

Feb. 17, 1953

M. L. FRANCE ET AL
 WASHING MACHINE PROVIDED WITH CONICAL
 RINSE WATER DISTRIBUTING MEANS

2,628,488

Filed Sept. 17, 1948

3 Sheets-Sheet 1

FIG. 1.

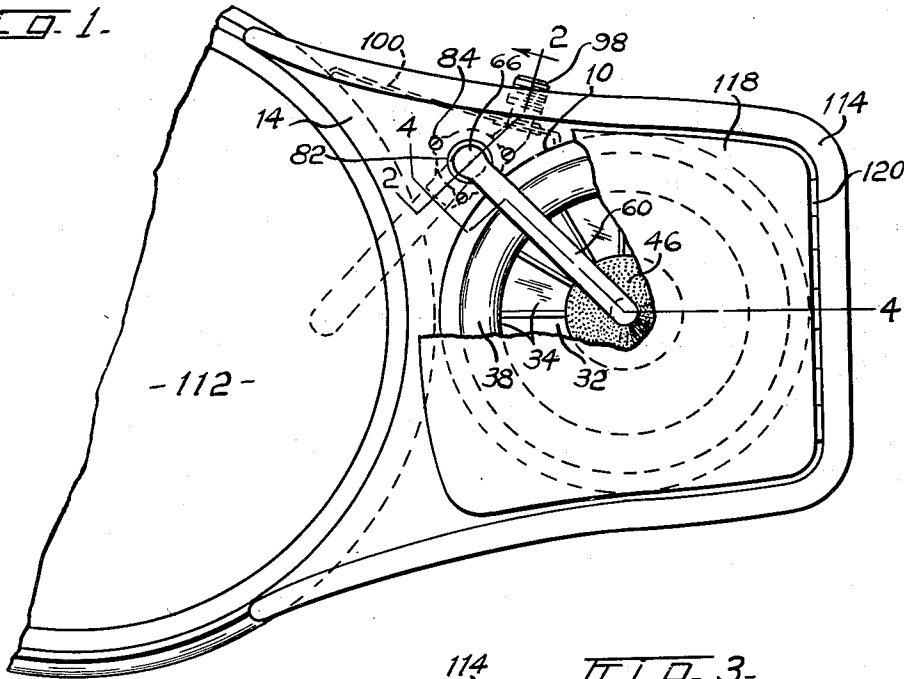


FIG. 2.

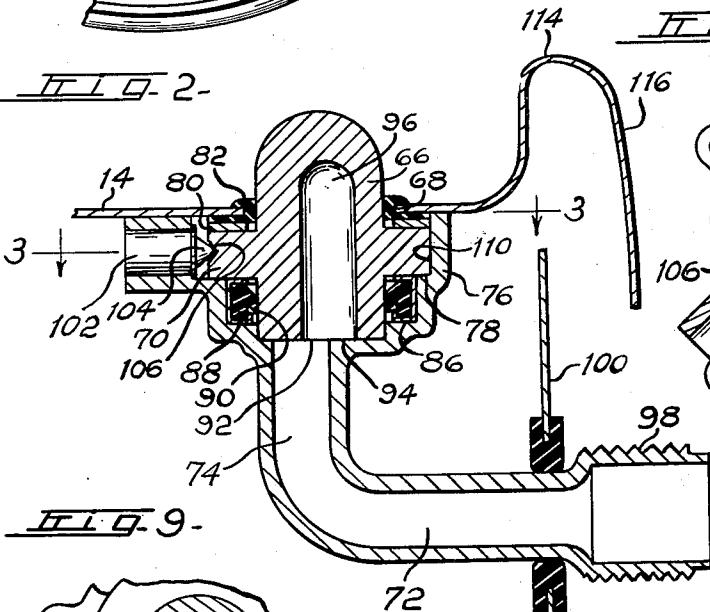


FIG. 3.

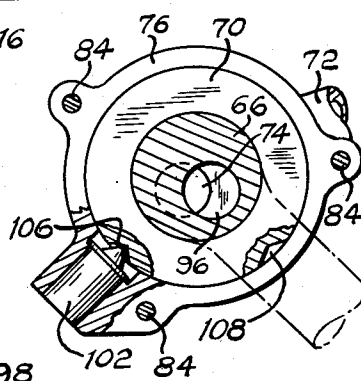
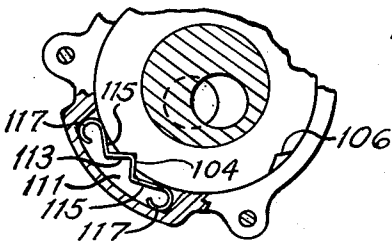


FIG. 9.



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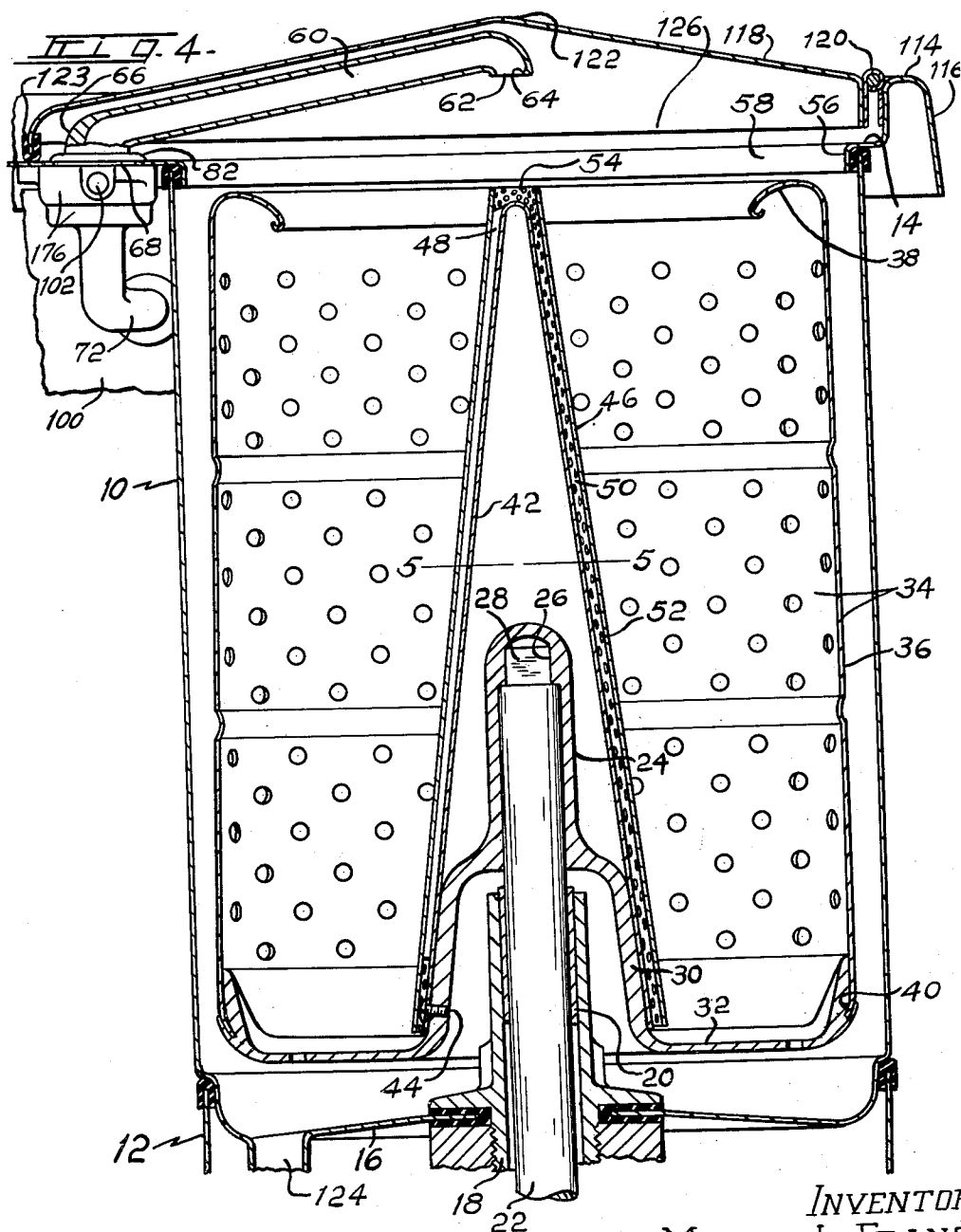
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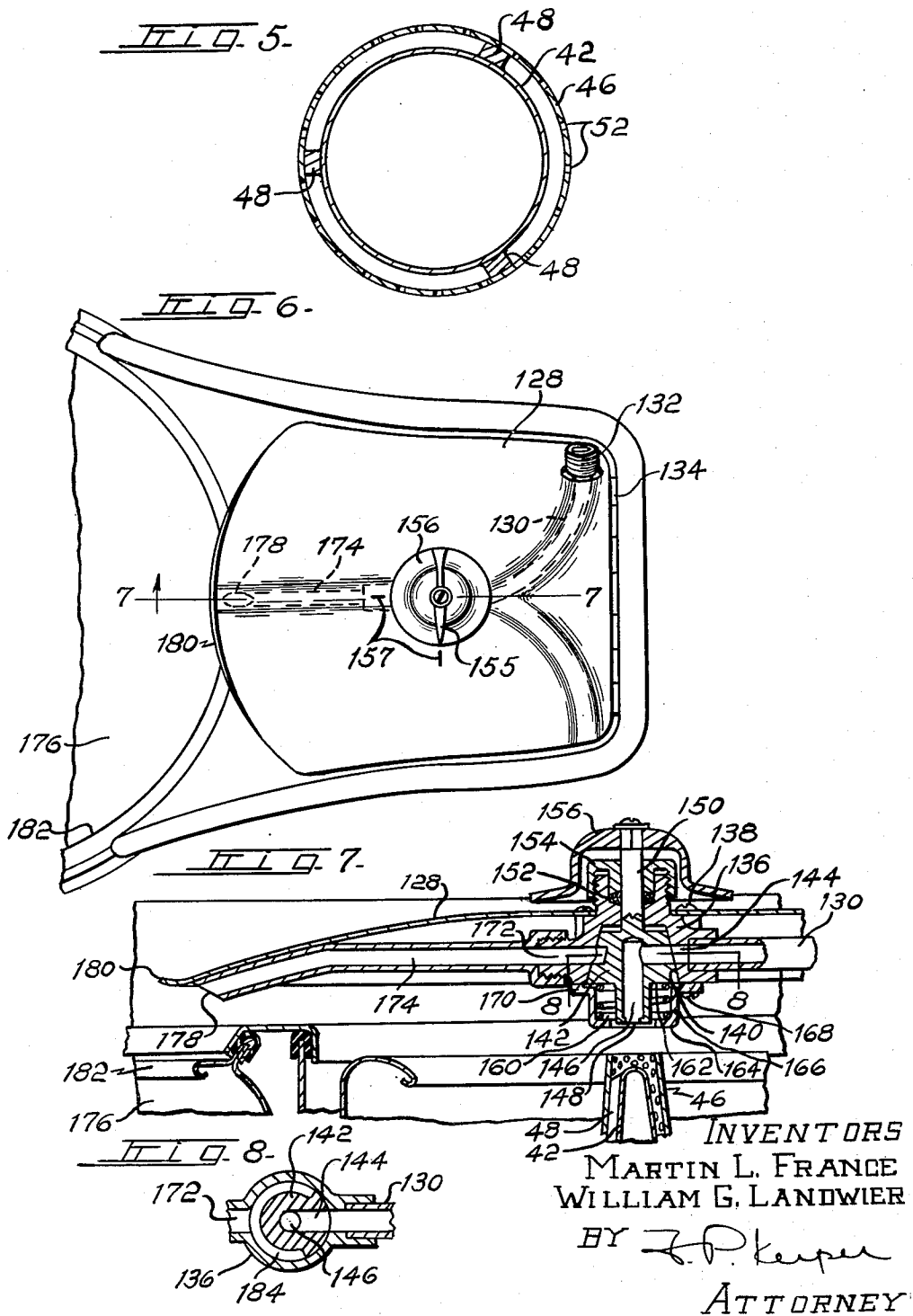
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UNITED STATES PATENT OFFICE

2,628,488

WASHING MACHINE PROVIDED WITH
CONICAL RINSE WATER DISTRIBUT-
ING MEANS

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Application September 17, 1948, Serial No. 49,682

6 Claims. (Cl. 68—9)

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This invention relates to washing machines, and more particularly to apparatus having centrifugal extractors adapted for centrifugal rinsing.

In an application Serial No. 775,211, filed September 20, 1947, Patent No. 2,595,609, there is shown a two-tub washing and extractor type laundry apparatus, in which rinse water is sprayed upon laundry contained in a vertical basket centrifuge to effect centrifugal rinsing thereof, and in which rinse water is introduced from beneath the apparatus. Such apparatus is used in conjunction with two-tub constructions of the type generally illustrated in Nelson et al. Patent 1,720,851, issued July 16, 1929.

The present invention constitutes an improvement thereover, and has as an object to provide rinse water supply and distribution system in which rinse water may be introduced from the top under light pressure, after a free fall, and thereafter be centrifugally distributed substantially uniformly over the entire axial length of the extractor basket.

Another object of the invention is to provide a construction of the type described in which the distributing member may be readily removed for cleaning and inspection.

Another object of the invention is to provide a construction in which water may be handily directed into a wash tub, or axially into an extractor basket for cooperation with a distributor.

Still another object of the invention is the provision of an economical structure relatively simple in design, but effective to perform a rinsing and damp drying action in a relatively efficient manner.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, wherein like reference characters indicate like parts:

Figure 1 is a fragmentary top plan view of a machine of the type described, with part of the cover broken away;

Figure 2 is an enlarged transverse section taken on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a vertical section taken on the irregular sectional line 4—4 of Figure 1;

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Figure 5 is a section taken on the line 5—5 of Figure 4;

Figure 6 is a fragmentary top plan view of a modified form of the invention;

Figure 7 is a section taken substantially on the line 7—7 of Figure 6;

Figure 8 is a section taken substantially on the line 8—8 of Figure 7; and

Figure 9 is a modified detent structure.

In Figures 1 and 4, there is shown an extractor tub 10 mounted upon a base or frame 12 and having a formed top deck 14. The bottom 16 of the tub 10 has extending therethrough a sleeve 18 with a journal 20 in which the extractor drive shaft 22 rotates. Mounted upon the upper end of the shaft 22 is a hub member 24 having a squared socket 26 engaging the squared end 28 of the shaft 22. The hub 24 is flared outwardly as at 30 and merges into an end wall 32 of an extractor basket generally indicated as at 34. The basket wall in the arrangement shown consists of a perforated cylindrical member 36 having an inturned flange 38 at its upper end and having its lower end joined to the end wall 32 as at 40. It will be understood, however, that an imperforate tapered wall may be employed where suitable discharge apertures or means are provided in the larger diameter region.

The flare 30 forms a conical seat for the reception of a conical center member 42, preferably closed at its upper end, extending substantially the entire length of the axis of the basket, and such conical member 42 is secured to the flare 30 by one or more screws such as 44 or other suitable fastening means. Surrounding the conical member 42 and slightly spaced therefrom is a second conical member 46 slidably positioned on three or more vane-like members 48 secured upon the conical member 42. Such members support the outer conical member 46 in spaced relation to the member 42 to provide an annular conical passage 50 into which water may be introduced for distribution along the length of the extractor basket 34, and may extend elementally of the cone or spirally thereof.

The conical member 46 is provided with a large number of apertures 52 substantially uniformly spaced over its entire area to permit water to escape from the annular passage 50 and the structure is such that rinse water introduced into the open top end 54 of the conical member 46 will travel downwardly through the annular passage 50, be impelled by the vanes 48 and centrifugally thrown radially outward through the apertures 52 to uniformly distribute rinse water over the axial length of the basket 34.

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The top deck 14 may be clamped down against the rim of the tub 10 and provided with an access or working aperture 56 surrounded by a suitable flange 58, extending a short distance below and into the rim of the tub 10. The deck has mounted thereon a swivel conduit arm 60 having a nozzle 62 in the end thereof adapted to be directed downwardly at the open end 54 of the conical member 46. The nozzle 62 is slightly constricted by an annular shoulder such as 64 to insure vertical flow along the axis of the cone 46, so that water discharged from such nozzle will be directed to the open end 54 of the cone 46. While the nozzle shown effects this result, any other suitable means may be employed to direct the flow substantially vertical and in a non-diverging stream. The conduit arm 60 extends to a vertical swivel supporting portion 66 passing through an aperture 68 in the deck 14, and such vertical portion 66 is provided with a collar 70 which is clamped between the under side of the deck 14 and the upper end of a water inlet pipe 72 having an upwardly extending portion 74 terminating in a cup-like socket end 76. The cup-like socket end 76 is provided with a shoulder 78 against which one side of the collar 70 may bear, the other side of such collar 70 bearing against a washer 80 and a gasket 82 in the form of a grommet surrounding the aperture 68 in the deck 14. The cup-like end portion of the pipe 74 is secured to the deck by one or more screws 84. In the lower part of the cup-like portion 76 is a second shoulder 86 having therein a gasket 88 of V-section and adapted to bear against a cylindrical portion 90 of the vertical part 66 of the conduit arm 60. The lower end 92 of the vertical portion of the conduit arm 60 engages a third shoulder 94 which in effect constitutes the lower end wall of the cup-like portion 76 and the bore 96 is adapted to connect with the pipe 74 so that rinse water may be supplied to the standard hose fitting 98 outside the side wall 100 of the washing machine, and such water will then flow through the conduit arm 60, the nozzle 62, and into the open end of the cone 46.

Since it will be apparent that the conduit arm 60 is rotatably mounted within the cup-like portion 76, there is provided a spring-pressed detent or stop 102 having a conical end 104 adapted to engage either one of two arcuately spaced conical or V-shaped recesses 106 and 108 in the cylindrical edge 110 of the collar 70. The recesses are so located as to tend to hold the arm in correct position, that is radially across the extractor tub 10 and in the position shown in Figures 1 and 4, or in the dotted position shown in Figure 1, in which latter position water may be supplied from the nozzle to the wash tub 112.

A modified form of detent is shown in Figure 9, wherein the socket wall is provided with an arcuate recess 111, in which there is positioned a substantially symmetrical leaf spring, having a central V-portion 113 adapted to engage the V-notches or recesses 106 and 108, and resilient flanking portions 115 with rounded ends 117 for providing the desired radial pressure upon the V-portion.

It will be observed that the vertical bore 96 of the conduit arm 60 is disaligned from the vertical center line of the upwardly extending portion of the pipe 72. The bore 96 is eccentric with respect to the collar 74 and the conduit 74 is eccentric with respect to the point of entry into the cup portion 76. Thus, as the conduit arm is swung from the position shown in Fig-

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ure 1 to the position shown in dotted lines in the same figure, the conduit 96 and pipe 74 shift from the misalignment shown in Figure 2 to axial alignment. It will thus be seen that by such misalignment, flow of water through the conduit arm 60 is restricted when in the rinse position shown in Figure 4 and is unrestricted when the arm is swung to the position shown in dotted line in Figure 1.

The deck 14 is provided with a marginal inverted U-flange 114 having a short depending skirt-like rim 116 and there is attached to the inside of such flange a cover 118 by means of an elongated piano type hinge 120. Such cover may be slightly crowned as at 122 to accommodate the conduit arm 60 when in position for supplying rinse water to the cone 46 and also to permit the nozzle 62 to be positioned a predetermined distance above the rim of the tub 10 and the top opening 54 of the cone 46. By providing a free fall of a predetermined distance between the nozzle 62 and the rim of the tub 10, there is assured an adequate vacuum break such that under no circumstances, if the pressure in the supply pipe 72 should drop below atmospheric, could water be siphoned from the tub 10.

It will be understood that in practice, the hose connection 90 will be connected to a supply of rinse water controlled by the usual tap faucet, and that when it is desired to fill the wash tub 112, the arm 60 will be swung to the dotted position shown in Figure 1 and the lid 118 may at this time be opened. The wash tub 112 is thus filled with hot or lukewarm water, and suitable detergent for washing. After washing has been concluded, laundry may be transferred to the basket 34, the conduit arm 60 swung to the position shown in Figures 1 and 4, and the lid closed. Soapy water is first extracted from the laundry and by suitable connections to outlet 124, is returned to the wash tub 112 for reuse. When the soapy water has been extracted, fresh rinse water under control of the tap and also the constriction of the disalignment of the passages 96 and 74, at a reduced flow rate, is delivered to the cone 46. At this time, however, the outlet 124 is connected to the drain.

The extractor 34 rotates at a speed in the range of 800 or 900 R. P. M., and such rinse water as enters the cone 46 will travel downwardly and be impelled by the vanes 48 and centrifugally thrown through the apertures 52 through the entire length and circumference of the cone 46. Such rinse water is centrifugally thrown through laundry held against the wall 36 of the basket 34 and is thereafter removed from the tub 10 through the outlet 124, the outlet 124 being connected during this operation, as previously described, to any suitable drain. Upon completion of the rinsing operation, the flow of water through the conduit arm 60 is terminated by turning off the tap, whereupon further rotation of the basket extracts moisture from the laundry contained therein, producing a damp dry condition. During all of these operations, the cover 122 will be preferably closed in the position indicated in Figures 1 and 4 to prevent splash. The marginal edge of the cover 122 furthest from the hinge 120 may be provided with rubber lip 123 to form a reasonably tight closure against the top of the deck 14, and the cover is bounded by side flanges such as 126, which cooperate with the inverted U-flange 114 to prevent any possible splash escape of fluid during the rinsing operation.

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In Figure 6, there is shown a somewhat modified form of the invention, in that the nozzle supplying rinse water to the open end 54 of the cone 46 is mounted upon the hinged top 128. In this form, the top is deformed to admit of the mounting therein of a conduit 130 having a standard hose connection 132 at one end, the latter being located close to the axis of the hinge 134, and as near in alignment therewith as practicable. The deformation is such as to permit the connection 132 to be arranged on an axis as nearly parallel with the hinge axis as possible. By so arranging the hose connection in this manner, a flexible rubber hose may be coupled with the connection and little disturbance will be caused to the opening and closing of the lid 128 as a result thereof.

The conduit 130 leads to a valve body 136 secured to the cover 128 by a plurality of screws such as 138. The valve body has a taper bore 140 in which there is positioned a plug valve member 142, such plug valve member having a radial port 144 and axial port 146 terminating in a nozzle 148 at its lower extremity directed to the lower edge of the cone 46. The plug valve has an upwardly extending stem 150 passing through a gland 152 and gland nut 154, there being provided a dial handle 156 on the upper end thereof, above the lid for manual rotation of the valve plug 142. A suitable dial pointer 158 and lid indicia 157 may be provided. The plug is held upwardly in position in its conical seat 158 by a spring 160 bearing against an under shoulder 162, the spring bearing at its lower end against an annular flange 164 of a depending spring housing member 166 secured to the valve body portion by screws 168 passing through the attachment flange 170.

The conduit 130 extends through the valve body as shown to the valve plug 142. The valve body is also provided with an outlet connection 172 having a conduit 174 leading away therefrom beneath the cover 128, to a point where such conduit may discharge into the wash tub 176. The conduit 174 terminates as at 178 just short of the edge 180 of the cover 128 and is preferably inclined to assist in directing fluid downwardly into the opening 182 of the tub 176.

The valve plug 142 is provided with the radial port 144 previously described connected to the nozzle 148, and also an arcuate groove port 184 extending around the plug at a distance somewhat more than 180°, so that by turning the plug 144 through an angle of 90° in either direction from the position shown (see Figure 8), the conduit 130 will be connected with the conduit 172 by the arcuate port 184 to permit direct flow of water from the fitting 132 into the wash tub 176.

It will thus be seen that through the valve 156, an operator may at will control the flow of water, directing the same into the tub 176 or directing the same into the distributing cone 142. In this form, the orifice 148 will provide a suitable constriction so as to partially reduce the flow of water to a degree satisfactory to provide ample water to fill the length of the cone 46 and cause uniform distribution of water therefrom, while at the same time guarding the distributing cone from being unnecessarily flooded. Such constriction also assures that the tub 10 will not be unnecessarily flooded beyond the capacity of the outlet 124 in the drain connection.

Although a single embodiment and several modified forms of the invention have been illus-

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trated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a washing machine, an extractor tub having a bottom, side wall and top rim, a drive shaft extending upwardly through the bottom of said tub substantially to the axial center thereof, a basket mounted for rotation thereon, rinse water distributing means comprising an elongated perforated cone centrally located in and supported solely by the basket and rotatable therewith, said cone being open-ended at its upper smaller end, a rinse water feed means having a discharge nozzle located above the rim of said tub and directed toward the open end of said distributing means.

2. In a washing machine, an extractor tub having a bottom, side wall and means for determining an overflow level for said tub, a drive shaft extending upwardly through the bottom of said tub substantially to the axial center thereof, a basket mounted for rotation thereon, rinse water distributing means comprising an elongated perforated tubular member substantially conical in shape centrally located in and supported solely by the basket and rotatable therewith, said member being open-ended at its upper smaller end, a rinse water feed means having a discharge nozzle located above the overflow level of said tub and directed toward the open end of said distributing means.

3. In a laundry apparatus, a wash tub and an extractor tub arranged side by side, a deck member overlying the rims of said tubs, a drive shaft extending upwardly through the bottom of said extractor tub substantially to the axial center thereof, an extractor basket rotatably mounted on said shaft in said extractor tub, an elongated tubular rinse water distributing means substantially conical in shape centrally located in said extractor basket and secured thereto for rotation therewith, and having a water-receiving open end in the top thereof lying substantially in the plane of the top of said extractor basket, a conduit arm swivelly mounted upon said deck, said conduit arm extending substantially horizontally and swivelled upon said deck for movement about a vertical axis, said conduit being of a length and having a downwardly directed nozzle such that when swung to a position substantially radial of the basket axis, said nozzle will be axially aligned with said basket to discharge into said opening, and said nozzle being located a substantial distance above the rim of said extractor tub.

4. In a laundry apparatus, a wash tub and an extractor tub arranged side by side, a deck member overlying the rims of said tubs, a drive shaft extending upwardly through the bottom of said extractor tub substantially to the axial center thereof, an extractor basket rotatably mounted on said shaft in said extractor tub, an elongated tubular rinse water distributing means substantially conical in shape centrally located in said extractor basket and secured thereto for rotation therewith, and having a water-receiving open end in the top thereof lying substantially in the plane of the top of said extractor basket, a conduit swivelly mounted upon said deck, said conduit arm extending substantially horizontally and swivelled upon said deck for movement about

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a vertical axis, said conduit being of a length and having a downwardly directed nozzle such that when swung to a position substantially radial of the basket axis, said nozzle will discharge into said opening, and detent means for facilitating the location of said arm in said radial position. 5

5. In a laundry apparatus, a wash tub and an extractor tub arranged side by side, a deck member overlying the rims of said tubs, a drive shaft extending upwardly through the bottom of said extractor tub substantially to the axial center thereof, a cover for said extractor tub hinged to said deck, an extractor basket rotatably mounted on said shaft in said extractor tub, an elongated tubular rinse water distributing means substantially conical in shape centrally located in said extractor basket, and having a water-receiving open end in the top thereof, conduit means carried on said cover having an inlet end and outlets directed toward said wash tub and water-receiving opening, and valvular means for selecting a path of flow to either one or the other of said outlets. 10 15 20

6. In a laundry apparatus, a wash tub and an extractor tub arranged side by side, a deck member overlying the rims of said tubs, a drive shaft extending upwardly through the bottom of said extractor tub substantially to the axial center thereof, a cover for said extractor tub hinged to said deck, an extractor basket rotatably mounted 30

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on said shaft in said extractor tub, an elongated tubular rinse water distributing means substantially conical in shape centrally located in said extractor basket, and having a water-receiving open end in the top thereof, conduit means carried on said cover having an inlet end and outlets directed toward said wash tub and said opening, said outlet being located in the region of the hinge of said cover and extending in substantially the same direction as the axis of said hinge, said outlet directed toward said opening being restricted, and valvular means carried by said cover for selecting a path of flow to either one or the other of said outlets.

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