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[56]

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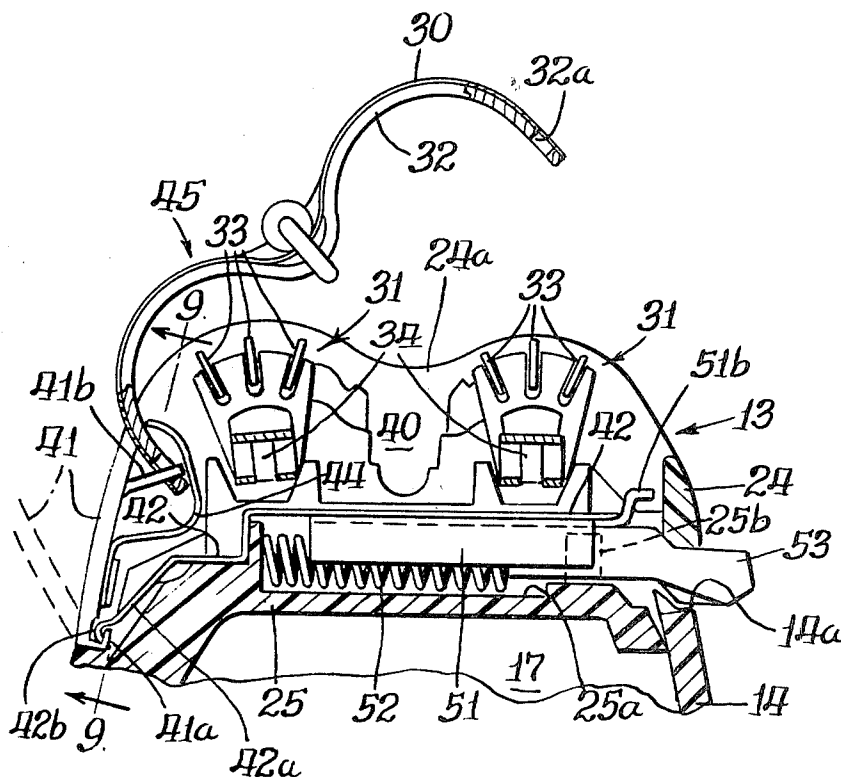
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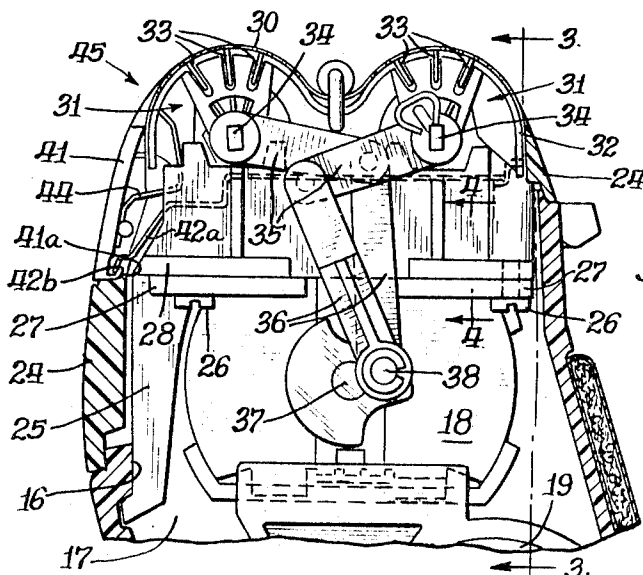
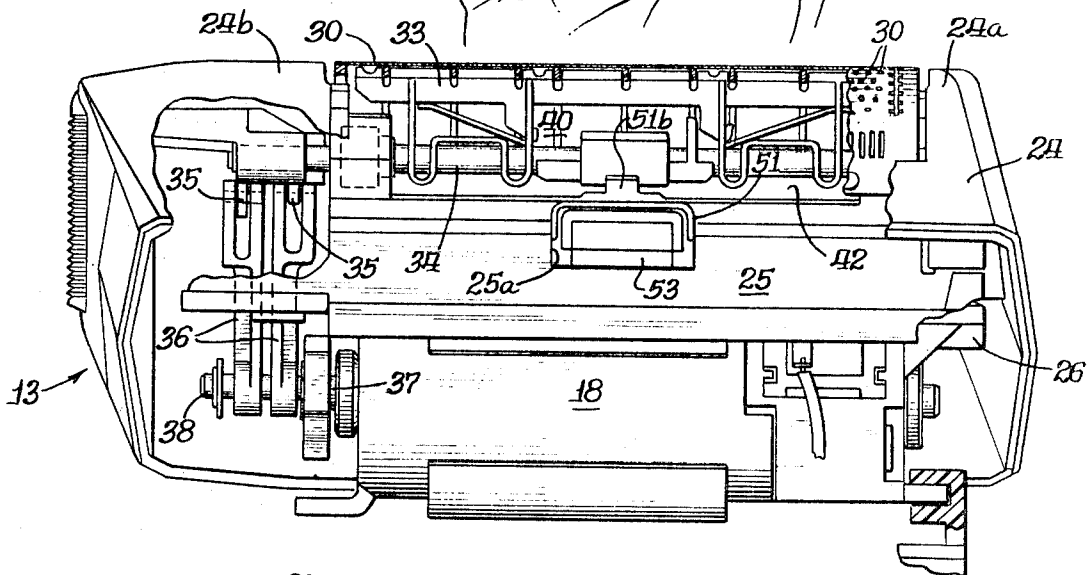
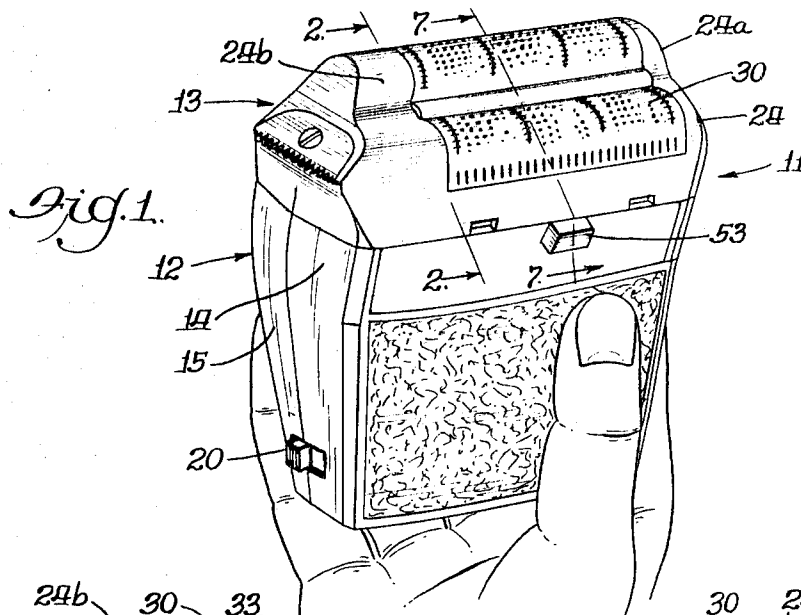
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[54] **COMB SUPPORT AND RELEASE MECHANISM
FOR ELECTRIC DRY SHAVER**
5 Claims, 9 Drawing Figs.

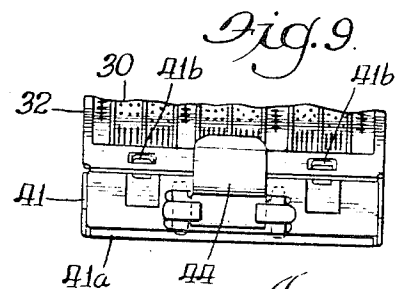
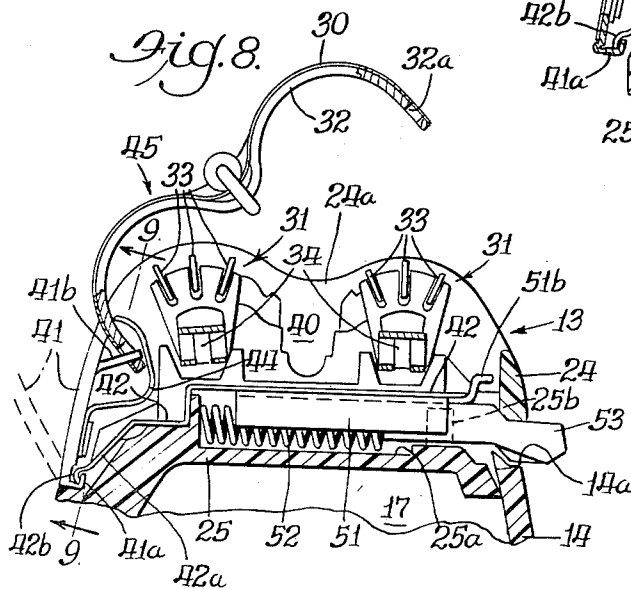
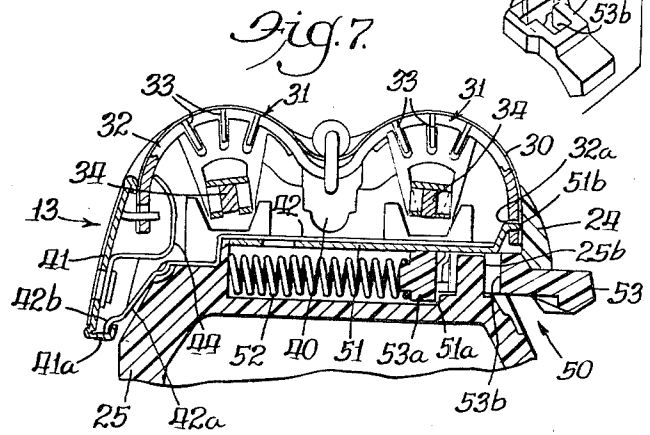
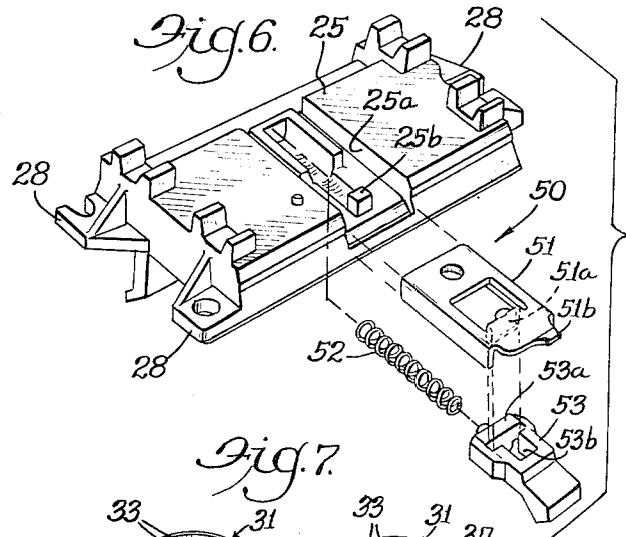
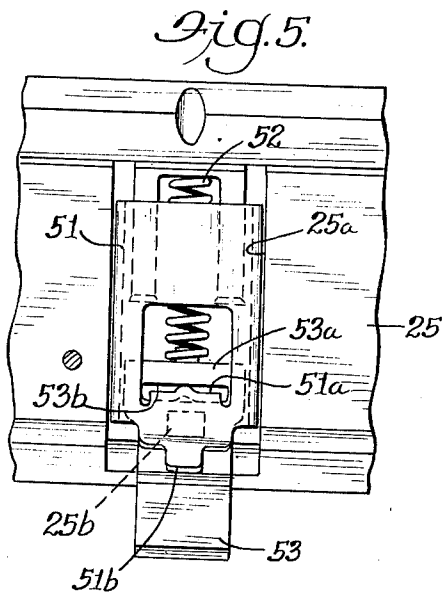
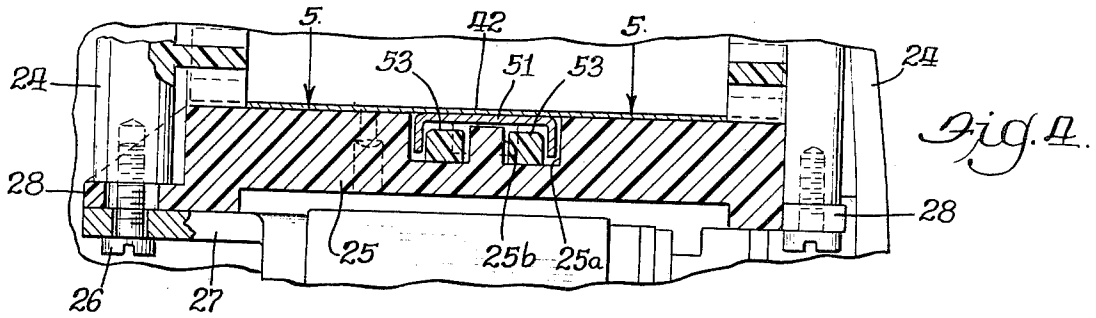
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ABSTRACT: A head for an electric dry shaver having a perforated comb which is pivotally supported so that it may be moved between an operative position in engagement with movable cutter means and an open position in which it is displaced from the movable cutters to facilitate cleaning. Push-button operated means slidably arranged within the head release and the comb so that it is moved to the open position through the action of spring biasing means.





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COMB SUPPORT AND RELEASE MECHANISM FOR ELECTRIC DRY SHAVER

BACKGROUND OF THE INVENTION

In the electric dry shaver field there are many types of shaving heads which may be broadly categorized by the manner in which the components are disassembled for cleaning purposes. The so-called clipper-type shavers have more or less unitary head assemblies which are cleaned by either blowing through the tubular head structure or sliding a brush through the tubular head structure. On the other hand, there are shavers which have the fixed outer comb mounted independently of the inner cutters and provide means for removing the outer comb to blow or brush away the accumulated hair clippings. The manner in which the comb is mounted is significant since cleaning must be performed frequently and the ease of removal of the comb is important to the daily maintenance and use of the shaver. It would be desirable to mount the comb so that it may be moved to a displaced position for cleaning purposes simply and easily and returned to the use position with similar ease. It is also desirable that the perforated comb be replaced in the same manner or orientation as it was initially to insure proper cooperation between the comb and the cutter means. In addition, because of the competitive nature of the shaver field, it is important that the mounting means for the comb be simple and inexpensive to manufacture as well as convenient to operate.

SUMMARY OF THE INVENTION

The invention involves a means of hingeably mounting a shaver comb for movement to and from a use position in cooperative engagement with cutting means and to and from a cleaning position in which the comb is positioned well out of engagement with the cutting means providing access for cleaning purposes. The perforated comb is mounted on a frame which is connected to a hinge plate which in turn is pivotally supported on the frame for the shaving head assembly. Slidable latch means carried by the frame provides means whereby actuation of a button causes the perforated comb to snap open so that the area beneath the comb is readily accessible for cleaning purposes.

It is an object of the present invention to provide an improved shaving head including a hingeably mounted comb which is readily movable from an operative to a cleaning position.

It is a further object of the present invention to provide a manually operable latch means which releases the comb in a shaving head so that it may automatically open to a cleaning position.

It is a further object of the present invention to provide an improved shaving head including a pushbutton latch for releasing a spring loaded shaver comb so that it will move out of engagement with its respective cutting means to permit cleaning of the shearing elements.

It is still a further object of the present invention to provide an improved electric dry shaver having a shaving head with a recessed portion to receive hair clippings and a spring biased comb overlying this recess with releasable latch means to cause the comb to move to an open position for cleaning purposes.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 1 is a perspective view of an electric dry shaver embodying the improved shaving head and comb release mechanism of my invention;

FIG. 2 is a sectional view taken substantially on line 2-2 of FIG. 1;

FIG. 3 is a sectional view taken substantially on line 3-3 of FIG. 2 with portions of the housing and comb cut away for illustrative purposes;

FIG. 4 is a fragmentary sectional view taken on line 4-4 of FIG. 2;

FIG. 5 is a fragmentary view taken on line 5-5 of FIG. 4;

FIG. 6 is an exploded perspective view of the comb release mechanism;

FIG. 7 is a vertical section taken on line 7-7 of FIG. 2;

FIG. 8 is a view similar to FIG. 7 but showing the comb in a partially open position; and

FIG. 9 is a sectional view taken substantially on line 9-9 of FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, there is shown in FIG. 1 an electric dry shaver designated generally by reference numeral 11. The shaver includes a boxlike housing 12 on which is superimposed a shaving head assembly 13. The housing 12 is formed by two interfitting housing members 14 and 15 which abut to form a housing with an outwardly facing opening 16. The shaving head assembly 13 is received within the opening 16 and cooperates with the housing 12 to form an enclosure 17 within which a motor 18 and batteries 19 are mounted.

As is well known in the art, the batteries 19 are of the rechargeable variety, and suitable means are provided for connecting the batteries 19 to an external power source for recharging purposes. The batteries 19 are electrically connected to the motor 18 through a switch 20 which controls the energization of the motor 18.

The shaving head assembly 13 is made up of an outer frame 24 which has an open, somewhat rectangular shape and an inner frame or motor supporting block 25. The outer frame 24 and the inner frame 25 are secured together by means of the motor assembly screws 26 which are best shown in FIGS. 2 and 4 as extending through motor brackets 27, through support pads 28, inner head frame 25, and into threaded engagement with the outer head frame 24.

The shearing elements in the head assembly 13 comprise an outer shearing member or perforated comb 30 and a pair of inner cutter assemblies 31. The perforated comb 30 is a thin, flexible member which is secured to a supporting frame 32 whereby the comb assumes a double arched or M-shape, as is best shown in FIGS. 1 and 2. In order to shear hair which extends through the perforations in the comb 30, there are a plurality of cutters or cutting blades 33 which are carried by shafts 34 for movement in shearing engagement with the underside of the comb 30. The structure of the comb 30 and the inner cutter assemblies 31 made up of the cutting blades 33 and supporting shafts 34 are well known in the art, and their action need not be described in detail herein.

In order to produce the necessary oscillation in the shafts 34, there are provided suitable drive arms 35 which are fixed on the outer ends of shafts 34 and extend in overlapping relation. Pivotaly connected to the outer ends of drive arm 35 are connecting rods 36 which are interconnected to armature shaft 37 at their lower ends by means of an eccentric crank pin 38. Thus, as the armature shaft 37 rotates, the cutter supporting shafts 34 will be caused to oscillate. As the cutter supporting shafts 34 oscillate about their axes, the cutting blades 33, which are spring biased against the interior wall of the comb 30 are moved across the perforations in the comb 30 thereby shearing off hair or whiskers which extend therethrough.

As the hair or beard is clipped by the cutting blades 33, it falls into an enclosure or receptacle 40 which is defined by the inner and outer head frames 25 and 24 and the comb 30. This enclosure 40 provides a receptacle for the clipped hair so that it will not be deposited in unwanted areas during or after the shaving operation. The frame 24 is shaped to provide a depression or recess between spaced end walls 24a and 24b. The comb 30 overlies this recess and together with the inner head frame 25 forms the enclosure 40.

For the purpose of supporting the comb 30 and relating it to the shaving head assembly, there is provided a hinge plate 41 as is best shown in FIGS. 2, 7, 8, and 9. The hinge plate 41 is formed along one edge with a lengthwise extending, intumed

flange 41a which cooperates with an assembly plate 42 to pivotally connect the hinge plate to the remainder of the shaving head assembly 13. The assembly plate 42 extends across the upper surface of the inner head frame 25 and is held against the upper surface of the frame 25 by the outer head frame 24 which more or less sandwiches the assembly plate 42 therebetween. The assembly plate 42 is formed of spring steel and includes an unsupported edge 42a which is under tension against the inturned flange 41a of the hinge plate 41. The portion of the edge 42a which is in engagement with the inturned flange 41a formed with a lengthwise extending channel 42b which engages in the inturned flange 41a and permits limited, pivotal movement of the hinge plate 41.

In order to connect the comb 30 and its supporting frame 32 to the hinge plate 41, the hinge plate is formed with inwardly extending protuberances 41b which extend through openings in the comb 30 and the supporting frame 32. These openings in the comb and frame are large enough to permit pivotal movement of the comb and frame with respect to the hinge plate 41 as is evident from FIGS. 7 and 8. A retaining and biasing spring 44 is secured to the inner surface of the hinge plate and the unsupported portion of the biasing spring 44 overlies and engages the edge of the supporting frame 32 and applies a biasing force against the frame 32 and the comb tending to rotate the comb counterclockwise about the upper edge of the hinge plate 41 as shown in FIGS. 7 and 8. This assembly, including the hinge plate 41, the comb 30, and its supporting frame 32, may be termed a comb assembly 45 and is pivotally related to the remainder of the head assembly 13 by the interengagement of the inturned flange 41a and the unsupported edge 42a of the assembly plate 42. By virtue of the manner of connection between the hinge plate 41 and the comb and frame 30, 32, there is also a limited amount of relative pivotal movement permitted between the hinge plate 41 and the comb 30 for a purpose which will be explained in greater detail below.

In order to retain the comb assembly 45 in assembled relationship against the outer head frame 24 and to close the receptacle 40, there is provided a latch means 50 which is located primarily between the assembly plate 42 and the inner head frame 25. The latch means 50 consists only of three parts; a latch member 51, a biasing spring 52, and a manual actuating button 53. As is best shown in FIGS. 5 and 6, the latch member 51 is an inverted, channel-shaped member which is received and guided in a groove or recess 25a formed in the upwardly facing surface of the inner head frame 25. The spring 52 engages the left end of the recess 25a as shown in FIG. 8, while the other end of the spring engages a cross bar 53a formed on the button 53. The cross bar 53a in turn engages a downwardly extending projection 51a on latch member 51 thereby resulting in the latch member 51 being biased by spring 52 to the right as shown in FIG. 2. The projection 51a extends into an opening 53b in the button 53 so that the button 53 and the latch member 51 move as a unit in the slot 25a. The latch member 51, the biasing spring 52, and the actuating button 53 are retained in the slot 25a by the assembly plate 42 which overlies the inner head frame 25 as is best shown in FIGS. 4 and 8. In addition, the assembly comprising the latch member 51 and the button 53 is prevented from moving outwardly from the right end of the slot 25a, as shown in FIG. 2, by means of an upwardly extending post 25b formed in the bottom of the recess 25a. The housing member 14 is provided with a notch 14a along its upper edge which forms an opening with the lower edge of the frame 24 through which the exposed end of the button 53 extends.

For the purpose of engaging and retaining the comb assembly 45 in its closed position with respect to enclosure 40, the latch member 51 is formed with an upwardly and outwardly extending projection 51b as is shown in FIGS. 3, 5, 6, 7, and 8. The projection 51b engages a corresponding opening 32a in the comb supporting frame 32.

In operating the latch means 50 to permit access to the enclosure 40, the operator applies an inward force against the

actuating button 53. This force compresses the spring 52 and causes the latch member 51 to move inwardly withdrawing the latch projection 51b from engagement with the comb supporting frame 32. As soon as the latch means is disengaged from the frame 32, the retaining and biasing spring 44 mounted on the hinge plate 41 causes the comb 30 and frame 32 to pivot upwardly with respect to the head frame 24 as well as the hinge plate 41 as shown in FIG. 8. As the comb 30 and frame 32 move outwardly and reach the limit of their movement with respect to plate 41, which is approximately thirty degrees with respect to the hinge plate 41, the inertia of the comb 30 and frame 32 causes the comb assembly 45 to continue moving toward its open position in which the hinge plate 41 is pivoted outwardly as shown in dotted lines in FIG. 8. In this position, the volume formerly in enclosure 40 is well exposed for cleaning purposes.

To return the comb assembly to its use position following the cleaning of the shaver, the comb 30 and hinge plate 41 are merely pivoted back to the original position shown in FIG. 2 at the same time the actuating button 53 is depressed to move the latch projection 51b to a retracted position so that the frame 32 may be moved to its fully closed position, and upon release of pressure on the button 53, the latch projection 51b again moves into engagement with the frame 32. Accordingly, there is provided a simple and effective means to provide access to the inner cutter assemblies 31 and the enclosure 40 within which the hair or beard clippings are received and stored. Thus, the shaver 11 may be cleaned, and the inner cutter assemblies 31 serviced with a minimum amount of effort and with little opportunity of losing the head parts or reassembling the parts improperly.

While there has been shown and described a single embodiment of the present invention, it will be understood that changes and modifications may be made to the claims by those skilled in the art and it is, therefore intended by the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

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

1. A shearing head for an electric dry shaver comprising an inner head frame and an outer head frame secured together to form a head assembly, a foraminous shearing member hingeably supported on said head assembly, at least one cutter means mounted on said head assembly for movement in shearing engagement with said foraminous member, said outer head frame having spaced end walls forming with said inner head frame a recess within which said cutter means is mounted, means biasing said foraminous member from a closed position seated against said outer head frame closing said recess toward an open position in which said foraminous member is spaced away from said cutter means, latch means slidably mounted in said inner head frame and having manually actuable means extending outwardly of said outer head frame so that it may be finger actuated, said latch means including a latch retainer adapted to lock said foraminous member in said closed position, said latch retainer being disengaged from locking engagement with said foraminous member upon actuation of said latch means, said latch means including a slidably mounted latch member received in an upwardly facing groove in said inner head frame, spring means received in said groove and biasing said latch member to one end of said groove, a latch assembly plate overlying said groove to hold said spring and latch member in assembled position on said inner head frame, said assembly plate being gripped between said inner and outer head frames, said latch retainer being formed on said latch member and comprising an L-shaped projection which extends into locking engagement with said foraminous member.

2. The shearing head of claim 1 including supporting means which hingeably support said foraminous member with respect to said head assembly, said assembly plate being formed with an unsupported edge portion which clamps the edge of said supporting means against said head assembly to

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provide the hingeable support means for said foraminous member whereby said foraminous member may move from its closed position to an open cleaning position when said manually actuable means is depressed.

3. A shearing head for an electric shaver as set forth in claim 1 wherein said cutter means comprises a pair of cutter carrying shafts, said shafts having mounted thereon radially directed cutters which engage the underside of said foraminous member when said member is in said closed position, said shafts being supported for oscillation in spaced bearings which are mounted between wall portions of said inner head frame and said outer head frame, said latch assembly plate being positioned beneath said cutter supporting shafts and being substantially coextensive with said inner head frame.

4. An electric dry shaver comprising a frame supporting an arched perforated comb, movable cutter means supported by said frame for shearing engagement with the underside of said comb, said cutter means being supported in a recessed portion of said frame, said arched comb overlying said recess and forming a compartment for receiving and storing hair clippings, a hinge plate for movably mounting said comb with respect to said frame, said hinge plate being pivoted for limited movement at one edge to said frame and pivoted for limited movement at the opposite edge to said comb, spring biasing means operating on said hinge plate and said comb to bias said comb with respect to said hinge plate to the limit of its movement in one direction, said hinge plate and said comb being movable to a locked position in opposition to said biasing means, said hinge plate and comb holding said biasing means in a deflected stressed condition when in said locked

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position, said hinge plate and said comb in said locked position closing said hair clipping receiving recess, spring operated latch means for retaining said hinge plate and said comb in said locked position, said latch means comprising a latch member slidably mounted on said frame and having a manually actuable means extending beyond said frame and having a latch retainer which engages said comb to retain said comb and said hinge plate in said locked position, spring means biasing said latching member to a position in which said latch retainer is engaged with said comb, said latch member being slidable in opposition to said spring biasing means to disengage said latch retainer from said comb whereby said biasing means operating between said hinge plate and said comb moves said comb from said locked position, said latch member being slidably received in an outwardly facing channel in said frame, and a plate member overlying said channel to retain said latch means and extending into engagement with said hinge plate to pivotally support said hinge plate with respect to said frame.

5. The electric dry shaver set forth in claim 4 having a cup-shaped housing including an opening within which said frame is mounted, a motor secured to said frame on the side thereof within said shaver housing, drive means extending from said motor into driving engagement with said cutter means, said frame having an opening through which said drive means extends from said motor enclosure into engagement with said cutter means, a channel formed in said frame on the side thereof opposite from the side mounting said motor, said latch means being slidably positioned within said channel.

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