No. 715,525. Patented Dec. 9, 1902.

O. TYBERG.

NUT FINISHING MACHINE.

(Application filed Oct. 4, 1899.)

(No Model.) 4 Sheets—Sheet 1.

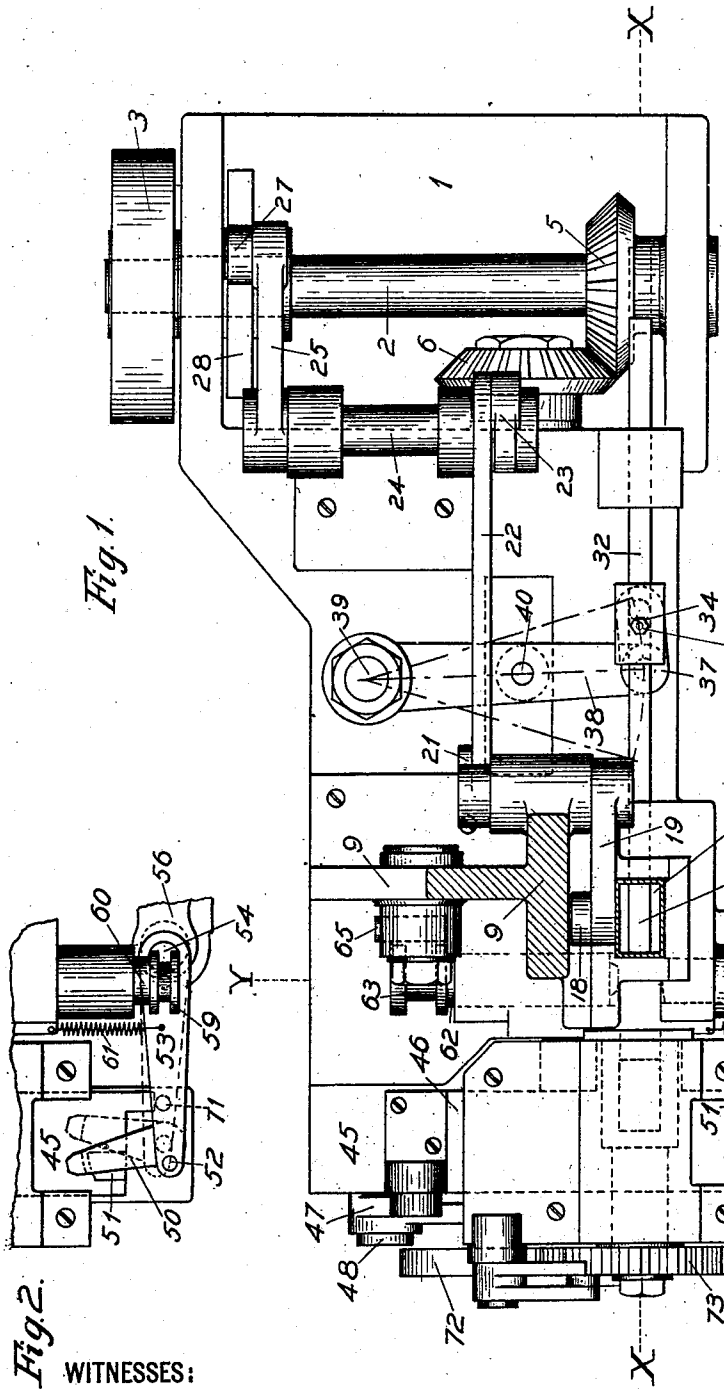


Fig. 1.

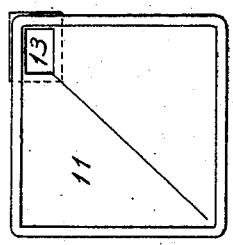


Fig. 3.

Fig. 2.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 4.

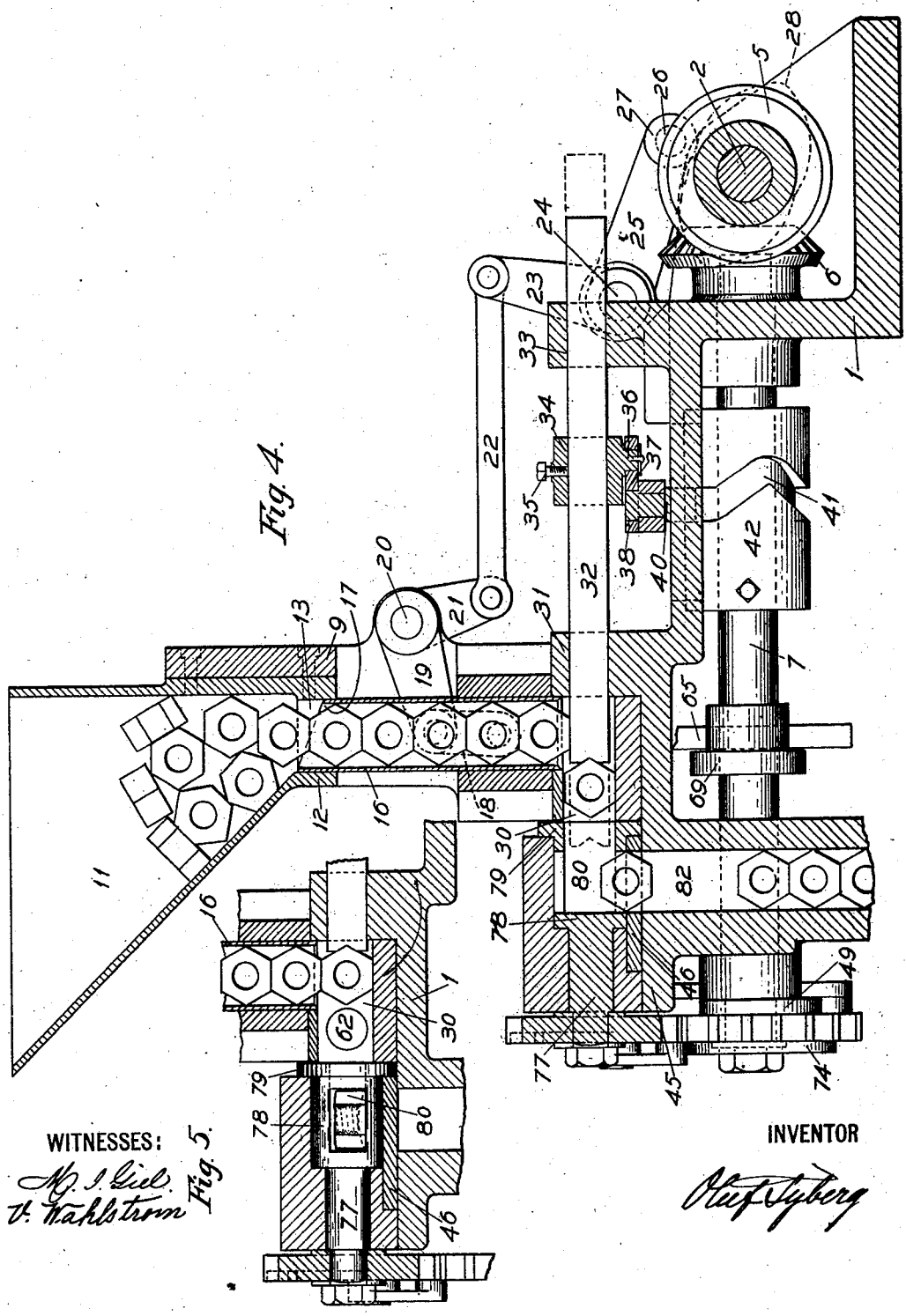


Fig. 5.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 7.

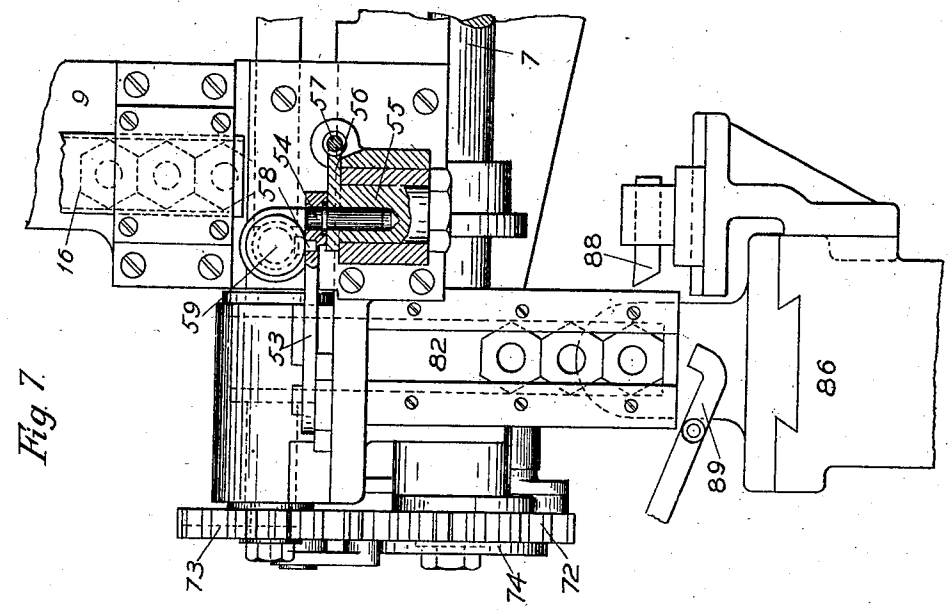
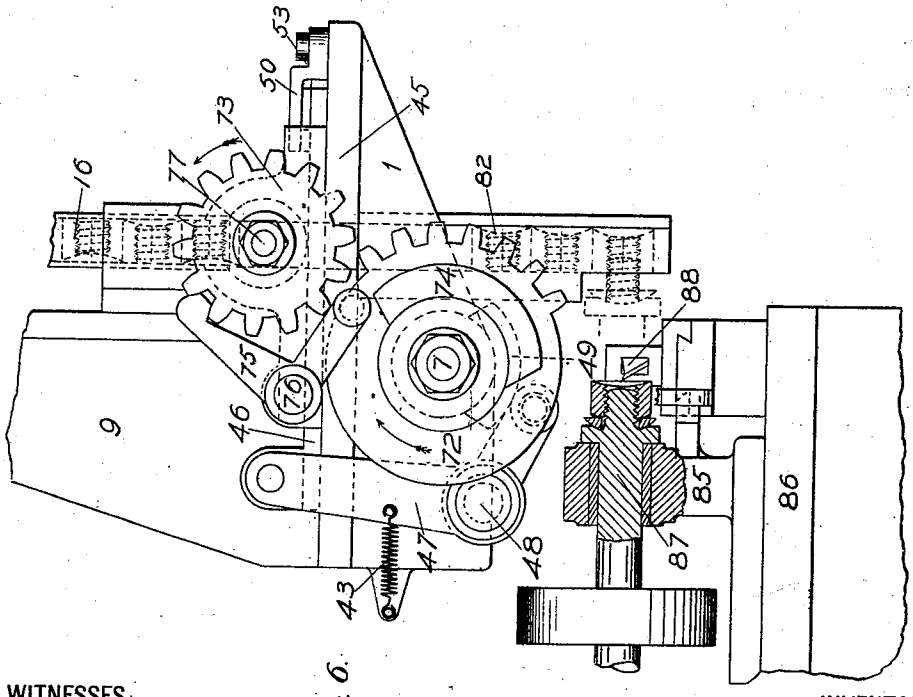


Fig. 6.



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NUT FINISHING MACHINE.

(Application filed Oct. 4, 1899.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 9.

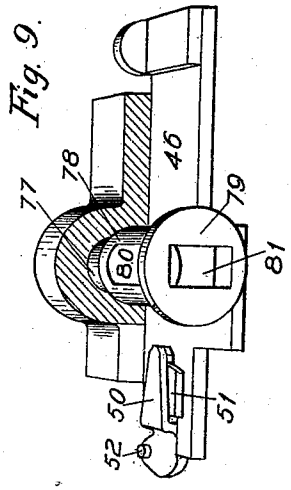


Fig. 11.

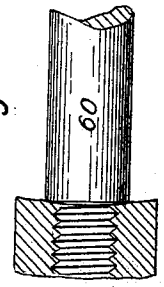


Fig. 13.

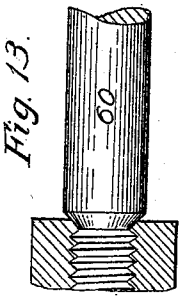


Fig. 10.

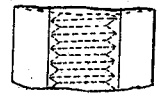


Fig. 12.

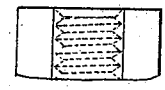
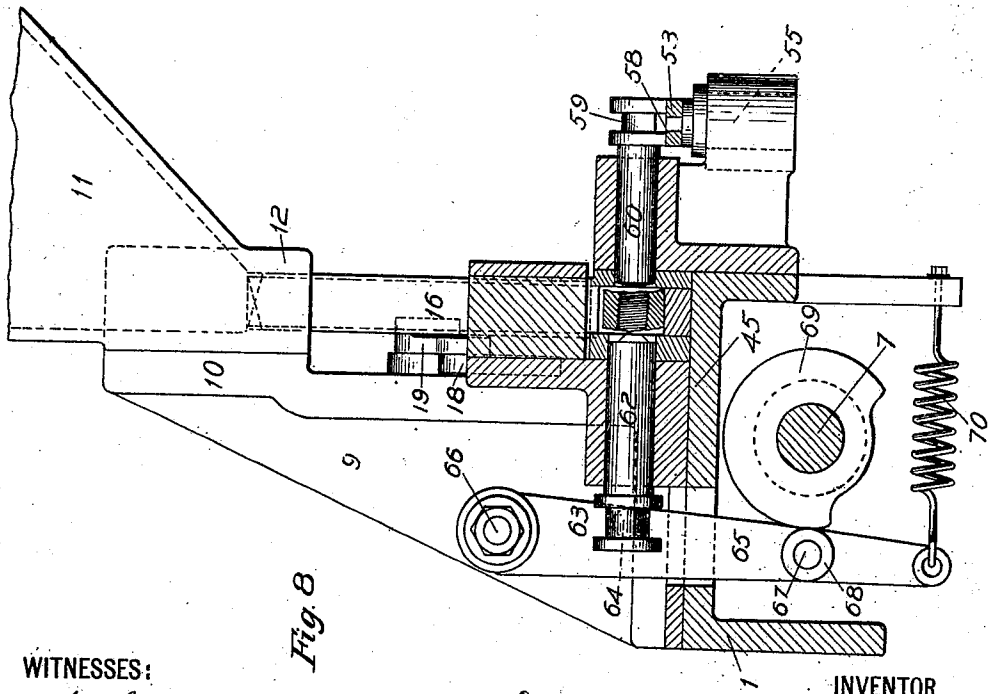


Fig. 8.



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UNITED STATES PATENT OFFICE.

OLUF TYBERG, OF BROOKLYN, NEW YORK, ASSIGNOR TO RUSSELL, BURDSALL & WARD BOLT & NUT COMPANY, OF PORT CHESTER, NEW YORK, A CORPORATION OF NEW YORK.

NUT-FINISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 715,525, dated December 9, 1902.

Application filed October 4, 1899. Serial No. 732,540. (No model.)

To all whom it may concern:

Be it known that I, OLUF TYBERG, a citizen of the United States of America, and a resident of the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Nut-Finishing Machines, of which the following is a specification.

This invention relates to an improvement in nut-finishing machines; and its object is to provide an automatic device attached to and forming part of the finishing-machine and adapted to feed the blank nuts to the cutter in such a manner as to always present the same relative top or bottom face of each blank to the tool irrespective of its position when the blanks are thrown into the nut-receptacle. When the hole in the blank nut is formed by means of a punch, it invariably follows that the metal about the edge of this hole is depressed on the side from which the punch is driven, so that this face of the blank is appreciably concave, while the opposite face is convex, being bulged outward by the action of the punch. One face of the finished nut is a plane surface, while the other is more or less rounded or convex. In order to prevent waste of material during the finishing operation, it is necessary that the convex face of the blank should become the convex face of the finished nut and that the concave face of the blank should become the plane face of the nut. As the blanks come from the punch to the finishing-machine they are thrown indiscriminately together into a receptacle without regard to their future treatment. Heretofore it has therefore been necessary to sort the blanks by hand and feed them one by one to the finishing-machine by first presenting the concave faces to be cut to a plane face and then in a second operation to present the convex face of the blanks to be trimmed by the cutter. I employ an automatically-operated rotatable tumbler adapted to reverse any blank which may enter the machine with its face in the wrong position and also an automatic feeler or finger adapted, in conjunction with a plunger, to determine the position of the relative faces of the blank nut, and therefore control the reversing movement. I also employ a nut receptacle or hopper in connection therewith, from which the nuts may be automatically brought into the feed-tube.

The invention, however, comprehends, broadly, mechanism which takes the nuts from a receptacle irrespective of any predetermined position and presents each nut to a tool, such as a finishing-tool, with either the top or bottom face exposed to the tool, as may be determined before setting the machine into operation. The subject-matter deemed novel is set forth in the claims.

In the accompanying drawings, Figure 1 is a plan view of the machine with the nut-receptacle removed. Fig. 2 is a plan view of a modification of the feeler-controller. Fig. 3 is a plan view of the nut-blank receptacle on a reduced scale. Fig. 4 is a section of the line X X of Fig. 1 with the nut-receptacle in position. Fig. 5 is a section on the line X X of Fig. 1, partly broken away and showing the tumbler half turned over. Fig. 6 is an end elevation showing the relative positions of the delivery-channel and finishing-cutter. Fig. 7 is a side elevation of the machine, partly broken away and partly sectional. Fig. 8 is a section on the line Y Y of Fig. 1 with the nut-receptacle in position. Fig. 9 is a perspective view of the tumbler. Fig. 10 is a side elevation of a blank nut. Fig. 11 is a section of a blank in contact with the feeler. Fig. 12 is a side elevation of a blank having the plane face finished, and Fig. 13 is a section of a partially-finished nut in contact with the secondary feeler.

In constructing my machine I employ a frame 1, in which is journaled the main shaft 2, carrying the driving-pulley 3, which overhangs one of the journals. Fixed upon said main shaft 2 and close to one of the journals is the bevel-gear 5, meshing with a second bevel-gear 6, keyed or otherwise fixed upon the cam-shaft 7, the purposes of which will be presently explained. An upright 9 is fixed upon the frame 1 by means of bolts or other fastenings at a point near the end of the frame opposite the main shaft. The upper end of this upright has an offset 10, to which the nut-receptacle 11 is fixed. This receptacle

has preferably two vertical walls and two inclined walls, and its lower or contracted end terminates in a rectangular downwardly-projecting neck 12, provided with a rectangular opening 13. Fitted within said opening 13 and adapted to reciprocate therein is mounted the rectangular feed-tube 16, the upper end of which is cut at an angle, forming a tripper, the obtuse angle 17 being at the side of the opening 13 next the vertical wall of the nut-receptacle. The lower end of this feed-tube is slidably mounted in a suitable opening in the base of the upright. Pivotally connected to said feed-tube is the link 18, which is in turn pivoted to the rocking arm 19, fixed on the rock-shaft 20, journaled in a suitable boss on the upright. To the opposite end of the rock-shaft a second rocking arm 21 is fixed. This arm 21 is pivoted to the connecting-rod 22, pivoted to the lever 23, which is fixed to the shaft 24, mounted in suitable journals on the main frame parallel to and adjacent to the main shaft. At the opposite end of the shaft 24 the arm 25 is fixed. Upon a wrist-pin 26, fixed to the free end of this arm, a roller 27 is mounted. This roller contacts with and the arm is operated by a double heart-cam 28, keyed or otherwise fixed to the main shaft 2, preferably close to one of its journals and opposite the bevel-gear 5. Through the medium of the cam, the arms, connecting-rod, and link the feed-tube and tripper are constantly reciprocated while the machine is running, and the upper end of the tube projecting into the receptacle trips the nut-blanks and forces them to fall into the tube, as shown in Fig. 4. A rectangular chamber 30, forming part of the passage from the feed-tube to the finishing devices, of a suitable size to permit of the free passage of a nut-blank therethrough, is located at the bottom of the feed-tube 16 and into which said feed-tube discharges. An aperture 31 is provided in the front wall of this chamber, and through this aperture the feed-plunger 32 slides. A suitable bearing 33 is provided for the opposite end of the plunger, and at a point between said bearing and said chamber the block 34 is fixed to said plunger by means of the set-screw 35. The lower face of this block is provided with a pin 36, upon which the link 37 is pivoted. The arm end of this link is pivoted to one end of the rock-bar 38, the other end of which is pivoted to the frame by means of the pin 39.

The rock-bar 38 is provided at a point about midway between its ends with a downwardly-projected spur or roller 40, which engages the slot 41 in the cam 42, fixed upon the cam-shaft 7.

The guide-plunger 32, is through the medium of its linked connection with the rock-bar and cam, caused to reciprocate with an intermittent motion, pushing the nut-blank in position between the feeler 60 and plunger 62 and thence to the tumbler 78, (which will be more fully described hereinafter,) and it then retreats sufficiently to allow another blank to fall into the chamber 30, when the operation is repeated.

The rear end of the machine is provided with a table 45, upon which in suitable guides the slotted gate 46 is adapted to reciprocate. This gate is actuated by means of the bell-crank 47, fulcrumed at 48 to the frame 1 and actuated in turn by the interrupted cam 49, fixed upon the cam-shaft 7, and by the spring 43. At the end of the table opposite the bell-crank 47 is fulcrumed a latch 50, adapted to intermittently hook over the spur or block 51, fixed upon the gate 46. (See Fig. 9.) The latch 50 is pivotally mounted on the table 45 and by means of the pin 52 connected to one end of a lever 53, the other end of which carries a pin 54. (See Fig. 7.) This pin is mounted in the rotatable post 55, the axis of which is eccentric to that of the pin. This post is mounted on a bracket of the main frame and has an enlarged head provided with a segmental worm-gear 56, meshing with the adjusting-screw 57, mounted on the frame in suitable journals, by means of which the latch 50 may be properly adjusted in relation to the block 51. A pin 58, fixed in said lever 53, engages the channeled head 59 of the reciprocating finger or feeler 60. A suitable spring 61, attached to the main frame and to the lever 53, keeps the pin 71, placed on the under side of the lever 53, normally pressed against a projection on the gate 46. The feeler 60 slides in a suitable hole in the frame, and its inner end is adapted to be projected slightly into the chamber 30 at right angles to the axis of said chamber and at a point between the tumbler 78 and the feed-tube 16, as is best shown in Fig. 1. Directly opposite said feeler and slidably mounted in a suitable bearing is the plunger 62, having a channeled head 63 engaging a pin 64, fixed in the operating-lever 65. This lever is fulcrumed at its upper end to the upright 9 by means of the pin 66. On a pin 67, fixed to the lever 65, below the table, is rotatably mounted a roller 68, which contacts with an interrupted cam-disk 69, fixed upon the cam-shaft 7. A spring 70 tends to keep the roller 68 against the cam-disk 69 at all times, except when its action is resisted by the plunger 62 bearing against a nut-blank, as will hereinafter be described.

Fixed upon the extreme end of the cam-shaft 7 at the rear of the machine is the interrupted spur-gear 72, so proportioned that one revolution thereof will cause the spur-gear 73, meshing therewith, to rotate at the proper time a one-half revolution. An interrupted cam 74 is fixed to the outer face of the interrupted gear 72 and controls a pawl 75, which acts as a lock for the gear 73 when not engaged by the interrupted gear 72. This pawl 75 is fulcrumed to the table 45 at 76. The gear 73 is fixed upon the extreme end of the spindle 77 of the tumbler 78, which has an enlarged head 79, adapted to revolve at the rear end of the chamber 30. A diamet-

rical slot 80 is cut in the tumbler 78, and a rectangular aperture 81 in the head 79 communicates between said slot and said chamber 30. A delivery tube or channel 82 is formed in the frame, having its upper end or opening immediately underneath the tumbler and its lower opening leading to the finishing-machine. The gate 46 is arranged between the tumbler 78 and the channel 82 and has an opening corresponding to the opening in both tumbler and channel.

The finishing-machine may be of any well-known type or, as indicated here, may consist of a head 85, slidably mounted on a bed 86, said head having a spindle 87, adapted to receive one at a time the threaded nuts directly from the lower end of the channel 82 by moving toward said channel, (in a manner indicated by the dotted lines in Fig. 6,) thereupon retreating and permitting the cutter 88 to finish one side of the nut, after which the nut is removed from the spindle 87 by turning the arm 89 into contact with the nut and reversing the spindle. I do not, however, confine myself to any particular type of finishing-machine.

In the operation of the machine the nut-blanks are thrown indiscriminately into the receptacle 11 and the main shaft started. The feed-tube will at once reciprocate vertically, tripping the blanks and causing them to fall one at a time through the feed-tube 16 into the chamber 30, with the top and bottom faces arranged vertically. The feed-plunger 32, actuated by the cam 42, will now advance and push the nut-blank forward to the position shown in Fig. 4, where the blank rests for a moment directly in line with the feeler 60 and plunger 62. The plunger 62, which has been normally kept back by the arm 65 resting against the cam 69, will now be permitted to advance by means of the spring 70 and push the nut rigidly against the opposite side of the chamber 30. The end of the feeler 60 is normally held in the position shown in Figs. 1 and 8—*i. e.*, clear of the wall of the chamber 30—so that the blank may be pushed to its position between the plunger and feeler. It is held in this position by the pressure of the gate 46 on the pin 71, which is fixed in the lever 53, operating the feeler 60. The gate 46 will now be moved just enough to permit the feeler, through the action of the light spring 61, to push against the face of the nut-blank. If the position of the nut-blank is such that its concave side faces the feeler 60, the feeler will advance sufficiently to allow the arm 53 to move the latch 50 and make it assume about a position such as indicated by dotted lines in Fig. 1, thus hooking over the block 51, and thereby preventing the gate from being moved by the spring 43 through the bell-crank 47, and thus leaving the opening in the gate directly under the opening in the tumbler 78, and thus affording a free passage between the tumbler 78 and the channel 82. The plunger 62 will now be withdrawn from the nut-blank, and the plunger 32 will then push the nut-blank from the chamber 30 through the opening 81 into the tumbler 78, from which it will drop directly through the opening in the gate 46 into the channel 82. If, however, the convex side of the nut-blank should have been presented to the feeler 60, the feeler would not be able to advance so far, and the latch 50 would therefore not hook over the block 51 and prevent the movement of the gate, which in that case would be moved sufficiently to close the passage between the tumbler 78 and the channel 82. This nut-blank, therefore, when pushed into the tumbler 78 is caused to remain there while the tumbler makes a half-revolution, caused by the interrupted gear 72 acting upon the gear 73. After the tumbler has completed its turn the gate is again returned to its normal position, leaving a free passage for the nut-blank to drop into the channel 82. It will thus be seen that all the nut-blanks when entering this channel are in the same relative position with regard to faces irrespective as to how they may enter the feed-tube from the nut-receptacle.

Fig. 10 illustrates a nut-blank, and Fig. 11 the same nut in section, showing also the particular shape of the feeler as preferably used for the operation just described. After the bottom of the nut has been finished the nut-blank will take the shape indicated in Fig. 12, and in general practice the threaded hole is then chamfered, as indicated in the section of the nut in Fig. 13. The nuts may now again be placed in the receptacle, a secondary feeler, as indicated in Fig. 13, substituted for the one shown in Fig. 11, and the block 51 on the gate 46 removed and another fixed to the gate in the position indicated in Fig. 2 by the numeral 151. If all the parts are now adjusted and the operation repeated, the nuts which enter the channel with the finished bottom facing the feeler will be reversed by the tumbler, while the others fall directly into the channel 82, thus feeding them in their proper position into the channel.

I desire it to be understood that I do not confine myself strictly to the particular type of elements herein shown and described, which may be considerably modified without affecting the scope of my invention.

It is to be understood that the mechanism by which the various operations carried out by this machine are performed may be widely varied in construction and arrangement. Other constructions may be substituted for some of those now employed, and the relative movement of some of the parts with respect to others may be effected, not only by moving the parts described in the machine, but by moving the other parts or by moving both parts. It will also be understood that some of the mechanism may be used in structures in which other parts of the mechanism are not employed and that the independent use

of such mechanism is comtemplated. The invention is not, therefore, to be restricted to the particular mechanism or the precise details of construction herein shown and described.

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

1. The combination of a feed-tube for nut-blanks to which the nuts are supplied irrespective of any predetermined position, a finishing-tool and means acting solely on the exterior surfaces of said blanks and interposed between said feed-tube and said tool for uniformly presenting like faces of said blanks to said tool, substantially as described.

2. The combination of a receptacle for nut-blanks through which the nuts pass irrespective of any predetermined position, a finishing-tool, a delivery-channel and means acting solely on the exterior surfaces of said blanks for uniformly entering like faces of said blanks in the same relative position in said channel, substantially as described.

3. The combination of a receptacle for nut-blanks to which nuts are supplied irrespective of any predetermined position, a finishing-tool, a delivery-channel, and an automatically-rotated tumbler acting solely on the exterior surfaces of said nut-blanks interposed between said receptacle and said delivery-channel and adapted to deliver nut-blanks in the same relative position to said channel, substantially as described.

4. The combination of a receptacle for nut-blanks in bulk, a finishing-tool, means for delivering nut-blanks from the receptacle irrespective of any predetermined position, and means acting solely on the exterior surfaces of the nut-blanks interposed between said receptacle and said tool for acting upon the indiscriminately-arranged nuts and uniformly presenting like faces of said nuts to said tool, substantially as described.

5. The combination of a receptacle for nut-blanks, a finishing-tool, a reciprocating feed-tube communicating with said receptacle through which the nuts travel from the nut-blank receptacle indiscriminately arranged as to position, a delivery-channel, and means acting solely on the exterior surfaces of said nut-blanks interposed between said feed-tube and said delivery-channel for presenting predetermined top or bottom faces of said nut-blanks to said tool, substantially as described.

6. In a nut-feeding device, the combination of a feed-tube to which the nuts are fed indiscriminately as to position, a delivery-channel, and means acting solely on the exterior surfaces of the nuts interposed between said tube and said channel for delivering to said channel uniformly like faces in the same relative position, substantially as described.

7. In a feeding device for nuts, the combination of a feeler for determining the direction in which the respective nuts are turned or faced, and a tumbler adapted to control the delivery of said nuts in predetermined relative positions by turning those improperly faced or positioned, substantially as described.

8. In a feeding device, the combination of a feed-tube to which the nuts pass irrespective of any predetermined position, a delivery-channel, a feeler interposed between said tube and said channel and a tumbler also interposed between said tube and said channel and acting in conjunction with said feeler to deliver to said channel predetermined faces in the same relative position, substantially as described.

9. In a feeding device, the combination of a receptacle, a feed-tube communicating therewith through which the nuts pass irrespective of any predetermined position, and a feeler and tumbler adapted to deliver predetermined faces in the same relative position, substantially as described.

10. In a feeding device, the combination of a receptacle, a reciprocating feed-tube communicating therewith through which the nuts pass irrespective of any predetermined position, and a feeler and tumbler adapted to deliver predetermined faces in the same relative position, substantially as described.

11. In a feeding device for nut-blanks, the combination of a feed-tube through which the nuts pass irrespective of any predetermined position, a delivery-channel, and means interposed between said tube and said channel for delivering to said channel, predetermined faces in the same relative positions, substantially as described.

12. In a feeding device for nut-blanks, the combination of a receptacle, a feed-tube communicating therewith through which the nuts pass irrespective of any predetermined position, and a feeler and tumbler adapted to deliver predetermined faces in the same relative position, substantialy as described.

13. In a feeding device for nut-blanks, the combination of a receptacle, a reciprocating feed-tube communicating therewith through which the nuts pass irrespective of any predetermined position, and a feeler and tumbler adapted to deliver predetermined faces in the same relative position, substantially as described.

14. In a feeding device for nut-blanks, the combination of a tube or passage-way through which nuts pass indiscriminately arranged as to any predetermined position, a feeler or device for determining the positions in which the tops and bottoms of the respective nuts lie and means for turning those nuts that are in false position whereby all the nuts may have like faces presented in a uniform determined position to a proper tool.

15. In a feeding device for nut-blanks, the combination of a tube or passage-way through which nuts pass indiscriminately arranged as to any predetermined position, a feeler or device for determining the positions in which

the respective nuts lie and means controlled by the feeler for turning those nuts that are in a false position whereby all the nuts may be presented in a uniform determined position to a proper tool.

16. In a feeding device for nut-blanks, the combination of a receptacle for the nuts, a tumbler, a delivery-channel communicating with the tumbler, a gate interposed between the delivery-channel and the tumbler, means for feeding nuts to the tumbler, a feeler for determining the positions in which the nuts lie as they pass to the tumbler, and devices connecting the feeler with the gate for controlling the movement of the gate.

17. In a feeding device for nut-blanks, the combination of a receptacle for the nuts, a tumbler, a delivery-channel communicating with the tumbler, a gate interposed between the delivery-channel and the tumbler, means for feeding nuts to the tumbler, a feeler for determining the positions in which the nuts lie as they pass to the tumbler, a cam for moving the gate in one direction, a spring for moving it in the opposite direction, a lever, means for connecting the lever with the gate, connections between said lever and the feeler, and devices for adjusting the connections between the feeler and the gate.

18. The combination of a receptacle for the nut-blanks, a delivery-channel, a tumbler interposed between the receptacle and the delivery-channel, means for feeding nut-blanks to the tumbler, means for at times turning the tumbler, and at other times causing it to rest, a gate interposed between the tumbler and the delivery-channel, and devices controlling the operation of the gate.

19. The combination of a receptacle for nut-blanks, a delivery-channel, a tumbler interposed between the receptacle and the delivery-channel to which nut-blanks are fed, means for at times turning the tumbler to reverse the position of the nut-blank, and means for at other times causing the tumbler to rest while a nut is being fed past it.

Signed by me this 29th day of September, 1899.

OLUF TYBERG.

Witnesses:
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M. I. GIEL.