Feb. 18, 1936. W. A. PAPWORTH 2,031,427

CENTRIFUGAL CLOTHES DRIER

Filed Sept. 28, 1926 2 Sheets-Sheet 1

FIG. 5.

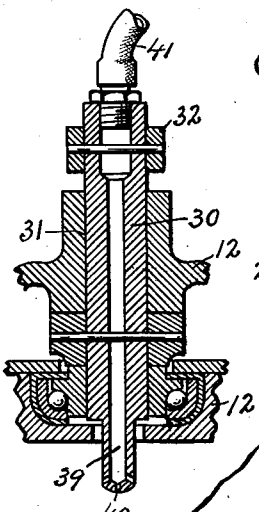


FIG. 1.

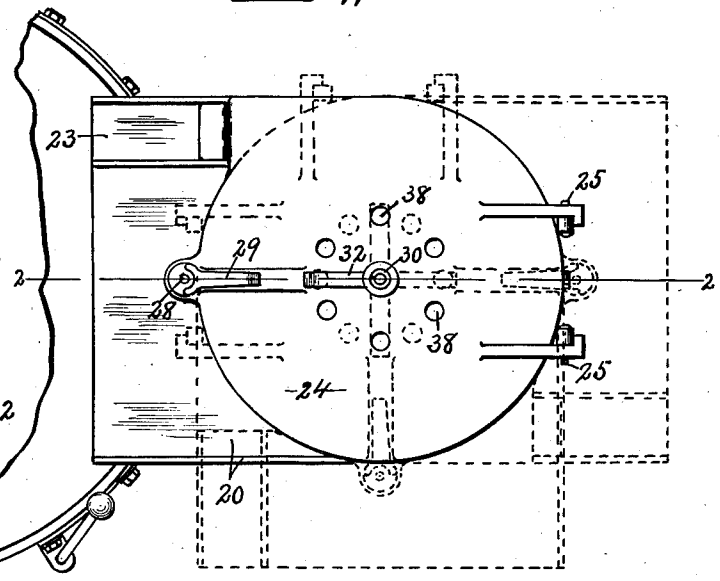
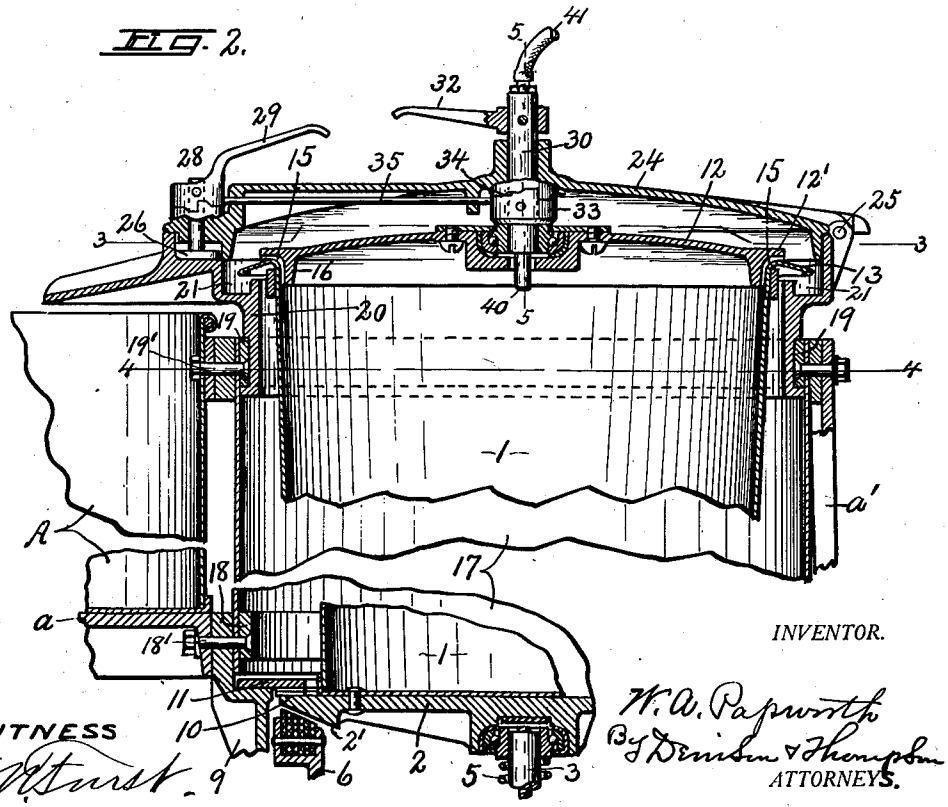


FIG. 2.



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FIG. 3.

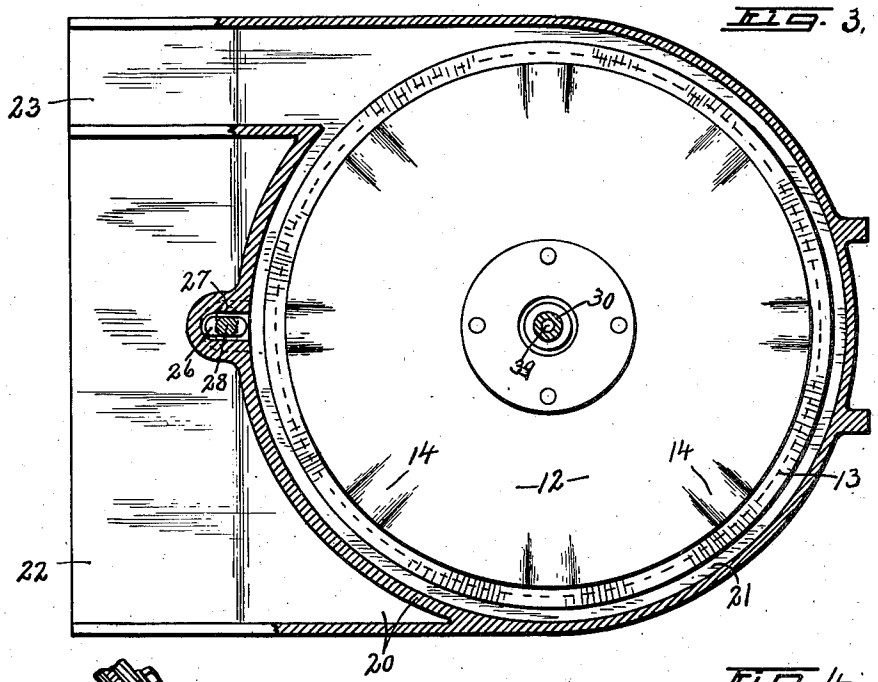
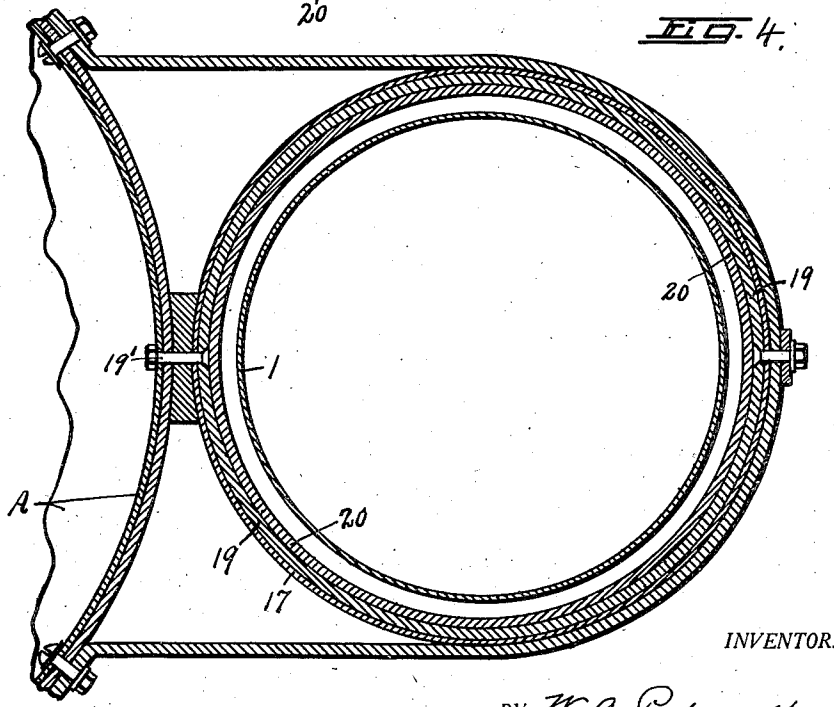


FIG. 4.



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UNITED STATES PATENT OFFICE

2,031,427

CENTRIFUGAL CLOTHES DRIER

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Application September 28, 1926, Serial No. 138,295

20 Claims. (Cl. 210—75)

This invention relates to a centrifugal clothes-drying and rinsing apparatus in which a vertically disposed container for the clothes is rotatably mounted within a relatively stationary upright casing or jacket carrying at its upper end a drain-board extension which is adapted to be adjusted rotarily about the axis of the container and casing to enable the water expelled from the clothes to be discharged in different radial directions into other receptacles at different positions around the outside of the casing.

In this apparatus the drain-board extension is provided with a cover extending across the entire area of the upper end of the casing and container and preferably hinged to the extension to permit it to be swung from a closed position to a fully open position, and upon which is revolubly mounted a supplemental cover or lid movable therewith into and out of frictional engagement with the upper end of the container to rotate with said container relative to the casing and cover therefor.

These centrifugal driers are adapted to be used more particularly in connection with clothes washing machines, and also with rinsing vats for receiving, rinsing and drying the clothes which may be transferred thereto from other washing or rinsing vats, and one of the objects of the present invention is to provide a more convenient means for permitting the transfer of the clothes and the washing fluid to and from the vats which may be located at different positions around the centrifugal drier.

Other objects and advantages relating to the specific use of the apparatus will be brought out in the following description.

In the drawings:—

Figure 1 is a top plan view of the centrifugal drying and rinsing device and adjacent portion of a washing machine showing by dotted lines the drain-board extension in different positions of adjustment, and by full lines as registering with the top of the washing vat.

Figure 2 is an enlarged vertical sectional view partly broken away taken on line 2—2, Figure 1.

Figures 3 and 4 are horizontal sectional views taken in the planes of lines 3—3 and 4—4 respectively, Figure 2.

Figure 5 is an enlarged vertical sectional view taken in the plane of line 5—5, Figure 2.

As illustrated, this centrifugal drier is mounted upon one side of the tub as A of a mechanical clothes washer which, in turn is supported upon a horizontal platform *a* of the main supporting frame. This supporting frame may also be used as a part of the supporting means for the centrifugal drier in addition to one or more legs *a'*.

The centrifugal drier, as shown, comprises an upright downwardly tapered vat or container 1 made in the form of an inverted truncated cone and having its bottom and side walls imperforate, the bottom wall being mounted upon and secured to a suitable platform or disk 2 through which the receptacle as a whole may be rotated about a vertical axis.

The disk 2 is centrally journaled upon a suitable bearing post 3 on an underlying portion of the main supporting frame *a* and also has a limited axial movement lengthwise of the bearing 3 against and with the action of a coiled spring 5 which forms a yielding support for the receptacle to permit the receptacle to be moved vertically into and out of engagement with a rotary driving element 6.

This driving element 6 may be connected to any available source of power such as the motor driven mechanism of the washer as shown in my pending application referred to and preferably consists of a conical friction disk adapted to be engaged by a conical friction face 2' on the disk 2 when the receptacle is depressed against the action of the spring 5 for engaging the disk 2 with the driving disk.

The marginal edge of the disk 2 extends radially some distance beyond the side walls of the lower end of the vat 1 to form an annular brake surface 10 which when the receptacle 1 is elevated by the spring 5, is adapted to engage an overlying brake shoe 11 on the bracket 9 as shown in Figure 2 for stopping the rotation of the receptacle when disengaged from the driving element 6.

The upper or larger end of the container 1 is provided with a lid or closure 12 rotatable therewith, but adapted to be displaced when necessary to permit the insertion and removal of clothes into and from the open upper end thereof.

The main body of the receptacle 1 is preferably made of sheet metal and is provided at its upper end with an outwardly and downwardly extending marginal flange 13, while the lid 12 is also provided with a marginal flange 12' overlying the adjacent portion of the flange 13 and preferably corrugated at 14 at intervals throughout its periphery to form a series of discharge passages 15 leading from the interior to the exterior of the container 1, said lid being also provided with a depending annular flange 16 within the upper end of the vat 1 in spaced relation thereto to form the inner walls of the passages 15.

The object of these passages 15 is to permit the escape of any fluid which may be expelled from the clothes by centrifugal force as the receptacle 1 with the wet clothes therein is rotated at a more or less high rate of speed which causes the water to pass upwardly along said walls and through the passages 15 over the top of the flange 13.

The rotary container 1 is surrounded by a relatively stationary upright casing 17 which extends nearly the full length of the container in radially spaced relation thereto, and is provided near its lower and upper ends with internal reinforcing rings 18 and 19 and together with said rings is secured to the adjacent side of the vat A by bolts 18' and 19', Figure 2.

The upper ring 19 forms an annular bearing for receiving and supporting an annular extension 20 of the casing 17 and permitting said extension to be adjusted rotarily, and for this purpose said extension 20 is provided with a peripheral groove for receiving the ring 19 which also serves to hold the extension against axial movement.

This extension 20 is provided in its upper face with an annular channel 21 which underlies the outer edge of the flange 13 for receiving the overflow water from the passages 15.

The extension 20 is also provided with a laterally projecting shelf or drain board 22 which may be adjusted to different radial positions by the rotary adustment of the extension 20 to permit the overflowing suds and other washing or rinsing fluid from the container to be returned to the washing vat or to other receptacles at different positions around the container, and also to facilitate the transfer of the clothes to and from the container and to and from different receptacles.

This shelf 22 is provided with a branch passage 23 leading laterally from one side of the trough or conduit 21 tangential to the corresponding side of the revoluble receptacle 1 for conducting the water expelled from the clothes by the rotation of the receptacle from the conductor 21 into the washing or rinsing vat for re-use, or to any other place desired.

A cover 24 is movable to and from a position across the upper end of the vat 1 directly over the lid 12 and for this purpose is hinged at 25 to one side of the upper end of the extension 20 while its opposite side is movable into and out of engagement with the corresponding side of the extension 20 and is provided with a locking member 26 movable into and out of engagement with a keeper 27 on the shelf.

The locking member 26 is secured to the lower end of a spindle 28 which is journaled in the adjacent portion of the cover 24 and is provided at its upper end with an operating handle 29 by which it may be turned to move the lock 27 into and out of engagement with its keeper.

The lid 12 is mounted upon the cover 24 to open and close therewith and in order that it may be free to rotate with the receptacle 1 relatively to the cover 12 it is centrally journaled upon the lower end of a post 30, which, in turn is journaled in a central bearing 31 in the cover 24 and is provided with an operating handle 32.

A cam collar 33 is secured to the intermediate portion of the post 30 between the lid 12 and cover 24 and is provided with a cam face 34 adapted to engage a companion cam face on the underside of the adjacent portion of the cover, whereby the rotation of the post 30 in one direction by means of the handle 32 will force the receptacle 1 downwardly against the action of its retracting spring 5 for engaging its friction face 2' with the driving element 6 whereby rotary motion will be transmitted from said driving element to the receptacle 1 including its lid 12 about the vertically alined axes of the co-axial bearing posts 3 and 30.

Suitable means is provided for preventing the opening of the cover 24 and lid 12 when the receptacle 1 is being rotated by its driving element 6 and also for preventing the axial operation of said receptacle into engagement with its driving element, while the cover 24 and lid 12 are opened to reduce the liability of danger to the operator by contact with the rotating parts and escape of fluid by upward displacement into the room in which the machine is located, and for this purpose is provided a locking bolt 35 which is slidable endwise in suitable bearings in the cover 24 between the post 30 and spindle 28, or rather between the collar 33 and hub of the handle 29, Figures 2 and 5.

The cam collar 33 is provided with a lengthwise peripheral groove movable into and out of registration with the inner end of the locking bolt 35 as the handle 32 is adjusted rotarily to different positions indicated by full lines and dotted lines in Figure 1, while the hub of the handle 29 is provided with a circumferentially extending peripheral groove movable into and out of registration with the outer end of the locking bolt 35 as the handle 29 is adjusted to different positions.

During this rotary adjustment of the handle 32 and cam 33 the latter will ride against its companion face on the underside of the adjacent portion of the cover 24, thereby forcing the receptacle 1 downwardly to engage its lower friction face 2' with the driving element 6 for imparting rotary motion to the receptacle.

As long as the handle 32 and its cam collar 33 remain in their adjusted positions for effecting the rotation of the receptacle 1, the lever 29 and its locking member 26 will be held against return movement to their releasing positions by the engagement of the inner end of the locking bolt 35 with the periphery of the cam collar 33, and therefore, the cover 24 and lid 12 cannot be released for opening until the lever 32 and its cam collar 33 are returned to their starting positions.

When the lever 32 and its cam collar 33 are returned to their starting positions as just described, the locking lever 29 may be turned to release its locking member 26 from engagement with the keeper 27, during which operation the periphery of the hub of the handle 29 will be brought into engagement with the locking bolt 35 for forcing the latter endwise inwardly into engagement with the registering groove in the cam collar 33.

The cover 24 is provided with one or more air-vent openings 38 to prevent the trapping of the air in the chamber between the cover 24 and lid 12 and thus permit the free exit of the fluid expelled from the clothes by centrifugal force through the passages 15.

If desired, the post 30 may be provided with a central lengthwise passage 39 therethrough from end to end, and a spray nozzle 40 at its inner end, while the outer end may be connected by a flexible conduit 41 to any available source of supply for rinsing water, or for air, either warm or cold, under pressure as may be required for expediting the cleansing and drying of the clothes in the

receptacle 1 during the rotation thereof, or while the fluid is being expelled therefrom.

Operation

When it is desired to dry a set batch of clothes which have been previously washed in the washing machine A, the cover 24 is first unlocked by the proper adjustment of the handle 29, after which the cover with the lid 12 thereon is opened about the axis of the pivot 25.

The clothes which have been previously washed in the washing machine A are then withdrawn by hand over and along the shelf 22 and dropped into the open upper end of the receptacle until the latter is substantially filled, whereupon the cover 24 with the lid thereon is returned to its closed position and locked by the proper adjustment of the handle 29.

Immediately following this operation, the lever 32 will be adjusted rotarily to force the receptacle 1 downwardly into engagement with its driving element 6 which may be rotated by any suitable driving mechanism for imparting rotary motion to the receptacle.

As the receptacle 1 with the wet clothes therein is rotated at a relatively high rate of speed, the water therein is expelled by centrifugal force laterally and upwardly along the side walls of the receptacle 1 and outwardly through the passages 15 into the trough 21 from which it is free to escape through the tangential passage 23 into the tub A or into any other suitable receptacle, during which operation a rinsing fluid or air under pressure may be introduced into the receptacle through the passage 39 and nozzle 40 for expediting the cleansing and drying of the articles in the receptacle.

It is found that the upwardly flaring imperforate wall of the receptacle greatly facilitates the escape of the expelled water over the upper edge thereof, and that a thorough drying of the articles may be accomplished in a relatively short period of time, leaving said articles in a fluffy condition ready for ironing.

In removing the clothes from the receptacle, the handle 32 must be first returned to its starting position to release said receptacle from engagement with its driving element 6, thereby allowing the spring 6 to lift the receptacle and to cause its brake surface 10 to engage the stationary brake member 11 for quickly stopping the rotation of the receptacle.

Immediately following the release of the receptacle from engagement with its driving element, the handle 29 may be adjusted to unlock the cover 24, thus permitting said cover with the lid 12 thereon to be fully opened, whereupon the practically dry clothes may be removed by hand through the upper open end of the receptacle, the machine being then ready for a repetition of the operations previously described.

I claim:

1. In an apparatus for the purpose set forth, a vertically disposed revoluble receptacle forming a combined rinsing and drying chamber, an adjustable drain board, means carried at the top of the receptacle to permit of adjustably positioning said board circumferentially with respect to the receptacle for directing the overflow from said chamber to the point desired.

2. An apparatus for the purpose set forth comprising a washing chamber, a combined rinsing and drying chamber, and a revoluble support carried at the top of the combined rinsing and drying chamber and provided with a drain board capable of being shifted by the support to extend over the washing chamber for directing the overflow from the combined rinsing and drying chamber into the washing chamber.

3. In an apparatus for the purpose set forth, a vertically disposed revoluble receptacle forming a combined rinsing and drying chamber, a drain-board supporting member surrounding the upper end of the receptacle and adjustable about the axis thereof for directing the overflow from said chamber to the point desired, and means for supporting said member.

4. In an apparatus for the purpose set forth, a vertically disposed revoluble extracting receptacle flanged outwardly at its upper end to provide a bearing surface for a lid, a separable driving connection for the lower end of said receptacle, a troughed member having an open upper end surrounding the upper end of said receptacle and manually adjustable about the axis for directing water expelled thereinto from said receptacle to the point desired, a drain board connected to and adjustable with said troughed member, a supporting means for said troughed member, a cover for the open upper end of said trough member, and a lid revolubly connected with said cover and adapted when said cover is in closed position to assume a closed position with respect to said receptacle and have an engaging relation with the flanged end thereof, said lid and flanged portion of said receptacle being so related to each other as to provide water egress passages therebetween.

5. In an apparatus for the purpose set forth, a centrifugal extractor comprising a rotatable receptacle, a cover for the receptacle, circumferentially adjustable means for the discharge of overflow water at the top of the receptacle, said means permitting of the discharge of the liquid selectively at one or another of a plurality of points spaced circumferentially about the receptacle, and means independent of said receptacle for supporting said cover for rotation with the receptacle.

6. In an apparatus for the purpose set forth, a rotatable extracting receptacle, a housing supported to be manually and circumferentially adjusted about the upper end of said receptacle and to receive and conduct water therefrom, a drain board connected to and adjustable with said housing, a cover for said housing, and a lid rotatably connected with said cover and adapted when said cover is in closed position to serve as a closure for and to rotate with said receptacle.

7. In an apparatus for the purpose set forth, a rotatable extracting receptacle, a housing supported to be manually and circumferentially adjusted about the upper end of said receptacle and to receive and conduct water therefrom, a drain board connected to and adjustable with said housing, a cover for said housing, and a lid rotatably connected with said cover and adapted when said cover is in closed position to serve as a closure for and to rotate with said receptacle, the latter and the lid being related to each other to provide water egress passages therebetween.

8. In an apparatus for the purpose set forth, a rotatable extracting receptacle, a separable driving connection for the base of said receptacle, a drain board supported to be manually and circumferentially adjusted about the upper end of said receptacle, whereby said drain board may be brought into relation with differently placed receptacles, and means to conduct water expelled from said receptacle to said drain board when in its different adjusted positions.

9. In an apparatus for the purpose set forth, a

vertically disposed revoluble receptacle forming a combined rinsing and drying chamber, a drain board having a supporting member surrounding the upper end of the receptacle and adjustable about the axis thereof for directing the overflow from said chamber to the point desired, and means for supporting said member.

10. In a centrifugal clothes drier, a receptacle for the clothes revoluble about a vertical axis and provided at its upper end with an overflow passage, and means extending laterally from the upper end of the receptacle to receive overflow from said passage and adjustable about the axis thereof to direct said overflow to different points of the receptacle.

11. In a machine for drying clothes, a drying vat, a rotatable clothes container mounted in said drying vat said rotatable clothes container having diverging side walls whereby when the container is rotated at high speed the fluid extracted from the clothes is discharged at the top of the container, and a trough mounted at the top of and supported by the drier vat and adapted to receive and discharge the fluid received from said container.

12. A centrifugal clothes drier comprising a vat, a receptacle for the clothes to be dried rotatably mounted in said vat, means for rotating the clothes receptacle, a manually rotatable ring mounted at the upper end of the vat, and a drain board carried by and extending outwardly from the ring and rotatable therewith to different positions about the periphery of the vat.

13. A centrifugal clothes drier comprising a vat, a receptacle for the clothes to be dried rotatably mounted in said vat, means for rotating the clothes receptacle, a supporting member, a drain board carried by said supporting member and rotatably mounted at the upper end of the vat and adapted for disposition at different places about the periphery thereof, and a cover hinged to said supporting member.

14. A centrifugal clothes drier comprising a vat, a receptacle for the clothes to be dried rotatably mounted in said vat, means for rotating the clothes receptacle, drain board carrying means rotatably mounted on the upper end of the vat, and a drain board projecting outwardly from said carrying means and adapted to be disposed at different positions about the periphery of the vat upon rotation of said carrying means.

15. In a centrifugal clothes drier, a rotatably mounted receptacle for the clothes to be dried, means for rotating said receptacle, a ring member operatively associated with said receptacle, a drain board carried by and affixed to said ring member and adapted for manual disposition at different points about the periphery of said receptacle.

16. In a machine for drying clothes, a supporting member, means for drying clothes associated with said supporting member, a drain board, an annular member carrying said drain board and adapted to be rotated on said supporting member to move said drain board to various circumferential positions with respect to said clothes drying means.

17. In a machine for drying clothes, a supporting member, means for drying clothes associated with said supporting member, a drain board, an annular member disposed about the top of said clothes drying means and having a portion for receiving fluid discharged from said clothes drying means, said annular member being movable on said supporting member to move said drain board to various circumferential positions with respect to said clothes drying means.

18. In a machine for drying clothes, a supporting member, means for drying clothes associated with said supporting member, a drain board, an annular member carrying said drain board disposed about the top of said clothes drying means and having a portion for receiving fluid discharged from said clothes drying means, said annular member being movable on said supporting member to move said drain board to various circumferential positions with respect to said clothes drying means, and a cover hinged to said annular member.

19. In a machine for drying clothes, a rotatably supported receptacle, means for rotating said receptacle, an annular member disposed about said receptacle near the top thereof, a drain board carried by said annular member, said annular member being adapted to be rotated about the top of the receptacle to dispose the drain board at any one of a plurality of positions with respect to the receptacle, a cover for said annular member hinged thereto, a cover for said receptacle rotatably mounted on the underside of said first-mentioned cover and engageable with said receptacle for rotation therewith, said receptacle and said receptacle cover forming a closed container for the clothes to be dried and having openings formed only near the top thereof to enable the escape of fluid extracted from the clothes.

20. In a machine for drying clothes adapted to be mounted in close proximity to a washing vat, a stationary vat having a supporting frame, a rotatable clothes drying receptacle within said vat, means for rotating said receptacle to extract fluid from the clothes, an annular member disposed at the top of said vat and supported thereby, a drain board carried entirely by said annular member and being adapted to extend with its free edge overlying the edge of the washing vat so as to catch fluid as it drips from the clothes as the clothes are transferred from the washing vat to the drying vat.

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