Nov. 13, 1951 R. H. CLARKE 2,575,160

HYDRAULIC AUTOMOBILE JACK

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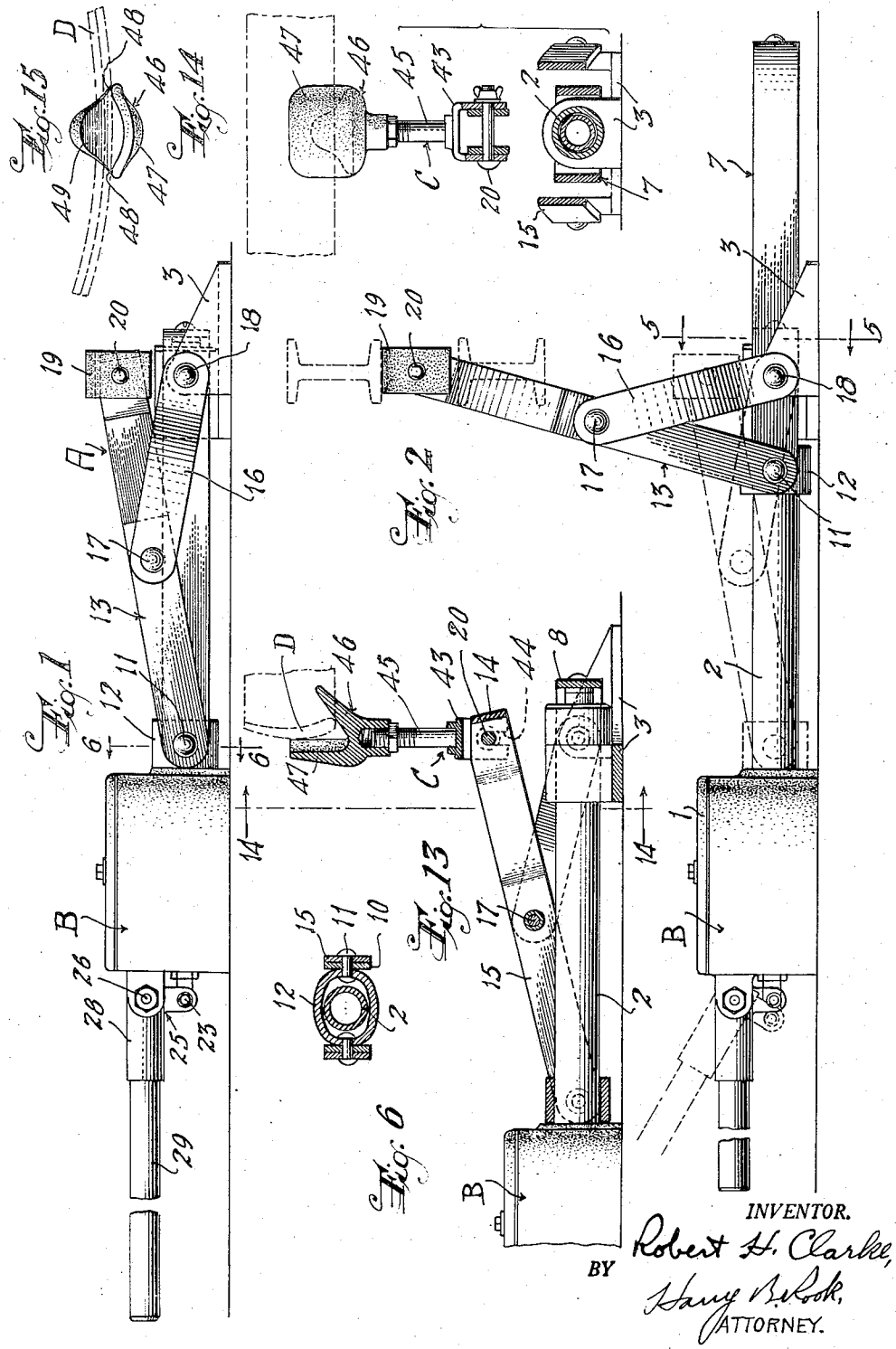


Fig. 1

Fig. 2

Fig. 6

Fig. 13

Fig. 14

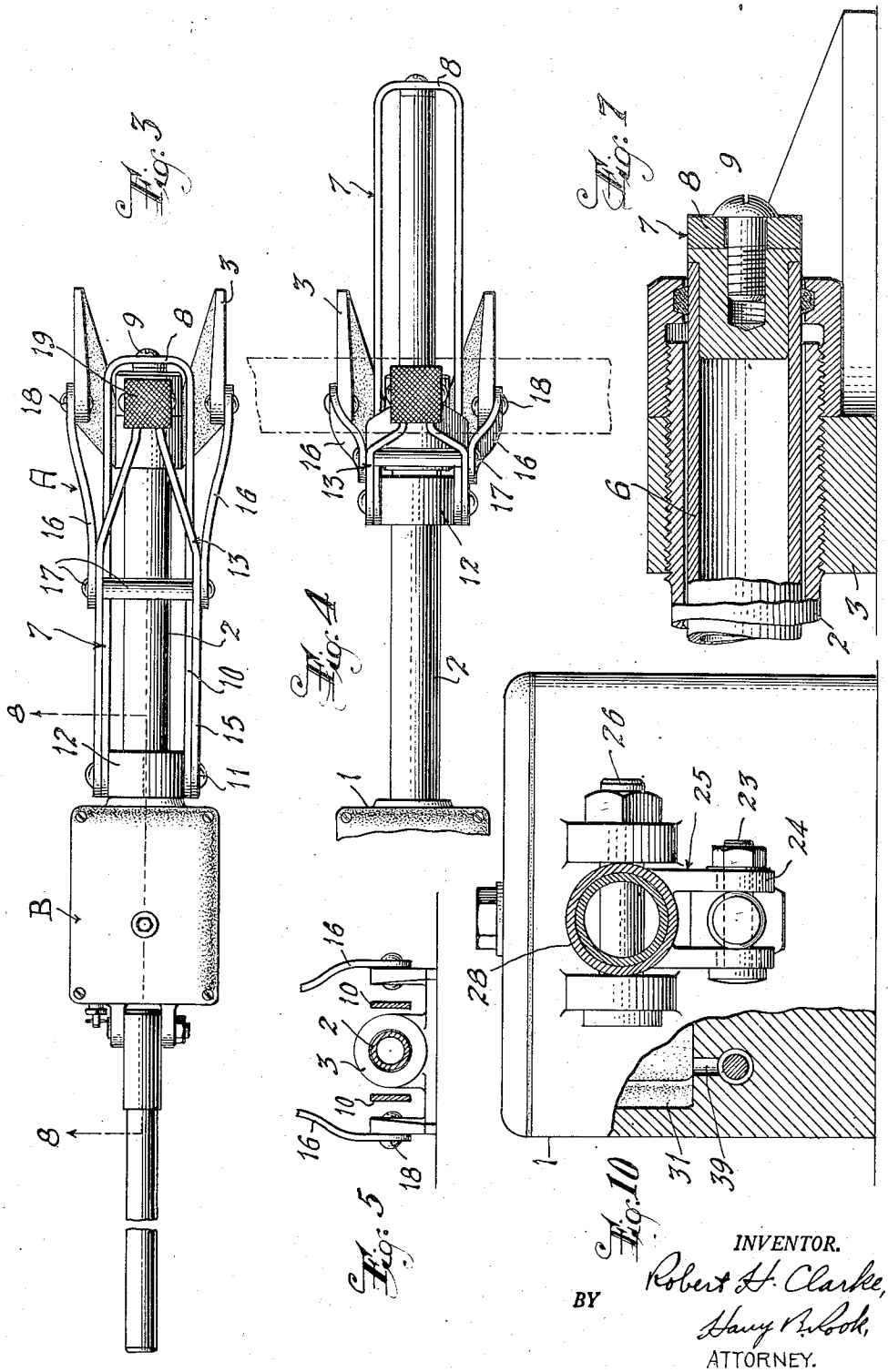
Fig. 15

INVENTOR.
Robert H. Clarke,
BY Harry B. Cook,
ATTORNEY.

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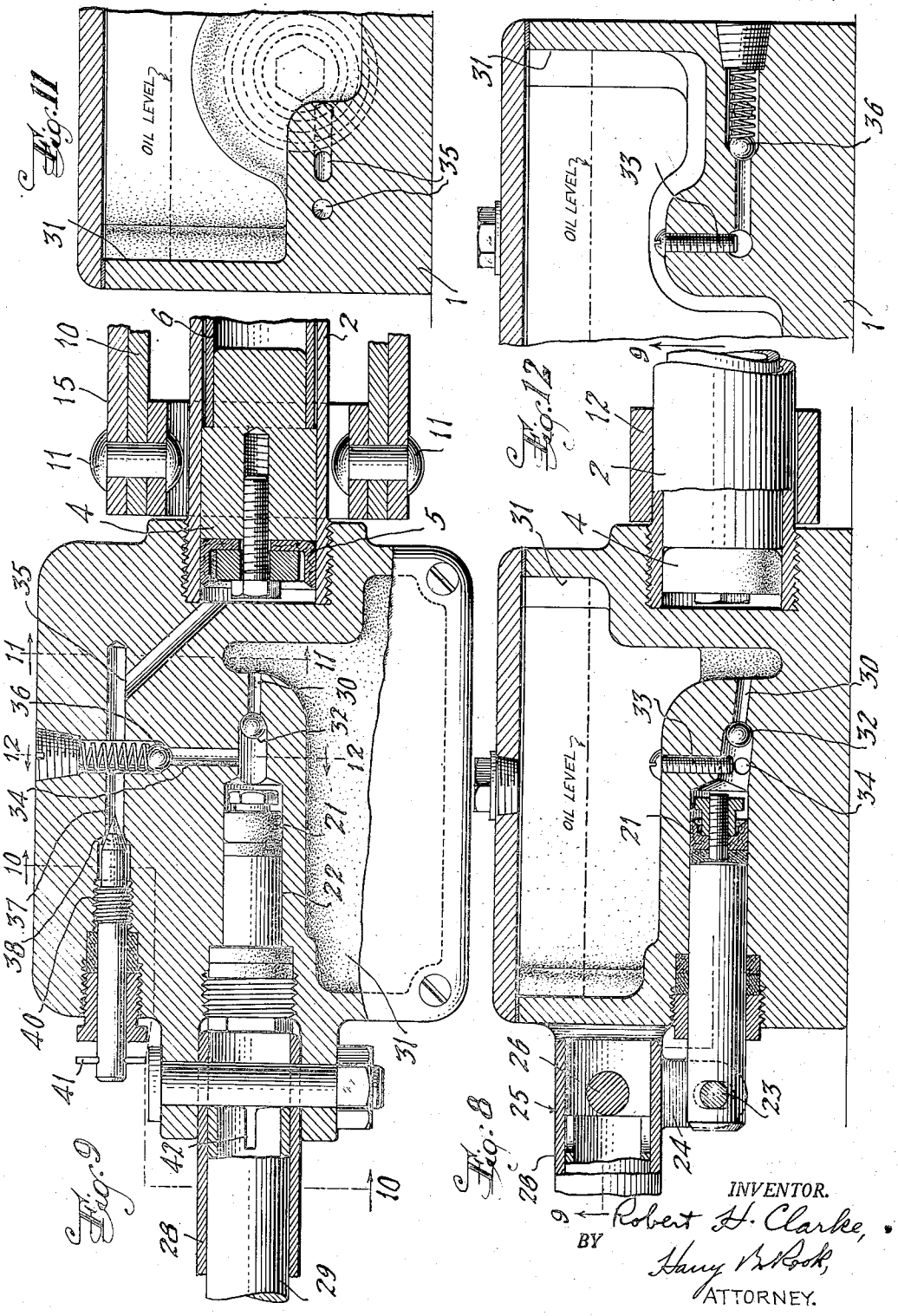
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HYDRAULIC AUTOMOBILE JACK

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INVENTOR.
Robert H. Clarke,
BY
Harry R. Cook,
ATTORNEY.

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HYDRAULIC AUTOMOBILE JACK

Robert H. Clarke, Nutley, N. J.

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4 Claims. (Cl. 254—93)

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This invention relates to an automobile jack of the type whereby an automobile may be elevated by hydraulic pressure, and one object of the invention is to provide such a jack the operation of which shall be smooth, safe, positive, and require a minimum of manual effort on the part of the operator, and which shall be light in weight.

Another object is to provide a hydraulic automobile jack which shall include novel and improved features of construction, whereby the operator may positively and accurately control the speed of lowering of the jack.

A further object is to provide such a jack which shall embody novel and improved features of construction whereby the lifting elements can be easily inserted beneath exceptionally low vehicle axles to permit use of the jack with almost any type of automobile.

Other objects are to provide a hydraulic jack which shall include a hydraulic pump that can be operated with a minimum of manual effort, and novel lifting mechanism operated by hydraulic pressure which shall permit lifting of a vehicle with a minimum of hydraulic pressure; to provide novel and improved interchangeable attachments for the lifting mechanism to adapt the latter for engagement with vehicle axles or with vehicle bumpers, as required; and to obtain other advantages and results that will be brought out by the following description in conjunction with the accompanying drawings, in which

Figure 1 is a side elevational view of an automobile jack embodying the invention, showing it in normal or retracted condition;

Figure 2 is a similar view showing the jack in extended position during the lifting of a vehicle;

Figure 3 is a plan view of the jack as it is illustrated in Figure 1;

Figure 4 is a fragmentary top plan view of the jack as it is shown in Figure 2;

Figure 5 is a fragmentary transverse vertical sectional view, approximately on the plane of the line 5—5 of Figure 2;

Figure 6 is a similar view, approximately on the plane of the line 6—6 of Figure 1;

Figure 7 is an enlarged fragmentary vertical longitudinal sectional view through one end of the cylinder and piston of the lifting mechanism;

Figure 8 is a similar view through the other end of said cylinder and piston and hydraulic pump, approximately on the plane of the line 8—8 of Figure 3;

Figure 9 is a horizontal sectional view, taken

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approximately on the plane of the line 9—9 of Figure 8;

Figure 10 is a fragmentary transverse vertical sectional view, approximately on the plane of the line 10—10 of Figure 9;

Figures 11 and 12 are fragmentary transverse vertical sectional views, approximately on the planes of the respective lines 11—11 and 12—12 of Figure 9;

Figure 13 is a fragmentary longitudinal sectional view showing the attachment for adapting the lifting mechanism for engagement with an automobile bumper;

Figure 14 is a transverse vertical sectional view, on the plane of the line 14—14 of Figure 13, and

Figure 15 is a top plan view of the bumper-engaging shoe as shown in Figure 14.

Specifically describing the invention, the jack comprises an elevating or lifting mechanism generally designated A which is operated by pressure generated in a hydraulic pressure generating mechanism generally designated B.

As shown, the mechanism B comprises a casing 1 having a flat bottom to rest upon the roadway or other supporting surface and to one side wall of which is connected one end of the cylinder 2 of the elevating mechanism, the other end of which has connected thereto a foot 3 formed with a flat surface for engaging the roadway or other support and disposed in substantially the same plane with the bottom of the pump casing 1. With this construction, the pump casing and the foot 3 cooperate to provide a stable support for the jack.

Within the cylinder 2 is reciprocable a piston 4 that has a suitable packing 5 at the end thereof, facing the pump casing and connected at its other end to a piston rod 6 that is preferably tubular for lightness in weight. The other end of the piston rod is connected in any suitable manner to one end of a pull link 7. As shown the pull link is approximately U-shaped and has its base portion 8 connected to the piston rod 6 by a screw 9 whereby the pull link is constrained to move with the piston rod. The extremities of the arms 10 of the pull link are pivotally connected by pins or rivets 11 to a guide ring 12 that encircles the cylinder 2 and preferably slidably bears on the cylinder, as shown in Figure 6.

A load-carrying link 13, preferably U-shaped as shown, and comprising a base portion 14 and arms 15 has the free end of each of its arms pivotally connected to the guide ring 12, preferably on one of the pins 11. An elevating link 16 at each side of the load-carrying link 13 is

pivotally connected to the latter by a pivot pin 17 and to the foot 3 by a pivot pin 18. The swinging end of the load-carrying link 13 has pivotally connected thereto an axle-engaging shoe 19 that is inverted and U-shaped and pivotally connected to the link by a pivot pin 20 so as to be separable.

The parts are so proportioned and related that when the piston 4 is at the pump end of the cylinder 2, the load-carrying link 13 and the elevating links 16 are contracted or collapsed alongside of each other and closely adjacent the upper side of the cylinder 2, as best shown in Figure 1. With the parts in this position, it will be observed that they can be easily inserted between the roadway or other supporting surface and an exceptionally low vehicle axle, so that the shoe 19 can be readily slipped beneath the axle. In operation, when the lifting mechanism is located beneath an axle, in order to elevate the vehicle, hydraulic pressure is applied to the piston 4 to force the latter outwardly in the cylinder 2, which causes the pull link 7 to pull the guide ring 12 outwardly on the cylinder, and, through cooperation of the load-carrying link and the elevating links 13, swing the free end of the load-carrying link upwardly beneath the axle as shown in Figure 2.

The hydraulic pressure for actuating the lifting mechanism is created by a pump piston 21 reciprocable in a cylinder 22 in the pump casing 1, which has a pin and slot connection 23 with a crank arm 24 on a bell crank actuating lever 25 which is pivotally mounted at 26 intermediate its ends on the pump casing. Preferably the bell crank lever has a tubular arm 28 in which may be removably inserted an operating handle 29 to be manually oscillated. The pump cylinder 22 has an inlet port 30 from an oil reservoir 31 in the pump casing, said port being controlled by an inwardly opening check valve 32 so that as the piston moves outwardly to the left in Figures 8 and 9, the check valve 32 will open to permit oil to be drawn into the pump cylinder from the reservoir. A stop screw 33 is provided to limit the opening movement of the check valve. An outlet port 34 leads from the pump cylinder through a passage 35 to the end of the cylinder 2 of the lifting mechanism, said outlet being controlled by a spring-closed outwardly opening check valve 36. With this construction, it will be obvious that as the handle 29 is oscillated, the pump piston 21 will be reciprocated to generate hydraulic pressure in the operating cylinder 2 behind the piston 4 for actuating the lifting mechanism.

In accordance with the invention, means is provided to permit accurate and positive control by the operator of the lowering of the jack. As shown, a by-pass duct 37 leads from the passage 35 past a needle valve 38 to a port 39 which communicates with the reservoir 31. The needle valve 38 is threaded at 40 in the pump casing and has a pin handle 41, and with this construction it will be observed that by proper manipulation of the valve by the handle, the return of the oil under pressure from the cylinder 2 through the duct 37 and port 39 may be accurately controlled so that the jack and vehicle may be lowered at any desired speed. Conveniently, at least one end of the handle 29 is tubular and has transverse slots 42 to fit over the pins 41 of the needle valve so that the valve can be reached and operated by the handle from a remote point if necessary.

In order to enable the jack to be used for elevating vehicles where the axle is inaccessible to a jack, I provide an adaptor attachment C to permit the jack to be engaged with a bumper D of an automobile. As shown, this adaptor attachment comprises an inverted U-shaped base portion 43 having notches 44 in the ends of its arms to slip over the pin 20 at the end of the load-carrying link 13, the base having a shank or stem 45 projecting upwardly therefrom and through which is preferably separably secured, as by screw threads a bumper-engaging shoe 46. This shoe is roughly Y-shaped and has a transversely curved arm 47 to engage the front of the bumper at two points 48, and a finger 49 to engage the other side of the bumper. With this construction, an excellent grip of the shoe on the bumper is obtained at the lower edge of the bumper and at two spaced points 48 longitudinally of the bumper.

It will be observed that with the operating cylinder and the pump operating lever mounted on opposite side walls of the casing 1 and with the elevating mechanism A at the outer end of the cylinder, said mechanism can be pushed conveniently beneath an automobile as far as may be necessary to reach the axle and the pump handle will always be easily accessible. Also, with the operating portion of the by-pass valve at the same side of the casing as the pump lever, said valve can be easily reached with the pump handle.

While I have shown and described the invention as embodied in certain details of construction, it should be understood that this is primarily for the purpose of illustrating the principles of the invention and that many modifications and changes can be made in the structural details of the jack within the spirit and scope of the invention.

Having thus described the invention, what I claim is:

1. An automobile jack comprising a foot, an elevating link pivotally connected at one end to said foot, a load-carrying link having load-engaging means at one end and pivotally connected intermediate its ends to the other end of said elevating link, a linearly movable guide element pivotally connected to the other end of said load-carrying link, a cylinder connected at one end to said foot and having said guide element slidable longitudinally thereof, a piston reciprocable in said cylinder with one end projecting therefrom, a pull link connecting said end of said piston to said guide element, and means for supplying hydraulic pressure to said cylinder at the other end of said piston.

2. An automobile jack comprising a hydraulic pressure generating mechanism including a casing having a liquid reservoir, an operating cylinder having one end connected to a side wall of said casing and a piston reciprocable therein responsive to pressure from said hydraulic pressure generating mechanism, a foot connected to the other end of said cylinder, elevating mechanism including a guide element slidable on said cylinder exteriorly thereof, means connecting said guide element to said piston, a plurality of pivotally connected parts, one of which is pivotally connected to said guide element and another of which is pivotally connected to said foot, and a load-engaging element actuatable by said parts so that said load-engaging element is raised upon movement of said piston in one direction by said hydraulic pressure.

3. An automobile jack comprising a foot. an elevating link pivotally connected at one end to said foot, a load-carrying link having load-engaging means at one end and preferably connected intermediate its ends to the other end of said elevating link, a linearly movable guide element pivotally connected to the other end of said load-carrying link, and means for actuating said guide element in one direction to elevate said load-engaging means, said means for actuating said guide element including a hydraulic piston and cylinder device the piston of which projects at one end of said piston from said cylinder and is connected to said guide element and the cylinder of which is rigidly connected to said foot and has said guide element slidably mounted thereon, and means for supplying hydraulic pressure to said cylinder at the other end of said piston.

4. An automobile jack as defined in claim 3 wherein said guide element comprises a ring encircling and slidable longitudinally of said cylinder.

ROBERT H. CLARKE.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,844,585	Manley	Feb. 9, 1932
2,038,974	Werner	Apr. 28, 1936
2,099,903	Nilson	Nov. 23, 1937
2,233,745	Nilson	Mar. 4, 1941
2,264,979	Jackson	Dec. 2, 1941