

Feb. 18, 1930.

P. E. GELDHOF

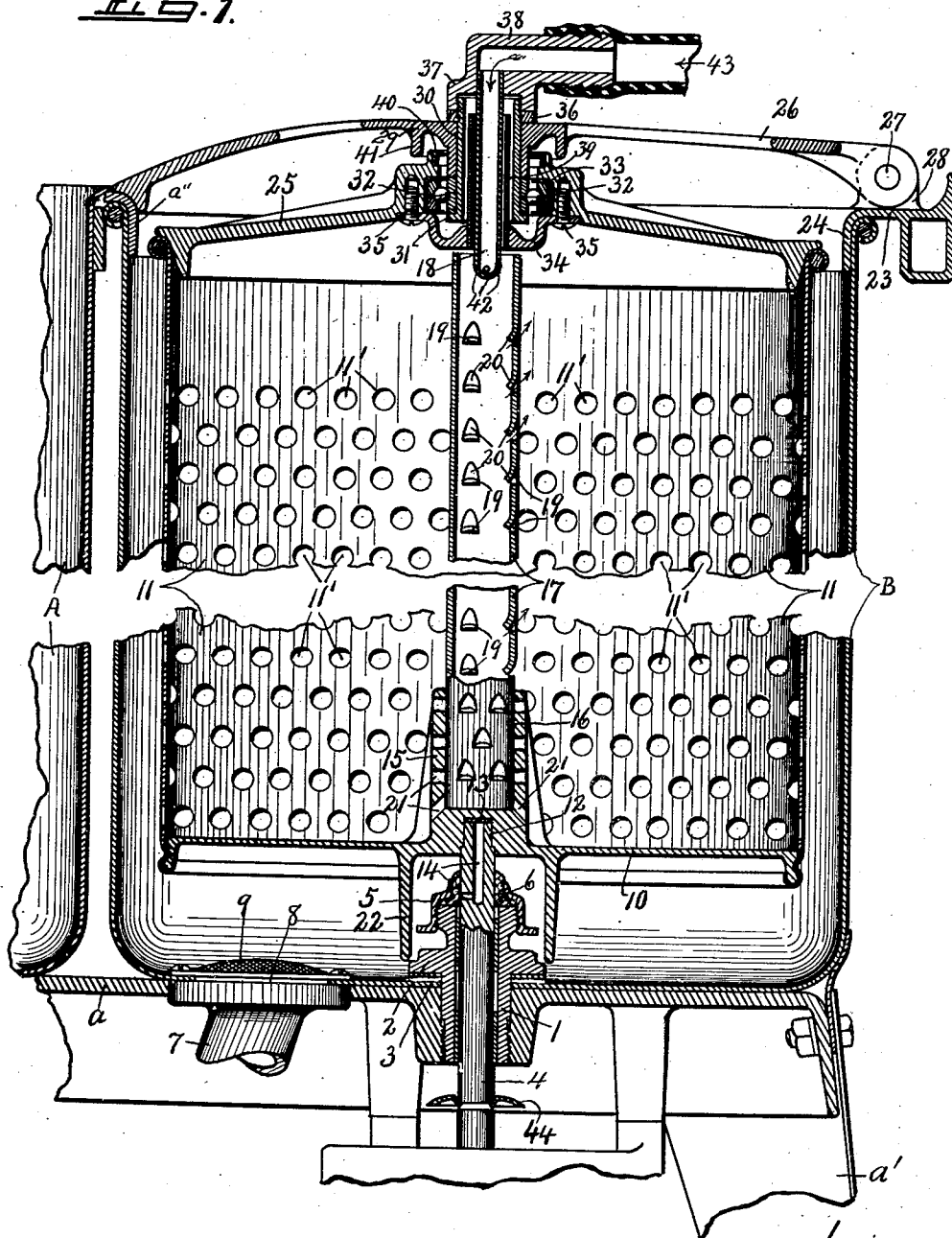
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RINSING DEVICE FOR CENTRIFUGAL CLOTHES DRIERS

Filed July 12, 1927

2 Sheets-Sheet 1

FIG. 1.



WITNESS

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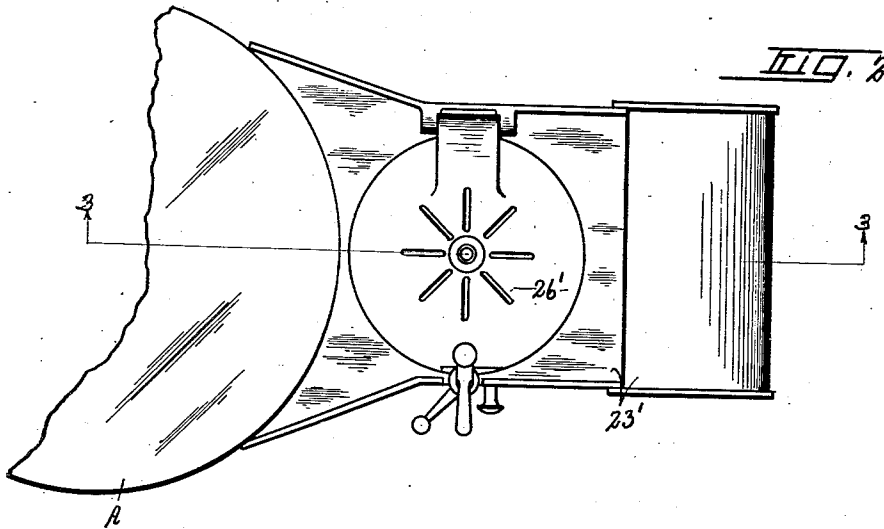
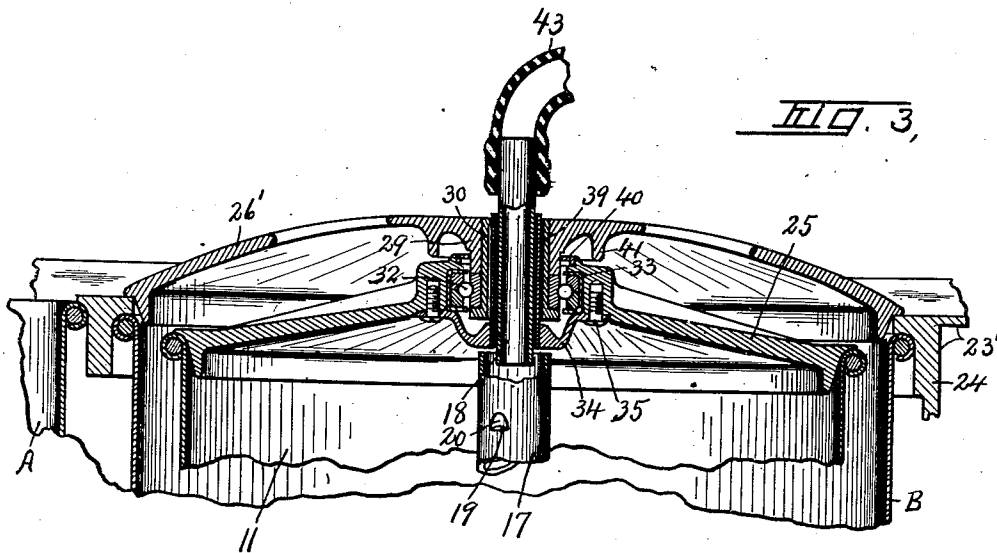
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UNITED STATES PATENT OFFICE

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RINSING DEVICE FOR CENTRIFUGAL CLOTHES DRIERS

Application filed July 12, 1927. Serial No. 205,170.

This invention relates to a rinsing device for centrifugal clothes driers for applying clean fresh water or other rinsing fluid to the clothes after the washing fluid has been expelled therefrom by centrifugal force and without removing the clothes from the perforated container.

The main object is to provide simple and efficient means for producing a more effective and wider distribution of the rinsing fluid through the clothes in the container than has heretofore been practised simultaneously with the rotation of the container with the previously washed clothes therein during or immediately following the expulsion of the washing fluid from the clothes in the same container.

One of the specific objects is to provide the rotary container with a central co-axial upright tube rotatable therewith and provided with a series of peripheral apertures and deflectors arranged at intervals throughout the major portion of the height of the container whereby a rinsing fluid introduced into the upper end of the tube will be precipitated to the bottom thereof and thence upwardly and outwardly through the apertures in the form of a series of spray jets with sufficient force to penetrate practically all portions of the clothes within the container and to be simultaneously expelled therefrom through the perforated peripheral walls of the container to the exterior thereof by centrifugal force.

Other objects and uses relating to specific parts of the device will be brought out in the following description.

In the drawings:—

Figure 1 is a vertical sectional view of a centrifugal clothes drier and adjacent portion of a clothes washing machine, together with my improved rinsing attachment, all of which are partly broken away.

Figure 2 is a top plan on a reduced scale of a slightly modified form of my invention in which a portion of the tub is broken away.

Figure 3 is an enlarged detail sectional view, taken in the plane of line 3—3, Figure 1, of the upper portion of the apparatus.

In carrying out the objects stated the mechanical clothes washer and centrifugal drier

are preferably mounted side by side on a suitable supporting base or platform —a— having legs —a'— for supporting the washing and drying mechanism at the desired height, the washing mechanism being provided with the usual vat —A— while the drying mechanism includes a water-receiving vat —B—, both of said vats being mounted upon the platform —a— in any suitable manner.

It is to be understood, however, that the rinsing device is to be connected with any centrifugal drier which may or may not be used in connection with a mechanical clothes washer.

The platform —a— and bottom of the vat —B— are provided with registering openings for receiving the lower reduced end of a bushing —1— which is screwed or otherwise secured in the opening in the platform —a— and has its inner end provided with an annular flange —2— adapted to be drawn against suitable packings —3— on the inner face of the bottom of the vat —B— as the bushing is tightened to form a liquid tight joint.

The bushing —1— serves as a journal bearing for an upright shaft —4— which extends through and beyond the inner and outer ends of said bushing and has its lower end adapted to be connected to any suitable driving mechanism by which the shaft may be rotated.

An internally-threaded gland nut —5— is screwed upon the reduced upper threaded end of the bushing —1— and cooperates with said bushing to secure a packing ring —6— in place around the adjacent portion of the shaft —4— to form a water-tight gland within the lower portion of the vat —B— and thereby to prevent leakage of water from the interior of the vat along the shaft.

The platform —a— is also provided with an opening at one side of the center for receiving the upper end of a downwardly extending conduit —7— which is registered with an outlet opening —8— in the bottom of the vat —B— and together with a screen —9— is secured to said bottom across the

opening to permit free discharge or drainage of the washing or rinsing fluid which may be expelled from the clothes by the centrifugal drier presently described.

5 The centrifugal clothes drier is preferably made in the form of a cylindrical container mounted upon the upper end of the shaft —4— co-axial therewith and wholly within the vat —B— between the bottom and top thereof so that its perforated walls will be
10 surrounded by the peripheral walls of the vat to confine the water expelled from the clothes within the vat and allow it to drain out through the outlet conduit —7—, the screen —9— serving to prevent the discharge of lint
15 and any other solid matter which may lodge in the bottom of said vat.

The bottom —10— of the container is provided with a socket —12— for receiving the
20 upper end of the shaft —4—, said socket and portion of the shaft projecting thereinto being preferably of angular cross section to serve as a spline for transmitting rotary motion from the shaft —4— to the container
25 and also to permit the container to be readily removed by upward displacement from the shaft.

The upper end of the shaft —4— is provided with oil passages —14— leading downwardly to the interior of the packing —6—
30 for lubricating the journal bearing —1— for said shaft and is normally closed by a washer cap —13— to prevent the entrance of dust and other foreign matter.

35 The bottom —10— of the perforated clothes container is also provided with a central upwardly projecting hub —15— having a co-axial socket —16— extending downwardly from the upper end thereof for receiving the lower end of an upright rinsing
40 tube —17— having its upper end terminating close to but slightly below the level of the upper end of the container and open at the top for receiving the lower end of an upright
45 spray nozzle —18—.

The lower end of the rinsing tube —17— and socket —16— are cylindrical and of approximately the same diameter so that the tube may slide endwise within the socket
50 without excessive friction or undue clearance.

That is, the tube —17— may be removed from the socket —16— by upward displacement for cleaning or other purposes if desired.

55 The extreme lower end of the tube —17— abuts against and is normally closed by the lower end wall of the socket —16— to cause any rinsing water which may be introduced into the tube to rise therein to any level desired within the height of the perforated
60 container.

The major portions of the peripheral walls of the tube —17— within the container or between the bottom and top thereof are provided
65 at more or less regular intervals through-

out its length and circumference with lateral openings —19— and a corresponding number of inwardly projecting deflectors —20— extending downwardly and inwardly from the upper walls of the openings —19— thereby forming a multiplicity of what may be
70 termed upwardly and outwardly diverging passages for the rinsing fluid which may be introduced into the tube —17—.

These passages —19— and deflectors —20— are formed by punching and pressing
75 inwardly portions of the metal tube so that the lower ends of the deflectors will project inwardly beyond the peripheral walls of the remaining portions of the tube, whereby as the rinsing liquid introduced into the tube
80 —17— through the spray nozzle —18— will rise in said tube and will be forced outwardly and upwardly into a corresponding number of spray jets to permeate the clothes in the container around the tube which, although slidable, fitted within the socket
85 —16—, is nevertheless sufficiently tight to cause the tube to rotate with the container.

If desired, the lower end of the socket —16— may be provided with downwardly
90 and outwardly inclined branch passages —21— to allow any water which may accumulate in the socket to pass out into the container and thereby to be expelled from the
95 clothes by centrifugal force through the perforations as —11— in the peripheral walls —11— of the container.

The bottom —10— of the container is provided with a downwardly projecting annular
100 flange —22— surrounding the gland —5— to prevent the passage of water to the shaft —4—. A shelf or drain board —23— is supported upon the upper edge of the vat —B— and is provided with a drop flange —24—
105 fitting closely within the upper end of said vat and, this shelf may be stationary or movable circumferentially as may be required for different installations.

The clothes container is provided with a
110 lid —25— movable into and out of frictional engagement with the upper end of the peripheral wall —11— so that when closed it will rotate with the container but may be
115 opened at will to permit the insertion and removal of clothes into and from the container.

The means for supporting the lid —25— and for permitting its free rotation of the
120 cage —11— comprises a cover —26— pivoted at —27— to a lug —28— on the top of the shelf —23— just at the outside of the flange —24—, to swing to and from a position across the top of the vat —B— and is provided
125 with a hub —29— having a central opening therethrough for receiving a tubular sleeve —30— which extends some distance above and below the upper and lower ends of the head.

The sleeve —30— also extends through a
130

central opening in the lid —25— and has its lower end provided with an annular flange —31— for supporting the inner annular section of a ball-bearing retainer —32— against the inner end of the central hub —29—, the outer section of said ball-bearing retainer being seated in an annular recess —33— forming an annular enlargement of the central opening in the lid —25—.

A cap section —34— is secured by screws —35— to the inner face of the central portion of the lid —25— around the inner end of the nozzle —18— and against the inner end of the outer section of the ball-bearing retainer to hold the latter against inward displacement from its recess —33—.

The outer end of the sleeve —30— is threaded externally and engaged by a lock nut —36— and also by an internally threaded hub —37— of a pipe elbow —38— thereby holding the sleeve and elbow in fixed relation to the cover —26— while permitting the free rotation of the lid —25— around the inner end of the sleeve through the medium of the ball-bearings —32— when said lid is frictionally engaged with the upper end of the container shell —11—.

A tubular shield —39— has its inner end screwed or otherwise secured in a central opening in the cap —34— and its upper end extended into the sleeve —30— some distance above the journal bearings —32— to form with the cap —34— an oil cup for receiving lubricating oil for the bearings —32— and also to assist in preventing the passage of water from the tube —17— upwardly into the bearings.

An additional cap section —40— is secured in an annular recess in the central portion of the top of the lid —25— around and in close proximity to the periphery of the hub —29— to additionally prevent the entrance of water to the journal bearings and also to retain the oil in the cap —34— for lubricating purposes.

For a similar purpose the inner end of the arm —26— is provided with an annular flange —41— surrounding the cap section —40— and adjacent central portion of the lid —25— which is slightly conical to drain any water from the top thereof to the outer sides of the upper end of the container shell —11— and thence into the vat —B—.

The spray nozzle —18— extends through and beyond the opposite ends of the inner tubular shield —39— with sufficient clearance to prevent friction between those parts and has its lower end provided with a plurality of relatively small openings —42— through which the rinsing water or other fluid may be projected into the upper end of the rinsing tube —17—, it being understood that the lower perforated end of the nozzle —18— is allowed to project a limited

distance into the open upper end of said rinsing tube.

The upper end of the nozzle —18— is rigidly secured in a central opening in the elbow —38— coaxial with the tube —17— and, therefore, co-axial with the lid —25— and shell —11— and rinsing tube —17— and permits the lid —25— to rotate freely relatively to the spray nozzle —18— and elbow —38—.

The upper horizontally extending end of the elbow —38— is connected by a flexible pipe —43— to any available source of supply for fresh water or other rinsing fluid and is made flexible to permit the cover —26—, lid —25— and nozzle —18— to be rocked vertically about the axis of its pivot —27— when opening and closing the lid.

An annular flange —44— is secured to the lower end of the shaft —4— some distance below the lower end of the bushing —1— for the purpose of deflecting laterally and downwardly any water or oil which may accidentally escape through the bushing along the shaft —4—.

Operation

When it is desired to dry the wet clothes after being thoroughly washed, the cover —26— with the lid —25— thereon is rocked upwardly about the axis of the pivot —27— to open said lid and permit the clothes to be drawn from the upper end of the tub —A— into the perforated container whereby they become packed more or less uniformly around the rinsing tube —17—, this operation being preferably performed by hand.

When the perforated container is reasonably filled the cover —26— and lid —25— will be closed and both the container and lid rotated at a sufficiently high rate of speed to cause the washing fluid to be expelled from the clothes by centrifugal force into the vat —B— from which it may be drained off from the outlet —7— practically as fast as it accumulates.

During this centrifugal expulsion of the water from the clothes or after the clothes have been dried the rinsing water may be turned on to pass through the pipes —43—, —38— and nozzle —18— into the upper end of the rinsing tube —17— which it will be remembered, rotates with the perforated container and as the rinsing fluid rises in the tube —17— it is expelled laterally and upwardly partly by centrifugal force and partly by pressure so that it emerges from the interior of the tube in a series of jets distributed around the axis of the tube and thereby distributed through the clothes from the interior outwardly and is then expelled from the clothes by centrifugal force through the perforations and into the vat —B— to be precipitated to the bottom thereof and thence to the drainage outlet —7—.

The deflectors —20— serve to impede the backflow of water upwardly along the inner walls of the tube —17— and to deflect said water through the passages —19— in a more or less upward and lateral direction so that while the tube —17— is revolved each jet describes an upwardly diverging cone of water and thereby causes a greater penetration of the rinsing water through practically the entire mass of clothes resulting in a more expeditious rinsing and drying of the clothes simultaneously with the expulsion of the washing fluid from the clothes than has heretofore been practiced.

The construction shown and described is particularly simple and efficient but it is evident that the shape of the perforated container and vat surrounding the same and also the construction of other details of the rinsing device may be varied without departing from the spirit of this invention.

In Figures 2 and 3, the shelf or drain board —23'— is mounted upon the upper edge of the vat —B— and is provided with a downwardly projecting annular flange —24'— around the outside of the vat while the cover as —26'— is shown as hinged to the rear side of the shelf and is adapted to be locked and released in and from its closed position by mechanisms similar to that shown in the pending joint application of myself and J. C. Nelson, Serial No. 28,564, filed May 7, 1927.

It will be noted, however, that the essential difference of this construction over that shown in Figure 1 is that the rinsing nozzle as —18— is not attached to the cover —26'— but, on the contrary, is loosely inserted into the shield —39— when discharging the rinsing fluid into the upper end of the rinsing tube —17— and may be withdrawn at will by upward displacement, this operation being permitted by the flexible connection —43— with the source of supply for the rinsing fluid.

What I claim is:—

1. The combination with a perforated container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith and provided with a multiplicity of relatively small passages directly connecting its interior to the interior of the container, and means for introducing a rinsing liquid directly into the tube, said tube having means for deflecting the rinsing fluid upwardly as it escapes through said passages.

2. The combination with a perforated container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith and provided with a multiplicity of relatively small passages directly connecting its interior to the interior of the container, and means for introducing a rinsing liquid directly into the tube, said tube having portions thereof deflected in-

wardly across the inner ends of the passages to deflect the rinsing fluid upwardly as it escapes through the passages.

3. The combination with a perforated container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith, and provided with a plurality of upwardly and laterally inclined discharge orifices, and means for introducing a rinsing fluid directly into the upper end of said tube.

4. In a centrifugal clothes drier having a rotary perforated container and a socket in its bottom co-axial with its axis of rotation, said socket having branch openings leading therefrom to the interior of the container, a perforated rinsing tube having its lower end frictionally seated in said socket to rotate with the container and to permit it to be removed by upward displacement, means for rotating the container, and means for introducing a rinsing fluid directly into the upper end of the tube.

5. In a centrifugal clothes drier, a vat, a bushing secured in an opening in the bottom of the vat and extending upwardly some distance from said bottom, a rotary shaft journaled in the bushing, a perforated container for the clothes having its bottom wall splined upon the shaft to rotate therewith and to permit it to be removed by upward displacement, said bottom having an annular flange depending therefrom around the upper end of the bushing, a perforated tube rotating with the container co-axial with the shaft, and means for introducing a rinsing fluid into the upper end of the tube.

6. The combination with a container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith and provided with a multiplicity of relatively small passages directly connecting its interior to the interior of the container, and means for introducing a rinsing liquid directly into the tube, said tube having means for deflecting the rinsing fluid upwardly as it escapes through said passages.

7. The combination with a container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith and provided with a multiplicity of relatively small passages directly connecting its interior to the interior of the container, and means for introducing a rinsing liquid directly into the tube, said tube having portions thereof deflected inwardly across the inner ends of the passages to deflect the rinsing fluid upwardly as it escapes through the passages.

8. The combination with a container, and means for rotating the same, of a rinsing tube rotating with the container co-axial therewith and provided with a plurality of upwardly and laterally inclined discharge orifices, and means for introducing a rinsing

fluid directly into the upper end of said tube.

9. In a centrifugal clothes drier having a rotary container and a socket in its bottom co-axial with its axis of rotation, said socket having branch openings leading therefrom to the interior of the container, a perforated rinsing tube having its lower end frictionally seated in said socket to rotate with the container and to permit it to be removed by upward displacement, means for rotating the container, and means for introducing a rinsing fluid directly into the upper end of the tube.

10. In a centrifugal clothes drier, a vat, a bushing secured in an opening in the bottom of the vat and extending upwardly some distance from said bottom, a rotary shaft journaled in the bushing, a container for the clothes having its bottom wall splined upon the shaft to rotate therewith and to permit it to be removed by upward displacement, said bottom having an annular flange depending therefrom around the upper end of the bushing, a perforated tube rotating with the container co-axial with the shaft, and means for introducing a rinsing fluid into the upper end of the tube.

In witness whereof I have hereunto set my hand this 2nd day of July, 1927.

PETER E. GELDHOF.