

C. RICHARDS.
Machine for Punching Nut-Blank Bars.
No. 219,113. Patented Sept. 2, 1879.

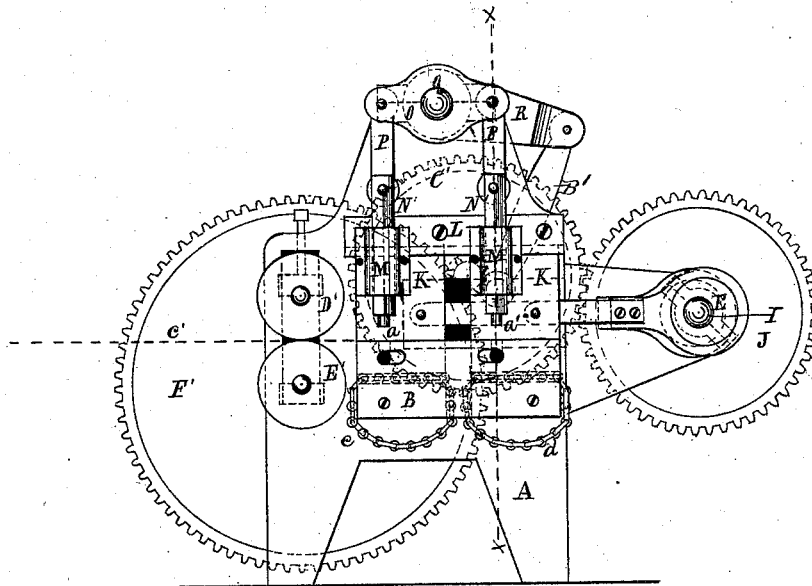


Fig 1

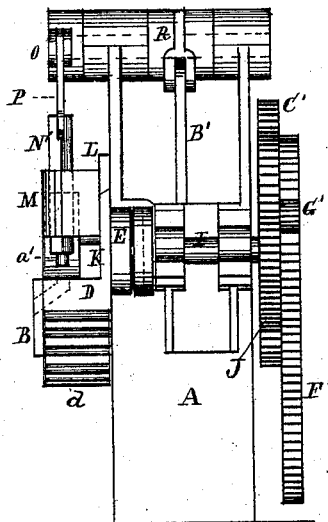


Fig 2

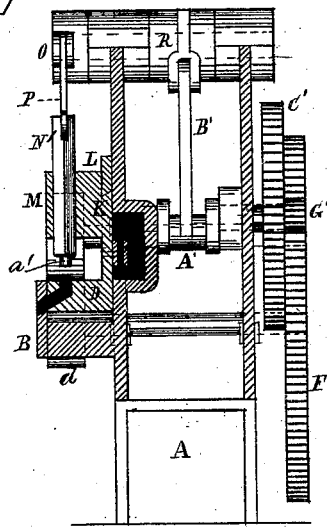


Fig 3

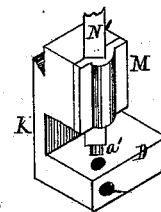


Fig 4

WITNESSES
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INVENTOR
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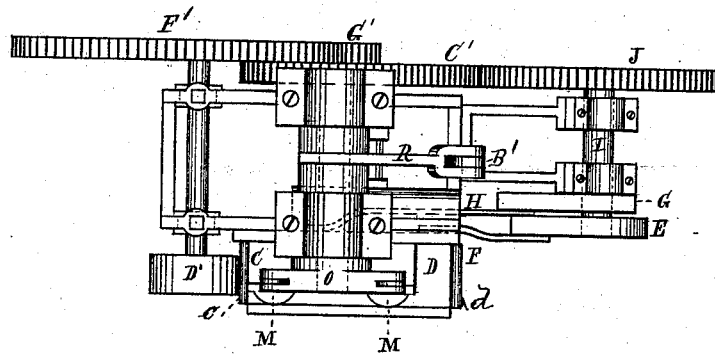


Fig 5

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UNITED STATES PATENT OFFICE.

CHARLES RICHARDS, OF CLEVELAND, OHIO.

IMPROVEMENT IN MACHINES FOR PUNCHING NUT-BLANK BARS.

Specification forming part of Letters Patent No. **219,113**, dated September 2, 1879; application filed May 19, 1879.

To all whom it may concern:

Be it known that I, CHARLES RICHARDS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Machine for Punching Nut-Blank Bars; and I do hereby declare that the following is a full, clear, and complete description of the same.

This invention relates to a machine for punching nut-blank, washer, &c., bars.

Said machine consists of a pair of punches having an alternating vertical action in respect to each other, and also a horizontal reciprocating movement, conjointly with a pair of dies having a horizontal reciprocating movement and a pair of feed-rollers for feeding the bar from which the nut-blanks, &c., are to be cut to the punches. Said punches, dies, and feed-rollers are operated by certain mechanism consisting of cams, connecting-rods, and gearing.

A full and complete description of the machine is substantially as follows, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is an end elevation. Fig. 3 is a transverse vertical section taken in the line *x x*, Fig. 1. Fig. 4 is a perspective view of one of the reciprocating dies and its punch. Fig. 5 is a plan view.

Like letters of reference refer to like parts in the several views.

On the side of a suitably-constructed frame, A, Fig. 1, is secured a bracket, B, in which is fitted so as to move freely therein a pair of dies, C and D, Figs. 2 and 5. The die D is given a reciprocating movement by the eccentric E, to which it is attached by the connecting-rod F. The die C is given a reciprocating movement by the eccentric G, connected therewith by a rod, H. The two eccentrics are secured to the shaft I, having its bearings in the frame, and driven by the cog-wheel J, as presently shown.

Each of the dies alluded to has an upwardly-projecting flange or back, K, Figs. 1 and 2. The upper edges of the backs are beveled, and fit a correspondingly-beveled guide or way, L, for guiding the dies and retaining them in place. To each of the said backs is secured a sleeve, M, in which is fitted a shaft, in the

end of which is inserted a punch, *a*, corresponding to the hole in the die. A detached view of a die, sleeve, and punch-shaft is shown in Fig. 4. These parts are also shown in the transverse section, Fig. 3.

The punch-shafts N N' have each a vertical movement by means of a walking-beam, O, Figs. 1 and 5, to the ends of which they are respectively attached by connecting-links P. The walking-beam is secured to a shaft, Q, having its bearings in the top of the frame A, as shown in the drawings. The shaft Q is operated by an arm, R, projecting therefrom, and attached to a crank, A', Fig. 3, by a pitman, B'. The shaft carrying the crank is actuated by a cog-wheel, C', Fig. 5, which engages with the wheel J, as seen in Fig. 1.

D' and E', Figs. 1 and 5, are a pair of rollers. The roller E' is secured to and rotated by the shaft carrying the cog-wheel F', made to engage a pinion, G', on the shaft carrying the cog-wheel C'. The roller D' is rotated by contact with the roller E'. Said rollers will be further alluded to hereinafter.

The dies C and D, above referred to, rest, respectively, upon the endless chains of friction-rollers *c* and *d*, Figs. 1 and 2, whereby they are caused to move easily and freely while under the pressure of the punches.

The lengths of stroke of the two eccentrics operating the dies and punches are equal; hence the distances the dies move are of the same length, and necessarily made in the same time. The relative positions of the eccentrics in respect to each other are such that the extreme length of the throw of one is in the opposite direction from that of the other; hence in the reciprocating movements of the dies they approach each other at the same time, and they also recede from each other at the same time.

The gearing operating the feed-rollers is calculated to rotate said rollers the same peripheral distance and in the same period of time that the dies move—that is to say, the throw of the eccentrics, the distances the dies move, and the same distance passed over by the peripheral movement of the rollers are equal in time.

Having described the construction and arrangement of the machine, the practical operation of the same is as follows: A rod of iron

of the proper width and thickness of which to make nut-blanks is introduced into the machine by passing it between the rollers D' and E', as indicated by the dotted line *c'*, Fig. 1. By the time the end of the rod is carried by the rollers to and under the punch *a* of the die C the said punch descends and punches the rod.

During the punching of the hole the punch and die, together with the rod, move forward toward the punch *a'* of the die D. The said hole is punched and the punch lifted before the die quite reaches the end of its forward movement and begins to return. While the die and punch are returning the rod is continued to be carried forward by the rollers to and under the punch *a'*, which, during the time the punch *a* was operating on the rod, moves back toward the die C. The said continued forward movement of the rod and the backward movement of the die D are such as to bring the rod under the punch *a'*, directly between the holes made by the punch *a*.

During the operation of the punch *a'* said punch and the rod are carried forward, and at the same time the die C and punch are moving back toward the rollers. By the time they have moved entirely back, and are about to move forward again for punching the rod, the punch *a'* is lifted from the rod and moves back, allowing the rod to move forward while being operated upon by the punch *a*. The distance between the holes made by the punch *a* is so far as to permit another hole to be made between them by the punch *a'*. The series of holes thus made by the alternating action of the two punches leaves metal between the holes sufficiently wide as when cut off to form a nut-blank.

The timely movements of the machine are such that each punch makes one hole at each revolution of the crank A', the punch *a* making the first series of holes a certain uniform distance apart, the punch *a'* following, punching the same number of holes and of the same uniform distance from each other between the

first series of holes punched. The bar is now cut up into nut-blanks, as before stated.

Different-sized nut-blanks can be made in the machine by giving more or less length to the throw of the eccentrics, thereby increasing or decreasing the horizontal travel of the punches and dies. This change made in the throw of the dies would require a corresponding change to be made in the sizes of the rollers. In making this change the distances between the holes will be more or less, according to the size of the nut-blank required.

The description herein given refers more especially to the manufacture of nut-blanks; but the same operation may be applied to the manufacture of washers, &c.

The feed-rollers need be used only when large nut-blanks are to be made, in which event the heavy bar is fed to the punches by the rollers. A light bar for small blanks will be carried forward by the movement of the dies and punches when holes have been punched by punch *a* in that part of the bar extending from said punch to and under the punch *a'*.

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

1. The reciprocating die C and punch-shaft N, arranged in relation to and co-operating with the reciprocating die D and its punch-shaft N', in combination with suitable mechanism for operating said dies and punches, substantially as described.

2. The combination of the feed-rollers D' and E', reciprocating dies C D, with their respective punches, and mechanism for operating said dies and punches, substantially as shown and described.

3. The combination of the feed-rollers, reciprocating dies C D, pitmen F H, and eccentrics, punches, links P P, and walking-beam, arm R, pitmen B', and shaft O, substantially as set forth, and for the purpose specified.

CHARLES RICHARDS.

Witnesses:

W. H. BURRIDGE,
P. T. BYERLEY.