

Title (en)
Multiple micro-blade hair removal devices and methods for manufacturing

Title (de)
Mit mehreren Mikroklingen versehenen Haarentfernungsgeräte und Verfahren zur dessen Herstellung

Title (fr)
Dispositifs d'enlèvement de cheveux avec plusieurs microlames et procédés pour leur fabrication

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Application
EP 01306454 A 20010727

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Abstract (en)
[origin: EP1175973A2] Hair removal devices comprising a plurality of micro-blades and methods for their fabrication, include, for example, microelectronic manufacturing techniques. Preferred "blades" have at least one edge with a radius of curvature not greater than about 1000 angstroms, preferably not greater than about 500 angstroms. Alternative embodiments of the present invention comprise a relatively high number of abrasion elements for hair removal. In addition to blades and/or abrasion elements, shaving devices of this invention can comprise skin flow control elements which control the flow of hair across the shaving device and thereby control the angle at which the blade edges or abrasion elements contact the hair. Another aspect of the present invention comprises blades having cutting depth which are much smaller than previously known shaving devices. For example, the cutting depth of one or more blades is not greater than about 75 microns, or is even less. Shaving devices are formed on rigid or flexible substrates using one or more of the following techniques: photolithography, wet chemical etching, dry etching, or material deposition techniques. <IMAGE>

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Citation (search report)

- [X] US 5802720 A 19980908 - PRIBE CHRISTOPHER A [US]
- [AX] US 3761372 A 19730925 - SASTRI A
- [A] US 5121660 A 19920616 - KRAMER CAROLYN M [US]
- [X] US 1383783 A 19210705 - BILLINGSLEY RENNIE E
- [X] US 4754548 A 19880705 - SOLOW TERRY S [US]
- [XA] US 2311060 A 19430216 - LURRAIN NATHANIEL M
- [DA] US 5088195 A 19920218 - LAZARSHIK DANIEL B [US], et al
- [DA] US 5205040 A 19930427 - WERNER ERIC J [US]
- [A] US 4893641 A 19900116 - STRICKLAND EDWARD [US]
- [A] US 5842387 A 19981201 - MARCUS ROBERT B [US], et al
- [A] US 5750956 A 19980512 - BARNES CLIVE [GB], et al
- [A] EP 0884142 A1 19981216 - WARNER LAMBERT CO [US]
- [A] US 5488774 A 19960206 - JANOWSKI LEONARD J [US]
- [PA] EP 1092515 A1 20010418 - NEWMAN MARTIN H [US]
- [A] "ETCHING, ELECTROCHEMICAL MACHINING AND CHEMICAL MILLING", SURFACE TREATMENT TECHNOLOGY ABSTRACTS, FINISHING PUBLICATIONS LTD. TEDDINGTON, GB, vol. 30, no. 3, 1 May 1988 (1988-05-01), pages 118, XP000047655, ISSN: 0950-5199
- [A] "REDUCTION OF TRENCHING NEAR EDGES IN REACTIVE ION ETCHING", RESEARCH DISCLOSURE, KENNETH MASON PUBLICATIONS, HAMPSHIRE, GB, no. 315, 1 July 1990 (1990-07-01), pages 556, XP000134143, ISSN: 0374-4353
- [A] ASMUSSEN J: "ELECTRON CYCLOTRON RESONANCE MICROWAVE DISCHARGES FOR ETCHING AND THIN-FILM DEPOSITION", JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY: PART A, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 7, no. 3I, 1 May 1989 (1989-05-01), pages 883 - 893, XP000049613, ISSN: 0734-2101
- [A] LIPP S ET AL: "Local material removal by focused ion beam milling and etching", NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH, SECTION - B: BEAM INTERACTIONS WITH MATERIALS AND ATOMS, NORTH-HOLLAND PUBLISHING COMPANY. AMSTERDAM, NL, vol. 106, no. 1, 1 December 1995 (1995-12-01), pages 630 - 635, XP004001886, ISSN: 0168-583X
- [A] MATSUSHITA K ET AL: "15.4 ION BEAM MILLING AND SPUTTER ETCHING OF INP", PROPERTIES OF INDIUM PHOSPHIDE, INSPEC, LONDON, GB, no. 6, 1991, pages 346 - 349, XP000878733
- [A] VERDONCK P ET AL: "REACTIVE ION ETCHING AND PLASMA ETCHING OF TUNGSTEN", MICROELECTRONIC ENGINEERING, ELSEVIER PUBLISHERS BV., AMSTERDAM, NL, vol. 21, no. 1 / 4, 1 April 1993 (1993-04-01), pages 329 - 332, XP000361102, ISSN: 0167-9317
- [A] BIEGELSEN D K ET AL: "SIMPLE ION MILLING PREPARATION OF 111 TUNGSTEN TIPS", APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 54, no. 13, 27 March 1989 (1989-03-27), pages 1223 - 1225, XP000111950, ISSN: 0003-6951

Cited by
WO2004071722A1; WO2006045460A1; WO2004073449A1; WO2004054402A1; WO2004076134A3

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