Sept. 11, 1934. O. M. OTTE 1,973,416

SLIDING SHELF STRUCTURE FOR REFRIGERATORS

Filed Nov. 20, 1931 2 Sheets-Sheet 1

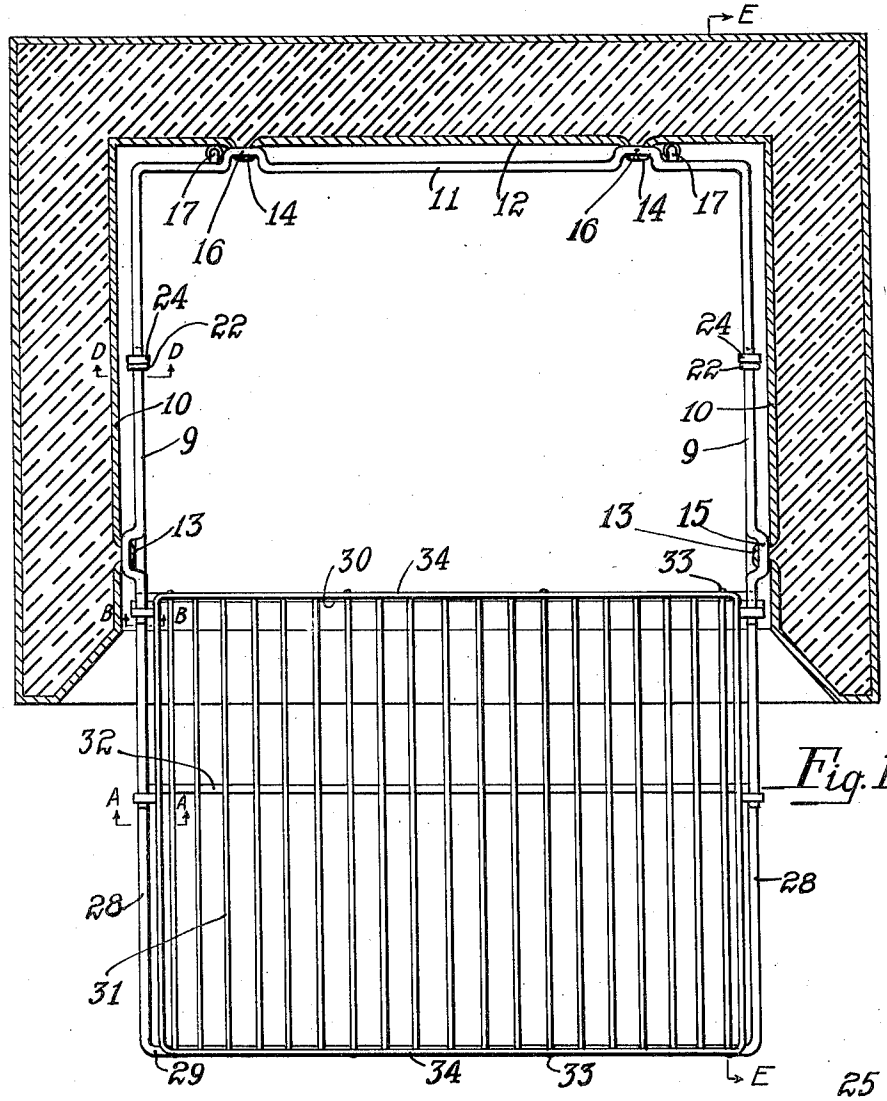


Fig. 1.

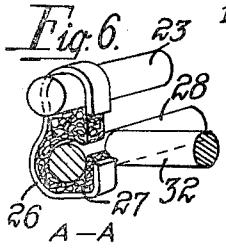


Fig. 6.

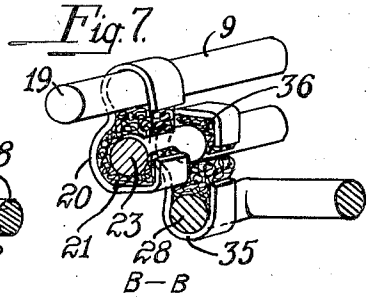


Fig. 7.

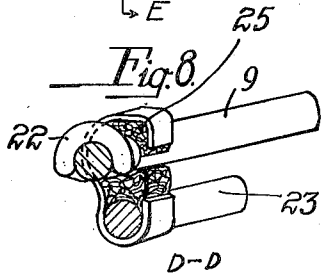


Fig. 8.

INVENTOR

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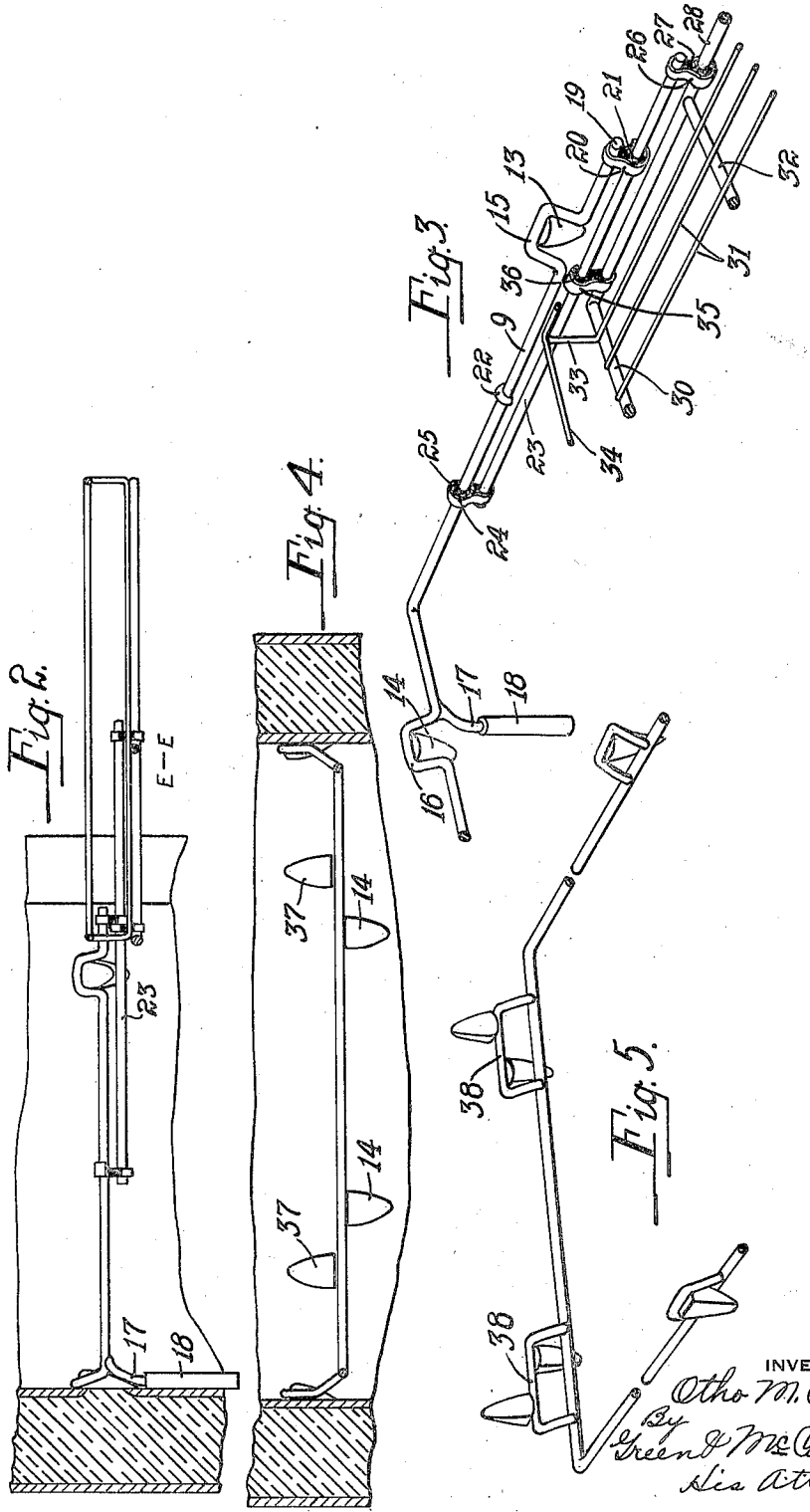
By Green & McCallister

His Attorneys

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SLIDING SHELF STRUCTURE FOR REFRIGERATORS

Filed Nov. 20, 1931 2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SLIDING SHELF STRUCTURE FOR REFRIGERATORS

Otho M. Otte, Tarentum, Pa., assignor to Allegheny Steel Company, a corporation of Pennsylvania

Application November 20, 1931, Serial No. 576,237

6 Claims. (Cl. 211—143)

This invention relates to refrigerators and more particularly to sliding shelves for refrigerators.

In an application filed by me and serially numbered 552,866 I have disclosed an extremely simple sliding shelf structure for refrigerators. This structure is provided with means for overcoming the usual noise which occurs during the sliding of the shelves. The principal function of this means however, is to reduce to a minimum the tendency to wear off or remove the coating material from the intersliding portions of the shelves during the movements of the shelves into and out of the refrigerator.

In the structure of said application only partial extension of the sliding shelves is obtained.

In another application filed by me and serially numbered 560,741, I have disclosed a sliding shelf structure particularly adapted for ovens, broilers or like compartments in which it is possible to secure to the side walls thereof channel-like members which co-operate with and to a great extent make possible the structure disclosed in said application.

In the structure of this second application, full extension of the shelf is obtained but no provision is disclosed for minimizing wear of the shelf coating material nor is any provision disclosed for rendering it noiseless.

An object of this invention is to produce a full extension sliding shelf structure for refrigerators, that is, a structure in which the shelves may be slid so as to be substantially wholly outside of the refrigerator compartment. The advantage of such a structure is clear.

Another object is to provide in a full extension sliding shelf structure for refrigerators, means as in said application 552,866 for minimizing the noise and shock during movements of the shelf and for reducing to a minimum the tendency to wear off or remove the material with which the shelves and their supports are coated.

A further object is to provide an extremely simple, full extension sliding shelf structure capable of being utilized with the same type of struck-up shelf supporting projections as are now found in most of the modern types of household refrigerators especially those in which a refrigerating fluid is circulated through refrigerating coils or pipes.

These, as well as other objects, I attain by means of the structure described in the specification and illustrated in the drawings accompanying and forming part of this application.

In the drawings:—

Figure 1 is a horizontal sectional view through a refrigerator compartment just above the shelf line and in this view a sliding shelf structure embodying this invention is shown fully extended and in plan.

Fig. 2 is a view taken on line E—E of Figure 1 looking in the direction of the arrows.

Fig. 3 is a perspective view showing the shelf supports formed in the side and back walls of the refrigerator compartment, a portion of the support frame, a portion of the sliding shelf and one of the floating cradle elements which permits full extension of the shelf from the refrigerator compartment.

Fig. 4 is a fragmentary view partially in elevation and partially in section of a portion of a refrigerator back wall and illustrates a modified form of back wall support and means for preventing the rear end of the shelf support from tipping or moving upwardly when the shelf is extended and under load.

Fig. 5 is a perspective view of a modified form of support frame and shelf supports on the refrigerator side walls and back walls.

Figs. 6, 7 and 8 are detail sectional views and are respectively taken on lines A—A, B—B and D—D of Fig. 1 looking in the direction of the arrows.

The device of this invention embodies a support frame preferably made from wire rod and shaped so as to provide guide members which parallel the refrigerator compartment side walls. This support frame rests upon the support elements which are embodied in the make-up of the refrigerator compartment side and rear walls and means are provided for preventing the support frame and therefore the shelf from tipping when the shelf is extended and is carrying a load.

The shelf consists of a rectangular frame to which longitudinally spaced wire rods are secured (preferably by welding) and which form the shelf bottom or floor. A cross bar located midway between the front and rear of the frame and secured to the frame side bars is utilized for stiffening the shelf floor.

The shelf is supported by a two-part cradle which is mounted for sliding upon the guide members of the support frame.

The halves of the two-part cradle are preferably unconnected one with the other, are capable of independent sliding movement on the support guide bars, are moved back and forth by the shelf proper as it is moved back and forth and facilitate easy movement of the shelf because binding of the shelf due to irregularities in the

refrigerator compartment side wall structure is prevented.

I have found that no matter what metal is used for the cradle and the side rods of both the shelf and support frame, the most satisfactory in operation, that is, the smoothest sliding movement of the shelf (substantially noiseless movement with no chatter or vibration) can be obtained by making the points of contact between the cradle and the shelf and the cradle and the support frame of some fibrous material such as felt or soft open pored wood or more or less firmly compacted pith or like material made from paper stock or some such fibrous substance. Such contact points reduce to a less than negligible amount the chatter occasioned by irregularities of surface or misalignment of the elements of the structure and because there is no metal to metal contact, a quiet smooth sliding shelf is obtained.

The shelf support structure as shown in Figs. 1, 2 and 3 is open at its forward side and comprises side bars 9 which parallel the side walls 10 of the refrigerator compartment and a back rod or bar 11 which in the main parallels the back wall 12 of the refrigerator compartment. The refrigerator compartment illustrated in connection with this invention in Figs. 1 and 2 is provided with a front opening (adapted to be closed by a hinged door) which embraces the full width of the compartment. The inner metal side walls are provided with pressed-up supporting projections 13 and the inner back wall is provided with projections 14 and these projections act as supports for the support frame. This invention obviously is not limited to the particular type of compartment shown.

In the form of support frame shown in Figs. 1, 2 and 3 the side rods are provided with outwardly and upwardly inclined more or less U-shaped embracing portions 15 which hang over side wall projections 13 and thus not only support the forward ends of the support frame, but lock said frame against forward and backward movement. The rear bar 11 of the support frame is provided with backwardly inclined more or less U-shaped embracing portions 16 which hang on supporting projections 14 formed in the inner rear wall of the compartment.

The back bar 11 adjacent each portion 16 is provided with a downwardly extending anchor member 17 as clearly shown in Figs. 2 and 3 and this anchor member is preferably covered with a section of soft rubber tubing 18 which is adapted to lie snugly against the back wall 12 of the refrigerator compartment. This anchor prevents the support frame and therefore the shelf, when under load and when fully extended, from tipping.

Each of the support frame side bars 9 adjacent its forward end 19 is provided with a depending, loop-like member 20. This member 20 is preferably spot welded to the side bar and in its lower loop it carries a fibrous liner 21. Each side bar 9 also carries a stop 22.

The two-part cradle for carrying the shelf proper is made up of two rods 23 and one of these rods is slidably supported below each of the side bars 9 of the support frame. Each rod 23 at its rear end carries an upstanding loop-like member 24 which is preferably spot welded to the rod adjacent its rear end and loosely loops over the side bar 9; a fibrous lining 25 being carried within the upper loop for contact with the side bar in the rear of stop 22. The forward portion of bar or rod 23 slides within fibrous lining 21 carried within loop-like member 20. The forward end of rod 23 carries a depending loop-like member 26 preferably welded to rod 23 and also provided with a fibrous lining 27 for contact with the side bar on the shelf proper. It thus may be said that the support frame 9 and the two-part cradle constitute a support structure for the slidable shelf 23.

The support shelf proper is constructed with side bars 28, a front bar 29 and a back bar 30. The floor of the shelf is constructed of evenly spaced bars 31 which rest on the front and back bars and are preferably spot welded thereto. A central stiffening bar 32 aligned with the front and back bars is positioned midway of the shelf and to this the bars 31 may or may not be spot welded, whichever is preferred.

Certain of the bars 31 are longer than the remainder and are bent upwardly at right angles to the body of the bar to provide posts 33 for a retaining rail 34 which surrounds the shelf, is spaced a distance above the floor plane, and is welded to these upstanding posts. Each side bar 28 of the shelf proper lies within the lower loop-like member 26 secured to the forward end of the cradle bars 23 and is surrounded by the fibrous liner or bushing 27 carried in said loop-like member.

Each side bar 28 adjacent its rear end carries an upstanding loop-like member 35 which embraces cradle rod 23. This loop-like member 35 is preferably spot welded to side bar 28 and is provided with a fibrous liner 36 which bears against the cradle rod 23.

The details of these loop-like members and their fibrous liners are clearly illustrated in Figs. 6, 7 and 8.

From this construction, it will be seen that the support frame, after being brought to the position within the refrigerator compartment where it rests securely on support projections 13 and 14 and is anchored against tipping by rubber covered anchor 17, forms a firm support for the shelf proper which is suspended from the support frame through the intermediary of the two-part sliding cradle.

In Figs. 1 and 2, the shelf proper is shown fully extended while in Fig. 3 it is illustrated in a partially extended position.

The two-part cradle permits considerable lateral movement of the shelf with reference to the support frame and therefore takes care of any irregularities that may occur in the refrigerator compartment side walls.

In Fig. 4, modified means are shown for anchoring the rear of the support frame and in this form, pressed-up portions 37 are provided which lie above and in contact with the back bar of the support frame, thereby, in conjunction with the support projections 14, anchoring the back bar in place.

In Fig. 5, the same arrangement of support propections is shown as in Fig. 4, but in this form the back bar is provided with backwardly inclined more or less U-shaped loops 38 which contact with the back wall and lie between projections 14 and 37.

Te fibrous liners are preferably inserted after the structure is assembled and coated. After assembly, the structure must be handled as a unit and is not capable of being taken apart without opening up some of the welds. The structure is easily handled as a unit and is capable of being readily removed, cleaned and replaced.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a refrigerator or the like having the side walls thereof provided with outwardly projecting supports, in combination, a support frame positioned on said supports and provided with side rods, means for preventing the rear of said frame from tilting upwardly, cradle members suspended from each of said support frame side rods and slidable fore and aft thereon and a shelf member swung from said cradle members and slidable fore and aft with relation thereto.

2. A structure in accordance with claim 1, in which the cradle is formed in two parts independent one from the other.

3. In a refrigerator whereof the inner side walls are struck up at spaced intervals, a wire rod support frame supported by said struck-up portions, said frame comprising a pair of side rods and a connecting back rod closely paralleling the walls of the refrigerator, an independent cradle member slidingly slung from each of said side rods, a shelf member slidingly slung from said cradle members, and means for limiting the extent of said sliding engagements, said side and back rods each having an offset portion engaging said struck-up portions.

4. In a refrigerator whereof the inner side walls are struck up at spaced intervals, a wire rod support frame supported by said struck-up portions, said frame comprising a pair of side rods and a connecting back rod closely paralleling the walls of the refrigerator, an independent cradle member slidingly slung from each of said side rods, a shelf member slidingly slung from said cradle members, and means for limiting the extent of said sliding engagements, means being included for reducing wear and noise in said sliding engagements.

5. In a refrigerator whereof the inner side walls are struck up at spaced intervals, a wire rod support frame supported by said struck-up portions, said frame comprising a pair of side rods and a connecting back rod closely paralleling the walls of the refrigerator, an independent cradle member slidingly slung from each of said side rods, a shelf member slidingly slung from said cradle members, and means for limiting the extent of said sliding engagements, the sliding engagements being effected by loops provided with non-metallic receiving surfaces.

6. In a refrigerator whereof the interior back and side walls are provided with pressed-up supporting projections, a wire rod support frame supported by said projections, means to prevent said support frame from tilting, said support frame comprising back and side rods closely paralleling the back and side walls of the refrigerator and having offset portions cooperating with the projections aforementioned, said side rods also being provided with limiting stops, a cradle member formed in two independent parts each of which parts is slidingly slung from one of the side rods aforesaid and whereof the sliding engagement is limited by said limiting stops on said side rods, and a shelf member slidingly slung from said cradle member parts and provided with means to prevent unintentional oversliding, said sliding engagements being characterized by noiselessness and freedom from chatter and vibration due to the provision of non-metallic lined loops, and said shelf member being characterized by a capacity for limited lateral movements.

OTHO M. OTTE.