No. 638,880. Patented Dec. 12, 1899.

W. A. PENDRY.

TURNING TOOL.

(Application filed Jan. 21, 1899.)

(No Model.) 3 Sheets—Sheet 1.

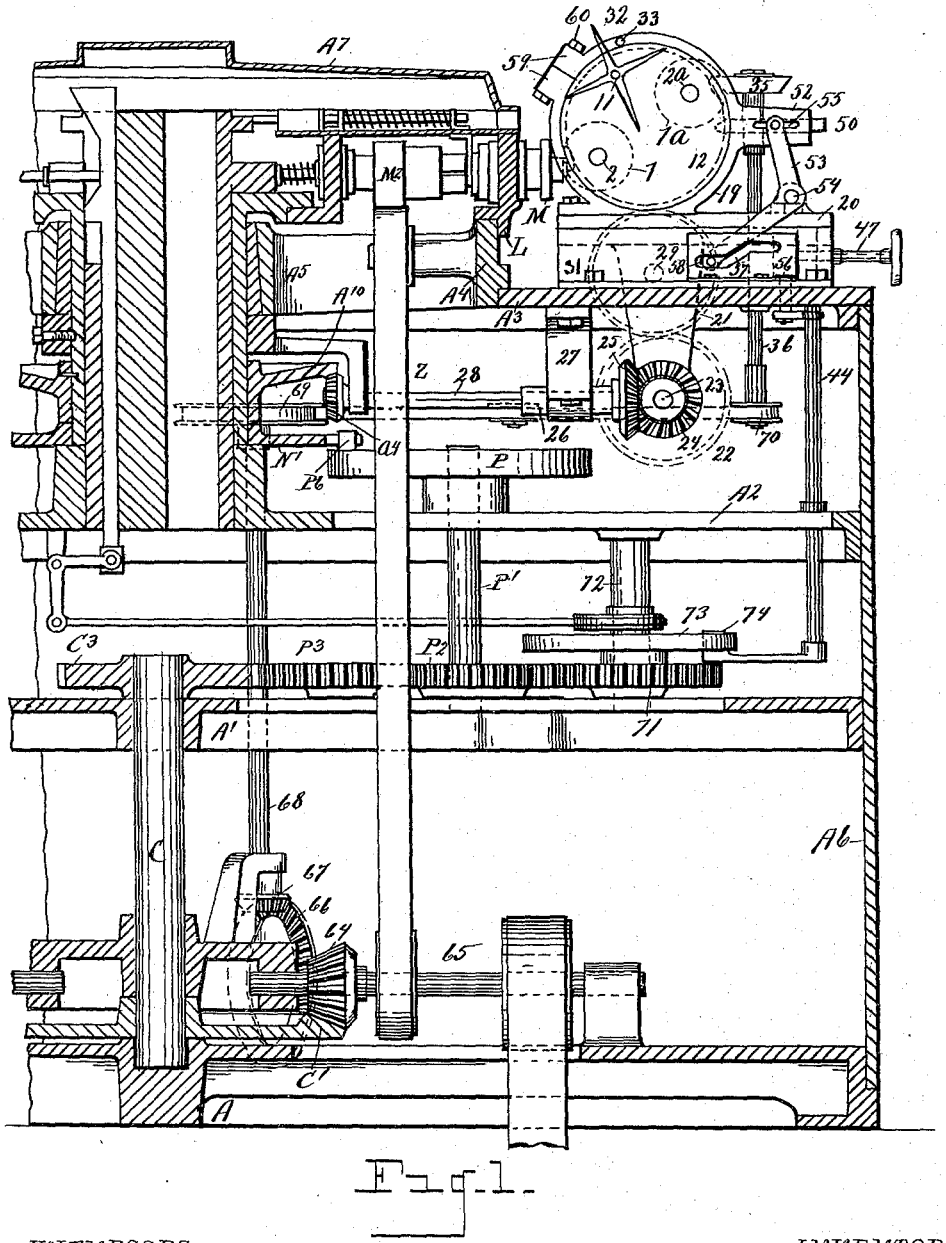

Fig. 1.

WITNESSES.

O. B. Barringer.

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3 Sheets—Sheet 2.

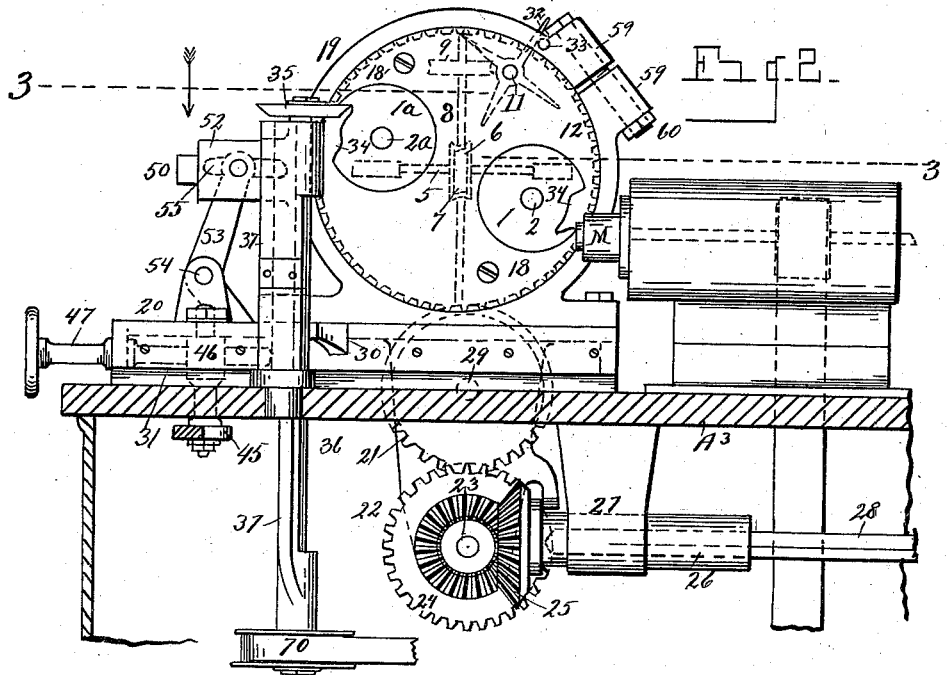

Fig. 2.

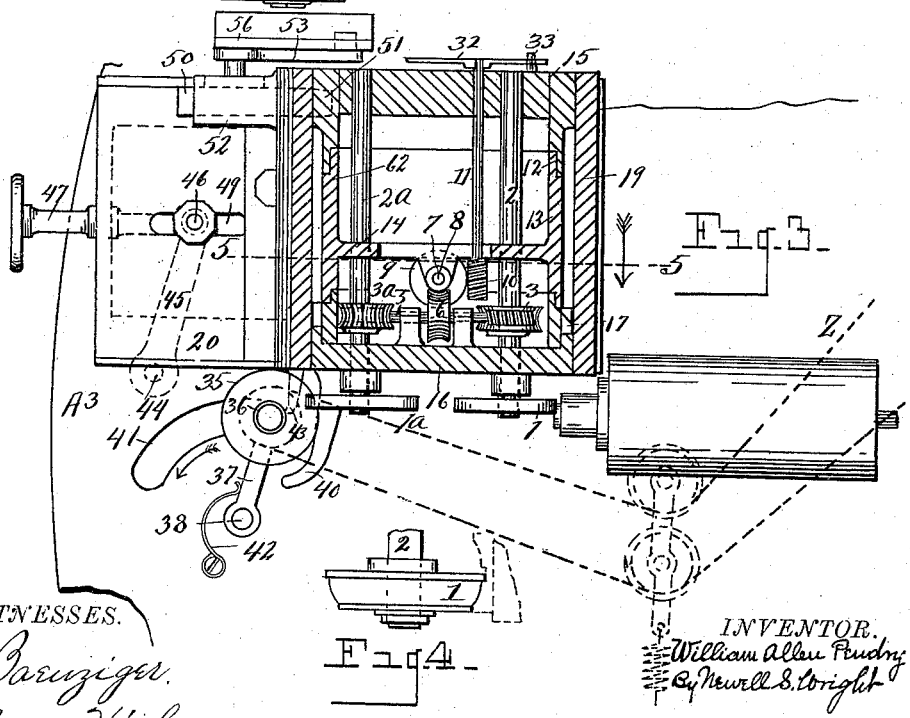

Fig. 3.

Fig. 4.

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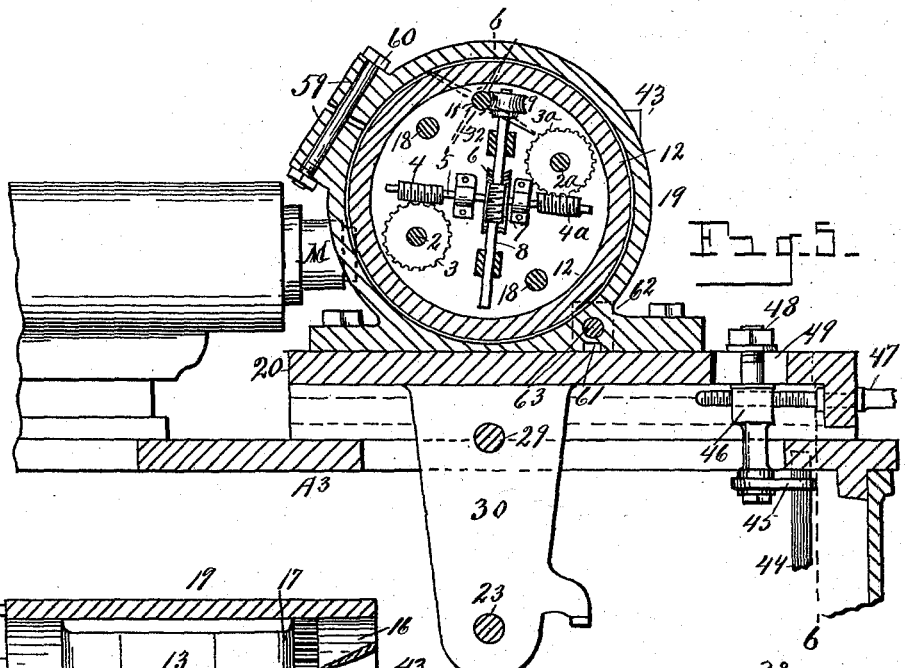

Fig. 5.

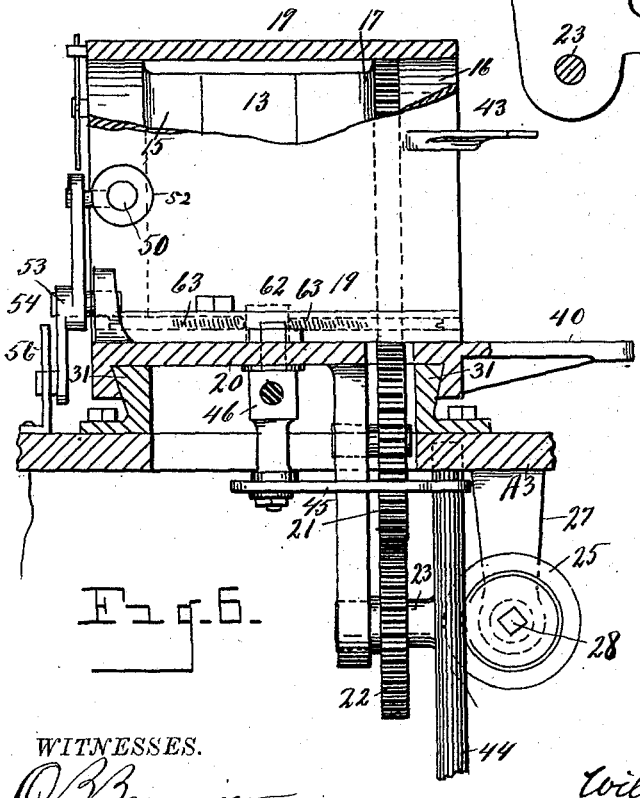

Fig. 6.

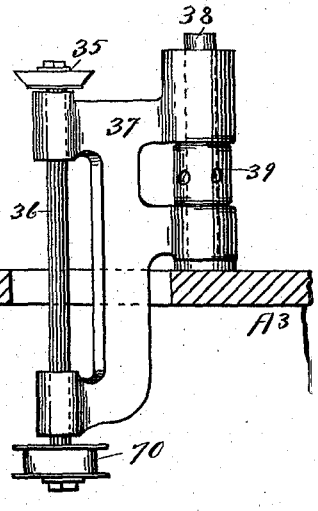

Fig. 7.

WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM ALLEN PENDRY, OF DETROIT, MICHIGAN.

TURNING-TOOL.

SPECIFICATION forming part of Letters Patent No. 638,880, dated December 12, 1899.

Application filed January 21, 1899. Serial No. 702,936. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ALLEN PENDRY, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Turning-Tools and Mechanism for Operating the Same; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in a turning-tool and mechanism connected therewith adapted for various purposes; and it consists of the devices and appliances hereinafter described and claimed, and illustrated in the accompanying drawings.

My improved turning-tool is specially adapted for use in making buttons of pearl and other materials, and I have illustrated the same herewith in connection with certain portions of button machinery; but I would have it definitely understood that I do not limit my invention to button machinery alone nor to the special construction of button-machinery parts herewith shown, the particular button machinery disclosed herewith being shown in the drawings and described in the specification simply to illustrate the construction and the particular adaptation of my invention, although, as above stated, the turning-tool and connected mechanism may be employed within the scope of my invention in a wider range of uses; but the illustrations and subjoined description will illustrate the construction and operation of the features more particularly forming the subject-matter of my present invention. The turning-tool may be used, for example, with an ordinary turning-lathe or with screw-cutting machinery or with automatic turret-lathes for reproducing duplicate parts among the various uses to which my invention may be applied.

Figure 1 of the drawings is a vertical section showing parts of a button-machine, showing features of my invention in elevation. Fig. 2 is a side elevation showing, on an enlarged scale, certain features of my improved cutting mechanism. Fig. 3 is a view in section on the line 3 3, Fig. 2. Fig. 4 is a detail view of one of the cutters in plan. Fig. 5 is a view in section on the line 5 5, Fig. 3. Fig. 6 is a view in section on the line 6 6, Fig. 5, showing the inside cylinder in elevation. Fig. 7 is a view in elevation showing the bracket or arm carrying the shaft of the grinding-wheel.

The numerals 1 and 1^a show turning-tools embodied in my invention, two such tools 1 and 1^a being shown, that number being preferably employed in my improved turning mechanism, although I do not limit myself to any given number of turning-tools that may be employed. The turning-tools are mounted upon a corresponding shaft (indicated at 2 and 2^a.) The tool 1 is shown in the accompanying drawings in operation, while the tool 1^a is shown out of operation. The shafts 2 2^a are provided with a worm-gear 3 3^a, operated by corresponding worms 4 4^a upon a shaft 5. Upon the shaft 5 is an additional worm-gear 6, meshing with a worm 7 upon a shaft 8, upon which is mounted a worm-gear 9, meshing with a worm 10 upon a shaft 11. The shafts hereinbefore mentioned, with their gearing, are mounted in a rotatable cylinder 12. The rotatable cylinder 12 is preferably constructed with an intermediate cylinder-body 13, formed with a web or diaphragm 14 with heads 15 and 16 and with a toothed cylinder 17, forming a gear by which the complete cylinder is rotated. The various parts of the cylinder, it will be understood, may be bolted together in any suitable manner, as indicated at 18. A non-rotatable cylinder 19 is mounted upon a slide 20, having a reciprocatory movement, the cylinder 19 inclosing the periphery of the rotatable cylinder 12, the latter cylinder effectually excluding dust and dirt from the gears therewithin.

The cylinder 12 may be rotated in any suitable manner, as by a gear 21, meshing with a gear 22 upon a stud 23, which may also be provided with a bevel-gear 24, meshing with a gear 25 upon a reciprocatory and rotary sleeve 26. The sleeve 26 is mounted in a bearing 27, secured to the bed A^3 of the machine. The sleeve 26 is rotated by a shaft 28, which may be a squared shaft engaged therewith, the shaft 28 being driven from any suitable source of power. The gear 21 is mounted

upon a stud 29, carried by a bracket 30 upon the carriage or slide 20.

The bed A^3 is provided with ways 31, upon which the slide 20 reciprocates. The slide 20 may be reciprocated in any suitable manner. Upon the shaft 11 is a star-gear 32. Upon the outer cylinder 19 is a striking-pin 33, one or more such pins being employed, as may be desired. It will be evident that as the inner cylinder 12 is rotated the star-gear 32, striking against the pin or pins 33, would be rotated thereby, causing a corresponding rotation of the worm-gears hereinbefore mentioned and a corresponding rotation of the turning-tools 1 1^a. The turning tool or tools may have any desired conformation on the outer periphery thereof corresponding to the form desired to be produced upon the work thereby, as upon the surface of a button, for example.

The turning-tool is constructed primarily of annular form and is then provided with a gap, (indicated at 34,) of any desired form to form a cutting edge. It is evident that a turning-tool so constructed may be readily ground or sharpened without disturbing the conformation of the cutting edge.

My invention, as already observed, contemplates the mounting of such a tool upon a rotatable shaft within a rotatable cylinder and by which the position of the tools may be made interchangeable, one turning-tool being in working position while the other turning-tool is in a position to be sharpened or ground. My invention further contemplates means by which the turning-tools may be automatically ground when out of operation or working position. By making the shafts of the turning-tools revoluble the tools themselves may be given a proper rotation to compensate for the grinding away of the cutting-face thereof. My invention contemplates to this end also the provision of a suitably-mounted wheel 35, which may be mounted upon a shaft 36, driven from any suitable source of power. The shaft 36 is preferably mounted in a movable arm or bracket 37. This bracket has a jointed or hinged engagement upon a post 38, which may be provided with an adjusting-nut 39 upon said post by which the bracket 37 may be adjusted vertically, as may be required.

When it is desired to move the grinding-wheel out of the way of one of the turning-tools in order to shift the position of the turning-tool, the bracket 37 may be swung over into inoperative position. The grinding-wheel may be thrown out of operative position in any desired manner. As shown, the outer case 19 is provided with a spur 40, which when the outer case is reciprocated strikes against the bracket and causes it to swing outward upon its post 38.

The bed A^3 of the table may be constructed with an arc-shaped slot 41, through which the shaft 36, carrying the grinding-wheel, passes, together with a corresponding portion of the bracket 37. A spring 42 may serve to keep the bracket and the grinding-wheel in their normal position. On the stationary cylinder 19 is a spur 43, against which the bracket 37 will strike when in normal position to prevent the grinding-wheel from making too great a depth of cut in the turning-tool. Any suitable means, however, may be employed to hold the grinding-wheel in proper operative position.

Any desired means may be employed to reciprocate the outer cylinder 19. Those shown in the accompanying drawings consist, essentially, of an oscillatory shaft 44, said shaft being oscillated by any suitable means. To this shaft is engaged a crank-arm 45, attached to a post 46, movably engaged with the slide 20. An adjusting-screw 47 serves to adjust the position of the post 46. After the adjustment by means of a tightening-nut 48 the post 46 may be securely held in adjusted position. The slide 20 is provided with an elongated slot 49 to permit the adjustment of said post.

To hold the inner cylinder 12, with its cutters, firmly in operative position while a given tool is making its cut, as shown in the drawings, I provide a reciprocatory bolt 50, normally entering a socket 51 in the head of the cylinder 12, as indicated more particularly in dotted lines in Fig. 3. The outer cylinder 19 is provided with a sleeve-bearing 52 to carry the bolt 50. A bell-crank 53, fulcrumed, as at 54 to the sliding carriage 20, is connected with the bolt 50, the bearing 52 being constructed with an elongated slot 55 to permit the operation of the bell-crank in connection with said bolt. Upon the bed A^3 is engaged a stationary bracket 56, constructed with a cam-groove 57. The lower arm of the bell-crank 53 is provided with a roller 58, riding in the cam-slot 57. It will be seen that as the cylinder 19 reciprocates in one direction the roller 58, rising in the cam-slot 57, will throw outward the upper end of the bell-crank, retracting the bolt 50, releasing the inner cylinder, and permitting its rotation. The reverse movement of the cylinder 19 will restore the bolt 50 into locked position.

The outer cylinder 19 is preferably slitted and provided with ears, (indicated at 59,) through which is passed a bolt 60 for tightening the outer-cylinder upon the inner cylinder. The cylinder 19 has a movable engagement upon the slide 20 in a direction transverse to the reciprocation of the said slide to adjust the turning-tools to the work with greater accuracy. The slide 20 may to this end be provided with a guide 61 and with a "snug" 62. The cylinder 19 carries adjusting-screws 63, impinging against opposite sides of the snug 62, by which means the position of the cylinder 19 may be very carefully adjusted upon the slide.

M denotes any suitable rotatable chuck to carry the work. As my present invention does not contemplate any specific construction of the chuck, it will be unnecessary to

further describe the same, inasmuch as a chuck corresponding to the chuck shown in Patent No. 581,830, dated May 4, 1897, may be employed or any other suitable chuck for carrying the work required to be done.

While I do not limit myself to any special means of operating the parts hereinbefore described as applied to a button-making machine, the various features embodied in my said patent may be employed in the turning-tool and related mechanism as applied to a button-making machine. To this end, as shown in Fig. 1 more particularly, A is the base of a button-making machine, provided with a spider A′, a support A^2, and the bed A^3. A^6 is the case of such a machine, and A^7 the top or covering. C is a shaft provided with a gear C^3. L is a rotatable turret carrying the chuck or chucks M. A^{10} is a gear mounted upon the arbor of the rotatable turret. The turret is driven by the gear C^3 through the gears P^3 and P^2 on the shaft P′, said shaft carrying a disk P, provided with a spur or arm P^6, which actuates a disk or number plate N′ upon the hub of the gear A^{10}. The gear A^{10} drives a pinion a^4 upon the shaft 28. The shaft 28 is provided with the gear 25, already described. C′ is a gear upon the shaft C, meshing with a pinion 64 upon a shaft 65, from which latter shaft is driven the chuck M. Upon a shaft similar to 65, but upon another plane, is a gear 66, meshing with a pinion 67 upon a shaft 68, provided with a pulley 69, belted with a pulley 70 upon the shaft carrying the emery-wheel, already described. A gear 71 upon the shaft 72 meshes with a gear P^2. The shaft 72 carries a cam 73, which operates the wiper 74, actuating the shaft 44, already described.

When the turning-tool and its immediately-connected mechanism is applied to a turning-lathe or to other purposes than for use in a button-making machine, it will be understood that the various parts of the novel mechanism hereinabove described will be driven otherwise and by any suitable means.

The operation of the mechanism constituting my present invention is as follows: The turning-tool in working position is non-rotatable while performing its work, the chuck carrying the work being rotatable. At the same time the reciprocatory slide is advancing the turning-tool toward the work by the mechanism already described. When the work is accomplished, the reciprocatory slide is retracted, carrying the turning-tool away from the work, and at the same time the grinding-wheel is swung out of operative position, as above set forth. The locking mechanism for holding the inner cylinder in locked position while the tool is at work is also at the same time retracted to permit the rotation of the inner cylinder. The rotatable turret L is then given a rotary movement sufficient to carry the work already operated upon to the next step and to bring an adjacent chuck into working position. The rotation of the turret rotates the inner cylinder by the means already described, carrying the tool that has just done its work into position for grinding and carrying the tool that has just been ground into working position ready for the next operation. A partial rotation has also been given to both turning-tools to compensate for the wear in grinding. The locking mechanism again locks the inner cylinder in working position by the advancing of the reciprocatory slide, carrying the tool to the work.

The mechanism may be advanced to carry the tool to the work when used on an ordinary lathe by hand or other means. The chuck may also only have a rotatable movement within the scope of my invention. In an ordinary lathe the grinding-wheel may also be operated in any suitable manner.

I desire that the grinding-tool shall be doing its work while the reciprocatory mechanism is advancing to the work in order that the grinding-wheel may have longer effect upon the turning-tool. To this end the grinding-wheel is shifted out of working position at or near the limit of the retracting movement of the reciprocatory mechanism, while the grinding-wheel is restored to working position again when the reciprocatory mechanism begins to advance toward the work. To this end the spur 40 is arranged to strike the arm or bracket 37 toward the limit of the retracting movement of the reciprocatory mechanism. The release of the spur 40 from said bracket when the reciprocatory mechanism advances will of course permit the grinding-wheel being instantly restored to working position.

What I claim as my invention is—

1. A sharpening device, a turning-tool stationary in working position, a rotatable shaft carrying said tool, and means to partially rotate said shaft to compensate for the wear in sharpening the tool, substantially as described.

2. An annular turning-tool stationary in working position, a shaft carrying said tool, and a rotatable device carrying said shaft, said turning-tool rotatable transversely of the length of said shaft, substantially as described.

3. A turning-tool, a rotatable shaft carrying said tool, and a rotatable device carrying said shaft, said tool stationary in working position, substantially as described.

4. A rotatable device, a turning-tool stationary in working position, a shaft eccentrically mounted upon said device and carrying said tool, and a chuck arranged at right angles to said shaft, substantially as described.

5. A rotatable device, a sharpening device, a turning-tool, a shaft carrying said tool mounted upon said rotatable device, and means to give a partial rotation to said shaft, substantially as and for the purpose described.

6. A rotatable cylinder, a turning-tool, a shaft carrying said tool mounted in said cylinder, and mechanism housed within the cylinder and actuated thereby to give a partial rotation to said shaft, substantially as and for the purpose described.

7. A rotatable device, a turning-tool, a shaft mounted in said device carrying said tool at right angles thereto, and means to lock said device in a working position, substantially as described.

8. A rotatable device, a turning-tool, a shaft mounted in said device carrying said tool, means to lock said device in working position, and means to give to said shaft a partial rotation, substantially as described.

9. A rotatable device, a turning-tool, a shaft mounted in said device carrying said tool, means to lock said device in working position, and means to give to said shaft a partial rotation, and means to reciprocate said device, substantially as described.

10. A rotatable device, a turning-tool stationary in operation, a shaft mounted in said device carrying said tool, means to lock said device in a working position, and means to automatically rotate said device, substantially as described.

11. A rotatable device, an annular turning-tool constructed with a cutting edge at its periphery, a shaft carrying said tool mounted in said device, means to automatically rotate said device, and means to automatically give to said shaft a partial rotation, substantially as described.

12. A rotatable device, a turning-tool stationary in operation, a shaft carrying said tool mounted in said device, means to give to said tool a step-by-step partial rotation, and means to automatically sharpen said tool, substantially as described.

13. A turning-tool, means to carry said tool from a working position to a non-working position and to return the tool to working position, and a sharpening device to sharpen the tool when in a non-working position, said tool being stationary when in working position, substantially as described.

14. A turning-tool stationary in operation, means to carry said tool from a working position to a non-working position and to return the tool to working position, a sharpening device to sharpen the tool when in a non-working position, and additional means to move the tool toward and from the work, substantially as described.

15. Plural turning-tools, means to carry said tools from a working position to a non-working position and to alternately return the tools to working position, a sharpening device to sharpen said tools when in a non-working position, and means to shift said sharpening device toward and from a working position, substantially as described.

16. A turning-tool, a shaft to carry said tool, a rotatable device to carry said shaft and the turning-tool from a working position to a non-working position, mechanism to reciprocate said device, and means to turn said shaft upon the reciprocation of said device, substantially as described.

17. A turning-tool, a shaft to carry said tool, a rotatable device to carry said shaft and its tool from a working position to a non-working position, means to reciprocate said device, means to turn said shaft upon the reciprocation of said device, and means to adjust said reciprocatory mechanism at right angles to the line of its reciprocation, substantially as described.

18. Multiple turning-tools, a sharpening device, and means to interchange the position of said tools to bring said tools consecutively into position to be sharpened by said device and to return said tools consecutively to working position, said tools being stationary when in working position, substantially as described.

19. Multiple turning-tools, a shaft carrying each of said tools, means to interchange the position of said tools, and mechanism to give a partial rotation to each of said shafts, substantially as described.

20. Multiple turning-tools stationary in operation, a shaft carrying each of said tools, and a rotatable device carrying said shafts, substantially as described.

21. Multiple turning-tools stationary in operation, a shaft carrying each of said tools, a device carrying said shafts, and means to give a partial rotation to said device, substantially as described.

22. A rotatable device, multiple turning-tools stationary in operation, and shafts eccentrically mounted upon said device carrying said tools, substantially as described.

23. A turning-tool stationary in operation, a device to carry said tool from a working position to a non-working position and to return the tool to working position, means to reciprocate said device, and means to rotate said shaft and its tool when out of working position, substantially as described.

24. A rotatable cylinder, a shaft carried by the cylinder, a turning-tool mounted upon the shaft, means whereby the rotation of the cylinder shall effect a partial rotation of the shaft and means to hold the shaft stationary when the tool is in working position, substantially as described.

25. A rotatable device, mechanism to reciprocate the device, a shaft carried by said device, a turning-tool upon said shaft, a grinding-wheel, and means to withdraw the reciprocatory mechanism from working position and to withdraw the grinding-wheel from working position before said device is rotated, substantially as described.

26. A rotatable device, mechanism to reciprocate the device, a shaft carried by said device, a turning-tool upon said shaft, a grinding-wheel, means to retract the reciprocatory

mechanism from working position and to withdraw the grinding-wheel from working position before said device is rotated, said grinding-wheel being withdrawn from working position at or near the limit of the retracting movement of the reciprocatory mechanism, and means to restore the grinding-wheel to working position when the reciprocatory mechanism begins to advance, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

WILLIAM ALLEN PENDRY.

Witnesses:

N. S. WRIGHT,

MARY HICKEY.