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[54] **SHAVER**
1 Claim, 6 Drawing Figs.

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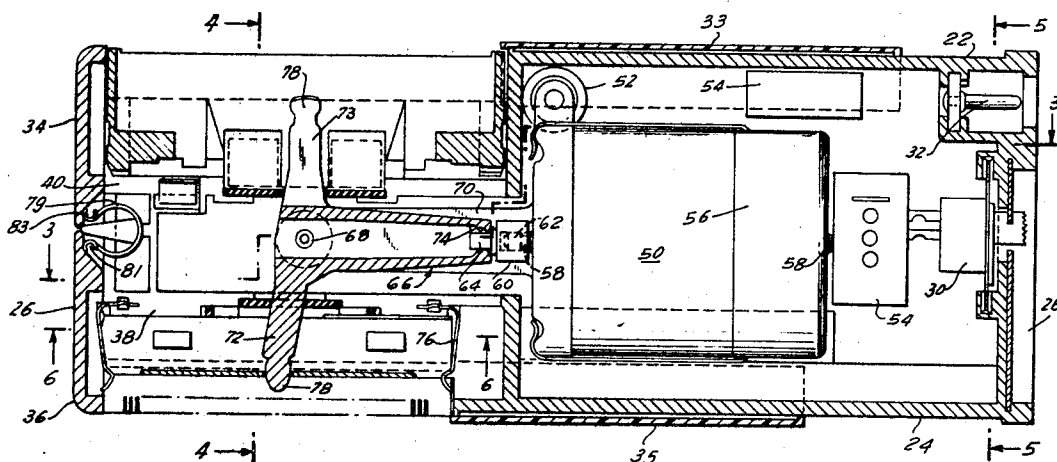
[50] Field of Search **30/43.91,**
43.92, 90, 34.1, 43.2

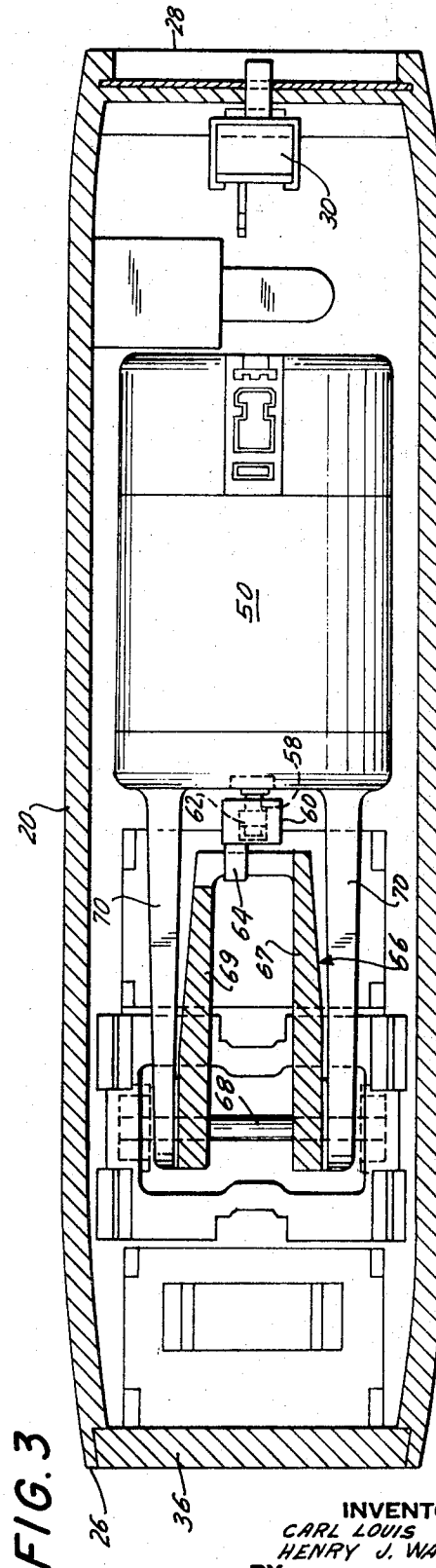
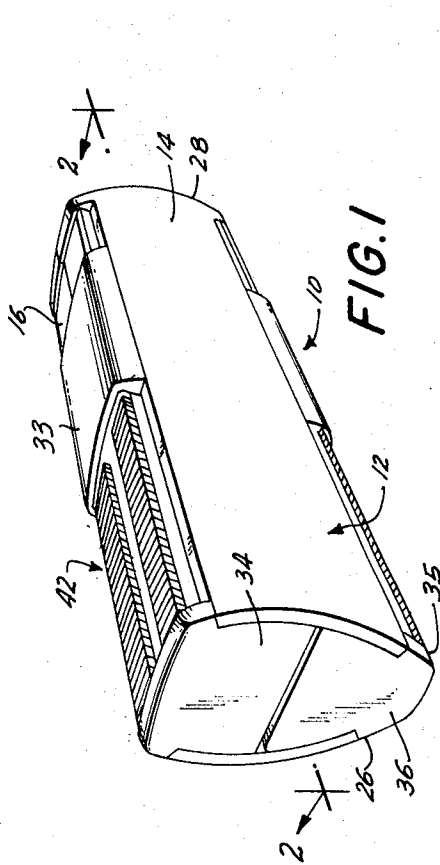
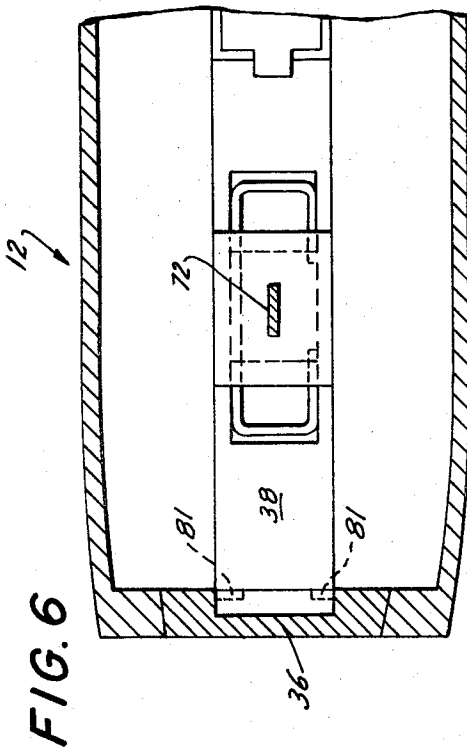
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ABSTRACT: An electric shaver is provided with one or more shaving heads disposed parallel to the shaver motor longitudinal axis. The shaver motor drives an eccentric shaft head which oscillates the opposed tips of an actuator which engage and drive moveable cutters of the shaving heads. The shaver is provided with slidable covers for covering the head or heads when not in use.





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FIG. 4

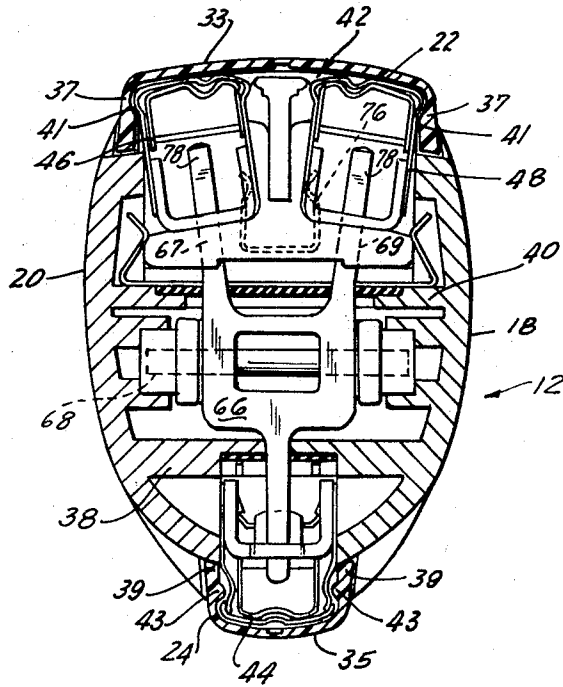
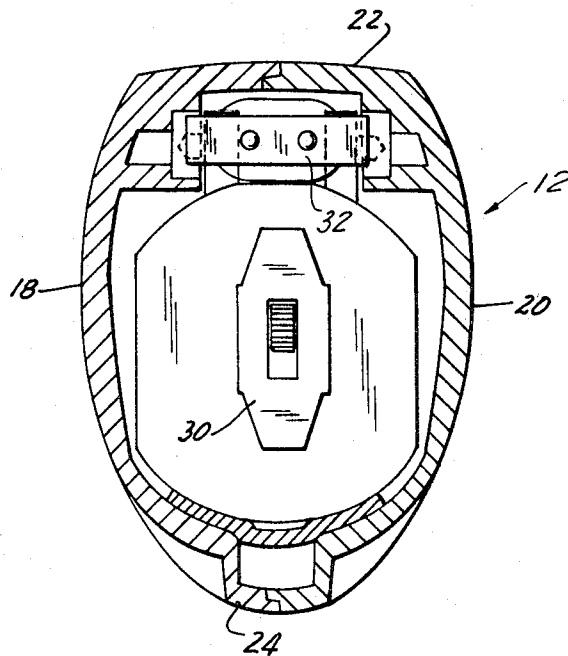


FIG. 5



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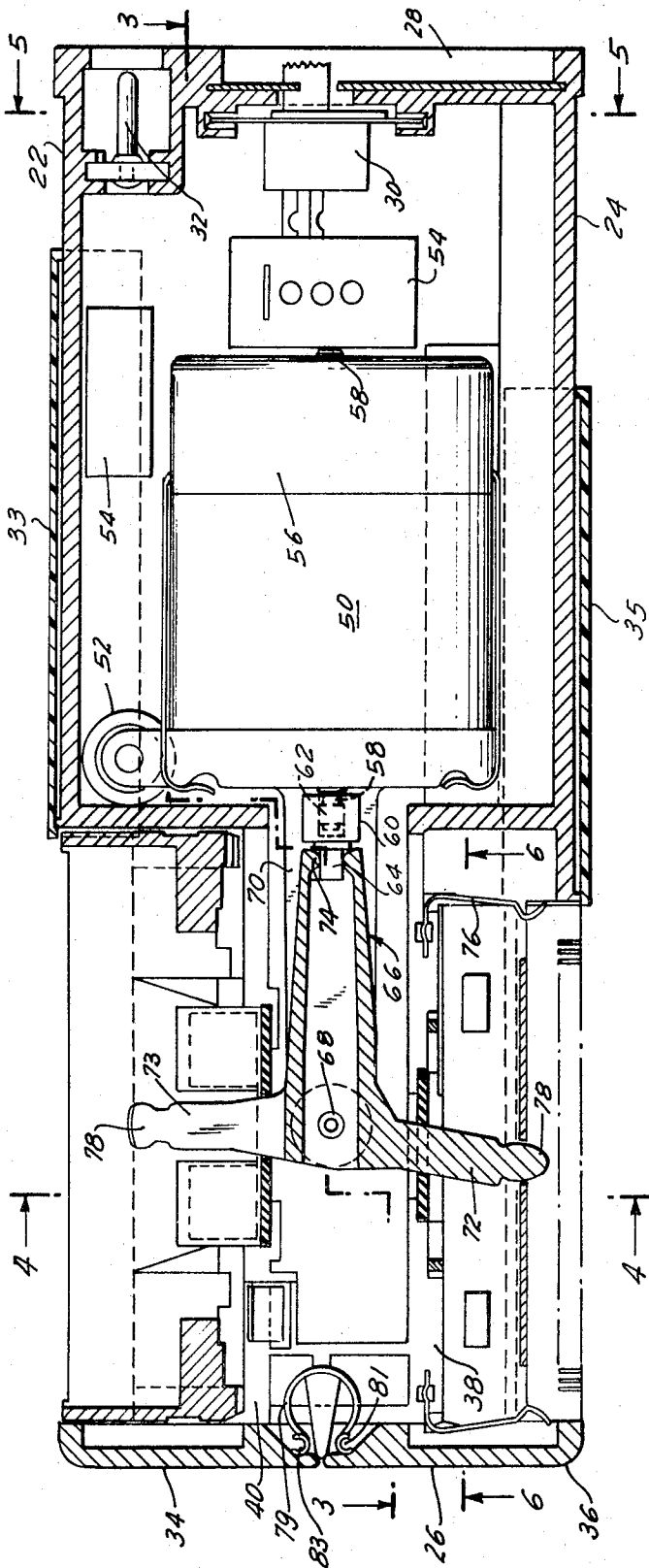


FIG. 2

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SHAVER

BACKGROUND OF THE INVENTION

Electrically driven shavers utilizing driven cutters are extensively used to cut hair. The common cutter structure consists of one or more substantially rectangular units comprising inner and outer cutters having open ends. In operation, the inner cutter is reciprocally driven with respect to the outer cutter along the cutter longitudinal axis, and the hair clippings fall into the cutter interior where they are ejected toward the open ends of the cutters by this reciprocal movement.

The cutters of prior art shavers have been affixed to one end of the shaver at an angle of substantially 90° to the axis of the shaver motor. Thus, the action of these shavers has followed the concept of the safety razor rather than that of the straight razor. This arrangement is quite satisfactory for normal facial shaving needs although it falls short of allowing total grooming. Further, since the shaving action occurs at only one end of the shaver, the type of shave available is governed by the nature of the shaving head affixed to that end. Attempts have heretofore been made to provide such prior art shavers with means for adjusting the depth of cut and hence the closeness of the available shave such as by varying the depth of the open space between adjacent cutter assemblies. These prior art arrangements have allowed some degree of flexibility in the range of available shaves but they have not provided the full cutting range required, especially for feminine grooming. To afford complete service, a lady's shaver must satisfy the two diametrically opposite requirements of shaving a large area with rather short sparse coarse hair and tough skin, like the legs, as well as the shaving of the armpits with long, fine hair in a cavity with extremely pliable and tender skin. Similarly, male grooming requires a shaver capable of removing ordinary facial hairs which are generally short and coarse and also capable of trimming sideburns, beards and mustaches which are longer and usually finer. All attempts to "adjust" one shaving head for both these functions for male and female needs have met only very limited success.

It is therefore a principal object of the present invention to provide an improved electric shaving device, the cutters of which are disposed in line with the major axis of the motor, and which may be provided with more than one shaving head to allow for more total grooming than was heretofore possible.

These and other beneficial objects and advantages are attained in accordance with the present invention by providing a shaver comprising an elongated housing containing an electrical drive motor. The drive shaft of the motor is substantially parallel to the longitudinal axis of the housing and has an eccentric shaft head affixed to one end. An actuator having diametrically opposed transverse arms is mounted within the casing interior and is adapted to be driven by the motor through the eccentric shaft so as to oscillate the transverse arms parallel to the longitudinal axis of the motor through the action of the eccentric shaft. The outer portions of the actuator arms engage the inner cutters of cutting heads disposed within the shaver casing parallel to the motor shaft, thereby causing the inner cutters to reciprocate parallel to the motor axis. Since the shaving heads are disposed in the sides of the shaver casing rather than at an end, more than one shaving head may simultaneously be driven.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a perspective view of an electric shaver produced in accordance with the present invention;

FIG. 2 is a side elevational sectional view taken along reference line 2-2 of FIG. 1 in the direction indicated by the arrows;

FIG. 3 is an elevational sectional view taken along reference lines 3-3 of FIG. 2 in the direction indicated by arrows;

FIG. 4 is a sectional view taken along the reference lines 4-4 of FIG. 2 in the direction indicated by the arrows;

FIG. 5 is a sectional view similar to FIG. 4 taken along reference lines 5-5 of FIG. 2 in the direction indicated by the arrows, and

FIG. 6 is a fragmentary sectional view taken along reference lines 6-6 of FIG. 2 in the direction indicated by the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference is now made to the drawings wherein similar components are indicated by the same reference numerals throughout the several views.

In FIG. 1, a shaver 10 in accordance with the present invention is depicted. The shaving and drive mechanisms are contained within an elongated housing 12, formed of two halves 14 and 16, that is generally oval in cross section, as seen in FIGS. 4 or 5. For ease of description, the shaver housing may be considered as being formed of major sidewalls 18 and 20 and minor sidewalls 22 and 24, as well as top and bottom ends 26 and 28. An on-off control switch 30 and a receptacle 32 for coupling the shaver to an electric outlet are provided extending through the shaver bottom 28. The shaver top 26 is formed of two hinged closures 34 and 36, known as "whiskits" that serve to seal the open ends of the shaver cutting assembly support decks 38 and 40, respectively. Shaving head covers 33 and 35 are provided integral with the shaver housing and shiftably mounted to minor sidewalls 22 and 24, respectively. The covers are each adapted to be shifted between a first position at which their associated shaving head is exposed to a second position at which the shaving head is covered. In this regard, the minor sidewalls 22 and 24 are provided with surfaces defining tracks within which the downwardly depending aprons 37 and 39 of covers 33 and 35, respectively, ride. The aprons each include inwardly directed portions 41 or 43 which interengage with the tracks and thereby cooperate in maintaining the covers on the shaver housing while permitting longitudinal shifting.

In this preferred embodiment, the shaver 10 is provided with a double cutter shaving head 42 mounted to deck platform 40 in the top end of minor sidewall 22 and a single cutter shaving head 44 mounted to a similar platform 38 in the top end of minor sidewall 24. The double cutter shaving head 42 may, for example, be a standard head for general shaving while the single cutter head 44 may have widely spaced apart teeth to facilitate trimming and cutting relatively long hair. The two cutting assemblies 46 and 48 of the double cutting head 42 as well as the single cutter 44 utilize a well known construction form wherein an open ended inner cutter is disposed within an open ended outer cutter with the former cutter being adapted to be reciprocated with respect to the latter cutter in the direction of the cutter longitudinal axis. In this manner, hair clippings removed by the shaver are directed toward the open ends of the various cutter assemblies.

The shaver 10 is driven by an electric motor 50 mounted within the housing interior and supported on mounting bosses 52 by suitable coupled means such as screws or rivets extending to the housing sidewall. The circuitry 54 associated with motor 50 is also contained within the housing and suitably mounted to the housing interior. The motor includes a fixed casing 56 comprising the stator and a rotor to which a shaft 58 is affixed that is suitably journaled to the casing. The longitudinal axis of the motor drive shaft is substantially parallel to the longitudinal axis of the housing 12. In the depicted embodiment, the motor is adapted to be driven by an AC power supply. However, it should be evident that with slight modification the motor may be battery driven by either rechargeable or standard batteries. A portion of drive shaft 58 extends through the top end of motor casing 56 and a shaft head 60 is mounted to the shaft 58 by a suitable bushing 62. An upwardly extending eccentric lug 64 is affixed to the top of head 60 and serves to oscillate actuator 66 which is pivotally mounted by pin 68 to the actuator support arms 70 which in turn are affixed to the motor casing 56. The actuator 66 includes an elongated body portion having legs 67 and 69 each of which,

as described above, have one end pivotally mounted between the actuator support arms 70 and the other end in operative contact with lug 64 of the shaft head 60. The actuator 66 further includes a pair of transverse arms 72 and 73 which extend outwardly from the pivotally mounted end of the actuator legs 67 and 69 in both directions and form substantially right angles with the longitudinal axis of the actuator. In operation, as the eccentric head rotates with drive shaft 58, the lug 64 will intermittently contact one side and then the other side of the lower, inwardly directed peripheral lip 74 that comprises the bottom end of the actuator body portion. The actuator is thereby caused to rock about the pivotal pin 68, causing transverse arms 72 and 73 to move in opposite directions substantially parallel to the longitudinal axis of the shaver 10.

Shallow recesses in minor sidewalls 22 and 24 are provided in housing 12. Each of the recesses extends to the shaver top end. The recesses are formed in such a manner that the center point of each recess is substantially in line with the actuator pivotal pin 68. The bottoms of the recesses form the decks 38 and 40 upon which the shaving head assemblies 44 and 46, respectively, are seated and secured in place by clips 76. Suitable openings are provided in decks 38 and 40 to permit portions of the actuator arms 72 and 73 respectively to penetrate the decks and engage the inner cutters of the shaving heads. As was previously mentioned, each shaving head comprises either one or two cutter assemblies, and consists of an inner open ended cutter disposed within an outer cutter. The inner cutter is adapted to be reciprocated within the outer cutter by virtue of the outer tips 78 of the actuator transverse arms 72 and 73 engaging the inner cutter and thereby causing the inner cutter to move with the actuator arm. Thus, the shaving action of the present shaver will be performed in planes substantially parallel to the longitudinal axis of the present shaver.

During use, the hair that is removed by the shaver is directed, through the action of the inner cutters, toward the open ends of each cutter assembly. At the top end of the shaver, there is provided closures 34 and 36 which are pivotally mounted in back to back fashion to the top of the shaver housing to form the shaver top end. Closures 34 and 36

provide convenient access means to the cutter interior to enable the removal of any hair clippings contained therein. Accordingly, closures 34 and 36 each comprise a substantial flat member pivotally mounted to the housing top at points corresponding to the top end of the cutter assembly decks 38 and 40. A biasing spring 79 is coupled to the casing and to each of the closures 34 and 36 and serves to maintain the closures in a normally closed position against the end of the housing. Biasing spring 79 also cooperates with the closure pivotal points 81 and 83 and the closures in forming toggle joints so that if the closures are rotated past a dead center point toward their open position they will snap open and similarly, if rotated past their dead center point toward their closed position, they will snap closed.

Thus, in accordance with the above description, an improved electric shaving device is provided with one or more cutting heads disposed in line with the longitudinal axis of the shaver motor.

We claim:

1. An electric shaver comprising: an elongated housing; a motor disposed within said housing substantially parallel to the longitudinal axis of said housing; shaver head actuating means disposed within said housing and coupled to said motor; means for securing a shaving head to said housing substantially parallel to the longitudinal axis of said motor; a shaving head including at least one elongated inner cutter disposed within an elongated outer cutter wherein said actuating means includes portions adapted to engage said shaving head inner cutter and reciprocate the same relative to said outer cutter along a path of motion substantially parallel to the longitudinal axis of said motor; shaver head cover means affixed to said housing; said shaving head-securing means including a recessed portion of said housing disposed adjacent one end of the housing and said shaving head cover means including surfaces of said housing defining a track substantially parallel to said motor longitudinal axis and extending from said housing one end toward the housing opposite end; and a cover having portions thereon adapted to ride in said track whereby said cover is adapted to be shifted from a first position wherein said recessed portion is exposed to a second position wherein said recessed portion is covered by said cover.

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