

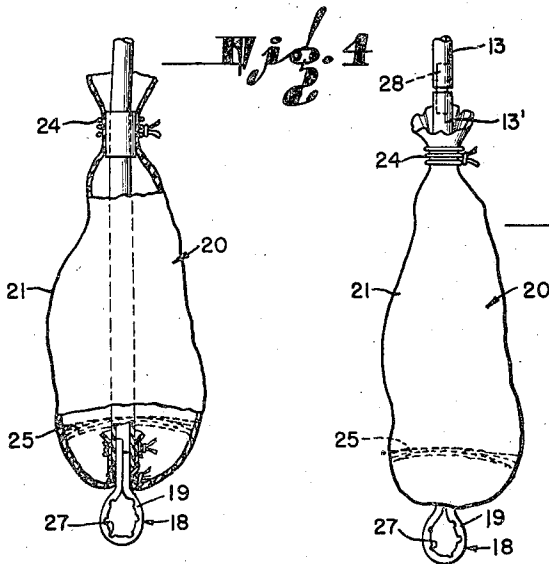
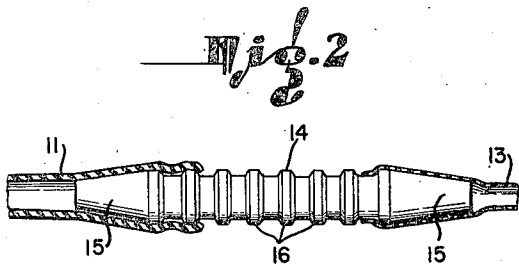
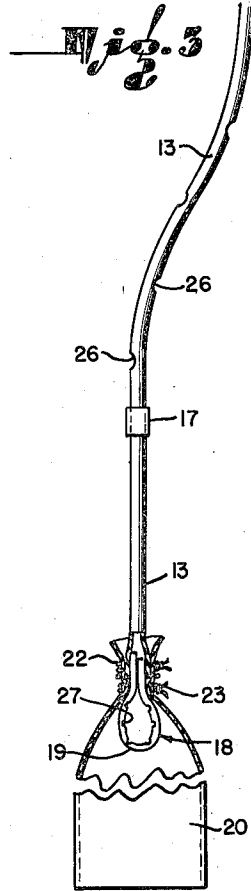
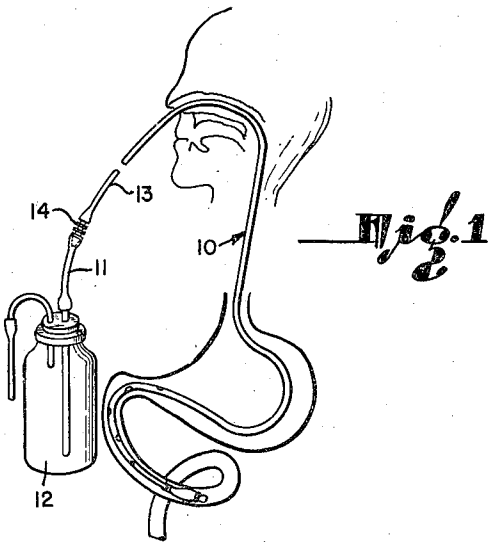
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GASTROINTESTINAL TUBE

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GASTROINTESTINAL TUBE

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1 Claim. (Cl. 128—276)

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The present invention relates generally to a gastro-intestinal tube such as utilized in the diagnosis and treatment of the stomach and the intestines.

It is a main object of my invention to provide an improved gastro-intestinal tube of simple construction, wherein novel means of predetermined weight may be provided adjacent the distal end of the tube, which is in the form of a bag or balloon having its interior in closed or unconnected relation with the tube lumen and containing fluid opaque to X-rays.

It is a further object to provide a tube of the herein described character including an improved non-metallic tip which is of such construction that it will be absolutely non-traumatic and there will be no danger of irritation to mucous membrane, either when the tube is being passed or is in position in the stomach or intestines.

A further object is to provide an improved tip construction which is flexible and perforated in such a manner that it will be practically impossible to block the openings therein by intestinal mucosa, and in which the tip will act to push the mucosa away and effect better drainage by keeping the path clear.

It is a further object to provide in a device of the herein described character an improved fastening means for the ends of a weight bag or balloon at the distal end of the tube, which will permit tying the ends of the bag forming material to the tube without closing or constricting the lumen.

Another object is to provide a gastro-intestinal tube which is constructed of a transparent plastic rather than opaque rubber in order that the nature of material passing through the tube may be observed, and which due to simplicity and inexpensive construction may be entirely discarded after use.

Still another object is to provide in connection with a tube of this character a distal end section containing a weight bag or balloon which may be disconnected from the tube after use and discarded, a new section being affixed each time the tube is to be used.

Further objects and advantages of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing preferred embodiments of the invention without placing limitations on the scope of the invention defined in the appended claim.

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Referring to the drawings which are for illustrative purposes only:

Fig. 1 is a view diagrammatically illustrating the use of a gastro-intestinal tube embodying the features of my invention, and showing its connection to a suction source, such as a suction bottle;

Fig. 2 is a fragmentary detailed view, partly in section, to show the manner of connecting a suction tube with a gastro-intestinal tube of my invention;

Fig. 3 is a fragmentary view of the distal end portion of my gastro-intestinal tube, showing detailed features of the tube and tip construction, and the manner in which one end of the bag or envelope forming material is secured at the distal or tip end of the tube;

Fig. 4 is a somewhat similar view partly in section to show the manner in which the other end of the envelope is secured to the tube at a point spaced from the distal or tip end; and

Fig. 5 is a view showing the parts of Fig. 4 arranged as a replaceable unit which may be removably attached to the main tube of the device.

As diagrammatically illustrated in Fig. 1, a gastro-intestinal tube embodying the features of my invention is disclosed in its position of use. The device with which my invention is concerned is generally indicated at 10. Intubation of the device is accomplished by passing the tube intra-nasally to position its distal end portion in the stomach or connected portions of the small intestines for the purpose of diagnosis or treatment in cases of intestinal obstruction. The outermost end of the device may be connected as by a short tubing 11 of rubber or other suitable material to a suction bottle 12 or other suitable source of suction according to the usual practice.

The device more specifically comprises a gastro-intestinal tube 13 approximately ten feet in length which is of smooth transparent plastic tubing of approximately 16 French diameter. The use of a plastic tube is especially advantageous as the material is not attacked, as in the cases of rubber, by the ointments used to lubricate the tube during intubation.

As shown in Fig. 2, the tube 13 is connected at its outermost end with the tube 11 by means of a connection fitting 14 formed of a suitable metal such as aluminum and provided with oppositely extending end tapered portions 15 for receiving the ends of the tubes to be joined thereover. Intermediate the ends, this fitting is provided with spaced shoulders or ridges 16 which aid in retaining a connected tube against removal there-

from. The tube 13, as shown in Figs. 1 and 3, is continuous from its connection with the tube 11 to its distal end.

Adjacent the distal end of the tube 13 and spaced therefrom is a short plastic collar 17 which is retained in position by friction, or, if desired, this collar may be more permanently secured by a suitable adhesive. This collar provides a reinforced section in the tube for a purpose which subsequently will be explained.

The distal end of the tube 13 is provided with a nozzle, as generally indicated by numeral 18. This nozzle comprises a small plastic tube 19 formed into a loop by bringing the ends of the tube together and inserting them into the distal end of the tube 13. The details of fastening the tip into the tube 13 will subsequently be described.

It has been found in practice to be particularly efficacious to provide a weight at the distal end of the device as an aid to intubation. The manner in which this is accomplished constitutes a feature of my invention. For such purpose, I provide an open ended sleeve 20 of flexible material such as rubber, which is secured at its ends, as will hereinafter be explained, to form a closed bag or container 21 around the distal end portion of the tube 13.

The open ended sleeve 20 is turned inside out and one end placed over the distal end of the tube 13, as shown in Fig. 3. This end is then secured by a binding 22 of linen thread or other suitable material, which is tightly wound about the tube 13 at the position containing the end portions of the nozzle tube 19 so as to draw and tightly bind the tubes together and retain the ends of the tube 19 against removal. A second binding 23 is then applied around the sleeve material just outside the termination of the associated end of the tube 13, this binding tightly drawing the sleeve material against the end portions of the tube 19 and further serving to bind them together. I may, in addition to using the bindings 22, 23, and 24, secure the sleeve ends with a suitable cement to the tube 13, in which case the bindings will serve as a reinforcing means for the connection.

The sleeve 20 is then turned back over the tube 13 to bring the other end of the sleeve over the collar 17. This end of the sleeve is then secured in a similar manner by a binding 24 of linen thread or other suitable material.

It will be noted that the end portions of the tube 19 and the collar 17 provide reinforced sections at the points where the ends of the sleeve are secured, these sections preventing constriction of the lumen of the tubing. Moreover, the use of binding 23 causes the sleeve material to fold over the raw edge at the distal end of the tube 13, so that there is no danger of its causing irritation.

The bag or envelope thus formed is utilized as a chamber for containing a weighting substance 25 sealed therein. The material which I have utilized for providing additional weight at this end of the tube has a flowable characteristic and is also opaque to X-rays. For this purpose approximately 2 cc. of free metallic mercury placed in the bag 21 has been found to work very well. Other materials such as barium paste may also be used.

The bag 21 with the weighting material therein facilitates intubation of the device and functions as a means for promoting peristaltic movement of the tube through the intestinal tract. By utilizing a tube having a single lumen, the lumen may be made of sufficient caliber to allow liquid fecal material to be sucked into the lumen. Since the weighting material is opaque to X-rays, this material provides means by which the ends of the

gastro-intestinal tube may be located as to position within the intestinal tract during its use.

Communication with the lumen of tube 13 is provided above the bag 21 by means of a plurality of fenestrations 26 which are placed in the tube 13 immediately above the collar 17, these fenestrations being spaced apart along the tube and alternately disposed on opposite sides thereof.

Communication below the bag 21 is accomplished by providing a plurality of small openings 27 in the tube 19 which forms the nozzle structure. These openings are placed in alignment along one side of the tube 19 in such a manner that, when the tube is folded to form the loop, the openings will be on the inside thereof. A nozzle constructed in this manner has been found to be particularly advantageous in that it forms a pliable soft construction which is non-traumatic and will not irritate the mucuous membrane lining. Moreover, by placing the openings on the inside of the loop portion, the openings cannot be easily blocked by intestinal mucosa. The elastic flexible nozzle tip thus formed, due to its spreading action when engaging against an object, will act to push the mucosa away, and thus give better drainage by keeping the path clear.

It has been found in practice that devices of this type, when used, retain a rather unpleasant odor, particularly if made of rubber. In the construction which I have used in my present invention, the use of rubber has been reduced to a minimum, and by simplifying the construction, it is contemplated that the entire device may be disposed of after it is used.

However, if desired, the tube 13 and its associated nozzle 18 may be retained and a new sleeve applied to form the bag 21. In view of the time required to apply a new sleeve and wind the bindings 22, 23, and 24 at its ends, I may provide the end portion of the tube 13 as a separate section 13', as shown in Fig. 5, which may have the bag 21 secured thereto and constitute a replaceable unit which may be removably attached to the tube 13 and discarded after use. Of course, in practice it would be desirable to salvage the waste material, particularly if it is mercury, before discarding the used unit.

Any appropriate means may be utilized for securing the tube section 13' of the replaceable unit to the tube 13. For purposes of disclosing one mode of accomplishing this connection, I have disclosed a short tubular section 28 of plastic material having its ends respectively inserted into the ends of the tube 13 and section 13' which are to be joined. Before insertion, the tubular section 28 may be coated on its exterior surface with a suitable adhesive cement, which is commercially attainable, to hold the ends joined thereon. This cement, however, permits the associated ends to be peeled from the tubular section 28 so that the unit may readily be detached from the tube 13, when desired, and replaced with a new unit.

I claim as my invention:

A gastro-intestinal device comprising a main elongate tube, a smaller tube having its ends secured in and communicating with the lumen of the main tube at one end and forming a projecting loop portion, said smaller tube having a plurality of openings disposed on the inside of said loop, a closed envelope carried by the main tube disposed adjacent said loop portion, and a weight material carried within said envelope.

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