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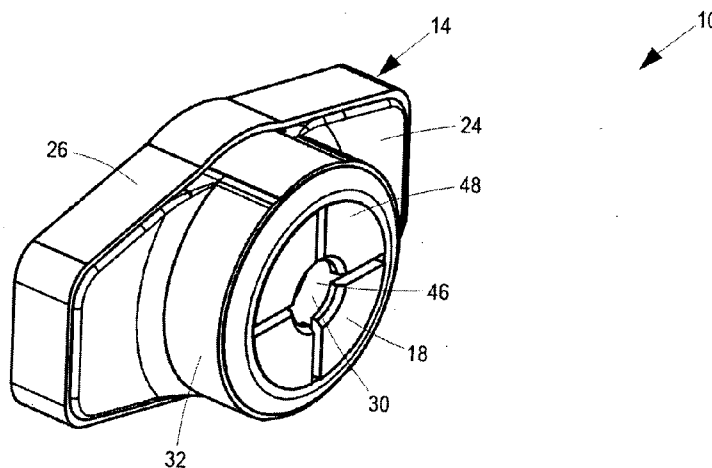


Figure 1

(57) Abstract: An accessory (10) for a syringe (12) includes: a body (14) sized and shaped in use to locate over finger flanges (22) on a syringe; and means, in use, to secure the body to the finger flanges (22). The body defines a bore extending there through. A plunger rod (16) including a first array of notches and/or protuberances (44) along at least a portion of its length is received within the bore defined by the body. Located within the bore defined by the body is an insert (18) that defines a bore through which the plunger rod, in use, extends. The insert (18) also includes a first finger (48) extending into the bore defined by the insert for, in use, engaging the first array of notches and/or protuberances (44) on the plunger rod (16).



ACCESSORY FOR A SYRINGE

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BACKGROUND

The present invention relates to an accessory for a syringe. More specifically, the present invention relates to an accessory that, when attached to a syringe, generates audible clicks as the plunger rod moves along the barrel of the syringe. The invention also relates to a syringe including such accessory.

Syringes with mechanisms for regulating or monitoring movement of a plunger along a barrel are known. For instance:

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US3,934,586 to Easton describes a syringe with tabs on the plunger rod that engage with wedges extending radially inwards from the barrel;

DE807,113 describes a syringe with tabs extending from the plunger rod and a regulator attachable to the outer perimeter of the barrel to regulate relative movement of the plunger rod and barrel; and

US4,642,102 to Ohmori describes a stopper secured to and incrementally movable along the plunger rod, which stopper limits relative movement of the plunger rod and barrel when the stopper comes into contact with the barrel.

It is an object of the first aspect of the present invention to provide an accessory for a syringe that includes a body that secures to the finger flanges of a syringe and into which an insert can be located, in use, to generate audible sounds as the plunger rod moves relative to the syringe barrel. Alternatively, where the syringe is sized to permit it, such insert can be located directly within the body of the syringe.

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SUMMARY OF THE INVENTION

According to a preferred embodiment of a first aspect of the present invention, an accessory for a syringe includes:

a body sized and shaped in use to locate over finger flanges on a syringe;

means, in use, to secure the body to the finger flanges;

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the body defining a bore extending therethrough;

a plunger rod including a first array of notches and/or protuberances along at least a portion of its length; and

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an insert sized to fit within the bore defined by the body, the insert defining a bore through which the plunger rod, in use, extends and including a first finger extending into the bore defined by the insert for, in use, engaging the first array of notches and/or protuberances on the plunger rod.

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Typically, at least a portion of the bore defined by the body is right circular cylindrical.

Generally, the body includes a substantially planar portion that, in use, locates over a planar surface of the finger tabs on a syringe.

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Preferably, a lip extends substantially orthogonally from at least a portion of the peripheral end of the substantially planar portion.

25

Typically, the securing means comprises at least one tab that extends inwards from or near the free end of the lip.

Generally, the bore defined by the body extends substantially orthogonally to the planar portion along the centre of the planar portion.

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Preferably, the body includes an insert housing that extends substantially orthogonally from the centre of the planar portion in a direction opposite to the direction in which the lip extends, and the bore defined by the body extends through the insert housing.

Typically, the insert housing is right circular cylindrical.

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Generally, the bore defined by the body includes a constriction spaced from the free end of the insert housing.

5 Preferably, the insert is right circular cylindrical with an outer diameter corresponding to the inner diameter of the right cylindrical portion of the bore defined by the body.

Typically, the axial height of the insert substantially corresponds with the length of the right circular cylindrical portion of the bore defined by the body.

10 Generally, the constriction is spaced from the free end of the insert housing a distance corresponding substantially to the axial height of the insert.

Optionally:

- (i) lip does not extend along one side of the body;
- 15 (ii) the substantially planar portion of the body defines a slot extending from the side of the body without the lip towards and terminating at the bore defined by the body; and
- (iii) the radial wall of the insert housing defines a slot that extends from the side of the body without the lip, along the entire length of the insert housing,
- 20 such that the accessory may slidably be located over the finger flanges of a syringe (with plunger rod), with the plunger rod being received within the bore defined by the body via the slot defined by the radial wall of the insert housing.

25 Further optionally, the insert defines a slot along its radial wall, which slot extends between the axial ends of the insert.

Preferably, the plunger rod includes a second array of notches and/or protuberances extending from a side of the plunger rod opposite the side on which the first array of notches and/or protuberances are located.

30

Typically, the insert includes a second finger arranged opposite the first finger, which second finger extends into the bore defined by the insert and, in use, engages the second array of notches and/or protuberances.

Generally, the insert includes third and fourth fingers, wherein the first, second, third and fourth fingers are symmetrically arranged around the bore defined by the insert.

5 Preferably, the plunger rod, in section orthogonal to its longitudinal axis, has a shape wherein four equally spaced arms of the same length radiate radially from its longitudinal axis.

10 Typically, the first array of notches and/or protuberances is located at the free end of one of the arms and the second array of notches and/or protuberances is located at the free end of an opposite arm.

Generally, the insert, in use, extends between the plunger rod arms, in use, to limit relative rotation of the insert and plunger rod.

15 Typically, the free end of each of the four arms on the plunger rod includes an array of notches and/or protuberances for, in use, engaging with one of the four fingers on the insert.

20 Generally, the plunger rod includes a plunger at one axial end and an enlarged head at the other axial end.

Preferably, the radial wall of the insert is a shell with the fingers extending radially inwards from one of its axial ends.

25 Typically, the bore defined by the insert is in cross section circular with four orthogonal linear portions that radiate from the centre of the bore defined by the insert.

30 Generally, (i) the bore defined by the body includes at least one notch and/or protuberance on its inner radial surface and/or (ii) the insert includes at least one notch and/or protuberance on its outer radial surface to secure the insert within the bore defined by the body. Alternatively, the insert is adhered to the body within the bore defined by the body. Even further alternatively, the insert is secured to the body within the bore defined by the body by an interference fit between the insert and body.

According to a second aspect of the invention, a syringe includes an accessory according to the first aspect of the invention with the body located over finger flanges of the syringe and the plunger rod extending along the syringe barrel.

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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:

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Figure 1 is an upper perspective view of an accessory for a syringe according to a first embodiment of a first aspect of the invention, without the plunger rod;

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Figure 2 is a lower perspective view of the accessory in Figure 1, without the plunger rod;

Figure 3 is a perspective exploded view of the accessory in Figure 1;

20

Figure 4 is a perspective view of an accessory for a syringe according to a second embodiment of the first aspect of the invention;

Figure 5 is a perspective view of the insert according to an alternative embodiment.

25

Figure 6 is a perspective view of a syringe with the accessory in Figure 1, according to a second aspect of the invention; and

Figure 7 is a perspective view of the insert in Figure 1 inserted directly into a chamber of a syringe.

30

DESCRIPTIONS OF THE INVENTION

With reference to Figures 1 to 4, an accessory 10 for a syringe 12, according to a first embodiment of a first aspect of the invention includes a body 14, a plunger rod 16 and an insert 18.

35

The syringe 12 is a standard syringe comprising a barrel 20 and a pair of finger flanges 22 extending diametrically from the barrel 20.

The body 14 is sized and shaped to locate over the finger flanges 22 of the syringe 12.

5 The body 14 includes a substantially planar portion 24 that, in use, overlies the operative upper planar portions of the finger flanges 22. A lip 26 extends orthogonally from the peripheral end of the planar portion 24, in use, covering the sides of the finger flanges 22. Tabs 28 extend inwards from or near the free end of the lip 26. The tabs 28 function as securing means 28 for, in use, securing the body 14 to the finger flanges 22.

10

A bore 30 extends through the body 14, passing orthogonally through the centre of the planar portion 24.

15 The body 14 further includes an insert housing 32 that extends from the centre of the planar portion 24 in a direction opposite to the direction of the lip 26. The insert housing 32 is right circular cylindrical and the bore 30 extends therethrough. At least a portion of the bore 30 defined by the insert housing 32, extending from the free end of the insert housing 32 is right circular cylindrical, terminating in a constriction (not shown).

20 The plunger rod 16, in section orthogonal to its longitudinal axis, has a shape wherein four equally spaced arms 38 of the same length radiate from the longitudinal axis (i.e. in the shape of an "X"). A plunger 40 is secured to the plunger rod 16 at one end and the other end of the plunger rod 16 terminates in an enlarged head 42 in the shape of a disc.

25 The free ends of two opposing arms 38 of the plunger rod 16 include arrays of notches and/or protuberances 44 extending along a portion of the length of the plunger rod 16. It will be appreciated that although the plunger rod 16 has been shown with arrays of notches and/or protuberances 44 along two arms 38, it will be appreciated that an array of notches and/or protuberances 44 could alternatively be located on one arm 38 only or
30 on three or four of the arms 38.

Alternatively (but not shown), the notches and/or protuberances 44 could be located at the points of intersection of the arms 38 of the plunger rod 16.

35 Insert 18 is a right angled cylinder with an outer diameter and height corresponding to the inner diameter and length, respectively, of the cylindrical portion of the bore 30 extending through the body 14 / insert housing 32, such that the insert 18 can be inserted within the

insert housing 32, with further insertion limited by contact with the constriction. The insert 18 defines a central bore 46 sized and shaped for receiving the plunger rod 16 therethrough. Fingers 48 extend into the bore 46 defined by the insert 18 for, in use engaging with the notches and/or protuberances 44 on the plunger rod 16. The fingers 48 are symmetrically located at an axial end of the insert 18, i.e. each finger 48 is offset about the longitudinal axis of the insert 18 by 90 degrees.

In cross-section, the bore 30 defined by the insert 18 preferably comprises a circle portion with four orthogonal linear portions radiating from its centre.

10

The radial wall of the insert 18 is a shell.

The insert 18 is shaped to extend at least partially between the plunger rod 16 arms 38 so as to limit relative rotation of the plunger rod 16 and insert 18.

15

Furthermore, the insert 18 includes a notch 50 that co-operates with a corresponding protuberance 52 that extends radially inwards from the insert housing 32 to secure the insert 18 within the insert housing 32. Alternatively, it will be appreciated that: (i) the insert 18 could include a protuberance while the insert housing 32 defines a corresponding notch; (ii) the insert 18 could be adhered to the insert housing 32; or (iii) an interference fit between the insert 18 and insert housing 32 could secure the insert 18 within the insert housing 32.

In use, with the insert 18 located within the insert housing 32 and the plunger rod 16 inserted through the bore 46 defined by the insert 18, when the plunger rod 16 is moved axially relative to the insert 18, fingers 48 on the insert 18 run along the notches and/or protuberances 44 on the plunger rod 16 to generate audible clicks.

Preferably, the fingers 48 are sufficiently thin and flexible to generate audible clicks without materially resisting movement of the plunger rod 16 relative to the insert 18. The audible clicks assist the doctor to administer the correct dosage to the patient, and satisfy the patient that the dosage requested / prescribed has been administered.

To assemble the syringe 12, the plunger 40 is located within the syringe barrel 20, the accessory 10 is then secured to the finger flanges 22 of the syringe 12. The insert 18 can be inserted within the insert housing 32 axially from either end of the insert housing 32, with such relative axial movement between the insert 18 and the insert housing 32 limited

by the constriction defined by the insert housing 32. The plunger rod 16 is then received within the bore 46 defined by the insert 18 and secured to the plunger 40.

It will be appreciated that the accessory 10 can be sold as a kit, separate to syringes 12.

5 A user can purchase the kit and depending on the syringe 12 to be used, either attach the insert 18 to the syringe 12 via the body 14 (as shown in Figures 1 and 2) or insert the insert 18 directly into the syringe 12 chamber (as shown in Figure 7). The kit could also include: sterile drapes; alcohol swabs or other sterilizing means; needles; leurlock syringes; cotton buds; 2-way connectors; sterile syringe caps; cannulae; and/or gauze
10 swabs.

A second embodiment of the accessory 210 according to the first aspect of the invention is shown in Figure 4. The accessory 210 is similar to the accessory 10 according to the first embodiment of the first aspect of the invention. However:

- 15 (i) the lip 226 does not extend along one side of the body 214;
- (ii) the radial wall of the insert housing 232 defines a slot that extends from the side of the body 214 without the lip 226, along the entire length of the insert housing 232, such that the accessory 210 may slidably be located over the finger flanges of a syringe (with plunger rod), with the plunger rod being received within the bore 246 defined by the
20 body 214 via the slot defined by the radial wall of the insert housing 232.

It will be appreciated that, should the insert housing 232 be spaced from the side of the body 214 without the lip 226 by the substantially planar portion 224 of the body 214, such substantially planar portion 224 of the body may also define a slot that connects the side
25 of the body 214 without the lip 226 and the slot defined by the radial wall of the insert housing 232.

Turning to Figure 5, optionally, the insert 218 could define a linear cut/slot along its radial wall, which cut/slot extends between the axial ends of the insert 218 (i.e. in the form of a
30 C-clip). In such an arrangement, the plunger rod 16 could be received within the insert bore 234 via the cut/slot defined by the radial wall of the insert 218. The radial outer surface of the radial wall of the insert 218 could also define an annular groove for receiving an elastomeric band 254 to prevent the insert 218 from splaying when the notches and/or protuberances on the plunger rod 16 engage the fingers on the insert 218.
35 The elastomeric band 254 could be sized to fit the internal diameter of the insert housing 232.

To assemble the syringe 12 using the accessory 210 according to the second embodiment of the invention, the plunger rod 16 with plunger 40 secured thereto is located within the syringe barrel 20, the accessory 210 is then slidably located over the finger flanges 22 of the syringe 12 from the side – the plunger rod 16 traveling through
5 the cut/slot defined by the radial wall of the insert housing 232. The plunger rod 16 is located within the insert 218 via the cut/slot defined by the radial wall of the insert 218. After having received the plunger rod 16 within its bore, the insert 218 is located within the insert housing 132. Alternatively, the plunger rod 16 can be received within the bore defined by the body 14 while the insert 218 is located within the insert housing 232.

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Turning to Figure 6, according to a second aspect of the invention, a syringe 110 includes the accessory 10 previously described with the body 24 located over the finger flanges 22 and the plunger 40 extending along the syringe barrel 20.

CLAIMS

1. An accessory for a syringe including:
 - a body sized and shaped in use to locate over finger flanges on a syringe;
 - means, in use, to secure the body to the finger flanges;
 - the body defining a bore extending therethrough;
 - a plunger rod including a first array of notches and/or protuberances along at least a portion of its length; and
 - an insert sized to fit within the bore defined by the body, the insert defining a bore through which the plunger rod, in use, extends and including a first finger extending into the bore defined by the insert for, in use, engaging the first array of notches and/or protuberances on the plunger rod.
2. An accessory according to claim 1, wherein at least a portion of the bore defined by the body is right circular cylindrical.
3. An accessory according to claim 2, wherein the body includes a substantially planar portion that, in use, locates over a planar surface of the finger tabs on a syringe.
4. An accessory according to claim 3, wherein a lip extends substantially orthogonally from at least a portion of the peripheral end of the substantially planar portion.
5. An accessory according to claim 4, wherein the securing means comprises at least one tab that extends inwards from the free end of the lip.
6. An accessory according to claim 5, wherein the bore defined by the body extends substantially orthogonally to the planar portion along the centre of the planar portion.
7. An accessory according to claim 6, wherein the body includes an insert housing that extends substantially orthogonally from the centre of the planar portion in a direction

opposite to the direction in which the lip extends, and the bore defined by the body extends through the insert housing.

8. An accessory according to claim 7, wherein the insert housing is right circular cylindrical.
9. An accessory according to claim 8, wherein the bore defined by the body includes a constriction.
10. An accessory according to claim 9, wherein the insert is right circular cylindrical with an outer diameter corresponding to the inner diameter of the right cylindrical portion of the bore defined by the body.
11. An accessory according to claim 10, wherein the axial height of the insert substantially corresponds with the length of the right circular cylindrical portion of the bore defined by the body.
12. An accessory according to claim 11, wherein the constriction is spaced from either axial end of the insert housing a distance corresponding substantially to the axial height of the insert.
13. An accessory according to claim 12, wherein:
 - (i) the lip does not extend along one side of the body;
 - (ii) the substantially planar portion of the body defines a slot extending from the side of the body without the lip towards and terminating at the bore defined by the body; and
 - (iii) the radial wall of the insert housing defines a slot that extends from the side of the body without the lip, along the entire length of the insert housing, such that the accessory may slidably be located over the finger flanges of a syringe (with plunger rod), with the plunger rod being received within the bore defined by the body via the slot defined by the radial wall of the insert housing.
14. An accessory according to claim 13, wherein the plunger rod includes a second array of notches and/or protuberances extending from a side of the plunger rod

opposite the side on which the first array of notches and/or protuberances are located.

15. An accessory according to claim 14, wherein the insert includes a second finger arranged opposite the first finger, which second finger extends into the bore defined by the insert and, in use, engages the second array of notches and/or protuberances.
16. An accessory according to claim 15, wherein the insert includes third and fourth fingers, wherein the first, second, third and fourth fingers are symmetrically arranged around the bore defined by the insert.
17. An accessory according to claim 16, wherein the plunger rod, in section orthogonal to its longitudinal axis, has a shape wherein four equally spaced arms of the same length radiate radially from its longitudinal axis.
18. An accessory according to claim 17, wherein the first array of notches and/or protuberances is located at the free end of one of the arms and the second array of notches and/or protuberances is located at the free end of an opposite arm.
19. An accessory according to claim 18, wherein the insert, in use, extends between the plunger rod arms, in use, to limit relative rotation of the insert and plunger rod.
20. An accessory according to claim 19, wherein the free end of each of the four arms on the plunger rod includes an array of notches and/or protuberances for, in use, engaging with one of the four fingers on the insert.
21. An accessory according to claim 20, wherein the plunger rod includes a plunger at one axial end and an enlarged head at the other axial end.
22. An accessory according to claim 21, wherein the radial wall of the insert is a shell with the fingers extending radially inwards from one of its axial ends.
23. An accessory according to claim 22, wherein the bore defined by the insert is in cross section circular with four orthogonal linear portions that radiate from the centre of the bore defined by the insert.

24. An accessory according to claim 23, wherein the insert defines a slot along its radial wall, which slot extends between the axial ends of the insert.
25. An accessory according to claim 24, wherein an elastomeric band is located around the radial wall of the insert.
26. An accessory according to claim 23, wherein: (i) the bore defined by the body includes at least one notch and/or protuberance on its inner radial surface and/or (ii) the insert includes at least one notch and/or protuberance on its outer radial surface to secure the insert within the bore defined by the body.
27. An accessory according to claim 23, wherein the insert is adhered to the body within the bore defined by the body.
28. An accessory according to claim 23, wherein the insert is secured to the body within the bore defined by the body by an interference fit between the insert and body.
29. An accessory according to claim 17, wherein the notches and/or protuberances are located at the points of intersection of the arms of the plunger rod.
30. A syringe including the accessory claimed in any one of claims 1 to 29, with the body located over finger flanges of the syringe and the plunger rod extending along the syringe barrel.

1/3

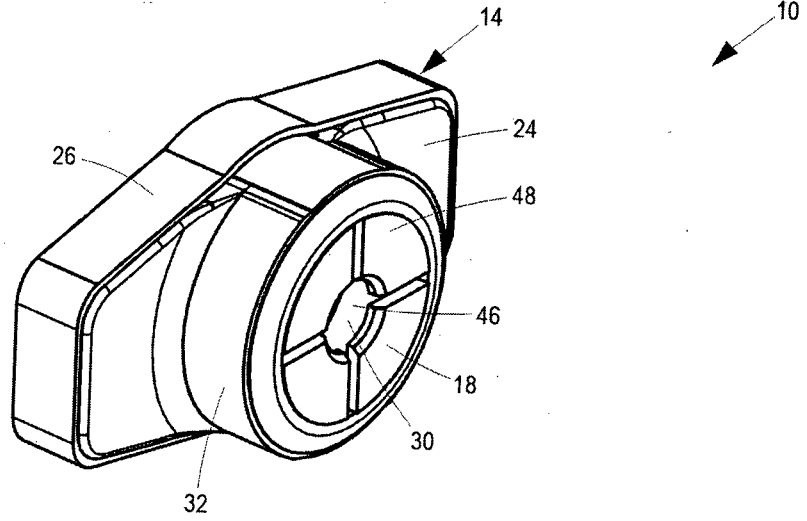


Figure 1

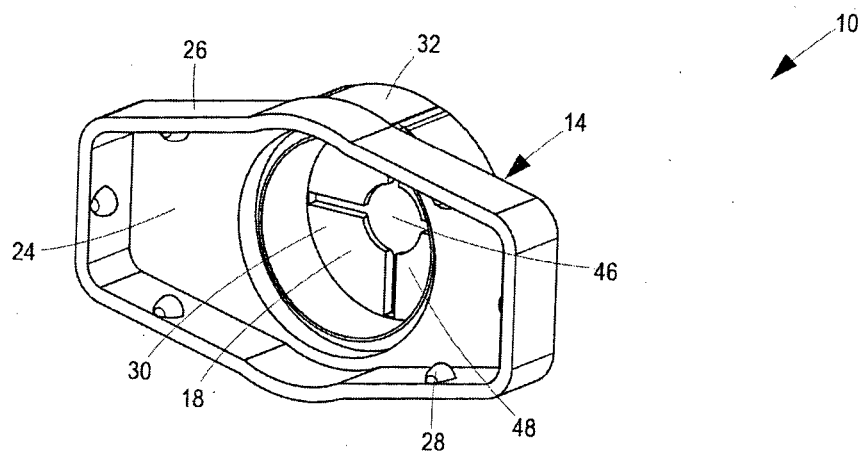


Figure 2

2/3

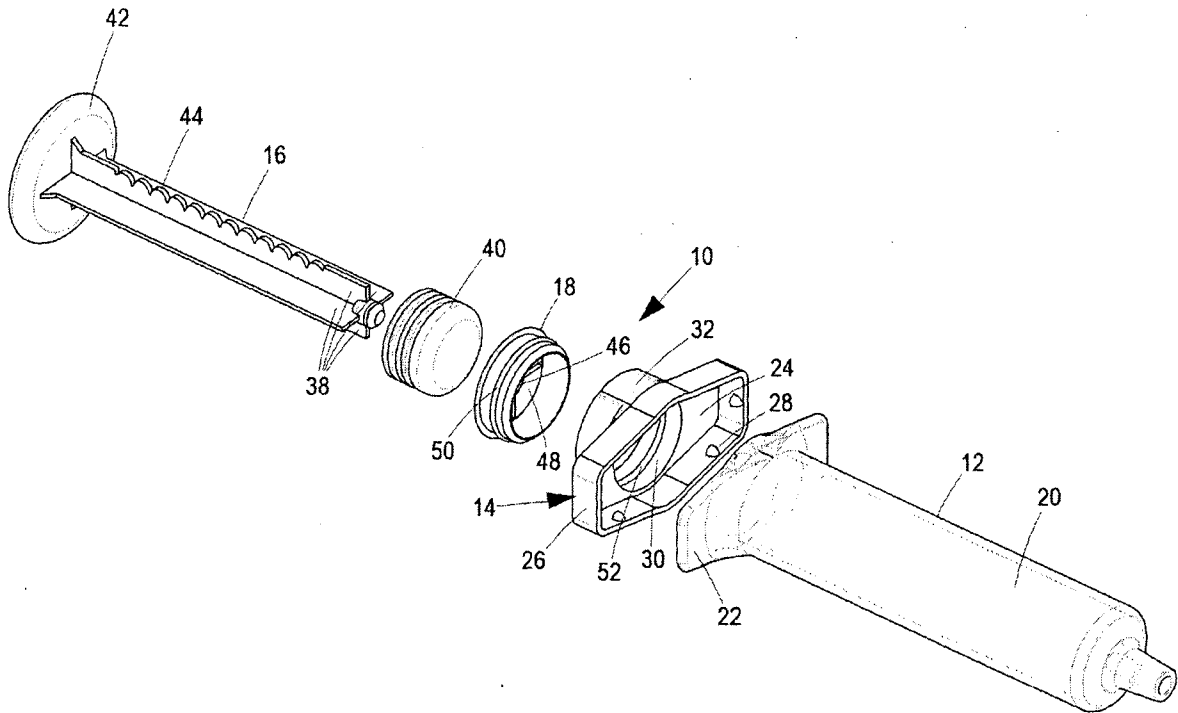


Figure 3

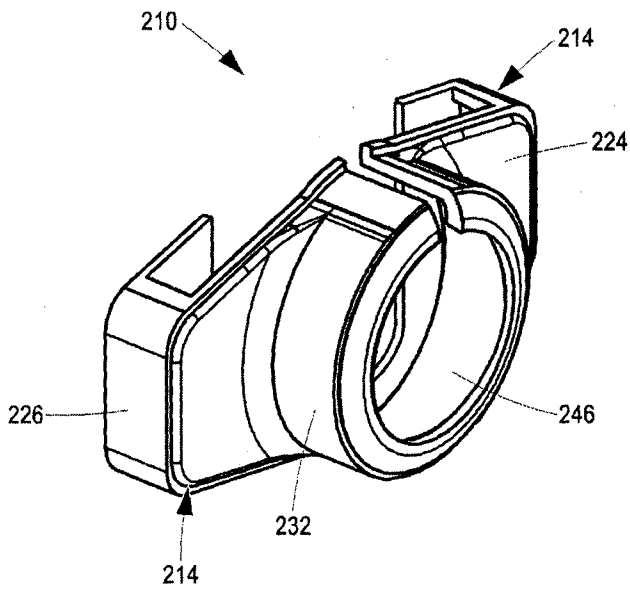


Figure 4

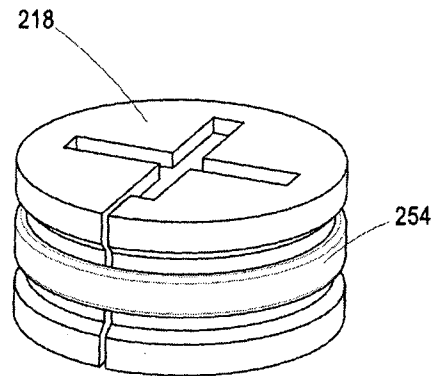


Figure 5

3/3

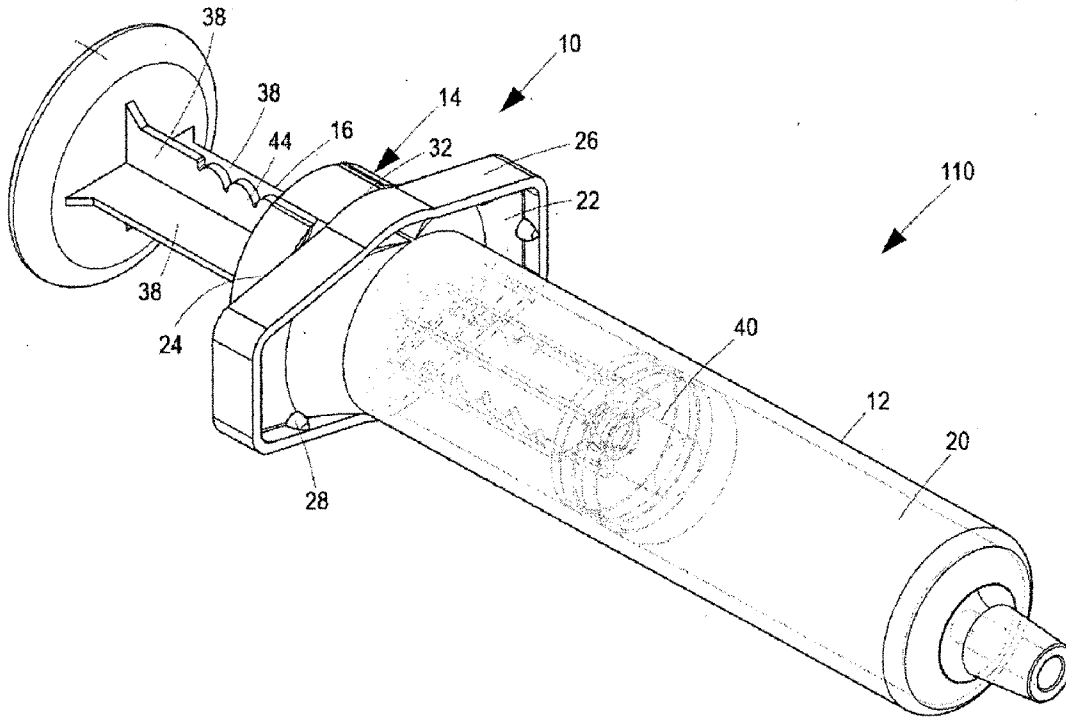


Figure 6

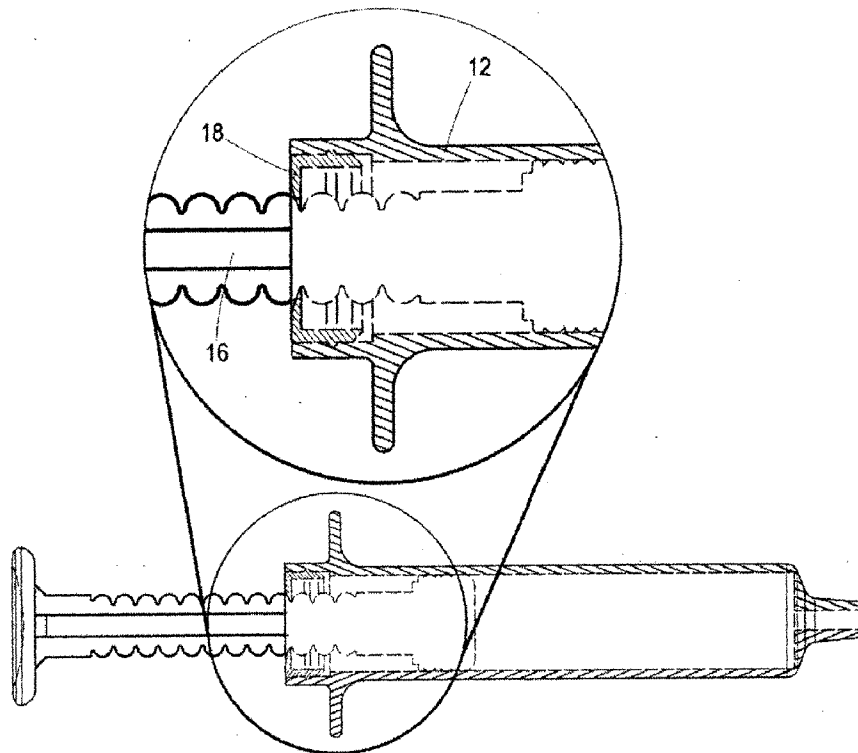


Figure 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT / ZA 2014/000008

A. CLASSIFICATION OF SUBJECT MATTER IPC: A61M 5/315 (2006.01) 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) 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 practicable, search terms used) wpi, epodoc, fulltext-databases		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A A	WO 2008057976 A2 (AVANCA MEDICAL DEVICES) 15 May 2008 (15.05.2008) abstract, fig. 2, paragraph [0018] US 6579269 B1 (KLEYMAN) 17 June 2003 (17.06.2003) abstract, fig. 9, column 4: lines 47-56	1-12, 30 13-29 1-30
<input type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
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"E" earlier application or patent but published on or after the international filing date		"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
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"O" document referring to an oral disclosure, use, exhibition or other means		"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 25 June 2014 (25.06.2014)	Date of mailing of the international search report 07 July 2014 (07.07.2014)	
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT / ZA 2014/000008

Patent document cited in search report			Patent family member(s)			Publication date
WO	A2	2008057976	WO	A2	2008057976	2008-05-15
US	B1	6579269	US	B1	6579269	2003-06-17