

(No Model.)

J. H. BLAKE.
STEAM HAMMER.

No. 405,072.

Patented June 11, 1889.

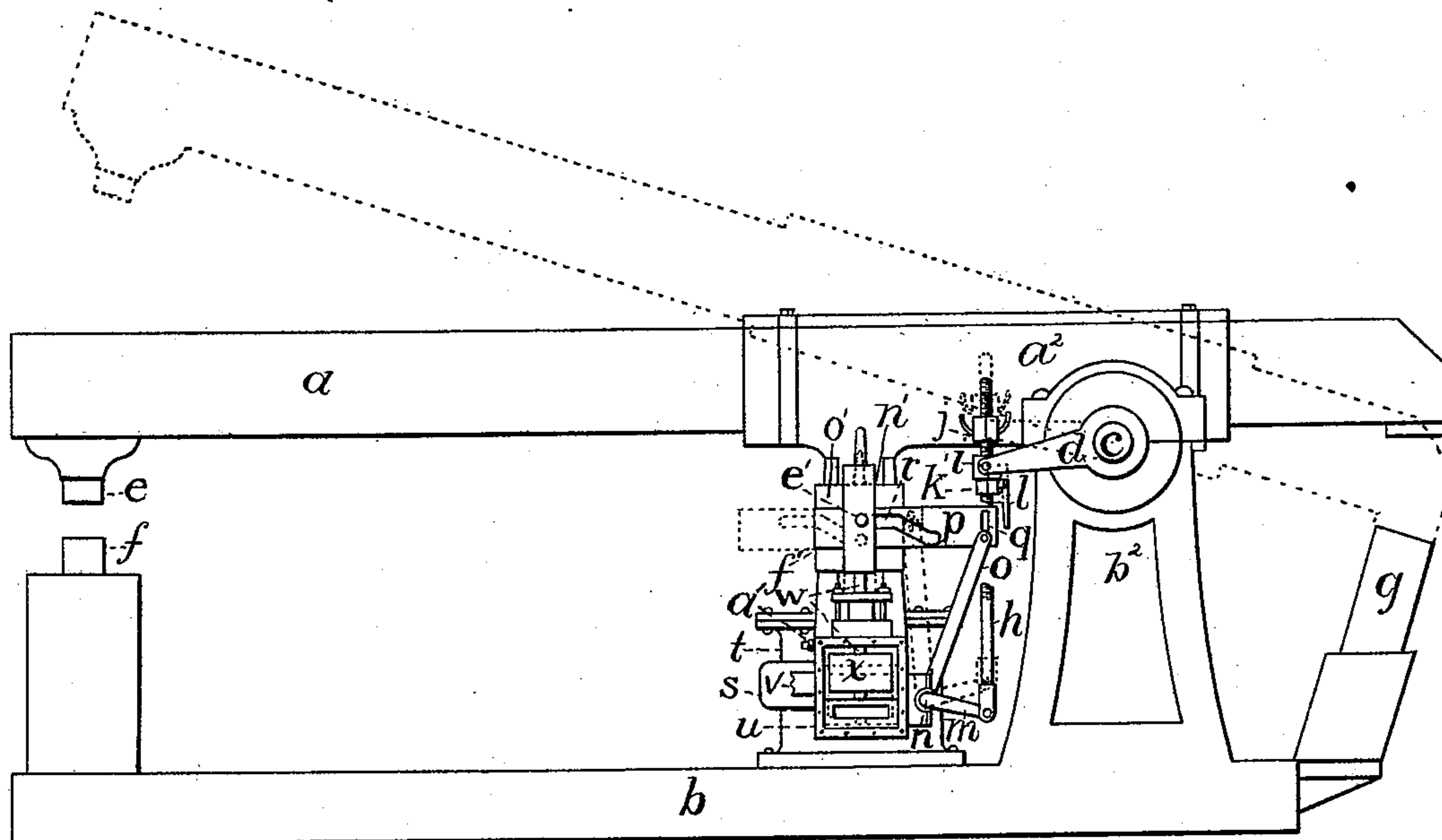


Fig. 1.

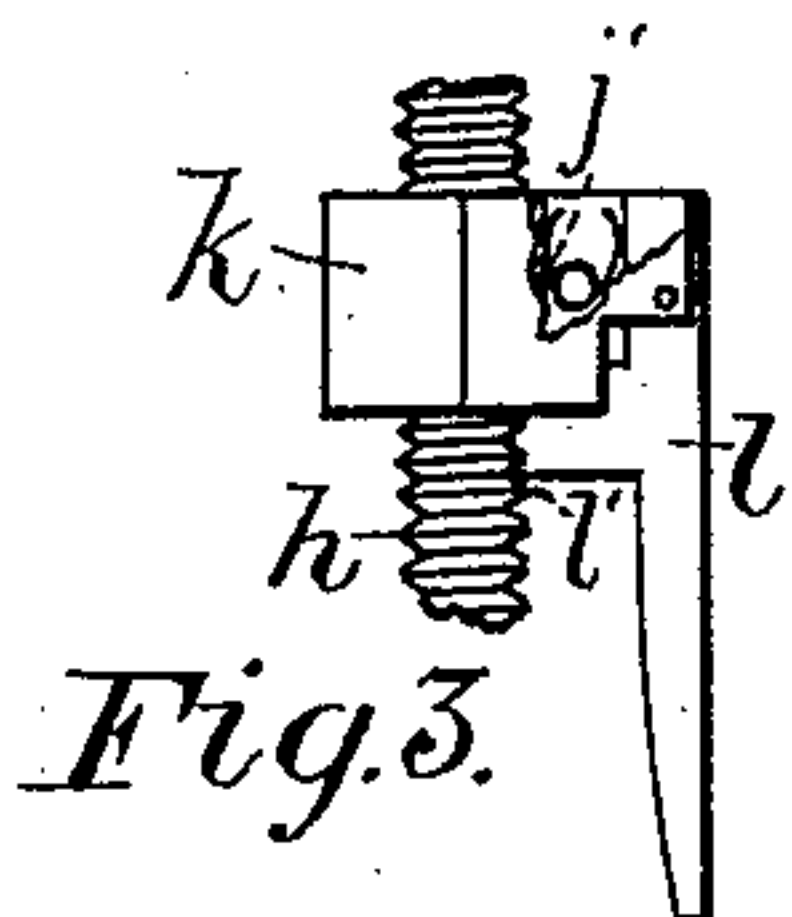


Fig. 3.

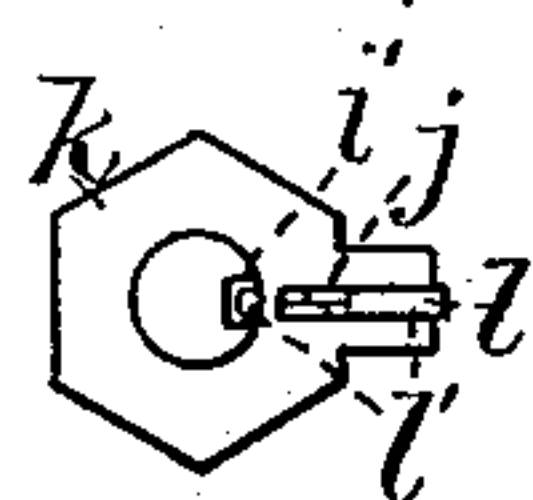


Fig. 4.

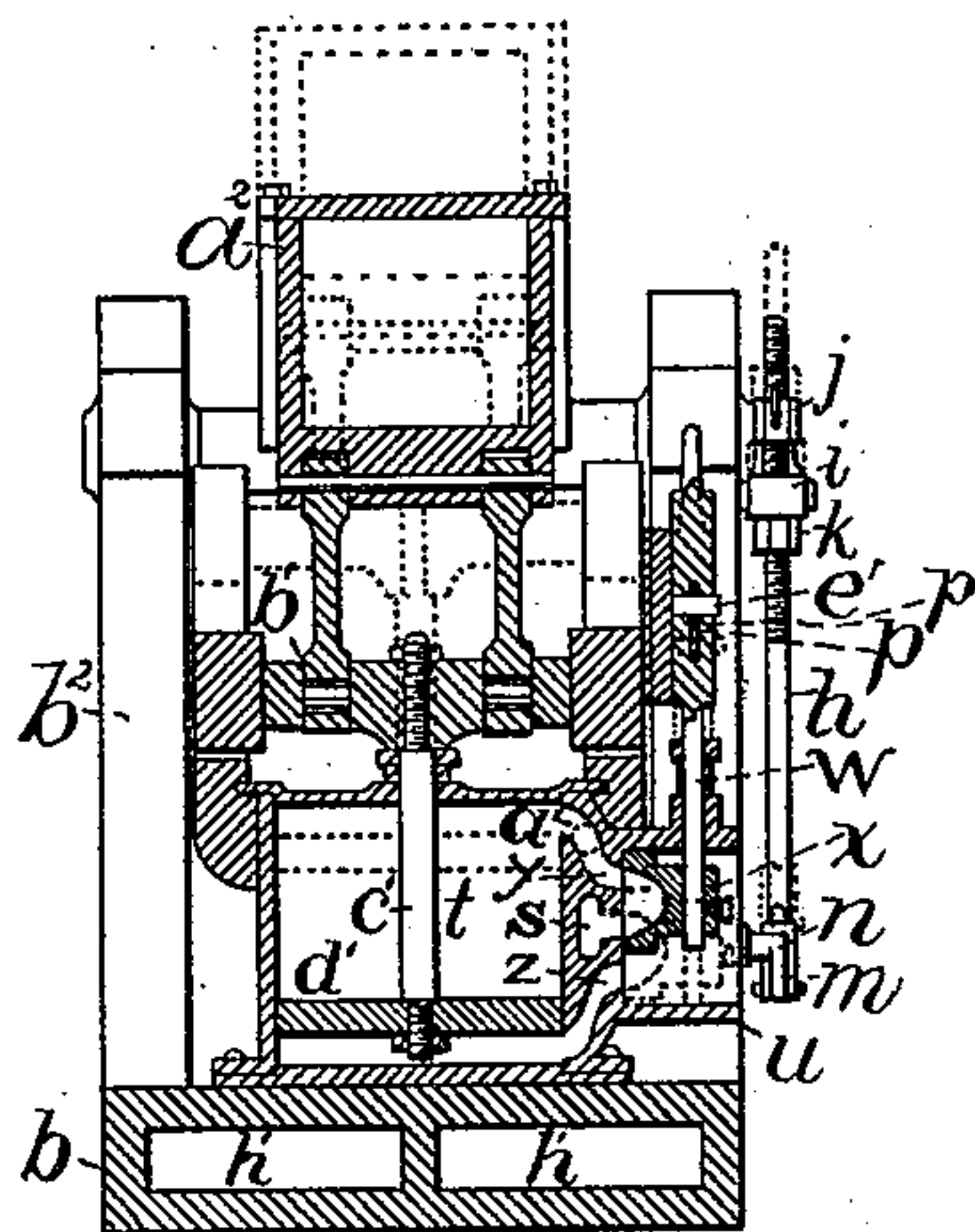


Fig. 2.

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UNITED STATES PATENT OFFICE.

JOHN H. BLAKE, OF DEERING, MAINE.

STEAM-HAMMER.

SPECIFICATION forming part of Letters Patent No. 405,072, dated June 11, 1889.

Application filed March 9, 1889. Serial No. 302,696. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. BLAKE, of Deering, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Steam-Hammers; 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, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in steam-hammers, and pertains more especially to mechanism for regulating the operation of the valve in the steam-chest, for regulating the supply of steam on top of the piston and thereby the force of the blow, and for preventing the breaking of the bed-plate.

In the drawings herewith accompanying, Figure 1 is a side elevation of my improved hammer, certain parts being removed; Fig. 2, a cross-section of Fig. 1 on line 1 1. Figs. 3 and 4 are details showing nut-lock, and same letters refer to like parts.

The helve *a* is mounted on a trunnion *c*, either directly or in a husk or sleeve *a*², which is mounted on the trunnion. The trunnion *c* is journaled in the standards *b*² upon the bed-plate *b*. Upon the bed-plate at the end is the anvil *f*, and over the anvil and attached to the helve is the hammer proper *e*. The block *g*, behind the standards *b*², serves to limit the upward movements of the hammer.

In front of the standards and beneath the helve is a cylinder *t*, having piston *d*' and piston-rod *c*'. The piston-rod is connected with the cross-head *b*', and said cross-head is attached to the helve or husk, as seen in Fig. 2. At the side of the cylinder is a steam-chest *u*, in which is valve *x* and valve-stem *w*. From the steam-chest ports *y* and *z* lead into the cylinder, port *y* above the piston and port *z* below. The steam-chest has also the supply-pipe *v* and the exhaust *s*. The valve-stem *w* extends upwardly, passing through the vertical hole *n*' in the block *o*', and has the horizontal slot *p*' and the bolt *e*' passing through stem and slot *p*'. The block *o*' has a horizontal groove *f*'. In groove *f*' runs a horizontal slide *p*, having therein a slot *r*.

The slide *p* passes through the slot *p*' in the stem *w*, and the bolt *e*' passes through the slot *r* in the slide, as seen in Fig. 2. The slot *r* is horizontal at each end and inclined in the middle. In the end of slide *p* is a slot *q*. Attached to slide *p* by a bolt free to move up and down in slot *q* is a lever *o*. The lever *o* is pivoted at its lower end on a rod *n*, having the arm *m*. Pivoted to the end of the arm *m* is an upright rod *h*, with a screw-thread cut on its upper end. An arm *d* is rigidly attached to the trunnion *c*, having on its outer end a pivoted clasp *i*, through which the vertical rod *h* passes. On the rod *h* is a nut *j* above the clasp and a nut *l* below said clasp. The nut *k* below the clasp should have a nut-lock to hold it securely in any given position. This lock may have the form shown in Figs. 3 and 4, in which *i*' is a groove in the rod, *k* the nut, *l* the lock having finger *l*' adapted to enter groove *i*', and *j*' a spring constantly tending to hold the finger clutched in the groove *i*'. When the bed-plate is made solid, it requires a great amount of metal to prevent it from breaking. In order to secure lightness combined with strength, I make the bed-plate with one or more hollow places *h*', extending longitudinally, as shown in Fig. 2.

My invention having now been fully described, I will proceed to explain its operation.

The hammer being in the position shown in Fig. 1, the steam enters the steam-chest, passes through port *z* into the cylinder, and forces the piston upward, the piston-rod driving the hammer upward until it reaches the position shown by dotted lines in Fig. 1. The upward movement of the hammer turning on the trunnion *c* raises arm *d*, and with it the rod *h*, and thus throws forward the lever *o* and the slide *p* through slot *f*' in block *o*'. The inclined slot *r*, in which bolt *e*' of the valve-stem runs, raises the said stem and the valve the distance between the two horizontal ends of the slot *r*, which distance should be just sufficient to open and shut the ports *y* and *z* alternately. This means of operating the valve *x* prevents any strain on the valve, and also prevents the valve from getting too far below or too far above the ports, because as soon as the hammer is raised sufficiently to open the ports the valve ceases to rise, in-

asmuch as the end of slot r is horizontal. In order to regulate the downward blow of the hammer, I introduce into the port y , through which steam enters the cylinder on top of the piston, a shut-off valve a^2 , which should be adapted to shut off the port y gradually to any desired extent. The form or shape of valve a^2 is not essential so long as it will close to a greater or less extent, as desired, the port y . To regulate the length of each stroke of the hammer, I place nuts j and k the one above and the other below the clasp i on rod h .

Having thus described my invention and its use, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a steam helve-hammer having a bed-plate and supporting-standards, a helve-hammer mounted on a trunnion journaled in said standards, a steam-cylinder with piston and piston-rod, a cross-head connecting piston-rod and helve, a steam-chest with ports opening into the cylinder one above the other below the piston, a valve adapted to open and close the ports alternately, and a valve-stem adapted to move up and down in a stem-hole in a fixed block, said stem having a vertical slot therein, the combination, with said stem, of a horizontal slide moving in said block and passing through the slot in the valve-stem, said slide having a slot therein, as described,

to operate the valve, a lever attached to said slide, and a vertical rod attached to an arm on the lever, said rod being operated by an arm rigidly fixed on the trunnion, all substantially as and for the purposes hereinbefore set forth.

2. In a steam-hammer having cylinder, piston, piston-rod, cross-head connecting helve and piston-rod, a steam-chest with ports opening one above the piston the other below, a valve adapted to open and close said ports alternately, a valve-stem running in a fixed block o , as described, the combination, with horizontal slide p , having slot r , lever o , attached to slide p in slot q , rigid arm m , attached to lever o , vertical rod h , attached to arm m and having a screw-thread at the top, and arm d , rigidly set on trunnion c and having the pivoted clasp i , of nuts j and k , the one above the other below the clasp i , substantially as and for the purposes hereinbefore set forth.

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

JOHN H. BLAKE.

Witnesses:

LEVI O. VERRILL,
ELGIN C. VERRILL.