

Nov. 9, 1965

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3,216,170

EXTRUDED METAL SUPPORT FRAME

Filed Aug. 28, 1962

3 Sheets-Sheet 1

FIG. 1.

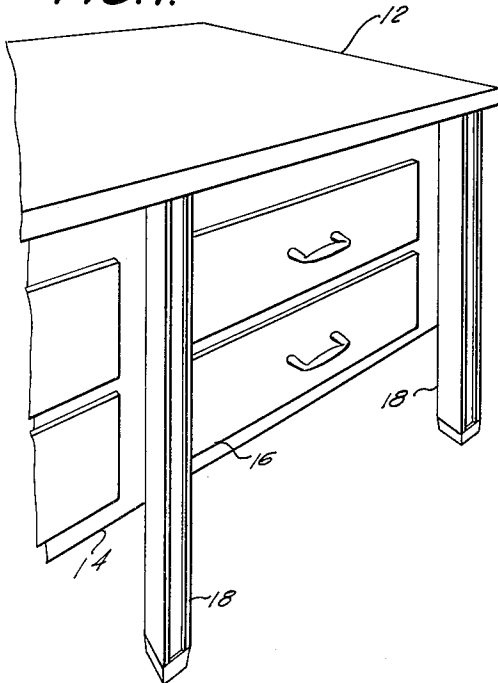


FIG. 2.

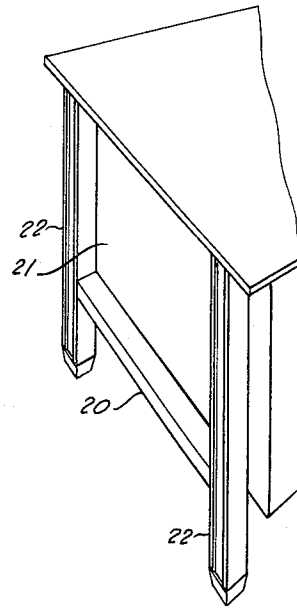
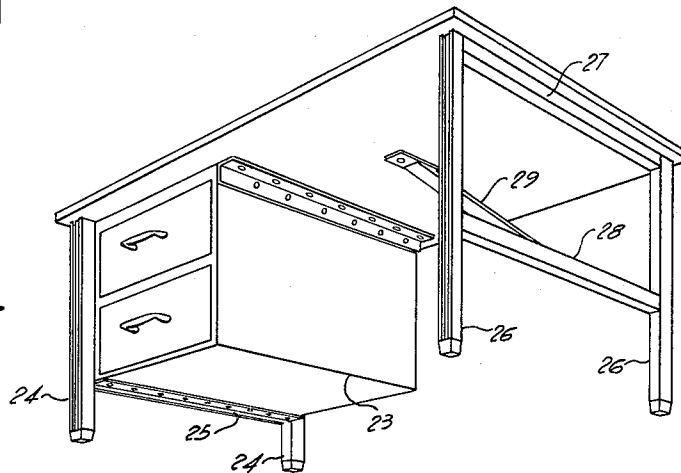


FIG. 3.



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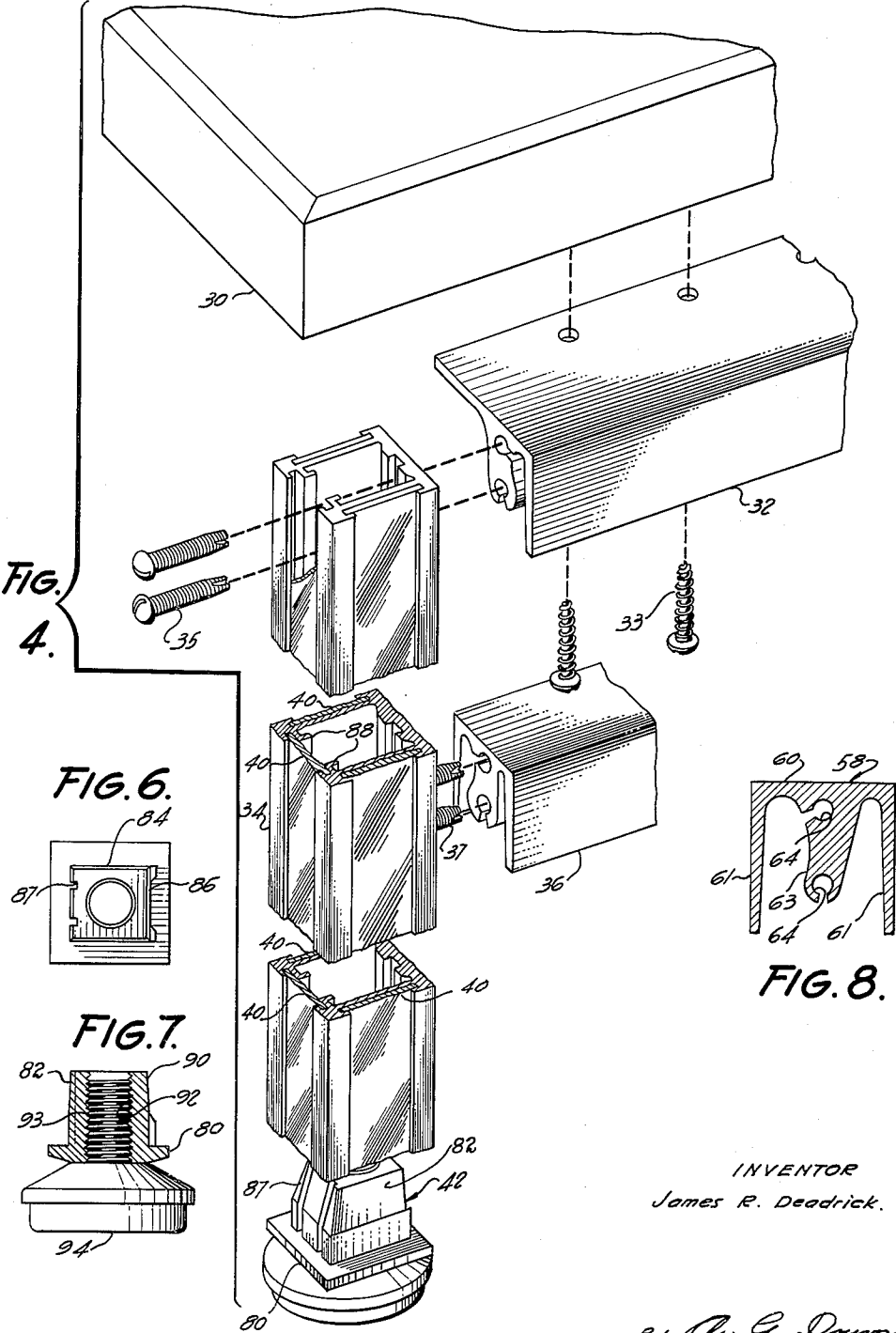
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FIG. 9.

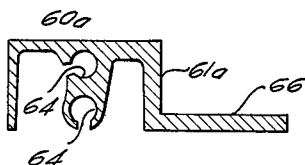


FIG. 10.

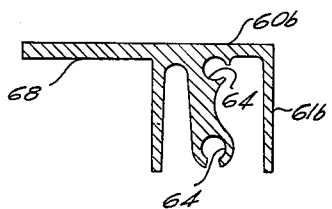


FIG. 13.

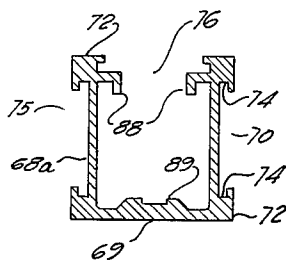


FIG. 11.

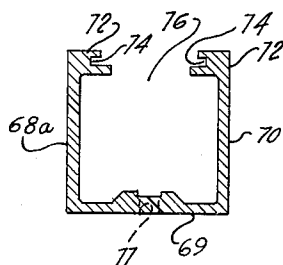


FIG. 5.

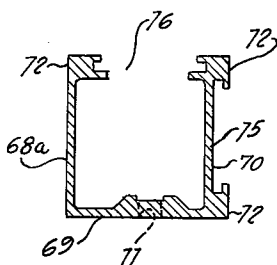
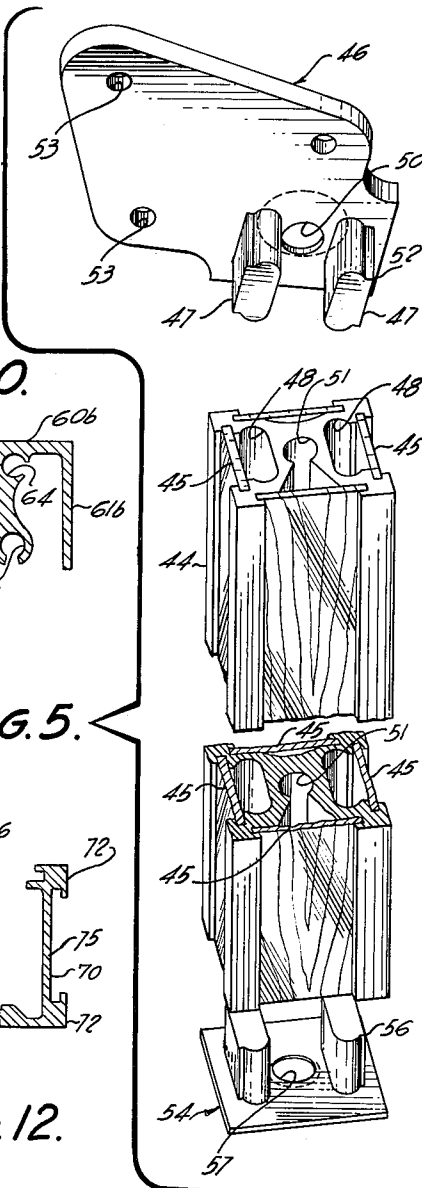


FIG. 12.



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EXTRUDED METAL SUPPORT FRAME

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Filed Aug. 28, 1962, Ser. No. 219,887
4 Claims. (Cl. 52-731)

This invention relates to the manufacture of furniture, and more particularly, to the use of extruded metal members for forming the support frames thereof.

In the design of furniture and especially that area directed to office furnishings, there has been an increase in the use of desks, tables, chairs, etc., having support frames constructed of metal rather than wood. Most of such office furnishings have support members including H frames or the like formed of steel tubings welded together. The welded tubing, without polishing, is seldom clean, but has unsightly, irregular surfaces at the weld point and the adjacent sides thereof. This decreases the overall aesthetic appeal of the structure after assembly. Surface finishing or polishing of the irregularities after assembly is quite costly, since automatic machine operation requires numerous particular machine expenditures while manual operation produces abnormally high labor charges. Furthermore, steel construction actually does not hold up as well as some of the furniture manufacturers would like.

As a result, the designers have departed from the ferrous metals and have gone into the nonferrous metals, such as brass and aluminum. In the change to the nonferrous metals, added considerations must be given to securing the members together. This is because of the normal inability to weld nonferrous materials and the disinclination to detract from the ornamental value of the assembly with exposed connecting means such as screws, bolts, or separate coupling members.

It is, therefore, a primary object of this invention to provide an improved metal support frame for an article of furniture, in which the individual members are formed of non-ferrous extrusions.

It is a further object of this invention to provide an improved support frame having individual single element, non-ferrous extrusions joined together, and in which the joints between the elements are relatively clean and free, and formed without the requirement for welding.

Another object of this invention is to provide an improved furniture support frame of non-ferrous extrusions, in which mounting means at the opposite ends of each extrusion are adapted for easy connection to a caster or glide and to the structure to be supported.

It is a further object of this invention to provide an improved supporting frame formed of aluminum extrusions in which the connecting means between the separate extrusions are completely hidden to provide increased aesthetic appeal.

In this regard, there is an increasing demand for and use of modern office furniture and the like having aesthetic qualities as well as the traditional utilitarian appeal. In achieving this object, furniture designers often make use of composite supporting frame members incorporating elements with contrasting metal finishes, contrasting painted surfaces, or elements formed of different materials, such as metal and plastic or metal and wood.

It is, therefore, a further object of this invention to provide an improved supporting frame constructed primarily of non-ferrous extrusions in which means are provided for attaching separate panel members of contrasting finish to the extrusions or standards of the frame to enhance the overall appearance of the frame.

It is a further object of this invention to provide an improved supporting frame composed primarily of non-

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ferrous extrusion members including contrasting decorative panels in which the connections between the extrusion members are extremely simple, involve a minimum number of parts, and are completely hidden by the contrasting panels.

In order that these and other objects may be more fully appreciated reference is herein made to the following drawings, wherein:

FIGS. 1, 2 and 3 are perspective views of typical furniture constructions using the subject frame supports.

FIG. 4 is an exploded perspective view of a vertical support member including an end plug and various horizontal cross-support members, as used with a supported object;

FIG. 5 is an exploded perspective view of another vertical support member including an end plug and an end mounting plate;

FIG. 6 is a top plan view of an end plug adapted to be received in the lower end of the vertical support member of the embodiment of FIG. 4;

FIG. 7 is a longitudinal center section of the plug of FIG. 6 shown as combined with a caster glide device;

FIGS. 8, 9 and 10 are cross-sectional views of various cross-members used in the subject frame supports; and

FIGS. 11, 12 and 13 are cross-sectional views of various support members adapted to be used, respectively, with 1, 2 and 3 panel inserts.

In general, the present invention teaches the utilization of single element, non-ferrous, extruded members acting either separately or integrally as a supporting frame for an article of furniture. The extruded members are generally rectangular in exterior shape, including spaced corner portions. A recess is defined between a pair of opposed slots formed within adjacent corner portions, the slots being generally parallel to the corner portions and spaced inwardly therefrom. The slots and recess act to receive cooperating, longitudinally extending panel members or inserts which can be formed of a like metal, a different metal, plastic or wood and can have identical or contrasting finishes. The panel inserts provide a very pleasing overall appearance to the frame member and at the same time act to cover the means connecting the vertical frame member to cross-supports, base elements, or the element supported by the vertical frame member. Plug means, which can aid in supporting a glide or caster within the bottom of the vertical frame member, also prevents the inserted panels from sliding out the bottom of the slots.

Referring to the drawings, there is shown in FIGS. 1-3 various articles of furniture employing different types of frame supports. For instance, FIG. 1 shows a desk construction having a top 12 supported on a cabinet portion 14 which includes slidable spaced drawers 16. Vertical support members or legs 18 are secured by bolting directly to the sides of the cabinet 14. FIG. 2 shows an embodiment similar in part to that of FIG. 1 except cross-support 20 is shown which has a projecting ledge upon which the cabinet 21 of the desk rests. Thus the vertical support members or legs 22 of the desk are maintained spaced from the sides of the cabinet and are generally independent structurally therefrom. FIG. 3 shows the underside of a desk construction similar in part to FIG. 2 including a cabinet 23, legs 24, and lower cross-support member 25, while it further shows a pedestal frame having spaced vertical members 26, and top and intermediate cross-members, 27 and 28 respectively. A diagonal support member 29 can be provided if desired to add rigidity to the unit.

It is thus seen that many furniture types are possible. The cabinet can be supported directly to the vertical support members, suspended from the top, supported by

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the cross-support members, or any combination of these. The particular constructions shown do not form the subject matter of the present invention but are merely illustrative of where and how the subject frame supports can be used.

Of importance to the present invention is the utilization of single element support members formed as continuous non-ferrous extrusions of a metal such as aluminum. These members are given particular desired configuration to accommodate removable panels in any desired arrangement to produce the desired exterior appearance. This can be varied by varying the number and/or arrangement of the removable panels and/or by blending or contrasting surface finishes and/or colors.

The method of incorporating typical single element extrusions into a frame support can be readily seen by reference to the exploded perspective view of FIG. 4. The embodiment includes a supported top 30, a horizontal cross-member 32 adapted to be secured by means of the bolts 33 to the top, a vertical support member 34 adapted to be secured to the horizontal cross-member 32 by bolts 35 and an intermediate horizontal cross-member 36 adapted to be secured to the vertical support member 34 by bolts 37. The vertical support member 34 is adapted to receive in three of its four sides removable panel member 40. The top of the vertical support member or leg 34 is adapted to be flush with the underside of the top 30. The panels 40 similarly flush with top 30 are adapted to be inserted into the lower end of the leg and be maintained therein by means of a plug member 42 press-fitted into the leg opening.

FIG. 5 shows a vertical support member 44 adapted to hold a removable panel 45 in each of its four sides. A top mounting base member 46 is adapted to be positioned on the upper end of the vertical support member 44 by means of male plugs 47 being received within complementarily interior contours 48 of the support member. The base member 46 is secured to the leg 44 by means of a self-tapping screw or the like (not shown) inserted through opening 50 in the plate into the hollow core 51 in the leg. The self-tapping screw can have a tapered head which, when received in the counter-sunk opening 50 is flush with the top surface of the member 46. The base member 46 is used to secure the vertical support member 44 directly to the underside of a supported top (not shown). The particular embodiment shown has two adjacent edges 52 which are aligned with the corners of the vertical support member for flush exposure as on an open corner of a table. Other shapes are possible, as when the plate will be hidden, such as making the plate symmetrical of the through-opening 50. The base plate is supported by means of bolts (not shown) through the openings 53 to the underside of the supported top. A plug member 54 having similar male plugs 56 and opening 57 as member 46 is secured to the lower open end of the vertical support member 44.

FIG. 8 shows one embodiment of a cross-member 58 which could be used for example at 28 or 36 previously-mentioned. The cross-member 58 has three walls including the top wall 60 and the two side walls 61. A center core portion 63 extends from the top wall 60 longitudinally of the extrusion and is formed with a pair of longitudinal bores 64. The bores 64 are adapted to receive the self-tapping screws as for example 35 and 37 previously-mentioned to secure the cross-member 58 to the vertical support member. In such a relationship the screw members draw the cross-member in a tight flush fit against the vertical support member with sufficient force to produce a highly stable assembly.

FIGS. 9 and 10 show a slight modifications of the cross-members shown in FIG. 8 including a ledge projecting from the structure operable for direct connection to or support of the supported member. Thus FIG. 9 shows a projection 66 extending from the lower end of side wall 61a which can have particular application as a cross-

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member such as 20 in FIG. 2 or 25 in FIG. 3. FIG. 10 shows a projection 68 extending from the juncture of the top wall 60b and the side wall 61b, the cross-member having particular adaptability as at 27 in FIG. 3. In addition to the easy direct connection to supported article, the lateral projection increases the support capacity of the cross-member for adding rigidity to the assembled H-frame.

FIGS. 11-13 show in cross-section specific embodiments of the vertical frame member for use, respectively, with one, two and three removable panel members. The various members can be used separately or can be coupled to a cross-support member to form a frame structure. In each, the general cross-section of the member is U or C-shaped and includes three longitudinal walls 68a, 69 and 70. Corner portions 72 are formed on the ends of the various walls and define opposed slots 74 therebetween open to a recess 75 disposed inwardly of the corner portions. Each pair of opposed slots 74 is adapted to receive one of the removable panel members such as 40 and 45, previously-mentioned. It is readily apparent that the connection screws such as 35 and 37 can be inserted from the open side 76 of the cross-section through an opening such as 77 shown in FIGS. 11 or 12 in the intermediate wall 69.

When assembled, the upper end of the vertical support member contacts the lower surface of the supported member. Similarly, the upper end of the inserted panel member is in contact with the lower surface of the supported member. The various components are sequentially fabricated, such as the H-frame is assembled including the particularly desired cross-members and as held together by the screw members through the vertical member into the core of the cross-member. The frame is secured to the supported structure and the removable panel members are inserted into the opposing slots in the manner as desired. The panel members are maintained in assembly by the plug members inserted into the open lower end of the vertical support member. The plug member is formed in any conventional manner with the base portion having an outside dimension overlapping the portion of the slot occupied by the panel member.

The vertical support member, as in FIGS. 11, 12 and 13, having a hollow center portion, can readily receive a plug member 42 as shown in FIGS. 6 and 7. A peripheral flange or ledge 80 of equal dimension as the vertical support member thereby overlaps and supports the panel members in place. The plug member 42 has upward projection 82 adapted to blend with and frictionally engage the inner contours of the vertical support member. Thus as shown in FIGS. 4, 6 and 7, the plug member 42 has generally flat opposing sides 84 and opposing dish-out contour 86 and slotted contours 87. The webs 88 on the vertical support member thus can be received within the slots 87 while the raised center portion 89 on intermediate wall 69 is received complementarily within the contour 86. A slight converging taper as shown at 90 is included at the upper end of the projection 82 to assist in initial aligning and positioning thereof within the open lower end.

The plug member can further include a centerbore 92 through which can pass and be attached in some conventional manner the pintle 93 of a caster or caster glide device 94 such as is shown in FIG. 4 and FIG. 7. Thus the plug member 42 can be used to support a caster glide in addition to maintaining the panel members in place.

Of great importance to the present invention is the fact that after a coupling is made between the various support members the mere insertion of the cooperating panel member 40 in the slots hides the screws or connections from view. This thus presents an improved overall appearance of a fabricated frame support.

In summary the present invention provides an arrangement in which all of the frame members are extruded of aluminum or other non-ferrous metal. The connection joints including the locking bolt means or the like be-

tween joined members are completely hidden by panel members. The panel members can be made of wood, plastic, a blending or contrasting metal, or of any desired finish or color to complement or contrast the decorative and easily changeable overall appearances. Thus for instance a satin finish could be provided on aluminum extrusions while stainless steel panels used on the slotted areas.

While there has been shown and described the fundamental novel features of the invention as applied to the preferred embodiments, it will be understood that various omissions, substitutions and changes in the details can be made without departing from the teachings of the invention. For instance while the extruded frame members have been shown as being generally rectangular in shape with the edges relatively square, rounded edges or extrusions having overall appearance of being round could be used. It is also possible that the particular overall configuration could be varied to elliptical or circular form, rather than rectangular. It is the intention, therefore, that the invention be limited only by the following claims.

What is claimed is:

1. A furniture assembly comprising a plurality of spaced apart standards of extruded metal having a substantially U-shaped cross-section with an elongate slot adjacent the end of each side leg with the slot in each side leg opening in the direction of the other side leg and in opposing relationship to the slot in the other side leg, elongate crosspieces with each crosspiece located between a respective pair of standards, means on the back leg of each standard fastening a respective crosspiece thereto, and a continuous panel member for each standard of substantially the same length as the respective standard inserted between the opposing slots on each standard whereby said fastening means are camouflaged and a plurality of four-sided standards are formed supporting said furniture assembly.

2. A furniture assembly comprising a plurality of pairs of longitudinally extending U-shaped standards for supporting a top planar wall, extended cross members with each cross member located between a respective pair of standards, a passageway in the back wall of each standard, fastening means inserted between the side legs of said standards and through the passageway fastening each cross member between the respective pair of standards, a pair of opposed recessed elongated wall sections on the ends of said side legs of each standard, and a panel member for each standard of a continuous length substantially equal to the length of the respective standard received in said recessed wall sections camouflaging said passageway in the back wall and said fastening means.

3. A desk comprising a plurality of spaced apart standards of extruded metal having a substantially U-

shaped cross-section with a pair of elongate opposing slots adjacent the outer surface of each side leg and a third slot adjacent the end of each side leg with said third slot on each side leg opening in the direction of the other side leg whereby said third slots face each other, spaced apart extruded crosspieces, means on the back leg of each standard fastening a respective crosspiece thereto, a panel member inserted between each pair of opposing slots, and a panel member inserted between the facing slots adjacent the end of each leg whereby the said fastening means are camouflaged while the appearance of said standards is uniformly enhanced, each panel member having a continuous length equal to the length of the respective standard, a plug for each standard frictionally engaged between said side legs at the lower end of each standard, and a flange on each plug engaging the lower end of each associated panel retaining said panels in position in the respective slots on retraction of the respective standard from a support surface.

4. A desk comprising a plurality of spaced apart standards of extruded metal having a substantially U-shaped cross-section with an elongate slot adjacent the end of each side leg opposing the slot in the respective other side leg, spaced apart extruded crosspieces, means on the back leg of each standard fastening a respective crosspiece thereto, a panel member inserted between each pair of opposing slots to camouflaging said fastening means, inwardly projecting webs on the side legs of each standard, a plug for each standard having an irregular tapered periphery in which slots are formed frictionally engaging said inwardly projecting webs at the lower end of the respective standard, a flange on each plug engaging the lower end of the associated panel retaining the associated panel in position in the respective slot on retraction of the standard from a supporting surface.

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