March 2, 1943. G. L. C. EARLE 2,312,325

CLOSURE MEMBERS

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FIG. 3

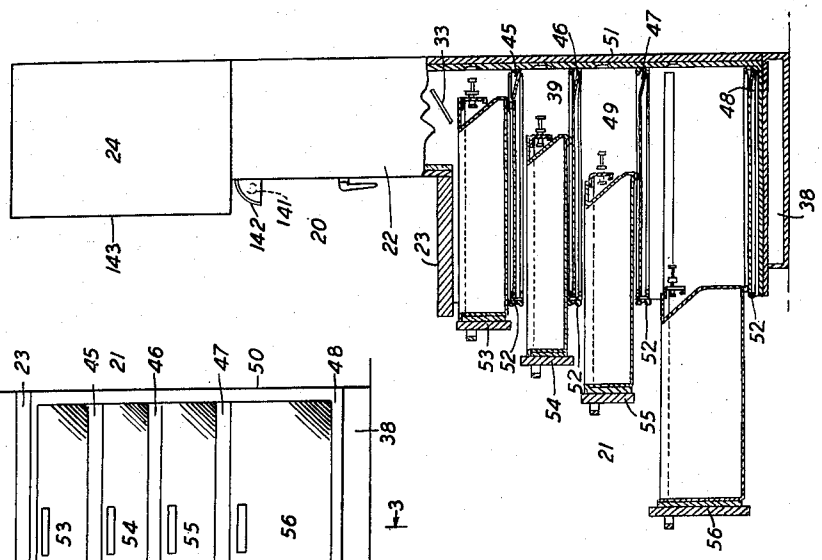


FIG. 2

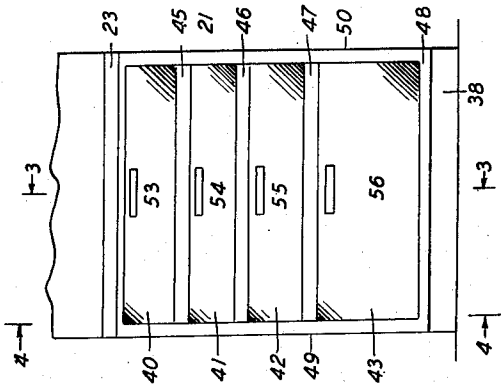
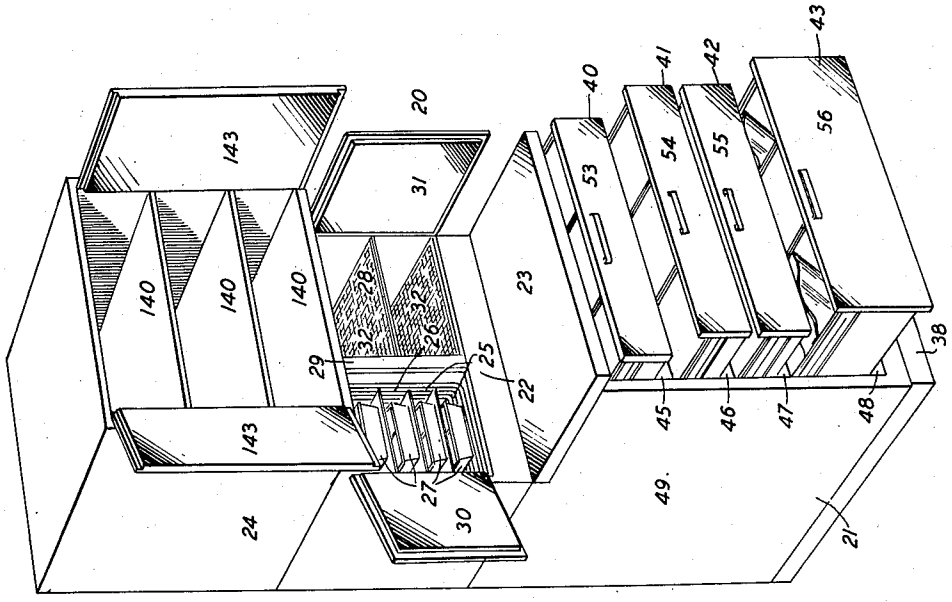


FIG. 1



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FIG. 5

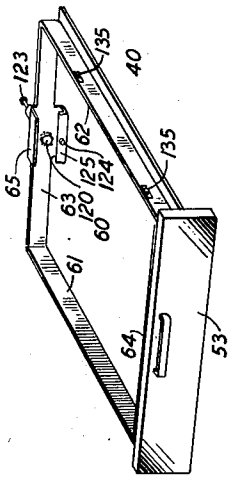


FIG. 6

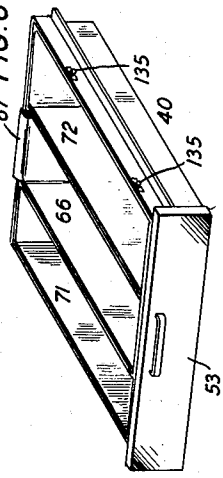


FIG. 8

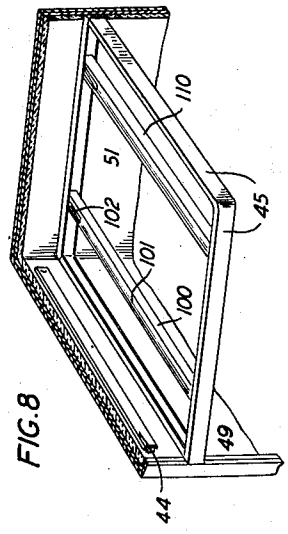


FIG. 7

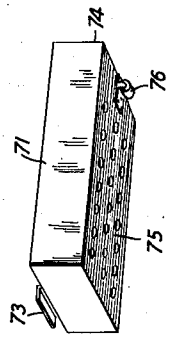
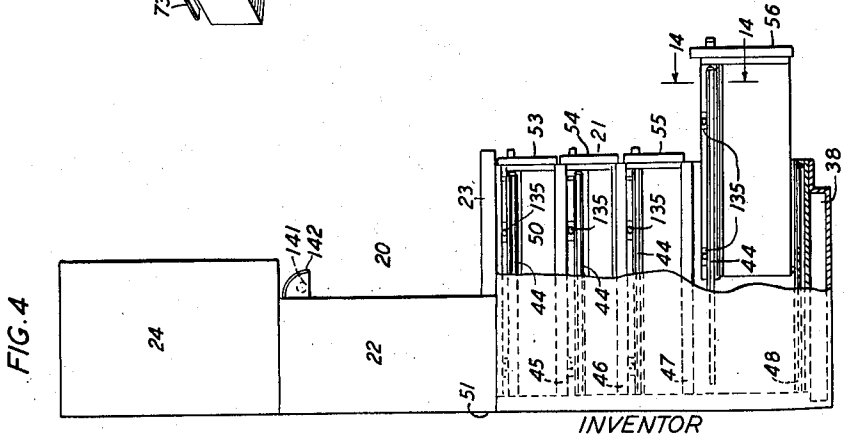


FIG. 4



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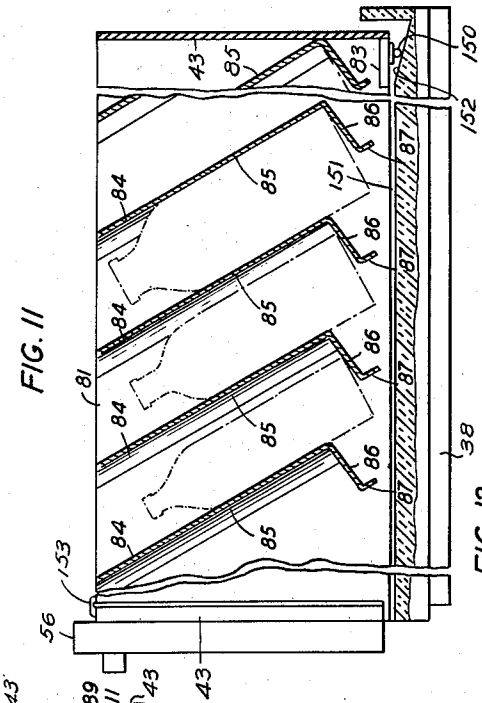


FIG. 11

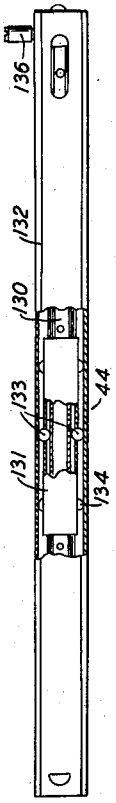


FIG. 12

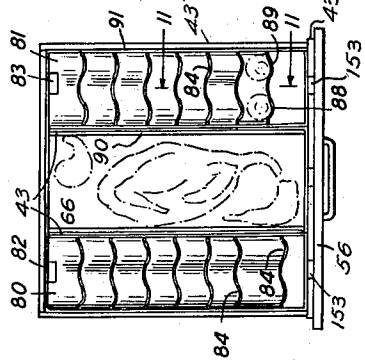


FIG. 10

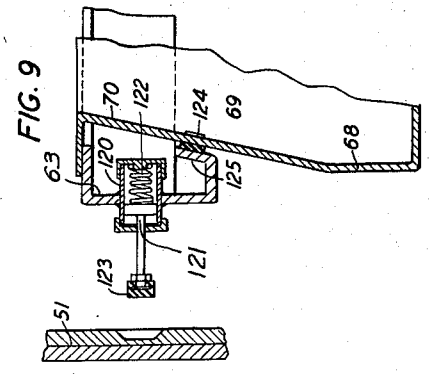


FIG. 9

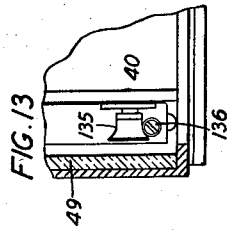


FIG. 13

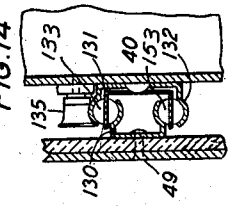


FIG. 14

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UNITED STATES PATENT OFFICE

2,312,325

CLOSURE MEMBERS

Guyon L. C. Earle, Forest Hills, N. Y., assignor to Genevieve M. Earle, Forest Hills, N. Y.

Application February 10, 1940, Serial No. 318,223

5 Claims. (Cl. 45—7)

This application relates to furniture and more specifically, though not necessarily, to refrigerators having slidable closure members therein.

In Patent 2,180,459, issued November 21, 1939, to Guyon L. C. Earle, there is disclosed a refrigerator having a plurality of drawers therein (instead of one large outside door). The use of drawers is advantageous as it permits more food to be stored and makes it possible to better arrange the food in the refrigerator and to take out an article without disarranging other dishes or packages, etc. The housewife needs only to pull out a drawer and then place the article to be refrigerated exactly where she wants it or take out an article, both without moving the adjacent food. Moreover, she can easily see exactly what is in the refrigerator without stooping or without squinting around articles placed at the front of the refrigerator (as in the case of the conventional single door refrigerator).

It is an object of this invention to provide a novel refrigerator which makes use of slidable closure members.

The use of drawers (the term will be used in this specification to be broad enough to include a skeleton framework supporting one or more trays or racks) as closure members for refrigerators presents many problems and the present invention is directed to the solving of certain of these problems.

When a refrigerator employs a single door, a fairly expensive lock or catch is required and if this cost is multiplied by three or four (or even more if many drawers are used) the cost of these locks and latches is a considerable item.

It is another object of this invention to provide a refrigerator employing drawers in which novel securing means for the drawers are utilized.

It is well known in the art to employ gravity to assist in the closing of drawers. In the present invention, the action of gravity on a rack or tray, supported at the front end only by the drawer frame and supported at the rear end by a roller which engages a track sloping downwardly and rearwardly, helps the closing of the entire drawer and keeps the drawer fronts tightly against rubber gaskets around the entrance to the drawer wells. Thus expensive locks are avoided and the drawers tend to slide into their wells of their own accord especially when the trays or racks are loaded. In the preferred embodiment of my arrangement two trays or racks with rollers thereon are provided for certain of the drawers to assist in their closing.

When a drawer (particularly the bottom drawer which is adapted to carry many heavy bottles) is sharply and repeatedly pushed, there is danger that, in time, the rear wall of the refrigerator will become weakened.

It is a further object of this invention to provide a novel arrangement in which the sliding movement of a drawer in the latter portion of its movement into its well is retarded.

This latter problem is solved in the present invention by providing a plunger mounted on the rear end of the drawer frame which engages a cylinder in such a way that a dashpot is formed to check the rear part of the movement of the drawer in the well, the plunger being forced into the cylinder as it contacts the rear wall of the refrigerator.

Many other objects and features, some of them more or less ancillary to those mentioned above, will be apparent as the description proceeds. While the invention in some of its aspects relates to refrigerators, in other of its aspects it is not so limited.

In one embodiment of this invention, chosen by way of example for purposes of illustration of the principles of this invention, a refrigerator is provided comprising a relatively deep (considering depth as the horizontal dimension from front to rear) lower portion, a relatively narrow upper portion the front of which is set back from the front of the lower portion, and a table top member above the lower portion and in front of the upper portion. The lower portion comprises a plurality of drawers, the lower one being higher than the others.

Each drawer preferably comprises a skeleton framework having sides, back and front but without a top or bottom. Supported within this framework are one or more trays or racks. Certain of the trays or racks are supported in the front from the framework but depend for their support in the rear upon rollers engaging tracks which run from front to rear under the drawer framework.

In order to aid the drawer in closing and fastening, the rear portion of one or more of these tracks may be inclined downwardly and rearwardly so that gravity is permitted to act on the roller or rollers and help the drawer containing the racks to close. The pull of gravity also serves to keep the door closed without additional latches or locks, particularly if the drawer is made heavy by bottles, etc., or if additional weight is added to the rear portion of the racks or trays containing the rollers.

On the rear of the drawer framework is mounted a cylinder within which a plunger is adapted to slide against the action of a spring. The head of the plunger projects out the rear of the framework and is adapted to engage a recessed portion of the back wall of the refrigerator to cushion the shock of a heavily laden drawer when it is sharply closed.

Channels carried by each drawer framework are adapted to slide within a pair of extension members each of which slides within a track carried by a side wall of the refrigerator, thus permitting the drawers to be pulled to the full open position without tilting downwardly.

Within at least one of the drawers is a novel bottle rack containing a back, a front, and side walls but with no bottom. Within this rack is mounted a plurality of metal bottle supporting members, each of the latter comprising an inclined portion adapted to support the side of a bottle and a turned-in portion to support the bottom of another bottle whose side is supported by an adjacent supporting member. The inclined portion of each supporting member may be grooved in one or more places to prevent the bottles from rolling. Due to the fact that the rack has no bottom, it is very easy to clean and cold air circulates through it. In a typical lower drawer, two of these racks are arranged on opposite sides of a central rack (which may be supported at both front and rear from the drawer framework) which is preferably large enough to hold a medium size turkey. The middle drawers may have bottle racks therein or they may have simple drawer-like racks with apertures in their bottom surfaces to permit the circulation of cold air. The upper drawer may be like one of the others or it may comprise a single rack with a foraminated bottom so designed so as to distribute the circulation of cold air. For example, the punched out portions may be left attached to the bottom at one edge thereof and thus act to deflect the air in any desired direction. In one form of rack, the rear portion thereof slopes downwardly and rearwardly, the depth of the top of the rack being less than the bottom because of the plunger member on the drawer framework.

In the upper portion of the refrigerator is arranged the evaporator unit, ice cube trays, and an upper refrigerated compartment. Above the refrigerator is placed suitable cabinet structure, the front plane of which is preferably set out from the front plane of the upper portion of the refrigerator but which is set back from the front plane of the lower portion of the refrigerator. The compressor for the refrigerator is preferably located under a sink or other unit adapted to be placed adjacent the refrigerator unit and connection is made to it from the evaporator by means of flexible tubing. All drawer fronts, doors, and walls are thickly insulated and all drawer and door seats are gasketed.

The invention will be more readily understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which:

Fig. 1 is a perspective view of a refrigerator unit in accordance with this invention;

Fig. 2 is a front elevation view of the lower portion of the refrigerator shown in Fig. 1;

Fig. 3 is a right side elevation and partial section view taken along line 3—3 of Fig. 2;

Fig. 4 is a left side elevation and partial section view taken along line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a drawer framework with the supported racks or trays removed;

Fig. 6 is a perspective view of the framework of Fig. 5 with the supported racks or trays in place;

Fig. 7 is a perspective view of one type of rack or tray adapted to be supported by the framework of Fig. 5;

Fig. 8 is a fragmentary view in perspective of a well for one of the drawers;

Fig. 9 is a cross-sectional view of a portion of the framework of the drawer, a portion of a supported rack or tray, and a plunger on the framework;

Fig. 10 is a pan view of one of the drawers;

Fig. 11 is an enlarged fragmentary vertical sectional view, with portions broken away, of the drawer of Fig. 10 taken through the line 11—11 of that figure showing its position with respect to a track member under it;

Figure 12 shows an extensible support member for a drawer framework;

Fig. 13 is a fragmentary plan view of a drawer and the side of its well; and

Fig. 14 is a fragmentary vertical sectional view of a drawer and the side of its well.

Referring more particularly to the drawings, Fig. 1 shows, for purposes of illustration and in perspective, an embodiment of this invention, chosen by way of example for purposes of illustration, comprising a refrigerator unit 20 consisting of a lower refrigerator portion 21, an upper set-back refrigerator portion 22, a table top member 23 above the lower portion 21 and in front of the upper portion 22, and a cabinet structure 24. The entire unit is preferably mounted on a recessed base 38.

The upper refrigerator portion 22, the front of which is preferably set-back from the front of the lower refrigerator portion 21, comprises a compartment 25, containing the evaporator 26 of the refrigerator operating mechanism, and a plurality of ice cube trays 27, and an upper refrigerated compartment 28 at the side of the compartment 25, which compartment 28 preferably contains one or more mesh shelves 32. The compartments 25 and 28 are separated from each other at the front by the common door jamb 29 for the insulated doors 30 and 31. One or both of the doors 30 and 31 may be replaced by drawers, if desired.

The cold air from the evaporator 26 is caused to flow into the lower refrigerator portion 21 and then back up through the upper refrigerated compartment 28 and over to the evaporator coils. The circulation of the air into both front and back portions of the lower portion 21 of the refrigerator may be aided by a removable deflecting member 33 (see Fig. 3) or by any other appropriate means. For a more complete description of a refrigerator having an upper set-back portion, reference should be made to Patent 2,149,160, issued November 21, 1939, to Guyon L. C. Earle, and to an application Serial No. 318,224, filed February 10, 1940, by the same inventor. The compressor for the refrigerator may be placed under an adjacent unit, such as a sink, and connection made to it from the evaporator 26 by flexible tubing, as disclosed in the copending Earle application.

The lower portion 21 of the refrigerator of this invention preferably comprises a large well 39 into which a plurality of drawers 40, 41, 42 and 43 are caused to slide. While four drawers have been shown for purposes of illustration, it is to

be understood that a larger or smaller number may be used, as desired. Each of the drawers is preferably slidably supported from its well by a telescopic extension member referred to generally by the reference character 44 (see Fig. 12), although it is to be understood that any well known means for mounting the drawers may be used instead. The large well may be considered to be divided into a plurality of individual wells for the respective drawers by bands 45, 46, 47 and 48 (see Figs. 2, 3, 4 and 8) each of which extends around the inner surface of the side walls 49 and 50 and the back wall 51 (preferably in slight indentations therein) and which forms, in front, a stop member for the drawer fronts. Preferably gaskets or bumpers of any suitable material are mounted on these stop members (as indicated by the reference character 52 in Fig. 3—they having been omitted in the other figures for the purpose of simplifying the drawings), although the members 52 may be omitted if desired and gasket material (not shown) applied to the inner surface of the drawer fronts 53, 54, 55 and 56 instead.

While the drawers closing the lower refrigerated portion 21 may be of the conventional kind having a bottom surface, perforated or meshed to permit air circulation therethrough, as disclosed in the co-pending Earle application mentioned above, they are preferably, in accordance with this invention, of an entirely different type, as shown in detail in Figs. 5 to 7, inclusive, and as indicated in certain of the other figures.

Referring now to Figs. 5 to 7 and considering, for example, the top drawer 40, it comprises preferably a skeleton framework 60 having two side strips 61 and 62, a back strip 63, and a front strip 64 to which the drawer front 53 is attached. Preferably the framework has no bottom. On the middle portion of the back strip 63 is a plate 65 which supports a flange 67 of the middle rack or tray 66, the front part of this tray being supported by the front strip 64. This tray may have a back portion which is perpendicular to the side strips (as in Fig. 6) or it may take the form (as in Fig. 9) in which the back lower portion 68 of the deep tray or rack 69 (suitable for the lower drawer 43) projects beyond the upper portion 70 thereof. Of course, if desired, all of the trays may have the same height, the extra space above the top of the lower drawer frame being taken by the tops of the bottles stored in the lower drawer 43.

Mounted within the framework 60 and on both sides of the tray 66 are preferably arranged trays 71 and 72. Each of these trays is supported at the front from the front strip 64, a flange such as the flange 73 in Fig. 7 projecting over the front strip 64. If desired, live rubber bumpers or gaskets may be used between the strips 63 and 64 and the flanges of racks or trays to prevent the contact of metal on metal.

Fig. 7 shows a rack which may be used in the assembly of Fig. 6. As shown, the rear surface 74 is perpendicular to its side surfaces but it may be inclined as in the case of the tray shown in Fig. 9. The bottom 75 has been shown as of foraminated solid material but it may be of mesh or of slats or could even be entirely removed, as in the case of the racks 80 and 81 shown in Figs. 10 and 11. In the racks 80 or 81, there is no bottom, there being only small plates 82 and 83 to carry rollers, such as the roller 76 in Fig. 7—the purpose of which will be described below.

Fig. 11 is a cross-sectiona view of the rack 81 taken along lines 11—11 in Fig. 10 (the rack 80 being similar) and a track 151 under it which has a downwardly inclined portion 152 at the rear portion thereof. These two figures show clearly the arrangement of bottle supporting members 84, each comprising a relatively large inclined piece 85 and a turned-in piece 86, the latter having a turned-down portion 87 so that there are no turned up edges to cut fingers or to engage the bottoms of bottles. The angle between each of the pieces 85 and its corresponding piece 86 is a little larger than a right angle so that the bottom of the bottle engages the piece 86 at only one point and forces the bottle against the preceding inclined piece 85 for support. Each inclined piece preferably has waves or depressed portions 88 and 89 therein to keep the bottles from rolling. The supporting members 84 are fastened to the sides 90 and 91 of the rack by any convenient method and are placed far enough apart to accommodate bottles of, for example, 2, 2½ or 3 inches in diameter. If desired, the distance between the first two supporting members 84 of the rack 80 may be larger than between the others to accommodate larger bottles as (for example) large milk bottles or cartons. It may be desired to dispense with one of the waves or depressed portions in the first supporting member 84 if it is desired to support only one bottle or container. In Fig. 10, the relative size of the large bottom drawer may be observed as it can be used to carry over two dozen bottles of milk, cola drinks, beer, etc. and have enough room in the middle rack 70 for a turkey, etc.

The purpose of the roller 76 and similar rollers on other suitable trays or racks will now be described. In order to provide a rear support for the rack 71, the roller 76 is adapted to roll along track 100 having a groove 101 therein complementary to the shape of the roller 76. At the rear portion 102 of the track 100, it is inclined downwardly and rearwardly so that when the roller 76 reaches this portion of the track 100 (when the drawer 40 is almost closed), the action of gravity will assist the drawer closing and will tend to keep the drawer closed similarly, a roller 150 on the rack 81 of Fig. 11 engages the track 151 having the downwardly inclined portion 152. A heavily laden tray or rack closes the drawer easily and keeps it tightly closed, requiring a pull to open it. It will be apparent that in this arrangement the drawer frame itself always moves in a horizontal plane but that the downward movement of the rear portion of the outside trays helps the drawer to close and to remain closed. By this arrangement, the weight of the drawer 40 and its contents is distributed on the track 100 and its roller 76, the track 110 and its corresponding roller, and upon the side extension members 44 which will be described below. Because of this distribution, there is no severe strain on any part and the drawer rolls easily in and out. The trays may be easily and entirely removed for cleaning. If the drawer consisted of one member (that is without the trays) it would be hard to remove it from its extension members. In the arrangement according to this invention only the trays or racks need be removed.

A heavily laden drawer, when sharply and repeatedly closed may cause quite a shock to the walls of the refrigerator. To lessen the shock of closing, a cylinder 120 (see Fig. 9) may be

mounted on the back strip 63 of the framework. A piston or plunger 121 is adapted to move within the cylinder 120 against the action of a spring 122 when the cushioned head 123 of the plunger strikes the rear wall 51 during the closing stroke of the drawer. This acts like a dashpot to greatly check the jar of closing. In Fig. 9 also is shown a rubber bumper 124 fastened to the rear portion of the tray 69 so that there is no contact of metal on metal when the tray 69 contacts the turned-up portion 125 of the rear strip 63.

In Figs. 12 to 14, inclusive, is shown a convenient telescopic sliding support member 44 for the drawer 40, a portion of the drawer being shown in plan view in Fig. 13 and in vertical section in Fig. 14. It is to be understood that the drawer 40 is taken merely by way of example. The member 44 comprises a channel member 130 fastened to the side wall 49 of the refrigerator, a middle extension channel 131 which slides over the channel 130, bearings 133 being privided for anti-friction purposes, and an outside channel 132 mounted on the side of the drawer 40 and which slidably engages channel 131, bearings 134 being provided for anti-friction purposes. A roller member 135 engages stop 136 when the drawer is pulled open and a similar member may engage a corresponding stop when the drawer is closed. While there has been disclosed one extensible method of supporting a drawer framework, it is obvious that any other method may be used instead, this invention not being directed to the specific way of slidably mounting the skeleton framework of the drawer.

Above the refrigerator (see Fig. 1) is preferably arranged the cabinet structure 24 containing a plurality of shelves 140 of any convenient form. One or more soffit lights 141 may be located behind a screen or screens 142 or behind an overhang created by the doors 143 projecting downwardly slightly below the level of the lower of the shelves 140. These lights may be manually operated or they may be illuminated by opening one or the other of the doors 30 or 31.

All walls, drawer fronts and doors of the refrigerator are insulated with any suitable material. If desired, portions of the refrigerator unit may be set back into the wall of the kitchen, as in the co-pending Earle application.

While the invention has been described in connection with a "set-back" type refrigerator it is obvious that it is not limited to that specific type as in certain of its aspects the invention is equally applicable to other types. Moreover, the invention in some of its aspects is not limited to refrigerators as some of the principles of this invention are equally applicable to other types of furniture.

Various modifications may be made in the embodiments described above without departing from the spirit of the invention, the scope of the invention being indicated by the appended claims. In the claims the term "drawer" is to be construed broadly as explained in the first page of this specification.

What is claimed is:

1. A drawer structure comprising a framework adapted to move within a compartment, said framework having a front wall, a back wall and two side walls but having an open bottom, means within said compartment for movably supporting said framework, a track member supported in said compartment under said framework but separated therefrom, and a rack or tray member supported partially from said framework at the front portion thereof and partially from said track member at the rear portion of the rack or tray, said track member sloping downwardly and rearwardly in at least the rear portion thereof.

2. A drawer structure comprising a framework adapted to move within a compartment, said framework having a front wall, a back wall and two side walls but having an open bottom, means within said compartment for movably supporting said framework, a track member supported in said compartment under said framework but separated therefrom, and a rack or tray member supported partially from said framework at the front portion thereof and partially from said track member at the rear portion of the rack or tray, said track member sloping downwardly and rearwardly in at least the rear portion thereof, and said rack or tray member having a roller which engages said track member.

3. The combination defined in claim 1 and being further characterized in that said rack or tray member has a flange on the upper portion thereof, which flange is supported by the front portion of said framework.

4. The combination defined in claim 1 in which said track member is of relatively small width compared with the width of said framework.

5. A cabinet structure comprising elements defining a drawer well, a drawer framework having a front wall, a back wall and two side walls but having a bottom which is at least partially open, means for supporting said drawer framework from said well in such a manner that all points in said framework move in substantially horizontal paths from the fully opened to the fully closed position thereof, a track member supported in said well under said framework but separated therefrom, said track member being downwardly inclined in at least the rear portion thereof, a rack or tray member having a flange at the front top portion thereof, said flange being adapted to engage the front portion of said framework, and a roller on the rear bottom portion of said rack or tray member which engages said track and thus provides partial support for said rack or tray member, the movement of the roller down the inclined portion of said track assisting the passage of the framework into said well.

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