

A DRY SHAVER WITH A READILY REPLACEABLE OUTER SHEARING FOIL

The present invention is directed to a dry shaver with a readily replaceable outer shearing foil, and more particularly to a reciprocatory type dry shaver having a replaceable head frame carrying the outer shearing foil.

Dry shavers having a replaceable head frame are already known as disclosed in U.S. patent No. 4,604,801 in which an outer shearing foil is fixed to a replaceable head frame and is removable together therewith from a shaver housing for replacement. The head frame is provided at its longitudinal ends with hook elements which are resiliently deformed into locked engagement with complementary stops formed on the part of the shaver housing when the head frame is placed upon the top of the shaver housing. Provided on the part of the shaver housing are release levers which are capable of resiliently flexing inwardly into contact with the corresponding hook elements of the head frame. Pressing in the release levers causes the hook elements to disengage from the stops, permitting the removal of the head frame from the shaver housing for a replacement or cleaning purpose.

In the dry shaver of the above construction, the head frame is intended to be removed, the user must be careful not to accidentally drop the head frame on the floor while the shaver

housing is being supported in one hand and at the same time
the release levers are being pressed in by the fingers of the same
hand, and with the head frame being pulled from the shaver
housing. In this manner, the user is compelled to exert a pressing
5 force with the hand supporting the housing in order to manipulate
the release levers to unlock the
head frame from the housing and at the same time to
hold the head frame with the other hand to remove it and
prevent it being accidentally dropped. This manipulation of
10 exerting carefully applied pressing forces to the individual
objects by the
respective hands in removing the head frame is rather
inconvenient and is not satisfactory for the user always
seeking the replacement of the head frame in a manner as easy
15 as possible.

In order to obviate the above inconvenience, the present
invention provides an improved dry shaver with a
replaceable head frame which is easy to mount on
or demount from the shaver housing

for replacement and cleaning purposes.

According to the present invention in a dry shaver comprising:

5 a housing mounting on its top a generally elongated inner blade assembly driven to reciprocate along the longitudinal axis of said inner blade assembly; and

10 a head frame demountable from said housing and carrying a shearing foil, said head frame being of rectangular configuration including a pair of opposed end walls connected by opposed side walls and detachably mounted on the top of said housing so that the inner blade assembly projects into the head frame for shearing engagement with the undersurface of said
15 shearing foil, each of said end walls having a hook engageable with a corresponding stop formed on a part of said housing for retaining said head frame on the top of said housing;

20 said shaver is characterised in that each of said end walls further includes a release lever extending integrally from the end wall adjacent to said hook and being capable of flexing resiliently for disengaging said hook from the corresponding stop, permitting said head frame to be removed from the housing, and that
25 each of said release levers has a finger-engengageable

portion exposed to be accessible by the finger of the user.

According to the present invention, in a dry shaver comprising:

5 a housing mounting on its top an elongated inner blade assembly, said housing formed integrally on its top with opposed end plates between which said inner blade assembly is driven to reciprocate along the longitudinal axis of said inner blade assembly; and

10 a head frame demountable from said housing and carrying a shearing foil, said head frame being of rectangular configuration including a pair of opposed end walls connected by opposed side walls and detachably mounted to the top of said housing between the end plates so that the inner blade assembly projects into the head frame for shearing engagement with the undersurface of said shearing foil;

15 said shaver is characterised in that each of said end plates of the head frame is formed with a top-opened generally vertical slot having along its inner side edges flanges, said flanges terminating at the respective lower ends in tabs which are spaced upwardly from the bottom of the slot to co-operate with one another to define at their lower edges a stop, said tabs projecting toward one another to define therebetween a passage;

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that each of said end walls has a resilient hook provided at its lower end with an outwardly projecting latch end for locking engagement with each of said stops to retain the head frame onto the top of the housing, said resilient hook integrally extending generally in the same plane of said end wall to be resiliently flexible inwardly so that the inward flexing thereof causes the latch end to come into and out of said latching engagement with the corresponding stop; and

that each of said end walls further includes a release lever extending along each said resilient hook outwardly thereof and having at its lower end an unlock stub projecting toward said latch end of the adjacent resilient hook, said release lever being received in said slot outwardly of said flanges when said head frame is mounted on the housing, said release lever integrally connected at its top end to the adjacent end wall to be resiliently flexible inwardly toward the resilient hook such that the inward flexing of said release lever causes said unlock stub to move through said passage to press said latch end inwardly for disengaging it from the stop while inhibiting the other portions of the release lever from entering inwardly of said flanges, allowing the removal of the head frame from the housing while

limiting the inward displacement of the release lever, each of said release levers further including at its lower end a finger-engageable portion exposed to be accessible by the finger of the user.

5 According to the present invention a shaver comprises a main body, a shaving foil frame, and means to mount the frame releasably on the body, the mounting means comprising at least one resilient hook member on the frame engageable with a
10 corresponding abutment on the body, and a resilient actuating member on the frame manually movable to move the hook member out of engagement with the abutment.

How the invention may be carried out will now be described by way of example only and with reference to
15 the accompanying drawings:

FIG. 1 is a front view, partially cut away, of a dry shaver in accordance with a first embodiment of the present invention;

FIG. 2 is an exploded perspective view illustrating a top portion of a shaver housing, a support frame, and a head frame carrying a shearing foil for the shaver of FIG. 1;

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FIG. 3 is an enlarged perspective view illustrating the longitudinal end of the head frame of FIG. 2 with a release

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lever being cut away;

FIG. 4 is an enlarged perspective view showing the release lever of the head frame as viewed from a different angle from that of FIG. 3;

5 FIG. 5 is an enlarged perspective view showing an end wall of the housing formed with a slot;

FIGS. 6A, 6B, 6C, and 6D are sectional views illustrating the sequence of removing the head frame from the housing;

10 FIG. 7 is an exploded perspective view, partially cut away of a dry shaver in accordance with a second embodiment of the present invention;

FIGS. 8 to 10 are partial views respectively similar to FIGS. 3 to 5 illustrating the longitudinal ends of the head frame and the housing of the shaver of FIG. 7;

15 FIG. 11 is a perspective view of a top portion of a dry shaver in accordance with a third embodiment of the present invention;

FIG. 12 is an exploded perspective view illustrating a head frame and a support frame forming the top portion of the
20 shaver of FIG. 11;

FIG. 13 is a sectional view illustrating the locking engagement between the head frame and the support frame of the shaver of FIG. 11;

25 FIG. 14 is a perspective view of the longitudinal end of a head frame utilized in a dry shaver in accordance with a fourth embodiment of the present invention;

FIG. 15 is a sectional view illustrating the locking engagement between the head frame and a corresponding housing of the shaver of FIG. 14;

FIG. 16 is a perspective view of the longitudinal end of a head frame utilized in a dry shaver in accordance with a fifth embodiment of the present invention;

FIG. 17 is a perspective view illustrating a top portion of a housing receiving the head frame of FIG. 16;

FIGS. 18A and 18B are respectively perspective view and front view of a resilient element fixed to the housing of FIG. 17;

FIG. 19 is a sectional view illustrating the locking engagement between the head frame of FIG. 16 and the housing of FIG. 17;

FIG. 20 is a perspective view of the longitudinal end of a head frame utilized in a dry shaver in accordance with a sixth embodiment of the present invention;

FIG. 21 is a partial side view of the head frame of FIG. 20 in the locked condition with a housing;

FIG. 22 is a perspective view of the longitudinal end of the housing receiving the head frame of FIG. 20;

FIG. 23 is a sectional view illustrating the locking engagement between the head frame of FIG. 20 and the housing of FIG. 22;

FIG. 24 is an exploded perspective view of a dry shaver in accordance with a seventh embodiment of the present invention;

FIG. 25 is a sectional view illustrating a locking engagement between a head frame and a housing of the shaver of FIG. 24; and

FIG. 26 is a sectional view taken along line 26-26 of FIG. 25.

First embodiment <FIGS. 1 to 6>

Referring now to FIGS. 1 and 2, a shaver of this embodiment comprises a housing 1 mounting thereon an inner blade assembly 10 20 and a head frame 30 carrying a shearing foil 38. The inner blade assembly 20 is driven by an electric motor (not shown) in the housing 1 to reciprocate in shearing engagement with the undersurface of the shearing foil 38. The housing 1 is composed of a main housing 2 and a support frame 10 which is 15 detachably mounted on the top of the main housing 2 by engaging a retractable latch 3 on either side of the main housing 2 into mating latch recess 4 formed in the inner surface of the support frame 10. The inner blade assembly 20 comprises a plurality of arcuate cutter blades 21 supported on 20 a base 22 which is detachably connected to a joint 23 projecting from the top of the main housing 2 and driven to reciprocate. The support frame 10 is for detachably mounting the head frame 30 and is shaped from a rigid metallic or plastic material into a generally rectangular configuration 25 having a pair of opposed end plates 11 the lower portions of which are integrally connected by opposed side plates 12. The

head frame 30 is shaped from a plastic material into a generally rectangular configuration with a pair of opposed end walls 31 connected by opposed side walls 32. The shearing foil 38 is supported on the head frame 30 with its peripheral edges fixed such as by welding or any other bonding technique to the insides of the side walls 32 so as to be curved in conformity with the contour of the cutter blades 21. The head frame 30 thus carrying the shearing foil 38 is prepared as a unitary replacement part and for this purpose the head frame 30 itself is made preferably from an inexpensive plastic material to avoid adding extra cost to the replacement part.

In order to detachably mount the head frame 30 on the support frame 10 on the side of the housing 1, the head frame 30 has a pair of hooks 33 which come into locked engagement with complementary stops 13 formed respectively in the end plates of the support frame 10. Each of the hooks 33 is formed centrally of each end wall 31 of the head frame 30 and, as best shown in FIG. 3, has its lower major portion separated therefrom by vertical notches 34 to make it capable of resiliently flexing inwardly. Formed on the lower end of each hook 33 is an enlarged latch end 35 which is tapered on its outwardly facing surface 36. As best shown in FIG. 5, each of the end plates 11 of the support frame 10 is formed with a top-opened slot 14 with a pair of vertically extending flanges 15 on its opposed side edges thereof. The flanges 15 are integrally formed with the end plates 11 and extend adjacent the inner surface of the

end plate 11 to define outwardly of itself a portion for receiving a release lever 41 which is formed on the head frame 30 and serves to disengage the hook 33, the detail of which will be discussed hereinafter. The lower ends of the flanges 5 15 terminate integrally in respective tabs 16 which are spaced upwardly of the bottom of the slot 14 to define at their lower edges the above stop 13 for a locked engagement with the latch end 35 of the hook 33. The tabs 16 extend toward one another to define between the ends thereof an open-slit passage 17 and 10 are formed on the portions projecting beyond the adjacent flanges 15 with an inwardly facing tapered surface 18.

When the head frame 30 is placed upon the support frame 10 with its end walls 31 inserted inside the end plates 11, each hook 33 has its latch end 35 abutted at 36 against the 15 tapered surface 18 of the tabs 16 to be thereby flex inwardly enough to move the latch end 35 past the tabs 16, after which it is resiliently urged outwardly into locked engagement with the stop 13, or the lower edges of the tabs 16, as shown in FIG. 6A, for retaining the head frame 30 in 20 position. In this mounted position, the head frame 30 has its side walls 32 rested upon the side plates 12 of the support frame 10 with rails 19 on the upper edge of the side plates 12 engaged with the insides of the side walls 31.

Also formed on the head frame 30 is a pair of release 25 levers 41 each of which extends integrally from the end wall 31 in outwardly adjacent relation to the corresponding hook 33.

Each of the release levers 41 joins the upper end of the adjacent hook 33 through a segment 42 and depends therefrom in a substantially parallel relation to the hook 33 to be likewise capable of resiliently flexing inwardly. Each release lever 41 is formed at its lower end with an unlock stub 43 which projects inwardly toward the latch end 35 of the adjacent hook 33 and is also formed with an outward projection 44 forming a finger engaging button. When the head frame 30 is mounted on the support frame 10, the release levers 41 on the opposite ends thereof are received respectively in the slots 14 outwardly of the flanges 15 with the finger engaging buttons 44 as well as ears 47 at the upper outer ends of the release levers 41 projecting from the outer surfaces of the corresponding end plates 11. In this condition, the unlock stub 43 of each release lever 41 is spaced outwardly from the latch end 35 to leave therebetween a clearance C. The portions on both sides of the unlock stub 44 are recessed to form thereat individual inclined guide surfaces 45. When it is required to remove the head frame 30 for a replacement or cleaning purpose, the release levers 41 are pressed in by the fingers of the user while holding the head frame 30 by the same fingers. Upon being pressed in, each release lever 41 is resiliently flexed inwardly to have the respective unlock stub 43 passed through the open-slit passages 17 into abutment with the latch end 35 of the hook 33. Further pressing in of the release lever 41 will cause

the hook 33 to flex inwardly sufficiently for disengaging the latch end 35 from the stop 13, as shown in FIG. 6B. Once the release lever 41 is sufficiently flexed inwardly to disengage the hook 33 from the stop 13, the inclined guide surfaces 45 on both sides of the unlock stub 43 come into abutment against the lower end of the flanges 15, or the tabs 16, preventing the release lever 41 from flexing excessively inwardly. After the hooks 33 are disengaged, the user is only required to pull the head frame 30 upwardly to move the latch end 35 away from the tabs 16 while holding the head frame 30 by the same fingers to complete the removal of the head frame 30 from the support frame 10, as shown in FIGS. 6C and 6D. It should be noted at this time that the inclined guide surfaces 45 at the inner lower end of the release lever 41 are kept abutted against the flanges 15 in the slot 14 so long as the release lever 41 is flexed inwardly to disengage the latch end 35 from the stop 13 and move it upwardly away from the stop 13, limiting the amount of inward flexing movement of the release lever 41 all through this procedure.

Each release lever 41 is formed at a portion between the finger engaging button 44 and the ear 47 with a finger trapping recess 46 which serves to facilitate gripping. Also formed with each release lever 41 is a bump 48 which projects inwardly from the upper end of the release lever 41 into constant abutment against the upper portions of the flanges 15 whereby the flanges 15 can bear any external shocks as applied

to the release lever 41 to thereby keep the end wall 31 of the head frame 30 safe from such external shocks which would otherwise distort the head frame 30 and result in the rupture of the shearing foil 38 which is of delicate construction.

5 Second embodiment <FIGS. 7 to 10>

FIG. 7 shows a second embodiment of the dry shaver which is identical in construction to the above first embodiment except that a housing 1a is integrally formed with a pair of opposed end plates 11a in place of using the separate support frame.

10 The same parts are designated by same numerals but suffixed with a letter "a". A head frame 30a is constructed to be identical in its functions with the exception that the ear at the upper end of each release lever 41a is eliminated so that only the finger engaging button 44a of each release lever 41a

15 protrudes out of the slot 14a when the head frame 30a is mounted between the end plates 11a. In the mounted condition, the head frame 30a carrying a shearing foil 38a has its side walls 32a rested on stepped shoulders 6 extending edgewise between the opposed end plates 11a so that the side walls 32a

20 can be flush with the front and rear faces of the housing 1a.

 Third embodiment <FIGS. 11 and 12>

Similarly to the first embodiment, a shaver head of this embodiment comprises a support frame 50 demountable on a main housing (not shown) and a head frame 60 carrying a shearing

25 foil 68. The support frame 50 is identical in construction to that utilized in the first embodiment except that each of the end

plates 51 is formed with an aperture 53 instead of the slot 14. The aperture 53 defines a stop for locking engagement with a corresponding hook 63 formed in each end wall 61. As shown in FIG. 13, the portion of the end plate 51 above the aperture 53 has an inclined inner surface or cam surface 59 along which a latch end 65 at the lower end of the hook 63 is guided to flex the hook 63 inwardly until it is engaged with the upper edge of the aperture 53. A release lever 71 depends integrally from the top of each end wall 61 in a substantially parallel relationship to the adjacent hook 63 and has at its lower end an inwardly projecting unlock stub 73 abutable against the latch end 65. The lower end of each resilient lever 71 is also formed with a finger-engagable button 74 opposite to the unlock stub 73. When the release levers 71 are pressed in, the unlock stubs 73 will push the corresponding latch ends 65 inwardly to disengage them from the apertures or stops 53, in the same way as in the first embodiment, thus permitting the removal of the head frame 60. In this embodiment, each end wall 61 of the head frame 60 has its upper portion 69 projecting to form a crown 69 which rests upon the upper edge of the corresponding end plate 51 of the support frame 50 when the head frame 60 is mounted with the lower portion of each end wall 61 disposed inside the corresponding end plate 51 of the support frame 50.

Fourth embodiment <FIGS. 14 and 15>

The head frame 90 of this embodiment is similar to that of the first embodiment except for the structure responsible for a detachable engagement with end plates 81 on the part of a housing (not shown). The end plates 81 may be formed as in the support frame of the first embodiment or may be formed as integral members in the main housing as in the second embodiment. The head frame 90 carrying the like shearing foil (not shown) has a pair of opposed end walls 91 (only one of which is seen) each having a single resilient member 93 which depends from the top of the end wall 91 in outwardly spaced relation thereto so that it is capable of resiliently flexing inwardly toward the end wall 91. The resilient member 93 is formed at its lower end with an outwardly projecting latch end 95 for a locked engagement with a corresponding stop 83 formed in the corresponding end plate 81 on the part of the housing. Upwardly of the latch end 95 the resilient member 93 is also formed with a finger-engagable button 94 which projects outwardly and cooperates with an ear 97 at the top of the resilient member 93 to form therebetween a finger trapping recess 96. Each of the end plates 81, inside of which the end wall 91 of the head frame 90 is mounted, is formed with a top-opened slot 84 with a post 85. The post 85 projects integrally from the bottom of the slot 84 and has its upper end bent inwardly to form the stop 83 for locked engagement with the latch end 95. In the mounted condition of FIG. 15,

each resilient member 93 has its major portion received in the slot 84 with its finger-engagable button 94 projecting outwardly of the slot 84 to be accessible by the finger of the user. When the buttons 94 are pressed in, the resilient members 93 are flexed inwardly to disengage the latch ends 95 from the stop 83, permitting the removal of the head frame 90. In this sense, the resilient member 93 has the dual function of attaching and releasing the head frame 90 to and from the housing.

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Fifth embodiment <FIGS. 16 to 19>

The head frame 110 of this embodiment is similar to that of the first embodiment except for the structure responsible for a detachable engagement with end plates 101 on the part of a housing (not shown). The end plates 101 may be formed as in the support frame of the first embodiment or may be formed as integral members in the main housing as in the second embodiment. The head frame 110 carrying the like shearing foil 118 has a pair of opposed end walls 111 (only one of which is seen) each having an integral hook leg 113 for a locked engagement with a stop 103 formed in the corresponding end plate 101 and further having an integral release lever 121 with a finger-engagable button 124. As shown in FIG. 16, the hook leg 113 is formed above a notch 119 in the center of the end wall 111 and has at its lower end a latch end 115 projecting inwardly of the end wall 111. The stop 103 for receiving the latch end 115 is formed on a separately formed resilient element 130 fixed to

the end plate 101 on the part of the housing. The resilient element 130 has a pair of U-shaped anchors 131 which are fixedly engaged with respective props 105 projecting in the lower portion of a top-opened slot 104 formed in each side plate 101 so that the upper portion of the resilient element 130 can flex inwardly for detachably engaging the stop 103 from the latch end 115 of the hook leg 113. A stud 132 is formed on the resilient element 130 to project between the upper portions of the anchors 131. The release lever 121 depends integrally from a raised top end of the hook leg 113 to be capable of resiliently flexing inwardly toward the resilient element 130 in the slot 104 and is formed at its inner lower end with an unlock stub 123 abutable with the stud 132 on the resilient element 130. When the release lever 121 is pressed in, the unlock stub 123 will press the stud 132 to correspondingly flex the resilient element 130 inwardly, disengaging the stop 103 from the latch end 115 of the hook leg 113, thus enabling the removal of the head frame 110. The stop 103 at the top of the resilient element 130 has a tapered cam surface 133 for guiding the latch end 115 therepast to effect the locking engagement with the stop 103 when the head frame 110 is placed in between the end plates 101.

Sixth embodiment <FIGS. 20 to 23>

The head frame 150 of this embodiment is similar to that of the fourth embodiment in the sense that a single resilient

member 153 is provided on each end wall 151 of the head frame 150 to effect the dual function of being hooked and unhooked to and from a corresponding beam 145 formed on the part of the housing. The resilient member 153 is connected integrally
5 with the raised top of each end wall 151 and depends therefrom in a parallel relation to the plane of the end wall 151 so as to be capable of flexing inwardly. At the outer lower end of the resilient member 153 there is formed a stepped pin 155 with sections 156, 157, and 158 of different diameters. The
10 first section 156 adjacent the lower end of the resilient member 153 has a diameter larger than the second section 157 aligned on the same axis but spaced away therefrom. The third section 158 at the outermost end of the stepped pin 155 has a maximum diameter and forms a finger engaging button to be
15 accessible by the finger of the user. The head frame 150 is mounted between end plates 141 at the top of a housing (not shown). Such end plates 141 may be included in the support frame as in the first embodiment or may be included as integral members of a shaver housing. Each end
20 plate 141 is formed with a top-opened slot 144 with a pair of beams 145 which project horizontally from the side edges of the slot 144 toward each other to define therebetween an open-slit passage 147. The passage 147 has a width which only allows the second section 157 of the pin 155 to pass
25 therethrough and inhibits the passage of the other sections of the pin 155. Thus, the beams 145 act as the stop for the

first section 156 to retain the head frame 150 between the end plates 141, as shown in FIG. 23. To detach the head frame 150, each resilient member 153 is pressed to flex inwardly to register the second section 157 with the passage 147, after which the head frame 150 is removed simply by being pulled upwardly to pass the second section 157 through the passage 147.

Seventh embodiment <FIGS. 24 to 26>

The head frame 170 of this embodiment is similar in construction to the previous embodiments but is somewhat different therefrom in that it has its end walls 171 as well as side walls 172 entirely exposed when mounted on the top of a housing 160. For this purpose, a pair of end plates 161 projecting on the opposite ends of the housing 160 are received in corresponding recesses 178 formed in the inner surfaces of each end wall 171. Each end wall 171 of the head frame 170 integrally formed with a hook 173 and a release lever 181 both depending from the top of the end wall 171 in parallel relation to each other. The hook 173 is relatively thick and extends a short length to be a rigid member while the release lever 181 is relatively thin and extends a longer length to be capable of resiliently flexing inwardly toward the hook 173. The hook 173 has at its lower end an inwardly projecting latch end 175 for locked engagement with a stop shoulder 193 formed at the upper end of a resilient element 190 projecting on the top of the housing 160. The resilient element 190 is

fixed to the housing 160 with its lower anchor end 191 secured into a hole 163 formed inwardly of the end plates 161 so that the upper portion of the resilient element 190 is capable of flexing inwardly. Formed on the middle of the resilient element 190 is a stud 192 projecting outwardly between the end plates 161 to be abutable with an unlock stub 183 projecting inwardly from the lower end of the release lever 181. When the head frame 170 is placed on the housing 160, the latch end 175 of each hook 173 will push the stop shoulder 193 inwardly after which it comes into locked engagement with the stop shoulder 193. To remove the head frame 170 from the housing 160, each of the release levers 181 is flexed inwardly to let the unlock stub 183 press the resilient element 190 inwardly, whereby disengaging the stop shoulder 193 from the latch end 175 of the adjacent hook 173.



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CLAIMS:

1. In a dry shaver comprising:

a housing mounting on its top a generally elongated inner
blade assembly driven to reciprocate along the
5 longitudinal axis of said inner blade assembly; and
a head frame demountable from said housing and carrying a
shearing foil, said head frame being of rectangular
configuration including a pair of opposed end walls
connected by opposed side walls and detachably mounted
10 on the top of said housing so that the inner blade
assembly projects into the head frame for shearing
engagement with the undersurface of said shearing foil,
each of said end walls having a hook engageable with a
corresponding stop formed on a part of said housing
15 for retaining said head frame on the top of said
housing;

said shaver is characterized in that each of said end walls
further includes a release lever extending integrally
from the end wall adjacent to said hook and being capable
20 of flexing resiliently for disengaging said hook
from the corresponding stop, permitting said head frame
to be removed from the housing, and that each of said
release levers has a finger engaging portion exposed to
be accessible by the finger of the user.



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2. A dry shaver as set forth in claim 1, wherein said finger-engageable portion forms a button which projects outwardly from the top portion of the housing.
3. A dry shaver as claimed in either claim 1 or claim 2, in which the said release lever is capable of flexing inwardly for disengaging said hook from said stop.



4. A dry shaver as set forth in claim 3, wherein said finger-engageable portion forms a button which projects outwardly from the top portion of the housing.
5. A dry shaver as set forth in claim 3, wherein each of said end plates is formed with a top-opened generally vertical slot having a pair of tabs projecting from its side edges to define outwardly of said tabs a portion for receiving said release lever, said tabs being spaced upwardly from the bottom of said slot to define at their lower edges said stop and projecting towards one another to define therebetween an open-slit passage, each of said hooks extending integrally from a respective end wall of the head frame and having at its lower end a latch end for locking engagement with said stop, said hook being connected at its top end to the end wall so as



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to be resiliently flexible inwardly,
each of said release levers extending along said hook
outwardly thereof and having at its lower end an inwardly
projecting unlock stub abutable against said latch end,
5. said release lever being connected at its top end to the end
wall so as to be resiliently flexible inwardly toward said
hook, whereby the inward flexing of the release lever
causes the unlock stub to move through said passage to push
the latch end inwardly for disengaging it from said stop
10 while the lower end of the release lever adjacent the
unlock stub comes into abutment with said tabs so as to
limit the inward displacement of the release lever,
preventing it from urging the hook excessively inwardly.

6. A dry shaver as set forth in claim 5, wherein
15 said unlock stub of the release lever is spaced from the
latch end of the hook to define therebetween a clearance.

7. A dry shaver as set forth in claim 5, wherein
each of said release levers having at its lower end an
outward projecting button which defines said finger
20 engaging portion, said release lever being formed in its



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outer surface upwardly of said button with a finger trapping recess.

8. A dry shaver as set forth in claim 5, wherein

each said vertical slot has along its inner side edges flanges each terminating at its lower end in each of said tabs, said release lever being formed at its upper end with an inwardly projecting bump for constant abutment against said flanges when said head frame is mounted on said housing.

9. A dry shaver as set forth in claim 6, wherein

said release lever is formed adjacent said unlock stub with an inclined guide surface which comes in sliding surface contact with the flanges and the tabs when the release lever is flexed inwardly to disengage the latch end from the stop, permitting the head frame to be removed upwardly from the housing in such a manner as to slide said inclined guide surface along said flanges.



10. A dry shaver as set forth in claim 3, wherein

said housing comprises a main housing mounting therein means for driving said inner cutter assembly and a support frame detachable on the top of the main housing, said support frame being a rectangular frame including said end plates integrally connected by opposed side plates and detachably supporting said head frame between said end plates by said engagement between the hook and the stop.

11. A dry shaver as set forth in claim 3, wherein

each of said end plates of the housing is formed with an aperture, said hook extending integrally from the end wall of said head frame and connected at its top end thereto so as to be capable of resiliently flexing inwardly, said hook having at its lower end a latch end for a locking engagement with the upper edge of said aperture, said end plate having on its inner surface upwardly of said aperture an inclined surface along which the latch end of the hook is guided as flexing said hook into the locked engagement with the aperture, said release lever extending integrally from said end wall in spaced relation to said hook outwardly thereof and capable of resiliently flexing inwardly toward said hook, said release lever having at its lower free end an inwardly projecting unlock stub which enters said aperture and



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presses the latch end of said hook inwardly for disengaging it from the stop when the release lever is flexed inwardly.

12. A dry shaver as set forth in claim 4, wherein

5 said hook and said release lever is defined by a single resilient member integrally extending from the top of the adjacent end wall, said resilient member being connected at its top end to the end wall of said head frame and extending in spaced relation thereto so that it is capable of resiliently flexing inwardly toward the end wall, 10 said release lever having a latch end at its lower free end and said finger-engageable button at the portion upwardly of said latch end, each of said end plate having a top opened generally vertical slot which is formed at its bottom with an upwardly projecting post, the upper end of said post 15 being turned inwardly to define said stop for locking engagement with said latch end.

13. A dry shaver as set forth in claim 3, wherein

20 said hook projects inwardly of the end wall of said head frame, each of said end plates being formed with a top-opened generally vertical slot into which extends a resilient



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element having at its upper free end said stop engageable
with said hook, said resilient element being fixed at its
lower end to the end plate so as to be capable of
resiliently flexing inwardly for effecting locking
5 engagement between the hook and the stop when the head
frame is placed between the end plates, said resilient
element being formed at a portion intermediate the lower fixed
end and the upper free end with an outwardly extending
stud, said release lever extending integrally from the end
10 wall in spaced relation thereto and outwardly thereof and
having at its lower end an inwardly projecting unlock stub
abutable to said stud, said release lever being connected
at its upper end to the end wall so that it is capable of
resiliently flexing inwardly, whereby the inward flexing of
15 said release lever causes the unlock stub to abut against
said stud to flex the resilient element inwardly for
disengaging the stop from the hook.

14. A dry shaver as set forth in claim 4, wherein
said hook and said release lever are defined by a single
20 resilient member integrally extending from the top of the
adjacent end wall of said head frame, said resilient member
extending in spaced relation to said wall to be capable
of resiliently flexing inwardly,



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said release lever having at its lower free end an outwardly extending stepped pin which has a first section of large diameter and a second section of small diameter, and a third section of maximum diameter defining said finger-engagement button, these sections being aligned on a common axis in this order from the lower end of said resilient member to the free end of said pin, each of said end plates having a top - opened generally vertical slot which is formed on its side edges with a pair of gate projections which define at their lower edges said stop for locking engagement with said first section of said pin, said gate projections extending to one another to define therebetween a passage of a width allowing only the second section to pass therethrough so that the inward flexing of the resilient member permits the stepped pin to pass through the passageway at the second section for mounting and demounting the head frame on and from said housing.

15. A dry shaver as set forth in claim 2, wherein said housing is formed at either end with a pair of upwardly projecting end plates to be fitted in corresponding recesses formed in the inner surface of each of the end walls of said head frame, said end plates at either end of the housing defining therebetween a top-



opened slot along which a resilient element extends with its lower end fixed to the housing so as to be allowed to move resiliently inwardly away from the slot, said resilient element having at its top end said stop for locking engagement with said hook, said hook being in the form of an inward projection on the corresponding end wall of the head frame, said release lever extending integrally from the adjacent end wall and being provided at its lower end with an unlock stub which projects inwardly into said slot to be abutable against said resilient member and provided with said finger-engagable button on its surface opposite to said stub, said release lever being connected at its upper end to the end wall so as to be capable of resiliently flexing inwardly, whereby the inward flexing of said release lever causes the unlock stub to press the resilient element for flexing it inwardly for disengaging said stop from said hook, permitting the head frame to be removed from the housing.

16. A dry shaver as set forth in claim 3, wherein said end plates are formed integrally with the housing to project upwardly therefrom.



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17. In a dry shaver comprising:

- a housing mounting on its top an elongated inner blade assembly, said housing formed integrally on its top with opposed end plates between which said inner blade assembly is driven to reciprocate along the longitudinal axis of said inner blade assembly; and
- 5 a head frame demountable from said housing and carrying a shearing foil, said head frame being of rectangular configuration including a pair of opposed end walls connected by opposed side walls and detachably mounted
- 10 to the top of said housing between the end plates so that the inner blade assembly projects into the head frame for shearing engagement with the undersurface of said shearing foil;
- 15 said shaver is characterized in that each of said end plates of the head frame is formed with a top-opened generally vertical slot having along its inner side edges flanges, said flanges terminating at the respective lower ends in tabs which are spaced upwardly from the
- 20 bottom of the slot to cooperative with one another to define at their lower edges a stop, said tabs projecting toward one another to define therebetween a passage;
- that each of said end walls has a resilient hook provided at its lower end with an outwardly projecting latch end
- 25 for locking engagement with each of said stops to retain the head frame onto the top of the housing, said



resilient hook integrally extending generally in the same plane of said end wall to be resiliently flexible inwardly so that the inward flexing thereof causes the latch end to come into and out of said latching engagement with the corresponding stop; and

5 that each of said end walls further includes a release lever extending along each said resilient hook outwardly thereof and having at its lower end an unlock stub projecting toward said latch end of the adjacent
10 resilient hook, said release lever being received in said slot outwardly of said flanges when said head frame is mounted on the housing, said release lever integrally connected at its top end to the adjacent end wall to be resiliently flexible inwardly toward the resilient hook
15 such that the inward flexing of said release lever causes said unlock stub to move through said passage to press said latch end inwardly for disengaging it from the stop while inhibiting the other portions of the release lever from entering inwardly of said flanges,
20 allowing the removal of the head frame from the housing while limiting the inward displacement of the release lever, each of said release levers further including at its lower end a finger-engagable portion exposed to be accessible by the finger of the user.



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18. A dry shaver as set forth in claim 17, wherein
said finger-engagable portion forms a button which projects
outwardly of the top portion of the housing.

19. A dry shaver substantially as described in the
5 description with reference to Figures 1 to 6 of the drawings.

20. A dry shaver substantially as described in the
description with reference to Figures 7 to 10 of the drawings.

21. A dry shaver substantially as described in the
description with reference to Figures 11 to 13 of the
10 drawings.

22. A dry shaver substantially as described in the
description with reference to Figures 14 to 15 of the
drawings.



35.

23. A dry shaver substantially as described in the description with reference to Figures 16 to 19 of the drawings.

24. A dry shaver substantially as described in the
5 description with reference to Figures 20 to 23 of the drawings.

25. A dry shaver substantially as described in the description with reference to Figures 24 to 26 of the drawings.

26. A shaver comprising a main body, a shaving foil frame, and means to mount the frame releasably on the body, the mounting means comprising at least one resilient hook member on the frame engageable with a corresponding abutment on the body, and a resilient actuating member on the frame manually movable to move the hook member out of engagement with the abutment.
