

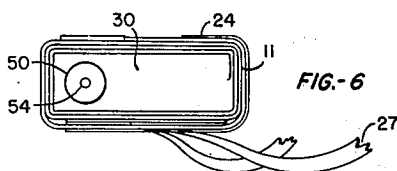
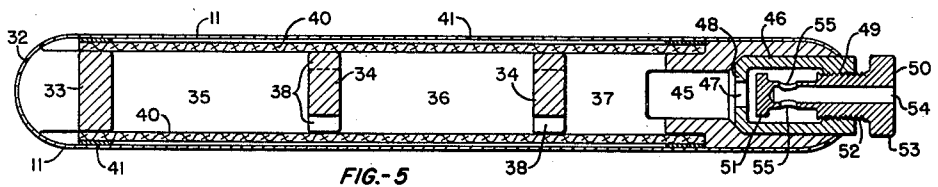
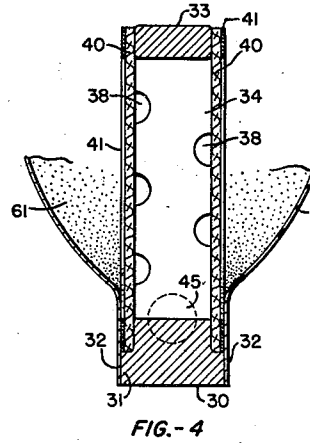
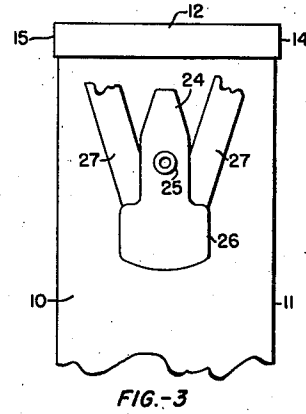
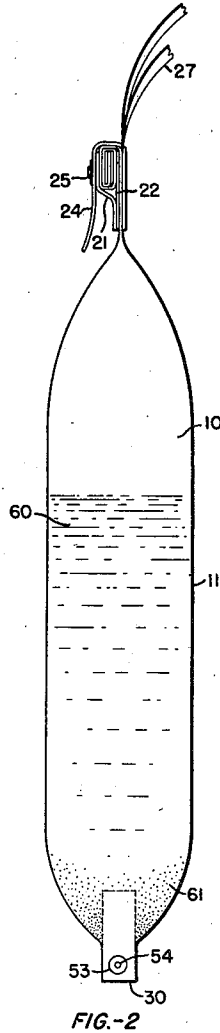
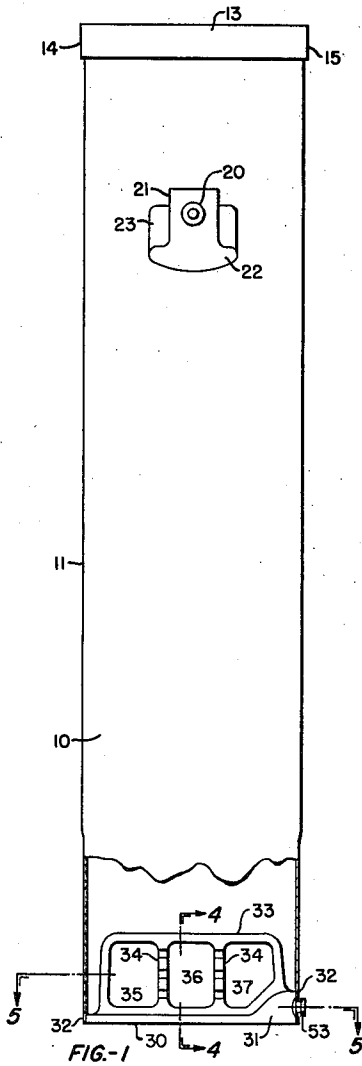
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E. PICK

2,643,771

LIQUID TREATMENT DEVICE

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INVENTOR:

E. Pick

UNITED STATES PATENT OFFICE

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LIQUID TREATMENT DEVICE

Eric Pick, East Rockaway, N. Y., assignor to The Permutit Company, New York, N. Y., a corporation of Delaware

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1 Claim. (Cl. 210-149)

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This invention relates to a liquid treatment device and it comprises a collapsible bag having sides made of pliable plastic material, means for closing the top of said bag, and a rigid bottom element having mounted thereon filtering means and outlet valve means; all as more fully described and as claimed hereinafter.

The problem of providing shipwreck victims with drinking water has been in existence ever since man went to sea. The increased trans-oceanic movement of airplanes has made this problem more acute and there have, in recent years, been developed new chemical processes of rendering sea water potable by removing the dissolved salts by means of ion exchange and/or precipitation.

The object of this invention is to provide for the carrying out of such processes a device which is compact, reliable, light in weight, efficient and convenient in manipulation and which, in storage, occupies a minimum of space.

The manner in which this object is achieved is shown in the appended drawing in which:

Fig. 1 is an elevational view of a device according to my invention, with the filter element 40 and the lower part of the tube 11 removed to show the bottom element 30;

Fig. 2 is a side view of the same device as it appears during use;

Fig. 3 is a view of the upper portion of the side opposite to that shown in Fig. 1;

Fig. 4 is a cross-sectional view on an enlarged scale of the lower portion of the device taken along 4-4 of Fig. 1;

Fig. 5 is a cross-sectional view, likewise on an enlarged scale, taken along line 5-5 of Fig. 1; and

Fig. 6 is a side view of the device rolled up for storage.

Like numerals refer to like parts throughout the several views.

As shown in the drawing, the device comprises a container 10 which is formed by a tube 11 having an open top and made of pliable plastic material such as the vinyl resin known under the trade name "Vinylite." A thickness of about 0.01 to 0.02 inch is satisfactory but not critical. Joints of such material may readily be made by heating with simultaneous application of pressure to the parts to be joined. The previous application of a suitable solvent sometimes improves the quality of the joints.

Adjacent to the open top a stiff strip 12 of plastic material is joined to one side of the tube 11 and a pliable reinforcement strip 13 to the other

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side, the end portions of strips 12 and 13 protruding somewhat beyond the flattened tube 11 and being joined to each other at 14 and 15. At some distance below strip 13 a male part 20 of a snap fastener is mounted on a pliable support 21 the lower, wider portion 22 of which is joined to a stiff plate 23 which in turn is joined to the tube 11 and part of which lies back of the male part 20. On the opposite side of the tube 11 is joined thereto the portion 26 of a pliable strap 24 on which is mounted the female part 25 of a snap fastener. Between portion 26 and the tube 11 is sealed a supporting tape 27, made of cotton or a plastic material such as that known under the trade name "Nylon," which serves to fasten the device to some object so as to prevent loss.

The lower end of the container 10 is closed by a rigid bottom element 30 having a flange 31 to which, at 32, is joined the lowermost part of the tube 11. The bottom element 30 comprises a frame 33 projecting upwardly into the tube 11 and having two ribs 34 which divide the space within the frame 33 into three chambers 35, 36 and 37, open on opposite sides. The ribs 34 are provided with notches 38 forming passageways to establish communication between adjacent pairs of chambers. On each side the frame 33 carries a filter element 40 made of cotton filter cloth or some other suitable material such as woven glass or synthetic plastic, fine mesh wire screening or a finely perforated sheet of soft rubber. Rims 41 made of plastic material are sealed to the periphery of each filter element 40 and, through the interstices of the filter element, to the frame 33, thus effectively preventing unravelling of the edges of the filter elements if they are made of a woven material, and holding them in place over both sides of the open chambers 35, 36 and 37, the ribs 34 supporting the central portions of the filter elements 40.

In the bottom element 30 and connecting the chamber 37 with the outside is an outlet passage 45 into which is pressed a hollow valve body 46 having a port 47 formed in a flange 48 and provided with an internally threaded portion 49. Within the valve body 46 is a moveable valve member 50 having a flange 51 adapted to engage and close the port 47. The valve member 50 has an externally threaded portion 52 matching the threaded portion 49, and a knurled flange 53. Within the member 50 is a central bore 54 communicating with two cross-bores 55.

The plastic parts of the device which are joined together are advantageously made of the same type of plastic material in order to provide

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strong and permanent joints. Instead of the vinyl resin referred to previously, other suitable water-proof and water-tight plastic materials may be employed such as rubber or impregnated fabric. Transparency or translucency of the tubular portion (a property of vinyl resins), while advantageous in some types of use, is not essential.

In using the device, the member 50 is screwed in so that flange 51 closes port 47. Then pressure is exerted against the ends 14 and 15, as by grasping between thumb and index finger of one hand, so that the stiff strip 12 bends and the middle portion of the pliable reinforcement strip 13 may be pulled away from strip 12 leaving a relatively wide opening through which suitable quantities of sea water 60 and treating chemical are introduced.

The open top of the container is then closed by tightly rolling or folding the upper portion of tube 11 over the strip 13 towards the male part 20 whereupon the female part 25 is snapped to the male part 20 so as to strap the rolled-down folds of the tube 11 firmly against the stiff plate 22, as shown in Fig. 2. In this manner an effectively water-tight closure of the open top is obtained even when subjecting the not-folded part of the tube 11 to external pressure or handling. This container closure forms the subject matter of my Patent No. 2,372,391, dated March 27, 1945.

The container 10 is then kneaded, shaken or otherwise manipulated to bring about good contact between the liquid and the treating material. After an interval of time the chemical reactions in the bag are completed. Upon unscrewing the moveable valve member 50 a few turns and using the knurled flange 53 as a mouthpiece, clear treated water may be sucked from the bore 54, the filter elements 40 retaining the suspended matter 61 (see Fig. 4). When the user has drunk all the water the bag is opened by pulling the female part 25 away from the male part 20 and unfolding the upper end of tube 11. The solid

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matter 61 retained in the container 10 is then rinsed out which makes the device ready to treat another batch of liquid. It may be used repeatedly in this manner.

For shipping and storing the tube 11 may be folded or rolled over the rigid bottom element 30 as shown in Fig. 6 thus making a light-weight, compact and readily stowable package.

This device may, of course, be used for treating liquids other than sea water. Modifications other than those mentioned herein may be made without departing from the spirit of this invention and reference is, therefore, made to the following claims for a definition of the scope of my invention.

What I claim is:

A liquid treatment device comprising a collapsible bag having sides made of a tube of pliable plastic material and a bottom element made of rigid plastic material joined to the bottom end of said tube, a rectangular frame integrally formed on said bottom element and having two opposite open sides extending into said tube, filter means wholly within said bag and mounted on said frame and extending over said open sides, an outlet passage in said bottom element communicating with the space within said frame, valve means in said outlet passage, and means for closing the top end of said tube.

ERIC PICK.

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