

[54] **GUIDING TUBE FOR THE INSERTION OF AN ADMISSIBLE MEDICAL IMPLEMENT INTO A HUMAN BODY**

[75] Inventors: **Noboru Fukuda; Yutaka Otani**, both of Tokyo, Japan

[73] Assignee: **Olympus Optical Co., Ltd.**, Tokyo, Japan

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[52] **U.S. Cl.**..... **128/2 M**

[51] **Int. Cl.**..... **A61b 1/00**

[58] **Field of Search** 128/2 M, 3, 4, 5, 6, 7, 128/8, 9, DIG. 16, 214.4

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[57] **ABSTRACT**

A guiding tube for the insertion of an admissible medical implement into a human body which consists of an inlet member and a tube member connected to the inlet member, said tube member comprising an innermost tube unit having a passageway formed therein through which to conduct an admissible medical implement, for example, an endoscope into and out of the human body, a flexible core tube unit so disposed as to concentrically surround the innermost tube unit and an outermost tube unit so positioned as to concentrically enclose the flexible core tube unit.

7 Claims, 4 Drawing Figures

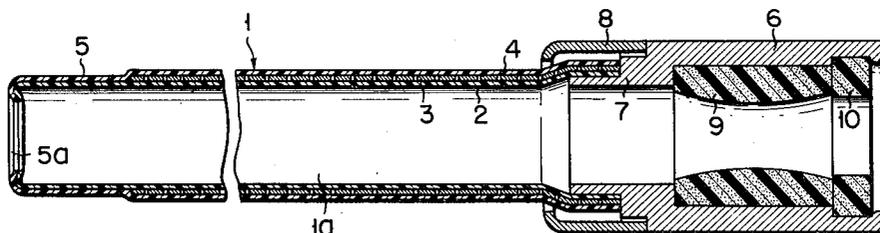


FIG. 1

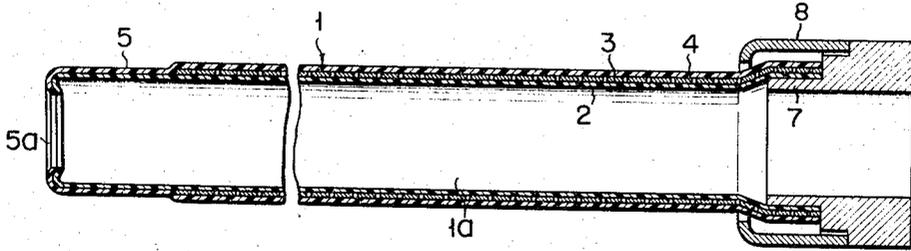


FIG. 2

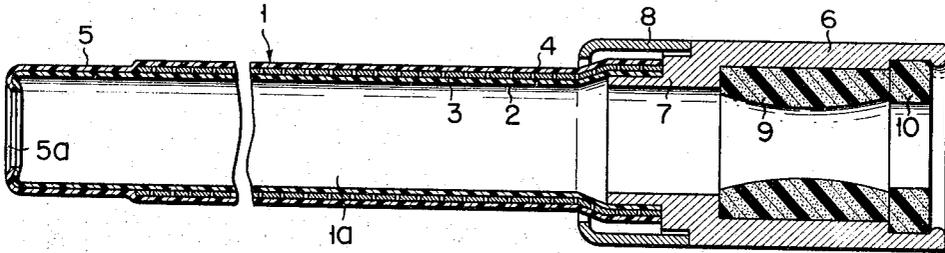


FIG. 3

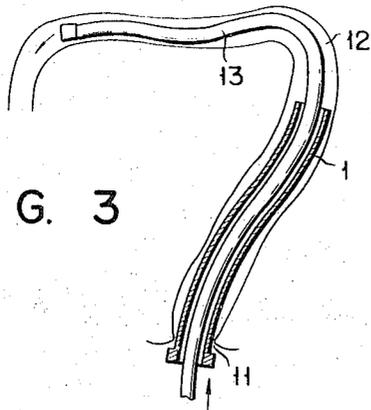
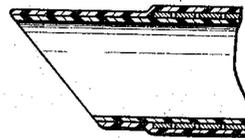


FIG. 4



GUIDING TUBE FOR THE INSERTION OF AN ADMISSIBLE MEDICAL IMPLEMENT INTO A HUMAN BODY

BACKGROUND OF THE INVENTION

This invention relates to a guiding tube adapted to facilitate the insertion of an admissible medical implement, for example, an endoscope into a human body, or the removal therefrom.

An admissible medical implement, for example, an endoscope is slowly introduced into a human body so as to examine and/or medically treat the internal portion of the human body through an observation window provided at the forward end of the endoscope. The flexible tube of such an admissible medical implement is made sufficiently pliable to be easily inserted into the snaky or zigzag portion of the human body, for example, the bowels. When, therefore, the flexible tube of the endoscope is drawn near the narrow part of, for example, the bowels, the forward end portion of the flexible tube tends to be forcefully bent in a folded state at the narrow part, obstructing the examination of any further section than the narrow part. Generally, the prior art endoscope has its flexible tube previously coated with lubricant so as to facilitate its insertion into a human body. This lubrication which is carried out customarily by hand has the drawbacks that not only troublesome lubricating work has to be undertaken before examination, but also, after the endoscope is pulled out of the human body, the lubricant and the feces and body fluid attached to the endoscope has to be manually wiped off the endoscope. The lubricant, feces and body fluid is likely to soil the fingers and medical implements by being attached thereto.

SUMMARY OF THE INVENTION

This invention has been accomplished to eliminate the above-mentioned difficulties and provides a guiding tube adapted smoothly to guide, for example, an endoscope to any desired internal part of the human body.

A guiding tube according to this invention consists of an inlet member for the entry of an endoscope and a tube member having a passageway formed therein which communicates with the inlet member and through which the flexible tube of the endoscope can travel. The tube member is open at the forward end and comprises an innermost tube unit, a flexible core tube unit concentrically surrounding the innermost tube unit in close contact and an outermost tube unit concentrically enclosing the flexible core tube unit in close contact. The inlet member is formed of a cylindrical frame and a cylindrical unit made of liquid-absorbable foamed resin and concentrically received in said cylindrical frame.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal sectional view of a guiding tube according to an embodiment of this invention;

FIG. 2 is a longitudinal sectional view of a guiding tube according to another embodiment of the invention;

FIG. 3 shows the condition where an endoscope is inserted into the bowels of a human body with the aid of the guiding tube of the invention; and

FIG. 4 is a sectional view of the forward end of a guiding tube according to still another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a tube member 1 consists of a thin innermost tube unit 2 made of polyurethane resin, a flexible core tube unit 3 comprising, for example, a helical steel band and so disposed as to concentrically surround the innermost tube unit 2 in close contact and an outermost tube unit 4 made of the same material as the innermost tube unit 2 and so positioned as to concentrically enclose the flexible core tube unit 3 in close contact. In the tube member 1 is provided a passageway 1a through which an endoscope, for example, can travel. The forward end of the tube member 1 consists of a pliable portion 5 which is formed by thermally fusing the outermost tube unit 4 directly with that portion of the innermost tube unit 2 which is not contacted by the flexible core tube unit 3. The forward end of the pliable portion 5 is flat and has an opening 5a, whose edge is slightly bent inwardly. The inwardly bent edge enables the guiding tube to travel through the bowels without injuring the mucous membrane of the walls of the bowels. A cylindrical coupling means 7 is fixedly inserted into the rear end of the tube member 1 to which a protective ring 8 is attached. The guiding tube of this invention is made shorter than an endoscope, namely, is chosen to be about 30 cm long, and is used as a guide for the endoscope, particularly where the internal condition of the bowels is examined by inserting the endoscope through the anus.

A guiding tube shown in FIG. 2 is a type whose inlet portion is fitted with a device for coating lubricant on the endoscope when it is taken into the bowels with the aid of the guiding tube and wiping off the lubricant and the feces and body fluid attached to the endoscope when the endoscope is drawn out.

Referring to FIG. 2, a tube member 1 has its inlet portion fitted with a cylindrical inlet frame 6 by means of a coupling means 7. To the periphery of the junction of the inlet portion and inlet frame 6 is attached a protective ring 8. In the inlet frame 6 are received a slightly elongate cylindrical member 9 made of liquid-absorbable foamed resin, such as polyurethane foam and a resin 10 prepared from elastic liquid-nonabsorbable resin, such as rubber or Toraytef (trade name) — semihard closed — cellular foam prepared by expanding a high pressure process polyethylene 10 to 40 times of its volume — so as to act as a wiper. The cylindrical member 9 has preferably swollen inner central walls which are impregnated with lubricant, for example, silicone. The wiper ring 10 made of liquid-nonabsorbable resin has an inner diameter very close to the outer diameter of the endoscope, thereby enabling the lubricant applied to the endoscope before its insertion to be almost fully wiped off the endoscope when it is pulled out. The exchange of the cylindrical member 9 and elastic ring 10 is performed in a manner that the cylindrical member 9 and elastic ring 10 are drawn out from the inlet frame 6 and new ones are inserted thereinto.

Before the guiding tube 1 is first introduced into the bowels 12, the endoscope 13 is inserted into the guiding tube 1. When the forward end of the endoscope surrounded with the guiding tube 1 reaches the bent portion of the bowels, then the guiding tube 1 is brought into the bowels 12, enabling the endoscope 13 to be smoothly carried forward around the bent portion of

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the bowels 12 (FIG. 3). Since the guiding tube contains a flexible core tube unit of stainless steel interposed between the innermost and outermost tube units 2 and 4 formed of polyurethan resin, the guiding tube has considerable resistance to pressure applied in the radical direction, while retaining suitable flexibility, and is saved from distortion in said direction, thus attaining smooth insertion into the bowels.

Where, in this case, there is used the guiding tube of FIG. 2 having the inlet portion 6 impregnated with lubricant, the lubricant contained in the cylindrical member 9 of the inlet portion 6 is squeezed out in the endoscope when it is inserted into the guiding tube, eliminating the troublesome work of manually applying lubricant on an endoscope prior to its insertion into the bowels as has been practised in the past. Where the endoscope is slightly retreated from and again inserted into the bowels, the additional coating of the lubricant is automatically carried out. Further, when the endoscope is pulled out of the guiding tube, the wiper ring 10 effectively wipes off the lubricant remaining on the peripheral surface of the endoscope and the feces and body fluid attached to the endoscope, thereby preventing the fingers and medical implements from being soiled by the lubricant, feces and body fluid.

According to the embodiment of FIG. 2, the forward pliable end portion of the guiding tube has its end face formed flat. However, said end face may be inclined, as shown in FIG. 4, to the axis of the guiding tube. If the forward end portion of the guiding tube has such an inclined end face, then that portion of the walls of the bowels which happens to be pinched during the insertion of the guiding tube in a gap between the forward end portion of the guiding tube and the endoscope can be easily released by slightly rotating the guiding tube.

The tube member 1 of the guiding tube is formed in the following manner. A core rod (not shown) having the prescribed diameter is inserted into the innermost tube unit 2 made of polyurethane resin. About the periphery of the innermost tube unit 2 (except for the forward end portion) is helically wound a stainless steel band to form a flexible core tube unit 3. The innermost tube unit 2 is bonded to the flexible core tube unit 3 by an adhesive of polyurethane resin. An outermost tube unit 4 concentrically surrounds the flexible core tube unit 3 up to the forward end of the innermost tube unit 2. The forward end portion of the outermost tube unit

4 and the forward end portion of the innermost tube unit 2 which is not contacted by the flexible core tube unit 3 are thermally fused together to form a pliable portion 5. After the tube member 1 is thus formed, the aforesaid core rod is taken out. The flexible core tube unit 3 may be formed by helically winding a steel wire, instead of a steel band, about the periphery of the innermost tube unit 2.

What we claim is:

1. A guiding tube for the insertion of an admissible medical implement into a human body which comprises a tube member consisting of an innermost tube unit having a passageway formed therein through which to conduct an admissible medical implement, a flexible core tube unit concentrically surrounding the innermost tube unit in close contact, an outermost tube unit concentrically surrounding the flexible core tube unit and a pliable forward end portion open at the forward end; and an inlet member fitted to the inlet of the tube member.

2. A guiding tube according to claim 1 wherein the inlet member comprises an inlet frame fitted to the inlet of the tube member, a protective ring provided on the periphery of the junction of the inlet frame and the inlet of the tube member, a cylindrical member made of liquid-absorbable resin impregnated with lubricant and inserted into the inlet frame and a ring made of liquid-nonabsorbable resin so as to act as a wiper and inserted into that portion of the inlet frame which faces the inlet of the tube member.

3. A guiding tube according to claim 1 wherein the flexible core tube unit consists of a stainless steel band helically wound about the periphery of the innermost tube unit.

4. A guiding tube according to claim 1 wherein the pliable forward end portion has the edge of its opening bent inward.

5. A guiding tube according to claim 1 wherein the pliable forward end portion has a flat end face.

6. A guiding tube according to claim 1 wherein the pliable forward end portion has an inclined end face.

7. A guiding tube according to claim 2 wherein the cylindrical member made of liquid-absorbable resin has swollen inner walls so as to be impregnated with lubricant.

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