June 17, 1958 F. M. HILL ET AL 2,839,350

ADJUSTABLE SHELF AND A MOUNTING MEANS THEREFOR

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Fig. 1

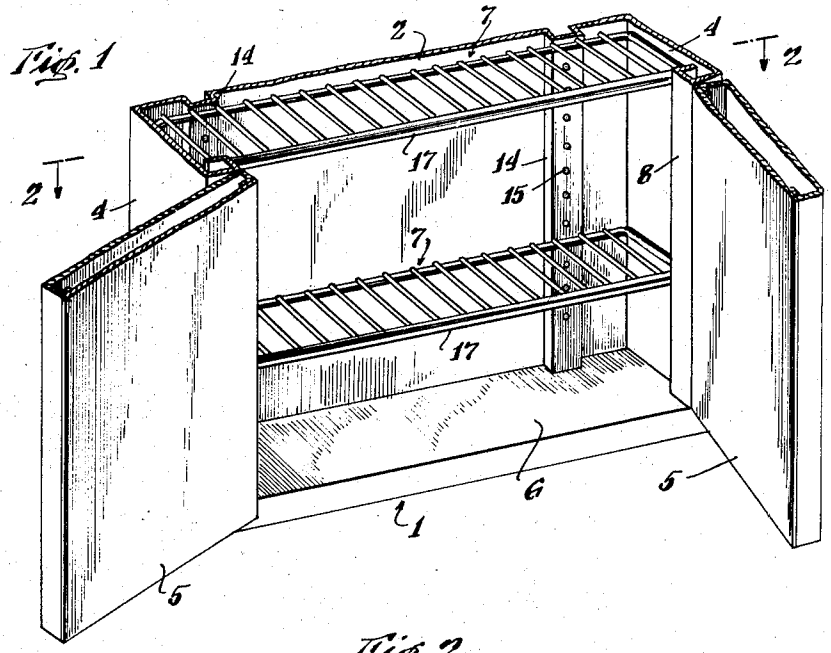


Fig. 2

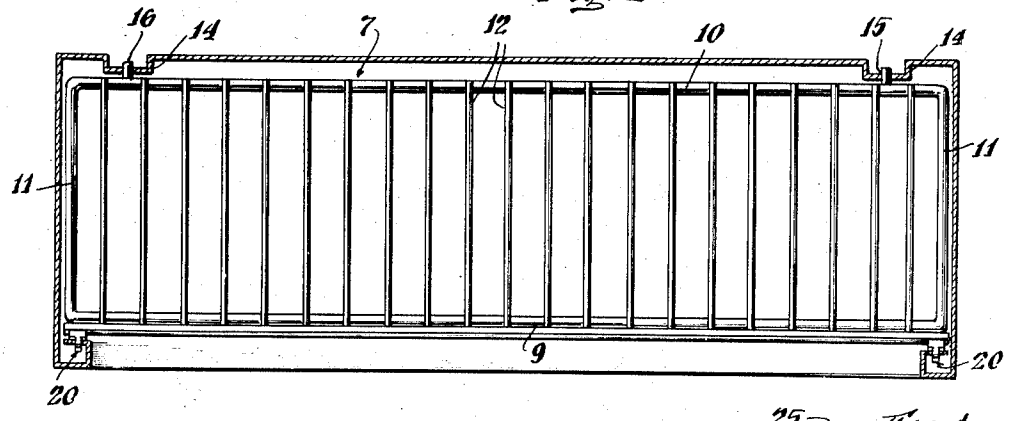


Fig. 3

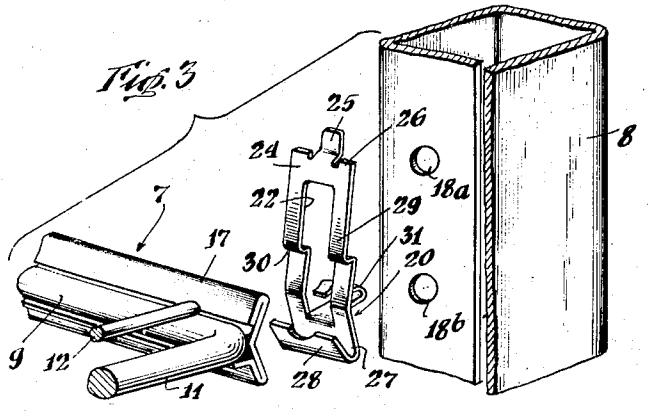
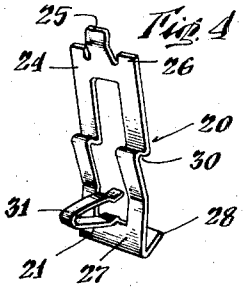


Fig. 4



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Fig. 8

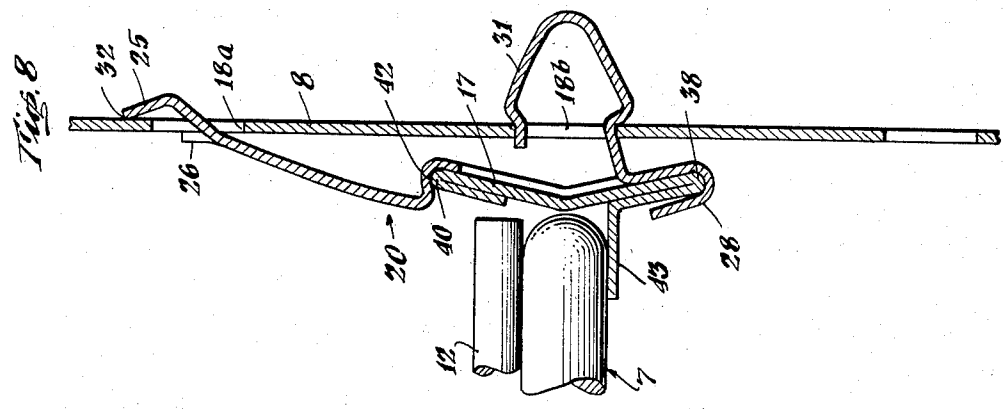


Fig. 7

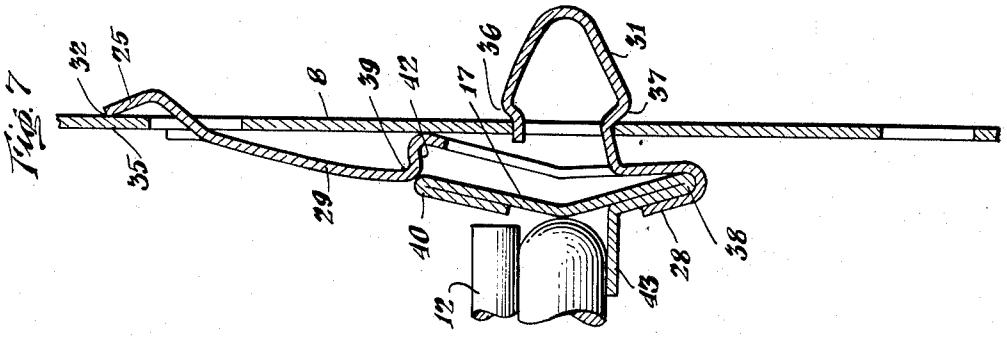


Fig. 6

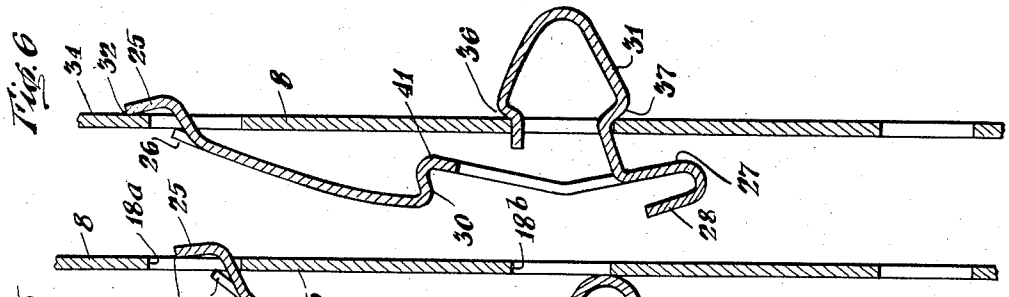
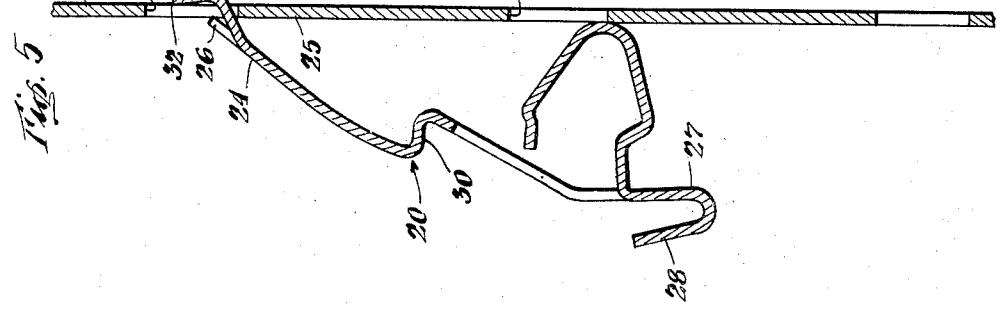


Fig. 5



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ADJUSTABLE SHELF AND A MOUNTING MEANS THEREFOR

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Application May 10, 1956, Serial No. 583,978

7 Claims. (Cl. 312—351)

The present invention relates to adjustable shelving and more particularly to an adjustable shelf and a mounting means therefor for use in cabinet-like enclosures.

Large numbers of shelved cabinets are now being used for miscellaneous storage purposes such as, for example, food or utensil storage in the kitchen areas of homes and restaurants. Many of these cabinets are provided with built-in shelving which is mounted in fixed relation to the cabinets with predetermined spacing so that they cannot be adjusted for different shelf spacing without extensive reconstruction. Others of these cabinets have adjustable shelving but have one or more of the following undesirable features. Some of the adjustable shelving systems are relatively complicated and expensive and thus are not suitable for use in low-cost cabinet construction. Others of the adjustable shelves are relatively heavy and thick and thus are not easily handled and also tend to reduce the visibility within the cabinet. Other known types of shelving are made of relatively fragile material, such as glass, and thus are not suitable for certain types of use where heavy articles such as bottles or canned goods, are stored in the cabinets.

Accordingly, an object of the present invention is to provide an improved shelf and an adjustable mounting means therefor.

Another object of the present invention is to provide a relatively strong, lightweight, adjustable shelf.

Another object of the present invention is to provide an adjustable shelf which gives good visibility within a cabinet-like enclosure.

Another object of the present invention is to provide an improved lightweight shelf suitable for an adjustable shelf mounting means.

Another object of the present invention is to provide an improved shelf fastener.

Another object is to provide a highly efficient and relatively simple adjustable shelf fastening means.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein:

Fig. 1 is a perspective view of a cabinet partially cut away having shelves and an adjustable mounting means therefor in accordance with the present invention;

Fig. 2 is a sectional view of the cabinet of Fig. 1 along the line 2—2 of Fig. 1 showing the position of the shelf with respect to the cabinet;

Fig. 3 is an enlarged exploded perspective view of a corner of the cabinet of Fig. 1 showing the shelf attaching clamp;

Fig. 4 is a perspective view showing the back of the shelf attaching clamp; and

Figs. 5-8 are enlarged vertical sectional views of the shelf attaching clamp and a portion of the cabinet wall showing the attaching of the clamp to the wall and the mounting of the shelf edge in the clamp.

Fig. 1 shows a cabinet-like enclosure 1 having a rear wall 2, side walls 4, hinged doors 5, and a bottom 6. Adjustable shelving in accordance with the present invention comprising two shelves 7 and adjustable supports therefor is shown positioned between the rear wall 2 and the corner posts 8 at the front of the cabinet 1. The shelving 7 is preferably light in weight, relatively strong, of open design to provide good visibility, and adaptable for use with the adjustable fastening means of the invention which will be more fully described below.

A preferred shelf incorporating these features is shown in Figs. 2 and 3 formed with a metal frame comprising front and rear metal rods 9 and 10, respectively, which are attached at their ends to side rods 11. The front, rear, and side rods 11 may be formed separately and welded together at their intersections or they may comprise a single rod such as a round steel rod bent into a rectangular shape and having its ends welded or otherwise fastened together. The article supporting surface of the shelf 7 is formed of parallel wires or rods 12 running between the front rod 9 and the rear rod 10 and fastened thereto by a suitable weld or other fastening means.

The adjustable mounting for the rear edge of shelf 7 preferably comprises vertical rows of spaced apertures 15 formed in the rear wall 2 of of the cabinet 1 to accommodate circular mounting pins 16 which extend outwardly from the rear rod 10 of shelves 7. The front of each shelf 7 is supported by shelf clamps 20 which are removably fastened in spaced apertures 18 of the front posts 8 of the cabinet 1 at a suitable position to space the shelves 7 a desired distance from the cabinet bottom 6. A reinforcing channel 17 is preferably attached to the front rod 9 of each shelf 7 to stiffen the shelf, to provide a smooth and attractive front edge, and to cooperate with the shelf fastening clamp 20 to lock the front edge of the shelf in place in the cabinet 1, as will be more fully described below. When the rear wall 2 of the cabinet 1 is relatively thin, a channel 14 is preferably formed therein for the apertures 15 to accommodate the inserted portion of the shelf mounting pins 16.

The shelf clamps 20 will now be more fully described with particular reference to Figs. 3 through 8. The shelf clamp 20 is preferably a single-piece clamp cut and bent from a suitable sheet metal material, preferably spring metal or cold rolled or other metal having resilient or spring-like characteristics. Thus, a generally rectangular elongated flat blank is formed from sheet or strip material having a shank 21 at the center of the blank formed by cutting an aperture 22 in the center of the blank outlining the shank 21. One end of the blank, which will be designated as the upper end 24 herein since it is at the top of the clamp 20 in its normal shelf attaching position, is formed with a projecting tongue 25 centrally located between wall abutting prongs 26. The opposite or lower end 27 of the clamp 20 has a shelf engaging hook 28 shaped thereon by being bent upwardly. Between the upper and the lower ends 24 and 27, respectively, the clamp 20 has a body portion 29 shaped to provide a disengageable locking corner 30 for the upper edge of the shelf 7. The elongated shank 21 is bent outwardly of the clamp body portion 29 opposite to the hook 28 into a generally U-shaped spring clip 31 adapted to engage the lower aperture 18*b* of two vertically spaced apertures 18 when the tongue 25 is inserted into the upper of the apertures 18*a*.

The preferred shaping of the clamp 20 and its mounting and shelf gripping action will now be described with particular reference to Figs. 5 through 8.

As seen in Fig. 5, the upper end 24 of the clamp 20 is attached to the adjacent portion of the cabinet wall, such as post 8, by the insertion of tongue 25 into an aperture 18*a*. The tongue 25 is preferably given a concave shape so that its upper edge 32 engages the rear surface 34 of post 8 as the abutting prong 26 engages the outer surface 35. The resilient material of the tongue deforms to lightly grip the post 8 adjacent to the aperture 18*a*.

After the tongue 25 has been inserted, the lower end 27 of the clamp 20 is anchored in place by the insertion of resilient clip 31 into suitably spaced lower aperture 18*b*. In order to space the lower end 27 of the clamp 20 from the surface 35 of the post 8 to allow for the shelf gripping action, which will be more fully described below, corners 36 and 37 are formed on the upper and lower portions of clip 31 to position the clip 31 and the attached clamp body 29 with respect to post 8.

In Figs. 7 and 8, the shelf attaching and gripping action is shown. In the mounting the shelves after the clamps 20 have been clipped into place, the mounting pins 16 at the rear edge of the shelf 7 are first slipped into the proper apertures 15. The central portion 39 of the body 29 of the clamp 20 is now pressed inwardly against post 8, as shown in Fig. 7, to permit the lower edge 38 of the shelf to be seated in hook 28 and to allow the upper edge 40 of the shelf edging 17 to clear the clamp body 29. The upper shelf edge locking corner 30 engages the upper edge 40 of shelf edge channel 17 when the clamp 20 is released as shown in Fig. 8.

In order to allow for the depressing of the center portion of clamp 20 to permit it to engage the top of shelf edging 17, clamp 20 in its preferred form has its lower edge spaced from the outer surface of post 8 by spring clip 31. Additionally, the central portion 29 of the clamp 20 is arched outwardly to space the inner edge 41 of corner 30 from the post 8. It is clear that the central portion 29 of clip 20 may be spaced outwardly by either the arching shape or the spaced bottom portion separately or by a combination of both, as shown. Thus, where the lower end 27 of the clamp is spaced at or on the surface of post 8, an additional arching may be employed to allow for the necessary outward spacing of the shelf locking corner 30.

Preferably the corner 30 which engages the upper edge 40 of the channel 17 has an S-shape to provide a recess 42 which tends to grip the channel edge 40 to help hold it in place. The resilient material of which the clamp 20 is formed allows the edge 40 to snap under the corner 30 into recess 42 where a tight fit is provided as shown in Fig. 8.

In the preferred embodiment, the channel 17 has a V-shaped cross section as shown in Figs. 7 and 8. This provides a stiffer shelf edge, cooperates to provide an improved positioning and locking action between the channel 17 and the clamp 20 which has a complementarily V-shaped portion between its hook 28 and its shelf locking corner 30, and also provides a more attractive appearance. A horizontal flange 43 on channel 17 is attached to the lower surface of shelf rod 10 to attach the channel 17 to the shelf frame and to provide for additional shelf strength.

The outward spring force of clamp 20 away from the post 8 after the insertion of the shelf 7 forces the shelf toward the rear wall 2 of the cabinet 1.

Although particularly suited for supporting shelving in the above-described manner, the clamp 20 may also be used for positioning vertical dividers or panels by providing suitably spaced rows of apertures in the clamp supporting surface.

It will be seen that the present invention provides improved shelving and an adjustable mounting means therefor. The shelving is relatively light and strong and is also readily removable and adjustable to provide for easy cleaning or rearrangement of the shelf spacing in its supporting cabinet structure. The shelf mounting means includes a relatively simple flexible shelf clamp which requires only a row of spaced apertures for its attachment to a cabinet wall. The clamp is easily moved from one position to another on the cabinet wall to provide for the ready rearrangement of shelving. The clamp also cooperates with the improved shelving to tightly lock it into place during use and is at the same time easily and quickly disengaged to permit its removal or rearrangement. The clamp is easily manufactured at a relatively low cost and is thus suitable for extensive use in both home and industrial applications.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. An adjustable shelf support comprising a vertical support member having a plurality of spaced apertures, a shelf clamp having a generally vertical resilient body portion, a tongue means at the top of said body portion adapted to fit into one of the spaced apertures, a resilient aperture-engaging clip adjacent the bottom of said body portion adapted to engage a lower aperture than said tongue means, a shelf edge support adjacent the lower edge of said body portion and on the opposite side thereof from said resilient aperture-engaging clip adapted to engage the lower edge of the shelf, and a shelf engaging corner in said body portion between said tongue and said shelf edge support formed in an S-shaped portion of said body to resiliently and removably engage the upper edge of the shelf.

2. A shelf supporting clamp adapted for mounting in spaced apertures comprising a generally vertical resilient body portion, an aperture engaging means at the top of said body portion adapted to fit into a first aperture, a resilient aperture engaging clip adjacent the bottom of said body portion adapted to engage a second aperture, a shelf edge support adjacent the lower edge of said body portion on the opposite side thereof from said resilient aperture-engaging clip adapted to engage and support the lower edge of a shelf, and a shelf edge engaging corner in said resilient body portion adapted to resiliently and removably engage the upper edge of the shelf and hold said shelf edge support snug in said clamp.

3. A shelf clamp adapted for wall mounting between two spaced apertures comprising a piece of spring metal bent to define a body portion and a generally U-shaped attaching clip extending outwardly from one side of the body portion adjacent a first end adapted to engage a first aperture, an aperture engaging means at the opposite end of said body portion adapted to engage a second aperture, a shelf supporting means at the first end of said body portion overlying a portion of the face of the body portion opposite said attaching clip, and a shelf edge engaging corner formed in said resilient body portion between said clip and said aperture engaging means to resiliently lock an edge of said shelf between said shelf supporting means and said corner.

4. A support clip adapted for mounting in spaced apertures on a wall comprising a piece of sheet metal bent to define an arched body portion and a mounting arm extending outwardly from one end thereof on the concave side of the arched body portion comprising a generally U-shaped clip adapted to engage a first aperture, a tongue means at the other end of said body portion adapted to engage a second aperture, hook means on said body portion at said one end and on the convex side thereof, and a corner in said body portion spaced from said hook means and adapted to removably engage one edge of a shelf having its other edge engaged by said hook means.

5. A shelf clamp adapted to be removably attached

to two spaced apertures on a wall surface comprising a piece of resilient sheet metal bent to define a resilient arched body portion and a mounting clip extending outwardly from the concave side of the body portion adjacent one end thereof comprising a generally U-shaped clip adapted to be inserted into and to grip a first of said spaced apertures with the adjacent end of the body portion in spaced relation from the wall surface, a tongue means at the opposite end of the body portion adapted to engage the second of said spaced apertures, hook means on the body portion extending partially above the convex side adapted to engage the one edge of the shelf, a corner formed in said body portion spaced from said hook means and from the wall surface adapted to engage the opposite edge of the shelf, and said arched body portion being removably bendable against the wall surface whereby said corner may be moved clear of the shelf edge during insertion or removal of the shelf from said hook means and said corner.

6. In a cabinet having shelf supporting walls, the combination of a shelf, wall mounting means for removably mounting one edge of said shelf on a first wall, a support engaging means on another edge of said shelf, a shelf supporting clamp having an aperture engaging portion adjacent one end of the clamp adapted to engage one aperture of a plurality of apertures in a second wall and a portion adjacent the other end of said clamp bent outwardly and shaped to snap into a second of said apertures, together with a hook for engaging the lower

edge of said support engaging means and a resilient edge engaging corner for the upper edge of said support engaging means, said corner being spaced from the wall portion when the clamp is mounted thereon and adapted to be removably sprung thereagainst to admit the lower edge of said support engaging means to said engaging hook and the upper edge beneath said corner when the shelf is mounted.

7. In a cabinet having shelf supporting walls with vertically spaced apertures, a shelf having on one side mounting pins for insertion in the apertures of one wall and a reinforcing strip fixed to its opposite edge, removable shelf supporting clamps for mounting on the other wall, said clamps comprising an aperture engaging portion adjacent one end adapted to engage one aperture of a plurality of apertures in said other wall and a portion adjacent the other end bent outwardly and shaped to snap into a second aperture in said other wall, an offset resilient portion in the body of said clamp shaped to releasably receive the lower and upper edges of said reinforcing strip in a resilient clamping action.

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