July 28, 1936. E. A. JOHNSTON 2,048,869

RAZOR BLADE SHARPENER

Filed April 1, 1935

Fig. 2.

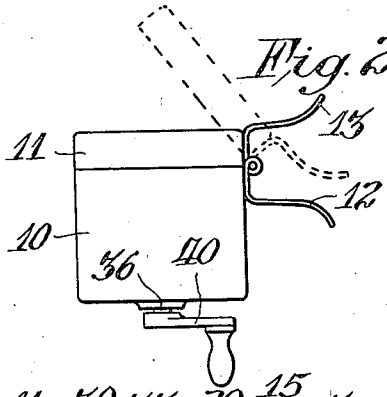


Fig. 1.

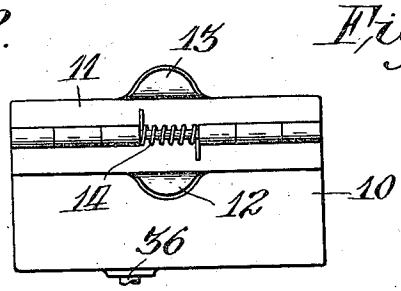


Fig. 3.

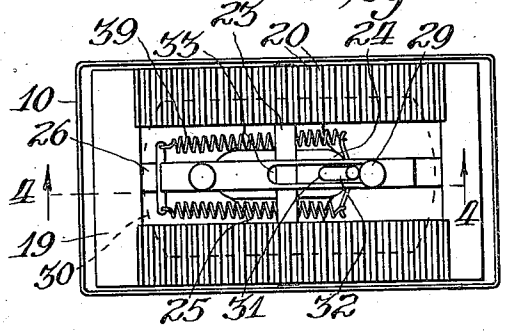


Fig. 5.

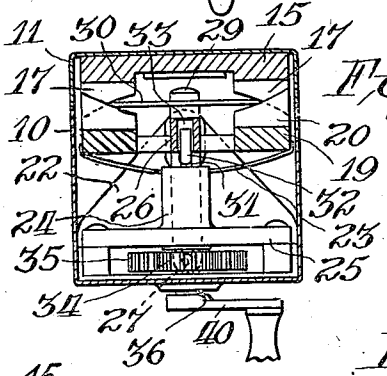
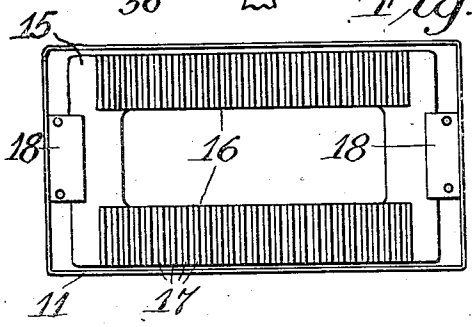


Fig. 6.



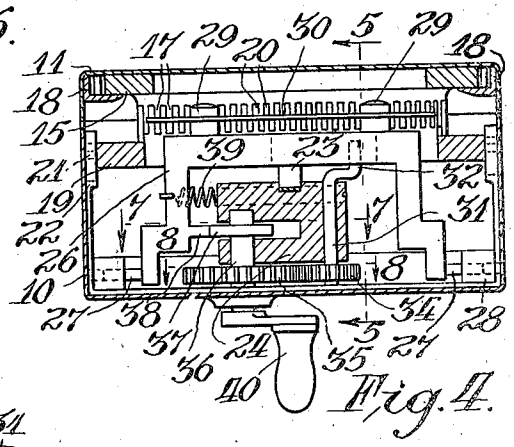


Fig. 4.

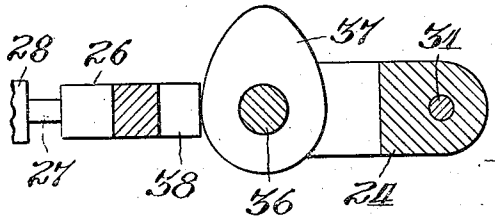
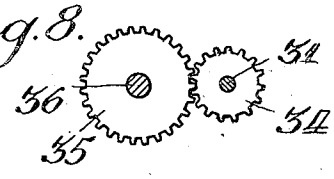


Fig. 7.

Fig. 8.



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RAZOR BLADE SHARPENER

Edward A. Johnston, Chicago, Ill.

Application April 1, 1935, Serial No. 14,005

3 Claims. (Cl. 51—158)

The present invention relates to razor blade sharpening devices such as used for restoring the cutting edges of safety razor blades of the kinds in common use.

The primary purpose of the invention is to improve the efficiency of such devices by providing mechanism having a mode of operation designed to impart the type of stroke or movement between the abrasive elements and blade which has been demonstrated by microscopic examination and by tests to act most quickly in producing correct sharpening effects on the cutting edge or edges of a blade. Another purpose is to provide the mechanism in compact form suitable for a portable or pocket type sharpener.

The foregoing, as well as other purposes and advantages hereinafter referred to, are attained by providing means for causing reciprocating movements between a blade and the abrasive elements on lines substantially straight and in the direction of the width of the blade. This because it is well established that the most efficient shaving edge for a razor blade is one having irregular microscopic projections or "teeth" which constitute the actual cutting edge all lying substantially parallel and in the plane of the blade. This condition will result from movement of the abrasive against the sides of the blade edge at substantially right angles to the edge. It will not result if the movement is circular or orbital, as excessive movement between the abrasive and blade in the direction of the blade edge causes the projections referred to to incline towards each other and even to overlap, therefore giving a poor shaving edge.

In the mechanism embodying the present invention the blade sharpening movements are quick and in the direction of the plane of the blade, transverse to its longitudinal axis and substantially rectilinear, such axial movement of the blade as occurs being slow and designed to present the blade edges uniformly to the abrasive, all orbital or curvilinear sharpening movements or strokes being eliminated, as will be better understood from the following description and by reference to the accompanying drawing, where,

Figures 1 and 2 are side and end views, respectively, of the two-part casing housing the portable form of the device, the open position being indicated in dotted lines on Fig. 2.

Figure 3 is a top or plan view of the device as seen with the cover of the casing removed.

Figure 4 is a longitudinal vertical section on the line 4—4 of Fig. 3 with the casing cover in place.

Figure 5 is a transverse section on the line 5—5 of Figure 4.

Figure 6 is a plan view of the inside of the casing cover.

Figure 7 is an enlarged detail sectional view on the line 7—7 of Fig. 4, and

Figure 8 is a detail view on line 8—8 of Fig. 4.

In the particular embodiment of the invention chosen for purposes of this disclosure, there is provided a two-part oblong casing of rectangular form comprising a body portion 10 and cover 11. Opposed finger pieces 12 and 13, or the equivalent thereof, may be provided on the body and cover of the casing, respectively, for opening the casing. A coil spring 14 on the hinge pin that joins the two parts of the casing serves to normally retain the casing closed.

Within the cover of the casing there is secured an abrasive member or head 15 which preferably consists of an elongated base frame or plate provided on its opposite longitudinal margins with abrasive elements 16. These elements consist of a series of equally spaced, plate like, lugs or teeth 17 higher at the outer sides than at the inner sides and therefore presenting top edges which incline towards the longitudinal median line of the base plate. These are preferably slightly concave, as illustrated and best seen in Fig. 5. Clamp plates 18 serve to secure the head 15 to the cover.

The base of the casing contains an abrasive member or head 19, a duplicate of head 15, positioned to face the opposed abrasive elements on the head 15. The lugs or teeth 20 on head 19 are disposed in offset relation to the lugs 17 on head 15 and the higher portions of the lugs on the respective heads therefore inter-engage or mesh as shown on Fig. 5, and present inwardly V-shaped grooves. The head 19 is movably and yieldably supported in the casing by providing pins 21 centrally on its opposite ends which engage in vertical slots in upright guide pieces 22 lying against the casing end walls. A bowed leaf spring 23, located centrally, has its arms yieldably supporting the head 19 and its mid-portion anchored to a bearing block or head 24 which stands on a base plate 25 supported in spaced relation to the bottom of the casing. An elongated, inverted U-shaped blade carrier 26 is positioned longitudinally of the casing and has its arms, adjacent the bottom of the casing, provided with long pivot pins 27 slidably and pivotally received in bearings 28 at each end of the casing in the central longitudinal vertical plane thereof. The upper portion of the carrier 26 is straight and lies within the central space of the

abrasive head 19. This straight portion of the carrier is formed with spaced cylindrical lugs 29 adapted to loosely engage the openings in a wafer blade 30 of the commonly used types when said blade is placed on the abrasive head 19, as shown in Figures 4 and 5. The carrier 26 is accordingly rockable on pins 27 and is movable longitudinally in the casing on these pins as they slide in the bearings 28.

As means for actuating the carrier 26, there is shown an upright shaft 31 journaled in the block 24 and formed with a crank 32 on its upper end which engages in a longitudinally extending slot 33 in the upper portion of carrier 26. The lower end of shaft 31 has a gear 34 fixed on it which meshes with a larger gear 35 fixed on an upright stub shaft 36 also journaled in block 24. The shaft 36, within a suitable space in the end of block 24, carries a cam 37 of the oval or heart shape shown. This cam engages an abutment 38 on the inner side of the arm of carrier 26. Springs 39, connected at one end to this arm and anchored at the other ends to block 24, serve to hold the carrier and cam in contact and to move the carrier in the direction opposite to that imparted by the cam. A hand crank, or the like, serves to rotate shaft 36.

With the construction and arrangement described, the casing is opened by grasping the finger holds 12, 13 and a blade to be sharpened is laid on abrasive member 19 with its openings receiving by lugs 29. Its edges will lie approximately at the center of the abrasive elements 20. The casing is then closed to bring the opposite abrasive elements into engagement with the opposite sides of the blade edges, as in Figure 5. Rotation of shaft 36 by means of crank 40 will be communicated at multiplied speed to shaft 31 and crank 32. The rotation of shaft 31 causes comparatively rapid rocking movement of carrier 26 thereby reciprocating the blade 30 transversely between the abrasive elements which grasp both its edges, the yieldable mounting of head 19 and loose engagement by lugs 29 permitting free movement of the blade. At the same time, the comparatively slow rotation of shaft 36 causes slow movement of carrier 26 at right angles to its rocking movement and correspondingly moves the blade, thereby causing the full length of the blade edges to be subjected to the action of the plate-like abrasive elements 17, 20 on the respective heads which remain stationary. All four sides of the blade edges are accordingly swept over the abrasive elements on zig-zag lines extending at such acute angles to one another as to be substantially perpendicular to the longitudinal axis of the blade and the effect on the cutting edge is to restore the ultimate thin and delicate tooth-like projections thereon to the perpendicular and aligned relations constituting what is known as a keen edge.

Other important features contributing to the efficiency of the device are that the driving gears 34, 35 are not of even ratio, that is, the driving relation is such that the blade is moved in varying zig-zag paths at each shift of the carrier by cam 37. Also, the teeth 17, 20 of the abrasive elements are thin and closely spaced so that the delicate blade edge lying thereon will bridge the spaces without being distorted, as would be the case if wider spacings were present.

The illustrative embodiment of the invention herein disclosed is obviously capable of various modifications without departure from the scope of the invention as defined in the following claims.

What is claimed as new is:

1. In combination, a casing, a pair of opposed stationary oblong plates mounted in the casing having abrasive elements adapted to simultaneously engage the four sides of the cutting edges of a double edged blade, means for maintaining said engagement, a carrier having spaced lugs adapted to loosely engage the openings of a wafer type razor blade and located to position a blade between said abrasive elements, said carrier being mounted in the casing for reciprocating movements on lines at right angles to each other, and actuating means in the casing for imparting rapid reciprocating movements to the carrier in the direction of the width of a blade carried thereby and simultaneously imparting slow movement thereto in the direction of the length of such blade.

2. In combination, a pair of opposed stationary oblong plates having abrasive elements positioned to simultaneously engage the four sides of the cutting edges of a double-edged razor blade, a movably mounted blade carrier located between said plates, means for rapidly reciprocating the carrier in the direction of the width of a blade carried thereby to move the blade edges across the abrasive elements, and means for moving the carrier slowly on a straight line in the direction of the length of such blade during said reciprocation of the carrier.

3. In combination, a pair of opposed stationary plates having inclined abrasive elements formed to inter-engage at their outer margins thus presenting inwardly facing V-shaped grooves, a yieldable support for one of said plates, a movably mounted blade carrier located between said plates and adapted to receive a double-edged razor blade having its opposite edges lying in said grooves, means for rapidly reciprocating the carrier in the direction of the width of a blade carried thereby, and means for moving said carrier slowly on a straight line in the direction of the length of the blade during said reciprocation of the carrier.

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