TABLE WITH FOLDING LEGS

Inventors: William P. De Saussure, William P. De Saussure, III, both of Englewood, N.J. 07632

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ABSTRACT

A table with folding legs, each leg having a supporting member operable with a locking mechanism for retaining the leg in an extended and retracted position and each locking mechanism having a releasing device for disengaging the supporting member in order to retract the leg. The supporting member for each leg is pivotally connected to its respective leg at one end and has mounted at its other end detent means which engages a cam surface that is provided with a recess to receive the detent means to lock the leg in an extended position. A leaf spring maintains the detent means in contact with the cam surface as the supporting member moves with the folding leg and also retains the detent means in the recess when the leg is in a locked position. The releasing mechanism upon actuation lifts the detent means from the cam recess in opposition to the force applied by the leaf spring and allows the leg to be manually folded with the leaf spring remaining in contact with the supporting member to provide a retaining force to keep the leg in a folded position. For tables of normal height and of lengths less than 60 inches the legs are mounted such that for each pair of legs one leg will be folded one on top of the other with the first leg lying flush with the underportion of the table and the other leg lying directly on top of the first leg.

3 Claims, 6 Drawing Figures
TABLE WITH FOLDING LEGS

This invention relates to a table with folding legs and, in particular, to a structure for mounting each leg to the underside of the table including a mechanism for locking each leg in an extended position and associated releasing mechanisms for allowing the legs to be folded and retained in a retracted position.

Conventional tables with folding legs have a number of inherent defects. For example, due to the fact that the legs must be mounted in a pivotal manner and provided with locking mechanisms, it has been difficult to mount them at the extreme corners of the table. Also, the locking mechanisms are often poorly designed and susceptible to wear under normal usage so that they quickly lose their effectiveness.

An object of the present invention is to provide a new and improved table having folding legs mounted at or near the extreme corners of the table.

Another object of the present invention is to provide a table of the above character in which a mechanism is provided for locking the legs selectively either in a stable extended position or in a collapsed position.

A further object of the present invention is to provide a table of the above character in which the locking mechanism for the legs is easily operable and is concealed when the legs are in a collapsed position.

Another object of the present invention is to provide a table of the above character having a leg-locking mechanism that will not be affected by normal manufacturing tolerances nor by extended use.

A representative embodiment of the present invention consists of pairs of legs pivotally mounted to the underside of the table at its extreme corners. For conventional tables having heights of about 29 inches and which have lengths less than 60 inches, the mounting points for the legs are selected to enable pairs of legs to fold one on top of the other with the first leg lying flush with the table top and the other leg lying directly on top of the first leg. For tables more than 60 inches long the folding of legs one on top of the other is not required. There is a separate locking mechanism for each leg which comprises a support arm pivotally connected to the leg at one end and having detent means fixedly mounted at its other end. The detent means rides along a cam surface of a guide plate as the leg is manually extended or retracted. The guide plate is appropriately mounted with respect to the leg and is provided with a recess to receive the detent means in order to lock the leg in place in the extended position. A compression spring is provided to maintain the detent means in contact with the cam surface and to retain it within the recess in a locked position. The compression spring also provides a force against the support arm when the legs are folded in order to maintain the legs in the retracted position.

The releasing mechanism comprises an actuating rod pivotally mounted on the underside of the table and having an actuator member secured thereto. When the actuator member is depressed the actuator rod forces the detent means out of the recess in the guide plate thereby releasing the leg and enabling it to be moved to the retracted position.

These and other objects and advantages of the invention will be more fully apparent from the detailed consideration of the following detailed description of a preferred embodiment, taken in conjunction with the accompanying drawings in which:

FIG. 1 is a bottom plan view of a table with folding legs constructed according to one embodiment of the invention, intended for use with tables less than 60 inches in length;

FIG. 2 is a sectional view along line 2—2 of FIG. 1;

FIG. 3 is a sectional view similar to the view of FIG. 2 except that the table illustrated in this figure has a length greater than 60 inches;

FIG. 4 is a perspective view of a pair of legs and a locking and releasing mechanism for one of the legs of the present invention with the legs in the extended position;

FIG. 5 is a perspective view of a leg and its respective locking and releasing mechanism, with the leg in a partially retracted position; and

FIG. 6 is a perspective view similar to FIG. 5 but showing the leg and its respective locking mechanism in the retracted position.

Referring to FIG. 1, a table 10 has fixedly mounted on two opposite sides thereof, angle irons 36 and 38. Pivoted at points 40 and 42 at the opposite ends of the angle iron 36 near two of the corners of the table 10 are plates 12 and 14 respectively, to which the legs 20 and 22 are fixedly mounted, respectively. Similar plates 16 and 18, having legs 24 and 26 secured thereto, are pivotally mounted at points 44 and 46 at the opposite ends of the angle iron 38 near the two other corners of the table. The legs 20, 22, 24 and 26 are provided with locking mechanisms 28, 30, 32, 34 respectively, which are appropriately mounted with respect to the corresponding legs as shown.

As shown in FIG. 2, the radial distances between the pivot points 40 and 42, respectively, and the points 44 and 46, respectively, where the legs 20 and 22 are secured to the plates, should differ by an amount sufficient to enable one leg to be positioned on top of the other in such fashion that the two legs are parallel with respect to both the underside of the table top and to each other.

By mounting the legs in this fashion they will pivot about the points 40 and 42, respectively, when they are manually folded or extended and in the latter case pivot into a position close to the corner of the table and perpendicular thereto. The pivot points 40 and 42 and the leg-mounting points 44 and 46 can be selected in order to bring the legs when extended into a position as near the corners as desired (as can be seen in FIGS. 4 and 5).

The locking mechanism 28 is best illustrated in FIGS. 4, 5 and 6 which show the legs in erected, partially erected and retracted positions, respectively. It includes a supporting arm 56 pivotally mounted at one end to the plate 12 at the point 58. Mounted at the other end of the support arm 56 is detent means consisting of a pin 60 extending perpendicularly from the side of the support arm 56 and which is adapted to ride on a cam surface 62 formed on a plate 64. The guide plate 64 is secured to the angle iron 36 in a position perpendicular to the bottom of the table 10. Formed in the cam surface 62 on which the pin 60 rides is a recess 66 into which the pin 61 is adapted to be received in order to lock the support arm 56 and consequently leg 20 in the extended position. A compression spring 68, which is anchored to the angle iron 36 at the point 70 applies force to the support arm 56 so as to maintain the pin 60 in engagement with the cam surface 62. When the leg 20 is in the extended position shown in FIG. 1, the spring 68 retains the pin 60 in the recess 66, thereby locking the leg in the extended position. The compression spring 68 also serves to retain the leg 20 in a folded position, as illustrated in FIG. 6, in a manner to be discussed below.

In order to move the leg 20 from the locked extended position to the collapsed or retracted position, the detent means 60 must be lifted out of the recess 66 in opposition to the force applied by the compression spring 68. This is accomplished by an actuator arm 72 mounted at one end on a rod 74 supported by brackets 76 and 78 secured to the underside of the table. The rod 74 is free to rotate about its axis within the brackets 76 and 78 and is adapted to be rotated by an actuator plate 80 secured thereto.

When the legs are in the extended and locked position as shown in FIG. 4, each leg is firmly held in that position due to the fact that there is no play in the linkage provided by the support arm 56 between the firmly held detent means 60 and the pivot mounting point 58 on the plate 12. The working parts of the locking mechanism (e.g., the support arm 56, the cam surface 62, the part of the plate 65 bounding the recess 66, and the pin 60) are preferably case hardened or otherwise treated to minimize wear and insure long life with effective locking action.
In order to retract the leg from the locked position, the actuator plate 80 is depressed towards the undersurface of the table, thereby lifting the end of the recess 66 in opposition to the force applied by the compression spring 68. The leg 20, together with the plate 12 is pivoted manually about the point 40 as shown in FIG. 5, causing the detent pin 60 to slide down the cam surface 62. The detent pin 60 is kept in constant contact with the cam surface 62 by the compression spring 68 which remains in contact with support arm 56 and thereby continually applies a retaining force to the pin 60.

As the leg is folded to the retracted position, the pivot 58 on the support arm 56 with travel through an arc of 90° until the edge 50 of the plate 12 comes to rest on the bottom surface of the table (FIG. 6). In this position, the support arm 56 will assume a horizontal position relative to the bottom side of the table and the distance between the retracted leg and the bottom surface of the table will depend on the mounting of the legs as previously discussed and illustrated in FIGS. 2 and 3.

Once the legs are retracted into the completely folded position (FIG. 6), the compression spring 68 aids in retaining the legs in that position since it remains constantly in contact with the support arm 56.

To release the leg from the folded position, all that is required is to manually lift the leg to cause it to pivot with the plate 12 about the point 40. This rotates the connecting point 59 of the plate 12 to which the support arm 56 is attached through an arc which lifts and moves the support arm in the same direction as the leg. It is to be noted that the compression spring 68 still remains in contact with the support arm thereby maintaining the detent means in contact with the cam surface. When the leg is in the extended position and the detent means 60 reaches the recess 66 it snaps into locking position therein, locking the leg securely in the open position.

The angle iron 36 not only provides means for mounting the plate 12 and the plate 64 on the table 10 but also conceals the locking mechanism and leg mounting brackets from view when the legs are extended. Also, the angle iron is provided with a lip 37 which runs along its entire length parallel to the surface of the table. The edge of the lip 37 acts as a guide along which the leg slides as it is being folded or extended. The plate 12, support arm 56, compression spring 68 and guide plate 64 are mounted so as not to extend beyond the lip 37 so that they are not in the path of travel of the leg as it is folded or unfolded.

In the case of tables greater than 60 inches in length, the mounting points 44' and 46' where the legs 20' and 22', respectively, are secured to the plates 12' and 14', respectively, may be located equal radial distances from the pivot point 40' and 42', respectively, as shown in FIG. 3. The locations for these pivot points are selected so that the legs in the extended position will be in predetermined spaced relations to the corners of the table. The locking mechanism associated with each leg is identical to that described above with respect to FIGS. 4, 5 and 6.

The present invention, therefore, provides a table with folding legs that are mounted in such a manner as to provide the table with a high degree of stability. Furthermore, the locking mechanism provides an efficient and reliable device for locking the legs in an extended position that is unaffected by extended use or manufacturing tolerances. Moreover, the locking mechanism permits the detent pin 60 out of a rigid extending position but also retains the legs in a retracted position preventing an accidental extension of the legs when in this position.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. In a folding table, the combination of a leg pivotally mounted for movement between a first position substantially parallel to the plane of the table and a second position substantially perpendicular to the table, an arm having one end coupled to the leg for movement therewith and having detent means at its other end, retainer means on the table adapted to cooperate with said detent means to retain the leg in said second position, means urging said detent means and said retainer means into cooperating relation, the actuator means for releasing said detent means comprising an arm having one end coupled to the leg in said second position to permit said leg to be moved to said first position, with said urging means retaining said leg in said first position, said actuator means including a rod rotatably mounted on the table, an actuator arm projecting outwardly from one end of the rod to a position adjacent said retaining means so that the actuator arm is movable into engagement with said detent means when the leg is in said second position, and an actuator plate attached to the rod for rotating the same to move the actuator arm into engagement with the retent means to disengage the latter from the retaining means and thereby enable the leg to be moved to said first position.

2. In a folding table having a leg with corners the combination of a first leg pivotally mounted near one of said table corners for movement in a given plane between a first position substantially parallel to the table and a second position substantially perpendicular to the table, a second leg pivotally mounted near an adjacent corner of said table for movement in a said given plane between a first position substantially parallel to the table and a second position substantially perpendicular to the table, the radial distances from said first and second legs to the respective pivot points therefore being different by an amount sufficient to enable one leg to be positioned on top of the other in such fashion that the two legs are substantially parallel with respect to both the underside of the table top and to each other, separate locking means for each of said legs, said locking means comprising an arm having one end coupled to the respective leg for movement therewith and having detent means at its other end, retainer means on said table adapted to cooperate with said detent means to retain said respective legs in said second position, means urging said detent means and said retainer means into cooperating relationship and actuator means for releasing said detent means from said retaining means when said respective legs are in said second position to permit said legs to be moved to said first position, said urging means retaining said legs in said first position, said actuator means including a rod rotatably mounted on the table, an actuator arm projecting outwardly from one end of the rod to a position adjacent said retaining means thereby enabling the leg to be moved to said first position.

3. In a folding table, the combination of a leg pivotally mounted for movement between a first position substantially parallel to the table and a second position substantially perpendicular to the table, an arm having one end coupled to the leg for movement therewith and having detent means at its other end, retainer means on the table adapted to cooperate with said detent means to retain the leg in said second position, means urging said detent means and said retainer means into cooperating relation, the actuator means for releasing said detent means comprising an arm having one end coupled to the leg in said second position to permit said leg to be moved to said first position, with said urging means retaining said leg in said first position, said actuator means including a rod rotatably mounted on the table for movement about its axis, a portion of the rod projecting to a position adjacent said retaining means forming an actuator arm, so that said portion is movable into engagement with said detent means when the leg is in said second position, and a manually operable means attached to the rod for rotating the same about its axis to move the actua...
tor arm into engagement with the detent means to disengage the latter from the retaining means and therefore enable the leg to be moved to said first position.