Nov. 24, 1931. L. A. SAFFORD 1,833,182

NUT TAPPING MACHINE

Filed June 6, 1927 3 Sheets-Sheet 1

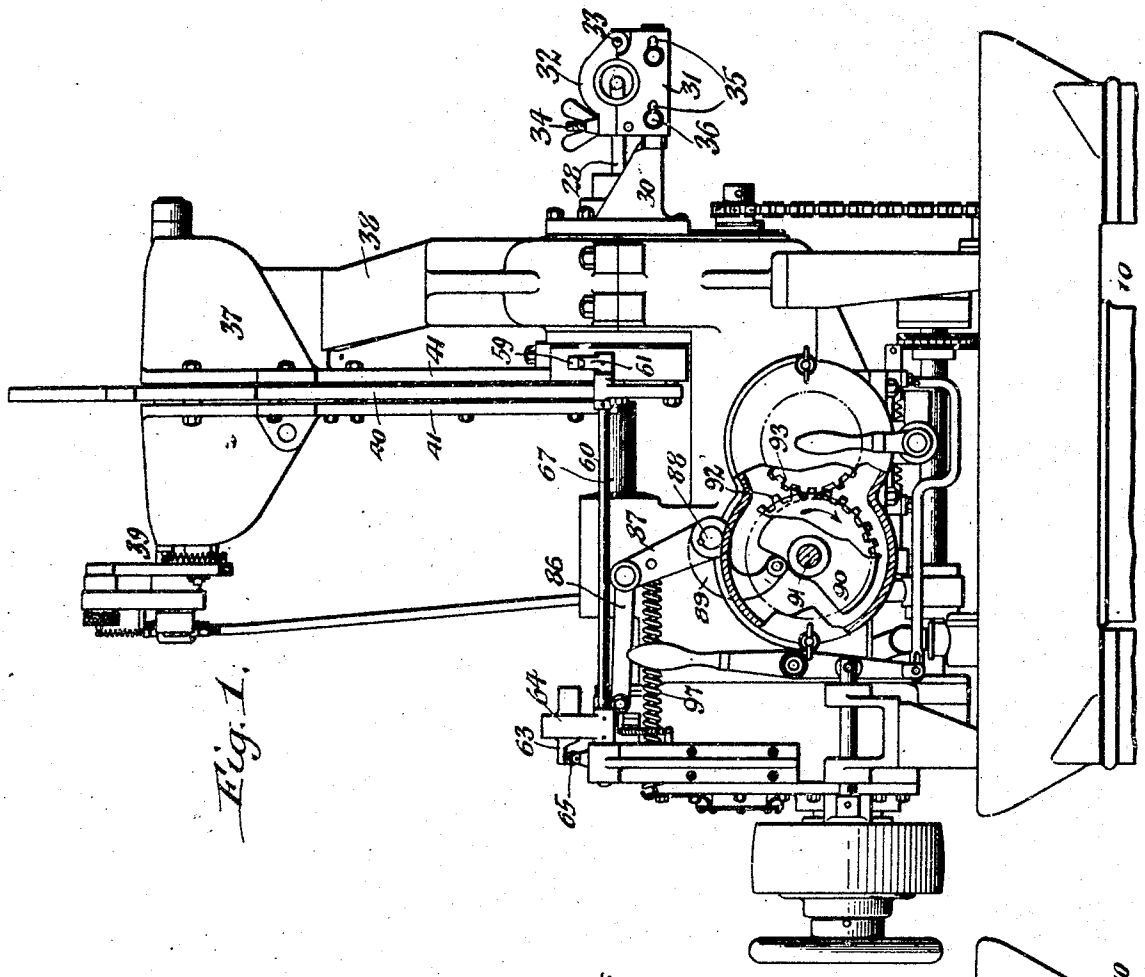


Fig. 1.

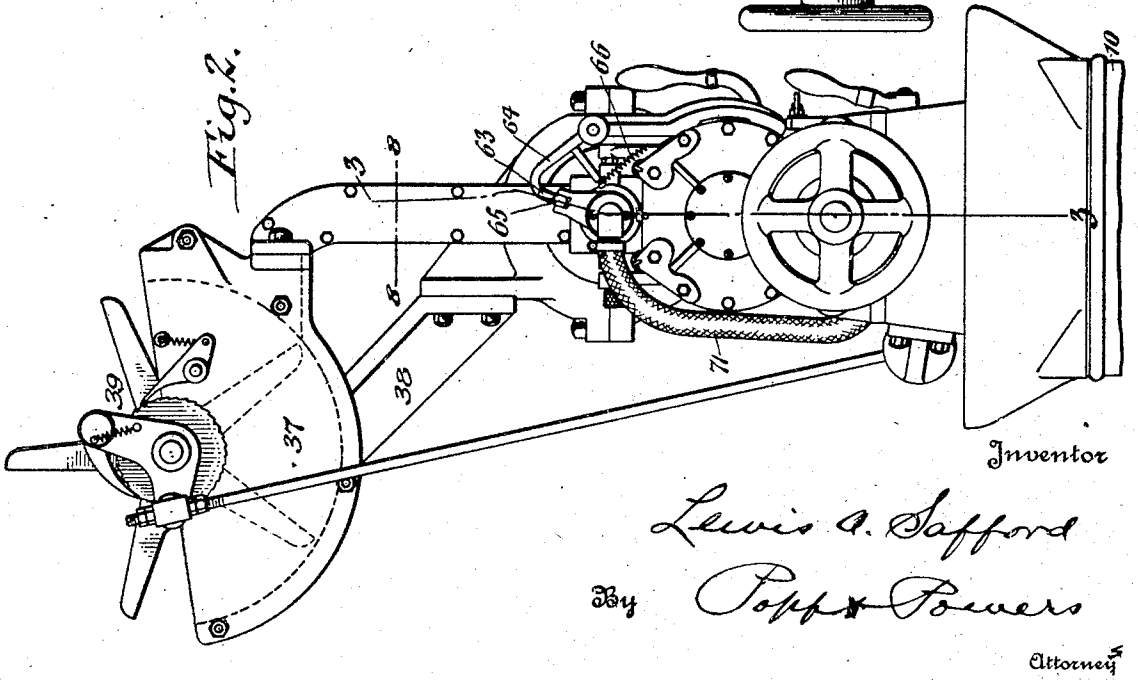


Fig. 2.

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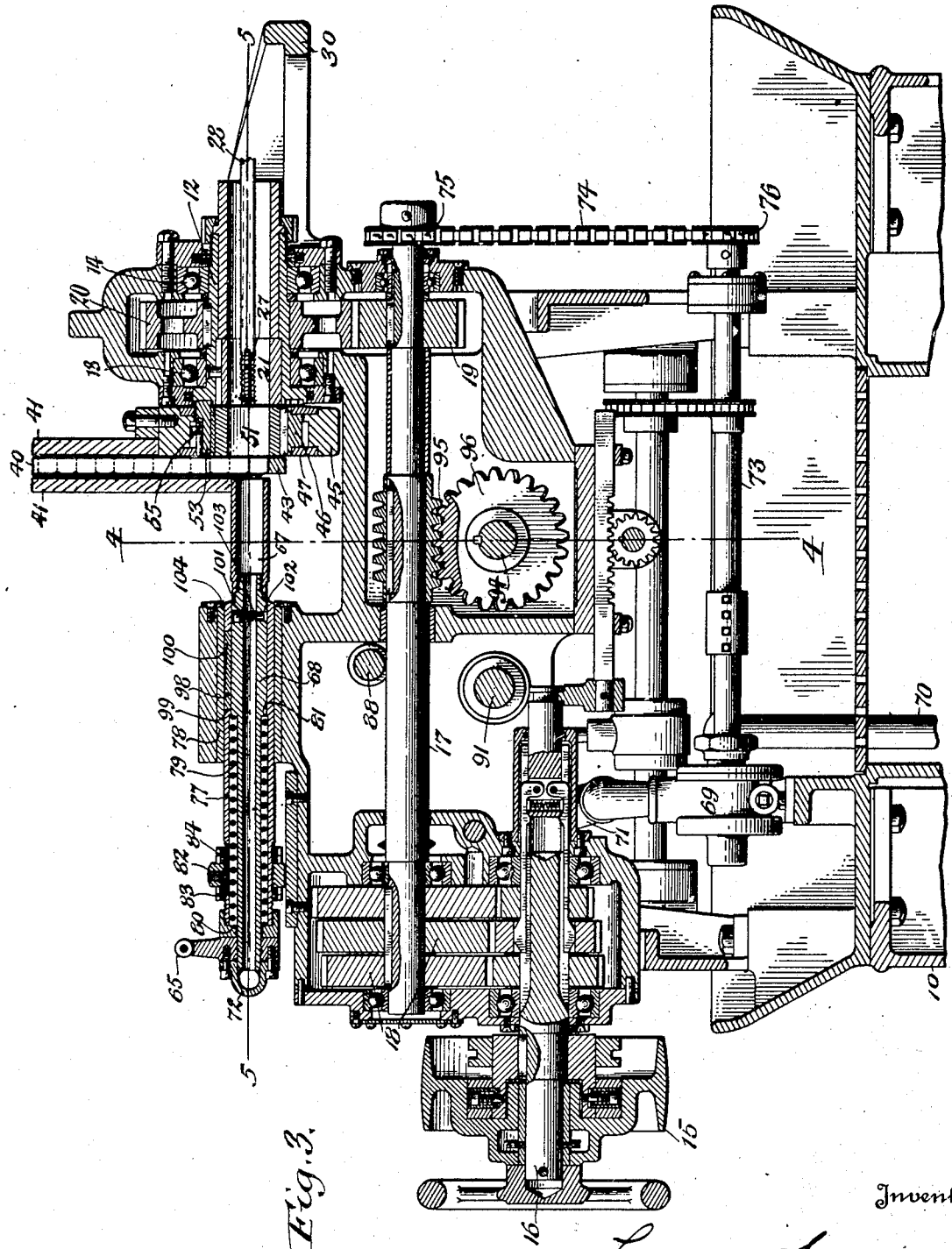


Fig. 3.

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NUT TAPPING MACHINE

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Fig. 4.

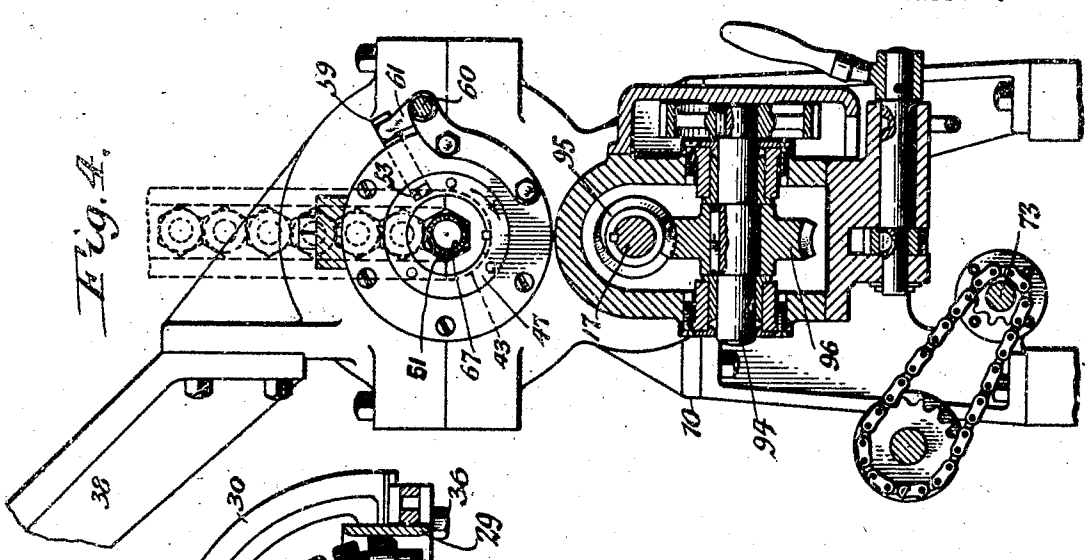


Fig. 5.

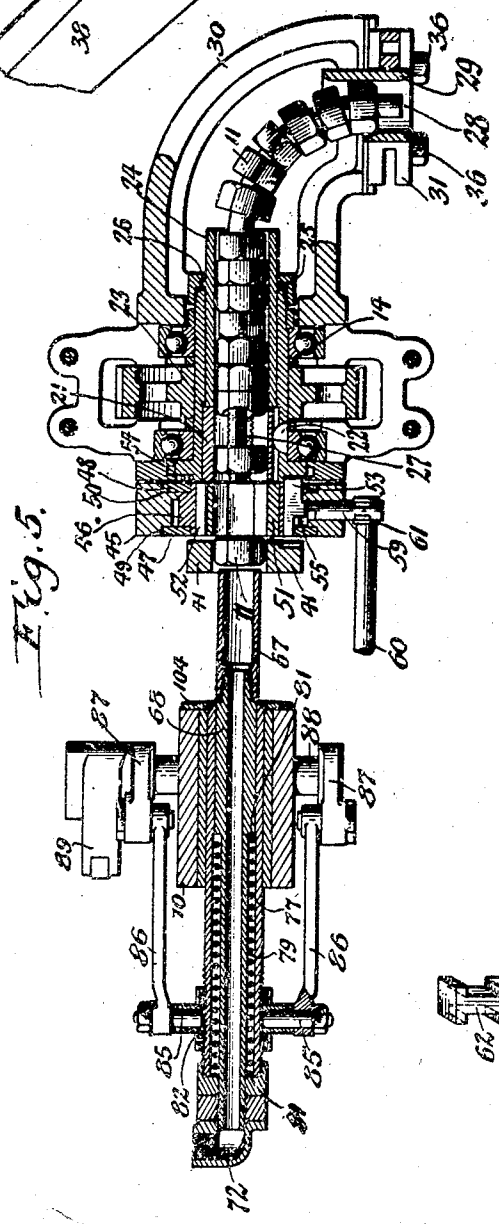


Fig. 8.

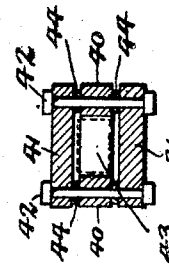


Fig. 7.

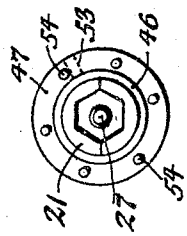
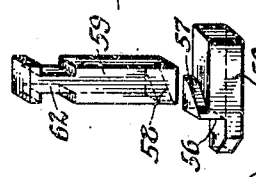


Fig. 6.



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Patented Nov. 24, 1931 1,833,182

UNITED STATES PATENT OFFICE

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NUT TAPPING MACHINE

Application filed June 6, 1927. Serial No. 196,680.

This invention relates to a machine for automatically threading blanks such as nut blanks and more particularly to the means whereby the nut blanks are fed from a source of supply to the means whereby the threads are cut in the openings of these blanks.

It is the object of this invention to provide a machine whereby the nut blanks are fed automatically and rapidly to the threading mechanism so as to secure a large output within a given time, also to properly align the nut blanks with the chuck whereby the nut blanks are rotated with reference to the threading tap, also to provide means whereby breakage or derangement of the machine is prevented in the event that an imperfect nut blank is presented, and also to provide simple and efficient means for adjusting the guide through which the finished nut blanks are discharged from the shank of the threading tap.

In the accompanying drawings:—

Figure 1 is a side elevation, partly in section, of a nut tapping machine embodying my improvements.

Figure 2 is a front end elevation of the same.

Figure 3 is a vertical longitudinal section of the machine, on an enlarged scale taken on line 3—3 Fig. 2.

Figure 4 is a vertical cross section taken on line 4—4 Fig. 3.

Figure 5 is a horizontal section taken on line 5—5 Fig. 3.

Figure 6 is a perspective view of the coupling dog and the trip slide forming part of the means for coupling and uncoupling the adapter of the nut register with the spindle of the chuck.

Figure 7 is a front elevation, on an enlarged scale, of the chuck.

Figure 8 is a horizontal section on an enlarged scale of the chute which supplies the nut blanks, said section being taken on line 8—8 Fig. 2.

Similar characters of reference indicate like parts in the several views of the drawings:—

The numeral 10 represents the main frame of the machine which may be of any suitable construction to support the various working parts. Mounted on the upper rear part of the main frame is the mechanism which operates to cut a thread through the bore or opening of the nut blanks 11, which tapping mechanism in the preferred form, as best shown in Figs. 1, 3, 5, and 7, is constructed as follows:—

The numeral 12 represents a hollow or tubular chuck spindle which is arranged horizontally and lengthwise of the machine and journaled in the upper rear part of the main frame preferably by two ball bearings 13 and 14 interposed between the front and rear ends of this spindle and the adjacent part of the main frame, as best shown in Fig. 3. This chuck spindle is rotated continuously while the machine is in operation by any suitable mechanism from any available source of power. As best shown in the drawings power is transmitted to this machine by means of a belt passing around a driving pulley 15 which is mounted upon the front outer end of a main driving shaft 16, journaled in suitable bearings on the front part of the main frame, an intermediate shaft 17 journaled horizontally and lengthwise in suitable bearings on the main frame above the driving shaft, a change speed gearing 18 which is interposed between the inner end of the main shaft 16 and the intermediate shaft 17 and which may be of any suitable construction, and a driving pinion 19 secured to the rear end of the intermediate shaft 17 and meshing with a gear wheel 20 which is secured to the chuck spindle 12 between the front and rear ends thereof.

Within the front end of the chuck spindle are mounted means whereby a nut blank which is fed into the front end of the spindle is compelled to turn therewith, which means may be varied but in the preferred construction the same comprises two like jaws 21, 21 which have a cylindrical periphery fitting into the front end of the bore of the chuck spindle and compelled to turn therewith by means of a key 22 while the bore of the two jaws are constructed to fit the periphery of the nut blank which is to be tapped by the machine. The bore of these

jaws as shown in Fig. 7 are of hexagonal form and also of a certain size, but these jaws may be changed so that the bore of the same corresponds to different shapes of nuts and also different sizes. For example, this bore may be of square form when the nut blanks are this shape and the bore also may be made of smaller or larger diameter to suit the particular size of nut blank which is to be tapped.

When driven fully inward the front ends of the chuck jaws are flush with the front end of the spindle and the inner or rear ends of the same engages with an internal shoulder 23 formed within the bore of the chuck spindle, as shown in Fig. 5, so as to avoid displacement of the jaws when they are subjected to rearward pressure.

Within the rear part of the chuck spindle is arranged a guide bushing 24 of tubular form, the bore of which is determined in accordance with the size of nut blank which is to be tapped so as to properly guide the same during its passage through the chuck. This bushing is held in place by means of an external flange 25 thereon which engages its front side with the rear end of the chuck spindle while its rear side is engaged by a clamping ring 26 having a screw connection with the rear end of the chuck spindle, as best shown in Figs. 3 and 5.

Within the front part of the chuck spindle is arranged a floating tap 27 whereby screw threads are cut in the bore of the nut blanks which are fed over the same. This tap is provided with a cylindrical unthreaded shank 28 which extends rearwardly from the tap through the bushing 24 and then curves laterally and terminates within a guide bushing 29. As the nut blanks are pushed over the tap 27 the same are rotated by the chuck and a thread is thereby cut into the bore of the nut blank during which time the tap is held against turning by reason of its laterally projecting shank 28 being arranged within the bushing 29.

After the threading of the nut blank has been completed the finished nuts slide successively in the manner of a string of beads lengthwise on the unthreaded shank 28 to the laterally projecting rear end thereof, at which point they pass through the guide bushing 29 and then drop into a receptacle or other means provided for that purpose. When tapping nuts of different sizes or thicknesses it is necessary to adjust the tap lengthwise in the chuck to meet varying conditions, and as this necessarily moves the rear or delivery end of the tap shank 28 lengthwise of the machine provision is made for adjusting the delivery guide 29 accordingly. This delivery guide must also be replaced by one of larger or smaller diameter depending on the size of nut blank which is being tapped. The preferred means for thus interchangeably holding a guide bushing 29 and also permitting of adjusting the same on the main frame may be varied but the preferred means which are shown in Figs. 1 and 5 for this purpose are constructed as follows:—

The numeral 30 represents a rearwardly and laterally projecting bracket formed on the rear upper part of the main frame. On the outer end portion of this bracket is mounted a holder consisting of lower and upper sections 31, 32 which removably receive between them the delivery guide bushing 29. In the preferred construction these holder sections are pivotally connected on one side of the bushing by means of a pin 33 and on the opposite side of this bushing by means of a clamping bolt 34. By this means the two sections of the holder may be disconnected for the purpose of inserting therebetween a delivery guide bushing of the right size. For the purpose of adjusting this holder and the guide bushing 29 thereon lengthwise of the machine, the lower guide section is provided with one or more longitudinal slots 35 each of which receives a clamping screw 36 entering the adjacent part of the bracket 30. By these means the bushing 29 and its holder may be readily adjusted lengthwise of the machine for bringing the tap 27 into the required position for tapping nut blanks of various sizes and thicknesses.

The means which are provided for feeding the nut blanks to the tapping mechanism in accordance with my invention are constructed as follows:—

The numeral 37 represents a supply hopper or mechanism which is adapted to contain a quantity of nut blanks which are to be threaded. This hopper is arranged over the main frame of the machine and supported thereon by means of a bracket 38 and means are provided for discharging one nut at a time from this mechanism to a chute which is adapted to hold a column of such nut blanks and deliver them one at a time into a position axially in line with the threading mechanism. Inasmuch as the means for delivering the nuts from the hopper forms no part of the invention no particular description of the same is required and general reference will therefore be made to this mechanism by the reference numeral 39.

The chute which receives the nut blanks from the supply hopper and delivers them to the point where they are transferred to the threading mechanism preferably comprises two upright side rails 40, 40 which are arranged parallel and form the side walls of the chute, and front and rear end walls 41, 41 which are connected by means of bolts 42 with opposite edges of the side walls 40 so as to form therewith an upright conduit or passageway which conforms to the general outline of the nuts to be threaded and therefore compels them to form a pile or column,

the blanks of which cannot be disarranged by moving from the upper inlet end of the chute to the outlet or lower end of the same. The outlet of this chute is formed by extending the side rails or bars 40 downwardly below the end walls 41 equal to the diameter of one of the nut blanks and connecting the lower end of the side walls 40 by a curved bottom or cross-piece 43, thus leaving an opening on the front and rear sides of this chute at the lower end thereof which permits the means whereby the nut blank is ejected from this chute to enter the lower end of the front side thereof and discharge the nut blank from the rear side thereof.

Washers 44 are preferably arranged on the bolts 42 between opposite sides of the side walls 40 and the end walls 41 so that by selecting washers of varying thicknesses the depth of the chute in a line parallel with the axis of the chuck can be varied to suit nut blanks of varying heights which are to be threaded or tapped.

Between the outlet at the lower end of the chute and the front or inlet end of the chuck is arranged a mechanism which is adapted to receive the nut blanks one at a time from the chute and present the same in correct register with the jaws of the chuck preparatory to threading these blanks by rotating them about the relatively stationary tap. This registering or transferring mechanism is best illustrated in Figs. 3, 4, 5 and constructed as follows:—

The numeral 45 represents an outer ring-shaped frame which is mounted in any suitable manner on an adjacent stationary part of the machine, and 46 represents an inner rotatable ring which is journaled in the ring 45 so as to turn about a horizontal longitudinal axis in line with the tap. A practical form of the means for pivotally mounting or journalling this inner ring on the outer ring 45 consists of two flanges 47, 48 secured to the front and rear sides of the inner ring and engaging with annular rabbets 49, 50 on the front and rear sides of the outer supporting ring 45 as shown in Figs. 3, 4 and 5. Within the inner ring is mounted an adapter 51 which is secured thereto by a key 52 or otherwise so as to be compelled to turn therewith and which has its bore made of hexagonal form, as shown in Fig. 4, or any other form corresponding to that of the outline of the nut blank which is to be tapped.

Motion for turning the inner supporting ring 46 together with the adapter mounted therein is derived from the chuck and the means whereby this is effected are so constructed that at times this adapter remains at rest in a registered position a sufficient length of time to permit a nut blank to be fed from the chute into the adapter and then the adapter and its supporting rings are coupled with the chuck while the adapter and the jaws of the chuck are in register, so as to permit of transferring the blank nut from the adapter to the jaws of the chuck and over the tap preparatory to threading the latter.

This coupling is effected between the adapter supporting ring and the spindle of the chuck and the construction of this coupling is preferably as follows:—

The numeral 53 is a coupling dog mounted in a part of the adapter ring 46 so as to be capable of sliding parallel with the longitudinal axis thereof so that its rear end can move into and out of the path of the coupling pins 54 which are arranged in an annular row on the front face or end of the chuck spindle. The coupling dog 53 is yieldingly held in its rearwardly projected operative position by means of a spring 55 interposed between a forwardly facing shoulder 56 on the coupling dog 53 and the front flange 47 of the adapter ring 46, as shown in Fig. 5. On its outer side the coupling dog is provided with an inclined face 57 which is adapted to be engaged by an inclined face 58 on the inner end of a trip bar 59 which slides radially in a guide way in the stationary outer supporting ring 45 so that the inclined face 58 can move into and out of the path of the incline 57 on the coupling dog 53. This inward and outward movement of the trip bar 59 is effected in harmony with the operation of other parts of the machine and particularly in harmony with the mechanism whereby the nut blanks are fed from the lower end of the chute to the adapter of the registering mechanism. For this purpose this actuating mechanism for the trip bar 59 preferably comprises a longitudinal rock shaft 60 which is journaled in suitable bearings on the stationary parts of the machine and provided at its rear end with a fork 61 which embraces a reduced neck 62 on the outer end of the trip bar 59, and a trip cam 63 mounted on a cam arm 64 carried by the front end of the rock shaft 60 and adapted to be engaged by a longitudinally movable tappet 65 which operates in harmony with the nut feeding mechanism. The several parts are so timed that when the nut feeding mechanism effects the first part of its movement for transferring a nut blank from the chute to the adapter, the tappet 65 by engaging with the cam 63 will rock the shaft 60 in a direction for causing the trip bar 59 to be withdrawn from the incline 57 on the coupling dog 53 whereby the latter is permitted, under the action of the spring 55, to move rearwardly into the path of the coupling pins 54 so that the next following coupling pin will engage the rear end of the coupling dog 53 and thereby compel the adapter to rotate in unison and in register with the chuck.

The parts are so constructed and timed that this coupling of the adapter and the chuck will be effected when the adapter and the jaws

of the chuck are in correct register and thereby permit of properly transferring the nut blank in the adapter to the jaws of the chuck.

During the last part of the backward movement of the nut feeding mechanism during which the tappet 65 moves forwardly, the cam 63 by dropping from its high face to its low face on the tappet 65 will permit the rock shaft 60 to be turned in the opposite direction by a spring 66 connecting a lug on the cam arm 64 with an adjacent part of the frame, as shown in Fig. 2, thereby causing the trip bar 59 to be again pushed inwardly so that its cam face 58 stands in the path of the cam face 59 of the coupling dog 53, whereby the latter during the rotation of the adapter and its supporting ring with the clutch will cause the coupling dog 53 to be withdrawn by a wedge action from engagement with the respective coupling pin 54 on the chuck spindle so that the latter will continue to rotate independently of the adapter and the adapter will come to rest with its bore in the correct position or register with the lowermost nut of the column in the chute so that this lowermost nut can now be pushed forwardly from the chute into the adapter without encountering any obstruction.

The preferred form of the mechanism whereby the nut blanks are fed successively from the lower end of the pile or stack in the supply chute is constructed as follows:—

The numeral 67 represents a plunger which is arranged axially in line with the outlet of the chute, the adapter and the chuck, and is capable of longitudinal reciprocating movement for the purpose of transferring a nut blank from the chute through the adapter and into the chuck. When in its foremost position, as shown in Figs. 3 and 5, the rear end of the plunger is in line with or nearly so with the rear side of the vertical path of the nut blanks in the chute, so that the column of nut blanks is free to drop by gravity and enable the lowermost nut blank to engage the bottom 43 of the chute and stand in rear of the plunger 67. This plunger is secured at its front end to horizontally and longitudinally reciprocating guide rods 68 which latter, together with the plunger 67 are preferably made hollow to serve as a conduit for conducting a collant to the nut blanks while the same are being operated on by the tap and thereby not only lubricate the tool but also wash away chips which are formed during this operation. This collant is supplied from any suitable source by means of a pump 69 having its inlet connected by means of a pipe 70 with a source of supply while its outlet is connected by means of a flexible tube 71 and an angular fitting 72 with the front end of the plunger rod 68, as best shown in Figs. 2, 3, and 5. The shaft 73 of the pump is preferably driven by means of a chain belt 74 passing around sprocket wheels 75 and 76 secured respectively to the intermediate shaft 17 and the pump shaft 73, as best shown in Fig. 3.

Surrounding the plunger rod 68 is a shifting sleeve 77 which serves partly as a means for guiding the rod 68 of the plunger and which in turn is guided in a tubular guideway 78 arranged lengthwise on the upper part of the main frame. Between the front parts of the plunger rod and the shifting sleeve 77 is arranged a spring 79 which bears at its front end against a shoulder 80 at the front end of the shifting sleeve while its rear end bears against a shoulder 81 on the plunger rod, which spring tends constantly to move the shifting sleeve 77 forwardly relative to the plunger rod. On the front part of the shifting sleeve 77 is mounted a transverse yoke 82 which is capable of longitudinal adjustment thereon by means of jam nuts 83, 84 having a screw connection with the shifting sleeve 77 and engaging respectively with the front and rear sides of the yoke 82, as shown in Figs. 3 and 5. On opposite sides this yoke is provided with trunnions 85 which are connected by means of links 86 with the upper ends of rock arms 87 which are secured at their lower ends to a transverse rock shaft 88 journaled on the main frame. This rock shaft is provided with a depending cam arm 89 which engages with a cam 90 secured to a transverse shaft 91 journaled on the lower part of the main frame. Rotary motion is imparted to this shaft by means of a gear wheel 92 secured to the cam shaft 91 and meshing with the gear wheel 93 on a countershaft 94, and a worm 95 secured to the intermediate shaft 17 and meshing with the worm wheel 96 on the shaft 94, as shown in Figs. 1 and 3.

Upon rotating the cam 90 in the direction of the arrow associated therewith in Fig. 1, the cam arm and the rock arms 86 which together with the shaft 88 form a cam lever, will cause the shifting sleeve 77 to be moved backwardly through the chute into the adapter and toward the chuck whereby the lowermost nut blank in the chute is engaged with the jaws of the chuck and the front end of the tap so as to cause the bore of the nut blank to be threaded. After the high face of the cam 90 has cleared the cam arm 89 the plunger 67 is again returned to its retracted position out of the path of the column of nuts in the chute by means of return springs 97 which connect the rock arms 86 with adjacent stationary parts of the machine, as shown in Fig. 1.

If in attempting to move the plunger 67 forwardly this movement should be obstructed for any reason, such as would be likely to occur if the nut is imperfect due to an odd size of the same, or an excessive burr thereon or an obstruction in the hole thereof, then the forward movement of the plunger would

be blocked but the operating cam 90 would still be able to turn without however, injuring or breaking any of the parts, inasmuch as at such times the spring 79 would yield and permit the shifting sleeve 77 to move backwardly independently of the plunger and its rod. When the particular defective nut blank has been removed the plunger will again resume its normal stroke and feed nuts away from the chute to the adapter and chuck inasmuch as the spring 79 is sufficiently strong for rendering the shifting sleeve and the plunger rod practically rigid at such times and still provide a yielding connection between the positively moving actuating mechanism and the plunger which provides a safety measure for avoiding damage.

By adjusting the screw nuts 83, 84 forwardly or backwardly on the shifting sleeve 77 the plunger can be readily adjusted to cut nuts of different types and also take up any wear on the parts within certain limits.

The tappet 65 is preferably constructed in the form of a roller which is mounted on an arm secured to the front end of the plunger rod so that whenever the plunger moves forwardly and effects a working stroke this tappet by engaging with the cam 63 will operate to withdraw the trip bar 59 from the coupling dog 53 and permit the latter to engage with the coupling pins of the chuck for connecting the adapter of the registering device with the chuck preparatory to rotating the adapter in unison with the chuck and effecting a threading operation on a nut blank.

Means are provided whereby the nut blank feeding mechanism is automatically rendered inoperative in the event that a nut blank should become stuck either in the lower end of the chute, the adapter of the registering device, or the chuck, and thereby prevent nut blanks from dropping successively to the lower end of the chute and clogging the same and other parts of the machine. For this purpose a safety device is provided which is preferably constructed as follows:

The numeral 98 represents a safety latch which is arranged lengthwise in a recess 99 in the upper front part of the shifting sleeve 77 and provided on its upper side adjacent to its rear end with a forwardly facing shoulder 100. In the rear part of the shifting rod 68 and normally arranged within the rear part of the shifting sleeve 77 is a vertical guide way 102 which contains a vertically movable lifting pin 101 which is normally held with its upper end against the upper inner side of the shifting sleeve 77 by means of a spring 103 bearing at its lower end against the inner side of the plunger rod while its upper end bears against a shoulder on the upper part of the lifting pin 102.

Normally the plunger rod and shifting sleeve 77 move forwardly together under the action of the cam 90 so that the solid front part of the shifting sleeve remains over the upper end of the lifting pin 102 and prevents the latter from rising. At such times the safety latch 98 when moved forwardly beyond the rear side of a catch plate 104 which is secured to the adjacent part of the main frame will remain in its depressed position within the recess or pocket 99 and therefore permit the shifting sleeve to again return to its foremost position preparatory to effecting the next following full rearward stroke for successively feeding nut blanks from the chute to the registering device and chuck. If, however, the forward movement of the plunger should be obstructed by reason of an imperfect nut blank present at the lower end of the chute which cannot enter the adapter or is incapable of passing into the chuck or over the tap, then the shifting sleeve 77 will move forwardly independently of the plunger rod and thereby cause the advancing end of the safety latch 98 to be carried over the upper end of the lifting pin 102 while the advancing end of the latch is exposed in rear of the catch plate 104. The instant this occurs the lifting pin 102 will push the advancing end of the latch upwardly so that during the subsequent part of the return or forward stroke of the shifting sleeve 77 the shoulder 100 of this latch will engage with the adjacent edge portion of the catch plate 104 and thereby prevent the shifting sleeve 77 from moving forwardly. When this condition exists the cam 90 will move idly and only reciprocate the sleeve part of a stroke if at all and also reciprocate the plunger more or less if at all, depending on the point in the stroke at which the movement of the plunger has been arrested by the presence of an imperfect nut blank which obstructs the normal path of the same.

The machine will now remain inoperative and fail to feed any more nut blanks to the tapping mechanism until the attendant has removed the obstructing imperfect nut blank and when this is done the attendant merely presses the safety latch downwardly far enough to disengage its shoulder 100 from the catch plate 104 when the spring 79 will immediately move the shifting sleeve 77 forwardly and restore the parts again to their normal working position.

From the foregoing it will now be apparent that no damage can occur in this machine if any imperfect nut blank is present in the supply and that the same can be easily restored to its working condition without seriously interrupting the operation of the machine. Moreover all perfect nuts which are supplied by this chute are taken from their normal stationary position in the chute and tranfserred to the continuously rotating chuck while in a perfectly registered condition so that there is no liability of clogging

the machine or injuring any of the parts and thereby permit of running the machine more rapidly and increasing the output accordingly.

When operating upon comparatively large nut blanks the plunger is reciprocated comparatively slow on account of the greater length or height of the nut blanks, but when threading smaller nut blanks which are of less height the plunger can be reciprocated faster. It is therefore possible to vary the rate of feed of nut blanks to the threading mechanism by selecting the required pair of intermeshing gear wheels 92 and 93 which will give the desired rate of speed of the plunger for a particular size of nut blank.

I claim as my invention:—

1. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive nut blanks to be tapped and means to compel rotation of the same with the chuck, a nonrotating tap arranged within the spindle, a stationary chute in which a column of nut blanks is adapted to be arranged and having a blank outlet, a registering device interposed between the outlet of said chute and said chuck, and feeding means for transferring the nut blanks from said chute to said registering device, chuck and tap, said registering device comprising an adapter which receives the nut blanks and is constructed to compel rotation of the nut therewith, and means for intermittently coupling and uncoupling said chuck and adapter and compelling rotation of the same in unison while in register with each other.

2. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive the nut blanks to be tapped, jaws arranged in said spindle and adapted to engage said blanks for compelling them to turn with the spindle, a tap arranged within the spindle and adapted to receive the nut blanks and held against turning, a chute adapted to guide a column of nut blanks and having an outlet through which said blanks are discharged, a registering device interposed between said chute outlet and said chuck spindle and having a rotary adapter which receives said nut blanks from the outlet of said chute, feeding means for transferring the nut blanks from said chute to said adapter, chuck and tap, and means for coupling and uncoupling said adapter and spindle comprising a plurality of coupling pins arranged in an annular row on said spindle, a coupling dog mounted on the adapter and engaging one or another of said pins, and a retractor mounted on a stationary part and adapted to withdraw said dog from the path of said pins.

3. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive the nut blanks to be tapped, jaws arranged in said spindle and adapted to engage said blanks for compelling them to turn with the spindle, a tap arranged within the spindle and adapted to receive the nut blanks and held against turning, a chute adapted to guide a column of nut blanks and having an outlet through which said blanks are discharged, a registering device interposed between said chute outlet and said chuck spindle and having a rotary adapter which receives said nut blanks from the outlet of said chute, feeding means for transferring the nut blanks from said chute to said adapter, chuck and tap, and means for coupling and uncoupling said adapter and spindle comprising a plurality of coupling pins arranged in an annular row on said spindle, a coupling dog mounted on the adapter and engaging one or another of said pins and having an incline, a spring for moving said dog into the path of said pins, and a retracting slide guided on a stationary part and having an incline adapted to be engaged by the incline of said dog for withdrawing the same from the path of said pins.

4. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive the nut blanks to be tapped, jaws arranged in said spindle and adapted to engage said blanks for compelling them to turn with the spindle, a tap arranged within the spindle and adapted to receive the nut blanks and held against turning, a chute adapted to guide a column of nut blanks and having an outlet through which said blanks are discharged, a registering device interposed between said chute outlet and said chuck spindle and having a rotary adapter which receives said nut blanks from the outlet of said chute, feeding means for transferring the nut blanks from said chute to said adapter, chuck and tap, and means for coupling and uncoupling said adapter and spindle comprising a plurality of coupling pins arranged in an annular row on said spindle, a coupling dog mounted on the adapter and engaging one or another of said pins and having an incline, a spring for moving said dog into the path of said pins, a retracting slide guided on a stationary part and having an incline adapted to be engaged by the incline of said dog for withdrawing the same from the path of said pins, a rock arm engaging said retracting slide, a rock shaft carrying said arm, a cam arm arranged on said rock shaft, and a tappet engaging said cam arm.

5. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive the nut blanks to be tapped, jaws arranged in said spindle and adapted to engage said blanks for compelling them to turn with the spindle, a tap arranged within the spindle and adapted to receive the nut blanks and held against turning, a chute adapted to guide a column of nut blanks and

having an outlet through which said blanks are discharged, a registering device interposed between said chute outlet and said chuck spindle and having a rotary adapter which receives said nut blanks from the outlet of said chute, feeding means for transferring the nut blanks from said chute to said adapter, chuck and tap, and means for coupling and uncoupling said adapter and spindle comprising a plurality of coupling pins arranged in an annular row on said spindle, a coupling dog mounted on the adapter and engaging one or another of said pins, and having an incline, a spring for moving said dog into the path of said pins, a retracting slide guided on a stationary part and having an incline adapted to be engaged by the incline of said dog for withdrawing the same from the path of said pins, a rock arm engaging said retracting slide, a rock shaft carrying said arm, a cam arm arranged on said rock shaft and a tappet engaging said cam arm and movable with said nut blank feeding means.

6. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive nut blanks to be tapped and means to compel rotation of the same with the chuck, a non-rotating tap arranged within the spindle, a stationary chute in which a column of nut blanks is adapted to be arranged and having a blank outlet, a separate rotary registering device interposed between the outlet of said chute and said chuck, feeding means for transferring the nut blanks from said chute to said registering device, chuck and tap and neans for coupling and uncoupling said chuck and registering device in a predetermined relative position and controlled by said feeding means.

7. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive the nut blanks to be tapped, jaws arranged in said spindle and adapted to engage said blanks for compelling them to turn with the spindle, a tap arranged within the spindle and adapted to receive the nut blanks and held against turning, a chute adapted to guide a column of nut blanks and having an outlet through which said blanks are discharged, a registering device interposed between said chute outlet and said chuck spindle and having a rotary adapter which receives said nut blanks from the outlet of said chute, means for rotatably supporting said adapter comprising a stationary ring surrounding said adapter and flanges secured to opposite sides of the adapter and engaging opposite sides of the stationary ring, means for coupling and uncoupling the adapter and chuck in a predetermined relative position, and means for feeding nut blanks from said chute to said adapter, chuck and tap.

8. A nut tapping machine comprising a rotary chuck having a tubular spindle adapted to receive nut blanks to be tapped and means to compel rotation of the same with the chuck, a nonrotating tap arranged within the spindle, a stationary chute in which a column of nut blanks is adapted to be arranged and having a blank outlet, a registering device interposed between the outlet of said chute and said chuck including means for coupling said registering device and chuck in a predetermined relative position, feeding means for transferring the nut blanks from said chute to said registering device, chuck and tap, said tap having a laterally turned delivery shank, a bushing which receives said shank and which is arranged horizontally, and means for adjusting said bushing lengthwise of said tap, comprising a holder having upper and lower sections engaging opposite sides of said bushing, a pivot connecting said sections on one side of the bushing, a screw detachably connecting said sections on the opposite side of said bushing, a supporting bracket, and a bolt and slot connection between one of said sections and said bracket.

9. A nut tapping machine comprising a rotary chuck adapted to receive and turn nut blanks, a relatively stationary tap arranged within the chuck and adapted to thread the nut blanks, a chute for supplying nut blanks, a blank registering device interposed between said chute and chuck, and means for feeding nut blanks successively from said chute to said registering device, chuck and tap, comprising a reciprocating plunger adapted to engage the nut blanks, a cam, a cam lever actuated by said cam, and means for transmitting motion from said lever to said plunger comprising a sliding rod which carries said plunger and has a shoulder, a sleeve surrounding said sliding rod and having a shoulder, a spring interposed between said shoulders, and links connecting said sleeve with said cam lever.

10. A nut tapping machine comprising a rotary chuck adapted to receive and turn nut blanks, a relatively stationary tap arranged within the chuck and adapted to thread the nut blanks, a chute for supplying nut blanks, a blank registering device interposed between said chute and chuck and means for feeding nut blanks successively from said chute to said registering device, chuck and tap comprising a plunger adapted to engage said nut blanks, a sliding rod carrying said plunger, a reciprocating carrier surrounding said rod, a spring interposed between said rod and carrier, a detent latch mounted on said sleeve and having a shoulder adapted to engage a stationary part, and a spring pressed shifting pin mounted on the plunger rod and adapted to move said latch laterally into position for engaging said stationary part when the plunger is blocked and the carrier moves forwardly independently of said plunger rod.

11. A tapping machine for threading openings in blanks, comprising a chuck adapted to receive the blanks to be tapped, a tap arranged within the chuck and adapted to thread the blanks, said chuck and tap being rotatable one relatively to another, means for feeding said blanks, and a preliminary registering device separate from the chuck arranged between said feeding means and said tap and chuck and adapted to register said blanks with said chuck and including means for coupling and uncoupling the registering device and the chuck at a predetermined position relative to each other.

In testimony whereof I hereby affix my signature.

LEWIS A. SAFFORD.