

(No Model.)

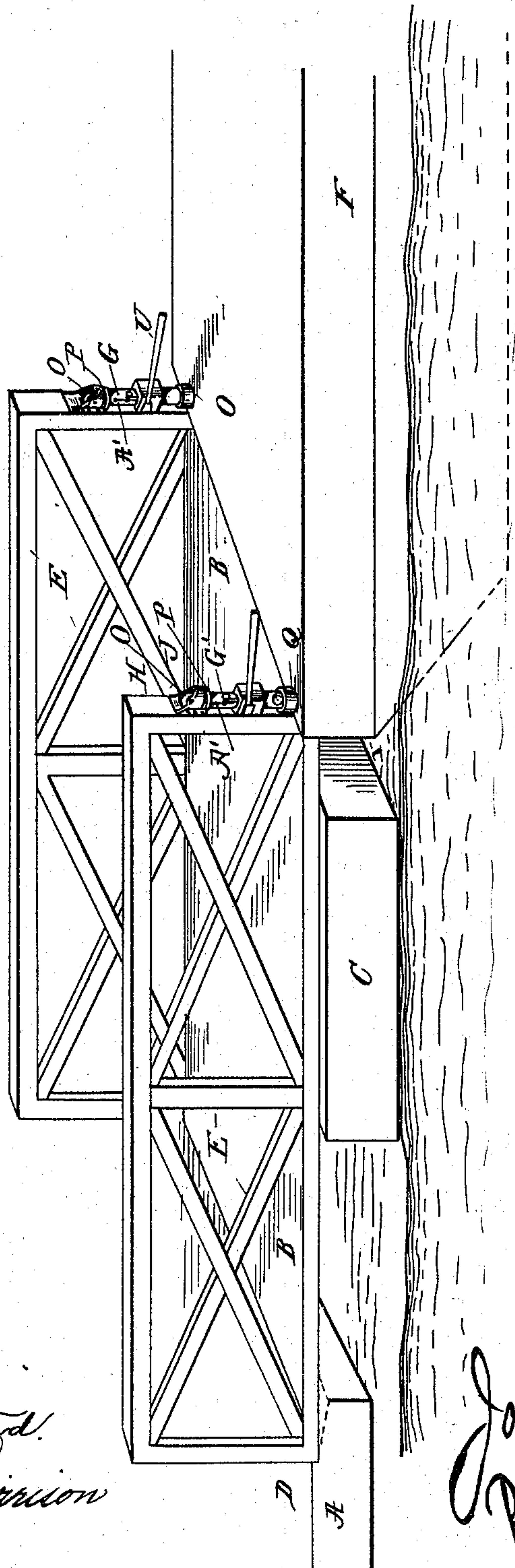
3 Sheets—Sheet 1.

J. WEEKS.
HYDRAULIC JACK.

No. 571,547.

Patented Nov. 17, 1896.

Fig. 1.



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(No Model.)

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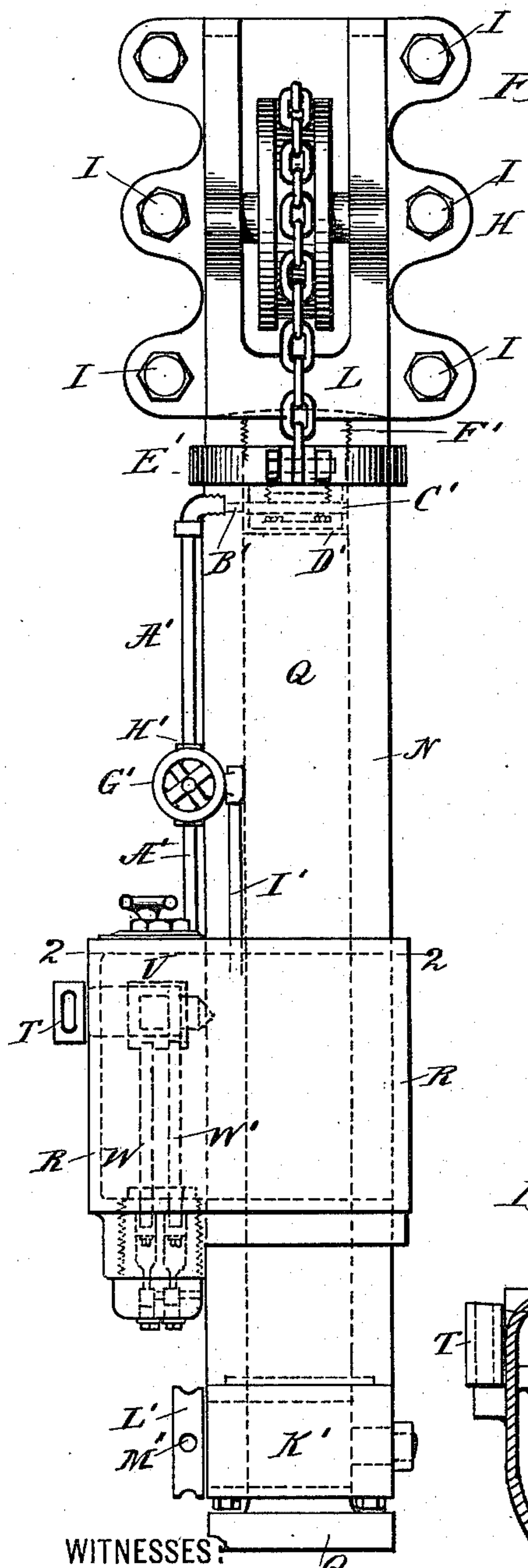


Fig. 2.

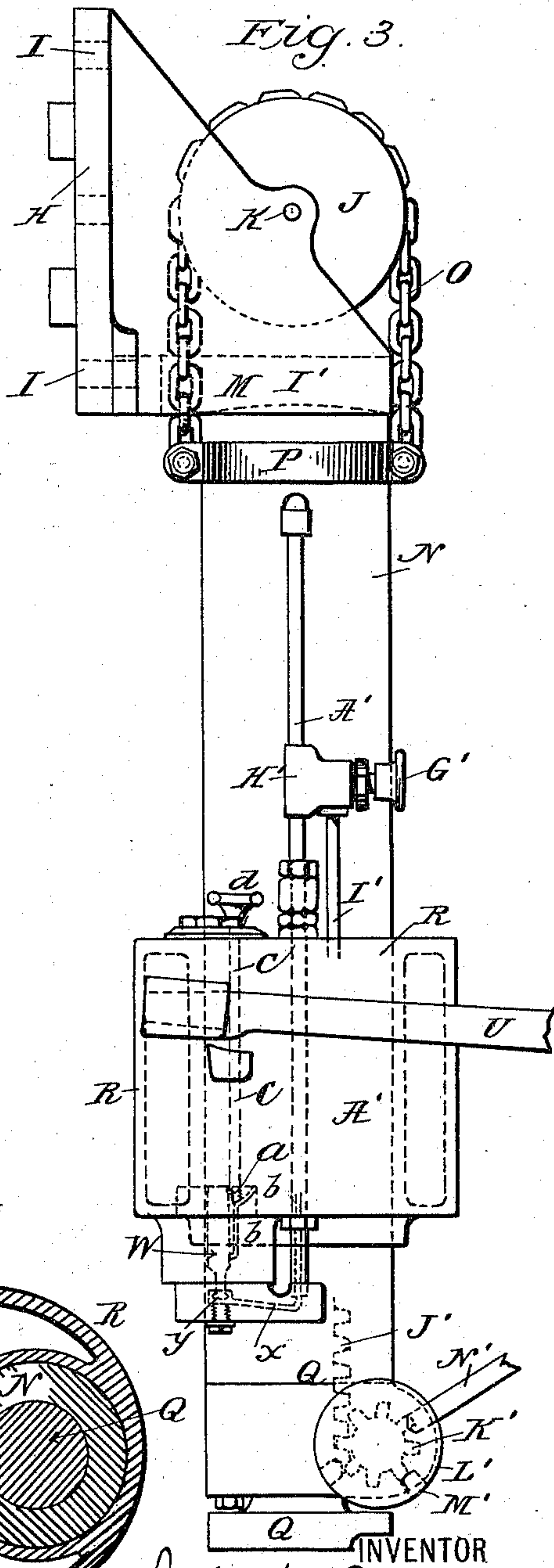
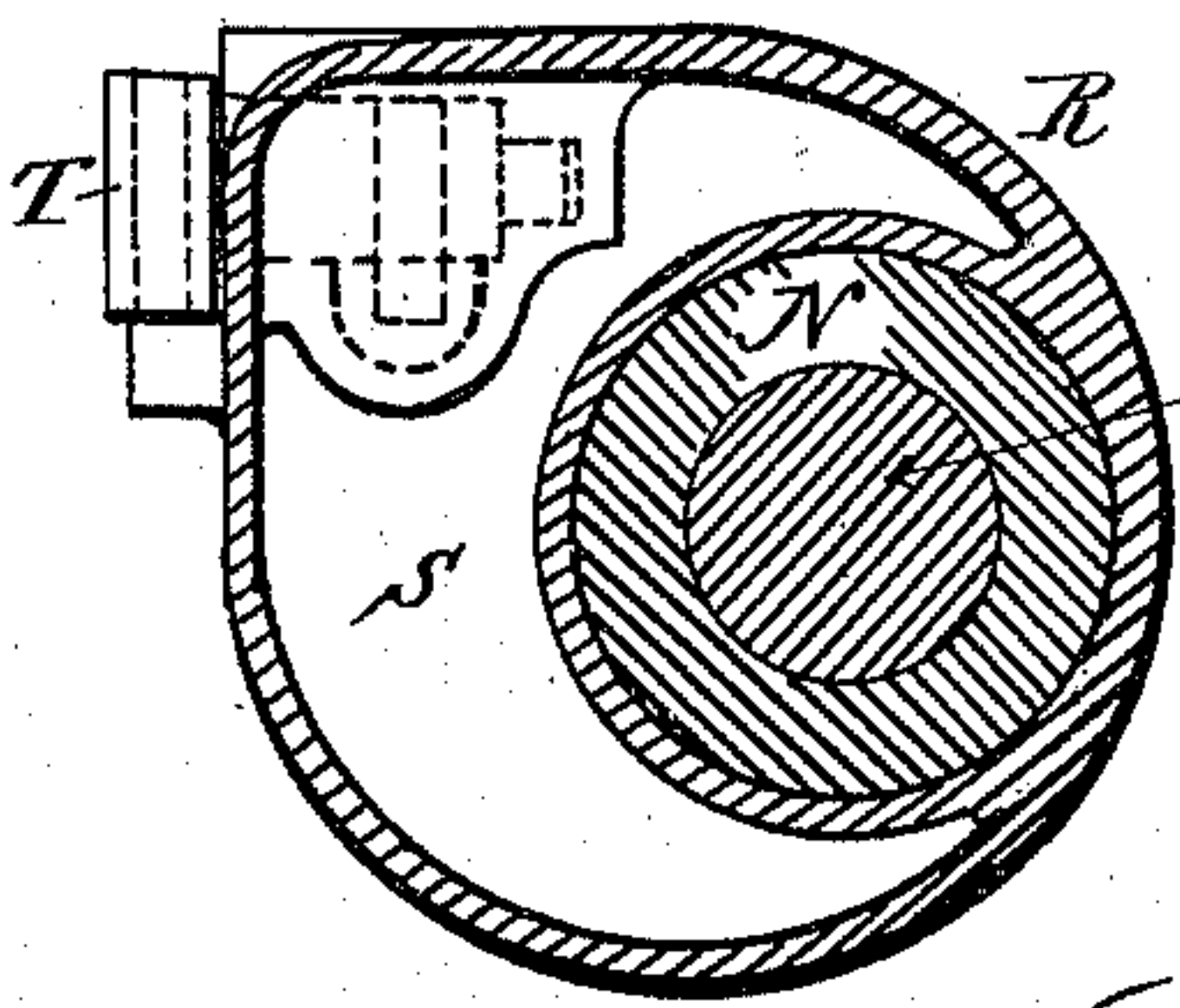


Fig. 3.

Fig. 4.



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Fig. 5.

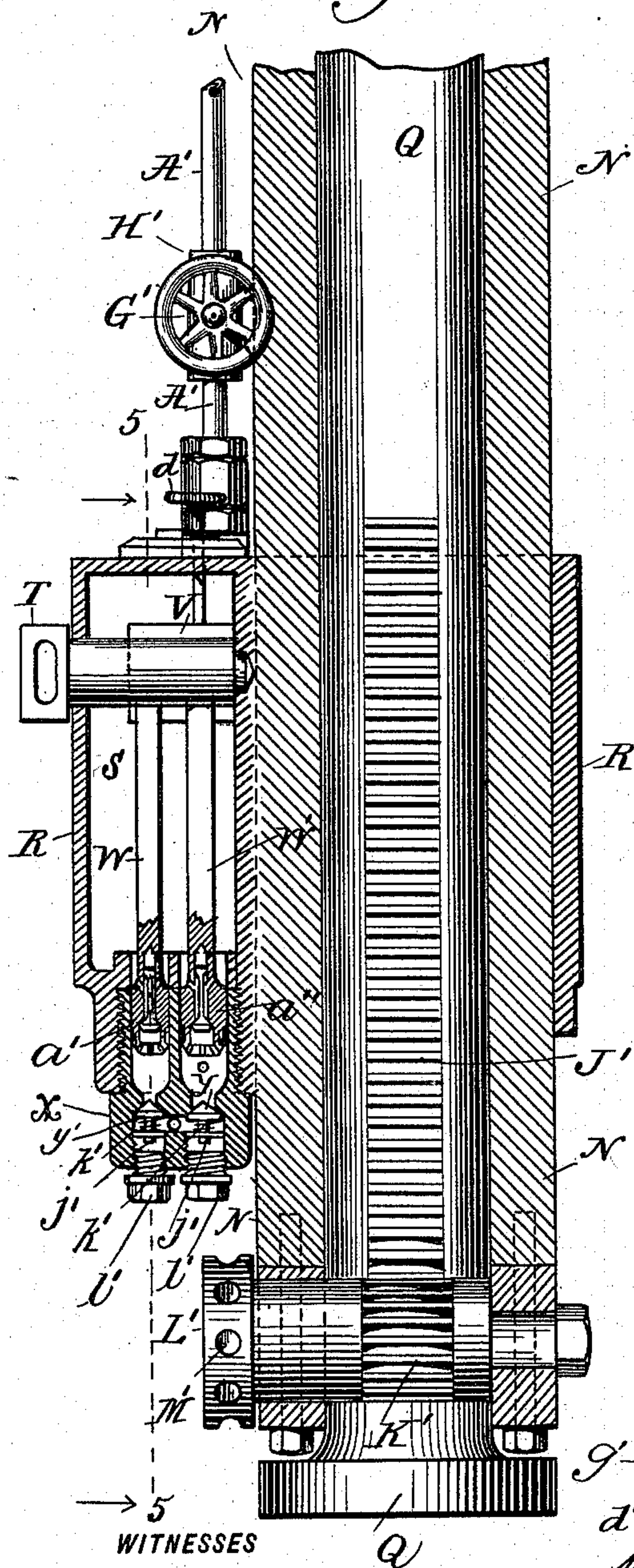


Fig. 6.

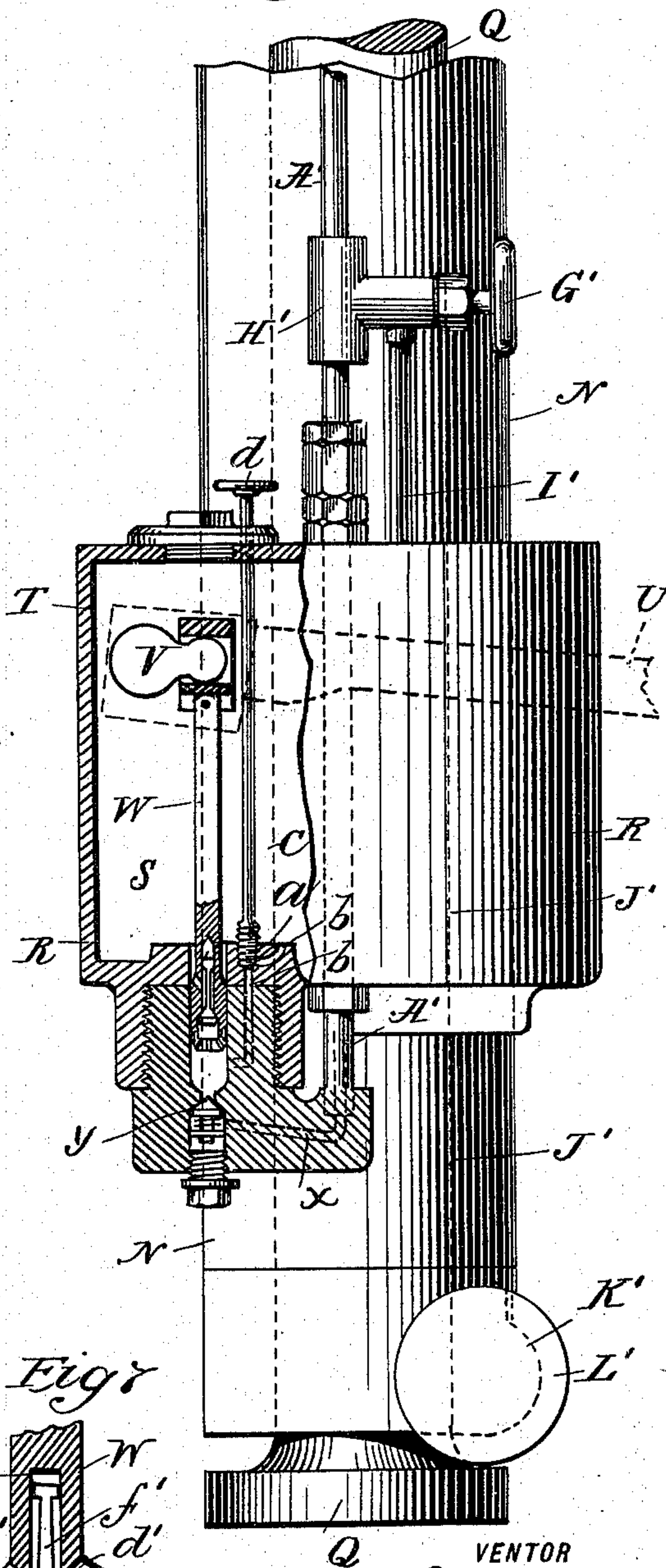
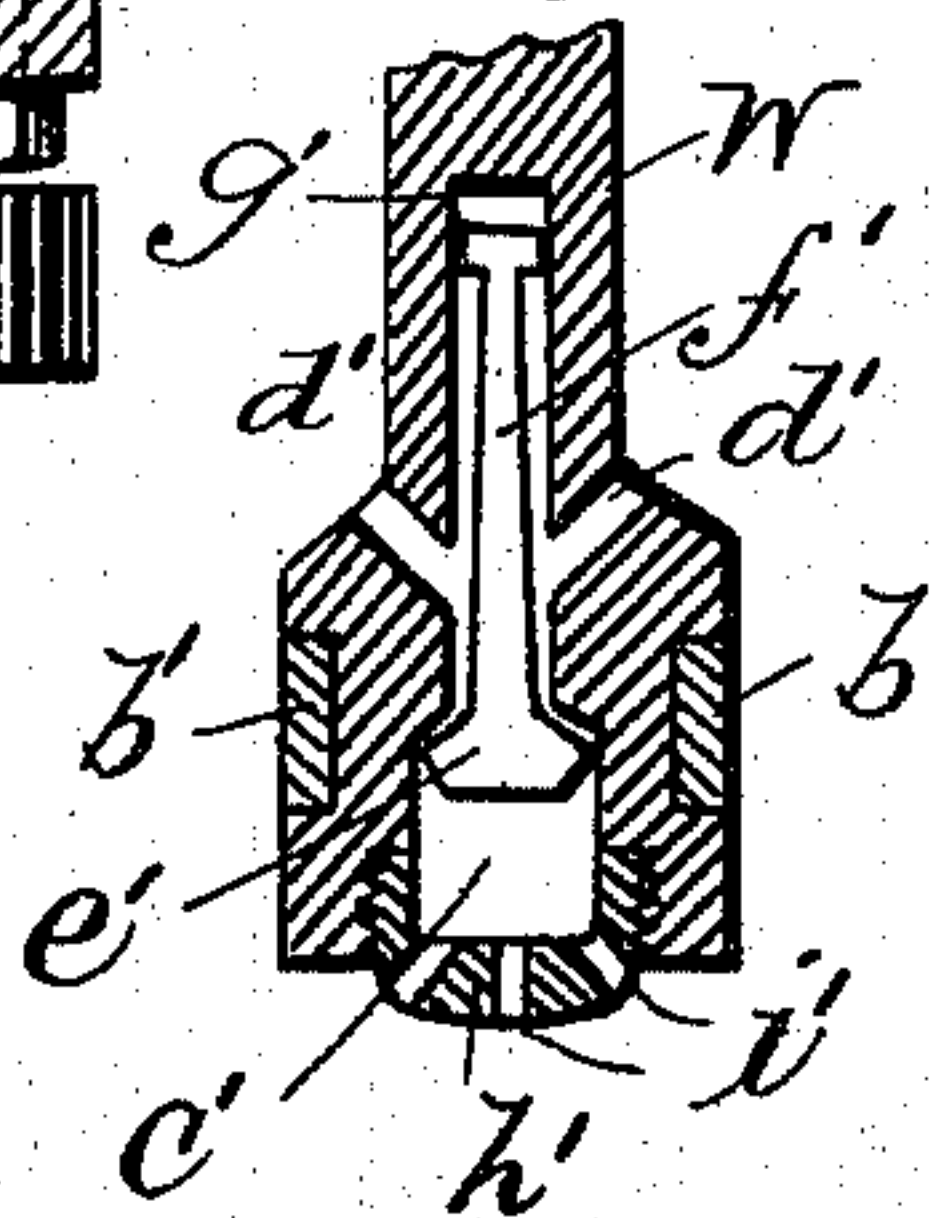


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN WEEKS, OF NEW YORK, N. Y., ASSIGNOR TO JOHN F. DETTMAR,
EXECUTOR OF RICHARD DUDGEON, DECEASED.

HYDRAULIC JACK.

SPECIFICATION forming part of Letters Patent No. 571,547, dated November 17, 1896.

Application filed May 26, 1896. Serial No. 593,120. (No model.)

To all whom it may concern:

Be it known that I, JOHN WEEKS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Hydraulic Jacks, of which the following is a specification.

My invention relates to a novel construction in hydraulic jacks and in certain attachments thereto, whereby they are adapted to be employed as a means for leveling docks and vessels or floats when made fast to the same, these jacks being especially intended by me for use under another invention of mine for which I filed an application for Letters Patent of the United States on November 16, 1895, the same being known as Serial No. 569,153.

The purpose of my invention is to provide a powerful and quickly-acting apparatus adapted to be permanently attached to the front of a dock or float in such manner as to engage with a scow, ferry-boat, or any other vessel when brought up to the dock, so as to secure uniform levels between the two, in order that cars, drays, wagons, &c., may pass from one to the other on substantially even grade.

More particularly described my invention consists in so constructing the jack that it has the following features:

First. Two pumps, both receiving their liquid supply from the same reservoir and both discharging into the same force-chamber. One of these pumps is of very much greater capacity than the other, and means are supplied whereby the larger pump can be cut out and rendered inoperative. Consequently when both of the pumps are in operation the movement of the ram is quite rapid; but when greater power is required to level the dock and vessel then the larger pump being cut out all the force of the pumping-lever is applied to the smaller pump, whereby very much greater power is attained.

Second. Devices are supplied whereby the ram may be returned to its retracted position rapidly.

Third. Attachments are supplied and made part of the jack by reason of flexible connecting devices, whereby the jack may be

pivotally connected to the dock or vessel, as the case may be, by a sort of universal joint, so that movement on the part of either will not occasion jamming in the mechanism, which would result in fracture.

Referring to the drawings, Figure 1 is a perspective illustrating generally the arrangement and relative location of the dock or bridge, the scow, and the leveling-jacks. Fig. 2 is a front elevation of a leveling-jack embodying my invention. Fig. 3 is a side elevation of that which is shown in Fig. 2. Fig. 4 is a partial detail taken on the line 2 2 of Fig. 2. Fig. 5 illustrates a view of the pumps, ram, &c., taken from the same position as Fig. 2 and showing all parts in vertical section excepting the ram, retracting-pinions, and coacting parts, which are shown in elevation. Fig. 6 illustrates a view of the pumps, ram, and coacting parts taken from the same position as Fig. 3. (Shown partially in section on the line 5 5 of Fig. 5 and partially in elevation.) Fig. 7 illustrates a detail in section of the piston of one of the pumps.

A is the permanent or fixed dock.

B is the bridge or floating dock, supported upon a pontoon C.

D are the pivots or other means whereby the floating dock is attached to the fixed dock.

E E are the truss-frames of the floating dock.

F is the scow, barge, or other vessel.

G G are the leveling hydraulic jacks, which form the subject of this invention.

Referring now more particularly to Figs. 2, 3, 5, and 6, and describing a single leveling-jack only, (it being understood, however, that there will ordinarily be two employed at each dock,) H is a bracket fastened to the framing of the dock, or to a post or other framing upon the vessel, as may be preferred, by bolts I.

J is a wheel rotating upon an axis K on the bracket.

L is the bottom plate of the bracket, which is firmly braced by the side pieces and has a concave seat M on its under side.

N is the external cylinder of the jack, which has a rounding head which fits within the concave seat M on the under side of the bracket-plate L. The cylinder is held in place

by a chain O, the lower ends of which engage with a collar P, as shown, or in any other suitable manner. The chain O passes over the wheel J.

5 Q is the ram of the jack, which preferably has an enlarged head at its lower end and extends upwardly within the cylinder N of the jack.

10 R is a cast-iron casing attached to the external cylinder of the jack, preferably at about the place shown, and within which is a reservoir S, (see Fig. 4,) and it is provided at its upper side with a pump-socket T, adapted to receive the pumping-lever U, (see Figs. 3, 15 5, and 6,) and within the casing R is a suitable knuckle V, as usual in hydraulic jacks, and this knuckle operates two pumps W and W'. From the lower end of the pump-chambers of both of these pumps extends the usual 20 egress-passage X, provided with valve Y, and they both connect with a pipe A', which opens through a passage-way B' into the chamber C' (see Fig. 2) between the upper end of the ram and the top of the cylinder. The ram is 25 provided with a suitable packing D', and the upper end of the cylinder is likewise provided with a suitable packing E', which prevents escape of liquid by the sides of the threaded plug F', which closes the upper cylinder.

30 G' is a small hand-wheel which operates a relief-valve H', from which extends a pipe I', which opens into the reservoir by passing through its upper shell.

The front edge of the ram Q is provided 35 with a rack J' and a pinion K', which meshes into the rack, and on the shaft of the pinion a wheel L' is keyed, having sockets M' in it adapted to receive a short lever N', whereby the pinion may be turned.

40 The construction and operation of the pumps and coacting parts in hydraulic jacks is now well understood, but in order that their connections, valves, &c., may be more fully described special reference is made to Figs. 45 5 and 6, in which the general parts are indicated by reference-letters, as in the other figures, but in which the valves, passages, &c., will be found as follows: The pumps *w* and *w'* are each provided with a piston *a'' a''* on 50 their ends. Each of these pistons has a suitable packing *b' b'*. (See Fig. 7.) This may be a hard packing, ring-packing, cup-packing, or in any other form. They are centrally bored, as at *c'*. Passages *d' d'* connect the 55 exterior of the piston on that side presented toward the reservoir with the central recess *c'*, and a valve *e'*, having a stem *f'*, which is received within an upwardly-extending recess *g'*, closes these passages on the downstroke 60 of the pumps. A bonnet *h'*, provided with a number of perforations *i'*, closes the recess in the piston and serves to retain the valve *e'* in position on the upstroke of the pumps, yet permitting free passage of the air. The 65 valves Y Y, at the bottom of the pump-chambers, (see Figs. 5 and 6,) are provided with downwardly-projecting spindles *j' j'* and re-

seating-springs *k' k'*. The bottom of the recesses in which they are respectively placed are closed by screw-blocks *l' l'*, and the egress- 70 pipe S connects with the space within which these valves Y Y are located.

The operation of the device is as follows: Ordinarily on floating bridges or docks chains and windlasses are employed, they being at- 75 tached to a stationary part of the dock structure for the purpose of elevating or depressing the outer or floating end of the dock; but it frequently happens that these devices are not present, and even if they are the dif- 80 ference in elevation of the vessel and the dock will be so great that these chains cannot bring them to a level, so that the dowl-timbers, which are used to maintain the level between them as the train, heavy dray, or the 85 like passes from one to the other, cannot be manipulated or brought to place. The purpose of my invention therefore is to provide means whereby if the chains referred to be wanting, or if when present they cannot ef- 90 fect the proper relation between the two, then my device accomplishes the necessary result as follows: The rams being in their uppermost position, that is to say, entirely or nearly retracted within the cylinders, then the ves- 95 sel is brought up against the dock or bridge and is made fast. Then an operator, preferably upon the vessel, although he may be upon the bridge or dock, if preferred, manipulates the pumps of the jack by means of the 100 pumping-lever U.

The operation of the pumps is too well understood to require detailed description. It may be said, however, that on the upstroke of the pumps the liquid passes from the res- 105 ervoir S into the pump-chambers below the pump-pistons by passing through the passages *d' d'*, the valve *e'* into the chamber or cavity *c'* below the valve, and through the perforations in the bonnet *h'*, and then, upon 110 the downstroke of the lever, the valve *e'* is immediately, by reason of the pressure, clamped back again to its seat, thus preventing the return of the liquid, and by the application of the power through the lever it (the liquid) 115 is forced down through the check-valves Y Y at the lower ends of the pumps, which are unseated by the pressure, into the chambers below these check-valves, and thence through the pipe X into the pipe A' and passage-way 120 B' into the force-chamber C', and as soon as the downward pressure of the pumps ceases the check-valves Y Y are immediately re-seated by the pressure supplemented by the springs *k'*, which are sometimes used and 125 sometimes not, depending upon the construction. In this manner the ram Q is forced downwardly, and the relative position of the bridge or dock, the vessel, and the ram is such that the lower end of the rams, as they descend, 130 will engage with the front edge of the vessel or of the bridge or dock, as the case may be, and the pumping being continued one of them is depressed and the other elevated by the pres-

sure applied by the jacks. When the desired leveling has been secured, the car, drays, or other vehicles or cargo will easily and without shock pass from one to the other.

5 If dowel-timbers are used, they of course will be properly manipulated to maintain the level between the two prior to the passage of the vehicle or other cargo.

10 If, as frequently occurs, wave action or wind or air-currents cause the vessel to sway or move, then the chain and the wheel and the rounded upper end of the jack-cylinder enable the jack to compensate and adjust itself to such movements without injury to
15 or fracture of any part.

I prefer to furnish each jack with the two pumps, one large one and one small one, and I provide the large one with a relief-valve *a*. This valve is seated in the upper end of a little
20 passage *b*, which connects with the lower end of the pump-chamber of the large pump, as shown in Fig. 3, and the spindle *c* of this valve has upon its upper end a small hand-wheel *d*. Both pumps are used during the ma-
25 jor portion of the operation of the jack, so as to secure rapid movement on the part of the ram, and they together exert a power of twenty or thirty tons, more or less, as the case may be, but if that pressure is not sufficient to secure
30 the proper leveling of the bridge or dock with the vessel then, by turning the hand-wheel *d*, the valve *a* will be lifted off of its seat. There will then be a continuous passage *b*, connecting the lower end of the pump-cham-
35 ber with the reservoir, so that the large pump will be entirely cut off, since the liquid which is pumped by it will merely flow back and forth through the passage *b* between the
40 pump-chamber and the reservoir. The little pump, however, will continue operative work, and by means of it a pressure of sixty, eighty, or one hundred tons, more or less, may be brought to bear upon the vessel and the bridge or dock. Of course the power of
45 the jack will be regulated to suit the necessities of each case, the figures above given being examples merely.

After the vessel has been loaded or unloaded, as the case may be, and it is desired
50 to leave the dock or bridge, the jack is released by opening the valve *H'* by means of the hand-wheel *G'*, and the liquid within the cylinder, which is under the upward pressure, is forced out of the chamber *C'*, through the
55 passage *B'*, pipe *A'*, valve *H'*, and pipe *I'*, into the reservoir again, but it will frequently happen that the weight upon the vessel will be such as to depress it so low that its upward pressure will not continue long enough to en-
60 tirely return the ram to its normal elevated position. To complete its return, therefore, a

short lever *N'* may be inserted into the sockets *M'* in the wheel *L'*, and by this means, through the instrumentality of the rack and pinion *J'* and *K'*, the ram will be fully returned 65 to its most elevated position.

It will be understood by those who are familiar with this art that various modifications may be made in the details of construction of my apparatus without departing from the es- 70 sentials thereof. Consequently I do not limit myself to the details which I have shown and described; but,

Having set forth my invention, I claim—

1. The combination of a bracket, a roller 75 supported by the bracket, a plate forming part of the bracket, a hydraulic jack seated against the plate, and a chain which passes over the roller and engages with the upper end of the jack, for the purposes set forth. 80

2. The combination of a bracket, a roller supported by the bracket, a plate forming part of the bracket having a concave side, a jack having a convex head, which engages with said plate, and a chain both ends of which 85 are connected with the jack, and which passes over said roller, for the purposes set forth.

3. The combination of a hydraulic jack having two pumps of differing capacity, a rack on the ram and a pinion on the frame of the 90 jack, a bracket carrying a roller, a plate or bearing for the upper end of the jack, and a chain which engages with the jack and passes over the roller on the bracket, whereby the two structures are permanently connected to- 95 gether, for the purposes set forth.

4. The combination in a jack of a bracket embodying a seat for the head of the jack, a jack, the head of which engages with the seat on the bracket, flexible devices permanently 100 connecting the bracket and the jack, two pumps in the jack of differing capacity, and means to throw the larger pump out of operation, for the purposes set forth.

5. The combination in a jack of a bracket 105 embodying a seat for the head of the jack, a jack the head of which engages with the seat on the bracket, flexible devices permanently connecting the bracket and the jack, two pumps in the jack, of differing capacity, 110 means to throw the larger pump out of operation, and a rack upon the ram of the jack and a pinion on the frame thereof for retracting the ram, for the purposes set forth.

Signed at New York, in the county of New 115 York and State of New York, this 13th day of May, A. D. 1896.

JOHN WEEKS.

Witnesses:

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E. SIMPSON.