

April 21, 1953

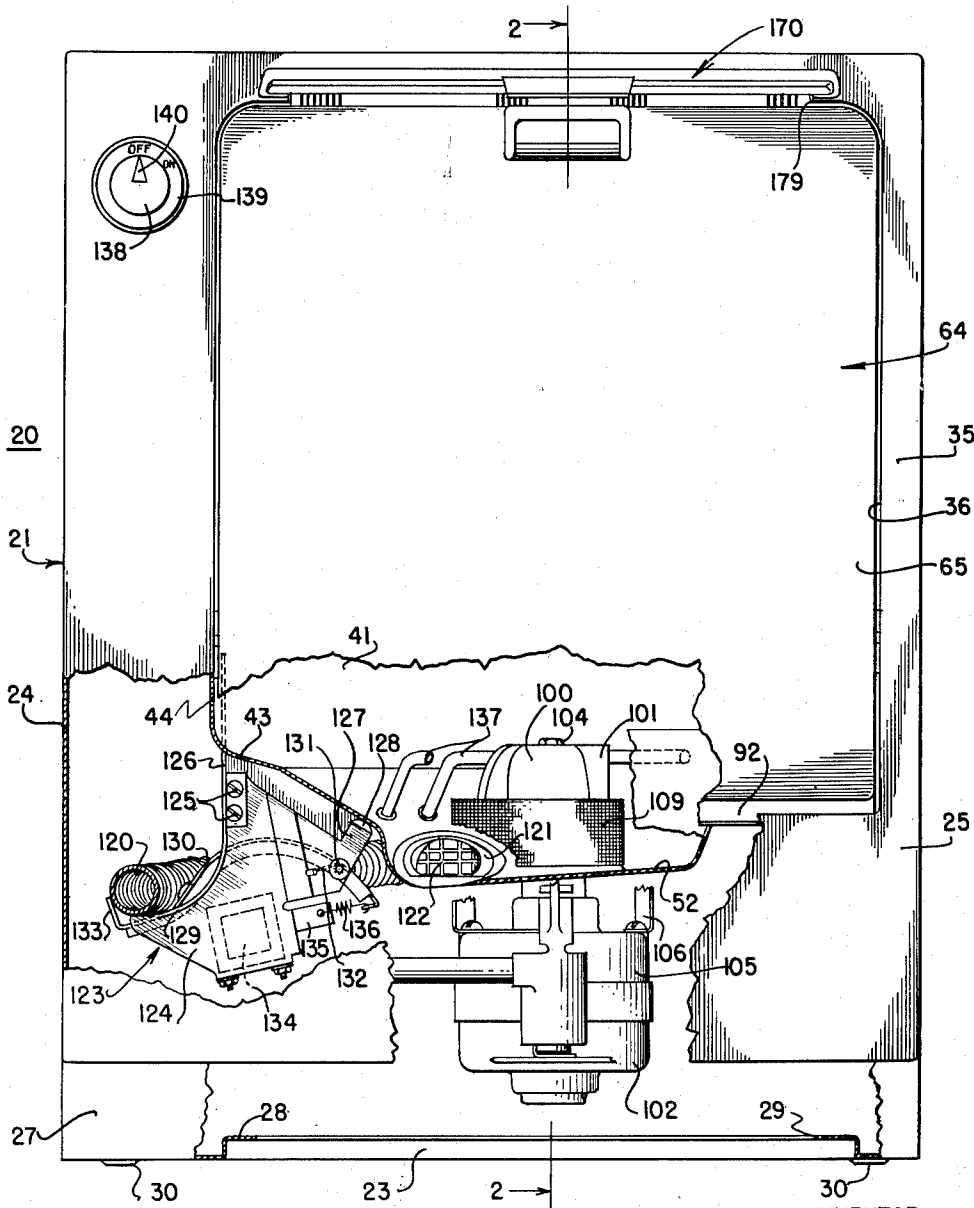
E. S. STODDARD
WASHING APPARATUS

2,635,941

Filed July 19, 1949

6 Sheets-Sheet 1

FIG. 1



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FIG. 4

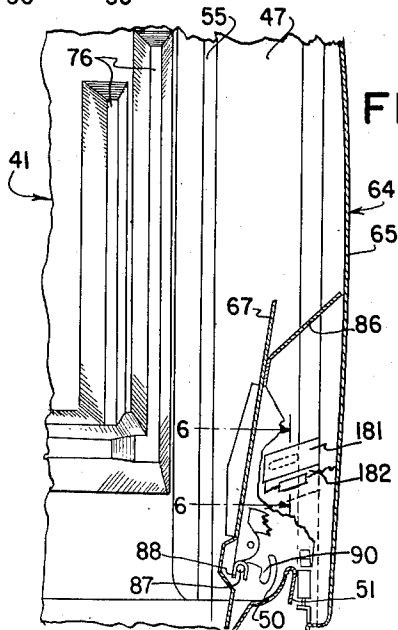
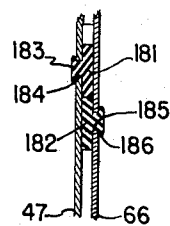


FIG. 5



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FIG. 9

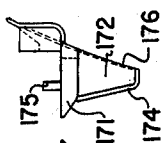


FIG. 7

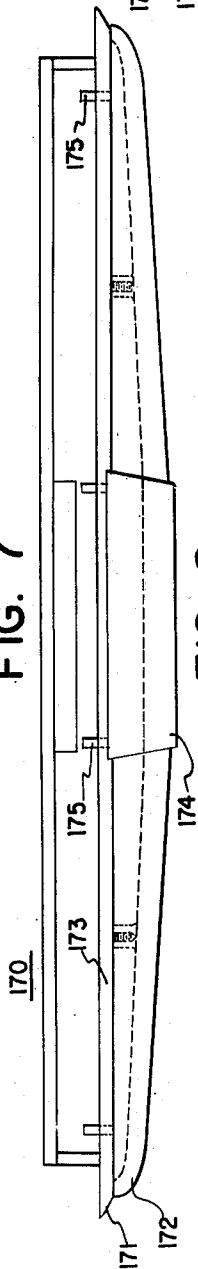


FIG. 8

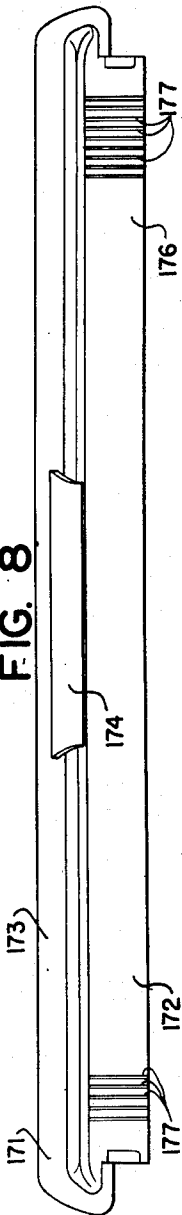


FIG. 12

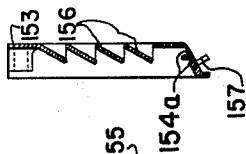


FIG. 10

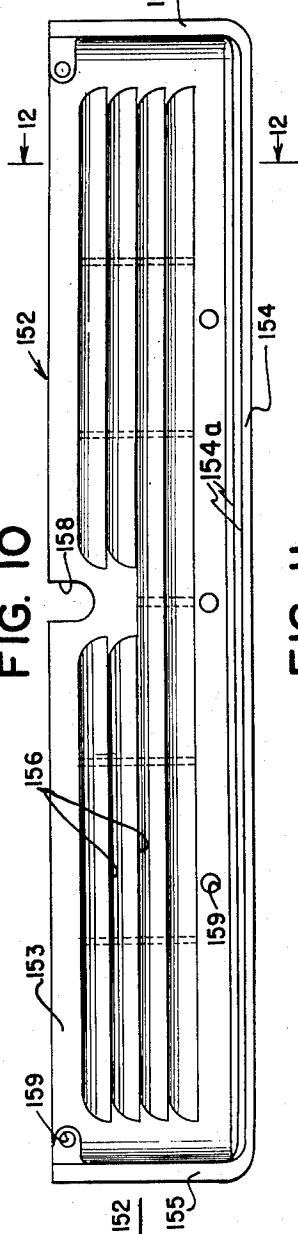
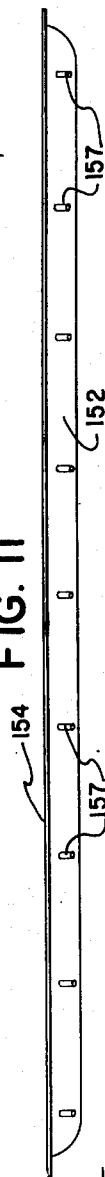


FIG. 11



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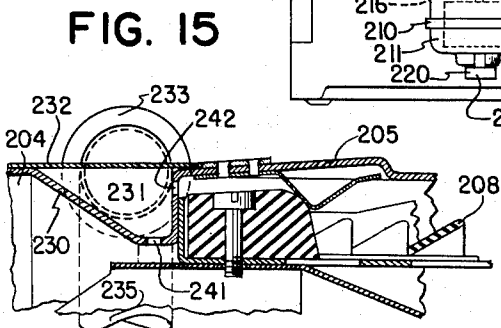
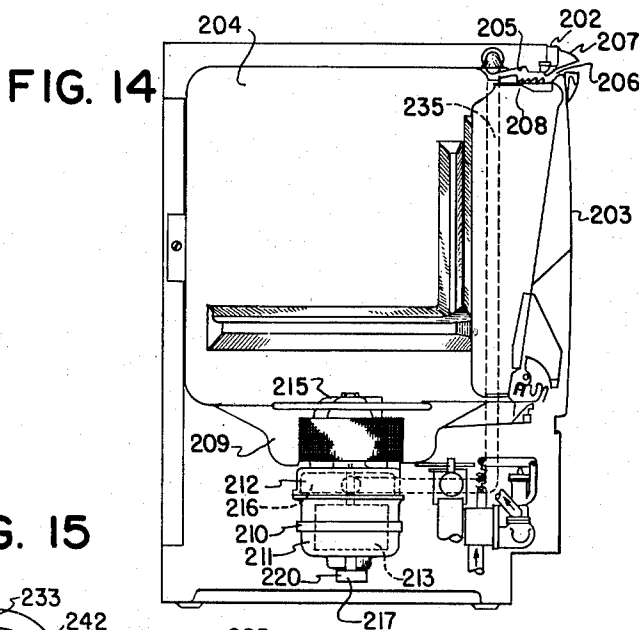
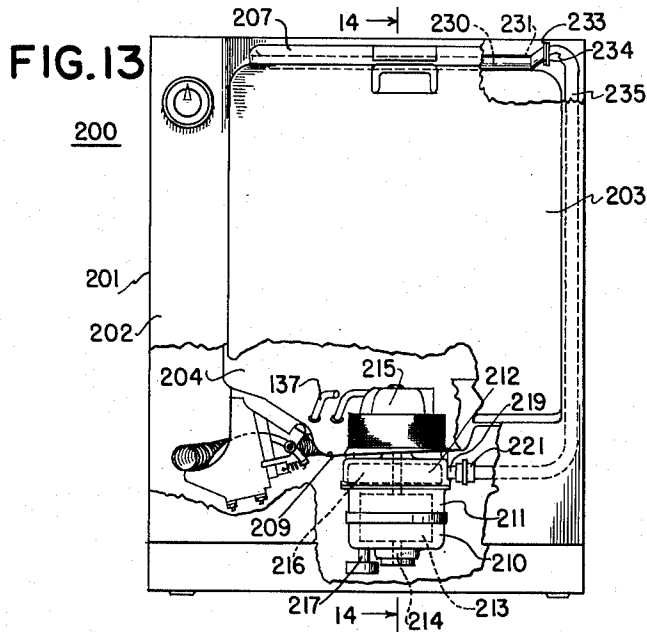
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UNITED STATES PATENT OFFICE

2,635,941

WASHING APPARATUS

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Application July 19, 1949, Serial No. 105,618

23 Claims. (Cl. 312-213)

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The present invention relates to washing apparatus, and more particularly to improved dishwashing apparatus of the general character of that disclosed in the copending application of Forrest A. Walker, Serial No. 57,448, filed October 30, 1948.

The dishwashing apparatus disclosed in the Walker application mentioned is of the timed washing cycle type that performs automatically and in predetermined sequence given steps including spraying, washing, rinsing and drying of the dishes and other utensils contained therein. This apparatus comprises a cabinet having a front opening and housing a vertically disposed vat including wall structure terminating in a forwardly directed doorway having a front opening registering with the first-mentioned front opening, and a door arranged in the doorway and mounted for movements with respect to the front openings between a substantially vertical closed position and a substantially horizontal open position. The wall structure of the vat and the door respectively carry cooperating baffles and are otherwise so constructed and arranged that hot washing fluid or liquid circulated in the vat does not escape between the doorway and the door out of the front opening, notwithstanding the fact that the usual sealing gasket therebetween has been omitted.

While this gasketless door and doorway construction in the apparatus of the Walker application is highly efficient and positive in operation, vapor given off by the hot washing liquid circulated in the tank rises therein and escapes between the top of the doorway and the top of the door and out of the top of the front openings. This operation is not in any way objectionable within itself, and is, in fact, very advantageous; however, the vapor rises gently adjacent to the top front of the cabinet into contact with the front edge of the cold sink normally overlying the top of the cabinet causing the vapor to condense thereon. The resulting condensate collecting on the front edge of the cold sink then drips back upon the kitchen floor in a highly objectionable manner, whereby the housewife, without examining the circumstances closely, erroneously concludes that the hot washing liquid circulated in the vat is escaping from the front openings between the doorway and the door in its closed position. While this difficulty is encountered only when the apparatus is positioned below a sink or other cold work surface, this combination is so frequently and generally used in modern kitchens that the undesirable char-

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acteristic noted may be considered to be inherent in the apparatus itself.

Accordingly, it is a general object of the present invention to provide washing apparatus of the front-opening gasketless-door type that may be employed below a sink or other cold work surface without producing condensation upon the sink of vapor issuing from the apparatus.

Another object of the invention is to provide in washing apparatus of the front opening type, an improved arrangement for projecting out of the front opening to the exterior the vapor given off by the hot washing liquid circulated therein.

Another object of the invention is to provide in washing apparatus of the front-opening gasketless-door type an improved arrangement for ventilating the interior of the vat through the structure of the front door and thence out of the top of the front opening to the exterior.

Another object of the invention is to provide in washing apparatus of the front-opening gasketless-door type an improved arrangement for venting vapor from the interior of the vat and for deflecting condensate resulting from the vented vapor back thereinto.

A further object of the invention is to provide in washing apparatus of the front-opening gasketless-door type, improved structure carried by the cabinet of the apparatus for directing vapor out of the top of the front opening to the exterior.

A further object of the invention is to provide in washing apparatus of the front-opening gasketless-door type, an air blast arrangement for directing vapor out of the front opening to the exterior.

Still a further object of the invention is to provide the combination of a sink, washing apparatus of the front opening type disposed below the sink and characterized by the issue of vapor out of the front opening, and an arrangement for projecting the vapor forwardly from the front opening out of contact with the front edge of the sink in order to prevent condensation of the vapor thereon.

Further features of the invention pertain to the particular arrangement of the elements of the washing apparatus, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification taken in connection with the accompanying

drawings, in which Figure 1 is a front elevational view, partly broken away, of dishwashing apparatus of the front-opening gasketless-door type incorporating fixed structure for directing vapor out of the top of the front opening and embodying the present invention; Fig. 2 is a vertical sectional view, partly broken away, of the dishwashing apparatus, taken in the direction of the arrows along the line 2—2 in Fig. 1; Fig. 3 is an enlarged fragmentary vertical sectional view of the upper front portion of the dishwashing apparatus shown in Fig. 2, illustrating in detail the structure of the top of the door, the vat, the cabinet and the vapor director and indicating the normal relation of these parts with respect to the front edge and work surface of an associated sink; Fig. 4 is a horizontal sectional view, partly broken away, of the dishwashing apparatus, taken in the direction of the arrows along the offset line 4—4 in Fig. 2; Fig. 5 is a fragmentary vertical sectional view of the lower front portion of the dishwashing apparatus shown in Fig. 2, illustrating in detail the structure of the condensate deflecting gaskets respectively carried by the lower portions of the front-door side flanges and by the lower portions of the front doorway side flanges; Fig. 6 is an enlarged fragmentary vertical sectional view of the condensate deflecting gaskets, taken in the direction of the arrows along the line 6—6 in Fig. 5; Fig. 7 is an enlarged plan view of the vapor director carried by the upper front portion of the cabinet; Fig. 8 is an enlarged front elevational view of the vapor director shown in Fig. 7; Fig. 9 is an enlarged end elevational view of the vapor director shown in Figs. 7 and 8; Fig. 10 is an enlarged plan view of the vapor directing structure carried by the top flange of the front door; Fig. 11 is an enlarged front elevational view of the vapor directing structure shown in Fig. 10; Fig. 12 is an enlarged sectional view of the vapor directing structure, taken in the direction of the arrows along the line 12—12 in Fig. 10; Fig. 13 is a reduced front elevational view, partly broken away, of modified dishwashing apparatus of the type noted incorporating an air blast arrangement for directing vapor out of the top of the front opening and embodying the present invention; Fig. 14 is a reduced vertical sectional view, partly broken away, of the dishwashing apparatus, taken in the direction of the arrows along the line 14—14 in Fig. 13; and Fig. 15 is a greatly enlarged fragmentary vertical sectional view of the upper front portion of the dishwashing apparatus shown in Fig. 14, illustrating in detail the structure of the air blast vapor directing arrangement incorporated in the top of the vat.

Referring now to Figs. 1 to 12, inclusive, of the drawings the dishwashing apparatus 20 there illustrated, and embodying the features of the present invention, is of the general character of that disclosed in the previous mentioned Walker application and comprises an outer casing or cabinet 21 provided with top and bottom walls 22 and 23, opposed side walls 24 and 25, and rear and front walls 26 and 27. The bottom wall 23 is upwardly offset adjacent to the central portion thereof in order to provide an inwardly directed flange 28 having an opening 29 formed therein accommodating ventilation of the lower portion of the cabinet 21. Also the bottom wall 23 has a plurality of downwardly depressed feet 30 formed therein for the purpose of spacing the bottom wall 23 from the supporting floor. The front wall 27 is rearwardly offset adjacent to

the bottom wall 23 providing connecting substantially vertical and horizontal panels 31 and 32 adjacent to the front of the cabinet 21 in order to define a foot-receiving recess, permitting a person to work close to the front of the cabinet 21. Also, the front wall 27 is provided with outwardly projecting top and side flange structure 33 defining a front opening 34 in the upper portion thereof, the front opening 34 being offset toward the right closer to the right-hand side wall 25 than to the left-hand side wall 24. Further, the front wall 27 carries a front panel 35 having an opening 36 formed in the upper portion thereof and offset toward the right-hand side thereof, the front opening 36 surrounding the front opening 34 and overlying a considerable marginal portion thereof adjacent to the lower portion of the front wall 27. The front panel 35 is provided with an inwardly directed marginal flange 37 surrounding the front opening 36 and lying within the top and side flange structure 33. Also the front panel 35 is provided with an inwardly directed boundary flange 38, the top and side portions thereof being respectively disposed substantially flush with the top wall 22 and the side walls 24 and 25, and the bottom portion thereof overlying the horizontal panel 32. More specifically, the front panel 35 is removably secured to the front wall 27 by an arrangement including a pair of laterally spaced-apart screws 39 extending through the top of the marginal flange 37 and the adjacent top flange structure 33 and by a pair of laterally spaced-apart screws 40 extending through the bottom of the boundary flange 38 and the horizontal flange 32. Thus it will be understood that the front panel 35 conceals the front wall 27 when it is secured thereto by the screws 39 and 40 and that the front panel 35 may be readily removed from the front wall 27 by removing the screws 39 and 40.

The cabinet 21 houses a substantially vertically disposed vat 41 arranged in the upper portion thereof and offset toward the right closer to the side wall 25 than to the side wall 24. The vat 41 comprises top and bottom walls 42 and 43, opposed side walls 44 and 45, and a rear wall 46; the top and bottom walls 42 and 43 and the side walls 44 and 45 terminate in a forwardly directed doorway 47 having a front opening 48 arranged in substantial registry with the front openings 34 and 36. More particularly, the top and side portions or flanges of the doorway 47 terminate in an outwardly and rearwardly rolled rim 49, while the bottom wall 43 is provided with a forwardly projecting flange 50 terminating in an upwardly and outwardly extending front ledge or lip 51 extending between the side flanges of the doorway 47. The front ledge 51 is directed first upwardly and outwardly and then downwardly terminating adjacent to the front opening 48 of the doorway 47, whereby the upper edge of the front ledge 51 is disposed considerably above the bottom flange 50 and consequently the bottom wall 43. A substantially centrally disposed downwardly depressed sump 52 is formed in the bottom wall 43 and communicates with a downwardly embossed depression or groove 53 formed substantially centrally in the bottom flange 50 and extending forwardly toward the central portion of the front ledge 51. Further, an upstanding inverted substantially U-shaped inwardly embossed vat rib 54 is formed in the top wall 42 and the side walls 44 and 45 at the junctions thereof with the corresponding flanges of the doorway 47, the vat rib 54 includ-

ing downwardly extending legs 55 terminating just above the bottom flange 50 and well behind and below the front ledge 51.

The front of the vat 41 is secured in position within the cabinet 21 by a three-point support, while the rear of the vat 41 is secured in position in the cabinet 21 by a two-point support, in order to accommodate ready placement and removal of the vat 41 with respect to the cabinet 21. More particularly, a top tongue 56 is secured to the top central portion of the roller rim 49 and projects forwardly therefrom through a top slot 57 formed in the front wall 27 above the top of the front opening 34; while two side tongues, not shown, are respectively secured to the side central portions of the rolled rim 49 and project forwardly therefrom through two side slots, not shown, formed in the front wall 27 on opposite sides of the front opening 34. The rear wall 26 is provided with forwardly directed flange structure 58 defining an enlarged opening 59 therein through which the vat 41 may be readily inserted or removed with respect to the cabinet 21. More specifically, a first rearwardly directed fixture 60 is welded or otherwise secured mutually to the side and rear walls 44 and 46 of the vat 41; and a second rearwardly directed fixture 61 is welded or otherwise secured mutually to the side and rear walls 45 and 46. The two fixtures 60 and 61 are respectively secured to the adjacent sides of the flange structure 58 by cooperating bolts 62 and 63, respectively, the bolts 62 and 63 being provided with associated nuts as illustrated. Thus it will be understood that the vat 41, together with its attachments subsequently described, is assembled as a unit and then inserted through the hole 59 in the rear wall 26 of the cabinet 21, the tongues 56, etc., being slidably received in the cooperating slots 57, etc., and thereafter the fixtures 60 and 61 are secured in place utilizing the bolts 62 and 63. Subsequently the front panel 35 may be placed upon the front wall 27 and secured in place employing the screws 39 and 40.

The cabinet 21 is provided with a front door 64 that comprises an outer body sheet 65 terminating in an inverted substantially U-shaped rearwardly directed marginal flange 66, and an inner body sheet 67 terminating in an inverted substantially U-shaped rearwardly directed marginal flange 68. The inner body sheet 67 is arranged in nested relation within the outer body sheet 65 and suitably secured in place so that the principal portions of the body sheets 65 and 67 are arranged in upwardly approaching spaced-apart relation. Further, the marginal flange 68 of the inner body sheet 67 is provided with an outwardly directed inverted substantially U-shaped marginal flange or lip 69 that cooperates with the front surface of the associated vat rib 54 when the door 64 occupies its closed position. In order to retain the door 64 in its closed position a latch element 70 formed of a suitable molded plastic, or the like, is secured to the central upper portion of the marginal flange 68 adjacent to the lip 69 by an arrangement including a screw 71. The latch element 70 cooperates with a resilient corrosion-resistant spring 72 secured within the upper central portion of the doorway 47 by an arrangement including a plurality of rivets 73. Also, the marginal flange 68 of the inner body sheet 67 carries inverted substantially U-shaped rearwardly directed baffle structure 74 therein that projects adjacent to the vat rib 54 into the interior of the vat 41 in order to prevent the entry of washing

liquid into the doorway 47. More particularly, the baffle structure 74 carried by the marginal flange 68 of the inner body sheet 67 cooperates with inwardly directed baffle structure formed in the side walls 44 and 45 of the vat 41 in order to complete the gasketless vat and door construction. The inwardly directed baffle structure formed in the left-hand side wall 44 is indicated generally at 75; and the inwardly directed baffle structure formed in the right-hand side wall 45 is indicated generally at 76; these baffle structures 75 and 76 being disposed rearwardly of the upstanding legs 55 of the vat rib 54. Also, the left-hand side wall 44 of the vat 41 carries an inwardly directed embossed trackway indicated generally at 77; and the right-hand side wall 45 of the vat 41 carries an inwardly directed embossed trackway indicated generally at 78; the opposed trackways 77 and 78 cooperating with and supporting movable dish carrying rack structure generally indicated at 79.

The door 64 is mounted adjacent to the lower edge thereof within the doorway 47 rearwardly of and below the front ledge 51 by a hinge arrangement including two laterally disposed substantially identical hinge mechanisms, whereby the lower ends of the outer and inner body sheets 65 and 67 are disposed in straddling relation with respect to the front ledge 51. More particularly, the right-hand hinge mechanism is indicated generally at 80 and comprises a first hinge element 81 secured to the flange 50 provided on the bottom wall 43 interiorly of the vat 41 and a second hinge element 82 secured to the front surface of the inner body sheet 67 and disposed between the inner and outer body sheets 67 and 65. Also, this mechanism comprises a bumper member 83 secured to the lower surface of the flange 50 exteriorly of the vat 41 and adapted to cooperate with a bumper member 84 carried by the hinge element 82. Also, a guide track 85 is secured to the rear surface of the inner body sheet 67 and disposed over the hinge element 80; and a detergent cup, not shown, is carried by the lower portion of the inner body sheet 67 in the space between the body sheets 67 and 65 and opening into the interior of the vat 41 for the purpose of receiving detergent. Further, the inner and outer body sheets 67 and 65 are restrained in spaced-apart relation by an upwardly and forwardly directed laterally extending bracing sheet 86 secured to the front surface of the inner body sheet 67 and abutting the rear surface of the outer body sheet 65. Further, the hinge mechanism 80 comprises a pintle 87 carried by the hinge element 81, a cooperating saddle 88 carried by the hinge element 82, and a locking pin 89 carried by the hinge element 82 and cooperating with a locking slot 90 formed in the hinge element 81. Further, a handle 91 is secured to the upper central front of the outer body sheet 65 for the purpose of facilitating movement of the door 64 between its open and closed positions; while the lower edge of the outer body sheet 65 carries a laterally extending flange 92 that cooperates with a rearwardly directed ledge 93 formed on the front panel 35 just below the bottom of the front opening 36 formed therein for the purpose of lending a finished appearance to the cabinet 21 when the door 64 occupies its closed position. Finally, a door switch 94 is secured to the front edge of the front ledge 51 and cooperates with a projection 95 carried by the outer body sheet 65.

In view of the foregoing description of the con-

struction of the door 64, it will be understood that the door 64 is movable into a closed position with respect to the doorway 47, at which time the outer body sheet 65 occupies a substantially vertical position and is disposed substantially flush with the front surface of the front panel 35, and at which time the inner body sheet 67 is disposed in an upwardly and forwardly inclined position. The door 64 is restrained in its closed position by the cooperation between the latch elements 70 and 72; whereby the baffle structure 74 carried by the marginal flange 68 of the inner body sheet 67 cooperates with the baffle structures 75 and 76 respectively carried by the side walls 44 and 45 and with the vat rib 54 carried by the vat 41, and the lip 69 carried by the marginal flange 68 of the inner body sheet 67 engages the front surface of the vat rib 54; thereby to prevent the escape of washing liquid from the interior of the vat 41 into the doorway 47. Also, at this time the projection 95 carried by the outer body sheet 65 engages the plunger of the door switch 94, operating the door switch 94 to its closed-circuit position. Moreover, the door 64 is movable into an open position with respect to the doorway 47, at which time the inner body sheet 67 occupies a substantially horizontal position and the outer body sheet 65 occupies an upwardly and forwardly inclined position. Thus the door 64 is movable through an angle slightly less than 90 degrees between its closed and open position. When the door 64 is moved into its open position the projection 95 disengages the plunger of the door switch 94 operating the door switch 94 into its open-circuit position. Also, as the door 64 is moved into its final open position the bumper member 84 carried by the hinge element 82 engages the bumper member 83 in order rigidly to support the door 64 in its open position; and the locking pin 89 carried by the hinge element 82 enters the locking slot 90 provided in the hinge element 81 in order positively to prevent removal of the door 64 while it occupies its open position. At this time while the door 64 occupies its open position the dish supporting structure 79 may be moved through the doorway 47 into and out of the vat 41. More particularly, the rack structure 79 may be moved from a supported position upon the trackways 77 and 78 within the vat 41 to a position exteriorly of the vat 41 upon the guide track 85, etc., carried by the inner body sheet 67; whereupon dishes may be readily loaded or unloaded with respect to the rack structure 79. Thus it will be understood that when the door 64 occupies its open position it may support the movable rack structure 79 permitting the ready placement and removal of dishes and other utensils with respect thereto.

In passing it is noted that when the door 64 occupies an intermediate position with respect to its closed and open positions described above, it may be completely removed from the doorway 47 by virtue of the fact that the saddle 83 is disengageable with respect to the pintle 37 prior to entry of the locking pin 89 into the locking slot 90.

The general construction and arrangement of the door 64 and the cooperating baffle structures 74, 75 and 76 and the vat rib 54, as well as the arrangement for movably supporting the rack structure 79 within the vat 41 and upon the door 64, have not been disclosed in great detail in the present application, since these arrangements form no part of the present invention, and are

disclosed and claimed in the previously mentioned Walker application.

Similarly, the construction and arrangement of the hinge mechanism 80 has not been disclosed in great detail in the present application, since this arrangement forms no part of the present invention, and is disclosed and claimed in the co-pending application of Frank D. Low, Serial No. 61,633, filed November 23, 1948, now Patent No. 2,573,798.

The apparatus 20 further comprises an impeller 100 which is provided with blades 101 that may have any suitable shape, the important feature being that the blades 101 are given a shape such that the washing liquid supplied to the vat 41 and allowed to accumulate in the sump 52 is flung upwardly and outwardly in an efficient manner through the rack structure 79. The impeller 100 may be formed of any suitable material, such, for example, as "Textolite" and is mounted upon a substantially vertically disposed operating shaft, not shown, of an electric motor 102 arranged below the sump 52. More particularly, the sump 52 is provided with an upwardly directed emboss 103 that terminates in a substantially vertically disposed tube, not shown, through which the shaft of the motor 102 projects and which is surrounded by the hub of the impeller 100. The hub of the impeller 100 may be secured to the shaft by an arrangement including a bolt 104 extending through an opening provided therein, the inner end of the bolt 104 being threaded into an opening provided in the upper end of the shaft of the motor 102. This arrangement permits ready rotation of the impeller 100 by the motor 102 and prevents escape of any substantial amount of washing liquid from the vat 41. The motor 102 is arranged in a substantially vertical position and is provided with an upper end bell 105 that is secured to the lower surface of the sump 52 by an arrangement including two angularly spaced-apart brackets 106 each having two downwardly directed legs receiving studs 107 carried by the end bell 105 and receiving cooperating nuts 108. Finally, an upstanding cylindrical reticulated screen 109 is removably arranged within the sump 52 about the emboss 103 in surrounding relation with respect to the blades 101 of the impeller 100. The screen 109 serves as a strainer to prevent foreign articles suspended in the washing liquid contained in the sump 52 from being caught by the blades 101 of the impeller 100 and flung upwardly through the dish supporting rack 79.

Provided in the space in the cabinet 21 below the vat 41 is a suitable liquid supply pipe 110 which is adapted to be connected to a source of cleansing or washing liquid, not shown, by coupling units, or the like, not shown. For example, in the event the washing liquid is water, the source of supply may be a convenient hot water tank, or the like. The washing liquid is piped from the bottom of the cabinet 21 upwardly between the rear wall 26 thereof and the rear wall 46 of the vat 41 by a flexible conduit 111 and into the top wall 42 of the vat 41. Specifically, a rotary spraying device 112 is arranged within an upwardly extending emboss 113 formed in the top wall 42 of the vat 41 so that the washing liquid may be sprayed downwardly through the rack structure 79 carried within the vat 41 and allowed to accumulate in the sump 52. The liquid supply pipe 110 is suitably connected to an inlet valve mechanism 114 of the solenoid dash-pot type supported by the panel 32 and arranged

to discharge into the conduit 111. The inlet valve mechanism 114 is normally biased to its closed position in order to cut off the supply of washing liquid from the liquid supply pipe 110 to the conduit 111 but is provided with an associated solenoid 115 that is adapted when energized to operate the inlet valve mechanism 114 to its open position in order that washing liquid may be supplied from the liquid supply pipe 110 via the casing of the inlet valve mechanism 114, the conduit 111 and the spraying device 112 into the upper portion of the vat 41. Subsequently, when the solenoid 115 is de-energized the inlet valve mechanism 114 is returned slowly to its closed position cutting off the communication between the liquid supply pipe 110 and the spraying device 112. The provision of the slow-closing inlet valve mechanism 114 eliminates water hammer in the plumbing preceding the liquid supply pipe 110. Also, a strainer, not shown, is incorporated in the casing of the inlet valve mechanism 114 in order positively to prevent foreign material in the liquid supply pipe 110 from being conducted into the spraying device 112.

Also provided in the lower portion of the cabinet 21 below the vat 41 is a drainpipe 116 that is connected through a suitable trap, not shown, to a drain connection. The drainpipe 116 is carried by a fixture 117 that is, in turn, secured by a bolt 118 to a bracket 119 that is welded or otherwise secured to the exterior surface of the sump 52. The drain fixture 117 communicates with a flexible conduit 120 that, in turn, communicates with a drain fixture 121 that is secured within a drain opening provided in the lowermost portion of the sump 52. Preferably the drain fixtures 117 and 121 are formed of molded rubber, or the like, while the flexible conduit 120 comprises a suitable section of rubber hose, or the like, that is internally reinforced to prevent collapse thereof. The opposite ends of the flexible hose 120 may be molded directly onto the drain fixtures 117 and 121 and communicating therewith. The drain fixture 121 frictionally engages the drain opening provided in the sump 52 and is restrained in position by an arrangement comprising a strainer 122 disposed in the throat thereof.

The flexible hose 120 comprises a portion of a drain mechanism 123 that further includes structure 124 that is secured by a plurality of screws 125 to a downwardly extending element 126 welded, or otherwise secured, to the side wall 44 adjacent to the bottom wall 43 of the vat 41. Also the structure 124 comprises a rearwardly and upwardly extending arm 127 carrying a resilient bumper 128 formed of rubber, or the like, and arranged in engagement with the bottom wall 43 just above the sump 52. Further, the structure 124 comprises two spaced-apart guide elements 129 extending below the midsection of the hose 120; and a substantially S-shaped operating member 130 disposed between the guide elements 129. The operating member 130 is pivotally mounted adjacent to the inner end thereof upon a pivot pin 131 carried by the structure 124 and is normally biased in the clockwise direction, as viewed in Fig. 1, by a coil spring 132 surrounding the pivot pin 131 and extending between the structure 124 and the operating member 130. The extreme outer end of the operating member 130 carries an upwardly extending projection 133 underhooking the midsection of the hose 120 and disposed between the outer surface of the hose 120 and the adjacent side wall 24 of the cabinet

21. Finally, the structure 124 carries an electro-responsive solenoid device 134 that is provided with a movable armature 135 which is operatively connected by a coil spring 136 to the extreme inner end of the operating member 130.

In view of the foregoing it will be understood that the hose 120 extends in an arc between the drain fixtures 117 and 121 and that the midsection thereof is normally disposed below the drain opening provided in the sump 52 so that the drain fixtures 121 and 117 are in free communication with each other through the hose 120, whereby any washing liquid in the sump 52 may be readily drained through the drain fixtures 121 and 117 by way of the communicating hose 120 and into the drainpipe 116. Moreover, the operating member 130 is normally biased by the weight of the hose 120 and against the counter-balancing spring 132 in the counterclockwise direction, as viewed in Fig. 1, in order to insure that the midsection of the hose 120 is moved into its lower position normally to rest upon the curved guide elements 129.

When the solenoid 134 is energized the armature 135 is attracted rotating through the coil spring 136 the operating member 130 in the clockwise direction, as viewed in Fig. 1, about the pivot pin 131 with the bias of the coil spring 132 so that the operating member 130 lifts or elevates the midsection of the hose 120 from its lower position to its upper position. More specifically, when the solenoid 134 is thus energized the operating member 130 moves the midsection of the hose 120 to its upper position disposed above the drain opening provided in the sump 52 effecting operation of the drain mechanism 123 from its non-draining position into its draining position. Subsequently, when the solenoid 134 is de-energized the weight of the hose 120 returns the operating member 130 in the counterclockwise direction, as viewed in Fig. 1, back into its normal position so that the midsection of the hose 120 is returned to its lower position in order again to return the drain mechanism from its non-draining position into its draining position.

Mounted within the lower portion of the vat 41 above the bottom wall 43 and below the movable rack structure 79 and surrounding the impeller 100 is a suitable electric heater 137 which is preferably of the sheathed resistance conductor type; which heater 137 is employed for the purpose of drying dishes after they have been washed and rinsed as explained more fully hereinafter. The opposite terminal ends of the heater 137 extend through liquid-tight openings provided in the bottom wall 43 to the exterior so that electrical connections may be made thereto from the exterior of the vat 41. Also, a timer, not shown, is arranged in the upper portion of the space disposed between the left-hand side wall 24 of the cabinet 21 and the left-hand side wall 44 of the vat 41; which timer is provided with an operating shaft, not shown, that extends through aligned openings provided in the front wall 27 and in the front panel 35, the extreme outer end of the operating shaft removably carrying a control knob 138. The control knob 138 cooperates with a substantially annular trim and indexing plate 139 carried by the front panel 35. Specifically, the control knob 138 carries an index pointer 140 that cooperates with the legends "off" and "on" provided on the indexing plate 139. Also, a terminal board, not shown, is disposed in the lower portion of the space mentioned below the timer; which terminal board is

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accessible through an opening, not shown, provided in the front wall 27 and is concealed by the front panel 35. This terminal board carries a measuring coil, not shown, and other wiring completing the electrical connections involving the operating motor 102, the heater 137, the solenoids 115 and 134 and the timer. Also, it is noted that the timer is preferably of the electro-responsive type employing a synchronous motor drive, such, for example, as a "Telechron" timer motor.

The construction and arrangement of the drain valve mechanism 123 and the terminal board have not been disclosed in great detail in the present application, since these arrangements form no part of the present invention, and are disclosed and claimed in the copending application of Edgar S. Stoddard, Serial No. 86,291, filed April 8, 1949; and similarly the construction of the timer and the connection of the electric circuits have not been disclosed in detail since these arrangements form no part of the present invention and are disclosed and claimed in the copending application of Douglas F. Illian, Serial No. 91,906, filed May 7, 1949.

Considering now the general operation of the apparatus 20, when it is at rest, the control knob 138 occupies the position illustrated in Fig. 1, whereby the index pointer 140 registers with the legend "Off" carried by the plate 139. At this time all of the electric circuits are open and the door 64 may be moved from its closed position into its open position, whereby the person may move the rack structure 79 from its retracted position supported within the vat 41 into its extended position supported over the door 64. The dishes are then loaded into the rack structure 79 and the rack structure 79 is returned into its retracted position within the vat 41. At this time a suitable quantity of an appropriate detergent, such, for example, as that sold under the name "Calgonite" is placed in the detergent cup, not shown, carried by the inner body sheet 67 of the door 64 and the door 64 is then returned from its open position into its closed position. The person then rotates the control knob 138 from its "off" position into its "on" position, whereby operation of the timer, not shown, is initiated. Also, operation of the motor 102 is initiated and the solenoid 115 is energized in order to effect opening of the inlet valve mechanism 114. The washing liquid from the liquid supply pipe 110 is supplied to the spraying device 112 and is sprayed thereby downwardly through the rack structure 79 in the vat 41 accumulating in the sump 52. Since the drain mechanism 123 occupies its draining position the washing liquid accumulating in the sump 52 is immediately drained into the drainpipe 116. This spray step continues for a time interval of approximately 30 seconds, whereupon the solenoid 134 is energized in order to operate the drain mechanism 123 into its non-draining position so that the washing liquid accumulating in the sump 52 is retained therein. The washing liquid accumulating in the sump 52 is caught by the blades 101 of the impeller 100 and is flung upwardly and outwardly with a rotary motion in the counterclockwise direction, as viewed in Fig. 4, through the rack structure 79 and is returned into the sump 52. When a predetermined quantity of washing liquid is supplied into the vat 41 a corresponding predetermined load is imposed upon the impeller 100 and consequently upon the motor 102, whereby the measuring coil, not shown, effects de-

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energization of the solenoid 115 so that the inlet valve mechanism 114 is returned to its closed position. Accordingly, a measured quantity of washing liquid is supplied to the vat 41. Also, the timer is arranged to de-energize the solenoid 115 approximately 45 seconds after the drain mechanism 123 is operated to its non-draining position in order positively to insure that the supply of washing liquid to the vat 41 is cut off in the event of improper operation of the measuring coil.

The first washing step described above continues for a total time of approximately 330 seconds following the closure of the drain mechanism 123, and within this time interval and in response to the accumulation of a predetermined quantity of washing liquid in the sump 52 the charge of detergent contained in the detergent cup, not shown, is introduced or washed into the washing liquid contained in the vat 41. This introduction of the detergent into the washing liquid is accomplished shortly following the operation of the drain mechanism 123 into its non-draining position so that the detergent is present in the washing liquid during a substantial part of the time interval of the first washing step. In passing it is noted that the detergent "Calgonite" comprises about 40 per cent sodium hexametaphosphate and 60 per cent sodium metasilicate.

At the conclusion of the first washing step the solenoid 134 is de-energized, whereby the drain mechanism 123 is returned to its draining position permitting the washing liquid and the suspended detergent to be drained from the sump 52 into the drainpipe 116. In order to insure that the hose 120 is not blocked by a partial air lock due to the presence of air bubbles therein the fixture 117 carries an upstanding breather tube 141 communicating with the exterior, all as described in the previously mentioned Stoddard application.

The washing liquid contained in the sump 52 is drained therefrom in a very short interval of time; and approximately 45 seconds after the drain mechanism 123 is operated into its draining position the solenoid 115 is energized in order to effect operation of the inlet valve mechanism 114 into its open position in order to initiate a second spray step. The second spray step is then followed by a second washing step in a manner substantially identical to that described above; and thereafter first and second rinsing steps are carried out in a similar manner. Each of the rinsing steps proceeds for a time interval of approximately 90 seconds and thereafter the drain mechanism 123 is again operated into its draining position to insure draining of all of the washing liquid from the sump 52.

At this time while the inlet valve mechanism 114 occupies its closed position and the drain mechanism 123 occupies its draining position, the timer effects energization of the heater 137 while the motor 102 is operating in order to initiate a drying step. This drying step proceeds for a time interval of approximately 1200 seconds, whereby the heat developed by the heater 137 effects drying of the dishes supported by the rack structure 79, the hot air being circulated in the vat 41 by the impeller 100. At the expiration of the time interval mentioned, the timer opens the circuit of the motor 102 while continuing the supply of electric energy to the heater 137 for a time interval of approximately 600 seconds in order to insure the fur-

ther drying of the dishes supported by the rack structure 79. At this time the timer has rotated the control knob 138 in the clockwise direction, as viewed in Fig. 1, from its "on" position back into its "off" position, whereby the circuit for supplying electric energy to the heater 137 is interrupted. At this time all of the electric circuits are open and the washing cycle has been completed. Thus the apparatus 20 is automatically operated through its various spraying, washing, rinsing and drying steps as a consequence of the initiation of operation thereof by rotating the control knob 138 from its "off" position into its "on" position.

During operation of the apparatus 20 through the timed cycle above described, the door 64 must be retained in its closed position in order to retain the door switch 94 in its closed position since the door switch 94 is arranged as an interlock switch in the electric circuits. During the various washing and rinsing steps when considerable washing liquid is accumulated in the sump 52, it is noted that the reticulated screen 109 prevents large particles of foreign matter, such, for example, as lettuce leaves, or the like, from being caught in the blades 101 of the impeller 100 and flung upwardly and outwardly thereby into the rack structure 79 and the dishes supported thereby. At the conclusion of the timed cycle, the dishes supported by the rack structure 79 have not only been thoroughly washed and rinsed, but they have also been dried. Subsequently, the door 64 may be moved from its closed position into its open position and the rack structure 79 may then be moved from its retracted position within the vat 41 into its extended position over the door 64 in order to permit removal of the dishes therefrom.

Considering now in greater detail the improved construction of the door 64 and, more particularly, the upper portion thereof, and referring more particularly to Figs. 2, 3, 4, 10, 11 and 12, it will be observed that the top portion of the marginal flange 66 of the outer body sheet 65 has a centrally disposed downwardly directed depression 150 formed therein that terminates in a cut-out or opening 151. The depression 150 constitutes a basin extending laterally across the top of the marginal flange 66 and receives and supports vapor directing structure 152. As best shown in Figs. 10, 11 and 12, the vapor directing structure 152 is substantially rectangular in plan and is preferably integrally molded of a suitable plastic material of low thermal conductivity. The structure 152 comprises a dished body sheet 153 terminating in a boundary flange including front and side portions 154 and 155, the boundary flange being substantially U-shaped. Also a plurality of forwardly and upwardly directed and laterally extending louvers 156 are formed in the body sheet 153 providing corresponding louver openings, and a row of forwardly and downwardly extending pins 157 are formed integrally with the front portion of the body sheet just below the front portion 154 of the boundary flange. The central rear portion of the body sheet 153 has an opening or slot 158 formed therein that is adapted to embrace the latch element 70 that is secured to the top of the marginal flange 68 of the inner body sheet 67 by the screw 71 previously described. Finally, a number of holes 159 are formed in the body sheet 153 for the purpose of receiving cooperating screws 160.

As best shown in Figs. 3 and 4, the structure 152 is arranged in the depression 150 formed in

the top of the marginal flange 66 of the outer body sheet 65 and retained in place by the pins 157 and screws 160 previously mentioned. More particularly, the laterally spaced-apart pins 157 project through cooperating laterally spaced-apart holes 161 formed in the top of the marginal flange 66; while the screws 160 extend through the holes 159 and are threaded into openings provided in the top of the marginal flange 68 of the inner body sheet 67. Also, two rows of laterally spaced-apart openings 162 are formed in the top of the marginal flange 68 of the inner body sheet 67 so that the interior of the door 64 and, consequently, the interior of the vat 41 communicates through the louvers 156 with the space disposed between the top of the marginal flange 66 of the outer body sheet 65 and the top of the doorway 47, and thence with the exterior. Finally, the flange structure 74 arranged within the marginal flange 68 of the inner body sheet 67 carries a laterally extending and forwardly directed shield 163 underlying the openings 162 formed in the top of the marginal flange 68 of the inner body sheet 67.

Referring now more particularly to Figs. 2, 3 and 4, it will be understood that during the operation of the apparatus 20 when the hot washing liquid is contained in the vat 41, moist vapor therefrom will rise toward the upper portion of the vat 41 when the door 64 occupies its closed position. This vapor in the upper portion of the vat 41 is vented between the top of the marginal flange 68 of the inner body sheet 67 and the shield 163 and thence through the holes 162 and is directed forwardly by the louvers 156 carried by the structure 152 into the space between the top of the marginal flange 66 of the outer body sheet 65 and the top of the doorway 47, whereby this vapor is directed forwardly out of the top of the front opening 36 when the door 64 occupies its closed position. It will be understood that the shield 163 also prevents hot washing liquid circulated in the vat 41 from being directed into the openings 162 and from escaping out of the top of the doorway 47 when the door 64 occupies its closed position.

Also, it will be understood that since the door 64 and the vat 41 cooperate without the utilization of a gasket, some minor quantities of vapor may escape from the upper portion of the vat 41 directly between the baffle structure 74 and the vat rib 54 and proceed between the front surface of the vat rib 54 and the abutting surface of the flange or lip 69 carried by the marginal flange 68 of the inner body sheet 67. This last-mentioned vapor proceeds into the space between the top of the doorway 47 and the structure 152 and is directed forwardly along with the vapor passing through the louvers 156 out of the top of the front opening 36 when the door 64 occupies its closed position.

Referring now to Figs. 1, 2, 3, 7, 8 and 9, it will be observed that the front surface of the front panel 35 carries a laterally extending and forwardly directed vapor director 170 disposed above the top of the front opening 36. As best shown in Figs. 7, 8 and 9, the vapor director 170 is substantially triangular in section and comprises a trim element 171 formed of metal and a body element 172 that is preferably integrally molded of a suitable plastic material of low thermal conductivity. The trim element 171 is preferably given a finished and polished coating of chromium, or the like, and comprises a laterally extending body 173 and a substantially centrally disposed for-

wardly extending hood 174, the hood 174 embracing the central portion of the body element 172. A number of metal pins 175 are molded into the body element 172 in laterally spaced-apart relation and project rearwardly through cooperating slots formed in the body 173 of the trim element 171 in order to position the elements 171 and 172 with respect to each other. Further, the body element 172 comprises a laterally extending and rearwardly and downwardly sloping lower surface 176 that is provided with a plurality of laterally spaced-apart serrations or ribs 177.

As best shown in Figs. 2 and 3, after the elements 171 and 172 of the vapor director 170 have been assembled, they are secured to the front surface of the front panel 35 above the top of the front opening 36 utilizing the rearwardly directed pins 175. More specifically, the laterally spaced pins 175 project through and frictionally engage corresponding laterally spaced-apart holes 178 formed in the front surface of the front panel 35. Further, metal spring clips or anchors, not shown, may be secured to the ends of the pins 175 in engagement with the inner surface of the front panel 35 adjacent to the holes 178. As illustrated in Figs. 1, 2 and 3, a centrally disposed notch or recess 179 is formed in the lower portion of the front panel 35 just above the top of the front opening 36 in order to accommodate the lower portion of the body element 172 of the vapor director 170.

When the vapor director 170 is assembled as illustrated in Fig. 3 upon the front surface of the front panel 35 above the top of the front opening 36 the rear portion of the lower surface 176 of the body element 172 projects rearwardly into the top front edge of the rolled rim 49 disposed about the front opening 48 in the doorway 47, whereby the extreme lower rear end of the lower surface 176 of the body element 172 overhangs the depression 150 formed in the top of the marginal flange 66 of the outer body sheet 65 of the door 64 and consequently the vapor directing structure 152 when the door 64 occupies its closed position.

Again considering the operation of the apparatus 20, it is pointed out that the vapor which is directed forwardly by the vapor directing structure 152 out of the top of the front opening 36 is further guided and directed by the vapor director 170 forwardly of the front surface of the front panel 35 into the kitchen or other room in which the apparatus 20 is located. This cooperation between the vapor directing structure 152 and the vapor director 170 is very advantageous as it prevents the vapor directed out of the top of the front opening 36 from rising gently into contact with the front edge of a supporting surface such, for example, as a sink, or the like, indicated at 180 in Fig. 3. It will be understood that the apparatus 20 is frequently arranged below a sink 180, in which case the front surface of the front panel 35 is disposed substantially flush with the front edge of the sink 180 as illustrated in Fig. 3. Since the front edge of the sink 180 is normally quite cold, any vapor striking it would condense and the resulting condensate would drip back upon the floor of the kitchen; however, the vapor director 170 prevents this undesirable possibility since it projects the vapor forwardly from the front surface of the front panel 35 beyond the front edge of the sink 180. Accordingly, when the apparatus 20 is installed below the sink 180 the vapor issuing from the top of the front opening 36 provided in the front panel 35 is projected by the vapor director 170 forwardly into the kitchen and rises outwardly beyond the front edge of the cold sink

180 preventing undesirable condensation thereon.

The formation of the vapor directing structure 152 and the vapor director 170 of plastic material having a low thermal conductivity, is very advantageous in view of the fact that it minimizes condensation of the vapor passing into contact therewith. Moreover, any small amount of the vapor that is condensed upon the lower surface 176 of the vapor director 170 is guided by the serrations 177 rearwardly toward the lower portion thereof and drips therefrom into or onto the vapor directing structure 152. The serrations 177 are closely spaced to prevent the formation of large droplets of condensate falling therefrom upon the vapor directing structure 152.

Also, as best shown in Figs. 3, 10 and 12, two laterally extending grooves 154a are formed in the vapor directing structure 152 adjacent to the front portion 154 of the boundary flange provided thereon for the purpose of catching or trapping any condensate that might otherwise fall upon the floor of the kitchen when the door 64 is moved into its open position. The condensate accumulating on the structure 152 within the basin 150 formed in the top of the marginal flange 66 of the outer body sheet 65 of the door 64, runs back through the louvers 156 onto the shield 163 and thence upon the inner body sheet 67 and back into the sump 52 since the lower end of the inner body sheet 67 is disposed rearwardly of the front ledge 51 when the door 64 occupies its closed position. The condensate runs down the rear surface of the inner body sheet 67 into the groove or depression 53 and is returned to the sump 52. Any of the vapor rising between the inner and outer body sheets 67 and 65 and condensing thereupon, is deflected behind the front ledge 51 and returned to the sump 52, the bracing sheet 86 extending between the body sheets 67 and 65 insuring that any condensate running down the inner surface of the outer body sheet 65 is deflected rearwardly onto the outer surface of the inner body sheet 67 and returned downwardly therefrom behind the front ledge 51. Also, a small amount of the condensate accumulating in the depression or basin 150 runs between the top marginal flange 66 of the outer body sheet 65 and the cooperating marginal flange 68 of the inner body sheet 67 since the joint therebetween is not liquid-tight, whereby this condensate runs down the outer surface of the inner body sheet 67 and is ultimately deflected rearwardly by the bracing sheet 86 in order to insure that it is returned to the sump 52 rearwardly of the front ledge 51.

Also, it is preferable that the handle 91 be integrally molded of a suitable plastic material having a low thermal conductivity in order further to minimize condensation of the vapor passing thereover out of the top of the front opening 36. As illustrated in Fig. 3, the top of the handle 91 is disposed substantially flush with the top of the marginal flange 66 of the outer body sheet 65 of the door 64 and below the lower surface 176 of the vapor director 170 when the door 64 occupies its closed position. Also, a number of laterally spaced-apart openings 91a are formed in the top of the handle 91 in order to permit air to rise therethrough as a result of the forward projection of the vapor out of the top of the front opening 36, thereby further tending to minimize any condensation of the vapor upon the handle 91.

As best shown in Figs. 4, 5 and 6, a pair of condensate deflecting gaskets 181 are secured to the

side flanges of the doorway 47 and cooperable with a pair of condensate deflecting gaskets 182 secured to the sides of the marginal flange 66 of the outer body sheet 65 of the door 64; the pair of gaskets 181 being disposed above the pair of gaskets 182 and in engaging relation therewith when the door 64 occupies its closed position. The gaskets 181 and 182 are disposed above the front ledge 51 adjacent to the bottom of the door 64 and project outwardly terminating adjacent to the front surface of the front panel 35. The gaskets 181 and 182 are sloped downwardly away from the front opening 36 and extend rearwardly well behind the front ledge 51. Preferably each of the gaskets 181 is integrally molded of rubber, or the like, and is provided with an integral tab or bead 183 that projects through and is frictionally retained in place in a corresponding slot 184 formed in the side flange of the doorway 47; and preferably each of the gaskets 182 is integrally molded of rubber, or the like, and is provided with an integral tab or bead 185 that projects through and is frictionally retained in place in a corresponding slot 186 formed in the side of the marginal flange 66 of the outer body sheet 65. This arrangement positively insures that any condensate draining down the sides of the marginal flange 66 of the outer body sheet 65 or down the side flanges of the doorway 47 when the door 64 occupies its closed position, is caught by the gaskets 181 and 182 in engagement with each other and deflected rearwardly behind the front ledge 51 and returned via the groove 53 into the sump 52.

In view of the foregoing, it will be understood that the dishwashing apparatus 20 is of the front-opening gasketless-door type and that the structures 152 and 170 cooperate in order to ventilate the interior of the vat 41 and to permit the escape of vapor therefrom while positively preventing this vapor issuing from the top of the front opening 36 from contacting the front edge of the cold sink 180 disposed above the apparatus 20 in order to prevent undesired condensation of the vapor thereon.

A modified form of the dishwashing apparatus 200 is illustrated in Figs. 13 to 15, inclusive, that utilizes an air blast arrangement in order to assist in the ventilation of the vat and the projection of the resulting vapor outwardly from the top of the cabinet front opening. The apparatus 200 is essentially of the construction of the apparatus 20 disclosed in Figs. 1 to 12, inclusive, and comprises a cabinet 201, a front panel 202, a front door 203, and a vat 204 arranged in the manner previously described. The door 203 is arranged in the doorway 205 provided in the front of the vat 204 and cooperates with a front opening 206 provided in the front panel 202. The front surface of the front panel 202 carries the vapor deflector 207 positioned above the top of the front opening 206, and the top of the marginal flange of the outer body sheet of the door 203 carries the vapor deflecting structure 208 in accordance with the construction previously described. In this embodiment the sump 209 of the vat 204 carries therebelow a combination electric motor and fan unit 210. More particularly, the unit 210 is of the totally enclosed type comprising a lower motor casing 211 and an upper fan casing 212. An armature 213 is arranged in the motor casing 211 and is carried by an operating shaft 214 suitably journaled therein, the operating shaft 214 projecting through the fan casing 212 and carrying the impeller 215 disposed within the sump 209.

Also, fan blade structure 216 is arranged within the fan casing 212 and directly secured to the shaft 214. Finally, the motor casing 211 is provided with an air intake fixture 217, and the fan casing 212 is provided with an air discharge fixture 219. Preferably, the air intake fixture 217 comprises filter structure 220, and the air discharge connection 219 comprises a threaded union 221.

The motor and fan unit 210 is of a well-known type and is arranged when operated to draw air through the filter structure 220 into the intake fixture 217 and thence into the motor casing 211. The air in the motor casing 211 effects cooling of the electrical elements of the electric motor and is conducted into the fan casing 212 wherein it is compressed and discharged under positive pressure through the discharge fixture 219 into the threaded union 221. Thus the air effects cooling of the electric motor and is preheated and discharged under positive pressure into the union 221. Of course, that shaft 214 of the electric motor not only operates the impeller 215 disposed within the sump 209, but it also operates the fan blade structure 216 to effect compression of the air in the fan chamber 212 and the consequent discharge of the air under positive pressure into the union 221.

Also, in this embodiment the top of the vat rib 230 disposed between the body of the vat 204 and the doorway 205 comprises a wall of a conduit 231; and, more particularly, a sheet 232 is extended over the top of the vat rib 230 and the sides thereof are suitably welded in place in order to define the other wall of the conduit 231. Accordingly, the conduit 231 extends laterally across the top of the vat rib 230, and the right-hand side thereof terminates in a flanged coupling 233 that is secured to a cooperating flanged coupling 234 carried by the upper end of a pipe 235, the lower end of the pipe 235 being suitably threaded and secured to the union 221. The pipe 235 extends between the union 221 and the flange coupling 233 at the right-hand end of the conduit 231, whereby the air discharged from the discharge fixture 219 is conducted via the union 221, the pipe 235 and the flanges 234 and 233 into the conduit 231 under positive pressure. Physically the pipe 235 is arranged between the right-hand side wall of the vat 204 and the right-hand side wall of the cabinet 201.

A first series of longitudinal spaced-apart holes 241 are formed in the bottom wall of the conduit 231 and communicate with the interior of the vat 204; and a second series of laterally spaced-apart holes 242 are formed in the front wall of the conduit 231 above the upper end of the flange or lip carried on the rear end of the marginal flange of the inner body sheet of the door 203 and communicate with the space between the top of the doorway 205 and the vapor directing structure 208.

In view of the foregoing, it will be understood that when the apparatus 200 is operating, the preheated air is delivered from the fan casing 212 into the conduit 231 under positive pressure and is projected through the two series of holes 241 and 242. The preheated air projected through the series of holes 241 enters the interior of the vat 201 causing a slight positive pressure therein, whereby the vapor is readily forced through the vapor directing structure 208 into the space disposed between the structure 208 and the top of the doorway 205. Also, the preheated air projected through the series of holes 242 sweeps for-

wardly directly through the space disposed between the structure 208 and the top of the doorway 205 in order positively to insure that the vapor is projected forwardly out of the top of the front opening 206 when the door 203 occupies its closed position.

In passing it is noted that the two series of holes 241 and 242 are really alternative and that an air blast operation of the apparatus 200 is obtained utilizing only one of these series of holes, although the two series of holes may be utilized in combination very advantageously. First assuming that only the holes 241 are provided, it will be appreciated that the pressure of the air in the vat 204 will be adequate in order to force the vapor through the structure 208 when the door 203 occupies its closed position. Now assuming that only the holes 242 are provided, it will be appreciated that the pressure of the air in the space between the structure 208 and the top of the doorway 205 produces a Venturi action, whereby the air sweeping over the structure 208 causes the vapor to be drawn therethrough from the interior of the vat 204.

In any case the air from the conduit 231 effects projection of the vapor out of the top of the front opening 206 under positive pressure, whereby the forwardly projecting air carrying the vapor renders unnecessary the vapor director 207. While the vapor director 207 is really not required in this air blast embodiment of the apparatus 200, as noted above, it is very useful in defining the forwardly directed passage through which the air is projected and it does further positively prevent any of the vapor from contacting the front edge of a sink disposed above the apparatus 200.

In view of the foregoing, it will be understood that the dishwashing apparatus 200 is of the front-opening gasketless-door type incorporating an improved air blast arrangement for ventilating the interior of the vat and for positively preventing the vapor issuing from the front opening of the cabinet of the apparatus from contacting a cold work surface such, for example, as a sink, or the like, when the apparatus is employed in combination therewith and disposed therebelow.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a space between the top of said door and the top of said doorway communicating with the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position the combination comprising means for preventing said hot washing liquid from escaping between said doorway and said door from said front opening when said door occupies its closed position, means defining a passage through the upper portion of said door

for accommodating the escape of the vapor given off by said hot washing liquid from the interior of said vat into said space when said door occupies its closed position, and means for projecting said vapor from said space forwardly out of the top of said front opening when said door occupies its closed position.

2. In washing apparatus including a cabinet provided with a front wall having a front opening, a vat housed in said cabinet and provided with wall structure terminating in a forwardly directed doorway having a front opening registering with said first-mentioned front opening, and a door arranged within said doorway and mounted for movements with respect to said front openings between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a space between the top of said door and the top of said doorway communicating with the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position the combination comprising means for preventing said hot washing liquid from escaping between said doorway and said door from said front openings when said door occupies its closed position and for accommodating the escape of the vapor given off by said hot washing liquid from the interior of said vat into said space when said door occupies its closed position, and means including laterally extending and forwardly projecting structure carried by said front wall for projecting said vapor from said space forwardly out of the top of said front openings when said door occupies its closed position in order to prevent said vapor from contacting said front wall above said front openings and the consequent accumulation of condensate thereupon.

3. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front opening when said door occupies its closed position, means including an opening formed in said top door flange rearward-

ly of said inner body sheet for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange so that said vapor may escape from the top of said front opening to the exterior when said door occupies its closed position, and means including a baffle carried by said door and projecting under said opening for preventing said hot washing liquid from escaping through said opening into said space when said door occupies its closed position.

4. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front opening when said door occupies its closed position, means including an opening formed in said top door flange rearwardly of said inner body sheet for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange when said door occupies its closed position, means including a baffle carried by said door and projecting under said opening for preventing said hot washing liquid from escaping through said opening into said space when said door occupies its closed position, and means for projecting said vapor from said space forwardly out of the top of said front opening when said door occupies its closed position.

5. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and

outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front opening when said door occupies its closed position, means including a series of upwardly and forwardly directed laterally extending louver openings formed in said top door flange rearwardly of said inner body sheet for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange and for projecting said vapor therefrom forwardly out of the top of said front opening when said door occupies its closed position, and means including a baffle carried by said door and projecting under said opening for preventing said hot washing liquid from escaping through said louver openings into said space when said door occupies its closed position.

6. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front opening when said door occupies its closed position, said top door flange having a downwardly depressed portion defining a basin disposed below said top doorway flange when said door occupies its closed position, means including an opening formed in said basin rearwardly of said inner body sheet for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange so that said vapor may escape therefrom through

the top of said front opening when said door occupies its closed position, some of said vapor condensing in said space and the resulting condensate accumulating in said basin and running back through said opening back into the interior of said vat rearwardly of said inner body sheet when said door occupies its closed position, and means including a baffle carried by said door and projecting under said opening for preventing said hot washing liquid from escaping through said opening into said space when said door occupies its closed position.

7. In washing apparatus including a cabinet provided with a front wall having a front opening, a vat housed in said cabinet and provided with walls terminating in a forwardly directed doorway having a front opening registering with said first-mentioned front opening, said doorway being provided with top and side flanges disposed rearwardly of said front openings, said vat being provided with a bottom wall having an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front openings, and a door mounted upon said vat within said doorway and movable with respect to said front openings between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front openings when said door occupies its closed position, said outer body sheet being disposed substantially flush with said front wall when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front openings when said door occupies its closed position, means including an opening formed in said top door flange for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange when said door occupies its closed position, and means including laterally extending and forwardly projecting vent structure carried by said front wall and cooperating with said top doorway flange for projecting said vapor from said space out of the top of said front openings when said door occupies its closed position in order to prevent said vapor from contacting said front wall above said front openings and the consequent accumulation of condensate thereupon.

8. In washing apparatus including a cabinet provided with a front wall having a front opening, a vat housed in said cabinet and provided with walls terminating in a forwardly directed doorway having a front opening registering with said first-mentioned front opening, said doorway being provided with top and side flanges disposed rearwardly of said front openings, said vat being provided with a bottom wall having an up-

standing front ledge extending between said side doorway flanges and disposed adjacent to said front openings, and a door mounted upon said vat within said doorway and movable with respect to said front openings between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front openings when said door occupies its closed position, said outer body sheet being disposed substantially flush with said front wall when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front openings when said door occupies its closed position, said top door flange having a first opening formed therein, an insert formed of low heat conductive plastic material secured in said first opening, said insert having a downwardly depressed portion defining a basin disposed below said top doorway flange when said door occupies its closed position, means including a second opening formed in said basin rearwardly of said inner body sheet for venting vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange when said door occupies its closed position, and means including laterally extending vent structure formed of low heat conductive plastic material carried by said front wall and provided with a forwardly and upwardly projecting surface cooperating with said top doorway flange for projecting said vapor from said space forwardly out of the top of said front openings when said door occupies its closed position in order to prevent said vapor from contacting said front wall above said front openings and the consequent accumulation of condensate thereupon, some of said vapor condensing on said surface and the resulting condensate running back down said surface and falling into said basin and then flowing through said second opening back into the interior of said vat rearwardly of said inner body sheet when said door occupies its closed position.

9. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a space between the top of said door and the top of said doorway communicating with the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively

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carried by said wall structure and by said door for preventing said hot washing liquid from escaping between said doorway and said door and for accommodating the escape of vapor given off by said hot washing liquid from the interior of said vat into said space when said door occupies its closed position, and means including a conduit supplied with air under gauge pressure for projecting a current of air through said space forwardly out of the top of said front opening in order to sweep said vapor along therewith when said door occupies its closed position.

10. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively carried by said side walls and by said door for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges and for accommodating the escape of vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange and said top doorway flange when said door occupies its closed position, means including laterally extending vent structure cooperating with said top doorway flange and provided with a forwardly and upwardly projecting surface extending out of said front opening and over said outer body sheet for projecting said vapor from said space out of the top of said front opening when said door occupies its closed position, some of said vapor condensing on said surface and the resulting condensate running back down said surface and falling onto said top door flange when said door occupies its closed position, and means including an opening formed in said top door flange rearwardly of said inner body sheet for conducting said condensate back into the interior of said vat when said door occupies its closed position.

11. In washing apparatus including a cabinet provided with a front wall having a front opening, a vat housed in said cabinet and being provided with walls terminating in a forwardly directed doorway having a front opening registering with said first-mentioned front opening, said doorway being provided with top and side flanges disposed rearwardly of said front openings, said

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vat being provided with a bottom wall having an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front openings, and a door mounted upon said vat within said doorway and movable with respect to said front openings between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front openings when said door occupies its closed position, said outer body sheet being disposed substantially flush with said front wall when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively carried by said side walls and by said door for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges and for accommodating the escape of vapor given off by said hot washing liquid from the interior of said vat into the space between said top door flange and said top doorway flange when said door occupies its closed position, said top door flange having a first opening formed therein, an insert formed of low heat conductive plastic material secured in said first opening, said insert having a downwardly depressed portion defining a basin disposed below said top doorway flange when said door occupies its closed position, and means including laterally extending vent structure formed of low heat conductive plastic material carried by said front wall and provided with a forwardly and upwardly projecting surface cooperating with said top doorway flange for projecting said vapor from said space flange forwardly out of the top of said front openings when said door occupies its closed position in order to prevent said vapor from contacting said front wall above said front openings and the consequent accumulation of condensate thereupon, some of said vapor condensing on said surface and the resulting condensate running back down said surface and falling into said basin when said door occupies its closed position, said basin having a second opening formed therein rearwardly of said inner body sheet so that said condensate accumulating in said basin flows therethrough back into the interior of said vat when said door occupies its closed position.

12. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said

door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front opening when said door occupies its closed position, means for venting vapor given off by said hot washing liquid circulated in said vat from the interior of said vat into the space between said top door flange and said top doorway flange so that said vapor may escape from the top of said front opening when said door occupies its closed position, some of said vapor condensing in said space and the resulting condensate running down said side door flanges and said side doorway flanges when said door occupies its closed position, and means including two deflecting gaskets respectively disposed in the spaces between said side door flanges and said side doorway flanges and cooperating therewith for deflecting said condensate rearwardly of said front ledge and back into the interior of said vat when said door occupies its closed position.

13. In washing apparatus including a vat provided with top and bottom and side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively carried by said side walls and by said door for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges when said door occupies its closed position, means for venting vapor given off by said hot washing liquid circulated in

said vat from the interior of said vat into the space between said top door flange and said top doorway flange so that said vapor may escape from the top of said front opening when said door occupies its closed position, some of said vapor condensing in said space and the resulting condensate running down said side door flanges and said side doorway flanges when said door occupies its closed position, and means including a first pair of deflecting gaskets respectively carried by said side door flanges adjacent to the lower ends thereof and a second pair of deflecting gaskets respectively carried by said side doorway flanges adjacent to the lower ends thereof for deflecting said condensate rearwardly of said front ledge and back into the interior of said vat when said door occupies its closed position.

14. In washing apparatus including a vat provided with top and bottom side walls terminating in a forwardly directed doorway having a front opening, said doorway being provided with top and side flanges disposed rearwardly of said front opening, said bottom wall being provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front opening when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively carried by said side walls and by said door for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges when said door occupies its closed position, means for venting vapor given off by said hot washing liquid circulated in said vat from the interior of said vat into the space between said top door flange and said top doorway flange so that said vapor may escape from the top of said front opening when said door occupies its closed position, some of said vapor condensing in said space and some of the resulting condensate accumulating upon said top door flange and other of the resulting condensate running down said side door flanges and said side doorway flanges when said door occupies its closed position, said top door flange having an opening formed therein so that said condensate accumulating thereon runs therethrough back into the interior of said vat rearwardly of said inner body sheet when said door occupies its closed position, and means including two deflecting gaskets respectively disposed in the spaces between said side door flanges and said side doorway flanges and cooperating therewith for deflecting said condensate running down

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said side door flanges and said side doorway flanges rearwardly of said front ledge and back into the interior of said vat when said door occupies its closed position.

15. In washing apparatus including a cabinet provided with a front wall having a front opening, a vat housed in said cabinet and provided with walls terminating in a forwardly directed doorway having a front opening registering with said first-mentioned front opening, said doorway being provided with top and side flanges disposed rearwardly of said front openings, said vat including a bottom wall provided with an upstanding front ledge extending between said side doorway flanges and disposed adjacent to said front openings, and a door mounted upon said vat within said doorway and movable with respect to said front openings between a substantially vertical closed position and a substantially horizontal open position, said door being provided with inner and outer body sheets arranged in spaced-apart relation and top and side flanges, the lower ends of said inner and outer body sheets being arranged in straddling relation with respect to said front ledge so that the lower end of said inner body sheet is disposed below and rearwardly of said front ledge and the lower end of said outer body sheet is disposed below and forwardly of said front ledge when said door occupies its closed position, said top and side door flanges cooperating in spaced relation with said top and side doorway flanges effectively to close said front openings when said door occupies its closed position, said outer body sheet being disposed substantially flush with said front wall when said door occupies its closed position, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping between said cooperating door and doorway flanges from said front openings when said door occupies its closed position, means for venting vapor from said hot washing liquid circulated in said vat from the interior of said vat into the space between said top door flange and said top doorway flange when said door occupies its closed position, means including laterally extending vent structure carried by said front wall adjacent to the top of said front openings and cooperating with said top doorway flange and projecting forwardly out of said front openings and over said outer body sheet for projecting said vapor from between said top doorway flange and said top door flange forwardly out of the top of said front openings when said door occupies its closed position, and a handle carried by said outer body sheet adjacent to said top door flange for facilitating movement of said door between its open and closed positions, said handle being disposed immediately below said vent structure and having an opening formed therein and communicating with said vent structure in order to assist in the projection of said vapor forwardly out of the top of said front openings when said door occupies its closed position.

16. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially hori-

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zontal open position, said door in its closed position cooperating with said doorway to define a passage therebetween communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, and means for supplying air under gauge pressure into said vat in order to sweep vapor given off by said hot washing liquid from the interior of said vat into said passage and to project said vapor from said passage forwardly out of said front opening when said door occupies its closed position.

17. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a passage therebetween communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, means including a fan disposed below said vat for supplying air under gauge pressure into said vat in order to sweep vapor given off by said hot washing liquid from the interior of said vat into said passage and to project said vapor from said passage forwardly out of said front opening when said door occupies its closed position, and means including an electric motor disposed below said vat for driving said fan.

18. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a passage therebetween communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, vapor given off by said hot washing liquid escaping from the interior of said vat into said passage when said door occupies its closed position, and means for supplying air under gauge pressure into said passage in order to project said vapor therefrom forwardly out of said front opening when said door occupies its closed position.

19. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open po-

sition, said door in its closed position cooperating with said doorway to define a passage therebetween communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, vapor given off by said hot washing liquid escaping from the interior of said vat into said passage when said door occupies its closed position, means including a conduit for supplying air under gauge pressure into said passage in order to project said vapor therefrom forwardly out of said front opening when said door occupies its closed position, means including a fan disposed below said vat for supplying air under pressure into said conduit, and means including an electric motor disposed below said vat for driving said fan.

20. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a passage therebetween communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, vapor given off by said hot washing liquid escaping from the interior of said vat into said passage when said door occupies its closed position, means including a conduit for supplying air under gauge pressure into said passage in order to project said vapor therefrom forwardly out of said front opening when said door occupies its closed position, an electric motor disposed in spaced relation below said vat, a fan having a casing disposed between said vat and said electric motor, and drive means operatively connecting said motor to said fan, said fan casing including an intake connection drawing air over said motor in order to cool said motor and to preheat said air and a discharge connection supplying said preheated air into said conduit.

21. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, an inverted substantially U-shaped inwardly directed vat rib provided in said wall structure at the rear of said doorway, a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, and an inverted substantially U-shaped outwardly directed flange provided on said door and cooperating with said vat rib when said door occupies its closed position, said door in its closed position cooperating with said doorway to define a passage between the top of said door and the top of said doorway communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing

said hot washing liquid from escaping through said passage from said front opening when said door occupies its closed position, said vat rib comprising a wall of a conduit, means for supplying air under gauge pressure into said conduit, and means including an opening provided in the top of said vat rib rearwardly of the top of said flange for conducting air under pressure from said conduit into said vat in order to sweep vapor given off by said hot washing liquid from the interior of said vat into said passage to project said vapor from said passage forwardly out of the top of said front opening when said door occupies its closed position.

22. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, an inverted substantially U-shaped inwardly directed vat rib provided in said wall structure at the rear of said doorway, a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, and an inverted substantially U-shaped outwardly directed flange provided on said door and cooperating with said vat rib when said door occupies its closed position, said door in its closed position cooperating with said doorway to define a passage between the top of said door and the top of said doorway communicating between the interior of said vat and the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means for preventing said hot washing liquid from escaping through said passage when said door occupies its closed position, vapor given off by said hot washing liquid escaping from the interior of said vat into said passage when said door occupies its closed position, said vat rib comprising a wall of a conduit, means for supplying air under gauge pressure into said conduit, and means including an opening provided in the top of said vat rib above the top of said flange for conducting air under pressure from said conduit into said passage in order to project said vapor therefrom forwardly out of the top of said front opening when said door occupies its closed position.

23. In washing apparatus including a vat provided with wall structure terminating in a forwardly directed doorway having a front opening, and a door arranged within said doorway and mounted for movements with respect to said front opening between a substantially vertical closed position and a substantially horizontal open position, said door in its closed position cooperating with said doorway to define a space between the top of said door and the top of said doorway communicating with the exterior, and said vat accommodating the circulation of hot washing liquid therein when said door occupies its closed position; the combination comprising means including cooperating baffles respectively carried by said wall structure and by said door for preventing said hot washing liquid from escaping between said doorway and said door and for accommodating the escape of vapor given off by said hot washing liquid from the interior of said vat into said space so that said vapor may escape out of said space from the top of said front opening to the exterior when said door occupies its closed position, means including an opening formed in the top of said door for draining any condensate accumulating in said space back into

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the interior of said vat when said door occupies its closed position, and means including a laterally extending trap formed in the top of said door for preventing any condensate accumulating on the top of said door from dripping therefrom when said door is moved from its closed position into its open position.

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