J. B. WILLS.

MACHINE FOR MAKING HORSESHOE NAILS.

No. 171,711. Patented Jan. 4, 1876.

Fig. 1.

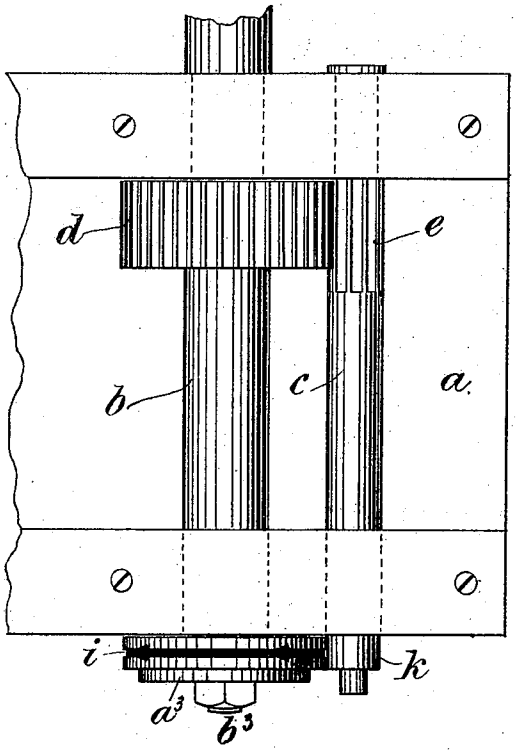


Fig. 4.

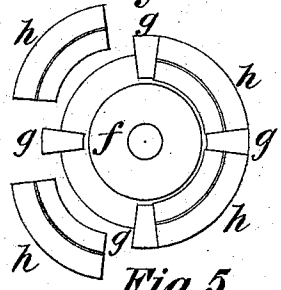


Fig. 6.

Fig. 5.

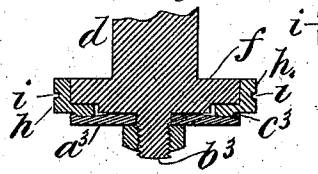


Fig. 7.

Fig. 8. *Fig. 10.* *Fig. 9.*

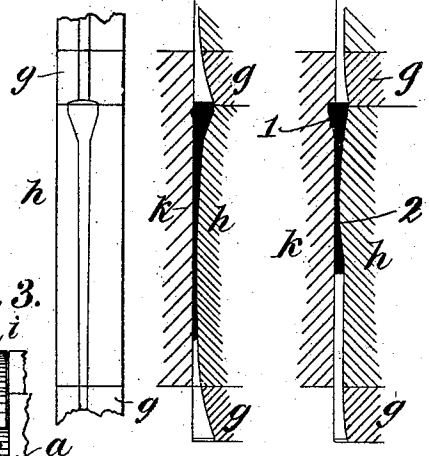


Fig. 2.

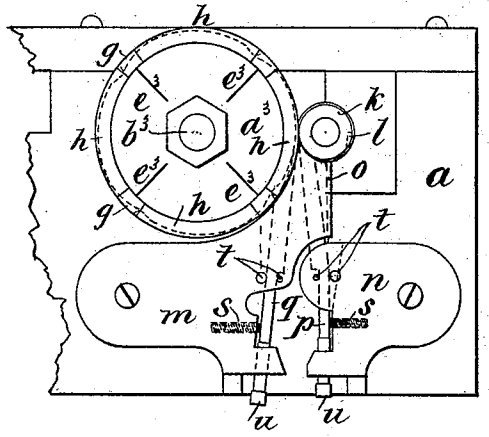


Fig. 3.

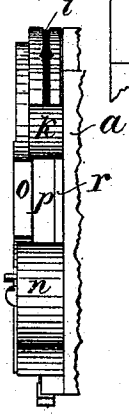


Fig. 11.

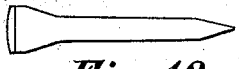


Fig. 12

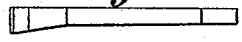


Fig. 13.

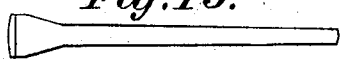
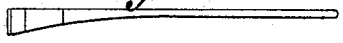


Fig. 14.



Witnesses

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IMPROVEMENT IN MACHINES FOR MAKING HORSESHOE-NAILS.

Specification forming part of Letters Patent No. **171,711**, dated January 4, 1876; application filed December 7, 1875.

To all whom it may concern:

Be it known that I, JOHN BOMAN WILLS, of the village of Keeseville, in the county of Essex, in the State of New York, have invented certain new and useful Improvements in Machinery for Elongating Blanks for Horseshoe-Nails; and I do hereby declare that the following is a full, clear, and exact description of the same.

In the drawings hereunto annexed similar letters of reference indicate like parts.

Figure 1 is a plan of a machine embodying my improved machinery. Fig. 2 is an end elevation of Fig. 1. Fig. 3 is a side elevation of Fig. 2. Fig. 4 is a detail of dies. Fig. 5 is a horizontal central section of end of shaft with dies attached. Figs. 6 and 7 are views of dies. Fig. 8 is a plan of the two dies forming a quarter of the circle, the periphery being straightened out to a flat surface. Fig. 9 is a section of Fig. 8, showing the roll reduced also to a flat surface, and applied to it as used for the first treatment of the nail-blank. Fig. 10 is a section of the dies and roll under the same circumstances as in Fig. 9; but in this case the dies are modified for the second treatment of the nail-blank. Fig. 11 is a plan of the blank to be operated upon. Fig. 12 is a side elevation of Fig. 11. Fig. 13 is a plan of the blank after it has gone through the operations of the dies. Fig. 14 is a side elevation of Fig. 13.

The object of my invention consists in the machinery shown in the drawings.

Letter *a* is any suitable frame-work for holding the bearings of the shafts *b* and *c*. These bearings are of any ordinary description used in similar cases. On the shaft *b* a gear-wheel, *d*, is secured, and on the shaft *c* teeth are cut, forming a portion of it into a gear-wheel, *e;* otherwise the gear-wheel *e* may be made separate from the shaft *c*, and secured thereon in the ordinary manner. As shown in the drawings, the relative proportions of the wheels *d* and *e* are as four to one, so that the shaft *c* will make exactly four revolutions to one of the shaft *b*. On the end of the shaft *b* is formed a disk, *f*. This may be made in one with it, as shown in Fig. 5, which represents the end of the shaft enlarged to form the disk; or it may be made separate and secured upon the end of the shaft—in this case reduced to receive it. *g* are four dies, inserted and secured in openings cut in the disk to receive them, care being taken to place them exactly at four equally distant points in the circle. *h* are segmental dies, as shown in Figs. 2 and 4. In the latter, two of them are moved out of place to show them more clearly.

The object of thus constructing the dies in parts *g* and *h* is that, in case the groove (which will hereinafter be described) in them should become imperfect from use, or in any way defective, the die in which the defect occurs may be removed and another one put in its place; or it may be repaired. This arrangement of the dies also, in a great measure, obviates the difficulty of twisting or taking an improper shape when being tempered, as they would do were they all in one piece—that is to say, forming a ring.

Fig. 6 shows the reverse side of the dies to that shown in Fig. 4, and Fig. 7 shows an end elevation of Fig. 6.

The dies are attached to the disk by a plate, a^3, placed on the screwed extension b^3 of shaft *d*. This plate is provided with a projection, c^3, engaging with a projection, d^3, on each of the dies *h*, having a miter form, and retaining them in their proper places down upon the periphery of the disk *f*, while it also holds them firmly against its face for the purpose of giving the plate a^3 a certain amount of spring, to cause it, in a measure, to act separately on each of the dies in case of any little irregularity in them. Cuts e^3 are made in it, as shown in Fig. 2. These dies are provided with a groove, *i*, extending around the whole of the periphery formed by the four dies *g* and four dies *h*. This groove is made in two forms. In either case the plan of the groove is as shown in Fig. 8; and for the first treatment of the blank shown in Figs. 11 and 12 the groove is of the configuration in depth as shown in Fig. 9, and in this case the end of the shaft *c* is provided with a roll, *k*, attached upon it, as shown, having a recess, *l*, for the first treatment of the blanks. This recess is made the exact shape of the head of the nail, and in depth as shown at 1 in Fig. 9.

The groove *i*, cut or engraved in the dies *h* and *g*, is of fourfold configuration. Each

configuration is complete in one of the dies *h* and its adjacent die *g*. The two being taken together are equal in length to the circumference of the roll *k*, and the configuration of the groove *i* is so situated that as the shafts *b* and *c* revolve the recess *l* comes to the exact position with each of the four configurations, as shown at 1 in Fig. 9.

It will be observed that the blank to form the nail (delineated by being made black) is reduced at the head and body down to about the required size—that is to say, to about the point 2, from which point the extremity begins to increase in thickness, as shown.

It will be seen that the diameter of the circle made up of the dies *g* and *h* is four times greater than that of the roll *k*. I have found by experiment that the greater the difference of diameter between the two, the better the action of the dies and the roll will be in elongating the blank.

Before proceeding further with this description of the drawing, I wish to state that I do not confine myself to the fourfold construction of the dies *g* and *h*, and the fourfold configuration of the groove *i*. They may be made in any number, from two upward, and the shaft *c* made to revolve a corresponding number of times to one revolution of the shaft *b*.

The blanks (shown in Figs. 11 and 12) are fed to the dies by any desired means already in use, forming no part of this invention, and, having been acted upon, as described, they are taken to a furnace, annealed, ready to be treated by the second dies, the first dies having been removed, and the second ones put in their place. In this case a roll, *k*, is provided not having any recess *l*.

The groove *i* is modified to the configuration shown in Fig. 10, by which the point end of the blank, from the point 2 in Fig. 9, is pressed or drawn out, giving the blank the configuration shown in black in Fig. 10, and also illustrated by Figs. 13 and 14.

It will be observed that the blank is turned with its opposite side toward the roll *k* in the second operation of the dies to that in the first. This is for the purpose of giving a good, smooth edge, so that the dies in the second instance have little or nothing to do with forming the head, or part of the body, down to the point 2 in Fig. 9, beyond straightening the head with the body. Their action elongating the point end stiffens and hardens that portion of the blank. They are now ready for pointing, thereby forming them into complete nails.

As shown in Figs. 2 and 3, guides are attached on the under side of the dies *g*, *h*, and *k*. These are constructed as follows: To the side of the frame *a* are attached blocks *m* and *n*, the one, *m*, having a projection, *o*, extending upward to the dies, and forming a guide to the blank on one side as it passes through the dies, and also forming a guide on one side of the guide-bars *p* and *q*. The guide on the inner side of the blank is formed by a plate or supplementary piece, *r*, attached on the frame *a*, and being in form similar that of the projection *o*. The upper extremity of the guide-bar *q* is provided with a point to run in the groove *i*, and be continually pressed against the bottom of the groove by the action of a spring, *s*, the bar being pivoted between two pins, *t*. *u* is a set-screw, acting upon the end of the bar *q* for the purpose of adjusting its height, and raising it as it is shortened by wear. The upper extremity of the guide-bar *p* is suited to act in a similar manner on the roll *k*, it being similarly pivoted with pins *t*, and provided with a spring, *s*, and a set-screw, *u*. Thus, by the plate *r* at the back, the projection *o* at the front, the guide-bar *p* to one side, and the bar *q* to the other, a passage a little larger than the head of the blank is formed, thereby preventing the blank from following around the roll *k*, or remaining in the groove *i*, and becoming in either case a dangerous obstruction to blanks being fed to the dies.

What I claim is as follows:

1. The combination of the dies *g* and *h*, having projection d^3, with the plate a^3, having projection c^3 and cuts e^3, substantially as and for the purposes set forth.

2. The combination of the guides *p*, *q*, *o*, and *r*, constructed, arranged, and operating substantially as and for the purposes set forth.

3. The dies *h*, of the form shown, in combination with the dies *g*, plate a^3, and the guides *p*, *q*, *o*, and *r*, substantially as and for the purpose specified.

Montreal, 30th day of November, A. D. 1875.

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Witnesses:

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