comprising a frame, means upon said frame to support said frame in a hatch in the roof of a car, a collapsible duct suspended from said frame and extending downwardly therefrom into to the lower part of the car and being open at its lower end, and means upon the lower end of said duct for connection with a part of the car adjacent the bottom thereof to maintain the duct in distended condition.

4. A portable ventilating duct for refrigerator cars comprising a frame which may be inserted in a hatch in the roof of a car and supported thereby, a flexible tubular duct suspended from said frame, means upon said duct to maintain said duct in distended condition radially, and securing means at the lower end of said duct connectible to a part of the car adjacent the floor thereof to secure said duct within the refrigerator car in extended condition.

5. A portable ventilating duct for refrigerator cars comprising a collapsible duct formed by a tube of flexible material, a frame connected to the mouth of said duct by which said duct may be suspended in a hatch in the roof of a car, hoops in said duct which can be nested within said frame, and securing means at the bottom of said duct which may be nested within said frame, said securing means being connectible with a part of the car adjacent the bottom thereof when the duct is extended to hold the duct in extended position in the car.

6. A portable ventilating duct for refrigerator cars comprising a deep frame, means upon said frame to support said frame within a hatch in the roof of the car, a collapsible duct suspended from said frame, hoops within said duct to maintain it in distended condition, and securing means upon said duct to maintain it stationary within the car, said duct, hoops and securing means being collapsible to nest within said frame.

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