

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO SHAVING UNITS

(71) We, WILKINSON SWORD LIMITED, a British Company, of Sword House, Totteridge Road, High Wycombe, Buckinghamshire, HP13 6EJ, formerly of Sword Works, Southfield Road, London, W4 5LE, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to shaving units. By the term 'shaving unit' is meant a substantially rigid member, generally of plastics material, to which is secured one or more razor blades each having one or more cutting edges, the rigid member providing a guard surface or guard surfaces located at a pre-set spacing from the cutting edge or cutting edges. Typical of such shaving units are those illustrated and described in British Patent Specification 1,294,666.

Shaving units are known having two razor blades which are spaced apart in parallel planes with one cutting edge in advance of the other cutting edge so that the two cutting edges lie approximately on a tangent to the part of the guard surface which in use is in contact with the skin of the user.

According to the present invention there is provided a shaving unit comprising a substantially rigid member, two elongated razor blades each having at least one cutting edge and secured to said rigid member, said rigid member providing a guard surface located at a pre-set spacing from the cutting edges, and spacing means integral with said rigid member, said spacing means engaging one of the blades at an intermediate position along its length to space said one of the blades from the other blade at said position.

The invention also provides a shaving unit comprising two plastics members, two

elongated razor blades sandwiched between said plastics members, at least one of said plastics members having at least one projection thereon which passes through an aperture in one blade at an intermediate position along its length and serves to space the blades from one another at said position.

Shaving units in accordance with the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view from one end and above of one construction of shaving unit, a central part of the blades being shown broken away.

Figure 2 is a sectional side elevation of the shaving unit shown in Figure 1, and

Figures 3 and 4 are diagrammatic views of the two cutting edges and the adjacent parts of the mouldings of the shaving unit shown in Figures 1 and 2.

Referring now to Figures 1 and 2, it will be seen that this construction comprises two blades 10, 11 each having a rear portion in contact with one another and sandwiched between an upper moulding 12 and a lower moulding 13, a part 12a of the moulding 12 passing through the moulding 13 and the blades 10 and 11 and being riveted over to secure the assembly. The lower moulding 13 is provided with a channel 13a for engagement with the runner of a holder, not shown. The forward edge 13b of the moulding 13 constitutes a guard surface which bears against the skin when the unit is used for shaving. The forward portion of blade 10 is curved out of the plane of the rear portion so that the cutting edge of the upper blade 10 is spaced from the surface of the lower blade 11; the cutting edge of the upper blade 10 being further from the guard surface 13b than the cutting edge of the lower blade 11. Spacing means are provided between

the two blades 10, 11, and in this construction takes the form of projections 13c on the lower moulding, the projections passing through apertures 11a in the lower blade 11. A further projection from the upper moulding 12 passes through an aperture in the blade 10.

In the construction illustrated only the upper blade is curved, but it will be appreciated that both blades may be curved either in opposite directions or, to a different extent, in the same direction, or the upper blade may be flat and the lower blade curved downwardly.

The curvature chosen for the, or each, blade and the spacing of the cutting edges from the guard surface and from one another determines the "effective shaving angle" for each cutting edge. Referring to Figure 3, the effective shaving angle 'D1' for the lower blade is the angle which the bisector 'A1' of the facet angle of the cutting edge makes with a line 'B1' which is tangential to the guard surface and passes through the tip of the cutting edge of blade 11. As shown in Figure 4, the effective shaving angle 'D2' for the upper blade 10 is the angle which the bisector 'A2' of the facet angle of the cutting edge makes with a line 'B2' which is tangential to the tip of the upper blade cutting edge and the tip of the lower blade cutting edge. Thus, it is possible to provide a different effective shaving angle for each cutting edge by arranging the blades so that the bisector of the facet angle of the cutting edge of one blade is inclined to the corresponding bisector of the other blade, the bisectors intercepting behind (rather than in front of) the cutting edges. The leading cutting edge may have a lower effective shaving angle than the rear cutting edge to give a more comfortable, less efficient, cutting action by the leading cutting edge followed by a more efficient "follow-up" cut by the rear cutting edge.

By way of example, the effective shaving angle of the leading blade may be from 16° to 27° , preferably $20^\circ \pm 2^\circ$, and that of the trailing blade 25° to 32° , preferably $28^\circ \pm 2^\circ$. The "protrusion" of the lower cutting edge, measured perpendicular to a line ('C1' in Figure 3) which is tangential to the guard surface and passes through the tip of the cutting edge of blade 10, may, for example, be up to 0.006 of an inch, preferably 0.002 to 0.004 of an inch. The protrusion of the rear cutting edge is measured perpendicular to a line ('C2' in Figure 4) which passes through the tip of the cutting edge of blade 11 and is tangential to the leading edge of the upper moulding 12. This protrusion can also be up to 0.006 of an inch, with a preferred range of 0.002 to 0.004 of an inch.

The protrusion of either blade can also be made a negative value. The cutting edge bisectors 'A1' and 'A2' will then intersect lines 'B1' and 'B2' respectively behind, instead of in front of, the respective lines 'C1' and 'C2'.

A preferred range of inclination between the bisectors of the facet angles is from 12° to 16° , but the inclination may be as low as 5° or as high as 28° .

Whilst there is advantage in having the rearward portion of the two blades abutting one another in order to avoid the necessity of providing spacers in this region, and thereby complicating assembly, spacers may be used in this rearward region but one or both of the leading edges of the blades may be suitably curved to provide a different effective shaving angle for each cutting edge. An alternative construction is to have two planar blades which are secured to the rigid member so that they lie in different planes and thereby have a different effective shaving angle. Many ways of achieving this are possible, for example one or more of the spacers may be of tapered cross-section. Another way, if the blades are sandwiched between two plastics members, is to provide projections on one or both plastics members which pass through apertures in the appropriate blade and serve to space the blades.

Another method of achieving different effective shaving angles is for each blade, whether planar or curved, to have the facets formed asymmetrically. Thus, one facet may, for example, be at an angle of 18° to the plane of the blade and the other at 6° . As the effective shaving angle is measured from the bisector of the included angle of the facets, different effective shaving angles are obtained with different asymmetry of the blades. In the limit, only one cutting facet is inclined to the plane of the blade, the other facet being a continuation of the plane of the blade, that is the blade edge is of conventional chisel form. This arrangement may be applied to one or more of the plurality of blades used and in the case of two or more blades the facet of one may face downwardly and the facet of another upwardly.

The upper and lower mouldings may be moulded from different plastics so that they have different resilience, whereby one moulding is more flexible than the other, thereby better accommodating manufacturing tolerances so as to improve the distributed load between the blades and mouldings.

Whilst a twin-bladed shaving unit has been described it will be appreciated that the same principle can be applied to three

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or more blades with the rearward portions of all abutting or with some or all of the rearward portions spaced apart, one or more of the leading edges of the blades being curved to provide a different effective shaving angle. Likewise, the invention is equally applicable to shaving units utilising double-edged blades, each set of cutting edges being located adjacent a respective guard surface in similar manner to conventional double-edged safety razors.

Features of the shaving units described above are the subject of our cognate copending patent applications Serial Nos. 54605/72 and 10908/73, (Serial No. 1 456 202) and our cognate copending patent applications Serial Nos. 31674/76 and 31675/76 (Serial No. 1 456 204).

WHAT WE CLAIM IS:

1. A shaving unit comprising a substantially rigid member, two elongated razor blades each having at least one cutting edge and secured to said rigid member, said rigid member providing a guard surface located at a pre-set spacing from the cutting edges, and spacing means integral with said rigid member, said spacing means engaging one of the blades at an intermediate position along its length to space said one of the blades from the other blade at said position.

2. A shaving unit according to claim 1, wherein said spacing means comprises at least one projection which passes through an aperture in one blade and engages the second blade.

3. A shaving unit according to claim 1, wherein said blades are sandwiched between two mouldings, one of said mouldings constituting said rigid member.

4. A shaving unit according to claim 3, wherein a part of one moulding passes through the other moulding and is riveted over to secure the assembly.

5. A shaving unit according to either claim 3 or claim 4, wherein said spacing means is constituted by a part of one moulding which passes through an aperture

in one blade and engages the other blade, and by a part of the other moulding which passes through said other blade and engages said one blade.

6. A shaving unit according to claim 2, wherein said blades are sandwiched between two mouldings, one of said mouldings constituting said rigid member.

7. A shaving unit according to any one of the preceding claims wherein said rigid member is provided with a channel for engagement with the runner of a holder.

8. A shaving unit comprising two plastics members, two elongated razor blades sandwiched between said plastics members, at least one of said plastics members having at least one projection thereon which passes through an aperture in one blade at an intermediate position along its length and serves to space the blades from one another at said position.

9. A shaving unit according to claim 8, wherein at least one projection on one plastics member passes through an aperture in one blade, and at least one projection on the other plastics member passes through an aperture in the other blade.

10. A shaving unit according to either claim 8 or claim 9, wherein a part of one plastics member passes through the other plastics member and is riveted over to secure the assembly.

11. A shaving unit according to any one of claims 8 to 10, wherein one of said plastics members is provided with a channel for engagement with the runner of a holder.

12. A shaving unit according to any of the preceding claims, wherein said razor blades are planar.

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WHAT WE CLAIM IS:

1. A shaving unit comprising a substantially rigid member, two elongated razor blades each having at least one cutting edge and secured to said rigid member, said rigid member providing a guard surface located at a pre-set spacing from the cutting edges, and spacing means integral with said rigid member, said spacing means engaging one of the blades at an intermediate position along its length to space said one of the blades from the other blade at said position.
2. A shaving unit according to claim 1, wherein said spacing means comprises at least one projection which passes through an aperture in one blade and engages the second blade.
3. A shaving unit according to claim 1, wherein said blades are sandwiched between two mouldings, one of said mouldings constituting said rigid member.
4. A shaving unit according to claim 3, wherein a part of one moulding passes through the other moulding and is riveted over to secure the assembly.
5. A shaving unit according to either claim 3 or claim 4, wherein said spacing means is constituted by a part of one moulding which passes through an aperture

in one blade and engages the other blade, and by a part of the other moulding which passes through said other blade and engages said one blade.

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7. A shaving unit according to any one of the preceding claims wherein said rigid member is provided with a channel for engagement with the runner of a holder.

8. A shaving unit comprising two plastics members, two elongated razor blades sandwiched between said plastics members, at least one of said plastics members having at least one projection thereon which passes through an aperture in one blade at an intermediate position along its length and serves to space the blades from one another at said position.

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11. A shaving unit according to any one of claims 8 to 10, wherein one of said plastics members is provided with a channel for engagement with the runner of a holder.

12. A shaving unit according to any of the preceding claims, wherein said razor blades are planar.

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