ROGERS & RINEHART.

Machine for Making Spikes.

No. 58,483. Patented Oct. 2, 1866.

Fig: 1.

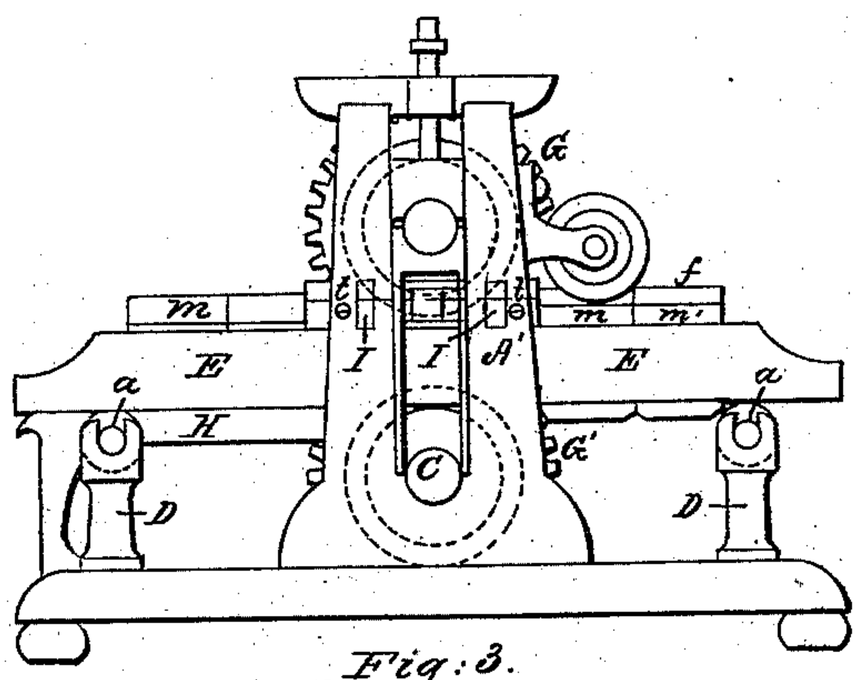


Fig: 2.

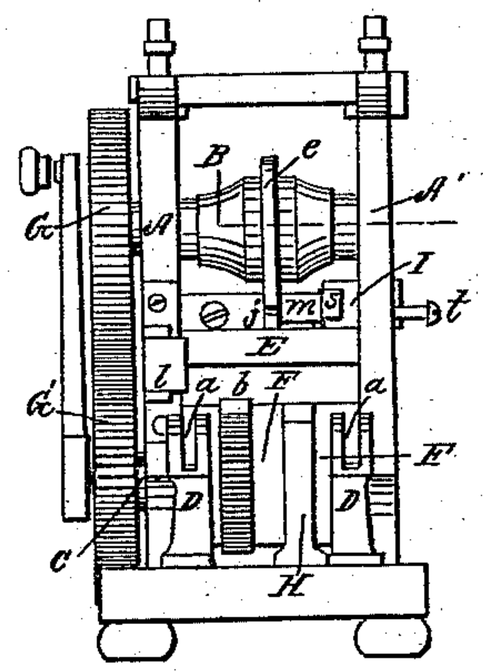


Fig: 3.

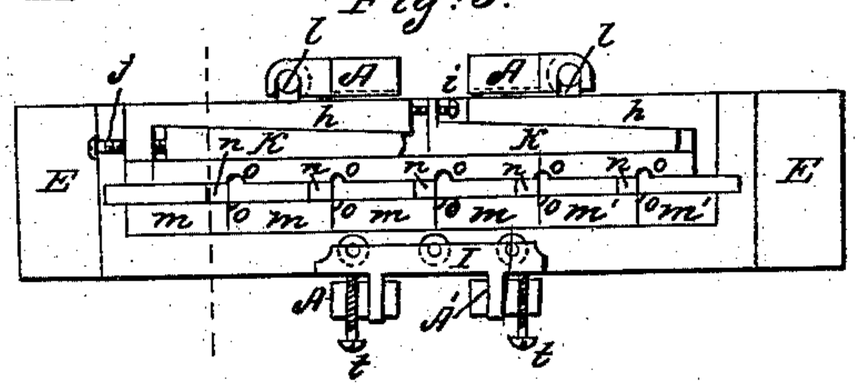


Fig: 4.

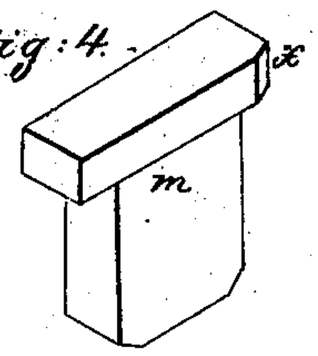


Fig: 5.

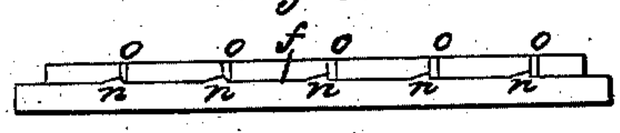


Fig: 6.

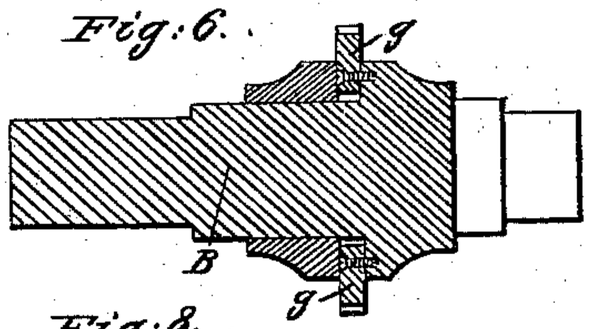


Fig: 7.

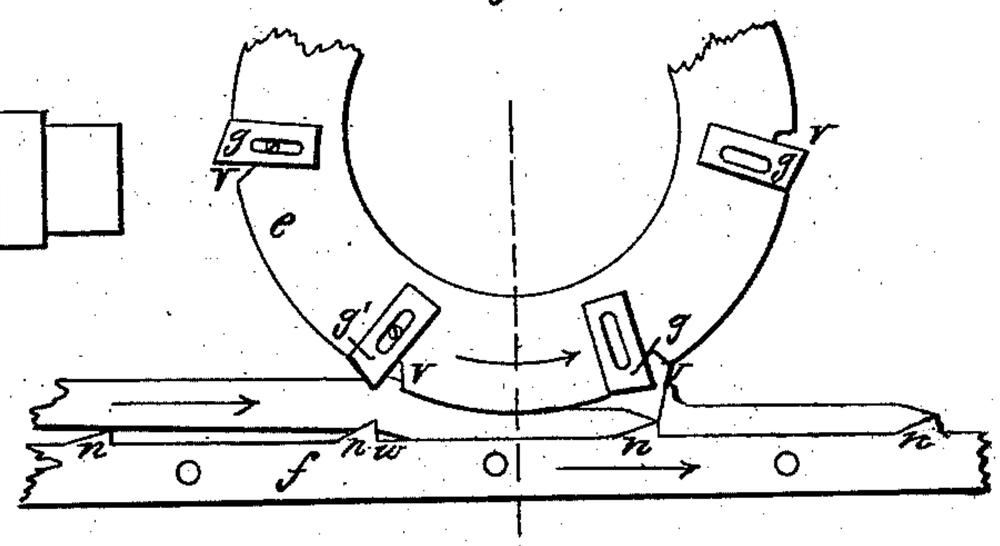
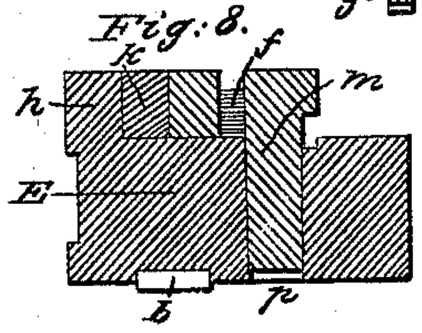


Fig: 8.



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By their Atty:
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UNITED STATES PATENT OFFICE.

A. J. ROGERS AND W. D. RINEHART, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR MAKING SPIKES.

Specification forming part of Letters Patent No. **58,483**, dated October 2, 1866.

To all whom it may concern:

Be it known that we, AMBLER J. ROGERS and WILLIAM D. RINEHART, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Spike-Machines; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of our improved machine. Fig. 2 is an end elevation. Fig. 3 is a top view, with the upper part of the housing and the rolls attached thereto removed. Fig. 4 is an enlarged perspective representation of one of poppets or side dies. Fig. 5 is a longitudinal side view of the die in which the spikes are made. Fig. 6 is a longitudinal section of the swaging-roll. Fig. 7 is an enlarged side view of part of the swage-roll and die, showing the operation of making spikes. Fig. 8 is a vertical cross-section through the die-table and dies on the line *x x*, Fig. 3.

In the several figures like letters of reference denote similar parts.

Our machine is an improvement on the machine for rolling spikes invented by Ambler J. Rogers, and for which Letters Patent are granted to him, bearing date the 8th day of May, 1866. In that machine a bar of iron heated red-hot is laid in a longitudinal groove in a horizontal table placed upon rollers, and caused to traverse under a roll having a flange which enters the groove in the table and rolls out the bar of iron, the flange of the roll being so shaped as, in conjunction with wedge-shaped projections in the bottom of the groove, to form the point of one spike and the head of another. In that machine the spikes are rolled from head to point, the head of each spike being first formed, and then the body of the spike rolled to the required thickness, and lastly the tapered point being made.

In order to operate the machine just described it is necessary to use a bar of iron considerably thicker than the body of the spike to be made, as otherwise the head would not be full, and in doing this the body of the spike must be reduced to about one-half the thickness of the bar, which gives the iron bar as it is elongated a tendency to bow out and rise up out of the groove in front of the roll. Another difficulty is that when the spike is compressed in the groove by the flanged roll, it fills the space so closely as to make it very difficult to remove the spikes without bending them out of shape.

Our improvement is designed to remedy these difficulties, so that not only can a thinner bar of iron be used, which will not require to be much reduced, but that the finished spikes can be taken out of the machine with the greatest ease.

We also, by means of our improvement, make a superior article of spike by rolling them from the point toward the head, (instead of vice versa, as has been heretofore the practice,) whereby the surplus iron is forced by the reducing-roll into the head of the spike, which is thus made full and large, with ears at the sides of the head, which are very important in spikes which require to be drawn after they have been used.

To enable others skilled in the art to construct and use our improved machine, we will proceed to describe its peculiarities of construction and mode of operation.

In the accompanying drawings, A A′ are the housing of the machine, in which are the bearings of the flanged roll B, by which the spikes are rolled, and of the shaft C, by which the machine is operated. The axes of the roll B and shaft C are parallel, and in the same vertical plane, the roll B being placed above the shaft C.

At each end of the machine are two uprights, D D, which support the horizontal table E on rollers *a a*, which have their bearings in the uprights D D. The horizontal table E is placed between the housing A A, as shown in Fig. 2. On the under side of the table E is a toothed rack, *b*, Fig. 2, extending from end to end, which gears into the teeth of the cog-wheel *c*, fixed on and revolving with the driving-shaft C. On the shaft C is also a cylindrical drum, F, which revolves with it, and is situate under the poppets or side-dies *m*. On the journal of the roll B and on the shaft C, outside of the housing A, are the gear-wheels G G′, by which the roll B is caused to revolve on its axis in such manner that the periphery of the flange *e* of the roll B shall revolve with rolling contact over the bar of iron placed in the die *f*. The circumference of the pitch-line of the cog-wheel *c* bears such relation to the periphery of the flange *e* of the roll B, and to the relative diameters of the cog-wheels G G′, that when the machine is in operation one of the

swages *g* in the roll B shall always exactly coincide with one of the wedge-shaped projections in the bottom of the die *f*, so as to form between them the point of the spike, as shown in Fig. 7.

On one side of the horizontal table E are fixed two L-shaped frames, *h h'*, against the ends of the short arm of which is placed the die *f*, in which the spikes are formed, extending lengthwise of the table E and parallel to its sides. The inner face of the long arm of each of the frames *h* is wider at one end than at the other, so as to form an incline; and between these inclined surfaces and the outer edge of the die *f* is placed, in each frame, a wedge, *k*, having a similar degree of inclination in the opposite direction, so that, by forcing the wedges forward, the die *f* may be pushed laterally from the frames.

The wedges *k* are moved by the screws *i i*, and by this means the die *f* is adjusted so as to be exactly in line with the flange of the roll B throughout its entire length. Projecting from the housing A on each side are rollers *l l*, which press against the side of the horizontal table E, and preserve in the proper direction as it traverses back and forth under the roll B, while they also prevent it from rubbing against the housing A.

The die *f*, in which the spikes are rolled, is made of chilled cast-iron or of steel. It is L-shaped in cross-section, forming the bottom and one side of the cavity in which the dies are formed. The length of the die *f* is such as may be convenient, being limited by the length of the horizontal table E. The width of the bottom of the die within its cavity is equal to the width of the spike, this width being increased by a recess, *o*, in the side of the die whenever the head of the spike is to be formed, so as to form a lug or ear on the side of the head of the spike. In the bottom of the die, at regular intervals apart equal to the length of the spike, are inclined projections *n*, by which the lower half of the point of the spike is formed. One side of the cavity of the die *f* is part of the die itself, as just stated, but the other side is formed of separate pieces or poppets *m m*, the shape of which is shown in Fig. 4. The poppets are placed end to end in suitable holes *p* in the table E, the head, which is larger than the shank forming the side of the die *f*, and the shank passing through, and descending a little below the under surface of the table. In front of the roll B the lower end of the poppets rests upon a shelf, H, (see Fig. 1,) which elevates them sufficiently to keep the upper edge of the T-head of the poppets level with the top of the side of the die *f*, and thus form with the die *f*, in front of the roll B, a rectangular cavity, having a bottom and two sides. The poppets *m'*, which are in the rear of the roll B, not being supported by the shelf H, drop down in their holes *p* in the table until the upper surface is level with the bottom of the cavity of the die *f*, so as to leave the finished spike exposed on one side, and enable it to be easily removed. The poppets are each the length of a single spike, and have one corner of the head taken off, as at *x* in Fig. 4, so as to form a recess in the side of the cavity of the die, corresponding with the recess *o* on the other side, and for the same purpose.

As the table E passes backward under the roller B the poppets *m'* drop down when they reach the end of the shelf H, as shown in Fig. 1, but to insure their descent a roller, *q*, projecting from one side of the housing A', the under side of which is at the level of the bottom of the die *f*, causes them to drop by pressing on their upper surface, as shown in Fig. 1.

In order to prevent the poppets or side dies *m* spreading out sidewise at the point where the pressure of the roll B acts upon the iron in the die *f*, a small frame, I, carrying two or more friction-rollers, *s*, is set in the inside of the housing A, as shown in Fig. 3, and is furnished with set-screws *t t*, by which the degree of pressure may be regulated. These rollers *s s* also serve to keep the table E in position, having their bearing on the opposite side from the rollers *l l* and between them.

The roll B has a flange, *e*, projecting from it all around, which flange is of the width of the cavity in the die *f*, between the side of the die and the poppets *m*, and fits into it, as shown in Fig. 2, entering it to such a depth as to roll the spikes to the proper thickness. The flange may be made as a separate ring, as shown in Fig. 7, keyed to the roll B, so as to be adjustable to the proper relative position to the die *f*. The flange *e* is of such diameter as to make several spikes at each revolution, and has recesses *v* at proper distance apart to form the head of the spike. Immediately back of each recess *v* is a slot in which slots are placed the swages *g*, by which the spikes are pointed. The projecting point of each swage *g* touches the apex of one of the inclined projections *n* in the die *f* as the roll B revolves and the table E moves under it so that the head of one spike is formed, and the next adjoining spike is cut off and pointed at the same time.

The operation of our improved machine is as follows: The horizontal table E being drawn back from under the roll B until all the poppets or side dies *m* rest on the shelf H, a bar of iron properly heated is laid in the bottom of the die *f* in the groove formed by the side of the die and the poppets. The roll B is then caused to revolve on its axis in the direction indicated by the arrow in Fig. 7, and the table moves forward in the same direction. The effect of this is shown in Fig. 7. The swage *g* presses down the point of the spike and tapers it against the inclined projection *n*. The body of the spike is then rolled down and slightly reduced in thickness, the excess of iron being pushed toward the head end of the spike, enlarging it at that point, forcing the iron into the cavities on either side, and thus forming ears on the spike. The next swage *g'* then cuts off the spike, the recess *v* forming the head. The spikes are thus formed in suc-

cession from point to head. After the spikes are formed and pass in front of the roll B the poppets pass off the end of the shelf H and drop down, as before described, leaving one side of the spikes exposed, and thus making it easy to remove the spikes from the die *f*. When the iron bar in the die *f* is all worked into spikes, the roller E is run back again by reversing the motion of the driving-shaft C. In doing this it is necessary to raise the poppets *m'* up onto the shelf H. This is effected by the drum F on the shaft C which raises the poppets up as soon as their shank touches the revolving surface of the drum.

The great advantage of our machine is that the spikes are made without either bending over or staving up the head, and that the spikes are wider at the head than in the shank, which makes it much easier to draw them.

When the head of a spike is formed by bending over the iron or staving it up the fibers of the metal are arranged and opened to a greater or less extent, which makes it weak at that point, but by our mode of making them the swell of metal necessary to form the head without bending is obtained by rolling it from the point toward the head, the effect of which is to swell the iron at the head.

Instead of making the recess *v* in the flange of the roll B to form the head of the spike, the flange might be made without such recesses, and the necessary recess be made in the bottom of the die *f*, as shown by dotted lines at *w* in Fig. 7.

Having thus described our improved machine for making spikes, what we claim as our invention, and desire to secure by Letters Patent, is—

1. Forming the head of the spike by rollin it from point to head between a flanged rol and reciprocating die, constructed and operat ing substantially as hereinbefore described, for the purpose of enlarging the head without bending or upsetting.

2. The use, in combination with the die *f* forming the bottom and one side of the cavity for forming the spikes, of the poppets or side dies *m*, constructed and operating substantially as hereinbefore described.

3. The use, in combination with the poppets or side dies *m*, of the drum F and table H, for elevating, and the roller *q* for depressing the poppets, constructed and operating substantially as hereinbefore described.

4. The use of the wedges *k*, in combination with the frames *h* and die *f*, for the purpose of adjusting the die *f* to the flanged roll B, substantially as hereinbefore described.

5. The use of the rollers *l l* in the housing-frame pressing against one side of the die-table E, and the rollers *s s* in the adjustable frame I, pressing against the poppets or side dies on the other side of the table E, in combination with the die-table E, die *f*, and poppets *m*, for the purpose of keeping the table in proper position, and preventing the spreading of the poppets, substantially as hereinbefore described.

In testimony whereof we, the said AMBLER J. ROGERS and WILLIAM D. RINEHART, have hereunto set our hands.

AMBLER J. ROGERS.
WM. D. RINEHART.

Witnesses:
ALLEN C. BAKEWELL,
W. D. LEWIS.