

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets

(11) Publication number:

**0 266 080**  
**A1**

(12)

# EUROPEAN PATENT APPLICATION

(21) Application number: 87308899.1

(51) Int. Cl.4: B26B 21/38

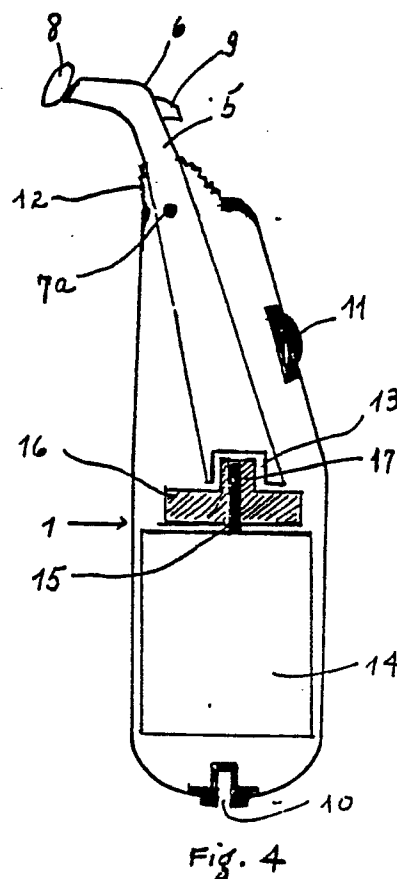
(22) Date of filing: 07.10.87

(30) Priority: 07.10.86 IL 80240

(43) Date of publication of application:  
04.05.88 Bulletin 88/18(84) Designated Contracting States:  
AT BE CH DE ES FR GB GR IT LI LU NL SE(71) Applicant: Kats, Ben-Tsion  
5 Hamasger Street  
Bat-Yam(IL)(72) Inventor: Kats, Ben-Tsion  
5 Hamasger Street  
Bat-Yam(IL)(74) Representative: White, Martin David et al  
MARKS & CLERK 57/60 Lincoln's Inn Fields  
London WC2A 3LS(GB)

(54) Electric razor.

(57) An electric razor (1) for wet shaving comprising a housing (1);  
a handle (5) pivotally engaged within said housing (1) and extending outward of said housing (1), said handle (5) comprising means for releasably engaging a wet shaving razor blade (8); and  
means (13-23) within said housing (1) for pivoting said handle (5) in vibrating motion at high speeds and method of shaving with same.



EP 0 266 080 A1

## "Electric Razor"

The present invention concerns an electric razor, specifically, an electric razor designed for wet shaving using standard commercially available razor blades.

Wet shaving is known to be the best way to obtain a close shave. The use of water and particularly soap lather helps line up the hair so that the razor blade can cut it very close to the face. Many devices have been introduced to make such shaving more comfortable, convenient, easier and safer. In general such devices comprise a handle to which an expendable razor blade can be affixed. Recently razor blades have been developed which are relatively safe and cause minimum of nicks and cuts. These usually are contained within a frame or cartridge wherein the entire cartridge is snapped into a handle.

Electric shavers are also known of course, and these are used generally for dry shaving, which means that no water or lather is used on the face. Such Electric Shavers generally work on the same principle as scissors, wherein the hair on the face is cut between two blades, one blade moving across the other.

It is an object of the present invention to provide an electric razor for wet shaving.

It is a further object of this invention to provide an electric razor which uses ordinary commercially available disposable blades.

Another object of the invention is to provide an electric razor which gives superior shaves in terms of speed, closeness, comfort and safety.

Yet another objective of this invention is to provide a method of wet shaving with an ordinary razor blade wherein said razor blade is vibrated at high speeds.

The invention will be better understood with reference to the drawings which represent the following:-

Figures 1 to 3 are side, front and top views respectively of an electric razor embodying the invention;

Figure 4 is a plan view of the interior of figure 1;

Figure 5 is an enlarged plan and top view of the flywheel 16 of figure 4;

Figure 6 shows another embodiment of vibrating means;

Figure 7 is an enlarged view of the watertight flexible rubber collar of figure 4; and

Figures 8a. and 8b. show the shaver handle with alternative coupling means to the razor blades.

Referring now to figures 1-3, the electric razor 1 has an outside appearance of a rectangular shaped cylinder with rounded edges 2 which partially taper 3 towards one end 4. Handle 5 comprising a bend 6 of about 120° protrudes from the body 1 at the tapered end 4 and is surrounded with a watertight flexible rubber collar 12 which is shown enlarged in figure 7. The handle 5 is attached pivotally within the body 1 by pin 7 so that it can pivot around pin 7. To one end of handle 5 is attached a razor blade 8 which can be detached readily by activating spring lever 9. Electric current enters the body via receptacle 10 and the power to the apparatus is turned on and off by means of switch 11.

Figure 4 gives a detailed view of the workings of the electric razor. Handle 5 has the general shape of a conventional razor handle and is positioned inside the body by means of pin 7 and hole 7a. From its curved neck upwards handle 5 is indeed identical with conventional razor handles. At its other end, handle 5 terminates in a hollow channel 13. Electric motor 14, when activated, turns rotor 15 which in turn rotates flywheel 16 which has an eccentric extension 17. The extension 17 fits into channel 13. When flywheel 16 rotates the eccentric extension 17 rotates off-center causing the handle to move back and forth, pivoting around pin 7. This back and forth motion of the handle at its lower end cause an up and up and down movement of the razor blade 8.

Figure 5 shows more clearly the flywheel 16 and eccentric extension 17. A hollow shaft 18 in the center of flywheel 16 is provided for tightly encasing a rotor 15 of motor 14. (Fig. 4). Such a shaft 18 may be round or it may be hexagonal in shape, as shown in Fig. 5b, as long as the flywheel fits snugly over the rotor and does not slip during rotation. The flywheel 16 and extension 17 are preferably one integral piece and may be fabricated from rigid plastics. This flywheel 16 has a preferred diameter of about 20 mm and a thickness of about 4 mm. The eccentric extension 17 is about 6 mm. high and has a diameter of about 6 mm. It is off-center about 2mm. Thus for each complete turn of the flywheel 16 of the extension 17 will rotate and deviate about 4 mm. in diameter. This deviation causes the handle 5 surrounding the extension 17 to rock back and forth in a vibrating motion.

Another means for causing vibration of the handle 5 is via a ball bearing as shown in figure 6. Flywheel 16 has an off center extension 19 with respect to rotor shaft 20. This extension is encased in a ball bearing 21. An arm 22 extending from

handle 5 is pivotally connected to the ball bearing 21 by pin 23. When the flywheel and extension 19 are rotated they cause the ball bearing 21 to move back and forth, thereby vibrating handle 5 around pin 7. This type of vibrator means is more expensive than the one shown in figure 4, but it is quieter during operation and has a longer life. Other vibrating means can also be used such as for example magnetic means etc.

Referring now to figures 8a and 8b, these show embodiments of two different handles. Figure 8a shows a handle having a head 24 for attaching razor blades 25, and Fig. 8b shows a similar handle with a head 26 for flexible blades having the Gillette (TM) contour. It is of course understood that the handle can be adapted for any type of commercially available razor blade, and is not limited to the embodiments shown herein.

The razor works as follows:

When the handle 5 which is suspended pivotally near the neck 4 of the body 1 by pin 7 is moved in any direction at its lower end the other end of the handle and the razor blade 8 move in the opposite direction. The distance the lower handle 5 moves is dependent on the eccentric extension on the wheel. The amount that the razor blade 8 moves depends on the ratio of a) the distance between the bottom of the handle 5 and the axis of pin 7 and b) the distance between blades 8 and the axis of the pin 7. The ratio in the figure 4 is about 5:3 but this is subject to change if one desires to increase or decrease the movement of the blades.

The electric motor 14 is turned on by switch 11 and rotates the rotor 15 at more than 10,000 r.p.m. The exact number of r.p.m. is determined by the voltage and load on the motor. The motion of the razor is angular, back and forth on the axis of pin 7 but the actual movement of the blades which is obtained is closer to a straight line because of the short distance. Thus, when shaving with a manual razor each movement of the hand results in a corresponding single movement of the razor blade across the face, whereas when using the electric razor of the invention, one single movement of the hand corresponds to thousands of movements of the razor blade. The motor for use in the present invention can be any electric motor capable of revolving a rotor. Such a motor can be operated on line current or battery operated, when battery operated, it is preferably rechargeable, as is known in electric shavers. When line operated it must have a suitable adaptor for house current.

The inventors have successfully used a 12 volt DC electric motor which is readily available commercially having the following parameters: 28 mm. diameter, 38 mm. long, a rotor 12 mm. long and 2.5 mm. diameter. Furthermore, the motor may be battery operated and rechargeable, as is known in the art.

## Claims

1. An electric razor (1) for wet shaving comprising a housing (1);
- a handle (5) pivotally engaged within said housing (1) and extending outward of said housing (1), and handle (5) comprising means for releasably engaging a wet shaving razor blade (8); and means (13-23) within said housing (1) for pivoting said handle (5) in vibrating motion at high speeds.
2. A razor in accordance with claim 1 wherein the outward extension of the handle (5) has a bend (6) of approximately 120°.
3. A razor as in claim 1 or 2 comprising sealing means (12) adapted to prevent water from entering said housing (1).
4. A razor as in any one of claims 1 to 3 comprising an electric D.C. motor (14).
5. A razor as in claim 4 wherein said motor (14) is operated by line or house current.
6. A razor as in claim 4 wherein the motor (14) is operated by battery.
7. A razor as in claim 5 wherein the battery is rechargeable.
8. A razor in accordance with any one of claims 1-7 wherein the pivoting means is a motor operated eccentric flywheel (16) adapted to engage the handle (5) within the housing (1).
9. A method of wet shaving with a conventional disposable razor blade (8) comprising vibrating the razor blade (8) at high speed while shaving.
10. A method of wet shaving in accordance with claim 9, using an electric razor (1) as claimed in any one of claims 1-8.

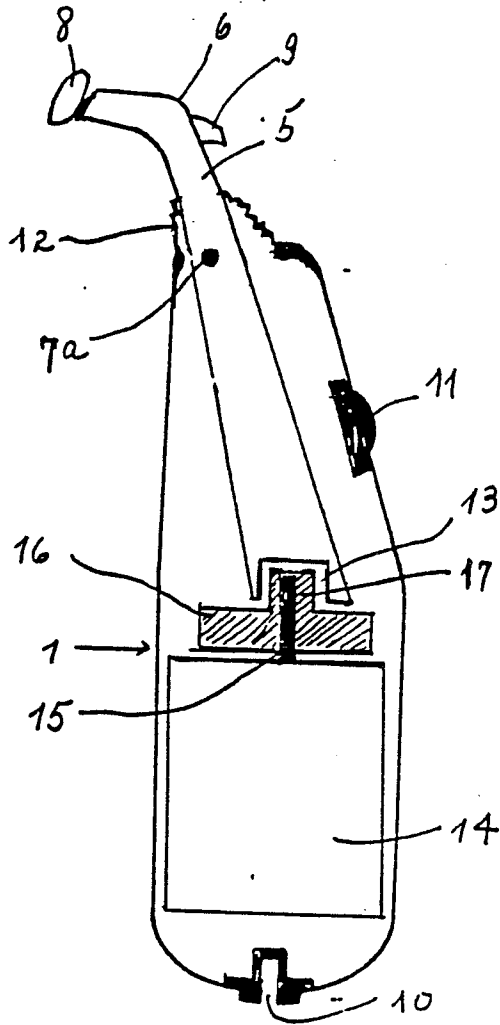


Fig. 4

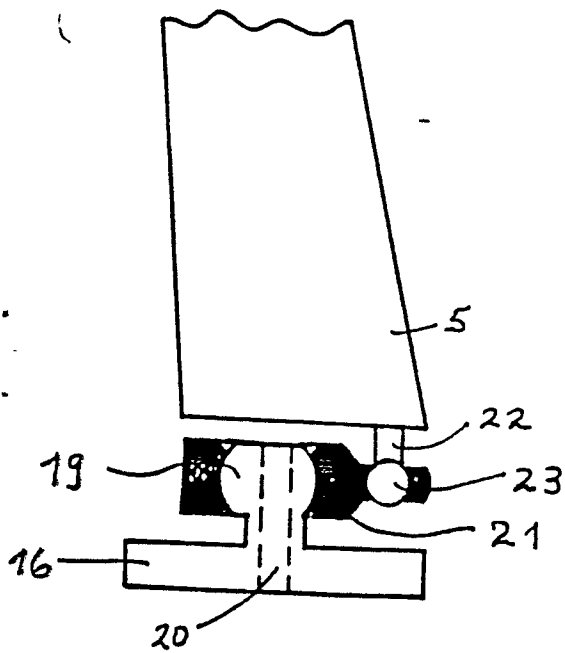


Fig. 6

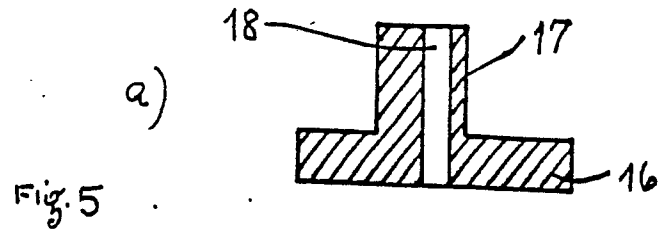


Fig. 5

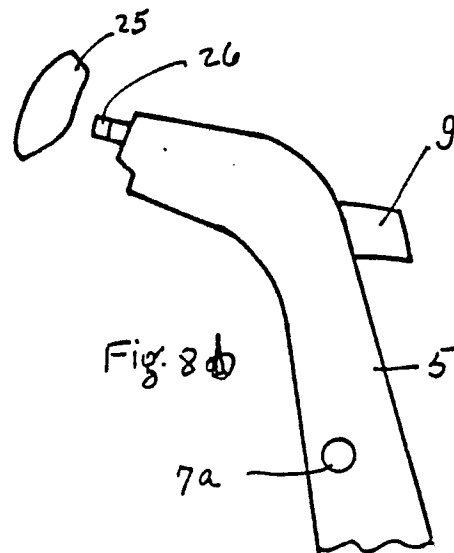
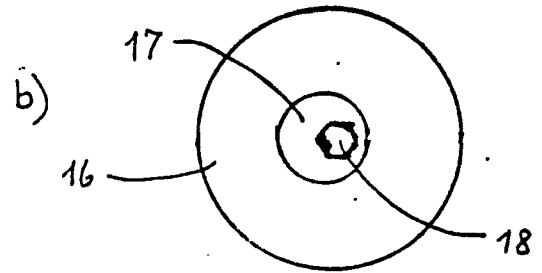


Fig. 8a

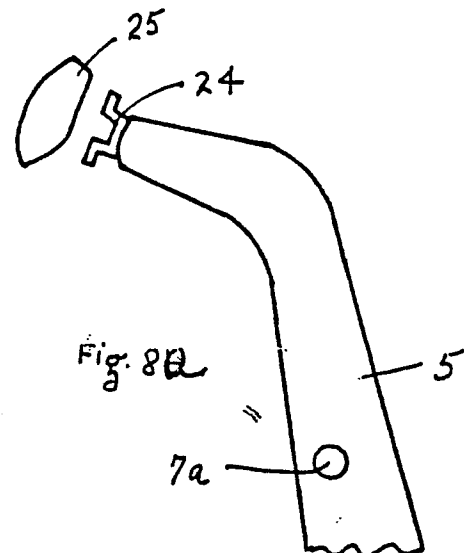


Fig. 8b

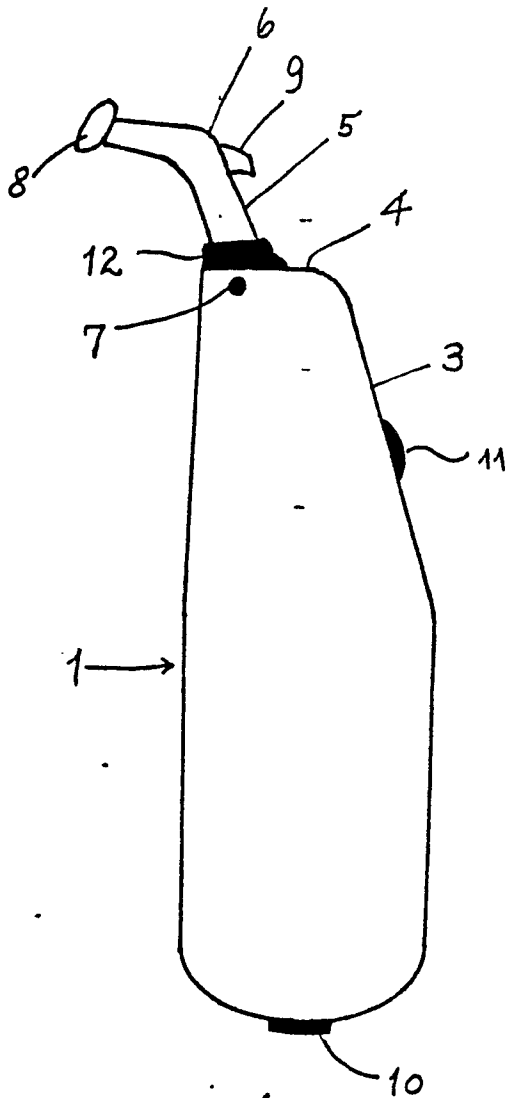


Fig. 1

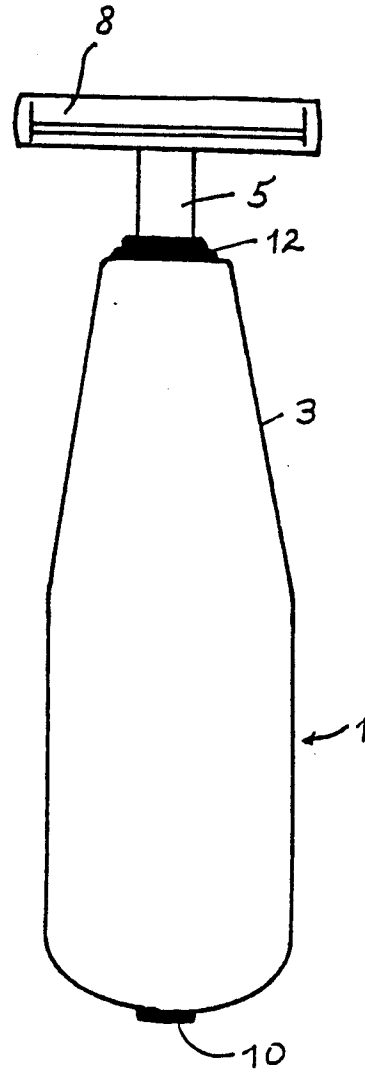


Fig. 2

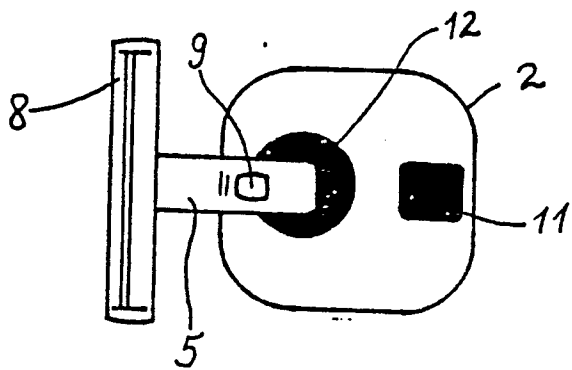


Fig. 3

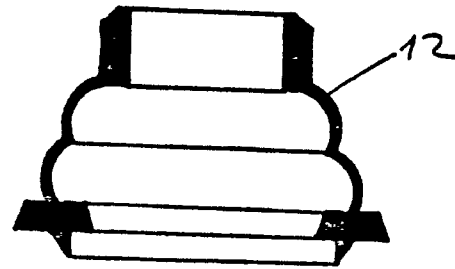


Fig. 7



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 87 30 8899

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. 4)
X	DE-A-3 444 735 (FEATHER SAFETY RAZOR) * Whole document * ---	1-4, 6, 8, 9	B 26 B 21/38
X	US-A-3 793 723 (A. KURIS et al.) * Columns 3, 4; figures 1, 12; column 9, lines 26-40 * -----	1, 3-5	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 26 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-01-1988	Examiner WOHLRAPP R.G.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			

EPQ FORM 1503 03.82 (P0401)