

Aug. 26, 1947.

D. PINKAS

2,426,412

ELECTRIC SHAVING DEVICE WITH HAIR COLLECTING MEANS

Original Filed Oct. 31, 1944 3 Sheets-Sheet 1

Fig. 1

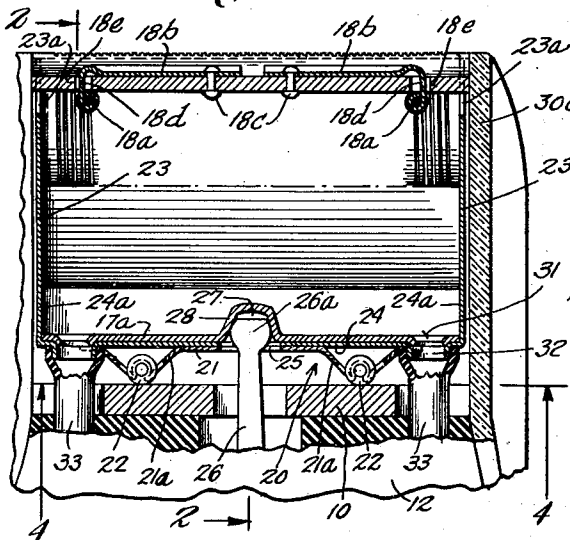


Fig. 2

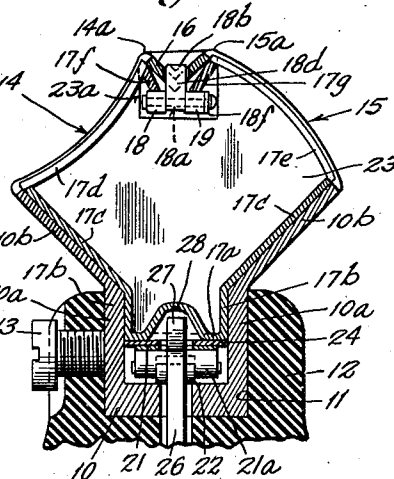


Fig. 6

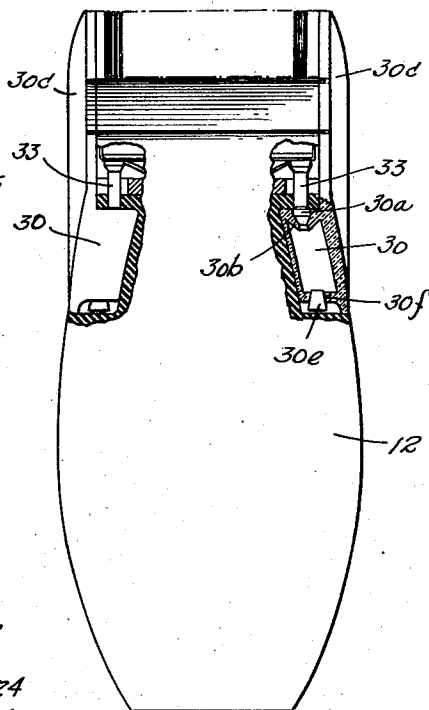


Fig. 3

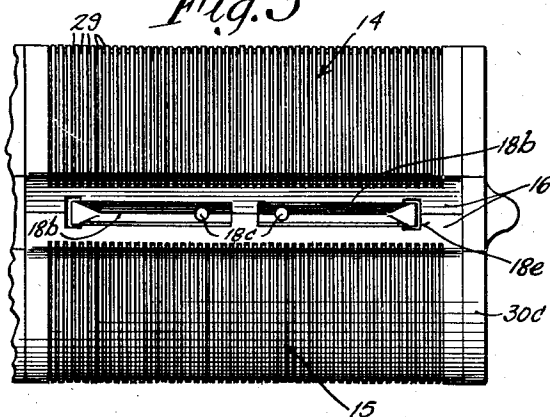
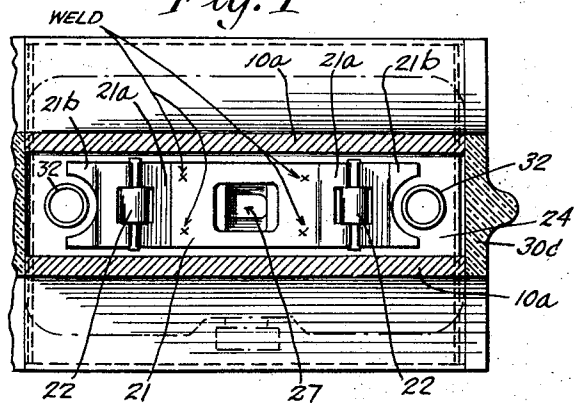


Fig. 4



INVENTOR
David Pinkas
BY *Johnson & Kline*
ATTORNEYS

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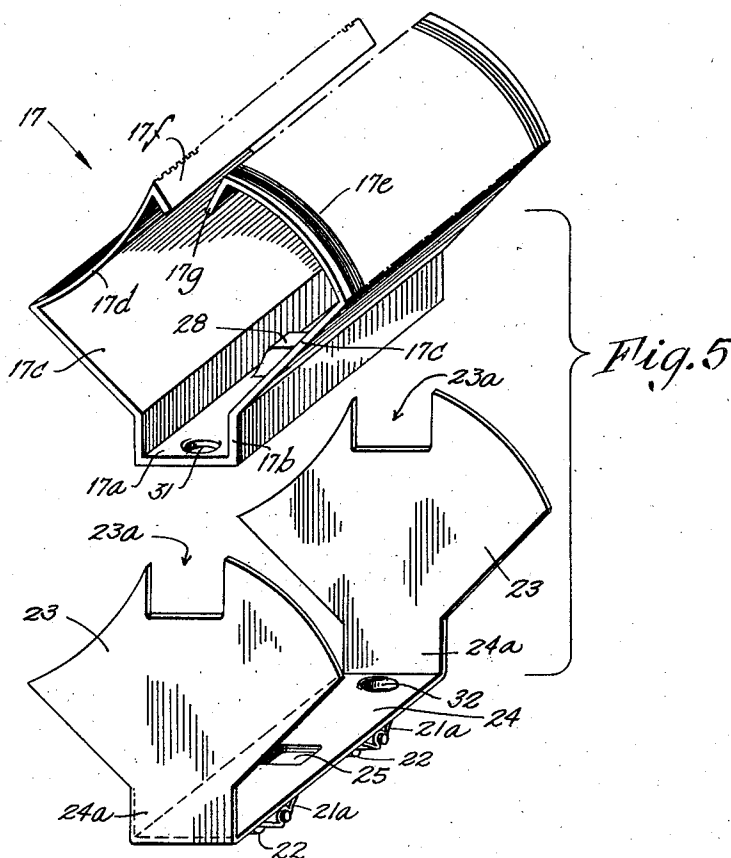
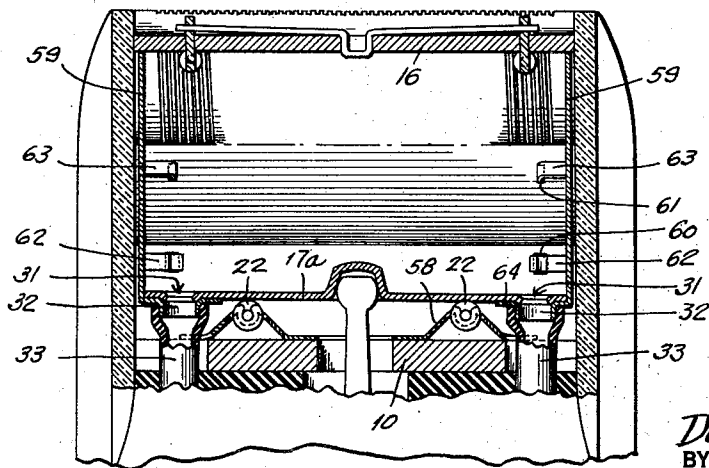


Fig. 7



INVENTOR
David Pinkas
BY Johnson & Klue
ATTORNEYS

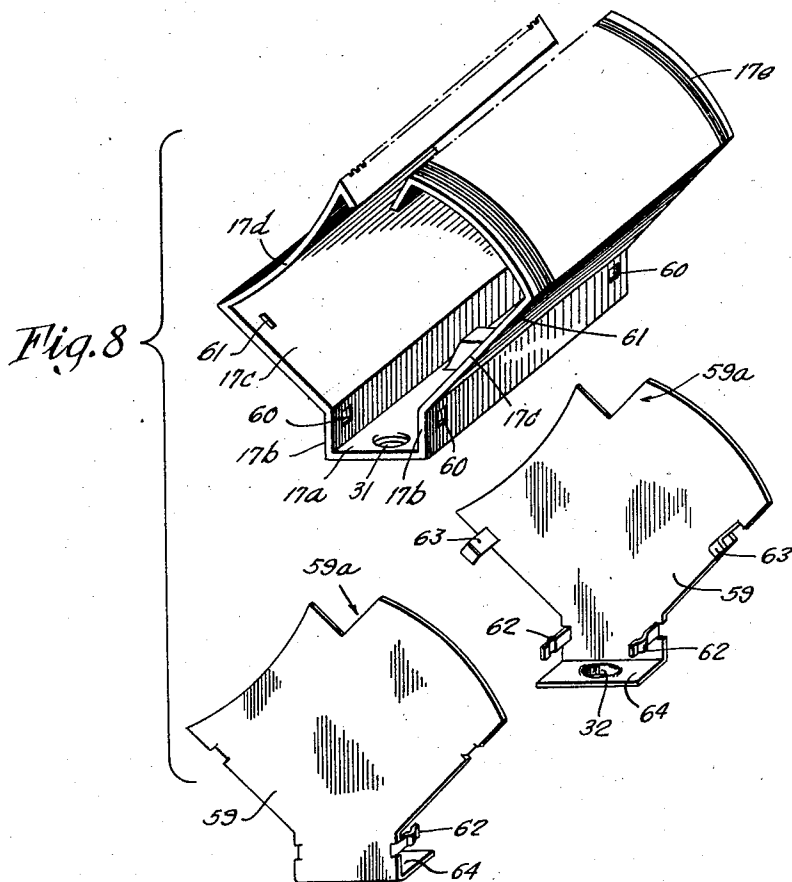
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D. PINKAS

2,426,412

ELECTRIC SHAVING DEVICE WITH HAIR COLLECTING MEANS

Original Filed Oct. 31, 1944 3 Sheets-Sheet 3



INVENTOR
David Pinkas
BY *Johnson & Kline*
ATTORNEYS

UNITED STATES PATENT OFFICE

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ELECTRIC SHAVING DEVICE WITH HAIR
COLLECTING MEANS

David Pinkas, Norwalk, Conn.

Original application October 31, 1944, Serial No.
561,199. Divided and this application March
27, 1945, Serial No. 585,044

7 Claims. (Cl. 30-41)

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This invention relates to electric shavers and more particularly to the cut hair collecting and disposal means therefor. This application is a division of my application Serial No. 561,199, filed October 31, 1944, now Patent No. 2,406,035, granted August 20, 1946.

An object of the invention is to provide a means for catching, storing and disposing of cut hair whereby the inadvertent and continual dropping of hair particles is obviated, and whereby disposal of same may be conveniently done.

This is accomplished by the provision of closure means associated with the cutters, forming inside the latter a substantially closed chamber, and by the provision of removable containers carried by the shaver casing, having connections with the closed chamber so that hair particles caught by the latter may be deposited in the containers for later disposal.

In the illustrated and described embodiments of the invention, the closure means is secured to the inner reciprocating parts of the cutters, to move therewith, so that the hair particles may be closely confined and prevented from getting between the inner and outer cutters to jam same or retard their free relative movement. By this arrangement the cut hair particles are also continually agitated and caused to be discharged into the storage containers of the casing. In a preferred embodiment the closure means comprise end plates which closely fit the cutter structures at all points, and which are individually demountable without removing the reciprocable cutter structure from the head, so that access may be had conveniently to the inside of the head for cleaning with a brush if desired.

Stationary guard walls or covers are provided, mounted on the casing, to cover the reciprocating closure means of the movable cutters and prevent inadvertent contact between the latter and a user's fingers.

A feature of the invention is the provision of novel bearing and spring means for the movable components of the cutters whereby inertia and friction are reduced, and but few, simple and economically producible parts are employed.

Other features and advantages will hereinafter appear. In the accompanying drawings:

Figure 1 is a longitudinal section of a cutter head made according to one form of the invention, mounted on a shaver casing, only a portion of the latter being shown.

Fig. 2 is a section taken on the line 2-2 of Fig. 1.

Fig. 3 is a top or plan view of the cutter head of Fig. 1.

Fig. 4 is a section taken on the line 4-4 of Fig. 1.

Fig. 5 is an exploded perspective of the mov-

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able cutter structure, and the end closure, mounting assembly for the structure.

Fig. 6 is a side elevation of the cutter head mounted on a shaver, portions of the shaver casing being broken away to show the containers for the cut hair particles.

Fig. 7 is a longitudinal section of a cutter head illustrating another modification of the invention.

Fig. 8 is an exploded perspective view of the reciprocating cutter and demountable end closures of the modification of Fig. 7.

Referring to Figs. 1, 2 and 3, the cutter head comprises a channel-shaped stationary body or base 10 adapted to be received and held in a recess 11 of a shaver casing 12 by means of a set screw 13. The side walls 10a of the base 10 have angularly outwardly-directed integral extensions 10b which carry integral apertured cutter plates 14 and 15, one substantially concave and the other substantially convex. The plates 14 and 15 extend generally angularly inward toward each other, the inner edges 14a and 15a of the plates being rigidly joined together by an integral V-shaped reinforcing rib of connector 16.

For cooperation with the cutter plates 14 and 15 a movable cutter structure 17, Fig. 5, is provided having an elongate base 17a with side walls 17b slidably fitting within the side walls 10a of the stationary base 10. Integral with the side walls 17b of the movable cutter structure are outwardly directed extensions 17c lying closely adjacent and inside the extensions 10b, the extensions 17c having inwardly directed cutter plates 17d and 17e respectively engaging the inner surfaces of the cutter plates 14 and 15. The inner ends of the cutter blades 17d and 17e have integral bearing strips or flanges 17f and 17g respectively, these flanges being respectively engaged and carried by pairs of rollers 18 and 19, Figs. 1 and 2, rotatably mounted on headed pins 18a in turn resiliently carried by springs arms 18b. As shown in Figs. 2 and 3, the arms 18b are formed with a V-section so that they fit snugly in the groove of the reinforcing rib 16, and are secured to the latter by rivets 18c. Each arm has a depending portion 18d extending through a clearance aperture 18e in the rib 16, the ends of the portion 18d being formed into eyes through which the pins 18a extend. Referring to Fig. 2, washers 18f are carried by the pins 18a adjacent the rollers 19, and the ends of the pins are flattened to hold the various parts against separation.

Preferably the arms 18b are biased slightly outwardly so that continuous pressure is exerted by the rollers 18 and 19 on the flanges 17f and 17g, to cause the cutters 17d and 17e to press against the undersides of their respective apertured plates.

As seen in Fig. 2, the curvature of the cutter

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blades 17d is such that they closely conform to the inner surface of the concave cutter plate 14 and cooperate therewith to shear hair extending through the plate. Similarly, the cutter blades 17e are curved to conform to the inner surface of the cutter plate 15 for the same purpose.

To further cause the cutter blades 17d and 17e to press against the inner surfaces of the plates 14 and 15 a spring carriage 20 is provided, Fig. 1, mounted on the underside of the base 17a. This carriage comprises a resilient metal plate 21, Figs. 1 and 4, shaped to provide legs 21a carrying rollers 22 engaging the inner bottom surface of the base 10. The plate 21 is secured, as by spot welding at the points marked "x," Fig. 4, to a carrier plate 24 having upturned ends 24a by means of which it is clamped to the underside of the base 17a. The extremities 21b of the plate 21 are free, however, so that they may slide an extent on the carrier plate 24, so that a yielding mounting is thereby provided for the rollers 22.

According to this invention closure means are provided at the ends of the cutter structure 17 in the form of substantially diamond-shaped plates 23 integral with the upturned ends 24a of the carrier plate 24. The closure plates 23 are cut away at their top portions to provide clearance openings 23a so that the entire movable cutter assembly may be inserted in the stationary cutter without interference between the rollers 18 and 19, and the closure plates 23.

In operation, the closure plates 23 reciprocate with the cutter 17, and function to contain the cut hair particles inside the latter. Comparatively few, if any, hair particles pass out through the openings 23a due to their locations close to the top corners of the cutters. As seen in Figs. 1 and 2 the plates 21 and 24 are apertured at 25 to provide access for the driving lever 26 from the shaver motor, the lever having a circular head 26a extending into and engaging the walls of a recess 27 formed by embossing the central portion 28 of the base 17a as indicated.

According to this construction the movable cutter structure 17 may be reciprocated by the driving lever 26 while the cutter blades 17d and 17e are being pressed against the plates 14 and 15 by the spring carriage 20. The rollers 22 function to materially reduce the friction of the cutter structure 17 so that most of the load imposed on the driving lever 26 is the result of, first, the friction between the respective pairs of cutter surfaces, and second, the shearing of hair during the shaving operation.

The apertures in the plates 14 and 15 may have any suitable shape, round or elongate, but at present I prefer to make the apertures in the form of slots 29 as indicated in Fig. 3. Also, I prefer to make the cutters 17d and 17e in the form of elongate plates to cooperate with the slotted plates for shearing hair.

It will be noted that by the above arrangement I have provided a pair of separated cutters having surfaces which are substantially angularly disposed with respect to each other whereby either cutter may be applied to the skin independently of the other, the curvatures of the cutters being such that practically any portion of the skin of the face or neck may be made to closely conform to one or the other of the cutter surfaces. As a result, by so conforming the skin and cutter surfaces, a closer and quicker shaving of the skin is made possible. The concavity and convexity of the plates 14 and 15 are preferably

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substantially slight as indicated so that practically all of the surface of the cutter being applied to the skin will come into use for shearing hair. Therefore a larger area of skin is covered during application of either of the cutter plates. In use, the shaver of this invention may be quickly manipulated to bring either of the cutters into engagement with the skin as desired. For instance, along the jaw bone where the skin surface is convex the concave cutter 14 may be advantageously employed. Under the jaw where the skin surface is concave the convex cutter 15 would be most advantageous, and by judicious use of the concave and convex cutters a user may considerably reduce the time required for shaving while at the same time obtaining a closer shave.

According to the present invention improved means are provided for catching, storing, and disposing of cut hair whereby the inadvertent dropping of hair particles is eliminated, and disposal of same may be quickly and conveniently done. As already pointed out above the space inside the movable cutter structure 17 is substantially enclosed by the closure plates 23 so that cut hair particles passing through the cutters will be contained and prevented from dropping out. Referring to Fig. 6 the casing 12 of the shaver is provided with a pair of containers 30 which may be mounted for convenient removal in any suitable manner, the upper end walls of the containers having apertures 30a with depending trapping flanges 30b through which hair particles may be deposited. Referring to Fig. 1 the base 17a of the movable cutter structure is provided with apertures 31 at each end, and the carrier plate 24 correspondingly apertured so that hair particles dropping inside the movable cutter structure may be discharged therefrom. The plate 24 is extruded at the said discharge apertures to provide dependent flanges 32 to which are secured rubber hose connections 33. As seen in Fig. 6 the hose connections 33 extend through apertures in the casing 12 substantially aligned with the apertures 30a of the containers 30. During the reciprocating movement of the cutter structure 17 the hose connections 33 will flex and bend, due to their lower ends being restrained by the stationary casing 12. However, the restraint on the movable cutter 17 due to the hose connections is slight, because of the small total movement of the cutter structure, and therefore no appreciable additional loading is imposed on the shaver motor.

By this construction the movement of the cutter structure 17 is utilized to cause the hair particles to be quickly discharged through the hose connections 33 into the containers 30, since the agitation given these particles causes them to traverse the base 17a until they drop through the apertures 31 therein. This is an important feature of the invention since it obviates the necessity of cleaning out hair particles from inside the cutter structure 17 as by a brush, but instead permits all the cut hair particles to be conveniently and neatly disposed of by merely emptying the containers 30 by removing the corks 30c in the discharge apertures 30f.

As seen in Figs. 1 and 6, the outer walls of the containers 30 are extended upward and shaped to function as stationary cover plates 30c, which prevent inadvertent contact between a user's fingers and the movable closure plates 23.

Another modification of the invention is shown

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in Figs. 7 and 8. In these figures characters similar to those in the previous figures indicate similar parts.

In this form of the invention a resilient carriage is provided between the base portions of the movable and stationary cutter frames. Referring to Fig. 7, a carriage plate 58 is shown, the central portion of which is welded to the stationary base 10. The plate 58, which is resilient, is formed at its end portions to angularly extend adjacent the base 17a of the movable cutter structure 17, the pair of rollers 22 being resiliently carried thereby for engagement with said base portion. By this construction the carriage plate 58 and rollers 22 are not reciprocated with the movable cutter 17, and therefore the inertia of the reciprocating structure is correspondingly decreased.

According to this form of the invention the reciprocating cutter 17 is provided with end plates 59 which are readily demountable independently of each other without first requiring removal of the cutter from the head. These plates at their lower portions carry the flexible connector hoses, and by being individually attachable, permit easy assembly of the shaver head without greatly bending or distorting the hoses. Referring to Fig. 8, the side walls 17b of the movable cutter base are provided with apertures 60, and the extensions 17c with apertures 61 for engagement respectively with pairs of resilient fingers 62 and 63 integrally formed on the end plates 59. Thus, the end plates may be clamped against the ends of the movable cutter structure 17 and securely held thereon, and when desired may be quickly removed for cleaning or other purposes. When removing the plates 59, a sharp flat tool is inserted between the fingers 63 and the walls 17c, to lift the hook portions of the fingers out of the apertures 61. The lower portions of the plates 59 have inwardly-extended flanges 64 which are apertured and extruded to carry the flexible connector tubes 33 as shown in Fig. 7. The base 17a of the movable cutter 17 is slightly flanged about the hair discharge apertures 31 thereof, the flanges nesting in the apertures 32 of the flanges 64 as shown in Fig. 7, thereby providing a more rigid assembly.

By this construction, the closure plates 59 may be fitted closely against the edges of the reciprocating cutter structure 17, and may be made to conform at their upper portions 59a to the shape of the inner surface of the rib 16. The close fit thus provided insures against hair particles inadvertently being discharged past the end plates 59.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. An electric shaver having a casing; a reciprocating cutter assembly mounted on the casing, shaped to enclose a space in which cut hair is deposited; a removable container on the casing; and a connection between the container and the cutter assembly whereby cut hair particles may be transferred from the inside of the cutter to the container and stored in the latter, the agitation of said reciprocating cutter causing said cut hair particles to move to said connection.

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2. An electric shaver having a casing; a cutter head having an outer set of stationary blades and a reciprocating cutter structure inside the stationary blades, said structure having blade means cooperating with the stationary blades and being shaped to provide a hair-receiving cavity; a removable container separated from the said hair-receiving cavity; and a connection between the container and the cavity whereby cut hair particles may be transferred from the latter to the container and stored therein, the said cutter structure by its movement agitating the cut hair particles in the cavity to aid transference of same to the container.

3. An electric shaver having a casing; a substantially tubular cutter head having an outer set of stationary blades and a reciprocating tubular cutter structure inside the stationary blades; closure means at each end of the reciprocating cutter structure; a container carried by the casing; a connection between the container and the said cutter structure whereby cut hair particles may be transferred from the latter to the container and stored therein, said cutter structure by its movements agitating the cut hair particles it carries to aid transference of same to the container; and a stationary cover plate carried by the casing at each end of the tubular cutter head, to enclose the reciprocating cutter structure and closure means therefor so that the latter are shielded from contact by a user.

4. The invention as defined in claim 1 in which the container has a hair-receiving aperture and an inner flange encircling said aperture to trap hair particles, and in which the container has a discharge opening and a removable closure for said opening whereby the container may be emptied.

5. The invention as defined in claim 1 in which the container has a hair-receiving aperture and means extending inside the container adjacent said aperture for trapping hair particles therein.

6. The invention as defined in claim 1 in which the container has a hair-receiving aperture and means extending inside the container adjacent said aperture for trapping hair particles therein, and in which the container has means, including a discharge opening, whereby it may be emptied.

7. A cutter head for an electric shaver, comprising an outer set of stationary cutter blades; a reciprocable substantially tubular cutter inside the stationary blades for cooperating with the latter; and closure means carried by each end of the tubular cutter for preventing cut hair particles lodged inside the latter from falling out the ends thereof, said closure means comprising plates having resilient fingers, and said tubular cutter being recessed to receive said fingers whereby the plate may be demountably carried by the cutter.

DAVID PINKAS.

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