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C. ELLIOT

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RAZOR BLADE SHARPENING METHOD AND MEANS

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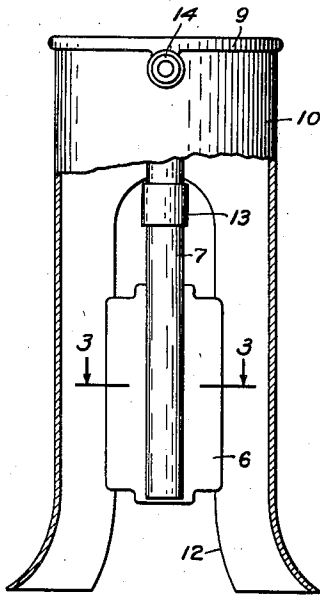


Fig. 1.

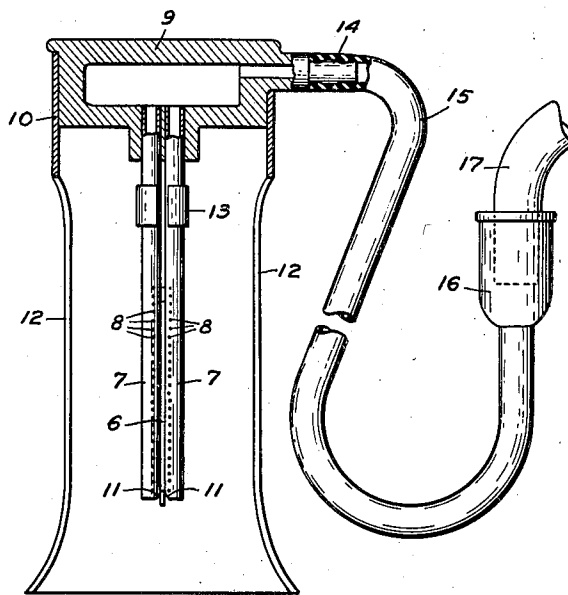


Fig. 2.

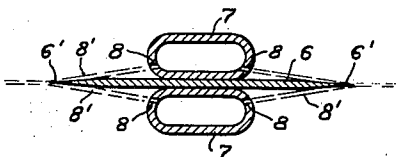


Fig. 3.

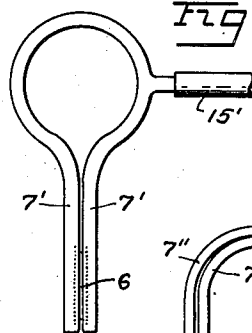


Fig. 4.

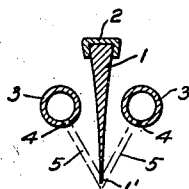


Fig. 7.

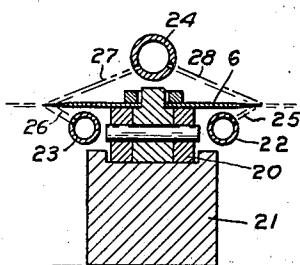


Fig. 8.

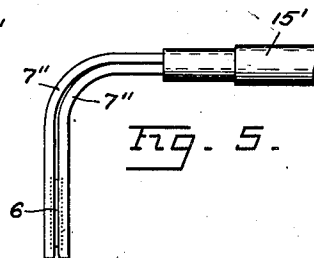


Fig. 5.

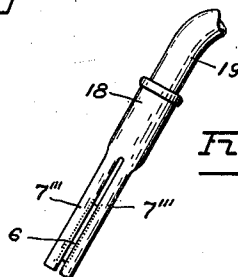


Fig. 6.

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2,138,520

RAZOR BLADE SHARPENING METHOD AND MEANS

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7 Claims. (Cl. 51—278)

This invention relates to the sharpening of razor blades, especially safety razor blades, and more particularly to the thin double-edged wafer type safety razor blades, and the object of the invention is to provide an improved method and means for sharpening and/or resharpening or putting the final cutting edge on such blades in place of the stropping and other methods at present in use for this purpose.

Another object of the invention is to provide a simple, cheap, effective device for carrying out the improved method.

A further object is to provide a device which will simultaneously resharpen or refinish the two opposite sides of the cutting edge of a single edge razor blade, or the two opposite sides of both edges of double edged safety razor blades.

Other objects and advantages of the invention will appear in the following description and accompanying drawing.

In the drawing:

Figure 1 is an elevation of one form of my device for sharpening the double edged wafer type of blades shown full size.

Figure 2 is a vertical section of the device of Figure 1 taken at right angles to the view of Figure 1.

Figure 3 is an enlarged cross section of a portion of Figure 1 taken along the line 3—3 thereof.

Figure 4 is a reduced size elevation of a modified form of holder for the blades.

Figure 5 is an elevation in reduced size showing another modified form of blade holder.

Figure 6 shows a still further modified form of the device, and preferably made mostly of rubber.

Figure 7 is an elevation showing the application of the method of the invention to a single edged or hollow ground razor blade.

Figure 8 is a vertical cross section showing the application of my method to the sharpening or re-edging of safety razor blades while in transit on a conveyor.

Before describing the drawing in detail, it may be stated that the invention was the result of a discovery by me that when a razor blade lost its keen edge so as to require stropping, it could be restored or resharpened by directing a stream of water at an angle against opposite sides of the cutting edge in succession for a short period of time, or against both sides simultaneously. I found best results to be obtained if the stream of water were ejected at high speed and substantially in the form of a sheet or flat jet of

water sweeping along the side of the blade to pass outward over the cutting edge.

The arrangement is illustrated best in Figure 7 of the drawing wherein 1 is a cross section of a common single edge razor blade supported in a suitable rigid holder 2 so as to point downward between two small water pipes 3 arranged close to the blade and perforated adjacent the blade with a row of very fine apertures or slits 4 out of which streams 5 of water substantially in the form of a flat sheet are forced under pressure so as to sweep downward and across the cutting edge 1' of the blade. Instead of the two streams or sheets of water applied simultaneously to both sides, a single stream may, as previously suggested, be applied alternately to opposite sides of the edge, but the first method insures even action on both sides of the edge.

Just what the actual action of the water jets on the steel is I do not know, but since there is substantially no measurable difference in a razor blade which is new and perfectly sharp, and one which has just lost its keenness through moderate use, the effect of the passing water applied in the manner described would seem to be almost a slight molecular wearing away of both sides sufficient to restore the edge to its original condition.

With the water spray emitted at ordinary tap pressure it only requires a few seconds to a minute or so to put the edge back to keen condition. Cold and hot water have been tried with success, also steam, though for blades of tempered steel the temperature should be kept below that which would tend to draw the temper.

Other liquids, such as alcohol and gasoline, gave a similar result, and the effect of water or other liquids may be augmented by slight additions of any soluble corrosive agent or an acid, or even a small amount of suspended polishing powder, but plain water as it comes from the tap is very satisfactory, and remarkable as it may seem, I have found quite satisfactory results to be had from the application of plain compressed air, or other gas, to the blade in the identical manner described. Dusty air of course would present itself as of greater cutting power in this connection.

In order to carry out the invention with the common wafer-type of double edged safety razor blades, I preferably provide a pair of flattened perforated water pipes between which the blades are held and eject the water sprays or sheets under pressure against all four sides at once as shown in Figure 3, which is enlarged consider-

ably above natural size to show the cross section of the blade and action of the water jets more clearly. In this figure the wafer blade is designated 6, the flattened water pipes or tubes between which it is resiliently clamped are shown at 7, perforated along opposite edges as at 8 so that the ejected water will sweep out over both sides of both cutting edges 6', under considerable force as indicated at 8'.

In practical construction the arrangement will include extending the two flattened tubes 7 downward from a larger pipe or header which may take the circular form shown in Figures 1 and 2 at 9 closing the upper end of a cylindrical shell 10 which is soldered or otherwise secured to it and extends considerably below the lower ends of the tubes and is preferably flared outwardly as shown to form a substantial base for supporting the assembly upright as when stood in the bowl of a wash basin. The tubes 7 are spaced apart just sufficiently to resiliently grip opposite sides of the wafer-type razor blade 6 when slid longitudinally between them from the free ends of the tubes which are closed and preferably slightly beveled as at 11 to facilitate entry of the blade.

Shell 10 functions both as a support as well as a splash guard for the water jets, and is cut away at opposite sides of the jets as at 12 so that the insertion or withdrawal of the blade will be plainly visible.

The tubes 7 are preferably about twice as long as the blade to make them more resilient, and if they are of proper metal they will always grip the blade properly and sufficiently to hold it during the water application. However, as an additional means of insuring the required resiliency a flat split spring clip 13 may frictionally embrace the tubes at a point above the blade, and the adjustment of the clip along the tubes will determine the clamping pressure of the tubes against the blade, especially if the tubes be reduced slightly at their upper ends.

Means for introducing water, steam, air or other fluid to the head 9 is here shown as a nipple 14 to which a rubber hose 15 is attached, and to the opposite end of which hose is a suitable rubber cup 16 for slipping over the end of a faucet 17.

In the design shown in Figures 1 and 2 a considerable distance has been preserved between the lower closed ends of tubes 7 and the lower end of the base or shell 10 so that if stood in a wash basin or lavatory fitted with rising discharge plug, it will not interfere but may freely rise within the shell.

Instead of the tubes 7 being soldered or brazed to a header 9 as shown, they may take the forms shown respectively at 7' and 7'' in Figures 4 and 5, wherein Figure 4 shows the tubes looped, and Figure 5 shows them formed with a gentle bend, to thereby increase their length and consequently aid in their resilient gripping of a razor blade 6 inserted between them. In both arrangements a suitable connection for a hose 15' or other source of operating fluid is shown, but no splash guard is shown as it is evident that it may be omitted, especially if air is used as the cutting fluid.

In Figure 6 a design of the device is shown which is adapted for making almost entirely of soft rubber, with a large rubber socket portion 18 for slipping over the end of a faucet 19, and with two rubber tubes 7''' projecting from it. These tubes are closed at their outer ends and

perforated as described for Figures 1 to 3, and being of rubber will grip an inserted blade perfectly, though they may be internally reinforced with thin metal sleeves or strips to hold them better to form if required. This is a very small and simple form of the device for directly slipping on a faucet and turning on the water.

In applying my method of fluid jet sharpening or finishing to large production, as for final edging in a razor blade factory, the blades may be placed automatically or by hand on a traveling conveyor, such for instance as one run 20 of an endless chain conveyor (see Figure 8) guided in a track 21 and carrying a row of blades 6 along perforated water or other fluid ejecting pipes 22, 23, 24 with sprays 25, 26, 27, 28 directed against the sides of the edges of the blades as previously described. Such conveyor arrangements for continuous production may assume many forms as will be evident to anyone skilled in the art.

In considering the invention as above described, I wish to say that I am aware of the disclosure in Patent No. 1,963,563 to use the eroding power of water on a razor blade by twirling a blade therein, but this does not embrace the principle of directing a jet of water under force upon the blade nor the simultaneous sharpening of both sides of one or both edges, and besides brings up the objection of much water passing transversely across the cutting edge, and my invention therefore clearly distinguishes from such prior attempts to sharpen blades with a liquid.

It should also be noted that while my method of finishing cutting edges is particularly suitable for razor blades, it may likewise be applied to other keen edge cutting tools, such as surgical scalpels, etc. and therefore my use of the words "razor blade" in the appended claims is intended to cover such other blades of similar keenness.

It should also be noted that while I show my invention applied to the wafer-type double edge safety razor blades, the blade holding device may be suitably modified to hold any type of safety or other razor blade for applying the method of my invention.

Having thus described my invention and some of the variations in the manner of carrying it out, what I claim is:

1. A device for holding and sharpening razor blades which comprises a pair of tubes arranged at opposite sides of a razor blade in a manner to extend across the blade and clamp against the blade to hold the same and provided with openings arranged to direct fluid under pressure from the tubes against opposite sides of the edge of the blade so as to sweep outwardly over its edge.

2. A device for holding and sharpening razor blades which comprises a pair of tubes arranged at opposite sides of a razor blade in a manner to extend across the blade and clamp against the same and provided with openings arranged to direct fluid under pressure from the tubes against opposite sides of the edge of the blade so as to sweep outwardly over its edge, and a guard arranged to intercept the ejected fluid after leaving the blade.

3. A device for holding and sharpening razor blades which comprises a pair of tubes arranged at opposite sides of a razor blade in a manner to extend across the blade and clamp against the same and provided with openings arranged to direct fluid under pressure from the tubes against opposite sides of the edge of the blade so as to sweep outwardly over its edge, a guard arranged

to intercept the ejected fluid after leaving the blade, and means provided for connecting a hose for admitting a fluid under pressure to both tubes.

4. A device for holding and sharpening razor
5 blades which comprises a pair of tubes arranged
at opposite sides of a razor blade in a manner to
extend across the blade and clamp against the
same and provided with openings arranged to
direct fluid under pressure from the tubes against
10 opposite sides of the edge of the blade so as to
sweep outwardly over its edge, said device made
generally of soft rubber and provided with a
socket for directly attaching to a water faucet.

5. A device for holding and sharpening razor
15 blades which comprises a pair of tubes arranged
at opposite sides of a razor blade in a manner to
extend across the blade and clamp against the
same and provided with openings arranged to
direct fluid under pressure from the tubes against
20 opposite sides of the edge of the blade so as to
sweep outwardly over its edge, and means for
controlling the clamping effect of said tubes upon
the blade.

6. A device for holding and sharpening razor
blades which comprises a pair of tubes arranged
at opposite sides of a razor blade in a manner to
extend across the blade and clamp against the
5 same and provided with openings along opposite
sides arranged to direct fluid under pressure from
the tubes against opposite sides of both edges
of the blade simultaneously to sweep outwardly
over its edges.

7. A device for sharpening razor blades which
10 comprises means for holding a razor blade, tubes
at opposite sides of the blade provided with open-
ings extending substantially along the length of
the cutting edge of the razor blade arranged and
adapted to direct fluid under pressure from the
15 tubes against opposite sides of the blade at the
rear of the cutting edge and at an angle converg-
ing toward the cutting edge so that the fluid will
sweep outwardly against and over said cutting
edge from both sides of the blade for substan-
20 tially the length of said edge.

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