

Sept. 26, 1950

W. H. RICHARDS
PHOTOGRAPHIC PRINT WASHER

2,523,331

Filed Feb. 15, 1950

2 Sheets-Sheet 1

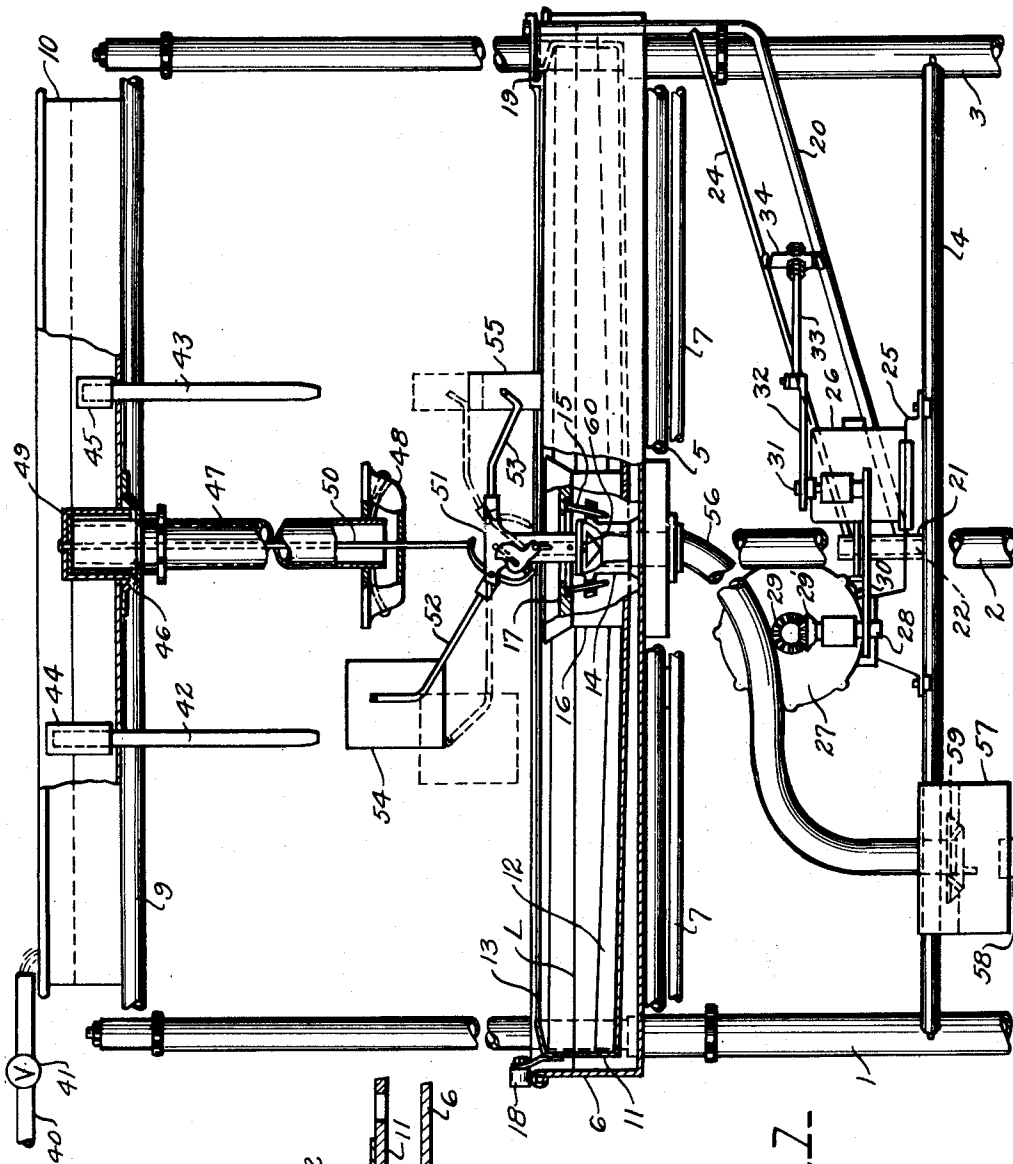


FIG. 10.

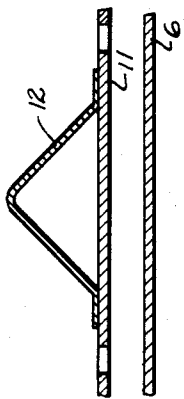


FIG. 1.

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2 Sheets-Sheet 2

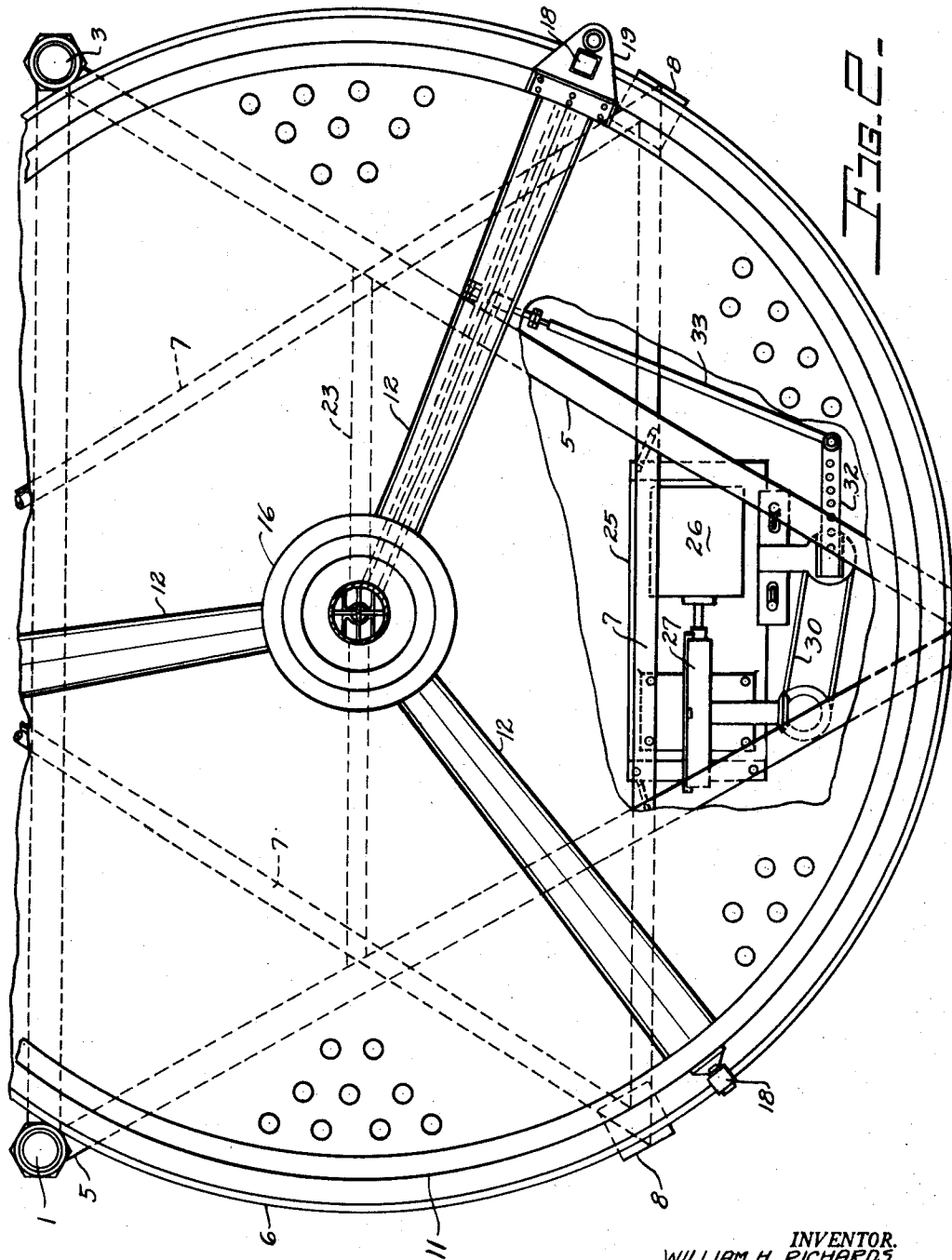


FIG. 2.

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PHOTOGRAPHIC PRINT WASHER

William H. Richards, Dayton, Ohio

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5 Claims. (Cl. 95—97)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

The present invention relates to a photographic print washer and particularly to liquid agitating means therefor.

A primary object of the invention is to provide a photographic print washer including a liquid containing washing pan having a print containing agitating tray rotatably mounted therein and connected to power driven mechanism for causing the tray to oscillate through a predetermined range of rotary movement.

A further object of the invention is to provide a photographic print washer including a liquid containing washing pan having a print containing agitating tray rotatably mounted therein, rotatably supported at its outer edge and near its center and connected to power driven mechanism for causing the tray to oscillate through a predetermined range of rotary movement.

Another object of the invention is to provide a photographic print washer including a liquid containing washing pan having a print containing agitating tray rotatably mounted therein and connected to means for causing regular oscillation of the tray about its central axis and wherein the tray has a plurality of radially extending ribs on its bottom surface provided with sloping side walls over which liquid flows relative to the tray during oscillatory motion thereof.

Another object of the invention is to generally improve the construction of large-volume, power-operated photographic print washers.

The above and other objects of the invention will become apparent upon reading the following detailed description in conjunction with the drawings, in which:

Fig. 1 is a side elevation view partly in cross section of a photographic print washer constructed in accordance with the present invention.

Fig. 1a is a detail view in cross section showing the construction of a special agitating rib used in the washer.

Fig. 2 is a top plan view of the photographic washer but omitting the liquid reservoir and liquid distributing mechanism. Portions of the washing pan and agitating tray are cut away to show the agitating mechanism.

The present application is a continuation-in-part of my previously filed application Serial No. 27,587 filed on May 17, 1948.

For a description of the photographic print

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washer reference is made to Fig. 1. The washer frame comprises three main upright posts or pillars 1, 2 and 3 arranged around the center of the washer at 120 degree intervals. In plan the washer is of generally circular shape, this general outline being determined by the shape of the various pans to be described. The adjacent pillars are connected near the floor level by braces or bars 4 which form an equilateral triangle in plan view. At a convenient height above the floor level the pillars are further connected by bars 5, which serve to support the washing pan or tank 6. Directly below the bars 5 are three interconnected bars 7 forming an equilateral triangle turned through an angle of 60 degrees with respect to the triangle formed by bars 5 (see Fig. 2). Where the bars 7 cross beneath the bars 5 they are secured thereto by bolts or welding and at the points where the bars 7 join each other there are brackets 8 serving to support the pan 6. The pan 6 when filled with washing liquid must be well supported to prevent its being twisted out of shape. Above the pan 6 the pillars are further connected by bars 9, which serve as supports for the reservoir pan 10. Mounted concentrically within the circular washing pan 6 for limited rotary motion is a circular agitating tray 11, having perforated walls to allow free circulation of washing liquid. The bottom wall of the tray slopes gradually inward from its outer edge to assist drainage of liquid when the washing pan 6 is drained and also to counteract to some extent the tendency for centrifugal force to throw the prints resting on the tray bottom toward the outer upstanding wall of the tray as the tray is rotated back and forth about its center. The tray bottom is provided with a plurality of radially extending ribs 12 of angular cross section to assist in agitating the washing liquid as the tray is rotated back and forth. The action of the ribs, which are shown in detail in Fig. 1a, in conjunction with the oscillation of the agitating tray 11 is one of the important features of the present apparatus. When the tray is rotated the washing liquid tends to remain in a condition of rest due to its inertia, so that liquid is forced up one side of each rib and down the other side in a broad stream relative to the moving tray. This sudden rush of liquid over the ribs produces a flow of liquid across each space between adjacent ribs and the flowing liquid thus tends to force its way between prints resting on the tray bottom. Because of the regular reversals of rotary movement the liquid flows over the ribs in one direction while the tray is

rotating in one direction and in the opposite direction while the tray is rotating in the other direction. Also because of the oscillating movement of the tray, the prints move back and forth slightly with respect thereto but always tend to come to rest finally in the original positions. The ribs 12 serve to materially stiffen the bottom of the agitating tray and also divide the tray into sections where prints of certain categories can be kept separate during processing.

It is further noted that the ribs 12 are of maximum height at the outer ends thereof and are of gradually diminishing height toward the center of the tray. This produces increased liquid agitation toward the outside of the tray and this increased agitation tends to prevent prints from being thrown away from the center by centrifugal forces set up by the rotation of the agitating tray. As seen in Fig. 2 the ribs 12 are wider toward the outer edge of the tray 11, so that the sloping sides of the ribs have a uniform angular relation with respect to the bottom of the tray over their full length. The photographic prints to be washed or processed are placed face upward on the bottom of the tray 11 and during washing the liquid level should be about at the level L. The top edge of tray 11 is flanged inwardly at 13 to prevent liquid from splashing over the edge and also to prevent prints from being pushed up the side wall beyond the top edge. The various features and accessories required to rotatably mount the tray 11 and to cause continuous agitating movement thereof will now be described.

At the bottom of the pan 6 there is rigidly secured a tubular bracket 14, having two or more tray supporting rollers 15 journaled thereon. The agitating tray 11 has a large central opening therein within which is secured an upright sleeve 16 which may be welded to the bottom of the tray.

The sleeve 16 carries an integral bearing surface or flange 17 providing a circular track for the rollers 15, and thus serving to rotatably support the central portion of the tray 11 for rotation about the central axis thereof. At its outer periphery the tray 11 is provided with three or more rollers 18 having rubber sleeves or tires mounted thereon. These rollers are adapted to roll back and forth on the rolled upper edge of the side wall of pan 6, thus serving to support the tray 11 at its outer periphery. At one point on its outer periphery the tray 11 has a bracket 19 fixed rigidly thereon. Secured to the outer end of the bracket 19 is the outer upper end of a radius arm 20 having its inner lower end fixed to a bearing sleeve 21 rotatably mounted on a post 22 located on the central axis of the pan 6 and tray 11. This pivot post 22 may be secured on a bar 23 welded to two adjacent brace bars 4. For further strengthening of the radius arm 20 there is provided another arm 24 rigidly secured to the vertical outer portion of the arm 20 and to the bearing sleeve 21.

The driving mechanism for the radius arm 20 comprises a base plate 25 mounted horizontally on two adjacent brace bars 4 and carrying a motor 26 and coupled reducing gear mechanism 27. Mounted on the reducing gear housing is a stub shaft 28 driven from the reducing gear 27 by meshing bevels 29 and 29'. Through a V-belt 30 the stub shaft 28 drives another stub shaft 31 having a crank arm 32 rigidly attached thereto. Pinned on the outer end of crank arm 32 is a connecting rod or pitman 33 secured rigidly to a short vertical bar 34. The bar 34 is pivotally

connected at its upper and lower ends to the arms 24 and 20 respectively. For each revolution of the crank arm 32, the radius arm 20 and the tray 11 will complete one cycle of oscillation. For example if the shaft 31 rotates at 30 R. P. M. the tray 11 will oscillate back and forth thirty times per minute. The crank arm 32 is provided with a plurality of apertures for changing the relative position of the connecting means joining the crank arm 32 and connecting link 33. Thus the crank throw may be changed to adjust the extent of oscillatory movement of the agitating tray 11.

The fresh water or other washing liquid is supplied to the reservoir pan 10 by means of an inlet pipe 40 provided with a valve 41 to regulate the steady flow from the pipe into the reservoir. The rate of inflow will determine the rapidity of the water replenishing cycle for the washer. Extending through the bottom wall of pan 10 are two diametrically opposite outlet tubes 42 and 43, which extend above the bottom wall different distances as shown in Fig. 1. The upper end portions of these tubes provide siphon-like discharge outlets in conjunction with associated cap members 44 and 45 mounted in fixed positions over the upper ends of tubes 42 and 43 in spaced relation thereto. Since the tubes 42 and 43 are open at their lower ends, the fresh water in reservoir 10 may fill up within cap members 44 and 45 until it reaches the upper ends of the tubes whereupon it will start to flow down inside the tubes toward the valve actuating mechanism therebelow. At the center of reservoir 10 there is a depressed circular portion 46 into which the contents of the reservoir tend to drain on emptying. Through the center of the depressed portion 46 extends a large conduit 47 securely fixed with respect to the bottom wall of the reservoir. At its lower end the conduit 47 carries a pan 48 to receive water from the conduit and allow overflow thereof into the washing tank 6. Loosely mounted over the elevated top portion of the conduit 47 is a heavy cap 49 having a rubber gasket secured against the upper wall thereof. The upper wall of the cap 49 has a small central socket therein to receive the upper end of a vertical push rod 50. The push rod and actuating mechanism therefor are supported by a bracket 51 securely bolted to the top of the tubular bracket 14. Included in the actuating means are two oppositely extending arms 52 and 53 which are pivoted on the bracket 51 and which carry large and small buckets 54 and 55 on the outer ends thereof in such positions as to receive water from the outlet tubes 42 and 43.

Fixed within the tubular bracket 14 there is a drain tube 56 extending downwardly to a trap chamber 57. The trap device comprises a closed container provided with an outlet 53. The lower end of the tube 56 extends down within the container and carries a trap pan 59. It is to be understood also that the lower end of tubular bracket 14 is elevated above the bottom wall of washing pan 6 or otherwise provided with discharge openings. Thus when the poppet valve 60, actuated by the mechanism carried by bracket 51, is opened the contaminated wash water may siphon out through the outlet tube 56. When the poppet valve 60 is in its closed position it seats against the upper end of outlet tube 56. For a complete description of the valve actuating mechanism and the water distributing apparatus, reference may be had to the copending application mentioned above. For the present de-

scription it should suffice to point out that filling of reservoir 10 to the top of outlet tube 42 results in filling the bucket 54 to actuate the valve mechanism in such a way as to close the valve 60 and open the valve 49 to transfer the fresh water from the reservoir to the washing pan 6. Later when the reservoir refills to the top of outlet tube 43, the valves reverse and the poppet valve 60 opens to drain contaminated water from the washing pan. Thus there is a regular draining and refilling of the washing pan in a periodic manner determined by the rate of liquid flow from supply pipe 40.

In making the print washer disclosed herein various suitable materials may be used according to choice and availability. It is preferred to make the pans and tray of stainless steel or Monel metal and wherever possible to make the various operating elements of brass or some nonrusting metal. While the washer has been described as for use in washing photographic prints, it may be put to other uses in fluid treatment of various parts or sheet materials. Even in photographic processes it may be put to various uses where suitable solutions are supplied from the reservoir 10, instead of pure water.

The embodiments of the invention herein shown and described are to be regarded as illustrative only and it is to be understood that the invention is susceptible of variations, modifications and changes within the scope of the appended claims.

I claim:

1. In a washing apparatus, a circular washing pan adapted to receive and hold washing liquid, a circular washing tray within said washing pan to receive material to be washed, a plurality of rollers mounted on the periphery of said washing tray and so positioned as to roll on the upper peripheral rim of said washing pan to thereby movably mount said washing tray within said washing pan, a radius arm rotatably mounted on a fixed pivot below said pans with the central axes of said pivot and said pans coinciding, means connecting the outer end of said radius arm to the upper peripheral rim of said washing tray, and power driven means connected to said radius arm to cause limited oscillatory movement of said arm and said washing tray about said central axes.

2. In a washing apparatus as recited in claim 1, a plurality of ribs secured to the bottom of said washing tray and arranged to extend radially with respect thereto and adapted to cause agitation of said washing liquid as said washing tray is oscillated about the central axis thereof.

3. In a washing apparatus as recited in claim 1, means fixed to the bottom of said washing tray centrally thereof and providing a circular track facing toward the bottom of said washing pan, a bracket fixed to the bottom of said washing pan centrally thereof, and a plurality of rollers mounted on said bracket and being in rolling contact with said circular track to support the bottom wall of said washing tray centrally thereof while permitting the limited oscillatory movement of said tray about its central axis.

4. In a washing apparatus, a circular washing pan adapted to receive and hold washing liquid, a circular washing tray rotatably mounted within said washing pan and having its axis of rotation coinciding with the central axes of said washing pan and said washing tray, power driven means connected with the upper peripheral rim of said washing tray to cause limited oscillatory movement of said washing tray about its axis of rotation, a plurality of radially extending ribs rigidly secured to the bottom of said washing tray to cause agitation of said washing liquid as said washing tray is oscillated, and each of said ribs having lateral side portions extending at an obtuse angle with respect to the bottom of said washing tray.

5. In a washing apparatus, a circular washing pan adapted to receive and hold washing liquid, a circular washing tray rotatably mounted within said washing pan and having its axis of rotation coinciding with the central axes of said washing pan and said washing tray, power driven means connected with the upper peripheral rim of said washing tray to cause limited oscillatory movement of said washing tray about its axis of rotation, a plurality of rollers secured to the upper peripheral rim of said washing tray and extending into rolling engagement with the upper peripheral rim of said washing pan, a plurality of radially extending ribs rigidly secured to the bottom of said washing tray to cause agitation of said washing liquid as said washing tray is oscillated, and said ribs being of gradually increasing height toward the outer ends thereof to promote increased agitation as the outer wall of said washing tray is approached.

WILLIAM H. RICHARDS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,325,255	Lenz	July 27, 1943