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(54) **SAFETY RAZORS**

SICHERHEITSRASIERER

RASOIRS DE SURETE

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Description

[0001] This invention relates to safety razors. A safety razor generally comprises a handle and a blade unit carried on the handle and including at least one blade with a sharp cutting edge. In the course of shaving the blade unit is applied against the skin and the blade or blades are moved across the skin so that the sharp cutting edges engage and cut through the hairs protruding from the skin. The blade unit can be fixed on the handle with the intention that the entire razor should be discarded when the cutting edges have become dull and no longer capable of providing a comfortable shave. Alternatively the blade unit may be removably mounted on the handle so that the blade unit can be replaced by a new blade unit when the sharpness of the blades has diminished to an unacceptable level. Replaceable blade units are often referred to as shaving cartridges.

[0002] The majority of safety razors currently marketed are operated and used entirely manually. Nonetheless electrical devices can be incorporated in safety razors. For instance it is known to include an electrically driven vibration mechanism which is operable to vibrate the razor, since it has been observed that such vibration can have a beneficial effect on razor performance. A simple and convenient vibration generating mechanism consists of an electric motor with a weight mounted eccentrically on its output shaft. The vibration mechanism and a battery for providing electric power to the motor can be conveniently housed in the razor handle. Examples of previous proposals for such razors are those described in US 3611568, US 5299354, US 5214851 and US 5046249. In US 6481104 B1 there is disclosed a safety razor housing including a vibration mechanism and a light emitting diode which is illuminated when the vibration mechanism is turned on. A vibrating razor described in EP-A-0885698 includes a power meter or indication to indicate the battery power remaining and/or to indicate when a new battery is needed.

[0003] A vibration mechanism may be adapted to vibrate only one or more selected components of the blade unit, such as the guard which contacts the skin in front of the blades, or one or more blades, and the vibration may be directional, for instance directed lengthwise of the blades to encourage a slicing cutting action or transverse to the blades. Another possibility is for an element to be vibrated in a direction generally perpendicular to the skin surface being shaved. The vibration mechanism may incorporate a piezoelectric device for producing the vibrations, instead of a motor for rotationally driving an eccentric weight.

[0004] Other forms of electrical device besides vibration generators may be included in wet razors, some examples of such devices being:

(i) heating devices for heating one or more blades or other components of a blade unit which contact the skin during shaving, such as Peltier devices or electrical resistance or ohmic heating devices;

(ii) dispensing devices for delivering a shaving enhancement product to the skin and which may be activated by operation of a motor driven pump or by operation of a valve having an electrically controlled actuator, shaving enhancement products which can be delivered at a safety razor blade unit during performance of a shaving stroke including those with the qualities and properties mentioned in our patent application No. WO00/47374 the contents of which are incorporated herein by reference;

(iii) conditioning devices to prepare the skin and/or hairs ready to be cut by the blades, such as a roller mounted in the region of the guard of the blade unit and adapted to be rotated about its axis for encouraging hairs lying against the skin to stand up for cutting;

iv) illumination devices for illuminating an area of skin being shaved; and

v) actuators for adjusting the blade unit in accordance with prevailing shaving conditions detected by a sensor.

[0005] In EP-A-0906814 and US 2002/0189102 there are described razors with force sensors and electronically activated indicates to signal that blade replacement is necessary. There is described in GB-A-2258922 a personal care apparatus such as a hair dryer or electric toothbrush that is mains operated and includes an indicator to show that the apparatus is connected to the AC source. There is a capacitive sensor in the handle so that the apparatus is activated as soon as it is picked up in the hand.

[0006] When there is an electrical device included in a safety razor it is often convenient for the device to be operated by a replaceable or rechargeable electric storage battery which can be housed within the razor handle. To conserve battery power it is preferable for the electrical device to be disconnected from the battery during periods when the razor is not in use. In some cases it may be immediately obvious to a user when connection between the electrical device and battery established, such as if the device is a vibration generator which is set into operation as soon as the electrical connection to the battery is made, but there may be other examples where it is not so obvious.

[0007] In accordance with the present invention there is provided a safety razor comprising a blade unit carried on a handle, an electrical arrangement including an electrically operated device, and an indicator, wherein the electrically operated device is actuable by the electrical arrangement during shaving, and the indicator produces a signal for indicating to a razor user that the electrical arrangement is connected to a source of electrical power and ready for actuation of the device.

[0008] As well as providing the user with a clear indication that the razor is ready and operational, the indicator will signal to a user not familiar with the razor that

something can be expected to happen and hence take away the sudden shock which could be caused, such as by an unexpected movement of a razor component.

[0009] In the presently preferred construction the indicator comprises a light emitting device, and in particular a light emitting diode. In another embodiment a low frequency and/or low amplitude oscillation indicates that the razor is operational. In yet another embodiment an audible signal, i.e. a sound or tone, indicates that the razor is operational. Any combination of these indicators may also be utilised.

[0010] The indicator is conveniently located on a neck of the razor handle which interconnects the blade unit with a gripping portion of the handle.

[0011] The handle can include a light transmitting section which is illuminated by the light emitting device, and the light transmitting section preferably extends around the entire periphery of the neck and along at least a major part of the neck. Since the neck is not usually covered by the hand of the user, with a relatively large part of the neck becoming illuminated a very clear and unmistakeable indication is given to the user that the razor is ready for use.

[0012] A power switch can be included to control connection of the electrical arrangement with the power source, and the indicator can be arranged to be energised by the power source when the power switch is closed. A manually operated power switch can be used, but then the razor user must remember to turn the power supply on and off at appropriate times for proper operation of the electrical device and to ensure that electrical energy is not consumed unnecessarily. Therefore, in a preferred embodiment the power switch is arranged to be operated to connect the power source to the electrical arrangement by separation of the razor from a holder on which the razor stored during periods of non-use. The power switch is conveniently included in the handle of the razor and can be a mechanical switch positioned on the handle to be actuated by engagement with and disengagement from the razor holder. In another embodiment the power switch is magnetically actuable, for example a reed switch, and the razor holder includes a magnet for the switch to be operated when the razor is separated from and placed onto the razor holder.

[0013] The razor holder is preferably arranged to grip the handle at or adjacent to the location of the power switch which can help in assuring proper operation of the power switch. The razor holder may have the form of a tray for the razor to lie on, e.g. of the general form described in US-A-5782346.

[0014] In a preferred embodiment the electrical arrangement includes, in addition to the electrical device actuable during shaving, a switching device to control operation of the electrical device in response to a predetermined condition being sensed by the switching device, more especially the blade unit being brought into contact with, or into close proximity to, the skin surface of a person holding the razor, and/or the blade unit being immersed into a body of water for cleaning the blade unit. When the power switch is turned on to supply power to the switching device from the power supply, such as a battery which can be conveniently housed in the handle, but power is not delivered to the electrical device the razor will be in a standby mode and fully prepared for use, and this standby mode is clearly signalled to the user by the indicator.

[0015] The indicator may be arranged to generate a modified signal when battery power is low. For example, if the indicator comprises a light emitting device it may be arranged to flash. Alternatively a further light emitting device may be included for producing a "battery low" signal.

[0016] The invention is specifically described hereinbelow with reference to an embodiment in which the electrical device controlled by the switching device is a vibration generator, more particularly a motor with an eccentric weight fastened to its output shaft. Other forms of electrical device, including those mentioned herein above could be provided alternatively or additionally.

[0017] A timing device can be provided to interrupt the supply of power to the electrical arrangement if the razor is not returned to the razor holder within a certain period of time after being removed from the razor holder. A timing device helps avoid unnecessary expenditure of energy if a razor user fails to return the razor to the holder after use. The turning device can be re-settable by placing the razor on the holder once again.

[0018] To facilitate a clear understanding of the invention a currently preferred embodiment is described in detail below with reference to the accompanying drawings, in which:-

Figure 1 is a partial isometric view of the razor illustrating the blade unit and an upper portion of the handle as seen from the rear;

Figure 2 shows the razor in rear elevation;

Figure 3 is a side elevation showing a razor holder in the form of a tray on which the razor is stored during periods of non-use, the razor being shown separated from the storage tray at a small distance;

Figure 4 is a side elevation corresponding to claim 3, but showing the razor at a greater distance form the storage tray;

Figure 5 shows the razor and storage tray of Figure 3 in an isometric view;

Figure 6 is an exploded rear elevation of the razor;

Figure 7 is a rear elevation of the razor illustrating an additional element of the water detecting arrangement;

Figure 8 is a block diagram of an electronic switching device incorporated in the razor; and

Figure 9 shows an example of a specific embodiment of a switching circuit.

[0019] The safety razor illustrated in the drawings has a handle 1 and a blade unit or cartridge 2 detachably

mounted on the upper end of the handle. The blade unit 2 includes a generally rectangular frame 3, and a plurality, e.g. 3, 4 or 5, blades 4 with substantially parallel sharp cutting edges, disposed in the frame and held in place by metal clips 5 positioned around the frame 3 at the opposite ends of the blade unit 2. A guard structure including a strip of elastomeric material is provided on the frame for contacting the skin in front of the blades, and a cap structure including a lubricating strip is provided on the frame for contacting the skin behind the blades during the performance of a shaving stroke. The frame is pivotally carried on a yoke member 8 having a pair of arms 9 which extend from a hub 10 and are journalled in opposite ends of the frame 2 so that the blade unit 2 can pivot relative to the handle 1 about an axis substantially parallel to the blade edges. The hub 10 is connected detachably to the end of the handle 1. As so far described the razor is of a known construction and for further details reference may be made to earlier patent publications, one example of which is WO 97/37819.

[0020] The razor handle includes a main portion 12 intended to be gripped in the hand and a neck 14 extending upwardly from the main portion and to the free end of which the blade unit 2 is attached. The main or gripping portion 12 of the handle 1 includes an electrically conductive, e.g. metal casing 13 which serves as an electrode for electrical contact with the hand of a user as described in more detail below. Housed within a battery compartment in the handle is a replaceable or rechargeable battery 15 which constitutes a power supply for an electronic switching device 16 also accommodated with the handle.

[0021] In accordance with the present invention the battery 15 is electrically connected to the switching device 16 through a power switch which is operable to interrupt power supply to the switching device for conserving battery energy during periods when the razor is not being used. The power switch could be located on the handle for manual operation, but in a preferred construction the power switch is arranged to be actuated by removing the razor from, and returning it to a razor holder on which the razor is intended to be stored when not in use. A known form of razor holder consists of a tray 18 as shown in Figures 3-5, the tray 18 having on its upper side a saddle 19 adapted to receive and lightly grip the neck 14 of the razor handle 1. The razor handle 1 could be equipped with a mechanical switch so arranged for cooperation with the storage tray 18 that the switch is operated automatically when the razor is lifted away from the storage tray 18 for power to be supplied to the switching device 16 from the battery 15, and to be actuated upon replacement of the razor on the tray to interrupt the power supply. In the preferred embodiment essentially the same result is achieved by a power switch in the form of a reed switch 20 located within the handle 1, the storage tray 18 being provided with a permanent magnet 21. The magnet is located in a position close to the saddle 19, and the reed switch is disposed in the handle 1 at or adjacent to the portion of me neck 14 adapted to be gripped in the saddle, when the razor is positioned close to the tray 18 the reed switch 20 is held open and there is no electrical power supply from the battery 15, as shown in Figure 3, but when the razor is moved away from the tray the reed switch 20 closes and electrical power supply to the switching device 16 is established.

[0022] The switching device 16, in a manner described in detail below, controls actuation of an electric motor 24 (Figs. 2 and 3) housed within the handle 1 and having an output shaft with an eccentric weight 26 fastened thereon. In a manner known per se, energisation of the electric motor results in a high speed rotation of the eccentric weight 26 and thereby vibration of the razor, and the blade unit 2 in particular. A suitable vibration frequency is around 120 Hz.

[0023] The neck 14 of the handle includes a transparent section 27 which extends around the entire periphery of the neck and along a major part of the length of the neck. Positioned within the handle for illuminating this transparent neck section 27, preferably with light of a distinctive colour, e.g. blue light, is a light emitting diode 28. The led 28 is energised when the reed switch 20 is closed and the switching device 16 receives electric power from the battery. The energisation of the led 28 results in the internal illumination of the neck section 27 which then takes on a softly glowing external visual appearance, thereby providing the razor user with an unmistakeable, highly visible, indication that electrical supply to the switch device 16 has been established and the razor is ready to be used.

[0024] The blade unit 2 incorporates an electrode which is conveniently constituted by at least one and preferably includes all of the blades 4 of the blade unit. Electrical connection between the switching device and this electrode 4 is achieved by the neck 14 of the handle 1 having a contact 30 arranged to project through me hub 10 of the yoke member 8 and to bear against a contact strip 32 fixed to the rear of the blade unit 2, the contact strip 32 having lateral wings 33 which extends to and are conductively connected to the metal blade retention clips 5, and these clips in turn having contact with blades 4. Of course, it is not essential to use the blades 4 as an electrode and a separate electrically conductive element could be provided on the blade unit in a position for contacting the skin when the blade unit 2 performs a shaving stroke. The contact 30 makes constant electrical contact with the contact strip 32 so that the electrical continuity between the electrode at the blade unit is not interrupted even during pivoting of the blade unit 2 on the handle 1 as tends to occur as the blade unit is applied to and moved across the skin. The contact 30 conveniently takes the form of a spring-loaded plunger for resisting pivotal movement of the blade unit away from a predetermined rest position. The contact 30 is shown connected electrically to the switching device 16 by a wire conductor 35 which is led through the neck 14 of the handle 1.

[0025] Of course there are other possibilities to ensure

electrical connection of the electrode on the blade unit and the switching device. For example, the frame 3 of the blade unit could be made of an electrically conductive material, such as a conductive plastics. Also the rear of the frame 3 could be plated, coated or printed with conductive material, have an adhesive metal foil applied to it, or have a metal element embedded therein, to provide electrical connection between the contact 30 and the clips 5, or to the electrode itself or another component in contact with the electrode. Alternatively the frame may include an injection moulded metal part to provide the conductive path between the electrode and the contact 30, or water held in capillary grooves may be sufficient to ensure the electrical continuity.

[0026] It is possible for the switching device 16 to be arranged to determine when the blade unit is immersed in water by sensing an electrical parameter between the electrode 4 on the blade unit 2 and the electrode formed by the metal casing 13 of the handle gripping portion 12. It is not necessarily essential for the blade unit 2 to be plunged into water so deeply that the water must contact the handle gripping portion 12 for the immersion of the blade unit into the water to be detected, as may be the case if it is known the body of water will be connected to earth and the casing of the gripping portion handle will also be connected to earth, such as by the razor user. As illustrated in Figure 8, however, the razor includes a water detection probe 36 which extends along the exterior of the neck 14 of the handle. The probe 36 is electrically conductive and serves as an electrode, or an electrode extension in as much that is can be electrically connected to the metal casing 13 of the handle gripping portion 12. A separate electrical connection between the probe 36 and the switching device 16 can alternatively be used. The switching device 16 senses an electrical parameter, which may be electrical resistance or capacitance, between the blade electrode 4 and the probe electrode 36, and is responsive thereto to actuate the electric motor 24 to activate the vibration generator 26 when the blade unit 2 is immersed into a body water W so that both electrodes make contact with the water, the switching device operating to turn off the power supply to the motor 24 when the blade unit 2 is lifted out of the water W. The operation of the switching device 16 is described in detail below. In the preferred embodiment of the invention the switching device 16 also functions as a touch sensitive device so that the motor 24 is actuated to drive the vibration generating eccentric weight 26 when a person holding the razor by the handle touches the blade unit 2 against the skin surface, e.g. at the start of a shaving stroke. Vibrating the blade unit as is moves across the skin can have a beneficial effect on the shaving performance. However, as soon as the blade unit is lifted away from the skin surface the vibration stops. It has been found that the discomfort perceived by users of vibrating razors applies for the most part only when the razor is held with the blade unit away from the body in free space and by me vibration occurring only when the razor is actually shaving and during rinsing of the blade unit, the user prejudices against vibrating razors are mostly eliminated.

[0027] As described above the control device functions so that the motor 24 stops immediately when the blade unit of the razor is moved out of contact with the skin. This is not essential and the control device can be arranged to provide a short delay of up to a few seconds, e.g. around 0.1 to 0.5 seconds, before turning off the power supply to the motor after contact between the blade unit and the skin of the user is interrupted, which may be beneficial in maintaining the vibration of the razor between shaving strokes performed in quick succession.

[0028] It should be understood that the foregoing description of the preferred embodiment, is given by way of non-limiting example only and that modifications are possible without departing from the scope of the invention as defined by the claims which follow. As an example of one possible modification it is mentioned that the conductive casing 13 of the handle could be provided with a thin covering layer of insulating material so that there is a high capacitance and high resistance coupling between the hand of the user and the handle electrode. Furthermore, if desired a manually operable switch mechanism can be included on the razor handle and be connected electronically in series with the switch 20, for use by a user who prefers not to use the storage tray for holding the razor when it is not being used. This switch, or a different manually operable switch, such as an electronic toggle switch which turns on and/or off after a certain delay, may be included in order to allow the razor user to select a non-vibrating mode for example when trimming hair in awkward areas.

Claims

1. A safety razor comprising a blade unit (2) carried on a handle (1), an electrical arrangement including an electrically operated device (24), and an indicator (28), wherein the electrically operated device (24) is actuable by the electrical arrangement during shaving, **characterised in that** the indicator (28) produces a signal for indicating to a razor user that the electrical arrangement is connected to a source of electrical power and ready for actuation of the device.

2. A safety razor according to claim 1, wherein the indicator comprises a light emitting device (28).

3. A safety razor according to claim 1 or 2, wherein the light emitting device is a diode (28).

4. A safety razor according to claim 1, 2 or 3, wherein the handle includes a gripping portion (12) and a neck (14) disposed between the gripping portion and the blade unit (2), and the indicator (28) is located at the handle neck (14).

5. A safety razor according to claim 2 or 3 wherein the light emitting device (28) is housed in the handle (1) and the handle includes a light transmitting section (27) arranged to be illuminated by the light emitting device (28).

6. A safety razor according to claim 5, wherein the handle (1) includes a gripping portion (12) and a neck (14) disposed between the gripping portion and the blade unit, and me light transmitting section (27) forms part of me neck (14).

7. A safety razor according to claim 6, wherein the light transmitting section (27) extends around the entire periphery of the neck.

8. A safety razor according to claim 6 or 7, wherein the light transmitting section (27) extends along at least a major part of the length of the neck (14).

9. A safety razor according to claim 1, wherein the indicator produces an oscillation or vibration of the razor.

10. A safety razor according to claim 1, wherein the indicator generates an audible signal.

11. A safety razor according to any one of claims 1 to 10, wherein a power switch (20) is included to control connection of the electrical arrangement with the power source (15), and the indicator (28) is energised by the power source (15) when the power switch (20) is closed.

12. A safety razor according to claim 11, wherein the power switch (20) is arranged to connect the power source (15) to the electrical arrangement in response to the razor being separated from a holder (18) on which the razor stored during periods of non-use.

13. A safety razor according to claim 12, wherein the power switch (20) is included in the handle (1).

14. A safety razor according to claim 13, wherein the power switch is a mechanical switch positioned on me handle to be actuated by engagement with and disengagement from the razor holder.

15. A safety razor according to claim 12 or 13, wherein the power switch (20) is magnetically actuable, and the razor holder (18) includes a magnet (21) for the switch to be operated when the razor is separated from and placed onto the razor holder.

16. A safety device according to claim 15, wherein the power switch is a reed switch (20).

17. A safety razor according to claims 14, 15 or 16, wherein the razor holder is arranged to grip the handle (1) at or adjacent to the location of the power switch (20).

18. A safety razor according to any one of claims 12 to 17, wherein the razor holder is a tray (18) for the razor to lie on.

19. A safety razor according to any one of claims 1 to 18, wherein the electrical arrangement includes the electrical device (24) and a switching device (16) to control operation of the electrical device (24) in response to a condition sensed by the switching device (16).

20. A safety razor according to claim 19, wherein the condition sensed by the switching device (16) is the blade unit (2) being brought into contact with, or into close proximity to, the skin surface of a person holding the razor.

21. A safety razor according to claim 19, wherein the condition sensed by the switching device (16) is the blade unit (2) being immersed into a body of water.

22. A safety razor according to any one of claims 1 to 21, wherein the power source is a battery (15).

23. A safety razor according to claim 24, wherein the battery (15) is housed in the handle (1).

24. A safety razor according to any one of claims 12 to 21, including a timing device to interrupt the supply of power to the electrical arrangement if the razor is not returned to the razor holder within a predetermined time period after being removed from the razor holder.

25. A safety razor device according to claim 24 wherein the timing device is re-settable by placing the razor onto the holder.

26. A safety razor according to any one of the preceding claims wherein the device actuable during shaving is a vibration generator.

Patentansprüche

1. Sicherheitsrasierer, umfassend eine Klingeneinheit (2), die an einem Griff (1) getragen wird, eine elektrische Anordnung, die eine elektrisch betriebene Vorrichtung (24) umfasst, und eine Anzeige (28), wobei die elektrisch betriebene Vorrichtung (24) während des Rasierens durch die elektrische Anordnung betätigt werden kann, **dadurch gekennzeichnet, dass** die Anzeige (28) ein Signal erzeugt, um einem Rasiererbenutzer anzuzeigen, dass die elektrische

Anordnung mit einer Quelle elektrischer Leistung verbunden und zum Betätigen der Vorrichtung bereit ist.

2. Sicherheitsrasierer nach Anspruch 1, wobei die Anzeige eine lichtemittierende Vorrichtung (28) umfasst.

3. Sicherheitsrasierer nach Anspruch 1 oder 2, wobei die lichtemittierende Vorrichtung eine Diode (28) ist.

4. Sicherheitsrasierer nach Anspruch 1, 2 oder 3, wobei der Griff einen Greifabschnitt (12) und einen Hals (14), der zwischen dem Greifabschnitt und der Klingeneinheit (2) angeordnet ist, umfasst und sich die Anzeige (28) an dem Griffhals (14) befindet.

5. Sicherheitsrasierer nach Anspruch 2 oder 3, wobei die lichtemittierende Vorrichtung (28) in dem Griff (1) untergebracht ist und der Griff einen lichtübertragenden Abschnitt (27) umfasst, der so angeordnet ist, dass er durch die lichtemittierende Vorrichtung (28) beleuchtet werden kann.

6. Sicherheitsrasierer nach Anspruch 5, wobei der Griff (1) einen Greifabschnitt (12) und einen Hals (14), der zwischen dem Greifabschnitt und der Klingeneinheit angeordnet ist, umfasst und der lichtübertragende Abschnitt (27) einen Teil des Halses (14) bildet.

7. Sicherheitsrasierer nach Anspruch 6, wobei sich der lichtübertragende Abschnitt (27) um den gesamten Umfang des Halses herum erstreckt.

8. Sicherheitsrasierer nach Anspruch 6 oder 7, wobei sich der lichtübertragende Abschnitt (27) entlang von wenigstens einem großen Teil der Länge des Halses (14) erstreckt.

9. Sicherheitsrasierer nach Anspruch 1, wobei die Anzeige eine Schwingung oder Vibration des Rasierers erzeugt.

10. Sicherheitsrasierer nach Anspruch 1, wobei die Anzeige ein hörbares Signal erzeugt.

11. Sicherheitsrasierer nach einem der Ansprüche 1 bis 10, wobei ein Leistungsschalter (20) beinhaltet ist, um die Verbindung der elektrischen Anordnung mit der Leistungsquelle (15) zu steuern, und die Anzeige (28) durch die Leistungsquelle (15) unter Spannung gesetzt wird, wenn der Leistungsschalter (20) geschlossen ist.

12. Sicherheitsrasierer nach Anspruch 11, wobei der Leistungsschalter (20) angeordnet ist, um die Leistungsquelle (15) in Reaktion darauf, dass der Rasierer von einem Halter (18), an dem der Rasierer in Zeiträumen der Nichtverwendung gelagert wird, getrennt wird, mit der elektrischen Anordnung zu verbinden.

13. Sicherheitsrasierer nach Anspruch 12, wobei der Leistungsschalter (20) in dem Griff (1) beinhaltet ist.

14. Sicherheitsrasierer nach Anspruch 13, wobei der Leistungsschalter ein mechanischer Schalter ist, der an dem Griff positioniert ist, um durch Eingreifen in den Rasiererhalter und Trennen von dem Rasiererhalter betätigt zu werden.

15. Sicherheitsrasierer nach Anspruch 12 oder 13, wobei der Leistungsschalter (20) magnetisch betätigt werden kann und der Rasiererhalter (18) einen Magneten (21) für den Schalter umfasst, der zu betreiben ist, wenn der Rasierer von dem Rasiererhalter getrennt und an dem Rasiererhalter platziert wird.

16. Sicherheitsvorrichtung nach Anspruch 15, wobei der Leistungsschalter ein Reed-Schalter (1) ist.

17. Sicherheitsrasierer nach den Ansprüchen 14, 15 oder 16, wobei der Rasiererhalter so angeordnet ist, dass er den Griff (1) an oder in der Nähe der Position des Leistungsschalters (20) greift.

18. Sicherheitsrasierer nach einem der Ansprüche 12 bis 17, wobei der Rasiererhalter eine Schale (18) ist, auf der der Rasierer liegen kann.

19. Sicherheitsrasierer nach einem der Ansprüche 1 bis 18, wobei die elektrische Anordnung die elektrische Vorrichtung (24) und eine Schaltvorrichtung (16) zum Steuern des Betriebs der elektrischen Vorrichtung (24) in Reaktion auf einen von der Schaltvorrichtung (16) erfassten Zustand umfasst.

20. Sicherheitsrasierer nach Anspruch 19, wobei der von der Schaltvorrichtung (16) erfasste Zustand darin besteht, dass die Klingeneinheit (2) in Kontakt mit oder in enge Nähe zu der Hautoberfläche einer Person, die den Rasierer hält, gebracht wird.

21. Sicherheitsrasierer nach Anspruch 19, wobei der von der Schaltvorrichtung (16) erfasste Zustand darin besteht, dass die Klingeneinheit (2) in einen Körper aus Wasser eingetaucht wird.

22. Sicherheitsrasierer nach einem der Ansprüche 1 bis 21, wobei die Leistungsquelle eine Batterie (15) ist.

23. Sicherheitsrasierer nach Anspruch 24, wobei die Batterie (15) in dem Griff (1) untergebracht ist.

24. Sicherheitsrasierer nach einem der Ansprüche 12

bis 21, umfassend eine Taktgebervorrichtung, um die Leistungsversorgung für die elektrische Anordnung zu unterbrechen, wenn der Rasierer nicht innerhalb eines vorgegebenen Zeitraums, nachdem er von dem Rasiererhalter entfemt wurde, zu dem Rasiererhalter zurückgeführt wird.

25. Sicherheitsrasiervorrichtung nach Anspruch 24, wobei die Taktgebervorrichtung durch Platzieren des Rasierers an dem Halter zurückgesetzt werden kann.

26. Sicherheitsrasierer nach einem der vorhergehenden Ansprüche, wobei die Vorrichtung, die während des Rasierens betätigt werden kann, ein Vibrationserzeuger ist.

Revendications

1. Rasoir de sûreté comprenant une unité de lame (2) supportée sur un manche (1), un agencement électrique incluant un dispositif actionné électriquement (24), et un indicateur (28) ; dans lequel le dispositif actionné électriquement (24) peut être actionné par l'agencement électrique pendant le rasage, **caractérisé en ce que** l'indicateur (28) produit un signal indiquant à l'utilisateur du rasoir que l'agencement électrique est connecté à une source d'alimentation électrique et prêt à actionner le dispositif.

2. Rasoir de sûreté selon la revendication 1, dans lequel l'indicateur comprend un dispositif électroluminescent (28).

3. Rasoir de sûreté selon la revendication 1 ou 2, dans lequel le dispositif électroluminescent est une diode (28).

4. Rasoir de sûreté selon la revendication 1, 2 ou 3, dans lequel le manche inclut une partie de préhension (12) et un col (14) disposé entre la partie de préhension et l'unité de lame (2), et l'indicateur (28) est situé sur le col du manche (14).

5. Rasoir de sûreté selon la revendication 2 ou 3 dans lequel le dispositif électroluminescent (28) est logé dans le manche (1) et le manche inclut une section transmettant la lumière (27) agencée pour être éclairée par le dispositif électroluminescent (28).

6. Rasoir de sûreté selon la revendication 5, dans lequel le manche (1) inclut une partie de préhension (12) et un col (14) agencé entre la partie de préhension et l'unité de lame, et la section transmettant de la lumière (27) fait partie du col (14).

7. Rasoir de sûreté selon la revendication 6, dans lequel la section transmettant de la lumière (27) s'étend autour de la périphérie entière du col.

8. Rasoir de sûreté selon la revendication 6 ou 7, dans lequel la section transmettant de la lumière (27) s'étend le long d'au moins une partie principale de la longueur du col (14).

9. Rasoir de sûreté selon la revendication 1, dans lequel l'indicateur produit une oscillation ou vibration du rasoir.

10. Rasoir de sûreté selon la revendication 1, dans lequel l'indicateur génère un signal audible.

11. Rasoir de sûreté selon l'une quelconque des revendications 1 à 10, dans lequel un commutateur d'alimentation (20) est inclus pour commander la connexion de l'agencement électrique avec la source d'alimentation (15), et l'indicateur (28) est alimenté par la source d'alimentation (15) lorsque le commutateur d'alimentation (20) est fermé.

12. Rasoir de sûreté selon la revendication 11, dans lequel le commutateur d'alimentation (20) est agencé pour connecter la source d'alimentation (15) à l'agencement électrique en réponse à la séparation du rasoir d'un support (18) sur lequel est conservé le rasoir pendant les périodes de non-utilisation.

13. Rasoir de sûreté selon la revendication 12, dans lequel le commutateur d'alimentation (20) est inclus dans le manche (1).

14. Rasoir de sûreté selon la revendication 13, dans lequel le commutateur d'alimentation est un commutateur mécanique positionné sur le manche pour être actionné par engagement avec et désengagement du support de rasoir.

15. Rasoir de sûreté selon la revendication 12 ou 13, dans lequel le commutateur d'alimentation (20) peut être actionné de manière magnétique, et le support de rasoir (18) inclut un aimant (21) pour le commutateur à actionner lorsque le rasoir est séparé de et placé sur le support de rasoir.

16. Dispositif de sûreté selon la revendication 15, dans lequel le commutateur d'alimentation est un contact en ampoule (20).

17. Rasoir de sûreté selon les revendications 14, 15 ou 16, dans lequel le support de rasoir est agencé pour tenir le manche (1) à l'endroit ou à côté de l'endroit où se trouve le commutateur d'alimentation (20).

18. Rasoir de sûreté selon l'une quelconque des revendications 12 à 17, dans lequel le support de rasoir

est un plateau (18) sur lequel repose le rasoir.

19. Rasoir de sûreté selon l'une quelconque des revendications 1 à 18, dans lequel l'agencement électrique inclut le dispositif électrique (24) et un dispositif de commutation (16) destiné à commander le fonctionnement du dispositif électrique (24) en réponse à une condition captée par le dispositif de commutation (16).

20. Rasoir de sûreté selon la revendication 19, dans lequel la condition captée par le dispositif de commutation (16) est l'unité de lame (2) mise en contact avec, ou à proximité étroite de, la surface de la peau de la personne tenant le rasoir.

21. Rasoir de sûreté selon la revendication 19, dans lequel la condition captée par le dispositif de commutation (16) est l'unité de lame (2) immergée dans un corps d'eau.

22. Rasoir de sûreté selon l'une quelconque des revendications 1 à 21, dans lequel la source d'alimentation est une pile (15).

23. Rasoir de sûreté selon la revendication 24, dans lequel la pile (15) est logée dans le manche (1).

24. Rasoir de sûreté selon l'une quelconque des revendications 12 à 21, incluant un dispositif de minuterie destiné à interrompre l'alimentation en électricité de l'agencement électrique si le rasoir n'est pas remis sur le support de rasoir dans une période prédéterminée après avoir été retiré du support de rasoir.

25. Rasoir de sûreté selon la revendication 24 dans lequel le dispositif de minuterie peut être réinitialisé en plaçant le rasoir sur le support.

26. Rasoir de sûreté selon l'une quelconque des revendications précédentes dans lequel le dispositif actionnable pendant le rasage est un générateur de vibrations.

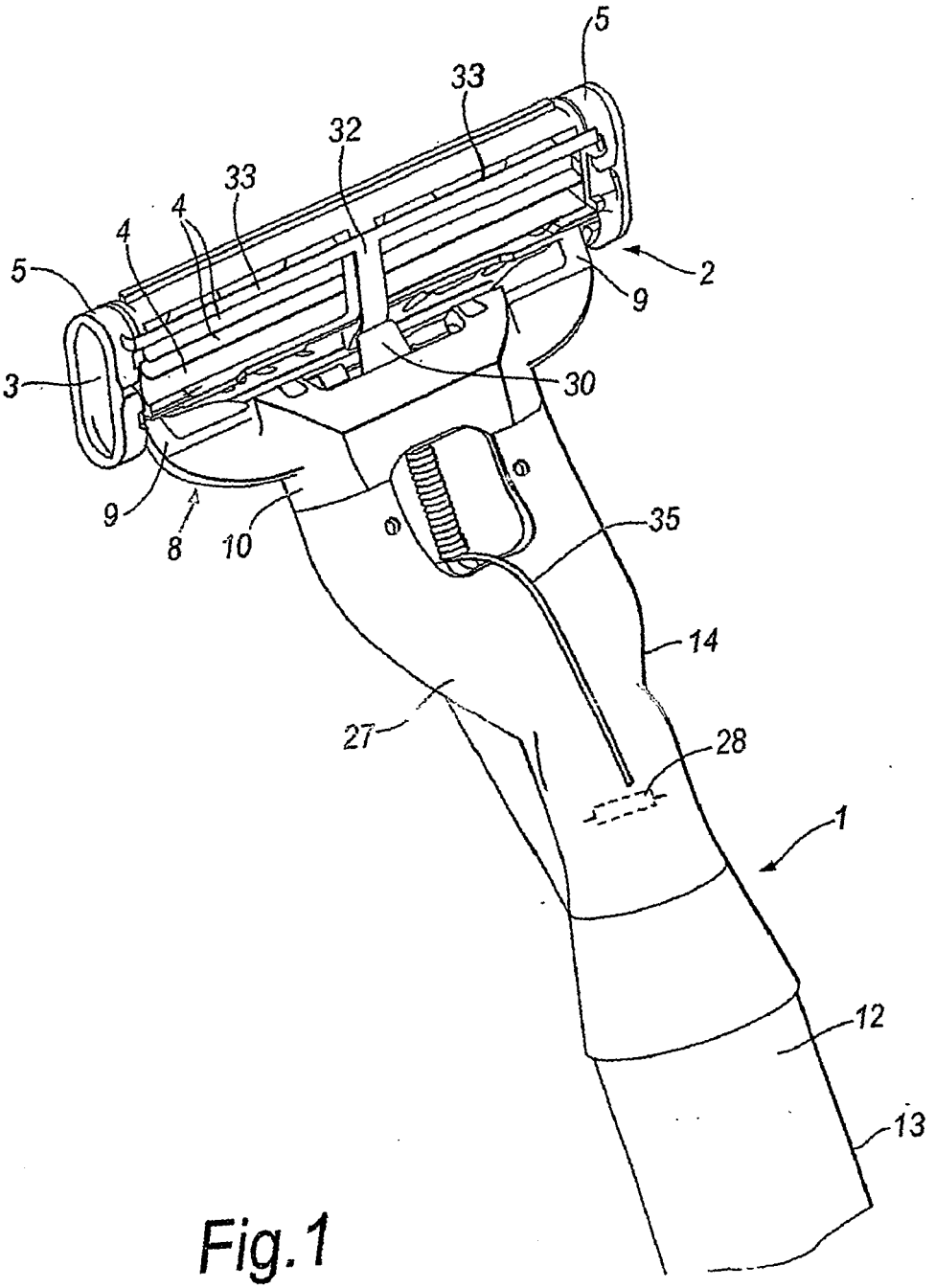

Fig.1

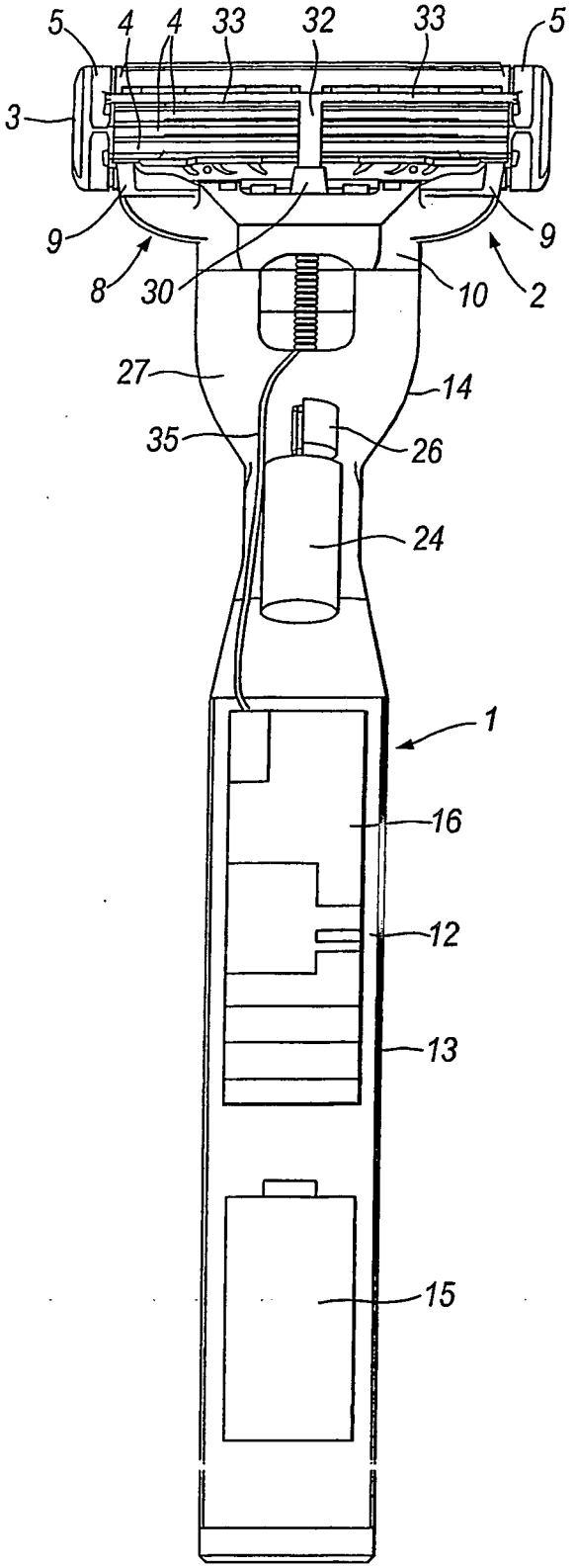

Fig.2

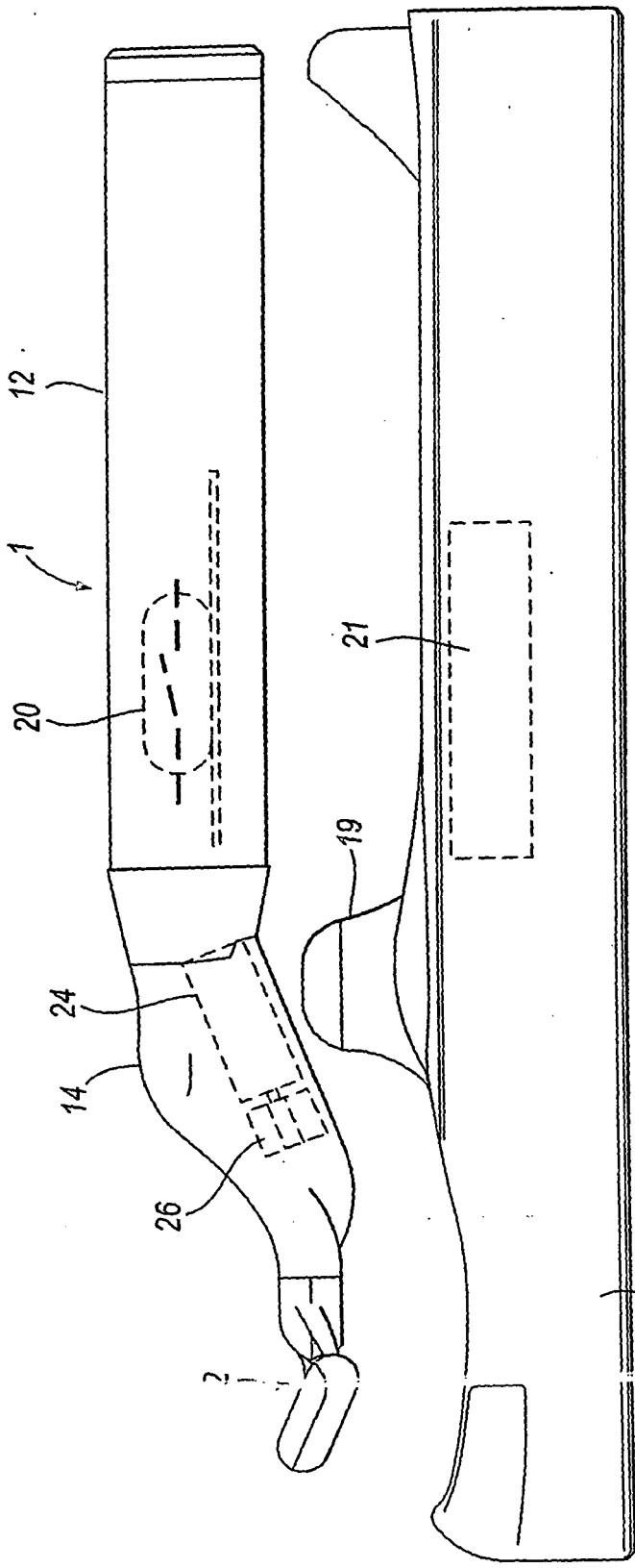

Fig.3

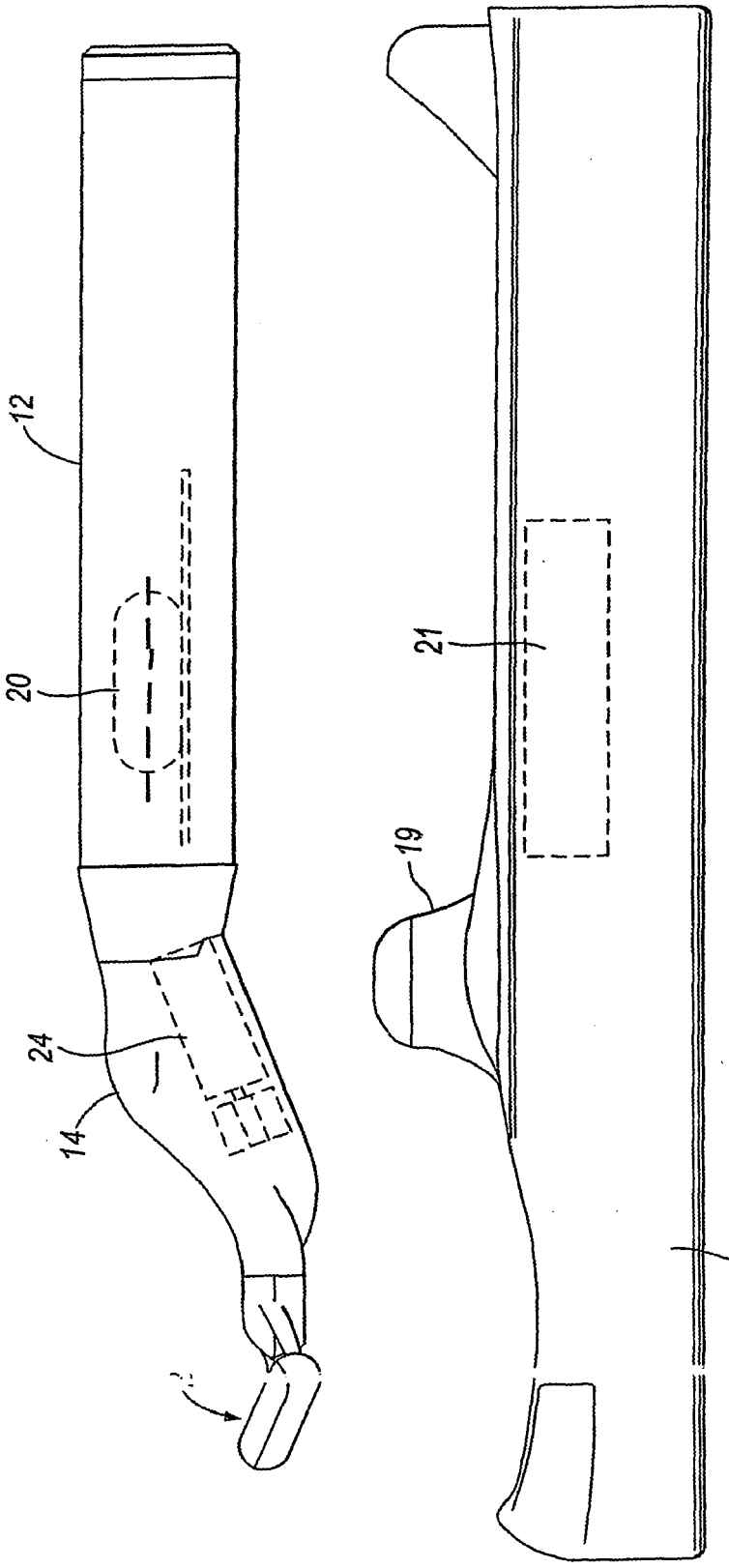

Fig.4

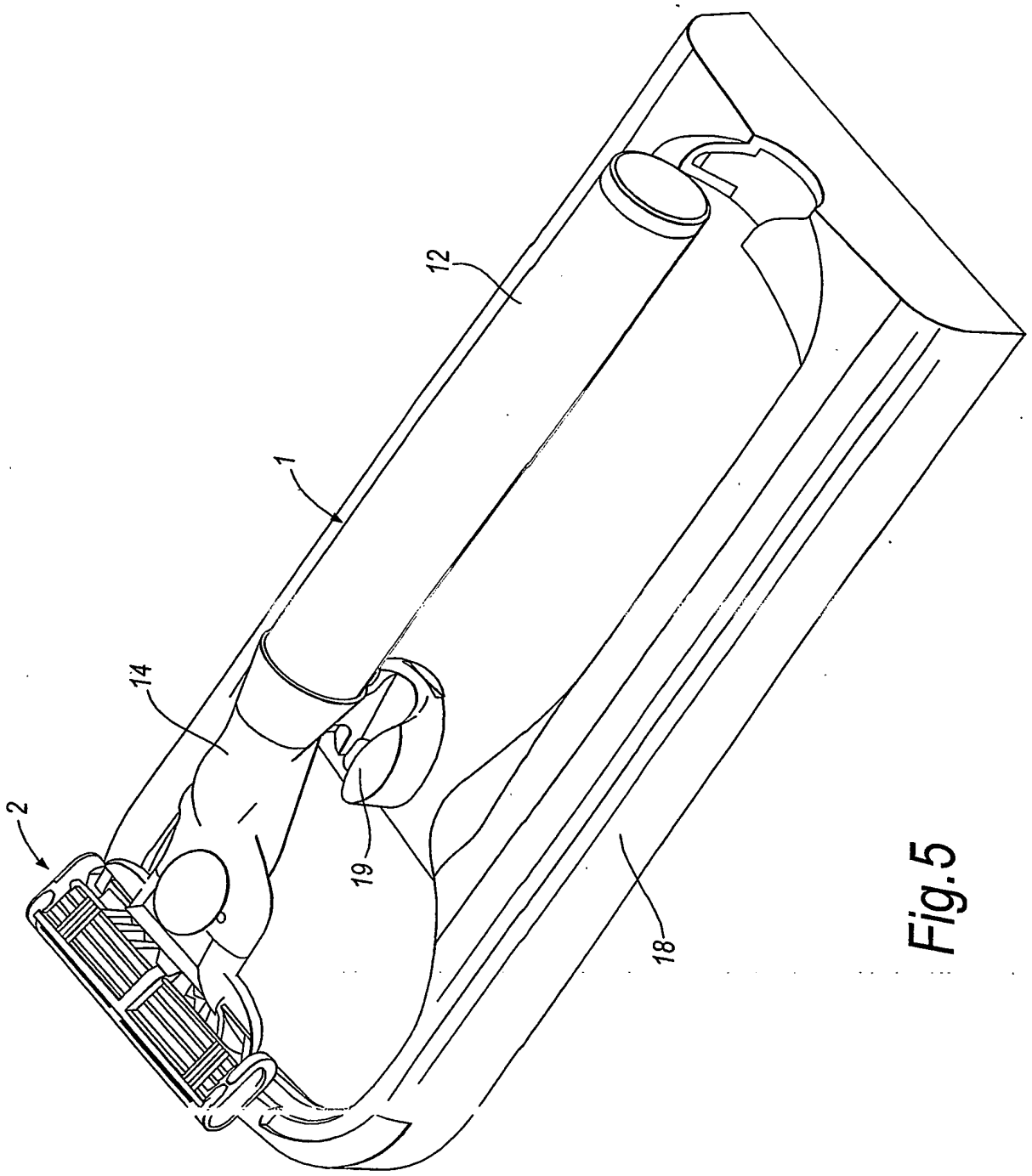

Fig.5

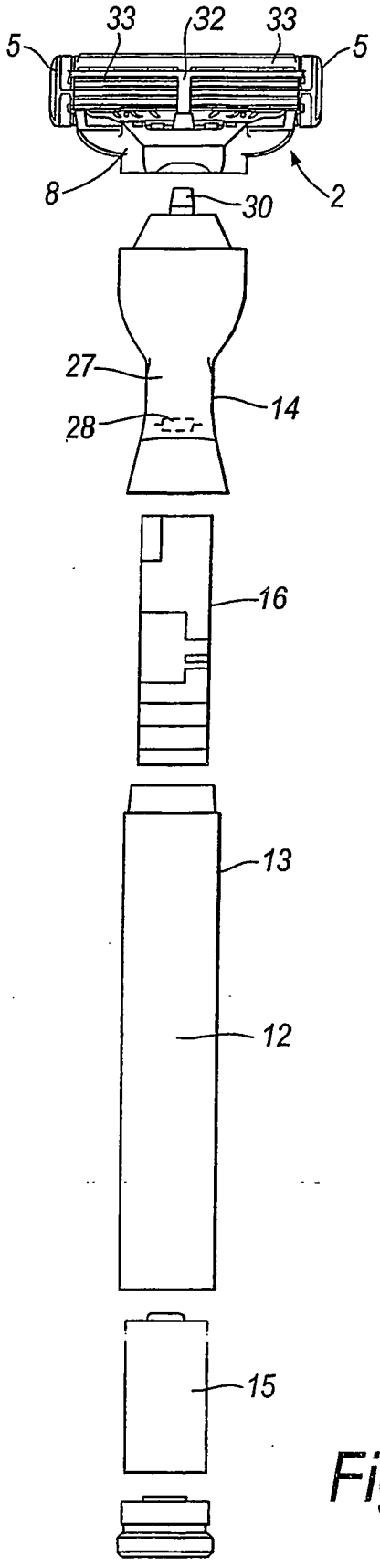

Fig.6

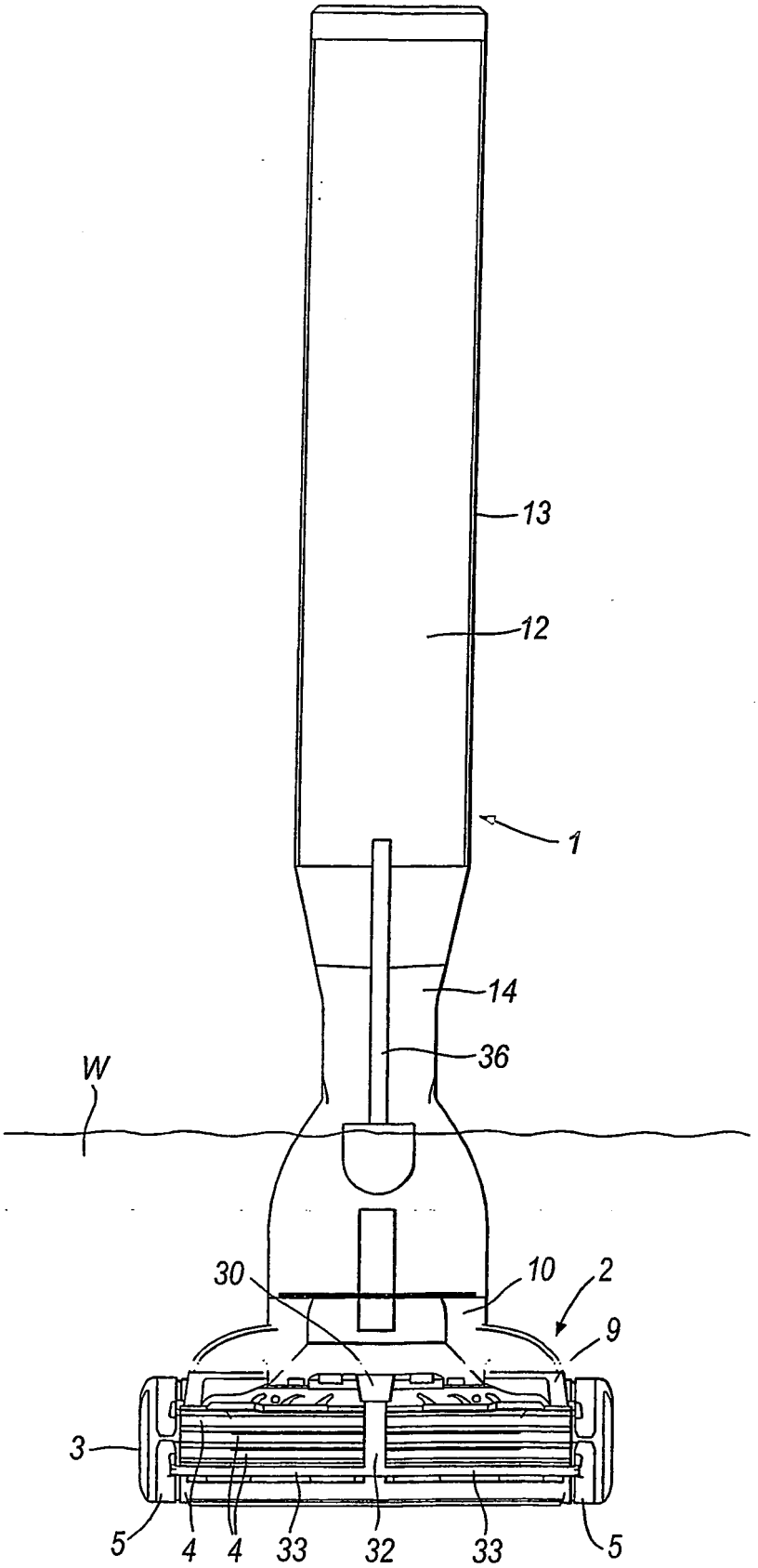

Fig.7

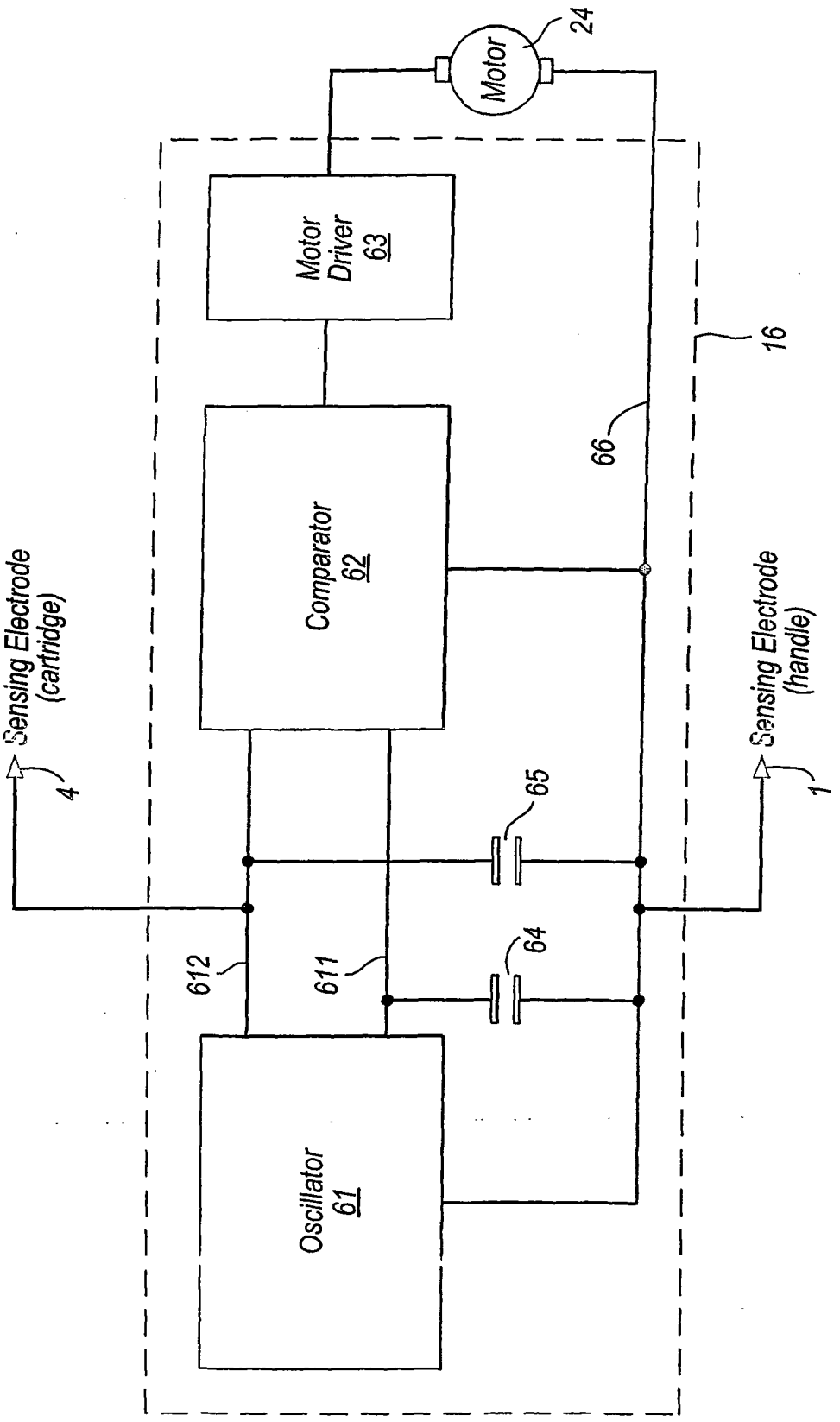
Motor
24
Motor Driver 63
16
66
Comparator 62
Sensing Electrode (cartridge)
4
Sensing Electrode (handle)
1
65
64
612
611
Oscillator 61

Fig. 8

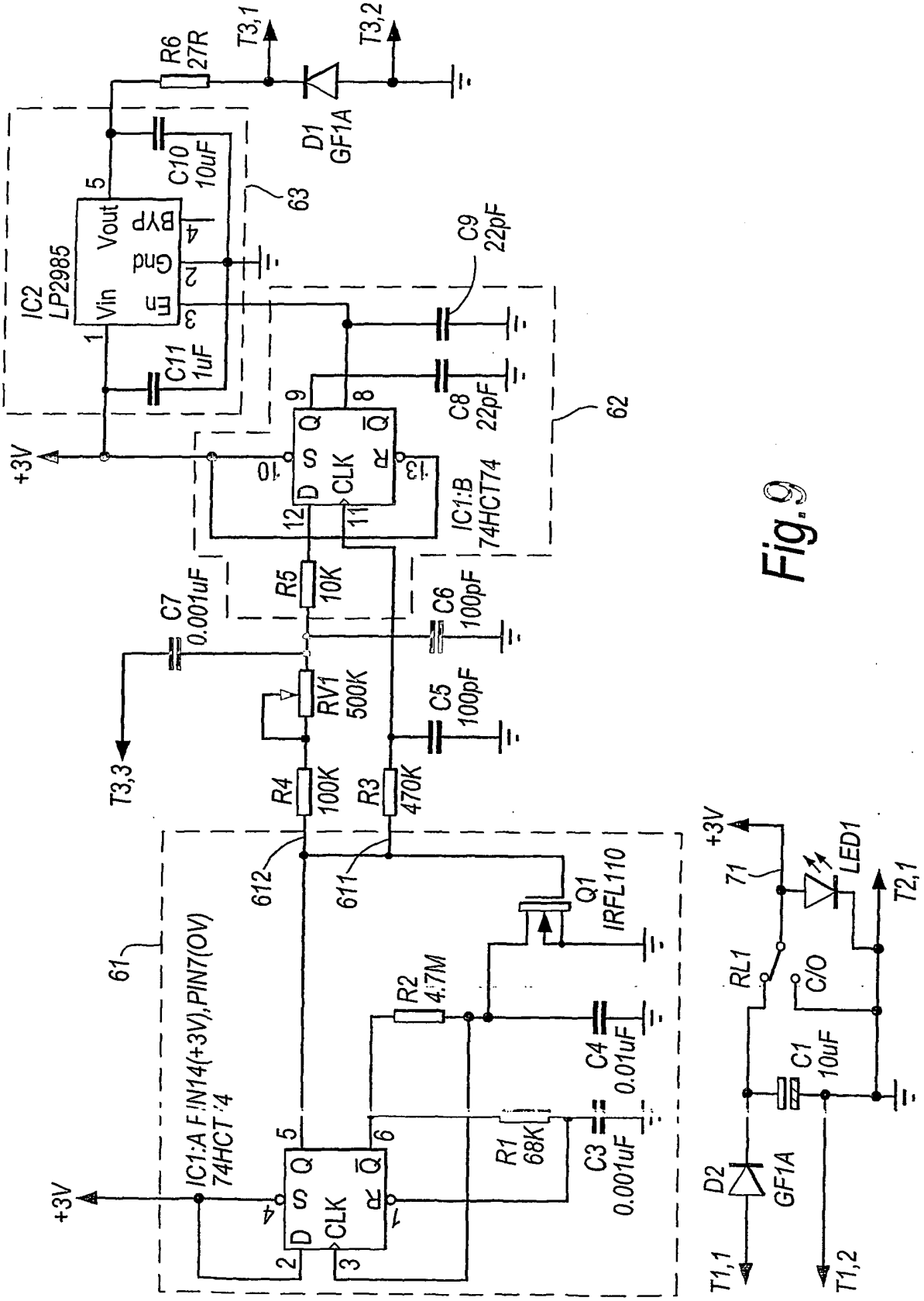
T3,1
T3,2
R6
27R
D1
GF1A
C10
10uF
63
IC2
LP2985
Vout
Byp
Gnd
Vin
C11
1uF
C9
22pF
C8
22pF
62
+3V
IC1:B
74HCT74
R5
10K
C7
0.001uF
C6
100pF
RV1
500K
C5
100pF
T3,3
R4
100K
R3
470K
612
611
Q1
IRFL110
61
IC1:A F!N14(+3V),PIN7(OV)
74HCT!4
R2
4.7M
C4
0.01uF
R1
68K
C3
0.001uF
+3V
71
LED1
T2,1
RL1
C/O
C1
10uF
D2
GF1A
T1,1
T1,2

Fig. 9