May 4, 1937. J. H. ASHBAUGH 2,079,238

METHOD OF SHIPPING REFRIGERATING APPARATUS

Original Filed Oct. 5, 1935 3 Sheets-Sheet 1

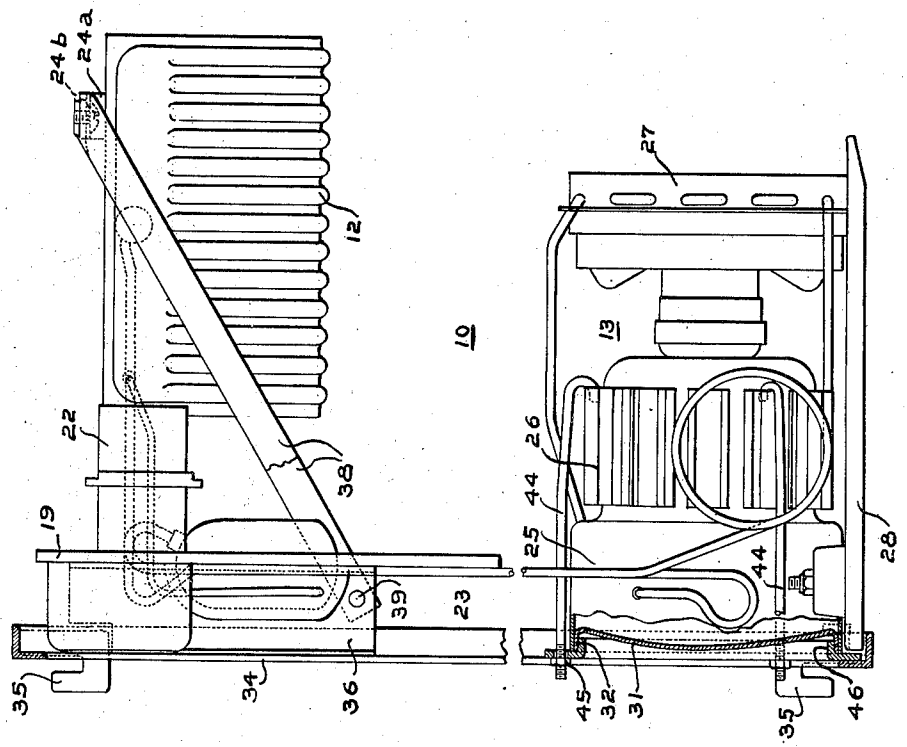


FIG. 2.

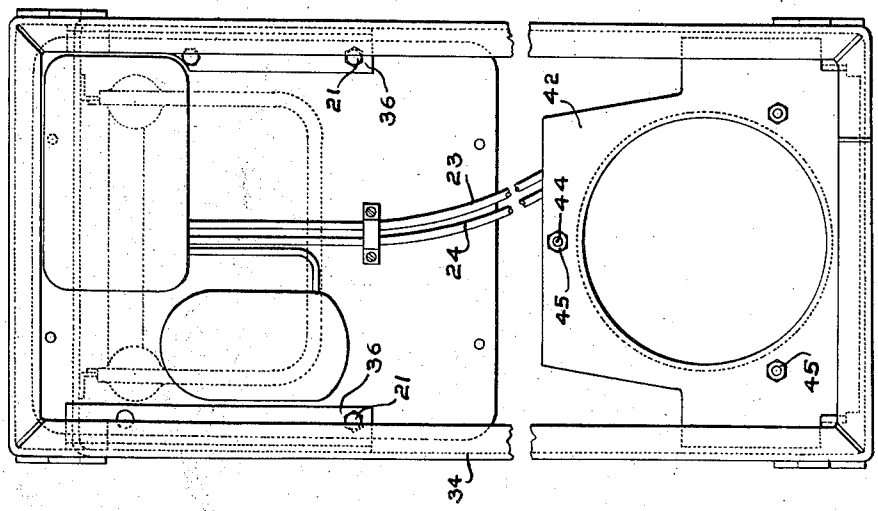


FIG. 1.

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METHOD OF SHIPPING REFRIGERATING APPARATUS

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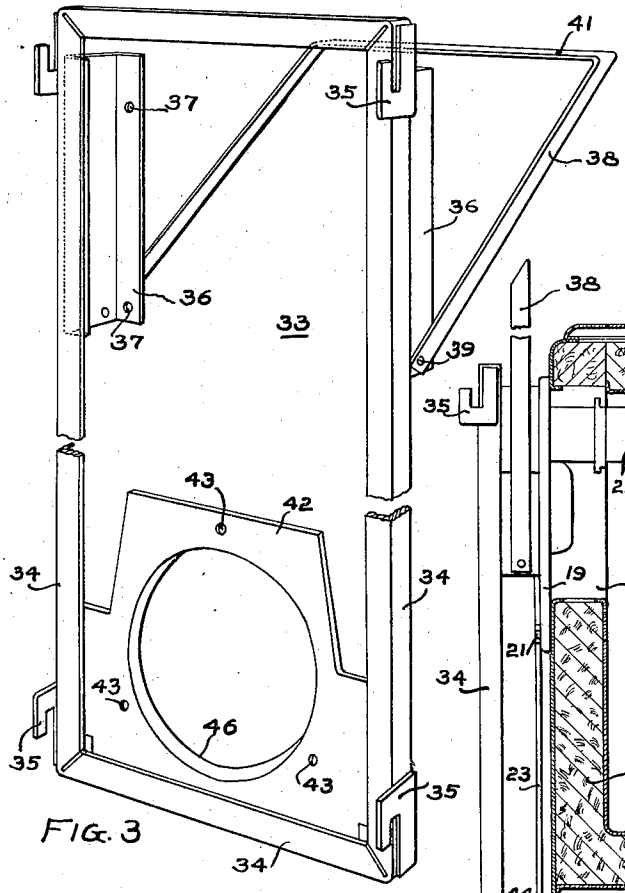


FIG. 3

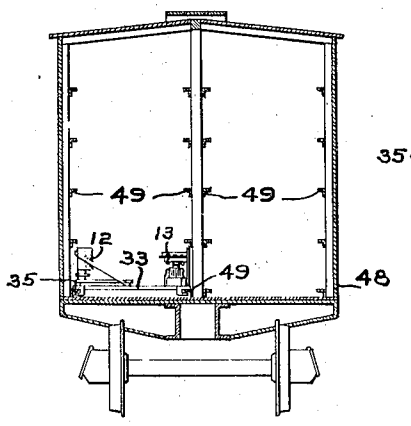


FIG. 5

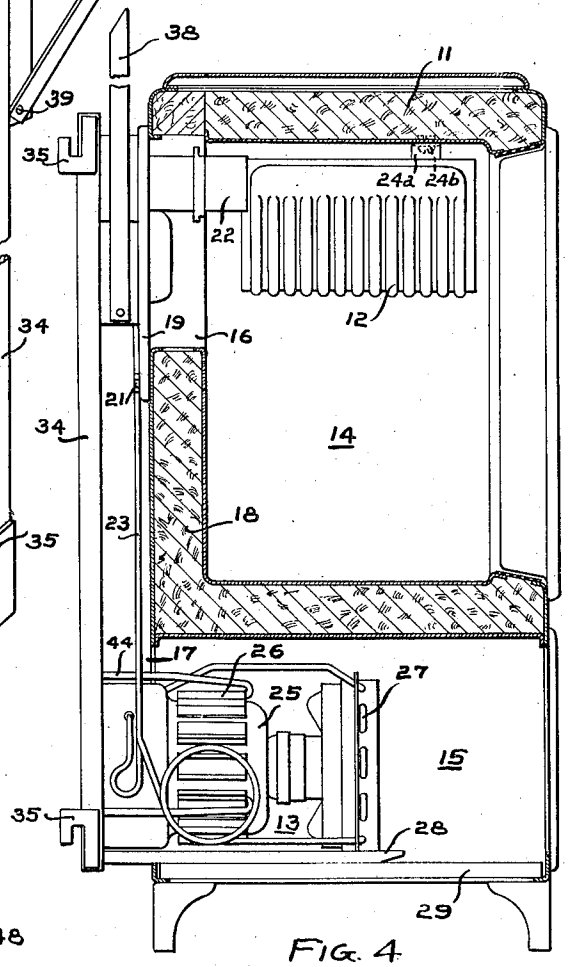


FIG. 4

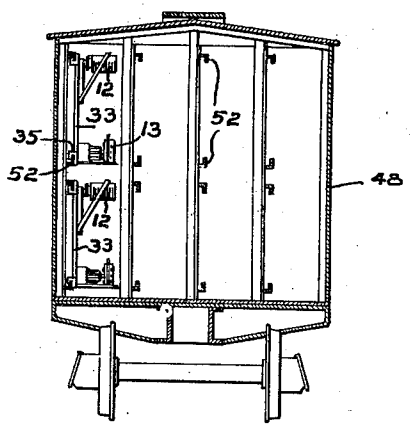
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METHOD OF SHIPPING REFRIGERATING APPARATUS

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FIG. 7.



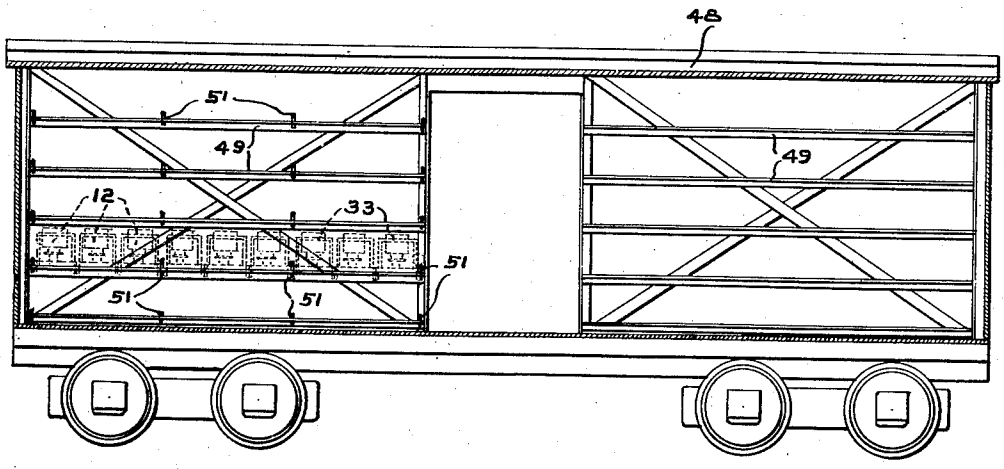


FIG. 6.

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UNITED STATES PATENT OFFICE

2,079,238

METHOD OF SHIPPING REFRIGERATING APPARATUS

John H. Ashbaugh, Springfield, Mass., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application October 5, 1935, Serial No. 43,647
Renewed September 11, 1936

14 Claims. (Cl. 105—367)

This invention relates to the art of shipping refrigerating or similar apparatus in vehicles and has for an object to provide an improved method and apparatus for shipping such apparatus.

A further object of the invention is to so arrange the apparatus in shipment that a maximum number may be transported in a conventional vehicle without the necessity of crating the apparatus.

A still further object of the invention is to provide improved method of transporting refrigerating apparatus having an evaporating element and a condensing element which are fitted after shipment, into respective spaced openings in a cabinet wherein the elements are maintained during shipment in such spaced relation that unitary insertion thereof into the cabinet is afforded.

These and other objects are effected by my invention, as will be apparent from the description and claims taken in connection with the accompanying drawings in which:

Figs. 1 and 2, are, respectively, rear and side elevations of a refrigerating unit arranged for shipment in a vehicle;

Fig. 3 is a perspective view of an improved shipping rack for the apparatus shown in Figs. 1 and 2;

Fig. 4 is a sectional view of a refrigerator cabinet having the refrigerating unit inserted therein and prior to the disengagement of the shipping rack from the unit;

Figs. 5 and 6 are, respectively, transverse and longitudinal sectional views taken through a boxcar and illustrating my improved method of arranging the refrigerator units therein; and,

Fig. 7 is a transverse sectional view of a car showing a modified arrangement of the units therein.

Referring now to Figs. 1, 2 and 4, I disclose a refrigerating unit, indicated generally by the reference numeral 10, which is to be shipped to a distant point for assembly in a cabinet 11 (Fig. 4). The unit 10 is of the type disclosed and claimed in the copending application of J. H. Ashbaugh, Serial No. 43,162, filed October 2, 1935, and assigned to the Westinghouse Electric & Manufacturing Company, but it will be understood that this type of refrigerating unit is shown by way of example and that other forms of refrigerating units or similar apparatus may be transported in accordance with my invention.

The refrigerating unit 10 includes an evaporator element 12 and a condensing element 13 which are spaced apart and which are arranged, respectively, for insertion in the compartments 14 and 15 of the cabinet 11. See Fig. 4. Openings 16 and 17 are formed, respectively, in a wall member 18 of the cabinet 11, through which the elements 12 and 13 are inserted.

The evaporator element may include a closure plate 19 which is attached to the back of the cabinet wall 18 by screws 21 and which supports one end of the evaporator 12 by means of a bracket 22. Flexible conduits 23 and 24 provide for the flow of refrigerant between the condensing element 13 and the evaporator 12. It will be apparent that, when the unit 10 is assembled in the cabinet 11, the evaporator 12 and condensing element 13 are independently supported by different portions of the cabinet, and that the flexible connecting conduits 23 and 24 function only as refrigerant conductors and in no manner provide a rigid support for any part of the unit.

The evaporator 12 may be provided at its front end with supporting lugs 24A which are secured to the cabinet 11 by means of screws 24B.

The condensing element may include a motor driven compressor (not shown) which is enclosed by a casing 25 having cooling fins 26 and a condenser 27. The casing 25 and condenser 27 are supported by a platform 28 which, when the unit is assembled in the cabinet, rests upon a bottom wall 29 of the cabinet 11. The end of the casing is closed by a cover 31 having upturned flanges which are welded within the casing to provide a flange structure, indicated at 32 in Fig. 2.

In order to facilitate the storage, handling and shipping of the unit 10, I provide a rack structure 33, to which the unit 10 may be attached in such manner, that a number of units and their racks may be compactly stored within a vehicle such as, for example, a railway freight car. Furthermore, the method of attachment to the rack facilitates the assembly of the unit to the cabinet 11 after shipment, as described hereinafter.

The rack 33 may include a rectangular angle iron frame 34 having guide clips 35 secured thereto, preferably, at each corner. A pair of brackets 36 may be fixed to the frame 34 for supporting the evaporator element 12 during shipment, which brackets 36 are provided with bolt holes 37. The front end of the evaporator 12 may be supported, during shipment, by a hinged bracket 38, pivoted at 39 to the frame 34, and including bolt holes 41. A plate 42 may be fixed to the frame 34 in spaced relation with the brackets 36, and includes a plurality of bolt holes 43. The rack 33 includes a plurality of hook bolts 44 and nuts 45 for attaching the condensing element 13 thereto.

In attaching the unit 10 to the rack 33 for handling and shipment, the closure plate 19 is secured to the brackets 36 by means of the bolts 21 as shown best in Fig. 1. The hinged bracket 38 may be moved to engage the lugs 24A of the evaporator 12 and secured thereto by means of the tap screw 24B. The condensing element 13 is secured to the plate 42 by means of the hook bolts 44 which are hooked in any convenient manner to a portion of the element 13, such as, for example, the cooling fins 26. The hook bolts project through the holes 43 in the plate 42 and are drawn tight by the nuts 45. Proper positioning of the condensing element 13 on the rack may be obtained by providing an annular flange 46 on the plate 42; which flange 46 fits in telescopic relation, within the flange 32 of the casing 25.

Reference will now be had to Figs. 5 and 6 in which I disclose a conventional box car 48 equipped with a plurality of pairs of rails 49 for receiving the racks 33 and the units carried thereby. The rails 49 extend longitudinally of the car 48 from adjacent the center door opening thereof, toward each end of the car. The frame 34 rests on the rails with the guide clips 35 extending beneath the rail. In loading, the racks 33 are inserted on the ends of the rails adjacent the car door and are slid toward the end of the car, adjacent racks being in engagement. When completely loaded, the plurality of tiers of racks 33 fill the car except for the portion of the car adjacent the center door. It is necessary that this portion of the car be available for the insertion of the racks on the rails and for the removal of the racks therefrom. After all racks and units are in place the space between the car doors may be utilized for shipment of other merchandise or a removable frame structure loaded with additional racks and units may be rolled into this space.

Longitudinal movement of the racks 33 upon the rails during transit may be prevented in any suitable manner such as, for example, by pins 51 which are inserted through openings in the rails 49 and which are engaged by the clips 35. A pin 51 may be employed at each end of each rail 49 for resisting the thrust of a row of racks, or preferably, a number of pins 51 may be employed at intervals along the rails, so that the thrust of only a few units is carried thereby.

In Fig. 7, I have shown a railway car having pairs of rails 52 which are spaced vertically instead of horizontally as in the prior embodiment. The racks are carried by the rails in the same manner as in the prior embodiment except that they are vertically disposed with the weight of the rack and units carried by the lower clips 35. In this embodiment the apparatus being transported is in its normal operating position which may be necessary with some apparatus.

When the car has arrived at its destination the racks and units are removed therefrom for assembly in the cabinets. The movable bracket 38 is first detached from the lugs 24A by removing the screws 24B and the bracket 38 is moved to a vertical position as shown in Fig. 4. As the evaporator element 12 and the condensing element 13 are supported by the rack 33 in their normal operating positions, they may then be inserted through the openings 16 and 17 with the rack 33 attached. See Fig. 4.

Screws 21 are inserted through holes adjacent the top and bottom edges of the closure 19 and are driven into the cabinet 11. The screws 21 which hold the closure 19 to the brackets 36 may then be removed. The hook bolts 44 are removed from the fins 26 and from the rack 33 by removing the nuts 45. The rack 33 is now disengaged from the refrigerating unit and may be removed and delivered to the car for its return journey and further use in transporting other units. The screws 21 which held the closure to the brackets 36 may then be driven in the cabinet through the remaining holes in the closure 19. The screws 24B which have been removed from the bracket 38 may be employed for attaching the lugs 24A of the evaporator to the top of the compartment 14. The method of assembling the refrigerating unit 10 to the cabinet 11 is disclosed and claimed in the copending application of W. B. Anderson and E. E. Grover, Serial No. 48,814 filed November 8, 1935, and assigned to the Westinghouse Electric and Manufacturing Company.

The racks and the attached units may be stored in a warehouse after unloading by providing rails in the warehouse arranged in a similar manner to the arrangement in the car. The units may be removed from the warehouse for assembly in cabinets as needed.

From the foregoing, it will be apparent that I have provided an improved method of storing, transporting and handling apparatus of the kind described wherein packing or crating is unnecessary and wherein the number of units transported is of a high value. Furthermore, I have provided shipping equipment which may be employed to facilitate assembly of the transported apparatus with other apparatus at its destination.

I have eliminated the expense of providing crates for the apparatus being shipped which are usually discarded at the destination, being unfit for further use. My improved rack may be employed over and over again for carrying the apparatus during shipment and for facilitating handling of the apparatus at its destination.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In the art of shipping a mechanism for assembly to a device at its destination, said mechanism including spaced elements which are assembled to spaced portions of the device; the method of shipping such mechanisms in transportation vehicles which comprises securing the spaced elements of the mechanism to a unitary carrying rack in such relative positions as will afford unitary assembly thereof to the spaced portions of the device upon completion of shipment and prior to their detachment from the rack, providing a plurality of supporting rails in the vehicle, and mounting the racks upon the rails in side-by-side relation for shipment.

2. In apparatus for transporting refrigerating machines or the like having elements which are flexibly connected and spaced apart, the combination of a vehicle having a plurality of supporting rails secured therein, a plurality of racks for respectively supporting the refrigerating machines to be transported, said spaced elements of the machines being secured to the racks in spaced

relation, said racks and their supported elements being mounted in juxtaposed relation upon said rails, and means for maintaining the racks substantially in a fixed position on the rails, whereby movement of the racks along the rails is prevented.

3. In the art of shipping refrigerator mechanisms having flexibly connected and spaced condensing and evaporating elements, the method of shipping such mechanisms in transportation vehicles which comprises rigidly securing said elements together, providing a plurality of rails in the transportation vehicle, mounting the mechanisms having elements secured together upon the rails in side-by-side relation, and restraining the mechanisms so that movement thereof along the rails is prevented during transit.

4. In the art of shipping refrigerating mechanisms for assembly, after shipment, in refrigerator cabinets, which mechanisms embody an evaporator for installation in one portion of the cabinet and a compressor for installation in a second and spaced portion of the cabinet; the method of shipping such mechanisms in transportation vehicles which comprises providing a plurality of rails within the vehicle, mounting said mechanisms uncrated upon the rails in side-by-side relation so that said evaporator and compressor are maintained in spaced relation and are out of contact with the walls of the vehicle, and restraining the mechanisms whereby movement thereof along the rails is prevented during transit.

5. In the art of shipping refrigerator mechanisms for assembly in refrigerator cabinets, which refrigerator mechanisms embody a heat absorbing element for installation in one portion of the cabinet and a motor-compressor mechanism for installation in a second and spaced portion of the cabinet, the method of shipping such refrigerator mechanisms in transportation vehicles which comprises securing the heat absorbing element and the motor-compressor mechanism to a unitary rack structure in such relative spaced positions as will afford insertion thereof into the refrigerator cabinet, upon completion of shipment, providing oppositely disposed rails in the transportation vehicle and mounting the racks in side-by-side relation upon the rails for shipment.

6. In the art of shipping refrigerator mechanisms for assembly in refrigerator cabinets, which refrigerator mechanisms embody a heat absorbing element for insertion through an opening in the cabinet and a heat dissipating element for insertion through a second opening in the cabinet which is spaced from said first-mentioned opening, the method of shipping such mechanisms in transportation vehicles which comprises securing the heat absorbing and the heat dissipating elements to a shipping rack in such relative positions as will afford insertion of at least one of said elements into the refrigerator cabinet, upon completion of shipment and prior to complete detachment of the refrigerator mechanism from the rack, providing a plurality of rails in the vehicles, and mounting the racks upon the rails in side-by-side relation for shipment.

7. In the art of shipping refrigerator mechanisms, uncrated, for assembly in refrigerator cabinets, which refrigerator mechanisms embody an evaporator structure for installation in one portion of the cabinet and a compressor for installation in a second and spaced portion of the cabinet, the method of shipping such refrigerator mechanisms in transportation vehicles which comprises securing the evaporator structure and the compressor to spaced portions of a unitary rack so that they may be inserted, without detachment from the rack, in their respective portions of the cabinet after shipment, providing a plurality of rails in the vehicle, and mounting the racks in juxtaposed relation upon the rails for shipment.

8. In the art of shipping refrigerator mechanisms having a heat dissipating element and a heat absorbing element, said elements being connected to each other by conduits, and said elements and said conduits forming a refrigerating system for containing a charge of refrigerant fluid, the method of shipping such mechanisms, uncrated, in transportation vehicles which comprises securing said elements to a rack structure, providing a plurality of rails within the vehicles and supporting the rack structures upon the rails in side-by-side relation and out of contact with the walls of the vehicle.

9. In the art of shipping refrigerator mechanisms having a heat dissipating element and a heat absorbing element, said elements being spaced from each other and connected to each other by conduits, and said elements and said conduits forming a refrigerating system for containing a charge of refrigerant fluid, the method of shipping such mechanisms, uncrated, in transportation vehicles which comprises securing said elements in spaced relation to a rack structure, providing a plurality of rails within the vehicle and supporting the rack structures upon the rails in side-by-side relation and out of contact with the walls of the vehicle.

10. In the transportation of uncrated refrigerating machines having spaced apart and flexibly connected heat absorbing and heat-dissipating elements for assembly, after transportation, in spaced portions of a refrigerator cabinet, the combination of a vehicle, means for rigidly securing the heat-absorbing and heat-dissipating elements of the respective refrigerating machines together during shipment, said securing means being so constructed and arranged as to support the heat-absorbing element relative to the heat-dissipating element during assembly of the refrigerating machine in the cabinet, and a plurality of horizontally extending members arranged within the vehicle for supporting said refrigerating machines and their respective securing means in juxtaposed relation during transportation.

11. In apparatus for transporting, uncrated, refrigerating machines each embodying two heat transmitting elements which are flexibly connected and spaced apart, the combination of a vehicle, bracket means secured to each refrigerating machine for retaining the heat transmitting elements thereof in spaced relation, and supporting means extending horizontally within the vehicle for supporting a plurality of refrigerating machines in juxtaposed relation with said bracket means assembled thereon.

12. In the art of shipping refrigerator mechanisms having a heat absorption element and a heat dissipating element spaced from each other and connected by flexible tubing, said elements and said conduits forming a refrigerating system for containing a charge of refrigerant fluid, the method of shipping such mechanisms, uncrated, in transportation vehicles which comprises securing said elements of the respective refrigerator mechanisms to each other in spaced rela-

tion by a rigid structure, providing horizontally extending supports within the vehicle and disposing the refrigerator mechanisms with said rigid structures attached thereto in side-by-side relation upon said supports.

13. In the art of shipping refrigerator mechanisms having spaced heat absorbing and heat dissipating elements which are assembled, after shipment, in a refrigerator cabinet, the method of shipping such mechanisms, uncrated, in transportation vehicles which comprises securing said elements to each other by a rigid structure which is so constructed and arranged as to support the heat absorbing element relative to the heat dissipating element during the assembly of the mechanism in the cabinet, providing horizontally-extending supports within the vehicle and disposing the refrigerator mechanisms with their respective rigid structures attached thereto in side-by-side relation upon said supports.

14. In the art of shipping refrigerator mechanisms for assembly in refrigerator cabinets, which refrigerator mechanisms embody a heat absorbing element for insertion in an opening in the cabinet and a heat dissipating element for insertion in a second opening in the cabinet which is spaced from said first mentioned opening, the method of shipping such mechanisms, uncrated, in transportation vehicles which comprises securing said elements to each other by bracket means in such relative position as will afford insertion of at least one of the elements into the refrigerator cabinet upon completion of shipment and prior to complete detachment of the refrigerator mechanism from said structure, providing horizontally extending supports within the vehicle and disposing the refrigerator mechanisms with their respective rigid structures attached thereto in side-by-side relation upon said supports.

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