Nov. 30, 1943. E. W. EWESON 2,335,657

WATER SOFTENING APPARATUS

Filed Jan. 23, 1942

Fig. 1.

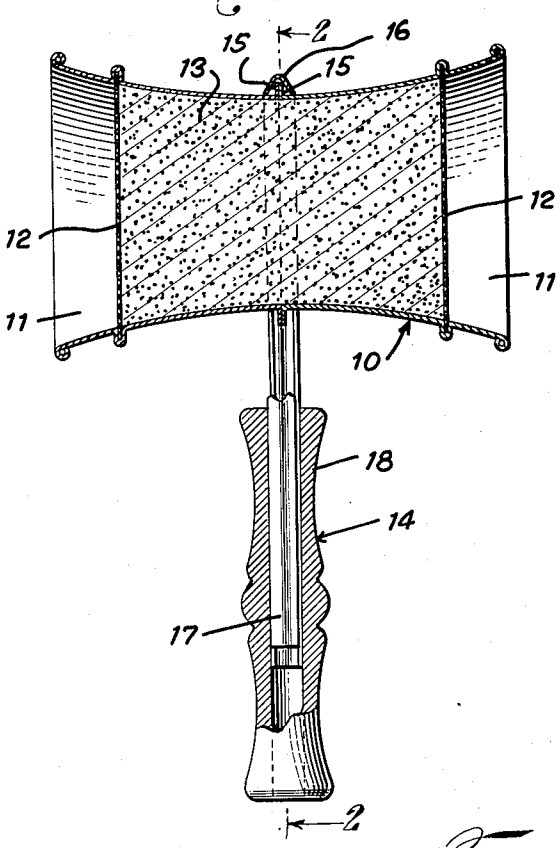


Fig. 2.

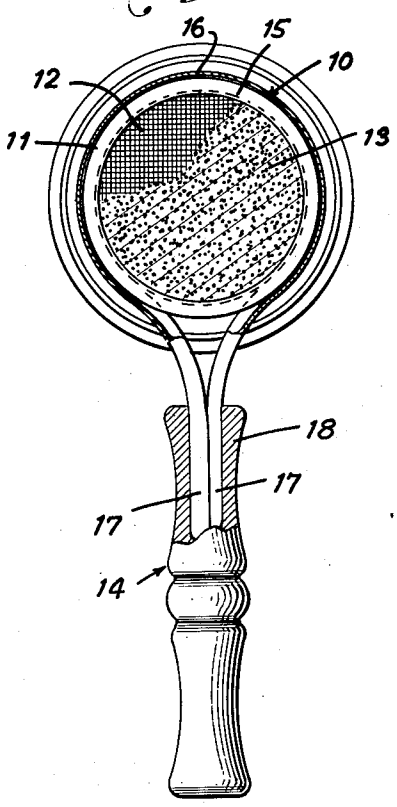
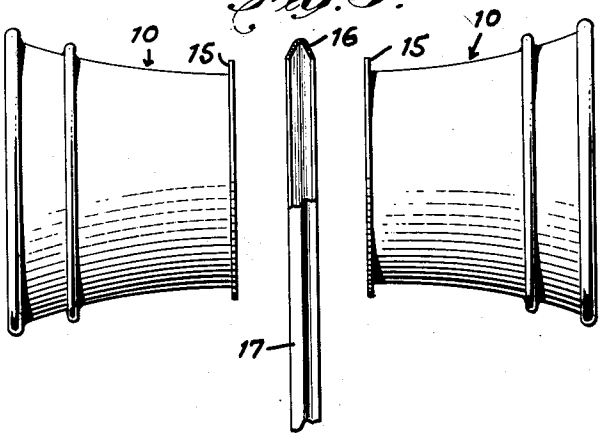


Fig. 3.



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WATER SOFTENING APPARATUS

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6 Claims. (Cl. 210—24)

This invention relates to water softening apparatus, particularly to portable hand-operated apparatus adapted to treat small amounts of water, and has for an object the provision of improvements in this art.

The large-capacity permanent type of water softening installation, which softens all the water passing through the pipe line to which it is connected, is well known. These installations are very desirable but are beyond the means and requirements of many potential customers. For example, it may be helpful to have a single basin or tub of soft water for washing the hair or delicate fabrics such as silk stockings and lingerie, whereas the rest of the water may well be used in its normal condition. The present invention provides a convenient device or utensil for holding a charge of water softening material and moving it about in a body of water in such a way as to cause a directed flow of water through the material, whereby the water is rapidly and completely softened. The softening material may be regenerated when required by stirring the utensil in a similar manner in a body of regenerating liquid.

An illustrative embodiment of the invention will be described in connection with the accompanying drawing, wherein:

Fig. 1 is a longitudinal section through the device;

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a side view, partly in section, showing the parts before assembly.

The utensil comprises a tubular container 10 provided with openings 11 at each end and screen sheets 12 at spaced points along the tube for confining the treating material 13 therebetween. The material is granular or particulate to permit the liquid to pass freely through the tube from end to end along the axis when the tube is moved axially through the liquid. To promote the rapid movement of the container through the liquid and avoid wetting the hand, the container may be provided with a trans-axial handle 14, preferably secured near the mid-point.

It is desirable that the liquid shall flow smoothly in and out of the tubular container and contact all of the material therein evenly and uniformly. To assist in attaining this action, the container is restricted between its ends and flared outward toward the ends, resembling two truncated cones connected at their smaller ends. This may be described as a Venturi shape or hyperboloid, particularly when it is of a continuous curved outline. The curved shape is illustrated herein.

The flared ends of the tube extend beyond the screens 12 to direct the water smoothly into and away from them.

The confined material may be permanently sealed up in the container, but preferably the container is formed to provide an opening through which the material may be introduced or removed, the opening being effectively closed during use.

As shown herein, the container is divided transversely between its ends, as at its smallest diameter, and is provided with out-turned flanges 15 adapted to be embraced by a recessed collar 16. The collar is divided on one side and the juxtaposed ends or tangs 17 are extended radially in merging fashion to enter a tubular hand sleeve 18. When the sleeve 18 is placed on the tangs and pushed down, it tightens the collar on the flanges 15. Since the collar is tapered or V-shaped in cross section, it pulls the flanges together as it is tightened thereon.

The screen plates are secured across the tube in any convenient manner, preferably in such a way as to leave the interior space free of projections which might cause eddy currents.

It will be seen that when the utensil is grasped by the handle and moved rapidly back and forth axially of the tube through a body of water, it will cause the water to flow through the tube and contact the material therein. Due to the Venturi shape the contact is practically uniform on all the material in the tube, and this is important for rapid and effective treatment and regeneration.

The confined material may be a zeolite, either natural or artificial, for softening water. This may be regenerated by a salt solution. Other granular liquid-treating materials may be similarly confined and utilized.

While the device is particularly useful for treating buckets or batches of liquid by being stirred about therein, it may also be held in a stream of running liquid for a like treating effect, the open cupped ends being adapted to catch the stream, and the shape of the tube being adapted to produce an even uniform flow through the material.

While one embodiment of the invention has been illustrated and described, it is to be understood that the invention may have various embodiments within the limits of the prior art and the scope of the subjoined claims.

I claim:

1. A utensil adapted to confine material for the passage thereover of liquid in either direction for softening water and like uses, comprising a tubular container having screens near both ends and divided transversely between its ends, juxtaposed exterior flanges on adjacent parts at the division point, a circumferentially split band provided with an interior groove for embracing said flanges, and means for tightening the band on the flanges.

2. A utensil adapted to confine material for the passage thereover of liquid in either direction for softening water and like uses, comprising a tubular container having screens near both ends and between the screens and divided transversely between its ends, juxtaposed exterior flanges on adjacent parts at the division point, a circumferentially split band provided with an interior groove for embracing said flanges, and means for tightening the band on the flanges, said band being V-shaped in cross-section to force said flanges together and being provided at the split with extended parallel tangs, a tubular handle being provided with can be pushed down on said tangs to tighten the band.

3. A utensil adapted to confine material for the passage thereover of liquid in either direction when moved back and forth in a body of liquid as for softening water and similar uses, comprising a tubular container which is restricted at the middle and flared at both ends, provided near the ends with screens for confining material between them, and a handle secured to the container between the ends for moving it endwise to and fro through the liquid.

4. A utensil adapted to confine material for the passage thereover of liquid in either direction when moved back and forth in a body of liquid as for softening water and similar uses, comprising a tubular container which is restricted at the middle and flared at both ends, provided near the ends with screens for confining material between them, the ends of said container being extended beyond the screens to provide open spaces for directing the liquid to the space in which the material is confined, and a handle secured to the container between the ends for moving it endwise to and fro through the liquid.

5. A utensil adapted to confine material for the passage thereover of liquid in either direction when moved back and forth in a body of liquid as for softening water and similar uses, comprising a tubular container which is restricted at the middle and flared at both ends, provided near the ends with screens for confining material between them, said container having the general shape of an hyperboloid, and a handle secured to the container between the ends for moving it endwise to and fro through the liquid.

6. A utensil adapted to confine material for the passage thereover of liquid in either direction when moved back and forth in a body of liquid as for softening water and similar uses, comprising a tubular container which is restricted at the middle and flared at both ends and provided near the ends with screens for confining material between them, said container being divided transversely in the middle for introducing material and including means for holding the divided parts together in use, said means including a laterally extending handle.

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