June 27, 1950 P. MOENCH 2,513,246

LIFTING JACK

Filed Aug. 28, 1946 3 Sheets-Sheet 1

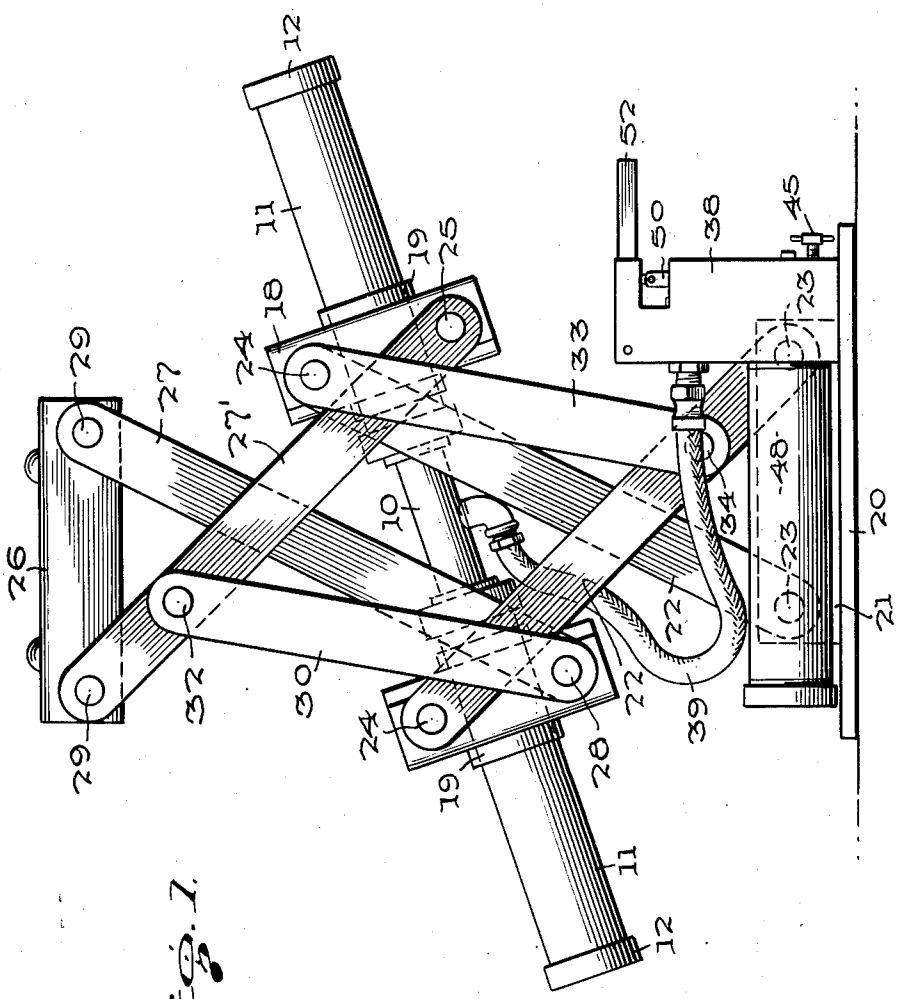


Fig. 1.

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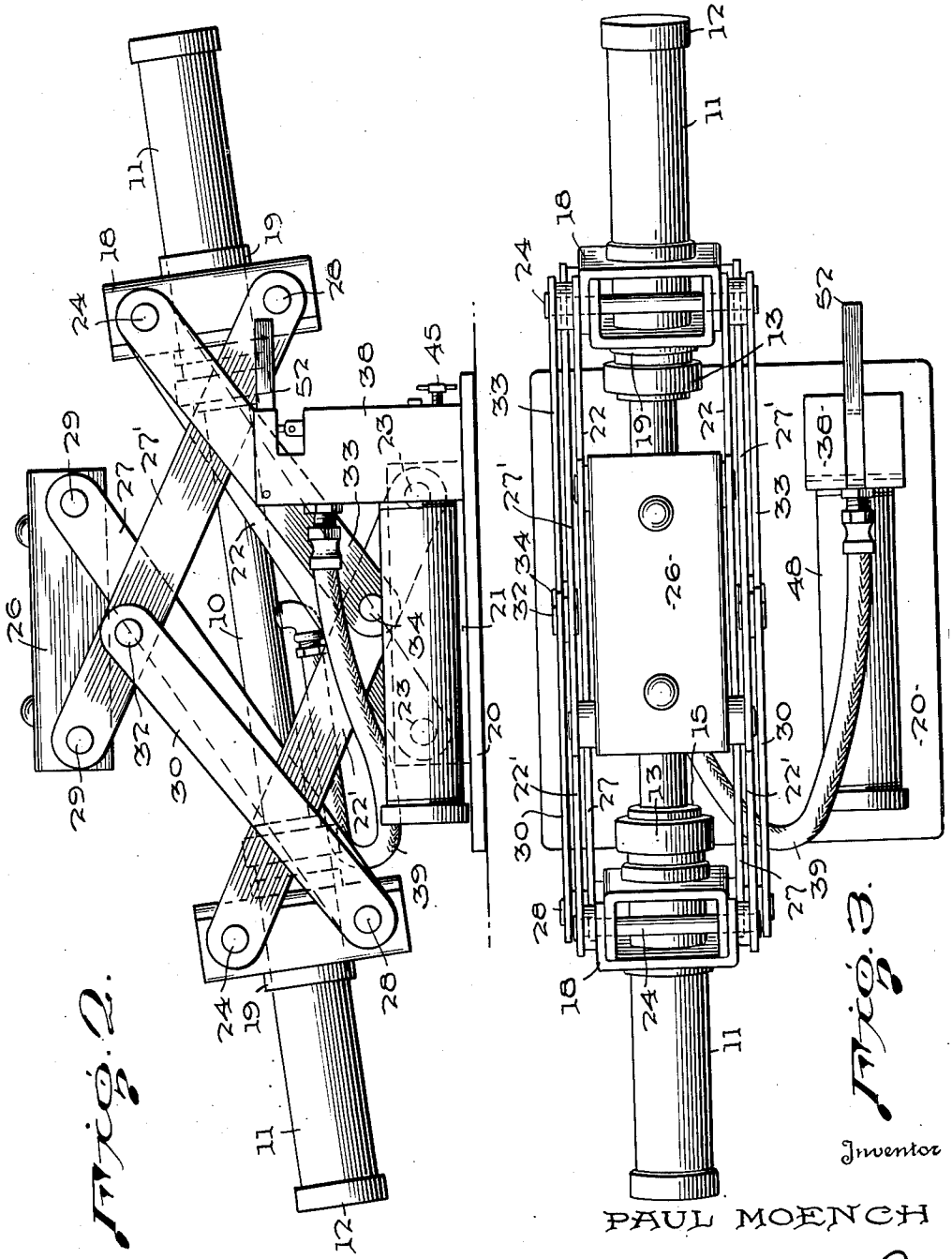


Fig. 2.

Fig. 3.

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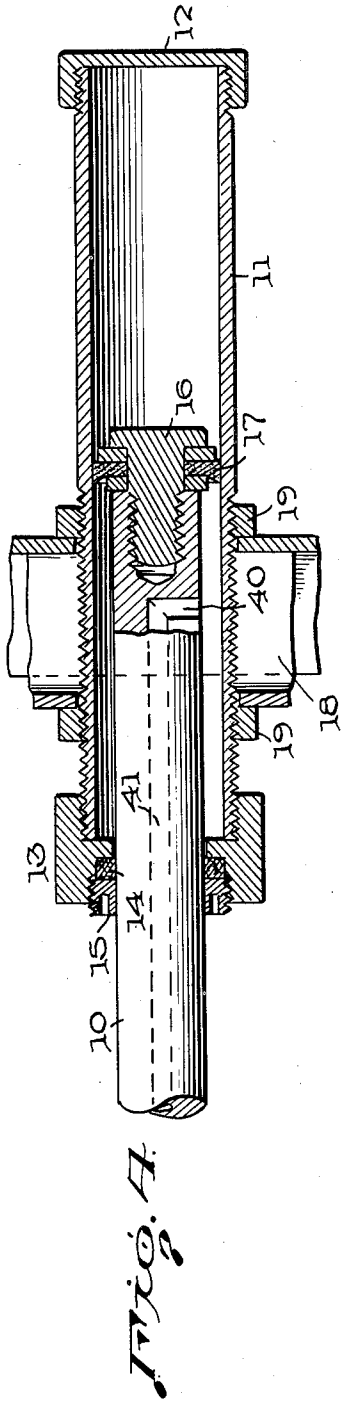


Fig. 4.

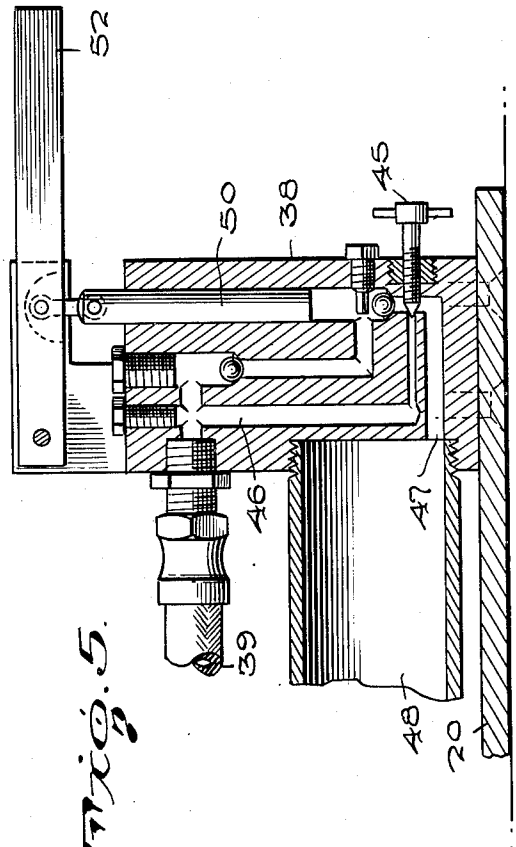


Fig. 5.

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LIFTING JACK

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Application August 28, 1946, Serial No. 693,391

5 Claims. (Cl. 254—122)

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This invention relates to lifting jacks and particularly to the type employed for elevating vehicles.

The invention consists of a series of links pivotally associated together, on the principle of lazy-tongs or of the scissors type, and having the links connected to a base member and a load bearing member so that when the links are caused to assume an expanded or distended position they will support a vehicle or other load.

A further object is to elevate the jack by hydraulic means, wherein links of the base and load members are pivotally connected to cylinders, and which cylinders are caused to slide on a shaft which guides the movement of the cylinders from and toward each other in distending or contracting the linkage in elevating and lowering a load.

The invention consists of certain novel features of construction and combinations of parts which will be hereinafter described and set forth in the claims.

In the accompanying drawings:

Figure 1 is a view in side elevation with the jack in raised position;

Figure 2 is a view in side elevation showing the jack in a partially collapsed position;

Figure 3 is a view in top plan view of the jack when collapsed;

Figure 4 is a longitudinal vertical sectional view through a cylinder, an end of the shaft, and a spacer member carried by the cylinder;

Figure 5 is a vertical sectional view of the pump.

As shown in the drawings, a shaft 10 has mounted thereon at each end a cylinder 11. The cylinders are each closed by a cap 12 at their outer ends, and by a gland nut 13 at their inner ends, which nut slides on the shaft 10. Suitable packing 14 is interposed between the gland nut and a retainer plug 15 screwed to the nut 13, for forming a liquidtight fit.

At each end of the shaft 10 is a plug or bolt 16 for retaining suitable packing or washers 17 to the shaft, which packing and plug act as pistons in the reciprocation of the cylinders on the shaft.

Mounted on the cylinders are spacer members 18—18 consisting preferably, of two channel-shaped members, which are so constructed that one member fits within the other so that the side walls are closed. The spacer members 18 are held in position by lock nuts 19, 19 screwed onto the outer cylinder wall.

The base member 20 of the jack is provided

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with upstanding flanges 21, 21 to each of which are pivoted two sets of links 22 and 22' by means of pins or trunnions 23, 23. The links of each pair cross each other, and the upper or free ends of these links are pivoted to the upper ends of spacer members 18 of the cylinders 11 by pins or trunnions 24, 24 passing through the spacer members and ends of the two pairs of links, so that a pair of links attached to the base are located on opposite sides of the respective spacer members.

Disposed above the shaft 10 is a load supporting member 26 and connected to this member ber on each side thereof are two sets of links 27 and 27'. The links of each set cross each other and their lower ends are pivotally connected to the lower ends or portions of the spacer members 18 by means of the pins or trunnions 28 which pass through the links and spacer members. The links are also pivotally connected to the load supporting member 26 by pins or trunnions 29 which pass through the members 26. A pair of shorter links 30 are pivotally mounted to one of the spacer members 18 by the pins or trunnions 28 and at their upper ends are connected to one of the links 27' on each side of the member 26 by a suitable pivot 32. Similarly there is a pair of links 33 connected to the other spacer member 18 but to the upper portion thereof by means of the pin 24 and these links extend downwardly and engage a link 22 extending upwardly from the base by means of pivots 34. The base member 20 and the load supporting member 26 are of greater length than the length of the spacer members 18 so that the links 22, 22' and 27, 27' are spaced farther apart on the base member 20 and member 26 than the ends of the links are spaced on the spacer members 18. That is, the links on the spacer members are in closer proximity from their pivot points than the links from their pivots when connected to the members 20 and 26.

The pivots 32 of the links 30 which connect each of the links 30 with its respective link 27', are each disposed to one side of the center line of the jack, and is on the same side of the center line as the spacer member 18 to which the links 30 are pivoted. Likewise each of the pivots 34 which connect each of the links 33 to its respective link 22', is disposed to one side of the center line of the jack and on the side thereof as the spacer member 18 to which the link 33 is pivoted. These pivots 32 and 34 are on opopsite sides of the center line of the jack at all times.

The set of links 22 and the set 27 are slightly longer than the sets of links 22' and 27' and because of this arrangement of the several sets of links, together with the shorter links 30 and 33, which latter are pivoted to the shorter links 27' and 22' respectively, the load supporting member 26 will be caused as the jack is elevated to move vertically and laterally with respect to the base 20 and at the same time one of the spacer members 18 and its cylinder 11 will be lowered, while the other spacer member 18 and cylinder 11 will be elevated. The load supporting member 26 will be disposed above the spacer member 18 assuming the lowermost position of the two spacer members. The purpose of this arrangement is to permit the load member 26 to move forwardly or laterally with respect to the base 20, so that the jack and member 26 follows the movement of the vehicle in its lifting arc, while at the same time the jack is moved vertically to elevate the vehicle and to sustain the load carried by the jack regardless of the elevation to which the jack is subjected. During these movements of the linkage and the supporting member 26, the supporting member 26 and the base 20 always remain in parallelism, so that there is no liability of the vehicle sliding off or from the load supporting member 26.

Mounted upon the base is a liquid pump 38 which has communication with the shaft 10 by means of a flexible hose 39. The shaft 10 is preferably made hollow so that the fluid is distributed axially of the shaft 10 into the cylinders 11. The shaft 10 is provided with lateral passages 40 which communicate with the longitudinal or axial passage 41 of the shaft for delivering the oil to the cylinder between the gland nut 13 and the head of the shaft. Therefore upon the delivery of the oil to the shaft, the oil will enter the cylinder and the pressure will be exerted against the ends of the shaft 10 causing the cylinders to move toward each other thereby causing the linkage 22, 22' and 27, 27' to be extended and thereby elevate the platform 26 to whatever height is desired. When it is desired to lower or collapse the jack, a releasing valve 45 of the pump is operated for allowing the fluid to travel through the passage 46 of the pump and to the main delivery passage 47 and thence to a reservoir 48. The oil is drawn from the reservoir by operating the piston 50 by the hand lever 52.

A jack of this character may be fitted beneath the axle of a very low slung car as it is capable of being collapsed at least 4½ inches in height and may be elevated to a height of 14½ inches. Of course these measurements may be varied and the foregoing is merely a statement of one of the possibilities for a jack of this character. With this construction, the shaft 10 acts as a support for the cylinders 11 as well as a guide in their movement from and toward each other as well as during any arcing movement that the cylinders may take in the raising and lowering of the jack and as the load bearing member 26 is moved forwardly with respect to the base in following the arcing movement of the vehicle as it is lifted.

I claim:

1. In a lifting device, the combination of a guide shaft having opposed cylinders mounted thereon for movement from and toward each other, a base member and a load supporting member disposed on opposite sides of said shaft, two sets of crossed links pivotally connected to said base and each set of links extending to and pivotally connected to one of said cylinders and a second two sets of crossed links pivotally connected to said load supporting member and each of said second set of links extending to and connected to each of said cylinders, and means for delivering fluid to said cylinders for effecting relative movement of said cylinders toward each other with respect to said shaft to extend said crossed links for elevating the load member with respect to the base member.

2. In a lifting device, the combination with a shaft having cylinders mounted thereon for movement from and toward each other on said shaft, spacer members mounted on said cylinders, a base member and a load supporting member, two sets of links pivotally connected to said base member and each set of links connected to a spacer member, a second two sets of links pivotally connected to said load supporting member and each of said second set of links pivotally connected to a spacer member below the pivot points of the links of said base member and means for delivering fluid to said cylinders for effecting relative movement of said cylinders with respect to said shaft for extending said links in elevating the load supporting member.

3. In a lifting device, the combination of a guide shaft, cylinders mounted on said shaft and having longitudinal sliding movement with respect to said shaft, a base member and a load supporting member disposed on opposite sides of said shaft, links pivotally connected to said base member, one of said links pivotally connected to one of said cylinders and said other link pivotally connected to said other cylinder, a second set of links pivotally connected to said load supporting member, one of said links of said second set pivotally connected to one of said cylinders and said other link of said second set pivotally conected to said other cylinder, and means for delivering fluid to said cylinders for effecting relative movement of said cylinders toward each other with respect to said shaft to extend said links in elevating said load supporting members.

4. In a lifting device, the combination of a hollow guide shaft having pistons at the ends thereof, cylinders mounted on said shaft and cooperating with said pistons, said cylinders having relative longitudinal sliding movement from and toward each other with respect to said shaft, a base member and a load supporting member disposed on opposite sides of said shaft, links pivotally connected to said base member, one of said links pivotally connected to one of said cylinders and said other link pivotally connected to said other cylinder, a second set of links pivotally connected to said load supporting member, one of said links of said second set pivotally connected to one of said cylinders and said other link of said second set pivotally connected to said other cylinder, said hollow shaft having communication with said cylinders, and means for delivering fluid to said hollow shaft for supplying said cylinders with fluid for effecting relative movement of said cylinders with respect to said shaft in operating said links connecting said load member and base member.

5. In a lifting device, in combination with a shaft having cylinders mounted thereon for movement from and toward each other on said shaft, spacer members mounted on said cylinders, a base member and a load supporting member, a first two sets of links pivotally connected to said base member and each set connected to a

spacer member, a second two sets of links pivotally connected to said load supporting member and each of said second sets pivotally connected to a spacer member below the pivot points of the first sets of links, a third two sets of links pivotally connected respectively to each of said spacer members, the links of said third sets on one spacer member extending downwardly and pivotally connected to a set of links of the first sets and the other set of said third sets of links extending upwardly from the spacer member and pivotally connected to a set of links of the second sets, one of the sets of links of the second sets connecting a spacer member with said load supporting member and one of the sets of links of the first sets connecting said other spacer member with said base member being of shorter length than the other of said first and second sets of links, and means for delivering fluid to said cylinders for effecting relative movement of said cylinders with respect to said shaft for extending said links for elevating the load supporting member.

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