This invention relates to improvements in surgical apparatus of the type adapted to impose sustained suction for evacuation of the stomach or other body cavity, and the principal object of the invention is to provide a simplified, more readily manipulated, and substantially leak proof apparatus of this class.

Another object of the invention is to provide novel and improved means for periodically washing the said cavity with liquid from external source.

Still another object of the invention is to provide a simple gauge device for indicating the presence or absence of suction and, if present, its relative strength.

In the attached drawing:

Fig. 1 is a view in perspective of an apparatus made in accordance with the invention;

Figs. 2 and 3 are fragmentary sectional views illustrating details of the mechanical structure, and

Fig. 4 is a diagrammatic view showing the suction system.

With reference to the drawing, the device comprises a standard 1 made preferably of tubing and comprising a base 2 mounted on castors 3, and an upright member 4. The upright 4 has a branch 5, the function of which will be hereinafter described.

In conjunction with the standard described above, the apparatus comprises a plurality of containers which may, as illustrated, be two in number, these containers being identical in form and being designated by the reference numerals 6 and 7. Each of the containers has at its upper end a tubular extension 8, the outer end of which is turned downwardly as illustrated, this extension constituting a support by means of which the container may be supported in a depending position on the standard, and having also a function related to the operation of the suction device, as hereinafter described. The lower ends of the containers 6 and 7, as viewed in Figs. 1 and 4 are connected by a flexible tube 8, and it will be noted that whereas the upper ends of the containers 6 and 7 may communicate with atmosphere through the inverted U-shaped extensions 9, the lower ends of the containers are sealed except as to their connection with each other by way of the tube 8.

The branch 5 of the upright 4 of the standard has a down-turned outer end which engages the top of a stopper 11 in a receptacle 12 and thereby holds the receptacle in place upon one of the arms of the base 2. The stopper 11, carries two glass or other tubes 13 and 14 and these latter tubes are connected respectively to flexible tubes 15 and 16 which pass through the branch 5 into the upright 4. The tube 15 passes out of the upright 4 through an aperture 17 in the side thereof and is connected to one end of a tube 18 mounted in and preferably extending transversely of the upright 4, as shown. Attached to the other end of the tube 18 is a fitting 19 by means of which the said tube 18 may be connected to three flexible tubes, 21, 22 and 23 respectively. The fitting 19, as illustrated in Fig. 3, may consist of a hollow casing 20 into one side of which the tube 18 is threaded and which has in the opposite wall three projecting nipples for reception respectively of the ends of the tubes 21, 22 and 23. The tube 16 extends upwardly in the upright 4 and is connected at its upper end to a terminal tube 24 which is held in a rubber or other suitable washer 25 in the upper end of the upright. The upper end of the tube 24 and a portion at least of the upper surface of the washer 25 is exposed at the top of the upright, so that when the down-turned terminal end of the extension 9 of either of the containers 6 or 7 is seated upon the washer and over the upper end of the tube 24, the weight of the container will cause the extremity of the extension 9 to bear down solidly upon the washer so as to effectively seal the joint between the extension and the tube. To this end, also, the container is maintained in substantially vertical position by means of a bracket 30 on the upright 4, so that the thrust of the turned down end of the extension 9 upon the said washer is in the vertical direction and normal to the planes of both the washer and the said end. This arrangement and relation of parts is best illustrated in Fig. 2, wherein it will be noted that the extremity of the extension 9 is forcibly seated on the rubber stopper 25 in a manner to effect the seal aforesaid. In the drawing, the container 7 is shown as supported in the lower part of the standard, being suspended from a ball 26 through which the turned over end of the extension 9 is passed as illustrated. The outer extremity of the extension 9 of the container 7 is, in this position, open to atmosphere so that a liquid in the container 5 may flow by gravity through the flexible tube 8 into the bottom of the container 7 and will so flow until the container 6 is empty. Such flow will impinge upon the tube 16, through the tube upon the interior of the receptacle 12, and through the receptacle upon the tube 16. Suction will be similarly imposed upon the tubes 21 and 22 which are connected to the tube 18 as previously described. Under these conditions, if the tube 21 is inserted in the stomach or other body cavity, the de-
vice will act to evacuate the cavity, and such of the contents as may be drawn through the tubes 21 and 15 will flow into the receptacle 12. The suction will be sustained one and will continue until the container 6 is emptied of its liquid contents. At this point, if the suction is to be further maintained, the container 6 will be removed to the bottom of the standard and the container 25, formerly occupied by the container 6, whereupon the liquid contents of the container 21 will drain to the container 6. When it may be required to empty the receptacle 12, the outer end of the branch pipe 5 may be separated from the inner end through the medium of a suitable detachable coupling 27 which, when released, will permit an elevation of the outer terminal end of the branch pipe 5 to an extent permitting removal of the receptacle 12 from its support upon one of the arms of the base 2 of the standard and removal of the stopper 4 with the tubes 13 and 14 from the mouth of the receptacle.

Supported from the upper part of the standard is a container 28, this being suspended in an inverted position from a ball 29 attached to the container and engaging a hook or the like provided near the top of upright 4. A suitable stopper 31 is fitted into the bottom of the container 28 and this stopper contains a tube 32 which extends completely through the stopper and upwardly through the interior of the container 28 to the upper portion thereof, as illustrated in Fig. 1. The stopper 31 contains a second tube 33 to which is connected the tube 23. The tube 23 is normally compressed and closed by means of a hemostat 34, or by other suitable clamp or valve, and when this clamp is released the liquid in the container 28 will be free to run through the tube 23 and the tube 21 to the body cavity. In order to preclude flow of liquid into the tube 15, that tube may be clamped off by the clamp 34. Subsequently the tube 23 may again be clamped so that the suction device may operate to evacuate the liquid from the body cavity to the receptacle 12.

The tube 22 extends upwardly in a loop 35 and downwardly through the upright 4 of the standard to an aperture 26 in the side of the latter where the tube passes out of the upright 4. At this point, it may be connected to a transparent or other suitable sight gauge tube 37 and this tube is in turn connected through a terminal tube 38 to the interior of one or more of the hollow cross arms of the base 2. This hollow base may act as a reservoir for a suitable liquid which, when suction is imposed upon the tube 27, as described above, will be elevated from the reservoir into the sight-tube 37. The level of the liquid in this tube will constitute a gauge of the amount of suction, if any, being imposed upon the suction duct 21.

I claim:
1. In a valveless suction apparatus of the type including a receptacle and a suction tube extending between said receptacle and the body cavity to be evacuated; a substantially vertical tubular standard having an open upper end; a washer within said end; a suction duct having its upper end passed through said washer and terminating at the upper face thereof, and having its lower end connected to said receptacle, a bracket on said standard near the upper portion thereof; a liquid container having at its upper end a substantially inverted U-shaped tubular extension and supported in substantially vertical position at the upper portion of said standard with the side of said container in engagement with said bracket, and with the end of its tubular extension resting on said washer, whereby the depending weight and liquid contents of said container cause said end to form a seal with said washer and with the terminal end of said suction duct; and a flexible tube connected to the lower end of said container so that liquid may flow by gravity therefrom to thereby create suction within the receptacle and within the suction tube connected thereto.
2. In a valveless suction apparatus of the type defined in claim 1 wherein the flexible tube connected to the lower end of the container is also connected to the lower end of a container of like construction positioned at a level below the first-mentioned container, whereby either of said containers may be selected and interchangeably supported at the upper portion of the standard.
3. In a valveless suction apparatus of the type including a receptacle and a suction tube extending between said receptacle and the body cavity to be evacuated; a substantially vertical tubular standard having an open upper end; a washer within said end; a suction duct having its upper end passing through said washer and terminating at the upper face thereof, and having its lower end connected to said receptacle, a bracket on said standard near the upper portion thereof; a ball on said standard near the lower portion thereof; a pair of similar, readily interchangeable liquid containers each having at its upper end a substantially inverted U-shaped tubular extension, one of said containers being supported at the lower portion of said standard by engagement of its tubular extension with said ball, and the other of said containers being supported in substantially vertical position at the upper portion of said standard with the side of said container in engagement with said bracket and with the end of its tubular extension resting upon said washer, whereby the weight and liquid contents of said container cause the said end to form a seal with said washer and with the terminal end of said suction duct; and a tube connecting the lower ends of said pair of containers so that liquid in the upper container may flow by gravity into the lower container to thereby create suction within the receptacle and within the suction tube connected thereto.
4. In a valveless suction apparatus of the type defined in claim 1, including a liquid reservoir, a tube connecting said reservoir with the suction tube, and a substantially vertical sight-gauge tube constituting a section of the tube which connects the reservoir with the suction tube, whereby liquid will be drawn from said reservoir into said sight-gauge tube where its level will constitute a measure of the degree of suction existing in said suction tube.
5. In a valveless suction apparatus of the type defined in claim 1, where the standard is supported on a base having a liquid reservoir thereon, and wherein the apparatus includes a tube connecting said reservoir with the suction tube, and a substantially vertical sight-gauge tube constituting a section of the tube which connects the reservoir with the suction tube, whereby liquid may be drawn from the reservoir in the base of the standard into said sight-gauge tube where its level will constitute a measure of the degree of suction existing in said suction tube.

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