Sept. 18, 1951 A. L. GOLDSMITH 2,568,148

SHELF

Filed Aug. 26, 1946

FIG. 1

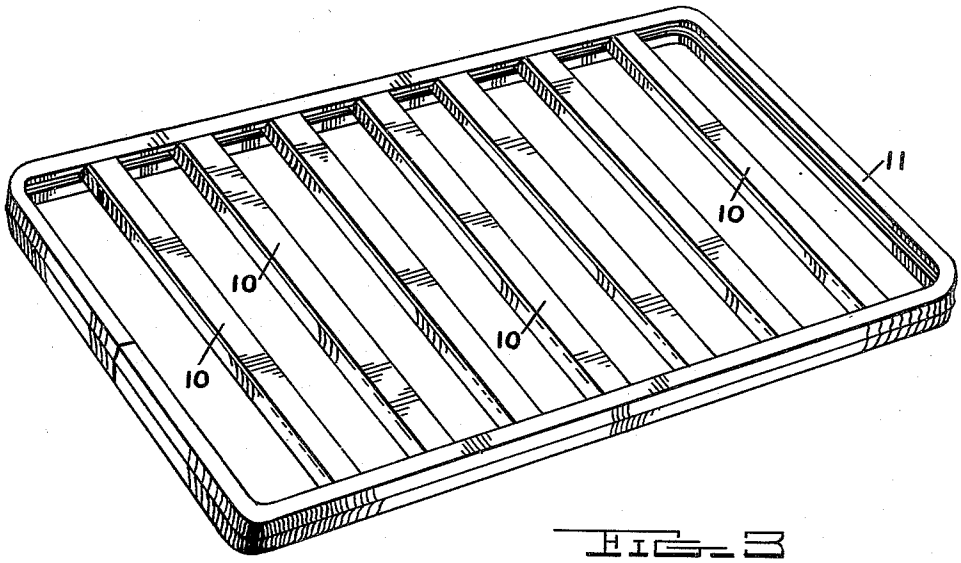


FIG. 3

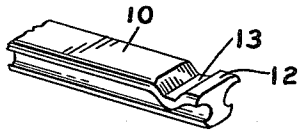


FIG. 2

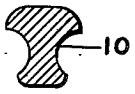


FIG. 4

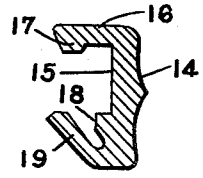


FIG. 5

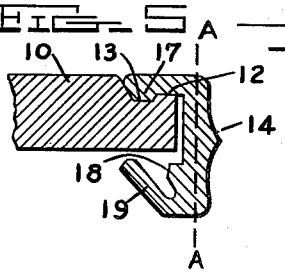


FIG. 6

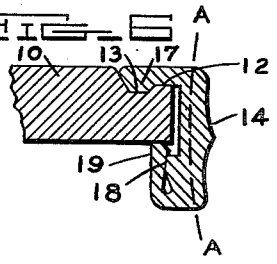


FIG. 7

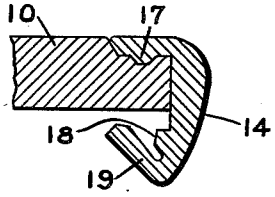
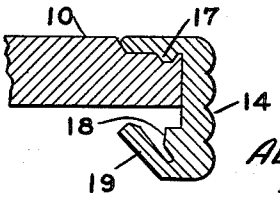


FIG. 8



INVENTOR.
ALLEN L. GOLDSMITH
BY
Karl B. Lutz
ATTORNEY

Patented Sept. 18, 1951

2,568,148

UNITED STATES PATENT OFFICE

2,568,148

SHELF

Allen L. Goldsmith, Adrian, Mich., assignor to Bohn Aluminum & Brass Corporation, Detroit, Mich., a corporation of Michigan

Application August 26, 1946, Serial No. 692,946

4 Claims. (Cl. 211—153)

1

This invention relates to an improvement in shelves. The improved shelf can be used in stoves, storage cabinets, etc., although it is particularly adapted for use in household refrigerators.

The invention is an improvement on the shelf disclosed in patent application Ser. No. 584,961, filed by Charles E. Hickman on March 26, 1945. In the construction of that application, the outer frame is substantially "C-shaped" in cross section and the upper and lower jaws of the C are crimped together to grip the ends of the crossbars. One disadvantage of the construction shown in that application is that after the jaws of the outer rim are crimped against the crossbars, there is a tendency for the jaws of the frame to move apart slightly, thus leaving a small amount of looseness or "play" in the joint. This is due to the fact that the metal has some resilience, so that after it is bent to a certain position there is a tendency for the metal to spring back toward its original position, unless some provision is made for locking or clamping the metal in the extreme position to which it was bent. The present invention provides means for so locking the parts.

This locking or clamping is accomplished by constructing the parts so that when the upper and lower jaws of the C are bent to their final positions the side wall of the frame is placed under tension by a cam locking action and the jaws of the C clamp the ends of the crossbars in a permanent resilient grip.

These and other objects and advantages of the construction will become apparent as the description proceeds.

While preferred forms of the invention are disclosed herein, for purpose of illustration it should be understood that various changes may be made without departing from the spirit of the invention as herein set forth.

In the drawings:

Fig. 1 is a perspective view of a shelf embodying the invention.

Fig. 2 is a cross section through one of the crossbars illustrated in Fig. 1.

Fig. 3 is a perspective view of one end of a crossbar after it has received its preliminary deformation.

Fig. 4 is a cross section of the frame section illustrated in Fig. 1.

Fig. 5 is a fragmentary cross section showing a deformed end of a crossbar assembled to its preliminary position with the frame.

Fig. 6 is a view similar to Fig. 5 but showing

2

the parts after they have been locked together.

Figs. 7 and 8 are views similar to Fig. 5 but illustrating possible variations.

As described in patent application Ser. No. 584,961, the crossbars 10 and the frame 11 are both formed from extruded sections, preferably of a suitable alloy of aluminum. In the present case the crossbars have the cross-sectional shape illustrated in Fig. 2 while the frame section has the cross-sectional shape illustrated in Fig. 4. As in the prior application, the crossbars are formed by cutting off suitable lengths of the extruded section having the shape of Fig. 2, while the frame is formed by bending a single piece of the extruded section illustrated in Fig. 4.

As a step preliminary to assembling, each end of each crossbar is deformed so as to give it the shape illustrated in Figs. 3, 5 and 6. In this deformation, which is produced by a suitable die, the entire end of the crossbar is given a depressed top area 12 and the depressed area is formed with a transverse groove 13. No deformation is given to the bottom of the crossbar.

As will be clear from Fig. 4, the frame section includes a side wall 14 which has a flat inner surface 15 corresponding in depth to the thickness of the end of the crossbar. The exterior of the side wall 14 may be given any preferred ornamental shape, as illustrated in Figs. 4, 7 and 8. An upper flange 16 projects inwardly from the side wall 14, the upper flange carrying a depending rib 17 which corresponds in size and location to the groove 13 of the crossbar. Just below the flat inner surface 15, there is an inwardly projecting stop ledge 18. A lower flange 19 projects inwardly from the bottom of the side wall 14 and is disposed at an acute angle to the side wall.

In producing the shelf, each end of each crossbar, after receiving its preliminary deformation, is inserted within the frame to the position illustrated in Fig. 5. The lower flange 19 is then deformed from the position of Fig. 5 to that of Fig. 6. In the position of Fig. 6, the inner wall of lower flange 19 is in engagement with the projecting stop ledge 18 and the end surface of lower flange 19 is in contact with the lower surface of the crossbar. The lower flange 19 is designed with such a width that when it is pushed to the position of Fig. 6 the side wall 14 is placed under a certain amount of tension. This bending action is illustrated in the drawings by showing that the straight line A—A of Fig. 5, which represents a section through the side wall, is slightly bowed after the parts have been bent to the position of Fig. 6. This bending up of the lower

flange 19, which may be called a cam locking action, causes the upper and lower flanges of the frame to clamp the ends of the crossbars in a resilient grip. Since the side wall remains under tension at all times, this live, resilient grip is permanent and precludes the development of any looseness or "play" during the entire life of the shelf.

The inwardly projecting ledge 18 serves as a stop so that during assembly the lower flange 19 cannot be accidentally pushed past the vertical position. If the stop ledge were not present and the lower flange were pushed past the vertical position, there would result a lessening of the amount of tension in the side wall.

Possible variations in the location of the rib 17 are illustrated. In Fig. 1 this rib is at the outer edge of the upper flange 16, in Fig. 8 it is near the inner edge, while in Fig. 7 it is at an intermediate position.

It will be clear to those skilled in the art that the improved joint between the frame and the crossbars may be useful in other structures.

The advantages and uses of the shelf disclosed herein will be apparent to those skilled in the arts concerned.

I claim:

1. In a shelf of the type in which a plurality of crossbars have their ends attached to a frame, each crossbar being formed near each end with a transverse groove, the frame having a side wall and an upper flange which extends over the ends of the crossbars and which carries a rib which is engaged in the transverse grooves of the crossbars, the frame having a lower flange which is engaged with the lower surface of the crossbars, the improvement which comprises: the lower flange being wider than necessary to reach the lower surface of the crossbars, the lower flange being upturned substantially parallel to the side wall, thereby being wedged against the lower surface of the crossbars, the side wall of the frame being under tension with the upper and lower flanges clamping the ends of the crossbars in a permanent resilient grip.

2. A shelf as claimed in claim 1 in which the side wall carries a stop ledge which limits the movement of the lower flange, so as to prevent over-movement of the lower flange with consequent lessening of the tension in the side wall.

3. In a joint between a first member and a second member of the type in which the first member is formed with a transverse groove, the second member having a side wall and a first flange which extends over one face of the first member, the first flange having a rib engaged in said transverse groove, the second member having a second flange which engages with the first member on the opposite face from that carrying the groove, the improvement which comprises: the second flange being wider than necessary to reach the surface of the first member, the second flange being upturned substantially parallel to the side wall, thereby being wedged against the lower surface of the first member, the side wall of the second member being under tension with the first and second flanges clamping the end of the first member in a permanent resilient grip.

4. A joint as claimed in claim 3 in which the side wall carries a stop ledge which limits the movement of the lower flange, so as to prevent over-movement of the lower flange with consequent lessening of the tension in the side wall.

ALLEN L. GOLDSMITH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
749,116	Valentine	Jan. 5, 1904
1,184,309	Berson	May 23, 1916
1,889,440	Groehm	Nov. 29, 1932
2,076,099	Smith et al.	Apr. 6, 1937
2,227,947	Shoen	Jan. 7, 1941
2,264,120	MacDonald et al.	Nov. 25, 1941
2,309,212	Reeves	Jan. 26, 1943
2,380,053	Kuenzli	July 10, 1945
2,407,721	Nauert	Sept. 17, 1946
2,421,089	Smith	May 27, 1947