H. J. HOGAN.

HYDRAULIC HAND TOOL.

APPLICATION FILED SEPT. 29, 1913.

1,120,717. Patented Dec. 15, 1914.

FIG. 1

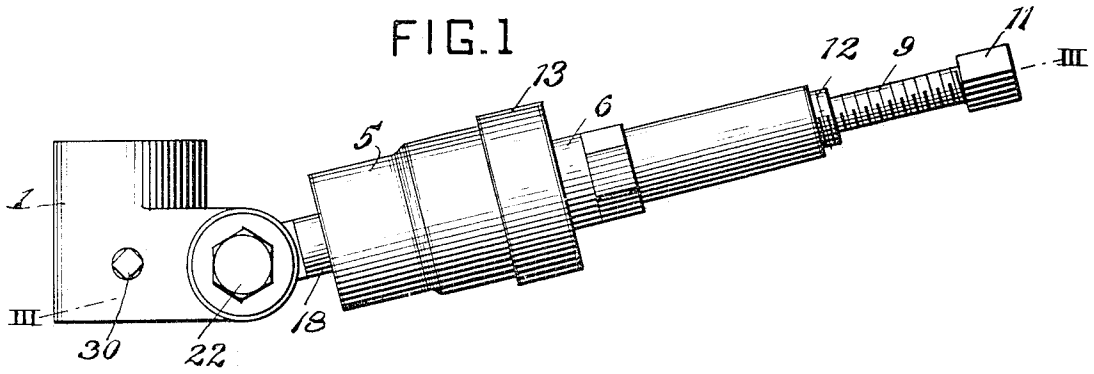


FIG. 2.

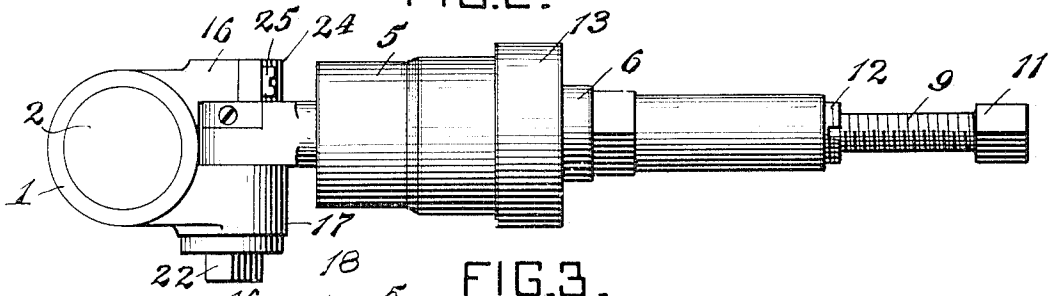


FIG. 3.

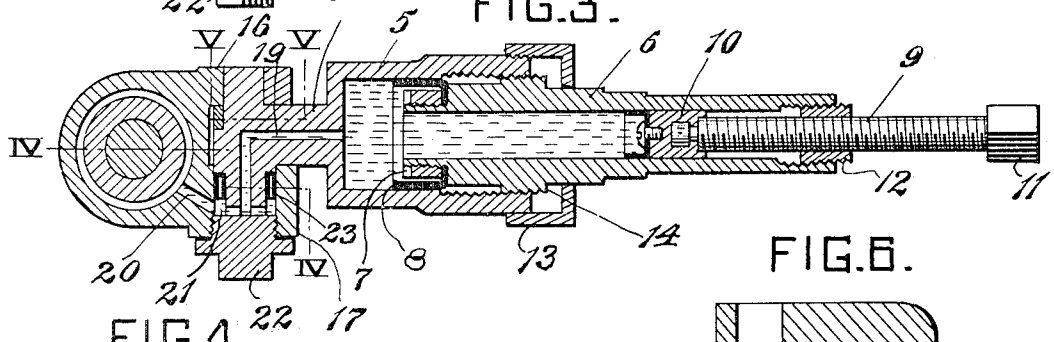


FIG. 4.

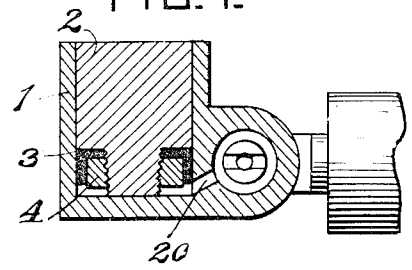


FIG. 5.

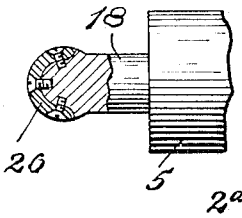
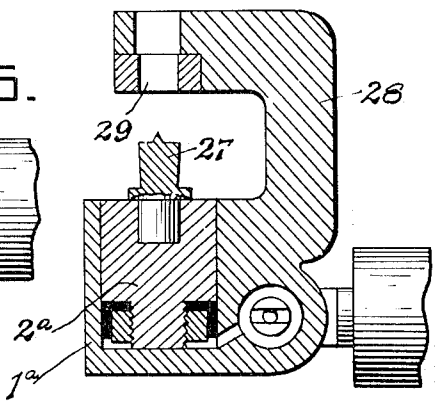


FIG. 6.



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HYDRAULIC HAND-TOOL.

1,120,717. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed September 29, 1913. Serial No. 792,432.

To all whom it may concern:

Be it known that I, HUGH J. HOGAN, residing at Rochester, in the county of Beaver and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Hydraulic Hand-Tools, of which improvements the following is a specification.

My invention relates to hydraulic hand tools, wherein a movable tool or tool-carrying member is mounted in a fluid-containing cylinder, and is moved therein by means of hydraulic pressure; and it is my object to provide such a hand tool which will be simple and effective, and which may be used in tight places.

In the accompanying drawing, which forms part of my specification, I have illustrated two tools embodying my invention in substantially the same form.

Figures 1 and 2 are, respectively, elevation and plan views of a lifting jack; Fig. 3 a sectional plan view taken on the line III—III, Fig. 1; Figs. 4 and 5 partial sectional elevations taken on the broken lines IV IV and V V, respectively, of Fig. 3; and Fig. 6 a view corresponding to Fig. 4, but illustrating a metal punch.

In the several figures like numerals are used to designate like part.

As usually constructed, tools of the character contemplated by my invention comprise an open ended cylinder provided with a plunger movable through the cylinder by hydraulic pressure, and a second cylinder provided with a piston adapted to be moved through it by hand power, as by the turning of a screw attached to the piston, the two cylinders being connected by a fluid conduit. A body of liquid, preferably oil, is placed in the two cylinders and their connecting conduit to the entire exclusion of air, so that, when the piston is moved through its cylinder, the liquid will be forced from the piston cylinder to the plunger cylinder, causing the plunger to move through its cylinder and to apply power as desired. In such hand tools the plunger cylinder and piston cylinder have usually been rigidly connected to each other, the result being that a single tool, on account of the fixed relative positions of its parts, cannot be used in many places.

Therefore, the object of my invention, more specifically stated, is to provide a hinge connection between the two cylinders, the conduit extending between them being through the hinge connection, and being fluid tight.

Referring to the embodiment of my invention illustrated in the drawings, and particularly to the lifting jack, the power-delivering part thereof consists of an open-ended cylinder 1, and a plunger 2, movable through the cylinder, but having liquid tight engagement with its inner walls. Such engagement is effected by means of a cup-washer 3 clamped to the lower end of the plunger by nut 4. The power-applying portion of the tool is pivoted to the cylinder 1 in a manner hereinafter more fully described, and consists of a cylinder 5, threaded interiorly to receive the piston 6, which is provided with a cup washer 8, secured thereto by a nut 7. To the end that pressure may be applied with different intensities and at different rates to the body of liquid within the cylinders, the piston 6 is tubular and a second and smaller piston is movable through it. The second piston comprises a screw-threaded rod 9, having a block 10 rotatably mounted on its inner end, and a shouldered portion 11 at its outer end. The threads of rod 9 preferably engage the piston 6 through an interposed sleeve nut 12 In order to limit the outward extent of travel of the piston 6, a cap nut 13 is threaded upon the outer portion of the cylinder 5, the inwardly-extending portion of such nut being adapted to engage the shoulder 14 of the piston 6.

In order to effect a fluid tight and mechanically efficient hinge connection between the power-applying and power-delivering parts of the tool, the cylinder 1 is provided with lugs 16 and 17, adapted to receive and afford bearings for the T-head 18 formed at the end of the cylinder 5. The main stem and one leg of the T-head are bored, as shown in Fig. 3, to form a fluid passageway 19, and the cylinder 1 is provided with a hole 20 extending from a point within the lug 17 to the bottom of the plunger 2 when in its extreme lower position. Communication between the passageways 19 and 20 is had through a small reservoir 21 within the lug 20, closed at one end by a plug 22 and at the other end with a washer 23, U-shaped in cross section. A yoke 24 is secured to the cylinder lug 16, as by screws 25,

thus completing the bearing for the unbored leg of the T-head 18. When the parts are thus assembled it will be seen that a secure and fluid tight joint will be had between the two main members of the tool. To facilitate the assembling of the joint, and also to increase the efficiency thereof, I attach a U-shaped collar 26 to the T-head 18, adjacent to the lug 16. (See particularly Fig. 5.) This collar helps to keep the T-head in its proper position, and by removing it, together with the yoke 24, the two main members may be readily taken apart.

My invention may be used in a lifting jack, a metal punch, or any other tool wherein a powerful but short stroke is required. In the disclosure of Figs. 1 and 4 inclusive a lifting jack is shown, whereas in Fig. 6 I have illustrated a metal punch, the plunger 2^a being provided with a punch 27, and the cylinder 1^a being provided with a yoke 28 adapted to receive a die 29.

In filling the cylinders with oil or some other suitable liquid, it is desirable that all the air be driven from both cylinders and their connecting passageway. To such an end I provide the cylinder 1 with a removable screw plug 30. By removing this plug all the air within the cylinder 1 may be displaced by oil.

It will be observed of my invention that, in whatever form it may be embodied, the power-delivering part of the tool being relatively small and adapted to operate in different lines of direction with relation to the power-applying portion thereof, may be used in many places and for many purposes that a rigid tool is useless.

I claim as my invention:

1. In a hydraulic hand tool, the combination of a fluid-containing cylinder provided with a cylindrical and a semi-cylindrical bearing lug, a yoke secured to the last named lug, a plunger movable in said cylinder, a second fluid pressure cylinder having a power-applying piston movable therein and provided with a T-head rotatably mounted in said lugs, a fluid passageway extending between said cylinders through the stem and one leg of said T-head.

2. In a hydraulic hand tool, the combination of a fluid-containing cylinder provided with a pair of lugs, one of said lugs forming an annular bearing closed at one end by a removable plug, and the other lug forming a partial bearing completed by a removable yoke, a plunger movable in said cylinder, a second fluid-containing cylinder having a power-applying piston movable therein and provided with a T-head rotatably mounted in said lugs, a fluid passageway extending from the second cylinder through the stem and one leg of said T-head to said plug-provided lug, and a passageway from the inner portion of said last named lug to said plunger chamber.

In testimony whereof I have hereunto set my hand.

HUGH J. HOGAN

Witnesses:
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P. M. STRUB.