

July 21, 1936.

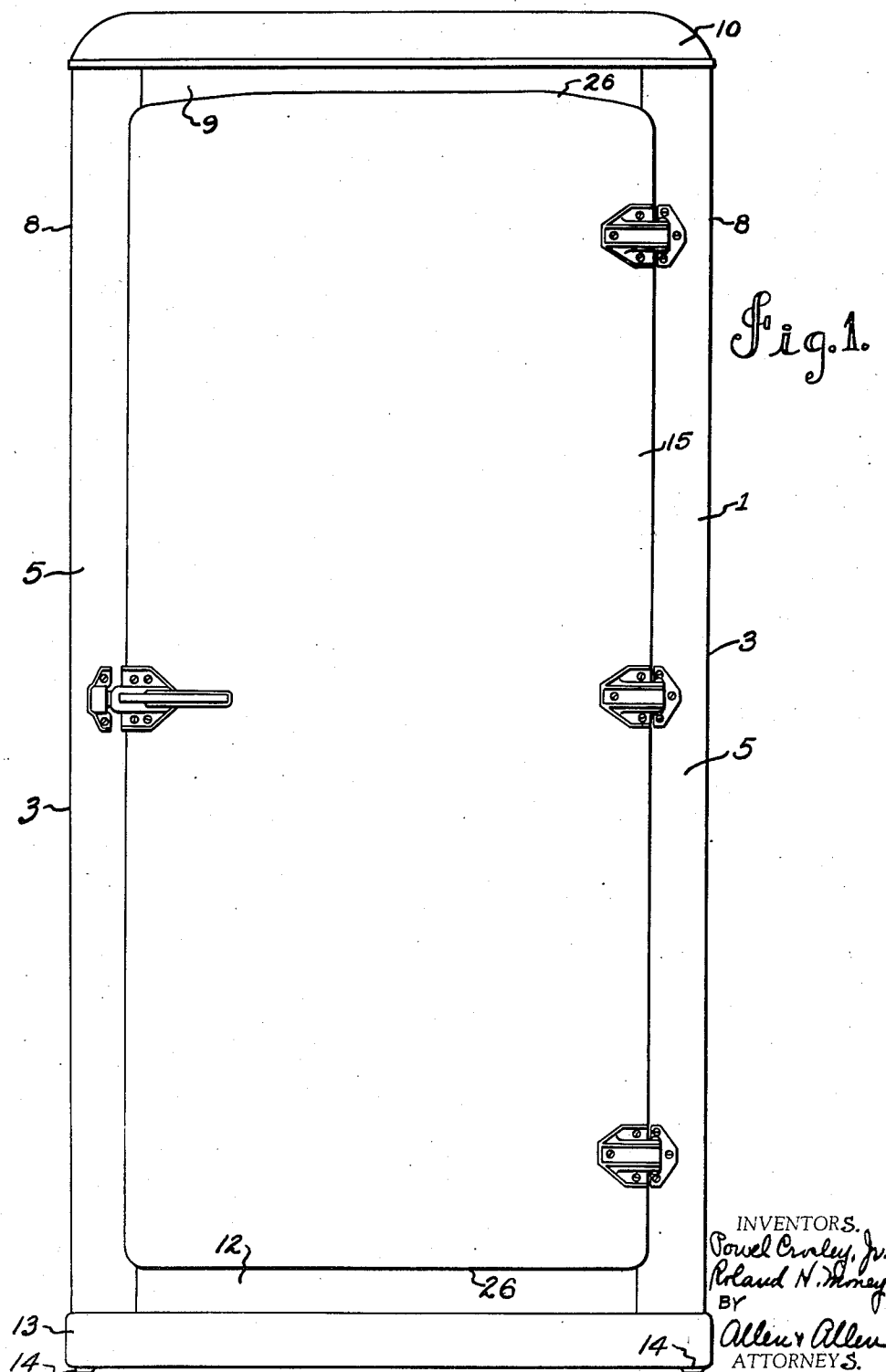
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REFRIGERATOR CONSTRUCTION

Filed Jan. 19, 1934

6 Sheets-Sheet 1



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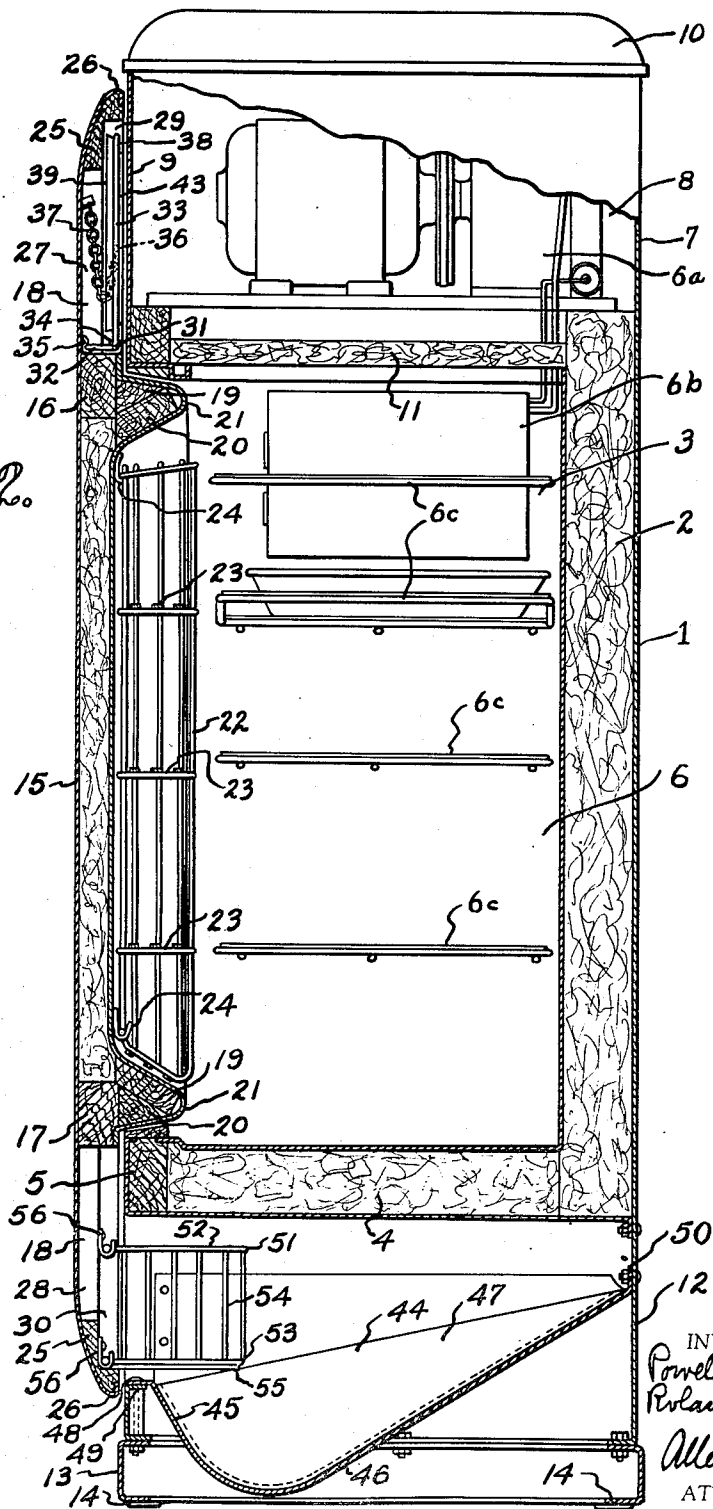
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REFRIGERATOR CONSTRUCTION

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6 Sheets-Sheet 2

Fig. 2.



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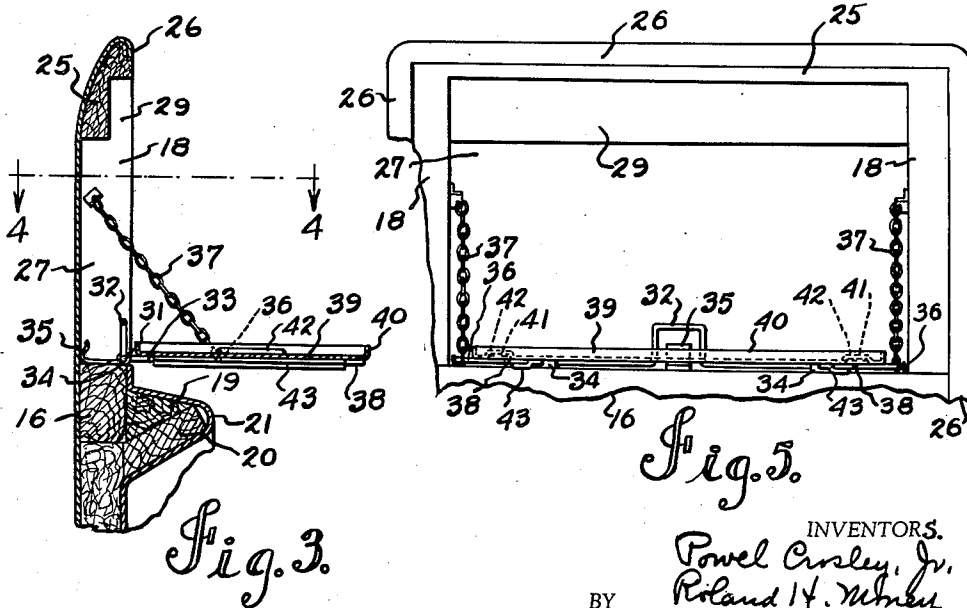
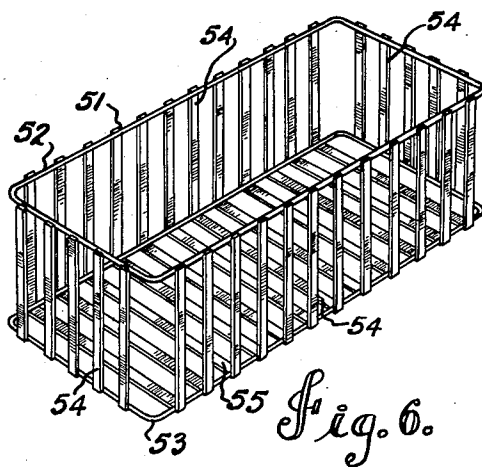
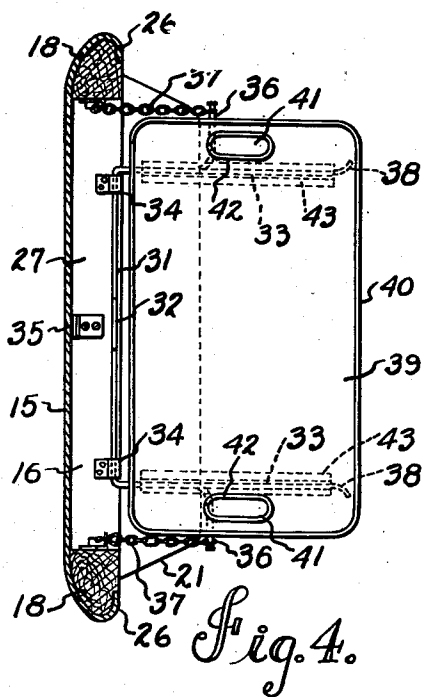
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REFRIGERATOR CONSTRUCTION

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6 Sheets-Sheet 3



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REFRIGERATOR CONSTRUCTION

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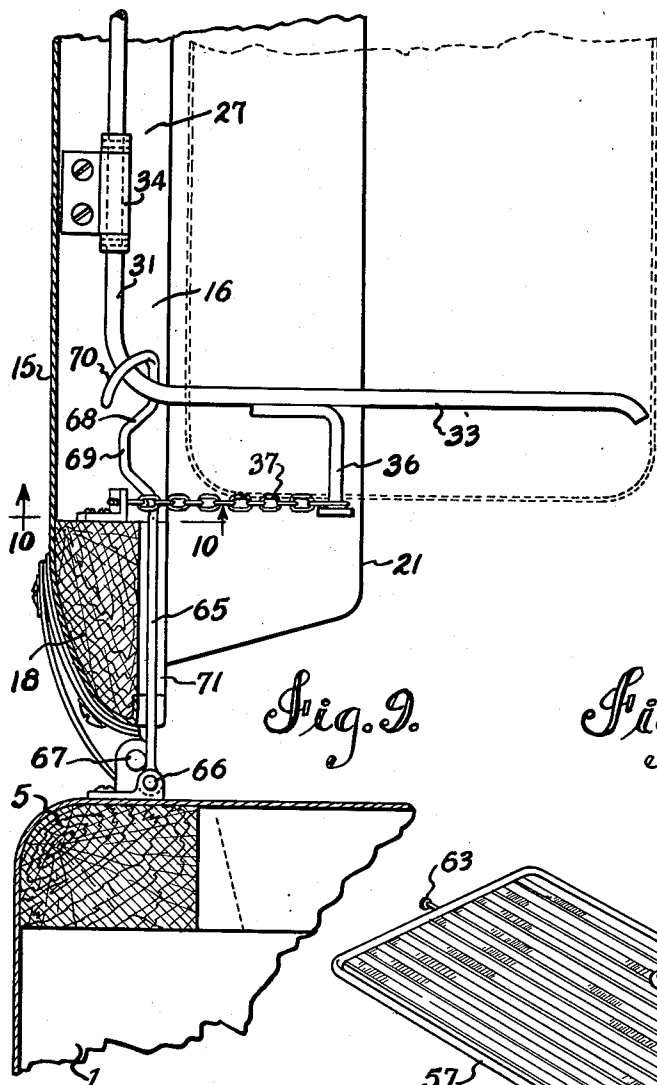


Fig. 9.

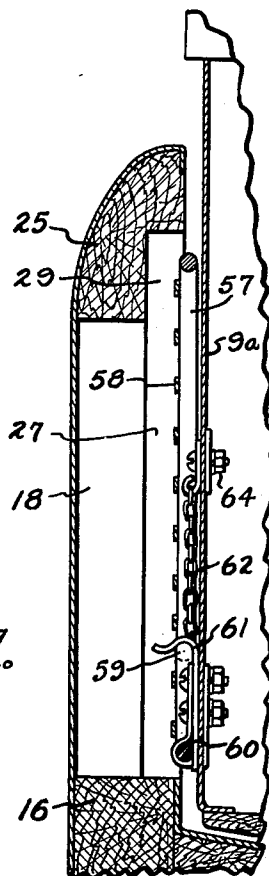


Fig. 7.

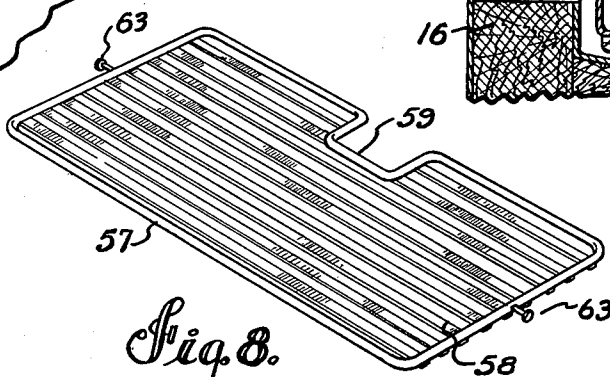


Fig. 8.

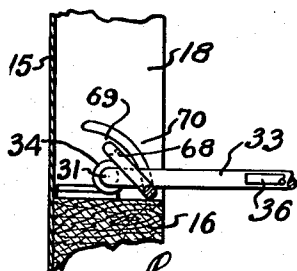


Fig. 10.

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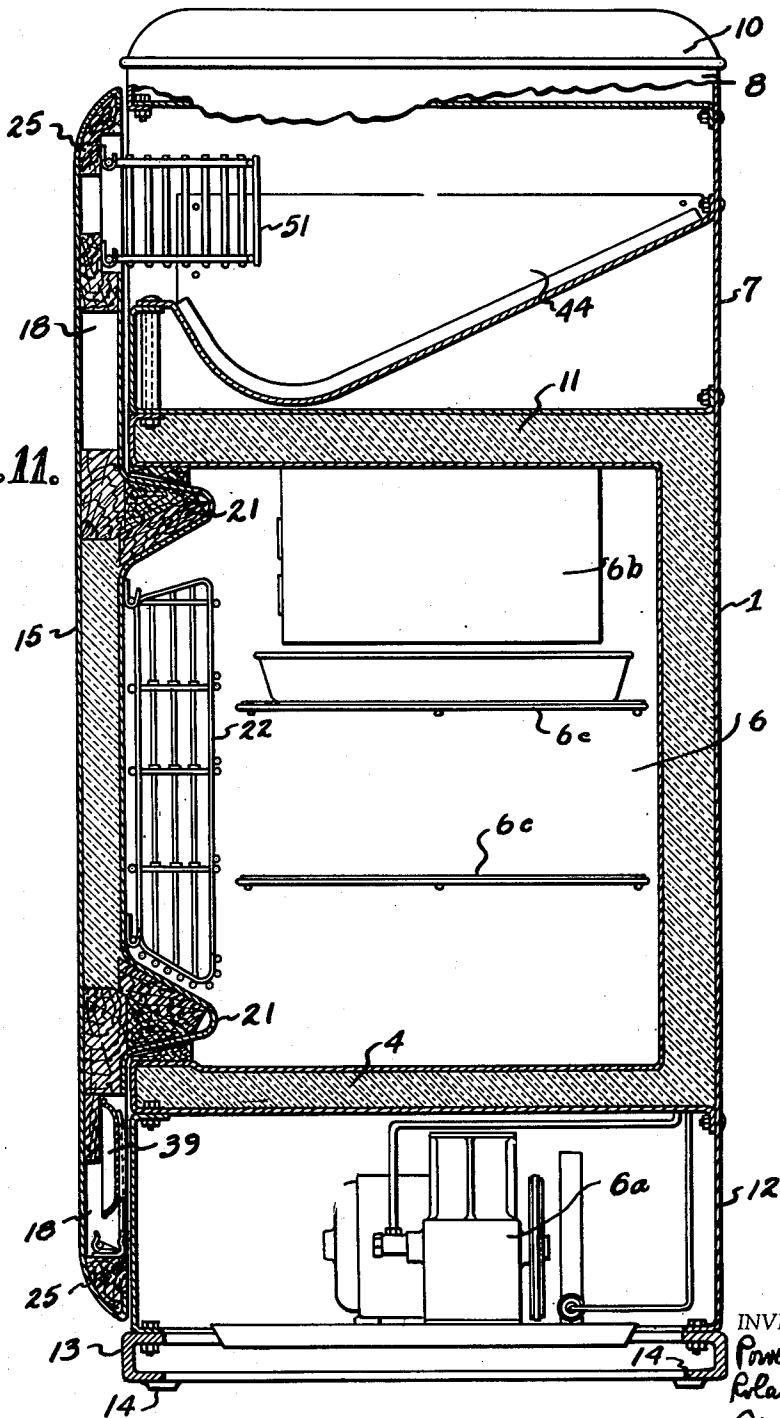
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Fig. 11.



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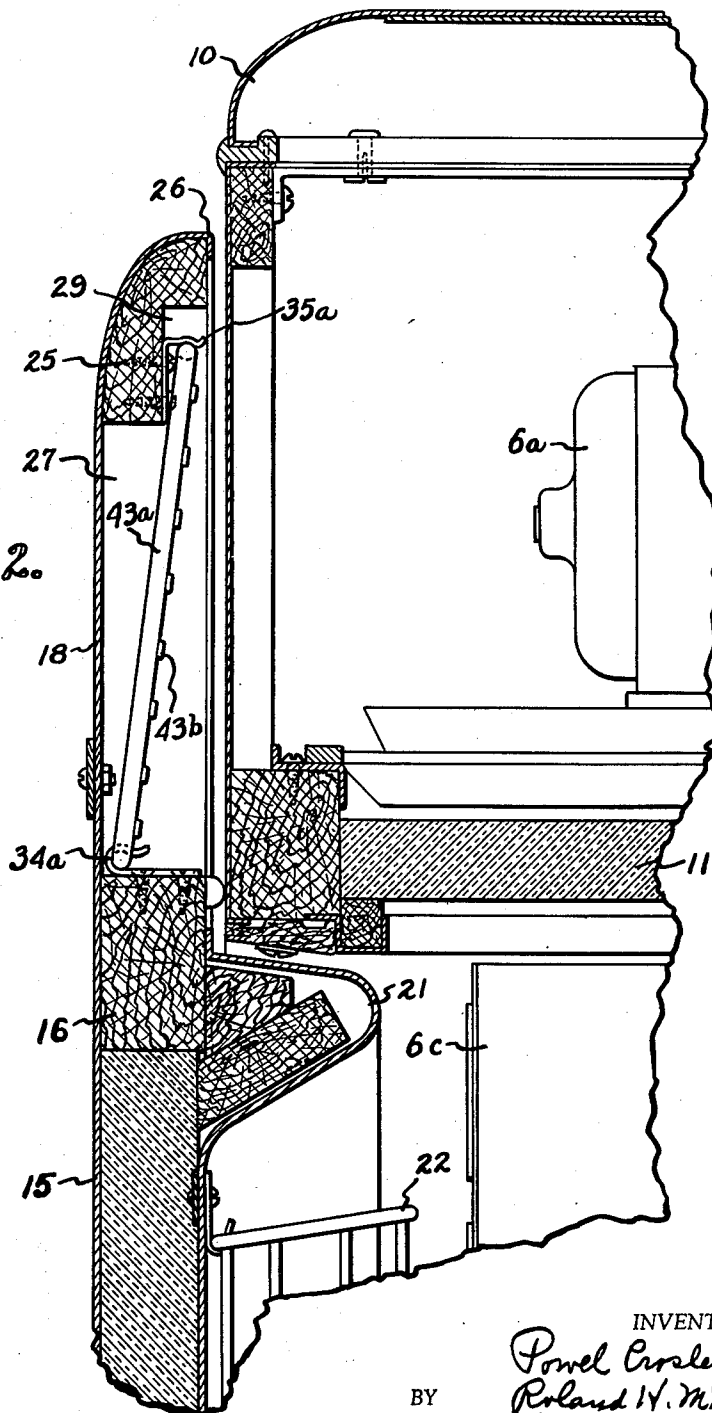
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REFRIGERATOR CONSTRUCTION

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Fig. 12.



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UNITED STATES PATENT OFFICE

2,047,996

REFRIGERATOR CONSTRUCTION

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Application January 19, 1934, Serial No. 707,370

7 Claims. (Cl. 312—173)

Our invention relates to refrigerator cabinets used in mechanical refrigeration and relates to structural features providing for additional storage, more convenient operation and other structural advantages of convenience and appearance.

In order to provide for a convenient height to the lower shelves of refrigerator cabinets, it has been the practice to place the cabinet upon legs of sufficient height, thus leaving a space below the said cabinet. In some constructions this space is utilized for housing the compressor elements for mechanical refrigeration. In some constructions also, the cabinet has been extended above the refrigeration compartment to provide a compartment above it, in which are housed the compressor elements aforesaid.

According to our invention, we employ a cabinet with a door which in addition to enclosing the open front of the refrigeration compartment, also forms a closure for an additional compartment, which will be located preferably at the space between the floor and the bottom of the refrigerator compartment, rather than a space above the said refrigerator compartment. Also it is part of our invention to extend the door beyond the refrigeration compartment at the opposite side from the additional compartment for which the door forms a closure, so as to provide an extension for the door within which may be housed a tiltable shelf or the like, serving as a supporting tray in the use of the refrigerator.

Furthermore, we may utilize the door as a compartment forming member in portions thereof which serve to close the refrigeration compartment, as has heretofore been suggested, which compartment together with the tiltable shelf or tray provides a convenient way of supporting articles when shifting them about in the refrigeration compartment or in the door compartment or between the two compartments.

Also in connection with the additional compartment, which our invention provides will be closed by the same door as the main compartment, we propose to enclose this compartment except for the said door opening thereby enabling us to maintain in this additional compartment some degrees lower temperature than the room temperature in which the device is located.

Other advantages incident to our invention will be stated in the ensuing specification, which describes in detail a preferred construction and some modifications thereof, same being illustrated in the appended drawings. The novelty inherent in the several structures described will be set forth in the claims that follow, there being no intent

that the details described other than as they are incorporated in said claims together with their mechanical equivalents, should be considered as of the essence of our invention.

In the drawings:

Figure 1 is a front view of a refrigerator embodying our invention in its preferred form.

Figure 2 is a vertical front-to-rear section of the same.

Figure 3 is a partial similar section of the upper part of the door only, with the support lowered for use.

Figure 4 is a sectional plan, the door being in section on the line 4—4 of Figure 3, showing the support as in Figure 3.

Figure 5 is a partial inside elevation of the door, and of the support, as in Figure 3.

Figure 6 is a detail perspective view of the receptacle preferably used on the lower part of the door as seen in Figure 2.

Figure 7 is a partial section of the upper part of the door and adjacent part of the cabinet, showing a modification in which the support is mounted on the cabinet.

Figure 8 is a detail perspective view of the support used in the example of Figure 7.

Figure 9 is a sectional plan of a portion of the cabinet and a portion of the door, the door being open, showing a modification in which means is provided for automatically moving the support from one of its positions to the other.

Figure 10 is a partial vertical section on the line 10—10 of Figure 9.

Figures 11 and 12 are views similar to Figure 2, showing modifications.

In Figures 1 to 6, inclusive, the cabinet 1 has the insulated back and side walls 2 and 3, respectively, the insulated bottom 4, and the front wall 5 with an opening to the main compartment 6 as well known in the art. Also, as is well known, the upper part of the cabinet in which the compressor 6a is contained is made with continuous side and front non-insulated walls 7 and 8 respectively, and the non-insulated removable top 10. The bottom 11 of this upper portion or compartment of the cabinet is insulated and below this bottom 11, in the upper part of the compartment 6, is the evaporator 6b, from which there is circulation of air cooled by this evaporator apparatus 6b downward in the compartment 6 for cooling articles stored therein on shelves 6c.

We prefer to omit the usual legs of the cabinet and instead provide below the compartment 6, an additional compartment, which usually will be a few degrees cooler than the surrounding

room, being suitable for storage of articles that are not so perishable as those usually stored in the main, effectively cooled compartment 6. As here shown, this lower compartment is provided 5 by connecting to the usual outer metal shell of the main part of the cabinet 1, a shell 12 of box like shape, open at its bottom and also at its front; and on the bottom of this shell 12 is secured an additional shallow base shell 13, also 10 open at top and bottom but having its four sides continuous. It may have short feet 14.

The door 15, intermediate of its end portions, is similar to refrigerator doors known in the art; being made up of metal sheets formed to desired 15 shape and secured to interior frame structure preferably of wood, made up of a top piece 16, a bottom piece 17, and side pieces 18. Additional filling pieces, preferably of wood, as at 19 and 20, support inwardly distended parts 21 of the door inner shell plate, which lap inside the cabinet front opening, and fitted with breaker strips, in a usual manner. These parts, however, are so formed as to provide a recess in the interior of the door, in which is removably mounted article 25 storage support means 22, according to the patent and the application hereinafter mentioned. As here shown, this support has shelves 23, and is made as a unit and hung on hooks 24 within the recess, according to the patent to West, Reissue 30 No. 19,008, the application of Crosley and Austin, Ser. No. 668,091 filed Apr. 26, 1933, to which reference is hereby made.

The door has its structure continued upwardly a substantial distance, as well as downwardly a 35 substantial distance, above and below the front opening of main compartment 6 which it closes. The extended side frame pieces 18 of the door support, at their upper and lower ends, transverse frame pieces 25, preferably of wood, which 40 outwardly have the desired curvature to support the front metal shell plate, with thin-edged formation imparting the desired pleasing appearance to the front of the refrigerator. These transverse pieces 25 have rabbets 29 and 30 respectively, in their inner edges, and the outer 45 metal door plate is flanged around and set into the thin outer edges of these pieces, as at 26, in a usual manner. Thus constructed, the door has at the top and at the bottom, the recesses 27 and 50 28, respectively, left within the extended frame elements and augmented by the rabbeting.

As an article support to be used on the upper extension of the door, we prefer to provide a rack in the form of round wire bent into a U-shape, 55 wide in proportion to the depth of the U. The bottom member 31 of the U-shape has at its middle a U-shaped bend 32 extending at right angles to the side members 33 of the U-shape. Metal strips are bent to form hinge loops 34 which 60 embrace the bottom member 31 at opposite sides of the bend or extension 32 thereof and are fastened, as by screws, to the bottom of the recess 27; and when the rack is swung down on these hinges, it extends out of this recess for a considerable distance as seen in Figs. 3 and 4, and 65 the middle extension or bend 32 then stands upright. Also fixed to the bottom of the recess 27, as by screws, is a resilient detent element 35, so shaped and in such position that when the bracket member is swung up on its hinges 34 to a 70 vertical position within the recess 27, the bend or extension 32 forces this detent element inwardly of the recess, to snap over the extension 32 and hold the bracket in this raised position. 75 The bracket has on its side members 33 lateral

extensions 36, preferably by welding L-shaped wires to the members; and two chains 37 are provided, each with its lower end connected to the outer end of a respective one of these extensions 36 and its other end connected to upper parts 5 of the inner faces of the adjacent door frame pieces 18. These chains are flexible, and when the bracket folds upwardly, drop within the side portions of the recess 27; and when the bracket is extended, they support it in substantially horizontal position. The outer end portions of the side members 33 of the bracket, at 38, are flared or bent laterally outwardly.

To be removably mounted on the bracket just described, we prefer to provide a tray 39, of 15 pressed sheet metal, with a low upturned rim 40, and, adjacent opposite ends, which will be laterally positioned when the tray is on the bracket, hand holes 41, preferably having their edges 42 slightly turned up to afford the desired smoothness. On its bottom, this tray 39 has Z-shaped 20 metal strips 43 with their lower members spaced down from the tray bottom surface and extending outwardly; being so located that they will receive the respective side members 33 of the 25 bracket with a snug sliding fit, for the tray to be slid in onto the bracket and held without rattling. The outward bending of the bracket side members at 38, facilitates the starting of this application of the tray to the bracket. 30

It will be seen that, with the door open and the bracket, with the tray thereon, lowered, any articles which it is desired may be temporarily supported while rearranging or gaining access to 35 other articles, either within the main compartment 6 or upon the support that is on the intermediate part of the door, such as the means 22, may be readily placed on the tray or removed therefrom. Upon closing the bracket and tray 40 upwardly, the tray 39 is accommodated in the inner portion of the recess 27, with the bracket entirely within the recess, permitting the door to be closed; whereupon the bracket and tray are concealed by the door upward extension, between 45 the latter and the front of the upper portion of the cabinet. This upper extension of the door then presents the appearance of closing a compartment opening that extends close to the top of the cabinet.

At the bottom of the refrigerator, within the 50 structure made up of the shells 12 and 13 as before described, we prefer to provide a receptacle or bin 44, having a front 45 and bottom 46 joined by a curve of ample radius, and sides 47 of generally triangular shape having their upper edges 55 extending straight from the top corners of the front 45 to the rear corners of the bottom 46; so that the bin may be described as scoop-shaped. At its front a flange 48 extends forward along 60 the top edge and is fixed to the lower flanged edge 49 of the front opening of the shell 12; and at its rear, a flange 50 extends up from its edge and is fixed to the rear wall of this shell 12, at such a height that the bin as a whole has a forwardly and downwardly inclined posture in the 65 base structure of the refrigerator and is readily accessible for placing articles therein or removing articles therefrom through the front opening of the shell 12. In this position, and of the depth 70 preferred, the bottommost part of the bin 44 projects down into the base shell 13, lying only slightly below the extreme bottom of the refrigerator.

The front opening of the shell 12 is closed by 75

the downward extension of the door; and in the recess 28 of this extension a basket like receptacle 51 is supported, extending in from the extension and occupying the front portion of the base interior by entrance through the front opening of the shell 12 when the door is closed. This receptacle preferably is formed of an upper loop of wire 52 and a like lower loop 53, the two joined by vertical slat wires 54 at the ends and front. Similar slat wires 55 join the front and rear members of the bottom loop 53, forming a bottom. The loop wires preferably are round, and the slat wires flat and welded to the loop wires. Upwardly opening hooks 56 are fixed to the inner faces of the rabbets of the side members 18 of the door frame, in positions to receive the upper and lower members 52 and 53, so that the receptacle may hang firmly in the lower door extension, or be readily removed therefrom.

The bin or receptacle 44, and this basket like receptacle 51 do not necessarily extend across the entire width of the space in the base, which may contain at one side, in certain refrigerator constructions, part of the refrigerating apparatus. These receptacles however are here shown as extending the full width; it being understood that it is not essential that part of the refrigerating mechanism be contained in the base.

Inasmuch as refrigeration involves evaporation within the food compartment, fresh vegetables and fruits, particularly those of an excessively porous nature or those having a very porous covering, could be thus refrigerated only at the sacrifice of the water content thereof resulting in deterioration and reduced food value and probable monetary loss as well, unless the same were kept in enclosed vessels within the compartment. These lower receptacles serve for storage of such articles.

While affording these added advantages in a refrigerator and increasing its capacity, the extension of the door down near to the bottom of the cabinet base affords the appearance, at the front of the refrigerator, when the door is closed, of one in which a single compartment extends into the base.

The best effect is attained with such provision at both the top and bottom, simplifying and improving the ornamental design in keeping with modern ideas of design. It will be understood that the wire structure, such as the basket like receptacle, the bracket, and the fittings for these, are preferably tinned; and that the tray used at the top, as well as the interior portions of the door involved in our improvement, may be enameled as are other portions of the refrigerator, as well known in the art.

In Fig. 7, we show a modification of our invention in which the article support, instead of being mounted on the upper door extension, is mounted on the front wall of the upper compartment of the cabinet, and is covered by the door extension when the door is closed. The support here, complete, corresponds to the bracket on which the tray 39 rests in the previous example; being made up, as best seen in Fig. 8, of a wire loop 57 forming a rectangular frame, with longitudinal slats 58 having their ends welded to the end members of the frame; the loop wire being preferably round and the slats being flat wire.

Instead of having an extension outward to engage a detent, this frame is formed with an inward extension 59 by bending the wire inward at

one side. Hinges 60 bolted to the sheet metal front wall 9a of the cabinet receive the lateral portions of the frame side, at each side of the extension 59; so that the support thus formed is adapted to be swung up or down. When up close to the wall 9a, the extension 59 engages with a resilient detent 61, also bolted to the wall 9a; this being its position as shown in Fig. 7. Chains 62 are connected to side extensions 63 of the frame 57 and to bolted connections 64 on the wall 9a, limiting the lowering of the support, as will be understood from the illustration and description of the bracket in the first example. The door extension recess 27, instead of having the support carried in it, makes room for the support that is mounted on the cabinet wall, when the door is closed and the support folded up to the wall.

In the example of Figs. 9 and 10, the support is mounted on the upper door extension, as in the first example, and comprises the bracket, with its side members 33 and its bottom or cross member 31, understood to be made with an extension to engage a detent, not shown, as in the first example, and to receive a tray, not shown, as in that example. It has the side extensions 36 connected by chains to the door side frame members 18, as in the first example. We have added, in this modification, means to cause the support to swing up within the recess 27 of the door extension automatically incident to the movement of the door relative to the cabinet, in closing; and to drop down, after automatic release from the detent, incident to opening movement of the door.

As here shown, this provision comprises a bent rod or wire 65, having at one end a loop or eye by which it is connected to a hinge member 66 fixed on the side of the front wall 5 far enough out of alignment with the hinges 67 of the door to impose a crank-like operation upon this rod 65, were it considered that the cabinet swung around on the door; the effect being the same when the door is swung on the cabinet. The hinge member or pivot 66 being located offside and inward from the line of the hinges 67, the effect is, when the door is closed, to cause the rod 65 to move endwise relatively to the door, toward the middle of the door. In so doing, a hump 68, formed by bending the rod 65 near its free end, which is inclined upwardly and forwardly as seen in Fig. 10, is forced under the side member 33 of the support, swinging the support upwardly until, when the side member 33 has ridden onto the top portion 69 of this hump, the support is fully swung up into the recess 27 of the door extension; and it will be understood that its extension then will engage the detent, not shown, and the support will be held in raised position.

When the door is opened, the relative movement of the wire or rod 65 is in the opposite direction, that is, toward the side of the door. The support will remain detained in its raised position until its side member 33 is engaged from the opposite side by an upwardly and forwardly inclined curved hook-like end portion 70 of the rod or wire 65. The shape of this portion 70 is such that the rod or wire 65 thus will pull the support loose from the detent and permit it to ride down the hump 68 to lowered position; its downward swinging being limited by the chains 37. The side frame member 18 of the door extension has a groove 71 to accommodate this rod or wire 65 within the inner face of the door, so that it does not interfere with the closing of the door.

It will be seen that this automatic closing provision makes the device much more convenient to operate, and avoids chance of damaging the parts should a person close the door without first raising the support, as might occur in the first example. However, we find that the apparatus is quite practical without the automatic provision; and it will be understood that we may construct our invention either with or without this provision, according to conditions that are to be met.

In Figure 11 we have shown a modification in which the storage compartment with the bin 44 is placed at the top and the compartment for the compressor 6a is placed at the bottom. In this modification also the door is provided with the basket 51 at the top and with the shelf or tray 39 at the bottom of the cabinet. Otherwise the construction of the cabinet is substantially the same as that shown in Figure 2, the modifications consisting merely in the change of location of the parts.

In the modification shown in Figure 12, the construction is like that of Figure 2, except that instead of having a rack hinged to the inner side of the upward extension of the door, on which a tray is removably mounted, the hinged structure is complete in itself, as a shelf. On the bottom of the recess 27 are hinge clips 34a, each with a longer lower part screwed to the bottom of the recess and a shorter upper part curving upward from the inner end of the longer lower part and extending outward with a slight downward and upward bend. The shelf is made up of a rectangular loop or frame 43a of heavy round wire, with slats 43b of lighter flat wire extending transversely and having their ends welded to the side members of the loop 43a. The lower side member of this loop or frame 43a is removably held in the curves of the members or clips 34a. Thus the shelf may swing down, whereupon it rests on the outer edge of the bottom of the recess 27. If it is swung upward, its upper side engages under a resilient clip 35a screwed to the door frame within the rabbet 29; the clip 35a having an outwardly extended part curved to receive and hold the shelf in its raised position, yet readily release it when it is pulled downward.

Other modifications may occur, and we do not wish to be understood as being limited to the precise disclosures herein; but what we claim as new and desire to secure by Letters Patent, is:

1. A refrigerator cabinet comprising a tier of compartments, one of which is insulated to exclude heat therefrom, a door extending substantially the full height of said tier, having an insulated portion closing said refrigerated compartment tightly, and an extension covering at least one of said other compartments without forming a tight closure therewith said extension of said door having a recess, and a pivotally mounted shelf occupying said recess when said door is closed.

2. A refrigerator cabinet comprising a plurality of compartments, one of which is insulated to exclude heat therefrom, a hinged door having a main insulated section for closing said insulated compartment and an extension lying in front of another compartment, a hinged shelf mounted on the inner face of said extension and normally held vertical, and an actuating device attached to said cabinet and operatively connected to said shelf whereby said shelf is automatically restored from horizontal position to vertical position when said door is being closed.

3. In a refrigerator cabinet an insulated food

compartment and an uninsulated compartment adjacent thereto, a door having an insulated main portion covering and forming a tight fit with said refrigerated compartment, and an extension lying in front of said uninsulated compartment, said extension being recessed and said recess terminating at its bottom in a horizontally disposed abutment member, pivoting means on said abutment member, and a shelf member having a rail engaging said pivoting means whereby said shelf may be swung from a vertical position within said recess to a horizontal position extending from said door, said pivoting means and said abutment member coacting to prevent the swinging of said shelf downwardly past said horizontal position, the engagement of said pivoting means and said rail being releasable by a horizontal pull whereby said shelf may be readily detached and used as a tray.

4. In a refrigerator cabinet an insulated food compartment having a door opening therein, at least one adjacent compartment, and a door having an insulated portion closing the opening of said food compartment and forming a sealing closure thereabout, and at least one extension on said door lying in front of an adjacent compartment when said door is closed, said extension having a recess therein and a shelf mounted on horizontal pivots and adapted when in upright position to be contained within said recess to permit closing of said door, and when said door is opened, adapted to assume a horizontal position and to serve as a temporary support for articles.

5. In a refrigerator cabinet an insulated food compartment having a door opening therein, at least one adjacent compartment, and a door having an insulated portion closing the opening of said food compartment and forming a sealing closure thereabout, and at least one extension on said door lying in front of an adjacent compartment when said door is closed, said extension having a recess therein, and a shelf mounted on horizontal pivots and adapted when in upright position to be contained within said recess to permit closing of said door, and when said door is opened, adapted to assume a horizontal position and to serve as a temporary support for articles, said shelf when in horizontal position being removable bodily to serve as a tray.

6. In a refrigerator cabinet an insulated food compartment having an opening for a door therein an adjacent storage compartment having an access opening on the same side of said cabinet, and an adjacent motor compartment having a face on the same side of said compartment, and a door having a main body lying beyond the front portion of said refrigerator cabinet, said door having an insulated portion lying in front of and forming a sealed closure to said food compartment, and additional portions covering said adjacent compartments, said additional portions lying in spaced relationship to the fronts of said adjacent compartments, said door having a substantially continuous outer surface and extending substantially from the top to the bottom of said refrigerator cabinet whereby the front thereof is given an attractive and finished appearance, said portion of said door extending in front of said motor compartment bearing a shelf pivoted thereto and parallel therewith when said door is closed but movable to a horizontal position when said door is open, and said portion of said door lying in front of said storage compartment having an article supporting means attached thereto, said

article supporting means when said door is closed adapted to extend into said storage compartment.

5 7. A refrigerator cabinet comprising a tier of compartments, one of which is insulated to exclude heat therefrom, a door extending substantially the full height of said tier, having an insulated portion closing said refrigerated compartment tightly, and an extension extending in front of at least one of said other compartments,

said last mentioned compartment having an opening adapted to be covered by said extension on said door, said extension bearing a projecting means for supporting articles of food and adapted to extend into said last mentioned compartment through said opening when said door is closed.

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