April 20, 1948. H. E. PAGE 2,440,114

DRY SHAVER

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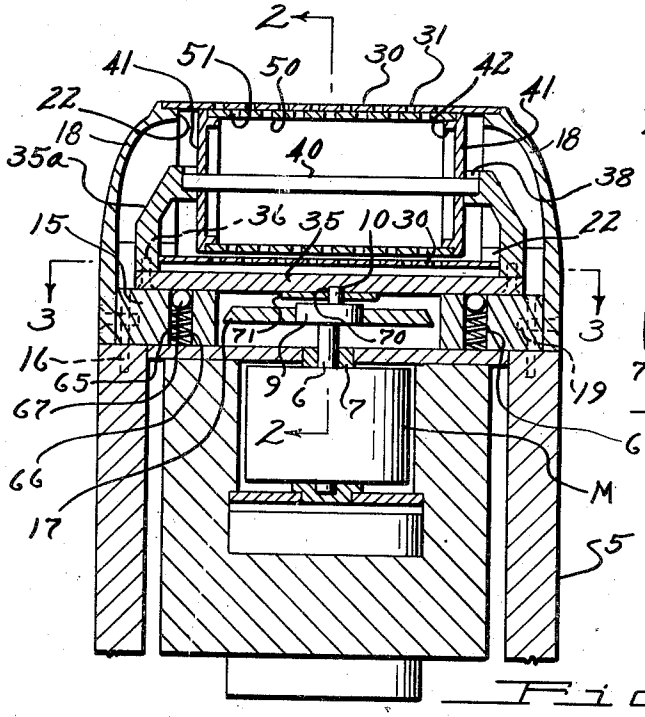



Fig. 1

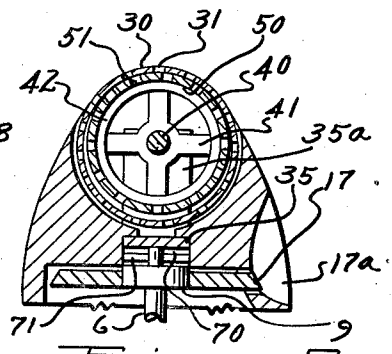



Fig. 2

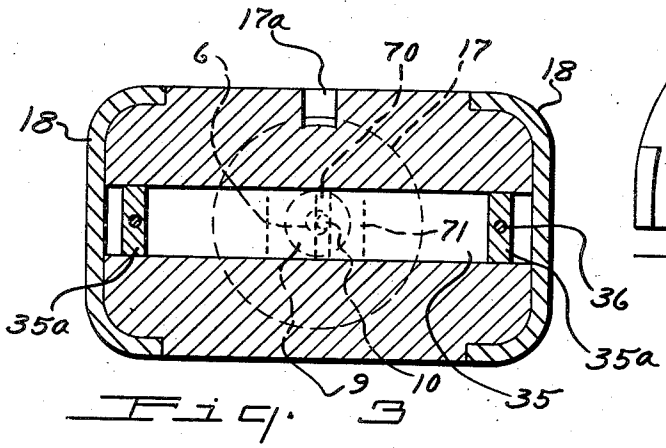



Fig. 3

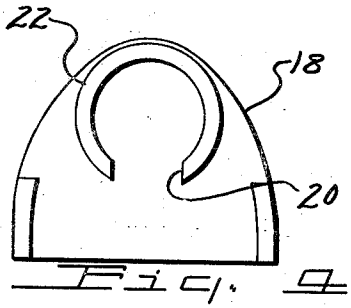



Fig. 4

INVENTOR.

Herbert E. Page

BY

Atty.

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2,440,114

## DRY SHAVER

Herbert E. Page, Alhambra, Calif.

Application February 3, 1945, Serial No. 575,943

4 Claims. (Cl. 30—43)

1

My present invention has to do with power-driven dry shavers and, in some aspects, involves improvements upon the electric shaver shown in my prior United States Letters Patent No. 2,355,672, dated August 12, 1944.

In one of its embodiments, the device shown in my said prior patent involves the use of two nested, concentric, perforated, cylindrical cutter elements, the outer element being freely rotatable so as to permit it to be freely rolled over the skin of the user, while the inner element is power-driven but is freely rotatable relative to the outer member and its driving element. In operation, as the outer element is rolled over the face, the hairs or whiskers on the face pass through the perforations therein and into the perforations in the inner member as the latter register with those of the outer member, and, by movement of the inner member relative to the outer member, said hairs are severed.

In such devices it is highly desirable to maintain free rotatability of the cutting members relative to each other, but at the same time it is essential that the outer surface of the inner cutter member sufficiently engage against the inner surface of the outer member to effect a clean cut and provide a sufficiently close shave. The friction resulting from the latter tends to reduce the freedom of relative rotatability of the cutting elements and it has been highly desirable, therefore, to overcome those difficulties while at the same time accomplishing both of the desired ends.

It is an object of the invention to provide, in a shaver utilizing a freely rotatable outer cylindrical cutting head and a freely rotatable driven cylindrical inner head, means for providing adequate light frictional engagement between the heads at the cutting point without destroying or unduly retarding the free relative rotatability of the parts.

Another object is the provision of novel and efficient means for the application of the driving power to the inner cutter element.

My invention possesses additional but more or less subordinate objects and advantages which will become apparent from the following detailed explanation of a presently preferred embodiment, it being understood, of course, that within the scope of the broader claims appended hereto the invention is capable of being embodied in other structures differing specifically from that now to be described.

For purposes of the following description I shall refer to the accompanying drawings, in which:

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Fig. 1 is a medial vertical section;

Fig. 2 is a cross section taken on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1; and

Fig. 4 is an elevational view of one of the end plates as viewed from its inside.

Referring now to the drawings, I show at 5 a body which also serves as a handle and which carries a conventional electric motor M having a drive shaft 6 journaled adjacent its top end in a bearing 7, the shaft having at its top end an annular flange 9 from the top of which projects a pin 10, the pin being offset from the axis of the shaft 6 so as to be eccentric relative thereto. A pair of spaced parallel plates 15 are secured to the top of the body by screws 16, the plates being disposed crosswise of the body.

A starting wheel 17 is secured on flange 9, its peripheral edge being accessible in a recess 17a provided in the body, for manual engagement by the user's finger to start the motor.

Secured to the respective plates 15 by screws 19 there are end plates 18, each of which has formed integrally therewith a circular flange 22 broken at 20, the latter flanges providing bearing surfaces for the outer shell or cutting head to be described. The numeral 30 designates a cylindrical outer shell or cutting head which has hair-passing perforations 31 and is freely rotatable upon the bearings provided by the flanges 22.

Slidably mounted on the top surface of the plates 15 I provide a yoke 35 comprising a base and end pieces in which the ends 35a are secured to the base portion of the yoke by screws 36, whereby to be detachable. Each of the ends 35a has a slot 38, the bottom of which slot provides a bearing for an end of the spindle 40. Freely rotatably mounted on each end of the spindle 40 there is a spider 41, whose legs carry a circular ring 42.

An inner cylindrical shell or cutter head 50, presenting perforations 51, has its respective ends mounted upon the rings 42, said ends being engaged by the extreme end portions 43 of the spider legs. Each of the spiders is held against outward movement axially of the spindle by engagement against the end members of the yoke.

The inner head 50 is of smaller exterior diameter than the inner diameter of the outer head 30 and is eccentric relative thereto. However, the inner head is maintained in contact with the inner surface of the outer head at the top portion of the device by the means now to be described.

In each of the plates 15 there is one or more vertical holes 65 in each of which is mounted a

coil spring 66 atop which rests a ball 67, each of the balls being urged outwardly against the bottom of the yoke by the spring. The yoke is thus constantly urged upwardly so that the spindle 40 which is disposed axially of the inner head 50 is resiliently urged upwardly, carrying with it the inner head 50 until the latter contacts the inner surface of the outer head. The springs 66 are weak, however, so as not to induce too great a frictional engagement of the outer surface of the inner head with the inner surface of the outer head at the point of contact, being only strong enough to maintain the inner head in contact with the outer head.

The yoke and consequently the inner head are caused to oscillate relative to the outer head by means of the eccentric pin 10 engaging in a transverse slot 70 at the bottom of the yoke. The slot 70 also passes through a plate 71 secured to the bottom of the yoke to relatively thicken the yoke at that point in order to insure that the pin 10 will always engage in the slot 70 despite the upward movement of the yoke away from the pin caused by the springs 66.

From the foregoing description it will be seen that, in operation, while the outer head 30 is held longitudinally stationary, it freely rotates on the flanges 22 so that, as the outer head engages the skin of the user while the body of the device is moved, the outer head will freely roll over the face. While the inner head 50 is free to rotate relative to the outer head, as well as relative to the yoke, since its supporting spiders are freely rotatable upon the spindle 40 and spindle 40 is rotatable in its bearings, it is positively driven to oscillate axially by means of the yoke 35. At the top end of the razor, which is usually the portion applied to the face, the inner head is lightly resiliently urged against the inner surface of the outer head to maintain proper contact.

I claim:

1. In a power-operated shaving device, a supporting body, a pair of perforated nested cylinders mounted on the body, the outer one of the cylinders constituting an outer cutter head and being mounted for free rolling movement relative thereto in response to movement of the body when said head is in contact with the skin, and the inner one of said cylinders constituting an inner cutter head and being mounted to move axially and to rotate freely relative to the body and outer cylinder, power means cooperating with the inner cylinder to oscillate it axially, and spring means urging the inner cyliner into eccentric relationship to the outer cylinder whereby to frictionally engage the outer surface of the inner cylinder against the inner surface of the outer cylinder.

2. In a power-operated shaving device, a supporting body carrying power means, a perforated, cylindrical outer cutter head mounted on the body for free rolling movement relative thereto in response to movement of the body when said head is in contact with the skin, a yoke mounted on the body to oscillate relative thereto, means operatively connecting the yoke to the power means, said yoke having upright end portions each presenting a bearing, a spindle journalled at its ends in said respective bearings, a perforated cylindrical inner cutter head disposed axially in the outer head and carried by the spindle, said spindle being disposed parallel with the axis of the outer head and coaxial with said inner head, and resilient means urging the spindle into eccentric relationship with the axis of the outer head.



3. In a power-operated shaving device, a supporting body carrying power means, a perforated, cylindrical outer cutter head mounted on the body for free rolling movement relative thereto in response to movement of the body when said head is in contact with the skin, a yoke mounted on the body to oscillate relative thereto, means operatively connecting the yoke to the power means, said yoke having upright end portions each presenting a bearing, a spindle journalled at its ends in said respective bearings, a perforated cylindrical inner cutter head disposed axially in the outer head and rotatably carried by the spindle, said spindle being disposed parallel with the axis of the outer head and coaxial with said inner head, and resilient means urging the spindle into eccentric relationship with the axis of the outer head.

4. In a power-operated shaving device, a supporting body carrying power means, a perforated, cylindrical outer cutter head mounted on the body for free rolling movement relative thereto in response to movement of the body when said head is in contact with the skin, a perforated inner cylindrical head mounted to reciprocate axially and to freely rotate in the outer head, a yoke slidably carried by the body, means operatively connecting the yoke to the inner head, and means operatively connecting the yoke to the power means.

HERBERT E. PAGE.


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