Jan. 13. 1925. **1,522,601**

F. A. STROBEL

SURGICAL DEVICE

Filed April 25, 1924

Fig. 1.

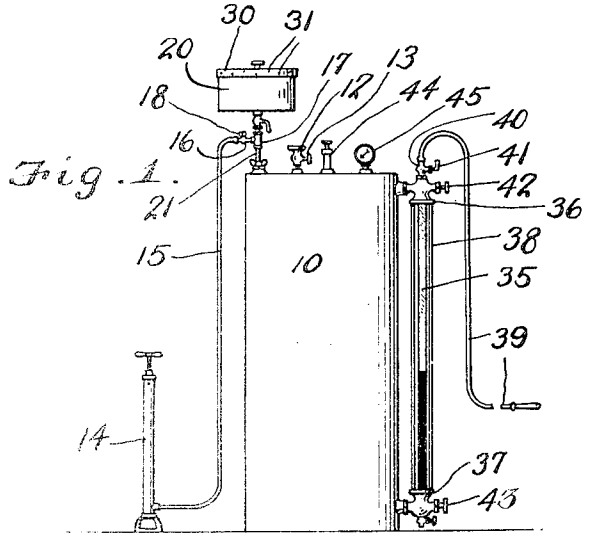


Fig. 3.

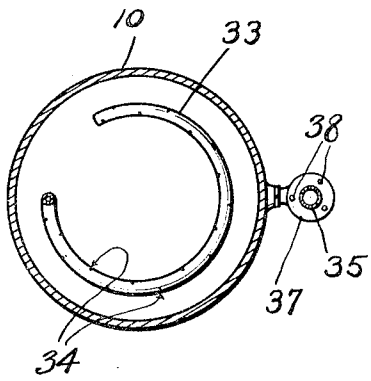


Fig. 2.

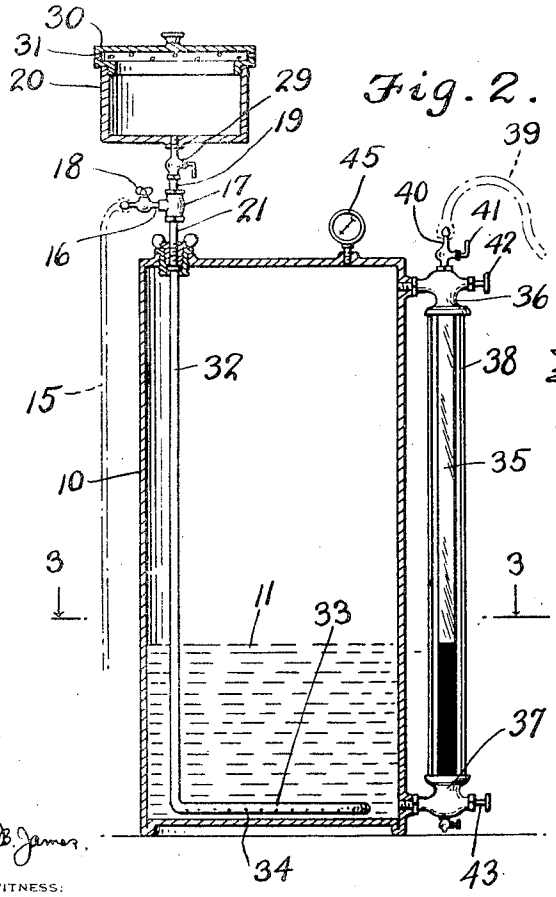
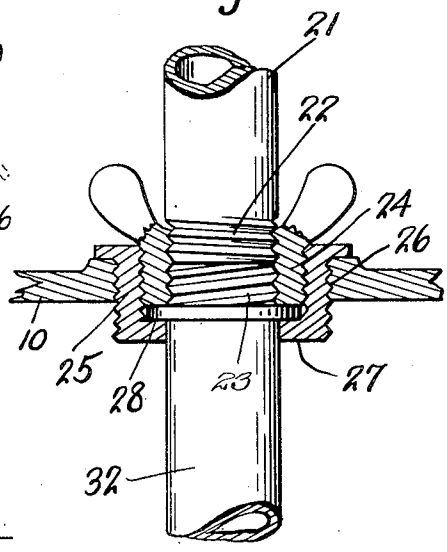


Fig. 4.



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WITNESS:

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UNITED STATES PATENT OFFICE.

FRANK A. STROBEL, OF THOMASVILLE, GEORGIA.

SURGICAL DEVICE.

Application filed April 25, 1924. Serial No. 709,033.

To all whom it may concern:

Be it known that I, FRANK A. STROBEL, a citizen of the United States, residing at Thomasville, in the county of Thomas and State of Georgia, have invented new and useful Improvements in Surgical Devices, of which the following is a specification.

This invention contemplates the provision of a surgical device which may be advantageously used in a laboratory, in the home or a hospital, in various capacities, such as an intestinal irrigator; or as an antiseptic spray for the purpose of cleaning wounds, nasal cavities, the throat, etc.; also as an external spray for the treatment of skin diseases, and as a very valuable aid in the making of quick X-ray pictures of the large and small intestinal tract which has heretofore required several hours to make, the device when used in this capacity filling the lower organs of the human body with the opaque fluids or mineral substances such as used for X-ray photography, thereby allowing a picture to be taken in a comparatively short time by means of the X-ray, or use made of the X-ray fluoroscope to watch the progress of the fluid, and to locate prolapses or obstructions of any kind.

In carrying out the invention, I make use of an air tight tank adapted to contain a fluid, such as water, an antiseptic fluid or a fluid made up of different compounds thoroughly mixed by air pressure, and any of which fluids can be conveyed to its proper destination depending upon the particular use to which the device is put, the fluids being conveyed under a pressure of air which can be conveniently regulated as the occasion may require; or the air in the container can be used independently of the fluid contained therein, when use of an air spray for cleaning purposes is desired.

The nature and advantages of the invention will be better understood when the following detailed description is read in connection with the accompanying drawings, the invention residing in the construction, combination and arrangement of parts as claimed.

In the drawings forming parts of this application, like numerals of reference indicate similar parts in the several views, and wherein:

Figure 1 is a side elevation of the device forming the subject matter of the invention,

Figure 2 is a vertical sectional view therethrough;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2,

Figure 4 is an enlarged detail sectional view showing the coupling between the mixing tube wholly disposed within the container, and the supply tube leading from an auxiliary container arranged above the main container and adapted to receive different kinds of medicine or solutions.

The apparatus forming the subject matter of this invention includes an air tight tank or container 10 which may be constructed from any suitable material, and also vary in size and configuration without departing from the spirit of the invention. The container 10 is adapted to receive a solution 11 which may vary in character or kind depending upon the particular use to which the device is intended to be put, and this solution is admitted into the tank or container 10 through a cup like valve casing 12 supported on the upper end of the container and equipped with a suitable valve 13. This solution is forced from the container 10 and conveyed to its proper destination for use by air pressure, and this pressure may be supplied by any suitable means such as a pump herein illustrated at 14. The pump shown is in the nature of the ordinary hand pump, but it is to be understood that when the device is used in laboratories or in hospitals, the pump used may be a motor operated pump or the like. The air supply hose is indicated at 15 and extends from the pump to the stem 16 of a T-shaped coupling 17, to which it is connected, the stem being equipped with a valve 18 to regulate the admittance of air into the tank or container 10. Coupled to one end of the T-coupling 17 is a short pipe 19 which depends from the bottom of a comparatively small auxiliary container 20 arranged directly above the tank or container 10, while connected to the other end of the coupling 17 is a short pipe extension 21, which in turn is coupled to the adjacent end of a mixing tube as clearly shown in Figures 2 and 4. The lower end of this short pipe extension 21 is threaded as at 22 while the upper end of the mixing tube is similarly threaded, and when these parts are arranged in end to end relation they are coupled by a nut 24 which

is internally threaded to engage the threads 22 and 23, and which nut is also externally threaded to engage the internal threads of a coupling sleeve 25 which is threaded into an opening 26 provided in the top of the tank 10. This sleeve 25 is also formed with an inwardly directed flange 27 upon which supports a gasket 28, the latter being held against the flange 27 by the coupling nut 24 when the parts are associated in the manner illustrated in Figure 4. This manifestly provides a fluid tight connection, and renders the tank 10 air tight. The auxiliary container 20 is adapted to receive a medicine or compound, when use of such compound is desired, and for controlling the admittance of this compound from the auxiliary container into the tank 10 through the mixing tube, I provide the pipe 19 with a valve 29. The auxiliary container 20 is provided with a removable cover 30, the edge of which is formed with a plurality of air inlet openings 31. As above stated this medicine or compound from the auxiliary container enters the tank 10 through a mixing tube, the latter including a vertically disposed portion 32 wholly disposed within the tank 10 and coupled to the adjacent end of the short pipe extension 21, while the tube also includes an annular lower portion 33 which is arranged immediately adjacent and parallel with the bottom of the tank 10, and provided with a plurality of openings 34, which of course allow the medicine or compound to enter the tank 10.

Arranged at one side of the tank 10 and substantially of the same height is a glass tube 35 which is positioned between upper and lower valve casings 36 and 37 respectively, the glass tube being protected by vertical rods 38 which are also terminally connected with the valve casings just referred to. The valve casing 36 is threaded into and communicates with the tank 10 adjacent the upper end thereof, while the valve casing 37 is similarly connected with the tank 10, communicating with the tank at a point immediately adjacent the bottom thereof, it being understood that the solution from the tank passes through this tube 35 into a flexible tube 39 which conveys the solution to its point of destination for use. The tube 39 is associated with a nipple 40 which rises from the upper valve casing 36, and which nipple is equipped with a valve 41 to control the communication between the glass tube 35 and the flexible tube 39. Then again this valve casing 36 is provided with a valve 42 to control the communication between the tank 10 and the valve casing 36, while the valve casing 37 at the lower end of the tank is provided with a similar valve 43 to control the communication between the tank 10 and the lower end of the glass tube 35. Supported upon the top of said tank 10 is a safety valve 44 which opens to exhaust any excess of pressure within the tank, while arranged adjacent this safety valve is an air pressure gage 45.

As before stated the apparatus may be used for various purposes, such as an intestinal irrigator or douche, or it may also be used as an antiseptic spray to clean wounds, nasal cavities, throats or as an external spray in the treatment of skin diseases. One of the most important uses attributed to the device resides in the fact that it may be employed in making quick X-ray pictures of the large and small intestinal tracts of the body, in that opaque or mineral substance such as used for X-ray photography can be immediately conveyed into the body by way of the rectum instead of waiting for these fluids to pass from the mouth to the stomach and through the intestinal tracts according to the present system, which requires from 36 to 48 hours to accomplish this end. When filling the intestines with opaque or mineral substances, the X-ray fluoroscope can be used to watch the progress of the fluid, and thus locate prolapses or obstructions of any kind; tumors, ulcers and any other abdominal condition existing in the intestinal tract.

In practice the tank 10 is supplied with a particular solution to be used, and when the valves 42 and 43 are opened the solution will find its level within the glass tube 35, which of course will indicate just how much fluid is poured into the tank or container 10. The valves 42 and 43 are then closed, and the valve 18 is opened to admit air to be pumped into the tank 10 until the proper air pressure within the tank is obtained, this pressure being indicated by the gage 45. If the device is used as an intestinal irrigator or douche plain water under pressure is forced from the tank 10 through the glass tube 35 into the flexible tube 39 which conveys the fluid to its point of use, but if a medical compound or solution is to be used, one of the ingredients can be arranged within the auxiliary container 20, and the other ingredient or compound placed within the container 10. By opening the valve 29 the proper proportion of the ingredient contained in the auxiliary container 20 is admitted into the tank 10 passing through the mixing tube 32, and finally entering the tank through the openings 33 in the lower annular portion of the tube. In order to hurry and facilitate the proper commingling or mixing of the different ingredients or compounds, air is forced into the mixing tube 32 by opening the valve 18 and operating the pump 14, under which circumstances the ingredient passing from the auxiliary container 20 is conveyed with the air through the mixing tube 32, and is finally

forced under pressure upwardly through the solution contained in the tank 10 and thus thoroughly mixed therewith. The valve 42 is now closed as is also the valve 43, and in order to put the apparatus into use, the valve 43 is opened as is also the valve 41, whereupon the solution within the tank will be forced therefrom upwardly through the glass tube 35 and into the flexible tube 39, during which time the operator can readily see through the glass tube so that he will know just how the apparatus or device is functioning.

Now, should the operator desire to use a spray of air independently of any of the solution contained within the tank 10, all that is necessary to do is to close the lower valve 43, and open the upper valve 42, under which circumstances the air will pass from the container through the valve casing into the flexible tube 39. Under these conditions, and while the air is still flowing from the tank 10, if the valve 43 is opened the fluid or solution passing upwardly through the transparent tube 35 will mix with the air, and be carried into use where water alone would not be sufficient for the purpose. By reason of this double use, the device is very advantageous for use in connection with operations, especially where a motor operated pump for supplying air to the tank is used, thereby furnishing pressure of air like a solid substance, or air under sufficient pressure that will maintain a heavy solution or substance thoroughly mixed at all times within the tank especially a substance of such gravity that tends to settle to the bottom in quick order, the safety valve 44 preventing excessive pressure within the tank. Furthermore the tank 10 and the auxiliary container 20 provide two distinct places for the reception of fluids or compounds of different characters, which of course makes the device particularly valuable, where the combination of compounds or ingredients is desired to be mixed for use.

While it is believed that from the foregoing description, the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

I claim:

1. A device of the character described comprising an air tight tank adapted to contain a solution, means for supplying said tank with air, said tank having outlet openings adjacent the opposed ends thereof, upper and lower valves including casings supported on said tank and controlling said openings, a transparent outlet tube arranged exteriorly of the tank and supported between the valve casings, one of said valves controlling communication between the tank and the lower end of said tube, and a flexible tube leading from the upper valve casing and having valve controlled communication with the tank and said transparent tube, said upper and lower valves being adapted to permit air to pass directly from the tank to the flexible tube, or solution to be conveyed through the transparent tube into the flexible tube for the purpose specified.

2. A device of the character described comprising an air tight tank adapted to contain a solution, means for supplying said tank with air, a container arranged above said tank, a pipe depending from the bottom of the container, a mixing tube wholly arranged within the tank and coupled thereto and to the adjacent end of the pipe depending from the container, a valve controlling communication between the pipe and the mixing tube, a discharge tube having valve controlled communication with said tank, and means whereby air is permitted to pass directly from the tank to said discharge tube, or the solution in said tank is forced therefrom into said discharge tube as and for the purpose specified.

3. A device of the character described comprising an air tight tank adapted to contain a solution, a container arranged above the tank and also adapted to contain a solution, a pipe depending from said container, a mixing tube wholly disposed within the tank and coupled thereto and to the adjacent end of said pipe, said mixing tube including an annular perforated portion arranged adjacent to and parallel with the bottom of the tank, a valve controlling communication between the pipe of the container and said mixing tube, means for supplying the tank with air through said mixing tube, a safety valve supported on the tank, a transparent outlet tube arranged exteriorly of the tank, a discharge tube leading from the transparent tube and having valve control communication therewith and with said tank, and means whereby air is permitted to pass directly from the tank to the discharge tube, or the solution from said tank is forced through the transparent tube into the discharge tube by air pressure for the purpose specified.

In testimony whereof I affix my signature.

FRANK A. STROBEL.