

C. HALL.

Machines for Heading Bolts.

No. 141,711.

Patented August 12, 1873.

Fig 3

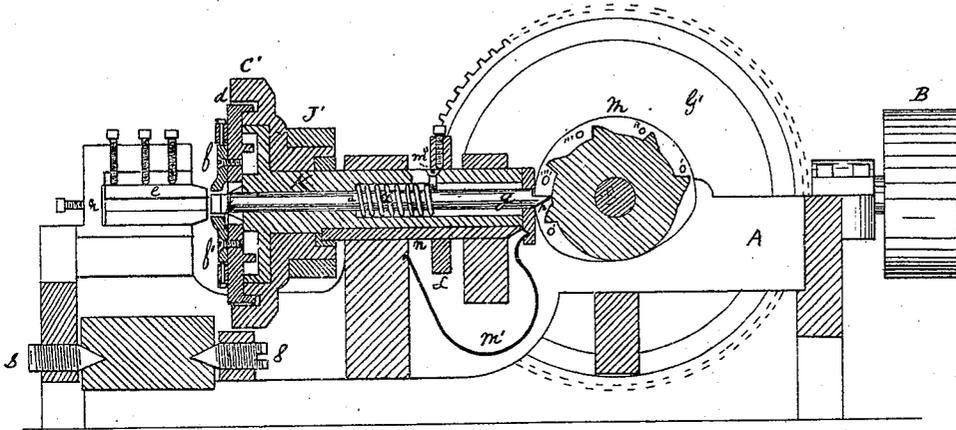
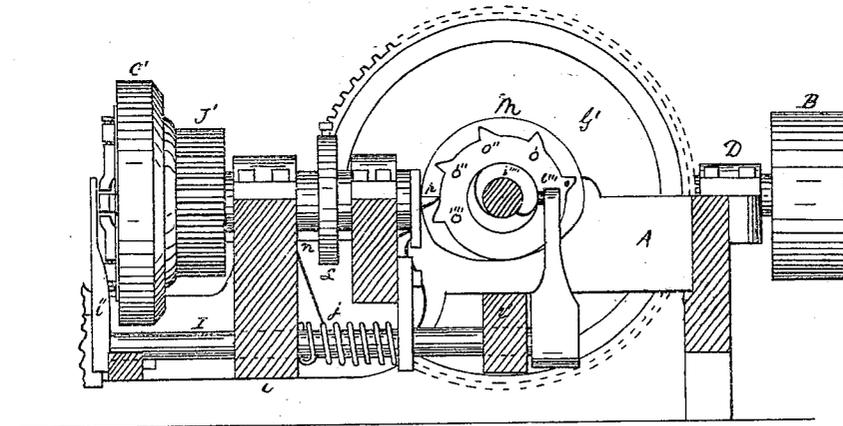


Fig 4



Witnesses
 Wm. B. Ladd
 J. M. Hicks

Inventor
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 by his atty
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Fig 5

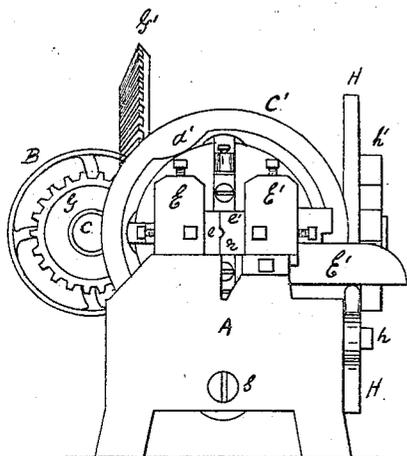


Fig 6

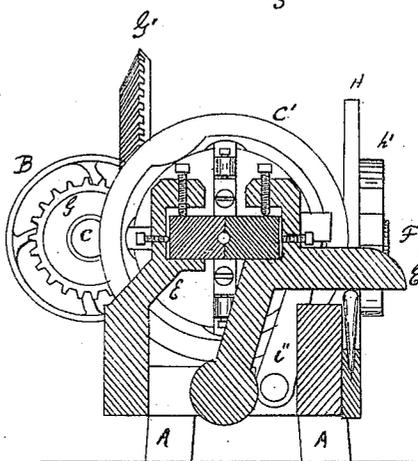


Fig 7

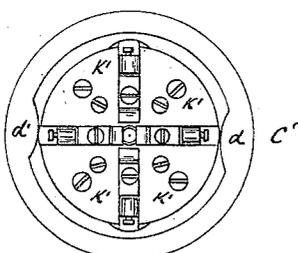


Fig 8

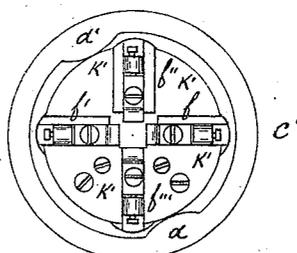
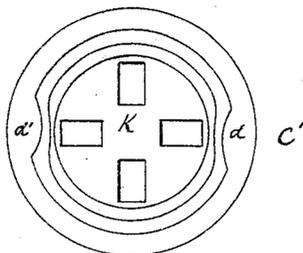


Fig 10



Fig 9



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES HALL, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR HEADING BOLTS.

Specification forming part of Letters Patent No. 141,711, dated August 12, 1873; application filed February 7, 1873.

To all whom it may concern:

Be it known that I, CHARLES HALL, of the city, county, and State of New York, have invented a new and useful Improvement in Machinery for Heading Bolts; and I do hereby declare that the following is a full, clear, and exact description and specification of the same.

The object of my invention is to obtain an automatic bolt-heading machine, simple, compact, and capable of rapid movements, to produce headed bolts of more uniform quality and more rapidly.

My invention consists in certain combinations of mechanical devices and instrumentalities, whereby the desired result is obtained, and which are specifically set forth at the close of this schedule.

To enable those skilled in the art to fully understand, construct, and operate my invention, I will proceed to describe its principal parts, referring to the accompanying drawings making part of this specification, in which—

Figure 1 is a side view of the machine. Fig. 2 is a top or bird's-eye view of the same. Fig. 3 is a vertical longitudinal section on the line 1 2. Fig. 4 is a vertical longitudinal section on the line 3 4. Fig. 5 is a front-end view of the machine. Fig. 6 is a vertical cross-section through the jaws and dies. Figs. 7, 8, 9 are front views of the face-plate of the shaft K, showing the side hammers $f f'$ and $f'' f'''$, the sleeve C' and its cams $d d'$, the plates for the ways for the side hammers, and the end of the heading-bar g . Fig. 10 shows a side view of the side hammer f .

A is the solid frame-work of the machine, resting on legs, to sustain the entire machine. B is the driving-pulley, attached to the shaft C, and revolving in the bearings D D'. E E' are the jaws, provided with dies $e e'$, for holding the heated rod or bar on which the head is to be formed by the blows of the reciprocating side hammers $f f'$ and $f'' f'''$, and the horizontal reciprocating header g . F is a horizontal cross-shaft, having bearings in the frame A, and driven by the shaft C through a pair of bevel-gears, G G', the latter keyed to the shaft F, and in this instance containing four times as many teeth as the gear G, keyed

to the shaft C. H represents a lever, having its fulcrum at h , and reaching to the cam h' on the end of the shaft F, its toe h'' following its configurations. The motions imparted to the lever H at the point h''' are communicated to the movable jaw E' through the upright h'''' , causing it to open, close, and remain closed at the proper times. The rocking and sliding shaft I is hung in the bearings $i i'$, and is furnished with a lever, i'' , on its end near the dies, actuated at the proper times through a lever and stud, i''' , on the other end near the shaft F, by the compound face and groove-cam i'''' on said shaft. A spiral spring, j , is coiled around said rocking shaft, which keeps the stud i''' in contact with the cam, so that the lever i'' receives motions corresponding with its configuration. J J' are two gears of the same size and number of teeth, the former keyed to the end of the shaft C and the latter to the revolving sleeve C', provided with cams $d d'$, for actuating the side hammers $f f'$ and $f'' f'''$, in pairs, for forming the sides of the bolt-head. The shaft K, on which this sleeve C' revolves, has a face-plate, on which the plates K' are bolted to make ways for the side hammers to reciprocate in, but it does not itself revolve. It is also provided with an adjustable stop-ring, L, and a heading-bar, g , a pin, m'' , furnishing a stop for the bar g . The cam m on the shaft F, directly behind the shaft K, forces the shaft K and all its attachments toward, and the flat spring m' from, the dies, the key n directing its movement and preventing it from revolving. The horizontal heading-bar g , located directly in the center of the shaft K, is driven forward by the cams O O' O'' O''' O'''' as they come in contact with its inclined projecting end p , and is returned against its stop m'' by a spiral spring, a , five times at each revolution of the shaft F. As the cam m is so formed that once at each revolution of the shaft F the whole combined mechanism connected to the shaft K is moved toward and from the dies, and then rests against the stop-ring L, I am enabled to use the heading-bar g as a stop, for the purpose of measuring the proper length of the heated bar, inserted through the open dies and against the heading-bar, to be cut off by the shear r connected with the movable die e' , and also

to allow the bolt-head when completed to fall from the dies without striking the side hammers. The dies *e e'* are fastened in the jaws *E E'* by adjusting-screws, and are furnished with a cutting-shear, *r*, which cuts off the iron bar from which the bolt is to be made, when the jaws are forced together by the cam *h'* through the lever *H*. One of these jaws is stationary, and the other extends down below the frame, and is pivoted at *S*, so that its movement is in an arc of a circle. The dies are made of such shape as is desired, to fit the bar from which the bolt is to be made, and when closed firmly clasp the metal and hold it until the head has been formed; then they are spread apart, and the bolt is allowed to fall by its own gravity. An adjusting-piece, *t*, is attached to the frame behind the movable jaw, and is made tapering to take the strain of the heading, and to prevent the wear which would otherwise fall on the pivots below.

The operation of the machine is as follows: The jaws being open, the shaft *K* with all its attachments being as far away from them as the stop-ring *L* will permit them to go, the heading-bar *g* also against the cam *m*, the bar or rod from which the bolt is to be made is thrust promptly through between the dies until its heated end strikes the end of the heading-bar. The shaft *C* being under motion, the side hammers are always in action; but the cam *m* and the cams *O O' O'' O''' O''''* are out of action when the jaws are open to receive the heated bar from which the bolt is to be made. The bar being in the groove of the stationary die, the cam *i''''* now moves the lever *i''* back and over until it rests on the bar in front of the dies, holding it in place while the lever *H*, by the action of the cam *h'*, closes the dies, at the same time cutting off the bar, and inclosing the part cut off and holding it firmly. The lever *i''* then recedes, and the cam *m* begins to move the shaft *K*, header *g*, and the side hammers forward against the heated rod, partially upsetting its end, the rapid blows of the side hammers molding the part upset into the proper shape for the head. Immediately

the heading-bar begins to upset still further the heated bar by rapid blows given it by the cams *O O' O'' O''' O''''*, which complete the head. The whole shaft *K* and its attachments are now moved back from the dies and off the bolt-head, and until arrested by the stop *L*. The jaws are then opened by the movement of the cam *h'*, and the headed bolt is allowed to drop, and the operation is again repeated.

It is to be observed that the blows of the header *g* are struck after both pairs of the side hammers have acted, and when they are away from the head of the bolt, the heading and shaping being done alternately.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a bolt-heading machine, the combination, substantially as herein set forth, of a pair of jaws provided with dies, an upsetting-header, and the side hammers, arranged in such manner that they are moved toward and from the face of the dies in a longitudinal direction, to form the bolt-head, and then to allow it to drop, as set forth.

2. In a bolt-heading machine, the combination, substantially as herein set forth, of a pair of jaws, a cutting-shear, and a detaining-lever, arranged to operate substantially as set forth.

3. In a bolt-heading machine, the combination, substantially as herein set forth, of a pair of holding-dies, the cutting-shear, and the detaining-lever, with the non-revolving upsetting-shaft and side hammers, all arranged to operate substantially as set forth.

4. In a bolt-heading machine, the combination, substantially as herein set forth, of a pair of holding-dies and a cut-off shear with the side hammers, arranged to shape the head of the bolt by blows at right angles to its axis, and also to reciprocate longitudinally toward and from the face of said dies, for the purposes set forth.

CHARLES HALL.

Witnesses:

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