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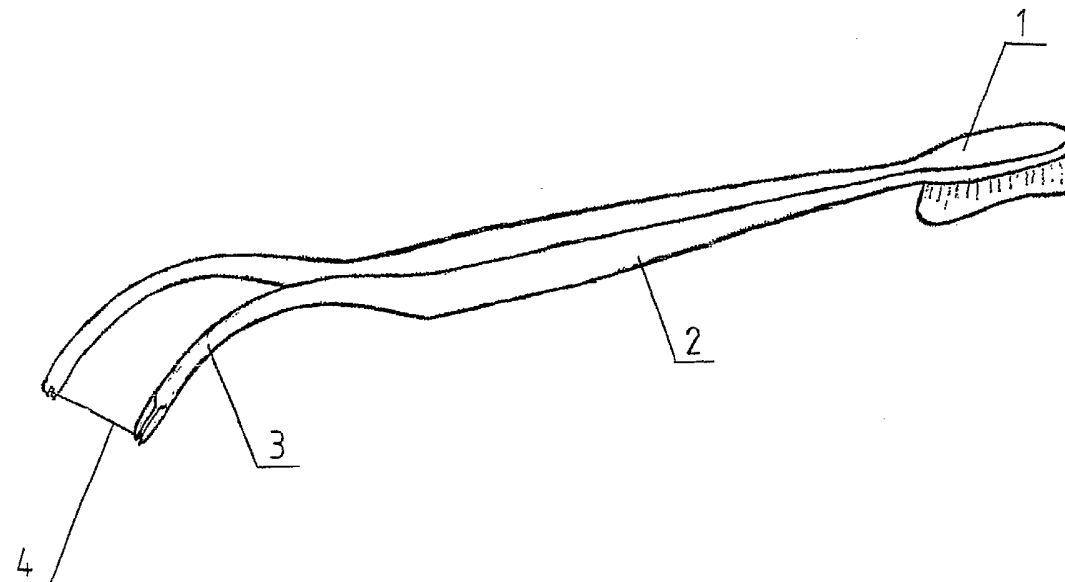
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(54) Title: DEVICE FOR CLEANING TEETH CONTAINING A DENTAL FLOSS



(57) Abstract: A device for cleaning teeth consists of a handle (2), which is at one end provided with a holder of dental floss (4) with forked arms (3) for manual attaching the dental floss (4), and at its other end with a toothbrush (1). The toothbrush (1) is connected with the handle detachably or it forms with holder handle (2) one functional unit. The forked holder arm (3) is at its end provided with a clamping mechanism for attaching the dental floss (4). The dental floss (4) contains clamping elements, which divide it into working sections (4.1) and connecting sections (4.2).

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Device for cleaning teeth containing a dental floss

### Technical Field

The invention concerns a device for cleaning teeth containing a dental floss holder with two forked arms for manual fixing the dental floss, which holder may be integrated with a toothbrush into one functional unit.

### Background Art

For the oral hygiene, there is at present most often used a toothbrush alone. Only a small percentage of population proceeds also to the next phase of oral hygiene, which is final cleaning of interdental spaces by a dental floss, produced as one piece of several meters length. It may be wound into a ball or on a bobbin, of which the necessary piece, usually of 15 to 25 cm length, is unwound, wound around index fingers of both hands and stretched between them.

This method of using dental floss requires considerable manual skill and is time consuming, thus causing, especially to elderly people or people having thicker and shorter fingers, problems with manipulation in the mouth, discouraging them from regular use of dental floss. Moreover, this fact discourages from using dental floss also a further part of population - the very busy part.

In case of separate dental floss holders, the floss is wound on the floss holders, but this method is relatively complicated and impractical.

These disadvantages are partially eliminated by the manual device for teeth cleaning according to US 2006/0011211 A1, which consists of a handle, a floss holder and a bobbin for winding the floss. Nevertheless, the device is mechanically relatively complicated and structurally robust and it is a single-purpose device, so that it has not won recognition in practice. Similar principle is used also by other devices for teeth cleaning with a holder and a floss dispenser (WO 03/043523; US 2006/0011212 A1; US 2005/0279379 A1; DE 103 57 838 A1; WO 2004/006800), some of them even with electrical driving mechanism (GB 2 402 341 A). Although manipulating the said devices in a mouth is simpler compared with manipulating the floss alone in a mouth, a disadvantage is a relatively complicated construction and, consequentially, rather high costs, resulting in small interest in these devices.

A further disadvantage is also the fact that the dental floss in the dispenser within the handle comes into contact with water, when rinsing the holder, in consequence of which hygienic conditions for the floss cannot be guaranteed.

The aim of the present invention is to provide such device for teeth cleaning which eliminates persistent problems with using dental floss and allows to its user comfortable and, therefore, massive using.

### Disclosure of Invention

The above aim is achieved by a device for teeth cleaning containing a dental floss holder, the subject-matter of which consists in that it consists of a handle, provided at one of its ends with a holder with forked arms for manual attaching the dental floss, and at the other end with a toothbrush. The toothbrush is detachably attached to the handle, for example by a lock-matrix and lock-patrix, or it forms one functional unit with the handle. The forked holder arms may be preferably twice broken or possibly slightly goosenecked.

The forked holder arms are provided at their ends with a clamping mechanism for clamping the dental floss, wherein the clamping mechanism may preferably be formed by unilaterally closed tunnels, which have at their vault top a longitudinal groove with guiding notch or noses, preferably spikes in the form of arrowy projections which continuously merge into the guiding notches. Alternatively, manual attaching the dental floss may be achieved by solid embedding the dental floss into the arms, so that the holder arms have no clamping device.

The dental floss, produced all of a piece, contains clamping elements, which simultaneously serve as dividing elements and allow clamping the floss in the clamping mechanism of forked holder arms. These elements divide the dental floss into regular working sections which are longer, and shorter connecting sections in which individual working sections will be separated (cut or trimmed off) from the dental floss before use. The working sections, delimited at both ends by the clamping elements, correspond in their length to the width of the span between both forked holder arms with clamping mechanisms and the clamping element shape corresponds to the clamping mechanism type.

The clamping elements may be three-dimensional or two-dimensional. Three-dimensional clamping elements exhibit preferably the shape of a ball, a cone, a teardrop or a pyramid, possibly also other suitable derived shapes. Two-dimensional (flat) clamping elements have preferably a shape of a loop, a ring, a square, a triangle, or possibly another shape, and they form a fixing "eye" for fixing to the clamping mechanism of the forked holder arm, formed by a nose, possibly having a shape of an arrowy projection.

The dental floss is alternatively made so that the working sections, delimited at both ends by the clamping elements, form separate pieces (prefabricated elements) ready to be fixed to the arms of the forked holder, which is especially advantageous for prefabricated elements with clamping elements having the shape of loops which are made directly from the material of the dental floss.

Naturally, the clamping elements of the dental floss are made of hygienically suitable material like, for example, polyvinylchloride (PVC), polypropylene (PPR), polyethylene (PET) and others, or they may be made directly of the dental floss material (above mentioned clamping elements in the form of loops).

The device for teeth cleaning containing at one end a holder with forked arms for manual attaching the dental floss and at the other end a toothbrush, is one functional unit, where after performing basic oral hygiene with the toothbrush one can continuously proceed to cleaning of interdental spaces by dental floss, which is provided with clamping elements, by simple attaching it to clamping mechanisms of the forked holder arms.

At the ends of the forked arms of the dental floss holder, there are located clamping mechanisms serving for attaching and fixing the clamping elements of the dental floss. They are formed by unilaterally closed tunnels, which are at their vault top interrupted by a longitudinal groove which continuously passes up to the ends of the forked holder arms with clamping mechanisms and there it forms a guiding notch for the dental floss with clamping elements, which notch directs the dental floss from one forked holder arm to the other one.

Method of clamping the dental floss with clamping elements is such that one end of the dental floss with a clamping element is inserted into the tunnel of the first forked holder arm so that the dental floss is guided through the groove and guiding notch out towards the second arm. The second forked holder arm will be

pressed into the spring-loaded position II towards the first arm so that the clamping element of the second end of the dental floss can be inserted into the tunnel of the second forked holder arm and, after subsequent releasing, this arm returns by its own elasticity into its basic position I, thus stretching the floss guided through the grooves and notches between the forked holder arms.

In another preferred embodiment, spikes in the form of arrowy projections may be used as the clamping mechanism for the dental floss with clamping elements, the shape of which corresponds to the shape of dividing-fixing elements of the dental floss in the form of loops.

When using the clamping mechanism version in the form of arrowy projections (spikes), the clamping method is essentially identical; there is a difference only in the way of attaching the clamping elements, which are fixed by getting caught by the arrowy projections (spikes) of the forked holder arms.

To exclude fully the manipulation with clamping the dental floss in the forked holder arms, in another preferred type of embodiment the dental floss holder is made as a whole, disposable, replaceable holder with a connecting lock. The dental floss is here fixed directly by embedding it in its forked arms, while the disposable holder is only slipped on the connecting lock at the end of the toothbrush handle or a separate handle.

In all above types of clamping mechanisms (unilaterally closed tunnels, arrowy projections - spikes, disposable prefabricated part of the dental floss holder), the dental floss holder may be made so that at the handle end it is equipped with detachable toothbrush head with a connecting element and thus, it may be used also as a separate tool with its own handle.

An advantage of the device according to the present invention is the fact that it simplifies manipulation of the dental floss, but especially the fact that by joining the dental floss holder with the toothbrush into one functional unit, cleaning of interdental spaces becomes automatic and natural activity, following the toothbrush use. An advantage consists also in that any type of toothbrush head may be used.

The dental floss with prefabricated elements may be produced either as a whole, wherein the arrangement of prefabricated elements (clamping elements) divides it into so called working sections, corresponding in their length to the width

of the span between the forked holder arms, or individual working sections are separate pieces, provided with prefabricated parts.

#### An overview of figures in the drawings

Device for teeth cleaning according to the present invention is explained in more detail with reference to the accompanied drawings, in which

Figs. 1 and 2 show schematically the space shapes of the dental floss holder with a clamping mechanism, joined with a toothbrush,

Fig. 3 shows a disposable dental floss holder with a connecting lock and a toothbrush,

Fig. 4 shows a dental floss holder with a clamping mechanism and a connecting lock, joined with a toothbrush,

Fig. 5 shows a detail of attaching the dental floss when a tunnel is unilaterally closed,

Fig. 6 represents a detail of forked arms of a dental floss holder with a clamping mechanism in the form of arrowy projections (spikes),

Fig. 7 shows a detail of a unilaterally closed tunnel with a longitudinal groove and a guiding notch for the dental floss,

Fig. 8 and 9 show details of arrowy projections (spikes) with a guiding notch,

Fig. 10 shows a dental floss with clamping elements in the form of balls,

Fig. 11 shows a clamping element in the form of a cone,

Fig. 12 shows a clamping element in the form of a cylinder,

Fig. 13 shows a clamping element in the form of a teardrop,

Fig. 14 shows a clamping element in the form of a pyramid,

Fig. 15 shows the dental floss with clamping elements having the shape of a loop,

Fig. 16 shows the dental floss with clamping elements having the shape of a ring,

Fig. 17 shows the dental floss with clamping elements having the shape of a square,

Fig. 18 shows the dental floss with clamping elements having the shape of a triangle, and

Fig. 19 shows the dental floss with clamping elements having the shape of an oval.

### Examples of invention embodiments

A device (Fig. 1, 2) for teeth cleaning consists of a handle 2, which is at one end provided with a holder with forked arms 3 and at the other end with a head of toothbrush 1. The forked holder arms 3, between which dental floss 4 is stretched, are twice broken (Fig. 2) or slightly goosenecked (Fig. 1). Both ends of the forked arm 3 of the dental floss holder are provided with clamping mechanism in the form of a unilaterally closed tunnel. A detailed view of tunnel 5 is shown in Figs. 5 and 7.

As obvious from Fig. 7, the tunnel is at its vault top interrupted by a longitudinal groove 9, which continuously passes up to the end of the forked arm of the dental floss holder and there it forms a guiding notch 10 for dental floss 4 with clamping element 6 (Figs. 7 and 5).

Dental floss 4 to be clamped in the clamping mechanisms of the forked holder arms, made as a whole (Figs. 10 to 14), is divided by the clamping elements into longer working sections 4.1 and shorter connecting sections 4.2. The clamping element shape on the dental floss corresponds to the clamping mechanism type on the forked holder arm, in which the dental floss will be clamped.

When using a clamping mechanism in the form of a unilaterally closed tunnel, the method of clamping the dental floss is such that one end of the dental floss with a clamping element (either in the form of a ball 6.1, Fig. 10, or in the form of a cone 6.2, Fig. 11, a cylinder 6.3, Fig. 12, a teardrop 6.4, Fig. 13, or in the form of a pyramid 6.5, Fig. 14) is inserted into the unilaterally closed tunnel of the first forked holder arm in such a way that the dental floss is led out through the longitudinal groove (Fig. 7) and the guiding notch towards the second arm (Fig. 5). The second forked arm will be pressed into a spring-loaded position towards the first arm so that the clamping element 6 of the second end of the dental floss can be inserted into the unilaterally closed tunnel of this second arm. After subsequent releasing, the arm returns into its basic position, thereby stretching the floss

guided through the longitudinal grooves and guiding notches between the forked holder arms (Fig. 5).

In another preferred embodiment (Fig. 6), the clamping mechanisms are formed by noses 7, the shape of which corresponds to the shape of a clamping element of the dental floss in the form of a loop 8 (for example arrowy projections - spikes).

When using clamping mechanism formed by noses 7 in the form of spikes, the method of clamping the dental floss is such (Fig. 6) that one end of the dental floss with a two-dimensional (flat) clamping element (either in the form of a loop 8, Fig. 15, or in the form of a ring 8.1, Fig. 16, a square 8.2, Fig. 17, a triangle 8.3, Fig. 18, or in the form of an oval 8.4, Fig. 19) is caught by the arrowy projection - a spike of the first forked holder arm so that the dental floss is led out through the longitudinal groove and guiding notch towards the second forked arm. The second arm will be pressed into a spring-loaded position towards the first arm so that the loop of the second end of dental floss can be slipped over the spike of the second arm. After subsequent releasing, the arm - as in the previous case - returns into its basic position, thereby stretching the floss guided through the longitudinal grooves and guiding notches between the forked holder arms (Figs. 6, 8, 9).

To exclude fully the manipulation with clamping the dental floss 4, in a further solution (Fig. 3), the dental floss holder is made as a whole, disposable, replaceable dental floss holder with a connecting lock-matrix 12 so that the ends of dental floss 4 are directly (solidly) embedded in its forked arms 3, and the holder is then only slipped onto the connecting lock-matrix 13 at the end of handle 2. This means that the clamping mechanism is replaced by solid connection of the forked holder arms with the dental floss.

In all types of clamping mechanisms, but also in an alternative without a clamping mechanism, the holder of the dental floss (Fig. 4) may be provided at the end of handle 2 with a connecting lock-matrix 12, into which a releasable head of toothbrush 1 with connecting lock-matrix 13 is slid, thus forming - after removing the releasable head of toothbrush 1 - a separate tool with its own handle 2.

A device for teeth cleaning according to the present invention, formed by a dental floss holder connected with a toothbrush or as a separate tool with its own handle, may considerably contribute to more efficient performing of oral hygiene,



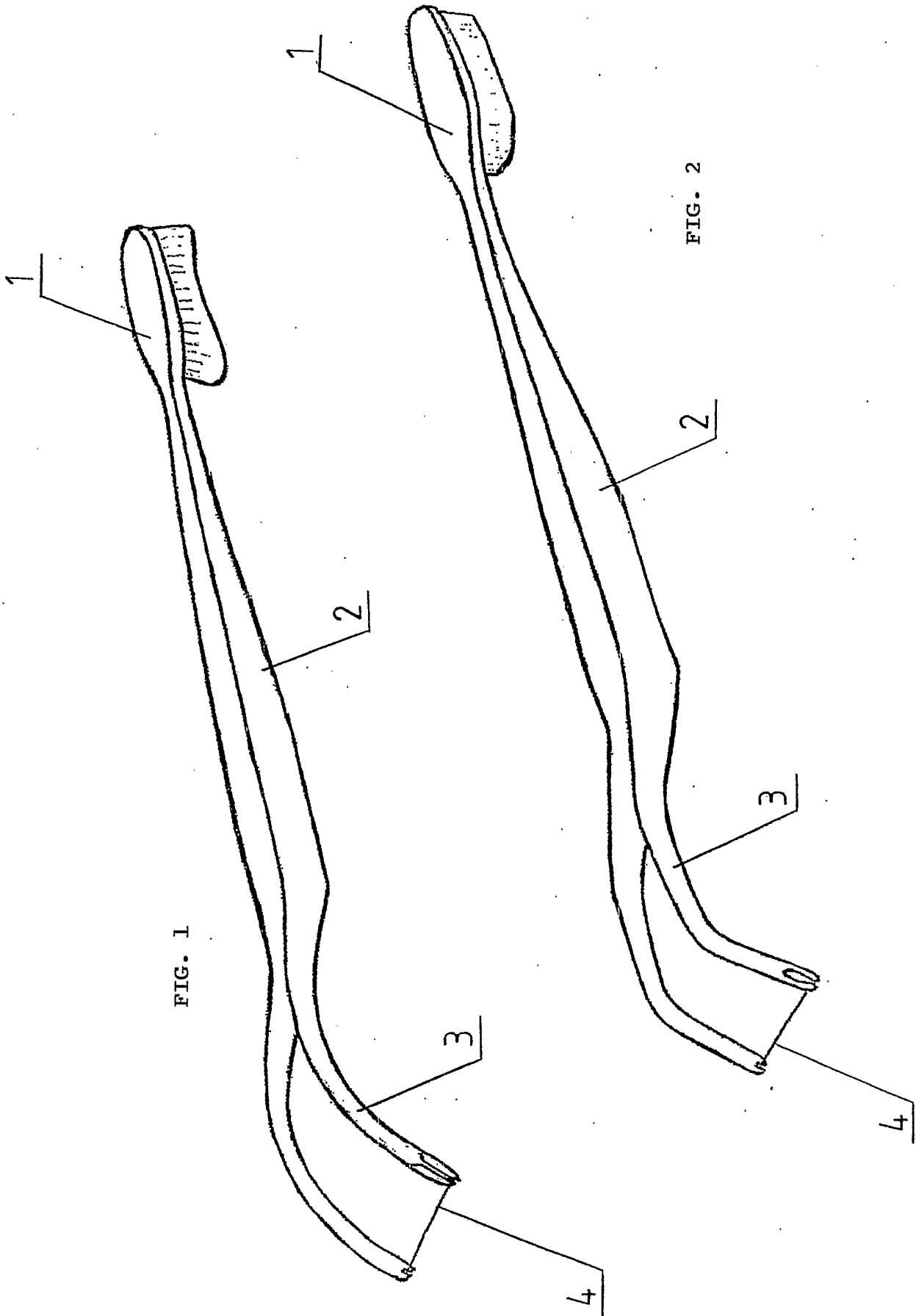
simply said to "teeth cleaning", and thus to caries prevention and to increasing dentition quality.

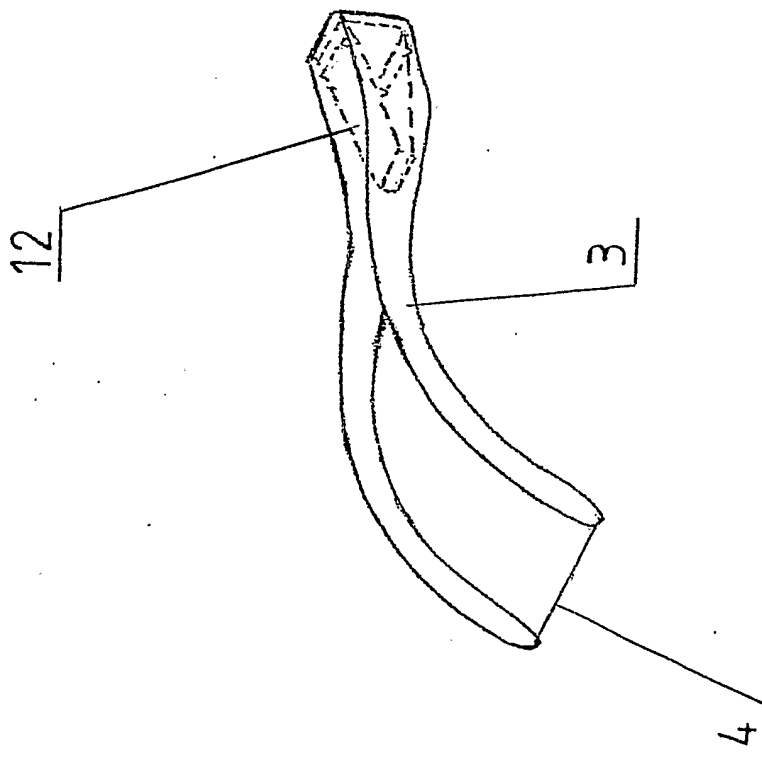
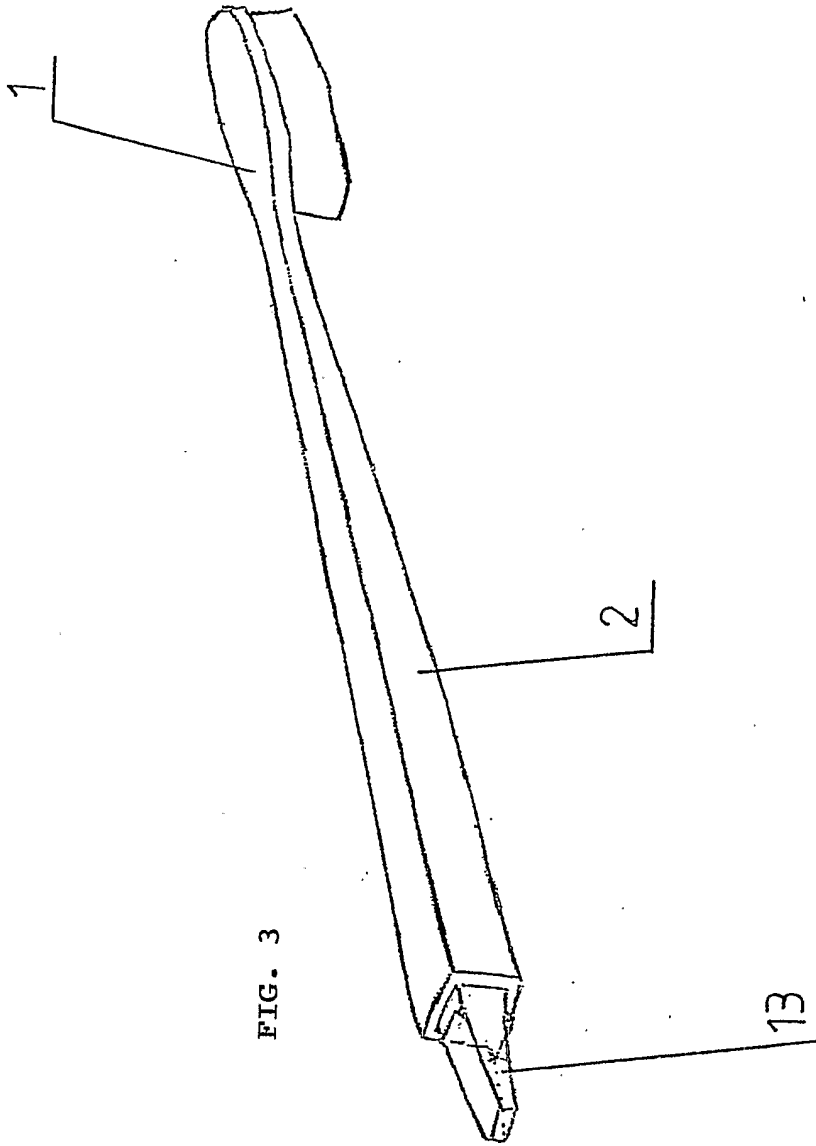
## P A T E N T   C L A I M S

1. Device for teeth cleaning containing a dental floss holder, characterized in that it consists of a handle (2), which is at one end provided with a holder with forked arms (3) for manual attaching dental floss (4), and at its other end by a toothbrush (1).
2. Device according to claim 1, characterized in that the toothbrush (1) is attached to the handle detachably.
3. Device according to claim 1, characterized in that the toothbrush (1) forms with handle (2) one functional unit.
4. Device according to claim 1, characterized in that each of the forked holder arms (3) is at its end provided with a clamping mechanism for attaching the dental floss (4).
5. Device according to claim 4, characterized in that the clamping mechanism consists of a unilaterally closed tunnel (5) having at its vault top a longitudinal groove (9) with a guiding notch (10).
6. Device according to claim 4, characterized in that the clamping mechanism is formed by a nose (7) continuously merging into the guiding notch (10).
7. Device according to claim 4, characterized in that the forked holder arms (3) are provided with solidly embedded dental floss (4).
8. Dental floss for attaching to forked holder arms of the device according to claim 1, characterized in that it contains clamping elements which divide it into working sections (4.1) and connecting sections (4.2).

9. Dental floss according to claim 8, characterized in that the clamping elements are either three-dimensional or two-dimensional.

10. Dental floss according to claim 8, characterized in that the working sections (4.1), delimited at both ends by the clamping elements, are produced as separate pieces.





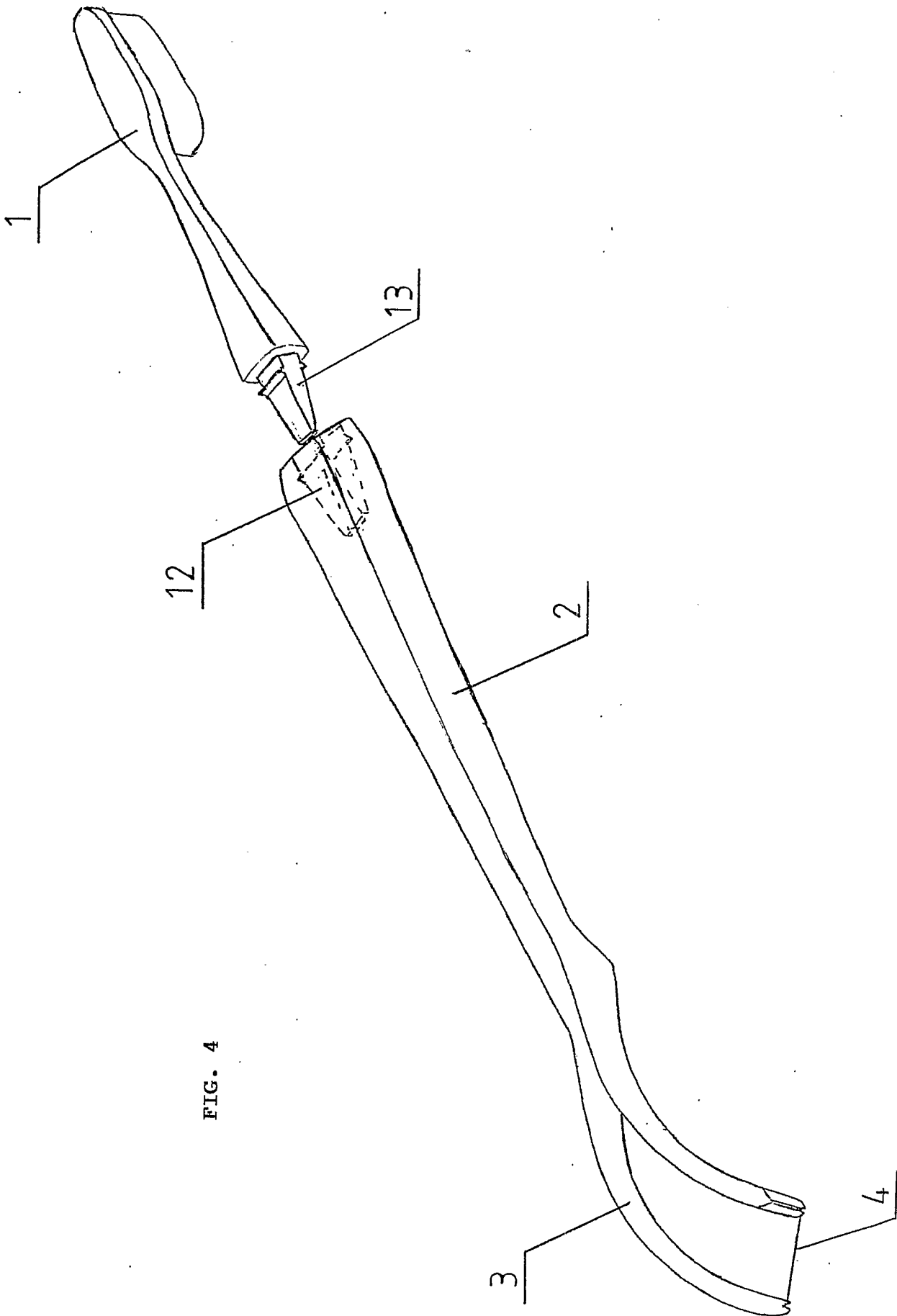


FIG. 4

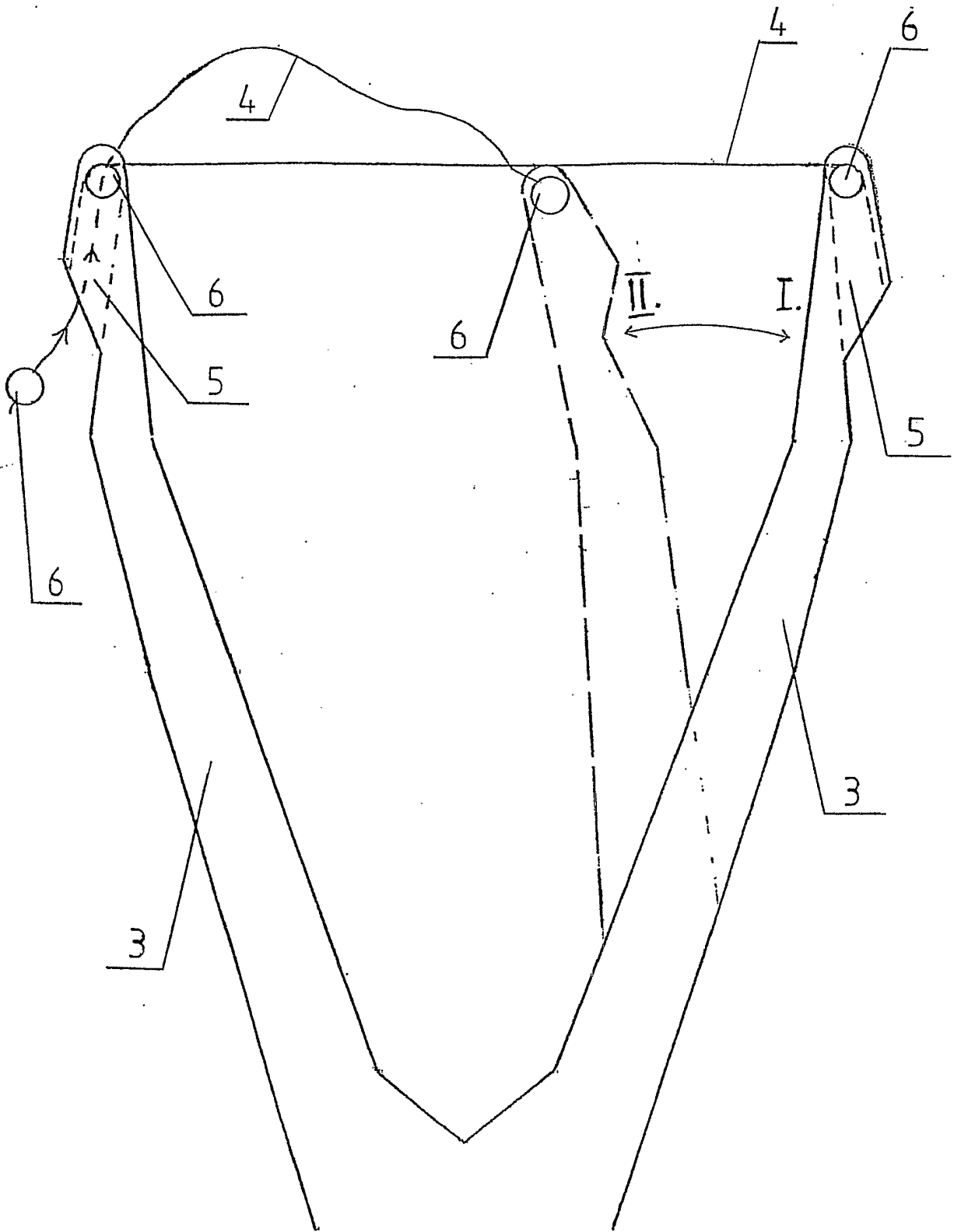


FIG. 5

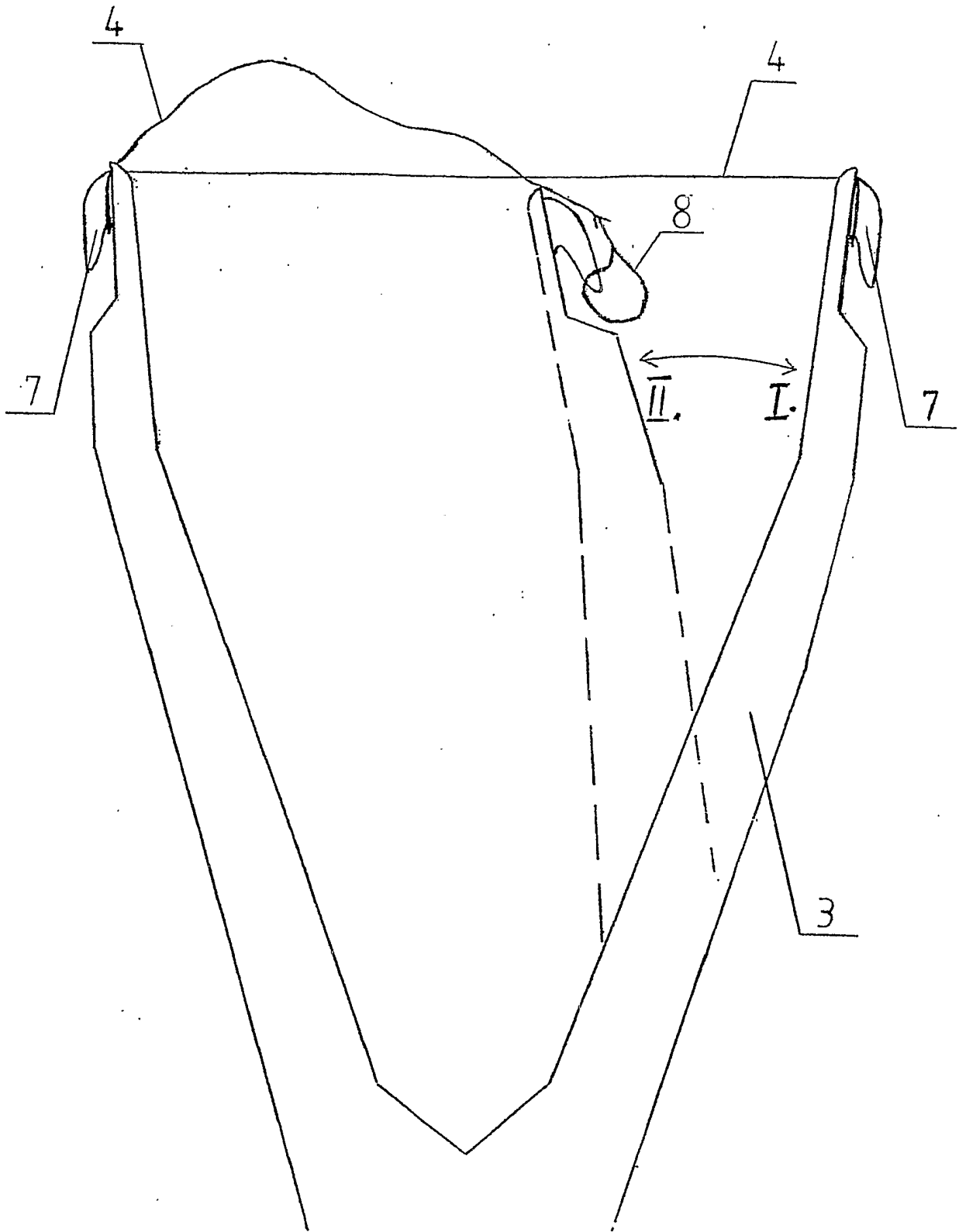


FIG. 6



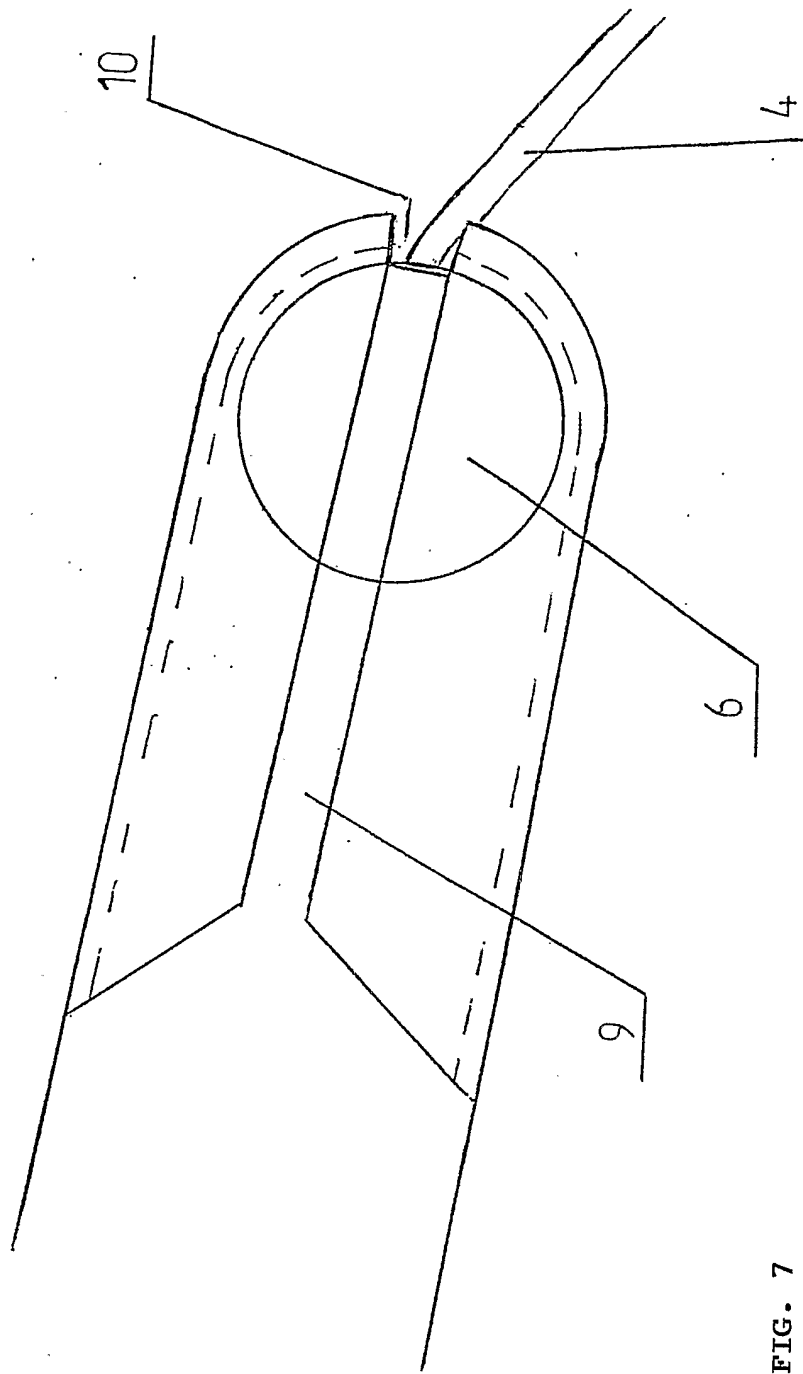


FIG. 7

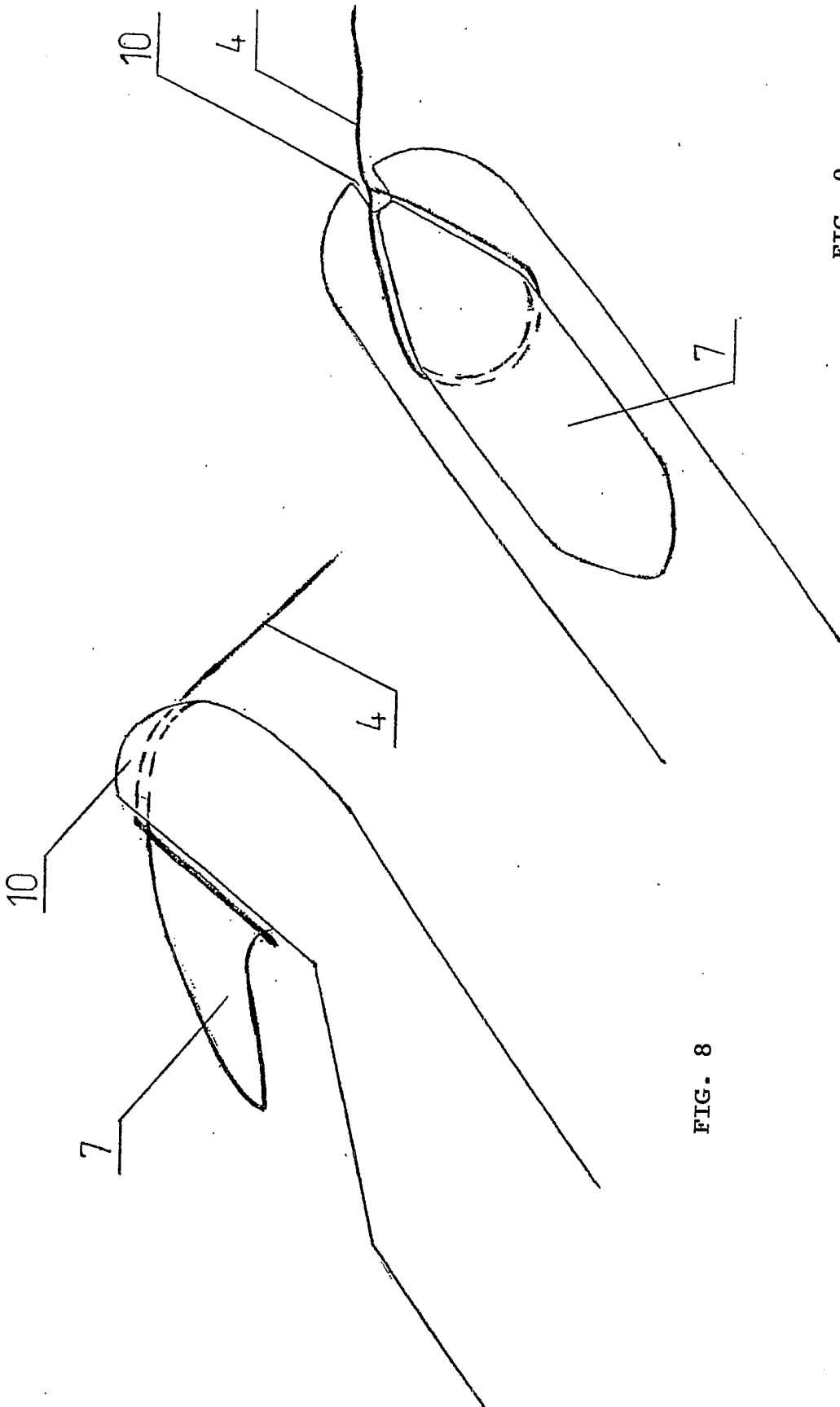
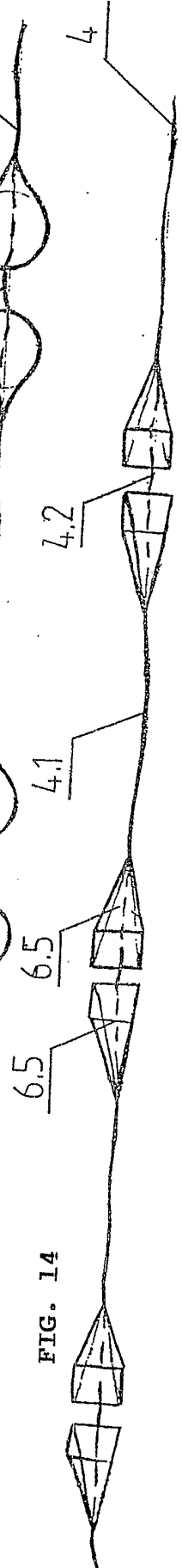
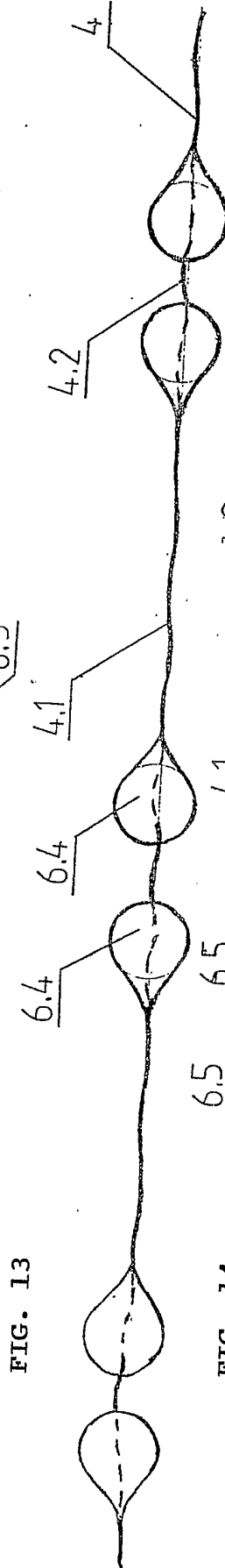
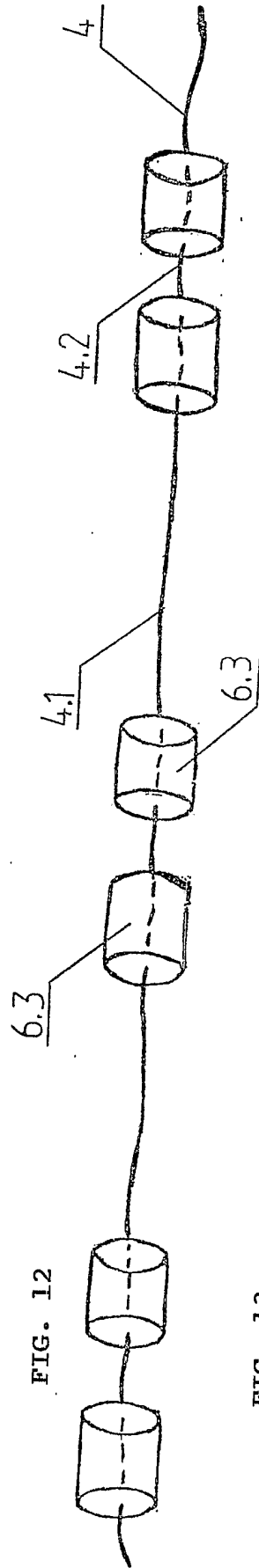
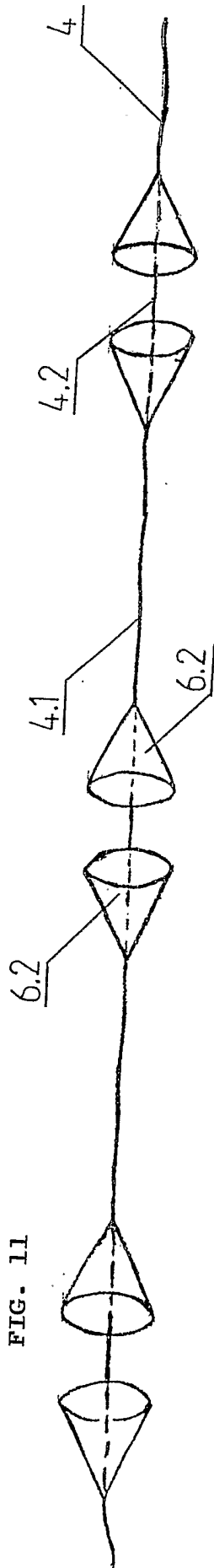
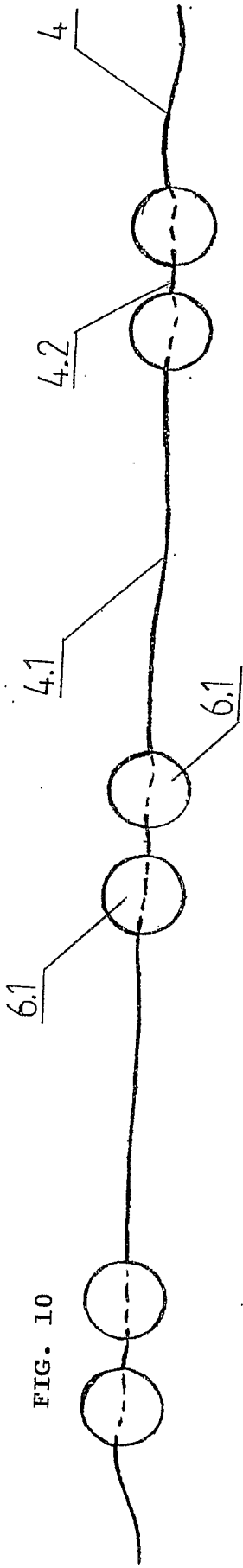
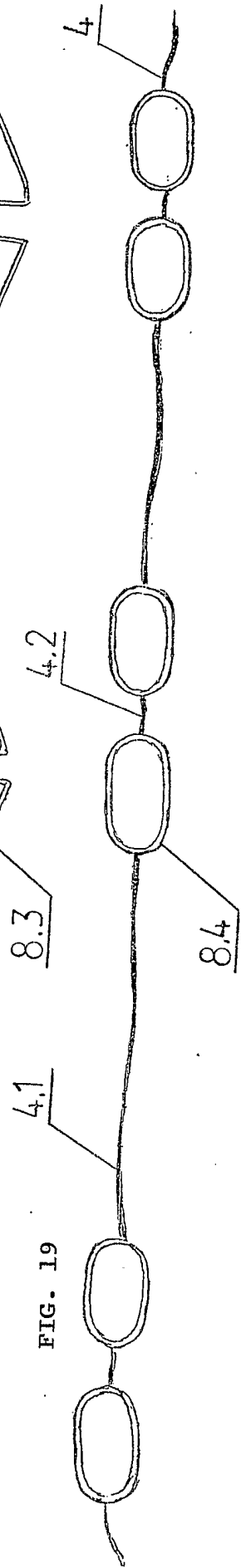
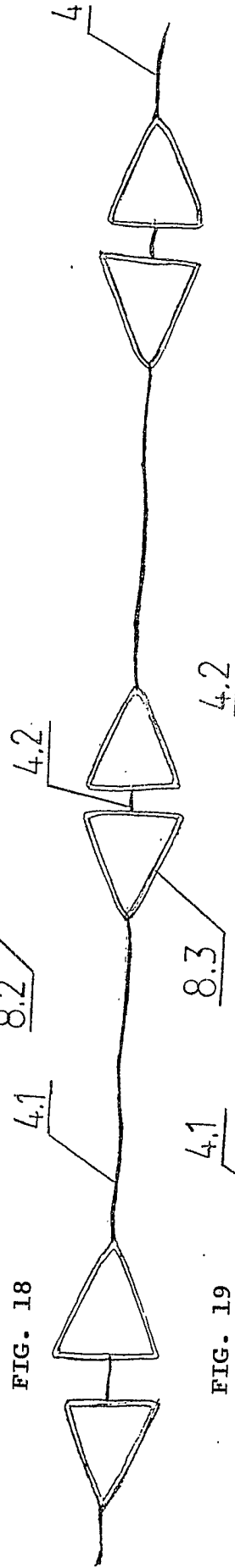
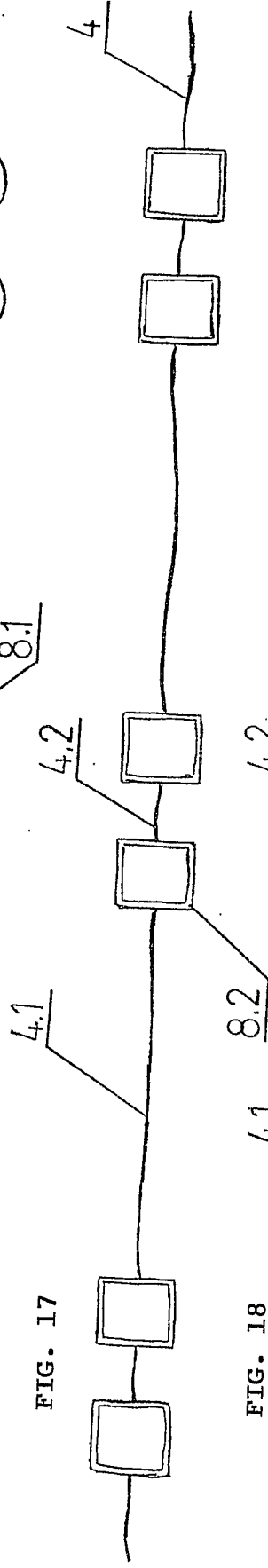
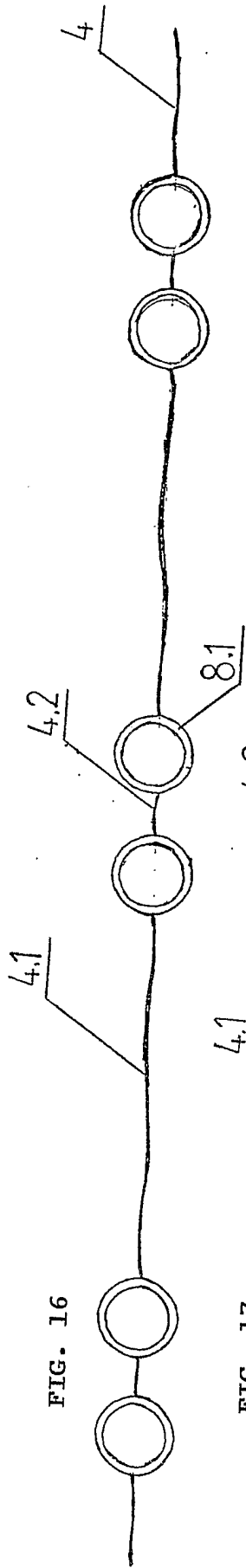
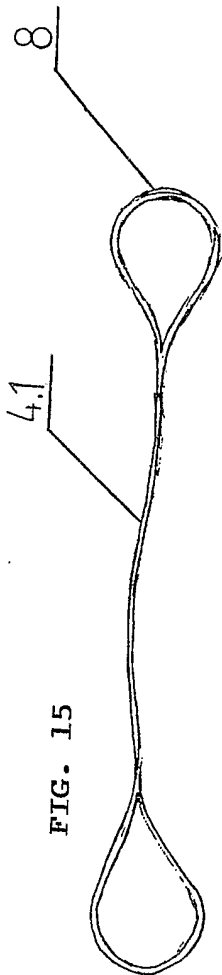


FIG. 8

FIG. 9





INTERNATIONAL SEARCH REPORT

International application No  
PCT/SK2006/000009

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. A61C15/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) A61C		
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		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 861 406 A (STITT ET AL) 21 January 1975 (1975-01-21) column 5, lines 1-22; figures 1-6,32 column 5, line 66 - column 6, line 32 column 8, lines 4-37 -----	1,3-5,8,9
X	US 2004/134510 A1 (VAN VILSTEREN ARNOLD G ET AL) 15 July 2004 (2004-07-15) paragraphs [0013], [0016]; figures 2,3 -----	1,3-5
X	US 6 039 050 A (GOLDENBERG ET AL) 21 March 2000 (2000-03-21) column 3, lines 4-27; figures 2,3,5 -----	1,2,4,7
X	US 4 016 891 A (KUPPERMAN ET AL) 12 April 1977 (1977-04-12) column 1, line 58 - column 2, line 61; figures 1,2,4,5 -----	1-4
	-/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family 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 May 2006		Date of mailing of the international search report  30/05/2006
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  Pypen, C

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/SK2006/000009

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 596 964 A (HABABOU JACQUES) 16 October 1987 (1987-10-16) page 1, line 34 - page 2, line 16; figures 1-3	1-5
X	US 6 672 316 B1 (WEIHRAUCH GEORG) 6 January 2004 (2004-01-06) column 5, lines 7-17; figure 5	8,9
X	WO 01/12100 A (WESTONE PRODUCTS LIMITED) 22 February 2001 (2001-02-22) page 8, line 34 - page 9, line 18; figures 1-3	8,9
X	WO 00/21459 A (ZASCHERINSKY, DMITRY ANATOLIEVICH) 20 April 2000 (2000-04-20) page 6, lines 16-21; figures 1,2 page 8, lines 11-19	8,9
X	US 6 003 525 A (KATZ ET AL) 21 December 1999 (1999-12-21)	8,9
A	column 3, line 65 - column 4, line 5; figures 8-11,13,15 column 4, lines 35-43 column 4, line 66 - column 4, line 1	4,5
X	US 4 162 687 A (LORCH, LEONARD G) 31 July 1979 (1979-07-31)	8,9
A	column 3, line 60 - column 5, line 50; figures 1-7	6
X	US 5 799 673 A (AMENDOLA ET AL) 1 September 1998 (1998-09-01) column 2, lines 26-30; figures 3,7,8 column 3, line 21 - column 4, line 2	8,9
A	US 1 488 214 A (MASON SAUL) 25 March 1924 (1924-03-25) figure 4	1,2,4
A	WO 03/011072 A (JOHN O. BUTLER COMPANY; STVARTAK, CHRISTOPHER; YOST, KEVIN, G) 13 February 2003 (2003-02-13) figures 1,4,5f,5g	1,2,7
A	US 3 843 297 A (ESPINOSA R,US) 22 October 1974 (1974-10-22) column 2, lines 19-37; figure 1	4,5,8,9
A	WO 2004/084759 A (TAYLOR, HATIB, DONALD) 7 October 2004 (2004-10-07) page 3, paragraph 6; figures 1,2	4,7
1 3	A US 5 738 124 A (CERVATO ET AL) 14 April 1998 (1998-04-14) the whole document	7

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 10

It is not clear what is meant by the wording "the working sections are produced as separate pieces".

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.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SK2006/000009

## 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.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 10  
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:

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/SK2006/000009

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