

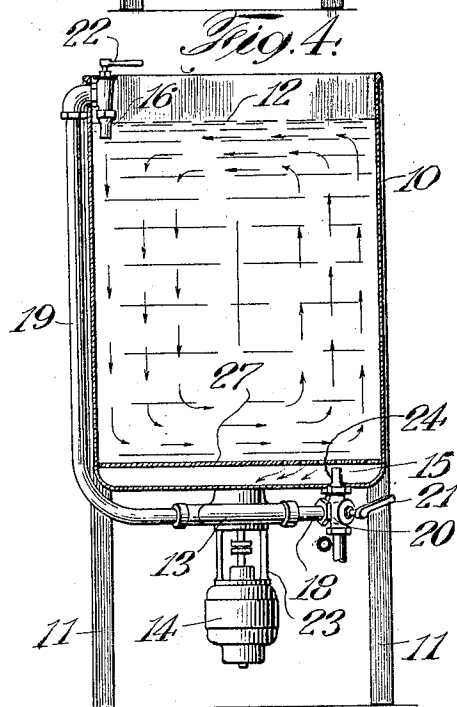
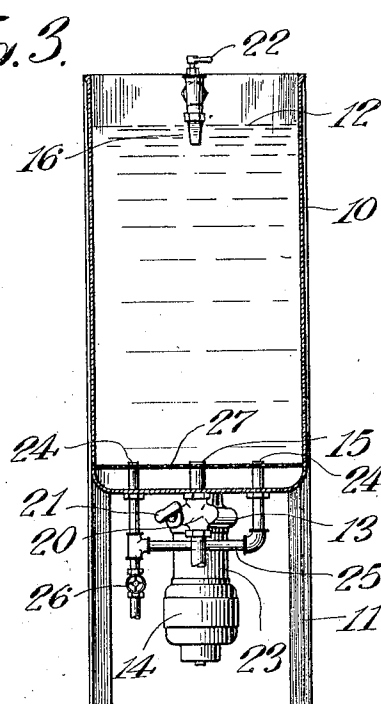
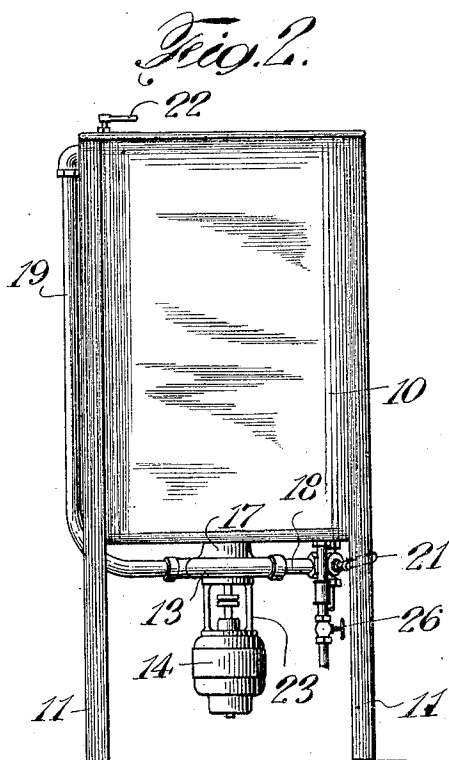
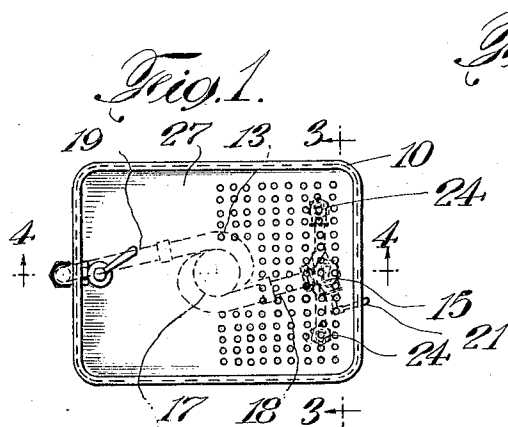
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APPARATUS FOR TREATING FABRICS WITH A LIQUID

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APPARATUS FOR TREATING FABRICS WITH A LIQUID

Application filed September 21, 1929. Serial No. 394,365.

This invention relates to apparatus and method for treating fabrics with a liquid, more particularly to washing machines and has as an object the provision of apparatus and method for liquid treating or washing fabrics thoroughly and quickly and with minimum wear and tear.

I have previously disclosed apparatus and methods of agitating a liquid bath containing fabrics wherein obstruction of the outflow of fluid by fabrics was prevented by the inflowing stream of liquid. I have also disclosed apparatus and method of preventing matting of fabrics in the bath by circulating the fabrics in a closed elliptical path about an elongated quiescent zone. The present invention aims to improve upon these prior inventions and also to provide certain additional benefits and improvements.

The nature of the objects and advantages of the invention will be revealed by the following description of an illustrative embodiment of the invention when considered in connection with the accompany drawing; in which:

Figure 1 is a top plan view of apparatus embodying the invention;

Figure 2 is a side elevation;

Figure 3 is a transverse vertical section taken on the line 3—3 of Figure 1; and

Figure 4 is a longitudinal vertical section taken on the line 4—4 of Figure 1.

Referring to the drawing, the machine comprises a tub 10 supported by vertical angle bars 11. The angle bars may be riveted to the tub or may be associated with other bars to form a framework to receive the tub. The washing is accomplished by an induced circulation of liquid and the articles immersed therein so the tub is formed with rounded corners and smooth sides so as not to hinder the circulation. The tub is made with certain dimensions greater than others for a purpose hereinafter apparent. In the present machine the vertical dimension is made greatest but the arrangement may be varied.

Liquid may be introduced into the tub at the beginning of operations by any desired means. If washing with water is desired the tub may be positioned under a tap or be fitted

with pipes as required. The liquid should fill the tub until it stands at about the line 12.

After the liquid has been introduced it is vigorously agitated by a pump 13 run by a motor 14, the liquid entering the tub by nozzles 15, 16 and leaving by the sump 17. The injection nozzles 15, 16 are connected to the outlet side of the pump by pipes 18 and 19 respectively and one of these pipes—18 here—at the lowest point in the system is provided with a two-way valve 20 controlled by the handle 21 for directing the liquid into the tub or for draining it therefrom. The nozzle 16 is provided with a valve 22 which may shut off completely or merely proportion the liquid between the two nozzles 15 and 16.

The pump may be placed at any convenient location. It is here disposed directly below the sump, its casting being an integral part of the sump wall attached beneath the tub for support. The motor 14 may be supported by the pump casing by tie rods 23 connected thereto.

It is often desirable to heat the liquid in the tub and for this purpose nozzles 24 entering the tub are connected to a supply by piping 25. A valve 26 is provided for regulating the flow. Steam is the heating fluid usually introduced, so for distinction the nozzles 24 may be referred to as steam nozzles.

The nozzles are all directed to create a circulation of liquid and fabrics within the tub. Thus, the nozzle 15 is directed upwardly and the nozzle 16 is directed downwardly on the opposite side of the tub. A circulation set up is therefore as indicated by the long-shafted arrows in Figure 4. The currents of liquid travelling in opposite directions along the major axis of the tub leave between them an elongated zone of more or less quiescent liquid—a scheme which aids materially in preventing the fabrics from tangling or wadding and hence accelerates their treatment by the liquid.

The fabrics have a tendency to float at the surface of the liquid, particularly in a heavy liquid like water. This tendency is increased by the occlusion of gases promoted by the agitation of the liquid and especially so when soap or other material forming suds is em-

ployed. The nozzles are disposed below the surface of the liquid to minimize this tendency but it may become objectionable, notwithstanding. But by locating the nozzle 16 near the surface of the liquid and directing it downward the fabrics are positively forced downward as they arrive at that location on their travel in the prevailing fluid current. The regulating valve 22 for the nozzle 16 provides a reduction in immersion effect when the flotation tendency is not pronounced as when using a light fluid like naphtha. In this case the upflow jet from nozzle 15 is increased correspondingly as the downflow jet from nozzle 16 is reduced by the valve.

Spaced above the bottom of the tub there is disposed a perforated plate 27 which admits fluid to the sump 17 on the intake side of the pump. The perforations are quite numerous to provide a large flow area and a correspondingly low flow velocity through the plate. I utilize the principle which I have heretofore developed—that of preventing obstruction of the outlet by closely associating a large area outlet with a high velocity inlet—in the present device. Here the inlet nozzle 15 extends through the plate 27 in the region of the outlet openings in the plate while the sump is located beneath an imperforate portion of the plate.

After the washing or other treatment of the fabrics has been completed, if it is desired to drain the tub, the valve 20 is turned to connect with the outlet opening therein and the liquid is quickly withdrawn from the tub, leaving the fabrics on the plate 27.

It will be understood that the invention may be variously modified within the scope of the subjoined claims.

What I claim is:

1. A liquid treating machine for fabrics, in combination, a tub, means for circulating liquid and fabrics in the tub in a closed path disposed in vertical planes, said means including upwardly and downwardly directed nozzles on opposite sides of the tub respectively and closely adjacent the distal portions of the sides for respectively directing fabric raising and fabric immersing jets, means for controlling the relative effects of said nozzles, there being outlet ports surrounding said upwardly directed nozzle and a pump for supplying said nozzles and withdrawing fluid from the tub.

2. A liquid treating machine for fabrics, in combination, a tub, means for circulating liquid and fabrics in a closed path in said tub, including upwardly and downwardly directed jet nozzles disposed on opposite sides of the tub beneath the surface of the liquid near the bottom and top respectively, and means for withdrawing liquid from said tub, said means including outlet ports surrounding said upwardly directed nozzles.

3. A liquid treating machine for fabrics,

in combination, a tub having its longest dimension vertical, means for circulating liquid and fabrics in a closed elliptical orbit, including jet nozzles on opposite sides of said tub directed in opposite vertical directions, and means for withdrawing liquid from said tub near one of said nozzles.

4. A liquid treating machine for fabrics, in combination, a tub, a false bottom for said tub, means to cause a circulation of liquid and fabrics in a closed path in said tub including means to cause a rapid flow across said false bottom, and nozzles at one edge of the bottom and substantially perpendicular thereto to produce a rapid flow away from said false bottom, and means for withdrawing liquid from said tub beneath said false bottom.

5. A liquid treating machine for fabrics comprising in combination, a tub provided with two opposite and approximately vertical sides, an upwardly directed nozzle located at the bottom of said tub adjacent one side for directing a stream upwardly along that side, a downwardly directed nozzle located near the liquid level adjacent the opposite side for directing a stream downwardly along that side, outlet openings surrounding one of said nozzles, and means for supplying said nozzles with fluid and withdrawing fluid by way of said outlet openings.

6. A liquid treating machine for fabrics comprising in combination, a tub provided with two opposite and approximately vertical sides, an upwardly directed nozzle located at the bottom of said tub adjacent one side for directing a stream upwardly along that side, a downwardly directed nozzle located near the liquid level adjacent the opposite side for directing a stream downwardly along that side, means for supplying said nozzles with fluid and withdrawing fluid by way of said outlet openings, and means for controlling the relative effects of said nozzles.

7. A liquid treating machine for fabrics, in combination, a tub, a plate spaced from one wall of said tub, said plate being provided with fluid outlet openings, means including a nozzle for directing jets of liquid directly along and parallel to the sides of the tub to cause a rapid flow of liquid across said plate, means to cause a jet of liquid to flow away from said plate in the region of said outlet openings, and an outflow opening in said tub behind said plate.

In testimony whereof, I have signed my name to this specification this 11th day of September, 1929.

EDWIN COWLES.