April 11, 1967 R. K. ULM 3,313,522

HORIZONTAL TYPE LIFTING JACKS WITH SUPPORTING LEG STRUCTURE

Original Filed Dec. 26, 1961 2 Sheets-Sheet 1

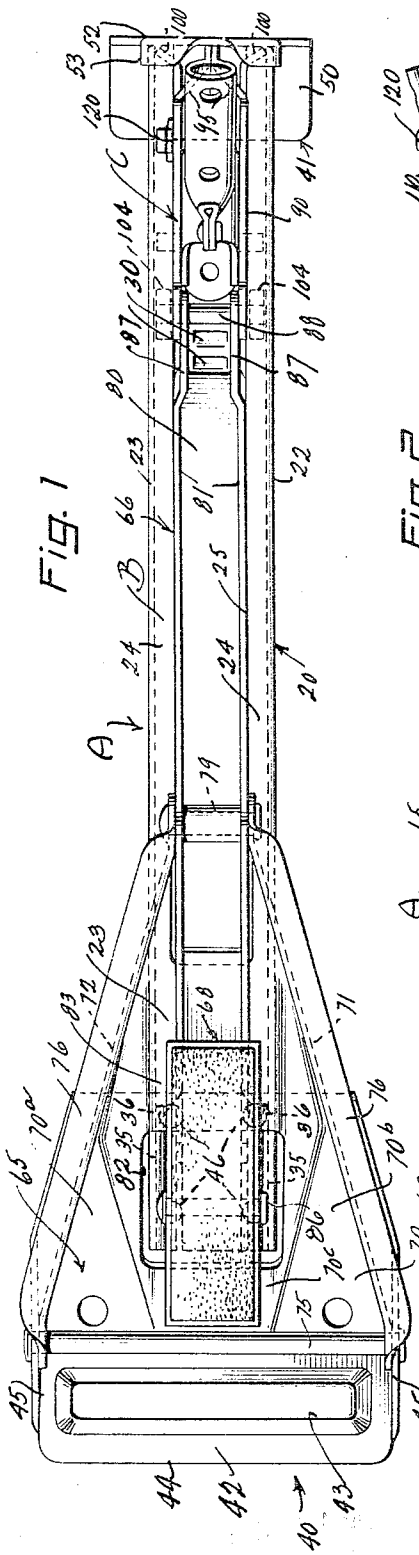


Fig. 1

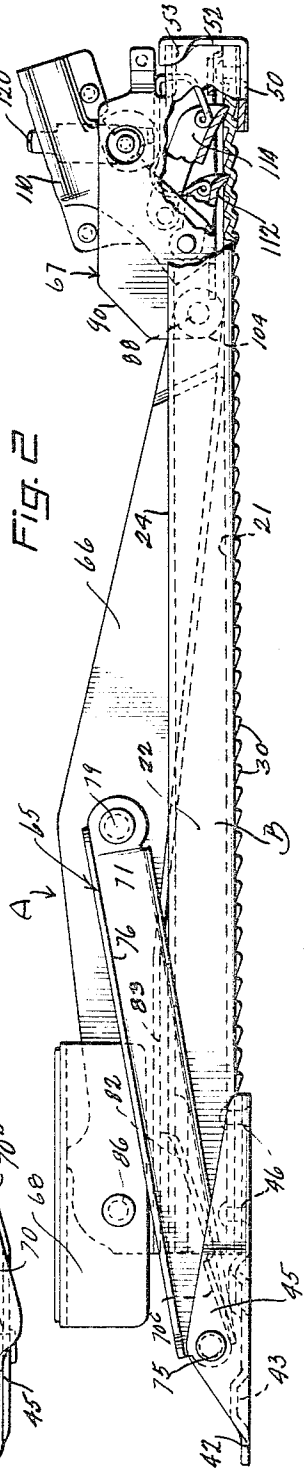


Fig. 2

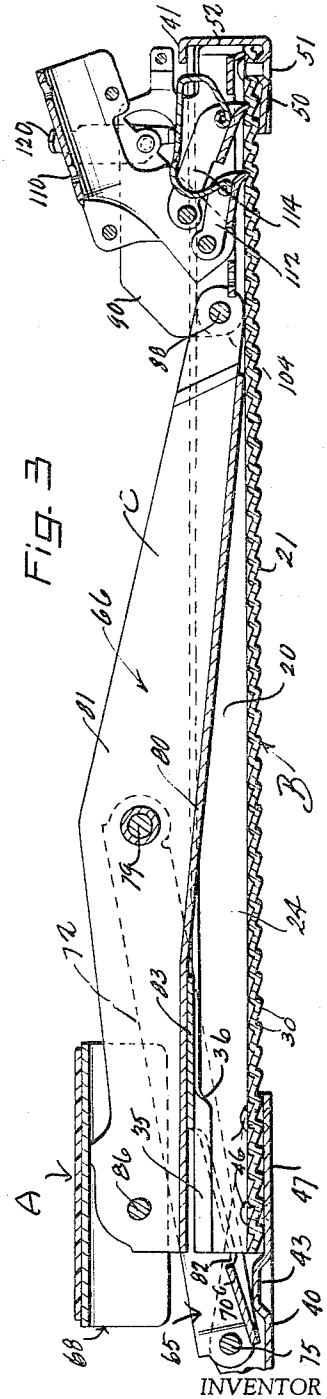


Fig. 3

INVENTOR

Russell K. Ulm

BY Rommel, Allwine & Rommel

ATTORNEYS

April 11, 1967 R. K. ULM 3,313,522

HORIZONTAL TYPE LIFTING JACKS WITH SUPPORTING LEG STRUCTURE

Original Filed Dec. 26, 1961 2 Sheets-Sheet 2

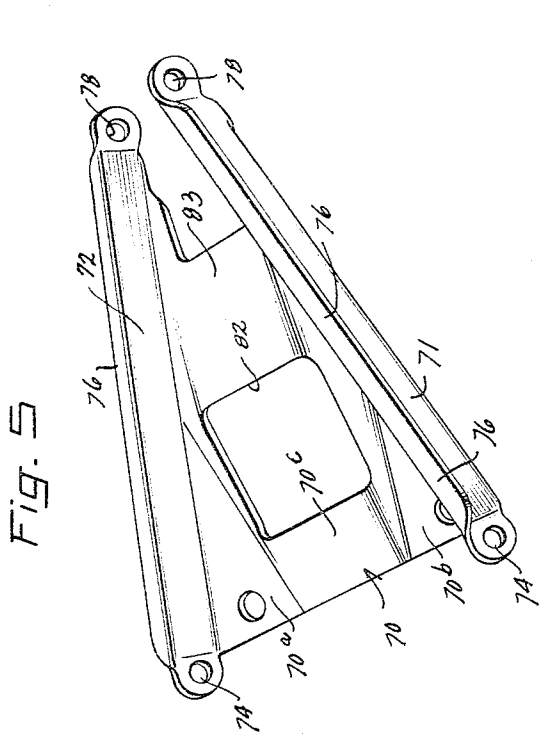


Fig. 5

Fig. 4

INVENTOR

Russell K. Ulm

BY Rommel, Allburne & Rommel

ATTORNEYS

United States Patent Office 3,313,522 Patented Apr. 11, 1967

3,313,522

HORIZONTAL TYPE LIFTING JACKS WITH SUPPORTING LEG STRUCTURE

Russell Keith Ulm, Butler, Ind., assignor to Universal Tool & Stamping Company, Inc., Butler, Ind., a corporation of Indiana

Original application Dec. 26, 1961, Ser. No. 162,087, now Patent No. 3,173,660, dated Mar. 16, 1965. Divided and this application Dec. 3, 1964, Ser. No. 415,726
3 Claims. (Cl. 254—108)

This application is a division out of United States Patent 3,173,660, dated March 16, 1965.

The primary object of this invention is the provision of an improved stamped sheet metal supporting leg structure for vehicle lifting jacks which enables a very low height and compact collapsing of the jack structure.

A further object of this invention is to provide a durable jack supporting load receiving leg which is of one piece construction and adapted to compactly and collapsibly receive a rack bar and jack means so as to provide a low height jack when the parts are collapsed.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views:

FIGURE 1 is a plan view of a jack structure in collapsed position, showing the position of the improved supporting leg.

FIGURE 2 is a side elevation of the jack structure, showing the supporting leg.

FIGURE 3 is a longitudinal cross sectional view taken through the jack structure in collapsed position and showing the related structure and details of the improved supporting leg.

FIGURE 4 is a side elevation of the elevated jack structure, more particularly showing the improved supporting leg.

FIGURE 5 is a perspective view of the improved beam or leg structure of the jack, which is adapted to carry substantially the entire load during lifting of a vehicle.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the letter A may generally designate the improved jack. It includes a rack bar and base structure B, and load lifting assemblage C.

Because it is important to understand the relation of the structural details of the improved beam or leg structure to the details of the jack, it will be necessary to describe substantially all of the jack details.

The assemblage B preferably includes a rack bar 20 of one-piece construction, which is formed of rolled steel, shaped to provide a wide horizontal bottom wall 21 having upstanding side vertical walls 22 and 23, the latter of which at the upper ends thereof are provided with inturned horizontal flanges 24, lying in the same plane. Thus, the rack bar may be said to have a polygonal or rather rectangular shaped cross section. The flanges 24 form an important part in the mounting of the slide carriage of the load lifting assemblage C, to be subsequently described. They terminate at their facing edges to provide a longitudinal opening 25 extending the length of the rack bar 20, through which extends the details of the load lifting assemblage C, to be subsequently described. These flanges 24 and the bottom wall and side walls of the bar, in effect, provide facing channels. The bottom wall 21 centrally thereof and facing and lying below the opening 25 is provided with a series of teeth 30.

The rack bar 20 is rolled and bent to form in a rolling mill, as described in my United States Patent 3,180,619, dated April 27, 1965, although it is of a different shape than the rack bar of that application. As will be noted from FIG. 1, these teeth are visible through the opening 25 in the top of the rack bar and they extend throughout the entire length of the rack bar.

Further referring to the rack bar and base structure B, the rack bar flanges 24 are downturned as shown at 35 (see FIG. 3) for a short distance, whereby to provide stops 36 which limit the forward movement of a slide carriage of the assemblage C.

The base structure for the rack bar preferably consists of a front base piece 40 and a rear base piece 41. The former is quite wide, being slightly less than three times the width of the rack bar 20, and comprises a ground engaging wall 42 the front end of which may be transversely raised as at 43 for strengthening the same. The rear edge 44 is quite thin since this portion of the base is intended to act as a shovel for clearing ground in order to operate the jack beneath a vehicle should such be necessary.

The sides of the base 40 are flanged vertically as at 45 substantially throughout their lengths, although the flanges stop short of the front edge 44, and the front portions of these flanges are parallel for the purpose of pivotally attaching a leg portion 65 of the load lifting assemblage C thereto, as will be subsequently described. The large base 40 is designed as to width and length for giving stability both fore and aft and sidewise, and such increases tremendously the buoyancy of the jack in soft ground.

The bottom wall 21 of the rack bar at the front end overlies for a short distance the bottom wall 42 of the front base piece 40 and is riveted thereto at 46, at each side of the row of teeth. The bottom wall 42 is recessed at this area, at 47, to receive the rear teeth 30 of the rack bar as shown in FIG. 3.

At its rear end the rack bar 20 is provided with the base piece 41. It consists of a bottom wall 50 which may be riveted or bolted at 51 to the rack bar bottom wall; an end wall 52 being vertically positioned on the rear margin of the bottom wall 50 to close the channel of the rack bar. It is overflanged and laterally flanged at 53 upon the rack bar, as shown in the drawings.

The load lifting assemblage C preferably comprises a main load supporting and lifting leg 65; beam 66, pawl supporting slide carriage 67 and a lift head 68. In this general arrangement the leg 65 is pivoted to the front base 40 and intermediate its ends the beam 66 is pivoted to the other end of the leg. The lift head 68 is mounted on the outer end of the beam 66, and the carriage 67 is pivoted to the lower end of the beam 66 and slides within the passageway of the rack bar 20.

Referring to the details of the leg structure 65, the same as shown in perspective in FIG. 5, comprises a rather trapezoidally shaped body wall 70 provided at the sides thereof with vertically disposed or upstanding wall flanges 71 and 72 which extend at the front of the widest portion of the leg structure beyond the widest end edge of the body wall 70 and are there apertured at 74 for receiving a hinge shaft 75 pivoted to the parallel portions of the upstanding flanges 45 of the base member 40, as can be seen from FIG. 1 of the drawings. The upstanding leg flanges 71 and 72 at the upper edges thereof are outwardly flanged for reinforcing purposes at 76, and the rear ends of the leg flanges 70 extend beyond the lateral flanges 76 and beyond the rear edge of body wall 70 and are there apertured at 78 for receiving a hinge pin 79 mounted upon the beam 66 intermediate the ends of the latter.

Before describing the additional details of the body portion 70 of the load carrying leg 65, it will be well to

describe the characteristics of the beam **66**. This beam includes a bottom or lower wall **80** and upstanding walls or flanges **81** at each side thereof. Thus, the beam is of channel shaped formation with the opening of the channel facing upwardly.

One of the most important features of the jack structure is its low height when collapsed. This is made possible, without sacrificing strength in the jack, by the design of the beam **66** and the leg structure **65**. It will be noted that the leg structure **65** is of one-piece formation, as is also the beam **66**. The Z-shaped sectional formation where the legs **71** and **72** connect with the body **70** and the flanges **76** give great strength to the leg **65**. The body **70** of the leg structure **65** has side bottom portions **70a** and **70b** at the front thereof lying in the same plane and a central raised rear portion **70c**. The central front portion **83** of the leg is also raised and the raised portions **70c** and **83** are spaced to provide an opening **82** therein which receives the front end of the rack bar when the jack is collapsed. The body **70** rearwardly of the opening **82** lies in substantially horizontal position when the jack is collapsed as shown in FIG. 3, and in this position the bottom wall **80** of the beam **66** rests flush thereon, when collapsed to low position. Thus, there is only one thickness of metal difference between the top surface of the rack bar and the beam section **66**, at this location. The bulged portion **83** lies flush on top of the rack bar when the jack is collapsed as shown in FIG. 3.

The beam **65** is connected intermediate its ends to the outer end of the leg **65** by means of a hinge pin **79**. At its lower rear end the beam **66** is connected by hinge pin **88** to the carriage structure **67**. The latter comprises a casing or housing **90** provided with anti-friction rollers **104** and flanges **105** which ride in the trackways of the rack bar. The carriage casing **90** supports a pawl mechanism which is purely conventional and includes a pawl actuating member **110** provided on the casing **90**. The pawl mechanism may include a pivoted pawl **112** adapted to act upon the rack teeth of the bar **20**. The pawl mechanism further includes a longer pivoted pawl **114** also adapted to act on the rack teeth. The pawls are spring biased as is conventional and a trip lever **120** is pivoted upon the casing **90** which when lowered out of operation enables the handle of the jack and member **110** to result in the jack retraction on the horizontal rack bar; the pawl mechanism enabling the lifting assemblage to move forwardly along the rack bar when the lever **120** is moved upwardly as more fully described in the parent application above identified.

A lifting head **68** is provided on the upper end of the beam **66** pivoted thereon at **86**.

Due to the structural features of the improved leg member **65** it is extremely strong and the casing structure **90** is thereby relieved of any of the load except a reactionary force to push the beam forwardly or let it come backwardly as the vehicle is raised or lowered.

Various changes in the size, shape and arrangement of parts may be made to the form of invention herein shown and described without departing from the spirit of the invention or scope of the claims.

I claim:

1. As an article of manufacture, a one piece force receiving supporting leg for vehicle jacks of the horizontal type, comprising a body wall of substantially trapezoidal shape having at the sides thereof upwardly extending transversely arranged elongated flanges which at their outer ends project beyond the edges of the body wall and are there transversely apertured for receiving hinges, said body wall at the sides thereof adjacent to and substantially throughout the lengths of said flanges having portions lying in the same plane; the intermediate portion of said body wall between said side portions being bulged in an elevated relation above the plane of said side portions and at a location between the ends of said intermediate portion being provided with a transverse opening, said intermediate portion of the body wall at the widest part of the trapezoidally shaped body wall being sloped upwardly from the wide end edge of said wall to the adjacent edge of said opening, and the upper end of the intermediate bulged portion of said body wall sloping upwardly from the upper edge of narrower end of the trapezoidally shaped body wall to the adjacent edge of said opening.

2. A force receiving supporting leg as defined in claim **1** in which the transversely extending flanges are provided at the upper margins thereof with outwardly extending elongated transverse reinforcing flanges.

3. As an article of manufacture a force receiving supporting leg for vehicle jacks comprising a body wall of substantially trapezoidal shape having at the sides thereof transversely extending flanges, said flanges at the upper margins thereof having outwardly extending transverse flanges, said transverse flanges connected to the body wall being provided at each end thereof with apertured extensions, the bottom portion of the leg being provided with a rack bar receiving opening transversely therethrough and adjacent thereto being provided with a beam supporting shelf elevated above the normal level of the said body portion.

References Cited by the Examiner

UNITED STATES PATENTS

2,182,676	12/1939	Nilson	254—2.4
2,213,285	10/1940	Nilson	254—2.4
2,435,693	3/1948	DeOrlow	254—9.4
2,687,873	8/1954	Trautman et al.	254—8.4

FOREIGN PATENTS

780,759	5/1935	France.
757,746	9/1956	Great Britain.

OTHELL M. SIMPSON, *Primary Examiner.*