

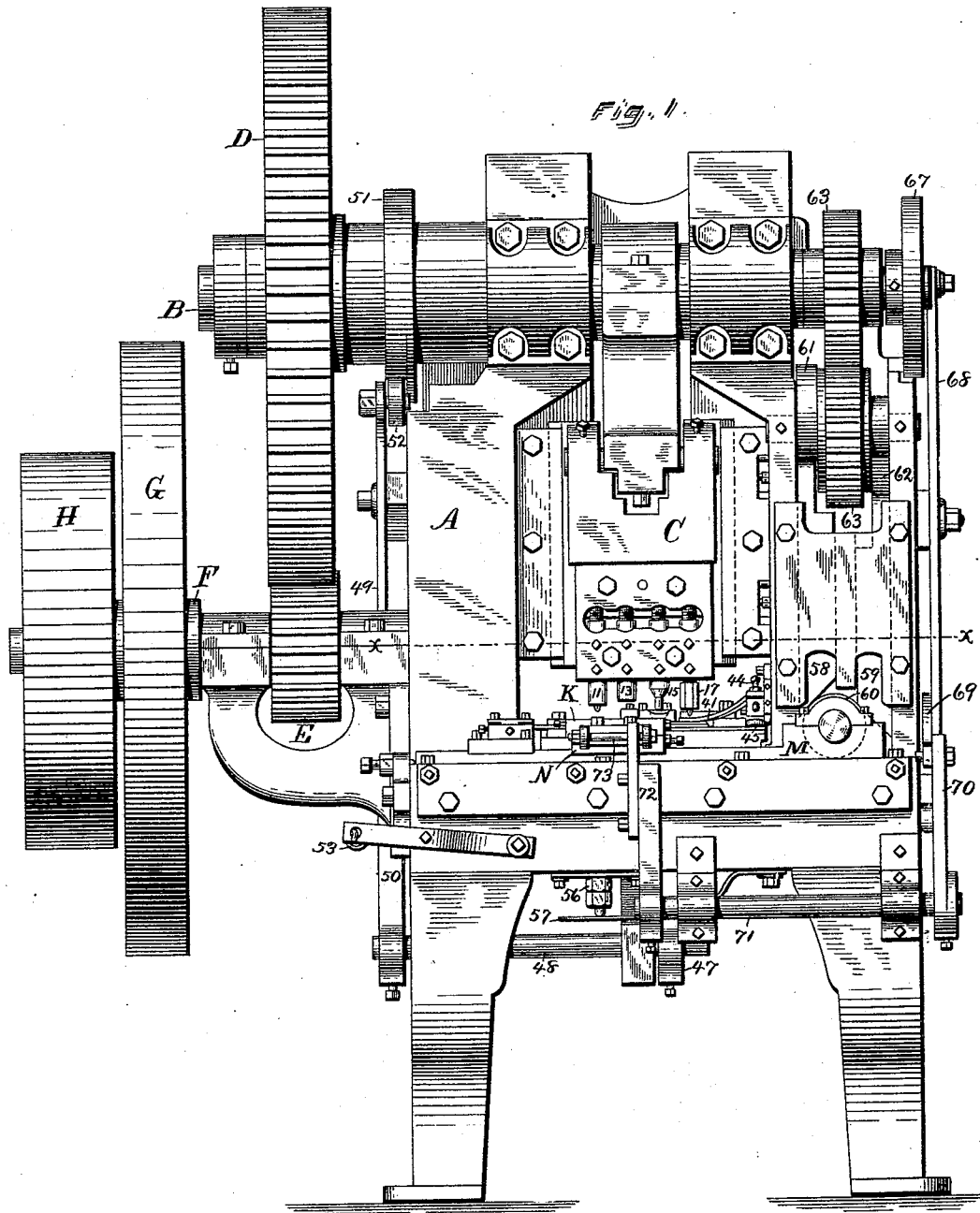
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5 Sheets—Sheet 1.

G. DUNHAM.
MACHINE FOR FINISHING NUTS.

No. 420,931.

Patented Feb. 11, 1890.



Witnesses.

John Edwards Esr.
F. Holland

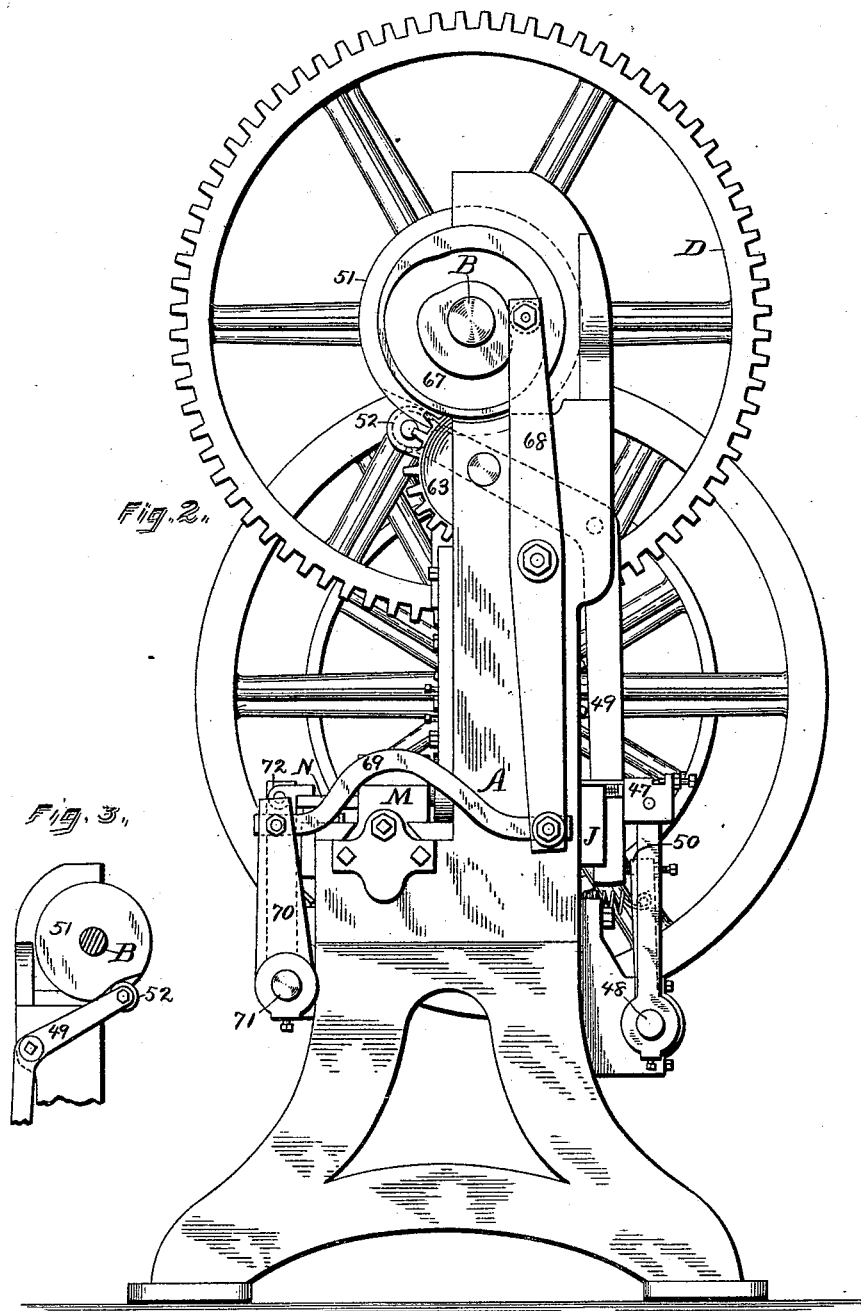
Inventor.

George Dunham.
By James Shepard
Atty.

5 Sheets—Sheet 2.

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John Edwards Jr.
F. Holland

George Dunham,
By James Shepard Atty.

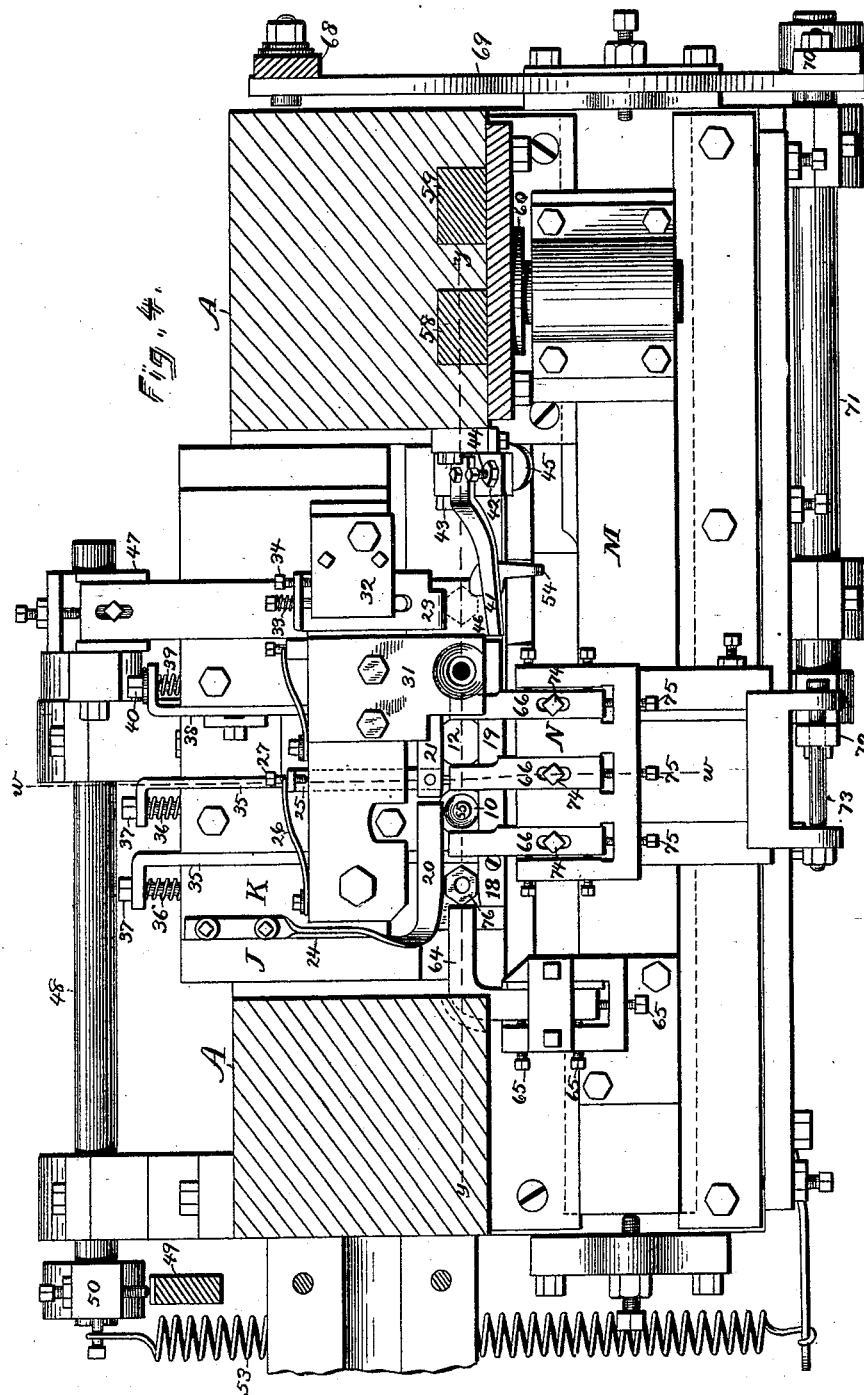
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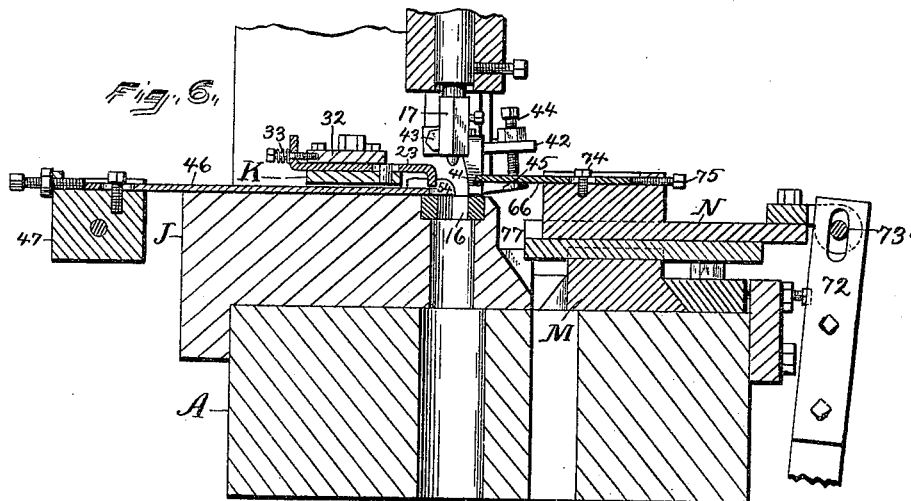
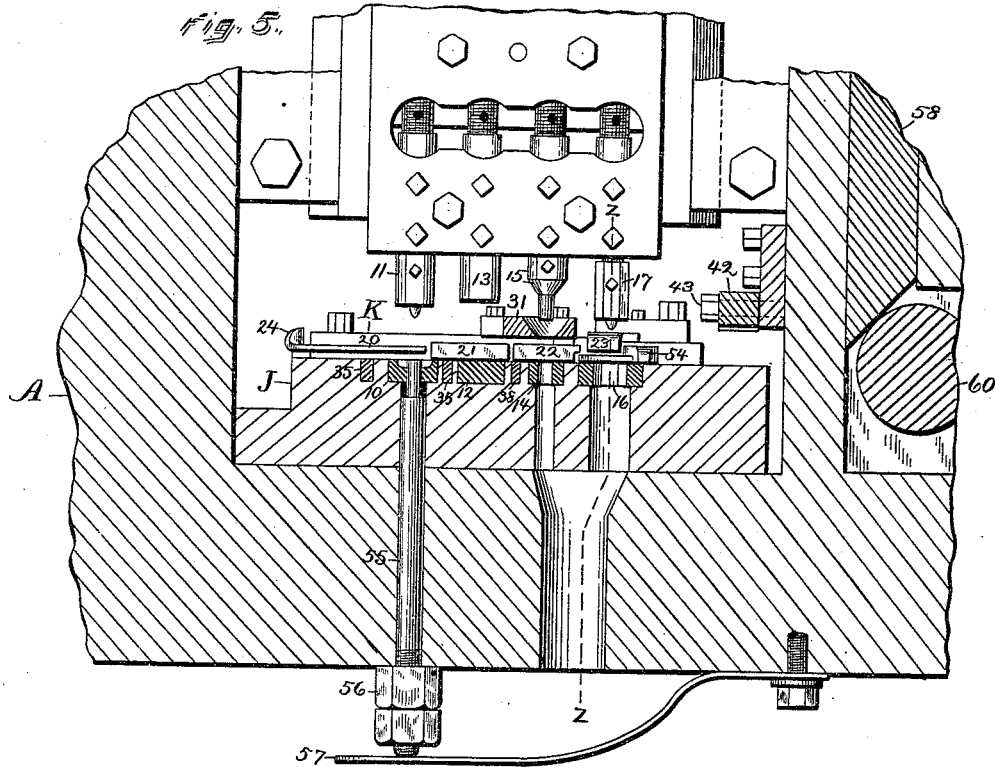
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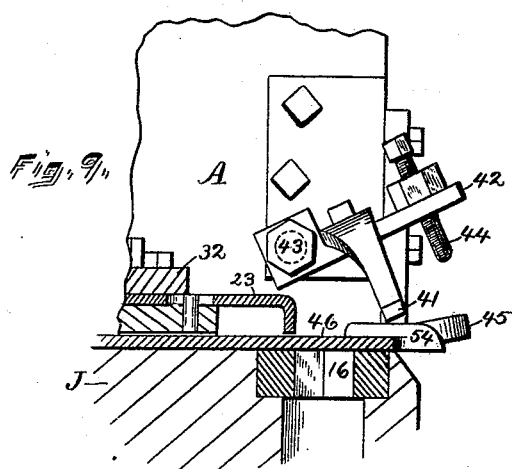
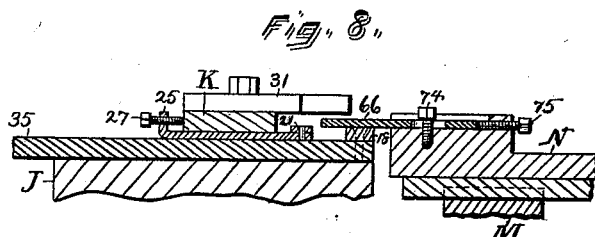
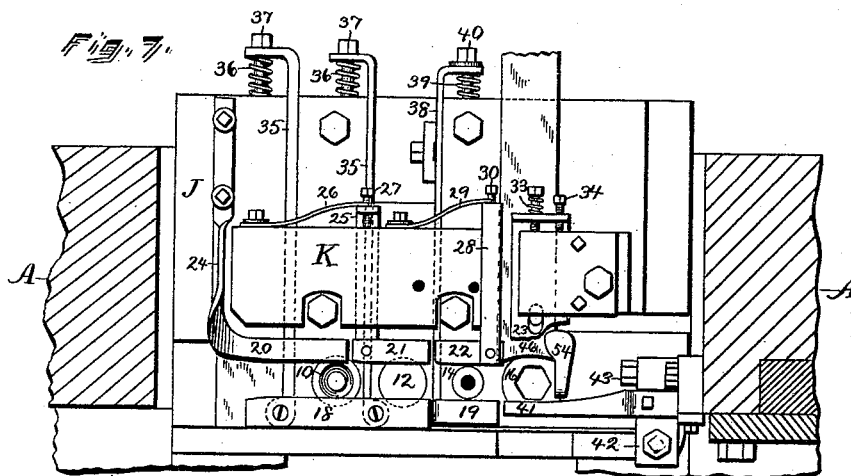
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By James Shepard Atty.

UNITED STATES PATENT OFFICE.

GEORGE DUNHAM, OF UNIONVILLE, CONNECTICUT.

MACHINE FOR FINISHING NUTS.

SPECIFICATION forming part of Letters Patent No. 420,931, dated February 11, 1890.

Application filed March 25, 1889. Serial No. 304,694. (No model.)

To all whom it may concern:

Be it known that I, GEORGE DUNHAM, a citizen of the United States, residing at Unionville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Finishing Nuts, of which the following is a specification.

My invention relates to improvements in machines for finishing nuts, and the objects of my improvement are simplicity of construction and general efficiency and convenience in operation.

In the accompanying drawings, Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation thereof. Fig. 3 is a detached view, on a reduced scale, showing a portion of the frame of the machine, one of the cams, and the lever operated thereby, the crank-shaft being in vertical section. Fig. 4 is a horizontal section of said machine on the line *x x* of Fig. 1. Fig. 5 is a vertical section of detached portions thereof on the line *y y* of Fig. 4, the slide and its punches being shown in elevation. Fig. 6 is a vertical section of parts thereof on line *z z* of Fig. 5. Fig. 7 is a horizontal sectional view of parts of the machine corresponding with Fig. 4, excepting that some of the parts have been removed. Fig. 8 is a vertical section of parts thereof on line *w w* of Fig. 4; and Fig. 9 is an enlarged vertical section of detached parts in the same plane as Fig. 6, but with the parts in a different position.

A few of the reference-characters where the parts are crowded have been omitted from Fig. 1.

The machine in its general form resembles an ordinary power-press.

A designates the frame; B, the crank-shaft; C, the punch-slide driven thereby; D, the driving-gear mounted on said crank-shaft, said gear being driven by the gear E on the main shaft F, which is provided with driving-pulleys G and H. These parts are of ordinary construction, and other ordinary equivalent parts may be substituted for them.

In the punch-slide I arrange four punches, and within the bed of the press underneath them four dies. Beginning at the left-hand side of the drawings, the first one of these is the crowning-die 10 and its punch 11, the flattening-die and punch 12 and 13, the central-

hole die and punch 14 and 15, and the trimming-die and punch 16 and 17. Upon the front and rear of these dies there are yielding gages or guides 18, 19, 20, 21, 22, and 23. The gage 20 is made integral with its spring-shank 24, which is secured to the die-bed J. This gage is set with its under face a little above the face of the crowning-die, so that said gage may yield a little in a downward direction—that is, toward the die-bed—while said gage also has the capacity of yielding in an edgewise direction. The gage 21 back of the flattening-die 12 is mounted upon a slide 25, which is pressed upon by a spring 26 to keep it toward the front, its forward motion being limited and adjusted by means of the set-screw 27. This slide is guided in suitable ways in the cap-plate K, and the set-screw 27 bears against the rear edge of said cap-plate. The gage 22 is arranged and adjusted in like manner in the upper side of the cap-plate upon the slide 28, said slide being provided with a spring 29 and set-screw 30. This slide 28 is held down by the picker-plate 31, through which the punch 15 works. The gage 23 works in a similar manner in guides formed in the upper side of the cap-plate K, and it is held in place by a supplemental cap 32. This gage 23 is formed as an integral part of a bar or slide, and it is pressed forwardly by means of the spiral spring 33, its forward motion being limited and adjusted by means of the set-screw 34, Figs. 4 and 7. The gages for the front side of the dies have their spring-pressure arranged to draw them backwardly, so that the springs force the gages toward each other. The gage 18, which confronts the gages 20 and 21, is mounted upon the two slides 35, fitted in suitable ways in the bed J, which slides are pressed backwardly by means of the springs 36, their backward motion being limited by means of the heads of the bolts 37, around which the springs 36 are coiled. The gage 19 is mounted upon a like slide 38, and held and adjusted in like manner by means of spring 39 and bolt 40. The front gage 41, in front of the trimming-die 16, is a yielding gage mounted upon a rocking arm 42, pivoted at 43, so as to be held in its position for gaging by gravity. The rocking motion of this gage and that of the rocking arm 42 is limited and adjusted by means of the screw 44, which strikes a stop 45, that is secured stationarily

upon the frame of the machine. Immediately underneath the gage 23, in suitable guides, I arrange the clearing-slide 46, which slides from the position in the rear of the trimming-die 16 (illustrated in Fig. 7) to a point forward of said die, as illustrated in Fig. 9. Motion is imparted to said slide by means of the rocking arm 47 on the rock-shaft 48 at the rear of the machine, which shaft is moved in one direction by means of the lever 49, fulcrumed on the frame of the machine, with its lower end bearing against the rocking arm 50 on said shaft, and its upper end being operated upon by the cam 51 on the crank-shaft B, the contacting end of said lever with said cam being preferably provided with a roller 52. The rock-shaft is moved in the opposite direction by means of the spring 53, Fig. 4. The clearing-slide 46 has rigidly connected with its front end a cam or projection 54, which, as said slide moves forwardly, strikes the gage 41 and swings it up out of the way, as shown in Fig. 9. The crowning-die 10 is provided with a knock-out pin 55, whose upward motion is limited and adjusted by means of the nut 56, Figs. 1 and 5, and it is pressed into its uppermost position by means of the spring 57.

Upon the front part of the machine, moving in suitable ways, I arrange a transverse slide M. This slide M is reciprocated by means of beveled slides 58 59, the ends of which bear upon a roller 60, mounted upon said slide M. Said beveled slides are operated by means of the cams 61 62 and gear-wheels 63 63, the latter of which is on the crank-shaft, which mechanism for operating the slide has been previously patented by me, and therefore it is not specifically a part of this invention, and any other mechanism for reciprocating said slide M to impart to it the same movements I consider an equivalent for this slide-operating mechanism for the purposes of the present invention. This slide M bears an adjustable carrying-finger 64, Fig. 4, which finger is in the form of an angle-arm, the operating member of which is adapted to reciprocate between the yielding gages 18 and 20. It is held and adjusted in its position by means of the set-screws 65, Fig. 4. I also provide the slide M with a finger-slide N, having three adjustable carrying-fingers 66, the same being set a distance apart, measuring from their forward or right-hand edges, equal to the distance from the center of one of the dies to the center of the next succeeding die. The gages 18 and 19 are of less thickness than the nuts to be operated upon, so that the fingers 66, which extend over the top of said gages, at times may engage the edges of the nuts at a point above said gages. This finger-slide is adapted to be reciprocated transversely to the movement of the slide M. It is actuated by means of the grooved cam 67 on the crank-shaft B, the lever 68, fulcrumed upon the frame of the machine, the pitman 69, rocking arm 70, rock-shaft 71, and rock-

ing arm 72. This latter arm is slotted, and is connected with the finger-slide N by means of a rod 73, passing through the slot in said arm, whereby said arm and slide are connected in such manner that the finger-slide may move laterally with the slide M, while the rocking arm 73 has no lateral movement. The fingers 66 are adjusted longitudinally by being slotted and held down by bolts 74, which pass through the slots in said fingers, and they are further secured and adjusted by means of the set-screws 75, which bear upon the rear ends of said fingers. Said fingers may also be provided with means for adjusting them laterally; but this is not essential, as they should always have a given relation to each other and to the distance between the dies in a lateral direction.

The nuts for being finished by this machine may be produced in any ordinary manner. I prefer to arrange them one upon the other in a suitable hopper, so as to remove the nuts from the bottom of the hopper one by one, as in well-known machines for operating upon blanks; but such hopper is not essential, as the nuts may be placed within the machine one at a time by hand. At a time when the slide M is at or near the left-hand limit of its movement, the finger-slide at its rearmost position over the space between the gages, and when the punch-slide is elevated (the parts being so timed as to come in these respective positions) a nut is dropped in between the yielding gages 18 and 20 at the point illustrated by the nut 76, Fig. 4. The gages 18 and 20 should be so arranged as to be slightly farther apart at this point than at the crowning-die, so that the nut may readily fall into position between them, and then be pinched or pressed upon by said gages as it is carried to the dies. The parts are so timed that the slide M next moves to the right when the finger 64 pushes the nut to a position over the crowning-die, the gages being so set that both of them press upon the opposite edges of the nut with friction enough to hold it in place. The finger-slide then withdraws from over the space between the gages into the position illustrated in Fig. 6, and the punch-slide descends to bring the punch 11 down upon the nut to force it into the crowning-die 10. The slide M, with the fingers 66 drawn out of the way of the dies and nut, moves to the left again to the extent of its motion, the punch-slide is elevated, and the finger-slide again operates to carry the fingers into the position shown in Fig. 4, when the left-hand finger 66 will be carried into a position on the left-hand side of the nut within or over the crowning-die. The ordinary knock-out pin 55 releases the nut from said crowning-die. The next movement of the slide M to the right carries another nut, as before described, and also carries a crowned nut to the flattening-die and punch 12 and 13, when the movements of the machine before described are repeated, another nut is

crowned, and the one previously crowned is flattened. The first two of the fingers 66, by what may be called their "four-four motion," come into a position upon the left-hand sides of the respective nuts so operated upon. Another nut is supplied and the machine makes the same movement as before, crowning and flattening the succeeding nuts and punching or trimming the central hole by means of the die and punch 14 and 15. A repetition of these movements repeats the operations before described, brings the right-hand finger back of the nut last punched, and brings the most advanced nut to the operation of the trimming-die and punch 16 and 17, which trim the edges of the nut. The pressure of the gages before the nut reaches the trimming-die should be such as to hold the nuts firmly in place while the fingers are moving by them to the left to obtain a fresh hold. After the nut has been trimmed, the clearing-slide 46 moves forwardly, lifts the gage 41 out of the way, and pushes the scrap from the top of the trimming-die into the passage 77, through which it may pass out of the machine. The clearing-slide and gage 41 then return to their former positions and the operations are repeated indefinitely so long as the supply of nuts is kept up. The nut is held firmly enough between the spring-pressed gage 23 and gage 41 to retain it in position for being acted upon by the trimming-die and punch.

In some cases it may not be desirable to trim the central hole in the nut, and in such case the die and punch 14 and 15 and right-hand finger may be omitted and the trimming-die and punch 16 and 17 occupy the position of said die and punch 14 and 15 without making any other changes in the machine, the operations being precisely the same as before described, with the exception of punching the central hole. Even when the machine is adapted for use with the central-hole-punching die and punch its operation may be omitted, if desired, by merely removing the punch 15 from the punch-slide, the only resultant change being that no operation will be performed on the nut when it stops over the die 14.

I claim as my invention—

1. In a machine for finishing nuts, the combination of a crowning-die and punch, a flattening-die and punch, and a trimming-die and punch arranged in succession at given distances from each other, and carrying devices to present the nuts successively to said dies and punches, substantially as specified.

2. In a machine for finishing nuts, the combination of a crowning-die and punch, a flattening-die and punch, a central-hole-trimming die and punch, and an edge-trimming die and punch arranged in succession at given distances from each other, and carrying devices to present the nuts successively to said dies and punches, substantially as specified.

3. The combination of a successive series of

dies and punches, the gages yielding under spring-pressure for bearing upon opposite edges of the nut, a series of carrying-fingers for moving the nuts along to said series of dies between said gages, and operating mechanism, substantially as described, and for the purpose specified.

4. The combination of a die and punch for operating upon a nut—as, for instance, 12 and 13—the gage 19 upon one side of said die, its slide 35, spring 36 and bolt 37, the gage 21 upon the opposite side of said die, its slide 25, spring 26, and adjusting-screw 27, all substantially as described, and for the purpose specified.

5. The combination of the edge-trimming die and punch 16 17, gage 23, swinging gage 41, the clearing-slide 46, having the projection or cam 54 for acting on said swinging gage, and mechanism for operating said clearing-slide, substantially as described, and for the purpose specified.

6. The combination of a series of dies and punches, a series of front and rear gages, the gages in front of said dies being of less thickness than the nuts to be operated upon, and a series of carrying-fingers arranged to operate over the top of said front gages, substantially as described, and for the purpose specified.

7. The combination of a series of dies and punches, the slide M, the finger-slide N, mounted on said slide M and moving at right angles thereto, a series of fingers 66 on said finger-slide, and mechanism for operating said slides, whereby the finger-slide moves in one direction at one end of the movement of the slide M and in the opposite direction at the other end of the movement of said slide M, substantially as specified.

8. The combination of a series of dies and punches, the yielding gages for bearing upon opposite edges of the nut, the slide M, the finger 64, rigidly mounted thereon, the finger-slide N, having fingers 66 and mounted to slide transversely to the movement of the slide M, and operating mechanism, substantially as described, and for the purposes specified.

9. In a nut-finishing machine, the combination of the slide M, the finger-slide N, mounted thereon and provided with the rod 73, mechanism for reciprocating the slide M, and the slotted rocking arm 72 and its operating mechanism, said rod 73 passing through the slot of said rocking arm, substantially as described, and for the purpose specified.

10. In a nut-machine, the combination of the clearing-slide having cam or projection 54, the swinging gage 41, mounted on the rocking arm 42, the adjusting-screw 44, and a stationary stop 45, substantially as described, and for the purpose specified.

GEORGE DUNHAM.

Witnesses:

E. G. DUNHAM,
GEORGE E. TAFT.