



US005185005A

United States Patent [19]

[11] **Patent Number:** **5,185,005**

Ballantyne

[45] **Date of Patent:** **Feb. 9, 1993**

[54] **METHOD AND APPARATUS FOR SECURING A NASOGASTRIC TUBE**

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[73] **Assignee:** Board of Regents, The University of Texas System, Austin, Tex.

4,658.814 4/1987 Anderson 604/179
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 4,804.374 2/1989 Laskody 604/180
 4,932.943 6/1990 Nowak 604/180

[21] **Appl. No.:** 710,060

[22] **Filed:** Jun. 4, 1991

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Attorney, Agent, or Firm—Arnold, White & Durkee

[51] **Int. Cl.:** A61M 5/32

[52] **U.S. Cl.:** 604/174; 128/207.18; 128/DIG. 26; 604/179

[58] **Field of Search** 604/174, 175, 177, 179, 604/54, 93, 264; 128/DIG. 26, 207.18; 606/108

[57] ABSTRACT

A nasogastric tube anchor, and a method of its use employing a bridle which passes through the patient's nostrils and nasopharynx, the ends of the bridle being fastened to a nasogastric tube exterior to the patient's nose to anchor said tube against undesired movement relative to the patient's nostril. Installation tools and methods are provided for positioning said bridle within the patient's nose such that one end of the bridle extends from each nostril.

[56] References Cited

U.S. PATENT DOCUMENTS

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17 Claims, 2 Drawing Sheets

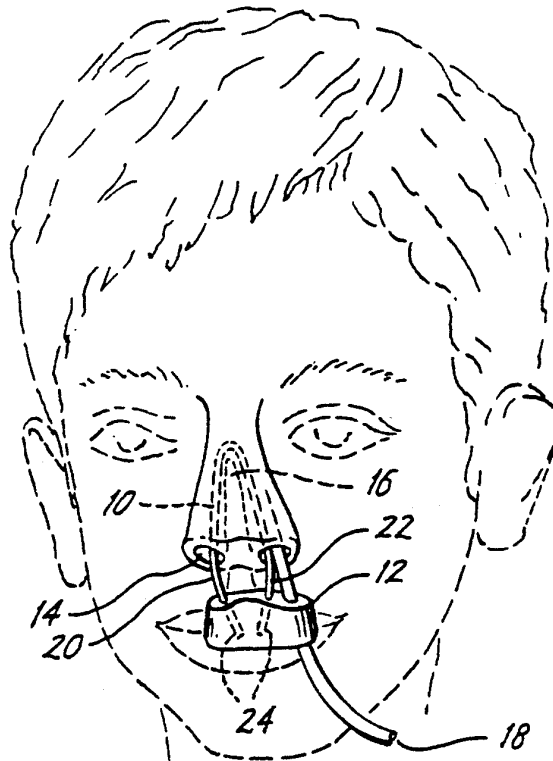


Fig. 1

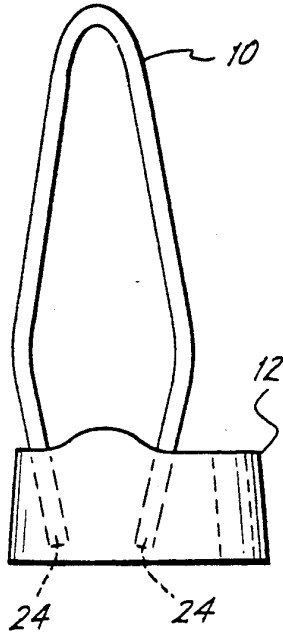


Fig. 2

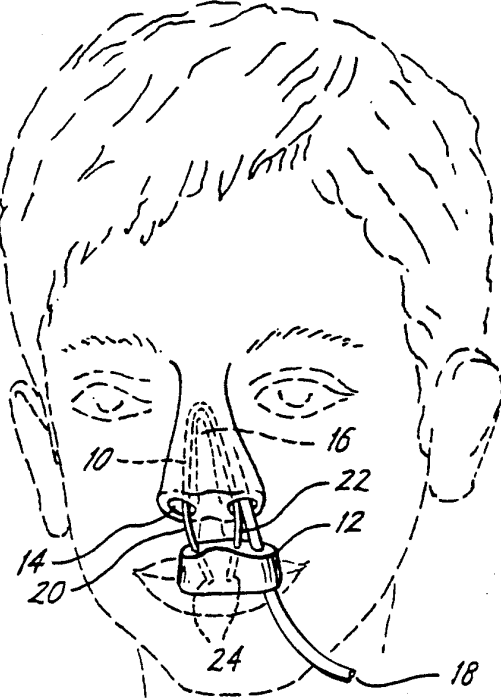


Fig. 2A

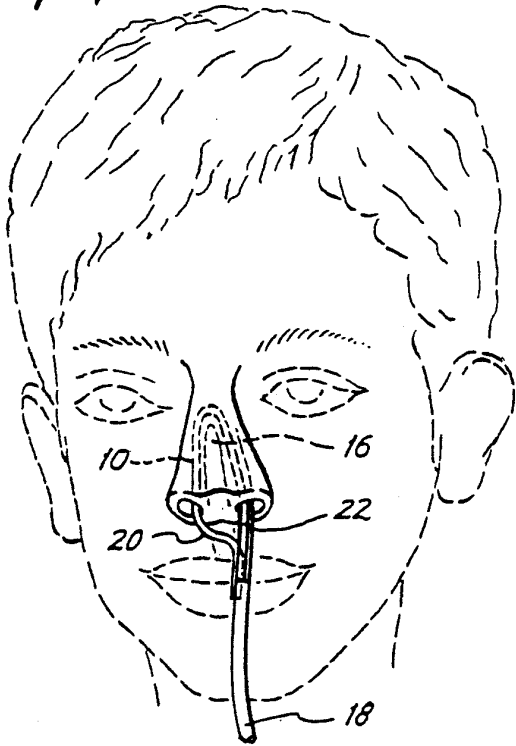
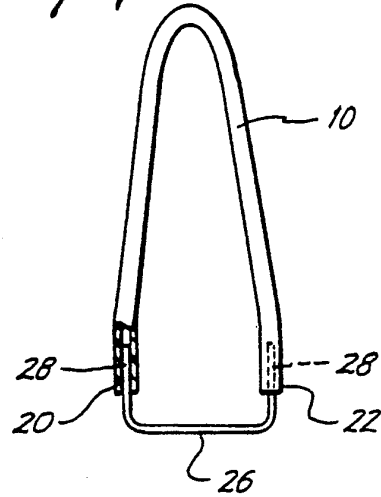
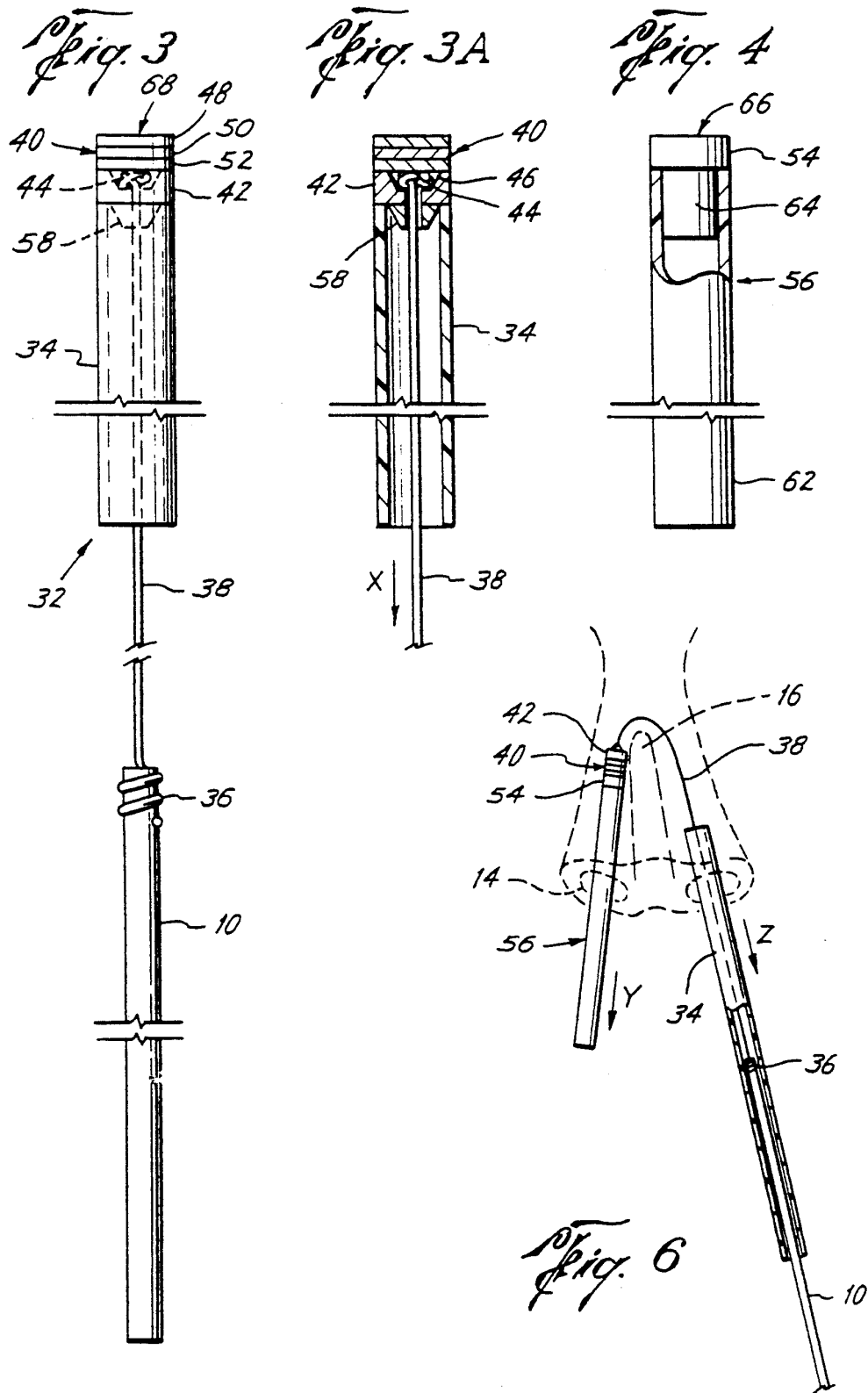


Fig. 5





METHOD AND APPARATUS FOR SECURING A NASOGASTRIC TUBE

BACKGROUND OF THE INVENTION

II. Field of the Invention

This invention relates to an apparatus which is used to anchor a nasogastric tube external to the nose. In particular, the apparatus employs an elongated flexible member which passes through one nostril, around the posterior nasal septum, and out the other nostril. The two ends of the flexible member, one passing out each nostril, are attached to a nasogastric tube or are affixed to an anchoring clip, to which also may be anchored a nasogastric tube. The invention also includes an apparatus and method for installing the elongated flexible member through the patient's nose to pass around the nasal septum.

II. Description of Related Art

In the medical treatment of patients it is common practice to use a nasogastric tube for entering the gastrointestinal tract of the patient by initially passing the tube into a nostril. While placement and operation of such tubes is quite common and effective, certain problems are recognized in the medical profession regarding efficient, safe and comfortable mounting or placement of such tubes, especially since such tubes are frequently maintained in their operative position for extended periods.

It is well recognized that conventional gastrointestinal tubes utilize securing means such as tape, sutures or complex headgear. The irritation and discomfort associated with such securement methods and devices may render many conventional devices unsuitable. A typical means for securing such a tube is to wrap adhesive around the outer surface of the tube and secure the same adhesive strip or material to the outer surface of the nose. This method is troublesome in that normal movement of the patient sometimes causes nasal septal ulcers and/or necrosis by causing excessive tube movement while the tube is in direct contact with an inner portion of the nose, such as when the tube is continuously repositioned or due to the normal movement of the patient.

Many conventional securing devices such as headgear or headband assemblies attempt to overcome problems of the type set forth above through the provision of specific anchoring or mounting structures. While operable for their intended function, numerous forms of these conventional devices have been found to be overly complicated or somewhat difficult or time consuming in their installation, maintenance or removal from the patient, thereby necessitating extensive nursing care for repositioning or readjusting the tube properly into its operative position.

The prior art consists primarily of tube anchoring devices which rely on adhesive means for connecting the anchoring device to the patient's nose, or which rely on some sort of strap encircling the head to hold the securing device in its proper position. Devices incorporating adhesive means include those described in patents issued to Liskody, U.S. Pat. No. 4,804,374, and Nowak, U.S. Pat. No. 4,932,943. Patents disclosing devices which utilize a strap around the patient's head include Hall, U.S. Pat. No. 4,284,076, and Coleman et al., U.S. Pat. No. 3,977,407.

Both adhesive and head-band type securements can be easily removed by a belligerent patient, and prolonged use of adhesive tape can cause skin irritation.

Furthermore, it is possible for these securement devices to hold the tube too securely. Some amount of normal movement of the tube relative to the nose and nostril through which it enters is desired. However, excessive movement relative thereto is to be prevented so as to reduce the possibility of ulcers or irritation to portions of the nose, skin, etc. disposed in direct contact with the adhesive tape or tube.

The above discussion points out the need for a method to securely anchor a transnasal tube, such as e.g. a nasogastric tube, at the point where it exits the patient's body through a nostril. There is particular need for such a method which will effectively resist the efforts of an uncooperative or belligerent patient to withdraw or excessively move the tube, and which avoids the other problems associated with adhesive and headband type securements.

SUMMARY OF THE INVENTION

The claimed invention comprises an apparatus for anchoring a tube such as a nasogastric tube which extends into a patient's nostril, more particularly comprising an elongated flexible bridle with two ends, one end protruding from each nostril, operatively positioned from one nostril, through the nasopharynx beyond the posterior nasal septum and out the other nostril, and means connected to said two ends of the bridle external to said nostrils for anchoring the tube relative to the nostril. The bridle may be constructed of a suitable elongated flexible material in the form of, for example, a tube, tape, ribbon, or cable.

The anchoring means, with which the nasogastric tube is anchored, may, for example, comprise an anchoring clip removably attachable to the two ends of the bridle, said anchoring clip having an outer surface upon which the tube can be connected, or having a bore or other structure which grips or holds the tube to be anchored. Said anchoring means may alternatively comprise, for example, a piece of material such as tape or string which is used to tape or tie together the protruding ends of the bridle and the nasogastric tube.

The anchoring clip may, for example, comprise simply a properly bent piece of wire or rod sized such that the two ends of a tubular bridle may be securely positioned over the two ends of said wire or rod with a fit that is tight enough to inhibit removal of the wire or rod from the bridle. In another embodiment, the anchoring means may comprise a clip removably attachable in other ways to the two ends of the bridle. Such a clip may also comprise a bore or other structure for receiving the nasogastric tube to be anchored. Such clip may further comprise two members which are designed to be snap fitted together with the two ends of the bridle seized between them to rigidly hold the ends of the bridle. Any of the above described anchoring means may be constructed to be either permanently or removably attachable to the ends of the bridle.

The claimed invention further comprises an apparatus providing means for operatively positioning the bridle through a patient's nose such that it passes through the nasopharynx and around the posterior nasal septum such that one end protrudes from each nostril. This apparatus comprises two installation tools.

In a preferred embodiment, a pulling cord is utilized, one end of which is affixed to a first magnet and the other end of which is affixed to one end of the bridle. The bridle and pulling cord are then slidably inserted

through the first installation tool until the magnet is pulled flush against the distal end of said tool. The first magnet is held in place against the distal end of the first installation tool by tension applied to the bridle and pulling cord which extend from the proximal end of said tool.

The second installation tool has a second magnet securely attached to its distal end. Both installation tools and magnets are sufficiently rigid and sized so as to be slidable into a patient's nostrils to a point in the nasopharynx beyond the posterior nasal septum. This positioning apparatus further comprises means for inserting the distal end of the first installation tool, complete with the first magnet, within one nostril, and for inserting the distal end of the second installation tool, complete with the second magnet, within the other nostril such that the magnets positioned by each installation tool magnetically couple behind the posterior nasal septum.

Alternatively, in another embodiment, the pulling cord is omitted and the leading end of the bridle is directly attached to the first magnet. The bridle is then inserted through the first installation tool until the first magnet is held in place against the distal end of said installation tool prior to insertion of the tool into the nostril.

In either of the above described embodiments, both magnets may comprise one or more permanent magnets, or one or more permanent magnets combined with ferromagnetic material, to provide adequate magnetic force to effect the coupling of the magnets within the nasopharynx and to enable both magnets, magnetically coupled together, to be pulled from the patient's nostril.

Also claimed is a method for anchoring a tube extending into a patient's nose, comprising passing one end of a bridle into one nostril, around the posterior nasal septum, and out the other nostril, one end of said bridle extending from each nostril exterior to the patient's nose, fastening the two ends of the bridle to one another with an anchoring clip or otherwise, and securing a nasogastric tube extending into one of the patient's nostrils to the bridle ends or to the anchoring clip.

The claimed method of inserting the bridle into the patient's nose may further comprise the steps of connecting a proximal end of a pulling cord to the bridle, placing a distal end of the pulling cord into one of the patient's nostrils to a point beyond the posterior nasal septum, and pulling the pulling cord around the posterior nasal septum and out the other nostril, such that the bridle is installed in the patient's nose passing behind the posterior nasal septum with one end extending out each nostril. The distal end of the pulling cord may be placed within the first nostril by positioning it with a first installation tool which is removably inserted within the nostril. The pulling cord may be pulled around the posterior nasal septum and out the second nostril by the use of a second installation tool comprising means to couple the end of the pulling cord inserted into the first nostril to the end of the second installation tool, enabling the leading end of the pulling cord to be pulled out of the second nostril by removing the second installation tool from the second nostril.

Said coupling may comprise magnetic coupling of one magnet attached to the leading end of the pulling cord and one magnet fastened to the distal end of the second installation tool, which magnets are placed into close proximity in the nasopharynx beyond the poste-

rior nasal septum such that they couple by magnetic force.

Both of the magnets involved may comprise permanent magnets or combinations of permanent magnets and ferromagnetic material. These methods for inserting the bridle into the patient's nose may be performed with the bridle itself directly attached to the first magnet, omitting the pulling cord connecting the leading end of the bridle to the first magnet.

Finally, the claimed invention comprises a method for anchoring a tube extending into a patient's nostril comprising inserting a bridle within a patient's nose by the methods discussed above or otherwise, and further comprising connecting an anchoring clip to both ends of said bridle, inserting the tube to be anchored into the patient's nostril and then securing that tube to the anchoring clip. Alternatively, the ends of the bridle and the tube may be securely joined together by, for example, tying with tape or string, or by gluing.

The present invention therefore provides an improved device and method which allows anchoring of a tube, such as a nasogastric tube, in a generally fixed position relative to the nostril by which it enters the patient's body. This invention avoids the problems associated with conventional means for anchoring such a tube, including discomfort, the need for replacing and repositioning, and efforts by belligerent patients to move or remove a transnasal tube. These and other advantages of the present invention will be further appreciated from the drawings and the detailed description provided below.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the above-recited advantages and features of the present invention, as well as others which will become apparent, are attained and can be understood in detail, a more particular description of the invention summarized above may be had by reference to the embodiment thereof which is illustrated in the appended drawings, which drawings form a part of this specification.

It is to be noted, however, that the appended drawings illustrate only typical embodiments of the invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments.

FIG. 1 is a frontal elevation view of an embodiment of an assembled nasogastric tube anchor.

FIG. 2 is a frontal elevation view of an assembled nasogastric tube anchor of the present invention installed on a patient in its operative position.

FIG. 2A is a frontal elevation view of an alternative embodiment of an assembled nasogastric tube anchor of the present invention installed on a patient in its operative position.

FIG. 3 illustrates a first installation tool used to install the bridle of the present invention, complete with bridle, pulling cord, and magnetic member.

FIG. 3A is a lateral cross-sectional view of a first installation tool used to install the present invention.

FIG. 4 illustrates a second installation tool used to install the bridle of the present invention.

FIG. 5 is a frontal elevation view of another embodiment of an assembled nasogastric tube anchor.

FIG. 6 illustrates the method of installation of a bridle in a patient's nose after the magnets have coupled together and during withdrawal of the first installation tool.

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