

2 Sheets—Sheet 1.

MACHINE FOR MAKING SPIKES.

Patented Sept. 18, 1883.



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(No Model.)

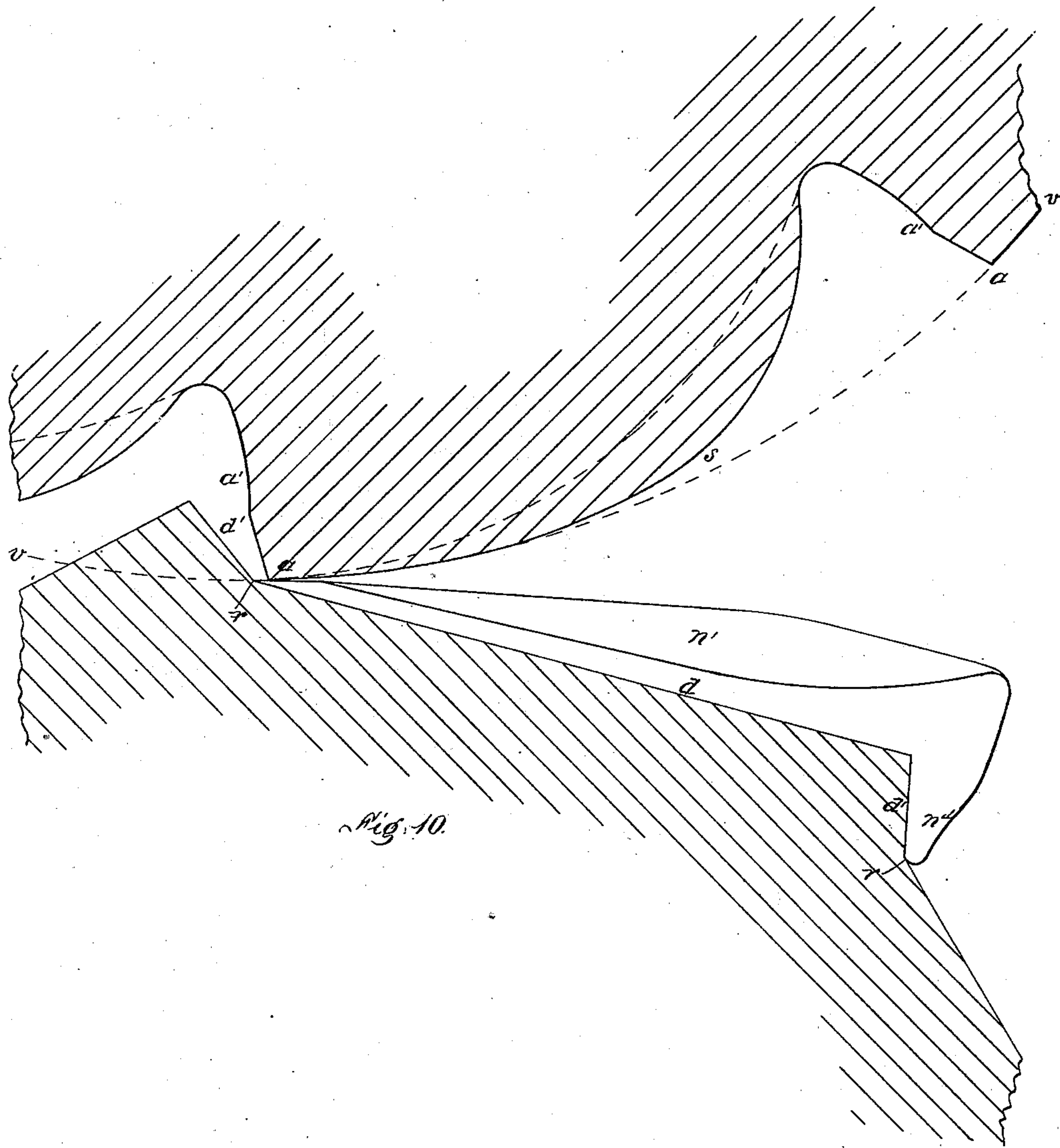
2 Sheets—Sheet 2.

H. GREER.

MACHINE FOR MAKING SPIKES.

No. 285,355.

Patented Sept. 18, 1883.



Witnessed.

C. M. Clarke.
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Inventor. Howard Greer.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING SPIKES.

SPECIFICATION forming part of Letters Patent No. 285,355, dated September 18, 1883.

Application filed April 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, HOWARD GREER, of Chicago, county of Cook, State of Illinois, have invented or discovered a new and useful Improvement in Spike-Rolls; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

like letters indicating like parts—

Figure 1, Sheet 1, is a view in elevation of a pair of rolls having die-faces suitable for the rolling of spikes under or in accordance with my present invention. Fig. 2 is a vertical cross-section thereof in the plane of the line $x x$ of Fig. 1. Fig. 3 is a detached view in perspective, to a somewhat larger scale, of a section of the rolls of Fig. 1. Fig. 4 shows in perspective the ends of a series or nest of blanks or bars such as I employ in the operation hereinafter described. Fig. 5 shows, to a still larger scale, one form of spike as produced in said operation. Fig. 6 is an end view of the spike-head. Fig. 7 shows another form of spike or spike-blank which the said rolls are adapted to make. Fig. 8 shows the same as formed by the further operation of swaging. Fig. 9 shows an end view of the head of the spike of Fig. 8; and Fig. 10, Sheet 2, shows by diagram in elevation the preferred form of the rolling-sections in their relation to each other and to the spike which is formed thereby.

In a separate application already filed I have shown, described, and made claim to an operation or method of rolling a series of bars such as are illustrated in Fig. 4, all of said bars being rolled simultaneously from a single billet, and at the last pass separated from each other, or substantially so, and ready for further working, as may be desired. The completed product of said operation is represented by the full lines in Fig. 4, where $c c$ represent the bars; but the form which the bar has just before the last or slitting or severing pass would be represented if every alternate bar c were in the position represented by the dotted lines c' , and with the adjacent corners of the sections $c c'$ so far lapping onto each other that they would be practically integral. The op-

eration hereinafter described may commence with either of the forms of bars thus represented. If the severed series be employed, (by which I mean such a series as is represented by full lines,) I pass them from the slitting or severing rolls by suitable guides, and without necessary reheating, directly to the rolls, presently to be described; or, if the unsevered bar be used, (by which I mean a bar substantially such as is represented by the alternately full and dotted lines,) I pass it, as before, directly to the rolls, presently to be described, and these rolls do the preliminary work of bringing all the sections $c c'$ to a common plane, as represented by full lines in Fig. 4, and this being done the remaining work is the same as in the case first supposed; and by the use of the rolls, such as are shown in the drawings, I work all the bars c into finished spikes, or into spike-blanks, as may be desired, and either completely severed from each other or so nearly severed that entire severance can easily be effected, so that the present invention relates to the construction of the die-faces employed and to the method of operation involved, as well as to minor details of construction and combination, as presently to be stated.

The rolls B B, which I employ, in their preferred construction, have each a pair of end collars, $b b$, so far apart on each roll that the intermediate space may be divided up into a series of die-faces corresponding in number and width to the number and width of the bar-sections $c c$, Fig. 4, which it may be desired to pass through and roll at once. These die-faces are designed chiefly for the rolling of spikes having each a T-shaped shank, substantially of the form shown in Fig. 5. The series of die-faces of one of the rolls—say the upper one—consists of ribs s and grooves e . The grooves commence just back of an angular corner or chisel-die, a , which forms the bevel n of the spike-point, and increase gradually in depth to near the other end, where they become more shallow, and the back rib, n' , of the spike is formed therein, and the shape of the groove should conform to the shape desired in the spike-rib. The grooves at their other or spike-head end widen out, as illustrated at e' , so as

to make room for the formation of the thickened part n^2 of the head, and the flattened end of the head is formed against the abrupt wall a' , adjacent to the next angular corner a of the next series. The die-ribs s are for the formation of the back faces, n^3 , of the T-heads of the spike-shank. The end ribs, s , next to the collars b , are of but half the width of those ribs which are between the grooves c , and the reason of this is that the end ribs s have only to form one of the parts n^3 , whereas each middle rib s has to form two such parts—that is to say, one on each adjacent edge of two contiguous bars or blanks. These series are repeated or duplicated around the roll. Corresponding to each of such series I make in the other roll two die-faces, of which the longer one, d , forms the flat side of the T-headed shank, and the shorter one, d' , forms the under side of the lip n^4 of the spike, and the angular corner a of the upper roll may enter so closely into the V-shaped groove or valley r , formed at the junction of the lower ends of the die-faces d d' , as to completely sever the two successive spikes while finishing the head and lip of one and beginning the chisel-point of the next, or, entering less deep, may leave the two adhering by a thin film or lamina of metal, to be easily broken or severed.

I desire it to be especially noted that the die-faces d are straight, or practically so, in the direction of their working length, and I am aware that such die-faces, made with a considerable degree of convexity—say as formed by striking a curve from the roll-center—are not new; but when this is the case the corresponding die-faces, s , of the upper roll have to be made with a much less degree of convexity than is necessary in the present invention. By making, as I do, the die-faces d flat, as stated, I am enabled to increase correspondingly the convexity of the opposite die-faces s , and thereby am enabled to make the angular corners a much more obtuse than could otherwise be done, and hence these corners are so much the less liable to break, and will wear away so much the more slowly; and as this is the part of the rolls subject to the most severe strain when in operation, and liable to the most rapid deterioration by wear, I deem this a very important and useful feature of the present invention, because by prolonging the life of the rolls it makes the working of the invention commercially practical and successful.

It will be observed that in working the invention as thus far described the width of the spike in its broadest part will be uniform from end to end, and also will be of the same width as the blank or bar from which it is made, because the nest or series of bars c going through simultaneously side by side and just filling or approximately filling the space between the end collars, b , there will be no room for lateral spread. All the reduction that is effected will be done by or as a result of “drawing,” as it

is technically called; but in order to make a spike the head of which shall, when it is completely finished, be wider than the widest part of the shank, I make in the die-wall a' , against which the head is formed, and directly at or near the points where the opposite edges of the head are formed, little recesses z z , of suitable size to form ribs or teats z' , Fig. 7, on the outer end or face of the spike-head, which forming is done in the rolling operation. This gives a spike-blank of uniform width from end to end, as before. The blank is then clamped between dies, just beneath its head, or set in a socketed anvil, and by a swaging blow of a hammer or die on the spike-head the ribs z' are swaged down, and the metal of the head is thereby spread out laterally, as at z^2 , Figs. 8 and 9, so as to form a head wider than the widest part of the shank. These recesses z z may be used or not, according to the style or shape of the spike-head desired; and the swaging referred to may be done while the blank is either cold or hot.

I am aware that it is not new to effect a severance between or a cutting off of spike-blanks by means of a cutter, the operative edge of which is projected beyond the periphery of the working-surfaces which form the shank; but in the construction shown and described, and which I believe to be the best, it will be observed that this is not the case. The angular points a , Fig. 10, have at their apexes the longest radial lines of the roll, (the curve being represented by the dotted line v v ,) and one side of the angle thus formed, which is composed of the adjacent die-faces s , has a regular or practically unbroken curve as it leaves the apex of a , and has the proper curvature for forming one side of the spike-shank; also, in the prior constructions of spike-rolls, the roll-face against which the cutter works has its adjacent working-face on the shank-rolling side sloping backward or toward the roll-center till it meets the curve which forms one side or face of the spike-shank, whereas in the preferred form of the present invention the corresponding side, d , runs straight, or practically so, from the bottom of the valley r to the opposite end of its working-face, or to its point of junction with d' . These features of construction further increase the durability or lasting power of the rolls and render the working of each bar into spike form more easy and certain. It is also true that in prior spike-roll constructions the rolling-face corresponding to that here lettered d has heretofore been made curved in the line of its length, the center of the curve being at or near the roll-center. My improved form of die-face departs from this prior construction, in that it removes a portion of such rolling-face—say so much as is included between such curve and its chord, or a considerable part thereof—so as to make the side d straight, or approximately so, and the portion so removed is added to the opposite die-faces of the other rolls, so as to that

extent to increase their convexity. As one of the results of making the angular projections *a* of an obtuse form, or approximating thereto, it is also true that it to that extent ceases to act in the manner common in the cutters heretofore employed, which latter cut somewhat like a knife or chisel, whereas in my improved construction the angular blunt corners *a* work down into the body of the bar and displace the metal by pressure, so as to press one way into the head so much metal as is needed to complete it and press the residue in the other direction, and so dispose of it that it will go properly into the shank; hence the angular corner *a* operates chiefly as a die, and to but a slight extent, if at all, as a cutter.

As regards the method of rolling spikes, by itself considered, by the simultaneous passage of a series of bars side by side through between a series of die-faces arranged side by side and duplicated around the rolls, I do not limit myself to any particular form of die-faces, cutters, &c., as such method may be used with any known style of such devices, though less advantageously than with substantially such die-faces as are shown and described herein, and such method of rolling, which, for convenience, I term "multiple rolling," I claim as within my invention, whatever the form or style of die-faces, cutters, &c., with which it may be used, and whether applied to the making of spikes or other articles.

In using the term "die-faces" I do not mean to be understood as implying or saying that such working-faces must be made of dies let into or secured to the rolls. They may be so constructed, if desired; or they may be made directly on the faces of otherwise solid rolls; or they may consist of rings slipped onto and secured on a shaft, as is common in die-rolling, or otherwise constructed, as may be preferred; and for the purposes of the present case all the die-faces, ribs, or working-faces on the rolls, hereinbefore referred to, may be generally termed "dies."

In order more certainly to prevent the formation of a fin between the collars *b b* at any part of their revolution, it may be better to dispense with, or turn down, or otherwise lessen, the diameter of the collars of one roll and increase the diameters of the others, so that they shall at all points of bite overlap the edges of the die-faces of the opposite roll.

I am aware of and hereby disclaim the form of dies shown in the Loughran patent, No. 20,076, of April 27, 1858; but it will be ob-

served that the lower Loughran die so far deviates from a straight form that it is adapted to produce thereby the one half of a wedge-shaped spike-point, and that the upper die so far deviates from a continuously-curved form that by its uncurved portion it is adapted to produce the other half of a wedge-shaped spike-point; hence the lower Loughran die is not straight, nor approximately so, within the meaning of that term as herein used, nor does the upper Loughran die have the continuous curve herein referred to.

I claim herein as my invention—

1. The method of multiple rolling herein described, which consists in simultaneously passing a series of two or more bars side by side and in edgewise contact with each other through between a series of die-faces arranged side by side and duplicated around the rolls, substantially as set forth.

2. A pair of spike or spike-blank rolling dies having in combination the one an angular projection, *a*, one side of the angle of which is formed by a curved die, *s*, which curves continuously forward from the apex of *a*, and the other having a valley, *r*, one side of which, *d*, extends directly forward in a line straight, or approximately so, substantially as described.

3. A spike-rolling die consisting of the blunt angular projection *a* and the die-face *s*, curving continuously forward from the apex of *a*, substantially as set forth.

4. A pair of spike-rolls having singly or in duplicated series the dies *d*, *d'*, *s*, *e*, and *a'*, substantially as set forth.

5. The spike-rolling die *d*, extending straight, or practically so, from the bottom of the valley *r* to its intersection with *d'*, substantially as set forth.

6. In rolls for the rolling of T-shaped spike-shanks, the die *d*, flat, or substantially so, in combination with the grooved convex die *s*, substantially as set forth.

7. The die *s*, having a groove, *e*, which widens toward the head-forming end, substantially as set forth.

8. The die *a*, having recesses *z z*, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

HOWARD GREER.

Witnesses:

FRANK J. LOESCH,
GEORGE H. CHRISTY.