March 24, 1964 R. C. GEIGER ETAL 3,126,098

RACK CONSTRUCTION FOR DISWASHING MACHINE

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FIG-1

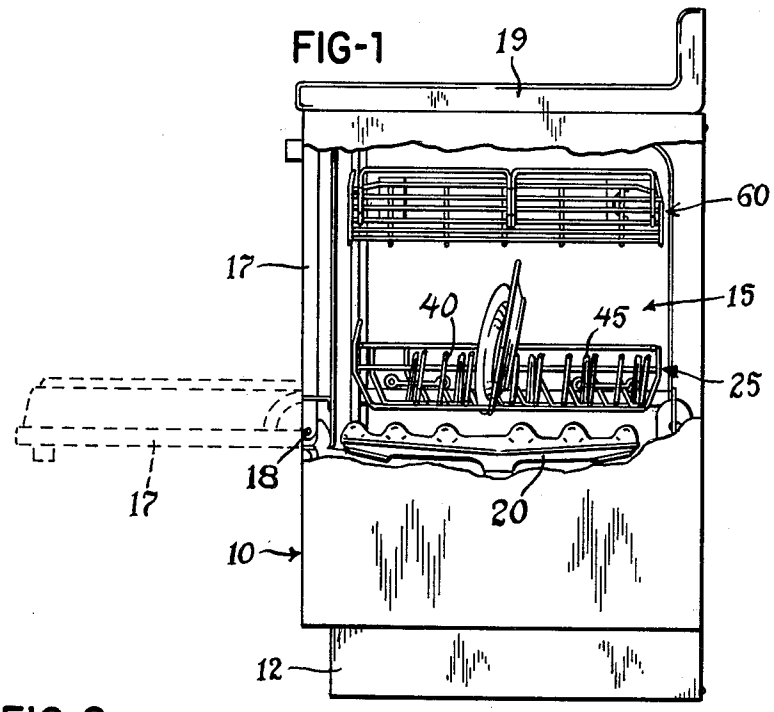



FIG-2

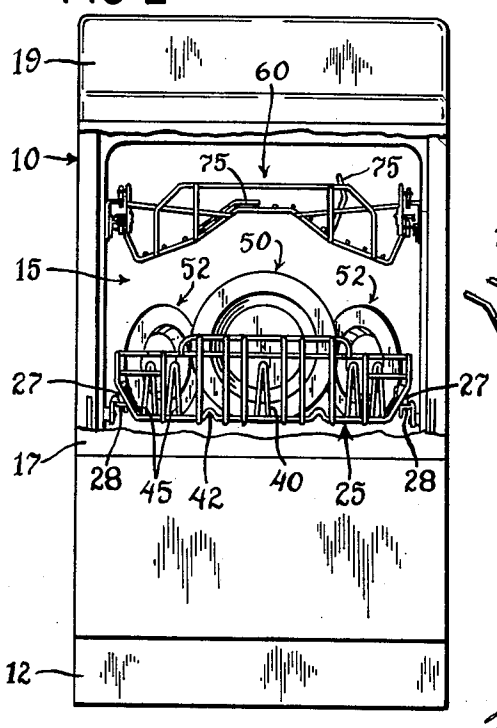
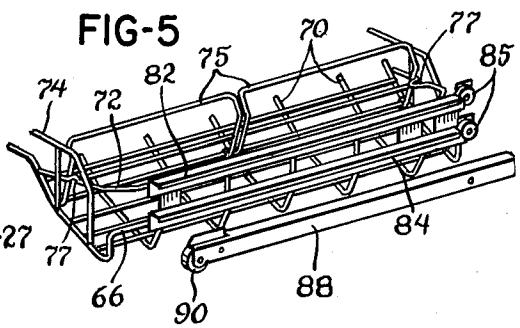



FIG-5




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RACK CONSTRUCTION FOR DISWASHING MACHINE

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FIG-3

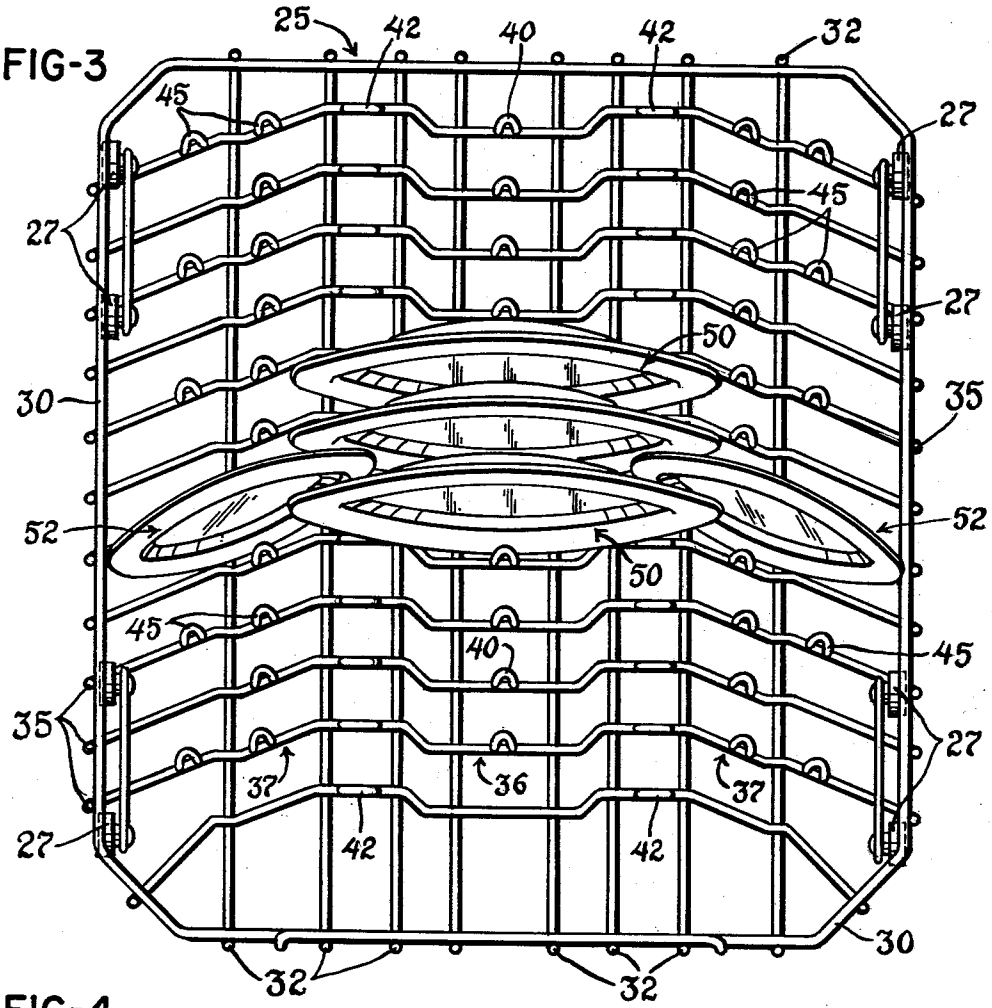
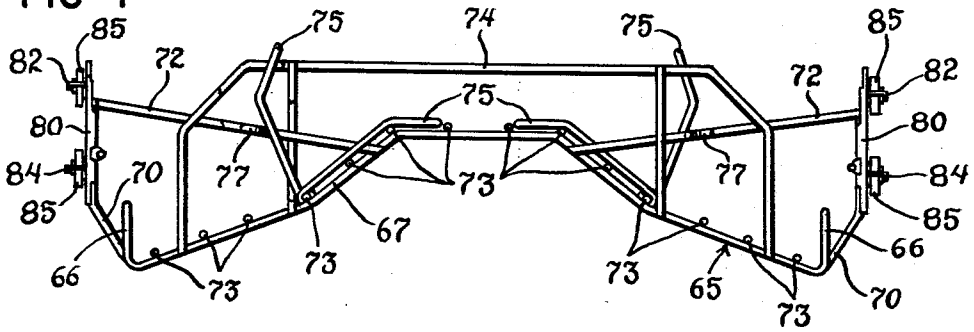



FIG-4





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# RACK CONSTRUCTION FOR DISHWASHING MACHINE

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2 Claims. (Cl. 211—41)

This invention relates to an improved rack construction for dishwashing machines, particularly domestic dishwashing machines which are required to cleanse a relatively wide variety of items, ranging from silver and the various pieces of place settings to relatively large pots and pans.

The cabinet dimensions of domestic dishwashing machines are, at the present time, standardized, and thus most manufacturers supply machines which occupy essentially the same space, as to height, width and depth. Excepting the fact that different manufacturers employ different types of liquid spraying apparatus and recirculating devices, it can be generally stated that the volume of the actual cleansing chamber in these machines is substantially the same, and the space required for the drive motor, electrical apparatus including the timer, a pump where one is employed, and the various plumbing fixtures and connections is, generally speaking, a given portion of the entire cabinet dimension. Thus, in order to increase the capacity of the machine it is desirable, rather than encroaching upon the space needed for such equipment by enlarging the cleansing chamber, to provide an efficient arrangement for stacking the articles to be cleansed and supporting them within the cleansing chamber, while maintaining the necessary optimum cleansing effect.

The present invention provides such an improved arrangement, including rack structures which provide the necessary support for dishes, pots and pans, tumblers, and other tableware and food preparing articles to be cleansed while attaining considerable versatility in the arrangement of the articles within the cleansing chamber according to the particular needs of the user.

Accordingly, the primary object of this invention is to provide novel rack structures for dishwashing machines which are versatile in use to support a wide variety of articles to be cleansed, and which use the available space within the cleansing chamber to optimum advantage while maintaining the most effective cleansing of the articles.

Another object of the invention is to provide a rack structure for a dishwashing machine in which dinner or main serving plates and smaller plates, such as salad plates or saucers, are supported on edge and essentially side by side, but with the bottom surfaces thereof in such angular relation that their respective beveled edges or lips are spaced and substantially parallel and overlapping, to minimize the impedance of the flow of liquid spray therebetween while affording close spacing of such plates and like articles.

An additional object of the invention is to provide an upper rack structure for a dishwashing machine as set forth above, and particularly for use with a novel lower rack as above defined, wherein the larger or main service plates are arranged centrally of the lower rack, the upper rack being formed with portions of greater depth at the sides than at the center such as to pass over the plates stacked below, and wherein the portions of greater and lesser depth in the upper rack can be separated by hinged divider members which in turn may be placed against the bottom of the upper rack to accommodate large articles extending into both such deeper and shallower portions thereof.



Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings—

FIG. 1 is a side elevational view of a dishwashing machine to which the present invention is directed, with the cabinet wall broken away to illustrate the general arrangement of the racks, the liquid spray apparatus, and the door providing access to the cleansing chamber;

FIG. 2 is a view similar to FIG. 1, looking from the front of the machine, and with the major portion of the door broken away to show the rack arrangement;

FIG. 3 is a plan view on an enlarged scale of the novel lower rack structure provided by the invention;

FIG. 4 is an end elevational view of the novel upper rack structure, also on an enlarged scale; and

FIG. 5 is a partial perspective view of the upper rack, showing the hinged mounting and the stop arrangement for the movable divider members in the upper rack structure.

Referring to the drawings, which illustrate a preferred embodiment of the present invention, FIG. 1 shows the general arrangement of a front loading type of dishwasher incorporating the improved rack construction of the present invention. The machine includes a cabinet indicated by the general reference numeral **10**, mounted on a base **12**, and forming a housing for a cleansing chamber **15**, to which access may be had by a door **17** at the front of the machine, hinged to swing forwardly and downwardly about the axis **18**. The top **19** provides an exterior cover for the housing. Within the chamber **15** there is a liquid spraying apparatus shown in the form of a rotatable spray head **20**. The spray head is supplied with cleansing liquid by a pump (not shown) which is motor driven, and which normally functions to recirculate a quantity of cleansing liquid supplied to the bottom or sump of chamber **15**, in a manner well known in the art. The pump, drive motor, timer controls, and plumbing connections have all been omitted since they are well known in the art, and form no particular part of the present invention. Details of a suitable such apparatus are shown and described in United States Patents Nos. 2,681,658 and 2,862,510, both issued to the assignee of this application.

As noted previously, the exterior cabinet dimensions of domestic dishwashing machines, to which the present invention is particularly directed, are in most cases standardized and thus the cabinet **10** occupies a predetermined space. As an example, the dimensions of the latest model of dishwashing machine provided by applicant's assignee, provided as a free standing unit with front opening door and including the top **19**, are: depth (front to back) twenty-five inches; width twenty-four inches; and height thirty-six inches. It is of course desirable to provide a maximum effective capacity of cleansing chamber **15**, but sufficient space must remain below this chamber, in the base **12** and adjacent bottom of the cabinet **10**, to house the timer, pump, drive motor, and various plumbing connections in an effective and not over-crowded manner. Otherwise, installation and servicing of the machine becomes difficult due to lack of work space.

The present invention provides novel rack arrangements which afford optimum arrangement of the articles to be cleansed within chamber **15**, and a major portion of such arrangement is in connection with the lower rack **25**, which is provided with a plurality of supporting rollers **27** resting on tracks **28** which are in turn supported from the sides of the chamber **15**, spaced properly above the spray head **20**. When the door **17** is opened, and it incorpo-

rates suitable stop mechanism for maintaining it in the horizontal position, shown in dotted lines in FIG. 1, the rack 25 will roll outwardly onto the interior (and then upwardly facing) surface of the door, supporting the rack outside the chamber in a position where it can easily be loaded and unloaded. This rack is preferably constructed of a plurality of wires or similar rod-like elements which are fastened together in the desired manner and preferably coated with a plastisol or the like. The rack 25 includes a generally rectangular frame piece 30 to which there is secured a plurality of lengthwise bottom pieces 32. Each of these is of generally U-shape, substantially elongated, and the ends of the lengthwise bottom pieces are secured to the framepiece, as by welding, at the front and back.

The rack 25 also includes further crosswise bottom pieces 35 which are similarly of elongated generally U-shape, and the opposite ends of which are suitably secured to the sides of frame piece 30. The bottom pieces 35 are further contoured or formed such that each one has a central section 36 which extends transversely at right angles to the bottom pieces 32, preferably resting thereon and secured thereto, and side sections or parts 37 which are formed angularly with respect to the central portion 36, and offset therefrom. There are a plurality of such pieces 35, arranged with the respective central and side portions parallel, as shown particularly in FIG. 3, and extending upwardly therefrom, formed either as integral parts or as separate finger like elements which are secured thereto, are dish supporting fingers. Thus, each of the central portions of the bottom pieces 35 has a finger 40 extending upwardly therefrom, formed as an elongated inverted V or U-shape member which may slant somewhat toward one end of the rack, as shown particularly in FIGS. 2 and 3. The central portions 36 may also be formed with short humped or raised segments 42 which serve to engage the bottom edge of wide dishes or trays arranged transversely of the rack, assisting in holding such articles on edge.

Each of the side portions 37 of the bottom pieces also is provided with an upwardly extending finger 45, and in a preferred arrangement there are in fact two such fingers on every other side portion 37, and one finger on the intermediate side portions. These fingers also may be inclined somewhat toward one end of the rack.

As noted previously, these parts may be formed in any suitable manner, but a preferred construction is formed from heavy gage wires or rods, shaped to the desired configuration and welded wherever they intersect, then coated or covered as a unit with a suitable plastisol or equivalent material. Therefore, the completed rack is an open mesh construction, including a bottom having openings of substantial size through which the cleansing spray may pass essentially unimpeded, and the bottom pieces 32 and 35, together with the fingers 40 and 45 cooperate to form divider pieces defining a number of main pockets in which plates or like articles can be supported on edge, and a number of side pockets extending at an angle into the main pockets providing for substantially parallel arrangement in overlapping relation of the beveled or upturned line of plates and the like which are placed on edge in associated main and side pockets.

With reference particularly to FIG. 3, the areas between adjacent central portions 36, together with the fingers 40 of each and the smaller humps or protrusions 42 on each, form a main pocket crosswise of the rack as viewed from above. For reasons which will be discussed further in detail, these central pockets form a convenient receiver for large dinner plates or the like, three of which are shown in FIG. 3, and designated by the general reference numeral 50. In a preferred construction, there are twelve main pockets. Similarly, the side portions 37 of bottom pieces 35, together with the fingers 45, define the side pockets, and the angular relation of these with respect to main pockets formed by the same bottom pieces and associate parts is such that smaller plates or the like, for example salad plates or saucers 52 shown in FIG. 3, will be received therein with the beveled edges extending generally parallel to the beveled edges of the larger plates 50.

It will be noted that the main and associated side pockets are somewhat staggered by the offset relation of the central portions 36, and thus the lips of the plates in side pockets of the rack will project into the space between adjacent plates in adjacent main pockets. This relation is clearly shown in FIG. 3. Such an arrangement maintains an effective flow of the cleansing spray through the spaces between the plates and over the surfaces thereof to assure complete cleansing of the articles, and also to assure an effective spray flow onto the articles supported on the upper rack structure, which is designated by the general reference numeral 60 in FIGS. 1 and 2.

A detail view on a larger scale of the top rack is shown in FIG. 4, and FIG. 5 is a perspective view which illustrates the general mounting arrangement for the upper rack structure, and which shows the supporting means for movable parts thereof. The upper rack is formed by a base or frame wire 65, which is of generally rectangular shape in plan view, having opposite side members 66 of elongated inverted and shallow U-shape, joining at the corners with identical front and rear portions 67. The shape of these front and rear portions is best described by reference to FIG. 4, wherein it will be noted that the outward segments extend upwardly and inwardly at an angle with respect to horizontal, and merge with inner segments extending upwardly at a steeper angle to join with a horizontal central segment. Spaced along the front-to-back dimension of the upper rack there are a plurality of similar bottom pieces, having generally the same configuration as the front and rear portions 67 of the frame outline or base 65. These bottom members 70 extend upwardly and outwardly, however, beyond the side portions 66, and they are joined on each side by an upper side wire member 72 which is secured at one end to the central segment of the end portions 67, and which is secured also to each of the bottom pieces 70 near the upper end thereof. The remainder of the bottom and sides of the upper rack is formed by a plurality of lengthwise extending bottom wires 73 which complete, with the bottom pieces 70, an open mesh framework for supporting soiled articles to be cleansed. At the front and back of the rack there are also vertically extending end pieces 74 which project upwardly from the frame piece 65 and are fastened to the upper side pieces 72, extending across the ends of the upper rack.

Thus, the upper rack structure has deeper portions at the sides thereof extending front to back, and a shallower central portion therebetween. A plurality of movable divider members 75, preferably four in number, two on each side, are hinged to one of the bottom wires 73, by looping the ends of the divider members thereabout. These divider members provide a removable barrier or support between the shallower central and the deeper side sections of the rack. Each of the divider members is of inverted, elongated, generally U-shaped configuration as shown in FIG. 5, and is looped around the appropriate bottom wire 73 as shown to form a hinge mounting. In FIG. 4, which is a view looking upon the front of the upper rack, the divider members 75 in the front half of each side of the rack are shown folded down upon the bottom wires 73, in which position larger articles such as pots, pans, or bowls can be placed thereover, extending across the general dividing area between the shallower and deeper portion of the rack. The rearmost two divider members 75 are shown in their erected position, and they are supported in this position by stops in the form of inwardly bent loops or protrusions 77 formed in the upper rack side pieces 72. When erected the dividers are convenient supports for smaller articles resting on the shallower portion of the rack.

The upper rack is provided with a two position mounting arrangement, whereby its spacing above the lower rack can be adjusted. This mounting is in the form of side support brackets 80 fastened to the sides of the upper rack and each including an upper rail 82 and a lower rail 84. Rollers 85 are mounted on the bracket at the rearward edge of each of these rails, with their axes generally aligned with the plane of the respective rails.

On the sides of the cleansing chamber 15 there are stationary supporting rails 88, one at each side, and at the front of these rails there are mounted supporting rollers 90. The rack is supported for sliding movement into and out of the cleansing chamber by engaging either the top pair or the lower pair of rollers 85 with the rails 88. This will automatically cause the stationary rollers 90 to engage with the corresponding upper rails 82 or lower rails 84, as the rack is pushed into the chamber. The arrangement of course can be varied merely by removing the rack and mounting it on its other set of rails, thus permitting the upper rack to accommodate articles of greater depth or height when mounted in its lower position.

Accordingly, the present invention provides a novel racking or article supporting arrangement for domestic dishwashing machines of standardized dimensions, and in which twelve complete place settings, according to N.E.M.A. (National Electric Manufacturers Association) standards, are accommodated. The serving plates and salad plates or saucers in the lower rack are maintained spaced apart and in position for complete flowing of the cleansing spray over the surfaces thereof, while maintaining an effective flow of the spray into the upper rack for cleansing of the articles supported thereon.

While the forms of apparatus herein described constitutes preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. For use in a dishwashing machine of the type described; an open mesh rack for supporting articles having openings of substantial size through which a cleansing spray can pass, said rack having a frame piece and bottom pieces extending therefrom to define a front and a back and opposite sides of said rack, said bottom pieces extending from said front to said back, a plurality of divider pieces extending across said bottom pieces from one side to the other of said rack defining a number of parallel main pockets from said front entirely to said back in which plates and like articles are received and also defining a number of side pockets extending at an angle into said main pockets, said side pockets likewise being arranged entirely from said front to said back, and means on at least some of said divider pieces for supporting on edge articles placed in said pockets providing for essentially parallel spaced overlapping of the beveled lips of plates and the like placed on edge in associated main and side pockets.



2. For use in a dishwashing machine of the type described; a rack for supporting articles comprising a generally rectangular frame piece forming a front and a back and opposite sides, a plurality of bottom pieces connected to said frame piece at said front and said back forming a bottom on which articles are supported and defining openings of substantial size through which a cleansing spray can pass onto and between the articles, and a plurality of divider pieces arranged across said rack over said bottom pieces at spaced intervals from said front entirely to said back defining a number of main pockets in which plates and like articles are received and supported on edge and also defining a number of side pockets extending at an angle into said main pockets providing for substantially parallel arrangement in overlapping relation of the beveled lips of plates and the like placed on edge in associated main and side pockets.


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