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BREVET D'INVENTION

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54 Titre : Improved disposable syringe with a retractable needle.

57 Abrégé : The invention relates to an improved disposable syringe with a retractable needle, for preventing the syringe from being reused, comprising a cylindrical body defining, at one end portion thereof, a needle coupled end-piece and being open, at the other end portion thereof, in order to engage therein a piston-plunger assembly, characterised in that in said end piece is provided an abutment for abutting thereagainst the abutment fins of a needle hub, a collar including latching means for engaging with the outer surface of said end piece and tightly coupling means for coupling said needle hub being moreover provided.

BACKGROUND OF THE INVENTION

The present invention relates to a disposable syringe construction provided with a retractable or withdrawable needle, for preventing the syringe from being reused.

As is known, a very important problem in making
5 disposable syringes is that associated with a possibility of re-using said syringes while preventing the needle from accidentally injuring an user handling the needle syringe.

Prior solutions to solve the above mentioned problem usually provide to use syringes including resilient means for causing the
10 syringe needle to be retracted inside the syringe.

These types of syringes, however, in addition to being very expensive, have the drawback that they involve a modification of the conventional use method of the syringes, since, as a puncture is performed thereby, it is anyhow usually necessary to overcome a
15 resilient opposing force.

Other prior solutions, which do not provide to use resilient means, comprise connecting elements for coupling the needle to the syringe body, which connecting elements, however, do not provide a safe locking of the needle in its intended position and, moreover, being
20 very complex from a construction standpoint.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing a disposable

syringe construction, including a retractable needle, allowing the needle to be easily withdrawn inside the syringe body, without the need of using return springs, while safely locking the needle in its intended use position.

5 Within the scope of the above mentioned aim, a main object of the present invention is to provide such a disposable syringe construction in which the needle can be withdrawn inside the syringe by very simple and mechanically reliable means.

 Another object of the present invention is to provide such
10 a disposable syringe construction which can be made by very simple component elements, thereby providing great economic advantages.

 Yet another object of the present invention is to provide such a disposable syringe construction which, owing to its construction features, is very reliable and safe in operation.

15 According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a disposable syringe construction, having the characterizing features of the characterizing part of claim 1.

20 **BRIEF DESCRIPTION OF THE DRAWINGS**

 Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of a disposable syringe construction, provided with a retractable needle for

preventing said syringe from being reused, which is illustrated, by way of an indicative, but not limitative example, in the accompanying drawings, where:

Figure 1 is an exploded view showing the syringe according to the invention;

Figure 2 is a schematic view illustrating a first use step of the subject syringe;

Figure 3 illustrates, on an enlarged scale, the details of the needle hub and of the syringe plunger in the position shown in Figure 2;

Figure 4 is a schematic cross-sectioned view illustrating the syringe during the coupling step in which the syringe plunger and fins of the needle hub are coupled to one another;

Figure 5 is a further cross-sectional view illustrating, on an enlarged scale, the position of Figure 4;

Figure 6 is a further cross-sectional view illustrating the needle withdrawing operation;

and

Figure 7 illustrates the subject syringe with the needle fully withdrawn and the syringe plunger broken away.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the number references of the above mentioned figures, the disposable syringe, provided with a withdrawing needle, for preventing the syringe from being reused, according to the present invention, which syringe has been generally indicated by the

reference number 1, comprises a cylindric body 2 defining, at an end portion thereof, an end-piece 3, which can be coupled to a syringe needle, generally indicated by the reference number 4.

5 A syringe piston, generally indicated by the reference number 5, including a plunger portion or sealing gasket 6, can be slidably engaged inside the mentioned cylindric body.

A first main feature of the present invention is that the end-piece 3 defines, in its inside, an abutment 10 including an annular abutment region defining an engagement element for the needle hub or drum 11, coupled to the inner end portion of said needle 4.

10 More specifically, the needle hub or drum portion 11 is provided with a body 12, coupled to said needle 4 which, at the other end portion thereof, ends with resiliently spreadable fins 15 which define, at their free end portions, a tapering region 16 delimiting a cut-out in turn delimited, at the other end thereof, by an abutment tooth 18
15 which, as the fins 15 are spread apart from one another, will engage the abutment element 10 thereby preventing the syringe needle from being accidentally withdrawn as it is used.

In this connection it should be pointed out that one of the
20 mentioned cut-out portions, indicated by 17a, is provided with a curved configuration in order to allow the needle to be properly slanted, as it is withdrawn inside the syringe, as it will become more apparent hereinafter.

For coupling the needle to the syringe, a collar 20 is

provided, defining, in its inside, an engagement annular rim 21 adapted to be snap coupled with edge portions 22 formed on the outer wall of the end piece 3, thereby preventing the needle from being disengaged.

Moreover, the collar 20 is provided with a cylindric portion 25 which can be tightly engaged with the cylindric body 12 of the needle hub 11, at the needle 4 attachment portion thereof, thereby providing a perfectly sealed connection.

Inside the syringe plunger 6 is provided a latching body 30, in which, by exploiting the provision of the end of the tapering portion 16, the mentioned fins 15 can be engaged, so as to cause said fins 15 to be radially contracted, thereby disengaging the abutment tooth elements 18 from the abutment 10, and consequently causing the needle hub to be disengaged from the mentioned end-piece while allowing the syringe plunger to be engaged, owing to the provision of the coupling tooth element 31 provided in the latching collar 30.

It should be apparent, that inside said cylindric body 1, on the open side thereof, a narrowing region 40 for preventing the piston from being disengaged is provided.

Moreover, on said piston are provided a plurality of weakening notches 42 adapted to facilitate the breakage of the piston as it is arranged in its withdrawn position.

In operation, as the syringe is used, as shown in Figure 2, the piston 5 is subjected to a pressure adapted to deliver the product held in the syringe.

At the end of the product delivery operation, the latching collar 30 engages with the resilient fins 15, owing to the tapering portion 16, while causing said resilient fins 15 to be radially contracted, with a consequent disengagement from the abutment 10 and latching of said fins inside the collar, due to the provision of the coupling tooth element 31.

As the piston is withdrawn, in particular, the needle will be brought, together with the needle hub thereof, inside the cylindric body, and, after having performed a full needle withdrawing, the needle will be caused to assume a slanted position, since the mentioned cut-out portion 17a will provide a different type of gripping with respect to the cut-out abutment 10.

Under this condition, a possible further pressing on the piston will anyhow prevent the needle from being extracted.

Moreover, as shown in Figure 7, it would be possible to break the piston or plunger, thereby the syringe cannot be absolutely further reused.

In this condition, the needle will be safely held inside the cylindric body, thereby said needle will be fully neutralized.

The invention as disclosed is susceptible to several modifications and variations, all of which will come within the scope of the invention.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, provided that they are compatible to the intended application, as well as the contingent size and shapes, can be any, depending on requirements.

CLAIMS

1. An improved disposable syringe with a retractable needle, for preventing the syringe from being reused, comprising a cylindric body defining, at one end portion thereof, a needle coupled end-piece and being open, at the other end portion thereof, in order to engage therein a piston-plunger assembly, characterized in that in said end piece is provided an abutment for abutting thereagainst the abutment fins of a needle hub, a collar including latching means for engaging with the outer surface of said end piece and tightly coupling means for coupling said needle hub being moreover provided.

2. An improved disposable syringe, according to Claim 1, characterized in that said needle hub is provided with a pair of resilient opposite fins said fins including an abutment tooth element which can be engaged with said abutment in order to prevent the needle from being accidentally withdrawn inside said syringe.

3. An improved disposable syringe, according to Claims 1 and 2, characterized in that said needle hub is provided with a cylindric body defining, at the part thereof facing said needle, a tightly engageable portion which can be engaged with a corresponding cylindric seat defined in said collar.

4. An improved disposable syringe, according to one or more of the preceding claims, characterized in that said latching means comprise an annular rim defined on the inner surface of said collar and adapted to be snap engaged with a corresponding annular tooth element

defined on said end-piece.

5 5. An improved disposable syringe, according to one or more of the preceding claims, characterized in that said abutment fins are provided, at their free end portions, with a tapering region defining a cut-out, and being closed at the other end portion thereof by said abutment tooth, said tapering region being adapted to provide a resilient shrinking of said fins by causing said fins to engage with a latching collar defined on said syringe plunger.

10 6. An improved disposable syringe, according to one or more of the preceding claims, characterized in that said latching collar is provided with a latching annular tooth element which can be engaged in said cut-outs of said needle hub.

15 7. An improved disposable syringe, according to one or more of the preceding claims, characterized in that one of said cut-outs is provided with a curved bottom adapted to facilitate said needle in assuming a slanted position as it has been withdrawn in said cylindrical body.

20 8. An improved disposable syringe, according to one or more of the preceding claims, characterized in that said cylindrical body is provided, in the inside thereof, at the open portion thereof, with narrowing portions adapted to prevent the syringe piston from being removed from the syringe.

9. An improved disposable syringe, according to one or more of the preceding claims, characterized in that said piston is

provided with weakening notches adapted to allow said piston to be easily broken.

10. An improved disposable syringe, provided with a retractable needle for preventing said syringe from being reused, according to one or more of the preceding claims, and substantially as
5 broadly disclosed and illustrated and for the intended objects.

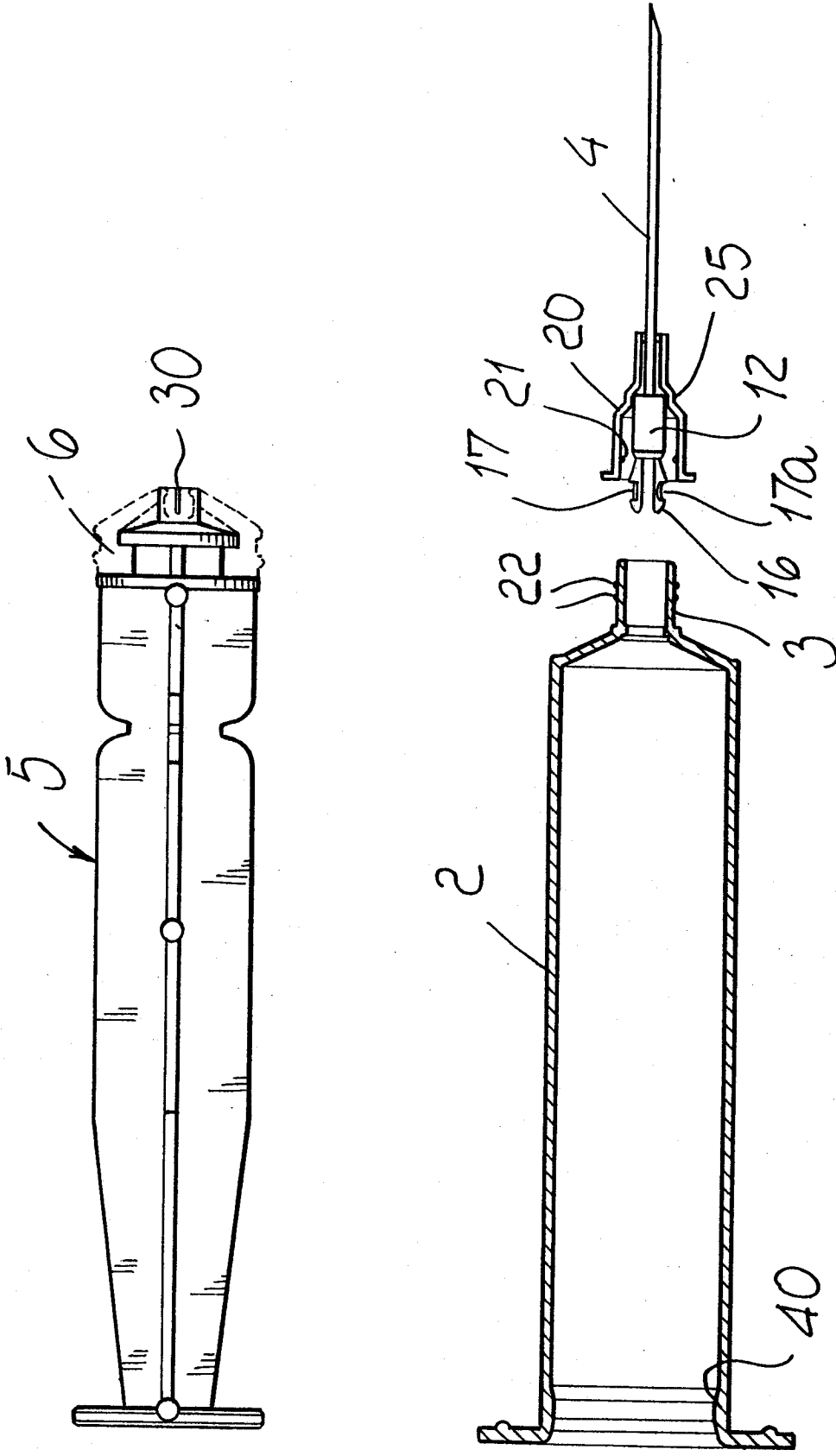
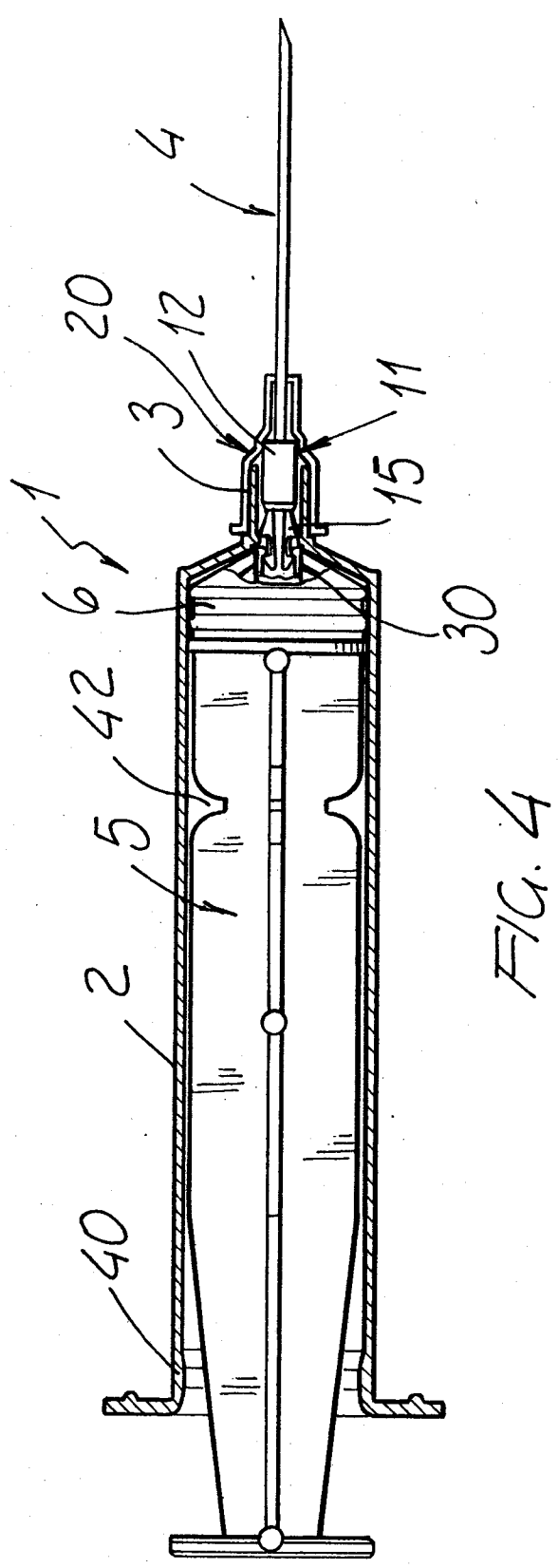
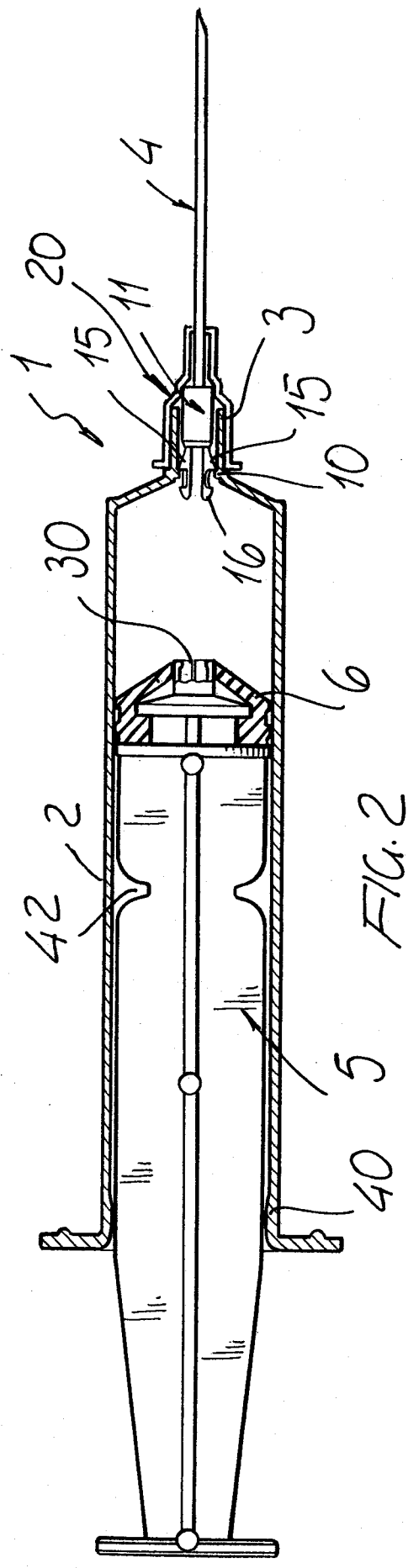
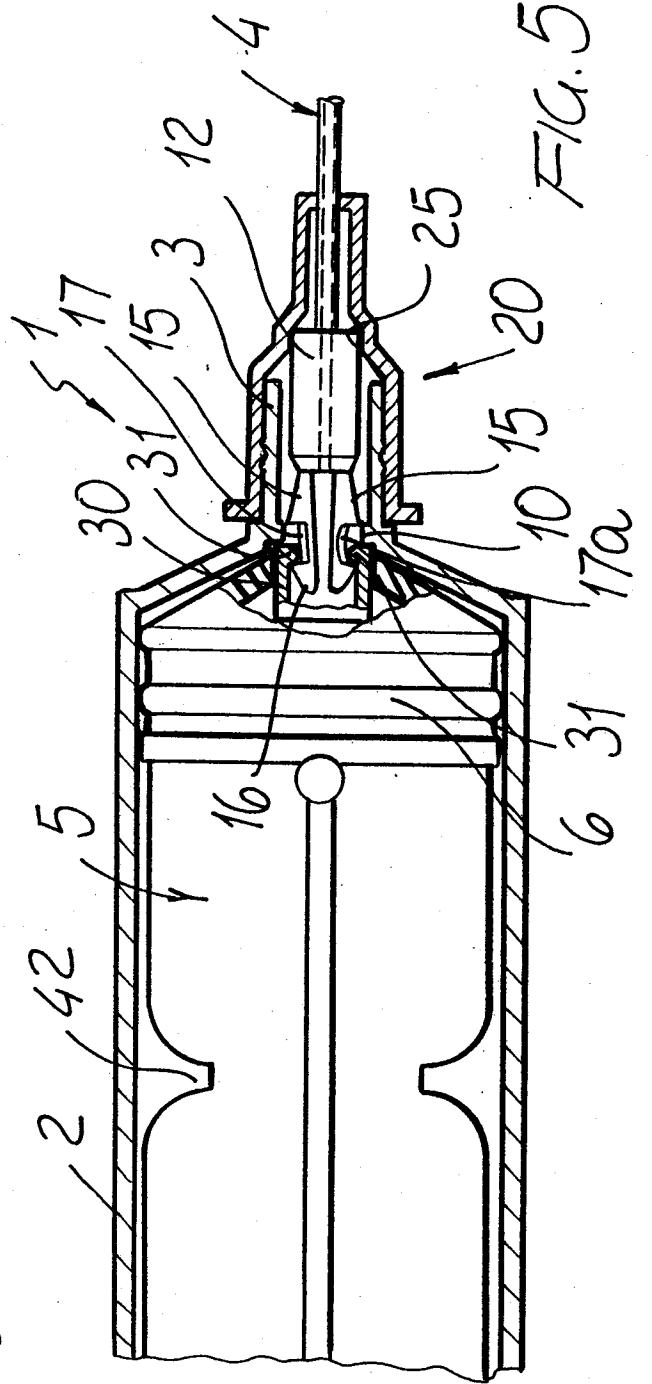
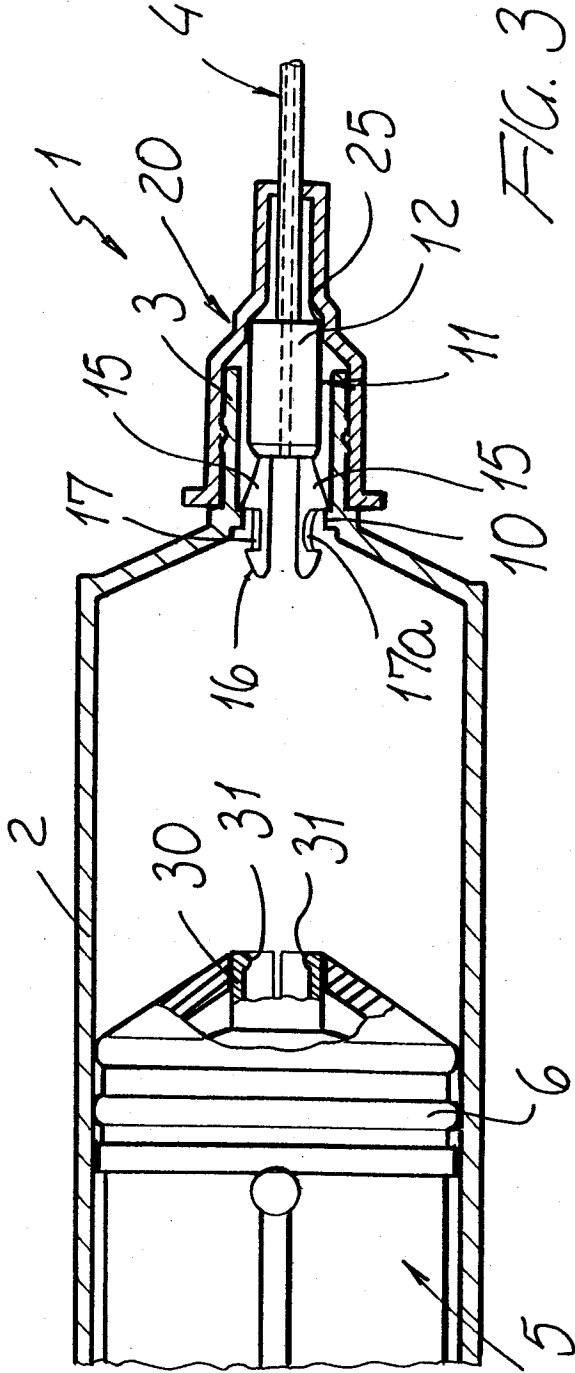


FIG. 1

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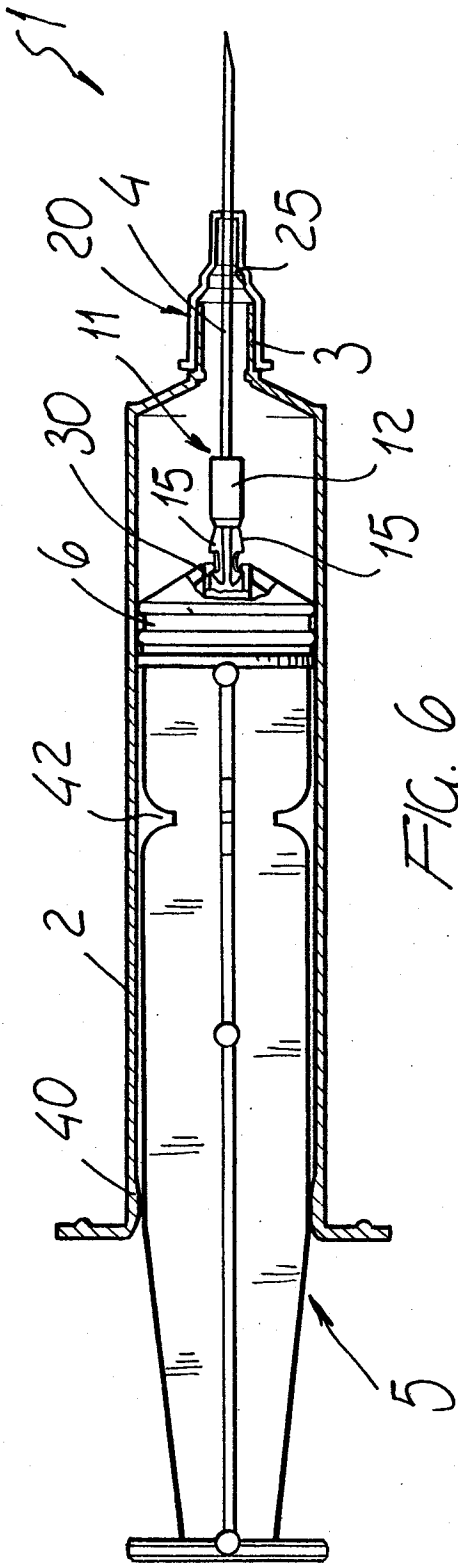


FIG. 6

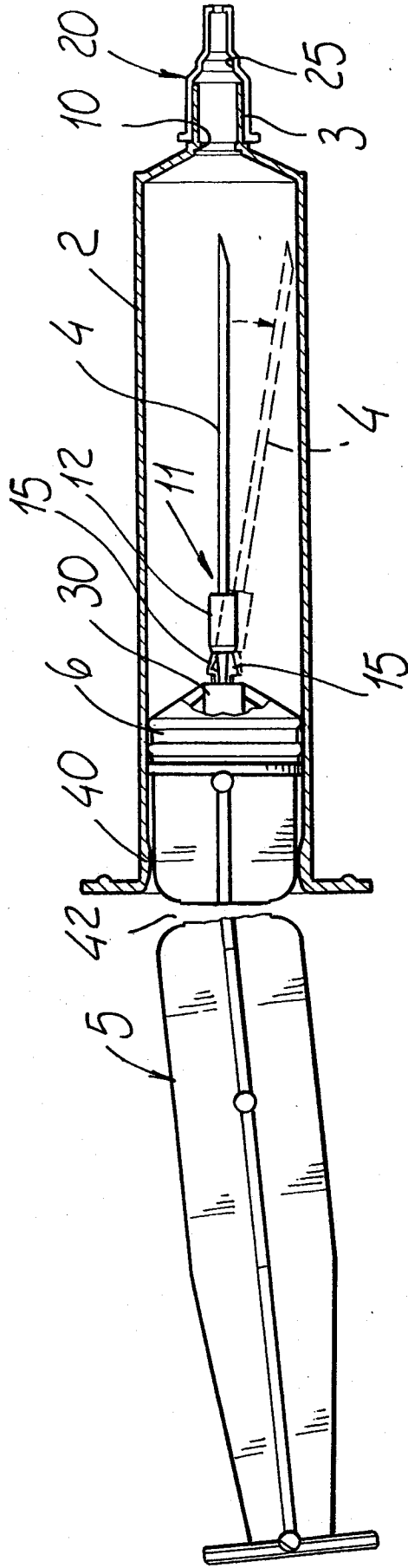


FIG. 7