

(No Model.)

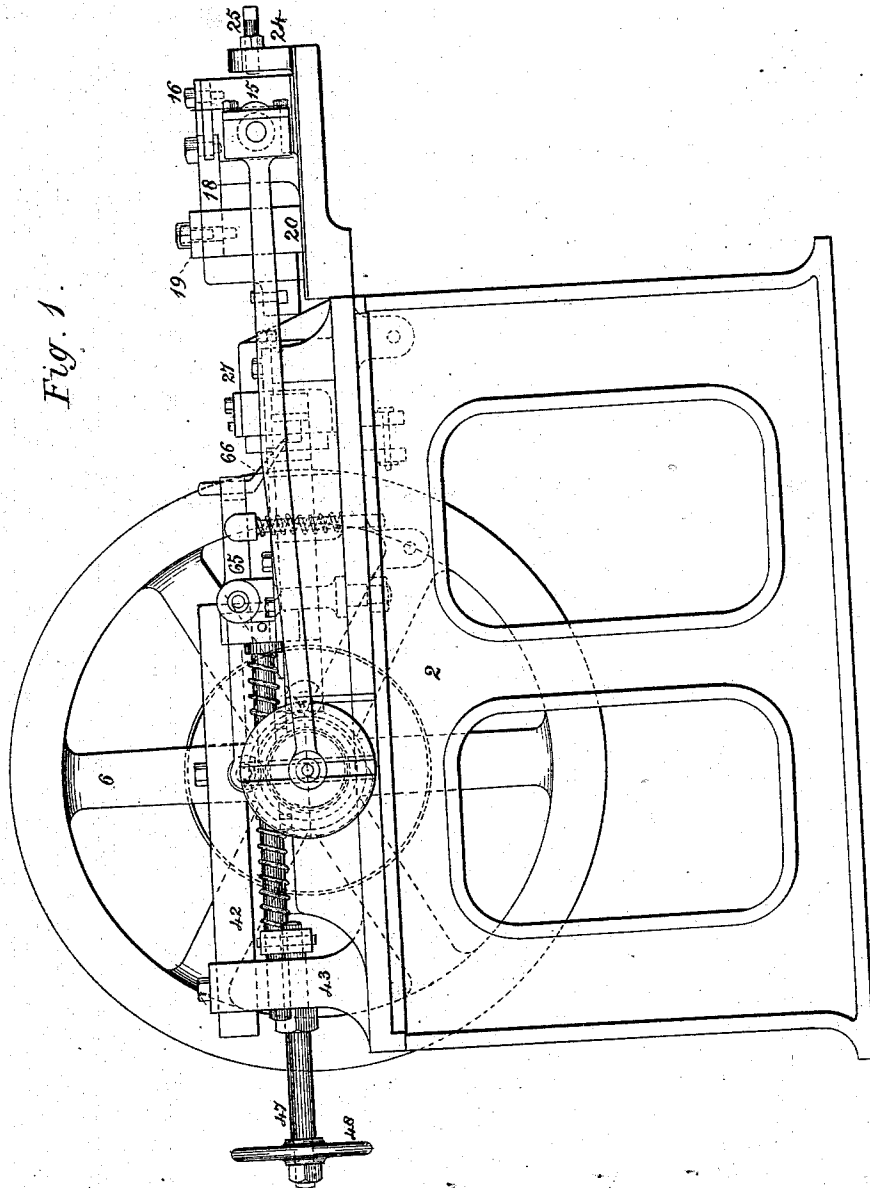
6 Sheets—Sheet 1.

W. TAYLOR.

MACHINE FOR MAKING SPIKES AND BOLTS.

No. 278,629.

Patented May 29, 1883.



Witnesses.
Jonathan Ord
Jonas Lindley

Inventor.
William Taylor.
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(No Model.)

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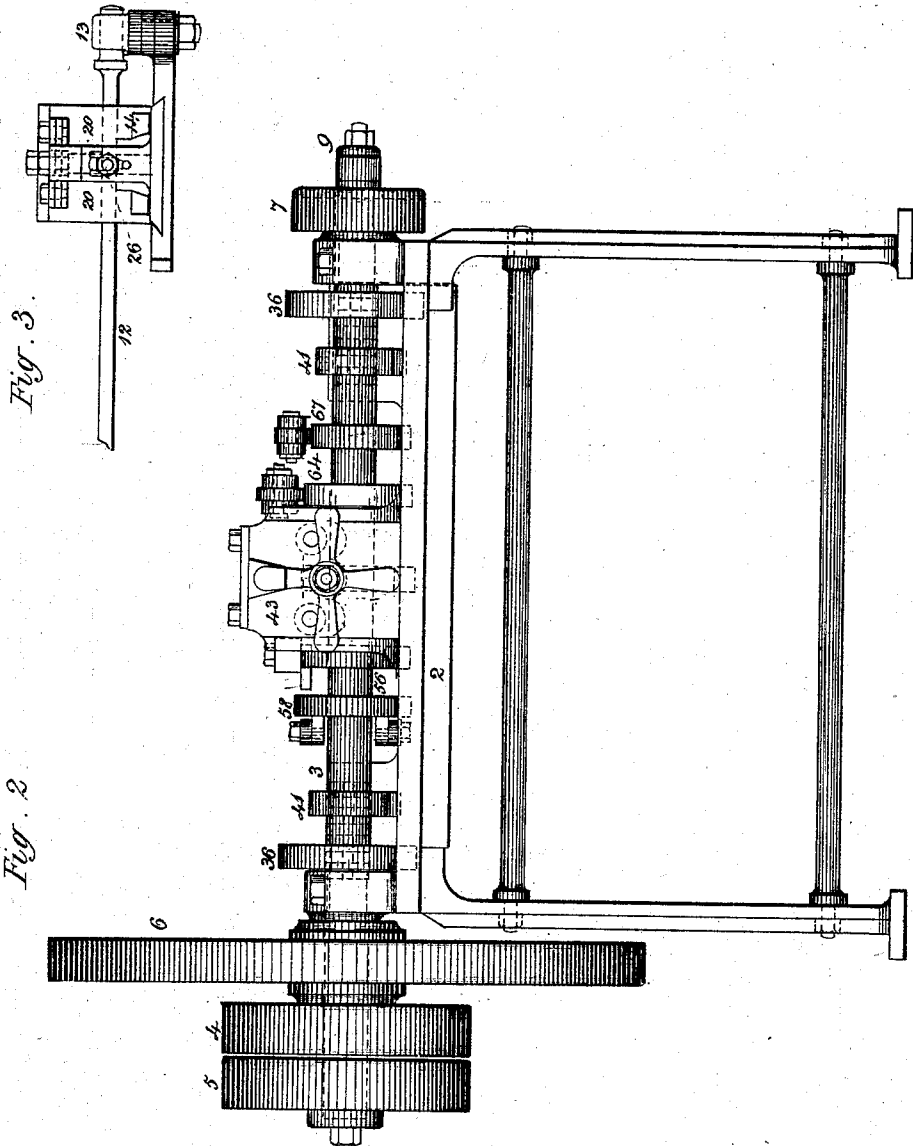


Fig. 3.

Fig. 2.

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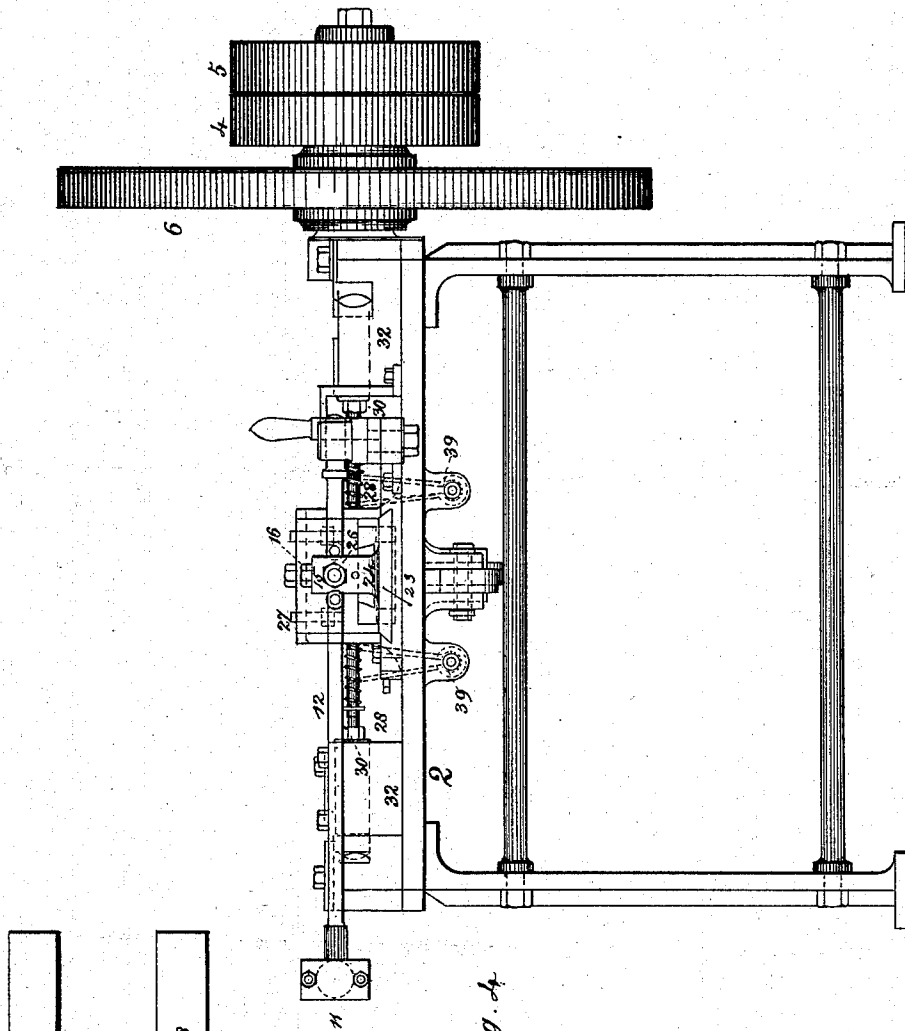
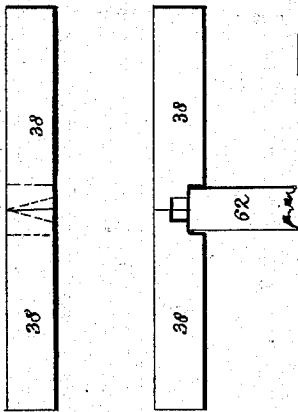


Fig. 4.



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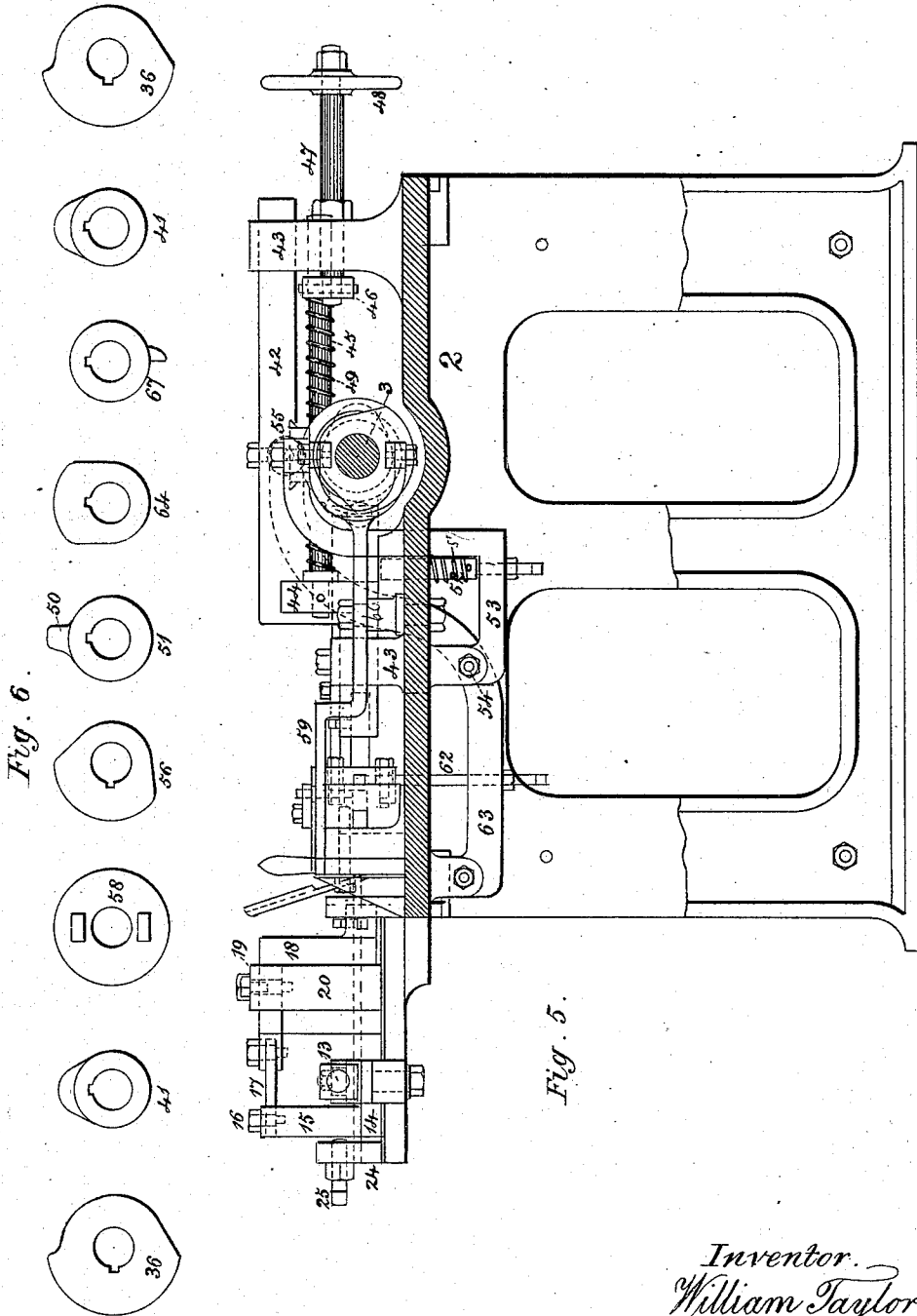


Fig. 6.

Fig. 5.

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6 Sheets—Sheet 5.

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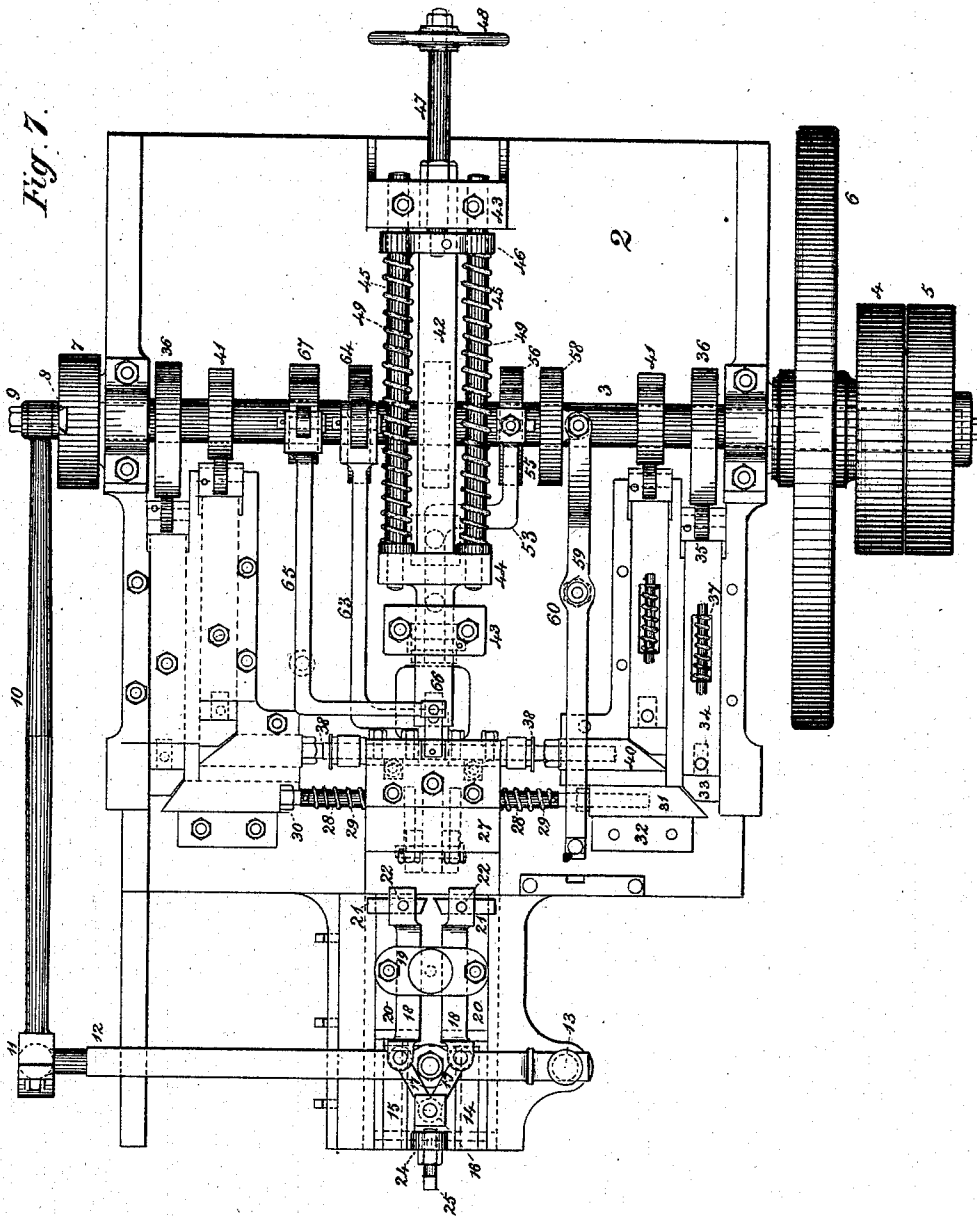


Fig. 7.

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6 Sheets—Sheet 6.

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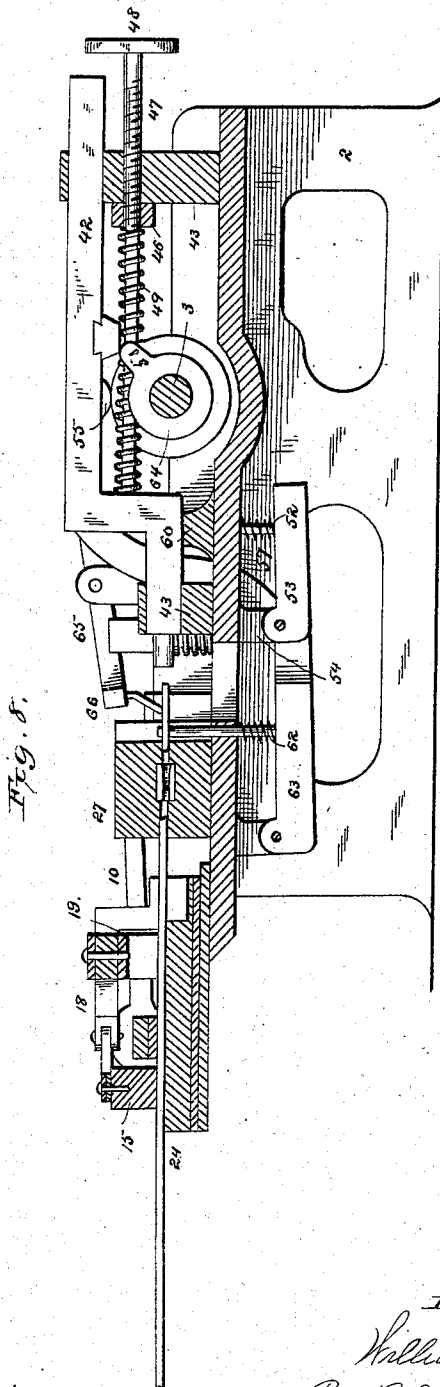


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM TAYLOR, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE
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MACHINE FOR MAKING SPIKES AND BOLTS.

SPECIFICATION forming part of Letters Patent No. 278,629, dated May 29, 1883.

Application filed December 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TAYLOR, a citizen of Great Britain, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful improvement in bolt and spike machines of that class wherein the rod from which the spikes and bolts are produced is automatically and intermittently fed into the machine and gripped while having a head formed thereon by percussive force or the impact of a sudden blow, the bolt being separated from the rod and pointed preparatory to the subsequent forward movement of the rod, of which the following is a specification.

The first part of my invention relates to the construction and operation of the feeding device.

The second part consists in the means employed for holding back the heading-ram while the rod from which the bolts are to be cut is fed in and properly gripped.

The third part relates to the means whereby the action of the heading-ram may be stopped, released, and controlled without affecting the movement of the other parts of the machine.

The fourth part of my invention comprises the peculiar construction of such devices as operate conjointly to bring about a proper movement of the gripping, cutting-off, and pointing dies.

To enable others to fully understand the invention I have made, I will now describe it by reference to the accompanying drawings, wherein—

Figure 1 represents a side elevation of my improved bolt-machine; Fig. 2, a rear end view of the same; Fig. 3, a detached front elevation of the feed device. Fig. 4 represents the front end of the machine; Fig. 5, a side view, partly in section; Fig. 6, the various cams used on the main shaft, arranged with respect to their relative positions thereon; Fig. 7, a top view or general plan of the entire machine. Fig. 8 represents a longitudinal sectional view of the machine.

As my improved bolt-making machine comprises an intermittent feeding device, grippers for holding the rod during the heading process, a header that is driven against the end of the infed

rod, cutting-off and releasing contrivances, together with suitable cams, levers, wheels, springs, friction-rollers, and such hereinafter-described appliances and appendages as may be necessary to constitute a complete machine, it is essential that its supporting-frame should be substantially built to enable it to withstand the vibratory shocks incident thereto. To this end I construct a strong cast-iron frame, 2, and mount the same upon suitable legs, and also provide it with such bearings and guide-ways as may be requisite for the reception and proper support of the moving parts. Across this frame 2 is arranged the main driving-shaft 3, on one of the projecting ends of which are placed side by side a loose and fast pulley, 4 5, by means of which power may be communicated to the shaft through the instrumentality of an endless belt, and to steady the revolutions of the shaft and operations of the machine a balance fly-wheel, 6, is made fast on the shaft beside the aforementioned pulleys. Located on the extreme opposite end of the main shaft 3, and rigidly secured thereto, is a thick circular disk, 7, having entirely across its axial line and face a dovetailed groove, 8, in which is fitted a movable block bearing a projecting wrist-pin, 9, made adjustable eccentrically with respect to the axis of the main shaft, whereby the wrist is given a crank-like movement, the stroke of which may be varied and regulated to suit the requirements of the case. This wrist-pin 9 carries one end of a long horizontally-arranged connecting-rod, 10, its other end being attached by a ball-and-socket joint, 11, to the extremity of a vibrating arm, 12, placed partially over and across the front of the machine, its other end being loosely connected by a pin, 13, to the stationary projecting portion of the main frame in such a manner as to allow the free end of this vibrating arm 12 to move back and forth horizontally in the arc of a circle.

Where a vertical plane drawn lengthwise through the center of the machine will intersect the vibrating arm 12, it is connected to a small tablet, 14, provided with a stout post, 15, upon the top of which, and by a single pin, 16, is pivoted one end of two short links, 17, their opposite ends being separately jointed

each to its downwardly-bent lever 18, so pivoted the one to the other by means of a vertical pin at or near their middle as to constitute a peculiar sort of tongs, one end of which will close only when the other is forced open, and these by the same pin are hinged to a small plate, 19, that rests upon and supports them between two uprights, 20. The free extremities of these angularly-bent levers 18 are each provided with a strong bevel-edged steel tooth, 21, held in their respective places and made adjustable by means of suitable pinch-screws, 22. The small tablet 14, supporting the post to which the short links 17 are attached, is dovetailed into and made to slide with and upon a large rectangular base-plate, 23, carrying the two uprights, 20, between which the tongs are pivoted, and this large base-plate is caused to move toward and from the machine on each revolution of the driving-shaft 3.

In a rigid standard, 24, on the outer end of the projecting portion of the main frame is a set-screw, 25, that serves to regulate the backward stroke of the post carrying the short links 17, and in the standard 24 is inserted a movable but fixed eye-piece, 26, Fig. 3, having its axis on a line corresponding to the space existing between the steel teeth 21 in the jaws of the pivoted tongs. This eye should be of a size adapted to serve as a guide and director for the iron rod on its way to the bolt or spike forming devices.

On revolving the main shaft 3 the action of its projecting wrist 9 will, through its connecting-rod 10, impart a vibratory movement to the long arm 12, and when that movement is toward the body of the machine the first impulse is upon the tablet carrying the post to which the small links are attached, and as it moves forward in obedience to the arm the farther ends of the links are spread apart, and, by reason of their connection with the tongs, its jaws are made to close until its teeth approach each other sufficiently to bite hard upon any object happening between them. Now, if a rod of iron suitable for the sort of bolts required be passed through the guiding-eye 26 in the standard 24, and extended onward so as to be taken hold of by the steel teeth 21, the impelling movement of the arm 12 in that direction will first exert a closing-pressure on the tongs, and then a quick forward action of the same, by means of which the iron rod will be fed along or advanced the proper length for forming a bolt, which, when ascertained, is fixed or regulated by the position of the wrist 9 to the axial line of the main shaft. Upon each revolution of the wrist the arm will travel to and fro, and in its retroaction cause the tongs to suddenly open wide and release the rod, and stay clear of it until they have moved back a full stroke, when the tongs will take a fresh hold upon the rod a suitable distance from the first, and again carry it forward, and thus the iron rod is spaced off and fed into the machine at each reciprocation of the arm 12. As the end of the rod is by this means intermittingly

fed forward, it eventually reaches and is caused to enter a suitable hole in that end of a stout square die-box, 27, rigidly affixed to the main frame of the machine a short distance behind the above-described feeding-in device. Within this box the iron rod on its advance is first gripped, held, and headed during the backward movement of the feed, and then cut off and knocked free that the same operations may be performed on the succeeding end of the rod. To accomplish these several functions the die-box 27 is provided with four transverse passage-ways leading into its center, so as to cross the line of travel given the bolt-rod. Two of these, or those nearest the feeding device, contain the gripping-dies 28, which consist of steel bars having their inner ends nicked and hardened, whereby they will more securely and positively hold the rod, and prevent its slipping back while undergoing the heading operation. Each of these gripping-dies and the means and mode of operation are alike, being forced outwardly and apart by a spring, 29, coiled around it, and made adjustable in the direction of its length by means of a nut, 30, at a point where the outer end enters a sliding bar, 31, having a like movement within suitable guides, 32. The end of this sliding bar most remote from the die-box 27 is beveled to an angle of forty-five degrees, and is acted upon by a similar bevel, 33, on the adjacent end of another sliding bar, 34, arranged at right angles to the first. The opposite end of this secondary bar 34 is provided with an anti-friction roller, 35, that bears against a single throw-cam, 36, on the main shaft 3, which at proper times forces forward the secondary bar 34, causing its bevel end to so operate on that toward and near its approaching counterpart in the reverse side of the die-box, whereby an iron rod fed in between them will be caught and tightly held with a vise-like grip. A coiled spring, 37, is placed within a suitable slot in or about the middle of the secondary bar 34, that serves to move it toward the operating-cam 36 and keep its anti-friction roller 35 in contact therewith.

Within the die-box, and on the same horizontal plane, but separated from the grippers a distance equaling the length of rod necessary to form a head on a bolt, are located the pointing and cutting-off tools 38, that move laterally and outwardly, each by an independent V-shaped spring, 39, (shown more particularly by dotted lines in the drawings, Fig. 4,) and are respectively forced inward at the same instant, each by its appropriate push-bars 40, that are provided with angular adjacent ends, the movements being effected by means of suitable cams, 41, on the main shaft. In short, substantially the same sort of devices are made use of for giving motion to these pointing and cutting-off tools that are used for the gripping-dies, so that the description of one will answer for all, with the exception that the cams 36, operating the push-bars of the gripping-

dies, are so shaped that the pressure of the grippers on the rod shall be maintained during a half-revolution of the main shaft, whereas the cams 41, operating the pointing and cutting-off tools, are so contrived as to impart to them a very quick inward thrust and speedy liberation.

The chief mechanism employed for forming heads on the bolts comprises a stout iron bar, 42, or heading-ram, arranged horizontally and lengthwise of the machine, and in substantial bearings 43, one of which is at or near the middle and the other the rear end of the main frame 2, and in these bearings it is made to slide with an endwise reciprocating movement. The greater portion of this ram is straight, but, for convenience, is so bent at a point between its bearings as that its end nearest the center of the machine will be on a line with the feeding and gripping devices, and this end is provided with a steel die of such form as will give proper shape to the bolt-head.

Attached to the ram 42, at or near the point of its bend, is a cross-yoke, 44, to which are rigidly affixed two separate and parallel rods, 45, their free ends passing loosely through a fixed but adjustable yoke, 46, of similar construction, and then through holes in the block 43, supporting the rear end of the ram. The adjustable yoke 46 is provided at its center with a swiveled screw, 47, that is tapped into and extends through the bearing-block 43 rearward, terminating in a hand-wheel, 48. Around each of these parallel rods 45 above referred to is wound a strong spiral spring, 49, and the object of the swiveled screw is to adjust the tension of these springs.

The heading-ram 42 is moved back endwise, so as to compress the powerful springs 49 around the extended rods, to which it is attached, at a comparatively slow rate of speed, by the toe 50 of a revolving cam, 51, on the main shaft acting against a lug on the under side of the heading-bar 42, and when this bar or ram has been moved back as far as this cam 51 can effect it, there it is held by a strong dog-bolt, 52, shot upward through the frame into a correspondingly-shaped hole in the lower side of the ram by means of an S-shaped lever, 53, so pivoted at a convenient point, 54, beneath the platform of the machine that its upper end, 55, shall rest upon a cam, 56, on the main shaft, that will give it an upward movement and release it at the proper time, enabling a spiral spring, 57, around the dog-bolt to force it down and clear of the ram.

Arranged loosely on the main shaft, beside the cam 56 for operating the dog, is a circular disk, 58, of a size equaling that of the cam, and this disk is provided with a forked lever, 59, jointed thereto, and swung upon a pivotal point, 60, in such a manner that a movement of the free end of this lever in one direction will cause said disk to slide upon the main shaft and under an adjacent lug, 61, on that end of the S-shaped lever 53, and by this means the header may be held back as long as

desirable, while the other parts of the machine are in operation; or it may be released for action by simply reversing the lever, so as to withdraw the disk from beneath the lug.

In this machine the points of the spikes are formed by compression and elongation, and to produce a good point in this manner and prevent the tools from sticking, it is essential that three tools should be used to close upon and withdraw from the iron in different directions. Two of these tools move in a horizontal plane, and together constitute three sides of a small tapering die-box, and a vertically-moving tool forms the fourth side, as shown in the enlarged and detached views, (numbered 38 and 62.) This third tool, 62, is attached to a long lever, 63, pivoted at the rear end to and underneath the platform of the machine, and is curved upward and over the main shaft, its end resting upon a cam, 64, by which it is given the requisite motion. Occasionally a bolt or spike will adhere to the end of the rod by a very thin tenure, and require to be knocked off. To break this connection and free the bolt or spike, an angular lever, 65, is used, having its fulcrum above the other levers, and provided with a bent steel finger, 66, that occupies a position directly over the pathway of the newly-made spikes. One end of this lever is arranged over the main shaft, so as to be acted upon by a suitable cam, 67, which at the proper moment will depress the finger end and free the finished spike.

The several parts of this machine having been properly adjusted and set in motion, its operation is as follows: An iron rod suitable for conversion into spikes or bolts, and while red-hot, is to have one end thrust through the eye or guide 26 in the stationary post, and onward between the steel teeth in the jaws of the moving tongs, which will immediately seize and by an advance movement carry it forward to the grippers, that will in turn close upon it with a tenacious grip, whereupon the tongs will open sufficiently wide to clear themselves from the rod, and return by a backward movement to obtain a new and fresh hold upon it at a distance from the first equaling the length required to form a finished bolt or spike. At this instant the header will be released and shot forward by its powerful springs against that portion of the rod extending beyond the grippers with sufficient force to form a head thereon. As the heading-ram returns to its former position the grippers open, that the feeding device may bring forward a fresh portion of the rod. Then the pointing-tools advance, sever, and point the headed spike. As these several movements of the machine take place with great rapidity and regularity the red-hot iron rod is automatically fed in, headed, pointed, and knocked off in the form of finished spikes with remarkable speed.

Having described the construction and operation of my bolt and spike making machine, I claim—

1. In a spike or bolt making machine, the

combination of the gripping-dies, the spring-actuated header, the pivoted bar which actuates the feed, and the adjustable bar connected with said pivoted bar, and a wrist-pin secured to a disk on the driving-shaft, and the four-motioned feed consisting of a pair of pivoted tongs or vibrating arms having, first, a closing motion to seize and hold the rod; second, an advancing movement to carry the rod forward the required distance; a third motion to open and clear itself of the rod, and a fourth motion to return for a fresh hold thereon preparatory to a readvance.

2. A bolt or spike making machine provided with gripping-dies and a spring-actuated heading-ram, in combination with an automatically-moving dog so contrived as to hold back the heading-ram during the advance of the rod from which the spikes or bolts are to be formed.

3. As a means of controlling the action of the heading-ram, the moving stop bolt or dog, in combination with a circular movable disk so operating in conjunction with a projecting lug on the lever of the dog as to prevent the dog from releasing its hold upon the heading-bar.

4. The combination, with the laterally-reciprocating slides 31 and 40, carrying the pressing and pointing dies, of the beveled slides adapted to operate the same, the mechanism for operating said slides, and the lever 63 and the tool 62, whereby the blank is held while being pointed, substantially as and for the purpose specified.

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Witnesses:

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JOHN S. KENNEDY.