Sept. 8, 1959 N. H. WILLIS ET AL 2,902,837

AIR CONDITIONING SYSTEM FOR RAILWAY CARS AND UNIT-MOUNTING MEANS THEREFOR

Filed Dec. 6, 1956 5 Sheets-Sheet 1

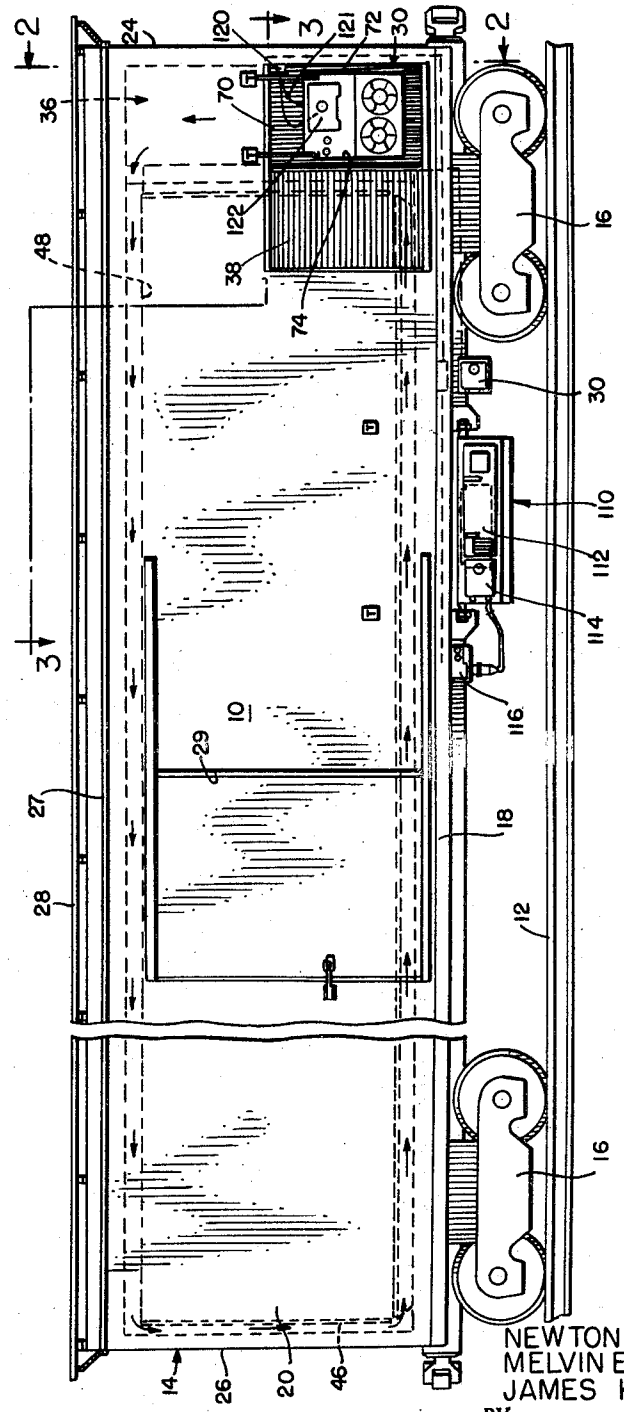


FIG. 1

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FIG. 2

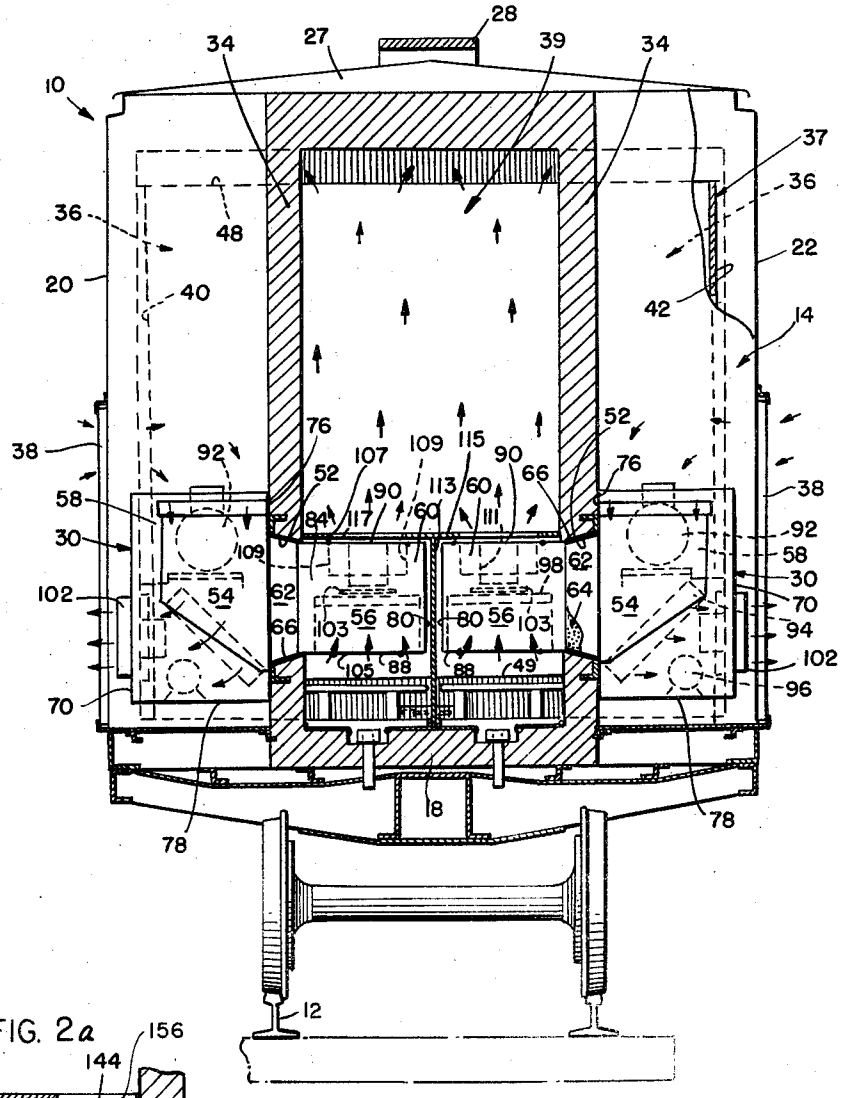
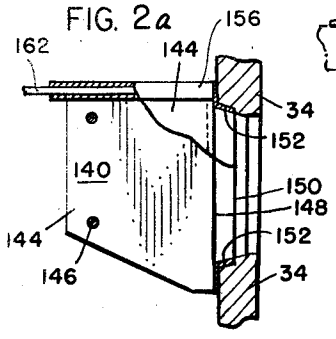


FIG. 2a



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AIR CONDITIONING SYSTEM FOR RAILWAY CARS AND UNIT-MOUNTING MEANS THEREFOR

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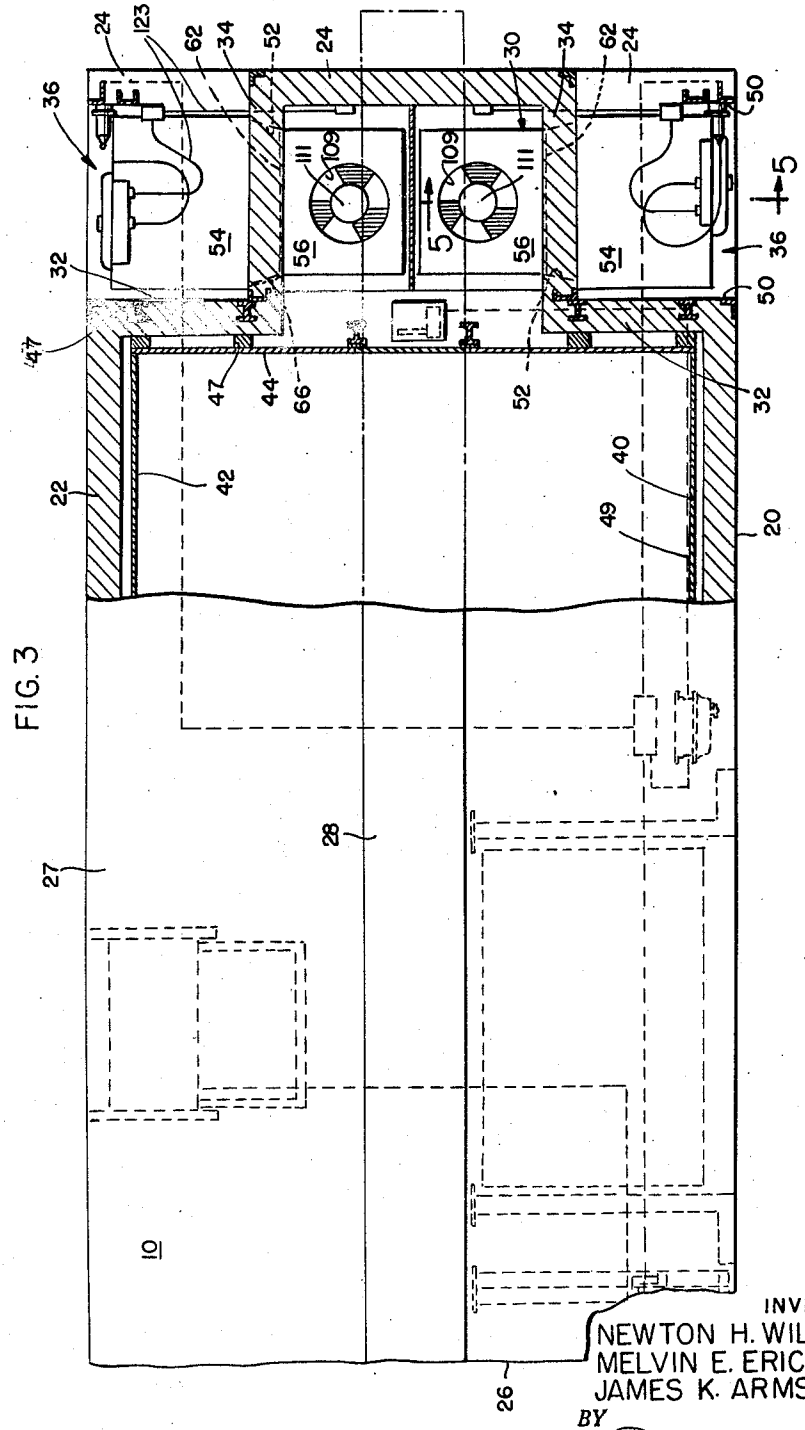


FIG. 3

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AIR CONDITIONING SYSTEM FOR RAILWAY CARS AND UNIT-MOUNTING MEANS THEREFOR

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FIG. 4

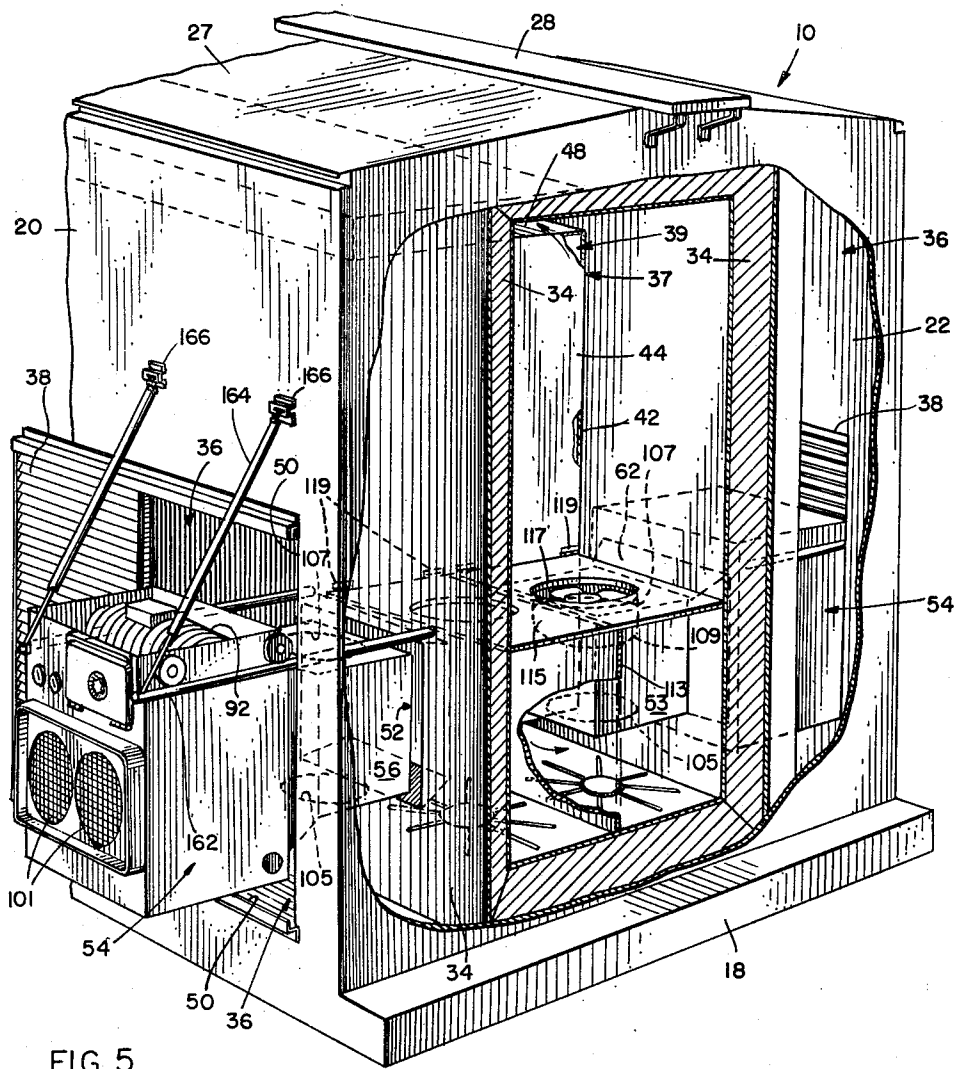
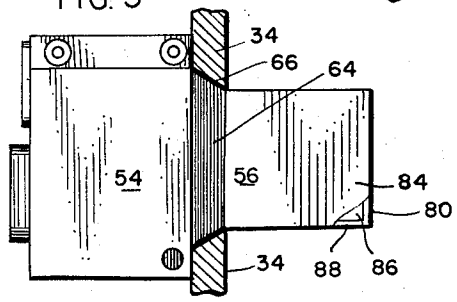


FIG. 5



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AIR CONDITIONING SYSTEM FOR RAILWAY CARS AND UNIT-MOUNTING MEANS THEREFOR

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FIG. 6

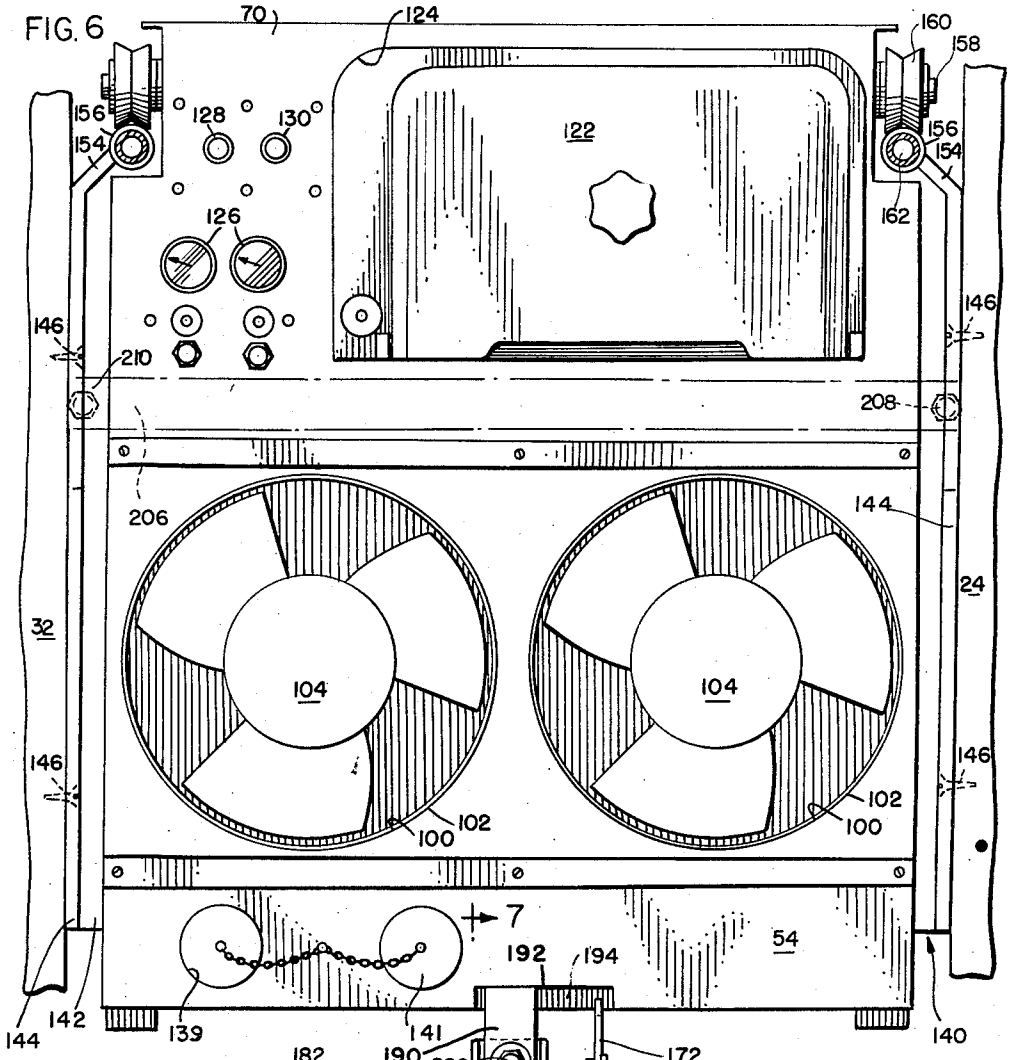
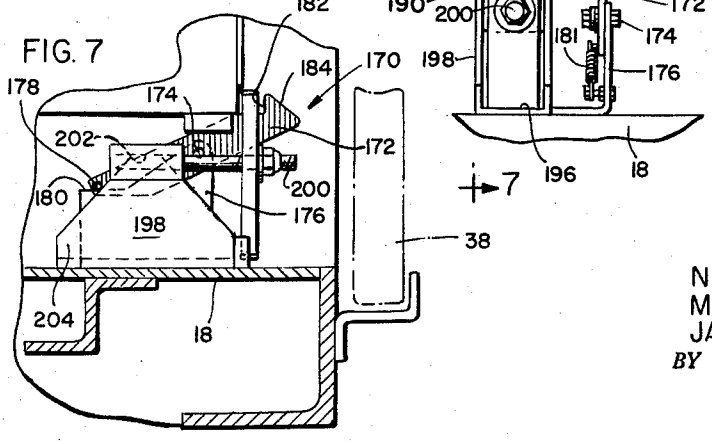


FIG. 7



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2,902,837

AIR CONDITIONING SYSTEM FOR RAILWAY CARS AND UNIT-MOUNTING MEANS THEREFOR

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Application December 6, 1956, Serial No. 626,694

4 Claims. (Cl. 62—239)

The improved air conditioning system comprising the present invention has been designed for use primarily in connection with the selective refrigeration and heating of the interior of railway refrigerator cars. The invention is, however, capable of other uses and the improved system of the present invention, as well as certain unit-mounting means associated with the system, may, if desired, with or without modification, be employed for regulating the temperature of air within other enclosures associated with mobile refrigerator vehicles such as, for example, the larger variety of refrigerator trucks designed for long distance transportation of perishable foodstuffs and the like. Irrespective of the particular use to which the invention may be put, the essential features thereof are at all times preserved.

Specifically, the invention relates to a novel association of a package type air conditioning unit including, among other things, the usual motor driven compressor, a condenser, a receiver, an evaporator and air circulating means for passing air through the evaporator, with a refrigerator car structure which will produce operational advantages and installation facilities hitherto not attainable with conventional air conditioning apparatus and conventional railway or other mobile car or vehicle structures. According to the present invention, both the package type air conditioning unit and the railway car structure are constructed according to novel principles, the former so that when installed in the railway car there will be a large volume flow of outside air through a portion of the unit and across the condenser for cooling purposes with a final discharge to the outside atmosphere, and the latter so that when the unit is installed therein there will be an efficient circulation of cold air through the entire length of the refrigerator car with the evaporator phase of the unit being operatively disposed in the closed circulatory path of cold air. Additionally, the refrigerator car and package type air conditioning unit are so designed that the latter may conveniently and with facility be introduced into and removed from the refrigerator car through an opening in the side of the car in such a manner that the unit, when desired, may be extended laterally from the car without completely detaching the same therefrom and without requiring the use of hoists, jacks or other lifting devices, for inspection and minor repairs in the field, or, when necessary, may readily be completely removed from the refrigerator car for return to the factory for major servicing with a replacement unit being substituted in its stead, the substitution taking place without necessitating any disassembly whatsoever of the package type unit.

The provision of a novel combination of an air conditioning unit and railway car structure of the character briefly outlined above being among the principal objects of the invention, it is a further object to provide a unit having a sectional housing providing a relatively large compartment designed to occupy a position near the outside wall of the refrigerator car and which may generally be referred to as the "hot compartment" or

"hot side" of the unit inasmuch as it encloses the compressor, condenser and receiver, and a relatively small compartment which is insulated from the large compartment and which is designed to occupy a position within the railway car inwardly of the large compartment, the latter compartment constituting generally for descriptive purposes a "cold compartment" or "cold side" of the unit inasmuch as it encloses the evaporator. In connection with such structure, the refrigerator car is so designed that the hot and cold sides of the unit, in addition to being effectively and inherently insulated from each other within the sectional unit housing, are additionally maintained in thermally isolated portions of the car structure, the hot side being contained within a limited enclosure near the outside of the car where outside air may conveniently be drawn into and expelled from the enclosure for cooling purposes as briefly outlined above, and the cold side being disposed on the opposite side of an insulated bulkhead or wall structure well within the interior of the car where its cooling effect is available by proper circulation of air therethrough and throughout the commodity-containing portion of the car for refrigerating purposes according to the present invention.

It is a further object of the invention, in an apparatus of this character to provide a novel association of the car structure and package type unit wherein dual air conditioning units extending inwardly from opposite sides of the car may be arranged in tandem near one end of the car with their cold sides positioned in close proximity to each other and within the inner refrigerating compartment of the car where they operate jointly to impart their cooling function to the air circulating through the compartment in the same general region of the latter.

A similar and related object of the invention is to provide an air conditioning apparatus and car structure wherein the former is totally enclosed within the latter as outlined above and in which the operating controls for the air conditioning unit, or for each unit in the case of dual units, are presented outwardly of the side walls of the car body whereby they are accessible to the operator and are normally concealed behind louvered sliding door panels which enhance the circulation of air through the hot sides of the unit for cooling purposes while at the same time protecting the units and their control mechanism against the adverse effects of the elements during inclement weather. Another allied object is the provision of an apparatus of this sort wherein the louvered panels, while effective to conceal and protect the air conditioning units are stated above, are nevertheless operative to disclose therethrough from the outside thereof the operation of certain colored signal lights associated with the units and whereby the operating condition of the units may readily be ascertained.

It is another object of the invention to provide an air conditioning unit and associated railway car structure possessing the features of novelty outlined above and wherein when the package unit is installed within the car by insertion bodily thereinto, proper thermal sealing of the hot and cold sides of the unit, one from the other across the aforementioned insulated bulkhead, will take place automatically without necessitating the use or application to the unit of special sealing compounds, crack fillers and the like which are not only messy in their application, but which also become hardened or set in time and require considerable labor for their application and their removal when substitution of units is made.

Another object of the invention is to provide a railway car structure capable of operatively receiving therein one or more air conditioning units of the character set forth above and wherein the car structure includes a large generally rectangular outer opening which is formed in the side wall of the car through which the package type unit

is initially introduced during installation thereof and which opening is aligned or in register with a smaller inner opening formed in the aforementioned insulated bulkhead, the bulkhead and outer wall defining therebetween a pocket adapted to enclose therein the hot side of the air conditioning apparatus with the smaller or cold side of the apparatus projecting through the smaller opening and extending into the refrigeration space behind the bulkhead and being sealed within said inner opening.

A similar object is to provide a car structure designed to accommodate reception of an air conditioning unit of the type set forth above wherein the pocket for the hot side of the unit is lined, so to speak, with a metal jacket designed for reception therein of a portion of the air conditioning unit, the jacket embracing the received portion and affording a rigid attachment or reaction device to which the unit may firmly be secured against dislodgment, the jacket serving to protect the car side walls, the bulkhead and other car structure from damage during installation and transit, as well as affording better anchorage for the unit which otherwise would require attachment directly to the car body. Another and related object is to provide such a confining jacket wherein the jacket has mounted thereon a pair of guide and supporting rails designed for tractional support of the entire air conditioning unit and by means of which sliding movement of the unit into and out of the openings provided for it in the side wall and bulkhead of the refrigerator car is facilitated. A similar object is the provision of such a confining jacket for the unit wherein the jacket has associated therewith releasable means for maintaining the unit securely anchored within the jacket against dislodgment. Another similar object is to provide an effective latch means whereby the unit is automatically latched in position within the confining jacket after it has been slid to its "home" position within the jacket so that the unit will be held in position against outward sliding movement preparatory to effecting the final securing operation upon the unit whereby it is permanently anchored within the jacket.

An additional object of the invention is to provide an air conditioning unit and associated car structure involving novel facilities for defrosting or deicing the drain pan associated with the unit, these facilities being built into the car structure and, otherwse existing independently of the air conditioning unit.

Simplicity of construction, compactness and convenience of arrangement of parts without sacrificing efficiency of operation, ruggedness and durability, and ease of operation and maintenance are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects and advantages of the invention, not at this time enumerated, will become more readily apparent as the nature of the invention is better understood.

In the accompanying five sheets of drawings forming a part of this specification a preferred embodiment of the invention has been shown.

In these drawings:

Fig. 1 is a fragmentary side elevational view of a railway refrigerator car constructed in accordance with the principles of the present invention and to which there has been applied a pair of package-type air conditioning units likewise embodying novel principles both inherently and in association with the railway car structure;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 2A is a detail sectional view taken vertically through a retaining and supporting plate employed in connection with the present invention and showing the same operatively installed in the car body structure;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary perspective view of one end of the refrigerator car with the conditioning units mounted therein and with a portion of the car end wall removed to more clearly illustrate the nature of the invention;

Fig. 5 is a detail sectional view taken substantially along the line 5—5 of Fig. 3;

Fig. 6 is an enlarged fragmentary front elevational view of one of the air conditioning units of the present invention and showing the manner in which the same is operatively mounted within a side opening formed in the refrigerator side wall; and

Fig. 7 is a sectional view taken substantially along the line 7—7 of Fig. 6.

Referring now to the drawings in detail and in particular to Fig. 1 the refrigerator car 10 disclosed therein is to a large extent of conventional construction insofar as its external appearances are concerned, its running gear and the coupling devices whereby it may be attached to an adjacent railway car in a train being purely conventional. The car 10 is generally of the type currently in use in connection with the transportation of perishable comestibles such as fruit, vegetables and frozen food products and it is adapted to travel on rails 12. The car is comprised of a car body 14 which is supported at its ends on the rails 12 by means of wheel-equipped trucks 16. The car body 14 includes a car floor 18, side walls 20 and 22, end walls 24 and 26, respectively. The wall 24 may be regarded as the forward or leading end wall and the wall 26 as the rear or trailing end wall for purposes of description herein although it will be understood that the car may travel in either direction on the rails 12. The car body 14 is further provided with a top wall or roof 27 having the usual trainmen's walk 28 extending therealong. The illustration made herein of the car body 14 is somewhat schematic and it will be understood that the car floor 18 is of a composite type including the usual side sills and other supports and appurtenances (not shown) incident to conventional car floor structures. Likewise, the side walls 20 and 22 and end walls 24 and 26 and roof 28 may be of composite double panel design, if desired. The medial regions of the side walls 20 and 22 are provided with the usual door-closed loading openings 29.

As best seen in Figs. 1, 2 and 3, the refrigerator car 10 is adapted to have associated therewith a pair of identical package-type air conditioning units or assemblies, each of these assemblies being designated in its entirety at 30 and the nature and function of which will be described presently. The forward region of the car body is modified to accommodate reception therein of the two units 30 with the units being arranged in tandem or back-to-back relationship as shown in Fig. 2. Accordingly, the forward regions of the side walls 20 and 22 are turned inwardly as at 32 (Fig. 3) and again forwardly as at 34 where they join the front end wall 24 at regions spaced inwardly of the vertical planes of the side walls 20 and 22. The inwardly turned wall portions 32 and forwardly extending portions 34 constitute in effect transversely and longitudinally extending bulkheads respectively which, in combination with the outer regions of the end wall 24, provide a pair of open pockets or compartments 36 which are substantially of full car height and which are adapted to receive therein in nested relationship, portions of the respective air conditioning units 30, all in a manner that will be made clear presently. The outwardly facing open sides of the pockets 36 constitute entrance openings for insertion of the units 30 into the car structure and these openings are adapted to be closed after installation of the units by means of sliding louvered door panels 38 (Figs. 1 and 4) of special design and having a novel function in association with the air con-

ditioning apparatus as will likewise be pointed out subsequently.

Referring now to Fig. 3, the bulkheads 32 and 34 are preferably of the insulated type and may be formed of heat insulating material or may be of a composite nature having an insulating filler material interposed between dual wall thicknesses. Disposed within the space which is bounded by the two side walls 20 and 22, the rear end wall 26, the transverse bulkheads 32 and the car roof 27 is an inner shell-like housing 37 providing a refrigeration enclosure 39 of rectilinear design and including side walls 40 and 42, front and rear end walls 44 and 46 respectively (see also Fig. 1), and a top wall 48. The side walls 40 and 42 are spaced slightly from the car side walls 20 and 22 respectively and may thus be regarded as being part of the composite refrigerator side walls. Similarly the rear end wall 46 is slightly spaced from the rear end wall 26 and may be regarded as being a part of the composite rear car wall. The front wall 44 is slightly spaced from the transverse bulkheads 32 and various structural members such as the vertical posts shown at 47 in Fig. 3 may be employed for maintaining the inner refrigeration enclosure spaced from the walls and roof of the car body 14. Overlying the floor 40 of the car 10 is the usual wooden planking 49 which is maintained slightly elevated from the floor and upon which is adapted to be supported the various boxes, crates or other containers for the commodities undergoing refrigeration. When the car is fully loaded, the various containers block the interstices between the individual adjacent planking units so that there will be a path for air circulation underneath the commodity. From the above description, it will be seen that due to the spaced wall arrangement described above, as well as the overlying planking 49, the entire refrigeration enclosure 39 is enveloped or "blanketed" by an air passage which it is a function of the present invention to refrigerate by the passage or circulation of cold air therethrough in a manner that will be described in detail subsequently.

Referring now to Figs. 2, 3 and 4, each of the previously mentioned full-height open pockets 36 has its outer side partially closed by a depending portion of the car side wall 20 or 22, as the case may be, while at the lower region of the pocket there is provided a rectangular entrance opening 50 through which one of the air conditioning units 30 is adapted to be introduced into the car upon initial installation thereof. Aligned with the opening 50 and formed in the adjacent longitudinal bulkhead 34 is a somewhat smaller rectangular opening 52, the rim of which is slightly tapered to provide a seating surface designed for sealing engagement with a frustopyramidal sealing gasket associated with the air conditioning unit 30 and the nature and function of which will be described presently. The unit 30, when installed, is adapted to be partially nested within the pocket 36 and to project through the opening 52 in sealing relationship so that the effective cooling instrumentalities associated therewith are positioned within the refrigeration enclosure 39.

The two air conditioning units 30 are identical in construction and therefore a description of one of them will suffice for the other. Each unit is a self-contained package type unit and includes an outer casing or shell of irregular configuration and which provides a relatively large rectilinear box-like structure 54 and a relatively small rectilinear box-like structure 56, the two structures affording interior compartments 58 and 60 respectively, which are separated by a medial rectangular relatively thick hollow dividing or partition wall 62 which may be of hollow construction and filled with insulating material 64 (Fig. 2). The outer face or edge of the rectangular partition wall 62 is tapered and receives thereover a resilient sealing gasket 66 of frustopyramidal configuration and designed for sealing engagement with the tapered opening 52 when the unit 30 is in its installed position within the car 10. In its installed position, the unit 30 is so situated that the relatively large box-like structure 54 is nested in the bottom region of the full-height pocket while the smaller box-like structure 56 is disposed within the refrigeration enclosure 39 with the partition wall 62 disposed in the plane of the longitudinally extending bulkhead 34.

With reference to the air conditioning unit in its installed position in the car 10, the large box-like structure 54 is provided with an outer vertical wall 70 (Fig. 2), front and rear vertical side walls 72 and 74 respectively (Fig. 1), an inner vertical wall 76 and a horizontal bottom wall 78. The upper end of the structure 54 is open. Similarly, the inner smaller box-like structure 56 is provided with an extreme inner vertical wall 80, front and rear vertical side walls 84 and 86 respectively, a horizontal bottom wall 88, and a horizontal top wall 90. The vertical partition wall 62 constitutes the remaining wall of the structure.

The outside box-like structure 54 is designed to enclose a motor driven compressor 92, a condenser 94 and a receiver 96 (Fig. 2), these elements being more or less of conventional design and constituting standard or essential elements of an operative air conditioning system. It will be understood that these elements are operatively connected to one another in a conventional closed-circuit hydraulic refrigerant system, the details of which have not been disclosed herein. Since heat is generated by the compressor 92 and since no cooling effect takes place in the compartment 58, the box-like structure 54 may be for purposes of description herein, be referred to as the "hot side" of the unit 30 and the compartment 58 as the "hot compartment."

The inside box-like structure 56 is designed to enclose an evaporator 98 which effects a cooling action on air passing therethrough and as a consequence the structure 56 may conveniently be referred to as the "cold side" of the unit 30 and the compartment 60 as the "cold compartment" thereof. The compressor is operatively connected in the refrigerant system by means not shown in proper hydraulic relation with respect to the other operative air conditioning instrumentalities.

As best seen in Fig. 2, the compressor is mounted in the upper regions of the hot compartment 58 and the condenser 94 is positioned beneath the compressor and is supported at an approximate 45° incline with respect to the vertical. The receiver 96 is positioned in the bottom regions of the compartment 58 where it is nested beneath the inclined condenser. The outside wall 70 of the structure 54 is formed with a pair of circular openings 100 which are screen-protected as at 101 (Figs. 4 and 6) and in which there are centered respective cylindrical air-confining conduits 102 having associated therewith electric fan assemblies 104.

Referring now to Figs. 1 and 4, the openings 74 formed in the side walls 20 and 22 of the car structure 10 are adapted to be closed by the sliding louvered door panels 38 when the system is in operation with the car in transit. Under such circumstances, air is drawn through the louvered panel and into each pocket or compartment 36 above the open-top box-like structure 54 under the influence of the fan assembly 104. The air passes into the hot side of the unit 30 and flows over and around the inclined compressor 92 and exerts a cooling effect thereon, after which it passes through the condenser 94 and over the receiver 96 and is expelled from the structure 54 and compartment 36 through the conduits 102 and louvered panel 38.

The evaporator 98 is disposed in the lower regions of the box-like structure 56 as shown in Fig. 2 immediately above an opening 105 (Fig. 4) which is formed in the bottom wall 88. An opening 107 provided in the top wall 90 has centered therein an air-confining conduit

109 having associated therewith a fan assembly 111 by means of which air is drawn upwardly through the structure 56, and consequently through the evaporator 98, and expelled into the refrigeration enclosure 39. An electric heater 103 is interposed between the fan assembly 111 and evaporator 98 and is adapted to be energized when the cooling system is not in operation so that heated air may be expelled from the opening 107 into the closure 39. A partition wall 113 (Fig. 6) extends upwardly from the floor 18 between the adjacent inner walls 80 of the box-like structure 56 and terminates substantially at the level of the top walls 90 thereof. A pair of horizontal panels 115 extend between the partition wall 53 and bulkheads 34 immediately above the top walls 90 of the structures 56 and are formed with openings 117 therein in alignment with the respective air outlet openings 107. The panels 115 may be hinged as at 119 to the front wall of the inner housing 37 so that they may be swung upwardly to an out-of-the-way position to give access to the floor region of the compartment 39 where certain defrosting instrumentalities are positioned and which will be described subsequently.

As shown in Figs. 1 and 3, electric current for operating the motor driven compressor 92 is obtained from an engine-generator unit 110 mounted beneath the car floor 18 and which includes an internal combustion engine 112 and an electric generator 114 operatively connected thereto in driving relationship. The combustion engine 112 is supplied with fuel from a suitable tank 116 likewise mounted beneath the floor 18. A battery 118 adjacent the generator 114 supplies starting current to the starting motor of the engine. The electrical system for the operation of the air conditioning units 30 forms no part of the present invention except insofar as certain signal devices which will be described subsequently are concerned. Current may be supplied from a receptacle 120 (Fig. 1) through leads 121 to a control box 122 suitably mounted within a recess 124 formed in the outside wall 70 of the outer box-like structure 54, and from which suitable electric conduits 123 may extend to the various electrical instrumentalities associated with the refrigeration system. Suitable pressure gauges 126 and other indicating or control devices may be mounted on the wall 70 or at any desired region on the refrigerator car 10 if desired. A pair of signal lamps 128 and 130 designed to radiate light of different colors, for example, green and red, respectively, are operatively mounted on the wall 70 and reflect their light onto and through the louvered door panel 38 so that the light therefrom is visible from the outside of the refrigerator car 10 even when the panel is closed over the opening 74. The lamps 128 may be selectively energized automatically by suitable relay or other mechanism to indicate when the unit 30 associated therewith is in operation for heating or cooling of the air within the refrigeration space 39. Adjacent the bottom of the outside wall 70 a pair of inspection openings 139 having removable closures 141 are provided with these openings being in direct register with the receiver 96.

Referring now to Figs. 2A and 6, the supporting means for the air conditioning units 30 has been shown in detail in these views but has been omitted for the sake of clarity from the other views except insofar as certain schematic representations thereof have been made, for example, in Figs. 1 and 4. This means comprises a frame member designated in its entirety at 140 and consists of a relatively thick sheet of metal of U-shape horizontal cross section and having a vertical base portion 142 from which there extend laterally a pair of side wings 144. The frame member 140 is adapted to embrace the box-like structure 54 of the air conditioning unit 30 on three sides thereof when the latter is installed within the refrigerator car 10 and, toward this end, the member is secured within the pocket or compartment 36 in such a manner as to line the walls thereof, so to speak, with the two wings 144 being secured by anchoring screws or the like 146 to the opposed bulkhead 32 and front end wall 24 respectively. The base portion 142 of the frame member 140 is formed with a central rectangular opening 148 therein which is surrounded by a marginal flange 150 the walls of which are inclined to accommodate the inclination or taper of the walls of the opening 52 formed in the bulkhead 34 and which flange extends into the opening 52 and seats within a recess 152 so as to lie flush with the edge surface thereof and lend reenforcement to the opening and protect the same from damage during installation of the unit 30.

The upper edge regions of the side wings 144 converge toward each other as at 154 (Fig. 6) and the extreme upper edge of each wing has welded thereto or otherwise carries a supporting rail in the form of a rod-like member 156, the two rails extending in parallelism on opposite sides of the unit 30. The rails 156 are adapted to support thereon substantially the entire weight of the unit 30 when the latter is in its "home" position within the car structure. Accordingly, a pair of stub shafts 158 project outwardly from each side of the box-like structure 54 near the top edge thereof and carry thereon grooved rollers 160 which are tractionally supported on the rods 156. As will be described presently, means are provided for locking the unit 30 in its retracted or "home" position within the car structure and for selectively releasing the same so that the entire unit may be bodily rolled outwardly on the rails 156 to an extended position such as has been illustrated in Fig. 4 wherein the unit is available for inspection and minor repairs in the field. In order that the unit 30 may be partially extended from the pocket 36 at the side of the car structure, the tubular rods 156 are adapted to receive therein removable extensions which are in the form of tubular rods 162 (see Figs. 2A, 4 and 6), the latter being telescopically receivable in the ends of the rods 156. The rods 162 when fitted in the ends of the rods 156 constitute rail extensions so that when the unit 30 is pulled outwardly of the pocket 36 the weight thereof is shifted from the rod 156 to the rod extensions 162. In order to support the outer ends of the rod extensions 162, a pair of struts 164 are detachably connected to the free ends of the rod extensions 162 at one end thereof and are capable at their other ends of being removably received in a pair of bayonet-type brackets 166 suitably secured to the outer face of the car side wall 20 or 22 as the case may be. When the unit 30 is in its retracted operative position within the car structure and the rod extensions 162 are not in use, they may be stored in a convenient place within the car structure.

Referring now to Figs. 6 and 7, a latching mechanism designated in its entirety at 170 is provided for the purpose of maintaining the unit 30 against outward rolling movement on the rails 156 during initial installation of the units in the car body as the unit approaches its final "home" position. The latch assembly includes a latch element proper 172 which is pivoted medially of its ends as at 174 to the upper end of an L-shaped bracket 176 mounted on the floor structure 18 immediately forwardly of the lower outer edge of the unit 30. The inner end of the latch member 172 carries a limit pin 178 designed for engagement with a shoulder 180 formed on the bracket 176. The latch member 172 is normally biased by a spring 181 to an advanced position wherein a shoulder 182 formed on the outer free end of the member is directly in the path of outward sliding movement of the lower outer edge of the unit 30. The forward end of the latch is provided with an inclined surface 184 which, when the latch is in its normal position of rest, is directly in the path of inward sliding movement of the unit 30 so that as the unit moves inwardly, the same may trip over the latch member and retract the same until such time as the outer lower edge thereof passes the shoulder 182, after which the latch may move to its normal advanced position with the shoulder pre-

venting withdrawal of the unit. The latch assembly **170** is provided merely as a precautionary measure against accidental dislodgment of the unit during installation, as, for example, when the railway refrigerator car is on a lateral incline.

During installation of the unit **30**, after the same has been moved to a position wherein the latch instrumentalities **170** are effective to hold the unit in its approximate "home" position, the same is adapted to be permanently clamped in position by means of a clamping bar **190** one end of which bears as at **192** against the bottom of a recess **194** provided in the forward face of the outer wall **70** and the other end of which seats within a socket **196** provided at the forward side of a block **198** secured to the floor structure **18**. A threaded tie rod assembly **200** projects through the medial region of the clamping bar **190** and has its end threadably received as at **202** in the block **198**. Additional securing means in the form of a longitudinally extending clamping bar **206** spans the width of the front wall **70** and has its ends secured to the member **24** and **32** by elongated studs **208**.

From the above description, it is thought that the construction, use, and many advantages of the herein described railway air conditioning system will be apparent without further description. The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. Only insofar as the invention has been particularly pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:

1. In an air conditioning system for railway refrigerator cars, the combination of a railway car body having a floor, upstanding side and end walls and a roof structure defining a refrigeration enclosure, a bulkhead adjacent one of said end walls extending between the floor and roof structure and defining in combination with said end wall, floor and roof structure a rectangular open-sided pocket which opens outwardly of the car body and which is separated from said enclosure by said bulkhead, there being an opening in said bulkhead in transverse alignment with the open side of said pocket, a self-contained package-type air conditioning unit removably disposed wholly within the confines of said car body and projecting through the bulkhead opening, said unit comprising a comparatively large rectangular box-like outer housing disposed wholly within the confines of said pocket, a relatively small rectangular box-like inner housing disposed within the enclosure inwardly of said bulkhead and an intermediate partition wall common to said housings and shaped conformably to the opening and fitting snugly therein, a self-contained motor driven compressor and a condenser disposed within said outer housing, an evaporator disposed within said inner housing, said outer housing having a vertical outer wall extending across the open side of the pocket, a vertical inner wall abutting against said bulkhead, vertical front and rear walls, a bottom wall and an open top, said inner housing having a bottom wall, a vertical inner wall, vertical front and rear walls, and a top wall, said partition wall defining the outer wall of said inner housing, means for circulating air serially through said enclosure and inner housing, means for passing outside air through said outer housing over said compressor and through the condenser and for thereafter discharging the same to the atmosphere, the outer wall of said outer housing being formed with an air discharge opening therein in the lower regions thereof, said means for passing outside air through the outer housing comprising an electric fan operatively disposed in said discharge opening, and a longitudinally slidable door for closing the open side of said pocket, said door being formed with a series of superimposed louvers therein extending from a region below said discharge opening to a region above the level of the open upper top of said outer housing whereby air may be drawn into said pocket above said outer housing and passed downwardly through said latter housing and across the condenser contained therein and discharged through said discharge opening under the influence of said fan.

2. In an air conditioning system for railway refrigerator cars, the combination set forth in claim 1 wherein the top and bottom walls of said inner housing are formed with openings therein, said means for circulating air through said serially arranged enclosure and housing comprising an electric fan operatively disposed in one of said two latter openings.

3. In an air conditioning system for railway cars, the combination set forth in claim 2 wherein the fan is operatively disposed within the opening in the top wall of said inner housing.

4. In an air conditioning system for railway refrigerator cars, the combination of a railway car body having a floor, upstanding side walls and end walls, and a roof structure, there being a rectangular opening formed in one of said side walls, a self-contained package type air conditioning unit removably mounted within said opening and having a front wall panel positioned substantially flush with the side wall when the unit is positioned within said opening, signal lamps mounted on said front wall panel for indicating the character of operation of said air conditionng unit, a sliding door panel supported on said side wall and movable from a retracted position wherein it uncovers said opening to a closed position wherein it covers the same and conceals said front wall panel of the air conditioning unit, and a series of louvers on said door panel permitting movement of air through said door panel in opposite directions, the light emitted by said signal lamps, when energized, being visible through said door panel by reflection from the various surfaces thereof.

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