STOMACH FREEZING SYSTEM WITH INFLATABLE DISTRIBUTOR MEANS
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1 Claim. (Cl. 128-401)

This invention relates generally to stomach freezing systems of the type in which the stomach is frozen by circulating chilled alcohol to and from an inflatable bag within the stomach. More particularly, the invention is concerned with such a system in which an inflatable distributor means is provided inside the inflatable bag, so as to avoid jittering the extremely cold alcohol against any one spot of the stomach lining.

Stomach freezing is a treatment which has been developed by medical research during recent years for the treatment of stomach ulcers and for other purposes. It is not within the scope of this patent specification to describe the particular types of cases in which medical science has found such treatment to be beneficial, nor will it be necessary to discuss the techniques employed by surgeons in carrying out the stomach freezing treatment; these matters are left to the knowledge and judgment of the highly skilled physicians who would be making use of the apparatus described herein. It is sufficient for the purposes of this disclosure to make reference to the extensive medical literature which reports highly successful treatment of human patients in the United States and foreign countries by stomach freezing treatment.

Still another important object of the present invention is to provide means which develops a gentle shifting movement under the influence of the recirculating alcohol within the bladder, so as to avoid any local spots of constant cold. These and other objects are achieved by means of an inflatable distributor held within the bladder and connected to the ends of the supply tubing.

In the drawings:
FIGURE 1 is a perspective view of a stomach freezing system constructed according to the present invention, and shown as it appears inflated in the stomach, with the side wall of the inflatable bladder partially broken away to reveal the disposition of the inflatable distributor within the bladder;
FIGURE 2 is a front perspective view of the inflatable distributor of FIGURE 1, showing the numerous fine discharge nozzles in the central part thereof;
FIGURE 3 is an enlarged cross-sectional view of the distributor and the outer supply tube, showing their construction; and,
FIGURE 4 shows the inflatable bladder and distributor folded into an elongated package, and ensased in a gelatin sheath preparatory for insertion into the patient.

In FIGURE 1, a human stomach is indicated symbolically by the phantom line 10. Inside the stomach 10 is shown an inflated rubber bladder 11, which is preferably of rubber or rubber-like material, and is shaped to accommodate itself to the interior of stomach 10, partially or nearly filling it.

For purposes of illustration and explanation, the inflated bladder 11 is broken away at 11a to show internal construction. It is seen that the bladder 11 is tightly sealed around a flexible rubber or plastic tubing 13, which accommodates a smaller tube 14 in its interior. As will be described hereinafter, tubes 14 and 13 are supply and return tubes, respectively, for circulating chilled alcohol to and from the interior 15 of bladder 11, circulation within tubes 14 and 13 occurring as indicated by the arrows 14a and 13a on supply and return, respectively.

It is seen that supply tubing 13 has an intake end 16 extending far into the interior 15 of bladder 11. Said intake end is provided with a plurality of intake holes 17 for continuously withdrawing alcohol in the direction of the arrow 13a. Anchored to the intake end 16 of return tube 13 is a supply distributor indicated generally by the numeral 20, and seen to be comprised principally of a central reservoir portion 21 and a plurality of radially projecting spacer arms 22. The distributor 20 is shown inflated by the pressure of incoming alcohol, but it will be understood that it is constructed of thin flexible walls, of material such as thin rubber sheeting or rubberized fabric, or thin plastic so that it will collapse readily upon deflation.

The perspective view of FIGURE 2 and the sectional view of FIGURE 3 show the manner in which chilled alcohol being supplied through supply tube 14 passes through supply holes 23 into the interior 24 of distributor 20, and is discharged into the interior 15 of bladder 11 by distributor holes 25. Preferably, the distributor holes 25 discharge newly supplied alcohol in a direction opposite to that which the alcohol must take for return through intake holes 17 and return tube 13. This arrangement forces the incoming cold alcohol to circulate extensively throughout the interior 15 as indicated by the arrows 30. The cold alcohol does not enter the bladder in a single jet, but through many openings, which discharges in a central portion of the interior volume 15, far removed from either end or any sidewall of bladder 11, so as to minimize spot chilling of the stomach wall. The circulating alcohol must flow uniformly through the bladder 11, and double back along the wall thereof in a
somewhat annular flow, so as to pass back around the internal wall surface of bladder 11, between the spacer arms 22, before reaching the intake holes 17.

FIGURE 3 also shows the manner in which the distributor 20 is anchored to the tubes 13 and 14. In the preferred star or wheel shape of distributor illustrated, the supply tube 14 passes axially through the central reservoir 21, and is received in an axially-positioned tubular extension 27 of central reservoir 21. Tubing 14 is anchored at the end, and closed by a tie of gut or the like 28.

An intake tubular extension 29, on the opposite side of reservoir 21 receives intake end 16 of return tube 13, and is sealed thereto. However, an internal annular spacer 35 encircles collapsed tube 14 and closely received in the interior of return tube 13, prevents any flow directionally between the interior of reservoir 21 and the interior of return tube 13.

When the distributor 20 is inflated with alcohol, its radially projected spacer arms 22 are sufficiently stiff to hold the main reservoir 21, containing the coolest alcohol, away from the walls of bladder 11, and consequently away from the walls of the stomach 10. However, spacer arms 22 are flexible and resilient. As cold alcohol continuously jets from openings 25 and then circulates along the lines of the arrow 30, intake end 16 and distributor 20 experience a gentle but continuous waving motion, with the spacer arms 22 touching first at one point and then another, the movement being encouraged by their resilience. This feature further assists in preventing any local spots having a temperature constantly depressed below the average of the rest of the interior 15 of bladder 11.

The freezing device illustrated in FIGURES 1 to 3 is easily inserted into the stomach and withdrawn. Preparatory to insertion, the patient's throat is anesthetized. The inflatable bladder 11, with the inflatable distributor 20 within its encircling collapsed tube 14 and folded or furled as illustrated in FIGURE 4. Preferably, the entire assembly is encapsulated in a capsule 40, illustrated in section in FIGURE 4, which is made of a slippery gelatin material which is soluble in the stomach juices.

The capsule 40 is readily slipped down the throat of the patient into the stomach. After the collapsed bladder 11 is properly positioned, the circulation of alcohol to and from the bladder 11 by way of supply and return tubes 13 and 14 is commenced. The supply pump, not shown, has sufficient pressure to inflate bladder 11 and distributor 20. At the conclusion of treatment, supply tube 14 is shut off and both inflatable distributor 20 and inflatable bladder 11 are collapsed by pumping out the alcohol. The entire assembly is then easily removed by pulling off return tube 13.

For example, although the illustrated construction is preferred, supply and return tubes might be exchanged, or might be arranged side by side instead of one within the other.

Also, if inner tube 14 were made the return tube, its end could extend far forward of the inflatable distributor 20. In this event, it might be preferable to have the distributor opening on the opposite face of distributor 20. Of course, the tube 13 would then have no side openings but would have passages in the annular spacer 35 in order for supply liquid to reach the interior of reservoir 21.

Although the foregoing description and accompanying drawings illustrate a preferred form of my invention, it is to be understood that the invention may be employed in a variety of other forms, having many differences in detail, but utilizing a combination of basic elements described herein. It is to be understood, therefore, that the foregoing detailed description is not to be construed as limiting the scope of the invention being extended to all creations which fall within the boundaries defined by the appended claim.

Having described the invention, what is claimed as new in support of Letters Patent is:

An inflatable stomach freezing device which includes: an inflatable bladder for reception into the stomach, said bladder being generally in the shape of an elongated tube extending longitudinally from a connection end having an opening to a closed penetration end; a supply and return tube communicating with the interior of said bladder through said connection end, for the circulation of chilled liquid to and from the interior of said bladder, said supply tube being smaller than said return tube, and received in the interior thereof, and said supply tube and return tube having discharge and intake openings, respectively, at their inner ends inside said bladder; an inflatable distributor anchored to the inner ends of said supply tube and said return tube, said supply tube discharging through said discharge openings into the interior of said distributor, and said distributor being comprised of a central reservoir portion receiving said incoming fluid, and a plurality of inflatable spacer arms internally contained with said reservoir and radially projecting therefrom; annular barrier means encircling said supply tube upstream from said discharge openings, within said return tube, said barrier means preventing the flow of circulating fluid directly from the interior of said distributor means into said return tube; and walls defining a plurality of distribution openings in said distributor, said distribution openings being directed to discharge circulating fluid towards said penetrating end of said bladder, whereby said fluid is forced to circulate backwardly from said penetrating end around said reservoir portion and in the openings between said radial spacer arm members of said distributor member to reach said return openings in said return tube.

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