(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 484 795 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91118391.1**

(51) Int. Cl.5: **B26B 19/38**, B26B 19/14

(22) Date of filing: **29.10.91**

(30) Priority: **05.11.90 NL 9002400**

(43) Date of publication of application:
13.05.92 Bulletin 92/20

(84) Designated Contracting States:
DE FR GB

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(54) Electric shaving apparatus.

(57) An electric shaving apparatus has a housing (1) which comprises a holder (2) for at least one cutting unit (3), which cutting unit (3) comprises an external cutting member (4) formed with hair-entry apertures (5) and an internal cutting member (6) which is drivable relative to the external cutting member (4), which shaving apparatus also comprises an adjusting element by means of which the position of the external cutting member (4) relative to the holder (2) can be varied, which adjusting member has been provided with indication means. The apparatus comprises light-emitting indication means (23,24,25) for the position of the external cutting member (4) relative to the holder (2), which indication means (23,24,25) are arranged in an electric circuit (27) of the shaving apparatus, and the adjusting member is coupled to a switching device (26) for the indication means.

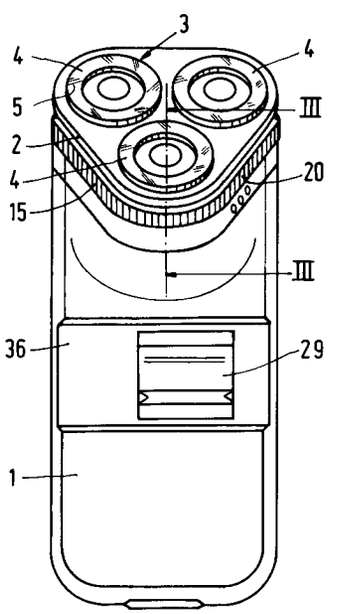

FIG.1

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The invention relates to an electric shaving apparatus having a housing which comprises a holder for at least one cutting unit, which cutting unit comprises an external cutting member formed with hair-entry apertures and an internal cutting member which is drivable relative to the external cutting member, which shaving apparatus also comprises an adjusting element by means of which the position of the external cutting member relative to the holder can be varied, which adjusting member has been provided with indication means.

Such a shaving apparatus is known from United States Patent 4,711,028 (PHN 11.627). The adjusting element enables the cutting unit to be set to various positions in which the cutting unit projects from the holder to different extents. Thus, the shaving performance of the apparatus and the degree of irritation of the skin as a result of shaving can be influenced. The characteristics of the skin and the hairs play an important part in this respect, so that the setting is very personal.

An arrow-shaped projection of the adjusting element and a corresponding scale gradation on the apparatus housing constitute the indication means in this prior-art construction. Since the space available for the indication means on the shaving apparatus is only limited and the apparatus is often used in conditions of poor ambient lighting reading of the indication means frequently presents a problem.

The invention aims at solving this problem and to this end it is characterised in that the apparatus comprises light-emitting indication means for the position of the external cutting member relative to the holder, which indication means are arranged in an electric circuit of the shaving apparatus, and the adjusting member is coupled to a switching device for the indication means.

An embodiment of the invention will now be described in more detail, by way of example, with reference to the Figures.

Figure 1 is a front view of a shaving apparatus in accordance with the invention;

Figure 2 is a side view of the shaving apparatus shown in Figure 1;

Figure 3 is a sectional view taken on the line III-III in Figure 1;

Figure 4 is a plan view of a part of the retaining plate used in the embodiment shown in Figure 3;

Figure 5 is a side view as indicated by the arrow P in Figure 4;

Figure 6 is a plan view of the elastic band of the shaving apparatus shown in the preceding Figures; and

Figure 7 shows the electric circuit of the shaving apparatus.

The shaving apparatus shown in the Figures comprises a housing 1 having a holder 2 for three cutting units 3. A cutting unit 3 comprises an external cutting member 4 formed with hair-entry apertures 5 and an internal cutting member 6 which is rotatable relative to the external cutting member. The internal cutting members can be driven by means of an electric motor which is accommodated in the housing and which is coupled to the internal cutting members in known manner. For the sake of simplicity this drive is not shown in the Figures.

A retaining plate 7 to which the external cutting members are secured is arranged inside the holder 2. For this purpose the retaining plate 7 is provided with a separate metal clamping plate 8 having resilient arms 9 with projections 10. The external cutting members 4 are clamped between the retaining plate 7 and the projections 10. Moreover, the internal cutting member 6 is retained between the retaining plate and the associated external cutting member 4.

The holder 2 is provided with a central pin 11 which projects through a central aperture 12 in the retaining plate 7. A fixing knob 13 is screwed onto the end portion of the central pin 11 and a resilient element in the form of a helical spring 14 is compressed between the retaining plate 7 and the fixing knob 13. This enables the retaining plate 7 to be moved to a limited extent relative to the holder in the axial direction of the central pin 11. In general, the position of the retaining plate 7 in the holder 2 will be such that each external cutting member 4 projects partly from the holder.

The extent to which the external cutting members 4 project from the holder can be varied by means of an adjusting element which enables the position of the retaining plate 7 in the holder 2 to be varied. This adjusting element comprises an elastic annular band 15 situated in a groove in the outer side of the holder 2. The elastic band 15 comprises three inward projections 17 which extend through apertures 18 in the holder 2 and engage with the retaining plate 7. At corresponding locations the retaining plate has three stepped portions 19 with steps 20, 21 and 22, with which stepped portions 19 said plate is urged against the projections 17 under the influence of the compression spring 14. If the projections 17 lie against the steps 20 the retaining plate 7 occupies a position in which the external cutting members 4 project from the holder 2 to a maximum extent. By shifting the elastic band 15 in the groove 16 in the direction R (Fig. 2) the projections 17 can be made to engage with the steps 21 or 22, in which case the external cutting members 4 project less far from the holder 2. In this way the shaving properties of the apparatus can be modified and adapted to personal need.

Instead of a stepped wall portion the retaining plate may comprise a wall portion with an inclined contact surface for the projections 17, enabling the position of the retaining plate relative to the holder to be varied continuously within a limited range.

The holder 2 is provided with light-emitting indication means 23, 24 and 25 corresponding to the above-mentioned three positions of the external cutting members 4 relative to the holder. These indication means 23, 24 and 25 with a switching device 26 form part of an electric circuit 27 (Figure 7) of the shaving apparatus, which circuit for example also includes the motor 28 and the main switch 29. The light-emitting indication means may be, for example, incandescent lamps or LEDs. Each indication means 23,24, 25 has an associated switch 30, 31 and 32 respectively. These switches are constructed as resilient contact strips 33, 34 arranged in the path of a switching member 35 at the inner side of the band 15 (Figure 3). By shifting the band 15 the switching member 35, which is constructed as a projection on the inner side of the band, can be brought alternately into contact with one of the switches 30, 31, 32, causing the relevant switch to be closed. For the sake of simplicity the switching member 35 and the switches 30, 31, 32 are represented in Figure 6 as broken lines on a straight part of the band 15.

In this way the indication means alternately light up when the band 15 is shifted and clearly indicate the selected position.

Obviously, the light-emitting indication means can also be used if more than three positions have been provided and can also be arranged at another location on the apparatus, for example on the panel 36 of the switch 29.

Alternatively, the indication means may be constructed as lit digits or as a continuous array of LEDs, the length of the lit part of the LED array being indicative of the selected position.

Claims

1. An electric shaving apparatus having a housing which comprises a holder for at least one cutting unit, which cutting unit comprises an external cutting member formed with hair-entry apertures and an internal cutting member which is drivable relative to the external cutting member, which shaving apparatus also comprises an adjusting element by means of which the position of the external cutting member relative to the holder can be varied, which adjusting member has been provided with indication means, characterised in that the apparatus comprises light-emitting indication means for the position of the external cutting member relative to the holder, which indication means are arranged in an electric circuit of the shaving apparatus, and the adjusting member is coupled to a switching device for the indication means.

2. An electric shaving apparatus as claimed in Claim 1, characterised in that the holder is provided with different light-emitting elements corresponding to different positions of the external cutting member relative to the holder, the switching device comprises switches corresponding to the light-emitting elements, and the adjusting member comprises a switching member which can alternately be brought into contact with the switches.

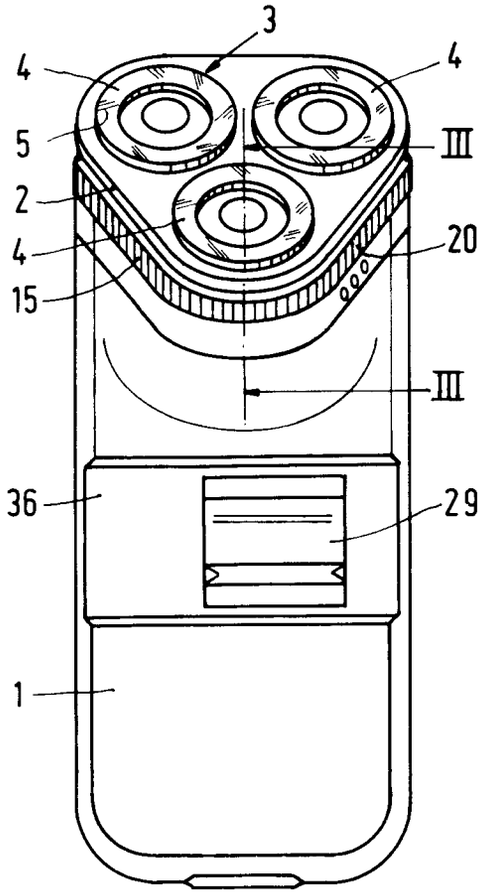

FIG.1

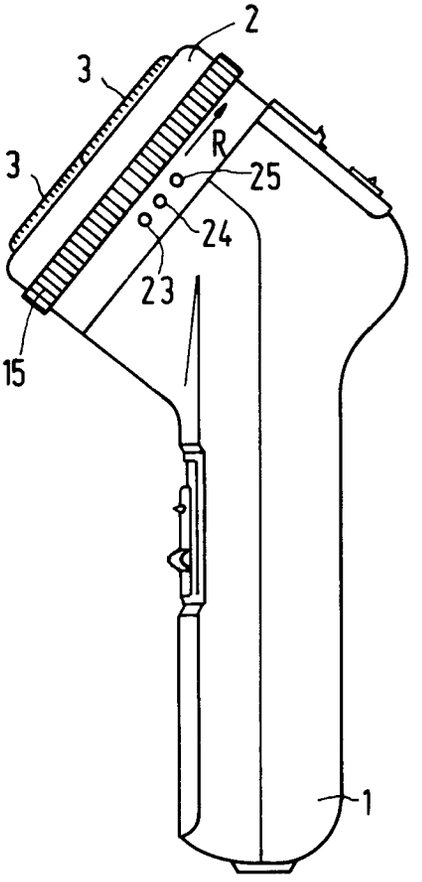

FIG.2

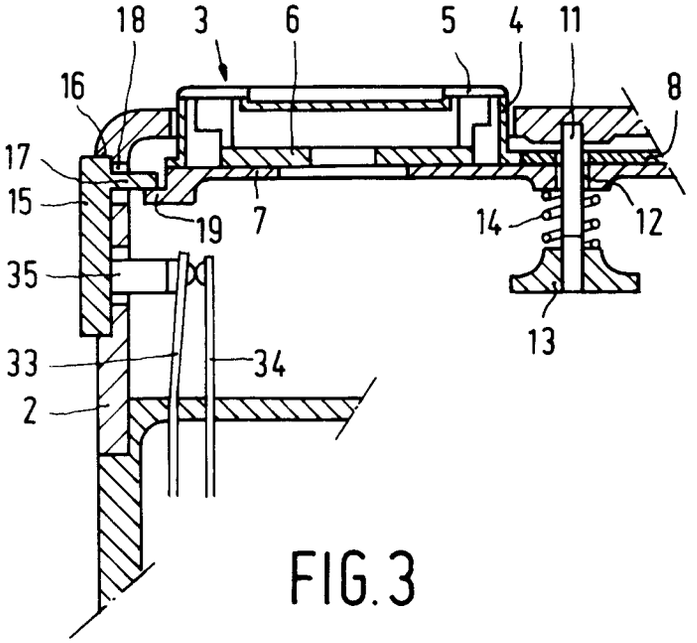

FIG.3

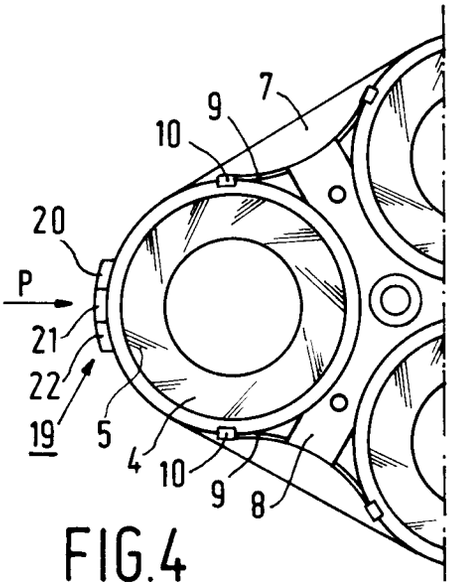

FIG.4

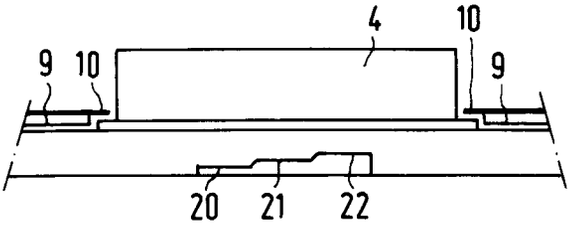

FIG.5

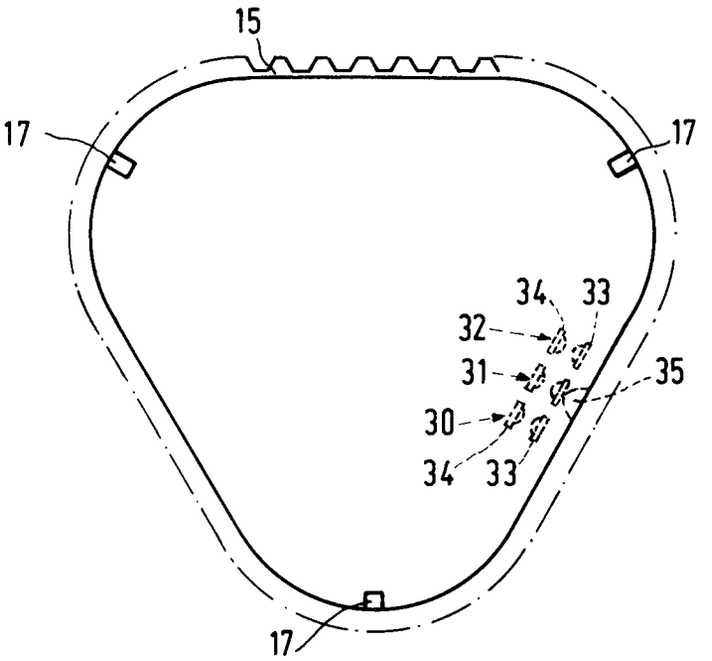

FIG.6

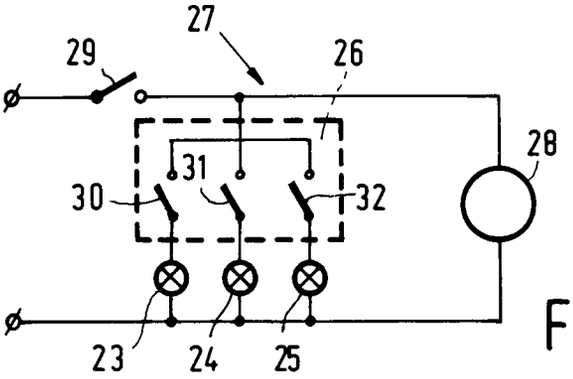

FIG.7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 8391

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,Y	US-A-4 711 028 (W. BERGSMA & K. OORD) * claims 3-5; figures * ---	1,2	B26B19/38 B26B19/14
Y	GB-A-2 129 731 (SANYO ELECTRIC CO. LTD.) * page 3, line 55 - line 58; figure 11 * -----	1,2	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B26B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 FEBRUARY 1992	RAVEN P.

CATEGORY OF CITED DOCUMENTS

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