

(No Model.)

2 Sheets—Sheet 1.

S. E. GROFF.
NAIL MACHINE.

No. 476,632.

Patented June 7, 1892.

Fig. 1

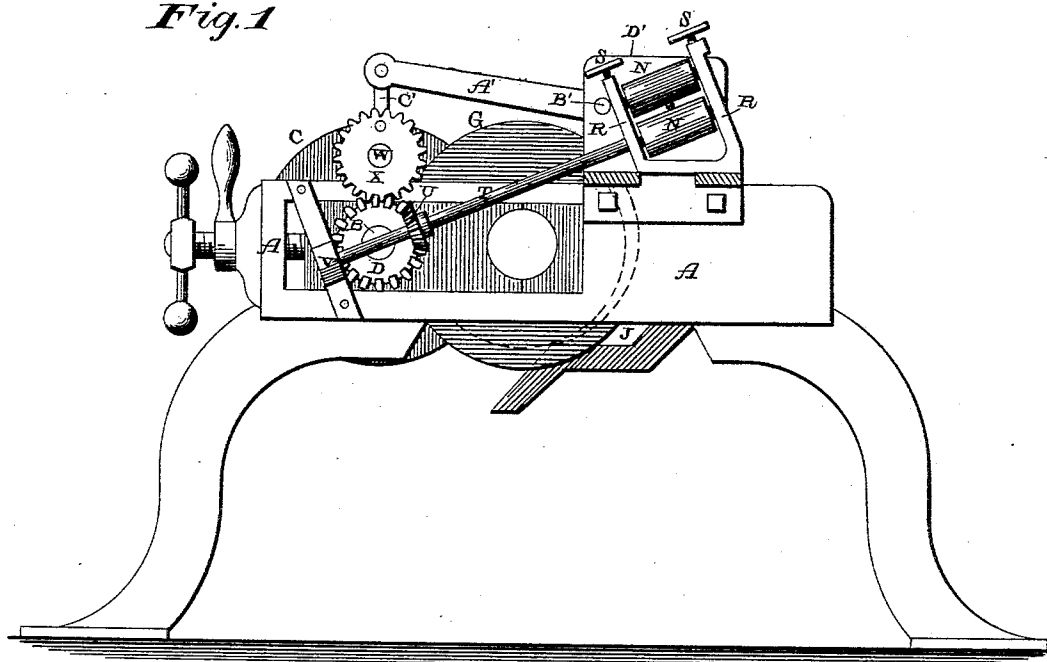


Fig. 3.

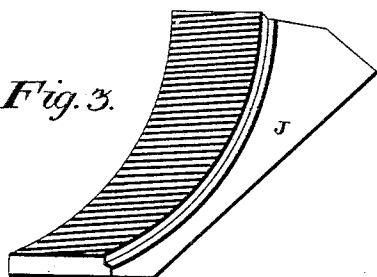


Fig. 4.

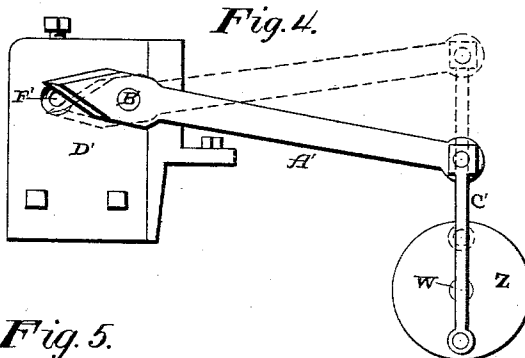
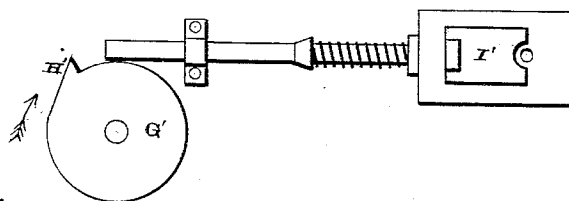


Fig. 5.



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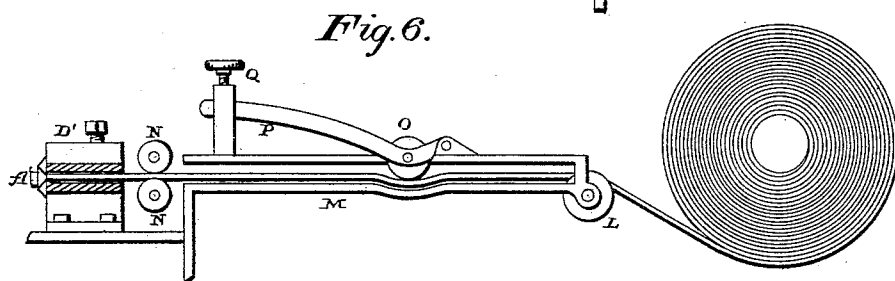
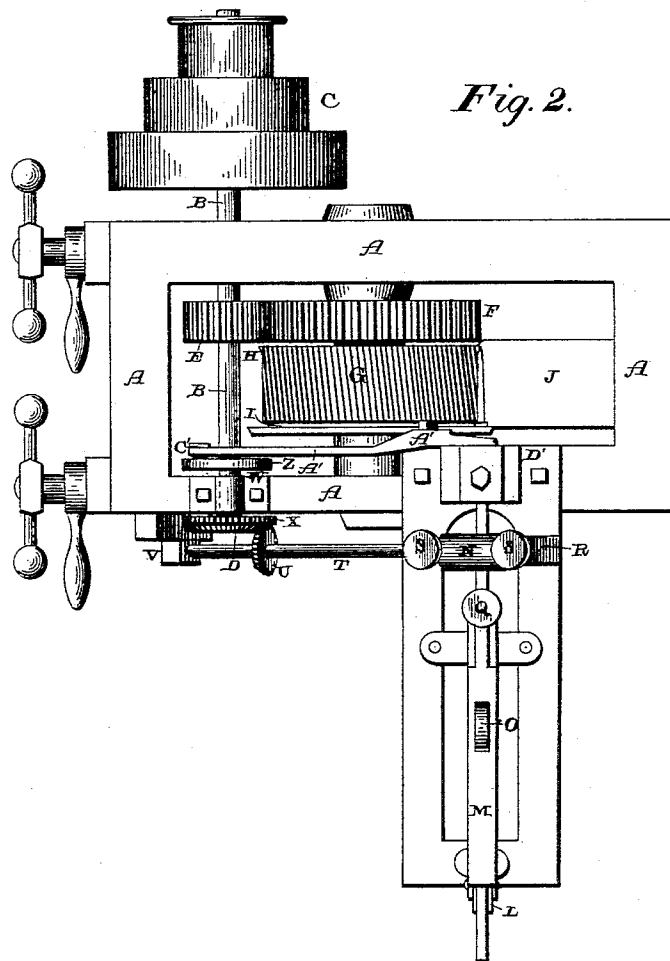
(No Model.)

2 Sheets—Sheet 2.

S. E. GROFF.
NAIL MACHINE.

No. 476,632.

Patented June 7, 1892.



Witnesses:

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UNITED STATES PATENT OFFICE.

SYLVANUS E. GROFF, OF MARIETTA, ASSIGNOR OF TWO-THIRDS TO HENRY C. MUSSER, OF SCHOCK'S MILLS, PENNSYLVANIA, AND HORACE M. ENGLE, OF ROANOKE, VIRGINIA.

NAIL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 476,632, dated June 7, 1892.

Application filed August 2, 1890. Serial-No. 360,791. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS E. GROFF, of Marietta, in the county of Lancaster and State of Pennsylvania, have invented certain
5 new and useful Improvements in Nail-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make
10 and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in nail-machines; and it consists in the arrangement and combination of parts, which will be
15 more fully described hereinafter.

The object of my invention is to produce a machine which will take wire, cut it into suitable lengths, form heads and points upon each
20 nail, and groove it spirally at the same time, so as to produce nails which are adapted to be used either as nails or screws and to produce nails more cheaply than has ever been done heretofore.

25 Figure 1 is a side elevation of a nail-machine which embodies my invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail view of the stationary grooved, corrugated, or fluted surface. Figs. 4 and 5 are detail views
30 of two forms of mechanisms for cutting off the wire. Fig. 6 is a detail view of the feeding and straightening mechanism.

A represents a suitable frame of any desired shape, size, or construction, and in which
35 the driving-shaft B is journaled. To the outer end of this shaft B is secured a suitable driving-pulley C and to the opposite end of the shaft B is secured the combined beveled and spur wheel D.

40 Secured to the shaft B, in between the sides of the frame A, is the pinion E, which meshes with the largest spur-wheel F, which is secured to the shaft upon which the large revolving wheel G is secured. This wheel G is provided
45 with a number of grooves, ribs, or corrugations which extend diagonally across its surface, and which wheel G has one edge slightly bulged or enlarged, as shown at H, so as to assist in forming the points of the

nails or screws, and has the opposite edge, as
50 shown at I, slightly recessed, grooved, or cut away, so as to assist in forming the heads of the nails or screws, as shown. The forms given to these two edges of the wheel may be varied according to the shape desired. This
55 wheel G operates in connection with the stationary curved die or surface J, which is provided with a series of grooves, flutes, or corrugations corresponding to those upon the surface of the wheel G, and which act in con-
60 nection with those upon the wheel G for rolling, elongating, grooving, or threading and finishing the nails or screws as they pass between the surface J and the wheel G. The opposite edges of this part J are shaped simi-
65 larly to the edges of the wheel G, so as to assist in shaping the points and heads of the nails or screws as they are being formed. At the upper end of the surface J it is farther from the wheel G than it is at its lower end,
70 as shown in dotted lines in Fig. 1, the object being to allow the cut-off piece of wire to drop readily between the two surfaces, between which it is compressed and elongated, at the same time that it is being gradually com-
75 pressed into a nail or a screw until it drops out below. The projecting edge H upon the wheel G, while the nail or screw is being formed, forms the point at the same time that the recess I forms the head. 80

The wire is fed from the reel and passes over the guiding-pulley L at the outer end of a suitable guide M and in between the feed-rollers N. In this guide M is a straightening-roller O, under which the wire is made to
85 pass, and which roller has its pressure upon the wire regulated by means of the lever P and an adjusting-screw Q of any desired construction. All of the kinks or bends in the wire are straightened out by means of the
90 roller O, so that only straight pieces of wire are fed to the machine. The feed-rollers N are placed at any desired angle in suitable bearings R, and the rollers are made adjustable to suit different thicknesses of wire by
95 means of the regulating-screws S. To the lower one of these rollers is secured the shaft T, which is provided with a suitable pinion U,

which meshes with the beveled portion of the wheel D. The shaft T extends across the wheel D at its lower end to the bearing V, which extends diagonally across the end of the frame to receive it, as shown in Fig. 1.

Journalled in suitable bearings upon the top of the frame is the short shaft W, which has a spur-wheel X secured to one end and which receives its motion from the wheel D, with which it meshes, and at the other end of the shaft W is a wrist-wheel Z, which operates the cutting-lever A' by means of the connecting-rod C'. The lever A' is pivoted at B' upon the casing D', through which is made an opening F', through which the wire is fed. The movement of the lever A' is so timed that the wire is cut off at even lengths, according to the length of the nail or screw which is to be made. The end of the lever A' is pointed, as shown, and the cutting-blade projects beyond its two edges, and the wire is cut by the lever at both the up and down movements thereof. Should it not be desired to use the mechanism shown in Fig. 4 for cutting off the wire, the mechanism shown in Fig. 5 may be used.

Instead of the wrist-wheel Z, a wheel G', having a shoulder H', may be used, and this shoulder will be made to move the spring-actuated cutter I' endwise for the purpose of cutting off the wire at each revolution of the wheel G'. The spring applied to the knife returns it to position as soon as the shoulder H' releases it.

Any sized wire will be used, according to the nail or screw that is to be made. Annealed wire may be used, and it will be sufficiently hardened by the forging it receives by passing through the machine to make a serviceable nail.

The nails made by this machine are intended to be used both as nails and screws. They can be driven with a hammer and removed by means of a screw-driver. If screws are to be made their heads must be slotted in the usual manner. By a change of dies and wheels either nails or screws may be made, as desired, direct from pieces of wire.

As shown in Fig. 1, the shaft B and the shaft to which the wheels F G are secured are held or journalled in suitable boxes, which are placed in slots made in the machine, and which boxes are rigidly held in position by means of suitable set-screws and jam-nuts; but I do not limit myself to this precise construction. Other forms of journals or boxes may be used without departing from the spirit of my invention.

The transverse ribs or flutes on the die are made at a reverse angle to those on the wheel. In the process of rolling the nail the flutes or ribs of the wheel are forced or pressed into the wire, which causes the wire to roll around against the die J. This rolling of the wire on the flutes or ribs of the wheel and die forms spiral grooves on the wire. The pitch and number of these grooves on the wire can be

regulated by the pitch given the flutes on the wheel or die and the number of flutes or ribs placed thereon.

The wire is of the same diameter that the head of the nail is intended to be when finished, and this being the case it is necessary to cut the wire shorter than the nail is intended to be when finished, so as to admit of the surplus wire being rolled and forged out from the head across the face of the wheel and die to the flange against which the point is formed. By this method the original size of the wire remains for the head, which is forced into the slot formed therefor.

Having thus described my invention, I claim—

1. In a machine for forming wire screws or nails, the combination of a frame, a die having a curved working face, one longitudinal edge of said working face being recessed throughout its length, so that one end of the wire-section will remain of the original diameter to form the head, the other longitudinal edge being bulged throughout its length to form the point, the portion of the face between said edges being formed to swage out the wire, and the rotary wheel coacting with said die and having one edge recessed and the other edge bulged completely around the wheel and having the periphery corresponding with the die, as set forth, the space between said wheel and die decreasing in size from one end to the other, whereby wire-sections dropped transversely into said space are headed and pointed instantaneously and by a single step.

2. The combination of a frame, a stationary vertical die provided with the downwardly-curved working face having one longitudinal edge recessed throughout its length and the other edge bulged, the face between said edges having the inclined projections, a horizontal shaft, and a wheel carried thereby coacting with said die, having one edge recessed and the other bulged completely around its periphery and its periphery formed to correspond with the die, said die being so formed that the space between the wheel and the die gradually decreases in width from the upper receiving end downwardly to the lower discharge end, whereby wire-sections dropped into said space are by one operation pointed, headed, and threaded, each section being swaged out, except at the end within said recess, which is left of the original diameter of the wire to form the head.

3. In a nail-machine, a frame, a stationary curved die, a shaft, a wheel carried thereby to coact with said die in forming a wire nail, a driving-shaft geared to said before-mentioned shaft, a wire-reel, a wire-guide carried by the frame, wire-feed rolls operated from said drive-shaft, and a cutting mechanism comprising a knife at the inner end of said guide, arranged to cut the wire into lengths and drop the lengths into the space between the die and wheel, combined substantially as specified.

4. In combination, a frame, a vertical sta-

tionary curved die, a rotary wheel coacting therewith, said die and wheel being relatively formed to simultaneously form the head, point, and grooves of the nail, the die and wheel being so arranged that the space between them decreases downwardly, a horizontal wire-guide in a plane above said space through which the wire is fed, and a knife acting with said plate to cut the wire into lengths and drop them transversely into the space, substantially as shown and described.

5. In a nail-machine, a stationary die transversely fluted, a transversely-fluted rotary die coacting therewith, a wire-guideway arranged transversely to and in a plane above said dies with its inner end located near the receiving end of the space between the dies, and a cutting mechanism at the inner end of said guideway to sever the wire into lengths and drop the lengths into said space, combined substantially as shown and described.

6. In a nail-machine, the combination, with the guide M, of a wheel R, the lever P, and a

regulating-screw for adjusting the pressure of the wheel upon the wire, feed-rolls, and a mechanism for operating the feed-rolls, substantially as set forth.

7. In a nail-machine, the combination of a supporting-frame, a shaft journaled therein carrying a wheel, a die placed therein adjacent to the wheel, a cog-wheel upon the said shaft, a driving-shaft having a wheel engaging therewith, a bevel and spur wheel upon one end, a shaft having a wheel on one end engaging the said bevel-wheel and a feed-roller upon its opposite end, a second roller engaging the said first roller, a cutter, and a wheel engaging the spur-wheel which operates the cutter simultaneously, as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

SYLVANUS E. GROFF.

Witnesses:

JOHN P. LIBHART,
URIE B. ENGLE.