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R. H. & G. T. LEWIS.

Hydraulic Jack.

No. 201,114. Patented March 12, 1878.

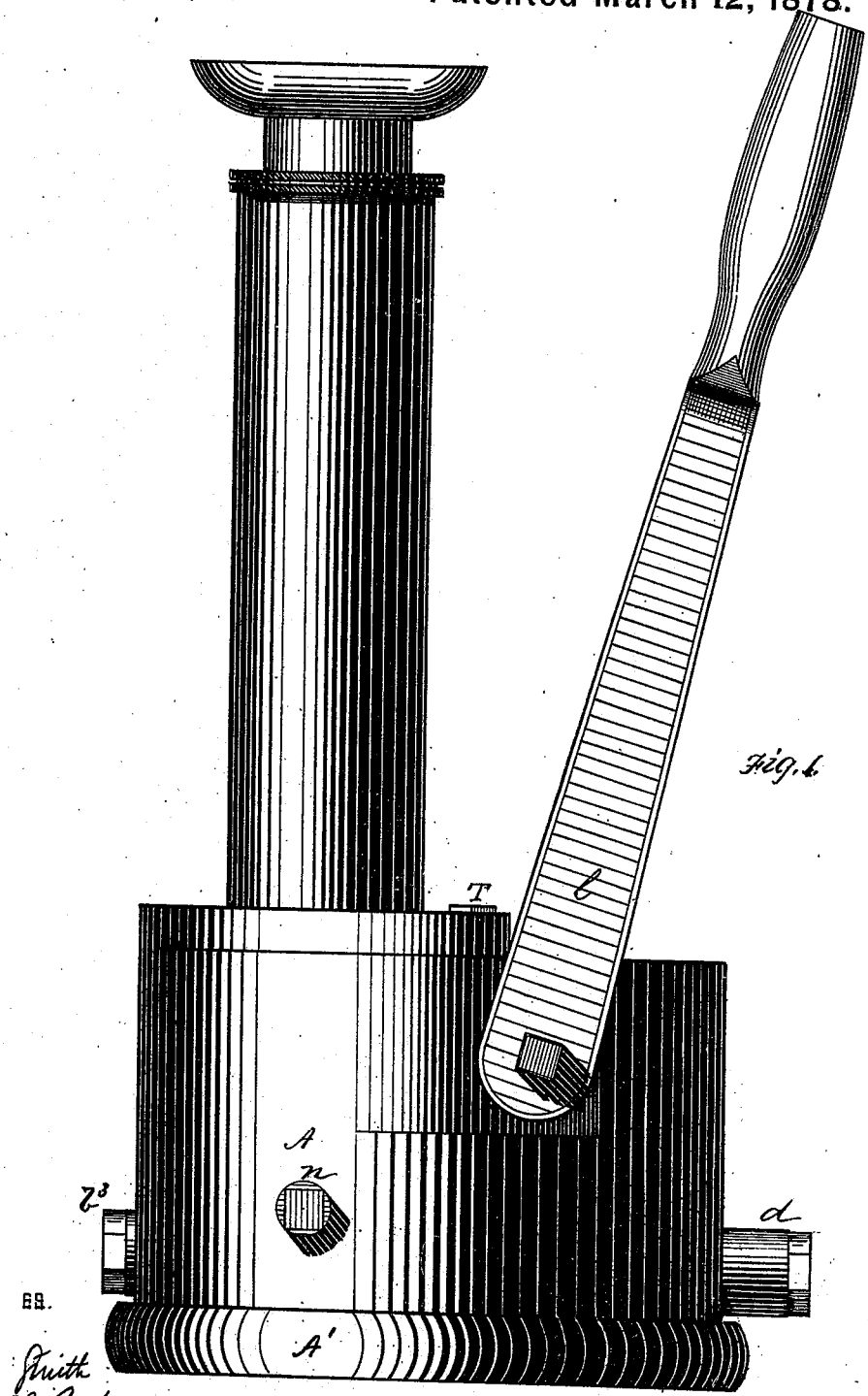

Fig. 6.

Witnesses
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R. H. & G. T. LEWIS.

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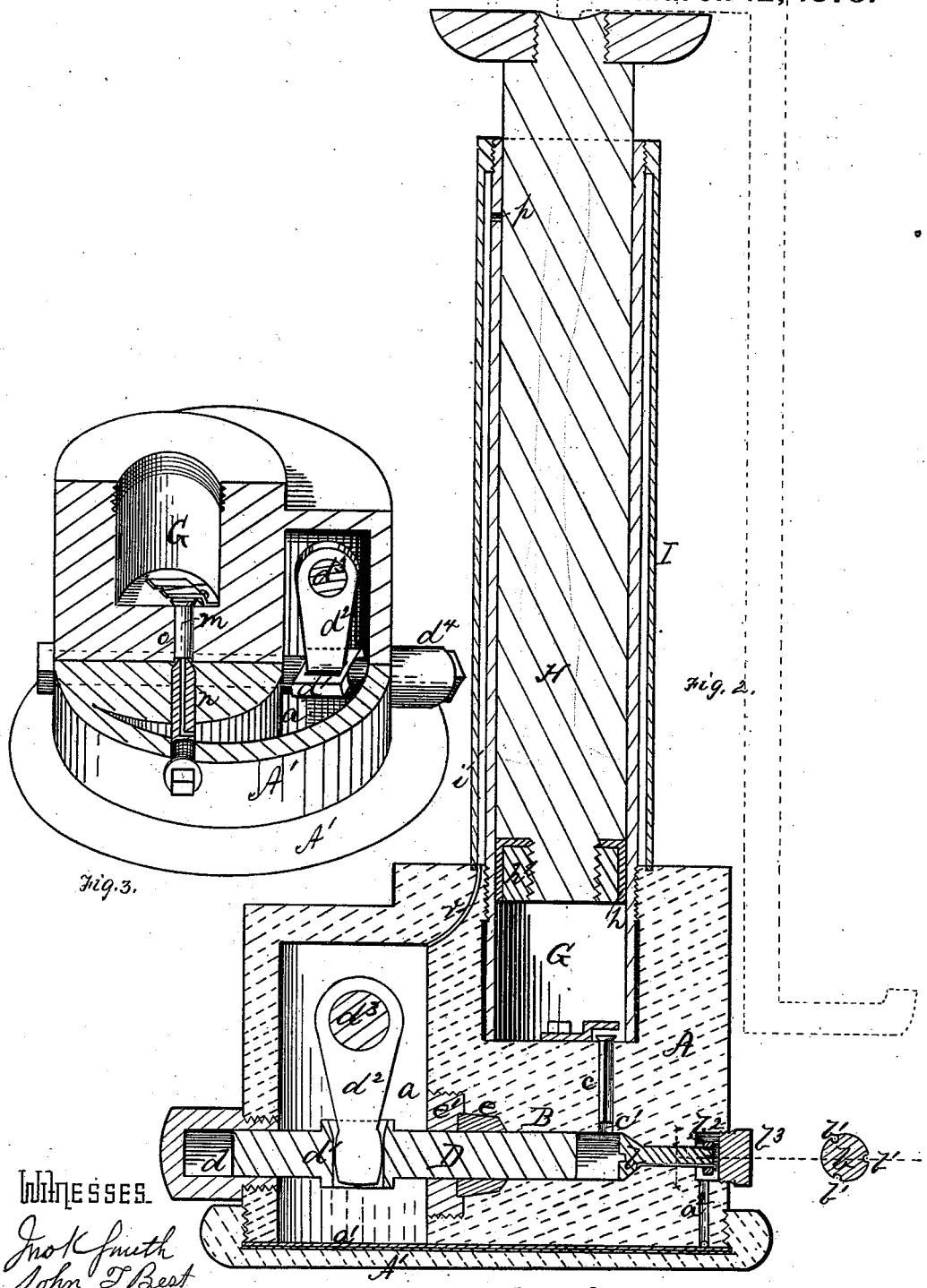

Fig. 2.

Fig. 3.

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3 Sheets—Sheet 3.

R. H. & G. T. LEWIS.

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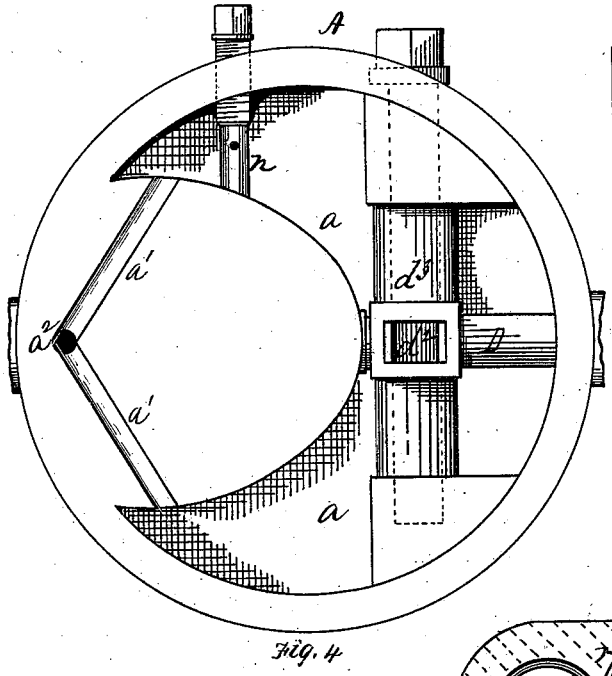

Fig. 4

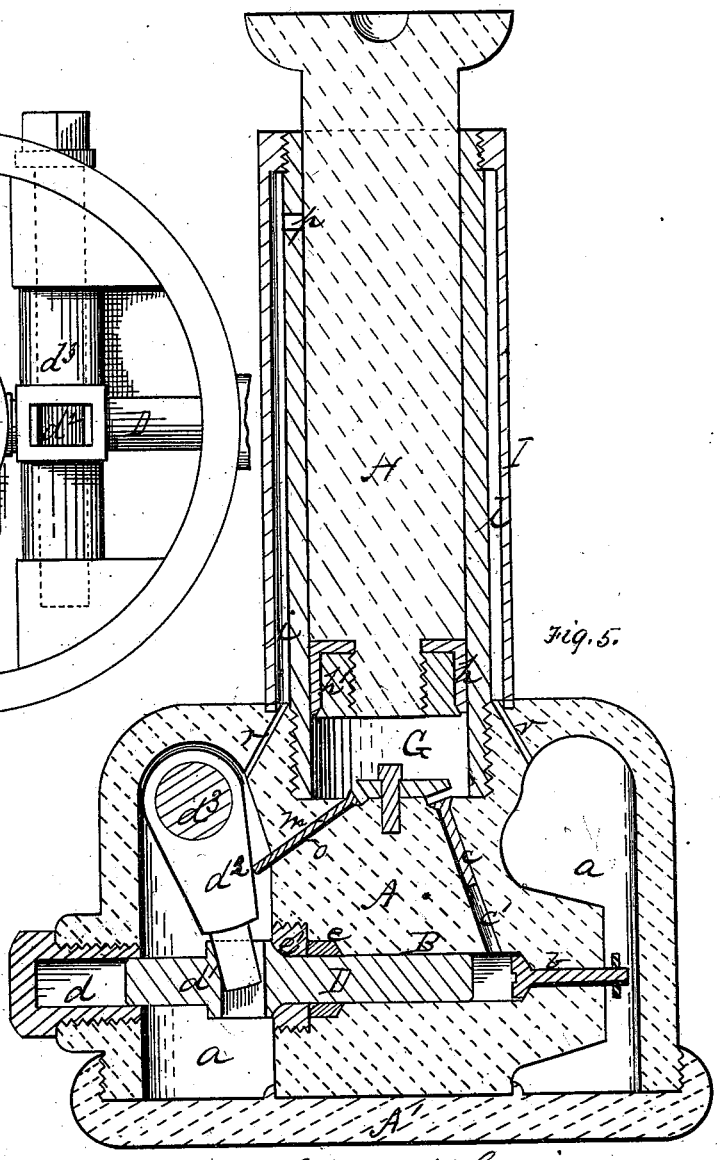

Fig. 5.

Witnesses.
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UNITED STATES PATENT OFFICE.

ROBERT H. LEWIS AND GEORGE T. LEWIS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN HYDRAULIC JACKS.

Specification forming part of Letters Patent No. **201,114**, dated March 12, 1878; application filed January 9, 1878.

To all whom it may concern:

Be it known that we, ROBERT H. LEWIS and GEORGE T. LEWIS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Hydraulic Jacks; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is an elevation of devices embodying our invention. Fig. 2 is a vertical central section. Fig. 3 is a perspective view of the base, partly in section. Fig. 4 is an underside view of the base, the bottom cap being removed; and Fig. 5 is a modification in the arrangement of the parts within the base.

Like letters refer to like parts wherever they occur.

Our invention relates to the construction of hydraulic jacks; and consists, first, in arranging the reservoir-pump, plunger, and valves entirely within the base, and combining them therewith, so as to obtain a light, compact, and balanced jack, wherein any leak from the pump escapes into the reservoir, avoiding loss and waste of liquid; secondly, in connecting the pressure-cylinder and reservoir by a channel, whereby any liquid escaping past the ram or its packing will be returned or find its way back to the reservoir, thereby avoiding leakage and waste; thirdly, in combining with the reservoir an air-expansion or relief chamber, to relieve the reservoir of any compressed air which might otherwise accumulate therein and retard the fall of the ram; fourthly, in providing the pressure-cylinder with an independent discharge-valve, which is seated by the pressure of the liquid in the cylinder, and is adapted to be tripped by a hollow screw trip or tap devices to permit the fall of the ram; and, finally, in details of construction, hereinafter more specifically set forth.

We will now proceed to describe our invention, so that others skilled in the art to which it appertains may apply the same.

In the drawing, A represents the base, hollowed out to form the reservoir *a*, which connects, by ports a^1 a^2, with the pump-chamber B. B represents the pump-chamber, bored or otherwise formed in the solid metal of the base directly under the pressure-cylinder, and provided with a receiving-valve, *b*, properly ground and seated in the end of the cylinder, its stem channeled longitudinally, as at b^1, and extending into the chamber or pocket b^2, the pocket being closed by a tap, b^3, which can be removed to get at port a^2 and the valve-stem.

c represents the discharge-valve of the pump-chamber, (or receiving-valve of the pressure-cylinder,) which is seated in the bottom of the pressure-cylinder, and closes the port *c'*, leading from the pump-chamber to the pressure-cylinder.

D is the pump piston or plunger, which extends across the reservoir *a*, projecting into a guide, *d*, which latter is, preferably, a screw-cap, which can be removed for insertion or withdrawal of the plunger D. The plunger is usually slotted, as shown at d^1, and is operated by a crank, d^2, located within the reservoir, and operated by a shaft, d^3, which projects through the walls of the reservoir, said shaft being fitted with a stuffing-box, d^4, whereby all leakage from the reservoir is prevented.

The plunger D is made to work tight in pump-chamber B by means of a packing-ring, *e*, fitted in a suitable recess of the pump-chamber, and backed by an annular screw follower or nut, *e'*, flush with the walls of the reservoir, which is found to be effective and durable, and to permit a longer stroke of the plunger than could otherwise be obtained in the necessarily limited space wherein the plunger acts.

G indicates the pressure-cylinder, properly secured in the base A at a point over the pump-chamber B, and inclosing the ram H, which is packed at its lower end by the leather cup *h* and nut or follower *h'*. Surrounding and inclosing the pressure-cylinder is a second cylinder, I, closed above to form an annular chamber, *i*, which communicates below with the reservoir *a* by means of one or more ports or passages, *r*. This chamber thus formed serves as an air-space, to receive the contained air expansion or relief of the reservoir *a* when the liquid from the pressure-cylinder is permitted to return to the reservoir, as in lowering the ram,

thereby avoiding the resistance sometimes offered to the descent of the ram by the compression of air in the reservoir.

A port, (or ports,) *p*, formed in the upper part of the pressure-cylinder G, establishes communication between the upper part of the pressure-cylinder and the annular chamber *i*, permitting the return to the reservoir of any liquid which escapes past the packing of the ram.

It will thus be seen that the annular chamber *i* serves two functions; but where the air-chamber is not desired it may be omitted, and a simple channel or tube may connect the top of the pressure-cylinder with the reservoir, and in other cases where the return-channel is not desired the port *p* may be omitted or the air-chamber differently located. *m* indicates the discharge-valve of the pressure-cylinder, located in the bottom thereof, and adjusted so as to be held upon its seat (or closed) by the pressure of the liquid in the pressure-cylinder, and adapted to be tripped from without when the ram is to be lowered. This valve is provided with a stem extending into the port leading from the bottom of the pressure-cylinder directly to the reservoir, and is tripped by means of a hollow threaded tap, *n*, Fig. 3, which, when screwed in, forces the valve *m* off its seat and permits the liquid from the pressure-cylinder to pass through valve-port *o* and hollow tap *n* to reservoir *a*. T indicates a screw-plug, which may be removed for filling the reservoir.

The base A may be closed by a threaded cap, A′, and interposed gaskets *a′*, so as to be removed for examination and repair of the parts.

The modification shown in Fig. 5 is merely a matter of form, to permit the pressure-cylinder to be placed on the center of the base instead of at the side, as in Fig. 2; but in all cases where the jack is to be used to lift directly from the ground, it is preferred to construct the base so that the pressure-cylinder will sit at the side, and the Z-hook may be used.

The operation of the devices is similar to that of other hydraulic jacks, and need not be specifically stated.

The advantages are compactness, lightness, effectiveness, and durability.

The manner of packing the plunger insures a perfect joint. The construction of the independent pressure-cylinder relief-valve obviates the liability of its either wearing loose and leaking, or sticking upon its seat and arresting the fall of the ram. The return-channel from the top of the pressure-cylinder obviates waste of liquid, and the air-chamber prevents the compression of air in the reservoir, so as to retard the fall of the ram.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a hydraulic jack having a ram pressure-cylinder and reservoir-base, the combination of the horizontal pump-plunger D with the pump-chamber B, having valves *b* and *c*, and with guide-cap *d*, the whole arranged and constructed substantially as described.

2. In a hydraulic jack, the combination, with the pump-plunger, of the packing *e* and annular screw-follower *e′*, let into the walls of the pump-chamber, and flush with the reservoir-wall, substantially as and for the purpose specified.

3. In a hydraulic jack, the reservoir provided with an expansion or relief air-chamber, substantially as and for the purpose specified.

4. The combination, with the pressure-cylinder and reservoir, of a return-channel connecting the upper part of the pressure-cylinder and the reservoir, substantially as and for the purpose specified.

5. In combination with the pressure-cylinder and reservoir of a hydraulic jack, a discharge-valve constructed and adapted to be held on its seat by the pressure within the cylinder, and a hollow screw trip or tap, substantially as and for the purpose specified.

In testimony whereof we, the said ROBERT H. LEWIS and GEORGE T. LEWIS, have hereunto set our hands.

ROBERT H. LEWIS.
GEORGE T. LEWIS.

Witnesses:
JAMES I. KAY,
F. W. RITTER, Jr.