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[73] Assignee **General Electric Company**

[54] **RACK ASSEMBLY FOR FRONT-LOADING DISHWASHER**
10 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **312/298**, 312/338
[51] **Int. Cl.** **E04b**, A47b 88/00, A47b 95/00
[50] **Field of Search** 312/271, 273, 275, 298, 299, 301, 308, 330, 294, 338, 350, 127; 49/103; 270/19; 126/340

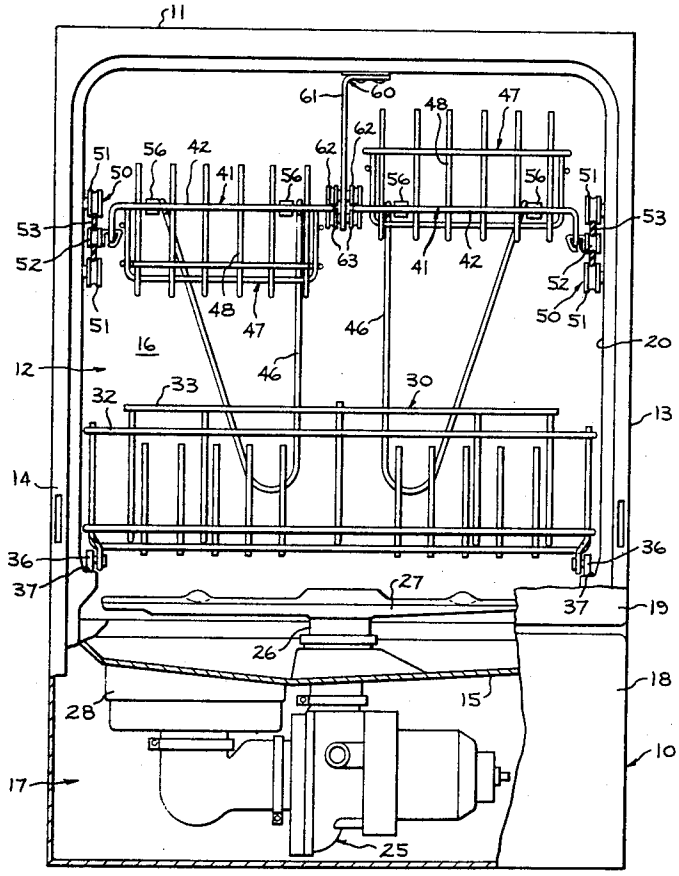
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ABSTRACT: In a front-loading dishwashing machine of the type having a front access opening to a washing chamber, and dish-supporting racks that may be manually slid outwardly from the chamber and through the access opening to facilitate loading of the machine with soiled tableware, a means is provided whereby when one dish-supporting rack is manually pulled outwardly to extend from the front of the dishwashing machine, another rack positioned at a different horizontal level is caused to move outwardly without the need for the operator of the machine to separately grasp the second rack and pull it outward through the access opening. It is also provided, when the dish-supporting racks are in their normal operating position, within the washing chamber, that the second rack may be manually moved outwardly independent the first rack, if so desired. The construction of the invention is particularly applicable to a dishwashing machine wherein upper and lower level racks are spaced substantially distant from one another within the wash chamber so that large or cumbersome articles can be conveniently stored for washing in the lower level rack.



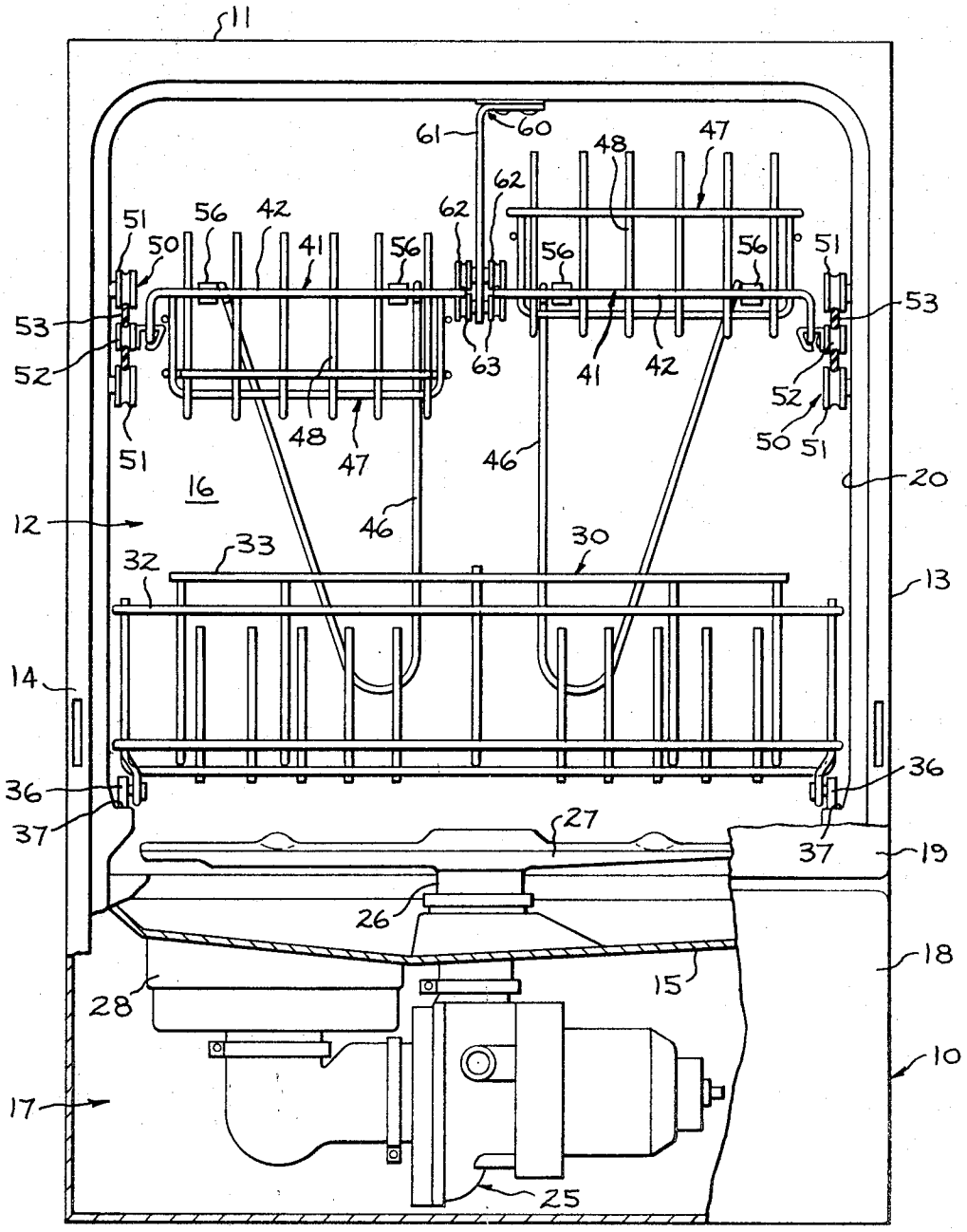
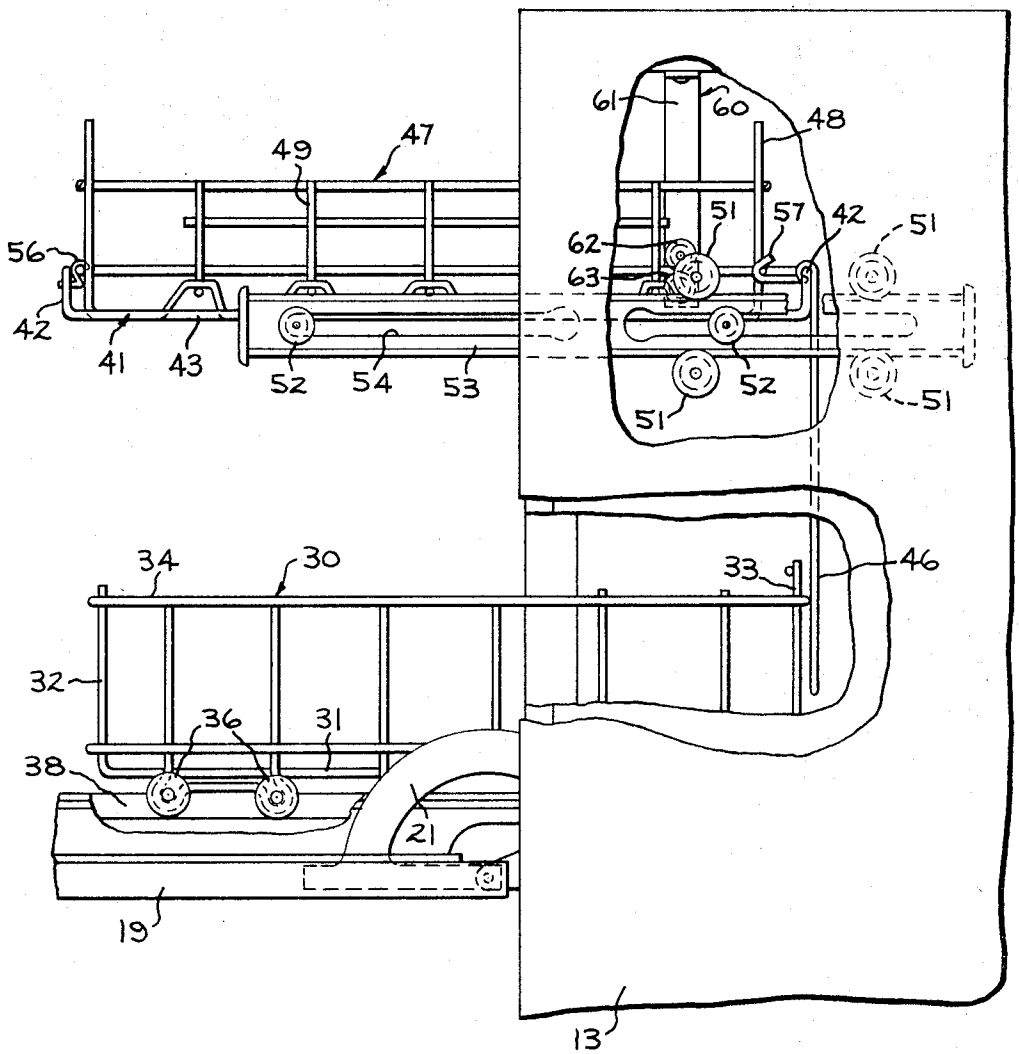


FIG. 1

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FIG. 2



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RACK ASSEMBLY FOR FRONT-LOADING DISHWASHER

BACKGROUND OF THE INVENTION

This invention broadly relates to an improved rack assembly for a front-loading dishwasher utilizing dish supporting racks mounted to be horizontally slidable so as to extend outwardly through a front access opening to enable soiled tableware to be conveniently placed in the racks for washing.

More particularly, the invention relates to an improvement for both a conventional rack assembly such as presently used in front-loading dishwashers where upper and lower racks are independently slidably mounted in the machine's wash chamber, and for a more sophisticated rack arrangement wherein separately supported vertically adjustable side-by-side racks constitute the upper rack level, such as described in the U.S. Pat. issued Sept. 9, 1969 to Melvin R. Kauffman and Wesley S. Pattison, U.S. Pat. No. 3,466,109 entitled "Front Opening Dishwasher With Improved Rack Assembly" and assigned to the General Electric Company, the assignee of the present invention.

An object of the present invention is to provide means by which a housewife operating a front-loading dishwasher can manually slide the racks located on different levels outwardly from the machine's washing chamber by a simple one-hand motion.

Another object of this invention is to provide a simplified means of manually imparting a unitary sliding action to a pair of vertically spaced apart racks in a dishwasher while allowing for independent horizontal manual sliding of each rack on its own slidable support means, as desired by the operator.

SUMMARY OF THE INVENTION

In a presently preferred form of the invention, push means is provided, in a front-loading automatic dishwasher, on each of a pair of side-by-side separately slidable upper racks whereby manual withdrawal of either of the upper racks will cause a substantially larger lower rack to move outwardly in unison with the withdrawn upper rack. In this embodiment of the invention, the lower rack may be freely independently moved inwardly or outwardly with respect to the washing chamber when the upper pair of racks are positioned entirely within the washing chamber, and either of the upper racks may be independently manipulated on its slide support means so long as the lower rack is in its outward position with respect to the washing chamber.

In a second modified form of the invention, a conventional independently slidable single upper rack may be provided with push means to engage a lower rack and cause the lower rack to move outwardly in unison with the upper rack. In this form, each of the racks has a horizontal cross-sectional area substantially the same as that of the washing chamber, and the lower rack is free to be manipulated horizontally inwardly or outwardly on its independent support means, without engagement with the upper rack, so long as the upper rack is permitted to remain in its normal operating position within the upper portion of the washing chamber. When the lower rack is in its outwardly extended position with respect to the washing chamber, then the upper rack may be freely independently moved inwardly or outwardly without engagement with the lower rack.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of an automatic dishwasher, partly cut away to show details of its internal construction; and

FIG. 2 is a side elevational view of the dishwasher first illustrated in FIG. 1, here shown with sidewall portions cut away to reveal various internal components as they are disposed to facilitate loading of the dishwashing machine.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Illustrated in FIG. 1 is an automatic dishwasher having an outer housing or cabinet **10** comprised of a top side or inner upper sidewall **11**, a rear wall **12**, and opposite sidewalls **13** and **14**. The interior of the cabinet **10** is divided by a bottom chamber wall or wash chamber floor **15** into an upper area or washing chamber **16** and a lower motor-pump assembly area **17**. Across the lower front side of the cabinet **10** is a front lower panel **18** that serves a front side of the motor-pump assembly area **17**. The upper portion of the front side of the cabinet **11** is a door **19** provided with hinges **21** (see FIG. **2**) at its lower end so that it may be opened from its closed vertical position to a substantially horizontal orientation to permit access to the washing chamber **16** through a front access opening **20**.

In the area **17** in the lower end of the cabinet **11** is housed a motor-pump assembly **25** having a pedestal **26** extending upwardly therefrom through an opening in the wash chamber floor **15** for supporting a rotatable reactive-type spray arm **27**. The wash chamber floor **15** has a second opening therethrough leading to a sump **28** for the purpose of drainage and recirculation of washing liquid between the wash chamber **16** and the motor-pump assembly **25**.

The apparatus heretofore described is considered representative of conventional dishwashers and the present invention is not intended to be limited to such construction. It is intended that the dishwasher may be modified or provided with additional equipment other than that which is shown without restricting the present invention.

Within the washing chamber **16** of the cabinet **10**, as illustrated in FIG. **1**, a lower rack **30** is adapted to be slidable horizontally outwardly through the access opening **20** over the open door **19**. The rack **30** is constructed of interconnected vertical and horizontal rodlike members or rigid wires that form the general configuration of a shallow four-sided basket for receiving soiled tableware to be washed in the washing chamber **16**. The rack **30** thus comprises a floor portion **31** having a front fence **32**, a rear fence **33** and opposed side fences **34** extended upwardly from the edge of the floor portion **31**. The horizontal cross-sectional area of the rack **30** is substantially equal to that of the washing chamber **16**. The lower rack **30** is also provided with lower edge side rollers **36** that rest, when the lower rack **30** is in its operating position within the washing chamber **16**, on ridgelike tracks or horizontal surfaces **37** formed on opposite inside surfaces of the respective sidewalls **13** and **14** of the cabinet **10**. Parallel spaced apart indentations or tracks **38** are provided on the inner surface of the door **19**, and are aligned with the corresponding ridges **37**, when the door **19** is in its open position, to form continuous tracks along which the rack **30** may be drawn outwardly to rest with its forward end on the door **19**. The outward-sliding movement of the rack **30** is usually accomplished by the operator of the machine who, after having opened the door **19**, grasps the rack **30** by placing the hand on the front fence **32** and pulling the rack **30** out over the door **19**.

Situated in the upper region of the washing chamber **16** and spaced substantially apart from the lower rack **30** is a support means preferably including a pair of slidably supported side-by-side frames or rack supporting sections **41**, each of which carries an upper rack **47** removably attached thereto. Each of the open frames **41** has the general configuration of a plane rigid rectangle having front and rear parallel frame rails **42** connecting opposed side rails **43**.

The outer edge of each of the frames **41** is supported for slidable movement, on the inner surface of the cabinet sidewalls **13** and **14**, by means of separate roller assemblies **50**. As illustrated in FIG. **2**, each roller assembly **50** comprises four rollers **51** group mounted on the inner surfaces of each cabinet wall **13** or **14** and properly spaced to slidably support a slide bar **53** for substantially horizontal sliding movement

between upper and lower pairs of the rollers **51**. The slide bar **53** is provided with longitudinally disposed forward and rearward horizontally aligned slots **54**, each of which acts as a trackway for a rack roller **52** journaled to the outer edge portion or outer side rail of the rack **41**.

A roller assembly **60** supports the inner edges of the respective racks **41**, as illustrated in FIG. **1**. The roller assembly **60** comprises a rigid hanger plate **61** having one end thereof attached to the inner upper sidewall or top **11** of the cabinet **10**, with rollers **62** and **63** journaled at the lowermost end of the hanger **61** for rotation on respective horizontal axes. The inner edge of each frame **41** is carried between the upper roller **62** and the lower roller **63** for movement of the frame **41** inwardly and outwardly with respect to the washing chamber **16**.

Each upper rack **47** is carried on its frame **41** by means of a pair of clips **56** integral to the forward edge or front rail **42** of the frame **41**, and hooks **57** integral to the rearward edge or rear rail **42** of the frame **41**. Each upper rack **47** is vertically adjustable with respect to its supporting frame **41**, inasmuch as each rack **47** may be disengaged from clips **56** and hooks **57** and repositioned so that the clips **56** and hooks **57** attach to other horizontally disposed side rails of the forward and rear fences of the rack **43**.

A rigid armlike push bar **46** is provided at the rearward edge of each frame **41** to act as a push means for imparting sliding movement to the lower rack **30** when the frame **41** is caused to slide outwardly through the access opening **20**. As illustrated in FIG. **1**, each push bar **46** may be formed of two leg portions the upper ends of which are fixedly joined to the rear edge of the frame **41** and the lower ends of which unite in a smoothly curved configuration that extends downwardly behind the rear fence portion **33** of the lower rack **30**.

From the foregoing description of the various elements shown in the accompanying drawings, it will be seen that utilization of a push means such as the push bars **46** provides an added convenience in that manual withdrawal of an upper rack **47** through the access opening **20** of the dishwasher serves the dual purpose of withdrawing both the upper rack **47** and the lower rack **30** to their outwardly extended position over the open front door **19** of the machine to facilitate front loading.

With the lower rack **30** in its outward loading position, the upper racks **47** are freely maneuverable and may be pushed back to the retracted position within the washing chamber **16** to give unobstructed access to the open top of the lower rack **30**.

In addition to the preferred form shown in the drawings, it is intended that the push means be applicable to the more conventional rack arrangement wherein a lower rack having a horizontal cross section substantially the same as that of the washing chamber is utilized along with a single independently slidably mounted upper rack having a horizontal cross-sectional area substantially equal to that of the lower rack.

It is considered evident from the foregoing description that certain aspects of the invention are not limited to the particular construction of the specific example or embodiment illustrated. It should be understood that various modifications may be made therein, and it is intended that the appended claims cover all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. In a dishwashing machine of the type having top, bottom and sidewalls defining an inside washing chamber, and an access opening through one of the sidewalls, an improved rack assembly for supporting articles to be washed within the chamber, comprising:

a. a lower rack mounted within a lower portion of the chamber and slidable outwardly in a substantially horizontal plane through the access opening;

b. an upper rack mounted above said lower rack, said upper rack vertically spaced substantially distant from said lower rack and slidable outwardly in a substantially horizontal plane through the access opening; and

c. push means mounted on one of said racks and actuated by manual sliding of one of said racks and operable to cause the other of said racks to slide outwardly through the access opening.

2. The combination set forth in claim **1**, wherein:

said push means comprises a downward extending portion of said upper rack that acts to engage a portion of said lower rack and urges said lower rack outwardly when said upper rack is manually moved outwardly through the access opening.

3. The combination of claim **2** wherein:

said push means disengages from said lower rack when said upper rack is manually retracted back through the access opening.

4. The combination set forth in claim **1** wherein:

a. said push means comprises an armlike downward projection extending from said upper rack; and

b. a portion of said projection intersects the plane of movement of said lower rack.

5. The combination set forth in claim **1**, wherein:

said lower rack is slidable inwardly and outwardly independent of said upper rack, and said upper rack is inwardly slidable independent of said lower rack.

6. The combination set forth in claim **1**, wherein:

a. said upper rack comprises a left section and a right section;

b. each of said sections is separately supported for slidable movement independent of each other; and

c. said push means operates to urge said lower rack to slide outwardly when either of said sections is manually slid outwardly through the access opening.

7. The combination set forth in claim **6**, wherein:

said push means is disengaged from said lower rack when both of said sections are in their retracted position within the wash chamber whereby said lower rack is independently slidable relative to said sections.

8. In an automatic dishwasher of the type including a cabinet having top, bottom and sidewalls and an access opening in one of the sidewalls, an improved rack assembly for supporting articles to be washed within the cabinet; comprising:

a. a lower rack positioned within a lower portion of the cabinet for substantially horizontal movement through the access opening;

b. support means for supporting a plurality of generally side-by-side removable upper racks selectively at different elevations above said lower rack for substantially horizontal sliding movement through the access opening independent of said lower rack and one another; and

c. means extending downwardly from said support means for contacting said lower rack and causing said lower rack to move outwardly through the access opening when one of said upper racks is moved outwardly through the access opening.

9. The combination set forth in claim **8** wherein said support means comprises a plurality of generally side-by-side open frames, and each of said frames has a downward projecting member integral to the rear portion thereof, said downward projecting member has a lower end portion thereof intersecting the plane of movement of said lower rack at the back end of said lower rack whereby, when either of said frames is caused to move outwardly through the access opening, the downward-projecting member contacts the back end of said lower rack and causes said lower rack to move outwardly in unison with said frame.

10. The combination set forth in claim **8** wherein said lower rack is slidable inwardly and outwardly independent of said upper rack, and said upper rack is inwardly slidable independent of said lower rack.