Dec. 9, 1930. L. C. STUKENBORG 1,784,553

HYDRAULIC JACK

Filed July 8, 1927

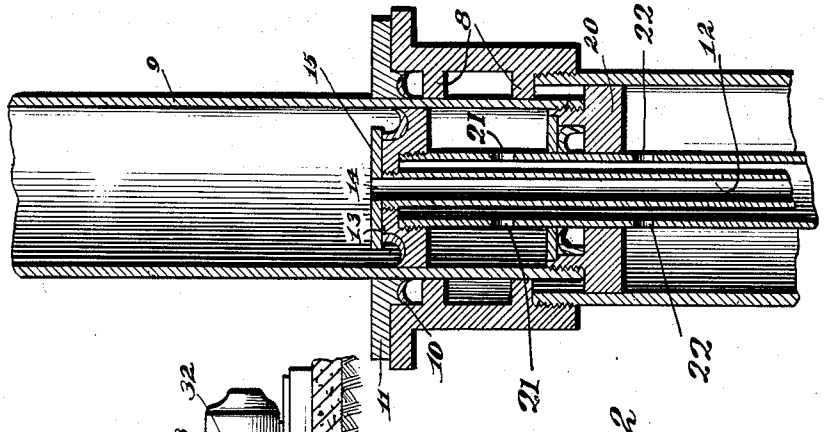


Fig. 2

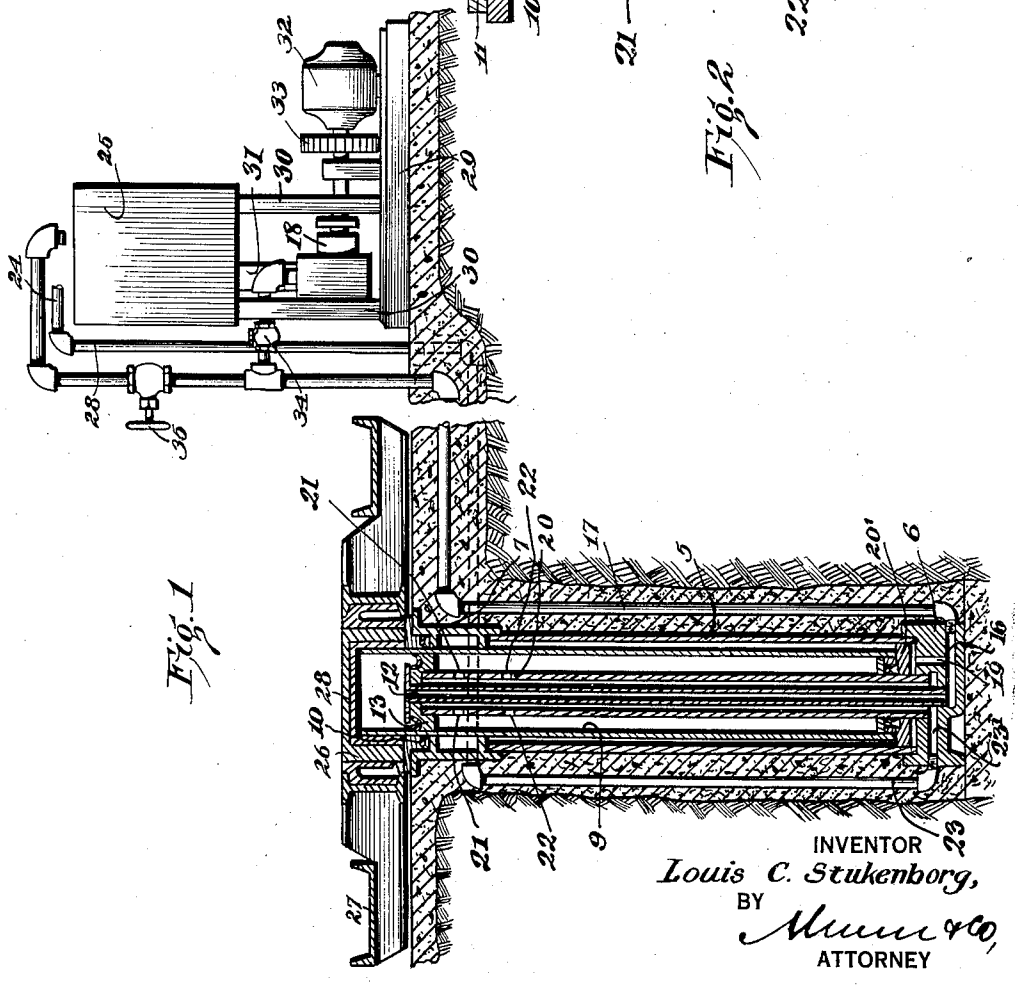


Fig. 1

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Patented Dec. 9, 1930 1,784,553

UNITED STATES PATENT OFFICE

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HYDRAULIC JACK

Application filed July 8, 1927. Serial No. 204,326.

My invention relates to hydraulic or fluid pressure actuated jacks and an object thereof resides in the provision of a jack wherein the lifting ram or piston is automatically stopped at a predetermined height and is permitted to descend to normal position upon release of the pressure therefrom.

The invention further contemplates a fluid actuated jack of this character which is automatic in operation and eliminates the numerous manually and automatically operable control valves now employed with mechanisms of this type.

With the preceding and other objects and advantages in mind the invention consists in the combination of elements, constructions, arrangements of parts, and operations to be hereinafter specifically referred to, claimed and illustrated in the accompanying drawings wherein

Figure 1 is a view partly in vertical section and partly in elevation of a hydraulic jack embodying my invention;

Figure 2 is a fragmentary sectional view of the jack with the hollow piston or ram in elevated position;

Referring to the invention in detail a cylinder 5 is provided having heads 6 and 7 at its upper and lower ends respectively. As illustrated in Figure 2 the head 7 is provided with a pair of spaced internal flanges 8 which surround a hollow piston or ram 9 reciprocable in the cylinder.

Suitable packing 10 is interposed between the uppermost annular flange 8 and a stuffing box gland 11 associated with the head 7 and embracing the piston.

In order to direct fluid pressure to the upper end of the ram or piston a vertically disposed conduit 12 rises centrally from the head 6, having a fixed piston 13 threaded upon its upper end arranged in and contacting with the walls of the hollow piston 9, the fixed piston having a central outlet opening 14 and suitable packing 15.

At its lower end the conduit 12 communicates with one end of a lateral inlet passage 16 which in turn has communication with a fluid pressure supply pipe 17 through which a suitable hydraulic medium is pumped by means of a pump 18. It is proposed to lift both ends of the ram or piston simultaneously and for that purpose a branch passage way 19 communicating with the passage way 16 is provided in the head 6 and arranged to discharge against a circular piston head 20′ of the hollow piston 9.

For the purpose of stopping the piston or ram at a predetermined height a return conduit 20 of a larger diameter than the conduit 12 extends vertically from the head 6 surrounds the conduit 12, and has its upper end attached to the under face of the piston 15.

A plurality of air vents 21 is provided in the conduit 20 adjacent its upper end and a set of fluid pressure inlet openings 22 is provided below the openings 21. At its lower end the conduit 20 communicates with an outlet passage way 22 in the head 6 and leading therefrom is return pipe 23 arranged with its outlet 24 to discharge into a receptacle 25.

A jack head 26 having channel shaped supporting members 27 to receive the wheels of a vehicle is provided at the underface of the jack head and is recessed as at 28 to receive the upper end of the piston or ram.

The pump 18 is mounted upon a base 29 while the receptacle 25 is elevated above the pump by supporting legs 30 rising from the base 29 and permitting the contents thereof to flow by gravity into the pump by way of a return pipe 31. Suitable electric motor 32 is provided on the base 29 which is operatively connected with the pump by gearing 33. A check valve 34 is interposed between the supply pipe 17 and the pump 18 to prevent the return of fluid pressure to the latter while a control valve 35 is provided in the supply pipe 17 above the check valve so that when the jack is not in operation and the motor is running, the fluid pressure will be circulated from the pump to the receptacle 25.

The operation of the invention is as follows:

The pump being in operation and valve closed forces fluid pressure against the opposite ends of the hollow piston by way of the

conduit 12 and branch passage way 19 elevating the piston elevating its head and load. As the head 20′ passes beyond the ports 22 further upward movement of the piston is prevented by reason of the fluid pressure entering these ports 22 flowing in a downward direction through the return conduit, through the outlet passage 22 and back to the receptacle 25 by way of the return pipe 23. However, the fluid pressure escaping slower than the liquid column building up in the cylinder 6 supports the piston with its load in elevated position. To lower the ram or piston, pressure is released from the lower end thereof by opening the valve 35 permitting the piston to gravitate forcing the liquid from the cylinder upwardly through the pipe 17 returning it to the receptacle 25. It will be observed that vacuum is prevented from forming in the piston below the fixed piston 13 by reason of the air vents 21.

I claim:

1. In a lifting jack, a vertically arranged cylinder, a fluid pressure raised piston mounted therein, a fluid holding receptacle, a continuously operating pump having communication with the receptacle, a pipe communicating with the pump having one end in communication with the lower end of the cylinder and its opposite end arranged to discharge into the receptacle, a manually controlled valve in the pipe between its discharge end and its point of communication with the pump, said pipe serving to conduct fluid to the cylinder to elevate the piston when the valve is closed and to discharge the fluid into the receptacle when the valve is open wherepon the piston will descend.

2. In a lifting jack, the combination of a vertically arranged tubular cylinder with a tubular piston therein, having a closed lower end, an opening in said closed end, an oil return pipe extending upwardly from the bottom of said cylinder, through said opening and into said piston, means for supplying oil to said cylinder outside of said return pipe and an opening in said return pipe adjacent the upper end thereof through which oil may flow from the interior of the cylinder into the return pipe when the closed end of said piston assumes a position above said last mentioned opening.

3. In a lifting jack, the combination of a vertically arranged tubular cylinder with a tubular piston therein, having a closed lower end, an opening in said closed end, an oil return pipe extending upwardly from the bottom of said cylinder through said opening and into said piston, a head on said return pipe, a supply pipe communicating with the interior of said tubular piston above said head, means for supplying oil to said cylinder outside of said return pipe and to said supply pipe, an opening in said return pipe adjacent the upper end thereof through which oil may flow from the interior of the cylinder into the return pipe when the closed end of said piston assumes a position above said last mentioned opening and a second opening in said return pipe between the first opening therein and said head to allow the escape of air from the space bounded by the tubular wall of said piston, the closed end thereof and said head, into said return pipe.

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