The present invention relates to an improved canteen type water purifier designed particularly for the use of military personnel and sportsmen.

The present invention contemplates the provision of a new canteen construction which contains, in a unique manner, the water purifying means so that untreated water placed into the canteen is automatically treated and purified while it is subsequently being dispensed from the canteen.

An object of the present invention therefore is to provide an improved canteen construction thereby the aforementioned desirable results may be obtained.

Another object of the present invention is to provide an improved canteen of this character which contains water purifying means and is yet of substantially the same size as conventional canteens used heretofore for the purpose of carrying drinking water.

A specific object of the present invention is to provide a unique construction wherein the water purifying element is coaxially arranged within the canteen to achieve a compact structure.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

Figure 1 is a view in elevation and partly in section of a canteen construction embodying features of the present invention;

Figure 2 is a sectional view showing the water purifying element shown also in Figures 1 and 2.

The canteen shown in the drawings is of conventional form and shape and has a capacity of approximately one quart, and is provided with a 2-inch opening in the top instead of the normal ¾-inch opening usually found in canteens.

The canteen body is designated by the reference numeral 10, its opening by the reference numeral 10A, and the externally threaded flange 10B defining such opening 10A is used to releasably mount and secure the assembly designated generally by the reference numeral 11. This assembly 11 is removable as a unit from the canteen case 10, and includes a water dispensing tube 12 which is normally sealed from the atmosphere by the removable cover 13. In general, the canteen is filled with untreated water by first removing the assembly 11 and pouring such untreated water through the opening 10A. The assembly 11 is then replaced and the drinking water is dispensed through the tube 12 on the assembly 11.

It will be clear from the following description that in the dispensing operation all of the water is caused to first flow through the filtering element 14 in its passage from the interior of the case 10 to the dispensing tube 12.

For this purpose the filtering element 14 is assembled on the assembly 11 according to the following detailed description.

The filtering element 14 is generally cylindrical, as shown in Figure 3, and is coaxially mounted with respect to the dispensing tube 12, but spaced therefrom as shown in Figure 2 by the radially apertured mounting cylinder 15.

The filtering element 14 itself consists of a number of flat fibrous disks assembled together on the perforated aluminum tube 15. The filtering element 14, together with the tube 15 upon which it is mounted, is replaceable as a unit.

The filtering unit 14 itself forms no part of the present invention and may be formed of different materials heretofore found useful for filtering purposes, and, for example, each one of the disks comprising the filtering element may be of felt which encloses filter media such as charcoal and the like mixed with other substances. The filtering element 14 is firmly maintained in place between, on the one hand, the annular flange 17A of the cap 17 and, on the other hand, the cup-shaped apertured stainless steel compression plate 18 which is engaged by the nut 19 threaded on the apertured plug 20, such plug 20 being affixed, as for example, by welding, brazing, soldering and the like to the lower end of the drinking tube 12, while the drinking tube 12 is likewise affixed to the cap 17 by similar means.

It is noted that the upper end of the tube 15 is flanged and extends upwardly into the annular opening 17C in the bottom of the cap 17 and engages the annular cap flange 17D.

An O-ring 21 is disposed between a shoulder on the plug 20 and the cup-shaped pressure plate 18. Similarly, O-rings 22, 23 surrounding respectively the upper and lower ends of the aluminum tube 15 serve to assure the flow of liquid exclusively radially inwardly through the filtering element 14 and through the apertured portions 15A of the aluminum tube upon which such filtering disks are mounted. The water thus flowing through the apertured portions 15A may enter the internal bore of the drinking tube 12 through the radially apertured portion 12B of such tube.

A tube 24 extends generally coaxially with the drinking tube 12 and is bent at its upper end to extend through the apertured portion 12A of the drinking tube 12, so that it is in communication with the radially extending aperture 17B in the cap 17. The lower end of the tube 24 has mounted thereon a check valve 25 in the form of a rubber cylinder, with the bottom portion thereof flattened to provide normally contacting flat portions 25A, 25B. These flat portions 25A, 25B are normally in contact and prevent the flow of water in the direction indicated by the arrow 28. When subatmospheric pressures are developed inside the canteen during the dispensing operation, described in greater detail hereinafter, the flattened portions 25B of the rubber cylinder are caused to separate to allow the flow of air into the canteen for purposes of equalizing pressures, i.e., for assuring atmospheric pressures within the canteen while water is being dispensed therefrom. As indicated above, such water, while being dispensed, flows radially inwardly through the filtering element 14, through the apertured portions 15A and out of the drinking tube 12.

It is observed that the present device requires the application of suction to the drinking tube 12 for purposes of extracting the liquid through the filter. To extract the liquid, the user must do two things: (1) tip the canteen, and (2) simultaneously apply suction to the drinking tube 12. The general purpose of the check valve 25 is to prevent liquid from flowing over the external surface of the drinking tube 12 at the time the canteen is tipped.
The filtering element 14 serves generally to provide ultra-fine filtration, together with adsorption of undesirable odors and taste caused, for example, by the decomposition of organic matter. Water passing through the filtering element 14 is freed from suspended particles, including bacteria, while the adsorption producing material in the filter removes bad taste and odors. In addition, the filtering element desirably includes an insoluble antibiotic material, homogeneously dispersed in the fibers of the filtering element, for the purpose of destroying entrapped bacteria. Flow through the filtering element 14 is induced by tipping the canteen filled with water and by sucking on the top of the drinking tube 12. At a suction of 2-inches vacuum, the canteen may be emptied in five to six minutes. Water discharging from the drinking tube 12 is bacteriologically safe for human consumption, even though the water in the canteen may be contaminated to the extent of a number of million organisms per pint.

The efficiency of the filtering element remains at a relatively high level until completely filled with the solids which are removed from the water, and up to the point where liquid no longer passes through the filter due to the accumulation of such solids.

It is evident from the foregoing description that the filtering element 14 is completely replaceable after removing the large cap 17 from the canteen, and by then removing the nut and compression plate 19 and 18, respectively, from the plug 20 mounted on the tube 12.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

We claim:

1. In a canteen of the character described, a canteen case having an apertured portion, a cap releasably mounted on said apertured portion, a suction drinking tube affixed to and extending generally coaxially with said cap into the interior of said canteen case, a filtering element comprising a plurality of disks mounted on an apertured tube, said apertured tube having its upper end extending into an annular opening in the bottom of said cap and engaging an annular flange of said cap, means releasably secured to the lower end of said apertured tube for pressing said filtering element into engagement with said cap, a pressure equalizing tube extending into said case, and a check valve on said pressure equalizing tube preventing flow of liquid from said case to said equalizing tube.

2. In an arrangement of the character described, a canteen case having an opening, a cap releasably secured to said case and closing said apertured portion, a suction drinking tube affixed to and extending through said cap, an apertured plug mounted on the lower end of said tube and having an externally threaded portion, a filtering element comprising disk-shaped elements, an apertured tube, upon which said disk-shaped elements are mounted as a unit, said cap having an annular flange the interior portion of which engages the drinking tube and the outer portion of which engages the filtering element tube to thereby space the same, a cup-shaped compression plate with an apertured portion engaging the threaded portion of said plug, a nut on said threaded portion in engagement with said compression plate to press said filtering element between said compression plate and said cap, a pressure equalizing tube extending coaxially with and in said drinking tube, said cap having a radially extending pressure equalizing aperture, said pressure equalizing tube being bent at its upper end and in communication with said pressure equalizing aperture in said cap, the lower end of said pressure equalizing tube extending through the apertured portion of said plug and having a check valve element mounted thereon preventing the flow of liquid from said case into said pressure equalizing tube.

3. In an arrangement of the character described, a liquid container, a suction drinking tube mounted on and extending within said container, means for mounting the drinking tube on the container, a filter element mounted on and extending within said container in communication with said drinking tube so that all liquid dispensed from said drinking tube flows through said filter element, said mounting having an apertured portion communicating with the atmosphere, a pressure equalizing tube mounted on and extending within said container, one end of said pressure equalizing tube communicating with said apertured portion, and a check valve in communication with the other end of said pressure equalizing tube preventing flow of liquid from said container into said pressure equalizing tube, said valve being normally closed when the pressure is equalized.

4. The arrangement set forth in claim 1 in which said pressure equalizing tube extends coaxially with and inside of said drinking tube with one end of said equalizing tube having said check valve mounted thereon and with the other end of said equalizing tube being in communication with an apertured portion of said cap.

5. In an arrangement of the character described, a canteen case having an opening, a cap releasably secured to said case and closing said apertured portion, a suction drinking tube affixed to and extending through said cap, an apertured plug mounted on the lower end of said tube, a filtering element comprising a disc-shaped element, an apertured tube upon which said disc-shaped element is mounted, said cap having an annular flange, the interior portion of which engages the drinking tube and the outer portion of which engages the filtering element tube to thereby space the same, a compression plate with an apertured portion engaging said plug, means on said plug pressing said filtering element between said plate and said cap, a pressure equalizing tube extending coaxially with and in said drinking tube, said cap having a pressure equalizing aperture, said pressure equalizing tube being in communication with said pressure equalizing aperture in said cap, the lower end of said pressure equalizing tube extending through the apertured portion of said plug and having a check valve element mounted thereon preventing the flow of liquid from said case into said pressure equalizing tube.

6. The arrangement set forth in claim 3 in which said pressure equalizing tube extends coaxially with and inside of said drinking tube.

References Cited in the file of this patent

UNITED STATES PATENTS

152,397 Messner .......................... June 23, 1874
281,608 Browne .......................... July 17, 1883
342,870 Grallke .......................... July 22, 1890
347,443 Mertz .......................... Sept. 30, 1890
780,682 Posch .......................... Jan. 24, 1905
1,019,171 Melville et al. ................. Mar. 5, 1912
1,062,118 Ritten ......................... May 20, 1913
2,149,227 Olson et al. ................. Feb. 28, 1939
2,429,321 La Brecque .................. Oct. 21, 1947