March 23, 1943. E. S. STODDARD 2,314,666

WASHING APPARATUS

Filed Feb. 27, 1941

Fig. 1.

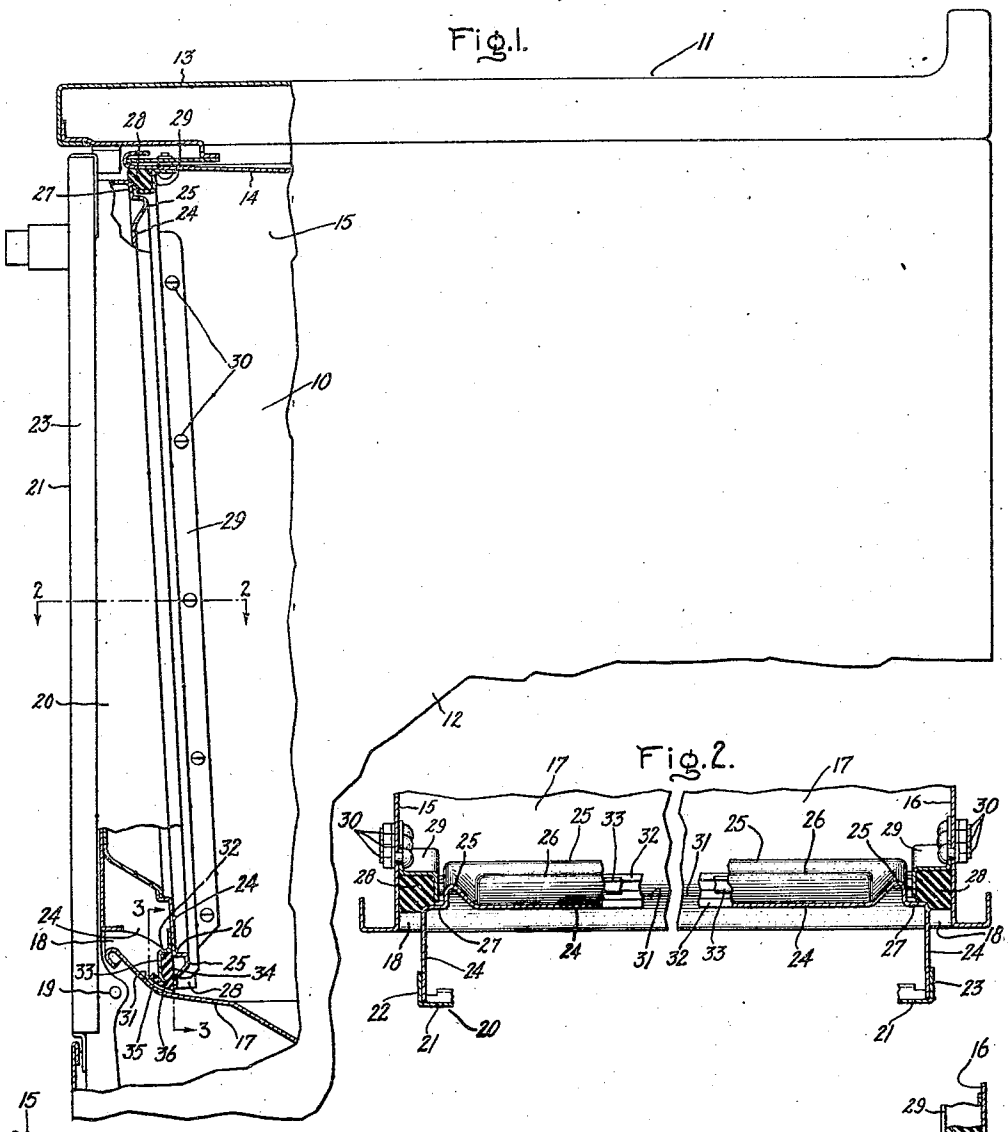
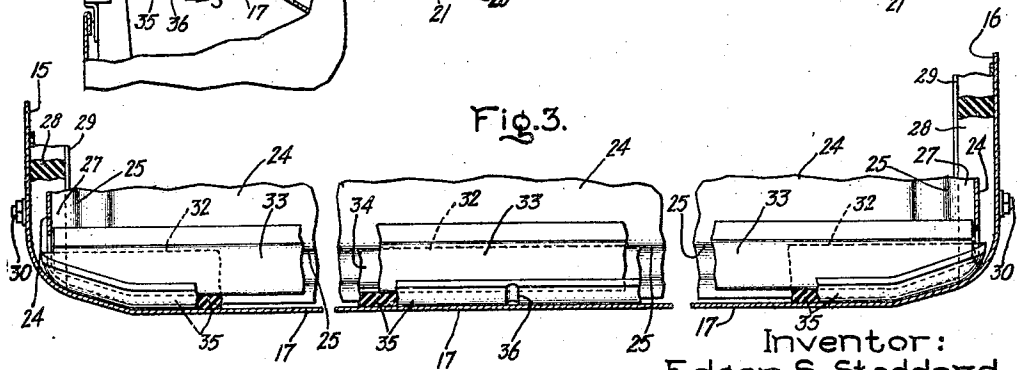


Fig. 2.

Fig. 3.



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WASHING APPARATUS

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9 Claims. (Cl. 220—46)

This invention relates to washing apparatus and more particularly to a washing apparatus of the front opening type and has for its object the provision of new and improved, inexpensive and effective means for preventing leakage at the opening through which articles to be washed are introduced into the washing apparatus and for effectively discharging into the washing apparatus any drippings, either food soil or water, which accumulate on the exposed inner surface of the door covering the front opening when the apparatus is in use.

While not limited thereto, this invention relates to a dishwashing apparatus of the front opening type in which a washing vat is provided with an opening in one of its walls, preferably a front wall, through which the articles to be washed are introduced and a door is provided for covering the opening, the door having a substantially vertical closed position and a substantially horizontal open position. Racks are provided within the vat for supporting the articles to be washed and these racks when being loaded or unloaded are adapted to be moved out over the door when the latter is in its open position.

In the manufacture of a washing apparatus of the aforementioned type, considerable difficulty has been encountered in preventing leaks around the opening where the dishes are introduced. The problem has been further complicated by the fact that provision must be made for taking care of the drippings of either food soil or water on the door lining so that they are not permitted to fall on the floor. Due to the provision which must be made for carrying such drippings to the drain a simple gasket arrangement for sealing the opening in the dishwasher has been found unsuitable.

In accordance with this invention these difficulties have been overcome by providing a discontinuous gasket for sealing the front opening. One portion of this gasket is mounted on the vat and seals the top and two sides of the opening in the vat and a second portion of the gasket is mounted on the lower edge of the door so as to engage the bottom of the tub and abut against the side gaskets at their lower edge to effectively seal the bottom of the door. By providing such a discontinuous gasket construction mounted in two planes an effective door seal is provided and it is insured that all of the liquid normally accumulated on the inner door panel will be discharged into the vat when the door is raised without interference from the door sealing means.

For a more complete understanding of my invention, reference should be had to the accompanying drawing in which Fig. 1 is a side elevation of a washing apparatus of the front opening type, parts being broken away to show the details of construction of the improved door seal construction of this invention; Fig. 2 is an enlarged view, partly in section and partly broken away, taken on the line 2—2 of Fig. 1 and looking in direction of arrows, showing further details of the door seal construction of this invention; and Fig. 3 is an enlarged view taken on the line 3—3 of Fig. 1 looking in direction of arrows with parts broken away and gasket portions sectioned to show further details of the bottom portion of the door seal construction of this invention.

Referring to Fig. 1, this invention has been illustrated as applied to a side or front opening type of dishwasher which comprises a vat 10 which is suitably supported within a casing 11 having side walls 12 and a top wall 13. The vat 10 includes a top wall 14, a pair of side walls 15 and 16, and a bottom wall 17 which define a front or side opening 18 through which articles to be washed may be inserted.

It will of course be understood that there will be provided within the vat 10 suitable means for supplying a washing fluid as well as means for circulating the washing fluid. Moreover, it will be understood that suitable racks will be provided within the vat for supporting the articles to be washed. Since these elements form no part of this invention per se and are well known to those skilled in the art, it is deemed unnecessary to show them in the drawing.

Pivotally mounted at 19 on the casing 11 so as to close the front opening 18 and to be movable between a substantially vertical closed position and a substantially horizontal open position is a door 20 which comprises a front panel 21 to which an inner liner 24 is suitably secured, as by welding, to the side flanges 22 and 23 of the panel 21. This inner liner is provided with a raised portion or bead 25 which, as shown in the drawing, extends across the top of the liner, down both sides thereof, and across the bottom to define a shallow well or receptacle 26. It will be observed that the portion of the bead extending across the top of the door lining and down the sides thereof is spaced from the outside edge of the lining so as to define a relatively flat flange portion 27 between the side

wall of the lining and the bead. The bead across the bottom of the liner, on the other hand, extends substantially to the lower edge thereof. The receptacle 26 formed by the bead 25 serves as a tray for catching the drippings, either food soil or water, which fall thereon when the door 20 is moved to its horizontal open position and the dish supporting racks (not shown) are moved out thereover. Depending upon the care in handling the dishes, there will be varying amounts of accumulated liquid in this receptacle. By means of the improved construction just described, this accumulated food soil and liquid will run down the door liner and be projected into the vat 10 by means of the projecting bead 25 along the lower edge of the vat. Thus it is insured that any food soil or other drippings accumulated during the handling of the articles washed or to be washed in the washing apparatus will be carried into the vat and thence to the drain without dripping onto the floor.

In accordance with this invention there is provided improved means for sealing a front opening door construction which is provided with such effective means for carrying drippings into the washing apparatus. This improved sealing means in its essential aspect consists of sealing the front opening by means of a discontinuous gasket and preferably by a discontinuous gasket mounted in two planes. Such improved sealing arrangement insures that the gasket will not interfere with the normal functioning of the improved means for carrying drippings into the washing vat.

Referring to Figs. 1 and 2, it will be observed that one portion of the sealing arrangement comprises a continuous gasket 28 which extends across the top wall 14 and down each side wall 15 and 16 of the vat near the edge of the opening 18. It will be noted that the portions of the gasket 28 which extend along the side walls 15 and 16 continue into the lower corners of the side walls and abut against the bottom wall 17. The gasket 28 is made of some suitable resilient material, preferably sponge rubber, and is held in position by means of a Z-shaped gasket retainer 29 which is secured to the top and side walls of the vat 10 by means of screws 30. The normal width of the gasket is made slightly greater than the space provided between the adjacent wall of the vat and the outside edge of the Z-shaped retainer so that when the retainer is fastened to the adjacent wall by the screws 30 the gasket will be slightly compressed. This continuous gasket is adapted to be engaged by the flange portion 27 of the door liner when the door is in its closed position. Thus, a fluid-tight seal is provided along the sides and across the top of the door.

For sealing the bottom of the door on the other hand, it will be observed that the bottom wall 17 of the vat is provided with an outwardly and upwardly flaring portion 31. It will be noted that this portion of the bottom wall defines a substantially smooth curve, as shown in Fig. 1, which may be easily cleaned and which offers no corners or niches in which food waste may accumulate. Provided on the back of the door lining 24 and extending across the full width of the door, as shown in Fig. 3, is a bottom gasket 32 made of some suitable resilient material which is preferably a synthetic rubber composition such as neoprene. Such a synthetic rubber composition is employed because of its desirable grease resisting properties which prevent deterioration of the gasket from the greases present in the drippings accumulated in the receptacle 26, which drippings come in contact with the gasket 32 upon being discharged into the vat. It is to be observed that the bottom gasket 32 lies in a different plane from the lower ends of the continuous gasket 28. As shown in Fig. 3, the bottom gasket at its ends is shaped to follow the contour of the lower corners of the opening 18 and the end portions of the gasket project beyond the edge of the door lining and abut against the lower ends of the side wall gasket 28 so as to form a fluid-tight seal at the lower corners of the door.

The bottom gasket 32 is held in its operative position along the lower edge of the door lining by means of a gasket retainer 33 which is welded or otherwise secured to the door lining 24. It will be observed that this lower gasket has a vertically extending portion 34 which lies within the gasket retainer and has a curved bottom portion 35 which is flexed to follow the contour of the outwardly and upwardly flaring portion 31 of the bottom wall of the vat. Thus, as the door is opened the portion 35 of the gasket sweeps inwardly along the flared portion of the bottom wall so as to loosely seal the door at this point. As the door is closed, the portion 35 of the gasket sweeps outwardly and follows the contour of the bottom wall so that when the door is finally closed, the gasket tightly and positively seals the lower edge of the door against leakage. By supporting the bottom gasket on the rear of the door lining 24, as shown, the gasket in no way interferes with the functioning of the drip collecting receptacle 26.

It has been found that when the door is in its sealed position, leakage through a defective seal will accumulate beyond or outside of the seal and will collect in the area between the outside edge of the bottom wall of the vat 10 and the gasket 32. In order to prevent this volume of liquid from accumulating to a point where it will spill over on to the floor, there is provided in the center portion of the gasket 32, a small opening 36 (Figs. 1 and 3) which permits such trapped liquid to flow back into the vat 10. The opening is made sufficiently small to prevent any substantial leakage outwardly therethrough when the door is closed and articles are being washed.

From the foregoing detailed description it will be observed that I have provided an improved sealing arrangement for a side opening type of washing apparatus which is both simple in construction and highly effective in operation and which permits the use of a simpler form of vat construction, particularly at the side opening by eliminating the need for any baffles or flanges on the vat itself for effecting a sealing function. Moreover, it will be observed that there is provided an improved sealing arrangement which in no way interferes with the projection into the washing vat of drippings accumulated on the vat door during loading or unloading operations. Furthermore, there is provided a sealing arrangement which comprises a discontinuous gasket in two planes which not only effectively seals the sides and top of a side opening door, but also effectively seals the bottom thereof so that no leakage can occur at this point which is subjected to rather heavy fluid circulation when the door is closed.

While a particular embodiment of this invention has been illustrated, it will be understood

of course that it is not intended to be limited thereto since many modifications may be made and it is therefore intended to cover by the appended claims all such modifications as fall within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a washing apparatus, a vat forming a washing chamber having a front opening therein, a door for closing said opening, hinge means mounting said door for swinging movement from a vertical closed position to a horizontal open position on a fixed axis at the lower edge of said door, the bottom of said door extending inwardly and downwardly into said vat when the door is in its vertical closed position, and a gasket mounted on said door positioned forwardly of the inner surface of said door constructed and arranged to engage a part of said vat under said front opening so as to form a seal and thereby prevent leakage along the bottom of the door when the door is in said vertical closed position, and so that it offers no obstruction as said door is being moved to its vertical closed position, to the discharge of drippings from said inner surface that collect thereon when the door is in a horizontal position.

2. In a washing apparatus, a vat forming a washing chamber having a front opening therein, a bottom wall in said vat having an outwardly projecting portion terminating in said front opening and defining an unobstructed surface, a door for closing said opening, hinge means mounting said door for swinging movement from a vertical closed position to a horizontal open position on a fixed axis at the lower edge of said door, the bottom of said door extending inwardly and downwardly into the vat when the door is in its vertical closed position, and a gasket mounted on said door located in a plane positioned forwardly of the rear surface of said door constructed and arranged to engage said outwardly projecting portion of said bottom wall and form a seal preventing leakage along the bottom of the door when it is in said vertical closed position, and so that it offers no obstruction, as the door is being moved to its vertical closed position, to the discharge of drippings from said inner surface that collect thereon when the door is in a horizontal position.

3. In a washing apparatus, a vat forming a washing chamber having a front opening therein, a bottom wall in said vat having an outwardly projecting portion terminating in said front opening and defining an unobstructed surface, a door for closing said opening arranged to swing on an axis at its lower edge, the bottom of said door extending inwardly and downwardly into the vat so as to always cover the outwardly projecting portion of said bottom wall irrespective of the position of said door, and a gasket mounted on said door so as to engage said outwardly projecting portion of said bottom wall and form a seal preventing leakage along the bottom of the door when it is in the vertical closed position, said gasket being positioned on said door so that drippings collected on the inner surface of said door when it is in a horizontal open position are discharged into said vat over said gasket when said door is moved to the vertical closed position.

4. In a washing apparatus, a vat forming a washing chamber having a side opening therein, a bottom wall for said vat having an outwardly projecting unobstructed curved surface defining the lower edge of said opening, a door for closing said opening arranged to swing on an axis at its lower edge, the bottom of said door extending inwardly and downwardly into said vat so as to always cover the outwardly projecting portion of said bottom wall irrespective of the position of said door, a gasket mounted on said door so as to engage said outwardly projecting surface of said bottom wall and form a seal preventing leakage along the bottom of the door when it is in the vertical closed position, said gasket being positioned on said door so that drippings collected on the inner surface of said door when it is in a horizontal open position are discharged into said vat over said gasket when said door is moved to the vertical position, and means defining an opening in said bottom portion of said gasket for draining into said vat fluid trapped beyond said gasket between said gasket and the lower edge of said opening.

5. In a washing apparatus, a vat forming a washing chamber having a side opening therein, a bottom wall for said vat having an outwardly projecting unobstructed curved surface defining the lower edge of said opening, a door for closing said opening arranged to swing on an axis at its lower edge, the bottom of said door extending inwardly and downwardly into said vat so as to always cover the outwardly projecting portion of said bottom wall irrespective of the position of said door, and discontinuous gasket means for preventing leakage around said door when said door is in its closed position comprising gaskets mounted on the top and side walls of said vat and adapted to be engaged by the top and side edges of said door, and a gasket mounted on the bottom edge of said door having portions adapted to engage said gaskets on said side walls so as to seal the lower corners of said door and having a bottom portion engaging said curved surface of said bottom wall to seal the lower edge of said door.

6. In a washing apparatus, a vat forming a washing chamber having a front opening therein, a door for closing said opening, hinge means mounting said door for swinging movement on an axis at its lower edge, the bottom of said door extending inwardly and downwardly into said vat when said door is in its vertical closed position, and discontinuous gasket means for preventing leakage around said door when said door is in its closed position comprising gaskets mounted on the top and side walls of said vat and adapted to be engaged by the top and side edges of said door, and a gasket mounted on the bottom edge of said door having portions adapted to engage the gaskets on said side walls so as to seal the lower corners of said door, and also having a portion engaging the bottom wall of said vat to seal the lower edge of said door.

7. In a washing apparatus a vat forming a washing chamber having a side opening therein, a bottom wall for said vat having an outwardly projecting unobstructed curved surface defining the lower edge of said opening, a door for closing said opening arranged to swing on an axis at its lower edge from a closed position to an open position the bottom of said door extending inwardly and downwardly into said vat so as to always cover the outwardly projecting portion of said bottom wall irrespective of the position of said door, a discontinuous gasket means for preventing leakage around said door when said door is in said closed position comprising gaskets mounted on the top and side walls of said vat and adapted to be engaged by the top and side

edges of said door, and a gasket mounted on the bottom edge of said door having portions adapted to engage the lower portions of said gaskets on said side walls so as to seal the lower corners of said door and having a bottom portion engaging said curved surface of said bottom wall to seal the lower edge of said door, said bottom portion including an outwardly projecting portion adapted to loosely seal against said curved surface of said bottom wall during movement of said door between its closed and open position.

8. In a washing apparatus, a vat having a top wall, side walls, and a bottom wall, said bottom wall having an upwardly and outwardly projecting portion defining the lower edge of said opening, a door for closing said opening arranged to swing on an axis at its lower edge, a door lining having a portion projecting into said opening, and means for preventing leakage of fluid through said opening when said door is in its closed position comprising a discontinuous gasket having a portion secured to said top and side walls of said vat adapted to be engaged by said door lining to seal the top and side walls of said door, and a second portion secured to the bottom of said door lining and adapted to engage said outwardly projecting portion of said bottom wall to seal the bottom of said door against leakage, said second portion having portions projecting beyond said door lining to engage said first portions in the lower corners thereof so as to prevent leakage at the lower corners of said door, and means defining an opening in said second portion for draining into said vat fluid trapped between said gasket and the lower edge of said opening.

9. In a washing apparatus, a vat having top, side, and bottom walls defining a front opening therein, said bottom wall having an upwardly and outwardly flared portion terminating at the bottom edge of said front opening, a door for closing said opening arranged to swing on an axis at its lower edge, said door having an inner lining, a bead in said inner lining defining a receptacle for collecting drippings when said door is in its open position, a flange projecting outwardly from said bead along the top and side edges of said inner lining, gasket means secured to said top and side walls of said vat adapted to be engaged by said flange when said door is in its closed position to form a fluid-tight seal therefor, said gaskets along said side walls projecting downwardly into engagement with the adjacent portion of said bottom wall, a gasket lying out of the plane of said side wall gaskets for sealing the bottom edge of said door lining, means for supporting said gasket on said bottom edge of said door lining so that it extends beyond the corners of said bottom edge to engage said gaskets secured to said side walls and thereby seal the bottom corners of said door when it is in its closed position.

EDGAR S. STODDARD.

CERTIFICATE OF CORRECTION.

Patent No. 2,314,666. March 23, 1943.

EDGAR S. STODDARD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 25, after "position", line 46, after "obstruction", and line 47, after "position", strike out the comma; line 51, beginning with "3. In a washing" strike out all to and including the word and period "position." in line 70, comprising claim 3, and for the claims now numbered 4, 5, 6, 7, 8 and 9 read 3, 4, 5, 6, 7 and 8 respectively; and in the heading to the printed specification, line 7, for "9 Claims." read --8 Claims.--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of June, A. D. 1943.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.