

PATENT SPECIFICATION

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- (21) Application No. 8184/77 (22) Filed 23 Feb. 1977
 (31) Convention Application No. 180153 (32) Filed 1 Mar. 1976 in
 (33) New Zealand (NZ)
 (44) Complete Specification Published 26 Sep. 1979
 (51) INT. CL.² F16B 12/20
 (52) Index at Acceptance
 F2M 205 222 276 C2 E
 E1K 1B1E 1B1G 1B1U



(54) FURNITURE AND STRUCTURAL ELEMENTS FOR USE IN FURNITURE

(71) I, ANTHONY CHARLES WORRALLO 15 Sprott Road, Auckland 5, New Zealand, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates generally to furniture such as cabinets and shelving and to structural elements for use in such furniture.

According to one aspect of the present invention there is provided an elongated structural element comprising an elongated structural element comprising in cross-section a web and two spaced apart legs protruding from the web on one side thereof, the inner faces of the legs defining, with said web, a first slot for receiving a panel edge, and at least two ribs protruding from the outer face of one of said legs and defining, with said one leg, a second slot for receiving a panel edge, the free extremity of said one leg having a bead extending continuously therealong, and there being a longitudinally extending, continuous, screw receiving groove in said bead, the groove extending in the direction of elongation of said bead and the mouth of the groove being narrower, than the maximum transverse dimension of the groove.

The free extremity of the inner face of each leg can have a protrusion thereon, the protrusions being continuous along the length of said element and together defining the mouth of said first slot. Preferably one of said ribs forms a continuation of said web beyond said one leg.

In a preferred form there are three ribs which together define two slots. In this form each of said ribs can have a protrusion extending continuously along the free extremity thereof, the centre rib having protrusions extending continuously along both faces thereof, and the outer ribs having similar protrusions projecting towards the protrusions of the centre rib.

The screw receiving groove can be the internal bounding wall of part-circular configuration, said groove extending continuously in the direction of elongation of said element and said internal wall being more than 180° in circumferential extent.

To promote location of a panel with respect to the first slot, one of said legs is preferably longer than the other. In this form said ribs protrude from the outer face of the longer of the two legs.

An element which is useful in the construction of cabinets has one of said legs longer than the other and three ribs which protrude from the outer face of the longer leg, one rib forming a continuation of said web beyond said one leg, a second rib protruding from the free extremity of said one leg and the third rib being between the first and second ribs, the free extremity of the longer leg having a protrusion extending continuously therealong which projects towards the shorter leg, said protrusion and said second rib together forming part of said bead.

The element may be an extrusion of aluminium or an aluminium alloy.

According to a further aspect of the present invention there is provided an article of furniture including elements as described above and panels having the edge portions thereof entered in the slots of said elements.

According to another aspect of the present invention there is provided an article of furniture including elements as described above, panels having the edge portions thereof entered in the slots of said elements, and further panels secured to said elements by means of screws passed through the further panels and into said grooves.

For a better understanding of the present invention reference will now be made, by way of example, to the accompanying drawings in which:-

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Figure 1 is a section through a structural element according to the present invention; and

Figure 2 is a vertical section illustrating an article of furniture fabricated from panels and lengths of structural element as illustrated in Figure 1.

The element 10 as shown in Figure 1 is of generally U-section and comprises a short leg 12, a long leg 14 and a joining web 16. The legs 12 and 14 lie at right angles to and on the same side of, the web 16. The section can be an aluminium extrusion of indefinite length.

The extremity of the short leg 12 tapers as shown at 18 from its outer surface 20 to an edge 22. The inner surface 24 of the leg 12 is parallel to the surface 20 over the greater part of its extent. At said extremity of the leg 12 the surface 24 merges with a radiused protrusion 26 which projects inwardly from the surface 24 towards the leg 14 and extends continuously along the length of the element 10. The surface of the protrusion 26 in turn merges with the edge 22.

The web 16 is provided on its outer surface with a series of ribs, serrations or other formations 28 to provide a decorative face.

The limb 14 has an inner surface 30 which lies parallel to, and is spaced from, the surface 24 of the limb 12. At its free extremity the limb 14 is formed with a protrusion 32 which is similar in shape to the protrusion 26. It will be noted that the protrusion 32 is further from the web 16 than the protrusion 26.

Three ribs 34, 36 and 38 protrude laterally from the leg 14. The rib 34 forms a continuation of the web 16 beyond the leg 14 and the extremity of this rib is formed, on its lower surface, with a rounded protrusion 40. The rib 36 is provided on its free extremity with a protrusion 42 which extends both upwardly and downwardly from the upper and lower surfaces of the rib 36. The third rib 38 has a planar upper surface at the outer extremity of which there is a rounded, upwardly directed protrusion 44. This rib forms part of the boundary wall of a longitudinally extending groove 46 of part-circular cross-section. The groove 46 is intended to receive a screw from each end thereof (as described in more detail hereinafter) and its internal surface extends for substantially over 180° so that a screw entered therein axially cannot be removed by a movement transverse to its axis. Stated another way, the mouth of the groove 46 is narrower than the maximum transverse dimension of the groove.

The ribs 34, 36 and 38 provide between them two slots 48 and 50. The entrances to these slots are defined by the protuberances 40 and 42, and 42 and 44 respectively.

Depending on the intended use of the structural element, one of the ribs 34 or 36

may be omitted, whereby a single slot is provided, or more ribs may be added to provide further slots.

The distance between the legs 12 and 14 where they join the web 16 slightly exceeds the thickness of the panel P which is slid between them. However, the distance between the faces of the protrusions 26 and 32, measured at right angles to the faces of the panel P as shown by the distance X, is slightly less than the thickness of the panel. Because the protrusions 26 and 32 are not directly opposite one another, the true spacing therebetween is as shown at Y which is greater than the thickness of the panel P. Thus a panel can readily be entered between the protrusions in the direction of the arrow A and then can be swung towards the illustrated position so that it lies substantially parallel to the legs. The two protrusions 26 and 32 act at spaced locations against opposite faces of the panel P and, as the distance X is less than the thickness of the panel P, the protrusions press strongly against the panel to provide a force fit. Furthermore, when the panel is pressed fully into the slot between the legs, a turning moment is exerted thereon by the somewhat splayed apart legs 12 and 14. More specifically, there is a force on the panel where it and the protrusion 26 contact one another. A similar force is exerted on the panel where it and the protrusion 32 engage and both these forces tend to turn the panel clockwise (as illustrated in Figure 1). Thus the panel P is pressed against the face 30 of the leg 14 where it joins the web 16. The inclination of the panel with respect to the faces 24 and 30 is exaggerated in Figure 1.

The surface of the web 16 which carries the formations 28 may, if desired, be formed with a longitudinally extending re-entrant opening 52 in which tickets, information strips and the like may be inserted. This opening replaces the formations 28.

The element has been described in a position in which the legs 12 and 14 extend downwardly from the web 16. However, as will be more clearly understood from the description which follows, the element may be used in any spatial condition.

Turning now to Figure 2, an item of furniture in the form of a cabinet 54 is illustrated. The cabinet 54 comprises a top panel 56, a back panel 58, a bottom panel 60, two end panels (only one of these which is referenced 62 being visible) and a pair of sliding doors 64 and 66. Four elements 10 are also employed and these are referenced 10.1 to 10.4.

The elements 10.1 and 10.2 each have a length equal to that of the top panel 56. The longitudinally extending edges of the panel 56 are forced between the legs 12 and 14 as described above so that the legs 12 overlies

the panel 56 and the legs 14 extend inwardly beneath the panel. Because the elements 10.1 and 10.2 are as long as the top panel, both exposed edges of the panel are entirely covered.

As regards the panel 60, this is similarly associated with the elements 10.3 and 10.4. However in this case, it is the legs 14 of the elements 10.3 and 10.4 which overlie the edge portions of the panel 60 and the legs 12 which extend beneath the panel 60.

The side panel 62 is provided with four screw holes, the screw holes being one adjacent each corner thereof. The spacing of each screw hole from the adjacent vertical edge of the panel 62 is greater than the distance from the centre of the screw groove 46 to the outer face of the web 16. Thus when the end panels are secured to the elements 10.1 to 10.4 by screws S passed through the screw holes in the panels and into the screw grooves 46, the end panels protrude slightly forwardly and slightly rearwardly of the web 16.

After one end panel 62 has been secured to the four elements 10.1 and 10.4 the rear panel 58 is slid into the slot 50 of the element 10.1 and the slot 50 of the element 10.3. It will be understood that the rear panel is slid into the slots 50 from the end thereof remote from the panel 62 until the rear panel 58 abuts the secured-on end panel 62.

The next step in the assembly of the cabinet is to slide the doors 64 into the grooves 48 and 50 of the elements 10.2 and 10.4 in the same way that the panel 58 was slid into the grooves 50 of the elements 10.1 and 10.3. The doors 64 and 66 are somewhat over half the length of the rear panel 58 so that, when at opposite ends of the slots 48 and 50, their central portions overlap so as completely to close the front of the cabinet.

The final step in construction of the cabinet is to secure the other end panel 62 in position by means of four more screws S entered in the opposite ends of the screw grooves 46.

The various panels may be differently coloured or textured on their front and rear surfaces. Thus, if it is desired to alter the colour scheme of the cabinet, it is simply necessary to disassemble and reverse the position of all, or some, of the panels.

Two further ribs 68 and 70, as shown in chain-dotted lines in Figure 1, may be added to the leg 12. With this form, when the element 10 is horizontal, with the web 16 vertical there are both upwardly open and downwardly open panel or sliding door receiving slots. Thus this particular element can be used to form book shelving or the like having a plurality of vertically spaced shelves each with a rear panel, end panels and sliding doors for at least some of the

shelves.

WHAT I CLAIM IS:-

1. An elongated structural element comprising in cross-section a web and two spaced apart legs protruding from the web on one side thereof, the inner faces of the legs defining, with said web, a first slot for receiving a panel edge, and at least two ribs protruding from the outer face of one of said legs and defining, with said one leg, a second slot for receiving a panel edge, the free extremity of said one leg having a bead extending continuously therealong, and there being a longitudinally extending, continuous screw receiving groove in said bead, the groove extending in the direction of elongation of said bead and the mouth of the groove being narrower than the maximum transverse dimension of the groove.

2. An element as claimed in claim 1, wherein the free extremity of the inner face of each leg has a protrusion thereon, the protrusions being continuous along the length of said element and together defining the mouth of said first slot.

3. An element as claimed in claim 1 or claim 2, wherein one of said ribs forms a continuation of said web beyond said one leg.

4. An element as claimed in any preceding claim, wherein the free extremity of each of said ribs has along one face a protrusion extending continuously along the length of the element, said protrusions defining the mouth of said second slot.

5. An element as claimed in any preceding claim, wherein there are three ribs which together define two slots.

6. An element as claimed in claims 4 and 5, wherein each of said ribs has a protrusion extending continuously along the free extremity thereof, the centre rib having protrusions extending continuously along both faces thereof, and the outer ribs having similar protrusions projecting towards the protrusions of the centre rib.

7. An element as claimed in any preceding claim wherein the internal bounding wall of the screw receiving groove is of part-circular configuration, said internal wall being more than 180° in circumferential extent.

8. An element as claimed in any preceding claim wherein one of said legs is longer than the other.

9. An element as claimed in claim 8, wherein the said ribs protrude from the outer face of the longer of the two legs.

10. An element as claimed in claim 1, in which one of said legs is longer than the other and three ribs protrude from the outer face of the longer leg, one rib forming a continuation of said web beyond said one leg, a second rib protruding from the free extremity of said one leg and the third rib being

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the panel 56 and the legs 14 extend inwardly beneath the panel. Because the elements 10.1 and 10.2 are as long as the top panel, both exposed edges of the panel are entirely covered.

As regards the panel 60, this is similarly associated with the elements 10.3 and 10.4. However in this case, it is the legs 14 of the elements 10.3 and 10.4 which overlie the edge portions of the panel 60 and the legs 12 which extend beneath the panel 60.

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After one end panel 62 has been secured to the four elements 10.1 and 10.4 the rear panel 58 is slid into the slot 50 of the element 10.1 and the slot 50 of the element 10.3. It will be understood that the rear panel is slid into the slots 50 from the end thereof remote from the panel 62 until the rear panel 58 abuts the secured-on end panel 62.

The next step in the assembly of the cabinet is to slide the doors 64 into the grooves 48 and 50 of the elements 10.2 and 10.4 in the same way that the panel 58 was slid into the grooves 50 of the elements 10.1 and 10.3. The doors 64 and 66 are somewhat over half the length of the rear panel 58 so that, when at opposite ends of the slots 48 and 50, their central portions overlap so as to completely close the front of the cabinet.

The final step in construction of the cabinet is to secure the other end panel 62 in position by means of four more screws S entered in the opposite ends of the screw grooves 46.

The various panels may be differently coloured or textured on their front and rear surfaces. Thus, if it is desired to alter the colour scheme of the cabinet, it is simply necessary to disassemble and reverse the position of all, or some, of the panels.

Two further ribs 68 and 70, as shown in chain-dotted lines in Figure 1, may be added to the leg 12. With this form, when the element 10 is horizontal, with the web 16 vertical there are both upwardly open and downwardly open panel or sliding door receiving slots. Thus this particular element can be used to form book shelving or the like having a plurality of vertically spaced shelves each with a rear panel, end panels and sliding doors for at least some of the

shelves.

WHAT I CLAIM IS:-

1. An elongated structural element comprising in cross-section a web and two spaced apart legs protruding from the web on one side thereof, the inner faces of the legs defining, with said web, a first slot for receiving a panel edge, and at least two ribs protruding from the outer face of one of said legs and defining, with said one leg, a second slot for receiving a panel edge, the free extremity of said one leg having a bead extending continuously therealong, and there being a longitudinally extending, continuous screw receiving groove in said bead, the groove extending in the direction of elongation of said bead and the mouth of the groove being narrower than the maximum transverse dimension of the groove.

2. An element as claimed in claim 1, wherein the free extremity of the inner face of each leg has a protrusion thereon, the protrusions being continuous along the length of said element and together defining the mouth of said first slot.

3. An element as claimed in claim 1 or claim 2, wherein one of said ribs forms a continuation of said web beyond said one leg.

4. An element as claimed in any preceding claim, wherein the free extremity of each of said ribs has along one face a protrusion extending continuously along the length of the element, said protrusions defining the mouth of said second slot.

5. An element as claimed in any preceding claim, wherein there are three ribs which together define two slots.

6. An element as claimed in claims 4 and 5, wherein each of said ribs has a protrusion extending continuously along the free extremity thereof, the centre rib having protrusions extending continuously along both faces thereof, and the outer ribs having similar protrusions projecting towards the protrusions of the centre rib.

7. An element as claimed in any preceding claim wherein the internal bounding wall of the screw receiving groove is of part-circular configuration, said internal wall being more than 180° in circumferential extent.

8. An element as claimed in any preceding claim wherein one of said legs is longer than the other.

9. An element as claimed in claim 8, wherein the said ribs protrude from the outer face of the longer of the two legs.

10. An element as claimed in claim 1, in which one of said legs is longer than the other and three ribs protrude from the outer face of the longer leg, one rib forming a continuation of said web beyond said one leg, a second rib protruding from the free extremity of said one leg and the third rib being

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- between the first and second ribs, the free extremity of the longer leg having a protrusion extending continuously therealong which projects towards the shorter leg, said protrusion and said second rib together forming part of said bead.
11. An element as claimed in preceding claim, wherein the face of the web remote from said legs includes longitudinally extending ribs and grooves to decorate said web.
12. An element as claimed in any one of claims 1 to 10, wherein the face of said web remote from said legs has a longitudinally extending re-entrant groove therein.
13. An element as claimed in any preceding claim which is an extrusion of aluminium or an aluminium alloy.
14. An article of furniture including elements as defined in any preceding claim and panels having the edge portions thereof entered in the slots of said elements.
15. An article of furniture including elements as claimed in claim 7 or claim 10, panels having the edge portions thereof entered in the slots of said elements, and further panels secured to said elements by means of screws passed through the further panels and into said grooves.
16. An elongated structural element substantially as hereinbefore described and as illustrated in Figure 1 of the accompanying drawing.
17. An article of furniture substantially as hereinbefore described and as illustrated in Figure 2 of the accompanying drawing.

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Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1979.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.