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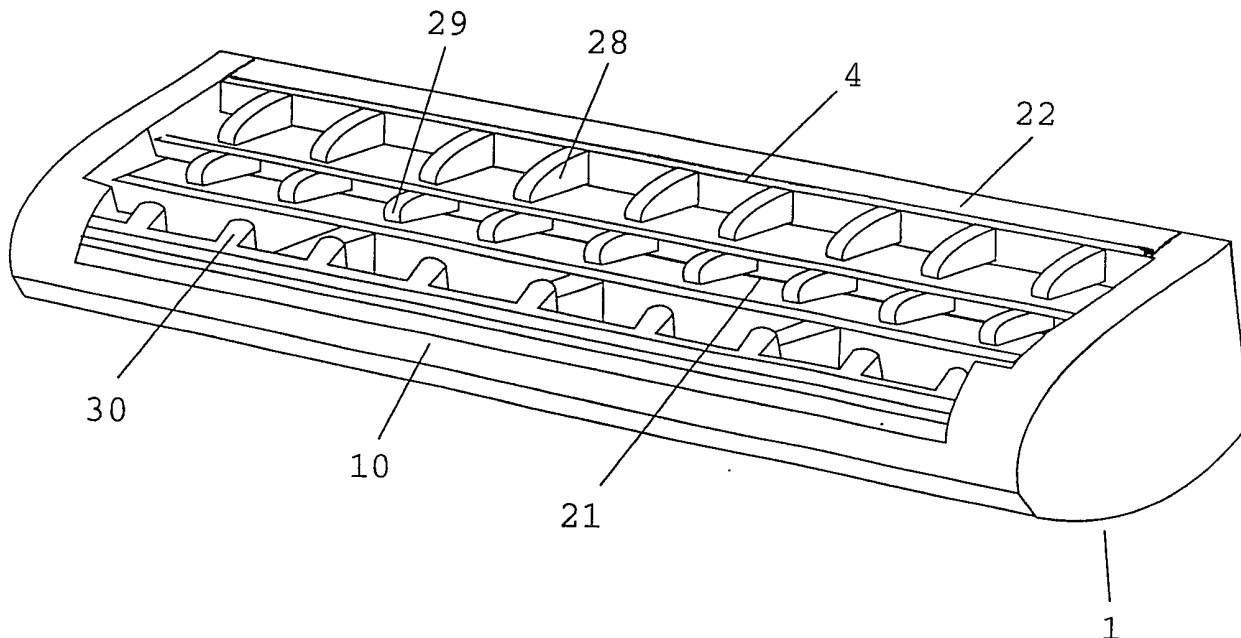
(56) Documents cited
GB 2087288 A GB 1433594 A EP 0178066 A1
US 4912846 A US 4409735 A US 4272885 A
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(58) Field of search
UK CL (Edition K) B4B B33B1A B33B1B B33D1
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(54) Razor head of a wet razor

(57) A razor head of a wet razor comprises a pair of blades separated by a spacer 21, a guardbar 10 and a top cover 4. The guardbar 10, spacer 21 and top cover 4 parts are provided with comb-like projections 28, 29, 30 which are aligned with each other and create a protection for the skin. The dimensions and positions of the comb-like projections 28, 29, 30 are such as to optimise the balance between the closeness and safety of the shave.

Fig. 4



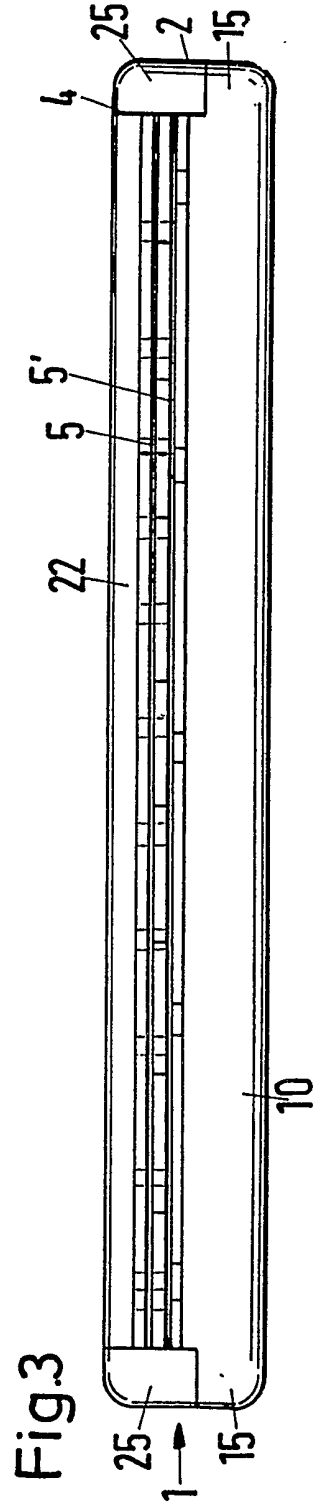
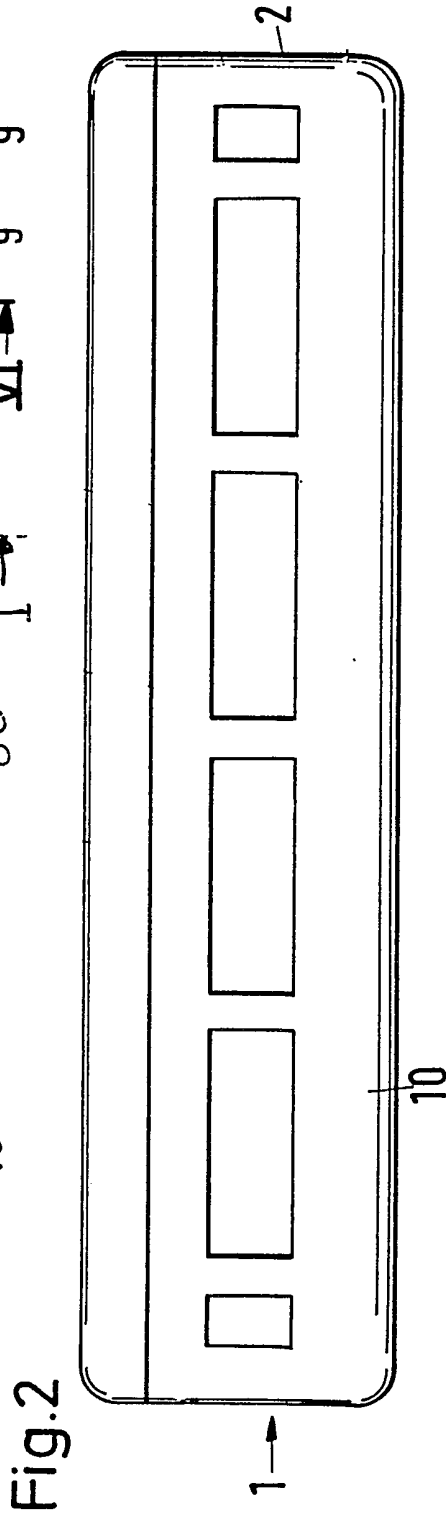
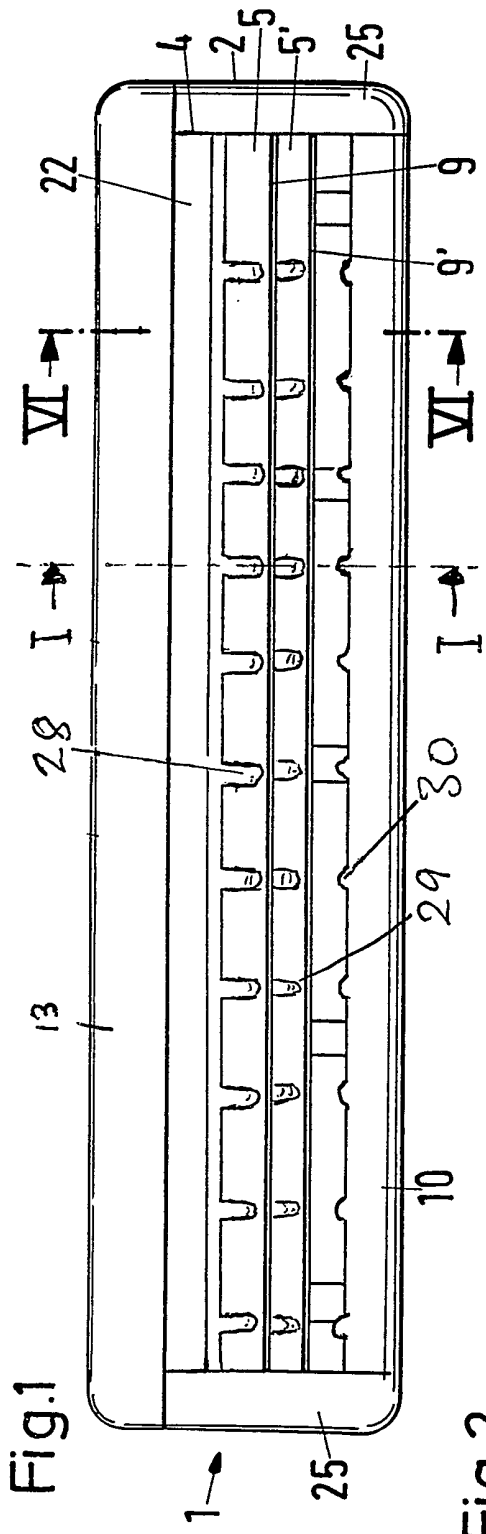


Fig. 4

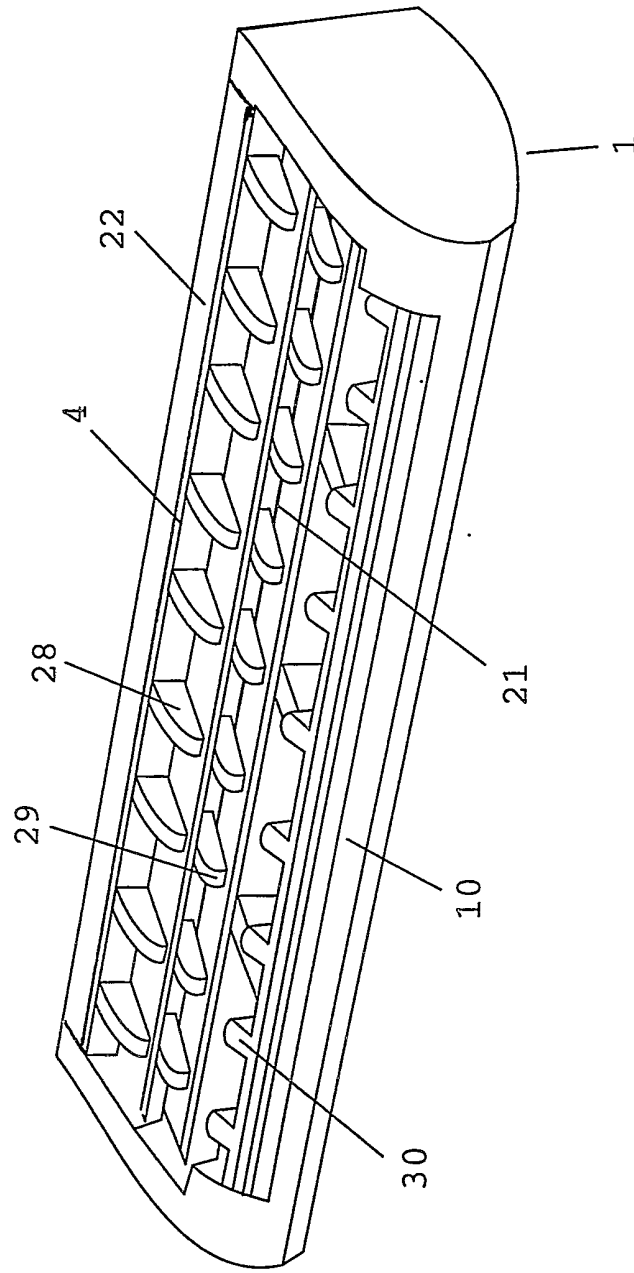


Fig. 5

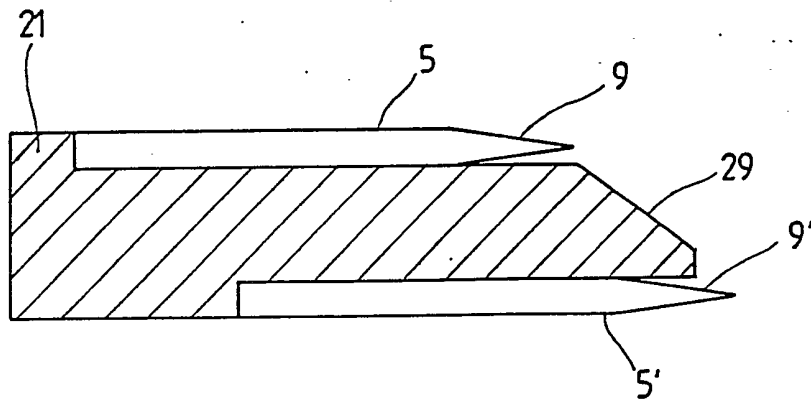


Fig. 6

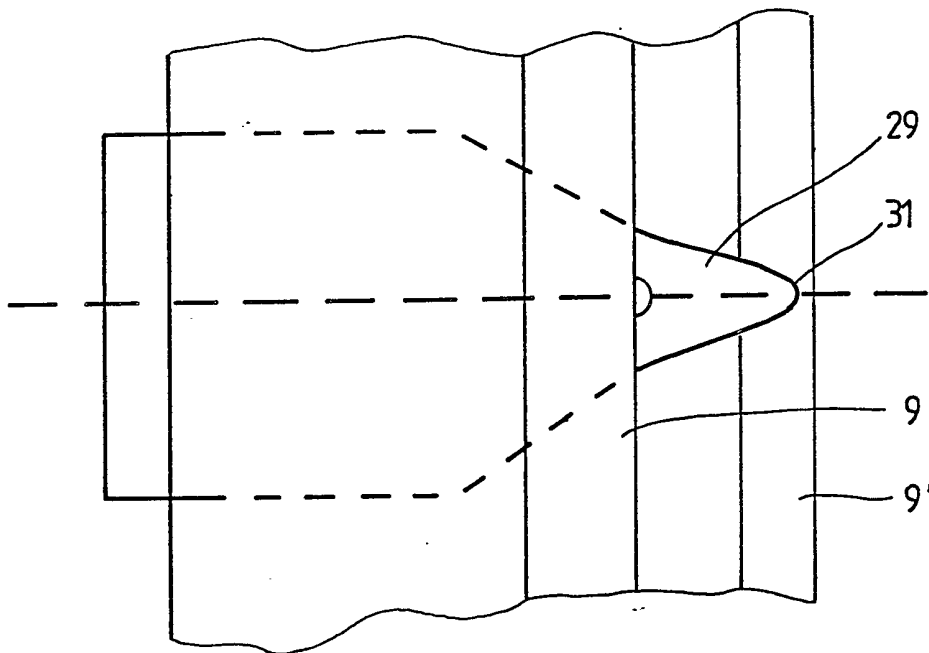


Fig. 7

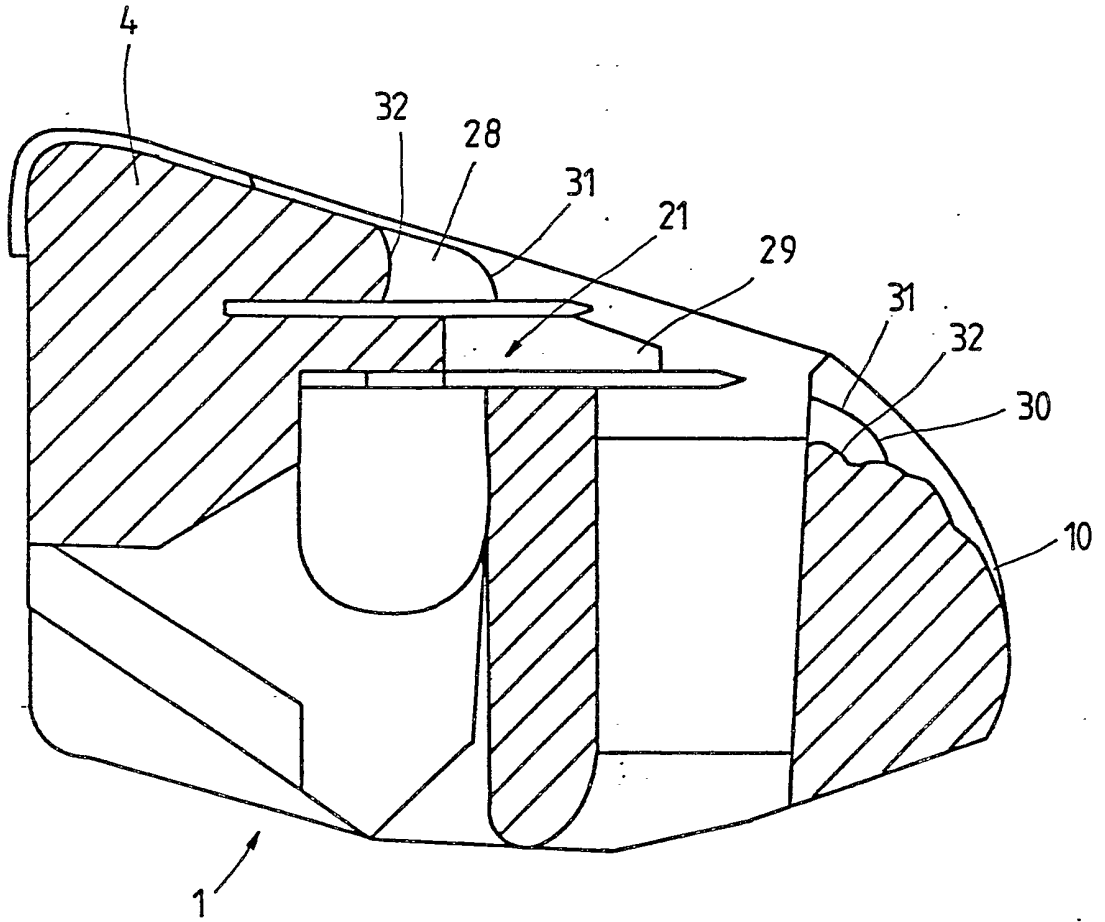


Fig. 8

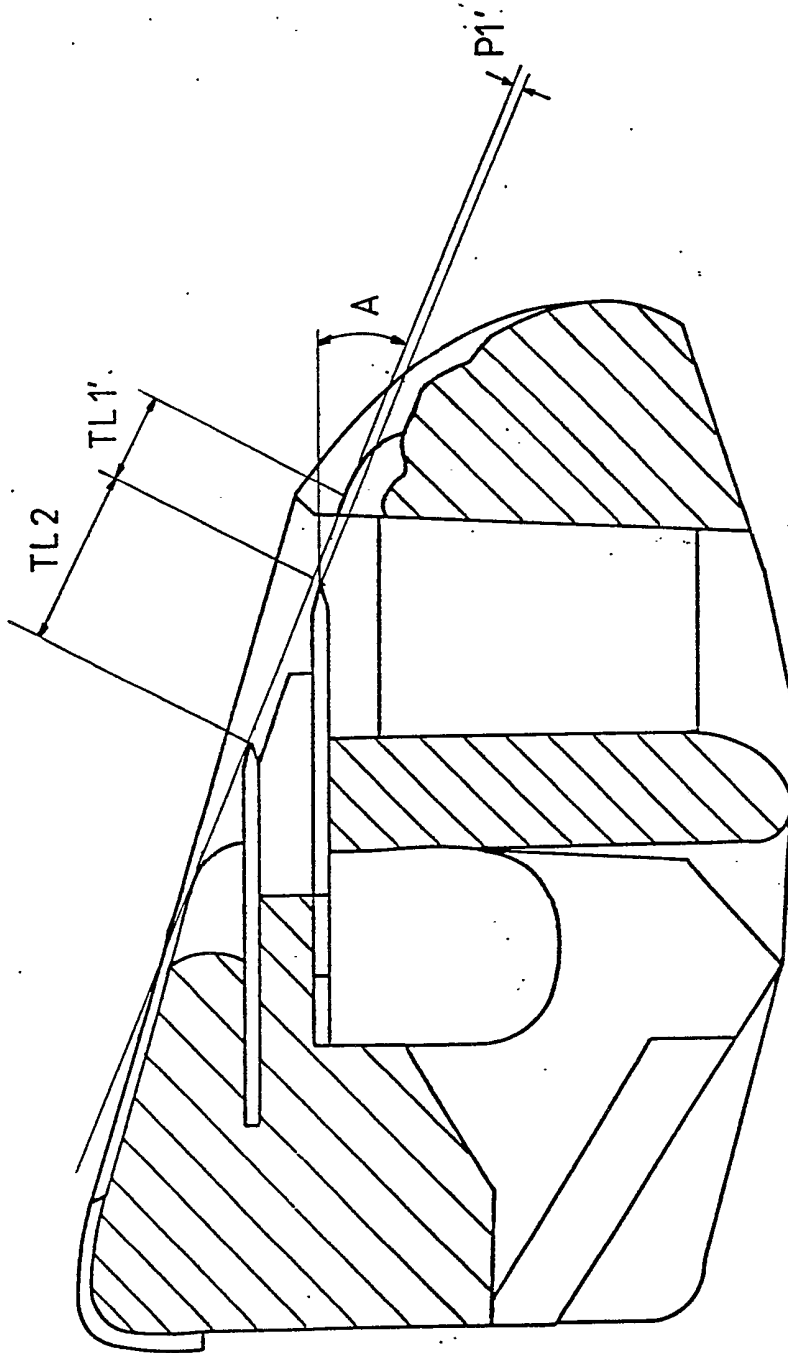
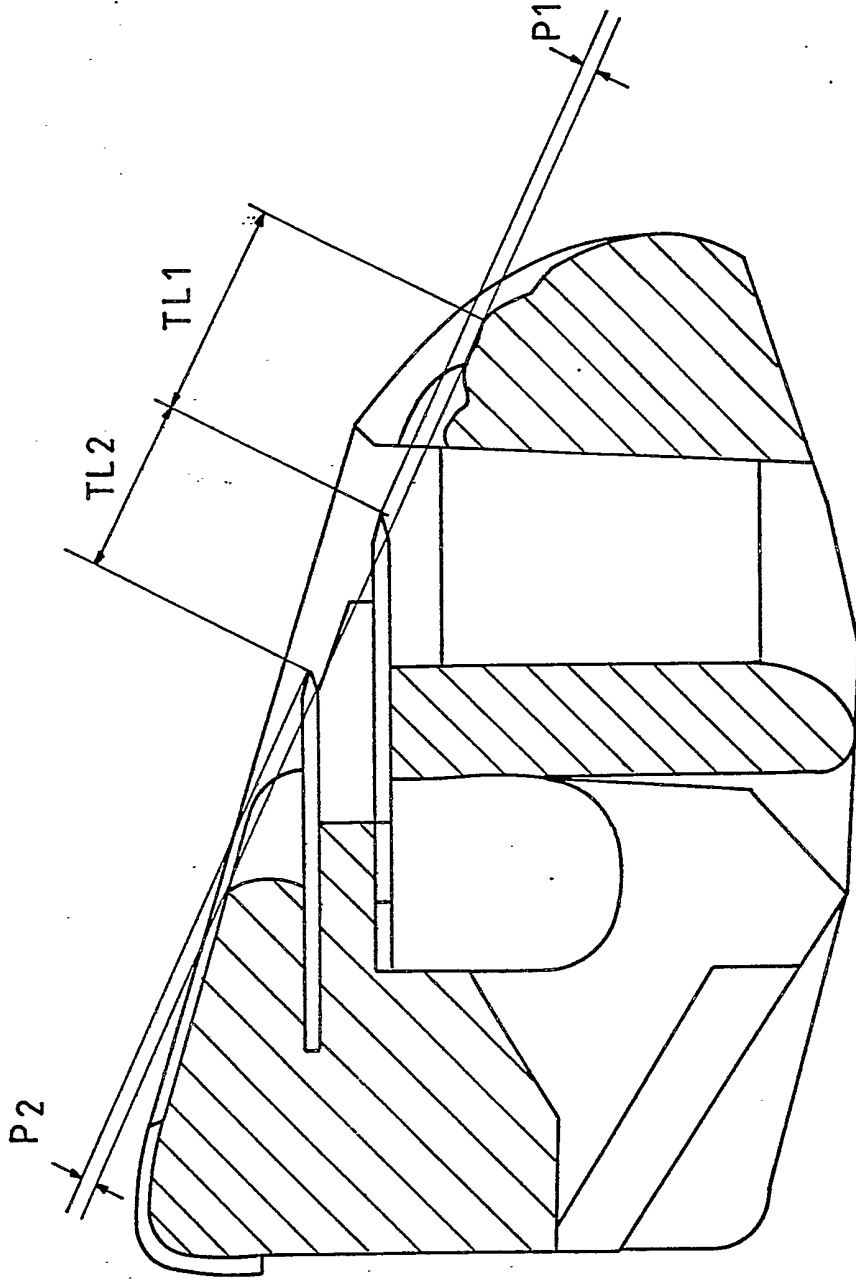


Fig. 9



RAZOR HEAD OF A WET RAZOR

The present invention relates to a razor head, and especially a razor blade unit, disposed at the front end of a handle of a wet razor. A razor blade means in the form of a single or double razor blade is disposed in a plastic body. In the vicinity of the upper side of the razor head that defines a surface for engaging the skin of a user are comprised of comb like projections extending towards the cutting edge(s) of the blade means.

Various embodiments of wet or safety razors are known. In each case, disposed at the front end of a handle is a razor head that carries the single or double razor blade. The razor head can be integrally formed with the handle as a moulded plastic part. If the razor head is separate from the handle and is to be secured thereto in an exchangeable manner via an appropriate mechanism, it is designated as a so-called razor blade unit, with a single or double razor blade being fixedly embedded in a plastic housing.

A razor head in the form of such a razor blade unit is disclosed in EP 0389007. A wire having a number of adjacent windings is wound around the plastic body in which the double razor blade is embedded. In the vicinity of the surface of the razor blade unit that engages the skin of a user, the individual windings extend at a distance from one another and parallel to the direction of shaving, while at the underside of the plastic body the windings extend at an angle. This protective wire winding significantly improves the shaving characteristics. For example, the wire prevents the formation of folds or bulges of the skin, so that injury to the skin can also be prevented in non-visible areas. Furthermore, the wire reduces the actual shaving resistance, since it reduces the

frictional forces. Finally, the protective wire prevents the user from accidentally cutting himself during improper handling of the razor blade unit at the razor blades thereof.

All these advantages achieved by the use of wires have the disadvantage that the wire is very difficult to assemble to the blade unit which makes the blade expensive to manufacture. As a technical solution to this problem it is proposed in accordance with the invention that the skin engaging and spacer parts of the blade unit have comb-like projections which extend towards the cutting edges. These extensions have a very similar effect to the wire strands in that the protrusion of the cutting edge is reduced at the point of the projection which reduces the risk of cutting too close which causes redness or of nicking the skin causing bleeding.

If a double razor blade is provided, it is proposed pursuant to a further specific embodiment that the two razor blades be secured to both sides of a spacer that is disposed between them, with the thus-formed razor blade/spacer/razor blade unit essentially being inserted from above onto a platform or support means of the plastic body. The spacer has comb-like projections extending towards the cutting edge of the blades.

In a preferred specific embodiment of this concept, the guardbar and blade platform form a lower plastic part interconnected by side walls. The blade/spacer/blade unit is located and fixed to the lower part by means of recesses in the side walls. The top cover is then placed on top of the blades and secured to the lower plastic part in an interlocking manner or in any other suitable fashion. The guardbar, spacer and top cover parts all have comb-like projections which are aligned with each other and create a protection to the skin. During shaving the skin has a

tendency to form bulges and folds which when out of sight of the user can cause these parts of the skin to be excessively exposed to the cutting edges of the blades. The comb-like projections prevent this from occurring and also provide an additional friction reducing effect to the razor head. This provides the combined effect of a comfortable and safe shave.

It is still important, of course, to ensure that the shave is still effective and sufficiently close. Critical to the balance between closeness and safety is the position of the blades with respect to the skin engaging surfaces in particular the guardbar and the cover. This is dependent on three values, the protrusion, the tangent length and the shaving angle. The protrusion of each blade is the distance which the cutting edges of each blade protrude beyond the tangent plane formed by the skin engaging points on the guardbar and cover. The tangent length of the bottom blade is the distance between the tangent point on the guardbar and the cutting edge of the bottom blade. The tangent length of the top blade is the distance between the cutting edges of the two blades. The shaving angle is the angle between the plane of the blades and the tangent plane formed by the skin engaging points.

In a razor head according to the invention the protrusions will have different values along the length of the blade according to the tips and troughs of the projections of the guardbar and cover parts measurement. Similarly the tangent length of the bottom blade will vary according to tips and troughs of the guardbar. In a further embodiment of the invention it has been determined that the best balance between closeness and safety depends on controlling the two separate measurements of the protrusion and the tangent length caused by the projections. The first measurement based on the tips of the projections, which will be referred to as the tip

protrusion, and the second measurement based on the troughs formed in between the projections, which will be referred to as the trough protrusion.

In razors according to the invention the protrusions measured based on the tips of the projections, the tip protrusion will be in the range of minus 0.5 mm to plus 0.1 mm. The protrusion measured based on the troughs of the projections, the trough protrusion, will be in the range of minus 0.1 mm to plus 0.5 mm. The tangent length measured from the tips of the guardbar projections will be in the range of 0.5 mm to 4 mm and measured from the troughs of the guardbar projections it will be in the range of 1 mm to 6 mm.

This objective, and other objectives and advantages of the present invention, will appear more clearly from the following specification in conjunction with the accompanying schematic drawings in which:

Fig. 1 is a top view of the exemplary embodiment of the inventive razor head in the form of a razor blade unit of a wet razor,
Fig. 2 is a bottom view of the razor blade unit of Fig. 1,
Fig. 3 is a front view of the razor blade unit of Fig. 1,
Fig. 4 is a perspective view of the exemplary embodiment of the inventive razor head,
Fig. 5 is an enlarged cross-sectional view of the blade/spacer/blade unit taken along the line I-I in Fig. 1,
Fig. 6 is an enlarged part top view of the blade/spacer/blade unit showing a further embodiment of the projections,
Fig. 7 is an enlarged cross-sectional view of the razor blade unit of fig 1 along the line VI-VI,
Fig 8 is the same view as fig 7 showing the shaving geometry at the tips of the projections,
Fig 9 is the same view as fig 7 showing the shaving geometry

at the troughs of the projections.

Referring now to the drawings in detail, the illustrated razor head, which is in the form of a so-called razor blade unit for a wet or safety razor, and can be secured to the front end of a non-illustrated handle, comprises a plastic body 1 in which are disposed two razor blades 5 and 5', the cutting edges 9 and 9' of which extend parallel to one another and are offset one behind the other.

The plastic body 1 comprises a base member 2 that is provided with the razor blades 5, 5', as well as an top cover 4 that is placed upon the base member 2.

On the upper side, the base member 4 defines a platform or support means 16 for the razor blades 5, 5'. For this purpose, a spacer 21 is sandwiched between the two razor blades 5, 5', which are securely connected to the spacer 21. These components thus form a razor blade/spacer/razor blade unit 6, which is placed from above upon the support means 16 of the base member 4. For this purpose, the spacer 21 comprises projections (not shown) extending from the rear and each end of the spacer 21 which are received in recesses (not shown) in the sides 25 of the base member 4. The projections at each end of the spacer 21 serve to locate the blade/spacer/blade unit accurately with respect to the base member 2 and correspondingly to the skin engaging surfaces. It will be appreciated that the blades can be accurately located with respect to the base member by in number of known ways. The base member 2 also comprises a front guardbar 10 extending parallel to the blades 5, 5'.

The cover 4 is provided at the top with a convexly curved glide or antifriction strip 22 which is convexly curved so that it extends partially over the back wall of the plastic

body 1. The particular advantage of this glide strip 22 is that it is also more effective at the end of the razor blade unit. When shaving, the skin is made taut and is pressed in and a bulge is formed at the end of the razor blade unit. Thus, the curved glide strip 22 glides better in this region and thus produces a more comfortable shave.

As best shown in figure 4 the forward guardbar 10 and the top cover 4 both comprise projecting comb-like projections 30, 28 which extend perpendicular to the blades and are aligned with each other. The spacer 21 comprises similar comb-like projections 29. All the comb-like projections on the guardbar 10, cover 4 and spacer 21 have a rounded tip 31 at the end of the projection. Various curvatures and shapes can be used on the ends of the tips to provide the best shaving comfort. A rounded trough 32 is provided at the base of the comb-like projections 30, 28, 29 where they are joined to the respective guardbar 10, cover 4 and spacer 21 parts. The preferred shape of the tips 31 and troughs 32 is rounded side surfaces and rounded uppermost surfaces forming a smooth spherical surface.

As shown in figures 8 and 9, the blades are fixed at a certain shaving angle A with respect to the skin engaging parts of the razor head and each blade has a certain protrusion P and a tangent length TL . The shaving angle A is the angle between the plane of the blades and the tangent connecting the guardbar 10 and the top cover 4. In the illustrated embodiment the shaving angle can be between 15° and 30° .

The protrusion of the bottom and top blades P_1 and P_2 is the distance by which the respective blades extend beyond the tangent plane connecting the guardbar 10 and the top cover 4. The tangent length TL_1 of the bottom blade 5' is the distance between the tangent point on the guardbar and the cutting edge

9'. The tangent length TL2 of the top blade 5 is the distance between the cutting edge 9' and the cutting edge 9.

At the tip 31 of each of the comb-like projections 28, 29, 30 both the protrusions and the tangent length TL1 of the bottom blade will be much less than at the trough 32. The blade unit in the illustrated embodiment has trough protrusions P1 and P2 measured at the troughs 32 of each of the skin engaging surfaces of 0.07 mm, and tip protrusions P1' and P2' of 0 mm at the tips 31 of the comb-like projections 28, 29, 30. Successful shaves have also been achieved for particularly heavy beards with trough protrusions P1 and P2 of 0.1 mm or higher and tip protrusions P1' and P2' of -0.1 mm.

In the illustrated embodiment the tangent length TL1 measured at the troughs 32 of the guardbar projections and the tangent length TL1' measured at the tips 31 of the guardbar projections 30 are both 1.5 mm. Successful shaves have also been achieved for particularly heavy beards with a trough tangent length TL1 of 2.5 mm and a tip tangent length TL1' of 0.5 mm. The guardbar projections 30 can extend towards the blades resulting in a tip tangent length TL' as low as 0.1 mm.

It will be understood that the razor head may take many forms other than the one described. For example the protrusions P1, P2 and P1', P2' could have different values. Also the blade of the second or of additional blades could be set at a different angle to the first blade. The projections 28, 29, 30 need not be aligned with each other one of more of them could be out of line.

The projections 28, 29, 30 are spaced a preferred distance apart and will be of a preferred thickness in order that the objectives of comfort, safety and closeness are achieved. The preferred spacing is at least 2 mm and the preferred thickness

is at least 0.2 mm.

The projections 28, 29, 30 are typically made from a single piece plastic part but can also be made from a metal part which has a lower frictional resistance. Alternatively or additionally the projections 28, 29, 30 are preferably coated with a friction reducing coating such as a polyvinyl pyrrolidone/polyurethane (PVP/PE) mixture.

The present invention is, of course, in no way restricted to the specific disclosure of the specification and drawings, but also encompasses any modifications within the scope of the appended claims.

CLAIMS

1. A razor head comprising a plastic body 1 having a top cover 4 and a front guardbar 10 which define a surface for engaging the skin of the user, and a razor blade means 5 comprising at least one cutting edge 9 disposed in said plastic body 1, characterised in that, at least one of said guardbar 10 and said top cover 4 comprise at least two comb-like projections 30, 28.
2. A razor head according to claim 1, characterised in that the razor blade means comprises two razor blades 5, 5' located on opposite sides of a spacer 21 disposed there between.
3. A razor head according to claim 2, characterised in that the spacer 21 comprises at least two comb-like projections 29.
4. A razor head according to any one of the preceding claims, characterised in that the comb-like projections 28, 29, or 30 comprised in said cover 4, spacer 21 or guardbar 10 are perpendicular to the said at least one cutting edge 9.
5. A razor head according to any one of the preceding claims, characterised in that at least one of the comb-like projections 28, 29 or 30 comprised in said cover 4, spacer 21 or guardbar 10 are orientated at an angle to said at least one cutting edge 9.
6. A razor head according to claim 5, characterised in that at least one of the comb-like projections 28, 29 or 30 are orientated at an angle the remaining projections

7. A razor head according to any one of the preceding claims characterised in that the comb-like projections 28 comprised in said cover are aligned with the comb-like projections 29, 30 in at least one of the spacer 21 and guardbar 10.
8. A razor head according to any one of the preceding claims, characterised in that said comb-like projections 28, 29, 30 comprise a tip 31 portion at the free end of the projection and a trough 32 portion at the base of the projection where it joins the respective guardbar 10, cover 4 and spacer 21 parts.
9. A razor head according to any one of the preceding claims, characterised in that the trough protrusion of said at least one cutting edge 9 is at least minus 0.1 mm and at most 0.5 mm.
10. A razor head according to claim 7, characterised in that the trough protrusion of one of the blades is negative and the trough protrusion of the other blade is positive.
11. A razor head according to claim 7, characterised in that the trough protrusion of said at least one cutting edge 9 is at least 0.02 mm.
12. A razor head according to any one of the preceding claims, characterised in that the tip protrusion of said at least one cutting edge 9 is at least minus 0.5 mm and at most 0.1 mm.
13. A razor head according to claim 10 and claim 2, characterised in that the tip protrusion of one of the blades is negative and the tip protrusion of the other blade is positive.

14. A razor head according to claim 10, characterised in that the tip protrusion of said at least one cutting edge 9 is at least 0.1 mm.
15. A razor head according to any one of the preceding claims, characterised in that the tangent length of the at least one of said blades is at least 0.5 mm and at most 6 mm.
16. A razor head according to claim 13, characterised in that the tangent length formed by the tips 31 of the guardbar projections 30 is at least 0.1 mm.
17. A razor head according to claim 13, characterised in that the tangent length formed by the troughs 32 of the guardbar projections 30 is at most 6 mm.
18. A razor head according to any one of the preceding claims, characterised in that at least one of said cover 4, spacer 21 and guardbar parts comprise said projections 28, 29, 30 which are spaced at least 2 mm from each other and have a thickness of at least 0.2 mm.
19. A razor head according to claim 16, characterised in that said projections 28, 29 30 are spaced at least 4 mm from each other and have a thickness of at least 0.5 mm.
20. A razor head according to any one of claims 5 to 17, characterised in that at least one of the tips 31 or troughs 32 of the projections 28, 29, 30 are rounded on the uppermost surface.
21. A razor head according to any one of claims 5 to 17, characterised in that at least one of the tips 31 or troughs 32 of the projections 28, 29, 30 are rounded on

the side surfaces.

22. A razor head according to claim 18 or 19, characterised in that the tips 31 or the troughs 32 of the projections 28, 29, 30 are rounded on the uppermost and the side surfaces.
23. A razor head according to any one of the preceding claims, characterised in that the projections 28, 29, 30 are made of plastic.
24. A razor head according to any one of the preceding claims, characterised in that the projections 28, 29, 30 are made of metal.
25. A razor head according to claim 21 or 22, characterised in that the projections 28, 29, 30 are coated with a friction reducing coating.
26. A razor head according to any one of claims 2 to 23, characterised in that the shaving angle A is between 15° and 30° .
27. A razor head according to claim 24, characterised in that the shaving angle of one blade is different to the shaving angle of the other blade.
28. A razor head according to any one of the preceding claims, characterised in that the said cover 4 is provided with a glide strip 22.
29. A razor head according to claim 26, characterised in that the glide strip 22 is convexly curved.

E: miner's report to the Comptroller under Section 17 (The Search Report)

Application number

9206844.4

Relevant Technical fields

- (i) UK CI (Edition K) B4B (B33B1A, B33B1B, B33D1, B33D2)
- (ii) Int CL (Edition 5) B26B (21/54, 21/56)

Search Examiner

J A MULLEN

Databases (see over)

- (i) UK Patent Office
- (ii)

Date of Search

J A MULLEN

Documents considered relevant following a search in respect of claims

1-29

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2087288 A (THE GILLETTE CO) See figure 18	1-4 at least
X	US 4912846 (YU) See lines 27-51, column 2	1,4 at least
X	US 4409735 (CARTWRIGHT)	1-4 at least
X	US 4272885 (FERRARO)	1-4 at least
X	US 4094066 (DANIEL) See comb 21	1,4 at least
X	GB 1433594 (WILKINSON SWORD LTD)	1,4 at least
X	EP 0178066 A1 (WARNER-LAMBERT CO)	1,4 at least

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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