June 23, 1964 L. MASLOW 3,138,123

KNOCKDOWN SHELVING UNIT

Filed July 25, 1961 2 Sheets-Sheet 1

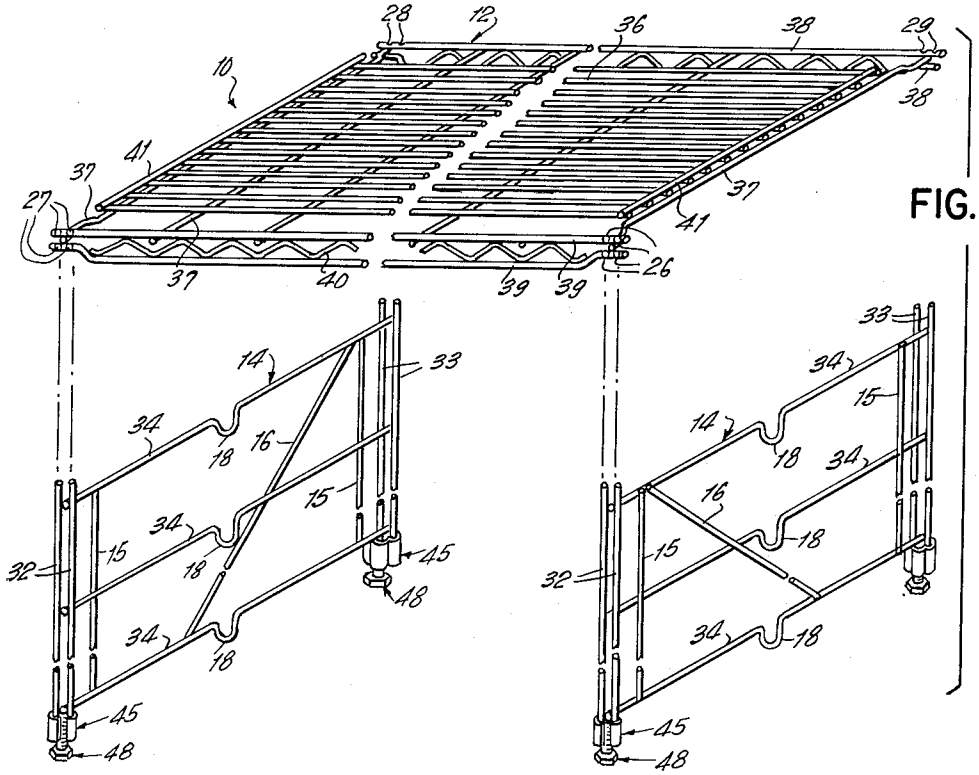


FIG. 1

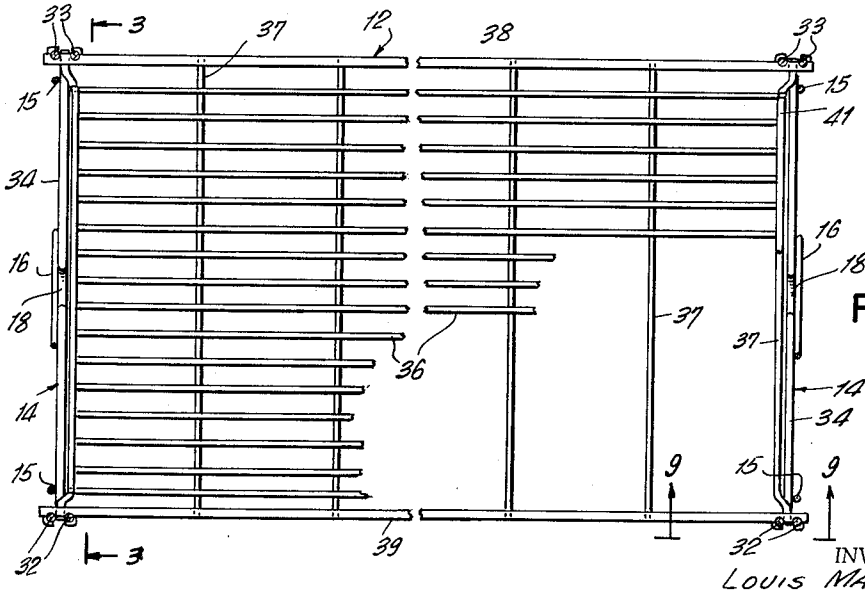


FIG. 2

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June 23, 1964 L. MASLOW 3,138,123

KNOCKDOWN SHELVING UNIT

Filed July 25, 1961 2 Sheets-Sheet 2

FIG. 3

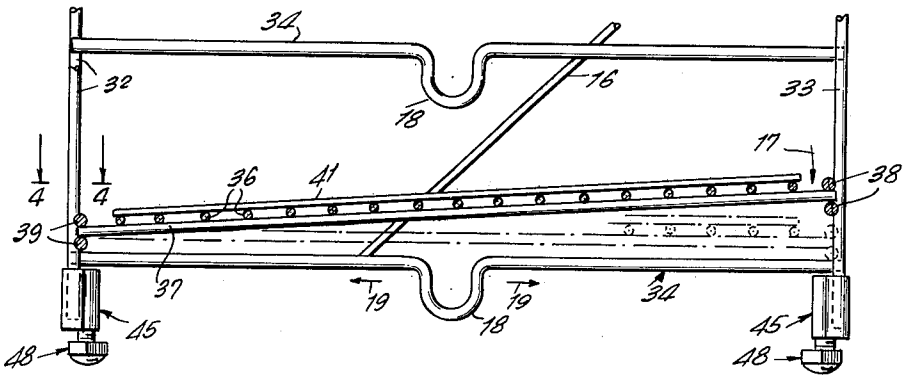


FIG. 4

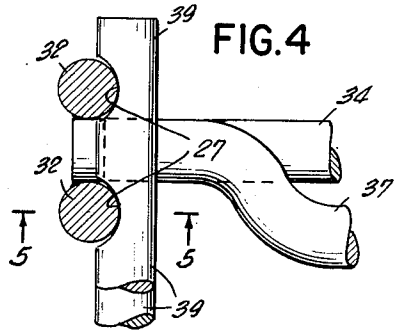


FIG. 5

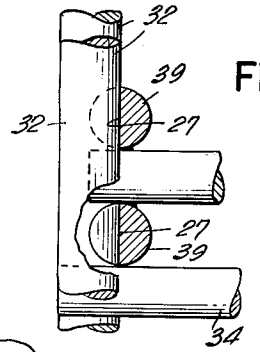


FIG. 6

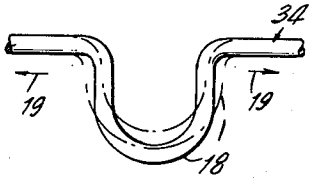


FIG. 7

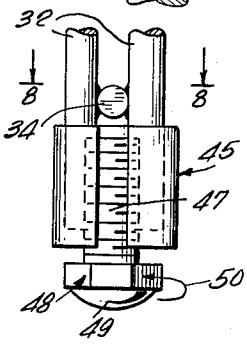


FIG. 8

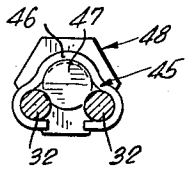
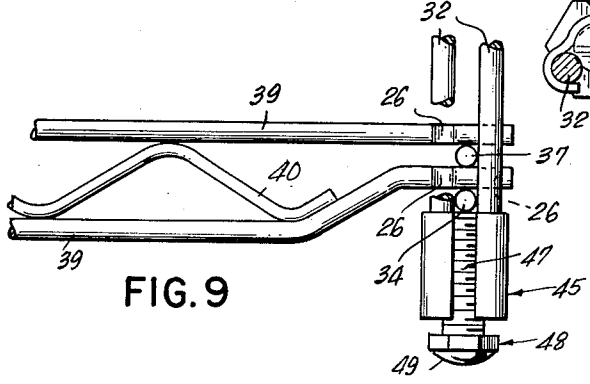


FIG. 9



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3,138,123

KNOCKDOWN SHELVING UNIT

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Filed July 25, 1961, Ser. No. 126,709
8 Claims. (Cl. 108—159)

The present invention relates to further improvements in the construction of furniture such as cabinets, shelves, bookcases or the like, which can be rapidly assembled from component parts dismantled or modified to provide a varied assortment of furniture by the homemaker himself.

The present invention is directed to frames of substantially similar construction which can be joined at home by an unskilled person to form a variety of furniture designs dismantled or modified without additional coupling means or tools of any form whatsoever. The coupling means are integrally incorporated in the frames requiring but a simple manual operation to effect an assembly or the dismantling of an existing assembly. In particular, the present invention is directed toward a highly novel supporting member for the shelf units or frames.

The primary object of the present invention is the provision of an inexpensive furniture construction adapted for mass production methods of fabrication which can be readily assembled or modified into a variety assortment of furniture shapes or dismantled into substantially similar units adapted for transportation and storage without tools, wherein the means for coupling the components are integrally incorporated in the components but requiring a relative simple manual operation to either dismantle or secure the components together and wherein provision is made for facilitating the coupling of the components together which provision results in a superior type of coupling action.

Another object of the present invention is the provision of economical frames designed particularly for production techniques wherein the said frames can readily be joined to provide a large variety of sturdy, stylish furniture and wherein coupling means are integrally incorporated in the frames to permit an unskilled person to manually dismantle or assemble the frames without the aid of tools and yet to provide a simplified and superior coupling action.

A further object of the present invention is the provision of a highly novel and generally improved support unit for shelving frames or the like which support unit has provision both to facilitate the coupling of the shelving units to the support unit and to provide a superior coupling action.

A still further object of the present invention is the provision of an inexpensive latticed furniture construction comprising an assemblage of substantially similar latticed units, said units being secured together with integral coupling means of a highly novel and superior construction, which do not require the use of tools to either assemble or disassemble the frames.

Other and further objects and advantages of the present invention will become readily apparent to those skilled in the art from a consideration of the following specification taken in connection with the appended drawings which illustrate the best mode presently contemplated for carrying out the present invention.

In the drawings:

FIGURE 1 is an exploded view of a knockdown shelving unit pursuant to the present invention;

FIGURE 2 is a top plan view of the shelving unit;

FIGURE 3 is a sectional view on an enlarged scale taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary sectional view on an enlarged scale taken on the line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary sectional view taken on the line 5—5 of FIGURE 4;

FIGURE 6 is a detailed view of the support unit;

FIGURE 7 is a detailed view of another portion of the support unit;

FIGURE 8 is a sectional view taken on the line 8—8 of FIGURE 7; and

FIGURE 9 is a fragmentary enlarged sectional view taken on the line 9—9 of FIGURE 2.

Referring now to the drawings in detail, there is shown a knockdown shelving unit **10** of the type illustrated and described in Patent No. 2,919,817, issued on January 5, 1960, to Louis Maslow. The shelving unit **10** is constituted by a plurality of shelf or frame components **12** which are supported between a pair of support or frame components **14**. The frame or shelf **12** comprises spaced ribs **36** secured to transverse rods **37**. As best shown in FIGURE 9, the front and rear edges of the frame comprise pairs of spaced ribs **38** and **39** which are closely spaced adjacent the ends of the frame and more widely spaced in parallel relation along the central portion thereof. The pairs of spaced ribs **38** and **39** are further provided with a truss-like reinforcement in the form of a sinuously bent wire which is secured to the upper and lower members of ribs **38** and **39** abutting points, as by welding, the said wire being indicated by the reference numeral **40**. The longitudinal edges of the frames are thus substantially reinforced against banding stresses and a more rigid assembly is achieved wherein considerably greater weights may be supported over substantially increased spans. The rods **36** are welded to the upper surfaces of the transverse ribs **37**, However, at each of the opposite ends of the shelf frame **12** provision is made for an additional transverse rod **41** which is welded to the upper surfaces of the ribs **36**. The exterior edges of the ribs **38** and **39** are provided at their respective ends with curvate pairs of notches **26**, **27**, **28** and **29**, which provide means for securing the frame **12** to transverse supporting frames **14**, as will be disclosed.

The supporting frames **14** each comprise pairs of vertical rods **32** and **33** which are interconnected with spaced horizontal stiffeners **34** and which form transverse supports for the shelves. The stiffeners are interconnected by vertical supporting struts **15** and by obliquely extending supporting struts **16**. The space separating the pairs of rods **32** and **33** is smaller than the overall width of the shelf frame **12**—that is, the out-to-out dimension from the ribs **38** to the ribs **39** is greater than the space separating the inner surfaces of the supports **32** and **33**. Consequently, the notches **26**, **27**, **28** and **29** are made large enough to permit the insertion of the frame between the vertical rods **32** and **33** of the supporting frame members **14**, as shown in FIGURES 4 and 5.

In making the assembly **10**, the horizontal shelf frames **12** are tilted relative to the horizontal position and the notches **26**, **27**, **28** and **29** are aligned with the vertical rods **32** and **33**, as shown in full line in FIGURE 3. The horizontal frames **12** are then forced downward, as indicated by the arrow **17** in FIGURE 3 towards the horizontal position causing the notches to securely engage and partially encompass the supports **32** and **33**. Pursuant to an important feature of the present invention, each, of the horizontal stiffeners **34** of the support frames **14** is provided centrally thereof with an integral U-shaped portion **18**. The U-shaped portions **18** form expansion elements within the horizontal stiffeners **34** so that when the shelf elements **12** are urged downwardly, as indicated by the arrow **17**, to assume the horizontal or broken position thereof shown in FIGURE 3, the expansion means **18** will expand slightly, as indicated by the arrow **19** in FIGURE 3, thereby increasing the lateral distance be-

tween the horizontal supports 32 and 33 to facilitate the full movement of the shelf element 12 to its normal horizontal position. When the element 12 reaches its normal horizontal position, the expansion means 18 will compress somewhat or reduce its horizontal dimension so as to provide the necessary compressive force to effect a secure coupling between the shelf frames 12 and the support frames 14. In the illustrated horizontal position of the shelf members 12, there is sufficient compressive pressure between the walls of the notches and the supports to prevent dislodgement during normal use, said compressive pressure being aided by the contraction of the expansion unit or means 18 in the stiffener element 34. It should further be noted that the lower ones of each of the pairs of ribs 38 and 39 also bear upon the stiffeners 34 of the vertical frame augmenting the retaining frictional engagement between said ribs and vertical rods 32 and 33.

The disposition of the supports 32 and 33 within the notches prevents longitudinal and transverse movement of the frame. Since the frame is only called upon to resist vertical downward pressure from objects placed on the ribs, it is not necessary to positively restrict upward movement of the frame relative to the supports. However, it will be understood that the tendency for such upward movement is resisted by the compressive force applied by the expansion elements 18 as they tend to contract after the horizontal frame elements 12 reach their full horizontal position.

To dismantle the assembly, it is only necessary to force manually one pair of ribs upward relative to the engaging supports. Such upward pressure causes the frame to tilt relative to the horizontal reducing thereby the frictional engagement between the supports and the ribs. The dimensions of the horizontal frame relative to the support spacing is such that the induced frictional forces can be readily overcome by manual force applied by a person of less than average strength.

FIGURE 6 illustrates the previously described operation of the expansion means 18, it being noted from FIGURE 6 that the U-shaped means 18 moves from its full line to its broken line position as a result of the expansion thereof under the movement, in the direction of the arrow 17, to seat the horizontal shelf 12 in its fully horizontal position.

Pursuant to another feature of the present invention, provision is made to adjust the vertical extent of the vertical supports or rods 32 and 33 so as to adjust the overall height of the shelving unit 10 or to effect the leveling thereof. In this connection, each of the pairs of vertical supports 32 and 33 of each of the supporting units 14 is provided at the lower end thereof with a bracket 45 which is wrapped around the lower end of the vertical supports and which is centrally bowed as at 46 to threadedly receive the threaded shank 47 of a bolt 48 provided with a head 49. It will be readily apparent that the head of the bolt constitutes a foot for the associated end of the support unit 14. It will be readily apparent that the bolt 48 may be rotated as indicated by the arrow 50 so as to thread into or thread out of the bracket 45 for increasing or decreasing the overall height of the associated end of the support member 14.

While I have illustrated and described the presently preferred embodiment of the invention, it will be readily apparent that various changes and modifications may be made therein without however departing from the spirit and scope thereof as set forth in the appended claims.

I claim:

1. In combination, a planar frame having opposing longitudinal, marginal sides and end supports for said frame, each of said sides having end portions provided with notched portions adapted to engage said end supports when the frame is disposed transversely of said supports, said supports including pairs of laterally spaced longitudinal rods having free lower end portions, and adjustable leg means provided on the lower end portions of each pair of rods, said leg means comprising a bracket encompassing each pair of lower end portions and a member threadedly engaged in said bracket.

2. The combination as in claim 1, said bracket having an outwardly bowed portion extending between said lower end portions for the engagement of said threaded member.

3. In combination, a planar frame having opposing longitudinal marginal sides and end supports for said frame, each of said sides having end portions provided with notched portions adapted to engage said end supports when the frame is disposed transversely of said supports, the transverse dimension of each of said supports being less than the transverse dimension of said frame, and means for expanding the transverse dimension of each of said supports to effect secure engagement between said notched portions and said supports, said last-mentioned means being a U-shaped portion provided in said stiffener member between the ends thereof.

4. An assembly comprising a frame and spaced vertical supports, said frame including parallel sides and opposite transverse ends, said sides comprising pairs of spaced ribs, the spacing of the ribs being perpendicular to the plane of the frame, said supports including pairs of vertical rods spaced apart slightly less than the width of the frame from side to side, said pairs of ribs including notches engaged with the vertical rods in a retaining manner so as to provide compressive pressure between the sides and the vertical rods, and means on the vertical supports for expanding the transverse dimension between associated pairs of vertical rods to effect secure engagement between said notched portions and said pairs of vertical rods.

5. An assembly as in claim 4, said expanding means being a stiffener member extending between associated pairs of vertical rods and provided with means to increase the distance between the associated pairs of vertical rods.

6. An assembly as in claim 5, said last-mentioned means being a U-shaped portion provided in said stiffener member between the ends thereof.

7. In combination, a planar frame having opposing longitudinal marginal sides and end supports for said frame, each of said sides having end portions provided with notched portions adapted to engage said end supports when the frame is disposed transversely of said supports, the transverse dimension of each of said supports being less than the transverse dimension of said frame, means for expanding the transverse dimension of each of said supports to effect secure engagement between said notched portions and said supports, and means for adjustably varying the longitudinal extent of said supports, said adjustable means comprising bracket means encompassing said supports adjacent an end thereof and a member threadedly engaged in said bracket means.

8. The combination as in claim 7, each of said supports including a pair of spaced elongated members, and said bracket means having an outwardly bowed portion extending between said members for engagement of said threaded member.

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