T. NICHOLS.

MACHINE FOR SMOOTHING, POLISHING, FILING, &c.

APPLICATION FILED SEPT. 18, 1907.

947,023. Patented Jan. 18, 1910.

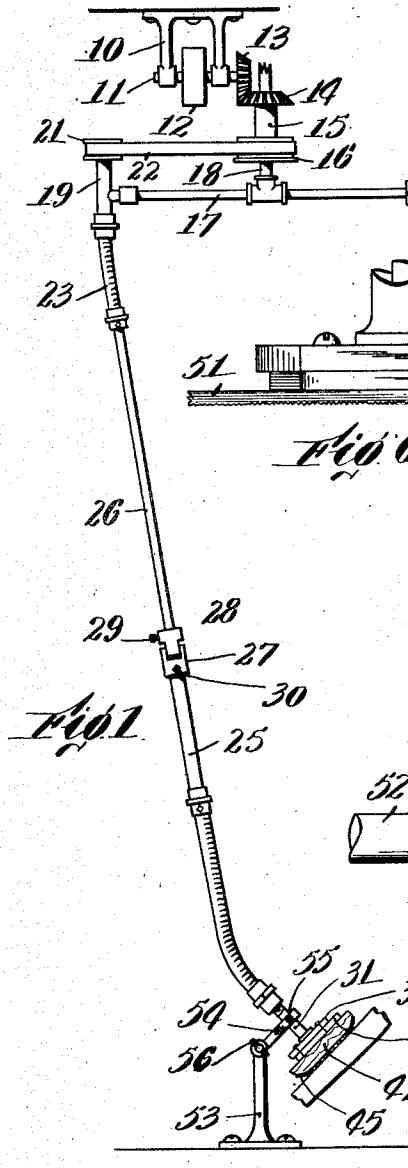

Fig. 1.

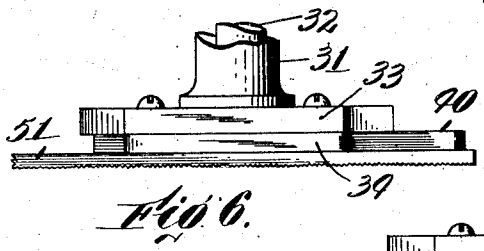

Fig. 6.

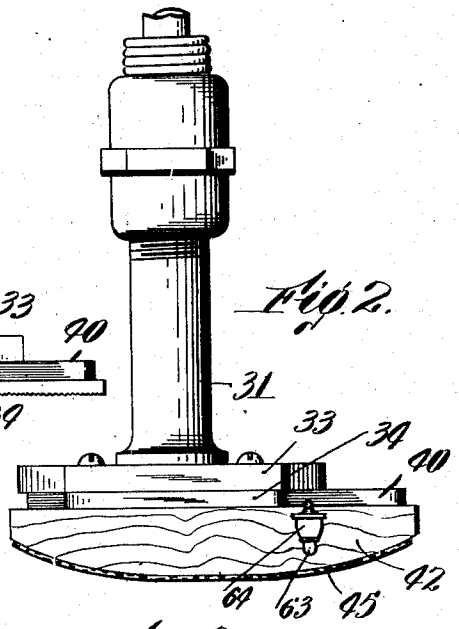

Fig. 2.

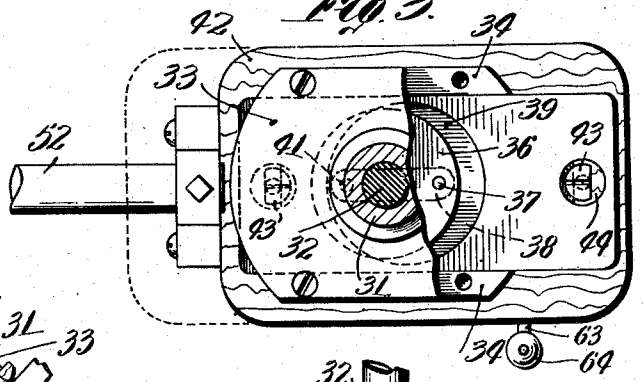

Fig. 3.

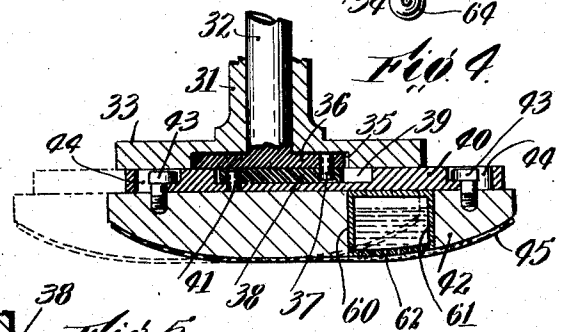

Fig. 4.

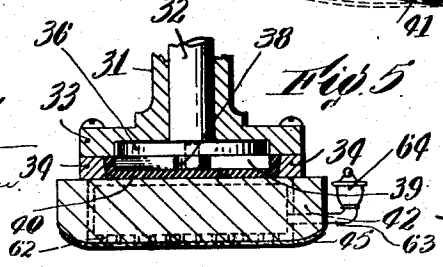

Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS NICHOLS, OF GARDNER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO L. G. McKNIGHT, OF GARDNER, MASSACHUSETTS.

MACHINE FOR SMOOTHING, POLISHING, FILING, &c.

947,023. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed September 18, 1907. Serial No. 393,581.

To all whom it may concern:

Be it known that I, THOMAS NICHOLS, a citizen of the United States, residing at Gardner, in the county of Worcester and State of Massachusetts, have invented a new and useful Machine for Smoothing, Polishing, Filing, &c., of which the following is a specification.

This invention relates to a device which while capable of forming several operations is especially adapted for smoothing, polishing, filing, and similar operations which are ordinarily performed on furniture and other wood work. Heretofore operations of this kind performed on small articles especially has been done entirely by hand, except for certain machines which will polish flat surfaces when they are fed through them. This hand operation is arduous and disagreeable labor, and the principal object of this invention is to substitute for it a machine having a holder which can be held in any desired position and can be made to operate on flat, curved, and irregular surfaces in such a manner as to polish, rub or file them in accordance with the particular tool or surface with which the holder is provided, the tool being caused to reciprocate by the rotation of a shaft; furthermore, to provide such a construction in combination with a flexible shaft so as to permit the operating head to be moved as desired and to be applied at any desired angle; to provide means whereby said flexible shaft is movably supported so that it may have a wide range of motion; to provide means whereby the rotation of the flexible shaft may be transmitted to the head to reciprocate the latter in a simple and convenient manner; to provide for supporting said head so that it may reciprocate in a plane along which the surface to be operated upon may be moved; and generally to provide a simple and convenient mechanism for this purpose.

Reference is to be had to the accompanying sheet of drawings which show a preferred form of the invention, and in which,

Figure 1 is a side elevation of a machine showing the several features of the invention. Fig. 2 is a side elevation of the holder and head for the same. Fig. 3 is a bottom plan of said holder with the head removed, parts being broken away. Fig. 4 is a longitudinal sectional view of the same. Fig. 5 is a transverse sectional view, and Fig. 6 is a view similar to Fig. 2 showing the application of a file to said holder.

In order to provide for bodily moving the flexible or other shaft with which the tool is connected, the invention is shown as supported from brackets 10 which carry a power or counter-shaft 11. This shaft receives power in any desired way, as for example, through a pulley 12. It is provided with a bevel gear meshing with a gear 14 on a vertical shaft 15 on which is a pulley 16. A frame or bracket 17 is so mounted as to turn on an axis concentric with that of the shaft 15, and a convenient way to do this is to make said shaft hollow and extend a shank 18 on the frame 17 through said shaft supporting it at the upper end thereof so that the shaft may turn independently of it, and so that the frame 17 may turn on this axis. This frame is provided with a bearing 19 and with a counterweight 20 at the other end, which is preferably adjustable. Through the bearing passes a spindle on which is a pulley 21 connected with the pulley 16 by belt 22. It will be seen that as the frame 17 swings about its axis, the belt 22 will always transmit power from the pulley 16 to the pulley 21. It will also be seen that by changing the belt and changing the distance between the shank 18 and the bearing 19 as by adjusting the frame or replacing the parts thereof, the range in which the bearing 19 may swing may be adjusted. The pulley 21 is connected through its spindle, not shown, with a flexible shaft 23.

In order to provide for moving the lower end of the shaft longitudinally, the same is made in two sections 25 and 26 telescoping together, as I have previously described in my prior application for patent on a "Flexibly supported tool", Serial No. 338,600, filed October 12, 1906. On one of the telescoping sections is fixedly mounted a clutch member 27, and on the other is adjustably mounted a similar clutch member 28 for engaging the member 27. A screw 29 fixes the member 28 to the tube 26. If it is desired to hold the two tubes in stationary position with respect to each other, this can be done by tightening a screw 30 which passes through the member 27 on the tube

25 into engagement with the tube 26 therein, as has been described in my above mentioned application.

Below the section 25 is mounted a tubular holder 31 to which is secured a shaft 32 connected to be rotated by a flexible shaft. This holder 31 is provided with a plate 33 at its lower end, preferably cast integral with it, and having ways 34 on its lower surface. The plate has a recess 35 in which turns a disk 36 on the shaft 32. This disk has an eccentric pin 37 engaging a link 38 to operate the same, said link being located in a recess 39 in a sliding plate 40, which is provided with a pin 41 for connection with said link. This sliding plate is mounted between the ways 34 and moves therealong. To the plate may be connected any desired tool or implement which it is desired to reciprocate by means of the flexible shaft. In the present case it is shown as connected with a head 42 by means of screws 43 extending through slots 44 in the plate, and this is shown as provided with a surface 45 which may be sand-paper, emery-cloth, or in fact any kind of a surface which may be desired for the purpose of polishing, burnishing, grinding, or the like.

When the instrument is to be used for the purpose of filing the head 42 is removed from the plate 40, and a file 51 secured thereon. This is especially desirable in cases where the file is employed in furniture making for smoothing surfaces constituting parts of small holes through the same, as for example in chairs and the like.

In the use of the apparatus the holder 31 is held in the hand and power applied. The rotation of the flexible shaft reciprocates the head 42 or the holder 31 as may be desired at a rapid rate. The holder can be moved above the work to operate with it, with the grain or across the grain, as may be desired. When the work is of an irregular curved form, the direction of motion of the head may be varied accordingly at will. As the device may be speeded up to several hundred reciprocations per minute, the work can be done much more rapidly than it could be by hand, and the operator can keep up his work for a much longer period, as he has nothing to do but guide the instrument and apply a certain amount of pressure, which he can do more easily and accurately in practice than in the hand operation for the reason that he is able to devote more of his attention to this point.

In some cases a handle 52 is provided for assisting in guiding and holding the device. In other cases it may be desirable to provide means for keeping the holder stationary, so that a plurality of pieces of work each having a flat surface may be moved along in the same plane and operated upon. In this case a stand or bracket 53 is provided having an adjustable arm 54 which can be clamped on the holder 31 by means of a screw 55 or the like. This adjustable arm may be held in adjusted position by turning the thumbscrew 56.

Another object of this invention is to provide for efficiently supplying a lubricant to the surface 45. For this purpose the head 42, which may be of metal, wood, or any other material, is made hollow, or provided with a cavity 60, in which is located a tank or receptacle for the lubricant 61 having perforations 62 in its bottom communicating with the surface 45. The bottom of the receptacle 61 may constitute part of the backing for the surface 45. The receptacle may be held in position in any desired way and may be of any convenient size or shape, but it preferably extends substantially across the head 42 so as to supply lubrication over all the surface operated upon. It may be filled through a pipe 63 connected with an oil cup 64 so that the height of lubricant may be observed.

I have shown herein a device for permitting the lengthening of the flexible shaft, but I have not claimed it in this case, as it constitutes a part of my above mentioned application.

While I have illustrated and described certain preferred forms of the invention, I am aware that many modifications may be made therein and that the invention may be used for many other purposes than those mentioned, without departing from the scope of the same as expressed in the claims. Therefore, I do not wish to be limited to the particular form or use of the invention as set forth above, but

What I do claim is:—

1. In a machine of the character described, the combination of a shaft, an eccentric fixed to the end thereof, a holder into which the end of said shaft enters, said holder having a recess for said eccentric, a link connected with said eccentric, a plate mounted on the bottom of said holder and connected with said link and having perforations provided with shoulders, guides for said plate, whereby the rotation of the shaft will reciprocate said plate in a plane transverse to the axis of the shaft, a polishing head or block adapted to be secured to the bottom of said plate, headed screws passing through said perforations and entering the head, the heads of the screws engaging said shoulders, whereby said head is removably fixed to the plate, and a polishing surface on the bottom of said head.

2. In a device of the class described, the combination of a shaft, a movable wooden polishing head supported by the shaft, means connected with the shaft for reciprocating said head, said polishing head having a recess extending transversely across the same

from its polishing surface to the top thereof, a metallic receptacle set into said recess flush with the bottom thereof for receiving a lubricant and having perforations in the bottom thereof, whereby the lubricant may be discharged clear across the head, and a sheet of polishing material on the lower surface of said head and receptacle and extending under the perforated surface of said receptacle, whereby the lubricant is prevented from being discharged rapidly, but may be distributed along said polishing surface.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

THOMAS NICHOLS.

Witnesses:
LEWIS G. MCKNIGHT,
HENRY A. PERKINS.