March 19, 1963 C. O. LARSON 3,082,025

FOLDING TABLE LEG BRACKETS

Filed Dec. 22, 1960 2 Sheets-Sheet 1

FIG. 1

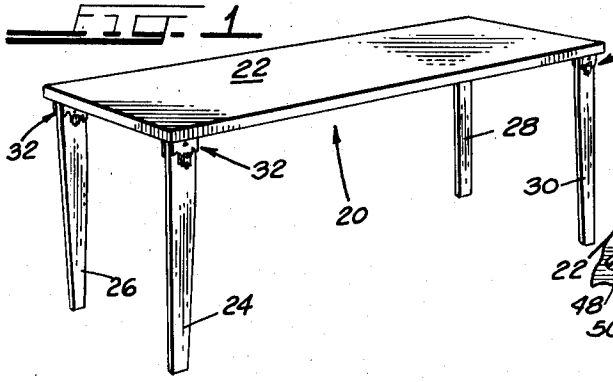


FIG. 2

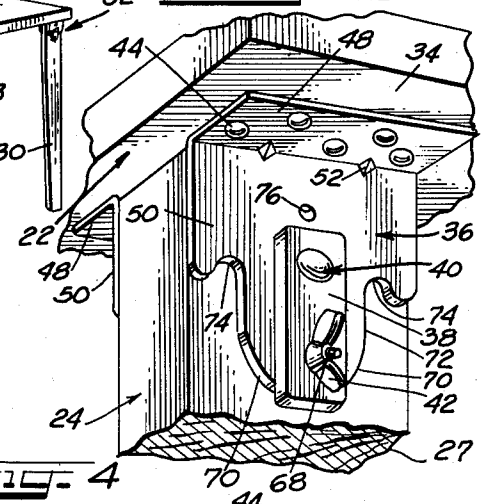


FIG. 3

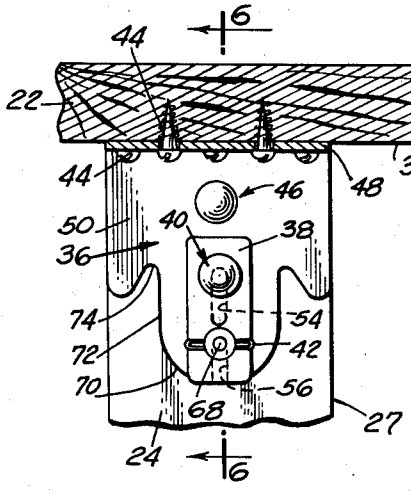


FIG. 4

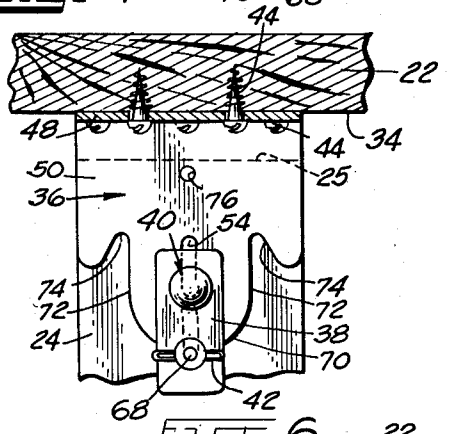


FIG. 5

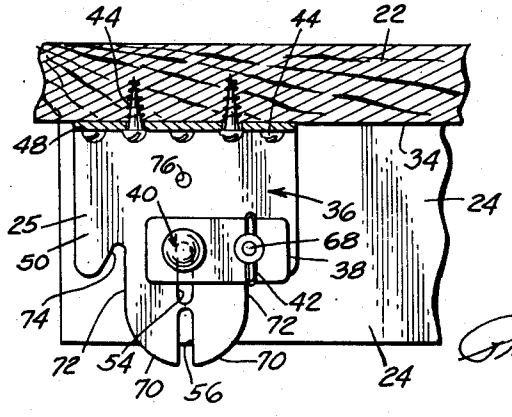
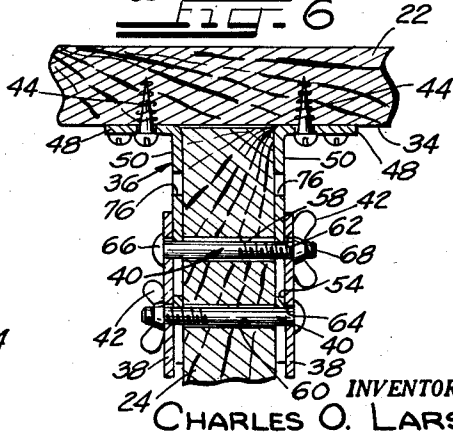


FIG. 6



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FOLDING TABLE LEG BRACKETS

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FIG. 7

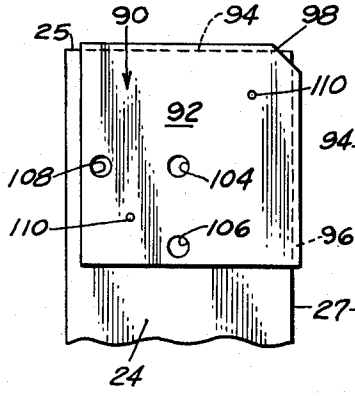


FIG. 8

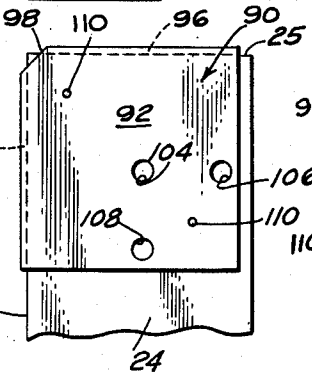


FIG. 9

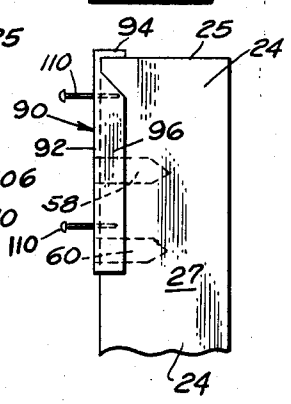


FIG. 10

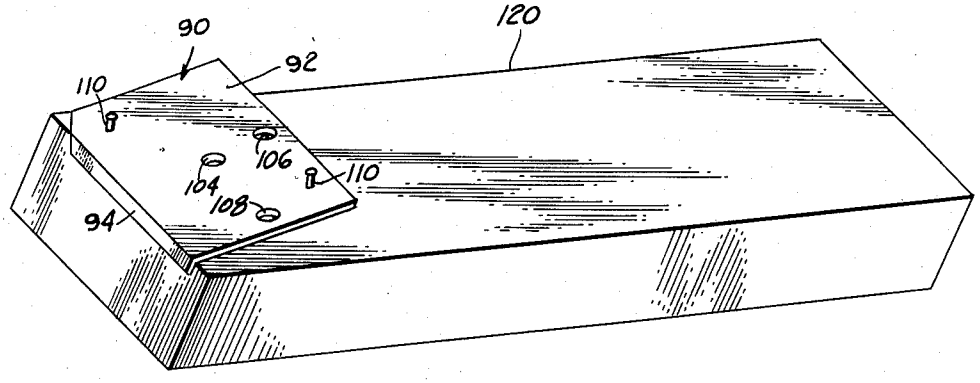
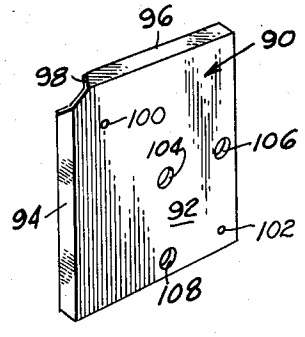


FIG. 11



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United States Patent Office 3,082,025
Patented Mar. 19, 1963

3,082,025

FOLDING TABLE LEG BRACKETS

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Filed Dec. 22, 1960, Ser. No. 77,633
4 Claims. (Cl. 287—14)

This invention relates to a bracket structure for connecting legs to the under surface of supports such as a table top, and more particularly to a bracket assembly which is adapted in one arrangement to hold the leg in a rigid non-folding and supporting position with respect to the table top, in another arrangement to permit folding the leg with respect to the table top, and in yet another arrangement to permit the placement of the leg a variable distance from the table top to achieve a leveling action.

It is an important object of the present invention to provide an improved bracket and bracket assembly of the type set forth for connecting legs to the under surface of a flat support such as a table top and the like.

Another object of the invention is to provide a bracket assembly of the type set forth which can be assembled with suitable bolts to hold an associated leg in a rigid and non-folding position with respect to the associated table top, the distance between the upper end of the leg and under surface of the top being adjustable to achieve a leveling action.

Still another object of the invention is to provide an improved bracket assembly of the type set forth which in addition to being suitable to hold a leg in a rigid non-folding position can also support a leg in a folded position with respect to an overlying associated table top.

A further object of the invention is to provide an improved bracket assembly of the type set forth which more firmly clamps the associated leg in the adjusted position thereof.

A still further object of the invention is to provide an improved template for and method of guiding and positioning the formation of holes in the upper end of a leg to receive bolts therethrough in the assembly of the improved bracket assembly.

These and other objects and advantages of the invention will be better understood from the following description when taken in conjunction with the accompanying drawings. In the drawings, wherein like reference numerals have been utilized to designate like parts throughout:

FIGURE 1 is a perspective view of a table top having four supporting legs mounted thereon by means of the improved bracket assembly of the present invention;

FIG. 2 is a perspective view with certain portions broken away of the underside of the table top of FIG. 1 and showing the improved bracket assembly of the present invention mounted thereon and supporting a table leg in operable position thereunder, all in accordance with and embodying the principles of the present invention;

FIG. 3 is a side elevational view of the bracket assembly illustrated in FIG. 2, the leg being shown in the supporting position;

FIG. 4 is a view similar to FIG. 3 and illustrating the manner in which the improved bracket assembly permits adjustment of the position of the end of the leg with respect to the underside of the table top to achieve a leveling action;

FIG. 5 is a view similar to FIG. 3 and showing the leg in the folded position and locked therein by means of the bracket assembly;

FIG. 6 is a view in vertical section through the bracket assembly illustrated in FIG. 3 substantially as seen in the direction of the arrows along the lines 6—6 thereof;

FIG. 7 is a side elevational view illustrating the template of the present invention in position upon one side of a leg of the table in FIG. 1 to indicate the proper position to form the bolt holes therein;

FIG. 8 is a view similar to FIG. 7 and illustrating the application of the template to the other side of the leg of the table of FIG. 7;

FIG. 9 is a side view of the assembly of FIG. 7 as viewed from the right-hand side thereof;

FIG. 10 is a view similar to FIG. 7 and illustrating the application of the template to a slanting leg; and

FIG. 11 is a perspective view of the template illustrated in FIGS. 7 through 10 of the drawings.

There is shown in FIG. 1 of the drawings a table generally designated by the numeral 20 including a table top 22 and four legs 24, 26, 28 and 30 which are connected to the table top 22 by means of a bracket assembly generally designated by the numeral 32 and made in accordance with and embodying the principles of the present invention. The table top 22 is a planar support member having an upper flat surface and a lower flat surface 34 (see FIG. 2) on which are mounted the bracket assemblies 32. Each of the bracket assemblies 32 includes a pair of identical brackets 36, a pair of identical clamping and leveling straps 38, a pair of bolts 40, a pair of wing nuts 42 engaging the threaded ends of the bolts 40, and a plurality of screws 44 used to mount the brackets 36 on the underside 34 of the table top 22. There also may be provided an optional bolt 46 and an associated wing nut (not shown), see FIG. 3 of the drawings.

Each of the brackets 36 comprises an attachment flange 48 with one edge formed integral with a side plate 50, the flange 48 and the side plate 50 being disposed perpendicular to each other. The attachment flange 48 has a plurality of apertures formed therein, five such apertures having been shown for purposes of illustration, to receive therethrough suitable fasteners such as the wood screws 44 which connect the bracket 36 to the overlying support surface 34. Preferably, the junction between the attachment flange 48 and the side plate 50 is reinforced by means of several reinforming ribs 52.

Referring to FIG. 6 of the drawings, it will be seen that the two brackets 36 are positioned apart a distance such as to receive the upper end of a leg such as the leg 24 therebetween. In order to connect the leg 24 to the brackets 36 a first elongated slot 54 is formed in the side plate 50 and has the longitudinal axis thereof disposed substantially perpendicular to the attachment flange 48 and to the underside 34 of the associated table top 22, the slot 54 being closed at both ends thereof. A second elongated slot 56 is provided in alignment with the slot 54 and has the lower end thereof open as can best be seen in FIGS. 5 and 6 of the drawings. The leg 24 has a first hole 58 therethrough adjacent to the upper end thereof and generally centrally thereof as viewed in FIG. 5 and a second hole 60 is formed therein and disposed below the hole 58 with the axes of the holes in alignment and the centers of the holes disposed in a line in general parallelism with the longitudinal axis of the leg 24. Each of the clamping straps 38 has a pair of aligned apertures 62 and 64 formed therein and having the centers thereof spaced apart a distance equal to the distance between the centers of the holes 58 and 60, whereby the upper bolt 40 is adapted to extend through the aligned apertures 62 in the clamping straps 38, the aligned slots 54 in the side plates 50 and the upper hole 58 in the leg 24 as can be best seen in FIG. 6 of the drawings. Likewise the lower bolt 40 extends through the aligned apertures 64 in the clamping straps 38, the aligned slots 56 in the side plates 50 and the lower hole 60 in the leg 24 as is also illustrated in FIG. 6 of the drawings.

Each of the bolts 40 includes an enlarged head 66 engaging against the outwardly disposed surface adjacent to the clamping straps 38 and has the outer end thereof threaded as at 68 threadedly to receive the wing nuts 42.

The slots 54 and 56 are arranged so that the upper ends thereof are spaced apart a distance equal to the spacing between the two bolts 40 and the lengths of the two slots 54 and 56 are such that when the upper bolt 40 is at the lower end of the slot 56 as viewed in FIG. 5, for example, the lower bolt is beyond the lower edges of the slot 56 and is in a position such that the parts can be pivoted about the upper bolt 40. The lower edges of the side plates 50 are rounded as at 70 and have a radius of curvature slightly less than the distance between the two bolts 40, and the center thereof at the lower end of the upper slot 54 so that the parts can be moved to the position illustrated in FIG. 5 of the drawings. It will be noted that the lower ends of the side plates 50 are formed symmetrical in this respect whereby the leg can be folded in either direction. After the leg has been folded into a position parallel to the under surface 34 of the table top 22, it is desirable to move the leg 24 upwardly so that one of the longitudinal edges thereof is in engagement with and lies against the under surface 34 of the table top 22. The lower end of each side plate 50 is accordingly provided with a pair of parallel sides 72 which are formed tangential with respect to the curved edges 70. There is formed in alignment with the upper end of the elongated slot 44 a pair of notches 74, the notches 74 being spaced from the elongated slot 54 to receive the lower bolt 40 therein when the leg 24 is in the position illustrated in FIG. 5 of the drawings.

When it is desired that the leg 24 be positioned in the vertical supporting position illustrated in FIGS. 1 and 2, the bolts 40 are positioned in the upper ends of their respective slots 54 and 56 and the position of the holes 58 and 60 in the leg 24 insure that the upper end 25 of the leg 24 is adjacent to the under surface 34 of the table top 22. By tightening the wing nuts 42 upon the threaded ends 68 of the bolts 40, the leg 24 can be clamped in this vertical supporting position. More specifically, the heads 66 and the wing nuts 42 press against the clamping straps 38 which in turn press against the side plates 50 to urge the side plates 50 into firm gripping engagement with the sides of the upper end of the leg 24, thereby to hold the leg 24 in this position. The straps 38 materially aid in providing a firm grip upon the leg 24 and serve to distribute the clamping force exerted by the bolts 40 and particularly the heads 66 and the associated wing nuts 42 whereby a maximum clamping effect is produced by the force derived therefrom.

In fact, the clamping force developed by use of the clamping straps 38 in cooperation with the bolts 40 is sufficiently great that the leg 24 can be placed in a vertical adjusted position other than that in which the upper end 25 of the leg is adjacent to the under surface 34 of the table top 22. As illustrated in FIG. 4 of the drawings, the bracket assembly 32 is operative to hold the leg 24 in a vertical supporting position even when the lowermost bolt 40 is disposed between the ends of the slot 56, the necessary clamping action being provided by the clamping straps 38 in combination with the bolts 40 and the side plates 50. The ability thus to adjust the position of the upper end 25 of the leg 24 with respect to the table top 22 permits the leg 24 to be used to "level" the table 20 thereby to compensate for minor variations in the lengths of the four legs 24, 26, 28 and 30. The clamping straps 38 also serve more firmly to hold the leg 24 in the folded position illustrated in FIG. 5 of the drawings.

If it is desired to mount the leg 24 so that it cannot be folded with respect to the table top 22 whereby to provide a more rigid leg structure, an additional aperture (not shown) may be provided in the upper end of the leg 24 in alignment with openings 76 formed in each of the side plates 50. Each opening 76 is aligned horizontally in the center of the associated side plate 50 and is positioned upwardly toward the juncture of the attachment flange 48 and the side plate 50. More specifically, the opening 76 may be arranged in longitudinal alignment with the slots 54 and 56. The aligned openings 76 and the associated apertures in the upper end of the leg 24 can receive therethrough the bolt 46, the bolt 46 being provided at the other end with a threaded portion to receive a wing nut (not shown). This assembly will serve firmly and permanently to mount the leg 24 in a rigid non-folding position with respect to the table top 22.

When it is desired to fold the leg 24 from the position illustrated in FIGS. 2, 4 or 6 to that illustrated in FIG. 5, the wing nuts 42 are first loosened and if a bolt 46 is in position through the openings 76, the bolt 46 is removed. This permits the leg 24 to be dropped to a position in which the upper bolt 40 is at the lower end of the upper slot 54 and the lower bolt 40 is beyond the edges of the open ended slot 56. The leg 24 can now be moved to the position illustrated in FIG. 5 by pivoting the leg about the upper bolt 40, the lower bolt 40 riding along one of the curved edges 70 of the side plate 50 and up one of the straight portions 72 thereof. Thereafter the leg 24 is urged bodily and in a rectilinear manner toward the under surface 34 thereby to move the upper bolt 40 to the upper end of the slots 54 and the other bolt 40 into one of the aligned pairs of notches 72. The leg 24 can be held in this folded position by simply tightening the wing nuts 42 upon the bolts 40 to exert a clamping pressure upon the clamping straps 38 which in turn press against the side plates 50 to cause them to grip the sides of the leg 24.

From the above description of the cooperation and interaction between the bracket assembly 32 and the associated leg 24, it is clear that it is necessary properly to position the holes 58 and 60 in the leg 24. To this end an improved marking template has been provided, the template being designated by the numeral 90 and illustrated in FIGS. 7 through 11 of the drawings. Referring particularly to FIGS. 7, 9 and 11 of the drawings, it will be seen that the template 90 includes a generally flat and planar body 92 that is generally square in shape and is provided with two edges disposed perpendicular to each other and provided with flanges 94 and 96, respectively, having the planes thereof disposed perpendicular to each other. The body 92 is cut away at the corner adjacent to the flanges 94 and 96 as at 98 to insure that the flanges 94 and 96 can rest firmly against the associated edges of a leg such as the leg 24. Two small holes 100 and 102 are formed in the body portion 92 to receive therethrough positioning nails or screws useful temporarily to hold the template 90 in operative position with respect to the associated leg, the holes 100 and 102 being disposed on a diagonal line through the corner of the body 92 which is cut as at 98 and bisecting the angle between the planes of the flanges 94 and 96. A first aperture 104 is formed on the body 92 also on the diagonal line through the corner cut at 98 bisecting the angle between the flanges 94 and 96 and positioned from the flanges 94 and 96 a distance equal to substantially one-half of the width of the associated leg with which the template is to be used. A second aperture 106 is provided spaced from the aperture 104 and having the center thereof on a line perpendicular to the flange 94 and passing through the center of the aperture 104. The distance between the centers of the apertures 104 and 106 is at least 0.414 times the distance of the center of the aperture 104 from the flanges 94 and 96, and the distance between the center of the aperture 106 and the adjacent flange 96 being equal to the distance of the center of the aperture 104 of the flange 96. A third aperture 108 is also formed in the body 92 and the center thereof together with the center of the aperture 104 defines a line per-

pendicular to the flange **96** and the distance between the centers of the apertures **104** and **108** is also at least 0.414 times the distance between the center of the aperture **104** and the flanges **94** and **96**.

In using the template **90** to form the holes **58** and **60** in the leg **24**, one of the flanges such as the flange **94** is pressed against the end **25** of the leg **24** that is to be disposed toward the table top **22** and the other of the flanges such as the flange **96** is pressed against the edge **27** of the leg **24** that is to be disposed toward the table top **22** when the parts are in the position illustrated in FIG. 5 of the drawings. A pair of nails **110** disposed respectively in the openings **100** and **102** serves temporarily to position the template **90** in the proper position upon the leg **24**. Two holes are then drilled through the apertures **104** and **106** and preferably the holes are drilled only half way through the leg **24**, care to be taken to insure that the axes of the holes are perpendicular to the body **92** of the template **90**. In the case in which the holes in the leg **24** are only drilled partially therethrough, the template **90** is removed from the leg **24** and placed on the opposite face thereof with the flange **96** disposed against the top **25** of the leg **24** and the flange **94** disposed against the edge **27** thereof adapted to lie against the table top **22** when the parts are in the folded position illustrated in FIG. 5, this position of the parts being illustrated in FIG. 8. It is now necessary to drill holes through the apertures **104** and **108** to complete the holes **58** and **60**, respectively, in the upper end of the leg **24**. FIG. 9 diagrammatically illustrates the position of the parts after the holes **58** and **60** are partially drilled therethrough with the template **90** in the position illustrated in FIG. 7 of the drawings.

Each of the other legs **26**, **28** and **30** is prepared in a similar manner, care being taken to insure that one of the flanges **94** or **96** is disposed against the upper end of the leg and that the other of the flanges is disposed against the side of the leg adapted to be positioned toward the table top **22** when the parts are in the position illustrated in FIG. 5.

There is shown in FIG. 10 the manner in which the template **90** can be utilized to provide the necessary holes in a slanting leg **120**. Again one of the flanges **94** or **96** of the template **90** is disposed against the end of the leg **120** to be positioned uppermost toward the associated table top and the other flange is disposed along but spaced from the side of the leg **120** that will be next to the table top when the parts are in the folded position.

It will be seen that there has been provided an improved bracket assembly and an improved template to assist in mounting a bracket on a leg all made in accordance with and embodying the principles of the present invention therein. Although certain forms of the invention have been illustrated and described, it is to be understood that various changes and modifications can be made therein without departing from the true spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. In combination, a support member having a substantially planar under surface thereon, a bracket assembly having a pair of spaced apart side plates, means for securing said side plates on said surface in a position extending normally thereto, a leg having an upper end portion slidably disposed between said spaced side plates and having a pair of longitudinally spaced apart holes therein, each of said side plates having a vertically disposed elongated closed slot therein disposed normal to the plane of said surface, said closed slots being formed centrally of the lateral marginal edges of the associated side plate, each side plate having an additional elongated open slot spaced from and disposed in line with the closed slot thereof, said open slots having the outer ends opening onto the lower marginal edge of the associated side plate, a clamping strap disposed against the outer surface of each of said side plates and extending substantially beyond the edges of said slots to provide a substantial area of contact with the associated side plate and having a pair of spaced apart apertures therein, a pair of spaced bolts normally disposed respectively in said slots and extending through said holes in said leg and said apertures in said clamping straps, each of said bolts having a clamping head disposed against the adjacent one of said clamping straps and having a fastener engaging end extending beyond the other of said clamping straps, fasteners engaging said ends of said bolts and adapted to bear against said other clamping strap, said leg being foldable with respect to said support when said pair of spaced bolts is disposed in said aligned closed and open slots, said bolts when positioned in said slots passing through said holes in said leg and being spaced apart such that when the upper bolt is at the upper end of the upper closed slot the lower bolt will be at the upper end of the lower open slot and when the upper bolt is at the lower end of its slot the lower bolt will be disposed wholly beyond the open end of the lower open slot, the lower walls of each side plate beginning with the outer open end of said open slot curving arcuately outwardly in opposite directions from each adjacent wall of said open end of said open slot and then extending parallel to and directed away from said open slot toward the opposite end of each plate, said clamping straps distributing the clamping pressure of said bolts and said fasteners over a substantial area of said side plates thus serving fixedly to hold said leg in any adjusted position thereof with respect to said support.

2. In combination, a support member having a substantially planar under surface thereon, a bracket assembly having a pair of spaced apart side plates, means for securing said side plates on said surface in a position extending normally thereto, a leg having an upper end portion slidably disposed between said spaced side plates and having a pair of longitudinally spaced apart holes therein, each of said side plates having a vertically disposed elongated closed slot therein disposed normal to the plane of said surface, said closed slots being formed centrally of the lateral marginal edges of the associated side plate, each side plate having an additional elongated open slot spaced from and disposed in line with the closed slot thereof, said open slots having the outer ends opening onto the lower marginal edge of the associated side plate, each of said side plates having an opening formed therein and disposed toward the under surface of said support member and in alignment with said slots, a clamping strap disposed against the outer surface of each of said side plates and extending substantially beyond the edges of said slots to provide a substantial area of contact with the associated side plate and having a pair of spaced apart apertures therein, a pair of spaced bolts normally disposed respectively in said slots and extending through said holes in said leg and said apertures in said clamping straps, each of said bolts having a clamping head disposed against the adjacent one of said clamping straps and having a fastener engaging end extending beyond the other of said clamping straps, fasteners engaging said ends of said bolts and adapted to bear against said other clamping strap, said leg being mounted rigid and non-folding with respect to said support member when one of said bolts is disposed in said openings and the other of said bolts is disposed in one of said slots, said leg being foldable with respect to said support when said pair of spaced bolts is disposed in said aligned closed and open slots, said bolts when positioned in said slots passing through said holes in said leg and being spaced apart such that when the upper bolt is at the upper end of the upper closed slot the lower bolt will be at the upper end of the lower open slot and when the upper bolt is at the lower end of its slot the lower bolt will be disposed wholly beyond the opened end of the lower open slot, the lower walls of each side plate beginning with the outer open end of said open slot curv-

ing arcuately outwardly in opposite directions from each adjacent wall of said open end of said open slot and then extending parallel to and directed away from said open slot toward the opposite end of each plate and forming on opposite marginal sides of said side plates in equally spaced relation from the walls of said closed slots a pair of notches spaced laterally and equally from and in line with the upper end of said closed slots, said clamping straps distributing the clamping pressure of said bolts and said fasteners over a substantial area of said side plates thus serving fixedly to hold said leg in any adjusted position thereof with respect to said support.

3. A bracket assembly for use in mounting a leg on a support member having a substantially planar under surface, comprising a pair of spaced apart side plates, means for securing said side plates to the under surface of the associated support member with said side plates disposed substantially parallel to each other and perpendicular to the under surface, said side plates being positioned to receive therebetween the upper end of the associated leg, each of said side plates having a vertically disposed elongated closed slot therein disposed normal to the plane of the associated support member, said closed slots being disposed centrally of the lateral marginal edges of the associated side plate, each side plate having an additional elongated open slot spaced from and disposed in line with the closed slot therein, a clamping strap disposed against the outer surface of each of said side plates and extending laterally substantially beyond the edges of said slots to provide substantial area of contact with the associated side plate and having a pair of spaced apart apertures therein, a pair of spaced bolts normally disposed respectively in said slots and extending through holes in the associated leg and said apertures in said clamping straps, each bolt having a clamping head disposed against the adjacent one of said clamping straps and having a fastener engaging end extending beyond the other of said clamping straps, fasteners engaging said fastener engaging ends of said bolts and adapted to bear against said other clamping strap, said bolts being spaced apart such that when the upper bolt is at the upper end of the upper closed slot the lower bolt will be at the upper end of the lower open slot and when the upper bolt is at the lower end of the upper slot the lower bolt will be disposed wholly beyond the lower end of the open slot, the lower walls of each of said side plates beginning with the outer end of said open slots curving arcuately outwardly in opposite directions from each adjacent wall of said open end of said open slot and then extending substantially parallel to and directed away from said open slot toward the opposite end of said side plate, said clamping straps distributing the clamping pressure of said bolts and said fasteners over a substantial area of said side plates thus serving fixedly to hold the associated leg in any adjusted position thereof with respect to the associated support member.

4. A bracket assembly for use in mounting a leg on a support member having a substantially planar under surface, comprising a pair of spaced apart side plates, means for securing said side plates to the under surface of the associated support member with said side plates disposed substantially parallel to each other and perpendicular to the under surface, said side plates being positioned to receive therebetween the upper end of the associated leg, each of said side plates having a vertically disposed elongated closed slot therein disposed normal to the plane of the associated support member, said closed slots being disposed centrally of the lateral marginal edges of the associated side plate, each side plate having an additional elongated open slot spaced from and disposed in line with the closed slot thereof, each of said side plates having an opening therein disposed toward the under surface of the associated support member and in alignment with said slots, a clamping strap disposed against the outer surface of each of said side plates and extending laterally substantially beyond the edges of said slots to provide a substantial area of contact with the associated side plate and having a pair of spaced apart apertures therein, a pair of spaced bolts normally disposed respectively in said slots and extending through holes in the associated leg and said apertures in said clamping straps, each bolt having a clamping head disposed against the adjacent one of said clamping straps and having a fastener engaging end extending beyond the other of said clamping straps, fasteners engaging said fastener engaging ends of said bolts and adapted to bear against said other clamping strap, the associated leg being mounted rigid and non-folding with respect to the associated support member when one of said bolts is disposed in said openings and the other of said bolts is disposed in one of said slots, the associated leg being foldable with respect to the associated support member when said pair of spaced bolts is disposed in said aligned closed and opened slots, said bolts being spaced apart such that when the upper bolt is at the upper end of the upper closed slot the lower bolt will be at the upper end of the lower open slot and when the upper bolt is at the lower end of the upper slot the lower bolt will be disposed wholly beyond the lower end of the open slot, the lower walls of each of said side plates beginning with the outer end of said open slot curving arcuately outwardly in opposite directions from each adjacent wall of said open end of said open slot and then extending substantially parallel to and directed away from said open slot toward the opposite end of said side plate and forming on opposite marginal edges of said side plates in equally spaced relation from the walls of said closed slots a pair of notches spaced laterally and equally from and in line with the upper end of said closed slots, said clamping straps distributing the clamping pressure of said bolts and said fasteners over a substantial area of said side plates thus serving fixedly to hold the associated leg in any adjusted position thereof with respect to the associated support member.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,082,025 March 19, 1963

Charles O. Larson

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 41, for "reinforming" read -- reinforcing --.

Signed and sealed this 8th day of October 1963.

EAL)
test:

NEST W. SWIDER
esting Officer

EDWIN L. REYNOLDS
Acting Commissioner of Patents