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## SHELF AND LINER ASSEMBLY

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7 Claims

### ABSTRACT OF THE DISCLOSURE

The invention provides an easily mountable and dismountable shelf which is supported on the inner liner of a refrigerator at its rear side by fillet grooves integrally molded in the inner liner and at its front side by resilient legs of an angled member, forming a portion of the frame of the shelf, which are disposed in apertures integrally molded in the inner liner.

### BACKGROUND OF THE INVENTION

#### Field of the invention

This invention relates to refrigerating apparatus and, more particularly, relates to a manner of attaching a refrigerator shelf in a refrigerator cabinet.

#### Description of the prior art

Although shelf and inner liner combinations somewhat similar to that disclosed in the instant application are known to be old in the art, for example, such a combination being shown in U.S. Pat. 2,684,884 issued July 27, 1954, none of these combinations take advantage of the fact that there is extreme flexibility in the shaping of an inner liner made by the deep drawing process and the fact that a portion of the supporting arrangement for a shelf, at least, may be formed integrally with the inner liner. Further, none of the previous shelf and inner liner configurations have provided a simplified front shelf support configuration which utilizes the shelf front piece as the sole supporting means for the cross rods of the shelf and the nesting means for the resilient U-shaped frame member forming the sides and back portions of the shelf frame.

Accordingly, it would be advantageous to provide a shelf and inner liner combination which took full advantage of both the deep drawing characteristics utilized in molding the inner liner and a simplified front support structure on the shelf.

### SUMMARY OF THE INVENTION

The invention provides an inner line and shelf combination which utilizes a fillet groove in each of the rear corners of the inner liner to mount the rear corners of the shelf, with these rear corners being comprised of the corners of a U-shaped frame member. The legs of the U-shaped frame member have substantial freedom at their front ends so as to be resiliently engageable within grommets inserted into bores in the inner liner of the refrigerator. A front piece of the shelf is formed substantially in the shape of a right angle in cross section with turned in ends to provide support for and an attachment means for the cross bars which form the major support surfaces for the shelf by extending from the front to the rear of the shelf, itself. The front piece also provides an open cross section in which the resilient ends of the U-shaped member may be disposed against the effect of their inherent resilient bias so that the U-shaped ends may be displaced inwardly relative to the ends of the front piece so that they may be easily inserted in the grommets mounted in the inner liner.

### DRAWING DESCRIPTION

For a better understanding of the invention, reference may be had to the preferred embodiment, exemplary of the invention, shown in the accompanying drawings in which:

FIG. 1 is a view in perspective of a refrigerator incorporating the principles of my invention;

FIG. 2 is a view in cross section of the refrigerator taken substantially intermediate the height of a pair of fillet grooves which offer support for a shelf;

FIG. 3 is a cross sectional view of the mounting of a front corner of one of the shelves;

FIG. 4 is a cross sectional view taken substantially on line IV—IV of FIG. 3; and

FIG. 5 is a partial perspective view taken substantially on line V—V of FIG. 2 and showing a fillet groove.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring particularly now to FIGS. 1 and 2, a refrigerator 10 is shown as having a food storage space 12 formed by an outer wrapper 14 and an inner liner 16. The front of the refrigerator 10 is closed by a door 18 which may be conventionally hinged (not shown) to the outer wrapper 14 in any suitable manner.

A series of shelves 20 are disposed within the open space food storage space. Each of the shelves 20 is formed into a rectangular frame bordered, in part, by a U-shaped frame 22 of heavy gauge wire to which is attached a plurality of cross rods 24 that form the article supporting surface for the shelf 20, with these cross rods being attached at their rear to a bight portion 26 of the U frame member 22 by any conventional method such as welding or the like. At their fronts, the cross rods 24 are attached to a front piece 28 having, in end view, a right angle with intumed ends 30 and 32; again a conventional fastening arrangement such as welding or the like may be utilized for attachment.

Each shelf 20 is supported at its rearward extent by a pair of radiused fillet grooves 34 (FIGS. 2 and 5) formed integrally in the inner liner 16. Each of the grooves 34 extends rearwardly from the corner surface 36 of inner liner 16 and terminates in a wall 38 which extends for the height of the groove. The grooves 34 thereby form opposed surfaces 40, 40 substantially in the shape of an equilateral triangle having a curved base 42, with this base also forming the most forward extent of the radiused groove 34 and also being on the surface of the corner surface of inner liner 16. By this arrangement, then, both sideward portions of the bight 26 or U-shaped frame 22 and the most rearward portions of a pair of legs 44, 44 integral with the bight 26 are supported on one of the surfaces 40 in each integral groove and limited in their upward movement by the opposed surface 40 in each groove.

The means for mounting the forward portion of shelf 20 (FIGS. 2 and 3) is also substantially integral with the inner liner 16. More specifically, each of the legs 44, 44 of the U-shaped frame 22 include at their outer, forward terminations, short, outwardly turned ends 46, 46. Each of these outwardly turned ends is received in an aperture 48 formed integrally in the inner liner 16, these apertures each taking the shape of a round bore extending through the wall formed by the inner liner 16. In order to provide more bearing surface for the outwardly turned ends 46, 46 in their nesting engagement, a grommet 50 is mounted in each of the circular apertures 48 with this part extending outwardly, relative to the refrigerator 10 a slight distance beyond the outer termination of the aperture 48 and seating on the internal surface of inner liner 16 by means of an integral flange 54. Each of the outwardly turned

ends 46 of legs 44 are inserted into these grommets through a bore 52 disposed centrally axially relative to the linear extent of the grommet. The grommet 50 extends beyond the inner liner 16 so that it is wedged into the insulation 55 filling the volume between the inner liner 16 and outer wrapper 14. Thus, the outwardly turned ends 46, 46 of U-shaped frame member 22 are provided with a larger bearing surface through the grommets 50, 50 and their wedging relationship with the refrigerator 10 so that the shelf 20 is supported through outwardly turned ends 46, 46 engaging within a pair of bores which is fixed relative to the inner liner 16.

The front piece 28 which forms the forwardmost extent of the shelf provides a convenient space 56 between its intumed ends 30 and 32 for the reception of a portion of the legs 44, 44 of the U frame 22 and a portion of the outward turned ends 46, 46 of the legs 44. This permits a resilient deformation inward of the legs 44, 44 so as to permit the shelf 20 to be moved inwardly into the food storage space 12, until the rear corners of the shelf 20 have been nested in the radiused grooves 34, 34. The legs 44, 44 of U frame member 22 are then permitted to move outwardly, biased by their inherent resiliency so as to be disposed within the apertures 52, 52 of the plugs 50, 50.

The self 20 is thereby mounted within the refrigerator 10 and, because of the configuration of the annular grooves 34, 34 and the fact that the legs 44 of the U frame 22 have a resiliency to thereby permit the turned ends 46, 46 engaging within the apertures 52, 52 in a slightly misaligned condition, the refrigerator 10 and its inner liner 16 is not required to have extremely close tolerances relative to the location of the grooves 34 and the apertures 52. Further, the self, itself, may suffer from slight misalignments and tolerance variations and yet still be capable of being mounted securely within the food storage space 12 of the refrigerator 10.

It should appear clear from the foregoing description that the invention satisfactorily preforms to provide all the advantages listed for it at the beginning of the description, and, that similar arrangements of inner liners and shelves could be provided which vary from the specifically described embodiment but which would still be within the spirit and scope of the invention as described.

What is claimed is:

1. In a refrigerator, the combination comprising:

- (a) an inner liner,
- (b) a shelf means disposed in said inner liner,
- (c) annular groove means integral with said inner liner for supporting at least a portion of said shelf, and
- (d) aperture means in said inner liner for supporting at least another portion of said shelf.

2. The combination of claim 1, wherein:

- (a) said shelf means includes a U-shaped frame member having resilient ends, and
- (b) said resilient ends are received in said apertures in said inner liner.

3. The combination set out in claim 2, wherein:

- (a) the surface of said inner liner above and below said annular groove means is offset inwardly relative to the refrigerator and said annular groove means.

4. The combination set out in claim 1, wherein:

- (a) said shelf means includes an open U frame member with the ends of said U frame resiliently sprung,
- (b) said open U frame member forming three sides of the periphery of said shelf means, and
- (c) a frame member forming the fourth side of the periphery of the shelf means having a cross section which is generally right angled.

5. A shelf for a refrigerator comprising:

- (a) a U-shaped frame member,
- (b) a frame member right angled in cross section extending between and closing the open ends of the U-shape,
- (c) cross bar members disposed between said U-shape frame member and said right angle cross section shape frame member and connected thereto,
- (d) said U-shaped frame member including legs, said legs being attached to said shelf only through a bight portion of said U-shaped frame member, and
- (e) said right angle member forming an open channel arrangement for the reception of the ends of said leg members when flexed.

6. The shelf set out in claim 5, wherein:

- (a) said legs of said U-shaped frame member include outwardly turned ends,
- (b) said outwardly turned ends and the rear portion of said leg members providing means for mounting said shelf within a refrigerator.

7. A shelf for a refrigerator comprising:

- (a) a U-shaped frame member,
- (b) a frame member right angled in cross section closing the open ends of the U-shape,
- (c) cross bar members disposed between said U-shaped frame member and said right angle cross section shape frame member and connected thereto,
- (d) said U-shaped frame member including legs, said legs being attached to said shelf only through a bight portion of said U-shaped frame member,
- (e) said right angle member forming an open channel arrangement for the reception of the ends of said leg members when flexed,
- (f) said legs of said U-shaped frame member including outwardly turned ends,
- (g) said outwardly turned ends and the rear portion of said leg members providing means for mounting said shelf within a refrigerator,
- (h) said refrigerator including an inner liner means, and
- (i) said inner liner means including aperture means and groove means for reception and support of said shelf.

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