May 14, 1935. R. L. GARDNER ET AL 2,000,941

RAZOR BLADE SHARPENING DEVICE

Filed Dec. 27, 1933 2 Sheets-Sheet 1

Fig. 2.

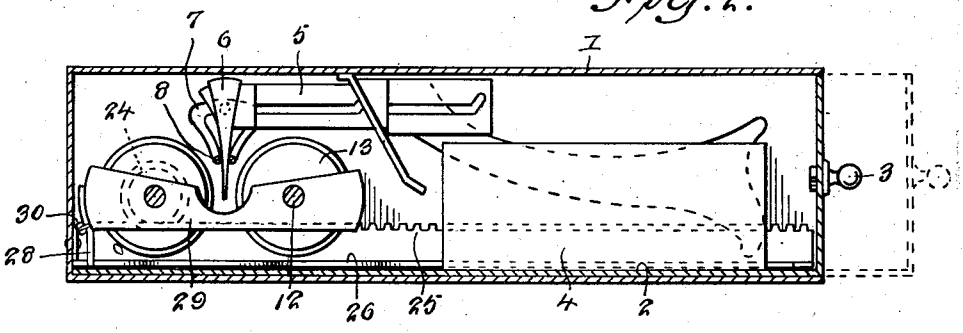


Fig. I.

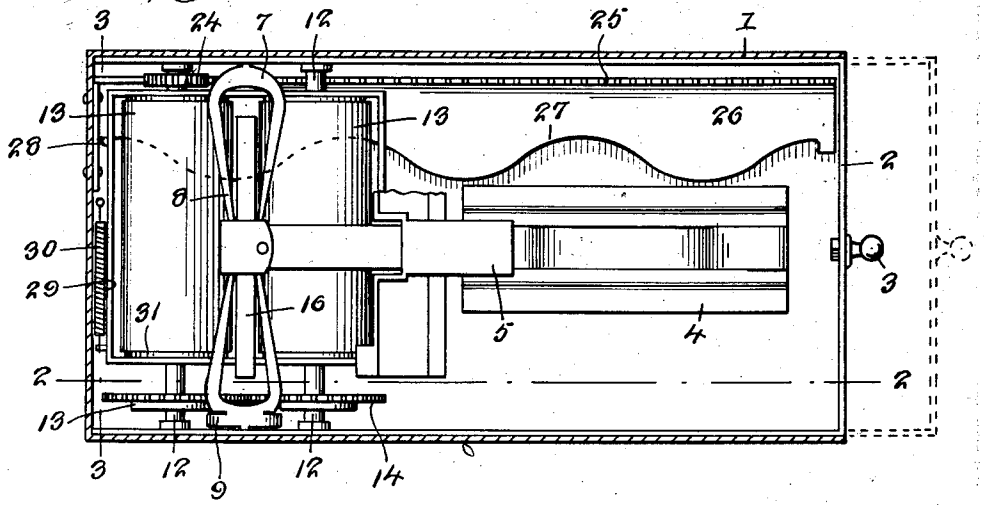


Fig. 3.

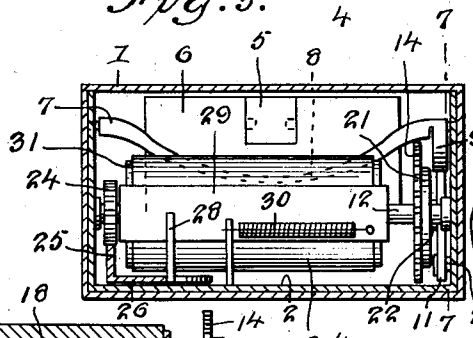


Fig. 4.

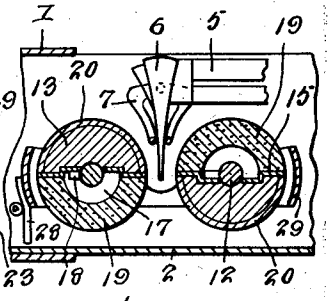
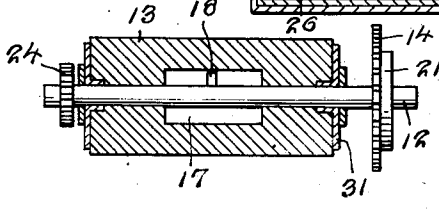


Fig. 10.



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Fig. 5.

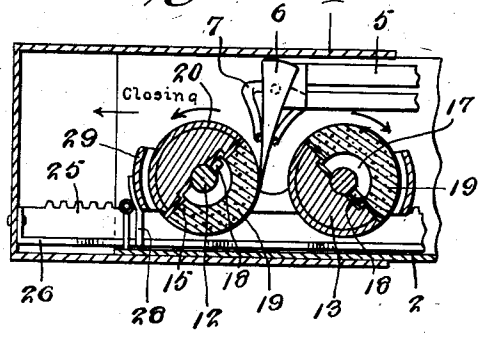


Fig. 6.

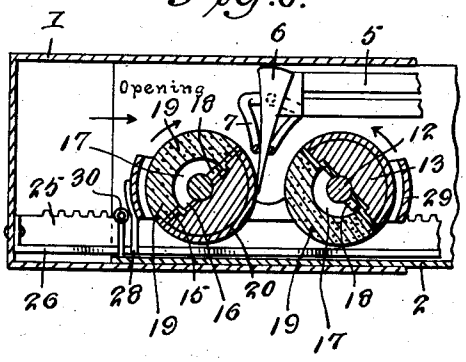


Fig. 7.

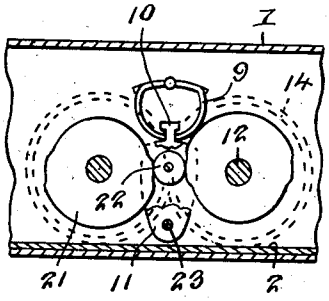


Fig. 8.

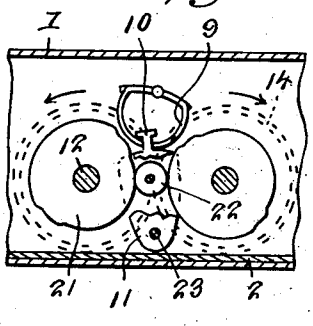


Fig. 9.

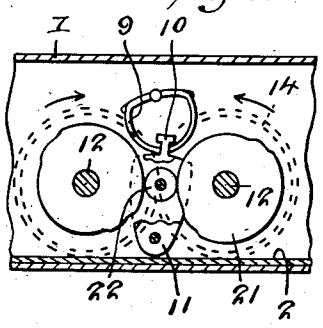


Fig. 12.

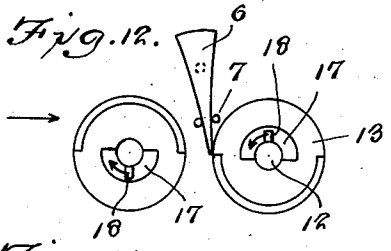


Fig. 13.

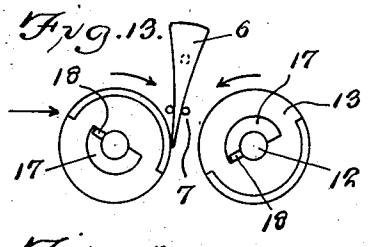


Fig. 14.

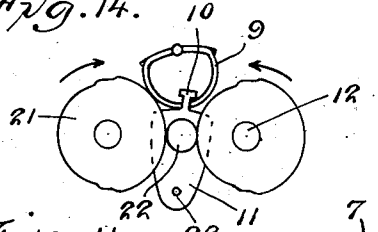


Fig. 15.

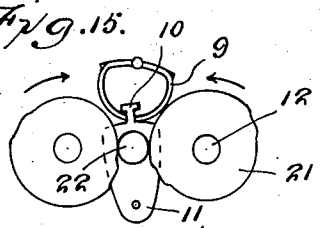
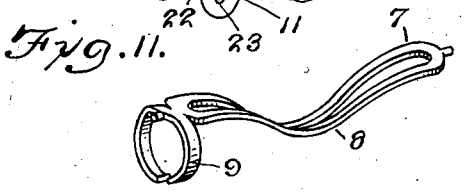


Fig. 11.



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UNITED STATES PATENT OFFICE

2,000,941

RAZOR BLADE SHARPENING DEVICE

Robert L. Gardner and Roy D. Lloyd,
Pittsburgh, Pa.

Application December 27, 1933, Serial No. 704,168

8 Claims. (Cl. 51—86)

This invention relates to automatic razor blade sharpening devices, and has for the primary object the provision of a device of the above stated character whereby a razor blade may be mechanically honed and stropped in one operation to maintain the cutting edge of the blade in efficient condition for shaving.

With these and other objects in view this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of our invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a horizontal sectional view illustrating an automatic razor blade sharpening device constructed in accordance with our invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a fragmentary vertical sectional view showing the blade acted upon by the honing surfaces of the sharpening rollers.

Figure 6 is a similar view showing the blade acted on by the stropping surfaces of the sharpening rollers.

Figure 7 is a fragmentary sectional view taken on the line 7—7 of Figure 3 showing the cams acting on the blade holder to place the blade in a neutral position between the sharpening rollers.

Figure 8 is a similar view showing the blade holder positioned by the cams to bring the blade in contact with one of the sharpening rollers.

Figure 9 is a similar view showing the position of the blade holder by the cam to bring the blade in engagement with the other sharpening roller.

Figure 10 is a detail sectional view illustrating one of the sharpening rollers and the drive between itself and the supporting shaft.

Figure 11 is a perspective view illustrating the blade holder.

Figure 12 is a diagrammatical view showing the lost motion between the sharpening rollers and their respective shafts.

Figure 13 is a diagrammatical view showing the rollers driven by their respective cams.

Figure 14 is a diagrammatical view showing the shifting of the blade holder by the cams to engage with one of the sharpening rollers.

Figure 15 is a similar view showing the blade holder shifted by the cams to engage the other sharpening roller.

Referring in detail to the drawings, the numeral 1 indicates a casing open at one end to receive a slide 2 preferably in the formation of a drawer so that the casing will be closed at its open end when the slide is positioned entirely within the casing. The end wall of the slide has secured thereto a finger piece 3 so that a person may readily impart to the slide an inward and outward movement with respect to the casing. Mounted to the slide is a suitable rack 4 adapted for supporting a safety razor blade holder 5 wherein the blade 6 is capable of having pivotal movement with respect to the holder. It is to be understood that the type of holder 5, shown in the drawings, forms the subject matter of a copending application filed September 20, 1933, and Serial No. 690,271. However, this present invention is so constructed that it will successfully sharpen razor blades other than the type shown, or it is not necessary that the blade be pivoted to a holder of the character shown at 5 as a special means is provided in the present invention which is capable of accommodating blades employed with other types of holders.

A blade holder 7 is pivotally mounted to opposite side walls of the slide 2 and consists of curved resilient gripping portions 8 engageable with opposite faces of the blade, as shown in Figure 2. Integral with one end of the blade holder 7 are arcuately curved resilient fingers 9 to engage a flanged extension 10 of a shifting element 11 which will be hereinafter more fully described.

A pair of roller shafts 12 are journaled in opposite walls of the slide 2 and rotatably and slidably support sharpening rollers 13 spaced slightly from each other to permit the cutting edge of the blade to extend between the rollers, as shown in Figure 2. The shafts are connected by meshing gears 14 so that during the rotation of said shafts they will be compelled to rotate in opposite directions and also will synchronize the rotation of said shafts. The rollers have located therein plates 15 offset to form recesses or pockets 16. The rollers also have formed therein elongated recesses 17 communicative with the pockets and the shafts so that the pins 18 secured to said shafts may move in the recesses 17 to engage with the pockets at opposite sides of the shafts. The pockets, recesses and pins establish a drive between the shafts and the rollers wherein the shafts are capable of rotating approximately one-half a revolution before turning the rollers therewith. Each roller is of sectional construction wherein

one section, indicated by the character 19, is of a honing material while the other section is of a stropping material and indicated by the character 20. Secured to the gears 14 are cams 21 on which rides a roller 22 and the latter is journaled to the shifting element 11 and said shifting element is pivotally supported to the slide 2, as shown at 23. A pinion 24 is secured to one of the shafts 12 and meshes with a rack bar 25 secured to the casing 1 and extending substantially the full length of the latter. The rack bar has integral therewith a flange 26 provided with a serpentine face 27 on which rides a pin 28 forming part of a shifting frame 29. The shifting frame extends about the rollers, as shown in Figure 1, and has connected thereto a spring 30 which is in turn secured to the slide 2 for the purpose of urging the shifting frame in a position that the pin 28 thereof will always ride or contact with the serpentine face 27 of the flange 26. The sharpening rollers are caused to move endwise of their respective shafts and also endwise with respect to the blade 6 as well as rotate during the sliding movement of the slide 2 with respect to the casing 1. The rotation of the rollers is through the pinion 24 meshing with the rack bar 25 and the sliding movement of the rollers is by the pin 28 operating against the serpentine face 27 of the flange 26 carried by the rack bar.

Each sharpening roller at its ends is provided with wear plates 31 to be engaged by the shifting frame and sufficient friction is had between the shifting frame and the rollers to prevent the latter from accidentally rotating so that said rollers will not rotate until positively driven by their respective shafts.

The cams 21 engaged by the roller 22 of the shifting element 11 act to move the blade into the neutral position and the two operative positions above mentioned.

The cams are so shaped and cooperate with each other and the shifting mechanism of the blade that said blade will have three positions with respect to the sharpening rollers, namely, neutral position and two operative positions, one in engagement with one roller and the other in engagement with the other roller.

The blade assumes the stated positions during the inward and outward movement of the slide with respect to the casing and the described driving connection between the shafts and the rollers permits the cams to reverse their positions with respect to the rollers so that on the slide moving into the casing the blade will first be brought into contact with the honing surface of one roller and then in contact with the honing surface of the other roller and during the movement of the slide outwardly with respect to the casing the blade first comes in contact with the stropping surface of one of the rollers and then in engagement with the stropping surface of the other roller, so that during the inward and outward movement of the slide with respect to the casing the blade will have received honing and then stropping so that the cutting edge thereof will be maintained in the most efficient condition for shaving. During the rotatable action of the rollers upon the blade said rollers also move endwise with respect to the blade to prevent the sharpening rollers from forming in the cutting edge of the blade minute grooves or saw teeth.

In operation, the slide is moved manually in opposite directions relative to the casing. The sliding movement of the slide rotates the sharpening rollers and also the blade holder is oscillated by the rotation of said rollers. The oscillation of the blade intermittently engages the latter with said sharpening rollers, first contacting with the honing surfaces and then with the stropping surfaces. During the rotation of the rollers they are also moved endwise in opposite directions by the pin 28 on the shifting frame 29 riding upon the serpentine face 27.

Having described the invention, we claim:

1. A sharpening device comprising a support, a slide mounted to said support for movement in opposite directions, a holder pivoted to the support and receiving and frictionally gripping a blade and adapted for oscillatory movement, sharpening rollers mounted to the support for rotation and sliding movements endwise relative to the blade and each having honing and stropping surfaces, means between said sharpening rollers and said holder whereby movement of the slide in opposite directions imparts rotation to the rollers, means for sliding the rollers endwise in opposite directions during the rotation of the latter, and means for intermittently engaging the blade first with the honing surfaces and then with the stropping surfaces of said rollers.

2. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, means for rotatably and slidably mounting the rollers to the support, means between said last means and said holder whereby movements of the slide in opposite directions imparts rotation to the rollers, means for sliding the rollers endwise in opposite directions during the rotation of the latter and means for intermittently oscillating the holder to bring the blade first into engagement with the honing surfaces and then into engagement with the stropping surfaces of said rollers.

3. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, and means between said shafts and said holder whereby movement of the slide in opposite directions imparts rotation to the rollers, means for sliding the rollers endwise in opposite directions during rotation of the latter and means for intermittently engaging the blade first with the honing surfaces and then with the stropping surfaces of said rollers.

4. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces,

shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, gears connecting the shafts whereby said shafts will be synchronized and caused to rotate in opposite directions, and means between one of the shafts and the slide to cause rotation and sliding movement of said rollers by the movements of the slide in opposite directions, and means between the slide and the holder to cause oscillatory movement of the holder during the sliding movements of the slide to intermittently engage the blade first with the honing surfaces and then with the stropping surfaces of said rollers during sliding movement of the slide.

5. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, gears connecting the shafts whereby said shafts will be synchronized and caused to rotate in opposite directions, a rack bar secured to the support, a pinion between one of the shafts and the rack bar to cause rotation of the rollers by the sliding movement of the slide in opposite directions, means between the rack bar and the rollers to impart endwise movement to said rollers during the sliding movement of the slide, and means between the slide and the holder to oscillate the latter during the sliding movement of the slide to first engage the blade with the honing surfaces and then with the stropping surfaces of the rollers.

6. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, gears connecting the shafts whereby said shafts will be synchronized and caused to rotate in opposite directions, a rack bar secured to the support, a pinion between one of the shafts and the rack bar to cause rotation of the rollers by the sliding movement of the slide in opposite directions, a shifting frame carried by the shafts and frictionally engaging the ends of the rollers, a flange on the rack bar and having a serpentine face, a pin on the frame and riding against the serpentine face, spring means urging the pin to engage the serpentine face, and means between the holder and the shafts to impart oscillatory movement to the holder during the rotation of said shaft.

7. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, gears connecting the shafts whereby said shafts will be synchronized and caused to rotate in opposite directions, a rack bar secured to the support, a pinion between one of the shafts and the rack bar to cause rotation of the rollers by the sliding movement of the slide in opposite directions, a shifting frame carried by the shafts and frictionally engaging the ends of the rollers, a flange on the rack bar and having a serpentine face, a pin on the frame and riding against the serpentine face, spring means urging the pin to engage the serpentine face, cams carried by the shafts, a cam roller engaging said cams, pivotal means on the support and carrying the cam roller, and means for connecting the pivotal means to said holder.

8. A sharpening device comprising a support, a slide carried by said support and having movements in opposite directions, a holder pivoted to the support and including resilient gripping portions to receive and frictionally engage a blade, said holder adapted for oscillatory movement, sharpening rollers arranged at opposite sides of the holder with the blade extending therebetween and including honing and stropping surfaces, shafts journaled to the support and extending through the rollers for rotatably and slidably supporting the latter, driving means between the shafts and the rollers, gears connecting the shafts whereby said shafts will be synchronized and caused to rotate in opposite directions, a rack bar secured to the support, a pinion between one of the shafts and the rack bar to cause rotation of the rollers by the sliding movement of the slide in opposite directions, a shifting frame carried by the shafts and frictionally engaging the ends of the rollers, a flange on the rack bar and having a serpentine face, a pin on the frame and riding against the serpentine face, spring means urging the pin to engage the serpentine face, cams carried by the shafts, a cam roller engaging said cam, pivotal means on the support and carrying the cam roller, and resilient fingers on the holder and engageable with opposite sides of said pivotal means.

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