

Oct. 12, 1943.

G. G. GOING

2,331,466

ELECTRIC DRY SHAVER

Original Filed June 21, 1938

2 Sheets-Sheet 1

FIG. 1

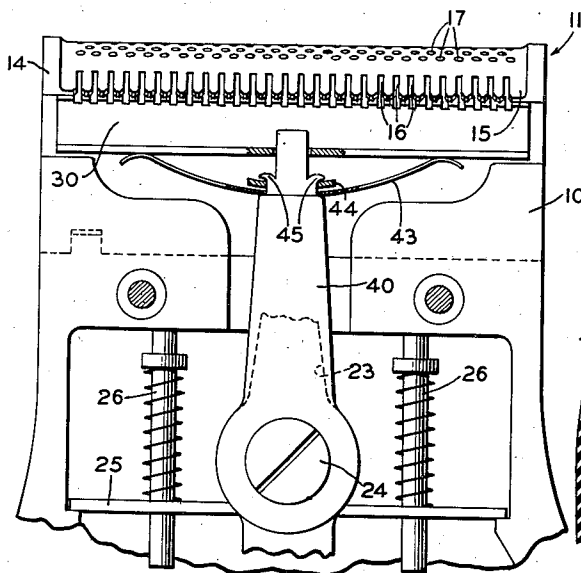


FIG. 2

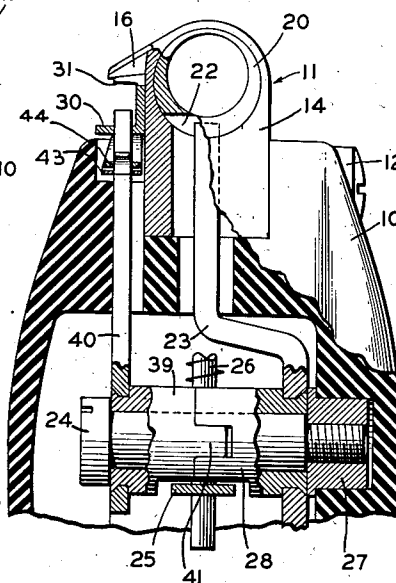


FIG. 3

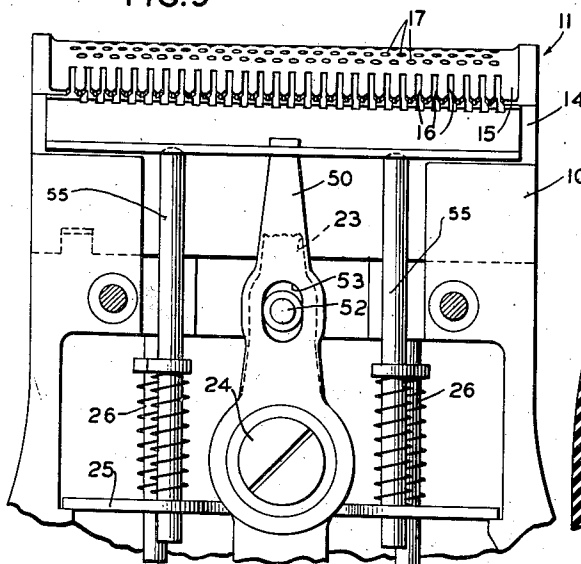
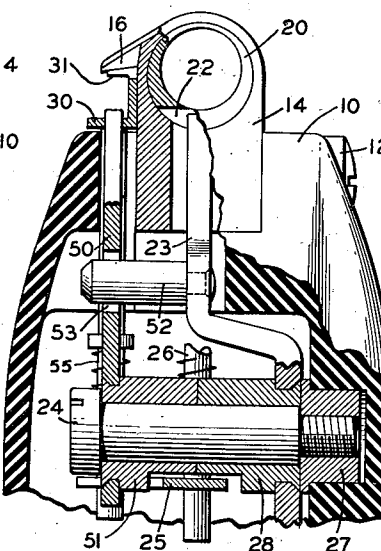


FIG. 4



INVENTOR
GEORGE G. GOING.

BY *A. C. Spark*
ATTORNEY

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G. G. GOING

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FIG. 5

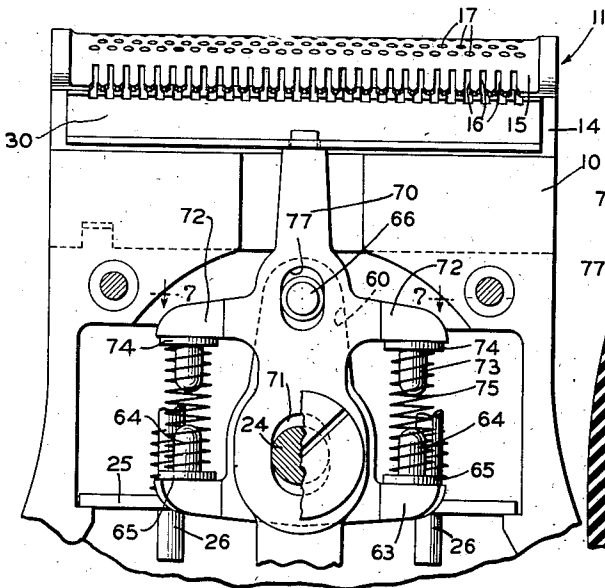


FIG. 6

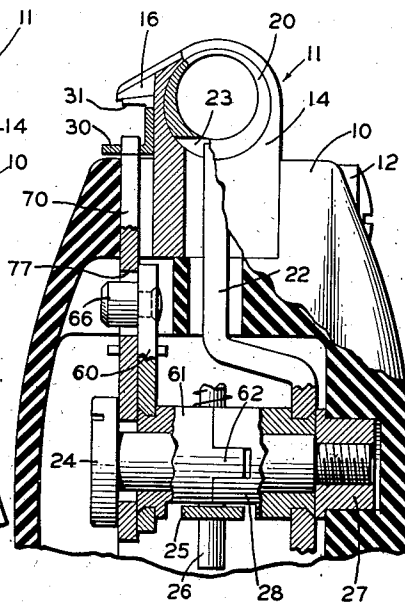
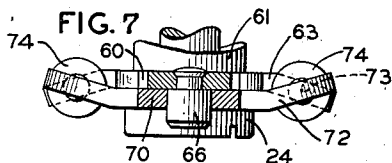
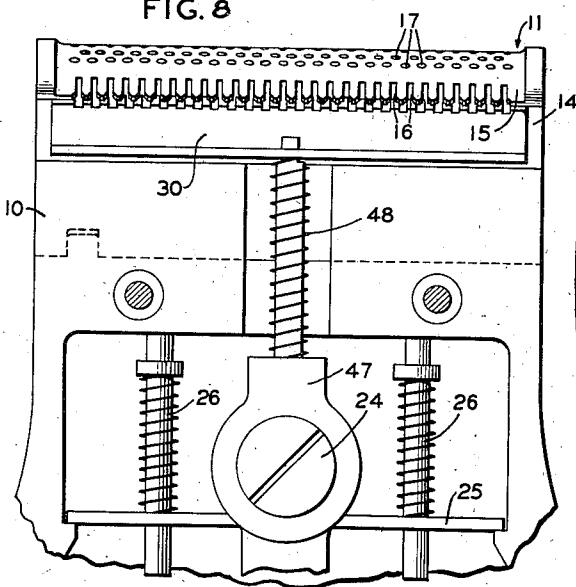
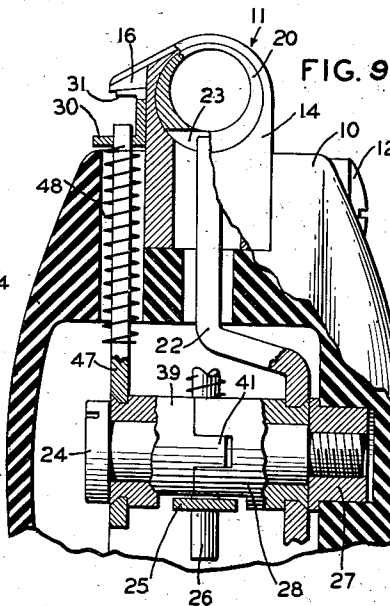


FIG. 8



INVENTOR
GEORGE G. GOING.

BY *H. A. Sparks*
ATTORNEY

UNITED STATES PATENT OFFICE

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ELECTRIC DRY SHAVER

George G. Going, Stamford, Conn., assignor to
Remington Rand Inc., Buffalo, N. Y., a corpora-
tion of Delaware

Original application June 21, 1938, Serial No.
214,896. Divided and this application January
6, 1942, Serial No. 425,802

5 Claims. (Cl. 30—43)

This invention relates to improvements in electric dry shavers, and particularly to means for engaging and operating the movable cutter and resiliently projecting it into cutting engagement with the shear plate construction.

This application is a division of application Serial No. 214,896, filed June 21, 1938, now Patent No. 2,292,438 issued August 11, 1942.

The invention provides a driving arm for electric dry shavers for obtaining more efficient operation of the movable cutter; a driving arm construction having relatively movable parts for transmitting the motion of the motor to the movable cutter; a driving arm construction comprising a plurality of cooperative parts that may be readily and cheaply constructed for interfitting cooperation to provide a driving arm adapted for operation with one or more movable cutters; a driving arm having relatively movable parts with resilient means cooperating to project some of the parts into engagement with a movable cutter or cutters for projecting and maintaining the movable cutter or cutters in cutting cooperation with a shear plate; and a driving arm having resilient means cooperating therewith and carried thereby for engaging a movable cutter to drive and maintain the cutter in cutting engagement with a shear plate construction.

In the drawings:

Fig. 1 is a side elevation showing a modified form of driving means with the front cover removed;

Fig. 2 is a fragmentary cross section of Fig. 1;

Fig. 3 is a side elevation of another modified form with the cover removed showing the driving means for the auxiliary cutter;

Fig. 4 is a fragmentary cross section of Fig. 3;

Fig. 5 is a side elevation of still another modified form of driving means;

Fig. 6 is a fragmentary cross section of Fig. 5;

Fig. 7 is a detail transverse section taken substantially along line 7—7 of Fig. 5;

Fig. 8 is a side elevation of still another modified form of auxiliary blade driving means;

Fig. 9 is a fragmentary cross section of Fig. 8.

The new shearing head and its associated driving mechanism is adapted to be incorporated in any well known type of electric razor in which the inner cutter is reciprocated. A razor of this type comprises a motor casing 10 which constitutes the handle of the razor, and in which may be mounted any suitable type of motor either of the vibrator or rotating type providing a driving means.

The shearing head 11 is located in a longitu-

dinal slot in the top of the casing 10 and is secured thereto by a set screw 12, as shown in Fig. 4. The shearing head comprises a fixed outer shear plate or shear member 14 which is substantially rectangular in shape, having the upper surface ground to an arcuate shape. One side of shear member or plate 14 is formed with a flange 15 having slots cut therein to form cutter bars and comb teeth 16. The upper surface of the shear plate is provided with perforations 17 forming shearing edges.

The portion of shearing member 11 having the openings 17 and the flange 15 may be hereinafter referred to as shaving sections.

The inner cutter 20 is cylindrical in shape, and has an eccentric bore. The cutter bars (not shown) are at the top portion of the inner cutter as shown in the drawings. A transverse slot 22 is formed in the inner cutter diametrically opposite to the cutter bars, which is adapted to be engaged by an arm 23 pivotally mounted on stud 24, and reciprocated by having an arm portion connected with the motor or driving means. The stud 24 is screwed into a bushing 27 secured in the casing by any well known means.

Located in the casing is a plate 25 in which is positioned a pair of spring pressed pins 26 which cooperate with the underside of the inner cutter, thereby insuring close contact between the cutter bars of the inner cutter and the perforations 17 in the outer cutter.

The perforated portion of the shear plate when moved over the face will pick up the hair which enters the perforations 17 where it will be cut by the action of the cutter bars of inner or movable cutter 20 cooperating with the edges of the perforations. Since the metal of the shear plate is very thin, the hair will be cut close to the skin.

The bars 16 in the flanges 15 referred to above, are provided for cutting long hair, and cooperating therewith is a movable cutter 30. The cutter 30 is substantially channel-shaped with side flanges of unequal width, and is positioned with the web portion against the side of the shear plate and the shorter of its flanges engaged with the underside of flange 15. The shorter flange is slotted to form cutter bars 31, which are adapted to cooperate with bars 16 for cutting long hair. The movable cutter 30 may be reciprocated by a number of independent means, several types of which will be described hereinafter. The under surface of flange 16 and the upper face of cutter 30 are formed at an angle of approximately 15° to the lower flange. This shape prevents cutter 30 from slipping out of position while operating.

A driving mechanism or arm for movable cutter 30 is shown in Figs. 1 and 2. Here the stud 24 is long in order to accommodate the hub 28 of arm portion 23, and the hub 39 of a lever or arm 40. The hub 28 has been slotted to accommodate a lug 41 formed on the hub 39 to provide a coupling, so that any movement of lever 23 is transmitted to lever 40.

The lever 40 extends through a slot in movable cutter 30, and the rocking of lever 40 transmits a reciprocatory motion to cutter 30. A flat spring 43 is positioned on a shoulder of lever 40 and held thereon by a washer 44 fastened in place by bent over ears 45. The spring 43 is so formed that it exerts an upward push on cutter 30, forcing it into contact with flange 15 of the outer cutter. Flat or leaf spring 43 engages cutter 30 at opposite ends and thereby secures a more uniform bearing contact for insuring efficient cutting cooperation of the cutting edges of the movable cutter with the cutting edges of the shear member.

The drive mechanism of Figs. 8 and 9 is similar in every respect to that just described, except that the lever 40 has been replaced by a slender lever 47, and the spring 43 has been replaced by a coil spring 48 surrounding the lever 47 and which urges the movable cutter toward the outer portion of the shear member for retaining the movable cutter in efficient cutting cooperation with the shear member.

Referring to Figs. 3 and 4 another drive mechanism for the movable cutter is shown. In this case the arm 50, which engages the movable cutter, has a hub 51 which is not connected to hub 28. The connection between the levers 23 and 50 comprises a pin 52 secured in lever 23 and extending into a slot 53 in the arm 50. Any rocking motion imparted to lever 23 is transmitted thereby to the lever 50. Two spring pressed pins 55 are located in the plate 25, engage cutter 30 and resiliently retain it in contact with flange 15 of the outer cutter.

Figs. 5, 6 and 7 discloses another form of drive mechanism, in which a short lever or arm portion 60 is secured to a hub 61 having a lug 62 thereon engaging the slot in hub 28. The lever 60 is formed with ears 63, in which are secured short pins 64 having washers 65 positioned thereon. Secured in the free end of lever 60 is a pin 66.

A second lever or arm portion 70 is provided which is mounted on stud 24 by a slot 71. Extending from the mid portion of lever or arm portion 70 is a pair of ears 72 similar to and formed to align with the ears 63 above described. Each of the ears 72 have a pin 73 secured therein, and positioned thereon is a washer 74. Engaging the pins 73, and 64, and resting on the washers 74 and 65, is a coil spring 75, tending to separate the ears 63 and 72 and thus raise the lever 70 which in turn forces movable cutter 30 into close engagement with the flange or shaving section 15. A slot 77 is provided in the lever 70 with which the pin 66 is adapted to cooperate, and by means of which any movement of lever 60 is transmitted to lever 70 to cause cutter 30 to be reciprocated.

The invention claimed is:

1. In a shaver having a casing carrying a driving means, shear means mounted on said casing having a plurality of shaving sections formed with cutting edges, and a plurality of movable cutters engaged one with each shaving section and having cutting edges for cutting cooperation

with the cutting edges on said shaving sections, the combination of a stud mounted on said casing, a plurality of driving arms pivotally mounted on said stud in coaxial relation, each arm having a portion extending from said stud into engagement with one of said movable cutters, one of said arms having another portion extending from said stud and connected with said driving means for transmitting motion from said driving means to operate said movable cutters, and complementary portions on each of said arms interengaged with one another for simultaneously driving all of said arms.

2. In a shaver having a casing carrying a driving means, shear means mounted on said casing having a plurality of shaving sections formed with cutting edges, and a plurality of movable cutters engaged one with each shaving section and having cutting edges for cutting cooperation with the cutting edges on said shaving sections, the combination of a stud mounted on said casing, a plurality of driving arms having hub portions rotatable on said stud in end to end coaxial relation, each driving arm having an end portion engaged with one of said movable cutters, complementary interengaged portions on said hub portions for interconnecting said arms for simultaneous operation, one of said arms having an end portion connected to said driving means for operation thereby to move all of said arms for simultaneously operating all of said movable cutters.

3. In a shaver having a casing, a shear member mounted on one end of said casing, a movable cutter having cooperative engagement with said shear member, and a driving means in said casing, the combination of a post mounted in said casing, and a drive arm for transmitting motion from said driving means to said movable cutter comprising an arm portion rotatable on said post at one end and having laterally projecting ears extending from said end, said arm portion having the other end extending radially outward from the post, means connecting said arm portion with said driving means for operation of said arm portion by said driving means to transmit motion, a second arm portion mounted in radial relation relative to said post with one end slidably and pivotally mounted on said post adjacent said first-mentioned arm portion and having the opposite end engaged with said movable cutter, said second mentioned arm portion having ears formed thereon extending in opposed aligned relation to the ears on said first-mentioned arm portion, complementary interengaging portions on both of said arm portions for transmitting motion from one arm portion to the other, and resilient means engaged between aligned ears on said arm portions normally operable to project said second arm portion outwardly relative to the first-mentioned arm portion for retaining said movable cutter in cutting cooperation with said shear member.

4. In a shaver having a casing carrying a driving means, shear means mounted on said casing having a plurality of shaving sections formed with cutting edges, and a plurality of movable cutters engaged one with each shaving section and having cutting edges for cutting cooperation with the cutting edges on said shaving sections, the combination of a stud mounted on said casing, a hub rotatably mounted on said stud, a plurality of driving arms mounted in spaced relation on said hub and extending radially therefrom, one of said arms having engage-

ment with said driving means for transmitting motion from said driving means and the remaining arms extending from said stud into engagement with one of said movable cutters for transmitting the motion from said first-mentioned arm to operate said movable cutters simultaneously.

5 5. In a shaver having a casing carrying a driving means, shear means mounted on said casing having a plurality of shaving sections formed with cutting edges, and a plurality of 10 movable cutters engaged one with each shaving section and having cutting edges for cutting co-operation with the cutting edges on said shaving

sections, the combination of a stud mounted on said casing, a plurality of driving arms pivotally mounted on said stud in coaxial relation, each arm having a portion extending from said stud into engagement with one of said movable cutters, one of said arms having another portion extending from said stud and connected with said driving means for transmitting motion from said driving means to operate said movable cutters, and means securing all of said arms together for simultaneous unitary operation.

GEORGE G. GOING.