Nov. 17, 1970 M. A. MORET ET AL 3,541,485

CONTROL DEVICE FOR ELECTRICAL BODY CARE

Filed July 8, 1968

FIG. 1

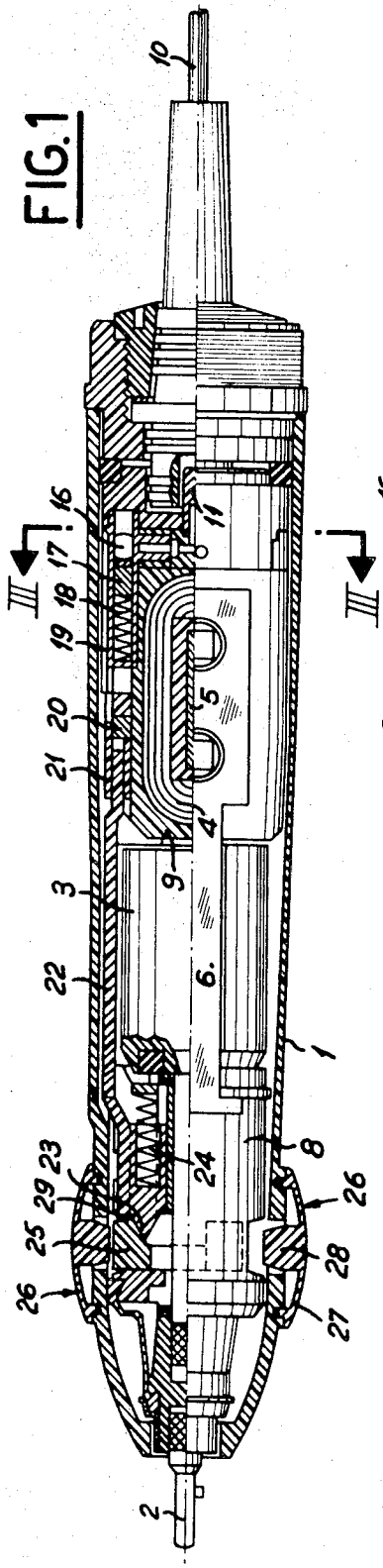


FIG. 2

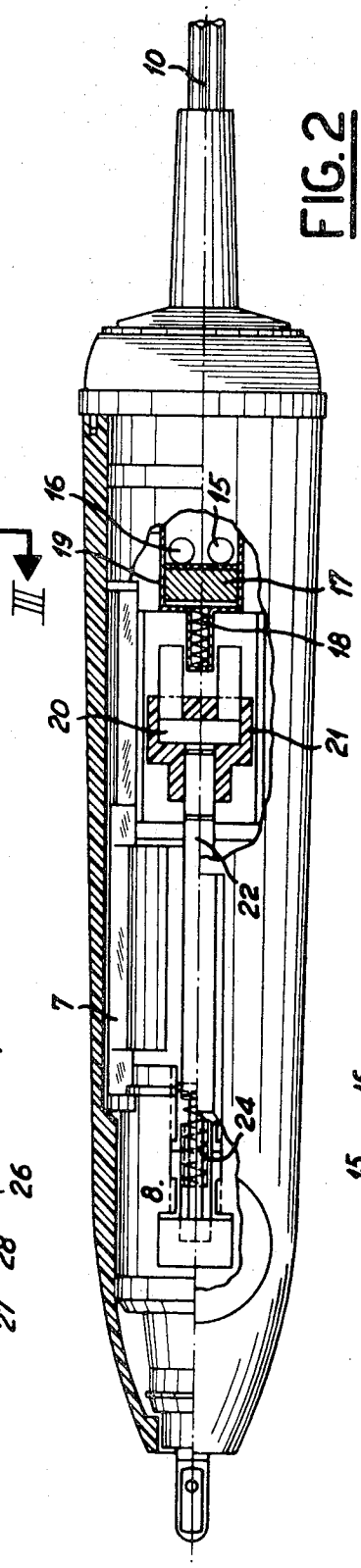
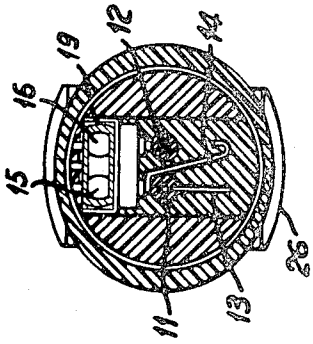


FIG. 3



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CONTROL DEVICE FOR ELECTRICAL BODY CARE

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U.S. Cl. 335—205 3 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure concerns a control device for an electrical body care apparatus having a source of magnetic flux formed by a permanent magnet slidingly mounted inside the casing of the apparatus, with means provided for bringing said magnet into two positions, one for opening and the other for closing an operating switch. The latter comprises a waterproof housing containing a pair of contact terminals and a bar of magnetizable material having a conductive surface facing the terminals. The bar is actuated by the magnet, and is slidably guided by the walls of the housing between limits determined by the contact terminals and an end wall of the housing.

This invention is concerned with a control device for an electrical body care device and constitutes an improvement over that disclosed in co-pending application Ser. No. 638,997 (Swiss patent application No. 7,413/66) which has for subject a control device for an electrical body care apparatus comprising a switch with magnetic contact blades and at least one source of a magnetic flux for the control of this switch.

The present invention has for its object an improvement over the device of that application wherein the source is formed by a permanent magnet slidingly mounted inside the casing of the apparatus, means being provided for bringing said magnet into two positions, one for the opening and the other for closing the switch.

The accompanying drawing represents by way of example one embodiment of the present invention.

FIG. 1 is a partial longitudinal cross section of an apparatus for body care seen from one side.

FIG. 2 is a partial longitudinal cross sectional view of this apparatus seen from above.

FIG. 3 is a cross section taken along line III—III of FIG. 1.

The body care apparatus shown in the drawing comprises a casing **1** and in said casing means for driving an accessory, for example a tooth brush, which can be secured at the end of shaft **2**. The other end of this shaft is attached on a cylindrical rotor **3** of an oscillating electric motor comprising an energizing coil **4** surrounding a core **5**, the core having two pole pieces **6** and **7** extending to and partially encircling a rotor **3**. One of the extremities of each of pole pieces **6**, **7** is fixed on the edge of an element **8** of insulating material in which is pivoted shaft **2**, while the other extremity of each piece is secured to core by a mass of insulating material **9** in which is also embedded the coil **4**.

The supply cord **10** comprises two wires **11** and **12**. As shown in FIG. **3**, the wire **11** is directly connected to one end **13** of coil **4**, while wire **12** is connected to the other end **14** of the coil through the switch of the invention. Specifically, wire **14** is connected to the lower end of terminal **15** and wire **12** is connected to the lower end of terminal **16** of the switch.

This switch is constituted by fixed conductive terminals

15 and **16** which can be connected by a movable bar **17**. This bar is made of magnetizable material and the side thereof in contact with the terminals is covered with a good conductor in order to obtain a better contact when the bar is held against terminals **15** and **16** under the urging of helical spring **18**.

Terminals **15** and **16** extend into a watertight housing **19** of insulating material, and bar **17** and spring **18** are mounted therein. The connections of wires **11**, **12** to terminals **15**, **16** are embedded in insulating material, and this may be part of the mass of insulating material **9** in which coil **4** is embedded. This arrangement makes it possible to prevent all dangers of penetration of water or water vapor into the parts of the apparatus receiving a voltage.

Magnetizable bar **17** is subjected to a magnetic field emanating from a permanent magnet **20** which can slide longitudinally and which is located between pole pieces **6** and **7** on a flat section of the insulating mass **9** of the coil.

Magnet **20** has the shape of a U and its two poles are disposed on each side of spring **18** outside the watertight housing **19**. This magnet is attached by an insulating piece **21** to a rod **22** mounted for longitudinal movement inside casing **1**. Rod **22** terminates in a point **23** and is subjected to the urging of a spring **24** which presses the point **23** against a sliding piece **25**.

Piece **25** slides perpendicularly to the axis of the apparatus and is controlled by two pushers **26** constituted by a flexible element **27** the periphery of which is fluid-tightly secured to casing **1** and which has in its central part a pusher head **28** passing through the casing in a corresponding opening.

With the slide **25** in its upper position as seen in FIG. 1, rod **22** is to the left and permanent magnet **20** is away from housing **19**, thereby allowing bar **19** to be held against contact terminals **15**, **16** by spring **18** and closing the circuit to coil **4**. When the slide is moved to its lower position, the inclined surface thereof bearing against point **23** moves rod **22** to the right. This moves permanent magnet **20** toward the housing **19**, thereby producing a sufficient magnetic attraction on bar **17** to pull it away from contact terminals **15**, **16** and open the circuit.

It is thus possible by simple pressure on one or the other of pushers **26** to command the starting or the stopping of the apparatus.

In a modification, there can also be provided to actuate a magnetizable part located on the side of the terminals opposite the movable magnet, that is to say by inverting the system.

Any other system for moving the rod is also possible. It would be possible for example to effect the command of this rod by means of a bistable switch operated from outside the casing.

As will be appreciated from the foregoing description and the drawings, the switch mechanism is very simple. Permanent magnet **20** moves rectilinearly toward and away from one end of the waterproof housing **19**. Fixed contact terminals **15** and **16** in the housing **19** are spaced apart laterally of the direction of movement of magnet **20**. The bar **17** is slidably guided by the walls of housing **19** for rectilinear movement in the same direction as magnet **20**, between limits determined by the contact terminals **15**, **16** and the adjacent end wall of the housing. Spring **18** biases bar **17** toward the limit of travel away from magnet **20**. Movement of magnet **20** toward the housing **19** pulls bar **17** to its limit of travel nearer the magnet, and movement of the magnet away from the housing allows bar **17** to return to its other limit.

What is claimed is:

1. In an electrically operated hand appliance including a casing, an electric motor mounted within said casing,

and connecting means for connecting said appliance to an external power source, switch means mounted in said casing for making and breaking a circuit between said connecting means and motor which comprises

(a) a watertight housing of insulating material,

(b) a permanent magnet,

(c) mounting means for mounting said permanent magnet externally of said watertight housing for substantially rectilinear movement in a predetermined direction toward and away from one end of the housing,

(d) a pair of fixed contact terminals in said housing spaced apart laterally of said predetermined direction,

(e) a bar of magnetizable material in said housing between said contact terminals and an end wall of the housing and having a conductive surface facing the contact terminals,

(f) said bar being slidably guided by the walls of said housing for substantially rectilinear movement in said predetermined direction between limits determined by said contact terminals and the adjacent end wall of the housing,

(g) a spring mounted within said housing for biasing said bar toward the limit of travel away from said permanent magnet,

(h) said permanent magnet and said bar being arranged and adapted so that movement of the magnet toward said housing pulls the bar to the limit nearer the magnet and movement away from the housing allows the bar to return to the other limit,

(i) and actuating means for moving said permanent magnet toward and away from said housing.

2. Apparatus in accordance with claim **1** in which said bar of magnetizable material is located between said contact terminals and the end of said waterproof housing toward said permanent magnet, and said permanent magnet has a pair of poles forming a U-shaped structure with the poles facing said bar.

3. Apparatus in accordance with claim **2** in which said spring is a compression spring mounted in a projection of said housing lying between the poles of the U-shaped permanent magnet.

References Cited

UNITED STATES PATENTS

2,767,278	10/1956	Collins	335—302 X
3,020,366	2/1962	Dolph	200—51.16
3,176,097	3/1965	Wood	335—205 X
3,316,379	4/1967	Clarke, et al.	

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200—51.16, 168