

May 6, 1952

C. C. SCHEELE
LAUNDRY APPARATUS

2,595,609

Filed Sept. 20, 1947

3 Sheets-Sheet 1

FIG. 1.

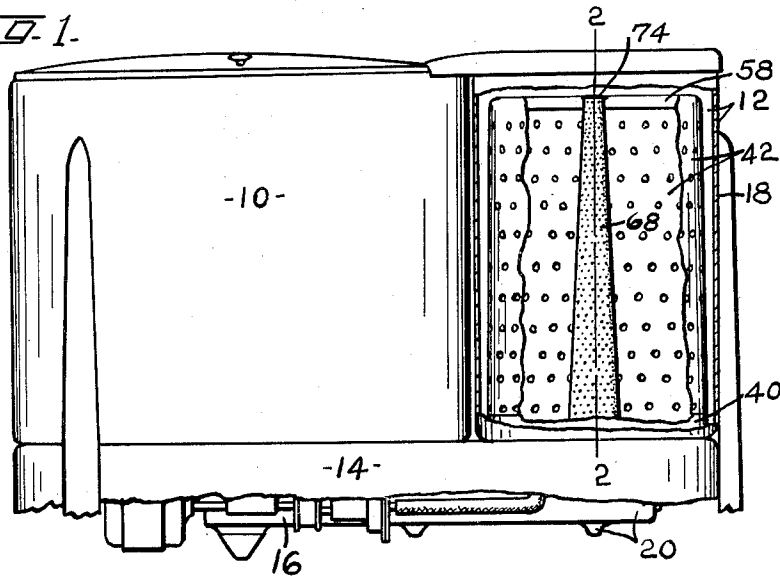
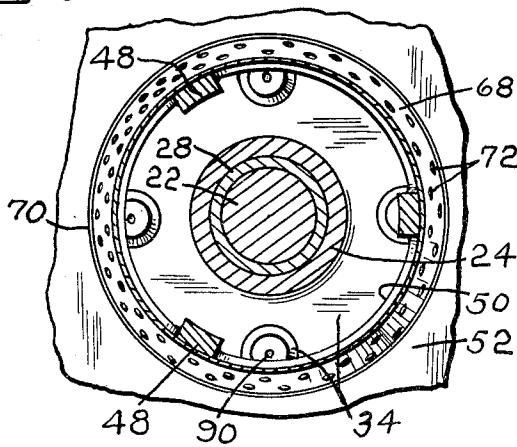


FIG. 3.



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FIG. 2.

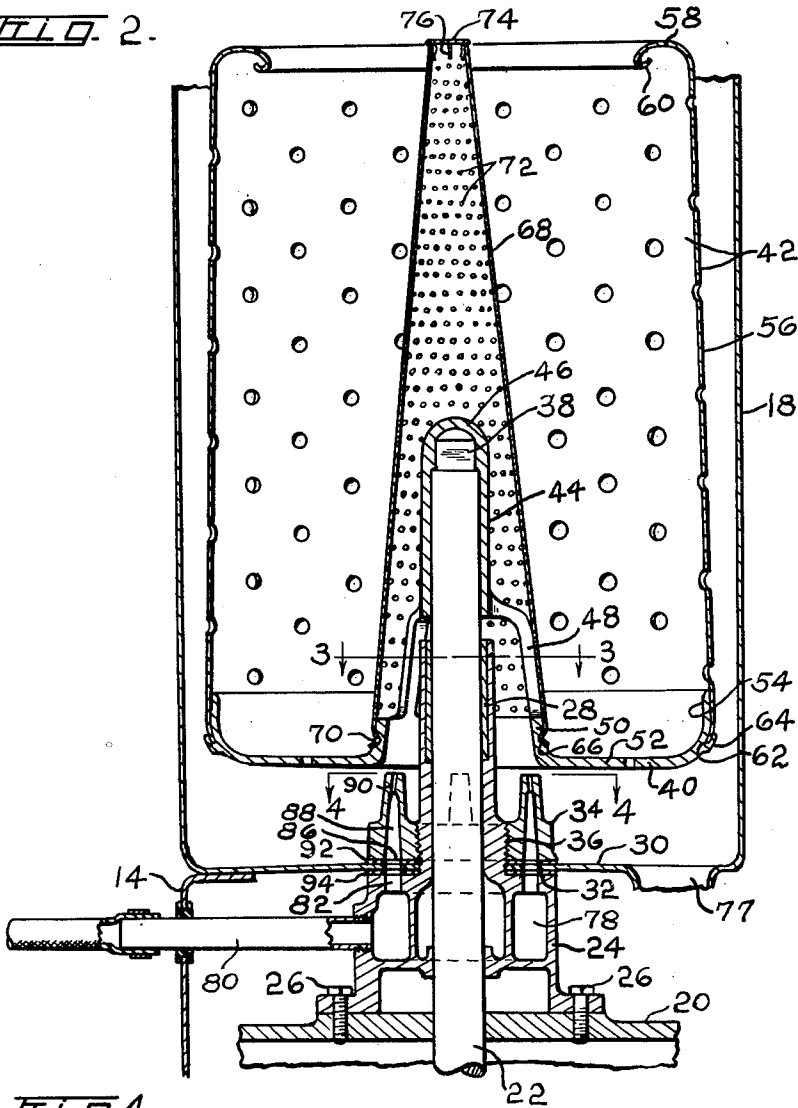
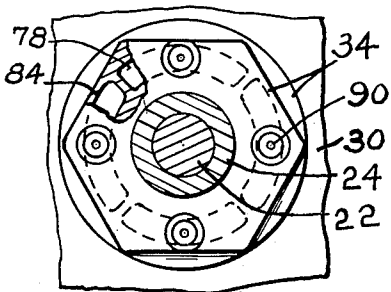


FIG. 4.



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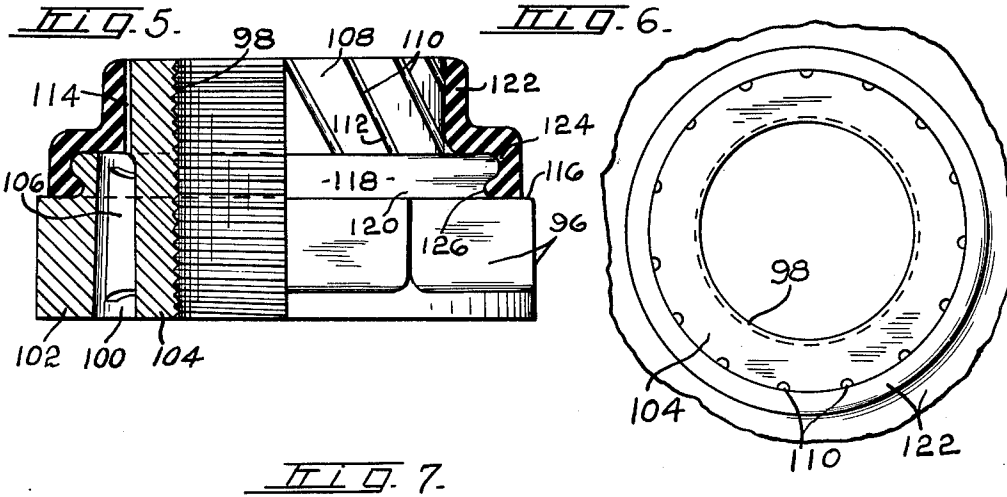
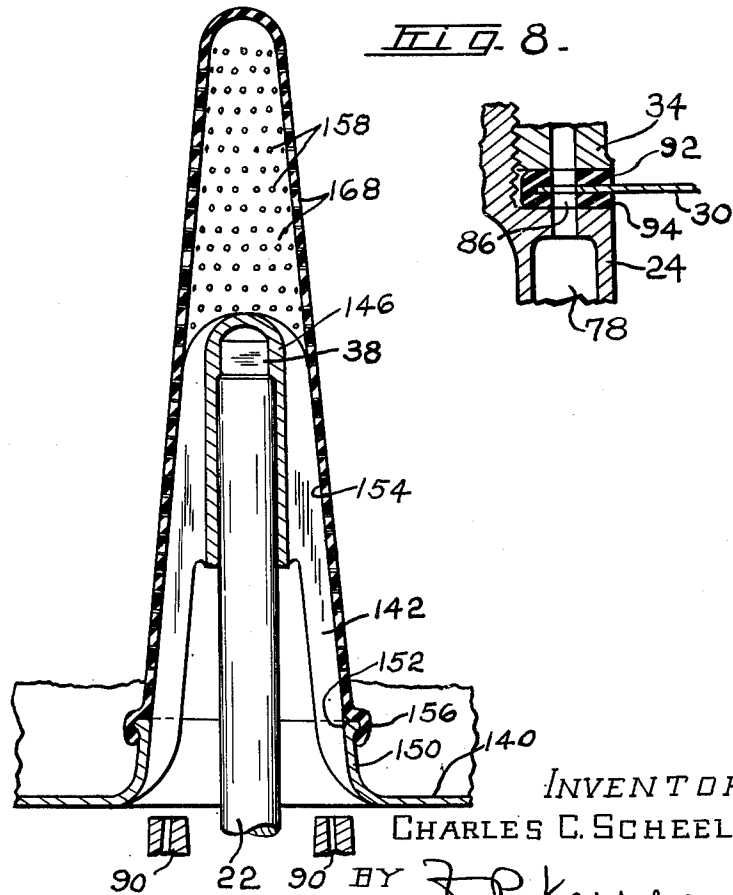


FIG. 7.



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2,595,609

LAUNDRY APPARATUS

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Application September 20, 1947, Serial No. 775,211

7 Claims. (Cl. 68—23)

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This invention relates to laundry apparatus, and more particularly to a centrifugal rinsing and drying device.

In centrifugal rinsing and drying devices employing a foraminous basket revolving on a vertical axis, within which water is extracted from laundry by centrifuging, it has been the practice heretofore to spray a stream of fresh rinse water upon the laundry while undergoing centrifugal action to rinse the soapsuds therefrom. In such apparatus, the rinse water has generally been introduced through the top and centrally of the revolving basket, and difficulty has been encountered in providing an even distribution of the rinse water axially of the entire vertical length of the revolving basket and washed clothes contained therein. In many instances, a stream of rinse water has been directed into the open top of the revolving basket manually by a flexible hose, in which case it is difficult to enclose the basket and prevent splash during the operation. In other instances, it has been the practice to flood the basket compartment for rinsing, and draining before spinning the basket. Where it has been proposed that the rinse water should be distributed over the axial length of the basket in a spray rinse by a spray tube, the distribution has generally been non-uniform, the apparatus cumbersome, and so located as to interfere with the facile loading and unloading of the basket.

In such devices, water impurities tend to block the spray apertures in time and thus prevent the uniform distribution which is desirable where minimum quantities of water and efficient rinsing operation is to be obtained.

The present invention is directed to a spraying device for use in conjunction with a centrifugal laundry-containing basket as described, wherein water is sprayed radially outward upon the laundry by centrifugal action and in such a manner that distribution is substantially uniform over the entire axial length.

The invention further has to do with a structural arrangement which affords ready disassembly of the parts for quick access to both sides for cleaning of the perforated centrifugal spraying distributor.

Further, the invention has to do with the provision of means for transferring spray water from stationary jets into the centrifugal spray distributor without the use of packing glands and other complicated and troublesome constructions.

The invention further has to do with the construction of such a device wherein all constricted water passages are of relatively large size and

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readily accessible for cleaning obstructing deposits therefrom as may result from the use of relatively hard water.

An additional feature of the invention is in the particular arrangement whereby the spraying distributor is supplied with rinse water from the bottom, and the distributor so mounted and shaped as to afford a minimum of interference in the loading and unloading of the basket. Additionally, the arrangement in practice is such as to facilitate the proper balanced loading of the centrifugal basket, so that the likelihood of a severe unbalanced condition during centrifuging is considerably lessened.

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, however, 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.

Referring to the drawings, wherein like reference characters indicate like parts,

Figure 1 is a side elevation of a washing machine having a separate centrifuge drier associated therewith with the centrifuge and its casing broken open to show the general arrangement;

Figure 2 is a section taken substantially on the line 2—2 of Figure 1, through the axis of the centrifuge;

Figure 3 is a transverse section through the spray distributor, taken substantially on the line 3—3 of Figure 2;

Figure 4 is a transverse section taken substantially on the line 4—4 of Figure 2, immediately below the centrifuge basket;

Figure 5 is a view partly in elevation and partly in section of a modified nut and jet which may be employed in the arrangement shown in Figures 1 and 2;

Figure 6 is a fragmental top plan view of the construction shown in Figure 5;

Figure 7 is a longitudinal section through the axis of the centrifuge showing a modified form of spray distributor; and

Figure 8 is an enlarged detail of grommet seal construction.

Referring to Figures 1 and 2 in the drawings, there is shown a washing machine of the type generally illustrated in a patent to Geldhof No. 2,111,143, wherein there is provided a washing compartment 10 and a separate rinsing compart-

ment or tub 12, mounted upon a common frame 14 in which the requisite drive mechanism 16 is mounted. The centrifugal rinsing and drying device comprises an outer stationary cylinder or tub 18 mounted upon the transmission housing 20 of the transmission mechanism 16, which mechanism is carried by the common frame 14. Upwardly extending from the housing is a drive shaft 22, the latter extending through a bearing support sleeve 24 bolted or otherwise secured to the transmission 20, as by cap screws 26. The upper end of the bearing support sleeve is provided with a bearing sleeve 28, journaling the upper end of the shaft 22. The cylinder 18 is preferably provided with an integral bottom wall 30 having a central aperture positioned over the bearing support sleeve 24, the same being clamped upon the bearing support sleeve between a U section grommet having joined upper and lower sealing members 92 and 94 by the shoulder 32 and a clamp nut 34 screw threaded upon the sleeve 24 as at 36.

The upper end of the shaft 22 is squared as at 38 and projects a substantial distance beyond the end of the bearing sleeve 24 to receive an integral spider and circular end wall member 40 of the centrifuge basket, the latter generally indicated at 42. The member 40 is constituted by a central shaft-receiving sleeve portion 44, a cap portion 46 having a complementary square receptacle for receiving the shaft squared end 38, and a plurality of spider arms 48 extending radially outwardly and downwardly to an internal flange 50 on the end wall 52. The end wall 52 is also provided with an external flange 54 to which is secured a foraminous slightly tapered circular basket or shell 56 having an intumed flange 58 suitably rounded and finished as at 60. The lower end of the basket is inwardly turned as at 62 to be received in a corresponding groove in the outside surface of the flange 54, and a peripheral lip 64 is subsequently spun over the intumed portion 62 to rigidly secure the basket to the flange 54.

The internal flange 50 is provided with an annular groove 66 and is slightly tapered to receive the lower end of a frusto-conical sleeve-like spray distributor member 68 extending upward through substantially the entire length of the basket 42, the lower end of the member being annularly spun inwardly as at 70 into the annular groove 66 of the flange 50. The frusto-conical member is provided with a large number of perforations 72 substantially uniformly spaced over the surface thereof to provide spray orifices for rinse water received within the frusto-conical member in a manner hereinafter to be described. The upper end of the frusto-conical member is provided with a cap 74 secured in place by a plurality of spring fingers 76. The cap may be supported by the spring fingers slightly axially spaced above the frusto-conical member to provide an annular end orifice at the very tip end of the spray distributor.

In order to deliver rinsing water to the rotating spray distributor, the bearing sleeve support member 24 is provided with an annular chamber or conduit 78 arranged around the shaft 22, and to which is connected a source of rinse water supply 80. A number of upwardly directed ports 82 connect the chamber with the shoulder 32, the ports being of substantial arcuate length as indicated at 84 (see Figure 4). The end wall 30 and gaskets 92 and 94 of the cylinder 18 are provided with a number of apertures 86 in align-

ment with the ports 82 to permit passage of rinse water into the arcuate cavities 88 formed in the clamp nut 34, the cavities connecting with a plurality of jets 90 adapted to upwardly direct a stream of water into the spray distributor 68. As shown in Figure 4, four such jets are employed, although the number thereof may be varied to suit conditions. The jets, while having a generally upward direction, may be inclined at different angles in order to direct the stream of one jet into impingement with the inside wall of the frusto-conical member at a different height from the points of impingement of the other jets, so that a uniform distribution of rinse water within the distributor may result.

From the foregoing description, the operation of the device will readily appear, it being understood that the laundry which has been washed but not rinsed of soapsuds is placed within the basket 42, being arranged therein around the annular space defined by the basket and frusto-conical member, whereupon the basket is set in rotation and rinse water introduced through the connection 80 to the annular chamber 78. The jets 90, there being but four in number, produce streams of water ejected under pressure and in considerable quantity, which in turn are directed into the spray distributor 68 whence the rinse water is centrifugally distributed through the ports 72 in a substantially uniform fashion through the length of the basket 42. Due to the pressure behind the jets 90, the rinse water is caused to be directed to the upper end of the distributor, so that the distributing action from the upper end of the distributor results from a combination of pressure derived from the jets 90 as well as the centrifuging action. At the same time, gravity causes the water to distribute downwardly within the distributor, so as to provide a substantially even spray distribution radially and axially of the basket.

It will be observed that the spider arms 48, being of relatively small cross section, afford a minimum of interference to the delivery of rinse water into the upper and central portion of the spray distributor. Such interference as occurs, causes distribution of the stream to the lower portion of the distributor. The rinse water being thus sprayed upon the soapy laundry, is driven centrifugally outward and thrown from the basket 56 through the numerous apertures provided, into the surrounding tub whence it passes through the drain 77. As is the usual practice, upon the completion of a sufficient rinsing period, the rinse water supply is cut off and thereafter the laundry is spun to extract substantially all the water therefrom resulting in damp dry, thoroughly rinsed laundry.

While the structure thus described is readily accessible for cleaning purposes, it will appear that the basket 42 is removable with the spray distributor so that access to the spray distributor may be had both inside and out from both ends, by removal of the cap 74. At the same time, when the basket is removed, access to the jets 90 is afforded. If desired, the jets 90 may be removed by merely unscrewing the clamp nut 34, if clogging should occur.

In order to further facilitate the cleaning of the spray distributor as well as the jets 90, the modifications shown in Figures 5, 6, and 7 may be employed. In the arrangement shown in Figures 5 and 6, a modified clamp nut 96 is threaded as at 98 for positioning upon the bearing support sleeve 24, and is provided with an annular cavity 100

formed by spaced annuli 102 and 104 interconnected by a plurality of webs 106. The inner annulus 104 has a smooth circular wall 108 which may be cylindrical or slightly conical as desired, around the periphery of which are a number of grooves 110, which may be spiral as at 112 or elemental as at 114, for purposes which will hereinafter appear. The outer annulus 102 is provided with a shoulder 116 and reduced diameter portion 118, the latter being rounded and provided with an annular groove 120. In order that the elemental grooves may act as discharge orifices or jets, a molded rubber ring 122 is positioned therearound to form conduits of the grooves. The ring is provided with an annular lip 24 adapted to be stretched over the reduced diameter portion 118. The lip has an internally extending bead 126 adapted to be received in the annular groove 120 for resiliently retaining the collar in the position shown. The pitch of the grooves 112 may be varied to cause the streams projected from such grooves to vary in direction in order that the streams may impinge upon the spray distributor at different points along its length. Some of the grooves may be elemental as at 114, and any combination of elemental and varying pitch grooves may be employed as may be found best suited to the purposes. It will be appreciated that the orifices thus provided may be readily cleaned of deposits of foreign matter by merely removing the rubber ring, thereby exposing the grooves for cleaning purposes, after which the ring may be readily replaced.

A modified form of spray distributor is disclosed in Figure 7, wherein the frusto-conical member is formed of vulcanized rubber of a durometer hardness sufficient to be self-sustaining under the forces present during spin rinsing. At the same time, it will be appreciated that the distributor will be resilient and flexible so as to yield during loading and unloading of the basket if momentarily its position impedes the placing of laundry within the basket. In the form shown, the basket bottom wall 140 is carried upon preferably three or more spider arms 142 formed integrally therewith and capped as at 146 with a square recess for engaging the square end 38 of the shaft 22. The inside flange 150 of the end wall 140 is provided with an annular bead 152. The frusto-conical member 168 is so shaped as to rest against the outer faces 154 of the spider arms 142 and is supported along its lower length largely thereby. The lower end of the spray distributor is provided with an annular lip 156 adapted to be stretched over and embrace the bead 152. The distributor is provided with a series of spray ports 158 as in the previous modification. It will be appreciated that the structure shown is such as to permit the ready removal of the rubber distributor, thereby affording access to the numerous ports therein from both the inside and outside for removing foreign matter lodged therein. Any form of jet arrangement may be employed, for example, the jets 90 as shown or such other form as may be desired.

From the foregoing, it will appear that a spray rinsing device is provided wherein the distribution of the rinsing spray is substantially uniform, the force of gravity tending to distribute the rinsing water within the distributor in opposition, at least in part, to the tendency of the upwardly directed supply streams. At the same time, the slope of the conical distributor may be varied to control the effect desired. By the arrangement of the angles of the various supply

streams, so that impingement thereof upon the inside wall of the distributor produces a desired pattern, substantially uniform rinsing distribution over the entire basket length is obtained.

While the arrangement has been shown with modified forms, it is to be understood that the invention is not limited thereto. As various changes in construction and arrangement of parts 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 rinsing device of the centrifuge type, a frame having an upstanding bearing sleeve for a vertical shaft, a shaft extending upwardly therethrough, a tub having a substantially cylindrical side wall and bottom wall having an open drain in the bottom thereof, said bottom wall having an aperture positioned over said sleeve, a shoulder upon said sleeve for supporting said bottom wall, a nut having water passages and an upwardly directed jet screw threaded upon said sleeve for clamping said tub against said shoulder, an annular water-receiving conduit arranged in said sleeve below said shoulder said conduit having an inlet opening adapted to be connected to an outside source of water under pressure, and discharge passages leading upwardly therefrom through said shoulder and said bottom wall and into said water passages, an elongated open top centrifuge basket comprising an outer circular wall, an annular bottom plate and a central tubular spray distributor having an axial length substantially that of the basket, said spray distributor being open at the bottom and of a diameter large enough to encompass said jet, a spider for supporting said basket upon said shaft.

2. In a rinsing device of the centrifuge type, a frame having an upstanding bearing sleeve for a vertical shaft, a shaft extending upwardly therethrough, a tub having a substantially cylindrical side wall and bottom wall, said bottom wall having an aperture positioned over said sleeve, a shoulder upon said sleeve for supporting said bottom wall, a nut having water passages and a plurality of upwardly directed jets screw threaded upon said sleeve for clamping said tub against said shoulder, an arcuate water-receiving conduit arranged in said sleeve below said shoulder said conduit having an inlet opening adapted to be connected to an outside source of water under pressure, and discharge passages leading upwardly therefrom through said shoulder and said bottom wall and into said water passages, an open top centrifuge basket comprising an outer circular wall, an annular bottom plate and a central tubular spray distributor having an axial length substantially that of the basket, said spray distributor being open at the bottom and of a diameter large enough to encompass said jets, and a spider for supporting said basket upon said shaft, said plurality of jets being directed to impinge upon the inner wall of said distributor at different points along the length thereof.

3. In a rinsing device of the centrifuge type, a bearing frame, a shaft projecting therethrough, a spider on said shaft, a centrifuge basket comprising an annular base, a substantially cylindrical open top outer wall secured thereto around the outer periphery of the base, and an upstanding conical perforate member supported upon said spider and having a length substantially

that of the basket, and having its lower base marginal edge secured to the inner periphery of said base, and stationary nozzle means associated with said bearing frame for projecting streams of rinse water upward into said perforate conical member and beyond said spider said nozzle means having a water inlet connection adapted to be connected to an outside source of water under pressure.

4. In a rinsing device of the centrifuge type, a bearing frame, a shaft projecting therethrough, a spider on said shaft, a centrifuge basket comprising an annular base, a substantially cylindrical open top outer wall secured thereto around the outer periphery of the base, and an upstanding elongated hollow perforate conical member supported upon said spider of an axial length approximately that of the basket, and having its lower base marginal edge secured to the inner periphery of said base, and means in the form of upwardly directed stationary jets associated with said bearing frame for projecting streams of rinse water upward into said perforate conical member and beyond said spider said nozzle means having a water inlet connection adapted to be connected to an outside source of water under pressure.

5. In a rinsing device of the centrifuge type having a centrifuge basket, an annular base having internal and external flanges and a central spider including a shaft-receiving collar formed integral with the internal flange, said spider and collar extending upwardly from the flange and forming the sole supporting and driving means for said basket a circular elongated open top shell secured to said outer flange having means for centrifugally eliminating rinsing water received upon the inner wall of said shell, and a central conical distributing perforate elongated hollow member having its larger diameter end surrounding said spider and collar and secured to said inner flange and adapted to receive a rinsing water stream upwardly directed thereinto past said spider said member being of a length commensurate with said shell.

6. In a rinsing device of the centrifuge type, a bearing frame, a shaft projecting upwardly therethrough, a centrifuge container having an annular base and a central spider including a shaft-receiving collar mounted on the upper end of said shaft, a circular open top shell secured to the outer edge of said base having means for centrifugally eliminating rinsing water received upon the inner wall of said shell, a central per-

forate elongated hollow distributing member secured to the inner edge of said base adapted to receive a rinsing water stream upwardly directed thereinto past said spider, means in the form of an upwardly directed jet associated with said bearing frame for projecting a stream of rinse water upward into said perforate elongated member said jet means having a water inlet connection adapted to be connected to an outside source of water under pressure.

7. A centrifuge basket comprising an annular integral base having a hub located a substantial distance above the plane of the base said hub having a bore and drive means for mounting on the end of an upstanding drive shaft in driving relation, and adapted to receive a shaft extending through the base, said base having inner and outer upstanding flanges, an upwardly extending spider connecting said inner flange with said hub, a circular upstanding elongated open top shell carried by the outer flange, said shell having means for eliminating centrifugal rinse water collecting on the inner surface thereof, and a central elongated water distributing cone having its larger diameter end carried upon said inner flange of a length commensurate with said shell, and in part surrounding said hub, said hub forming the sole support for the centrifuge basket said cone being open at one end to receive a stream of water, and being perforate throughout its surface area to centrifugally discharge a uniform stream of water toward said shell, upon rotation.

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