



- (51) **International Patent Classification:** Not classified
- (21) **International Application Number:**
PCT/IB2013/001594
- (22) **International Filing Date:**
19 July 2013 (19.07.2013)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (72) **Inventors; and**
- (71) **Applicants :** ALSHDAIFAT, Wasfi [JO/AE]; P.O. Box 46618, Abu Dhabi (AE). ALMUHAIRBI, Eida [AE/AE]; P.O. Box 46618, Abu Dhabi (AE). KASSAB, Farah, Affif [LB/AE]; P.O. Box 46618, Abu Dhabi (AE).
- (74) **Common Representative:** ALSHDAIFAT, Wasfi; P.O. Box 46618, Abu Dhabi (AE).

- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,

MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

- upon request of the applicant, before the expiration of the time limit referred to in Article 21(2)(a)
- without international search report and to be republished upon receipt of that report (Rule 48.2(g))

- (54) **Title:** RECIPROCATING ELECTRIC RAZOR

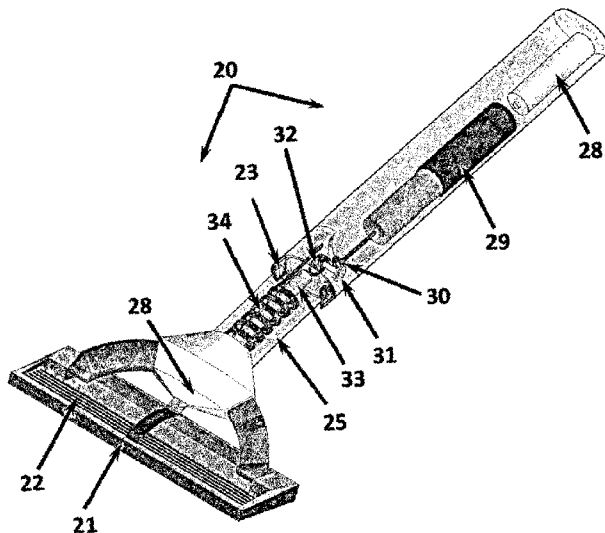
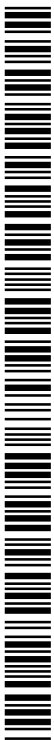


FIG. 2

(57) **Abstract:** To provide an electric reciprocating razor (20), that automatically simulates perfectly the manual operation, which is a reciprocating motion of the blades head (21), by the user to release the repeatedly accumulating hair in front of the blades head (21), that blocks the blades from shaving (cutting) more hair. A hand held wet razor (20) is modified. The tubular housing of the razor contains a battery, powering a drive motor, which drives a pinion gear (30), driving a crown (31) gear, which drives a camshaft. The cam (32) tapered side is pushing away a spring loaded follower (34), that by its role pushes the blades head (21) in a reverse direction, in relation to the shaving forward direction, while when the cam's (32) tapered side is rotated, such that the convex side of the cam's (32) becomes with a slight contact with the follower (34), the follower (34) is retarded back by the spring, pulling the razor head (21) in the same cutting direction.



RECIPROCATING ELECTRIC RAZOR

Description of the Invention

Technical Field of Invention

To provide an electric reciprocating razor, which aims to move the head of blades to shave the hair in a more effective and fast way.

Background Art

To carry out shaving, a bladed tool called a razor, is primarily used in the removal of unwanted body hair through the act of shaving. Kinds of razors include straight razors, disposable razor, and electric razors.

10 Safety razor with disposable blades was first invented in 1901, by the American inventor King C. Gillette. The straight razors with double-edged safety razor, with replaceable blades, was first manufactured by King C. Gillette., while The first electric razor was patented in 1928 by the American manufacturer Col. Jacob Schick. Prof Alexandre Horowitz, from Philips laboratories is the one who
15 invented the very successful concept of the rotary electric razor, which has a shaving head consisting of cutters, that cut the hair entering the head of the razor at dry skin level.

Electric razors are normally powered by rechargeable batteries, sealed inside the razor's case. An international patent application publication No.:
20 WO/2006/096372 titled Oscillating Razors, published for The Gillette Company, has a razor providing a vibrating function, and thus further includes a vibrating mechanism.

An electric shaver having a reciprocating shaving cutter assembly at the upper end of its shaver body, and also a safety razor assembly disposed parallel to
25 the shaving cutter assembly, is disclosed in patent publication No.: US 2011001943.

A hand held oscillating razor for wet shaving, comprising an internally operated eccentric for forcibly, rapidly vibrating the cutting blades, is disclosed in patent
30 No.: US 4,744,144, wherein the transmissibility operating point and the roll couple attributes of the unit, insure that the razor exhibits uniform shaving characteristics, substantially independently of the manner in which it may be held by the user.

US 5,131,147 Reciprocating Cam Powered Razor in which the drive is effected through the use of multi-sided triangular section cams, to reciprocate the inner hair cutting sleeve in a multiple manner, but for a single revolution of the drive shaft, arrangements are included wherein the shaving operation is carried out without the interference of the handle body. The vibratory effect of these cams add a good feeling to the skin and direct hair into the cutting slots of the cutting head.

Patent publication No.: US 20050172492, an electric shaver, a high low cost dry shaver includes a cutting assembly includes a motor, and an associated drive shaft for operating the cutting reciprocations greater than eight thousand cycles per minute for the high-speed shearing operation. A cam assembly is interposed between the motor and the cutting assembly for translating motor revolutions to cutting reciprocations.

In all of these types of wet or dry electric razors, in the prior art, the cutting of the hair is supported with oscillation, vibration, or a very short distance reciprocation motion for the blades.

Specifically, in the wet razors, where shaving depend on dragging the double, triple.. blades on the skin, using the razor handle, directly after shaving part of the skin's hair, the hair accumulates nearly vertically with time, in-between the blades, and the next hair to be cut, blocking the blades from cutting more hair, so the user normally, either flush the blades from the hair, or knock the razor on the wash basin, or slide backward the razor on his face, to release the stuck and accumulating hair, to guide again the razor toward the remaining non-cut hair.

Some users, developed their skills, to shave their hair via a reciprocating movement of the blades, towards the hair and away, in a so called cut-release hair. The invention here, aims to provide a successful effective and active, cheap and simple, electric wet razor, using some available parts in the mechanism of conventional razors, to simulate and carry out that operation automatically.

Disclosure of Invention

Brief Description

Normally, after starting shaving, the accumulated hair in front of the razor head, blocks the blades from shaving (cutting) more hair, as a result, a high number of flushing of the shaver blades from the stuck hair is carried out.

A conventional way used by some users, is to retard back the shaver head, by sliding it back on the face, to release the standing stuck hair, then moving the shaver head again towards a non-cut hair region.

To provide an electric (motorized) reciprocating shaver, that automatically simulates perfectly this manual operation, which is a reciprocating motion of the shaver head, a hand held shaver is modified, such that the tubular housing of the shaver contains a battery, powering a drive motor, that drives a pinion gear, driving a crown gear, which drives a camshaft.

The camshaft tapered side is pushing away a spring loaded follower, that by its role pushes the blades head in a reverse direction, in relation to the shaving forward direction, while when the cam tapered side is rotated, such that the convex side of the cam become with a slight contact with the follower, the follower is retarded back by the spring, wherein while the follower is retarded back, it pulls the razor head in the same cutting direction.

During this reciprocation motion, the razor head is moving back and forth, as a result, every time the hole razor is pulled towards cutting the hair, the razor head moves back and release and spread the stuck hair, while the hand of the user, and the forward reciprocation of the head, move the shaving head forward toward a new non cut-hair to be cut.

25

Brief Description of the Drawings:

- FIG. 1: Illustrates a 3-dimensional view for the reciprocating razor.
- FIG. 2: Illustrates a 3-dimensional view for the reciprocating razor inner mechanism.
- FIG. 3: Illustrates a 3-dimensional view for the reciprocating mechanism main parts.

30

- FIG. 4. A: Illustrates a three dimensional view for the reciprocating razor forward hair cut, by the forward drag of the user.
- FIG. 4. B: Illustrates a front view for the razor forward hair cut.
- 5 • FIG. 5. A: Illustrates a three dimensional view for the razor reciprocating backward for hair release.
- FIG. 5. B: Illustrates a front view for the razor reciprocating backward for hair release.
- FIG. 6. A: Illustrates a three dimensional view for the reciprocating razor forward hair cut, accompanied with forward drag by the user.
- 10 • FIG. 6. B: Illustrates a front view for the reciprocating razor forward hair cut.

Best Mode for Carrying out the Invention:

Detailed description of operation

In order to make it easy to carry out the invention, a detailed description of the parts of the invention, supported with figures is provided here, as each part has many features, we made it easy to read, by referring to each feature with a number included in the parts description text, and in the parts numbering list, the numbering of the parts features is indicated here by starting it sequentially from number 20, whenever a part feature appears in a text, it is directly assigned its required serial number. As example in FIG. 1, the parts' features are arranged sequentially from number 20 to 21, 22...

Normally, after starting shaving, the accumulated hair in front of razor's head 20 of blades 21, blocks the blades 22 from shaving (cutting) more hair, as a result, a high number of flushing of the head 20 of blades 21 from the stuck hair is carried out, or sometimes knocking the razor 20 on the inner edge of the wash basin, to release the blocking hair in between the blades 22, in addition to the accumulated hair on the front side of the blades head 20.

Some users, developed their skills, to shave their hair via a reciprocating movement of the blades 22, towards the hair and away, in a so called cut-release hair (cut: forward motion, release: backward motion).

To provide a successful effective and active, cheap and simple, electric wet razor 20, using some available parts in the mechanism of conventional razors, to simulate and carry out that operation automatically, and to achieve that requirement; an electric (motorized) reciprocating razor 20, which automatically
5 simulates perfectly that manual reciprocation, of the blades head 21, a hand held razor 20 is modified, according to the following:

1- Conventional razor with slight modification on its outer shape (FIG. 1):

As the blades head 21 of the hand held wet razor 20, is to be the reciprocating part, it is found that to reciprocate this part practically, and as
10 a design requirement, this part should not reciprocate in relation to the two arms 23 supporting it, neither both reciprocate relative to the joint block 24, nor the three parts (blades head 21, supporting arms 22, and joint block 24) reciprocate relative to the tubular link 25, but the hole set, which is
15 composed of the blades head 21, supporting arms 23, joint block 24, and the tubular link 25, should reciprocate as one block relative to the handle 26 of the razor 20, wherein the tubular link 25 should move forward and backward (reciprocate) telescopically in and out through the front hollow interconnection part 27 of the tubular handle 26, it is shown in FIG. 1, where the place of the telescopic operation is located.

20 2- The reciprocating razor 20 inner mechanism (FIG. 2, 3):

To create the reciprocating motion of the blades head 21, a power source is required to drive the mechanism, wherein a conventional handle's tubular housing 26 of the razor 20, contains a rechargeable battery 28, powering a
drive motor 29, that drives a pinion gear 30, driving a crown gear 31, which
25 drives a camshaft 32.

The cam's 32 tapered side is pushing away a spring 33 loaded follower 34, that by its role pushes the joint block 34, which pushes the supporting arms 23, which pushes the blades head 21 in a reverse direction, in relation to the shaving forward direction, while when the cam's 32 tapered side is rotated,
30 such that the convex side of the cam 32 becomes with a slight contact with the follower 34, the follower 34 is be retarded back by the spring 33, wherein

while the follower 34 is retarded back, it pulls the blades head 21 in the same cutting direction.

During this reciprocation motion, the blades head 21 is to be moving back and forth, as a result, every time the hole razor 20 is pulled towards cutting the hair, the blades head 21 moves back and release and spread the stuck hair, while the hand of the user, and the forward reciprocation of the head 21, move the shaving head forward toward a new non cut-hair to be cut.

1- Method of operation (FIG.s (3, 4, 5)):

10 a- FIG. 4. A: Illustrates a three dimensional view for the reciprocating razor 20 forward hair cut of part of a beard on a man face, wherein the user at first locate the first edge where to cut the hair, then he shaves normally for nearly 0.5 cm – 1 cm distance, depending on the length of the hair, or quantity. It is demonstrated in the figure, how the part of the cut hair has started accumulating in-between the blades head 21, and the rest of the non-cut hair, blocking the blades 22 from cutting the blocked non-cut hair.

15
20 FIG. 4. B: Illustrates a front view for the razor's head 21 forward hair cut on part of a man face.

25 b- FIG. 5. A: Illustrates a three dimensional view for the razor 20 after starting the reciprocation option, wherein it reciprocates backward for hair release. The reciprocating option which is to be kept running for the whole shaving process. It is demonstrated here, that even the user continued dragging the razor 20 down in-between the first step in (FIG.4) and the second step in (FIG. 5), the razor's head 21 has retarded (moved backward away from the non-cut hair, wherein here the accumulated cut hair in-between the razor's head 21 and the non-cut hair, is both released from the blades 22, and spread from front of the razor's head 21.

30

FIG. 5. B: Illustrates a front view for the razor 20 reciprocating backward for hair release.

5 **c- FIG. 6. A: Illustrates a three dimensional view for the reciprocating razor 20 forward hair cut, after it is also being dragged forward by the user, once again, the user continues normally dragging the razor 20 forward, towards the non-cut hair, wherein here it is clear that a new part of the hair is cut, and a new quantity of hair has accumulated again in front of the razor's head 21.**

10 **FIG. 6. B: Illustrates a front view for the reciprocating razor 20 forward hair cut, after being dragged forward by the user.**

15 **Note 1: The user should neither keep shaving, without cleaning the razor's head 21, nor cleaning his face from the accumulated hair, but the reciprocating option here, decreases the number of times for repeating this face and razor's head flushing operation to less than 30%.**

Note 2: The reciprocating razor 20 may have a speed selector, depending on the beard thickness, and length.

20 **Note 3: The razor 20 may still have also the conventional vibration option, which works depending on the same battery and motor.**

Industrial applicability

The subject invention has the following benefits, which make it easier to be industrially applicable:

- 5 **1- All the reciprocating razor and its mechanism: the handle, motorizing mechanism, the casing, and the supporting frames can be easily manufactured from available tools and materials used successfully in the art, with easy modifications.**
- 10 **2- Modifying the conventional wet electric razor, without disturbing its final operating shape.**
- 3- For the first time, an electric wet razor can simulate perfectly the actual recommended effective and active shaving, but with a top quality controlled shaving performance than the manual one.**
- 4- Simple, easy, and cheap active electric reciprocating razor.**

Parts Drawing Index:

- 20 Electric reciprocating razor.
- 21 Blades head.
- 22 Blades.
- 5 23 Supporting arms.
- 24 Joint block.
- 25 Tubular link.
- 26 Tubular handle.
- 27 Hollow interconnection.
- 10 28 Battery.
- 29 Drive motor.
- 30 Pinion gear.
- 31 Crown gear.
- 32 Camshaft.
- 15 33 Spring.
- 34 Follower.

Claims

- 1- An electric reciprocating razor (20), comprising:
A handle casing (26);
A hollow interconnection (27);
a power supply battery (28);
a drive motor (29);
a pinion gear (30);
a crown gear (31);
a cam (32);
a spring (33);
a cam follower (34);
a telescopic tubular link (25);
a joint block (24);
a supporting arms (23);
a blades head (21).**

- 2- The electric reciprocating razor (20) according to claim 1, wherein the battery (28), drive motor (29), pinion gear (30), crown gear (31), and cam (32) are based inside a sealed handle casing (26) inside the handle of the razor (20), while the spring (33) and camshaft follower (34) are installed inside the tubular link (25).**

- 3- The electric reciprocating razor (20) according to claim 1, wherein the rotation of the drive shaft of the motor (29) drives the pinion (30), driving a crown gear (31), which drives a camshaft. The cam (32) tapered side is pushing away a spring (33) loaded follower (34), that by its role pushes the joint block (24), which pushes the supporting arms (23), which pushes the blades (22) head (21) in a reverse direction, in relation to the shaving forward direction, while when the cam (32) tapered side is rotated, such that the convex side of the cam (32) becomes with a slight contact with the follower (34), the follower (34) is to be retarded back by the spring (33), wherein while the follower (34) is retarded back, it pulls the razor (20) head (21) in the same cutting direction.**

- 4- The electric reciprocating razor (20) according to claim 1, wherein the razor's head (21) when pulled towards cutting the hair, it also reciprocates backward and release and spread the prior stuck and accumulated hair from a prior cutting process hair, then while the hand of the user, and the forward reciprocation of the razor's head (21), move the shaving head (21) forward toward a new non cut-hair, the new non-cut hair is cut., and so on, simulating perfectly an actual manual reciprocating shaving.**
- 5- The electric reciprocating razor (20) according to claim 1, wherein the blades head (21), supporting arms (23), joint block (24), and the tubular link (25), reciprocate as one block relative to the handle of the razor (21), such that the tubular link (25) moves from one side forward and backward (reciprocate) telescopically in and out through the hollow interconnection part (27) of the tubular handle (26), while its is moving from another side forward and backward pushing and pulling the joint block (24), which performs the same action on the razor head (21) via the support arms (23).**

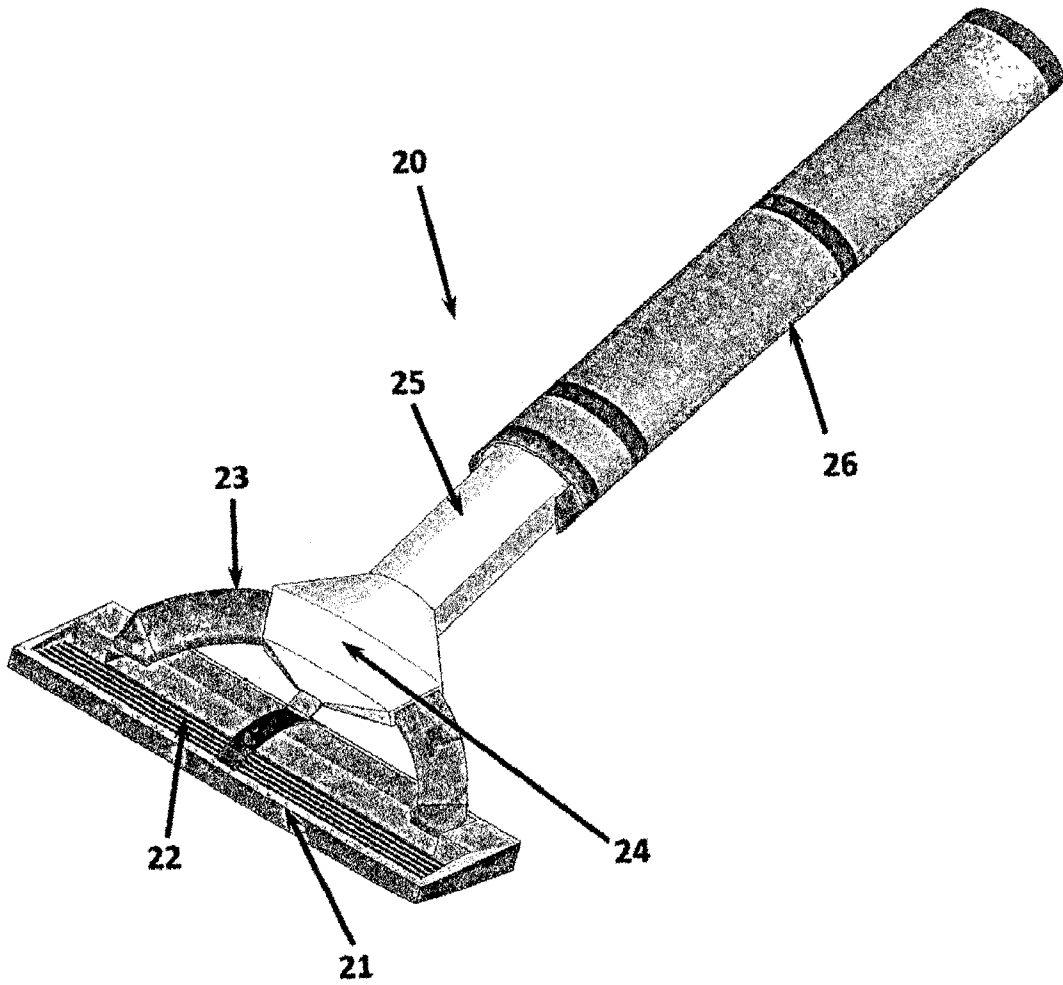


FIG.1

2/4

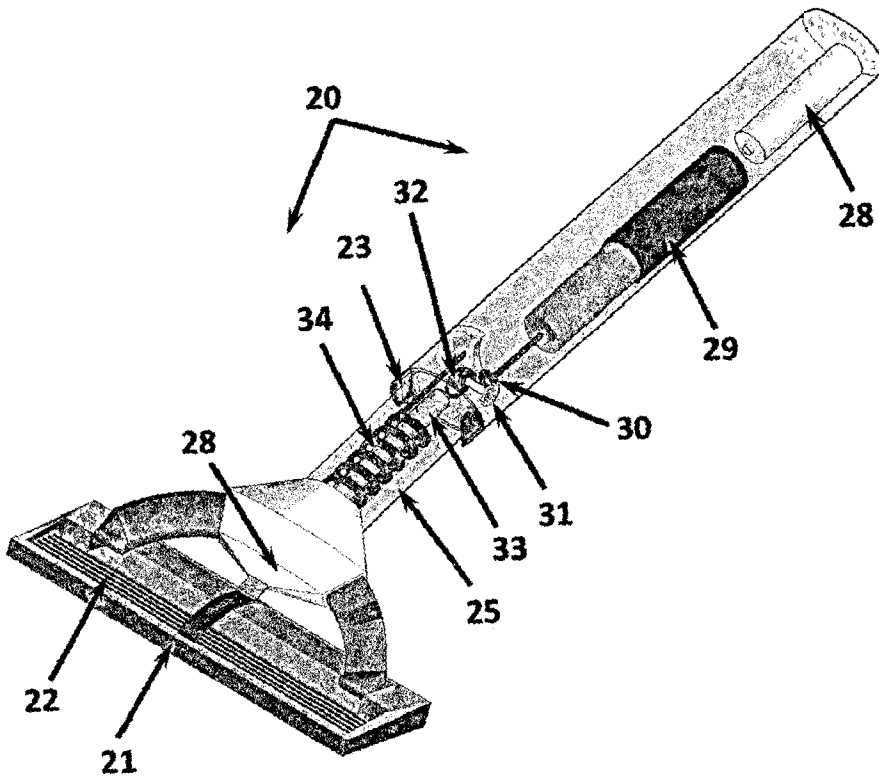


FIG. 2

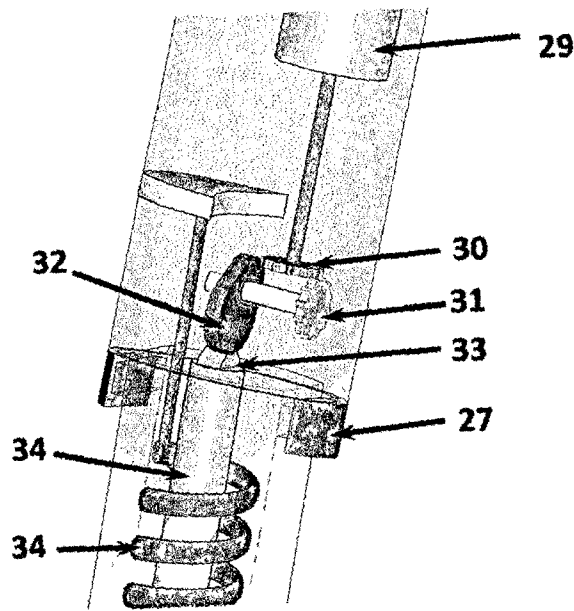


FIG. 3

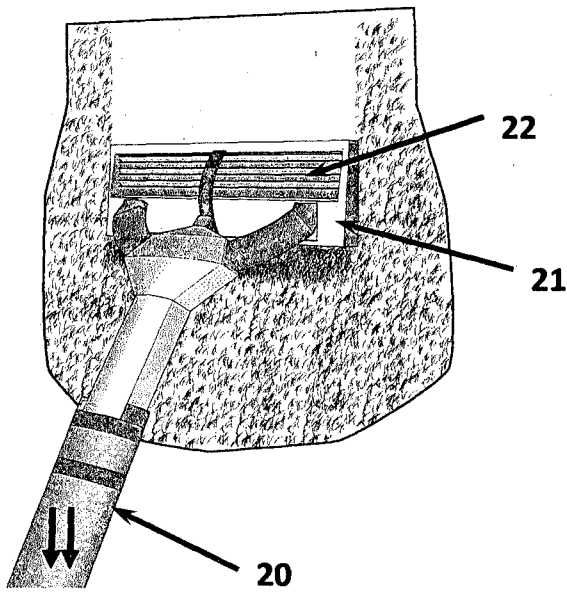


FIG. 4- A

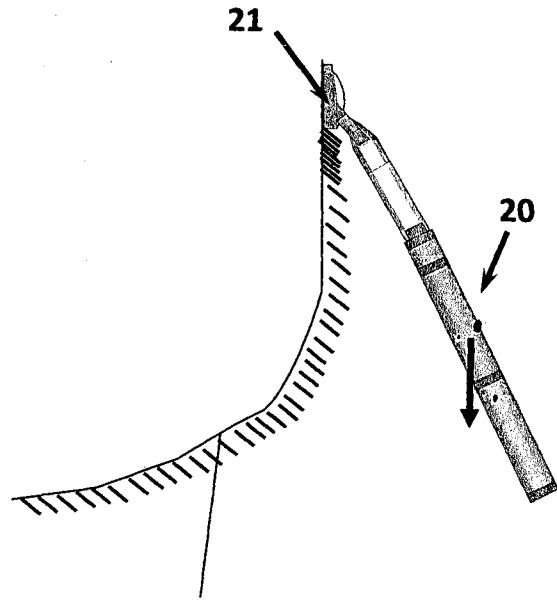


FIG. 4- B

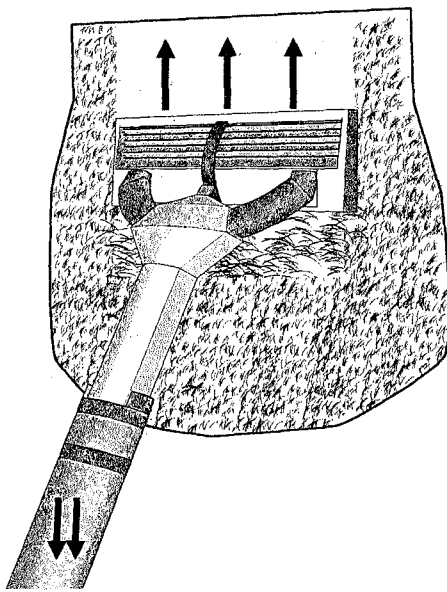


FIG. 5- A

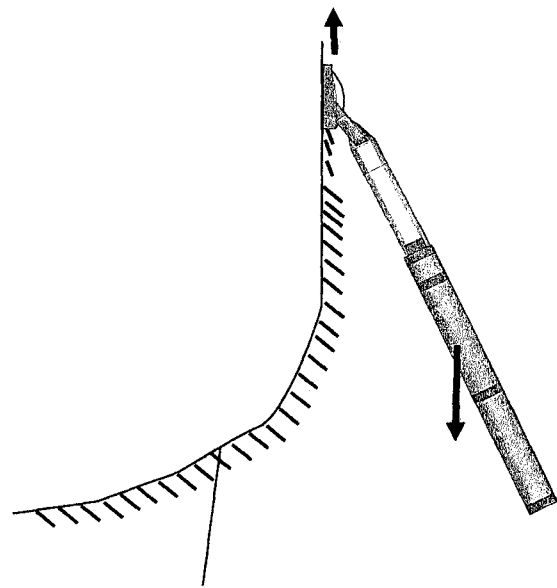


FIG. 5- B

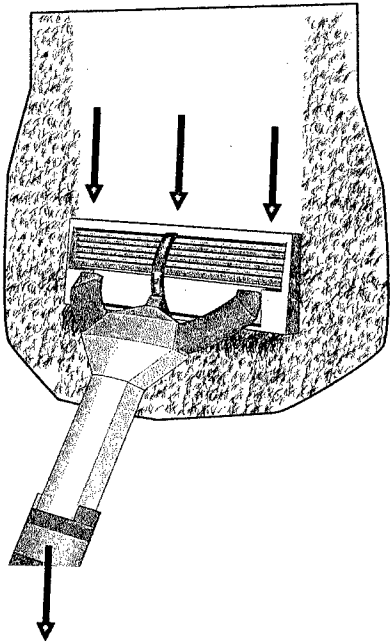


FIG. 6- A

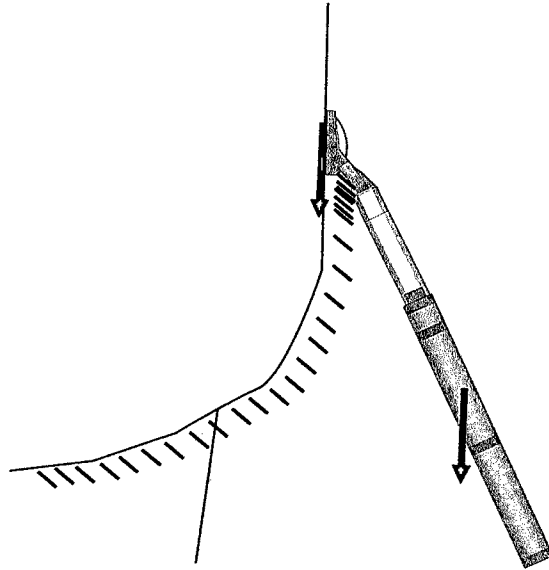


FIG. 6- B