Aug. 4, 1953 D. A. DODSON 2,647,308

SAFETY RAZOR

Filed Sept. 14, 1951

Fig. 1.

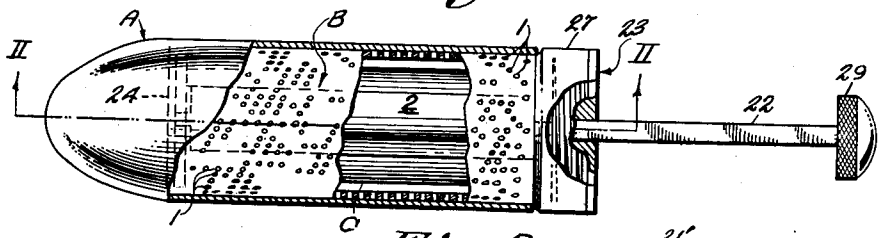
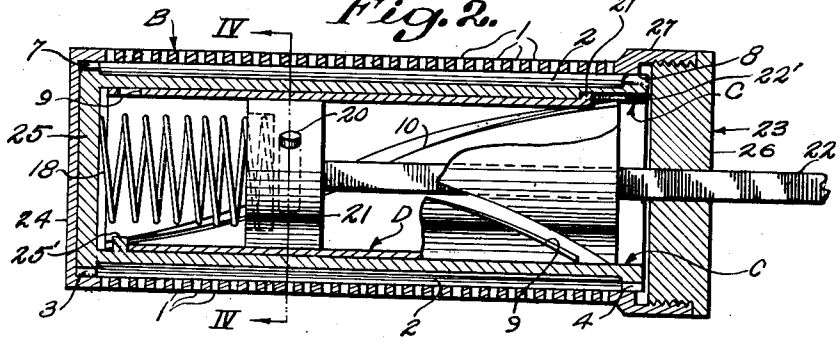


Fig. 2.



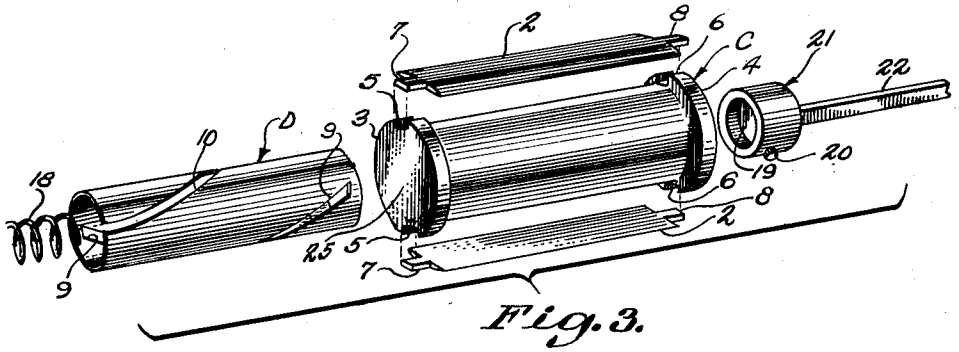


Fig. 3.

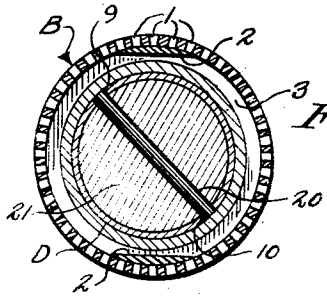
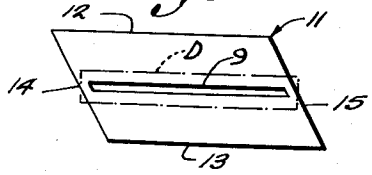


Fig. 4.

Fig. 5.



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SAFETY RAZOR

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2 Claims. (Cl. 30—43)

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The present invention relates to an improved construction of safety razor which embodies advantages not found in the conventional types of safety razors. The invention provides a construction of a razor which is simple and inexpensive, both from the standpoint of manufacture and sale, and which affords positive protection to the user against cutting or nicking of the skin during shaving.

One of the disadvantages inherent to the conventional types of safety razors is the likelihood of the user accidentally nicking or cutting his skin or flesh during shaving, causing tenderness of the skin, imperfectly shaved areas, sore spots, and other objectionable features. Many attempts have been made to overcome this deficiency which is universally present in all conventional types of safety razors, either using double-edged blades or single-edged blades, notwithstanding many efforts have been made to eliminate such defects, which usually is caused by the razor head or guard imperfectly protecting the skin of the shaver against direct contact with the cutting edge or corners of the blade.

A further drawback in the standard types of safety razor lies in the fact that in order to remove the blade, a plurality of interfitting and mutually dependent parts of the razor must be disassembled to remove a dulled blade for replacement with a new and serviceable blade, with the likelihood of accidental misplacement or loss of one or more of the parts. Efforts which have been made to make such razors in one piece have met with indifferent success, since the resulting constructions are relatively complicated and easily get out of working order.

The present invention provides an improved safety razor which positively protects the user against the danger of nicks and cuts, and which minimizes replacement of the cutting blade, as it embodies self-sharpening features which maintain the blade in good shaving condition over indefinitely long periods of time.

A further object of the invention is to provide a rotary-type of safety razor that is simple in construction and easily used for shaving, while being inexpensive to manufacture and sell.

A further object of the invention is to provide a safety razor of the above-indicated character in which the interfitting parts can be disassembled and reassembled readily whenever desired, but which can be maintained assembled in useable condition over long periods of time.

A further object of the invention is to provide a razor of the above-indicated character which

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embraces novel means for transmuting linear or rectilinear movement into rotary movement for shaving.

Further objects and advantages of the present improved construction will become apparent as the description proceeds, and the features of novelty will be pointed out in particularity in the appended claims.

The accompanying drawing illustrates an exemplary embodiment of a construction of a safety razor including the improved features of the present construction, in which:

Fig. 1 is a side elevational view of the device with parts broken away and partly in section.

Fig. 2 is a longitudinal section taken on the line II—II of Fig. 1.

Fig. 3 is an exploded perspective view of the rotor, rotor drive and actuating elements, and blades disassembled.

Fig. 4 is a sectional view taken on the line IV—IV of Fig. 2 looking in the direction of the arrows.

Fig. 5 is a plan view of a blank for forming the spirally slotted rotor actuating means shown in Fig. 3, and in dot and dash lines in Fig. 5.

Referring more particularly to the drawings, reference character A represents an outer casing or housing adapted to contain the razor structure when the said structure is not in use. This razor structure or assembly comprises a tubular cylindrical razor head or guard B, which is perforated, as shown, with a multitude of perforations indicated at 1, extending longitudinally along the entire length of the razor head and peripherally completely around the circumference of the razor head B. These perforations permit access of the hairs of the beard of the user to the cutting blades 2, which are mounted on a cylindrical tubular exterior rotor C, which receives an inner tubular cylindrical rotor D. The perforations 1 are aligned as indicated in Fig. 1, and are of sufficient size and frequency to assure even access of the beard hairs to the cutting blades 2, responsive to pressure of the razor head against the face.

For mounting the blades 2, which are shown to be relatively narrow, double-edged blades, the rotor C has end flanges 3 and 4, that are provided with aligned recesses 5 and 6 which are adapted to receive snugly the end lugs 7 and 8 for retaining the blades 2 in mounted position on the rotor C, the blades 2 are curved transversely to conform somewhat to the cylindrical periphery of the rotor C, but on a somewhat longer radius, so as to leave a cutting clearance between the

edges of the blade and the rotor C. The rotor C is closed at one end by a closure member 25 of greater diameter than that of said rotor and which forms the flange 3, the flange 4 being formed on the rotor at its opposite or open end.

The rotor C is actuated by an inner tubular cylindrical rotor D, which is formed with oppositely disposed spiral slots 9 and 10, the inner rotor D being formed from a blank 11, that is in the shape of a parallelogram with parallel sides 12 and 13 and oblique ends 14 and 15, the blank 11 having a longitudinal slot 9 therein. When the blank is turned so as to bring it into a cylindrical configuration with the ends square or in a vertical plane, the body of the blank is twisted correspondingly and the slot 9 becomes a spiral slot, the longitudinal edges 12 and 13 forming the second spiral slot 10, that is disposed oppositely to the spiral slot 9. The blank 11 is cut to a size such that when it is bent into the cylindrical rotor D, said rotor will fit inside of the outer rotor C, and will receive an actuating coil spring 18 positioned interiorly of the inner rotor D and received and held in place in a flanged cylindrical seat 19 mounted in the rotor D and slidable relative thereto longitudinally of the inner surface of said inner rotor.

This inner rotor D is actuated by a pin 20 which extends through the opposite spiral slots 9 and 10 and which is mounted in a piston 21 actuated by a piston rod 22 which passes through and is guided by an end cap assembly 23 which closes one end of the razor assembly, the opposite end of the razor assembly being closed by the end 24 of the head B. The end cap or closure assembly 23 comprises a cap 26 that is threadedly received by an enlarged integral annular retaining collar 27 of the razor head B.

The projecting ends of the pin 20 engageable in the oppositely disposed spiral slots 9 and 10 are adapted to impart rotary motion to the rotor member D as the pin and spring seat 19 in the piston 21 are moved inwardly responsive to an inward thrust on the piston rod 22, thus compressing the spring 18 as the inner rotor D is turned by movement of the pin 20 in the spiral slots 9 and 10. The rotor D is suitably interconnected with rotor C by a lug 21' formed on said rotor D and engageable in a groove 22' formed in the inner surface of the rotor C at one end thereof, and a lug 25' formed on the inner surface of the rotor C adapted to engage in the end of spiral slot 10 at the opposite end and side of rotor D from the lug 21', when the rotor D is in operative position, as shown in Fig. 2, so that the rotation imparted to the rotor D by the pin 20 operable in the spiral slots 9 and 10 is transmitted to the blade carrying rotor C, thereby turning the blades 2 through a corresponding rotary motion responsively to each inward thrust of the piston rod 22. The compression thus imparted to spring 18 returns the piston to its starting position responsively to the release of the actuating pressure on the piston rod 22, which pressure is imparted by the pressure of an operator's finger. The action therefore is an oscillating rotary movement of the blades 2, the edges of which make wiping engagement with the inner surface of the perforated razor head B, which is as smooth mechanically as it is possible to obtain. This wiping contact shaves off the hairs entering the perforations 1 with a closeness corresponding to the pressure of the razor head against the face. The razor head B is made of thin metal to permit a close shave being obtained through

the use of the razor, while preventing all possibility of injury to the skin or flesh of the user.

The piston rod 22 is square in cross section and the aperture in cap 26 is likewise square, so that the ends of pin 20 will reciprocatingly move in fixed longitudinal paths in effecting rotary movement of rotors D and C.

When the razor assembly is not in use, the outer casing A is slipped over it. The offset edge of the annular retaining collar 27 of the end closure assembly 23 forms a seat for the outer casing or housing A. The end of the casing A may be rounded into a rounded conical configuration as shown, but this is an immaterial detail.

Piston rod 22 terminates in an actuating head 29, which is adapted to be engaged by the thumb or finger of the operator. For shaving, the outer casing or housing A is removed, uncovering the holes 1 in the razor head B. The apertured portion is held in the same hand of the shaver as actuates the piston rod 22, and the apertured surface of the head is pressed against the skin so as to cause the hairs of the beard to enter the holes 1. Inward pressure on the actuating head 29 on piston rod or stem 22 forces the spring seat 19 and the pin 20 inwardly, thus causing the seat to slide in the actuating rotor D when the pressure applied to the piston 21 exceeds the pressure exerted by the spring 18, thereby compressing the spring 18 between the movable spring seat 19 and the end closure 25. The movement of the piston and seat 19 causes the pin 20 to slide in the spiral grooves 9 and 10 of the inner actuating rotor D, thereby causing the rotor to turn through an arc of approximately 360 deg. The connection between the slotted actuating rotor D and the outer blade carrying rotor C, causes this latter to turn through a corresponding arc, thereby imparting a shaving rotation to the blades 2. Upon release of the pressure on piston rod 22, the compression of spring 18 returns the piston and rotor to their original position, thereby rotating the blades 2 in the opposite direction, and since the blades 2 are double-edged, they will cut when rotating in either direction. Also, since the edges of blades 2 make wiping contact with the smooth inner surface of the razor head B, the blades become automatically re-sharpened with each stroke. The razor is designed to be a so-called "dry shaver" thereby eliminating clogging of the holes 1 with accumulations of lather and debris, but when cleaning becomes necessary, the assembly can be taken apart easily for access to the blades and the blade-carrying rotor C. This rotor having a solid surface can be easily wiped clean when the blades are removed by releasing the frictional hold between the end tabs 7 and 8 of the blades and the tab-receiving recesses 5 and 6 in the end flanges of the rotor.

The form of the construction herein illustrated and described represents one embodiment of a razor assembly embodying the improved features of this construction. It will be apparent, however, that the specifically illustrated and described embodiment of the invention can be modified quite extensively without departing from the concept of the invention, and accordingly, it will be understood that it is intended and desired to embrace within the scope of this invention such modifications and changes as may be necessary to adapt the construction of the invention to such various conditions and uses, as defined by the scope of the appended claims.

What is claimed is:

1. A rotary type razor comprising, in combination, a razor head provided with a multiplicity of perforations, a rotor mounted in the razor head, a cutting blade mounted on the rotor adjacent to the razor head and behind the perforations thereof, means on the rotor for removably holding the blade on the rotor in operative position, an operating rotor mounted interiorly of the blade-carrying rotor, interacting means coupling the operating and the blade-carrying rotors, a coil spring mounted in the operating rotor, rectilinearly movable, manually operative plunger means for compressing the coil spring, and instrumentalities for converting rectilinear movement of the plunger means into rotary movement for operating the operating rotor and blade-carrying rotor for rotatably operating the blade, rectilinear movement of the plunger means compressing the spring and rotating the operating rotor and the blade-carrying rotor, the spring returning the plunger means to original position responsive to release of pressure on the plunger means for causing rotation of the rotor and blades in an opposite direction.

2. A rotary type razor comprising, in combination, a razor head provided with a multiplicity of perforations, a rotor removably mounted in the razor head, a cutting blade removably mounted

on the rotor, a driving rotor mounted in the blade-mounting rotor, means connecting the driving rotor and the blade-mounting rotor, the driving rotor being provided with oppositely disposed spiral slots therein, a pin slidably mounted in the slots, manually operable, rectilinearly movable plunger means bearing against the pin, a coil spring in the driving rotor adapted to be compressed by the plunger means responsive to inward movement of the plunger means, the said inward movement rotating the rotor and blade in one direction, release of the plunger means enabling the spring to return the plunger means to original position, thereby rotating the rotors and blade in an opposite direction, and closure means for the rotors in the razor head for operation of the razor, while enabling separation of the rotors from the razor head responsively to removal of the closure means.

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