Sept. 20, 1966 C. R. SOUTHARD 3,273,573

DISHWASHING MACHINE AND REFUSE DISPOSAL AND METHOD

Filed Sept. 14, 1964 2 Sheets-Sheet 1

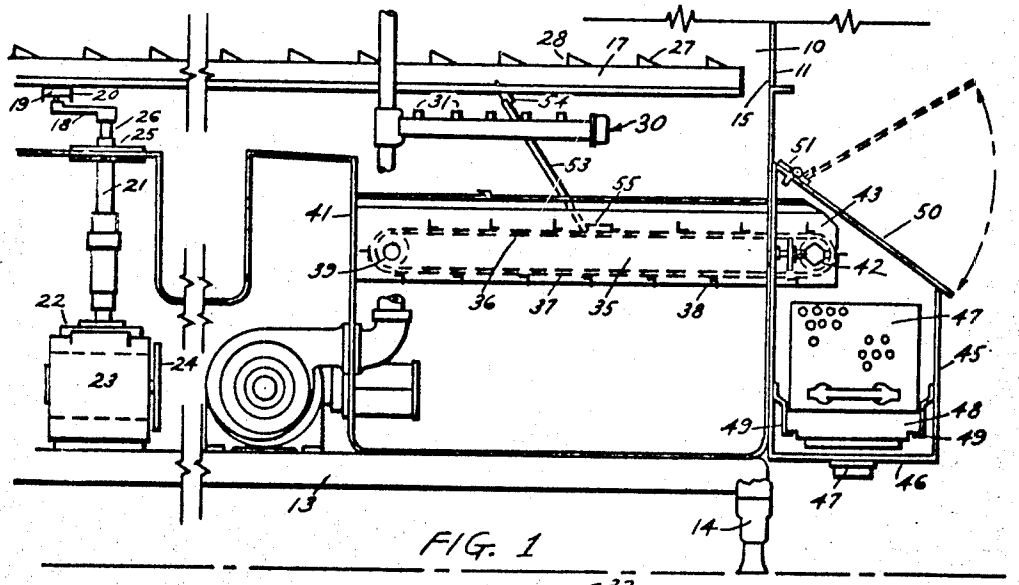
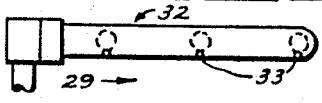


FIG. 1



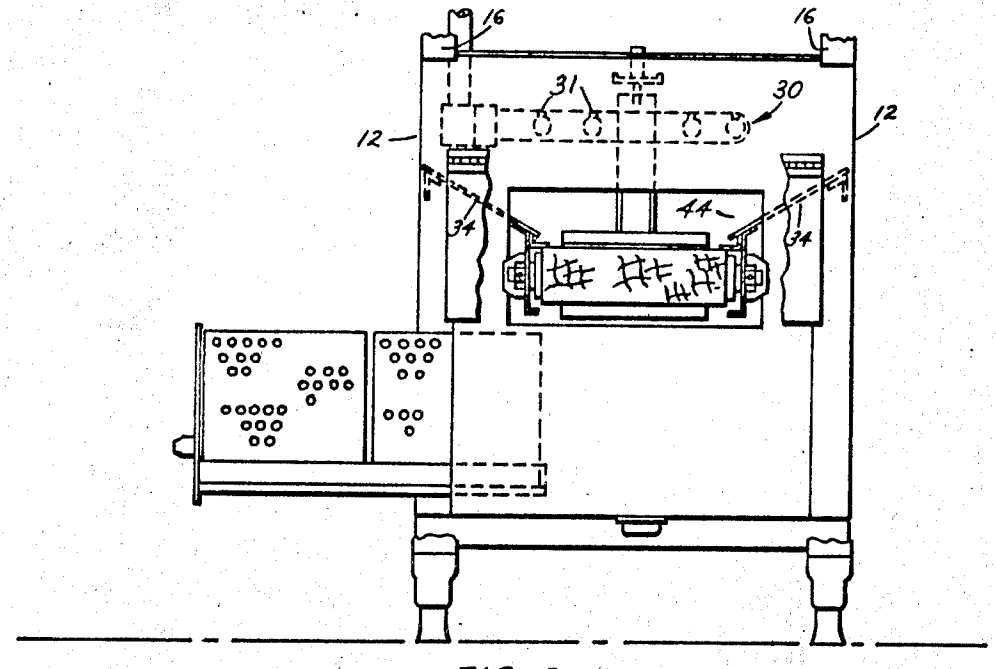


FIG. 2

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DISHWASHING MACHINE AND REFUSE DISPOSAL AND METHOD

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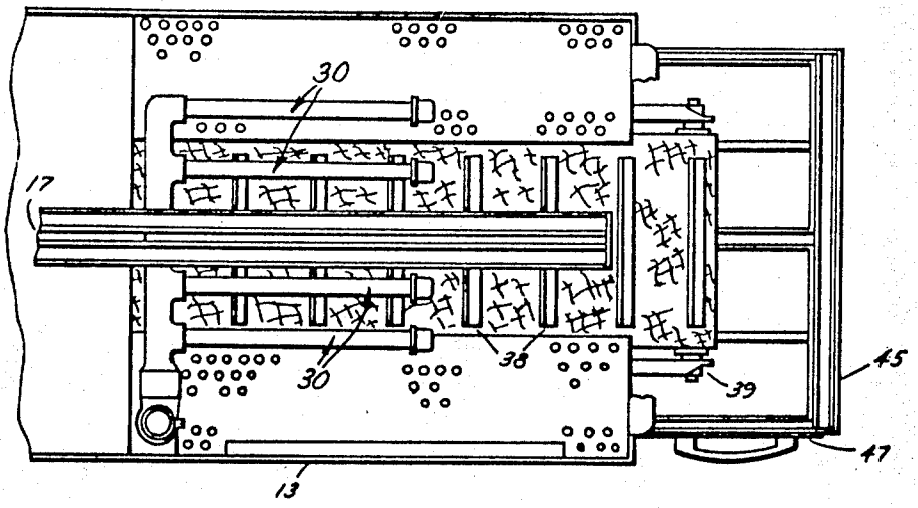


FIG. 3

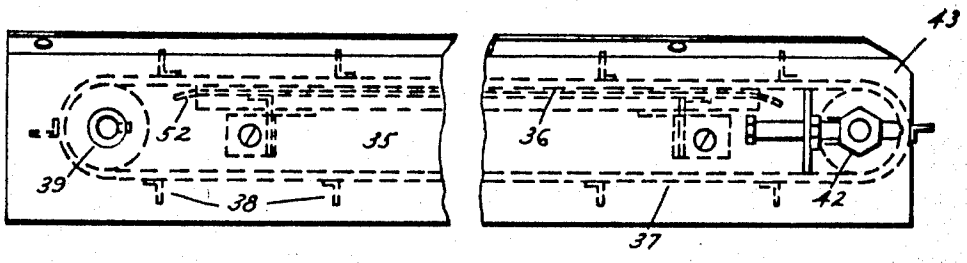


FIG. 4
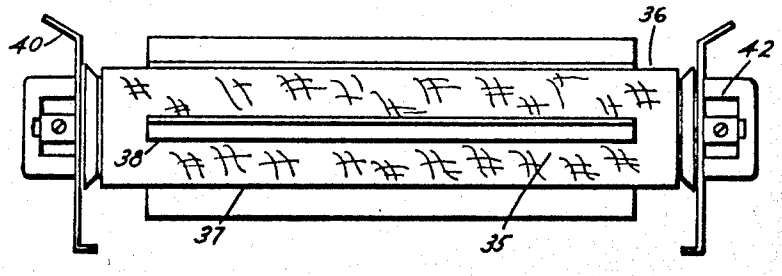


FIG. 5

United States Patent Office 3,273,573 Patented Sept. 20, 1966

3,273,573

DISHWASHING MACHINE AND REFUSE DISPOSAL AND METHOD

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Filed Sept. 14, 1964, Ser. No. 396,319
7 Claims. (Cl. 134—104)

This invention relates to dish washing machines and more particularly to an automatic dish washing apparatus incorporating a dish rack advancing conveyer and a refuse disposal conveyer.

Commercial dish washing machines utilize various types of dish rack conveying systems for advancing dish racks through various stages for prewashing, washing and rinsing dishes supported in the dish rack with a final rinsing stage. Suitably positioned nozzles spray dishes supported in the dish racks as the racks are advanced continuously through the pre-wash cycle for removal of food particles or refuse and washing them generally into the base or lower compartment of the cabinet for removal after a period of time. Suitable strainers or filters may be utilized to separate the refuse from the water and periodic cleansing of the compartment is required to remove the accumulated refuse when the apparatus is shut down.

Therefore, it is an objective of this invention to provide a dish washing apparatus in which dishes stacked in dish racks may be advanced continuously through a spray or prewashing chamber to dislodge food particles and other refuse while collecting and removing the refuse and disposing of it to a remote location while washing dishes continuously.

Another objective of this invention is to provide a dish washing apparatus in which dish racks containing dishes may be conveyed continuously through a prewashing stage for removal of refuse and collecting and conveying the refuse to a remote location while water is sprayed continuously without interruption of the washing of dishes and conveying refuse to a remote location.

Still another objective of this invention is to provide a refuse conveyer for collecting refuse removed from dishes passed along a conveyer while the conveyer is actuated by movement of the dish rack conveying member for discharging refuse thereon into a receptacle located outside of the dish washing machine.

A further objective of this invention is to provide a refuse conveyer for a dish washing apparatus to collect, convey and discharge refuse from the apparatus in one direction while conveying dishes to be cleaned in an opposite direction without interrupting the continuous advance of the dish racks.

Other objects and many of the attendant advantages of this invention will become more readily apparent to those skilled in this art from the following detailed description taken in conjunction with the accompanying drawings in which like characters of reference designate corresponding parts throughout the several views, and wherein:

FIG. 1 is a partial side elevational view of a portion of a dish washing apparatus embodying the invention illustrating only the pre-wash section of a cabinet with intermediate and upper portions removed;

FIG. 2 is a partial end elevational view of the dish washing apparatus of FIG. 1;

FIG. 3 is a partial top plan view of FIG. 1;

FIG. 4 is an enlarged partial side elevational view, with an intermediate portion removed, illustrating the refuse conveyer; and

FIG. 5 is a front elevational view of the refuse conveyer.

Referring to the drawings and particularly to FIGS. 1, 2 and 3, there is illustrated only the pre-wash stage of a

four stage dish washing apparatus in which the cabinet **10** is provided with a front wall **11**, side walls **12**, and a base **13** elevated above the ground a suitable distance by means of the pedestals **14**. Front wall **11** is provided with a dish rack receiving opening **15** through which racks loaded with dirty dishes on which food particles or refuse remain are presented through the rack receiving opening **15** to be received and supported on laterally spaced apart rack-supporting rails **16** that are mounted by suitable brackets to the side walls **12** and extend horizontally through the cabinet to support and guide the racks into each of the dish washing stages. A reciprocating conveyer pawl bar **17** is mounted between the rails **16** to advance dish racks supported on the rails **16** through the cabinet continuously by intermittent movement as the bar **17** is longitudinally reciprocated by means of pawl bar reciprocating mechanism consisting of a crank arm **18** to which is mounted a roller **19** that travels within the socket **20** mounted beneath the pawl bar **17** at a convenient location. The arm **18** is revolved by the shaft **21** driven by means of the gear reducer **22** which in turn is driven by motor **23** through the pulley and belt connection **24**. A suitable slip clutch member **25** is positioned at the upper end of shaft **21** for connection with the stub shaft **26** which in turn is actually connected to the arm **18**. The pawl bar **17** is mounted in suitable bearing guide members (not shown) and supports a series of spaced apart aligned pawls **27** each of which is pivotally mounted on the pawl bar **17** and suitably counterweighted permitting the individual pawls to pivot in a clockwise direction to present the vertical portion **28** as a lug or shoulder against a rack to be advanced through the cabinet as the pawl bar is moved to the left in FIG. **1**, from the entrance opening **15** through the spray section **29** of the cabinet into the other stages of the cabinet forward of the prewashing stage.

A series of laterally spaced-apart headers **30** supplied with water under pressure project horizontally in the direction of rack travel for spraying water under the traveling dish racks through the nozzles **31** that are spaced from each other along each of the headers **30**. An additional series of headers **32** supplied with water under pressure have spaced-apart nozzles **33** that project streams of water downwardly against the dirty dishes stacked in the traveling racks passing along the rails **16** during reciprocation of the pawl bar **17**.

A pair of baffles or chutes **34** extend below the pawl bar **17** and are inclined inwardly and downwardly from the horizontal to catch and convey refuse dislodged from the dishes in the traveling racks and deposit the refuse and permit the flow of water toward the center of the cabinet over the reticulated belt conveyer **35** mounted directly beneath the pawl bar **17** that is centrally supported in the cabinet between and below rack-supporting rails **16**.

The top and bottom flights **36** and **37** of the belt conveyer **35** have supported thereon a series of longitudinally spaced-apart transversely-extending belt conveying members **38**. One conveyer belt roller **39** is bearingly supported in the plate **40** that is mounted at one end to the vertical wall **41** and at the other end to the front wall **11**. The other belt supporting roller **42** is bearingly supported and slidably adjustable in the side plates **40** to exert a suitable tension on the endless conveyer belt. The discharge end **43** of the conveyer **35** extends out beyond the front wall **11** through the refuse discharge opening **44** directly above the refuse container housing **45** that is fastened to the front wall **11**. The base **46** of the housing **45** is provided with a drain plug **47**. A perforated refuse collecting receptacle **47** is supported on the slidable receptacle-receiving tray **48** and retained on the tray guide rails **49** that are secured to the interior of the housing **45**.

A refuse container guard **50** is pivotally hinged through

the hinge 51 that is mounted above the refuse conveyor opening 44 to prevent dishes from being dropped into the receptacle 47 and to serve as a guard over the discharge end of the conveyor 35. A suitable guide 52 for the upper flight 36 of the conveyor is provided in order to facilitate traveling of the conveyor in the event of increased refuse load to which the upper flight may be subjected as the upper flight moves toward the refuse discharge opening 44.

Movement of the conveyor 35 occurs through the downwardly extending depending shoe 53 that is pivotally mounted to the reciprocating pawl bar 17 through the connecting link 54. The lower end of the shoe 53 is provided with a lug-engaging member 55 that contacts each of the conveyor mounted angle brackets 38 upon each rearward movement of the pawl bar 17 to move the upper flight 36 of the conveyor 35 toward the discharge opening 44. Forward or movement in the direction of the flow of dish racks to the left in FIG. 1, to advance the dish racks, will permit the shoe 53 and member 55 to pass over an angle member 38 and upon rearward movement of the pawl bar 17, the member 55 will engage a member 38 and force it in the same rearward movement as the pawl bar 17.

During operation, dirty dishes placed in dish racks, the bottoms of which are usually perforated, will be advanced along the rails 16 by means of the pawls 28 that engage the racks in their forward movement while the pawls 28 are pivoted counterclockwise as the pawl bar is moved rearwardly at which time the shoe 53 urges the conveyor belt rearwardly. Streams of water impinge and spray particles of food and wash them from the dishes through the racks and the water with the food particles and refuse flow downwardly onto the top flight 36 of the conveyer 35. The intermittent travel of the conveyer belt will ultimately discharge the refuse from the discharge end of the conveyer through the opening 44 in the front wall depositing the refuse into the receptacle 47. The receptacle 47 is slidably removable from the front of the cabinet as shown in FIG. 2.

Obviously, many modifications and variations may be made to the orientation of the conveyer and the specific linkage member for advancing the conveyer for the refuse without departing from the purpose and spirit of this invention and such modifications are contemplated within the scope of the appended claims.

What is claimed is:

1. In a dish washing machine and refuse disposal apparatus for receiving and conveying dish racks having dishes stacked therein along a directed path of travel through a spray cabinet in which spray nozzles direct streams of water on the dishes comprising a dish rack-receiving cabinet having a front wall and side walls, said front wall having a dish rack-receiving opening and a refuse conveyer opening therebeneath, dish rack-supporting rails mounted adjacent to the side walls for receiving and supporting a dish rack through the front wall opening, a longitudinally extending dish rack-advancing member reciprocably mounted in said cabinet between said rails, said member having a plurality of longitudinally spaced-apart dish rack-engaging pawls thereon, each of said pawls having a forward rack engaging portion and a downwardly extending rear surface, said rack engaging portion reaching above said rails, means for reciprocating said dish rack-advancing member to advance dish racks intermittently through the spray cabinet on a forward rack advancing stroke of said member, an endless reticulated conveyer belt having a plurality of spaced-apart lugs thereon mounted in said cabinet beneath said rack-advancing member to receive refuse dislodged from dishes supported in the dish racks and extending through said refuse conveyer opening, means for driving said conveyer comprising a pivotally depending drive shoe extending from said longitudinally extending dish rack advancing member for engaging said conveyer lugs whereby upon the return stroke from the advance stroke of said longitudinal member a conveyer lug will be engaged by said shoe to displace the conveyer belt rearwardly toward the refuse conveyer opening, and a receptacle for receiving refuse discharged on said conveyer belt mounted beneath the discharge end of the conveyor.

2. In a dish washing machine and refuse disposal apparatus for receiving and conveying dishes supported in dish racks along a directed path of travel through a spray cabinet having nozzles for spraying water on the dishes from above and below the dish racks comprising a spray cabinet having a dish rack-receiving opening means for supporting dish racks along a path of travel introduced into said opening, dish rack advancing means for engaging dish racks at spaced intervals as they are subjected to spraying water and advancing in a directed path of travel on said rack supporting means, an endless reticulated conveyer belt having a plurality of spaced-apart lugs thereon mounted in said cabinet beneath said dish conveyer advancing means to receive refuse dislodged from dishes supported in the dish racks, means for driving said conveyer comprising a pivotally depending drive shoe extending from said dish conveyer advancing means for engaging said conveyer lugs, and a receptacle for receiving refuse discharged on said conveyer belt mounted beneath said conveyer.

3. In a dish washing machine and refuse disposal apparatus for receiving and conveying dishes supported in dish racks along a directed path of travel through a spray cabinet having headers with spray nozzles to spray water above and below the dish racks comprising a spray cabinet having at least front and side walls, said front wall having a dish rack-receiving opening and a refuse conveyer discharge opening, means for supporting dish racks introduced to the cabinet through said dish rack-receiving opening and advanced along a directed path of travel, a pawl bar mounted for reciprocation between said dish rack-supporting means, means for reciprocating said pawl bar, a plurality of spaced-apart dish rack engaging pawls on said pawl bar, each of said pawls extending vertically above said dish rack-supporting means to engage and forwardly advance a dish rack through the spray cabinet in one direction of pawl bar movement and ride under a dish rack in the opposite direction of pawl bar movement, an endless reticulated belt conveyer having top and bottom flights for receiving refuse from dishes in said dish racks mounted beneath said pawl bar, means associated with said pawl bar for displacing the belt conveyer in the direction of the discharge opening.

4. In a dish washing machine and refuse disposal apparatus for receiving and conveying dishes supported in dish racks along a directed path of travel through a spray cabinet having nozzles at spaced intervals to spray water on dishes from above and below the racks comprising a spray cabinet having front and side walls, said front wall having a dish rack-receiving opening, means for supporting dish racks introduced into the cabinet through said front wall opening and advanced along a directed path of travel, a dish rack advancing means supported between said dish rack-supporting means having a plurality of spaced-apart dish rack engaging pawls thereon with each of said pawls extending vertically above said dish rack-supporting means to engage and intermittently advance a dish rack in only one direction of movement of said dish rack advancing means through the spray cabinet, means for actuating said dish rack advancing means, an endless belt conveyer for receiving refuse from dishes in said dish racks mounted beneath said dish rack advancing means, means for actuating the belt conveyer to move the refuse caught thereon to a remote location, and a receptacle for receiving refuse caught on said conveyer belt mounted beneath the discharge end of the conveyer at said remote location.

5. In a dish washing machine and refuse disposal apparatus for receiving and conveying dish racks having

dishes to be washed therein along a directed path of travel through a spray cabinet comprising a spray cabinet having front and side walls, said front wall having a dish rack-receiving opening and a refuse conveyer discharge opening therebelow, means for supporting dish racks introduced to the cabinet through the rack-receiving opening for advancement along a directed path of travel, a pawl bar mounted for reciprocation between said dish rack supporting means, a depending conveyer advancing means depending from said pawl bar, means for reciprocating said pawl bar, a plurality of spaced-apart dish rack-engaging pawls on said pawl bar, each of said pawls extending above said dish rack-supporting means to engage and advance a dish rack in only one direction of pawl bar movement through the spray cabinet and ride beneath a dish rack in the opposite direction of pawl bar movement, an endless conveyor for receiving refuse from dishes in said dish racks mounted beneath said pawl bar, refuse deflector baffles for guiding refuse on to said conveyer mounted beneath said dish rack supporting means and above said conveyer, said conveyer having a plurality of spaced apart conveyer advancing members for engaging said conveyer advancing means whereby opposite movement of said pawl bar displaces the conveyer rearwardly through conveyer advancing means engagement with a conveyer advancing member whereby refuse is passed through the refuse conveyer opening, and a receptacle for receiving refuse from said conveyer mounted directly beneath said discharge opening.

6. In a dish washing machine and refuse disposal apparatus for receiving and conveying dish racks having dishes to be washed therein along a directed path of travel through a cabinet having nozzles for directing water on said dishes comprising a spray cabinet having a dish rack-receiving opening, means for supporting dish racks introduced into said opening for advancement along a directed path of travel, a pawl bar mounted for reciprocation between said dish rack-supporting means, means for reciprocating said pawl bar, a plurality of spaced-apart dish rack engaging pawls on said pawl bar to engage and advance a dish rack in one direction of pawl bar movement through the spray cabinet, an endless conveyer for receiving refuse dislodged from dishes in said dish racks mounted beneath said dish rack supporting means, a receptacle for receiving refuse discharged on said conveyer belt mounted beneath the discharged end of said conveyer, and means associated with said pawl bar for displacing said conveyer upon travel in a direction opposite to dish rack advancement.

7. In a dish washing machine and refuse disposal apparatus for receiving and conveying dishes along a directed path of travel through a spray cabinet having nozzles for spraying water on the dishes from above and below to remove food refuse therefrom comprising a spray cabinet having a dish receiving opening, conveyer means for supporting dishes introduced into said opening, dish conveyer advancing means for supporting dishes as they are subjected to spraying water and advancing in a directed path of travel on said dish supporting means, a belt conveyer for receiving refuse from dishes mounted directly beneath the path of travel of the dishes, means for displacing the belt conveyer to move the refuse deposited thereon to a remote location, and a receptacle for receiving refuse discharged on said belt conveyer mounted beneath the discharged end of the conveyer at said remote location, said belt conveyer displacing means comprising a pivotally depending drive shoe extending from said dish conveyer advancing means.

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