May 30, 1950 L. IRRGANG 2,509,868

DRY SHAVER MOTOR

Filed Oct. 29, 1948

Fig. 1.

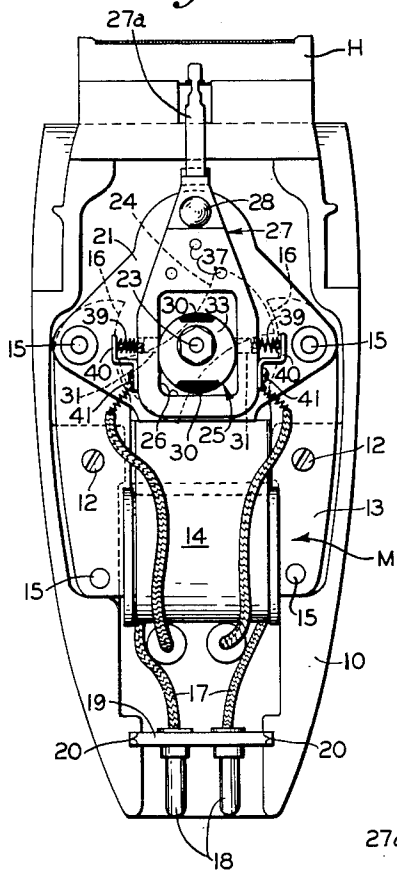


Fig. 2.

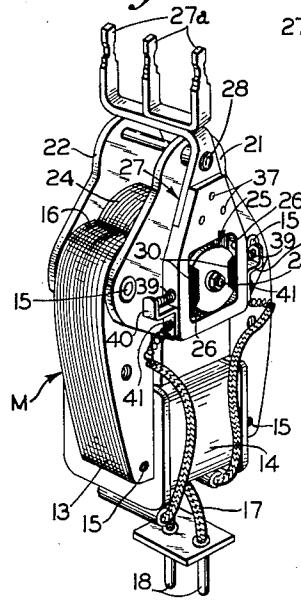


Fig. 3.

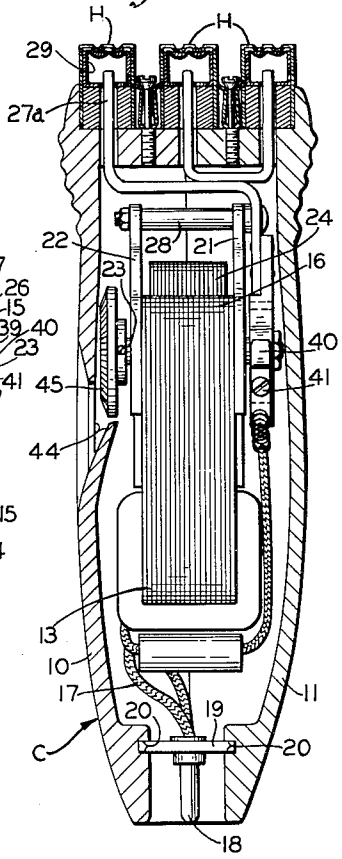


Fig. 4.

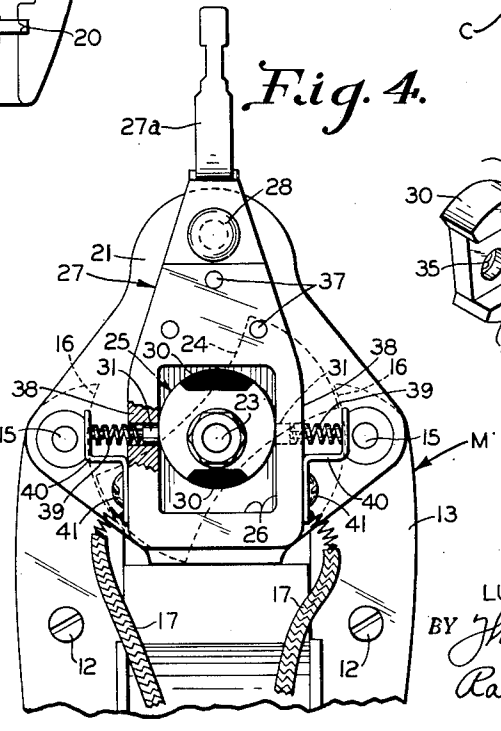


Fig. 5.

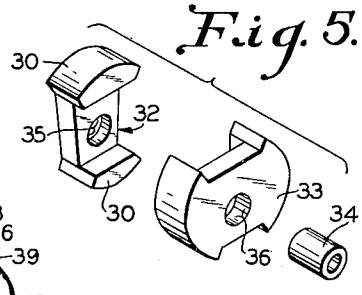
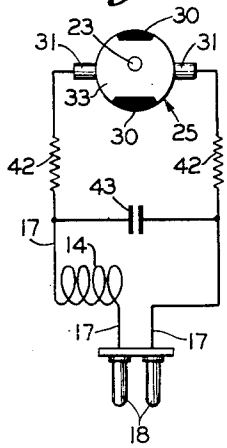


Fig. 6.



INVENTOR.
LUDWIG IRRGANG
BY Thomas S. Ross
Ralph E. Bitner.
ATTORNEYS.

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DRY SHAVER MOTOR

Ludwig Irrgang, Jersey City, N. J., assignor to Remington Rand Inc., New York, N. Y., a corporation of Delaware

Application October 29, 1948, Serial No. 57,368

3 Claims. (Cl. 172—36)

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This invention relates to electric dry shavers, and more particularly to combined and simplified means for oscillating the inner reciprocable cutters of the shaving heads and for periodically interrupting the energization of the shaver motor field coil.

The invention comprehends an improved shaver construction that will facilitate more economical manufacture; provide better timing of the motor by eliminating the conventional contact arms and points; provide a quieter motor; provide a motor having fewer parts; and provide a more reliable, and thinner motor, together with other features hereinafter described.

In the drawing:

Fig. 1 is a side elevational view of a shaver in accordance with this invention with the cover section of the casing removed to show the motor assembly in side elevation.

Fig. 2 is a perspective view of the motor mechanism removed from the casing.

Fig. 3 is a vertical transverse cross-sectional view through the casing and cutter heads showing the motor mechanism in end elevation.

Fig. 4 is an enlarged fragmentary side elevational view of the motor mechanism shown in Fig. 2.

Fig. 5 is an exploded perspective view of the motor shaft eccentric, and

Fig. 6 a wiring diagram of the motor circuit.

The electric dry shaver to which the present invention has been applied comprises a conventional housing or casing C which provides the handle for holding the shaver and manipulating it during shaving operations. Casing C as shown, is molded or otherwise formed of suitable material and comprises the conventional main body section 10 and a removable cover section 11. The upper end of casing C is provided with a channel structure of rectangular form to which the cutter heads H are mounted in a well-known manner, for example as shown in U. S. Patent 2,331,453 to L. C. Carissimi.

The shaver motor, designated as a whole by reference character M, is shown mounted within casing C in Figs. 1 and 2, and is preferably secured to body section 10 by suitable screws 12. The motor comprises a substantially U-shaped core 13, preferably built up of steel laminations and shaped to receive the magnetizing coil 14 wound around the base thereof. These laminations are secured together in any suitable manner, as by riveting indicated at 15 in Figs. 1, 2 and 4, and the legs thereof are shaped to provide the poles 16. Current supply leads 17 for the

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coil 14 are connected to a pair of terminal prongs 18 mounted on a suitable insulating plate 19 received by groove 20 in casing C in the conventional manner. Connection to these terminals may be made by means of any suitable connector plug forming part of the current supply cable commonly employed with dry shavers.

Secured to opposite sides of core 13, so as to enclose the pole faces from the sides, are a pair of insulating plates 21 and 22 which may be secured thereto by two of the rivets 15 as shown, or other suitable fastening means. Journaled in these plates is a motor shaft 23 which extends transversely of the longitudinal axis of core 13. Mounted on this shaft between the insulating plates 21—22 is a suitably shaped armature 24 preferably comprising a plurality of steel laminations secured together. Peripheral ends of the armature are shaped to move in a circular path in close proximity to the pole faces 16. Also secured to shaft 23, adjacent the outer surface of plate 21, is an eccentric 25 which lies within an elongated opening 26 formed in the lower end of driving lever 27. This lever is pivotally mounted upon one end of pivot pin 28 which is mounted near the upper ends of plates 21—22 as will be clear from Figs. 2 and 3.

It will now be clear that when eccentric 25 is rotated by motor shaft 23, lever 27 will be rocked upon its pivot pin 28 and its arms 27a will reciprocate the inner cutters 29 of heads H in the usual and well-known manner. According to the present invention, eccentric 25 also serves as a part of the means for periodically interrupting the energization of the magnetizing or motor field coil 14. This is accomplished by providing the peripheral surface of eccentric 25 with spaced-apart insulating elements 30 which serve to make and break the current supply to coil 14 in conjunction with a pair of brushes 31 carried by lever 27, similar to an electric commutator in a manner presently described.

One construction which may be used for the eccentric 25 is shown in Fig. 5 as comprising two inter-locking elements 32 and 33, element 32 being made of insulating material and element 33 of current conducting material. It is important that motor shaft 23 be insulated from element 33 when eccentric 25 is secured to said shaft for rotation therewith. To this end, an insulating bushing 34 is inserted into aligned holes 35—36 in elements 32—33 respectively, as clearly illustrated in Fig. 5. As is clear from Figs. 2 and 4, the lower portion of driving lever 27, or that portion having the opening 26, is

formed from insulating material and secured to the upper portion in any suitable manner, for example by rivets 37.

Referring now to the current interrupting mechanism for the motor circuit, attention is directed to Fig. 4, which illustrates a portion of the lower end of lever 27 broken away to show the pair of brushes 31 previously referred to. These brushes are oppositely disposed and slideably supported within openings formed in the vertical arms 38 of driving lever 27, and are resiliently pressed against the peripheral surface of eccentric 25 by springs 39. The springs are supported by suitable means in the form of brackets 40, the latter being secured to the lever 27 by screws 41.

From the wiring diagram of Fig. 6, it will be clear that energization of coil 14 takes place during the time element 33 of eccentric 25 engages the brushes 31—31, and that the circuit to the coil is broken and the coil de-energized during the time element 32 of eccentric 25 engages the brushes. The brushes are connected in series with the coil 14 by means of the leads 17, each of which have a resistor 42, and the leads are shunted by means of condenser 43 to reduce sparking all in accordance with well-known practice.

It will be apparent from Fig. 3, that body section 10 of casing C is provided with an opening 44 through which a knurled wheel 45 may be engaged by the thumb to effect rotation thereof. This wheel is suitably secured to motor shaft 23, adjacent the outer face of plate 22, and is employed, as is well known, for purposes of starting the motor in the event that it stops after previous use in a position wherein the brushes 31 engage insulating element 32 of eccentric 25, thereby breaking the circuit which includes the field coil 14.

An important advantage of the construction above described will be realized when consideration is had of the device in use. For example, by the use of the commutator eccentric 25 and brushes 31, instead of the conventional cam operated contact points, the requirement for fine adjustment of the contact point opening is eliminated. A further advantage of an arrangement of this type is that by combining the means for rocking the driving lever 27 with the means for periodically interrupting the energization of field coil 14, a reduction in the number of motor parts is made possible, and as these two mechanisms lie in the same vertical plane, it is possible to reduce the overall thickness of the shaver to some

extent, and effect more economical manufacture and assembly. A still further advantage of the described shaver construction is that the commutator type of current interrupter for the motor field coil operates with little or no noise compared with the conventional make and break contact point current interrupters.

While there have been shown and described and pointed out the fundamental novel features of the invention by means of a single illustrative embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

The invention claimed is:

1. In a dry shaver motor of the type described, the combination of a motor shaft; an eccentric cam mounted upon one end of said shaft for rotation therewith; a lever actuated by said cam for transmission of power; and a current interrupter carried by said cam and lever.

2. In a dry shaver of the type having a cutter assembly composed of an outer stationary cutter and an inner movable cutter, the improvement which comprises the combination of a motor; a motor shaft; an eccentric cam fixed for rotation with said shaft; a pivoted driving lever rocked by said cam to impart a reciprocating motion to said inner cutter; and a current interrupter for said motor carried by said cam and lever respectively.

3. In a power-operated dry shaver of the class described having in combination a motor, a motor shaft, an electrical circuit for said motor, and a current interrupter for said motor circuit including an eccentric mounted on said shaft and composed of two interlocking elements, one of which is formed from an insulating material and the other of which is formed from a current conducting material.

LUDWIG IRRGANG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,343,705	Rand	Mar. 7, 1944