2 Sheets—Sheet 1.

S. VANSTONE.

MACHINES FOR MAKING SCREW-BLANKS.

No. 186,905. Patented Jan. 30, 1877.

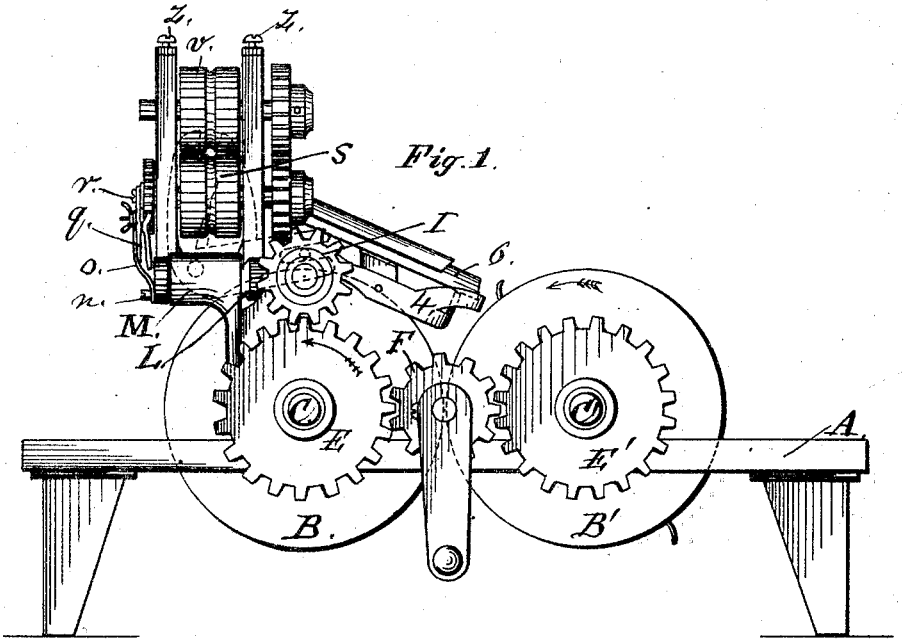

Fig. 1.

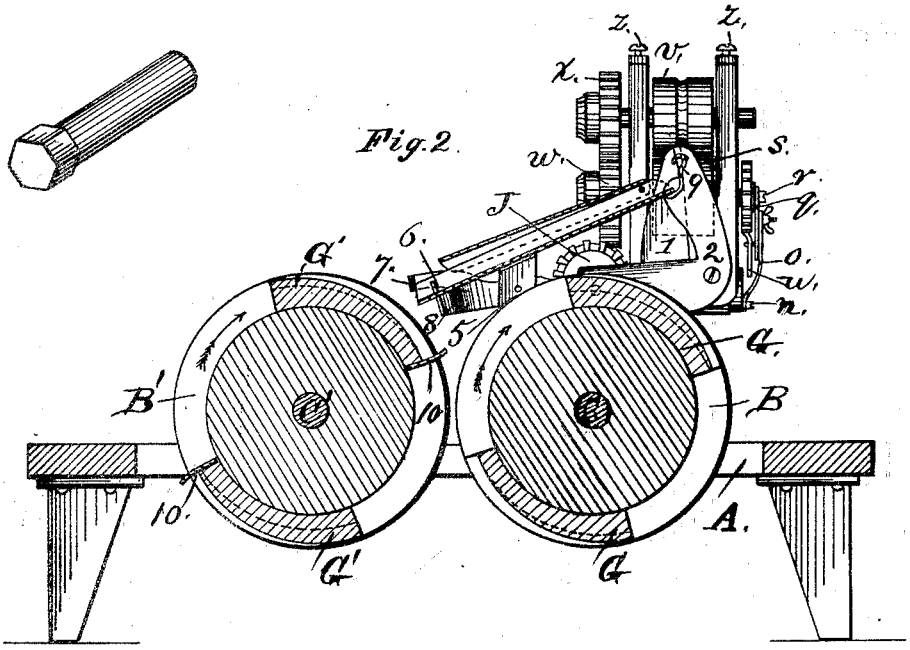

Fig. 2.

Witnesses

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2 Sheets—Sheet 2.

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Fig 3

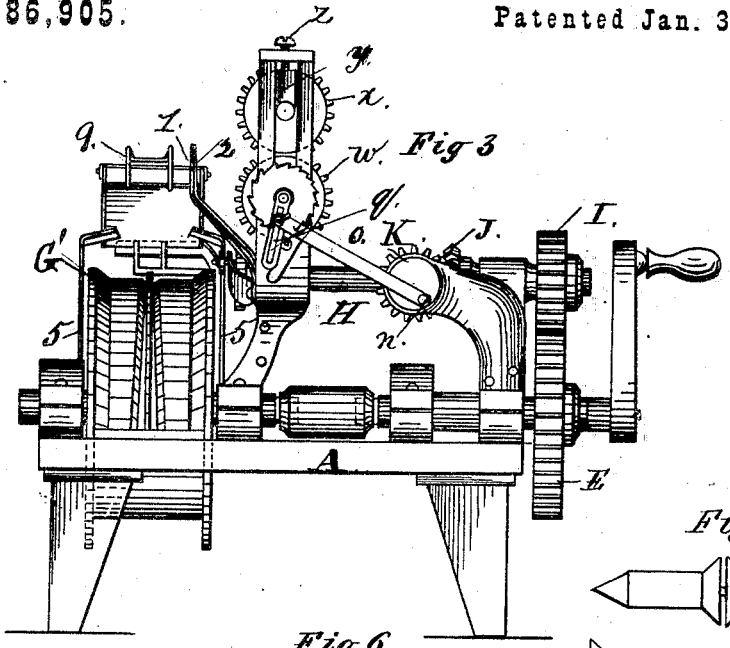


Fig 5

Fig. 6.

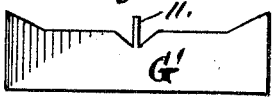
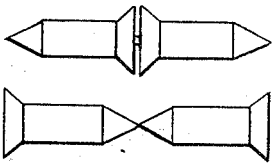
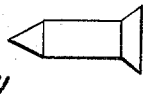


Fig. 10.





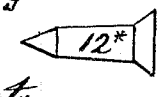


Fig. 7.

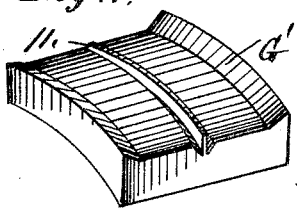
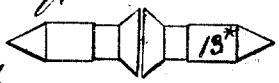


Fig. 4.

Fig 11



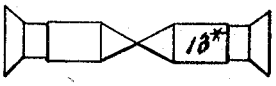


Fig. 8.

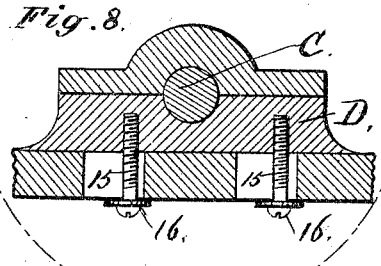
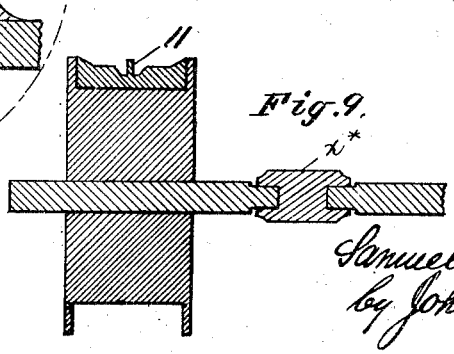


Fig. 9.



Witnesses.

W. C. Shaffer

M. R. Eddon

Inventor

Samuel Vanstone

by John J. Halsted,

his Atty.

UNITED STATES PATENT OFFI

SAMUEL VANSTONE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN W. HOARD, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING SCREW-BLANKS.

Specification forming part of Letters Patent No. **186,905**, dated January 30, 1877; application filed September 4, 1876.

To all whom it may concern:

Be it known that I, SAMUEL VANSTONE, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Making Screw-Blanks, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to the fabrication of blanks for screws, bolts, threaded nails, &c.; and consists in mechanism which is adapted to feed a coil or continuous wire or rod to cutters, then cut it into appropriate lengths, deliver or drop these lengths successively to a pair of shaping-rollers, both of which revolve in the same direction, and which then, as the blank is lying parallel with the axis of such rollers, roll it over and over upon its own axis, in order that the dies upon the rollers shall gradually impart to it the required shape for the head, shank, and tip, the body of the metal being also, by the same act, highly compressed and compacted, so that the porosity of the metal is materially overcome, and the article made harder, tougher, and stronger throughout—conditions so important in screws, especially at their tips and heads.

In the drawings, Figure 1 is a side elevation, showing the gearing. Fig. 2 is a longitudinal section through the die-rollers; Fig. 3, an end elevation; Fig. 4, a detail, in perspective, of the shears and feeding adjustments; Fig. 5, an end view of one of the dies (enlarged) for making two blanks with their points together; Fig. 6, an end view of a die-roller for making two blanks with their heads together; Fig. 7, a perspective of one of the dies detached from the roller; Fig. 8, a detail of bearing of a die-roller, showing the means for adjustment; Fig. 9, a section through a die-roller, shaft, and coupling; Fig. 10, various kinds of blanks, and Fig. 11 a blank with a swelled or enlarged shank.

A is a frame for supporting the mechanism. B B′ are the die-rollers, mounted on appropriate shafts C C′, a bearing, D, of one of which shafts is made adjustable to admit of placing the rolls the requisite distance apart, according to the size of the blank to be made. E E′ are the gears of the two shafts, these gears having each the same number of teeth, and both engaging with an intermediate gear, F, which may be used as the driving-gear, so that both revolve in the same direction, and preferably with the same velocity. G G′ are the dies on the rolls B B′, and they may be either made integral therewith, or permanently affixed or removably attached to their peripheries. I have shown them as removable, and by way of illustrating different forms of dies adapted to produce different styles of blanks, I have, in this instance, shown two different patterns of dies upon each roller. In actual practice but one pattern would be used on a roller.

The dies G are shaped for rolling blanks for two screws having their tips connected, and intended to be severed after they are discharged from the machine; and the dies G′ are shaped for rolling blanks for two screws having their heads connected, to be subsequently severed. The die-rolls are placed with their axes or shafts in the same horizontal plane, and the pieces of rod or wire to be treated are dropped down into the space between them. Such pieces, of the length desired, may be previously cut from a continuous wire by any well-known means, and presented to the action of the die-rollers by hand; but I prefer that the continuous wire shall be fed to a pair of shears, and automatically cut to any length desired, and then drop into a chute or hopper, from which, one by one, they are, at the proper juncture, delivered to the die-rollers, and presented to them in the proper position. For this purpose my machine is provided with the following mechanism: A shaft, H, driven by its pinion I, which engages with gear E, is provided with a bevel-gear, J, which engages with a bevel-gear, K, on a short shaft, L, mounted in a hanger, M. On this latter shaft is a crank-pin, *n*, to which is connected a link or crank-rod, *o*, which is adjustably connected, by thumb-screw or its equivalent, to a slotted arm, *q*, affixed to the

shaft *r* of the wire-feeding grooved roller *s*, a ratchet-wheel, *t*, on said shaft *r* imparting motion to it by means of the weighted or gravitating pawl *u*, pendent on the slotted arm *q*. The revolution of crank-pin *n* gives an intermittent rotary motion to shaft *r* through the agency of this pawl and ratchet; and the upper grooved roller *v* receives its corresponding intermittent motion through the agency of the gears *w x* on the respective shafts of these grooved rollers, the upper one of which may be adjusted relatively to the lower one by any well-known devices—such, for instance, as the slide-boxes *y* and set-screws *z*. By these devices the length of wire to be fed before it is cut by the shears may be regulated at will.

The shears are shown at 1 and 2, the former being the stationary blade, and the latter the movable one, and which is operated as follows: On the end of shaft H is a crank-pin, 3, entering a slot in the lower arm of an elbow-lever, on the upright arm of which lever is the movable cutting-blade 2, and the revolution of the crank-pin 3 operates this blade of the shears at the appropriate time. This same crank-pin 3 also enters a slot in one arm of a lever, 4, fulcrumed upon one of the supports 5 of the chute 6, and the opposite end of this lever 4 is furnished with a gate, 7, which extends across the mouth or outlet of the hopper, and vibrates up and down with the movements of the lever. This same lever carries teeth or forks 8 8, which, at intervals, project upward through orifices in the bottom of the chute near its discharging end.

When the machine is in motion, the piece of wire, as cut intermittently from the stock or coil of wire, drops into the chute lying across the same, the bent guard 9 serving to guide and position it while being cut. The piece so cut then rolls down the chute until arrested by the forks or detainers 8; and when the die-rollers are about approaching their proper stage of revolution to receive the piece, the detainers retire and permit the piece to roll down, to be again arrested for a moment by the gate 7, and at the instant the rolls have revolved to bring the dies into proper relative positions to commence their action, the gate rises, and the piece of wire is delivered to the rolls. The rising of the gate also again raises the forks or detainers 8, which now again arrest the next succeeding piece, which has just been severed by the shears, and so on successively.

Each die-roller is provided with detainers or catch-pieces 10 10 at the front or receiving end of its die, the function or duty of which is to catch, arrest, and detain the piece of wire to be treated as it is dropped from the chute, and prevent its falling through the space between the rolls before the dies have seized it.

As both die-rolls revolve in the same direction, it will be noticed that their adjacent surfaces, which are in contact with the piece of metal under treatment, are moving in opposite directions, and, consequently, they act upon the metal in a manner similar to that of the action of the human hands when placed palm to palm and moved to roll a stick of plastic material between them, the pressure of the hands tending to compress and reduce the material.

In order to give this gradual compression and solidification to the metal during its rolling treatment, the surfaces of the dies are, as shown, eccentric relatively to the axis of the rolls, so as to continuously take a tighter and tighter hold of the piece of metal as it is rolled between them, until it is finally discharged at the ends of the dies. This rolling and squeezing action, while reducing the diameter of the stock, forms also the head and point, and somewhat elongates the piece.

The central bead or rib 11 (shown in one of the pairs of dies) is a sort of knife or blunt edge, for forming a groove between the two heads of double blanks, such groove being a partial or a full severance of the two blanks. This knife or rib I prefer to make removable from the die, so that it can be taken off to be kept in order and replaced, or to allow the substitution of another one.

The dies may be shaped to give the tapering shank, as shown at 12*; or to make a single blank instead of two connected ones; or to make a shank of a swelled form—that is, larger in diameter throughout its main body than at or under its head, as shown at 13* in Fig. 11.

The hopper or chute 6 may be kept hot, if desired, to prevent the cooling of the pieces cut off from the wire. The top or cover of the hopper is preferably made to be lifted like a lid, as shown.

In making polygonal-headed bolts, polygonal wire or rods would be used. In making large bolts, the wire-feeding apparatus may be dispensed with, the pieces to be rolled being, in such case, cut previously in any convenient way, or by any well-known means, and then passed direct to the feed-hopper.

To facilitate the adjustment to or from each other of the die-rollers, each has a short shaft coupled with another short shaft in the same line, such coupled shafts acting as one, but yet permitting the shifting of the one which is provided with adjusting devices. Such adjusting devices are shown for the roll, the journal box or bearings 14 being arranged to have their positions shifted at will a short distance by means of the slots 15 and set-screws 16.

The couplers (shown at Fig. 9) also permit the removal and replacing, when desired, of the die-rollers and their shafts, without disturbing the short shafts to which the gears C C′ are attached.

I claim—

1. The combination of the cylinders or rolls, constructed as described, for rolling screw-blanks.

2. In combination with die-rolls, construct-

ed and operating as described, an adjustable automatic wire-feeding device, and an automatic wire-cutting apparatus, adapted for feeding and severing the wire in the desired lengths, preparatory to rolling and shaping.

3. In combination with the die-rolls, provided with catch-pieces 10, operating as described, the chute 6, the automatic forks or detainers 8, and an automatic gate, 7, operating to hold, position, and deliver the rod or piece of wire to the die-rollers at the proper juncture in their revolutions, substantially as and for the purpose set forth.

SAMUEL VANSTONE.

Witnesses:
CHARLES SELDEN,
JOHN C. PURKIS.