April 11, 1939. A. A. KUCHER 2,154,242

SHIPPING CRATE FOR REFRIGERATING APPARATUS

Filed July 17, 1936 4 Sheets-Sheet 1

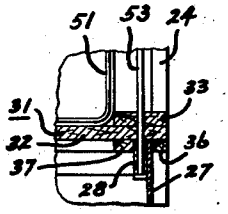


Fig. 3

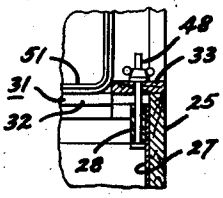


Fig. 2

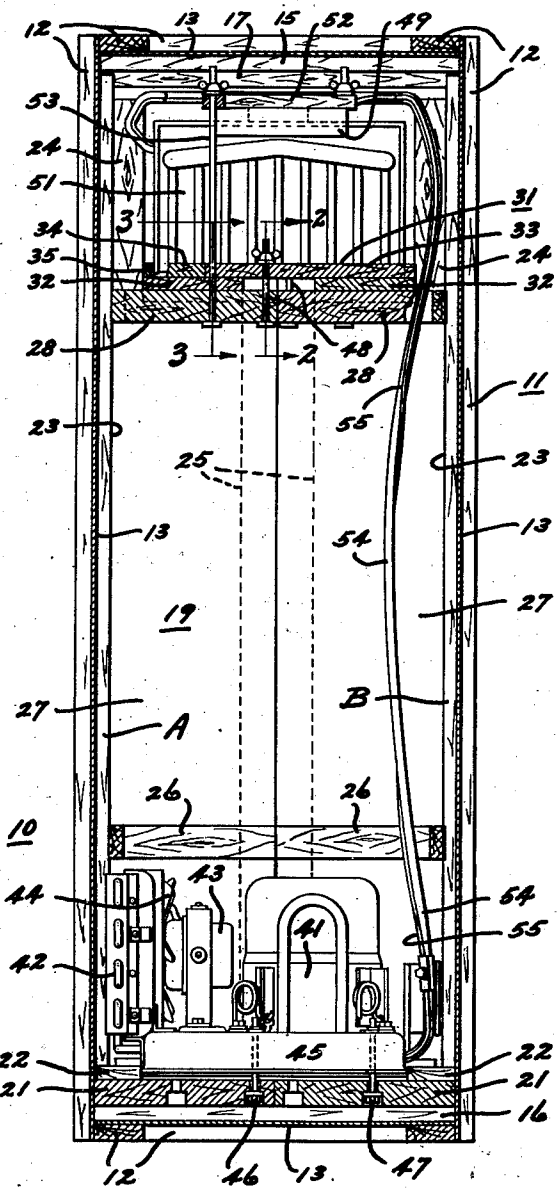


Fig. 1

INVENTOR.
ANDREW A. KUCHER.

BY
Spencer, Hardman and Fehr.
HIS ATTORNEYS.

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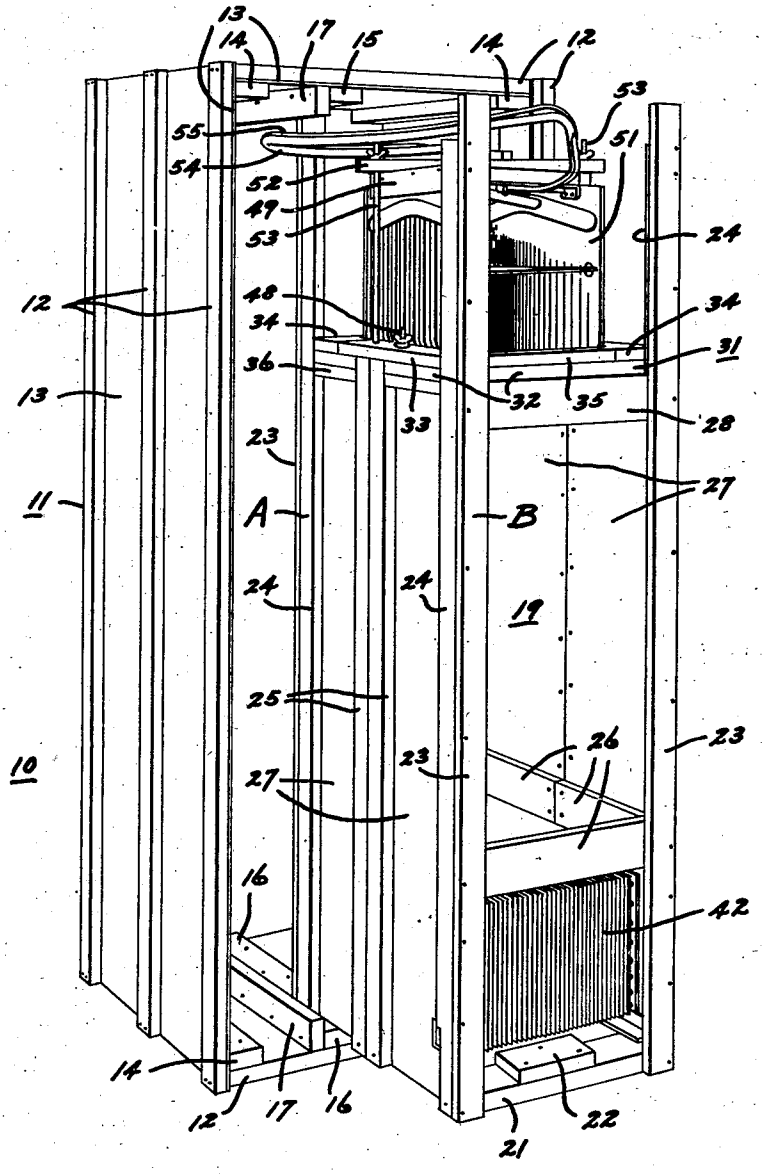


Fig. 4

INVENTOR.
ANDREW A. KUCHER.

BY
Spencer, Hardman and Fehr.
HIS ATTORNEYS.

April 11, 1939. A. A. KUCHER 2,154,242

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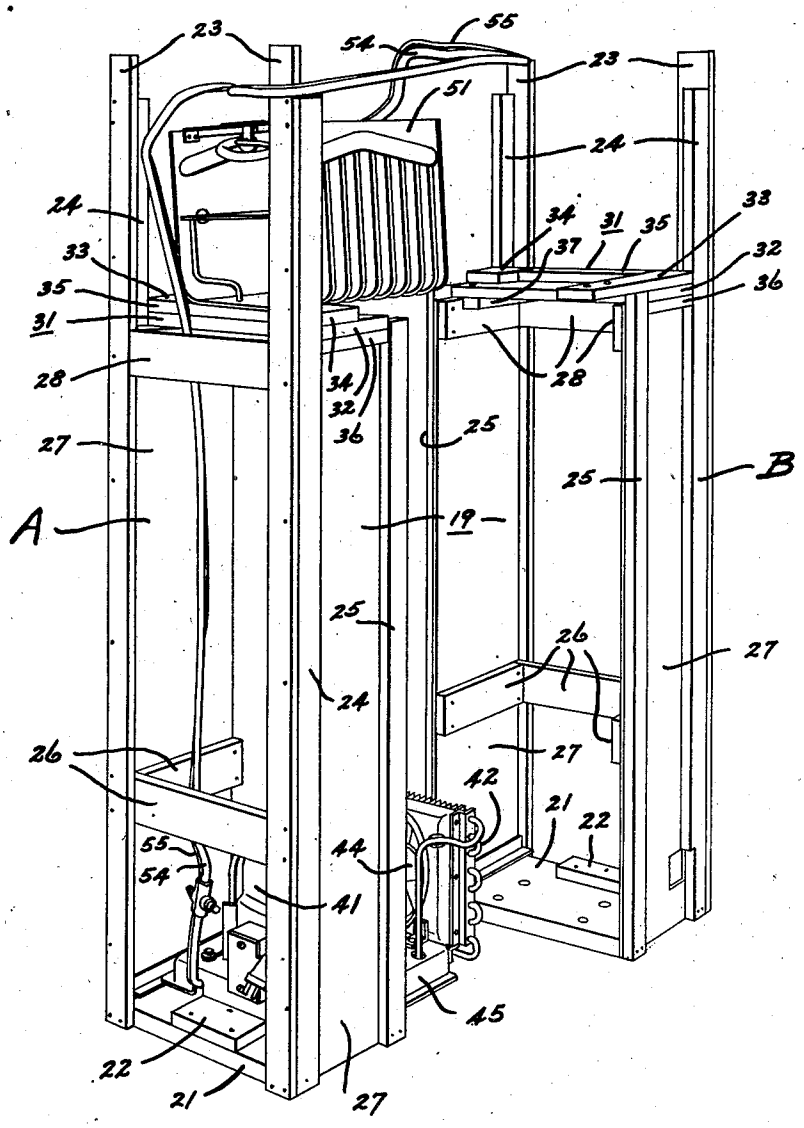


Fig. 5

INVENTOR.
ANDREW A. KUCHER.

BY
Spencer, Hardman and Fehr.
HIS ATTORNEYS.

April 11, 1939. A. A. KUCHER 2,154,242

SHIPPING CRATE FOR REFRIGERATING APPARATUS

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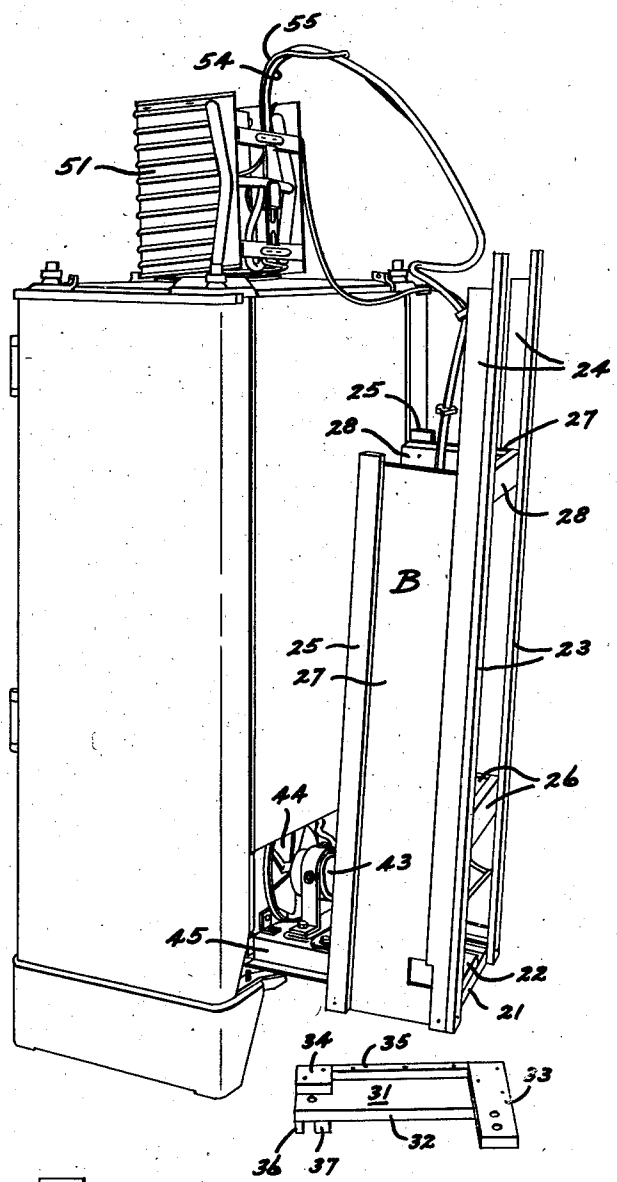


Fig. 6

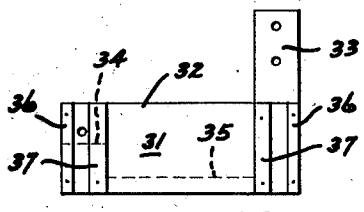


Fig. 7

INVENTOR.
ANDREW A. KUCHER.

BY
Spencer, Hardman and Fehr.
HIS ATTORNEYS.

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2,154,242

UNITED STATES PATENT OFFICE

2,154,242

SHIPPING CRATE FOR REFRIGERATING APPARATUS

Andrew A. Kucher, Oakwood, Ohio, assignor to General Motors Corporation, Dayton, Ohio, a corporation of Delaware

Application July 17, 1936, Serial No. 91,141

5 Claims. (Cl. 217—36)

This invention relates to shipping devices for closed fluid systems such as a complete refrigerating system to be installed in a refrigerator cabinet.

In recent years manufacturers of refrigerating systems particularly of the type adapted for installation in household refrigerator cabinets have been making systems in such manner that certain adjustable or moving parts internally of elements employed therein are hermetically sealed within the system and are not therefore accessible to servicemen. Such practice necessitates removal of the entire closed system from the cabinet and shipment thereof to the factory for repair. This presents the problem of providing a suitable shipping crate for supporting the refrigerating system therein during shipment thereof and the present invention particularly relates to this phase of the industry.

When a refrigerating system installed in a household refrigerator cabinet ceases to operate or operates inefficiently or incorrectly, due to reasons beyond ordinary adjustment of switches, valves, etc., that can be made by local servicemen, the entire closed system must be removed from the cabinet and sent back to the manufacturer. Present-day refrigeration demands of housewives renders it necessary to replace the inoperative system with a new or properly operating system and this replacement must be effected as quickly as possible in order that refrigeration within the refrigerating cabinet may be continued.

An object of the present invention is to provide a device which serves as a shipping crate or box for a closed refrigerating system and which also serves to facilitate the removal of a closed refrigerating system from a refrigerator cabinet and to facilitate replacement of the removed system with another closed refrigerating system.

Another object of the invention is to provide an improved shipping crate or box with a unitary supporting construction composed of a removable two-part frame device, one part of which is complementary to the other part thereof and utilized to support various elements of a closed refrigerating system in spaced relation, during removal of a refrigerating system from a refrigerator cabinet, while the other part of the frame is utilized for supporting various elements of another closed refrigerating system adapted to be installed in the refrigerator cabinet.

In carrying out the foregoing objects it is a still further object of the invention to make the complementary frame parts of the improved device so that the parts thereof will selectively support the elements of the refrigerating system in order to render the device suitable for successive removal and installation operations of closed refrigerating systems.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical sectional view through a shipping device constructed in accordance with my invention and showing a closed refrigerating system mounted therein;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1 showing a means for fastening the parts of a two-part frame structure together;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1 showing a means for clamping an element to the frame structure;

Fig. 4 is a perspective view of the device disclosed in Fig. 1 showing a supporting frame structure partially removed from the shipping box;

Fig. 5 is a perspective view showing one part of the two-part supporting frame structure detached from the other part thereof;

Fig. 6 is a perspective view showing a part of the two-part supporting frame structure associated with a refrigerator cabinet; and

Fig. 7 is a bottom view of a removable platform part of one of the two-part frame structures.

Referring to the drawings, for illustrating the present invention, I have shown in Fig. 1 thereof a shipping device generally represented by the reference character 10. The device 10 comprises a crate or box generally represented by the reference character 11 and formed of heavy wood pieces 12 secured together in any suitable manner such as by nails or screws with relatively thin ply wood slabs 13 therebetween to form closure walls for the device 10. The box or crate 11 has four inner corner blocks 14 (see Fig. 4) extending transversely to the posts 12 which serve to strengthen and make the device 10 rigid. Box 11 is also provided with a block 15 intermediate blocks 14 along the inside of the top wall thereof and a block 16 along the inside of the bottom wall thereof. The blocks 15 and 16 are similar to and extend parallel with blocks 14 and each are backed on one side by a block or strip 17. The blocks 15 and 16 together with their backing blocks 17 form a track along the interior of the device 10 and spaced from one side wall thereof for a purpose to be later described.

A two-part frame construction, the whole of

which is generally represented by the reference character 19, adapted to support elements of a sealed or closed refrigerating system is positioned within the box 11 of device 10. The entire construction 19 is made in two parts A and B and each part is complementary to the other and composed of similar wood members. Each part A and B of the frame construction 19 has a rectangular wood base 21 provided with a block 22 secured to its upper surface and which block is for a purpose to be later described. Secured to and extending upwardly from two corners of base 21 and on one side thereof there are a pair of long wood post members 23. On the two sides of base 21 opposite members 23 there is a relatively long wood member 24 which abuts against the wood members 23 and a relatively short wood member 25 spaced from the members 24. Intermediate the top of the short uprights 25 and base 21 there are provided strengthening slabs 26 which extend around the interior of the three sides of each of the parts A and B of the unitary frame structure 19 and these slabs 26 are nailed or otherwise securely fastened to the upright posts 23, 24 and 25. A ply wood member 27 is interposed between the strengthening slabs 26, base 21 and the upright posts 24 and 25 to further strengthen the parts A and B of the frame structure 19. It will be noted that the ply wood side members 27 of each of the parts A and B terminate in spaced relation to the top of the short upright posts 25 (see Fig. 6) and that a relatively heavy wood slab 28 is disposed over the ply wood 27 on three sides of the parts A and B along the interior thereof and at the termination of the ply wood sides 27. One of the slabs 28 is disposed between the posts 24 and serves as a backing member for posts 23 near the top of the frame structure. The slab members 28 serve to strengthen the top portion of each part A and B of structure 19 and to also provide a support for a two-part removable platform the parts of which are generally represented by the reference character 31. Each platform portion 31 of each part A and B of the frame structure 19 comprises a heavy rectangular wood member 32 (see Figs. 6 and 7) having secured thereto a relatively long wood piece 33 along one side of the top surface thereof and a relatively short wood piece 34 along the opposite side of the top surface thereof. A wood piece 35 extends along the top of platform portion 31 between the parallelly extending wood pieces 33 and 34 for maintaining these pieces in spaced relation and for providing a wall along one side of each platform portion 31. There are a pair of wood pieces 36 and 37 secured to the underside of member 32 of each platform portion 31 and these parts are mounted in spaced parallel relation to one another and extend along the two sides of the platform portion 31 below the wood pieces 33 and 34. The platform portions 31 are removably mounted on the parts A and B of the frame structure 19 in reverse relation relative to one another so that the end of long wood piece 33 of one platform portion overlaps the member 32 of the other platform portion and abuts the end of the short wood piece 34 of the other platform portion (see Figs. 1 and 4).

A refrigerant liquefying and condensing unit of a refrigerating system, comprising a motor-compressor 41, a condenser 42 and a motor 43 and fan 44 mounted upon a base 45, is supported upon the complementary base members 21 of the parts A and B of the supporting frame structure 19. Bolts 46 which pass through suitable openings provided in the base 45, of the refrigerant liquefying and circulating unit, and openings provided in the base 21 of the one part A of the structure 19 and bolts 47 which pass through suitable openings provided in the base 45, of the refrigerant liquefying and condensing unit, and in the base 21 of the other part B of the structure 19 rigidly secure the parts A and B of the two-part frame structure 19 together at the bottom thereof and rigidly support the refrigerating unit therein. The top portion of the parts A and B of the two-part frame construction 19 are rigidly held together by a bolt 48 which passes through suitable openings provided in the wood slabs 28 and in the wood pieces 33 on two sides of the frame structure. A square or rectangular wood frame 49 is disposed over the cooling element or evaporator 51 of the closed refrigerating system and has a wood piece 52 extending diagonally across the frame 49. Bolts 53 pass through the wood piece 52, disposed upon the frame 49, through the member 33 of the removable platform portion 31 of part B of the structure 19, and through members 32 and 28 of the part A of the structure 19 to further secure the parts A and B rigidly together at their upper portion and to also clamp the element or evaporator 51 rigidly upon the platform portions 31 between the members 33, 34 and 35 thereof. The evaporator 51 is connected to the refrigerant liquefying and condensing unit of the refrigerating system, mounted within the unitary frame construction 19 of device 10, by suitable refrigerant conveying conduits 54 and 55, so as to permit circulation of refrigerant therebetween in the usual and well-known manner.

It is to be noted that the construction of the two portions 31 of the platform permits the side pieces 36 and 37 to straddle the side members 28 and ply wood sides 27 on two sides of the frame structure while fitting between the upright posts 24 and 25 thereof. Thus each portion of the platform is securely mounted against side movement in either direction relative to the parts A and B of the frame construction 19. After the bolts 48 and 53 have been tightened it is obvious that the platform formed by the portions 31 is rigidly held against upward movement upon the wood supporting members 28 of the parts A and B. Thus the two portions of the closed refrigerating system supported by the frame construction 19, comprising the separable complementary parts A and B, are firmly held in spaced relation within the device 10 for shipment. Since the side portions of the frame construction 19 fit snugly within the box or crate 11 with the ends of the upright posts 23 thereof abutting the track members 14, 15 and 16 of the crate 11, there is no movement of the unitary frame 19 within the box or crate 11 of the shipping device 10. The conduits 54 and 55 connecting the evaporator 51 with the refrigerant liquefying and circulating unit are metallic and are of the type which will withstand bending thereof on large radii only. Therefore the space within the device 10 between the frame construction 19 of the one wall of box or crate 11 is for the purpose of receiving the looped or bent portions of conduits 54 and 55, which portions ordinarily extend from the front to the back of a refrigerator cabinet as will be presently observed, and these loops are of such proportion that they cannot be confined, without abnormally bending same, within the boundary of the frame structure 19.

Assuming now that the shipping device 10 has

been delivered to a point of installation of a refrigerator cabinet having a closed refrigerating system therein similar to the one contained in device 10 and which is to be removed from the refrigerator cabinet and replaced by the new system within the shipping device. Therefore the one side of box or crate 11 is removed and the unitary supporting frame construction 19 is then slid out of the crate or box as a unit, as shown in Fig. 4 of the drawings. The frame 19 is then tilted or turned over upon its side so as to permit access to the bolts 46 and 47 which bolts are removed to permit separation of the one part A from the part B at the bottom of the construction 19. The frame construction 19 is then placed in an upright position and the wing nuts on bolts 48 and 53 are removed. While the frame construction 19 is in an upright position the one complementary part B is removed from the other part A thereof, the refrigerating system being supported by the part A as disclosed in Fig. 5 of the drawings. It is to be understood that the parts A and B of frame 19 may selectively support the refrigerating system during separation of the frame parts from one another and that I have shown the system supported by the part A for illustrating purposes only. The platform portion 31 is removed from the frame part B and placed closely adjacent thereto as shown in Fig. 6 of the drawings so as to be readily accessible for future operations to be described. The part B separated from the part A of the frame construction 19 is then moved adjacent the back of a refrigerator cabinet as shown in Fig. 6 and the refrigerant liquefying condensing unit, having been previously loosened from its mountings within the refrigerator cabinet, is slid outwardly of the refrigerator cabinet toward the rear thereof so as to be received by and supported upon the base portion 21 in abutting relation with the block 22 of the one part B of the frame structure. The cooling element or evaporator 51, having been previously loosened from its mounting within the food storage compartment of the refrigerator cabinet, is moved outwardly from the compartment toward the front of the cabinet and lifted over the top thereof. Evaporator 51 may rest upon the top of the refrigerator cabinet during replacing of the platform portion 31 upon the frame part B for receiving the evaporator 51. Thereafter the evaporator 51 is moved away from the refrigerator cabinet and supported upon the platform 31 of frame part B by making a large loop or bend in the refrigerant conduits 54 and 55. In this manner the closed refrigerating system can be removed from the refrigerator cabinet without moving the spaced elements of the refrigerating system too far apart or too close together as might cause fracture of the refrigerant conduits 54 and 55. With the one refrigerating system removed from the refrigerator cabinet the replacement system, shipped in the device 10 and now supported upon the one frame part A, from which the part B was removed, can be installed within the refrigerator cabinet. The frame part A together with the refrigerating system supported thereby is therefore moved closely adjacent the back wall of the refrigerator cabinet, in the same position occupied by the frame part B during removal of the refrigerating system from the cabinet, as shown in Fig. 6 of the drawings. Assuming therefore that frame part A is now in the position in which frame part B is located in Fig. 6 of the drawings it will be understood that the operations previously described for removing a refrigerating system from the refrigerator cabinet should now be reversed to carry out the replacement of the refrigerating system carried by frame part A into the refrigerator cabinet. After the new refrigerating system has been installed in the refrigerator cabinet the part A of the unitary frame construction 19 is moved into cooperative position with the part B, now supporting the old or inoperative refrigerating system removed from the refrigerator cabinet, and the fastening bolts 46, 47, 48 and 51 are all replaced in their respective positions and tightened to thus form the completed unitary frame structure disclosed in Fig. 4. The complete frame 19 can then be slid into the box or crate 11 as shown in Fig. 4 and the removed side of crate 11 replaced thereon to thus render the device 10 with its content ready for shipment.

From the foregoing it will be seen that I have provided an improved shipping device which facilitates the installation of a closed or sealed refrigerating system into a refrigerator cabinet and which also facilitates the removal of a refrigerating system from a refrigerator cabinet. The improved device has a three-fold purpose and may be used over and over again thus reducing cost of providing shipping crates by eliminating the waste of scrapping crates at the point of installation. The improved shipping device can be produced at costs approximating those of ordinary devices which are usually destroyed at the point of installation of a refrigerating system into the refrigerator cabinet. Furthermore the improved device is of light weight and since it is constructed in such a manner that it facilitates removal of a refrigerating system from a refrigerator cabinet and the replacement thereinto of a refrigerating system one man can very readily manipulate the device to carry out the various operations described.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a device of the character described comprising in combination, a crate, a unitary construction removably positioned within said crate, said unitary construction including a base portion and a platform portion intermediate the base portion and the top of the construction, said portions of said construction each supporting an element of a closed fluid circulating system, complementary frame members for supporting said base and said platform portions of said construction, each of said frame members having parts forming a part of the base and platform portions of said construction, said frame members being separable from one another, and means including the elements of the closed fluid circulating system within said construction for rigidly locking the complementary frame members together to form said unitary construction.

2. In a device of the character described comprising in combination, a crate, a unitary construction removably positioned within said crate, said unitary construction including a base portion and a platform portion intermediate the base portion and the top of the construction, said portions of said construction each supporting an element of a closed fluid circulating system, complementary frame members for supporting said base and said platform portions of said construction, each of said frame members

having parts forming a part of the base and platform portions of said construction, said frame members being separable from one another, and means including the elements of the closed fluid circulating system within said construction for rigidly locking the complementary frame members together to form said unitary construction, said complementary frame members being constructed and arranged to selectively support both elements of the closed fluid circulating system during the act of separating said frame members.

3. In a device of the character described comprising in combination, a crate, a unitary construction removably positioned within said crate, said unitary construction including a base portion and a platform portion intermediate the base portion and the top of the construction, said portions of said construction each supporting an element of a closed fluid circulating system, complementary frame members for supporting said base and said platform portions of said construction, each of said frame members having parts forming a part of the base and platform portions of said construction, locking means engaging one of the elements of the closed fluid circulating system and passing through each of the parts forming the base portion of said construction for securing said complementary frame members together at the bottom thereof, locking means engaging the other of the elements of the closed fluid circulating system and passing through each of the parts forming the platform portion of said construction for securing said complementary frame members together adjacent the tops thereof to form said unitary construction, and one of said frame members and the parts thereof forming said base and said platform portions of said construction being separable from the other frame member and the base and platform forming parts thereof.

4. In a device of the character described comprising in combination, a crate, a unitary construction removably positioned within said crate, said unitary construction including a base portion and a platform portion intermediate the base portion and the top of the construction, said portions of said construction each supporting an element of a closed fluid circulating system, complementary frame members for supporting said base and said platform portions of said construction, each of said frame members having parts forming a part of the base and platform portions of said construction, locking means engaging one of the elements of the closed fluid circulating system and passing through each of the parts forming the base portion of said construction for securing said complementary frame members together at the bottoms thereof, locking means engaging the other of the elements of the closed fluid circulating system and passing through each of the parts forming the platform portion of said construction for securing said complementary frame members together adjacent the tops thereof to form said unitary construction, and one of said frame members and the parts thereof forming said base and said platform portions of said construction being separable from the other frame member and the base and platform forming parts thereof, said complementary frame members being constructed and arranged to selectively support both elements of the closed fluid circulating system during the act of separating said frame members.

5. In a device of the character described comprising in combination, a crate, a unitary construction removably positioned within said crate, said unitary construction including a base portion and a platform portion intermediate the base portion and the top of the construction, said portions of said construction each supporting an element of a closed fluid circulating system, complementary frame members for supporting said base and said platform portions of said construction, each of said frame members having parts forming a part of the base and platform portions of said construction, means for rigidly locking the complementary frame members together to form said unitary construction, means engaging one of the parts forming the base portion of said construction and also engaging one of the elements of said closed fluid circulating system to secure said one element upon the base portion, and means engaging one of the parts forming the platform portion of said construction and also engaging another of the elements of the closed fluid circulating system to secure said other element upon the platform portion, some of said means being detachable to permit one of said frame members and its base and platform forming parts to be separated from the other frame member and its base and platform forming parts.

ANDREW A. KUCHER.