May 7, 1946. W. U. VINTON ET AL. 2,399,963

LOW TEMPERATURE CABINET CONSTRUCTION

Filed May 10, 1944 4 Sheets-Sheet 1

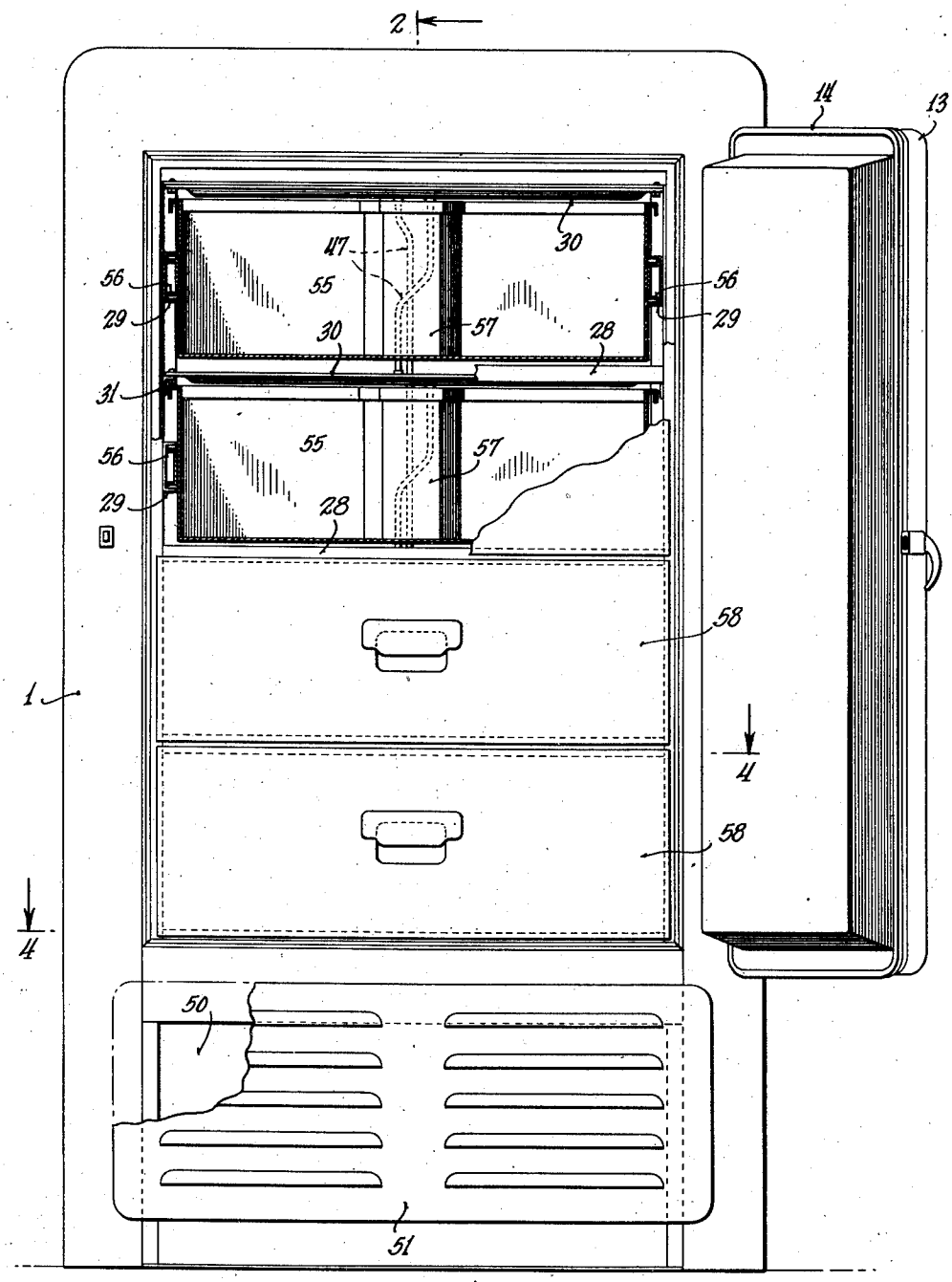


Fig. 1

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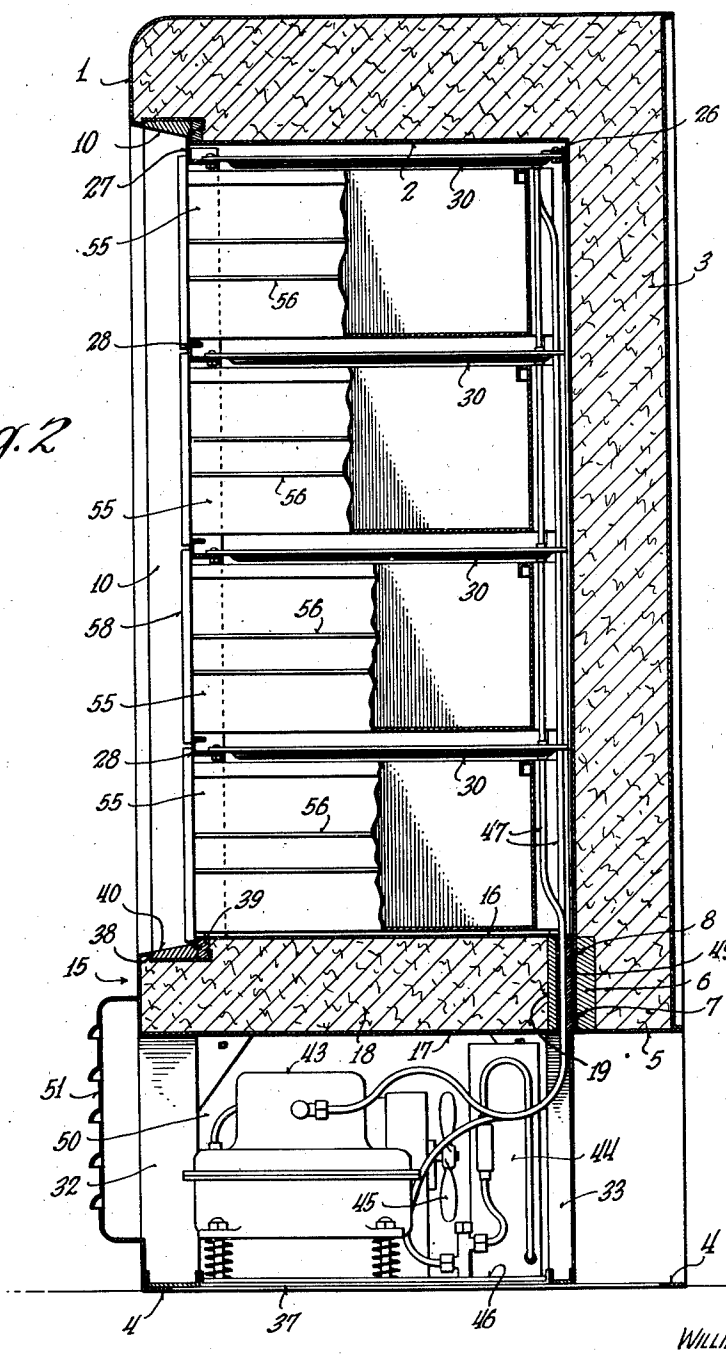
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Fig. 2



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LOW TEMPERATURE CABINET CONSTRUCTION

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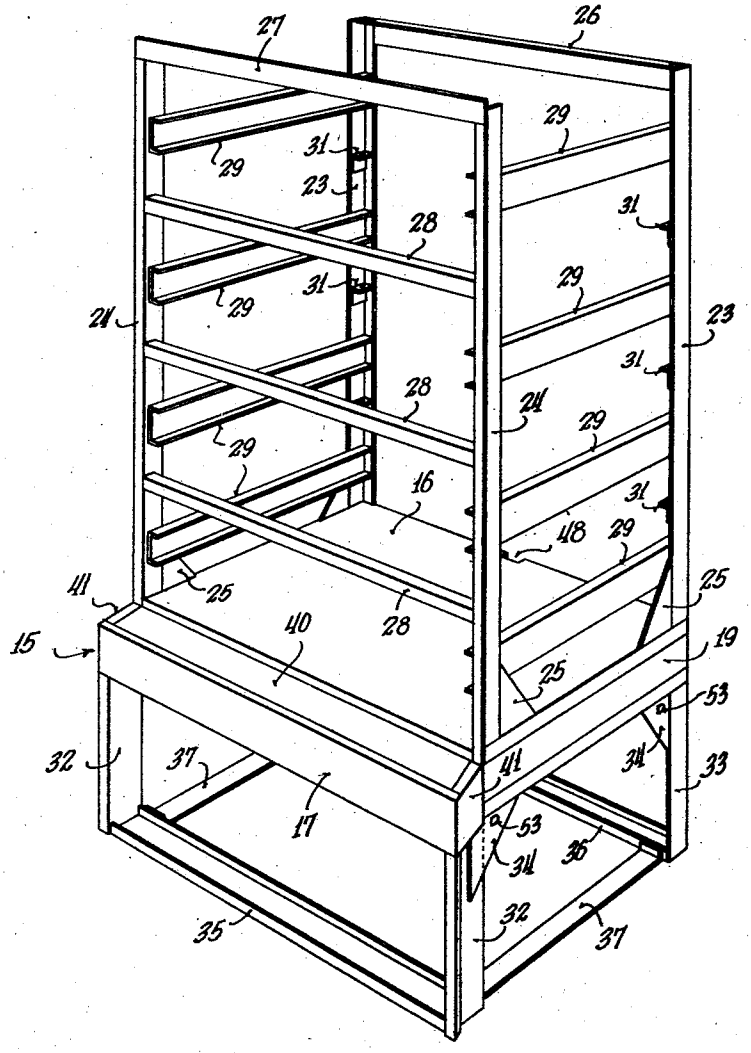


Fig. 3

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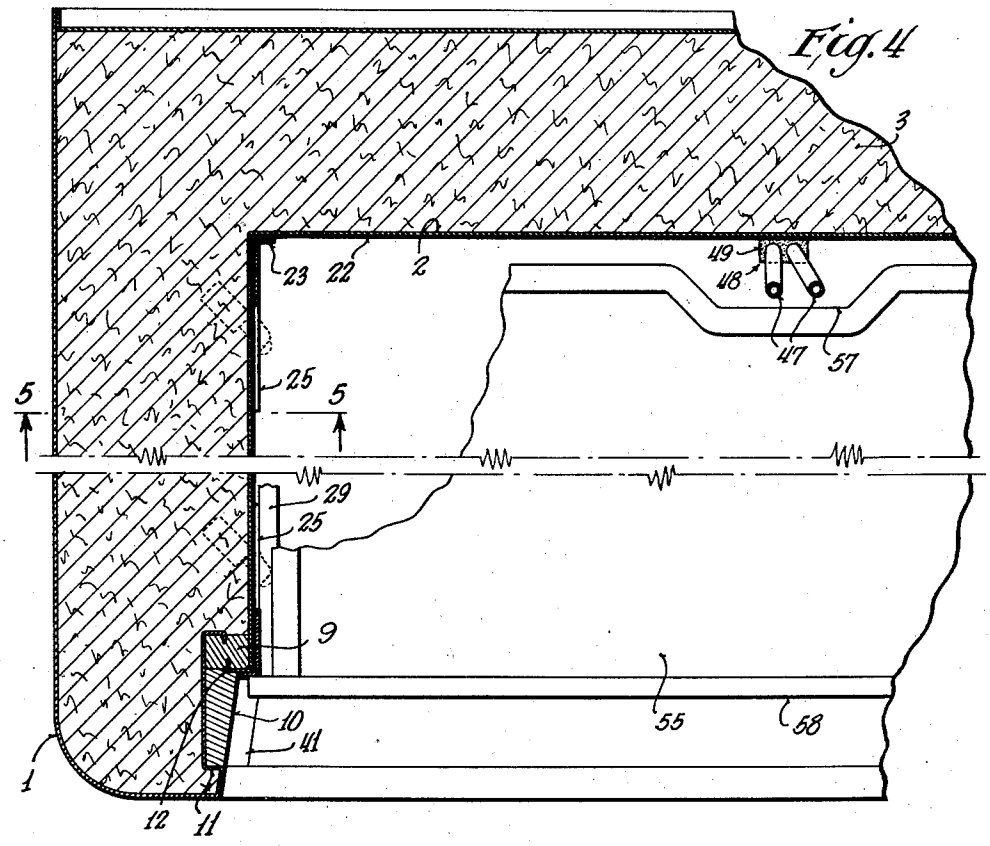
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LOW TEMPERATURE CABINET CONSTRUCTION

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Fig. 4



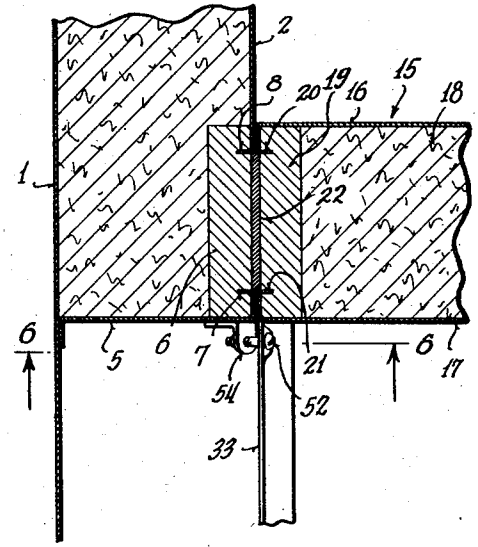


Fig. 5

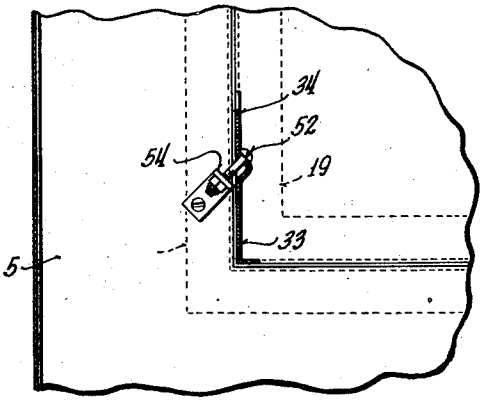


Fig. 6

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Patented May 7, 1946

2,399,963

UNITED STATES PATENT OFFICE

2,399,963

LOW TEMPERATURE CABINET CONSTRUCTION

William U. Vinton and Alvin H. Myers, Manitowoc, Wis., assignors to Manitowoc Shipbuilding Company, Manitowoc, Wis.

Application May 10, 1944, Serial No. 534,868

7 Claims. (Cl. 62—116)

This invention relates to a low temperature cabinet construction, such as a cabinet for quickly freezing and storing frozen foods, or the common type of refrigerator, or other cabinets of this general type.

In low temperature cabinets it has been the usual custom to provide a main insulated compartment having a front opening normally closed by a door and a lower compartment normally closed by a removable member and to position the evaporator plates or refrigerating means within the main compartment and join them by means of pipes to the power unit for supplying the refrigerant to the refrigerating means. Difficulty has been experienced in installing the evaporator plates and the power unit in their separate compartments and having them joined by pipes without disturbing the continuity of the pipes during installation. Also it has been found that it is difficult to test or repair or renew any portion of the refrigerating unit while the apparatus is in place. In addition to this, there is considerable danger of chipping, scratching or otherwise marring the finish of the main cabinet.

Another defect which exists in the heretofore known devices is that when the evaporator plates and power unit are in place, the low temperature cabinet is very heavy and it is a very difficult job to carry it into a house or into a basement without denting, scratching or otherwise injuring the cabinet.

This invention is designed to overcome the above noted defects, and objects of this invention are to provide a low temperature cabinet in which a main insulated compartment is provided and below this compartment a second compartment is provided for the reception, respectively, of the refrigerating elements and the power plant for furnishing the refrigerant to the refrigerating elements, the construction being such that the lower section or bottom portion of the insulated main compartment and a frame rigid therewith carrying the refrigerating elements and supporting means for drawers, shelves or the like and carrying the power plant for supplying the refrigerant to the refrigerating elements constitutes a unitary structure and may be installed or removed as a unit from the main body of the low temperature cabinet without disturbing the pipes connecting the power plant with the refrigerating elements.

This invention, therefore, has for its further object the provision of a novel form of low temperature cabinet construction in which a portion of the insulated walls of the main cabinet is normally fastened in place but is freely removable as a unit with the refrigerating elements and the power means for supplying the refrigerant to the refrigerating elements, in which the main cabinet which is relatively light may be easily carried into the house without any danger of damage thereto and thereafter the heavier removable section or unitary structure including the frame, refrigerating elements and power plant, may be caried into the house separately and readily installed in the main cabinet, the construction being such that in the event it is desired to substitute a new refrigerating unit that the old refrigerating unit consisting, as stated, of the refrigerating elements and power plant and carrying with it a lower section of the insulated main cabinet, may be freely removed and a new removable section substituted bodily therefor.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a front view of the cabinet, such view being partly broken away and having parts in section.

Figure 2 is a sectional view on the line 2—2 of Figure 1 with parts broken away.

Figure 3 is a view of a part of the removable section of the low temperature cabinet, the power plant and evaporator plates and connecting pipes being omitted.

Figure 4 is a sectional view on the line 4—4 of Figure 1.

Figure 5 is a sectional view on the line 5—5 of Figure 4.

Figure 6 is a sectional view on the line 6—6 of Figure 5.

Referring to the drawings, it will be seen that the low temperature cabinet comprises an outer casing 1 and an inner casing 2 with the space therebetween filled with thermal insulating means such as fiber glass as indicated by the reference character 3. The side walls of the outer casing 1 continue downwardly all the way to the bottom of the apparatus and are inturned at their bottom edges as indicated in Figure 2 and are preferably joined by transverse straps 4.

The outer casing 1 is provided with a lower portion 5 which extends inwardly as shown in Figures 2 and 5 and this lower portion 5 is separated from the inner casing 2 by means of thermally insulating breaker strips, such as straps 6 formed of wood or other suitable material. The straps 6 are provided with parallel grooves within which inwardly turned flanges 7 and 8 formed respectively on the lower portion 5 and the inner casing 2 are fitted or locked as shown in Figures

2 and 5. The straps 6 extend around the sides and back at the bottom portion of the insulated section of the low temperature cabinet. At the front of the cabinet a breaker strip construction is provided for thermally separating the outer casing from the inner casing. This breaker strip construction is shown most clearly in Figure 4 and may comprise an inner breaker strip 9 and an outer or locking breaker strip 10.

The inner casing 2 is provided with rearwardly turned flanges and the outer casing 1 is provided with forwardly turned flanges which fit within the grooves in the breaker strip 9 on opposite sides thereof, as shown particularly in Figure 4, and the outer casing is provided with a shouldered portion 11 against which the outer end of the front breaker strip 10 bears, the front breaker strip 10 being pushed into place and the casings slightly yielding and allowing it to seat against the shouldered portion 11 and to bear against the flanged part of the inner casing 2, the outer breaker strip 10 being provided with a small shouldered portion 12 which seats against the flanged portion of the inner casing 2 and thus locks the outer breaker strip in place. This construction forms the subject matter of the copending application of Robert D. West and Alvin N. Dedricks for Low temperature cabinet constructions, Serial No. 533,126, filed April 28, 1944.

A door 13, see Figure 1, is provided for closing the upper portion or main compartment of the low temperature cabinet and, in accordance with the usual construction, is provided with a gasket 14 extending completely around the door.

The removable portion includes the bottom insulated section of the low temperature cabinet indicated generally by the reference character 15, see Figures 2 and 3. This bottom portion has an upper sheet metal top 16 and a sheet metal bottom portion 17 spaced apart with the space between such portion filled with thermal insulating material, such as fiber glass 18 as indicated in Figure 2. It is provided with rear and side walls which are formed of thermal insulating material such as strips or sections of wood as indicated at 19 in Figure 5. These wooden strips are provided with grooves within which inturned flanges 20 and 21 fit, such flanges being integral with the upper and lower plates 16 and 17 respectively.

The adjacent portion of the main cabinet, as has been previously described, is provided with wooden or other thermal insulating breaker strips 6. When the removable section is slipped into place from the open front of the cabinet a yielding gasket 22 is interposed between the breaker strips 19 and 6 and extends around the sides and back of the removable bottom portion 15 of the apparatus. Means hereinafter described are provided for holding the removable portion of the apparatus in place.

Figure 3 shows the major part of the removable portion of the device. This consists of the removable insulated bottom section indicated generally at 15 hereinbefore described which is built as a unit with a frame like structure consisting of a pair of upwardly extending rear angle irons 23 and a pair of front, upwardly extending angle irons 24. The angle irons 23 and 24 are joined to the upper plate 16 of the removable insulating bottom portion indicated generally at 15 and preferably reinforcing triangular webs 25 are secured to both the angle irons and the upper plate 16 of the bottom insulated portion 15, as shown in Figure 3. The rear angle irons 23 are joined by a horizontal angle iron 26 at their upper ends and the front upright angle irons 24 are joined adjacent their top by a horizontal angle iron 27. The front uprights 24 are joined at intermediate portions of their length by means of inwardly directed channel irons 28. The front and rear uprights 24 and 23 are joined by means of drawer slides consisting of inwardly turned channel members 29. Evaporator plates or refrigerating elements 30, see Figure 2, are supported between the front and rear uprights 24 and 23. The upper evaporator plate 30 is supported from the horizontal angle irons 26 and 27, see Figure 2, and the remaining evaporator plates are supported upon rear brackets 31, see Figures 1 and 3, and upon the front channel members 28, see Figure 2.

Front and rear legs formed of angle iron indicated by the reference characters 32 and 33 extend downwardly from the lower plate 17 of the insulated bottom section 15 and the joint between such legs and the bottom wall 17 of the portion 15 may be reinforced by means of the triangular webs 34. The front legs 32 are joined by means of the channel members 35 and the rear legs are joined by means of the channel member 36. Tie members or bottom straps 37 extend between the front and rear channel members 35 and 36 to brace the device.

The bottom wall 17 of the insulated section 15, see Figure 2, extends upwardly at the front and is provided with a shouldered portion 38 and terminates in an outwardly turned flange. The top wall 16 of the insulated section 15 terminates in a rearwardly extending flange. A breaker strip construction similar to that shown in Figure 4 is provided for interlocking with the flanges of the plates 16 and 17 and consists of the inner breaker strip 39 and the outer breaker strip 40 of wood or other thermal insulating material. The side ends of the front portion of the section 15 are finished off in any suitable manner, as by means of wood plates 41 held in place in any desired way, not shown. These plates 41 are set at an angle to fit against the angular faces of the vertical breaker strips 10, see Figures 3 and 4.

The power plant which may consist of the compressor 43, the radiator 44 and the motor driven fan 45 is mounted on a sub-base 46 which is supported from the tie members 37 and secured thereto in any suitable way not shown. Pipes 47 join the power plant with the evaporator plates 30 and extend upwardly through a rear notch 48 formed in the insulating bottom section 15, as shown most clearly in Figure 4. The space within the notch 48 is filled with an asphaltic compound as indicated at 49 in Figures 2 and 4, such compound being odorless, water repellent and non-absorbent and being a thermal insulator. The material commonly known as "Hydrolene" has been successfully employed. This material is also used in assisting in sealing the joints at the several thermally insulating breaker strips.

The lower compartment indicated generally by the reference character 50 in Figure 2 is normally closed by means of an apertured front closure member 51 which is removably held in place by any suitable means not shown.

It is intended that the main body of the cabinet, which is relatively light, be carried into the house or into the basement first and thereafter the heavier section or unitary frame carrying the drawer slides, evaporator plates, the bottom insulated section and the power unit is carried in and is slipped into place, a gasket 22, see Figure 5, as previously described being positioned be-

tween the breaker strips 6 and 19 and extending around the lower insulated section 15. Thereafter the main section and the unitary frame and refrigerator unit section are bolted together. This is readily accomplished by providing bolts or screws 52 which extend in a slanting manner through apertures 53 formed in the webs 34 of the unitary frame structure as shown most clearly in Figure 3 and extending in a slanting manner rearwardly as shown in Figures 4 and 6. These bolts pass through apertured brackets 54 carried by the section of the bottom wall 5 which is a unitary structure with the main cabinet. Preferably the webs 34, see Figure 6, are provided with slightly deformed portions to provide flat faces against which the heads of the slanting bolts 52 are adapted to bear. It will be seen that as the bolts are tightened, the inner section is drawn inwardly and in clamping relation to the back and side portions of the main cabinet body.

It is obvious that the removable unitary frame and refrigerating unit may be tested outside of the cabinet as it may be removed from the main body portion as a unit while leaving the main body portion supported from its base portion. It is also clear that if a defect should develop in the refrigerating unit after the cabinet has been in service, it is a simple matter to remove the unitary frame and old refrigerating unit and thereafter bodily substitute therefor a new unitary frame and refrigerating unit.

The frame shown in Figure 3 may carry drawers or shelves as desired. In the form chosen for illustration drawers have been provided. These drawers are indicated generally by the reference character 55 and are provided with channel like portions 56, see Figures 1 and 2, which slide within the channel like drawer slides 29 of the frame. The drawers are provided with inwardly depressed portions indicated at 57 in Figure 4 in order to provide a clearance for the pipes 47. It is also preferable to provide the drawers with front walls or faces 58 which overlap the transverse front channels 28 of the frame, the front face of the upper and lower drawers overlapping the shouldered or flanged portion of the upper wall 16 of the section 15 and the upper flange 27 of the frame as shown in Figure 2. The front walls of the drawers, therefore, form a secondary seal in addition to that provided by the door and this minimizes the amount of spilling of cold air when the main door is opened. In addition to this the drawers are formed with imperforate front, rear, side and bottom walls and thus retain the dense chilled air within themselves even when a drawer is pulled forwardly to provide access to the material stored therein. This feature forms the subject matter of the copending application of Robert D. West and William U. Vinton for Low temperature cabinet constructions, Serial No. 533,127, filed April 28, 1944.

It will be seen that a novel form of low temperature cabinet construction has been provided by this invention in which the refrigerating unit may be tested and repaired outside of the main body of the cabinet, thus providing the utmost freedom for testing or repairing. Also it will be seen that by following this invention a new refrigerator unit including the lower insulating section of the low temperature compartment and the unitary frame may be substituted for a defective refrigerating unit and the associated parts with the utmost ease.

This invention also permits the main body portion and the removable portion of the device to be separated and the lighter main body portion carried into the house or into the basement without danger of denting or scratching or otherwise marring the cabinet and thereafter allows the heavier main portion of the device including the refrigerating unit and unitary frame structure to be carried into the house and slid into place from the front of the main cabinet structure and thereafter bolted into place.

It will also be seen that the continuity of the pipes connecting the power plant or refrigerant supplying means with the evaporator plates or refrigerating means is not interrupted or disturbed when the removable unitary structure is removed from or repositioned within the main cabinet structure.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

We claim:

1. A low temperature cabinet construction having an upper and a lower compartment and comprising a main body portion having insulated upper, side and back walls and having a base portion, a door for said upper compartment, a removable section fitting within said main body portion and supported by said main body portion and having an insulated section forming the bottom of said upper compartment and having frame means rigid with said insulated section, refrigerating means carried by said frame means and normally located in said upper compartment, and power means for supplying a refrigerant to said refrigerating means, said power means being carried by said frame means and being normally located in said lower compartment, said removable section consisting of said insulated section, said refrigerating means, said power means and said frame means being removable as a unit from within said main body portion leaving said main body portion supported from its base portion.

2. A low temperature cabinet construction having an upper and a lower compartment and comprising a main body portion having insulated upper, side and back walls and having a base portion, a door for said upper compartment, a removable section fitting within said main body portion and having an insulated section forming the bottom of said upper compartment and having frame means rigid with said insulated section, refrigerating means carried by said frame means and normally located in said upper compartment, power means for supplying a refrigerant to said refrigerating means, said power means being carried by said frame means and being normally located in said lower compartment, and pipes connecting said power means and said refrigerating means, said removable section consisting of said insulated section, said frame means, said refrigerating means and said power means being removable as a unit from within said main body portion without disturbing said pipes while leaving said main body portion supported from its base portion.

3. A low temperature cabinet construction having an upper and a lower compartment and comprising a main body portion having an insulated upper wall and having side and back walls insulated part way down from the upper wall and having a base portion, a removable insulated bottom section normally dividing the upper compartment from the lower compartment and positioned

adjacent the lower portion of the insulated part of the side and back walls, refrigerating elements and power means for supplying a refrigerant to said refrigerating elements respectively located above and below said bottom section and rigidly attached to said bottom section and removable therewith as a unit from within said main body portion while leaving said main body portion supported from its base portion, and a door for said upper compartment.

4. A low temperature cabinet construction having an upper and a lower compartment and comprising a main body portion having an insulated upper wall and having side and back walls insulated part way down from the upper wall and having a base portion, a removable insulated bottom section normally dividing the upper compartment from the lower compartment and positioned adjacent the lower portion of the insulated part of the side and back walls, refrigerating elements and power means for supplying a refrigerant to said refrigerating elements respectively located above and below said bottom section and rigidly attached to said bottom section and removable therewith as a unit from within said main body portion while leaving said main body portion supported from its base portion, detachable fastening means for holding said bottom section in place, and a door for said upper compartment.

5. A low temperature cabinet construction comprising a main body portion and a removable unit normally located within said main body portion, said main body portion having an open front provided with a door and having insulated upper, side and rear walls, said removable unit having an intermediate insulated horizontal part normally extending completely across the interior of said body portion and dividing said main body portion into an upper and a lower compartment and having an upper and a lower frame forming a unitary structure with said insulated horizontal part and projecting, respectively, upwardly and downwardly therefrom, a plurality of spaced refrigerating elements and supporting means carried by said upper frame, said supporting means being arranged to support food carrying means, and power means carried by said lower frame for supplying a refrigerant to said refrigerating elements.

6. A low temperature cabinet construction comprising a main body portion and a removable unit, said main body portion having insulated walls and having an open front provided with a door and having a base portion, said removable unit having an insulated portion coacting with said main body portion to form a cabinet having a main insulated compartment and an auxiliary compartment, and a refrigerating unit formed as a unitary part of said removable unit and having refrigerating means and power means for supplying a refrigerant to said refrigerating means normally located, respectively, in said main insulated compartment and in said auxiliary compartment, said removable unit being removable as a unit from within said main body portion while leaving said main body portion supported from its base portion.

7. A low temperature cabinet construction comprising a main body portion and a removable unit, said main body portion having insulated walls and having an open front provided with a door, said removable unit having an insulated horizontal portion normally extending completely across the interior of said main body portion and coacting with said main body portion to form a cabinet having a main insulated compartment and an auxiliary compartment, a refrigerating unit formed as a unitary part of said removable unit and having refrigerating means and power means for supplying a refrigerant to said refrigerating means normally located, respectively, in said main insulated compartment and in said auxiliary compartment, and a frame forming a unitary portion of said removable unit and normally located in said main insulated compartment and extending from adjacent the bottom to adjacent the top of said main body portion and arranged to support food carrying means.

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