

No. 852,376.

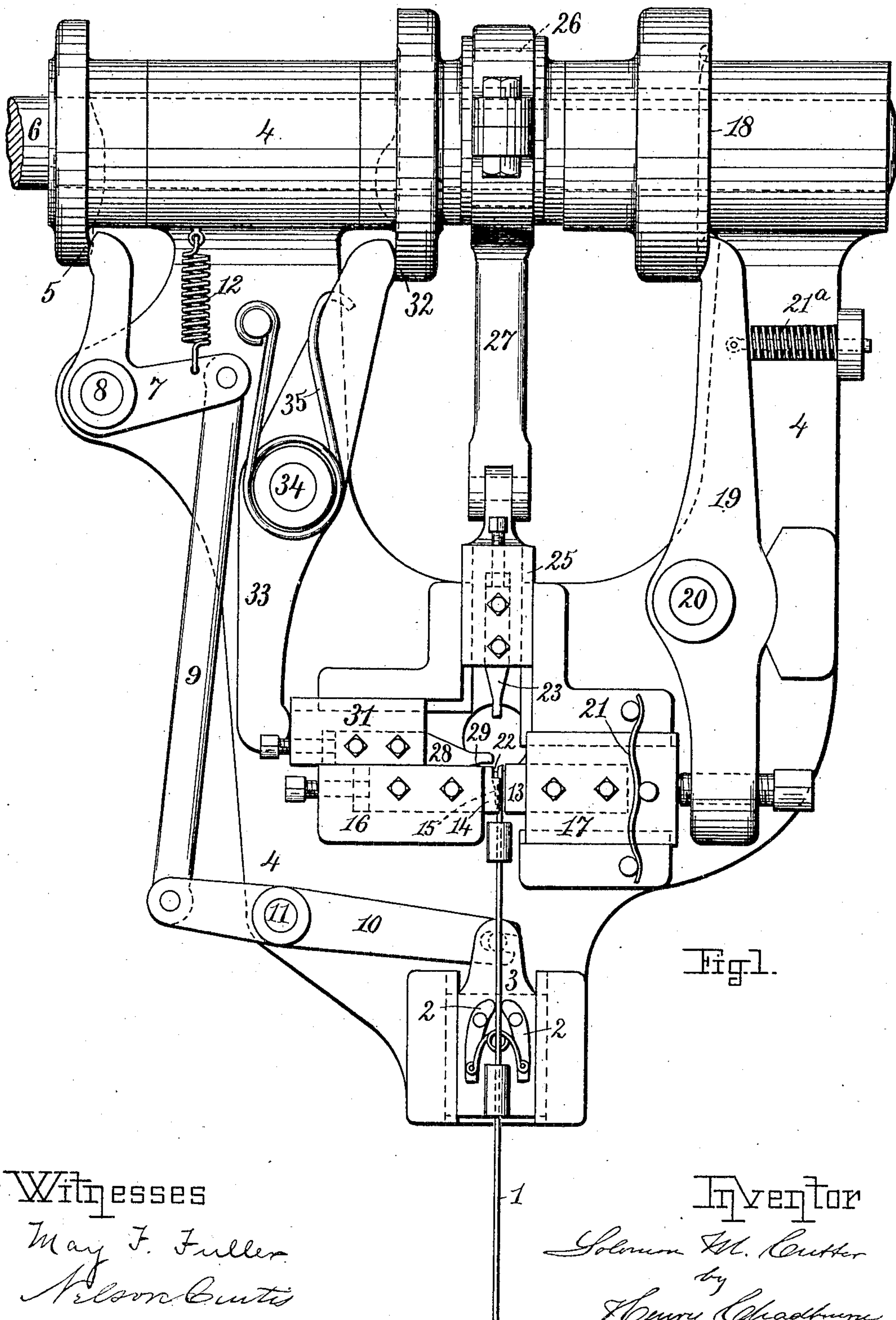
PATENTED APR. 30, 1907.

S. M. CUTTER.

MACHINE FOR MAKING HORSESHOE NAILS.

APPLICATION FILED JUNE 17, 1904.

3 SHEETS—SHEET 1.



Witnesses

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Nelson Curtis

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Henry Chadburne  
his atty.

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3 SHEETS—SHEET 2.

Fig. 2.

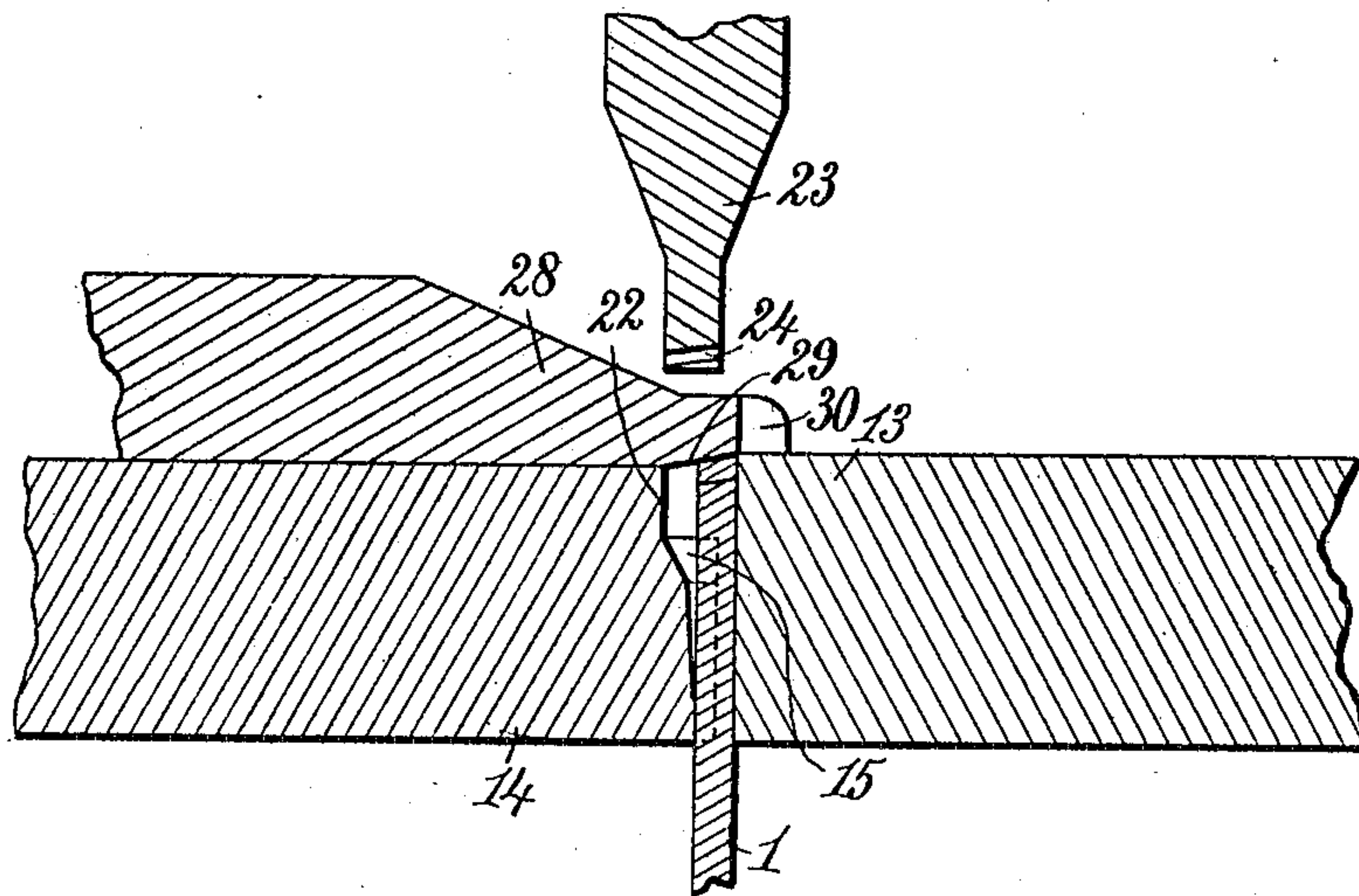


Fig. 3.

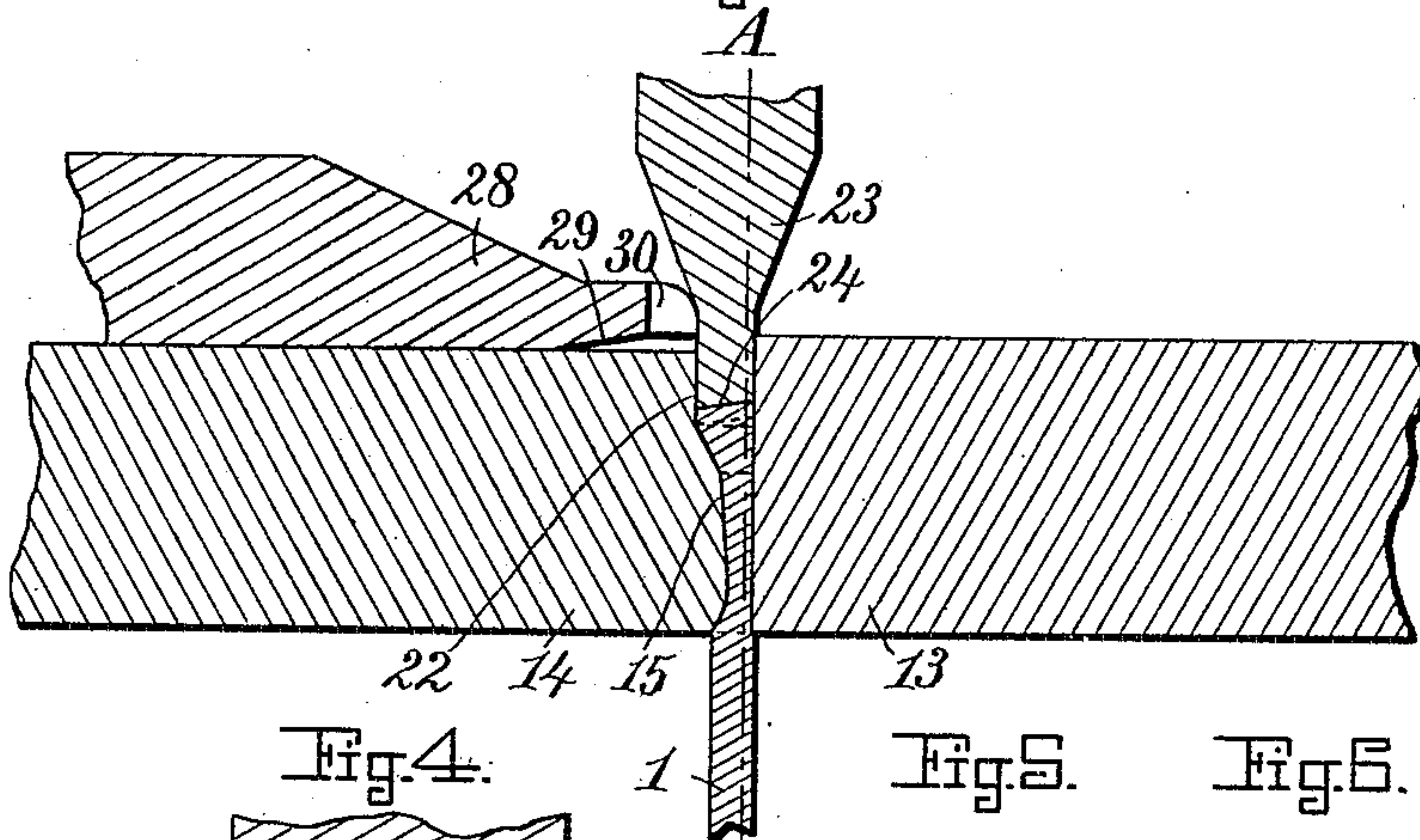


Fig. 4.

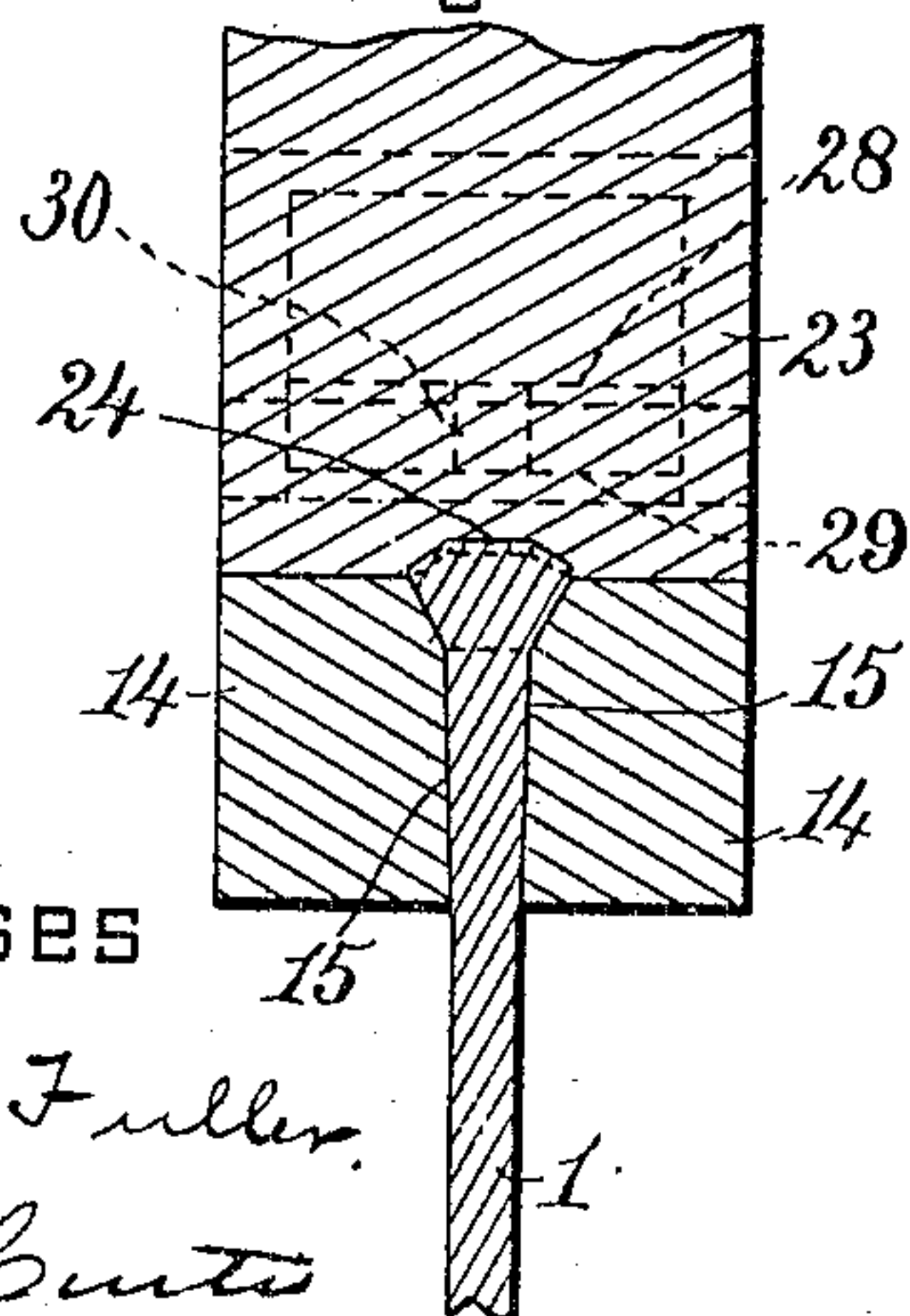
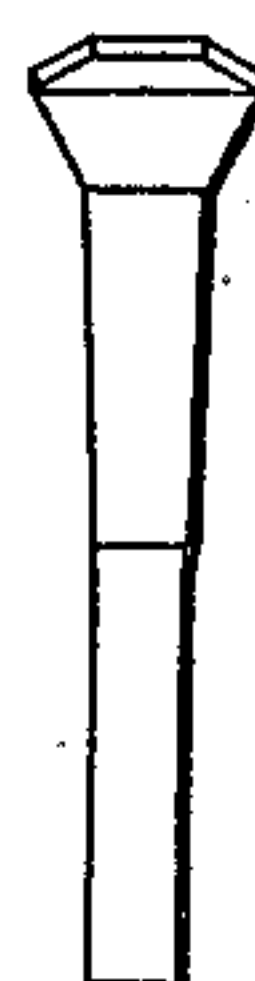


Fig. 5.



Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

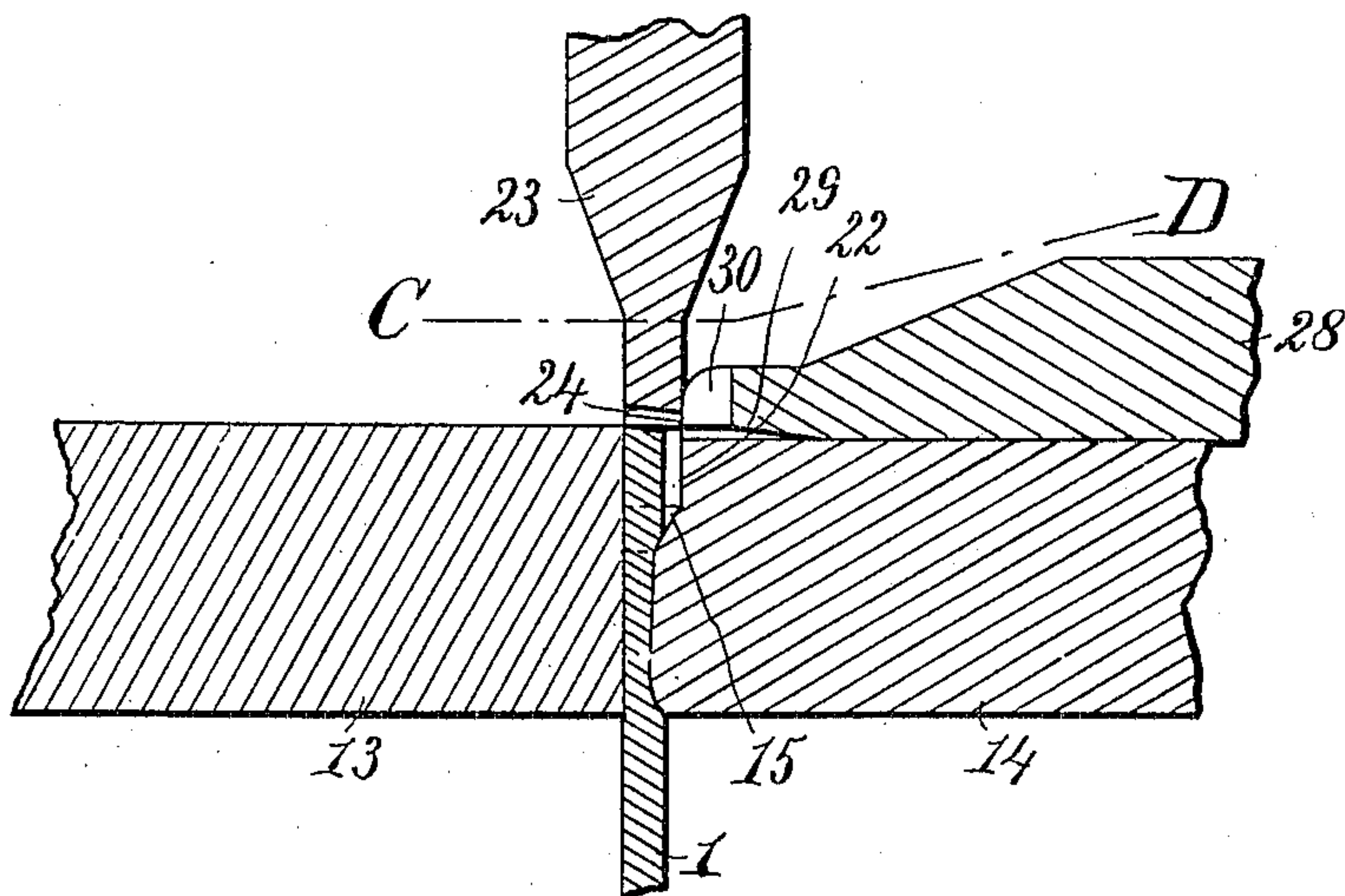
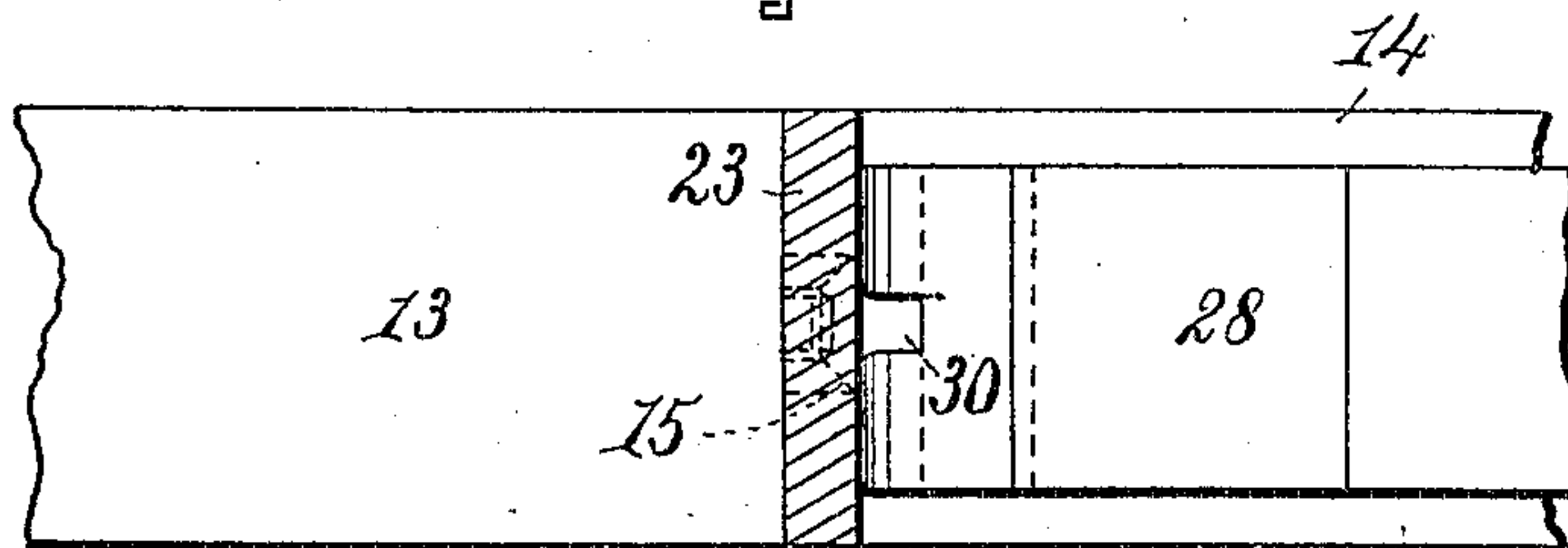


Fig. 8.



Witnesses

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# UNITED STATES PATENT OFFICE.

SOLOMON M. CUTTER, OF ASHLAND, MASSACHUSETTS.

## MACHINE FOR MAKING HORSESHOE-NAILS.

No. 852,376.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed June 17, 1904. Serial No. 213,026.

*To all whom it may concern:*

Be it known that I, SOLOMON M. CUTTER, of Ashland, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Horseshoe-Nail Blanks, of which the following is a specification.

This invention relates to improvements in machines for the manufacture of blanks for horse-shoe nails from wire, and it has for its object to provide a machine in which the blanks will be so formed as to have a completed head portion, a part of the shank portion completed, and sufficient of the wire attached thereto to insure the completion of the formation of a nail therefrom, with very little if any waste metal to be removed when the point is afterward produced upon the nail; and to form the blank without projecting fins.

The invention consists in two dies, which engage the wire upon opposite sides and thereby force the metal of a portion of the wire into a cavity between the dies, which cavity corresponds in shape to the head and a portion of the shank of the nail, and so that the metal will fill the shank forming portion of the cavity; in providing a die which enters a space between the above mentioned dies engaging the end of the wire and forcing the metal thereof into and filling the cavity which forms the head portion of the blank; a feeding mechanism to move the wire, with the head and shank portions formed thereon, forward and thereby feed wire for the formation of the next blank; and a cutting off device to sever the blank from the end of the wire.

The invention is carried out substantially as illustrated on the accompanying drawings, which form an essential part of this specification and whereon like characters of reference refer to like parts wherever they occur.

On the drawings: Figure 1 represents a plan view of a machine provided with suitable mechanisms to operate the blank forming dies and to feed the wire thereto. Fig. 2 represents a detail section of the dies used to form the blanks, showing the same, as well as the wire from which the blanks are to be formed, in position ready to commence their operations. Fig. 3 represents a similar view to that shown in Fig. 2, but showing the parts in their relative positions occupied when the blank is completely formed on the end of the wire. Fig. 4 represents a section of the dies

and blank, on the line A—B in Fig. 3. Fig. 5 represents a side elevation of the finished blank, and Fig. 6 represents a front elevation of the blank. Fig. 7 represents a section of the dies and the wire used in the formation of the blanks, showing same in the relative positions which they occupy when the shank portion of the blank has been formed and the heading die is about to engage the portion of the wire which is to be upset to form the head of the blank, and showing the cutting off die in position to guide and support the heading die. Fig. 8 represents a section on the line C—D, showing the shape of the front of the cutting off die.

In making the nail blanks, I use a wire 1 which is preferably fed to the machine from a suitable coil, not shown on the drawings, and which is preferably square in cross sections, but may be of other shape in cross section if so desired. This wire is intermittently fed to the machine by any suitable intermittently operated feeding mechanism, which mechanism has been shown on the drawing as consisting of two pawls 2 2, mounted upon a block 3 which is reciprocated within suitable guides on the frame 4 of the machine, by means of a cam 5 on the driving shaft 6 and any suitable intermediate mechanism between the cam and the block 3, such as the lever 7 fulcrumed at 8 to the frame, which lever is acted upon at one end by the cam 5 and has its opposite end connected by the link or connecting rod 9 to one end of a lever 10 fulcrumed at 11 to the frame of the machine and having its opposite end acting upon the block. The lever 7 is kept in contact with the cam surface in the cam 5 by means of the spring 12.

The machine is provided with a pair of dies 13 and 14, the former being flat on its working face and the latter being provided on the working face with a cavity or recess 15 of substantially the size and shape of the upper portion of the shank of the nail to be made and also of the head portion of the nail excepting the extreme top portion of the head. These dies are mounted upon the machine in such a manner that they engage the wire on opposite sides and so that their working surfaces may be brought together with sufficient pressure to press the wire into the cavity in the die 14.

As the shank portion of a horse shoe nail is thickest where it joins the head portion, and gradually tapers from that portion toward



the point of the nail, it will be seen that the inner surface of the cavity 15 will be inclined to the surface of the die within which this cavity is formed, and it will also be seen that  
 5 when the wire which freely enters the cavity 15 is pressed between this inclined inner surface of the cavity and the flat surface of the die 13, there will be a tendency for the wire to move toward the head forming portion of  
 10 the cavity when pressure is applied to the dies and the wire is pressed into shape within the shank forming portion of the cavity thereby. There will also be a slight tendency at this time for the wire to move backward to-  
 15 ward the feeding device and the cam 5 is so formed as to compensate for this backward movement of the wire.

Either or both of the dies 13 and 14 may be made movable, but I prefer to make the  
 20 die 13 movable and the die 14 stationary, substantially as shown on the drawings, whereon the die 14 is securely mounted in position within a box or holder 16 made in one piece with or firmly secured upon the  
 25 frame of the machine and the die 13 is mounted within a box or holder 17 loosely guided within guides on the frame and moved toward the stationary die 14 by means of the cam 18 on the driving shaft act-  
 30 ing upon the lever 19, fulcrumed at 20 to the frame and having its opposite end in engagement with the holder 17. Springs 21 and 21<sup>a</sup> acting upon the lever 19 tends to move the holder 17 and its die 13 away from the  
 35 die 14 and also tends to keep the lever 19 in contact with the surface of the cam 18.

It will be understood that when the end of the wire 1 is within the cavity in the die 14 as shown in Fig. 2, and the die 13 is pressed to-  
 40 ward the die 14, with sufficient pressure, the wire will first be pinched between the working surface of the die 13 and the inner surface of the most shallow portion of the cavity 15 in the die 14. A continuation of the pres-  
 45 sure will then press the wire so as to force it into that part of the cavity which is to form the shank portion of the nail; will entirely fill said portion of the cavity, and will cause the metal of the wire to move toward the  
 50 head forming portion of the cavity thus acting to elongate that end of the wire, and at the same time there will be a slight return of the feeding mechanism and the wire held thereby, which return movement is permit-  
 55 ted by the shape of the cam 5. The die 14 is provided on its face with a cut away portion 22 which forms a space between the two dies when their surfaces are pressed hard together. The extreme end of the wire which  
 60 is used to form the nail blank will extend through the cavity in the die 14 and into this space between the two dies.

A heading die 23 is used, which has its end so formed as to enter and fill the space formed  
 65 between the dies 13 and 14 by the cut away

portion on the die 14 and this heading die has its working face provided with a cavity 24 which, in combination with the head forming portion of the cavity in the die 14, completes  
 70 the shape of the head of the blank. This heading die is mounted within a box or holder 25 mounted upon the frame of the machine in such a manner that it can be moved thereon into and from the above mentioned space formed between the dies 13 and 14.  
 75

The mechanism for operating the heading die, as illustrated upon the drawing, consists of the eccentric 26 upon the driving shaft 6 and the eccentric rod or link 27 between the  
 80 eccentric and the holder for the heading die. It will be seen that by this means the heading die is reciprocated into and from the space formed between the dies 13 and 14 and will press against the end of the wire which projects within said space. This reciprocating  
 85 movement of the heading die is so timed relative to the movements of the dies 13 and 14 that the end of the heading die will be forced into the space between the dies 13 and 14 when these latter dies are pressed and held  
 90 firmly together and upon opposite sides of the wire with the end of the wire projecting through the head forming portion of the cavity in the die 14 and into the space between the dies. The heading die coming into con-  
 95 tact with the projecting end of the wire will upset said wire into the head forming portion of the cavity in the die 14 and in the heading die and will thus form the head upon the blank.  
 100

After the blank has been formed upon the end of the wire as thus described, the heading die is withdrawn from the space between the dies sufficiently to allow for the operation of  
 105 the feeding mechanism. The die 13 is then withdrawn from contact with the die 14 and the feeding mechanism is operated to feed the wire forward into the space between the dies 13 and 14. This movement of the feeding  
 110 mechanism will force the blank from the cavity in the die 14 and will move it forward out of the space between the dies. When the blank and a sufficient portion of the wire has been fed beyond the dies it is cut from the re-  
 115 mainder of the wire by a suitable cutting off mechanism. This cutting off mechanism consists of a die 28 which moves upon the surface of the die 14 and across the space between the die 13 and 14 so that its forward or  
 120 cutting edge engages the wire and cuts it off against the edge of the die 13. The cutting die near its forward end is made with a surface 29 which is inclined to its line of movement so as to shape the end of the remainder of the  
 125 wire in such a manner as to prevent the wire from being bent by the return movement of the cutting die and so that the surface thus formed on the end of the wire will be inclined substantially like the incline on the top sur-  
 130 face of the head of the next blank to be



formed from the wire. This shaping of the end of the wire by the cutting off die acts to assist the operation of the heading die and also acts to prevent the heading die from having a tendency to slide off the end of the wire or the wire to move from under the heading die. The forward end of the cutting die is also provided with a recess 30 which acts as a guide to place the wire in a central position and to hold it so during the operation of the cutting off die and so that it will properly enter the shank forming portion of the cavity 15. This cutting off die is preferably mounted within a box or holder 31 which is suitably guided within guides upon the frame of the machine, and the mechanism for operating said die, as shown on the drawing, consists of the following devices:

A cam 32 is mounted upon the driving shaft 6 and said cam operates upon a lever 33 fulcrumed at 34 to the frame of the machine. The opposite end of the lever 33 acts upon the box or holder 31 for the cutting off die in such a manner as to cause its intermitting reciprocation at the desired time.

The lever 33 is kept in contact with the cam surface on the cam 32 by means of the spring 35 or by any other well known and equivalent device. In order to properly guide the heading die during its reciprocating movements and so that it will not engage either of the dies 13 or 14 while entering the space between them I prefer to so shape the cam surface which operates the lever 33 and controls the position of the cutting off die that the end of the cutting off die will only withdraw to such a position as to cause it to rest against the side of the heading die and thus support and guide the latter die. This will prevent any injury to the edges of the heading die.

The cam which operates the wire feeding device may be so shaped as to allow of a slight return movement of the wire after the blank has been severed therefrom by the cutting off die, and in order to properly adjust the amount of the wire which will be engaged by the blank forming dies at their next operation and so as to completely fill the blank forming cavity without having any surplus metal.

Having thus fully described the nature, construction and the operation of my invention I wish to secure by Letters Patent and to claim:

1. In a machine to manufacture blanks

for nails, dies having a cavity between them corresponding to the size and shape of the blank to be formed, a wire feeding mechanism, a cutting off die having an inclined surface back of its cutting edge to prevent bending the end of the wire by the withdrawal of the cutting off die after the blank has been severed therefrom, and to leave the end of the wire with an incline corresponding to the incline of the top of the head of the next blank to be formed from said wire and means to operate said dies.

2. In a machine to manufacture blanks for horseshoe nails from wire, dies having a cavity between them, corresponding to the size and shape of the blank to be formed, a wire feeding mechanism, and a cutting off mechanism, a cam operating the feeding mechanism so shaped as to produce a slight return movement during the operation of the blank forming dies to allow for the elongation of the wire thereby.

3. In a machine to manufacture blanks for horseshoe nails from wire, dies having a cavity between them, corresponding to the size and shape of the blank to be formed, a wire feeding mechanism to feed the blank from between said dies, and a cutting off die movable across the ends of the cavity between the blank-forming dies to sever the blank from the wire, said cutting off die having a groove on its face forming a guide for the proper guidance of the wire during the cutting off of the blank and to leave the wire in position to enter the blank forming die.

4. In a machine to manufacture blanks for horse shoe nails from wire, dies having a cavity between them corresponding to the size and shape of the blank to be formed, a heading die, means for causing it to enter the cavity between said dies to form the head on the blank, a wire feeding mechanism to feed the blank from said dies, and a cutting off die movable across the end of the cavity into which the heading die enters to sever the blank from the wire, mechanism to operate the cutting off die, causing its front end to rest against the heading die and thereby form a guide for the heading die during the heading of the blank.

In testimony whereof I have affixed my signature, in presence of two witnesses.

SOLOMON M. CUTTER.

Witnesses:

HENRY CHADBURN,  
NELSON CURTIS.