J. W. LESLIE.

APPARATUS FOR SHARPENING BLADES.

APPLICATION FILED FEB. 13, 1908.

909,098. Patented Jan. 5, 1909.

Fig. 1.

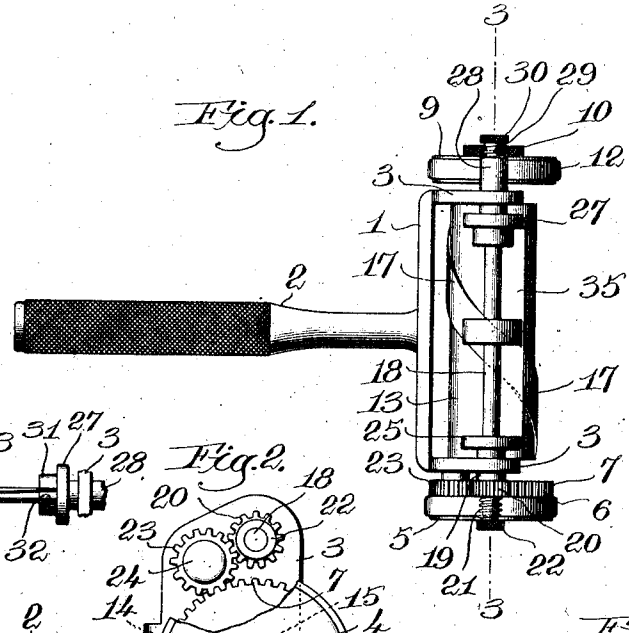


Fig. 6.

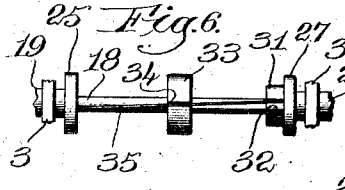


Fig. 2.

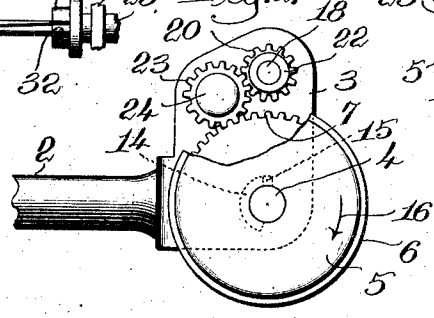


Fig. 5.

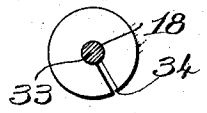


Fig. 7.

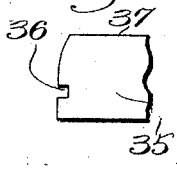


Fig. 3.

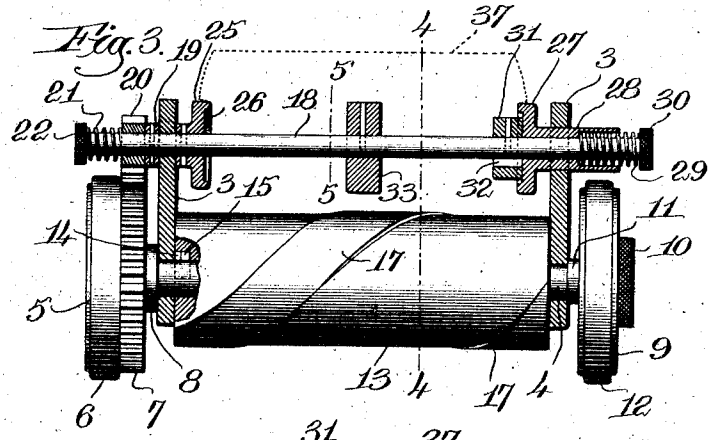
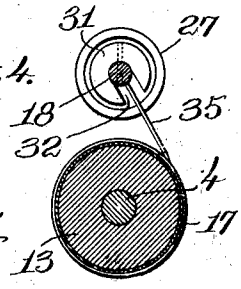


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES W. LESLIE, OF WAKEFIELD, MASSACHUSETTS, ASSIGNOR TO LESLIE SAFETY RAZOR COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

APPARATUS FOR SHARPENING BLADES.

No. 909,098. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed February 13, 1908 Serial No. 415,648.

To all whom it may concern:

Be it known that I, JAMES W. LESLIE, a citizen of the United States, and a resident of Wakefield, county of Middlesex, State of Massachusetts, have invented an Improvement in Apparatus for Sharpening Blades, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has for its object the production of a novel apparatus particularly designed for sharpening blades used in safety-razors, whereby such blades may be easily, quickly and accurately sharpened, such term including honing, stropping, etc., as the case may be.

The apparatus herein illustrated as one practical embodiment of my invention is designed to sharpen razor-blades made of flat, relatively thin steel, and I have so constructed and arranged the apparatus that the sharpening means acts with a combined rotary and traversing motion upon the edge of the blade, with practically the same effect as is produced by the most skilful hand stropping or honing. That is, the sharpening surface acts upon the edge of the blade in precisely the way the surface of a hone or strop acts when the blade is drawn across the same longitudinally thereof and with a slight transverse movement, so that the action is progressive from one to the other end of the blade.

I have also provided means whereby first one and then the other face of the blade is presented automatically to the action of the sharpening means, as will appear hereinafter.

In accordance with my invention the sharpening surface is made as a rotatable cylindrical spiral, with means to rotate it first in one and then in the other direction, the blade being held in a suitable holder and presented tangentially to the sharpening surface. Whenever the direction of rotation of the latter is changed the blade is acted upon automatically to reverse the face which is to be acted upon, and the change in the blade face is effected prior to the change in the rotation of the sharpening surface, so that it is impossible for the blade and sharpening surface to coöperate when the latter is moving toward instead of away from the cutting edge.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view of a blade-sharpening apparatus embodying one form of my present invention, either moving to the right or just in readiness to be reversed; Fig. 2 is an enlarged left hand end elevation thereof, viewing Fig. 3, with the handle broken off and with the disk-like carrier broken out to show the gear behind; Fig. 3 is an enlarged view partly in longitudinal section on the line 3—3, Fig. 1, looking toward the left; Fig. 4 is a transverse section on the line 4—4, Fig. 3, looking toward the right, but with the blade in elevation and coöperating with the sharpening means; Fig. 5 is a side elevation of the central seat for the blade at the right of the line 5—5, Fig. 3; Fig. 6 is a top plan view of the main portion of the blade-holder, with a blade therein, showing how the blade may tilt slightly in the holder; Fig. 7 is a side elevation of one end of a razor-blade for which this sharpening device is arranged.

I have herein shown the operative parts of the sharpening device mounted on a frame 1 having a fixedly attached handle 2 and upturned, parallel sides 3, the lower portions of said sides having rotatably mounted therein a transverse shaft 4, one projecting end of the shaft having fixedly secured to it a disk-like carrier 5 preferably provided with a tread 6 of leather, rubber or other suitable material. A large gear 7 is secured to or forms part of said carrier at the inner face thereof, the gear-hub 8, Fig. 3, abutting against the adjacent side 3 of the frame. A similar carrier 9 is loosely mounted on the opposite end of the shaft 4 and is held in place by a nut 10, the carrier hub 11 adjacent the frame side acting, with the hub 8, to prevent longitudinal movement of the shaft in the frame, the carrier having a leather or other tread 12.

A cylindrical member or roll 13, of wood or metal, is loosely mounted on the shaft 4 and the roll has at one end a segmental recess 14, Figs. 2 and 3, into which enters a pin 15 on the shaft, so that there is thus a lost-motion connection between the rotatable member 13 and the shaft, and hence with the carriers supporting the latter.

When the frame is moved bodily the carriers, if supported by a flat surface, such as a

table, will rotate in the direction of such bodily movement and when the pin 15 is at either end of the recess 14 the member or roll 13 will rotate in unison with the shaft and carriers, in the same direction.

Referring to Figs. 1 and 2, if the frame be moved to the right the carriers and shaft will rotate in the direction of arrow 16, Fig. 2, and the roll 13 will be rotated in unison with the shaft, but if the movement of the frame be reversed the direction of rotation of the carriers and shaft will be reversed, but the roll 13 will not be revolved in the reverse direction until the shaft 4 has made a part revolution, nearly one-half a revolution as shown in Fig. 2, being required to bring the pin 15 into engagement with the lower end of the recess 14. The roll has a short rest period every time bodily movement of the frame is reversed, as will be manifest, the rotation of the shaft and carriers thereby being established in the new direction before rotation of the roll is begun. During this non-rotative period of the roll the position of the blade to be sharpened is changed or reversed, to present first one and then the other face of the blade to the action of the sharpening member, as will be described.

The sharpening member is made in the form of a cylindrical spiral 17 upon the rotatable member or roll 13, and the sharpening member may be a relatively narrow strip of leather, treated canvas, or other material which will present a sharpening surface. A spiral band of fine emery may be used, or if the blade is to be honed the sharpening member will present a cylindrical spiral of honing material, and as shown herein the spiral makes somewhat more than one complete turn around the roll 13.

When the edge of the blade is applied tangentially to the sharpening member the rotation of the roll causes said sharpening member to act with a combined rotary and traversing motion upon the blade, the sharpening surface acting upon successive portions of the edge from one to the other end of the blade, closely approximating the most skilful hand manipulation when a blade is stropped or honed.

A rocking, reversing blade-holder is mounted on the frame above the sharpening member, said blade-holder comprising a shaft 18 rotatably mounted in the frame-sides 3 and blade-retaining or locking means carried by the shaft, which latter is above and parallel to the shaft 4.

The shaft 18 has pinned or otherwise secured to it a collar 19 outside one of the sides, and next the collar a pinion 20 is rotatably mounted on the shaft and frictionally connected thereto by a spring 21 coiled around the shaft between the pinion and a nut 22 fixed on the shaft. Pinion 20 meshes with an intermediate pinion 23 rotatably mounted on a stud 24 on the frame side and in turn meshing with the gear 7, see Fig. 2, so that the pinion 22 rotates in the same direction as the gear, but at a higher speed. When the resistance to rotation of shaft 18 is greater than the force of the frictional connection between the pinion 20 and the shaft the pinion will turn thereon, but otherwise the shaft and pinion will be rotated in unison.

Adjacent the inner face of the left-hand frame-side 3, Fig. 3, the hub of a locking disk 25 is pinned to the shaft 18, coöperating with collar 19 to prevent endwise movement of the shaft, the disk having an annular flange 26 on its inner face. A similarly flanged locking disk 27 has a long hub 28 loosely surrounding the opposite end of the shaft and rotatably mounted in the right-hand side 3 of the frame, Fig. 3, the outer end of the hub being counterbored to receive the inner end of a spring 29 coiled about the shaft and held in place by a nut 30. The spring presses the inner, flanged face of the disk 27 against a collar 31 pinned to the shaft 18 and having a radial seat 32 of greater width than the thickness of a blade, as best shown in Fig. 4, and a central, larger collar 33 is fixedly secured to the shaft, having a radial seat 34, to loosely receive the blade, but not so wide as the seat 32, Figs. 5 and 6. The flanged disks 25, 27 coöperate with the ends of the blade to be sharpened and retain said blade in the seats 32 and 34, so that the blade is securely held in the blade-holder, the latter being herein shown as arranged to coöperate with a thin, flat blade 35, shaped at its ends to present shouldered portions 36, Fig. 7, the edge of the blade being indicated at 37.

To apply the blade to the blade-holder the disk 27 is retracted against its spring 29, and the blade is dropped into the seats 32, 34, and one of the shouldered portions 36 is pushed under the flange 26 of the disk 25, whereupon the disk 27 is released and its spring pushes it inward against the adjacent end of the blade, the flange on said disk 27 overhanging the shouldered part 36 at that end of the blade. The blade is now locked in the holder, but it may tilt out of axial alinement with the shaft 18, by reason of the width of the blade-seats on the holder, as shown in Fig. 6, the blade tilting about the central collar 33 and within the seat 34. This is provided in order that when the blade is presented to the sharpening member it may accommodate itself tangentially thereto at the point of contact, in order to get the best results, and also to obviate the effect of any slight irregularity in the sharpening surface.

Release of the blade is effected by pulling the locking disk 27 outward, releasing that end of the blade, and permitting the operator to lift the blade out of the holder.

To sharpen the blade the operator grasps the handle 2 and rolls the frame back and

forth upon a firm, flat surface, the initial rotative movement of the carriers causing the gearing 7, 23, 22 to swing the blade-holder in the direction of movement of the frame, presenting the cutting edge of the blade against the surface of the sharpening member 17. The rotation of the latter and its traversing movement along the edge of the blade sharpens the latter rapidly and accurately, whether the blade be thick or thin. When the direction of movement of the frame is reversed the sharpening member ceases to rotate, but the train of gearing instantly oscillates the shaft 18 and thereby reverses the blade-holder, swinging the blade in a circular path over said shaft and down upon the sharpening member at the other side of its center. This reversal of the blade takes place before the sharpening member begins to rotate in the reverse direction, so that it is impossible for the sharpening member to turn toward the cutting edge of the blade. As soon as the blade is brought against the sharpening surface the angular movement of the blade-holder is stopped, and then the pinion 20 revolves upon the shaft 18 during the continued movement of the frame.

It will be manifest that my sharpening apparatus may be used with different forms of flat blades by merely changing the locking devices sufficiently to accommodate the particular shape of the blade to be sharpened.

In practice the surface of the roll 13 will be covered with leather, and the spirally arranged sharpening member will be mounted thereon, so that if the edge of a blade should accidentally come in contact with the roll when being handled the edge would not be injured.

Various changes in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as expressed in the appended claims.

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

1. In a blade-sharpening device, a rotatable member having a spirally-arranged sharpening surface thereon, means to effect rotation of said member by bodily movement above a plane surface, a blade-holder; a frame in which it and the rotatable member are mounted, a handle attached to the frame, and means independent of the handle to automatically reverse the blade-holder before a change in the direction of rotation of the sharpening surface is effected.

2. In a blade-sharpening device, a frame provided with a handle, rotatable supporting carriers for the frame, a spiral sharpening member rotatably mounted in the frame, means to rotate said member by movement of the carriers upon a plane surface, a blade-holder mounted in the frame adjacent the sharpening member, and means to automatically reverse the blade-holder by a change in the direction of rotation of the carriers and prior to a change in the direction of rotation of said sharpening member.

3. In a blade-sharpening device, a cylindrical spiral sharpener, means to effect rotation thereof by bodily movement above a plane surface, a blade-holder, means thereon to permit the blade to tilt in the direction of its length to adapt its edge to the surface of the sharpener, a frame in which the latter and the blade-holder are mounted, a handle attached to the frame, and means independent of the handle to automatically reverse the blade-holder before a change in the direction of rotation of the sharpener is effected.

4. In a device of the class described, a holder for the blade to be sharpened, a sharpening member, means including rotatable carriers to rotate said member and cause it to act with a traversing movement along the edge of the blade from one to the other end thereof, first in one and then in the other direction, and connections between the blade holder and the carriers, operating to automatically reverse the blade-holder at each reversal of movement of the sharpening member and apply the blade tangentially thereto.

5. In a device of the class described, a spiral sharpening member, means to rotate it first in one and then in the other direction, a holder, means thereon to retain the blade to be sharpened while permitting limited movement of the blade to seat itself tangentially upon the sharpening member, and means to automatically reverse the blade-holder at each reversal of rotation of the sharpening member and press the blade against said member to be acted upon and sharpened.

6. In a device of the class described, a holder for the blade to be sharpened, to present the blade tangentially to the sharpening member, said sharpening member, and means to move it to act upon successive portions of the edge of the blade from one to the other end thereof.

7. In a device of the class described, a sharpening member, a holder to present the blade to be sharpened tangentially to the sharpening member, means to rotate the latter first in one and then in the other direction and cause it to act upon successive portions of the edge of the blade from one to the other end thereof, said means including a rotatable member having a lost motion connection with the sharpening member, and a separate connection between said rotatable member and the blade-holder to automatically reverse the blade-holder before rotation of the sharpening member is reversed.

8. In a device of the class described, a

cylinder, a spiral sharpening member fixedly mounted thereon, means to rotate the cylinder first in one and then in the other direction, a rocking holder for the blade to be sharpened, to present the edge of the blade tangentially to the sharpening member, a frame on which the cylinder, rotating means therefor, and the blade-holder are all mounted, a handle fixedly attached to the frame, and means connected with and actuated by the cylinder-rotating means to automatically reverse the blade-holder at each reversal of rotation of the cylinder and apply the blade to the spiral sharpening member.

9. In a device of the class described, a cylindrical spiral, rotatable sharpening member, means to rotate it first in one and then in the other direction, said means including a rotatable member having an attached gear, a holder for the blade to be sharpened, and means connected with and operated by said gear to reverse said holder at each reversal of rotation of the sharpening member and press the edge of the blade tangentially upon said sharpening member, the latter acting with a combined rotary and traversing movement upon the blade.

10. In a device of the class described, a holder having a central, radial seat to loosely receive the back of the blade, means to coöperate with the ends of the blade to be sharpened and retain it in the holder while permitting slight play of the blade to accommodate itself to the sharpening surface, sharpening means to act with a combined rotary and traversing movement upon the edge of the blade, and means to automatically cause the holder to present first one and then the other face of the blade to the action of the sharpening means.

11. In a device of the class described, sharpening means to act with a combined rotary and traversing movement upon the edge of the blade to be sharpened, a holder having radial seats to loosely receive the back of the blade, and devices to engage the ends of the blade and lock it in the seats while permitting a slight movement to accommodate the edge to the sharpening surface, and means to automatically change the face of the blade to be acted upon whenever the rotary and traversing movement of the sharpening means is changed, whereby first one and then the other face of the blade is brought into coöperation with the sharpening means.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JAMES W. LESLIE.

Witnesses:
THOMAS J. DRUMMOND,
ELIZABETH R. MORRISON.