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Published:

— *with international search report (Art. 21(3))*

(54) Title: CAP FOR CONNECTING A TUBE TO A CONTAINER

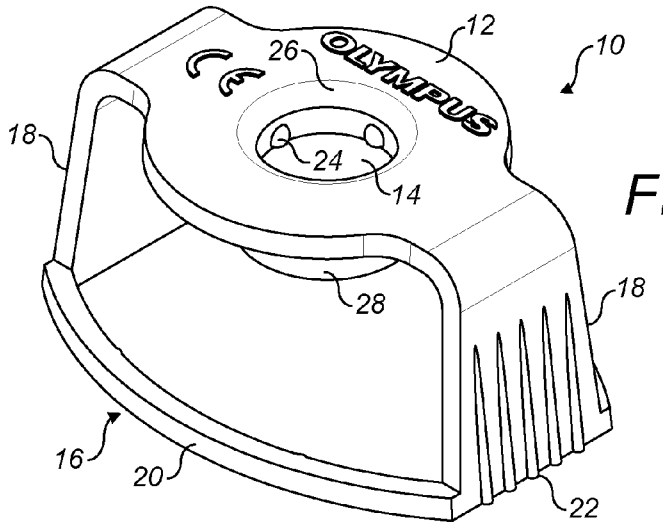


FIG. 1

(57) Abstract: A cap (10) for connecting a tube (36) to a container (32), for example to provide irrigating fluid used in a medical procedure, consists of a flange (12) to extend over the opening in the neck (30) of the container (32). An aperture (14) is formed in the flange (12) to receive a tube (36). A resilient collar (16) is provided to engage the container neck (30). At least one connecting arm (18) joins the flange (12) to the collar (16). The cap (10) is simple to manufacture, for example by plastic moulding, and easy to fit to a container (32) with one hand. The flange (12) does not seal the opening so that air can enter the container (32) as fluid is withdrawn in order to prevent the container (32) collapsing under suction.

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CAP FOR CONNECTING A TUBE TO A CONTAINER

The present invention relates to a cap for connecting a tube to a container.

During endoscopic medical procedures, it is often necessary to supply irrigating fluid such as sterile water to the interior of an endoscope. The water is typically provided in a plastic bottle with a screw cap and transferred to the endoscope via a tube set consisting of at least one tube. One end of the tube is passed into the bottle through the neck when the cap is removed and the other end attached to the endoscope often via an adaptor. Part of the tube may pass through a peristaltic pump to pump water from the bottle to the endoscope.

The tube must be secured in place to avoid it simply pulling out of the bottle under its own weight or by vibrations caused by the pump. Typically, the tube set includes an auxiliary screw cap to fit onto the bottle when its usual cap is removed, which includes an opening through which the tube passes.

Such an auxiliary screw cap will only fit one size of threaded bottle neck. It is also relatively cumbersome to engage and disengage from the bottle, in that it generally requires the operator to use both hands. A cap with internal threads is also relatively complex mould and therefore more expensive to manufacture.

The present invention provides a cap for a container having a neck defining an opening, the cap comprising a flange to

extend over the opening in the container neck in use and defining an aperture, and a resilient collar for engaging the container neck, wherein the flange is spaced from the resilient collar and connected to it by at least one connecting arm.

This type of cap is easy to fit to a bottle with one hand. It is simple to mould and therefore inexpensive and suited to single use as a disposable item.

In one embodiment, the cap comprises a pair of opposed arms connecting the flange to the collar and the collar comprises resilient struts extending between the connecting arms.

In this case, the connecting arms are preferably movable towards and away from each other to cause the resilient struts to flex. Conveniently, the connecting arms may be provided with grip-enhancing features.

In an alternative embodiment, the resilient collar may comprise a substantially C-shaped member. At least one tab may project from the C-shaped member for a user to grasp. The tab may be provided with grip-enhancing features.

Preferably, the resilient collar includes a plurality of projections for engaging the container neck.

Preferably, the collar is configured to engage the exterior of a container neck.

The aperture in the flange may comprise a plurality of projections for engaging a tube inserted therethrough.

The invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a perspective view from above of a cap in accordance with a first embodiment of the present invention;

Figure 2 is a perspective view from below of the cap shown in Figure 1;

Figure 3 is a perspective view of the cap of Figures 1 and 2 in place on a bottle neck with a tube inserted;

Figure 4 is a perspective view from above of a cap in accordance with a second embodiment of the present invention;

Figure 5 is a perspective view from below of the cap shown in Figure 4; and

Figure 6 shows the cap of Figures 4 and 5 in place on a bottle neck with a tube inserted.

A first embodiment of the present invention is shown in Figures 1-3. A cap 10 is provided which can be fitted onto the neck of a container such as a plastic bottle.

The cap 10 includes a flange 12 which is substantially circular and will extend over the opening of the bottle neck in use. The flange 12 defines an aperture 14 for receiving a tube. The cap 10 also comprises a resilient collar 16 for clipping the cap 10 to the neck of the bottle. A pair of

connecting arms extend from the flange 12 and join it to the resilient collar 16.

In this embodiment, the collar 16 comprises a pair of resilient arcuate struts 20 joining the connecting arms 18 to form a generally oval shaped collar.

The connecting arms 18 may have ridges 22 or other grip-enhancing features on their outer surfaces. The connecting arms 18 are diametrically opposed to one another on either side of the flange 12. Squeezing them towards one another causes the resilient arcuate struts 20 to flex outwardly so that the resilient collar 16 becomes a fatter oval or more circular shape. In this condition, the cap 10 can be fitted over the neck 30 of a bottle 32. Releasing the connecting arms 18 allows the collar 16 to resume its natural oval shape. The cap 10 is dimensioned such that the arcuate struts 20 will engage a given bottle neck 30 below the threads 34, as shown in Figure 3, thus retaining the cap 10 on the bottle neck 30.

The aperture 14 in the flange 12 may include protruding beads 24 to grip a plastic tube 36 inserted therethrough. The upper edge 26 of the aperture 14 is preferably radiused and a tubular part 28 extends below the flange 12 to facilitate entry of the tube 36 and avoid any sharp edges which could damage the tube 36 or cause it to kink.

The arcuate struts 20 may also include projecting beads 38 to assist with gripping the bottle neck 30.

The flange 12 in this example substantially covers the opening in the neck 30 of the bottle 32 as shown in Figure 3 but does not seal against it. In this way, air can enter the bottle 32 as water is withdrawn through the tube 36, to stop the bottle 32 collapsing under suction.

A second embodiment of the present invention is illustrated in Figures 4-6. In this embodiment, a cap 40 is provided comprising a flange 42 defining an aperture 44. The flange 42 is connected to a generally C-shaped resilient collar 46 by a connecting arm 48.

The collar 46 defines an opening 50 allowing the cap 40 to be pushed from the side on to the neck 30 of a bottle, rather than fitting the cap over the top of the bottle neck 32 as in the first embodiment. The cap 40 is preferably provided with a tab 52 opposite the opening 50 for gripping by a user. The tab 52 may include ridges 54 or other grip-enhancing features.

The lower edge of the resilient collar 46 may be provided with inward projections 56 which can engage beneath the threads 34 on the bottle neck 30 to help retain it in position.

As in the first embodiment, the aperture 44 may have protruding beads 58 to grip a tube 36. The upper edge of the aperture 44 may also be radiused. However, preferably there is no tubular part corresponding to tubular part 28 in the first embodiment, so as not to inhibit movement of the cap 40 sideways on and off the bottle neck 30.

The free ends 60 of the C-shaped collar 46 preferably flare outwardly to facilitate pushing the collar 46 around the bottle neck 30.

Thus the present invention provides a cap which can be engaged and disengaged with a bottle neck quickly and easily, even with one handed operation. Both embodiments comprise a simple, unitary moulding which is cheap and easy to manufacture. Thus, the cap of the present invention is suitable as a disposable/single use item which does not require cleaning and sterilisation. The cap does not seal the bottle opening, thereby allowing the ingress of air to avoid the bottle collapsing under section. Further, the cap is suitable for use on a variety of different container necks and is not restricted to use with a neck of particular dimensions.

It will be appreciated that a number of alternatives and modifications can be adopted without departing from the scope of the claims. In the embodiments described the resilient collar fits the exterior of a container neck but the collar could be arrange to engage the interior of the neck. As covered by the two embodiments described, the collar may be continuous or discontinuous and other configurations from the precise details described are possible.

CLAIMS

1. A cap for a container having a neck defining an opening, the cap comprising a flange to extend over the opening in the container neck in use and defining an aperture, and a resilient collar for engaging the container neck, wherein the flange is spaced from the resilient collar and connected to it by at least one connecting arm.

2. A cap as claimed in claim 1, wherein a pair of opposed arms connect the flange to the collar, wherein the collar comprises resilient struts extending between the connecting arms.

3. A cap as claimed in claim 2, wherein the connecting arms are movable towards and away from each other to cause the struts to flex.

4. A cap as claimed in claim 2 or claim 3, wherein the connecting arms further comprise grip-enhancing features.

5. A cap as claimed in claim 1, wherein the collar comprises a substantially C-shaped member.

6. A cap as claimed in claim 5, further comprising at least one tab projecting from the C-shaped member.

7. A cap as claimed in claim 6, wherein the tab comprises grip-enhancing features.

8. A cap as claimed in any preceding claim, wherein the collar includes a plurality of projections for engaging the container neck.

9. A cap as claimed in any preceding claims, wherein the collar is configured to engage the exterior of a container neck.

10. A cap as claimed in any preceding claim, wherein the aperture in the flange comprises a plurality of projections for engaging a tube inserted therethrough.

11. A cap substantially as hereinbefore described and with reference to the accompanying drawings.

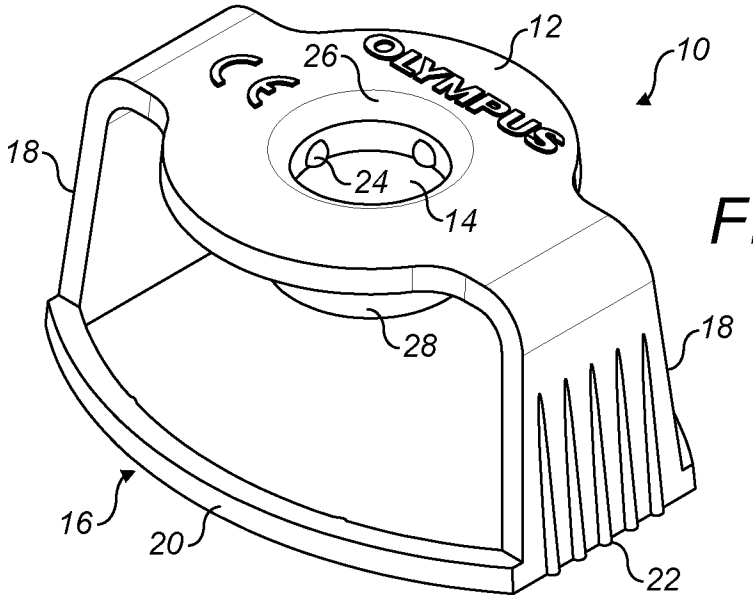


FIG. 1

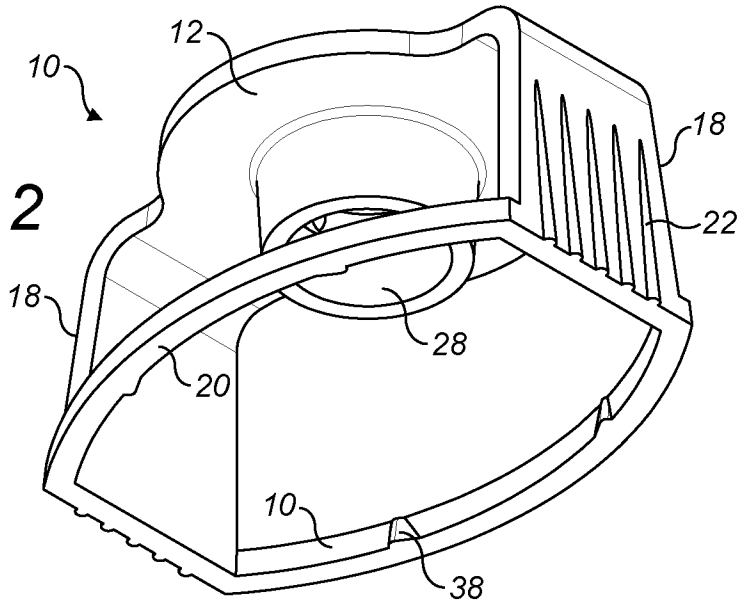


FIG. 2

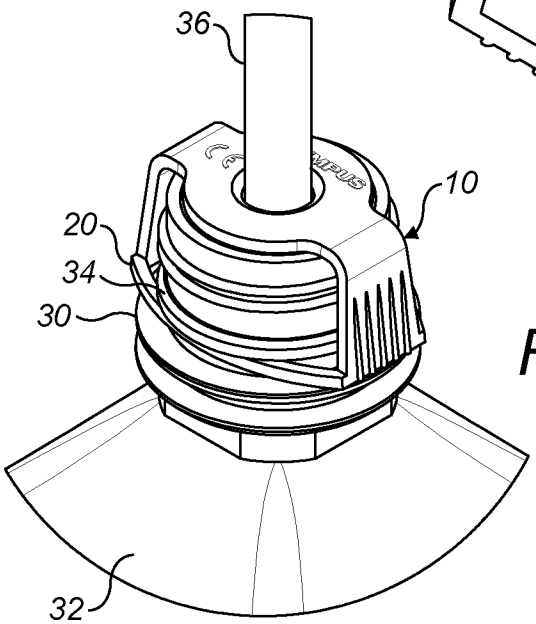


FIG. 3

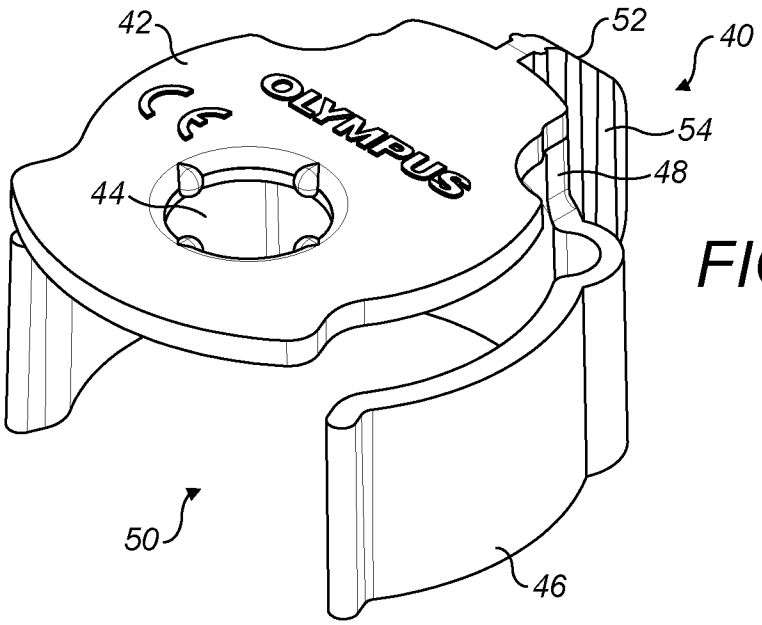


FIG. 4

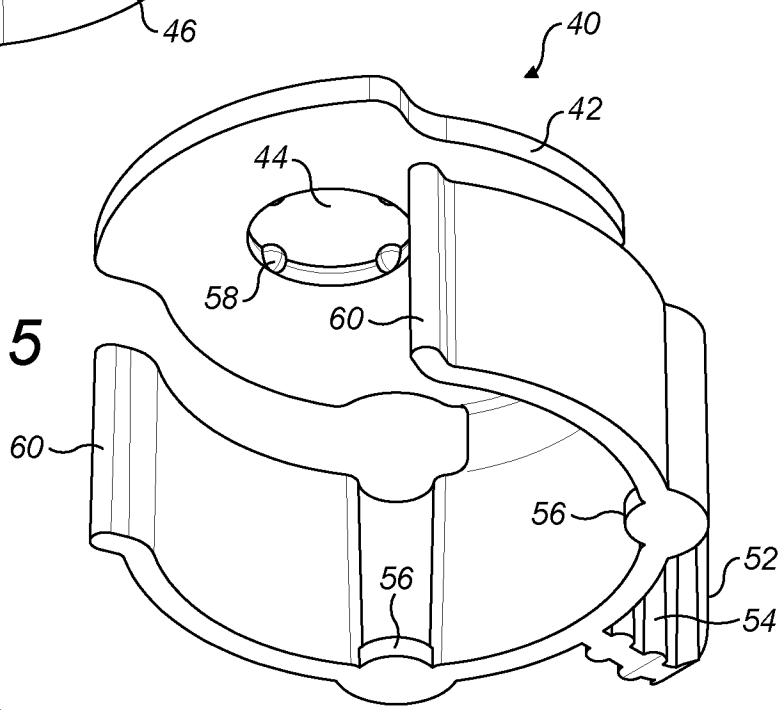


FIG. 5

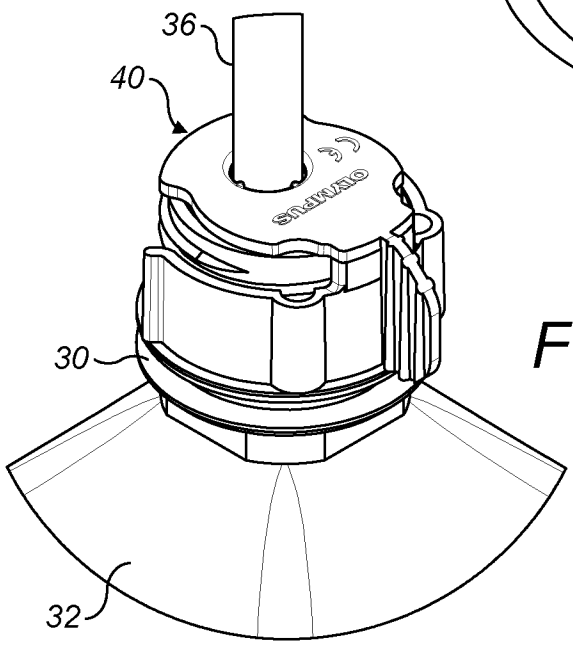


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2013/051026

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B1/00 B67D7/02 B67D1/08
ADD.

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)
B67D A61B

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 practicable, 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.
X	DE 44 37 981 A1 (STORZ ENDOSKOP GMBH [CH]) 27 April 1995 (1995-04-27) column 3, line 44 - column 4, line 19; figures	1,5-9
X	US 5 110 013 A (CLARK RUSSEL W [US] ET AL) 5 May 1992 (1992-05-05) column 2, line 53 - column 3, line 2	1,8-10
X	GB 2 482 048 A (THREADLESS CLOSURES LTD [GB]) 18 January 2012 (2012-01-18) page 15, paragraph 3; figures 7,8	1
A	US 6 070 624 A (BILBREY ROBERT [US] ET AL) 6 June 2000 (2000-06-06) column 14, lines 18-38; figures 2, 4	1

-/--

[X] Further documents are listed in the continuation of Box C.

[X] 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 application or patent 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	Date of mailing of the international search report
17 July 2013	30/07/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Müller, Claus

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2013/051026

Box No. 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.: 11
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 No. 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 fees, this Authority did not invite payment of additional fees.

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 and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2013/051026

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 784 299 A (STENGER DONALD R [US]) 15 November 1988 (1988-11-15) column 2, line 52 - column 3, line 8; figures 1,3,4,7,8	1
A	DE 198 38 685 C1 (HENKEL ECOLAB GMBH & CO OHG [DE]) 25 November 1999 (1999-11-25) column 2, line 49 - column 3, line 10; figures 1,2	1
A	US 5 381 924 A (KIEFEL STANLEY A [US]) 17 January 1995 (1995-01-17) abstract; figures	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2013/051026

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4437981 A1	27-04-1995	NONE	
US 5110013 A	05-05-1992	NONE	
GB 2482048 A	18-01-2012	AR 082164 A1	14-11-2012
		AU 2011278174 A1	21-02-2013
		CA 2805141 A1	19-01-2012
		EP 2593376 A2	22-05-2013
		EP 2593377 A1	22-05-2013
		GB 2482000 A	18-01-2012
		GB 2482048 A	18-01-2012
		KR 20130033453 A	03-04-2013
		US 2013134123 A1	30-05-2013
		WO 2012007707 A2	19-01-2012
		WO 2012007708 A1	19-01-2012
US 6070624 A	06-06-2000	NONE	
US 4784299 A	15-11-1988	NONE	
DE 19838685 C1	25-11-1999	AT 234233 T	15-03-2003
		CA 2341593 A1	09-03-2000
		DE 19838685 C1	25-11-1999
		DK 1107918 T3	14-07-2003
		EP 1107918 A1	20-06-2001
		ES 2194502 T3	16-11-2003
		JP 2002523314 A	30-07-2002
		US 6543654 B1	08-04-2003
		WO 0012403 A1	09-03-2000
US 5381924 A	17-01-1995	NONE	

Continuation of Box II.2

Claims Nos.: 11

Claim 11 is formulated such that no meaningful search can be carried out, Rule 6.2(a) PCT.

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 Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.