

Aug. 27, 1968

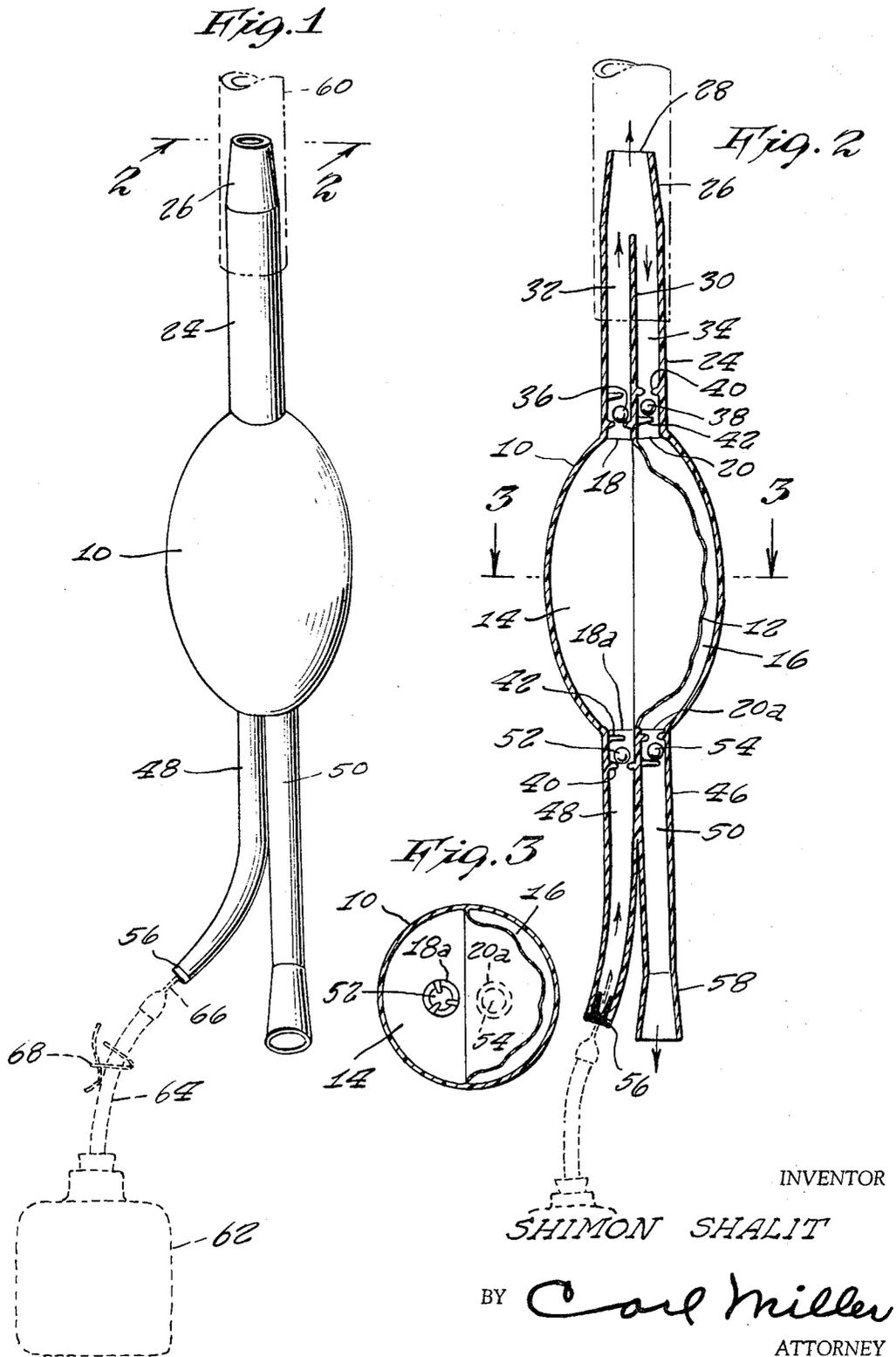
S. SHALIT

3,398,743

CLOSED SYSTEM IRRIGATING APPARATUS FOR VISCUS ORGANS

Filed Oct. 20, 1965

2 Sheets-Sheet 1



INVENTOR

SHIMON SHALIT

BY

Carl Miller

ATTORNEY

Aug. 27, 1968

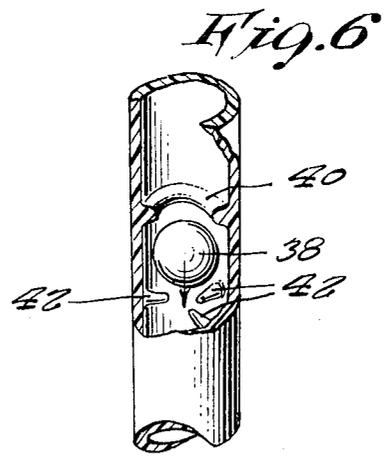
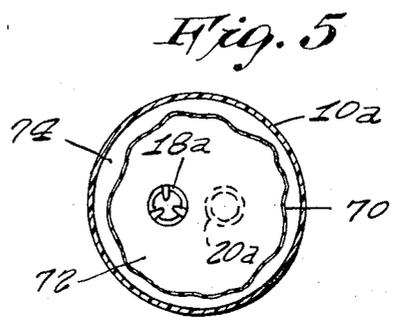
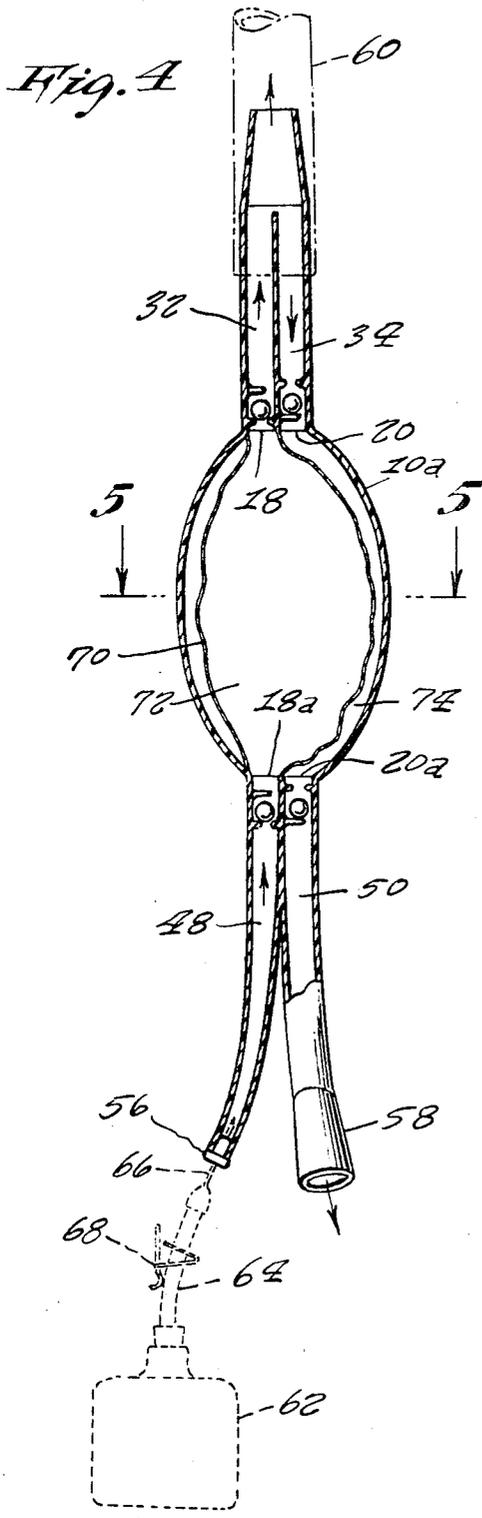
S. SHALIT

3,398,743

CLOSED SYSTEM IRRIGATING APPARATUS FOR VISCUS ORGANS

Filed Oct. 20, 1965

2 Sheets-Sheet 2



INVENTOR

SHIMON SHALIT

BY Carl Miller

ATTORNEY

1

3,398,743  
CLOSED SYSTEM IRRIGATING APPARATUS  
FOR VISCUS ORGANS  
Shimon Shalit, 63 Avon Circle,  
Port Chester, N.Y. 10573  
Filed Oct. 20, 1965, Ser. No. 498,729  
2 Claims. (Cl. 128—231)

#### ABSTRACT OF THE DISCLOSURE

An irrigating device for human hygiene, comprising a hollow resilient bulb receivable between a tube from a viscus organ and a container of irrigating fluid, the bulb having a flexible central diaphragm to divide the bulb interior into two compartments, one of which communicates between the viscus organ and fluid while the other communicates between the viscus organ and a discharge port; and one way valves to direct the container fluid through the first compartment to the viscus organ, and one way valves to direct the fluid through the second compartment from the viscus organ to the discharge port.

This invention relates to irrigating apparatus and more particularly to a disposable closed system irrigating apparatus for use in a viscus organ.

It is the principal object of this invention to provide an apparatus for hygienic and/or medical purposes embodying a hand bulb constituting a pump having at each end thereof a pair of inlet and outlet tubes, the hand bulb having therewithin a deflectable diaphragm dividing the same into two separate chambers with regard to which the inlet and outlet tubes at each end are respectively in communication, the inlet and outlet tubes at one end of the hand bulb having a common passage at the free end thereof for connection to a tube inserted in a viscus organ, while the other inlet and outlet tubes at the other end of the hand bulb are respectively individually connected to a container provided with the irrigating fluid and to a drainage tube, there being in each inlet and outlet tube a check valve to prevent back flow and the inlet tube from the container having a clamp to close off the connection thereto, such as to provide in all a closed system for supplying by a pumping action irrigating fluid to a viscus organ, and withdrawal of the same therefrom.

Another object of this invention is to form the hand bulb in the above closed system with an inner deflectable walled chamber to provide within the hand bulb, an inner, and a surrounding outer chamber, with the inner chamber in communication at each end thereof respectively, with an inlet and an outlet tube, and the outer chamber in communication at each end thereof respectively, with an adjacent outlet and inlet tube of each said pair.

A further object of this invention relates to forming the hand bulb with its associated inlet and outlet tubes of a plastic material, it being contemplated that the same be used only for one patient and then discarded, thus dispensing with the necessity of sterilization and insuring the use of a wholly sterile irrigating device.

A still another object of this invention is to provide a small compact unit handled irrigating apparatus interposed between the tube from the viscus organ and the drainage tube, and can be left intact when irrigation is not applied, without interference in drainage passing from the viscus organ, thus preventing dismembering the system for irrigation. The apparatus will efficiently function in a positive manner, which will also prevent a soiling or a wetting of the surroundings either before or after the irrigating operation, which is simple in construction

2

and operation, economical to make, and which is capable of substantially repeated cycles of operation.

Further objects of the invention will appear as the description proceeds.

5 To the accomplishment of the above, and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being directed to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described within the scope of the appended claims.

In the drawings:

FIGURE 1 is an elevational view of the irrigating apparatus;

15 FIGURE 2 is a longitudinal sectional view thereof taken on line 2—2, FIGURE 1;

FIGURE 3 is a transverse sectional view through the hand bulb taken on line 3—3, FIGURE 2;

FIGURE 4 is a longitudinal sectional view similar to FIGURE 2, showing a modified form of construction;

20 FIGURE 5 is a transverse sectional view similar to FIGURE 3, taken on line 5—5, FIGURE 4;

FIGURE 6 is a detail view partly in section showing the check valve construction.

25 Referring to the drawings in detail, the irrigating apparatus consists of a flexible walled hand bulb 10 of substantially ellipsoidal form preferably made of any suitable plastic material. Provided within the hand bulb 10 is a deflectable flexible thin diaphragm 12 integrally connected along its side edges to the wall of the hand bulb 10 and extending lengthwise thereof to form two separate chambers 14 and 16. The diaphragm 12 may also be of a thin plastic material as the hand bulb 10. At one end of the hand bulb 10, there is provided two separate openings 18, 20 communicating respectively with the chambers 14, 16. Similar openings 18a, 20a at the other end of the hand bulb 10 also communicate respectively with the chambers 14, 16. It is to be noted, see FIGURE 2, that the diaphragm 12 is thin-walled and is normally dish-shaped, i.e., concave-convex, so as to lie adjacent to one side wall of the hand bulb 10, whereby one chamber will be larger than the other as the diaphragm flexes from one side to the other in a manner, and for a purpose to be hereinafter described.

35 Extending from the openings 18, 20 at one end of the hand bulb 10 is a plastic tube 24 that is integrally joined therewith, the free end of the tube 24 terminating in a tapered end 26 having a single opening 28. A longitudinal partition 30 within the tube 24 divides the same into an outlet tube 32, and an inlet tube 34; the outlet tube 32 communicating with chamber 14 through opening 18, while the inlet tube 34 communicates with chamber 16 through opening 20.

45 Disposed respectively within each of the tubes 32, 34 is a ball check valve 36, 38. Referring to FIGURE 6, it is seen that there is interiorly of the tube a seat 40 formed as an annular flange integral with the wall of the tube of an inside diameter less than the diameter of the ball check valve 38. With the ball check valve 38 seated on seat 40, flow of fluid in the tube is stopped. Pins 42 extend radially within the tube and are longitudinally spaced from the flange 40, and function as limit stops for the ball check valve when it is inserted from seat 40 by flow in the opposite direction as indicated by the arrow. The pins 42 and seat 40 provide a cage within which the ball check valve operates, which is the same for all of the inlet and outlet tubes. In outlet tube 32, the ball check valve 36 prevents back flow into chamber 14, while in inlet tube 34, the ball check valve 38 prevents back flow through the tube from chamber 16.

70 At the other end of the hand bulb 10 are openings 18a

and 20a corresponding in all respects to the openings 18 and 20, and communicating respectively with the chambers 14 and 16. Integrally joined with the hand bulb 10 at this end is a plastic tube 46 comprised of two separate tubes 48, 50 which preferably are formed joined together at their ends adjacent to the hand bulb 10, as shown in FIGURE 2. Tube 48 is an inlet tube and communicates with chamber 14 through opening 18a, and tube 50 is an outlet tube and communicates with chamber 16 through opening 20a. Ball check valves 52, 54, are provided respectively in tubes 48, 50, and are similar as to their location seats and limit stop pins as described above with reference to ball check valves 36, 38. Inlet tube 48 and outlet tube 50 are as shown in FIGURE 2, separate for the major portion of their length. At its free end, inlet tube 48 is provided with a sealed closure plug 56 of the type that is puncturable by a needle having a fluid passage as is well known in the medical art. The free end of outlet tube 50 is slightly flared as at 58, tube 50 serving as a drainage tube, as will be hereinafter described.

In the use of the irrigating apparatus, a tube 60 (see FIGURE 1) is first inserted into the viscus organ (not shown) and into this tube 60 is inserted the tapered end 26 of tube 24 in what is preferably a friction tight fit so as to provide a fluid tight connection therewith. A container or receptacle 62 containing the irrigating fluid is provided with a flexible conduit 64 having at its free end a hollow needle 66 which is inserted through the plug 56 at the end of tube 48. Conduit 64 is provided with a conventional spring lock or clamp 68, as shown. Thus, connected to viscus tube 60 and irrigating fluid container 62, the irrigating of the empty viscus organ is effected by first squeezing the hand bulb 10 which on release of the compression thereon will by the suction set-up in chamber 14 cause the irrigating fluid to flow through conduit 64, needle 66, inlet tube 48 to fill the chamber 14. When the chamber 14 is filled, the conduit 64 is closed by the spring clamp 68. Compression of the hand bulb 10 will then force the irrigating fluid from the chamber 14 into outlet tube 32 past check valve 36 into viscus tube 60 and into the viscus organ, the compression on hand bulb 10 being then released. The irrigating fluid from the viscus organ after its treating action therein then flows outwardly therefrom into inlet tube 34, by the suction set up in the hand bulb upon the release of compression therefrom, unseating check valve 38 and enters chamber 12 and moving the diaphragm 12 towards the other opposite wall of the hand bulb 10 to provide the chamber 16 with its maximum capacity. With the chamber 16 thus filled, compression of the hand bulb 10 will cause the irrigating fluid in chamber 16 to be discharged therefrom past check valve 54 into outlet tube 50 for final discharge. Outlet tube 50 is a drainage tube and its discharge end 58 may be located in a drainage receptacle (not shown). If desired, the discharge end 58 may drain into a suitable drainage conduit (not shown) connected to a drainage receptacle. The cycle of operation of the flow of irrigating fluid may be repeated by unclamping the spring clamp 68 before releasing the compression on the hand bulb, and repeating the operations as set forth above. It is to be understood that in lieu of hollow needle 66 and sealing plug 56, that inlet tube 48 may be directly connected by a flexible conduit or hose directly to the container 62. Also a clamp or valve (not shown) may be provided in the inlet tube 48 to control the flow of irrigating fluid from the container. It is also to be understood that the used irrigating fluid in chamber 16 may drain out therefrom through outlet tube 50 by gravity action to be discharged into a drainage receptacle from drain outlet end 58 upon final completion of the irrigation of the viscus member, without interference of further continued drainage of the viscus organ.

FIGURES 4 and 5 illustrate a modified form of construction of the chambers in hand bulb 10a, the pairs of inlet and outlet tubes at each end thereof being identical

with that shown in FIGURES 1 and 2. Thus, within the hand bulb 10a, there is provided an ellipsoidal thin walled bag member, formed of a collapsible, flexible plastic material such as that forming the diaphragm 12. The collapsible bag 70 is open at each end and is integrally joined to the hand bulb 10a at the periphery of openings 18 and 18a communicating respectively with the outlet tube 32 and inlet tube 48. The interior of bag 70 forms a chamber 72 corresponding to chamber 14 of FIGURE 2. The other chamber 74 corresponding to chamber 16 of FIGURE 2 is provided by the space between the wall of hand bulb 10a and the wall of the bag 72. The manner of operation is the same as that set forth above, it being understood that when chamber 72 is filled with irrigating fluid, the wall of the bag 70 will lie closely adjacent to the wall of the hand bulb 10a. Compression of hand bulb 10a will impart compression on bag 70 to effect discharge of the irrigating fluid therein through outlet tube 32. Before release of the compression of the hand bulb closing the spring clamp 68 closes off conduit 64 will prevent suction of irrigating fluid from container 62, but will impart suction for outward flow of the irrigating fluid from the viscus organ flowing into inlet tube 34 will enter chamber 74 retaining the walls of the bag 70 to collapse to provide the maximum capacity of chamber 74, the irrigating fluid then draining out therefrom through outlet tube 50 either by gravity or being discharged therefrom by compression of the hand bulb 10a if the irrigating action is to be repeated.

While certain novel features of my invention have been shown and described and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A viscus organ irrigating apparatus comprising:

- (a) a compressible hollow hand bulb,
- (b) a flexible diaphragm within said hand bulb integrally joined at its edge to the wall thereof substantially along a medial longitudinal plane of said hand bulb and providing therein a pair of adjacent chambers,
- (c) said diaphragm being movable from a position adjacent one side of the wall of said hand bulb to a position adjacent the side opposite thereto to provide a varying in the volume of each said chamber from a minimum to a maximum, and vice versa,
- (d) there being an inlet and an outlet opening oppositely disposed in the wall of said hand bulb for each chamber with the inlet opening of one chamber being adjacent to the outlet opening of the other chamber at each of said opposite locations thereof,
- (e) a first tube integrally joined to said hand bulb at one said location,
- (f) a partition in said first tube providing therein an inlet passage and an outlet passage, each in direct communication at one end respectively, with the inlet opening and adjacent outlet opening at said one said location,
- (g) the other ends of said inlet and outlet passages terminating short of the free end of said first tube to provide a single flow passage thereat,
- (h) a pair of inlet and outlet tubes integrally joined at corresponding ends to the hand bulb at the other said location, each in direct communication respectively with the inlet and outlet openings at said other location,
- (i) valve means in each of said inlet and outlet passages and tubes operative to prevent back flow therein,

whereby on connection of the free end of said first tube to the tube in an empty viscus organ and the connection

of said inlet tube to a source of irrigating fluid including manual means to stop the flow therefrom, a compression of said hand bulb followed by release of said compression will provide a flow of irrigating fluid by suction into one said chamber which when filled, will be ejected therefrom by a second compression of the hand bulb to be discharged through the outlet passage, and single flow passage into the viscus organ; before release of the said second compression, closing of the said manual means to prevent suction of irrigating fluid from the container, thus the said release will cause suction of the irrigating fluid from the viscus organ, which then enters the said flow passage and inlet passage to fill the other chamber for ultimate discharge by compression of the said hand bulb; opening the said manual means prior to, and release of the last said compression will start a repeated process of irrigation; when the irrigation is to be terminated, the said ultimate discharge is left to be drained by gravity,

- (j) said hand bulb is ellipsoidal in shape,
  - (k) each pair of inlet and outlet openings being located at an end of said hand bulb at the major axis thereof,
  - (l) said hand bulb, diaphragm and associated first tube, inlet and outlet tubes, are of plastic material and provide a unit handled device,
  - (m) the free end of said first tube is tapered for connection to a viscus tube inserted in the viscus organ,
  - (n) said valve means comprising a ball check valve structure disposed within each said inlet and outlet passage and tube adjacent to said inlet and outlet openings in the wall of said hand bulb associated therewith,
  - (o) means at the free end of said inlet tube for connection to a conduit having a flow control connected to a source of irrigating fluid, and
  - (p) said outlet tube serving to drain said other chamber, the irrigating fluid therein received from the viscus organ, being either discharged therefrom by compression of said hand bulb, or by a gravity drainage therefrom into a receiving receptacle.
2. A viscus organ irrigating apparatus comprising:
- (a) a compressible hollow hand bulb,
  - (b) a flexible, collapsible walled bag within said hand bulb open at each opposed end,
  - (c) there being a pair of inlet and outlet openings oppositely disposed at opposite locations in the wall of said hand bulb,
  - (d) one open end of said bag being joined to the inlet tube at the inlet opening at one location thereof,
  - (e) the other open end of said bag being joined to the outlet tube at the outlet opening at the other location thereof,
  - (f) said collapsible bag providing one chamber and the space between the wall of said bag and the wall of said hand bulb defining another chamber,
  - (g) a first tube integrally joined to said hand bulb at one said location,
  - (h) a partition in said first tube providing therein an inlet passage and an outlet passage, each in direct communication at one end respectively with the inlet opening and adjacent outlet opening at one said location,
  - (i) the other ends of said inlet and outlet passages terminating short of the free end of said first tube to provide a single flow passage thereat,
  - (j) a pair of inlet and outlet tubes integrally joined

at corresponding ends to the hand bulb at the other said location, each in direct communication respectively with the inlet and outlet openings at said other said location,

- (k) valve means in each of said inlet and outlet passages and tubes operative to prevent back flow therein,

whereby on connection of the free end of said first tube to the tube in an empty viscus organ and the connection of said inlet tube to a source of irrigating fluid including manual means to stop the flow therefrom, a compression of said hand bulb followed by release of said compression will provide a flow of irrigating fluid by suction into one said chamber which when filled, will be ejected therefrom by a second compression of the hand bulb to be discharged through the outlet passage, and single flow passage into the viscus organ; before release of the said second compression, closing of the said manual means to prevent suction of irrigating fluid from the container, thus the said release will cause suction of the irrigating fluid from the viscus organ, which then enters the said flow passage and inlet passage to fill the other chamber for ultimate discharge by compression of the said hand bulb; opening the said manual means prior, to and release of the last said compression will start a repeated process of irrigation; when the irrigation is to be terminated, the said ultimate discharge is left to be drained by gravity,

- (l) said hand bulb is ellipsoidal in shape,
- (m) each pair of inlet and outlet openings being located at an end of said hand bulb at the major axis thereof,
- (n) said hand bulb, collapsible bag, and associated first tube, inlet and outlet tubes are of plastic material and provide a unit handled device,
- (o) the free end of said first tube is tapered for connection to a tube inserted in the viscus organ,
- (p) said valve means comprising a ball check valve structure disposed within each said inlet and outlet passage and tube adjacent to said inlet and outlet openings in the wall of said hand bulb associated therewith,
- (g) means at the free end of said inlet tube for connection to a conduit having a flow connected to a source of irrigating fluid, and
- (r) said outlet tube serving to drain said other chamber, the irrigating fluid therein received from the viscus organ being either discharged therefrom by compression of said hand bulb or by a gravity drainage therefrom into a receiving receptacle.

References Cited

UNITED STATES PATENTS			
3,800	10/1844	Gale .....	128—349
493,208	3/1893	Cruikshank .....	128—240
818,814	4/1906	Bosworth .....	128—241
867,445	10/1907	Thayer .....	128—241
1,925,230	9/1933	Buckhout .....	128—231
2,711,740	6/1955	Pickens .....	128—349
2,896,629	7/1959	Warr .....	128—349

RICHARD A. GAUDET, *Primary Examiner.*

65 R. L. FRINKS, *Assistant Examiner.*