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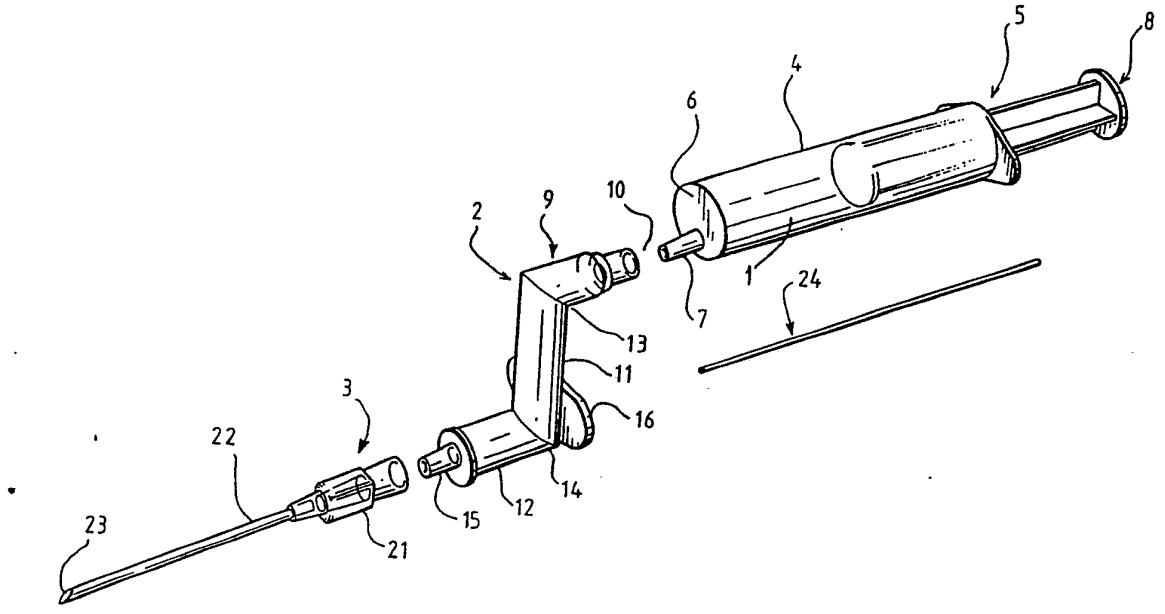
(54) Title: A FITTING FOR A HYPODERMIC SYRINGE AND A HYPODERMIC SYRINGE ARRANGEMENT



(57) Abstract

A fitting for use with a hypodermic syringe includes a first portion for mounting on an outlet of a hypodermic syringe and a second terminal portion having its longitudinal axis off-set from the axis of the first portion. The second terminal portion is provided with a distal end on which a hypodermic needle can be mounted.

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A fitting for a hypodermic syringe and a hypodermic syringe arrangement.

This invention relates to a fitting for a hypodermic syringe and relates to a hypodermic syringe arrangement incorporating the fitting.

Hypodermic syringes are utilised for many functions. In particular, such hypodermic syringes are utilised when inserting a catheter into a vein. Catheters may be inserted into veins for many reasons, for example during an operation to enable drugs to be delivered direct to the blood stream of the patient, and to enable blood samples to be taken for analysis, or for feeding patients intravenously.

The procedure that is presently adopted in a great proportion of the cases is to utilise a hypodermic syringe with a relatively large bore needle. This needle is then inserted into a jugular vein or the sub-clavican vein. When the needle on the hypodermic syringe has been inserted into the vein, and some blood has been drawn into the hypodermic syringe to confirm that the needle is correctly inserted in the vein, the hypodermic syringe is removed from the needle and a guide wire, in the form of a small diameter tightly wound helical wire with certain spring properties (sometimes known as a Seldinger wire) is inserted into the needle and passed through the needle into the vein. The needle is then removed from the vein, leaving the wire in position and finally a catheter is threadedly mounted on the wire and is slid down the wire into the vein, the wire then being removed.

Certain problems exist with this procedure. Firstly it is desirable for the needle to be inserted into the vein at a relatively acute angle. In order to achieve this the axis of the hypodermic syringe must be virtually parallel with the axis of the vein. It is sometimes found that it is not possible to obtain the correct angle of insertion of the needle into the vein because the body of the hypodermic syringe is in contact with another part of the skin of the patient, or the hands that are holding the hypodermic syringe are in contact with part of the body of the patient. Thus, on many occasions, the needle is introduced to

the vein at an angle that is not quite perfect. This is clearly undesirable, and in the case of an insertion into the sub-clavican vein can sometimes lead to an inadvertent puncturing of the lung.

When the needle has been inserted into the vein and the hypodermic syringe is removed from the needle to permit the insertion of the wire, blood can flow directly from the patient through the needle and escape. Thus this procedure can be very messy. Also this stage of the procedure can be considered to be "open" and give rise to subsequent infections.

The present invention seeks to provide a fitting for a hypodermic syringe which will reduce or obviate the problems described above.

According to one aspect of this invention there is provided a fitting for use with a hypodermic syringe, said fitting being of tubular form and comprising a first portion adapted to be sealingly mounted on the outlet of a hypodermic syringe, and a terminal portion having an axis significantly off-set from the axis of the first portion, the terminal portion being provided with an end on which a hypodermic needle can be sealingly mounted.

Preferably means are provided to enable a guide wire to be inserted into the terminal portion of the fitting and through a needle mounted thereon.

Conveniently said means to enable the guide wire to be inserted into the terminal portion of the fitting comprise an aperture formed in the fitting substantially aligned with the axis of the terminal portion of the fitting, the aperture being sealed by means which permit a needle to be inserted therethrough, but which prevent the egress of blood.

Advantageously said sealing means comprise means defining a thin self-sealing diaphragm.

Preferably said sealing means comprise a tubular resilient bung, one end of which is closed with a diaphragm.

Alternatively said sealing means comprise a tri-cuspid valve.

Preferably a finger plate is provided aligned with and extending transversely to the axis of the terminal portion of the fitting.

In one embodiment the first portion and the terminal portion are inter-connected by means of an intermediate portion connected to the first portion and the second portion at substantially right-angle bends.

Alternatively the first portion and the terminal portion are inter-connected by an intermediate portion of sinuous form.

According to another aspect of this invention there is provided a hypodermic syringe arrangement, said arrangement comprising a substantially cylindrical body provided with a plunger, the body having an outlet, the outlet being connected to a hypodermic needle, the axis of the hypodermic needle being significantly off-set from the axis of the body.

Preferably means are provided to enable a guide wire to be inserted into the needle while the needle is still connected to the hypodermic arrangement.

Conveniently said means comprise an aperture formed in the arrangement aligned with the axis of the needle, said aperture being sealed with means which permit a wire to be inserted through the aperture, but which prevent the egress of blood.

According to another aspect of this invention there is provided a method of inserting a hypodermic needle into a person, said method comprising the steps of utilising a hypodermic syringe comprising a body provided with a plunger and having an outlet, and a hypodermic needle

connected to the outlet, the axis of the needle being significantly off-set from the axis of the body of the hypodermic syringe, locating the arrangement so that the needle is in contact with the skin of a person, and the body of the syringe is spaced away from the skin of the person, and then pushing the needle into the person.

According to a further aspect of this invention there is provided a method of inserting a catheter into a person, said method comprising the steps of utilising a hypodermic syringe arrangement comprising a body provided with a plunger and having an outlet, and a hypodermic needle connected to said outlet, the axis of the needle being significantly off-set from the axis of the body, locating the arrangement so that the needle in contact with the skin of a person into whom the catheter is to be inserted, with the body of the syringe being at a position spaced away from the skin of the person, pushing the needle into a vein within the person, inserting a guide wire through the needle, whilst the needle is still connected to the hypodermic syringe, and passing the guide wire into the vein, and subsequently removing the hypodermic syringe from the person, leaving the guide wire in position, and finally sliding a catheter down the guide wire into the vein and removing the guide wire.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is an exploded view of a hypodermic syringe incorporating a fitting in accordance with the invention;

Figure 2 is a perspective view of the fitting shown in Figure 1;

Figure 3 is an enlarged view of a rubber bung mounted on the fitting, and

Figure 4 is a cross-sectional view of the bung of Figure 3.

Referring now to the drawings, a hypodermic syringe arrangement incorporates a hypodermic syringe 1, a fitting 2 and a needle 3. The syringe 1 is of conventional design and comprises a tubular body 4 having an open end 5 and a substantially closed end 6 having projecting therefrom an outlet in the form of an axially extending tubular spigot 7 which has an external tapering surface. This taper is known as a "Morse" taper. The spigot is off-set from the axis of the tubular body but the axis of the spigot still passes through the tubular body. Slidably inserted into the body through the open end 5 is a plunger 8. Such hypodermic syringes are, of course, conventional.

The fitting 2 is of generally tubular construction and comprises a first tubular portion 9 having one end which defines a socket 10 having an internally tapering surface to enable the socket 10 to be mounted upon the spigot 7 of the hypodermic syringe 1 with a sealed connection between the spigot 7 and the fitting 2. The first tubular portion 9 of the fitting 1 is connected, by an intermediate portion 11 to a final portion 12. The final portion 12 is a linear portion having an axis which is parallel to but off-set from the axis of the first portion 9. In the described embodiment the intermediate portion 11 is connected to the first portion 9 by means of a corner 13 and is connected to the terminal portion 12 by means of a corner 14. Both the corners are right-angled corners.

The free end of the terminal portion 12 is provided with a tapering external surface 15, of a size and shape corresponding to that of the spigot 7.

Mounted on the surface of the intermediate portion 11 of the pipe which is aligned with the axis of the terminal portion 12, but which is remote from the tapered end thereof is a finger plate 16. The finger plate 16 extends transversely to the axis of the terminal portion 12. The finger plate is provided to enable pressure to be applied to the

fitting moving the fitting in the direction of the axis of the terminal portion 12.

Provided in the centre of the finger plate is an aperture 17 which is aligned with the axis of the terminal portion 12. Contained within the aperture is a bung 18 which is formed from a short length of compressed rubber tube 19, One end of which is closed by a thin membrane 20. The compressed tube and membrane thus effectively form a seal, but a guide wire can be inserted through the bung into the terminal portion 12 of the fitting if desired.

The needle 3 is of conventional design. At one end the needle is provided with a connector box 21 which defines an internal surface which tapers, so that the needle can be mounted on the spigot 7 or on the tapering end 15 of the terminal portion 12 of the fitting 2 in a sealing manner. The connector box 21 is mounted on one end of a hollow metal shaft 22, the other end 23 of which is pointed.

In use of the apparatus as described, the hypodermic syringe is assembled with the fitting, mounting the first portion 9 of the fitting 2 on the spigot 7 of the hypodermic syringe 1, and mounting the needle 3 on the end 15 of the terminal portion 12 of the fitting. It will be appreciated that the axis of the needle is thus off-set from the body of the syringe, the amount of off-set being dictated by the length of the intermediate portion 11 of the fitting 2. The off-set is such that the axis of the needle does not pass through the body of the syringe - this axis of the needle is significantly off-set from the axis of the body of the syringe. A person utilising the hypodermic syringe arrangement may locate the needle substantially parallel with the skin of a patient, with the body of the hypodermic syringe being located a distance above the skin of the patient, without the hypodermic syringe or the hands holding he hypodermic syringe coming into contact with the patient. This can greatly facilitate the insertion of the needle into the vein at the described acute angle. The person using the arrangement may hold the fitting 2 in the region of the finger plate 16, thus facilitating

the application of pressure to the needle to insert the needle into the vein.

It will be appreciated that once the needle has been inserted into the vein one end of a guide wire 24 may be inserted through the rubber bung, and may be passed through the needle into the vein while the hypodermic syringe is still connected to the needle. If any resistance to the movement of the guide wire is felt, which sometimes happens, it is possible to check that the free end of the needle is still correctly positioned in the vein by pulling on the plunger of the hypodermic syringe. When the guide wire has been inserted into the vein, the needle, together with the fitting and the hypodermic syringe may be removed from the patient and slid down the wire and off the free end of the wire, in a step corresponding to the conventional step of sliding just the needle down the wire. However, it is envisaged that this step will be much less "messy" than the step conventionally carried out at this time and also will not be an "open" step thus minimising the risk of infection arising in the patient. The catheter may then be slid down the wire into the vein in the conventional manner.

Whilst the invention has been described with reference to an embodiment in which a rubber bung is mounted in an aperture formed in the fitting to provide access for the guide wire to the terminal portion of the fitting it is to be understood that various alternative expedients may be adopted. For example the fitting may be provided, at this point, with a hole which is provided with a thin, readily punctured membrane. The membrane may be formed of a rubber or rubber-like material having self-sealing properties. Alternatively again the aperture formed in the body may be associated with a one-way valve, such as a tri-cuspid valve, which will form the function of permitting the guide wire to be inserted into the terminal section 12 of the fitting 2, but which will preclude the egress of blood.

Whilst the invention has been described with reference to an embodiment in which the first portion and the second portion are

interconnected by an intermediate portion having right-angle bends therebetween, it is to be appreciated that it may be preferred to utilise an alternative embodiment in which the bends are replaced by smoothly curved portions so that the flow passage through the fitting is of a sinuous or "S"-type configuration.

The described fitting may be moulded of an appropriate plastics material.

CLAIMS

1. A fitting for use with a hypodermic syringe, said fitting being of tubular form and comprising a first portion adapted to be sealingly mounted on the outlet of a hypodermic syringe, and a terminal portion having an axis significantly off-set from the axis of the first portion, the terminal portion being provided with an end on which a hypodermic needle can be sealingly mounted.

2. A fitting according to Claim 1, wherein means are provided to enable a guide wire to be inserted into the terminal portion of the fitting and through a needle mounted thereon.

3. A fitting according to Claim 2, wherein said means to enable the guide wire to be inserted into the terminal portion of the fitting comprise an aperture formed in the fitting substantially aligned with the axis of the terminal portion of the fitting, the aperture being sealed by means which permit a needle to be inserted therethrough, but which prevent the egress of blood.

4. A fitting according to Claim 3 or 4, wherein said sealing means comprise means defining a thin self-sealing diaphragm.

5. A fitting according to Claim 3 or 4, wherein said sealing means comprise a tubular resilient bung, one end of which is closed with a diaphragm.

6. A fitting according to Claim 3, wherein said sealing means comprise a tri-cuspid valve.

7. A fitting according to any one of the preceding Claims, wherein a finger plate is provided aligned with and extending transversely to the axis of the terminal portion of the fitting.

8. A fitting according to any one of the preceding Claims, wherein the first portion and the terminal portion are inter-connected by means of an intermediate portion connected to the first portion and the second portion at substantially right-angle bends.

9. A fitting according to any one of Claims 1 to 8, wherein the first portion and the terminal portion are inter-connected by an intermediate portion of sinuous form.

10. A hypodermic syringe arrangement, said arrangement comprising a substantially cylindrical body provided with a plunger, the body having an outlet, the outlet being connected to a hypodermic needle, the axis of the hypodermic needle being significantly off-set from the axis of the body.

11. A hypodermic arrangement according to Claim 10, wherein means are provided to enable a guide wire to be inserted into the needle while the needle is still connected to the hypodermic arrangement.

12. A hypodermic arrangement according to Claim 11, wherein said means comprise an aperture formed in the arrangement aligned with the axis of the needle, said aperture being sealed with means which permit a wire to be inserted through the aperture, but which prevent the egress of blood.

13. A hypodermic arrangement according to Claim 12, wherein said sealing means comprise means defining a thin self-sealing diaphragm.

14. A hypodermic arrangement according to Claim 12 or 13, wherein said sealing means comprise a tubular resilient bung, one end of which is closed with a diaphragm.

15. A hypodermic arrangement according to Claim 12, wherein said sealing means comprise a tri-cuspid valve.

16. A method of inserting a hypodermic needle into a person, said method comprising the steps of utilising a hypodermic syringe comprising a body provided with a plunger and having an outlet, and a hypodermic needle connected to the outlet, the axis of the needle being significantly off-set from the axis of the body of the hypodermic syringe, locating the arrangement so that the needle is in contact with the skin of a person, and the body of the syringe is spaced away from the skin of the person, and then pushing the needle into the person.

17. A method of inserting a catheter into a person, said method comprising the steps of utilising a hypodermic syringe arrangement comprising a body provided with a plunger and having an outlet, and a hypodermic needle connected to said outlet, the axis of the needle being significantly off-set from the axis of the body, locating the arrangement so that the needle in contact with the skin of a person into whom the catheter is to be inserted, with the body of the syringe being at a position spaced away from the skin of the person, pushing the needle into a vein within the person, inserting a guide wire through the needle, whilst the needle is still connected to the hypodermic syringe, and passing the guide wire into the vein, and subsequently removing the hypodermic syringe from the person, leaving the guide wire in position, and finally sliding a catheter down the guide wire into the vein and removing the guide wire.

18. A fitting for a hypodermic syringe substantially as herein described with reference to and as shown in the accompanying drawings.

19. A hypodermic syringe arrangement substantially as herein described with reference to and as shown in the accompanying drawings.

20. A method of inserting a hypodermic needle into a person substantially as herein described.

21. A method of inserting a catheter into a person substantially as herein described.

22. Any novel feature or combination of features disclosed herein.

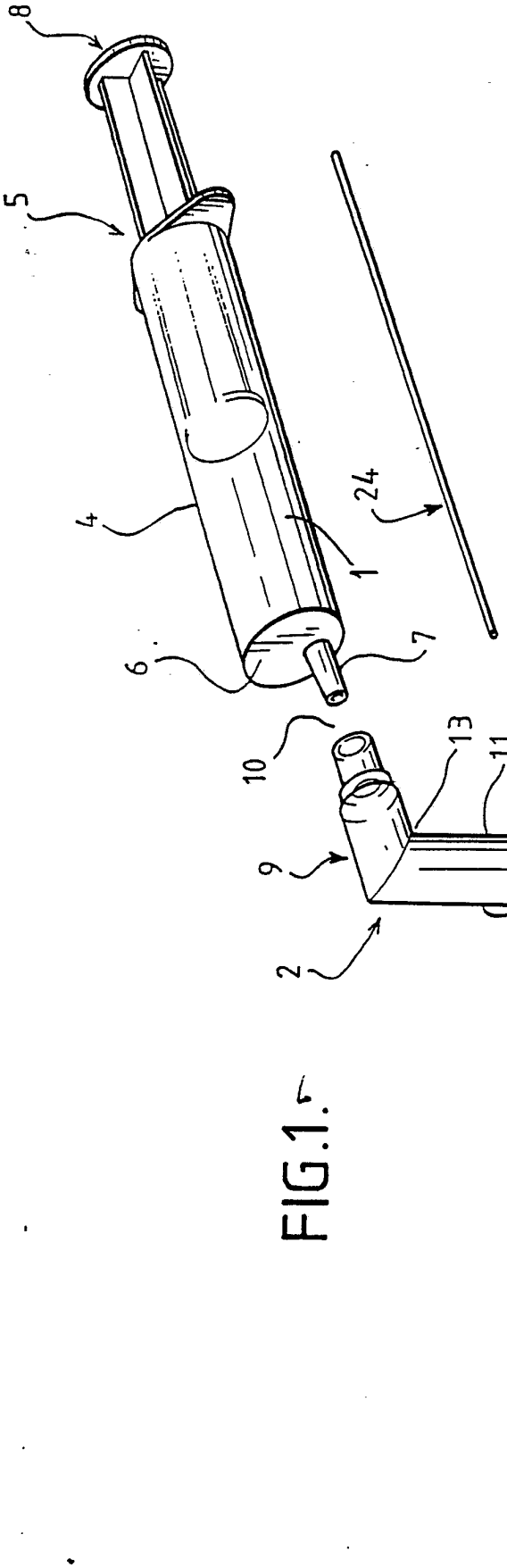

FIG.1.

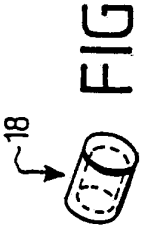

FIG.3.

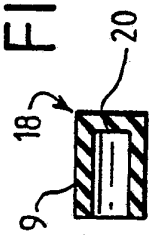

FIG.4.

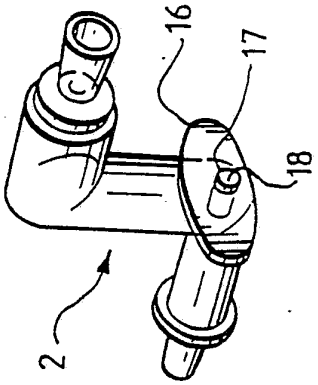

FIG.2

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 89/01416

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: A 61 M 5/32

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC5	A 61 M

Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 3822701 (CLOYD) 9 July 1974, see column 1, line 1 - line 13; figure 1	1,10
Y		2,3,8,9, 11,12
Y	US, A, 4652256 (VAILLANCOURT) 24 March 1987, see abstract	2,3,8,9, 11,12
A	US, A, 3920013 (BODZIN) 18 November 1975, see the whole document	2,3,6, 15

* Special categories of cited documents: [10]

"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

"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

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
13th March 1990	10. 04. 90

International Searching Authority	Signature of Authorized Officer
EUROPEAN PATENT OFFICE	L. ROSSI

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 4525157 (VAILLANCOURT) 25 June 1985, see abstract	2,11
A	US, A, 3262449 (K.A. PANNIER, JR., ET AL) 26 July 1966, see the whole document	1,10
A	DE, A1, 2238722 (C.R. BARD INC.) 15 February 1973, see the whole document	1,10

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. [X] 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. [X] Claim numbers 16, 17 because they relate to subject matter not required to be searched by this Authority, namely:

Methods for treatment of the human or the animal body by surgery or therapy, see rule 39.1 (IV)

2. [X] Claim numbers 18-22 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:

Claims refer to description or drawing, see rule 6.2 (a)

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 PATENT APPLICATION NO. PCT/GB 89/01416

SA 33076

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 28/02/90
The European 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	Publication date	Patent family member(s)		Publication date
US-A- 3822701	09/07/74	CA-A-	1015235	09/08/77
		DE-A-	2342897	14/03/74
		FR-A-	2197612	29/03/74
		JP-A-	49067487	29/06/74
US-A- 4652256	24/03/87	NONE		
US-A- 3920013	18/11/75	CA-A-	1039598	03/10/78
US-A- 4525157	25/06/85	NONE		
US-A- 3262449	26/07/66	NONE		
DE-A1- 2238722	15/02/73	CA-A-	1000580	30/11/76
		DE-B-C-	2265373	20/09/79
		FR-A-B-	2148481	23/03/73
		GB-A-	1336093	07/11/73
		US-A-	3739778	19/06/73