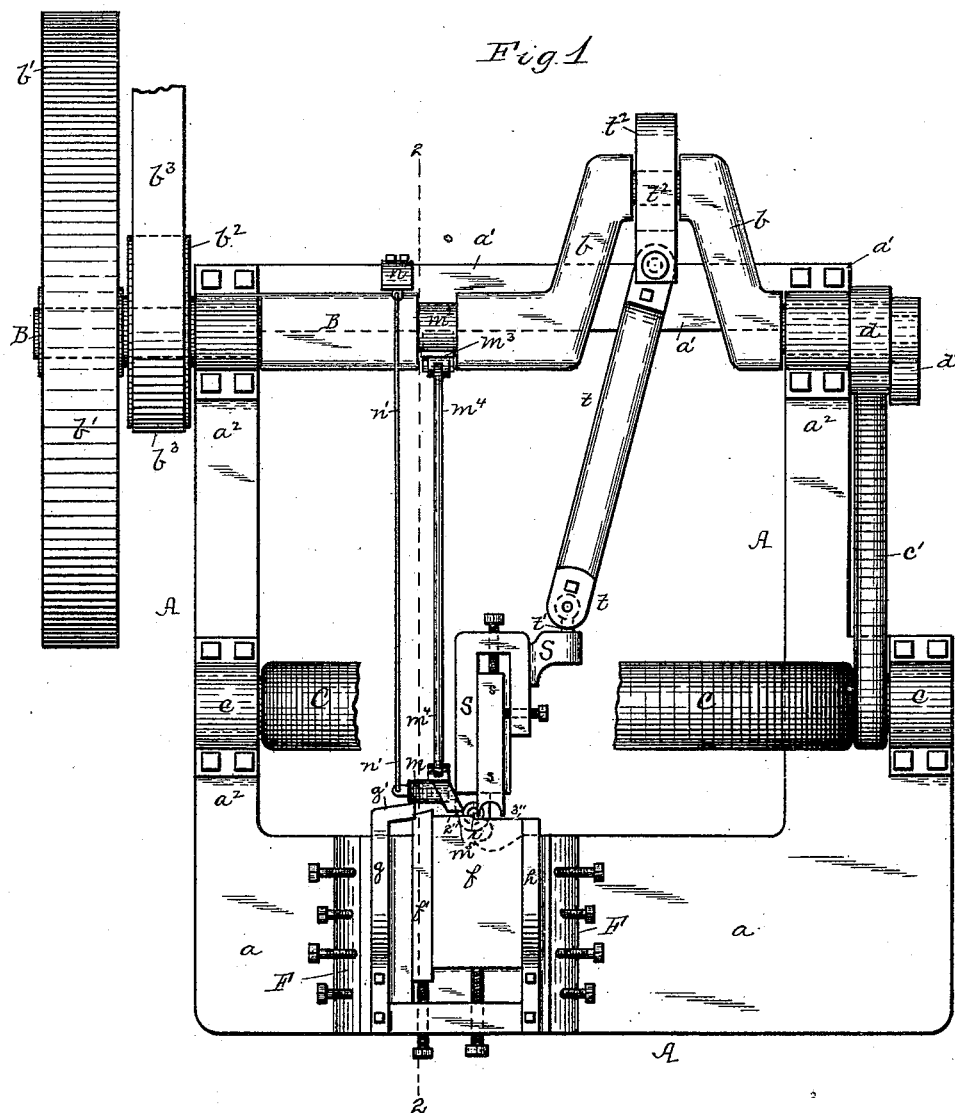


4 Sheets—Sheet 1.

No. 421,019.

Patented Feb. 11, 1890.



J. H. Barker.  
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Sansom Taylor  
By James D. Gray  
Attorney

(No Model.)

4 Sheets—Sheet 2.

S. TAYLOR.  
MANUFACTURE OF HOOK NAILS.

No. 421,019.

Patented Feb. 11, 1890.

Fig. 12.

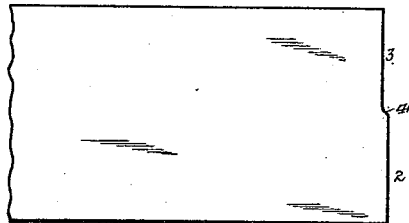


Fig. 13.

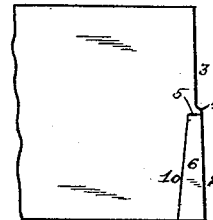


Fig. 2.

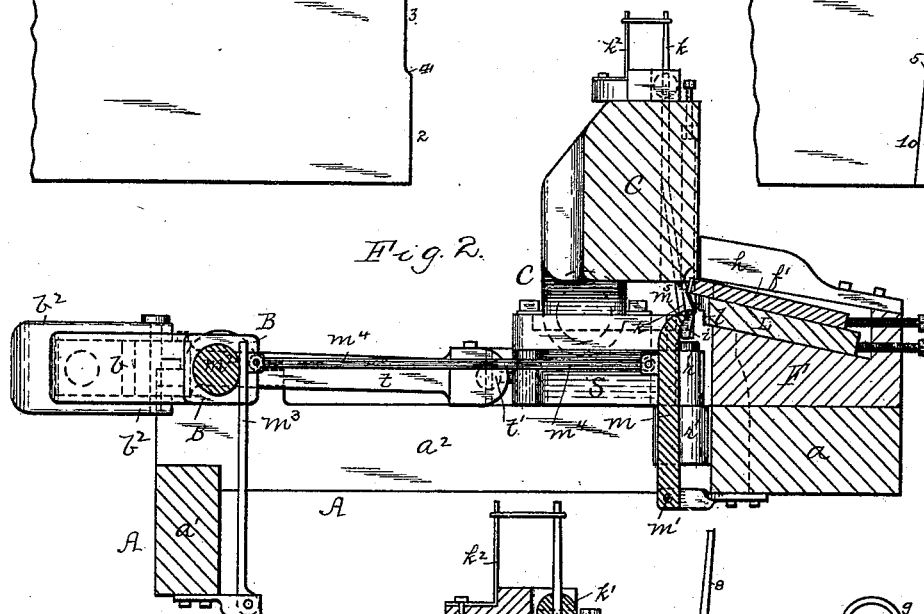


Fig. 14.

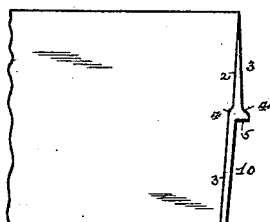


Fig. 15.

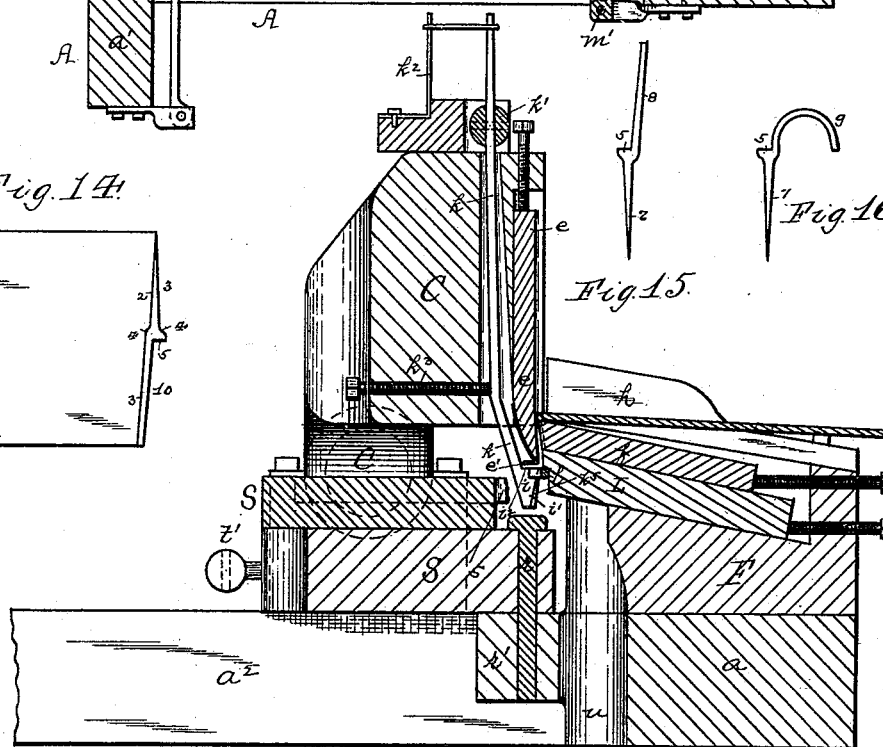


Fig. 3.

Witnesses:  
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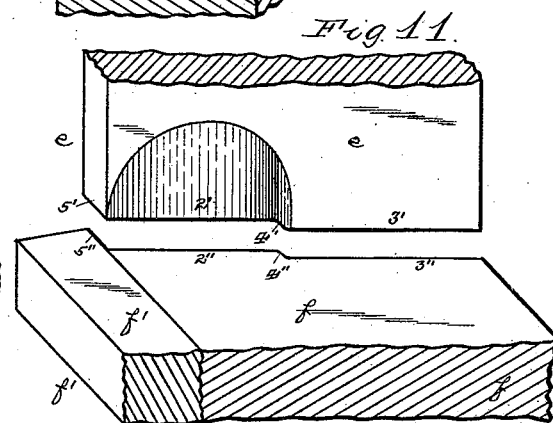
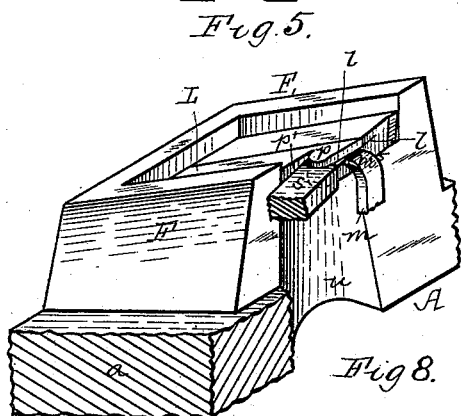
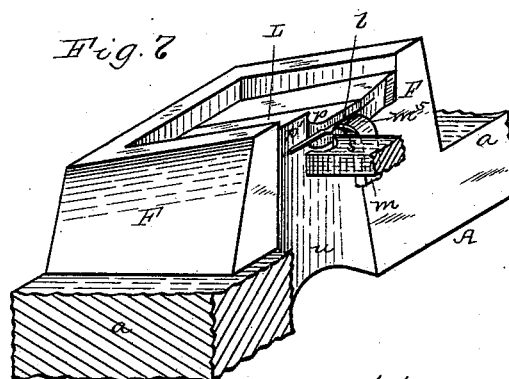
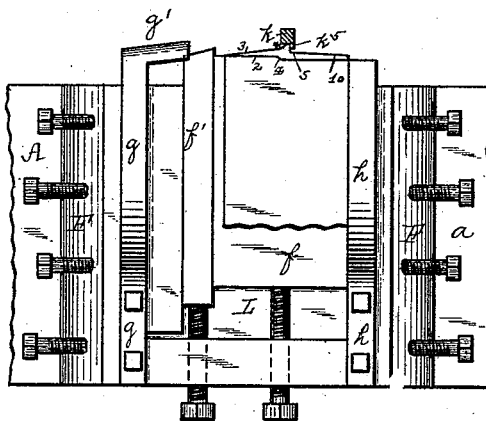
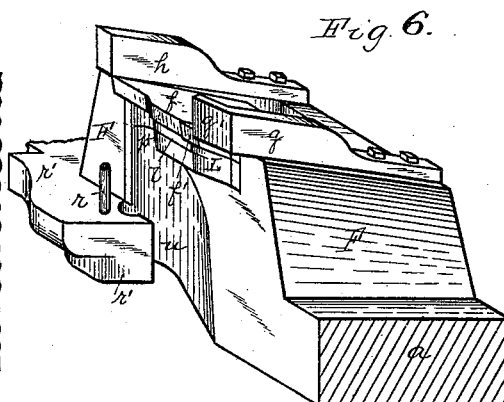
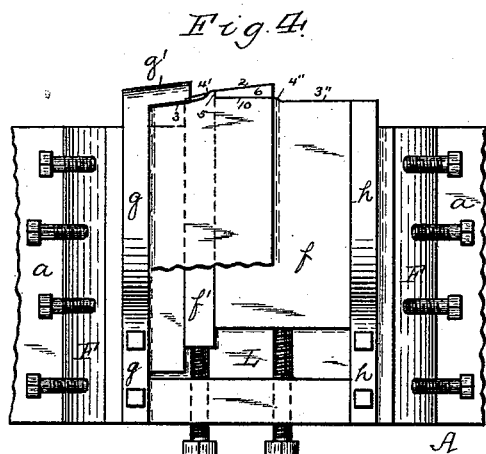
(No Model.)

4 Sheets—Sheet 3.

S. TAYLOR.  
MANUFACTURE OF HOOK NAILS.

No. 421,019.

Patented Feb. 11, 1890.



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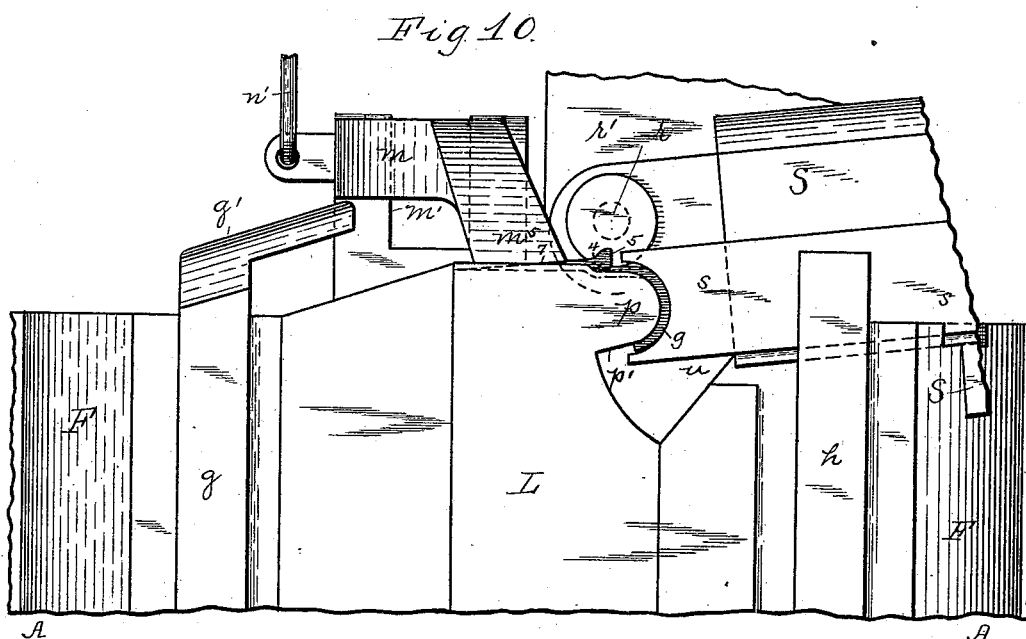
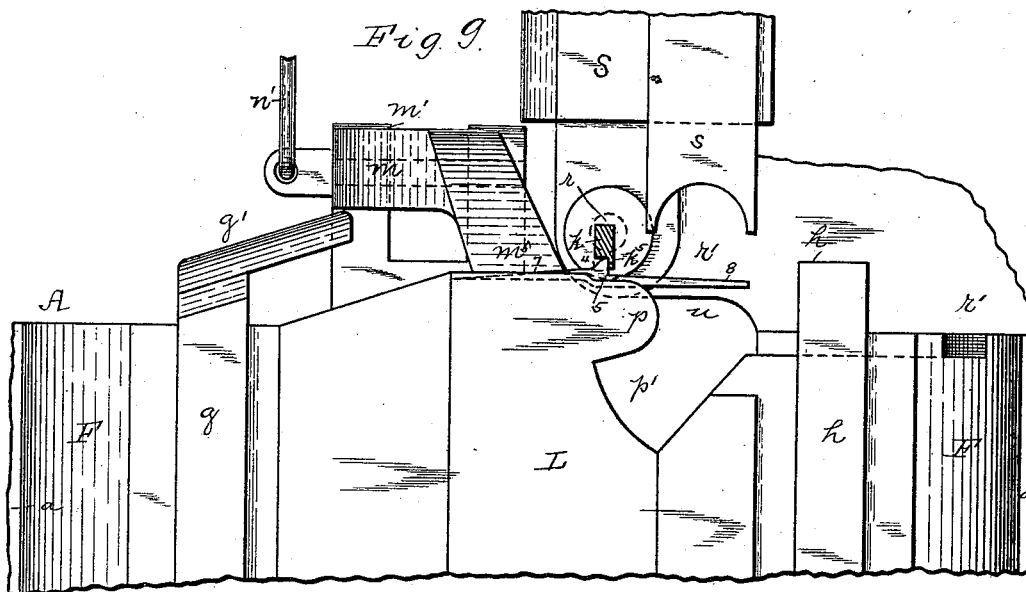
(No Model.)

4 Sheets—Sheet 4.

S. TAYLOR.  
MANUFACTURE OF HOOK NAILS.

No. 421,019.

Patented Feb. 11, 1890.



Sicknesses;  
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**Inventors**  
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Attorney

# UNITED STATES PATENT OFFICE.

SANSOM TAYLOR, OF PITTSBURG, PENNSYLVANIA.

## MANUFACTURE OF HOOK-NAILS.

SPECIFICATION forming part of Letters Patent No. 421,019, dated February 11, 1890.

Application filed October 21, 1889. Serial No. 327,653. (No model.)

*To all whom it may concern:*

Be it known that I, SANSOM TAYLOR, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in the Manufacture of Hook-Nails; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to what are known as "hook-nails" or "gas-pipe nails," these nails being used in large quantities for different purposes, and particularly for fastening pipes to the beams, girders, or other supports within houses, its object being to provide a rapidly-operating machine for the manufacture of these nails.

To these ends my invention consists, generally stated, in a machine for forming these nails having cutting-shears corresponding to the blank and adapted to produce the blank from the cut plate and bending mechanism in position to receive the blank from the shears for bending the upper portion of the blank into hook form, all as will be hereinafter more particularly set forth and claimed.

To enable others skilled in the art to practice my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a top or plan view of said machine, the part of the lever carrying the knife being removed. Fig. 2 is a longitudinal section of the machine on the line 2 2, Fig. 1. Fig. 3 is an enlarged sectional view of the shearing-knives and their supports. Fig. 4 is a top view of the stationary shearing-knife, showing the position of the plate when cutting the shoulder on the blank. Fig. 5 is a like view of the stationary shearing-knife, showing the position of the plate when severing the blank from the plate. Figs. 6, 7, and 8 are perspective views of the bending-anvil in different positions, illustrating the bending of the hook portion of the blank. Figs. 9 and 10 are top views, the stationary shearing-dies being moved so as to illustrate more clearly the bending of the blank. Fig. 11 is a perspective view showing the stationary and movable shearing-knives, and Figs. 12 to 16 illustrate different steps of cutting the blank from the plate and producing the finished hook-nail.

Like letters and figures of reference indicate like parts in each.

In forming a hook-nail according to my invention, I employ the ordinary plate-iron such as employed in the making of nails, this plate being rolled to the proper thickness and the nail-plate being cut therefrom across the grain, so that the grain runs longitudinally of the width of the plate, and as this plate is fed to the machine the grain of the metal extends longitudinally of the blanks cut from the plate.

The following is a brief description of the method of making the nails: The plate or strip is fed to the machine, so that its end is cut on two lines 2 3, extending toward the center of the plate and connected by a rounded portion or ogee curve. At the end of the plate is first cut a shoulder 5, the knives also cutting along the line 10, and thus necessitating waste of the metal 6, as shown in Fig. 13. The finished nail-blank is then cut from the plate, as shown in Fig. 14, by a cut the opposite to that shown in Fig. 12, the metal being cut along the lines 2 3 4, and severing the finished nail-blank, (shown in Fig. 15,) this blank having the point 7, shoulder 5, and the strip 8 above the shoulder. The grain of the iron from which the blank is cut extends longitudinally through the point 7 and the strip 8 as the nail-blank has been cut from the end of the plate, in which the grain runs longitudinally of the width of the plate. The final step in forming the finished hook-nail is to bend the strip 8 over to the desired curve, as shown at 9, Fig. 13, so producing the finished nail, in which the fiber of the hook metal extends longitudinally through the point end 7 and follows the curvature of the hook end 9.

The machine shown in the drawings is specially constructed for the manufacture of these hook-nails, and I will first describe the construction of the machine and then the operation of forming the hook-nails thereon. The machine is supported on a suitable bed A, resting on suitable legs or standards, and having the front cross-beam  $a$ , rear cross-beam  $a'$ , and side cross-beams  $a^2$ . On the bed A, mounted on suitable bearings, is the driving-shaft B, having the crank  $b$  therein for operating the bending apparatus, as here-

inafter described, having the crank  $d$  for operating the lever carrying the movable knife, and having the fly-wheel  $b'$  and driving-pulley  $b^2$ , over which passes the belt  $b^3$ . The lever C, carrying the knife  $e$ , is pivoted at  $c$  on the side beams of the frame, and its arm  $c'$  is connected to the crank  $d$  on the driving-shaft B by a link-bar  $d'$ , which acts to give the necessary reciprocating movement to the lever and shearing-knife supported thereon at each rotation of the main shaft. The shearing-knife  $e$  is secured in a box on the lever C, and its position may be adjusted thereon by means of screws, as is usual in nail-machines. Resting upon the front cross-beam  $a$  is the support for the stationary shearing-knife, this support being shown at F, and the stationary shearing-knife  $f$  being adjusted in its support by means of screws, as is usual with the stationary shears of nail-machines.

Before proceeding to the description of the bending mechanism I will describe in particular the shearing mechanism, an enlarged view of the shearing-knives being shown in Fig. 11. The removable shearing-knife  $e$  has a face corresponding to the edge 2 4 3, (shown in Fig. 14,) having the shearing-edge 2', extending from the left-hand side of the die toward the center, the shearing-edge 3', extending from the right-hand side toward the center, and the curve or ogee edge 4', connecting said shearing-edges 2' 3'. The movable knife  $e$  has also the square edge 5', for cutting the shoulder 5 on the nail, as illustrated in Fig. 13. The lower die  $f$  has the edges corresponding to those of the upper die, having the shearing-edges 2'' 3'' and the curved shearing-edge 4'' connecting them, and at the left-hand side of the die the extension 5'' for cutting the shoulder 5 on the blank. I prefer to form the extension 5'' of a separate die  $f'$ , as shown, thus obtaining the square shoulder and providing a more easy grinding of the die. These dies are employed in the manner illustrated in Figs. 4 and 5, guides  $g$   $h$  being provided on each side of the stationary shearing-dies, as shown, the guides  $g$  on the left-hand side of the shears having an inward extension  $g'$ , against which the plate is pressed in cutting the shoulder on the blank, as shown in Fig. 13, the blank having its edge cut as shown in Fig. 11, being fed along the left-hand side over the shearing-knife until it strikes the guide  $g$  and its extension  $g'$ , when, as the shearing-knife descends, the shoulders 5 will be cut out and the plate sheared along the line 10 by the shearing-faces 5' 5'' and 2' 2'' of the dies, so cutting out the waste metal 6. The blank is then drawn over until it strikes the guide  $h$  and is fed forward, the thickness of the blank being regulated by mechanism hereinafter referred to, so that when the shearing-knife again descends it will cut the nail-blank from the plate, as shown in Fig. 14, the plate being then turned over as in the method of

cutting nails, and being ready to be again presented to the shearing-knife for cutting the shoulder for the next blank.

In order to regulate the thickness of the blank to be cut from the plate, as shown in Fig. 14, I employ the guide  $k$  in the lever C, this stop-guide extending through a block or roller  $k'$ , journaled in the upper part of the lever C and extending downwardly through the lever back of the shear  $e$ , the upper end of the stop-guide  $k$  being connected to a spring-bar  $k^2$ , the pressure of which is exerted in such a manner as to force the stop-guide forward, while its movement is regulated by the set-screw  $k^3$ , extending through the lever C, near the base thereof. The lower end or base  $i$  of this stop-guide  $k$  has the form illustrated in Fig. 3, this base extending under the top shearing-knife, while its lower forward portion  $i'$  is backwardly inclined, and as the blank to be cut is pushed under the shearing-knife it will strike against this stop-guide and force it back until the stop-guide strikes the set-screw  $k^3$ , the width of the blank to be cut being measured in this way. As shown in Fig. 5, this stop-guide  $k$  has a lip  $k^5$ , against which the shoulder 5 of the blank strikes, the stop-guide therefore assisting the guide  $h$  in holding the blank in line for the last shearing cut. The shearing-knife  $e$  has either an extension  $e'$  secured thereto and extending out above the upper horizontal face  $i^2$  of the base  $i$  of the stop-guide  $k$ , or it is forged with such an extension, so that as the nail is cut from the blank and forces the stop-guide back there is no opportunity for it to pass between the lower edge of the knife  $e$  and the upper edge of the base of the stop-guide, the shoulder or extension  $e'$  of the shear and the pressure of the stop-guide holding the blank so that as it is forced down it will be held in proper line until it enters the seat formed therein in the stationary bending-anvil L, said seat being shown at  $l$ . As soon as the blank is carried down into the seat  $l$  in the bending-anvil L, the gripper M grasps the point end of the blank and holds it with said seat  $l$  during the operation of bending the hook end of the blank. This gripper M is pivoted at  $m'$ , and is operated by a cam or eccentric  $m^2$  on the shaft B, the cam-box  $m^3$  fitting around the cam and the cam-box and gripper being connected by a bar  $m^4$ . The gripper M is drawn back by a spring  $n$ , connected to the gripper by the rod  $n'$ . The finger  $m'$  of the gripper extends out in line with the seat  $l$  in the bending-anvil L and acts to hold the blank in said seat, the top and forward faces of point end of the blank resting in the seat  $l$ , while the rear face is held by the finger  $m'$  of the gripper M, the blank being thus firmly held during the bending operation.

I will now describe the construction of the bending mechanism. The bending-anvil L rests within the support F below the stationary knife  $f$ , so that when the blank is carried down by the top knife it is brought

into line with the seat *l* of the bending-anvil, as above described. This seat *l* extends along the face of the bending-anvil and corresponds in shape to the forward edge of the blank, while its upper face extends out horizontally above the blank and prevents its turning during the bending operation. The anvil has also the convex bending-face *p*, corresponding in shape to the hook portion 10 to be formed upon the blank, this seat *p* extending into the body of the anvil, and a recess *p'* being formed therein, into which the bending-die enters when bending the hook end of the blank.

15 Extending out from the rear face of the front beam of the bed is a lug *r'*, from which a pivot-pin *r* extends upwardly, and on this pin *r* is journaled the bending mechanism, this mechanism consisting of a die-box *S*, 20 pivoted on said pin and carrying the bending-die *s*, the outer end of said die-box being connected to the strap *t* by a universal joint *t'*, and the strap *t* being pivoted at its opposite end to a box *t''*, fitting around the crank 25 *b* of the driving-shaft *B*. The movement of the bending mechanism is such that when the crank is advanced toward the front beam the bending-die box *S* and its die *s* have imparted to them a swinging movement on the 30 pivot *r*, this movement causing the bending-die *s* to pass around the curved face *p* of the bending-anvil and bend the strip 8 of the blank against said curved face *p*, so forming the hook portion of the nail. The bending-face *s'* of the bending-die *s* is concave and corresponds in shape to the bending-face *p* on the anvil *L*, and as it is carried forward its edge enters the recess *p'* in the anvil *L*, so 40 enabling the apparatus to bend a half-circle or other desired form on the hook end of the blank.

The operation of such machine in forming hook-nails according to my invention is as follows: The end of the blank being cut, as 45 shown in Fig. 12, is fed over the stationary knife *f* against the guide *g* and its inward extension *g'*, the edge 2 of the blank extending under the knife *e*, while the plate rests upon the knife *f* and its extension *f'*. When 50 the cutter descends, it cuts from the blank a piece 6 (see Fig. 13) and forms the shoulder 5 on the blank, leaving the edge of the plate cut along the lines 3, 4, 5, and 10. The operator then slides the plate over until it strikes the guide *h* and presses it forward against 55 the stop-guide *k*, which is forced back until it strikes the set-screw *k''*, and when the knife again descends it cuts the plate along the line 2 4 3, Fig. 14, severing from the plate a 60 blank such as shown in Fig. 15, having the point end 7, shoulder 5, and upper strip 8. This blank is carried down by the movement of the upper knife or cutter, being held in proper place as it descends by the pressure 65 of the stop-guide *k* until it enters the seat *l* of the bending-anvil *L*, when the gripper *M* advances and grips the point end of the

blank, as shown in Fig. 7, and the cutter and its stop-guide rise out of the way. When 70 held in this position, the strip 8 of the blank extends out beyond the curved face *p* of the bending-anvil, and the bending-die *s* then advances and bends the strip 8 of the blank around the bending-die *d*, so forming the hook end on the nail and producing the finished nail, which drops through the space *u*, 75 leaving the machine ready for the formation of another nail. As soon as the blank has been cut from the plate the plate is turned over, so reversing the relative position of the 80 edge 2 4 3 formed by the last cut, and so presenting the proper edge of the plate for the cutting of the next blank, as shown in Fig. 12, and the operation is repeated.

The machine is simple in operation and 85 capable of forming these hook-nails rapidly and at low cost, and as the nails are formed from plate metal, which can be rolled in large plates and then sheared into the nail-plate, the hook-nails can be formed at low cost. At 90 the same time I am enabled to produce a nail with a driving-shoulder which is clearly defined and gives a wide head for the blows in driving the nail. I am also enabled to produce a cut hook-nail made from plate metal, 95 and therefore reduced in cost, with the fiber extending longitudinally through the point and following the curve of the hook portion, so obtaining the maximum of strength in such a nail. 100

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

1. In a machine for forming hook-nails, the combination of shears having cutting-edges corresponding to the shape of the blank to be 105 cut, a bending-face below the shears corresponding to the hook portion of the blank, and a bender moving over said bending-face, substantially as and for the purposes set forth.

2. In a machine for forming hook-nails, the 110 shear-knives having continuous cutting-edges extending the entire length thereof, said edges having straight portions extending from the ends toward the center and curved portions connecting said straight portions at or near the center of the knives, substantially as and for the purposes set forth. 115

3. In a machine for forming hook-nails, the combination of the bottom shearing-knife having an edge corresponding to the blank 120 and having an extension *5''* at one end thereof, and the top shearing-knife having an edge corresponding to the blank and having the cutting-face *5'*, substantially as and for the purposes set forth. 125

4. In a machine for forming hook-nails, the combination of the top shearing-knife, the bottom shearing-knife having the extension *5''*, and the guide *g*, having the inward extension *g'*, substantially as and for the purposes set forth. 130

5. In a machine for forming hook-nails, the combination, with the stationary knife *f*, of the movable knife *e*, having the shoulder *e'*,

and the stop-guide *k*, having the base *i*, provided with a horizontal top face extending under said shoulder *e'*, substantially as and for the purposes set forth.

5 6. In a machine for forming hook-nails, the combination of the lever *C*, the knife *e*, secured therein, the stop-guide *k*, secured to the pivoted block *k'*, the spring *k*<sup>2</sup>, connected to the upper end of the stop-guide, and the  
10 set-screw *k*<sup>3</sup>, substantially as and for the purposes set forth.

7. In a machine for forming hook-nails, the combination of the shearing-knives, the stop-guide, and the bending-anvil under the stationary knife, and having a seat on its face  
15 to receive the cut blank, substantially as and for the purposes set forth.

8. In a machine for forming hook-nails, the combination of the bending-anvil *L*, having  
20 the seat *l* to receive the cut blank and the bending-face *p*, and the gripper *M*, for holding the point end of the blank in the seat *l*, substantially as and for the purposes set forth.

25 9. In a machine for forming hook-nails, the combination of the shearing-knives, the bending-anvil under the stationary knife and having a seat on its face to receive the cut blank, the stop-guide moving with the reciprocating  
30 knife, and the gripper for holding the point end of the blank, substantially as and for the purposes set forth.

10. In a machine for forming hook-nails, the combination of the bending-anvil *L*, gripper *M*, pivoted below the anvil and working  
35 against the same, cam *m*<sup>2</sup>, cam-box *m*<sup>3</sup>, and bar connecting the cam-box and gripper, substantially as and for the purposes set forth.

11. In a machine for forming hook-nails,

the combination of the bending-anvil *L*, having the bending-face *p* thereon, and the pivoted bending-die swinging around said bending-face, substantially as and for the purposes set forth.

12. In a machine for forming hook-nails, the combination of a bending-anvil having a bending-face thereon, a gripper acting to hold the point end of the blank, and a bender acting to force the blank against said bending-face, substantially as and for the purposes set forth.

13. In a machine for forming hook-nails, the combination of the bending-anvil having the convex bending-face *p*, and the bending-die pivoted in front of the anvil and having  
55 the concave bending-face *s'*, substantially as and for the purposes set forth.

14. In a machine for forming hook-nails, the combination of the bending-anvil having the convex bending-face *p* and recess *p'* at the side thereof, and the bending-die pivoted in front of the anvil and swinging into said recess and having the concave bending-face  
65 *s'*, substantially as and for the purposes set forth.

15. In a machine for forming hook-nails, the combination of the bending-anvil, the bending-die pivoted in front thereof, the driving-shaft having a crank therein, and the bar connecting the crank and bending-die, substantially as and for the purposes set forth.

In testimony whereof I, the said SANSOM TAYLOR, have hereunto set my hand.

SANSOM TAYLOR.

Witnesses:

JAMES I. KAY,  
J. N. COOKE.