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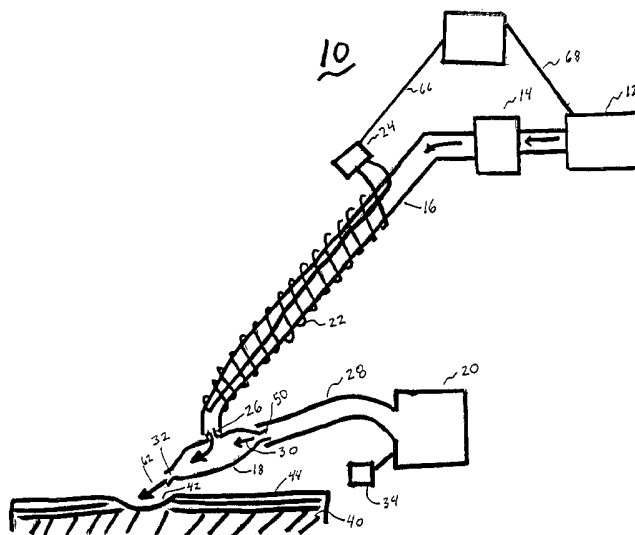
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(54) Title: APPARATUS AND METHOD FOR CUTTING AND REMOVAL OF BIOLOGICAL TISSUE BY PRESSURIZED PROPULSION OF ICE PARTICLES



(57) Abstract: An apparatus (10) and methods for cutting and removal of biological tissue (41) using pressurized propulsion of ice particles is disclosed. An apparatus (10) for cutting and removal of biological tissue includes: an ice particle generator (12), for producing ice particles; a particle delivery element (16), connected to the ice particle generator, for transporting the ice particles from the ice particle generator; an injection handpiece(18), connected to the particle delivery element, the injection handpiece having an injection outlet (32); and, a high pressure source (20), connected to the injection handpiece, for propelling the ice particles in a jet stream of fluid (62) from the injection outlet, under high pressure and at high linear velocity, so as to cut and remove a desired portion of the biological tissue.



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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 01/48772

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A61B17/54

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A61B B24C A61K A22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 01 80750 A (PEARL I LLC) 1 November 2001 (2001-11-01)  the whole document	1-5, 7, 8, 15-19, 24, 29, 36-48
E	WO 02 38125 A (PEARL TECHNOLOGY HOLDINGS LLC) 16 May 2002 (2002-05-16)  the whole document	1-5, 7, 8, 15-19, 24, 29, 36-48

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*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)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*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
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*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.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

29 July 2002

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## INTERNATIONAL SEARCH REPORT

Inter-<sup>---</sup> national Application No

PCT/US 01/48772

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 37229 A (VERY INVENTIVE PHYSICIANS INC) 29 July 1999 (1999-07-29)  page 4, line 10 -page 6, line 34; figures 1,2 page 12, line 25 -page 13, line 24; figure 6	1, 8, 15, 21-24, 28, 29, 35, 40, 42-48
A	---	2-7, 16, 17
X	US 6 001 000 A (VISAISOUK SAM ET AL) 14 December 1999 (1999-12-14) cited in the application  the whole document	1, 2, 7, 8, 10, 11, 15-20, 22, 24, 36, 40-42
X	US 3 089 775 A (REGINALD LINDALL) 14 May 1963 (1963-05-14)	1, 2, 7, 8, 18, 19, 21, 22, 24, 27, 40, 42
A	the whole document  -----	12, 15-17, 20, 36-39

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 01/48772

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: **49-54**  
because they relate to subject matter not required to be searched by this Authority, namely:  
**Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery**
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/48772

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0180750	A	01-11-2001	WO 0180750 A1 AU 4362500 A	01-11-2001 07-11-2001
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US 3089775	A	14-05-1963	NONE	