No. 622,334. Patented Apr. 4, 1899.

# G. DUNHAM.

## MACHINE FOR FINISHING OR FACING NUTS.

(Application filed Apr. 12, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

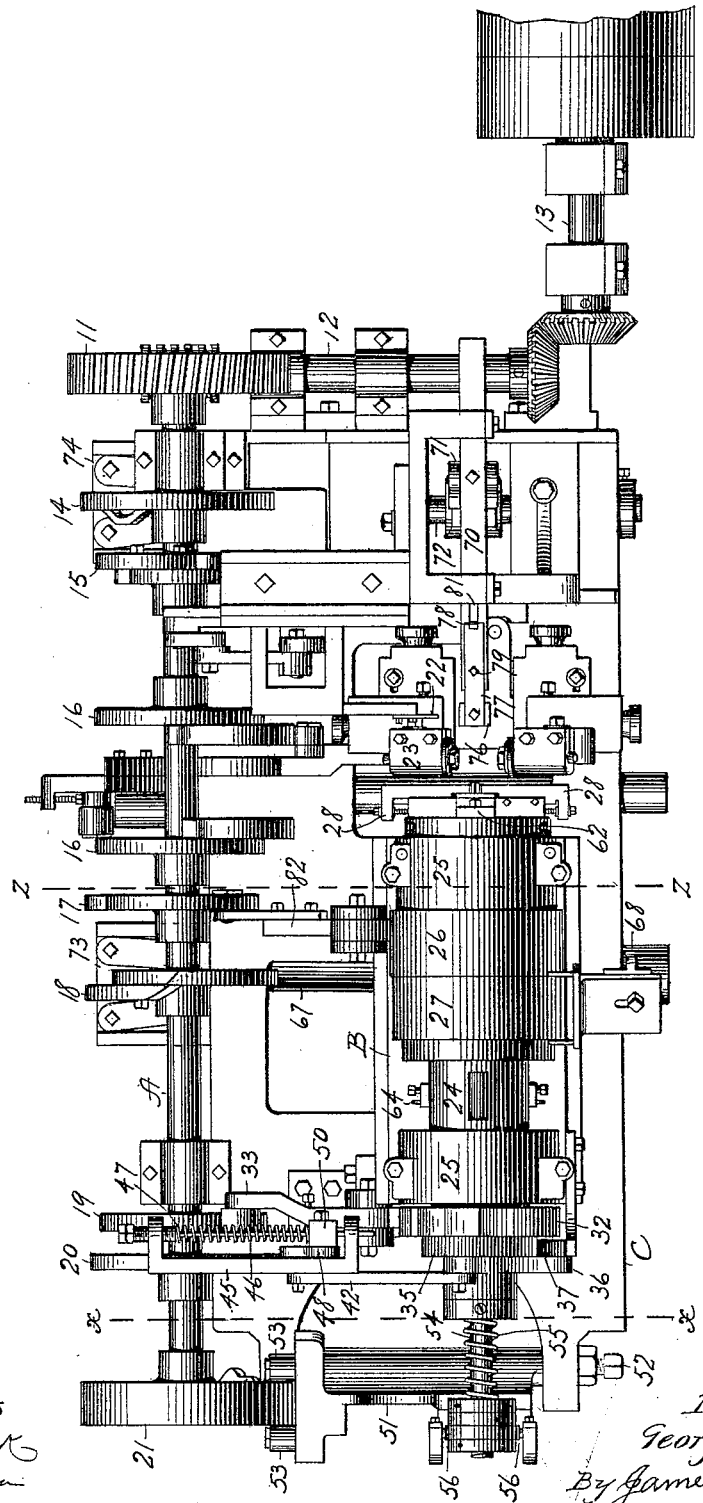


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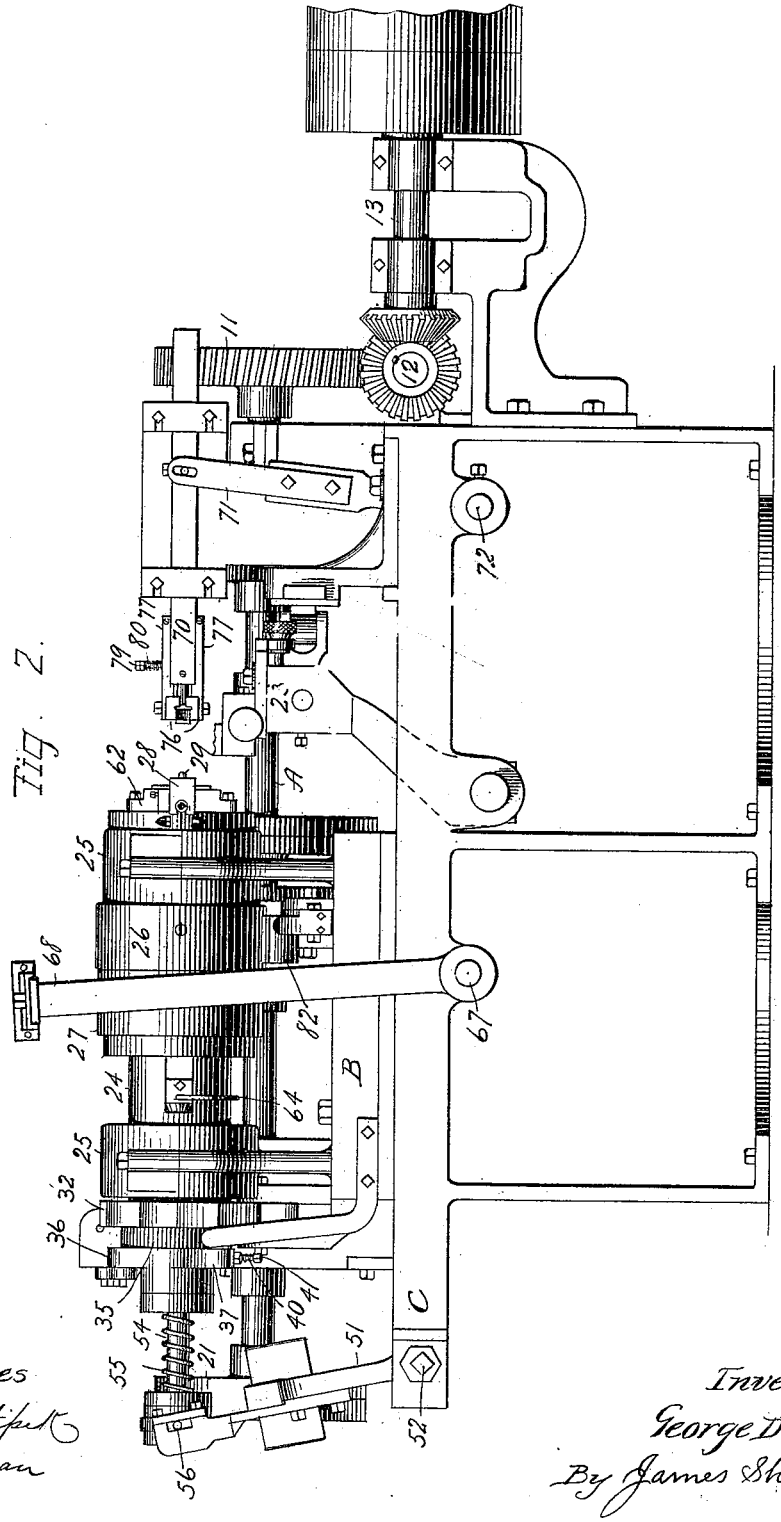
Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

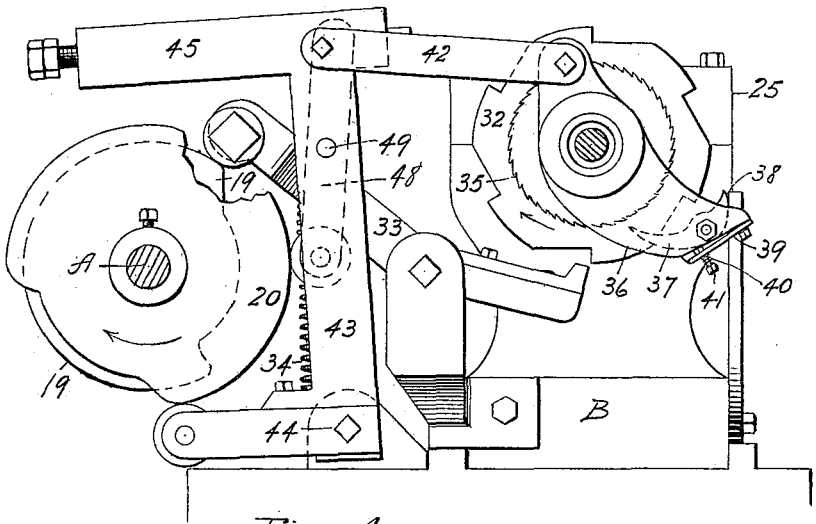


Fig. 4.

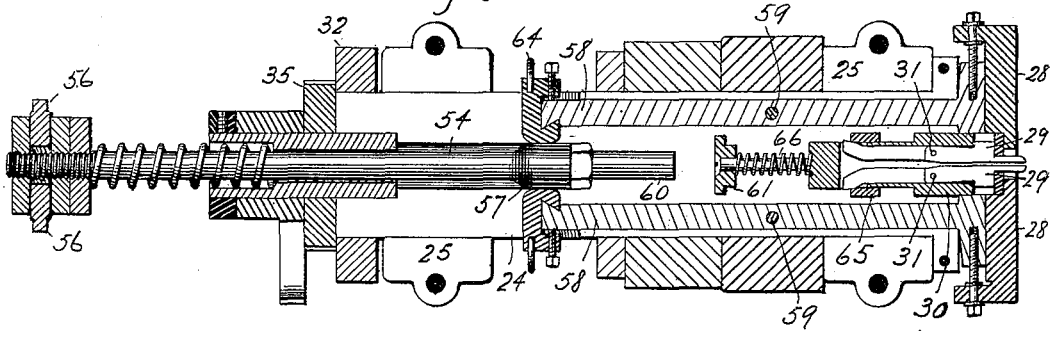


Fig. 5.

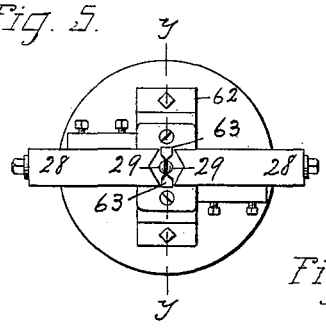


Fig. 6.

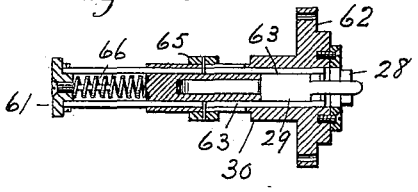


Fig. 7.

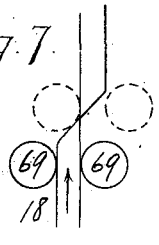


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Fig. 8.




Fig. 9

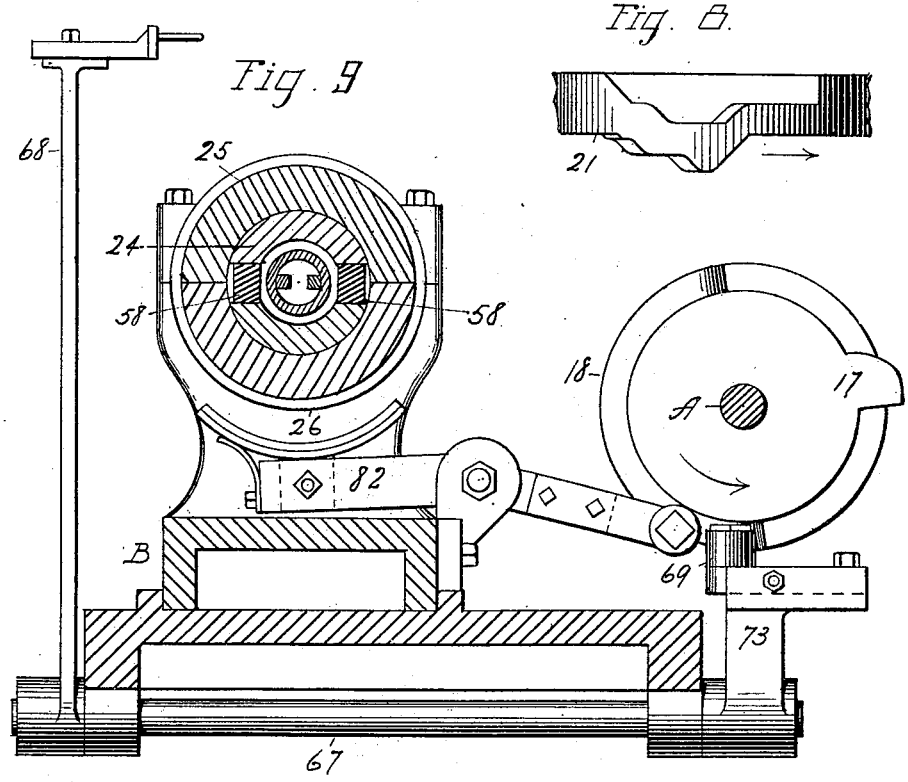



Fig. 10.

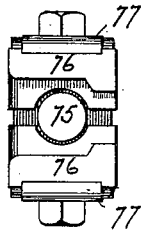



Fig. 11.

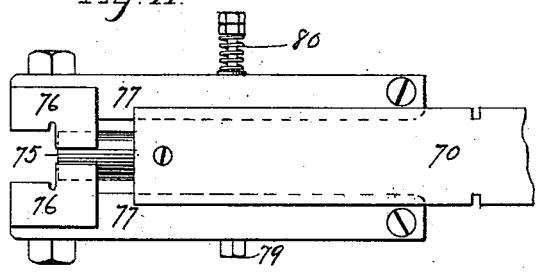
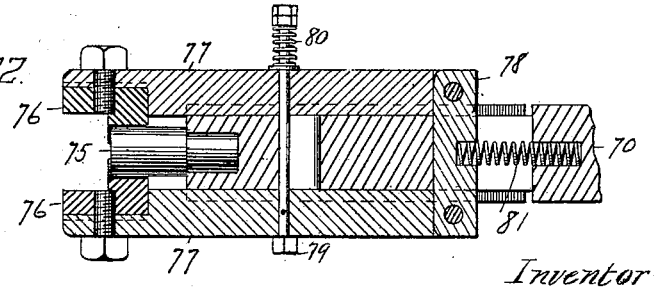



Fig. 12.

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# UNITED STATES PATENT OFFICE.

GEORGE DUNHAM, OF UNIONVILLE, CONNECTICUT.

## MACHINE FOR FINISHING OR FACING NUTS.

SPECIFICATION forming part of Letters Patent No. 622,334, dated April 4, 1899.

Application filed April 12, 1898. Serial No. 677,308. (No model.)

*To all whom it may concern:*

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

My invention relates to improvements in machines for finishing or facing nuts; and the objects of my improvements are simplicity and economy in construction and convenience and efficiency in operation.

In the accompanying drawings, Figure 1 is a plan view of my machine. Fig. 2 is a front elevation of the same. Fig. 3 is a sectional side elevation on the line *x x* of Fig. 1. Fig. 4 is a central longitudinal section, partly in elevation, of the work-carrying spindle and connected parts. Fig. 5 is an end view of the same. Fig. 6 is a central longitudinal section of the split pilot and connected parts, the plane of section being indicated on the line *y y* of Fig. 5, which plane is at right angles to the plane of the section in Fig. 4. Fig. 7 is a developed plan view of one side of the shipper-cam and the rollers upon which said cam acts. Fig. 8 is a plan view of a portion of the chuck-operating cam. Fig. 9 is a sectional view of portions of my machine on the line *z z* of Fig. 1. Fig. 10 is an enlarged end view of the nut-carrier. Fig. 11 is a front elevation of the same, and Fig. 12 is a central longitudinal section thereof.

My invention relates particularly to the means for holding and revolving the nut and for presenting the nut to the said holding and revolving mechanism. All other parts of the machine may be of any ordinary construction and will be only described in a general way.

A designates the cam-shaft, which may be driven by any suitable means—as, for example, by the worm-wheel 11, worm-shaft 12, and driving-shaft 13. Said cam-shaft has mounted on it the carrier-rock-shaft cam 14, feed-cam 15, tool-post cams 16, brake-lever cam 17 for the brake-lever 82, shipper-rock-shaft cam 18, stop-lever cam 19, pawl-carrier cam 20, and chuck-operating cam 21. The cam 15 operates the feed-finger 22, and the cams 16 operate the tool-posts 23. These parts are not peculiar to the present invention, and any other desired feed and tool-carrying mechanism may be substituted therefor.

The hollow shaft or spindle 24 of what I may call the "lathe-head" is mounted in suitable bearings 25 and provided with fast and loose pulleys 26 27. For convenience of manufacture it is made in halves and is so illustrated; but it is practically one shaft. It is also provided with grasping-jaws 28 and split pilot composed of levers 29, pivoted within the pilot-shaft 30 by pins 31, Fig. 4. Said hollow shaft 24 has also mounted on it the stop-disk 32, which when hexagonal nuts are to be finished has six stop-shoulders, as best shown in Fig. 3. Said stop-disk is acted upon by or rather acts against the stop-lever 33, which is forced out from engagement with said stop-disk by means of the stop-lever cam 19 and into engagement therewith, when the cam permits, by means of the spring 34, one end of which is secured to said lever and the other end to some fixed part of the machine. By the side of the stop-disk 32 on the hollow shaft is a ratchet-wheel 35, and by the side of said ratchet-wheel are an oscillating pawl-carrier 36 and its pawl 37. The pawl 37 (see broken lines in Fig. 3) is provided with a curved heel 38, and the frame B of the lathe-head is provided with a fixed post, so that when the pawl-carrier reaches the position shown in Fig. 3 the pawl is held out of engagement with the ratchet-wheel. An oscillating plate 39 on the pawl-carrier bears upon the pawl with a tendency to force it against the ratchet-wheel, and said plate is pressed upon by a spring 40, that surrounds a bolt or screw 41, that is screwed into the pawl-carrier 36. Said pawl-carrier is connected by means of a link 42 to the pawl-carrier lever 43, which is fulcrumed on the bolt 44, so that when the pawl-carrier cam 20 acts upon the short arm of the lever 43 the pawl-carrier will be in the position shown in Fig. 3. Upon the upper end of the lever 43 there is a cross-arm 45, carrying a rod 46 and a compression-spring 47. A sublever 48 is pivoted at 49 to one side of the lever 43. Said sublever is shown in plan view, Fig. 1, and its contour is indicated by broken lines in Fig. 3. Its lower end bears upon the pawl-carrier cam 20, and its upper end is provided with a lug 50, that

slides on the rod 46 and is pressed upon by the spring 47. Whenever the cam 20 releases the lower end of the lever 43 from the position shown in Fig. 3, by bringing the depressed portion of said cam opposite the end of the short arm of said lever the spring 47 immediately expands and acts, through the sublever 48, to throw the upper end of the lever 43 forward and move the pawl-carrier in the direction to release its pawl, thereby causing said pawl to engage the ratchet-wheel, so that said wheel and its shaft are rotated a partial revolution in case the said wheel and shaft are free to rotate. The spring 47 is strong enough to move the parts in the manner above described for operating the pawl-carrier and parts driven thereby when free; but if the shaft is blocked or stopped in any way—for example, by the stop-lever 33 and stop-disk 32—then after the pawl is released and engages the ratchet the lever 43 remains stationary for a time, and when the depression in the cam 20 passes the end of the sublever 48 said lever merely swings on its pivot 49 under the influence of the spring 47 as its lower end follows the said depression without any movement of the lever 43.

A swinging lever 51 is pivoted at 52 to the main frame C and is provided with two lugs or rollers 53, that are acted upon by the chuck-operating cam 21 for oscillating said lever 51. The main portion of this cam is shown in plan view in Fig. 8. A chuck-operating rod 54 is arranged to slide within the tail end of the hollow shaft 24 and is provided with a spring 55 for forcing it outwardly. The outer end of said rod is provided with suitable lugs 56, by means of which it is connected to the swinging lever 51. Said rod is provided with a wedge or cone 57 for being forced in between the tails of the chuck-levers 58, which levers are pivoted within the hollow shaft 24 at 59, Fig. 4, and the chuck or grasping jaws 28 are on the outer ends of said levers. A spring 64 acts on the tails of the chuck-levers 58 with a constant tendency to move said levers in the direction to open the grasping-jaws 28. The inner end of the sliding rod 54 is provided with a plunger 60 for acting upon the knock-out slide 61. Said knock-out slide is mounted on the pilot-shaft 30. This pilot-shaft is concentric to and within the head end of the hollow shaft 24 and is made rigid therewith by a cross-head 62, that is bolted or otherwise fastened to the head end of the said hollow shaft. The knock-out slide has rigid therewith two knock-out fingers 63, that pass through suitable ways, so that they may extend outwardly to bring their ends about flush with the face of the chuck-jaws 28. A ring or sleeve 65 slides on the pilot-shaft 30 and is rigidly connected with the knock-out fingers, so as to move longitudinally with the knock-out slide. The tails of the pilot-levers extend outwardly through slots in the pilot-shaft 30, so as to be acted upon by said sleeve 65. A spring 66, acting in one direction on the knock-out slide 61 and in the opposite direction on the end of the pilot-shaft 30, has a tendency to hold the sleeve 65 firmly upon the tails of the pivot-levers and thereby force the split pilot—that is, the outer projecting ends of said levers—open. When the sleeve is forced in the opposite direction, so as to release the tails of the pilot-levers, the split pilot is free to shut up or contract.

A rock-shaft 67 for the shipper-lever 68 extends from front to rear through the frame C and carries at its rear end a short arm 73, bearing two lugs or rollers 69, Figs. 7 and 9, for being acted upon by the shipper-rock-shaft cam 18, so as to move said rollers relatively to the cam from the position indicated by broken lines in Fig. 7 to the position shown in full lines. The side view of this cam, Fig. 9, shows that its shoulders or inclines are arranged nearly diagonally to each other and stand in reverse directions, so that when the half diagonally opposite the half shown in Fig. 7 comes in contact with the rollers it moves the lugs or rollers 69 laterally to their former position, whereby a rocking movement is imparted to the rock-shaft 67 for operating the shipper-lever 68. A suitable driving-belt will be placed on the fast and loose pulleys 26 27, so that the shipper will shift the belt from one of said pulleys to the other and back again repeatedly.

In axial alinement with the hollow shaft 24 of the lathe-head is the longitudinally-sliding nut-carrier 70. It is reciprocated by means of the rock-shaft arm 71 of the carrier rock-shaft 72 and the cam 14 on the cam-shaft, said cam acting upon two rollers of a short arm 74 on the rear end of the rock-shaft. This short arm 74 is only shown in plan view, Fig. 1, and its rollers are therein hidden from view. The arm and rollers are, however, the same as those of the short arm 73 on the rock-shaft 67, Fig. 9, and therefore it is considered unnecessary to further illustrate the same. The nut-carrier 70 has mounted on the end which faces the chuck a pusher 75, and on opposite sides of said pusher are the carrier-jaws 76. Said jaws are mounted on the carrier-jaw levers 77, which levers are hinged to a cross-bar 78 and are yieldingly held together by the tie-bolt 79 and spring 80. Said parts are mounted to slide longitudinally at times on the sliding carrier, and when free they are held in the position shown by means of the cross-bar spring 81, Fig. 12.

The machine is intended for dressing either broad side of the nut with any suitable cutting or turning tool. The nuts may be fed to the carrier in any desired manner—as, for example, by hand. Although portions of a feed mechanism and of the facing mechanism are incidentally shown, no further reference to them need be made, as the present invention relates to the mechanism for presenting the nuts to the grasping-jaws and related parts. A nut is placed in the carrier-jaws 76 from the rear and of a size that will fill said jaws

sufficiently to cause the nut to be held against accidentally falling out of the jaws. The carrier is moved toward the chuck-jaws by means of the cam 14 and parts between said cam and carrier to present the nut to the jaws when they are open and when the split-pilot levers are released and the pilot, so to speak, is collapsed. The split pilot steers or guides the nut into place by entering the hole in the nut. It is immaterial whether the nuts have been tapped or not. As the carrier-jaws strike the chuck-jaws their movement in that direction is stopped; but the carrier and pusher continue their movement until the nut is forced fully home in the grasping-jaws, and then the carrier retreats. The chuck-operating cam 21 acts to draw the chuck-rod and wedge or cone 57 in between the tails of the chuck-levers 58 for closing the jaws upon the nut and also to withdraw the plunger 60 from the knock-out slide, so as to bring the sleeve 64 for the pilot-levers over their tails and thereby open the split pilot, so as to firmly fill the hole in the nut and center the nut on the pilot. This expansion of the split pilot will take place a little in advance of closing the chuck-jaws. The chuck-rod may be small enough to spring sidewise slightly, or it may be loosely fitted in its bearings or otherwise made to yield slightly, so that while the chuck-levers are forced apart by the wedge or cone a given distance the said cone does not center the nut in the jaws, but merely acts to force the grasping-jaws upon the nut while it is fixed in position and centered by the pilot. With the nut thus held on the pilot within the chuck-jaws the shipper-cam and connected parts throw the driving-belt upon the fast pulley 26 for revolving the hollow shaft and chuck to perform any desired work on the nut. At about a half-revolution of the cam-shaft the shipper-cam acts to throw the driving-belt upon the loose pulley, and the brake-lever cam 17, acting on the fast pulley 26 through the brake-lever 82, stops the hollow shaft and chuck and withdraws. The stop-lever cam releases the stop-lever 33 to the action of its spring 34, Fig. 3, to bring the opposite end of the stop-lever into the path of the shoulders on the stop-disk 32. The pawl-carrier cam 20 and connected parts act to move the pawl-carrier for turning the shaft 24 through the ratchet and pawl until one of the shoulders on the stop-disk comes in contact with the end of the stop-lever, so as to always stop the grasping-jaws in one of six equidistant positions and always bring the grasping-faces of the chuck-jaws into a position parallel to the six edge faces of the hexagonal nut as held within the carrier. The cam 21 also acts to move the rod 54 to withdraw the wedge or cone 57 from between the chuck-levers, permitting the jaws to open and also to force the plunger against the knock-out slide 61 for releasing the pilot-levers and contracting the split pilot and when thus contracted to carry the knock-out slide along to knock the nut off from the split pilot and out of the chuck-jaws ready to repeat the operations hereinbefore described. It should, however, be noted that the highest or most prominent side projection of the cam 21, Fig. 8, acts first to carry the knock-out fingers outwardly for knocking off the nut, and then as said highest point passes the roller on the chuck-lever allows the knock-out fingers to retreat far enough to receive a new nut, while the second projection on the cam holds the chuck-rod 54 still against the knock-out slide, so as to prevent the sleeve 65 from expanding the split pilot until after the nut is forced into place thereon. It will also be noted that the sleeve 65 is let back to expand the pilot a little before the cone or wedge 57 acts to close the grasping-jaws.

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I claim as my invention—

1. The combination of the revolving chuck-jaws with a divided or split pilot and means for contracting and expanding said pilot, substantially as described.

2. The combination of the revolving nut-grasping jaws with a pair of pivoted pilot-levers mounted within the shaft on which said grasping-jaws are mounted and means for contracting and expanding the pilot ends of said levers, substantially as described.

3. The combination of the pilot-levers forming the split pilot at their outer ends, with the pilot-shaft within which said levers are pivoted, the knock-out slide 61, the operating-sleeve 65, and knock-out fingers carried by said knock-out slide and means for reciprocating said knock-out slide, substantially as described.

4. The combination of the grasping-jaws, the pilot-levers forming a split pilot within said jaws, and a single reciprocating rod acting to operate said grasping-jaws and also to operate the said pilot-levers, substantially as described.

5. The combination of the hollow shaft, the grasping-jaws and their levers, the pilot-levers mounted between the outer ends of the jaw-levers, the rod 54 for operating said jaw and pilot levers, the swinging lever 51 connected with said slide-rod and the cam 21 for operating said swinging lever, substantially as described.

6. The combination with the lathe-head shaft of a stop-disk mounted thereon, a stop for acting in connection with said disk, a ratchet mechanism for partially rotating the shaft to bring the stop-disk and stop into engagement, and means for engaging and actuating said ratchet mechanism, substantially as described.

7. The combination of the lathe-head shaft, with a shipper for putting on and off the driving means, a brake mechanism, a stop mechanism and yielding mechanism for partially rotating the shaft to bring the stop mechanism into engagement after the driving means for the shaft has been cut off by the shipper, substantially as described.

8. The combination of the sliding nut-carrier having the pusher 75 fixed thereon, with the carrier-jaws, yieldingly mounted relatively to the longitudinal movement of said carrier and pusher, substantially as described.

9. The combination of the nut-carrier, its operating mechanism, the shaft 24, grasping-jaws 28, the split pilot within said jaws, operating mechanism for said grasping-jaws and pilot, the shipper mechanism, brake mechanism, stop mechanism, and yielding mechanism for partially rotating the shaft for bringing the stop mechanism into engagement, substantially as described.

10. The combination of a lathe-head shaft, the pilot and holding jaws mounted thereon the longitudinally-sliding nut-carrier in axial alinement with the said shaft a stop-disk mounted on said shaft, a stop for acting in connection with said disk, and spring-actuated mechanism for partially rotating the shaft to bring the stop-disk and stop into engagement substantially as described.

11. The combination of a lathe-head shaft, the pilot and holding jaws mounted thereon, and the sliding nut-carrier having the pusher 75 with the carrier-jaws yieldingly mounted relatively to the longitudinal movement of said pusher and arranged to move in advance of said pusher until they engage the said holding-jaws, substantially as described.

12. The combination of the sliding nut-carrier, its operating mechanism, the lathe-head shaft, the grasping-jaws mounted thereon, operating mechanism for said grasping-jaws, the shipper mechanism, stop mechanism, yielding mechanism for partially rotating the shaft for bringing its stop mechanism into engagement, and a cam-shaft with cams for operating said shipper, stop and yielding mechanism, substantially as described.

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