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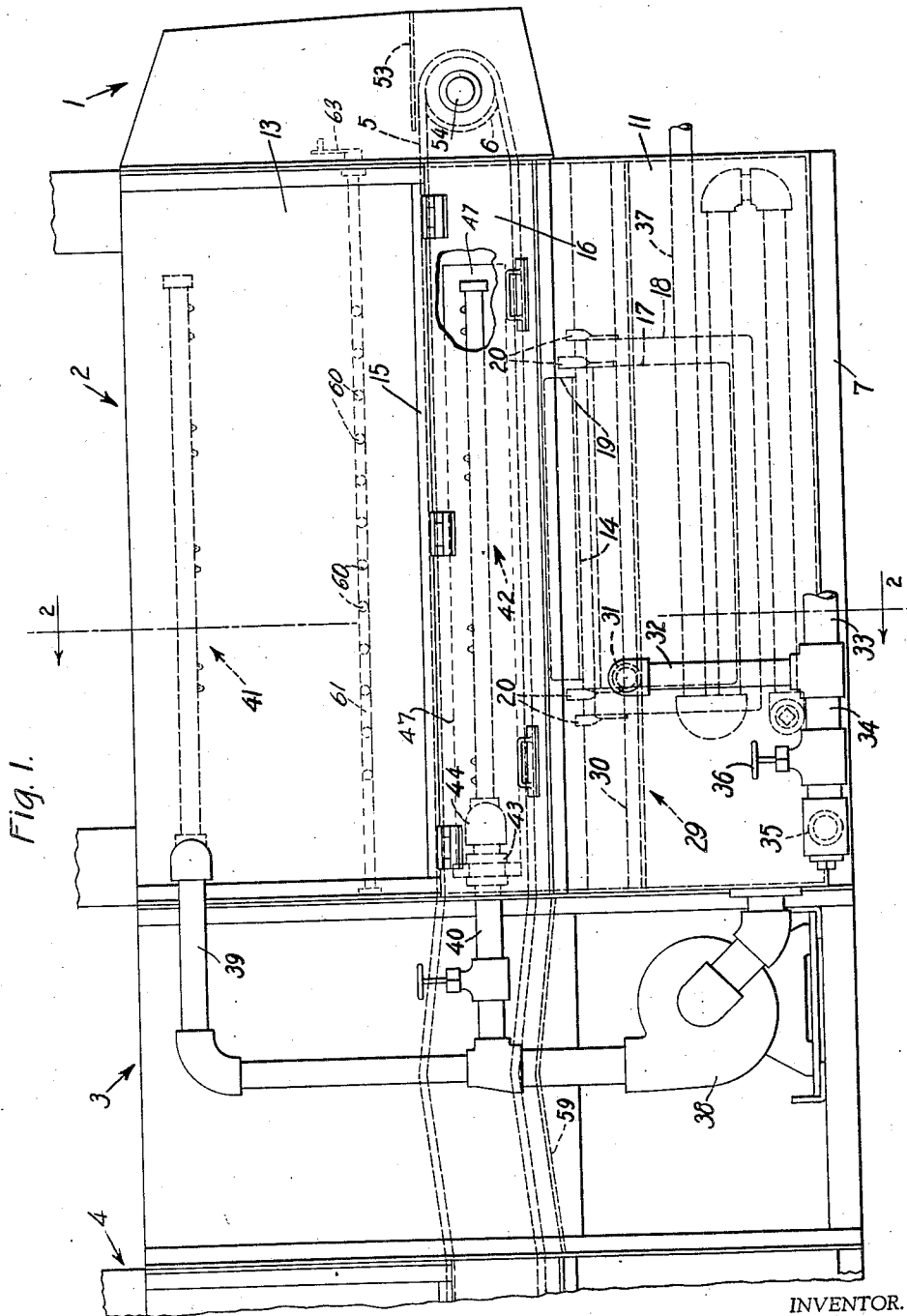
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WASHING MACHINE

Filed April 16, 1936

2 Sheets-Sheet 1



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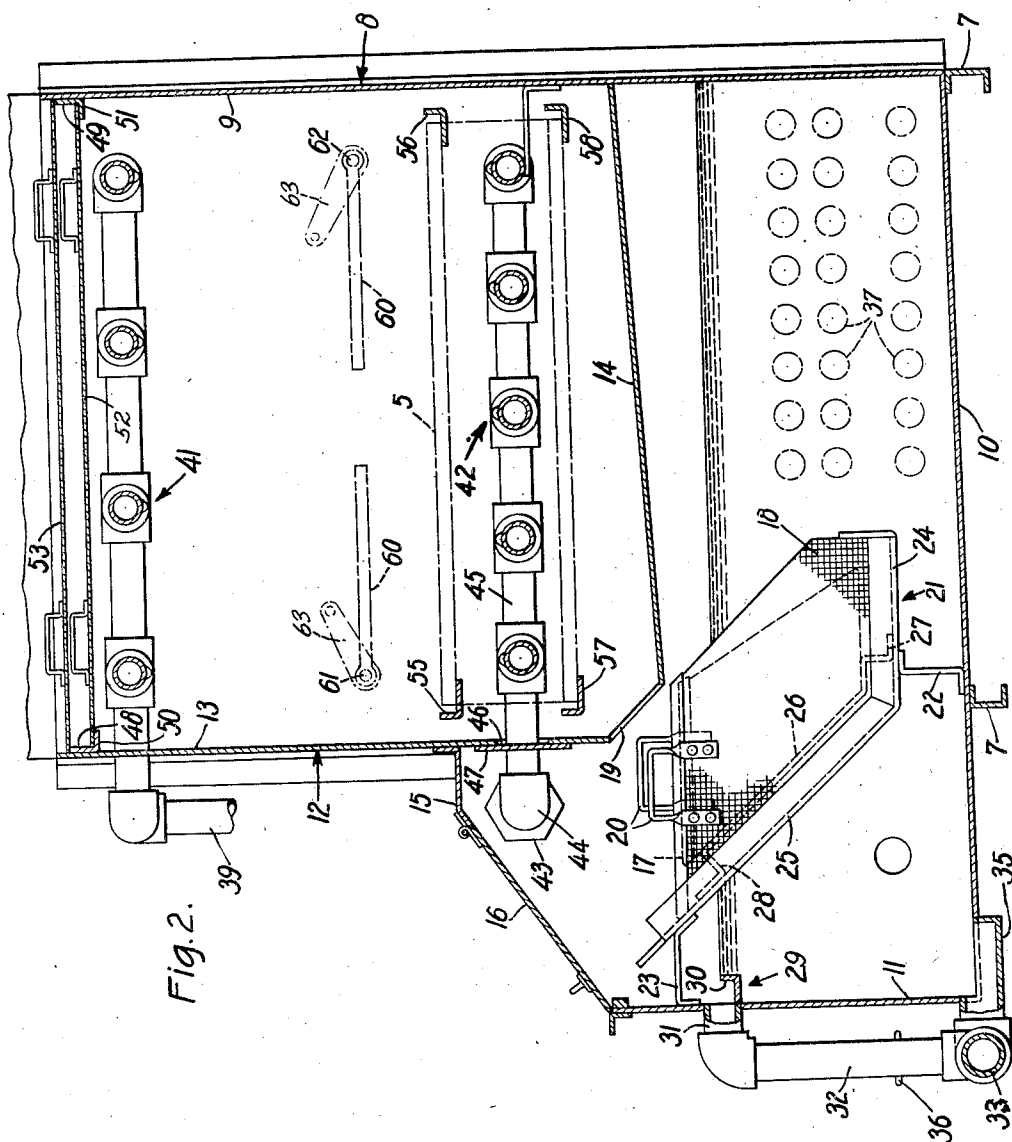
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WASHING MACHINE

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12 Claims. (Cl. 141—1)

This invention relates to machines for washing articles or for otherwise treating articles while conducting them through a treating chamber.

5 In a preferred embodiment the invention involves a combination of two or more treating chambers arranged in series. Ordinarily the successive treatments may be washing, rinsing, and drying, but the treatments may obviously be altered by changing the treating fluids.

10 It has been the practice in the past to provide machines of this character in which the articles are conducted successively through washing, rinsing, and drying chambers. In such machines provision is usually made for access to the interior washing and rinsing sections through a side. In accordance with prior practice, however, it has been necessary to make a machine which affords access through its right side of radically different construction from a similar machine which affords access through its left side.

20 It is an important object of the present invention to provide a construction in which all or practically all of the parts may be the same regardless of whether access is to be had through the right or the left side of the machine.

25 To this end it is a feature of this invention that spacer units are provided between successive operating units of the machine, as between the washing and the rinsing units. The spacer unit is a distinct entity from either the washing or the rinsing unit. The ends of the washing unit are alike. The washing unit may, therefore, be set up with either of its ends adjoining the spacer unit and hence with the side tank at either the right or left side of the machine. The only difference between the right hand machine and the left hand machine consists then in minor variations in the pipe connections.

30 A further feature of the invention has to do with provision for removal of the lower spray nozzles when necessary. In accordance with prior practice the lower spray nozzles have been removable through openings located in a side of the washing chamber above the side tank. Such openings, unless very securely sealed, permitted leakage to the exterior of the apparatus.

35 In accordance with an important feature of the present invention the opening in the washing compartment wall for permitting withdrawal of the lower nozzles is located at the side of the compartment toward the side tank and below the top of the side tank. With this arrangement

any leakage which may occur will simply be into the side tank.

In the preferred construction the washing unit housing is formed primarily of a single main piece of sheet metal bent to provide at its lower end the tank portion of the machine and another piece of sheet metal bent to provide the front wall and a bottom drain plate of the washing compartment. The drain plate is slanted toward the side tank to cause the solution from the washing compartment to pass through strainer baskets located in the side tank before returning to the main tank.

A further feature of the invention has to do with the cover or top of the washing compartment. It has been the practice in the past to provide a removable cover so as to afford access to the washing compartment from above. The force of the upwardly projected sprays or jets is frequently sufficient to cause a considerable amount of the liquid to pass the removable cover. In accordance with the present invention, two removable covers are provided one above the other so as to form a trap or a chamber between the covers that will prevent any liquid escaping past the second or outer cover.

A further feature of the invention has to do with hold-down frames or bars which are provided for preventing light articles from being thrown about inside the washing chamber. It is a feature that the hold-down bars are pivotally mounted so that they can be swung out of the way when they are not needed and will then stand clear of the liquid jets issuing from the upper bank of nozzles.

35 A further feature of the invention has to do with a loading platform unit. The loading unit may be bolted onto one end or the other of the washing unit according to the side of the machine at which it is desired to locate the side tank. This loading unit includes end sprockets for the conveyor. It also includes a loading plate or platform disposed immediately above the introductory end of the conveyor onto which articles intended for the conveyor can be first deposited. This relieves the conveyor of shock and strain, particularly when articles are dumped or dropped with some violence into the machine.

40 A further feature of the invention has to do with a novel strainer construction. In accordance with this feature a pair of strainer baskets is provided in position to receive the liquid drained back from the washing chamber. One of these baskets is located within the other, the arrangement being such that the removal of the

inner basket for cleaning will still leave the outer basket available to strain the liquid so that it is ordinarily not necessary to stop the machine when the inner basket is to be cleaned.

5 The rinsing unit is desirably a duplicate of the washing unit. Features of the washing unit hereinafter described and claimed are, therefore, to be construed without specific limitation to a washing function or operation.

10 Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification, and disclosing a preferred embodiment of the invention:

15 Fig. 1 is a fragmentary view in side elevation showing loading, washing and spacing units joined together and a fragment of a subsequent unit, which may be a rinsing unit, attached to the spacing unit; and

20 Fig. 2 is a fragmentary, transverse sectional view taken on the line 2-2 of Fig. 1 looking in the direction of the arrows.

The illustrated machine comprises a loading unit 1, a washing unit 2, a spacing unit 3 and a rinsing unit 4. The washing unit is the chief operating unit disclosed and it will be described first. It may be remarked, however, that the articles are conducted through the several units upon an endless travelling conveyor 5 which runs upon end sprockets 6 mounted in the loading unit, the sprockets being employed for advancing the conveyor.

The washing unit comprises supporting rails 7 and a main plate 8 supported on the rails. The main plate comprises a high side wall 9, a bottom wall 10 and a low side wall 11. A second plate 12 is associated with the main plate and comprises a vertical wall 13 and a bottom or drain wall 14. The walls 9, 13 and 14 jointly define an upper or washing compartment which is narrower than the bottom wall 10 of the main plate. That portion of the bottom wall 10 lying outside of the lateral bounds of the wall 14, and the wall 11 form boundaries of a side tank. The side tank also includes a narrow top plate 15 which is secured to the wall 13, and a closure plate 16 which is inclined, and which is hinged at its upper edge to a downwardly inclined margin of the plate 15. It should be observed that the wall 13 extends for a substantial distance below the plate 15 or, in other words, a substantial distance below the top of the side tank.

Provision is made of strainer baskets 17 and 18 which are located in the side tank, the former within the latter. The strainer basket 17 is supported in position to receive all of the liquid drained back from the washing compartment, the plate 12 being provided with an opening 19 through which all of the returning liquid must pass. The strainer basket 17 is provided with handles 20. The basket may be lifted directly out through the opening in the top of the side tank when the closure plate 16 of the side tank is swung to an open position. While the strainer basket 17 is being cleaned the strainer basket 18 still remains in place and performs its usual straining function so that no interruption of the operation of the machine is necessary.

70 The strainer basket 18 is supported upon angle bars 21 carried by brackets or rails 22 and 23. Each of the angle bars 21 comprises a bottom web 24 and an inclined web 25, the latter web being disposed at such an angle that the basket 17 can be slid upward in the direction of the

web and through the opening in the top of the side tank without striking any of the other parts.

The strainer basket 17 is provided with supporting bars 26 having offset flanges 27 and 28 at its lower and upper ends which constitute supporting feet for engaging the inner faces of the strainer basket 18. The bars 26 space the strainer basket 17 at a substantial distance from the walls of the strainer basket 18. It will be noticed, however, that the upper edges of the two strainer baskets adjacent the opening 19 of the plate 12 are contiguous or substantially contiguous so that normally all liquid passes into the inner strainer basket and must, therefore, pass through the mesh of both baskets in order to return to the tank portion of the machine.

A plate 29 is secured to the wall 11 of the main plate 8 and includes an upwardly extending flange or lip 30 over which floating impurities may pass. A pipe 31 penetrates the wall 11 just above the lower edge of the plate 29 for conducting away the floating impurities. The pipe 31 communicates through a pipe 32 with a drain pipe 33. Provision is also made of a pipe 34 which communicates with the drain pipe 33 and with a conduit 35 which lets into the bottom of the side tank. A valve 36 normally closes the passage through the pipe 34 but may be opened when it is desired to drain off the entire contents of the tank.

A steam conduit 37 having a multiplicity of convolutions is disposed in the tank for heating the cleaning liquid.

The liquid is withdrawn from the tank by means of a pump 38 and delivered through conduits 39 and 40 to upper and lower spray nozzles 41 and 42. The pipe 40 is connected through a union 43 to an elbow 44 leading to the manifold pipe 45 of the lower nozzle bank 42. The manifold pipe 45 passes through an elongated opening 46 which is formed in the lower portion of the wall 13. The opening 46 is normally closed by a plate 47, screwed or bolted to the wall 13. When it is desired to remove the lower nozzle bank, the union 43 is disconnected and the plate 47 is detached from the wall 13. The entire bank of nozzles together with the plate 47 may then be removed through the opening in the top of the side tank.

It should be particularly observed that the opening 46 does not communicate directly with the exterior of the machine but that any leakage which occurs past the plate 47 will only drip back into the tank.

The upper nozzle bank 41 is removable through the top of the machine as has been customary heretofore. In accordance with the present invention, however, novel provision is made for normally sealing the top of the washing compartment while affording ready access to the interior of the compartment. Angle bars 48 and 49 secured to the walls 9 and 13 have horizontal webs 50 and 51 which form a continuous ledge upon which an inner removable cover plate 52 rests. An upper removable cover plate 53 rests upon the upper edges of the vertical webs of the bars 48 and 49. With this arrangement the inner cover plate breaks the force of the spray jets so that any liquid which passes the inner cover 52 will have spent its force and cannot pass the outer cover 53. The fact that the gravity sealed joints at the edges of the inner and outer cover plates are in stepped or disaligned relation contributes to the security of the seal effected. The flanges 50 and 51 moreover cooperate with the cover plate

52 to compel the liquid to change its course in passing around the edges of the cover plate 52.

It should be observed that the separate spacer unit, which includes no side tank, affords a convenient space for mounting the pump 38 outside the housing and adjacent to an end of the side tank. The spacer unit also prevents the splashing of liquid from the washing unit over into the rinsing unit and vice versa.

10 The washing unit is reversible end for end and may be attached to the spacer unit so as to locate the side tank on either the right hand side or the left hand side of the machine. At the time when such assembly is effected the manufacturer, of course, knows what assembly is desired. It is at that time that the opening in the side tank for effecting communication with the pump is made. The drain pipe connections may be the same regardless of whether the machine is to be set up with the side tank on the right or the left.

15 Wall openings for the steam pipes and for the upper and lower spray connections may be made after the form of the assembly is known. The opening 46 and the plate 47 would be the same for all constructions, however, since the opening 46 is long enough to permit the entire lower bank of nozzles to be inserted and removed through it, and the endwise reversal would only necessitate reversing the plate 47 end for end. It is to be noted that endwise reversal of the washing unit will also be accompanied by rotation through 180 degrees of the longitudinal spray pipes carried by the manifold 45 so that the nozzles will face upwardly.

20 The loading unit 1 may be attached to the appropriate end of the washer unit after the washer unit has been attached to the spacer unit. The loading unit includes a loading platform 53 which may consist of a metallic plate rigidly supported to extend just above the introductory end of the conveyor 5. The end sprockets 6 are mounted on a shaft 54 which is journaled in suitable bearings carried by the loading unit. Proper spacing of the loading platform 53 from the conveyor is, therefore, assured.

25 The conveyor 5 desirably runs upon supporting rails 55, 56, 57 and 58. These rails are made in sections, each rail section being coterminous with the machine unit of which it forms a part. The rails desirably extend straight through the washing unit but in the spacing unit they are inclined, their ends adjacent the washing unit being inclined downward toward the washing unit, and their ends adjacent the rinsing unit being inclined downward toward the rinsing unit. The articles are thus tilted in passing through the spacer unit to facilitate draining and thereby minimize the carrying over of liquid from one tank to the other. The spacing unit also includes a drain plate 59 which similarly slopes from its middle downward toward the washing and rinsing units.

30 Provision is made within the washing chamber of hold-down grids 60 to prevent the displacement of light articles by the lower spray jets. A series of rods is provided at each side of the machine, the rods at the left side being fast on a shaft 61 and the rods at the right side being fast on a shaft 62. The rods may be swung up out of the way by rotation of the shafts 61 and 62. The shafts 61 and 62 extend to accessible positions at the introductory end of the machine and may be operated between effective and ineffective positions by any suitable means. The pivotal mounting of the rods is a desirable feature

since it enables the rods to be located when ineffective in positions clear of the space between the conveyor and the upper nozzles, so that they do not obstruct the spray jets of the upper bank of nozzles.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. In a washing machine, in combination, means forming a washing chamber, means forming a main tank beneath the washing chamber, said main tank having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, and said washing chamber including a wall which partitions the washing chamber from the upper part of said offset tank portion and which has an elongated aperture formed in it, a set of nozzles within the washing chamber, and a conduit for feeding said nozzles, said conduit being disposed to pass through the offset tank portion and through said aperture in the partitioning wall.

2. In a washing machine, in combination, means forming a washing chamber, means forming a main tank beneath the chamber, said main tank having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, and said washing chamber including a wall which partitions the washing chamber from the upper part of said offset tank portion, a set of nozzles within the washing chamber, and a conduit for feeding said nozzles, said conduit being disposed to pass through the offset tank portion and through said partitioning wall, said partitioning wall having an elongated opening through which the entire nozzle set can be removed as a unit, and a removable plate normally covering said opening.

3. In a washing machine, in combination, means forming a washing chamber, means forming a main tank beneath the chamber, said main tank having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, and said washing chamber including a wall which partitions the washing chamber from the upper part of said offset tank portion, a set of nozzles within the washing chamber, a conduit for feeding said nozzles, said conduit being disposed to pass through the offset tank portion and through the partitioning wall, said partitioning wall having an opening through which the entire nozzle set can be removed as a unit, and a removable plate normally covering said opening, and said offset tank portion including a sloping top having an opening in line with the opening in the partitioning wall and through which the entire nozzle set can be removed as a unit, and a closure for said opening operable between open and closed positions.

4. In a washing machine, a washing chamber, a conveyor in said chamber, means for advancing said conveyor through said chamber, upper and lower nozzles in the chamber trained to project jets upon the articles on the conveyor, hold-down bars in the chamber for preventing dislodgement of the articles by the upwardly projected jets, and rotary means supporting the hold-down bars and operable to swing them out of the way of the downwardly projected jets when they are not required for use.

5. In a washing machine, a washing chamber, a conveyor in said chamber, means for advancing

said conveyor through said chamber, upper and lower nozzles in the chamber trained to project jets upon the articles on the conveyor, a pair of rock shafts extending longitudinally of the washing chamber at opposite sides thereof, and hold-down bars fast on the respective shafts and extending part way across the washing chamber, said bars being operable between effective positions, and ineffective positions in which they are out of the way of the upper spray jets, by rocking of the shafts.

6. In a washing machine, a washing chamber, a conveyor in said chamber, means for advancing said conveyor through said chamber, upper and lower nozzles in the chamber trained to project jets upon the articles on the conveyor, and hold-down members located in the washing chamber and pivotally mounted to swing from operative positions to inoperative positions in which they are completely clear of the space between the upper nozzles and the conveyor.

7. A reversible washing machine assembly including, in combination, a loading unit, a washing unit, a spacer unit and a second treating unit disposed in the order stated, said washing unit including a washing chamber substantially co-extensive in width with the loading unit and the spacer unit, and a tank beneath the washing chamber which is substantially coterminous with the washing chamber at one side thereof, but which projects a substantial distance beyond the washing chamber at the opposite side thereof, said washing unit including a set of spray nozzles in the washing chamber whose intake side is disposed toward the projecting tank portion of the washing unit, a liquid pump alongside the spacer unit and in substantial alignment with the laterally projecting portion of the tank, and connections for delivering liquid from the pump to the spray nozzle set, said assembly being adapted for lateral inversion by turning the washing unit end for end, transferring the pump to the opposite side of the spacer unit, and rearranging the connections from the pump to the spray nozzle set to run rearward to the spray nozzle set from the opposite side of the spacer unit.

8. In a washing machine, in combination, a washing chamber, a main tank disposed beneath the washing chamber and having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, a horizontally disposed bank of spray nozzles in the lower portion of the washing chamber, and a strainer basket disposed in the lower portion of the main tank, said offset tank portion having an opening therein, the opening being so disposed that the bank of nozzles can be removed horizontally through the opening and the strainer basket can be directly removed in an outward and upward direction through the opening.

9. A reversible washing machine assembly as set forth in claim 7, in which the washing and spacer units include supporting means for an endless conveyor and the loading unit includes end sprockets for the conveyor, the conveyor supporting means of the washing unit being symmetrically arranged with respect to the washing chamber and also with respect to the loading and spacer units, so that the conveyor may be

removed preparatory to lateral inversion of the assembly, the washing unit may be turned, and the conveyor may be replaced on the end sprockets and on the conveyor supporting means to run through the loading unit, the washing unit and the spacer unit as before.

10. In a washing machine, in combination, a washing chamber, a main tank disposed beneath the washing chamber and having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, a drain disposed beneath the washing chamber for catching the washing liquid and directing it into the upper part of the offset tank portion, a set of upwardly directed spray nozzles disposed in the washing chamber above the drain, a strainer disposed in the tank to receive the liquid delivered from the drain, means for guiding the strainer upwardly toward the top of the offset tank portion at the side thereof remote from the washing chamber, said offset tank portion having an opening extending lengthwise of the washing chamber beyond the ends of the upwardly directed spray nozzle set and in horizontal alignment with the upwardly directed spray nozzles and in alignment with the strainer path defined by said guiding means, through which either the set of spray nozzles or the strainer can be directly withdrawn, and closure means for normally closing said opening.

11. In a washing machine, in combination, a washing chamber, means for conveying articles through said chamber, a main tank disposed beneath the washing chamber and having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, a horizontally disposed plurality of spray nozzles in the lower portion of the washing chamber under said conveying means, said plurality of nozzles extending both transversely and longitudinally of the washing chamber and being interconnected to form a removable unitary bank, said offset tank portion having an opening therein extending lengthwise of the washing chamber beyond the ends of the bank of spray nozzles and in horizontal alignment therewith, the opening being so disposed that the bank of nozzles can be removed as a unit horizontally through the opening.

12. In a washing machine, in combination, 50 means forming a washing chamber, means forming a main tank beneath the washing chamber, said main tank having an offset portion which extends laterally beyond the bounds of the washing chamber at one side thereof, said washing chamber having an opening establishing communication with said offset tank portion, a bank of spray nozzles in the lower portion of the washing chamber, and a conduit for feeding said nozzles, said conduit being disposed to pass through the offset tank portion and through said opening, said offset tank portion having an opening therein extending lengthwise of the washing chamber beyond the ends of the bank of spray nozzles and in horizontal alignment therewith, the opening being so disposed that the bank of nozzles can be removed horizontally through said opening.

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