

[54] **OBLIQUE VIEW TYPE ENDOSCOPE**

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[51] Int. Cl. **A61b 1/12**

[58] Field of Search..... 128/4, 5, 6

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[57] **ABSTRACT**

An oblique view type endoscope whose distal end has an inclined end plane provided with a view window to bring a view field obliquely upward, wherein forceps is positioned on the upper side of the distal end to have the end of the forceps brought into the view field.

7 Claims, 2 Drawing Figures

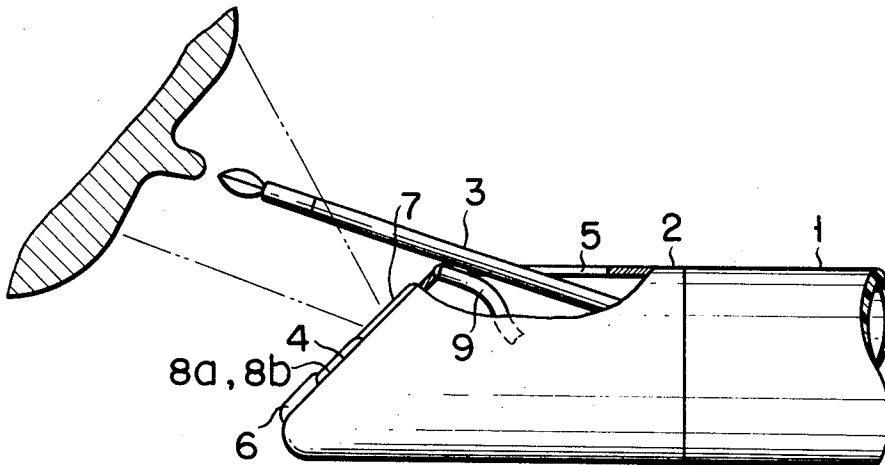


FIG. 1

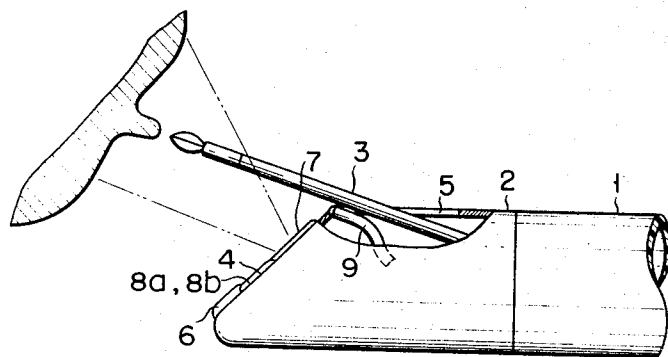
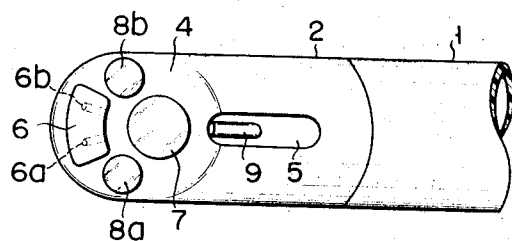


FIG. 2



OBLIQUE VIEW TYPE ENDOSCOPE**BACKGROUND OF THE INVENTION**

This invention relates to an oblique view type endoscope provided with an opening through which a forceps is extended.

For special observation and treatment of an affected part in the abdominal cavity of living creatures by means of an endoscope, it is generally required easily to conduct the treatment member fitted to the tip of the forceps to the affected part and smoothly move the forceps.

Hitherto known are a forward view type endoscope wherein the forward surface of the distal end provided with a view window and forceps opening is positioned at right angles to the lengthwise axis of said distal end and a side view type endoscope wherein the view window and forceps opening are cut out in the side wall of the distal end.

The forward view type endoscope has the drawback that it is difficult to clearly observe the movement of the tip portion of the forceps in the abdominal cavity and conduct the treatment member fitted to the tip properly to an affected part therein. Further, the side view type endoscope requires the forceps to be inserted into the abdominal cavity by being bent through a large angle using a forceps raising mechanism and in consequence a great force to be used in moving the forceps, thus causing the end portion of the forceps to have the tendency to become readily bendable.

For the above reason, application of the forward view type endoscope is limited to those parts of the abdominal cavity such as the gullet and rectum which enables the treatment member fitted to the forceps end portion to be brought to the prescribed position with relative ease. On the other hand, the side view type endoscope is applied in the observation and treatment of an affected area in those parts of the abdominal cavity, for example, the stomach which occupies a large space. Therefore, it calls for troublesome work to use different types of endoscope depending on the parts of the abdominal cavity being examined.

SUMMARY OF THE INVENTION

It is accordingly the object of this invention to provide an improved oblique view type endoscope which enables a treating member fitted to the end portion of forceps to be easily brought to an affected part in the abdominal cavity, permits the smooth movement of the forceps and moreover whose application is not limited with respect to the parts of the abdominal cavity being examined.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view, partly in section, of an oblique view type endoscope embodying this invention, where forceps is drawn out therefrom; and

FIG. 2 is a plan view of said endoscope where the forceps is retracted thereinto.

DETAILED DESCRIPTION OF THE INVENTION

There will now be described the oblique view type endoscope of this invention by reference to the appended drawing.

Throughout the Figures, numeral 1 denotes the cylindrical body of an endoscope wherein a light guide, image guide, water and air supply tubes and a suction

tube of water and air are arranged as already known and also a forceps channel is provided which receives a forceps 3 so as to permit it to slide therethrough. The endoscope 1 has a distal end 2 mounted at one end thereof, and the known control unit disposed at the other end. The distal end 2 has a front plane surface 4 which is inclined to the axis thereof at the prescribed angle, preferably 30° to 60° (about 45° in this embodiment). In the upper side wall of the distal end 2 defining an obtuse angle with the inclined front plane surface 4 is formed a forceps opening 5 parallel with the axis of the distal end 2 as shown in FIG. 1. This opening 5 has an elliptic shape and has its forward end extended to the upper part of the inclined front surface 4 of the distal end 2. To the lower part of the inclined front surface 4 is provided with a water-air delivery block 6 bored with a water port 6a and air port 6b so as to cause these ports 6a and 6b to face a view window 7 described later and forceps opening 5. In the inclined front plane surface 4 between the water-air delivery block 6 and the forceps opening 5 is formed a view window 7 with the central axis of the view field thereof set at right angles to the inclined plane 4. On both sides of the view window 7 are provided illumination windows 8a and 8b.

In the distal end 2 are disposed, though not shown, a view optical system, illumination optical system and forceps raising device so as to take positions corresponding to the view window 7, illumination windows 8a and 8b and forceps opening 5, as well as to the image guide, light guide and forceps channel provided in the endoscope 1.

The known forceps raising device is so arranged as to push a little obliquely upward the forceps 3 fitted at the tip with a treatment member (cutting cup in this embodiment) from the forceps opening 5 into the view window 7, and when not used, retract said forceps 3 back into the distal end 2.

The control unit includes an operation mechanism for actuating the light guide, image guide and forceps raising device and a head for connecting the object lens, forceps opening, light guide, air and water tubes and exhaust or suction tube of water and air to the light source means and pump. The image guide is connected at the other end to the object lens and the light guide is connected at the other end to the illumination windows 8a and 8b facing the light source. The water and air delivery tubes and exhaust or suction tube of water and air are connected at the forward end to the water-air delivery block 6 bored with the water port 6a and air port 6b as well as to the forceps opening 5.

The oblique view type endoscope of this invention arranged as described above has the view window 7 cut out in the front plane surface 4 of the distal end 2 inclined to the axis thereof. Accordingly, the field of view offered by the view window 7 has its optical axis also inclined to the axis of the endoscope as illustrated in FIG. 1. The upper wall of the distal end 2 defining an obtuse angle with the inclined end plane 4 is bored with the forceps opening 5, through which the forceps 3 is drawn out. The forceps 3 has the forward end introduced into the field of view immediately after drawn out at a gently raised angle, attaining a smooth movement and rendering the forward end portion little liable to be bent. The aforementioned relationship between the field of view offered by the view window 7 and the extending direction of the forceps 3 enables the for-

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ward end portion of the forceps 3 to be quickly and readily brought to an affected part in the abdominal cavity of living creatures, its movement therein to be easily observed, and further provides a prominently large latitude for the operation of the forceps in the view field. Like the prior art forward view type endoscope, therefore, the oblique view type endoscope of this invention can be effectively used for general purposes, namely, in the observation and/or treatment of an affected part not only in the relatively shallow sections but also in the deep sections of the abdominal cavity of living creatures such as the digestive system, gullet, duodenum, proving that application of said endoscope is not limited with respect to the parts of the abdominal cavity being examined.

Where the view window 7 of the endoscope of this invention has its surface soiled with, for example, the content of the stomach during examination to obstruct observation, then such contamination can be removed simply by ejecting water on the window surface from the water port 6a through the water tube. If, in this case, the bottom end of the exhaust or suction tube or pipe 9 of water is previously connected to a vacuum pump, the wash water can be sucked out through the pipe 9. It is also possible to expel water particles still remaining on the surface of the view window 7 by introducing air into the air tube at the bottom end and ejecting the air on the window surface from the air port 6b.

What is claimed is:

- 1. An oblique view type endoscope comprising:
 - a distal end having a front end plane surface inclined to the longitudinal axis thereof;
 - a view window formed in the inclined front surface; and

a forceps opening bored in the upper wall of the distal end portion defining an obtuse angle with the inclined front surface, said opening being disposed behind the view window in the direction of the insertion of said endoscope into a body portion, and one end of said opening extending to the inclined front surface to enable the end portion of the forceps to be brought into the view field of the view window.

2. The endoscope according to claim 1 wherein there is further provided a forceps adapted to be drawn out through the forceps opening at an obtuse included angle to the longitudinal axis of the distal end.

3. The endoscope according to claim 1 wherein the distal end further has at least one illumination window formed in the inclined end.

4. The endoscope according to claim 1 wherein the distal end further has water and air ports bored in the inclined front plane surface and a suction tube for water and air disposed in the forceps opening.

5. The endoscope according to claim 4 wherein the illumination windows are positioned on both sides of the view window and the water and air ports are cut out in a block provided on the opposite side of the illumination windows to the forceps opening.

6. The endoscope according to claim 4 wherein said water and air ports are disposed ahead of said forceps opening in said direction of insertion of said endoscope.

7. The endoscope according to claim 3 wherein said at least one illumination window is disposed ahead of said forceps opening in said direction of insertion of said endoscope.

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