April 7, 1942. W. ZEINDLER 2,278,817

LIFTING TABLE OR TRUCK

Filed Feb. 24, 1941 2 Sheets-Sheet 1

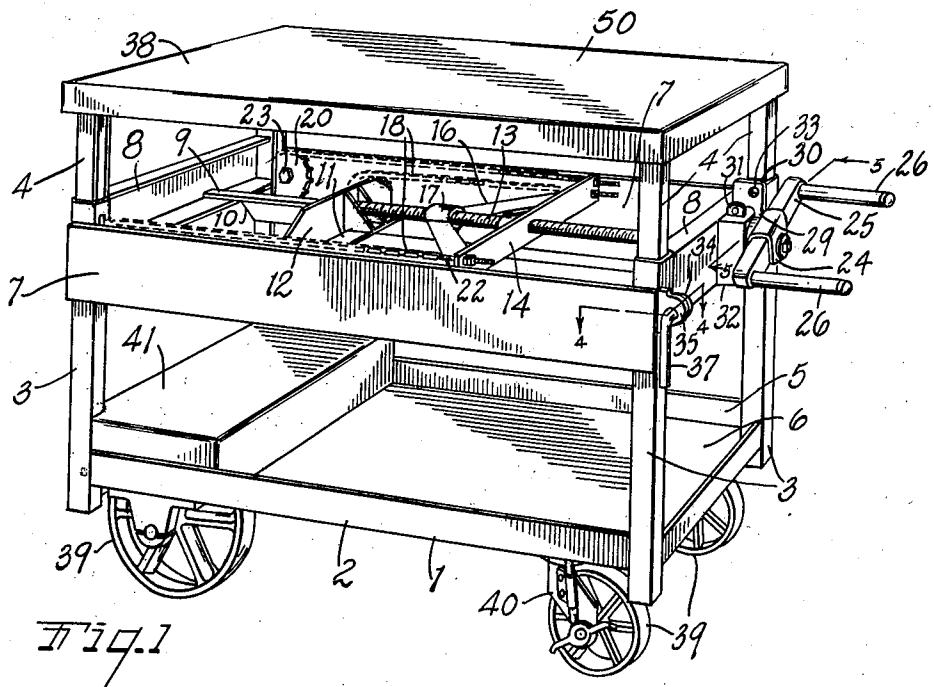


Fig. 1

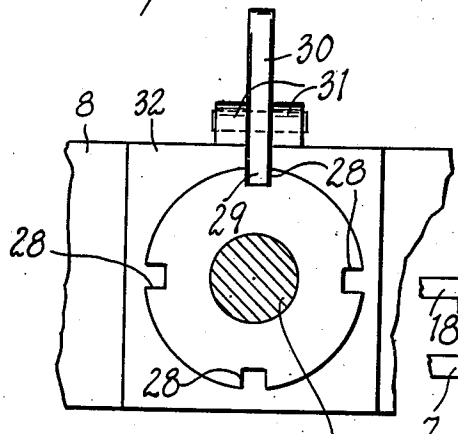


Fig. 5

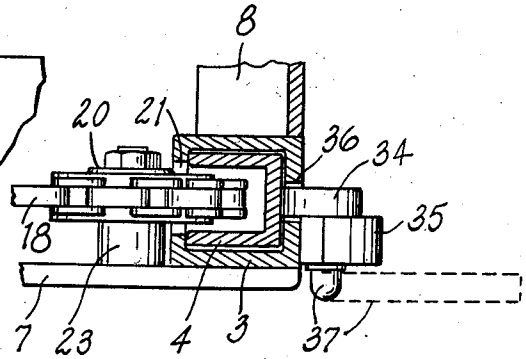


Fig. 4

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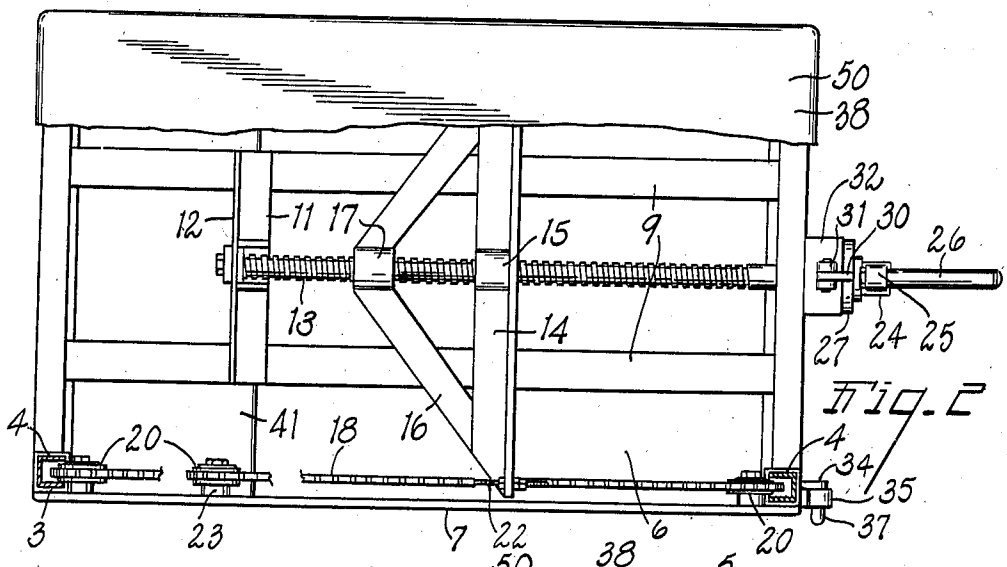


Fig. 2

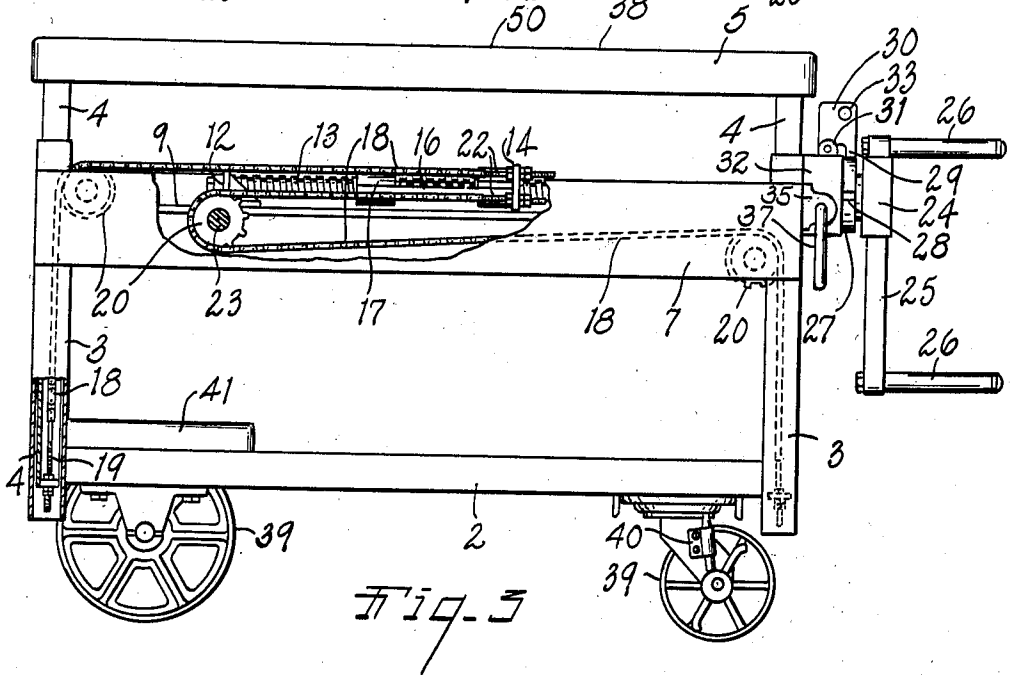


Fig. 3

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LIFTING TABLE OR TRUCK

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Application February 24, 1941, Serial No. 380,100

13 Claims. (Cl. 254—4)

This invention relates to improvements in lifting tables or trucks.

The main objects of this invention are:

First, to provide an improved portable work table which is vertically adjustable to the work or user and which is of extremely sturdy construction capable of supporting heavy loads at any desired elevation.

Second, to provide an adjustable top, work supporting bench or table of the foregoing character having an elevator mechanism which is manipulated with the expenditure of little effort to vertically position or adjust work supported on the top, and effectively locked in the desired position.

Third, to provide a construction of the type described including a support and a top member vertically adjustable thereon without lateral sway or binding, and actuating means for effecting the aforesaid vertical adjustment which is highly resistant to distortion following continued day by day use in lifting heavy loads.

Fourth, to provide a device of the foregoing character which is exceedingly simple, compact, and inexpensive in construction, notwithstanding the exceeding sturdiness thereof.

Fifth, to provide a wheeled structure of the type described adapted to be selectively utilized as a work bench or as a truck for the transportation of heavy work, in which means are provided to lock the wheels of the truck to immobilize the same when desired.

Sixth, to provide in combination with a vertically adjustable device of the type described, novel distortion resistant means for effecting the aforesaid vertical adjustment to thereby maintain the level of the table top of the device accurately at all times.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a view in perspective of a structure embodying the invention.

Fig. 2 is a top plan view, partially broken away and in horizontal section further illustrating details of the top actuating or elevating mechanism of the invention.

Fig. 3 is a view in side elevation partially broken away and in vertical section further illustrating the construction and relation of parts of the top elevating device.

Fig. 4 is an enlarged fragmentary view in section on line 4—4 of Fig. 1.

Fig. 5 is an enlarged fragmentary view in section on line 5—5 of Fig. 1, illustrating a mechanism associated with the elevating structure for locking the top thereof in any desired elevation so as to prevent any tendency for undesired lowering thereof due to heavy vibration.

Referring to the drawings, reference numeral 1 indicates generally the structure of my invention, which includes a rectangular steel welded frame, base or support 2 provided with four hollow corner uprights 3 of rectangular, box-like section for the sliding reception of the channel-like legs 4 of U-section which are welded to the adjustable table top 50. The frame has the angle steel slide and end members 5 internally receiving and supporting a sheet metal floor plate 6, which is electrically welded thereto. The uprights 3 are rigidly spaced and braced by the elongated, flat, relatively wide, side bracing plates or side pieces 7 and the end pieces 8 of channel section, all of these parts being electrically welded to constitute a base or support of extreme strength and rigidity, highly resistant to distortion or sway under load.

Referring to Figs. 1 and 2, the reference numeral 9 designates a pair of horizontally disposed longitudinal thrust members or struts extending between the end spacers 8. These struts are of angle steel construction, having the depending flanges thereof cut away at 10 for welded connection to the inturned bottom flanges of the end spacer channels 8. Struts 9 have welded thereto in spaced relation to one end of the base a transverse thrust or abutment member 11 which is fabricated of L-section steel providing an enlarged upturned flange 12 which rotatably receives one end of the elongated, heavy duty actuating screw 13 in a suitable end thrust bearing, thereby sustaining end thrust on the screw. The opposite end of the screw is similarly journaled in the end spacer 8 remote from the thrust or abutment member 11.

Screw 13 threadedly receives a reinforced sliding crosshead 14 extending transversely of the table or bench and resting or sliding on the longitudinal struts 9 so as to resist rotation of the crosshead. The crosshead is provided with an integral nut portion 15 internally threaded for coacting engagement with the screw 13. A yoke-like crosshead brace 16 is welded at its ends, or may be integrally connected, to crosshead 14 and is also provided with an integral nut portion 17 threadedly coacting with the screw 13. This

constitutes a crosshead structure having a very effective and distributed threading engagement with the screw 13 so that the heavy loads can be transmitted without undue stress in the parts.

Referring to Figs. 2, 3 and 4, it will be noted that the channel-like or U-section depending legs 4 of the table top 5 are disposed to open inwardly of the table so as to receive the respective actuating link belts or chains 18 by means of which the elevation of the legs and table is effected internally of their respective confines, the chains extending parallel to the legs. These link chains have engagement at one end with the bottom end of the legs through the adjustable screws 19 and clamp nuts thereon coacting with blocks welded on the leg ends, thereby enabling initial adjustment of the various chains to exert equal lifting force on the respective legs when tensioned. Chains 18 extend upwardly interiorly of and parallel to the channel-like legs, then over sprockets 20 which are appropriately journaled on the reinforcing side plates 7 adjacent the hollow posts 3. These latter are cut away at 21 adjacent the tops thereof to enable the chains to be brought out over the sprockets.

As clearly illustrated in Figs. 1, 2 and 3, the link chains are adjustably connected to the crosshead 14 at their respective opposite ends by means of threaded takeup connectors 22, whereby movement of the cross member longitudinally of the frame, i. e., to the right of Figs. 1, 2 and 3, tensions the chains and elevates the legs in the hollow tubular frame uprights. To effect this action, it is necessary to train the pair of chains for one pair of legs around idler sprockets 23 which are appropriately journaled on the side plates 7.

From the foregoing, it will be apparent that movement of crosshead 14 away from the end thrust member 12 equally tensions or retracts each of the chains or link belts 18 so as to elevate the table with an equal distribution of stress in the four chains. As previously stated, this equal distribution of stress, and the correct vertical positioning of the respective legs relative to one another to maintain the level of the top is effected by initial adjustment of the threaded connectors. I find that this type of chain belt is subject to very little distortion or stretching under load, even following extensive and heavy use; however, should it occur, so as to effect the horizontal level of the table top, it is very readily compensated for by the threaded connectors described.

Rotation of the axially restrained screw 13 is effected by means of a vise type handle including an actuator head 24 secured to the screw and a crank 25 slidably received therein and provided with handles 26.

A distinct advantage of the foregoing structure is that the threaded engagement of the screw 13 with crosshead 14 is, of course, self-locking in any position thereof. However, I find that in certain installations where the table or truck is subjected to pronounced vibration there may be a tendency for the screw to creep slightly. Therefore, in order to prevent this, I provide the locking or latching mechanism illustrated in Figs. 2, 3 and 4, comprising a generally circular latch member 27 secured to screw 13 and provided with spaced notches 28 on its periphery, which are engageable by the detent nose 29 of a coacting latching member 30. This latter is pivoted on lugs 31 on a suitable bracket 32 carried by the end spacer plate 8. Latch member 30 is manually shifted upwardly to inoperative position when it is desired to actuate the screw, using a fingerhole 33 therein for this purpose, and with the table top at the desired elevation, it may be swung into engagement with a notch on the latch member 27 to positively hold the parts against creep in the adjusted position of the table top 5.

By reference to Fig. 4, it will be seen that the hollow box-like tubular guide posts 3 of rectangular section provide a very satisfactory vertical guide for the channel-like legs 4 so that the table top is effectively supported against lateral sway in its vertical movement. There is, however, slight clearance in this guiding relation of the parts to prevent objectionable friction. Therefore, I provide a suitable wedging or locking arrangement for the legs in adjusted position including a cam 34 pivoted in a journal member 35 spot welded to one of the end posts or uprights, adjacent an outer opening 36 provided in the latter for the reception of cam 34, the cam being provided with an actuating handle 37. When the table is in proper elevated position, handle 37 is actuated outwardly to rotate cam 36 to engage and wedge the leg against the post. This is normally sufficient to not only hold the table top against lateral sway or shifting whatsoever under load, but also to resist creep of the screw 13 due to vibration. In fact, it is only under extraordinary conditions of vibration that either the wedging cam 34 or the coacting anti-creep latch members 27, 30 need be employed to resist creep, since the elevator screw is self-locking. Cam 34 is mainly for the purpose of taking up the very slight, anti-friction lateral play between the legs and uprights, thereby in effect constituting the same a single unitary support.

The table top itself includes a rigid rectangular frame (not shown) to which the sheet metal top member 38 is welded, the latter being provided with downturned connected side and end flanges and smooth rounded top edges to facilitate the sliding of work onto and off the same.

The foregoing construction may take the form of a stationary table if desired, however, I prefer to provide the same with wheels or casters 39 to constitute the same a translatable truck, at least one of the pairs of these wheels being provided with a suitable braking and/or locking mechanism 40, including a wheel swivel lock and wheel brake. This enables the truck to be held immovable and used as a stationary table when such is desired. The frame bottom 6 is offset at 41 to provide space for the accommodation of the other and larger pair of wheels.

The foregoing structure is exceedingly compact and simple, yet highly resistant to distortion and capable of sustaining relatively heavy loads by reason of its reinforced steel welded character. The table is at all times maintained in horizontal position and there is no possibility of wedging, jamming or the like such as would render the device inoperative. Stresses arising in the operation are equally distributed, so that no one of the parts is subjected to a damaging strain. Likewise, the forces are so transmitted that the handle can be manipulated to elevate relatively heavy loads with little exertion. The vise type sliding handle with double grips makes said manipulation possible when the loads overhang the table periphery.

I have illustrated and described my improvements in an embodiment which is very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is be-

lieved this disclosure will enable those skilled in the art to embody or adapt the same as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A combined table, bench, and truck comprising a reinforced welded supporting frame having corner uprights of hollow rectangular tubular section, a top adapted for elevation relative to said frame having depending legs of channel section secured thereto with the channels opening inwardly of the top, said uprights telescopingly receiving said legs for relative vertical movement, a longitudinally extending actuating screw journaled on said frame and restrained from longitudinal movement, a crosshead threadedly engaging said screw and slidable on said frame longitudinally of said screw upon rotation of the latter, a chain for each of said legs connected thereto at one end of the chain to extend longitudinally of the leg internally of its channel section, there being sprockets journaled on said frame adjacent the top of said uprights over which said chains are trained, said chains being secured at the opposite end thereof to said crosshead for tensioning thereof upon longitudinal movement of the crosshead to elevate said table top, and manually operable means on the frame wedgingly engageable with at least one of said legs for locking the same in adjusted position against retrograde movement.

2. A combined table, bench, and truck comprising a supporting frame having corner uprights of hollow rectangular tubular section, a top adapted for elevation relative to said frame having depending legs of channel section secured thereto with the channels opening inwardly of the top, said uprights telescopingly receiving said legs for relative vertical movement, a longitudinally extending actuating screw journaled on said frame and restrained from longitudinal movement, a crosshead threadedly engaging said screw and slidable on said frame longitudinally of said screw upon rotation of the latter, a chain for each of said legs connected thereto at one end of the chain to extend longitudinally of the leg internally of its channel section, there being sprockets journaled on said frame adjacent the top of said uprights over which said chains are trained, said chains being secured at the opposite end thereof to said crosshead for tensioning thereof upon longitudinal movement of the crosshead to elevate said table top, and manually operable means on the frame for locking the table top in adjusted position against retrograde movement.

3. A combined table, bench, and truck comprising a supporting frame having corner uprights of hollow rectangular tubular section, a top adapted for elevation relative to said frame having depending legs of channel section secured thereto with the channels opening inwardly of the top, said uprights telescopingly receiving said legs for relative vertical movement, a longitudinally extending actuating screw journaled on said frame and restrained from longitudinal movement, a crosshead threadedly engaging said screw and slidable on said frame longitudinally of said screw upon rotation of the latter, and a chain for each of said legs connected thereto at one end of the chain to extend longitudinally of the leg internally of its channel section, there being sprockets journaled on said frame adjacent said uprights over which said chains are trained, said chains being secured at the opposite end thereof to said crosshead for tensioning thereof upon longitudinal movement of the crosshead to elevate said table top.

4. A combined table, bench, and truck comprising a supporting frame having supporting uprights of hollow tubular section, a top adapted for elevation relative to said frame having depending legs of U-shaped section secured thereto with the channels opening inwardly of the top, said uprights telescopingly receiving said legs for relative vertical movement, a link chain for each of said legs connected at one end of the chain to extend longitudinally of the leg internally of its channel section, there being sprockets journaled on said frame adjacent said uprights over which said chains are trained, means adjustable on said frame and operatively connected to the opposite end of said chains to tension the same and elevate the top, and manually operable means associated with said last named means for locking the top in adjusted position against retrograde movement relative to the frame.

5. In a table, bench, or like construction, a rolling frame having provision for locking the same against rolling movement, said frame having hollow uprights of box-like tubular section, a top adjustable vertically relative to said frame having depending legs of inwardly opening channel section secured thereto and telescopingly and slidingly engageable with said uprights, a plurality of link belts one for each leg, each adjustably secured at one end to a leg extremity internally of the leg, a plurality of sprockets journaled on said frame over which said belts are trained so as to extend parallel to the leg and internally of the channel-like leg section, a crosshead longitudinally adjustable on said frame to which said belts are secured at the opposite extremities thereof, and means threadedly engaging said crosshead for adjusting the same longitudinally to simultaneously tension said belts and elevate the top.

6. In a table, bench or like construction, a rolling frame having provision for locking the same against rolling movement, said frame having hollow uprights of box-like tubular section, a top adjustable vertically relative to said frame having depending legs of inwardly opening channel section secured thereto and telescopingly and slidingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each adjustably secured at one end to a leg internally of the leg and extending parallel to the leg and internally of the channel-like leg section, a crosshead longitudinally adjustable on said frame to which said elements are secured at the opposite extremities thereof, and means threadedly engaging said cross-head for adjusting the same longitudinally to simultaneously tension said elements and elevate the top.

7. In a table, bench, or like construction, a rolling frame having provision for locking the same against rolling movement, said frame having hollow uprights of box-like tubular section, a top adjustable vertically relative to said frame having depending legs of hollow section secured thereto and telescopingly and slidingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each secured at one end to a leg internally of the leg and extending parallel to the leg and internally of the leg, and means to simultaneously tension said elements and elevate the top, including a mem-

ber adjustably shiftable on the frame and connected to said elements and manually actuable rotating means drivingly connected to said last named means to shift the same.

8. In a table, bench, or like construction, a frame having uprights, a top adjustable vertically relative to said frame having depending legs of hollow section secured thereto and telescopingly and slidingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each secured at one end to a leg internally of the leg and extending parallel to the leg and internally of the hollow leg section, and means to simultaneously tension said elements and elevate the top, including a member adjustably shiftable on the frame and connected to said elements and manually actuable rotating means drivingly connected to said last named means to shift the same.

9. In a table, bench, or like construction, a rolling frame having provision for selectively locking the same against rolling movement, said frame having uprights, a top adjustable vertically relative to said frame having depending legs of hollow section secured thereto and telescopingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each secured at one end to a leg internally thereof and substantially below its top, a plurality of rotatable supports journaled on said frame over which said elements are trained, said elements extending upwardly to said supports internally of the hollow leg section, a crosshead longitudinally adjustable on said frame in which said elements are secured at the opposite extremities thereof, screw means threadedly engaging said crosshead for adjusting the same longitudinally to simultaneously tension and elevate said elements, manually actuable means on the frame wedgingly engageable with at least one of the legs to frictionally engage the same with the frame in adjusted position, and further locking means for positively locking said screw means against retrograde movement.

10. In a table, bench, or like construction, a rolling frame having provision for selectively locking the same against rolling movement, said frame having uprights, a top adjustable vertically relative to said frame having depending legs telescopingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each secured at one end to a leg and substantially below its top, a plurality of rotatable supports journaled on said frame over which said elements are trained, a crosshead longitudinally adjustable on said frame in which said elements are secured at the opposite extremities thereof, screw means threadedly engaging said cross-head for adjusting the same longitudinally to simultaneously tension and elevate said elements, manually actuable means on the frame wedgingly engageable with at least one of the legs to frictionally engage the same with the frame in adjusted position, and further locking means for positively locking said screw means against retrograde movement.

11. In a table, bench, or like construction, a frame having uprights, a top adjustable vertically relative to said frame having depending legs telescopingly engageable with said uprights, a plurality of flexible elevating elements one for each leg, each secured at one end to a leg and substantially below its top, a plurality of rotatable supports journaled on said frame over which said elements are trained, a crosshead longitudinally adjustable on said frame in which said elements are secured at the opposite extremities thereof, screw means threadedly engaging said crosshead for adjusting the same longitudinally to simultaneously tension and elevate said elements, and locking means for positively locking said screw means against retrograde movement.

12. In a construction of the type described, a selectively translatable frame having uprights, a top member adjustable vertically relative to the frame including depending legs telescopingly engageable with the uprights, a plurality of flexible elevating elements one for each leg secured thereto substantially below the top thereof, means for simultaneously tensioning said elements to elevate the legs and table top, manually actuable means on the frame wedgingly engageable with at least one of said legs to frictionally engage the same in adjusted position with the frame, and further locking means coacting with said element tensioning means to lock the same against retrograde movement.

13. In a construction of the type described, a frame having uprights, a top member adjustable vertically relative to the frame including depending legs telescopingly engageable with the uprights, a plurality of elevating elements one for each leg secured thereto substantially below the top thereof, means for simultaneously tensioning said elements to elevate the legs and table top, manually actuable means on the frame wedgingly engageable with at least one of said legs to frictionally engage the same in adjusted position with the frame, and further locking means coacting with said element tensioning means to lock the same against retrograde movement.

WERNER ZEINDLER.