Dec. 10, 1963 A. L. SNOW 3,113,533

LOCKING AND UNLOCKING FOLDING BRACE

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FIG. 1

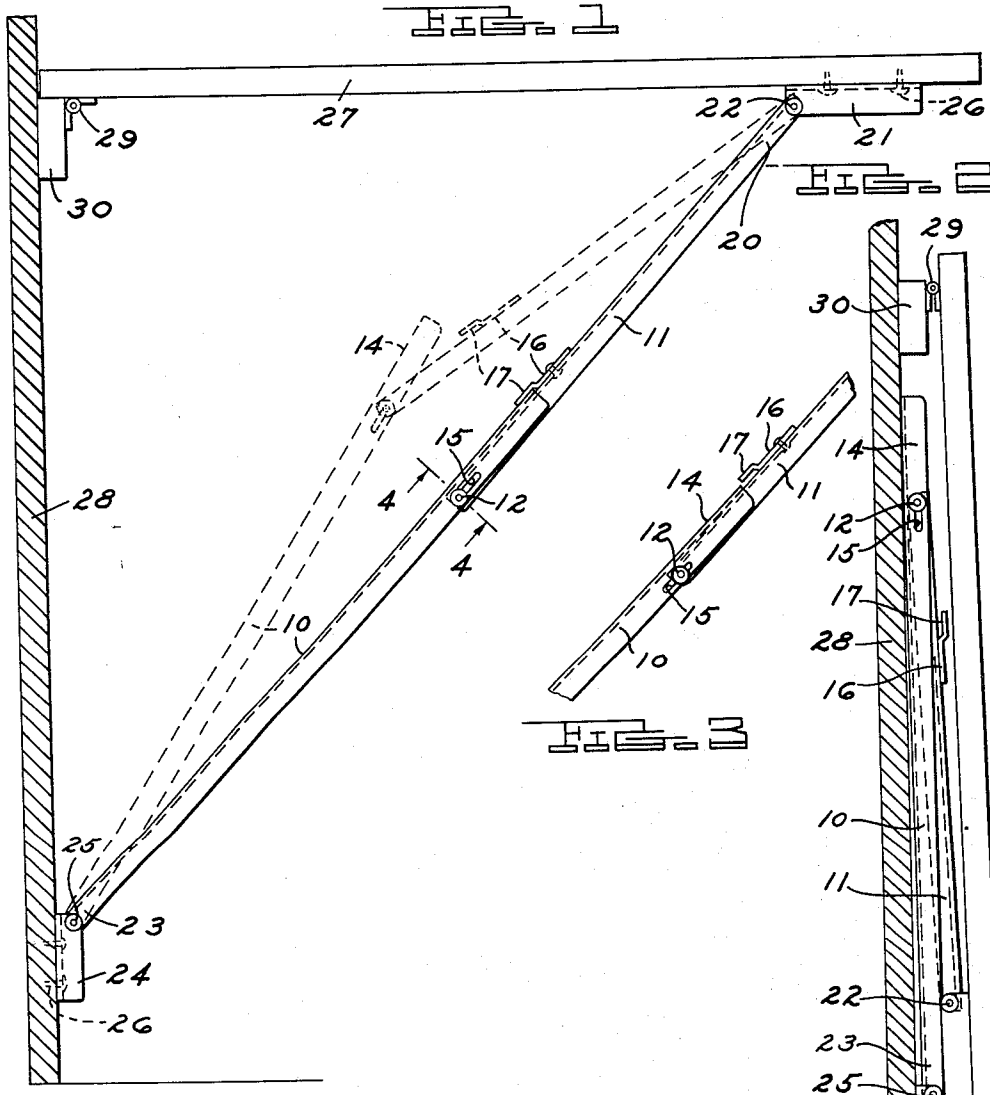
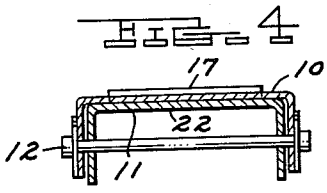


FIG. 2

FIG. 3

FIG. 4



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LOCKING AND UNLOCKING FOLDING BRACE

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This invention relates to folding braces and in particular to a folding brace which locks in the supporting position to prevent accidental folding of the brace. This prevents accidental collapse of a member supported by the brace.

Various types of folding braces have been employed in the prior art to support a hinged element in a use position and for folding to permit the hinged element to swing to a storage position. However, the several devices of the prior art are complicated in design and construction, expensive to manufacture, and do not lock easily and positively in a support position.

With the foregoing in view, it is a primary object of the invention to provide a folding brace which is simple in design and construction, inexpensive to manufacture, and which locks easily and positively in the support position.

An object of the invention is to provide a folding brace having pivotally interconnected legs and means preventing the legs pivoting in one angular direction past a straight angle, axially aligned, support position.

An object of the invention is to provide slide means permitting telescopic movement of the legs relative to one another in their supporting position.

An object of the inevntion is to provide selectively operable lock means on the legs to prevent pivoting in the other angular direction locked by inward telescopic movement of the legs and unlocked by outward telescopic movement of the legs.

An object of the invention is to provide legs U-shaped in cross section having web portions and flange portions nesting with one another.

An object of the invention is to provide a pivot pin interconnecting the leg's flanges in a knee joint.

An object of the invention is to provide an extension on a first or lower leg web portion past the pivot pin contacting the second or upper leg web portion blocking pivoting movement in one angular direction at a straight angle between the legs.

An object of the invention is to provide a cleat on the second leg overlapping the web extension on the first leg preventing reverse angular movement between the legs from a straight angle thereby locking the legs.

An object of the invention is to provide slots in the flanges of one leg at the pivot pin allowing telescopic bidirectional movement between the legs for moving the second leg cleat over the first leg web extension and for moving the cleat from over the extension for respectively locking and unlocking the knee joint.

An object of the invention is to provide nesing attaching plates for the legs to save space and to lend lateral rigidity.

An object of the invention is to provide a folding brace for a hinged member such as a table which is telescopically movable to lock by lowering the member from an elevated position and to unlock by raising the member from a lower position.

An object of the invention is to provide an automatically locking folding brace knee joint which locks by first lifting a table to which the brace is attached slightly above a horizontal position and then allowing the table to lower to a horizontal position whereby the one leg cleat moves outside the other leg projection with the upward movement and moves over the projection in the downward movement thereby automatically locking the knee joint.

These and other objects of the invention will become apparent by reference to the following description taken in conjunction with the drawing wherein:

FIG. 1 is a side elevational view of a hinged table and a brace according to the invention shown in the supporting locked position in solid lines and showing the unlocked and partially folded positions in broken lines.

FIG. 2 is a side elevational view of the table and brace of FIG. 1 in the folded position.

FIG. 3 is a partial side elevational view of the brace showing the knee joint in the telescopically extended position; and

FIG. 4 is a cross sectional view of FIG. 1 taken on the line 4—4 thereof.

Referring now to the drawing, the brace shown therein to illustrate the invention comprises a lower leg **10** and an upper leg **11** pivotally interconnected by a pivot pin **12**. Each leg **10** and **11** is U-shaped in cross section having a central web and depending flanges. The upper leg **11** is narrower than the lower leg **10** and fits inside the lower leg at the pivot pin **12** in nested relationship. The lower leg **10** projects beyond the pivot pin **12** over the upper leg **11** in an extension **14**. The web portion of the extension **14** contacts the web portion of the upper leg **11** and prevents angular movement between the legs **10** and **11** at a straight angle as seen in FIGS. 1 and 3.

The legs **10** and **11** pivot to the folded position of FIG. 2. They unfold from the folded position of FIG. 2 through the position indicated by broken lines in FIG. 1 to the solid line position of FIGS. 1 and 3. At this point the lower leg **10** extension **14** web portion contacts the web portion of the upper leg **11** locking the legs against further movement in the unfolding direction.

The pivot pin **12** as shown lies in an aperture formed in the upper leg **11** flanges and in slots **15** formed in the lower leg **10** flanges. This permits the upper leg **11** to slide axially relative to the lower leg **10**. The slots **15** in the lower leg **10** limit upper leg **11** telescopic travel with the pivot pin **12**. The upper leg **11** moves telescopically in both directions relative to the lower leg **10** between the position shown in FIG. 3 and the solid line position of FIG. 1.

A tab **16** is fixed on the upper leg **11** and has an extending cleat **17** lying over the lower leg extension **14** as seen in solid line position of FIG. 1. The lower leg extension **14** lies outside the cleat **17** in the position of FIG. 3. Thus, by telescopically moving the upper leg **11** relative to the lower leg **10**, the cleat **17** may be located over the lower leg extension **14** and moved away from the lower leg extension **14** selectively. When the cleat **17** overlies the lower leg extension **14** it locks the legs **10** and **11** against pivotal movement in the folding direction. When the upper leg cleat **17** is outside the lower leg extension **14**, the legs are free to pivot in the folding direction.

The top end **20** of the upper leg **11** is pivotally connected to a plate **21** by a pin **22**. The bottom end **23** of the lower leg **10** is pivotally connected to a plate **24** by a pin **25**. The plates **21** and **24** are U-shaped in cross section and have apertured flanges receiving the pins **22** and **25** respectively. The leg ends **20** and **23** lie within the flanges of the plates **21** and **24** respectively. The plates **21** and **24** have web portions equipped with screw-receiving apertures through which screws **26** are inserted.

The plate **21** may be screwed to a table **27** and the plate **24** screwed to a wall or support **28**. A hinge **29** pivotally mounts the table **27** on the support **28**. A spacer block **30** may be located between the hinge **29** and the support **28** to space the table **27** outwardly from the support **28** in the folded position, FIG. 2. This creates a parallel space between the table and the support to house the brace between the table and the support in

the folded position with the table **27** lying substantially parallel to the support **28**.

The brace of the invention is easily mounted by screwing the plate **21** to the table **27** and the plate **24** to the support **28**. In the solid line position of FIG. 1, the brace supports the table **27** and is locked against pivotal movement in one direction by the lower leg extension **14** abutting the upper leg **11**. In this position the brace is also locked against pivotal movement in the other direction by the cleat **17** overlying the lower leg extension **14**.

To collapse the table **27** from the solid line position of FIG. 1, the user lifts the table **27** above the solid line position of FIG. 1. This causes the upper leg **11** to move telescopically outwardly of the lower leg **10** with the lower leg flange slots **15** sliding relative to the pivot pin **12**. This moves the upper leg cleat **17** from a position over the lower leg extension **14**. The user then pushes the brace knee to broken line position B of FIG. 1 such as with his foot. The user then lowers the table to the collapsed position of FIG. 2 with the brace automatically assuming its folded position.

To erect the table **27**, the user elevates the table **27** to the position of FIG. 1 shown in solid lines whereupon the extension **14** falls on top of the cleat **17**. The user then elevates the table **27** above the solid line position indicated in FIG. 1 during which movement the upper leg **11** moves telescopically outwardly from the lower leg **10** and the lower leg extension **14** falls off the cleat **17** and drops on the upper leg **11** as shown in FIG. 3. The user then allows the table to descend to the solid line position of FIG. 1 with the upper leg **11** moving telescopically inwardly on the lower leg **10**. This travels the upper leg cleat **17** over the lower leg extension **14**. The brace is now locked against pivoting in either direction as previously described.

The brace of the invention provides means for supporting a table and for locking the table in supported condition against accidental pivoting of the brace with consequent accidental collapse of the table.

The brace of the invention is lockable and unlockable by merely raising and lowering the table as described without the user being required to reach under the table to operate the locking means.

Two braces according to the invention have been found adequate to support a table thirty inches wide and sixty inches long. Braces with approximately 1¾" webs and ½" flanges made of 1/16" stock have been found adequate to support such a table with a man sitting on the outer edge.

Braces according to the invention are easy to make, assemble, and mount and are attractive in appearance. When mounted under a table they provide adequate room for persons sitting at the table on chairs. Moreover, persons seated at the table cannot accidentally dislodge the braces from the supporting position.

Although but a single embodiment of the invention has been disclosed and described in detail, it is obvious that changes may be made in the size, shape, detail, arrangement, and reversal of the various elements of the invention within the scope of the appended claims.

I claim:

A folding brace and hinged table top combination comprising a vertical support, a table top adjacent said support, a hinge connecting said support and said table top; said table top being swingable on said hinge between a use position normal to said support and a storage position substantially parallel to said support,

a base plate secured to said support at a point spaced below said hinge,

a table plate secured to said table at a point spaced out from said hinge,

a lower leg pivotally connected to said base plate,

an upper leg pivotally connected to said table plate;

said legs being channels U-shaped in cross section having upwardly disposed webs and depending flanges;

said lower leg having a knee end; said lower leg flanges having slots at a point spaced from said knee end of said lower leg; said lower leg thereby having a web extension beyond said flange slots;

said upper leg having a knee end; said upper leg having aperatures at said knee end of said upper leg,

said lower leg being wider than said upper leg;

said upper leg knee end fitting inside said lower leg knee end with said flanges' apertures and slots aligned with one another;

a pivot pin lying in said flanges' apertures and slots pivotally interconnecting said legs in a knee joint pivotally movable between a folded position of substantially zero angulation to an unfolded straight angle position;

said lower leg web extension beyond said flange slots and pivot pin contacting said upper leg web preventing angular movement between said legs beyond a straight angle in the unfolding direction of angular movement;

said legs pivotally connected knee ends when at a straight angle being telescopically slidable relative to one another within the limits of said lower leg flange slots sliding relative to said pivot pin between an axially inward weight supporting position and an axially outward non-supporting position;

and a cleat on said upper leg web extending toward and overlapping said lower leg web projection in the weight supporting position preventing reverse angular motion between said legs locking said legs in their straight angle weight supporting position;

axially outward sliding movement of said legs relative to one another as permitted by said slots at said pin moving said lower leg web projection out of said cleat thereby permitting reverse folding angular movement between said legs from a straight angle to a folded position of substantially zero degrees;

said legs upon moving from their folded position to their unfolded straight angle position being blocked from further unfolding motion by said lower leg web projection contacting said upper leg web;

said upper leg web extension being insertable under said cleat by axial outward sliding movement between said legs to clear said cleat and subsequent axial inward sliding movement between said legs to move said extension under said cleat;

axial outward sliding unlocking movement being effected by raising said table at said table plate manually; axial inward sliding movement being effected by releasing said table at said table plate from a manually lifted position.

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