

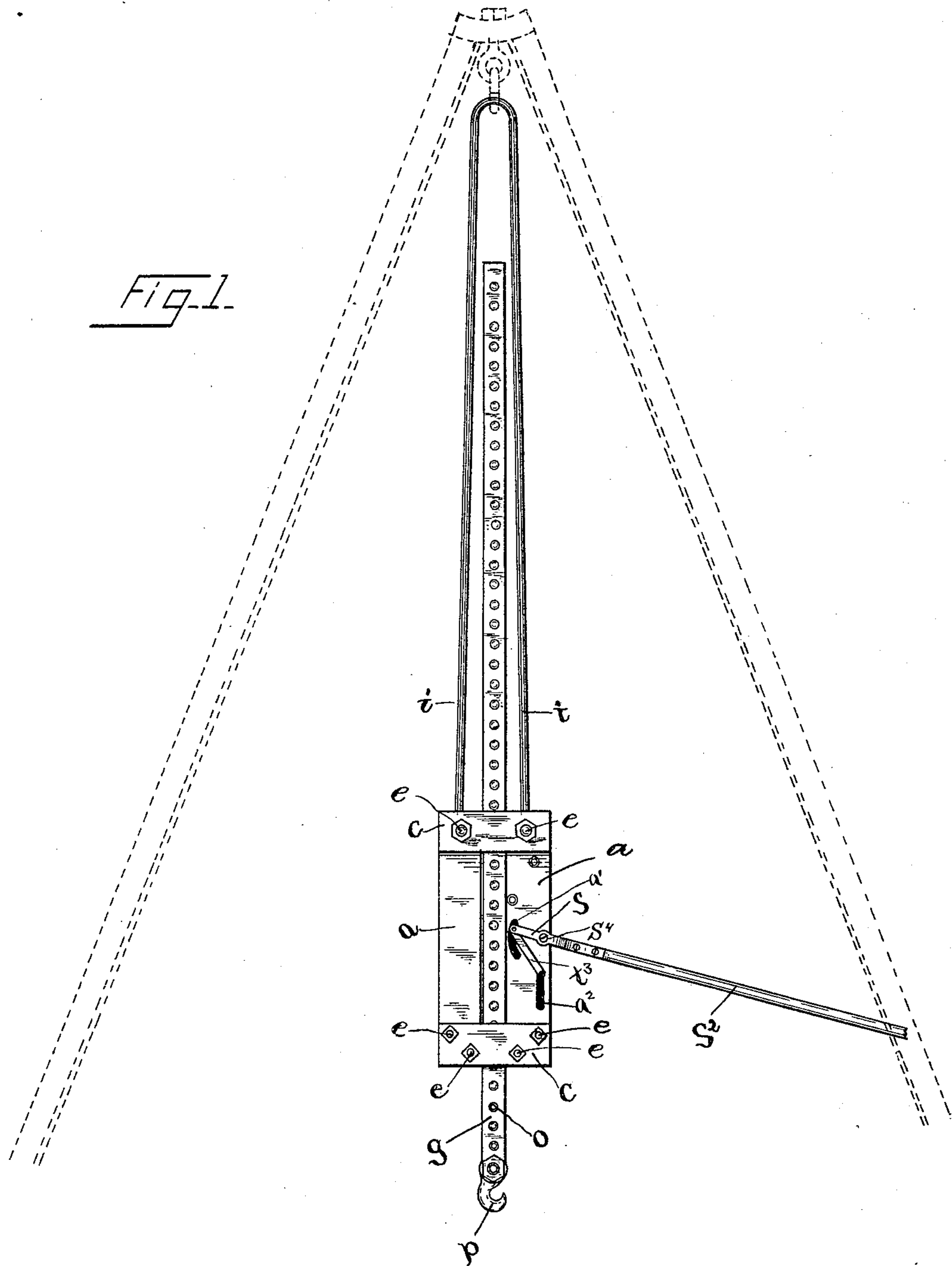
(No Model.)

3 Sheets—Sheet 1.

J. S. CROUCH.  
LIFTING MACHINE.

No. 481,224.

Patented Aug. 23, 1892.



Witnesses

*George W. Luther.*  
*Lila Q. Peale.*

Inventor

*Joseph S. Crouch.*

By his Attorney

*Francis H. Allen.*

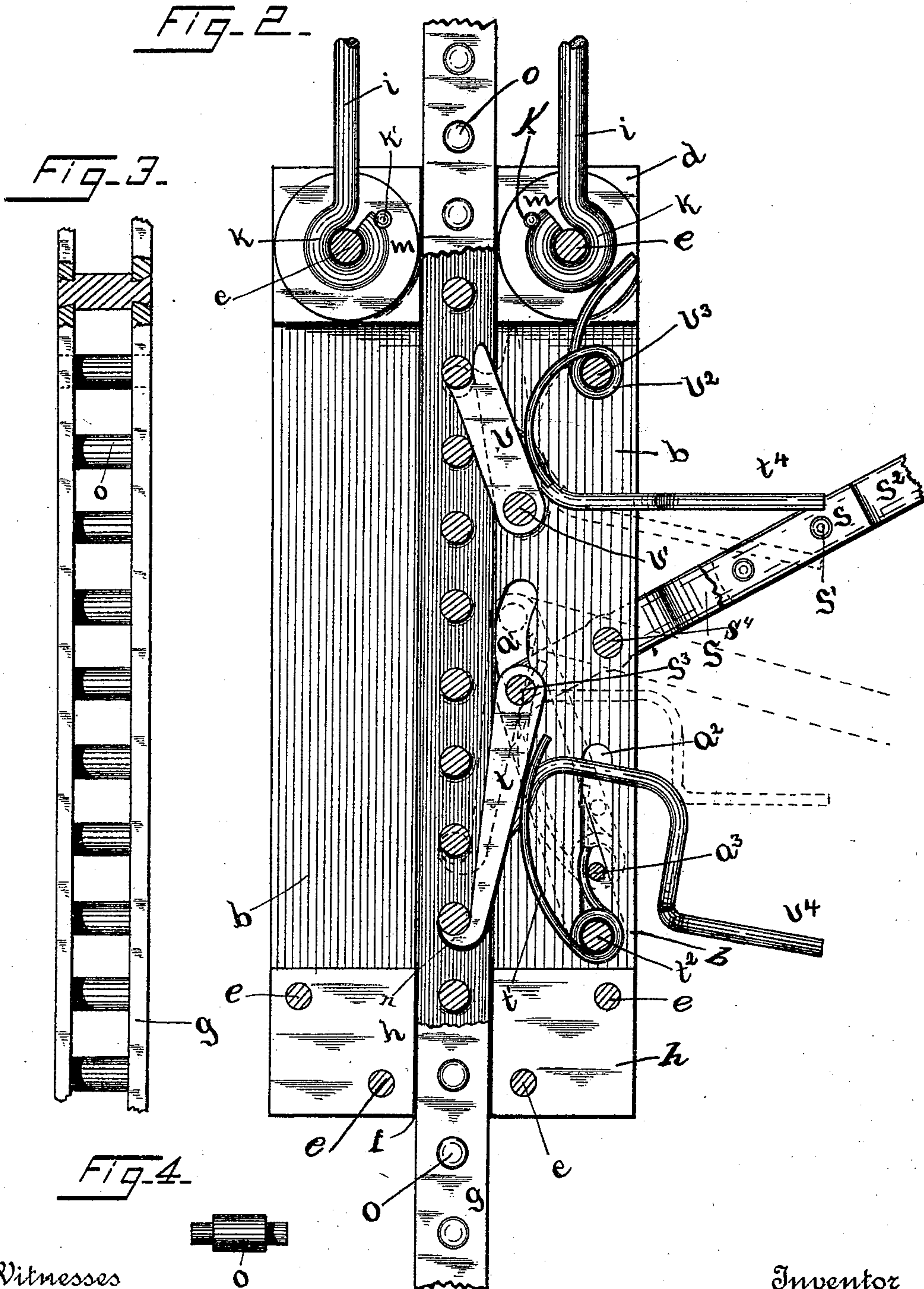
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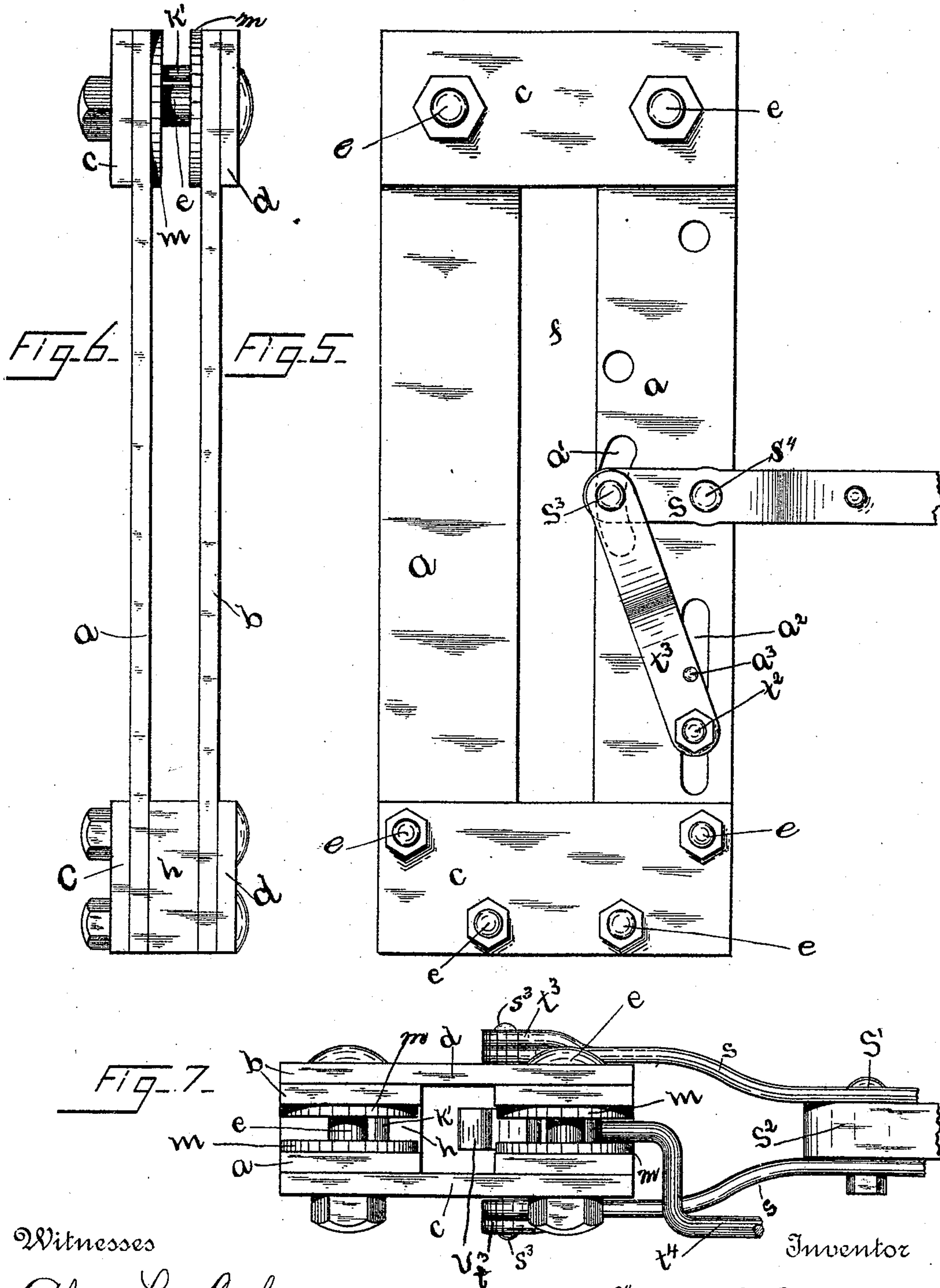
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# UNITED STATES PATENT OFFICE.

JOSEPH S. CROUCH, OF CENTRE GROTON, CONNECTICUT.

## LIFTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 481,224, dated August 23, 1892.

Application filed February 23, 1892. Serial No. 422,425. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH S. CROUCH, a citizen of the United States, residing at Centre Groton, in the county of New London and State of Connecticut, have made certain new and useful Improvements in Lifting-Machines, which improvements are fully set forth and described in the following specification, reference being had to the accompanying three sheets of drawings.

My invention is in the class of lifting-machines specially adapted for raising and handling heavy stones and for pulling stumps and the like articles, and has for its object the production of a machine of moderate cost which shall be simple in construction, extremely light yet strong, and which may be easily operated by a single attendant.

Said invention is in the sub-class of lifting-machines which provides a lifting-bar of notched or rack form and mechanism for actuating the same with a step-by-step movement, and my present improvements relate to the various details of construction rather than to the broad principle.

In the accompanying drawings, Figure 1 is a side elevation of a complete lifting-machine embodying my improvements; and Fig. 2, an enlarged view of portions of the lifting-mechanism, showing particularly the arrangement of pawls, springs, rack, &c. Fig. 3 is a detached view of a portion of the rack, the upper end being shown in cross-section to show the manner of riveting the cross-bars to the side bars. Fig. 4 is a detached view of one of the cross-bars or rivets *o*. Fig. 5 is a side view of the main frame of my machine with portions of the operating-handle in place therein, and Fig. 6 is an edge view of said frame. Fig. 7 is a top end view of said machine with rack and suspension-rod removed.

In the annexed drawings, the letters *a a b b* denote the front and back plates and *c c d d* cross-bars, all forming portions of the framework of my machine and firmly secured together by bolts *e*. The bars *a a* and *b b* are so located and clamped relative to each other that an open space *f* is left between said bars, in which is located a rack *g* of considerable length, which I will describe more fully hereinafter. Between the said bars at their lower ends are interposed plates *h*, that serve to keep

the bars a given distance apart, and thus provide a chamber within which certain operative parts of the machine may be located. The cross-bars *c c* and *d d* are placed upon the outside of the front and back plates or side plates, and are of such a length that when they are secured thereto a space will be left between the inner edges of the plates just wide enough to permit the rack to move vertically therein, and the side plates and the interposed plates *h* are of such thickness that when they are secured together by the bolts of the frame the space between the cross-bars will be just sufficient to permit the rack to move freely between them.

The complete machine is suspended by a rod *i*, doubled back upon itself, as in Fig. 1, having at its ends eyes *k*, which enter between the bars *a b* and surround the bolts *e*. Washers *m* are preferably placed on each side of said eyes, as shown in Figs. 2, 6, and 7. Great strain is brought upon the rod *i* when the machine is at work, and in consequence the eyes *k* are liable to straighten. To prevent such a result, I notch the rod near the ends of the eyes (see Fig. 2) and then pass locking-pins *k'* across said notches and through the washers *m* and bars *a b*. By thus locking the eyes the rod *i* may be formed of much smaller wire than would otherwise be necessary. As the pins only extend through the sides of the frame, they are kept from coming out by the cross-bars, which cover the holes in the plates or sides through which the pins pass.

My complete machine when in use is preferably supported by a tripod of any suitable construction.

The rack *g* is formed of two bars of considerable length connected by a multiple of short cross-bars *o*, that are shouldered down at each end to enter corresponding holes in the side bars of the rack, and when so entered the ends of the bars *o* are riveted over, as shown at the upper end of Fig. 3. By making the bars of the rack of the same thickness as the thickness of the front and back pieces the inner surface of all three of the pieces will be even and the pawls which are located between the front plates will fit between the bars of the rack and engage with the rungs or cross-bars *o* of the rack. This manner of construction provides a rack of great strength with



the least possible weight of metal. The lower end of the rack has secured to it any convenient form of hook  $p$ , by means of which a chain or rope may be attached.

5 Fulcrumed on plates  $a b$ , about midway of their lengths, by means of a pin or bolt  $s^4$  are levers  $s$ , between whose outer ends is firmly secured by bolts  $s'$  a long handle  $s^2$ . The inner ends of levers  $s$  are connected by a bolt  
10 or short shaft  $s^3$ , that extends through a curved slot  $a'$  in the side plates  $a b$ , the said slot being curved as an arc of a circle whose center is also the center of the fulcrum of the levers  $s$ .

15 Hung on bolts  $s^3$  is a pendent arm  $t$ , whose lower end is formed as a hook  $n$ , that is of suitable size and shape to hook under the cross-bars of the rack. Said hook is held normally in engagement with the rack by a spring  
20  $t'$ , (here shown as a simple piece of spring-wire coiled around a bolt  $t^2$ , carried by arms  $t^3$ , extending downward from bolt  $s^3$ , the bolt  $t^2$  being located in and guided by vertical slots  $a^2$  in the machine-frame.) One end of  
25 said spring bears against the arm  $t$ , the other end being held by a rod  $a^3$  in the arms  $t^3$ . (See Figs. 2 and 5.) At the upper portion of the machine-frame is a stop-pawl  $v$ , hung on a bolt  $v'$ , and also adapted to engage success-  
30 ively the cross-bars of the rack as the latter is moved upward. This pawl  $v$  is forced into engagement with said rack by a wire spring  $v^2$ , coiled about a bolt  $v^3$ , having one end bearing against said pawl  $v$  and having the other  
35 end resting against one of the eyes  $k$ . (See Fig. 2.) The arm with a hook  $n$  may be termed the "working" or "operating" pawl and the pawl  $v$  the "locking" or "holding" pawl, for the reason that when the handle  $s^2$  is grasped and  
40 forced downward the arm  $t$  is correspondingly raised and carries upward with it the rack-bar until such time as the upper pawl snaps under a tooth of the rack. The operating hook or pawl  $t$  may be lowered to en-  
45 gage the next tooth, the upper pawl  $v$  meanwhile holding the rack and its load. By repeatedly raising and lowering the operating-handle  $s^2$  the teeth or bars of the rack may be successively engaged, and the rack-bar  
50 thus raised with a step-by-step movement, and by providing a very long operating-handle very heavy objects may be lifted with comparative ease.

It frequently happens that it is necessary  
55 to lower the rack-bar, and in order to do this quickly I have secured to the upper and lower pawls, respectively, arms  $t^4 v^4$ , (here shown as made of strong wire bent to shape,) which  
60 arms extend outward beyond and in front of the frame within easy reach of the operator. By means of these described releasing-arms  $t^4 v^4$  the pawls may either or both be withdrawn from the rack-bar and the latter lowered the whole or a portion of its length. Af-  
65 ter the rack has been lowered the pawls are released and at once slip in and engage with the cross-pieces of the rack. As the inner

surfaces of the rack-bars are even with the side pieces, there is no danger of the pawls catching on the edge of the bars of the rack, and thus being kept out of engagement with the cross-pieces of the rack. By making the rack as above described it is reversible—that is, it may be placed in the frame either side front—thus rendering it more convenient  
75 than it would be if it had the teeth all formed on one edge in position to be engaged by the pawls, and in case the lower end of the rack becomes broken the rack may be turned end for end, as the pawls will engage with the  
80 cross-pieces whichever end is up, which is not the case with a notched-edge rack, in which the notches must each have a flat and an inclined face for the purpose of engaging or being engaged by the pawls.

My device is simple in construction, not easily disarranged or broken, and of such weight and lifting-power that it may be readily operated and transported by a single man.

Having described my invention, I claim—

1. In a lifting-machine, the combination, with a frame the upper portion of which is provided with two bolts, and the side plates each provided with a hole adjacent to each of the bolts, said holes being covered by the cross-pieces of the frame, of a supporting-rod  
95 doubled upon itself and the ends formed into eyes which surround the bolts and each eye having its outer surface provided with a notch near the end, and a locking-pin through each hole of the plates and through each notch of the eyes, substantially as set forth.

2. In a lifting-machine, the combination, with a frame comprising front and rear side pieces, top and bottom cross-pieces, and interposed plates at the bottom of the side pieces, whereby a space is formed between the opposite cross-pieces and the top and rear side pieces, respectively, of a rack within said space, comprising two perforated bars, the inner faces of which are even with the inner  
105 faces of the side pieces, a series of cross-bars secured in the perforations of the perforated bars, an operating and a retaining pawl pivotally secured between the front side pieces, the free ends of which are adapted to pass the joint between the edges of the rack and the side pieces and engage with the cross-pieces of the rack, and a lever for moving the operating-pawl, substantially as set forth.

3. In a lifting-machine, the combination, with the frame, each side of which is provided with two slots, one of which is curved, of a vertically-movable rack within the frame, a bifurcated lever pivotally secured to the side of the frame, the inner ends of said bifurcation being connected by means of a bolt through the curved slot, a hook pivotally secured upon the bolt within the frame, two arms or links pivotally secured to the bolt upon the outside of the frame, the free ends of which are connected by means of a bolt through the other slot, a spring upon said last-mentioned bolt, the free end of which en-  
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gages with the pawl upon the first-mentioned bolt, and a retaining-bolt within the frame for engaging with the rack, substantially as set forth.

- 5 4. In a lifting-machine, the combination, with a frame, of a rack therein, a lever pivotally secured to the frame, the inner end of which is provided with a bolt, a retaining-pawl within the frame, and an arm secured

to each pawl, said arms extending toward the 10 outer end of the lever, whereby they may be operated and the pawls withdrawn from the rack and the rack be permitted to descend, substantially as set forth.

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Witnesses:

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