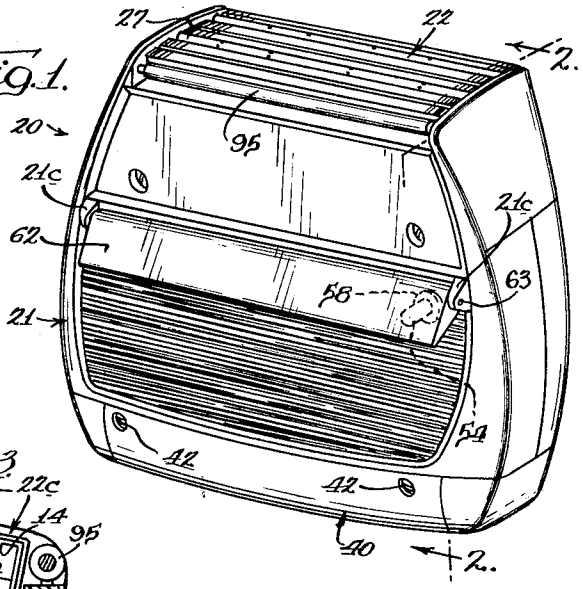
April 6, 1965 R. P. GWINN 3,176,392

GLIDE AGENT DISPENSER FOR ELECTRIC DRY SHAVER

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Fig. 1.



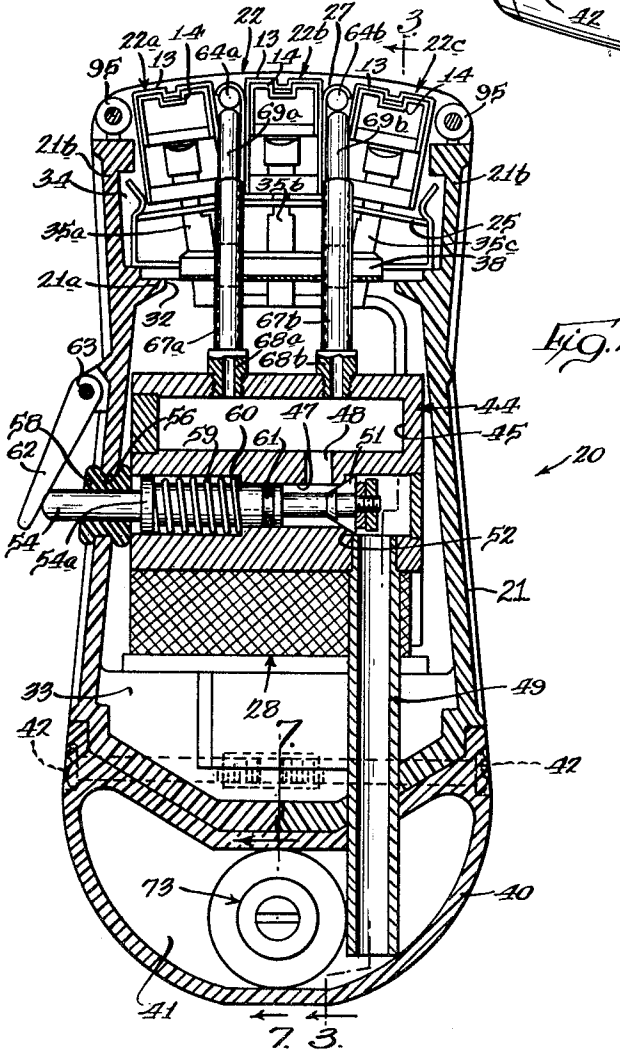


Fig. 2.

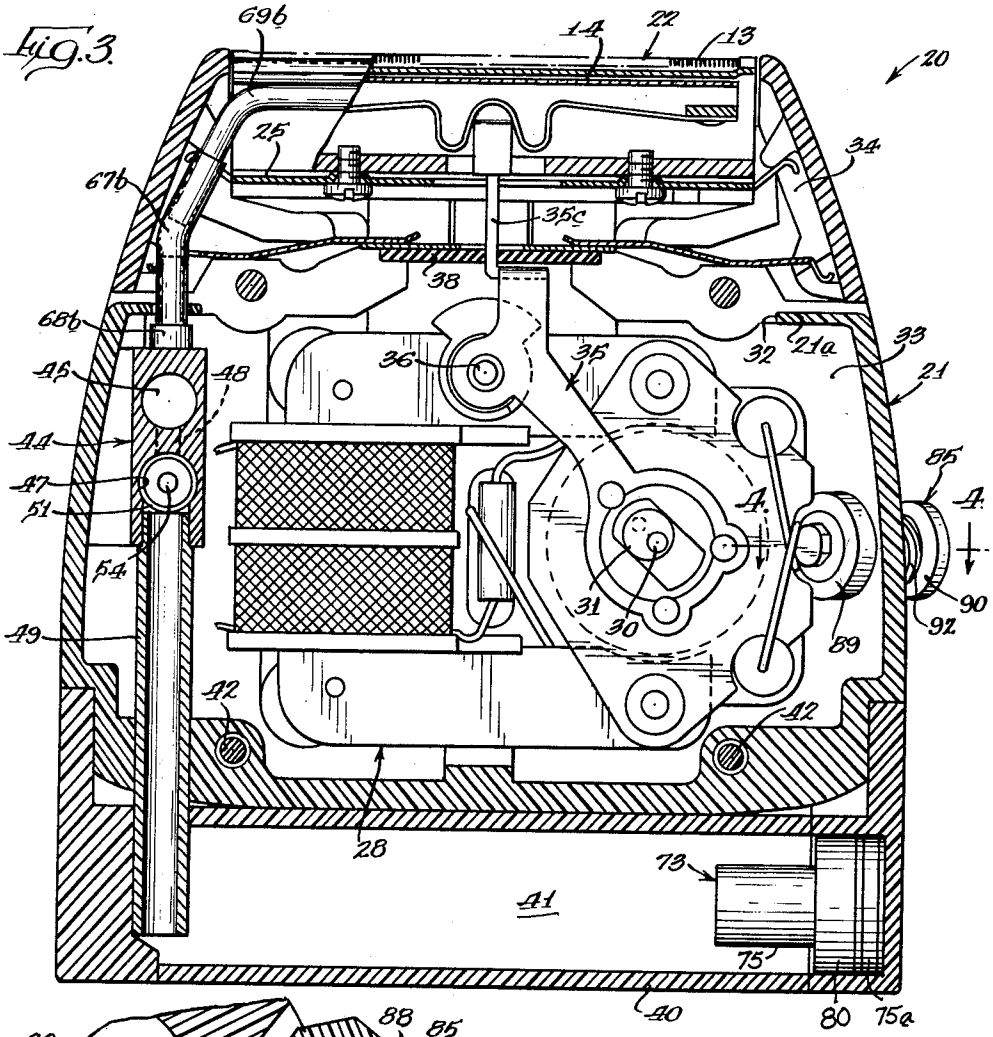
INVENTOR:
Robert P. Gwinn
BY
George R. Clark
Atty

April 6, 1965 R. P. GWINN 3,176,392

GLIDE AGENT DISPENSER FOR ELECTRIC DRY SHAVER

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Fig. 3.



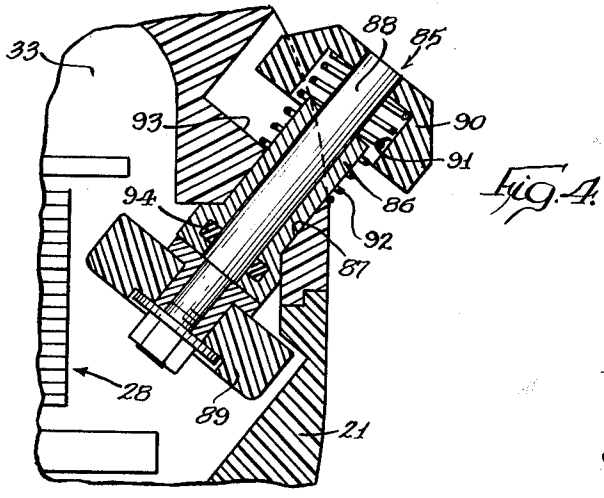


Fig. 4.

INVENTOR.
Robert P. Gwinn
BY
George R. Clark Atty

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GLIDE AGENT DISPENSER FOR ELECTRIC DRY SHAVER

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Fig. 5.

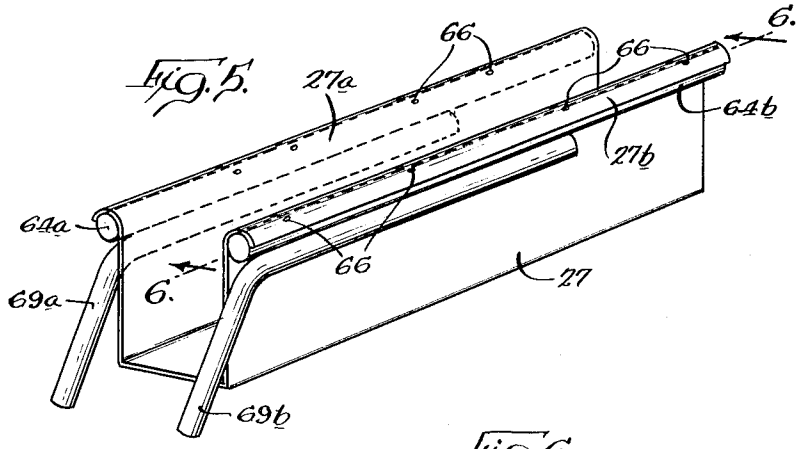


Fig. 6.

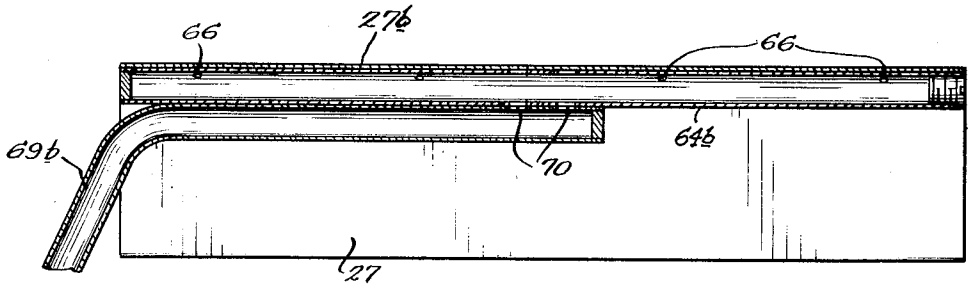


Fig. 7.

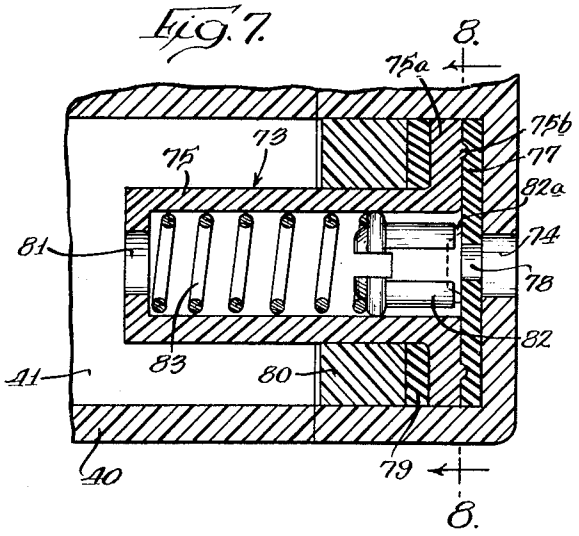
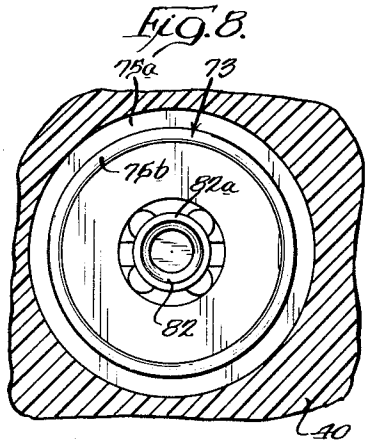


Fig. 8.



INVENTOR:
Robert P. Gwinn
BY
George R. Clark
Atty

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GLIDE AGENT DISPENSER FOR ELECTRIC DRY SHAVER

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Fig. 9.

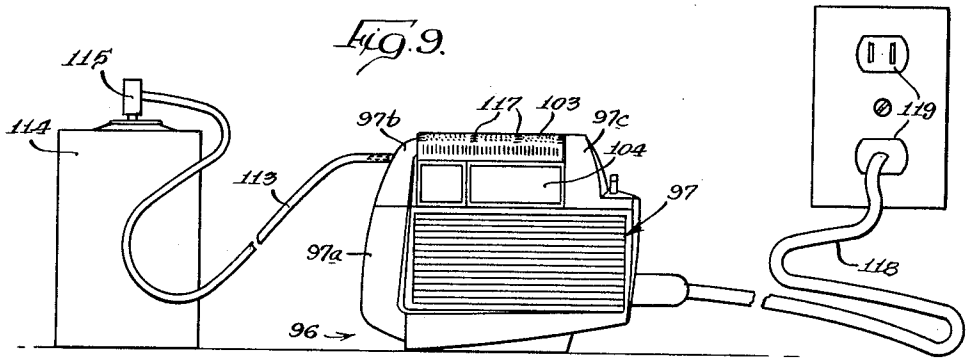


Fig. 10.

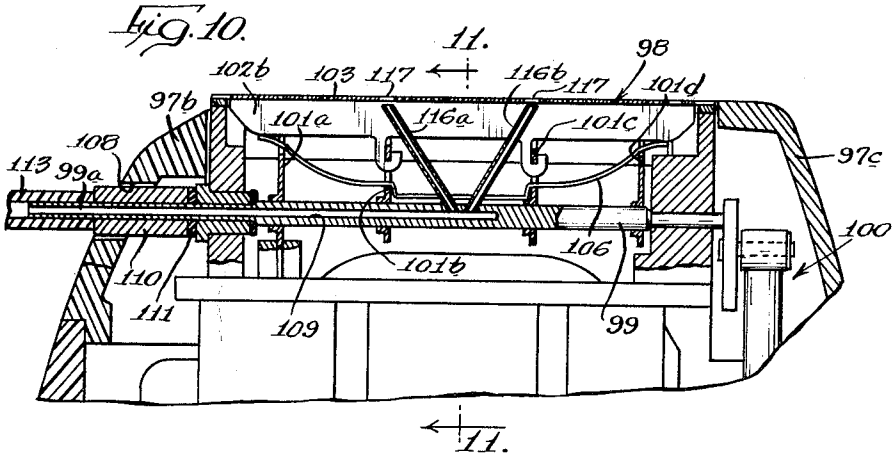
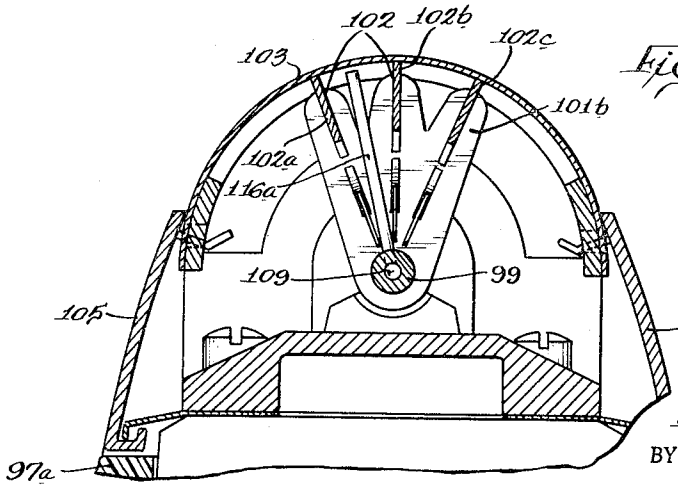


Fig. 11.



INVENTOR:
Robert P. Gwinn
BY
George R. Clark
Atty

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Fig. 12.

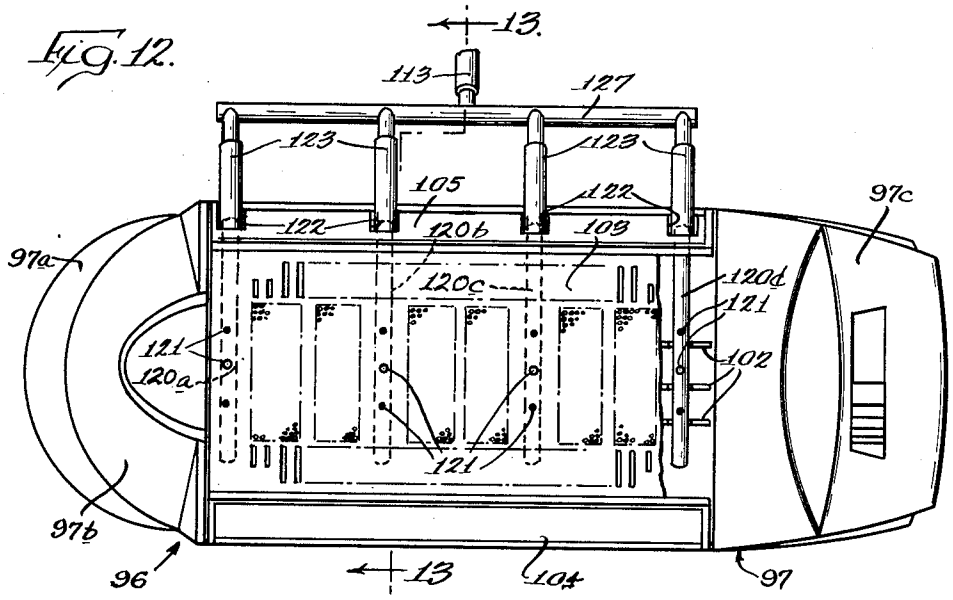
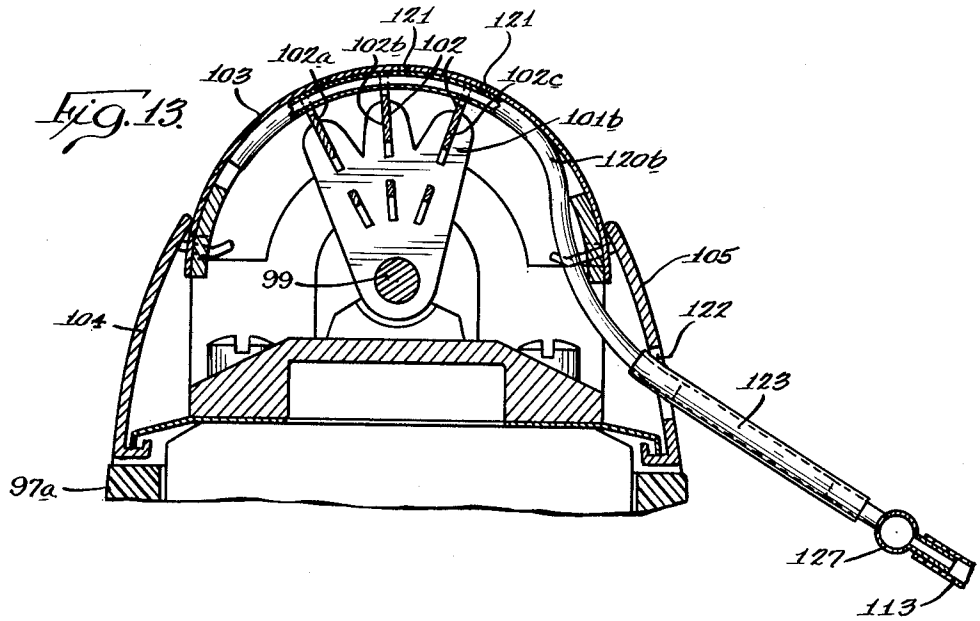


Fig. 13.



INVENTOR:
Robert P. Gwinn
BY
George R. Clark
Atty

United States Patent Office 3,176,392 Patented Apr. 6, 1965

3,176,392

GLIDE AGENT DISPENSER FOR ELECTRIC DRY SHAVER

Robert P. Gwinn, Riverside, Ill., assignor to Sunbeam Corporation, Chicago, Ill., a corporation of Illinois

Filed Jan. 21, 1963, Ser. No. 252,663
2 Claims. (Cl. 30—41)

The present invention relates to an apparatus for dispensing friction reducing substance adjacent the cutting portion of an electric shaver, and more particularly to dispensing what might be termed a "glide agent" adjacent the cutting surface of an electric shaver during the shaving operation to reduce the friction between such surface and the skin of the user from which hair is being removed.

The so-called electric dry shaver has been extensively used for many years and the popularity thereof is increasing constantly. This is primarily due to the fact that shaving with an electric dry shaver is simple, clean, and can be accomplished when the user is fully dressed. Today it is not even necessary that an electric power source be available, for electric shavers may be battery powered. This is in contrast to the conventional "wet type" razor where it is necessary to use lather, towels, water, etc. Obviously shaving with a razor of the wet type cannot be conveniently accomplished where the user is fully dressed.

Some users of electric dry shavers have complained because of the friction between the cutting head and the skin of the user. It would be desirable to provide an improved shaving arrangement in an electric dry shaver whereby the friction between the cutting head and, for example, the face of the user is substantially reduced. It has been suggested that the user of an electric dry shaver wet his face before starting to shave. Unfortunately, water or other liquids used for this purpose dry quickly and any advantage thus disappears before the shaving operation is hardly started. Consequently, it would be desirable to provide an electric dry shaver with means for dispensing some sort of glide or friction reducing agent to the face of the user continuously or as desired during the shaving operation.

Accordingly, it is an obect of the present invention to provide an electric dry shaver with means for dispensing liquid at the cutting head during the shaving operation.

It is another object of the present invention to provide an electric dry shaver having a reservoir for a suitable glide agent preferably in the form of a liquid under pressure which can be automatically dispensed at the will of the user at the cutting surface during the shaving operation.

Yet another object of the present invention resides in the provision of an electric dry shaver with a built-in reservoir for a glide agent, such as a liquid of some sort, with ready means to refill such reservoir from a suitable source of liquid under pressure.

Still another object of the present invention resides in an electric dry shaver having a reservoir for containing a glide agent to be dispensed at the cutting head at the will of the user, which reservoir does not substantially increase the size of the electric dry shaver and which reservoir may readily be recharged or refilled with a minimum of delay.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty are pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the present invention reference may be had to the accompanying drawings wherein:

FIG. 1 is a perspective view of an electric dry shaver of the reciprocating type illustrating one modification of the present invention;

FIG. 2 is an enlarged sectional view taken substantially along line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken substantially along line 3—3 of FIG. 2, assuming that FIG. 2 shows the complete structure;

FIG. 4 is an enlarged fragmentary sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is an enlarged fragmentary perspective view of a portion of FIGS. 1, 2 and 3 to illustrate a detail of the present invention;

FIG. 6 is a somewhat enlarged sectional view taken on line 6—6 of FIG. 5;

FIG. 7 is an enlarged sectional fragmentary view taken on line 7—7 of FIG. 2, assuming that FIG. 2 shows the complete structure;

FIG. 8 is a fragmentary sectional view taken on line 8—8 of FIG. 7;

FIG. 9 is an elevational view illustrating another modification of the present invention applied to an electric dry shaver of the type having an oscillating cutter instead of a reciprocating cutter;

FIG. 10 is an enlarged fragmentary sectional view of a portion of FIG. 9 taken substantially longitudinally through the cutting head thereof;

FIG. 11 is a sectional view taken on line 11—11 of FIG. 10, assuming that FIG. 10 shows the complete structure;

FIG. 12 is a top plan view, with certain portions cut away, of an oscillating type electric dry shaver illustrating still another modification of the present invention; and

FIG. 13 is a sectional view taken on line 13—13 of FIG. 12.

Briefly, the present invention is concerned with providing electric dry shavers, regardless of whether the shaver is of the reciprocating, oscillating or rotary type, with apparatus for dispensing a suitable glide agent at the cutting surface thereof. Any liquid that provides a slippery condition between the shaving head and the face could be satisfactory. For a reciprocating type shaver the liquid is dispensed from between the heads of a multihead shaver toward the face of the user. For an oscillating type shaver the liquid is dispensed to the outside of the comb through the holes in the comb or against the inside surface of the comb where it is picked up and distributed by the blades or through tubes directly against the skin through openings provided in the comb. The fluid flow may be controlled by various means such as an On-Off valve, a variable flow control means, or a metering device which delivers a known quantity each time the metering device is actuated. Moreover, automatic flow control means may be employed, such as by actuating the valve in response to pressure on a roller associated with the shaver. The liquid may be stored in reservoirs under pressure, such as an aerosol type reservoir, or it may be stored with pump means for discharging the same. Additionally, a gas under pressure, such as a CO_2 capsule, may be used to force the liquid from the reservoir to the shaving head. Also, a remote reservoir may be employed, which remote reservoir may be under pressure or may be elevated so that a gravity head is utilized.

Referring now to FIGS. 1 to 8 of the drawings, there is illustrated an embodiment of the present invention as applied to a reciprocating type shaver. As there illustrated, an electric dry shaver, generally indicated at 20, is provided which may be substantially identical to the reciprocating shaver disclosed in copending Jepson application Serial No. 848,102, filed October 22, 1959, now Patent No. 3,090,119, assigned to the same assignee as the instant

application. As in the above-mentioned Jepson patent, the shaver **20** comprises a casing, generally designated at **21**, having attached thereto one or more cutting units specifically illustrated as a multiple shaver head **22** extending almost completely across one of the longer dimensions of the generally rectangular housing or casing **21**. As illustrated, the head **22** is a multiple cutting head comprising generally identical cutting units designated in FIG. 2 of the drawings as **22***a*, **22***b* and **22***c*, joined together to form the cutting head **22**. Each cutting unit comprises a stationary comb **13** and a reciprocally movable cutter **14**. The multiple cutting head **22** comprising the substantially identical individual units **22***a*, **22***b* and **22***c* is arranged as a unitary structure presenting a large cutting surface of somewhat convex configuration, which head may be removed as a unit. This is accomplished by virtue of the comb bracket **25** to which the individual cutting units **22***a*, **22***b* and **22***c* are secured. The cutting head **22** including comb bracket **25** are preferably identical to that disclosed in the above-mentioned Jepson patent.

In view of the somewhat arcuate nature of the comb bracket **25**, the space between the combs adjacent the upper cutting surface is greater than the spaced adjacent the comb bracket. Preferably the space between the cutting heads **22***a* and **22***b* and the space between cutting heads **22***b* and **22***c* is filled by a suitable comb spacer designated as **27**. As best shown in FIG. 5 of the drawings, the comb spacer **27** comprises a U-shaped member having curved flanges **27***a* and **27***b* at the ends of the legs of the U-shaped member, which flanges provide curved spacing members between the combs, as best shown in FIGS. 2 of the drawings. The comb spacer **27** is secured to the bracket **25** by the same means securing cutting unit **22***b* thereto.

In order to cause the cutters **14** of the three cutting heads to reciprocate relative to the stationary combs **13**, there is provided within the casing **21** a suitable prime mover in the form of an electric motor, generally designated at **28**, which motor is preferably identical with that disclosed in the above-mentioned Jepson patent. This motor **28** is illustrated as of the so-called impulse type and no further description thereof is included herein. The motor includes a rotor connected to drive a shaft **30** supporting eccentric **31**. As in the above-mentioned Jepson patent, the motor **28** is suitably secured within a motor chamber **33** defined in the casing **21**, which chamber is below a ledge **21***a* integrally formed with the casing **21**. The casing **21**, moreover, includes integral upwardly extending wall portions **21***b* disposed above ledge **21***a* defining a cutting chamber **34** therebetween for receiving cutting head **22**. The ledge **21***a* defines the periphery of an opening **32** interconnecting the motor chamber **33** and cutting chamber **34**.

For the purpose of drivingly relating the motor **28** and the reciprocating cutters **14**, there is provided an oscillating arm or bell crank, generally designated at **35**, which is pivotally mounted as indicated at **36** to the field structure of the motor **28**. One end of the oscillating arm is drivingly connected to the eccentric **31** in the manner fully disclosed in the above-mentioned Jepson patent. The other end of the oscillating arm **35** is provided with a plurality of driving arms designated as **35***a*, **35***b* and **35***c* which extend into the cutter chamber **34** through the opening **32** and drivingly engage the respective cutter **14** of the cutting units **22***a*, **22***b* and **22***c*, respectively, in a manner well understood by those skilled in the art. Suitable sealing means are provided, generally designated at **38**, through which the arms **35***a*, **35***b* and **35***c* project, which sealing means prevent hair clippings from entering the motor chamber **34** through opening **32**. The sealing means and the associated means for holding the sealing means in position and for simultaneously securing the multiple cutting head **22** in cutting position forms no part of the present invention and may be identical with that disclosed in the above-mentioned Jepson patent.

For the purpose of dispensing a suitable glide agent at the cutting surface of the cutting head **22**, there is provided, in accordance with the present invention, a casing extension **40** which defines a reservoir **41** therein for containing a suitable material such as a liquid or the like which may be dispensed at will at the cutting surface of the shaver **20**. The casing extension **40** is preferably designed so as to be readily secured to the lower end of the casing **21**, as is best shown in FIG. 1 of the drawings. It is important that the casing extension **40** does not substantially increase the size of the shaver. Suitable fastening means, such as **42**, are provided to relate the shaver casing **21** and the casing extension **40** as a unitary structure. It should be understood that instead of defining the reservoir **41** within the casing extension **40** it could be formed within casing **21**. Moreover, casing extension **40** might be made readily removable from casing **21** so that the reservoir **41** is associated with the shaver **20** only when liquid is to be dispensed at the cutting surface of the multiple cutting head **22**. It should be understood that the present invention contemplates either a removable reservoir or a reservoir built as an integral part of the shaver. An important feature of the invention, however, is a reservoir of such size that it will not materially increase the size of the shaving implement and hence will not interfere with the ease of operation. The reservoir **41** is preferably a fluid-tight chamber in which the glide agent may be stored, preferably under pressure, for release at the shaving head, as described hereinafter.

The particular fluid or liquid stored in the reservoir **41** may vary widely, and any liquid that provides a slippery condition between the shaving head and the surface of the body being shaved, such as the face, is satisfactory. The liquid is to be applied during the shaving operation and hence does not remain on the face long enough to produce any conditioning of the beard. Consequently, the liquid need not have any long-term lubricating characteristics. The liquid, for example, may comprise the material disclosed and claimed in a copending application of Frederick Morawetz and Frederick D. Timmons, Jr., Serial No. 181,777, filed March 22, 1962, and assigned to the same assignee as the present application. Actually, liquids comprising alcohol type shaving lotions, plain soap and water, hand lotions, as well as aerosol type shaving soaps have been found to work satisfactorily. The principal objection to using a soapy type of liquid is that it tends to become too frothy. It is contemplated by the present invention to cover any material which reduces the friction between the head and the face and which is generally characterized as a glide agent.

So that liquid under pressure housed in reservoir **41** may be dispensed selectively at the cutting surface of the cutting head **22**, there is preferably housed within the casing **21** a suitable manifold and valve member **44** defining a manifold **45** and a valve chamber **47** interconnected by a passageway **48**. The valve chamber **47** is connected to the reservoir **41** by suitable conduit **49** which preferably extends close to the bottom of reservoir **41**. In accordance with the present invention the flow of fluid from reservoir **41** to valve chamber **47** is controlled by a suitable reciprocally movable valve member **51** adapted to be seated against a valve seat **52** in a conventional manner. The valve seat **52** is illustrated as defined by a shoulder in the valve chamber **47**. The valve member **51** is suitably connected to one end of a valve actuating plunger **54**, the longitudinal axis of which coincides with the longitudinal axis of the valve chamber **47**. The other end of the valve plunger **54** remote from the valve member **51** projects through an opening **56** in casing **21**, which opening is closed by suitable annular sealing member **58** having a central opening for the plunger **54**. A suitable spring **59** normally biases the plunger **54** and, consequently, the valve member **51** to the closed position seated against valve seat **52** (FIG. 2). As illustrated, the spring **59** is a coiled compression spring

concentric with the plunger 54, one end of which engages an enlargement 54a on the plunger 54, while the other end engages a shoulder 60 defined in the valve chamber 47. A suitable O-ring seal 61 prevents any fluid which is permitted to enter the valve chamber 47 upon opening movement of the valve member 51 from passing into the portion of the valve chamber 47 housing the spring 59.

To make it easy for the user of the electric dry shaver 20 to actuate the liquid dispensing valve comprising valve member 51, there is provided a valve actuating lever 62 pivotally mounted as indicated at 63 to projecting ears 21c of the shaver casing 21. The free end of the lever 62, as best shown in FIG. 2 of the drawings, engages the projecting end of the plunger 54. This lever 62 preferably extends across the entire shaver casing 21 so that the user of the shaver may readily engage it with his thumb or fingers to actuate the liquid dispensing valve.

In accordance with the embodiment of the present invention illustrated in FIGS. 1 to 8 of the drawings, fluid under pressure supplied to the manifold chamber 45 upon actuation of the valve member 51 is supplied to dispensing conduits 64a and 64b which are preferably disposed immediately beneath the curved portions 27a and 27b of the comb spacer 27, as best shown in FIGS. 5 and 6 of the drawings. The dispensing conduits 64a and 64b, as well as the curved portions 27a and 27b of the conduit members 27 are provided with suitable aligned openings 66 so that fluid under pressure supplied to the conduits 64a and 64b will be supplied through these openings to the face of the user. The dispensing conduits 64a and 64b are preferably secured as by spot welding or the like in the position indicated in FIGS. 5 and 6 of the drawings.

For the purpose of supplying the fluid from the manifold 45 to the dispensing conduits 64a and 64b, there are provided conduits 67a and 67b which are connected at one common end thereof to the manifold 45 by connecting means 68a and 68b, respectively. The other ends of the conduits 67a and 67b are connected to the dispensing conduit 64a and 64b either directly or through intermediate conduits, such as conduits 69a and 69b, respectively. Preferably the conduits 69a and 69b are formed of metal and are suitably spot welded or otherwise secured to the associated dispensing conduit 64a and 64b, respectively, and suitable openings, designated as 70, interconnect the respective conduit 69a or 69b with its associated dispensing conduit 64a or 64b, as the case may be, in the manner clearly indicated in FIG. 6 of the drawings. If intermediate conduits such as 67a are employed, as is illustrated in FIGS. 2 and 3 of the drawings, then these conduits 67a and 67b may be formed of plastic tubing or the like and connected to the conduits 69a and 69b, respectively, by a sleeve joint, as clearly indicated in FIGS. 2 and 3 of the drawings.

The reservoir 41 has been illustrated as a very small reservoir which will not appreciably increase the size of the shaver 20. It will be appreciated that means must be provided for periodically filling the reservoir with the desired fluid from a larger container of some sort. Since with the arrangement disclosed it is contemplated that a fluid under pressure is employed, the reservoir 41 is illustrated as being provided with a suitable filler valve mechanism (FIGS. 2, 7 and 8), generally designated as 73 through which fluid under pressure may be supplied but which will prevent such fluid from escaping once it is supplied through this valve mechanism. As best shown in FIGS. 7 and 8 of the drawings, the filler valve mechanism 73 is disposed at one end of the reservoir 41, and to afford a connection between the valve mechanism 73 and the exterior of reservoir 41 a suitable opening 74 is provided in the casing extension 40. As illustrated, the valve mechanism 73 includes a tubular molded plastic member 75 open at both ends with an integral flange 75a at one end. The flange 75a is provided on the side thereof, opposite that from which the tubular portion projects, with an annular rib 75b. To define a suitable valve seat, there is provided an annular resilient washer 77 having a small central opening 78 aligned with the opening 74. This washer 77 is clamped between the flange 75a and the end wall of casing extension 40. As illustrated, another gasket 79 is provided on the opposite side of the flange 75a from that where the valve seat defined by washer 77 is located, and suitable means 80 are provided to clamp the valve mechanism 73 in the position best shown in FIG. 7 of the drawings. Cooperating with the washer 77 and normally closing the opening 78 therein is a valve member 82 continually biased to the closed position by a suitable compression spring 83 housed within tubular member 75. Preferably valve member 82 has an annular valve seating surface 82a of larger diameter than either the opening 78 in washer 77 or the opening 74 in casing extension 40.

When it is desired to fill reservoir 41 with a suitable glide agent, a suitable rigid conduit associated with the source of fluid under pressure (not shown) is inserted through the aligned openings 74 and 78 to bias the valve member 82 away from the washer 77, whereupon the fluid under pressure from the source is supplied to the reservoir 41 until the pressures are equalized. Withdrawal of the rigid conduit from the openings 74 and 78 will, of course, permit the spring 83 to bias valve member 82 to the closed position illustrated.

It will be appreciated that with the liquid dispensing means associated with the shaver 20, as described above, some excess liquid may appear on the outside of casing 21. The conventional dry shaver, such as 20, is commonly provided with a starting wheel protruding through an opening in the casing. It will be appreciated that with the conventional starting wheel disclosed in the above-mentioned Jepson patent, when the starting wheel is actuated it is depressed, which, of course, results in the opening in the casing being increased in size and permitting any liquid on the outside of casing 21 to enter therein. The starting wheel mechanism of the present invention, generally designated at 85, is one in which no change in size of the opening occurs upon actuation of the starting wheel and, in fact, a sealed construction against the entrance of moisture is provided. Referring now to FIG. 4 of the drawings, the starting wheel mechanism 85 comprises a sleeve 86 rigidly supported within an opening 87 defined in the casing 21. Rotatably and axially mounted within the sleeve 86 is a shaft 88. Secured to the inner end of the shaft 88 within the casing 21 is a friction wheel 89 which is adapted to engage the armature of the motor 28 in a well understood manner to cause it to rotate slightly for starting purposes. Secured to the end of the shaft 88 projecting outside of the housing or casing 21 is an actuating wheel 90. This actuating wheel 90 is provided with a recess on the underside thereof designated as 91. A suitable compression spring 92 concentric with the shaft 88 has one end disposed in the recess and the other end engaging with a shoulder 93 defined on the casing 21. An O-ring or other suitable sealing member 94 is provided within the sleeve 86 to make sealing engagement with the shaft 88. From the above description it will be apparent that the starting wheel mechanism 85 provides a sealed arrangement for preventing liquid from entering the casing 21 through opening 87. When it is desired to start the motor, the operator depresses and rotates starting wheel 90, which causes the friction wheel 89 to engage and rotate the armature of the motor 28, with the resultant starting of such motor.

In view of the detailed description included above, the operation of the arrangement disclosed in FIGS. 1 to 8 of the drawings will readily be understood by those skilled in the art. When it is desired to dispense a suitable glide agent at the cutting surface of the shaver, the operator actuates the lever 62 and the liquid is dispensed through the openings 66 against the face of the user. The openings 66 may cause the liquid to be dispensed directly

against the face, in other words, with the stream of liquid being directed perpendicularly to the surface over which the shaver is moving or it could be directed at an angle. As illustrated in FIGS. 5 and 6 of the drawings, one set of openings may direct the liquid directly against the face of the user while other openings direct the liquid at an angle.

Although the control of the liquid flow has been illustrated as by a manual On-Off valve comprising valve member **51**, it should be understood that variable flow control means might be employed or a metering valve might be employed which delivers a known quantity of liquid each time the valve is actuated. Obviously, however, automatic regulation of the liquid flow might be employed and the electric shaver **20** is illustrated as comprising the usual rollers **95** at the extreme edges of the cutting head **22**, which may be depressible in accordance with the arrangement disclosed in the above-mentioned Jepson patent. If it is desired, the depression of one or both of these rollers **95** may be utilized to actuate a suitable liquid dispensing valve and the amount of liquid dispensed may be controlled by the pressure applied to the cutting surface causing actuation of these rollers. It will be understood, of course, that the motor **28** might be utilized to actuate a suitable pump so that whenever the motor is energized a predetermined amount of liquid would be supplied at the openings **66** by virtue of such pump.

In the arrangement described above the glide agent to be dispensed is stored in a reservoir associated with the shaver itself. It should be understood that the glide agent may be stored in a separate container connected to the shaver at the desired time by suitable conduit means. Such an arrangement is disclosed in FIGS. 9 to 11 of the drawings and described hereinafter. Furthermore, instead of storing the liquid under pressure in the reservoir **41** or a separate reservoir connected to the shaver at the desired time, the liquid may be inserted in such reservoir and then a charged gas, such as a CO_2 capsule, may be used to furnish the desired pressure for forcing the liquid to the shaving head. If desired, the charged gas, instead of forcing the liquid to the shaving head, may be used in an aspirating type arrangement to draw the liquid to the shaving head in a manner well understood by those skilled in the art. It should also be understood that the reservoir may be elevated so that fluid flow to the shaver is by virtue of gravity.

Referring now to FIGS. 9 to 11 of the drawings, there is illustrated a modification of the present invention where the liquid dispensing means is associated with a shaver of the oscillating type. As there illustrated, there is disclosed an electric shave **96** which, except for the addition of the liquid dispensing means, may otherwise be identical with the shaver disclosed in copending Jepson and Schuessler application Serial No. 109,551, filed May 12, 1961, and assigned to the same assignee as the present application. As disclosed in the above-mentioned Jepson and Schuessler application, the shaver **96** comprises a casing **97** housing a suitable electric motor (not shown). The casing **97** comprises a cup-shaped member **97***a* and end caps **97***b* and **97***c*. Between the end caps **97***b* and **97***c* is a cutting head generally indicated at **98**. This cutting head comprises an oscillating shaft **99** journalled in suitable bearings forming a part of the cutting head **98** and fully described in the aforementioned Jepson and Schuessler application. The oscillating shaft **99** is suitably connected by driving means generally designated at **100**, comprising a conventional connecting rod, crank arms, etc., with the electric motor housed in casing **97**. Rigidly supported from the oscillating cutter shaft **98** are a plurality of blade supporting members **101***a*, **101***b*, **101***c* and **101***d* which are provided with suitable aligned slots for supporting a plurality of blades **102**, specifically designated as **102***a*, **102***b* and **102***c*. These blades are oscillated in shearing engagement with a suitable perforated comb generally designated at **102**, the comb being of arcuate configuration and secured to the casing by suitable comb locks **104** and **105**. Suitable spring means **106** bias the cutting blades **102** against the comb **103** and the hair to be cut enters perforations in this comb and is sheared by the blades **102**. In accordance with the present invention, the oscillating cutter shaft **99** is provided at one end with a tubular extension **99***a* extending through an opening **108** in end cap **97***b*. Moreover, the cutter shaft is provided with a bore **109** within the tubular extension and extending at least beyond the center of this shaft, as best shown in FIG. 10 of the drawings. A suitable sleeve **110** and a sealing gasket **111** preferably surround a portion of the projecting extension **99***a* of the oscillating shaft **99**. The tubular extension may readily be connected with a conduit **113** to a source of glide agent under pressure indicated generally at **114**. It will be understood that the source **114** may be one of the well-known aerosol type dispensers which upon depression of the member **115** at the upper end thereof will cause liquid to be dispensed under pressure through the conduit **113** and to the hollow bore **109** within the oscillating shaft **99**.

In order that liquid supplied under pressure to the bore **109** in the oscillating shaft **99** may be dispensed at the cutting surface, a pair of dispensing tubes **116***a* and **116***b* are provided which are supported for oscillation with the shaft **99** and are connected to the bore **109**. These dispensing tubes **116***a* and **116***b* preferably terminate closely adjacent the inside surface of the comb **103** and preferably adjacent elongated openings **117** defined in the comb so that the liquid is dispensed against the face of the user, for example, through these openings. In FIG. 9 of the drawings a suitable power cord **118** is illustrated as connecting the shaver **96** to a suitable source of electric power, such as the conventional electric outlet, generally designated as **119**. It will be appreciated that the flexible tube **113** and the power cord will permit the user to use the shaver in any desired manner. If desired, the container **114** may be a container disposed at an elevation such that the hydraulic head will cause the liquid to be supplied to the shaver. In such case, a suitable valve adjacent the shaver would be provided to control the flow of liquid to the dispensing tubes **116***a* and **116***b*. It will be appreciated that the shaver **96** could be modified in the manner of the shaver illustrated in FIGS. 1 to 8 of the drawings so as to have a built-in reservoir and a control valve for supplying the liquid to the hollow oscillating shaft **99**. In such case the extension **99***a* would terminate inside the casing **97** and connection through a flexible tubular member with a reservoir within the shaver could readily be accomplished.

In FIGS. 12 and 13 of the drawings there is illustrated another embodiment of the present invention wherein liquid dispensing means are associated with an oscillating shaver which, again, may be identical with that disclosed in the above-mentioned Jepson and Schuessler application, and the shaver is generally designated by the same reference numeral **96**. The corresponding parts of FIGS. 12 and 13 are designated by the same reference numerals as in FIGS. 9 to 11. Instead of supplying the liquid through the hollow oscillating shaft, a plurality of liquid dispensing tubes **120**, specifically designated as **120***a*, **120***b*, **120***c* and **120***d*, are secured in spaced relationship to the inside surface of the comb **103**, each of these tubes being curved to conform to the comb shape, as best shown in FIG. 13. It will be appreciated that the blades **102** must be provided with suitable notches so as not to interfere with the dispensing tubes **120**. As illustrated in FIGS. 12 and 13 of the drawings, the dispensing tubes **120** are disposed at portions of the comb where no openings are provided, and then suitable dispensing openings **121** are pro-

vided through both the comb **103** and the walls of tubes **120**. In the specific embodiment illustrated in FIGS. 11 and 12 of the drawings, four dispensing tubes **120** are provided, although fewer than that number may be utilized, as desired. As illustrated, the dispensing tubes extend through openings **122** in comb lock **105** and are connected by tubes **123** with a manifold **127**, which in turn may be connected by the tube **113** to a source of fluid under pressure, such as **114** shown in FIG. 9 of the drawings. It will be appreciated that the dispensing tubes **120** could be connected to a reservoir built into the shaver casing **97** rather than connected to an exterior reservoir, in which case the openings **122** in comb lock **105** are unnecessary.

In view of the detailed description included above, it is apparent that there has been provided an arrangement in which a suitable glide agent is dispensed at the cutting surface of an electric dry shaver. Although the application of the present invention to a rotary type dry shaver has not been illustrated, it will be understood by those skilled in the art that the present invention could equally well be applied thereto by supplying the fluid through a hollow shaft or the like.

While there have been illustrated and described several embodiments of the present invention, it will be apparent to those skilled in the art that numerous changes and modifications will occur, and it is contemplated by the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In an electric dry shaver, the combination of a casing, an electric motor mounted in said casing, an arcuate comb secured to said casing, a cutter shaft journalled in said casing, a cutter blade supported by said shaft for movement in shearing engagement with said comb, means drivingly relating said shaft and said motor to cause oscillation of said shaft and said blade, means comprising a bore in said shaft, a conduit projecting from said shaft and connected to said bore, the end of said conduit remote from said shaft terminating adjacent the inside surface of said comb, said comb being provided with a slot at the terminus of said conduit, and means for supplying a friction reducing substance under pressure to said bore.

2. The electric dry shaver of claim 1 wherein said friction reducing substance is a liquid.

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WILLIAM FELDMAN, *Primary Examiner.*

MYRON S. KRUSE, MILTON S. MEHR, *Examiners.*