CONTROL SWITCH FOR AN ELECTRIC DRY RAZOR

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FIG. 1

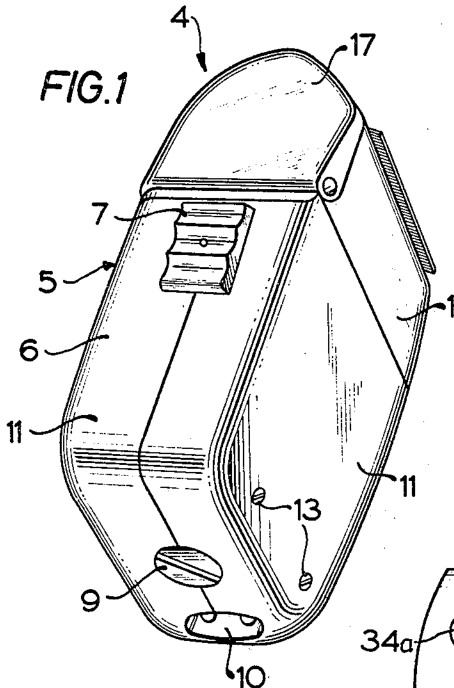

FIG. 2

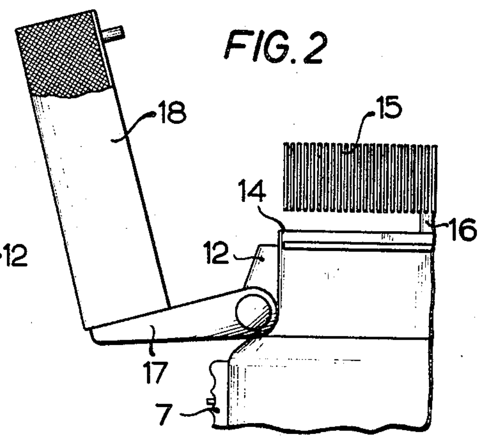

FIG. 5

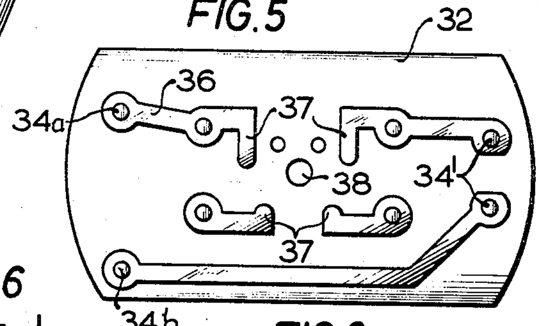

FIG. 7

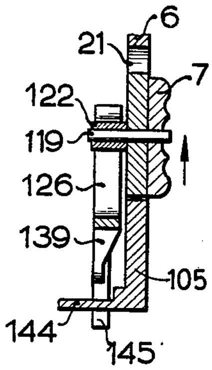

FIG. 6

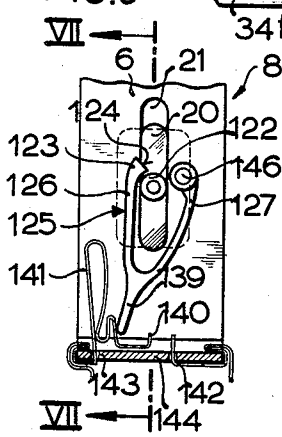

FIG. 8

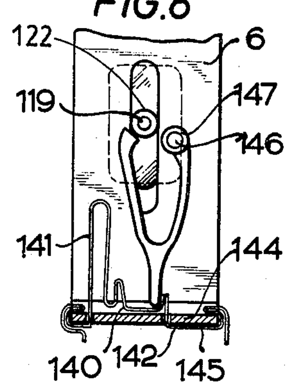

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FIG. 3

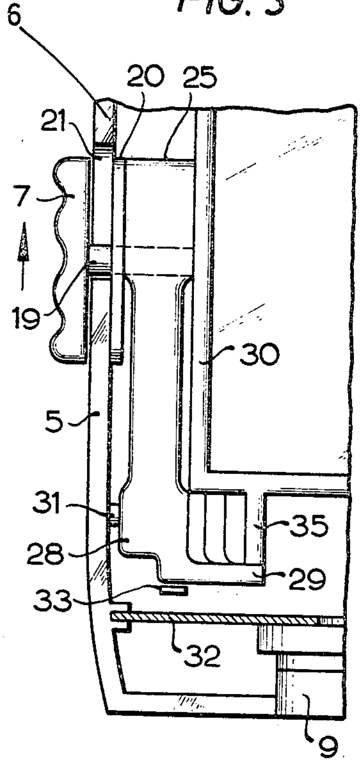
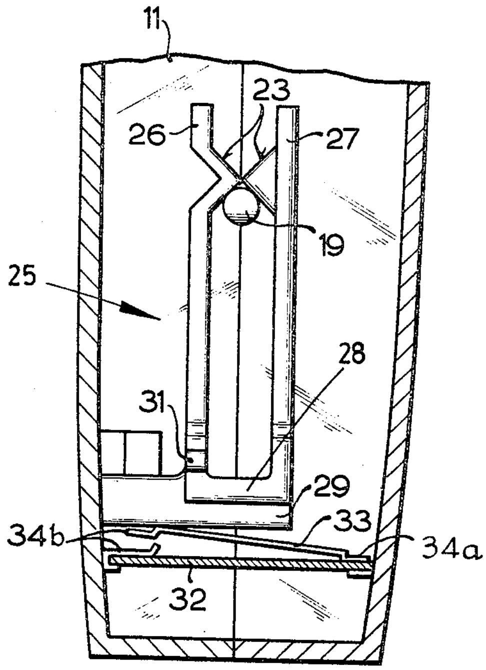


FIG. 4



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CONTROL SWITCH FOR AN ELECTRIC DRY RAZOR

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U.S. Cl. 200—154 11 Claims

ABSTRACT OF THE DISCLOSURE

A control switch for an electric dry razor having an operating knob with a lug secured thereto the lug co-operating with a wedge-shaped projection on a control member to urge the member to one or other of spaced positions to open or close a pair of electrical contacts controlling a motor for the razor. The member may slide in the casing or be pivoted and rockable.

BACKGROUND OF THE INVENTION

The invention concerns a control switch for an electric dry razor having an on-off switch separate from the cable connection. In known devices of this type long connecting leads have been provided between the on-off switch and the cable connection.

The invention is intended to mitigate this disadvantage and further to improve devices of the type mentioned above.

SUMMARY OF THE INVENTION

The wedge-shaped projection of the spring or control member advantageously lies with a wedge face against the lug on the control or operating knob so that a component of the reaction force acting on the spring member is active in the direction of movement of said one contact. If the control knob is moved with its lug over the peak of the projection of wedge shape there occurs a reversal of the reaction component acting in the direction of movement of said one contact and the spring member jumps with the shifter bar into its extreme position, in the opposite direction to the direction of movement of the control knob. In this way a snap action is achieved for the switch by using simple mechanically robust structural members.

The arrangement makes do with a plate on which the electrically conductive connections for the on-off switch and a voltage selector switch are combined structurally. The structural combination is achieved by securing or impressing the conductive connections together with the contacts of the on-off switch, tthe voltage selector switch and the cable connection onto tthe plate. In a preferred embodiment the voltage selector switch is disposed centrally of the plate and the plate is provided at one end with connections to said pair of contacts for the on-off switch and at the other end with the contacts, in particular contact pins, for the connection cable to an electrical power supply.

The spring member is with advantage fork-shaped. It is also possible to provide the lug on the control knob with one or more rollers in order to reduce the friction between the spring member and the lug on the control knob. The spring member may be adapted to slide or formed as a pivoted rocker. A slide must be appropriately guided in the casing to prevent it moving in undesired directions.

A rocker must be appropriately mounted for pivotal movement and co-operates with said one contact of the pair of which is adapted to slide. The pivot is with advantage mounted at one arm of the member. The other arm of the spring member formed as a rocker co-operates

with the lug on the control knob through its wedge shaped projection. Linear movement of the control knob over the peak of the wedge-shaped projection of the spring member causes a sudden rotary movement of the spring member about its pivot with the movable contact until a limit is reached, resulting in a rapid opening or closing of said pair of switch contacts.

DESCRIPTION OF DRAWINGS

Further details of the invention are illustrated by means of the drawings; two embodiments of the invention are shown in the drawings in which:

FIG. 1 is a perspective view of a dry razor having a control switch, in longitudinal view,

FIG. 2 shows a dry razor with the top open,

FIG. 3 is an elevation of the razor with half the casing removed,

FIG. 4 is a sectional side view,

FIG. 5 is an underneath plan view of a switch plate,

FIG. 6 is a longitudinal cross-section of a further embodiment showing the switch in the off position,

FIG. 7 is a cross-section taken along the line VII indicated in FIG. 6, and

FIG. 8 is a view corresponding to FIG. 6 with the switch in the on position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings like references denote like parts and only the parts of a dry razor **4** which are necessary for comprehension of the invention are shown. The dry razor **4** has as a handle, an elongated casing **5** which has on one wall **6** a control knob **7** for an on-off switch **8** and has on the underside of the casing **5** a voltage selector switch **9** and recessed connection pins **10**. The casing **5** is divided into two shell halves **11** which are secured together by means of a casing head **12** and in the lower region by means of screws **13**.

The casing head **12** is sealed by a plate **14** and is set on both shell halves **11** together with a cutter head **15**. The casing **5** encloses an electrical drive with an oscillating armature motor, the swing arm **16** of which is visible and projects into the casing head **12** through an opening in the plate **14**. On the casing head **12** there is mounted a carrier bracket **17** being hinged to open in a lateral direction.

The control knob or operating member **7** is provided with an inwardly directed lug **19**, and is adapted for displacement in a slot **21** provided between the two shell halves **11**, as may be seen from FIG. 3. The lug **19** carries a retaining plate **20** at the inside of the casing **5** and co-operates with a U-shaped spring member or control member **25** via at least one projection **23**. In FIGS. 3 and 4 the U-shaped member **25** is in the form of a slide, is guided in the casing **5** in the longitudinal direction and is manufactured in one piece with two parallel arms **26**, **27** and a base **28** from a body of synthetic material. The base **28** has a lug **29**, projecting beneath a frame **30** for the oscillating armature motor and co-operating with a stop **35** to limit downward movement of the member **25**, and is supported by a lug **31**, slidable against the inner wall of the casing **5**. The arms **26**, **27** each bear one of the projections **23** defined by inclined surfaces.

The member **25** co-operates at its bottom end with a switch plate **32**, arranged in the lower region of the casing **5**, and bearing a contact arm **33** shown in the "off" position which in an "on" position bridges across two contacts **34**_a_ and **34**_b_ on the switch plate **32**. When the member **7** is actuated, the lug **19** is moved over the peaks of the projections **23**, resulting in a reversal of the reaction component acting on the contact arm **33** caused by spring action of the member **25** and the inclined surfaces of the projections **23**. The member **25** thus moves rapidly with the contact arm **33** into its opposite extreme position as soon as the lug **19** has moved past the peaks of the projections **23**. A movement of the actuating knob **7**, in the direction indicated by the arrow in FIG. 3, causes movement of the switch member **33** in the opposite direction and thus closes the switch contacts **34**_a_ and **34**_b_.

The contacts **34**_a_ and **34**_b_ are secured at one end on the switch plate **32**, and are conductively connected at the opposite end of the switch plate **32** to two socket members **34'** (FIG. 5) for the connections pins **10**, by printed circuit members **36**. Pairs of contact members **37** are mounted on plate **32** and the voltage selector switch **9**, which is of a known construction, and is mounted for rotation with its axis in a hole **38** is the switch plate **32**.

In FIGS. 6 to 8 a fork-shaped control member **125** of the on-off switch **8** having arms **126**, **127** and a stem operating portion **139**, is mounted in a casing **105** for pivotal movement about the arm **127**. The other arm **126** co-operates with a roller **122** carried by a lug **119** secured to the operating knob **7**, via a projection **123** with inclined planes **124** provided on the arm **126**. The stem **139** co-operates with a movable contact member **140** formed as a slide, the contact member **140** is formed in one piece with a U-shaped spring **141** and co-operates with a stationary contact **142**. The U-shaped spring **141** and the stationary contact **142** are secured by bent over portions **145** in slots **143** in a base plate **144**. The fork-shaped member **125** acts as a rocker and is mounted on a pin **146** which is secured in the casing **105** parallel to and at a spacing from the roller **122**. Flanges **147** are provided at opposite ends of the pin **146**, one of which flanges **147** serves for fastening the pin **146** to the casing **5**.

Movement of the operating knob **7** upwardly as shown causes the roller **122** to ride over the projection **123** and the fork-shaped member **125** to pivot in an anti-clockwise direction from the position shown in FIG. 6 to the position shown in FIG. 8. Such movement effects contact between the movable contact **140** and the stationary contact **142** to energise the motor.

As already mentioned, the figures only show embodiments of the invention by way of example and the invention is not intended to be limited of these embodiments; on the contrary other embodiments and uses are also possible. Particularly the arms **126** and **127** may be in the form of leaf springs and be set into the base **128**. The inclined faces of the projection **123** may also be steeper or flatter according to the particular closing strength desired for the switch contacts.

I claim:

1. A switch, comprising, in combination, support means; a pair of contact means mounted on said support means for opening and closing a circuit connected to said contact means; an operating member mounted on said support means movable along a predetermined path between two end positions; and a control member mounted on said support means movable between a first and a second position, said control member having an operating portion cooperating with one of said contact means for opening said circuit in one of the positions of the control member and for closing said circuit in the other position thereof, said control member including a pair of arms connected at one end to each other and at least one of said arms being resilient and carrying in the region of the free end thereof a wedge-shaped projection projecting toward the other arm, said wedge-shaped projection being located in the path of said operating member and resiliently engaging with one face thereof said operating member when the latter is in one of its end positions so that said control member is held in one of its positions and the apex of said projection snaps over said operating member during movement of the latter from said one to the other of its end positions so that the other face of said wedge-shaped projection resiliently engages said operating member to move thereby said control member to the other of said positions thereof.

2. A switch as defined in claim **1**, wherein both arms of said control member are resilient and each carrying in the region of the free end thereof one of said wedge-shaped projections projecting toward each other, said operating portion being in the region of the connected ends of said arms, said operating member being in one of said end positions thereof located between said arms.

3. A switch as defined in claim **1**, wherein said control member is made of insulating material.

4. A switch as defined in claim **2**, wherein said control member is mounted on said support means moveable in direction of said path of said operating member, and including stop means on said support means for limiting movement of said control member in one direction.

5. A switch as defined in claim **4**, wherein said pair of contact means comprises a fixed contact and a resilient contact resiliently engaging said operating portion of said control member to urge the latter in engagement with said stop means.

6. A switch as defined in claim **1**, wherein said control member is pivotably mounted on said support means.

7. A switch as defined in claim **6**, said projection being provided on the free end of one of said arms and the other of said arms being at the free end thereof connected to said support means pivotable about a fixed pivot axis, said operating portion of said control member projecting from the connected ends of said arms in engagement with one of said contact means, and said operating member being in one of the end positions thereof located between said arms.

8. A switch as defined in claim **7**, wherein said one contact means is resilient and biases said control member means and said control member are located, and said operating member comprises an operating knob outside

9. A switch as defined in claim **1**, wherein said support means comprises a casing in which said contact for pivotal movement in one direction about said pivot axis.

of said casing and a lug extending through a slot in said casing into the interior of the latter and cooperating with said at least one projection on said control member.

10. A switch as defined in claim **9**, wherein said lug comprises a roller cooperating with said at least one projection.

11. A switch as defined in claim **9** wherein said support means comprises further an insulating plate extending transverse to said casing, said pair of contact means being mounted on said insulating plate and said circuit being at least in part formed by a printed circuit on said insulating plate, and including connecting means on said casing for connecting said circuit to a supply of electrical energy.

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