Aug. 3, 1948. A. H. HABERSTUMP 2,446,368

CONVEYER TYPE DISHWASHER

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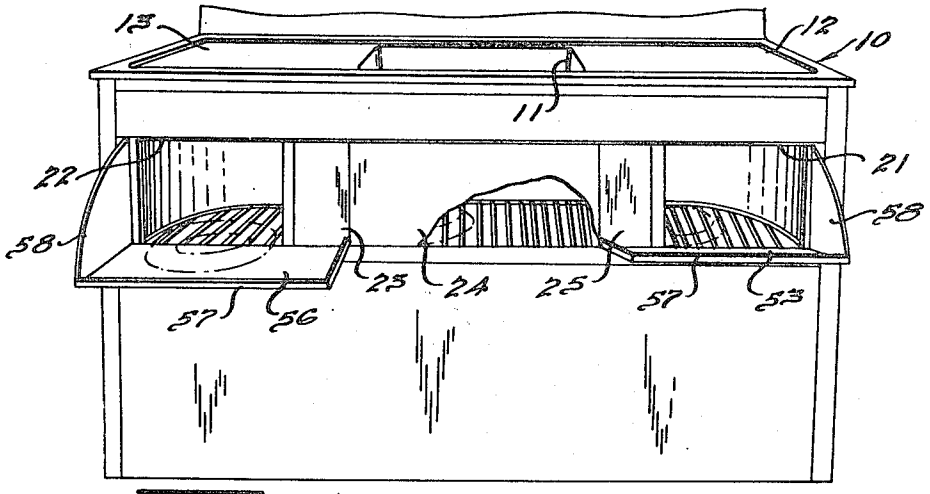
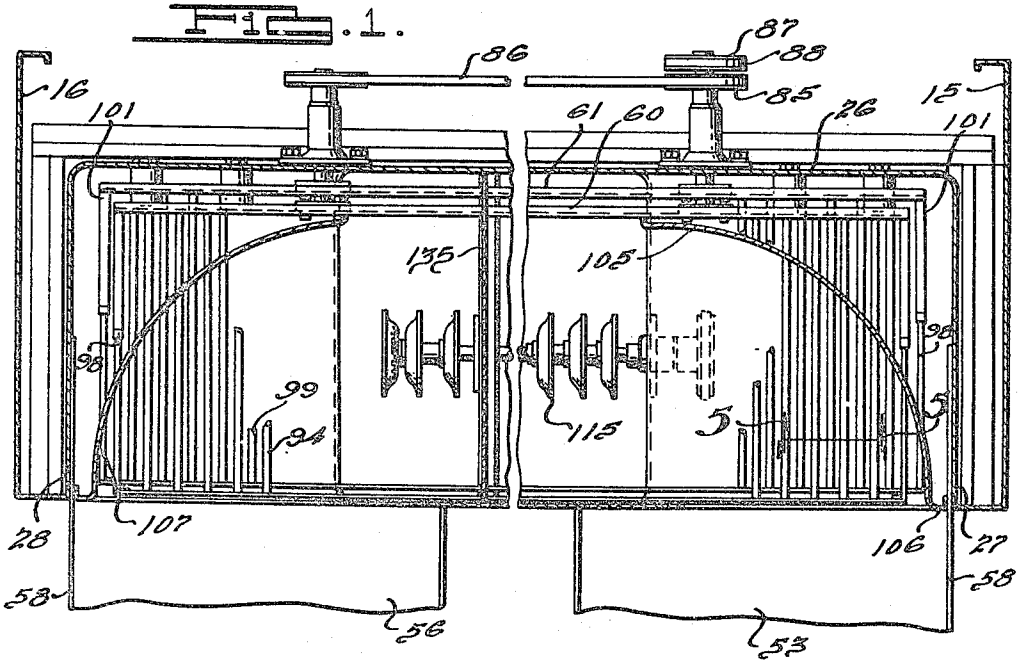


Fig. 1.



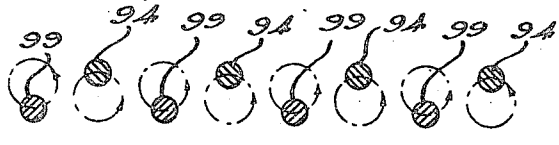


Fig. 3.

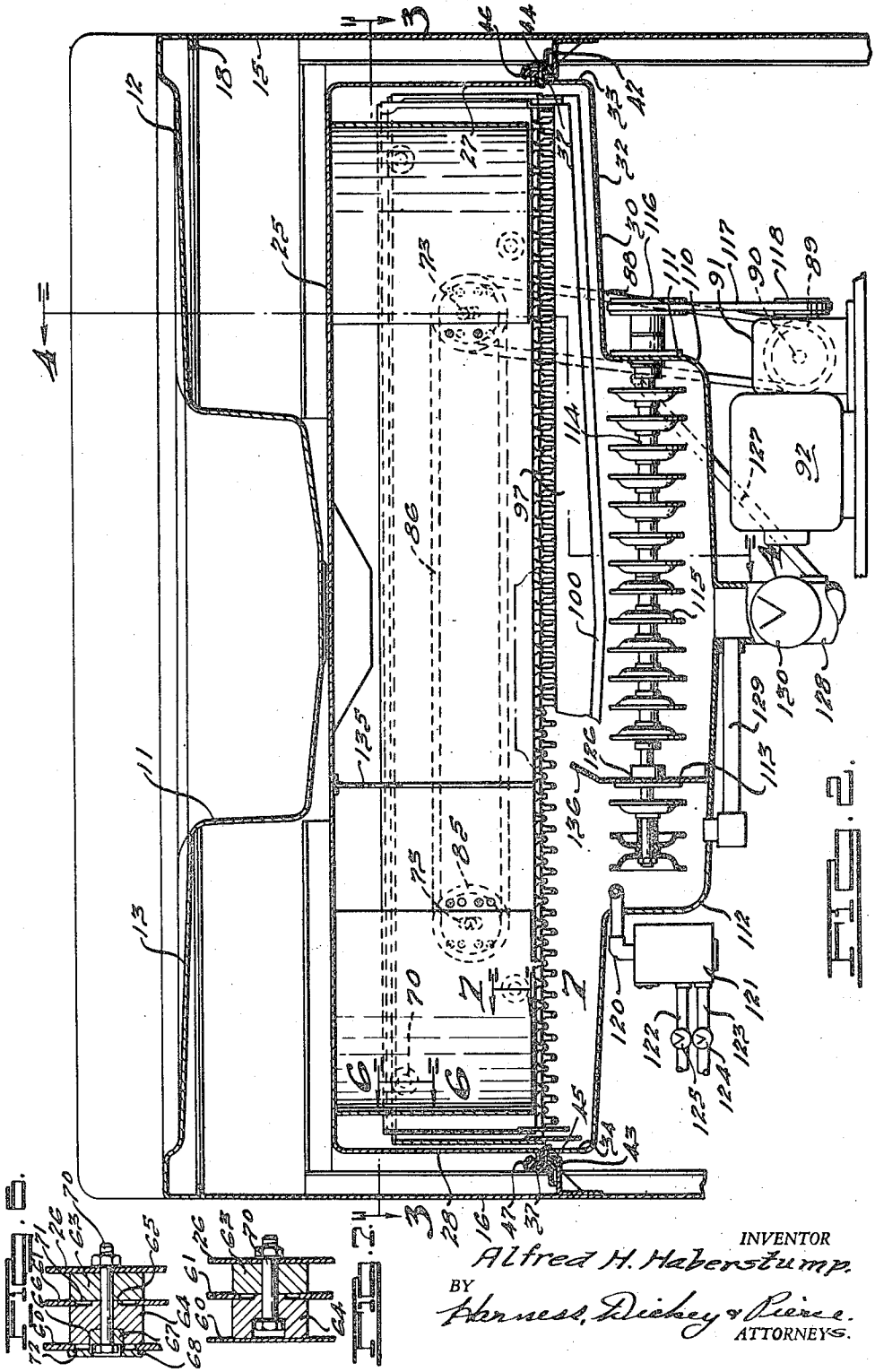
Fig. 2.

INVENTOR
Alfred H. Haberstump.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

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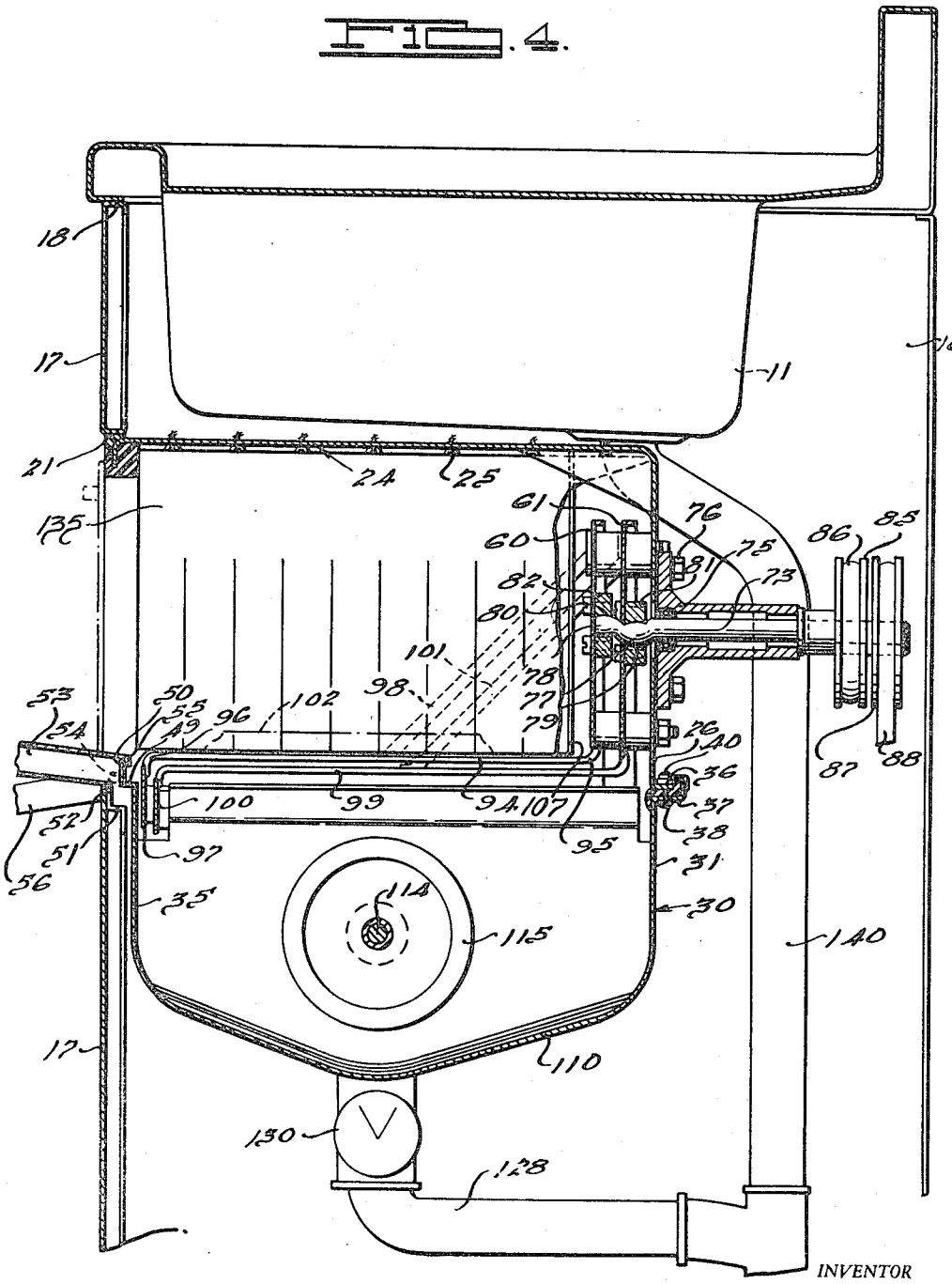
INVENTOR
Alfred H. Haberstump.
BY
Harness, Dickey & Pierce.
ATTORNEYS.

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FIG. 4.



INVENTOR
Alfred H. Haberstump
BY
Harness, Dickey & Pierce
ATTORNEYS

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CONVEYER TYPE DISHWASHER

Alfred H. Haberstump, Detroit, Mich., assignor to The Murray Corporation of America, Detroit, Mich., a corporation of Delaware

Application January 7, 1942, Serial No. 425,817

7 Claims. (Cl. 134—78)

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The invention relates to dish washing apparatus and in certain respects it is related to the invention embodied and claimed in my copending application Serial No. 408,855, filed August 29, 1941, which has matured into Patent Number 2,436,169, issued Feb. 17, 1948.

One object of the present invention is to provide an improved and efficient dish washing machine having spaced inlet and discharge openings for the articles and means automatically operating to thoroughly clean the articles while moving them from the inlet to the discharge opening.

Another object of the invention is to provide an improved continuously operating machine for washing dishes or other articles which includes an external support at the inlet side of the machine upon which the articles to be cleaned may be placed and from which they will automatically move into the machine.

Another object of the invention is to provide a similar external support at the discharge end of the machine upon which the cleaned articles automatically will be placed after their passage through the machine.

Another object of the invention is to provide a multiple part washing machine through which the articles to be cleaned pass and which effects washing and rinsing of the articles in a progressive order.

Another object of the invention is to provide an improved conveying means for carrying the articles through the machine and which is of such a character that all surfaces of the articles to be cleaned will be exposed to the action of cleaning fluid thrown over the articles.

Another object of the invention is to provide an improved dish washing machine which is built into a cabinet forming part of a drain and sink combination.

Other objects of the invention will become apparent from the following specification, from the drawings relating thereto, and from the claims hereinafter set forth.

For a better understanding of the invention, reference may be had to the drawings, wherein:

Figure 1 is a front elevational view, with certain parts broken away, illustrating dish washing apparatus constructed according to one form of the invention;

Fig. 2 is a longitudinally directed cross-sectional view, on a larger scale, of the apparatus shown by Fig. 1;

Fig. 3 is a cross-sectional view taken substantially along the line 3—3 of Fig. 2;

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Fig. 4 is a cross-sectional view taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a cross-sectional view, on a larger scale, taken substantially along the line 5—5 of Fig. 3;

Fig. 6 is a cross-sectional view, on a larger scale, taken substantially along the line 6—6 of Fig. 2; and

Fig. 7 is a similar cross-sectional view, on a larger scale, taken substantially along the line 7—7 of Fig. 2.

Referring to Figs. 1, 2 and 4, in particular, the structure illustrated includes a cabinet 10 having a sink 11 and drain or similar sections 12 and 13 at the top of the cabinet. Walls 15 and 16 are provided at the ends of the cabinet and a similar wall 17 is provided at the front of the cabinet. As shown, the sink 11 and drain board sections 12 and 13 form a stamping separate from the walls 15, 16 and 17, and such parts may be suitably fastened together along the junction line 18 by releasable fastening means or by welding. The front wall 17 of the cabinet has openings 21 and 22 at opposite ends and between these openings the wall may be closed by panels 23, 24 and 25 removably fastened in place. The openings 21 and 22 serve as inlet and discharge openings, respectively, for the dish washing machine presently to be described.

Within the cabinet walls, a compartment is provided which includes an upper shell 24 having an upper wall 25, a rear wall 26, and end walls 27 and 28. A complemental lower shell 30 has a rear wall 31, a bottom wall 32, end walls 33 and 34, and a front wall 35. As best shown by Fig. 4, the back walls 26 and 31 have outwardly turned flanges 36 and 37, respectively, and between these flanges, a rubber cushioning and sealing strip 38 is provided. Suitably spaced bolts 40 extending through the flanges secure the upper and lower shells together. The end walls 27 and 33 and 28 and 34 similarly may be fastened together in order that the shells will be positively and sealingly joined.

As shown by Fig. 2, the compartment thus provided rests on brackets 42 and 43, respectively, secured to the end walls 15 and 16 of the cabinet and it will be observed that rubber strips 44 and 45 are disposed between the flanges 37 on the lower shell and the brackets so that the compartment is resiliently supported on the brackets. Metal retainers 46 and 47 which may be releasably fastened to the brackets 42 and 43 are disclosed in overhanging relation to the joint be-

tween the shells so as to hold the compartment on the brackets.

As shown by Fig. 4, the front wall 35 of the lower shell 30 extends upwardly to the lower edge of the opening 21 and then is outwardly turned, as indicated at 49, and finally it terminates in an upwardly directed shoulder 50. The edge of wall 17 along the bottom of the opening 21 has a shoulder 51 at its inner side and an upwardly directed flange 52 outwardly of the shoulder and these parts of the walls 35 and 17 serve as retaining and supporting means for a door 53 adapted to be swung upwardly to close the opening 21. Suitable pivots 54 may be provided at each side of the door adjacent the bottom which hingedly connect the door to the front wall of the cabinet. This door in its open position, as shown in Fig. 4, is inclined outwardly and upwardly a slight degree, and its upper wall terminates inwardly in a downwardly extending flange 55 adapted to engage the flange 50 so as to limit opening of the door to the position shown. A similarly hinged door 56 may be provided for the opening 22, but in this case the arrangement of parts is such that the door normally in its open position is inclined downwardly from the horizontal. As shown by Fig. 1, both doors having marginal ribs 57 around two edges and end walls 58 at the remote ends of the doors so as to retain dishes thereon, and as shown by Fig. 3, the end walls are movable into the compartment along the end walls 27 and 28 in close relation thereto.

Now referring to Figs. 3, 4 and 6, a pair of plates 60 and 61 are disposed vertically in spaced relation adjacent the back wall 26 and it will be noted that spacing means are provided between the upper and lower edges of the plates adjacent each end. Referring particularly to Fig. 6, each spacing means at the upper edges of the plates comprises a block 63 disposed between the wall 26 and the plate 61 and a second block 64 disposed between the two plates. This second block has a smaller end portion 65 abutting the block 63 and the length of this projecting portion is slightly greater than the width of the plate 61, so that the latter, while being held substantially against lateral movement, is free to revolve around the projection. The outer side of the block 64 has a recess 66 which receives a projection 67 of an outer cap 68 overlying the outer plate 60. The length of the projection 67 is such that when seated in the recess 66, the plate 60 is free to revolve about the projection while being held substantially against lateral movement. A bolt 70 extending through the blocks and through the back wall 26 positively anchors the plates on the back wall while still permitting the revolving movements mentioned. It will be observed that the plates have openings 17 and 72, respectively, which are of sufficient size that revolving movements hereafter to be more specifically mentioned are permitted. One of the spacing and anchoring means, shown by Fig. 6, is provided at each end of the plate adjacent the upper edge thereof.

The plate 61 and wall 26 are similarly separated along the lower edge of the plate at each end thereof and similarly the plates 60 and 61 are maintained in spaced relation. In this anchoring means at the lower edges of the plate, however, the cap 68 is omitted and the head of the bolt seats in the recess 66.

For moving the plates, a shaft 73 is provided adjacent opposite ends of the plates, as shown by Figs. 2 and 4, and each shaft is journaled in a hub 75 anchored by bolts 76 to the wall 26. The inner end of the shaft has eccentrically arranged portions 77 and 78 and these portions, respectively, are closely but rotatably received in sockets 79 and 80, respectively, formed in blocks 81 and 82 that are respectively bolted to the plates 60 and 61. Each of the blocks 81 and 82 may be formed in two pieces to permit its assembly with the eccentric portions 78 and 79, as will be readily understood. From this description, it should be apparent that upon rotating the shafts 73, the plates will have revolving movements in accordance with the movement of the eccentric portions 78 and 79.

For drivingly connecting the shafts, pulleys 85 are provided respectively on their outer ends and these are connected by means of a belt 86. A second pulley 87 on one of the shafts has a belt 88 thereon which leads downwardly, as shown by Fig. 2, to a lower pulley 89 on a shaft 90 projecting from a reduction gearing 91 operatively connected to a motor 92.

Referring again to Fig. 4, the plate 60 on its lower edge has a series of rods 94 disposed in spaced parallel relation and extending substantially to the front edge of the compartment and it will be noted that each of these rods is connected to the lower edge of the plate by means of an elbow 95, so that the rods together lie in a plane somewhat below the lower edge of the plate. The outer ends of the rods are turned downwardly, as indicated at 96, and are connected to a metal strip 97 extending longitudinally of the compartment. It might be mentioned that the ends of the rods may be connected to the lower edge of the plate and to the strip 97 by spot welding or the like. With reference to Figs. 3 and 4, the end rods are connected to opposite ends of the plate by braces 98 and such braces in conjunction with the outer metal strip 97 connecting the outer ends of the rod serve to provide a sturdy rod assembly extended from the plate.

The lower edge of the plate 61 similarly is provided with a series of rods 99 connected at their outer ends to a metal strip 100 and in this case too, braces 101 are provided to connect the ends of the plate to the end rods.

Now directing attention to Figs. 3 and 5 jointly, the rods 94 and 99 are disposed respectively in alternating relation and the arrangement of eccentrics is such that while all of the rods revolve in the same direction about axes spaced from their center lines, the one set of rods 94 is moving upwardly while the other set is moving downwardly and vice versa. This means, therefore, that if a flat dish 102 is placed on the rods 94 (as seen in Fig. 4), it will advance in the direction of revolving movement of the rods and also downwardly until the upwardly moving rods 99 contact it and move it upwardly while advancing it in a revolving movement. Continued movement of the now contacting rods 99 moves the plate downwardly until the upwardly moving rods 94 again contact the plate and continue the progressive advancement.

In view of the fact that the rods are disposed in fairly close relation, dishes or articles of different sizes will be maintained in the position they are placed on the rods and normally they will not tilt or turn sidewise during the successive engagements therewith of the two sets of rods. Moreover, it is to be noted that contact with the dishes or articles repeatedly changes so

that no part of the article remains unexposed very long by reason by contact with any particular rod or rods.

It now may be observed that the doors 53 and 56 lead substantially to the rod conveyer described, and since the door 53 at the inlet end is slightly inclined, articles placed thereon normally will gravitate on to the right end of the conveyer either due to the inclination alone or due to the inclination plus vibrations which will cause or urge the articles to be moved downwardly. Similarly, articles at the discharge end of the conveyer will gravitate on to the door 56. These doors may be closed when the machine is not in use so as to close the front side of the cabinet.

In order to guide the articles on the conveyer, a curved plate 105 may be provided, as shown by Fig. 3, and this plate extends to the upper wall 25 and substantially to the plate 60. It may be welded to the upper wall 25 and its lower edge is sufficiently spaced from the rods that it will not interfere with their operation. The outer edge of this curved plate terminates in a flange 106 which, jointly with the end wall 27, may provide a guide for the end wall 68 of the door 53. A similar guiding plate 107 may be fastened to the upper wall adjacent the other end of the conveyer and this wall will cause the article to be moved from the conveyer on to the door 56.

Now referring to Figs. 2 and 4, the lower shell 30 includes a reservoir 110 intermediate the ends of the bottom wall 32, which has end walls 111 and 112 and an intermediate partitioning wall 113 adjacent the end wall 112. A shaft 114 is journaled in openings in the end wall 111 and the partitioning wall 113, and this shaft has a projecting end portion disposed between the partitioning wall 113 and the end wall 112. The shaft is provided with a series of discs 115 disposed in spaced relation and these discs are adapted to throw liquid cleaning fluid such as water upwardly through the conveyer. The nature of these discs and the manner of their operation are disclosed in the copending application previously mentioned. Beyond the end wall 111, the shaft 114 has a pulley 116 and a belt trained about this pulley is in turn trained about a pulley 118 mounted on a second shaft projecting from the gear box 91. It will be noted that the bottom wall 32 of the lower shell is inclined towards the reservoir 110 so that liquid thrown upwardly through the compartment will either fall back into the reservoir or will drain from the wall 32.

Water is conducted into the space between the end wall 112 and the partitioning wall 113 by means of conduit 120, and this conduit may be connected to a mixing valve 121 in turn connected to hot and cold water inlets 122 and 123. Valves 124 and 125 in these pipes serve to close and open them as desired. The mixing valve is of such character that the temperature of the water entering the smaller reservoir space between the walls 112 and 113 may be governed as desired.

From the smaller reservoir space mentioned, water may flow through an opening 126 in the wall 113 so as to flow into the larger space between the walls 111 and 113. The right end of this space is connected by means of a conduit 127 leading to a drain 128 and it follows that water flowing into the left end of the reservoir will continue to flow from left to right and finally discharge through the conduit 127 into the drain. This drain may be connected to the bottom of the larger reservoir space and a secondary drain pipe 129 may extend to the bottom of the smaller reservoir space. A valve 130 normally will close the drain at the bottom of the reservoir so that the water will have to leave the reservoir through the conduit 127.

When the discs are rotating and the water thrown upwardly through the conveyer, it is desirable to confine the liquid thrown substantially to certain parts above the respective discs. For this reason, a flexible curtain 135 is disposed above the conveyer in substantial alignment with the partitioning wall 113 and this curtain is of slitted character so that any article on the conveyer can pass through it by deflecting portions of the curtain. It will be understood from this that the curtain is provided with a series of vertically arranged and spaced slits running close together so as to form a series of depending ribbons so that when an article passes through the curtain, it deflects one or more ribbons, depending on the size of the article. Also, it may be stated that the upper part of the wall 113 has a deflecting portion 136 so as to deflect any water toward the right of the curtain.

Assuming that the machine is operating and that the water level is maintained substantially at the level of the opening 126 and the end of the conduit 127 by regulation of the inlet valves 124 and 125, dishes placed on the door 53 will gravitate onto the right end of the conveyor and will be gradually stepped along as the rods revolve. Normally, for instance, the plate 102 would be turned upside down so that it may be cleaned better by upwardly throwing water and so that the water will drain from it. Then as the plate passes over the discs in the larger end of the reservoir, the sheets of water thrown against and over it will rapidly clean it, and since the water normally will be cleaner toward the left due to its direction of flow, increasingly cleaner water will be thrown against the plate and over it. As the plate passes beyond the curtain 135, it is subjected to water which is even cleaner because of the partition 113 and the curtain 135 and finally the plate leaves the reservoir in absolutely clean condition.

While the water in the righthand of the reservoir naturally will tend to get dirty more rapidly due to the dirt falling when the water is thrown upwardly, the continuously flowing water will remove dirt sufficiently as the dish washing operation continues that fairly clean water can be thrown upwardly even in the right end of the reservoir. Accordingly, with a continuously operating process, the dishes will be fully cleaned by the time they reach the left end of the reservoir. At intervals the reservoir may be drained to remove any sediment which might collect on the bottom thereof.

Finally, it may be stated that a drain 140 may be connected to the sink 11 and that the drain 128 from the reservoir may be connected to the drain 140 so that the sink and reservoir have a common drain. From this it will be seen that the sink may be used in the ordinary manner and that if the dish washing machine is to be used, it is only necessary to open the doors 53 and 56 and then to start the machine operating. When the doors are closed, the cabinet has a pleasing appearance and, in fact, resembles the ordinary kitchen cabinet.

Although only one form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that vari-

ous modifications may be made without departing from the scope of the appended claims.

What is claimed is:

1. A machine for washing articles comprising a compartment, a conveyor for moving articles through the machine comprising a series of spaced supporting rods in the compartment disposed crosswise of the path of movement of the conveyor for supporting the articles to be washed, means for relatively moving alternating rods so that at one interval an article is supported by certain rods and at another interval by other rods so as to complete the exposure of the entire supported surface of the article, and means for throwing a cleaning fluid in sheets parallel to said rods for passing therebetween against the articles as they are advanced thereby.

2. A machine for washing articles comprising a compartment, a conveyor for advancing articles through the machine embodying a series of spaced rods disposed in the compartment in substantially horizontal relation and crosswise of the path of advancing movement for supporting articles to be washed, means for revolving certain rods about an axis parallel to but spaced from the center line of the rods respectively, and means for throwing cleaning fluid in sheets parallel to said rods for passing therebetween and impinging upon said articles as they are advanced through said sheets.

3. A machine for washing articles comprising a compartment, a conveyor for advancing articles through the machine embodying a series of spaced rods disposed in the compartment in substantially horizontal relation and crosswise of the path of advancing movement for supporting articles to be washed, means for revolving each rod about an axis parallel to but spaced from the center line of the rod with the arrangement such that certain rods are moving upwardly while others are moving downwardly, and means for throwing a cleaning fluid in sheets parallel to said rods for passing therebetween and impinging upon said articles as they are advanced through said sheets.

4. A machine for washing articles comprising a compartment, a series of spaced rods disposed in the compartment in substantially parallel and horizontal relation for supporting articles to be washed, means for revolving each rod about an axis parallel to but spaced from the center line of the rod with the arrangement such that certain rods are moving vertically in one direction while others alternating thereto are moving vertically in the opposite direction, and means for throwing cleaning fluid upwardly in sheets parallel to said rods for passing therebetween to engage and wash the articles advanced by said rods.

5. A machine for washing articles comprising a compartment, a series of spaced rods disposed in the compartment in substantially parallel and horizontal relation for supporting articles to be washed, means for revolving each rod about an axis parallel to but spaced from the center line of the rod, with all rods revolving in the same direction and the arrangement such that certain rods are moving vertically in one direction while others are moving vertically in the opposite direction, and means for throwing cleaning fluid upwardly in sheets parallel to said rods for passing therebetween to engage and wash the articles advanced by said rods.

6. A machine for washing articles comprising a compartment, means for supporting the articles to be washed and comprising a pair of plates disposed vertically in adjacent relation, a series of spaced, parallel rods projecting laterally from the lower edge of one plate and disposed in substantially the same horizontal plane for supporting the articles, a series of similar, spaced and horizontal supporting rods projecting laterally from the lower edge of the other plate and disposed in alternating relation to the rods on the first plate, means for moving the plates so that the rods on one plate are moving upwardly while the rods on the other plate are moving downwardly, and means for throwing a liquid cleaning fluid upwardly in sheets parallel to said rods for passing therebetween to engage and wash the articles advanced by said rods.

7. A machine for washing articles comprising a compartment, means for supporting the articles to be washed and comprising a pair of plates disposed vertically in adjacent relation, a series of spaced, parallel rods projecting laterally from the lower edge of one plate and disposed in substantially the same horizontal plane for supporting the articles, a series of similar, spaced and horizontal supporting rods projecting laterally from the lower edge of the other plate and disposed in alternating relation to the rods on the first plate, means for bodily moving the plates in fixed paths of movement so that each rod bodily revolves about an axis spaced from its center line with all rods revolving in the same direction but with alternating rods moving upwardly while rods intermediate thereto are moving downwardly, and means for throwing liquid cleaning fluid upwardly in sheets parallel to said rods for passing therebetween to engage and wash the articles advanced by said rods.

ALFRED H. HABERSTUMP.

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