

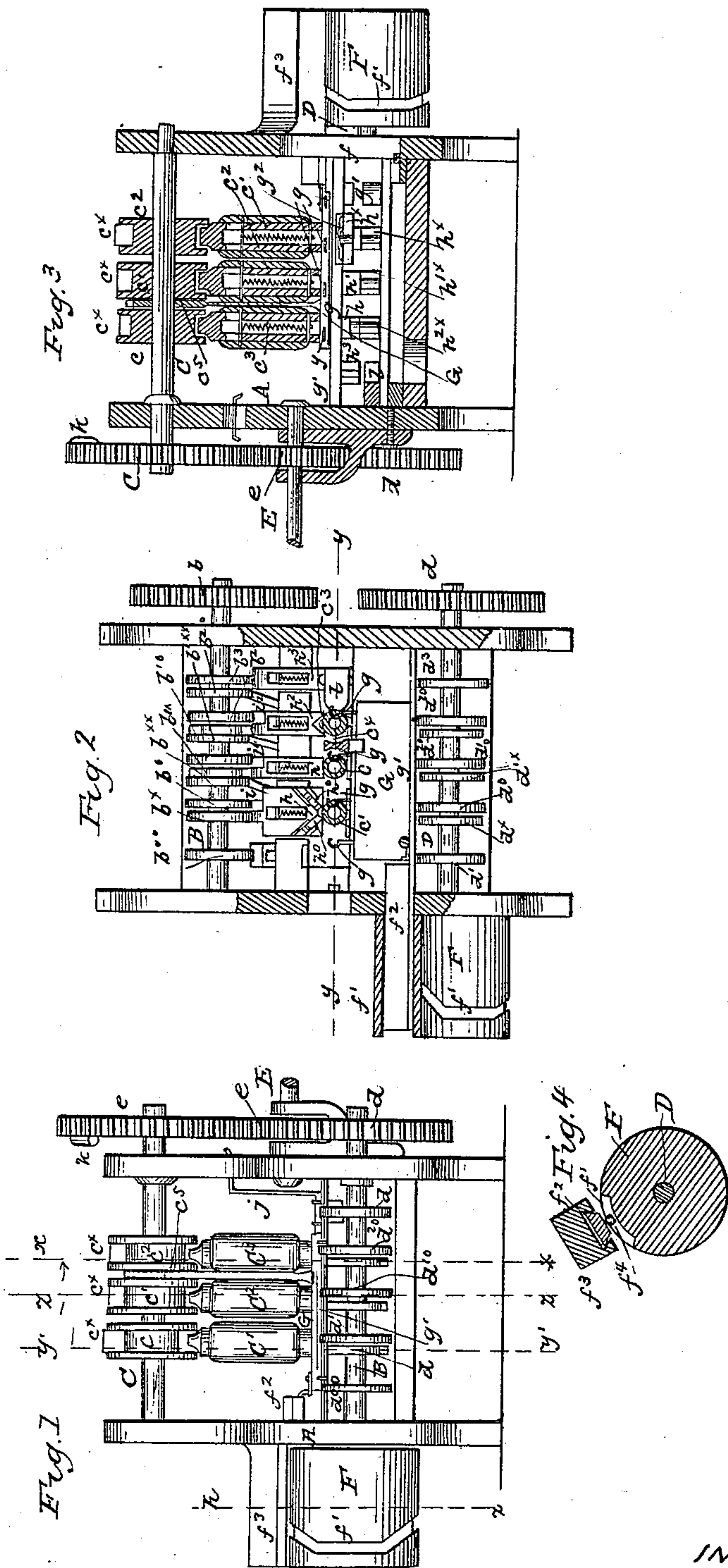
2 Sheets—Sheet 1.

F. SCHWEIZER.

# Bolt Heading Machine.

No. 50,848.

Patented Nov. 7, 1865.



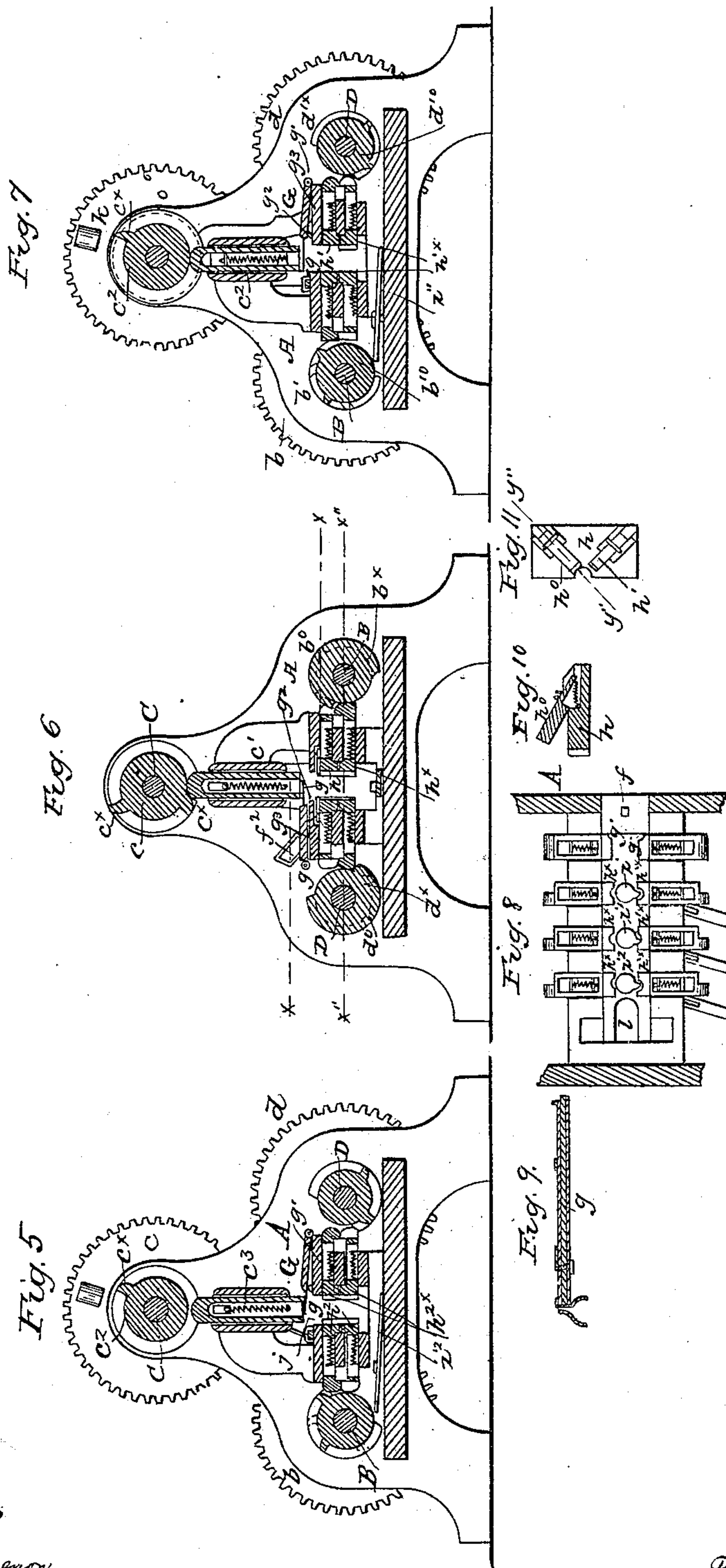
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Bolt Heading Machine.

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# UNITED STATES PATENT OFFICE.

FRANZ SCHWEIZER, OF NEW YORK, N. Y.

## BOLT-HEADING MACHINE.

Specification forming part of Letters Patent No. 50,848, dated November 7, 1865.

*To all whom it may concern:*

Be it known that I, FRANZ SCHWEIZER, of No. 26 Barrow street, in the city, county, and State of New York, have invented a new and Improved Bolt-Heading Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of this invention. Fig. 2 is a horizontal section of the same, the line  $xx$ , Fig. 6, indicating the plane of section. Fig. 3 is a longitudinal vertical section of the same, the plane of section being indicated by the line  $yy$ , Fig. 2. Fig. 4 is a transverse section of the cam detached, the line  $zz$ , Fig. 1, indicating the plane of section. Fig. 5 is a transverse vertical section of the bolt-machine, the line  $xx'$ , Fig. 1, indicating the plane of section. Fig. 6 is a similar section in the plane indicated by the line  $y'y'$ , Fig. 1. Fig. 7 is a similar section, the plane of section being indicated by the line  $z'z'$ , Fig. 1. Fig. 8 is a horizontal section of the same in the plane indicated by the line  $x''x''$ , Fig. 6. Fig. 9 is a detached plan or top view of one of the carrying-tongs, in a larger scale than the previous figures. Fig. 10 is a transverse vertical section of one of the spring-jaws detached, the line  $y''y''$ , Fig. 11, indicating the plane of section. Fig. 11 is a plan or top view of the same.

Similar letters of reference indicate like parts.

The object of this invention is to produce bolts with square or polygonal heads by the action of a mechanism which requires no more attention except that necessary to feed the blanks to the machine. The blanks are cut off to the proper length from round iron bars of the required thickness, and one blank after the other is fed into the machine by the attendant. Suitable tongs grasp hold of the blank and carry the same along under the several heading-tools, by the successive action of which, combined with that of suitable heading-dies, heads of the proper size and shape are formed, and the bolts, after having been headed, are discharged from the machine automatically. During the heading operation the blanks are held in position by suitable clamping-jaws, and

while the first heading-tool is brought into action the head to be formed is sustained by sliding spring-jaws. Simultaneously with the second heading-tool, the head to be formed is exposed to the lateral action of heading-dies, and when the last heading-die comes into action the head is confined by a heading-die with a suitable recess representing one-half of the head to be formed. The tongs which carry the blanks from one heading-tool to the other are secured in a sliding spring-head, so that they rise and clear the blanks in going back, and the blanks are raised, after the heading-tools have acted thereon, to such a position that the tongs on their forward stroke are enabled to grasp them and advance them to the next succeeding heading-tool, or to the discharge-opening. While being moved from the second to the third heading-tool, each blank receives a quarter-revolution (or less) by the action of a sliding pusher, so as to bring the heads in the proper position in relation to the last heading-dies.

A represents a frame, made of cast-iron or any other suitable material, and composed of two side pieces, which are connected by a bed-plate or cross-bars in a firm and substantial manner. This frame forms the bearings for three shafts, B C D, to which motion is imparted by cog-wheels  $b c d$ , mounted on their ends and gearing in a cog-wheel or pinion,  $e$ , mounted on the driving-shaft E. The shaft C bears three drums,  $c' c^2 c^3$ , which are provided each with one or more toes,  $c^*$ , projecting from their peripheries, and intended to act upon the heading-tools  $C' C^2 C^3$ . Said toes are rounded off, and depress the heading-tools gradually and with great pressure on the blanks to be headed. If two or more toes are used on one and the same drum, they are made of gradually-increasing height, so that the force exerted on the blanks is graduated and the heads are formed without exposing the mechanism to an excessive strain. The blanks, which are first cut off to the requisite length, are heated and introduced one after the other into the machine through an aperture,  $f$ , Figs. 3 and 8, in one of the side pieces of the frame A, and being left in an upright position, they are grasped by jaws  $g^0$ , which are compressed by cams  $b^{00} d^{00}$ , mounted on the shafts B D,



and by tongs  $g$ , which are secured in a reciprocating head,  $G$ . A detached elevation of the tongs is shown in Fig. 9. They are provided with one stationary and one adjustable jaw, and they are fastened to the head  $G$  by their shank in any suitable manner. The jaws are adjusted to correspond to the thickness of the blanks that are to be headed in the machine.

The head  $G$  receives its motion by the action of the cam-groove  $f'$  in a drum,  $F$ , which is mounted on the end of the shaft  $D$ , (see Figs. 1, 2, and 3,) and by a slide,  $f^2$ , which moves in a guide-piece,  $f^3$ , secured to the frame, and from which a pin,  $f^4$ , projects in the cam-groove, as shown in Fig. 4.

The slide  $f^2$  is connected to the head  $G$  by a hook and eye or any other suitable flexible connection, and its head is guided in its motion by a rod,  $g'$ , and it is supported by springs  $g^2$  resting upon a cross-bar,  $g^3$ , which is fastened between the side pieces of the frame  $A$ , said springs having a tendency to raise the inner edge of the head, so as to enable the tongs to clear the top ends of the blanks in going back. When the head advances it is held down upon the cross-bar  $g^3$  by the action of a cam,  $c^5$ , mounted on the shaft  $C$ , and made to act on a vertically-moving tappet,  $c^4$ . (See Figs. 1 and 3.)

The head  $G$  is provided with four tongs,  $g$ , each of which corresponds to one pair of dies,  $h$   $h'$   $h^2$   $h^3$ . The first pair of tongs  $g$  carry the blank from the jaws  $g^0$  to the first pair of heading-dies,  $h$ , which are situated under the first heading-tool,  $C^1$ , and over a pair of clamping-jaws,  $h^*$ , as shown in Fig. 6. Detached views of the heading-dies  $h$  are also shown in Figs. 10 and 11. On arriving under the heading-tool  $C$  the blank is first grasped by the jaws  $h^*$ , which are compressed by the action of cams  $b^* d^*$ , mounted on the shafts  $B$  and  $D$ , respectively, and then the heading-tool  $C'$  and dies  $h$  are brought into action simultaneously, the former being acted upon by toes  $C^*$ , of gradually-increasing height, and the latter by cams  $b^0 d^0$ , mounted on the shafts  $B$   $D$ . Cavities in the edges of the heading-dies admit the blank and steady the same while being headed, and yielding spring-jaws  $h^0$  guide the head and partially shape the same while the heading-tool takes action. At the beginning of the operation the inner ends of said spring-jaws come close up to the blank, and as the iron is gradually upset said jaws are depressed and made to recede. In order to effect this purpose they are connected to the dies  $h$  by means of springs, as shown in Fig. 10 of the drawings. One or more jaws may be applied to each of the dies, according to the shape of the heads to be produced.

The cams  $c^*$  and  $d^*$ , which compress the clamping-jaws  $h^*$ , are so shaped that said clamping-jaws retain the blank nearly during the entire revolution of the shafts  $B$   $C$   $D$ ; but the shape of the cams  $b^0 d^0$  is such that the heading-dies

are brought into action simultaneously with the action of the toes  $c^*$  on the heading-tool  $C'$ . During the interval occurring between the successive actions of the toes  $c^*$  on the heading-tools the head  $G$  with the tongs recedes, and when the blank is released by the jaws  $h^*$  the cam  $b^{**}$  acts upon the rear end of the swinging lever  $i$ , which has its fulcrum on a knife-edge or other suitable support secured to the bed-plate of the frame  $A$ . By this action the front end of said lever is raised and the blank is pushed up, so that the second pair of tongs  $g$  are enabled to grasp the same on the return-stroke of the head  $G$ .

The second pair of tongs are constructed similar to the first pair, and by their action the blank is delivered to the clamping-jaws  $h'^*$  under the second heading-tool,  $C^2$ . While being held between those jaws the blank is exposed to the action of the heading-dies  $h'$  and to that of the heading-tool  $C^2$ . The jaws  $h'^*$  are moved by cams  $b'^* d'^*$ , and the dies  $h'$  by cams  $b^{10} d^{10}$ , and the heading-tool  $C^2$  receives its motion by toes secured in the circumference of the drum  $c^2$ . The dies  $h'$  are simply flat, square, or polygonal punches, which are brought into action simultaneously, or nearly so, with the heading-tools  $C^2$ , whereas the jaws  $h'^*$  are held closed during the largest part of the revolution of the shafts  $B$   $C$ , the same as the clamping-jaws  $h^*$  under the first heading-tool. By the action of the heading-dies  $h'$  the sides of the head are flattened out. When the blank is released from the jaws  $h'^*$  it is pushed up by the action of the cam  $f'^{**}$  upon the outer end of a swinging lever,  $i'$ , and the third pair of tongs  $g$  catch hold of the same and carry it along under the last heading-tool,  $C^3$ . While being acted upon by this tool the blank is held by the jaws  $h^{2*}$ , and the final finish is given to the head by the heading-dies  $h^2$ .

If the heads are square, the heading-dies are provided with a V-shaped recess, as shown in Fig. 2, and while being carried from the second to the third pair of clamping-jaws the blank is turned a quarter-revolution by the action of a pusher,  $j$ , which strikes the head of the blank, and to which motion is imparted by the action of the cam  $K$ , mounted on the shaft  $C$ .

During the action of the heading-tool  $C^3$  the blank is held simultaneously by the jaws  $h^{2*}$  and dies  $h^2$ , the latter being provided with semicircular cavities to fit to the blank close under the head, and the head is supported by the recesses in the heading-dies, so that its shape is clearly defined. When the head is to be hexagonal or octagonal, the shape of the recess in the heading-die must be changed accordingly; but the operation of the several parts of my machine will remain unaltered. On being released from the clamping-jaws  $h^{2*}$  the finished bolt is pushed up by the swinging platform  $i^2$ , and the last pair of tongs, grasping the same, carry it and deliver it to the last pair of jaws,  $h^3$ , which, being operated by the cams  $b^3 d^3$ , drop the same through the aperture in the bed-plate of



the frame. The several jaws and dies and also the heading-tools are subjected to the action of springs, which keep the same in contact with their cams. These spring may be connected to said parts in various different ways; and I do not wish to confine myself in this respect to the precise arrangement shown in the drawings, but reserve the right to modify the same as circumstances may render desirable. The number of heading tools and dies may also be increased if it is deemed necessary, though for square-headed bolts three heading-tools such as shown in the drawings are sufficient.

It must be further remarked that the several heading tools and dies are continually kept at work, for as soon as the first blank has been removed from the first pair of jaws and dies a second blank is fed into the machine, and while the first blank is acted upon by the second heading-tool the second blank is exposed to the action of the first heading-tool, &c.

A large number of bolts can thus be headed in a comparatively short time and with little manual labor; and the several parts of my machine are so constructed that they are not liable to get out of order.

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

1. The tongs *g*, with an adjustable jaw, applied, in combination with the longitudinally-

sliding head *G* and heading-tools, in the manner and for the purpose substantially as herein set forth.

2. Supporting the head *G* by springs, as and for the purpose specified.

3. The combination of a series of heading tools, dies, and clamping-jaws with the reciprocating carrying-head *G* and cam *c*<sup>5</sup>, and tappet *c*<sup>4</sup>, constructed and operating substantially as and for the purpose described.

4. The heading-dies *h*, with yielding jaws *h*<sup>0</sup>, constructed and operating substantially as and for the purpose set forth.

5. The swinging levers *i i' i*<sup>2</sup>, operated by cams *b*<sup>\*\*</sup>, and applied in combination with the clamping-jaws and with the tongs *g*, substantially as herein described, whereby the bolts are automatically raised to such a position that the tongs can readily grasp them and carry them along to the next surrounding heading-dies.

6. The pusher, *j*, applied in combination with the heading-dies *h* and carrying-head *G*, in the manner and for the purpose substantially as herein set forth.

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Witnesses:

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C. L. TOPLIFF.