March 31, 1953 A. W. HAAS 2,633,399

DISHWASHING MACHINE

Filed June 24, 1947 6 Sheets-Sheet 1

Fig. 1

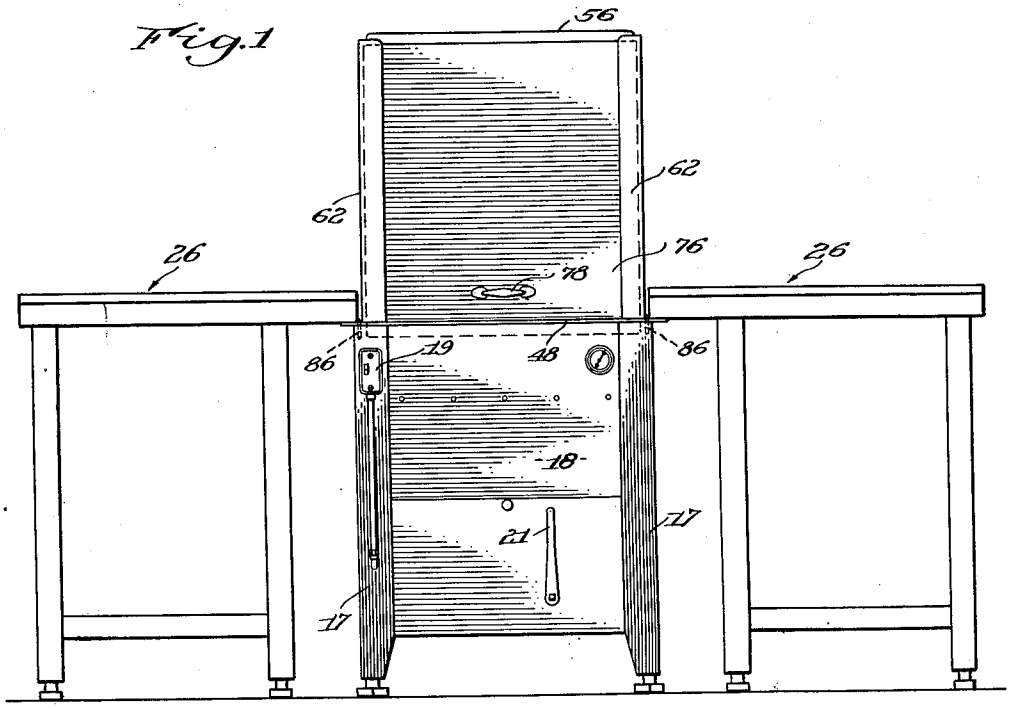


Fig. 7

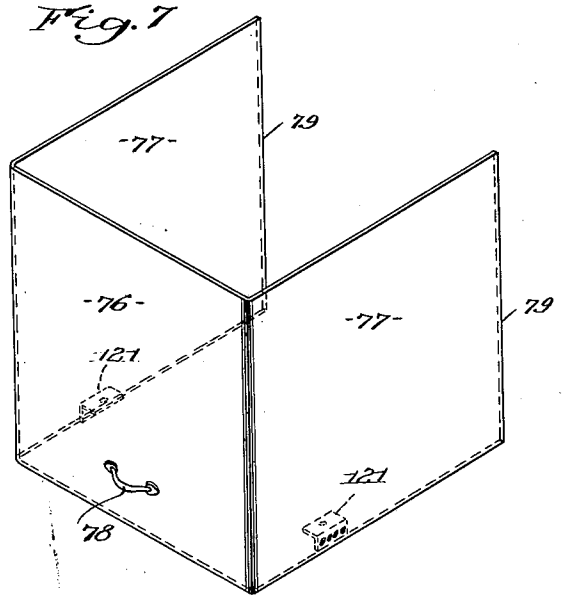
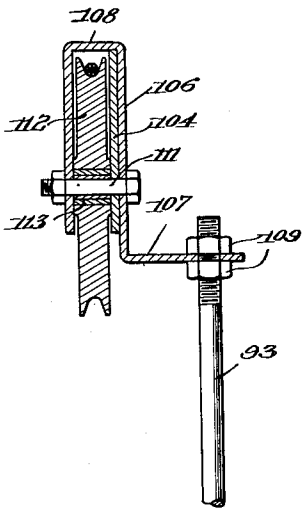


Fig. 8



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March 31, 1953 A. W. HAAS 2,633,399

DISHWASHING MACHINE

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Fig. 2

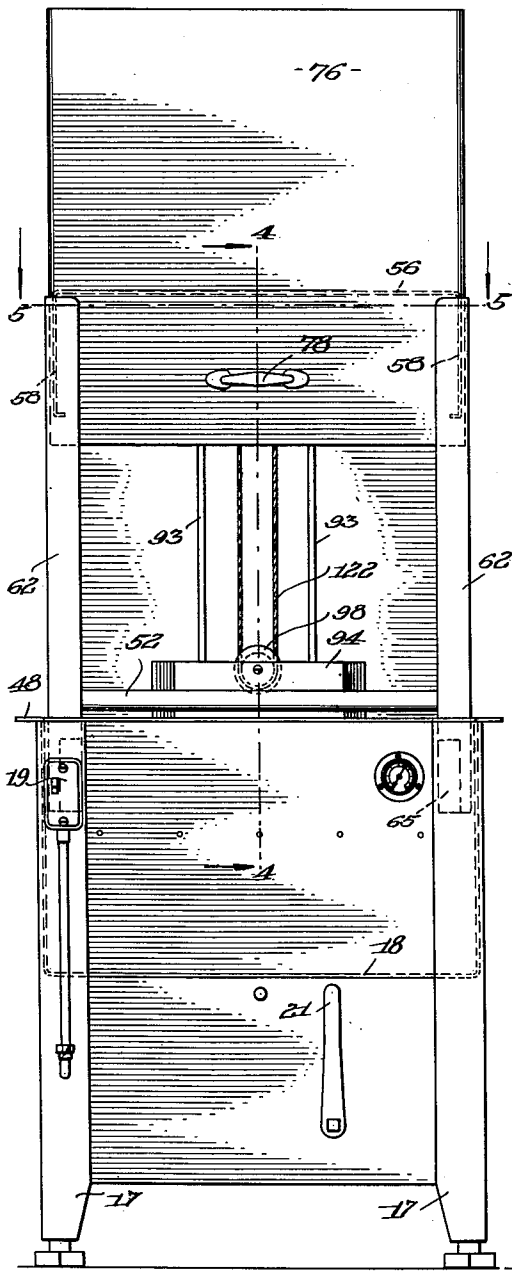
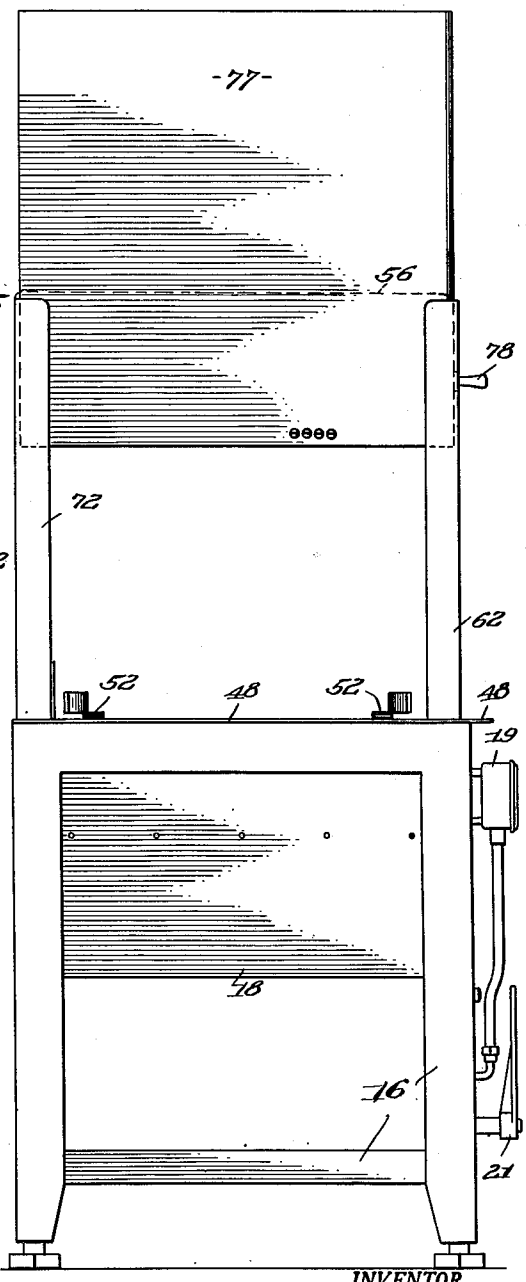


Fig. 3



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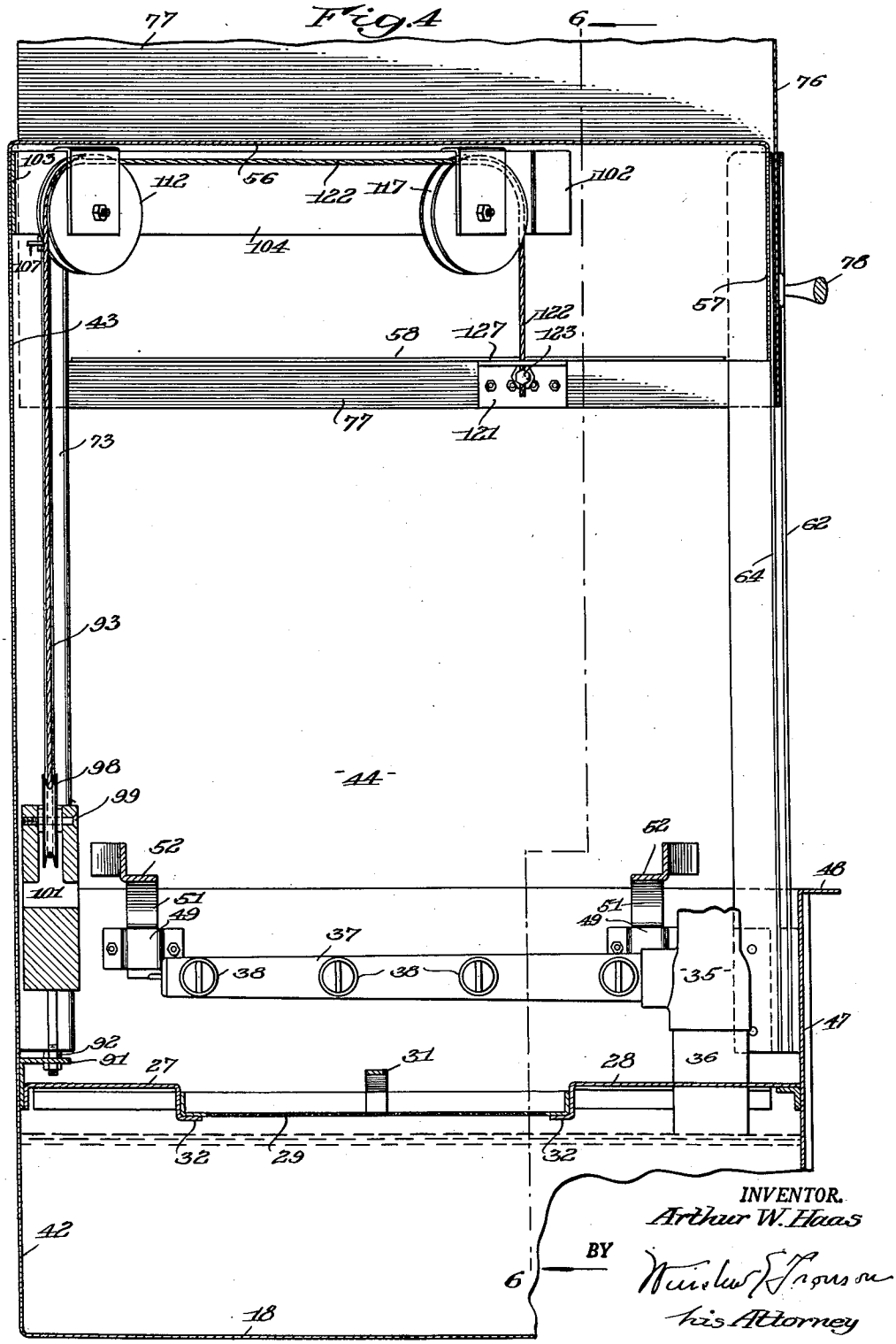
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his Attorney

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DISHWASHING MACHINE

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Fig. 4



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DISHWASHING MACHINE

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Fig. 5

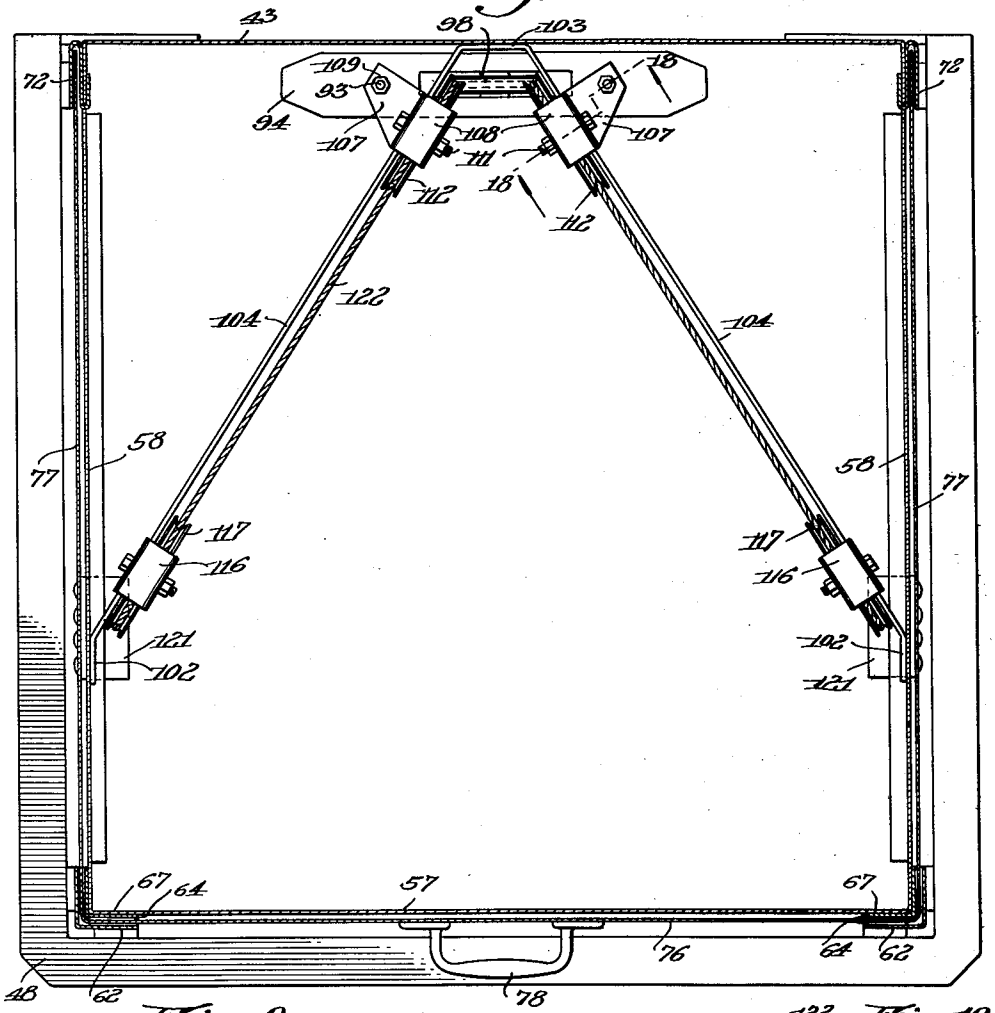


Fig. 9

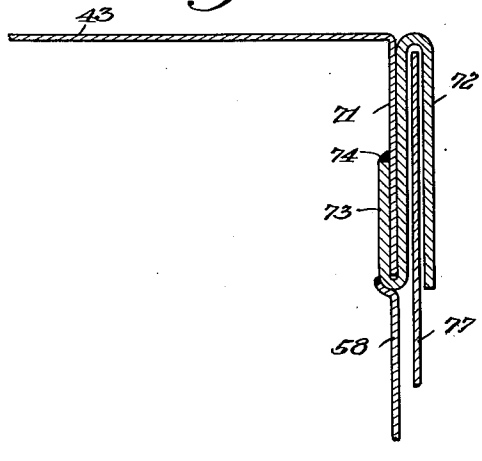
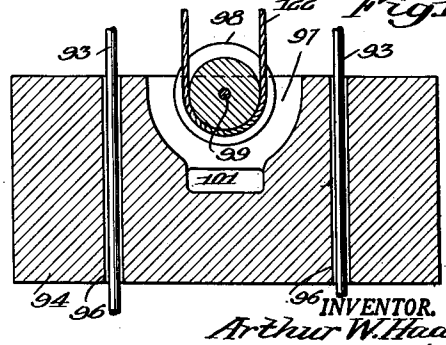


Fig. 10



INVENTOR.
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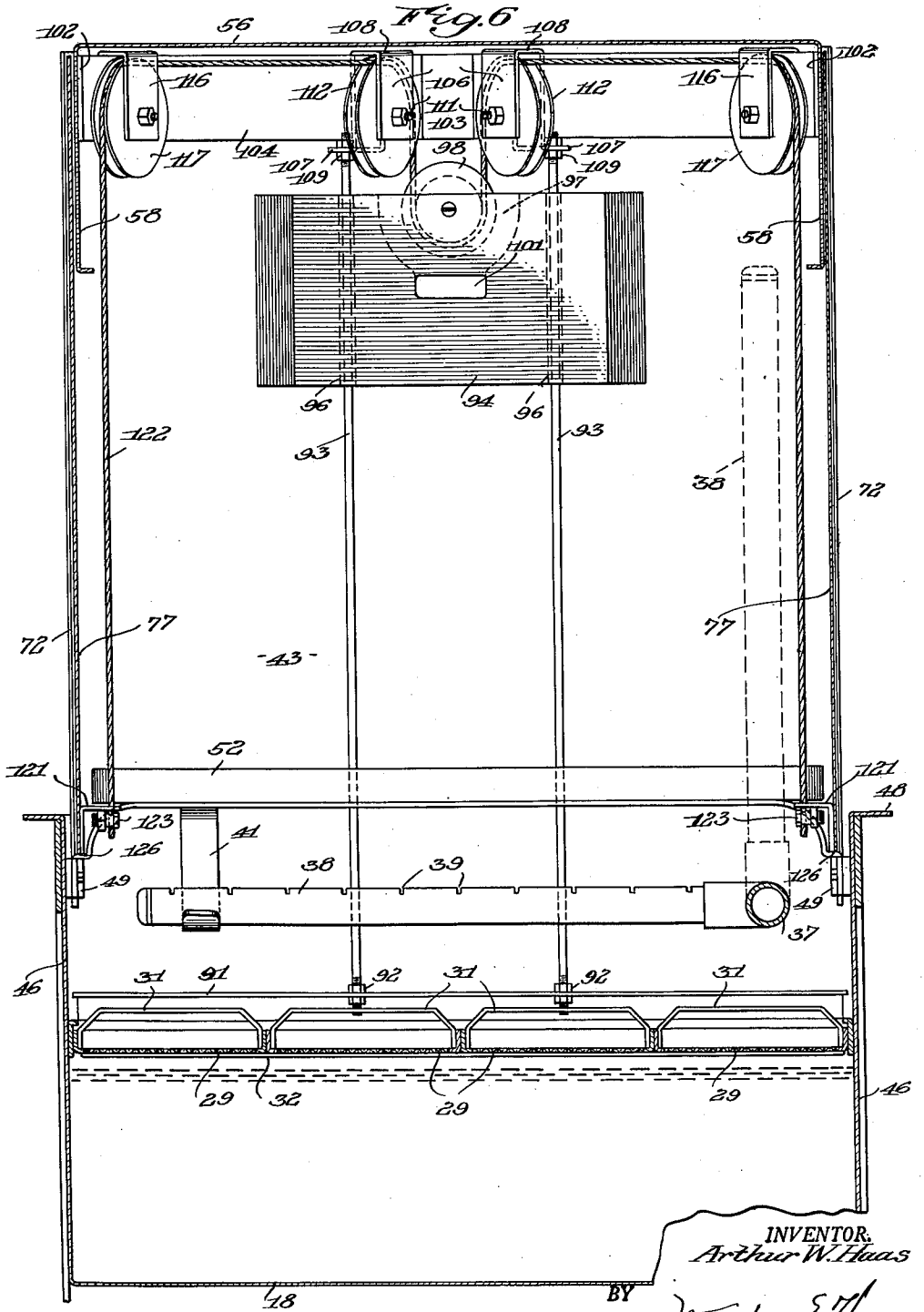
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March 31, 1953 A. W. HAAS 2,633,399

DISHWASHING MACHINE

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Fig. 6



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DISHWASHING MACHINE

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Fig. 11

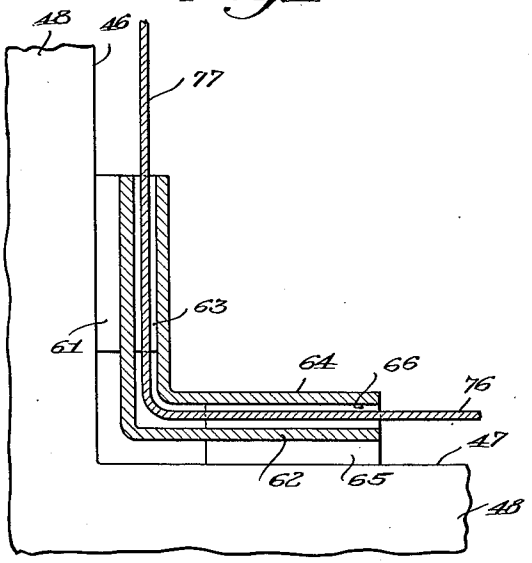


Fig. 12

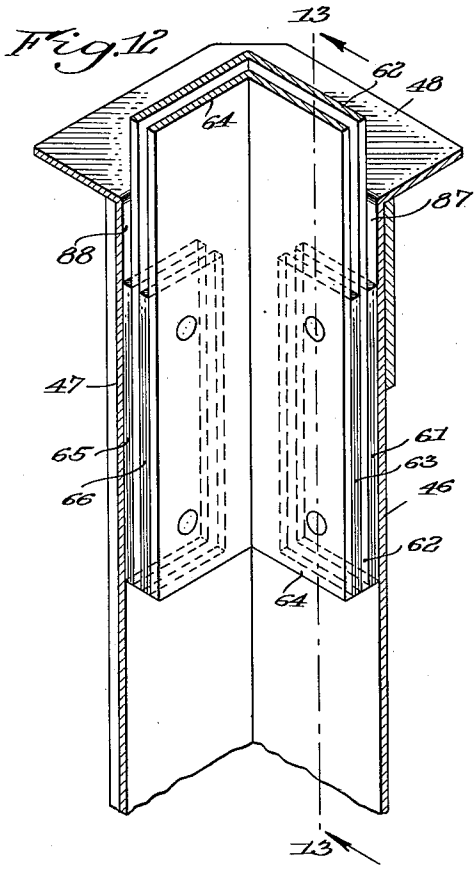
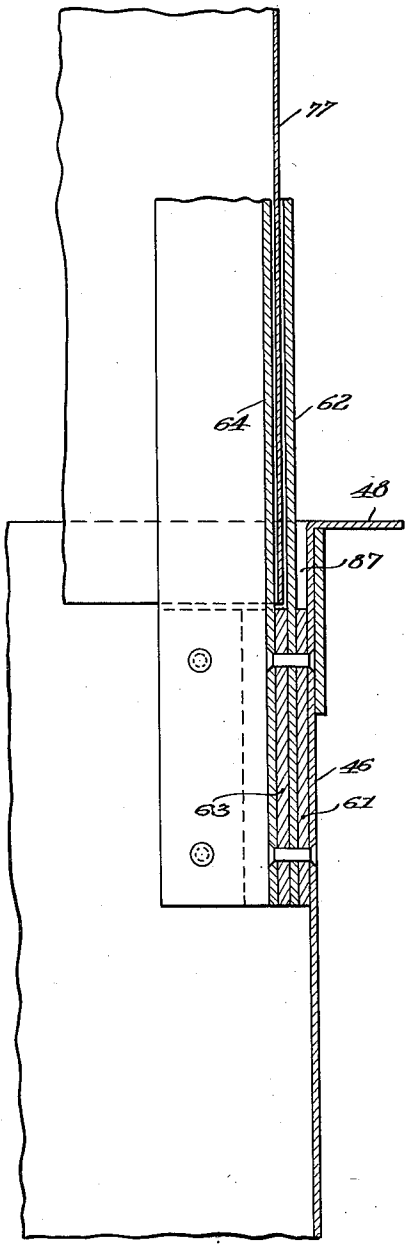


Fig. 13



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Patented Mar. 31, 1953 2,633,399

UNITED STATES PATENT OFFICE

2,633,399

DISHWASHING MACHINE

Arthur W. Haas, Rochester, N. Y., assignor, by mesne assignments, to Toledo Scale Company, Toledo, Ohio, a corporation of New Jersey

Application June 24, 1947, Serial No. 756,717

6 Claims. (Cl. 312—289)

1

My invention relates to a dishwashing machine, particularly that type of dishwashing machine for use in hotels, clubs, restaurants and other eating establishments adapted to serve large numbers of people.

An object of my invention is to provide a dishwashing machine which is simple in construction, economical to manufacture and more convenient for the operator thereof to use than present commercial dishwashing machines.

Another object of my invention is to provide a dishwashing machine in which a single one-piece door or closure is provided for the washing and rinsing space of the dishwashing machine which has three sides or panels adapted to close three open sides of the machine when in a closed position, two opposite sides of the machine being adapted when the closure is open for the ingress and egress of dish racks while the front panel of the closure carries a handle enabling the three panel closure to be opened from the front, thereby eliminating the necessity of the operator reaching over dish tables to reach the closure handle as in prior art dishwashing machines.

A further object of my invention is to provide a dishwashing machine, particularly adapted for use in hotels, clubs, restaurants or other large eating establishments adapted for use along a wall, the dish racks being moved in at one side of the machine and out at the other or is adapted for use in a corner of a room in which case the dish racks are moved into the machine at one side thereof, and when washed and rinsed, are moved forwardly out of the front of the machine to a dish tray or table.

Still another object of my invention is to provide a washing machine in which the parts thereof are so constructed and arranged that dish tables may be placed in cooperative relation to the machine either on two sides thereof or on one side and the front thereof.

My invention further contemplates a commercial dishwashing machine in which the washing and rinsing space is open on three sides enabling ingress and egress of the dish racks and convenient access to various parts of the machine for the purpose of cleaning the same, the machine being provided with a closure which has three integral panels adapted to close the open sides of the machine, the three panels being counterbalanced in such a manner so that the closure may be moved to an opened or closed position by a single handle on the front of the machine.

Other objects and advantages of my invention will be particularly pointed out in the claims and

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will be clear from the following description, when taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of the machine of my invention showing it arranged against a wall and illustrating its relation to the dish trays or tables which are usually employed with commercial dishwashing machines;

Fig. 2 is a front elevation of the dishwashing machine of my invention with the closure for closing the dishwashing and rinsing space in an open position;

Fig. 3 is a side elevation of the washing machine as the parts are shown in Fig. 2;

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 2 in the direction indicated by the arrows;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 2 in the direction indicated by the arrows;

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 4 in the direction indicated by the arrows;

Fig. 7 is a perspective view of the three panel closure or door of my invention;

Fig. 8 is a sectional view taken substantially on the line 8—8 of Fig. 5 in the direction indicated by the arrows;

Fig. 9 is an enlarged view of the rear right corner of the machine taken approximately in the same horizontal plane as Fig. 5;

Fig. 10 is a vertical sectional view taken through the counterweight which is employed to counterbalance the three panel closure;

Fig. 11 is an enlarged view showing the front left hand corner of the machine, the view being taken substantially on the same horizontal plane as Fig. 5;

Fig. 12 is a perspective view showing one of the front corners of the machine and indicating how the three panel closure guides are spaced and how the guides are spaced from the washing machine apron; and

Fig. 13 is a sectional view taken substantially on the line 13—13 of Fig. 12 in the direction indicated by the arrows.

As shown most clearly in Figs. 1, 2 and 3, the washing machine of my invention comprises a main frame, generally indicated by the numeral 16, which includes legs 17. The main frame carries a wash and rinse water tank 18, a pump and driving motor (not shown), a starting switch 19, a water tank drain handle 21 and other appurtenances not necessary to be described herein, since they are conventional in dishwashing ma-

chines of the type to which this invention relates.

As shown most clearly in Fig. 1, the machine has arranged adjacent thereto dish trays or tables, generally indicated by the numeral 26, the dishes usually being stacked in dish racks on the right hand table 26. The racks carrying the dirty dishes are pushed into the machine after which the washing and rinsing space of the dishwasher is closed during washing and rinsing operations. After the dishes have been washed and rinsed they are moved out on to the left hand dish table where they are usually allowed to air dry.

While I have shown the machine as being arranged for side ingress and side egress of the dish racks from either side of the machine, as will be presently explained, the machine of my invention is readily convertible for corner operation, that is, for side ingress and front egress of the dish racks.

As shown most clearly in Fig. 4, the washing machine includes a rear splash pan 27 and a front splash pan 28. The splash pans extend from one side to the other of the machine; are suitably supported from the frame of the machine, as indicated in the drawings; and carry a series of scrap trays 29, each of which is provided with a handle 31.

As shown most clearly in Fig. 6, preferably, in the size of machine shown, four scrap trays are provided which are supported by flanges 32 (Fig. 4) formed on the front and rear splash pans 27 and 28. The scrap trays may be made of heavy screening or may be sheets of metal suitably perforated to permit the water used in washing and rinsing the dishes to drop back into the tank 18 while all but the finest food particles and other refuse material, flushed off the dishes during the washing and rinsing operations, are retained on the scrap trays.

As most clearly indicated in Fig. 4, water is pumped from the tank 18 through a pipe 36 which is located at the front right hand corner of the machine. The pipe 36 connects through an elbow 35 to a distributing pipe 37 which extends along the right side of the machine. The distributing pipe 37 connects with a series of spray pipes 38, in the particular machine shown four spray pipes being employed. Although not shown, it will be understood that a set of upper spray pipes may also be provided.

As shown most clearly in Fig. 6, each of the spray pipes 38 has a series of openings, nozzles or spray slots 39 through which water at relatively high velocity is discharged upward into the washing and rinsing space in which the usually basket type racks carrying the dishes to be washed are located during the washing and rinsing operation, as will presently appear.

As shown in the drawings, each of the spray pipes 38 is rigidly connected to the distributing pipe 37. The distributor pipe, however, is free to be rotated with respect to the elbow 35 (Fig. 4). This enables all of the spray pipes to be lifted as a unit and rotated, with the distributor pipe, about the axis of the elbow 35 to the dotted line vertical position shown in Fig. 6. In this position of the spray pipes, access to the scrap trays is made possible to enable the scrap trays to be removed from the machine for cleaning. When the spray pipes are in their operative position for washing the dishes, they are supported by a bracket 41 which is carried by the rear track of the machine.

As shown most clearly in Fig. 4, the rear wall 42 of the tank 18 is extended upward to form a rear wall 43 for the washing and rinsing space 44. The side walls 46 (Fig. 6) and the front wall 47 (Fig. 4) of the tank are extended upward only slightly above the level of the spray pipes. The sheet metal forming the front and side walls 46 and 47 are turned outward, as shown in the drawings, to provide an apron 48 which extends completely around the two sides and the front of the machine.

Mounted on the inner sides of the side walls 46 are brackets 49 which are bent so as to provide slots for the reception of tongues 51. These tongues extend downward from dish rack tracks 52. The tracks are mounted at the front and rear of the machine and extend from one side of the machine to the other (Fig. 6) just slightly above the level of the apron 48.

It will now be clear that, as viewed in Fig. 1, the racks carrying the dishes are placed on the table 26, then pushed over the table on to the tracks 52. When in this position the closure, as will presently appear, is moved to a closed position and the washing and rinsing operations are carried on. Thereupon the closure is opened after which the racks are pushed usually sidewardly to the left of the machine.

The rear wall 43 is extended upward and turned forwardly to form a top wall 56, the metal being turned downward to form a partial front wall 57. Similar partial side walls 58 (Figs. 4, 6 and 9) may be welded to forwardly turned portions of the rear wall to complete a dome extending above the washing and rinsing space 44. It will thus be appreciated that the washing and rinsing space 44 is open on three sides to enable ingress and egress of the dish racks and access to the spray pipes, splash pans and scrap trays.

As shown most clearly in Figs. 12 and 13, riveted to the side wall 46 is a strip of metal 61 forming a spacer as will presently appear, an angular strip of metal forming an outer guide 62, a spacer 63 and an angular piece of metal forming an inner guide 64. Similarly located between the front 47 and the outer guide 62 and and the inner guide 64 are spacers 65 and 66.

As shown most clearly in Fig. 5 the guides 62 and 64 form corner posts at each of the front corners of the machine, the inner guides being welded, as shown at 67 (Fig. 5) to the downwardly turned front panel 57 and side panels 58 of the top dome.

As shown most clearly in Fig. 5 guides are formed at the rear corners of the machine, a detail of one of these guides being shown in Fig. 9. As previously mentioned, the side edges of the back wall 43 may be turned inward, as shown at 71. Each of the guides 72 may be U-shaped in cross-section and each has a part 73 turned over to lie on the inside of the forwardly turned part 71 of the back and welded thereto, as shown at 74. The rear guides 72 extend upwardly along the rear wall of the machine and are carried thereby rigidly in position. The side panels 58 of the top dome may be welded, as shown in Fig. 9, to the guides 72.

The closure for closing the three open sides of the dishwashing and rinsing space during operation of the machine is shown in perspective in Fig. 7. The closure comprises a single sheet of metal which is bent to form a front panel 76 and side panels 77. The front panel adjacent its lower edge is provided with a handle 78. If desired, door handles may be provided on any or all of the panels and in the case of a corner

machine may be placed at the corners of the closure.

The closure is mounted so as to be slidable in the guides formed by the guide elements 62 and 64 at the front of the machine and the guides 72 at the rear of the machine which receive the rear edges 79 of the side panels 77 of the closure. At their forward corners, the side panels 77 are rounded and merge into the front panel 76 so as to provide a smooth curve to facilitate the movement of the closure in the corner guides 62 and 64. While I have shown a three panel closure it would be possible to provide a square or rectangular closure if desired but little or no advantage is derived thereby because the back panel of the machine usually is placed against a wall. In such case, however, four corner guides would be employed.

In Fig. 11 I have illustrated the closure in horizontal cross-section and shown it in relation to the adjacent corner guide. In this view the spacing of the guides 62 and 64 from the walls of the closure has been somewhat exaggerated for purposes of illustration. As shown, the guides 62 and 64 are free of the walls of the closure. Similarly, as illustrated in Fig. 9, the guide 72 is relatively free with respect to the walls of the side panel. The rear guides are in reality not bearings or guides but instead are loose fitting baffles to prevent leakage of water. The arrangement thus described enables the closure substantially to float in its guides when the closure is properly counterbalanced, as will presently be described.

In the conventional dishwashing machines with which I am familiar, it has been customary to provide doors on opposite sides of the machine when the machine is intended for use, as illustrated in Fig. 1. These doors have been sometimes separately operated and in other machines have been arranged with a common counterweight so that both doors move together. The front of such machines has been solid and connected to the main frame usually in a manner similar to the rear panel or wall 43, illustrated herein.

With the machines of the prior art, as described above, it has been necessary for the operator, usually a woman, in order to open the doors, to reach over the dish tables 26 which are usually relatively high and lift the door by means of its handle while standing in a relatively awkward off-balance position.

The door guides tend to corrode and bind due to the excessive presence of moisture, lime in the wash water and food particles unavoidably lodged in the guides. Unless the guides and doors are frequently cleaned and oiled they cannot be shifted from closed to open position very freely. Particularly in the case of a relatively short woman, the necessity of reaching over the dish tables to reach the door handle make it difficult for her to apply her full strength to opening the door. This fact combined with corrosion of the guides makes the task sufficiently difficult that in many commercial dishwashing machines doors are not employed. Instead the washing and rinsing space is closed at the sides by a pair of hanging canvas sheets. This, of course, is undesirable as it is impossible to prevent water, usually containing strong detergents, from escaping from the machine and falling on the adjacent dish tables and the floor. Moreover, access to the spray pipes for cleaning and the scrap trays for removal for cleaning is difficult because it is necessary to reach in from the side of the machine over the dish tables to reach the spray pipes and the scrap trays. The difficulties encountered in cleaning such machines has been such that the operators thereof have not cleaned their machines as frequently as proper and clean operation requires. The result is that the wash water becomes excessively dirty requiring frequent replacement, loss of detergent and excessive use of water.

In the machine of my invention the front panel of the closure is readily accessible and upon opening the closure the spray pipes, the distribution pipe and the tracks for the dish racks are readily accessible from either the front or the sides of the machine for easy cleaning. Upon rotating the spray pipes 38 to the dotted line position shown in Fig. 6, the splash pans 27 and 28 are readily accessible and the scrap trays 29 may be easily removed for cleaning. Moreover, because three sides of the machine are open, the view of the operator is not cut off by a solid front panel. Thus the entire interior of the machine is accessible to view so that the operator can readily see where scrap and food particles are lodged to enable adequate cleaning.

A further advantage of the arrangement of my invention lies in the fact that in the conventional machine having two side doors, four vertical edges exist at the sides of the doors through which leakage of water may take place. With the three panel closure of my invention, leakage of water may occur only along the vertical edges of the closure at the rear thereof.

In Fig. 1 I have shown my machine arranged for mounting against a side wall with the dish tables arranged on each side of the machine. Of particular importance is the fact that the washing machine of my invention may be readily converted for corner operation.

As shown in Fig. 1, each of the dish tables 26 has a downwardly extending lip 86 at its forward edge which extends into a groove or slot 87 formed at each side of the machine. Adjacent the corner guides, this slot is continued by reason of the use of the spacer 61 which provides an intervening space between the side wall 46 and the outer guide 62. Thus, the dish tables may be made the same width as the width of the machine and so as to extend over the apron 48 with the lip 86 extended into the slot 87 (see also Figs. 6 and 12).

As also will appear from Fig. 12, the spacer 65 separates the front wall 47 from the outer guide 62 so as to provide a slot or groove 88 at the front of the machine. As will be apparent the slot 87—88 is continuous from the rear of the machine around both sides and the front thereof and is co-extensive with the apron 48 which, as will be noted from Fig. 5, extends around three sides of the machine. Thus, the dish table 26 at the left of Fig. 1 may be shifted around to the front of the machine with its lip 86 lodged in the slot 88 at the forward side of the machine. By this arrangement the machine may be readily converted for corner use, the only change in the machine itself being the removal of the tracks 52 for the dish racks and the substitution therefor of a pair of tracks (not shown) in which one section of each track extends at right angles to another section of each track. This enables side ingress and front egress of the dish racks or vice versa.

The three panel closure of my invention may be hydraulically operated or otherwise automatically operated so as to be raised and lowered under

push button control. However, in the drawings I have shown the three panel closure as counterbalanced for easy manual operation.

As shown most clearly in Fig. 6, carried at the back of the machine is a counterweight rod support strip 91 which by means of nuts 92, anchors a pair of counterweight guide rods 93. The counterweight guide rods 93 extend upward along the back of the machine and serve to guide a counterweight 94 which is provided with bores 96 for the reception of the guide rods.

The counterweight, as shown most clearly in Figs. 5, 6 and 10 is provided with a recess 97 in which is mounted a pulley 98 carried by a shaft 99. To enable the recess 97 to drain itself of any water which may collect therein and to enable cleaning out of refuse material from said recess, the counterweight is provided with an opening 101 which communicates with the recess 97.

Welded to the side walls of the top dome, as at 102, and to the rear wall 43, as at 103, is a V-shaped brace 104 which not only serves to stiffen the top dome but also serves to support the counterweight mechanism.

As shown most clearly in Figs. 5 and 8, a pair of brackets 106 extend over the brace 104 and are supported thereby. These brackets have horizontally extending parts 107 and a U-shaped part 103. The horizontally extending part 107 serves as an anchor for the upper end of the guide rod 93, a pair of nuts 109 being employed to maintain the guide rod in position. The U-shaped part 108 of the bracket 106 is apertured to receive a shaft 111 which supports a pulley 112 rotatable with respect to the shaft, suitable bushings 113 being provided for the pulley and shaft.

As shown most clearly in Fig. 5, brackets 116 are provided which are toward the forward part of the top dome and extend over the braces 104 in a manner similar to the brackets 106. The brackets 116 serve to suport pulleys 117, the brackets 116 and pulleys 117 being similarly constructed in all respects to the brackets 106 and pulleys 112, except that the brackets 116 lack the horizontally extending portions 107 of the brackets 106.

As shown most clearly in Fig. 7, each side panel of the closure has screwed thereto on its inner side an angle piece 121, these angle pieces also being clearly shown in Figs. 4 and 5. The upper flange of each angle piece is apertured to receive a cable 122 which extends through the aperture and is prevented from slipping therethrough in any suitable manner as by an apertured bolt 123 provided with a nut and a lock washer.

As shown most clearly in Fig. 6, the cable 122 is continuous. At one end it is anchored to one of the angle brackets 121 on the closure, extends upward over one of the pulleys 117, then over one of the pulleys 112 and beneath the pulley 98 which is supported in the counterweight 94. From thence the cable extends up over the other pulley 112 and over the other pulley 117 and is anchored to the angle bracket 121 on the opposite side of the closure. Since the cable is continuous, any changes or variations in the length of the cable are automatically compensated for to maintain equal lengths of cable on opposite sides of the vertical center of the counterweight.

As will appear most clearly from Fig. 5, the angle brackets 121 are located forwardly of the vertical center of the closure. This position of the angle brackets is provided to offset the fact that the closure lacks a rear panel, the brackets being located at the fore and aft center of weight of the closure. Thus the closure is counterbalanced at its center of weight and because the guides in which the closure slides are relatively free, the closure substantially floats in its guides and is freely movable therein.

As shown most clearly in Fig. 6, in its down position the closure is stopped, as indicated at 126, by engaging a portion of the track 52 which is turned downward to form the tongues 51 which are removably lodged in the slots formed by the brackets 49. Upward movement of the closure is arrested by engagement of the angle brackets 121 on the side panels of the closure with the downturned portions 58 of the top dome, as shown most clearly at 127 of Fig. 4. The door may also be stopped if desired by providing a cushion bumper for the counterweight.

It will now be apparent that I have provided a commercial dishwashing machine suitable for use in eating establishments which is more convenient for the operator to use, as merely by lifting on the handle located on the front panel of the closure, the interior of the washing and rinsing space is accessible from three sides. This avoids the necessity of lifting the doors of the prior art machines while the operator stands in an awkward position and enables convenient access to the parts of the machine which must be kept clean and access to the scrap trays for removal and cleaning. The three panel door of my invention has uses in connection with other machines such, for example, as degreasing machines for machined parts.

While I have shown and described the preferred form of my invention, it will be apparent that various changes may be made therein particularly in the form and relation of parts without departing from the spirit of my invention as set forth in the appended claims.

I claim:

1. In a dishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a washing and rinsing space is provided above the frame, the combination of a stationary wall closing said washing and rinsing space at the top, means extending from the said frame for supporting said top wall in spaced relation to the frame, said washing and rinsing space being substantially open on at least three sides, a one-piece closure unitarily formed of a metal sheet, said closure enclosing said space on at least three sides, means between the frame and said top wall for guiding said closure as it is moved with respect to said frame and top wall to and from a closed position, and a counterweight operative in cooperation with said closure, said counterweight supported by an intermediate portion of a continuous line guided by a pulley system, the loose ends of said line being anchored to the parallel sides of said closure, said closure being freely movable in the guide and support means.

2. In a dishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a washing and rinsing space is provided above the frame, the combination of a stationary wall closing said washing and rinsing space at the top, said space being open on at least three sides to enable access to the washing and rinsing space and the dishwashing mechanism from at least three sides, a movable one-piece closure having at least three sides two of which extend at right angles to a third side for closing the open sides of said space during washing and rinsing operations, guide means comprising inner guide members extending between said frame and

said top wall and outer guide members attached to said frame only and embracing the corners of the movable closure for guiding said closure as it is moved with respect to said frame and top wall to and from a closed position, and counterbalance means in cooperation with the parallel sides of said one-piece closure, said closure thereby being substantially free of binding with the support and guide means thereof during movement of the closure.

3. In a wishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a washing and rinsing space is provided above the frame, the combination of a stationary wall closing said washing and rinsing space at the top, said space being substantially open on at least three sides to enable access to the washing and rinsing space and the dishwashing mechanism from at least three sides, a movable one-piece closure having at least three sides two of which extend at right angles to a third side for closing said open three sides of said space during washing and rinsing operations, guide members for said movable closure comprising inner members extending between and attached to said frame and said top wall and located within the corners between the sides of the movable closure and outer members attached to and extending upwardly from the frame and embracing the corners of the movable closure, counterbalance means in cooperation with the parallel sides of said one-piece closure, said closure thereby being substantially free of binding with the support and guide means thereof during movement of the closure, an apron extending around at least three sides of the machine substantially at the level of the lower edge of the closure when in its closed position, and spacer elements mounted between said frame and said guide means for forming a slot extending around at least three sides of the machine between said apron and the lower edge of the closure when in its closed position.

4. In a dishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a space is provided above the frame, the combination of a rear wall extending upward from the frame, a post extending upward from the frame at each front corner of the machine, a top wall supported by the rear wall and said front posts in spaced relation to the frame to provide a washing and rinsing space which is open on three sides, a substantially U-shaped closure, said U-shaped closure comprising three panels joined to form a one-piece closure, guides formed in connection with said posts for the reception of the base corners of the U, guides carried by said rear wall for the reception of the free edges of the U, said guides enabling the closure to be moved from a closed position in which the washing and rinsing space is closed on all sides to an open position enabling access to the washing and rinsing space and parts of the washing mechanism from three sides, guides extending along the rear wall from the frame to the top wall, a counterbalnace movable on said guides, a pulley carried by said counterbalance, pulleys carried by said top wall, and a continuous line guided by said pulleys and having its ends connected to the parallel sides of the U, said connection being forward of the center line of the sides of the movable closure.

5. In a dishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a space is provided above the frame, the combination of a stationary rear wall extending upward from the frame, a post extending upward from the frame at each front corner of the machine, a top wall supported by the rear wall and said front posts in spaced relation to the frame to provide a washing and rinsing space which is open on three sides, a movable substantially U-shaped closure enclosing said posts, a guide attached to the frame and extending upwardly along and embracing each corner of the movable closure and cooperating with said posts for the reception of the base corners of the U, guides carried by said rear wall for the reception of the free edges of the U, said guides enabling the closure to be moved from a closed position in which the washing and rinsing space is closed on all sides to an open position enabling access to the washing and rinsing space and parts of the washing mechanism from three sides, counterweight means operative with said closure, said counterweight supported with a single line, the ends of said line connected to the parallel sides of said closure, and spacer elements mounted between said frame and said posts for forming a slot extending around said frame inwardly of said frame on three sides thereof.

6. In a dishwashing machine wherein a frame is provided for supporting dishwashing mechanism and wherein a space is provided above the frame, the combination of a stationary rear wall extending upward from the frame, a post extending upward from the frame at each front corner of the machine, a top wall supported by the rear wall and said front posts in spaced relation to the frame to provide a washing and rinsing space which is open on three sides, a movable substantially U-shaped closure, each of said posts including an inner strip angular in cross section secured to the frame and to the top wall and a spaced outer strip angular in cross section attached only to the frame, the space between said strips accommodating the base corners of the U of the movable closure, a counterweight means operatively connected with the parallel sides of the closure, and U-shaped guides carried at the sides of said rear wall to accommodate the free edges of the U of the closure, the strips of the posts being spaced and the guides of the free edges of the U of the closure being spaced in such a manner that the closure may substantially float in said guides in cooperation with the counterbalance means when the closure is moved.

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