Dec. 26, 1939. E. F. KNOWLES 2,184,500

FOLDING TABLE AND OPERATING MEANS THEREFOR

Filed Feb. 5, 1938 2 Sheets-Sheet 1

Fig. 1.

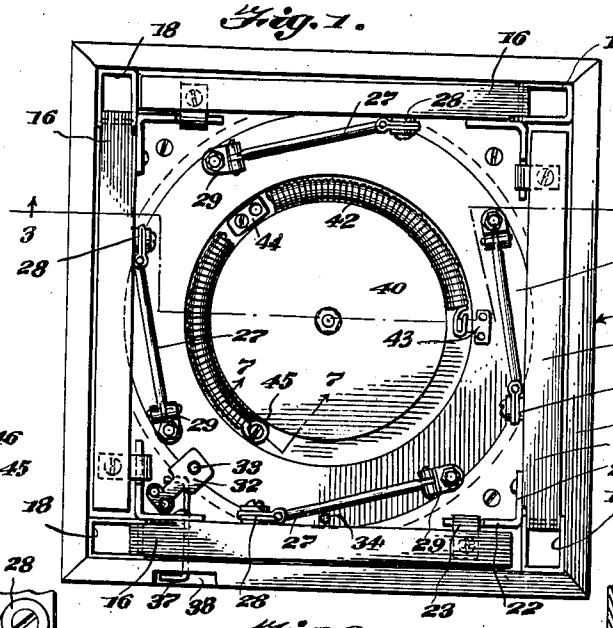


Fig. 7.

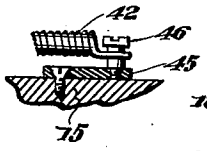


Fig. 10.

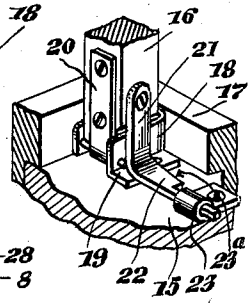


Fig. 8.

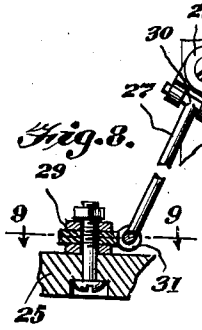


Fig. 2.

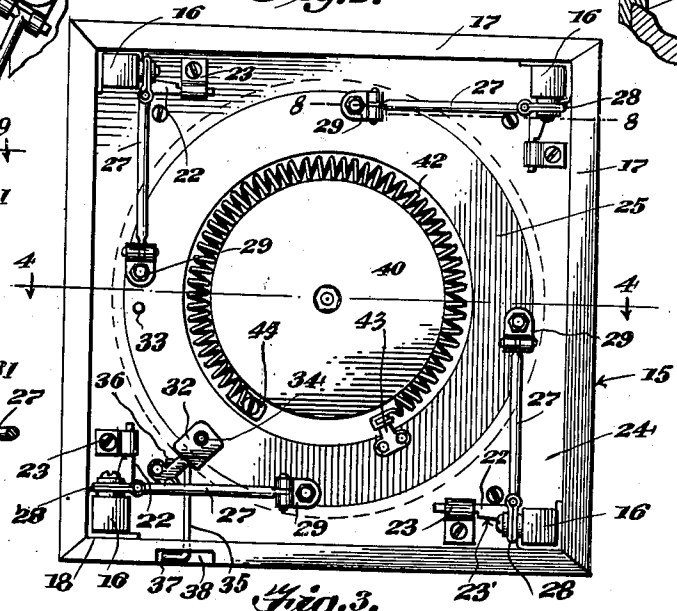


Fig. 9.

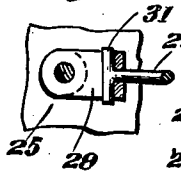
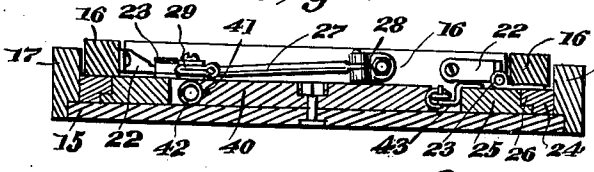


Fig. 3.



Inventor
EDWIN F. KNOWLES

By Irving R. M. Cathcart
Attorney

Dec. 26, 1939. E. F. KNOWLES 2,184,500

FOLDING TABLE AND OPERATING MEANS THEREFOR

Filed Feb. 5, 1938 2 Sheets-Sheet 2

Fig. 4.

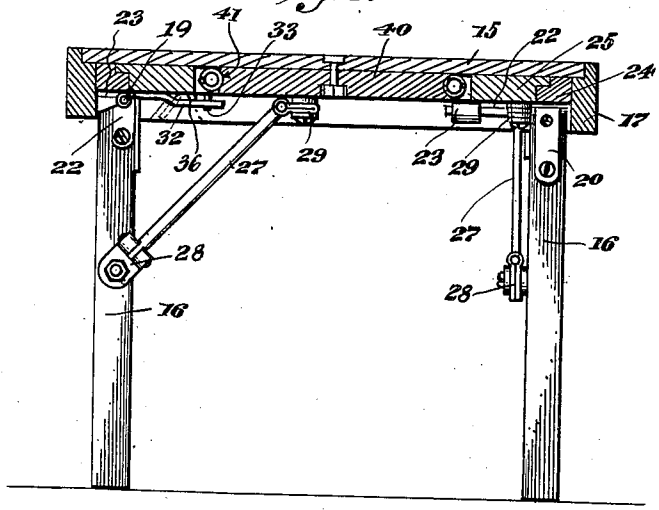


Fig. 5.

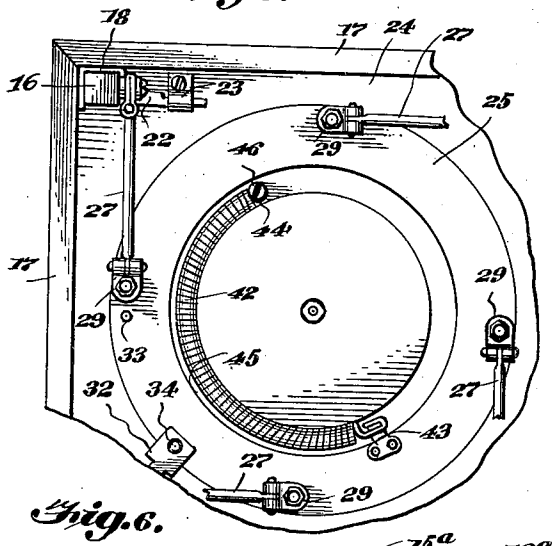


Fig. 11.

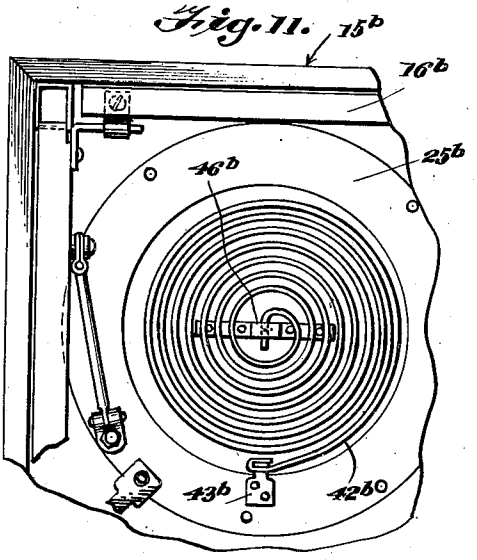


Fig. 6.

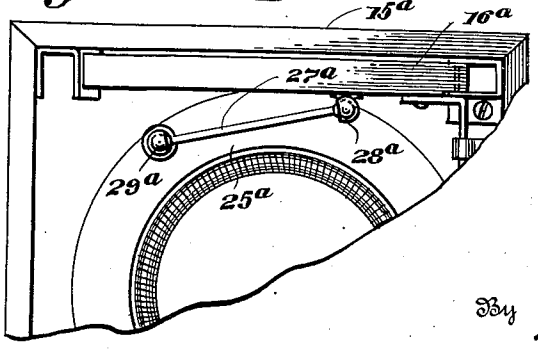
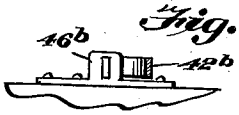


Fig. 12.



Inventor
EDWIN F. KNOWLES

By Irving R. McCathran

Attorney

Patented Dec. 26, 1939 2,184,500

UNITED STATES PATENT OFFICE

2,184,500

FOLDING TABLE AND OPERATING MEANS THEREFOR

Edwin F. Knowles, Globe, Ariz.

Application February 5, 1938, Serial No. 188,987

3 Claims. (Cl. 311—82)

This invention relates to a self-closing, or self-opening folding table, and has for one of its objects the production of a simple and efficient means for simultaneously moving all of the legs of a table to or from an open position as one of the legs is moved.

A further object of this invention is the production of a simple and efficient folding table and the like, having novel leg bracing means for providing a sturdy and secure support and brace for the legs.

Other objects and advantages of this invention will appear throughout the following specification and claims.

In the drawings:

Figure 1 is a bottom plan view of a table and the like, showing the legs in a folded position;

Figure 2 is a bottom plan view of a table and the like, showing the legs in an extended position, showing the operating spring in a position to automatically move the legs to a folded position;

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 1;

Figure 4 is a transverse sectional view taken on line 4—4 of Figure 2;

Figure 5 is a fragmentary bottom plan view of the table and the like with the parts in an extended position;

Figure 6 is a fragmentary bottom plan view of a modified form of the invention illustrating a ball and socket connection for the leg brace;

Figure 7 is a sectional view taken on line 7—7 of Figure 1;

Figure 8 is a sectional view taken on line 8—8 of Figure 2;

Figure 9 is a sectional view taken on line 9—9 of Figure 8;

Figure 10 is a sectional perspective view of a portion of one corner of a table and leg, showing the hinge connection therefor;

Figure 11 is a fragmentary bottom plan view illustrating a modified spring control of a spiral spring type for actuating the legs; and

Figure 12 is a side elevational view of the means for anchoring the inner end of the spiral spring shown in Figure 11, a portion of the spring being shown in transverse section.

By referring to the drawings, it will be seen that 15 designates the top of the table, which will be referred to as a body, in view of the fact that the element 15 may constitute a table top, chair seat, or other structure, which is adapted to be supported by the legs 16. The body 15 carries side rails 17 which depend from the edges of the body 15, as shown in Figure 4. A substantially U-shaped yoke hinge 18 is fitted in each corner of the body 15 and is secured to the underface of the body 15 and the inner faces of the rails 17 by means of screws or other suitable anchoring means. These yoke hinges 18 constitute an efficient bracing means for the corners of the body 15 and rails 17, thereby forming a rigid frame for the legs 16. One leg 16 is hingedly secured within each yoke hinge 18 by means of a hinge pin 19 which passes through the yoke hinge 18 and through a hinge plate 20 carried by the inner end of the leg 16. The yoke hinge 18 is provided with an open face facing outwardly in the direction of swing of the leg 16 as shown in Figure 10, to permit the legs 16 to freely swing to and from an open and a closed position. A hinge brace 21 is carried by each leg and comprises an angular member secured to one side of the leg 16 having one end 22 extending laterally of the leg 16. The outer extremity of the end 22 is journaled in a spaced bearing 23, which bearing 23 is in alignment with the hinge pin 19. This brace 21 strengthens the leg 16 at its hinge connection and braces the leg against lateral strain. It should be noted that the end 22 of the hinge brace 21 is provided with an inclined inner side edge 23a this side edge being inclined to provide a tapering side toward the outer extremity of the end 22 and prevent the binding of this hinge brace against the adjoining outer end of the adjoining leg 16 when the legs are moved from a folded to an open position.

The body 15 carries upon its under face a retaining plate 24, which is engaged by an actuating ring 25. The actuating ring 25 is supported upon an overlapping annular flange or trackway 26 formed along the inner edge of the plate 24, as shown in Figure 3. The ring 25 extends flush with the plate 24.

Each leg 16 is engaged by a bracing and actuating link 27, as shown in Figures 1 and 2, and these links 27 are in turn connected to the actuating ring 25. A pivoted hinge clip 28 connects each link 27 to the legs 16 and a pivoted hinge clip 29 connects the opposite end of the link to the ring 25. The links 27 are attached to the ring 25 at a point distant from the hinge axis of the leg 16 so that the link will produce an hypotenuse of an isosceles right triangle equal to the chord of the arc described by rotating the ring 25, a sufficient amount to draw the leg down flat against the plate 24. The above referred to isosceles triangle is formed by attaching the link 27 to the leg 16 at a point below the hinge axis equal to the distance from the hinge axis to the point of

attachment to the ring 25. Each link 27 is provided with a T-shaped head 30 which is journaled in the hinge clip 28 and a T-shaped end 31 extending in a plane at right angles to the head 30 which end 31 is journaled in the clip 29.

A spring latch 32 is secured to the plate 24 and overhangs the ring 25. This latch 32 is apertured to receive one of the spaced pins 33 and 34, the pin 33 being positioned to hold the parts in a folded or closed position, and the pin 34 being placed to hold the parts in an open position. A disengaging trigger 35 is journaled in one of the rails 17 and is provided with an angle end 36 which fits under the latch 32. A crank handle 37 is carried by the opposite end of the trigger 35 and lies in the notch 38 formed in one of the rails 17. By turning the trigger 35, the latch 32 may be raised out of engagement with one of the pins 33 or 34 with which it has engaged.

The body or table top 15 is provided with a central disc 40 which may be secured to the body or table top 15 in any suitable or desired manner, and is provided at its periphery with a concave channel 41 for receiving the tension coil spring 42 which is located between the ring 25 and the edge or periphery of the disc 40. The tension spring 42 is connected at one end to a hook 43 carried by the ring 25 adjacent its inner periphery. A pair of spaced anchoring plates 44 and 45 are secured to the under face of the body or table top 15 within the channel formed by the space between the inner periphery of the ring 25 and the outer periphery of the disc 40. One end of this spring 42 is adapted to be anchored in selective engagement with one of the plates 44 or 45, by securing the pin 46 in engagement with one of the plates, such as the plate 45 shown in detail in Figure 7. When the spring is in the position shown in Figures 1 and 2, and the pin 46 engages the plate 45, the spring 42 will automatically move the parts to a position to automatically extend the legs to an open position when the spring latch 42 is released from the pin 33. When the pin or screw 46 is anchored in engagement with the plate 44, as shown in Figure 5, and the spring 42 is in the position shown in Figure 5, the spring will automatically pull the legs 16 to a closed or folded position when the latch 32 is released from the pin 34.

From the foregoing description, it will be seen that merely by reversing the position of the spring 42 and without substitution or addition of parts, the table may be readily converted into an automatic self-opening or an automatic self-folding table.

As shown in Figure 2, the spring 42 is under tension and when the latch 32 is released from the pin 34, the spring 42 will rotate the ring 25 counterclockwise, causing the legs 16 to automatically swing to a closed position whereby the legs may assume a folded position under the table top, such as is shown in Figure 1, when the spring 42 is in a contracted position. If it is desired, the operator may, through the medium of a screw driver disconnect the end of the spring 42 from the pin 46 carried by the plate 45 and connect the said end of the spring to the pin carried by the plate 44, extending the spring in a reverse direction to that shown in Figure 1, or in that position shown in Figure 5. The latch 32 should then engage the pin 34 to hold the ring 25 in the position shown in Figure 5, and the legs 16 will be extended. When the ring 25 shown in Figure 5 is rotated in a counterclockwise direction to bring the pin 33 into engagement with the latch 32, the spring 42 will be extended and under tension. When the latch 32 is released from the pin 33 the tension of the spring 42 will rotate the ring 25 shown in Figure 5, in a clockwise direction and automatically swing the legs 16 to an extended position.

As shown in Figure 6 I have illustrated a modified form of the invention wherein a table top 15*a* is illustrated having legs 16*a* similar to the legs previously described, and an actuating ring 25*a*, one leg 16*a* being connected to the actuating ring 25*a* by means of an actuating link 27*a*, which link is connected to the ring 25*a* and leg 16*a* respectively, by means of ball and socket joints 29*a* and 28*a* respectively. The other parts of the device are similarly constructed to the structure previously described, with the exception that ball and socket joints are employed as a connecting medium between the leg and ring structure.

In Figure 11, there is shown a further modified form of the invention, wherein a table top 15*b* is illustrated, which is provided with suitable supporting legs 16*b* operated and constructed similar to that structure previously described. The actuating ring 25*b* which is similar to the actuating ring 25, however, carries a hook 43*b* which engages one end of a spiral spring 42*b*, which spiral spring 42*b* is connected at its opposite end to an anchoring plate 46*b* as is shown in Figures 11 and 12.

It should be understood that the device, such as the table top, rails, legs, and other parts, may be constructed of wood, metal, or other material without departing from the spirit of the invention, and that the present structural features are adaptable for use in connection with folding chairs, as well as tables, and other articles of the same general type. Furthermore, it is pointed out that the particular hinge structure illustrated in detail in Figure 10 may be applied to other types of hinged devices.

Certain detail changes in the mechanical construction, as well as arrangement of parts may be employed without departing from the spirit of the invention, so long as such changes fall within the scope of the appended claims.

Having described the invention, what I claim as new is:

1. A device of the class described comprising a body, a plurality of legs hingedly secured to the under face of said body, a retaining plate secured to the under face of said body and having a central annular opening, a supporting flange formed around the periphery of said opening, an annular actuating member having a supporting flange along its outer periphery and fitting in engagement with said first mentioned flange for retaining said annular actuating member in an operative position, actuating links connected to said actuating member and said legs whereby all of said legs will be simultaneously moved from one position to another position as said actuating member is rotated, a second annular actuating member having an annular spring-receiving channel, a tension coil spring fitting within said channel, means for anchoring one end of said spring to said first mentioned annular actuating member, and means for selectively anchoring the opposite end of the spring to said body whereby the first mentioned actuating member may be selectively and auto-

matically moved to and from an opening and closing position, said actuating member being adapted to be normally locked in one position.

2. A device of the class described comprising a body, a plurality of legs hingedly secured to the under face of the body and having an annular opening, an annular actuating member suspended from said retaining plate, means connecting said actuating plate with said legs for simultaneously moving the legs to and from an extended position as said actuating member is rotated, the actuating member being adapted to be normally locked in one position, a second annular actuating member mounted within the first mentioned actuating member and spaced therefrom, a coil spring secured to the actuating member at one end and to said body at the other end intermediate the actuating members, and the coil spring partly encircling the periphery of the second actuating member and being located between the said actuating members and shielded thereby.

3. A device of the class described comprising a body, a plurality of legs hingedly secured to the under face of the body and having an annular opening, an annular actuating member suspended from said retaining plate, means connecting said actuating plate with said legs for simultaneously moving the legs to and from an extended position as said actuating member is rotated, the actuating member being adapted to be normally locked in one position, a second annular actuating member mounted within the first mentioned actuating member and spaced therefrom, the periphery of the second actuating member having a concave channel, a coil spring secured to the actuating member at one end and to said body at the other end intermediate the actuating members, and the coil spring partly encircling the periphery of the second actuating member and being located between the said actuating members and shielded thereby and fitting within the concave channel.

EDWIN F. KNOWLES.