

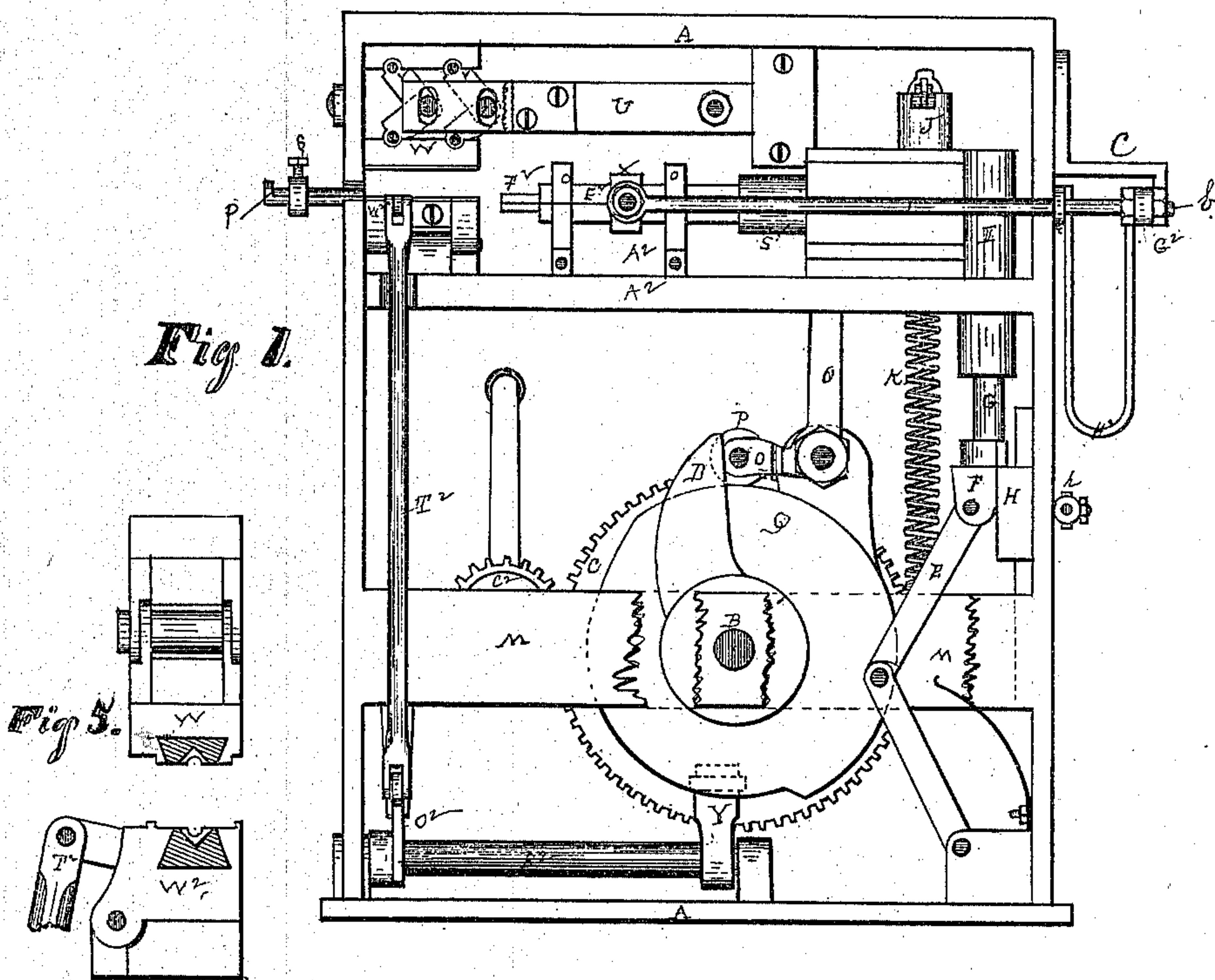
Hull & Thomas,

2. Sheets. Sheet. 1.

Heading Bolts.

No. 112248.

Patented Feb. 28. 1871.



Witnesses

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Wm. H. West

INVENTORS.

Thomas Hull  
Nicholas Thomas



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Fig 2.

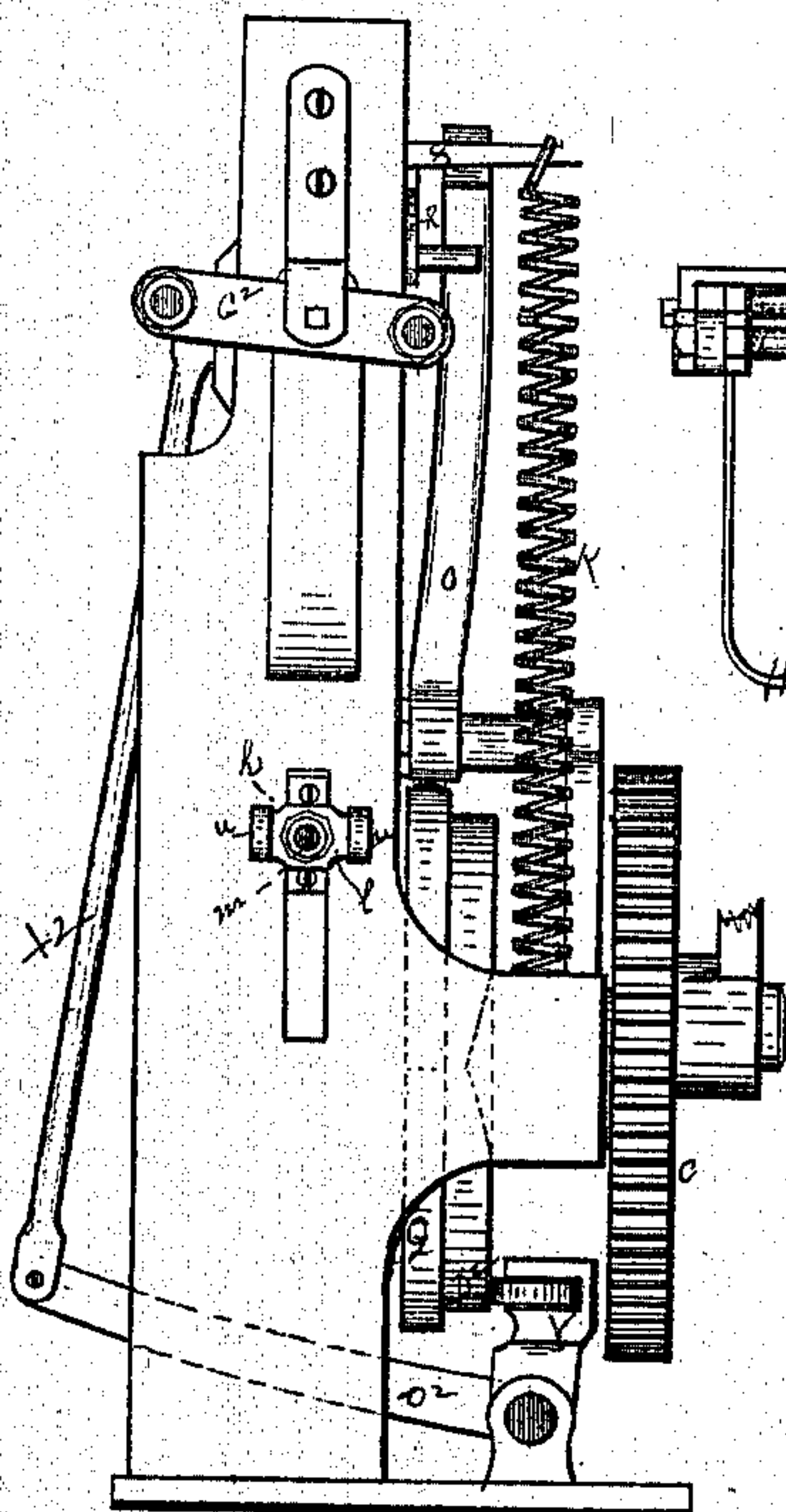


Fig 3.

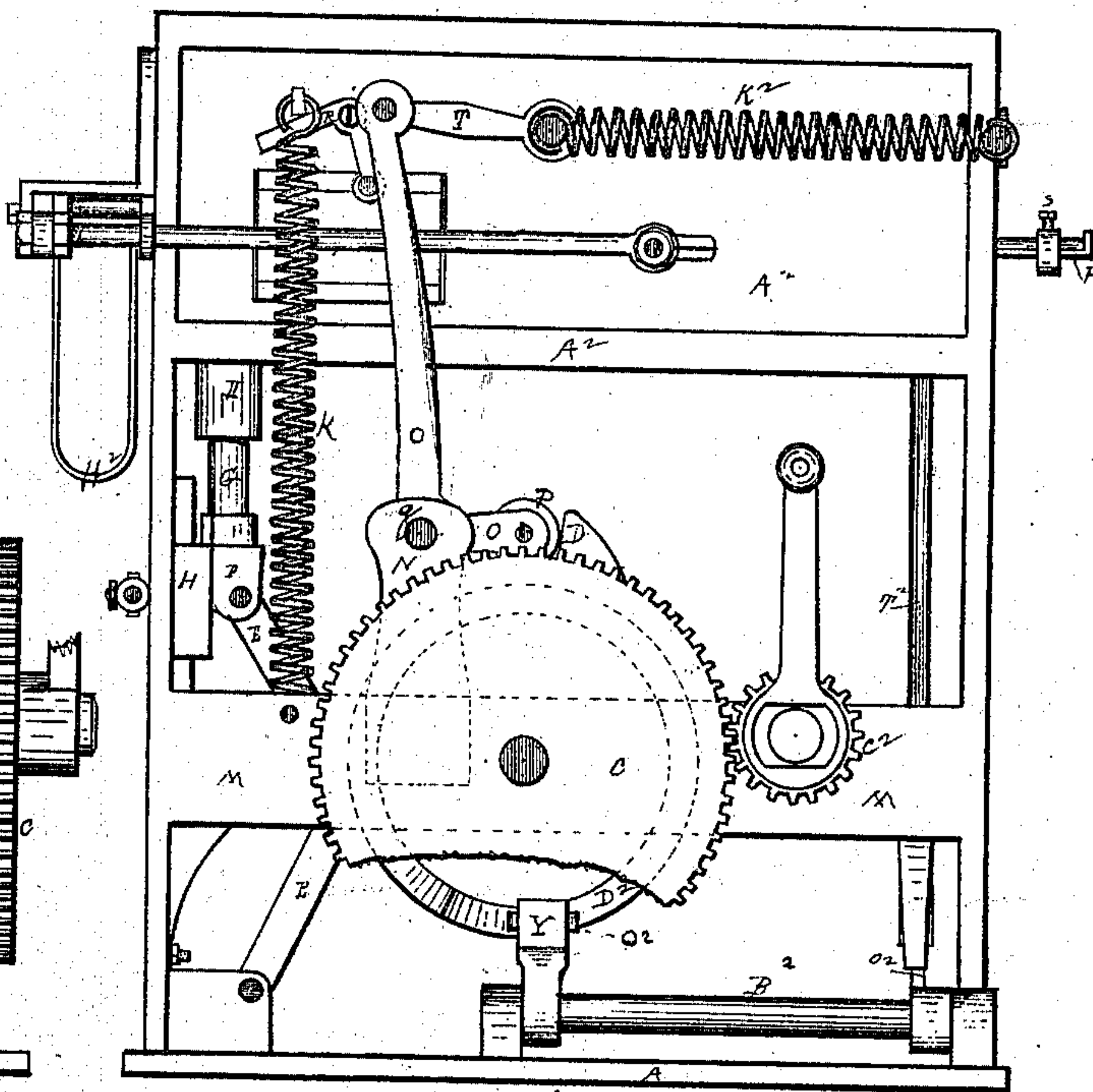
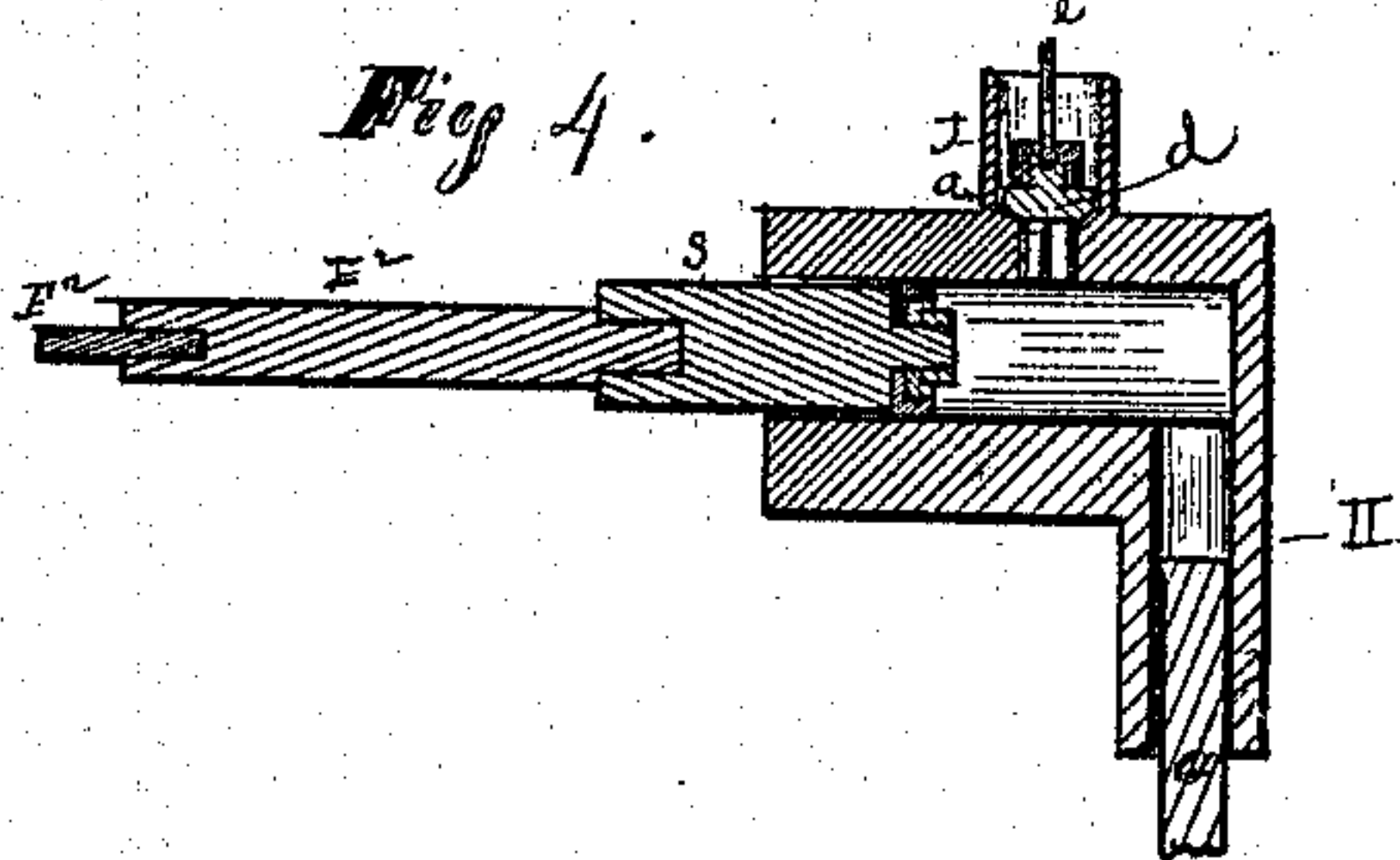


Fig 4.



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# UNITED STATES PATENT OFFICE.

THOMAS HULL AND NICHOLAS THOMAS, OF CHICAGO, ILLINOIS.

## IMPROVEMENT IN BOLT-HEADING MACHINES.

Specification forming part of Letters Patent No. **112,248**, dated February 28, 1871.

*To all whom it may concern:*

Be it known that we, THOMAS HULL and NICHOLAS THOMAS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Making and Heading Bolts; and we do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1, Plate 1, is a side elevation, showing those parts of the machine which are at the left hand in Fig. 2. Fig. 2, Plate 2, is an end view of the same. Fig. 3, Plate 2, is a side elevation, showing those parts of the machine which are at the right hand in Fig. 2. Fig. 4, Plate 2, is a vertical longitudinal central section of the press employed in operating the heading-tool; and Fig. 5, Plate 1, is a vertical transverse section of the dies employed in shaping the bolt-head.

Similar letters of reference indicate corresponding parts in the several figures of the drawing.

The object of our invention is to provide a mechanical device by the use of which the end of the bolt may be upset and pressed to any desired shape, whereby the head is formed upon the same; and the nature of our improvement consists, first, in the employment of a hydraulic press for operating the heading-tool; and, second, in the dies which form the bolt-head, and the manner of operating the same, a description of which will be hereinafter more fully given.

In the accompanying drawing, A is the frame of the machine, and B the main or driving shaft. Said shaft is extended across from side to side of the frame, and provided on its outer end with a gear-wheel, C, which engages with a gear-pinion, C<sup>2</sup>, to which power is applied for operating the moving parts of the machine. Fixed upon said shaft B is a cam, D, which comes in contact with or against a buckle-jointed lever, E, the lower end of which is hinged to the lower portion of the frame, and at the upper end to the lower end of guide F, secured to plunger G of the pump.

Said guide is dovetailed to and moves upon a vertical guide or way, h, secured to the main frame.

Attached and firmly secured to the central portion or partition, A<sup>2</sup>, of frame A is a hydraulic press, I, into which plunger G of the pump passes. Said press is provided upon its upper side with a reservoir, J, which communicates with the press by means of an aperture, a, cut through the upper surface of the cylinder of the same. The orifice of said aperture is provided with an escape-valve, d, the shank of which is socket-jointed to the valve-stem e. Said valve-stem extends upward, and is pivot-jointed to lever f, which is hinged to the upper side of said reservoir and extends horizontally across the same through partition A<sup>2</sup>, and is provided at its outer end with or attached to a spiral spring, K, which extends downward to cross-piece M of the frame, and is secured thereto. Attached to said cross-piece is a vertical upright, N, which is provided at its upper end with a horizontal pivot, g, upon which is fitted an L-shaped lever, O. To the end of the lower and horizontal portion of said lever is fitted an anti-friction wheel, P, which traverses the periphery of a cam-wheel, Q, on shaft B, whereby the upper end of said lever receives an oscillating movement. Attached to said partition at or near the upper end of lever O is a rock-shaft, R, which communicates with said lever and lever f of the reservoir. Thus, as said lever O is moved backward by the action of cam-wheel Q, valve d is raised upward, and the cylinder of the press is filled with water preparatory to an outward movement of the piston S of the press. Attached to the upper end of said lever O is a pitman, T, to which is connected a horizontal slide, U. Said slide moves in guides or ways recessed within said partition, and is attached at its outer end to the center of buckle-jointed levers V V', the upper ends of which are hinged or jointed to the top portion of the frame, and at their lower ends to the upper or moving die-block, W.

Thus, as the upper end of said lever O is tilted backward by the cam on wheel Q, said die-block is raised vertically by the traversing of wheel P upon the annular surface of cam-wheel Q, and, as said wheel P passes over the



inclined surface of the cam, lever O is tilted forward by the recoiling of spring K<sup>2</sup>, which is attached to the end of said pitman and to the side of the frame, whereby said levers V V' are thrown to a vertical position, thus forcing die-block W downward against the upper side of the lower die-block, W<sup>2</sup>. Said block W<sup>2</sup> is hinged to the frame in a manner admitting of an automatic reciprocal movement with block W.

Attached to the outer side of said block W<sup>2</sup> is a pitman, T<sup>2</sup>, which extends obliquely downward, and is hinged to the outer end of lever O<sup>2</sup> on rock-shaft B<sup>2</sup>. Said shaft is supported by suitable bearings secured to the lower portion of the frame. Attached to the inner end of said shaft is a vertical lever, Y, which is provided at its upper end with an anti-friction wheel, P<sup>2</sup>, which traverses the side of the rim of cam-wheel D<sup>2</sup> on shaft B. The arrangement of said cam is such as to tilt the outer end of lever O<sup>2</sup> downward when die-plate W is at its highest vertical position adjusted by the action of cam-wheel Q. Thus die-block W<sup>2</sup> is tilted automatically forward from a horizontal to a vertical position.

Fixed to the outer side of guide F of the pump-plunger is a pivot, h, which extends through slots i cut vertically in the upright of the frame. Upon said pivot, at or near its outer end, is a cross-head, l, secured thereon by means of nut m. Fixed upon the end of said cross-head are auxiliary wheels u u, so arranged as to traverse upon said upright, the object of which is to impair the downward movement of the pump-plunger as cam D recedes from lever E.

Attached to die-block W<sup>2</sup> is a gage, P, so arranged as to admit of being adjusted to any desired point, and firmly secured in position by means of collar and set-screw s, the object of which is to govern the length of bolt.

Piston S of the press comes in contact with and against slide E<sup>2</sup>, which receives the heading-tool. Said slide moves in guides o o, secured to partition A<sup>2</sup> of the frame. Secured to said slide is a collar, x, to the outer end of which are attached pitmen 1 and 2. Said pitmen extend horizontally outward through guide r, fixed to the upright of the frame, and are provided at their outer ends with a cross-head, G<sup>2</sup>, to which is pivoted spring H<sup>2</sup>, said spring forcing the piston of the press backward as the pump-plunger recedes, bringing said cross-head in contact with or against set-screw b, secured in the lower end of bracket C, whereby the thickness of the bolt-head is governed, as the stroke of the press-piston is in all cases the same from its starting-point, said starting-point being regulated by the length of set-screw, whereby the distance between the end of the heading-tool and shoulder of the header is increased or diminished, as re-

quired; or the same may be adjusted by means of a collar on the outer end of the piston which comes against the end of the cylinder of the press, said collar and piston being screw-threaded to admit of an easy adjustment.

The reservoir of the press may be supplied with water by means of suitable pipes leading from a second reservoir or from a hydrant. (Not shown in the drawing.)

In arranging the machine for the heading of different-sized bolts, the central or shaping portion of the dies are changed, being fitted into a dovetailed recess in the main die-blocks, which admit of the same.

The operation of our machine is as follows: The iron of which the bolt is made, being properly heated, is placed in die W<sup>2</sup>, and power is then applied to pinion C<sup>2</sup>, which communicates with lever O through the medium of cam-wheel Q and gear-wheel C on shaft B, allowing wheel P of said lever to pass the cam. Said lever is then tilted forward by means of spring K<sup>2</sup>, forcing die-block W downward by the action of slide U and levers V V', thus upholding the bolt between the compressible sides of the dies. Cam D of shaft B is then thrown in contact with or against jointed lever E, forcing plunger G into the pump, whereby the pressure of the water is thrown against piston S of the press, forcing heading-tool F<sup>2</sup> into the die. Thus the bolt is upset and pressed to proper shape, forming the head. As the required amount of pressure is received upon the bolt escape-valve d is raised and the water escapes into reservoir J. Heading-tool F<sup>2</sup> and piston S are then withdrawn by means of spring H<sup>2</sup>. As cam D recedes from lever E die-block W is adjusted. Lever O<sup>2</sup> is then tilted downward by the action of cam-wheel D<sup>2</sup> against wheel P<sup>2</sup> of said lever, which communicates with die-block W<sup>2</sup> by means of pitman T<sup>2</sup> tilting the same to a vertical position, and the bolt is discharged from the machine.

Having thus described the nature and object of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of die-blocks W W<sup>2</sup>, levers V V', pitman T<sup>2</sup>, lever O<sup>2</sup>, and rock-shaft B<sup>2</sup>, all constructed and arranged as described.

2. The combination of the U-shaped spring H<sup>2</sup>, cross-head G<sup>2</sup>, bracket C, pitmen 1 2, the collar-arms X, and header F<sup>2</sup>, when arranged substantially in the manner and for the purpose specified.

The above specification of our invention signed by us this 1st day of September, 1870.

THOMAS HULL.  
NICHOLAS THOMAS.

Witnesses:

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E. A. ELLSWORTH.