P. Miles.

Nut Machine.

No. 52.
31,056.

Patented Jan. 1, 1861.

Fig. 1.

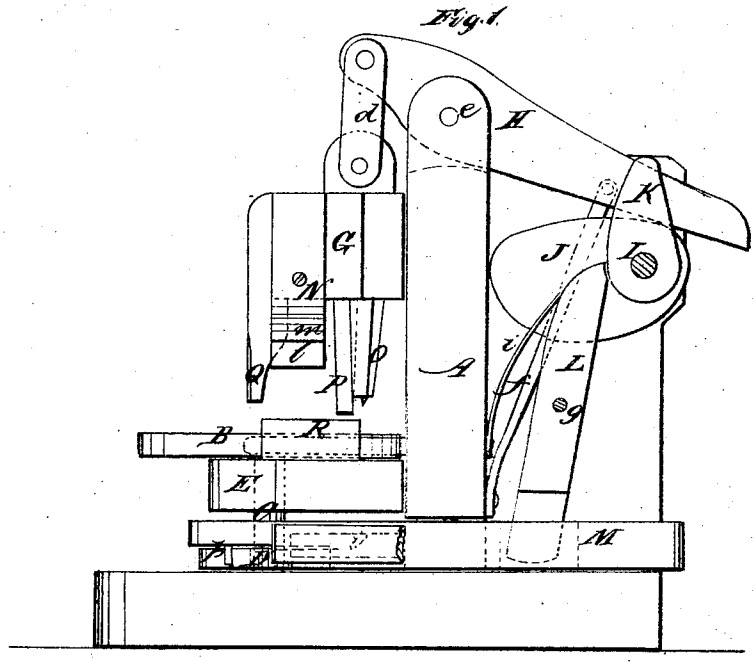


Fig. 4.

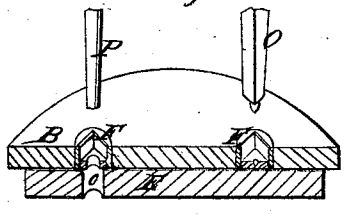


Fig 3.

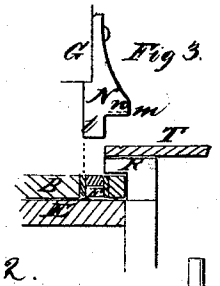


Fig. 2.

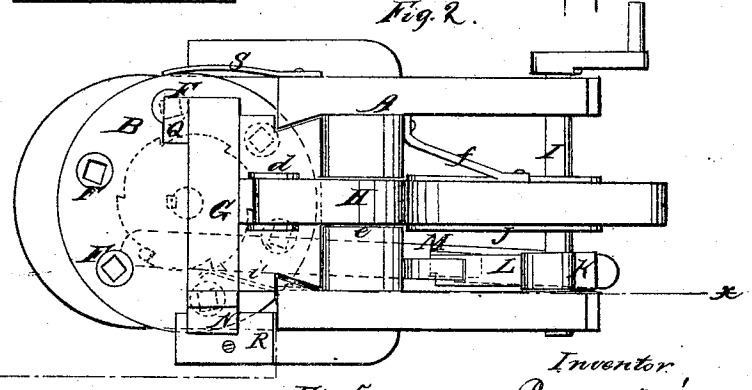
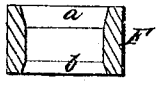


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

PURCHES MILES, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO HIMSELF, AND A. P. PLACE, OF PLANTSVILLE, CONNECTICUT.

NUT-MACHINE.

Specification of Letters Patent No. 31,056, dated January 1, 1861.

To all whom it may concern:

Be it known that I, PURCHES MILES, of New Haven, in the county of New Haven, and State of Connecticut, have invented a new and Improved Machine for Making Nuts and Washers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side sectional view of my invention, taken in the line *x*, *x*, Fig. 2. Fig. 2 is a plan or top view of the same. Fig. 3 is a detached section of a portion of the die-plate and the cutter. Fig. 4 is a detached section of the die plate, the plane of section passing through two of the dies which are fitted therein. Fig. 5 is an enlarged vertical section of one of the dies.

Similar letters of reference indicate corresponding parts in the several figures.

The object of this invention is to obtain a machine by which the operation of cutting off the blanks from the bar, the swaging of the same and the punching thereof may be simultaneously and automatically performed in a perfect manner.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A represents the frame of the machine, which may be constructed in any proper way to support the working parts.

B is a circular die-plate which may be of cast-iron. This die-plate is in a horizontal position and is at the upper end of an arbor C, which has a ratchet D, at its lower end. The die-plate is placed on or over a steel block or bed E, which however does not extend to the front edge of the die plate, as plainly shown in Fig. 1.

In the die-plate B, a series of dies F, are placed. These dies are of steel, of quadrilateral form and placed near the periphery of the die-plate in a circle concentric therewith. The dies have not a uniform interior; they are larger, being made of flaring form, at their upper and lower ends, as shown clearly in Fig. 5,—*a* representing the enlarged upper, and *b* the enlarged lower end.

In the front part of the frame A, there is placed between suitable guides *c*, *c*, a sliding block G. The upper end of this block is connected by a link *d*, to a lever H, the fulcrum *e*, of which is at the upper part of the frame. The back part of this lever has a spring *f*, attached to it, which spring has a tendency to keep the front end of the lever H, and the block G, elevated.

In the back part of the frame A, the driving shaft I, is placed. This shaft has a cam J, placed on it, which acts against the under side of the back part of lever H. On the shaft I, there is also placed a tappet K, which acts against the upper end of a lever L; said lever having its fulcrum at *g*, and its lower end fitted in a slide M, the front end of which is provided with a pin *h*, that engages with the ratchet D. The lever L, has a spring *i*, bearing against it to keep the upper end of said levers in contact with the tappet, and the slide or pawl M, has a spring *i'*, bearing against it to keep the pin *h*, engaged with the ratchet D.

From the above description it will be seen that by rotating the shaft I, the block G will be raised and lowered through the medium of lever H, the cam J, and spring *f*; and the die-plate B, will be intermittently rotated by means of the tappet K, lever L, spring *i*, ratchet D, and slide M; the latter performing the function of a pawl in consequence of its pin *k*, engaging with the ratchet.

To the block G, there is attached a cutter N, which has its lower cutting end of rectangular form, as shown at *l*. Just above the lower cutting edge *l*, there is a lateral projection or shoulder *m*, the under surface of which is counter-sunk, as shown clearly in Fig. 3, at *n*. The form of this counter-sunk portion is precisely the same, inversely, as the top of the nuts to be made by the machine, and consequently the face of the shoulder or projection *m*, must be equal in area to the upper surfaces of the nuts. The cutter and projection may be formed of one piece and of steel, at least that would be the preferable material.

O is a swage, which is simply a vertical

taper rod of quadrilateral form, as shown clearly in Figs. 1 and 4. This swage is attached to the back part of the block G. P is a flanch of cylindrical form also attached to block G, at its back part, and Q is a punch or clearer, which is attached to the block at its front end. The swage punch and clearer may also be formed of steel, and they and the cutter are secured to the block at equal distances apart, and in the arc of a circle corresponding to the annular line in which the dies are placed in the die-plate.

R is a horizontal plate attached to the frame A, and overlapping a little at its inner edge the die-plate E.

S is a spring which bears against the side of the die-plate preventing any casual movement of the same. The die-plate B, has a hole *o*, made vertically through it, said hole being in line with the punch P, as clearly shown in Fig. 4.

The operation is as follows: The operator places a bar T, of metal of the proper width and thickness on the plate R, and shoves one end of it a proper distance underneath the cutter N, which as it descends cuts a blank from the bar, and forces it into the upper part of the die F, immediately below it, and the projection *m*, at the same time swages or forms the upper surface of the bar, which adjoined the part cut off, with beveled edges, as shown at *p*, said part of the bar thus swaged being the upper surface of the next blank. After the descent of the cutter it immediately rises and when at its culminating point the die plate B, is turned through the medium of the pawl or slide M, the distance of one tooth of the ratchet D, and an empty die F, is brought underneath the cutter N, and the filled die, that is to say, the one which had the blank forced into it by the previous descent of the cutter, is brought underneath the swage O. The operator again adjusts the bar under the cutter N, the swaged portion of the upper surface of the bar determining the distance, and the block G, again descends, the cutter N, cutting off another blank, which is forced into the die beneath it, the projection *m*, swaging or beveling the upper surface at the end of the bar T, as before, while the swage O, drives the blank first cut off from the bar, down to the bottom of its die, the walls of which at this point are of conical form or expanding in area downwardly. The depth of this conical portion of the die is intended to be just equal to the intended thickness of the nut.

The blow given to the nut blank, by the downward movement of the swage O must have sufficient force to expand or spread the metal composing the nut blank so that the blank will fill the said conical part of the die and become tightly locked therein and form a temporary water tight bottom to said die. By this method four important advantages are secured.

First, the blank, by being spread so as to occupy the said conical formation of the lower part of the die is at one blow formed into the necessary external shape, viz: a slightly conical shape.

Second, the blank, by being spread and made to fill the conical form of the die, is prevented from adhering to the punch, when the latter rises (as will be hereinafter more particularly shown) and thus the use of nut holders or clearers, usually required to separate the nut from the punch is wholly avoided.

Third, the blank, by being expanded or compressed into the conical formation of the die plate, forms a temporary water tight bottom to said die; and in use, I arrange a water faucet or pipe over the die plate so that each die after its bottom is filled by the blank, as before stated, will pass under the faucet and become filled with cold water. The liquid keeps the walls of the die cool and thus prevents them from cracking; and the punch O, in descending, also dips into and passes through the water and is also kept cool, thus rendering it durable. The upper or exterior surface of the nut is also cooled and chilled while the lower surface is left warm and soft.

Fourth, the blank by being compressed into said conical formation of the die is tightly secured in the rotary die plate, so that when the said plate is rotated, after the hole in the blank has been punched, the bur left by the punch, upon the under surface of the blank, will be smoothed or ground off, by the friction of the nut over the surface of the bed E.

The die-plate B, it will be seen is moved each time the precise distance of the spaces between the dies, which spaces correspond with those between the cutter, swage, punch and clearer. The blank, when forced by the swage, fully down within its die, has its bottom part expanded in consequence of the enlarged portion *b*, at the lower ends of the dies. At the next movement of the die-plate, the blank first cut is brought underneath the punch P, which at the next descent of the block G, punches a hole through the blank, the metal punched out dropping through the hole *o*, and as the punch rises the blank is prevented from following it in consequence of the expanded lower part of the nut. At the next movement of the die-plate the blank first cut is brought underneath the clearer Q, which on the descent of the same forces the nut from the die.

It will be understood that a blank is cut from the bar T, at each descent of the block, and after the fourth descent of the block a nut is discharged from it at each descent,

as each die F, is filled and the operations of cutting off the blanks, swaging and punching, are performed simultaneously.

I am aware that intermittingly rotating die-plates have been previously used in connection with punches, swages, etc., and I do not claim broadly such device; but

I do claim as new and desire to secure by Letters Patent:—

1. The combination of the lateral countersunk clamping projection *m* with the cutter *l* in the manner herein shown and described.

2. The arrangement of the cutter N, punch P, swage O, clearer Q, and block G, with the rotary die plate B and bed E, as herein shown and described.

3. In nut machines I claim making the lower portion of the open die F of conical form, substantially in the manner and for the purpose set forth.

4. The locking of the nut blank within the bottom of the open die F, substantially as and for the purposes herein shown and described.

PURCHES MILES.

Witnesses:
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