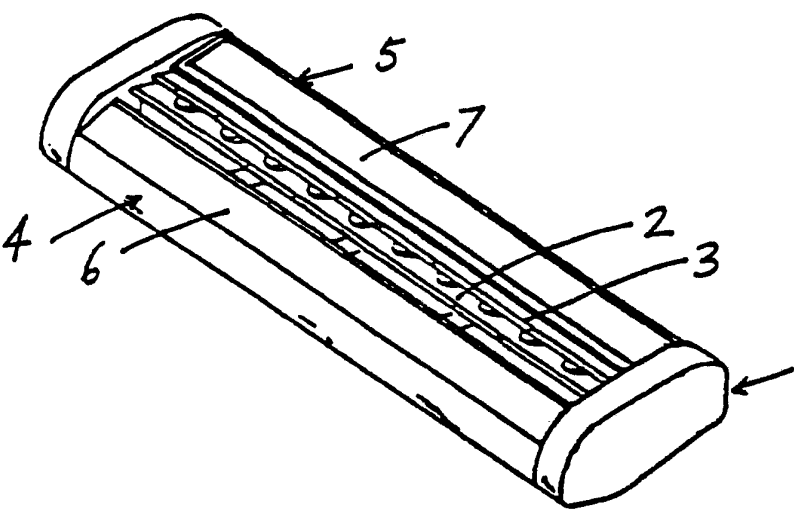


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<p>(21) International Application Number: PCT/US91/07166</p> <p>(22) International Filing Date: 1 October 1991 (01.10.91)</p> <p>(30) Priority data: 9022128.4 11 October 1990 (11.10.90) GB</p> <p>(71) Applicant (for all designated States except US): THE GILLETTE COMPANY [US/US]; Prudential Tower Building, Boston, MA 02199 (US).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only) : CROOK, Alan [GB/GB]; 15 Silchester Road, Pamber Heath, Basingstoke, Hampshire (GB).</p> <p>(74) Agents: HANDELMAN, Joseph, H. et al.; Ladas & Parry, 26 West 61 Street, New York, NY 10023 (US).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), PL, SE (European patent), SU⁺, US.</p> <p>Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: SAFETY RAZORS</p> <div style="text-align: center;">  </div> <p>(57) Abstract</p> <p>A safety razor in which at least part of the skin engaging surface (6, 7) thereof has an adherent coating comprising substantially spherical elastomeric particles in a polymer matrix, the size and concentration of such particles being such that the coated surface has a surface roughness with spaced major and subsidiary peaks.</p>		

+ DESIGNATIONS OF "SU"

Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

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Safety Razors

This invention relates to razors having one or more blades and skin engaging surfaces arranged ahead of and/or behind the blade edge or edges.

5 The invention is applicable to razors of various forms, such as so-called 3-piece razors, one-piece, or disposable razors and to razors in which the blade or blades are present in a replaceable blade cartridge.

10 In conventional razors, the skin engaging surfaces are formed as cap and guard members, the cap member being positioned behind the blade edge(s) and the guard member ahead of the edge(s).

 A number of proposals have been made for
15 providing the cap and/or guard surfaces with surface configurations or textures. Thus, for example, British Specification 1,458,356, describes a safety razor having a guard surface, at least part of which has a roughness of between 0.5 and 10.0 micrometres (μm) centre-line-
20 average values. The spacing of the peaks is preferably from 0.5 to 5.0 times the surface roughness.

 The surface roughness may, for example, be obtained by abrading the surface with particles of grit, ceramics, oxides or metals, by mechanical roughening, or
25 by roughening the surface of a mould in which the guard surface is formed. Alternatively the guard surface may be coated or impregnated with particles, for example

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particles of grit, ceramics, oxides or metals, to give the desired surface roughness.

It is known that small discrete regions of the skin, approximately 1mm across on the face, are served
5 by separate nerve networks so that it is not possible subjectively to distinguish between two separate points of pressure applied to skin less than about 1mm apart. These areas can be stimulated repeatedly by a succession of pressure points moving across them. By controlling
10 the pressure to a low but adequate level it can be assured that the sensation is pleasant, but it has been found, surprisingly, that this raises the threshold stimulus level for discomfort. That is to say, the pleasant tactile sensation due to the provision of an
15 appropriate texture on a skin engaging surface of the razor tends to mask the sensations caused by contact of the blade edge(s) with the skin and, more significantly, the facial hairs as they are severed.

We have now found that a particularly
20 favourable effect can be obtained by providing at least part of the skin engaging surface of a safety razor with an adherent coating comprising substantially spherical elastomeric particles in a polymer matrix, the size and concentration of such particles being such that the
25 coated surface has a surface roughness and spacing of the major and subsidiary peaks within certain selected ranges.

According to the present invention, there is provided a safety razor having one or more blades and
30 skin engaging cap and guard surfaces, in which at least part of the skin engaging surface is provided with an adherent coating comprising substantially spherical elastomeric particles in a polymer matrix, the size and concentration of such particles being such that the
35 coated surface has a surface roughness of 4 to 10 μm centre-line-average, with the spacing of the major peaks at 20 to 30 times the surface roughness and the spacing

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of the subsidiary peaks at 6 to 10 times the surface roughness.

The "centre-line-average" value of the surface roughness is defined in British Standard BS 1134:1961 and corresponds to the term "arithmetical average" used in U.S. Standard ASA B46. The term "spacing" is also used in BS 1134:1961 and refers to the average distance between the peaks (major or subsidiary) referred to.

The coating is preferably provided on the guard surface or the guard and cap surfaces. We have found that best results are obtained when at least 75 mm² and preferably at least 120 mm² of skin engaging surface is coated.

For the better understanding of the invention, a preferred embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a razor cartridge, and

Figure 2 is an optical micrograph of a coated surface, and

Figure 3 is a scanning electron micrograph of a coated surface.

A safety razor cartridge of conventional form is shown in Figure 1. The cartridge body 1 is of moulded construction (usually being made up of a number of individual mouldings) in which are permanently secured a pair of blades 2,3 whose cutting edges are disposed to act in tandem upon the skin. The body is formed to provide a guard member 4 and a cap member 5 having skin engaging surfaces 6 and 7, respectively, to engage the skin ahead of and behind the blade edges.

In accordance with the invention, a part or the whole of one or both of the surfaces 6 and 7 is provided with a coating of the kind described.

In a currently preferred embodiment, the coating is formed by spraying the surface to be coated

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with a texturising paint comprising substantially spherical elastomeric particles in an elastomeric polyurethane binder, the majority of the particles having a diameter of less than 70 μm and the particles having a mean size of 30 μm . Spraying is effected to form a coating which has a dried thickness of 0.04 to 0.1 mm and the coated area should be at least 75 mm^2 and preferably at least 120 mm^2 .

A suitable texturising paint for this purpose is commercially available from Sonneborn & Rieck Limited as "Jaxalac" Two Pack V.T.1. finish. This paint is formulated as a two-pack polyurethane paint using an aliphatic polyisocyanate curing agent.

Micrographs of coatings obtained with this paint form Figures 2 and 3. Figure 2 is an optical micrograph at a magnification of X25; the spherical nature of the texturising particles can be clearly seen.

Figure 3 is a scanning electron micrograph at a magnification of X40 (45° tilt); it will be seen that the spherical particles give rise to rounded peaks which may be contrasted to the angular peaks which would be obtained by the use of grit.

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C L A I M S

1. A safety razor having one or more blades and skin engaging cap and guard surfaces, in which at least part of the skin engaging surface is provided with an adherent coating comprising substantially spherical elastomeric particles in a polymer matrix, the size and concentration of such particles being such that the coated surface has a surface roughness of 4 to 10 μm centre-line-average, with the spacing of the major peaks at 20 to 30 times the surface roughness and the spacing of the subsidiary peaks at 6 to 10 times the surface roughness.
2. A safety razor according to claim 1, in which at least 75 mm^2 of skin engaging surface is provided with said coating.
3. A safety razor according to claim 1 or 2, in which the coating is present on the guard surface.
4. A safety razor according to any of claims 1 to 3, in which said coating is formed by spraying the skin contacting surface with a texturising paint comprising substantially spherical elastomeric particles in an elastomeric polyurethane binder, the majority of the particles having a diameter less than 70 μm and the particles having a mean size of 30 μm , to form a dried coating having a thickness of 0.04 to 0.1 mm.

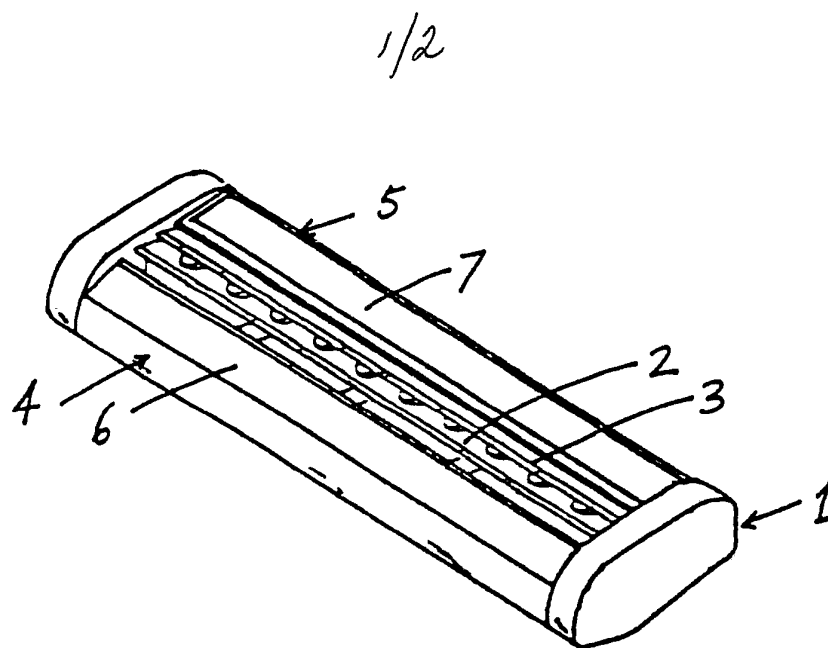


Fig. 1.

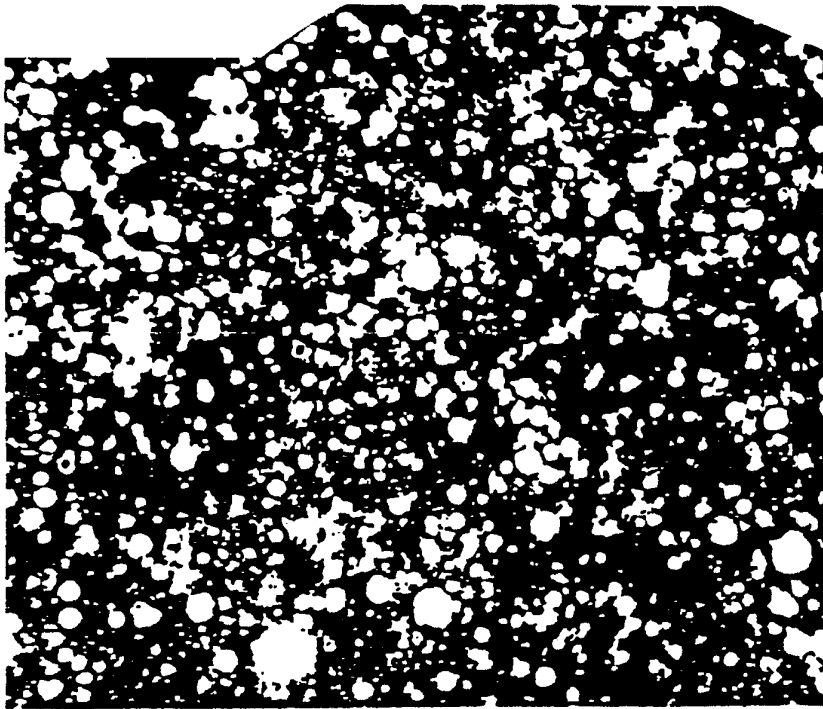


Fig. 2

Jaxalac coating. Optical micrograph x25

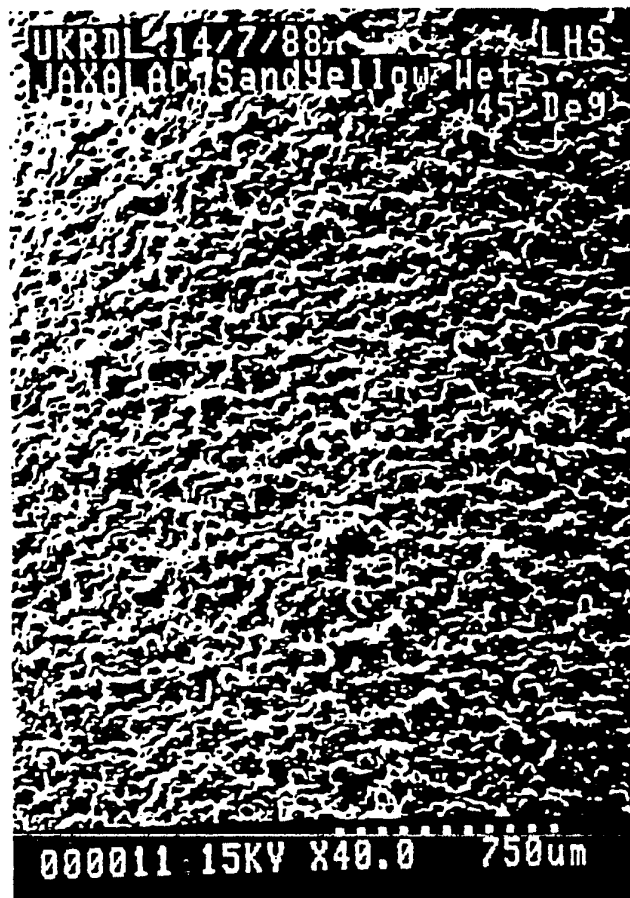


Fig 3.

Jaxalac coating. Scanning electron micrograph x40 (45° tilt)

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US91/07166

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC(5) B26B 21/14		
US 30/77, 34.2		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
US	30/34.05, 34.2, 47-50, 77	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category [*]	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	US, A, 3,673,684 (Muntz), 04 July 1972 (see entire document)	1-4
A	US, A 3,939,560 (Lyll) 24 February 1976 (see entire document),	1-4
A	US, A, 4,189,832 (Harper et al), 26 February 1980 (see entire document)	1-4
A	US, A 4,741,103 (Hultman), 03 May 1988 (see entire document)	1-4
A, P	US, A 4,998,347 (Schachter), 12 March 1991 (see entire document)	1-4
<p>[*] Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
24 January 1992		18 FEB 1992
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