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ADJUSTABLE REFRIGERATOR DOOR SHELF

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Fig. 1

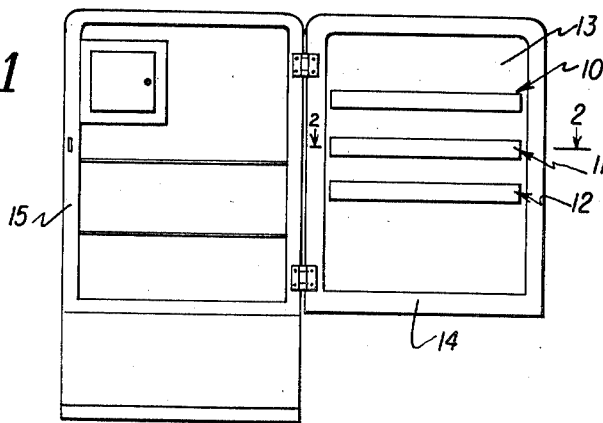


Fig. 2

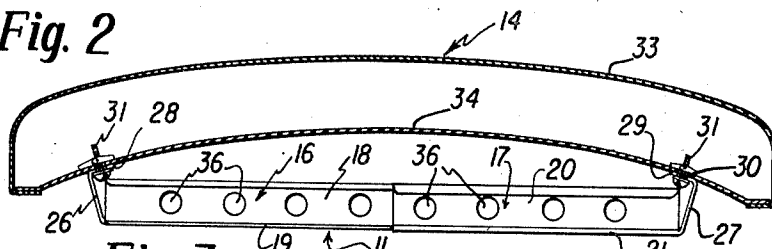


Fig. 3

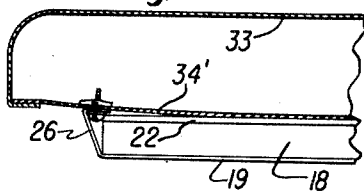


Fig. 4

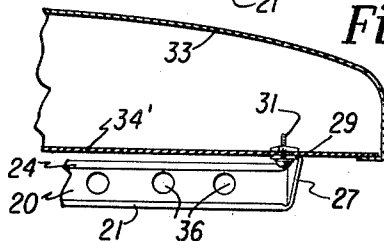


Fig. 5

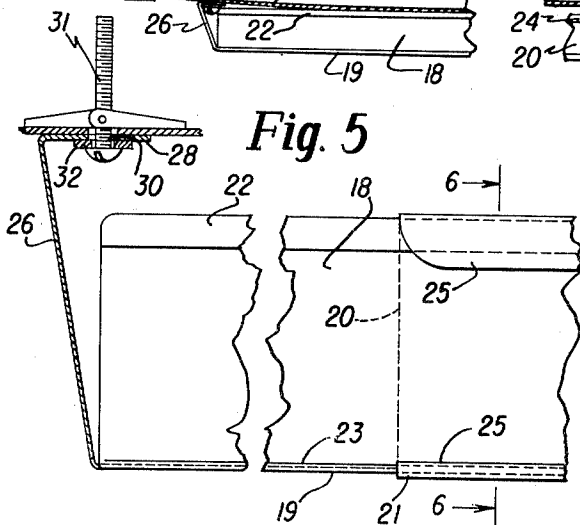


Fig. 7

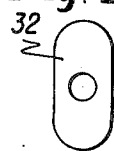
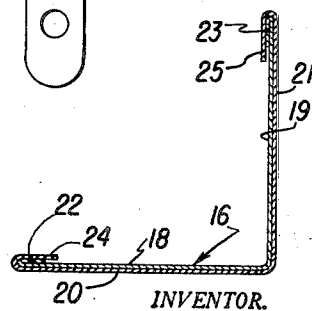


Fig. 6



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ADJUSTABLE REFRIGERATOR DOOR SHELF

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3 Claims. (Cl. 211—90)

This invention relates to shelves for refrigerator doors, more particularly to shelves which are adjustable lengthwise for application to refrigerator doors of various widths, and the invention has for an object the provision of adjustable shelf constructions of this character which are simple and inexpensive to manufacture, which provide an attractive appearance, and which may be readily and securely attached to the inner surface or liner of a refrigerator door.

Over a period of a number of years and, in fact, substantially since the introduction of household refrigeration to the public, the construction of household refrigerators having one or more shelves disposed on the inside surface of the refrigerator door as been the exception rather than the rule. More recently, however, the advantages and conveniences flowing from the provision of refrigerator door shelves have come to be more widely appreciated and many, if not most, of the manufacturers of household refrigerators today are including door shelves of one type or another in their refrigerators. There are in use today, however, hundreds of thousands of household refrigerators having doors of various size and shape which are not equipped with door shelves, and it is accordingly a further object of this invention to provide shelf constructions which may easily be accommodated to refrigerator doors of widely varying width, which may be accommodated to refrigerator doors having differently shaped and constructed inner surfaces or liners, and which may be permanently and firmly secured to such door surfaces without the use of skilled labor or special tools.

In carrying out the invention in one form, an adjustable shelf construction for mounting on refrigerator doors is provided, comprising a pair of sheet metal members of substantially L-shaped cross section, the legs of each of these members respectively forming article-supporting bottom walls and article-retaining front walls. One of the L-shaped members is provided with means extending along the upper edge of the front wall and along the rear edge of the bottom wall for receiving the corresponding edges of the other member in telescopic relation, and the outer ends of the telescoped members are provided with rearwardly extending end panels which terminate in longitudinally-extending supporting flanges. The end panels are free of connection to the bottom walls so as to permit limited longitudinal and angular adjustment of the supporting flanges in order to accommodate them to differently shaped surfaces and fastening means are provided, extending through suitable apertures in the supporting flanges for securing the shelf structure to the inner surface of the refrigerator door. More specifically, each of the L-shaped members has the upper edge of the front wall and the rear edge of the bottom wall reversely bent to form reinforcing flanges along these edges, and the flanges on one of the members are arranged to form guideways for receiving the corresponding reinforced edges of the other member. Preferably, the fastening means constitutes a blind type fastener such as a conventional toggle bolt which may be inserted through the aperture in the supporting flange and through an aligned aperture in the inner wall or liner of the refrigerator door from the front so that when the toggle bolt is thereafter tightened, the shelf construction will be securely and permanently fastened to the door.

For a more complete understanding of the invention, reference should now be had to the drawing in which:

Fig. 1 is an elevational view of a conventional house-

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hold refrigerator provided on the inner surface of the refrigerator door with a plurality of shelf constructions embodying the present invention;

Fig. 2 is a sectional view on an enlarged scale taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view similar to Fig. 2, but showing the shelf construction applied to a refrigerator door having a differently shaped inner surface than the refrigerator door of Fig. 2;

Fig. 4 is a fragmentary sectional view similar to Fig. 3, illustrating the application of the improved shelf construction to still another type of refrigerator door;

Fig. 5 is an enlarged fragmentary type view partially in section of one of the shelf constructions shown in Figs. 1 and 2 applied to a flat wall such as is illustrated in Fig. 4;

Fig. 6 is a detailed sectional view taken along the line 6—6 of Fig. 5; and

Fig. 7 is a detailed view showing one form of reinforcing and strengthening washer which may advantageously be employed with the toggle bolt type of blind fastener shown in Figs. 2 to 5, inclusive.

Referring now to the drawing, the invention is shown as embodied in an improved shelf construction, three of which, 10, 11 and 12, are shown in Fig. 1 as being applied to the inner surface or liner 13 of the door 14 of a conventional household refrigerator 15. As shown best in Figs. 2 and 5, the shelf construction 11, for example, which is identical with the shelf constructions 10 and 12, comprises a pair of substantially L-shaped members 16 and 17, the member 16 comprising an article-supporting bottom wall 18 and an article-retaining front wall 19, and the member 17 comprising an article-supporting bottom wall 20 and an article-retaining front wall 21. As shown best in Fig. 6, the rear edge of the bottom wall 18 of the L-shaped member 16 is reversely bent to provide a reinforcing flange 22 which extends along the rear edge of the bottom wall, and the upper edge of the front wall 19 is similarly bent to provide a reinforcing flange 23. Likewise, the rear edge of the bottom wall 20 of the member 17 is reversely bent to provide a reinforcing flange 24 and the front wall 21 is reversely bent to provide a reinforcing flange 25. The flanges 24 and 25 on the L-shaped member 17 are spaced upwardly and inwardly, respectively, from the bottom and front walls 20 and 21 to provide guideways or channels for receiving the reinforced edges of the bottom wall 18 and the front wall 19 of the member 16, whereby the members 16 and 17 may be telescopically engaged and may be adjusted inwardly or outwardly with respect to each other to provide a shelf construction of the desired length.

At the respective outer ends of the front walls 19 and 21, the L-shaped members 16 and 17 are provided with suitable rearwardly extending end panels 26 and 27 which respectively terminate in inwardly extending supporting flanges 28 and 29. It will be observed that the end panels 26 and 27 which are formed integrally with the respective front walls are free of connection to the bottom walls 18 and 20, and thus these end panels may be flexed to permit limited longitudinal and angular adjustment of the flanges 28 and 29 so as to accommodate the shelf construction to refrigerator doors having inner surfaces or liners which are either concave as in Fig. 2, convex as in Fig. 3, or flat as in Figs. 4 and 5.

Associated with each of the supporting flanges 28 and 29 and extending through suitable apertures 30 therein, is a pair of blind fastening elements which, in the embodiment of the invention shown, take the form of conventional toggle bolts 31. Since the supporting flanges 28 and 29 are formed of relatively thin sheet metal, it is desirable to reinforce and strengthen these flanges in the neighborhood of the apertures 30, and accordingly, each of these members is provided in accordance with the present invention, with a pair of elongate reinforcing washers 32, which washers are disposed between the heads of the toggle bolts 31 and the flanges 28 and 29.

Referring now to Fig. 2, the refrigerator door structure 14 there shown comprises an outer member 33 and an inner wall or liner 34 which are permanently fastened together at the outer edges of the liner 34 to provide a space therebetween which, in accordance with conven-

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tional practice, may be filled with suitable insulating material. It will be noted that the liner 34 provides a concave surface while, in the door construction shown in Fig. 3 to which corresponding reference numerals have been applied, the inner wall or liner 34' provides a convex surface, and the inner wall or liner 34'' in the door construction shown in Fig. 4 provides a flat inner wall.

In order to apply shelf constructions embodying the present invention to the liner or inner door surface of a conventional refrigerator, it is only necessary for the owner of the refrigerator to drill a pair of holes through the liner 34, for example, one hole being arranged adjacent each outer edge of the refrigerator door or at any desired inner point, if it is desired that the shelf extend across only part of the door width. After these holes have been drilled, the shelf structure may be adjusted to the proper length by telescopic movement of the L-shaped members 16 and 17 and the toggle bolts 31 may thereupon be inserted through the drilled holes. Upon tightening the toggle bolts, the toggle portions will assume the positions shown in Figs. 2 and 5, as is well understood by those skilled in the art, and it will be seen that the shelf construction is securely and permanently fastened to the door.

As will be evident upon inspection of Figs. 2, 3 and 4, the flexibility of the end panels 26 and 27 permits the supporting flanges 28 and 29 to move angularly and longitudinally so as to accommodate the structure to either concave, convex or flat walls. Furthermore, the end panels 26, 27 and the supporting flanges 28, 29 may be adjusted by properly bending the same so that the shelf is positioned as close as possible to the inner liner 13 in which position the shelf occupies a minimum of space within the box while conforming to inner liners of different shapes. If desired, the L-shaped members 16 and 17 may be provided in the respective bottom walls thereof with a plurality of spaced apertures 36 to facilitate the positioning of various articles such as eggs, for example, in one or more of the shelves.

While blind type fastening means in the form of toggle bolts have been illustrated, it will be understood that other blind type fasteners may be employed such as explosive rivets, for example, or in some instances, ordinary screws may be employed which can be threaded into the liner or inside surface of the refrigerator door in order to removably secure the shelves in position. Since the L-shaped members 16 and 17 may readily be adjusted to any desired telescoped position, and since the flexible end panels 26 and 27 permit limited adjustment of the supporting flanges, it will be seen that the members 16 and 17 may be produced on a mass production basis and the final shelf construction may be adapted to refrigerator doors of practically any size and shape in use on refrigerator doors.

While a particular embodiment of the invention has been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made and it is therefore contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent is:

1. An adjustable shelf construction for mounting on the liners of refrigerator doors, comprising a pair of sheet metal members of substantially L-shaped cross-section, the legs of said members forming article-supporting bottom walls and article-retaining front walls, one of said members having the upper edge of said front wall and

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the rear edge of said bottom wall reversely bent to form guideways for receiving the corresponding edges of the other of said members in telescopic relation, the front wall of each member at the outer end thereof being extended beyond its juncture with said bottom wall to form an end panel extending rearwardly from the outer end of said front wall of each of said members and terminating in a longitudinally-extending liner-engaging supporting flange, said end panels being free of connection to said bottom walls to permit limited longitudinal and angular adjustment of said supporting flanges, and means for securing said supporting flanges to the liner of a refrigerator door with said members in telescoped relation to form a shelf of the desired length.

2. An adjustable shelf construction for mounting on the liners of refrigerator doors, comprising a pair of sheet metal members of substantially L-shaped cross-section, the legs of said members forming article-supporting bottom walls and article-retaining front walls, means extending along the upper edge of said front wall and along the rear edge of said bottom wall of one of said members for receiving the corresponding edges of the other of said members in telescopic relation, the front wall of each member at the outer end thereof being extended beyond its juncture with said bottom wall to form an end panel extending rearwardly from the outer end of said front wall of each of said members and terminating in an inwardly-extending liner-engaging supporting flange, said end panels being free of connection to said bottom walls to permit limited longitudinal and angular adjustment of said supporting flanges, and means for securing said supporting flanges to the liner of a refrigerator door with said members in telescoped relation to form a shelf of the desired length.

3. An adjustable shelf construction for mounting on the liners of refrigerator doors, comprising a pair of sheet metal members of substantially L-shaped cross-section, the legs of said members forming article-supporting bottom walls and article-retaining front walls, means extending along the upper edge of said front wall and along the rear edge of said bottom wall of one of said members for receiving the corresponding edges of the other of said members in telescopic relation, the front wall of each member at the outer end thereof being extended beyond its juncture with said bottom wall to form an end panel extending rearwardly from the outer end of said front wall of each of said members and terminating in a longitudinally-extending liner-engaging supporting flange, said end panels being free of connection to said bottom walls to permit limited longitudinal and angular adjustment of said supporting flanges, said supporting flanges being apertured, and blind fastening means in said apertures adapted to extend through the liner of a refrigerator door for securing said supporting flanges to said liner with said members in telescoped relation to form a shelf of the desired length.

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