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BLADE HOLDING MECHANISM FOR BLADE SHARPENING MACHINES.

APPLICATION FILED FEB. 2, 1916.

1,280,284. Patented Oct. 1, 1918.

2 SHEETS—SHEET 1.

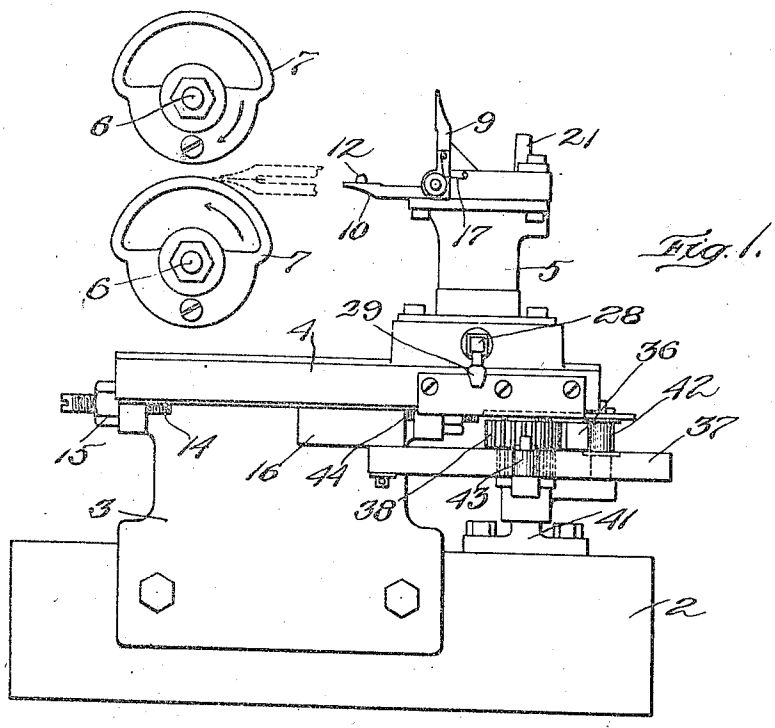


Fig. 1.

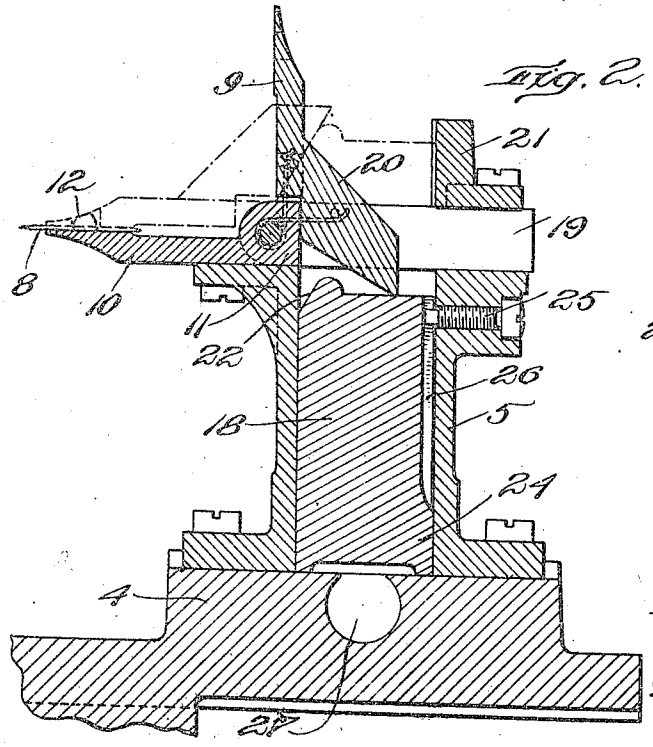


Fig. 2.

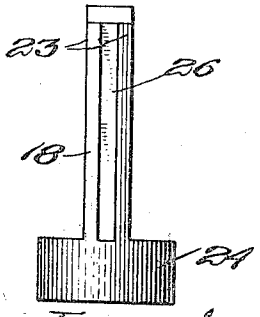


Fig. 3.

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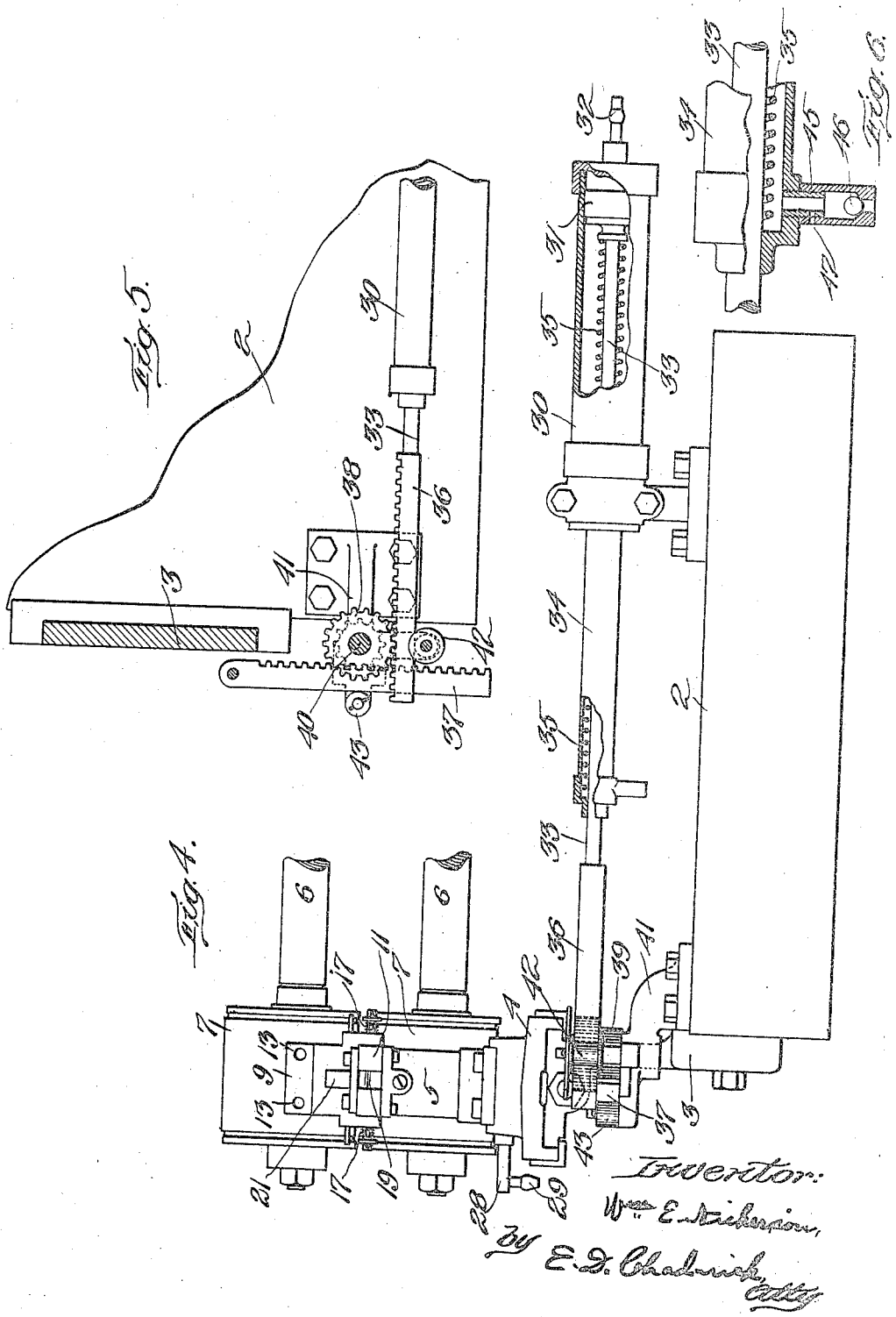
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UNITED STATES PATENT OFFICE.

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BLADE-HOLDING MECHANISM FOR BLADE-SHARPENING MACHINES.

1,280,234. Specification of Letters Patent. Patented Oct. 1, 1918.

Application filed February 3, 1916. Serial No. 75,794.

To all whom it may concern:

Be it known that I, WILLIAM E. NICKERSON, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Blade-Holding Mechanism for Blade-Sharpening Machines, of which the following is a specification.

This invention relates to mechanisms employed in blade-sharpening machines for holding the blades and presenting them to the sharpening devices, and is particularly intended to provide an improved blade-holding mechanism for use in machines for stropping safety razor blades. The invention includes as its principal features a blade holder which is adapted for automatic operation, both with respect to the clamping and unclamping of the blades carried thereby and with respect to the movements of the holder toward and away from the stropping devices, a locking arrangement for the blade-clamping devices, and a pneumatically-operated mechanism for effecting the necessary movements of the holder.

The accompanying drawings illustrate my invention as embodied in a machine for stropping Gillette safety razor blades, in which the blade-stropping devices are constructed and operated substantially as set forth in a co-pending application for U. S. Letters Patent filed on the 26th day of January, 1916, Serial No. 74894. In the drawings, which show as much of the particular machine just referred to as is necessary for an understanding of the present invention:

Figure 1 is a front elevation of the mechanism, as preferably constructed and arranged;

Fig. 2 shows the blade holder in central vertical section, on a larger scale;

Fig. 3 is an elevation of a plunger hereinafter described;

Fig. 4 is a side elevation, partly broken away, of the parts shown in Fig. 1, as viewed from the right hand side of the machine;

Fig. 5 is a plan view of a mechanism for moving the blade holder toward and away from the stropping devices; and

Fig. 6 is a detail view, partly in section, showing an air check hereinafter described.

The mechanism illustrated in Fig. 1 of the drawings includes a base plate 2 having an upright bracket 3 bolted to its front end and a blade holder comprising a carriage 4 mounted to slide laterally on the horizontal upper end of the bracket 3, an upright pedestal 5 secured to the top of the carriage 4, and blade-clamping devices secured to the top of the pedestal 5 and so arranged that a blade held thereby will be located in a horizontal plane passing midway between the axes of two parallel shafts 6 located one above the other and each carrying a stropping device 7. The blade-clamping devices, as constructed for use with a Gillette blade, (shown at 8 in Fig. 2) consists of upper and lower jaws 9 and 10 having flat inner faces adapted to engage the blade and hold it immovable during the stropping operation, with the edge to be stropped projecting beyond the jaws. The lower jaw 10 is formed integral with a horizontal plate 11 bolted to the top of the pedestal 5 and is provided with upwardly-extending pins 12 which are spaced to enter the end perforations in the blade and position the latter with respect to the jaws, the upper jaw 9 being pivoted to said plate 11 and provided with perforations 13 to receive the pins 12 when the jaws are closed. The lateral position of the blade while being stropped is accurately determined by an adjustable stop such as a horizontally-extending threaded bolt 14 carried by the bracket 3 and provided with a lock nut 15, this bolt being located in position to be engaged by a block 16 secured to the under side of the carriage 4 when moved toward the stropping devices.

The stropping devices 7, which have the form of a segment of a cylinder and act on the blade edge in alternation, are supported by means of the shafts 6 in the relative position shown in Fig. 1, but as these stropping devices constitute no part of the present invention it will be unnecessary to explain them or their operating mechanism in detail, and for present purposes they are to be regarded as representative of any suitable stropping or other sharpening devices. As described thus far the construction is substantially the same as that shown and described in my copending application above referred to, which also shows and describes suitable means carried by the base plate for supporting the aforesaid shafts and rotating them and the stropping devices in the direc-

tion of the arrows, (Fig. 1,) and for reciprocating said stropping devices axially.

According to the present invention the blade-clamping jaws 9 and 10 are opened by means of springs 17, which operate to lift the upper jaw 9 to the vertical position shown in full lines in Fig. 2 whenever such movement is permitted. For moving said jaw 9 into its closed position I employ a plunger 18 arranged to slide vertically in the pedestal 5 and shaped at its upper end to pass through a slot 19 in the plate 11. The jaw 9 is provided with an operating arm 20 which overhangs the top of the plunger 18 when the jaw is in open position, and hence when the plunger moves upward it pushes the arm 20 ahead of it and closes said jaw. Provision is made for locking the jaw 9 in closed position by giving the rear face of the arm 20 a slant such that when said jaw is closed an upwardly-tapering space is provided between said arm 20 and the opposed vertical face of an abutment 21 secured to the top of the plate 11, and by providing the upper end of the plunger 18 with slanting and vertical faces 22 and 23 which form a wedge adapted to enter said tapering space. The result of this construction is that when the plunger is moved upward its upper end passes through the slot 19 and ultimately exerts a wedging action on the arm 20, whereby the jaw 9 is firmly closed upon the blade and immovably locked in such position, as shown in dotted lines in Fig. 2. The plunger 18 is preferably operated pneumatically, in which case the pedestal 5 is bored to form a cylinder and the lower end of the plunger is provided with a piston 24 having a sliding fit therein, the alinement of the upper end of the plunger during its upward and downward movements being maintained by a pin 25 carried by the pedestal 5 and having its inner end located in a vertical groove 26 formed in the plunger. Below the piston 24 is provided a chamber 27 in communication with an inlet pipe 28 having at its outer end a nipple 29 for attachment to a flexible pipe connection (not shown), through which compressed air is let into the chamber 27 whenever it is desired to close the blade-clamping jaws, and is replaced by suction when said jaws are to be opened.

For moving the blade holder toward and away from the stropping devices I provide a pneumatic cylinder 30 supported in fixed position on the base plate 2 and preferably extending longitudinally at one side of the machine, which cylinder contains a piston 31 adapted to be forced forward by the admission of compressed air to the rear end of the cylinder through a nipple 32. To the piston 31 is attached a rod 33 which extends forward through the front end of the cylinder and is preferably surrounded beyond the latter by a casing 34, which forms in effect a reduced extension of the cylinder. This casing is utilized to receive a portion of a coiled spring 35 which surrounds the piston rod 33 between the front end of the casing 34 and the piston 31 and is compressed by the forward movement of said piston, so that it forces the latter backward when the air pressure behind it is relieved. The movements thus imparted to the piston rod 33 are transmitted to the carriage 4 by means of racks 36 and 37 connected to the rod 33 and the block 16 respectively and meshing with pinions 38 and 39 rigidly secured together and mounted on a vertical stud 40 carried by a supporting bracket 41, Figs. 1 and 4. Guide rollers 42 and 43 keep the racks 36 and 37 in mesh with their respective pinions, as shown in Fig. 5, and the movements of the carriage 4 are limited by the adjustable stop bolt 14 already described and by a similar stop bolt 44, Fig. 1.

In order to prevent shock when the movement of the blade holder toward the stropping devices is arrested by the stop bolt 14 the arrangement shown in detail in Fig. 6 may be employed. In this figure, 45 indicates a nipple entering the otherwise-closed casing 34 near its front end and carrying a ball valve 46 so arranged that air is freely admitted through the nipple when the piston 31 is forced backward by the spring 35, but is compressed in front of the piston when the latter is forced forward by the admission of compressed air behind it. The air thus compressed in front of the piston passes slowly out of the casing 34 through a small perforation 47, so that it checks the forward movement of the piston without preventing it from ultimately moving the blade holder into contact with the stop bolt 14.

In using the apparatus, after a blade has been placed in position between the open jaws and the latter have been closed upon the blade and locked by the admission of compressed air to the chamber 27, the compressed air is admitted to the cylinder 30 and the blade holder is thereby moved toward the stropping devices until arrested by the bolt 14, which brings the blade-clamping jaws and blade into the position shown in dotted lines in Fig. 1. The parts remain in this position until the stropping of the projecting blade edge has been completed, the air pressure beneath the plunger 18 being maintained during this operation. The air pressure in the cylinder 30 is then relieved and the blade holder is moved backward against the stop bolt 44 by means of the spring 35, whereupon the air pressure beneath the plunger 18 is replaced by suction, the plunger drops and the blade-clamping jaws automatically open, leaving the blade free to be removed and reversed edge for edge or replaced by another blade, as the case may be.

Thus the operation of the parts is controlled entirely through the air connections, manual operation of the blade holder and the clamping jaws being avoided entirely. This is particularly advantageous in case a considerable number of similar machines are in use simultaneously, since the operation of all of the machines can be controlled at a single point.

The admission and release of the compressed air pressure for closing the blade-clamping jaws and moving them into the stropping position may be accomplished by various means not necessary to be shown or described, as such means constitute no part of the present invention. It will be understood, however, that the blade-holder and jaws may be operated otherwise than pneumatically, if preferred, and may be readily modified for use in various forms of blade-sharpening machines and for sharpening blades of various types.

I claim:—

1. In a machine of the character described, a blade holder comprising a lower jaw having means for positioning a blade thereon, an upper jaw hinged thereto, means for forcibly closing the upper jaw upon the blade and holding the jaws in closed position, and a spring constantly tending to swing the upper jaw into an upright position.

2. In a machine of the character described, the combination with blade-clamping jaws of a plunger adapted to close said jaws and having a wedge-shaped portion for locking the jaws in closed position, means for operating the plunger, and means for automatically opening the jaws when released.

3. In a machine of the character described, the combination with blade-clamping jaws of a pneumatically-operated plunger for closing the same, and means for automatically opening said jaws.

4. In a machine of the character described, a blade holder comprising clamping jaws, a cylinder and a piston therein, means carried by the piston for closing said jaws, and means for automatically opening the jaws.

5. In a machine of the character described, a blade holder comprising clamping jaws, a cylinder and a piston therein, a plunger carried by the piston and adapted to close said jaws, said piston having a wedge-shaped portion for locking the jaws in closed position, and means for automatically opening said jaws.

6. In a machine of the character described, a blade holder comprising a fixed jaw having means for positioning a blade thereon, a movable jaw having an operating arm, a pneumatically-operated plunger arranged to engage said arm and close the movable jaw upon the blade, and means for automatically opening said movable jaw when released by the plunger.

7. In a machine of the character described, a blade holder comprising a fixed jaw having means for positioning a blade thereon, a movable jaw having an operating arm, a fixed abutment located opposite said arm and forming in connection with the latter a tapering space when the movable jaw is closed, a plunger adapted to engage said arm and close the movable jaw, the operating end of said plunger being shaped to wedge itself into said tapering space, means for operating the plunger, and means for automatically opening the movable jaw when released by the plunger.

8. In a machine of the character described, the combination of blade-sharpening devices, a blade holder movable toward and away from the same, and pneumatically-operated means for moving the blade holder.

9. In a machine of the character described, the combination of blade-sharpening devices, a blade holder movable toward and away from the same, an adjustable stop for limiting the movement of the blade holder toward the sharpening devices, and means for moving the blade holder into engagement with said stop.

10. In a machine of the character described, the combination of blade-sharpening devices, a blade holder movable toward and away from the same, and means for operating the blade holder comprising a cylinder having a piston therein, means for admitting compressed air behind the piston and thereby moving the latter in one direction, and a spring for moving the piston in the opposite direction when the air pressure in the cylinder is relieved.

11. In a machine of the character described, the combination of blade-sharpening devices, a blade holder movable toward and away from the same, an adjustable stop for limiting the movement of said blade holder toward said sharpening devices, and means for operating the blade holder comprising a cylinder having a piston therein, means for admitting compressed air behind the piston and thereby moving the blade holder against said stop and holding it in engagement therewith, and means for moving said blade holder in the opposite direction.

12. In a machine of the character described, the combination of blade-sharpening devices, a blade holder movable toward and away from the same and provided with clamping jaws, pneumatically-operated means for closing said jaws, means for automatically opening the latter, and pneumatically-operated means for moving the blade holder.

13. In a machine of the character de-

scribed, the combination of blade-sharpening devices, a blade holder movable toward and away from the same and provided with clamping jaws, a pneumatically-operated plunger carried by the blade holder and adapted to close said jaws and lock them in closed position, an adjustable stop for limiting the movement of said blade holder toward the sharpening devices, and means for operating the blade holder comprising a cylinder having a piston therein, means for admitting compressed air behind the piston and thereby moving it in one direction, and a spring arranged to move said piston in the opposite direction.

Signed at Boston, Massachusetts, this 29th day of January, 1916.

WILLIAM E. NICKERSON.