Feb. 24, 1959 C. J. FOX 2,875,007

VERTICALLY ADJUSTABLE SUPPORT FOR TABLE TOPS AND THE LIKE

Filed Feb. 11, 1957 2 Sheets-Sheet 1

Fig. 1.

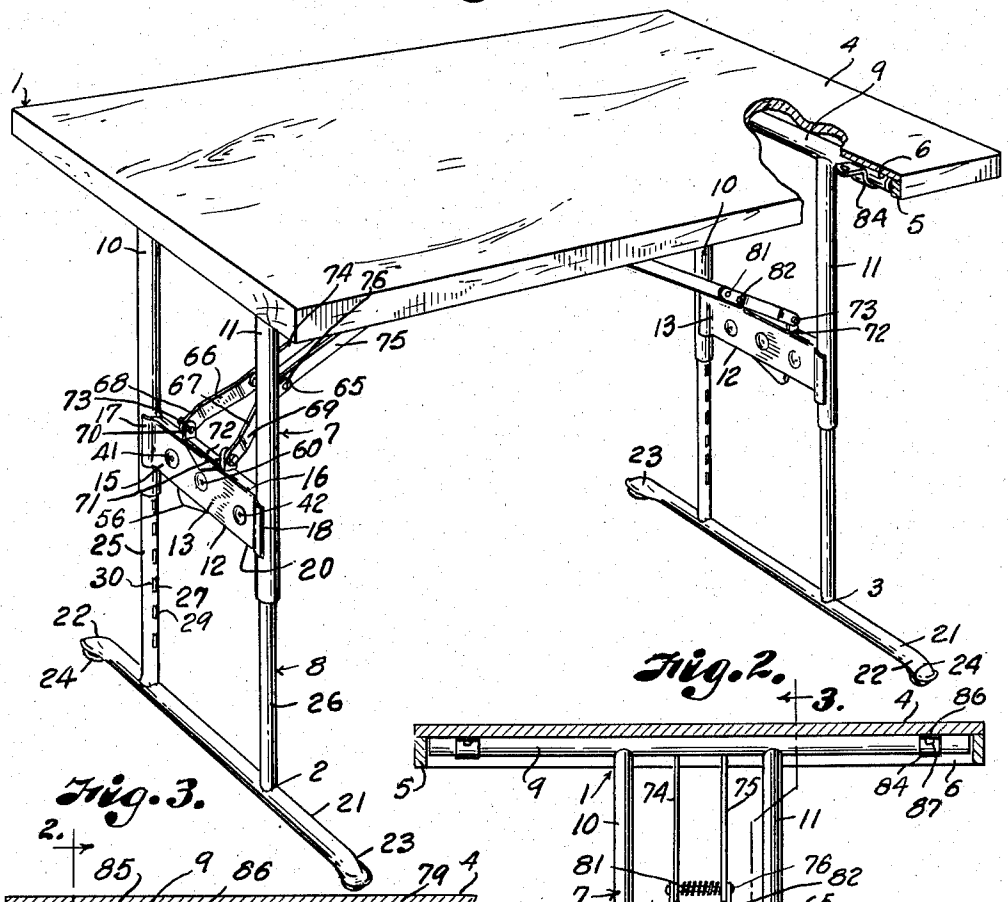


Fig. 2.

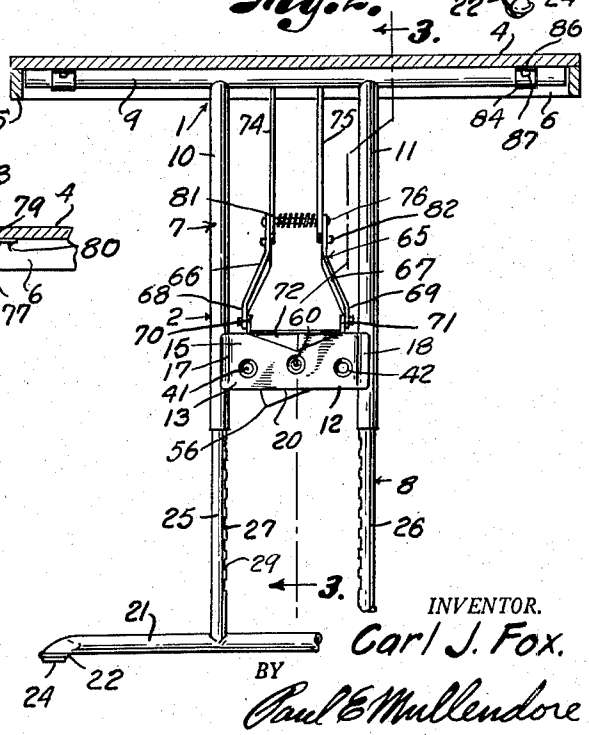
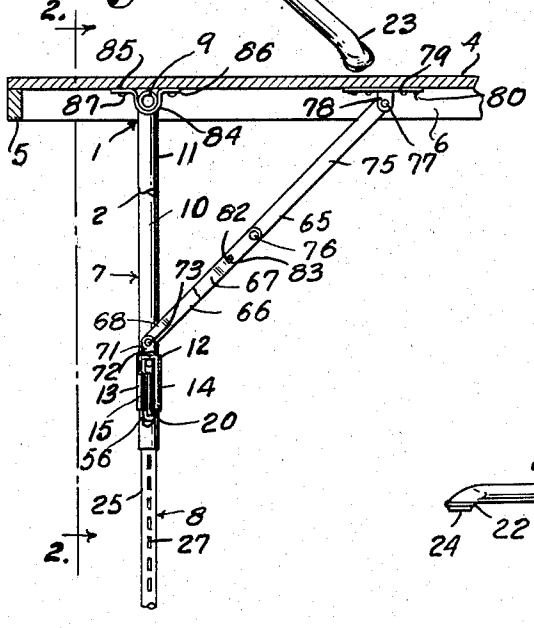


Fig. 3.



INVENTOR.
Carl J. Fox.
BY
Paul E. Mullendore
ATTORNEY

Feb. 24, 1959 C. J. FOX 2,875,007

VERTICALLY ADJUSTABLE SUPPORT FOR TABLE TOPS AND THE LIKE

Filed Feb. 11, 1957 2 Sheets-Sheet 2

Fig. 4.

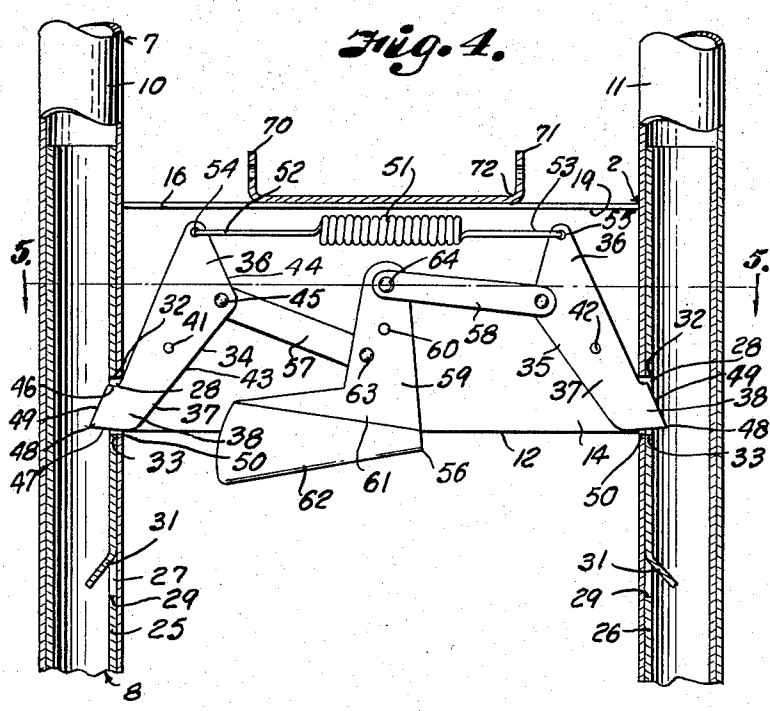


Fig. 7.

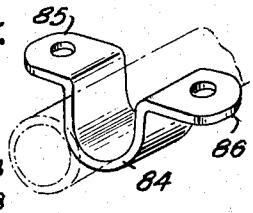


Fig. 8.

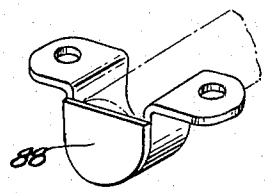


Fig. 5.

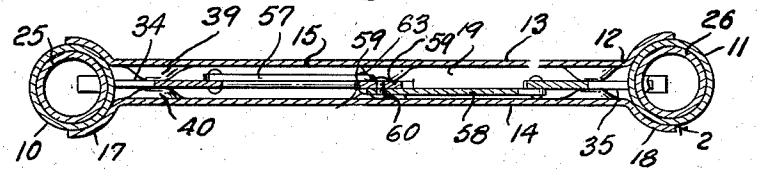


Fig. 6.

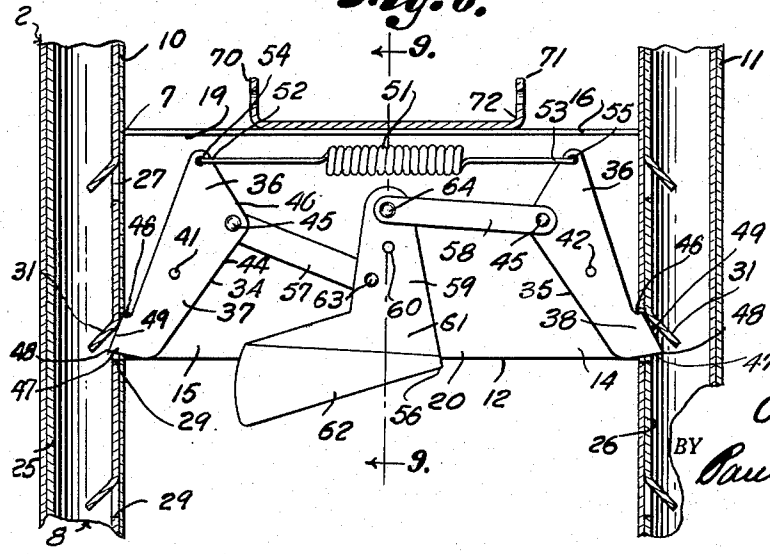
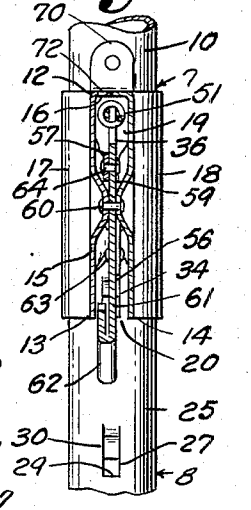


Fig. 9.



INVENTOR.
Carl J. Fox.
BY Paul E. Mullendore
ATTORNEY

United States Patent Office 2,875,007 Patented Feb. 24, 1959

2,875,007

VERTICALLY ADJUSTABLE SUPPORT FOR TABLE TOPS AND THE LIKE

Carl J. Fox, Clear Lake, Iowa, assignor of one-half to Maxine E. Warren, North Miami Beach, Fla.

Application February 11, 1957, Serial No. 639,489

7 Claims. (Cl. 311—39)

This invention relates to a vertically adjustable support for table tops and the like which are to be supported at different heights. For example, churches, schools and similar gathering places have banquet tables which ordinarily include table tops that are supported on sawhorses or folding legs, so that they may be stored when not in use. It is desirable to use such tables in the kindergarten and children's departments, but the supports therefor have been a problem for such adaptation, in that prior supports have not been practicable to provide legs which are short enough for the smaller children and which may be lengthened for the convenience of adults. This is because of the relatively close adjustments that are required for the children's groups, and the relatively higher position required to bring the table top to a standard height. In most instances it has been necessary to compromise by providing legs of somewhat medium length and to utilize blocks to bring the legs to the required maximum height. The blocks are unattached, are difficult to place, and, being unattached, are soon lost. Even when tables are provided with telescoping legs, it is difficult to make the lower adjustments and to assure locking of the legs at maximum height.

It is, therefore, a principal object of the present invention to provide vertically adjustable table supports comprising telescoping leg portions which are easily and safely adjusted for different heights.

It is also an object of the invention to provide the telescoping leg portions with a latch mechanism including detents which operate automatically when adjusting the legs upwardly through the low height range and which lock automatically at the maximum height to require manual release thereof.

It is a further object to provide a single leg assembly for each end of the table that is substantially flat and compact when folded to lie in an out of way position against the under side of the table top, and whereby one table top may be stacked upon another without interference by the leg assemblies.

Other objects of the invention are to provide telescoping leg assemblies having leg portions amply spaced apart for stabilizing the table in lateral direction; to provide individual latch means for the spaced apart leg portions; and to provide for simultaneous operation of the latches by means of a single release lever.

In accomplishing these and other objects of the invention as hereinafter pointed out, I have provided improved structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a table equipped with vertically adjustable supports constructed in accordance with the present invention, a part of the table top being broken away to better illustrate the pivotal connection of the supports with the table top.

Fig. 2 is a vertical cross section through the table on the line 2—2 of Fig. 3.

Fig. 3 is a vertical longitudinal section through one end of the table on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged fragmentary sectional view showing the latch mechanism for connecting the leg portions of the upper and lower sections of the support, the leg portions being shown in the high position with the detents of the latch mechanism shown in locked position so that the table top cannot be raised or lowered without manually releasing the detents.

Fig. 5 is a horizontal section on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary section similar to Fig. 4 but showing the adjustment in the lower range to which the table top is adapted to be supported and with the detents engaged for automatic release upon manual adjustment of the table top.

Fig. 7 is a perspective view of one form of bracket used for pivotally connecting the leg assembly with the under side of the table top.

Fig. 8 is a modified form of bracket.

Fig. 9 is a sectional view through the latch mechanism on the line 9—9 of Fig. 6.

Referring more in detail to the drawings:

1 designates a table equipped with supports 2 and 3 constructed in accordance with the present invention. The table includes a top 4, which may be of various shapes, lengths and widths, however, in the present illustrations the table top is rectangular and substantially elongated to conform with the tables used in churches, schools, clubs, and similar gathering places where the table may be adjusted to different heights.

The top 4 may comprise a single slab or sheet of plyboard, or the side and end marginal portions may be provided with a depending rim 5 to provide an underneath recess 6 into which the supports are adapted to be folded. Each support includes an upper section 7 and a lower section 8. The sections are preferably formed of tubing to provide a substantially strong, light weight construction. The upper leg section 7 comprises a cross member 9, preferably having a length to fit snugly within the width of the recess 6, as shown in Fig. 2. Fixed to and extending laterally from the cross member 9 are leg portions 10 and 11. The leg portions 10 and 11 are spaced apart a suitable distance to provide for lateral stability of the table, and they are short enough to permit lowering of the table top 4 to its lowermost position. The lower end of the leg portions 10 and 11 are interconnected by a tie member 12. The member 12 is preferably formed of two parts 13 and 14, each having a plate portion 15 and an inturned flange 16 extending along the upper edge thereof to cooperate with the other member in providing an enclosure for the latch mechanism, later described. The ends of the plate portions 15 have flanges 17 and 18 shaped to embrace the leg portions 10 and 11 and which are suitably connected therewith as by welding or the like.

When the parts 13 and 14 are assembled as shown and connected with the leg portions 10 and 11, they provide a substantially rigid tie and also a compartment 19 open along the length of the bottom thereof, as indicated at 20.

The lower leg section 8 includes a transverse tube 21 having the ends shaped to provide feet 22 and 23 for attaching casters or slides 24. Fixed to and extending upwardly from the tube 21 in coaxial spaced relation with the leg portions 10 and 11 of the upper section are leg portions 25 and 26. The leg portions 25 and 26 have an outside diameter to be slidably contained within the inside diameter of the leg portions 10 and 11, as best shown in Figs. 4, 5 and 6. The facing sides of the leg portions 25 and 26 of the lower section have a linear series of spaced apart openings 27 starting near the cross bar 22 and extending upwardly of the leg portions through a low range of adjustments necessary to

accommodate the height of the table top 4 to the children's group. Formed in each leg portion 25 and 26 above the series of openings 27 are one or more openings 28 for the upper adjustments.

The openings 27 are preferably rectangular and formed by slitting the material of the leg portions transversely to provide stops 29 at the lower ends of each opening, and the material is slit upwardly to form the sides 30 of the openings. The displaced material forming the openings 27 is preferably struck inwardly at the upper ends of the slits to provide upwardly sloping stops 31 for limiting inward movement of the detents, later to be described.

The material displaced in forming the openings 28 is completely removed, so that the upper and lower ends of the openings constitute stops 32 and 33, respectively. The length of the openings 28, that is, the distance between the stops 32 and 33, is greater than the length of the lower series of openings 27 to effect locking of the leg portions of the leg sections together, as later described.

The latch mechanism includes detents 34 and 35, which are best illustrated in Figs. 4, 5 and 6. The detents are of like construction and have an upwardly extending arm 36 and a downwardly extending leg 37 terminating in a lateral foot 38. The detents are pivotally mounted between instruck bosses 39 and 40 on the respective plate portions 15 by means of pins or rivets 41 and 42. The inner side edges 43 and 44 of the leg and arm portions converge to accommodate a pivot pin 45. The foot portions 38 of each detent are shaped somewhat in the form of a hook to provide upper and lower pallets 46 and 47 adapted for engagement with the upper and lower stops 32 and 33 of the upper openings 28. The sole of the foot portion is formed on an incline to provide an outwardly projecting toe portion 48 and a sliding pallet 49 adapted to slidably engage the inclined or sloping stops 31 of the lower openings 27, previously described, and whereby the inward movement of the toe portions of the detents is limited so that only the lower pallets are in position to engage a stop 29 and the upper pallets 46 are held out of line of the stops, as shown in Fig. 6. The detents have a material thickness so that the pallets 46 and 47 and the openings 27 and 28 are of corresponding width, to give ample bearing contact with the stops to restrict wear and deformation of the relatively thin wall tubing of which the leg portions are formed. To permit entrance of the toe portions 48 of the detents 34 and 35 into the respective openings, the upper leg portions 10 and 11 are provided with openings 50 which are larger than the openings 29, to give ample clearance in passing the toe portions of the detents therethrough and into contact with the lower leg portions 25 and 26.

The detents 34 and 35 are resiliently retained in sliding contact with the lower leg portions 33 and 35 by a substantially heavy coil spring 51 that is contained within the compartment 19 and has hooks 52 and 53 on opposite ends thereof for engaging in openings 54 and 55 in the arms 36 of the detents.

With the structure thus far described, the detents will operate automatically to swing the toe portions thereof into and out of engagement with the respective openings 27 as the leg portions 10 and 11 of the upper section are moved upwardly on the leg portions 25 and 26 of the lower section. This is brought about by the sliding pallets 49 of the detents engaging the inclined stops 31 which cam the detents inwardly to clear one opening 27 while moving into position to engage the next upper opening 27.

In order to disengage the detents from the upper openings 28 when moving the upper leg section either upwardly or downwardly, or to move the upper leg section downwardly of the lower openings 27, manual means is provided in the form of a release lever 56 and toggle links 57 and 58. The lever 56 comprises an upper arm 59 that is pivotally mounted within the center of the compartment 19 on a pin 60 having its ends supported within the centers of instruck bosses on the respective plate portions 15. The release lever also includes an arm 61 that extends laterally within the bottom opening 20 to the compartment and the lower edge is shaped to provide a handle 62 which is adapted to be engaged by the fingers of the hand when it is necessary to release the detents. The links 57 and 58 each have outer ends connected with the pivot pins 45 of the detents and their inner ends pivotally connected with pins 63 and 64 extending through the arm 59 of the release lever. Therefore, when the handle portion is pushed upwardly within the open bottom 20 of the compartment 19, the links 57 and 58 are moved outwardly to rock the detents on their pivots 41 and 42 to thereby effect retraction of the detents from any of the openings with which they are engaged and to hold the detents disengaged while they are moved to a position above or below the upper openings 28, or while they are being moved to a lower opening of the lower series of openings 27.

The supports also include folding braces 65 that are adapted to retain the supports rigid with respect to the table top and which are adapted to be folded to permit the supports to swing inwardly into contact with the under side of the table top. The braces 65 each include a lower pair of links 66 and 67 having ends 68 and 69 pivotally connected with ears 70 and 71 of a bracket 72 that is attached to the upper flanges 16 and 17 of the tie member 12, the ends being connected with the ears 70 and 71 by pivots 73. The links 66 and 67 are shaped to converge inwardly to connect with a pair of links 74 and 75 by a hinge pin 76. The upper ends of the links 74 and 75 are pivotally connected by pins 77 with depending ears 78 of a plate 79 that is adapted to be attached to the under side of the table top by screws 80. In order that the links 74 and 75 may be locked with respect to the links 66 and 67, a coil spring 81 is sleeved on the hinge pin 76 so that the ends thereof bear outwardly against the ends of the links to engage lugs 82 on the ends of the links 74 and 75 with openings or notches 83 in the links 66 and 67. When the lugs 82 are engaged with the notches 83, the braces are held rigid, but when the links 74 and 75 are moved inwardly against action of the spring 81, the lugs 82 are freed from the notches 83 and the links may break about the pivot pin 76 to permit inward folding of the supports so that they may be positioned within the recess 6 on the under side of the table top 4. The tables may then be stacked one upon another for storage purposes.

If the table top has the sides 5, the cross bar 9 is pivotally attached to the under side of the table top by straps 84 that extend over the cross members 9 and have ears 85 and 86 secured to the under side of the table top by screws 87. If the top comprises a single slab without the rim portion 5, a modified form of strap is used where the outer side is closed by a wall 88, against which the end of the cross member abuts, as shown in Fig. 8.

The tubular parts forming the supports are welded together as above described. The latch mechanisms are assembled between the parts 13 and 14 that form the tie member 12, after which the brace attaching bracket is attached to the inturned flanges 16 and 17. The assemblies are then moved into position between the leg portions 10 and 11 of the upper sections 7 where the ends of the detents will pass through the openings 50. The flanges 18 are then welded or otherwise attached to the leg portions 10 and 11. The links forming the brace are connected together and secured to the ears 70 and 71.

The parts may be suitably finished, as by plating, after which the leg portions 25 and 26 of the lower sections 8 are telescoped within the leg portions 10 and 11 of

the upper sections 7. When the detents register with the openings 28, the sprnig 51, if the release lever 56 is free, will swing the detents into engagement with these openings, however, the sections may be moved to completely collapsed position by holding the release lever 56 in disengaged position.

After attachment of the supports to a table top by means of the straps 84 shown in Figs. 7 and 8, and after securing the plates 79 to the under side of the table top, the supports are swung outwardly until the lugs 82 on the upper links of the braces engage within the openings 83 in the lower links, whereupon the supports are retained at substantially right angles to the table top.

To adjust the table top to the desired height, it is only necessary to place the foot upon the transverse tube 21 to hold it in contact with the floor, while the fingers are placed under the ends of the table top to lift the table top. The detents move over the respective openings. The detents will slide into each of the lower series of openings 27 as they pass so that the lower pallets thereof will seat upon any one of the stops 29 to support the table top at a desired lower level. However, if the upward lift is continued, the detents will engage the upper openings 28, where both the upper and lower pallets 46 and 47 are in position to engage the upper and lower stops 32 and 33. Thus the uper section is connected with the lower section and the table top cannot be moved up or down until the detents are disengaged by means of the release lever 56. This prevents the lower sections from dropping out of the upper sections when the table is lifted from the floor and carried about.

The lower sections are retained when the detents are engaged with the lower series of openings 27 by frictional contact of the detents with the inclined stops 31, the springs 51 having sufficient action to maintain the desired contact. Therefore, the table may be carried from place to place by the table top without the lower sections dropping out of the upper sections. However, when it becomes necessary to adjust the height, the frictional pressure is easily overcome by placing the foot upon the transverse tube and pulling upwardly on the table top to overcome the action of the springs 51.

From the foregoing it is obvious that I have provided vertically adjustable supports for a table top or the like which are of strong, light weight construction, and which are easily manipulated to support a table top at different heights in a lower range of adjustment, and at one or more heights in an upper range.

In the lower range of adjustments, the detents operate automatically, so that there is no necessity of stooping to manipulate the release lever 56, however, when the table top must be adjusted to its upper positions, where it is desirable to effect a positive lock in both directions, the handle of the control lever is in convenient reach so that it may be easily manipulated. When the table is to be stored, the braces are broken on the hinge provided by the pin 76, whereupon the supports are swung inwardly into the recess 6 and into contact with the under side of the table. The supports thus folded are in an out of way position, so that one table top may be stored directly upon another without interference of the folded supports.

While I have, in describing my invention, particularly illustrated and described the invention in connection with tables, it is obvious that vertically adjustable supports of the character described are adapted to desks and other articles of furniture where adjustment for height is desirable. It is also obvious that an adjustable support constructed as described may be adapted for other uses without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A support including an upper section having a transverse member and spaced apart tubular leg portions extending downwardly from the said member, a lower section having a transverse footing member and upwardly extending tubular leg portions telescoping within the leg portions of the upper section, said leg portions of the lower section having a linear series of spaced apart openings, a tie member connecting lower ends of the leg portions of the upper section, detents having oppositely extending arm and leg portions, means intermediate the arm and leg portions of the detents for pivotally mounting the detents on the tie member, said leg portions of the detents having foot portions adapted to engage in any one of said openings, a coil spring having ends respectively interconnecting the arms of the detents to urge the said foot portions of the detents into engagement with the openings, a release lever pivotally connected with the tie member at a point intermediate the detents, and links connecting the release lever with the detents to effect simultaneous disengagement of both detents from said openings.

2. An adjustable support including an upper section having a transverse member and spaced apart tubular leg portions extending from the said member, a lower section having a transverse footing member and upwardly extending tubular leg portions telescoped within the leg portions of the upper section, said leg portions of the lower section having detent engaging stops, a tie member connecting lower ends of the leg portions of the upper section, detents carried by the tie member and having portions to engage said stops, spring means normally urging the detents into engagement with the stops, means for manually retracting the detents from engagement with said stops in one direction of adjustment, and means carried by said leg portions for automatically disengaging the detents in the other direction of adjustment, said leg portions of the upper section having upper openings providing both upper and lower stops to be engaged by said portions of the detents to require actuation of the manual means to release the detents in both directions of adjustment.

3. An adjustable support including an upper section having spaced apart tubular leg portions, a lower section having tubular leg portions telescoping within the leg portions of the upper section, said leg portions of the lower section having a linear series of spaced apart openings, a tie member connecting lower ends of the leg portions of the upper section, detents having pivotal mounting on the tie member and having lower portions adapted to engage in all of said openings, said detents having portions adapted to engage in certain of said openings, a spring having ends respectively connected with the detents to urge said portions of the detents into said openings, the other of said openings having means for preventing entrance of said upper portions of the detents therein and to disengage the said lower portions of the detents in one direction of adjustment, and a release lever carried by the tie member and having connection with the detents for effecting manual disengagement of the detents from the other of said openings.

4. A support including an upper section having spaced apart tubular leg portions, a lower section having tubular leg portions slidable in the tubular leg portions of the upper section, said leg portions of the lower section having a series of spaced apart openings through facing sides of said leg portions near the lower ends thereof, each opening in the series of openings having a lower stop and an upper inclined stop extending inwardly of the tubular leg portions, a tie member connecting the leg portions of the upper section, detents having pivotal support on the tie member and having foot portions provided with upper and lower pallets and an intermediate sliding pallet adapted to successively engage said inclined stops as the foot portions of the detents enter the openings to engage the lower pallets with the lower stops and for holding the upper pallets from entering the openings when the leg portions of the upper and lower sections are extended relative to each other, said leg portions of the lower section each having at least one opening above said series of openings providing upper and lower stops spaced apart for entrance of the foot portions of the detents so that both the upper and lower pallets engage the upper

and lower stops to lock the upper and lower sections together, a release lever carried by the tie member, and means connecting the release lever with the detents to withdraw the foot portions of the detents from engagement with said last named openings when the leg portions of the upper section are to be moved relatively of the leg portions of the lower section and to withdraw the foot portions of the detents from the stops of the series of openings when the leg portions are telescoped for shortening the height of the support.

5. A support including an upper section having a transverse member and spaced apart tubular leg portions extending from the transverse member, a lower section having a transverse footing member and upwardly extending tubular leg portions slidable in the tubular leg portions of the upper section, said leg portions of the lower section having a series of spaced apart openings through facing sides of said leg portions near the lower ends thereof, each opening in the series of openings having a lower stop and an inclined stop extending inwardly of the tubular leg portions of the lower section, a tie member connecting the leg portions of the upper section, detents having pivotal support on the tie member and having foot portions provided with upper and lower pallets and an intermediate sliding pallet adapted to successively engage said inclined stops as the foot portions of the detents enter the openings to engage the lower pallets with the lower stops and to hold the upper pallets from entering the openings when the leg portions of the upper and lower sections are extended relative to each other, said leg portions of the lower section each having at least one opening providing upper and lower stops spaced apart for entrance of the foot portions of the detents so that both the upper and lower pallets engage the upper and lower stops to lock the upper and lower sections together, a release lever, means pivotally mounting the release lever on the tie member, and links connecting the release lever with the detents to withdraw the detents from locking engagement with the last named openings and to hold the detents from entering the series of openings when the leg portions of the upper section are to be moved downwardly on the leg portions of the lower section to shorten said support.

6. A support for a table top and including an upper section having tubular leg portions, a lower section having upwardly extending tubular leg portions telescoping within the leg portions of the upper section, said leg portions of the lower section having a linear series of spaced apart openings for adjusting the height of the support for use by children and said leg portions of the lower section having upper openings for accommodating height of the support for use by adults, detents carried by a part of the upper section for engaging in said upper openings to lock the sections together in both up and down directions whereby the upper section may be lifted to lift the lower section, a coil spring having ends interconnecting the detents to urge the detents into engagement with the openings, and means for manually disengaging the detents from said openings to change the height of said support, said linear series of openings each having inclined stops extending inwardly and downwardly from upper edges of said openings for automatically releasing the detents therefrom when the upper section is raised upwardly through the range adapted for children's use.

7. A support for a table top and including an upper section having tubular leg portions, a lower section having upwardly extending tubular leg portions telescoping within the leg portions of the upper section, said leg portions of the lower section having a linear series of spaced apart openings for adjusting the height of the support for use by children and said leg portions of the lower section having upper openings for accommodating height of the support for use by adults, detents carried by a part of the upper section for engaging in said openings, a coil spring having ends interconnecting the detents to urge the detents into engagement with the openings, means for manually disengaging the detents from said openings to change the height of said support in both directions, and means associated with the lower of said openings for automatically releasing the detents when the table top is lifted upwardly through the levels adapted for the children's use.

References Cited in the file of this patent

UNITED STATES PATENTS

242,804	Vanstone	June 14, 1881
872,498	Cleveland	Dec. 3, 1907
1,016,763	Nill	Feb. 6, 1912
1,063,642	Birdsall	June 8, 1913
1,888,117	Fox	Nov. 15, 1932
2,088,518	Hendricks	July 27, 1937
2,689,158	Mahr	Sept. 14, 1954
2,744,712	Brandt	May 8, 1956