The invention provides a packaging container (10) for a needle assembly (18) which facilitates attachment of the needle assembly (18) to a syringe or a blood drawing vial holder in a relatively safe and sterile manner. The needle assembly (18) includes a hypodermic needle (46) and an attachment formation (42, 44), and has a first end portion which includes a sharpened end of the hypodermic needle (46) and an opposed second end portion which includes the attachment formation (42, 44). The packaging container (10) includes a housing for containing the needle assembly (18), and means for opening a portion of the housing adjacent the attachment formation (42, 44) of the needle assembly (18). The packaging container (10) also includes at least one formation (28) on the housing for limiting the size of the housing portion (36) which is opened so that in an open condition of the housing the attachment formation (42, 44) of the needle assembly (18) is exposed and the first end portion of the needle assembly (18) is concealed by the housing.
PACKAGING CONTAINER FOR
A NEEDLE ASSEMBLY

BACKGROUND OF THE INVENTION

THIS invention relates to packaging for medical equipment, and more specifically to a packaging container for a needle assembly.

Many needle assemblies for hypodermic needles include a hub for attachment to a nozzle on a syringe or on a blood drawing vial holder, and a hypodermic needle extending from the hub to a sharpened, leading end. These needle assemblies may include a protective device which covers the sharpened, leading end of the needle to prevent needle stick injuries.

Generally, the needle assemblies are supplied in sterile packaging which has to be removed prior to use. When handling the needle assembly during and after removal from the packaging, there is a risk that the sterility of the hypodermic needle may be compromised.

Furthermore, for certain protective devices, it is important that the needle assembly has a specific orientation if maximum effect is to be achieved.

It is an object of the present invention to provide a packaging container for a needle assembly which facilitates attachment of the needle assembly to a syringe or a blood drawing vial holder in a relatively safe and sterile manner.
It is a further object of the invention to provide a packaging container for holding a needle assembly in a condition which ensures a desired orientation of the needle assembly prior to and during removal from the packaging container.

SUMMARY OF THE INVENTION

According to the invention there is provided a packaging container for a needle assembly which includes a hypodermic needle and an attachment formation, the needle assembly having a first end portion which includes a sharpened end of the hypodermic needle and an opposed second end portion which includes the attachment formation, the packaging container including:

- a housing for containing the needle assembly;
- means for opening a portion of the housing adjacent the attachment formation of the needle assembly; and
- at least one formation on the housing for limiting the size of the housing portion which is opened so that in an open condition of the housing the attachment formation of the needle assembly is exposed and the first end portion of the needle assembly is concealed by the housing.

In one embodiment of the invention, the housing includes a holder for holding the needle assembly and a cover sheet for covering at least a portion of the holder.
The holder may define a recess for receiving the needle assembly, and the cover sheet may extend over the recess to contain the needle assembly within the housing.

In one arrangement, the means for opening the portion of the housing adjacent the attachment formation of the needle assembly comprises a pull tab on the cover sheet. In this arrangement, the pull tab may be located adjacent the second end portion of the needle assembly so that the cover sheet may be peeled away from the holder adjacent the attachment formation of the needle assembly.

The at least one formation on the housing for limiting the size of the housing portion which is opened may comprise a fold line on the holder which allows a rear section of the holder to fold open relative to a front section of the holder.

Alternatively, the housing may include a hinge between the front and rear sections of the holder which allows these sections to pivot open relative to one another. In this arrangement, the hinge may comprise a line of reduced material thickness.

The holder may also include a gripping formation adjacent the fold line or the hinge for gripping the packaging container during opening of the housing.

The gripping formation may comprise an indentation or a projection in the housing.

Preferably the holder is formed from a relatively rigid material and is transparent.
In one arrangement, the holder is formed from a transparent plastics material such as, for example, a polyvinyl chloride, and the cover sheet is formed from a fibrous material such as, for example, a paper product.

The needle assembly may include a protective end cap adjacent the sharpened end of the hypodermic needle.

In one embodiment of the invention, the end cap includes an inclined surface at a leading end thereof, the holder includes a corresponding inclined surface on the front section thereof, and the two inclined surfaces are engagable with one another to ensure a desired orientation of the needle assembly prior to and during removal from the packaging container.

Typically, the attachment formation on the needle assembly includes a needle hub which is engagable with a nozzle on a syringe, or with a nozzle on a blood drawing vial holder.

The needle assembly may be a needle assembly of the type disclosed in US patent 5,746,718.

The invention extends to a needle assembly contained within a packaging container of the type described above.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:
Figure 1 shows a perspective view of a packaging container for a needle assembly according to one embodiment of the present invention;

Figure 2 illustrates a cross-sectional view of the packaging container of Figure 1 with a needle assembly contained therein;

Figure 3 illustrates a cross-sectional view similar to that of Figure 2 with one end of the packaging container partially open; and

Figure 4 illustrates a cross-sectional view similar to that of Figure 3 with the end of the packaging container fully open.

DETAILED DESCRIPTION OF THE INVENTION

The present invention has application in the medical field, and more specifically in packaging for medical equipment. The invention is embodied in a packaging container for a needle assembly which includes a hypodermic needle, an attachment formation, a first end portion which includes a sharpened end of the hypodermic needle, and an opposed second end portion which includes the attachment formation.

Figures 1 and 2 of the accompanying drawings illustrate a packaging container according to one embodiment of the present invention. The packaging container is designated generally with the reference numeral 10 and includes a holder 12 and a cover sheet 14. The holder 12 may be formed from a relatively rigid, transparent plastics material such as, for example, a polyvinyl chloride, and the cover sheet 14 may be formed from a
fibrous material such as, for example, a paper product.

As can be seen most clearly in Figure 2, the holder 12 defines a recess 16 for receiving a needle assembly 18 which will be described in more detail below. A peripheral flange or lip 20 extends around the recess 16, as illustrated in Figure 1. The peripheral lip 20 forms an engaging surface for engaging the cover sheet 14, in use.

As representatively illustrated in Figures 1 and 2 of the drawings, the holder 12 may include a gripping formation in the form of an indentation 22. In the illustrated embodiment, the indentation 22 includes a first inclined surface 24 and a second inclined surface 26 which are joined along a fold line 28 (see Figure 2). Instead of the fold line 28, the packaging container 10 could include a hinge (not shown) in the form of a line of reduced material thickness. In this case, the hinge may extend beyond the lateral extent of the indentation 22, and could, for example, extend across the entire width of the holder 12.

An inclined surface 30 is provided at an operatively front end 32 of the holder 12, and a step formation 34 is provided adjacent an operatively rear end 36 of the holder 12.

The cover sheet 14 may be adhered to the peripheral lip 20 of the holder 12 with any suitable adhesive. As shown in Figure 2, the cover sheet 14 may extend beyond the step formation 34 to provide a pull tab 38, and may carry a marking in the form of a line 40 to indicate a recommended peel back limit for correct and safe opening of the packaging container, in use.

The needle assembly 18 may be a needle assembly of the type disclosed in
US patent 5,746,718. This type of needle assembly is known in the art and need not be described in detail for a full understanding of the invention. However, generally, the needle assembly 18 includes an attachment formation in the form of a hub 42 with an end rim 44, an elongate steel hypodermic needle 46 extending from the hub, and a needle protective device 48 which includes a tubular member 50 and an end cap 52. A first end portion of the needle assembly includes a sharpened end of the hypodermic needle, and a second end portion of the needle assembly includes the attachment formation.

The tubular member 50 is formed from a medical grade silicone rubber and comprises a cylinder with axially extending slots therein. The end cap 52 is formed from a medical grade polystyrene and defines an inner chamber 54 for receiving the sharpened end of the hypodermic needle 46, an inclined surface 56 extending across a forward or leading end of the end cap, and an off-centre passage 58 for allowing the sharpened end of the needle 46 to exit the end cap, in use.

Exposing the sharpened end of the needle 46 involves manipulating the end cap 52 so as to align the passage 58 with the needle 46, and then pressing the end cap backwards relative to the needle so as to deform the tubular member 50.

In the illustrated embodiment, the inclined surface 30 of the holder 12 is arranged to engage the inclined surface 56 of the end cap 52 so as to ensure a desired orientation of the needle assembly 18 prior to and during removal from the packaging container.

In practice, a user opens the packaging container by placing the thumb of
one hand in the indentation 22 and the index finger of that hand on the cover sheet 14 opposite the indentation 22 so as to grip the packaging container and the needle assembly 18. Thereafter, the user pulls on the pull tab 38 with the other hand so as to peel the cover sheet 14 away from the holder 12 in the direction of the arrow "A" into the position illustrated in Figure 3. At this point, the user then folds the rear portion 36 of the holder 12 in the direction of the arrow "B", bending the rear portion relative to the front portion of the holder 12 about the fold line 28 into the position illustrated in Figure 4. In this condition of the packaging container 10, the attachment formation of the needle assembly 18 is fully exposed while the first end portion of the needle assembly is concealed by a portion of the holder 12 and a portion of the cover sheet 14.

With the packaging container 10 covering the first end portion of the needle assembly 18, attachment of the needle assembly to a syringe (not shown) or to a blood drawing vial holder (also not shown) can be effected in a relatively safe and sterile manner. Once the needle assembly 18 is attached to the syringe or to the blood drawing vial holder, the packaging container 10 may be retained over the front portion of the needle assembly during further handling prior to use. Also, if a fluid to be injected into a patient is drawn into the syringe at a distance from the patient, the needle assembly 18 may be re-inserted into the packaging container 10 before the syringe and needle assembly are carried to the patient. Apart from reducing the possibility of an injury, the packaging container 10 protects the needle from damage and retains the needle relatively sterile prior to use.

Furthermore, the engagement of the inclined surface 30 of the holder 12 with the inclined surface 56 of the end cap 48 ensures a desired orientation of the needle assembly 18 prior to and during removal from the packaging
container 10. In this way, the needle assembly 18 presents with the sharpened end of the hypodermic needle properly sheathed within the end cap 48 and the safety features of the protective device can be fully exploited to reduce the likelihood of an injury should the device be bumped or dropped.
CLAIMS

1. A packaging container for a needle assembly which includes a hypodermic needle and an attachment formation, the needle assembly having a first end portion which includes a sharpened end of the hypodermic needle and an opposed second end portion which includes the attachment formation, the packaging container including:

   a housing for containing the needle assembly;

   means for opening a portion of the housing adjacent the attachment formation of the needle assembly; and

   at least one formation on the housing for limiting the size of the housing portion which is opened so that in an open condition of the housing the attachment formation of the needle assembly is exposed and the first end portion of the needle assembly is concealed by the housing.

2. A packaging container for a needle assembly according to claim 1, wherein the housing includes a holder for holding the needle assembly and a cover sheet for covering at least a portion of the holder.

3. A packaging container for a needle assembly according to claim 2, wherein the holder defines a recess for receiving the needle assembly, and the cover sheet extends over the recess to contain the needle assembly within the housing.
4. A packaging container for a needle assembly according to any one of the preceding claims, wherein the means for opening the portion of the housing adjacent the attachment formation of the needle assembly comprises a pull tab on the cover sheet.

5. A packaging container for a needle assembly according to claim 4, wherein the pull tab is located adjacent the second end portion of the needle assembly so that the cover sheet may be peeled away from the holder adjacent the attachment formation of the needle assembly.

6. A packaging container for a needle assembly according to any one of the preceding claims, wherein the at least one formation on the housing for limiting the size of the housing portion which is opened comprises a fold line on the holder which allows a rear section of the holder to fold relative to a front section of the holder.

7. A packaging container for a needle assembly according to any one of claims 1 to 5, wherein the housing includes a hinge between a front section of the holder and a rear sections of the holder which allows these two sections to pivot relative to one another.

8. A packaging container for a needle assembly according to claim 7, wherein the hinge comprises a line of reduced material thickness.

9. A packaging container for a needle assembly according to any one of claims 6 to 8, wherein the holder also includes a gripping formation adjacent the fold line or the hinge for gripping the packaging container during opening of the housing.
10. A packaging container for a needle assembly according to claim 9, wherein the gripping formation comprises an indentation or a projection in the housing.

11. A packaging container for a needle assembly according to any one of claims 2 to 10, wherein the holder is formed from a relatively rigid material and is transparent.

12. A packaging container for a needle assembly according to any one of claims 2 to 11, wherein the cover sheet is formed from a fibrous material.

13. A packaging container for a needle assembly according to any one of the preceding claims, wherein the needle assembly includes a protective end cap adjacent the sharpened end of the hypodermic needle.

14. A packaging container for a needle assembly according to claim 13, wherein the end cap includes an inclined surface at a leading end thereof, the holder includes a corresponding inclined surface on the front section thereof, and the two inclined surfaces are engagable with one another to ensure a desired orientation of the needle assembly prior to and during removal from the packaging container.

15. A packaging container for a needle assembly according to any one of the preceding claims, wherein the attachment formation on the needle assembly includes a needle hub which is engagable with a nozzle on a syringe or with a nozzle on a blood drawing vial holder.
16. A needle assembly contained within a packaging container according to any one of the preceding claims.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IN% A61M5/00 A61M5/32 B65D83/02 B65D85/24

According to International Patent Classification (IPC) or both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D A61M

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 4 106 621 A (SORENSON JAMES L) 15 August 1978 (1978-08-15) column 4, line 6 - line 14 column 4, line 35 - line 48 column 5, line 22 - line 26 column 7, line 22 - line 43 figures 6-8</td>
<td>1-7, 9-12,16</td>
</tr>
<tr>
<td>A</td>
<td>column 3, line 51 - line 54; figure 3</td>
<td>15</td>
</tr>
<tr>
<td>X</td>
<td>US 2003/127349 A1 (FALLER ARMIN [DE] ET AL) 10 July 2003 (2003-07-10) paragraph [0025]; figures 1-3</td>
<td>1,6-8,16</td>
</tr>
<tr>
<td>X</td>
<td>US 5 853 087 A (SOS SIEGMUND [DE] ET AL) 29 December 1998 (1998-12-29) column 5, line 16 - line 20 figures 3,6</td>
<td>1,6,7</td>
</tr>
</tbody>
</table>

* 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 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
T1' 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
V' 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.
A' document member of the same patent family

Date of the actual completion of the International search 15 June 2007

Date of mailing of the international search report 25/06/2007

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 Sedy, Radim
<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 3 075 639 A (CRAWFORD LINGLEY ROBERT) 29 January 1963 (1963-01-29) column 2, line 23 - line 29 figures 1-4</td>
<td>1,16</td>
</tr>
<tr>
<td>A</td>
<td>US 3 353 664 A (ARMENTROUT JAMES L ET AL) 21 November 1967 (1967-11-21) column 1, line 70 - column 2, line 5 figure 1</td>
<td>1,13</td>
</tr>
<tr>
<td>Patent document cited in search report</td>
<td>Publication date</td>
<td>Patent family member(s)</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>US 4106621 A</td>
<td>15-08-1978</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 02059016 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 10103130 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1232963 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1353862 A1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2257376 T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2244757 T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 3657560 B2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2002234585 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2004517012 T</td>
</tr>
<tr>
<td>US 5853087 A</td>
<td>29-12-1998</td>
<td>DE 19646845 C1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ES 2153154 T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 10147387 A</td>
</tr>
<tr>
<td>US 5407070 A</td>
<td>18-04-1995</td>
<td>NONE</td>
</tr>
<tr>
<td>US 3075639 A</td>
<td>29-01-1963</td>
<td>GB 912055 A</td>
</tr>
<tr>
<td>US 3353664 A</td>
<td>21-11-1967</td>
<td>NONE</td>
</tr>
</tbody>
</table>