Sept. 26, 1950 A. A. MILLER 2,523,706

SCISSORS JACK

Filed June 21, 1945 2 Sheets-Sheet 1

Fig. 1

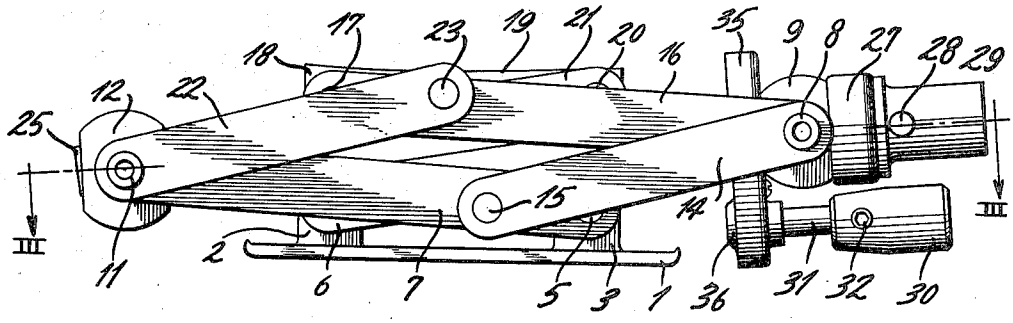


Fig. 2

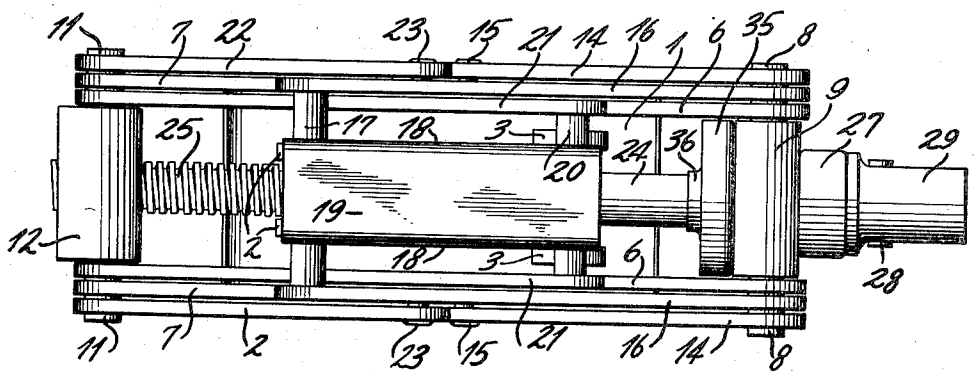
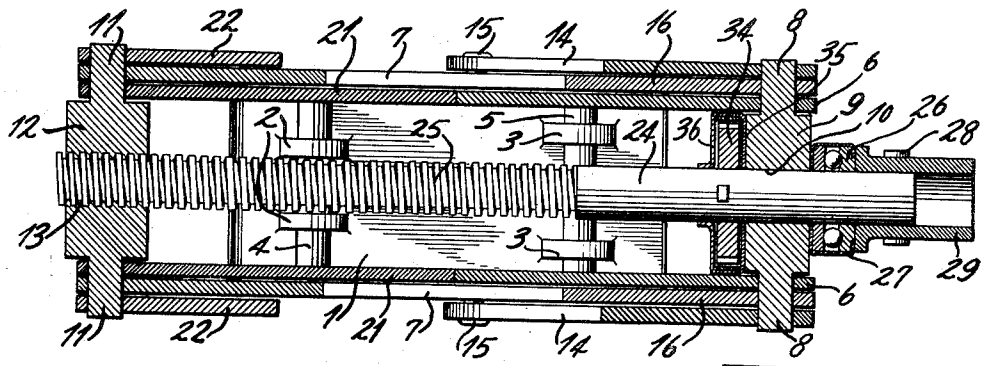


Fig. 3



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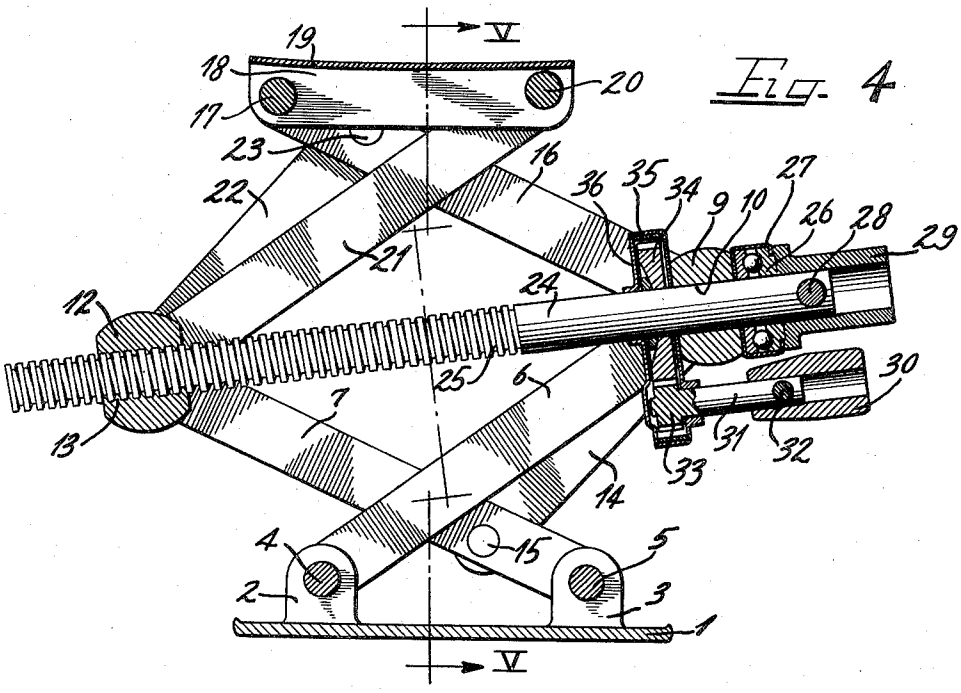


Fig. 4

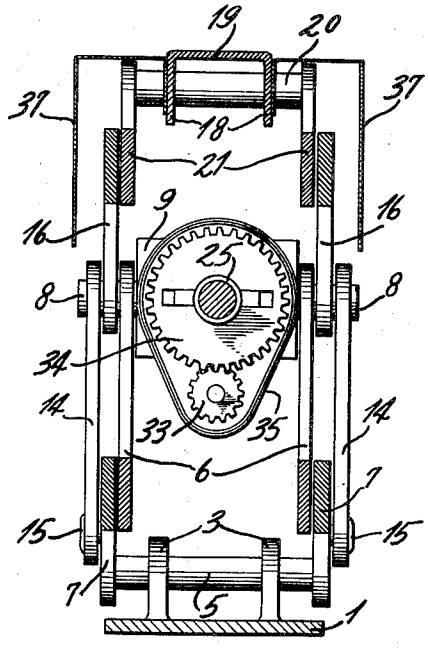


Fig. 5

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Patented Sept. 26, 1950 2,523,706

UNITED STATES PATENT OFFICE

2,523,706

SCISSORS JACK

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Application June 21, 1945, Serial No. 600,763

4 Claims. (Cl. 254—126)

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This invention is directed to weight-raising devices and more particularly to an improved and simplified form of weight-raising jack of the scissors or lazy tongs type whereby a lifting head is conveniently operable for use in raising either ordinarily loads or heavy loads through the medium of a screw control selectively operable by any one of a plurality of rotatable controls disposed in the same vertical plane for actuating the screw control at different speeds, depending upon the magnitude of the device or article which is to be raised or lowered.

It is an object of this invention to provide a weight-lifting device of simple and effective construction, including selectively operable means for operating a lifting unit at different rates of speed, whereby the objects and features contemplated are obtainable with economy and facility.

Another object of the invention is the provision of an improved and simplified form of jack wherein a scissors type mechanism is adapted to be raised or lowered by either a primary drive or a secondary drive, depending upon the magnitude of the weight to be raised or lowered.

It is also an object of this invention to provide a lazy tongs type of jack in which a speed reduction arrangement is selectively operable for converting the jack into a heavy duty weight raising or lowering mechanism.

It is furthermore an object of this invention to provide a combination light and heavy weight scissors type of jack mechanism wherein a lifting head or saddle includes a protecting hood for enclosing the operating parts when the jack is completely collapsed.

An important feature of the invention is the provision of a scissors or lazy tongs type of jack in which the operating screw may be directly rotated for handling light loads, or which may be actuated through a gear reduction means mounted within the lazy tongs on the inner side of one of the screw supporting blocks for the handling of heavy loads.

It is an important object of this invention to provide an improved and simplified form of screw-operated jack wherein a speed reduction drive may be selectively actuated for operating the device to convert the same into a heavy duty jack for raising or lowering heavy loads in excess of those normally intended to be handled by the device.

Other and further important objects and features of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

On the drawings:

Figure 1 is a side elevational view of a scissors type jack in collapsed form, embodying the principles of this invention.

Figure 2 is a top plan view of the jack.

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Figure 3 is a horizontal sectional view of the jack taken on line III—III of Figure 1.

Figure 4 is a longitudinal central vertical sectional view of the jack, with the operating mechanisms in raised positions and showing parts in elevation.

Figure 5 is a transverse vertical sectional view taken on line V—V of Figure 4 with a side of the gear reduction housing removed to show the gears. The figure also shows two cover sections secured to opposite sides of the lifting head to form a shield or hood for the jack when the same is in its collapsed position. The hood has been omitted from the other figures in order to show the operating parts more clearly.

As shown in the drawings:

The present invention pertains to an improved and more efficient type of a lifting or raising jack adaptable for use in connection with automobiles, heavy trucks, or for use in the lifting or raising of other devices or objects. The jack is of the scissors or lazy tongs type including a main control screw having a plurality of driving means disposed in the same vertical plane and selectively operable for the handling of ordinary loads or for the handling of heavy loads at a reduced speed. The jack is furthermore adaptable for raising or lowering a load of any selected weight at a substantially normal speed or at reduced or slow speed in case the article or object is extra heavy or is of such a nature that care must be exercised in the raising or lowering of the same to prevent accidents.

One of the principal features of the present invention is the provision of a scissors or lazy tongs type of jack wherein the main control or driving screw is inclined and may be operated by a wrench or crank to produce a direct rotation of the same or said screw may be operated through the medium of an auxiliary device such as a reduction gearing to slow down the raising or lowering of the load-carrying mechanisms for the more efficient handling of light and heavy loads or for controlling the rate of movement of an object which the jack is carrying.

The improved scissors type jack herein disclosed comprises a bottom or base plate 1 having two spaced pairs of apertured bearing lugs 2 and 3 integrally formed thereon for respectively supporting bearing shafts 4 and 5 the outer ends of which are reduced in diameter to form suitable supports for the lower ends of members forming parts of a collapsible and expandable type of weight lifting and lowering mechanism provided with a plurality of selectively operable driving or operating sockets disposed one above the other in the same plane for operating the lifting mechanisms at different rates of speed as hereinafter more fully described.

The load lifting and lowering mechanism is

supported on the base plate 1 and is of the scissors type including a lazy tongs or toggle frame comprising a pair of lower lazy tongs links or toggle members 6 which have the lower ends thereof pivotally supported on the reduced ends of the base bearing shaft 4. A second pair of lower lazy tongs links or toggle members 7 have the lower ends thereof pivotally supported on the reduced ends of the base bearing shaft 5. The arms 6 and 7 on each side of the jack cross one another and project upwardly and outwardly in opposite directions as illustrated in Figure 4. The upper ends of the lazy tongs links 6 are pivotally engaged on the trunnions or gudgeons 8 integrally projecting from opposite ends of a bearing block 9 provided with a transverse bearing opening or passage 10.

The upper ends of the lazy tongs links 7 are rotatably or pivotally supported on trunnions or gudgeons 11 which are integrally formed on opposite ends of a nut block 12 which is formed with a transverse opening or passage having internal screw threads 13. A pair of toggle bars or links 14 have the upper ends thereof pivotally supported on the trunnions 8 of the block 9. The lower ends of the toggle bars or links 14 are pivotally connected by means of pivot studs 15 to the outer side of the lower frame links 7.

The upper portion of the lazy tongs framework comprises a pair of upper lazy tongs links or toggle members 16 having the lower ends thereof pivotally supported on the trunnions 8 between the links 6 and 14. The upper ends of the upper lazy tongs links 16 are pivotally supported on the reduced ends of an upper shaft 17 which project through the side flanges 18 of a lifting head or saddle 19 to support one end thereof. Engaged transversely through the side flanges 18 at the opposite end of the lifting head or saddle 19 is a second upper shaft 20. Pivotally engaged on the outer reduced ends of the upper shaft 20 of the lifting saddle 19 are the upper ends of a pair of upper lazy tongs links or toggle members 21 the lower ends of which extend downwardly and are pivotally engaged on the trunnions 11 between the ends of the nut block 12 and the upper ends of the links 7. Pivotally mounted on the outer end portions of the trunnions 11 to the outside of the links 7 are the lower ends of a pair of toggle bars or links 22. The upper ends of the toggle bars 22 are pivotally engaged on pivot studs 23 which are secured on the outer sides of the upper links 16 a short distance from the upper ends of said links so that the toggle bars 22 are parallel with the toggle links 14 and are disposed in substantially the plane thereof.

For the purpose of raising and lowering the lazy tongs or toggle frames which support the lifting saddle 19 an operating screw means is provided which consists of a cylindrical shaft section 24 and a threaded section 25. The operating screw 24—25 is supported in a slightly inclined position as illustrated in Figure 4, with the screw section 25 directed downwardly and threaded through the internally threaded nut block 12. The inclined position of the operating screw positions the operating end so that it is conveniently accessible to permit operation of the jack. The plain shaft section 24 of the operating screw is rotatably supported and projects through the bearing block 9.

Engaged on the main shaft section 24 of the operating screw adjacent the outer side of the bearing block 9 is a ball bearing unit 26 which is enclosed by a ball bearing casing 27. Secured rigidly upon the outer projecting end of the operating screw shaft section 24 by means of a coupling pin 28 is the inner end of an inclined main or primary driving socket 29 designed for receiving a wrench, a crank or other suitable operating means for rotating the operating screw by a direct drive to cause either raising or lowering of the lifting saddle 19, depending upon the direction of rotation of the operating screw. By rotating the operating screw the threaded section 25 is caused to act upon the interior threads 13 of the nut block 12 to cause operation of the lazy tongs or toggle frames, to cause elevation of the lifting saddle 19 when the nut block is drawn toward the bearing block 9; lowering of the lifting saddle from a raised position is produced when the screw is rotated to cause the nut block 12 to travel outwardly on the threaded section 25 of the operating screw.

Direct operation of the operating screw by rotation of the driving socket 29 is for the purpose of raising or lowering relatively small or normal loads for which the jack is designed and at a rate of speed depending upon the speed of rotation of the operating screw.

The scissors type jack of this invention is also designed to raise and lower greater or heavier loads such as loaded trucks or the like. This is accomplished through the medium of an auxiliary or secondary operating drive socket 30 which is adapted to be operated by a wrench or crank. The auxiliary drive socket 30 is inclined and positioned below and in the same vertical plane with the main drive socket 29. One end of the auxiliary drive socket 30 is secured to one end of a gear shaft 31 by means of a coupling pin 32. When the auxiliary drive socket 30 is rotated the jack lifting and lowering mechanisms are adapted to be actuated at a lower rate of speed than the normal rate produced by direct rotation of the operating screw by means of the main driving socket 29. The reduced rate of speed is primarily adapted for raising and lowering heavy loads and is accomplished by means of a gear reduction unit mounted between the control blocks of the lazy tongs mechanisms. The gear reduction unit comprises a small gear 33 rigidly secured or integrally formed on one end of the gear shaft 31 and is in mesh with a large gear 34 keyed or otherwise secured on the operating screw shaft section 24 adjacent the inner side of the block 9. The gears 33 and 34 are enclosed in a gear housing 35 which is rigidly secured to the inner flat side of the bearing block 9 and has the shaft section 24 of the operating screw projecting therethrough. The gear housing 35 is provided with a removable cover 36. It will accordingly be noted that when the auxiliary drive socket 30 is operated by means of a wrench or crank that the small gear 33 is rotated to drive the large gear 34, thereby causing the operating screw to be rotated at a slower rate of speed whereby greater or excessive loads on the saddle 19 may be raised or lowered with comparative ease.

It will be noted that the operating controls for the jack are all disposed in the same vertical plane, with the gear shaft 31 and the auxiliary socket 30 below and parallel to the operating screw and the main drive socket 29.

Referring to Figure 5, a guard hood mechanism is provided for the scissors jack and this guard mechanism is in the form of a hood comprising a pair of inverted L cross-sectioned hood sections 37 having the short flanges thereof rigidly se-

cured to the side flanges 18 of the lifting head or saddle 19, thereby positioning the larger plates or flanges of the hood sections on opposite sides of the scissors jack and projecting downwardly as shown in Figure 5. When the jack is in its completely collapsed position with the head or saddle 19 in its lowermost position, the outer flanges or plates of the hood section 37 will nearly touch the ground at the sides of the base plate 1 to enclose the lazy tongs or toggle frame sections of the jack. The hood sections 37 have been omitted from all of the figures except Figure 5 in order to more clearly disclose the various mechanisms of the scissors jack. It will of course be understood that the hood sections may be omitted or said hood sections may form an integral part of the lifting head or saddle 19 instead of being attached to the sides thereof as shown in Figure 5.

One of the important features of this invention is the provision of the multiple operating control whereby the jack may be operated by direct rotation of the control screw for ordinary loads, or the auxiliary drive control may be operated through the reduction gearing to cause raising or lowering of the lifting saddle 19 for handling excessive loads. The reduced speed for raising or lowering the lifting saddle when the auxiliary drive is operated not only permits the handling of heavy loads but also affords a means for raising or lowering articles or objects which require slow movement in the raising or lowering of the same to prevent accidents, such for example as the spilling of the liquid contents of containers which may be required to be raised or lowered by means of the scissors type jack.

It will of course be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is, therefor, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In a collapsible lifting apparatus of the lazy tong type including a base, a work engaging head spaced therefrom, substantially equal upper and lower sets of opposed crossed links pivotally connected to said base and to said head respectively, and an intermediate operating rod carrying spaced trunnion blocks to which adjoining ends of said two sets of crossed links are pivotally connected, one block being threaded on the rod and the other being connected to the rod for movement therewith, operating gears connected to said rod directly between the blocks and having manual means for operating same extending parallel to and along said rod and said other block for actuation beyond the links and said other block.

2. In a collapsible lifting apparatus of the lazy tong type including a base, a work engaging head spaced therefrom, substantially equal upper and lower sets of opposed crossed links pivotally connected to said base and to said head respectively, and an intermediate operating rod carrying spaced trunnion blocks to which adjoining ends of said two sets of crossed links are pivotally connected, one block being threaded on the rod and the other being connected to the rod for movement therewith, operating gears connected to said rod directly between the blocks and having manual means for operating same extending parallel to and along said rod and said other block for actuation beyond the links and said other block, and a stabilizing link for each set of links pivotally connected at one end to one of said blocks and at its other end to an intermediate portion of one of said crossed links.

3. In a collapsible lifting mechanism of the lazy tong lever type including a base, a work engaging head spaced therefrom, crossed upper links pivotally connected at their upper ends to said head, spaced trunnion blocks in substantial axial alignment and to which the lower ends of said upper links are pivotally connected in spaced relation, lower crossed links pivotally connected at their lower ends to said base and at their upper ends to said spaced blocks, and an operating screw rod threaded at one end in one of said blocks and having its other connected to the other block for movement therewith, means for turning said rod to lower and raise said head comprising a first gear mounted on said other end of said rod between the blocks, a second gear in meshed engagement with said first gear, a gear case for said gears mounted between said blocks and manually operable means for turning said second gear and extending generally parallel to and along said rod and said other block for manual engagement beyond and independent of said other trunnion block.

4. In a collapsible lifting mechanism of the lazy tong lever type including a base, a work engaging head spaced therefrom, crossed upper links pivotally connected at their upper ends to said head, spaced trunnion blocks in substantial axial alignment and to which the lower ends of said upper links are pivotally connected in spaced relation, lower crossed links pivotally connected at their lower ends to said base and at their upper ends to said spaced blocks, and an operating screw rod threaded at one end in one of said blocks and having its other end connected to the other block for movement therewith, means for turning said rod to lower and raise said head comprising a first gear mounted on said other end of said rod between the blocks, a second gear in meshed engagement with said first gear, a gear case for said gears mounted between said blocks and manually operable means for turning said second gear and extending generally parallel to and along said rod and said other block for manual engagement beyond and independent of said other trunnion block, said other end of said rod having mounted thereon separate manually operable means for directly turning said rod independent of said pinion, said separate means disposed against the outer side of said other block and said gear case being in abutment with the inner side of said block.

ARTHUR ALFRED MILLER.

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