July 11, 1939. F. L. GORMLEY ET AL 2,165,367

HYDRAULIC LIFTING JACK

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Fig. 1.

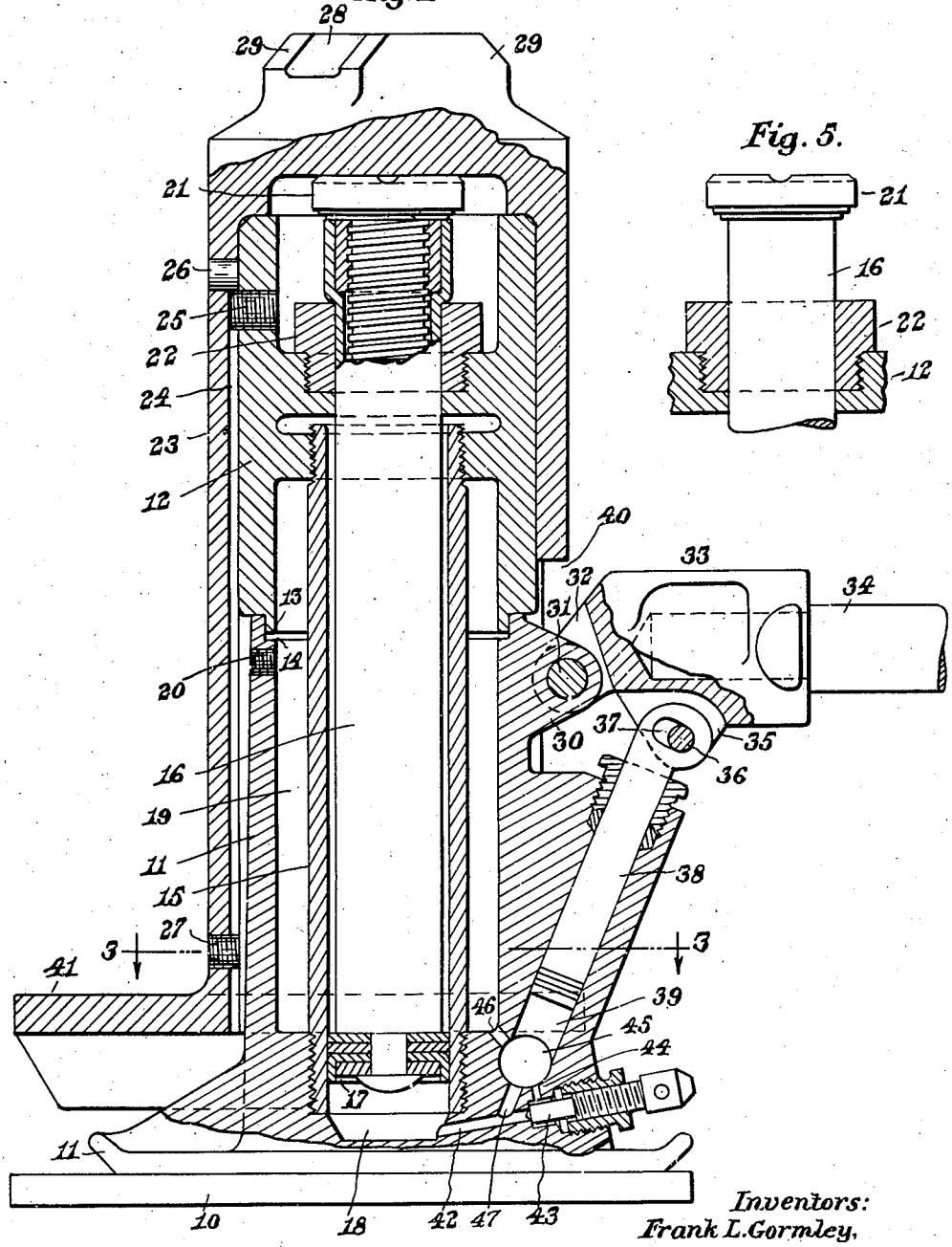


Fig. 5.

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Fig. 2.

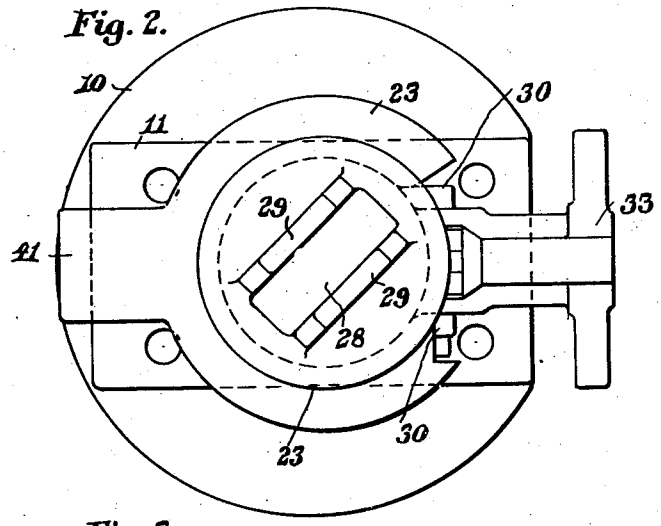


Fig. 3.

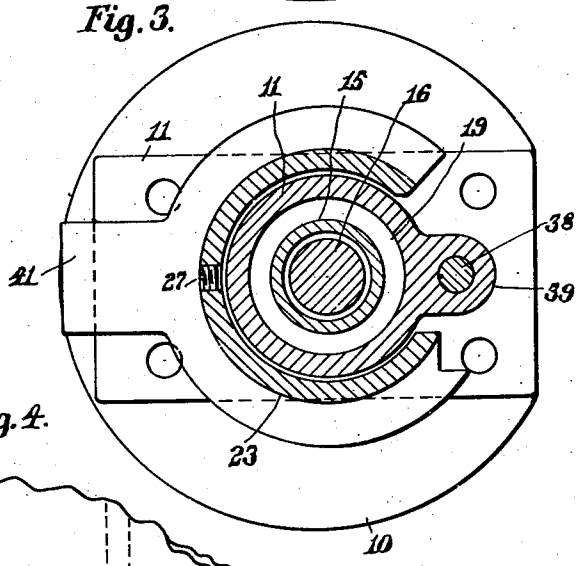
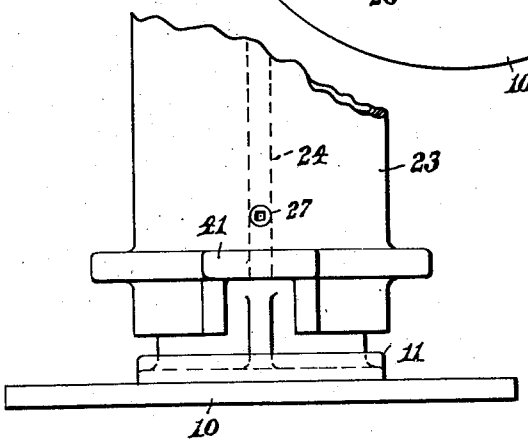


Fig. 4.



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Patented July 11, 1939 2,165,367

UNITED STATES PATENT OFFICE

2,165,367

HYDRAULIC LIFTING JACK

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Application December 27, 1938, Serial No. 247,877

11 Claims. (Cl. 254—93)

The present invention relates to improvements in hydraulic jacks and has for its main object the provision of means whereby a load near the ground may be readily lifted.

A further object is the provision of means whereby a load may be pushed when necessary.

These and many other desired objects are attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described except as required by the scope of the appended claims.

Of the drawings

Figure 1 represents a vertical section of a hydraulic jack embodying the principles of the present invention.

Figure 2 represents a plan of said jack.

Figure 3 represents a horizontal section of same on line 3, 3 on Fig. 1.

Figure 4 represents a side elevation of the lower portion of said jack, and

Figure 5 represents a vertical section of the bearing for the upper end of the ram having a head fixedly secured thereto.

Similar characters indicate like parts throughout the several figures of the drawings.

In the drawings, 10 is a base plate having secured to the top thereof the lower section 11 of a standard, said section 11 being surmounted by an upper section 12, having a diameter greater than that of the section 11, said section 12 having an annular flange 13 extending into an annular depression 14 in the upper end of section 11 and forming a water tight joint.

The sections 11 and 12 are secured by a tubular member 15 threaded at opposite ends to said sections and preventing separation thereof.

Within the member 15 is a ram 16 having at its lower end a piston 17 adapted to reciprocate lengthwise of said tubular member 15.

Beneath the piston 17 is an oil chamber 18 and surrounding the tubular member 15 is an oil reservoir 19.

This reservoir 19 may be filled by removing the filling plug 20 located near the upper end of the section 11.

The upper end of the ram 16 has threaded thereto a head 21.

The upper section 12 has threaded thereto a bearing 22 for the upper end of the ram 16.

For certain types of work the head 21 may be secured directly to the upper end of ram 16, as shown in Fig. 5 of the drawings.

The outer surface of the section 12 is cylindrical and a cup-shaped casing 23 is fitted over the cylindrical surface of section 12 so that it may move vertically thereon.

This casing 23 has a vertical groove 24 in its inner face into which extends a key 25 projecting from the section 12 and preventing any rotation of said casing on the standard.

A hole 26 is provided extending through the casing 23 for the relief of the tool when machining the key way 24. The downward movement of said casing 23 is limited by said casing coming in contact with base 10.

A member 27 at the lower end of said casing limits the upward movement thereof when it comes into contact with said key 25.

The upper end of the casing 23 is closed with its top surface rounded over and provided with a diametrical groove 28.

Preferably the groove 28 is formed by two parallel elongated ribs 29 extending upwardly from the top of casing and separated from each other.

The top faces of these ribs 29 are flat and capable of supporting a load.

The lower section 11 of standard has an ear 30 projecting from one side thereof and this ear is provided with a pivot pin 31 mounted in ears 32 of a lever socket 33.

The lever socket is movable about the axis of pin 30 by means of the handle 34.

The lever socket 33 has downwardly extending ears 35 in which is mounted pin 36 extending through a slot 37 in the upper end of a plunger 38 of an oil pump 39, the housing for which is formed integral with the lower section 11 of the standard.

The groove 28 in the casing 23 is disposed at an angle of 45° to the axis of the lever socket 33 and handle 34.

From the bottom of the casing 23 extends upwardly a wide slot 40 straddling the lever socket 33 and the housing of the oil pump 39.

The lower end of the casing 23 is provided with a lifting foot 41 which extends outwardly from said casing directly opposite to the lever socket 33.

From the chamber 18 extends an oil passage

42, the outer end of which is adapted to be closed by a valve 43.

When the valve 43 is open oil from chamber 18 may flow through passage 42 and the side passage 44 into the compartment 45 and from this compartment through passage 46 into the oil reservoir 19.

The passage 42 is also connected to compartment 45 by means of branch passage 47.

Suitable valve members control the flow of oil through the passages 46, 47 but as this particular valve mechanism forms no part of the present invention it is deemed unnecessary to illustrate the same.

It is sufficient to state that when the plunger 38 is moved downwardly oil will be permitted to flow into compartment 45 from which it will be forced through passages 47, 42 into chamber 18 and raise the ram 16.

The ram 16 may be lowered by opening the valve 43 and permitting oil in chamber 18 to return to reservoir 19.

By removing the casing 23 from the standard 11, 12, the jack may be used to lift a load on the head 21.

When the casing 23 is placed on the head 21 of the ram 16, the jack may be used in many ways that an ordinary jack could not be used as it is capable of raising a load set near the ground or it may be utilized in pushing a load.

For instance, in the inspection of railway tracks it is often found that two rails of a track are out of alinement and it is quite essential that they be properly alined.

This can be readily accomplished by the jack such as is herein shown and described by placing the jack on its side with either the head or base of a rail disposed in the groove 28 and then operating the pump sufficiently to aline the rail properly.

It is for this particular work that the groove 28 is disposed at an angle of about 45° to the axis of the handle 34 for the head or base of the rail is horizontal and when the jack is used in the manner just described, the handle 34 will be inclined upwardly at about an angle of 45° making it easier for the operator to actuate said handle.

The base 10 is round as indicated in Figs. 2 and 3 of the drawings and this permits the jack to take a good seat in the road ballast when performing the rail alining operation.

Moreover, the foot lift 41 at the lower end of the casing 23 is near enough to the base 10 so that it may be disposed beneath a rail to lift the rail a required distance to level the same.

While primarily the jack is designed for the leveling and alining of the rails of railroad tracks, it is obvious that the said jack may be used for a variety of other purposes.

It will be noted that the casing has a support on the standard for the full rise of the jack and positive stop means is provided to prevent the casing being raised beyond the limit mark.

By having the groove 28 at an angle of 45° when the jack is placed on its side while alining the rail, the liquid in the jack will cover the valves of the pump mechanism 39 at all times.

It will also be noted that when the jack is so used the valve member 43 will be in a convenient position to be opened when it is desired to permit the lowering of the ram.

The projections 29, 29 on the top of the jack do not interfere with the normal use of the jack when it is desired to support a load on the top of the casing, the upper faces of these projections being made flat for this purpose.

Constructed as shown and described in the present application there is little tendency for the ram to bend, as all such tendency to bend is overcome by the casing 23 surrounding the standard 11, 12.

The weight of the entire jack is reduced to a minimum and at the same time it is very powerful in operation.

It is believed that the operation and many advantages of the invention will be understood without further description.

Having thus described our invention, we claim:

1. A hydraulic lifting jack consisting of a cylindrical standard having formed in its lower end a housing for a pump; a vertically movable ram in said standard; a pump plunger in said housing for forcing liquid beneath said ram; a radial lever pivoted to a side wall of said standard and adapted to actuate said pump plunger; a casing slidably mounted upon the upper end of said standard and resting on said ram; means between said casing and standard for preventing rotation and limiting end movement of said casing relatively to said standard; and a lifting foot extending outwardly from the lower portion of said casing.

2. A lifting jack as set forth in claim 1 in which the upper end of said casing is rounded and provided with a diametrical flat bottom groove disposed at an angle of 45° to the radial plane of actuation of the pump lever.

3. A lifting jack as set forth in claim 1 in which the upper end of the casing is provided with two parallel flat-sided projections diametrically disposed thereon at an angle of 45° to the radial plane of actuation of the pump lever and extending upwardly therefrom with a continuous flat surface between said projections.

4. A lifting jack set forth in claim 1 in which the upper end of the casing is provided with two parallel flat-sided projections diametrically disposed thereon at an angle of 45° to the radial plane of actuation of the pump lever and extending upwardly therefrom with a continuous flat surface between said projections, the upper ends of said projections being flat and elongated.

5. A lifting jack as set forth in claim 1 in which the standard comprises a body portion having superimposed thereon an elongated cylindrical member of greater diameter and accurately fitting the interior of and forming a bearing for said casing.

6. A lifting jack as set forth in claim 1 in which the standard is made in two alined sections of which the upper section is elongated and cylindrical and accurately fitted to the interior wall of the casing, said upper section being superimposed on the lower section; and a tubular member threaded at opposite ends to said sections and preventing the separation thereof, said tubular member being surrounded by an oil reservoir.

7. A lifting jack as set forth in claim 1 in which the standard is made in two alined sections of which the upper section is an elongated cylinder accurately fitted to the interior wall of the casing, said upper section being superimposed on the lower section; and a tubular member threaded at opposite ends to said sections and preventing the separation thereof, said tubular member being adapted to enclose said ram.

8. A lifting jack as set forth in claim 1 in per threaded at opposite ends to said sections

the lower section having pivoted thereto opposite the lifting foot a radially disposed lever socket and the upper end of the casing is provided with a diametrically disposed groove at an angle of 45° to the radial plane of actuation of said lever socket.

9. A hydraulic lifting jack consisting of a standard in two sections the upper section being cylindrical and the lower section having formed integral therewith a pump housing; a plunger in said pump housing; a casing accurately fitted to the upper cylindrical section and slidable thereon; a vertically movable ram in said standard on the upper end of which said casing rests; an outwardly extending foot at the lower end of said casing; ears projecting from the side of said standard opposite said foot; a radial lever socket pivoted to said ears; and a pivotal connection between said plunger and said lever socket.

10. A lifting jack as set forth in claim 9, in which the pivotal connection between the lever socket comprises a lateral pin in ears on said socket and extending into an elongated transverse slot in the upper end of said plunger.

11. A lifting jack as set forth in claim 9, in which the inner wall of said casing is provided with a vertical groove into which projects a key projecting from the upper end of the standard; and a stop member in the lower end of the casing and projecting into said groove, said stop member being adapted to contact with said key and limit the upward movement of said casing.

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