Aug. 5, 1952 A. F. O'CONNOR 2,605,689

AIR IMPELLER FOR REFRIGERATOR CARS

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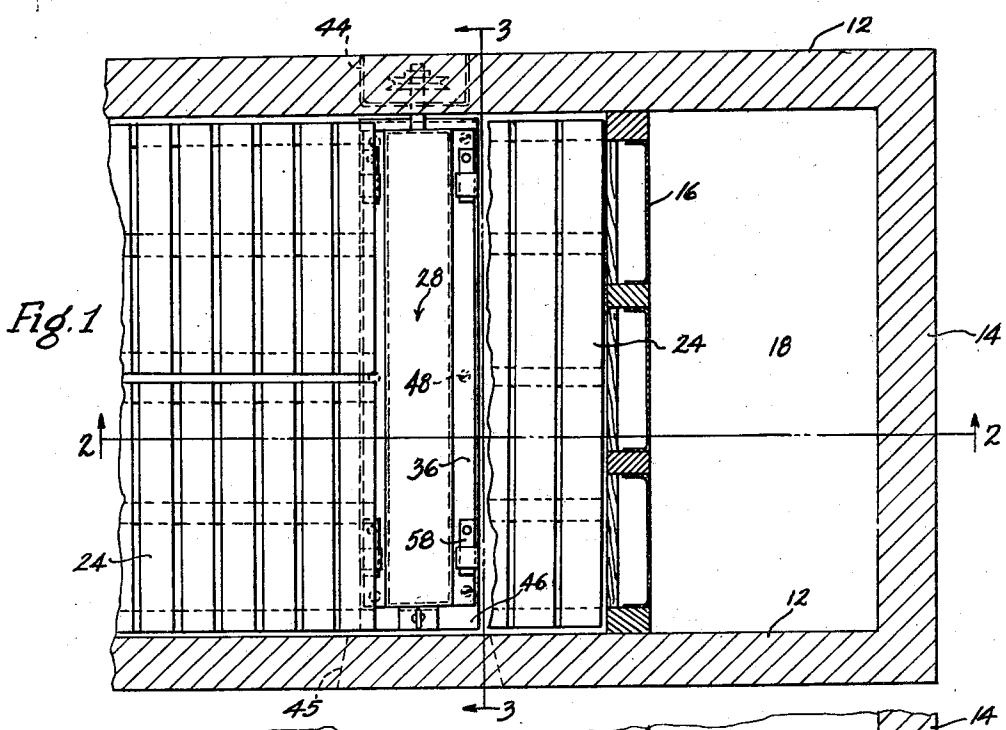


Fig. 1

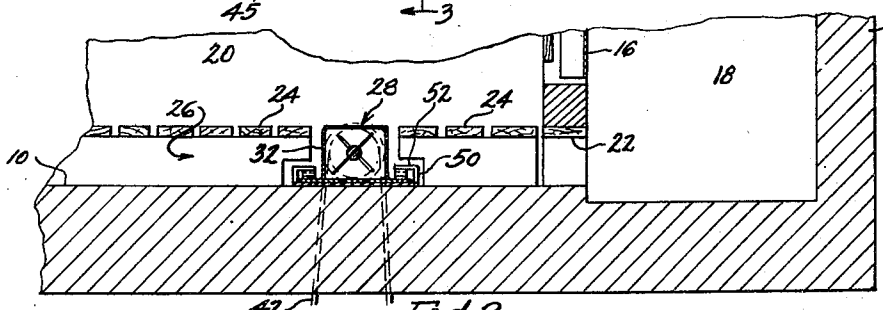


Fig. 2

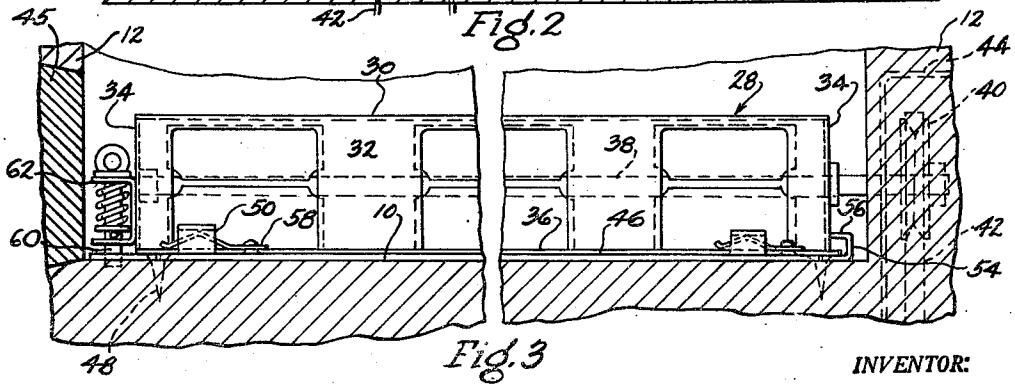


Fig. 3

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AIR IMPELLER FOR REFRIGERATOR CARS

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3 Claims. (Cl. 98—6)

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The invention relates to refrigerator cars and like vehicles used to transport perishable commodities, such as fruits and vegetables and, more particularly, to refrigerator cars equipped with air impellers of the general type shown in United States Patent No. 2,324,749 of July 20, 1943.

The principal object is to provide an improved air impeller which may be installed in or removed from the car from the exterior thereof.

A further object is the provision of an improved air impeller having automatic means for securing it in fixed relation with the car structure, simply by pushing it into the car through a small door opening in the car side wall.

Another object is to provide an improved air impeller automatically disengageable from the securing means which holds it in fixed operative position, simply by pulling it out of the car through the small door opening in car side wall.

An important object is the provision of an improved air impeller which may be removed from the car, while car is loaded, without entering the car or disturbing the load.

Another object is the provision of improved means for cushioning the air impeller from shocks received by the car and prevent direct transference of such shocks to the air impeller.

A further object is to provide an improved air impeller which may be applied to or removed from the car without the use of tools of any kind.

Another object is to provide an improved air impeller which will result in enormous savings to railroad and shipper and correct a condition prevalent with air impellers now in use which threatens the preclusion of the use of air impellers in refrigerator cars, due to the fact that the air impellers now in use have more disadvantages than advantages.

A further object is to provide an improved air impeller simple in construction and economical to manufacture.

Air impellers of the type referred to have come into general use during the past several years and they provide a better distribution of refrigerated air throughout the car and lading and a more even temperature through the various parts of the lading than was possible with the conventional end ice bunkers and no air impellers. They comprise, generally, an elongated housing disposed transversely of the car and secured to the car floor by bolts or lag screws; the housing enclosing and mounting a shaft provided with suitable blades or fins. The elongated housing extends substantially from side wall to side wall of the car, with its bottom supported upon the

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car floor and its upper surface in a common plane with the load supporting surface of the floor racks; the use of floor racks being common practice to space the load from the car floor proper and provide an air space or duct intermediate the load and the floor proper and permit the free circulation of air, through this duct, from one ice bunker to the other. This air duct adjacent the floor permits natural circulation of refrigerated air, between the opposed ice bunkers in the conventional refrigerator car having ice bunkers in opposed ends of the cars and no air impellers. When air impellers are added to the said conventional car, the housing substantially blocks the air passage or duct adjacent the car floor proper, for which reason the air impeller must remain in operative condition in order to provide even minimum requirements as to air circulation adjacent the floor and bottom of the load. If the air impeller becomes inoperative, the air circulation is less than in the conventional car without air impellers and is thoroughly unsatisfactory.

In refrigerator cars equipped with air impellers, the impellers must continue to operate as long as the car is under load and refrigeration, or the result will be fatal to the lading and result in enormous losses of fruits and vegetables, loss of freight revenue, loss of use of the car affected, damage and other claims on the carrier.

It is a well known fact that the air impellers now in use do not continue to operate and failures are common.

Refrigerator cars are loaded on the West coast with perishable commodities for delivery at the East coast, in cars equipped with air impellers. It is becoming a common occurrence to find one or more cars in a train of such cars with the air impellers inoperative. Inasmuch as the air impeller is under the load, such failures require setting the affected cars out of the train at intermediate points, opening the car doors (with loss of stored refrigeration), entering the car, removing the entire load in the affected half of the car, removing the housing fastening bolts, removing the air impeller unit from the car, making repairs to the unit, replacing same in the car and re-loading the produce. In many cases, repairs cannot be made at that particular point on the railroad, due to lack of essential replacement parts or lack of repair facilities. If repairs can not be made, the lading, in all probability will be a total loss, resulting in the loss of several thousand dollars worth of produce. If repairs can be made as quickly as possible, under the most favorable conditions as to availability of repair parts and

facilities, the marketability of the produce will be very seriously affected, market schedules upset and there is a great possibility that the entire load will be a total loss.

As mentioned before, the failure of the air impellers now in use in refrigerator cars, is a very serious matter and it is the main object of my invention to eliminate this unsatisfactory condition.

My invention makes it possible to replace an inoperative air impeller with an operative one, without opening the main car doors or entering the car. Replacement may be made without disturbing the lading. No tools nor shop facilities are needed to make the replacement. It is proposed that several of my improved air impeller units be stocked at strategic points along the railroad, for use in replacing inoperative units without delay and without setting the affected car out of the train. A stock of my units could be maintained at a constant figure, either by repairing a removed unit at the convenience of the shop storing the units or by shipping new units to that shop if a unit could not be repaired.

The foregoing and other objects and advantages of the invention will be readily apparent from the following description, in conjunction with the accompanying drawings.

In the drawings, Figure 1 is a horizontal section through one end portion of a refrigerator car, showing the air impeller in operative position in the car.

Fig. 2 is a vertical section through the same end portion of the car, taken along line 2—2 of Fig. 1.

Fig. 3 is an enlarged, fragmentary, sectional view taken along line 3—3 of Fig. 1.

In the drawings, the general car structure may include a floor 10, side walls 12 and an end wall 14, all of which may be of conventional insulated construction. A bulkhead 16 may be disposed transversely of the car to form an ice bunker 18 adjacent the end wall 14 and form a separating wall between the ice bunker and an adjacent lading compartment 20. The lower margin of the bulkhead 16 may be in spaced relation with the floor 10 and may have supported engagement with a sill 22 disposed in overlying spaced relation with the floor 10. The bunker 18 may be provided with suitable grates and other conventional fittings. The lading compartment 20 may be provided with slatted floor racks 24 adapted to support the lading in spaced relation with the floor 10 and provide an air space or duct 26 intermediate the lading and the floor 10 and, preferably, providing a continuous air duct adjacent the floor 10, throughout the length of the car and providing air communication between the opposed ice bunkers 18 in the ends of the car.

An elongated air impeller 28 may be disposed upon the floor 10, transversely of the car and may comprise an elongated box-like housing having a top wall 30 in substantial alignment with the load bearing surface of the floor racks 24, side walls 32, end walls 34 and a base plate 36.

The base plate 36 may be of greater width than that of the box-like portion of the housing, to provide opposed laterally extending margins adjacent the lower portion of the box-like portion. A horizontal shaft 38 may be suitably mounted within the housing for rotation about a horizontal axis and may be provided with suitable blades or fins. One end of the shaft 38 may extend within or through the side wall 12 and may be provided with a selectively removable belt pulley 40 adapted to be driven by a belt 42 having driven connection with a driving mechanism located beneath the car floor. A housing 44 may be provided in the car wall 12 to provide operating room for the belt 42 and associated parts and to provide access to said belt and parts, as for repair or removal, from the exterior of the car. The opposed side wall 12 may be provided with a door 45 in substantial axial alignment with the air impeller 28, adapted to permit withdrawal of the impeller from the car, through the door 45, by moving the impeller in a direction transversely of the car and toward the door 45.

A mounting plate 46 may be provided to slidably support the impeller 28 and may comprise a substantially flat elongated plate disposed transversely of the car and secured to the floor 10 by countersunk-head screws 48. The plate 46 may be slightly wider than the base plate 36 and may be provided, along its opposed marginal portions, with upstanding lugs 50 adapted to interlock with portions of the impeller 28, when the impeller is in operative position, and to serve as guiding means for the impeller as it is moved in and out of operative position. The lug 50 may comprise a vertically disposed metal plate affixed at its lower end to the mounting plate 46 and terminating at its upper portion in a laterally, inwardly turned horizontal portion 52.

Viewing Fig. 3 of the drawings, it will be seen that the lug 50 at the right hand side projects upwardly less than does the lug 50 at the left hand side. It will also be noted that I show an opposed pair of lugs 50 at the ends only of the impeller. I contemplate the use of additional lugs 50, intermediate those shown in the drawings, and, where additional lugs are used, I propose that the extreme right hand lug (viewing Fig. 3) project upwardly a given distance and that the additional lugs project upwardly progressively, the lug at the extreme left being the highest. This is in order that each lug 50 will engage only a predetermined cooperating part on the impeller, as the impeller is moved into and out of operative position, in order to facilitate such movement. The end margin of the mounting plate 46 may be flat, adjacent the door 45, to facilitate removal of the impeller without raising it and may be provided with an aperture adapted to cooperate with a lock bolt carried by the impeller, to limit movement of the impeller transversely of the car when in operative position. The opposed end margin of the mounting plate 46 may be provided with a vertical bent portion 54 and a rebent portion 56 facing inwardly of said margin. The portion 56 may serve as a stop to limit the movement of the impeller in one direction transversely of the car and the space intermediate the portion 56 and the plate 46 may provide means whereby any refuse, collecting in front of the impeller while being moved to operative position, may clear itself.

The opposed longitudinal margins of the base plate 36 may be provided with a resilient locking member 58; a locking member 58 being disposed on the base plate 36 coincident with the location of and cooperating with each of the lugs 50, when the impeller is in operative position.

The locking member 58 may comprise a flat strip of spring steel, secured adjacent one end portion thereof in flatwise engagement with the longitudinal marginal portion of the base plate 36 and may be formed with an arched portion adjacent its opposed end portion. The locking member 58 may be arched sufficiently to insure

the arched portion being under compression when in interlocked relation with the cooperating lug 50 whereby the impeller may be resiliently secured to the car floor 10 when in operative position and whereby the car shocks will not be transmitted directly to the impeller. The locking member 58 may be elongated in shape, with its length disposed parallel to the length of the impeller.

The air impellers now in use in refrigerator cars are delicately constructed, as compared with the usual rugged construction of all other devices on a freight car. Experience has proven that the transference of car shocks to the impeller has resulted in broken parts, other damage and misalignment of the bearings which journal the operating shaft 38 transversely of the car. It is an important objective of the makers and users of these impellers to cushion these car shocks as much as possible. The resilient fastening means of the present invention will help to cushion these shocks and and I contemplate the use of a strip or sheet of rubber, felt or other resilient material, intermediate the impeller and the floor 10, to further provide cushioning means. It will be apparent that the resilient fastening means, shown in the drawings, may be replaced, however, with more rigid fastening means without departing from the scope of my invention.

The end portion of the impeller, adjacent the door 45, may be provided with a vertically movable lock bolt 60, mounted for sliding movement in a bracket 62. The bracket 62 may be U-shaped and may be provided with a coil spring intermediate the parallel spaced arms of the bracket adapted to normally urge the lock bolt 60 downwardly into holding relation with the beforementioned aperture in the end portion of the mounting plate 46, adapted to maintain the impeller against movement laterally of the car when the impeller is in operative position.

It will be obvious that the lugs 50 may be secured to the floor 10, or other part of the car structure, without the use of the mounting plate 46, but I prefer to use the plate 46 to facilitate sliding movement of the impeller.

The door 45 may be relatively small in area—slightly larger than the cross-sectional area of the impeller—and may be similar in construction to that of the large car doors, with resilient packing around its edges to provide an air seal. I contemplate an embodiment of my invention where the door 45, or a part thereof, may be used to hold the impeller in operative position, when the door 45 is closed. The door 45 may be fitted with any suitable type of hinges and fastening means.

It will be obvious, to those skilled in the art, that various modifications may be made in the embodiment of my invention shown and described herein, without departing from the scope of my invention and it is to be understood that I do not limit same to the precise structure shown and described.

I claim:

1. In a refrigerator car having a floor, spaced side walls and a door opening in one of said walls, air circulating means comprising an elongated box like housing slidable lengthwise through the door into and out of the car to be disposed transversely of the car adjacent its floor, mounting means secured to the car floor to receive the housing, air circulating devices in the housing to cause a circulation of air therethrough and through the car, driving means connected to the air circulating devices a relatively flat base on the housing, guide means on the mounting means slidably engaging the base to guide the housing for linear sliding movement into and out of the car, and slidably interfitting fastening parts on the base and the guide means to engage when the housing is slid into the car on the guide means.

2. In a refrigerator car having a floor, spaced side walls and a door opening in one of said walls, air circulating means comprising an elongated box like housing slidable lengthwise through the door into and out of the car to be disposed transversely of the car adjacent its floor, mounting means secured to the car floor to receive the housing, air circulating devices in the housing to cause a circulation of air therethrough and through the car, driving means connected to the air circulating devices a relatively flat base on the housing, guide means on the mounting means slidably engaging the base to guide the housing for linear sliding movement into and out of the car, slidably interfitting fastening parts on the base and the guide means to engage when the housing is slid into the car on the guide means, and releasable detent means carried by the end of the housing adjacent to the door opening to engage the car floor and limit sliding of the housing.

3. In a refrigerator car having a floor, spaced side walls and a door opening in one of said walls, air circulating means comprising an elongated box like housing slidable lengthwise through the door into and out of the car to be disposed transversely of the car adjacent its floor, mounting means secured to the car floor to receive the housing, air circulating devices in the housing to cause a circulation of air therethrough and through the car, a driving shaft for the air circulating devices extending from one end of the housing to project through the other of the side walls when the housing is in the car, and slidably interfitting fastening parts secured respectively to the housing and the mounting means to engage in response to movement of the housing into the car through the door opening and to disengage in response to movement of the housing out of the car.

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