May 10, 1949. C. L. THOMPSON 2,469,670

LOW LIFT ATTACHMENT FOR HYDRAULIC JACKS

Filed March 11, 1946

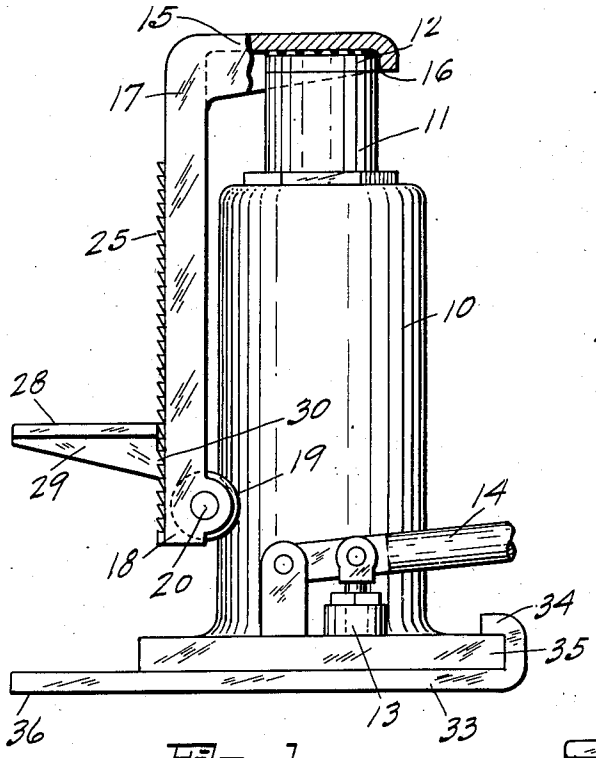


Fig. 1.

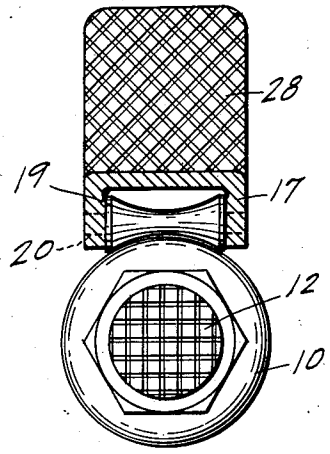


Fig. 2.

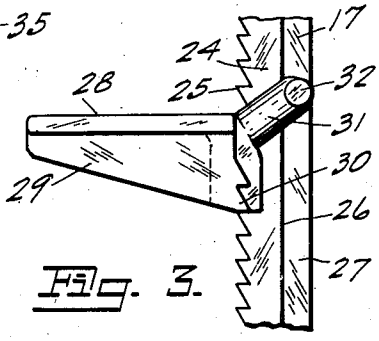


Fig. 3.

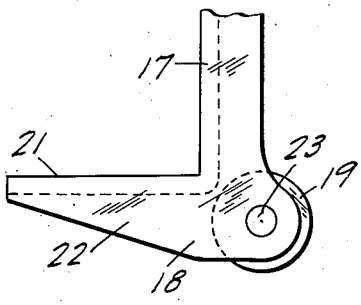


Fig. 5.

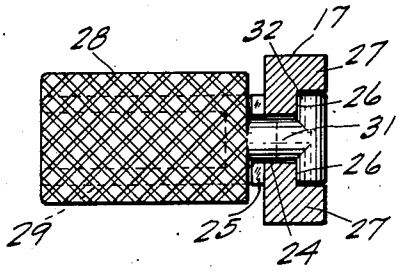


Fig. 4.

Inventor
Charles L. Thompson
By Philip A. Friedell
Attorney

Patented May 10, 1949 2,469,670

UNITED STATES PATENT OFFICE

2,469,670

LOW LIFT ATTACHMENT FOR HYDRAULIC JACKS

Charles L. Thompson, Oakland, Calif.

Application March 11, 1946, Serial No. 653,623

2 Claims. (Cl. 254—133)

1

This invention, a low-lift attachment for jacks is particularly designed for use in connection with hydraulic jacks though it may be used with other types of jacks which have no low-lift step.

Hydraulic jacks are not conventionally provided with a low-lift step, having only the conventional lift head axially aligned with the cylinder, and there are innumerable cases where the jack cannot be used because the jack is too high to be placed under the object to be lifted. Under such conditions it is necessary to revert to some type of mechanical jack having a low-lift step thus increasing the effort and the time necessary to lift the object.

This invention provides a low-lift attachment which can be applied to any hydraulic jack and requires no securing means for retention on the jack. It operates smoothly and can be arranged to lift from substantially floor or support level, and can be mounted at will to lift from a point at any desired angle to the pump handle or other operating means, so that the handle or other operating means can be operated from the most convenient and accessible position. The attachment is applied simply by hanging it over the head of the jack. It makes the jack adjustable for lifting from any desired elevation below the head.

The objects and advantages of the invention are as follows:

First, to provide a low-lift attachment for hydraulic jacks so that the jack can be made to lift from any desired level below the lowered position of the head of the jack plunger.

Second, to provide an attachment as outlined which requires no manually operable securing means for attachment to the jack, one which is simply placed in position and removed at will.

Third, to provide an attachment as outlined with non-cutting positive guiding means for retaining the low-lift step in alignment under load.

Fourth, to provide an attachment as outlined with an adjustable and removable low-lift step, so that the low-lift step can be arranged to lift from the most desirable level, and replaced by a step of different form for specific lifting conditions, at will.

Fifth, to provide an auxiliary base for the jack when the attachment is used for lifting exceptionally heavy objects, and which auxiliary base is applicable or removable merely by placing it under the base with no securing means required.

Sixth, to provide an attachment as outlined which is of the utmost simplicity in construction and operation and having an absolute minimum number of parts.

2

In describing the invention reference will be made to the accompanying drawings, in which:

Fig. 1 is a side elevation of the invention shown applied to a hydraulic jack.

Fig. 2 is a top plan view of the jack plunger and cylinder and shows the drop member in section to illustrate the function and operation of the concave bearing roller and its cooperation with the cylinder wall.

Fig. 3 is a side elevation of the adjustable step and shows the rack and one side of the slot.

Fig. 4 is a transverse section through the drop member and shows the tension member and cross-member in position within the slot.

Fig. 5 is a modification showing fragmentarily the simplest form of the invention in which the step is non-adjustable.

The invention is applicable to any type of hydraulic, pneumatic or mechanical jack having a body of cylinder 10 and a screw, ratchet or plunger 11 terminating in a pivotal head 12 and having operating means such as the pump 13 and pump-operating lever 14 for actuating the jack, and consists of a head member 15 which is provided with a depending flange 16 to encompass the head 12 and hook over the transverse-thrust side as indicated at 16, and having a drop member 17 which in conjunction with the head member is of an inverted L-shape, the drop member having mounted in its lower end 18 a concave roller 19 as indicated at 20, the concavity conforming as closely as possible to the periphery of the cylinder but preferably having a slightly lesser radius so that the outer edges of the roller ride on the cylinder to better maintain alignment of the attachment.

A low-lift step is provided for the attachment, and in its simplest form consists of a step 21 which is formed integral with the lower end of the drop member 17 as indicated in Fig. 5, and having ribs 22 between which the roller 19 is supported as indicated at 23. This type is devoid of adjustment and therefore is limited to the degree of lift in proportion to the degree to which the plunger must be raised before contact is made between the object and the step.

The preferred form of the invention has an adjustable step as indicated in Figs. 1, 3 and 4, in which a slot 24 is formed centrally of the width of the drop member 17 and flanked externally by suitable support means such as the rack 25, and internally by thrust surfaces 26 flanked by the ribs 27.

The step 28 has depending ribs 29 which terminate in teeth 30 complementary to those formed on the front face of the drop member, and are formed only on the lower portion of the ribs. A tension member 31 is cylindrical in cross-section and terminates in a cross-pin 32, the member 31 being slidable and rotatable in the slot 24, and the cross-pin 32 riding on the surfaces 26, the member 31 being formed angularly upward as is clearly illustrated in Fig. 3 and is formed integral with the step and cross-pin.

A base extension 33 terminates at one end in a hook 34 to fit over the edge of the foot 35 on the jack, and is made sufficiently long to take the vertical thrust on the step and thus prevent tipping of the jack. Under ordinary conditions this extension will not be needed, but it is a necessary adjunct in case of very heavy objects or when the object is apt to move under lateral thrust or which is in an unstable condition.

For use, the attachment is simply hung over the head of the plunger as indicated in Fig. 1. The depending flange 16 forms a recess and holding means for the head 12. The roller 19 extends partially about the periphery of the cylinder as indicated in Fig. 2 to maintain alignment of the attachment with the axis of the jack and this roller simultaneously provides substantially frictionless travel of the attachment as the jack is operated.

If the solid step shown in Fig. 5 is used, the jack is adjusted up until the step cooperates with the object to be lifted, the degree of lift being equal to the difference between the lift required to bring the step up to the object and the total lift of the jack.

The adjustable step illustrated in Figs. 1, 3 and 4, is replaceable and interchangeable, so that the most desirable type of step can be used at will, and assembly is easily and quickly effected. For assembly, the step is turned sideways, the pin 32 is passed through the slot, then the step is turned to its operative position which causes the pin to span the slot and bear on the surfaces 26, this assembly being accomplished by having the strain member 31 at right angles to the drop member 17.

When the attachment is in use, the step is raised at its outer end which moves the teeth 30 on the step ribs out of engagement with the rack 25 on the drop member. The step can then be raised to the proper height to engage the underside of the object (the jack being adjusted to its lowest limit), then lowered so that the teeth again engage. With this arrangement the object can be raised to a height equal to substantially the total travel of the jack plunger, or lowered to the same degree, and can be made to lift from substantially floor level. Thus the jack is capable of lifting through about twice the distance of which it is capable alone.

If the object is unstable, the foot extension 33 is placed on the bottom of the jack to prevent tipping, the load then being taken by the extension 36.

I claim:

1. A low-lift attachment for hydraulic jacks having a cylinder and a plunger and a pivotal head for said plunger, comprising; a cap member to fit over and engage said pivotal head and having a drop member at one end extending down substantially to the foot of the jack when the plunger is retracted and having a bearing at its lower end for cooperation with the side of the cylinder; said drop member consisting of two spaced members forming a vertical slot therebetween and a rack formed on the front face of each member; said step having a tension member passing through said slot and terminating in a cross-member for cooperation with the back wall of said spaced members on the respective sides of the slot, and cooperative teeth formed on the rearward portion of said step for engagement with said rack; said tension member being cylindrical in cross-section and being formed angularly upward and backward to provide for removal, replacement, or adjustment of the step at will, said step having teeth formed only in spaced relation below the level of the top of the step whereby upward swing of the step about the tension member axis moves the teeth out of engagement with the rack, and turning of the step about the axis of the tension member frees the cross-member for removal through the slot.

2. In a low-lift attachment having a cap portion to engage over the head of a hydraulic jack; a pair of spaced drop members forming a slot therebetween and with the upper ends integral with said cap portion and having a concave roller and a shaft therefor mounted at the lower ends to cooperate with the body of the jack, said shaft forming a tie between said lower ends; rack teeth formed on the front face of each of said drop members; a step having a back wall with rack teeth formed on the lower portion on each side for cooperation with the rack teeth on said drop members, and a tension member projecting diagonally upward centrally from the upper end of said back wall and terminating in a cross member to cooperate with the back walls of the drop members; whereby tilting of the forward end of the step under load is eliminated, and lifting the forward end of the step frees the step from said drop members for adjustment at will, and lifting the forward end of the step followed by rotating the step through a quarter turn frees the cross member to pass through the slot for removal and replacement of steps at will; said tension member having a cross-section fitting closely within the slot to maintain stability and being cylindrical in cross-section to permit rotation for removal and replacement of the step, said drop members being complementarily stepped inwardly from the back wall thereof with the cross member cylindrical in cross-section and fitting slidably between the side walls of the complementary steps in the drop members, with the back of the cross member flush with the back walls of the drop members to maintain the backs of the drop members free of obstructional elements for minimum clearance between the body of the jack and the drop members.

CHARLES L. THOMPSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
87,435	Ryan	Mar. 2, 1869
1,151,232	Alston et al.	Aug. 24, 1915

FOREIGN PATENTS

Number	Country	Date
4,020	Great Britain	Feb. 17, 1912
599,804	France	Oct. 26, 1925