Feb. 4, 1941. N. W. CUMMINS 2,230,220

FOLDING TABLE LEG HINGE AND LOCK

Filed July 27, 1938 3 Sheets-Sheet 1

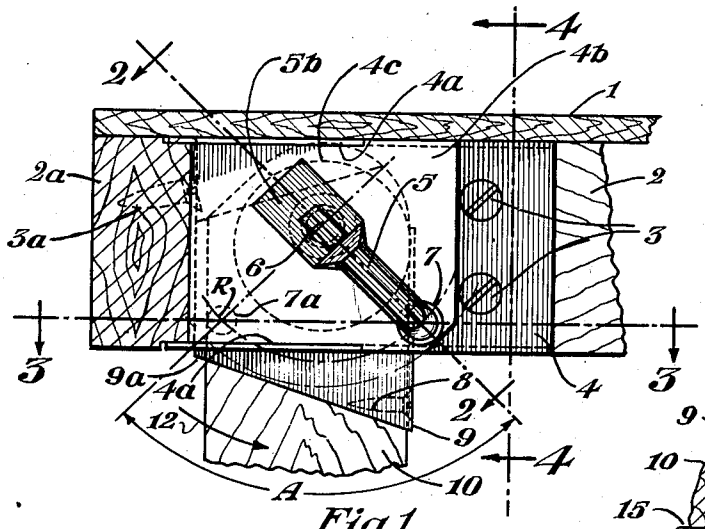

Fig. 1

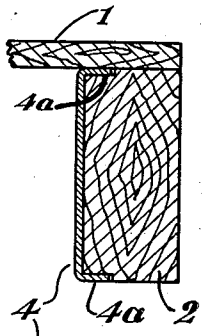

Fig. 4

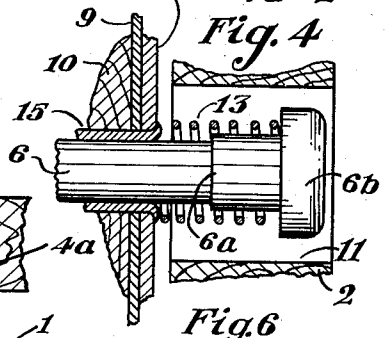

Fig. 6

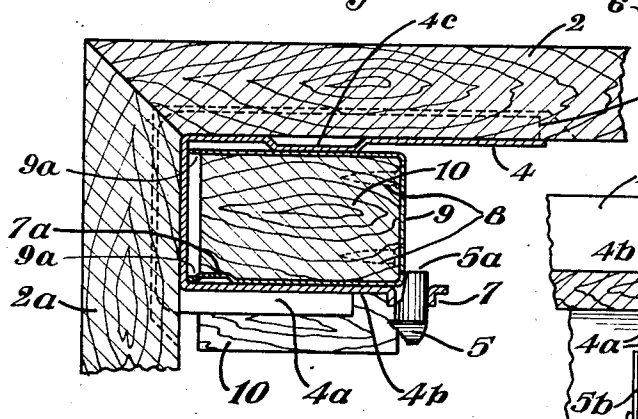

Fig. 3

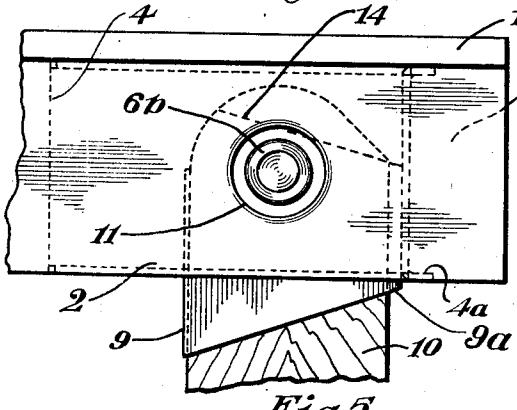

Fig. 5

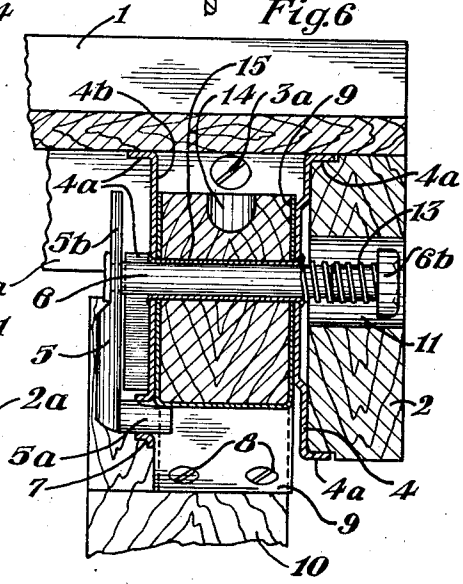

Fig. 2

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FOLDING TABLE LEG HINGE AND LOCK

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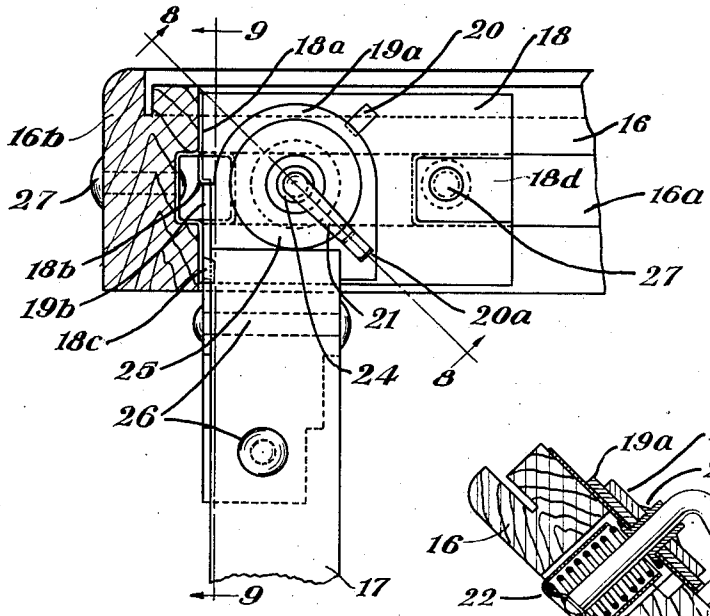

Fig. 7

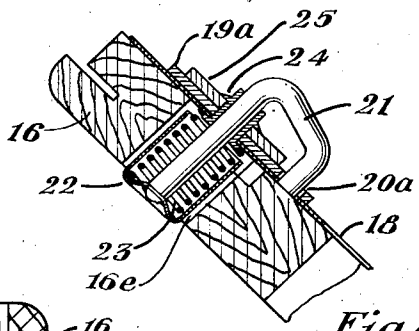

Fig. 8

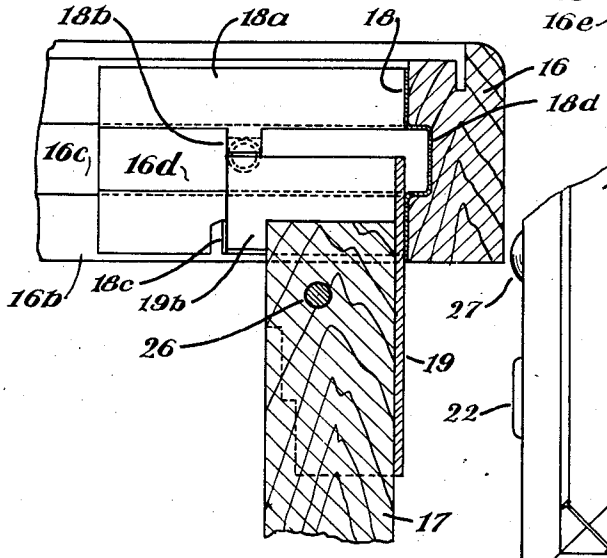

Fig. 9

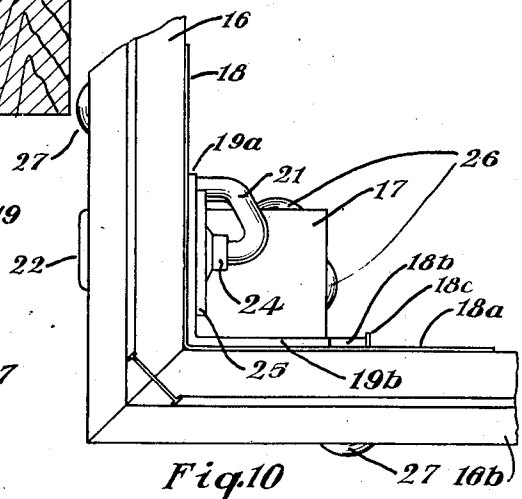

Fig. 10

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FOLDING TABLE LEG HINGE AND LOCK

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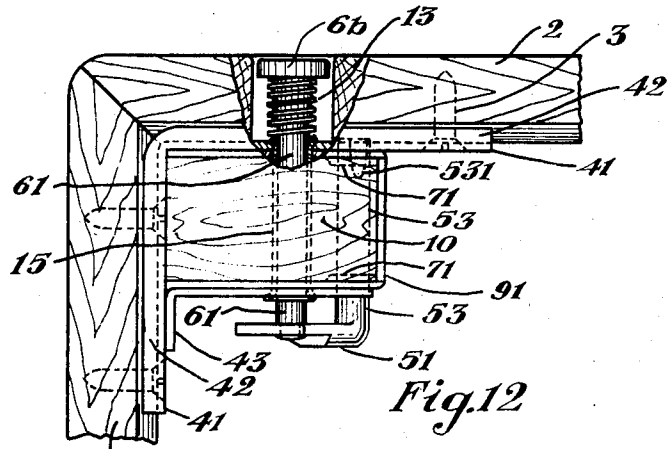

Fig.12

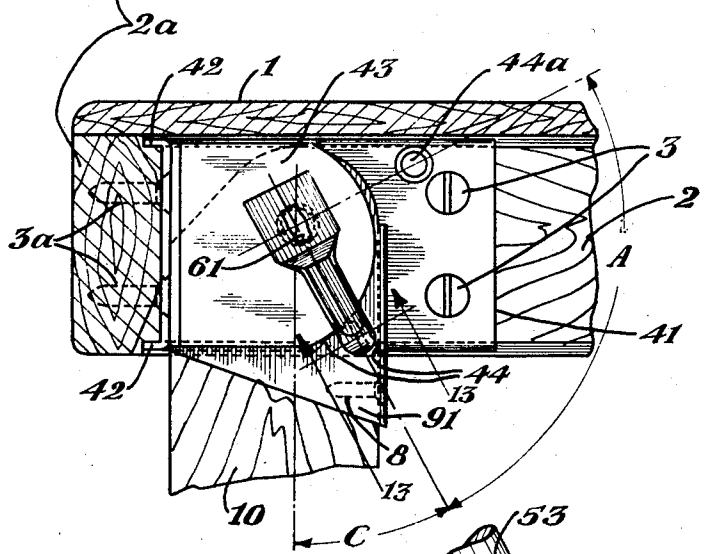

Fig.11

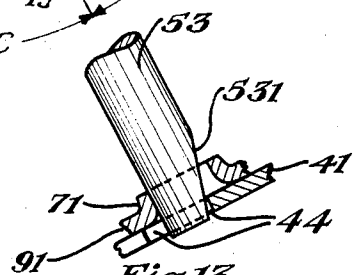

Fig.13

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UNITED STATES PATENT OFFICE

2,230,220

FOLDING TABLE LEG HINGE AND LOCK

Norman W. Cummins, Louisville, Ky.

Application July 27, 1938, Serial No. 221,546

5 Claims. (Cl. 311—99)

My invention relates to folding tables and analogous structures, and has particular reference to improvements in the construction of fixtures, or hardware, for pivotally attaching legs to a table top, and to improvements in the construction of a locking device for retaining the legs in extended or folded positions.

One object of my invention is to provide a construction having a lock-releasing element remote from the folding leg, so that the hand of the operator is fully protected from mechanical injury. Thus, my invention has for its main object the provision of a construction wherein the lock-releasing element projects through the corresponding flange of the table top.

Other objects of my invention include: the provision of a construction having very low manufacturing cost; the provision of a construction requiring only unskilled labor for its assembly on the table; and, the provision of a construction requiring simple woodworking operations on the perimetrical table-flanges and table legs.

The advantages of these, and other objects of my invention, will be readily understood by those versed in the art as the following description is read in connection with the accompanying drawings illustrating several embodiments of the broad principles of my invention, in which:

Figure 1 is a partial elevational view showing one embodiment of my invention applied to a table top, and the illustration shows the leg in extended position, such as is the case when the table is in use;

Figure 2 is a partial sectional view taken along lines 2—2 of Figure 1, showing the construction and relation of the lock-releasing plunger 6 and locking tip 5*a*;

Figure 3 is a partial sectional view taken along lines 3—3 of Figure 1, showing the construction and relation of the flanged corner brace 4, leg armor 9 and locking tip 5*a*;

Figure 4 is a partial sectional view taken along lines 4—4 of Figure 1, showing the construction and relation of the flanged corner brace 4 and table-top flange 2;

Figure 5 is a partial elevational view of the mechanism shown in Figure 1, as viewed from the outside face of the table-top flange;

Figure 6 is an enlarged view of a portion of Figure 2, showing the construction and relation of the lock-releasing plunger 6 and return spring 13;

Figure 7 is a partial elevational view illustrating another embodiment of my invention, and the illustration shows the table leg in extended position;

Figure 8 is a partial sectional view taken along lines 8—8 of Figure 7 showing the construction and relation of the lock-releasing plunger 21, corner brace 18, table-leg supporting-member 19*a* and return spring 23;

Figure 9 is a partial sectional view taken along lines 9—9 of Figure 7, showing stops 18*b* and 18*c*, which are engaged by the leg carried member 19*b*, when the table-leg is extended;

Figure 10 is a partial plan view of Figure 7, as viewed from the top of flanges 16 and 16*b*;

Figure 11 is a partial elevational view illustrating still another embodiment of my invention, and the illustration likewise shows the table-leg 10 in extended position;

Figure 12 is a partial plan view of Figure 11, as viewed from the top of flanges 2 and 2*a*;

Figure 13 is a partial sectional view taken along lines 13—13 of Figure 11, showing the construction and relation of locking plunger 53, leg armor 91 and corner brace 41.

Referring now to the drawings it will be first mentioned that three preferred embodiments of my invention have been illustrated. In order to avoid confusion, each embodiment has been illustrated on a separate sheet. Thus, sheet 1, containing Figures 1 through 6, illustrates the first embodiment. Likewise, sheet 2, containing Figures 7 through 10, illustrate the second embodiment, while sheet 3, containing Figures 11 through 13, illustrates the third embodiment. Hereinafter the descriptions of the drawings will be thus identified.

The first embodiment

Figures 1 through 6 illustrate one corner portion of a table, and the corresponding folding leg structure associated therewith. While the illustration has been thus simplified, it is to be understood that this structure is duplicated at each of the corners of the table, so that each leg of the table may be folded within the perimetrical flanges of the table top.

My invention is illustrated in connection with a folding table having a relatively thin and lightweight top member 1, which top is supported around its edges by perimetrical flanges 2 and 2*a* arranged in rectangular relation, and rigidly secured at the adjacent ends of each corner to form a continuous frame around the edges of the table top.

At each corner I have provided a flanged corner-brace 4. Each corner brace is U-shaped,

and has the adjacent sides thereof secured to the corresponding perimetrical flanges of the table top to provide a very rigid corner construction. In order to provide a very rigid U-shaped corner-brace from light-weight sheet metal said brace is provided with flanges 4a, which flanges securely engage the table-top flanges to provide a definite alignment of the corner brace 4 with the perimetrical flanges of the table-top.

Later it will be observed that this construction, while providing greater strength, also serves to maintain the table-leg carried by each corner brace 4 in definite alignment with the perimetrical flanges of the table-top. As illustrated in the drawings, each table-top flange 2 and 2a is recessed adjacent each corner, so that the flanges 4a of the corner brace 4 firmly grip the flanges of the table-top, without interfering with the table-top. As further illustrated, screws 3 and 3a securely attach the corner braces to flanges 2 and 2a, respectively. Thus, I have provided a very simple and efficient corner brace providing rigidity that has not heretofore been obtained on kindred devices.

The arms of the U-shaped corner-brace form a channel, or socket, within which is pivotally mounted a table-leg 10. The pivoted end of the table-leg 10 is covered with a thin metallic armor 9 to provide large bearing surfaces between the arms of the corner-brace 4. This armor is secured to the table-leg 10 by screws 8. Both the armor 9 and table-leg 10 are apertured to receive a sleeve bearing 15.

Within the sleeve bearing 15, a lock-releasing plunger 6 slidably operates. Referring to Figures 2, 5 and 6 it will be observed that the lock-releasing plunger 6 extends into an aperture 11 in the perimetrical table-top flange 2, and is provided with an actuating button 6b. A spring 13 serves to bias the plunger 6 outwardly, while a shoulder 6a serves to limit the amount the plunger 6 may be pressed inwardly by an operator. Thus it will be observed that this construction places the actuated portion of the lock-releasing plunger 6 remote from the pivotal connection of the folding leg, thereby eliminating exposure of the operator's hand to pinching between the leg and table-top flange, as is frequently encountered in devices having the lock-releasing mechanism carried by the leg.

At the inner end of the lock-releasing plunger 6, an arm 5 is secured thereto. The arm 5 is fashioned from wire stock and has one end flattened as shown in Figures 1 and 2. The opposite end of arm 5 is provided with a locking tip 5a, which tip passes through an eyeleted aperture 7 in the corner brace 1. It will be observed, from an examination of Figures 2 and 3, that the locking tip is slightly beveled so as to register properly with the outside face of the armor, when the leg is in its extended or at the open position, and to provide for a reasonable working tolerance.

At this time particular reference is made to the extensions 9a on the leg armor 9. These extensions project slightly beyond the leg and provide a definite metallic stop for the leg, when the leg is in its extended or open position. Thus, the armor 9 not only provides a durable metallic locking-surface for the locking tip 5a, but projections 9a, which projections serve as definite stops for the leg. Therefore, when the leg is extended, the armor 9 is rigidly held between the bottom of the U-shaped corner-brace 4, and the locking tip 5a.

When the leg is moved to its folded position, the locking tip 5a engages a depression 7a formed in the armor 9. Thus, the locking tip and depression 7a cooperate to retain the leg in folded position. It is understood that if it is desirable to positively lock the leg in folded position the depression 7a can be deeper and formed with substantially straight sides, or replaced by an aperture in the armor 9 at the same location.

In assembling the hardware to the perimetrical flange of the table-top, it has been found desirable so to assemble the U-shaped corner-brace, armor, and lock-releasing plunger, etc., to the leg, and then to attach same to the table-top flange as a unit. Accordingly the upper end of the table-leg 10 is grooved at 14 to allow screw 3a to be easily applied.

From the foregoing, it will be apparent that the operator presses button 6b to release the locking tip 5a from the back face of armor 9, whereupon the leg may be freely moved to its folded position. Thus, the leg 10 in moving to its folded position, moves in the direction of arrow 12 through the 90 degree arc A. When the leg is moved to its folded position, the depression 7a registers with the locking tip 5a, and thereby retains the leg yieldingly in the closed position.

In moving the leg from folded to open position, it is not necessary to press button 6b, unless the depression 7a has been replaced by a construction providing a positive lock.

The second embodiment

The second embodiment is illustrated in Figures 7 through 10, and, like the first embodiment, has the lock releasing plunger extending through the pivotal axis of the table-leg. The illustrations covering the second embodiment likewise show only one corner portion of a table-top together with its corresponding folding leg structure. Thus, it is to be understood that this structure is likewise duplicated at each corner of the table-top, so that each leg of the table may be folded within the perimetrical flanges of the table-top.

The second embodiment shows a construction particularly adapted for the light-weight and lesser expensive tables, and, like the first embodiment, the construction provides remarkable rigidity of the table-leg, when same is in its extended position, without the use of exposed braces.

In the lesser expensive tables the table-top is made as thin and light in weight as practicable. Table tops of this type are supported around their edges by perimetrical frame members having a construction similar to that illustrated in Figures 7 through 10. Such tops are usually covered with felt, or a suitable fabric, to provide a suitable finish for the top surface of the table. The top is set in depressed shoulders in the upper edge of the frame to finish off this edge, and glued in such position.

In the illustrations, the adjacent perimetrical flanges 16 and 16b, which flanges form one corner of the table top, have longitudinal grooves 16a and 16c, respectively, formed therein.

At each corner I have provided an L-shaped corner-brace having legs 18 and 18a, respectively. The legs of the L-shaped corner-brace have tongues 18d and 16d formed therefrom, which tongues are forced into their corresponding grooves 16a and 16c, respectively. Thus, the tongues 18d and 16d serve to align the perimet-

rical flanges of the table-top. Rivets 27 securely attach the L-shaped corner-brace to the table-top flanges. Accordingly, it will be observed that the tongues 18*d* and 16*d* reinforce the L-shaped corner-brace, and also serve to maintain the leg 17 pivotally carried by the corner brace in definite alignment with the flanges of the table-top.

In Figures 7, 9 and 10, it will be observed that the second embodiment has a leg supporting member 19—19*b* pivotally mounted on leg 18 of the L-shaped corner-brace by a tubular shaft 24. Note in particular Figure 8. The table-leg 17 is attached to the leg supporting member 19—19*b* by rivets 26.

In Figure 8 the construction of the pivotal connection is clearly shown, and it will be noted that a large reinforcing washer 25 is provided to form a very firm pivotal connection or bearing.

Within the tubular shaft 24, one leg of the lock-releasing member 21 slidably operates. Referring to Figure 8, it will be observed that the said one leg of the lock-releasing member 21 extends into an aperture 16*e* in the table-top flange 16, and is provided with an actuating button 22, which button has a long skirt serving to limit the amount the plunger 21 may be pressed inwardly by an operator. A spring 23 normally biases the said one leg of the lock-releasing member 21 outwardly. Therefore, the embodiment illustrated in Figures 7 through 10 likewise places the actuated portion of the lock-releasing member 21 remote from the folding leg, thus eliminating the possibility of pinching the operator's hand between the leg and table-top plunger, as frequently encountered in devices having the lock-releasing mechanism carried by the leg.

The lock-releasing member 21 is essentially a U-shaped device having a long leg extending through the tubular shaft 24, and a short leg extending through an aperture 20*a* in the extension 19*a* of the leg supporting member 19—19*b*. When the table leg 17 is moved to its extended position, as illustrated in Figures 7 and 8, the free end of the short leg of member 21 engages an aperture 20 in the leg 18 of the L-shaped corner-brace 18—18*a*, to lock securely the table leg in its extended position. When the table leg is moved to its folded position, the short leg of member 21 engages a similar aperture 20, to lock securely the table leg in its folded position.

Insofar as operation is concerned the member 21 of Figure 8 functions similarly to plunger 6 of Figure 2.

Particular attention is directed to the fact that, in the second embodiment, the lock releasing member 21 rotates with the leg supporting member 19—19*b*, when the table leg is moved from folded to extended position and vice-versa. For comparison it will be observed that, in the first embodiment, the lock-releasing plunger 6 and arm 5 remain relatively stationary with respect to the pivotal movement of the leg.

In Figure 7 it will be noted that the leg 18 of the L-shaped corner brace, has two rectangular apertures 20—20 formed therein substantially 90 degrees apart, and on the same arc. In this respect one of the apertures 20 receives the said free end of the said short leg of member 21, when the table leg is in folded position. In open or extended position a similar notch receives the short leg, thus providing positive locking of the table-leg in folded and extended positions.

To provide an additional support for the table-leg, when same is in its extended position, stops 18*b* and 18*c* are engaged by the table-leg supporting member 19—19*b*.

The leg supporting member is designed to accommodate legs of various rectangular cross-sectional dimensions. This is provided for by progressively varying the width of each arm of the leg supporting member in definite steps, as shown in Figures 7 and 9. Therefore, the leg can have any desired cross-sectional dimension within the range covered by the chosen steps, without detracting from the appearance of the finished article. Thus, as a means of presenting a symmetrical appearance in combination with any one of several sizes of legs, the leg supporting member has an angular shape and each arm thereof is cut to present a stepped effect.

The operation of the second embodiment is similar to that described for the first embodiment, except, in the second embodiment, the button 22 must be pressed when the leg is folded or opened.

The third embodiment

The third embodiment combines the salient features of the first and second embodiments. Thus, it will be observed that the third embodiment, illustrated in Figures 11, 12 and 13, utilizes a flanged corner brace similar to that employed in the first embodiment, and the very important feature of having the locking tip 53 engage apertures in one leg of the corner brace to provide positive locking. The third embodiment further utilizes the feature of having the armor stopping against the base of the corner brace, which in combination with the arrangement of the locking plunger, presents an unusually rigid folding-leg construction.

Referring now to Figures 11 and 12, it will be observed that the third embodiment employs an L-shaped corner-brace having flanges 42 firmly gripping corresponding sides of the table-top and to align the corner brace with respect to the perimetrical flange of the table top. In this respect the third embodiment is quite similar to the construction of the U-shaped corner-brace of the first embodiment. Wood screws 3 and 3*a* serve to securely attach the L-shaped corner-brace 41 to the corresponding flanges 2 and 2*a* of the table-top.

An arm 43 is rigidly secured to the leg of the corner-brace lying in face contacting relation with the table-top flange 2*a* by welding or riveting. The arm 43 projects outwardly from the aforesaid leg substantially parallel with the other leg of the corner-brace lying in face contacting relation with the table-top flange 2.

Thus, one leg of the corner-brace 41 and the arm 43 form a socket for receiving the upper end of a table-leg 10.

Similar to the construction employed in the first embodiment, the upper end of leg 10 is covered with a thin sheet-metal armor 91. A wood screw 8 serves to secure armor 91 to leg 10. Therefore, the armor provides very substantial and permanent bearing faces, which faces operate within the socket formed by arm 43 and the one leg of the corner-brace 41. It is to be further understood that the armor is slightly wider than the thickness of the leg, so as to provide metallic stops for the leg, when the leg is in its extended or operating position.

As particularly shown in Figure 12, a hollow shaft 15 extends through aligned apertures in the corner-brace, armor, leg and arm, to pro-

vide the pivotal attachment of the leg to the corner-brace. The hollow shaft 15 is secured to corner-brace 41 and arm 42. Thus, leg 10 and armor 91 pivot about the hollow shaft 15.

A plunger 61 passes through the hollow shaft 15. As shown in Figure 12, the outer end of the plunger 61 is provided with a push-button 6b, which push-button operates in an aperture fashioned in table-top flange 2 in alignment with hollow shaft 15. A spring 13 serves to bias the plunger 61 outwardly.

On the inner end of plunger 61 an arm 51 is permanently secured to the plunger 61 by riveting. The free end of the arm 51 is provided with an elongated locking-tip 53 having a taper 531 at its end. Such taper is illustrated in Figure 13.

From the foregoing it will be obvious that the spring 13 normally biases the locking-tip 53 toward the table-top flange 2. Therefore, the leg of the corner-brace 41 lying in face contacting relation with table-top flange 2 is provided with a V-shaped notch 44 and an aperture 44a.

Referring to Figure 11, it will be observed that the locking-tip 53 is angularly offset with respect to the vertical center-line of the table-leg, as illustrated by the character C. Accordingly, with the leg in its extended position, as illustrated in Figure 11 the V-shaped notch 44 is located so that the tapered face 531 of the locking-tip 53 wedges against one face of the V-shaped notch, as shown in Figure 13. This construction provides a pivoted table-leg more rigidly secured in its extended position than ever before realized with known commercial construction. Particular reference is made to the compensating effect of the taper face 531, which, from the very nature of the novel construction, automatically takes-up lost motion produced by wear, or variations encountered in manufacturing. This feature is a very valuable contribution.

In the folded position of the table leg, the lock need not be as secure as that provided for the extended or operating position. Therefore, an aperture 44a is provided in corner-brace 41 within which the free end of the locking-tip 53 lodges, when the leg is in its folded position. The angular movement, indicated by the character A, corresponds, with the relative movement of the locking-tip 53, when the table leg is moved from its extended to its folded position.

The operation of the third embodiment is quite similar to that of the other two, in that the button 6b is depressed to move the locking-tip 53 out of engagement with the V-shaped notch 44, when it is desired to move the leg to its folded position. Ordinarily, the aperture 44a is tapered so that it is not necessary to press the button 6b, when it is desired to move the leg to its extended position. On the other hand it is obvious that the aperture 44a could be replaced by a V-shaped notch or otherwise constructed to provide a positive and rigid lock for the leg in its folded position.

In the first embodiment the axis of arm 5 is angularly offset 45 degrees as illustrated in Figure 1, while in the third embodiment the axis of arm 51 is angularly offset 27 degrees as shown in Figure 11 and designated by the character C.

Having thus described my invention, I claim:

1. In combination with a table-top having a perimetrical frame; a leg pivotally attached to the frame so as to be swung from a folded position parallel to the table-top to an upright supporting position at right-angles to the top; means carried by the frame for locking the leg in its upright position, said means comprising a member extending through the pivotal axis of the leg and axially movable therein in a direction substantially at right-angles to the direction of movement of the leg, said member having a locking tip offset with respect to the pivotal axis of the leg, for moving into and out of locking engagement with the table leg, when the said member is moved axially in one or the opposite direction, respectively; and a spring for biasing the said member in the said one direction into locking engagement with the said leg.

2. In a folding table; a table-top; a pair of connected side rails secured to the table-top, and extending substantially at right-angles one to the other; a corner brace having two legs at an angle to each other conforming with the angle formed by the inner faces of the connected rails, and secured to the inner faces of said rails in face contacting relation throughout substantially their length, to brace the corner formed by the connected rails; an arm secured to one of said legs and spaced from and substantially parallel to the other leg of said brace; a table leg disposed between the said arm and the said other leg of said brace; a plunger carried by the said arm and the said other leg of the corner brace extending through the said table leg and axially movable therein; said rail adjacent the other leg of said brace having an aperture therein in axial alignment with the said plunger and receiving the outer end thereof; means for rigidly locking the leg with respect to the table-top, when the leg is moved to an upright position substantially at right-angles to the table-top; means operatively interconnecting the inner end of the said plunger and said locking means, for releasing the locking means, when the said plunger is moved inwardly, so that the table leg may be moved from the said upright position to a folded position substantially parallel to the table-top; and a spring normally biasing the said plunger outwardly.

3. In combination with a table-top, having a perimetrical frame; a leg pivotally attached to the frame so as to be moved from a folded position parallel with the table-top to an upright supporting position at right angles with the top; a plunger extending through the said frame and through the pivotal axis of the said leg, said plunger having a locking tip at its inner end offset with respect to the pivotal axis of the said leg, and projecting toward the inner face of the said frame; a spring normally biasing the locking tip of the said plunger toward the inner face of the said frame, for moving the said locking tip into locking position, when the leg is moved to its supporting position; and a button formed on the outer end of the said plunger, actuatable by an operator, for moving the said plunger and locking tip inwardly and out of locking position.

4. In a folding table; a table-top having a perimetrical flange; a leg support secured to the said flange; a table leg pivotally secured to the said support; a plunger extending from the outer face of the said flange, through the said flange and through the pivotal axis of the said leg, the said plunger having at its inner end a locking tip projecting outwardly toward the inner face of the said flange for locking the said leg to the said support, when the leg is moved to an upright position substantially at right angles with the table-top; a spring normally biasing the locking tip toward the inner face of the said

flange; and a button formed on the outer end of the plunger, actuatable by an operator, for releasing the lock between the leg and the support, so that the leg may be moved from its upright position to a folded position substantially parallel with said table-top.

5. In combination with a table having a depending perimetrical flange; a leg pivotally mounted at the inner side of the said flange; a reciprocating plunger extending through the flange, and through the pivotal axis of the said leg having a locking tip at its inner end offset with respect to the pivotal axis of the said leg, the said locking tip projecting outwardly toward the inner face of the said flange for locking said leg to the flange, when the leg is moved to a vertical position; a spring normally biasing the locking tip toward the inner face of the said flange; and a button formed on the outer end of the plunger, actuatable by an operator, for releasing the lock between the leg and said frame.

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