F. G. MARTIN & J. C. CROWTHER.

NAIL, SPIKE, AND THE LIKE WITH SOFT METAL HEAD.

APPLICATION FILED NOV. 15, 1913.

1,148,245.

Patented July 27, 1915.

3 SHEETS—SHEET 1.

FIG. 5.

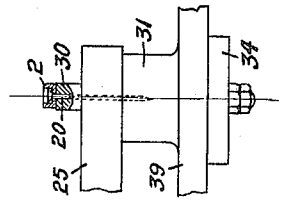


FIG. 4.

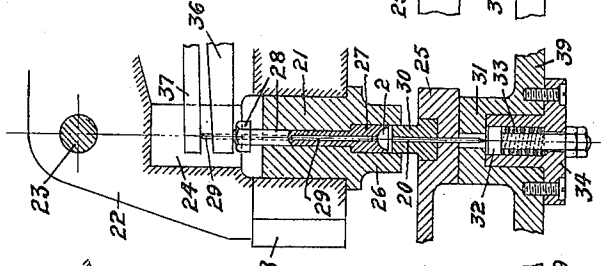


FIG. 3.

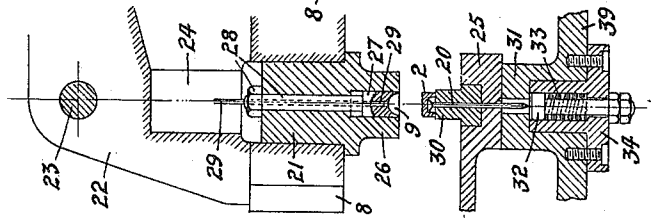


FIG. 2.

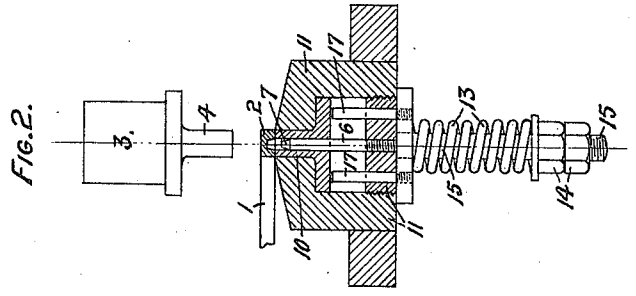
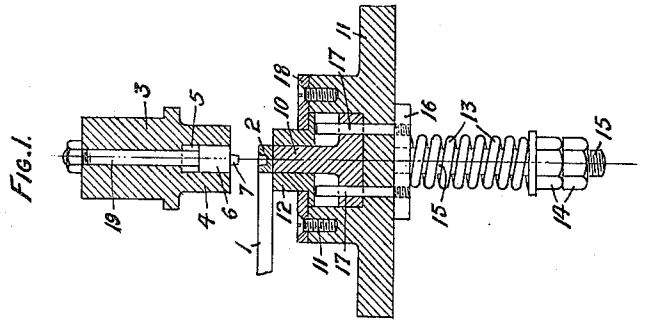


FIG. 1.



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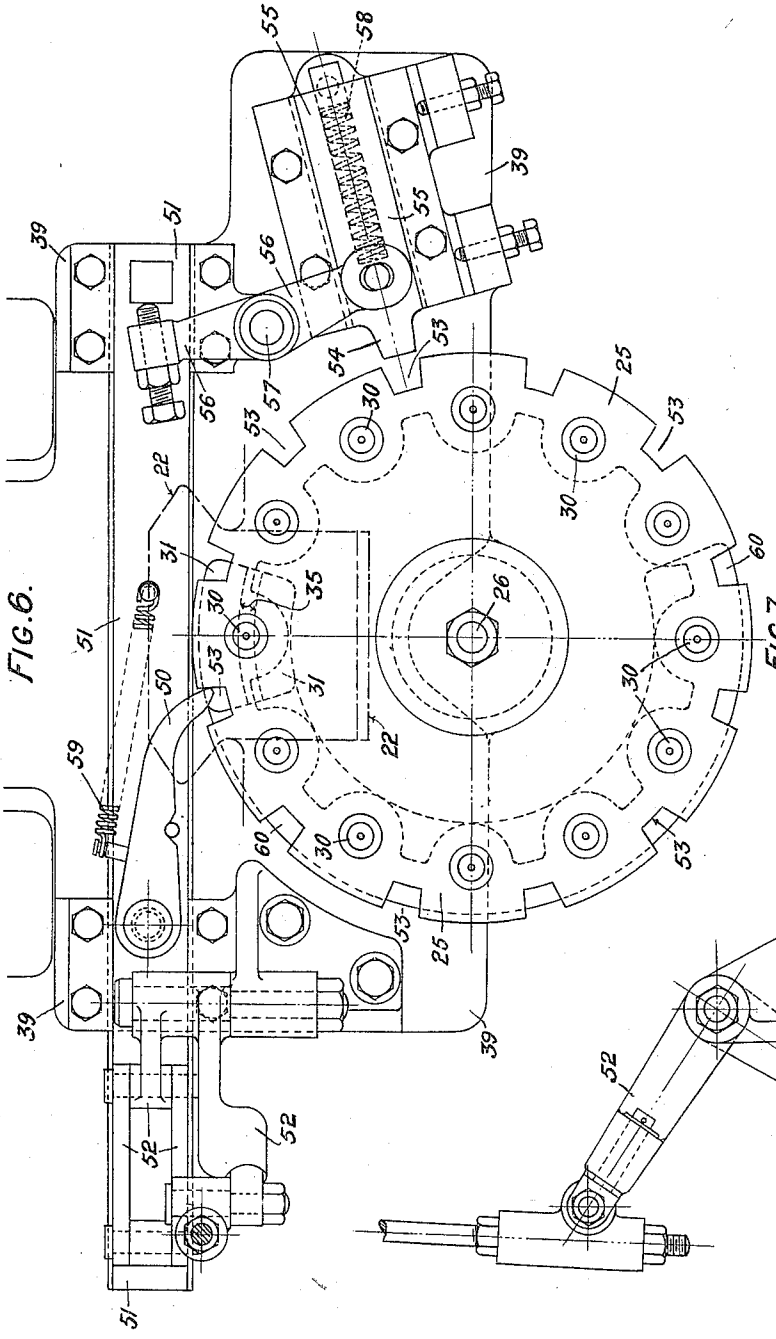


FIG. 6.

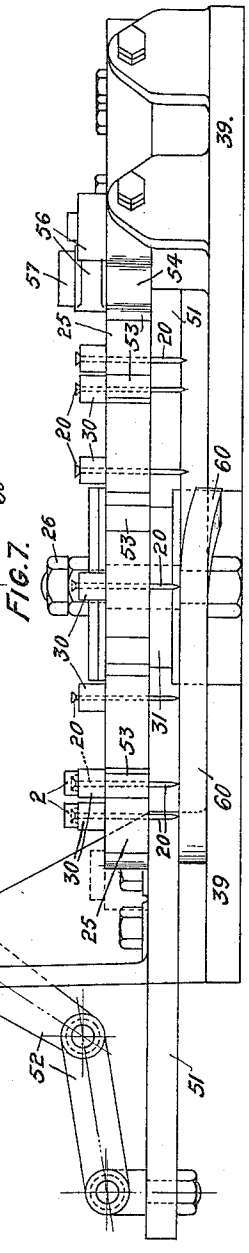


FIG. 7.

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3 SHEETS—SHEET 3.

FIG. 8.

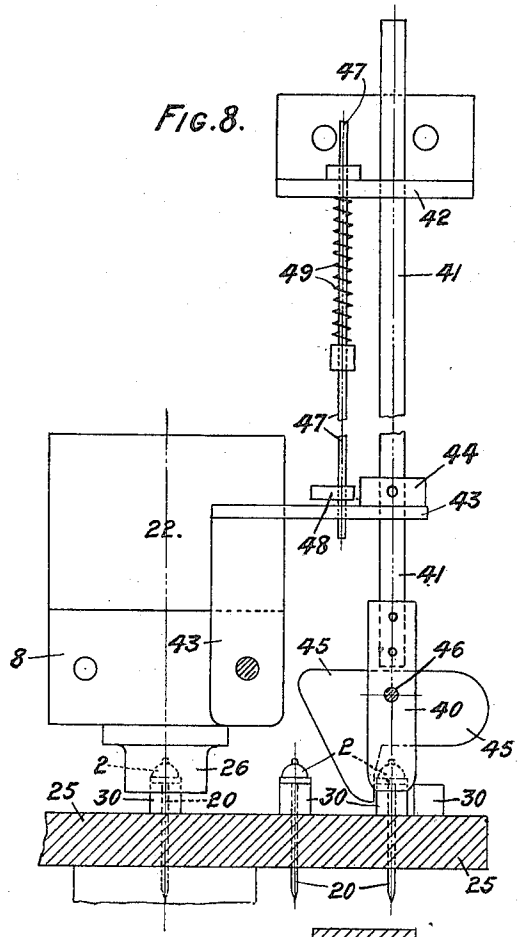


FIG. 9.

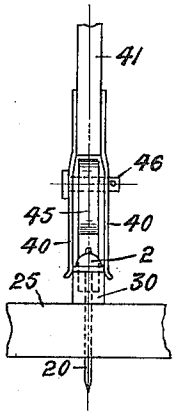
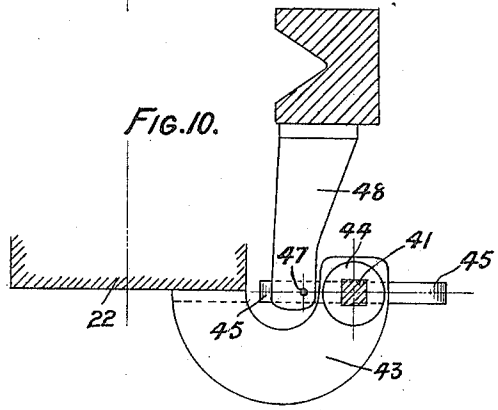


FIG. 10.



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NAIL, SPIKE, AND THE LIKE WITH SOFT-METAL HEAD.

1,148,245. Specification of Letters Patent. Patented July 27, 1915.

Application filed November 15, 1913. Serial No. 801,146.

To all whom it may concern:

Be it known that we, FRED GARDINER MARTIN and JOHN COOPER CROWTHER, subjects of the King of England, residing at London in the county of Middlesex, England, have invented certain new and useful Improvements in Providing Nails, Spikes, and the like with Soft-Metal Heads, of which the following is a specification.

This invention has reference to providing nails, spikes, and the like, with "soft" metal heads; and has for its object, mainly, to provide an improved means for this purpose.

Nails of the kind referred to are generally used in connection with nailing or fastening corrugated and other sheet metal, to beams, rafters, and other surfaces, where the heads are subjected to the action of the weather.

For convenience, it will be assumed that the article to which the soft metal head is to be applied or provided, is a nail, say a "wire French nail," and that the soft metal which is to constitute the head is lead, or other analogous soft metal or alloy.

The metal from which the soft heads are to be formed, is in the form of a bar, and this is cut by stamping or a punching apparatus or power press, into head blanks, which are punched out from the bar, and are adapted to receive the nail heads, a recess or indentation—into which the head of the nail to which the soft metal is to be applied will be introduced—being formed in the blank; and furthermore they may be partly shaped on their surfaces in this punching operation. The blank thus formed constitutes the immature soft metal head for the nail; and in applying to the nail, it is placed over the head, so that the head fits in the recess referred to; and the nail being supported in a bolster, through which its shank passes, the soft metal around the head, that is that surrounding the aperture or recess in which the head fits, is by pressure exerted by a press, made to envelop and inclose the nail head, as well as shape the soft metal head or produce upon it the formation required, and to hermetically inclose it.

By one method or mode of action, the nail will be held at its lower end, or supported on a spring, so that its head stands above the bolster top, thus allowing for nails of varying length being headed; and the blank will be placed over the head, so that the opening of the recess is downward.

The pressing means for acting upon the nail comprises a lower cylindrical or other suitably shaped part, which is adapted to keep the metal in at the sides when pressure is being applied; and in this part, there is a die which presses on the lead or soft metal blank in the pressing action, and all these parts come down together in action, and the lower retaining cylinder or part will pass not only over the lead head blank on the bolster, but also the bolster, which it will just fit over; and in this action, the part of the metal blanks which surround the recess in it, will envelop the upper surface and other parts of the conical or other head of the nail, it being squeezed inward so as to wholly inclose it hermetically.

In the front of the press, there will be a table provided with a number of bolsters, so that a plurality of nails will be carried in the table, being operated upon in different stages. For instance, there will be a point where the nails are fed into position, and then a position where the punch or swaging parts come, and a position where the ejector or extractor is placed; and these various functions are performed in sequence, the table being rotated in any suitable way.

The invention will be further described with reference to the accompanying drawings which illustrate it.

Figure 1 shows a section of the punching or swaging portions of a press, adapted to make the lead blanks, which constitute the lead heads of the nails, spikes or the like; and Fig. 2 is a similar view of a modified arrangement of punching or swaging parts of the press. Figs. 3 and 4 are sectional views showing the part of the press used for securing the soft metal head blanks on to the nails; Fig. 3 showing the parts in one position, and Fig. 4 in another. Fig. 5 shows a slight modification of mode of arrangement of the blank on the nail. Fig. 6 is a plan; and Fig. 7 a front view, illustrating the parts of the press by which the nails are fed under the tools of the press, and generally manipulated. Figs. 8 and 9 are two elevations viewed from different positions, and Fig. 10 is a plan of the parts employed for removing the lead headed nails from the press after completion.

Referring now to the drawings, and more particularly to Figs. 1 and 2, showing the parts of the press for forming the soft head blanks, 1 represents the bar of lead or soft

metal from which the head blanks are to be formed; and 2 shows a formed head blank. The bar is of rectangular section, and of about a width equal to the diameter of the die in which it is pressed and formed. It will be seen that this blank or immature head 2, will be cylindrical or other form outside according to the form of the die and punch, and will have a cavity in it of a diameter that will receive the head of the steel or other metal nail, or the like, of which it is to form the true lead or soft metal head.

Referring now more particularly to Fig. 1, 3 represents the upper moving part which will be fixed in the "ram" or moving part of a press of any known suitable kind used for stamping or similar operations; the ram being suitably fixed on the slide of the press, and moved up and down. The lower portion 4 of this part 3, forms the die in which the soft metal of the bar is pressed; and within the hollow portion or cavity 5 of this die, the anvil portion 6 fits, and is adapted to move up and down in it, and has at its lower end a projecting part 7 which forms the recess or cavity in the blank 2. The lower die portions of this apparatus comprise a bolster or upwardly projecting part 10, supported in the base or carrier 11, having around it a supporting ring 12, normally held up by a spring 13, which is supported at its lower end by nuts 14, on the spindle 15, fixed in the base 11, and exerting its force through a plate 16 and pin 17, which passes through the T headed base of the bolster 10, and presses on the underside of the supporting ring 12; holding its lower flange against the under side of the top ring 18 of the base 11. By this machine with the bar lying on the bolster 10, when the die 3 comes down in the punching action, the lead of the form of the cylinder 5, will be pressed up into the cylinder 5, the die 4, the part 7 receding as the die comes down, until its upper end reaches the end of the cylinder; and simultaneously, the ring 12 is pressed down by the lower edge of the die 3, compressing the spring 13. Afterward, when the die 3 moves up, the punched out blank 2 will be carried up with it, and the ring 12 will be forced up by the spring 13, into the position shown in the drawings; and when the die reaches a certain position in its upward stroke, the shank or pin 19 of the body 6 will be acted upon by a "knockout" arrangement of any known kind, which will force it down into the position shown in the figure, and so force out the formed blank.

In the modification shown in Fig. 2, the top movable portion 3 simply consists of a punch 4; and in this case, the bolster 10 is supported in the carrier or base 11, by the spring 13, and pins 17, similarly as the ring 12 is in Fig. 1; while the part 7 in this case is formed on the end of the rod 6 which is fixed in the bottom of the carrier 11. In this case, the punch 4 presses the metal down into the recess in the carrier 11, in which the bolster 10 fits, and the latter is pressed down as the punch 4 comes down; the recess in the blank being formed when the lead is forced down to the full position, after which, by the upward movement of the part 3, this spring 13 forces the bolster 10 up, and so the blank 2 out of the die or matrix. The top of the base 11 in this case, forms itself the support of the bolster 10, and is, on its upper face, coned downward, as shown.

In Fig. 1, the inner edge of the entrance of the cylinder 5, forms the cutting edge of the die; and in Fig. 2, the upper corner of the recess or aperture on which the bolster 10 works, forms the cutting edge. In some cases, these headed blanks may be made with a hole through the metal at the bottom of the recess formed by the die, of about the diameter of the shank of the nail to be headed; so that if desired, instead of the lead head being fitted over the head of the nail, as set forth with reference to and shown in Figs. 3 and 4, it may be placed in the manner indicated in Fig. 5, in which the gap or recess will lie on the bolster or supports in the heading action, and machine, uppermost, and the nail shank passes through the hole.

Referring now to Figs. 3, 4, 5, 6 and 7, more particularly of the drawings, the nail to receive the lead head 2 is marked 20, and it is of the form of the ordinary wire or French nail.

The form of press suitable for the work concerned is that of an ordinary stamp press, having a slide moved up and down, and carrying a "ram" which, in these drawings is marked 22, the pin marked 23 being that which connected the usual connecting rod to the ram. In this machine, the part 21 in which the upper forming and pressing parts are carried, is supported and carried in the "ram" 22 of the press, which has a cavity 24 above the part 21, for the purpose hereinafter explained; and this part 21 is held in position by the plate 28, which will be bolted on in position, in the usual way.

The pressing and forming parts or dies, consist of the annular part 26, and the plunger part 27, fitting within the space within the annular die 26, in which it is capable of being moved up and down to a limited degree; it being held in position and limited in its stroke downward, by the shank and nut 28, and upward by the end of the cavity in the die 26.

The plunger and shank 27, 28, have a small hole through them, and in this hole there is fitted a small pin 29; while its lower face has a cavity 9 of the form of the upper

part of the lead head of the nail to be formed, namely, about a hemisphere in the case shown.

The lower portion of the apparatus for carrying the nails and moving them under the dies, comprises a circular table 25, pivoted at 26 on the bed 39 of the press, about which pivot it is adapted to be rotated, step by step; and this table carries a plurality of bolsters 30, in which the nails 20 to be headed are carried.

The periphery of the table 25, which lies beneath the die carrying portions 21, has beneath it, supporting secondary bolsters 31, formed on or supported by the said plate of the press. And within this supporting portion 31—through the upper portion of which the lower end of the nail passes—there is a supporting device 32, normally pressed upward by a spring 33, carried in the socket 34, fixed to the under side of the bed 39; and upon this supporting device the lower end of the nail 20 rests; the parts being so arranged that the head of the nail 20 stands slightly above the top of the bolsters 30, thus allowing for nails of slightly varying lengths being headed.

In action, the nails are introduced into the empty bolsters 30, as they come toward the front of the machine; and also, before they pass beyond the front half or near it, they are provided with the blank heads 2, which are fitted over the heads of the nails in the manner indicated in Fig. 3. Thus, when a nail so covered with the blank 2 comes under the ram 22, and the ram 22 comes down, the part 27 first will be pressed up into the upper part of the space of the annular die 26, in which it works until it reaches the end; and when in this position, the lower part of the annular die 26 will surround the upper part of the bolster 30; and then the further pressure downward by the then held plunger 27, will squeeze the lower annular portion of the metal of the blank 2, around the cavity under the nail head, up to the nail shank, and around the head, and the pressure also forms the shape of head desired; while a small portion of the metal at the top and center will be forced up into the hole in the plunger 27. The condition then existing is that indicated in Fig. 4.

The next operation is the removal of the ram 22, and the parts in it upward. In this action, the die 26 will move off the bolster 30 for the required amount of space; and when this position is reached, the shank 28 of the plunger 27, will come against a knock-out lever 36, and press the plunger with the nail out of the die 26; and afterward, the knock-out lever 37 comes in contact with the pin 29 which knocks or presses this pin down, and insures the ejection of the nail from the upper portions of the presser or die parts; so that in this condition, the nail will be entirely clear from the upper parts of the machine, and will rest in its bolster 30.

To remove the nail from the bolsters, there is employed between the support 31, and the front of the bed 27, a removing mechanism shown in Figs. 8, 9, and 10. This consists of spring jaws 40, carried on a bar 41, supported at the top part by a guide 42, fixed to a stationary part of the press, and below by a bracket or plate 43, fixed on the ram 22; and this plate 43 acts upon a collar 44, fixed on the rod 41 so that in the upward movement of the ram, the rod 41 and spring clips 40 are raised; while, when the ram 22 falls, these parts fall by gravity. And it is in this action that the spring clips 40 pass down over the head 2 of the nail in the bolster 30, and grip it; and in the upward stroke of the ram they lift the nail quite clear of the bolster.

To automatically discharge and throw out the nail, a tipping ejector 45, hinged at 46, to the plates 40, is used; and when the press reaches the upper portion of its stroke, one end of this lever comes in contact with a rod 47, (guided by the parts 42, and a bracket 48 fixed to a part of the press), and lifts it, and compresses a spring 49 on it; and when this spring has a certain amount of tension put into it by the upward lift, it overcomes the friction between the head 2 of the nail, and the spring clips 40, and forces or jerks, by the lower part of the ejector device 45, the nail sidewise from the springs 40 into a suitable chute or receptacle.

The table 25 receives its step by step motion by means of a pawl 50 carried on a slide 51, supported in the bed 39, and vibrated to and fro by crank mechanism 52, which is operated from a suitable moving part of the machine, the active toe of the pawl being adapted to enter the recesses 53 in the edge of the table 25. A locking stud 54 on the slide 55, holds the table 25 after each movement, and this is worked from the slide 51, by a lever 56, hinged at 57; the parts being so arranged that when the pawl 50 is moving forward, and moving the table 25, the holder 54 will be first moved out from a notch 53 with which it was engaged; and then afterward, on the return stroke of the slide, the stud 54 engages with a further gap which will be opposite it. The slide 53 will be pressed forward by a spring 58, and the pawl 50 will be pressed toward the table 25 by a spring 59.

The nails 20, as stated, when they come under the pressing operation, have their heads projecting up above the level of the bolster 30 a certain amount, as indicated in Fig. 7; and they are raised to this position by a cam plate 60 which extends from the

front of the table around up to the support 31; and from this portion of the table, the blanks 2 are fitted over the nails; and to allow of the shanks of the nails passing into position under the upper movable die or pressing parts, the supporting part 31 has a gap 35 through its center, as indicated in dotted lines in Fig. 6.

What is claimed is—

1. Machine for the manufacture of nails and spikes, with soft metal heads, by squeezing same by pressure, comprising a movable carrier, which carries the nails and spikes to be headed; and pressing dies which are moved to and away from the said carrier, and carry punches which are adapted to squeeze the metal or swage it around the head of the nail or spike in one operation, and are moved relatively to the dies and are a working fit therein; substantially as described.

2. Machine for the manufacture of nails and spikes, with soft metal heads by squeezing the same by pressure, comprising a rotary carrier having a plurality of bolsters for carrying the nails, and spikes, upon which the soft metal is pressed, and a rectilinearly movable die or presser tool which is moved to and away from the carrier and has a part adapted to fit over the soft metal blank head, and a movable part therein adapted to act upon the upper part of the blank, and squeeze or swage it around the head of the nail or spike, in one operation, substantially as described.

3. Machine for the manufacture of nails and spikes, with soft metal heads, by squeezing same by pressure, comprising a movable carrier which carries the nails and spikes to be headed, a plate connected with the movable carrier for supporting the nails and spikes on their pointed ends, with the head slightly above the level of and away from the upper surface or part of the carrier, and pressing dies each having a movable part which operates upon the soft metal head within the die, and is moved to and away from the said carrier individually and with the die, and is adapted to squeeze the soft metal or swage it around the head of the nail or spike within the die; substantially as described.

4. Machine for the manufacture of nails, and spikes, with soft metal heads by squeezing same by pressure, comprising a rotary carrier having a plurality of bolsters for carrying the nails, and spikes, and upon which the soft metal is pressed, plates connected with the movable carrier which support the nail from their pointed ends with their heads above the level of and away from the upper surfaces or parts of the bolsters, and a rectilinearly movable die or pressing tool having a part adapted to fit over the soft metal blank head, and a movable part therein adapted to act upon the upper part of the blank, and form it, substantially as described.

5. Machine for the manufacture of nails and spikes with soft metal heads, wherein two sets of means, comprising a support for soft metal, an annular die which is moved to and from the support and alternatively covers and uncovers it and the soft metal, and a punch which works in the die and operates on the soft metal when it and the support are within the die, serves for shaping the soft metal head and effecting its attachment to the nail or spike; substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRED GARDINER MARTIN.
JOHN COOPER CROWTHER.

Witnesses:
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A. W. J. CLARKE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."