

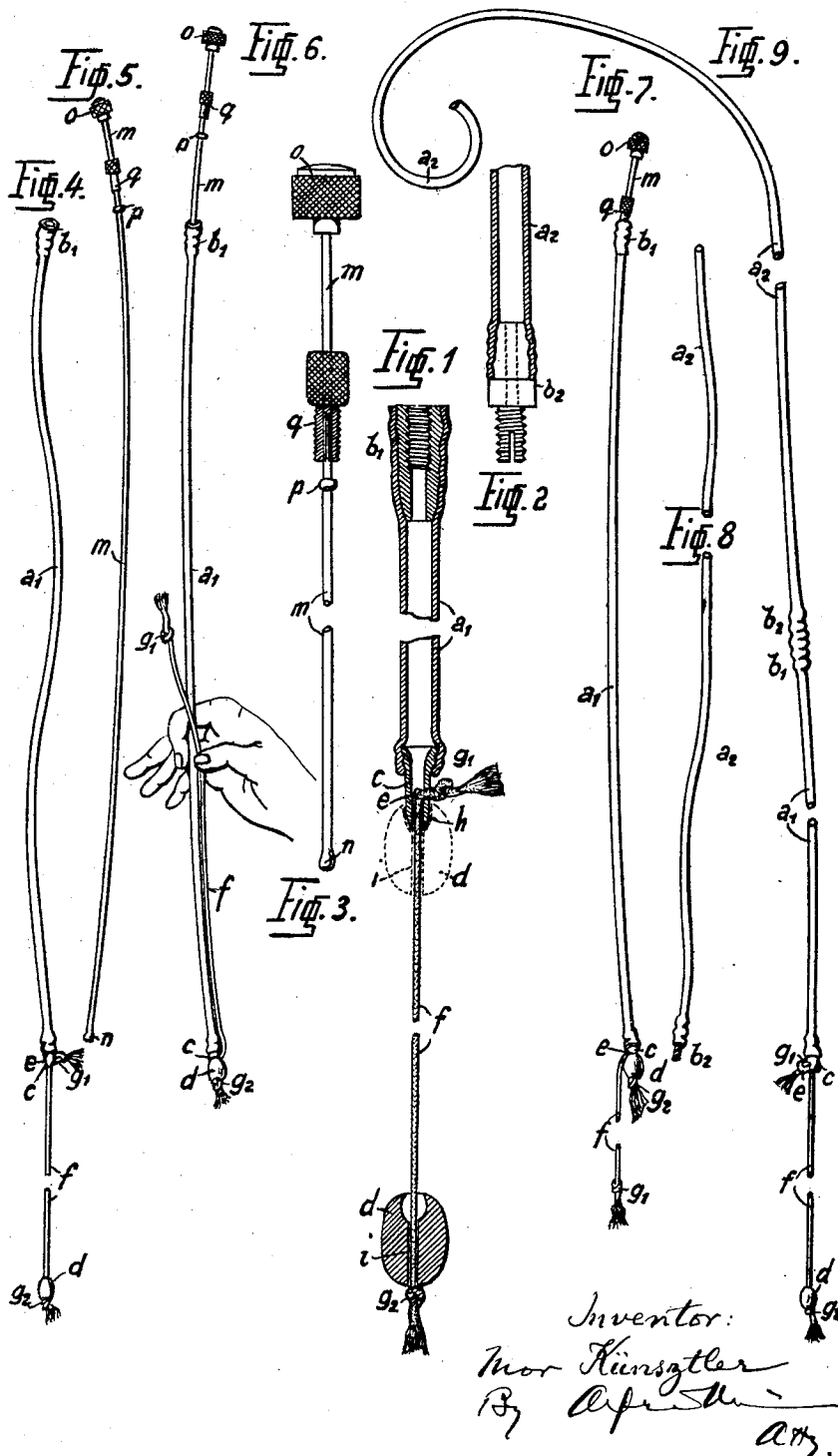
Oct. 4, 1932.

M. KÜNSTLER

1,880,964

DUODENAL OR STOMACHAL TUBE

Filed May 31, 1930



## UNITED STATES PATENT OFFICE

MÓR KÜNSZTLER, OF BUDAPEST, HUNGARY

DUODENAL OR STOMACHAL TUBE

Application filed May 31, 1930, Serial No. 458,096, and in Hungary June 15, 1929.

My invention relates to stomach tubes, or probes. The stomach tubes hitherto used cannot be introduced by the physician, the patient being obliged to swallow the tube. The choking and even vomiting caused thereby often renders the swallowing impossible, and even if this is not the case, the procedure is very complicated and disagreeable for the patient.

Attempts have been made to eliminate this drawback by inserting into the whole length of the tube a wire, a so-called mandrin, to give the necessary stiffness to the flexible soft rubber tube (drain) which wire is withdrawn as soon as the probe has reached the stomach. In practice this relatively long wire—just on account of its length—has not proved satisfactory, and has often caused cracks in the soft rubber tube.

In accordance with the present invention, the rubber tube is made of two or more sections to be connected as the tube is introduced, in combination with a mandrin having only the length of the first section.

On the accompanying drawing illustrating by way of example one embodiment of the invention:

Figures 1 and 2 show on a greatly enlarged scale portions of the first and second sections of the rubber tube in longitudinal section.

Figure 3 illustrates on the same scale the mandrin, that is, the wire for stiffening the first section of the tube as it is being introduced.

Figure 4 shows the complete first tube section on a much smaller scale.

Figure 5 shows the mandrin by itself.

Figure 6 shows the mandrin almost completely inserted into the first tube section.

Figure 7 the same, entirely inserted.

Figure 8 the second tube section, and finally

Figure 9 the two tube sections joined together.

The two tube sections designated respectively *a1*— and *a2*— are detachably connected with one another by means of a hose coupling—*b1*— and *b2*—.

The first tube section *a1*— carries at its lower free end the olive—*c*—, which differs

from the naked olives hitherto used in that it is connected to a cap—*d*—. At both ends of a white (preferably silk) thread—*f*— which is introduced through a bore—*e*— made on the side of the olive—*c*—, being then pulled out through the centre bore—*h*— of the olive and passed through the axial bore of the cap—*d*—, knots—*g1*— and—*g2*— are provided, movably attaching the thread—*f*— to the olive—*c*— and to the cap—*d*—.

The mandrin, that is, the wire—*m*—, which, as mentioned above, is about as long as the first tube section—*a1*— or only slightly longer (for instance from 15 to 20 millimetres), is formed at its lower free end with a button—*n*—, and is provided at its upper end with a handle. In the vicinity of the upper end of the mandrin—*m*—, but slightly (about 20 millimetres) beyond the first tube section, is a collar—*p*—, by means of which the movement of a member—*q*—, mounted displaceably on the mandrin—*m*—, is limited in the downward direction. The lower part of member—*q*— is of the same dimensions as the coupling member—*b2*— of the second tube section—*a2*—.

Hitherto, the patient has had to swallow the probe without the help of the physician, who could not do more than give encouragement. Now however the physician is able to intervene actively, the introduction being independent of the attitude and feelings of the patient.

First of all, the physician will introduce the mandrin—*m*— into the first tube section—*a1*— through the coupling piece—*b1*—, pulling the thread—*f*— so far out by means of the knot—*g1*—, that the cap—*d*— touches the lower end of the olive—*c*—. Thereupon he screws the threading of the member—*q*— into the female threading of the coupling piece—*b1*—, thereby stretching the flexible tube section—*a1*—. At the same time he fixes the thread—*f*— in the bore—*h*— of the olive—*c*— by means of the button—*n*— of the wire, so that the cap—*d*— cannot fall off.

The tube section—*a1*— prepared in this manner is then pushed down by the physi-

cian into the stomach of the sitting patient without difficulty through the open mouth, the throat and the gullet or esophagus. Then member —*q*— is unscrewed from the coupling piece —*b1*— so that the mandrin —*m*— can be easily withdrawn from the tube section —*a1*—. The button —*n*— of the mandrin will then no longer hold fast the thread —*f*—, so the cap —*d*— will detach itself from the olive —*c*—, and will begin to move freely in the stomach and draw the thread —*f*—, on account of its weight, through the olive —*c*— up to the knot —*g1*—, whereupon the cap comes to a stand-  
 15 still stretching the thread —*f*—.

After the mandrin has been withdrawn, the second tube section —*a2*— is instantly screwed into the coupling piece —*b1*— of the first tube section —*a1*— by means of the coupling piece —*b2*—.

Then the physician requests the patient to introduce the tube further, partly by swallowing and partly by pushing it in by hand.

By the movement of the stomach, the cap  
 25 is conveyed to the duodenal gut (duodenum) in a short time, about 3 to 6 minutes.

If the patient is examined on the basis of a trial breakfast, the tube is only introduced into the stomach down to a length of 54 centimeters. In this case the cap —*d*— has entered the duodenal gut (duodenum), the thread —*f*— lying on the pylorus, that is, the most usual place for stomach and gut ulcer. In the case of an activity (bleeding) of the  
 35 ulcer, the part of the thread —*f*— resting on the ulcer is dyed red by the blood, the remaining part of the thread showing a nice golden yellow colour caused by the gall. This is of great differential diagnostic value,  
 40 in a positive as well as in a negative sense, when the existence of an ulcer is suspected.

For a duodenal treatment or examination, the tube should be swallowed to a length of about 70 centimeters. In this case the cap  
 45 —*d*— located in the duodenal gut will by its weight, and by the help of the thread —*f*—, draw the olive and the tube into the gut so that the tube provided the pylorus is freely passable, will get into the duodenal gut with-  
 50 in a far shorter time than before, namely about 3 to 6 minutes instead of from one to two hours.

The mandrin may be made of any suitable material.

55 I claim:

1. A flexible stomach tube comprising a plurality of separate sections, a coupling piece at one end of each tube section to permit said sections to be detachably connected,  
 60 a mandrin adapted to be inserted into the first tube section for stiffening the same, and a movable coupling sleeve on said mandrin designed for cooperation with the coupling piece on said first tube section for detachably  
 65 connecting said mandrin to said tube section.

2. A flexible stomach tube as specified in claim 1, including means on said mandrin for limiting the displacement of said coupling sleeve thereon.

3. A flexible stomach tube comprising a plurality of separate sections, means on said sections for detachably connecting them together, a mandrin adapted to be inserted into the first tube section for stiffening the same, a guiding weight, and a thread freely sus-  
 75 pending said guiding weight from the forward end of the first tube section.

4. A flexible stomach tube comprising a plurality of separate sections, means thereon for detachably connecting them together, a mandrin adapted to be inserted into the first tube section for stiffening the same, an olive carried at the forward end of said first tube section, a guiding weight, a thread freely suspending said guiding weight from said olive and adapted to draw said weight against said olive, and means on said mandrin for securing said weight in its drawn-up position.

5. A flexible stomach tube comprising a plurality of separate sections, screw coupling members on said sections for detachably connecting them together, a mandrin adapted to be introduced into the first tube section for stiffening the same, a screw coupling sleeve movably mounted on said mandrin for detachably connecting the same to said first tube section, and a collar formed on said mandrin for limiting the displacement of said screw coupling sleeve on said mandrin.  
 In testimony whereof I have signed my  
 name to this specification.

MÓR KÜNSZTLER.

105

110

115

120

125

130