May 10, 1949. S. HORNSTEIN 2,469,825

AUTOMATIC PRINT WASHER

Filed Dec. 26, 1945

Fig. 1

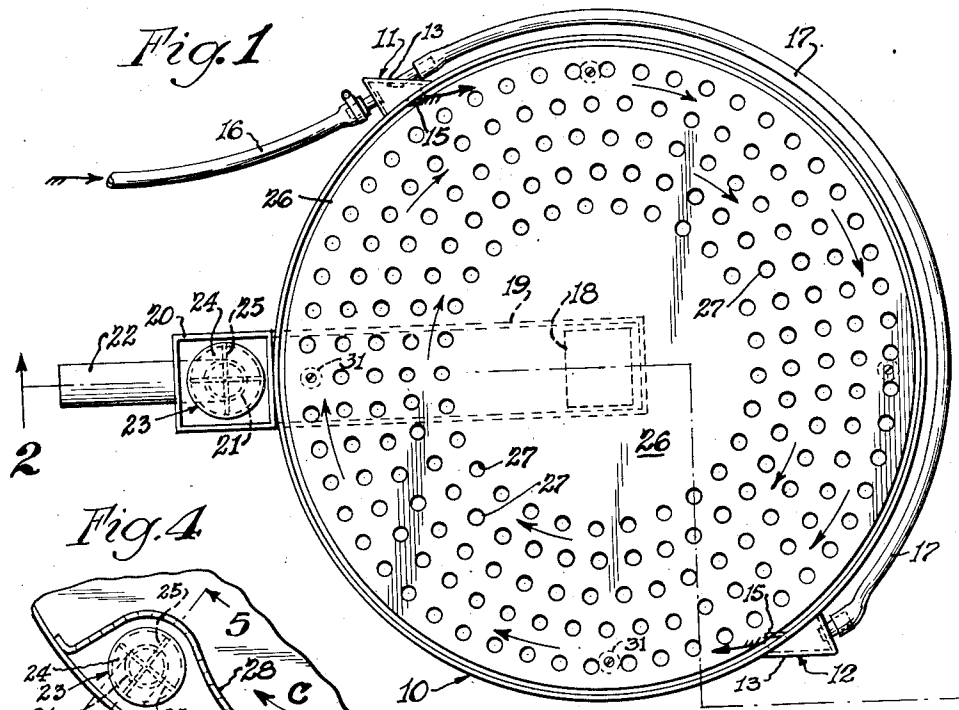
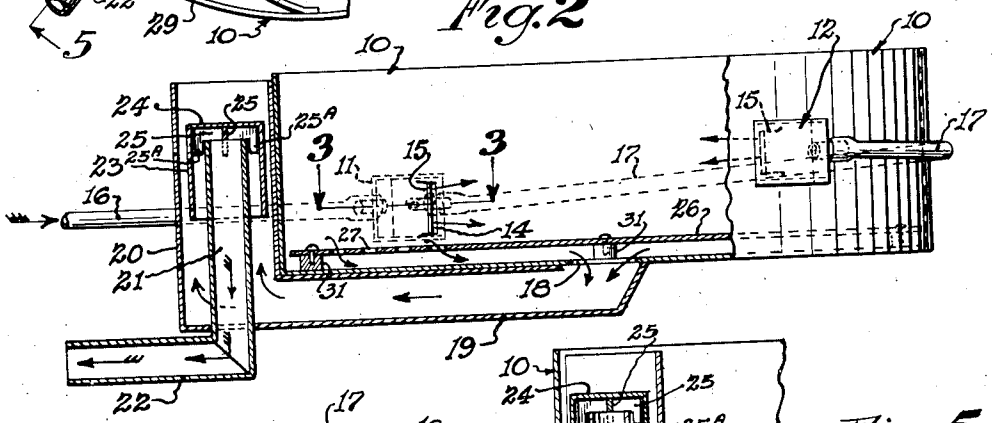


Fig. 4

Fig. 2



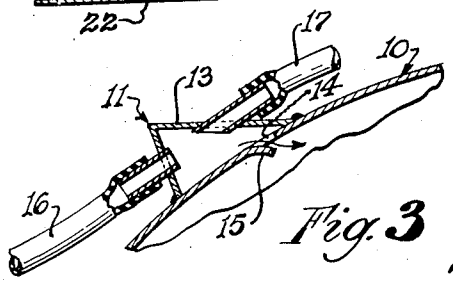


Fig. 3

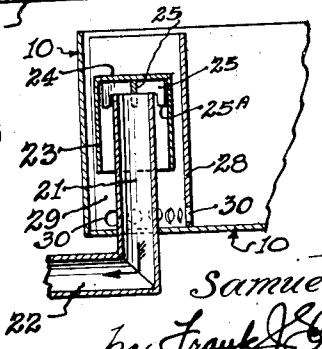


Fig. 5

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AUTOMATIC PRINT WASHER

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3 Claims. (Cl. 95—97)

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The present invention relates to the photographic art and has particular reference to apparatus for washing photographic prints to thoroughly remove therefrom the fixing solution; and it has for its object to provide washing apparatus embodying simplified features of construction and which apparatus operates automatically, efficiently and economically; the prints being continuously washed in a whirling body of water in a single compartment of a cylindrical tank in which the lower stratum of the polluted portion of the body of water containing the fixing solution is periodically automatically syphoned away while pure water is being admitted to maintain the whirling action of the water without interrupting the continuity of the washing.

An object of my invention is to provide an automatic photographic print washer which consists of a circular tank and in which the arrangement of the water inlets is such that the body of water is caused to rotate with a continuous whirling motion so as to create an active vortex in the central portion of the rotating body of water; the inlets being arranged in circumferentially spaced and preferably circumferentially and vertically spaced planes and the water supply conduits for such tank inlets being positioned to so direct the water along the inner face of the circular wall of the tank and, to facilitate the whirling motion of the body of water, spaced deflected streams of water are introduced at circumferentially spaced points at relatively different elevations.

Another feature of my invention is found in the provision of improved means for preventing the passage of the prints into the drain for the polluted water.

The various features of novelty whereby the present invention is characterized will hereinafter be pointed out with particularity in the appended claims; but, for a full understanding of the invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Fig. 1 is a top plan view of an apparatus embodying the present invention in a preferred form;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section, on a larger scale, on line 3—3 of Fig. 2;

Fig. 4 is a top plan view of a slightly modified form of apparatus, only a small fragment being shown; and

Fig. 5 is a section on line 5—5 of Fig. 4.

Referring to Figs. 1–3 of the drawing, 10 represents a cylindrical tank that is low compared to its diameter, the ratio in the tank illustrated being about one to three. On the periphery of the tank are a plurality of hollow lugs spaced apart circumferentially of the tank; two such lugs, 11 and 12, being used in the particular construction illustrated. The two lugs illustrated are disposed diametrically opposite each other and each is wedge shaped in horizontal section. The lugs are so disposed that one side of each coincides with the periphery of the tank and there meets the opposite side in what is the sharp edge of a wedge or the apex of a triangular chamber within the lug. The lugs may conveniently be wedge-shaped cups that are welded or soldered in place with their open sides facing and closed by the tank wall. The chamber in each lug communicates with the interior of the tank through a port 14 in the tank wall near the apex of the wedge. On the inner side of the tank wall, at each of these ports 14, is a deflector 15 extending from one side of and across the port 14 from top to bottom thereof; each deflector 15 starting at the tank wall on the side of the port farthest from the apex of the wedge and slanting away from the port 14 in roughly parallel relation to the outer angular wall 13 of the adjacent lug. The deflectors 15 are preferably the pieces of the tank wall that are partially severed to produce the ports 14 and are bent at their juncture with such wall, preferably at an acute angle, so that they project at the desired angle.

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A water supply conduit or hose 16 opens into the chamber in lug 11 through the wall forming the base of the wedge. A connection hose or conduit 17 communicates with the chamber in lug 11 through the wall thereof that forms the long outer side 13 of the wedge-shaped chamber in lug 11. Members 16 and 17 are preferably substantially coaxial in the vicinity of the lug 11 with which they both communicate. Conduit 17 extends half way around the tank and opens into the chamber in lug 12 through the wall constituting the base of the wedge-shaped chamber in lug 12. Consequently, when the conduit or hose 16 is connected to a supply of water under pressure, a stream of water enters the chamber in lug 11, a portion of the supply of water going straight ahead and into conduit or hose 17, and a portion entering the tank through the port 14 connecting that chamber of lug 11 with the interior of the tank. That portion of the water that enters hose 17 is carried thereby into the chamber in lug 12 and from there passes into the tank through the local port 14.

The function of the deflectors 15 is to cause the water to be delivered into the tank tangentially, that is, in a manner to flow circumferentially of the tank close to inner face of the tank side wall, whereby water in the tank is given a whirling motion, as indicated by the arrows in Fig. 1. With the lugs 11 and 12 placed in relatively different planes, as shown, effective rotation of the entire body of water in the tank to provide adequate agitation of prints in the water is assured.

In the bottom wall of the tank is a large central outlet 18. An outlet conduit 19, connected at one end to said tank outlet, extends radially of the tank, underneath the same, and to one side thereof where it meets a stand pipe 20. This stand pipe 20 is open at the top, provides a chamber therein which is of cross-sectional area longer than the conduit 19 and preferably terminates a little below the level of the top of the tank. A waste pipe 21, of substantially smaller cross-sectional area than conduit 19 and open at the upper end, extends up from below into the stand pipe 20 and terminates at a substantial distance below the top of the tank; rising to only about two thirds of the height of the tank in the arrangement shown. The lower end of the waste pipe 21 extends through the bottom of the stand pipe 20 and is joined to a horizontal waste discharge pipe 22 of the same diameter as the waste pipe 21 and forms therewith a sharp right-angular turn in the form of a sharp L. Telescoped over the top of the waste pipe 21 is a cylindrical bell or inverted-cup valve 23 closed at its top by an end wall 24 which rests on the crossed blade-like supports 25 disposed on edge on top of the waste pipe 21; the bell 23 being larger in diameter than the waste pipe 21 to provide an annular space within the same around the waste pipe 21.

The spider consisting of the thin blades 25 arranged in cross form which rests on top of the waste pipe 21 may be secured in any suitable manner, as by soldering or welding to the inner face of the bell cover 24 or preferably to the top of the waste pipe 21; sufficient clearance for passage of water being provided between the inner face of the bell and the depending portions 25A of the blades 25 and between the latter and the exterior of the waste pipe 21.

Within the tank 10 is a false bottom 26, supported a short distance above the main bottom wall of the tank on short spaced supports 31; the false bottom 26 being a disc that peferably is very slightly smaller in diameter than the interior of the tank. The false bottom is thickly perforated except in a central area of considerable size; the perforations being preferably numerous small holes 27 arranged in concentric circles.

In using the apparatus, the water is turned on and prints to be washed are placed in the tank. The water enters the tank in directions tangentially to the vertical tank wall, being guided by the deflectors 15, causing the entire body of water to whirl or revolve in the tank. No water escapes into the waste pipe 21 until the level in the stand pipe 20 rises slightly above the top of the waste pipe 21, whereupon some water starts to slightly overflow into the latter, however, the water level in the tank and in the stand pipe 20 continues to rise to about or near the top of the bell 23, the air within the upper part of the latter being carried along with the water, whereupon suddenly a solid column of water, extending

from the horizontal extension 22 at the lower end of the waste pipe 21 up to the top of the waste pipe 21, is created, as at this stage the water quite rapidly flows into the waste pipe 21 in sufficient volume to quickly fill the waste pipe 21 due to being retarded by the sharp turn at the bottom of the waste pipe 21 where it connects with the horizontal discharge pipe 22, consequently, a syphon is formed and water is quickly syphoned out of the tank until its level drops low enough to uncover the lower end of the bell 23, thereby allowing air again to enter the bell and breaking the syphon. The tank then fills to the high level, to be again partially drained; the cycle being automatically repeated as long as clean water is being delivered into the tank.

It may be noted that the polluted water from the lower portion of the tank is removed during the syphoning and that during such syphoning pure water is continuously being admitted into the tank so that the whirling washing of the prints is not interrupted during such intermittent automatic syphoning operations whereby the water is kept clean for continuous thorough washing of the prints.

The false floor prevents the prints from being drawn into the outlet 18 or from being subjected to the strong suction that exists directly above such outlet. The water that contains fixing solution gravitates to the bottom of the tank, so that only polluted water is withdrawn during a washing operation, fresh water constantly replacing the polluted water. In other words, fresh, clean water is constantly being brought into contact with the prints from above while water that has become polluted is constantly moving down, away from the prints. The raised false bottom, the periodic dumping of the lower stratum of water in the tank and the whirling movement of the body of water in the tank, all contribute to the end that fresh water shall flow past the prints and, in doing so, shall pick up the fixing solution and then move on.

In the modification shown in Figs. 4 and 5 the syphoning means is placed within the tank along one side of the vertical wall thereof. Instead of having a separate standpipe I make use of a portion of the space within the tank; a vertical partition 28 in the tank forming with the vertical side wall of the tank a small compartment or chamber 29. The waste pipe 21 and its bell or valve 23 are the same as in the other form, the waste pipe 21 coming up through the bottom of the tank into chamber 29. It will be seen that chamber 29 is preferably elongated circumferentially of the tank. One reason for this is to provide room for a long row of holes 30 in the partition 28; these holes being placed close to the bottom of the tank. Holes 30 take the place of both the main outlet 18 and the holes 27 in the other form; namely, preventing the prints from being drawn into chamber 29 and providing the desired drain outlet. A further reason for constructing the chamber 29 so that it is of elongated shape, as viewed from above, is to avoid corners in which the prints might be trapped and thus be prevented from being thoroughly washed. Arrow C in Fig. 4 indicates the direction in which the water moves past wall 28. A print that is being carried along by the water moves along this wall just as freely as it does along an unobstructed section of the main cylindrical wall of the tank.

Washing is done in exactly the same way in this form of the invention as in the other, except

that the polluted water may perhaps not recede as evenly as where there is a central outlet from the tank.

While I have shown the chamber **29** adapted to receive the polluted water through openings **30** in the partition wall **28**, it is obvious that the perforations **30** could be eliminated and the polluted water could readily be admitted into the chamber **29** through a conduit, similar to conduit **19**, connected at one end with an opening in the tank bottom within the area of the chamber **29** and connected at its other end with a discharge opening in the center of the tank bottom similar to the opening **18**.

While I have illustrated and described with particularity only a single preferred form of my invention, together with a single modification, I do not desire to be limited to the precise details thus illustrated and described; but intend to cover all forms and arrangements that come within the definitions of my invention constituting the appended claims.

I claim:

1. Washing apparatus comprising a cylindrical tank, a hollow lug enclosing a wedge-shaped compartment on the periphery of the tank with its outer and inner sides meeting in an apex adjacent to the cylindrical wall of the tank, a water supply conduit opening into said chamber of the lug through the base of the wedge, a port leading from said chamber into the interior of the tank at the inner side of the wedge, and a deflector within the tank at said port disposed approximately parallel to said outer side of the lug.

2. Washing apparatus comprising a cylindrical tank, two hollow lugs on the periphery and spaced apart circumferentially of the tank each defining a chamber which is triangular in horizontal section, the inner side of the triangular chamber constituting the periphery of the tank and the outer side extending at an angle to said inner side, a port in the said inner side of each chamber, a deflector on the inside of the tank at each port, each deflector being approximately parallel to said outer side of the corresponding chamber, a water supply conduit opening through the base of one of the lugs into one chamber, and a second conduit opening at one end into the outer side of the latter chamber and at its other end opening through the base of the other lug into the other chamber.

3. Washing apparatus as set forth in claim 2 wherein said other lug is located at an elevation which is higher than the elevation of said one of the lugs.

SAMUEL HORNSTEIN.

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