



# United States Patent Office.

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## IMPROVEMENT IN NUT-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN S. HALL, of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Nut-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation.

Figure 2 is a vertical section, taken in the line  $x x$  of fig. 3.

Figure 3 is a top view.

The nature of my invention consists in the peculiar arrangement of the mechanism of a nut-machine, by which means the nut is made by blows, instead of positive limited pressure.

By the latter means, if the piece of iron be too thick, the machine is liable to break, or if the iron be too thin, an imperfect nut is made, but by my arrangement this difficulty is obviated.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the drawings, the machine is represented as in the position when about to make the nut.

A represents the frame of the machine; B, the box, in which the ram C slides; C, the ram, in which the punch D is firmly held; E, the ram, in which the punch F is firmly held; F, the punch, by which the hole in the nut is made; G, the die, in which the nut is held while being punched; H, the box, in which the die G is held; I, the follower; J, the holder, in which the follower is secured; K, the guide-box, in which the holder J works; L, the driving-head, which is connected to the holder J by means of rods or bars  $a$ .

In the lower part of the driving-head L, one end of the eccentric-lever M is secured. This driving-head works on a bolt,  $b$ , which passes through the journal-boxes N, on the end of the frame A. The lever M extends the length of the machine, and is operated by a cam, O, on the shaft  $c$ . Near the centre of the lever M is a slot,  $d$ , in which is a crank, P. To the crank-shaft is attached a weighted lever, Q.

R R represent half-toggles, one end of each being pivoted to the punch-holder C, and the other ends are pivoted to the ears under the shaft of the driving-head S.

T represents a half toggle, one end of which is pivoted to the ram E, and the other end to the ear on the under side of the shaft of the driving-head U. The shafts of the driving-heads S U are journalled to the frame A.

In the driving-heads S U are secured drop-levers V W, on the outer ends of which are weights V' W'. The lever V is operated by the cam X, and the lever W by the cam Y, the three cams O X Y being upon one shaft.

The operation of the machine is as follows:

The hot bar of iron is placed between the faces of the die G and the end of the punch D, as seen in fig. 2, its end being against the adjustable stop  $e$ . The power may be applied, through the shaft  $c$ , by any method.

In the drawings, the levers V W are represented as resting on the outer edges of the cams X Y. As the cams revolve, when the end of the cam X passes beyond the end of the weighted drop-lever V, the said lever falls, thereby giving a partial revolution to the shaft of the driving-head S, which, by means of the half toggles R R, drives the ram C and the punch D against the bar of iron, cutting it off and driving it into the bar G. By this time the end of the cam Y has reached the end of the drop-lever W, which falls, and gives a partial revolution to the shaft of the driving-head U, operates the half toggle T, forces the ram E and punch F forward, and punches the hole in the nut, the pieces punched from the blank passing out through the opening in the follower I and holder J.

When the nut is punched, the punches D and F recede, and the cam O strikes the end of the lever M, forcing it down, which gives a forward movement to the follower I, and thus forces out the nut from the inside of the die G, and it then falls through the opening  $f$  in the frame A.

After the cam O has released the lever M from pressure, the said lever is thrown back into its former posi-

tion, by means of the weighted lever Q, which raises the crank P, which passes through the slot *d* in the lever M. This completes the operation, and the machine is in position to repeat its former operation.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The arrangement of the holing-punch F, cutting-out swaging-punch D, ram C, and half toggles R R, T, with the weighted levers V W, all constructed and operated substantially in the manner described.
2. The arrangement of the perforated follower I, matrix-box H, and holder J, with slotted lever M and weighted crank-lever P Q, the whole constructed and operated as herein shown and described.
3. The improved machine, as described and shown, for making nuts from hot bars of iron, in the manner specified.

JOHN S. HALL.

Witnesses:

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EDM. F. BROWN.