Nov. 20, 1951 V. R. ABRAMS ET AL 2,575,741

SHAVING APPARATUS

Filed Aug. 14, 1945

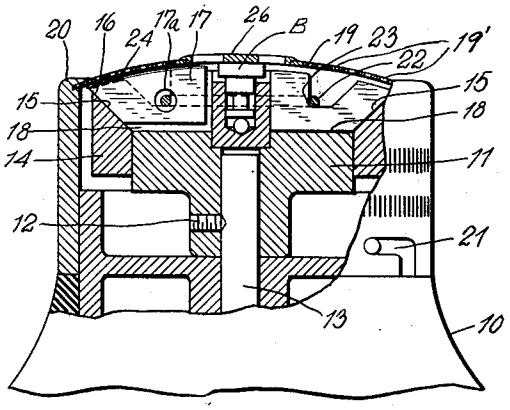


Fig. 1.

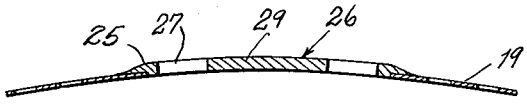
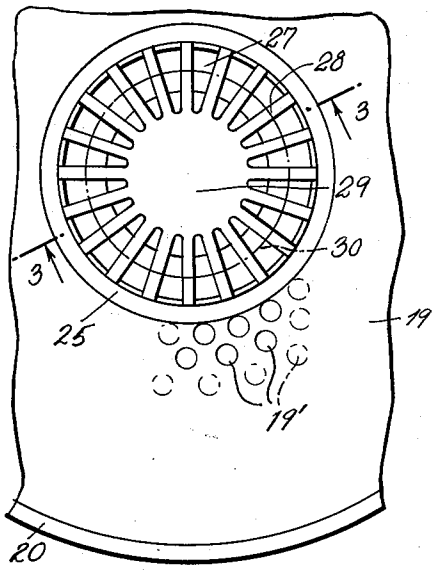


Fig. 3.

Fig. 2.



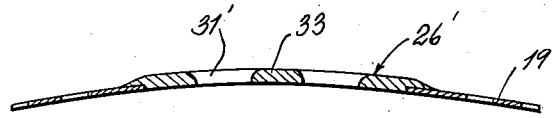


Fig. 5.

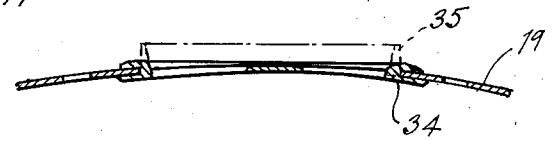


Fig. 6.

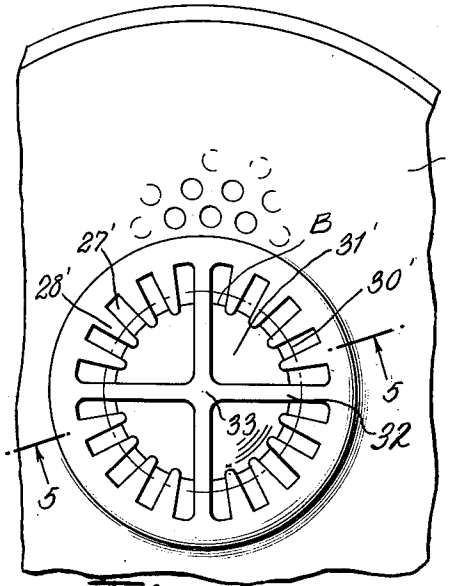


Fig. 4.

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SHAVING APPARATUS

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4 Claims. (Cl. 30—43)

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This invention relates to shaving apparatus, and has particular reference to shear plates for dry shaving devices.

Dry shaving devices of the perforated shear plate type are not as effective for severing long hairs as they are in cutting short hairs, because they depend upon the stiffness of the hair to spring up within the aperture and remain in erect position for severance, whereas the long hairs frequently are longer than the diameter of the aperture so as to be held down by its edge and are too flexible or bent to seek an erect position. Hence only the tips of long hairs are cut as they happen to be lifted into an aperture, and only then at random after repeated passages of the device over the skin, so that there is no assurance that the long hairs will be cleanly severed. In order to remedy this situation, separate long hair cutting shear plates have been supplied for substitution for the short hair cutting shear plate, or a special long hair cutting portion has been provided on the usual shear plate. The present invention is directed to the combination short and long hair cutting shear plate for dry shaving devices.

In accordance with the present invention, the thin, curved, perforated shear plate of one form of dry shaving device, such as that illustrated in Patent No. 2,280,836, for example, is combined with a novel long hair shearing portion to form a combination long and short hair shaving device.

In its preferred embodiment, the invention comprises a thin, flexible apertured dome-shaped shear plate whose under surface is traversed by blades severing hairs projected through the apertures, and whose outer surface is provided with a substantially radially-slotted clipping area, preferably centrally-located on the shear plate, which lifts the long hairs into the path of the blades for severance thereby to a length which is readily introduced into and cut in the apertures of the main shear plate portion.

In one form of the invention the bars of the central long hair cutting area that are formed by the slots extend radially to the center, whereas in another form the radial bars terminate short of the center and form comb-like segments. In both forms the long hairs pass into the radial slots to be severed by the moving blades into shearing cooperation with the edges of the bars.

For a more complete understanding of the invention, reference may be had to the accompanying drawings, in which:

Figure 1 is a side view of a shaving device embodying the invention shown partly in axial section and partly broken away to disclose the structure of the cutting mechanism;

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Fig. 2 is an enlarged plan view of the combination short and long hair cutting shear plate of the shaving device head of Fig. 1;

Fig. 3 is a fragmentary cross-section therethrough as seen along the line 3—3 of Fig. 2;

Fig. 4 is an enlarged plan view of another form of the combination shear plate for a shaving head;

Fig. 5 is a fragmentary cross-section therethrough as seen along the line 5—5 of Fig. 4, and

Fig. 6 is a fragmentary cross-section through the combination shear plate and illustrates one method of making the same.

Referring to Fig. 1, which illustrates a rotary shaving device of the general type disclosed in said patent, numeral 10 designates a handle in which the electric motor, not shown, is mounted for actuating a rotary head 11 which is secured by set-screw 12 to shaft 13 of the motor. Cutter member 11 is provided with a rim 14 having a conical inner surface 15 against which bear the inclined edges 16 of a plurality of sharp-edged blades 17, which are loosely received in substantially radial slots 18 in the cutter member 11. The blades are capable of axial as well as radial movement up the conical inner surface 15, in response to centrifugal force acting thereon during rotation of the head 11, so that the cutting edges of the blades 17 move into intimate engagement with the under surface of the shear plate 19.

The shear plate 19 is of dome- or convex-shape and is supported at its periphery in a collar 20 which is detachably connected to the upper end of handle 10 by means of pin and bayonet slot connections 21. The blades are retained on the cutter member 11 by means of a spring ring 22 received in under-cut groove 23 formed in the upper surface of the cutter member 11 and passing loosely through aperture 17a in each of the blades 17. The shear plate 19 is provided with a plurality of spaced apertures 19' preferably circular, as shown in Fig. 2, through which the short hairs project for severance by the sharp edges 24 of the blades 17 cooperating with the edges of the apertures 19'.

As shown particularly in Figs. 4 and 5, the center portion of the shear plate 19 is provided with a circular opening in which is set a disc 26 whose under surface is flush with the under surface of shear plate 19 and conforms to the curvature thereof. In order to have stiffness, the thickness of disc 26 preferably exceeds the thickness of the shear plate 19, being on the order of

about .015 inch as compared to about .003 inch for the shear plate 19. Accordingly, the disc 26, being flush with the under surface of the shear plate 19 is undercut around its lower edge so that its upper edge forms a flange or shoulder 25 which is elevated slightly above the upper surface of shear plate 19 as shown in enlarged cross-section of Fig. 3. The flange or shoulder 25 of the disc 26 is rounded so that it merges smoothly into the upper surface of shear plate 19.

As shown especially in Fig. 2, the disc 26 is pierced by a plurality of uniformly spaced wedge-shaped slots 27, thus forming a plurality of spaced, radially extending bars 28 and an imperforate center portion 29 of substantially circular shape. The inner edges of the blades 17 describe a circle designated 30 in Fig. 2, which approximately bisects the center of each radial bar 28. The dimensions of the radial bars 28 may be on the order of .02 inch, more or less, in width, and the angular spacing between adjacent teeth may be on the order of 18°. The bars 28 are rounded at their outer edges and, as indicated, their inner edges cooperate with the ends of the blades 18 to sever hairs projecting through the slots 27.

In the other form of the disc 26' shown in Figs. 4 and 5, the bars 28' are defined by parallel-sided slots 27' and the teeth 28' do not extend to the center of the button 26 but are interrupted by an open center 31 and stiffening bars 32 extend across the open center 31. The outer edges of the teeth or bars 28' extend inwardly from peripheral flange or shoulder 25 to a point beyond the circle of rotation 30' of the inner edges of the blades 18, as shown in Fig. 4. Two or three stiffening bars 32 may be employed instead of four, thus providing a larger net center opening 31'.

Although both discs 26 and 26' are relatively stiff, the shear plate 19 beyond their edges is flexible and support against undue flexure of shear plate 19 is afforded by a button B placed immediately below but spaced slightly from the center portion 29' of the disc 26 and the crossing portion 33 of the stiffening bars 32 of disc 26'.

In operation of the arrangements of Figs. 2 and 3, movement of the shear plate 19 with the annexed center disc 26 over the skin causes the long hairs to enter the radial slots 27 and be severed by the sharp edges 24 of the rotating blades 17 against the corresponding edges of the bars 28. Although disc 26 is relatively thick in the illustrated forms, it severs the long hairs to a length such that they can readily be severed substantially even with the surface of the skin as the shear plate 19 moves over it and traps the shortened hair in one of its apertures 27.

Similarly, in operation of the form of Figs. 4 and 5, long hairs pass into the center opening 31' of disc 26' and thence between the bars 28' into slots 27' for severance between the blades 18 and the corresponding edges of the bars 28'. Shorter severance is effected in the body of the surrounding shear plate 19 in the manner described.

In the arrangements of Figs. 3 and 5, the center disc 26 or 26' is set into an opening punched or otherwise formed in shear plate 19, and soldered, brazed or otherwise secured in place. In order to avoid possible distortion of the thin shear plate 19 by the soldering or brazing heat, and to simplify assembly, a circular blank 34 with an upstanding circular flange 35, shown in phantom in Fig. 6, and pierced with the spaced bar arrangements of Figs. 2 or 4, is inserted into the center opening of the shear plate 19 and the flange 35 spun or peened over upon the upper surface of shear plate 19 as shown. The corners are preferably rounded after assembly and the combination head thus completed without soldering, brazing, or other operation. Since the lower surface of disc 34 is not coextensive with that of the shear plate 19 as in Figs. 1 to 5, the blades must be recessed to accommodate the underside flange of disc 34.

Although certain preferred embodiments of the invention have been illustrated and described herein, it is to be understood that the invention is not limited thereby but is susceptible to changes in form and detail within the scope of the appended claims.

We claim:

1. In a combination with a shaving apparatus having a thin flexible shear plate and a cutter traversing the under surface of said shear plate about an axis substantially normal thereto to sever hair projected therethrough, said shear plate having a center opening and a thickened member mounted in said shear plate opening and positioned over said axis, said member being slotted substantially radially to form spaced bars intercepting the path of movement of said cutter adjacent to its axis of movement, whereby hairs introduced into the spaces between said bars are severed by the cutter.

2. In a combination with a shaving apparatus having a flexible shear plate about .003 of an inch in thickness and a cutter having spaced apart substantially radially extending blades traversing the under surface of said shear plate about an axis substantially normal thereto to sever hair projected therethrough, said shear plate having a center opening, a radially-spoked disc about .015 of an inch thick mounted in said shear plate opening and overlying said axis with the spokes thereof at least partially intercepting the path of movement of said cutter and extending inwardly beyond the inner ends of said blades, whereby hairs introduced into the spaces between said bars are severed by the cutter, and a supporting member mounted on said cutter and engaging the middle of said disc to resist inward flexing of said shear plate.

3. In a combination with a shaving apparatus having a thin flexible circular shear plate having a plurality of apertures therein and a cutter engaging the under surface of said shear plate and rotatable about an axis substantially normal to the center of the shear plate to sever hair projected through said apertures, a disc-like member in the center of said shear plate, said member being thicker than said shear plate and having an annular opening overlying the path of said cutter, and substantially radial bars on said member extending at least part way across said annular opening to intercept the path of movement of said cutter adjacent to its axis of rotation, whereby hairs introduced into the spaces between said bars are severed by the cutter.

4. In a combination with a shaving apparatus having a thin flexible shear plate and a cutter traversing the under surface of said shear plate about an axis substantially normal to its center to sever hair projected therethrough, a ring-shaped member at the center of and thicker than said shear plate, a plurality of substantially radial bars extending inwardly from said member at least part way across said annular opening to intercept the path of movement of said cutter,

whereby hairs introduced into the spaces between said bars are severed by the cutter, and a supporting member on said cutter engaging said bars to resist inward flexing of said shear plate.

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