

Specification

This invention relates to a cutter head for dry shavers having a cutter head frame removably secured to the shaver housing and an exchangeable frame which is adapted to be inserted and lockingly engaged therein and in which a cutter foil cooperating with a reciprocating blade assembly is held clamped in an arched manner.

Cutter heads of this type (DE-A-2,857,468) have the advantage that they can be readily disassembled and assembled again for cleaning, for replacing a damaged or worn down cutter foil, and generally for purposes of repair. In particular the removal and insertion of the cutter foil can be readily accomplished also by laymen and inexperienced users by means of the exchangeable frame carrying the cutter foil, without the risk for the cutter foil to become damaged in these manipulations. This cutter head structure necessitates, however, a high manufacturing accuracy with regard to the elements involved, with relatively close dimensional tolerances, in order to ensure, also in large-scale production, the desired accurate cooperative relation between the blades of the blade assembly and the cutting edges of the cutter foil over the entire contact surface provided.

As a result of the relatively long tolerance chain, extending from the blade assembly which, being secured to the oscillating lever of the motor, is thus to be indirectly associated with the housing, via the cutter head frame arranged on the housing, via the exchangeable frame insertable in the cutter head frame, up to the cutter foil secured to the exchangeable frame, adverse summations of tolerances may produce end products which tend to be noisy because of excessive slack and tend to cause poor cutting action and an uneven wear of the cutting parts because of unsatisfactory centering of the cutter foil relative to the blade assembly, so that the parts have to be considered as scrap rendering them unusable. Reworking and fit selection of individual elements, however, are left out of consideration where major production batches are involved.

It is an object of the present invention to improve in a cutter head of the type initially referred to the centering of the exchangeable frame or the centering of its cutter foil relative to the blade assembly while the advantages of an exchangeable frame are maintained, and to ensure a largely vibration-free interference fit of the exchangeable frame.

According to the invention, this requirement is satisfied in a surprisingly simple manner by a positive-engagement interlocking arrangement between the exchangeable frame and the shaver housing, which interlocking acts in the direction of working movement of the blade assembly.

By coupling the exchangeable frame back to the housing as disclosed in the invention, the tolerance chain from the blade assembly to the cutter foil is advantageously interrupted at practically negligible constructional expenditure, and the connection between the housing and the cutter head frame which is by nature subjected to major slack, is eliminated from the tolerance chain, so that adverse tolerances occurring there cannot adversely affect the cutting action. It is understood that the interlocking engagement of the exchangeable frame with the housing as disclosed in the invention can be used alone by itself, however, it will be convenient to retain the hitherto customary connection between the exchangeable frame and the cutter head frame as a slack-allowing connection without making particular demands on quality, in order to prevent the exchangeable frame from falling out of the cutter head frame as the latter is removed from the housing.

By contrast, according to DE-B-11 77 035, for fastening the exchangeable frame with its cutter foils to the shaver housing, the exchangeable frame is provided with locating means in the form of two limbs projecting perpendicular to the plane of the exchangeable frame and having cam-shaped projections frictionally cooperating with locating means secured to the shaver housing.

The removal of the cutter head frame from the housing is facilitated particularly if in an advantageous improvement of the invention the positive-engagement interlocking arrangement between the exchangeable frame and the housing is disengageable upwardly in a direction transverse to the direction of working movement of the blade assembly; this is substantially the direction in which the cutter head is unseated from the housing.

In a further advantageous embodiment of the invention, the interlocking arrangement of the exchangeable frame is comprised of cutouts which are in cooperative relation with projections fixed to the housing. Alternatively, it is also possible to provide the exchangeable frame with projections adapted to engage into cutouts on the shaver housing.

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In a preferred embodiment of the dry shaver in which the housing is flush with the cutter head frame, it will be convenient to provide the projections on a molding of the housing, on which molding the cutter head frame and the exchangeable frame are at least partially seated.

In another preferred embodiment in which both the cutter head frame and the exchangeable frame have their outer contours flush with the housing, the locking means on the frame side are suitably provided on inwardly staggered strips of the exchangeable frame.

Finally, for a safe seat of the exchangeable frame on the housing, at least one positive-engagement interlocking arrangement is suitably provided on each of the opposite sides of the frame.

Two embodiments of the invention are illustrated in the accompanying drawings, in which:

FIG. 1 is a view, partly in section, of the cutter head illustrating a first embodiment thereof;

FIG. 2 is a section on the line II-II of FIG. 1;

FIGS. 3.1 and 3.2 are views, partly in section and broken away, of a second embodiment of a cutter head, illustrating two variations of a detail thereof; and

FIG. 4 is a section on the line IV-IV of FIG. 3.

The cutter head, shown in FIG. 1, of a dry shaver substantially comprises a cutter head frame 2 which is adapted to be seated on a molding 3 of the shaver housing 4 and encloses a dome-shaped upper part 5 of the housing 4. Projecting from this upper part 5 is an oscillating lever 6 of the motor, not shown, mounted in the housing 4, which motor causes a reciprocating movement of a blade assembly 7 in the direction of the double arrow 8, hereinafter referred to as the working movement. Insertable in the cutter head frame 2 is an exchangeable frame 9 which abuts the molding 3 flush with the lower edge 10 of the cutter head frame 2 and holds an arched cutter foil 11 which is in cooperative relation with the blade assembly 7. A helical spring 12 urges the blade assembly 7 against the cutter foil 11. Resilient tongues 13 and 14 are provided on respective ends of the exchangeable frame 9, said tongues respectively having heads 15 and 16 engaging into corresponding recesses 17

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and 18, respectively, on the inner surfaces of the respective ends 19 and 20 of the cutter head frame 2, thereby locking the exchangeable frame 9 against falling out when the cutter head frame 2 is removed.

Alongside of the two sides of the exchangeable frame 9, V-shaped cutouts 22, 23, 24 are provided on its lower flange 21, into which cutouts round-headed projections 25, 26, 27 formed on the molding 3 of the housing 4 lockingly engage, thereby locking the exchangeable frame 9 against self-movements in the direction of arrow 8. The interlocking engagement is disengageable transverse to the direction of arrow 8.

The principle of construction of the cutter head 1 illustrated in FIGS. 3.1, 3.2 and 4 is identical to the one previously described, differing only in the positive-engagement interlocking arrangement of the invention:

Downwardly projecting strips 43, 44, 45 are formed on the inside of the exchangeable frame 9 which according to FIG. 3.1 are provided with a V-shaped cutout 46 engaged by projections 47, 48 provided on the housing 4; according to FIG. 3.2, the cutout may also be provided on the projection 47.1 itself into which the associated strip 44 then moves by positive engagement therewith. In FIGS. 3.1 and 3.2, the housing 4 with the associated projections 47, 47.1 is indicated in dot-and-dash lines for improved clarity. The positive-engagement interlocking arrangements formed by the cutouts 46 and the projections 47, 47.1, 48 may be provided in both the one embodiment (FIG. 3.1) and the other embodiment (FIG. 3.2), or they may be intermixed; the interlocking arrangements are suitably provided on both opposed sides of the frame, as becomes apparent from FIG. 4.

The interlocking arrangements which can be readily disengaged when the cutter head frame 2 is removed in upward direction lock the exchangeable frame 9 against self-movement in the direction of the working movement, indicated by the double arrow 8, of the blade assembly 7, which is caused by entrainment via the cutter foil 11 under the shaving pressure, and contribute to a perfect centering of the blade assembly 7 relative to the cutter foil 11.

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In the two embodiments of the cutter head 1 described in the foregoing, by fixing the exchangeable frame 9 on the shaver housing 4 directly, any dimensional variations relative to the cutter head frame 2 are compensated for by the resilient tongues 13, 14 which serve to hold the two frames 2 and 9 nested.



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Patent Claims

1. A cutter head (1) for dry shavers having a cutter head frame (2) removably secured to the shaver housing (4) and an exchangeable frame (9) which is adapted to be inserted and lockingly engaged therein and in which a cutter foil (11) cooperating with a reciprocating blade assembly (7) is held clamped in an arched manner, characterized by a positive-engagement interlocking arrangement between the exchangeable frame (9) and the shaver housing (4), which interlocking acts in the direction of working movement (double arrow 8) of the blade assembly (7).

2. The cutter head as claimed in claim 1, characterized in that the positive-engagement interlocking arrangement is disengageable upwardly in a direction transverse to the direction of working movement (double arrow 8) of the blade assembly (7).

3. The cutter head as claimed in claim 2, characterized in that the interlocking arrangement is comprised of cutouts (22, 23, 24; 46) which are in co-operative relation with projections (25, 26, 27; 47, 47.1, 48) fixed to the housing.

4. The cutter head as claimed in claim 2, characterized by projections (strip 44) which are adapted to engage into cutouts on the shaver housing (4).

5. The cutter head as claimed in claim 3, characterized in that the projections (25 to 27) are provided on a molding (3) of the housing (4), on which molding the cutter head frame (2) and the exchangeable frame (9) are at least partially seated.

6. The cutter head as claimed in claim 2, characterized by at least one positive-engagement interlocking arrangement on each of the opposite sides of the frame (9).

7. The cutter head as claimed in any one of the preceding claims, characterized in that the locking means (46 to 48) on the frame side are provided on inwardly staggered strips (43 to 45) of the exchangeable frame (9).