K. L. SHEETS.

PIVOT POLISHING MACHINE.

APPLICATION FILED JUNE 12, 1912.

1,053,232.

Patented Feb. 18, 1913.

2 SHEETS—SHEET 1.

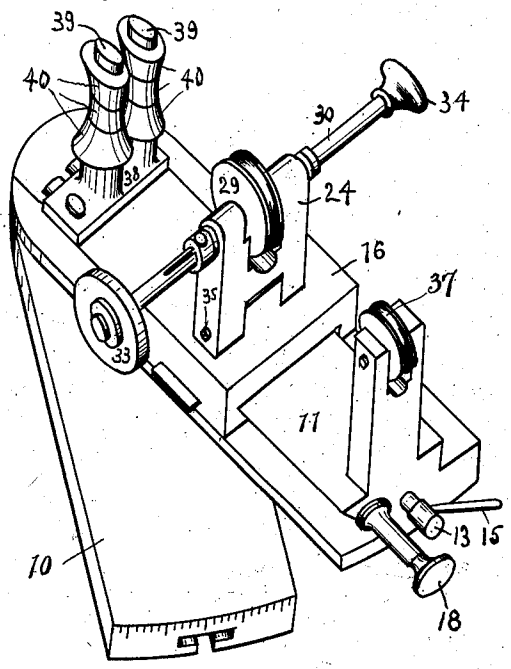


FIG. 1.

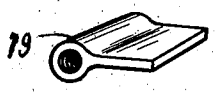


FIG. 3.

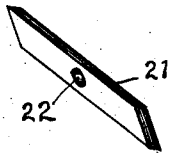
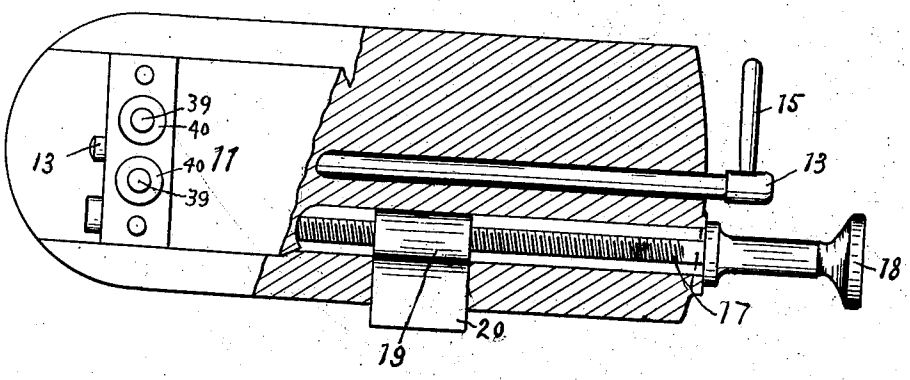


FIG. 4.

FIG. 5.

FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 6.

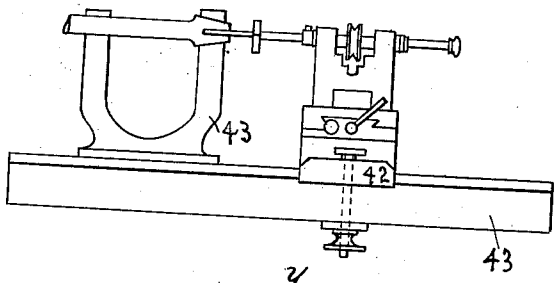
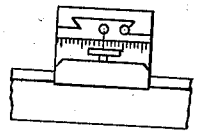


FIG. 7.



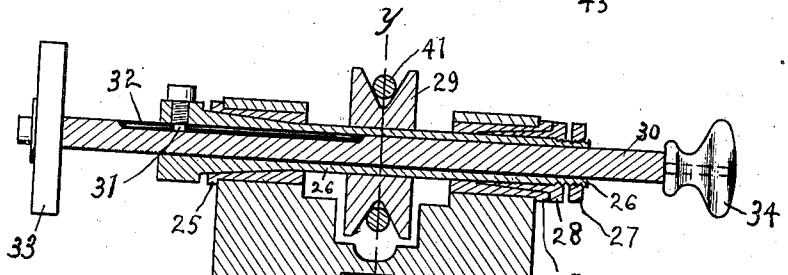
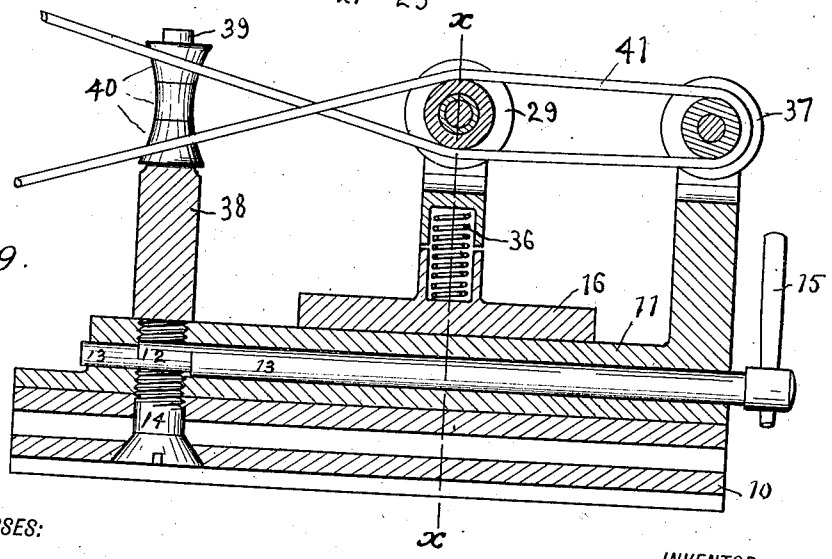


FIG. 8.

FIG. 9.



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PIVOT-POLISHING MACHINE.

1,053,232. Specification of Letters Patent. **Patented Feb. 18, 1913.**

Application filed June 12, 1912. Serial No. 703,361.

To all whom it may concern:

Be it known that I, KENNEY L. SHEETS, citizen of the United States, residing at Mount Vernon, in the county of Skagit and State of Washington, have invented a certain new and useful Improvement in Pivot-Polishing Machines, of which the following is a specification.

My invention relates to machines adapted to cut, polish, grind, turn or finish pivots or other forms of shaft journals, wherein is employed a lathe, with a suitable chuck for rotating a shaft, and a separately and independently driven abrasive cutting or polishing device like a rotating cutter, an emery-wheel or a copper disk charged with abrasive powder, but more particularly it relates to a machine for polishing, cutting, or turning small pivots like the pivots of watches; and the object of my invention is to provide a machine which shall be, first, simple in construction and operation, second, readily adjustable to different angles with respect to the axis of a pivot, and, third, adapted to work with such delicacy that the most minute pivot may be operated upon without breaking it. I attain these objects by devices illustrated in the accompanying drawings in which—

Figure 1 is a view in perspective of the principal portions of my invention, Fig. 2 is a plan view of parts partly in cross-section, Fig. 3 is a view in perspective of a traveling nut constituting a detail of my invention embodied in the structure illustrated by Figs. 1 and 2, Fig. 4 shows by a view in perspective a gib which forms part of the mechanism of my invention, Fig. 5 by a view in side elevation illustrates an elastic adjusting nut associated with the mechanism of my invention, Fig. 6 is a view in front elevation of my invention as applied to a watchmaker's lathe, Fig. 7 is a rear view in elevation of parts of my invention, Fig. 8 is a cross-sectional view in elevation of important parts of my invention on broken lines x—x of Fig. 9, Fig. 9 is a cross-sectional view in elevation of same on broken line y—y of Fig. 8.

Like reference numbers indicate like parts throughout the drawings.

Referring to the drawings, swingingly mounted on a base plate 10 is a slide-rest body 11 which is adapted to be clamped fast to base-plate 10 in a position at any desired angle relative thereto by the cam-like action of the eccentric portion 12 of a rod 13 when said rod 13 is turned by manipulation of arm 15 which is fixed in its end which projects from the front end of body 11. The said eccentric portion 12 of rod 13 is disposed within a hole in the fulcrum screw 14 through which rod 13 passes as shown most clearly in Fig. 9. The fulcrum screw 14 serves to hinge base-plate 10 and body 11 together and is disposed so that its axis is concentric with the circularly shaped ends of base-plate 10 and body 11. Upon body 11 is slidingly mounted a carriage 16 adapted to be moved backward or forward while guided by dove-tailed ways as illustrated in Fig. 1. The backward and forward movement of carriage 16 may be effected by the turning of a long feeding screw 17 whose knob 18 projects from the front end of body 11 and whose thread engages with a traveling nut 19 which nut 19 is shown in Fig. 3 provided with a projecting portion 20 which projects outwardly from the path of the nut 19 to engage with carriage 16, as shown in Fig. 2, whereby when the knob 18 is turned the nut 19 moves and its projecting portion 20 moves carriage 16 in a manner well known. To adjust the fitting of the carriage 16 to the dovetailed ways on the body 11 a gib 21 is disposed in one of the dovetailed ways of carriage 16 to engage with the dovetailed way of body 11 as shown in Fig. 8. The gib 21, as shown in Fig. 4, is provided with a depression 22 to receive and engage with a binding screw 23 whereby a tightening of said screw 23 may serve to tighten the fit of body 11 on dovetailed ways of base plate 10, or may serve to securely fasten body 11 and base-plate 10 together. In some operations, if it be desired, the carriage 16 may be moved forward and backward directly by hand in which case it will be necessary to remove the traveling nut 19 and dispense its use in such operations.

Flexibly mounted on carriage 16 is a support 24, of a form shown in Figs. 1 and 8, within which are disposed conical bearings 25 of well known form and which are adapted to receive and support a rotatable hollow spindle 26. On one end of spindle 26, a cone-shaped journal is provided which in form corresponds to the form of the conical bearing in which it runs while the journal of the other end of said spindle 26 is straight or of equal diameter throughout its length and this other end of spindle 26, for a suit-

able distance beyond its journal, is provided with a threaded screw adapted to receive a threaded and slotted nut 27 of a form shown in Fig. 5 whereby it is given a spring or elasticity to hug the threaded portion of spindle 26 and prevent its getting loose.

A sleeve 28 of conical shape is closely fitted on the straight journal end of spindle 26 and is adapted to fit and revolve within its respective conical bearing 25. The degree of freedom of fit of spindle 26 within its bearing is regulated by the position of nut 27 which may be turned on spindle 26 to force the cone shaped sleeve more or less into its respective bearing 25 in an obvious manner. On the spindle 26 is mounted and fastened a V shaped pulley 29 adapted to engage with a suitable belt moved by a suitable source of motion whereby spindle 26 may be rotated.

Within the hollow spindle 26 is disposed a shaft 30 which is movable longitudinally but which is prevented from moving circumferentially, or turning, with respect to said spindle 26 by an extended point of a screw 31 which projects through an enlarged portion of the end of spindle 26 into a longitudinal slot 32 provided in shaft 30 as shown in Fig. 8. This shaft 30 is adapted to have a rotary cutter or an abrasive wheel 33 (like an emery wheel or a copper disk charged with an abrasive dust) mounted on one end while the other end is provided with a freely mounted knob 34 adapted to be grasped by one's fingers to manipulate and guide the grinding wheel 33. As shown most clearly in Fig. 8, the support 24 is hinged to an upright projection of the carriage 16 by pivots 35 while a spiral spring 36 under compression is disposed between the support 24 and carriage 16 within suitable recesses whereby support 24 is normally maintained in a constant vertical position, but by a pressure of an operator's hand the support 24 may be moved for a limited distance either forward or backward to alter the position of the wheel 33 with respect to the object being operated upon.

From the top of the front end of body 11 there projects an upright at the upper end of which is mounted a pulley 37 which has a groove of semi-circular cross-section and which is considerably smaller than the V shape grooved pulley 29, and on the top of the back end of body 11 is mounted a yoke 38 carrying two spindles 39 on each of which are three freely running idler pulleys 40. The spindles 39 are of such distance apart as will allow a suitable belt 41 to run between the two sets of pulleys 40 such belt 40 leading from a suitable driving wheel not shown to pulley 37 while engaging with the larger V shape grooved pulley 29 as shown in Fig. 9. The idler pulleys 40 are mounted, one set, on each side of and on a line with the center of the fulcrum screw 14 whereby the belt 41 will be properly guided irrespective of the angle to which the body 11 may be set with respect to base-plate 10.

The front end surface of base-plate 10 describes the arc of a circle whose center coincides with the axis of fulcrum screw 14 and the degrees of a circle are marked thereon, as shown in Fig. 7, while there is a distinctive mark (not shown in the drawing) on the front end of body 11 whereby the angular position of body 11 may be determined within certain limits. The back end of base-plate 10 which is semi-circular in form is likewise marked off in degrees of a circle and body 11 at that end is also provided with a distinctive mark (as shown in Fig. 7) whereby the angular position of body 11 may be determined for a range of 180 degrees.

The foregoing description of the essential features of my invention makes manifest the mode of its operation. The apparatus is clamped to the rest-plate 42 of a lathe 43 in a manner well known as shown in Fig. 6 and the object to be operated upon is secured in the lathe chuck in the usual manner. An independently driven belt 41 leads from a suitable driving pulley (not shown in the drawing) between the idler pulleys 40 whereupon it crosses to engage with pulley 29 thence to the smaller pulley 37 which takes most of the strain of belt 41. The abrasive wheel 33 may then be disposed near the object to be operated upon by manipulation of knob 18 of screw 17 whereupon a delicate manipulation of the knob 34 in conjunction with manipulation by pressure on support 24 may cause wheel 33 to have desired effect on object to be operated upon.

Manifestly the various parts of my invention may be modified in proportions and replaced by equivalents without departing from the spirit of my invention.

What I claim is:

1. In a machine of the class described the combination with a rotary cutting tool, of a shaft adapted to rotate, upon which shaft said cutting tool is mounted, and a pulley adapted to communicate rotatory motion to said shaft, said pulley being disposed in the path of and adapted to engage with a belt that may extend between and run on two other pulleys whereby the pulley on said shaft is relieved of a great portion of the strain due to the tension of said belt.

2. In a machine of the class described, an abrasive wheel, a shaft, upon one end of which said abrasive wheel is mounted, a manipulating knob freely mounted upon the other end of said shaft, a rotatable hollow spindle within which said shaft is disposed with freedom of lengthwise movement, means for preventing a circumferential movement of said shaft with relation to said spindle, a driving pulley mounted on said

spindle, suitable bearings within which the said spindle may rotate, a support for said bearings, a carriage, upon which said support is flexibly mounted so that such support may be manipulated to sway from its normal position on said carriage, means whereby said carriage may be supported guided and permitted to travel backward and forward in combination with means for imparting rotary motion to said pulley.

3. In a machine of the class described, a suitably supported rotary cutting device, and means for communicating rotary motion to said cutting device from a pulley associated therewith, said pulley being disposed in the path of and engaging with a belt that may extend between and run on a driving pulley and a driven pulley, in combination with idler pulleys so disposed with relation to said belt and said other pulleys that the angular relation between the axis of said driving pulley and the axis of said driven pulley may change without altering the relation between said belt and the pulley associated with said rotary cutting device.

4. In a machine of the class described, a rotary cutting device suitably mounted on a carriage and adapted by suitable means to be rotated, a suitable supporting body upon which said carriage is mounted and upon which said carriage is adapted to be moved lengthwise thereon, a base-plate adapted to be clamped on the rest-plate of a turning lathe, upon which base-plate said supporting body is swingingly mounted by a pivoting stud, whereby said body may be disposed in different angular relations with respect to said base-plate, in combination with a clamping device for clamping said body fast in a desired angular position on said base-plate, said clamping device comprising a rod provided with an eccentric portion which eccentric portion is disposed within a hole perforating said pivoting stud whereby, when said rod is turned, the said eccentric portion acts on said stud to clamp said body to said base-plate.

In witness whereof, I, hereunto subscribe my name this 24th day of August A. D., 1911.

KENNEY L. SHEETS.

Witnesses:
JOHN L. TAYLOR,
LEE HOLT.