March 9, 1965 H. H. SIMMONS 3,172,416

CLEANING DEVICE FOR ELECTRIC RAZORS

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Fig. 1.

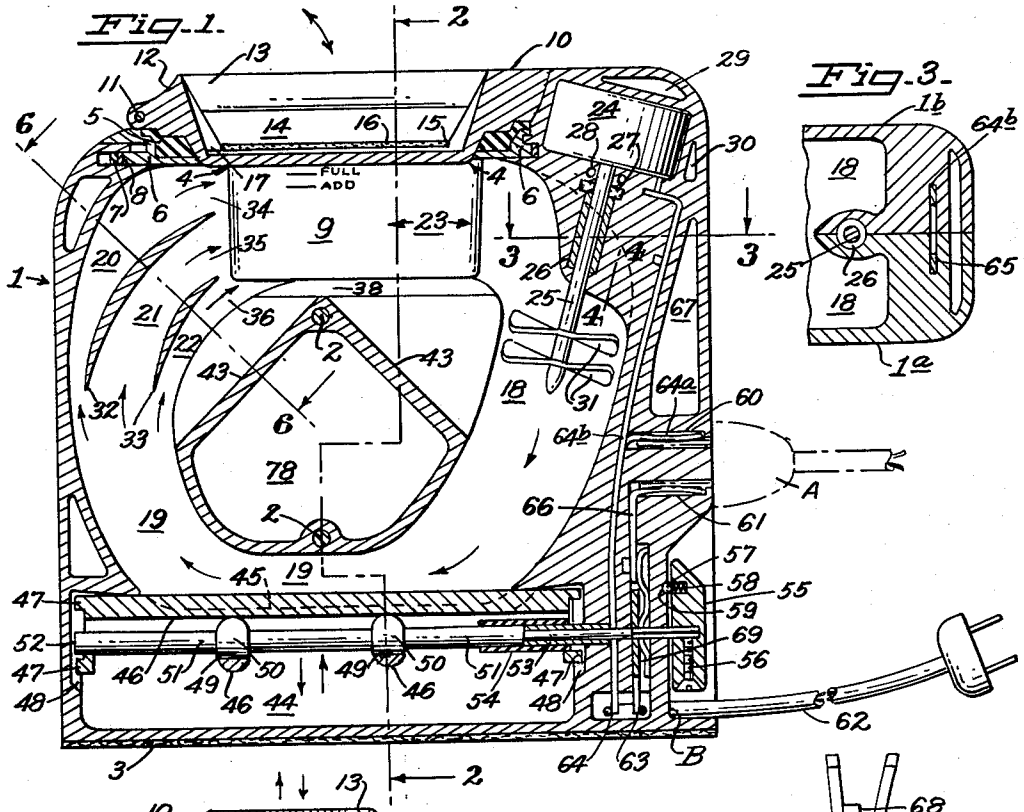

Fig. 3.

Fig. 2.

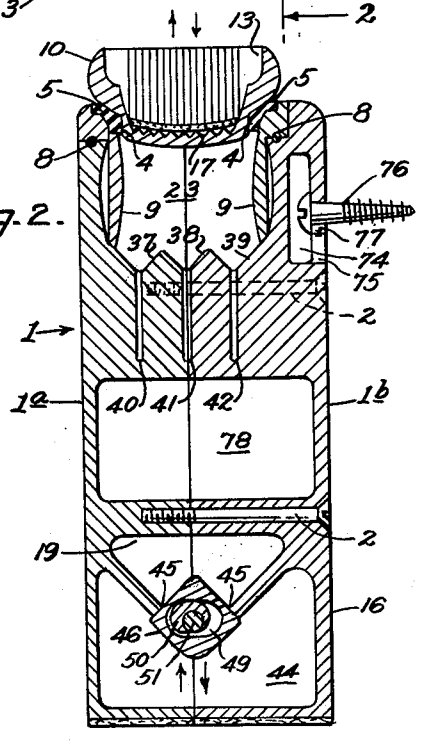

Fig. 4.

Fig. 5.

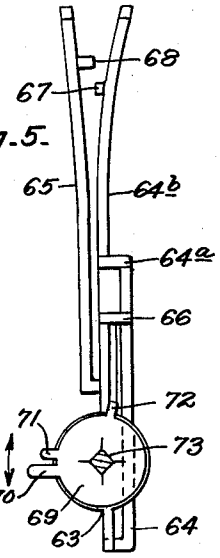

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Fig. 7.

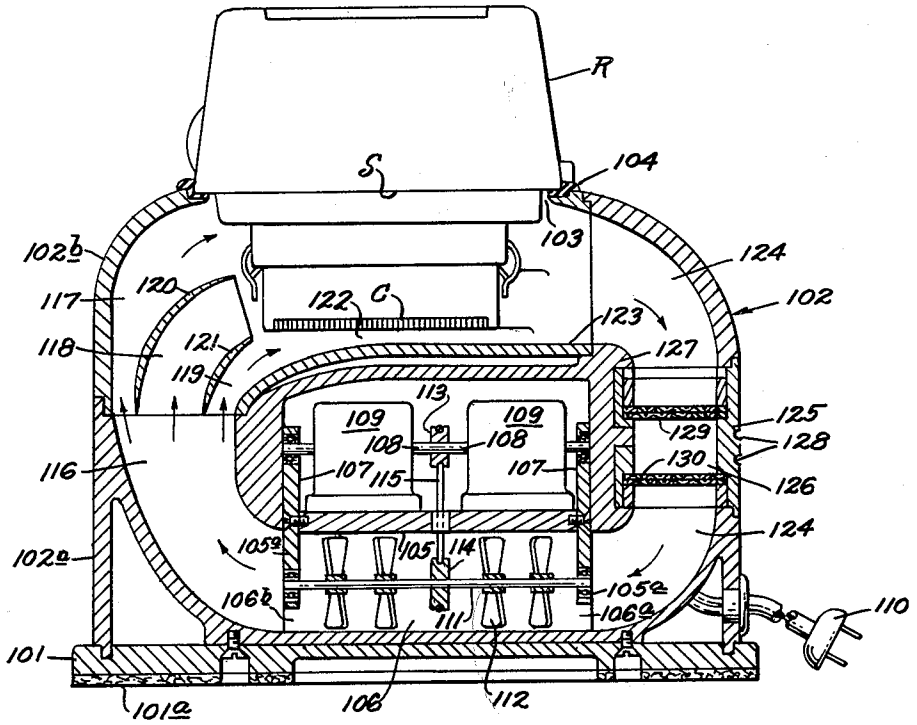
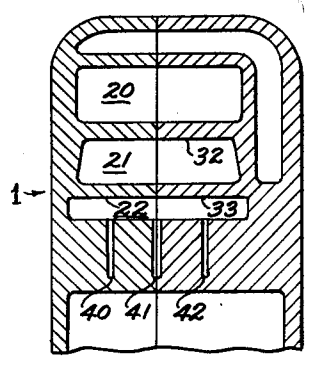


Fig. 6.



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3,172,416

CLEANING DEVICE FOR ELECTRIC RAZORS

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12 Claims. (Cl. 134—111)

This invention relates to improvements in electric razor cleaners and is particularly directed to a compact, self-contained cleaning device for electric razors.

The present application is a continuation in part of my co-pending application Serial No. 117,993, filed June 19, 1961 and allowed May 14, 1963, now forfeited, for a Pneumatic Electric Razor Cleaner, such application having been filed under my former name, Herbert Simonsohn.

While it is well known that various types of cleaning devices utilizing a suitable cleaning medium have been used for many purposes, there still remains a need for a simple, compact cleaner which will effectively and speedily dislodge and remove hair and other particles from the cutters and adjacent parts of an electric razor.

The present invention has for its primary object the provision of a single, compact and efficient cleaning device which is capable of fulfilling the aforementioned needs and which may also serve as a razor stand. Simplicity of manufacture and ease in assembly are noteworthy characteristics of the present invention.

To accomplish this object, the inventive improvement resides in the provision of a self-contained means for directing currents of a suitable cleaning medium such as liquid or air against the cutters and the adjacent parts of an electric razor so as to dislodge hair and other particles and convey the same to a particle collecting or retaining means such as a sediment trap, perforate filter or the like.

More specifically, the invention contemplates the provision of a casing formed with an opening adapted to receive the cutter portion of an electric razor, suitable channel or chamber means within which circulating currents of a suitable cleaning fluid are directed, preferably at high velocity, into contacting relationship with the cutters and adjacent supporting portion or housing of the razor, one or more fluid impelling members for propelling the fluid through the chambers, and hair and other particle collecting means attached to the chamber or channel means to collect and retain hair and other particles dislodged and carried from the cutters.

Another object of my invention is to provide for the disinfection and the lubrication of such an electric razor by the addition of a suitable lubricating, wetting or other agents to a suitable cleaning medium.

Other and further objects of my invention will be pointed out hereinafter or will be indicated in the appended claims or will be obvious to one skilled in the art upon an understanding of the present disclosure.

For the purpose of this application, I have elected to show herein certain details of two (2) species of a cleaning device for electric razors which are representative of my invention; it is to be understood, however, that the embodiment of my invention herein shown and described is for purposes of illustration only, and that therefore it is not to be regarded as exhaustive of the variations of the invention in the art.

In the accompanying drawings:

FIG. 1 is a vertical sectional view taken longitudinally and substantially centrally through a cleaning device for electric razors utilizing a cleaning liquid as a cleaning medium;

FIG. 2 is a sectional view taken on the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken on the line 4—4 of FIG. 1;

FIG. 5 is a side elevational view of the electric switch and wiring connections;

FIG. 6 is a sectional view taken on the line 6—6 of FIG. 1;

FIG. 7 is a vertical sectional view taken longitudinally and centrally through a cleaning device for an electric razor utilizing an air stream as a cleaning medium.

A broad visualization of such electric razor cleaning device reveals that it comprises:

A structure definable as a cleaning chamber capable of retaining a suitable cleaning medium which may be agitated or circulated continuously while the device is in operation, and one (1) or more, but not necessarily restricted to, such elements as:

Particle collecting or accumulating means such as sediment traps, perforate filters, magnetic or gummed surface collectors or the like, capable of collecting or retaining hair and other particles; fluid impelling means capable of propelling or agitating a suitable cleaning medium within the internal chamber or chambers of the device; a structure in the cleaning device having an opening adapted to admit and preferably hold an electric razor of predetermined size and shape in a position with the cutters and/or the cutter supporting portions of such a razor disposed inside the cleaning device in a cleaning zone, the opening of such structure being preferably adapted in shape and dimension to provide a substantial seal between such structure and such razor portions, such opening being preferably located in a removable and exchangeable portion of the cleaning device to adapt the device to accommodate different razor models and types; a channel structure defining a continuous or closed circuit fluid conveying channel system, the term "closed" being interpreted as operatively closed when a razor is positioned therein; any structural element constituting or connecting, wholly or in part, the internal elements of such a razor cleaning device is to be understood as coming within the scope of the term "casing" as used herein; sealing means, preferably movably suspended, for the particle collecting means as described, and to be of a shape and dimension necessary to seal such particle collecting means effectively, and preferably temporarily, from the fluid circulating chambers or channels; a preferably resilient gasket or lining member, portions or all of such member conforming generally in shape and size to portions of two (2) or more cooperating elements, such as the sides of an opening in the cleaning device and a peripheral portion of an electric razor of predetermined size and shape. The extent of such adaptation is understood to be of shape, proportion or location necessary in order to secure a substantial seal between such elements; a replaceable section in the cleaning device containing a razor receiving opening, such replaceable section possibly, but not necessarily, also comprising all or part of a passageway definable as a cleaning chamber and/or all or part of a passageway containing separating partitions, vanes or the like, definable as a self-contained nozzle section; closure means, preferably, but not necessarily, rotatably suspended, for the razor receiving opening in the cleaning device, such closure means conforming wholly or in part to portions of the cleaning device to an extent necessary to provide a substantially tight seal for the razor receiving opening, with the possible exception of small perforations desirable for pressure relief; a structure on or about the cleaning device containing means conforming dimensionally to an external portion of such an electrical razor to an extent necessary to provide a seat, holding means or depository for such

razor; a structure on or about the cleaning device containing a recess of proportions and shape adapted to receive moisture absorbent and/or padded material, such structure preferably having air circulating passageways next to such moisture absorbent material for ventilation purposes.

Referring to the drawings, and particularly to FIGS. 1–6, the numeral 1 designates a suitably shaped casing adapted to hold a cleaning solution, consisting preferably of a front section 1*a*, and a rear section 1*b*, which are secured one to the other as by screws 2, 2 or by an adhesive (not shown). A resilient padding 3 may be secured as by an adhesive to the bottom of the casing, or to its rear side (not shown), depending on the intended method of supporting the cleaning device. The top side of the casing is provided with an opening 4 of suitable size and shape to admit portions of an electric razor into the casing, the sides of said opening being adapted to engage in very close relationship with portions of such an electric razor. An annular resilient gasket or lining member 5, part of it conforming in shape to a peripheral portion of the razor with which it is intended to engage, is secured to the sides of the opening 4 to provide a firm and vibration-absorbent seat for the razor and to prevent fluid from entering or escaping from the interior of the casing.

The upper section of the casing having a razor-receiving opening 4 is preferably removably attached to the casing as by tongue and groove means 6, 6 or other effective arrangement, held in place by a spring or springs 7, with preferably resilient members 8, 8 providing a fluid seal. The upper section of the casing is further provided with longitudinal walls 9, 9 extending substantially parallel to the opening 4 and into the casing, such walls having their interior sides suitably shaped to provide narrow passageways extending alongside the cutters and possibly adjacent portions of the predetermined razor model to be inserted through the said opening and positioned between such walls. The upper section of the casing having the razor-receiving opening may further be provided with a movable lid or cover 10, preferably attached to the casing for swinging movement, as by a pivot pin 11. A portion 12 of such lid is suitably shaped to arrest the lid's opening movement when it assumes an inverted and substantially horizontal position, the said lid then providing a temporary depository platform for a razor's cutter guard. Central portions of the lid 10 preferably extend well into the opening and in close relationship with the surface level of the cleaning liquid normally contained in the cleaning device, to inhibit the evaporation of such liquid. The lid may also be provided with one or more recesses including a recess 13, adapted to provide a seat and stand for a completely assembled predetermined electric razor model, a recess 14 suitably shaped to permit the insertion of the bared cutter portion of such a razor, a recess 15 preferably provided with a soft and/or moisture-absorbent material 16, such as a blotter sheet, and one (1) or more grooves or passageways 17 extending next to and possibly beyond such moisture-absorbent material for purposes of proper ventilation.

The casing encloses a liquid circulating or agitating chamber or chambers consisting preferably of a series of continuous passageways, channels, or duct sections 18, 19, 20, 21, 22, 23, forming a closed circuit channel system when an electric razor has been inserted into the casing's opening 4, for the continuous circulation of a suitable cleaning medium. All wall portions of such liquid circulating chambers which actually support the weight of the cleaning liquid preferably slope downwardly toward a particle collecting means 44 in the lower portion of the casing, at a sufficient angle to prevent accumulation of sediment and to facilitate the passage of sediment toward such particle collecting means 44.

A cavity in the casing provides enclosure and support means for the liquid impelling assembly comprising such

elements as a motor 24, a drive shaft 25 rotatably supported in a bearing sleeve 26, a grease-holding recess 27, and draining passages 28. Passageways 29 and 30, open preferably at the rear of the casing, provide adequate ventilation for the motor 24, which is normally activated for very short periods at infrequent intervals. Drive shaft 25, having impeller blade or blades 31 secured thereto, extends into channel section 18. With the rotation of drive shaft 25 and impeller blades 31, liquid is drawn from channel section 23 into channel section 18 and expelled at high velocity into the contiguous channel section 19, passing therethrough and entering the generally parallel channel sections 20, 21, 22, to be discharged from these into channel section 23, and from there to be recirculated.

The connecting passageway between channel sections 19 and 23, to be designated an internal self-contained nozzle section, may be divided into two (2) or more generally parallel, tubular sub-channels as at 20, 21, 22, by preferably razor edged and thin partitions 32, 33 or the like. The outlet ports 34, 35, 36 of sub-channels 20, 21 and 22 connecting with channel section 23 may conform in cross-sectional shape and size to the respective portions of a predetermined razor model intended to be brought into substantial alignment with these outlet ports. One (1) or more of the tubular sub-channels 20, 21 and 22 of such internal nozzle section may have either a gradually increasing or a gradually decreasing cross-sectional area, or a constant cross-sectional area in the direction of fluid flow, whereby the velocity of the fluid streams passing therethrough may be increased, decreased or held constant, respectively. A nozzle section having a predetermined combination of such sub-channels will thus be able to convert a uniform velocity main current entering from the channel section 19 into several sub-currents of differing velocities, differing volumes and differing shapes and directions discharging into channel section 23, according to predetermined requirements.

Channel section 23, designated herein as a cleaning chamber, is formed by side walls 9, 9, a top portion having the razor-receiving opening 4 therein, and a bottom portion. To obtain a sufficient slope of the latter while at the same time maintaining a longitudinally and laterally narrowly spaced relationship between the bottom portion and the electric razor inserted into the cleaning chamber, the bottom portion is formed with one (1) or more longitudinal and elongated troughs 37, 38, 39, having grooves 40, 41, 42, each having a slanting bottom 43 as its base, all having a sufficient slope toward the particle collector 44 to facilitate the passage of sediment.

An internal chamber 44 in the casing herein, designated a particle collector or accumulator, is provided with a connecting passageway or opening 45 leading to the fluid circulating chambers, such passageway being temporarily closed, preferably during circulation of the cleaning medium in the circulating chamber or chambers, by a suitably shaped and adjustable sealing member such as a bar 46, having lateral protrusions 47, 47, which are arranged in suitable grooves 48, 48 to restrict its movement into and out of a sealing position. The top portion of the sealing member 46 likewise is slanted sufficiently to prevent accumulation of sediment thereon. Suitably shaped perforations 49, 49 in a portion of the sealing member permit the engagement with eccentric protrusions 50, 50 keyed to a rotatable shaft 51, so that, dependent on the direction of rotation of this shaft, the sealing member 46 may be moved to close or open the connecting passageway 45. One end of shaft 51 is journaled in a suitable depression 52 in a wall of the particle collector. The other end portion of the shaft 51, preferably having a smaller diameter, extends through a stationary sleeve 53 which is secured firmly to a side wall of the particle collector. A short length of preferably tightly fitting resilient tubing 54, extends partly over the stationary sleeve 53 and also partly over a portion of the rotatable

shaft 51, to provide a liquid seal. An extension of shaft 51, extending through the walls of the particle collector and the casing, terminates in and is fastened to, an electric switch knob 55 as by a set screw 56. A ball 57, held under pressure by a spring 58, is contained in a suitable recess in the switch knob 55, and such ball is adapted to engage alternately, and under pressure, in any one of preferably three (3) suitable indentations 59, in the casing wall in a customary click stop, knob retaining arrangement.

Recesses 60 and 61 in one side of the casing provide an electric socket which is adapted to receive the prongs of a standard electric plug A, attached to the electric cord of an electric razor.

Suitably shaped cavities in the casing provide enclosure and support means for the electric wiring and switching assembly which may be arranged in the following manner: One (1) terminal of an electric current supply cord 62, entering the casing at B, is firmly attached to a stationary plate 63, having current conducting properties. The second terminal of the electric current supply cord 62, entering the casing at B, is firmly attached to a current conducting strip or wire 64, having preferably two (2) upward extensions, one (1) of which, 64*a*, extends upwardly and into the recess 60, to supply current to one (1) terminal of the electric socket, the other upward extension 64*b*, connecting with one (1) terminal of the motor 24. Another current conducting strip or wire 65 extends from the second terminal of the motor 24 downwardly into the proximity of but not touching the plate 63. Yet another current conducting strip or wire 66 extends from the recess of socket terminal 61, downwardly into the proximity of but not touching the plate 63. Angular protrusions 67 and 68 carried on the current conducting strips 64*b* and 65 prevent their lateral movement.

A current conducting rotatable plate or disk 69, in contact with the plate 63, is preferably provided with suitably shaped protrusions 70, 71 and 72, preferably having springlike characteristics which, upon rotation of disc 69, may engage with or disengage from the current conducting extensions of either one (1) motor terminal, or one (1) socket terminal, or both. The rotatable disk 69 preferably has a square-shaped central perforation 73, snugly receiving a square-shaped portion of the rotatable shaft 51, so that upon rotation of such shaft by means of the knob 55, a circuit opening and closing means is provided which is synchronized with the movements of the sealing member 46, when opening or closing the particle collector 44.

To permit the cleaning device to be mounted on a wall, the casing is provided with one (1) or more cavities 74 communicating with large openings 75 adapted to receive the head of a screw or screws 76, the said large opening or openings connecting with narrow slot-like openings 77, the said screws usually being secured to and extending from a bathroom or other wall.

The central hollow chamber 78 of the cleaning device may have a front opening (not shown) of suitable size and shape, which may be used as a temporary depository area for an electric razor's cutter guard.

It should be noted that all or portions of the cleaning device may be made of transparent material so that the cleaning operation may be observed, particularly, however, in order to determine when the particle collecting means has been filled to capacity. Illuminating means (not shown) may also be incorporated into the device.

With the suction force of the impellers being equal to their propelling force in this closed circuit channel system, a penetration of the cleaning liquid into the higher portions of the electric razor is impossible. If so desired, however, the removable porous surface sponge cushion which all electric razors of the type mentioned have between the cutters and their supporting structure, may be replaced by an identical cushion having, however, a sealed surface, or a wholly or partially elastic thin membrane may be supplied, such membrane being somewhat larger than the opening in the motor housing of the razor and preferably having centrally located elastic sleeves fitting tightly around the oscillating prongs which agitate the razor cutters, with the membrane portion covering said opening and surrounding said sleeves, having sufficient bulges or folds to permit unhampered oscillation of the prongs. It should be noted, however, that such provisions are unnecessary under normal conditions.

To prepare the cleaning device for repeated cleaning operations, a suitable cleaning liquid such as Isopropyl Alcohol (Rubbing Alcohol, seventy to ninety-one percent (70–91%)), to which a small amount of additives such as a wetting agent and a razor lubricant may or may not be added, is poured into the opening 4, after opening of the lid 10, until the liquid level reaches the indicating mark "full" on the side of the cleaning chamber wall 9. The device is then ready for operation after connecting it to an electric power outlet. Normally, an electric razor, whose cord has been plugged into the outlet socket 60, 61 is "cradled" in an inverted position in the recess or seat 13 in the lid 10 at the top of the cleaning device.

To commence operation, the electric razor is lifted from its cradle, and the switch knob 55 is rotated from its "off" position to an intermediate position. This action will lift the sealing member 46 and seal the closed circuit channels from the particle collector 44, and at the same time an electrical current is allowed to flow to outlet 61 and thus to the razor to activate its cutters. The razor may then be used for shaving in the usual manner. After completion of the shaving operation, the lid 10 is opened, the cutter guard, if any, is removed from the razor and deposited on the inverted open lid 10, which is now supported in a horizontal position. The razor's cutters, pointing downwardly and still activated, are then inserted through the opening 4, into the cleaning chamber 23, until they are firmly seated on and held by the resilient sealing member 5. The switch knob 55, is then rotated further to the third and "on" position which, while keeping the cutters still activated, also activates the impeller blades 31 in the closed circuit channels, thus circulating the cleaning liquid continuously within the said channels at high velocity. The hair particles adhering to the cutters and adjacent parts of the razor are flushed from these parts by the fast moving liquid stream, aided by the cutter's own oscillating action. When the cutters have been cleaned, usually after about twenty (20) to thirty (30) seconds, the switch knob 55 is then returned to the intermediate position, which will de-energize the impellers 31 and discontinue the forced circulation of the cleaning liquid. After a few seconds, the now cleaned, disinfected and lubricated razor is lifted out of the cleaning chamber and with the cutters still reciprocating, is drained for a few seconds over the opening 4. The opening is then closed by the lid 10, and the razor, still inverted, is inserted within the recess 14, at the top of the lid 10. The absorbent material 16 at the bottom of the recess 15 will further absorb possible drainage of the few remaining droplets, if any, of the normally volatile cleaning liquid. The switch knob 55 is then returned to the "off" position, thereupon disconnecting the electrical power supply to the razor and at the same time opening the passageway 45 from the particle collector 44 to the closed circuit channel system. All liquid supporting portions of the channels being inclined toward the particle collector at suitable angles, the now sterilized hair particles, having a higher specific gravity than the above named or other suitable cleaning liquid, will precipitate into said particle collector during the interval between normally spaced cleaning operations, thus leaving the liquid in the closed circuit channels clear and clean for the next cleaning operation.

These cleaning operations may be repeated again and again over a period of time until the particle collector has been filled to capacity. The transparent walls of the particle collector (or of the entire device) will aid in determining when the full point has been reached. At such time, the cleaning device (wall model) is lifted slightly

to permit the holding screws 77 to slide from their retaining slots 76. The device is then removed from the supporting wall after disconnecting the power supply; the lid 10 is opened and the cleaning liquid drained from the device through the opening 4. Repeated filling with and draining of water will aid in the removal of all foreign matter. After final draining, the device will be refilled with proper cleaning liquid for further service as previously described.

It should be noted that the basic principles involved in the present invention are similar regardless of whether liquid or air is used as a cleaning medium. However, while the device heretofore described is particularly adapted to utilize a cleaning liquid, adaptation of some of the features to the use of air as a cleaning medium will presently be described. In the embodiment of my invention shown in FIGURE 7, the numeral 101 designates a structurally rigid base having a resilient pad 101*a* secured as by an adhesive to its lower side. Secured as by screws to the base 101 is a suitably shaped casing 102, which preferably comprises a lower section 102*a* and an upper exchangeable section 102*b*, which are secured one to the other by screws or a suitable locking device (not shown). The top side of the casing section 102*b* is provided with an opening 103 of suitable size and shape to receive that portion of an electric razor housing R which carries one (1) or more sets of cutters C, such razor housing having a peripheral shoulder S, which firmly seats upon a resilient ring-shaped gasket or member 104 secured to the edges of the opening normally to prevent air from entering or escaping from the interior of the casing.

Supported centrally in the casing 102 and firmly secured to the base 101 is a supporting structure 105 which is formed with a horizontally disposed channel 106 extending therethrough. The supporting structure comprises opposed upright members 107, 107 which support suitable bearings within which the ends of a rotatable drive shaft 108 are journaled. The shaft 108 is connected to and rotated by one or more electric motors 109 which are secured to and supported on the supporting structure 105. The motors 109 are electrically connected in the usual manner to an electric connector plug 110, and a switch (not shown) connected in the circuit provides convenient means on the casing for controlling the operation of the motors. Small holes are preferably provided in the lower section 102*a* of the casing, preferably at opposite sides of the motors 109, to permit the discharge of air which is heated by the operation of the motors. Extending longitudinally through the channel 106 is a driven shaft 111 which has a plurality of fan or impeller blades 112 secured thereto. The driven shaft is rotatably supported at its ends within suitable bearings carried by depending members 105*a*, 105*a* forming parts of the supporting structure 105. Keyed to the shafts 108 and 111, respectively, are pulleys 113 and 114 which are operatively connected by an endless belt 115. With the rotation of the fan blades 112 by the electric motors 109, air is drawn into the channel 106 through the inlet opening 106*a* and expelled through the outlet opening 106*b*.

The interior of the casing 102 is provided with suitably shaped partitions which together with the casing define a series of channels for the circulation and recirculation of a high velocity current of air for purposes of dislodging and removing hair and dust particles adhering to the cutters and the adjacent sides of the razor housing. Connected to the outlet opening 106*b* of the channel 106 is a duct 116 leading upwardly and divided into a plurality of channels as at 117, 118 and 119, which are formed within the upper section 102*b* of the casing by means of curved partitions 120 and 121. The channels 117, 118 and 119 have different sizes and shapes, and each communicates with a zone or area 122 which is partially enclosed by a wall structure 123 which is suitably contoured in accordance with the general shape of the cutters C and the adjoining portions of the razor housing R. The air discharging from zone 122 enters an air duct 124 which connects with the inlet opening 106*a* of the channel 106.

Mounted in a suitable opening provided in an end of the casing 102 is an air filter supporting drawer 125 which has a vertical channel 126 through which air proceeding through the duct 124 is adapted to flow. The filter supporting drawer 125 is adapted to fit into a suitably shaped structure 127 in the casing, and finger grooves 128 in the sides of 125 provide means for withdrawing the drawer when the filters are to be cleaned.

Supported by the filter supporting drawer 125 in positions extending across its channel 126 are vertically spaced perforate air filters 129 and 130. The air duct 124 gradually assumes narrow proportions as it extends from the zone 122 toward its lower extremity, and as a consequence the upper filter 129 is larger in area than the lower filter 130.

It is to be noted that the casing is provided with an air duct section having a self-contained air nozzle so constructed as to embody internally arranged asymmetric air stream subdividing partitions, having longitudinally and laterally progressively changing structural patterns varying one from another as to cross-sectional size, shape and contour. It is also to be noted that a closed circuit is provided in the casing for the continuous circulation of air as will be presently described.

To commence the cleaning operation, the electric razor is positioned in the opening 103 of the casing 102 with its cutters reciprocating in the usual manner. When the electrical circuit is closed and the electric motors 109 are energized, the fan blades 112 discharge air into the air duct 116 with considerable velocity and at the same time draw air from the duct 124 into the channel 106. The moving air from the duct 116 is divided into a plurality of air streams by the partitions 120 and 121, and such air streams are conveyed through the channels 117, 118 and 119 into and through the zone 122. The hair and dust particles adhering to the cutters and the adjacent sides of the razor housing R are dislodged by the fast moving air stream and carried thereby into the duct 124. The hair and dust particles are intercepted and retained by the air filters 129 and 130 as the air stream flows downwardly through the duct 124, and the channel 126 in the drawer 125, to the inlet 106*a* of channel 106.

When the cleaning operation has been completed, the electrical circuit is broken by opening the electrical switch. The drawer 125 may be withdrawn from the casing when the filters 129 and 130 require cleaning.

It is to be noted that in the examples shown, the cleaning devices are adapted for use in cleaning a certain type or make of electric razor. By utilizing the principles of the present invention, suitable modifications may be made in the construction of the partitions and in the shape of the casing and its razor seat to accommodate other types and makes of electric razors.

The term "hold" used herein with respect to the opening in the casing which is adapted to receive portions of an electric razor means that the sides of such opening restrict, at least partially, the movement of the razor portions brought into juxtaposition with the sides of the opening.

Although I have described my invention with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What I claim is:

1. In a cleaning device for electric razors of predetermined size and shape, a casing having a replaceable section, the casing enclosing a closed circuit fluid conveying duct adapted to have a fluid stream circulated therein, fluid propelling means in the casing for directing a fluid stream through the duct, the replaceable section of the casing having an opening dimensionally adapted to receive

and hold such an electric razor in a position with its cutters located in the duct, and particle collecting means in the casing connected to the fluid conveying duct and adapted to accumulate hair particles carried by such fluid stream from such razor.

2. In a cleaning device for electric razors of predetermined size and shape, a casing enclosing a closed circuit fluid conveying duct wherein a fluid stream is adapted to be circulated, an opening in the duct adapted dimensionally to receive and hold portions of such an electric razor with its cutters positioned in the duct, the opening having a resilient member disposed between the sides of the opening and such razor, portions of such resilient member being adapted dimensionally to conform to a peripheral portion of such a razor to form a substantially close fitting seat therefor, fluid impelling means arranged in the duct for propelling a fluid stream through the duct, and particle collecting means connected to the duct and adapted to accumulate particles carried by such fluid stream from the cutters of such razor.

3. In a cleaning device for electric razors of predetermined size and shape of the type having at least one set of aligned cutters, a casing having an opening adapted dimensionally to hold snugly such a razor in a position with its cutters disposed inside the casing, the opening being adapted to be substantially closed by such razor positioned therein, a structure positioned within the casing defining in combination with such casing a closed circuit fluid circulating passageway having a plurality of channel sections arranged to direct streams of fluid longitudinally through and alongside such cutters, particle collecting means in the casing connected to the passageway and arranged to collect particles carried by the fluid stream from such cutters, fluid impelling means mounted in the casing and arranged to circulate fluid through the passageway and the channels, at least one electric motor in the casing connected to an electric supply circuit, and means operatively connecting the motor and the fluid impelling means.

4. In a cleaning device for electric razors having a predetermined size and shape, a continuous fluid channel structure adapted to circulate a cleaning fluid continuously sectionally divided into a first channel section having an opening adapted to receive portions of such an electric razor adapted to be inserted through the opening into the said first channel section, the walls of the said first channel section forming enclosure means extending longitudinally alongside and in spaced relation to portions of such razor adapted to be inserted through said opening, a second channel section having particle collecting means connected thereto, the said particle collecting means being arranged to collect hair particles carried by such fluid stream in the continuous fluid channel structure, and a third channel section adjoining and interposed between the first channel section and the second channel section having at least one impeller blade therein for propelling a fluid stream through the continuous fluid channel structure.

5. In a cleaning device for electric razors of predetermined size and shape, the cleaning device, utilizing a cleaning fluid, a casing comprising at least one chamber wherein such cleaning fluid is adapted to be circulated, fluid impelling means supported in the casing and arranged to circulate such fluid in said chamber, an opening in said chamber adapted to receive and hold portions of such razor in a position with its cutters disposed inside said chamber, said opening being formed with an annular member, portions of said member closely conforming in size and shape to an external peripheral portion on such razor, whereby such circulating cleaning fluid is substantially prevented from escaping from said chamber.

6. In a cleaning device for electric razors, the cleaning device being of the type adapted to utilize a cleaning liquid, a casing comprising a cleaning chamber adapted to retain and hold such cleaning liquid and wherein such liquid is adapted to be agitated, an opening in said cleaning chamber dimensionally adapted to admit the cutter portion of such an electric razor into the said chamber, particle collecting means internally connected to said chamber and adapted to accumulate hair particles carried by such liquid in said cleaning chamber, a passageway connecting said particle collecting means and said cleaning chamber, and movable means supported in the casing for opening and closing the said passageway.

7. In a cleaning device for electric razors of predetermined size and shape, the cleaning device being of the type adapted to utilize moisture-absorbent material and a cleaning fluid, a continuous circuit fluid conveying channel wherein a fluid is adapted to be circulated, a (side) opening in said channel adapted to receive portions of such razor with its cutters disposed inside said channel, the said opening being adapted dimensionally to engage snugly with a peripheral portion of such razor, movable closure means adapted to fit against the sides of said opening and adapted to form a substantial seal for said opening, the said closure means having a recess adapted to receive and hold such moisture-absorbent material in a position engageable by said portions of the razor, fluid impelling means arranged in the channel for circulating a fluid through the said channel, and particle collecting means connected to the channel and arranged to accumulate hair particles carried by the fluid from such razor.

8. In a cleaning device for electric razors of predetermined size and shape, a continuous circuit fluid conveying channel wherein a fluid is adapted to be circulated, an opening in the channel adapted to receive portions of such razor with its cutters disposed inside the channel, movable closure means adapted to fit against the sides of said opening and arranged to form a substantial seal for said opening, the said closure means having a recess adapted in shape and size to form a cradle for portions of such an electric razor, particle collecting means connected to the channel and arranged to accumulate particles carried by such fluid from such razor, a passageway connecting said particle collecting means and said channel, and closure means movably suspended to provide a sealing means for said passageway.

9. In a cleaning device for electric razors, the cleaning device being of the type adapted to utilize a cleaning liquid, a closed circuit liquid conveying channel system having walls adapted to retain such cleaning liquid, one section of the channel walls having an opening adapted to receive such an electric razor with its cutters disposed inside the channel system, a substantial portion of the channel walls supporting such cleaning liquid arranged to have an inclination (away) from the horizontal in excess of twenty-nine degrees (29°) whereby sediment is prevented from accumulating on such wall sections, and particle collecting means connected to the channel system and arranged to accumulate particles carried by such cleaning liquid from such an electric razor.

10. In a cleaning device for electric razors the cleaning device being of the type adapted to utilize a cleaning fluid, a casing enclosing an internal fluid circulating passageway adapted to have such cleaning fluid circulated therein, fluid propelling means mounted in the casing and arranged to circulate such cleaning fluid through the fluid circulating passageway, an opening in the casing adapted to admit portions of such razor into the casing and into the fluid conveying passageway, the sides of the opening having a peripheral shoulder adapted dimensionally to engage snugly with a peripheral portion of such razor to prevent fluid from escaping from the passageway, a self-contained nozzle section in the casing forming a portion of such passageway and comprising a fluid conveying channel divided by at least one partition into generally parallel, elongated, tubular channels for directing fluid streams in said fluid conveying passageway, and particle collecting means supported in the casing and

adapted to accumulate particles carried by such cleaning fluid from such razor.

11. In a cleaning device for electric razors of predetermined size and shape, the cleaning device being of the type adapted to utilize a cleaning liquid, a casing having a chamber wherein such liquid is adapted to circulate, an opening in the casing adapted to admit portions of such a razor into the chamber, movable closure means adapted to close the said opening and providing a substantially liquid-proof seal for the said opening, a seat for portions of such razor adapted structurally to provide holding means for such a razor, the said seat being positioned adjacent the closure means, impeller means supported in the casing and arranged to direct a liquid stream against the cutters of such razor, and particle collecting means in the casing internally connected to the cleaning chamber for accumulating hair particles carried by such liquid stream from the cutters.

12. In a cleaning device for electric razors of predetermined size and shape, the cleaning device being of the type adapted to utilize a cleaning fluid, a casing having a cleaning chamber adapted to retain and hold such cleaning fluid and wherein said fluid is adapted to be agitated,

an opening in the cleaning chamber dimensionally adapted to admit the cutter portion of such razor into the said chamber, a seat for portions of such razor adapted structurally to provide holding means for such razor portion, the said seat being positioned adjacent the said opening, impeller means in the casing arranged to propel such cleaning fluid against the cutter portion of such razor, and actuating means connected to the impeller means and operable by means of external impulses for activating the said impeller means.

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