June 3, 1930. G. P. ANSTISS 1,761,099

WATER THROWING APPARATUS FOR WASHING MACHINES

Filed Dec. 17, 1925

Fig. 1.

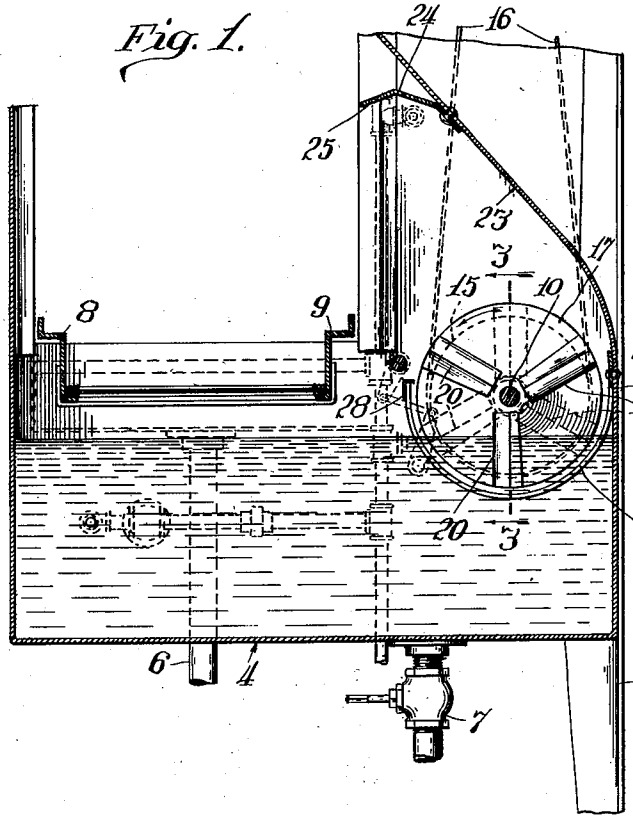


Fig. 2.

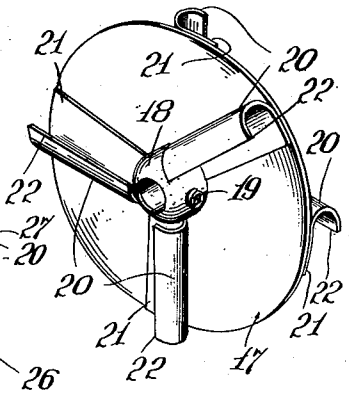
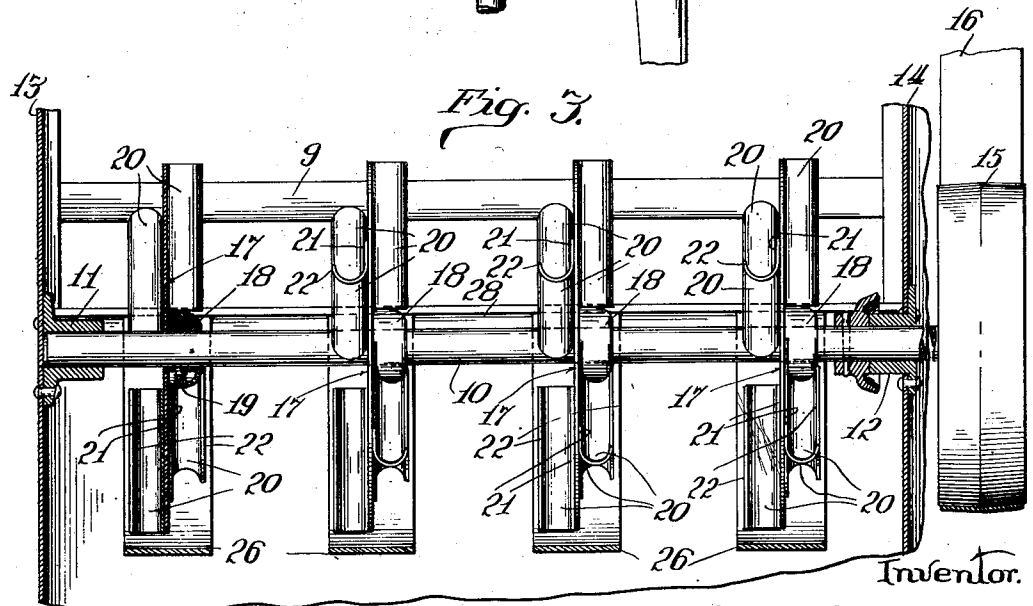


Fig. 3.



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UNITED STATES PATENT OFFICE

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WATER-THROWING APPARATUS FOR WASHING MACHINES

Application filed December 17, 1925. Serial No. 76,031.

My invention has to do with apparatus used in connection with washing machines for taking up water from a reservoir, usually a tank in the lower portion of the washing machine, and distributing it forcibly over the articles to be washed, which may be either dishes or any other articles that may be washed by that means. It has for its object to provide improved apparatus for the purpose stated which will operate more efficiently than prior devices of like character, not only with regard to the distribution of the water, but also as to economy of operation. I accomplish this object as illustrated in the drawings and as hereinafter described. What I regard as new is set forth in the claims.

In the accompanying drawings, in which I have illustrated my invention as applied to a well known type of washing machine comprising a tank adapted to contain wash water or rinsing water, or both, over which extends a support for the articles to be washed, or for baskets containing such articles, in the form of parallel rails at opposite sides of a washing or rinsing compartment which is disposed over the tank,—

Fig. 1 is a partial transverse vertical section of the washing machine;

Fig. 2 is a perspective view of one of the units composing the water throwing means, in the form of a paddle wheel adapted to be mounted on a rotary shaft; and

Fig. 3 is an enlarged partial longitudinal vertical section on line 3—3 of Fig. 1.

In the illustrated embodiment of my invention, 4 indicates a tank which constitutes the lower portion of the washing machine, said tank being preferably supported by suitable legs 5, one of which is shown in Fig. 1. Said tank is provided with the usual means for supplying it with hot water and for maintaining the water therein at the proper level, and it will be understood that any suitable devices for such purposes may be employed. In the illustrated construction, 6 indicates an overflow pipe for limiting the height of the water in the tank, and 7 indicates a valved outlet pipe for drawing off the water.

Extending longitudinally of the machine at one side thereof and at a point above the level of the water in the tank are rails 8, 9, which in the machine illustrated are designed to support baskets and permit them to be moved along the tank. In such machines the articles are usually introduced at one end of the machine, and after passing through washing and rinsing compartments are withdrawn at the other end, but in some machines they are introduced and withdrawn at the same end. So far as my present invention is concerned, either of the above arrangements may be employed, or the articles may be moved through the machine on a traveling conveyor, as is common in washing machines.

Extending longitudinally of the machine at one side thereof, and somewhat above the normal water level, is a shaft 10 suitably journaled in bearings 11, 12 mounted on the end members 13, 14 of the machine, as shown in Fig. 3. One end of said shaft extends outside of the housing and carries a pulley 15 over which runs a belt 16 driven preferably by an electric motor mounted on the machine. By this means the shaft 10 may be rotated at high speed.

The shaft 10 carries one or more water throwing units spaced a distance apart, as shown in Fig. 3, each of which units comprises a supporting member in the form of a disc 17, preferably imperforate as shown in Fig. 2, and arranged to be secured to the shaft 10 to rotate therewith. For this purpose the disc is provided, preferably at one side only, with a hub 18 bored to fit on the shaft 10, and provided with a set screw 19 by which it may be secured non-rotatably thereto. The disc 17 is provided at each side with one or more blades or buckets 20 in the form of channel plates preferably disposed tangentially with respect to the outer surface of the hub 18, that is to say, each blade is disposed so that the bottom of its channel lies in a line that is substantially tangential to the hub 18. Furthermore, the blade extends from the hub outward substantially to the margin of the disc 17, and it is so arranged that its outer end

lies ahead of its inner end as the disc rotates. The purpose of this arrangement is to cause the outer end of the blade to enter the water first, so that the blade will dip into the water gradually instead of squarely, and without any trapping of air by the blade. The operation is best shown by the dotted lines in Fig. 1. The blades 20 are preferably secured to the disc 17 by a welding operation, the inner marginal portion 21 of each blade being welded throughout its length to the disc, as best shown in Fig. 2. I find that the best results are obtained by providing the disc 17 with three of the blades 20 at each side spaced equally distant apart, with the blades at one side of said disc in staggered relation to the blades at the opposite side thereof. I thus provide a device, that may be termed a paddle wheel, which rotates smoothly when in operation, since the tangential disposition of the blades and the staggered relation of the blades at one side of the disc with reference to those at the other side thereof contribute to the movement of the blades into the water without shock, and equalize the resistance encountered by the paddle wheel as it rotates. Furthermore, the outer marginal portions 22 of the blades function as knife edges to cut into the water as the blade enters it, thereby further reducing the shock. It will thus be seen that each blade defines a channel or U-shaped water throwing trough which extends outwardly of the disc-like support 17 substantially parallel with the face or side thereof, and it will be evident that the outer marginal portions 22 of these troughs will trap the water laterally and minimize the tendency for the water to be thrown laterally away from the side of the disc. The result is that the paddle wheel operates very smoothly and efficiently, the power required for operating it being much less than for any other paddle wheel that I know of of equal water throwing capacity. While, as above stated, I prefer to provide three blades at each side of the disc 17, my invention is not limited to the use of that number, as one or more of such blades may be used at each side. But, however many may be used, the blades at one side of the disc 17 should be disposed in staggered relation to those at the other side thereof.

The paddle wheel is designed to rotate in the direction indicated by the arrow in Fig. 1, so that the blades at the side of the shaft 10 remote from the articles to be washed take up the water and throw it upwardly and across the washing or rinsing compartment, and consequently upon them, but to more effectively direct the water upon the articles to be washed I provide a deflecting plate 23 that extends diagonally upward and inward over the shaft 10 and the paddle wheels carried by it, as best shown in Fig. 1. The upper portion of said plate carries a deflector 24 disposed generally in a horizontal position and having an angular lip 25 that is inclined inward and downward, as shown in said figure. This deflector serves to divert the flying water from an upward course, and directs it laterally into the washing compartment over the articles therein, the lip 25 serving also to direct the water slightly downward so that it impinges more directly on the articles.

Associated with each paddle wheel is a curved guide 26 in the form of a semi-circular plate slightly wider than the over all width of the paddle wheel, as best shown in Fig. 3, and extending around the lower half of the paddle wheel at a short distance from the periphery of the disc 17, as shown in Fig. 1. One end of said guide is secured to one of the walls 27 of the tank, and the other end thereof is secured to a bar 28 that extends longitudinally of the tank and is suitably supported by the end walls 13, 14 thereof. This provides a convenient way of securing the several guides 26 in position, but any other suitable means for the purpose may be employed. This guide functions to cause the water to a large extent to flow laterally to the blades of the paddle wheel, or, in other words, the water moves towards the sides of the paddle wheel, and therefore the blades strike the water more gradually, thus contributing further to the avoidance of shock and vibration. By providing individual guides 26 for each paddle wheel, and by spacing these guides laterally from each other and supporting the same above the bottom of the tank, a water space remains below the guides from which the water can rise freely between the guides in passing laterally into the paths of the several paddle wheels, thereby securing a constant and even replenishment of the water supply to the several wheels. These guides also minimize outward throw of the water through the lower part of the path of rotation of each paddle wheel.

From the foregoing description, it will be manifest that the construction described provides a water throwing apparatus that operates very smoothly and with comparatively small expenditure of power, and at the same time takes up a large volume of water and throws it over upon the articles to be washed. While I prefer to make the channel plates rounded, as shown in the drawings, my invention is not limited to making them of that contour, as they may be made of any other suitable shape.

What I claim as my invention and desire to secure by Letters Patent, is—

1. In a washing machine, the combination with a paddle wheel comprising a disc-like support and channel plate blades secured thereto at opposite sides thereof, each chan-

nel plate curved about an axis parallel to the plane of the disc, of a water holding tank in which the lower portion of said paddle wheel is partially submerged, and means in said tank spaced upwardly from the bottom thereof for directing the water laterally to said paddle wheel.

2. In a washing machine, the combination with a paddle wheel comprising a disc-like support and channel plate blades secured thereto at opposite sides thereof to define channel shaped troughs extending outwardly substantially parallel with the face of said disc-like support, of a water holding tank in which the lower portion of said paddle wheel is submerged, and means in said tank for directing the water laterally to said paddle wheel, comprising a guide disposed adjacent to and extending around a peripheral portion of said paddle wheel, the bottom of said guide being spaced upwardly from the bottom of said tank to permit water to flow upwardly around the sides of said guide.

3. In a washing machine, the combination of a tank, a shaft disposed substantially horizontally in said tank, a plurality of paddle wheels mounted in laterally spaced relation on said shaft, and a plurality of guides individual to said paddle wheels supported above the bottom of said tank and disposed in laterally spaced relation whereby the water can rise between said guides and flow laterally thereof into the paths of said paddle wheels.

4. In a washing machine, the combination of a tank, a shaft disposed substantially horizontally in said tank, a plurality of paddle wheels mounted in laterally spaced relation on said shaft, each of said paddle wheels comprising a disc-like support and blades secured thereto at opposite sides thereof, and defining trough shaped channels extending outwardly substantially parallel with the face of said disc-like support, and a plurality of stationary, arcuate guides individual to said paddle wheels and extending around the lower peripheral portions thereof, said guides being supported above the bottom of said tank and being disposed in laterally spaced relation whereby the water can rise between said guides and flow laterally thereof into the paths of the paddle wheels.

5. In a washing machine, the combination of a tank, a shaft disposed substantially horizontally in said tank, a plurality of paddle wheels mounted in laterally spaced relation on said shaft, each of said paddle wheels comprising a disc-like support and channel plate blades secured thereto at opposite sides thereof, said blades defining U-shaped water throwing troughs with the bottoms of said troughs extending outwardly non-radially and substantially parallel with the face of said disc-like support, and a plurality of stationary guides of substantially the width of said paddle wheels, extending around a peripheral portion of each paddle wheel, said guides being supported in laterally spaced relation above the bottom of said tank, whereby water can flow upwardly between said guides for moving laterally into the paths of the paddle wheels.

6. In a washing machine, the combination with a paddle wheel comprising a disc-like support and a channel plate blade secured thereto at one side thereof, of a water holding tank in which the lower portion of said paddle wheel is submerged, and means in said tank spaced upwardly from the bottom thereof for directing the water laterally to said paddle wheel.

7. In a washing machine, the combination with a paddle wheel comprising a disc-like support and a channel plate blade secured thereto at one side thereof to define a channel shaped trough extending outwardly substantially parallel with the face of said disc-like support, of a water holding tank in which the lower portion of said paddle wheel is submerged, and means in said tank for directing the water laterally to said paddle wheel, comprising a guide disposed adjacent to and extending around a peripheral portion of said paddle wheel, the bottom of said guide being spaced upwardly from the bottom of said tank to permit water to flow upwardly around the sides of said guide.

8. A washing machine comprising the combination of a paddle wheel comprising a disc-like support and a channel plate blade secured thereto at one side thereof said channel plate blade being curved about an axis parallel to the plane of the disc, a water-holding tank in which the lower portion of said paddle wheel is submerged, means in said tank spaced upwardly from the bottom thereof and below said paddle wheel for directing the water laterally to said paddle wheel, and means in the tank and above the paddle wheel to direct the water thrown from the paddle wheel downwardly, said means including an upwardly extending deflecting plate and a downwardly extending deflector, connected to the upwardly extending deflecting plate.

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