Oct. 24, 1950 C. E. HEILIG, JR 2,526,747

CABINET CONSTRUCTION

Filed July 30, 1946

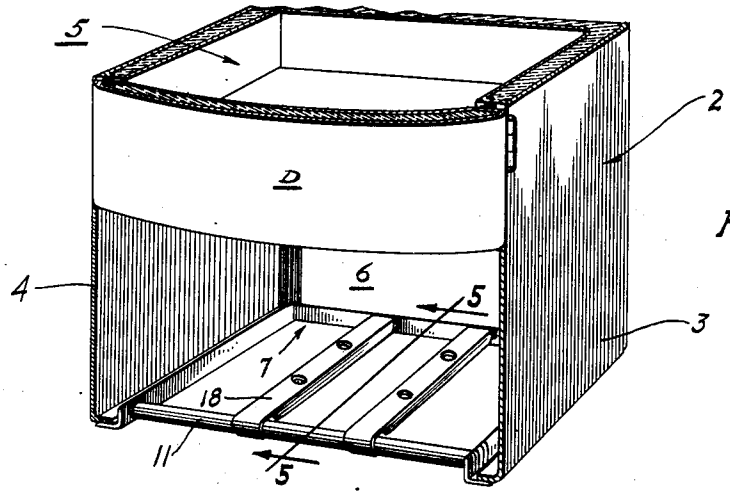


FIG. 1.

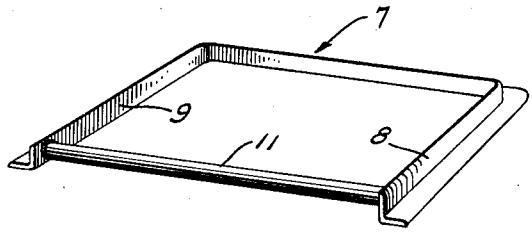


FIG. 2.

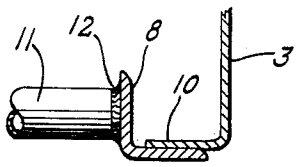


FIG. 3.

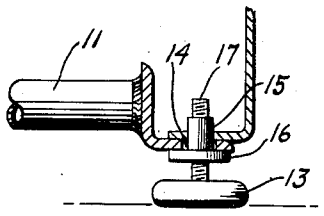


FIG. 4.

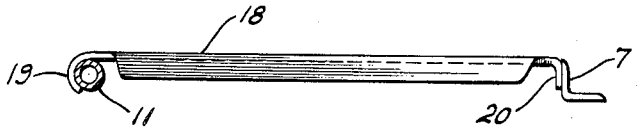


FIG. 5.

INVENTOR.
CHARLES E. HEILIG JR.
BY
Brown, Dunk & Synnestvedt
AGENTS

Patented Oct. 24, 1950 2,526,747

UNITED STATES PATENT OFFICE

2,526,747

CABINET CONSTRUCTION

Charles E. Heilig, Jr., Llanerch Hills, Pa., assignor to Philco Corporation, Philadelphia, Pa., a corporation of Pennsylvania

Application July 30, 1946, Serial No. 687,105

2 Claims. (Cl. 312—141)

1

The present invention relates to cabinet construction, and is especially concerned with the construction of refrigerator cabinets of the type including a relatively heavy door mounted for opening movements about a substantially vertical axis.

Refrigerators of this character have long been subject to a difficulty in that they tend to rock or "wobble" as the walls are stressed by opening and closing movements of the main door. With the advent of refrigerators of larger cubic capacity, and the consequent increase of door size and weight, this problem has become particularly annoying. In such refrigerators it has been observed that during opening or closing movements of the door, particularly when such movements are effected with considerable force, there is noticeable warping of the cabinet and consequent instability.

In studies of this problem, leading up to the making of the present invention, I found that opening and closing of the door subjects the cabinet to rather complex forces. This problem of cabinet instability was solved by careful analysis of the manner in which these forces are applied, and the solution was found to lie in so reinforcing the cabinet as to prevent relative displacement of certain portions thereof.

In this connection, it was found that during opening movements of the door (assuming right-hand hinging thereof), due to the fact that the weight of the door is applied through an increasing moment arm (with respect to the plane of the front of the cabinet), there is an increasing force tending to rotate the right-hand side wall of the cabinet forwardly. This force results in an appreciable rotation of the right side wall, forwardly about the front lower corner of said wall. Similarly, during closing movements, the diminution of this force tends to permit a corresponding inclination of the cabinet rearwardly. At times it has even been found that there occurs an oscillatory rocking of the entire cabinet. Thus, during the completion of one opening and closing movement there may occur an angular displacement of the two walls, with relation to one another, amounting to several degrees. This type of displacement, or warping of the cabinet, causes the objectionable instability. By preventing such relative angular rotation of the two side walls, and preferably in the region of the lower portion of the cabinet, it is possible to substantially eliminate the difficulty, and this without increasing the cost or complexity of the cabinet structure.

2

With the foregoing premises in mind, it is the primary object of the present invention to provide a sturdy cabinet which is not subject to objectionable rocking movements when the door is opened or closed forcibly.

It is also an object of the inventor to provide a cabinet in which a single unitary structure serves both to reinforce the cabinet, and as a support therefor.

It is a feature of cabinet construction in accordance with this invention that the attachment of levelling supports, of the type commonly employed in refrigerators, is considerably simplified, and that the construction permits greater freedom in designing a decorative toeplate, by virtue of making it unnecessary for that member to serve as a strength-increasing part of the cabinet base structure.

In the achievement of the foregoing general ends, the invention provides a frame member of substantially U-shape—the opposed leg portions of which are each secured to one of said side walls and disposed in substantially coplanar relation—in novel combination with a substantially cylindrical torque rod extending between and into engagement with said opposed portions. From the foregoing it will be recognized that the wall-engaging portions of this frame member are subject to forces tending to produce displacement out of their normal coplanar relation, as the walls are stressed by forcible opening and closing movements of the door, and that such displacement movements of said wall-engaging portions are substantially eliminated by the use of the torque rod aforesaid.

The invention extends further to certain details of constructional arrangement fully set forth in the following specification and illustrated in the accompanying drawings, in which:

Figure 1 is a fragmentary view, in perspective, illustrating the lower portion of a refrigerator cabinet incorporating the reinforcing structure of the present invention;

Figure 2 is a perspective illustration of the frame member-torque rod assembly;

Figure 3 is a sectional illustration, on an enlarged scale, illustrating the association of the torque rod with the adjacent portions of the frame member and the manner in which the frame assembly may serve as a support for the cabinet;

Figure 4 is a view similar to Figure 3, and further illustrates the manner in which cabinet levelling supports may readily be included in the construction; and

Figure 5 is a sectional view taken as indicated by the line 5—5 applied to Figure 1.

Referring now in more detail to the above-identified figures, it is seen that the construction includes a refrigerator cabinet designated, generally, by the reference character 2, which cabinet includes right and left side walls of sheet metal, shown at 3 and 4, respectively, the illustrated portion of the cabinet being divided into an upper food storage compartment 5 and a lower machine compartment 6, in accordance with usual practice. A portion of the main door is shown at D in Figure 1.

In particular accordance with this invention, the cabinet is supported upon and reinforced by the frame member indicated at 7, in Figures 1 and 2, which frame member is fabricated in U-shape of stock having suitable L-shaped cross-sectional configuration. As best appears in Figures 1 and 3, the right and left leg portions of the frame illustrated at 8 and 9, respectively, are engaged with and suitably secured to the adjacent lower sections of the cabinet walls 3 and 4. To this end, each of said walls is provided with an inwardly turned flange, see for example flange 10 of side wall 3, which flanges are spot welded or otherwise suitably secured to the underlying horizontal flanging of the legs of the reinforcing and supporting frame 7. A cylindrical torque rod, or bar 11, extends between and has its opposite ends welded to the legs of the frame, as represented at 12, in Figure 3. This bar should be of a steel having considerable rigidity, and the cross-sectional area thereof will be primarily determined by the span of the reinforcing frame.

As fully brought out above, the walls of the cabinet are so stressed, during opening and closing movements of the main door D, as to tend to displace their lower edges and consequently, the legs 8 and 9 of the frame member 7, out of the normal coplanar relationship. By provision of the torque rod 11, particularly when this rod is located between and secured to the forward portions of the legs 8 and 9, such displacement is effectively prevented, and the cabinet is rendered highly stable, and this by a simple and inexpensive construction.

As shown in Figure 4, provision for adjustable levelling supports, such as those shown at 13, may very readily be made, by suitably aperturing the horizontal flange and the inwardly extending flanges of the side walls, as represented at 14. An internally threaded bushing 15 extends through the aligned apertures, and has a collar 16 which may be welded or otherwise secured to the lower surfaces of the angular frame member. The support 13 may be adjusted with respect to the cabinet assembly by rotating its mounting stud 17 within the bushing 15. As will be evident, such a levelling support would be provided in the region of each of the four corners of the cabinet.

As clearly appears in Figure 5, the construction has the further advantage that it lends itself well to the inclusion of support members upon which may be carried the motor-compressor (not shown). One of these support members is designated 18, in Figure 5, and as appears in that figure, the support member is of channel configuration and is provided, at each end thereof, with downwardly extending flanges. The forward flange, shown at 19, is formed arcuately to embrace the torque rod 11, to which it may be welded, while the rear flange 20 extends vertically downward and is secured to the rear cross-rail of reinforcing frame 7.

From the foregoing description, it is evident that the invention provides a unitary structure which serves both to support the cabinet, and to effectively prevent instability thereof. Furthermore, these advantages are realized at a minimum of cost and without sacrifice of simplicity.

I claim:

1. In a refrigerator cabinet defined by main walls and having a relatively heavy door mounted for opening movements about a substantially vertical axis extending adjacent a corner portion of the cabinet, a frame extending between an opposed pair of walls and adapted to reinforce said walls to prevent warping movements of the cabinet as the walls are stressed by forcible opening and closing movements of the door, said frame being of substantially U-shape and having each of its opposed leg portions secured to one of said main walls, said leg portions being disposed in substantially coplanar relation and being subject to forces tending to produce displacement out of such relation as the walls are stressed by opening and closing movements of the door, and means for preventing warping movements of the cabinet by preventing such displacement of said leg portions, said means comprising a cylindrical torque rod extending between and being secured to said opposed leg portions in the region of the free ends thereof in such manner that relative rotation of said rod with respect to said leg portions is substantially prevented.

2. A construction in accordance with claim 1, and further including a pair of members extending between and secured to both said torque rod and the base portion of said U-shaped frame in general parallelism with said opposed leg portions, and providing a platform adapted for the support of machinery.

CHARLES E. HEILIG, JR.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,043,036	Duncan	June 2, 1936
2,167,525	Rosendale	July 25, 1939
2,206,767	Derman	July 2, 1940
2,295,915	Ring	Sept. 15, 1942

FOREIGN PATENTS

Number	Country	Date
381,567	Great Britain	Oct. 3, 1932