D. LEVINGER & O. ANDERSON.

TAPPING MACHINE.

APPLICATION FILED JULY 28, 1916.

1,254,709.

Patented Jan. 29, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

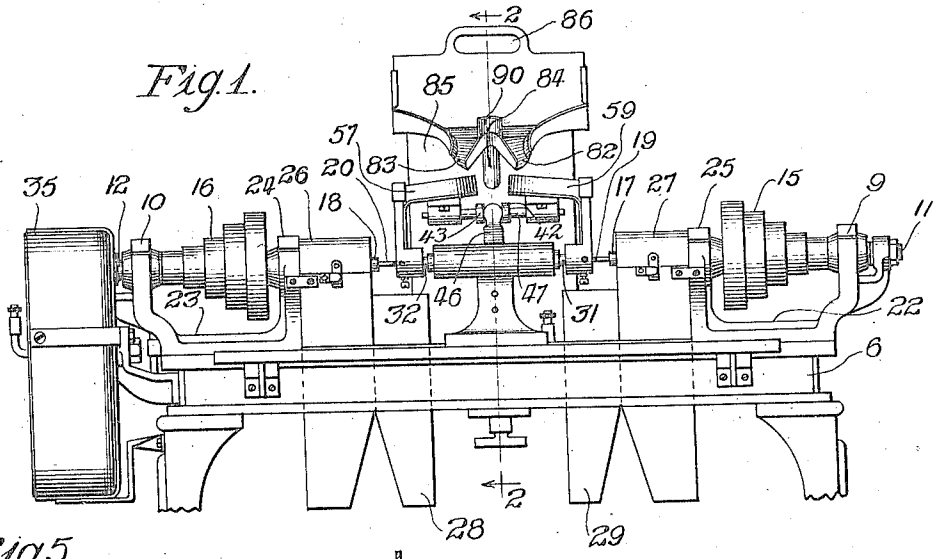


Fig. 5.

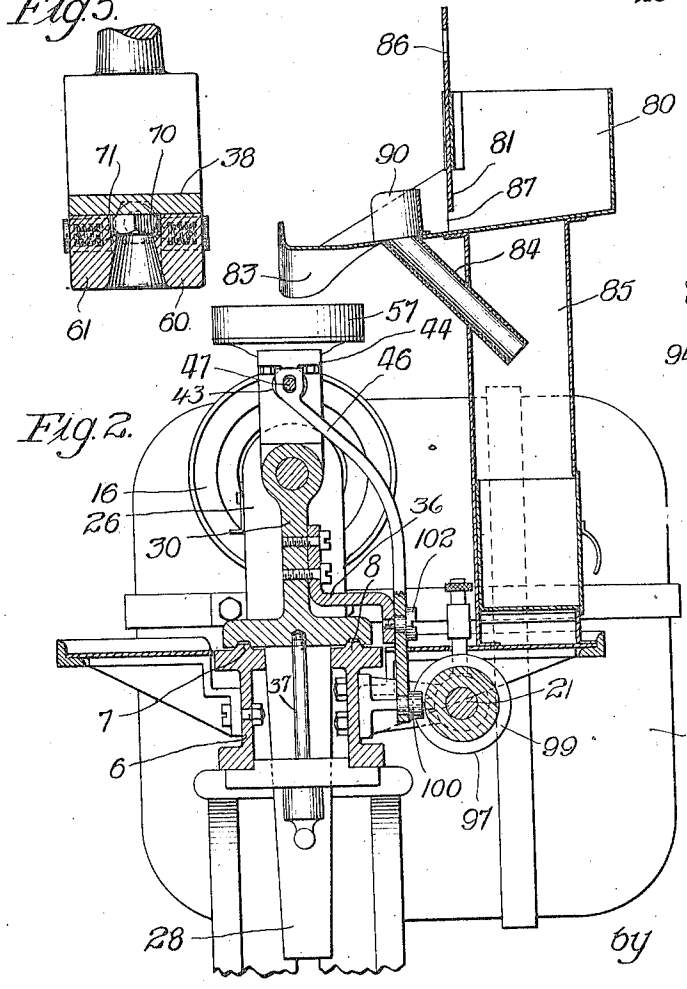


Fig. 6.

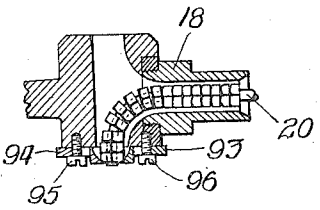


Fig. 4.

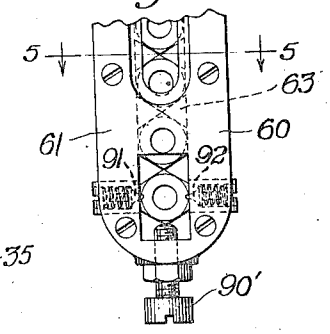


Fig. 2.

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2 SHEETS—SHEET 2.

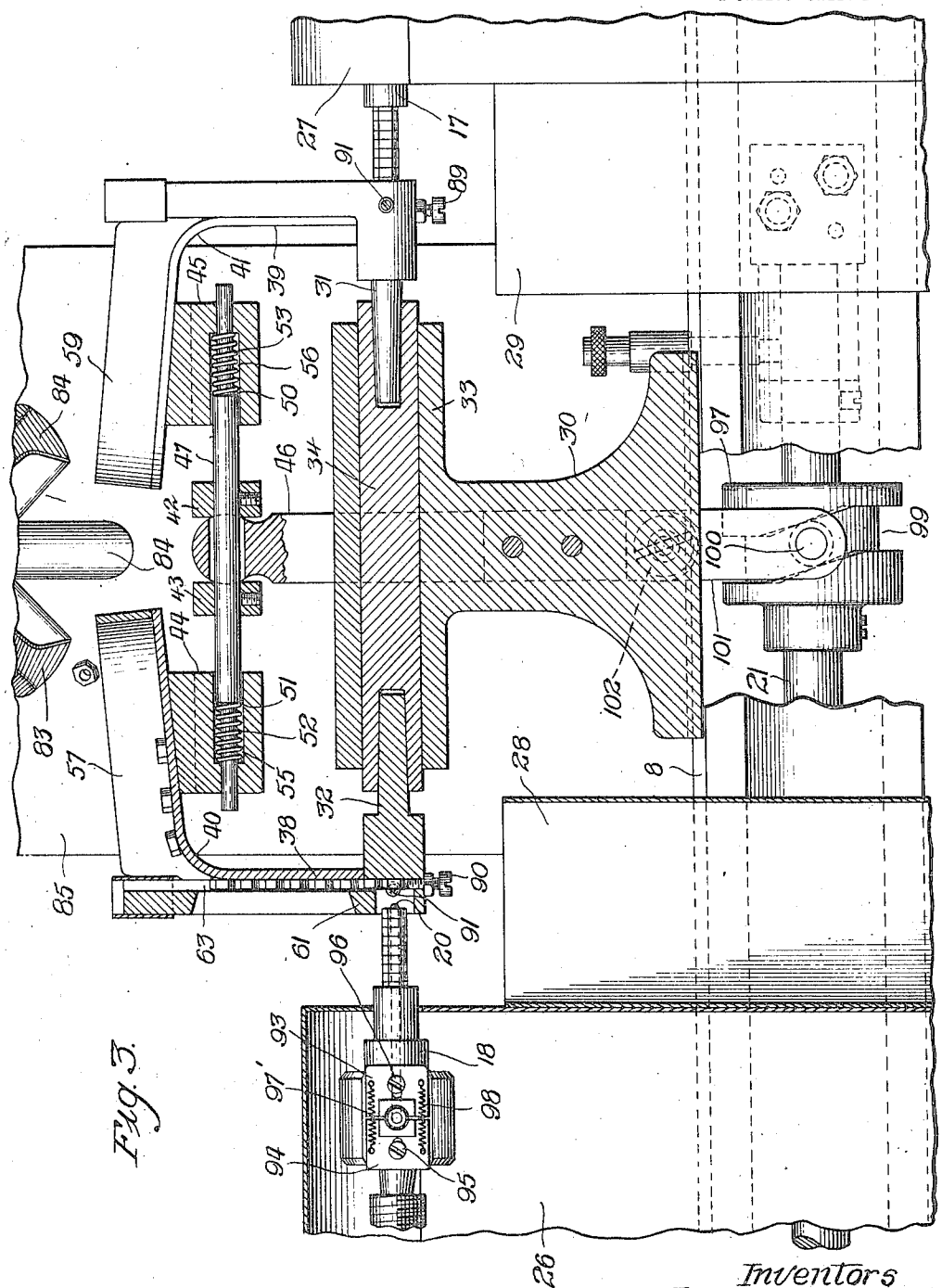


Fig. 3.

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UNITED STATES PATENT OFFICE.

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TAPPING-MACHINE.

1,254,709. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed July 28, 1916. Serial No. 111,762.

To all whom it may concern:

Be it known that we, DAVID LEVINGER and OLOF ANDERSON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tapping-Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to a tapping machine, and more particularly to a machine for automatically guiding articles to be tapped from a hopper or storing means to the tapping mechanism. One of the objects of this invention resides in means for greatly increasing the operating speed and efficiency of tapping.

Another object consists in an improved and efficient means for automatically feeding the articles to be tapped from a suitable hopper to the taps and then automatically ejecting the articles after they have been tapped.

A further object consists in automatic means for reciprocating the feeding means and for automatically tapping the article at each stroke of the feeder.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described and pointed out in the appended claims.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a front elevation of the complete machine;

Fig. 2 is a vertical section on the plane 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is an enlarged front elevation partly in section of the article or nut feeding and tapping mechanism;

Fig. 4 is an end elevation of the vertical slide which feeds the nuts to the tap;

Fig. 5 is a horizontal section of the vertical slide on the plane 5—5 of Fig. 4 looking in the direction of the arrows, and

Fig. 6 is a vertical section of the chuck which holds the tap, showing the method employed for ejecting the nuts after they have been tapped.

The machine consists of a horizontal base plate 6 fitted with the key-ways 7 and 8. The adjustable bases 22 and 23 are mounted on the key-ways 7 and 8 at either end of the bed plate 6 and carry the upwardly extending arms 10 and 24 and 9 and 25 which hold the bearings in which the shafts 11 and 12 are journaled. Mounted on each of the shafts 11 and 12 respectively are the cone pulleys 15 and 16 and the chucks 17 and 18 in which the taps 19 and 20 are held. To the left of the upright member 10 is secured a housing 35 in which is mounted a train of gear wheels (not shown) which serve to drive the cam shaft 21. A housing 26 which incloses the chuck 18 is mounted immediately adjacent and to the right of the bearing member 24, and a similar housing 27 is mounted adjacent and directly to the left of the bearing member 25. A chute 28 which catches the chips is secured to the right of the housing 26, and a similar chute 29 is secured to the left of the housing 27. An I-shaped bracket 30 is adjustably secured by means of the bolt 37 on the key-ways 7 and 8 between the housings 26 and 27. The upper arm 33 of the I-shaped bracket 30 is bored for its entire length to form a sleeve in which a cylindrical rod 34 is loosely fitted and in which said rod is free to reciprocate. The rod 34 supports the tapered pins 31 and 32, on the outer end of each of which is mounted a vertical feeding slide. The tapered pins are mounted in the I-shaped bracket 30 so that the center lines of these pins are in approximate alinement with the center lines of the chucks 17 and 18 and the taps 19 and 20.

The vertical slides are equipped with back plates 38 and 39, said plates being curved at 40 and 41 so that they will assume a position having a slight inclination from the horizontal, the angle of inclination being upward from the points 40 and 41. The horizontal parts of the plates 38 and 39 are utilized as floors of receiving pans and are attached to the blocks 44 and 45. Extending upwardly from the edge of the horizontal portion of the plates 38 and 39 are the walls 57 and 59. These walls prevent the articles which are fed to the pans from sliding over the edge of the horizontal portion of the plates 38 and 39. Secured to the web of the I-shaped bracket 30 is an S-shaped bracket 36 to which is pivotally secured by means of the screw 102 a lever 46 which extends above the arm 33 of the I-shaped bracket. The upper end of said lever 46 is drilled to receive the cylindrical rod 47 which is positioned with

respect to said lever by means of the adjustable holding blocks 42 and 43. The cylindrical rod 47 is provided with the shoulders 50 and 51, on each of which is mounted a spiral spring 52 and 53, said springs being compressed between the shoulders 51 and 50 and the end wall of a perforation 55 and 56 in the blocks 44 and 45. These springs serve to absorb excess pressure and shock as the hoppers are thrown from side to side. They consequently act as a resilient cushion between the taps and nuts and in effect constitute the driving power, by means of which the threads are started. They thus serve to protect the taps from sudden jars and jolts and permit a higher speed of the reciprocating feeding mechanism which is independent of the lead of the taps. The retaining strips 60 and 61 which constitute the side walls of the vertical slide are attached to the plate 38 and are so mounted that the space 63 between the inner edges of these two plates will slidably receive the nuts fed to the tapping mechanism. Each of these strips 61 and 60 is provided with a shoulder 70 and 71 which hold the nuts against the back plate 38. The back plate 38 and the side strips 60 and 61 consequently form a vertical slide into which the nuts may be fed and in which they pile up in a vertical column. This column will be advanced a distance equal to the width of a nut as the bottom nut of the column is picked up by the tap and extracted from the slide. A similar vertical slide is fitted to the back plate 39.

Mounted above these feed slides is the hopper or storing means 80, the bottom surface of which extends beyond the front wall 81 of the hopper and terminates in two pan chutes 82 and 83 from which the nuts or articles to be tapped are fed to the vertical feed slides. Midway between the two pan chutes 82 and 83 is a third chute 84 which extends rearwardly into a hopper 85, the walls of the hopper 85 constituting the means for supporting the hopper 80. The one piece sheet metal bottom of the hopper 80 and the pan chutes 82 and 83 is given a downward inclination so that the articles from the hopper 80 will tend to slide down these chutes. The front wall 81 of the hopper is fitted with a handle 86 by means of which this front wall can be slidably adjusted to vary the size of the opening 87 through which the nuts or articles are fed from the hopper to the pan chutes 82 and 83. The chute 84 is partially surrounded by a wall 90 to prevent the articles which slide from the hopper 80 down the floor of the pan chutes 82 and 83 from entering the chute 84. This wall does not extend around to the front portion of the chute 84, and consequently articles can be slid back into this chute up the inclined floor of the pan chutes 82 and 83.

The vertical feed slides to which the nuts are fed are equipped with adjusting screws 89 and 90′ for vertical adjustment of the column of nuts in the vertical feed slides. By means of these adjustment screws the column of nuts is so adjusted that the center of the hole in the bottom nut is in alinement with the center of the taps 20 and 19. The strips 60 and 61 of each feed slide are fitted with spring pressed spurs 91 and 92. These serve to hold the nut located in the bottom of the column in the vertical slide in position. This is clearly shown in Fig. 4.

Fig. 6 shows a cross section of the chuck and shows the method of floating the tap in the chuck. The tap is curved at substantially right angles and is floated in a cavity in the chuck, the nuts passing from the threaded end of the tap over the shank from which they are ejected into the hopper 26. The end nut on the shank of the tap is held in position between the plates 93 and 94 which are slidably mounted on the chuck 48 by the screws 95 and 96 and which are drawn toward each other by the spiral springs 97′ and 98. As each nut is picked up from the slide and run on to the threaded portion of the tap, the column of nuts on the shank of the tap, as shown in Fig. 6, is forced along the shank, and the nut at the end of the shank is forced out between the spring pressed plates 93 and 94 and dropped into the hopper 26.

The rod 47 which carries with it the feeding apparatus is reciprocated by the lever 46. This reciprocating movement is controlled by the cam 97 secured to the shaft 21 which is rotated by means of the train of gears in the housing 35 from the shaft 12. The cam 97 is equipped with a cam slot 99 in which a cam pin 100 rides, the cam pin 100 being secured to the lower arm 101 of the lever arm 46. Consequently as the cam shaft 21 is rotated, the pin 100 will move in the cam slot 99, thereby oscillating the lever 46 about the fulcrum screw 102 and reciprocating the rod 47 and its associated feeding mechanism, the rod 34 reciprocating in the sleeve 33. The feeding apparatus is thus reciprocated to and fro between the taps 19 and 20.

In the operation of the machine the hopper 80 is filled with nuts or articles to be tapped. The operator in starting the machine will raise the front wall of the hopper 81 a distance sufficient to cause the nuts to slide down the inclined bottom of the hopper at the desired rate. The nuts are slid down the pan chutes 82 and 83 with the aid of the operator and in doing this the operator will inspect the nuts for defective ones which might break the tap if allowed to enter the vertical feed chutes. All nuts of this type are fed back by the operator to the chute 84 from which they are dropped into the defective nut hopper 85. All other nuts will fall from the pan chutes 82 and 83 into

the horizontal parts of the vertical slides and from there, due to the vibration of the hoppers as they oscillate to and fro between the taps, the nuts will slide down the pans 82 and 83 integral with the vertical feed slides and take a position required for the tapping operation in these slides. As each nut takes this position it will slide down and pile up in the slides. As the hopper moves toward each tap, the tap will engage the nut in the lowest position of the slide and the nut will be run on the tap. After the nut is run on it is extracted from the vertical feed slide by the return movement of the feeding mechanism, and the weight of the column of nuts in the slide forces another nut into the tapping position. Consequently with each movement of the hoppers a nut is run on to the tap and a nut is forced into position to be tapped, two nuts being tapped for each complete oscillation. The chips from the tapping operation drop into the chutes 28 and 29 and may be collected in a suitable receptacle. As previously stated, the taps used are of the bent type. As the nuts are tapped they are pushed over the shank of the tap by others which are run on the threaded portion of the tap, and consequently the tapped nuts are gradually fed along the shank of the tap and are finally dropped off from the free end of the shank. The plates 93 and 94 in coöperation with the last nut on the shank of the tap serve to steady and also cushion the tap. They also serve to feed the nuts one at a time from the free end of the shank of the tap into the hoppers 26 and 27. The machine is driven by any suitable means of power which may be applied to the cone pulleys 15 and 16.

In the preferred embodiment of the invention herein illustrated and described it has been adapted to a machine for tapping nuts, but it will be obvious that it might likewise be utilized for drilling articles and that it is capable of many variations and applications without departing from its spirit and scope as expressed in the appended claims.

What is claimed is:

1. In a device of the character described, the combination with a tapping means, of a stationary means for storing articles to be tapped, an article carrying chute reciprocating between said tapping means which automatically feeds the articles to said tapping means, one for each stroke thereof, resilient means interposed between said tapping means and said articles whereby the speed of said article carrying chute is independent of the lead of said tapping means, and means for automatically ejecting the articles after they have been tapped.

2. A machine for tapping articles comprising in combination, a tapping means, a stationary article storing means, an automatic guiding means which may be reciprocated between said tapping means into which the articles are delivered from said storing means and which automatically feeds said articles to said tapping means, one for each stroke thereof, resilient means interposed between said tapping means and said guiding means whereby the speed of said guiding means is independent of the lead of said tapping means, and means for automatically ejecting the articles after they have been tapped.

3. A machine for tapping articles comprising in combination, a stationary article storing means, means for guiding the articles from said storing means, a reciprocating mechanism which receives the articles from said guiding means, a tap mounted at each end of said reciprocating means, means for operating said reciprocating means whereby an article is automatically fed to the tap at each stroke of said means, and a resilient means interposed between said taps and said reciprocating means whereby the speed of said reciprocating means is independent of the lead of said tapping means.

4. A machine for tapping articles comprising in combination, a stationary article storing means, means for guiding the articles from said storing means, a reciprocating mechanism which receives the articles from said guiding means, a tap mounted at each end of said reciprocating mechanism, means for operating said reciprocating mechanism whereby an article is automatically fed to one of said taps at each stroke of said mechanism, a resilient means interposed between said taps and said reciprocating mechanism, and means for automatically ejecting the articles from the shanks of said taps.

5. A machine for tapping articles comprising in combination, a tapping device, a stationary article storing means, a reciprocating article carrying means for automatically feeding the articles to the tapping device, one for each stroke thereof, means intermediate said storing means and said feeding means to guide the articles from said storing means to said feeding means said tapping device coöperating with said feeding means for tapping the articles, a resilient cushion interposed between said tapping device and said feeding means, and means for automatically ejecting the articles after they have been tapped.

6. A machine for tapping nuts comprising in combination, a pair of rotating taps, reciprocating means placed intermediate said taps for automatically feeding nuts to said taps, a resilient means interposed between said taps and said reciprocating means, a stationary storing means from which the nuts are fed to said reciprocating means, and means for reciprocating said means between said taps.

7. A machine for tapping nuts comprising

in combination, a pair of rotating taps, a stationary hopper for storing the nuts, reciprocating means placed intermediate said taps for automatically feeding nuts to said taps, means for reciprocating said means between said taps, a resilient means interposed between said taps and said reciprocating means, and means for automatically ejecting the nuts after they are tapped.

8. A machine for tapping nuts comprising in combination, a pair of rotatable taps, a stationary nut storing means, a feeding means for automatically feeding the nuts to the taps, means for guiding the nuts from said storing means to said feeding means, a shiftable means for mounting said feeding means, means for shifting said last-mentioned means between said taps to feed the nuts to said taps, and a resilient means interposed between said taps and said shifting means which acts as a cushion between said taps and said shifting means and thereby protects the taps.

9. A machine for tapping nuts comprising in combination, a pair of rotatable taps, a stationary hopper for storing nuts to be tapped, a vertical slide for feeding the nuts to the taps, a chute for feeding the nuts from said storing means to said vertical slide, a reciprocating means for mounting said vertical slide feeding means, a cam for reciprocating said vertical side feeding means between said taps to automatically feed the nuts to the taps, and a resilient means interposed between said taps and said feeding means whereby the speed of said reciprocating feeding means is independent of the lead of said taps.

10. A machine for tapping nuts comprising in combination, a stationary storing means, an automatic nut feeding means, a pair of rotatable taps, means for reciprocating said feeding means between said taps whereby a nut is automatically fed to a tap at each stroke of said feed means, a resilient cushion interposed between said taps and said nuts as the nuts are fed to said taps, and means for feeding said tapped nuts along the shank of the tap and automatically ejecting said nuts from said shank.

11. A machine for tapping nuts comprising in combination, a hopper for storing the nuts, means to which the nuts are fed from said storing means said means comprising three chutes, a hopper for receiving defective nuts connecting with one of said chutes, a pair of nut feeding devices associated with the other two chutes, a pair of rotating taps, a reciprocating member for mounting said nut feeding devices, means for reciprocating said member between said taps, and mounting means for said taps whereby the nuts will be automatically ejected from said taps.

12. A machine for tapping nuts comprising a pair of rotatable taps, a stationary hopper for storing the nuts, a reciprocating means into which the nuts are fed from said hopper which automatically feeds the nuts to said taps, a resilient cushion interposed between said reciprocating means and said taps, a receiving means into which the nuts are automatically ejected after being tapped, and means for receiving and collecting the metal chips resulting from the tapping operation.

In witness whereof, we hereunto subscribe our names this 22d day of July, A. D. 1916.

DAVID LEVINGER.
OLOF ANDERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."