My present invention relates generally to the broad class of pushing and pulling implements, and more specifically to an improved folding mechanical jack of the portable, multi-throw ratchet and lever type employing a toggle lift, and designed especially for use in raising and lowering automotive vehicles.

The primary object of the invention is the provision of a lifting jack of this type that is simple in construction and operation, and in which the component parts may be manufactured at low cost of production and assembled with facility to form an effective tool, which may be folded to compact form for storage and transportation purposes.

While the jack of my invention is well adapted for raising and lowering various types of heavy weights, it is particularly useful in raising and lowering automotive vehicles of low clearance, and the manual operating means are so arranged that the operator may with facility control the jack from a safe distance and without danger of accidents.

All of the parts of the jack are related and connected to provide a unitary structure which may be manipulated with safety and convenience, and while I have herein illustrated and described a foldable jack it will be understood that the invention may be embodied in a non-folding implement without material changes in construction and operation.

The invention consists in certain novel combinations and arrangements of component parts in this type of jack as will hereinafter be more particularly described and set forth in my appended claims.

In the accompanying drawings I have illustrated one example of the physical embodiment of my invention in a folding jack wherein the parts are combined and arranged according to one mode I have devised for the practical application of the principles of the invention; but it will be understood that changes and alterations are contemplated and may be made in these exemplifying drawings and mechanical structures, within the scope of my claims without departing from the principles of my invention.

Figure 1 is a view in side elevation of a jack embodying my invention, and shown in uplifted position.

Figure 2 is a top plan view of the device as shown in Fig. 1.

Figure 3 is a longitudinal vertical sectional view as at line 3—3 of Fig. 2.

Figure 4 is an enlarged detail sectional view showing the lever and ratchet mechanism for operating the jack.

Figure 5 is a view similar to Fig. 4, but showing the lever and ratchet mechanism disengaged from the rack bar.

Figure 6 is a longitudinal vertical sectional view through the jack, as it appears in folded position for storage or transportation purposes.

Figure 7 is a detail view of the operating lever or ratchet lever of the jack.

Figure 8 is a bottom plan view of one of the base-bar sections showing especially the corrugated or roughened anti-slip faces thereon.

Figure 9 is a vertical detail sectional view at line 9—9 of Fig. 7 through the folding joint between the two base-bar sections.

Figure 10 is a sectional view at line 16—16 of Fig. 2, through the ratchet, and one of the pivots of the linked draw-bar.

Figure 11 is a sectional view at line 11—11 through the ratchet and another of the pivotal joints of the draw-bar.

Figure 12 is a detail sectional view at line 12—12 of Fig. 2 through the pivot of the operating lever.

In this preferred form of the invention the foldable jack is shown as formed with two channel base-bar sections including a hinged section 1 and a base section 2, which are hinged at their adjoining ends to form a foldable joint 3; and the two sections when extended and aligned form a comparatively long base for the operating parts of the jack.

The outer end of the hinged section 1 is equipped with a hilo or loop 4 pivoted in the flanges of the bar at 5, so that the implement, when folded as in Fig. 6 may be latched by engagement of the bar with the bar 2, to retain the jack in folded position for storage or transportation purposes.

The main, supporting channel bar 1 on its under face is smurried, corrugated, or otherwise roughened, as at 5, 6, to provide anti-slip means that prevent displacement or dislocation of the implement when in use, beneath an automotive vehicle.

Within the bottom of the base formed by the extended channel bars or sections a drawbar 7 is mounted for sliding and reciprocal movement, and as shown this bar is of channel shape in cross section to conform to the shape of the base bars, and to prevent lateral movement of the draw bar as it is guided in its movement within the channelled base.

When the hinged section of the base is extended for use the draw bar extends across the hinge joint of the base sections, and by means of a pivoted link 8, the drawbar is connected to a rack bar 9 forming an extension of the drawbar.

The vehicle, or other load, is raised by the sliding movement of the combined drawbar and rack bar within the base, in one direction, and the load is lowered by a sliding movement of the combined bar in the reverse direction.

In this raising and lowering movement the combined drawbar and rack bar co-acts with a toggle lift consisting of a short lever arm 10 pivoted at
11 with a movable joint on the outer end of the drawbar, and a longer arm 12 pivoted at 13 to the short arm to provide a movable joint, and also pivoted or theretied at 14 on the base section 1 to provide a stationary hinge joint for the toggle lift.

These toggle arms are preferably of channel shape in cross section, and the adjoining ends of the flanges at the vertically movable joint 13 of the toggle are undercut at 15, or otherwise 10 fashioned to form a seat or rest for the vehicle axle as indicated at A in Fig. 3.

The power arm 10 of the toggle lift is thus provided with a movable fulcrum at 19 on the drawbar, and the weight arm 12 is provided with a stationary pivot anchor 14 on the fixed base 1 for insuring a vertical movement of the load-supporting joint 13 of the lift.

The load-supporting faces 18, which form the seat for engagement with the axle, may be adjusted or fashioned to adapt them for various forms or shapes of loads to be supported, and they eliminate the necessity for use of special saddles or other similar devices.

For activating the draw bar and operating the toggle lift, a lever-pawl and ratchet mechanism is mounted in the base 1, with the operating lever 18 located at a safe distance from the load and in position for facile manual operation.

The lever 16, which is preferably of channel shape in cross section is pivotally mounted at 17 in the side walls of the channel base bar, or section 2 of the foldable base, and a pawl 18 pivoted at 19 on the lever engages the teeth of the rack bar for moving the drawbar in one direction and elevating and retaining the lift in uplifted position.

At the pivot end of the lever a lug 11 is fashioned for engagement with a pawl or detent 20 which is pivotally mounted at 21 in the base section 2 in opposed relation to the pawl to prevent accidental backward movement of the rack bar and draw bar. The lug is designed for quick-action in releasing the ratcheting from the rack bar, and a retaining pin 22 is mounted in the base to limit movement of the ratchet.

For releasing the pawl from engagement with the rack bar, the lever handle 16 is slotted at 23 to accommodate two spaced double headed pins or rivets 24. These pins are passed through the slotted lever and fixed to a slide blade 25 mounted within the channel lever, and the inner or lower end of the slide is adapted to engage the pivot end of the pawl and swing it out of engagement with the rack bar.

From the above description taken in connection with the drawings, the construction and operation of the improved jack will be apparent, and the manipulation of the parts, due to the simplicity in construction of the jack as a unit, may readily be understood by one accustomed to the use of such tools.

In the preferred form of the invention involving the foldable features, the link connecting the draw bar with the rack bar is utilized, as in Fig. 6, to separate these parts and they are stored in the foldable sections of the base, while the operating lever and its connections are stored in one section of the hinged base, with the toggle arms stored in the other base section.

The parts as thus stored are enclosed within a housing, and the housing is latched or locked by the releasable ball, thus insuring a comparatively small and compact implement for storage and transportation.

As heretofore mentioned, I do not limit my invention to the foldable type of implement, for it will be understood that the base may be a one-piece or integral bar, and the combined draw bar and rack bar may be an integral draw bar with rack teeth thereon, for use in a non-folding structure. And various other changes and alterations may be made in the illustrated implement to adapt the jack for a variety of uses.

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

1. A lever jack comprising a base having two sections channel-shaped in cross section and hinged midway of the length thereof, a draw bar slidably mounted in said base, a rack bar also slidably mounted in the base, a link with one end pivotally connected to the draw bar and the other pivotally connected to the rack bar, a toggle-lift having two hinged arms, with the outer end of one arm being pivotally mounted in the base and the outer end of the other arm pivotally mounted on the draw bar, an actuating lever pivotally mounted in the base, and a pawl carried by the actuating lever and positioned to actuate with the rack to move the latter and thereby the draw bar to elevate the toggle-lift.

2. In a portable foldable adjusting jack, the combination with a pair of hinged channel bars including a base section and a hinged section forming a base, a channel shaped draw bar reciprocable in the base a rack bar, and a link pivotally connecting the draw bar and rack bar, of a toggle lift having a movable supporting seat adjacent a common pivotal axis, said lift having a fulcrum on the draw bar movable relative to the base and a pivotal anchor on the hinged section of the base, and a lever including pawl and ratchet mechanism mounted on the base section for actuating the rack bar.

3. A lever jack comprising a base having two sections channel-shaped in cross section and hinged midway of the length thereof, a draw bar slidably mounted in said base, a rack bar also slidably mounted in the base, a link with one end pivotally connected to the draw bar and the other pivotally connected to the rack bar, a toggle-lift having two hinged arms positioned on said base with the outer end of one arm pivotally mounted in the base and the outer end of the other arm pivotally mounted on the draw bar, an actuating lever pivotally mounted in the base, a pawl carried by the actuating lever and positioned to actuate with the rack bar to elevate the toggle-lift, a pawl pivotally mounted in the base and positioned to connect with the rack bar to retain the toggle arms elevated, and means releasing said pawl by the actuating lever.

ROY D. LLOYD.

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