United States Patent

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[54] **FOLDING-TELESCOPING SUPPORT**
13 Claims, 9 Drawing Figs.

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[51] Int. Cl. **A47b 3/00**
[50] Field of Search 108/11-118; 16/190; 287/14; 5/312

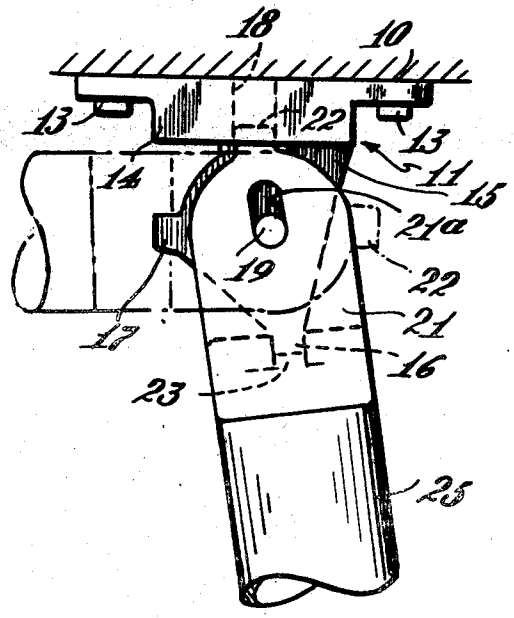
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ABSTRACT: Folding-telescoping support structure having completely self-contained, manually manipulatable means for shifting and securing between extended and collapsed positions of adjustment, and between erected and folded positions of assembly.



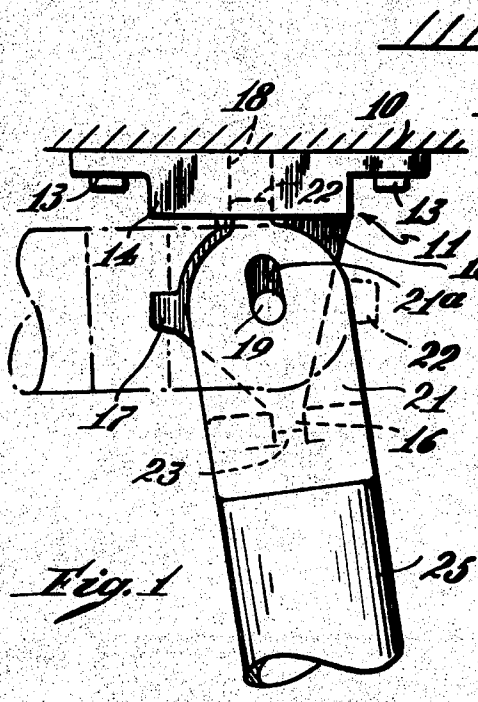


Fig. 1

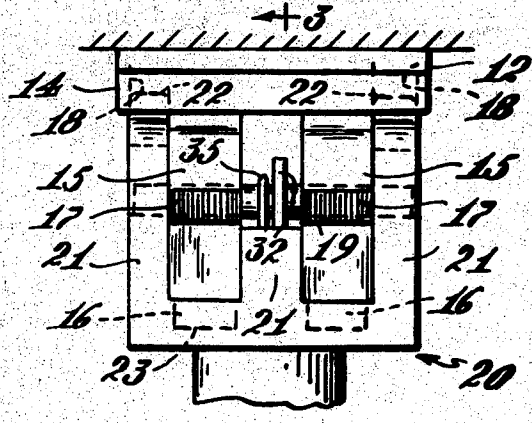


Fig. 2

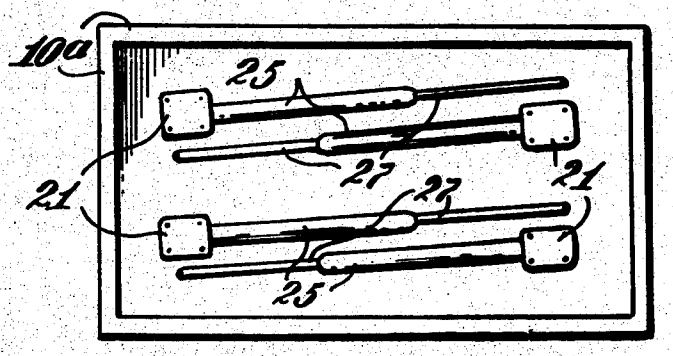


Fig. 7

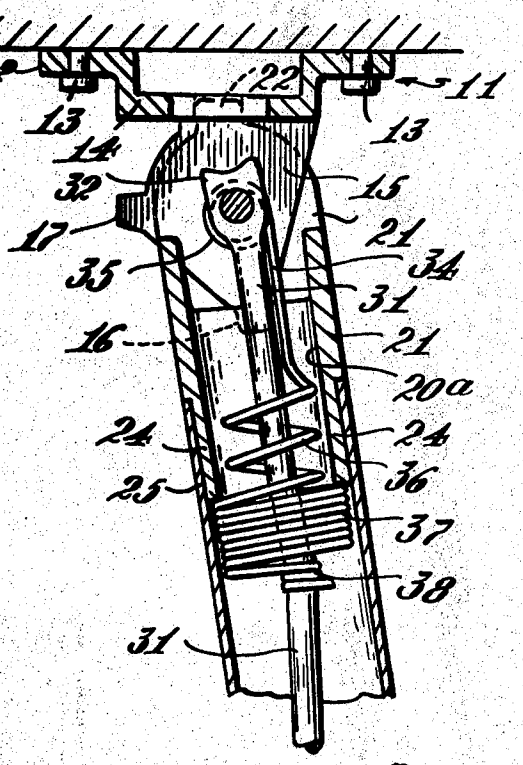
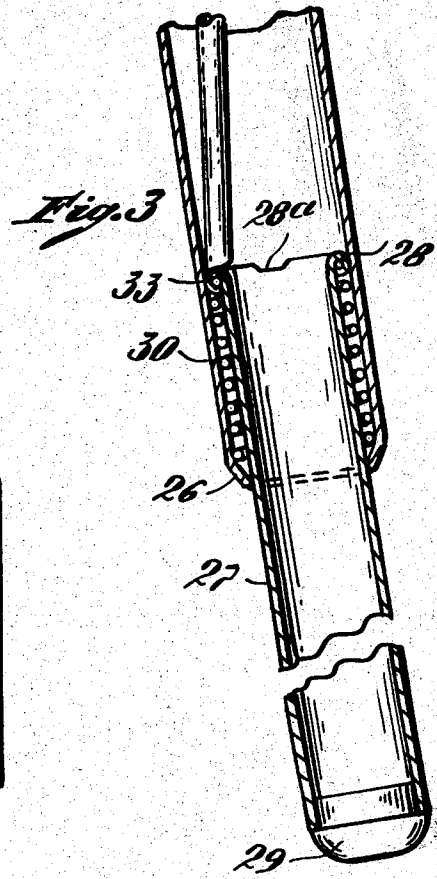


Fig. 3



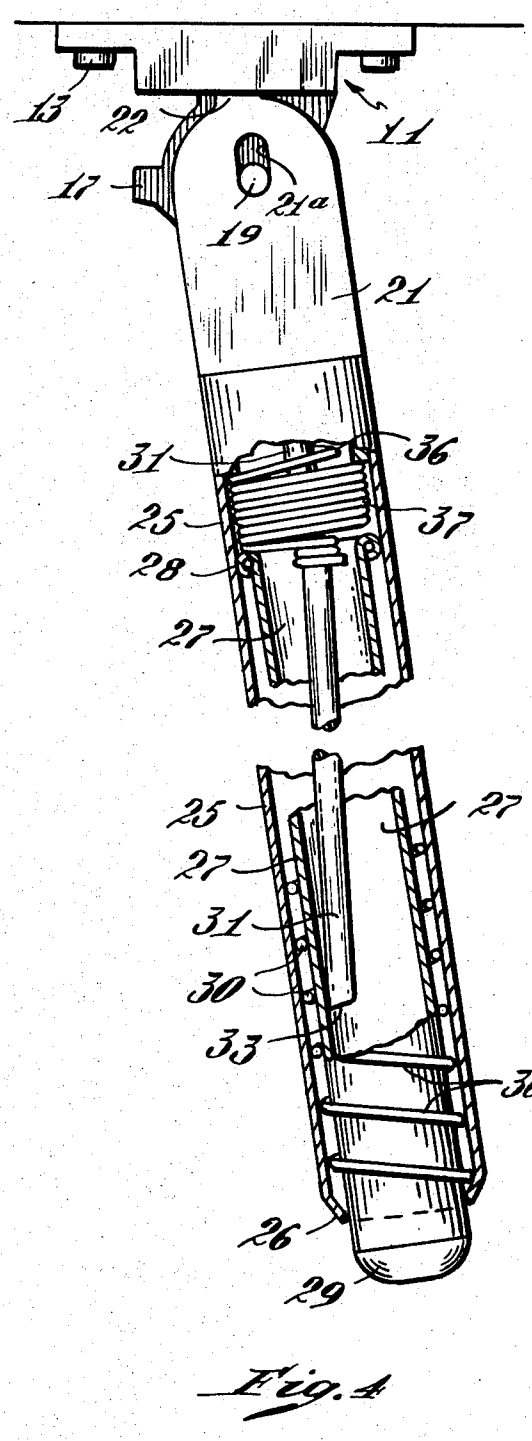


Fig. 4

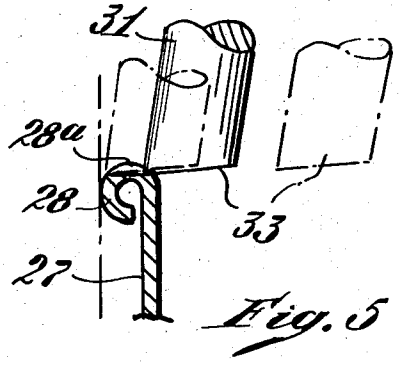


Fig. 5

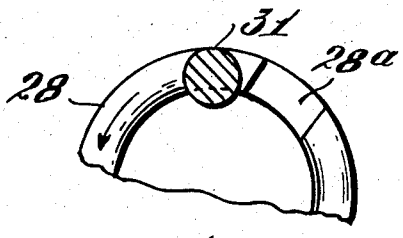


Fig. 6a

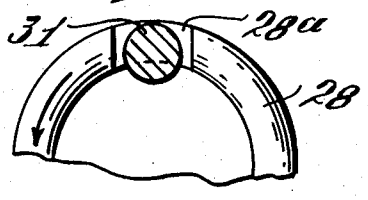


Fig. 6b

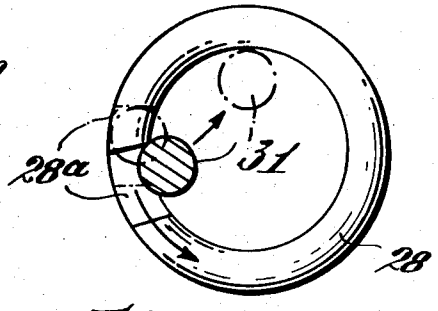


Fig. 6c

FOLDING-TELESCOPING SUPPORT

BACKGROUND OF THE INVENTION

The invention relates to adjustable supports, and more particularly to folding-telescoping support structure characterized and distinguished by completely self-contained, manually manipulatable means for its adjustment, for erecting folding by longitudinal and pivotal movement of an upper section, and for extending collapsing by longitudinal and rotational movement of a lower section.

So far as applicants are aware, the improvements by this invention are, in the herein claimed combination, entirely new to the art.

SUMMARY of THE INVENTION

A folding-telescoping support, or leg, is provided wherein the folding-telescoping mechanism is self-contained within leg structure comprising solid closed tubing, and wherein resilient biasing means are utilized both for releasably securing the leg selectively in the erected and folded positions, and for staying the leg in the extended position and subject to release to the collapsed or lower position, as for supporting selectively at greater and lesser heights.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be fully understood by reference to the following description taken together with the accompanying drawings in which:

FIG. 1 is a side view of a pivotal portion of a table or the like leg according to the invention;

FIG. 2 is a like view at right angles to FIG. 1;

FIG. 3 is a vertical section on the line 3 of FIG. 2, showing a leg of the invention in the erected, extended position;

FIG. 4 is a like view of the leg in the collapsed or lowered position;

FIGS. 5 and 6*a*, *b*, 6*c* illustrate the rotation of the lower tube and the release thereby of the leg stay means to allow the telescoping of the leg tubes from the extended position of FiG. 3 to the collapsed position of FIG. 4; and

FIG. 7 shows the folded positioning of the leg used as table understructure.

In the preferred embodiment of the drawings, the invention support structure or leg is shown as applied to a top 10 such as of a table, chair, stand, stool or other supporting, working, game playing, etc. surface of any and every description, and which may be, for merely illustrative example, wholly or partly of durable, waterproof, plastic construction.

Among the end uses thus far known for the support or leg of this invention may be mentioned: tables; chairs, stands; stools; game boards; portable barriers; tripods portable carpenter's horses; portable camping equipment, sun umbrellas; tent supports; portable lecterns; portable benches; nautical equipment, general instrument or equipment support and pedestals; music stands; display racks; artist's work boards; and the like. In these and other applications, it will be understood, the leg hereof may be utilized in varying number and in combination or not with a supporting surface such as the top 10.

The invention support or leg, comprises a pivot structure having a fulcrum 11 formed with a plate portion 12 suitably adapted or apertured for removably securing as by the screws 13 to the underside of the top 10.

The fulcrum 11 is further defined by an intermediate portion or base 14 which may be squared or paralleled faced, as shown, FIG. 2, or canted in either direction normal to the pivot, for inclining the leg in that direction to any desired extent.

Dependent from said base 14 are pivot projections herein comprising a pair of spaced-apart ears or arms 15.

In accordance with the invention, the downfacing ears 15 are formed with still further projecting detent or lug pairs 16, 17, said lug pairs arranged or oriented in downfacng and side-facing directions for engaging the associated tube pivot structure in the erected and folded positions of the leg respectively.

The fulcrum 11 is seen further to have in its base portion 14 a pair of recesses or pockets 18, the same located outside fulcrum ears 15 and for receiving detent means of the associated pivot structure to be described, when the leg is in the erected position.

The fulcrum ears 15 are apertured to receive a pin or the like transverse pivot bearing 19, which may be press or otherwise fitted to the apertures of the ears 15 to preclude its lateral sliding therethrough.

The invention leg further comprises as the associated pivot structure a yoke member 20 provided with upstanding arms or ears 21, FIG. 2, extending intermediate and outside the fulcrum ears 15 and having flat faces closely interfitting therewith for desired rigid, side-play free pivoting of the yoke and fulcrum about the bearing 19.

The outer yoke ears 21 are seen to be provided with the detents or lugs 22 extending upwardly in the erected leg position for reception then in the aforementioned fulcrum pockets 18 as shown, FIGS. 1—3.

In accordance with the invention, the yoke ears 21 are provided further with the longitudinal slots 21*a*, FIG. 1, whereby the fulcrum and yoke are afforded a degree of relative reciprocating movement as well as relative pivotal movement about the bearing 19, all as hereinafter to be described.

The yoke 20 is formed at the base of and intermediate the ears 21 with detent or lug recesses or pockets 23 receiving the fulcrum ear detents 16 when the yoke ear detents or lugs 22 are received in the fulcrum pockets 18, FIGS. 1 and 2.

A centrally dependent neck or stem portion 24, FIG. 3, is formed on the yoke for rigid interfitting with upper leg tube 25, for which interfitting the stem portion 24 may as herein be dimensioned for a tight fit within the tube upper end.

The upper tube 25 of the invention leg structure is of generally straight, smooth, open construction, and is formed at its other or lower end with a reducing taper 26, FIG. 3, for a purpose to be mentioned.

The support structure hereof comprises further a lower leg tube 27, FIG. 3, arranged for telescoping or collapsing within the upper tube 26, and formed at its upper end with a rim, flange or the like 28 extending outwardly to close between and slidingly engage upper tube 25, and thereby also to confine the leg collapsing spring means hereinafter mentioned.

In accordance with the invention the lower tube rim 28 is formed generally to engage or seat, and is provided with a flattened indentation or notch 28*a* by which to release, the means hereinafter described for staying the leg in the extended position.

The lower tube 27 is closed at the bottom as by a suitable floor engaging tip 29 or the like, which may be of plastic or other suitably durable material, and which may be of the illustrated smooth rounded configuration, or may have such other characteristics of shape and surface as desired or appropriate to the intended use of the support structure.

In accordance with the invention, a spring 30 is compressed between the lower tube rim 28 and upper tube taper 26, the said rim and taper 28, 26 closing the space provided between the tubes for the said spring 30, and by their two point circumferential bearing interface assuring a smooth sliding fit and wobble-free telescoping action of the tubes 25, 27.

The invention support further comprises a leg-stay means herein formed as a rod 31 having an upper end 32, which may be flattened and wherein it is apertured to receive and pivot about bearing pin 19.

The yoke 20 is formed centrally with a throughgoing bore passage 20*a*, FIG. 3, through which the rod 31 extends downwardly into the upper tube 25, and whereby the rod is permitted freedom of movement, by the means thus far described, for reciprocating in any direction across, and swinging or gyrating in either direction about, the inside of said upper tube 25.

At its other or lower end the rod 31 is formed with a bevel 33 inclined inwardly from a point at the outside of the rod, FIG. 3. The leg-stay seating configuration of the lower tube

rim 28 is, then, of the indicated rounded shape, or such other form as coacts with bevel 33 to hold rod 31 on, or urge it outwardly on, the rim of seat 28, the more so under relative endwise closing or collapsing pressure on the tubes 25, 27.

In accordance with the invention, completely enclosed, self-contained means are utilized conjointly to releasably secure the leg structure in one or another of its erected-folded pivoting positions, and in one and the other also of its extended-collapsed telescoping positions.

As herein embodied such release locking means comprise the spring 34 having at its upper end a wrap 35 around the pivot 19.

Within the yoke passage 20*a*, the spring 34 has an intermediate open coil 36 smaller than the yoke passage, the same merging with a dependent larger closed coil 37, and which intermediate coil 36 is stretched or tensioned by the engagement of larger coil 37 around the periphery of the passage 20*a* at the underside of the yoke stem 24, all as clearly shown in FIG. 3.

The spring 34 terminates at its lower end in a closed spiral wrap 38 around the rod 31, by which it functions to yieldably position the leg stay, at its lower extremity or bevel 33, against the inside of the upper tube 25, at some point around the periphery thereof. For such positioning, or more particularly canting or biasing, of the leg stay against the tube side, the spring wrap 38 may be offcenter; or it may be more or less centered and the rod 31 bent thereat, as herein shown, FIG. 3.

A support structure or leg of the invention is shown in FIGS. 1 and 3 as in the assembled or erected position with the erect-locking fulcrum and yoke detents 16, 22 releasably secured in their respective pockets 23, 18 by the action of spring 34 pulling the pin 19 downwardly to the bottom of the yoke ear slots 21*a*. It will be understood that the spring 34 may be of a force, at the tensioned coil 36, to require the desired or an appreciable downward pull on the tube 25, whereby to reciprocate the fulcrum and yoke relative to the bearing 19 and as permitted by the slots 21*a*, and so to withdraw the pivot locking lugs from their respective pockets, freeing the hinge parts for swinging of the leg from the erected position of FIGS. 1 and 3 to the folded position shown dotted in FIG. 1. Upon such pivoting, and more particularly upon release of the aforementioned yoke-fulcrum shifting pull on the leg tube, the alternate or collapse-locking fulcrum detents 17, FIGS. 1 and 3, will be seen to be snapped into place in the yoke pockets 23 to secure the leg in the disassembled or folded position of FIG. 7, this by the continued action of the biasing spring 34 as just described.

To swing the invention leg from the folded to erected position will be seen merely to require the reverse of the manipulation just described, with the tube 25 being again pulled to free fulcrum detents 17 from yoke pockets 23, and then released, after swinging downwardly to the FIGS. 1, 3 and 4 position, to allow spring return of the yoke locking detents 22 to the fulcrum pockets 18, and of the fulcrum detents 16, in place of the detents 17, to the yoke pockets 23.

It will be understood that suitably fitted with the invention understructure, and with the legs in the erected position the supported surface or top 10 may have many uses such as herein before mentioned, and that with the leg support structure of the invention folded the top 10 may still have a variety of lowered surface uses, such as for a game board, while also being fitted by such leg folding for compact storage, as in a closet.

Considering now the extending-collapsing manipulation of the invention support structure, the leg hereof may if in the retracted position of FIG. 4 be adjusted to the extended position of FIG. 3 simply by pulling down on the lower tube 27 until the top of that has cleared stay 31, freeing the latter to be resiliently urged or biased by spring 34 against the side of the upper tube 25 as shown, FIG. 3. IT will be understood in this connection that the leg of the invention may be positioned both in the erected and in the folded positions whether in the extended or collapsed condition.

Upon its subsequent release, the tube 27 will be urged by the spring 30, as well as by the weight bearing on the tube 25, against the stay 31. And the greater the pressure of said spring 30 and tube supported weight, the greater the force thereby canting the top of the stay against the tube 25, through the camming interaction of the lower tube rim 28 and the leg stay bevel 33.

As already mentioned, when fitted with the invention legs as adjusted to the extended position of FIG. 3, a surface or top 10 may have various types of relatively higher elevation uses, such as particularly for a typing table, sewing table, dinner, bar and bedside table and the like.

With the support structure of this invention, when it is desired to convert the table or the like top 10 to a different or lower elevation type of use, such as for a coffee table, TV table or living room or end table, no tools are needed, and it is not necessary either to provide or manipulate anything whatever projecting without the leg tubes, the converting mechanism being wholly contained within completely closed leg structure as herein shown and described.

To effect the conversion, then, or more particularly the telescoping of the lower tube 27 within the upper tube 25, and the dropping thereby of the top 10 from the higher to the lower supported position, the user need merely rotate the lower tube 27 to a sufficient amount to effect the release or disengagement of the leg stay 31, while simultaneously applying a slight pressure toward the fulcrum 11.

The rotation of the tube 27, indicated as counterclockwise or to the left in Fig. 6, serves first to shift the rim notch 28*a* until the rod 31 is brought from any other point on the rim 28 to a position in which the rod is seated in said notch 28*a*, by the action or pressure of spring 30 contracted between the rim 28 and taper 26. The tube 27 rotation, again, relatively advances rod 31 from any other point of engagement with rim 28, as represented in FIG. 6*a*, to the desired seating of it in the notch 28*a*, as represented in FIG. 6*b*, and by the leftmost, dash-line position of FIGS. 5 and 6*c*.

The continued rotation of the tube 27 serves to swing or gyrate the rod 31 around the inside periphery of tube 25, as compelled by its confinement within, and hence thrust engagement by the back (in this case) side of the notch 28*a*.

Now the rod 31 is urged by the spring 34, and more particularly by its spiral 38, against a particular point on the tube 25 wall. Thus when the rod 31 has been rotated or swung from that point through a sufficient arc, which may be on the order of, say, a quarter turn, it will be seen that the direction of force of the spring 34 is then such as to urge the rod 31 inwardly out of the notch, as indicated in solid line, FIGS. 5 and 6*c*, the spring 34 tending thereupon to return the rod to its original point of bearing engagement against the tube 25 wall, as indicated by the rightmost, dash-line rod positions of FIGS. 5 and 6*c*.

Such inward forcing of the rod 31 out of the notch 28*a* serves to free the spring 30 to thrust the lower tube 27 upwardly within the upper tube 25, the effect of which is, of course, to drop the lower tip or bevel 33 of the rod 31 within the lower tube 27 as shown in FIG. 4. It will be understood the force of spring 30, or alternatively or conjointly manual force, may be relied upon to advance rim 28 past bevel 33 before that can be reseated thereon by the described action of spiral 38.

To complete the telescoping or retracting of the leg structure, the lower tube 27 may be manually advanced until the tube rim 28 engages the stop means provided, as herein by the intermediate spring coil 37, FIG. 4.

From the foregoing it will be seen that the invention apparatus is adapted for adjustable, low cost portable tables and the like, such as affording a work surface of any suitable dimension, for example 16 inches by 32 inches.

The invention support structure has been shown further to comprise a work surface supporting leg which is foldable and adjustable in two positive locking positions, one for a greater height, say 26 inches, and one for a lesser height, say 13 inches, of the supported surface.

IT will be appreciated that with the invention support structure tables and the like are enable to be attractively styled, to be both rugged and lightweight, to be designed to take advantage of mass production techniques, and to be firm and stable when open or erected.

The invention leg structure may be provided or mounted in any desired number and arrangement, may be proportioned for erecting to any desired height, and may be retractable for nesting within the rim or skirt of a top of any desired size. Further the table legs may, by appropriate positioning of the hinge lugs, be erected at any desired angle, and mounted to project at that angle to any desired extent relative to the periphery of the supported top.

As illustrated in FIG. 7, for one example, the legs may be oriented to pivot in parallel planes that deviate from the longitudinal axis of the table **10**, whereby without interference the legs may be mounted at corresponding distances from the side, and at the same distance from the end, margins **10***a* of the table.

The invention leg structure may be fabricated in any of various desired or suitable materials, such as zinc die castings for the fulcrum and yoke, spring steel wire for the hinge and leg springs, steel rod for the leg stay, and painted or chrome-plated welded steel tubing for the leg tubes.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents falling within the scope of the appended claims.

We claim:

1. In a table or the like, in combination, a top, and a plurality of foldable-extensible legs therefor, said legs adapted for erected support of the top at different heights and for folded storage of the same, each said leg comprising;

a pair of telescoping tubes, the lower of said tubes sliding within the upper between extended and collapsed positions of top support at greater and lesser heights;

a yoke secured to said upper tube;

a fulcrum secured to said top;

detent means on one end for engaging the other of said yoke and fulcrum to lock the leg selectively in the erected and folded positions;

pivot bearing means for said yoke and fulcrum affording their relative shifting between detent engaged and disengaged positions;

spring means for biasing said yoke and fulcrum to the detent engaged positions; and

leg-stay means associated with said spring means for supporting said lower tube in its said extended position, said leg-stay means adapted to be disengaged by relative rotation of the tubes whereby said lower tube may be telescoped from the extended to its said collapsed position within the upper tube.

2. The apparatus of claim 1, wherein the fulcrum has a plate portion for screwing to the underside of the top.

3. The apparatus of claim 1, wherein the yoke has a dependent stem rigidly interfitting the upper tube upper end.

4. The apparatus of claim 1, wherein the yoke and fulcrum have oppositely extending, slidably interfitting male and female projections and pockets affording rigid support and side-play free pivoting of the leg.

5. The apparatus of claim 2, wherein said detent means comprise lugs on one and lug pockets on the other of said yoke and fulcrum, the lugs arranged to engage in the pockets in both the ere erected and the collapsed position of the leg.

6. The apparatus of claim 1, wherein the pivot bearing means comprise pin means transversely received through holes in one and slots in the other of said yoke and fulcrum, and wherein the slots are oriented for shifting of said detent means in and out of their said engaging in both said erected and folded positions.

7. The apparatus of claim 6, wherein said holes are in the fulcrum, and said spring is stretched between said pin means and said yoke.

8. The apparatus of claim 7, wherein said spring is passed through and engages the underside of said yoke.

9. The apparatus of claim 1, wherein said yoke has a longitudinal through passage extending downwardly from said pivot bearing, and wherein said leg-stay means comprises a rod supported on said bearing and extending downwardly through said passage with freedom of movement thereby for universal swinging within said tube.

10. The apparatus of claim 1, wherein said spring means engages said leg-stay means yieldably to bias the same into engagement with said lower tube.

11. The apparatus of claim 9, wherein said spring means has a coil wrapped around said rod and arranged to bias the same out of alignment with the leg and against the inside of the upper tube, and thereby into endwise engagement with the lower tube.

12. The apparatus of claim 8, wherein said spring means is arranged also to stop the telescoping of and thereby define the collapsed position of said lower tube.

13. The apparatus of claim 1, wherein the legs are oriented to pivot in parallel planes that deviate from the longitudinal axis of the table, whereby without interference the legs may be mounted at corresponding distances from the side margins and at the same distance from the end margins of the table.