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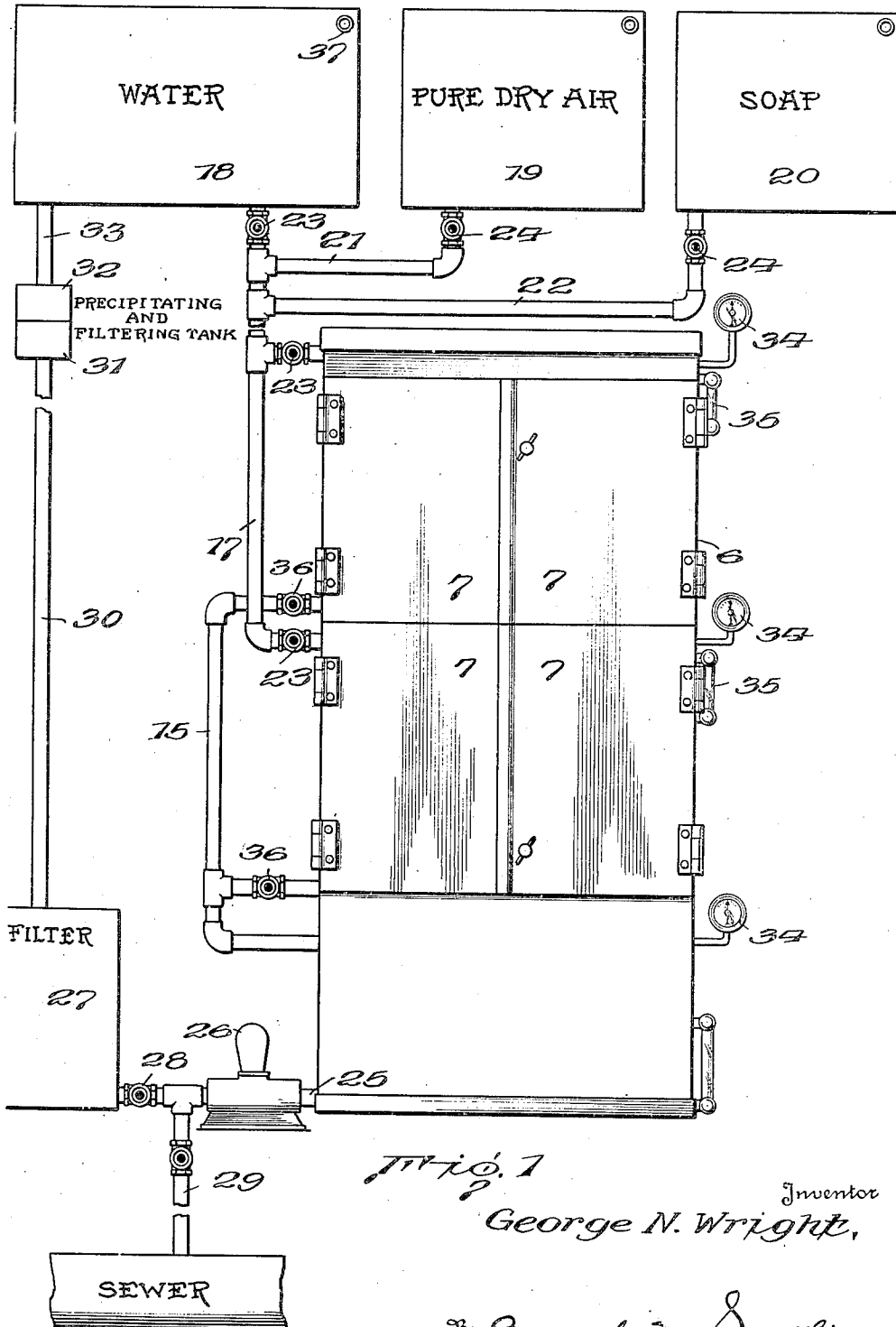
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2,159,114

APPARATUS AND METHOD FOR WASHING AND DRYING CLOTHES

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2 Sheets-Sheet 1



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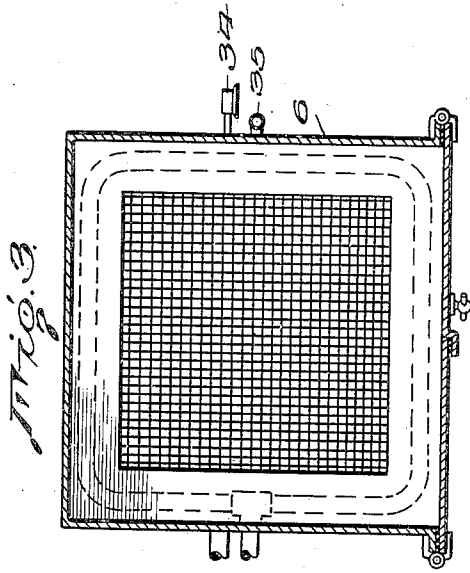
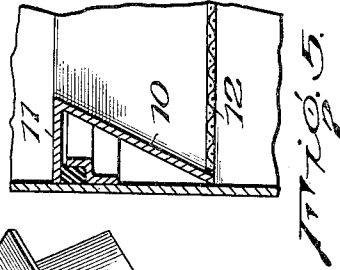
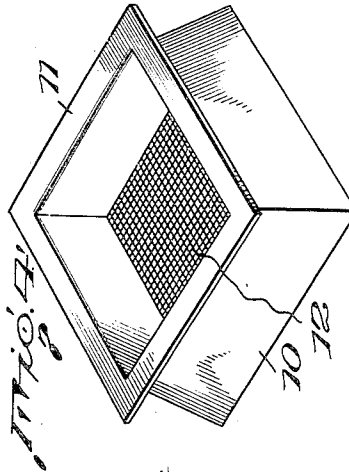
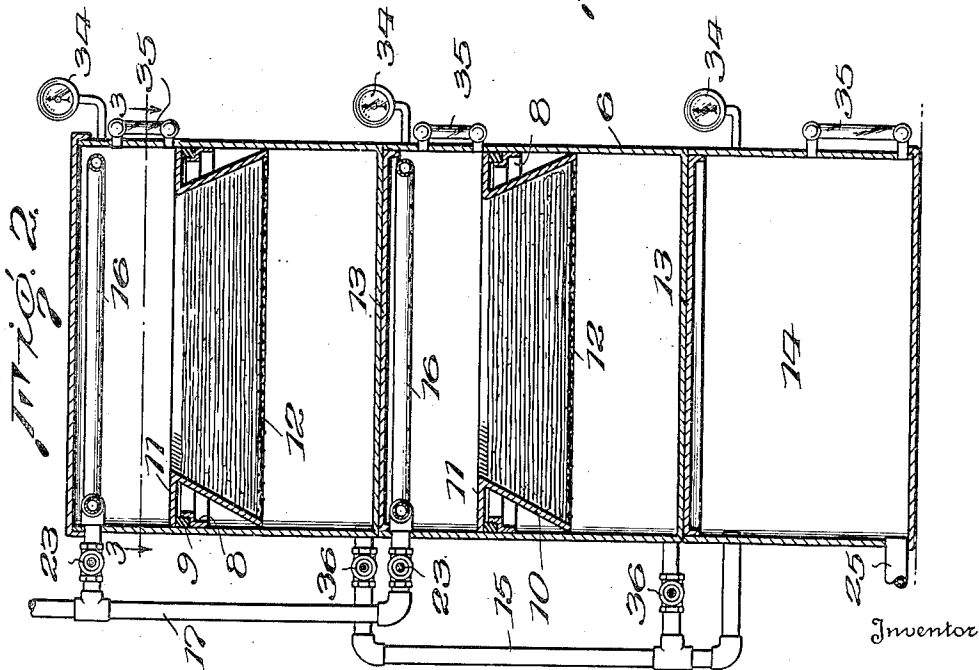
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APPARATUS AND METHOD FOR WASHING AND DRYING CLOTHES

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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APPARATUS AND METHOD FOR WASHING
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Application October 2, 1934, Serial No. 746,556

4 Claims. (Cl. 68—20)

The present invention consists of a novel apparatus and method for washing clothes. The customary methods of removing dirt from clothes by agitation, compression, pounding, etc., usually in the presence of hot water, are displaced by a circulatory water system, in conjunction with a vacuum for effecting a thorough saturation of the clothes, followed by a progressive extraction or suction which breaks up the dirt in the fabric and immediately carries it off.

Objects of the invention are to provide a clothes washing method and apparatus which effects a tremendous saving in water, in that the water, after having once passed through the clothes, is filtered and re-filtered to permit its re-use; to provide an apparatus and method which may be used for drying the clothes, eliminating separate drying machinery; to provide an apparatus and method in which water at hydrant temperature is used, eliminating the necessity and expense of using water heaters; and to provide an apparatus and method which eliminates corrosives in the clothes.

Extensive experimentation has shown that in following out the teaching of the present invention, there is no displacement of the clothes during the washing operation sufficient to cause bunching or knotting and the clothes are positively maintained at all times in a state of complete permeability, offering no artificial resistance to the water or air in the washing or drying operations.

In clothes washing apparatus, it is customary to repeatedly pass the water through the clothes by a regurgitation or like process, resulting in the dirt-laden water being repeatedly forced through the clothes, causing discoloration of the clothes and necessitating the use of harmful bleaches or whitening compounds. In the present invention, there is no re-passing of the washing fluids through the clothes, since these fluids are drawn through the clothes pack from the bottom of the latter and highly filtered water and purified air are drawn through the pack in a continuous stream until the clothes have been completely cleansed and their original color is restored.

The apparatus employed is very simple in construction and includes for the most part, conventional mechanism, yet embodying the use of a novel form of container and clothes-carrying basket or tray, the latter being suspended in the container in a manner to positively effect a seal between the tray and container when clothes are mounted in the tray.

The invention further contemplates a method

and apparatus which is adapted to completely dehydrate the clothes at the option of the user without removing the clothes from the washing container, the drying being effected by employment of the same apparatus and same method which includes the introduction of a highly purified and rarefied air above the clothes, the air being drawn through the wet clothes pack into a vacuum chamber below the latter.

Other objects and advantages of the invention will be apparent from the following description of the present preferred form of the invention, taken in connection with the accompanying drawings, wherein

Fig. 1 is an elevational view of a washing apparatus constructed in accordance with the present invention, the conventional auxiliaries being also shown in elevation in association with the apparatus;

Fig. 2 is a vertical, sectional view, taken through the clothes washing container, showing to advantage the manner of mounting the clothes trays in the container;

Fig. 3 is a horizontal sectional view, taken on the line 3—3 of Fig. 2, looking in the direction of the arrows and showing one of the clothes trays in top plan;

Fig. 4 is a perspective view of one of the clothes trays; and

Fig. 5 is a detail, enlarged, fragmentary sectional view of one of the trays, showing the manner of mounting the same on the wall of the container.

The device of the present invention includes apparatus consisting of a washing cabinet generally designated 6, the cabinet in the present instance being shown to be of rectangular configuration and composed of a series of superposed units, each of which is completely closed throughout, except at one side where doors 7 are hingedly mounted. The cabinet may be of any desired size, depending upon the number of washing units, to be included therein. I have found from experiment that any number of units from one to five, may be advantageously used and I have, in Fig. 2, for the purpose of illustrating the application of this invention, shown two washing units.

In Fig. 2, I show supporting flanges 8, one of which extends completely around the walls of each unit, including the doors and is fixedly secured thereto in any desired manner. The flanges are adapted for the reception of a sealing material 9, which may be soft rubber, raw-hide, or any other suitable material, in order to effect

the seal therebetween and the clothes tray in a manner more fully hereinafter described. Each of the flanges is adapted to support a clothes tray or basket 10, preferably made of sheet steel, the top 11 of which is of a size and configuration to complement the cabinet units 8. The outer margin of the top 11 engages the sealing strip of one of the flanges and is thereby pendantly mounted within the cabinet. The side walls of each tray are preferably canted at an angle of approximately 45°, the top of the sides extending from a point remote from the sides of the cabinet, gradually sloping downwardly into contact with said sides at a point below and in parallel relation with the flanges 8. The bottom of the tray consists of a reticulated or mesh panel 12, which extends completely across the cabinet in engagement with the lower margins of the tray sides. By mounting the tray intermediate the top and bottom of the unit, an air space is provided above and below each tray. The cabinet 8 further includes a chamber 14, which consists of a master vacuum chamber in communication with an auxiliary vacuum chamber 13 immediately beneath each clothes tray, through the medium of a conduit 15.

Each of the units is also equipped with a water supply pipe, which in the present instance, is shown to be perforated to provide a spray pipe 16 extending completely around the top of each unit. The spray pipes 16 are serviced through a manifold 17, the latter being in communication with a water tank 18. The manifold 17 is also in communication with an air supply tank 19 and a soap supply tank 20, through the medium of pipes 21 and 22, respectively. The manifold 17 in proximity to the tank 18 and the cabinet 8 at the points where the spray pipes 16 are supplied, are provided with valves 23. The pipes 21 and 22 are likewise provided with valves, as indicated at 24.

The master vacuum chamber 14 is provided with an outlet pipe 25 which leads into a pump 26, the latter communicating with a filter 27 through valved pipe 28. The pipe 28 communicates with the sewer or other waste conduit, through a valved air outlet pipe 29. The filter 27 is preferably in the same plane with the chamber 14 and has a pipe 30 rising therefrom which extends into a mineral precipitator 31, the latter being in communication with a secondary filter 32, which latter communicates with the water tank 18 through pipe 33.

If desired, each of the cabinet units and the master vacuum chamber may be equipped with an air gage 34 and a water gage glass 35.

In following out the method of the present invention, the trays 10 are first removed from the cabinet 8 and the clothes laid in relatively flat layers on the mesh bottoms 12. On each layer of clothes I preferably spray a liquid soap. Care is exercised to distribute the clothes completely over the bottom of the trays and to superimpose the layers of clothes to contact with the inclined side walls of the trays. The trays are of sufficient depth to accommodate several layers of clothes, without rendering the clothes impermeable during the washing operation. After the clothes have been mounted in the trays as above described, the latter are inserted in the cabinet units, as shown in Fig. 2 of the drawings and the doors 7 closed. A fine spray of water and soap are introduced through the spray pipes 16 from the manifold 17 in sufficient quantity to permit the clothes to be thoroughly soaked. After hav-

ing remained in soak for a predetermined period of time, usually three or four minutes, water, soap and air are sprayed on the top of the clothes through the spray pipe 16 and communication established with the master vacuum chamber 14 by opening valves 36 on the conduit 15. It is understood that during the soaking operation of the clothes, the valves 36 are closed. The opening of the valves 36 begins very slowly, to thereby establish a condition of vacuity in the auxiliary vacuum chambers immediately below the clothes pack to uniformly withdraw the liquids from the clothes. This may be done at any desired velocity. The washing fluids in the clothes are in this way drawn through the bottom of the clothes pack and water continues to be sprayed on the latter for a pre-determined period of time, usually a few minutes, to complete the rinsing operation. The washing fluids, after having passed through the clothes, flow into the conduit 15 and chamber 14, from which latter they are pumped into the filter 27, where the primary filter operation takes place to clarify the water. The water is then pumped from the filter into a mineral precipitating tank, where any minerals in solution in the water are removed and the water then conducted to a secondary filterer where the filtering process is completed, preparatory to returning the water to water supply tank 18. As the water evaporates during the course of repeated washing operations, the supply may be replenished through a fill pipe or opening 37 in the tank.

After the rinsing operation has been completed, the water valve is closed and the air valve opened, to permit pure, dry air from the tank 19 to pass through the spray pipes and impinge the clothes. This operation forces the water from the clothes pack in advance of the air stream to a point of complete or partial dehydration, at the option of the user. Where the clothes are to be ironed, complete dehydration is undesirable and hence, the air supply is cut off before dehydration has been consummated. Where a so-called "rough dry" wash is desired, the air supply is permitted to continue for a predetermined time, to effect complete dehydration. The air passes from the chamber 14 into the sewer through pipe 28. It has been found from experiment, that the complete washing and drying operation, in accordance with the teaching of the present invention, consumes not in excess of forty minutes during which period of time the clothes are at no time touched by an operator, nor subjected to any agitation or the like, tending to knot or bunch the clothes, with a resultant condition of impermeability. The clothes are at all times maintained in a relatively flat position to permit freedom of passage of water, air and soap therethrough, in accordance with the teaching of the present invention. Water of hydrant temperature is at all times used, eliminating the use of heating auxiliaries for the water.

Various changes may be made in the device of the present invention, especially in the details of construction, proportion and arrangement of parts, within the scope of the appended claims.

What is claimed is:

1. An apparatus for washing clothes including a cabinet consisting of a vacuum chamber and superposed washing units, a clothes tray suspended in each unit intermediate the ends of the latter, a liquid spray pipe in each unit for supplying water to the top of the clothes, and a valved conduit connecting each unit with the vacuum cham-

ber, the valves of the conduit being operable to release air from the units at a point below said trays.

5 2. An apparatus for washing clothes including a closed cabinet embodying a clothes unit and an intercommunicating vacuum chamber, a clothes tray suspended from the walls of the cabinet and in liquid-tight engagement with the latter, a
10 valve to normally close communicating between said unit and chamber, and a liquid supply pipe in said unit above the tray for saturating clothes carried by the latter, said valve being operable to open communication between the unit and cham-
15 ber for withdrawing the liquid from the clothes through the bottom of the tray.

3. Apparatus as set out in claim 2, together with an air supply pipe in communication with the liquid supply pipe for ejecting air through the clothes for dehydrating the latter.

4. In a laundering apparatus, a laundering unit, 5 a clothes tray mounted in said unit, the lower wall of said tray being perforated and the side walls of said tray being inclined inwardly in an upward direction to hold the clothes in packed
10 relation in said tray, and means for drawing fluid through the clothes in said tray and the perforated lower wall of said tray for washing the clothes in said tray.

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