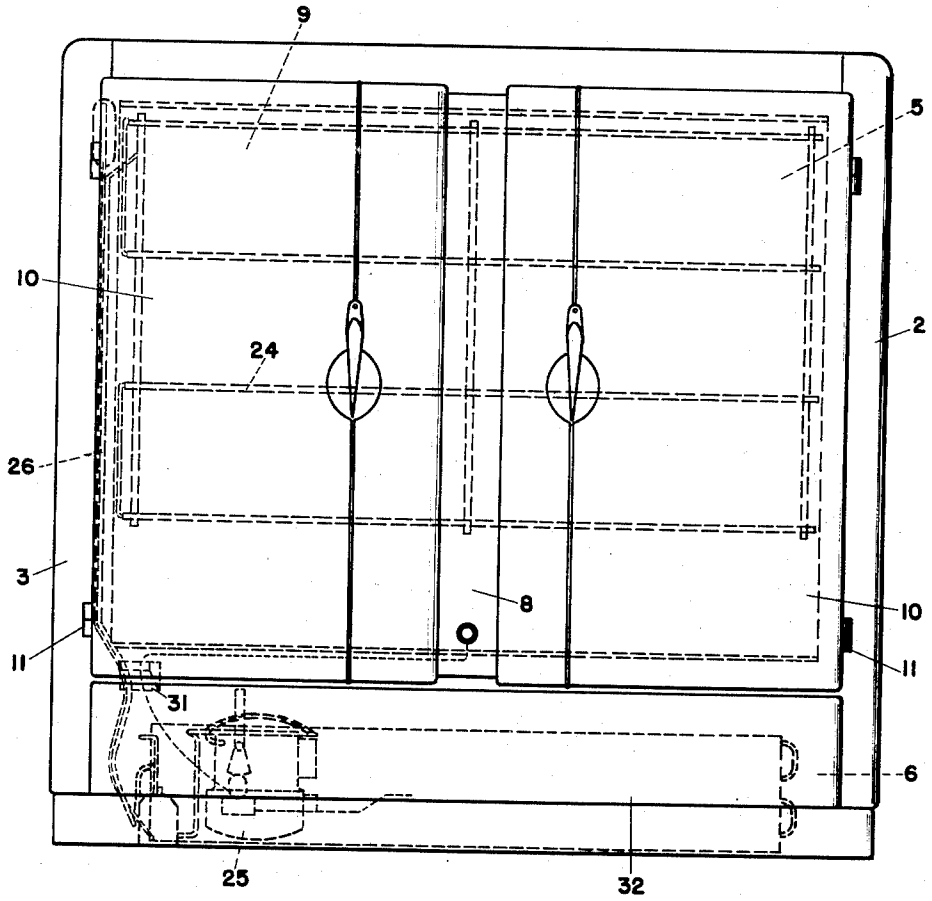
Dec. 26, 1950 J. L. FLETCHER ET AL 2,535,790

REMOVABLE REFRIGERATION UNIT WITH CABINET STRUCTURE

Filed Nov. 30, 1946

4 Sheets-Sheet 1

FIG. 1



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4 Sheets-Sheet 2

FIG. 2

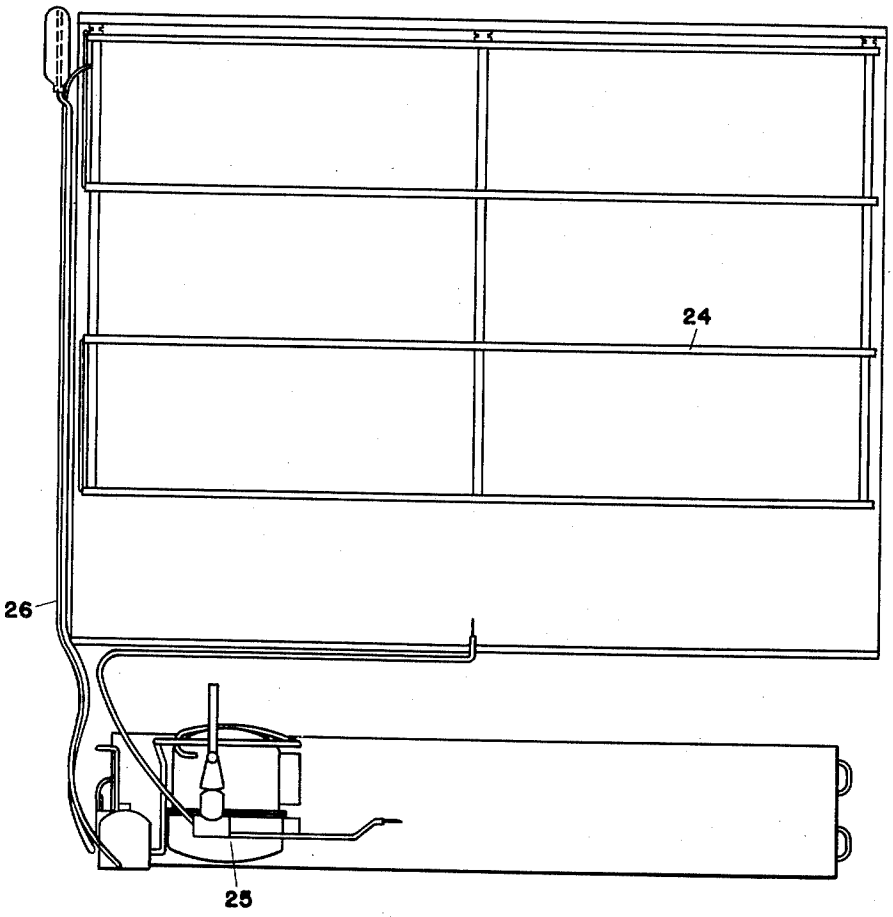

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FIG. 3

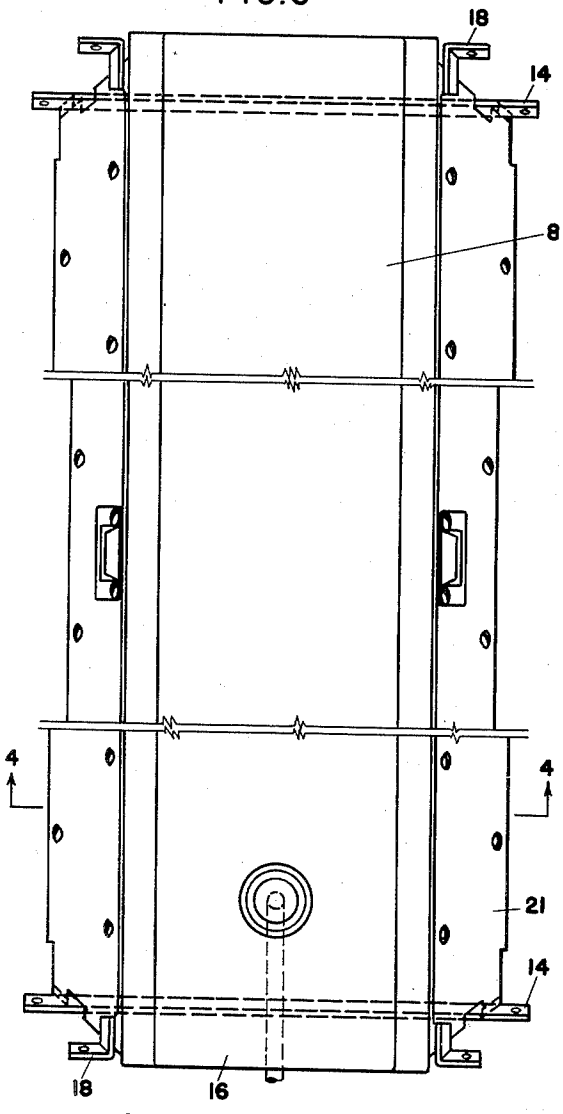
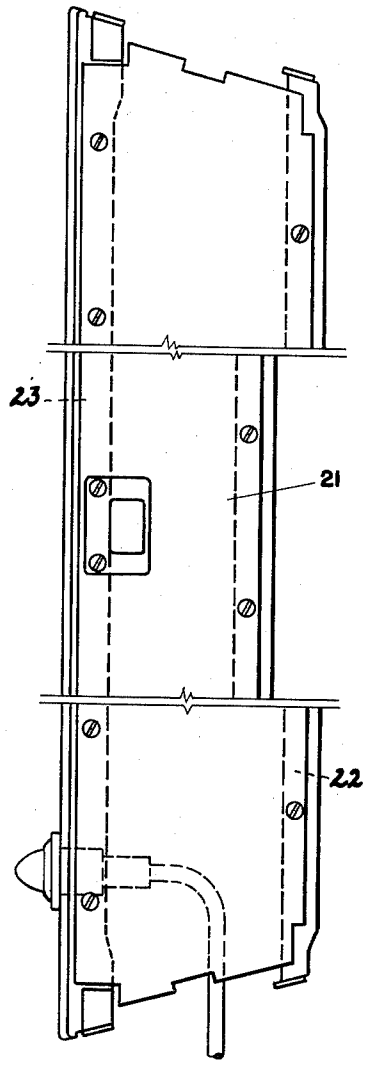


FIG. 5



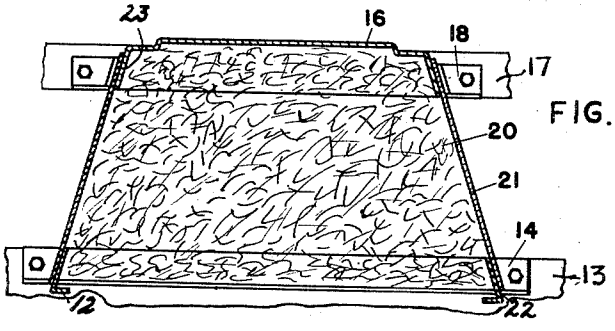


FIG. 4

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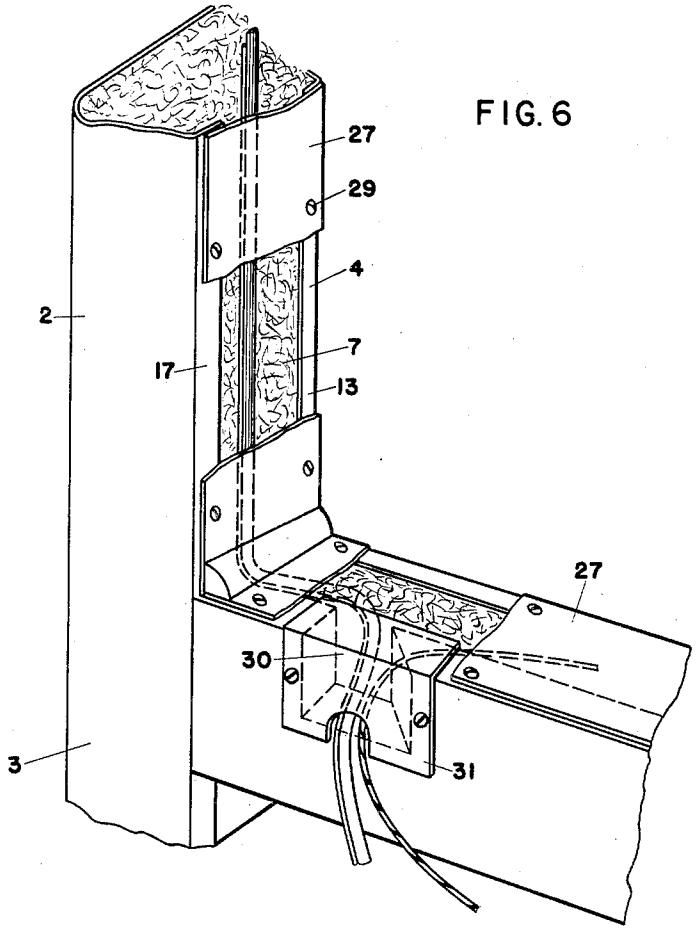
FIG. 6



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Patented Dec. 26, 1950

2,535,790

UNITED STATES PATENT OFFICE

2,535,790

REMOVABLE REFRIGERATION UNIT WITH CABINET STRUCTURE

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Application November 30, 1946, Serial No. 713,308

3 Claims. (Cl. 62—117.2)

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This invention relates to refrigeration cabinets and more particularly to a cabinet structure so constructed as to permit a hermetically sealed refrigeration system to be disposed in the cabinet and adapted for speedy removal therefrom as a unit when repairs, for example, are required to the refrigeration system.

It is desirable to provide a hermetically sealed refrigeration system for domestic refrigerators or freezers since the complete system can be manufactured at a central point rather than being assembled in the field at the place of use. Such practice avoids leaks in the refrigeration system since under ordinary conditions factory assembly is more speedy, less expensive and, generally speaking, more satisfactory; in addition, a sealed system may be tested more adequately at the place of manufacture, thereby assuring that the system does not contain minor defects therein which might permit escape of refrigerant.

The chief object of the present invention is to provide a refrigeration cabinet structure so constructed as to permit the ready insertion therein of a hermetically sealed refrigeration system, the system being readily and quickly removed as a unit when repairs are necessary thereto.

An object of the present invention is to provide a cabinet structure of the freezer type containing therein a refrigeration system including an evaporator having a length greater than its width, its length being greater than the openings in the storage compartment in which it is disposed.

A further object is to provide a refrigeration cabinet including a plurality of openings for access to the storage compartment, the openings being separated by a removable mullion and being closed by a plurality of doors which engage the removable mullion. The various lines connecting the evaporator disposed in the storage compartment of the cabinet with remaining elements of the refrigeration system are disposed beneath the breaker strips surrounding the door jambs in such manner that they are easily removed therefrom to permit removal of the evaporator and the remaining elements of the refrigeration system as an integral unit.

A still further object is to provide a method of assembly of a refrigeration cabinet to permit ready insertion of the refrigeration system in the cabinet with the evaporator thereof disposed in the storage compartment and to permit speedy and ready removal of the system in the cabinet when it is desired to make repairs to the system.

This invention relates to a refrigeration cabinet which comprises a shell, a liner spaced from the

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shell forming a storage compartment, insulation material disposed between the liner and the shell, the shell and the liner having an opening therethrough permitting access to the storage compartment, a removable mullion extending from one side of the opening to the other dividing the opening into a plurality of smaller openings, doors closing said openings, a heat exchanger disposed in the storage compartment having a length greater than the width of any of the openings, the mullion including a rear wall member, a front wall member removably connected to the shell, insulation material disposed between the wall members, and breaker strips, or any suitable insulating means forming the side walls of the mullion, removal of the mullion permitting removal of the heat exchanger as a unit. The remaining elements of the refrigeration equipment may be disposed in the machine compartment preferably located below the storage compartment and are removable therefrom as a unit with the heat exchanger. The lines connecting the heat exchanger with the remaining elements of the refrigeration system are disposed beneath the breaker strips surrounding the door openings and are concealed by the breaker strips. The system is readily removable when repairs are required thereto by opening the door members which close the storage compartment, removal of the breaker strips concealing the connecting lines, and removal of the mullion, thus permitting the heat exchanger and remaining elements of the refrigeration system to be removed from the cabinet as an integral unit and to be returned to the place of manufacture as required for purposes of repair.

This invention further relates to a method of assembling a refrigeration structure in which the steps comprise assembling a shell and a liner with insulation disposed therebetween to form an accessible storage compartment and a machine compartment, disposing refrigeration equipment assembled as an integral unit in the structure with the heat exchanger in the storage compartment extending substantially the length thereof, and the remaining elements in the machine compartment with connecting lines disposed between the shell and the liner, attaching the rear wall member of a removable mullion to the liner in position to extend from one wall of the liner to the opposite wall thereof, attaching the front wall member of the removable mullion to the shell in spaced relation to the rear wall member, disposing insulation material between the wall members, disposing breaker strips in position to close the space between the liner and the shell and to form

the sides of the mullion, placing a panel in position to close the machine compartment and attaching a plurality of doors to close the storage compartment, removal of the panel, breaker strips and mullion permitting removal of the refrigeration equipment as an integral unit from the structure.

The attached drawings illustrate a preferred embodiment of my invention, in which:

Figure 1 is a view in elevation of a refrigeration cabinet constructed in accordance with the present invention;

Figure 2 is a view in elevation of a refrigeration system for assembly with the cabinet shown in Figure 1;

Figure 3 is a view in front elevation of the removable mullion;

Figure 4 is a sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a view in side elevation of the removable mullion shown in Figure 3; and

Figure 6 is a view illustrating the manner in which connecting lines extend beneath the breaker strips of the structure.

Referring to the drawings, there is shown a refrigeration cabinet 2 including an outer decorative shell 3 and a liner 4 forming a storage compartment 5. Shell 3 forms a machine compartment 6 preferably disposed beneath storage compartment 5. Insulation material 7 of any suitable type such as rock wool, cork board, glass wool, or the like is disposed between shell 3 and liner 4 and surrounds storage compartment 5 insulating it from the ambient atmosphere. Shell 3 and liner 4 are provided with aligned openings permitting access to the storage compartment 5 for the ready disposal and removal of products to be stored therein.

A mullion 8 divides the opening into the storage compartment 5 into a plurality of smaller openings 9 adapted to be closed by doors 10, hinged at 11 to shell 3. Doors 10 engage mullion 8 and preferably are adapted to compress a gasket (not shown) surrounding the opening in order to securely seal the storage compartment.

Mullion 8 includes a rear wall member 12 adapted to be secured to a flange 13 of liner 4. Bar or strap members 14 are spot welded to member 12 and are provided with openings for the reception of fastening means adapted to secure member 12 to flange 13. The fastening means extend through the openings in members 14 and through the flanges 13 of liner 4 to secure wall member 12 in place extending perpendicularly of the opening into the storage compartment 5.

A front wall member 16 extends from side to side vertically of the opening in alignment with member 12. Member 16 is secured to flange 17 of the shell 3 by means of brackets 18 and suitable fastening means. Insulation material 20 similar to insulation material 7 is disposed between members 12 and 16. Removable breaker strips or other suitable insulating means 21 are secured to flanges 22 and 23 of members 12 and 16 to form side walls of the mullion.

A heat exchanger 24 is disposed in storage compartment 5. Heat exchanger 24 preferably is of a length greater than the width of the openings 9 to the storage compartment and serves as the evaporator of the refrigeration system. In addition, heat exchanger 24 may serve to provide shelves for stored products. The heat exchanger so described is illustrated and claimed in the copending application of T. G. Crider, Serial No. 713,307, filed November 30, 1946, now Patent No. 2,489,754, issued November 29, 1949. The remaining elements of the refrigeration system including the compressor, the condenser and the like, as well as the actuating means of the compressor are disposed in machine compartment 6. A plurality of lines 26 connect heat exchanger 24 with the remaining elements 25 of the refrigeration system.

Connecting lines 26 are disposed in the structure, preferably, in such manner as to be concealed from view while permitting removal of the heat exchanger, and the remaining elements of the system as an integral unit. These lines are preferably imbedded in the insulation material 7 between liner 4 and shell 3 at one side of an opening 9, beneath breaker strips 27. Preferably, a notch (not shown) is formed in flange 13 to permit lines 26 to be connected to heat exchanger 24. Breaker strips 27 are secured to flanges 13 and 17 by suitable fastening means 29. At the bottom of opening 9 an opening 30 is provided in the front wall of shell 3 adapted to be closed by a suitable plate 31 secured to shell 3. A panel 32 is provided to close machine compartment 6. The lines 26 extend from heat exchanger 24 beneath breaker strip 27 forming a side of the door jamb and then across the bottom of the door jamb beneath a second breaker strip to opening 30 and downwardly into the machine compartment where they connect with the remaining elements of the refrigeration system. It will be noted that removal of the panel 32, plate 31, breaker strips 27 and mullion 8 permits ready removal of the refrigeration system as an integral unit.

In the method of assembling a refrigeration cabinet including a refrigeration system adapted to be installed and removed therefrom as an integral unit, the shell 3 and liner 4 are assembled in spaced relation to one another with insulation material disposed therebetween. The refrigeration system is then disposed in the structure with the heat exchanger 24 disposed in the storage compartment formed by liner 4 and the remaining elements 25 of the refrigeration system disposed in the machine compartment 6. Lines 26 connecting heat exchanger 24 with the remaining elements 25 of the system are disposed between liner 4 and shell 3 and imbedded in the insulation material 7. As described above, such lines extend beneath the breaker strips and opening 30 into the machine compartment. The rear wall member 12 of removable mullion 8 is then disposed in position and is connected to liner 4. Mullion 8, of course, divides the opening into a plurality of smaller openings adapted to be closed by doors 10. The front wall member 16 of mullion 8 is then disposed in position and secured in place attached to flange 17 of shell 3 by fastening means and brackets 18. Insulation material 20 is disposed between wall members 12 and 16. A plurality of breaker strips 21 and 27 are disposed about each opening into the storage compartment; strips 21 being attached to mullion 8 to form its sidewalls while strips 27 are secured to flanges 13 and 17 of shell 3 and liner 4. Breaker strips 27 conceal lines 26 connecting the elements of the refrigeration system. Plate 31 is disposed in position closing opening 30 in shell 3 and panel 32 is secured in place closing machine compartment 6. The structure is thus assembled ready for use.

Assume, for example, that a leak occurs in the refrigeration system and it is desired to re-

move it from the cabinet, return it to the factory for repair, and to dispose a second system in place in the structure. Mullion 8 and breaker strips 21 are easily removed from the structure, if desired, as a unit. Breaker strips 27, plate 31 and panel 32 are also quickly and easily removed from the structure. Upon removal of such elements the refrigeration system may be removed from the cabinet as an integral unit and a second system disposed in place in the cabinet. The removed elements are quickly and easily assembled in the structure, and the cabinet is again ready for use.

This invention provides a refrigeration cabinet containing a refrigeration system including a heat exchanger disposed in the storage compartment of the cabinet having a length greater than the openings into the storage compartment. The present invention permits such heat exchanger to be inserted in the storage compartment assembled with the remaining elements of the refrigeration system and forming an integral unit. The cabinet is so assembled that a few minor members thereof may be readily removed to permit speedy and ready removal of the refrigeration system from the structure as an integral unit and to permit a second refrigeration system to be disposed therein when repairs, for example, are necessary to the system. This advantage is provided in such a manner that it does not detract from the ready and economical assembly of the structure during production line assemblies, and as a matter of fact, considerably decreases the cost of assembly of the structure.

This invention provides a method of assembling a refrigeration cabinet of the freezer type including a hermetically sealed refrigeration system in which the refrigeration system may be disposed in the cabinet at the place of manufacture rather than being disposed therein in sections in the field when it is desired to place the structure in use. So doing provides an advantage in that the refrigeration system may be more adequately tested at the factory than it could be in the field. Another advantage so provided resides in the fact that such systems may be returned to and serviced at the factory rather than in the field. This is desirable since the factory is provided with more adequate equipment for servicing refrigeration systems than can possibly be provided by servicemen.

While I have described and illustrated a preferred embodiment of my invention, it will be understood my invention is not limited thereto since it may be otherwise embodied within the scope of the following claims.

We claim:

1. In a refrigeration assembly, the combination of a decorative shell, a liner spaced from the shell enclosing a storage compartment, insulation material disposed between the shell and the liner, said shell forming a machine compartment, said shell and liner having an opening extending therethrough permitting access to the storage compartment, a removable mullion extending vertically from one side of the opening to the other and separating the opening into a plurality of smaller openings adapted to be closed by doors, a plurality of doors closing said openings, said doors being supported from said shell, said mullion including a rear wall member, means removably connecting said member to opposite sides of the liner, a front wall member, means removably connecting the front wall

member to opposite sides of the shell surrounding the opening therein, insulation material disposed between said mullion wall members, breaker strips disposed about the door openings closing the space between the liner and the shell and forming side wall members for the mullion, means securing the breaker strips in place, a heat exchanger disposed in the storage compartment, said heat exchanger having a length greater than the width of the door openings, refrigeration equipment disposed in the machine compartment, lines connecting the equipment with the heat exchanger, said lines extending beneath the breaker strips at a door opening, a panel closing the machine compartment, and a plate closing an opening in the front wall of the shell above said panel, removal of the panel, plate, breaker strips and mullion permitting the withdrawal of the heat exchanger from the storage compartment, withdrawal of equipment from the machine compartment and the connecting lines from beneath the breaker strips as an assembled unit.

2. In a refrigeration assembly, the combination of a decorative shell having an inwardly extending flange, a liner spaced from the shell having an outwardly extending flange and forming a storage compartment, said shell forming a machine compartment disposed below said storage compartment, said shell and said liner having an opening extending therethrough permitting access to the storage compartment, a removable mullion extending from one side of the opening to the other and separating the opening into a plurality of smaller openings adapted to be closed by doors, a plurality of doors closing said openings, said doors being supported from said shell, said mullion including a rear wall member having flanges at its ends, means removably securing said flanges to the flange of the liner, a front wall member, means removably securing said front wall member to the flange of said shell, insulation material disposed between said wall members, breaker strips disposed about said door openings closing the space between the shell and the liner and forming side walls for said mullion, means securing the breaker strips in position, a heat exchanger disposed in the storage compartment forming at least some of the shelves for the reception of stored articles, said heat exchanger having a length greater than the width of the door openings, refrigeration equipment disposed in the machine compartment, lines connecting the equipment and the heat exchanger, said lines extending beneath the breaker strips at the door opening, a panel closing the machine compartment, and a plate closing an opening in the front wall of the shell above said panel, removal of the panel, plate, breaker strips and mullion permitting withdrawal of the heat exchanger, refrigeration equipment and connecting lines as an assembled unit.

3. In a refrigerator cabinet, the combination of a shell, a liner spaced from the shell enclosing a storage compartment, insulation material disposed between the shell and the liner, said liner and shell having an opening therethrough permitting access to the storage compartment, a removable mullion extending from one side of the opening to the other and separating the opening into a plurality of similar openings, said mullion including a rear wall member, strap members secured to the rear wall member, said strap members having openings therein, fasten-

ing means extending through the openings in the strap members to secure the rear wall member to the liner, a front wall member, brackets adjacent the front wall member and the shell, and fastening means securing the brackets to the front wall member and to the shell, a heat exchanger in the storage compartment having a length greater than the width of the opening therein, a machine compartment enclosed by the shell, elements of the refrigeration system disposed in the machine compartment, said elements being connected to the heat exchanger in the storage compartment, removal of the mullion permitting removal of the heat exchanger and the elements of the refrigeration equipment as a unit.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,385,274	Rhodes	July 19, 1921
1,452,271	Gwyer	Apr. 17, 1923
1,789,916	Thornton	Jan. 20, 1931
1,791,503	Hull	Feb. 10, 1931
1,825,731	Hull	Oct. 6, 1931
1,911,432	Chase	May 30, 1933
1,948,587	Macready	Feb. 27, 1934
2,117,082	Darbyshire	May 10, 1938
2,266,703	Cooper	Dec. 16, 1941
2,414,061	Richard et al.	Jan. 7, 1947
2,445,470	Brauer	July 20, 1948