Dec. 29, 1931. H. W. TURNER 1,838,595

WASHING MACHINE

Filed Nov. 5, 1930 2 Sheets-Sheet 1

Fig. 1.

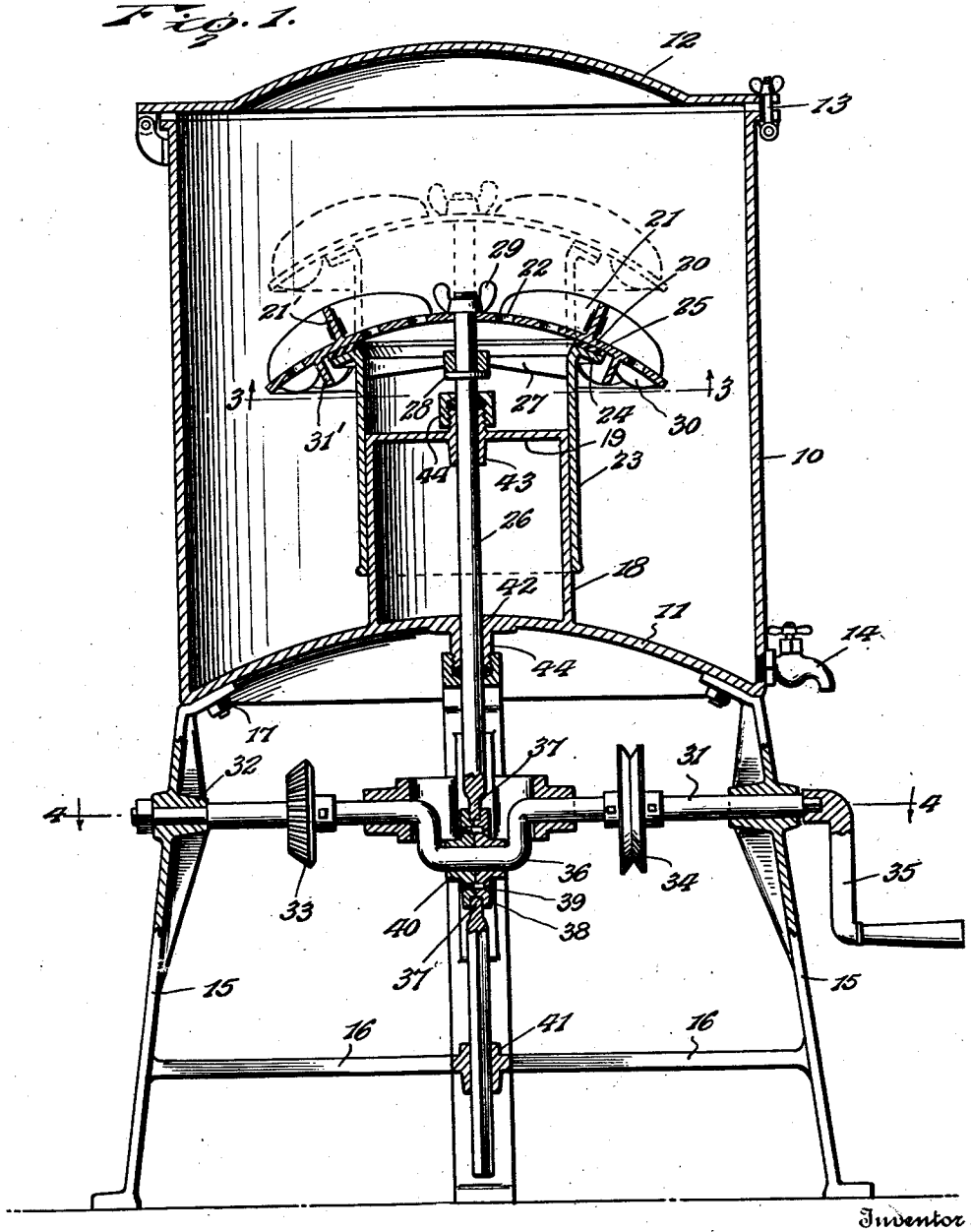

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Fig. 2.

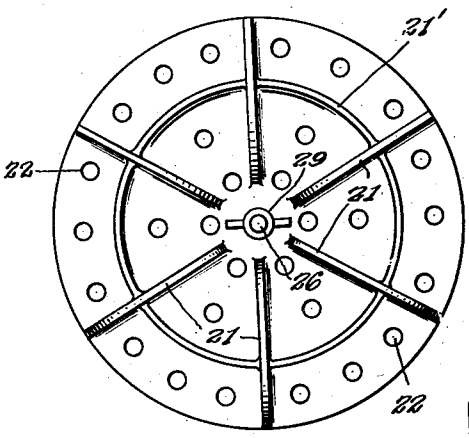


Fig. 3.

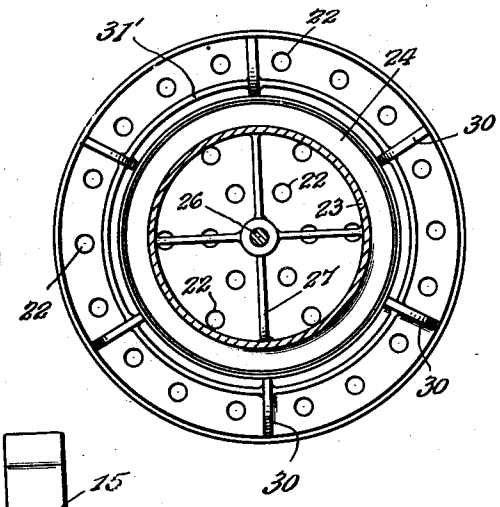


Fig. 4.

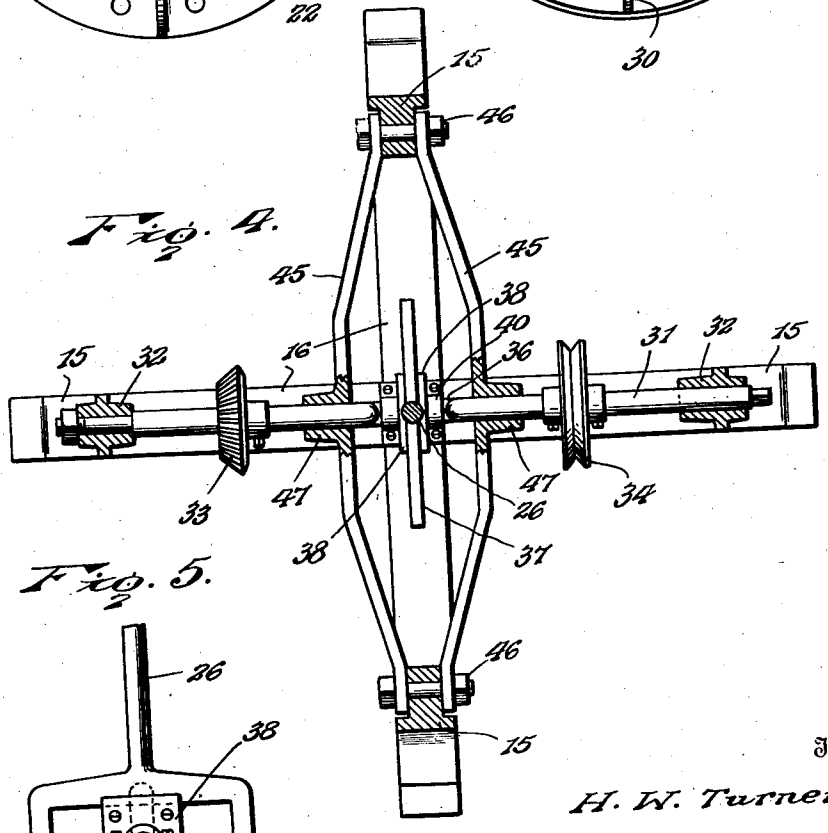
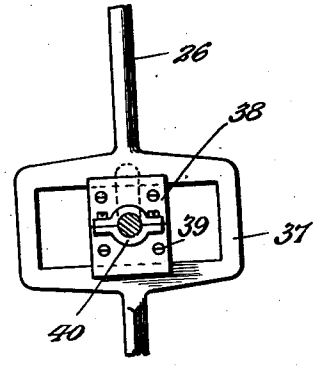


Fig. 5.



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Patented Dec. 29, 1931 1,838,595

UNITED STATES PATENT OFFICE

HOWARD W. TURNER, OF GREENSBORO, NORTH CAROLINA

WASHING MACHINE

Application filed November 5, 1930. Serial No. 493,624.

This invention relates to washing machines and has for an object to provide a reciprocating agitator which cooperates with a stationary drum on the bottom of the tub to alternately suck and force water through the clothes in order that a more thorough cleansing of the same may be accomplished in shorter time than usual.

A further object of the invention is to provide a two-piece agitator comprising a convex hood and a cylinder, both of which may be disassembled from the agitator shaft for cleansing by removal of a single nut from the end of the shaft.

A still further object is to provide a convex hood for the agitator having rows of perforations alternating with radial ribs, the latter being disposed both on the top surface and on the bottom surface of the hood and serving as fenders to prevent the clothes from being sucked into the interior of the agitator during the suction stroke of the agitator.

A still further object of the invention is to provide a washing machine which may be constructed of a few simple, durable and inexpensive parts which will not easily get out of order.

With the above and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a longitudinal sectional view through a washing machine constructed in accordance with the invention,

Fig. 2 is a top plan view of the hood,

Fig. 3 is a cross sectional view taken on the line 3—3 of Fig. 1,

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 1, and

Fig. 5 is a detail side elevation of the cross head and the guide frame of the agitator shaft.

Referring now to the drawings in which like characters of reference designate similar parts in the various views 10 designates a tub, the same preferably being formed of metal and having the bottom 11 preferably convex. The top of the tub is closed by a hinged cover 12 which is removably secured in place by cover clamps 13. A drain cock 14 is disposed at the bottom of the wall of the tub for emptying the tub in the usual manner. The tub is preferably supported by legs 15 which are braced near the bottom by horizontal braces 16. The legs may be bolted to the bottom of the tub, as shown at 17.

Referring now more particularly to Figs. 1 to 3 inclusive, it will seen that a drum 18 is secured in any preferred manner to the center of the bottom 11 and extends upwardly in the tub to nearly the center of the tub. The drum is cylindrical in contour and the top 19 of the drum is preferably flat, as shown. The drum may be formed integral with the bottom or separate therefrom and secured to the bottom in any desired manner. The drum serves as a stationary piston or abutment upon which the agitator cylinder oscillates to alternately suck and force water through the clothes, as will now be described.

The agitator comprises a head or hood 20 which is preferably, like the drum, formed of sheet metal and is convex in contour. The top surface of the drum is provided with a plurality of radially disposed ribs 21 connected to arcuate ribs 21'. Between the ribs rows of openings 22 are formed in the hood. A cylinder 23 is assembled with the hood, the cylinder preferably being formed of sheet metal, and being of sufficient diameter to snugly receive the drum 18. The cylinder is open at both ends and the upper end is provided with a marginal flange 24. A gasket 25 is interposed between the marginal flange and the bottom face of the hood.

Both the hood and the cylinder of the agitator are assembled on the agitator shaft 26. The cylinder is provided with a spider 27 which is supported upon a collar 28 carried by the agitator shaft. The top of the shaft projects through a central opening in the

hood and a wing nut 29 is threaded onto the exposed end of the shaft. When the nut is tightened, it forces the hood and cylinder downwardly until the spider binds tightly against the collar 28, in which position of the parts the cylinder and hood are assembled as a rigid unitary structure. Removal of the nut permits of the hood and cylinder being disassembled from the agitator shaft and from each other for cleansing.

By referring to Figs. 1 and 3, it will be seen that the underneath face of the hood is provided with a plurality of radial ribs 30 connected by arcuate ribs 31'. The function of the ribs 21 on the top face of the hood is to prevent the clothes being sucked through the openings 22 on the suction stroke of the agitator and the function of the ribs 30 on the bottom face of the hood is to prevent the clothes from becoming lodged in the space between the cylinder and overhanging edge of the hood.

The agitator shaft 26 is oscillated vertically, as will be hereinafter fully described, and during the upstroke or suction stroke, shown in dotted lines in Fig. 1, water will be sucked into the cylinder 23 through the openings 22 and accumulated in the space above the stationary piston or drum 18. During the down stroke or compression stroke of the agitator shaft, the water will be forced back through the openings 22 as the hood advances toward the stationary piston. Thus the water is alternately sucked and forced through the clothes and it has been found that as a result of this method of agitation, a more thorough cleansing of the clothes will be accomplished in a shorter time than is usually required.

For reciprocating the agitator shaft 26, a drive shaft 31 is journaled at the ends in suitable bearings 32 carried by the legs 15. The shaft may be power driven by means of a gear 33 or a belt pulley 34, or even may be hand operated by a crank 35, as desired. In the event of a motor being used, the same may be suitably secured to the horizontal braces 16 and the legs 15 of the tub may be enclosed by wire mesh or sheet metal, as desired, to conceal the machinery. The drive shaft 31 is provided with a centrally disposed crank 36.

By referring to Figs. 1 and 3, it will be seen that the agitator shaft 26 is provided with an integral substantially oblong cross head guide frame 37. A cross head 38 is mounted to slide in the guide frame and is preferably formed of two pieces bolted together, as shown at 39 in Fig. 1. The cross head is provided with alined journal boxes 40 which receive the crank 36 of the crank shaft.

The lower end of the agitator shaft 26 is square in cross section and slidably fitted in a square bearing 41 disposed at the intersection of the braces 16. The agitator shaft is also slidably fitted in an opening 42 formed in the bottom of the tub and in a similar opening 43 formed in the head of the drum 18. A stuffing box or gland nut 44 surrounds the agitator shaft at each opening of the tub and prevents leakage.

By referring to Fig. 4, it will be seen that a pair of brace bars 45 are bolted, as shown at 46, to the legs 15 of the tub and are provided centrally with alined journal boxes 47 which receive the crank shaft 31 near the crank 36 thereof.

In operation, the rotary movement of the crank shaft 31 is imparted to the agitator shaft 26 as reciprocatory movement, due to the cross head and cross head guide connection between the agitator shaft and crank shaft, as will be understood. The reciprocating agitator shaft moves the agitator upon the stationary drum to alternately suck the water into the agitator above the drum and force it from the agitator during the suction and pressure strokes, as above described. The clothes piled upon the agitator will thus be agitated thoroughly while the water is being forced and sucked therethrough.

It will be particularly pointed out that by virtue of the two-piece construction of the agitator, namely, a hood and a cylinder, the agitator may be maintained in a sanitary condition at all times since the removal of the single nut 29 permits disassembling of the parts from each other for cleansing.

It will be furthermore pointed out that by virtue of the gasket 25 interposed between the hood section and cylinder section of the agitator, a tight juncture between these parts will be effected so that the clothes cannot be drawn into the interior of the agitator and mutilated during the washing operation.

If desired, an oil tight casing may be employed to house the moving parts of the apparatus below the tub.

From the above description, it is thought that the construction and operation of my invention will be thoroughly understood without further explanation.

Having thus described the invention, I claim:

1. In a washing machine, a tub, a stationary piston disposed at the center of the bottom of the tub, a vertically disposed reciprocating shaft in said piston and projecting at the upper end beyond said piston, a perforated hood, a cylinder on said piston open at both ends and having a flange at the top supporting the hood, a packing ring confined between the flange and the hood, said cylinder having a spider, a collar on said shaft supporting said spider, and a nut threaded on the exposed end of said shaft and forcing said hood and said cylinder downwardly to cause said spider to bind against said nut and hold the cylinder and the hood detachably connected together.

2. In a washing machine, a tub, a piston integral with the bottom of the tub, a cylinder

mounted to reciprocate on said piston and having an outstanding flange at the upper end, a hood supported upon said flange, a packing ring disposed between the hood and the flange, a reciprocating agitator shaft disposed axially in said piston and projecting through an opening in said hood, a spider on said cylinder, a stop collar on said shaft supporting said spider, a nut threaded on the exposed end of said shaft forcing said hood into contact with said flange and forcing said spider into contact with said collar whereby to detachably secure said hood and said cylinder together as an integral unitary assembly to reciprocate as a unit on said piston, and means for reciprocating said shaft.

3. In a washing machine, a tub, a hollow stationary piston on the bottom of the hub having a closed top, a cylinder open at both ends and mounted to reciprocate on said piston, a hood superposed on said cylinder above the closed top of the piston, radial ribs on the top face of the hood, radial ribs on the bottom face of the hood, said hood being perforated between said ribs, concentric annular flanges on the top and bottom faces of the hood connecting the ribs carried by said faces, means for reciprocating said shaft, and a nut threaded onto the top end of the shaft forcing said cylinder said hood and said spider downwardly to cause the spider to bind against said collar and detachably secure the hood and the cylinder together.

In testimony whereof I affix my signature.

HOWARD W. TURNER. [L. S.]