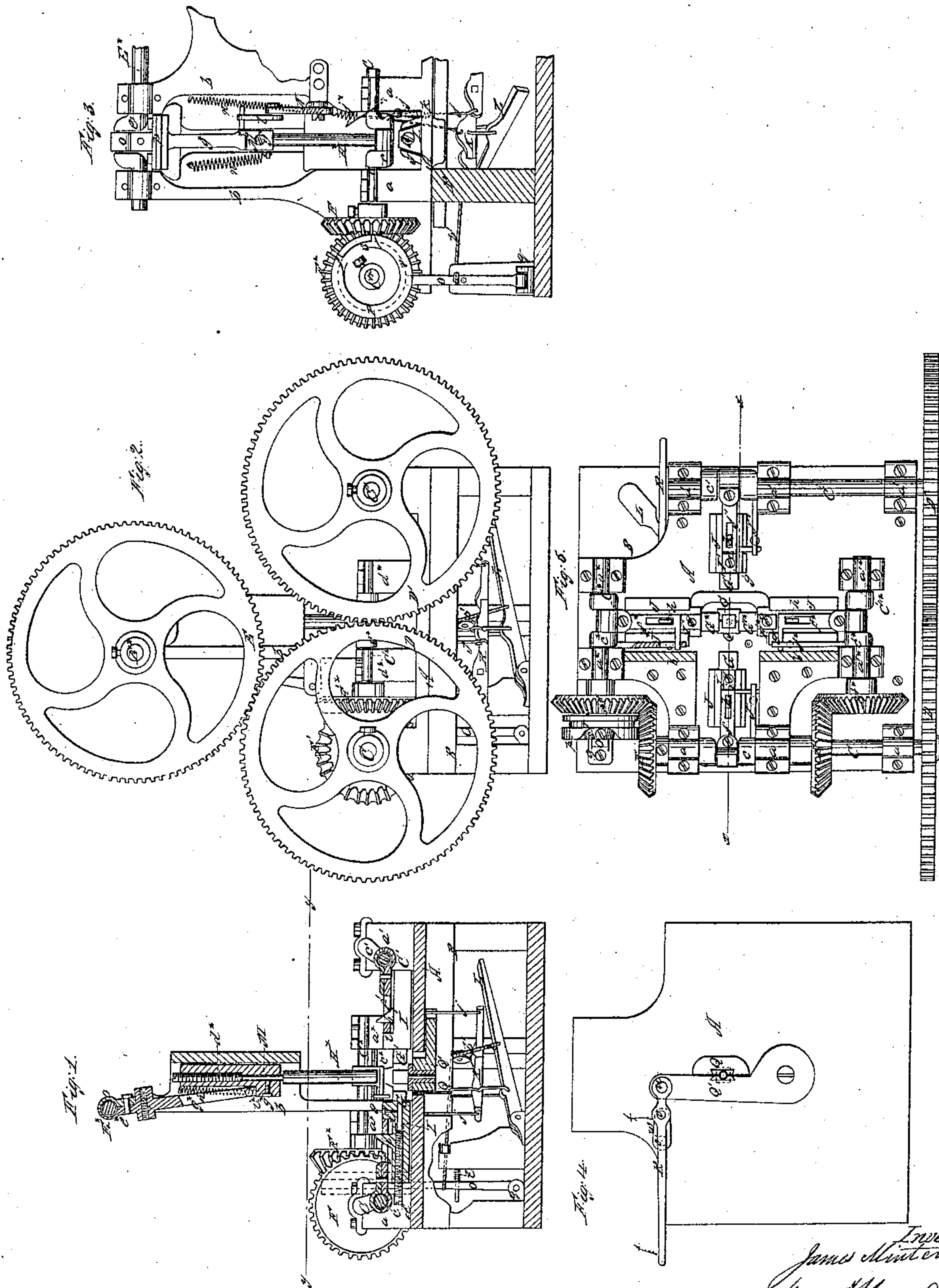


# *J. Minter,*

## *Bolt-Heading Machine,*

*N<sup>o</sup> 43,521.*

*Patented July 12, 1864.*



*Witnesses:*

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# UNITED STATES PATENT OFFICE.

JAMES MINTER, OF WORCESTER, MASSACHUSETTS.

## IMPROVED BOLT-HEADING MACHINE.

Specification forming part of Letters Patent No. 43,521, dated July 12, 1864.

*To all whom it may concern:*

Be it known that I, JAMES MINTER, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and Improved Bolt-Heading Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a transverse vertical section of my invention, taken in the plane indicated by the line *x x*, Fig. 5. Fig. 2 is a front elevation of the same. Fig. 3 is a side elevation of the same. Fig. 4 is an inverted plan of the jaws for clamping the shanks of the bolts. Fig. 5 is a horizontal section of the same, the plane of section being indicated by the line *y y*, Fig. 1.

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

This invention relates to a machine for heading bolts in which the bolts are held stationary by means of two jaws while their heads are exposed to the successive action of a series of heading-dies striking the sides and the top of each head. These heading dies are adjustable, to suit heads of different sizes, and they are operated by hinged spring-dogs, which are connected to a foot-lever in such a manner that by stepping on the same the dogs are successively thrown in working position, causing two of the heading-dies to act, first, on two opposite sides of the head and the second pair afterward, and finally the vertical die is set in motion and caused to act on the top of the head, and by these means all sides of the head and its top are smoothed without moving the bolt in the jaws. Said foot-lever connects with a guide-lever, the position of which is determined by a cam-groove in the circumference of a revolving drum in such a manner that the foot-lever is prevented from throwing the spring-dogs in gear with the heading-dies at the wrong point. Finally, the connection between the foot-lever and hinged dog, acting on the vertical heading-die, is made by means of a spring-rod, and a yielding bolster is inserted between said dog and its connection with its crank-shaft in such a manner that the dogs of the horizontal dies will be thrown in gear before that of the vertical die, and in case said ver-

tical heading-die meets with an undue resistance it is allowed to yield, and injury to the working parts of the machine is prevented.

A represents the bed-plate of my machine, which is secured to the top of a wooden structure or frame, B, or which may be placed on suitable walls. The bed-plate A is provided with three pillow-blocks, *a*, which form the bearings for the driving-shaft C, and this shaft carries a large cog-wheel, D, which gears in two other cog-wheels, D' E, of the same size as the wheel D. The wheel D' is mounted on the end of the secondary shaft C', which has its bearings on pillow-blocks *a'*, rising from the bed-plate on that side opposite the pillow-blocks *a*. The driving-shaft C has mounted upon it two bevel-wheels, F F', which gear in corresponding bevel-wheels, F\* F', on the ends of the shafts C\* C' which have their bearings in pillow-blocks *a\** *a'*\*, rising from the front and back ends of the bed-plates and which run at right angles with the shafts C C', as clearly shown in Fig. 5. The wheel E is mounted on the end of a shaft, E\*, which has its bearings in standards *b*, rising from the middle of the bed-plate A.

The several shafts C C' C\* C' E\* are provided with cranks, *c c' c\* c' e\**, which carry the dogs *f f' f\* f' g\**, by the action of which motion is imparted to the heading-dies G G' G\* G' H\*. The heading dies G G' G\* G' are inserted in carriages I I' I\* I', which move between suitable guideways, J, attached to or cast solid with the bed-plate A, and they are adjustable toward and from the center of the bed-plate by means of screws *d*, passing in from the ends of the carriages and bearing on the inner ends of the shanks of the heading-tools, and fastened in the desired position by set-screws *g*, as clearly shown in Fig. 1, where one of the carriages is represented in section. Each of the carriages I I' I\* I' is provided with a lug, *h*, passing through a slot in the corresponding dog, causing the same to carry the carriage back, and with the shoulder *i*, against which the corresponding dog bears if the carriage is pushed forward. The inner ends of the dogs are bent at right angles, and said ends project through slotted arms J J' J\* J', which are hinged to the pillow-blocks *a a' a\** *a'*\*, and connected by means of rods *j* with an H-shaped piece, K, the middle-bar of which



is attached to the foot-lever L. Suitable springs,  $k$ , placed under the slotted arms  $J J' J^* J'^*$ , have a tendency to force the same up and to raise the dogs  $I I' I^* I'^*$  clear of the shoulders  $i$  of the carriages, so that the several crank-shafts  $C C' C^* C'^*$  can be rotated without causing the dogs to impart motion to the carriages until, by depressing the foot-lever L said dogs are brought to bear on the shoulders of the carriages, and by these means motion is imparted to the heading-dies. The vertical heading-die  $H^*$  is inserted in a carriage, M, which moves in suitable guideways cast solid with or otherwise attached to the standards  $b$ , and it is adjustable in each carriage by means of the screw  $d^*$  and set-screw  $g^*$  in the same manner as the horizontal dies. The carriage M is provided with a shoulder,  $i^*$ , and the dog  $g^*$  is thrown in contact with this shoulder by the action of a bell-crank lever, N, one arm of which connects by means of a spring-rod,  $j^*$ , with the central bar of the H-shaped piece K, and its other arm is connected by a link,  $l$ , with the loose end of the dog, as clearly shown in Fig. 3. The connection between the elbow-lever N and the foot-lever L is made yielding, so that by depressing said foot-lever the dogs  $f f' f^* f'^*$  can be thrown in gear with the shoulders of the horizontal carriages independent of the position of the vertical carriage. Without this precaution, and if the connection between the elbow lever and foot-lever should be made rigid, the same as that of the dogs  $f f' f^* f'^*$ , the dog  $g^*$  would prevent the dogs  $f f' f^* f'^*$  from dropping in gear with the shoulders of the carriages  $I I' I^* I'^*$  until by the revolution of the shaft  $E^*$  said dog should be raised high enough to clear the shoulder  $i^*$  of the vertical carriage. As soon as the foot-lever L is released the dog  $g^*$  is thrown off from the shoulder  $i^*$  by a spring,  $m$ , acting on the elbow-lever N, and if the dog releases the shoulder the vertical carriage M is raised automatically by the action of a spring,  $n$ . The dog  $g^*$  is connected to the crank-shaft  $E^*$  by a journal-box,  $o$ , and between this box and the top of the dog a thick piece,  $p$ , of india-rubber or other elastic material is inserted, so that in case the vertical heading-die, on being depressed, meets with an undue resistance the dog is allowed to yield, and injury to the mechanism is prevented. The foot-lever L connects by a rope or chain,  $p'$ , with a lever, O, hinged to a bracket,  $q$ , below the level of the platform A in such a position that its top end or point stands in front of a cam, P, mounted on the end of the shaft  $C^*$ . This cam consists of a disk with a circular groove,  $r$ , in its circumference, to which access is had from the front side or face of the cam through a recess,  $s$ , cut out of the same, as clearly shown in Figs. 3 and 5. The point of the lever O is prevented from passing into the groove  $r$  until the cam P has been turned to such a position as to bring the recess  $s$  opposite the same. A spring,  $t$ , throws the point of the lever clear of the face of the cam P, and

if the foot-lever is depressed the point of the lever O will strike the face of the cam, and the foot-lever is prevented from going down far enough to throw the dogs  $f f' f^* f'^* g^*$  in gear with the carriages  $I I' I^* I'^* M$  until the cam has been turned so as to bring the recess  $s$  opposite the point of the lever O. At that point the lever O drops into the groove  $r$ , and the foot-lever L descends, carrying with it the dogs  $f f' f^* f'^* g^*$ , and causing them to engage with the shoulders of the several carriages at the proper periods. By this arrangement the motion of the heading-dies is controlled and the bolt-heads are exposed to the action of the dies  $G G'$  first, then to that of the dies  $G^* G'^*$ , and finally to that of the vertical heading-die  $H^*$ . The bolt to be acted on is held by the jaws  $Q Q'$ , one of which is stationary, while the other is secured to a lever pivoted to the under surface of the bed-plate A and connected by means of a pivot,  $u$ , to a hand-lever, R. (See Fig. 4) This hand-lever has its fulcrum on a pivot,  $v$ , secured in the loose end of a swivel-arm,  $w$ , which is attached to the under surface of a bed-plate by a pivot,  $v'$ . By throwing the hand-lever in the direction of the arrow marked near it in Fig. 4 the swivel arm  $w$  turns out in the direction of arrow 1 and the movable jaw  $Q'$  opens. In the position shown in Fig. 4 of the drawings, the swivel-arm is in line with the lever and the jaw  $Q'$  is closed. It will be noticed that the lever R and swivel-arm  $w$  form a sort of a toggle arrangement, which is calculated to clamp the shanks of the bolts firmly and preclude the possibility of their opening spontaneously.

In my machine the bolts remain perfectly stationary while their heads are acted upon by the heading-dies, and by these means the jaws  $Q Q'$  are preserved from wearing out, whereas with ordinary machines for heading bolts the bolts have to be partially revolved after two sides have been acted upon by the heading-dies, and by this motion the jaws wear out, so that they have to be renewed at short intervals.

It is obvious that the improvements hereinbefore described are applicable to hexagonal or octagonal bolt-heads, as well as to those with four sides, as shown in the drawings, and in order to finish a bolt-head with more than four sides it will only be necessary to increase the number of the horizontal heading-dies to correspond to the number of the sides of the heads to be acted on.

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

1. Forming the heads of the bolts by the squeezing action of heading-dies  $G G' G^* G'^* H^*$ , operating substantially as herein described.

2. The heading dies  $G G' G^* G'^* H^*$ , arranged in combination with each other and with the screws  $d g d^* g^*$ , substantially as herein specified, so that said dies can be readily adjusted to suit heads of different size.

3. The spring-dogs  $f f' f^* f'^* g^*$ , carriages



I I' I\* I\* M, with shoulders  $i i^*$ , and dies G G' G\* G'\* H\*, in combination with the H-shaped piece K, or its equivalent, and with the foot lever L, constructed and operating in the manner and for the purpose substantially as herein shown and described.

4. The spring-rod  $j^*$ , in combination with the elbow-lever N, dog  $g^*$ , vertical heading-die H\*, and foot-lever L, constructed, substantially as herein specified, so that the dogs of the horizontal heading-dies are allowed to drop into gear in advance of the dog  $g^*$ .

5. The combination of the elastic plate  $p$  with the dog  $g^*$ , journal-box  $o$ , and vertical heading die H\*, constructed and operating as and for the purpose set forth.

6. The hinged lever O and cam P, in combination with the foot-lever L and with the dogs acting upon the heading-dies, arranged, substantially as herein specified, so that the dogs are not allowed to act upon the heading-dies until the cam P and with it the several working parts of the machine have reached the desired position.

7. The combination of the swivel-arm  $w$  with the hand-lever R and movable jaw Q', constructed and operating substantially as and for the purpose shown and described.

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Witnesses:

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HENRY MINTER.