June 2, 1936. G. W. VAN EWEYK 2,042,749

WATER SOFTENER

Filed Nov. 16, 1933

Fig. 1.

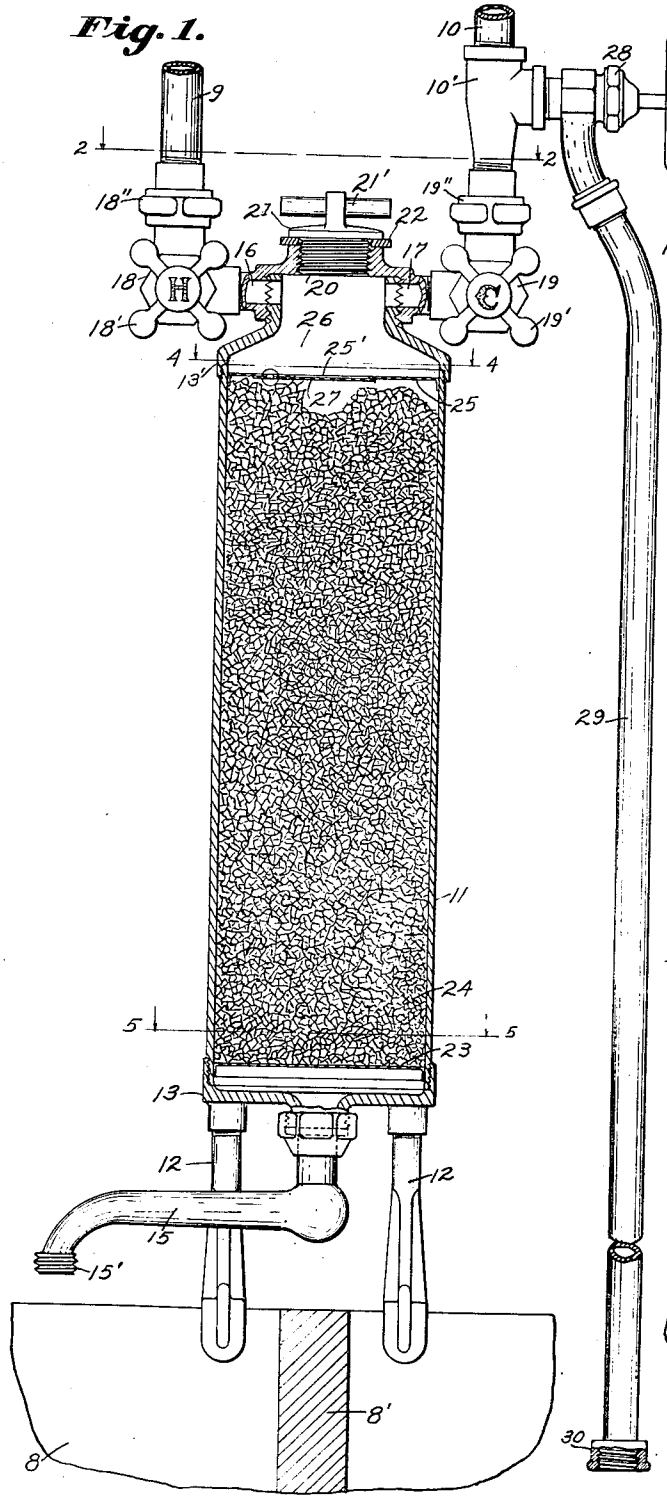


Fig. 2.

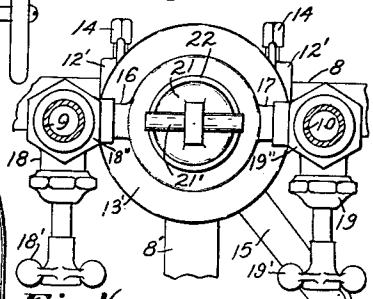


Fig. 4.

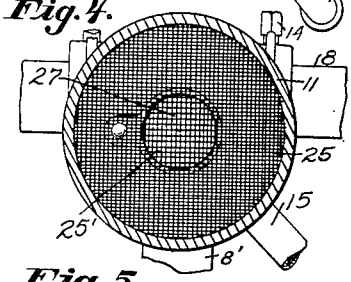


Fig. 5.

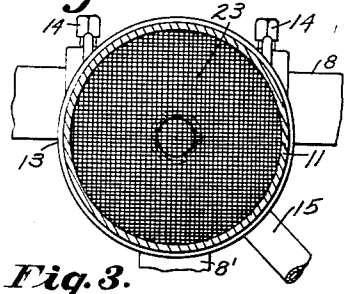
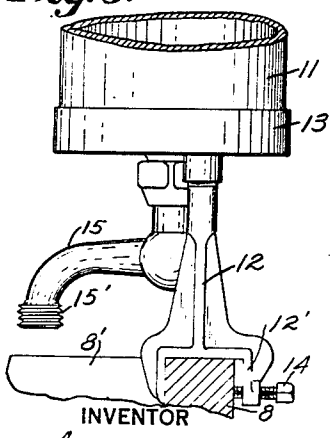


Fig. 3.



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WATER SOFTENER

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Application November 16, 1933, Serial No. 698,244

3 Claims. (Cl. 210—24)

This invention relates to improvements in water softeners more particularly adapted for home use in the laundry.

The general object of the invention is to provide a water softener which may be easily connected to the water supply pipes in the laundry and in a position to discharge hot or cold softened water into either compartment of the ordinary two compartment laundry tub.

A further object of the invention is to provide a water softener more particularly, but not solely, adapted for using zeolite, or other similar base exchange material, as the water softening medium.

A further object of the invention is to provide a water softener having means permitting restoration of the base exchange capacity of the water softening medium when it becomes exhausted.

A further object of the invention is to provide a water softener with means permitting the back flushing of the water softening medium in the receptacle when desired.

A further object of the invention is to provide a water softener having means permitting the convenient recharging of the receptacle with the water softening medium without disconnecting the receptacle from the water system.

With the above and other objects in view the invention consists of the improved water softener and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawing in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a vertical central sectional view of the major portion of the water softener shown mounted on a laundry tub, some of the parts being shown in full line;

Fig. 2 is a horizontal sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a view taken at right angles to Fig. 1 of the lower end portion of the water softener;

Fig. 4 is a horizontal sectional view thereof taken on line 4—4 of Fig. 1; and

Fig. 5 is a similar view taken on line 5—5 of Fig. 1.

Referring to the drawing the numeral 8 indicates a fragmentary portion of an ordinary two compartment laundry tub, and 9 and 10 portions of spaced pipes forming part of the water system of a laundry of an ordinary home. The improved water softener is arranged to be interposed between the pipes and the laundry tub and comprises a cylindrical receptacle 11 supported on the tub by brackets 12 which extend downwardly from the lower head 13 of the receptacle and are bifurcated at their lower portions to straddle the upper edge portion of the rear wall of the tub. Set screws 14 threaded through the rear bifurcated portions 12' of the brackets 12 impinge against the rear wall and firmly hold the receptacle in a position centrally of the tub partition 8'. A horizontally movable discharge swing spout 15 is connected to the lower head between the two brackets and is adapted to be swung to discharge the softened water into either compartment of the tub. The discharge end of the spout is threaded in the ordinary manner as indicated by the numeral 15' for connection with a flexible tube or hose to be later described.

The upper end portion of the receptacle is closed by an upper head 13' having opposite side inlet openings 16 and 17 for connection with angular valves 18 and 19. The said valves are provided with handles 18' and 19' for manual operation, and the handle 18' has the letter H to indicate hot, while handle 19' has the letter C to indicate cold. The valve 18 is connected to the hot water supply pipe 9 and the valve 19 is connected to the cold water supply pipe 10. For convenience of connection coupling unions 18'' and 19'' are provided.

The upper portion of the upper head 13' is formed with a threaded opening 20 closed by a plug 21 having a handle 21' for manual operation. A rubber gasket 22 forms a water tight connection between the plug and the head.

A lower screen partition 23 is positioned within the lower portion of the receptacle a short distance above the lower head to prevent the loss of any of the zeolite or other base exchange material 24 supported on said screen when water is discharged from the spout 15.

An upper screen partition 25 within the upper portion of the receptacle is positioned below the upper head to form a mixing chamber 26 in said head to permit tempering the water to the desired degree before it passes through the receptacle.

The upper screen partition is formed with a central opening 25' to permit recharging the receptacle with zeolite or other like material in the event that any of the material is lost, and to prevent the loss of material during the back flushing operation, a gate or closure 27 formed of screen material is pivoted to the lower side of the partition to be swung edgewise to open position when it is desired to replace the material lost. The swing gate is positioned on the lower side of the screen partition to prevent the pressure dur-

ing back flushing springing the gate upwardly to an open position.

A manually operated valve 28 connected to a T 10' forming part of the pipe 10 has coupled thereto a depending flexible tube or hose 29 provided with a threaded coupling 30 at its lower end. The coupling 30 is of a size to fit the thread of the spout 15 and the hose is of sufficient length to permit threading the coupling thereon when desired.

In operation the portion of the receptacle between the two screen partitions is filled with zeolite or other like base exchange material in granular form and the screen gate is swung to closed position and the plug is threaded into the upper head and the device is ready for use. Upon turning on the water by means of either valve 18 or 19 or both, the hard water in passing through the bed of zeolite will lose its hardness, due to the base exchange quality of the zeolite, and be discharged through the swing spout in a soft condition. When the softening capacity of the zeolite is exhausted, it is easily restored by placing salt into the mixing chamber or pouring a brine solution therein and permitting the brine to percolate through the zeolite for a few minutes and then flush the brine from the zeolite by turning on the hot or cold water. This also is accomplished in a few minutes and the device is again ready for use. This rejuvenating operation can be repeated indefinitely without loss of efficiency.

In some installations where the water is not very clear and contains considerable foreign matter, the upper screen and the upper portion of the bed of zeolite may hold some of the foreign matter, and to remove the same the coupling 30 is connected to the swing spout 15 and the plug 21 is removed. Now upon turning on the water by means of the valve 28, the pressure will cause the water to flow upwardly through the bed of zeolite, the upper screen partition, and dislodge the foreign matter therefrom and it will be discharged with the back flush water through the upper head opening 20. After the back flushing operation, the zeolite bed may be treated with the brine solution before described. From the foregoing description it will be seen that the water softener is of very simple construction and is well adapted for the purpose described.

What I claim as my invention is:

1. A water softener for connection with a two compartment laundry tub and hot and cold water supply therefor, comprising a tubular receptacle having an upper and a lower headed end interposed between the tub and the water supply, valved connections between the upper head and the hot and cold water supply, a swing spout connected to the lower head for supplying hot or cold or tempered water to either tub compartment, screen partitions within the receptacle adjacent the heads, one of said screen partitions having a charging opening and a closure therefor, a water softening material in the receptacle between the partitions, means for directing a back washing flow of water upwardly through the swing spout and the receptacle, said upper head having a charging opening for receiving a medium for restoring the water softening quality of the material within the receptacle when it becomes exhausted, and an easily removable closure for the head opening removable without disconnecting the receptacle from the water supply.

2. A water softener, comprising a tubular receptacle having an upper and a lower headed end, valved connections on the opposite sides of the upper headed end for connection with a source of hot and cold water supply, a threaded end swing spout connected to the lower headed end, a lower screen partition within the receptacle above the swing spout, an upper screen partition within the receptacle below the valved connections and having a charging opening closed by a swing gate, a water softening material within the receptacle between the screen partitions, the upper headed end having a threaded opening closed by a plug for the insertion of a medium for restoring the water softening quality of the material when it becomes exhausted, and a valved and flexible tube means for connection with the threaded portion of the spout for directing a flow of water upwardly through the spout and the receptacle when the plug is removed.

3. A water softener for connection with a two compartment laundry tub and hot and cold water supply therefor, comprising a tubular receptacle having an upper and a lower headed end, the upper headed end having a material charging opening closed by a cover, the lower headed end having brackets for engagement with the upper edge portion of the tub, angle valve water inlet means forming part of the upper head for connection with the hot and cold water supply, a swing spout connected to the lower head for supplying hot or cold or tempered water to either tub compartment, screen partitions within the receptacle adjacent the heads, a water softening material within the receptacle between the screen partitions, a third valve interposed between one of the first mentioned valves and one of the water supply pipes, and a flexible tube connected at one end to the third valve and having means at its opposite end for easily removable connection with the free end of the swing spout for directing a back washing flow of water upwardly through the swing spout and receptacle when the upper end cover is removed, said upper end cover being easily removable without disconnecting the receptacle from the water supply pipes.

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