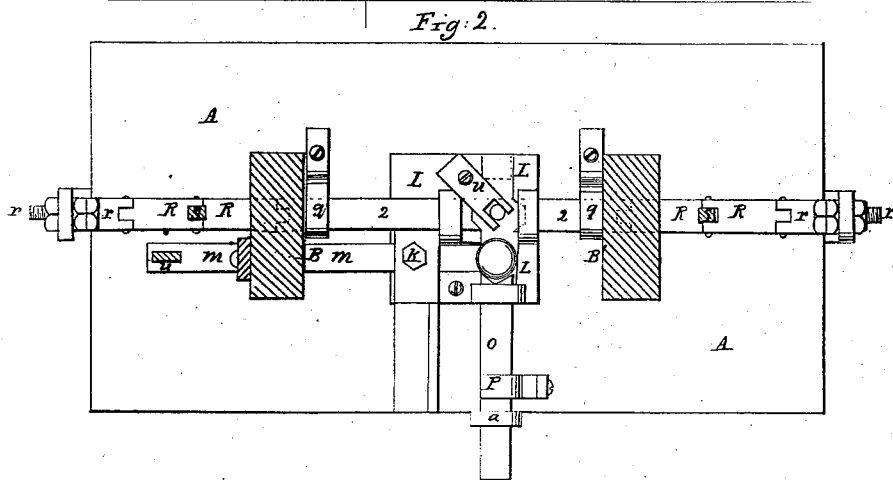
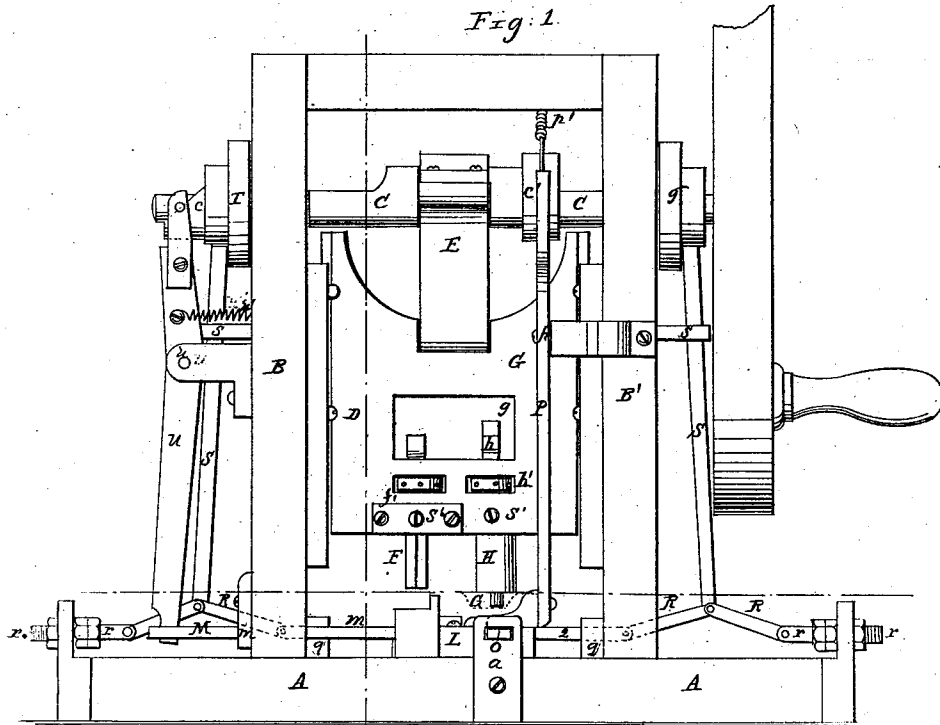


O. W. Yale.

Nut Machine.

No 82, 470.

Patented Sept. 22, 1868.



Witnesses:

C. H. Bishop
Jesse Pepp

Inventor.

O. W. Yale
by Prentiss & Co. Mys

Sheet 2 of Sheets

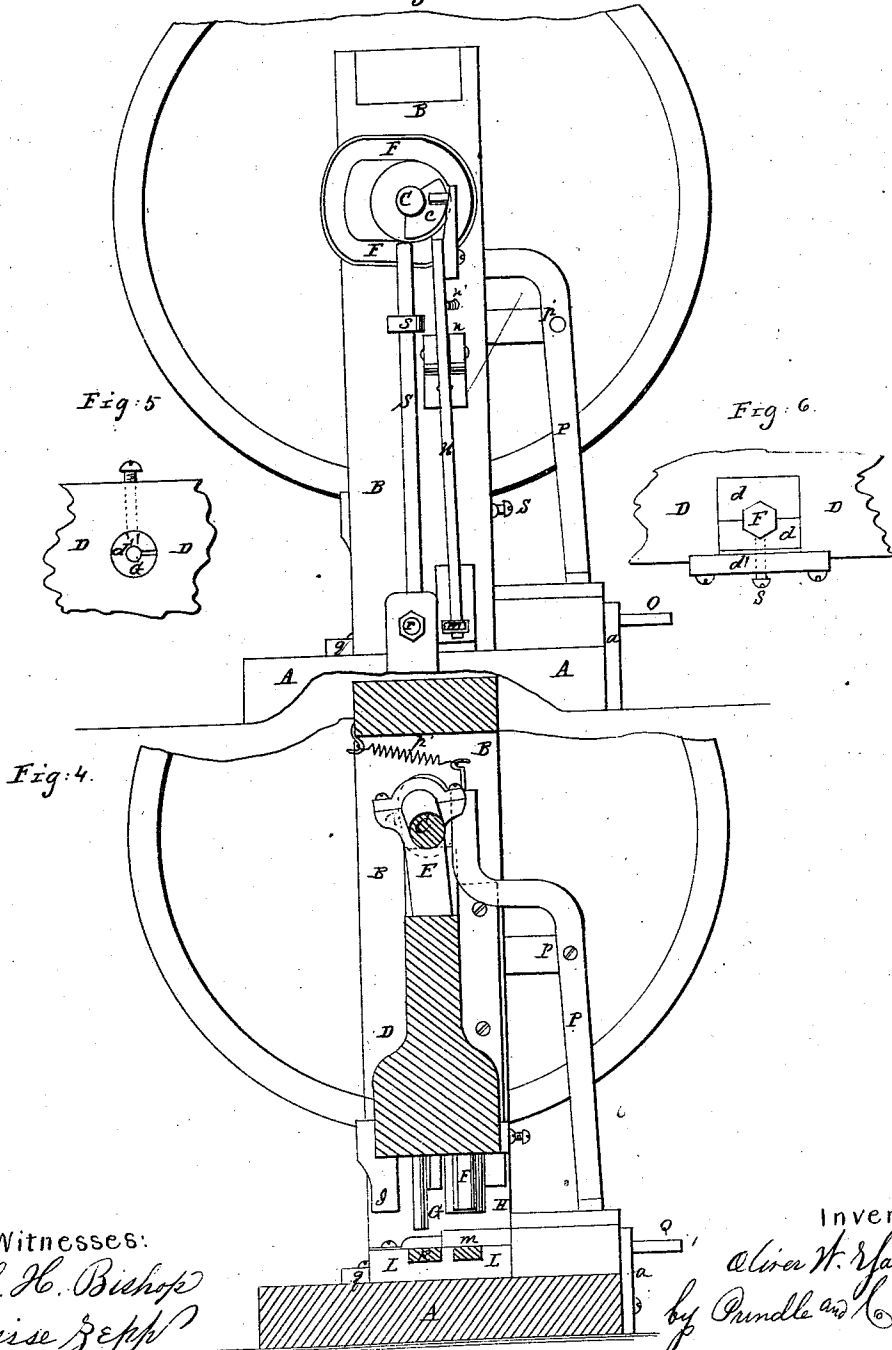
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Fig. 3.



Witnesses:

C. H. Bishop
Jesse Jeff

Inventor:

O. W. Yale
by Prindle & Co. Attys.

UNITED STATES PATENT OFFICE.

OLIVER W. YALE, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN MAKING NUTS.

Specification forming part of Letters Patent No. 82,470, dated September 22, 1868.

To all whom it may concern:

Be it known that I, OLIVER W. YALE, of Hartford, in the county of Hartford, and in the State of Connecticut, have invented an Improved Nut-Machine; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation. Fig. 2 is a horizontal section of Fig. 1 upon the line *x x*. Fig. 3 is an end view. Fig. 4 is a vertical section of Fig. 1 upon the line *y y*. Fig. 5 shows the means used for holding the round punch. Fig. 6 shows the means used for holding the blank-punch.

My invention relates to that class of machinery which is designed for forging nuts; and consists principally in the combination and arrangement of the several parts, as is more fully described below.

In the annexed drawings, A represents the bed-plate, secured vertically to which are two uprights, B B', connected together at their tops, forming a frame. Passing through suitable bearings in the frame, near its top, is a shaft, C, through which the several parts are operated by means of a crank and cams. Power is applied to its outer end by means of a pulley, crank, or other mechanism.

D represents a cross-head or gate, working vertically between the uprights B B', upon which are guides *b b*, corresponding to V-shaped projections upon the sides of the cross-head. Motion is imparted to the cross-head by means of a crank upon the shaft C, to which is secured, by an adjustable box, in the usual manner, one end of a connecting-rod, E, the lower end of which is pivoted to the upper side of the cross-head.

Secured to the under side of the cross-head are two punches, F and G, a chamfering-die, H, and a flattening-post, I, for performing the various operations necessary in forming the nut. The blank-punch F is held in place by means of a square bushing or box, *d d*, which is placed in a suitable recess in the bottom of the cross-head, the front of said recess being covered by a cap, *d'*, through which passes a set-screw, *s'*, for the purpose of adjusting the boxes and holding them in place. The box *d* is divided vertically in a line parallel to the

front face of the cross-head, and provided with a vertical opening, either four or six square, in which the punch is held by compressing the halves together.

The round punch is inserted in a bushing, *d''*, placed in a suitable recess in the bottom of the gate, said bushing being divided lengthwise upon one side, so as to spring together and tightly clasp the punch when the screw *s'* is set up against it. The elasticity of the bushing *d''* allows punches of different sizes to be held in it without change.

The punches F G and chamfering-die H are adjusted to length by means of other set-screws, *f*, *g*, and *h*, upon each of which are jam-nuts *f'*, *g'* and *h'*, working in suitable slots in the cross-head.

The punch F may be either four or six square, and has directly beneath it a corresponding die, K, the punch and die being used for forming the blank nut. The punch G is round, and used for making the hole in the center of the nut. The lower end of the chamfering-die H is concave, for the purpose of beveling or chamfering the edges of the nut, and the post I is flat upon its lower end, and used for smoothing or flattening the top of the nut.

Directly beneath the cross-head is an anvil, L, suitably prepared for the operation of the dies and punches, as will be fully described hereinafter.

M represents a feed-bar, one end of which slides in a channel in the anvil directly beneath the die K, and parallel to the line of the shaft C, while the other passes through a suitable guide, *m*, secured to the upright B, and is connected with the lower end of the lever H, which is pivoted at *n*, and operated by a cam, *c*, upon the end of the shaft. This cam is so constructed and adjusted as to push forward the feed-bar, and with it the blank, so that the latter is placed beneath the chamfering-die H just before it reaches the end of its downward stroke, when the feed-bar is released by the cam, and returned to place by a spiral spring, *n'*, secured to the frame and lever just above the pivot *n*.

Another feed-bar, O, is situated directly in front of the chamfering-die H, and works in a channel in the anvil at a right angle to the line of the shaft. The outer end of said feed-bar passes through a guide, *a*, secured to the

front side of the bed-plate, and is operated by means of a lever, P, pivoted at *p* to an arm secured to the upright B', and a cam, *c'*, upon the shaft. The cam is so adjusted as to push forward the feed-bar as soon as the blank is released by the chamfering-die, carrying the blank directly under the round punch G, when the feed-bar is released by the cam and returned to place by a spring, *p'*.

Crossing the anvil in a line with the shaft, and directly beneath the round punch G, is a channel, in which slide the die-bars 2 2, the inner ends of which are dies, shaped so that each shall form one side of a nut, either four or six square, while their outer ends pass through suitable guides *q q*, and are each pivoted to one end of a toggle-joint, R, the other end of which is pivoted to a bolt, *r*, passing through a lug secured to the end of the bed-plate. The bolts *r* are provided with nuts upon each side of the lugs, by means of which said bolts can be so adjusted as to bring the inner ends of the die-bars 2 at a proper distance from each other.

Pivoted to the center of each toggle-joint, is a bar, S, which passes through a suitable guide, *s*, secured to the upright, and is provided at its upper end with a pin, placed at a right angle to the bar, and in a line with the shaft C, which works in a cam-groove, T, by means of which the bar S is raised and lowered, so as to operate the toggle-joint and force the bars 2 toward each other, claspings between them the blank nut at the same instant that the round punch strikes it.

U is a pecker, formed by a strip of metal, secured at its rear end to the anvil, and projecting beneath the round punch G, for the passage of which a suitable opening is provided. The pecker is used to prevent the nut from clinging to the punch and rising with it when drawn upward.

To operate this machine, a bar of iron, of suitable size and shape, is heated, and one

end placed beneath the punch F, which, in descending, punches a blank nut through the die K into the channel beneath, from whence it is pushed, by the feed-bar M, beneath the chamfering-die H just in time to receive its downward stroke, which bevels or chamfers the upper edge. As soon as the chamfer-die rises, the feed-bar O pushes the blank beneath the round punch G, and between the die-bars 2 2, all of which strike it at the same instant, punching a hole through its center and forming its sides. From thence it is pushed back beneath the flattener by the next blank, where the forging is completed by having the top side smoothed or flattened.

The advantages possessed by this over any other machine in use are, that, while equally effective and easy to operate, it is more simple in construction, not liable to get out of repair, and can be furnished at less cost.

Having thus fully set forth the nature and merits of my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The arrangement of the cams *c c'*, cam-grooves T T, and crank-shaft C, with the cross-head D, levers U P S, and toggles R R, in the manner described.

2. The arrangement on the anvil L of the stationary die K, slides M O, edge-swages 2 2, and stripper U, in the manner described, and for the purpose set forth.

3. The combination of the punches and face-swages with the edge-swages, the transferrers, and the anvil-block, all constructed, arranged, and operated substantially as described.

In testimony that I claim the foregoing, I have hereunto set my hand and seal, this 15th day of August, 1868.

OLIVER W. YALE. [L. S.]

Witnesses:

JOHN G. ROOT,
HENRY R. SNATH.