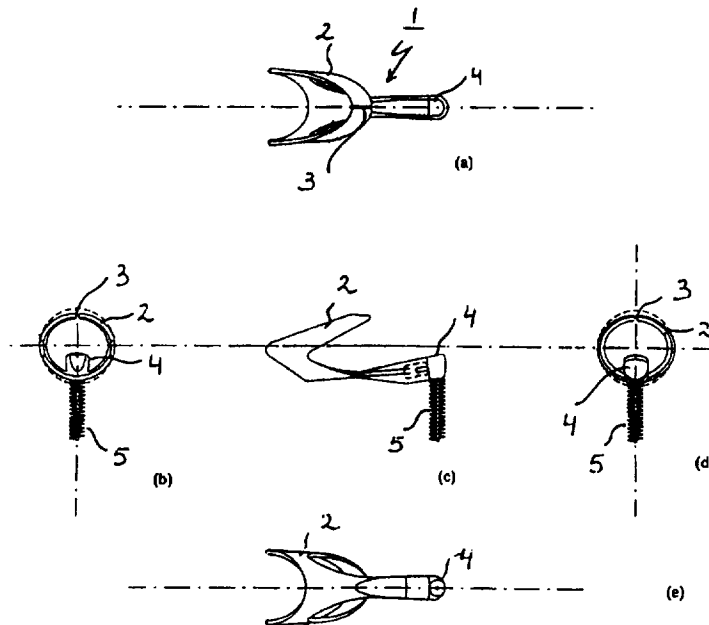




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<p>(21) International Application Number: PCT/NL97/00460 (22) International Filing Date: 8 August 1997 (08.08.97) (30) Priority Data: 1003771 9 August 1996 (09.08.96) NL (71) Applicant (for all designated States except US): LANDMARK B.V. [NL/NL]; Van Vollenhovenstraat 15, NL-3016 BE Rotterdam (NL). (71)(72) Applicant and Inventor: DE WILDE, Mirjam [NL/NL]; Laardenweg 128, NL-1402 BM Bussum (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): GROOTHUIZEN, Theodorus, Johannes, Jacobus [NL/NL]; Hoge Filterweg 148, NL-3063 KC Rotterdam (NL). VAN PEER, Irene, Petra [NL/NL]; Peperstraat 28, NL-2801 RE Gouda (NL). (74) Agents: HOOIVELD, Arjen, Jan, Winfried et al.; Arnold & Siedsma, P.O. Box 71720, NL-1008 DE Amsterdam (NL).</p>		<p>(81) Designated States: AU, CA, JP, KR, RU, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. In English translation (filed in Dutch).</i></p>

(54) Title: INTERDENTAL CLEANER



(57) Abstract

An interdental cleaner for cleaning interdental spaces and interspaces between bridgework and gums, which cleaner comprises a wire provided with brush hairs projecting in several directions therefrom, characterized in that the cleaner comprises a wire holder, which can be provided at least partially round a finger, and that the wire is made of plastic material. In a preferred embodiment the wire is detachably connected to the wire holder.

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INTERDENTAL CLEANER

The invention relates to an interdental cleaner for cleaning interdental spaces and interspaces between
5 bridgework and gums, which cleaner comprises a wire provided with brush hairs projecting in several directions therefrom.

Such an interdental cleaner is known from Dutch patent
10 No. 188.734 (Esro AG). With the known cleaner the wire is one metal wire, which is bent to comprise two parallel wire ends, which wire ends are twisted together, with brush hairs being provided between the windings, which brush hairs project in all directions
15 therefrom. The entire metal wire is coated with a sealing layer of a wear-resistant, electrically insulating and soft elastic plastic material. In this way cleaning will not cause the user any pain resulting from oversensitivity to galvanic effects occurring at
20 exposed or carious dental cervixes and amalgam fillings. In addition to that the metal of the twisted-together wire ends, between which the brush hairs are fastened, can no longer oxidize, so that the hairs cannot come loose any more.

25 One drawback of the interdental cleaner known from the aforesaid Dutch patent is the fact that frequently the interdental spaces are not properly cleaned, in particular because of the poor hold the fingers have on
30 the thin wire (0.6 mm diameter), as a result of which the wire can make all kinds of undesirable movements between the fingers, in practice it has even become apparent that the wire may slip from the user's fingers. The cleaning operation is made even more difficult
35 because the wire has an awkward length, which makes it hardly possible, if at all, to reach the interdental spaces in the back of the mouth cavity through rotation of the cleaner. Furthermore it has become apparent in

practice that the electrically insulating, soft elastic plastic material is not really wear-resistant, so that galvanic effects appear to occur after some time as yet. In addition to that a permanent deformation of the metal wire occurs during use, as a result of which not only the hold on the metal wire will become less strong, but also the brush hairs may come loose. Brush hairs that have come loose may find their way into the stomach and/or the intestines, with all the health risks involved (for example the formation of cysts). A final drawback of twisting the wire ends together is the fact that cavities may form between the windings, in which contaminations may deposit, and that the irregular shape of the metal wire effected by said twisting is experienced to be unpleasant in practice.

The object of the invention is to provide a simple and elegant interdental cleaner, by means of which all interdental spaces and interspaces between bridgework and gums can be cleaned in an efficient and comfortable manner, and in order to accomplish that objective an interdental cleaner of the kind referred to in the introduction is characterized in that it comprises a wire holder, which can be provided at least partially round a finger, and that said wire is made of plastic material. The wire holder forms a natural "extension" of the finger, as it were, as a result of which the brush hairs can easily reach the interdental spaces in the back of the mouth from the correct position of use (controlled by the finger and the finger tip) as well. As already said before, the wire is made of plastic material, in particular nylon, thus avoiding all the aforesaid drawbacks of the known metal wire; more in particular no permanent deformation will take place, quite the contrary, the wire is flexible, whilst an electrically insulating coating to protect against galvanic effects need not be provided. More in

particular the brush hairs are connected to the wire by means of sprue techniques (the so-called two-component injection moulding) - or, in another preferred embodiment, by means of ultrasonic techniques. The phenomenon of brush hairs coming loose, which is observed in the prior art, thus belongs to the past. It is preferred to make the wire of a hard nylon, whilst the brush hairs are made of a flexible plastic or a flexible rubber.

10

In a preferred embodiment of an interdental cleaner said wire is detachably connected to said wire holder. The advantage of the wire being detachable is not only the fact that the wire can be bought separately, whether or not packed in combination with other wires (due to wear the wire will usually have to be replaced sooner than the wire holder), but also that each individual within a family will have his or her own wire to match that individual's teeth, whilst all family members still use a common wire holder.

20

In another embodiment of an interdental cleaner according to the invention said wire holder comprises an annular part. This part forms a "sleeve", as it were, which can be slid over a second phalanx. The annular part preferably comprises an interruption, so that the flexibility thus provided renders the wire holder suitable for different finger thicknesses.

25

In another preferred embodiment of an interdental cleaner according to the invention said wire holder comprises a wing-shaped part. The user can take hold of the wire holder with two finger tips, one of which is present within the wing-shaped part, as it were, and be positioned inside or near the mouth cavity so as to clean all interdental spaces in an efficient manner.

30

35

In another preferred embodiment of an interdental cleaner according to the invention said wire and said brush hairs are made of plastic material, preferably nylon. This gives the wire the flexibility and pliancy required for cleaning, without undergoing any permanent deformation. As already said before, the occurrence of galvanic effects is excluded by this selection of materials. Furthermore the wire itself also has a cleaning effect, because all its physical properties are comparable with those of the brush hairs. Preferably an injection moulding technique, a laser technique or a micro-cutting technique is used for forming the wire and the brush hairs in one piece of one material, the so-called "mono material". With the latter two production techniques the unit of wire and brush hairs is "cut" from one starting material by means of a laser or by means of a die-cutting operation.

In another preferred embodiment of an interdental cleaner according to the invention the brush hairs have rounded ends. This prevents the teeth and the root surfaces from being damaged. Preferably the brush hairs have a flat contact surface, so that a larger contact surface (and thus an enhanced cleaning effect) is created than would be the case with brush hairs which have an entirely round cross-section.

In another preferred embodiment of an interdental cleaner according to the invention said wire has a length of 1 - 2.5 cm, preferably 1.5 - 2.5 cm, more in particular about 2 cm. Extensive testing has shown that it is possible to reach and clean all kinds of interdental spaces in the back of the mouth cavity with a wire of this type (by manipulating, in particular rotating, the wire holder in the mouth cavity). More in particular the wire can be selectively shortened to a particular length. This plays a role especially when the

wire is made in a continuous length at the factory and must be shortened to a particular length - depending on the customers' wishes - preferably by cutting or die-cutting.

5

In another embodiment of an interdental cleaner according to the invention said brush hairs have a length of 1 - 8 mm, preferably 3 - 5 mm.

10 The invention also relates to a wire holder and/or a wire suitable for being used with an interdental cleaner according to the invention, if a detachable connection between the wire holder and the wire is used.

15 The invention will be explained in more detail with reference to figures illustrated in a drawing, wherein:

- Figures 1a, 1b, 1c, 1d and 1e are a plan view, a rear view, a side view, a front view and a bottom
20 view respectively of a special variant of an interdental cleaner according to the invention;
- Figure 2 corresponds with Figure 1, with this
25 understanding that a different preferred variant is shown;
- Figure 3 is a diagrammatic, perspective view of a brush hair used with the interdental cleaner shown
30 in Figure 1.

30

Figure 1 shows an interdental cleaner according to the invention consisting of a wire holder 1 provided with an annular part 2, which is interrupted by a slot 3. This makes it possible to slide the wire holder over any
35 finger of any thickness, whereby the finger tip extends with the (global) centre of the first phalanx to the end 4 of the wire holder. A wire 5, which is detachably

connected to wire holder 1, extends downward from said end 4. Wire 5 has a length of about 1.5 mm and can be detachably connected at the user's home to wire holder 1 by means of a snap connection. Also other connections are possible, for example clamps etc. In use the cleaner constitutes an "extension" of the index finger, as it were, it can readily be moved to any desired position inside or near the mouth cavity for ideally cleaning interdental spaces. The whole is made of plastic material, so that the required flexibility is obtained without any risk of permanent deformation. Plastic has the added advantage that the user will not experience any pain due to galvanic effects occurring at exposed or carious dental cervixes when cleaning his or her teeth. This makes it possible to refrain from the use of insulating coatings, which are used in the aforesaid prior art.

Figure 2 corresponds with Figure 1, and like parts are numbered alike, with this understanding that a wing-shaped part 6 is used instead of an annular part 2. The index finger, for example, is present in the wing-shaped part, whilst another finger, for example the thumb, is present at the underside of wing-shaped part 6.

As already said before, Figure 3 is a perspective view of a brush hair used with the cleaner shown in Figure 1. Since the brush hair has a flat contact surface 7, a larger contact surface with parts of the teeth is created, which leads to an enhanced cleaning effect in comparison with a brush hair having an entirely round (smooth) cross-section. Also the brush hair shown in Figure 3 comprises a rounded end 8, so that the risk of damage to the teeth and the root surface is ruled out.

CLAIMS

1. An interdental cleaner for cleaning interdental spaces and interspaces between bridgework and gums,
5 which cleaner comprises a wire provided with brush hairs projecting in several directions therefrom, characterized in that said cleaner comprises a wire holder, which can be provided at least partially round a finger, and that said wire is made of
10 plastic material.
2. An interdental cleaner according to claim 1, wherein said wire is detachably connected to said wire holder.
15
3. An interdental cleaner according to claim 1 or 2, wherein said wire holder includes an annular part.
4. An interdental cleaner according to claim 1,
20 wherein said annular part comprises an interruption.
5. An interdental cleaner according to any one of the preceding claims 1 - 4, wherein said wire holder
25 includes a wing-shaped part.
6. An interdental cleaner according to any one of the preceding claims 1 - 5, wherein said wire and said brush hairs are made of plastic material,
30 preferably nylon.
7. An interdental cleaner according to any one of the preceding claims 1 - 4, wherein said brush hairs have rounded ends.
35
8. An interdental cleaner according to any one of the preceding claims 1 - 7, wherein said brush hairs

have a flat contact surface.

9. An interdental cleaner according to any one of the preceding claims 1 - 8, wherein said wire has a length of 1 - 2.5 cm, preferably 1.5 - 2.5 cm, more in particular about 2 cm.
10. An interdental cleaner according to claim 9, wherein said wire can be selectively shortened to a particular length during production.
11. An interdental cleaner according to any one of the preceding claims 1 - 10, wherein said brush hairs have a length of 1 - 8 mm, preferably 3 - 5 mm.
12. A wire holder suitable for being used with an interdental cleaner according to any one of the preceding claims 2 - 11.
13. A wire suitable for being used with an interdental cleaner according to any one of the preceding claims 2 - 11.

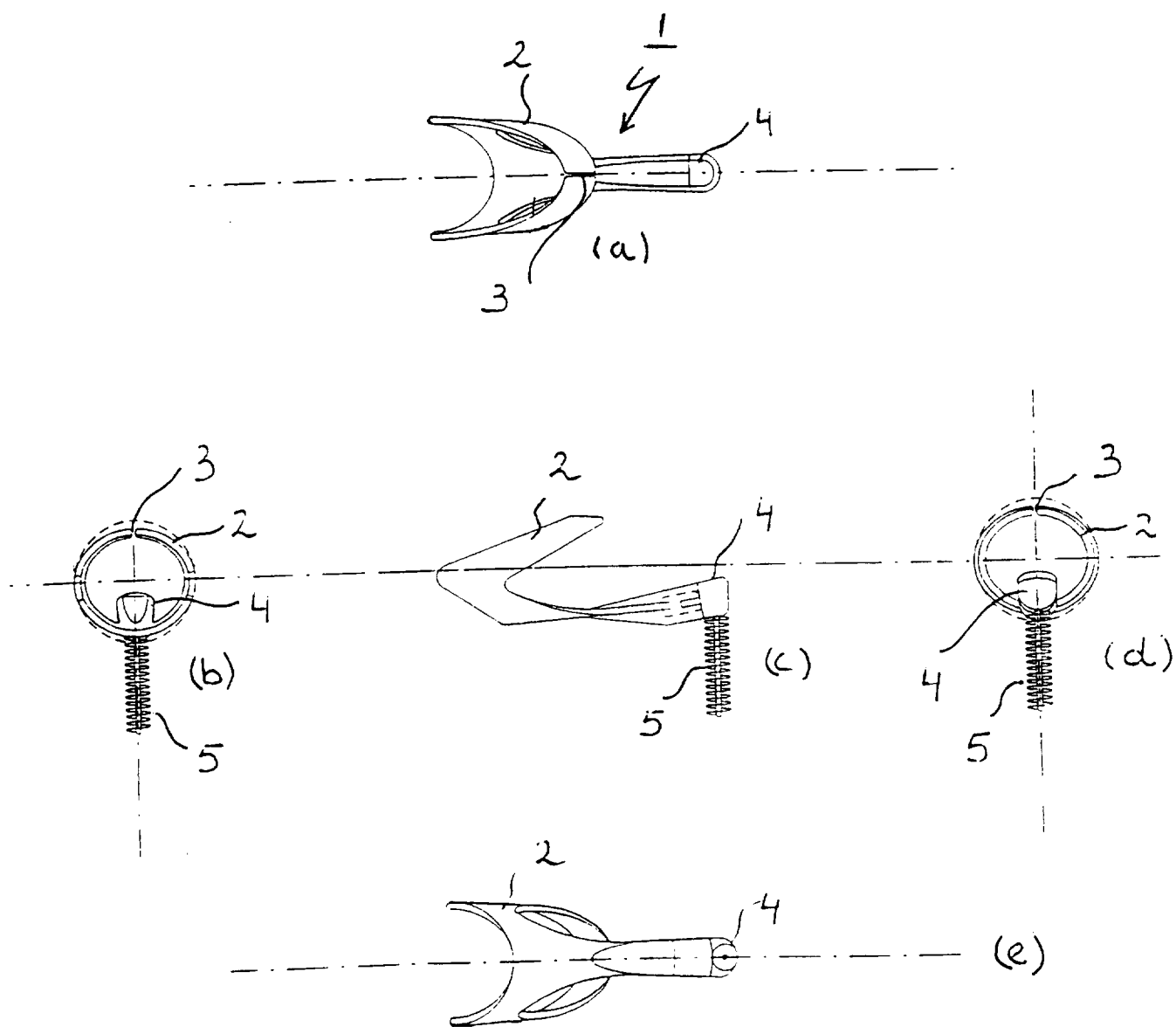


FIG. 1

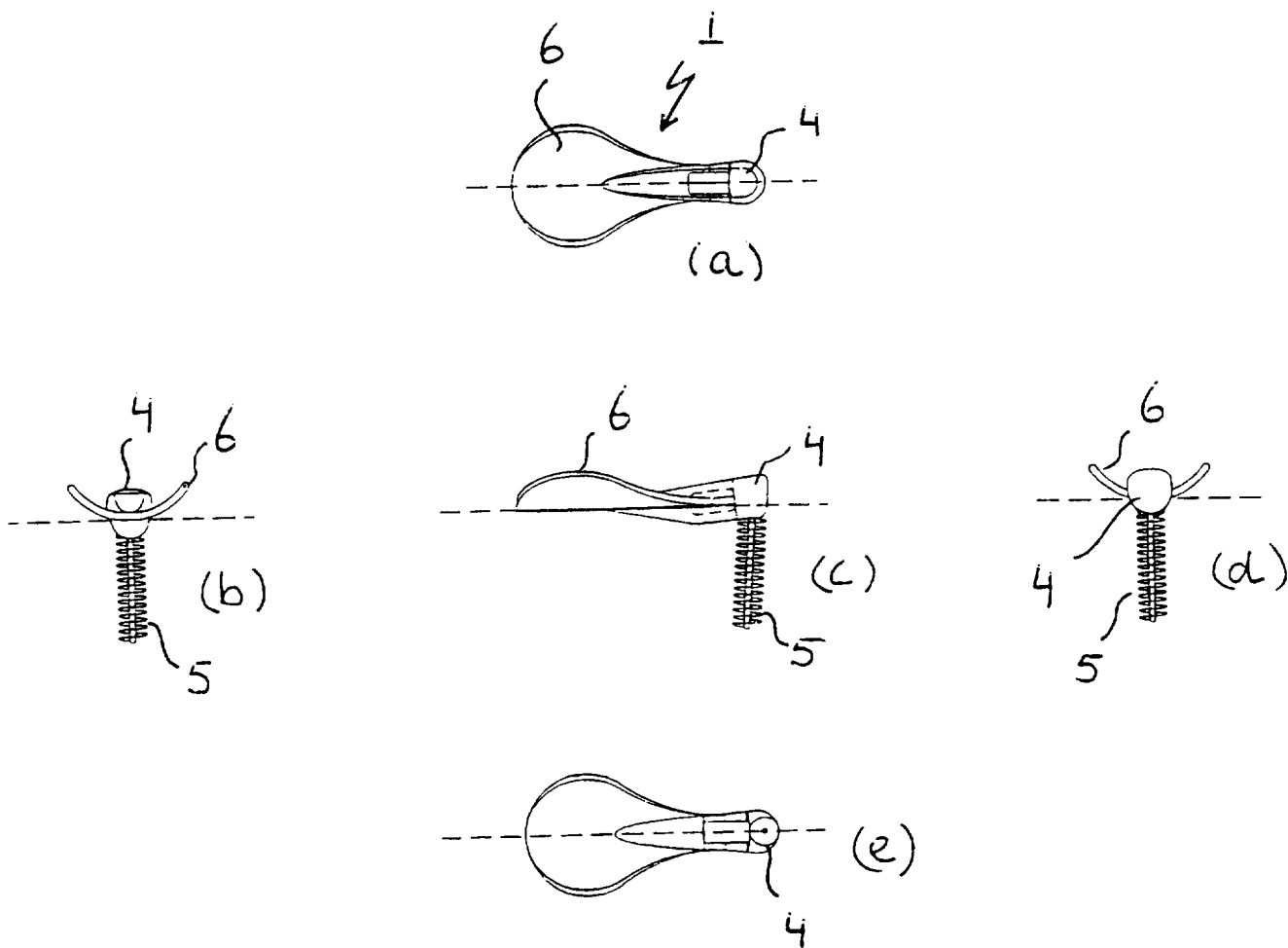


FIG. 2

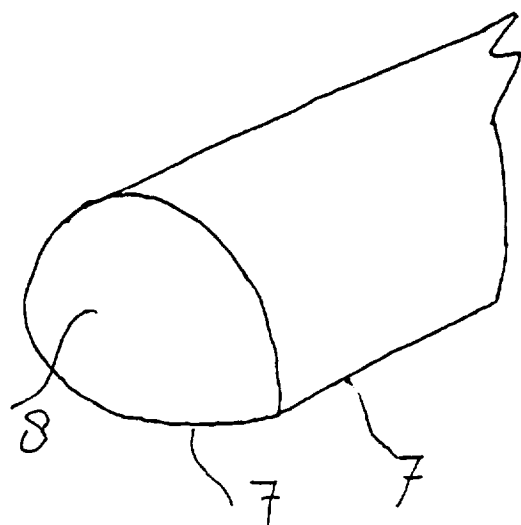


FIG. 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 97/00460

A. CLASSIFICATION OF SUBJECT MATTER IPC 6 A46B5/04 A46B17/02 A46D1/00 A46B3/18				
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 6 A46B A46D				
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C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
Y	US 3 720 975 A (NELSON S) 20 March 1973 see column 3, line 8 - column 5, line 26; figures	1,3,6, 12,13		
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
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Date of the actual completion of the international search <p style="text-align: center;">14 November 1997</p>	Date of mailing of the international search report <p style="text-align: center;">26/11/1997</p>			
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 <p style="text-align: center;">Ernst, R</p>			

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International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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