(No Model.)

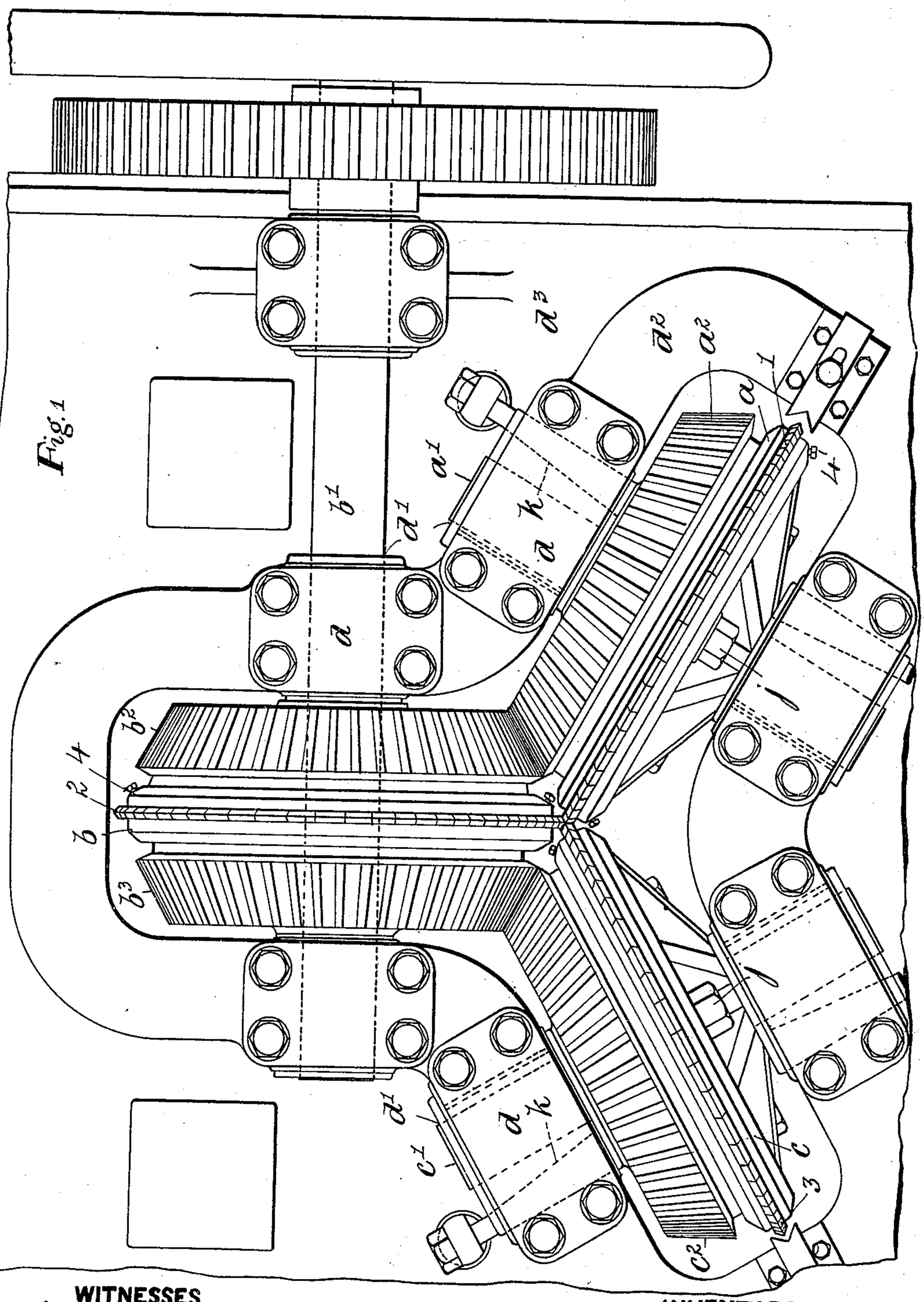
4 Sheets—Sheet 1.

H. E. FULLER & R. LIVESEY.

MACHINE FOR MANUFACTURING NAILS.

No. 548,980. Patented Oct. 29, 1895.

Fig. 1



WITNESSES

Geo. W. Rea.

Thos. A. Green

INVENTORS

Hiram Emery Fuller, and
Reginald Livesey

By James L. Norris.
Atty.

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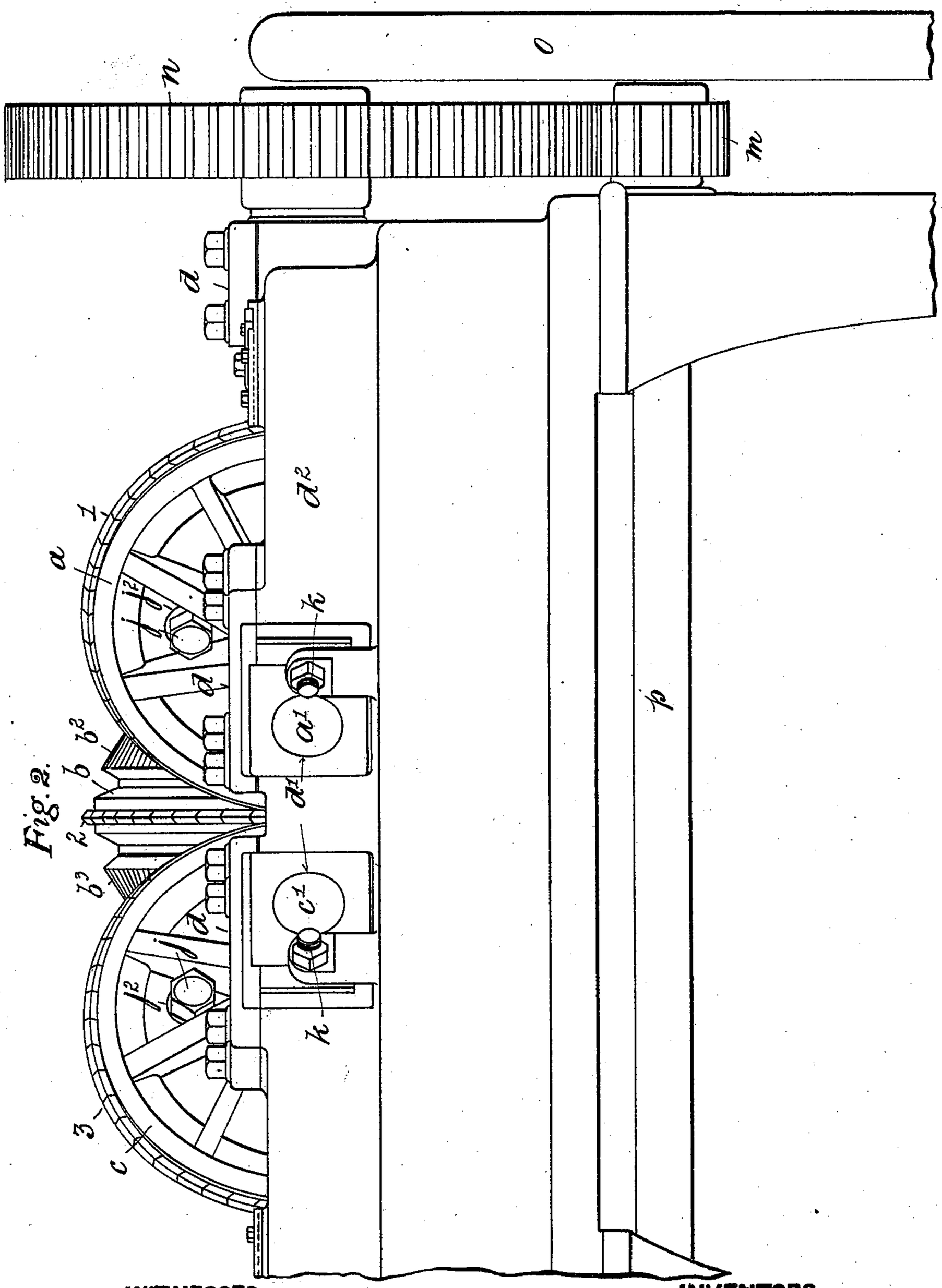

Fig. 2.

WITNESSES

Geo. W. Rea.

Thos. A. Green

INVENTORS

Hiram Emery Fuller, and
Reginald Livesey,
By James L. Norris.
Atty.

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Fig. 6.

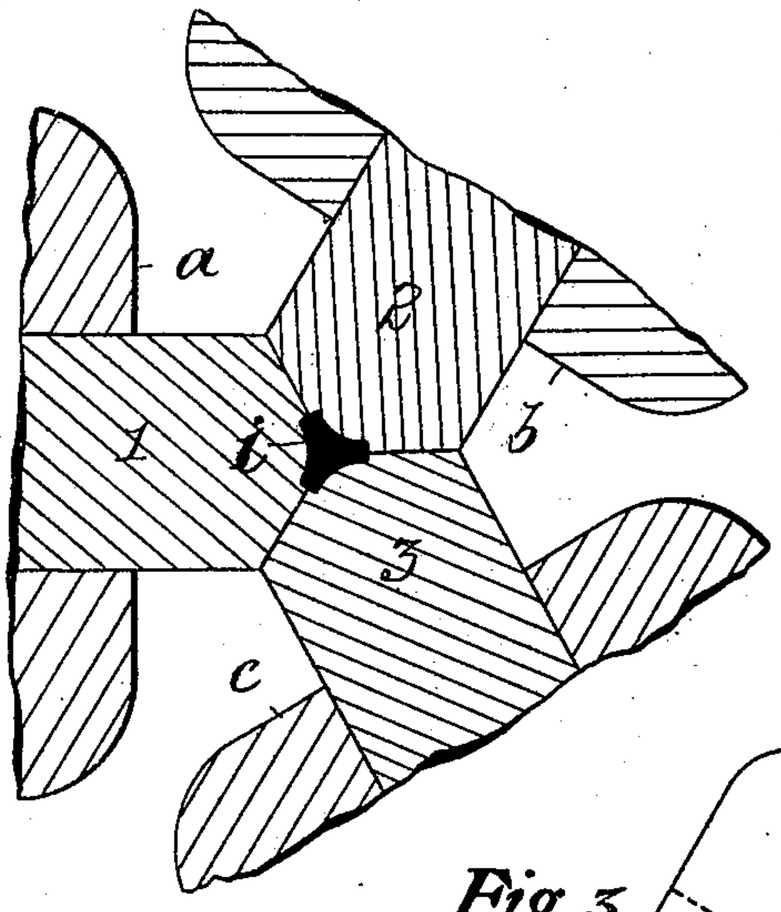


Fig. 5.

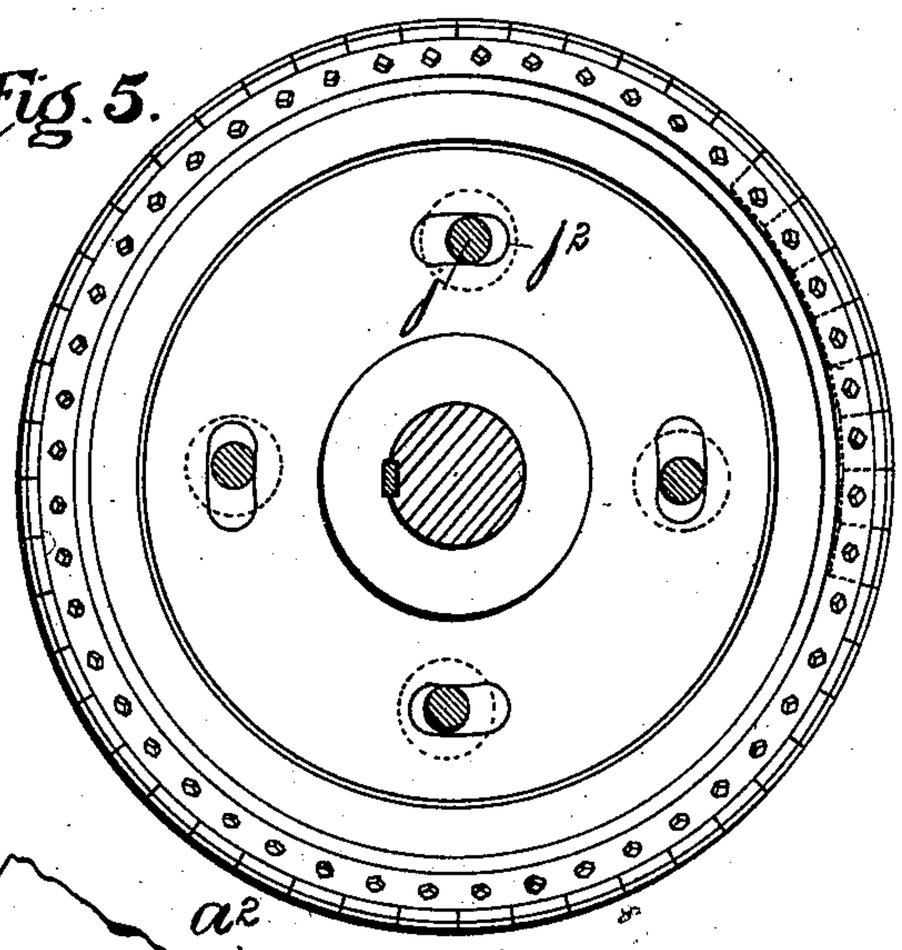
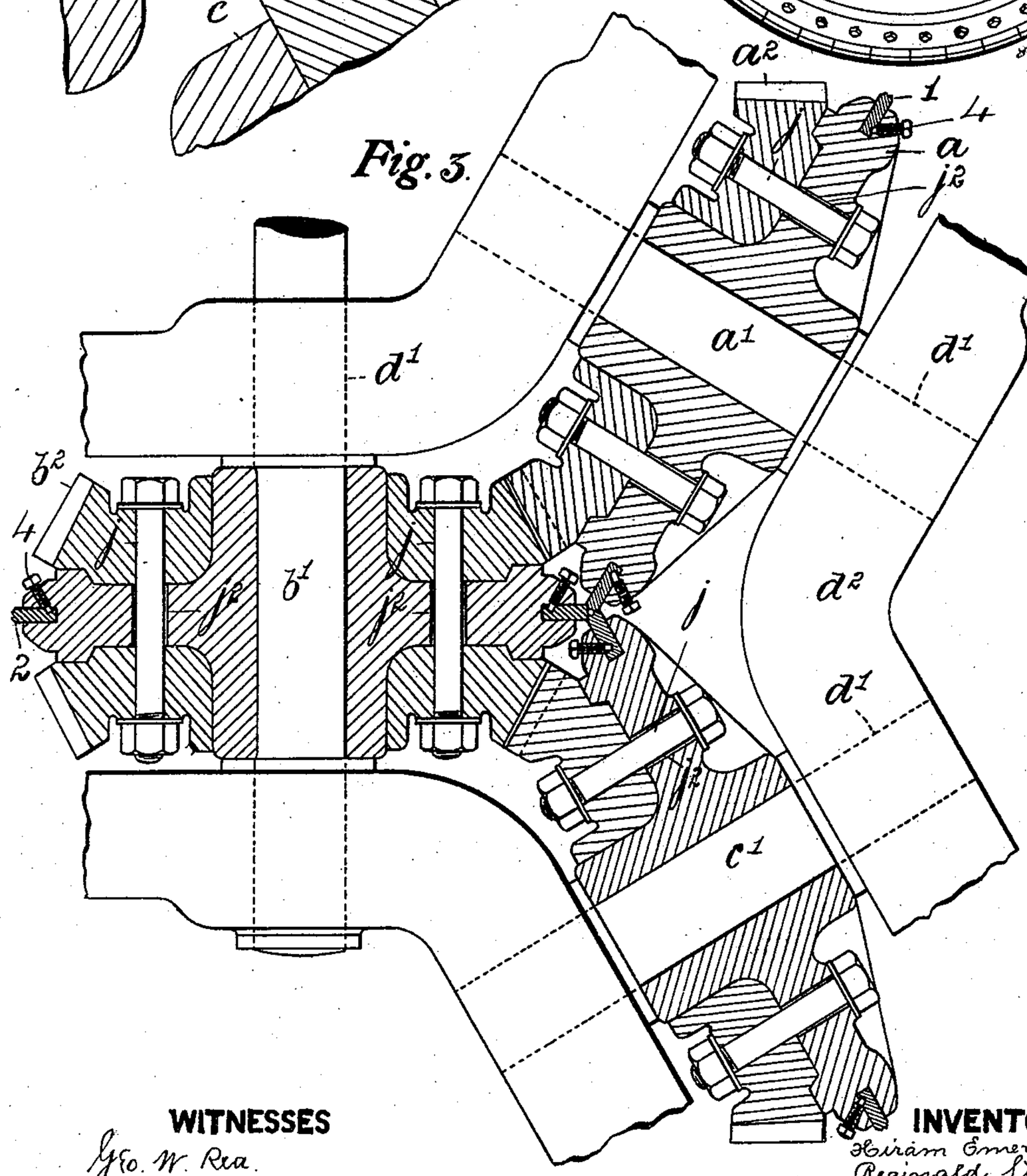


Fig. 3.



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Geo. W. Rea.

Thos. A. Green

INVENTORS

Hiram Emery Fuller and Reginald Livesey,

By James L. Norris.

Atty

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Fig. 9.

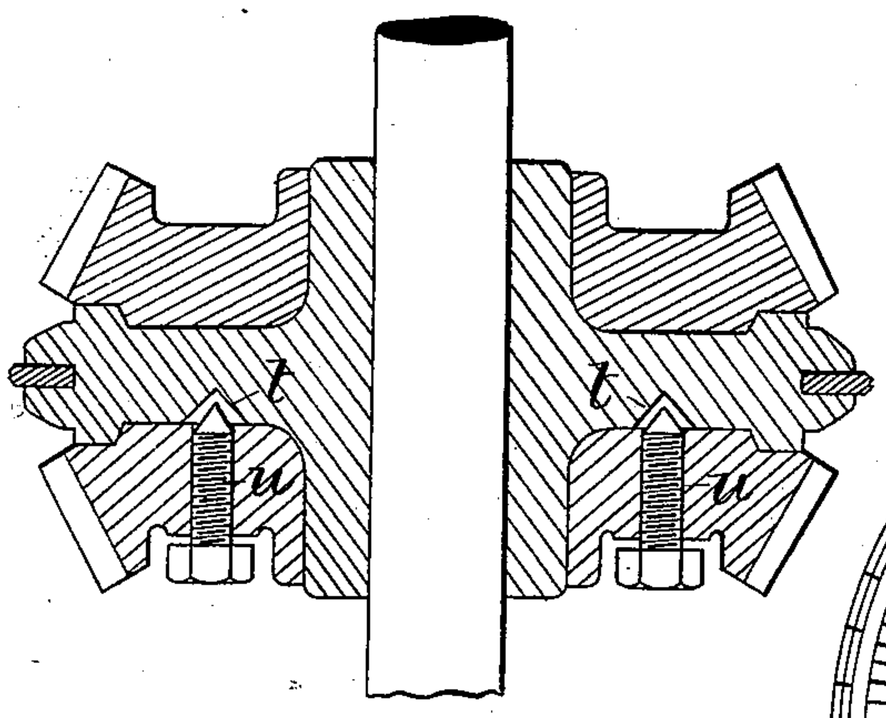


Fig. 8.

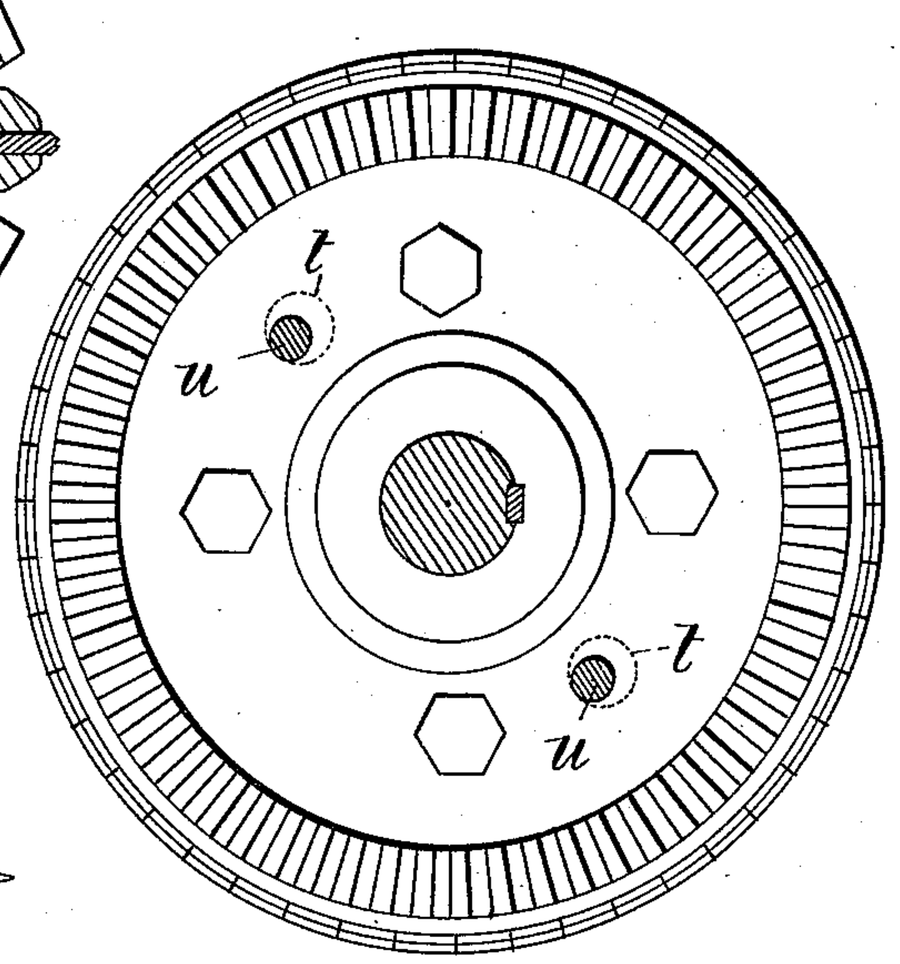


Fig. 7.

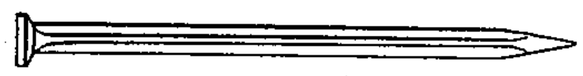
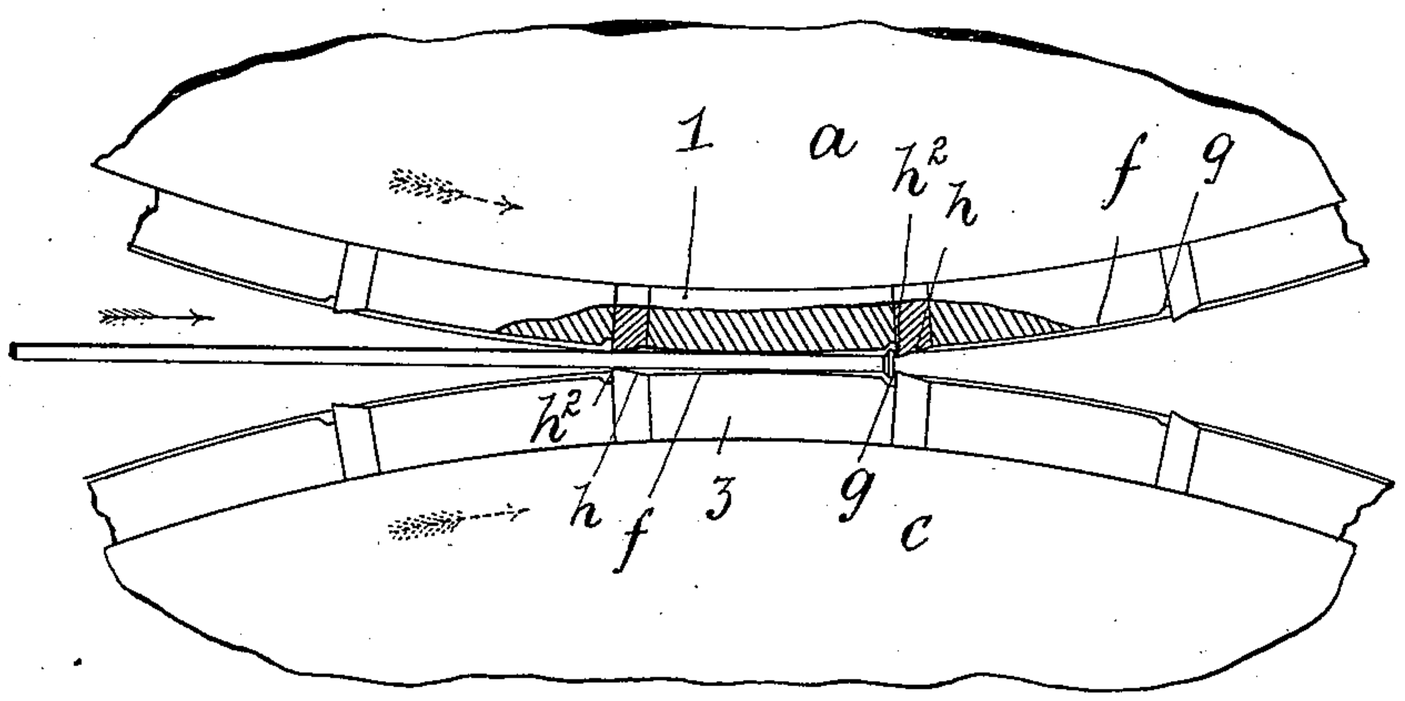


Fig. 4.



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UNITED STATES PATENT OFFICE.

HIRAM EMERY FULLER, OF BIRMINGHAM, AND REGINALD LIVESEY, OF LONDON, ENGLAND.

MACHINE FOR MANUFACTURING NAILS.

SPECIFICATION forming part of Letters Patent No. 548,980, dated October 29, 1895.

Application filed April 4, 1895. Serial No. 544,455. (No model.) Patented in England December 21, 1893, No. 24,639.

To all whom it may concern:

Be it known that we, HIRAM EMERY FULLER, engineer, of Star Hotel, Newhall Street, in the city of Birmingham, and REGINALD LIVESEY, gentleman, of St. John's Lodge, Ragnes Park, Wimbledon, near the city of London, England, have invented new and useful Improvements in Machinery for the Manufacture of Nails, of which the following is a specification, and for which Letters Patent of Great Britain have been obtained, dated the 21st day of December, 1893, and numbered 24,639.

This invention relates primarily to machinery for the manufacture of wire nails; and it consists, essentially, in the employment of three or more die-carrying rolls in a plane. The dies, when brought together at the nip, form the counterpart of the nail to be made, and which dies contain within themselves both shaping and cutting-off tools.

Figure 1 of the accompanying drawings represents a top side plan of a nail-rolling machine provided with three die-carrying rolls combined and provided with improvements made according to our invention. Fig. 2 represents a side elevation of the said machinery. Fig. 3 represents a horizontal section of the same, showing the dispositions of the die-carrying rolls and dies, with the opposed acting faces of the latter coming together, so as to embrace at all points of their traverse a space equal to any cross-section of the nail to be produced. Fig. 4 represents, upon an enlarged scale, a cross-section of the dies, showing how the opposed faces of the same come together and squeeze the metal fed into the machine into their opposed sinkings. Fig. 5 shows one of the die-carrying rolls with the driving bevel-wheel removed. Fig. 6 shows a vertical section, also on an enlarged scale, of the opposed faces of the dies as they come together. Fig. 7 represents a fluted nail made by the machinery represented. Fig. 8 represents a side elevation of one of the rolls, showing a modified means for adjustment or setting up; and Fig. 9 is a section of the same.

The same letters and numerals of reference indicate corresponding parts in all the views.

Mounted and made fast upon shafts or axles a' b' c' are die-carrying rolls a, b, and c, and with the necks of each of the shafts mounted within bearings d' of holsters d, supported by the general framing d^2, resting upon a bed d^3, while made fast to and rotating with the die-carrying rolls are bevel-wheels a^2, b^2, b^3, and c^2, intergearing one with another and adapted to uniformly drive the said die-carrying rolls, which have set up within the middles of their peripheries a series of contiguous dies 1, 2, and 3, fixed in position by set pins 4, and with each die having sinkings equal to one-third of the longitudinal cross-section of a nail to be made and in which combined sinkings of the three dies the metal fed between them in the form of wire is shaped. Thus each of the dies have body-sinkings f, head-sinkings g, point-sinkings h, and cutters h^2, which latter sever the shaped nail from the wire.

Assuming that a length of wire i is being fed vertically in the direction of the full arrow through the pass formed by the opposed sinkings of the rolls, as shown in diagram, Fig. 6, the metal is forced into the opposed body-sinkings f, and as the rolls rotate in the direction of the dotted arrows the metal, besides being put upon the stretch, is forced or made to flow into and fill up the interstices of the dies, and the superfluous metal is then made to flow backward into the wire, so as to form the head of the succeeding nail to be made—that is to say, the metal of the wire at the nip of the rolls is made to fill up the dies toward the point-sinkings, which as they take less metal to fill them than the body-sinkings cause the said metal to flow and retreat beyond the range of the point and form a bulge in the wire at the succeeding head-sinkings, and which superfluous metal as it comes opposite the nip is made to fill up the head-cavities, and at the same time the nail is cut off by the cutter-points h^2 coming together. The formed nail then drops, and the second nail is formed in the same way, and so on, by the continued rotation of the rolls.

It will be seen that the head of one nail is made to follow the point of the preceding one; but to this we do not limit ourselves, as the head may be formed prior to the shaping of the point by making the metal flow upward from the point and body to the head.

The setting of the die-carrying rolls is performed through the medium of cross-bolts *j*, taking through elongated slots j^2, made through the sides of the die-carrying rolls *a*, *b*, and *c*. This adjustment is for the purpose of bringing the cavities of the three opposed dies of each roll perfectly coincident. To admit of the bearings being set up consequent upon the wear of the necks of the rolls, we may employ pull-up wedges *k*. (Shown in dotted lines in Fig. 1.)

The mechanism of communicating motion to the rolls through the medium of suitable gear may be performed through the medium of a pulley, starting-lever, friction-clutch, pinion *m*, spur-wheel *n* on the shaft *b'*, fly-wheel *o*, and shaft *p*.

In Figs. 8 and 9, which represent means for obtaining a finer adjustment in setting up the acting faces of the rolls, *t* are inclined sinkings formed in the faces of the die-carrying rolls, into which sinkings conical-ended screw-pins *u*, working through the bevel-wheels, take, so that by the screwing up of one of the pins and at the same time slackening the other to a corresponding extent the die-holders are made to travel circumferentially.

We wish it to be understood that we do not limit ourselves to the particular fluted cross-section nail herein described, as nails of any section may be made by our machinery.

It is understood that our machinery is equally as applicable to the manufacture of spikes as to nails, and, further, that more than three rolls disposed radially on a plane may be used with equal effect.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

In machinery for the manufacture of nails and spikes from rod metal or wire, the combination of a series of radially disposed die-carrying rolls provided with intermeshing gears and having inclined planes *t* formed within or carried by said rolls, the set pins *u* carried by the gears and adapted to engage with said inclined planes, and the wedges *k* for setting up the bearings of the roll shafts, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands this 13th day of March, 1895.

HIRAM EMERY FULLER.
REGINALD LIVESEY.

Witnesses:
HENRY STARRETT,
ARTHUR F. SADLER.