April 13, 1943. I. VON K. HOTT 2,316,432

LIFTING JACK

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Fig.2

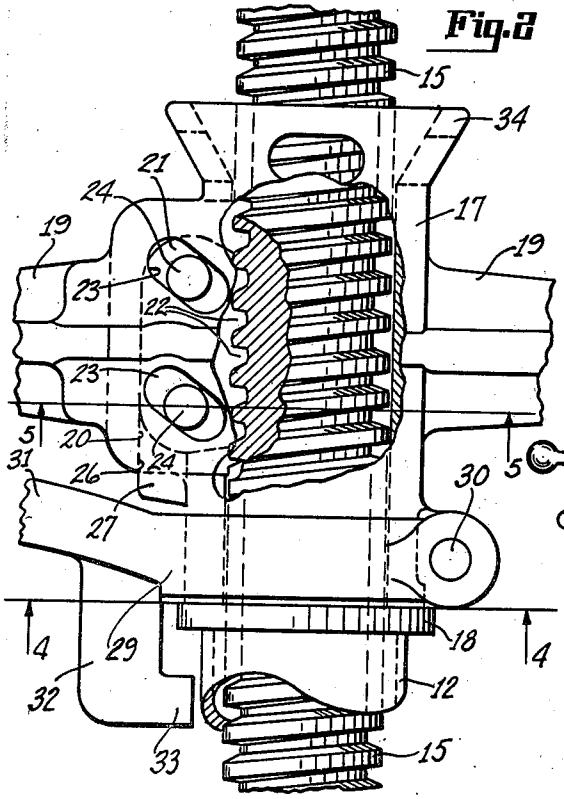


Fig.1

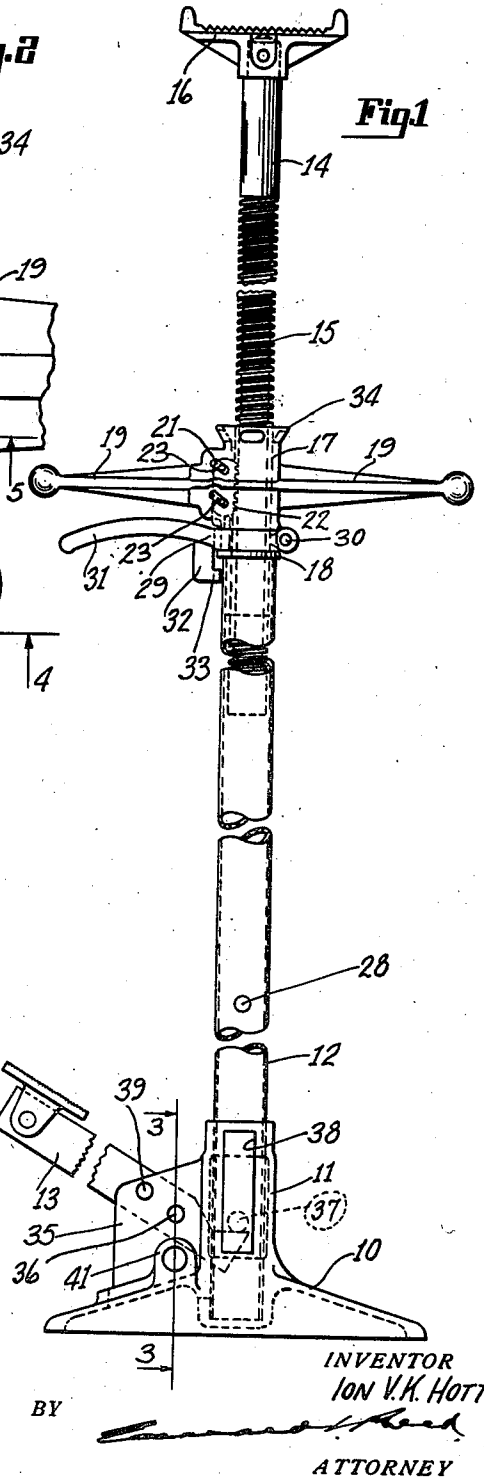
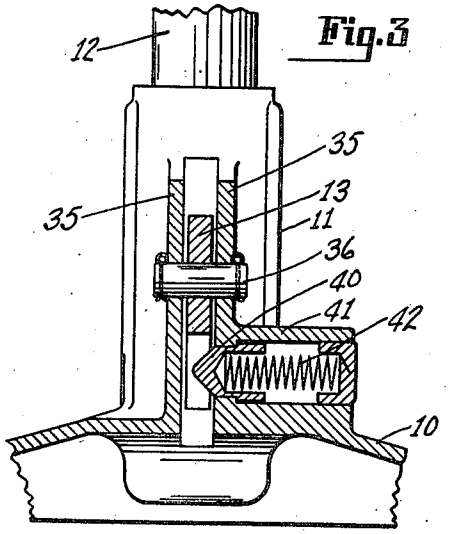


Fig.3



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Fig. 4

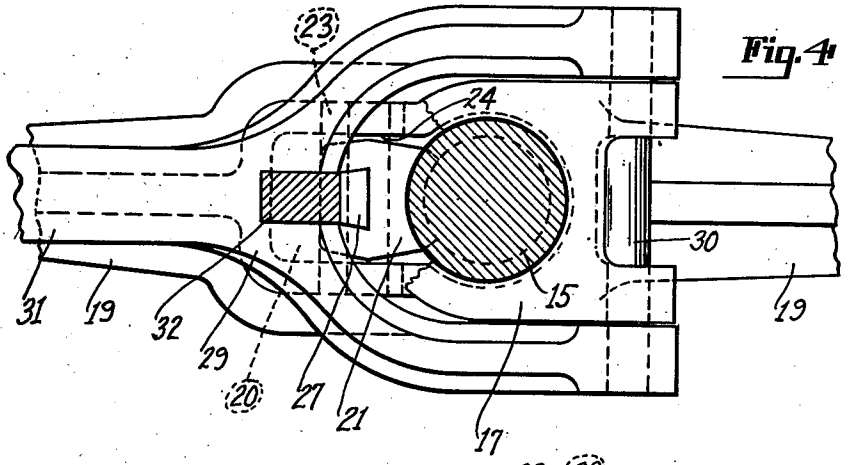


Fig. 5

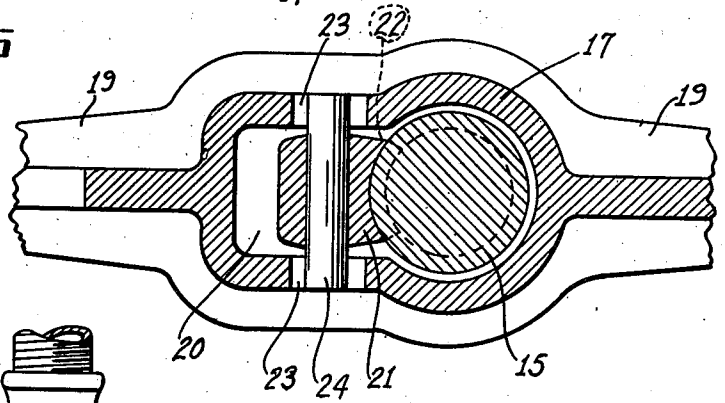
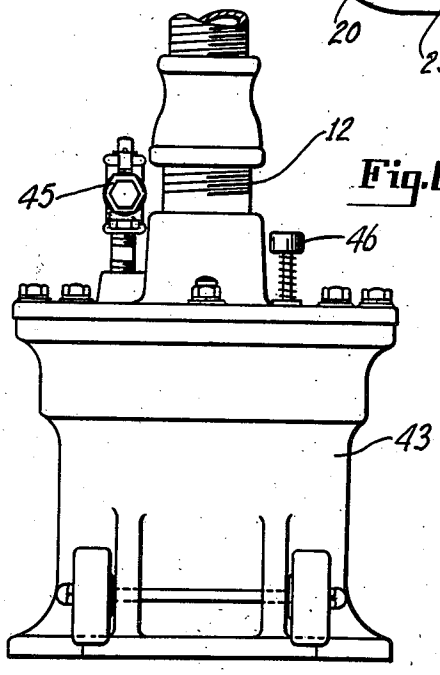


Fig. 6



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UNITED STATES PATENT OFFICE

2,316,432

LIFTING JACK

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Application April 26, 1940, Serial No. 331,840

8 Claims. (Cl. 254—98)

This invention relates to a lifting jack and more particularly to a jack which is adapted to lift the body of an automobile to relieve a spring or springs of the weight thereon and to then impart vibratory movement to the body to cause the leaves of the spring or springs to move with relation one to the other and thus facilitate the lubrication thereof, such a jack being sometimes called a jiggle jack.

One object of the invention is to provide a jack of such a character that the body of the automobile may be quickly and easily elevated preparatory to the vibratory operation and then quickly and easily lowered after the completion of that operation.

A further object of the invention is to provide such a jack in which the lifting element may have free movement into initial engagement with the body, may then be operated to elevate the body, and may be released for free movement from its elevated position to its lowered position.

A further object of the invention is to provide such a jack with controlling mechanism of such a character that the lifting element may have free sliding movement to a partially elevated position, and having means for holding said lifting element against downward movement, applying force thereto to further elevate the same and for releasing said lifting element for free downward movement.

A further object of the invention is to provide such a jack which will be of a simple durable construction and easily operated.

Other objects of the invention may appear as the jack is described in detail.

In the accompanying drawings Fig. 1 is a side elevation, partly broken away, of a lifting jack embodying my invention; Fig. 2 is a detail view, partly broken away, of the controlling mechanism; Fig. 3 is a sectional detail view taken on the line 3—3 of Fig. 1; Fig. 4 is a transverse section taken on the line 4—4 of Fig. 2; looking in the direction of the arrows; Fig. 5 is a transverse section taken on the line 5—5 of Fig. 2, looking in the direction of the arrows; and Fig. 6 is a side elevation of a modified form of the apparatus in which the base comprises a motor.

In these drawings I have illustrated the preferred embodiment of my invention, together with a minor modification thereof, but it will be understood that the mechanism may take various forms without departing from the spirit of the invention.

In that form of the invention here illustrated the jack comprises a base 10 provided with a vertical guideway 11 which is preferably in the form of a tubular socket. Mounted in this guideway is an upright supporting member, which, in the present instance, comprises a tubular element or pipe 12 the lower end of which extends into and is slidably mounted in the guideway 11 of the base. Mounted on the base are suitable means, such as a foot lever 13, for imparting reciprocatory movement to the supporting member 12, as will be hereinafter described. A lifting element 14 is slidably mounted on the supporting member 12 for vertical movement with relation thereto. In the present arrangement this lifting element comprises screw threaded shank or rod 15 which extends into the tubular supporting member 12, and is provided at its upper end with a load engaging head 16 adapted to engage the body or other load which is to be lifted.

Suitable mechanism is provided for so controlling the movement of the lifting element 15 with relation to the supporting member 12 that the lifting element may be quickly moved upwardly with relation to the supporting element to bring the head 16 into contact with or close to the load which is to be lifted, then locked against downward movement with relation to the supporting member, then further elevated with relation to the supporting member to elevate the load and held against movement with relation to the supporting member while the load is supported thereby, so that the reciprocatory movement of the supporting member will be transmitted to the load, and the lifting element thereafter released to permit the same to move freely to its lowered position. In its preferred form this controlling mechanism comprises a sleeve 17 mounted about the lifting element and supported on the upper end of the supporting member 12, which is preferably provided with a narrow circumferential flange 18. The sleeve is provided with means for rotating the same on the supporting member, such as oppositely extending handle bars 19. The sleeve is provided in one side thereof with an opening which is here shown as a recess 20 formed in the inner end of one of the handle bars 19. Movably mounted in this recess is an element 21 having on its inner edge a vertical series of teeth 22, preferably arcuate in form and adapted to extend into spaces between adjacent portions of the thread on the lifting element and to have supporting engagement with the latter. This element serves both as a detent to prevent the downward movement of the lifting element with

relation thereto and as a nut to impart upward movement to the lifting element when the sleeve is rotated in one direction. This element, which is herein referred to as a holding element, is mounted in the recess 20 for movement obliquely to the lifting element so that it moves downwardly and inwardly to bring its teeth into engagement with the thread of the lifting element. Consequently the downward thrust of the lifting element on the holding element tends to move the latter inwardly and thus maintain the teeth in firm engagement with the thread. It is also preferable that the lower surface of the thread and the upper surfaces of the teeth should have but a slight inclination so that there will be little tendency for the thrust of the lifting element to force the holding element outwardly. However, the upper surface of the thread and the lower surfaces of the teeth have a greater inclination so that an upward pull or thrust on the lifting element will force the holding element upwardly and outwardly and thus disengage the teeth from the thread and permit the free upward movement of the lifting element with relation thereto. The holding element may be mounted in any suitable manner to provide for this movement thereof but, in the present instance, the side walls of the recess in the bar 19 are provided with inclined slots 23 through which extend pins 24 mounted in the holding element, there being preferably two of these pins so as to prevent any substantial tilting of the lifting element. The space between the side walls of the recess 20 is open at its lower end, the holding element being supported on the lower walls of the slots 23 by the pins 24, and the holding element is provided at its lower end with a projection 27 which extends downwardly below the walls of the recess, for a purpose which will hereinafter appear.

When the jack is to be used it is placed in position beneath that part of the automobile body which is to be manipulated and the lifting element is moved upwardly to bring the head 16 into contact with that part of the body, the holding element automatically retaining the lifting element in its elevated position. The sleeve 17 is then rotated to cause the teeth of the lifting element to travel along the thread of the holding element in a direction to elevate the latter and thus impart further upward movement to the lifting element and elevate the body to the desired extent, and, of course, at the end of this final lifting movement the holding element locks the lifting element and the load against downward movement. The lifting element is thus so connected with the supporting member 12 that it will move vertically therewith and the reciprocatory movement of the supporting member is transmitted through the lifting element to the body of the automobile, or other load. When it is desired to lower the body the holding element 21 is moved out of engagement with the thread of the lifting element, thereby releasing the latter and permitting the same to drop to its lowered position by gravity. The downward movement of the lifting element with relation to the supporting member may be limited in any suitable manner but, in the present instance, a stop, such as a pin 28, is arranged in the supporting member at such a point that it will interrupt the downward movement of the lifting element just before the head strikes the upper end of the sleeve. Of course, if desired, the sleeve and holding element may be rotated in a direction to gradually lower the load to its normal position but in normal use it is not objectionable to release the holding element and permit the body to drop to its normal position.

The means for moving the holding element to an inoperative position may take various forms. In the present instance, it comprises a trip lever 29 having a bifurcated end which extends across the sleeve 17 and is pivotally mounted at 30 on that side of the sleeve opposite the holding element. A part of the trip lever adjacent the bifurcated end thereof lies directly beneath the projection 27 on the holding element and the lever has a handle portion 31 by means of which the lever may be moved upwardly about its pivotal axis and caused to engage the projection 27 and thus force the holding element upwardly and outwardly to its inoperative position. In the arrangement shown, the handle portion 31 of the trip lever lies directly beneath and adjacent to one of the handle bars 19 so that the bar and the handle can be gripped by the same hand and a strong pull exerted on the lever to move the holding element against the weight of the load resting thereon. The trip lever 29 also carries a downwardly extending arm 32 having at its lower end a finger 33 which is so arranged that when the lever is in its normal or lower position the finger 33 will lie beneath the flange 18 of the supporting member 12 and thus limit the upward movement of the sleeve and its associated parts with relation to the supporting member. However, this finger is so arranged that when the lever is moved upwardly about its axis the finger will be out of line with the flange so that it will not limit the upward movement of the sleeve. The sleeve is also preferably provided at its upper end with an outwardly flared portion 34 which serves as a guard to prevent the finger of the operator being caught between the thread on the lifting element and the upper end of the sleeve.

The lever 13 by means of which reciprocatory movement is imparted to the supporting member 12 may be mounted in any suitable manner but it is here shown as arranged between two upright plates 35 rigidly secured to the base 10 and is pivotally connected with those plates by a pin 36. The inner end of the lever extends through slots in the socket 11 and in the lower portion of the supporting member and beneath a pin 37 mounted in the supporting member so that the downward pressure of the foot on the lever 13 will move the supporting member and the parts carried thereby upwardly and when that pressure is relieved the supporting member and said parts will move downwardly by gravity. In the construction shown the base socket 11 is provided in its opposite sides with elongate openings 38 through which the pins 37 extend and thus hold the supporting member against rotation in the socket. If desired, the lever and the plates 35 may be provided with a second set of holes, as shown at 39, through which a pivot pin may extend to provide the lever with a longer throw and thus increase the extent of the vertical reciprocation of the supporting member. When the jack is not in use it is preferable that the foot lever 11 should be folded to an inoperative position substantially parallel with the base socket 11 and means controlled by this movement of the lever are provided to hold the same in its inoperative position. Preferably this means comprises a detent 40 mounted in a socket 41 on the base and pressed inwardly by a spring 42. The inner end of the detent has an inclined surface

which extends across the lower edge of the lever when the latter is in its operative position and is so arranged that it does not interfere with the operative movement of the lever. When the lever is moved to its upright or inoperative position the lower edge thereof acts on the inclined surface of the detent to force the latter outwardly against the action of the spring and thus permit the edge of the lever to pass the detent, and cause the latter to be pressed tightly against the side of the lever and thus frictionally retain the same in its inoperative position.

As has been stated the reciprocatory movement may be imparted to the supporting member **12** in any suitable manner and in some instances it may be desirable to provide power operated means for that purpose. In Fig. 6 the supporting member **12** is shown as mounted in the casing **43** of a motor which constitutes the base therefor and which is here shown as an air motor, and which is provided within the casing with means for imparting reciprocatory movement to the supporting member but this means forms no part of the present invention and is not shown. The motor is provided with means **45** for connecting the same with an air line and with an externally operable device **46** to regulate the operation of the supporting member.

While I have shown and described one embodiment of my invention, together with a minor modification thereof, I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

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

1. In a lifting jack of the type comprising a vertically reciprocatory supporting member having a tubular upper portion, a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion extending into said supporting member, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, extending upwardly therefrom about the screw threaded portion of said lifting element and rotatable with relation to said supporting member and said lifting element, a handle secured to said sleeve for rotating the same, said sleeve having a guideway, a holding element slidably mounted in said guideway, biased toward said lifting element and having a toothed portion to engage the screw thread of said lifting element to hold the latter normally against downward movement with relation to said sleeve and to impart upward movement to said lifting element when said sleeve is rotated in one direction, said holding element being movable to an inoperative position by an upward pull on said lifting element, and means carried by said sleeve for retracting said holding element to release said lifting element and the load thereon for downward movement.

2. In a lifting jack of the type comprising a vertically reciprocatory supporting member having a tubular upper portion, a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion extending into said supporting member, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, extending upwardly therefrom about the screw threaded portion of said lifting element and rotatable with relation to said supporting member and said lifting element, a handle secured to said sleeve for rotating the same, said sleeve having a recess provided in the lateral walls thereof with guideways sloping downwardly and inwardly toward said lifting element, a holding element in said recess having parts slidably supported in said guideways and movable by gravity into operative engagement with the threaded portion of said lifting element to hold the latter normally against downward movement with relation to said sleeve and to impart upward movement thereto when said sleeve is rotated in one direction, a device mounted on said sleeve separate from said handle and operable to retract said holding element and release said lifting element for downward movement with relation to said sleeve.

3. In a lifting jack of the type comprising a vertically reciprocatory supporting member having a tubular upper portion, a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion extending into said supporting member, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, extending upwardly therefrom about the screw threaded portion of said lifting element and rotatable with relation to said supporting member and said lifting element, a handle secured to said sleeve for rotating the same, said sleeve having a recess in one side thereof sloping downwardly and inwardly toward said lifting element, a holding element slidably mounted in said recess, having a toothed portion and movable by gravity to operatively engage said toothed portion with the threaded portion of said lifting element whereby the rotation of said sleeve in one direction will impart upward movement to said lifting element, and a lever pivotally mounted on that side of said sleeve opposite said holding element, extending across said sleeve and having a part to engage said holding element and move the latter to an inoperative position.

4. In a lifting jack of the type comprising a vertically reciprocatory supporting member having a tubular upper portion, a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion extending into said supporting member, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, extending upwardly therefrom about the screw threaded portion of said lifting element and rotatable with relation to said supporting member and said lifting element, a handle secured to said sleeve for rotating the same, a holding element movably mounted on said sleeve biased toward the screw threaded portion of said lifting element and having a toothed portion to engage the screw thread of said lifting element and hold the latter against downward movement when said sleeve is held against rotation and to impart longitudinal movement to said lifting element when said sleeve is rotated, and a lever separate from said handle pivotally mounted on said sleeve for rotation therewith in predetermined relation to said holding element and having a part to engage said holding element and retract the same to release said lifting element for downward movement with relation to said sleeve.

5. In a lifting jack of the type comprising a vertically reciprocatory supporting member and a lifting element mounted on said supporting mem-

ber for vertical movement with relation thereto and having a screw threaded portion, a structure mounted on the upper end of said supporting member for reciprocatory movement therewith, extending upwardly therefrom along the screw threaded portion of said lifting element and rotatable with relation to said supporting structure about said lifting element, a handle secured to said rotatable structure for rotating the latter, a holding element movably mounted on said rotatable structure, biased toward said lifting element and having a toothed portion to engage the screw thread of said lifting element and hold the latter normally against downward movement with relation to said rotatable structure and to impart upward movement to said lifting element when said structure is rotated in one direction, a retracting device movably mounted on said structure for rotation therewith in operative relation to said holding element and operable to retract said holding element and release said lifting element for downward movement with relation to said supporting member, said retracting device having a part to engage said supporting member when said device is in its normal position and limit the upward movement of said rotatable structure with relation to said supporting member.

6. In a lifting jack of the type comprising a vertically reciprocatory supporting member and a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, having an internal diameter slightly greater than the overall diameter of the screw threaded portion of said lifting element, extending upwardly about said screw threaded portion of said lifting element and rotatable about a vertical axis with relation to said supporting member, a handle secured to said sleeve for rotating the latter, said sleeve having a recess in one side thereof, a holding element movably mounted in said recess, biased toward said lifting element and having a toothed portion to engage the screw thread of said lifting element and hold the latter against downward movement when said sleeve is held against rotation and to impart longitudinal movement to said lifting element when said sleeve is rotated, said holding element having a part extending below said recess, and a lever pivotally mounted on said sleeve for rotation therewith and arranged to engage said part of said holding element and retract the latter.

7. In a lifting jack of the type comprising a vertically reciprocatory supporting member and a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, having an internal diameter slightly greater than the overall diameter of the screw threaded portion of said lifting element, extending upwardly about said screw threaded portion of said lifting element and rotatable about a vertical axis with relation to said supporting member, a handle secured to said sleeve for rotating the latter, said sleeve having a recess in one side thereof, a holding element movably mounted in said recess, biased toward said lifting element and having a toothed portion to engage the screw thread of said lifting element and hold the latter against downward movement when said sleeve is held against rotation and to impart longitudinal movement to said lifting element when said sleeve is rotated, and a lever pivotally mounted on said sleeve for rotation therewith in operative relation to said holding element and having a part so located with relation to the handle on said sleeve that said part and said handle may be simultaneously grasped by the hand of the operator to facilitate the operation of said lever to retract said holding element against the weight of the load thereon.

8. In a lifting jack of the type comprising a vertically reciprocatory supporting member and a lifting element mounted on said supporting member for vertical movement with relation thereto and having a screw threaded portion, a sleeve mounted on the upper end of said supporting member for reciprocatory movement therewith, having an internal diameter slightly greater than the overall diameter of the screw threaded portion of said lifting element, extending upwardly about said screw threaded portion of said lifting element and rotatable about a vertical axis with relation to said supporting member, a handle secured to said sleeve for rotating the latter, said sleeve having a recess in one side thereof, a holding element movably mounted in said recess, biased toward said lifting element and having a toothed portion to engage the screw thread of said lifting element and hold the latter against downward movement when said sleeve is held against rotation and to impart longitudinal movement to said lifting element when said sleeve is rotated, said supporting member having a shoulder near its upper end, a lever pivotally mounted on said sleeve and having a part to engage and retract said holding element when said lever is moved about its pivotal axis and having a second part to engage said shoulder and limit the upward movement of said sleeve with relation to said supporting member when said lever is in its normal position.

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