R. Dudgeon,

Hydraulic Jack,

No. 49,097. Patented Aug. 1, 1865.

Fig. 4.

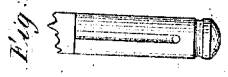


Fig. 3.

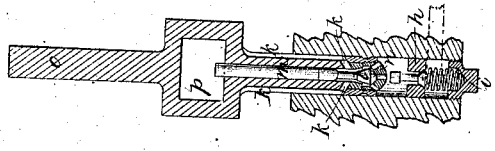


Fig. 5.

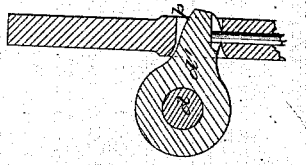


Fig. 2.

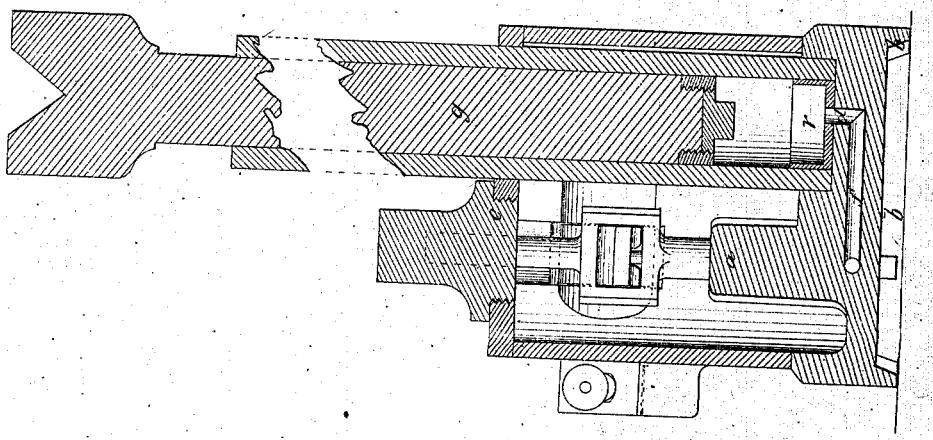
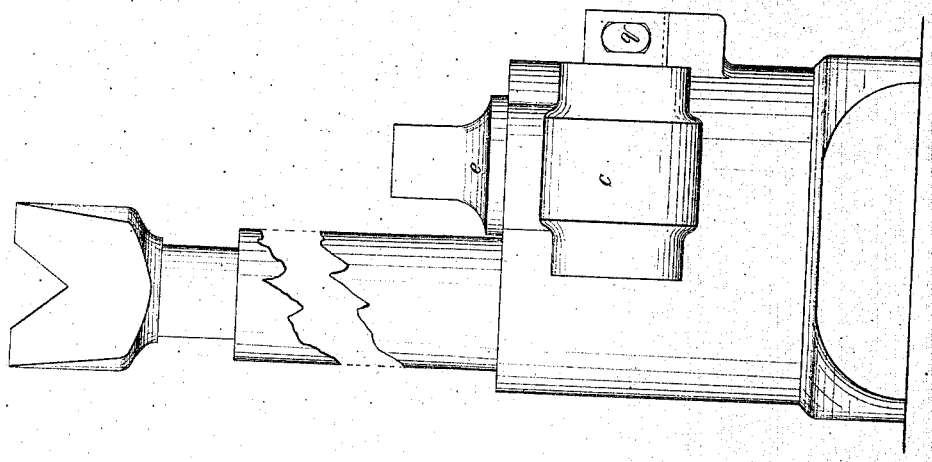


Fig. 1.



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UNITED STATES PATENT OFFICE.

RICHARD DUDGEON, OF NEW YORK, N. Y.

IMPROVEMENT IN HYDRAULIC JACKS.

Specification forming part of Letters Patent No. 49,097, dated August 1, 1865.

To all whom it may concern:

Be it known that I, RICHARD DUDGEON, of the city, county, and State of New York, have invented certain new and useful Improvements in Hydraulic Jacks, or Portable Hydraulic Presses; and I do hereby declare that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is an elevation of a jack embodying the principles of my invention. Fig. 2 is a longitudinal section through the same at the center line of the cylinder and ram. Fig. 3 is a longitudinal section through the pump, pump-plunger, valves, &c., some of the parts being shown in elevation. Fig. 4 is an elevation of the pump-piston, and Fig. 5 is a section through a part of the pump-plunger and the rock-shaft arm that imparts motion to it, explanatory of the apparatus for tripping the valves.

On the 8th day of July, A. D. 1851, Letters Patent of the United States were granted to me for a hydraulic jack, and a long experience since then in their manufacture and use has convinced me that there were certain defects in the jack then patented. These defects were, first, the top-heaviness of the jack, owing to the arrangement of the cistern on top of the plunger, and this arrangement also necessitated so small a cistern that the ram could not be run out to full length when the jack was laid upon its side. The third difficulty arose from the same arrangement, which caused the actual length of the jack to be equal to the combined lengths of the ram and the cistern, while its length of lift was less than the length of the ram alone. The weight being lifted or held up was therefore farther than necessary above its base, and consequently more unsteady than necessary. Fourthly, the jack was an expensive instrument to build, and their great cost prevented their use in many instances where a cheaper instrument with the same good qualities would have been preferred to the old screw-jack. With my old form of jack, moreover, it was almost impossible to lift weighty bodies when they had to be taken hold of at or near the level on which the jack stood, as the projecting cistern caused hooks applied to the claws and extending downward to stand out so far from the cylinder that the jack was liable to trip when the weight was lifted. The construction and arrangement of parts of the jack now to be described obviates all these difficulties, and, in addition, secures the advantage of a larger base in proportion to the weight and size of the jack.

In order to make this jack I cast a box (which is the cistern) of iron or other metal, with a solid projection, *a*, rising from its bottom, and I prefer to form a continuous projecting ring on its lower side, as at *b*, so as to prevent the sliding of the jack. The cistern has by preference, also, a protuberance, *c*, cast upon it, in which is located the rock-shaft, which conveys motion to the plunger; but the shaft may be supported in any proper bearings. An aperture in the top of the box is then to be bored out for the reception of the cylinder in which the ram moves, and through this aperture proper tools are to be inserted to bore out a proper seat for the cylinder in the bottom of the cistern, and also the small vertical passage-way *d*. Tools are then inserted through the opening into which the screw-bonnet *e* is screwed, and the pump cylinder or chamber is bored out, extending through the bottom of the cistern. The passage-way *f* is then to be bored from the outside, extending from *d* to the pump-chamber below the delivery-valve, and the opening between *d* and the outside of the piston is to be closed by a pin or screw-plug.

The ram-cylinder is to be passed through the top of the cistern and fastened above the passage *d*, any suitable packing and means of securing the cylinder being employed. No packing is necessary at the joint between the cylinder and the upper part of the piston, and I prefer to pack the cylinder to the bottom of the cistern by a leather cup, as shown in the drawings at *r*. The ram is to be fitted to the cylinder and packed in any usual or proper manner, and I prefer to forge a claw on its upper end, as shown in the drawings.

The lower or delivery valve-seat *h* may be shoved into place from either end of the pump-chamber. The valve opens downward, and is kept to its seat by a spring, and may be removed and replaced through the opening closed by the screw-bonnet *i*.

The pump-plunger has two passages, *k k*, leading along its periphery, through which liquid can pass to the induction-valve, and is bored out to receive a rod, *m*, which rests upon the

stem of the induction-valve *l*. This valve opens downward, and is prevented from falling out by a perforated screw-cap, *n*.

The plunger or piston may be packed tight to the pump-cylinder in any usual or proper manner, and I prefer to extend it upward, as at *o*, to enter a cavity in the bonnet *e*, which thus serves as a guide to the plunger. The plunger is slotted through, as at *p*, and into this slot projects an arm, *d'*, secured upon the rock-shaft *d*, which extends outside of the cistern, and has formed in it a socket, *q*, for the reception of the pump-handle. The arm *d'* has an open slot or groove formed in its lower side. The upper part is so shaped relatively to that surface of the arm which causes the pump-plunger to descend that it shall not touch the rod *m* until the plunger is forced down nearly to its lowest limit. At that point in the motion of the plunger the top of the groove will strike the rod, and will force it to descend faster than the plunger.

I prefer to extend the cavity of the cistern around the ram-cylinder, and also to form the projection *a* in contact with one of the sides of the cistern, for reasons hereinafter described.

An examination of the drawings by the aid of this description will show that there is but little fitting and few joints in a jack thus constructed; that the piston and upper valve are easily accessible through the upper bonnet, and lower valve through the lower bonnet; that the base of the jack is large proportionally; that it is not top-heavy; that its length of lift is all that is due to the length of the ram, while the jack as a whole is but little longer than the ram, and that a hook can be applied to the claw and project downward to take hold near the ground without danger of tripping the jack; and all these advantages in the use of the contrivance arise from arranging the bottom of the cistern substantially on a level with the bottom of the ram-cylinder and projecting the cylinder out sidewise from the cistern in such manner, as shown, that a hook hooked onto the claw may descend in close proximity to the ram-cylinder to take hold of weights near the ground. By passing the ram-cylinder through the top of the cistern I make a firm attachment between the two, so that the ram-cylinder is firmly supported upon the base of the cistern, which is the base of the jack, and has no tendency to twist in its socket at the bottom of the cistern, as would be the case if it passed down outside of the cistern and were secured to a channel-way projecting from the cistern, which inferior plan of construction may be adopted when the pump is inclosed in the cistern.

I sometimes intend to shape the cistern so that a portion of the outside of the ram-cylinder touches the walls of the cistern; but I prefer to make it as represented, as I thus increase the capacity of the cistern without projecting the cistern so far as to cause any practical inconvenience in lifting weights by taking hold of them near the ground; and I sometimes intend to form the projection *a* in the center of the cistern, but prefer to make it as shown, so that the pump may lie as low as possible when the jack is laid upon its side to shove weights along, for when the pump lies thus comparatively low it can take up a greater portion of the fluid contained in the cistern, and thus enables me to make a jack capable of running out its ram to the full extent when laid on its side without making the cistern of unreasonable size.

The drawings so fully explain the operation of the jack that I deem it unnecessary to describe it except in one point, and that is the method of lowering a weight after it has been lifted, or of lowering the ram. In order to do this, the pump-handle is to be lifted as far as possible, and the arm *d'* will then force down the rod *m*, which will strike the upper valve stem and throw that valve off its seat. The cap *n* will then strike the stem of the lower valve and throw it off its seat, and fluid will flow back from the ram-cylinder into the cistern, permitting the ram to descend.

I sometimes intend to use the arrangement of cistern and ram-cylinder herein described, with part of the cylinder inclosed in the piston, in connection with a pump outside of the cistern; but this plan is comparatively an imperfect one, as it would involve additional expense in construction.

I claim as of my own invention—

1. The arrangement and construction of the cistern, pump-chamber, and ram-cylinder in the manner hereinbefore described, and for the purposes set forth.

2. The relative arrangement of the pump-chamber, cistern, and upper aperture of the cistern, whereby the pump-chamber, although situated within the cistern and made in one piece with it, may nevertheless be bored out and have its plunger applied and removed, as set forth.

3. The combination and arrangement of the rod within the plunger for tripping the valve, substantially as described.

4. The arrangement of the pump-cylinder within the cistern and between two apertures closed by bonnets, as described, so that the eduction-valve may be applied and removed from the under side of the cistern and the pump-plunger may be applied and removed from the upper side of the cistern, as set forth.

In witness whereof I have hereunto set my hand.

RICHARD DUDGEON.

Witnesses:

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