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(54) Title: SYRINGE AND AN ACCESSORY THEREFOR

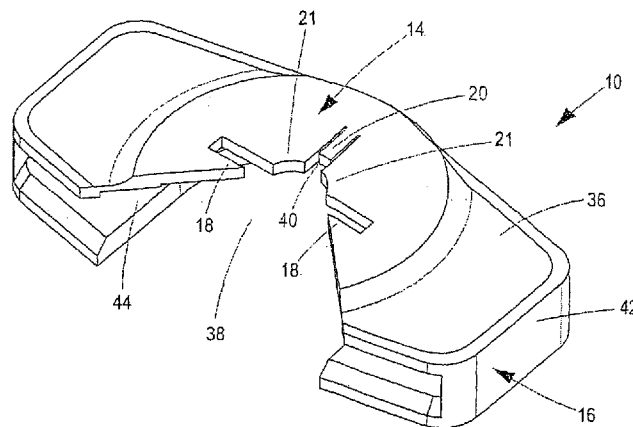


Figure 1

(57) Abstract: An accessory (10) for a syringe (12) includes a body (14) sized and shaped in use to locate either over finger flanges (24) on a syringe or to a barrel of a syringe. Securing means (16), in use, secure the body to either the finger flanges or the barrel (22) of a syringe. The body defines a primary bay (38) for receiving a plunger rod (26) therein, the primary bay: (i) includes at least one nipple (18) extending from the body into the primary bay, the nipple forming a constriction along the primary bay through which the plunger rod must, in use, pass before being captured within the primary bay with a portion of the body engaging the array of notches and/or protuberances (34) on the plunger rod; and (ii) is sized and shaped such that, in use, when the body is secured to finger flanges or barrel of a syringe and a plunger rod is received and captured within the primary bay, the longitudinal axis of the plunger rod is aligned with the longitudinal axis of the syringe barrel.

## SYRINGE AND AN ACCESSORY THEREFOR

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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  
10 clicks as the plunger rod moves along the barrel of the syringe. Even more specifically, the present invention relates to an accessory that can be secured to the finger flanges or barrel of a syringe and receive a syringe plunger while the plunger rod is located within the barrel of the syringe. The invention also relates to a syringe including the accessory.

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

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

20

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

25

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.

30

A syringe finger flange cover through which a syringe plunger rod is received and that regulates movement of the plunger rod therethrough is also known. For instance, US5,318,544 to Drypen *et al* describes such a cover defining a central bore for receiving the plunger rod. However, the cover disclosed in that patent requires that the plunger rod be removed from the syringe barrel, that the cover be secured to the syringe finger flanges, and that the plunger rod be re-inserted into the syringe barrel via the bore  
35 defined by the cover. A drawback of this arrangement is that removal of the plunger rod from the syringe barrel could adversely impacts sterility of the syringe.

It is an object of the present invention to provide an accessory for a syringe that includes a body that secures to the finger flanges or barrel of a syringe without requiring removal of the plunger rod from the syringe barrel and that creates audible clicks as the plunger rod moves along the syringe barrel.

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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:

10

a body sized and shaped in use to locate either over finger flanges on a syringe or to a barrel of a syringe;

15

securing means, in use, to secure the body to either the finger flanges or the barrel of a syringe;

the body defining a primary bay for receiving a plunger rod therein, the primary bay:

20

including at least one nipple extending from the body into the primary bay, the nipple forming a constriction along the primary bay through which the plunger rod must, in use, pass before being captured within the primary bay with a portion of the body engaging the array of notches and/or protuberances on the plunger rod; and

25

being sized and shaped such that, in use, when the body is secured to finger flanges or barrel of a syringe and a plunger rod is received and captured within the primary bay, the longitudinal axis of the plunger rod is aligned with the longitudinal axis of the syringe barrel.

30

The body may further include a first finger extending from the body into the primary bay, the first finger being the portion of the body that engages the array of notches and/or protuberances on the plunger rod.

Preferably, the body is secured to the finger flanges of a syringe.

35

Typically, the body includes a substantially planar portion that, in use, locates over a planar surface of finger flanges on a syringe and defines the primary bay.

Generally, the securing means includes a lip that extends substantially orthogonally from at least a portion of the peripheral end of the substantially planar portion.

- 5 Preferably, the securing means comprises at least one tab that extends inwards from the free end of the lip.

Typically, the at least one tab comprises an operatively lower planar segment that defines a secondary bay that corresponds with the outer diameter of a syringe barrel.

10

Generally, the lip spaces the substantially planar portion and the tab a distance corresponding to the width of a syringe finger flange.

- 15 Preferably, the lip spaces the substantially planar portion and the tab by between 1.5mm and 3mm.

Typically, the securing means permits the body to be slidable located over the finger flanges of a syringe.

- 20 Generally the accessory is used with a plunger rod that in section orthogonal to the longitudinal axis of the plunger rod, has a shape wherein four equally spaced arms radiate radially from the longitudinal axis of the plunger rod.

- 25 Preferably, the primary bay includes a linear channel that is sized and shaped to correspond with a first plunger rod arm so as, in use, to receive the first plunger rod arm therein.

Typically, the finger is located at or near the closed end of the linear channel.

- 30 Generally, in use, the nipple bears against a second plunger rod arm when the first plunger rod arm is received within the linear channel.

Preferably, in use, a second nipple bears against a third plunger rod arm when the first plunger rod arm is received within the linear channel.

Typically, the primary bay converges from the perimeter of the substantially planar portion towards the first and second nipples, in use to guide a plunger rod along the primary bay.

5 According to a second aspect of the present invention, a syringe includes:

a barrel;

finger flanges extending radially from the barrel;

10

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

15

the accessory according to the first aspect of the invention, with the body located over the finger flanges and the plunger rod received and captured within the bay.

Typically, the plunger rod in section orthogonal to the longitudinal axis of the plunger rod, has a shape wherein four equally spaced arms radiate radially from the longitudinal axis of the plunger rod.

20

Generally, the free end of at least one arm is chamfered to facilitate movement of that arm past the nipple.

25 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:

30 **Figure 1** is an upper perspective view of an accessory for a syringe according to a first aspect of the invention;

**Figure 2** is a lower perspective view of the accessory in Figure 1;

35 **Figure 3** is a plan view of the accessory in Figure 1;

Figure 4 is a perspective view of a syringe according to a second aspect of the invention;

Figure 5 is a perspective view of the syringe in Figure 4 with the accessory positioned prior to being slidably located over the finger flanges of the syringe; and

Figure 6 is a perspective view of an alternative embodiment of the accessory according to the present invention.

In this specification, "bay" means an open-ended slot / an aperture defined by a body that extends to the perimeter of the body.

#### DESCRIPTIONS OF THE INVENTION

With reference to Figures 1 to 5, an accessory 10 for a syringe 12, according to a first aspect of the invention includes a body 14, securing means 16, nipples 18 and a finger 20.

With reference to Figures 4 and 5, the syringe 12 is a standard syringe comprising a barrel 22 and a pair of finger flanges 24 extending diametrically from the barrel 22.

The syringe 12 includes a plunger rod 26 that, in section orthogonal to its longitudinal axis, has a shape wherein four equally spaced arms 28 of the same length radiate from the longitudinal axis (i.e. in the shape of an "X"). A plunger 30 is secured to the plunger rod 26 at one end and the other end of the plunger rod 26 terminates in an enlarged head 32 in the shape of a disc.

The free end of one arm 28 of the plunger rod 26 includes an array of notches and/or protuberances 34 extending along a portion of the length of the plunger rod 26. It will be appreciated that although the plunger rod 26 has been shown with an array of notches and/or protuberances 34 along one arm 28, it will be appreciated that an array of notches and/or protuberances 34 could alternatively be located on two or three arms 28.

Furthermore, it will be appreciated that the notches and/or protuberances 34 could be located at the point of intersection of the plunger rod arms 28. In such an arrangement,

formation(s) 21 could constitute the finger(s) 20 that engage such notches and/or protuberances 34 on the plunger rod 26.

5 The free (i.e. radial) end of at least one arm 28 is chamfered to facilitate movement of that arm 28 past the nipple 18.

Turning back to the accessory 10 and Figures 1 to 3, the body 14 is sized and shaped, in use, to locate over finger flanges 24 of the syringe 12. Although not shown in the Figures, it will be appreciated that the accessory 10 could alternatively be secured to the barrel 22  
10 of the syringe 12.

The body 14 includes a substantially planar portion 36 that is, in use, in facial contact with the operative upper planar portions of the finger flanges 24. The substantially planar portion 36 defines a primary bay 38 that extends from the perimeter of the substantially  
15 planar portion 36 into the substantially planar portion 36, the primary bay 38 defining an opening for receiving and releasably capturing the plunger rod 26 therein.

The primary bay 38 defined by the substantially planar portion 36 is sized and shaped such that, in use, when the body 14 is secured to the syringe finger flanges 24 and the  
20 plunger rod 26 is received and releasably captured within the primary bay 38, the longitudinal axis of the plunger rod 26 is aligned with the longitudinal axis of the syringe barrel 22.

The primary bay 38 converges from its open end towards the pair of nipples 18, which  
25 nipples 18 form a constriction in the primary bay 38. The width of the primary bay 38 at the nipples 18 is slightly smaller than the width of the plunger rod 26. As such, either the body 14 or the nipples 18 must resiliently flex / distort to permit the plunger rod 26 to pass the nipples 18 and continue along the primary bay 38. A linear channel 40 extends from the end of the primary bay 38 into the substantially planar portion 36. The linear channel  
30 40 is sized and shaped to receive a plunger rod arm 28 therein. The finger 20 is located near the closed end of the channel 40.

An alternative embodiment of the accessory 10 is shown in Figure 6. This embodiment includes a series of three fingers 20 that engage the notches and/or protuberances on the  
35 plunger rod 26 arm 28.

It will be appreciated that if a second or third plunger rod arm 28 includes notches and/or protuberances 34, corresponding second or third fingers 20 could extend from the body 14 in the vicinity of such arms 28.

5 When a plunger rod 26 is received within the primary bay 38, the plunger rod 26 is guided by the converging primary bay 38 towards the nipples 18. The plunger rod 26 is then forced past the nipples 18 and one of the plunger rod arms 28 (with notches and protuberances 34) is received into the linear channel 40 with the finger 20 engaging the notches and protuberances 34. With one plunger rod arm 28 received within the linear  
10 channel 40, two other plunger rod arms 28 bear against the nipples 38, acting to releasably capture the plunger rod 26 within the primary bay 38. So captured within the primary bay 38, the plunger rod 26 may move axially along the syringe barrel 22 with finger 20 running along the notches and/or protuberances 34 on the plunger rod arm 26 to generate audible clicks.

15

Preferably, the fingers 20 are sufficiently thin and flexible to generate audible clicks without materially resisting movement of the plunger rod 26 relative to the accessory 10. 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.

20

It will be appreciated that the accessory 10 could dispense with the finger 20. In such an arrangement (not shown in the Figures), the notches and/or protuberances 34 on the plunger rod arm 26 could interact directly with a portion of the body 14 to generate audible clicks.

25

A lip 42 extends orthogonally from the peripheral end of the planar portion 36, in use, covering the sides of the finger flanges 24. Tabs 44 extend inwards from or near the free end of the lip 42. The Figures show the tabs 44 in the form of an operatively lower planar segment extending between the curved lip 42. The planar segment 44 defines a circular  
30 secondary bay 46 that corresponds with the radial outer peripheral surface of the syringe barrel 22 (i.e. has a diameter corresponding to the outer diameter of the barrel 22). As such, when the accessory 10 is located over the syringe finger flanges 24, the substantially planar portion overlies the operatively upper surface of the finger flanges 24; the lip 42 overlies the sides of the finger flanges 24, and the planar segment 44 overlies  
35 the operatively lower surface of the finger flanges 24 – the lip 42 spacing the planar portion 36 from the planar segment 44 by the width of the finger flanges 24 (i.e. between 1.5mm and 3mm).



Referring to Figure 5, the accessory 10 is located over the finger flanges 24 by aligning the secondary bay 46 with the syringe barrel 22 and the primary bay 38 with the plunger rod 26, and sliding the accessory 10 sideways over the finger flanges 24.

5

The lip 42 and tabs 44 make up the securing means 16 that secure the body 14 to the finger flanges 24. However, it will be appreciated that the securing means 16 could comprise an ultrasonic weld that welds the body 14 to the finger flanges 24 or barrel 22.

10 Referring to Figures 4 and 5, according to a second aspect of the invention, there is provided a syringe 12 including: a barrel 22; finger flanges 24 extending radially from the barrel 22; a plunger rod 26 including an array of notches and/or protuberances 34 along at least a portion of its length; and an accessory 10 according to the first aspect of the invention. The accessory 10 locates over the finger flanges 24 and the plunger rod 26 is  
15 received and captured within the primary bay 38 defined by the planar portion 36 of the accessory 10 body 14.

It will be appreciated that fitment of the accessory 10 to the finger flanges 24 and syringe plunger 26 does not require removal of the plunger rod 26 from the syringe barrel 22,  
20 thereby maintaining sterility of the syringe 12. Furthermore, by capturing the plunger rod 26 within the primary bay 38, the accessory 10 also limits lateral movement of the plunger rod 26 as it is depressed axially into the syringe barrel 22.

CLAIMS

1. An accessory for a syringe including:

5 a body sized and shaped in use to locate either over finger flanges on a syringe or to a barrel of a syringe;

securing means, in use, to secure the body to either the finger flanges or the barrel of a syringe;

10 the body defining a primary bay for receiving a plunger rod therein, the primary bay:

15 including at least one nipple extending from the body into the primary bay, the nipple forming a constriction along the primary bay through which the plunger rod must, in use, pass before being captured within the primary bay with a portion of the body engaging the array of notches and/or protuberances on the plunger rod; and

20 being sized and shaped such that, in use, when the body is secured to finger flanges or barrel of a syringe and a plunger rod is received and captured within the primary bay, the longitudinal axis of the plunger rod is aligned with the longitudinal axis of the syringe barrel.

25 2. An accessory according to claim 1, wherein the body includes a first finger extending from the body into the primary bay, the first finger being the portion of the body that engages the array of notches and/or protuberances on the plunger rod.

30 3. An accessory according to claim 2, wherein the body is secured to the finger flanges of a syringe.

35 4. An accessory according to claim 3, wherein the body includes a substantially planar portion that, in use, locates over a planar surface of finger flanges on a syringe and defines the primary bay.

5. An accessory according to claim 4, wherein the securing means includes a lip that extends substantially orthogonally from at least a portion of the peripheral end of the substantially planar portion.
- 5 6. An accessory according to claim 5, wherein the securing means comprises at least one tab that extends inwards from the free end of the lip.
7. An accessory according to claim 6, wherein the at least one tab comprises an operatively lower planar segment that defines a secondary bay that corresponds  
10 with the outer diameter of a syringe barrel.
8. An accessory according to claim 7, wherein the lip spaces the substantially planar portion and the tab a distance corresponding to the width of a syringe finger flange.
- 15 9. An accessory according to claim 8, wherein the lip spaces the substantially planar portion and the tab by between 1.5mm and 3mm.
10. An accessory according to claim 9, wherein the securing means permits the body to be slidable located over the finger flanges of a syringe.  
20
11. An accessory according to claim 10 for use with a plunger rod that in section orthogonal to the longitudinal axis of the plunger rod, has a shape wherein four equally spaced arms radiate radially from the longitudinal axis of the plunger rod.
- 25 12. An accessory according to claim 11, wherein the primary bay includes a linear channel that is sized and shaped to correspond with a first plunger rod arm so as, in use, to receive the first plunger rod arm therein.
13. An accessory according to claim 12, wherein the finger is located at or near the  
30 closed end of the linear channel.
14. An accessory according to claim 13, wherein, in use, the nipple bears against a second plunger rod arm when the first plunger rod arm is received within the linear channel.
- 35 15. An accessory according to claim 14, wherein, in use, a second nipple bears against a third plunger rod arm when the first plunger rod arm is received within the linear channel.

16. An accessory according to claim 15, wherein the primary bay converges from the perimeter of the substantially planar portion towards the first and second nipples, in use to guide a plunger rod along the primary bay

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17. A syringe including:

a barrel;

10

finger flanges extending radially from the barrel;

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

15

the accessory claimed in any one of claims 1 to 16, with the body located over the finger flanges and the plunger rod received and captured within the primary bay.

18. A syringe according to claim 17, wherein the plunger rod in section orthogonal to the longitudinal axis of the plunger rod, has a shape wherein four equally spaced arms radiate radially from the longitudinal axis of the plunger rod.

20

19. A syringe according to claim 18, wherein the free end of at least one arm is chamfered to facilitate movement of that arm past the nipple.

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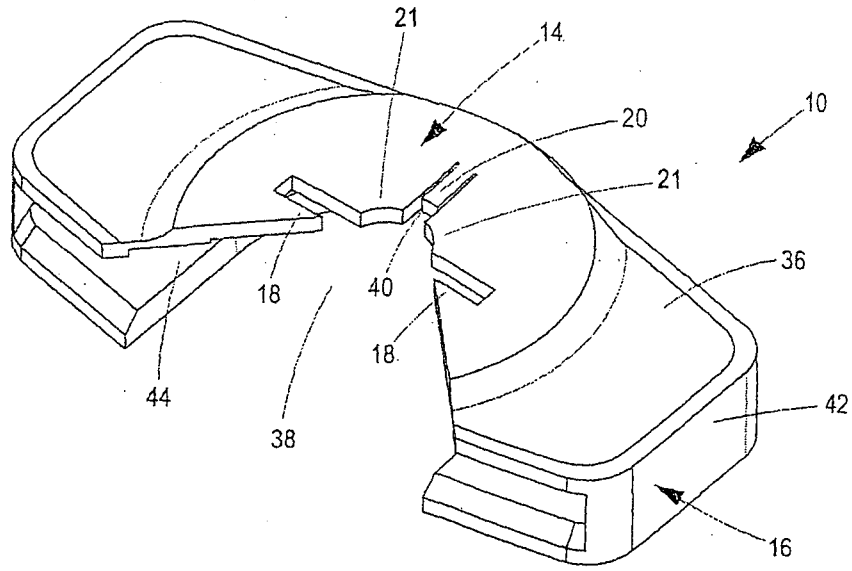


Figure 1

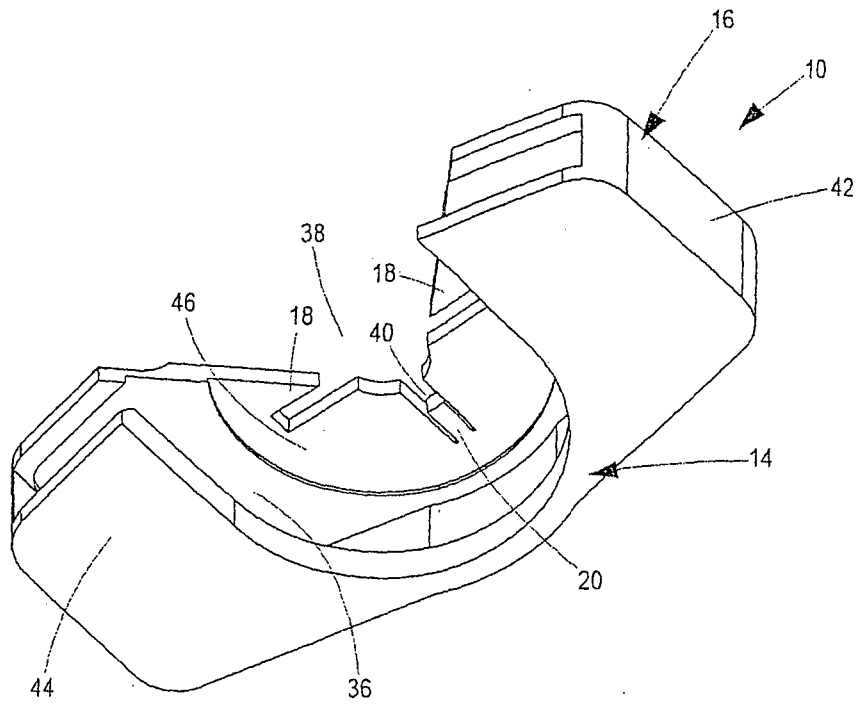


Figure 2

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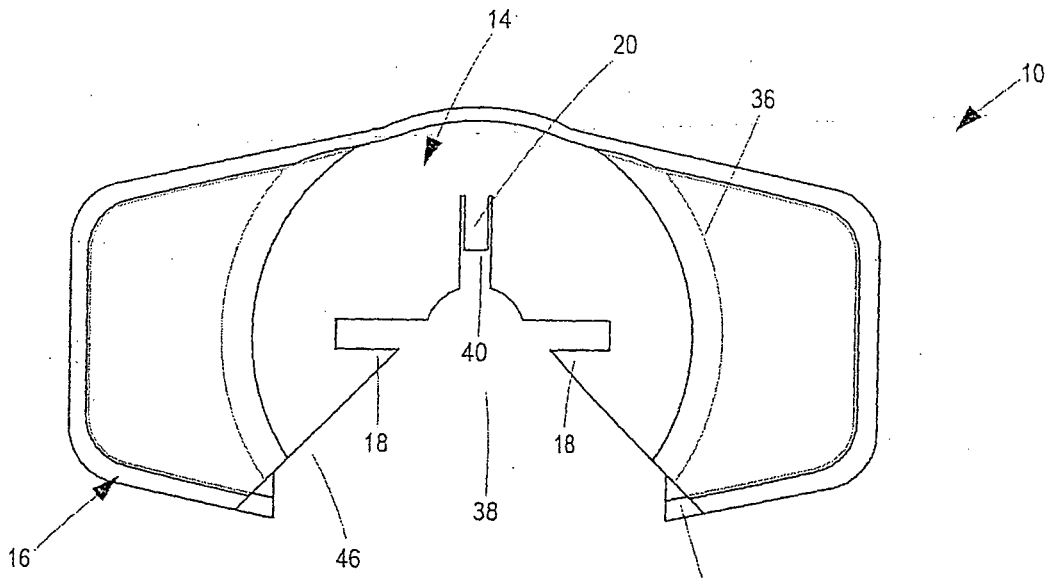


Figure 3

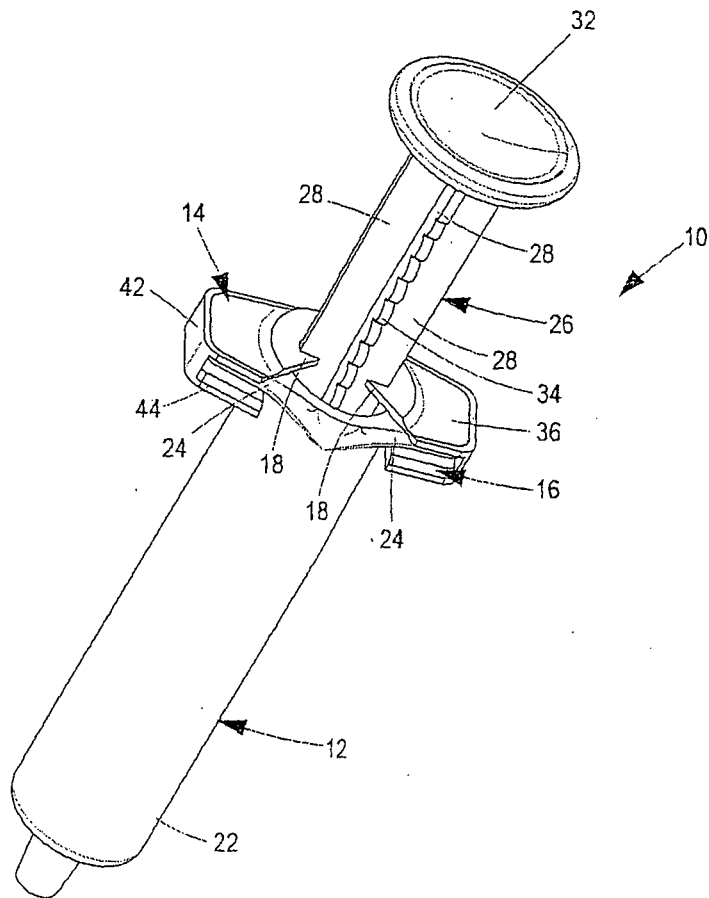


Figure 4

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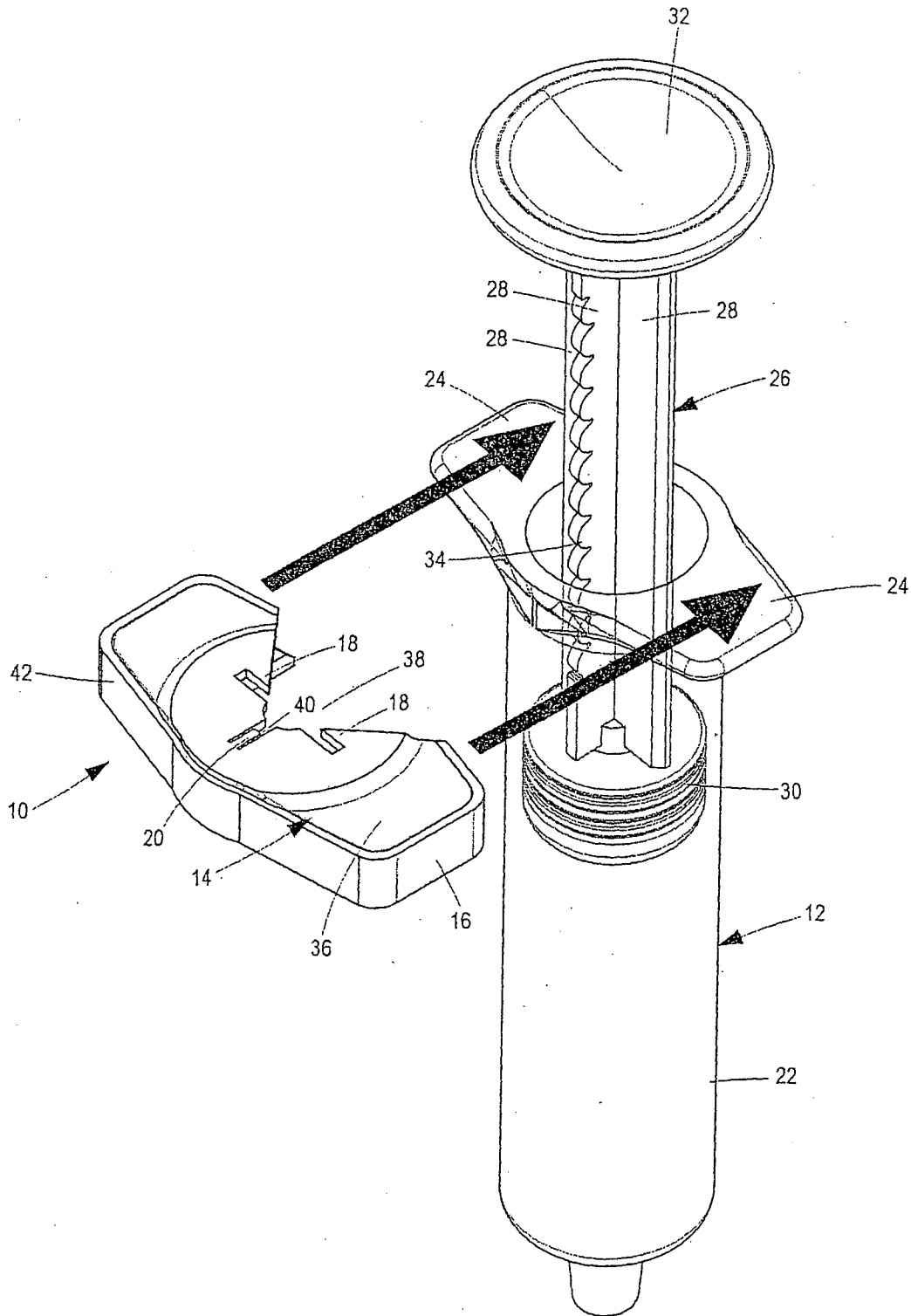


Figure 5

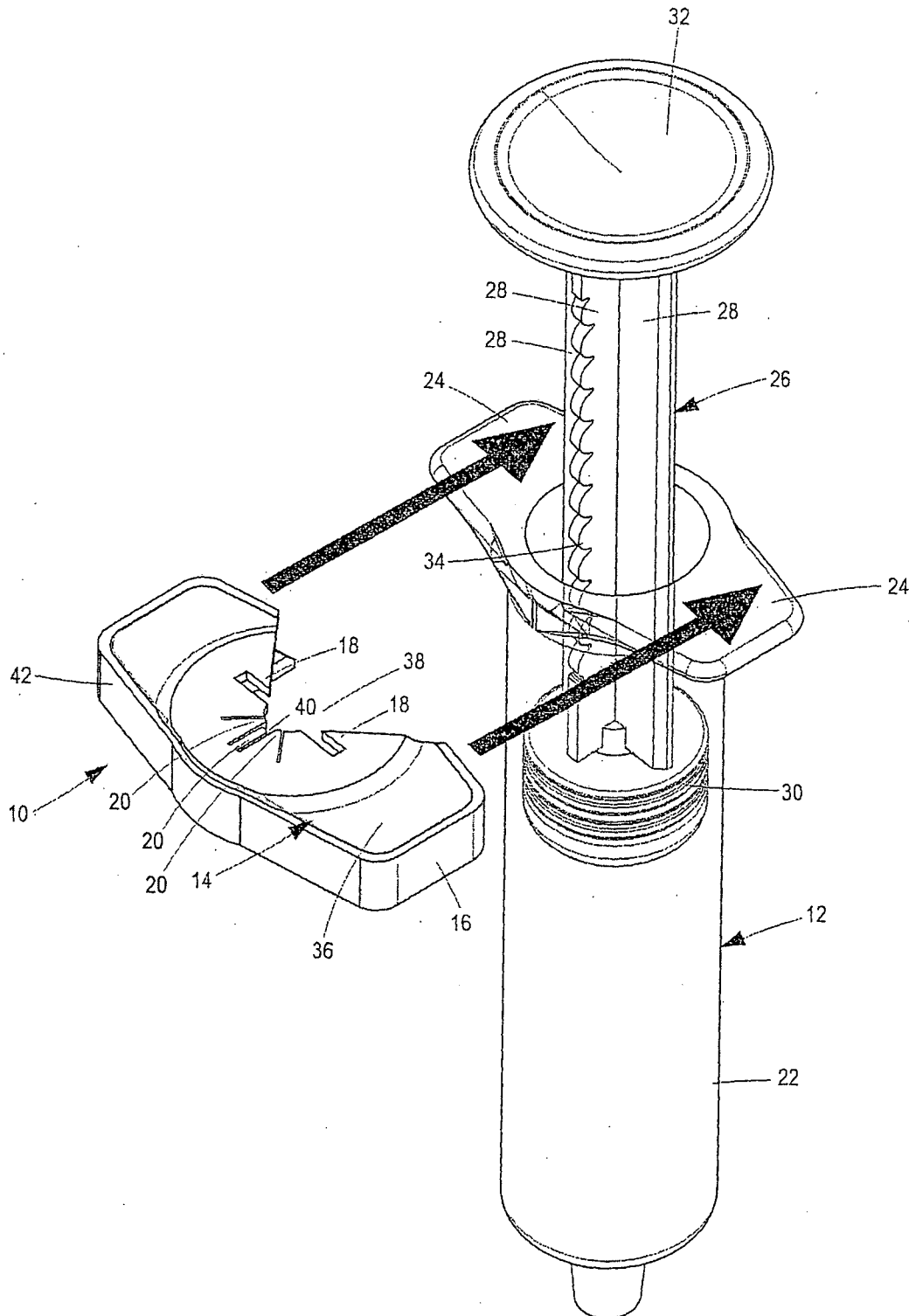


Figure 6



## INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER IPC: <b>A61M 5/315</b> (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.
A	WO 2009095735 A1 (BECTON DICKINSON FRANCE) 06 August 2009 (06.08.2009) abstract; figs. 1, 2, 4; claim 16	1 - 19
A	US 2011009829 A1 (KOSINSKI ET AL.) 13 January 2011 (13.01.2011) abstract, fig. 17; paragraph [0080]	1 - 19
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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 01 July 2014 (01.07.2014)	Date of mailing of the international search report 07 July 2014 (07.07.2014)	
Name and mailing address of the ISA/AT Austrian Patent Office Dresdner Straße 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24-535	Authorized officer PAVDI C. Telephone No. +43 / 1 / 534 24-374	

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.

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