

Title (en)
Manufacturing process for a micropump.

Title (de)
Herstellungsverfahren einer Mikropumpe.

Title (fr)
Procédé de fabrication d'une micropompe.

Publication
EP 0641934 A1 19950308 (FR)

Application
EP 94107419 A 19940513

Priority
FR 9306281 A 19930524

Abstract (en)
[origin: US5462839A] This process consists of machining a silicon piece (4) by means of selective oxidation operations and photolithography to form therein at least one cavity (7, 12) adapted to contain or convey a fluid, and of oxidizing the wall of the cavity to make this hydrophilic. The device is completed by fixing closing plates (1, 5) to its body thus formed. Prior to the machining operations the surfaces of the piece (4) adapted to be in contact with the closing plates (1, 5) are covered with a screening layer that resists these machining operations. Then, after these have been completed, the surfaces of the piece intended to be exposed to the fluid are oxidized to form therein an oxide layer favoring the wettability of these surfaces. The screening layer is then removed and the closing plates are fixed to the piece. The invention has applications, notably in micropumps.

Abstract (fr)
Ce procédé consiste à usiner par des opérations d'oxydation sélective et de photolithographie une plaquette en silicium (4) pour y former au moins une cavité (7, 12) destinée à contenir ou à véhiculer le fluide, et à oxyder la paroi de la cavité pour la rendre hydrophile. On achève le dispositif en assujettissant contre son corps ainsi formé des plaques de fermeture (1, 5). Préalablement aux opérations d'usinage, on recouvre les surfaces de la plaquette (4) destinées à être en contact des plaques de fermeture (1, 5) d'une couche-écran résistant à ces opérations d'usinage. Ensuite, après achèvement de celles-ci, les surfaces de la plaquette destinées à être exposées au fluide sont oxydées pour y former une couche d'oxyde favorisant la mouillabilité de ces surfaces. Puis, on élimine la couche-écran et on fixe les plaques de fermeture contre la plaquette. Application, notamment aux micropompes. <IMAGE>

IPC 1-7
F04B 43/04

IPC 8 full level
A61J 3/00 (2006.01); **A61M 1/14** (2006.01); **F04B 43/04** (2006.01); **H01L 21/306** (2006.01)

CPC (source: EP US)
F04B 43/046 (2013.01 - EP US)

Citation (search report)
• [A] EP 0465229 A1 19920108 - SEIKO EPSON CORP [JP]
• [A] WO 9015929 A1 19901227 - WESTONBRIDGE INT LTD [IE], et al
• [DA] WO 9107591 A1 19910530 - WESTONBRIDGE INT LTD [IE], et al
• [A] ESASHI, SHOJI & NAKANO: "Normally closed microvalve and micropump fabricated on a silicon wafer", SENSORS AND ACTUATORS, vol. 20, no. 1/2, 1 November 1989 (1989-11-01), LAUSANNE CH, pages 163 - 169, XP000135240
• [A] SHOJI AND ESASHI: "A study of a high-pressure micropump for integrated chemical analysing systems", SENSORS AND ACTUATORS A, vol. 32, no. 1/3, 1 April 1992 (1992-04-01), LAUSANNE CH, pages 335 - 339, XP026576996, DOI: doi:10.1016/0924-4247(92)80008-Q

Cited by
EP1149602A2; EP1129741A2; EP1792662A1; US9604242B2; US6405934B1

Designated contracting state (EPC)
AT BE CH DE DK ES FR GB IE IT LI LU NL SE

DOCDB simple family (publication)
US 5462839 A 19951031; AT E146853 T1 19970115; DE 69401250 D1 19970206; DE 69401250 T2 19970710; DK 0641934 T3 19971013; EP 0641934 A1 19950308; EP 0641934 B1 19961227; ES 2099991 T3 19970601; FR 2705693 A1 19941202; FR 2705693 B1 19950728; HK 1006739 A1 19990312; JP 3651809 B2 20050525; JP H0719170 A 19950120; SG 47036 A1 19980320

DOCDB simple family (application)
US 24755094 A 19940523; AT 94107419 T 19940513; DE 69401250 T 19940513; DK 94107419 T 19940513; EP 94107419 A 19940513; ES 94107419 T 19940513; FR 9306281 A 19930524; HK 98106084 A 19980623; JP 12333394 A 19940513; SG 1996003690 A 19940513