Aug. 20, 1940. W. D. BELL 2,212,488

BED TABLE

Filed Dec. 23, 1937 5 Sheets-Sheet 1

Fig. 1.

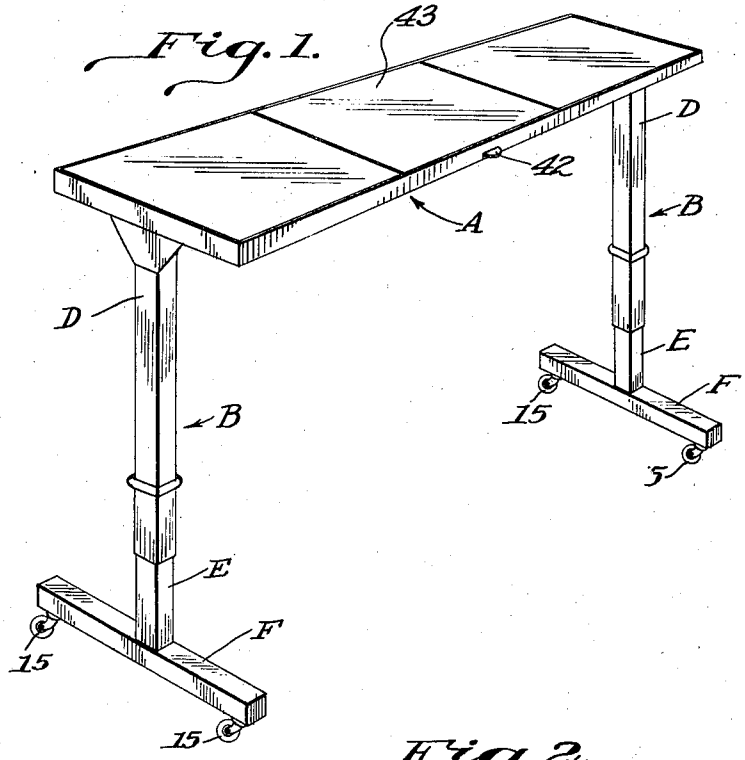
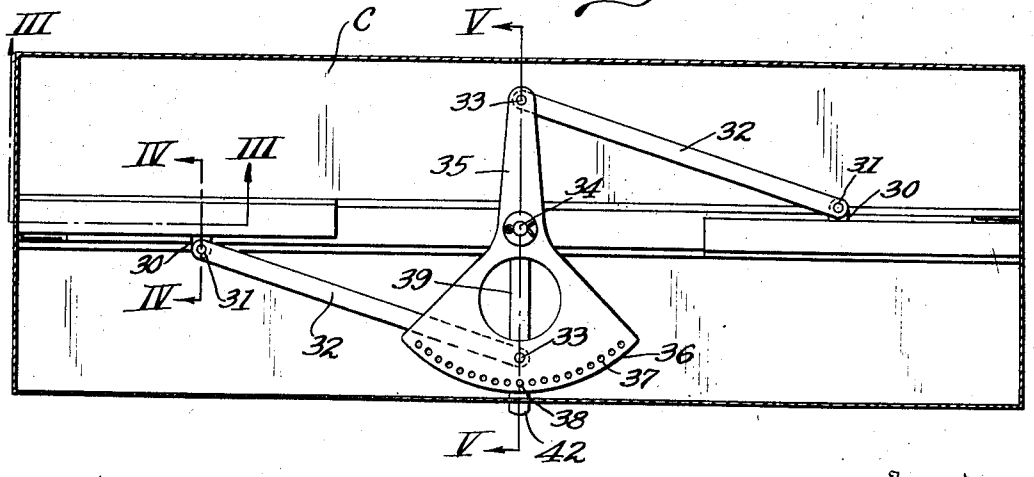


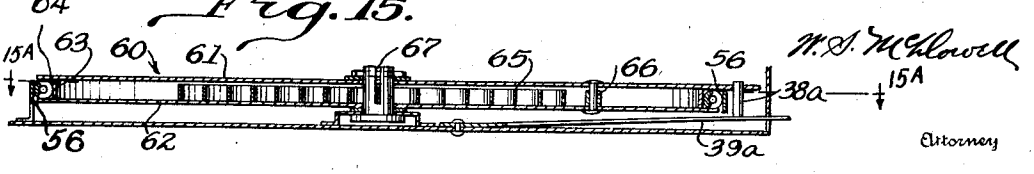
Fig. 2.



Inventor

William D. Bell

Fig. 15.



M. S. McClowell

Attorney

Aug. 20, 1940. W. D. BELL 2,212,488

BED TABLE

Filed Dec. 23, 1937 5 Sheets-Sheet 2

Fig. 3.

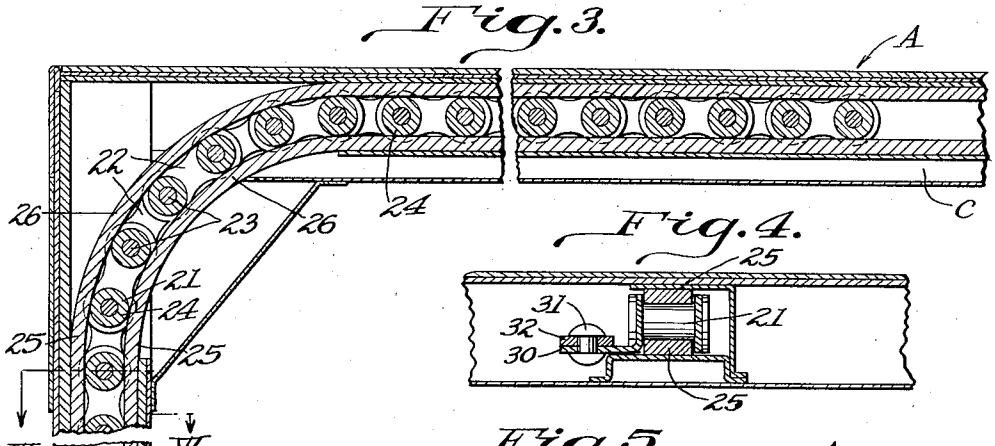


Fig. 4.

Fig. 5.

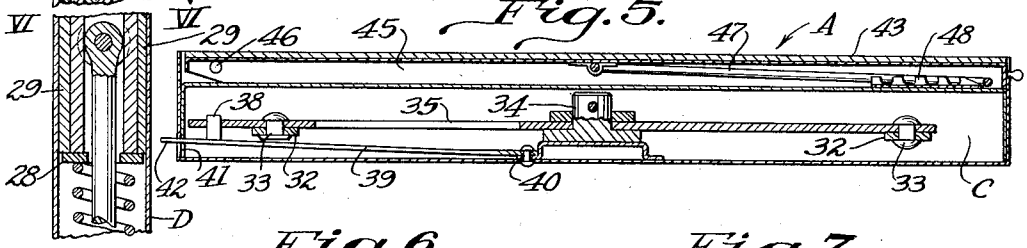


Fig. 6.

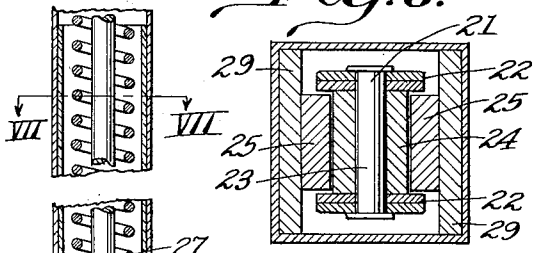
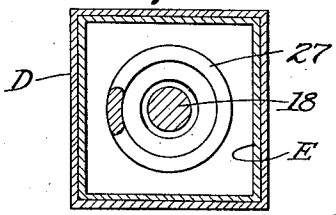


Fig. 7.



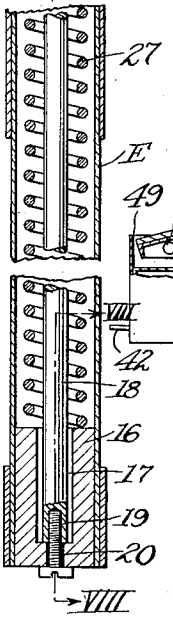


Fig. 9.

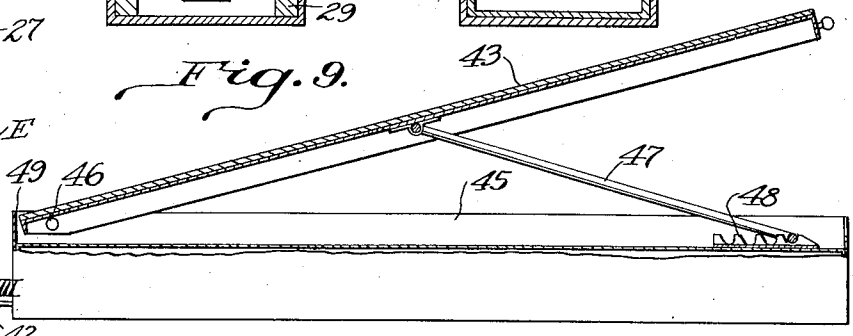
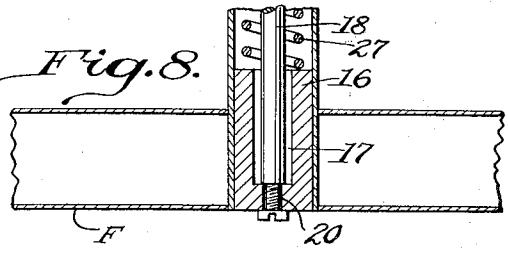


Fig. 8.



Inventor
William D. Bell
W. D. McClowell
Attorney

Aug. 20, 1940. W. D. BELL 2,212,488

BED TABLE

Filed Dec. 23, 1937 5 Sheets-Sheet 3

Fig. 10.

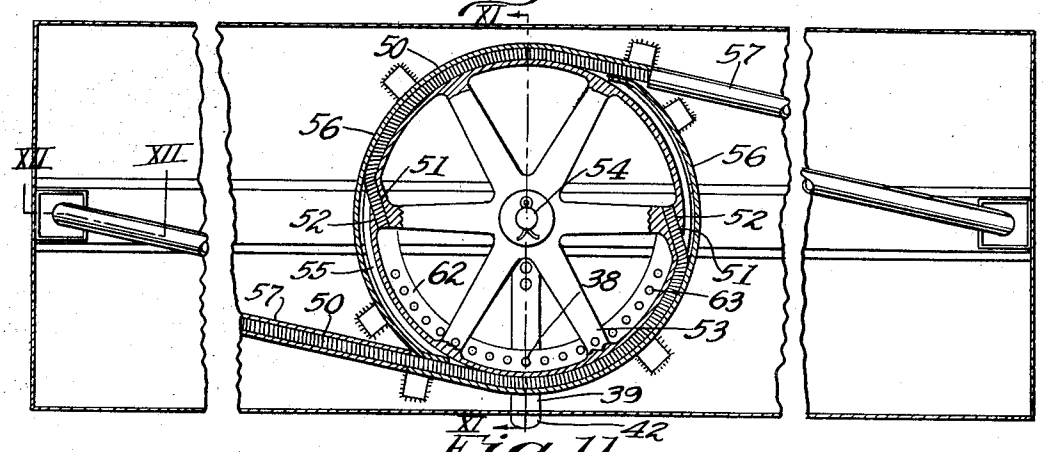


Fig. 11.

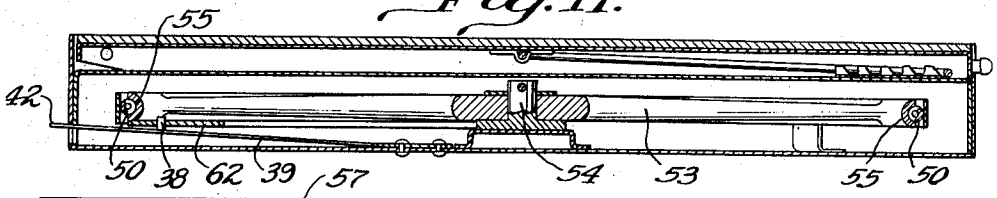


Fig. 12.

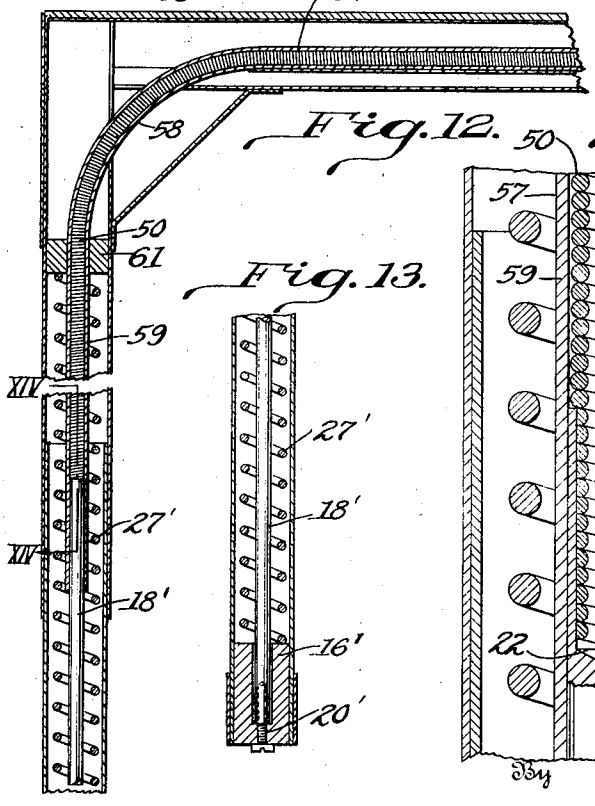
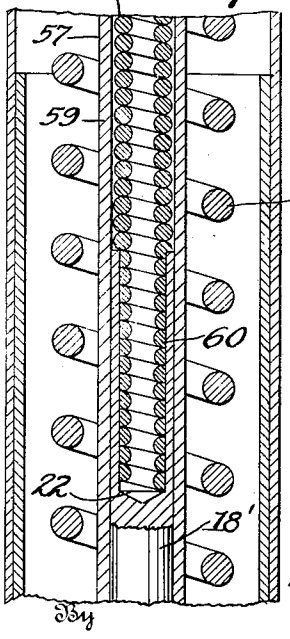


Fig. 13.

Fig. 14.



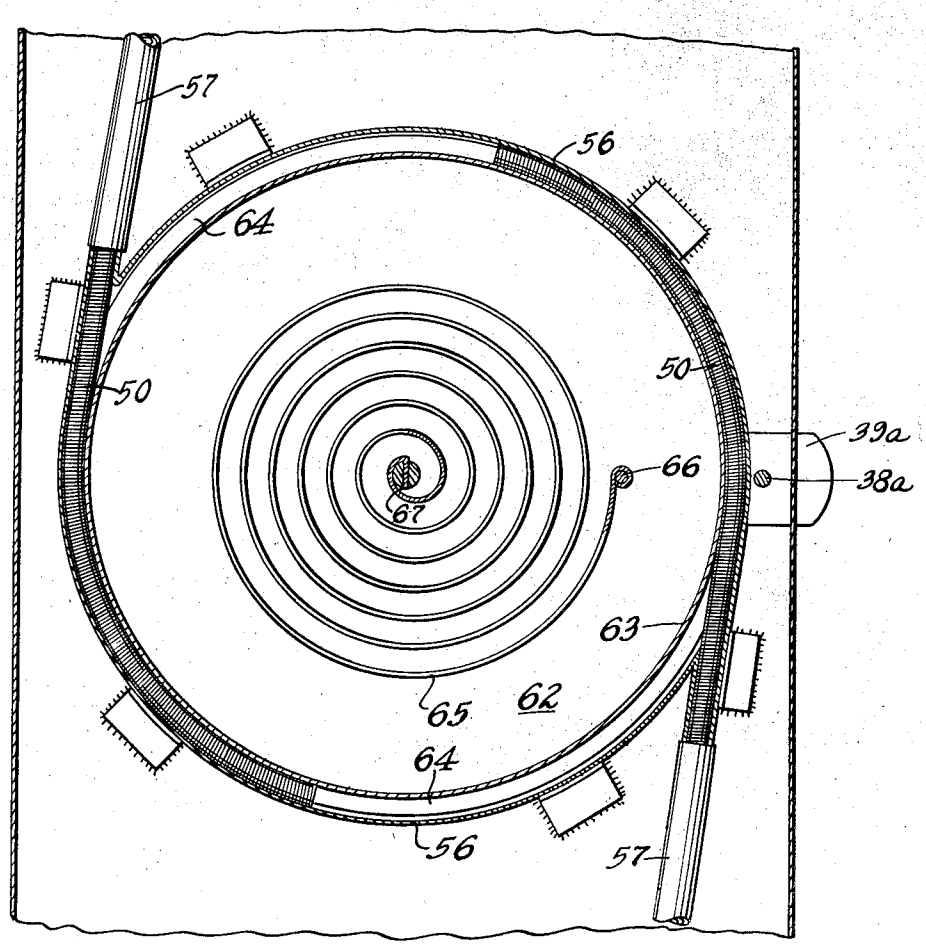
Inventor
William D. Bell
W. D. McClowell
Attorney

Aug. 20, 1940. W. D. BELL 2,212,488

BED TABLE

Filed Dec. 23, 1937 5 Sheets-Sheet 4

Fig. 15A.



Inventor
William D. Bell

By W. S. McDowell

Attorney

Aug. 20, 1940. W. D. BELL 2,212,488

BED TABLE

Filed Dec. 23, 1937 5 Sheets-Sheet 5

Fig. 16.

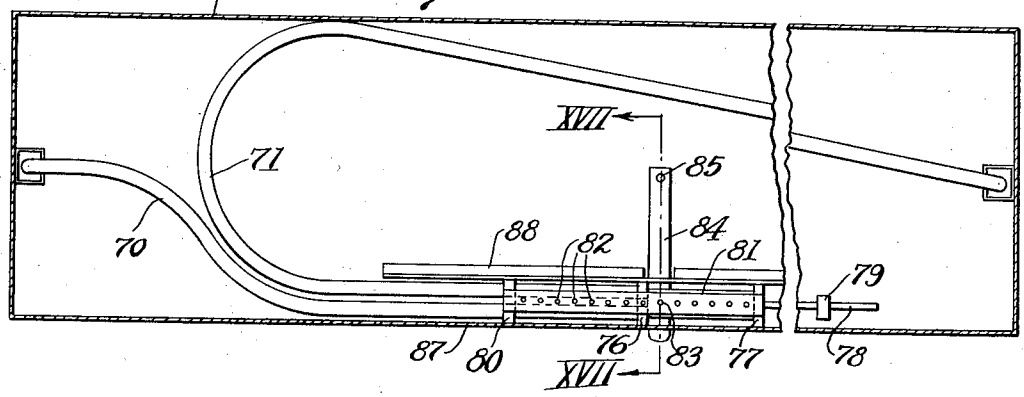


Fig. 17.

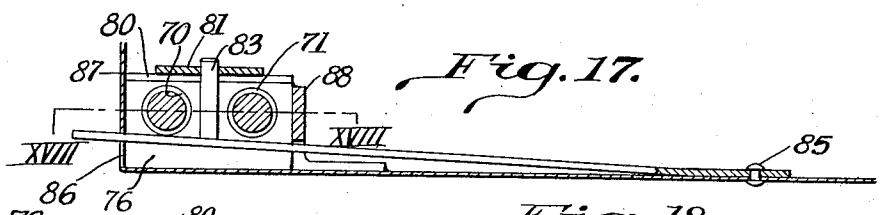


Fig. 18.

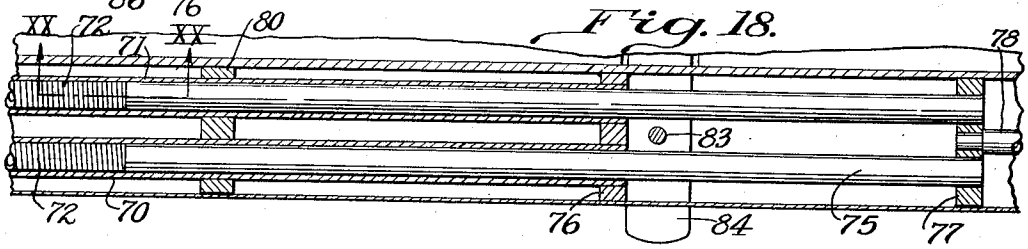


Fig. 19.

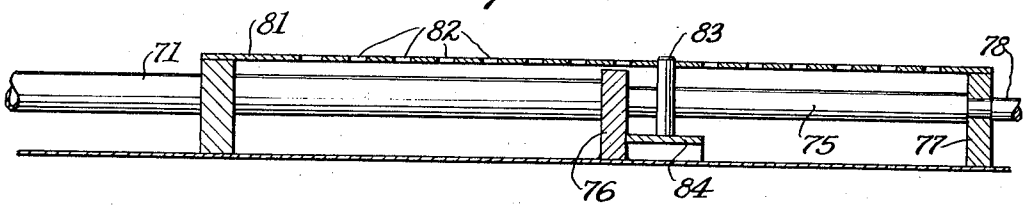
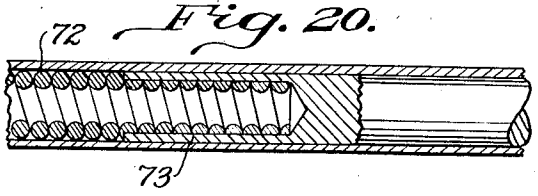


Fig. 20.



Inventor
William D. Bell

By W. A. McClowell

Attorney

Patented Aug. 20, 1940 2,212,488

UNITED STATES PATENT OFFICE

2,212,488

BED TABLE

William D. Bell, Columbus, Ohio, assignor to F. O. Schoedinger, Columbus, Ohio

Application December 23, 1937, Serial No. 181,358

8 Claims. (Cl. 311—36)

This invention relates to furniture and has particular reference to a portable table adapted primarily for use in hospitals or by bedridden persons for the purpose of providing a table which will bridge a bed and provide a convenient support for food trays and other articles needed in the care and comfort of the sick.

Tables of this kind are known in the art as "over-bed" tables. The same comprise a horizontally extending shelf supported by a pair of depending vertical leg members. The leg members are placed at each side of a bed while the shelf bridges or spans the top of the bed over the patient. Since beds are of different heights and since patients demand different vertical adjustments of the shelf portion of the table, it has been customary to provide the leg members with rotatable screws actuated by a bevel gearing carried by a manually rotated shaft for the purpose of raising and lowering the shelf of the table and retain the shelf in its various positions of vertical adjustment. The gear actuated screw construction employed in effecting these adjustments is somewhat complicated and costly to manufacture and usually the rotating crank employed for revolving the bevel gear shafts is disposed at one side of the table where it is not always conveniently accessible, particularly to a sick person.

It is, therefore, one of the primary objects of the present invention to provide an over-bed table of the character set forth wherein improved mechanism under the convenient control of one occupying a bed is provided for the purpose of effecting vertical adjustment of the shelf member of such a table and maintaining such adjustment.

Another object of the invention resides in the provision of a table of this character having a centrally situated releasing latch and wherein provision is made for raising and lowering the shelf mechanism by applying hand pressure to the shelf member or releasing such pressure.

A further object resides in the provision of means cooperative with both of the vertical leg members of the table and with the shelf member so that the latter will not bind or encounter undue friction while being adjusted vertically.

Other objects reside in a strong and substantial table for the purposes set forth, light in weight, economical to manufacture and susceptible to easy control by a bedridden person.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view of an over-bed table formed in accordance with the present invention;

Fig. 2 is a horizontal sectional view taken through the shelf member of the table and disclosing the pivoted compensating lever arranged within said shelf member and the links which unite said lever with the flexible raising and lowering elements;

Fig. 3 is a vertical sectional view on the plane disclosed by the line III—III of Fig. 2, and illustrating more particularly the internal construction of the leg members of the table and adjoining portions of the shelf member;

Fig. 4 is a vertical transverse sectional view on the line IV—IV of Fig. 2, and disclosing the guides for the flexible elements mounted within the shelf member;

Fig. 5 is a similar view on the line V—V of Fig. 2 and disclosing the pivoted compensating lever and the adjustable book rest;

Fig. 6 is a horizontal sectional view on the line VI—VI of Fig. 3 disclosing the guides for the roller chain in one of the leg members;

Fig. 7 is a similar view on the line VII—VII of Fig. 3 and illustrating the telescopic construction of the leg members and one of the compression springs;

Fig. 8 is a detail vertical sectional view on the line VIII—VIII of Fig. 3 and disclosing the bottom construction of one of the leg members;

Fig. 9 is a detail vertical transverse sectional view showing the adjustable book rest in a partially elevated position;

Fig. 10 is a horizontal sectional view disclosing a slightly modified form of my invention wherein stranded wire cables are employed as flexible elements in lieu of the roller chains disclosed in Fig. 3;

Fig. 11 is a vertical transverse sectional view on the line XI—XI of Fig. 10;

Fig. 12 is a vertical sectional view taken through one of the leg members and the adjoining portions of the shelf construction and illustrating the guiding of the stranded wire cable in guides provided therefor within the table;

Fig. 13 is a detail vertical sectional view through the bottom of the leg construction of the table set forth in Fig. 10;

Fig. 14 is a similar view on an enlarged scale, the plane of the figure being indicated by the line XIV—XIV of Fig. 12;

Fig. 15 is a vertical transverse sectional view taken through the compensating mechanism of a further modified type of table;

Fig. 15A is a horizontal sectional view taken on the plane indicated by the line XVA—XVA of Fig. 15 and showing an equalizing member simi-

lar to that shown in Fig. 10 equipped with a spiral spring.

Fig. 16 is a horizontal sectional view taken through the shelf member of the table and illustrating a further modified form of cable arrangement;

Fig. 17 is a vertical transverse sectional view on the line XVII—XVII of Fig. 16;

Fig. 18 is a horizontal sectional view on the plane indicated by the line XVIII—XVIII of Fig. 17;

Fig. 19 is a detail longitudinal sectional view of the latching means employed in connection with the mechanism disclosed in Fig. 16;

Fig. 20 is a detail longitudinal sectional view disclosing the union between one of the cable and rod elements, the plane of the figure being indicated by the line XX—XX of Fig. 18.

Referring more particularly to the drawings and, for the present, to the construction illustrated in Figs. 1 to 9 thereof, my improved overbed table comprises a horizontal shelf A and at each side thereof vertical depending legs B—B. These elements are preferably formed from sheet metal, the shelf A possessing a hollow interior, constituting a mechanism receiving chamber C, while the legs B are, as shown in Fig. 7, substantially rectangular in transverse cross section, each leg member consisting of a hollow upper section D which is welded or otherwise permanently secured to each end of the shelf A, the hollow upper section D of each leg telescopically receiving a correspondingly formed lower section E, the latter terminating in a transversely extending cross bar F carrying casters 15 at the outer ends thereof, to facilitate rolling movement of the table over a floor surface.

The present invention is particularly concerned with novel and improved mechanism for effecting the raising and lowering of the shelf A. This is accomplished by welding or otherwise firmly securing in the bottom of each of the leg sections E a plug of the type indicated at 16. This plug is formed with a socket 17 in which is positioned the lower end of a vertically extending rod 18, one of the latter being provided in each of the legs B. The lower end of each rod is formed with a threaded bore 19 which receives the threaded shank of a headed screw 20, by which the rod is firmly secured in connection with its associated stationary plug 16.

To the upper end of each of the rods 18, there is secured one end of a roller-type link chain 21. Each of these chains includes the usual side links 22, cross pins 23, the latter being surrounded by the customary rollers or thimbles 24. Engaging with the rollers 24 and disposed between the side links 22 of said chains are guide strips 25. These strips are stationarily positioned in the shelf A and in the hollow upper ends of the leg sections D, the strips being arcuately bent as at 26 (see Fig. 3) to provide for the guiding of the chain during vertical movement of the shelf A, and prevent loss of alignment of the chain when under either compression or tension forces, the chain being always maintained in a fixed vertical plane.

Surrounding each of the rods 18 is an elongated compression spring 27, the lower end of which engages with a plug 16 while the upper end contacts with a washer 28 disposed in engagement with the lower edges of the strips 25 and the vertical reenforcing bars 29 of the leg sections D. The normal function, therefore, for the springs 27 is to effect the elevation of the shelf A to its highest position. The springs are, however, of such strength as to counter-balance the weight of the shelf A and if said shelf is unweighted or if there is no downward pressure applied thereto, the said springs will effect the elevation of the shelf. The movement of the shelf is easy to effect and may be readily accomplished by a sick or bedridden person.

In order to provide for uniform telescopic movement of each of the leg sections so that there will be no binding forces resulting from unequal movement of the leg sections, the inner or adjacent end links of the chains 21 are provided with laterally directed lugs 30, to which are pivotally secured, as at 31, the outer ends of a pair of link members 32. The inner ends of these link members are pivotally secured as at 33 equidistantly from the fulcrum center 34 of an equalizing lever 35. This lever is formed with an enlarged segmental portion 36 having formed therein, contiguous to its edge, a plurality of arcuately spaced openings 37. These openings selectively receive an upstanding locking pin 38 carried adjacent to the outer end of a leaf spring 39. The latter has one end fixed as at 40 in connection with the bottom of the shelf A, while the outer end of said spring projects through a vertical slot 41, formed in one of the vertical sides of the shelf A, the spring projecting through and beyond the slot 41 to produce a manipulating extremity 42.

In view of the foregoing, it will be seen that in order to adjust the shelf A, and to retain the same in its adjusted positions, it is merely necessary for the patient, or other operator, to depress the manipulating extremity 42 of the spring 39. This results in the withdrawal of the pin 38 from one of the openings 37 of the lever 35. If it is desired to lower the shelf A, the operator merely presses downwardly on said shelf, the balance of the mechanism permitting this to be done easily and without requiring excessive pressure. The movement of both leg sections D in a downward direction is accomplished in a compensated uniform manner by the inclusion of the lever 35, which, rocking about its pivot 34, causes equalized travel of the chains 21. These chains are confined for movement in their longitudinal guides 25, so that irrespective of whether or not the said chains receive forces of compression or tension, their travel is uniform.

Because of this construction, pressure may be applied to any part of the shelf throughout its length, not necessarily in the center thereof, without binding on the part of the telescopic leg sections. When the desired level of the shelf has been reached, the manipulating extremity 42 of the spring 39 is released, which causes the pin 38 to move upwardly into one of the openings 37 disposed in registration with the locking pin. This retains the lever 35 against movement and correspondingly holds the shelf in its adjusted position.

The raising of the shelf is likewise accomplished with even greater facility, since when the locking pin is withdrawn from engagement with the openings in the lever 35, the compression springs 27 expand and effect automatic upward movement of the shelf until the desired elevation has been reached. Preferably, during such upward movement, it is desirable to place a hand on the shelf to provide convenient control in the matter of limiting or regulating the upward movement. The table is essentially simple and sturdy in construction, contains but few operating parts

and is capable of giving extended service without requiring repair or mechanical attention.

I preferably equip the top of the shelf in the center thereof with an adjustable panel 43. This panel is normally received within a shallow pocket 45, formed in the upper and central region of the shelf, so that when the panel occupies a lowered position, its upper surface will be flush with the remaining upper surfaces of the shelf to form a smooth unbroken table or shelf surface. However, the panel is pivoted as at 46 in connection with the side walls of the pocket 45 adjacent to one end, so that the panel may be brought to assume an inclined position with respect to the horizontal, as shown in Fig. 9.

To retain the panel in such an inclined position, the under side thereof is provided with a pivoted bail 47, the lower horizontal portion of which is receivable within the teeth of a stationary rack 48, arranged on the bottom of the pocket 45. This engagement is effected by the action of gravity, and may be conveniently controlled. The hinged end 46 of the panel, when the latter is elevated, projects below the front vertical wall 49 of said pocket to produce a shoulder in order to hold a book or magazine in an applied position on the panel, for the convenience of the patient.

A variation of the invention is disclosed in Figs. 10 to 14 inclusive, wherein, in lieu of employing link chains of the type disclosed at 21, I employ flexible wire cables of the type indicated at 50. A pair of cables 50 is employed and the inner end of each cable is anchored as at 51 in a tangentially disposed bore 52 provided in the peripheral portion of a wheel 53. This wheel is disposed in the hollow interior of the shelf A and rotates about an upstanding stud 54, the peripheral portion of the wheel being grooved as at 55 to partially receive the adjoining portions of the cables 50. Compression and/or tension forces may be applied to these cables to rotate the wheel, without flexing of the cables, by surrounding the circumference of said wheel with an annular guide band 56.

Extending tangentially from the band 56, and disposed within the hollow interior of the shelf A, are guide tubes 57 in which the cable 50 are mounted for sliding movement only. The tubes 57 includes arcuately curved intermediate portions 58 and downwardly directed vertically extending portions 59, which are disposed centrally in the upper leg sections D, the lower portions of the tubular cable guides 59 receiving for sliding movement the upper ends of rods 18', the latter being anchored in connection with the lower ends of the leg sections E, as indicated at 20' in Fig. 13. The upper ends of the rods 18' include open-ended bores 22 in which are anchored, by welding or otherwise, the outer end convolutions 60 of the cables 50. Compression springs 27' surround the rods 18' and engage at their lower ends with plugs 16' and at their upper ends with collars 61 which are fixed to the leg sections D. In this form of my invention, the wheel 53 equalizes the action of the cables in substantially the same manner as the lever 35 used in connection with the chain type construction, and the cables 50 are disposed in guides throughout the full length thereof so that compression forces, as well as tension, may be applied thereto in the raising and lowering of the shelf A.

The wheel 53 is provided with a peripheral flange 62, having formed therein a plurality of arcuately spaced openings 63, which are adapted for the reception of the locking pin 38 of the spring 39, by which control of the rotation of the wheel is secured.

In view of the foregoing, it will be seen that the present invention provides an over-bed table of a simple, readily controlled positive mechanism for governing vertical adjustment of the shelf portion of the table. The present invention dispenses with the use of screw shafts and the beveled gearing heretofore employed in furniture of this character. The shelf member may be moved up or down with but a minimum of hand pressure, and the locking device is under the control of the centrally situated tongue extremity 42 and so disposed that it may be conveniently grasped and operated by the bedridden person. The uniform operation of the shelf is largely attributable to the inclusion of the pivotally, movable compensating devices present in the form of the lever 35 and the wheel 53 which, through the flexible elements joined therewith, provide for uniform movement of the upper sections of the legs in response or in opposition to the action of the actuating springs 27, causing both of the leg sections D to travel uniformly on the upper portions of the leg sections E.

In the modification of the invention illustrated in Fig. 15, the compensating mechanism also takes the form of a pivoted wheel 60. This wheel includes upper and lower disks 61 and 62 held in spaced relation by an annular rim member 63. The latter member is spaced from the peripheral edges of the disks to provide an annular recess 64 for the reception of the flexible cables. As in the first modified form of the invention, guide bands 56 are provided in spaced relation from the periphery of the wheel to confine the cables for movement therewith. The disk 61 extends beyond the guide band 56 on one side and is perforated to receive the locking pin 38a carried in connection with the leaf spring 39a.

In the space between the disks 61 and 62, there is provided a spiral or clock-type spring 65 which has one end anchored to the disks 61 and 62 as at 66. The opposite end of the spring is received within a slot 67 formed in the pivot for the wheel. By this construction, power is provided to counterbalance the weight of the table and the compression springs in the legs may be omitted. An advantage resulting from the use of the spiral spring is that the force resisting downward movement of the shelf remains substantially constant during the entire travel of the shelf due to the fact that the wheel only turns about one-half a revolution.

In Figs. 16 to 20 inclusive, another form of my invention has been disclosed wherein the shelf A is provided with curved guide tubes 70 and 71 in which are confined for longitudinal travel a pair of stranded or coiled wire cables 72. These cables, as shown in Fig. 20, have their ends positioned within and secured to sockets 73 formed in the adjacent ends of a pair of guide rods of an equalizing yoke 75. These rods are arranged in parallel relationship and are mounted for sliding movement in the adjoining ends of the tubes 70 and 71. These tubes have their adjoining ends stationarily secured to the shelf A by means of a bracket 76, while their outer or opposite ends extend to the legs of the table, the outer and lower ends of the cables 72 being secured to the legs in the same manner as disclosed in Figs. 12 and 13, or by other equivalent structure.

The ends of the rods 74 which project beyond the tubes 70 and 71 are united by a slidable cross bar 77. The cross bar 77 has extended therefrom a guide rod 78 which is slidably positioned in a stationary bearing 79, formed with the bottom of the shelf A.

Connected with the top of the cross bar 77 and with a complemental slidable cross member 80 is a latching strip 81, formed with a plurality of spaced openings 82. Selectively engageable with these openings is an upstanding stud 83 formed on a leaf spring latch 84. One end of this latch is secured as at 85 to the bottom of the shelf A, while the opposite or free end thereof projects through an opening 86 in one of the vertical edge walls of the shelf so that it may be manually operated.

By this construction, it will be observed that the cable elements are guided for longitudinal travel only in the tubes 70 and 71 so that when the shelf A is raised or lowered, the said cable elements will impart longitudinal travel to the sliding equalizing member, composed of the rods 74, the guide rod 78, the cross bar 77 and the cross member 80. This equalizing member is limited to linear sliding movement within the confines of the shelf A and is guided by the vertical edge wall 87 of said shelf and the guide angles 88, shown in Figs. 16 and 17, which are stationarily positioned on the bottom of the shelf A. In this construction, the equalizing member slides rather than rotates, as in the previously described forms of my invention.

What is claimed is:

1. In a table of the character described, a pair of leg members having upper and lower telescoping sections, a horizontal shelf unitarily joined with the upper sections of said leg members, compression springs disposed in said leg members and normally tending to elevate the upper of said leg sections and said shelf member with respect to said lower sections, a pair of flexible elements having their lower and outer ends arranged in said leg members, means for securing the lower and outer ends of said flexible elements with the lower sections of said leg members, an equalizing member carried by said shelf for turning movement about a fixed axis, and means uniting the upper and inner ends of said flexible elements to said equalizing member.

2. In a table of the character set forth, a shelf, hollow supporting legs arranged at each end of the shelf, each of said legs including upper and lower telescopic sections, the upper sections of said legs being rigidly joined with said shelf counterbalancing springs confined in said legs, flexible elements having their lower and outer ends connected with the lower of said leg sections, and a turnable equalizing member mounted in said shelf and connected with the upper and inner ends of said flexible elements.

3. In a table of the character set forth, telescopic leg members composed of upper and lower slidably movable sections, a horizontal shelf member joined at its ends with the upper sections of said leg members for unitary movement therewith, springs mounted within said leg members and serving normally to effect elevation of said shelf member, flexible elements positioned in said shelf and leg members, the lower and outer ends of said flexible elements being joined with the lower sections of said leg members, and a turnable equalizing member arranged in said shelf member for turning movement in a horizontal plane about a fixed axis, the upper and inner ends of said flexible elements being connected with said equalizing member on opposite sides of its fixed axis.

4. In a table of the character set forth, telescopic leg members composed of upper and lower slidably movable sections, a horizontal shelf member joined at its ends with the upper sections of said leg members for unitary movement therewith, springs mounted within said leg members and serving normally to effect elevation of said shelf member, flexible elements positioned in said shelf and leg members, the lower and outer ends of said flexible elements being joined with the lower sections of said leg members, a turnable equalizing member arranged in said shelf member for turning movement in a horizontal plane about a fixed axis, the upper and inner ends of said flexible elements being connected with said equalizing member on opposite sides of its fixed axis, and manually controlled latch means for retaining said equalizing member against movement about its fixed axis.

5. In a table of the character set forth, a pair of spaced vertical legs, a shelf mounted for vertical movement on the upper ends of said legs, spring means interposed between said legs and said shelf and normally serving to elevate the latter, means for controlling the operation of said springs comprising a pair of flexible elements, means for securing the outer ends of said elements to said legs, an equalizing member carried by said shelf and movable about a fixed axis, the inner ends of said flexible elements being connected with said equalizing member on opposite sides of its fixed axis, and guide means cooperative with said flexible elements to limit the latter for travel in fixed longitudinal directions, said guides including arcuate intermediate portions uniting the shelf and leg elements.

6. A bed table comprising a pair of spaced vertical legs, a shelf mounted for vertical movement on said legs, a pair of flexible elements, means for securing the outer ends of said elements to said legs, a rotatable equalizing member carried by said shelf, the inner ends of said flexible elements being connected with said equalizing member on opposite sides of its fixed axis, and guide means cooperative with said flexible elements to limit the latter for travel in fixed lengthwise directions, said guides including arcuate intermediate portions between the adjoining portions of said shelf and legs.

7. In a bed table, a pair of spaced leg members, a shelf member spanning the distance between said leg members, said shelf member being provided at the opposite ends thereof with a pair of downwardly directed extensions having telescopic engagement with said leg members, a pair of roller chains arranged in said leg and shelf members and passing through said extensions, means connecting the lower ends of said chains with said leg members, an equalizing lever pivotally mounted in said shelf member, links connecting opposite portions of said lever with the upper ends of said chains, guide devices cooperative with said chains for limiting movement of said chains in fixed lengthwise paths, and latch means cooperative with said lever for controlling the movement of the latter.

8. In an over-bed hospital table of the type having spaced vertically extending legs and a

shelf supported for vertical movement thereon, a pair of elongated flexible elements connected at their outer ends with the lower portion of said legs and extending into said shelf, guide means encasing said flexible elements to limit them to lengthwise travel, and a freely movable equalizing member carried by said shelf, the inner ends of said flexible elements being connected with said equalizing member, said equalizing member serving to impart tensioning forces to either of said flexible elements when a compressive force is applied to the other.

WILLIAM D. BELL.