

Aug. 24, 1937.

G. A. LEWIS

2,091,002

WATER SOFTENING DEVICE

Filed Feb. 11, 1935

Fig. 1.

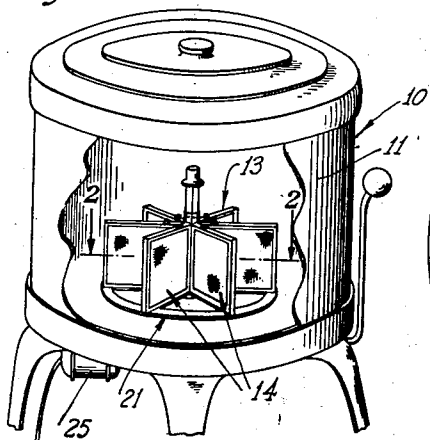


Fig. 2.

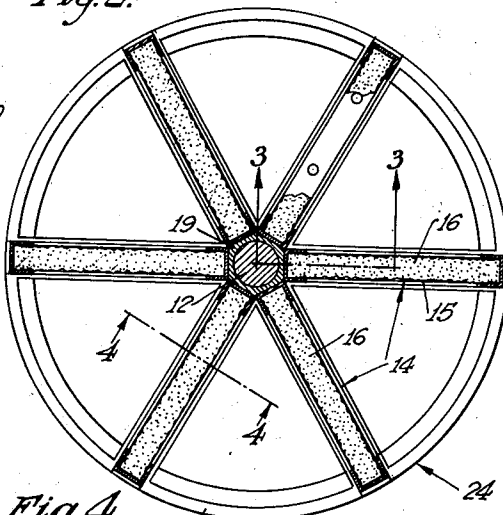


Fig. 3.

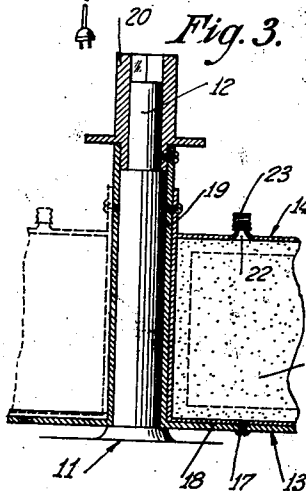


Fig. 4.

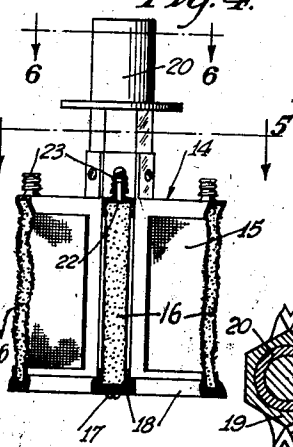


Fig. 5.

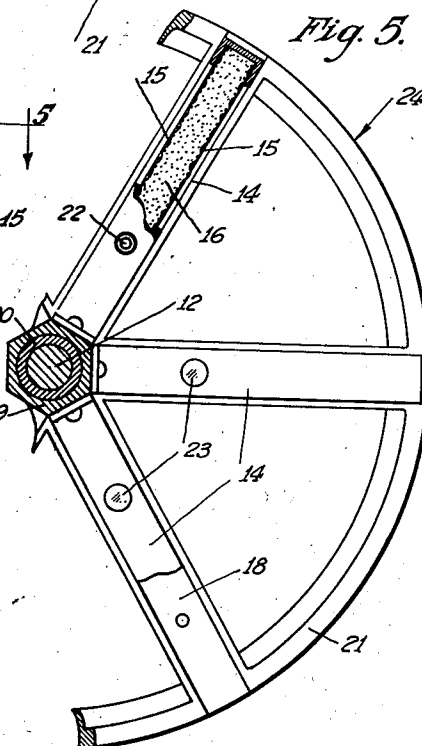


Fig. 6.

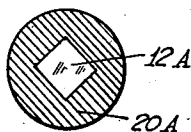


Fig. 6 A

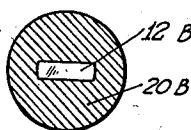


Fig. 6 B

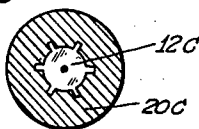
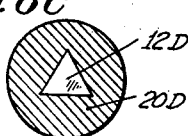


Fig. 6 C



INVENTOR.
George A. Lewis
BY Threedy and Cannon
HIS ATTORNEYS.

UNITED STATES PATENT OFFICE

2,091,002

WATER SOFTENING DEVICE

George A. Lewis, Chicago, Ill., assignor to The
Permutit Company, New York, N. Y., a corpo-
ration of Delaware

Application February 11, 1935, Serial No. 6,044

10 Claims. (Cl. 210—24)

This invention relates to a water softening device.

It is an object of this invention to provide an improved water softening device, which is relatively simple and inexpensive in construction and efficient in use.

Another object of the present invention is to provide a novel and improved device for attachment to any home or domestic washing machine of the agitator type for softening hard water by the base exchange or zeolite method.

A further object of the invention is to provide the novel combination of: a power driven home or domestic washing machine of the agitator type; and means removably associated with said washing machine for agitating or circulating a water-softening medium therein.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing, showing the preferred form of construction and in which:

Fig. 1 is a perspective view of a conventional home or domestic washing machine of the agitator type having a preferred form of the present invention associated therewith;

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

Fig. 3 is a vertical sectional detail view on line 3—3 in Fig. 2;

Fig. 4 is a vertical sectional detail view on line 4—4 in Fig. 2;

Fig. 5 is a sectional detail view on line 5—5 in Fig. 4;

Fig. 6 is a sectional detail view on line 6—6 in Fig. 4; and

Figs. 6A, 6B, and 6C are sectional detail views similar to Fig. 6 but showing several modifications of one detail of the invention.

A conventional home or domestic washer is shown in the drawing, is therein generally indicated at 10, and comprises a housing or casing 11, a part which is shown is broken away to show the operating parts arranged therein.

The washer 10 is of the conventional agitator type and comprises an upright or vertical post 12 which is arranged at the center of the housing 50 or casing 11 for the reception of the agitator blades (not shown); the post 12 being operated by means of a motor 25 and suitable mechanism associated therewith (not shown).

In the practice of the present invention the housewife or operator removes the agitator blades

from the central post or driving shaft 12 of the washer, and then slidably inserts thereon the new unit which supports or carries the water-softening medium, a preferred form of the new unit being shown in the drawing wherein it is generally indicated at 13.

The new carrier unit 13 includes a supporting frame, generally indicated at 24, and this supporting frame 24 is adapted to carry or support a quantity of any suitable water-softening medium such as, for example, the so-called "permutit" or zeolite base exchange softener, and to this end the carrier 13 includes a plurality of radially arranged and spaced open or foraminous frames or cartridges 14.

Each of these cartridges or open frames 14 is adapted to contain a quantity of the water-softening medium 16 and includes open or porous side walls which are formed of a suitable wire mesh 15.

Each of the cartridges 14 is detachably attached, at its bottom edge, as at 17, to an arm 18 of the supporting frame 24, these arms 18 extending radially from a central sleeve 19 of the frame 24, which is adapted to be slidably inserted upon the central post or shaft 12, the sleeve 19 being accommodated to the post 12 by means of an adapter 20; and to this end various forms of adapters 20A, 20B, 20C, and 20D are shown in Figs. 6, 6A, 6B, and 6C, for use in conjunction with the central posts or shafts 12 of various well-known domestic or home washers.

The cartridge supporting arms 18 of the supporting frame are attached at their radially outer ends to a ring 21 which is formed as a part of the supporting frame 24.

Each cartridge 14 is provided at the top thereof with an opening 22, on which is arranged a removable closure member 23, so that the cartridge may be emptied and refilled as and when desired.

Operation

In the use of the new water-softening device the operator of the home or domestic washing machine 10 removes the usual agitator blades from the central post or shaft 12, prior to the washing operation, and in place thereof slidably inserts the new carrier unit 13 onto the post or shaft 12, this being accomplished by merely slipping the sleeve 19 and adapter 20 over the central post or shaft 12, the adapter 20 being splined upon a reduced upper end portion of the central post or shaft, as shown in Figs. 6, 6A, 6B, and 6C.

A predetermined quantity of water, intended for the washing operation, is then run into the

washer 10, whereupon the motor 25 and associated mechanism (not shown) are set in operation so as to oscillate the post 12 in a conventional manner, thereby oscillating the carrier 13 and its supporting frame 24 for the water-softening medium through the water in the washer 10. This movement of the carrier unit 13 causes the water in the washer 10 to flow through the open or foraminous walls 15 of the cartridges 14 into contact with the water-softening or base exchange medium 16 in the cartridges 14, thereby effecting the water-softening operation by a chemical reaction which is well understood in the art and need not be detailed here.

After the carrier 13 and its cartridge-supporting frame 24 have been operated a few minutes, sufficient to complete the water-softening operation, the carrier 13 and its cartridge-supporting frame 24 are removed from the central shaft or post 12 and the agitator blades replaced thereon, whereupon the washing operation may be completed with the thus softened water.

The water-softening medium contained in the cartridges 14 may be regenerated by attaching the carrier unit 13 to the post 12, in the manner shown, placing a brine solution in the washer, and then running the washing machine motor for a few minutes, and the water softening material in the cartridges may be rinsed free of waste brine by placing fresh water in the washer and again running the motor for a few minutes, which operation may be repeated after renewing the water.

The supply of the base exchange or water-softening medium 16 in the cartridges 14 may be replaced or replenished as and when desired by removing the closure caps 23 from the openings 22 in the cartridges 14.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification, without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. The combination of: a domestic washing machine including a casing and a power driven unit therein; and a device removably attachable to said power driven unit for circulating a quantity of a water-softening medium in said casing.

2. The combination of: a domestic washing machine including a housing having an upright centrally disposed post therein; and a device removably mounted upon said post for circulating a quantity of a water-softening medium in said housing.

3. The combination of: a domestic washing machine of the power driven agitator type including a housing having an upright centrally disposed post therein; and a device removably mounted upon said post for circulating a quantity of a water-softening medium in said housing; said device including a carrier adapted to be slidably and removably mounted upon said post; and a plurality of cartridges radially arranged upon said carrier; each of said cartridges being adapted to contain a quantity of a water-softening medium; and each of said cartridges having foraminous, water-penetrable walls so that the water in the washer housing may circu-

late therethrough into contact with the water softening medium contained therein.

4. In a water softening device, the combination of: a domestic washing machine of the power-driven agitator type, including a housing having a centrally disposed upright shaft therein; and means removably mounted upon said shaft for circulating a quantity of a water softening medium in said washer housing and through water contained therein; said means including a supporting frame adapted to be mounted upon said shaft; and a plurality of water penetrable cartridges radially arranged upon said frame, relative to said shaft, and each adapted to contain a predetermined quantity of a water-softening medium.

5. An attachment for a power driven domestic washing machine of the type which includes a casing having a centrally disposed upright post therein for removably supporting agitator blades, said attachment comprising a supporting frame adapted to be removably mounted upon said post; and a plurality of radially arranged liquid-pervious cartridges carried by said supporting frame and each adapted to contain a quantity of a water softening medium.

6. An attachment for a power driven domestic washing machine of the type which includes a casing having a centrally disposed upright shaft therein for removably supporting an agitator device, said attachment comprising a supporting frame adapted to be removably mounted upon said shaft when said agitator device has been removed from the shaft; and a plurality of radially arranged cartridges carried by said supporting frame and each adapted to contain a quantity of a water softening medium; each of said cartridges having foraminous water-penetrable walls.

7. An attachment for a power driven domestic washing machine of the type which includes a casing having a centrally disposed upright post therein for supporting agitator blades, said attachment comprising a supporting member adapted to be removably mounted upon said post; and a plurality of radially arranged cartridges in the form of substantially rectangular frames having water-penetrable side walls and carried by said supporting member, each said frame being adapted to contain a quantity of a water softening medium.

8. An attachment for a power driven domestic washing machine of the type which includes a casing having a centrally disposed upright post therein for supporting agitator blades and adapted to be oscillated, comprising a supporting frame, adapted to be removably mounted upon said post, and foraminous container means for water-softening material arranged in a circle around said supporting frame and carried thereby.

9. A water-treating attachment for domestic washing machines having an agitator mechanism, comprising: a movable carriage member attachable to a said agitator mechanism for movement thereby; and foraminous cartridge means bearing a water softening substance and carried by said carriage member.

10. An attachment for domestic washing machines of the type having an agitator shaft, comprising: a supporting frame removably mounted upon said shaft, and a radially extensive cartridge carried by said frame and adapted to contain a water treating substance, said cartridge having water-penetrable portions.

GEORGE A. LEWIS. 75