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Vass et al.

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[54] **INSTRUMENT FOR ADMINISTERING FLUID INTO A BODY THROUGH AN ORIFICE THEREIN**

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[51] **Int. Cl.** **A61m 3/00**

[58] **Field of Search** 128/245, 241, 242, 246, 128/248, 350

[56] **References Cited**

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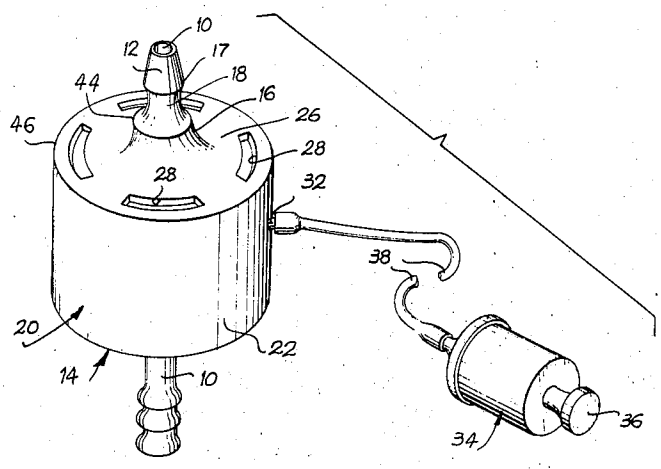
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[57] **ABSTRACT**

An instrument for administering fluid into a body through an orifice therein, which consists of a tube having an orifice entering end having means for being retained on the body during the administration of the fluid. The retaining means consists of an enlargement surrounding the tube adjacent said end and having concentric inner and outer concavities formed in its frontal surface defined by ridges adapted to form a seal with the body surface around the orifice; the outer concavity having an opening through its wall through which its interior is connected to an air exhaust pump; the means connecting the concavity opening with the air pump including a one-way air valve.

7 Claims, 2 Drawing Figures



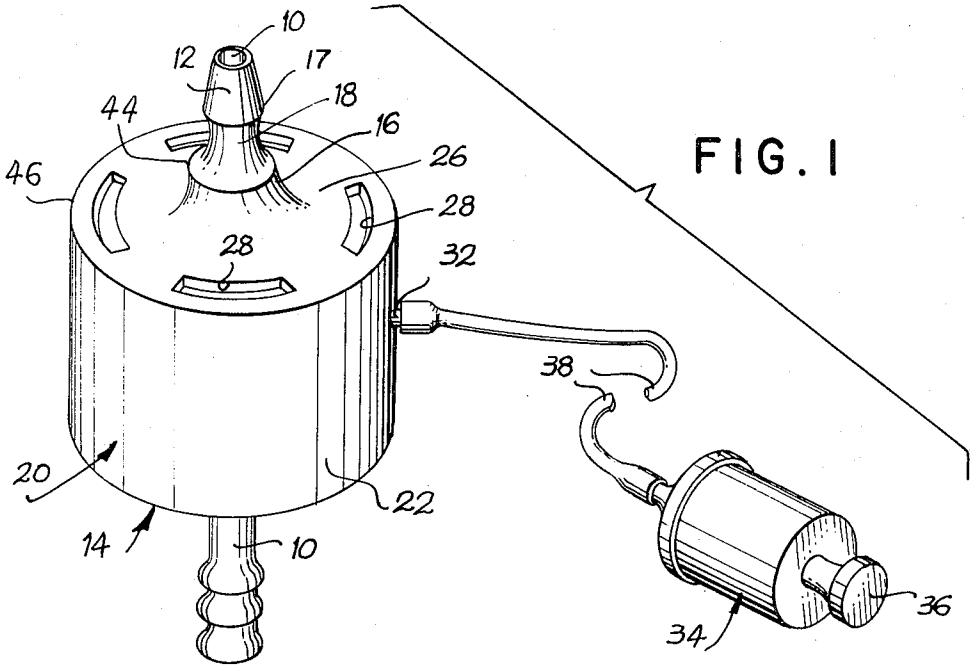


FIG. 1

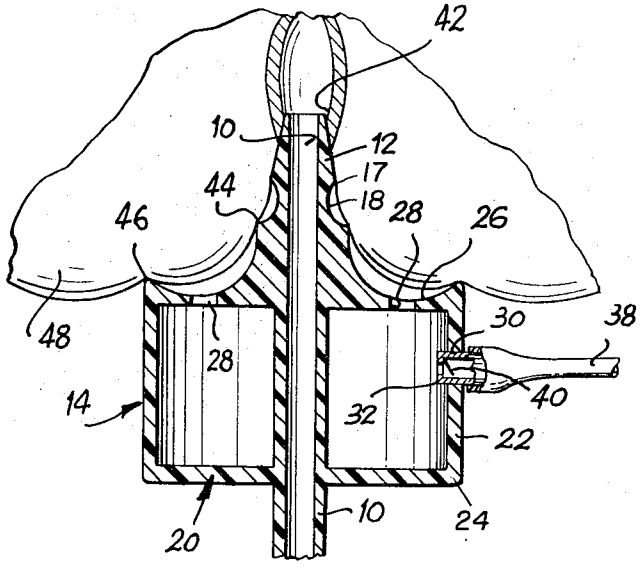


FIG. 2

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INSTRUMENT FOR ADMINISTERING FLUID INTO A BODY THROUGH AN ORIFICE THEREIN

The present invention relates to an instrument for the administering of fluids into a body through a body orifice or stoma, as for the delivery of fluids, such as barium solution into the intestinal tract, per rectum, and is an improvement over the similar device described and claimed in U.S. Pat. No. 3,469,571, dated Sept. 30, 1969, and U.S. Pat. No. 3,575,160, dated Apr. 20, 1971.

Administration of fluid into the body through a body orifice, as the administration of barium fluid per rectum into the intestinal tract, for instance, by conventional intrumentalities heretofore used, presented the difficulties of retaining the instrument in administering position throughout the procedure against the various pressures that tend to expel it from the body and which also tend to expel the fluid from the body. Such difficulties, obviously, interfered greatly with the efficient and expeditious practice of the administering procedure.

In the said U.S. Pat. No. 3,469,571 there is described and claimed a fluid administering instrument or device, of the character described, which provides for the retention of the instrument in place on the body during its use. In the device of said patent, a fluid conveying tube whose end is adapted to be inserted into a body orifice, is surrounded adjacent its body entering end with a concentric enlargement whose frontal surface is formed with concavities that surround the tube and are concentric with it and with one another, the two concavities or cupped areas being defined by peripheral ridges. Such device, when pressed against the body surface surrounding the orifice into which the tube end is inserted, such as the rectum, will cause the air from the concavities to be evacuated by being pressed out, to thereby create suction between the interior of the concavities and the body surface which will contribute to the retention of the instrument in place on the body. Also, the inner concavity will form a seal against the backflow of the fluid from the body orifice.

The present invention is directed to the provision of an improved instrument of the character described, which will be more positively and more securely held on the body during the fluid administering procedure, by means of more positive and stronger suction created between the enlargement around the tube and the body surface surrounding the body orifice.

Broadly stated, the present invention is directed to the provision of an instrument of the character described having means, applied from the exterior thereof, which will mechanically exhaust the air from the outer of the concavities of the frontal surface of the enlargement around the administering tube, to thereby provide stronger suction which may be maintained constant throughout the procedure.

The foregoing and other objects and advantages of the fluid administering device of the present invention will become more readily comprehensible to those skilled in the art from the embodiment thereof, in the form of an instrument for use in administering fluid per rectum, into the intestinal tract, which is shown in the accompanying drawings and from the description following. It is to be understood, however that such embodiment is shown by way of illustration only and without any intent of limiting the invention to the specific details shown.

In the drawings:

FIG. 1 is a top perspective view of one embodiment of the instrument of the present invention, as designed for use in administering fluid, per rectum, into the intestinal tract; and

FIG. 2 is a vertical section through the same, shown in more or less schematic fashion, as positioned on the body in readiness for use.

Referring in greater detail to the embodiment of the invention illustrated in the drawings, the same is shown to comprise a fluid conduit, such as a tube, **10**, having a body entering end which may be outwardly taperingly thickened to provide the head, **12**. An enlargement, generally designated as **14**, is formed around tube **10**, distally of head **12**, which surrounds and is preferably concentric and integral with tube **10**. Enlargement **14** is provided on its frontal surface, facing the body entering end of tube **10**, with a pair of concavities that are concentric with one another and surround tube **10**, including an outer concavity or cup shaped area, **26**, defined between preferably sharp inner and outer ridges, **44** and **46**, respectively and an inner concavity or cup-shaped area, **18**, defined between ridge **44** and the tube **10**.

Where the instrument is intended for rectal application, ridge **44** may be elevated relative to ridge **46**, to form a stud-like formation, **16**, and to lie on a slope, and concavity **18** may likewise be disposed on a slope, with its inner edge defined by the intersection of its concave surface with the distal edge, **17**, of head **12**. It may here be stated, however, that concavities **18** and **26** may have their edges or defining ridges formed substantially on a level with one another, as illustrated in U.S. Pat. No. 3,469,571. It will also be understood that the widths and depths of the concavities or cupped areas **18** and **26** may be varied to meet the different requirements of instruments intended for use on parts of the body other than around the rectal opening.

It will be seen that when the instrument is applied to the body with the end of tube **10** extending into an orifice, such as the anal orifice, **42**, the frontal surface of enlargement **14** will engage against the body area surrounding the orifice, and when pressed against such surface, ridges **17**, **44** and **46**, will flatly contact such surface to provide a pair of sealed chambers between the concavities **18** and **26** and the body surface encompassed between such ridges. While continued pressure of the instrument against the body will exhaust the air in such chambers to create a vacuum therein, means are provided for more effectively exhausting the air from such chambers and to maintain the vacuum created during the entire procedure.

In the illustrated embodiment of the invention such means is shown to comprise one or more openings formed in the wall of the concavity **26** which is connected to an exhaust pump that may be manually operated to withdraw or exhaust air from the sealed chamber formed by the concavity to create a vacuum therein and which may be operated from time to time during the procedure to maintain such vacuum, as may be required. More specifically, the air exhaust means of the invention comprises a hollow chamber formed in or connected to the enlargement, generally designated as **20**, defined by a cylindrical wall **22** depending distally from the frontal wall thereof, and a distal wall con-

nected to the edges of wall **22**, and designated as **24**. At least one opening and preferably a plurality of spaced openings, **28**, are formed through the bottom of the concavity **26**, opening into the chamber **20**, and opening **30** is formed in a wall of the chamber, as in wall **22**, into which may be set a nipple **32**, which is tubular and to which is connected a tube **38**, by one end, with its other end connected to a manually operable exhaust pump, **34**, provided with the plunger **36**. Nipple **32** may be provided with a one way valve, diagrammatically illustrated at **40**, that will permit air to be withdrawn from chamber **20** and will seal it against inlet of air, when it is exhausted.

It will be readily understood that the air exhaust pump may be mechanically or electrically operated, instead of manually and that the one way valve may be installed at any point in the air exhaust system, other than in nipple **32**, with equally effective results.

This completes the description of the fluid administering instruments of the present invention and the manner of their use. It will be readily apparent that such instruments possess improved characteristics for retention on the body during use as well as for preventing backflow of the administered fluid, to thereby render the fluid administering procedure more efficient and effective and expedite its performance. It will also be apparent that such instruments are relatively simple and easy to use.

It will be further apparent that numerous variations and modifications may be made in the instruments of the present invention by any one skilled in the art, in accordance with the principles of the invention hereinabove set forth and without the exercise of any inventive ingenuity.

What we claim is:

1. An instrument for administering fluid into a body through an orifice therein, comprising a tube having a frontal end insertable into said orifice, an enlargement surrounding said tube distally of its said frontal end, said enlargement having a first frontally facing concavity formed therein, said concavity defined by an outer peripheral edge and an inner peripheral edge, said inner peripheral edge spaced from said tube, said peripheral edges adapted to form a sealing contact with the body area surrounding said orifice when said frontal end is inserted into said orifice, said concavity having an opening formed in a wall portion thereof, and air exhaust means connected to said enlargement adapted to exhaust air from said concavity through said opening, said enlargement having a second frontally facing concavity between said first concavity and said tube, said second concavity defined from said first concavity by said inner peripheral edge of said first concavity.

2. The instrument of claim **1**, wherein said concavities surround said tube.

3. The instrument of claim **1**, wherein said concavities surround and are concentric with said tube.

4. The instrument of claim **3**, wherein said tube is formed with an enlarged orifice-entering head at its said frontal end and said enlargement is formed distally of said head.

5. The instrument of claim **4**, wherein the peripheral edges of said first concavity are disposed in longitudinally offset relation to one another with said outer peripheral edge thereof disposed distally of said inner edge thereof, and said second concavity is formed with an inner peripheral edge frontally offset relative to the inner edge of said first named concavity and defined by the intersection of the surface of said second concavity with the distal end of said head.

6. The instrument of claim **4**, wherein said air-exhaust means include a closed chamber connected to said enlargement, distally thereof, the interior of said chamber communicating with the interior of said first concavity through said opening, said chamber having an opening formed in a wall portion thereof, and means connecting the interior of said chamber to an air exhaust mechanism, said connecting means including a one-way air valve adapted to permit passage of air outwardly of said chamber and inhibiting movement of air thereinto.

7. The instrument of claim **1**, wherein said air-exhaust means includes an air exhaust mechanism and means connecting said mechanism to said first concavity through said opening, said connecting means including a one-way valve adapted to permit passage of air out of said first concavity and inhibiting passage of air thereinto through said opening.

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