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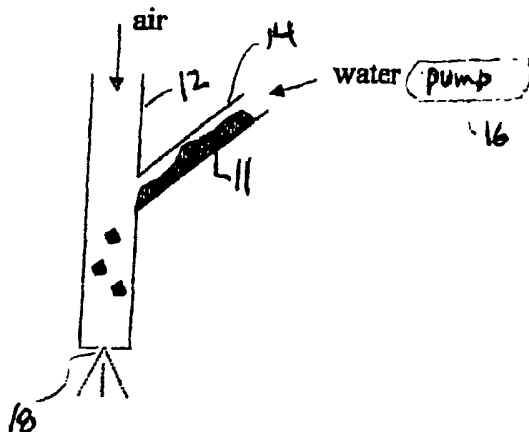
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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,

[Continued on next page]

(54) Title: DROPLET JET SYSTEM FOR CLEANING TEETH



(57) Abstract: The system includes a reservoir for fluid; a droplet generator for creating a stream of fluid droplets from the fluid wherein the velocity of the stream of droplets is within a range of 20 meters per second to 200 meters per second and the size of the droplets is within a range of 5 microns to 200 microns. A nozzle or nozzles direct the stream of droplets to safely clean a selected tooth or teeth surface area. The specific momentum of effective fluid droplets within the stream of fluid droplets is important in safe and effective cleaning.

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BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

**Published:**

- with international search report

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

IB2005/050244

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 A61C17/028 A61C17/02

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 A61C B41J

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, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 508 396 A (INSTITUT DE RECHERCHES ET DE DIFFUSION INDUSTRIELLE P. G. E) 15 June 1971 (1971-06-15) column 6, lines 1-18 column 7, lines 4-8	1
X	EP 0 726 743 A (SABBAH, CLAUDE) 21 August 1996 (1996-08-21) cited in the application column 3, lines 1-15,40-46 column 4, lines 50-10; figure 1	1,13
X	DE 86 20 898 U1 (WOLZ, STEFAN, 6702 BAD DUERKHEIM, DE) 5 February 1987 (1987-02-05) page 2, lines 27-30 page 3, lines 31-36; figure 1	1,13

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

18 April 2005

Date of mailing of the international search report

14.07.2005

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2005/050244

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 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.: 20-31  
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 therapy.
2.  Claims Nos.: 1-19, 32-39  
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:  
see FURTHER INFORMATION sheet PCT/ISA/210
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 III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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.

Continuation of Box II.1

Claims Nos.: 20-31

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy.

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Continuation of Box II.2

Claims Nos.: 1-19,32-39

Claims 1, 32 and 36 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved:

- velocity of the droplets is within a range of 20 to 250 m/s or more than 20 m/s;
  - fluid droplets have a diameter greater than 5  $\mu$ m;
  - fluid droplets have a combined specific momentum of at least  $3 \times 10^3$  N/m<sup>2</sup>;
  - removing biofilm from the oral surface without discomfort or damage to the teeth or surrounding tissues of the user.
- Those terms merely amount to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

Almost all the dependent claims are also not clear because they also attempt to define the subject-matter in terms of the result to be achieved.

Consequently the claims as originally filed were either not industrial applicable (claims 20-31) or so unclear (too many possible technical solutions to achieve the results defined in claims 1-19 and 32-39) that it has not been possible to perform the search on such basis.

Therefore the passages in the description and the claims that clearly define the droplet generator for cleaning teeth, which seems to be the subject-matters of the potential invention, has been used by the search authority as the basis for the search to be carried out, namely the three following subject-matters:

- a/ A fluid droplet system for cleaning the teeth comprising:
- a source of fluid;
  - a fluid droplet generator for creating a stream of individual droplets from the fluid wherein the droplet generator includes a gas tube member, in which a gas is moved at high speed, a nozzle on the extremity of said gas tube and an assembly including an adjoining fluid tube member for introducing fluid into the moving gas (see page 3, line 19 to page 4, line 6, claim 13 and figure 1).

b/ A fluid droplet system for cleaning the teeth comprising:  
a source of fluid;  
a fluid droplet generator for creating a stream of individual droplets from the fluid wherein the droplet generator includes at least one small nozzle and a pump assembly providing a pressure of 30-100 bar for moving said fluid from said source to said nozzle and forcing said fluid through said nozzle, said nozzle having a diameter in the range of 10-50  $\mu\text{m}$  and a length of approximately 200  $\mu\text{m}$  (see page 4, line 32 to page 5, line 22 and claim 14).

c/ A fluid droplet system for cleaning the teeth comprising:  
a source of fluid;  
a fluid droplet generator for creating a stream of individual droplets from the fluid wherein the droplet generator includes a piezoelectric member, at least one small nozzle and a pump member to move the fluid from said source to the piezoelectric member, wherein the piezoelectric member has at least one well positioned in front and adjacent to said at least one small nozzle to produce a high-speed pumping effect on said fluid, accelerating significantly said fluid through said at least one nozzle (see page 5, lines 23-30, claim 16 and figure 3).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claim: a/

Droplet generator with liquid mixed in a propeller gas  
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2. claim: b/

Droplet generator with calibrated nozzle  
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3. claim: c/

piezoelectric droplet generator  
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INTERNATIONAL SEARCH REPORT

IB2005/050244

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CH 508396	A	15-06-1971	NONE
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EP 0726743	A	21-08-1996	FR 2696638 A1 15-04-1994
		DE 69320660 D1	01-10-1998
		DE 69320660 T2	06-05-1999
		EP 0726743 A1	21-08-1996
		WO 9408533 A1	28-04-1994
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DE 8620898	U1	05-02-1987	NONE
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