Aug. 14, 1945. H. AARON 2,381,867

HAIR CLIPPER

Filed March 21, 1938 2 Sheets-Sheet 1

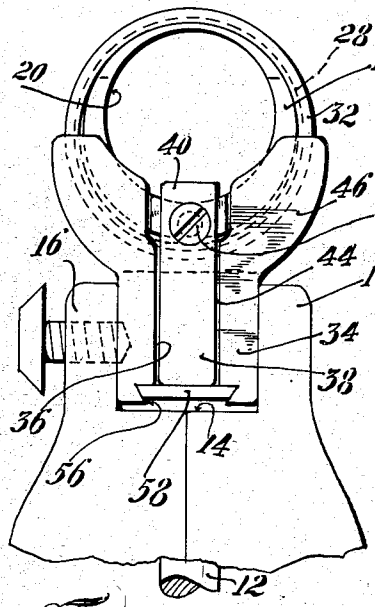



Fig. 2.

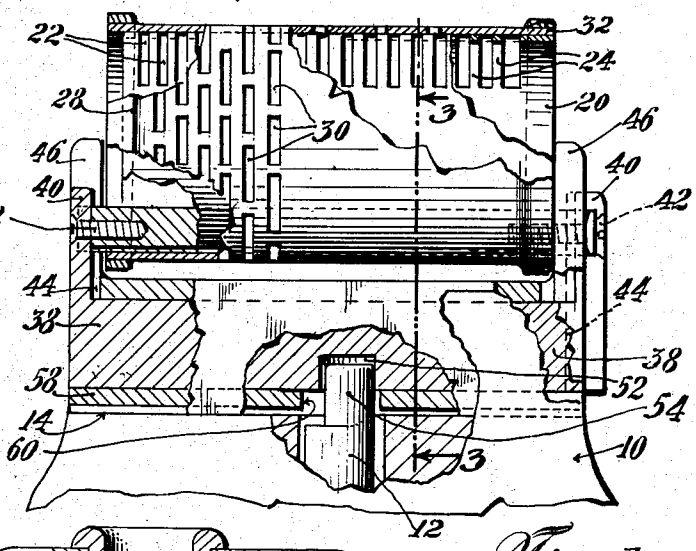



Fig. 1.

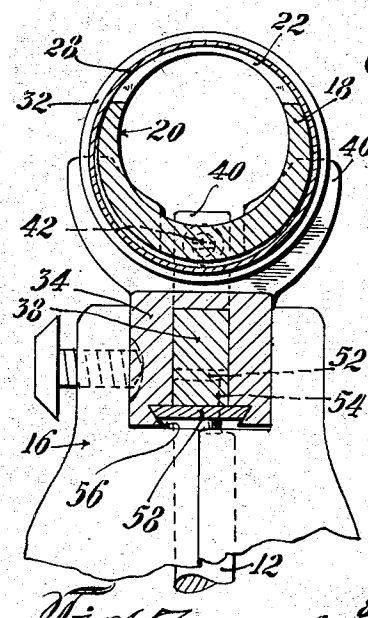



Fig. 3.

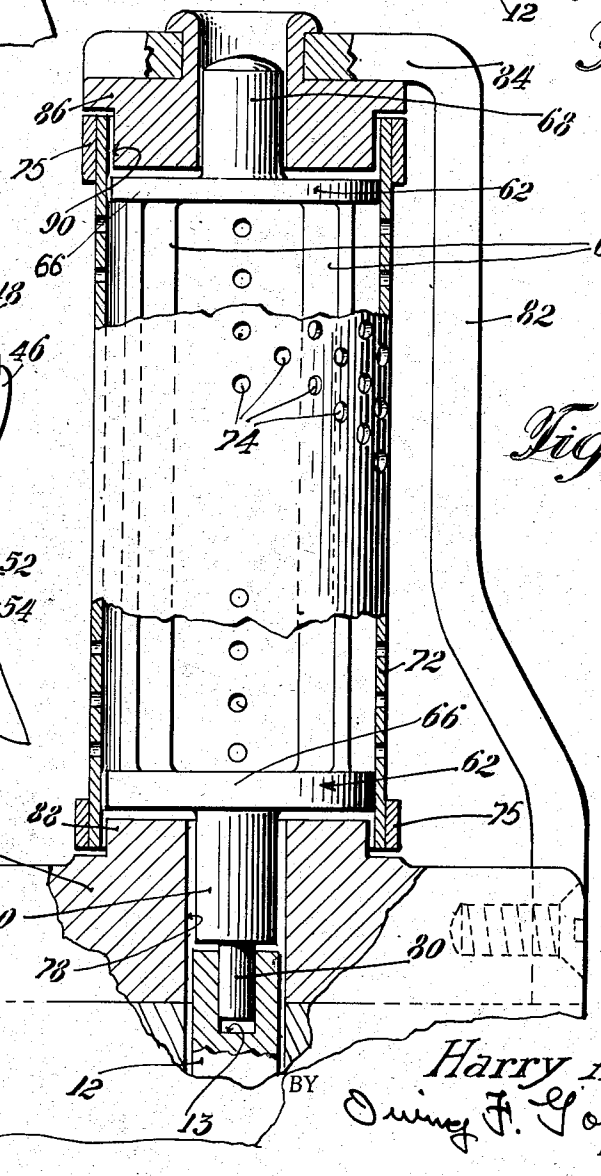



Fig. 4.

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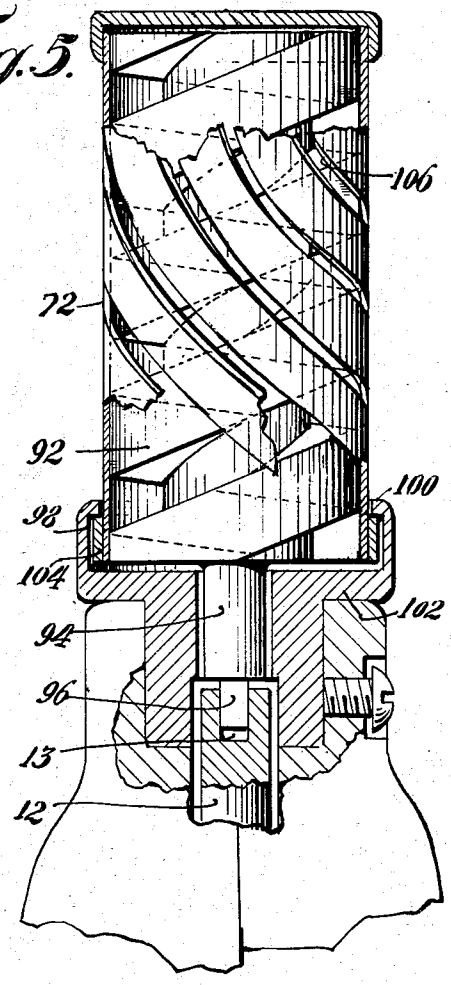
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2 Sheets-Sheet 2

Fig. 5.




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# UNITED STATES PATENT OFFICE

2,381,867

## HAIR CLIPPER

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Application March 21, 1938, Serial No. 197,094

6 Claims. (Cl. 30—43)

The present invention relates to electrically operated dry shaving apparatus of the type disclosed in U. S. Patent No. 1,970,518, issued to me August 14, 1934, for Hair clipper.

The present invention contemplates the provision of improved dry shavers of the character described which will be more effective in operation to give a more comfortable and closer shave.

The present invention further contemplates the provision of such improved dry shavers which will be economical to produce and easy and convenient to assemble, and particularly adaptable and convenient for the replacement or interchanging of the parts of the instruments.

The present invention contemplates the accomplishment of the foregoing purposes by providing dry shavers of the type to which it relates with a motor operated cutter, which either reciprocates or rotates in a freely movable housing or guard and thus makes possible easier and smoother and more comfortable movement of the operative part of the shaver over the face.

This invention contemplates the further attainment of its objects by the provision of such freely movable housing surrounding the cutter which is relatively thin and flexible, both of which characteristics permit a closer approach of the cutter to the base of the hair, to obtain thereby a relatively closer shave than heretofore possible with dry shavers.

This invention contemplates the provision of such a novel cutter assembly which may be produced in a form adapted for operative assembly with the handle enclosed motors of the type now used in the art, such as the type shown in my above identified patent.

In addition, my novel freely movable housing may be combined with any type of movable cutter such as the rotary reciprocatory cutters of the prior art.

In dry shavers of the present known type, stationary perforated housings are provided. With such shavers, there is a tendency for the hair to be bent away from the perforation, into which it is to be admitted to be cut. Therefore, unless the hair admitting perforation chances to be disposed in proper position for admission as the device is passed over the skin, it will be forced away from the perforation and, therefore, will not be cut.

By providing a perforated housing which is freely suspended on the movable cutter or freely movable with relation thereto, I overcome these inherent disadvantages of the known prior devices.

By such construction, it is contemplated to provide a housing which freely rotates or moves relatively to the movable cutter as it is passed over the skin to thereby always dispose a hair admitting perforation to the hair to be cut irrespective of the direction in which the device is moved. Due to the combined rolling and sliding movement of the outer housing, the hair will either fall or be scraped into or because of the inherent resilience of the hair spring into any perforation brought into alignment with hair.

In the shavers heretofore used, since the outer housings are stationary, only a limited area thereof is available for the provision of hair admitting perforations. On the other hand, in my new device, since the outer housing rotates about the movable cutter, the entire surface of the housing may be perforated. Such perforations, furthermore, may be comparatively numerous and relatively close together to thereby provide a maximum of open hair admitting surface.

It is still further contemplated to provide a perforated outer housing which is freely suspended on the movable cutter to thereby permit the outer housing to be urged as a unit and maintained against the cutter by normal shaving pressure. Because of the extremely thin housing, which may be used, this results in much closer and faster shaving than heretofore possible.

These and other advantages of the dry shaving apparatus of the present invention, the details of their construction and assaembly and their method of operation will become clearer from the several practical embodiments and modifications thereof which are illustrated in the accompanying drawings, in which

Fig. 1 is a side elevational view, partly broken away and in section, to show details of construction, assembly and cooperation with a power unit, of an embodiment of the present invention;

Fig. 2 is an end view of the same;

Fig. 3 is a vertical sectional view of the same taken along line 3—3 of Fig. 1;

Fig. 4 is a side elevational view, partly broken away and in section to make its details of construction and assembly clearer, of another embodiment of the present invention.

Fig. 5 is a side elevational view, partly broken away and in section, to show greater detail, of a further modification of my invention.

The embodiments illustrated are all designed for use in association with the well known power unit of the type illustrated in Patent No. 1,970,518 comprising a hollow handle 10 containing a motor which is not thought necessary to be shown, but is indicated by the motor shaft

12 which extends into the space 14 formed between upstanding parallel walls 16 which form a seat for the hair cutting mechanism of the various embodiments.

In the embodiment illustrated in Figures 1, 2 and 3, the hair cutting mechanism comprises a reciprocating cutter member 18 which is preferably a cylinder having an eccentric bore 20, whereby one portion of the cylinder wall is thinner than the other. The thinner portion of the wall is provided with spaced transverse slots 22, forming intervening cutting teeth 24, which teeth, in order to cut effectively, may be formed with even, straight upper edges.

The cutter member 18 is fitted into a cylindrical outer housing or guard member 28, which is formed with a plurality of hair admitting perforations 30 of any suitable or desired size or shape, the edges of which perforations 30 cooperate with the edges of the reciprocated teeth 24 of the cutter member to shear the hair entering into the perforations.

To shear the hair as closely to the skin as possible, the guard member is preferably formed of relatively flexible, thin metal, preferably of a spring steel sheet of about two thousandths of an inch in thickness, which is bent into cylindrical shape, the base edges being engaged by closely fitting rings 32, to retain the cylindrical form.

The guard member construction described enables a housing not more than .002 of an inch in thickness to be used, which extreme thinness has not been practically possible heretofore.

The guard member 28 is freely suspended on the movable cutter so that it is freely rotatable thereabout. For that purpose, the housing is preferably made with an internal diameter slightly larger than the external diameter of the movable cutter 18, and it will at once be apparent that as the device is moved over the skin the housing will revolve about the cutter and roll over the skin, much as a roller bearing with resulting greater comfort in shaving.

To mount the cutter and housing operatively upon the motor handle, there is provided a connecting block or base 34, preferably rectangular in shape and adapted to fit snugly within the seat 14, wherein it may be retained by a set screw threaded into one of the walls 16. The block 34 is provided with a longitudinal vertical channel 36 at its lower end giving it a substantially inverted U-shape. Into this channel there is inserted a reciprocating cutter carrying block 38 having upstanding cutter engaging ears 40 to which the cutter 18 may be secured by screws 42 threaded into the base of the cutter.

To permit the reciprocation of the cutter and carrier block 38, the space between the ears 40 must be sufficiently greater than the intervening length of the base 34. Preferably, in order to have the cutter supporting block protected during its movement, this difference in length may be partly provided by forming grooves 44 in the edges of the base 34, to accommodate the ears 40.

The guard member 28 is placed over the cutter before the latter is secured to the ears 40, and to limit its lateral movement, so that it may not interfere with the reciprocation of the cutter by striking against such ears, the base 34 is provided at each edge with forked arms 46. These forked arms retain the guard member adjacent the cutter member and limit its relative lateral movement. It will be understood that sufficient clearance should be allowed to permit free movement of the guard member about the cutter 18.

It will be understood that, if desired, braking means to restrict the relative freedom of rotation of the guard member 28 may be provided in any suitable manner such as by inserting a spring between the forked arms 46 and the guard members or by maintaining such forked arms and guard member in frictional engagement.

In order to enhance the presentation of perforations for the admission of hair to be cut, as the guard member is rolled over the skin about the cutter, I provide numerous small perforations preferably in relatively closely spaced staggered arrangement. Such perforations may be arranged parallel to the cutting teeth, as illustrated at 30, or, if desired, at an angle to said cutter teeth.

To reciprocate the cutter upon operation of the motor, the block 38 is provided, at substantially its center, with a transverse slot 52, of a suitable width to snugly accommodate a pin 54 eccentrically placed on the end of the shaft 12. It will be understood that the slot 52 is of such transverse length as to permit free proper movement of the pin in such transverse direction. It will be apparent that as the motor shaft rotates the block 38 and the cutter 18 supported by it are reciprocated by the action of the pin 54 in said slot 52.

To retain the block 38 snugly fitted within the slot and to prevent its up and down movement therein, the walls of the channel 36 may be provided at their lower ends with dovetail grooves 56 within which may be fitted the dovetail edged retainer plate 58, which is provided with an opening 60 at substantially its center to permit access of the shaft pin 54 into the block slot 52.

The manner of operation of the above described embodiment will be obvious. As the device is passed over the skin, the guard member 28 rolls thereon about the reciprocating cutter 18, to thereby dispose a plurality of hair admitting perforations 30 or 32 for entrance of the hair thereinto. The hair thus admitted is sheared by the action of the moving teeth 24 against the walls of the perforations.

It will be apparent that the guard member is fully suspended on the cutter member and as the device is passed over the skin in shaving will be pressed and held, as a unit, against the cutter thereby assuring a close shave.

Figures 4 and 5 illustrate embodiments in which the freely rotatable guard member of the present invention is adapted for use with shavers of the rotary cutter type.

Referring particularly to Fig. 4, I provide a cylindrical member 62, which is longitudinally slotted on its circumference to form the parallel spaced cutting blades 64, between the end discs 66 on which are arranged the outwardly extending upper and lower shafts 68 and 70, respectively. Although I have illustrated the cutter with four blades, it will be understood that it may be provided with any desired number.

To provide cooperating cutting edges for the cutter blades 64, there is mounted around the cutter member a cylindrical guard member 72 having air admitting perforations 74, illustrated as round in shape, the edges of which serve as the cooperating cutting edges for the cutter blades to make possible the shearing process by which the hair is cut.

The guard member 72 of this embodiment may

also be formed of a flexible thin spring metal sheet, approximately .002 of an inch in thickness, bent to form a cylinder, with the edges thereof inserted into two tightly fitting rings **75** which serve to retain the sheet in the cylindrical shape and to reenforce the guard member **72**.

To permit the required free movement of the guard member around the movable cutter **62**, its diameter is preferably slightly larger than that of such cutter, thereby providing the required clearance.

To support the cutter and guard member operatively upon the motor handle **10**, a block **76** adapted to fit within the seat **14** is provided. A central vertical passage **78** is provided in the block **76** communicating with the handle, into which the motor shaft end **12**, which is provided with a squared recess **13**, partly extends. The upper part of the passage **78** serves as a bearing for the lower cutter shaft **70** which extends from the lower cutter disc and which is provided with a squared reduced end portion **80**, fitting into the recess **13** and operably engaged thereby.

To support the upper end of the cutter **62**, a substantially L-shaped bracket arm **82** may be secured to an edge of the block **76**, in a manner to have one of its legs **84** disposed horizontally above, parallel to and spaced from the block **76**. The horizontal bracket arm **84** may be provided with a second bearing **86** aligned with the first one in which may be journaled the upper cutter shaft **68**, extending from the upper cutter disc **66**.

The block **76** and the bearing **86** may be provided, respectively, with facing reduced cylindrical bosses **88** and **90** around which the edges of the cylindrical guard member **72**, which may be made longer than the cutter, may fit loosely, to permit free movement thereof around the cutter and yet keep it from sliding off therefrom.

It will be recognized that the guard member of the modification just described will likewise roll over the skin and be pressed and held, as a unit, against the cutter member to shave closely and comfortably.

In Fig. 5, I have illustrated a further modification of my freely movable guard member combined with a rotary spiral or screw cutter **92**, such as is illustrated in my copending application Serial No. 141,163, filed May 6, 1937, and wherein the bracket arm may be eliminated. The cutter **92** is retained in operative position on the motor by a tight, removable connection between the cutter shaft **94** and the motor shaft **12**, which means of connection may be of any suitable type, such as the squared pin **96** on the motor shaft **94** engaging the corresponding squared recess **13** on the motor shaft. The housing **72** may be movably retained over the cutter by means of flanges **98** having inturned edges **100**, which may be integral with a block **102** formed in sections or which, if desired, may be separably secured to a unitary block. The inturned edges **100** of the flange **98** are adapted to overhang the lower reenforcing ring **104** of the guard member to prevent removal thereof from the recess formed by the said flanges, the said flanges fitting loosely around the guard member to permit its independent rolling movement along the face when the device is passed over the skin.

The embodiment illustrated in Fig. 5 shows further possible modifications, which, it may here be stated, are readily adaptable for use with any of the other modifications and may be interchanged with any of the corresponding members or structures of the other illustrated modified embodiments. Thus, the guard member, instead of being provided with small circular or rectangular hair admitting perforations, is constructed with elongated spirally arranged hair admitting slots **106**. It will be understood that the pitch of the slots **106** and the cutter blades **92** will be different, and their relative magnitude may be varied.

It will be apparent that the guard members of all the modifications illustrated and described are freely suspended adjacent the mechanically actuated cutter members, are extremely thin, are pressed and held, as a unit, against the cutter members, and freely revolve thereabout with a rolling motion over the skin as the device is passed thereover in shaving.

It will be further apparent that my novel shaving apparatus will provide a close and extremely comfortable shave not heretofore possible of attainment.

While I have shown and described certain specific examples of my invention, it will be understood that such examples are illustrative and are not given as limitations, since other modifications within the spirit and scope of the invention will be apparent to those skilled in the art. Hence, I do not intend to limit myself thereto, but intend to claim my invention as broadly as may be permitted by the state of the prior art and the terms of the appended claims.

I claim:

1. In a device of the character described adapted to be held and moved over the skin of the user in contact therewith, a motor, a handle enclosing the motor, a hair clipping unit arranged on the handle comprising a base secured to the handle, said base having a longitudinal channel extending therethrough on the underside thereof, an element arranged in the base in the channel and adapted to be reciprocated therein by the motor, a hollow cutter member above the said reciprocated element, an ear extending upwardly from each end of said element and secured to the cutter member at the respective ends thereof, forked arms arranged on the base at each end thereof and a hollow perforated guard member loosely mounted between the forked arms and loosely held on the cutter member for free turning movement with reference thereto and thereabout independently thereof, said cutter member adapted to be reciprocated within the said guard member.

2. In a dry shaver, a cutter head including a stationary substantially U-shaped frame of channel shaped cross sectional configuration and the base portion of which is adapted to be removably secured within a handle, a substantially U-shaped movable frame having the base portion thereof nested within the base portion of the stationary frame and adapted for longitudinal reciprocation with reference thereto, an inner hollow cylindrical cutter element slidably mounted within the arm portions of the stationary frame and secured to the arm portions of the movable frame for reciprocation therewith, said inner cutter element having circumferentially extending axially spaced cutting teeth, an outer hollow cylindrical perforated cutter element surrounding and adapted for free turning movement with reference to the driven cutter element, with the opposite ends thereof located and confined between the arms of the stationary frame.

3. In a dry shaver, a cutter head including a stationary frame having a channel therein, the

base portion of said cutter head adapted to be removably secured within a handle, a movable frame having the base portion thereof nested within the base portion of the stationary frame and adapted for longitudinal reciprocation with reference thereto, an inner hollow cylindrical cutting element slidably mounted within the arm portions of the stationary frame and secured to the arm portions of the movable frame for reciprocation therewith, said inner cutter element having circumferentially extending spaced cutting teeth, an outer hollow cylindrical perforated cutter element surrounding and constructed and arranged for free turning movement with reference to the driven cutter element, with the opposite ends thereof located and confined between said arms of the stationary frame.

4. In a dry shaver having a base, a cylindrical cutter member movably carried by the base, said member presenting radial cutting surfaces, mechanical means for moving the cutter member, and a cylindrical skin-contacting guard provided with hair-admitting perforations, said guard being disposed loosely around and supported exclusively by the cutter member, and being freely rotatable relative to and independently of said cutter member and mechanical means in response to movement of the base when the guard is in contact with the skin of the user.

5. In a dry shaver having a base presenting a mechanically actuated movable cutter member, a perforated, cylindrical shell-like skin-engaging guard disposed around and freely rotatable relative to the cutter member, and ring-shaped members respectively secured in reinforcing engagement with the respective end portions of the guard.

6. In a device of the character described adapted to be held against and moved over the skin of the user in contact therewith, a shaving head comprising a longitudinally channelled base, a cutter-supporting block reciprocally disposed within said channel, a cutter member fixed on said cutter-supporting block and disposed thereabove, a skin-contacting guard member provided with a plurality of hair-admitting perforations, said guard member being loosely mounted on and freely rotatable relative to the cutter member in response to movement over the skin of the user, and means on the base member for arresting lateral movement of the guard member relative to the cutter member.

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