

Feb. 23, 1937.

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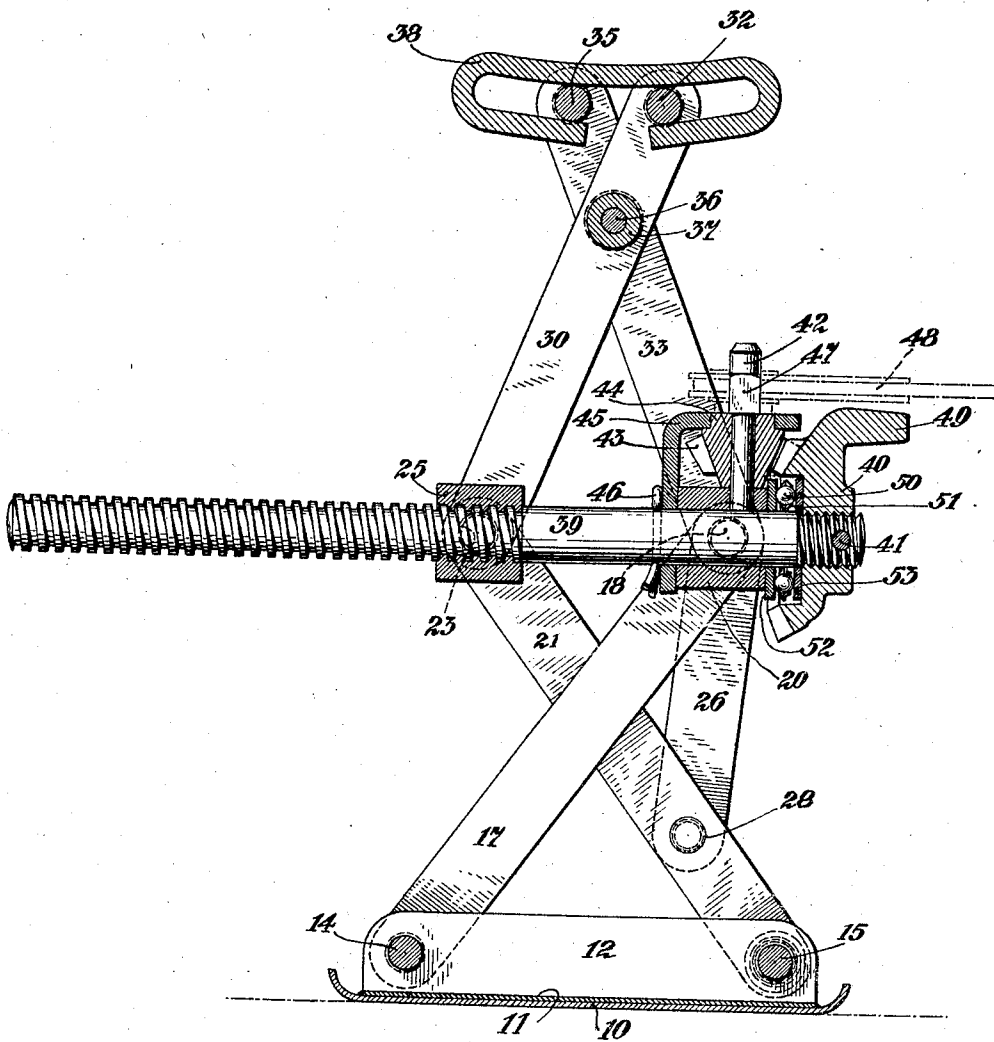
2,071,470

AUTOMOBILE JACK

Filed April 18, 1933

2 Sheets-Sheet 1

Fig. 1



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FIG. 3

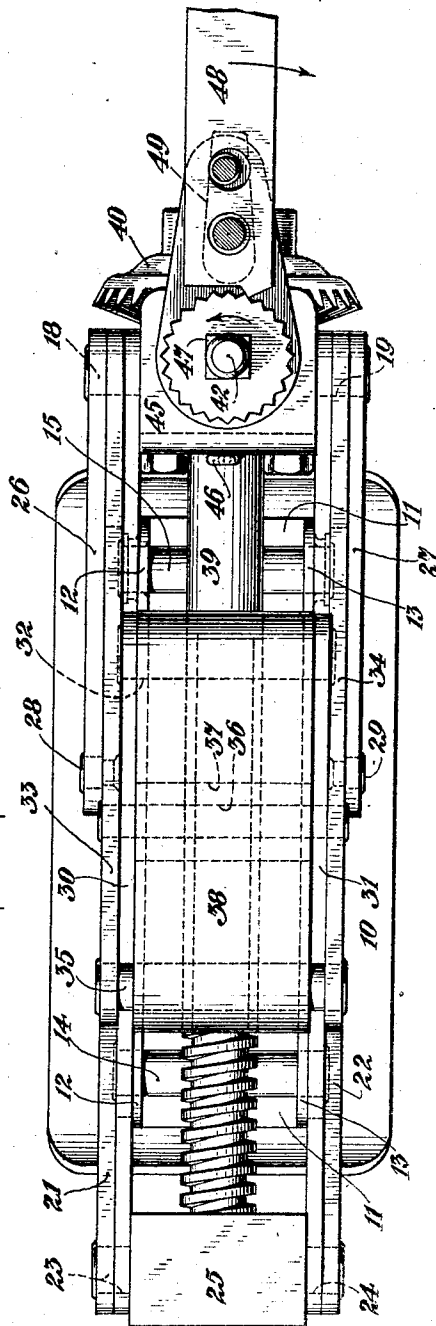
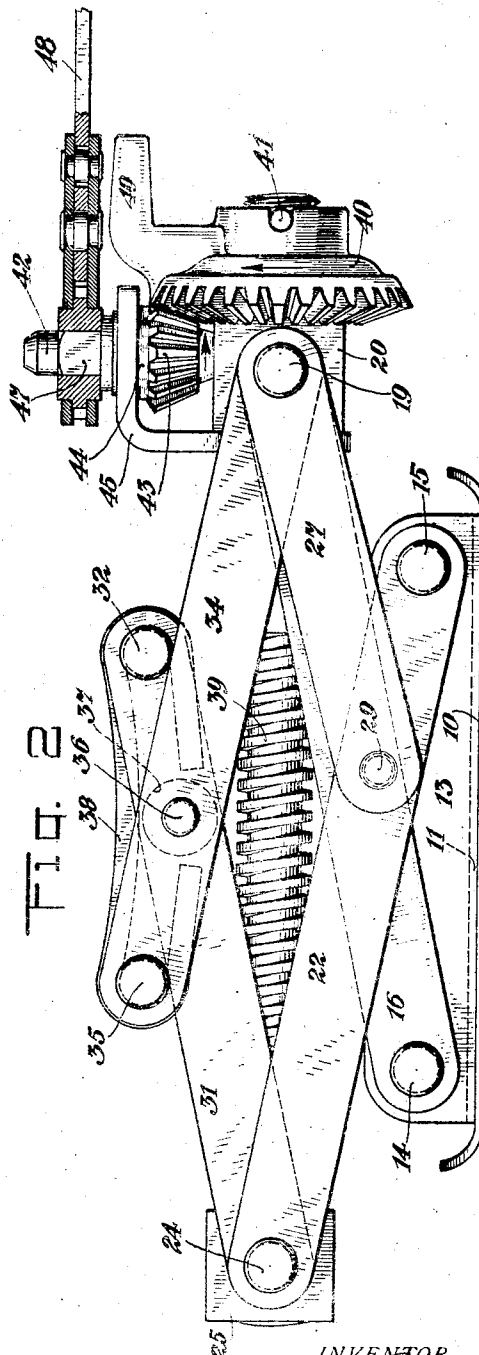


FIG. 2



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2,071,470

AUTOMOBILE JACK

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Application April 18, 1933, Serial No. 666,645

7 Claims. (Cl. 254—126)

This invention relates to lifting devices or jacks, and especially to means for operating such devices.

Such devices in general, comprise a screw or spindle which when rotated in one direction elevates the jack and when rotated in the other direction lowers the jack. Heretofore, it has been common practice to rotate the screw or spindle by means of either a crank handle or a vertically movable ratchet lever, a crank handle being generally employed in connection with quick acting jacks designed to carry light loads and a ratchet lever being generally employed in connection with slower acting jacks designed to carry relatively heavy loads. Both of these arrangements, however, operate in a vertical plane consequently when the vertical operating space is limited, as for example, when raising and lowering an automobile, neither arrangement is satisfactory.

An object of the present invention is to provide means for operating a lifting device or jack where the vertical operating space is limited.

Another object of the invention is to provide means whereby a jack may be rapidly operated by a crank handle when subjected to a relatively light load and by a ratchet lever when subjected to a relatively heavy load.

In accordance with the present invention, the above and other objects are attained by providing means for rotating the screw or spindle of such devices by a crank handle having a relatively short offset or lever portion and with a horizontally movable ratchet lever. More specifically the operating screw or spindle of such devices is provided with a main drive gear which may be operated by a crank handle or by a horizontally movable ratchet lever through the medium of an auxiliary gear, the main drive gear being rotated by the crank handle while elevating the jack into frictional engagement with the load and then by the horizontally movable ratchet lever through the medium of the auxiliary while elevating the load.

In the accompanying drawings, the invention is shown merely in preferred form and by way of example and as applied to a jack of the lazy tong type, but obviously many changes and variations may be made therein and in its mode of application, which will be comprised within its spirit. It should therefore be understood that the invention is not limited to any specific form or embodiment, except in so far as such limitations are specified in the claims.

Referring to the drawings:

Fig. 1 is a side elevational view, in section, of a jack in raised position which embodies the principles of the present invention:

Fig. 2 is an elevational view of the jack in lowered position, and

Fig. 3 is a top plan view of Fig. 2.

As shown, the base of the jack comprises an oblong plate 10, the opposite end edges of which are turned upwardly to permit the jack to be easily pushed or pulled along a supporting surface and a reinforcing plate 11 which is secured to the plate 10 and the side edges of which are bent upwardly to form supporting flanges 12 and 13. The flanges 12 and 13 are provided with bearing bolts or rods 14 and 15 upon which the lazy tong superstructure is pivotally mounted.

The lazy tong superstructure comprises a plurality of pairs of crossed links. The lower ends of one pair of links 16 and 17 are pivotally mounted on the ends of the rod 14 and the upper ends of these links are pivotally mounted on trunnions 18 and 19 which extend from the opposite ends of a spacer block 20. The lower ends of a similar pair of links 21 and 22 which cross the links 16 and 17 respectively are pivotally mounted on the other bearing ends of the rod 15 and the upper ends of these links 21 and 22 are pivotally mounted on trunnions 23 and 24 which extend from the opposite ends of a spacer block 25. The upper ends of two supporting links 26 and 27 are also pivotally mounted on the trunnions 18 and 19 respectively and the lower ends of these links are pivotally connected to the links 21 and 22 by pivot pins 28 and 29 respectively to prevent horizontal movement of the superstructure during operation of the jack.

The lower ends of another pair of links 30 and 31 are also pivotally mounted on the trunnions 23 and 24 respectively and the upper ends of these links are pivotally mounted on the opposite ends of a bearing rod 32. The lower ends of another pair of links 33 and 34 which cross the links 30 and 31 respectively are pivotally mounted on the trunnions 18 and 19 respectively and the upper ends of these links are pivotally mounted on the opposite ends of a bearing rod 35. The crossed links 30 and 33 and the crossed links 31 and 34 are pivotally mounted on opposite ends of a cross rod 36, a spacer collar 37 being positioned on the cross rod 36 to maintain the inner links in spaced relation.

A dished bearing plate 38 is slidably mounted on the rods 32 and 35, the ends of the bearing 55

plate being bent inwardly around the rods 32 and 35 to prevent displacement.

The expansion and contraction of the lazy tong arrangement to raise and lower the jack is effected by the rotation of a spindle 39, an unthreaded portion of the spindle being journaled in the spacer block 20 and a threaded portion of the spindle being disposed in a threaded opening which extends through the spacer block 25.

In accordance with the present invention means are provided to permit the spindle to be rotated by a crank handle and by a horizontally movable ratchet lever. The means desirably employed for this purpose comprises a main drive bevel gear 40 and an auxiliary gear 43, the teeth of which are in mesh with the teeth of the main drive bevel gear 40 and less in number than the number of teeth on the main drive gear 40 so as to give a reduced gear ratio. The main drive bevel gear 40 is in threaded engagement with the end of the spindle 39 and is secured thereto as by a pin 41 so as to rotate in unison therewith. The auxiliary gear 43 is mounted on a shaft 42, the lower end of the shaft being journaled in the upper face of the spacer block 20. The upper end of the auxiliary bevel gear 43 comprises a hub portion 44 which is journaled in the horizontal section of a shelf member 45, the vertical section of the shelf member 45 being mounted about the spindle 39 adjacent the inner face of the spacer block 20. A pin 46 is positioned in the spindle 39 adjacent the outer face of the vertical section of the shelf member 45 to prevent the spindle from being forced outwardly through the block 20 when the jack is operated. The upper end of the shaft 42 is provided with a squared portion 47 to permit the shaft and the auxiliary gear 43 to be rotated by a horizontally movable ratchet lever 48. A crank handle 49 extends upwardly and outwardly from the outer periphery of the main drive gear 40, the length of the lever portion of the handle being such as to permit the handle to be rotated when the ratchet lever 48 is positioned on the squared portion 47 of the shaft 42.

A plurality of bearing balls 50, journaled in a race 51, are disposed between two thrust plates 52 and 53 which are positioned in a suitable housing formed by the hub of the main drive bevel gear 40. This arrangement serves to permit the main drive gear 40 to be easily rotated by the handle 49 as well as to prevent the spindle 39 from being drawn through the block 20 when the jack is operated.

In operation, the jack, when lowered, is inserted under the object to be lifted as, for example, the axle of an automobile. The main drive bevel gear 40 and the associated spindle 39 are rotated in the direction of the arrow by the crank handle 49. As the spindle 39 rotates it draws the block 25 inwardly towards the block 20 and since the various links are pivoted at their ends, they assume a more vertical position thereby elevating the bearing plate 38. The elevation of the bearing plate 38 is continued by the rotation of the crank handle until the bearing plate is brought into contact with the axle. During this time there is no load on the jack, hence the rapid elevation of the jack by a crank handle having a relatively small offset or lever portion is possible. As the bearing plate 38 is brought into contact with the axle it slides on the rods 32 and 35 until the load is evenly distributed on the jack. After the bearing plate has been brought into engagement with the axle, shaft 42 and the associated auxiliary bevel gear 43 are rotated in the direction of the arrow by

the horizontally movable ratchet lever 48. As the auxiliary gear 43 rotates it drives the bevel gear 40 and the associated spindle 39 thereby drawing the blocks 20 and 25 still closer together and further elevating the bearing plate 38. To lower the jack the shaft 42 and the auxiliary gear 43 are rotated in the opposite direction by the ratchet lever 48 until the bearing plate 38 is lowered out of contact with the axle after which the jack may be rapidly restored to its initial position by rotating the crank handle 49.

Having thus described my invention, what I claim is:

1. In a lifting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when rotated in one direction draws said blocks together to raise said supporting member and when rotated in the opposite direction forces said blocks apart to lower said supporting member, a main drive gear mounted on said spindle and means for applying a plurality of driving forces which are at an angle to one another to said gear.

2. In a lifting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when rotated in one direction draws said blocks together to raise said supporting member and when rotated in the opposite direction forces said blocks apart to lower said supporting member, a main drive gear mounted on said spindle, means for applying to said gear a driving force in a plane perpendicular to the axis thereof, and means for applying to said gear a driving force in a plane disposed at an angle to the first mentioned plane.

3. In a lifting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when rotated in one direction draws said blocks together to raise said supporting member and when rotated in the opposite direction forces said blocks apart to lower said supporting member, a main drive gear for rotating said spindle, means carried by said main drive gear for applying a driving force thereto in one plane and auxiliary means operatively connected to said main drive gear for applying a driving force thereto in a different plane.

4. In a lifting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when rotated in one direction draws said blocks together to raise said supporting member and when

rotated in the opposite direction forces said blocks apart to lower said supporting member, a gear for rotating said spindle, means carried by said gear for applying a force thereto in a plane perpendicular to the axis thereof, and auxiliary means operatively connected to said gear for applying a force thereto in a plane disposed at an angle to the first mentioned plane.

5. In a lifting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when rotated in one direction draws said blocks together to raise said supporting member and when rotated in the opposite direction forces said blocks apart to lower said supporting member, a gear for rotating said spindle, a handle carried by said gear for applying a driving force thereto in one plane and an auxiliary gear operatively connected to said gear for applying a driving force thereto in a different plane.

6. In a lighting device, two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a rotatable spindle associated with said blocks which when

rotated in one direction draws said blocks together to raise said supporting member and when rotated in the opposite direction forces said blocks apart to lower said supporting member, a main drive gear for rotating said spindle, a handle carried by said main drive gear for applying force thereto in a plane perpendicular to the axis thereof, and an auxiliary gear operatively connected to said main drive gear for applying force thereto in a plane disposed at an angle to the first mentioned plane.

7. In a lifting device, the combination of two oppositely disposed blocks, a base positioned below said blocks, a supporting member positioned above said blocks, a plurality of pairs of crossing links associated with said base and said blocks, a plurality of pairs of crossing links associated with said supporting member and said blocks, a spindle one end of which is in threaded engagement with one of said blocks and the other end of which is journaled in the other of said blocks, means comprising a shelf member for preventing longitudinal movement of said spindle through the block in which said spindle is mounted, a main drive gear mounted on said spindle, a crank handle carried by said main drive gear for rotating the same, a shaft disposed at an angle to said spindle and journaled in said shelf member and in one of said blocks and an auxiliary gear mounted on said shaft and in mesh with said main gear, said shaft being adapted to be rotated by a ratchet lever.

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