



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

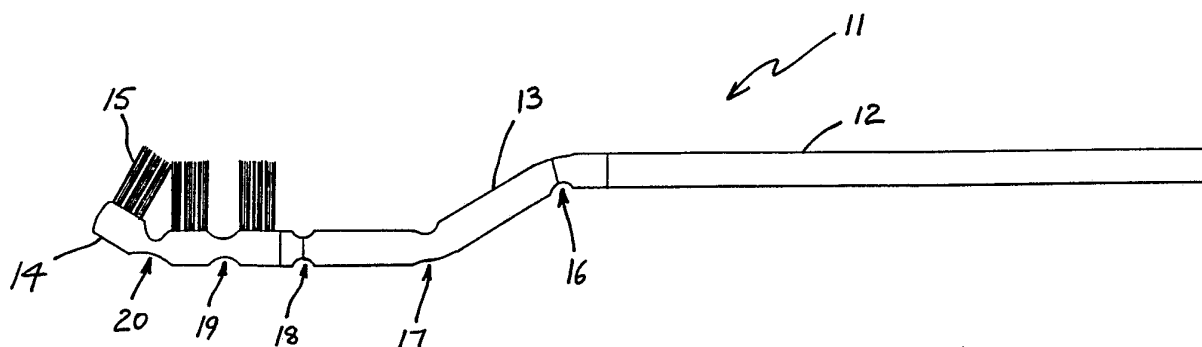
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PK 0665 15 June 1990 (15.06.90) AU(71)(72) Applicant and Inventor: HUMPHRIES, Victor, Alfred  
[AU/AU]; 83 River Road, Emu Plains, NSW 2750 (AU).(74) Agent: PETER MAXWELL & ASSOCIATES; Blaxland  
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(54) Title: TOOTHBRUSH



## (57) Abstract

A toothbrush (11) having an elongated handle part (12) and a head part (14) with bristles (15) projecting therefrom. A neck part (13) joins the handle part (12) to the head part (14). The head part (14) has at least one region thereof (19, 20) weakened so as to allow deformation in the head part (14) to suit the shape of the user's dental arches.

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TOOTHBRUSHFIELD OF INVENTION

5 The present invention relates to toothbrushes and in particular to a toothbrush that may be deformed to suit the shape of the user's dental arches or for other purposes.

BACKGROUND ART

Deformable toothbrushes which are designed to bend or pivot in the neck part between the head and handle are known. For instance, Australian Patent No. 582,098 discloses a toothbrush incorporating a deformable plastic neck. The manner in which the neck deforms is continuous and gradual and the toothbrush is not adapted to be deformed in the head part. Toothbrushes that can discretely pivot in the neck part are disclosed in US Patent No. 3,868,742. However, the pivoting of the head part about the neck part is in a plane parallel to the upper surface of the handle.

Neither of these types of toothbrush have means whereby the head part of the toothbrush may be deformed. It is, therefore, an object of the present invention to provide a toothbrush in which the head part is deformable, either with or without the adjacent neck part being deformable, so that the shape of the toothbrush may be adjusted to suit the particular size and shape of the user's dental arches.

25 DISCLOSURE OF THE INVENTION

According to the invention, there is provided a toothbrush comprising an elongated handle part, a head part, and a neck part joining the handle part and the head part,

said head part having bristles projecting from at least one side thereof and having at least one region thereof weakened so as to allow deformation in the head part to suit the shape of the user's dental arches.

5           In a preferred form of the invention, the neck part is of smaller cross sectional area than the adjacent parts of the head part and handle part.

          Preferably, the neck part includes at least one region thereof weakened so as to allow deformation in the neck part  
10       to suit the shape of the user's dental arches.

          Preferably, the region at which the deformation occurs comprises a localised narrowing in the cross section of the head or neck part. Pressure applied adjacent to the or each narrowed region results in a sharp and discrete deformation.  
15       Other means by which the structure may be weakened are contemplated by the invention, such as by provision at the weakened region of material that is less dense than the surrounding material.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20           In order that the invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings in which:-

          Fig. 1 is a side view of a toothbrush according to one embodiment of the invention,

25           Fig. 2 is a top view of the toothbrush of Fig. 1,

          Fig. 3 is a top view of a toothbrush according to a second embodiment of the invention,

Fig. 4 is a side view of the toothbrush of Fig. 1 that has been deformed to suit the shape of the dental arches of a particular first user,

5 Fig. 5 is a side view of the toothbrush of Fig. 1 that has been deformed to suit the shape of the dental arches of a particular second user, and

Fig. 6 is a side view of the toothbrush of Fig. 1 that has been deformed to suit the shape of the dental arches of a particular third user.

10 DESCRIPTION OF PREFERRED EMBODIMENT

The toothbrush 11 shown in Figs. 1 and 2 comprises a handle 12, a neck 13 and a head 14 having an array of bristles 15 attached thereto in any convenient way. The neck 13 has been weakened at regions or loci 16, 17 and 18 through  
15 a narrowing of the cross section of the neck at those sites. The head 14 has been weakened at regions 19 and 20 by narrowing the cross section of the head 14 at those regions. Rows of bristles are missing from each of the regions 19 and 20.

20 The toothbrush 21 shown in Fig. 3 also comprises a handle 22, neck 23 and head 24 with an array of bristles 25 attached thereto in any convenient way. The neck 23 is narrowed at regions 26, 27 and 28 whilst the head 24 is narrowed at region 29. Rows of bristles are missing from  
25 region 29.

The weakness in structure arising from the narrowing of these regions in the neck and head of both toothbrushes of Fig. 1 and Fig. 3 allow these toothbrushes to be deformed at

these sites. This deformation can be sharp and discrete at those sites.

The invention is not restricted to the weakening in the head part (and optionally the neck part) being a discrete narrowing in particular regions of these parts, and any manner of weakening is contemplated by the invention so long as it allows one or more deformations in the appropriate part to suit the shape of the user's dental arches, and whether or not it leads to a sharp and discrete deformation at the weakened regions. In some circumstances, it may be useful for only the head part or the neck part to have a weakened region.

The material from which the toothbrushes of Figs. 1 to 6 may be integrally constructed are those commonly used in the manufacture of toothbrushes and which can withstand the pressure needed to deform the toothbrush to its required shape and to maintain that shape during use. Preferably, the material is a transparent or translucent hydrocarbon resin which can be readily manipulated and deformed at its weakened regions at room temperature or under hot water. The material used may also be an opaque styrene polymer or copolymer which can be manipulated at higher temperatures. Preferably, a plastic material commonly referred to as PETG is used.

Figs. 4 to 6 show three ways in which the toothbrush of Fig. 1 may be deformed. The toothbrushes of the invention may be deformed at the weakened regions by manual or hand pressure applied by the user adjacent to the weakened region or by other means.

In Fig. 4, the neck 13 has been deformed as shown at regions 16 and 17 to improve access of the head part to the target teeth and the head 14 has been deformed upwardly at region 20. As a result, the bristles 15 of the head 14 provide a brushing surface that is slightly concave.

Fig. 5 shows the toothbrush 11 deformed according to Fig. 4 but having its head 14 deformed downwardly at region 20, rather than upwardly, thereby providing a brushing surface of bristles 15 that is slightly convex.

In Fig. 6, the toothbrush 11 has been deformed in the neck 13 at regions 16, 17 and 18 and the head 14 has been deformed at sites 19 and 20. As a result, the bristles 15 of the head 14 provide a brushing surface that is even more concave than that of the toothbrush deformed according to Fig. 4.

The particular arrangements of the neck 13 and head 14 shown in Figs 4 to 6 will be most effective in cleaning distal and mesial surfaces of teeth next to areas where teeth have been extracted.

It will be apparent that one advantage of the invention is that the shape of the toothbrush can be adjusted by a dentist in consultation with the user patient to suit the particular size and shape of the patient's dental arches and that the shape of the neck and head may be varied in many number of combinations. Although it is preferable for the adjustment to be done in consultation with the dentist, the present invention also allows the user to independently conduct the adjustment.

By way of dimension only, the toothbrush of the invention may come in a small (junior) size for children or a large size for adults. In the junior model, preferably the head would measure approximately 20 millimetres in length with a row of bristles missing about 8 millimetres from the distal end. In the adult model, preferably the head would measure approximately 30 millimetres in length with a row of bristles missing about 8 millimetres from the distal end and another row missing about 22 millimetres from the distal end.

For large arches, the length of the neck together with the head should preferably be about 11 centimetres. The handle should preferably be 11 or 12 centimetres in length and be at least 13 millimetres wide for adequate grip.

Various modifications may be made in details of design and construction without departing from the scope or ambit of the present invention.

For instance, the handle part of the toothbrush of the invention may have at least one weakened region so as to allow deformation thereof to suit particular forms of grip, such as the grip of infants or arthritis sufferers.

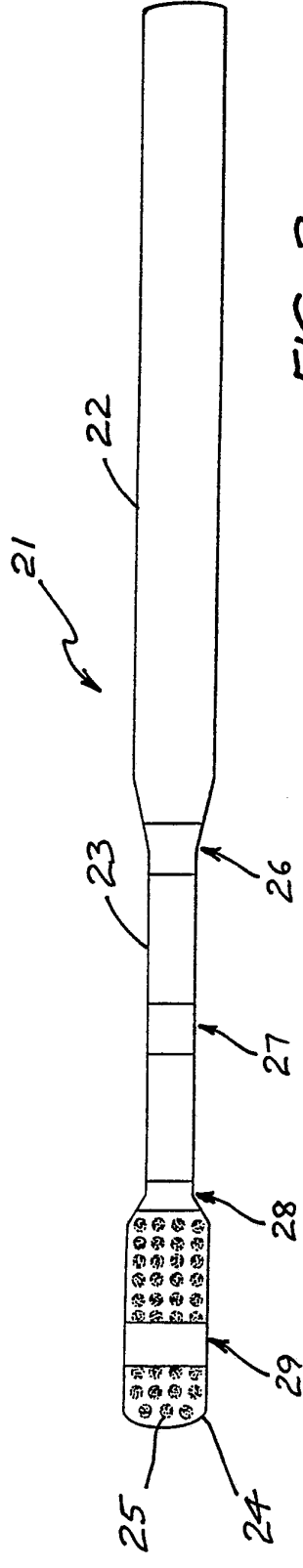
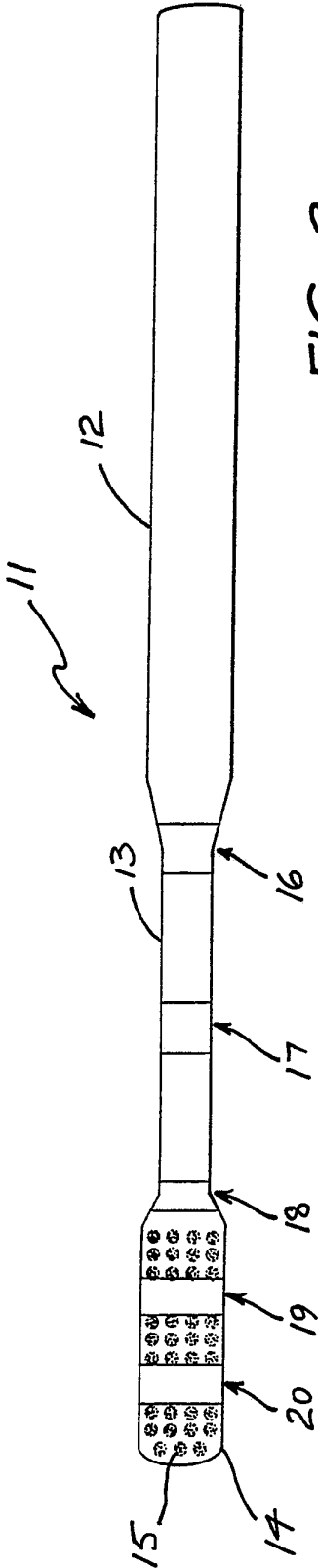
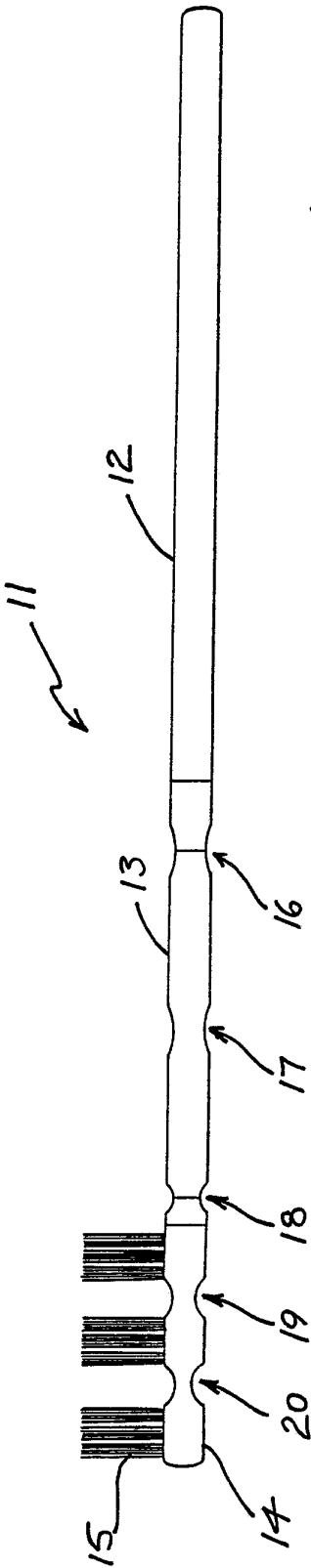
CLAIMS

1. A toothbrush comprising an elongated handle part, a head part and a neck part joining the handle part and head part, said head part having bristles projecting from at least one side thereof and having at least one region thereof weakened so as to allow deformation in the head part to suit the shape of the user's dental arches.
2. The toothbrush of claim 1 wherein the neck part is of smaller cross sectional area than the adjacent parts of the head part and handle part.
3. The toothbrush of claim 1 or claim 2 wherein the neck part includes at least one region thereof weakened so as to allow deformation in the neck part to suit the shape of the user's dental arches.
4. The toothbrush of any one of claims 1 to 3 wherein the at least one weakened region includes means for allowing the deformation to be sharp and discrete.
5. The toothbrush of claim 4 wherein said means for allowing sharp and discrete deformation is a localized narrowing in the cross section of the respective part.
6. The toothbrush of any one of claims 1 to 5 wherein the toothbrush is made of transparent or translucent hydrocarbon resin that can be deformed at its at least one weakened region at room temperature or under hot water.
7. The toothbrush of any one of claims 1 to 5 wherein the toothbrush is made of an opaque styrene polymer or copolymer.

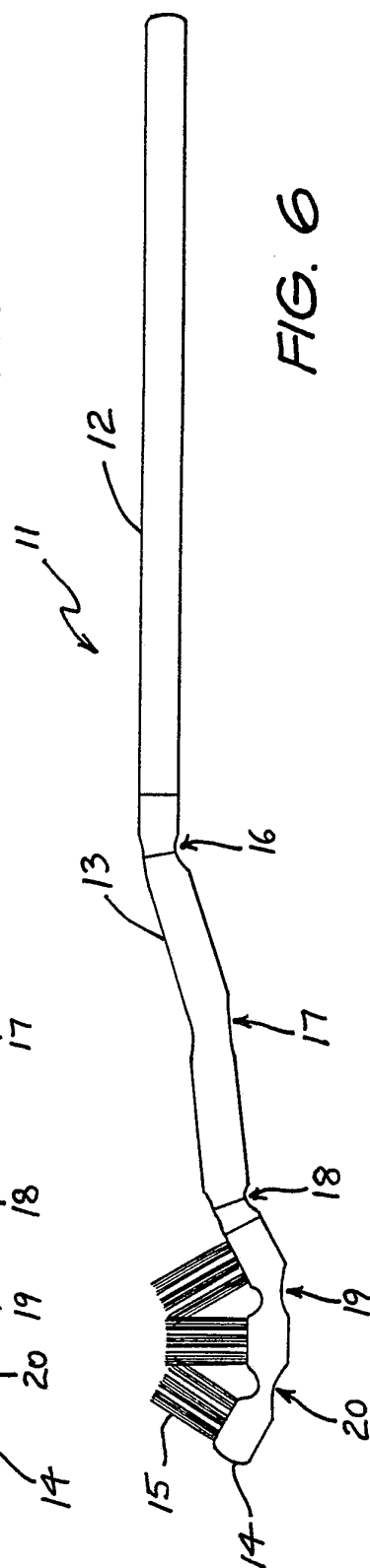
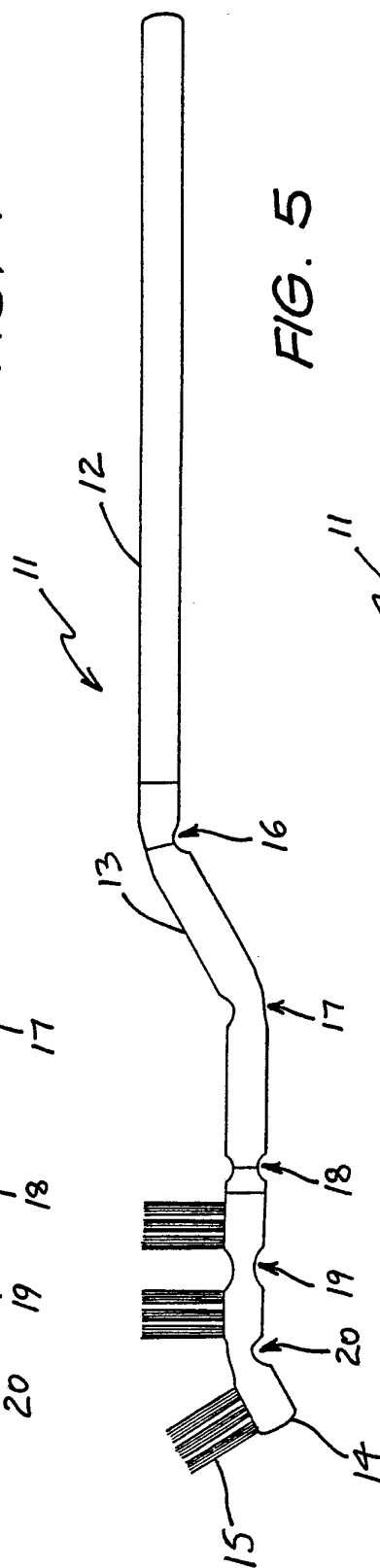
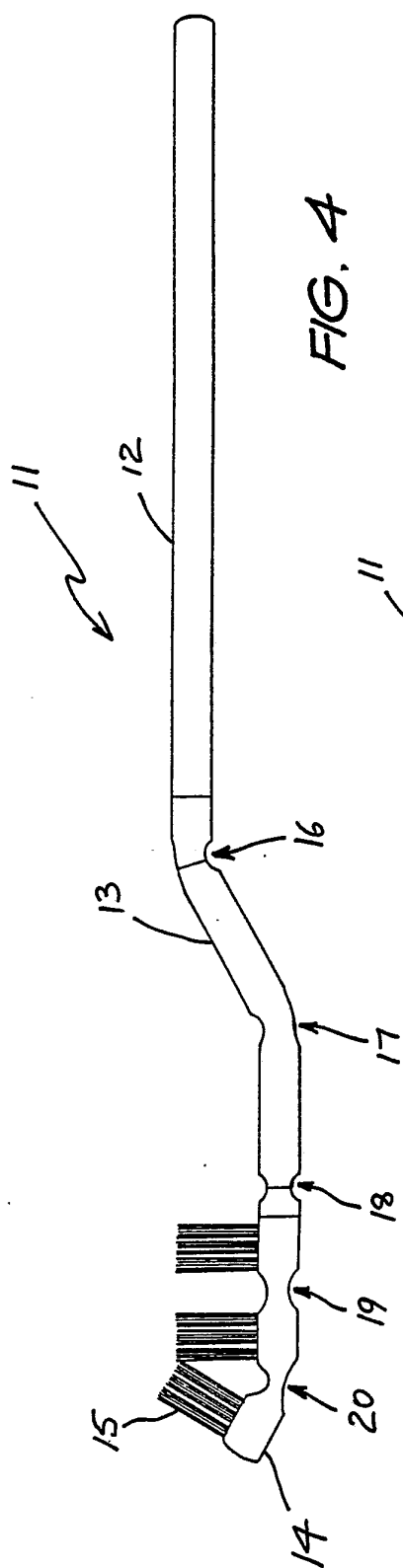
8. The toothbrush of any one of claims 3 to 7 wherein the head part has two weakened regions and the neck part has three weakened regions.

9. The toothbrush of claim 8 wherein the head part has one weakened region.

10. The toothbrush of any one of claims 1 to 9 wherein the deformation at the at least one weakened region is by manual or hand pressure applied adjacent to the at least one weakened region.



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# INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 91/00257

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. <sup>5</sup> A46B 9/10, 5/02		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	A46B 9/10, 5/02, 5/00	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8		
AU : IPC as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> 9		
Category*	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	AU,A, 59009/86 (BARMAN) 22 December 1987 (22.12.87)	(1-2)
X	US,A, 4691405 (REED) 8 september 1987 (08.09.87)	(1-2)
X,Y	US,A, 4829621 (PHENEGAR) 16 May 1989 (16.05.89)	(3,10)
X	CH, 460705 (SOCIETE ANONYME DES ETABLISSEMENTS LECLERC, PARIS) 15 October 1968 (15.10.68)	(1-2)
E	AU,A, 75961/91 (WARNER-LAMBERT COMPANY) 27 November 1991 (27.11.91)	(1-2, 10)
X,Y	AU,A, 44932/89 (McCUSKER) 28 May 1990 (28.05.90)	(2-3, 10)
(continued)		
<p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
27 August 1991 (27.08.91)	2 September 91	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	J. THOMSON <i>John Thomson</i>	

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	DE,A, 393882 (HONNEF) 19 April 1924 (19.04.24)	(1, 4-5)
X	DE,A, 660830 (DIETEL) 3 June 1938 (03.06.38)	(1, 4-5)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claim numbers ..., 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. ☐ Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

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 of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
  
3. ☐ 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 claim numbers:
  
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

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

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON  
INTERNATIONAL APPLICATION NO. PCT/AU 91/00257

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Members		
AU 59009/86	DK 483/88	DK 157777	US 4938539	
	WO 8707123	DE 3664718	EP 267901	
	JP 63503276	US 4876157		
AU 44932/89	WO 9004938			

END OF ANNEX