A. M. POLSEY.

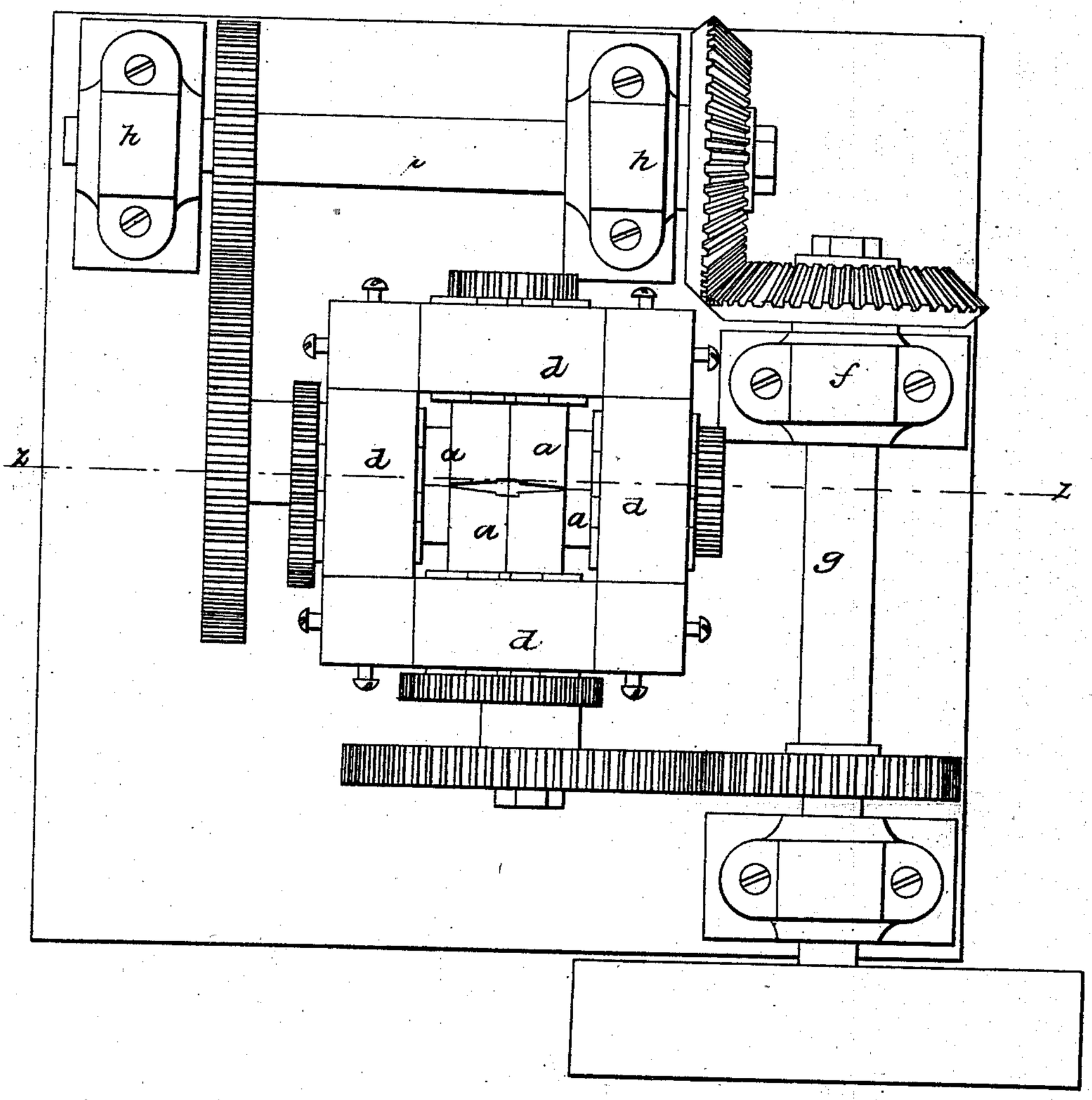
Nail Machine.

No. 60,056.

3 Sheets—Sheet 1.

Patented Nov. 27, 1866.

Fig. 1



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A. M. POLSEY.

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3 Sheets—Sheet 2.

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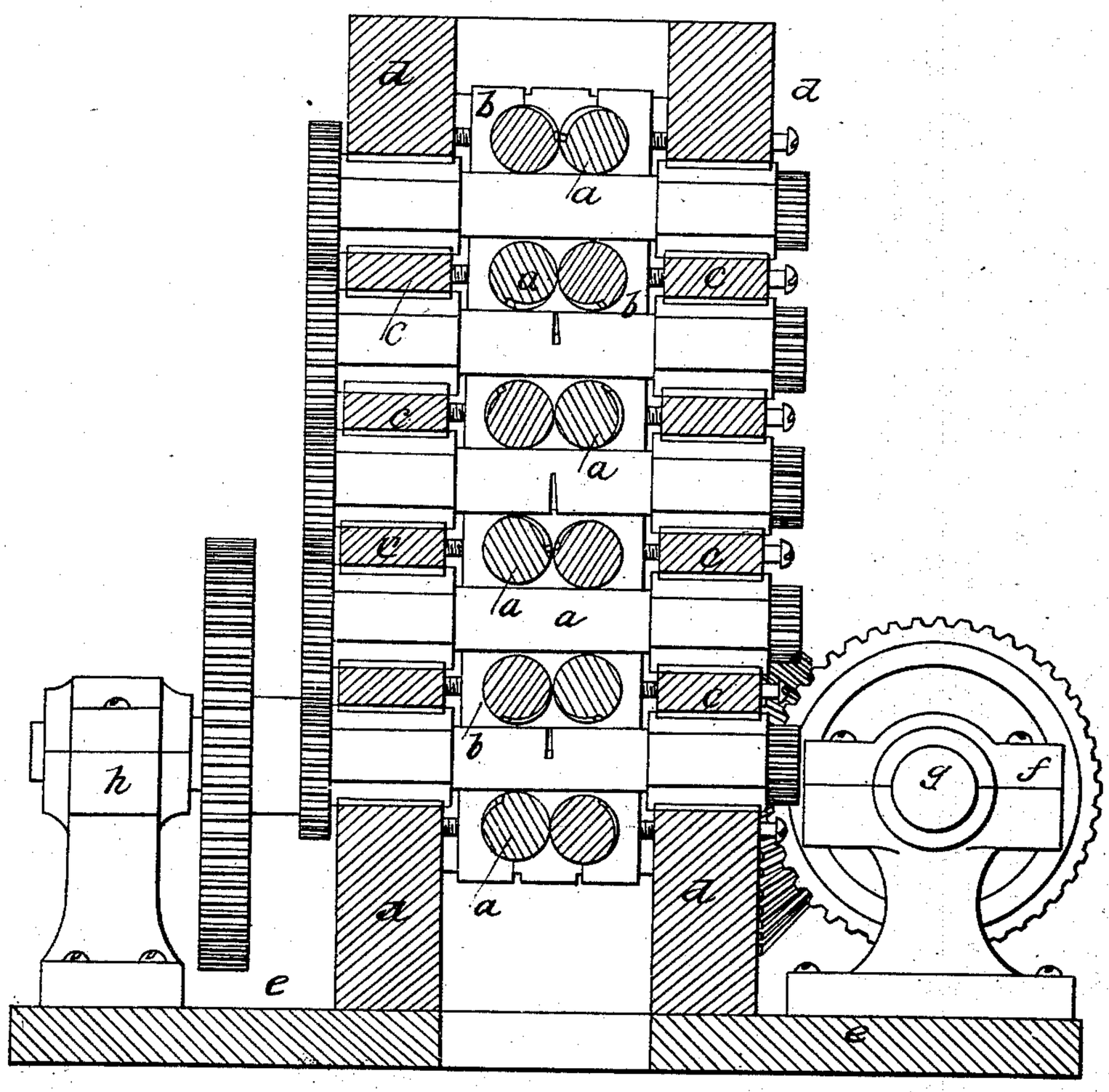
Fig. 2



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Nail Machine.

No. 60,056.

3 Sheets—Sheet 3.

Patented Nov. 27, 1866.

Fig. 3

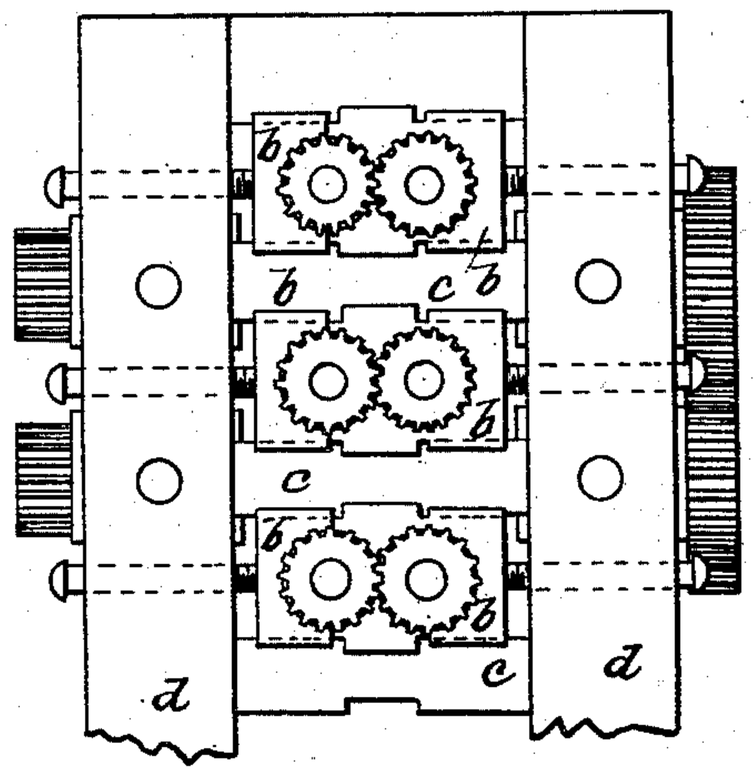

Fig. 4.

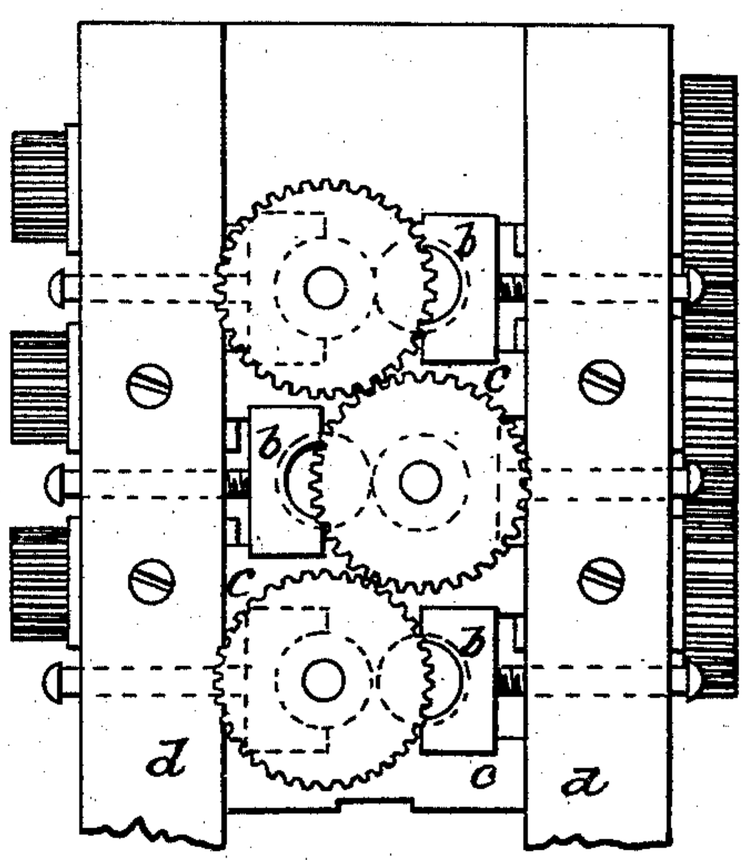

Fig. 5

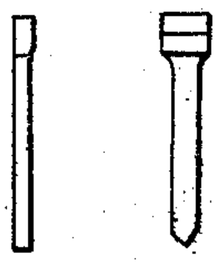

Fig. 6.

Witnesses

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United States Patent Office.

IMPROVEMENT IN MACHINES FOR MAKING NAILS.

ARLON M. POLSEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO T. H. FULLER.

Letters Patent No. 60,056, *dated November* 27, 1866.

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, A. M. POLSEY, of Boston, in the county of Suffolk, and State of Massachusetts, have invented an improved Machine for Rolling Nails; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

This invention relates to the described arrangement of two or more pairs of peculiarly constructed rolling dies, adapted to the purpose of drawing and shaping headed blanks of suitable form into nails by the operation of rolling the shanks or bodies of said blanks.

It consists in arranging and operating each pair of a series of pairs of rolling dies having the peculiarity hereinafter set forth, with reference to the other pairs of the series, so that a nail blank with a formed head thereupon shall have its sides and edges acted on alternately, without turning the blank on its axis, and so that it shall be passed onward, head foremost, by each pair of rolling dies, and shall be by them delivered by the head into the enlargement of the die-formed recess, and subjected to the action of the die formations in the next succeeding pair by which the blank is seized before being released by the preceding pair, and so on through the series of pairs. Where the article to be drawn and shaped is substantially rectangular in cross-section, each pair of rolling dies is placed at right angles to the pair which next succeeds in the drawing and shaping operation; but this invention is not confined, however, exclusively to such right-angled arrangement, for if the article to be drawn and shaped is of other form of cross-section, the pairs of roller dies may be placed at such angles with relation to the other pairs of the series as will act successively on the different sides or faces of the article, it being sufficient in this respect for the embodiment of my invention that two or more pairs of rolling dies shall be placed at angles with each other having the necessary relation to the form of the article to be drawn and shaped by rolling, when such pairs of rolling dies have the recessed provision for the head upon the blank to be rolled, in addition to the forming or shaping part of the dies, and act to positively pass or feed onward from one pair to the other the article in the manner before stated, and operate on its different faces to cause it to approximate more and more nearly to the shape desired at each successive passage through the pairs of rolling dies, and without turning the article on its axis, as practised in drawing and shaping by successive passes through a series of die grooves made in one pair of rolls.

The drawings represent a machine embodying my invention, and adapted to the purpose of reducing, by drawing and shaping in rolling dies, blanks similar to those shown on sheet 1, fig. 5, to such finished nails as are shown in fig. 6.

Figure 1 of the drawings shows my machine in plan.

Figure 2 exhibits it in vertical longitudinal section taken through the line *z z*, fig 1; and

Figures 3 and 4 are partial elevations of opposite sides of the machine illustrating a system of gearing the rolling dies together.

The rolling dies, *a a*, are mounted in suitable half boxes, *b*, sustained on the cross-pieces, *c*, of the cheeks, *d*, of the mill, which rise from the bed-plate, *e*, on which are secured the bearings, *f*, of the shaft, *i*, arranged to be driven at right angles to the shaft, *g*. By means of intermediate gears, plainly shown in figs. 1, 2, and 3, all of the pairs of the rolling dies, *a a*, are rotated, all turning inward and downward, so that when a nail blank like that seen in fig. 5 is taken by its head into the grip of the enlargement of the die grooves, made in the upper pair of rolling dies, it is passed in a right line, without turning, directly through all of the series of pairs of rolling dies, they acting alternately on the sides and edges of the nail blank till it falls from the last pair of dies out of the machine at the bottom in a finished condition, and of the form shown in fig. 6. The operation of the machine may be made very nearly continuous, for a new blank may be fed into the upper pair of rolling dies as soon as the die grooves therein are so presented in their rotation as that they can receive a new blank, and after having discharged the blank previously received, so that it will be obvious that in a machine made of several pairs of rolling dies, several blanks may be in the process of reduction to nails, all passing in succession through the machine at the same time. In the manufacture of nails by this machine, it is intended that the blank shall be cut or punched from a suitably rolled plate with its head of the exact size and form desired, and with its body requiring no more reduction than can be practically obtained by cold rolling. But it will be evident, however, that the blank may be heated, and rolled in this machine in that condition, in which case the shank or body of the blank will not need to be formed with so near an approximation to the finished nail.

It is unnecessary herein to describe minutely the forms given to the die grooves in each successive pair of the series of pairs of dies. It is sufficient to say that the grooves should be so formed in all the dies as to receive easily the heads of such blanks as are to have their bodies reduced, and that in the first pair of rolling dies the body of the blank shall be slightly drawn, and so on through the series of pairs, each pair contributing to the drawing and shaping of the shank or body part of the nail, but not changing materially, if at all, the shape of the head, and the last pair giving the finished shape; between said pairs of the series the reduction of the blank toward the final finished form of the nail should be performed in as nearly equal degrees by each of the pairs of rolling dies as possible. Part of the arrangement of the rolling dies included in the gist of my invention, is the matter of their size and distance apart relative to the length of the blank, and to the length of the finished article produced therefrom, which matter may be stated as follows: The size of the last pair of rolling dies must be sufficient to admit of the sinking, in the surfaces thereof, the parts of a die groove of a length not less than that desired for the finished article, and the size should be such as to admit of a die groove longer than the intended length of the finished article, so as to receive any surplus metal which may happen to exist in the body of the blank. And while the size and surface of the last pair of rolling dies should be as stated, it is necessary to have the sizes and locations of the first and succeeding pairs, such that the partially rolled article will reach from the die grooves of one pair into the die grooves of the next succeeding pair, so that the head of each nail will be seized in the enlargements of the die grooves of each succeeding pair, before the grooves of the preceding pair relinquish their hold upon the shank thereof, this insuring the absolute mechanical delivery of each partially rolled blank from one pair of rolling dies to the pair that next succeeds in the operation. It is desirable, in the practice of my invention, that the rolling dies shall so move as to exert a slight tensile strain on the metal of the piece being rolled, between the points where any two adjacent pairs of dies are performing their rolling operation. Each pair of the rolling dies must be so adjusted with respect to the action upon the blank of the pair immediately preceding, that said preceding pair shall deliver the head of the blank into the enlargement of the die grooves made for its reception in the succeeding pair. This adjustment being made throughout the series of pairs, each pair of rolling dies is caused to revolve isochronously with all of the other pairs. The function of the enlargements of the die grooves is not merely to receive the head, so as to render it possible to roll the shanks of headed blanks by passing them directly through a series of pairs of rolling dies, but is also to obtain, by the interlocking of the heads of the blanks in the recesses or enlargements of the die grooves, such a hold of the rolling dies upon the blanks as shall lessen the chances of the slipping of the dies upon the blanks, and to facilitate and render certain the transfer of the blanks from one pair of roller dies to another, and the passage of each blank through the machine. The arrangements for the adjustment of the rolling dies, and for their removal from the cheeks of the machine, are not of the essence of my invention, and are clearly enough shown by the drawings to enable any commonly skilled mechanic to understand them without further description; but by having means for adjustment of the pairs of die rolls so that the centres of each rolling die of any pair may be forced toward each other, or may be allowed to separate provision is made for elongating the nail blank, more or less, within limited degrees, by any pair or pairs of die rolls, and use may be made of this provision to secure harmonious working of the mill, and to compensate in some degree for defects in other adjustments of the parts, and in the workmanship thereof.

I am aware of John Wotton's patent, of August 29th, 1854, in which are shown two pairs of rolling dies arranged to deliver, or to positively feed the article wrought thereby, from one to the other pair. This arrangement, broadly, I do not claim, and consider my invention as limited to a machine which, while arranged and operating like Wotton's, in shaping and feeding, has the further provision for the reception of formed heads in nail or other similar blanks, this provision giving my machine capacities not possessed by the one referred to. In the patent to Milton D. Whipple, and elsewhere, I am aware that rolling dies have been shown, having enlargements in the die grooves capable of receiving formed heads upon blanks, the bodies of which are to be drawn. But in the cases referred to the arrangement of the rolling dies, as to size or diameter, and the distances apart of the centres of the several pairs, are such that the blank in passing from one pair to another of the series is freed from the control of any of the dies, and falls by gravitation. This renders machines so organized uncertain in their operation, and worthless for the purpose designed.

I claim a series of rolling dies, provided with die grooves having enlargements therein for reception of headed blanks, and otherwise formed, substantially as described, when arranged with reference to each other, and so as to operate substantially as specified.

In witness whereof I have hereunto set my hand this twentieth day of July, A. D. eighteen hundred and sixty-six.

ARLON M. POLSEY.

Witnesses:

J. B. CROSBY,

F. GOULD.