Oct. 29, 1968 G. H. PACKARD 3,407,940

SHELF ASSEMBLY

Filed Oct. 5, 1966 2 Sheets-Sheet 1

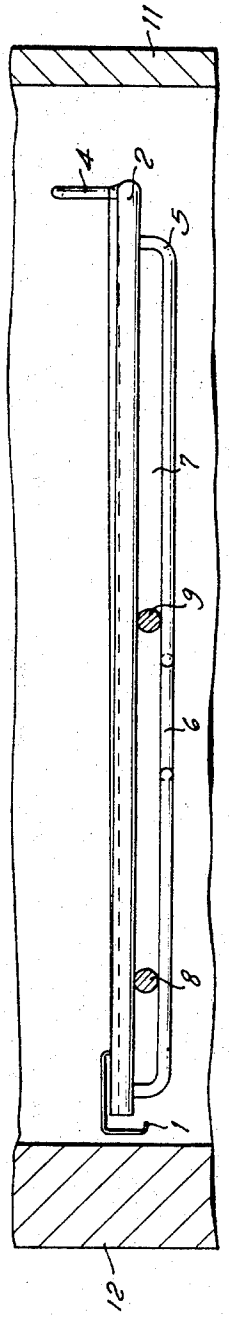

FIG. 1

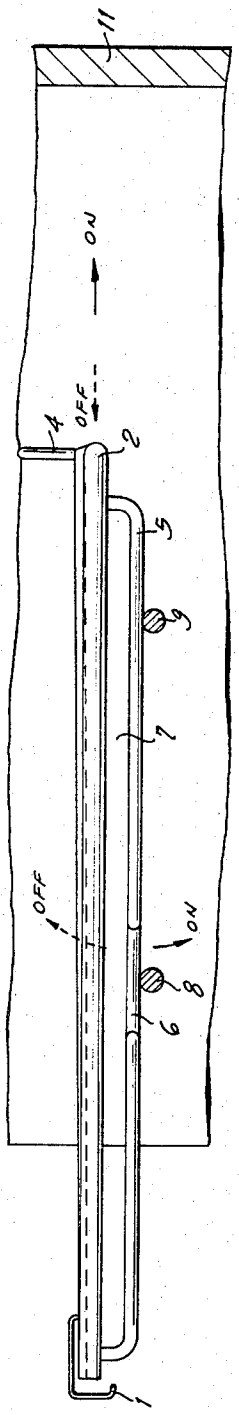

FIG. 2

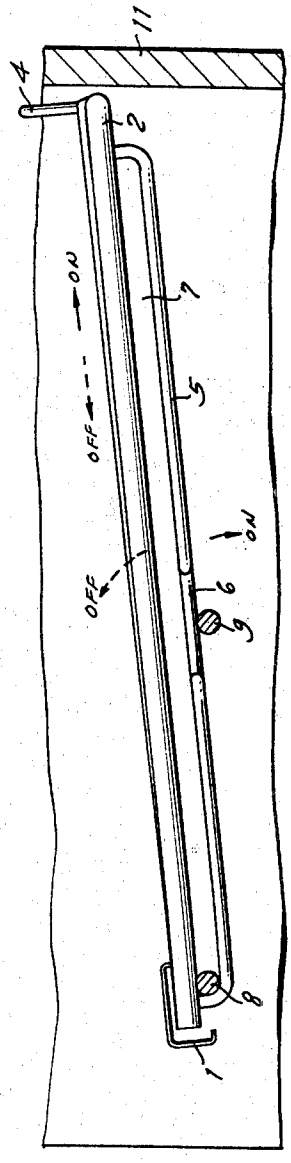

FIG. 3

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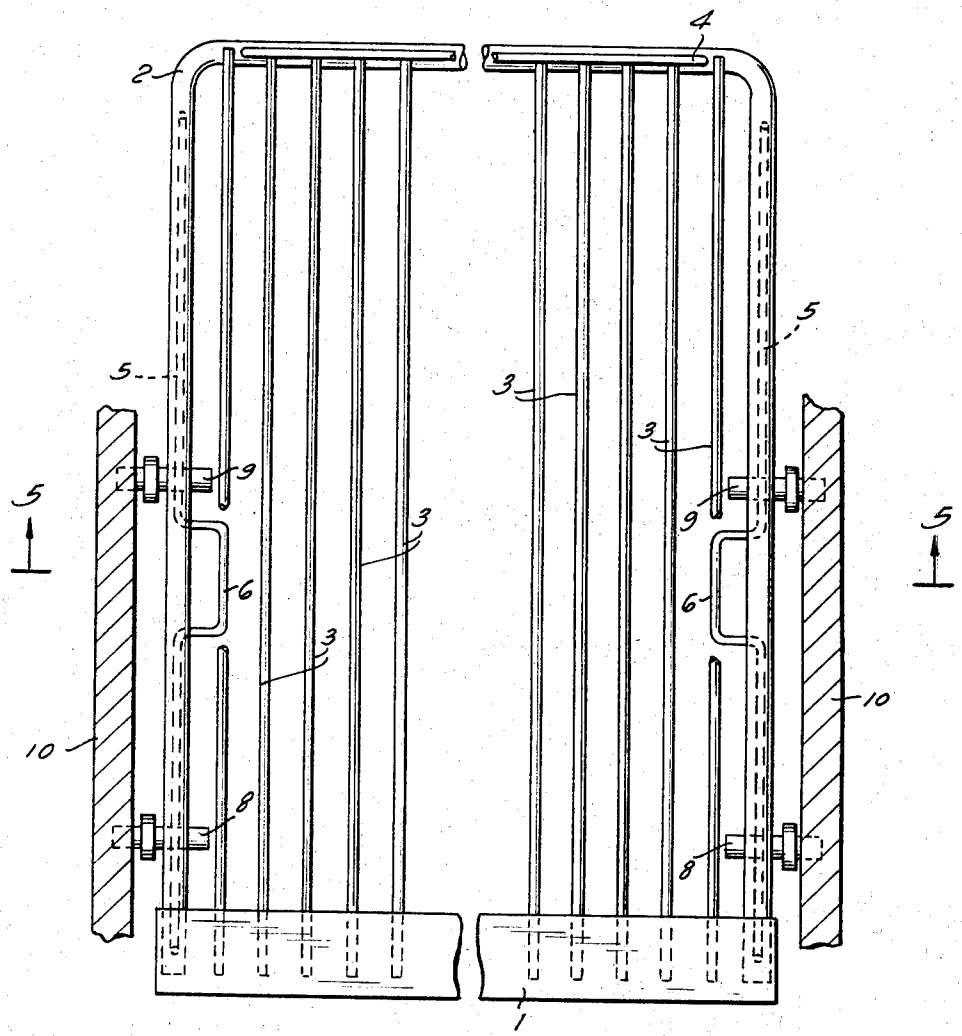
FIG. 4



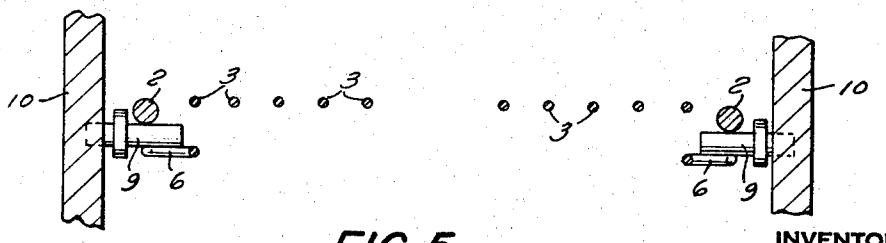


FIG. 5

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United States Patent Office 3,407,940
Patented Oct. 29, 1968

3,407,940

SHELF ASSEMBLY

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Filed Oct. 5, 1966, Ser. No. 584,536
4 Claims. (Cl. 211—153)

ABSTRACT OF THE DISCLOSURE

A removable, slidable shelf assembly, for a cabinet, having members forming guide channels beneath the side edges of the shelf assembly and loops in the guide channel members allowing for insertion and removal of support members, the support members acting also to limit at least the forward motion of the shelf assembly.

This invention relates to a slidable, removable shelf assembly for use in a cabinet structure, such as a refrigerator cabinet. More particularly, this invention is directed to a shelf assembly so formed that its support members perform the additional function of limiting the forward sliding motion.

Slidable and removable shelves have been provided in cabinet structures, primarily for convenience in use and for sanitary reasons. Particularly in structures which are employed for the storage or preparation of food, such as refrigerators and stoves, it is important that the user be able to easily clean the shelves used to support items which are placed in the structure. The ability to properly clean the shelves is greatly enhanced when the shelves can be removed from the structure for cleaning. Additionally, for ease in reaching items placed at the rear of the shelf, it is convenient for the shelf to be movable in a forward direction so that these items can be removed without disturbing items placed on the forward portion of the shelf. It is, of course, important that the forward motion of the shelf be positively limited, so that the shelf is not completely removed from the structure, accidentally. It is also important that the shelf be positively and firmly supported both in itse normal position within the cabinet structure and in its extended position.

A wide variety of shelf assemblies have been described which are both slidable within a cabinet structure and removable from that structure, either for cleaning or for other purposes. However, these assemblies have generally been very complex, or have required the use of extra parts, particularly in order to limit the forward motion of the shelf, or both. For example, stops are often removably attached to a portion of the shelf in order to limit the forward motion. Thus, both the expense of manufacture of the shelf and the propensity for malfunctioning are very high.

In accordance with the present invention a shelf assembly has been found which is easily and economically manufactured, requires no additional or attached parts, and allows the support members extending from the walls of the cabinet structure to perform the additional function of limiting the forward sliding motion of the shelf assembly, while firmly supporting that assembly in both the normal and extended positions.

It is one object of the present invention to provide a shelf assembly which is both removable from and slidable within a cabinet structure, which is easily and economically produced and which is so formed that the support members extending from the walls of the cabinet structure perform the additional function of limiting at least the forward sliding movement of the assembly.

It is a further object of this invention to provide a shelf assembly which is removable from and slidable within a cabinet structure, and is so formed that the

support members for the assembly, which extend from the walls of the cabinet structure, perform the additional function of limiting at least the forward sliding motion of the assembly without a requirement for additionally attached parts.

This invention contemplates a removable and slidable shelf assembly having a standard flat surface for supporting items to be stored on the assembly and, on either side of the flat surface and depending from it, a rod or bar spaced from the surface and generally parallel to it, the ends of which are bent and joined to the underside of the flat surface, so as to form guide channels. In the running portion of each rod or bar a loop is formed, generally parallel to the flat surface, the loops projecting toward each other. These loops are provided for the purpose of inserting the support members mounted on the walls of the cabinet structure into the guide channels of the shelf assembly. Preferably, each of the loops formed in the rods or bars are the same distance from the forward edge of the shelf.

The support members are generally in the form of pins mounted in the side walls of the cabinet structure and extend perpendicularly from that wall. Preferably, there are two such pins on each side wall, one nearer the forward edge of the cabinet, and the other nearer the rearward edge of the cabinet. The shelf assembly is inserted into the cabinet by passing the pins nearer the forward edge through the loops formed in the rod or bars, moving the shelf assembly towards the rear of the cabinet structure, with the forward pins in the forward portion of the guide channel, a distance sufficient that the loops and the pins nearer the rearward edge are in alignment, and passing the rearward pins through the loop. The shelf is now supported by the underside of the at surface of the shelf assembly, or a frame member therefor, resting on the upper surface of the pins. To slide the shelf assembly within the cabinet, the shelf assembly is merely pulled forward, its forward motion being limited by the abutment of the rearward pins upon the bent vertical portion of the rod or bars which are joined to the underside of the flat surface of the shelf assembly. The shelf assembly is removed from the cabinet structure by reversing the operation of insertion.

These and other objects and advantages of the present invention will be more clearly understood when considered in conjunction with the accompanying drawings, showing the preferred embodiment of the present invention, in which:

FIG. 1 is a side elevational view of the shelf assembly mounted within a cabinet structure, the cabinet structure being shown in a fragmentary view to illustrate more clearly the shelf assembly;

FIG. 2 is a view similar to FIG. 1 showing the shelf assembly about to be mounted onto the first support member;

FIG. 3 is a view similar to FIG. 2 where the shelf assembly is mounted on the first support member and is about to be mounted on the second support member;

FIG. 4 is a plan view of the shelf assembly, with a portion broken away and removed, mounted in a cabinet structure, which is again shown in fragmentary view; and

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4.

As can be seen in the drawings, particularly FIGS. 4 and 5, the shelf assembly comprises a front frame member 1, which can be formed with a lip to facilitate gripping (best seen in FIGS. 1–3), and a bent wire frame member 2 attached at two points to the front frame member. A series of rods or wires 3 are attached to the front frame member and the rear portion of the bent wire frame member. It should be understood, of course, that in place of the rods or wires 3, which form the flat surface for

supporting the goods placed on the shelf, the flat surface may take the form of a piece of sheet metal, or of separated flat strips of metal, or any other convenient, desirable form.

Attached to the trailing edge of the bent support member is a bent wire member **4**, lying in a plane perpendicular to the flat surface of the shelf assembly. The purpose of the bent wire **4** is to act as a stop and prevent items from falling off the back of the shelf assembly when it is slidably moved forward within the cabinet. Dependent from the flat surface of the shelf assembly, and permanently attached to the sides of the bent frame member are bent rod or wire members **5**, in which are formed loops **6**.

The running portion of the bent wire **5** is parallel to the side portion of the bent frame member **2**, and, together, they form a guide channel **7**. This guide channel is sized to accommodate forward support members **8** and rear support members **9** which extend from the side walls **10** of a cabinet, such as a refrigerator cabinet. As shown in the various figures the support members take the form of pins or posts which are flanged near the walls in which they are mounted. However, the support members can take any convenient shape so long as they can be placed in the guide channel **7** by passing through the loops **6**. The loop is so placed in the bent wire **5**, and the support members are so located in the walls, that the shelf assembly can be mounted and, when mounted, can be slidably moved a predetermined distance until the rear support members abut the horizontal rear portions of the bent wire **5**. In some situations, the support members may be detachable and reinsertable at other points on the side wall to provide either for additional sliding movement or to regulate the height of a shelf assembly which is so mounted.

A side elevation of the shelf assembly of the present invention mounted in a cabinet is shown in FIG. 1 with a fragmentary view of the back wall **11** and a fragmentary view of the front of the cabinet **12**, which is generally a door. The preferred method of inserting the shelf assembly of the present invention into a cabinet is shown in FIGS. 2 and 3, where the door is removed, as when it is opened. The shelf assembly is placed part way into the cabinet so that the loops **6** are in alignment with the front support members **8**, as shown in FIG. 2. The shelf is then lowered onto these front support members so that the lower portion of the bent frame member **2** rests on the support members and the support members **8** are within the guide channel **7**; the shelf is then moved slidably to the rear so that the loops **6** are in alignment with the rear support members **9**. The shelf is again lowered so that the lower surface of the bent frame member **2** rests upon the rear support members and the shelf assembly may then be slidably moved rearward or forward, the rearward movement being limited by the placement of the front support member or by the rear wall of the cabinet and the forward movement being limited by the placement of the rear support members **9**. Forward or rearward movement is obviously limited, with reference to the support members, by their abutment against the vertical bent portions of the bent wire **5**. As previously mentioned, the support members can be formed in such a way that they can be moved from one position to another along the wall of the cabinet so as to vary the position in which movement of the shelf assembly is limited.

In use, the shelf assembly is placed into the cabinet, particularly a refrigerator cabinet, employing the steps as described with reference to FIGS. 1, 2 and 3. It can then be moved in a forward direction, as by grasping the lip of the forward frame member and pulling toward the user. The forward motion is limited by the abutment of

the rear support member against the rear, vertical bent portion of the member forming the lower portion of the channel guide. When the user has placed the desired items upon or removed them from the flat surface of the shelf assembly, the shelf assembly is easily returned to its original position, merely by pushing in a rearward direction. The rearward motion of the shelf assembly is arrested either by abutment of the front support members against the forward, vertical bent portion of the member forming the lower portion of the channel guide, or by the abutment of the rear of the shelf assembly against the rear wall of the cabinet. When it is desired to remove the shelf assembly from the cabinet, as for cleaning, the steps described with respect to FIGS. 1, 2 and 3 are merely reversed. That is, the shelf is moved to such a position that the rear support members are in alignment with the loops formed in the member forming the bottom portion of the channel guide, the shelf is lifted from these supports by passing the supports through the loop, the shelf is then moved forward until the front support members are in alignment with the loops, and the shelf is then removed from the cabinet by passing the front support members through the loops.

While a specific embodiment of the invention has been shown and described, it should be understood that many variations are possible. The important feature is the formation of the loop in a member forming a bottom portion of a channel guide so that the support members can be placed within the channel guide and at least the rear support members will perform the additional function of limiting the sliding movement of the shelf.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A removable, slidable shelf assembly for use in a cabinet structure comprising:

(a) a flat surface having a front edge, a rear edge, and two side edges, said flat surface acting to support items to be stored,

(b) members dependent from the side edges of said flat surface, forming a guide channel,

(i) each of said members having a running portion parallel to the flat surface of said shelf assembly,

(ii) said members also having vertical, front and rear segments attached to the bottom of said flat surface,

(c) loops formed in the running portion of said members, said loops facing inwardly in opposing relation, whereby support members, mounted to the side walls of said cabinet structure, can be inserted into said guide channel through said loops so as to support said shelf assembly and limit at least the forward sliding movement of said shelf.

2. The shelf assembly of claim **1** wherein a raised portion is provided at the rear edge of said flat surface as a stop for items placed upon said surface.

3. The shelf assembly of claim **1** wherein the front edge of said flat surface is formed with a lip.

4. The shelf assembly of claim **1** wherein said flat surface is formed by a series of parallel wires extending from said front edge to said rear edge, essentially parallel to said side edges.

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