Sept. 27, 1966 J. H. WORTHINGTON 3,274,682

RAZOR WITH SOUND DETECTING MEANS

Filed Feb. 28, 1964

FIG. 1

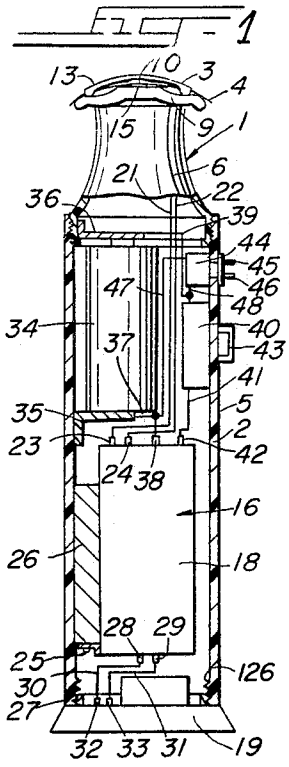


FIG. 3

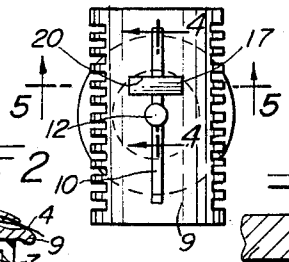


FIG. 2

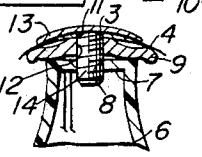


FIG. 4

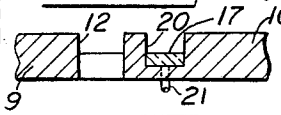


FIG. 8

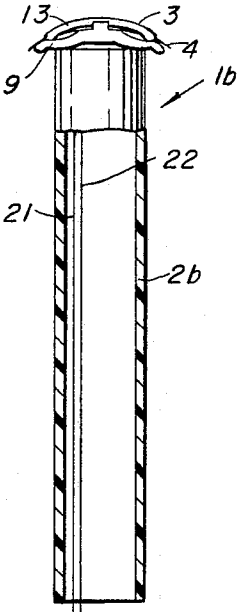


FIG. 5

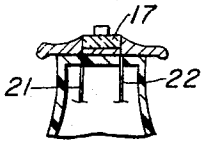


FIG. 6

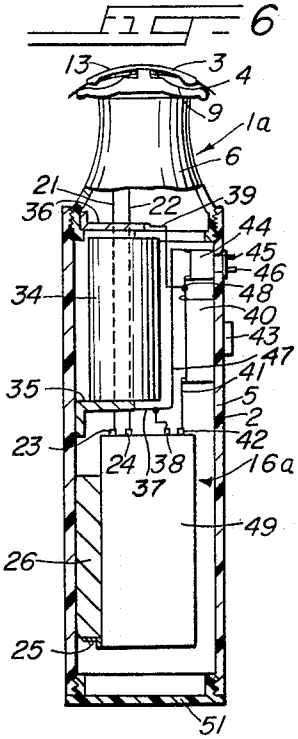
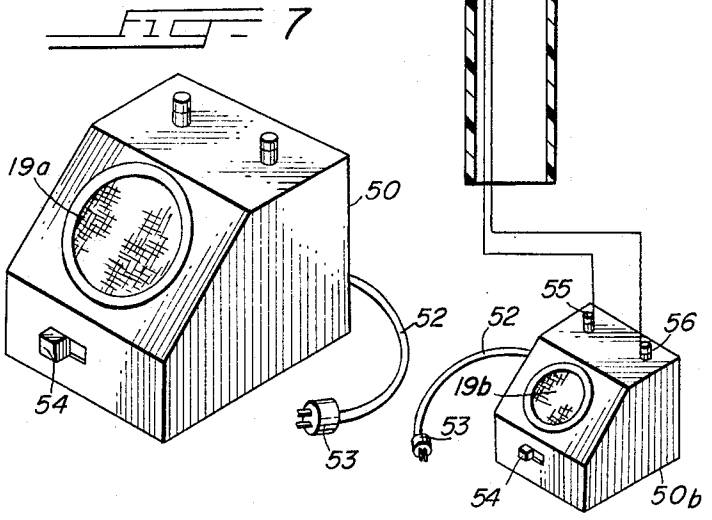


FIG. 7



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United States Patent Office 3,274,682 Patented Sept. 27, 1966

3,274,682

RAZOR WITH SOUND DETECTING MEANS

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Filed Feb. 28, 1964, Ser. No. 348,037
4 Claims. (Cl. 30—34)

This invention relates to razors, and more particularly, to razors having sound detecting means for informing the operator whether or not the portion of the surface being shaved is clean shaven.

It is a primary object of the present invention to afford a novel razor.

Another object is to enable a novel razor of the type commonly known in the trade as a "safety razor" to be afforded.

In shaving with safety razors, and the like, the procedure heretofore known has been that the person shaving drew the razor across the hairs to be cut off in a cutting operation, without any definite, immediate knowledge as to whether or not a "smooth" or "close" shave was being produced in that area. As is well known, a single stroke of the razor blade across an area of skin is seldom effective to produce a smooth shave of that entire area, but is often sufficiently effective to render it substantially impossible to accurately determine visually whether a satisfactory smooth shave has been produced. This is particularly true in hard-to-see areas of the body, such is, for example, along the jowls, on the neck, and the like. As a result, the procedure for shaving heretofore commonly has been for the person shaving to shave such an area of the skin and then check the smoothness of that area with the finger-tips, repeating this alternate shaving and checking operation as many times as necessary to produce the desired smoothness of the shave. Using such procedure, it is not uncommon for a shaver to repeat the alternate shaving and checking of particular areas a number of times before the desired smoothness of skin surface is realized. Such procedure is time consuming and is an important factor in the reasons why, heretofore, shaving has been a relatively slow process if a close or smooth shave has been desired. It is an important object of the present invention to overcome such disadvantages of shaving, and to eliminate any necessity for a person to check the smoothness of any skin area with the fingers during a shaving operation in order to determine whether a close shave has been afforded for that area.

Another object of the present invention is to enable a person to be accurately advised, in a novel and expeditious manner, throughout a shaving operation as to the closeness of the shave being produced.

Another object is to afford a novel razor embodying parts constituted and arranged in a novel and expeditious manner so as to effectively emit sounds audible to the human eear effective to advise a person shaving with the razor as to the degree of smoothness or closeness of the shave being produced on a particular skin area.

Yet another object is to afford a novel razor of the aforementioned type embodying a shaving blade and a sound producing member constituted and arranged in a novel and expeditious manner.

An object ancillary to the foregoing is to enable the vibrations of the shaving blade of such a razor during a shaving operation to be picked up, amplified and emitted as sounds audible to the human ear, in a novel and expeditious manner.

Another object is to afford a novel razor of the aforementioned type wherein the aforementioned sounds are emitted by a speaker.

A further object it to enable a novel razor of the aforementioned type to be afforded wherein a speaker of the

aforementioned type may be embodied directly in the handle of the razor.

Another object it to enable a novel razor of the aforementioned type to be afforded wherein the speaker, while being within hearing distance of the person shaving, is disposed in stationary position during such a shaving operation and is operatively connected to the shaving blade of the razor either through electrically conductive wires, or the like, or by a transmitter-receiver combination.

Another object is to afford a novel razor of the aforementioned type which is practical and efficient in operation, and which may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings, which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a somewhat diagrammatic, side elevational view of a razor embodying the principles of the present invention, with certain parts broken away to show underlying parts;

FIG. 2 is a fragmentary, detail sectional view of a portion of the razor shown in FIG. 1;

FIG. 3 is a top plan view of the razor shown in FIG. 1, with the razor blade and upper blade-retaining plate removed therefrom;

FIG. 4 is an enlarged, fragmentary, detail sectional view taken substantially along line 4—4 in FIG. 3;

FIG. 5 is a fragmentary detail sectional view taken substantially along the line 5—5 in FIG. 3;

FIG. 6 is a view similar to FIG. 1, but showing a modified form of the present invention;

FIG. 7 is a front perspective view of a receiver, which forms a part of the razor shown in FIG. 6; and

FIG. 8 is a view somewhat similar to FIG. 1, but showing another modified version of the present invention.

A razor 1, embodying the principles of the present invention, is shown in FIGS. 1–5, inclusive, of the drawings, to illustrate the presently preferred embodiment of the present invention.

The razor 1 includes a main supporting member, preferably in the form of an elongated handle 2, which is of such size that it may be readily held in a man's hand. The razor 1 also includes a head 3, which in the assembled razor 1 is mounted on the upper end of the handle 2 in position to support a razor blade 4 in operative position for a shaving operation, in substantially the same manner as is common among safety razors presently available on the market.

The handle 2 includes a substantially cylindrical shaped main body portion 5 threadedly connected at its upper end to the lower end portion of a neck 6, FIG. 1, which tapers upwardly and inwardly from the main body portion 5 and terminates at its upper end in a top wall 7, FIG. 2. The top wall 7 has a threaded opening 8 extending therethrough for a purpose which will be discussed in greater detail presently.

The head 3 includes a substantially rectangular-shaped lower plate or guard plate 9, FIG. 3, having serrated, oppositely disposed longitudinal edge portions in the manner heretofore known in the art. The guard plate

9 embodies an upwardly projecting rib 10, which extends along the longitudinal center line of the upper face of the guard plate 9 and terminates at its ends in inwardly spaced relation to respective ends of the guard plate 9, FIGS. 1 and 3. When a razor blade, such as the blade 4, is mounted in operative position on the guard plate 9, the rib 10 projects upwardly through an elongated opening 11 in the blade 4, and the longitudinal edge portions of the blade 4 are disposed in overlying, outwardly projecting relation to respective ones of the serrated longitudinal edges of the guard plate 9, FIG. 1. An opening 12 extends through the longitudinal center of the rib 10 and the guard plate 9, for a purpose which will be discussed in greater detail presently.

The head 3 also includes a substantially rectangular-shaped blade-retaining plate or upper plate 13, which is preferably of the same length as the guard plate 9, but has a width preferably corresponding to the distance between the serrated portions of the opposite longitudinal edges of the guard plate 9. The upper plate 13 embodies an externally threaded member or bolt 14, which projects downwardly from the center of the lower face thereof, and also includes an upwardly concave recess 15, FIG. 1. The recess 15 is complementary in cross-sectional size and shape to the rib 10 on the guard plate 9, and extends completely along the longitudinal center line of the lower face of the upper plate 13 in both directions from the bolt 14.

When the head 3 is mounted in operative position on the handle 2, the guard plate 9 rests on the upper face of the top wall 7 of the neck 6, the blade 4 rests on top of the guard plate 9 with the rib 10 projecting upwardly through the blade 4 into the recess 15 in the upper plate 13, and the bolt 14 extends downwardly through the blade 4 and the guard plate 9 and is threadedly engaged in the opening 8 in the top wall 7 to thereby releasably secure the head 3 on the handle 2, with the blade 4 clamped between the top plate 13 and the guard plate 9 in operative position for a shaving operation.

The razor 1 shown in FIGS. 1 to 5, inclusive, of the drawings includes an electro-magnetic unit 16 for sensing or picking up vibrations of the blade 4 during a shaving operation, and converting those vibrations to sounds audible to the human ear. The electro-magnetic unit 16 includes a suitable transducer or pick-up, such as, for example, a piezo-electric crystal 17, FIGS. 3–5, an amplifier 18 operatively connected to the pick-up 17, FIG. 1, and a speaker 19 operatively connected to the amplifier 18.

The pick-up 17 comprises a substantially rectangular-shaped crystal mounted in a complementary shaped recess 20 in the upper face of the guard plate 9. Preferably, the pick-up 17 extends transversely across the rib 10 on the guard plate 9, and is so disposed in the upper face of the guard plate 9 that when the blade 4 is disposed in operative position in the head 3 it rests on the upper face of the pick-up 17 in intimate contact therewith. The pick-up 17 is operatively connected to the amplifier 18 by two wires 21 and 22, which are directly connected at one end to respective ends of the pick-up 17, the other ends of the wires 21 and 22 being connected to two connector posts 23 and 24, respectively, on the amplifier 18, FIGS. 1 and 5.

The amplifier 18 is removably supported in operative position in the lower end portion of the body portion 5 of the handle 2 by suitable means such as a hanger bracket 25 removably mounted on a mounting block 26 secured in the lower end portion of the handle 2, FIG. 1. The body portion 5 of the handle 2 is open at the bottom and has internal threads 126 formed in the lower end portion thereof. The speaker 19 has an externally threaded collar or flange 27 thereon which extends into the lower end of the handle 2 and is threadedly engaged with the threads 26 to thereby removably mount the speaker 19 on the lower end of the handle 2. The speaker 19 is preferably relatively thin, and of a diameter not substantially greater than the diameter of the main body portion 5 of the handle 2.

The amplifier 18 has two output connector posts 28 and 29 electrically connected by suitable electrical conductors, such as, for example, wires 30 and 31, to two connector posts 32 and 33, respectively, on the speaker 19, to thereby operatively electrically connect the amplifier 18 to the speaker 19.

Electric power for the electro-magnetic unit 16 is preferably afforded by a battery 34 removably mounted in the handle 2 of the razor 1 above the amplifier 18, FIG. 1. The battery 34 may be of any suitable type readily available on the market, but is preferably of the rechargeable type such as, for example, a suitable nickle-cadmium battery.

The body portion 5 and the neck 6 of the handle 2 are preferably made of a suitable electrical insulation material, such as, for example, hard rubber, or a suitable plastic, or the like, and a mounting bracket 35, made of suitable electrically conductive material, such as, for example, copper, or the like, is mounted in the body portion 5 of the handle 2 in position to support the battery 34 in operative position in the handle 2. Another mounting bracket 36, made of suitable electrically conductive material, such as, copper, is mounted in the neck 6 of the handle 2 in such position that when the neck 6 is disposed in operative position in the body portion 5, the bracket 36 is disposed in engagement with the upper end of the battery 34 and is effective to releasably clamp the battery 34 against the mounting bracket 35. When the battery 34 is thus disposed in operative position in the handle 2, the brackets 35 and 36 are operatively engaged with opposite ends thereof in operative position to afford electrical connectors for the opposite sides of the battery 34. One side of the battery 34 is connected by the bracket 35 and an electrical conductor 37 to a connector post 38 on one side of the amplifier 18. The other side of the battery 34 is connected through the bracket 36, a conductor 39, a switch 40 and a conductor 41, to a connector post 42 on the other side of the amplifier 18. The switch 40 is mounted in the handle 2 and has a control button 43 projecting outwardly therefrom for manually opening and closing the switch 40 to thereby open and close the electrical connection between the battery 34 and the amplifier 18.

A suitable connector plug, such as a male connector plug 44, is mounted in the handle 2, with the prongs 45 and 46 thereof projecting outwardly from the handle 2. The aforementioned one end of the battery 34 is connected by the bracket 35, the conductor 37, and a conductor 47 to the prong 45; and the aforementioned other end of the battery 34 is connected by the bracket 36, the conductor 39, and a conductor 48 to the other prong 46. Thus, it will be seen that by connecting the plug 44 to a suitable source of power, not shown, the battery 34 may be recharged during periods of non-use. When the razor 1 is being used in shaving operations, it is preferably disconnected from all outside sources of electric power.

In the operation of the novel razor 1 in a shaving operation, the switch 40 is disposed in closed position to thereby operatively connect the amplifier 18 to the battery 34. During such operation, the handle 2 is held in the hand of the person performing the shaving operation, and the blade 4 is moved across the skin area to be shaved in a normal shaving stroke. Any vibrations of the blade 4 occurring during such a shaving stroke are picked up by the transducer 17 and transmitted thereby as electric impulses to the amplifier 18 through the wires 21 and 22. The amplifier 18 amplifies the signals received from the transducer 17, and feeds the amplified signals through the conductors 30 and 31 to the speaker 19 thus exciting the speaker 19 and causing it to emit sounds audible to the human ear which vary in accordance with the magnitude of the vibrations of the blade 4. The blade 4, during a

shaving stroke, vibrates considerably more when it is moving across a skin area on which it engages hairs or whiskers in a shaving operation, than it does when moved across that same skin area after the whiskers or hairs have been shaved therefrom. Therefore, considerably more noise is emitted from the speaker **19** when the blade **4** is engaging such hairs or whiskers in a shaving operation than when the blade **4** is moving across a smoothly shaved area, so that during a shaving stroke the operator of the novel razor **1** is audibly advised as to whether or not the blade **4** is moving across a skin area from which hairs or whiskers still protrude, or is moving across a skin area which has been cleanly shaven.

Thus, with the novel razor **1**, a person may shave relatively rapidly, without it being necessary to check by feeling with the fingers or visually whether or not the various areas being shaved have been cleanly shaved, the sounds eminating from the speaker **19** accurately advising the person shaving as to the condition of the skin area being shaved. With a razor embodying the principles of the present invention, the graduations of sound eminating from the speaker preferably are such that the person shaving cannot only tell whether the particular area being shaved is completely unshaven or closely shaven, but can tell the degree of unshaveness which may be remaining, the noise, which eminates from the speaker at the beginning of a shaving operation on a heavily bearded skin area being relatively loud and in the nature of radio static, and diminishing in intensity as the amount of protruding hairs or whiskers being engaged by the blade **4** becomes less, until, when the blade **4** is pulled across a smoothly shaven skin area, very little sound eminates from the speaker **19**, and what sound does eminate is preferably in the nature of a soft whisper.

The modified form of my novel razor which is shown in FIGS. 6 and 7 operates on the same principal as the preferred form of the razor illustrated in FIGS. 1–5, inclusive, and like reference numerals have been used on like parts and the same reference numerals with the suffix "*a*" have been used on parts which are similar but which have been substituted for parts of the preferred form of my razor.

The differences between the razor **1** shown in FIGS. 1–5 and the razor **1***a* shown in FIGS. 6 and 7 are embodied in the electro-magnetic units thereof. In the razor **1***a* the amplifier **18** of the razor **1** has been replaced by a transmitter **49**, mounted in the body portion **5** of the handle **2**; the speaker **19** has been removed from the handle **2** and replaced by a speaker **19***a* in a receiver **50**, which is remote from the handle **2**, FIG. 7; and the bottom end of the handle of the razor **1***a* has been closed by a plug **51** threaded thereinto, FIG. 6.

In the razor **1***a* shown in FIG. 6, the transmitter **49** is connected to the wires **21** and **22** and the battery **34** in the same manner as is the amplifier **18** of the razor **1**. The operation of the razor **1***a* is similar to the operation of the razor **1** in that during a shaving operation vibrations of the blade **4** are picked up by the transducer **17** and sounds corresponding to those vibrations eminate from the speaker **19***a*. However, the transmiter **49** is not connected by physical electrical conductors such as the wires **30** and **31** of the razor **1** to the speaker **19***a*. Instead, the transmitter **49**, as a result of the vibrations of the blade **4** picked up by the transducer **17**, emits radio signals which are inaudible to the human ear, but which are picked up by the receiver **50** and emitted as sound, audible to the human ear, from the speaker **19***a*.

The receiver **50** may be of any suitable type readily available on the market, but preferably is of the type which includes suitable wires **52** and a plug **53** by which it may be operatively connected to a suitable source of electric power, not shown, such as, for example, the usual wall outlet in a bathroom, or the like. The receiver **50** also includes a switch **54** which may be manually actuated between on and off positions to control the operation of the receiver **50**.

In the operation of the razor **1***a* shown in FIGS. 6 and 7, the receiver **50** may be operatively connected to the aforementioned suitable source of electric power, and the switch **54** may be moved into "on" position. Thereafter, with the switch **40** in the handle **2** in "on" position, the operator may move the blade **4** across an area of skin in a shaving stroke. As in the operation of the razor **1** shown in FIG. 1, the vibrations of the blade **4** caused by the engagement of the blade **4** with many, few, or no whiskers in such a shaving stroke are clearly detectable by the person shaving by the sound or amount of noise eminating from the speaker **19***a*, the noise eminating from the speaker **19***a* when the blade **4** is being drawn across a heavily bearded area being relatively great and in the nature of static and the noise eminating from the speaker **19***a* when the blade **4** is being drawn across a cleanly shaven skin area being relatively little and in the nature of a whisper.

Thus, it will be seen that the razor **1***a* shown in FIGS. 6 and 7, like the razor **1** shown in FIG. 1, affords a novel and practical razor which is effective to clearly indicate to a person shaving therewith whether the area being shaved is clean shaven or not.

The modified form of razor which is shown in FIG. 8 operates on the same principal as the forms of razor shown in FIGS. 1 to 5, inclusive, and FIGS. 6 and 7, and like reference numerals have been used on the like parts, and the same reference numerals with the suffix "*b*" have been used on parts which are similar but which have been substituted for parts of the forms shown in FIGS. 1 to 7, inclusive.

In the razor **1***b*, shown in FIG. 8, the head **3** is of the same construction as the head of the razor **1** shown in FIG. 1, and is mounted on the handle **2***b* in the same manner. Also, the head **3** includes a transducer like the transducer **17** in the razor **1**, but the wires **21** and **22** connected thereto extend from the handle **2***b* and are operatively connected to suitable connector posts **55** and **56**, respectively, on a receiver **50***b*, which may be positioned remotely from the handle **2***b*. The receiver **50***b* includes a speaker **19***b* and may be operatively connected to a suitable source of electric power by means of a cord **52** and a plug **53** in the same manner as the receiver **50** shown in FIG. 7. The receiver **50***b* includes a manually operable switch **54** for turning it on and off.

In the operation of the razor **1***b*, the vibrations of the blade **4** are picked up by the transducer, not shown, mounted in the head **3** in the same manner as the transducer **17** in the razor **1**, the transducer converting the vibrations to electrical impulses which are fed through the wires **21** and **22** to the receiver **50***b*. The impulses received by the receiver **50***b* are amplified therein by a suitable amplifier, not shown, and the amplified impulses or signals are fed to the speaker **19***b* to thereby cause the speaker **19***b* to emit sounds in accordance with the vibrations of the blade **4**.

Thus, it will be seen that the operation of the razor **1***b* is on the same principle as that of the razors **1** and **1***a*, the sounds eminating from the speaker **19***b* during a shaving operation affording a clear indication to the person shaving as to the smoothness of the skin area being shaved.

From the foregoing it will be seen that my novel invention affords a novel razor which provides a person using the same with a constant check as to the quality of the shave which has been produced, without checking the shaved area visually or by feeling with the hand.

Also, it will be seen that the present invention affords a novel razor with which clean shaves may be quickly and easily accomplished.

In addition, it will be seen that the present invention affords a novel razor which is practical and efficient in

operation and which may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A razor for shaving comprising
(a) a handle,
(b) a blade
(1) removably carried by said handle, and
(2) having a sharp edge projecting outwardly from said handle in operative position to cut hairs in a shaving operation,
(c) means carried by said handle in position to pick-up vibrations of said blade,
(d) a speaker, and
(e) means operatively connected to said first-mentioned means for operatively actuating said speaker in accordance with such vibrations of said blade picked up by said first-mentioned means and thereby convert said vibrations to sound emitting from said speaker.

2. A razor as defined in claim 1, and in which
(a) said speaker is carried by said handle.

3. A razor as defined in claim 1, and in which

(a) said second-mentioned means comprises an amplifier carried by said handle and operatively connected to said speaker.

4. A razor as defined in claim 3, and in which
(a) said speaker is mounted on said handle and supported thereby.

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