H. RUDDICK.

RIVET-HEADING MACHINE.

No. 182,962. Patented Oct. 3, 1876.

Fig: 1.

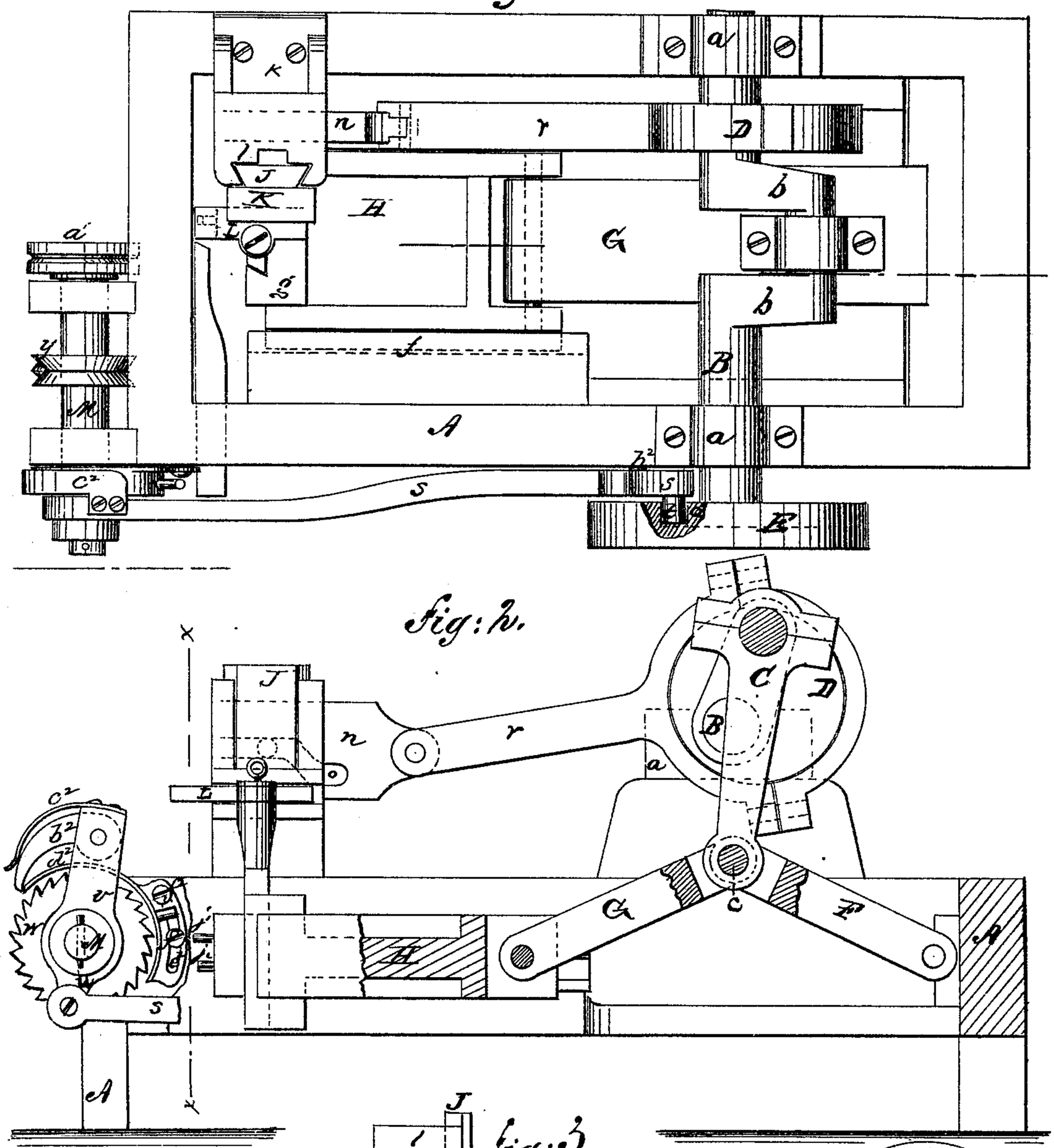


Fig: 2.

Fig: 4.

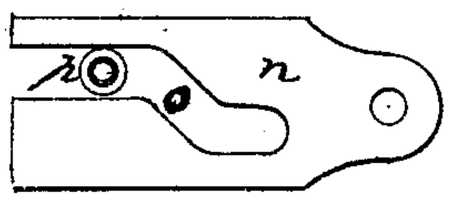


Fig: 3.

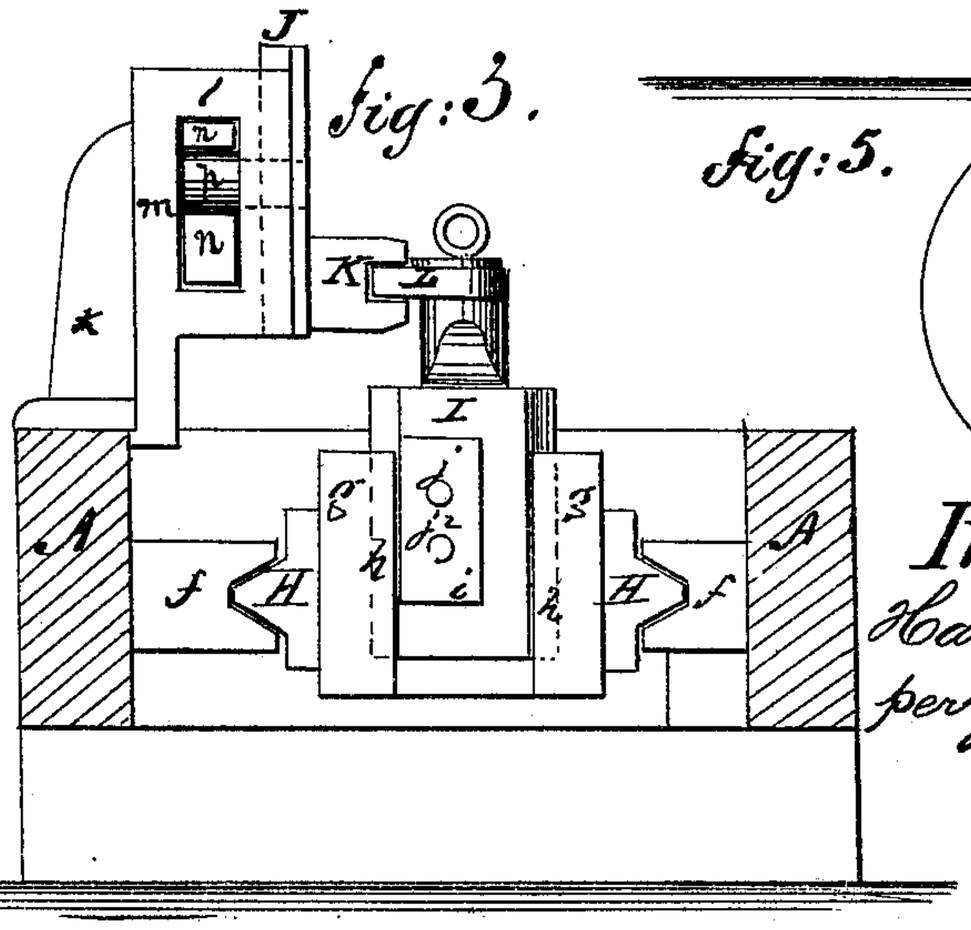
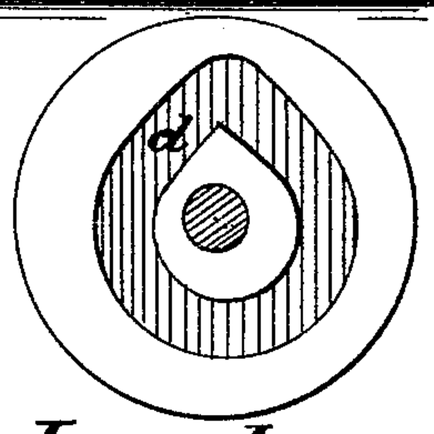


Fig: 5.



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UNITED STATES PATENT OFFICE

HAMILTON RUDDICK, OF WATERBURY, CONNECTICUT, ASSIGNOR TO BLAKE & JOHNSON, OF SAME PLACE.

IMPROVEMENT IN RIVET-HEADING MACHINES.

Specification forming part of Letters Patent No. **182,962**, dated October 3, 1876; application filed February 14, 1876.

To all whom it may concern:

Be it known that I, HAMILTON RUDDICK, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and Improved Machine for Heading Rivets; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention is in the nature of an improvement in machines for heading rivets; and the invention consists in a machine for heading rivets constructed with two punches capable of a reciprocating and vertical motion, but so arranged and combined that the vertical motion shall be suspended while the punches are making a horizontal thrust.

In the accompanying sheet of drawings, Figure 1 is a plan or top view of my machine; Fig. 2, a side view of same, partly in section; Fig. 3, a cross-section through the line *x x*, Fig. 2; Fig. 4, a detail view of cam in plate, and Fig. 5 a detailed view of cam in driving-wheel.

Similar letters of reference indicate like parts in the several figures.

In machines for making rivets, particularly such as form the head, the heading has been performed generally by one punch, which, by a series of horizontal thrusts, would upset the metal on the end of the wire from which the rivet was made, and in this way form the head; but since the motion was simply a reciprocating horizontal one, the punch would barely give sufficient time to adjust the wire, unless its motion was too slow to be profitable. Besides, in forming the head on a rivet with the aid of but a single punch, it is difficult to form the head true and perfect, because the thrusts of a single punch must of necessity be of the same stroke or throw at the beginning of the heading operation as at the end, the result of which is that the metal is apt to be upset more on one side than the other, and an imperfect head in this way formed.

By my invention these difficulties are obviated, and a greater degree of certainty is had in forming up the rivet-head, besides facilitating the operation, and at the same time admitting of sufficient opportunity to adjust the wire and remove the rivet, as will be seen from the following description.

A represents the supporting base or frame, and B the driving-shaft, properly supported, and secured in bearings *a*. This shaft is constructed with double cranks *b*, or it may have any similar mechanical device for changing a revolving to a reciprocating motion; and also secured to the shaft B is an eccentric, D, and a driving-wheel, E, having formed on its inner surface or face a cam, *d*. Suitably attached to the cranks *b*, and extending downward, is a connecting-link, C. Within the frame A, and to its rear inner face, is secured a link, F, which link is attached to a second link, G, by a knuckle-joint, *c*, to which knuckle-joint is affixed one end of the connecting-link C. The other end of the link G is attached to the rear end of a sliding block, H. This sliding block rests in guides *f*. To the front end of this block H is secured a block, *g*, with a slideway, *h*, formed in its face, and into this slideway is fitted a plate, I, to the face of which is affixed a block, *i*, and to this last-named block are attached two punches, j^1 j^2, one of said punches being slightly longer than the other.

Secured to the upper side of the frame A, supported by a suitable bracket, *k*, is a slideway, *l*, into which is fitted a sliding plate, J, and to the lower end of this sliding plate is affixed, at right angles to it, a slide, K, into which is fitted a sliding plate, L, which last-named plate is secured to the head of the sliding plate I. Passing into a suitable slot, *m*, formed in the bracket *k*, is a plate, *n*, into which is made an irregular slot, *o*, making a cam. To the rear of the sliding plate J is fastened a pin, *p*, which enters into the irregular slot or cam *o*. Suitably fastened to the plate *n* is an eccentric rod, *r*, through which the plate *n* is operated by means of the eccentric D. To the outer side of the frame A is attached a lever, *s*, one end of which is provided with a pin, *t*, and the other end of which is secured to one end of a connecting rod or arm, *u*. The other end of this arm extends and is attached to an arm or lever, *v*, which revolves on a shaft, M. Onto this shaft, and adjoining the arm or lever *v*, is a ratchet-

wheel, w, and a friction-wheel, y, and a feed-wheel, a^1, and immediately below this first-mentioned shaft M is a second shaft, with corresponding friction-wheel and feed-wheel. To the upper end of the arm or lever v is secured a pawl, b^2, and spring c^2. Partially surrounding the ratchet-wheel w is a guard-plate, d^2, with a curved slot, e^2, through which pass one or more set-screws, f^2.

My machine for heading rivets being constructed substantially as above described, its operation is as follows: Motion being applied in any suitable manner to the shaft B, it is caused to revolve, and motion thereby imparted to the links F and G through the connecting-link C, and, as these links are alternately drawn up and forced down by the action of the cranks b, a reciprocating motion is imparted to the block H, which is thereby caused to slide or reciprocate within or on the guides f, alternately thrusting and withdrawing the punches j^1 j^2 in a horizontal position, so that, as the wire to form the rivet is fed by the action of the feed-wheels or rollers a' through the frame A and into contact with these punches, the head is formed; but, since two punches are employed, one of which being slightly longer than the other, as before stated, it is necessary that these punches be brought alternately in contact with the end of the wire to form the head of the rivet, the shorter punch making the first blow or impression, and the longer punch the last or finishing blow.

It is necessary that the punches have a second motion imparted to them—such as a vertical motion—which will alternately bring the punches in position, and, since it is important that the horizontal thrusts or blows of the punches should be straight and direct, in order to form the perfect rivet-head, the vertical motion must not influence the directness of the thrust. To accomplish this, as the punches are thrust forward by the action of the sliding block H, just as the sliding block begins to advance, the irregular slot or cam o in the plate n, operated by the eccentric D, acts upon the pin p on the sliding plate J, causing the slide J to descend, and, by so doing, forcing downward the plate I, bringing the uppermost punch j^1 in position to deliver a blow to form the rivet-head, and, as the slide H is drawn back through like action of the pin, cam, and slide, the lower punch is brought in position to deliver a blow, and so on, alternately, first one punch and then the other is brought in position; and, to avoid influencing the direct thrust of the punches, as would be the case if the vertical motion and horizontal motion were simultaneous, the slot or cam o in the plate n is arranged so as not to influence the vertical movement at the time the punches deliver their blows, and for a short time before and after the blows are delivered. This not only enables the punches to deliver square horizontal blows, but alsd gives sufficient time for adjustment of the wire, and removal of the rivet after the head is formed.

That no obstacle may be permitted to interfere with the horizontal thrust of the punches, the connection between the plate I bearing the punches and the slide J is made by the slide K, secured at right angles to the lower part of the slide J, and the sliding plate L working therein and secured to the head of the plate I, so that the horizontal thrust of the punches and the action of the sliding block H, and the other operating parts of the machine, may not be interfered with, since this connection moves simultaneously and parallel with the motion of the sliding block H.

As the driving-wheel E revolves, the cam d acts upon the pin t, causing the lever s to oscillate on a pivot, h^2, by which motion is communicated, through the connecting arm or rod u, to the arm or lever v, so that each oscillation of this arm causes the pawl b^2 to alternately advance and retreat, each advance engaging into a ratchet-tooth, as with ordinary pawl-and-ratchet movements, thereby imparting motion to the upper feed-wheel a^1, which in turn imparts motion to the lower feed-wheel by reason of the friction-wheels y. Now, as it is important that the rate of feed shall be regulated, I inclose a portion of the ratchet-wheel w with a guard-plate, d^2, so that, as this guard-plate is permitted to cover more or less of the surface of the ratchet-wheel, the pawl b^2 will be prevented from engaging into the teeth of this wheel, or such of them as are covered by the guard-plate. Therefore, as the guard-plate is advanced, the pawl is restricted in its action to the first ratchet-tooth beyond the edge of the plate, the position of the edge of the plate determining the engagement of the pawl. The position of the plate is governed by the slot e^2 and set-screws f^2. The guard-plate d^2 possesses another feature in its application—that is, it prevents injury to the teeth of the ratchet-wheel by the friction of the pawl as it travels over them.

It is obvious that gear-wheels may be substituted instead of friction-wheels for operating the feed-rolls.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a machine for heading rivets, the combination of a horizontally-reciprocated punch-carrier, H, vertically-reciprocated punch-adjuster J, slotted plate n, eccentric rod r, and knuckle-jointed links F G, arranged and cooperating substantially as and for the purpose specified.

HAMILTON RUDDICK.

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