(No Model.) 5 Sheets—Sheet 1.

H. K. JONES.

MACHINE FOR HEADING POINTED BLANKS.

No. 590,576. Patented Sept. 28, 1897.

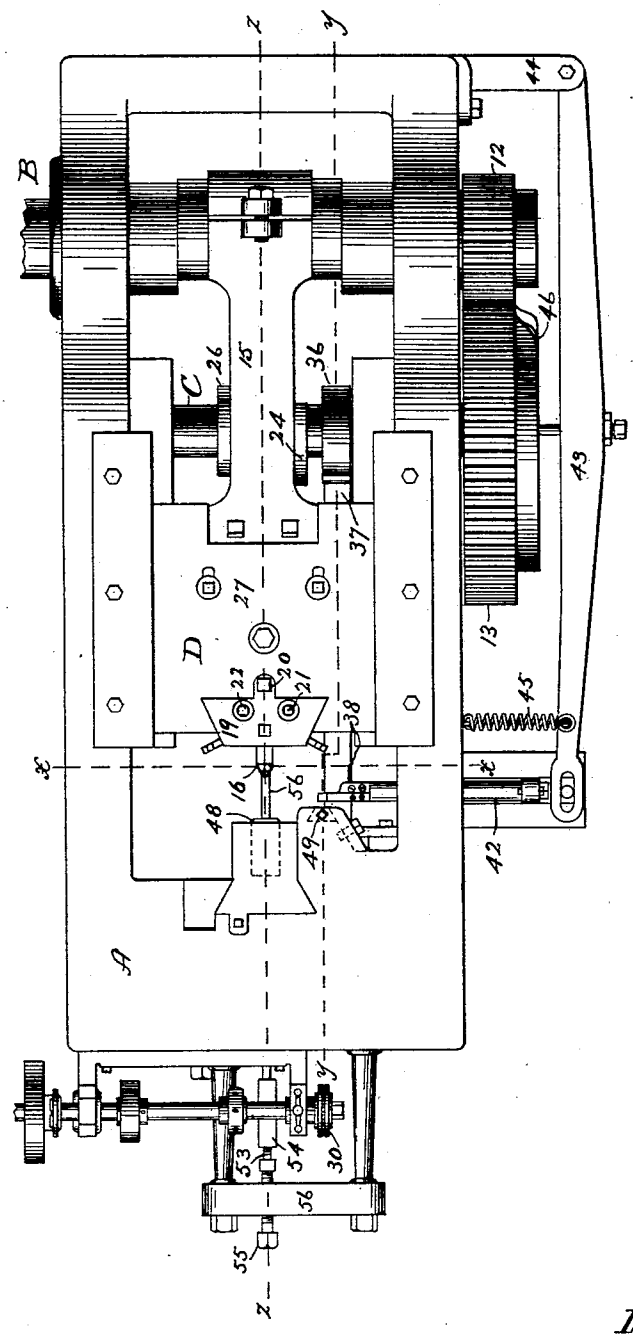


Fig. 1.

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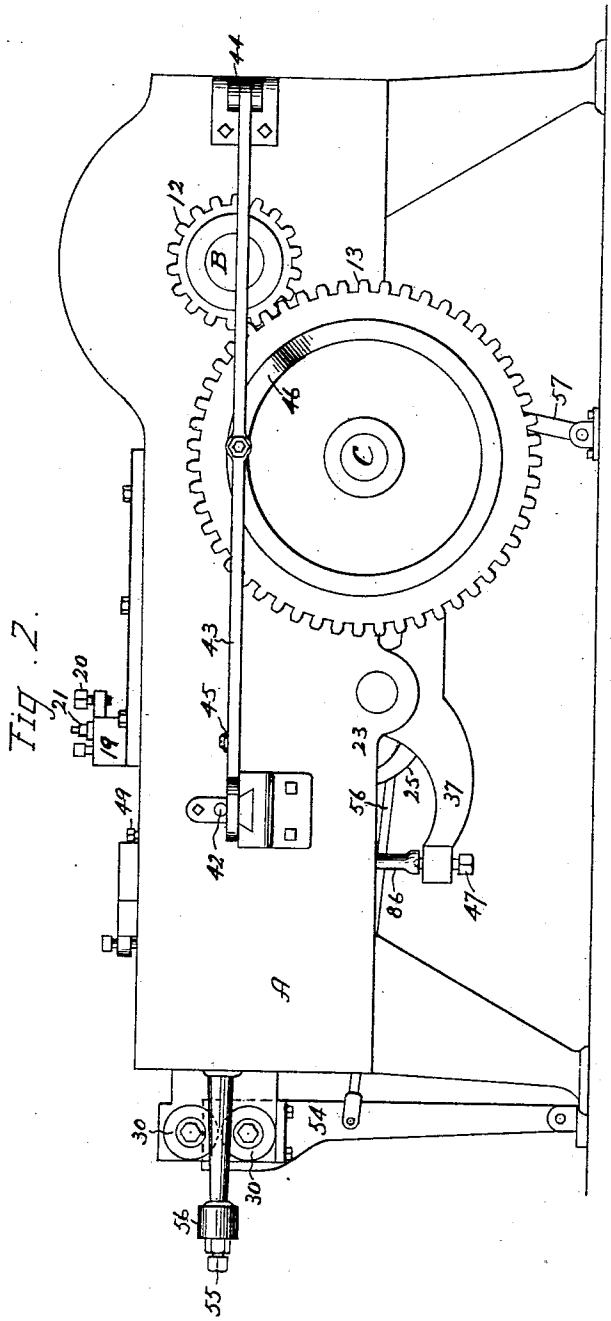


Fig. 2.

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Fig. 3.

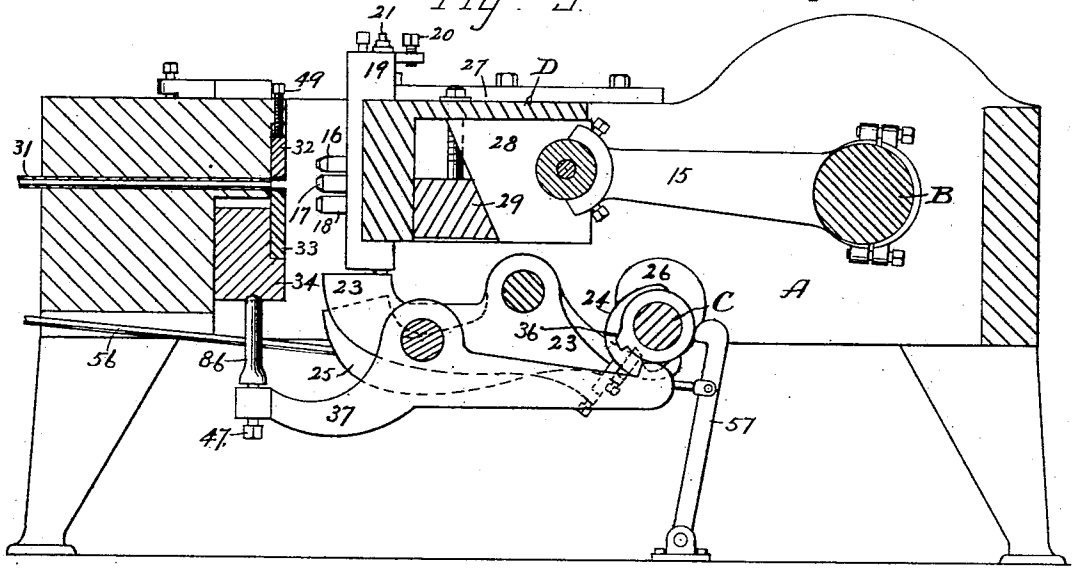


Fig. 4.

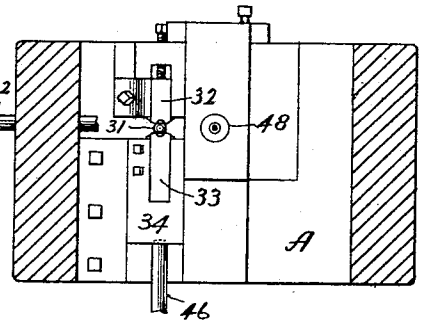


Fig. 5.

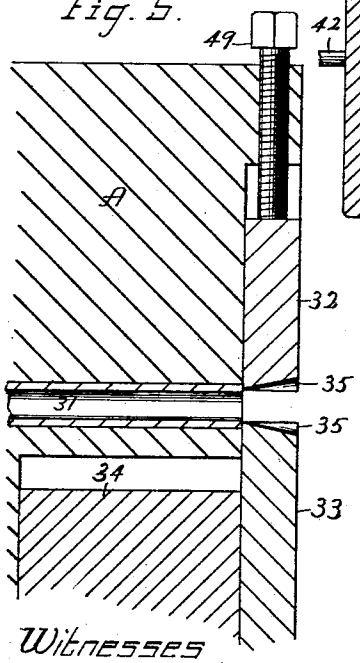


Fig. 6.

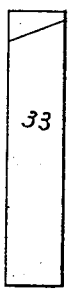
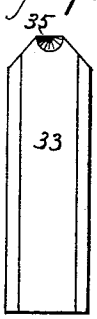


Fig. 7.



Witnesses
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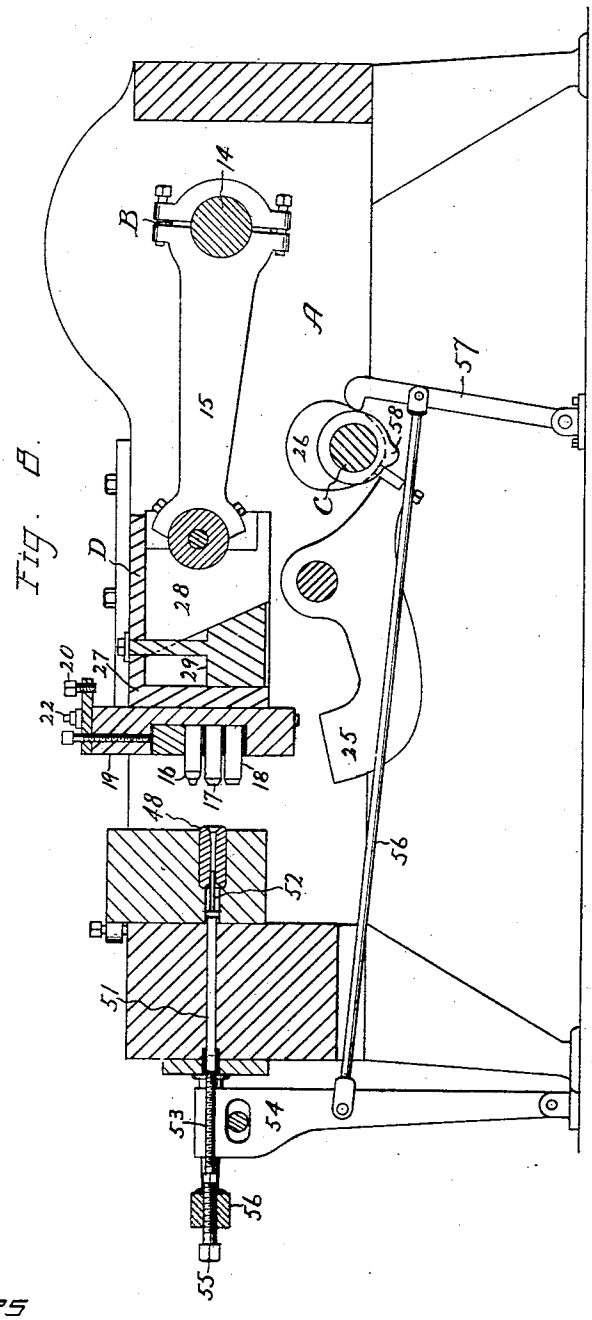
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MACHINE FOR HEADING POINTED BLANKS.

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Fig. 9

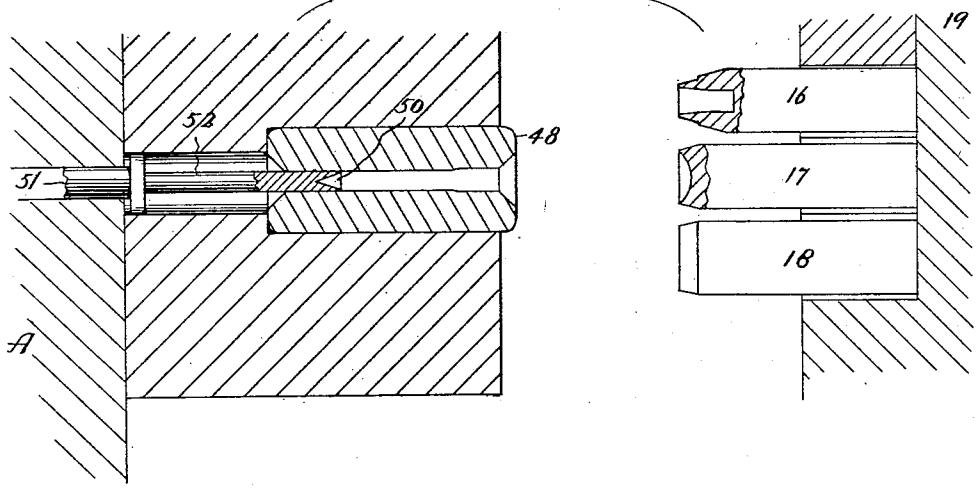


Fig. 10.

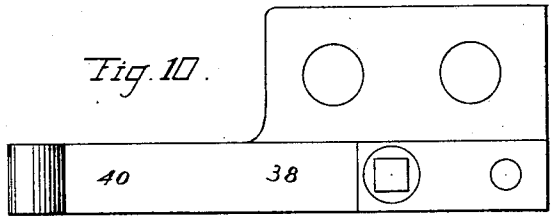
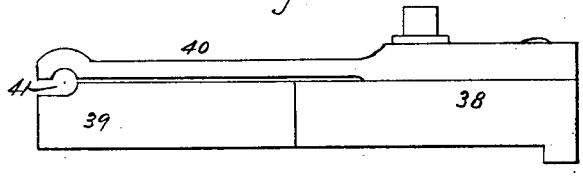


Fig. 11.



Witnesses
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UNITED STATES PATENT OFFICE.

HORACE K. JONES, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE RUSSELL & ERWIN MANUFACTURING COMPANY, OF NEW BRITAIN, CONNECTICUT.

MACHINE FOR HEADING POINTED BLANKS.

SPECIFICATION forming part of Letters Patent No. 590,576, dated September 28, 1897.

Application filed October 12, 1895. Serial No. 565,488. (No model.)

To all whom it may concern:

Be it known that I, HORACE K. JONES, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Heading Pointed Blanks, of which the following is a specification.

My invention relates to improvements in machines for heading pointed blanks for screws and analogous articles; and the main objects of my improvement are to facilitate the manufacture of such blanks and to produce a superior article.

In the accompanying drawings, Figure 1 is a plan view of so much of a screw-blank-heading machine as is necessary to show my improvements. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal section of the same on the line *y y* of Fig. 1. Fig. 4 is a transverse section of the frame of said machine on the line *x x* of Fig. 1, together with the cutting-off and heading dies in elevation. Fig. 5 is an enlarged vertical section of the cutting-off dies and adjacent parts. Fig. 6 is a detached side elevation or edge view of one of said dies. Fig. 7 is a front elevation or face view of the same. Fig. 8 is a vertical section of the machine on the line *z z* of Fig. 1 on the same scale as Fig. 1. Fig. 9 is an enlarged vertical section of the heading-dies. Fig. 10 is a detached plan view of the carrier, and Fig. 11 is a side elevation of the same.

A designates the frame of the machine, B the driving-shaft, and C the cam-shaft, said shafts being parallel and connected by the gear-wheels 12 13. The main shaft is provided with a crank or eccentric 14, Fig. 8, to which is connected the pitman 15 for driving the reciprocating slide or ram D. The ram carries the three heading-punches 16 17 18, and consequently the shafts B C are geared one to three, the gear-wheel 12 having one-third as many teeth as the gear-wheel 13, so that the ram or slide makes three strokes for every revolution of the cam-shaft.

The heading-punches are arranged in a vertical slide 19 on the front end of the ram D, the lowermost position of said slide being adjusted by the screw 20, the medium position by the screw 21, lever 23, and cam 24, and its highest position by the screw 22, lever 25, and cam 26. I also make the body of the ram D in two parts 27 and 28, which are adjustable longitudinally one upon the other by means of the wedge 29, (see Figs. 3 and 8;) but I illustrate and describe the heading-punches and their operating mechanism only to show one way of carrying out my invention, and any other heading punch or punches and their operating mechanism for striking one, two, or three blows, according to the number of punches used, may be employed as a substitute or equivalent of those herein shown for the general purposes of my machine, which relates mainly to the cutting-off and pointing dies, the carrier or transferrer, the heading-die, and the combination of said parts with so much of the machine as is necessary to make an operative combination. The particular construction of the ram, including its punch-holder, and its adjusting and operating mechanism, are not herein claimed, because they have been made in part the subject of another application of even date herewith.

The feed-rollers 30 may be of any ordinary construction and operated in the usual manner to feed a wire or rod through the front end of the frame A, preferably through a bushing 31, Fig. 5, to the cutting-off and pointing dies 32 33, of which 32 is fixed in proper position at the upper side of said bushing, while the lower cutting-off and pointing die 33 is arranged to slide up and down with the holder 34. At the time when the wire is fed in between the open ends of the cutting-off and pointing dies the carrier 38 lies directly in front of the wire to receive the same as it is fed endwise into said carrier. This carrier is shown separately in Figs. 10 and 11 and is constructed with one rigid jaw 39 and one spring-jaw 40. The rigid jaw 39 has the socket or seat 41 for the wire left open toward its end, so as to permit the carrier to be pulled off the wire by a movement transversely to said wire, while the yielding of the spring-jaw permits the same movement of the carrier without thus cutting away the socket. Said carrier is mounted on a slide 42 and is moved into its position in front of the dies 32

33 by a cam 46 on the side of the wheel 13 acting upon a lever 43, one end of said lever being connected to said slide and the other end being pivoted to a bracket 44 on the frame A. The carrier is moved in the opposite direction by means of the spring 45, Fig. 1. The middle portion of each of the dies 32 and 33 has a semiconical recess 35, while each side edge of the die at this end is beveled off to meet said recess in a chisel edge. The upper die 32 is adjusted into its proper position by the set-screw 49. A cam 36 on the cam-shaft C acts upon a lever 37 to force the die-holder 34 and its die 33 upwardly. A push-rod 86 lies between the die-holder 34 and the end of the adjusting-screw 47 on the end of the lever 37. The upward movement of the die 33 cuts off the wire, and then as the chisel edges of the dies come together a small piece is cut from opposite sides of the wire, while the portion between the semiconical recesses is swaged into a conical point and the dies open, leaving the pointed blank in the jaws of the carrier, which now moves forward to bring the blank into alinement with the heading-die 48. This is what is known as a "solid" die, being a die whose blank receiving and shaping orifice has stationary walls in contradistinction to a die whose side walls close upon the blanks to hold them and then open to discharge the headed blank. Within said die 48 I arrange the sliding knock-out pin 52, the anvil-face of which is provided with an acute-angled conical recess 50, Fig. 9, to receive and hold the pointed end of the blank. This knock-out pin is a slender cylindrical body fitted to reciprocate within the cylindrical portion of the die-cavity, and the acute-angled cavity in the anvil end of said pin extends substantially to its periphery, so as to form a thin acute angled edge surrounding what I may term a "wedge-shaped" cavity. It is evident that if said cavity were filled with metal under a heavy pressure there would be a tendency to spread out or expand the delicate thin-edged end of the knock-out pin. This tendency can be overcome by the employment of blanks the pointed ends of which are somewhat sharper or more acute than the conical cavity, whereby the pressure would first be exerted at the bottom of the cavity, where its walls are the thickest, while the pin near its end, where the walls are the thinnest, would be either wholly relieved from pressure or, if pressed upon, would receive the least pressure of any portion of the cavity.

Back of the knock-out pin is a follower or rod 51, that is backed by an adjusting-screw 53 in the upper end of the lever 54, which screw 53 is backed by the stop-screw 55 in the bracket 56 on the frame A. The lever 54 is connected by a rod 56 to a lever 57, the upper end of which lever is acted upon by a cam 58 to operate the knock-out pin in the direction for ejecting the headed blank.

After the carrier presents the pointed blank in front of the heading-die the ram makes its first stroke with the upper punch 16, which I prefer to recess, as shown in Fig. 9. The pointed end of the blank is now forced into the heading-die and the opposite end is in the recess in the punch 16, so as to hold the blank as the carrier withdraws out of the way, the spring-jaw permitting the carrier to slip off from the blank. The two other strokes of the ram now follow, (in case a three-stroke ram is employed,) presenting successively the punches 17 and 18 to complete the headed blank in the desired form either with or without a swaged slot. The die being a solid one cannot grip the stock as does a divided die, and consequently the conical anvil-seat of the knock-out pin serves largely as a resistance to the thrust of the heading-punches, the said knock-out pin being held in position by a rigid and unyielding backer. During the heading operation in a solid die the pointed end of the blank is seated in the conical recess or anvil of the knock-out pin, and at the first part of the stroke of the heading-punch the whole force of the blow is transmitted through the blank to its pointed end, which is received in and resisted by the conically-recessed end of the knock-out pin, whereby the pointed end of the blank is perfected in shape by being pressed firmly into the bottom of said end of the blank and is not only protected from injury but is somewhat perfected in shape by being pressed firmly into said recess. It is obvious that this conically-recessed knock-out pin can be used to advantage for heading pointed blanks in open dies as well as in solid dies. After heading the blank the knock-out pin is operated by the means before described to eject the blank. It is returned to its solid backing to act as an anvil when the heading-punch pushes in the next blank.

Many of the details of construction herein described are not essential to my invention, as other constructions having the same mode of operation in the various combinations I consider a full equivalent for those which I have described for the purpose of showing one way of carrying out my invention.

Without confining myself to the details of construction, I reserve the right to make such changes as fairly fall within the spirit and scope of my invention.

By my improvement I am enabled to head a pointed blank in a die having immovable side walls. I am also enabled to cut off and point the blank in the same machine and present it to said die for heading.

I claim as my invention—

1. In a heading-machine a cylindrical knock-out pin of a diameter that fits and fills the smallest cylindrical die-cavity, of the heading-die, said knock-out pin having an acute-angled conical anvil-seat extending inwardly from its periphery substantially as described and for the purpose specified.

2. In a heading-machine, a cylindrical knock-out pin having an acute-angled con-

ical anvil-seat extending inwardly from its periphery, and a heading-punch, substantially as described and for the purpose specified.

3. The combination of the solid heading-die having a cavity therethrough a portion of said cavity being cylindrical, a cylindrical knock-out pin fitted to reciprocate longitudinally in the cylindrical portion of said die-cavity and having an acute-angled conical seat extending inwardly from its periphery and acting to shape the end of an acute-angled conically-pointed blank, substantially as described.

4. The combination of a heading-punch, a heading-die having a cavity therethrough a portion of which is cylindrical, a cylindrical knock-out pin fitted to reciprocate longitudinally in the cylindrical portion of said die-cavity and having an acute-angled conical recess in its anvil end said recess extending to the periphery of said knock-out pin and forming a thin, acute-angled edge within the cylindrical portion of said die, substantially as described.

5. In a machine for heading pointed blanks, the combination of a heading-punch, a solid die having a die-cavity therethrough, a portion of which is cylindrical, a cylindrical knock-out pin fitted thereto and having in its anvil end an acute-angled conical recess that extends to its periphery and terminates in the thin circular edge with an acute angle, and a solid backing for said pin to hold the pointed end of the blank in place under the pressure of the heading-punch substantially as described.

6. The combination of a feeding mechanism, the cutting-off and pointing dies, a heading-die arranged to one side of the said cutting-off and pointing dies, and means for carrying the several blanks bodily in a lateral direction from the said cutting-off and pointing dies to the said heading-die, substantially as described and for the purpose specified.

7. The combination of the cutting-off and pointing dies, the carrier, the heading-die, and the knock-out pin having the conically-recessed anvil, substantially as described and for the purpose specified.

8. In a heading-machine having two or more heading-punches, the combination of a point-forming and cutting-off die, the solid heading-die, the first heading-punch recessed for receiving the end of the blank to be headed, and a carrier for transferring said blank from the point-forming to the heading die, substantially as described and for the purpose specified.

9. In a machine for heading pointed blanks, the combination of a feeding mechanism, the point-forming, cutting and swaging dies, with a solid heading-die and a reciprocating carrier arranged to move from a position in front of said point-forming, cutting and swaging die to a position in front of the said solid heading-die, substantially as described and for the purpose specified.

10. In a machine for heading blanks, the combination of a feeding mechanism with the mechanism for cutting off the blanks, a heading-die, and a carrier arranged to seize the wire before cutting off and after cutting off to carry the severed blanks to a position in front of the heading-die, substantially as described and for the purpose specified.

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M. S. WIARD.