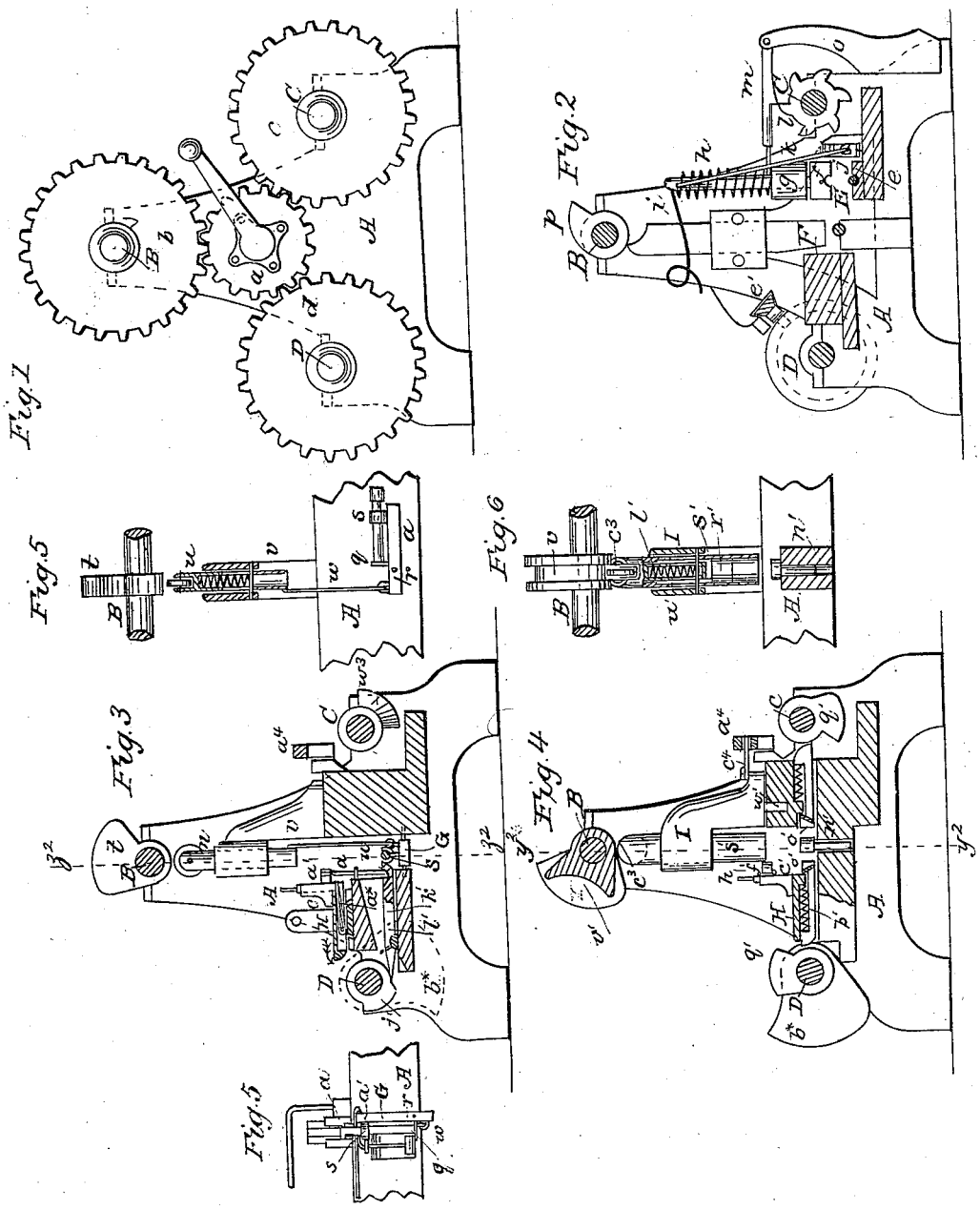
2 Sheets—Sheet 1.

F. SCHWEIZER.

Bolt Heading Machine

No. 53,351. Patented March 20, 1866.



Witnesses

Inventor

2 Sheets—Sheet 2.

F. SCHWEIZER.

Bolt Heading Machine,

No. 53,351. Patented March 20, 1866.

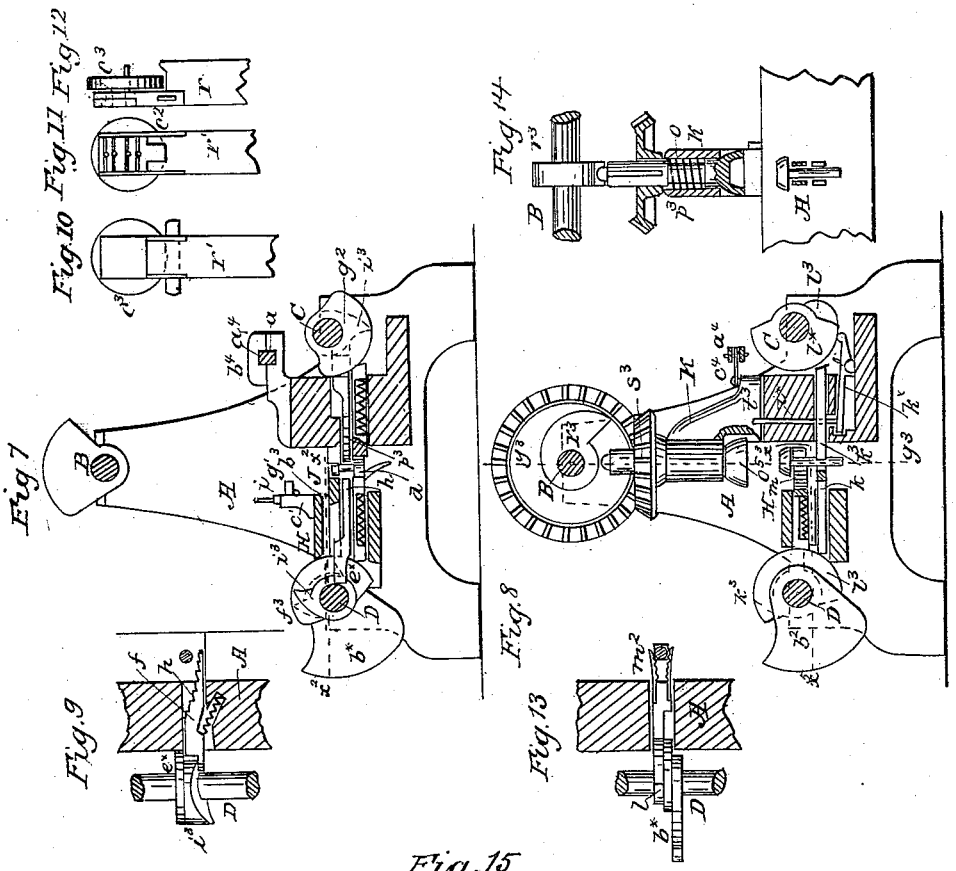
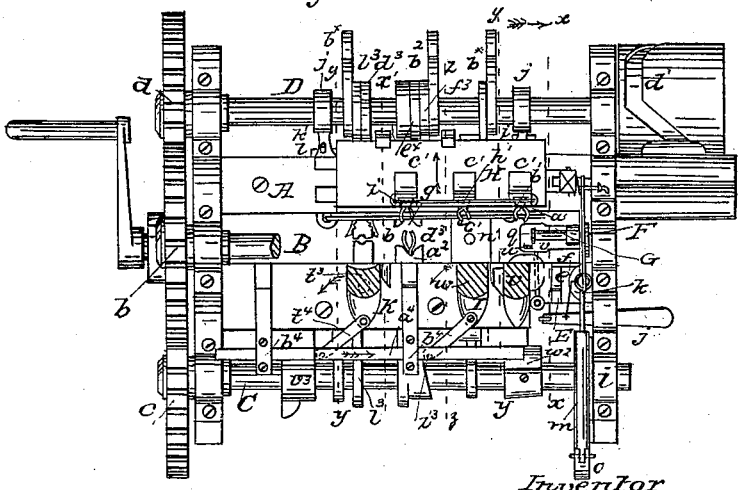


Fig. 15



Witnesses

Inventor

UNITED STATES PATENT OFFICE.

FRANZIS SCHWEIZER, OF NEW YORK, N. Y.

IMPROVEMENT IN BOLT-HEADING MACHINES.

Specification forming part of Letters Patent No. **53,351**, dated March 20, 1866.

To all whom it may concern:

Be it known that I, FRANZIS SCHWEIZER, of the city, county, and State of New York, have invented a new and Improved Bolt and Rivet 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 represents an end view of this invention. Fig. 2 is a transverse vertical section of the same, taken in the plane indicated by the line *x x*, Fig. 15, and looking in the direction of the arrow opposite to that line. Fig. 3 is a similar section in the plane indicated by the line *y y*, Fig. 15. Fig. 4 is a similar section taken in the plane indicated by the line *z z*, Fig. 15. Fig. 5 is a partial longitudinal section of the same, the line z^2 z^2, Fig. 3, indicating the plane of section. Fig. 5* is a similar section of the same, showing the parts in a different position from that shown in Fig. 5. Fig. 6 is a similar section of the same, taken in the plane indicated by the line y^2 y^2, Fig. 4. Fig. 7 is a transverse vertical section of this invention, the line x' x', Fig. 15, indicating the plane of section. Fig. 8 is a similar section taken in the plane indicated by the line y' y', Fig. 15. Fig. 9 is a partial horizontal section of the same, the line x^2 x^2, Fig. 7, indicating the plane of section. Figs. 10, 11, and 12 are detached views of the adjustable roller used for adjusting the position or stroke of the punches. Fig. 13 is a horizontal section of the same, the line x^3 x^3, Fig. 8, indicating the plane of section. Fig. 14 is a partial vertical longitudinal section of the same, taken in the plane indicated by the line y^3 y^3, Fig. 8. Fig. 15 is a plan or top view of the same.

Similar letters of reference indicate like parts.

This invention relates to a machine for making bolts or rivets with round four-sided polygonal heads, which are produced by the successive action of a series of punches and dies. The iron bar from which the bolts or rivets are to be made is first exposed to the action of a swage which is hung between two springs, one to raise and the other to depress it, the latter spring being made adjustable by a treadle, so that the force of the blows can be increased or decreased at pleasure. After having been prepared by the swage the blank is cut off by the action of shears and deposited on a tilting platform, which brings said blank in an erect position and delivers it to the tongs which serve to carry the same under the heading-dies. Said tongs are secured to rising and falling slides, which move in standards rising from a reciprocating carriage, and by their action the bolts or rivets are withdrawn from one heading-die and carried to the next until the same are finished. A funnel connected with the first die assists the tongs in introducing the blanks into said die, and in order to hold the blank in a central position while being headed a tubular sleeve is brought down over it before the hammer strikes. After having been upset at one end by the action of the hammer the blank is carried to the heading-die, which is composed of a stationary jaw or anvil and a movable jaw or die, both the anvil and movable jaw being formed to correspond to the desired shape of the bolt-head. With this anvil a spring-tong is combined to keep the head of the bolt or rivet free from the face of the anvil and to increase the effect of the blows, and a pair of spring-pushers with small teeth are provided, for the purpose of turning the bolt or rivet and to expose different sides of the head to the action of the heading-die. The fins which form on the edges of square or polygonal heads are removed by the action of files, which are operated automatically by the action of suitable cams, and the fins forming on the circumference of round heads are taken off by the action of a countersink, to which a revolving motion is imparted from the driving-shaft. The standards which form the bearings for the hammer and for the shaft of the countersink are so arranged that they turn from over the dies in order to prevent them from interfering with the motion of the blanks, bolts, or rivets from one die to the next.

A represents a frame, made of cast-iron or any other suitable material, of sufficient strength for the occasion. The end pieces of this frame form the bearings for three shafts, B C D, by means of which motion is imparted to the various working parts of my machine. These shafts are geared together by cog-wheels *a b c d*, the cog-wheel *a* being mounted on a stud or shaft which is secured in the frame and so situated that said cog-wheel gears in all the cog-wheels *b c d*, as shown in Fig. 1 of the drawings. In the lower part of the frame, and

near to that end of the same which is opposite to the cog-wheels *a b c d*, is the swage E, which is composed of the stationary jaw *e* and the movable jaw or hammer *f*. The shank of this movable jaw is guided in a socket, *g*, which is secured to the inner surface of the end piece of the frame A, and said shank is subjected to the action of two springs, *h i*, which are so balanced that the spring *h* is enabled to raise the hammer sufficiently high to allow of introducing the iron bar; but if said hammer is raised still higher against the action of the spring *i* and then suddenly released it comes down with considerable force on the stationary jaw or anvil *e*. The power of the blow can be still further increased by means of a treadle, *j*, which connects with the shank of the hammer by a rod, *k*. The swage is actuated by a wiper-wheel, *l*, which is mounted on the shaft C, and which acts on a lever, *m*, that has its fulcrum on a pin secured in a standard, *o*, rising from the frame A, and the end of which catches in a slot or hole in the shank of the hammer. After the end of the bar has been worked down to the desired size by the action of the swage it is inserted between the jaws of the shears F, the movable jaw of which is actuated by a cam, *p*, mounted on the shaft B. (Best seen in Fig. 2.) The length of the blank is determined by a gage, *q*, which is adjustable in a tilting platform, G, which swings on a pivot, *r*, and which is provided with a pair of tongs, *s*, as shown particularly in Figs. 3 and 5, where said platform is represented in a horizontal position, and in Fig. 5*, where the platform is shown in an upright position. The tilting motion of the platform G is produced by the action of a cam, *t*, which is mounted on the shaft B, and which depresses a spring-slide, *u*, that is guided in a standard, *v*, rising from the frame A. This slide connects, by a rod, *w*, with the inner end of the platform G, as shown in Fig. 5, and as it is depressed by the cam the platform is brought from a horizontal to an upright position. By this motion of the platform G the blank is presented to a pair of tongs, *a'*, which are secured to a rising and falling slide, *b'*, that is guided in a standard, *c'*, rising from a carriage, H. This carriage is fitted into a dovetailed guideway on the upper surface of the frame A, and a reciprocating motion is imparted to it by the action of a cam-groove, *d'*, on a slide, *e'*. (See Fig. 15.) On the carriage are secured three pairs of tongs, *a'*, *f'*, and *g'*, which project from rising-and-falling slides, *b'*, *h'*, and *i'*, and these slides are guided in suitable standards *c'*. The rising and falling motion of the tong-slides is produced by the action of cams *j'*, which are mounted on the shaft D, and which act on levers *k'*, as seen in Figs. 3 and 15. These levers have their fulcra on suitable pivots or knuckles *l'*, and by making these fulcra adjustable the rising and falling motion imparted to the tongs can be increased or decreased at pleasure. The motion of the levers is transmitted to the tongs and slides by a yoke, *m'*, or any other suitable means. The carriage H is subjected to the action of springs *a** and cams *b**, and by the springs is drawn back in the direction of the arrow marked on it in Figs. 3 and 15, whereas the cams b^3 force the same in the opposite direction, so as to enable the tongs to grasp the bolts or rivets and bring the same to the desired spots. After having been grasped by the tongs *a* the blank is raised and carried forward by the mechanism above-described and deposited into the socket *n'*, which is just large enough to receive the shank of the blank, as shown in Fig. 4. In order to facilitate the introduction of the blank into this socket, a funnel-shaped conductor, O', is applied, which is made in two halves that open by the action of springs *p'*, (see Fig. 4,) and close by the action of cams *q'*, mounted on the shafts C and D. After the blank has dropped into said socket the funnel opens and the end of the blank is upset by the action of the hammer *r'*. This hammer is surrounded by a tubular sleeve, *s'*, which moves up and down in a standard, I, which rises from the frame A, and the hammer is forced up by a spring, *t*, whereas a spring, *u'*, has a tendency to raise the sleeve *s'*, and a cam, *v'*, which is mounted on the shaft B, serves to depress first the sleeve *s'* and then the hammer *r'*. The form of this cam is best seen in Figs. 4 and 6. It is composed of two cheeks, which straddle the upper end of the hammer and act on the sleeve, and of a middle portion which acts on the hammer, and which is so formed that it produces two or more blows during each revolution of the shaft B.

The standard I is not rigidly connected to the frame A, but it is made to oscillate on a pivot, *w'*, so that it turns out of the way whenever a blank is to be inserted in or withdrawn from the socket *n'*, and after the blank is in the socket the standard turns back and brings the hammer and sleeve in the proper position to act. By the sleeve the head of the bolt formed by the action of the hammer is kept in a central position and prevented from being turned off sidewise.

The action of the cam on the upper end of the hammer is facilitated by a friction-roller, c^3, the bearings of which are adjustable, (see Figs. 10, 11, and 12,) so that the stroke of the hammer can be increased or decreased at pleasure.

When the action of the hammer *r'* is completed the blank is taken from the socket *n'* by the action of the second pair of tongs *f'*, and carried between the heading-dies J. These dies are composed of a stationary die or anvil, a^3, and a movable die, b^3, as shown in Fig. 7. If the heads of the bolts or rivets are to be square the anvil a^3 and the die b^3 are V-shaped, as shown in the drawings, but for round or polygonal heads the form of said dies has to be changed.

A pair of tongs, d^3, situated below the anvil a^3, grasps the blank and supports the same while

the head is shaped, and a spring, e^3, is made to bear on the lower end of the blank by the action of a cam, e^*, and prevents the head from lodging in the corner of the anvil, and thereby the action of the die b^3 is greatly facilitated. The die b^3 is operated by a cam, f^3, mounted on the shaft D, and this cam is so shaped that said die gives two or more blows during each revolution of the shaft. After the first blow has been given the spring e^3 is withdrawn by a suitable spring, and simultaneously with the backward motion of said spring the tongs d^3 are pushed out by the action of a cam, g^3, so that the head of the bolt or rivet clears the anvil a^3, and while being held in this position the bolt or rivet is turned by the action of two serrated fingers, h^3, which act thereon from opposite sides, motion being imparted to them by cams i^3, mounted on the shafts C and D. (See Figs. 7 and 15).

When a square or round head is to be produced a quarter-revolution is imparted to the bolt or rivet by the action of the fingers; but the amount of this motion must be changed for polygonal heads.

The reversing-fingers are self-adjusting by means of a spring, f^*, so that they can accommodate themselves to bolts or rivets of different sizes.

When the bolt has been turned the tongs d^3 recede and the die imparts to the head the second blow, so that the same is brought in the desired form or shape, and when this object has thus been accomplished the bolt or rivet is grasped by the tongs g' and deposited between the movable jaws k^3. These jaws are actuated by the cams l^3, and they grasp the shank of the bolt or rivet and hold it in position for the files m^3. These files are used for square or polygonal heads, and they serve to take off the fins which form, or may form, on the edges of the heads. The requisite motion is imparted to these files by a cam, n^3, mounted on the shaft D, as shown in Fig. 8, and this cam is so shaped that it produces several strokes of the files during one revolution of the shaft on which it is mounted.

For bolts or rivets with round heads the files m^3 are replaced by a revolving countersink or milling-tool, o^3. This tool is secured to the bottom end of a spindle, p^3, (see Fig. 14,) which has its bearings in a standard, K, rising from the frame A. A spring, q^3, (see Fig. 14,) acts on the spindle p^3, which slides and turns freely in the standard K, and said spring has a tendency to raise the spindle, whereas a cam, r^3, mounted on the shaft B, depresses the same once for every revolution of said shaft.

The spindle passes freely through a bevel-wheel, s^3, which is provided with a feather-key catching into a groove in the spindle, so that a revolving motion imparted to the wheel will be transmitted to the spindle without interfering with the rising and falling motion thereof.

The standard K, instead of being rigidly attached to the frame A, is made to swivel on a pivot, t^3, and by giving the proper motion to it the wheel s^3 is thrown in gear with a bevel-wheel, u^3, which is mounted on the shaft B, and a revolving motion is imparted to the milling-tool o^3. A stop, i^*, which is raised and lowered by the action of a spring-lever, k^*, and cam l^*, retains the standard K and prevents the wheels s^3 and o^3 from getting out of gear. When the standard is to be turned the stop i^3 drops. The swivel motion of the standard K, and also that of the standard I, which forms the bearing for the hammer and tubular sleeve, (as previously described,) is produced by the action of cams v^3 w^3, which are mounted on the shaft D, and one of which pushes a sliding rod, a^4, in one direction, while the other cam forces said rod back to its original position. This rod slides in suitable boxes, b^4, secured to the frame A, and it connects by links c^4 with the standards I K, as shown in Figs. 4, 8, and 15. By pushing the rod in the direction of the arrow (marked on it in Fig. 15)the standards are caused to swing in the direction of the arrows marked opposite to them in said figure, so that they do not interfere with the operation of inserting or removing a bolt or rivet from the respective sockets, and by moving the rod a^4 in the direction opposite to the arrow marked thereon the standards turn in and the hammer and milling-tool assume their working position.

When the fins have been removed from the heads by the action of the files m^3, or by the milling-tool o^3, the bolts or rivets are released by the clamping-jaws k^3, and they drop down under the frame A, where they may be collected in a suitable receptacle.

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

1. The arrangement of the swage-hammer f, in combination with two springs, h i, and treadle j, constructed and operating substantially as and for the purpose described.

2. The tilting platform G, in combination with the gage g, tongs s, and shears F, constructed and operating substantially as and for the purpose set forth.

3. The compound or triple cam v', constructed and operating in combination with the sleeve s' and hammer r', substantially as and for the purpose set forth.

4. The funnel o', made in two parts, which open and close by the action of suitable springs and cams, in combination with the carrying-tongs f' and socket n', constructed and operating substantially as and for the purpose described.

5. The stationary anvil a^3, and movable die b^3, both V-shaped, or in any other suitable form, in combination with a spring, e^3, intended to force the head of the bolt or rivet out of the anvil a^3, substantially as and for the purpose set forth.

6. The movable spring-tongs d^3, in combina-

tion with the anvil a^3, and hammer-die b^3, constructed and operating substantially as and for the purpose described.

7. The reversing-fingers h^3, in combination with the tongs d^3, anvil a^3, and punch b^3, constructed and operating substantially as and for the purpose set forth.

8. Adjusting the gripe of the reversing-fingers by a spring-fulcrum $f^\times$, or other equivalent means, substantially as described, so that the same will gripe bolts or rivets of any desired size.

9. The files m^3, operated by a suitable cam, n^3, in combination with the clamping-jaws k^3, constructed and operating substantially as and for the purpose set forth.

10. The milling-tool o^3, arranged on a rising-and-falling and laterally-oscillating spindle, p^3, to which an intermittent revolving motion is imparted by bevel-wheels s^3 u^3 or other equivalent means, substantially as and for the purpose described.

11. The compound three-way carriage H, in combination with one or more rising-and-falling slides and tongs, constructed and operating substantially as and for the purpose set forth.

12. The levers k' and yoke m', in combination with the tongs a' f' g', constructed and operating substantially as and for the purpose described.

13. Giving to the standards I K a swivel motion by means substantially such as hereinbefore described, or any equivalent means, for the purpose set forth.

14. The self-adjusting stop i^3, in combination with the swivel-post K, constructed and operating substantially as and for the purpose described.

FRANZIS SCHWEIZER.

Witnesses:
M. M. LIVINGSTON,
WM. E. LYNN.