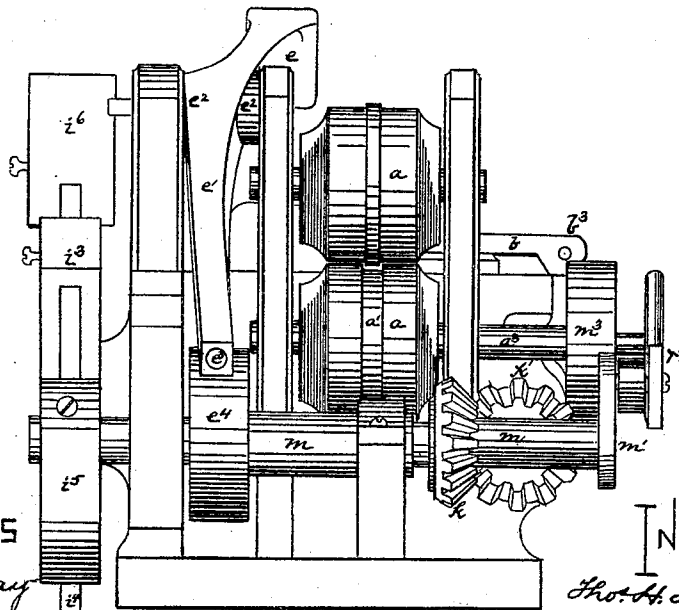
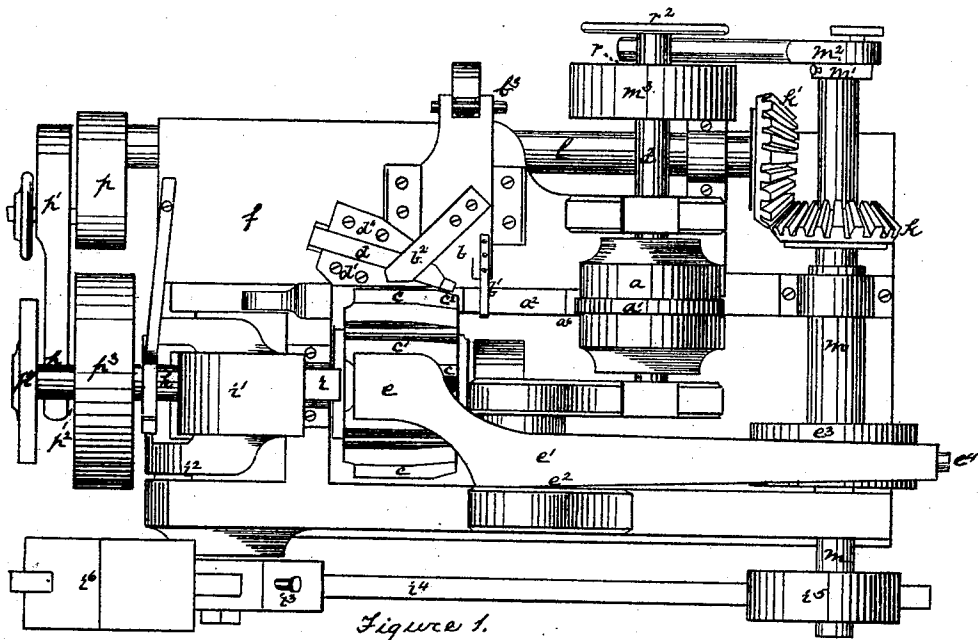


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Spike-Machines.

No. 147,269.

Patented Feb. 10, 1874.



WITNESSES

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INVENTOR

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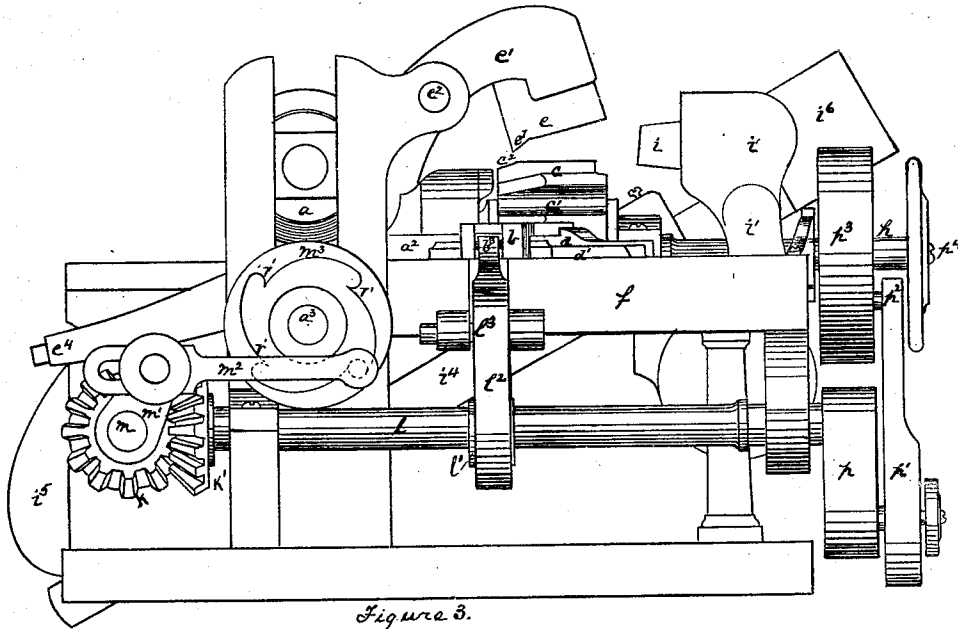


Figure 3.

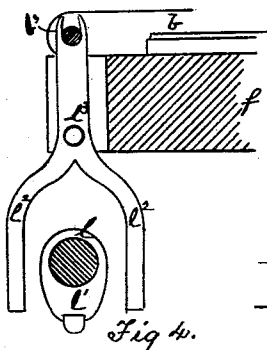


Fig 4.

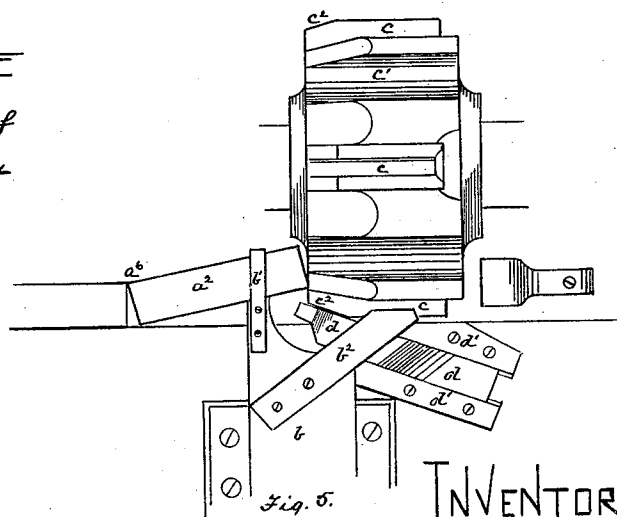


Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS H. JOHNS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO HIMSELF
AND ALBERT TOMLINSON, OF SAME PLACE.

IMPROVEMENT IN SPIKE-MACHINES.

Specification forming part of Letters Patent No. **147,269**, dated February 10, 1874; application filed
May 31, 1873.

To all whom it may concern:

Be it known that I, THOMAS H. JOHNS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improved Spike-Machine; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a plan view of my improved machine. Figs. 2 and 3 are, respectively, end and side views of the same. Fig. 4 is a side view of the power-connection of the shearing and beveling device, and Fig. 5 is a plan view of the shearing and beveling device.

Like letters of reference indicate like parts in each.

My invention consists in the construction of an improved spike-machine; and its distinguishing features consist, first, of a rotating block carrying a series of dies in its periphery, operating in combination with a feeding device, beveling and shearing device, and the forming-dies; second, in the device for cutting off the blank from the bar; third, of an operating mechanism, by means of which the feeding-rolls, beveling and shearing device, and the rotating die-block, are each operated successively in turn, so that no two of such operations are being carried on at the same time; and by which the levers carrying the forming and heading dies are operated alternately with the device for rotating the die-block, the block being held stationary while the heading and forming dies are operating upon the blank in the die-box.

To enable others skilled in the art to make and use my invention, I will describe its construction and mode of operation.

Referring to Fig. 1, which is a plan view of my machine, the upper feeding-roll is at *a*. Directly back of this, in the path of the groove *a*¹, is a metallic box, *a*², which is hinged at *a*³, and is attached to the slide *b* by the band *b*¹. Directly back of the end of this box is the line of the path of the die-boxes *c*, which are attached to, and carried by, the rotating die-block *c*¹, successively in front of the delivery end of the conductor or box *a*², so

that when the bar is fed in by the rolls *a*, it shall pass directly back through the conductor *a*², into the die *c*. Rigidly attached to the slide *b*, and extending forward at an acute angle therewith, is an arm, *b*². This arm extends in a recess in the upper face of a beveling-knife, *d*, the forward end of which stands just flush with and parallel to the beveling-edge of the die *c*². This beveling-knife is designed to move forward and back in the ways *d*¹, being actuated by the rigid arm *b*², which is attached to, and moves with, the slide *b*.

When the slide *b* advances across the table *f*, on which it is placed, the rigid arm *b*², moving in the recess in the upper face of the knife *d*, causes the knife to advance obliquely to the movement of the slide *b*, and when the slide is retracted or drawn back the knife *d* is caused to retreat by means of the backward movement of the arm *b*¹. The rear end of the box *a*² has a square metallic edge, which acts as a shear, to cut off the blank.

When the slide *b* advances across the table *f*, which movement takes place after the blank has been fed in to the die *c*, it causes the rear end of the box *a*² to be moved across the end of the die *c*, so as to cut off that portion of the bar which is in the die, and the same movement of the slide *b* causes the knife *d* to advance obliquely across the point of the cut blank, which projects from the die *c* at the beveled corner *c*², and bevel or cut off such projecting corner.

The rotating block *c*¹, which carries the dies *c* in its periphery, is journaled on the shaft *h*. After the blank has been fed into the die *c*, cut off, and beveled on one side of its point, in the manner described, the block *c*¹ is caused to rotate one-quarter way around, so as to bring the die containing the blank directly under the forming-die *e*.

The die *e*, the face of which is of such shape as to form the fourth side of the die *c*, is carried by a lever, *e*¹, which is pivoted at *e*², and operated by a cam, *e*³. The outer end of the lever *e*¹ is weighted at *e*⁴, to make it hug the surface of the cam *e*³. The die *e* incloses the blank on three sides, leaving one open side, which is covered, as above described, by a descending die, *e*. The face of the die *e* has a

projection at its rear end, which corresponds to the bevel c^2 of the die c . The other end of the die c is hollowed out on three sides to provide for the downward spread of the metal which forms the head of the spike. The head of the spike is formed by means of a hammer or die, i , which is secured to the lever i^1 . The lever i^1 is pivoted to the shaft i^2 , such shaft having a rigid arm, i^3 , which carries a weighted lever, i^4 , the forward end of which bears against the periphery of a cam, i^5 , upon the power-shaft m . The lever i^4 is weighted at its rear end i^6 , its forward end bearing against the cam i^5 , as described. Then, when the cam i^5 is rotated by means of the rotation of the power-shaft, the parts of this connection being all rigid throughout to the hammer i , the hammer is caused to advance and deliver a blow against the end of the spike-blank, which is then held in the die c . This blow being delivered by the hammer operating from a center, so as to describe an arc of a circle, causes the end of the blank to be swaged down into the recess c^5 in three sides of the rear end of the die c . This forms the head of the spike on three sides, leaving the upper side of the blank—that is, the side directly under the die c —plain. This blow is delivered at the same instant as the blow from the swaging-die e , which straightens the blank, and by the projecting end e^7 swages up the remaining square corner at that end of the blank, (the other corner having been beveled off,) so as to form the point of the spike. The further revolution of the power-shaft m causes the eccentricity of the operating cams i^5 and c^3 to turn past so as to release the levers i^4 and c^4 , and thereby permit their weighted ends to throw back the dies e and i , and release the die-block from their grasp, and leave it free for its further revolution. The feeding-rolls a are operated intermittently by power from the shaft m by means of a ratchet-and-pawl device, such device consisting of the crank m^1 , arm m^2 , and ratchet-wheel m^3 . The arm m^2 is provided with a hook-shaped pawl, r , which extends into the chambered ratchet-wheel m^3 , and plays over the ratchet-teeth or rack r^1 , and is prevented from escaping therefrom by means of a shield, r^2 . The ratchet-wheel m^3 is carried by the lower roll-shaft a^3 . The upper roll is rotated by means of the friction of the lower roll. Upon the power-shaft m is a bevel-gear wheel, k , which meshes into and operates a second beveled gear-wheel, k^1 , upon the forward end of the shaft l . On the shaft l there is an eccentric, l^1 , which operates in connection with a cam-yoke, l^2 , such cam-yoke being pivoted at l^3 , and at its upper end connected with the rear end of the slide b at b^3 . This cam is so arranged upon the shaft l that it shall come around and operate the slide b immediately after and upon the completion of the movement of the feeding-rolls a , so that, when the blank has been fed forward into the die c , the slide b moves and cuts off the blank in the die-box, and at the same time the shear d advances

and bevels the edge of the blank. At the rear end of the shaft l is a crank, p , which is connected with an arm, p^1 , having at its other end a pawl, p^2 , which extends into and operates in connection with a ratchet in the chambered-out wheel p^3 . The pawl is prevented from escaping from the wheel p^3 by means of the shield p^4 . The object of this ratchet device is to operate the die-block c^1 intermittently. The ratchet-wheel p^3 is carried by the outer end of the shaft h , which carries the die-block c^1 . The crank p is so arranged on the end of the shaft l that immediately upon the completion of the operation of the cutting and shearing device the pawl p^2 takes hold of and draws the ratchet-wheel around one-quarter of a revolution, so as to turn the die-block a like degree, and thereby to bring the next succeeding die into position under the swaging and heading dies. Thus the operating mechanism of this machine is divided in such a way as to successively communicate to, first, the feeding-rolls, second, the cutting and shearing device, and, third, the rotating die-block, their various movements, so that no two of these operations shall be carried on at one and the same time.

The operation of the machine in forming a spike is as follows: The bar from which the spike-blanks are cut, having been previously rolled to the proper shape, is fed into the rollers a , and by them is carried forward through the conductor a^2 to the die c . When the bar has been fed into the die c , the operation of the feed-rolls determines, in the manner described, because of the backward reach of the crank m^1 ; then, by the turning of the eccentric l^1 on the shaft l , the slide b , which carries the shear and beveling device, is moved across the table f , so as to cut off and bevel the blank in the die c ; then, by the farther revolution of the shaft l , the crank p , by means of the pawl p^2 , draws the ratchet-wheel p^3 around, so as to turn the shaft h , which carries the die-block c^1 . The shaft h by this means makes a one-quarter revolution, so as to bring the die c from its position in front of the discharging end of the conductor a^2 into position under the die c and the heading-die i ; then, by the next portion of the movement of the operating mechanism, the blank, which is in the die c , is straightened and pointed by the die e , and headed by a blow from the die i . The dies i and e are operated at the same moment that the next blank is fed into the next succeeding die c , it being necessary to hold the block c^1 stationary during both these operations; then, when the spike has been formed in the die-box c by the action of the forming-dies, the farther revolution of the block c^1 carries it around until it is discharged from its die-box at the under part of the machine. The die-block c^1 carries four dies, c , on its periphery, and the operating mechanism is so arranged relatively to that number that the power-shaft m makes one revolution, operating all the parts of the machinery during the

same time that the die-block c^1 is turned one-quarter the way around. Thus one spike is finished entire at every revolution of the power-shaft m .

In the first part of this specification I have spoken of the feeding-rolls a as being adapted to forming the last pass of the spike-bar. This may or may not be the case, according to the desires of the operator. These feeding-rolls may be adapted exclusively for feeding purposes; but in such case the bar must, of course, be entirely finished before being brought to the spike-machine.

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

1. The hinged conductor a^2 , for guiding the

bar into the die c , in combination with the die c , for cutting off the blank, substantially as described.

2. The dies c , arranged in the periphery of a rotating block, c^1 , in combination with the box or cutter a^2 , knife d , and dies e and i , substantially as and for the purposes described.

3. The operating mechanism, combined as described.

In testimony whereof I, the said THOMAS H. JOHNS, have hereunto set my hand.

THOMAS H. JOHNS.

Witnesses:

FREDERICK STANDISH,
T. B. KERR.