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R. M. HALL
SHELF STRUCTURE

2,420,173

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FIG. 1.

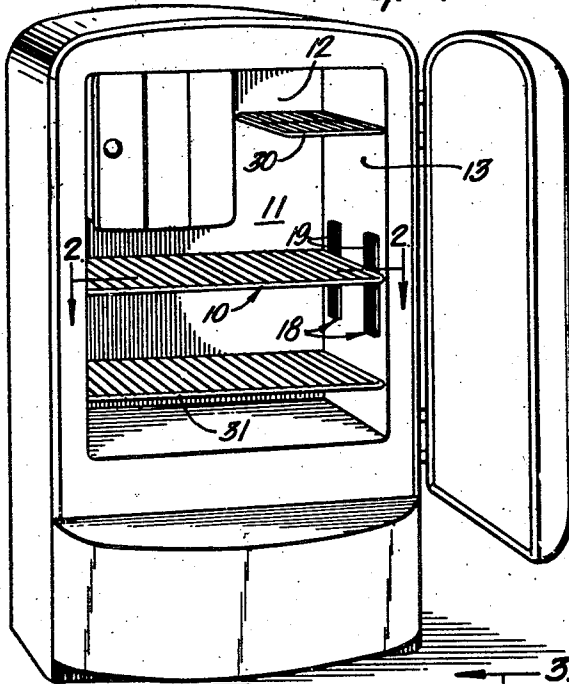


FIG. 4.

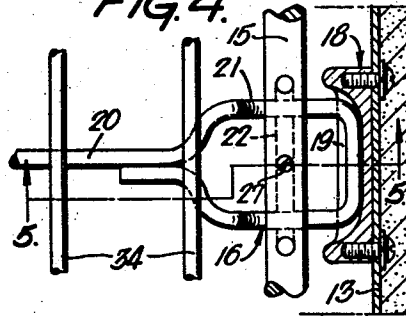


FIG. 5.

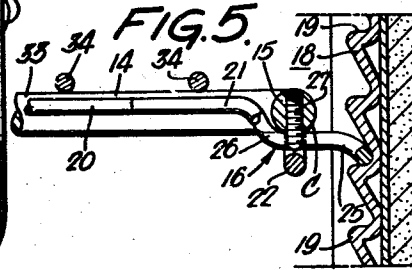


FIG. 2.

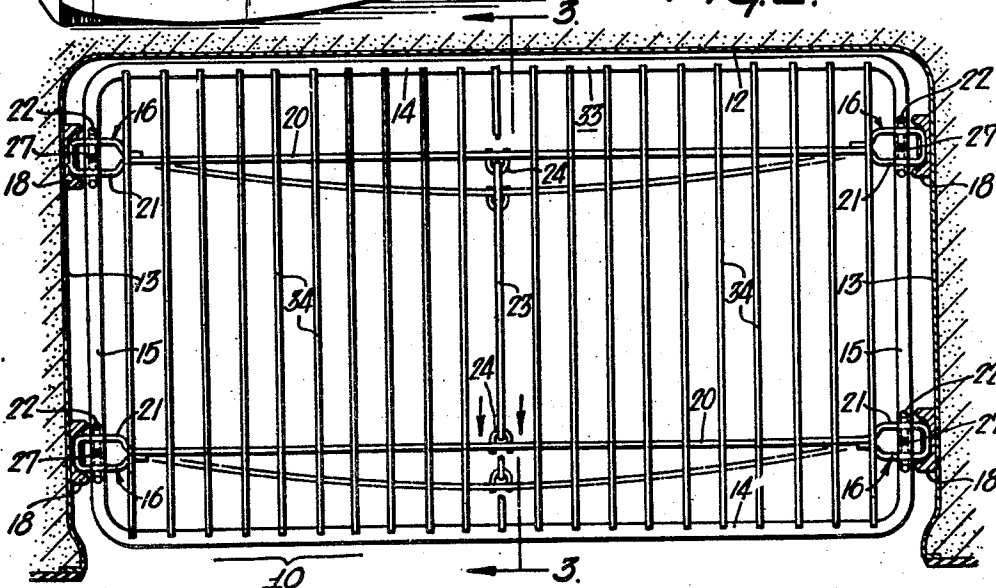


FIG. 3.



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SHELF STRUCTURE

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6 Claims. (Cl. 211-153)

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This invention relates to shelf structures more particularly of the type having means adapted for cooperation with a supporting structure in a manner to provide for mounting the shelf selectively at various levels upon said structure.

More especially, the invention is concerned with the problem of mounting a shelf or shelves within a confined storage area of standardized dimensions defined by fixed perpendicular walls as, for example, in domestic refrigerator cabinets, so that the vertical spaces above and below a particular shelf or between adjoining shelves may be readily varied at will to accommodate articles differing as to the vertical dimension.

The invention has for a primary object the provision of a shelf structure of the aforesaid type having easily manipulated, inexpensive, and simple yet rugged means for facilitating adjustment of the shelf to various positions in the supporting structure and for securely maintaining the shelf in the adjusted position against accidental displacement while in use.

Another and more specific object of the invention is to provide a shelf having a plurality of elements arranged for cooperation with complementary shelf-supporting means and retractably mounted on the shelf with respect to said means, said elements being connected for simultaneous retraction and readvancement to operative position in the shelf structure.

Still another object of the invention is to provide a device of the aforesaid character in the nature of an attachment applicable to the conventional refrigerator shelf without material expense or extensive modification of the conventional construction.

More particularly, the invention contemplates provision of a shelf designed especially for use in domestic refrigerator cabinets and incorporating a device having portions adapted, in normal position, to project at a plurality of points beyond the marginal edges of the shelf for engagement with complementary support means in the cabinet and retractable from engagement with said support means for the purpose of relocation of the shelf at different levels within the cabinet, said device comprising spring wires associated with said portions and connected for displacement as a unit to effect simultaneous retraction of said portions from the said normal position, said spring wires acting automatically when released to return the said portions to normal position.

Other objects and advantages of the invention will appear to those skilled in the art from the

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following detailed description and accompanying drawings, in which:

Fig. 1 is a perspective view of a domestic refrigerator cabinet provided with the improved shelf structure;

Fig. 2 is an enlarged top plan view of the shelf structure showing the same in operative position within the refrigerator cabinet, the latter being shown in horizontal cross-section as on line 2-2 of Fig. 1;

Fig. 3 is a transverse cross-sectional view through the shelf on the line 3-3 of Fig. 2;

Fig. 4 is an enlarged detail illustrating the construction and cooperation of the adjustable shelf supporting means; and

Fig. 5 is a sectional view on line 5-5 of Fig. 4.

With reference to the drawings, it will be noted that the shelf 10 illustrated therein is adapted to fit within a generally rectangular space 11 defined in part by a back wall 12 and two opposite side walls 13, 13. In this instance, therefore, the shelf 10 is correspondingly rectangular in form, with rectilinear marginal edge portions 14 and 15 dimensioned so as to correspond substantially to the width and depth of the space 11. The marginal edge portions 14 of the shelf substantially parallel the back wall 12 and the marginal edge portions 15 substantially parallel the side walls 13 of said space.

Suitably mounted at the side edges of the shelf are two pairs of elements 16, each element being movable in the shelf structure between a normal extended position, wherein it projects beyond the marginal edge portion 15, and a retracted position withdrawn within the confines of said edge portion. In practice the elements 16 are preferably located respectively adjacent the ends of the edge portions 15 of the shelf 10, and are normally urged into the extended positions for engagement with suitable complementary support means 18 on the side walls 13 so that the shelf, as a whole, may be detachably suspended within the space 11. It is proposed that the shelf 10 may be selectively established at various levels within the space 11 and, to that end the support means 18 are formed with series of step-like recesses 19 as more clearly shown in Fig. 5.

In accordance with the invention, provision is made for moving the elements 16 simultaneously into the retracted and extended positions. As will appear from Figs. 2 and 4, each of the oppositely arranged pairs of the elements 16 are formed integrally with flexible resilient rod-like elements 20, preferably steel spring wires, by bending or otherwise shaping the ends of the ele-

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ments so as to provide the widened end portions 21. These end portions are slidable in U-shaped members 22 depending from the undersides of the marginal edge portions 15 of the shelf. The wires 20 normally extend rectilinearly across the underside of the shelf and each wire is of such length that the widened end portions 21 thereof are projected for positive engagement with the associated support means 18 on the side walls 13. A link 23 interconnects the mid-portions of the wires 20, which for that purpose may be provided with loops 24, so that manual flexure or lateral bowing of one wire will be accompanied by a corresponding flexure of the other. Such flexure, as represented in dotted lines in Fig. 2, will retract the end portions 21 simultaneously and will thereby disengage the shelf from the support means 18. When the flexed or bowed wires are released, the wires straighten themselves and thereby return the end portions 21 simultaneously to positions engaging the support means.

It is to be noted that the end portions 21 of the wire 20 are bent reversely, as shown at 25 and 26 (Fig. 5), which adds to the rigidity of said portions and tends to limit the sliding movements thereof in the members 22. In order to preclude inadvertent disengagement of the end portions 21 of the wires 20 from the associated U-shaped members 22, threaded elements 27 may be provided on the marginal edge portions 15 of the shelf to intersect the looped end portions 21 and to thereby prevent withdrawal of said portions from the U-shaped members.

While the shelf structure is capable of many uses, it is, as hereinbefore indicated, especially useful in domestic refrigerator cabinets of the general type illustrated in Fig. 1, wherein an inner liner, including the back wall 12 and the side walls 13, defines a food storage compartment which in this case constitutes the space 11 within which the adjustable shelf 10 is to be suspended adjustably with respect to the companion shelves 30 and 31, mounted respectively above and below the shelf 10.

It will be noted that provision of the aforescribed device involves no material change in the normal construction of the shelf which may, and preferably does, comprise a continuous rectangular frame 33, forming the marginal edge portions 14 and 15, and the usual cross-wires 34. In assembling the device with the shelf, the wires 20 may be flexed or bowed in a plane substantially at right angles to the plane of the shelf so that the end portions 21 may be introduced into the U-shaped members 22. The wires 20 may then assume their normal positions wherein the bends 26 of the end portions will abut adjoining portions of the frame 33 in the manner best seen in Fig. 5, thereby assuring a symmetrical position of the wires between the side portions 15.

To locate the shelf within the refrigerator food storage compartment or space 11, one of the wires 20, which in actuality will be the wire nearest the front of the shelf, may be gripped manually as by hooking the fingers of one hand behind the mid-portion of said wire, preferably at both sides of the loop 24, as indicated by the arrows in Fig. 2, and by then exerting a forward pull in a plane substantially parallel to the plane of the shelf, the interconnected wires may be flexed or bowed, as represented in dotted lines in Fig. 2, thereby retracting the end portions 21 to an extent affording clearance with the supports 18 and permitting the shelf to be moved into desired position in the said compartment. When the wires

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are released the end portions will be projected into engagement with the registering recesses 19 of said support means and will thereby suspend the shelf within the compartment or space 11.

Preferably, the wires 20 are associated with the shelf so that the major portion of the wires, as more clearly illustrated in Fig. 5, will lie in close proximity to the cross-wires 34. In this manner the wires 20 may act to brace the shelf should the same be weighted down to an extent tending to flex the wires downwardly about the points of contact with the support means indicated at C in Fig. 5. In such event, it is to be noted that because of the reverse bends 25 and 26 of the end portions 21, these portions would be urged with increasing force into positive engagement with the recess 19 thereby insuring retention of the loaded shelf by the supporting means.

While a preferred embodiment has been illustrated and described, it is to be understood that the invention is not limited thereto and that structural changes and modifications may be made within the scope of the appended claims.

I claim:

1. In a shelf having marginal edges, suspension means including a flexible member provided with end portions engageable with the shelf respectively at different marginal edges thereof, said end portions being simultaneously movable either into a projected or a retracted position with relation to the said edges in response to flexing movements of said member.

2. In a shelf having marginal edges, suspension means comprising flexible elongated members each provided with end portions mounted on and located respectively at different marginal edges of the shelf, said end portions being movable between projected and retracted positions with relation to the said edges in response to movements of said members, and means interconnecting said members so that the said movements of one are transmitted to the other.

3. In a shelf having marginal edges, suspension means comprising flexible elongated members each provided with end portions mounted on the shelf and located respectively at different marginal edges thereof, said end portions being movable between projected and retracted positions with relation to the said edges in response to flexing movements of said members, and a link interconnecting the flexible members at points intermediate the end portions thereof so that the said flexing movements of one member may be accompanied by corresponding flexing movements of the other member.

4. In a shelf having opposed marginal edges provided with depending U-shaped members, and suspension means for said shelves including a flexible member provided with end portions slidable in said U-shaped members into projected and retracted positions with relation to the said edges in response to movements of said flexible member.

5. In a shelf having opposed marginal edges provided with depending U-shaped members, suspension means for the shelf comprising flexible elongated members each provided with end portions supported in said U-shaped members for movements into projected and retracted positions with relation to the said edges in response to flexing movements of said flexible members, and means interconnecting the flexible members at points intermediate the end portions thereof so that said flexing movements of one member may

be accompanied by corresponding flexing movements of the other member.

6. In a shelf having opposed marginal edges provided with depending U-shaped members, suspension means for the shelf comprising flexible elongated members each provided with end portions supported in said U-shaped members for movements into projected and retracted positions with relation to the said edges in response to flexing movements of said flexible members, and a link interconnecting the flexible members at points intermediate the end portions thereof so that said flexing movements of one member may be accompanied by corresponding flexing movements of the other member.

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