

**No. 695,760.**

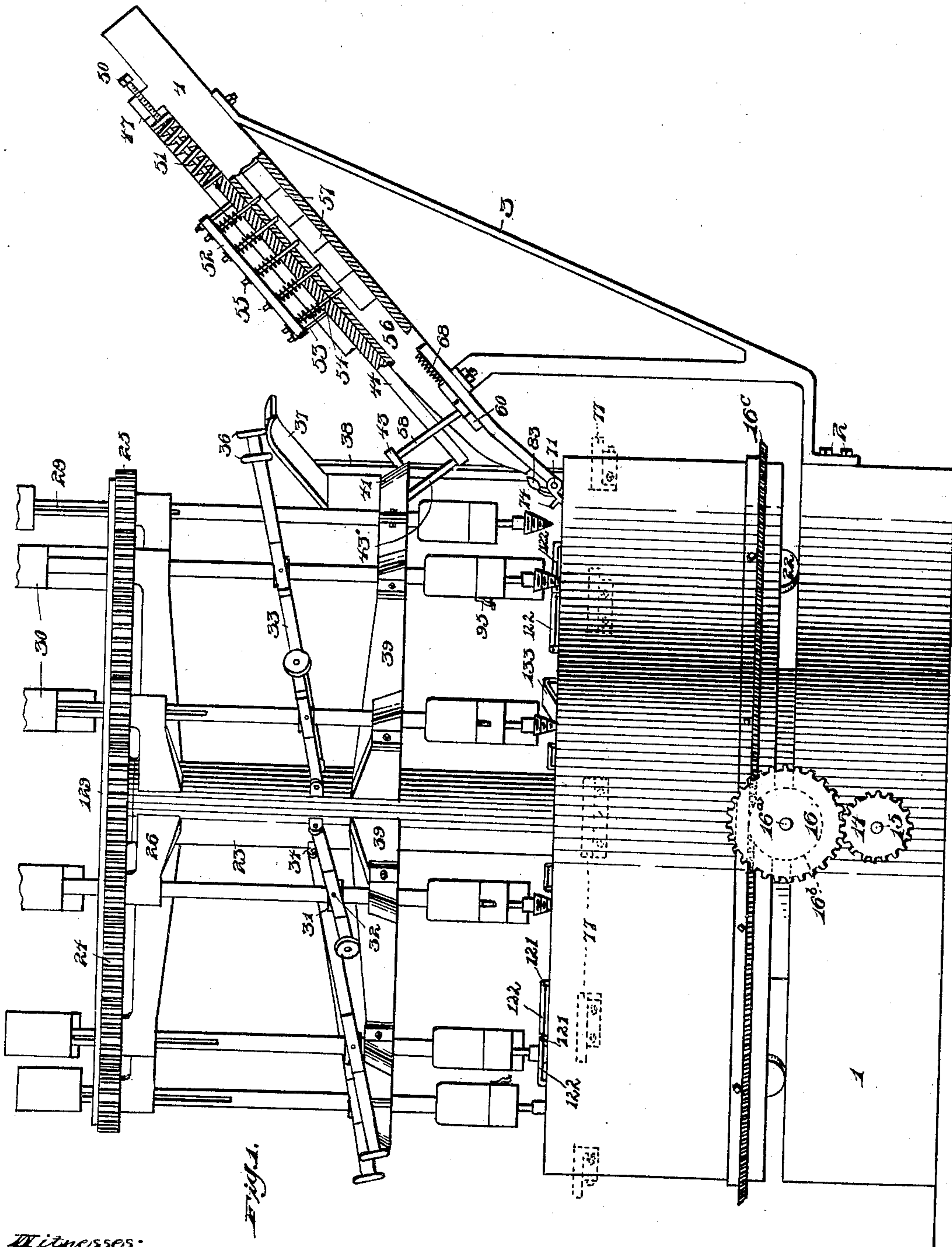
**Patented Mar. 18, 1902.**

**M. R. NOLAN.**  
**NUT TAPPING MACHINE.**

(Application filed June 4, 1901.)

(No Model.)

4 Sheets—Sheet 1.



*Witnesses:*

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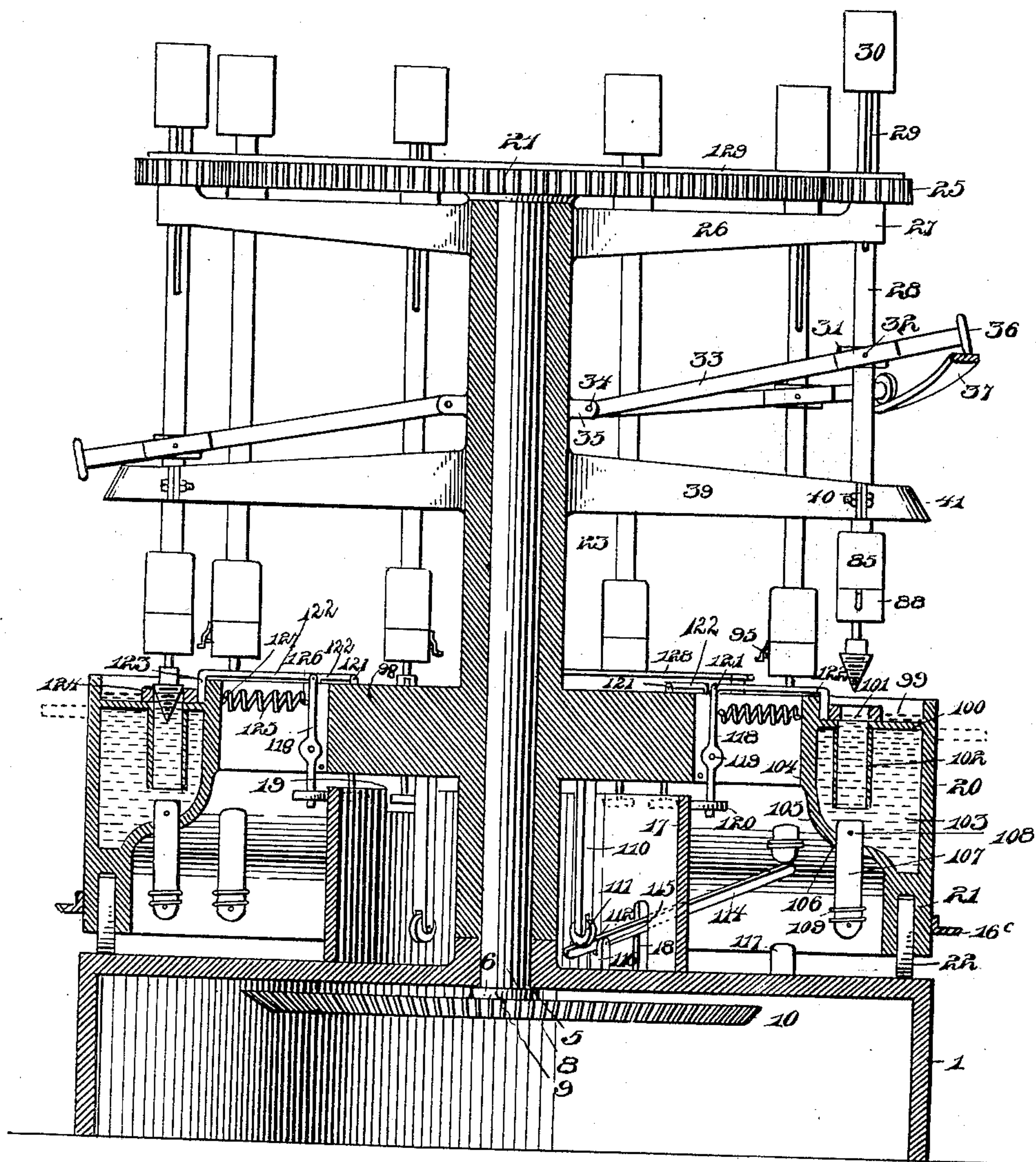
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.(No Model.)

**4 Sheets—Sheet 2.**

*Fig. R.*



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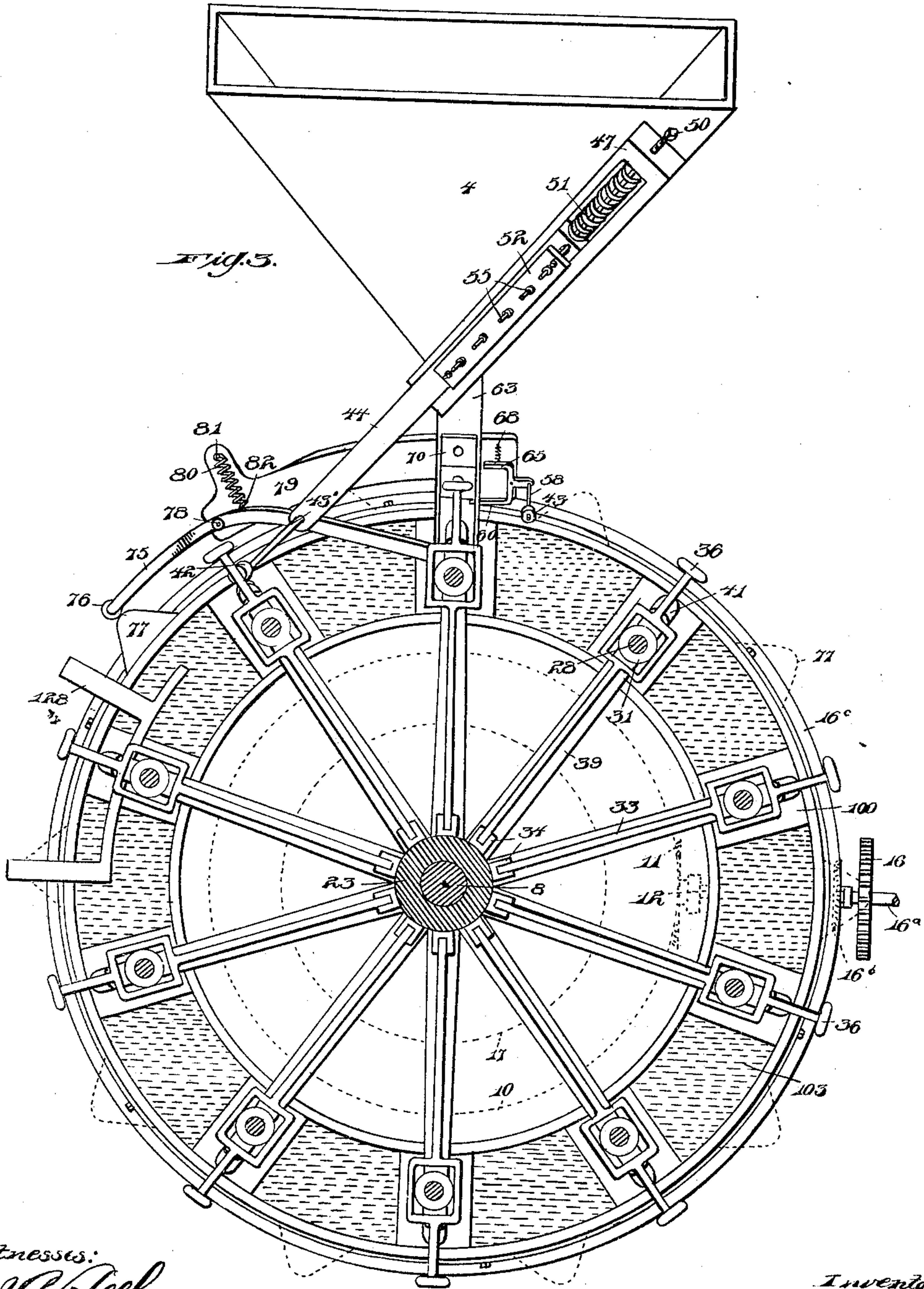
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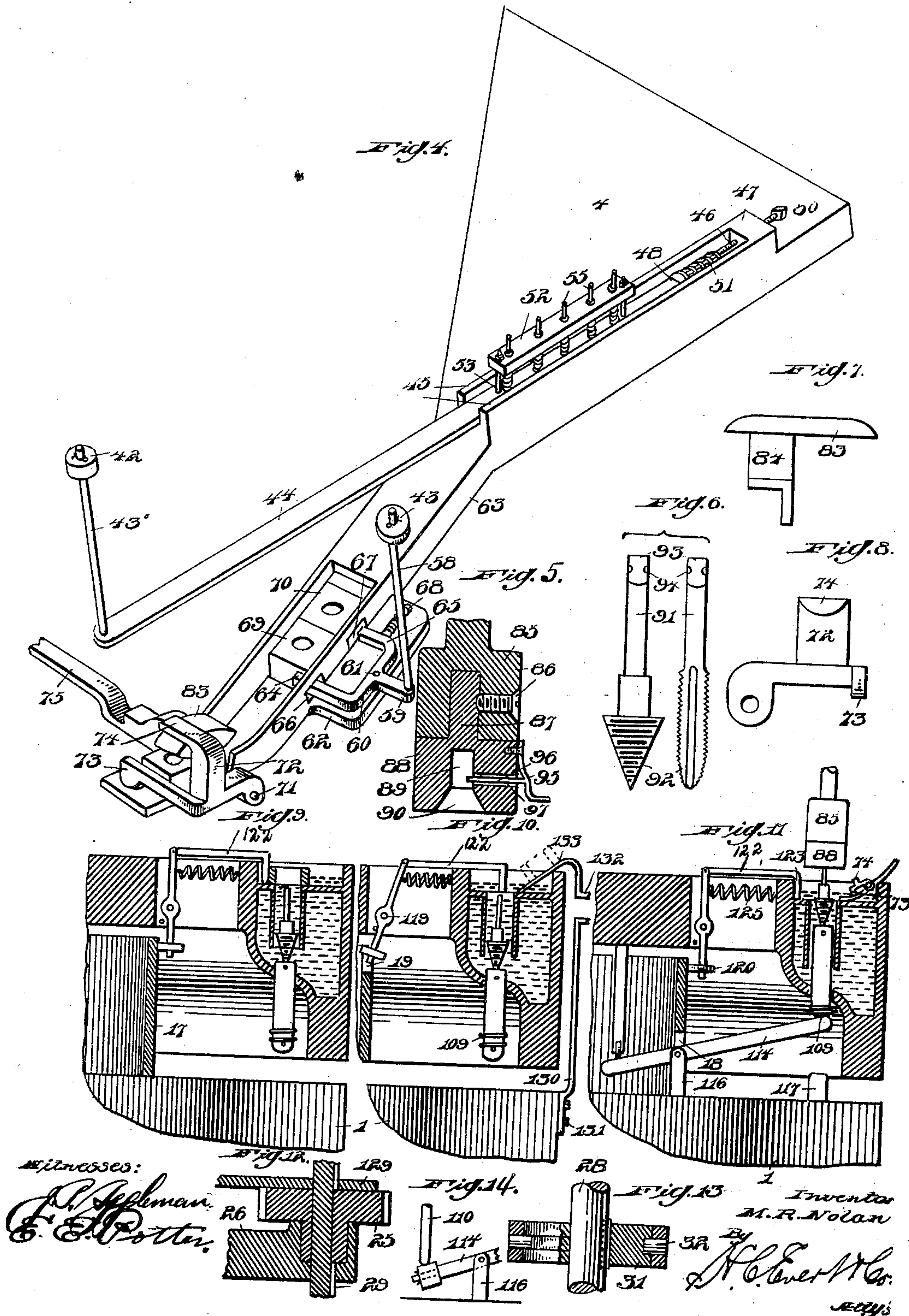
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4 Sheets—Sheet 4.





# UNITED STATES PATENT OFFICE.

MICHAEL R. NOLAN, OF MOUNT OLIVER, PENNSYLVANIA.

## NUT-TAPPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 695,760, dated March 18, 1902.

Application filed June 4, 1901. Serial No. 63,071. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL R. NOLAN, a citizen of the United States of America, residing at Mount Oliver borough, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Nut-Tapping Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in nut-tapping machines, and has for its object the provision of novel means whereby nuts are automatically fed from a suitable hopper or receptacle into a machine in which the nuts are carried with the tap and both the tap and nut are discharged after the thread has been cut upon the nut, the tap being again mounted in the machine to cut another nut. By this means I am enabled to rapidly and accurately cut the threads in the nuts in an economical manner.

The invention further contemplates to construct a feeding mechanism that will allow but one nut to be fed into the machine at a time and to provide mechanism that will accurately guide and convey the nut into the machine at the proper time and place; furthermore, to construct a machine that will permit the operation upon all the nuts simultaneously as the machine revolves, thereby greatly facilitating the operating of tapping and materially lessening the cost of manufacture.

With the above and other objects in view the invention consists in the novel combination and arrangement of parts to be hereinafter more fully described, and specifically pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate corresponding parts throughout the several views, in which—

Figure 1 is a side elevation showing the hopper partly in section. Fig. 2 is a vertical sectional view. Fig. 3 is a longitudinal sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a perspective view of the hopper and feeding attachment. Fig. 5 is an enlarged detailed vertical sectional view of the socket

wherein the taps are removably secured. Fig. 6 is a side elevation of two styles of taps. Fig. 7 is an end view of the feeding-arm. Fig. 8 is a side view of the pivoted stop arranged at the bottom of the chute leading to the hopper. Fig. 9 is a vertical sectional view of a portion of the revolving table, showing the releasing mechanism of the nut. Fig. 10 is a similar view showing the manner of releasing the nut. Fig. 11 is a similar view showing the raising of the tap into the socket. Fig. 12 is an enlarged vertical sectional view of one of the rotatable shafts. Fig. 13 is an enlarged vertical sectional view of the collar, showing the connection between one of the vertical rotatable shafts. Fig. 14 is a modified form of operating-lever to raise the tap.

In the drawings the reference-numeral 1 indicates a stationary or lower table, to which is secured at 2, by means of bolts or other suitable means, a bracket 3. Upon this bracket is mounted a hopper 4. The said lower or stationary table 1 has formed centrally therein at 5 an opening and has formed on its upper face a boss 6 for the reception of a central driving-shaft 8. This shaft extends through the boss and central opening of the table and has formed on its lower extremity a collar 9. Below said collar is secured a beveled driving-gear 10, meshing with the beveled gear 11, to which is secured a shaft 12, having arranged on its outer end a driven gear 14 of a drive-shaft 15, meshing with the cog-wheel 16, mounted upon the shaft 16<sup>a</sup>, to which is arranged a beveled gear 16<sup>b</sup>, which beveled gear meshes with the annular cog-rack 16<sup>c</sup>, secured to the revoluble table. To the upper face of the table 1 is also rigidly secured a hollow cylinder 17, having slot 18 formed therein, this hollow cylinder being also provided with cut-away portion 19 at the upper end thereof. The central driving-shaft 8 has sleeved thereto a revoluble table 20, said table being arranged slightly above the stationary table 1. This revoluble table 20 is provided with bearings 21, in which are secured wheels 22, operating on the upper face of the table 1. The revoluble table 20 also carries an interior frame 23, which is sleeved to the central driving-shaft 8 and revolves in the opposite direction therewith. At the upper end of this shaft 8 is secured a large cog-wheel 24, mesh-



ing with a series of small cog-wheels 25, arranged radially around the large cog-wheel 24. These small cog-wheels 25 are secured upon arms 26, forming a portion of the frame 23, and extend radially from the center outwardly. At the outer end of the arm 26 are bearings 27 to receive one of the rotatable shafts 28, extending through said bearings, these shafts having formed therein keyways 29, adapted to engage in keys (not shown in the drawings) securing the said shafts 28 to one of the small cog-wheels 25. The upper end of the shafts 28 carry weights 30.

The reference-numeral 31 indicates a sleeve or collar mounted upon each of the shafts 28, as shown in detail in Fig. 13 of the drawings. Upon this sleeve is suitably pivoted at 32 an arm 33, the one end of said arm being pivoted at 34 in the bifurcated ends 35 of brackets rigidly secured to the central portion 23 of the frame. The other end of said shaft carries an antifriction-roller 36, which is adapted to pass over the cam-face or incline 37, which is rigidly secured by means of a standard or other suitable fastening means 38 from the lower end of the chute extending to the hopper. Each shaft 28 is provided with a collar, a pivoted arm, and an antifriction-roller, but for the purpose of simplifying the description only one of these arms has been described.

The reference-numeral 39 represents a series of arms extending radially from the central frame portion 23 outwardly, said arms at their ends having arranged therein bearings 40, through which the shafts 28 extend and are guided. Each of these arms has also formed on its outer extension cam-faces 41, these cam-faces engaging antifriction-rolls 42 43, the said antifriction-roller 42 being rotatably mounted upon an arm 43', secured to the end of the agitator 44, this agitator 44 operating in guideways 45, secured to the outer face of the hopper 4. A screw-threaded rod 46 is slidably secured in the bearing 47, the engaging end of said screw-threaded rod being secured in the end of the agitator, as shown at 48. The upper end of the screw-threaded rod extends through the bearing 47 and carries at its free end an adjusting-nut 50. A spiral spring 51 encircles the said screw-threaded rod and tends to normally press the agitator downwardly. In the guideways 45 upon the agitator 44 is also rigidly secured a perforated plate 52, which is attached by bolts 53, attached at 54 to the agitator 44. This perforated plate 52 has mounted therein a series of spring-pressed fingers 55, extending through openings arranged in the agitator 44 and extend into the chute 56. These fingers are adapted to engage the upper face of the blanks 57, which are fed into the machine.

The reference-numeral 58 represents an arm upon the upper end of which the antifriction-roller 43 is mounted, the lower end of said arm being connected at 59 to the Y-

shaped rocker 60, which is fulcrumed at 61 to the plate 62, rigidly secured to the side of the chute extension 63 of the chute 56. This Y-shaped rocker is provided with two inwardly-extending arms 64 65, which are of unequal length, the arm 64 being longer than the arm 65 and the latter extending a distance into the chute through an opening 66. The arm 65 extends into an opening 67, formed in the side of the chute. A spring 68 is secured to the arm 65, the other end of said spring being conveniently fastened to the plate 62.

The reference-numerals 69 70 represent blanks that are to be fed into the machine. Near the lower end of the chute is pivotally secured at 71 a hanger-arm 72. This arm 72 is provided with inwardly-extending arms 73 and 74.

The reference-numeral 75 represents a curved feeding-lever carrying at its one end an antifriction-roller 76, operating over a series of cam-faces 77, arranged in the side of the revolving table. This feeding-lever 75 is fulcrumed at 78 to the rigid plate 79, which may be secured to the frame 3 of the hopper. A spiral spring 80 is secured at 81 to the plate 79, the other end of the spring being attached at 82 to the curved feeding-lever 75, this feeding-lever carrying on its free end a shoe 83, which is mounted upon the shank portion 84 and attached to the end of the curved feeding-lever.

At the lower end of the shafts 28 are arranged sockets 85. In these sockets 85 are secured set-screws 86, which are preferably countersunk in the sides of the sockets and extend into an opening formed in the central portion of the socket to receive the shank 87 of the tap-socket 88. This tap-socket has a central square opening 89 and a star-shaped tapering lower opening 90 to receive a stem 91 of the tap 92, having a square end 93, this square end having formed therein notches 94. Upon the side of the socket 88 is secured a retractile spring 95, carrying an inwardly-extending pin 96, passing through an opening 97, formed in the side of the socket 88, extending into the central opening thereof. The said pin 96 is adapted to engage in one of the notches 94, formed in the square portion 93 of the stem of the tap.

The reference-numeral 98 represents an enlarged circular portion formed integral with the interior frame 23.

The reference-numeral 99 represents a series of pockets arranged radially around the revolving table, said pockets having formed therein partitions 100, having openings 101, said openings communicating with tubes 102, secured to the lower face of said partitions 100. These pockets also form oil-chambers 103, into which the tubes 102 extend.

The reference-numeral 104 indicates the inner walls of the oil-chamber, having a downwardly-extending curved wall 105, containing an opening 106, which opening prefer-



ably contains a packing for the reception of a plunger 107, said plunger carrying pins 108, limiting the downward movement of the plunger through the opening. This plunger is also provided at its lower end with annular flanges 109 to limit the upward movement of the same.

Arms 110 are secured to the lower face of the portion 98 and are adapted to operate in the hollow cylindrical portion 17, these arms 110 carrying at their lower ends antifriction-wheels 111, which are adapted to operate upon the inclined face 112 of the lever 114, which is fulcrumed at 115 to a bifurcated lug 116, formed on the upper face of the stationary table, said lever 114 extending through the opening 18 in the hollow cylinder 17 and operated against the lower end of the plungers 107.

The reference-numeral 117 indicates a stop rigidly secured upon the upper face of the stationary table to limit the downwardly movement of the lever 114, upon which the latter normally rests.

The reference-numeral 118 represents a series of spring-pressed levers which are fulcrumed at 119 and carry on their lower end antifriction-wheels 120. These levers 118 are pivotally connected at their upper ends, as shown at 121, to fingers 122, extending over and into the pocket 99. These fingers are bent downwardly, as shown at 123, and engage the side of the nut 124.

The reference-numeral 125 represents springs connected at 126 to the spring-pressed levers 118 and the other ends connected at 127 to the inner wall of the oil-chambers.

The reference-numeral 128 indicates a yoke rigidly secured to the revoluble table to engage the retractile spring 95, serving to release the inwardly-extending pin 96 from engagement with the notches 94, formed in the square shank portion of the tap.

The reference-numeral 129 represents a plate secured over the top of the large and small cog-wheels 24 25 to relieve the strain from the tap as soon as the operation has been completed and when the same is released from engagement with the socket.

The reference-numeral 130 represents a bracket rigidly secured at 131 by means of bolts or other suitable fastening means to the stationary table and extends upwardly, forming a loop 132, in order to allow the cam-faces 77 of the revoluble table to pass the bracket. The upper end of this bracket is bent downwardly, as shown at 133, forming a guide having an inclined face, upon which the finished nut is conveyed to any suitable receptacle that may be provided for the reception of the same.

The operation of my improved machine is as follows: The drive-shaft 15, carrying the driven gear 14, rotating the large gear 16, the shaft 16<sup>a</sup> of said gear carrying the beveled gear 16<sup>b</sup>, rotating the annular cog-rack 16<sup>c</sup>, which operates the table in one direction,

while the drive-shaft 15, carrying the beveled gear 11, meshing in the beveled gear 10, rotates the shaft 8 in the opposite direction of the table and imparts a rotary movement to the large cog-wheel 24, rotating the small cog-wheels 25. The frame being formed integral with the revoluble table carries with it the cog-wheels 25 and the arms 33.

The detailed operation of the feeding mechanism is as follows, referring to Figs. 1 and 4 of the drawings: The blanks are placed in the hopper, the spring-pressed fingers of the agitator engaging the upper face of the blanks in a manner as to normally retain the same in position, but as the agitator is operated by means of the roller 42 passing over the cam-faces 41 as the table is revolved, thereby depressing the spring 51, will feed a number of blanks and allowing the blank to be conveyed by gravity to the position as shown by the blank 70, (referring to Fig. 4 of the drawings.) As the roller 42 is released from engagement with the cam-face the spring 51 will again expand to its normal position and will tend to return the agitator to its former position, thereby allowing the next blank to assume its position in the hopper and place the same in alinement to be fed. The roller 43, which also engages the cam-face 41, will tend to operate the rocker 61, thereby releasing the lower blank 69 and depressing the spring 62. As the lower blank 69 is released the upper blank 70 will be held by reason of the arm 65 until the roller 43 is disengaged from the cam-face, when the spring 62 will return the rocker to its former position, allowing the arm 64 to extend through the opening 66 and simultaneously release the arm 65 from engagement with the blank 70, whereupon the blank 70 will assume the position of the blank 69. In the meantime another blank will have taken the place of the blank 70. When the blank 69 has been released, it will assume the position of the lower blank. (Shown in Fig. 4 of the drawings.) The feed-arm 75, by reason of the antifriction-roller 76 traveling over the cam-face 77, will then come into place and by reason of the shoe 83 will raise the tilting lever 72, raising the arm 73 and allowing the feed-lever to convey the blank into its proper position in the machine. (Shown in Figs 2 and 9 of the drawings.) Before the last step of the latter operation is performed the antifriction-roller 36 passes over the inclined or cam face 37, thereby raising the rod 28, elevating the tap, and thus allowing the blank to be conveyed to its proper position. As the antifriction-roller 36 passes over the cam-face 37 the tap, by means of the rod 28 and weight 30, is lowered to engage the central opening of the blank, and being rotated by the small cog-wheels 25 and forced downwardly by means of the weight 30, the tap will cut its way through the blank, thereby tapping the blank and finishing the nut. As this operation is completed the spring 95 en-



gages the yoke 128, which will tend to disengage the pin from engagement with the notches 94 of the tap and allowing the tap to fall by gravity into the tube 102, and resting the point of the tap upon the plunger 107, allowing the tap to fall below the line of the under face of the nut that has been finished and assuming the position as shown in Fig. 9 of the drawings. When this operation has taken place, the antifriction-wheel 120 will reach the cut-away portion 19. This antifriction-wheel will then assume the position as shown in Fig. 10 of the drawings and the spring 125 will tend to move the lever 118 to the position as shown in Fig. 10 of the drawings, operating the finger 122, conveying the nut over the inclined portion 133 and out of the machine. When this operation has been completed, the antifriction-wheel 120 will again ride upon the outer periphery of the cylinder 17 and tend to return the lever, finger, and spring to their normal position. With the completion of this operation the antifriction-wheels will ride on the inclined face 112 of the lever and tilt the same, as shown in Fig. 2 of the drawings, thereby raising the plunger 107, extending the same into the tube 102, the upper end of the plunger raising the tap and forcing the same into the star-shaped beveled opening 90 in the socket, which operation will tend to square the shank to fit in the square opening 89 of the socket and force the spring outwardly, the latter engaging in the notches 94 and retaining the shank in its proper position in the socket to perform the next operation.

In lieu of the lever 114 having an inclined face at its end an antifriction-roller may be provided, as shown in the modified form shown in Fig. 14 of the drawings, and the ends of the arms 110 may be beveled, so as to engage the roller, which will produce the same result as heretofore described.

The many advantages obtained by the use of my improved machine will be readily apparent from the foregoing description, taken in connection with the accompanying drawings.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

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

1. In a nut-tapping machine, a base, a rotatable table having pockets, a rotatable frame, a series of radial arms carried by the frame having cam-faces on their outer ends, a rod carrying a tap slidably mounted in each of said arms, means for rotating the rods, means for elevating the rods, an inclined hopper and chute carried by the base, means operating in the chute for feeding the blank nuts to said pockets carried by the table, and means actuated by said cam-faces and connected to

said last-named means for feeding the blanks, substantially as described.

2. In a nut-tapping machine, a base, a rotatable table, a rotatable frame, rods carried by the frame, means for elevating said rods, means for rotating the rods, a tap removably secured in said rods, means for releasing the tap, means for engaging said tap when released, means actuated by the table for elevating said means engaging the tap, means carried by the table for removing the nuts after the same have been tapped, means carried by the base for actuating said last-named means, means for feeding the nuts, and arms having cam-faces carried by the frame for actuating said means, substantially as described.

3. In a nut-tapping machine, a base carrying a hollow cylinder, a rotatable table, a rotatable frame, rods vertically movable carried by the frame, means for elevating said rods at one point in their revolution, means for rotating said rods, a tap removably mounted on said rods, means carried by the table for releasing said tap, means actuated by the frame for elevating said taps, and means actuated by the hollow cylinder for removing the nuts after the same have been tapped, substantially as described.

4. In a nut-tapping machine, a base, a rotatable table, a rotatable frame, rods carrying weights at their upper ends carried by the frame, a stationary cam-face for elevating said rods, means for rotating said rods, spring-pressed means for removably securing a tap to the rods, means carried by the table for actuating said means to release the tap, means actuated by the table for elevating said tap, spring-pressed means for removing the nut after the same has been tapped, and means carried by the base for actuating said means, substantially as described.

5. In a nut-tapping machine, the combination with the base, the rotatable frame and table, of a series of rods carrying taps mounted in the frame, means for rotating the rods, means for releasing the taps, plungers engaging the taps when the same are released, levers pivotally mounted on the base, and arms carried by the table and rotating therewith for actuating said levers and elevating said plunger, substantially as described.

6. In a nut-tapping machine, a base, a rotatable frame, a rotatable table, rods carried by the frame, means for rotating said rods, means for elevating said rods, said table carrying a series of oil-pockets having partitions therein with a tube carried by the partitions, a tap removably secured to the rods, means for releasing said tap to permit the same to descend into said tube, means operating in the pocket to engage said tap, means for elevating said last-named means, and means actuated by the table for operating said means, substantially as described.

7. In a nut-tapping machine, a base carry-



ing a cylinder having a cut-away portion, a rotatable table and frame, a series of rods carrying taps mounted in said frame, means for rotating the rods, said table having pockets, for the reception of the blank nuts, a series of spring-pressed levers actuated by said cut-away portion of the cylinder, fingers connected to said spring-pressed levers extending into said pockets and engaging the blanks for removing the same after they have been tapped, substantially as described.

8. In a nut-tapping machine, a base carrying a cylinder, a rotatable table and frame, a series of rods carrying taps mounted in the frame, means for rotating and elevating the rods, a yoke secured to the rotatable table for

releasing said taps, said table having pockets, spring-pressed fingers extending into said pocket for engagement with the blanks and operated by said cylinder, a plunger beneath said pockets for engagement with the tap when released, a lever engaging said plunger and means actuated by the table for engagement with said lever to elevate said plunger and tap, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

MICHAEL R. NOLAN.

Witnesses:

JOHN NOLAND,  
E. E. POTTER.