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Extendable Container

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Abstract

An embodiment of the invention comprises an extendable container (10) for medical products including an open end (12), a closed end (13), an intermediate section (30) located between the open end (12) and the closed end (13), the intermediate section (30) including a concertina mechanism which is expandable to a plurality of lengths. The extendable container (10) is particularly suitable for laparoscopic or electrosurgical instruments and provides versatility in length compared to existing fixed length containers, amongst other advantages.

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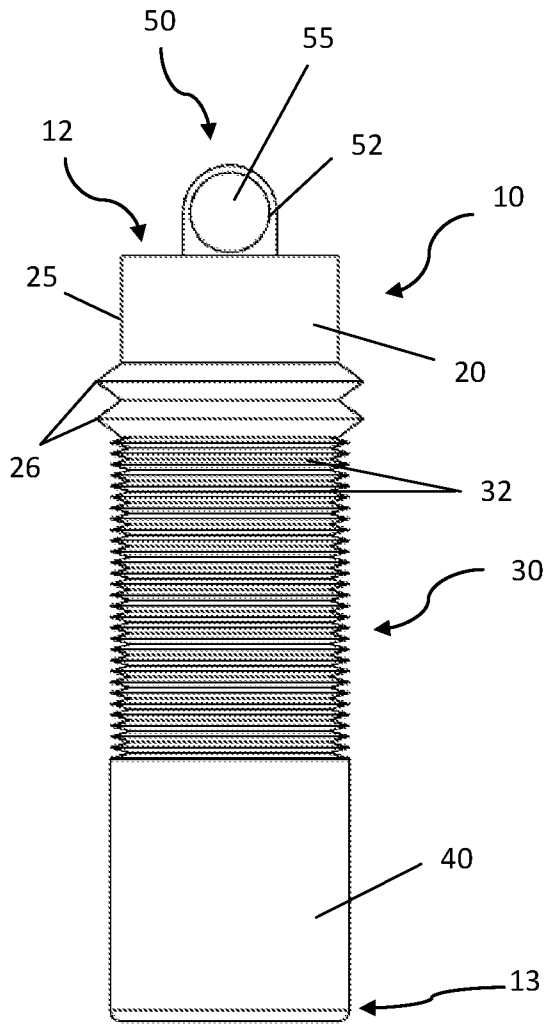


FIG. 1A

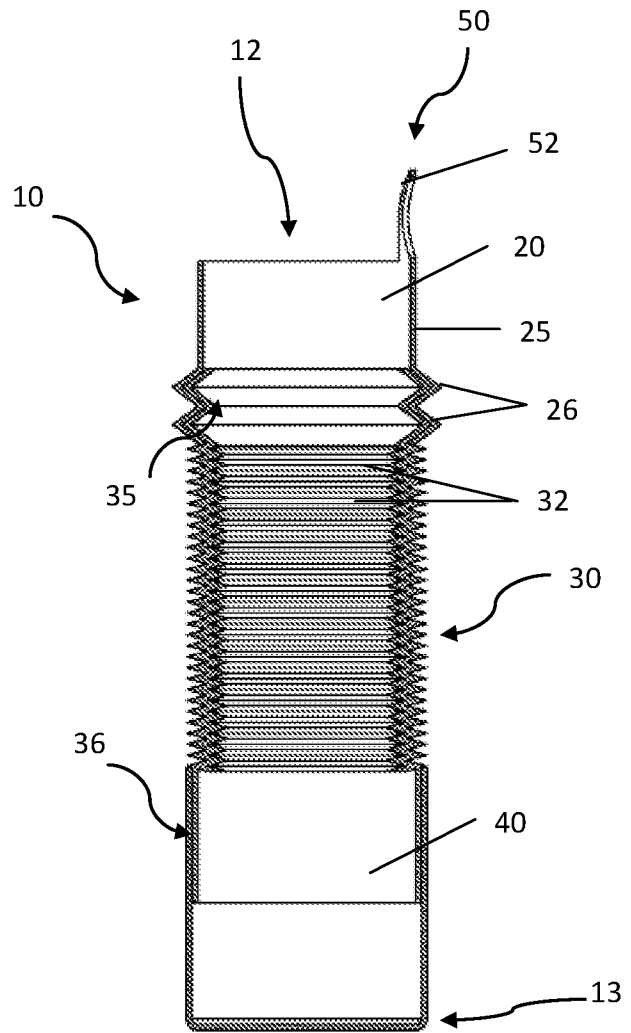


FIG. 1B

EXTENDABLE CONTAINER

Field of the Invention

This invention broadly relates to an extendable container suitable for receiving medical
5 equipment. The extendable container comprising the invention is particularly suitable for
receiving surgical instruments.

Background of the Invention

There has been substantial development in medical equipment in the last few decades.

10 Surgical instruments, in particular, which include items such as callipers, forceps, tweezers,
scalpels, probes, holders, scissors, speculums, scopes, retractors, dilators, cannula, tubing,
curettes, excavators, pliers, drills, and more, are designed as increasingly specialised tools for
surgeons and surgical assistants. With such diverse applications and designs, it can be
appreciated that modern medical equipment comes in a wide array of shapes and sizes.

15 Specialist medical containers have been developed for the safe stowing of medical equipment.
In the context of surgical operations, in particular, quivers commonly comprising an open
ended elongated tube made out of durable plastic and having a fixed length (eg. 150mm,
250mm, 350mm, 450mm, etc) are attached to or near sheeting or drapes covering a patient so
that a surgeon, or a surgeon's assistant, can have ready access to, and safely stow, the
20 instruments they need to perform the surgery. These quivers may be single use or reusable.

More specifically, it is common practice for electrosurgical and laparoscopic instruments to be
placed into and/or removed from quivers during surgery. Electrosurgical instruments may
include electrosurgical pencils, electrosurgical electrodes, suction coagulators, irrigation
devices, bipolar forceps or related accessories. In order to be fit for purpose, many such
25 electrosurgical instruments are long and thin in design. Laparoscopic instruments also include
long and narrow instruments that need to fit through small cuts in the abdominal wall. Such
instruments are generally used along with a laparoscope, a thin telescope fitted with a cold
light source and a video camera. Common laparoscopic instruments, besides the laparoscope,
include a needle driver (or needle holder) to assist with suturing, a trocar, grasper and surgical
30 mesh. Due to the long and thin nature of each of the needle driver, the laparoscope and the

grasper, it is common for a surgeon to employ a quiver that is removably attached to the sheets or drapes covering a patient, so that these instruments may be close to hand during the operation.

It can be costly and time consuming for hospitals, surgeries and other health care providers to source, store and maintain a sufficiently diverse range of medical equipment desirable for high quality medical practice. Similarly, it can be challenging for health care providers to source, store and maintain medical equipment containers of the appropriate size for the medical equipment they have.

A particular problem in the surgical theatre or medical equipment storage rooms is unnecessary cluttering of medical equipment and related accessories such as containers. In the worst case, cluttering can potentially obstruct or impede operations due to the limited space in surgical theatres. Other pressures may exist in the operating theatre. Time pressures can exist for a variety of reasons (eg. due to limited availability of in demand specialist medical equipment and/or medical specialists required for performing an operation; or the transient physical condition in which a patient is placed for an operation). Therefore, easy to use equipment with the capacity to alleviate space and time pressures may be advantageous.

In addition, it can be difficult for a medical practitioner to know precisely which equipment he or she is going to use during an operation before it is commenced. During the course of an operation, especially an operation which discloses new information about the patient as it progresses (gleaned, for example, via cameras such as laparoscopes), the steps to be taken and instruments to be employed may evolve with time. Therefore, versatile medical equipment which can be used in a variety of scenarios may be preferred.

Most quivers used today consist of an open ended elongated tube of fixed length as described above. Due to each quiver having a fixed length, multiple quivers may need to be employed.

This can result in cumbersome and cluttered conditions, whereby the surgeon has two or more quivers to match the surgical instruments used, or contemplated to be used, during an operation; furthermore, those responsible for sourcing and storing quivers may be required to keep many quivers of different lengths, which can create problems due to their bulky size.

Additionally, fixed length quivers can be cumbersome and not suitable for packing together with other items such as drapes, sponges, plastic hollowware and/or syringes in custom packs for surgery.

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In view of the shortcomings of the prior art, as well as the constant demand for improvement in medical equipment and accessories, it would be desirable to have a medical equipment container able to offer one or more of the following: versatility in size; a simple design which is easy to use; space saving benefits such as improved suitability for packaging with other items; and/or assistance with decluttering of medical operating or treatment rooms, or storage facilities.

An object of the present invention is to provide a container for medical equipment which improves over the prior art, or which at least provides a useful alternative.

10 **Summary of the Invention**

According to a first aspect of the invention, there is provided an extendable container suitable for receiving medical equipment, the container including an open end, a closed end, and an intermediate section located between the open end and the closed end, wherein the intermediate section includes a concertina mechanism expandable to a plurality of lengths.

15 In a preferred form, the concertina mechanism includes a plurality of coaxial subsections, each subsection able to be expanded or collapsed independently of the other subsection(s).

Preferably, when each of the plurality of coaxial subsections is in an expanded position, the extendable container is at a maximum length.

20 Preferably, when each of the plurality of coaxial subsections is in a collapsed position, the extendable container is at a minimum length.

Preferably each of the plurality of coaxial subsections includes an expandable fold. It is preferred that each expandable fold has a circular cross-section.

25 It is preferred that the extendable container includes an upper part. Preferably, the upper part is substantially cylindrical, or it includes a section which is substantially cylindrical. The open end of the extendable container is preferably located at one end of the upper part.

It is further preferred that the extendable container includes a lower part. Preferably, the lower part is substantially cylindrical, or it includes a section which is substantially cylindrical. The closed end of the extendable container is preferably located at one end of the lower part.

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Preferably the upper part and the lower part of the extendable container are each securely fixed to opposite end regions of the intermediate section.

The intermediate section is preferably glued to the upper part near or around a first end region of the intermediate section, and glued to the lower part near or around a second end region of the intermediate section.

The intermediate section preferably consists of ethylene vinyl acetate or an analogous elastic material such as another elastomeric polymer.

The upper part and the lower part of the extendable container preferably consist of polyethylene or an analogous material.

It is preferred that the extendable container of the present invention includes an attaching means located at or near the open end of the container. The attaching means is preferably for removably attaching the container to sheeting and/or drapery. The attaching means may include a tab which is located at or near the open end of the container, wherein the tab includes an aperture through which a part of the sheeting or drapery may pass. For example, where the sheeting or drapery includes a looping Velcro® strip, this may be passed through the aperture to removably attach the container to the sheeting or drapery. The attaching means may be integrally formed with the extendable container, and more specifically it may be integrally formed with the upper part of the container. Alternatively, the attaching means may comprise a split ring, hinged ring or other openable loop or band which is adapted to pass through an aperture located at or near the open end of the container. In other embodiments, the container may be attached to sheeting or drapery by adhesive tape, clips or similar means.

The extendable container the subject of the present invention may be adapted for use as a disposable container. When in a disposable form, the container may be extended as required by the user, used, and then after use it may be collapsed and ready for disposal.

The container described herein is preferably adapted for receiving electrosurgical and laparoscopic instruments. The container of the invention may also be adapted to be used with other long narrow instruments like probes or forceps.

Preferably, the open end of the extendable container includes an upper rim. It is further preferred that medical equipment may be received by the container whereby part of the equipment is supported by the upper rim of the container.

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As will be appreciated by the person skilled in the art, the expandable container offers many advantages. Its versatility in size permits it to be supplied in collapsed form, and expanded by the user shortly prior to use, so that space saving benefits may be realised; it permits a range of different lengths to be chosen, as the user need only expand the concertina mechanism as
5 much as is desirable in the particular context; it also provides many space saving advantages such as the capacity to be supplied more conveniently in a custom pack with other medical equipment for a specific procedure or operation; a further advantage is that the concertina mechanism operates to expand the length of the container without narrowing the internal dimensions of the container (compare with a telescoping mechanism in which the width of the
10 container decreases when the length of the container increases, thereby limiting the capacity for telescoping containers to receive one or more long medical instruments).

Brief Description of the Drawings

Possible and preferred features of the present invention will now be described with particular
15 reference to the accompanying drawings. However, it is to be understood that the features illustrated in and described with reference to the drawings are not to be construed as limiting on the scope of the invention.

In the drawings:

Figure 1A is a front view of an embodiment of the invention comprising an extendable
20 container in a fully collapsed position;

Figure 1B is a cross-sectional side view of the extendable container of Figure 1A;

Figure 2A is a front view of the extendable container of Figure 1A in a fully extended position;

Figure 2B is a cross-sectional side view of the extendable container of Figure 2A;

Figure 3A is a front view of the extendable container of Figure 1A in a partially extended
25 position;

Figure 3B is a cross-sectional side view of the extendable container of Figure 3A; and

Figure 4 is a perspective view of the extendable container of Figure 1A in a fully extended, partially extended and fully collapsed position.

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Detailed Description of the Invention

With reference to Figures 1A to 3B, an embodiment of the invention comprising an extendable container 10 for medical products (not shown) is depicted from front and cross-sectional side views. The container 10 includes an open end 12, a closed end 13, an intermediate section 30
5 located between the open end 12 and the closed end 13, and the intermediate section 30 includes a concertina mechanism which is expandable to a plurality of lengths.

The concertina mechanism includes a plurality of coaxial subsections 32, each subsection 32 is able to be expanded or collapsed independently of the other subsections 32. Each subsection includes an expandable fold 32a (not all folds 32a or subsections 32 are labelled in the Figures
10 1A to 3B for the purposes of clarity).

With reference to Figures 1A and 1B, the coaxial subsections 32 are each in a collapsed position and the extendable container 10 is at a minimum length.

With reference to Figures 2A and 2B, the coaxial subsections 32 are each in an expanded position and the extendable container 10 is at a maximum length.

15 With reference to Figures 3A and 3B, approximately half of the coaxial subsections 32 are in an expanded position and the extendable container 10 has a length in between the minimum and maximum lengths as shown in Figures 1A/1B and 2A/2B, respectively.

With further reference to Figures 1A to 3B, the expandable folds 32a each have a circular cross-section (whether or not they are expanded). There is an upper part 20 including a
20 substantially cylindrical section 25 and two bulges 26. At one end of the upper part 20 is located the upper end 12 of the extendable container 10. There is also a substantially cylindrical lower part 40 at one end of which there is located the closed end 13 of the extendable container 10.

The intermediate section 30 is secured by glue (not shown) near a first end region 35 to the
25 two bulges 26 of the upper part 20 of the container 10. The two bulges 26 provide an increased surface area to which the intermediate section 30 can be adhered; and since the shape of each bulge 26 is generally similar to that of an expanded coaxial subsection 32, this provides a secure fitting between the upper part 20 of the container 10, and the uppermost two coaxial subsections of the intermediate section 30. The intermediate section 30 is also

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secured by glue (not shown) near a second end region 36 to the substantially cylindrical lower part 40 of the container 10.

The intermediate section 30 consists of ethylene vinyl acetate and both the upper part 20 and the lower part 40 consist of polyethylene.

5 The extendable container 10 further includes an attaching means 50 near the open end 12 of the container. The attaching means 50 includes a tab 52 having a circular aperture 55 through which a part of the sheeting or drapery covering a patient may pass (not shown in the Figures). The tab 52 is integrally formed with the upper cylindrical part 20 of the extendable container 10.

10 The container 10 may be operated in a number of ways. The container 10 is able to be held by the user (not shown), and the intermediate section 30 can be expanded as required so that the open end 12 is moved away from the closed end 13 until the container 10 reaches the desired length (eg. the container may be partially extended as shown in Figures 3A/3B). The user may grip with a first hand the container 10 at or near the closed end 13, or at or near the open end
15 12, and grip with a second hand a part of the intermediate section 30, so that in expanding the intermediate section only the expandable subsections 32 of the intermediate section 30 located between the first hand and the second hand of the user are expanded. Alternatively, the user may grip with a first hand the container 10 at or near the closed end 13, and grip with a second hand the container 10 at or near the open end 12, and pull the ends 12, 13 away
20 from each other so that the intermediate section 30 is partially expanded (see Figures 3A/3B, for example), or fully expanded (see Figures 2A/2B).

The above described embodiment of the container 10 is a single use disposable container. The container 10 is adapted for receiving electrosurgical and laparoscopic instruments (not shown) of differing lengths such as laparoscopes, needle drivers/holders, graspers, electrosurgical
25 pencils, electrosurgical electrodes, suction coagulators, irrigation devices and bipolar forceps, amongst other instruments.

It will be appreciated by those skilled in the art that many modifications and variations may be made to the embodiments described herein without departing from the spirit or scope of the invention.

30 Throughout the specification and claims the word “comprise” and its derivatives are intended to have an inclusive rather than exclusive meaning unless the contrary is expressly stated or

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the context requires otherwise. That is, the word “comprise” and its derivatives will be taken to indicate the inclusion of not only the listed components, steps or features that it directly references, but also other components, steps or features not specifically listed, unless the contrary is expressly stated or the context requires otherwise.

- 5 In the present specification, terms such as “part” and “means” may refer to singular or plural items and are terms intended to refer to a set of properties, functions or characteristics performed by one or more items having one or more parts. It is envisaged that where a “part”, “means”, or similar term is described as being a unitary object, then a functionally equivalent object having multiple components is considered to fall within the scope of the term, and
- 10 similarly, where a “part” or “means” is described as having multiple items, a functionally equivalent but unitary object is also considered to fall within the scope of the term, unless the contrary is expressly stated or the context requires otherwise.

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Claims

1. An extendable container suitable for receiving medical equipment, the container including an open end, a closed end, and an intermediate section located between the open end and the closed end, wherein the intermediate section includes a concertina mechanism
5 expandable to a plurality of lengths.
2. The extendable container of claim 1, wherein the concertina mechanism includes a plurality of coaxial subsections, each subsection able to be expanded or collapsed independently of the other subsection(s).
3. The extendable container of claim 2, wherein each of the plurality of coaxial
10 subsections includes an expandable fold having a substantially circular cross-section.
4. The extendable container of any one of claims 1 to 3, wherein the container includes an attaching means for removably attaching the container to sheeting and/or drapery.
5. The extendable container of any one of claims 1 to 4, wherein the container is adapted for use as a disposable container.

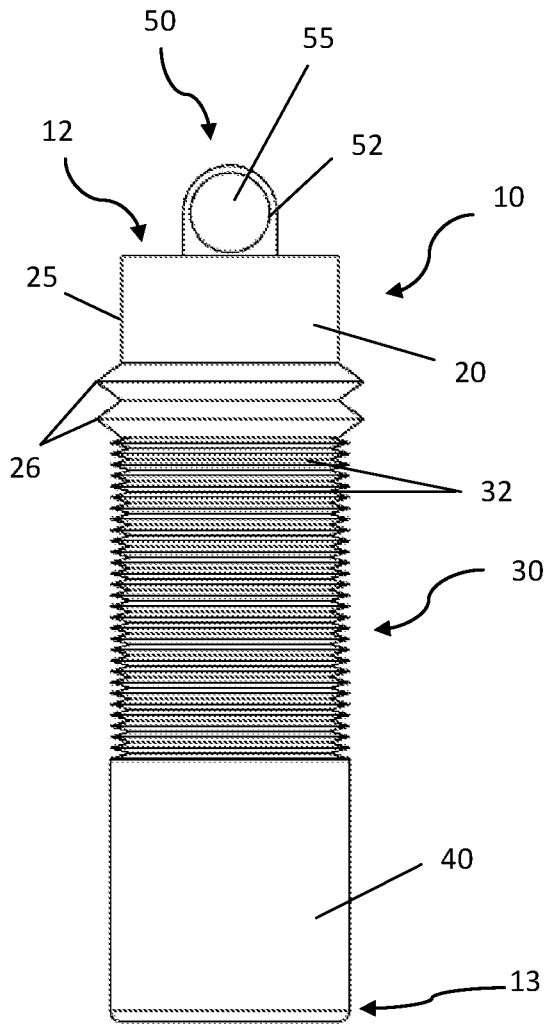


FIG. 1A

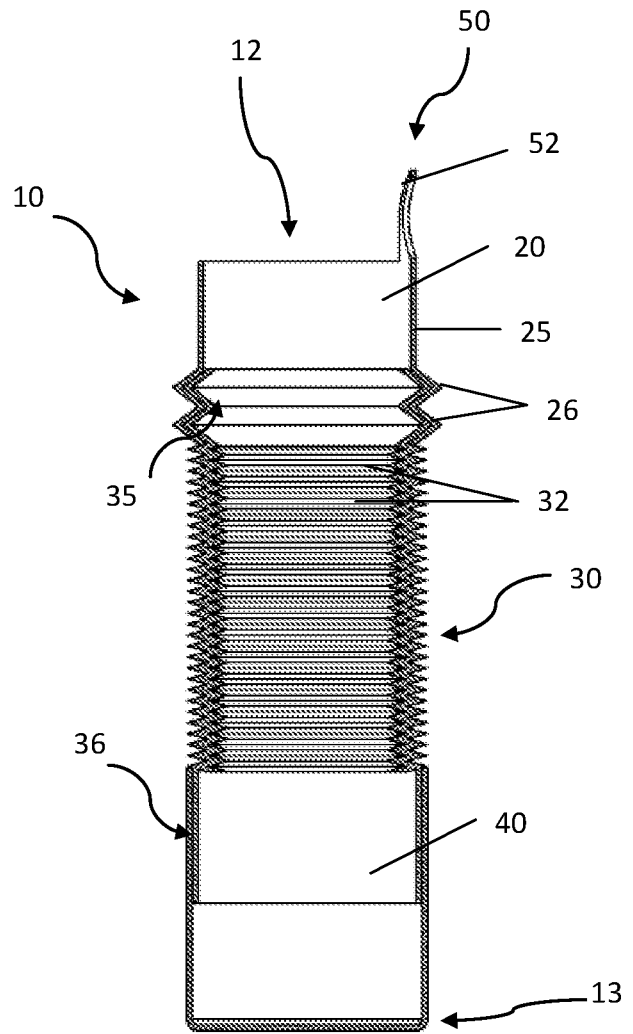


FIG. 1B

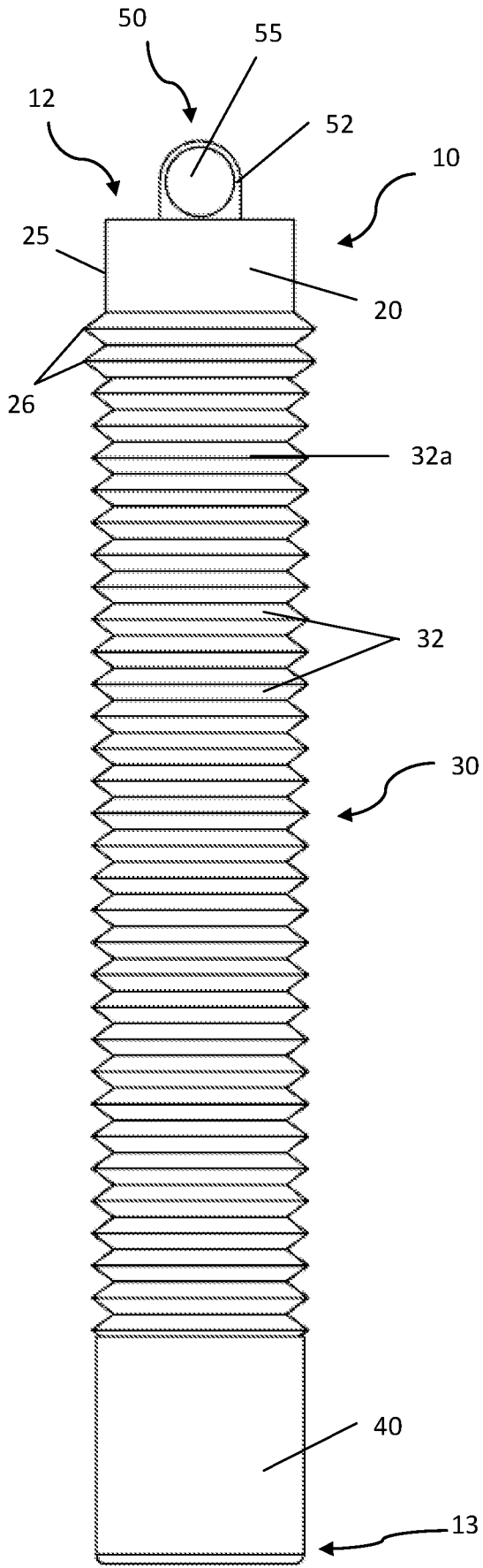


FIG. 2A

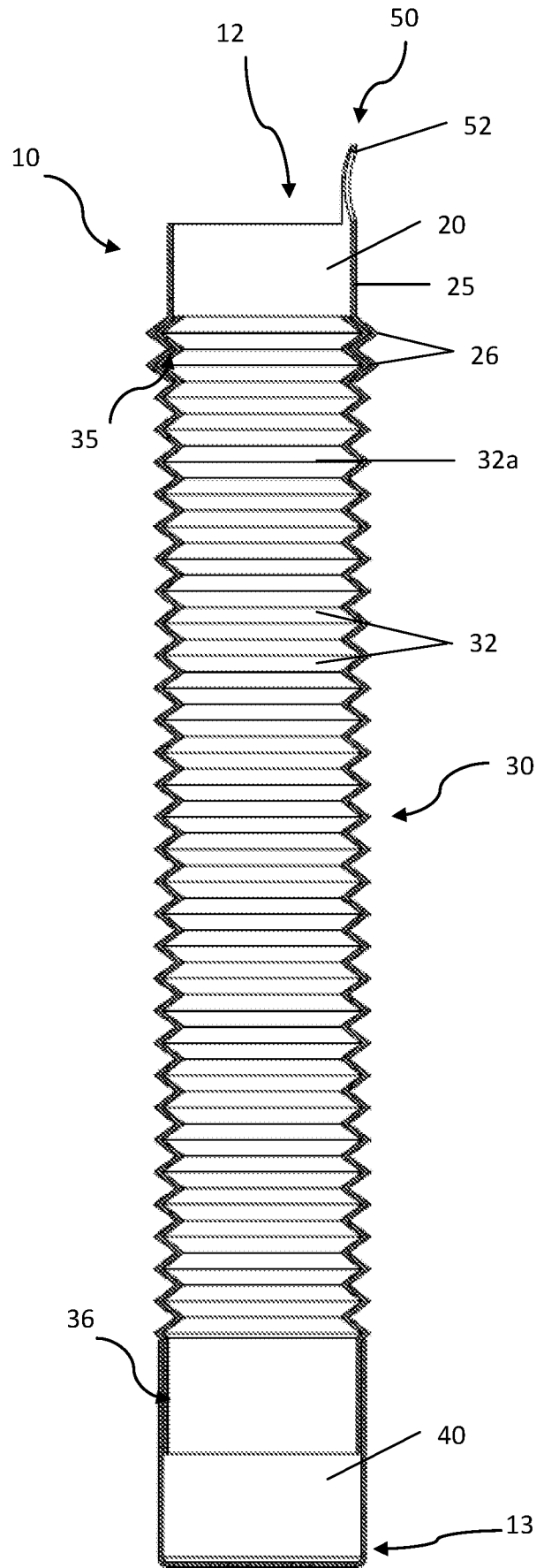


FIG. 2B

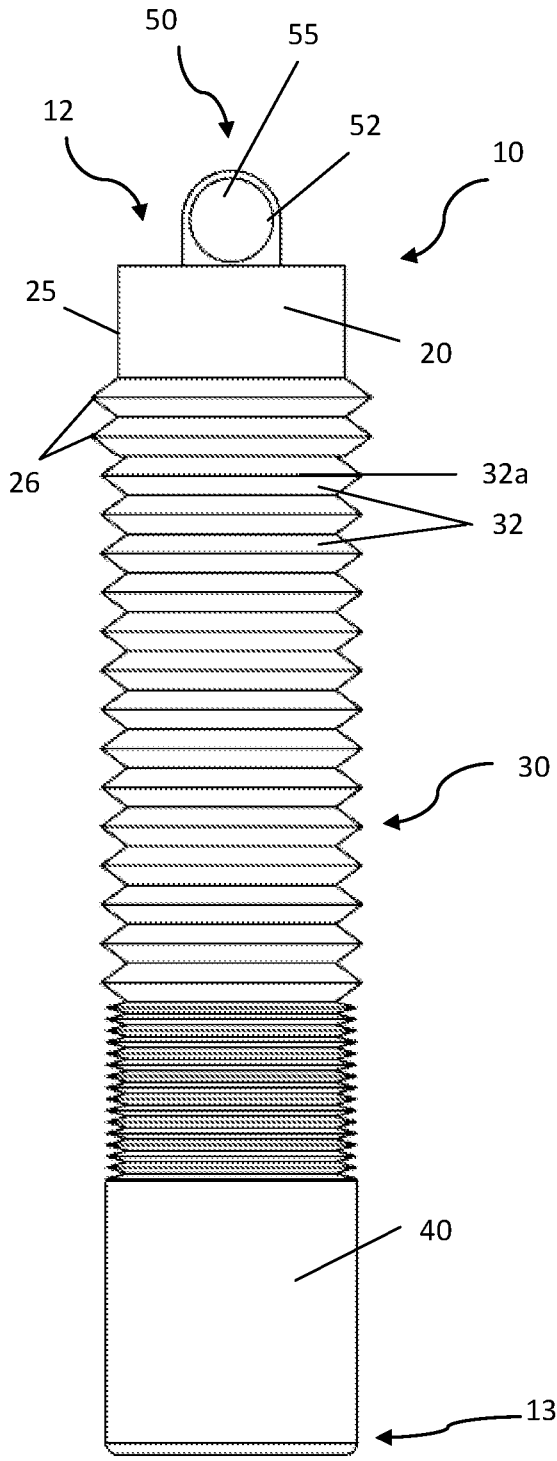


FIG. 3A

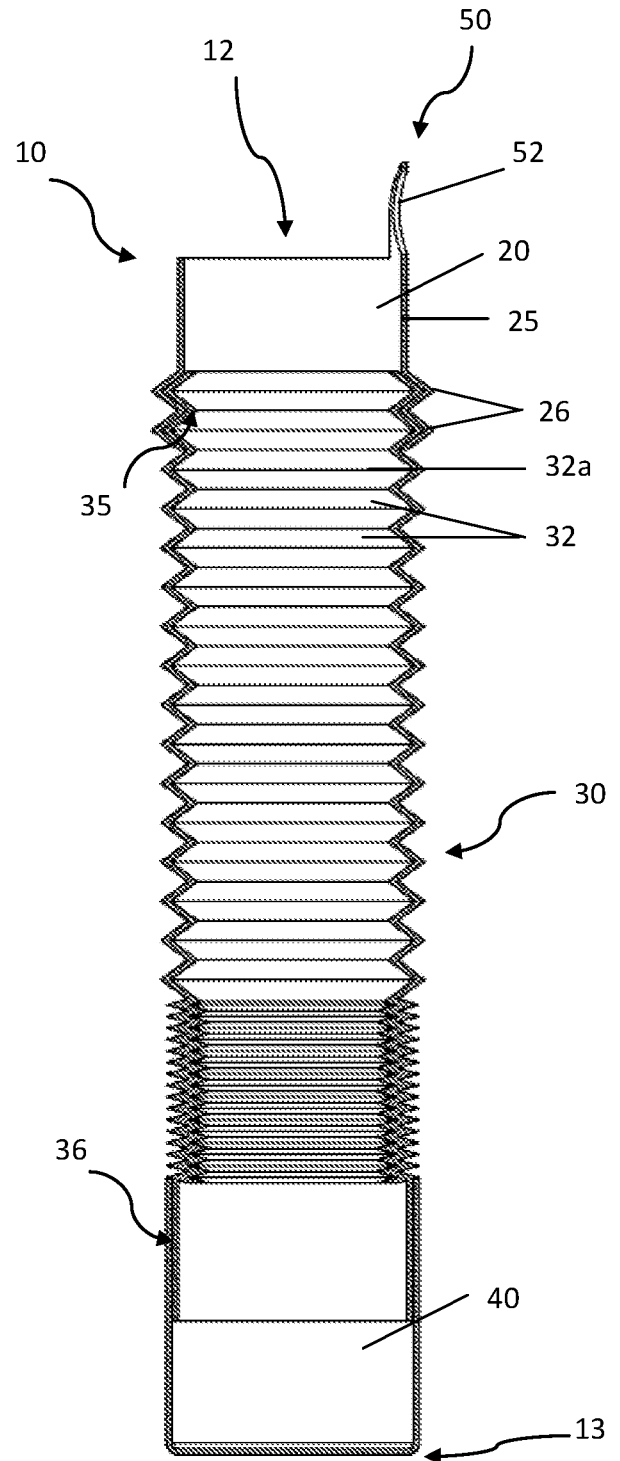


FIG. 3B

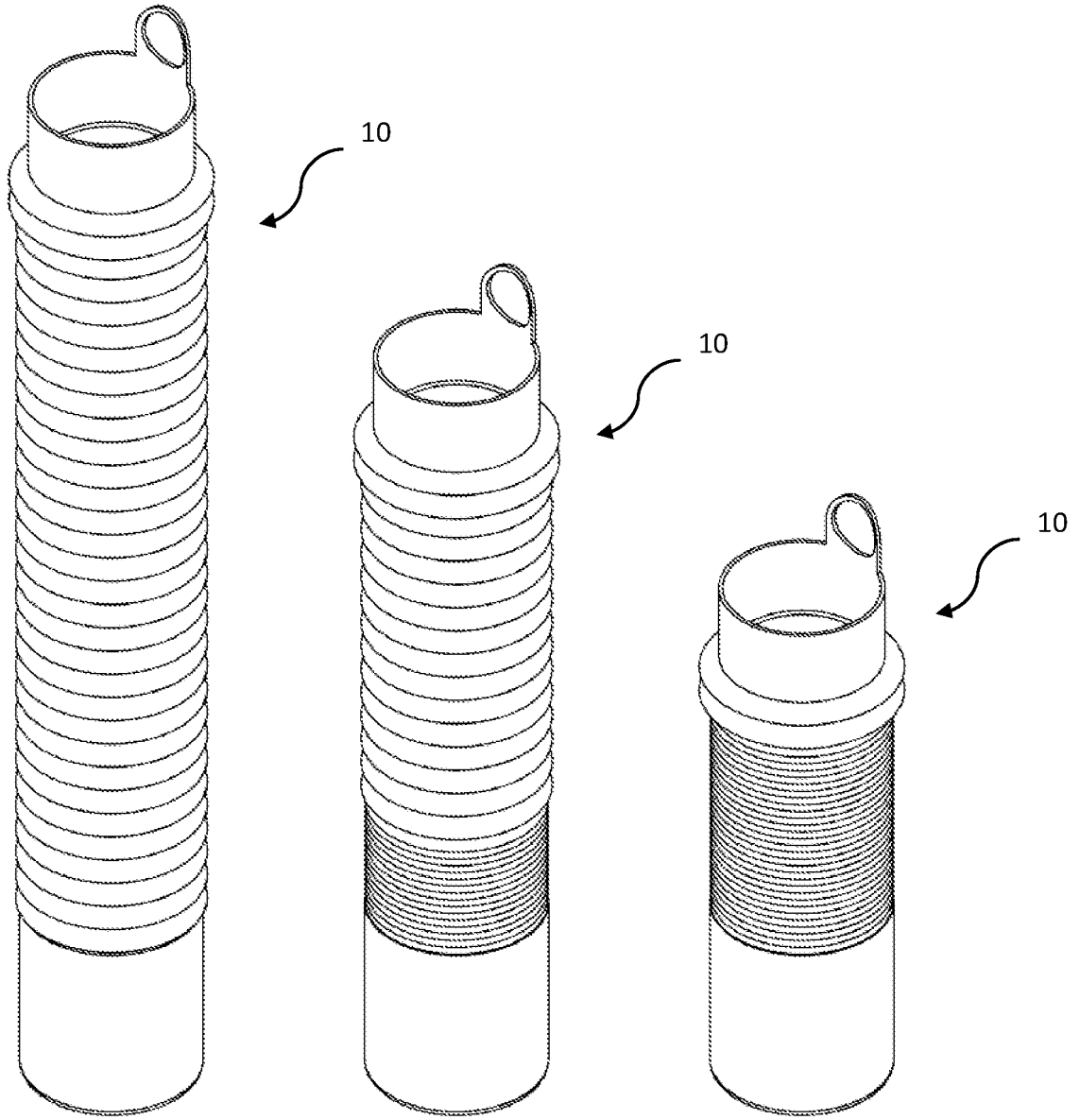


FIG. 4