

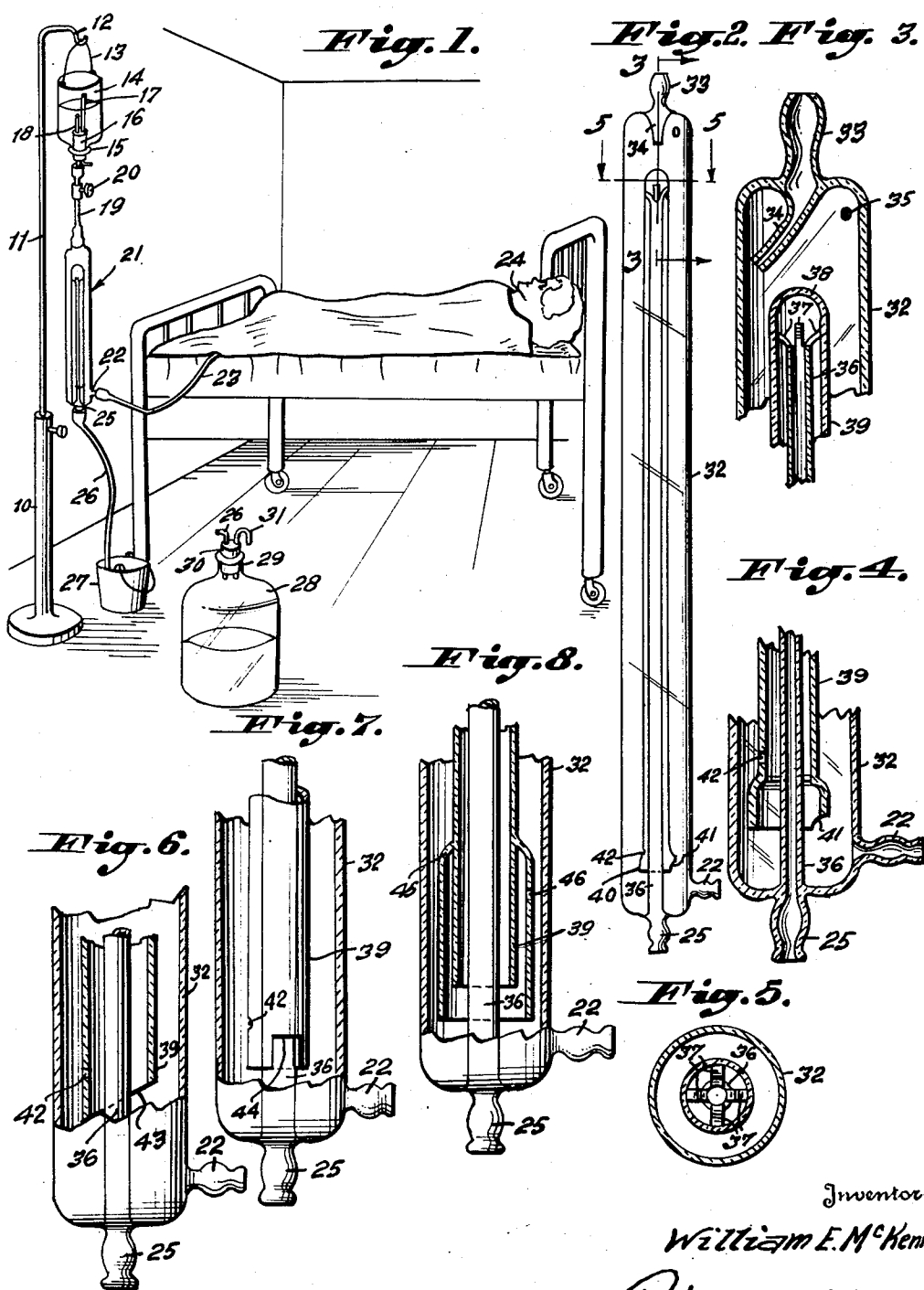
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TIDAL DRAINAGE AND IRRIGATING UNIT

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TIDAL DRAINAGE AND IRRIGATING UNIT

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4 Claims. (Cl. 128-227)

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The present invention relates to a tidal drainage and irrigating unit and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

Generally there is provided a simple, self-contained unitary device which provides automatic control of the flow of irrigating fluid from an infusion bottle or the like to the bladder of a human patient in an ebb and flow manner which, once adjusted, will act continuously and without attention as long as the supply of irrigating fluid is maintained in the infusion bottle or other container from which liquid will flow.

It is accordingly an object of the invention to provide a device of the character set forth which is simple in construction, comparatively inexpensive to manufacture and yet effective and efficient in use.

Another object of the invention is the provision of a device of the character set forth which is wholly without moving parts, is a single self-contained unit occupying but little space and which may be formed of glass, metal or any other substance which can be sterilized.

A further object of the invention is the provision of a device of the character set forth which, when made of transparent material, will permit the observance of the action therein at all times by a nurse, doctor, or other person having knowledge of the operation of the device.

A still further object of the invention is the provision of a tidal drainage and irrigating unit which is particularly adaptable to the care of patients suffering from a paraplegic bladder, but which may be utilized in the treatment of spastic bladders and in all other cases where the attending physician feels that irrigation at intervals is indicated.

Another object of the invention is the provision of a device of the character set forth which lends itself to easy cleaning and sterilization.

Another and important object of the invention is the provision, in a device of the character set forth, wherein means is provided for the interruption of a syphonic action in the presence of a constant flow of liquid.

A still further object of the invention is the provision, in a device of the character set forth, of means whereby a safety overflow is caused whenever an obstruction in the irrigation system is encountered.

Still another object of the invention is the provision of a device of the character set forth which may be utilized with other known means whereby the same may be utilized in conjunction with

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a cystometer or, in the case of larger projects, such as flood and water level control, the principle embodied in the device may be applied to such projects.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawing, in which:

Figure 1 is a perspective view of an apparatus involving the present invention used in connection with a patient.

Figure 2 is a side elevational view of a device embodying the present invention.

Figure 3 is an enlarged fragmentary sectional view taken along line 3-3 of Figure 2.

Figure 4 is an enlarged fragmentary vertical sectional view of the lower end of the device illustrated in Figure 2.

Figure 5 is an enlarged sectional view taken along line 5-5 of Figure 2, and

Figures 6, 7 and 8 are fragmentary elevational views, each partly broken away, similar to the view shown in Figure 4 but illustrating certain modifications which may be incorporated in the device forming the present invention.

Referring more particularly to the drawing, there is shown therein a standard having a base 10 and a vertically adjustable arm 11 which terminates at its upper end in a suspension hook 12 upon which is mounted the bail 13 of a reservoir 14 which is preferably formed of glass and entirely enclosed and having its neck portion 15 lowermost. Within the neck is mounted a two-hole stopper 16 in one of the holes of which is vertically mounted an air tube 17 and in the other of which is mounted a liquid tube 18. The lower end of the tube 18 is connected to a rubber tube 19 having an adjustable clamp mounted thereon.

To the lower end of the tube 19 there is connected the apparatus forming the present invention and which is generally indicated at 21. A fitting 22 connects the apparatus 21 with a tube 23 preferably formed of rubber and which, in turn, is connected to a catheter which may be inserted into the bladder of the patient who is indicated at 24. A fitting 25 in the lower end of the apparatus 21 is connected with a rubber tube 26 which, in turn, leads to a pail 27 or other container and which terminates at a point above any liquid which may be in the container 27.

Instead of the pail 27 a waste receptacle 28 may be employed which receptacle is in the form of a jar and which is provided with a neck 29 in which may be mounted two-hole stopper 30 through one

of the holes of which the tube 26 may extend and in the other hole of which is mounted a vent tube 31.

Referring now to the apparatus 21 more in detail, it will be seen that there is provided a vertically extending housing 32 the upper end of which is provided with a fitting 33 which is adapted to engage within the lower end of the tube 19 and the interior of which communicates with the interior of a spout 34 which extends downwardly and to a point adjacent the inner walls of the housing 32. Adjacent the upper end of the housing 32 there is provided a minute vent opening 35.

A vertically extending inner siphon member 36 is centrally fused to the bottom of the housing 32 and the interior thereof communicates with the interior of the fitting 25. The inner siphon member 36 extends upwardly and centrally within the housing 32 to a point adjacent the top thereof but lower than the lowermost end of the spout 34 and is connected at its upper end by four arms 37 which are, in turn, fused to points adjacent the upper closed end 38 of an outer siphon member 39 which latter extends downwardly and in spaced relation to the inner siphon member to terminate in a bell-shaped portion 40 whose lower end is slightly higher than the upper extremities of the fitting 22. The lip of the bell-shaped portion 40 is notched, as indicated at 41 and an opening 42 is formed in the upper end of the bell-shaped portion 40.

In operation, in the case of a paraplegic patient the apparatus 21 is adjusted to a position where the fitting 25 is approximately two centimeters below the anus of the prostrate patient. The catheter (not shown) is then introduced into the patient's bladder in conventional manner and the clamp 20 is then adjusted in such manner as to allow liquid to fall from the reservoir 14 by gravity through the tube 19 and thence through the fitting 33 to the spout 34 in such quantity or rate of flow as is desired by the attending doctor—usually at a sufficient rate to fill the bladder of the patient in approximately one hour's time; the fluid from the reservoir 14 will therefore continue to drop by gravity from the spout 34 through the space between the inner walls of the housing 32 and the outer walls of the outer siphon member 39 and thence through the fitting 22 into the tube 23 and thence to the catheter and the patient's bladder. It is possible to observe the rate of flow by watching the emission of liquid from the spout 34.

As the patient's bladder continues to fill, liquid will rise on a level equal to that within the bladder in the space between the walls of the casing 32 and the outer walls of the member 39 and in the space between the inner walls of the member 39 and the outer walls of the inner siphon member 36 and it will be seen that as the liquid rises in this manner that air may escape through the minute openings 35 to maintain atmospheric pressure on that column of liquid growing in the space between the casing 32 and the member 39 while the column growing between the outer and inner siphon members will be relieved of pressure through the interior of the inner siphon member 36 and thence downwardly through the tube 26 and to the open atmosphere either directly or through the escape vent 31.

When the patient's bladder is filled, liquid will then pass over the arms 37 and down through the interior of the inner siphon member 36 thus causing a siphonic action which will act to immediately empty the bladder of the patient through

the tube 23, fitting 22 upwardly through the outer siphon member 39 and downwardly through the inner siphon member 36 and thence through the fitting 25 and tube 26 to be deposited in the pail 27 or in the receptacle 28, in the latter case the displaced air from within the container 28 passing through the vent 31.

When the patient's bladder has been completely emptied in this manner it will be seen that a water seal will be left in the lower portion of the casing 32 and the height of which water seal will be governed by the opening 41 and the vent hole 42, air in the meantime filling up the remainder of the apparatus and the water seal acting to prevent air from being drawn into the bladder of the patient.

In Figures 6, 7 and 8, there are shown three modifications of the invention, the only change in each case being made in the lower end of the outer siphon member 39.

In Figure 6, the lower end of the member 39 is cut on a bias, as indicated at 43, while the customary vent opening 42 is positioned in its usual place. In Figure 7, the lower end of the outer cylindrical member 39 is perfectly cylindrical and is supplied with the customary opening 42 but has a slot 44 cut in the lower edge thereof.

In Figure 8 the lower end of the member 39 is again perfectly cylindrical but a bell-shaped member 45 is fused in spaced relation adjacent the lower end and depends a short distance below the end of the member 39 and is provided with a vent opening 46 adjacent its upper end.

In all of the last three mentioned modifications, it will be apparent that a water seal will be left after the relief of the patient's bladder. It will also be apparent that in whatever of the described devices is used, after the siphonic relief of the patient's bladder, the liquid from the container or reservoir 14 will continue to pass into the patient's bladder to begin another cycle and that this periodic filling and emptying of the bladder will continue to occur so long as liquid remains in the reservoir and that the flow from the reservoir may be easily regulated by means of the valve or clamp member 20.

While but certain forms of the invention have been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A device of the character described comprising, in combination with an elevated reservoir and a waste-receiving receptacle, of a vertically extending housing having a minute vent opening adjacent the upper end thereof, a fitting at the upper end of said housing for tubular connection with said reservoir, a fitting in the lower end of said housing for tubular connection with said waste receptacle, a fitting adjacent the lower end of said housing for tubular connection with the bladder of a patient, an inner siphon member comprising a vertical tube having interior communication with said fitting in the lower end of the housing and having an open top adjacent the upper end of the receptacle, arms extending outwardly from said top, an outer siphon member having a closed upper end and supported by said arms in concentric spaced relation to said inner siphon member and having an open flared bottom terminating at a point above said fitting adjacent the bottom of said housing, said flared bottom of said outer siphon

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member having a notch in the edge thereof and an opening in the upper portion thereof.

2. A device of the character described comprising, in combination with an elevated reservoir and a waste-receiving receptacle, of a vertically extending housing having a minute vent opening adjacent the upper end thereof, a fitting at the upper end of said housing for tubular connection with said reservoir, a fitting in the lower end of said housing for tubular connection with said waste receptacle, a fitting adjacent the lower end of said housing for tubular connection with the bladder of a patient, an inner siphon member comprising a vertical tube having interior communication with said fitting in the lower end of the housing and having an open top adjacent the upper end of the receptacle, arms extending outwardly from said top, an outer siphon member having a closed upper end and supported by said arms in concentric spaced relation to said inner siphon member and having an open bottom terminating at a point immediately above said fitting adjacent the bottom of the housing, said bottom having a notch formed therein and said outer siphon member being provided with an opening immediately above said notch.

3. A device of the character described comprising, in combination with an elevated reservoir and a waste-receiving receptacle, of a vertically extending housing having a minute vent opening adjacent the upper end thereof, a fitting at the upper end of said housing for tubular connection with said reservoir, a fitting in the lower end of said housing for tubular connection with said waste receptacle, a fitting adjacent the lower end of said housing for tubular connection with the bladder of a patient, an inner siphon member comprising a vertical tube having interior communication with said fitting in the lower end of the housing and having an open top adjacent the upper end of the receptacle, arms extending outwardly from said top, an outer siphon member having a closed upper end and supported by said arms in concentric spaced relation to said inner siphon member and having an open bottom terminating at a point above said fitting adjacent the bottom of the housing

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and a bell affixed to the outer side thereof in spaced relation thereto and extending downwardly to a point immediately above said fitting adjacent the bottom of the housing, said bell having an opening adjacent the upper end thereof.

4. A device of the character described comprising, in combination with an elevated reservoir and a waste-receiving receptacle, of a vertically extending housing having a minute vent opening adjacent the upper end thereof, a fitting at the upper end of said housing for tubular connection with said reservoir, a downwardly and angularly disposed spout within the upper portion of said housing and having interior communication with said fitting in the upper end of said housing, a fitting in the lower end of said housing for tubular connection with said waste receptacle, a fitting adjacent the lower end of said housing for tubular connection with the bladder of a patient, an inner siphon member comprising a vertical tube having interior communication with said fitting in the lower end of the housing and having an open top adjacent the upper end of the receptacle, arms extending outwardly from said top, an outer siphon member having a closed upper end and supported by said arms in concentric spaced relation to said inner siphon member and having an open bottom terminating at a point above said fitting adjacent the bottom of the housing and a bell affixed to the outer side thereof in spaced relation thereto and extending downwardly to a point immediately above said fitting adjacent the bottom of the housing, said bell having an opening adjacent the upper end thereof.

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