(No Model.)

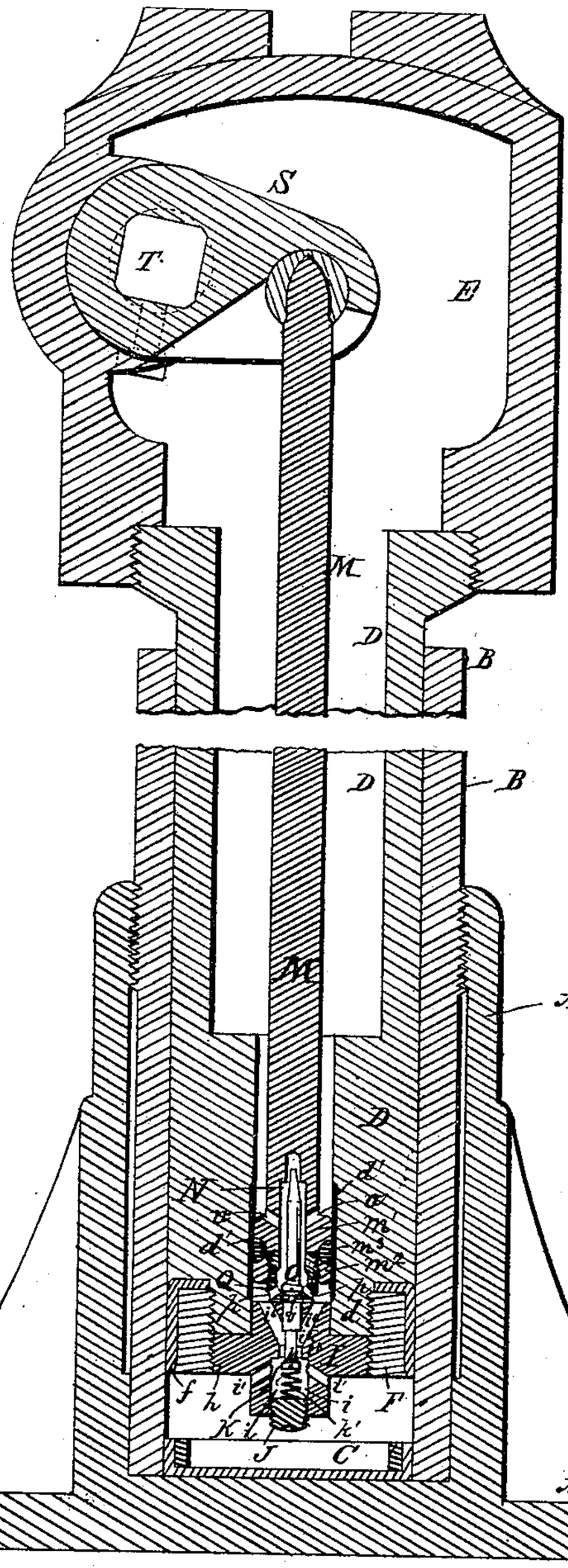
2 Sheets—Sheet 1.

O. H. MECHEM.

HYDRAULIC JACK.

No. 273,872. Patented Mar. 13, 1883.

Fig. 1.



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(No Model.)

2 Sheets—Sheet 2.

O. H. MECHEM.

HYDRAULIC JACK.

No. 273,872. Patented Mar. 13, 1883.

Fig. 2.

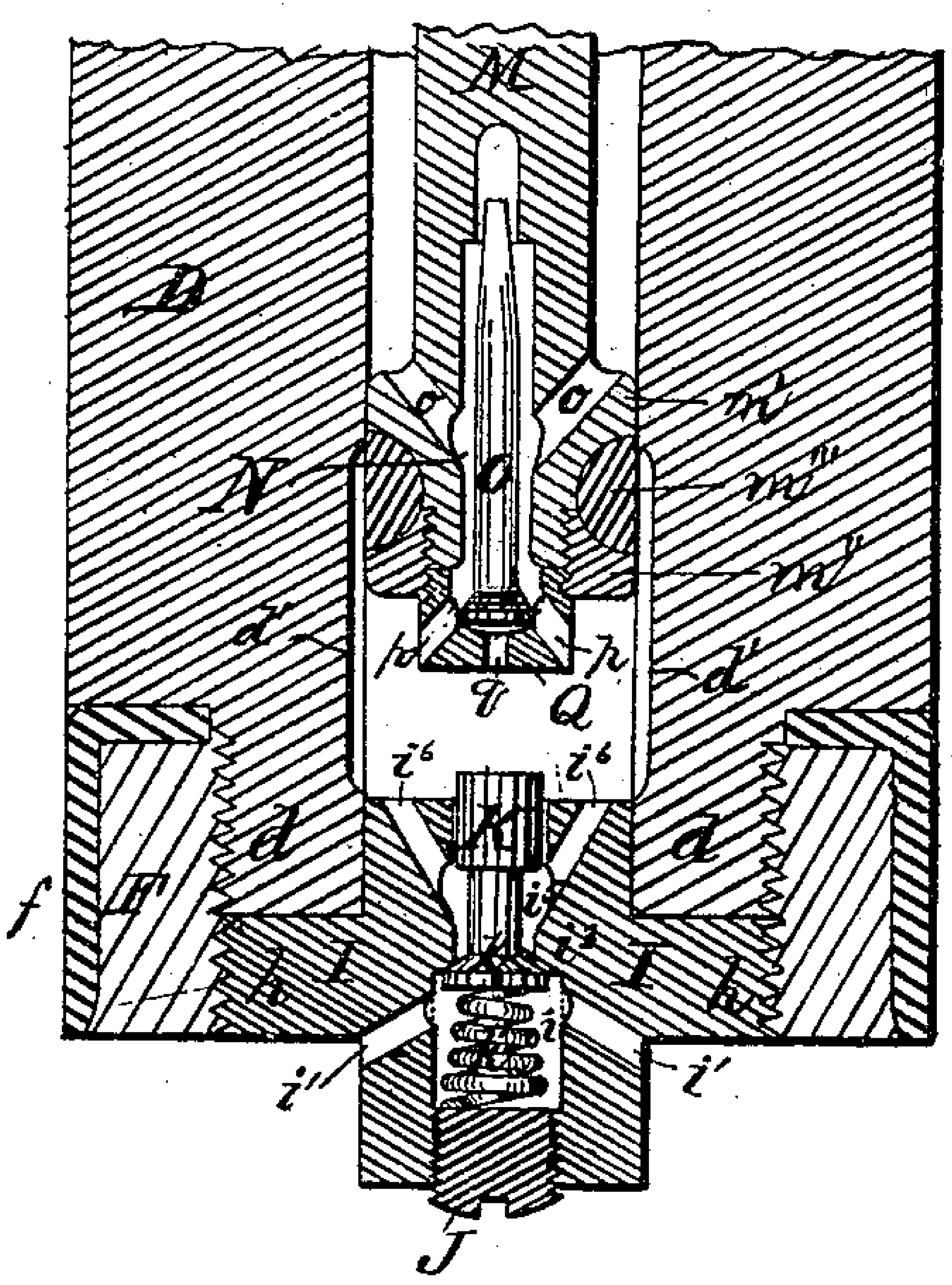


Fig. 3

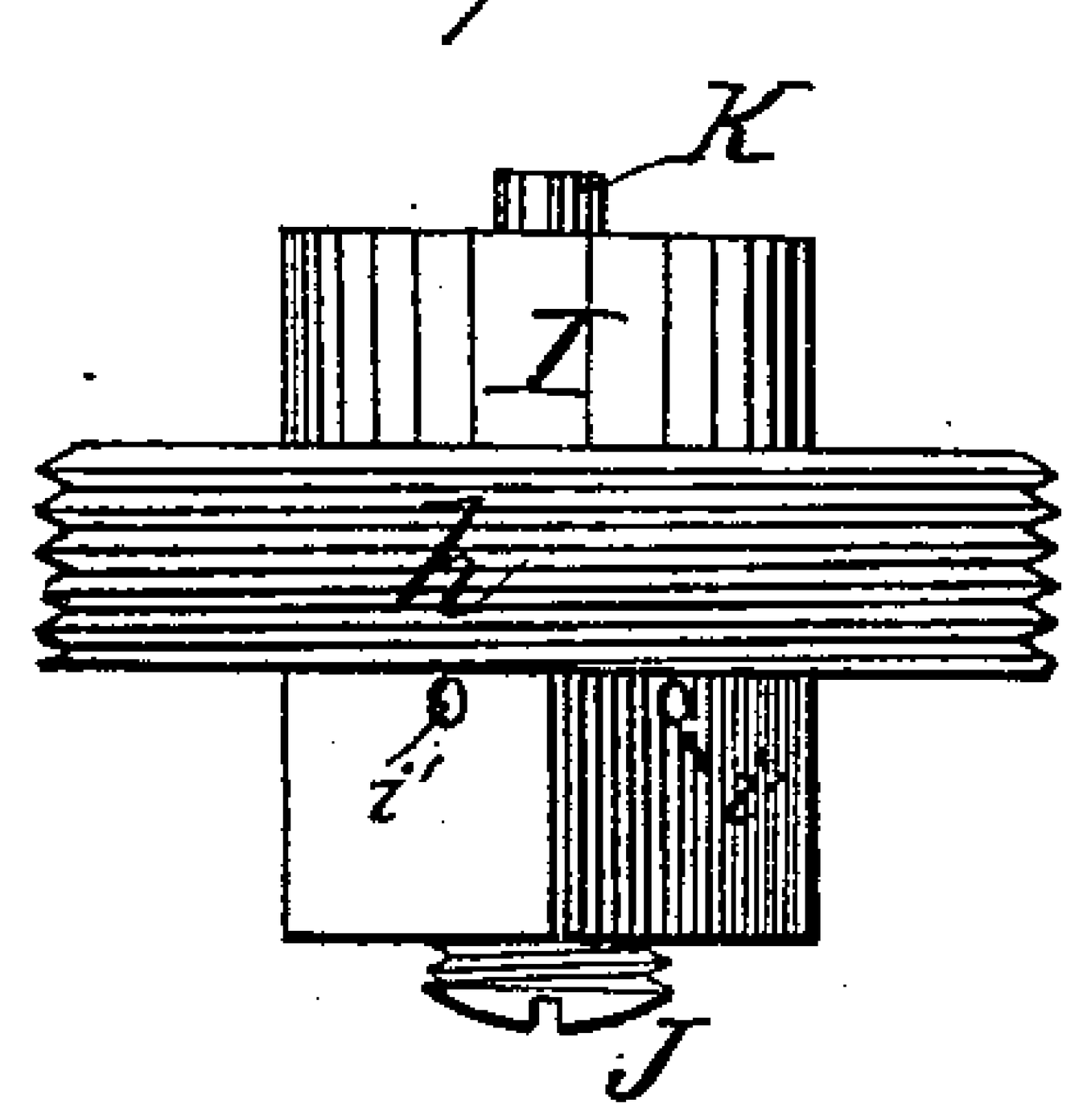
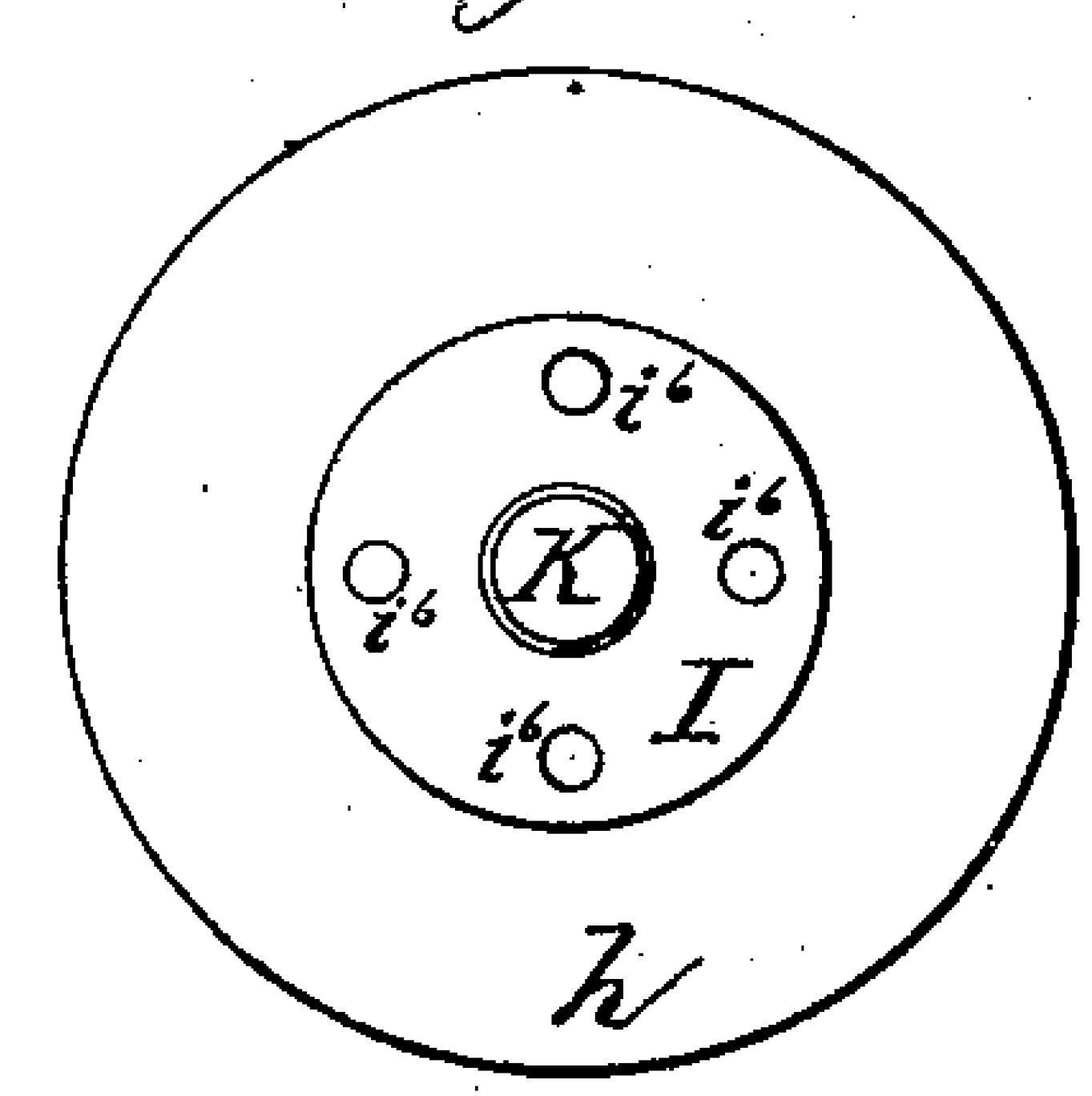


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

OLIVER H. MECHEM, OF CONNELLSVILLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN E. SAMPSEL, OF SAME PLACE.

HYDRAULIC JACK.

SPECIFICATION forming part of Letters Patent No. 273,872, dated March 13, 1883.

Application filed September 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, OLIVER H. MECHEM, of Connellsville, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Jacks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a vertical section of the jack. Fig. 2 is a section of the lower end of the ram and its contained plunger. Fig. 3 is a side view, and Fig. 4 a top view, of the ram-plug.

This invention has relation to hydraulic jacks of that class in which a plunger provided with a downwardly-opening valve forces a fluid from a reservoir formed in the head of the jack through a valve at the bottom of the ram and raises the same with an amount of power proportionate to the relative sizes of the plunger and ram.

The invention consists, first, in the novel construction of the packing at the end of the ram; secondly, in the provision of a removable plug at the bottom of the ram, provided with an adjustable spring-valve and suitable passages for the fluid; thirdly, in the provision of a novel form of plunger-head having a puppet-valve arranged in a cavity in its interior, a screw-threaded plug for retaining the valve in said cavity, and passage-ways through said plug and the body of the plunger; fourthly, in the provision of means for opening the lower valve by an abnormal depression of the plunger, so as to permit of the return of the fluid from the lower reservoir to the upper when it is desired to lower the ram in its containing cylinder.

Referring to the accompanying drawings, A represents the base of the jack, consisting of an upright cylinder mounted on and made integral with a flat base or bottom, A′. The cylinder A is threaded at its upper end, and receives a second cylinder, B, open at both ends, and having a screw-thread cut on a part of its outside at such distance from its bottom that when screwed into the cylinder A it will reach to the bottom thereof. The cylinder B receives the ram, and is smoothly finished on the inside, so as to form a water-tight joint with said ram.

C is a packing, which is inserted at the bottom of the cylinder B, to prevent the escape of fluid between the cylinders A and B.

D is the ram, and E the head of the jack, which is screwed onto the upper end of said ram. The head E is of any suitable or desired form, and is provided with suitable journals, through which pass the bearings of the operating-lever. The head of the ram is hollow, and serves as a reservoir for the fluid, and also to contain the plunger and its operating-lever. The lower end of the ram D is diminished in size, so as to leave an annular projection, *d*, which is threaded, as shown, and upon which is screwed a collar, F. The collar F is slightly spread at its lower edge for the purpose of retaining in position a packing-ring, *f*, which is slipped down over the collar F, and has its upper edge turned in over the top of the collar and held between it and the bottom of the ram. The collar F is of such a depth that it will project down below the portion *d* of the ram D and receive the collar *h* of plug I, which has a screw-thread on its periphery that fits the screw-thread on the inside of collar F. The plug I is bored out for about one-half its length, so as to form a chamber, *i*, which has a screw-thread at its lower end, into which is fitted a screw, J. Inclined passages *i′ i′* lead from the chamber *i* to the outside of the plug I and below the bottom of the collar *h* of said plug. From the chamber *i* an opening is made through to the top of the plug, and in this opening rests a valve, K, having a head, *k*, at its lower end that has a seat at i^3 in the chamber *i*. The valve K is held up to its seat by a spiral spring, *k′*, which rests upon the screw J, and by means of which the pressure of the spring upon the valve may be regulated. The valve K is diminished in size above its head, so as to leave a chamber, i^5, and into this chamber open passages i^6 i^6 lead from the top of plug I.

M is the plunger-rod. The head thereof is formed of two parts, m' m^2, screwed together, and has a groove around its periphery for the reception of a packing-ring, m^3. The plunger-rod has a central cavity, N, extending up a short distance into the rod and slightly in-

clined outwardly at its lower edge to form a seat for a puppet-valve, O, whose stem extends up into said cavity.

o o are passages running from the cavity N to the upper side or top of the plunger-head.

Q is a plug, which is screwed into the lower end of the cavity in the plunger, and which has a depression in its top, into which inclined passages *p p* and a central passage, *q*, lead. This plug retains the puppet-valve in place, while, by reason of the depression in its top, allowing a sufficient amount of movement of the same, and permits of ready access to the valve and passages when necessary.

d' d' are grooves formed in the sides of the plunger-cavity. These grooves are of such a length and so situated that when the plunger is depressed to its fullest extent they will extend from below the bottom of the same to above its top, and will form passages for the escape of the fluid from below the plunger to the upper reservoir.

The plunger-rod M extends up into the head of the jack, and is attached at its upper end to a crank, S, which has a square opening in its other end for the reception of the shaft T. The shaft T passes through journals in the head of the jack, and has an operating-lever attached to one or both of its ends.

The operation of the invention is as follows: The several parts of the jack being fitted together and the upper reservoir filled with a fluid, (preferably oil,) the plunger-rod is raised up and the fluid flows down through the passages *o o* and out through the passages *p p* and *q* in plug Q, thus filling up the space left between the plunger-head and the plug I. The plunger is then depressed, and the puppet-valve being forced up to its seat by the pressure of the fluid, the same seeks an outlet through the passages i^6 i^6 in the plug I, forces down the check-valve K, and escapes into the lower reservoir by way of the passages *i' i'*, thus elevating the ram a short distance. Upon elevating the plunger a second time the valve K is returned to its seat, by the pressure of the oil and the spring *k'*, closing the passage through the plug I and preventing the escape of the fluid from the lower reservoir. The upward movement of the plunger tends to produce a vacuum above the plug I, which is filled with fluid from the upper reservoir, and the operation is continued until the jack is elevated to the desired height. When it is desired to lower the ram in the jack the plunger M is forced down until the plug Q strikes the protruding end of check-valve K. This opens said valve and allows the fluid in the lower reservoir to escape into the space between the bottom of the plunger and the plug I, from whence it escapes into the upper reservoir through the passages *p p o o* in the plunger-head, and through the passages *d d*. These last-mentioned passages relieve the pressure of the oil on the puppet-valve, which would otherwise close and prevent the escape of the fluid into the upper reservor, and they are only brought into play when the jack is to be lowered, as the usual movement of the plunger is such that it only reaches to the top of said passages when depressed. A suitable stop may be employed to prevent the plunger from descending below such passages except when it is desired to return the fluid to the upper reservoir.

I claim—

1. In a hydraulic jack, the ram D, having the projection *d* and collar F, in combination with the plug I, screwed into said collar and projecting up into the plunger-cavity, substantially as described.

2. In a hydraulic jack, the ram D, having a central plunger-cavity extending to the bottom of said ram, in combination with a removable plug having suitable fluid-passages and a downwardly-opening valve, the said plug being fitted into the plunger-cavity and attached to the end of the ram outside of said cavity, substantially as described.

3. In a hydraulic jack, a ram having a central cylindrical plunger-cavity with grooves in its sides, and bearing-surfaces for the plunger-head between said grooves, the grooves being located in such position that they will form a by-passage around the plunger when the latter is depressed past a certain point.

4. In a hydraulic jack, the combination, with ram D, having a central cylindrical plunger-cavity, of plug I, projecting up into said cavity, and provided with fluid-passages, and a downwardly-opening valve whose stem projects through the top of said plug into the plunger-cavity, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

OLIVER H. MECHEM.

Witnesses:

T. J. PATTERSON,

JOS. B. CONNOLLY.