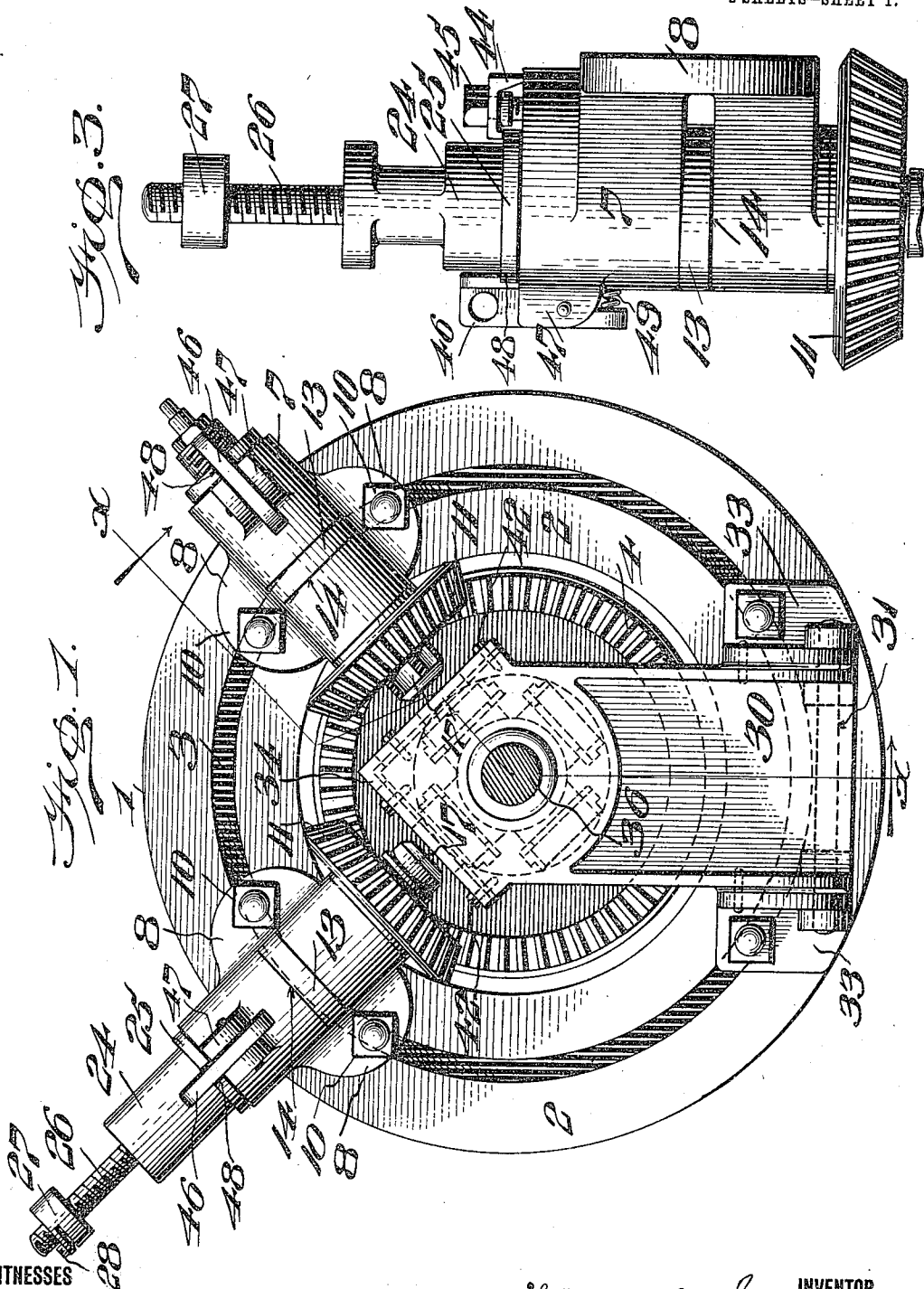


H. O. EVANS.
 FEED MECHANISM FOR SPINDLES FOR MACHINE TOOLS.
 APPLICATION FILED OCT. 23, 1909.

960,295.

Patented June 7, 1910.

2 SHEETS—SHEET 1.



WITNESSES

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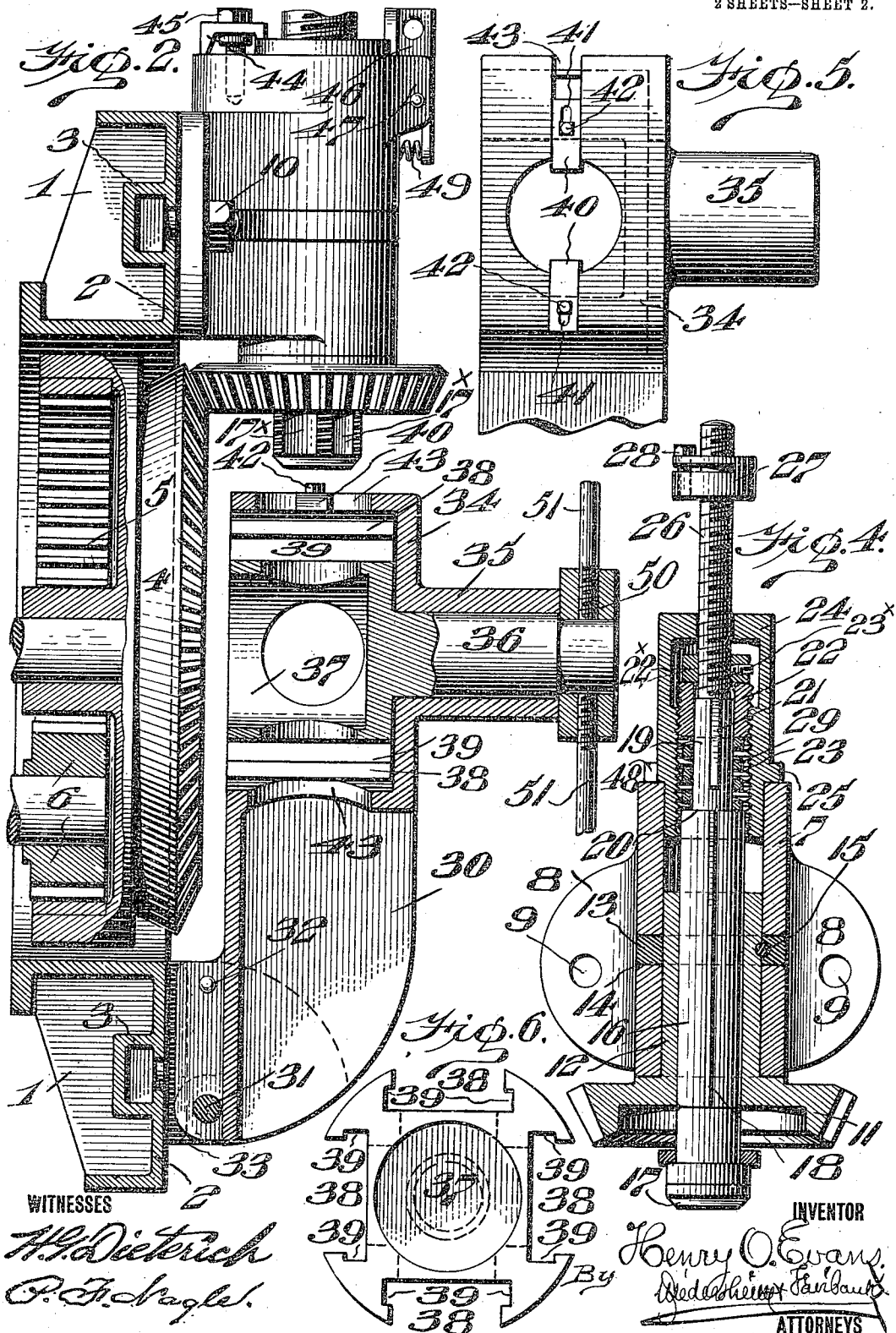
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UNITED STATES PATENT OFFICE.

HENRY O. EVANS, OF DETROIT, MICHIGAN.

FEED MECHANISM FOR SPINDLES FOR MACHINE-TOOLS.

960,295.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed October 23, 1909. Serial No. 524,134.

To all whom it may concern:

Be it known that I, HENRY O. EVANS, a citizen of the United States, residing in the city of Detroit, county of Wayne, State of Michigan, have invented a new and useful Feed Mechanism for Spindles for Machine-Tools, of which the following is a specification.

This invention relates to an improvement in feed mechanism for spindles for reaming and facing tools and has for an object to provide a spindle which may form a part of and operate as a complete reaming machine or the same may be fitted to a tapping or like machine when it is desired to finish a part by either reaming or facing, as the case may be.

In devices as heretofore constructed for finishing work which has been tapped or the like, it has been necessary to utilize a plurality of cams and like complicated structures in order to control the reaming mechanism and such machines are not only expensive but readily get out of order and the cost to maintain in operative condition is exceedingly high.

In my present invention I have devised a simple and inexpensive spindle mechanism adapted to cooperate with the bed of an ordinary tapping or like machine and which operates effectively to finish and face tapped parts and surfaces.

It further consists of a spindle so arranged and constructed that the tool may operate at any angle desired and furthermore is adapted to be connected to the main portion of a tapping or like machine so that its action is entirely automatic and both the working and withdrawing strokes may be made entirely independent of outside supervision.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention I have shown in the accompanying drawing one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a front elevation of a machine embodying my invention. Fig. 2 represents a section on line $x-x$, Fig. 1. Fig. 3 represents a side elevation of my novel spindle in assembled position. Fig. 4 represents a longitudinal section of the same. Fig. 5 represents a detail of a portion of the chuck mechanism. Fig. 6 represents an end view of the same.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates the main frame of a tapping or like machine to which my invention is adapted to be secured and cooperate, the machine as here shown, having a face plate 2 provided with a groove 3 preferably circular and serving as an attaching means for a tool or tools, as the case may be, for engagement with the part to be machined.

4 designates a driving gear suitably mounted for rotation on the main frame 1 of the machine and driven, in the present instance, by means of an internal gear 5 and pinion 6, which latter derives power from any suitable source.

7 designates a sleeve having preferably integral therewith a base plate 8 provided with openings 9 therein, through which latter securing bolts 10 or like fastening means are adapted to pass and engage the groove 3 of the base plate 2, whereby the tools carried by the sleeve 7 may be accurately positioned upon the machine.

11 designates a gear adapted to mesh with the driving gear 4 and having, in the present instance, an annular hub 12 integral therewith and adapted to fit within the sleeve 7 for rotary movement relative thereto. In order to prevent displacement of the gear 11 a collar 13 is provided which fits within a suitable slot 14 of the sleeve 6 and between which and the hub 12 is located a key 15, as will be apparent.

16 designates a spindle adapted to carry on the end thereof a facing or reaming tool or the like, as may be desired and in order that it may rotate with the gear 11 a key or spline 18 is provided between the two. A portion 19 of the spindle 16 is reduced in the present instance to form a shoulder 20, for a purpose to be presently described. This portion 19 has slidably secured thereto by a key 21, a leader nut 22, which latter is suitably threaded for engagement with the internal threads 23 of a cap 24, here shown

as partially fitting within the sleeve 7 and provided with a flange 25 serving as an abutment against the end of the sleeve 7. A portion of the spindle 16 is threaded, as at 26, and projects exterior of the cap 24 in order to provide adjusting means to limit the travel of the leader nut 22. This adjusting means in the present instance consists of a split nut 27 threaded on the spindle 16 and provided with a bolt 28 whereby the split portions of the nut 27 may be drawn together and securely lock the nut in any adjusted position. It will be apparent that as the spindle 16 passes through the cap 24 the nut 27 will be brought into engagement with the cap 24 and thereby prevent further feeding movement of the tool 17.

29 designates a spring encircling the portion 19 and located between the leader nut 22 and the shoulder 20, whereby a yielding pressure is exerted upon the spindle 16, which allows the leader nut 22 to feed against the compression of the spring after the split nut 27 has contacted with the said cap 24. In order to effect the return of the spindle 16, I preferably provide a collar 22* secured by a set screw 23* or the like to the spindle 16 and positioned to co-act with the nut 22.

It will of course be understood that the nut 27 is positioned upon the spindle 16 so as to contact with the cap 24 when the reaming is done and the spacing position is obtained and therefore as soon as it comes into determined position the forward feeding ceases and the spindle revolves until a smooth surface is faced, the further forward movement of leader taking place against the spring 29.

It will of course be understood that various types of tools may be used in connection with my novel spindle but in the present instance I have shown the same as having attached thereto in one instance, a facing tool 17 and in the other a reaming tool 17*.

The device as here shown is more particularly adapted for the reaming and facing of nuts, which are held in a suitable chuck consisting in the present instance of a bracket 30, suitably pivoted as at 31 to the main frame 1 and adapted to be locked in operative position by means of a pin 32 co-operating with suitable lugs 33 of the said main frame 1, as will be readily understood. This bracket 30 terminates in a hollow head 34 and is provided with a tubular extension 35 forming a bearing for the shank 36 of chuck member 37. This member is preferably provided with a plurality of slots 38 having recessed portions 39 at each side, whereby a nut or the like may be slipped into place and accurately positioned with respect to the reaming and facing or tapping tool.

In order to maintain and hold the nuts

or stock accurately in position, I preferably provide a plurality of fingers 40 adjustably mounted on the head 34 by means of a slot 41 and bolt connection 42, the fingers projecting a sufficient distance to rest upon and firmly grip the part to be held. It will be noted that the head is provided with suitable openings 43, whereby an operating tool may be passed completely through the chuck from one side to the other in the cutting operation, if it be necessary.

In order to prevent displacement of the cap 24 I preferably provide a clamp 44 adapted to engage the flange 25 of the same and be securely held in place by means of a bolt 45 or other fastening device, as may be desired. In addition to the clamp 44 a further securing means is provided to hold the cap 24 from turning with the leader nut 22, the same consisting as here shown, of a key 46 suitably pivoted to ears 47 formed on the sleeve 7 and adapted to engage a slot 48 of the flange 25. The key 46 is maintained normally in locking position through the medium of a spring 49, co-acting with the sleeve 7 and the operation will be readily understood.

The movement of the chuck 37 to bring the stock or nuts successively into alinement with the facing or reaming tools is controlled in the present instance by means of a collar 50 fixedly secured to the shank 36 and having rods 51 or the like threaded therein so that the shank 36 and its adjuncts may be rotated, as desired.

In operation, the chuck bracket 30 is suitably positioned and secured upon the face plate 2 of a suitable machine and the reaming and facing sleeves 7 also secured to the plate 2 in proper relation to the chuck head 34 in which, as will of course be understood, the nuts or like parts to be reamed or faced have been secured by means of the fingers 40. The gear wheel 4 is driven from any suitable source of power and transmits the same to the gears 11, which actuate the spindle 16 of each tool to simultaneously advance, one engaging a nut for reaming and facing, while the other engages a nut already reamed and faced to tap the same. The stop member 27 is positioned correctly upon the spindle 16 so as to prevent further feeding movement of the tool after the cutting operation has been completed and at this time it is understood that the machine automatically reverses and the leader nut 22 co-acting with the collar 22* withdraws the respective spindle which it controls and the bracket 30 may then be swung to one side and the nuts replaced by unfinished ones or the handles 51 may be rotated without moving the bracket and two other faces of the chuck brought into alinement with the tools for a similar operation.

It will now be apparent that I have de-

vised a new and novel spindle mechanism automatically operating to face and ream nuts in a tapping or like machine operating in combination with a chuck member adapted for use in connection with said spindle mechanism.

It will now be apparent that I have devised a novel and useful construction which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description and while I have in the present instance shown and described the preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. In a device of the character described, a sleeve, a spindle rotatably mounted therein having a reduced portion forming a shoulder, a threaded member splined to said reduced portion for sliding movement, resilient means between said member and shoulder, a relatively fixed thread cooperating with said threaded member, a stop secured to said spindle and means to rotate said spindle.

2. In a device of the character described, a sleeve, a spindle rotatably mounted therein having a reduced portion forming a shoulder, a threaded member splined to said reduced portion for sliding movement, a spring

between said member and shoulder, a cap fixedly secured to said sleeve, internal threads on said cap cooperating with said threaded member, a stop secured to said spindle and means to rotate said spindle.

3. In a device of the character described, a sleeve, a cap fixedly secured to said sleeve, internal threads on said cap, a spindle rotatably mounted in said sleeve and extending exterior of said cap, a leader nut on said spindle having threaded engagement with said internal threads of said cap, a collar secured to said spindle abutting said leader nut, a stop on said spindle, means between said leader nut and spindle to drive said spindle, and yielding means coacting with said nut whereby the latter may move independent of said spindle.

4. In a facing and reaming apparatus, a bracket having a recessed head and a plurality of openings therein, a chuck rotatably mounted in said head and having a plurality of receptacles therein normally in alinement with respective openings in said head, and means to lock a plurality of members in said chuck.

5. In a facing and reaming apparatus, a bracket having a recessed head and a plurality of openings therein, a chuck rotatably mounted in said head and having a plurality of receptacles therein each adapted to hold a member to be machined, means to lock said members in said chuck, and means to turn said chuck relative to said head.

HENRY O. EVANS.

Witnesses:

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L. E. A. GLOWINSKI.