

(No Model.)

W. E. WARD.
NUT MAKING MACHINE.

No. 262,158.

Patented Aug. 1, 1882.

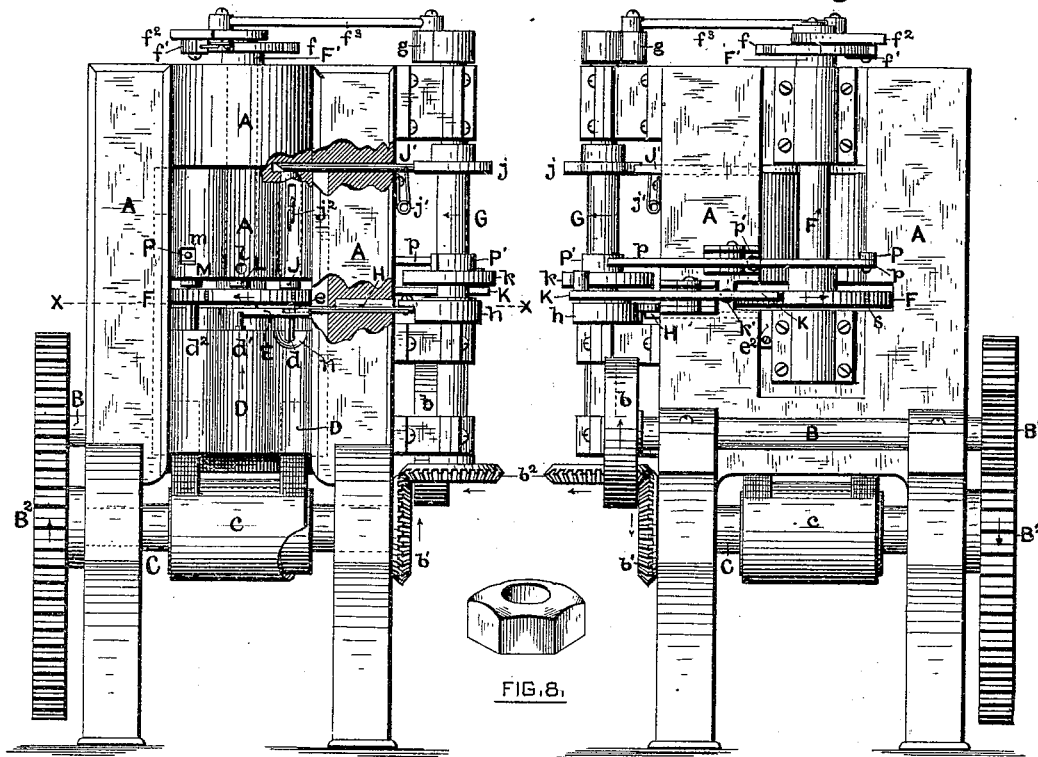


FIG. 1.

FIG. 2.

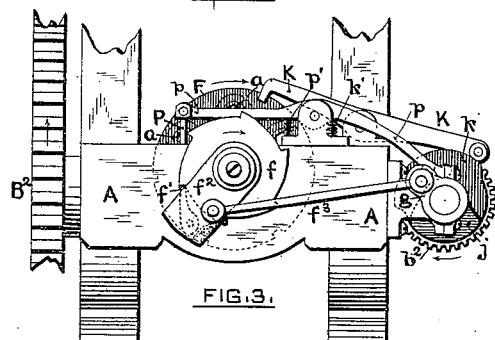


FIG. 3.

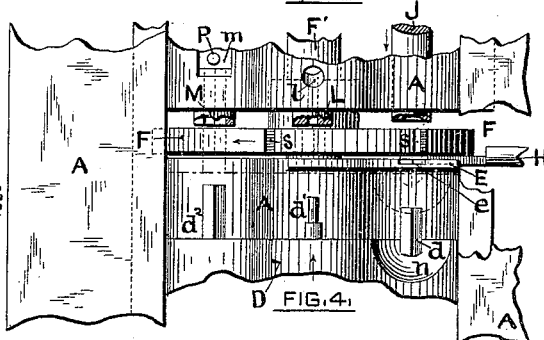


FIG. 4.

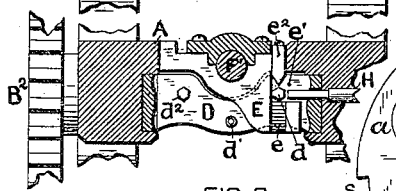


FIG. 6.

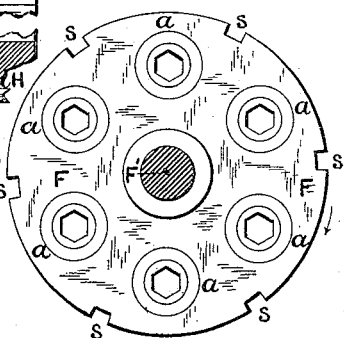


FIG. 5.

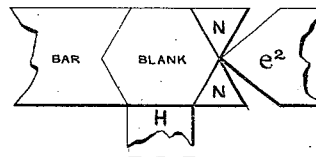


FIG. 7.

WITNESSES.

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NUT-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 262,158, dated August 1, 1882.

Application filed December 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. WARD, of Port Chester, county of Westchester, and State of New York, have invented a new and useful Improvement in Machines for Forming Nut-Blanks; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

The invention hereinafter described relates to a machine for making finished nut-blanks from cold bars of metal, and comprehends punching the nut-blank from the bar, crowning the top surface into suitable form, punching the central hole, which is afterward to be threaded, shearing the sides of the blank to make its faces regular and smooth and the corners sharp, and, finally, discharging the finished blank from the machine.

My improvement consists principally in the employment of an intermittingly-revolving roulette-carrier, the chief office of which is to receive the blanks as they are punched from the bar and retain them while the operations of crowning the top surface and punching the central hole are performed. It also serves to convey each blank, step by step, to the places where the several operations for completing it are to be performed; and, further, it may act, in combination with a punch, to cut the blanks in the first instance from the bar. This intermittingly-revolving roulette-carrier is in combination with suitable mechanism for feeding a bar of cold metal from which the nut-blanks one after another are to be punched, with devices for punching the blanks from the bar and for crowning the top surface of each blank, with devices for punching the central hole in the blank, and with devices for shearing the sides or faces of the blanks, as will hereinafter be particularly explained.

Referring to the drawings, Figure 1 represents in front elevation a machine embodying my improvement. Fig. 2 shows the same in rear elevation. Fig. 3 represents a top view of the machine. Fig. 4 shows an enlarged view of certain portions of the machine. Fig. 5 represents an enlarged plan of the roulette-carrier. Fig. 6 shows a horizontal section of the machine on line *x x*. Fig. 7 shows a bar

from which a blank is being removed. Fig. 8 represents a finished nut-blank.

A is the frame of the machine, in and upon which the various parts are mounted.

B, Fig. 2, represents the driving-shaft, having a pulley, *b*, to which power is applied. A pinion, *B'*, on this shaft meshes with a gear, *B²*, which is mounted upon a transverse shaft, C. Upon the shaft C is an eccentric, *c*, Figs. 1 and 2, which, as the shaft C revolves, causes a vertically-reciprocating movement to be given to the cross-head D, Figs. 1, 4, and 6, which is fitted to slide in suitable guides in the upright standards of the frame A, as shown in Fig. 6. Projecting from the top face of this cross-head and moving with it are a hexagonal punch, *d*, (or one of other geometrical figure,) for punching the blanks from the bar, a cylindrical punch, *d'*, for punching the central hole in a blank, and a plunger, *d²*, corresponding in figure with the punch *d*, for forcing the blanks into and through the shearing-die, hereinafter to be described.

E is a bed or table for supporting the bars from which the blanks are to be punched. It is provided with a groove, *e*, for guiding the bars, as shown in Figs. 1 and 4, and is cut away at *e'*, Fig. 6, to allow the punch *d* to engage the bar and to let the scraps of the bars pass out of the machine by gravity after each blank is cut. As the machine is constructed, six dies having cutting-edges are used to co-operate successively with the punch *d* to remove a series of six nut-blanks from a bar. These dies are mounted in a roulette-carrier, F, located immediately above the table E, as shown in Figs. 1 and 4, and are arranged concentric with the axis of said carrier and at equal distances from each other, as shown in Fig. 5. For the purpose of bringing these dies successively into alignment with the punch *d*, and for carrying the blanks into proper positions to be perforated and sheared, an intermittent revolution is given to the roulette-carrier F, which is mounted on a vertical shaft, F', journaled in the frame of the machine, as shown in Fig. 2. A ratchet, *f*, having six teeth, is secured to the upper end of the shaft F', and is engaged by a pawl, *f'*, which is pivoted upon an arm, *f²*, loosely mounted on the shaft F'. This pawl is vibrated to move the ratchet

through a rod, f^3 , by means of a crank-arm, g , mounted on a shaft, G , which is driven from the shaft C by a pair of beveled gears, $b^1 b^2$, the roulette-carrier F being moved one-sixth of a revolution to one revolution of the shafts C G , and having an interval of rest between each movement.

The rectangular bars of metal from which the nut-blanks are to be punched may be fed by hand, but are preferably delivered to the machine by any of the usual feeding mechanisms adapted to advance the bars intermittently as the blanks are removed. No feeding mechanism is shown in the drawings, as such mechanism is too well known in the art to need illustration.

A bar of cold metal, of the proper width to most economically supply the blanks, is fed into the machine through the groove e until its inner end comes in contact with a gage or stop, e^2 , Figs. 6 and 7, and is then forced and held against that wall of the groove e which is nearest the center of the machine by a clamp-bar, H , which is operated by an eccentric or cam, h , on the shaft G . The metal bars from which the blanks are punched are intended to be equal in width to the distance between the opposite sides of the blank, as shown in Fig. 7; but should the bars be slightly wider than the blank the clamp-bar H will perform the additional office of sizing or compressing the bars laterally. While the bar is clamped against lateral displacement by the means described the cross-head D rises and the punch d , in combination with that one of the dies a which is in alignment therewith, cuts out a blank and forces it upward into said die, which henceforth is the receptacle or mold in which this blank is contained during the subsequent operations upon it. For the purpose of supporting said die during the punching operation, and to afford a convenient means of crowning the top surface of the blank, a movable die, J , Figs. 1 and 4, is made to descend by the action of a cam, j , upon a bar, J' , which bar slides laterally in the frame A . The end of this bar is formed with an inclined plane, which, acting upon a corresponding inclined surface upon the upper ends of the die J , causes said die to be moved vertically downward to a position in close proximity to the top surface of the roulette-carrier and in axial alignment with the punch d , as shown in Fig. 1. The bar J' forces the die J downward during the rise of the punch d and before said punch engages the blank-bar. After removing the blank from the bar the punch d continues to rise and forces the face of the blank into the die J , thereby crowning the top surface of the blank. During this operation the die J remains stationary, and, although the top surface of the nut-blank is molded or crowned by the action of the punch d , the blank itself is not removed from its receptacle a in the roulette-carrier.

During the operations of punching a blank

from the bar and crowning the top surface the roulette-carrier F is held by a detent-lever, K , Figs. 2 and 3, so that one of the dies, e , is in alignment with the punch d and die J . The outer end of this lever is engaged by a cam, k , on the shaft G , and its inner end occupies one of the notches, s , in the periphery of the roulette-carrier F , and holds said carrier against accidental displacement. The blank having been crowned, the clamp-bar H is retreated by the action of its eccentric or cam h , the punch d descends by the action of the eccentric e , the bar J' is retreated by a spring, j' , (the contour of the cam j allowing of such movement,) the die J rises by the force of the spring j^2 , Fig. 1, and the inner end of the detent-lever K is moved out of engagement with the roulette-carrier by a spring, k' , Figs. 2 and 3. The pawl j' now engages one of the teeth of the ratchet f , and the roulette-carrier is revolved one-sixth of a revolution, carrying the nut-blank into vertical alignment with the punch d' , and bringing a second of the dies a into alignment with the punch d . This having been effected, the detent-lever K engages the roulette-carrier, the blank-bar is fed forward, the bar H moves inward to perform its office, and the cross-head D ascends to cause the punch d to remove a second blank from the bar and to bring the punch d' into action on the first blank.

Co-operating with the punch d' to produce a central hole in the blank is a stationary die, L , Figs. 1 and 4, which is secured in the frame of the machine and in axial alignment with said punch. This die forms a seat for the blank when the perforation in the latter is made, and a central hole in the die receives the cores which are removed from the blanks. During the operation of punching the central hole the blank still remains in the carrier. Contemporaneously with the perforation of the first blank a second blank is cut from the bar, in the manner heretofore described. The central hole in the first blank having been made, the roulette-carrier again partially revolves, carrying said blank into vertical alignment with the plunger d^2 and a stationary shearing-die, M , and the second blank into alignment with the punch d' . The plunger d^2 and die M are slightly smaller than the blank in the roulette-carrier. The upward movement of the plunger d^2 forces the blank out of the receptacle a into the roulette and carries it into and through the shearing-die M , by which last operation the faces of the blank are sheared and its angles made sharp and well defined. Contemporaneously with the operation of shearing the first blank the second blank is perforated and a third blank is cut from the bar.

From the foregoing description it will be understood that three of the dies or molds, a , in the roulette-carrier are in such relation at the same time to the rising punches d d' d^2 that the operations of shearing the first blank, perforating the second, and punching a third

from the bar are performed at one rise of the cross-head D, thereby saving time. It will also be understood that said dies *a* perform a double office—that of cutting-dies and that of
5 receptacles in which the blanks are contained while being transferred to new positions.

By reference to Fig. 7 it will be seen that the blank-bar is cut so that only the triangular portions N remain. These scraps pass
10 down and around the punch *d* as it descends, and are discharged from the machine by gravity along the chute *n*, formed in the cross-head D, Figs. 1 and 4. The cores produced by perforating the blanks pass up the central hole
15 in the die L, and are discharged, one after another, by gravity down the inclined duct *l* in the frame A. The finished nut-blanks pass upward through the shearing-die M into an orifice, *m*, in the frame A, and are discharged
20 therefrom successively by a plunger, P, which is pivoted to a lever, *p*, operated for the purpose by a cam, *P'*, Figs. 1 and 2, on the shaft G, and retreated by a spring, *p'*, Figs. 2 and 3.

In nut-blank machines, as heretofore organized, revolving tables or roulettes containing a series of molds or receptacles for the nut-blanks have been employed with separate die-tables or shear-blocks, and with punches or cutters by which the blanks were cut from a
30 bar, as instanced in the United States Letters Patent of Miles, No. 31,056, January 1, 1861, and Scoville, No. 39,590, August 18, 1863. The roulette-carrier shown and preferably employed by me differs from those described in
35 said Letters Patent, as well as from any other known to me, in that it contains molds or receptacles, with the edges of which the cutting-punch co-operates in punching the blanks from a bar.

Although I have shown and described the dies *a* as cutting-dies severally to co-operate with the punch *d* to remove blanks from the bars, yet it is obvious that said dies *a* need only perform the office of receptacles for the
45 blanks. In such case a stationary die should be located between the table E and the roulette-carrier to act in conjunction with the punch *d*, and the movement of said punch should be sufficient in extent to transfer the
50 blanks from such stationary die into the receptacles in the roulette wherein the same are to be contained during the operations, hereinbefore described, of crowning the top surface and punching the central hole, and during its trans-
55 ference to the several new positions where operations are to be performed upon it, as before explained.

If desired, the stop or gage *e'* may be dispensed with and a channel be made in the
60 frame of the machine from front to rear, through which the scraps of the bars may pass out. In such case the feeding mechanism would definitely gage the advance of the bar.

What I claim as my invention, and desire
65 to secure by Letters Patent, is—

1. As an improvement in nut-blank machines wherein revolving roulette-carriers are employed, a carrier having a series of nut-blank receptacles or molds provided with cutting-edges, and a cutting-punch which co-operates with said cutting edges for cutting blanks
70 from a bar of metal in contact with said carrier and across a receptacle or mold, substantially as described.

2. The combination, substantially as before
75 set forth, of an intermittingly-revolving carrier, a plunger for removing the nut-blank from the carrier, and a shearing-die for finishing the sides and corners of the blank.

3. The combination, substantially as before
80 set forth, of a reciprocating cross-head provided with a punch for cutting blanks in succession from a bar, a punch for cutting the central hole in the nut-blank, and a plunger for transferring the blanks to a shearing-die,
85 a crowning-die, J, a die, L, and a shearing-die, M, co-operating respectively with the punches and plunger above specified, and an intermittingly-revolving carrier for receiving, holding,
90 and transferring each nut-blank in succession to the positions where the several operations for finishing it are performed.

4. The combination, substantially as before
set forth, of a reciprocating punch for cutting nut-blanks in succession from a bar, a guide
95 for such bar, an intermittingly-revolving carrier containing a series of receptacles for said blanks, a crowning-die arranged in axial alignment with each of such receptacles successively and with the punch, and adapted by
100 suitable mechanism, as described, to approach the carrier at stated times to serve as a stationary mold for forming the top surface of the blanks in conjunction with the said reciprocating punch.

5. The combination, substantially as before
set forth, of the following elements or mechanisms for making nut-blanks from cold bars of metal, viz: mechanism for guiding the bar
110 of stock to the machine, mechanism for clamping the bar of stock in said guide while blanks are successively punched therefrom, mechanism for punching nut-blanks from such bar and transferring them to an intermittingly-revolving carrier provided with a series of recep-
115 tacles for the blanks, mechanism for crowning the blanks, mechanism for punching a central hole in the blanks, mechanism for discharging the blanks from the roulette-carrier into and through a shearing-die, and trimming and
120 shearing the same, and a roulette-carrier adapted by suitable mechanism, as described, to receive and hold the blanks one after another and transfer them to the several positions where the operations of crowning, perforating,
125 and shearing of the blanks are to be performed.

WM. E. WARD.

Witnesses:

E. BURDSALL, Jr.,
SAMUEL COMLY.