

March 10, 1959

H. S. KLINE, SR

2,877,075

FOLDING BRACE

Filed Feb. 11, 1957

2 Sheets-Sheet 1

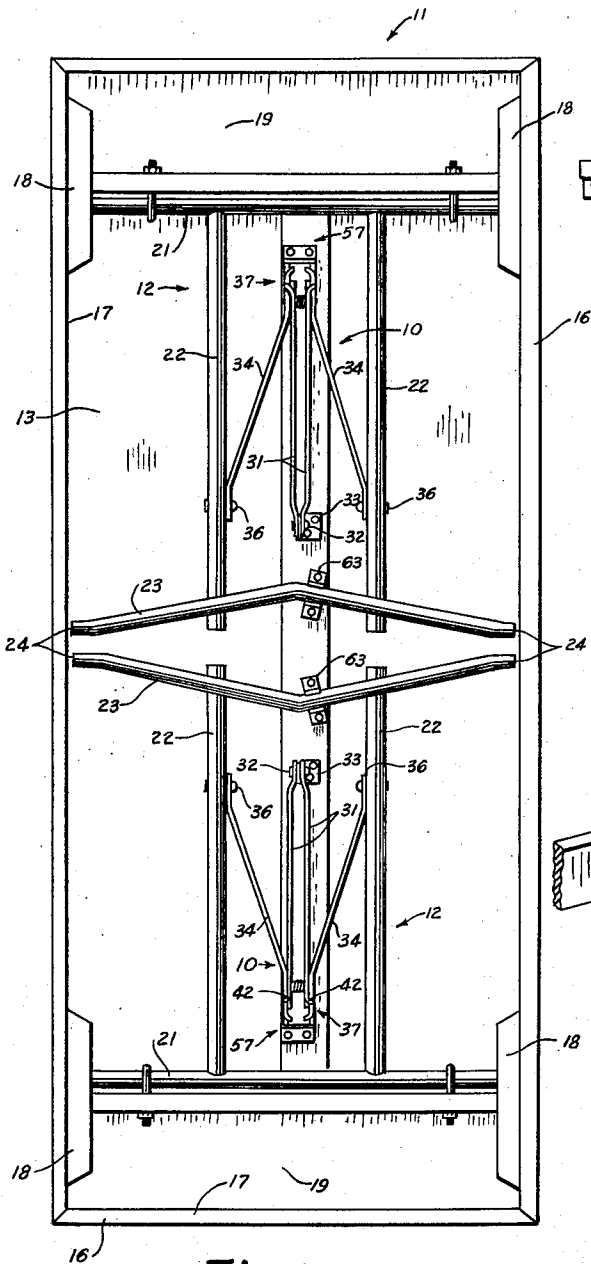


Fig. 1

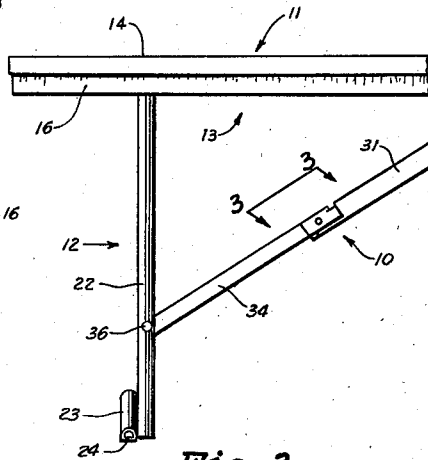


Fig. 2

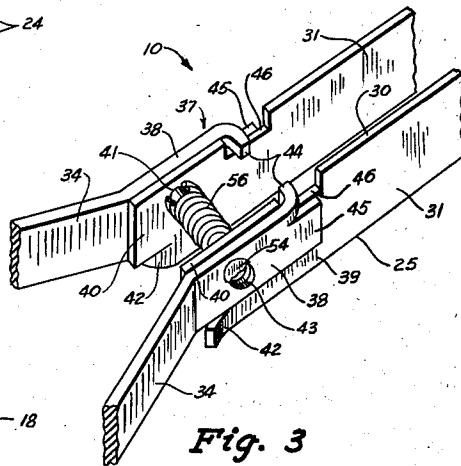


Fig. 3

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2 Sheets-Sheet 2

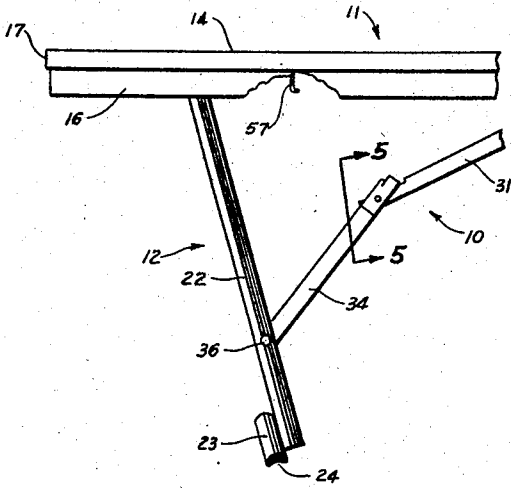


Fig. 4

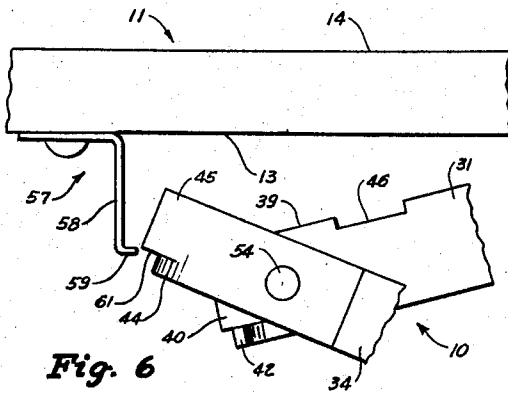


Fig. 6

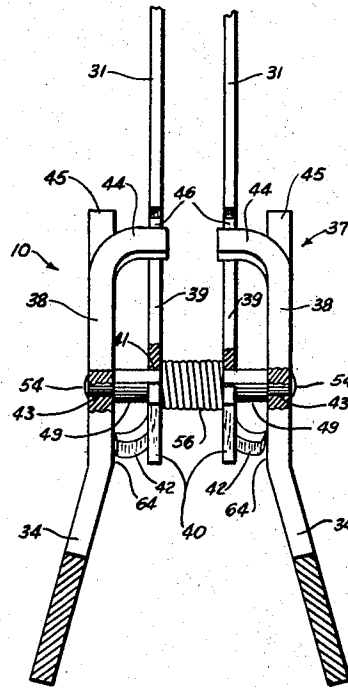


Fig. 5

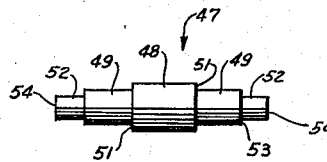


Fig. 7

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FOLDING BRACE

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4 Claims. (Cl. 311—98)

This invention relates generally to braces for folding legs of tables or like articles of furniture and more particularly to a folding leg brace which includes structure for locking the leg brace in an unfolded or open position.

An object of this invention is to provide an improved folding brace for folding table legs.

Another object of this invention is to provide a folding leg brace which includes structure providing for the brace being movable in only one direction from an unfolded position to a folded position.

A further object of this invention is to provide a folding brace for a table leg unit which will automatically snap into a locked position when the leg unit and associated brace are moved to an unfolded table supporting position.

A further object of this invention is to provide a folding brace for a leg unit which can be actuated by a simple manual movement to release it from a locked position, whereby the leg unit and the associated brace can be moved in only one direction to their collapsed and unfolded position.

Another object is to provide a folding leg brace as part of an associated brace member and leg unit structure whereby the entire unit may be folded flat against the underside of an article of furniture or the like having relatively short depending sides, wherein the unit does not extend below the sides of the article.

A further object of this invention is to provide a folding leg brace which is rugged in construction, and which is simple and effective in operation to maintain a table in a rigidly supported position.

Further objects, features and advantages of this invention will become apparent from a consideration of the following description when taken in connection with the accompanying drawings, in which:

Fig. 1 is a bottom plan view of a table or like article of furniture showing a pair of folding braces and their associated leg units in a completely folded position against the underside of the table;

Fig. 2 is a fragmentary side elevational view of one end of the table showing the folding leg brace and its associated leg unit in an unfolded and locked table supporting position;

Fig. 3 is a fragmentary perspective view of the folding leg brace of this invention;

Fig. 4 is a view similar to Fig. 2 showing the folding leg brace and associated leg unit in a partially unfolded position;

Fig. 5 is an enlarged sectional view taken along the line 5—5 of Fig. 4;

Fig. 6 is an enlarged, fragmentary side elevational view disclosing the structural arrangement for holding the folding leg brace in a folded position; and

Fig. 7 is a detailed view of a cylindrical pivot unit utilized for holding the terminal ends of the leg brace members in a side by side relation.

Referring now to the drawings, and particularly to Figs. 1 and 2, the folding brace of this invention, indi-

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cated generally at 10, is shown in Fig. 1 in assembled relation with a table 11 having a pair of folding leg units 12 pivotally secured to the underside 13 of the table top 14 for pivotal movement about axes extended transversely of the table 11. A peripherally extended frame 15 is secured to the underside of the table top 14.

Each folding leg unit 12 includes a pair of short inwardly directed transversely opposite bearing or support members 18 which are secured to the frame 16 adjacent an end 19 of the table top 14 and receive the opposite ends of a tubular shaft member 21. A pair of transversely spaced tubular supports or leg sections 22, projected radially from the shaft member 21, are connected between the free ends thereof by a transversely extended inverted V-shaped tubular foot member 23, the ends 24 of which are engageable with a floor surface in a supported position of the table 11 (Fig. 2). It is seen, therefore, that a folding leg unit 12 is pivotally movable as a unit relative to its corresponding bearing supports 18.

Since the assembly and operation of a leg unit 12 and an associated folding brace 10 is the same, only one of such assemblies will be described in detail, with corresponding parts in such assemblies being indicated by like numerals.

A folding brace 10 (Figs. 1 and 3) comprises a pair of parallel, transversely spaced brace members 31, hereinafter to be referred to as upper brace members, the top ends of which are pivotally secured by a pin 32 extended transversely of the table top 14 and carried in a bracket 33 attached to the underside of the table top 14. A pair of transversely spaced reversely inclined brace members 34, hereinafter to be referred to as lower brace members, have their bottom ends secured at 36 to a corresponding one of the tubular supports 22. The upper end portions 38 of the lower brace members 34 extend in the shape of a yoke 37, so as to be in a parallel and transversely spaced relation similarly to the lower end portions 39 of the upper brace members 31.

As best appears in Fig. 5, the upper end portions 38 of the lower brace members 34 are arranged in an overlapping relation with the lower end portions 39 of the upper brace members 31. These end portions 38 and 39 are pivotally connected together by a cylindrical pivot unit 47 extended through aligned openings 41 and 43 (Figs. 3 and 5), formed in the end portions 39 and 38, respectively, such that the pivot unit 47 is located adjacent the terminal ends 40 of the end portions 39.

Each lower end portion 39 of an upper brace member 31 has a laterally outwardly extending ear 42 at its terminal end 40 (Fig. 3) which extends outwardly only a sufficient distance to underlie an upper end portion 38 of a lower brace member 34, when such member is in a longitudinally aligned, side by side relation with an adjacent upper brace member 31. In turn, when the brace members are in the same position, each upper end portion 38 of a lower brace member 34 has a laterally inwardly extended projection 44 which overlies a lower end portion 39 of an upper brace member 31, the projection extending within a slot 46 formed along the upper edge of the end portion 39. By virtue of this opposed relation of an ear 42 and an end portion 38, with an ear 44 and a slot 46, the brace members 31 and 34 are interlocked against movement out of a longitudinally aligned position, namely, against relative pivotal movement about the cylindrical pivot 47.

This pivot member 47 (Fig. 7) comprises a center portion 48, an intermediate portion 49 extending outwardly at each end of the center portion 48, and an end portion 52 projected outwardly from an intermediate portion 49. The portions 48, 49 and 52, in that order, are of relatively reduced diameters so as to form a shoulder 51 at the junction of the center portion 48 and an inter-

mediate portion 49, and a shoulder 53 at the junction of an intermediate portion 49 with an end portion 52. Each intermediate portion 49 has a length greater than the combined width of a brace member 31 and an adjacent brace member 34 when they are in the side by side relation shown in Fig. 3, and the length of each outer portion 52 is slightly greater than the width of a brace member 34.

In the assembly of the cylindrical pivot member 47 (Fig. 5) with the pair of upper brace members 31 and the pair of lower brace members 34, the intermediate portions 49 are inserted in the bores 41 of the upper brace members 31, and the end portions 52 of the member 47 are inserted in the bores 43 of the lower brace members 34. For a purpose to appear later, the bores 41 are of a greater diameter than the bores 43 by amounts corresponding to the relative difference in the diameters of the portions 49 and 52 of the pivot 47.

Due to the length of the outer portions 52, each lower brace member 34 can pivot about a corresponding outer portion 52. However, because of the extended length of each intermediate portion 49, an upper brace member 31 is permitted not only to move pivotally about the intermediate portion 49 but can also move laterally thereon. To prevent the lower brace member 34 from moving outwardly and off the end portion 52 of the unit 47, the ends of the unit 47 are peened at 54.

A coil spring 56 mounted about the center portion 48 of the pivot member 47 is arranged in compression between the lower end portions 39 of the upper brace members 31 so as to continually urge each upper brace member 31 outwardly and against the end portion 38 of a lower brace member 34. The coil spring 56 is compressible on inward movement of the upper brace members 31 toward each other, to a length not less than the length of the center portion 48 of the pivot member 47. It is to be noted, that as the laterally extending ears 42 of the upper brace members 31 do not extend outwardly a distance greater than beyond the outer side of an adjacent lower brace element 34 (Fig. 1), and as the length of the intermediate portion 49 of the pivot member 47 is at least as great as the combined widths of an upper brace member 31 and the adjacent upper end portion 38 of a lower brace member 34, this arrangement provides for the upper brace members 31 being movable laterally inwardly toward each other, so that the ears 42 are located between the upper end portions 38 of the lower brace members 34.

The basic structure of the invention and its associated elements having been described, the operation of the invention is as follows: When a leg unit 12 and an associated folding brace unit 10 are in positions lying against the underside of the table top 14, wherein the brace member 23 is held against the underside 13 of the table top 14 by a resilient clamp 63 (Fig. 1), it may be noted that without further structure, the folding brace unit 10 would tend to pivot away from the underside of the table due to the force of gravity thereon, since the pivot points 32 and 36 are in substantial alignment transversely of the table. For this reason, a clip member 57 (Figs. 4 and 6) is attached to the underside of the table adjacent the terminal ends 45 of the lower brace members 34. The clip member includes a depending body portion 58 which has at the lower end thereof a portion 59 extending substantially at right angles to the body portion 58 and toward the terminal ends 45 of the brace members 34. Due to the projection 44 extending inwardly from the end 45 of the brace member 34, an overhanging shoulder 61 is formed at the terminal end 45 of the brace member 34. Thus as the brace members 31 and 34 are moved to their completely folded position (Fig. 1), the shoulder 61 moves over the extended portion 59 of the clip member 57 whereby to prevent the entire folding brace unit 10 from pivoting about the pivots 32 and 36.

By manually grasping any part of the leg unit 12 and

moving it away from the underside 13 of the table top 14, the lower brace members 34 begin to pivot about the pivot member 47 in a manner illustrated in Fig. 6, whereby the overhanging shoulder 61 moves away from its contacting or latched relation with the extended portion 59 of the clip member 57. Referring again to Fig. 6, it is noted that the extending ears 42 of the upper brace members 31 are extended a spaced distance beneath the adjacent sides of the terminal ends 38 of the lower brace elements 34. However, as the brace members 31 and 34 continue to pivot relative to each other, each ear 42 comes into contact with the inner side 64 of the respective adjacent lower brace member terminal end 38 (Fig. 5). Due to the hereinbefore described ability of each upper brace member 31 to move inwardly away from the respective adjacent lower brace member 34 by the compression of the coil spring 56, the pivoting action between the brace members 31 and 34 continues, with each ear 42 of a respective upper brace member 31 sliding across the entire depth of the adjacent lower brace member terminal end 38 (Fig. 5), until the respective brace members have almost assumed a completely unfolded position. It is to be remembered that during this sliding action of the ears 42, the coil spring 56 is under maximum compression. Thus, when the respective brace members 31 and 34 reach the unfolded position (Fig. 3), wherein the ears 42 are free from the inner sides 64 of each adjacent lower brace member terminal end 45, as the terminal ends 40 of the lower brace members 31 are now free to move laterally outwardly along the pivot unit portions 49, the coil spring 56 is released from its maximum compressed condition, whereupon its outwardly directed force snaps the upper brace member terminal ends 40 outwardly and against each adjacent lower brace member terminal end 45. In this position (Fig. 3) the inwardly extending projections 44 of the lower brace elements 34 now extend across the width of an adjacent lower brace member terminal end 45 and lie within the respective slots 46 of the adjacent upper brace members 31. In this position, it is obvious that due to the opposed force action of the respective ears 42 and the projections 44, the brace members 31 and 34 are held in locked position wherein the leg unit 12 is extended at substantial right angles to the table top 14 (Fig. 2) and to the floor (not shown) upon which it rests. Neither a force against the table top 14 in any direction, nor a force against the leg unit 12 in any direction will release the folding brace 10 from its locked position (Fig. 3).

A simple manual operation is but necessary to release the folding brace unit 10 from its locked position and to start a pivotal movement between the brace members 31 and 34 whereby to move them toward their folded position. By grasping the two upper brace members 31 in one hand and pressing them toward each other against the force of the coil spring 56, the brace members 31 are moved inwardly against the respective shoulders 51 of the unit 47 to a position where the ears 42 of the upper brace members 31 are completely between the upper end portions 38 of the lower brace members 34, whereupon by pulling or pushing the brace members 31 toward the underside 13 of the table top 14, the necessary pivoting action between the brace members 31 and 34 may take place until the folding brace unit 10 and the leg unit 12 are moved to a completely folded position where they lie against the underside 13 of the table top 14 (Fig. 1).

It is thus seen that a rugged folding leg brace unit of simple construction is provided, a unit wherein a positive locking action is automatically obtained by easy movement by the brace members toward an unfolded position; and further, a folding brace unit is provided where with but a simple manual operation the brace unit is released from its locked position.

Although a particular embodiment of the invention has herein been disclosed, it is to be noted that various modifications and alternate constructions may be obtained without varying from the true spirit and scope of the invention as defined in the appended claims.

I claim:

1. A jointed brace for an article of furniture having a flat support member and a folding leg unit therefor, comprising, a pair of brace sections with a first one of said sections being pivotally connected at one end to the underside of said support member, and the second one of said sections being pivotally connected at one end to said folding leg unit, with the end portions of said brace sections adapted to be placed in a longitudinally aligned side by side relation when said brace sections are in an unfolded position, means pivotally connecting said end portions for pivotal movement of said brace sections to folded and unfolded positions therefor, one of said end portions being movable laterally on said pivot means a distance equal to at least the width of the other end portion, laterally extended projections arranged on said brace sections in an opposed relation so that a projection on one brace section overlies the other brace section, when said sections are in an unfolded position, whereby to interlock said sections against pivotal movement out of said unfolded position, and means on said pivot means for yieldably holding said end portions in a side by side relation in said folded position of the brace sections, with said brace sections being released for movement to a folded position, on relative lateral movement of said brace sections against the action of said yieldable means to laterally spaced positions wherein a projection on one brace section is in a clearance relation with the other brace section.

2. A jointed brace for an article of furniture having a flat support member and a folding leg unit therefor, comprising a pair of brace sections with a first one of said sections pivotally connected at one end to the underside of said support member, and the second of said sections pivotally connected at one end to said folding leg unit, the free end portions of said brace sections adapted to be placed in a longitudinally aligned, side by side relation, pivot means for holding said end portions of said brace sections for relative pivotal movement therebetween, said pivot means having two cylindrical portions of different diameters whereby a shoulder is formed therebetween, one portion having a length equal to at least the combined widths of said end portions, said portions being inserted through respective bores formed in each end portion, a releasable interlocking means extending laterally from each end portion in opposed relation whereby to overlie the width of each adjacent end portion when said end portions are in said aligned position, and resilient means mounted about said pivot means whereby to continually urge said end portions into a side by side position, said resilient means being compressible by movement of one of said end portions away from the other end portion whereby to disengage said interlocking means.

3. A jointed brace for an article of furniture having a flat support member and a folding leg unit therefor, comprising, a pair of brace sections, a first section having a pair of laterally spaced brace members pivotally connected at one end to the underside of said support member, and a second section having a pair of laterally spaced brace members pivotally connected at one end to said folding leg unit, the free end portions of each sec-

tion being parallel and laterally spaced, pivot means for holding said end portions of said brace members wherein the end portions of one pair of members are disposed between and in a side by side relation with the end portions of the other pair, the end portions of the inner pair being movable inwardly and toward each other on said pivot unit, interlocking means formed on each end portion in opposed relation whereby said portions may be held in a longitudinally aligned position, said interlocking means being released upon inward movement of said inner pair of brace members, and yieldable means extending between and contacting the end portions of said inner pair of brace members, said yieldable means being compressible upon relative inward movement of said inner pair of end portions.

4. A jointed brace for an article of furniture having a flat support member and a folding leg unit therefor, comprising, a pair of brace sections, a first section having a pair of laterally spaced brace members pivotally connected at one end to the underside of said support member, and a second section having a pair of laterally spaced brace members pivotally connected at one end to said folding leg unit, the free end portions of each pair of said brace members being parallel and laterally spaced and adapted to be placed in a longitudinally aligned, side by side position, pivot means for holding said end portions of said brace members in said side by side position, said pivot means having a circular center section the length of which is equal to at least the combined width of all four brace member end portions, and an outer section extending axially outwardly from each end of said center section at a reduced diameter whereby a shoulder is formed between each outer section and said center section, said outer sections each being inserted in a bore of slightly greater diameter formed in each respective end portion of one pair of brace members, and the center section being inserted in bores of slightly greater diameter formed in each end portion of the other pair of brace members, the arrangement such that the end portions of said first pair of brace members are disposed between the end portions of said second pair, coil spring means mounted about said pivot means and continually urging each inner end portion outwardly against an adjacent outer end portion, said coil spring means being compressible by relative inward movement of the inner end portions a distance equal to at least the combined widths of said outer pair of end portions, and interlocking means comprising an ear extending laterally inwardly from the top of each second section end portion at the terminal end thereof whereby each ear overlies the adjacent end portion of said pair of first brace members when said end portions are in said longitudinally aligned position, and an ear formed on the bottom of the terminal end of each end portion of each first brace member, said ear extending laterally outwardly a distance sufficient only to underlie each adjacent end portion of a second brace member.

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