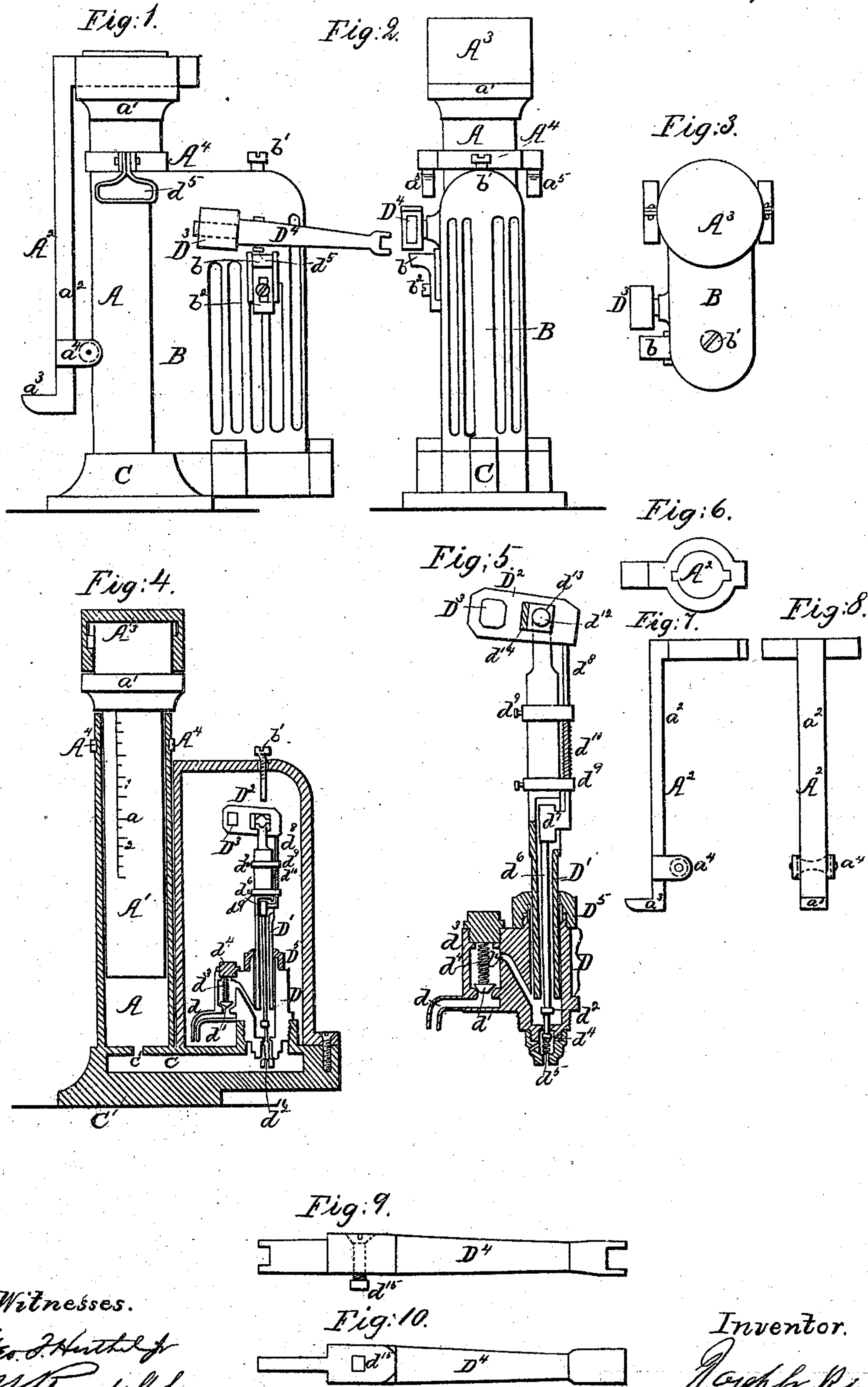


J. Ryan.

Lifting Jack.

No. 87,435.

Patented Mar. 2, 1869.



Witnesses.
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JOSEPH RYAN, OF ST. LOUIS, MISSOURI.

Letters Patent No. 87,435, dated March 2, 1869.

IMPROVEMENT IN HYDRAULIC LIFTING-JACKS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOSEPH RYAN, of St. Louis, in the county of St. Louis, and State of Missouri, have made certain new and useful Improvements in Hydraulic Jacks; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an hydraulic lifting-jack, having a reservoir in combination with it, the whole machine being compactly constructed, so as to make it a portable machine, and adapted to operate in a vertical, horizontal, or diagonal plane.

The force-pump, which actuates the lift, is contained within the reservoir, and a peculiar arrangement of the plunger-rod and valves of the said pump permits the fluid from the forcing-chamber to return to the reservoir after each lift.

To enable those skilled in the art to make and use my improved jack, I will proceed to describe its construction and operation.

Figure 1 of the drawings is a side elevation of one of the improved jacks.

Figure 2 is a front elevation of the same.

Figure 3 is a top plan.

Figure 4 is a sectional elevation of the whole jack, and its reservoir and force-pump.

Figure 5 is a sectional elevation of the force-pump and return-valve.

Figures 6, 7, and 8, are details of the ground-lift.

Figures 9 and 10 are details of the operating-lever.

The jack or forcing-cylinder A and the reservoir B are built upon a common base-block, C, the sub-chamber *c* of which connects the forcing-cylinder with the reservoir.

The pump D is placed within the reservoir, and receives its supply of water, oil, or other fluid, therefrom, through the pipe *d* and valve *d*¹, and forces it out, through the valve *d*², into the sub-chamber *c*, from whence it passes, through the aperture *c*, to the forcing-chamber A, and there acts upon the piston or plunger A¹, to force it up, in the usual manner of hydraulic presses.

The valve *d*¹ opens upward, so as to permit the fluid to flow up into and through the valve-chamber *d*³; and the spring *d*⁴, above the said valve, habitually forces it down upon its seat.

The valve *d*² opens downward, and is held up to its seat by the spring *d*⁵.

The plunger D¹ just fills the pump-chamber D, and the packing D² forms a perfect water-tight packing between these parts.

The top end of the plunger is attached to the vibrating arm D², which is affixed to and operated by the square axle D³, the said axle being operated by the adjustable lever D⁴, outside of the reservoir.

The lower end of the plunger D¹ is made hollow,

for the reception of the valve-plunger *d*⁶, the cavity in the said plunger D¹ being somewhat larger than the rod *d*⁶, for the purpose hereinafter described.

The upper end of the plunger *d*⁶ is secured to the head-piece *d*⁷, which latter piece is large enough to fill the cavity of the plunger D¹, and guide the rod *d*⁶ centrally therein.

An elbow at one side of the piece *d*⁷ has attached to it a rod, *d*⁸, which reaches nearly up to the arm D², when the latter is in operation, and which may be depressed, as hereinafter described, and for the purpose hereafter more fully explained.

The rods *d*⁶ *d*⁸, and the head-piece *d*⁷, are permitted to slide up and down in their bearings, the aperture through which the head-piece *d*⁷ passes to the outside of the plunger-rod being sufficiently long for this purpose.

The upper rod, *d*⁸, has two adjustable bearings, *d*⁹, by means of which it is secured to the rod D¹, and a spring, *d*¹⁰, so affixed to the said rod *d*⁸ as to hold it habitually up, and close the valve *d*² (at the bottom end of the rod *d*⁶) up against its seat at the bottom of the rod D¹.

The upper end of the plunger-rod D¹ is attached to the vibrating arm D², by means of the wrist *d*¹² and the bushing *d*¹³, an elastic packing, *d*¹⁴, of India rubber, or its equivalent material, being placed in the housing of the arm D², by the side of the bushing, for the purpose of allowing the latter to yield laterally, to accommodate the position of the bushing to the fixed axial line of the plunger D¹, while the vibration of the said arm constantly changes the distance between the axes of the shaft D³ and the wrist *d*¹².

The lever D⁴, by means of which the pump is operated, is to be inserted in a mortise in the outer end of the axle D³, the set-screw *d*¹⁵ being turned down, and adjusted so as to strike the adjustable stop *b* just before the end of the vibrating arm D² would touch the top end of the rod *d*⁸. In this position, the pump would be operated so as to force the fluid from the chamber B into the cylinder A. Then, when it is desired to lower the jack, the lever D⁴ will be turned, the other side up, the absence of the screw-stop *d*¹⁵ allowing the outer end of the arm D² to force the rods *d*⁶ *d*⁸ down, as in figs. 4 and 5, and thereby force open the valves *d*² and *d*¹¹, and thus allow the fluid from the cylinder A to return to the chamber B, through the said valves, and through the annular opening in the plunger D¹, and surrounding the rod *d*⁶, and the aperture formed in the side of the said rod D¹, for the passage of the head-piece *d*⁷.

It should be remarked that the stem of the valve *d*¹¹ will be long enough to strike the bottom end of the valve *d*², as soon as the latter shall have started from its seat, thereby causing both of the valves *d*² *d*¹¹ to be opened by one and the same operation, *i. e.*, by the depression of the arm D², as above described.

The plunger A^1 has a graduated scale, a , marked upon its side, so as to indicate the distance to which it is run out of the cylinder.

A collar, a^1 , near the top end of this plunger, receives the ground-rest A^2 , or the head-rest A^3 , or both of them together.

The ground-rest consists of a band, for surrounding the head of the plunger above the collar a^1 , and a rod, a^2 , with a foot or step, a^3 , projecting outwardly therefrom a short distance above the base of the cylinder.

Near the lower end of the rod a^2 is secured a roller, a^4 , fitted to the exterior surface of the cylinder A , against which it rests, and sustains the lateral thrust of the weight placed upon the foot a^3 .

The cylindrical part of the plunger, above the collar a^1 , is long enough to extend above the band at the top end of the ground-rest, as is clearly shown in fig. 1, for the purpose of placing the head-rest A^3 thereon, if it should be desired to use both rests at the same time.

This upper cylindrical part of the plunger has two lugs, one on either side, just fitted to enter the notches in the rest-band, as shown in fig. 6, and thereby prevent the turning or displacement of the parts, when the jack is under pressure.

A groove, turned in the side of the cylinder A , as is clearly shown in fig. 4, receives the band A^4 , to which band the handles a^5 are secured, the said handles affording a ready means of handling the machine.

The reservoir may be filled through the aperture closed by the screw-plug b^1 , the said plug also extending down into the chamber, to near the top of the vibrating arm D^2 , and forming an upper stop or abutment, against which the said arm would strike, were any of the valves or operative parts of the machine to

break while the press was under strain; and the danger from such breakage would be greatly reduced by the aforesaid arrangement of the said rest b^1 .

The adjustable rest b is secured to the side of the chamber B by means of the set-screw b^2 , and it may be used as an additional means of adjusting the stroke of the lever D^4 .

Having described my invention,

What I claim, is—

1. The base-block C , arranged with the sub-chamber c , and supporting the cylinder A , in such wise that the pressure of the ram A^1 shall be transmitted in the line of the axis of said ram, when combined with the reservoir B and pump D , substantially as set forth.
2. The pump D , having valves d^1 , d^2 , and d^{11} , and hollow plunger D^1 , arranged and operated as and for the purpose described and set forth.
3. The vibrating arm D^2 , when provided with a bushing, d^{13} , and elastic backing d^{14} , as described and shown.
4. The lever D^4 , provided with an adjustable stop, d^{15} , in combination with the adjustable lever-rest b , when arranged as and for the purpose set forth.
5. The ground-rest A^2 , when provided with a step, a^3 , and a bearing-roller, a^4 , all arranged as described and shown.
6. The plunger A^1 , when provided with ground-rest A^2 and head-rest A^3 , as described, and for the purpose set forth.
7. Stop-guard b^1 , when arranged with the lever D^2 , as and for the purpose set forth.

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Witnesses:

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