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Magenband

Bande gastrique

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Description

[0001] This invention relates to a gastric banding device that encircles a portion of the stomach to form a stoma opening of reduced diameter.

[0002] Morbid obesity is associated with medical risks in terms of the development of additional diseases such as diabetes, hypertension, cardiac insufficiency and other socio-psychological problems, overall reducing life expectancy. Dietary management, psychiatric or dietary regiments are the first choice for treating morbid obesity, but as they depend on the goodwill of the patient, especially in the long run, these approaches often fail.

[0003] Various surgical approaches have been developed and used for treating morbid obesity. These include gastric bypasses, small bowel bypasses and stapling of portions of the stomach. The stapling techniques include horizontal and vertical stapling for reducing the volume of the stomach, as well as narrowing the stoma opening thus controlling the food intake of the stomach. However the latter approach, stapling, may not bring the desired results due to the fact that the staples frequently open or tend to cause perforations. Furthermore the stomach opening formed by staples widens over time, thus the effect is reduced or even eliminated.

[0004] A different approach to the problem specified above is described in U.S. Patent No. 4,416,267, which discloses a method for treating obesity by placing an inflatable balloon into the stomach. Such a device displaces volume inside the stomach, thereby reducing the effective free volume of the gastric portion causing the individual to feel no need for additional food intake. The balloon is inflated in the stomach to a predetermined volume and is left there for a certain period of time after which it is easily removed. However, this procedure although being physically easy to implement and basically being non-surgical, may lead to harmful results. The inflated balloon in the stomach is in constant contact with gastric mucous, and such contact for an extended period of time may give rise to gastric ulcers and intestinal blockage.

[0005] Recently, another approach has been developed based on placing a physical means (i.e. a gastric band) outside the stomach. A gastric band is placed around the upper part of the stomach, thereby creating an altered stomach opening of a reduced diameter, resulting in the restriction of food intake into the digestive portion of the stomach. Such a gastric-banding technique is simple as compared to the above-mentioned balloon-based technique. However, this band has no means for adjusting its diameter to obtain the optimal diameter of the stomach opening.

[0006] Adjustable gastric bands have been developed, and disclosed for example in U.S. Patent No. 4,592,339, as well as in "A Gastric Band with Adjustable Inner Diameter for Obesity Surgery", P. Forsell et al., Obes Surg., 1993, No. 3, pp. 303-306. According to this technique, the diameter of a belt-like band, when in a closed position thereof, may be adjusted. For this purpose, the band includes an inflatable portion in its interior part. Controllable inflating and deflating of this portion alters the stomach opening. Although this gastric band can retain the predetermined diameter of the stomach opening, obtaining of the proper opening is somewhat problematic.

[0007] U.S. 4,696,288 discloses a calibrating apparatus for using with a gastric band for controlling the diameter of the stomach opening by regulating the band's diameter. Such a gastric band is typically mounted with a laproscopic technique, disclosed for example in U.S. Patent No. 5,226,429.

[0008] It is an object of the present invention to provide a gastric band of a belt type, which can be attached to a patient's stomach in a safe manner and without damaging the stomach circumference.

[0009] It is an advantage of the present invention to provide such a band which can be easily mounted on the stomach utilizing a laproscopic technique.

[0010] It is a further advantage of the present invention to provide such a band that is easily enables its facile detectable by any suitable imaging means, thereby facilitating access to the band when additional surgical/laproscopic intervention is desired.

[0011] There is thus provided according to one aspect of the present invention, a gastric band for attaching around a circumference of a patient's stomach so as to define the diameter of the stomach opening, the band comprising:

(a) outer and inner surfaces, wherein the inner surface engages the stomach, and at least the outer surface is formed by an elongated member substantially non-extendable along a longitudinal axis thereof;

(b) a through-going opening made in said member and located so as to define an end portion of the band having a predetermined length; and

(c) an opposite end portion of the band shaped so as to be insertable into said through-going opening for adjusting a desired inner diameter of the band in its closed operating position and fastening the opposite end portion to the outer surface of the band.

[0012] The gastric band is of a belt type, and also comprises a suitable fastening means, which may utilize a required number of stitches or the provision of bolt-and-nut arrangements on the band. The fastening means may also be in the form of teeth-like edges of the opposite end portion and a correspondingly shaped through-going opening.

[0013] The outer and inner surface may be formed either of the same material, or of different materials, provided that the material of the outer surface is substantially not-extendable.

[0014] Preferably, at least the outer surface of the band is made of poly-tetra-fluoro-ethylene, known as Gortex. The material of the inner surface of the band engaging

the stomach may be silicone. The band, when in the operation position thereof is such that its inner surface engaging the stomach has a substantially circular shape.

[0015] The predetermined length of the end portion is such as to enable the detection of the gastric band by a laproscopic inspection tool.

[0016] According to another aspect of the present invention, there is provided a system for laproscipically attaching a gastric band around a patient's stomach so as to define a certain diameter of the stomach opening,
the system comprising a calibration device which is insertable into the stomach at a predetermined depth and comprises:

an upper portion having variable volume, and
a lower projection-like portion having a diameter substantially equal to said certain diameter of the stomach opening to be defined by the band, the location of said projection-like portion when in the inserted position of the calibration device defining the location of the band with respect to the stomach;
said band comprising:

- outer and inner surfaces, wherein the inner surface engages the stomach, and at least the outer surface is formed by an elongated member substantially non-extendable along a longitudinal axis thereof;
- a through-going opening made in said member and located so as to define an end portion of the band having a predetermined length; and
- an opposite end portion of the band shaped so as to be insertable into said through-going opening for adjusting a desired inner diameter of the band in its closed operating position and fastening the opposite end portion to the outer surface of the band.

[0017] In order to understand the invention and to see how it may be carried out in practice, a preferred embodiment will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Figs. 1a and 1b are schematic illustrations of a gastric band in its open and closed positions, respectively, constructed according to one embodiment of the invention;
Fig. 2 schematically illustrates the band of Figs. 1a and 1b in its operation position being attached to the patient's stomach;
Figs. 3a and 3b are schematic illustrations of a gastric band in its open and closed positions, respectively, constructed according to another embodiment of the invention;
Figs. 4a and 4b are schematic illustrations of a gastric band in its open and closed positions, respectively, constructed according to yet another embodiment of the invention;
Figs. 5a and 5b are schematic illustrations of a gastric band in its open and closed positions, respectively, constructed according to yet another embodiment of the invention;
Figs. 6a and 6b schematically illustrate two steps of a calibration procedure carried out prior to mounting the band on the stomach; and
Figs. 7a to 7f illustrates five sequential steps, respectively, of mounting the band of Figs. 3a-3b onto the patient's stomach.

[0018] Referring to Figs. **1a** and **1b** there is illustrated a gastric band, generally designated **1,** constructed according to one embodiment of the invention. The band is typically an elongated strap having two opposite end portions **1a** and **1b**. The portion **1b** is substantially cone shaped, while the end portion **1a** is formed with a through-going, substantially elliptically-shaped opening **4** displaced from the corresponding butt-end of the band **1** by a certain length L_0, the purpose of which will be described further below. For example, the band's dimensions may be as follows:

1) the length L_1 of the entire band is about 15cm;
2) the length L_0 is about 3 cm;
3) the width h_0 of the band is 2cm;
4) the thickness h_1 of the band is 2 mm; and
5) the long axis $\mathbf{L_2}$ of the opening 4 is about 1-7mm.

[0019] As clearly seen in Fig. **1b**, the band 1 has outer and inner surfaces **2a** and **2b,** respectively. To attach the band 1 around a stomach (not shown here), the cone shaped end portion **1b** passes through the opening 4, and is fastened along a corresponding location on the band by a suitable fastening means, for example by stitches 6. Thereafter, the free part of the end portion **1b** is cut off by any suitable means, as shown in a dashed line. The opposite end portion **1a,** whilst being optionally partly stitched to the band 1, extends away therefrom. The band 1 is made of a polymer material, which is substantially non-extendable along its longitudinal axis. For example, poly-tetra-fluoro-ethylene (i.e. Gortex) can be used for manufacturing the band **1.**

[0020] Turning now to Fig. 2, there is illustrated that, when in the operative position of the band 1 being attached around a stomach **10,** the free end portion **1a** protrudes from the band. It will be readily understood that such a protrusion would be easily detected by any suitable imaging means. This is a very important feature facilitating the access to the band when additional surgical/laproscopic intervention is desired

[0021] As further seen in Fig. 2, the band 1 actually defines two portions **10a** and **10b** of the stomach **10,** and defines the diameter of a so-called stomach opening (not seen here) underneath the band 1. The portions **10a** and **10b** are fastened to each other by stitches **12** or the like within the vicinity of the band **1,** thereby fixing its relative

location on the stomach. It should be noted that stitches 6, as well as the stitches **12,** may be replaced by any other suitable fastening means.

[0022] Reference is made to Figs. 3a and 3b, illustrating a gastric band **14** in its opened and closed positions, respectively. The band **14** has somewhat different construction as compared to the band **1.** To facilitate understanding, same reference numbers are used for identifying those components, which are identical in the bands **1** and **14.** Here, at least one so-called "bolt-and-nut" arrangement is provided serving as the fastening means. To this end, as shown in the figures in a self-explanatory manner, spaced-apart mushroom-like bolts, generally at **16,** project upwardly from the upper surface **2a.** Consequently, holes **18** (four in the present example) are aligned along the longitudinal axis of the band in a spaced-apart parallel relationship. The diameter of the hole **18** corresponds to that of the head portion of the mushroom-like bolt **16** to put the bolt-and-nut arrangement into its engaged position, thereby closing the band.

[0023] In this specific example, the bolts **16** project from a plate-like support 20, forming together an integral assembly, generally designated 22. The assembly **22** is attached to the upper surface **2a** of the band **14** by stamping. The entire band, except for the assembly **22,** may be made of a polymer material like Gortex, while the assembly **22** may be made of a substantially rigid silicone. The bolts **16** (and consequently two jocally adjacent holes 18) are spaced from each other by the length L_4 of about 7mm, the dimensions of the plate **20** being as follows: the length L_3 = 2cm, and the width h_3=12mm. As shown in Fig. **3b,** after closing the band on the patient's stomach, two stitches **24** (or the like) are provided to ensure the fixed diameter of the band, and thereby of the stomach opening. Similarly to the previously described embodiments, the corresponding part of the end portion **1b** is cut off, while the opposite part **1a** protrudes from the band to be detectable.

[0024] Figs. **4a** and **4b** illustrate a gastric band, generally at **26,** according to yet another embodiment of the invention. Similarly, same reference numbers are used for identifying those components, which are identical in the bands 1, **14** and **26.** The band **26,** in distinction to the bands **1** and **14,** has its inner surface **2b** formed of a relatively flexible material relative to that of the outer surface. For example, this may be implemented by coating a center part of the inner surface of the band **26** with silicone. As for the outer surface **2a** of the band **26,** as well as the inner surface thereof within the end portions, they are made of a substantially non-extendable material. The end portion 1a should be made of such a non-extendable material which is not too rigid in order not to harm the stomach, e.g. Gortex.

[0025] Figs. 5a and 5b illustrate yet another construction of a gastric band **27** using the same reference numbers for identifying the common elements in the bands **1, 14, 26** and **27.** In the band **27,** similar to the band **26,** the center part of its inner surface is formed with a substantially flexible material, e.g. flexible silicone, while the end portions are made of a non-extendable material. As for the fastening means, in the band **27** the end portion 1b is formed with teeth-like edges 16'. Consequently, a through-going opening 4' is shaped in a manner to define a slot 18' allowing a forward movement of the portion **1b** through the opening **4',** but preventing its sliding back out of the opening **4'** in the operating (closed) position of the band **27.** To this end, the center part of the outer surface **2a,** as well as the end portion **1b,** are made of a substantially rigid material, e.g. rigid silicone. As indicated above, the opposite end portion **1a** should be made of a substantially flexible material.

[0026] Reference is now made to Figs. **6a** and **6b** illustrating two steps of a typically performed calibration stage for determining the desired diameter of the stomach opening and defining its location to mount a gastric band there. To this end, a calibrating device, generally designated **28,** is used. The construction and operation of such a calibration device are known *per se,* and therefore need not be described in detail, except to note the following. The device **28** comprises an upper, balloon-like portion **28a** associated with a suitable pump, which is not specifically shown, and a lower projection **28bb** having a substantially circular cross-section of the desired diameter $\mathbf{D_0}$.

[0027] Upon inserting the device **28** inside the stomach **10** through a stomach inlet **29,** the balloon-like portion **28a** is inflated up to the volume **V,** corresponding to the diameter $\mathbf{D_1}$ of the portion **28a,** so as to substantially engage the inner circumference of the stomach **10.** This maximum diameter $\mathbf{D_1}$ of the portion **28a** is determined in accordance with the inflating pressure.

[0028] Thereafter, the device is partially deflated to such a volume $\mathbf{V_2}$ that corresponds to the diameter $\mathbf{D_2}$ of the portion **28a,** and pulled upwardly up to the inlet **29.** Such a position of the device **28** having the known diameter $\mathbf{D_2}$ of its balloon-like portion **28a** actually allows for locating the projection **28b,** thereby defining the location for mounting the gastric band. The calibrating device 28 also comprises a pipe 30 installed thereinside, serving for aspirating the stomach contents and checking whether the mounting of the band caused any damage to the stomach itself, as will be described more specifically further below with reference to Fig. **7f.**

[0029] Referring to Figs. **7a** to **7f,** there are illustrated the main operational steps for laproscopic mounting of the gastric band, for example constructed as described above with reference to Figs. **3a** and **3b,** on the patient's stomach. As indicated above, the position of the projection **28b** defines the exact location for mounting the band. Hence, it defines the convenient locations for cuttings **32a** and **32b** to be made in the stomach connecting tissue **32** at opposite sides of the stomach **10.** An articulated gripping device **34** is typically used for mounting the gastric band on the stomach **10.** Fig. **7a** illustrates that the articulated gripping device **34** is sequentially pushed through the openings **32b** and **32a,** to clamp the cone

shaped end portion **1b** of the band **14.** Then, by pulling the device **34,** the band is threaded through the openings **32a** and **32b,** thereby engaging the back-side of the stomach (Fig. **7b).**

[0030] This having been done, a pair of gripping devices **36** and **37** are used for supporting the end portion **1a** of the band, while the device **34** passes through the opening **4** and proceeds towards the cone shaped portion **1b** (Fig. 7c). As shown in Figs. **7d** and **7e,** by manipulating the gripping devices **36** and **37,** the cone shaped end portion **1b** is threaded through the opening **4** and pulled to close the band in a manner described above with reference to Figs. 3a and 3b. The closed operating position of the band is illustrated in Fig. 7f.

[0031] After completing the mounting of the gastric band 14, a pair of stitches 24 are provided and, optionally, depending on the desired diameter, the end portion **1b** is partly cut off. To check whether the entire operation did not damage the stomach and did not completely block the stomach opening, the following procedure is carried out. After the total deflation of the balloon **28a** (through a suitable pump-valve assembly **38**) and pulling of the calibrating device 28 upwardly towards the upper part of the paunch, a colored liquid is injected into the pipe **30** through an upper opening **39** of the device **28.** It will be readily understood that the non-passage of this liquid into the stomach through the lower end of the pipe **30** indicates of the blockage of the stomach opening. Likewise, any dripping of the colored liquid out of the stomach would indicate of the dangerous condition of stomach perforation, which should immediately be treated.

[0032] Those skilled in the art will readily appreciate that various modifications and changes can be applied to the invention as hereinbefore exemplified without departing from its scope defined in and by the appended claims. For example, the gastric band may have any appropriate dimensions, providing it is capable of providing the desired diameter of the stomach opening and its free end portion is detectable by a suitable imaging system.

Claims

1. A gastric band (1,14,26,27) for attaching around a circumference of a patient's stomach so as to define a required diameter of the stomach opening, the gastric band being **characterized in that**:

(a) it has a non-inflatable belt-like shape such that the band (1,14,26,27) in a closed position thereof has a fixed diameter, the band is made of a substantially soft not-extendable material, and is configured to define outer and inner surfaces (2a, 2b) for engaging with the stomach by the inner surface (2b) of the band (1,14,26,27);
(b) the band is formed with a through-going opening (4, 4') spaced from a butt-end of the band a predetermined distance to define an extended end portion (1a) of the band (1,14,26,27) having a predetermined length, such that, when the band is closed, said end portion freely protrudes from the band; and has an opposite end portion (1b) shaped so as to be insertable into said through-going opening (4, 4') for adjusting a required inner diameter of the band (1,14,26,27) in its closed operating position and fastening the opposite end portion (1b) to the outer surface of the band (1,14,26,27) upon establishing the desired diameter, said extended end portion (1a) and said opposite portion (1b) serving for gripping the band (1,14,26,27) while mounting it onto the stomach and adjusting the diameter of the band (1,14,26,27) to bring it into its operating closed position, said extended free protruding end portion (1a) of the band enabling detection of the band while in the operative position thereof mounted on the stomach and enabling gripping the band for readjusting the diameter of the stomach opening after the band is brought into its operating position.

2. The gastric band according to Claim 1, and also comprising a fastening means for fastening said opposite end portion (1b) of the band (1,14,26,27) when in said operating position thereof

3. The gastric band according to Claim 1 or 2, wherein said fastening means utilizes one or more stitches (6,12,24) applied to the band.

4. The gastric band according to Claim 2 or 3, wherein said fastening means comprises at least one mushroom-like projection (16) located on the outer surface (2a) of the band , and at least one through-going hole (18) for receiving said at least one mushroom-like projection (16), when in the operating position of the band.

5. The gastric band according to Claim 2 or 3, wherein said fastening means comprises a plurality of teeth (16') extending along opposite edges of said opposite end portion (1b), said opening (4') being shaped for receiving the teeth-like opposite end portion so as to allow its movement in a forward direction through said opening (4') and reducing its sliding in a reverse direction.

6. The gastric band according to Claim 1, wherein at least said end portion (1a) is made of a substantially flexible material.

7. The gastric band according to Claim 1, wherein said outer and inner surfaces (2a, 2b) are formed of the same material.

8. The gastric band according to Claim 1, wherein said

outer and inner surfaces (2a, 2b) are formed of different first and second materials, respectively.

9. The gastric band according to Claim 8, wherein said second material is substantially flexible.

10. The gastric band according to Claim 7 or 8, wherein either one of said first and second materials or both of them comprise silicone.

11. The gastric band according to Claim 7 or 8, wherein either one of said first and second materials or both of them comprise poly-tetra-fluoro-ethylene.

12. The gastric band according to Claim 7, wherein the material of said outer and inner surfaces (2a, 2b) comprises poly-tetra-fluoro-ethylene.

13. The gastric band according to Claim 1, wherein said inner surface (2b) engaging the stomach has substantially circular shape when in the operating position of the band (1,14,26,27).

14. The gastric band according to Claim 1, wherein said predetermined length of the end portion is such as to enable the holding of the band and the detection of the gastric band (1,14,26,27) by a laproscopic inspection tool.

15. A system for laproscopically attaching a non-inflatable gastric band according to any one of preceding Claims, around a patient's stomach so as to define a certain diameter of the stomach opening, the system comprising a calibration device (28) which is insertable into the stomach at a predetermined depth and a pair of articulated gripping devices, wherein the calibration device (28) comprises:

an upper portion (28a) having variable volume, and
a lower projection-like portion (28b) having a diameter substantially equal to said certain diameter of the stomach opening to be defined by the band, the location of said projection-like portion when in the inserted position of the calibration device defining the location of the band with respect to the stomach.

Patentansprüche

1. Magenband (1, 14, 26, 27) zum Anbringen um einen Umfang des Magens eines Patienten, um einen erforderlichen Durchmesser der Magenöffnung festzulegen, wobei das Magenband **dadurch gekennzeichnet ist, daß**:

(a) es eine nicht aufblasbare riemenartige Form hat, so daß das Band (1, 14, 26, 27) in einer geschlossenen Position einen festen Durchmesser hat, das Band aus einem im wesentlichen weichen nicht dehnbaren Material hergestellt und so konfiguriert ist, daß es eine Außen- und eine Innenfläche (2a, 2b) zum Herstellen eines Eingriffs mit dem Magen durch die Innenfläche (2b) des Bands (1, 14, 26, 27) bildet;
(b) das Band mit einer Durchgangsöffnung (4, 4') gebildet ist, die von einem Endstück des Bands einen vorbestimmten Abstand hat, um einen verlängerten Endabschnitt (1a) des Bands (1, 14, 26, 27) mit einer vorbestimmten Länge so festzulegen, daß bei geschlossenem Band der Endabschnitt vom Band frei vorsteht; und einen entgegengesetzten Endabschnitt (1b) hat, der so geformt ist, daß er in die Durchgangsöffnung (4, 4') zum Einstellen eines erforderlichen Innendurchmessers des Bands (1, 14, 26, 27) in seiner geschlossenen Arbeitsposition und Befestigen des entgegengesetzten Endabschnitts (1b) an der Außenfläche des Bands (1, 14, 26, 27) nach Herstellen des Solldurchmessers einführbar ist, wobei der verlängerte Endabschnitt (1a) und der entgegengesetzte Abschnitt (1b) zum Ergreifen des Bands (1, 14, 26, 27) während seiner Anordnung am Magen und Einstellen des Durchmessers des Bands (1, 14, 26, 27) dienen, um es in seine geschlossene Arbeitsposition zu bringen, wobei der verlängerte freie vorstehende Endabschnitt (1a) des Bands die Detektion des Bands ermöglicht, während es sich in seiner am Magen angeordneten Arbeitsposition befindet, und das Ergreifen des Bands zum Neueinstellen des Durchmessers der Magenöffnung ermöglicht, nachdem das Band in seine Arbeitsposition gebracht ist.

2. Magenband nach Anspruch 1, ferner mit einer Befestigungseinrichtung zum Befestigen des entgegengesetzten Endabschnitts (1b) des Bands (1, 14, 26, 27), wenn es sich in seiner Arbeitsposition befindet.

3. Magenband nach Anspruch 1 oder 2, wobei die Befestigungseinrichtung einen oder mehrere Stiche (6, 12, 24) nutzt, die am Band angebracht sind.

4. Magenband nach Anspruch 2 oder 3, wobei die Befestigungseinrichtung aufweist: mindestens einen pilzartigen Vorsprung (16), der auf der Außenfläche (2a) des Bands liegt, und mindestens ein Durchgangsloch (18) zum Aufnehmen des mindestens einen pilzartigen Vorsprungs (16) in der Arbeitsposition des Bands.

5. Magenband nach Anspruch 2 oder 3, wobei die Be-

festigungseinrichtung aufweist: mehrere Zähne (16'), die sich entlang von entgegengesetzten Kanten des entgegengesetzten Endabschnitts (1b) erstrecken, wobei die Öffnung (4') zum Aufnehmen des zahnartigen entgegengesetzten Endabschnitts geformt ist, um seine Bewegung in Vorwärtsrichtung durch die Öffnung (4') zu ermöglichen und sein Gleiten in Rückwärtsrichtung zu reduzieren.

6. Magenband nach Anspruch 1, wobei mindestens der Endabschnitt (1a) aus einem im wesentlichen flexiblen Material hergestellt ist.

7. Magenband nach Anspruch 1, wobei die Außen- und Innenfläche (2a, 2b) aus dem gleichen Material gebildet sind.

8. Magenband nach Anspruch 1, wobei die Außen- und Innenfläche (2a, 2b) aus einem ersten bzw. zweiten unterschiedlichen Material gebildet sind.

9. Magenband nach Anspruch 8, wobei das zweite Material im wesentlichen flexibel ist.

10. Magenband nach Anspruch 7 oder 8, wobei das erste und/oder zweite Material Silikon aufweisen.

11. Magenband nach Anspruch 7 oder 8, wobei das erste und/oder zweite Material Polytetrafluorethylen aufweisen.

12. Magenband nach Anspruch 7, wobei das Material der Außen- und Innenfläche (2a, 2b) Polytetrafluorethylen aufweist.

13. Magenband nach Anspruch 1, wobei die Innenfläche (2b), die einen Eingriff mit dem Magen herstellt, in der Arbeitsposition des Bands (1, 14, 26, 27) im wesentlichen kreisförmig ist.

14. Magenband nach Anspruch 1, wobei die vorbestimmte Länge des Endabschnitts so ist, daß das Halten des Bands und die Detektion des Magenbands (1, 14, 26, 27) durch ein laparoskopisches Kontrollwerkzeug möglich sind.

15. System zum laparoskopischen Anbringen eines nicht aufblasbaren Magenbands nach einem der vorstehenden Ansprüche um den Magen eines Patienten, um einen bestimmten Durchmesser der Magenöffnung festzulegen, wobei das System eine Kalibriervorrichtung (28), die in den Magen in einer vorbestimmten Tiefe einführbar ist, und ein Paar gelenkige Greifvorrichtungen aufweist, wobei die Kalibriervorrichtung (28) aufweist:

einen oberen Abschnitt (28a) mit variablem Volumen und

einen unteren vorsprungartigen Abschnitt (28b) mit einem Durchmesser, der im wesentlichen gleich dem bestimmten Durchmesser der Magenöffnung ist, der durch das Band festzulegen ist, wobei die Lage des vorsprungartigen Abschnitts in der eingeführten Position der Kalibriervorrichtung die Lage des Bands im Hinblick auf den Magen festlegt.

Revendications

1. Bande gastrique (1, 14, 26, 27) destinée à être fixée autour d'une circonférence de l'estomac d'un patient de façon à définir un diamètre requis de l'ouverture de l'estomac, la bande gastrique étant **caractérisée en ce que** :

a) elle présente une forme de ceinture non gonflable de telle sorte que la bande (1, 14, 26, 27) a, dans sa position fermée, un diamètre fixe, la bande est fabriquée dans un matériau non expansible sensiblement souple, et est configurée pour définir des surfaces externe et interne (2a, 2b) destinées à se mettre en prisé avec l'estomac par la surface interne (2b) de la bande (1, 14, 26, 27) ;
b) la bande est conçue avec une ouverture de bout en bout (4, 4') disposée à une distance prédéterminée d'une extrémité de bout de la bande pour définir une partie d'extrémité étendue (1a) de la bande (1, 14, 26, 27) présentant une longueur prédéterminée, de telle sorte que, lorsque la bande est fermée, ladite partie d'extrémité fait saillie librement de la bande ; et présente une partie d'extrémité opposée (1b) formée de façon à être insérable dans ladite ouverture de bout en bout (4, 4') pour ajuster un diamètre interne requis de la bande (1, 14, 26, 27) dans sa position de fonctionnement fermée et fixer la partie d'extrémité opposée (1b) à la surface externe de la bande (1, 14, 26, 27) en établissant le diamètre souhaité, ladite partie d'extrémité étendue (1a) et ladite partie opposée (1b) permettant de saisir la bande (1, 14, 26, 27) tout en la fixant sur l'estomac et en ajustant le diamètre de la bande (1, 14, 26, 27) pour l'amener dans sa position fermée de fonctionnement, ladite partie d'extrémité étendue (1a) faisant saillie librement de la bande permettant la détection de là bande pendant qu'elle est montée, dans sa position de fonctionnement, sur l'estomac et permettant de saisir la bande pour réajuster le diamètre de l'ouverture de l'estomac une fois la bande dans sa position de fonctionnement.

2. Bande gastrique selon la revendication 1, et comprenant également un moyen de fixation destiné à

fixer ladite partie d'extrémité opposée (1b) de la bande (1, 14, 26, 27) lorsqu'elle se trouve dans sa position de fonctionnement.

3. Bande gastrique selon la revendication 1 ou 2, dans laquelle ledit moyens de fixation utilise un ou plusieurs points de couture (6, 12, 24) appliqués à la bande.

4. Bande gastrique selon la revendication 2 ou 3, dans laquelle ledit moyen de fixation comprend au moins une projection à tête bombée (16) située sur la surface externe (2a) de la bande, et au moins un trou de bout en bout (18) destiné à recevoir ladite au moins une projection à tête bombée (16), lorsque la bande se trouve dans sa position de fonctionnement.

5. Bande gastrique selon la revendication 2 ou 3, dans laquelle ledit moyen de fixation comprend une pluralité de dents (16') s'étendant le long des bords opposés de ladite partie d'extrémité opposée (1b), ladite ouverture (4') étant formée de façon à recevoir la partie d'extrémité opposée de type dents de façon à permettre son déplacement vers l'avant à travers ladite ouverture (4') et à réduire son coulissement dans une direction inverse.

6. Bande gastrique selon la revendication 1, dans laquelle au moins ladite partie d'extrémité (1a) est fabriquée dans un matériau sensiblement flexible.

7. Bande gastrique selon la revendication 1, dans laquelle lesdites surfaces externe et interne (2a, 2b) sont fabriquées dans le même matériau.

8. Bande gastrique selon la revendication 1, dans laquelle lesdites surfaces externe et interne (2a, 2b) sont fabriquées respectivement dans des premier et second matériaux différents.

9. Bande gastrique selon la revendication 8, dans laquelle ledit second matériau est sensiblement flexible.

10. Bande gastrique selon la revendication 7 ou 8, dans laquelle l'un desdits premier et second matériaux ou les deux comprennent du silicone.

11. Bande gastrique selon la revendication 7 ou 8, dans laquelle l'un desdits premier et second matériaux ou les deux comprennent du polytétrafluoroéthylène.

12. Bande gastrique selon la revendication 7, dans laquelle le matériau desdites surfaces externe et interne (2a, 2b) comprend du polytétrafluoroéthylène.

13. Bande gastrique selon la revendication 1, dans laquelle ladite surface interne (2b) mettant en prise l'estomac présente une forme sensiblement circulaire lorsque la bande (1, 14, 26, 27) se trouve dans sa position de fonctionnement.

14. Bande gastrique selon la revendication 1, dans laquelle ladite longueur prédéterminée de la partie d'extrémité est telle qu'elle permet le maintien de la bande et la détection de la bande gastrique (1, 14, 26, 27) par un outil d'inspection laparoscopique.

15. Système destiné à fixer par laparoscopie une bande gastrique non gonflable, selon l'une quelconque des revendications précédentes, autour de l'estomac d'un patient, de façon à définir un certain diamètre de l'ouverture de l'estomac, le système comprenant un dispositif de calibrage (28) qui est insérable dans l'estomac à une profondeur prédéterminée, et une paire de dispositifs de préhension articulés, dans lequel le dispositif de calibrage (28) comprend :

une partie supérieure (28a) présentant un volume variable, et
une partie de projection inférieure (28b) présentant un diamètre sensiblement égal au dit certain diamètre de l'ouverture de l'estomac destiné à être défini par la bande, l'emplacement de ladite partie de projection, lorsque le dispositif de calibrage est dans sa position insérée, définissant l'emplacement de la bande par rapport à l'estomac.

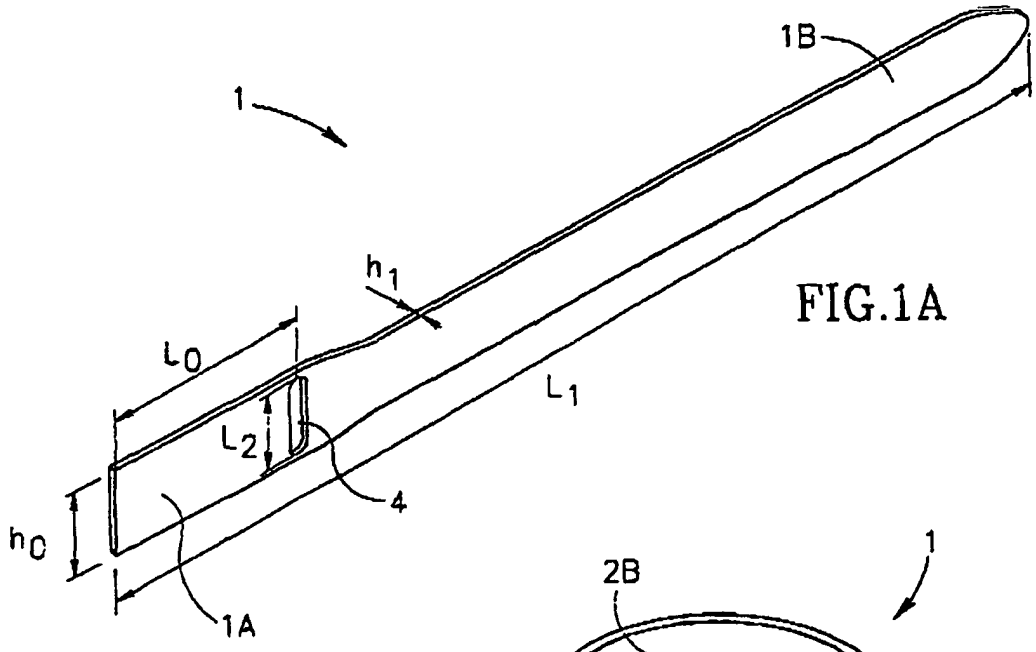

FIG.1A

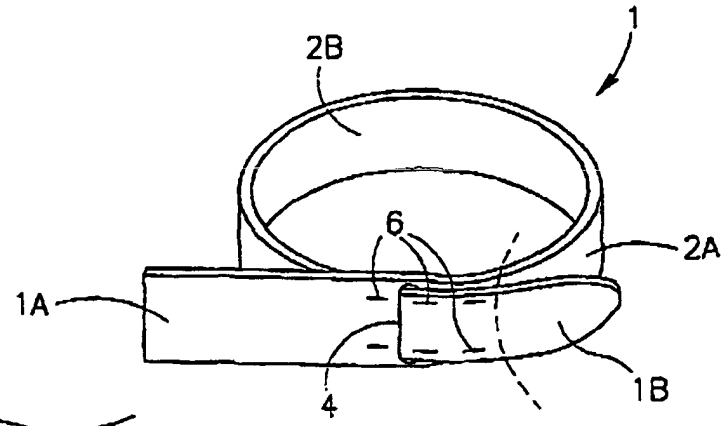

FIG.1B

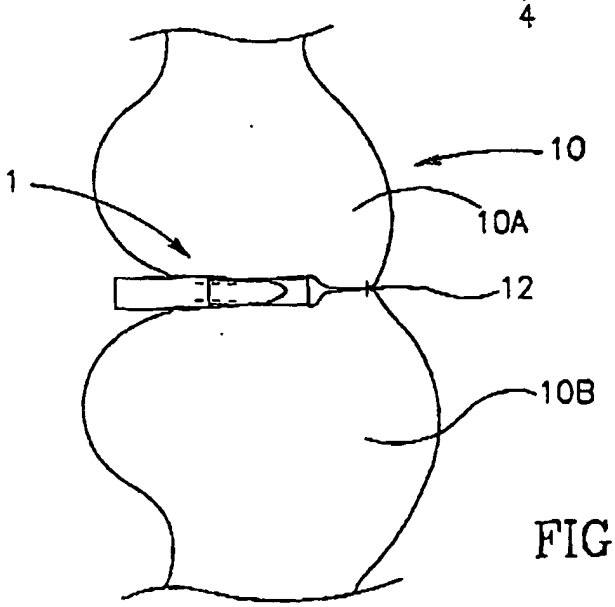

FIG.2

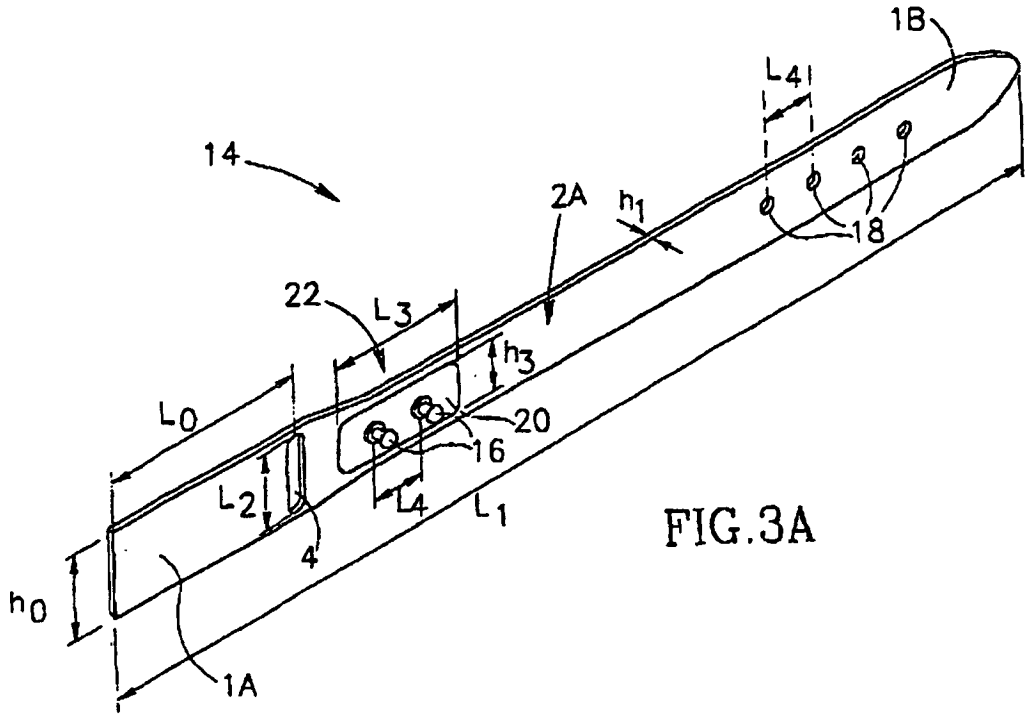
1B
L4
14
2A
h1
18
22
L3
h3
20
L0
16
L2
L4
L1
4
h0
1A

FIG.3A

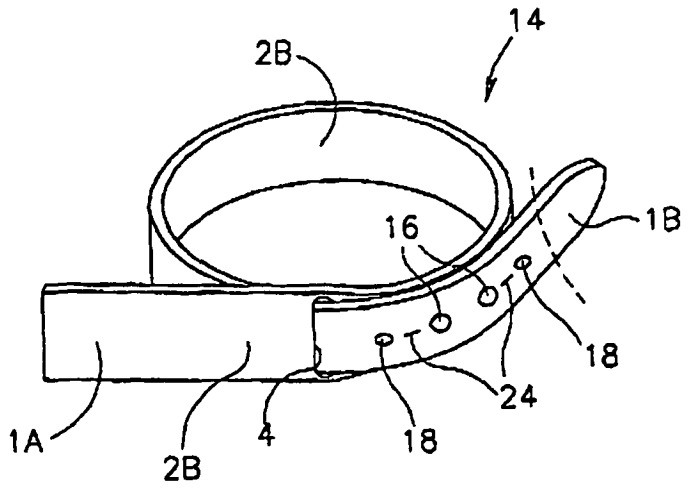
14
2B
1B
16
18
24
1A
2B
4
18

FIG.3B

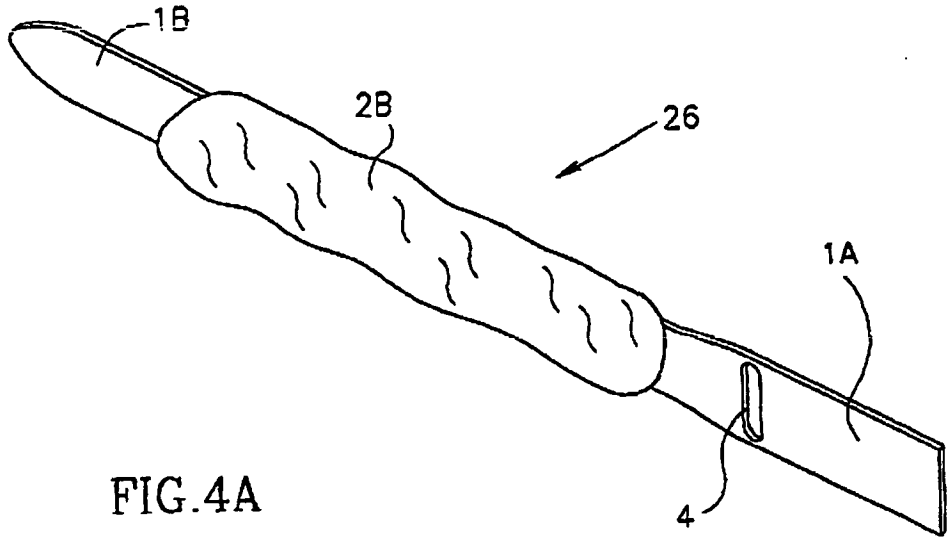

FIG.4A

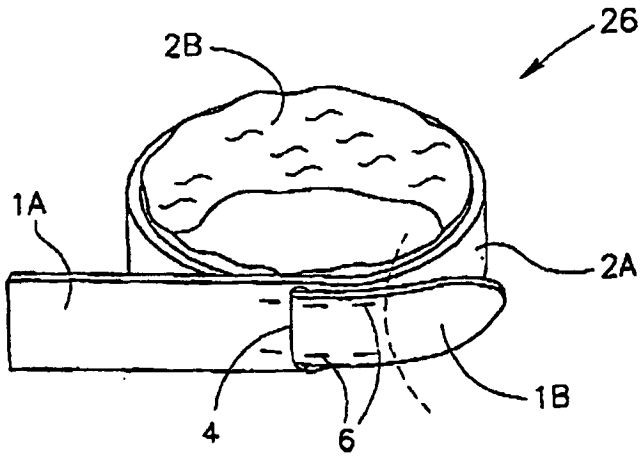

FIG.4B

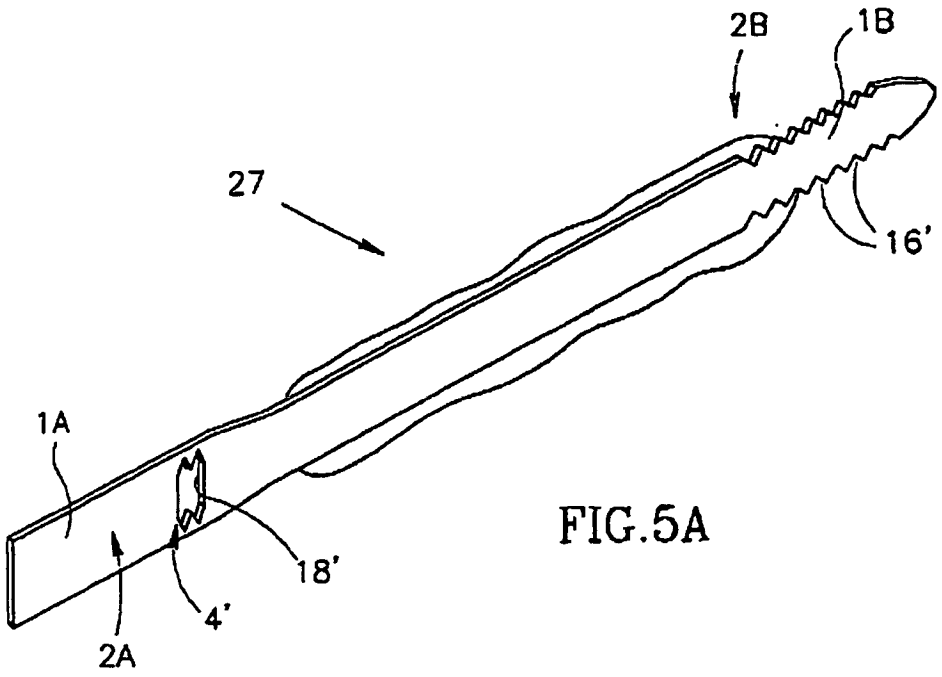

FIG.5A

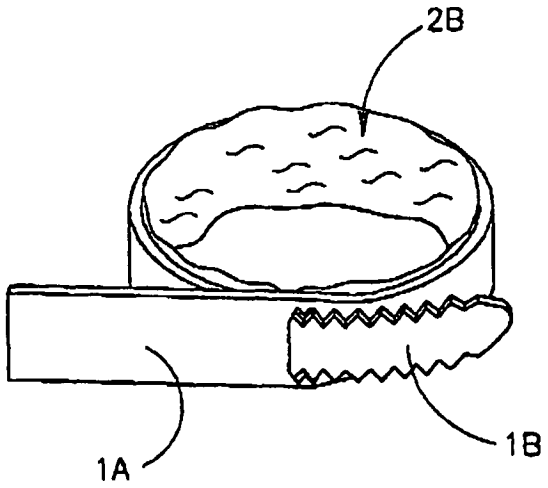

FIG.5B

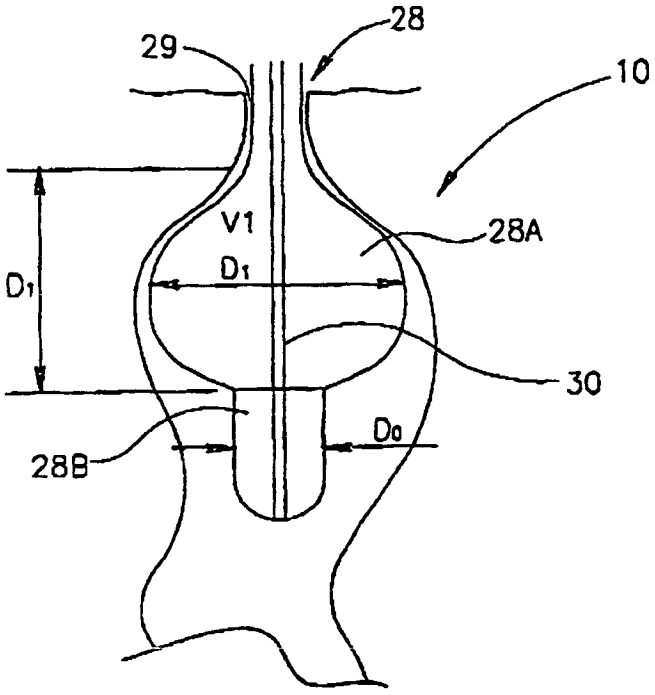

FIG.6A

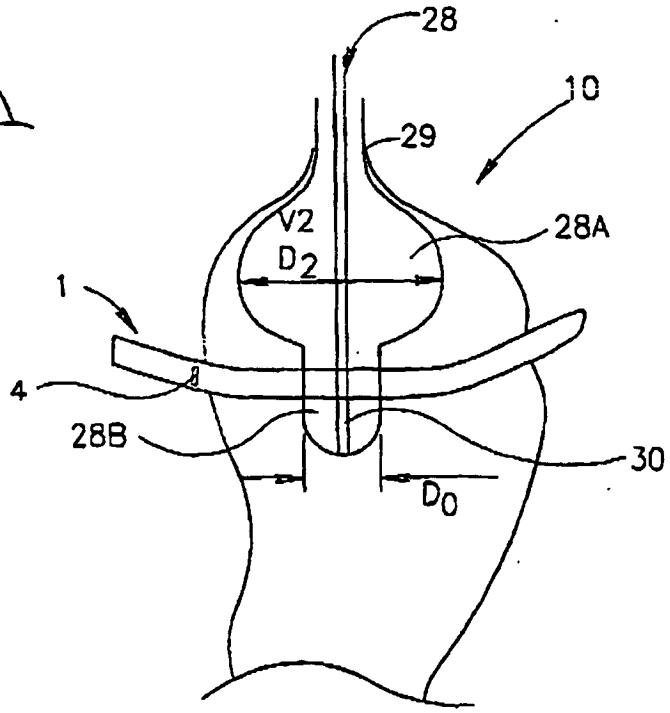

FIG.6B

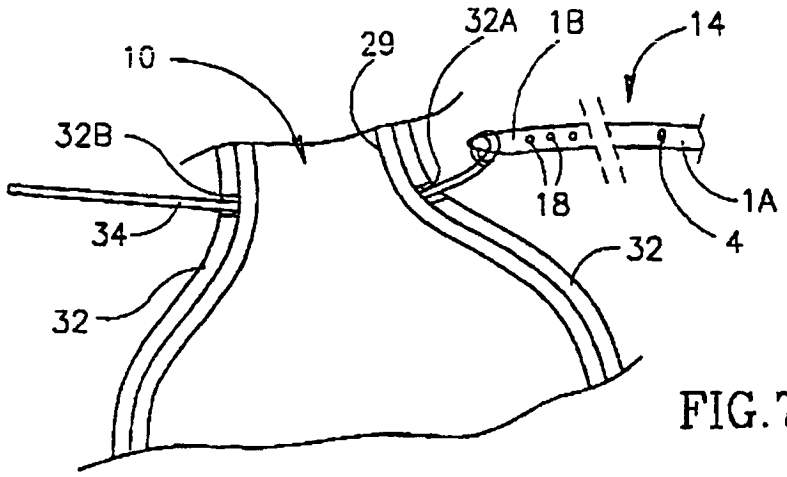

FIG.7A

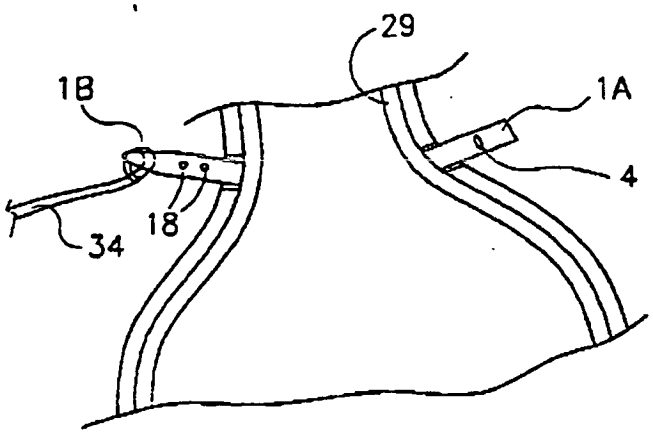

FIG.7B

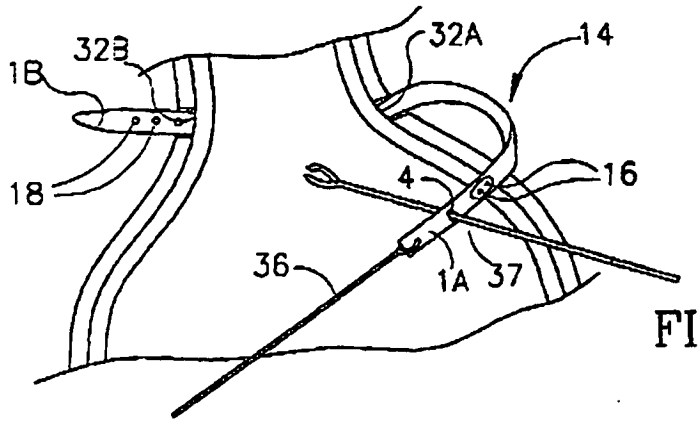

FIG.7C

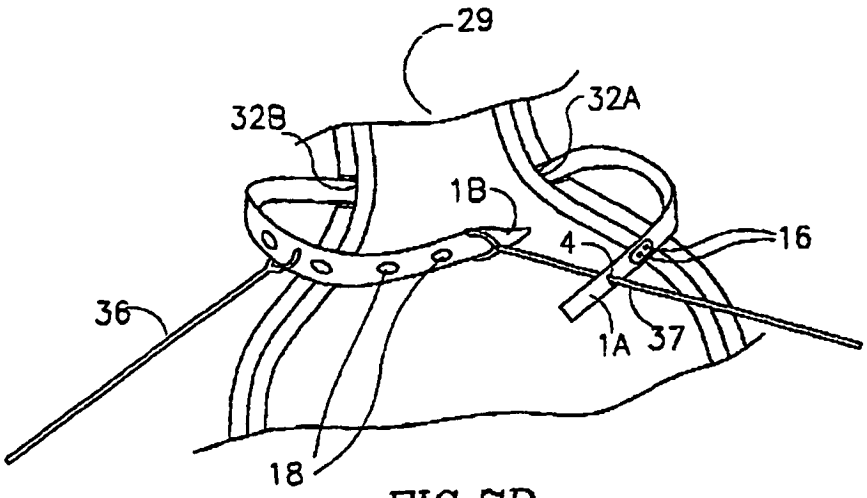

FIG.7D

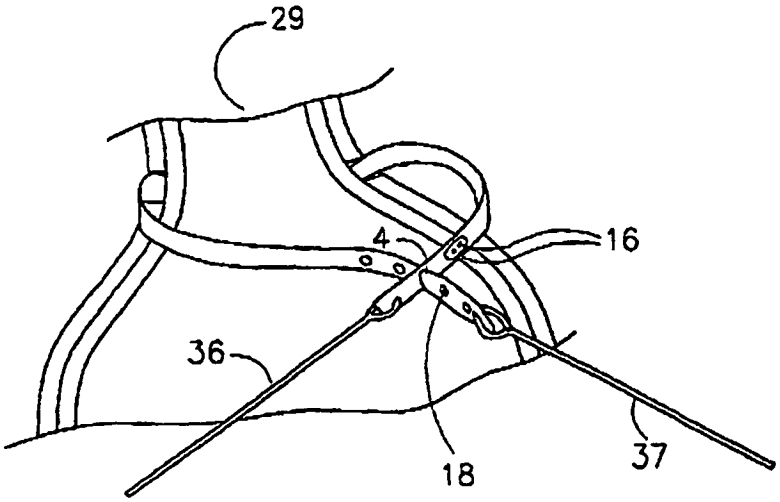

FIG.7E

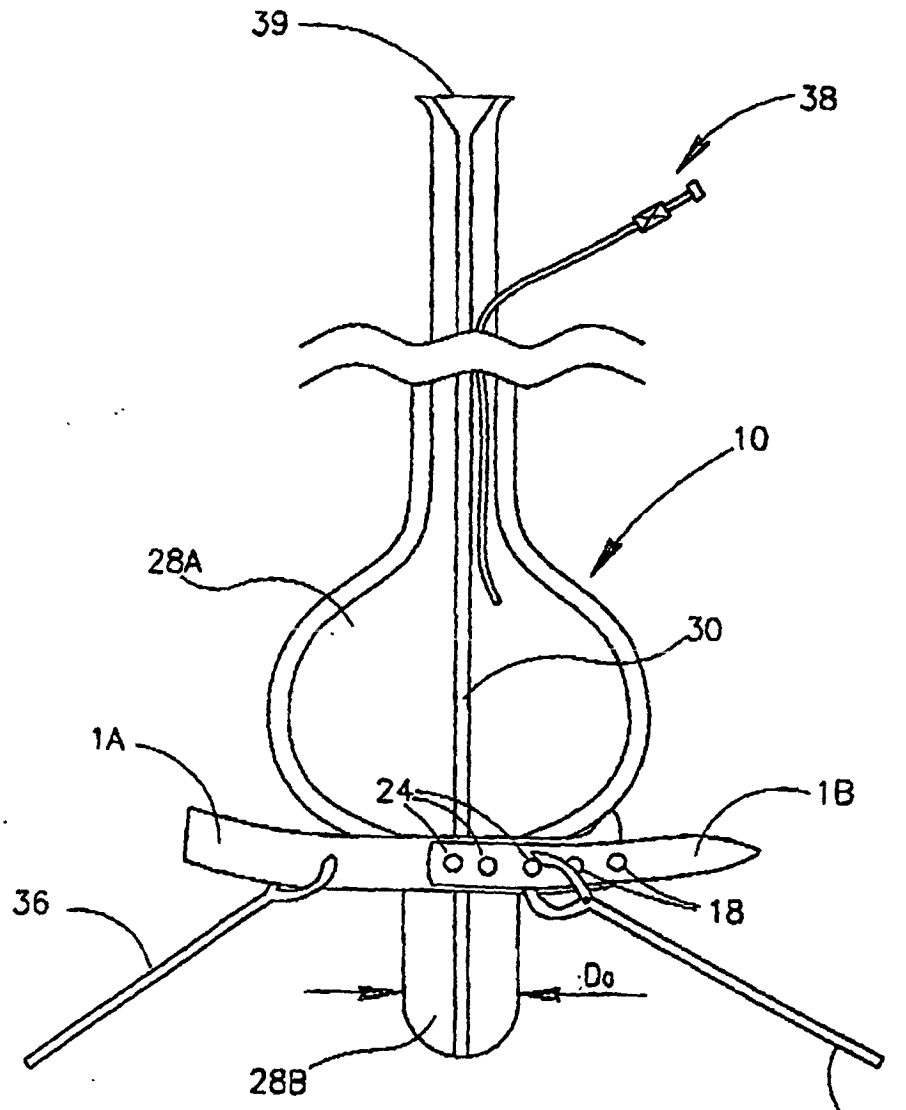

FIG.7F

专利名称(译)	胃带		
公开(公告)号	EP1036545B1	公开(公告)日	2006-01-18
申请号	EP2000105772	申请日	2000-03-17
[标]申请(专利权)人(译)	杜达伊摩西		
申请(专利权)人(译)	摩西，杜达伊		
当前申请(专利权)人(译)	摩西，杜达伊		
[标]发明人	MOSHE DUDAI		
发明人	MOSHE, DUDAI		
IPC分类号	A61B17/12 A61F5/00		
CPC分类号	A61F5/0066 A61B17/12 A61F5/003 A61F5/005 A61F5/0089		
代理机构(译)	法思博事务所		
优先权	129032 1999-03-17 IL		
其他公开文献	EP1036545A2 EP1036545A3		
外部链接	Espacenet		

摘要(译)

提供了一种带式胃束带，用于围绕患者胃的周围附接，以便限定胃口的直径。带包括外表面和内表面，其中内表面接合胃，并且至少外表面由沿其纵向轴线基本不可延伸的细长构件形成。在细长构件中形成贯通开口，并且该贯穿开口定位成限定具有预定长度的带的端部。带的相对端部成形为可插入通孔中，用于在其闭合操作位置调节带的期望内径，并将相对端部紧固到带的外表面。