

June 7, 1955

L. H. DAVIDSON
DOMESTIC DISHWASHER HAVING ROTARY
DISHRACK ON EXTENSIBLE BRACKET

2,710,011

Filed May 17, 1952

4 Sheets-Sheet 1

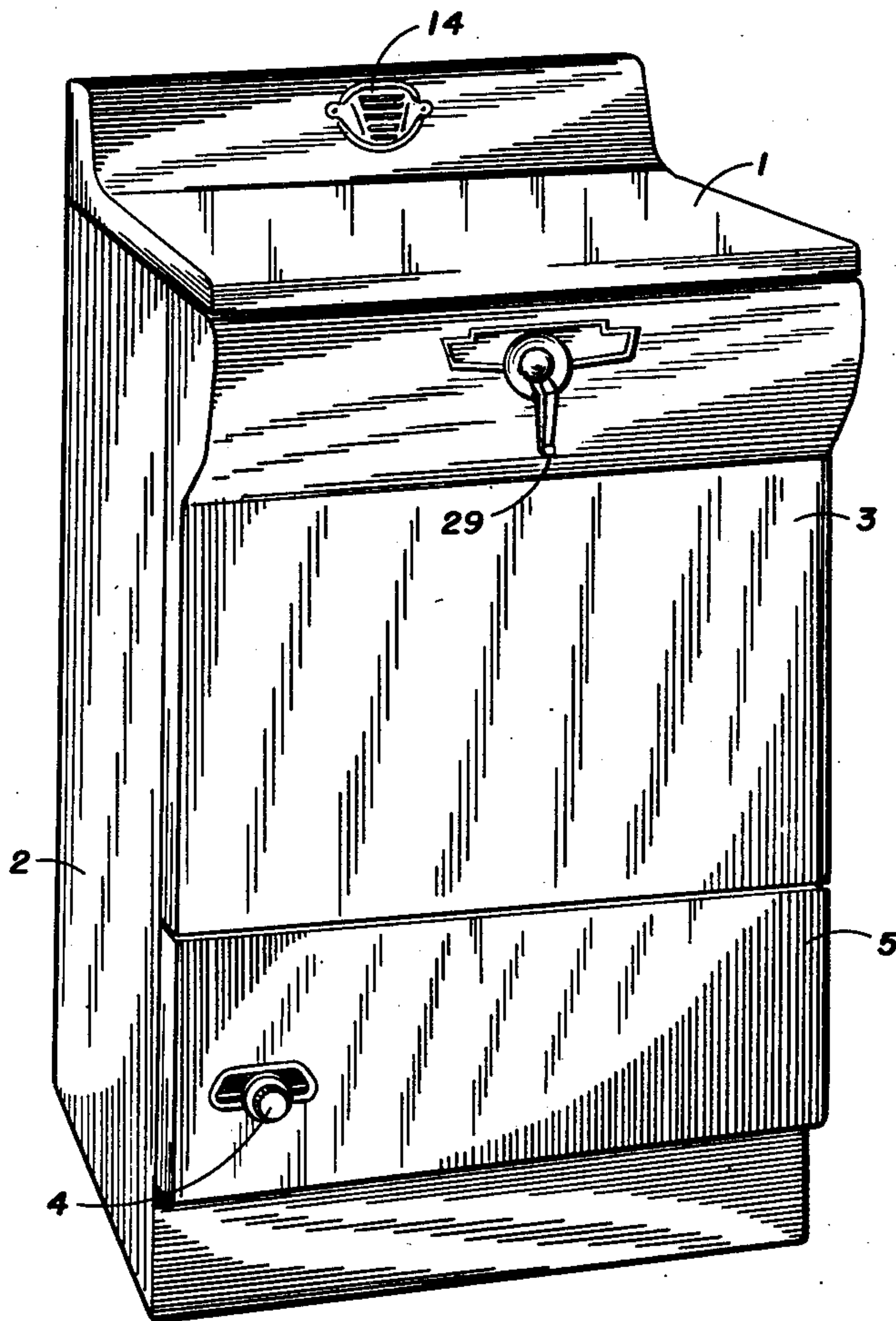


Fig 1

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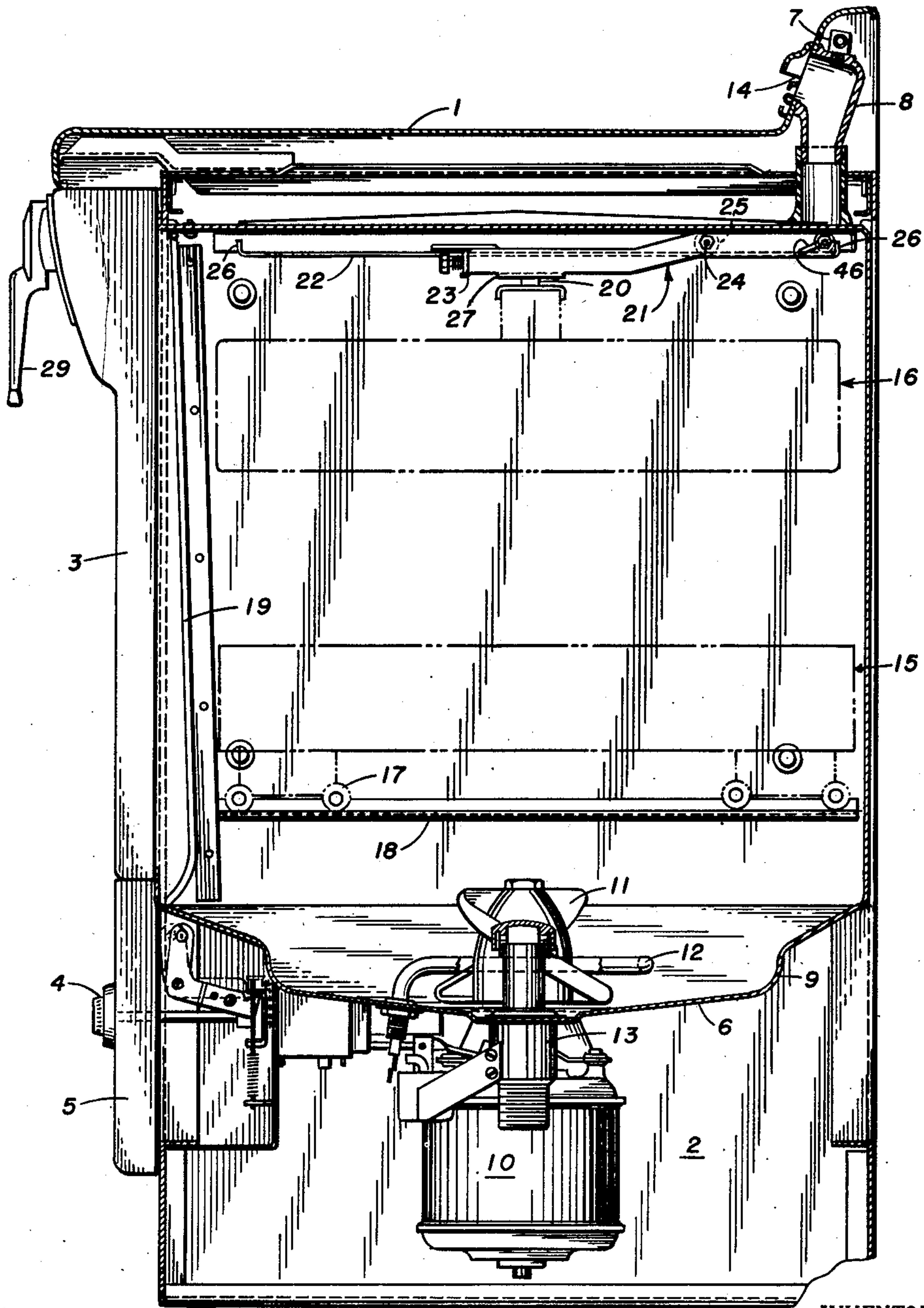
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Fig 2

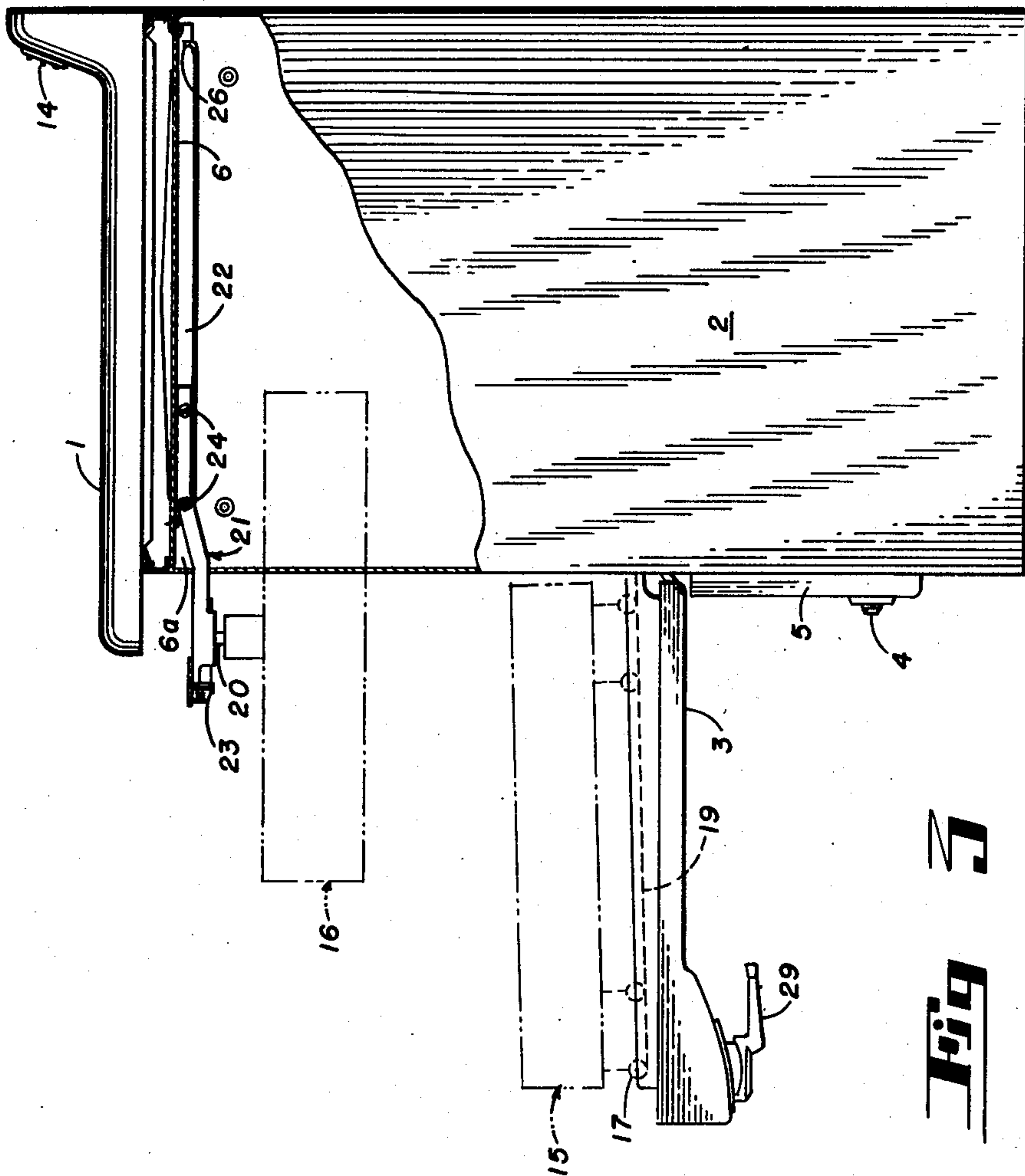
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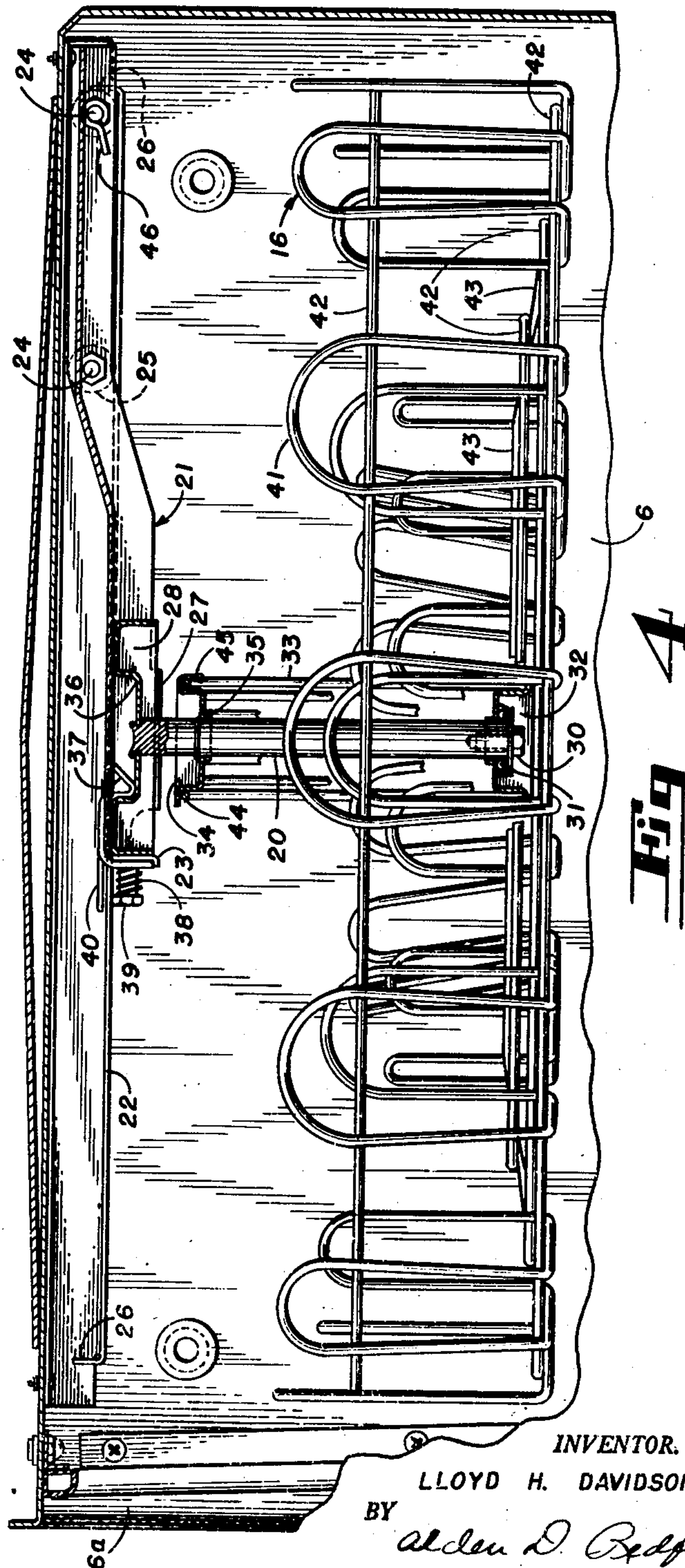
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DOMESTIC DISHWASHER HAVING ROTARY DISHRACK ON EXTENSIBLE BRACKET

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5 Claims. (Cl. 134—139)

The present invention relates to a domestic dishwasher, particularly one designed for installation within the kitchen of a home, desirably as part of a kitchen cabinet and sink installation.

The invention relates to that type of dishwasher which has a power driven impeller disposed on a vertical shaft located at the bottom of a washing vat which can be sealed closed so that dishes within the vat can be washed by the impact of water thrown through the dishes by the impeller. The water, thrown up through dishes supported by racks within the dishwasher, drains back to the bottom of the vat where it collects for a repetition of the cycle.

In dishwashers of this type, it is difficult to expose all surfaces of the dishes being washed to the action of the water thrown up by the impeller. If certain areas on the dishes are shielded from the washing action, it of course follows that these areas will not be cleaned and the overall performance of the dishwasher will be unsatisfactory. It is of the utmost importance that all surfaces on all dishes be washed perfectly, for even a very small amount of food particles remaining on the dishes will render it unsatisfactory in the user's eyes to the considerable detriment of the manufacturer.

Fairly satisfactory results have been obtained in many domestic dishwashers so far as the dishes within the lower rack are concerned. Space limitations usually dictate the need for a second rack vertically above the lower rack. Difficulty has been encountered in attaining a thorough washing action on the dishes located in this top rack, since the energy in the water is dissipated in part by its passage through the dishes in the lower rack and the dishes in the upper rack are partially blocked by the dishes in the lower rack.

In view of the foregoing, it is an object of the present invention to provide an improved top rack such that all of the dishes stored therein will be thoroughly washed in a domestic dishwasher.

A further object of the present invention is to provide a dish supporting rack which is supported from its top side for rotation about a central vertical axis so that all dishes supported on the rack can be completely washed. More specifically, it is an object of the present invention to provide in a dishwasher a rotatably supported dishrack which is mounted on an extensible bracket so that the entire rack can be withdrawn from the dishwasher to facilitate loading with a batch of dishes. More specifically still, it is an object to provide a rotatable dishrack releasably mounted on an extensible bracket so that it can be readily removed therefrom for cleaning or any other purpose.

More broadly stated, it is an object of the present invention to provide in a dishrack installation the advantages of rotatability as well as removability.

Again, broadly stated, it is an object of the present invention to provide an extensible mounting for supporting a dishrack which can be rotated by the influence of

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washing water thrown upwardly through the rack by an impeller located therebeneath.

With regard to the entire dishwasher, an important object of the present invention is the provision of a rotatable dishrack supported on a movable bracket so that the rack can be withdrawn for loading purposes through an access opening provided in the front face of the machine.

Still another object of the invention is the provision of a frictionless mounting for a rotatable dishrack which is not only strong and durable but so located, relative to the rack, that it does not interfere with the dishes being placed on the rack or with the rotation of the rack and dishes during operation of the dishwasher.

According to the present invention, a domestic cabinet type dishwasher is provided having an access opening in its forward face which is closed by a door hingedly secured near its lower horizontal edge. A washing vat is provided within the cabinet of the dishwasher and supports a vertically disposed impeller above its lower wall. A pair of vertically disposed dishracks are provided, the lower rack including rollers so that it can be rolled in and out of the vat. A feature of particular novelty in the present invention is the provision of a removable rotatable top rack on an extensible bracket, attached to the top wall of the vat in such a manner that the bracket can be moved on rollers towards the access opening of the dishwasher thereby rendering readily accessible the top rack for loading purposes. This rack is mounted for rotation about a central vertical axis, and during operation of the dishwasher rotates under the influence of the water thrown up by the impeller so that all surfaces of the dishes are exposed fully to thorough washing action.

The novel features that are considered characteristic of the invention are set forth in the appended claims; the invention itself, however, both as to its organization and method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of the dishwasher as it appears while in operation;

Figure 2 is a vertical longitudinal sectional view through the entire dishwasher showing in phantom lines a pair of dishracks disposed above an impeller located in the lower part of the unit;

Figure 3 is a side view of the dishwasher with the access door open and the dishracks extended for loading purposes, a portion of the side wall of the dishwasher being broken away to facilitate illustration of its interior arrangement, the racks being shown in phantom lines; and

Figure 4 is a vertical elevational view of the upper dishrack when disposed within the dishwasher. To facilitate illustration, the rack has been shown without dishes.

With particular reference to Figure 1, it will be noted that the dishwasher in which the present invention finds particular utility is a cabinet type unit having a coved top 1, outer cabinet 2, and a front access door 3 hingedly for opening and closing movements about its lower edge. A timer control is provided at 4 to regulate the operation of the dishwasher. For convenience, this timer may be located in lower panel 5. Referring to Figure 2, it will be noted that a washing vat 6 is provided within the cabinet and defines a front access opening 6a sealed by door 3 during the washing operation.

Water is introduced into the dishwasher by an inlet pipe 7, the water from the pipe passing through vacuum breaker 8 to the interior of the vat. The water can col-

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lect in the lower portion of the vat by virtue of its pan formation 9 in the lower wall. The lower wall also supports a driving motor 10 having a vertically disposed shaft to which is attached an impeller 11.

When motor 10 is in operation impeller 11 is driven at high speed and throws the water, which tends to collect in formation 9, up through the interior of the vat. A heating coil 12 may be provided to heat the water while it is being circulated and also to heat the air within the vat during the time that the dishes are being dried.

A solenoid operated drain valve 13 is provided to drain the water from the vat at the end of the washing operation.

It is possible to utilize several different types of operating cycles in dishwashers. It has been found particularly convenient to provide a pre-rinse during which the drain valve is open and incoming water from pipe 7 is sprayed throughout the vat to rinse small food particles from the dishes. After the pre-rinse, the drain valve is closed and water is introduced to fill the pan formation 9 while the impeller is operated. When a suitable quantity of water has collected, the water supply is cut off and the motor 10 continues to operate for a period of approximately ten minutes during which the washing water is thrown violently up through the vat to provide a thorough washing action. At the completion of this washing operation, motor 10 is de-energized and drain valve 13 opened to drain the wash water from the dishwasher. Since this wash water normally contains a high concentration of detergents, it is desirable to rinse the dishes with clean water after the washing operation. After rinsing, the dishes are dried by a blast of hot air from impeller 11 through energization of motor 10, the air circulated by the impeller being heated by coil 12 and eventually passing to the atmosphere through vacuum breaker 8 and open grille work 14. Fresh air enters the vat through the hub of the impeller which is made hollow (not illustrated) for this purpose.

To hold the dishes within the vat during the rinsing, washing, and drying operations, a pair of dishracks, generally designated 15 and 16, are provided. Lower rack 15 is more or less rectangular in horizontal plan view, and has not been shown in detail in this application since it does not directly concern the invention set forth. For the purposes of the present invention, it will be sufficient to understand that rack 15 includes rollers 17 at its lower corners which cooperate with rails 18 secured to the vertical sidewalls of the vat so that the rack is supported by the rails when disposed within the dishwasher and can be rolled out onto the inner face 19 of access door 3 when the door is open, as indicated in Figure 3. Dishes can be easily loaded onto rack 15 when it is fully extended from the dishwasher, as shown in this figure.

Dishrack 16 is rotatably supported on a central shaft 20 which depends from an extensible bracket, generally designated 21.

The racks assume the positions shown in Figure 2 during operation of the dishwasher, but rack 16 can be pulled through the front access opening of the dishwasher, for loading purposes, as indicated in Figure 3. With reference to this figure, it will be noted that the racks, when extended from the dishwasher, are substantially staggered so that dishes can be loaded into all parts of the lower-rack 15 without interference by the upper rack. On the other hand, all portions of the upper rack can be readily reached merely by rotating the rack as the loading proceeds.

The structural details of the upper rack installation can be more fully understood from a study of Figure 4 which shows bracket 21 in its retracted position within the washing vat 6. A pair of horizontally spaced, parallel, channel shaped guide and support members 22 are secured in depending relationship to the top inside surface of the vat for supporting bracket 21. The rear portion of the bracket carries transverse shaft members 24 which sup-

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port at their outer ends guide rollers 25 which are engaged with rails 22. It is convenient to provide vertical stops 26 at the ends of rails 22 to limit movement of extensible bracket 21.

Bracket 21 is provided with inturned lips 27 which support the lower edges of cylindrical cup 28 to the center of which is rigidly secured depending shaft 20, the lower end of which is provided with a bolt and thrust washer, as at 30. Above the thrust washer is located a small ball thrust bearing 31 which, in turn, bears against a cylindrical metal cup 32 which is pressed within central hub 33 of dishrack 16. Hub 33 carries a second metal cup 34 which has a central guide portion 35 engaging shaft 20 and maintaining rack 16 in position on the shaft.

By virtue of the foregoing installation, rack 16 is rotatably supported on shaft 20. Further, the ball thrust bearing makes it possible to rotate the rack with a very small amount of torque, with the result that the water thrown upwardly through the rack by impeller 11 is sufficient to rotate the rack, even when loaded with a batch of heavy dishes.

Cylindrical cup 28 is provided with a depressed central portion 36 in which is engaged a latch member 37 pivotally secured to the forward end of bracket 21. The bracket is provided at its forward end with a small prong 23 against which the lower end of latch member 37 pivotally bears. As the latch pivots around prong 23, it compresses a spring 38 which surrounds and is held in place by a screw 39. This screw is threadedly secured in the forward end of bracket 21.

A finger grip portion 40 is provided at the forward end of latch 37. When portion 40 is pressed down, latch 37 is rotated about prong 23, thus moving the latch out of engagement with depression 36. When the latch is thus disengaged, the complete rack and bearing assembly, including cylindrical cup 28 and shaft 20, can be forced to the rear, sliding along lips 27 until the cup 28 is disengaged from bracket 21. In this way, the complete rack and bearing assembly can be completely removed from the dishwasher for cleaning or any other purpose.

Should it be necessary to wash pots and pans of unusual size in the dishwasher, it is a simple matter to remove the top rack so that a large volume is exposed above rack 15 in which the articles may be positioned for washing purposes. After these large objects are cleaned, it is merely necessary to reinstall the upper rack for regular use of the dishwasher.

Many of the exact details of the rack 16 are not particularly important in the present invention, although it is important to note that the rack is reticulated, being formed of wires bent into dish supporting formations 41 which are secured to a plurality of concentric circular wires 42. A number of equally spaced radially extending wires 43 are provided which are bent upwardly to form hub portion 33, the wires being united at their top end by a ring of wire 44. Metal cup 34 is pressed within ring 44 and is provided with prongs 45 which can be bent around the ring for anchoring purposes.

If desired, the wires, forming rack 16, can be coated with a vinyl type plastic or any other resilient material for mutually protecting the dishes and rack.

From practical tests made on dishwashers of the type disclosed, it has been found highly desirable to disperse the water entering from pipe 7 throughout the dishwasher. It has been found that such dispersion of water may be accomplished by the provision of a lanced out prong 46 provided at the rear of and made integral with extensible bracket 21. As indicated in Figure 4, prong 46 slopes downwardly into the vat at a slight angle. The flow of water from pipe 7 down against prong 46 has been indicated in Figure 2, and it will be appreciated by those skilled in the art that the impact of the water on this downwardly sloping member fans the water out into a wide dispersion pattern suitable for rinsing food particles

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or detergent, as the case may be, from the dishes supported by racks 15 and 16.

In view of the foregoing disclosure of structural details, it will be apparent that dishracks 15 and 16 can be withdrawn from the dishwasher for loading purposes, as indicated in Figure 3. After the completion of the loading operation, rack 15 is rolled back into the dishwasher onto rails 18. The extensible bracket 21, carrying rack 16, is also rolled along members 22 until the upper rack is fully disposed within the washing vat. Thereafter, access door 3 is closed and latch handle 29 is first turned to a locked position and then to a run position. Timer 4 thereafter controls operation of the dishwasher admitting water to pipe 7 through a solenoid valve (not shown) and regulating the operation of motor 10, heater 12, and drain valve 13 so that the rinsing, washing, and drying operations are carried out in proper timed sequence. During the washing operation, impeller 11 is in operation and throws the wash water up through dishrack 15. A certain percentage of the water passes through the lower rack and its dishes up to dishrack 16. Impingement of the water on the dishes supported on this rack imparts rotation to the rack and carries the various surfaces of the dishes through the streams of water from the impeller. In this way, all surfaces of the dishes are fully exposed and a thorough washing action results.

After the drying operation is completed, during which the impeller is again operated, timer 4 de-energizes the various components of the dishwasher, and the dishes may be removed for storage elsewhere, if desired. In removing the dishes from the racks, the loading operation is reversed, the racks being pulled out of the dishwasher to the positions indicated in Figure 3. As will be understood from studying this figure, all portions of rack 15 can be readily reached. All portions of rack 16 are also rendered accessible merely by rotating the rack slowly.

As will be appreciated by those skilled in the art, the present invention has provided a very simple and effective top rack installation for a dishwasher and one which greatly facilitates movement of the rack out of the front access opening for loading and unloading of the rack as well as complete removal of the rack for cleaning, repair, or other purposes.

Having described a preferred embodiment of my invention, I claim:

1. In a cabinet type domestic dishwasher including a washing vat with top, back, and side walls, the vat defining an access opening through the front wall thereof and being provided with power driven washing means at the bottom of the vat, an improved extensible and removable rotary dishrack installation comprising guide means secured to the top interior wall of the vat, said guide means extending in fore and aft relationship from the access opening towards the rear wall of the vat, a bracket, bearing members extending between said bracket and said guide means for positioning said bracket for fore and aft movement along said guide means, a pair of inturned lips at the forward end of said bracket, a cup member positioned by said bracket and supported by said lips, a vertically disposed shaft secured to and depending from said cup member, a releasable latch secured to said bracket in engagement with said cup member for releasing said cup member from engagement with said bracket, and a reticulated dishrack rotatably positioned by said shaft whereby said rack may rotate under the influence of said power washing means when said rack

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is disposed within the vat, and said dishrack may be moved out of the vat to facilitate loading, said dishrack being removable from said bracket by operation of said latch.

2. In combination in a domestic dishwasher, a washing vat defining an access opening in a side face thereof, a bracket movably secured to said vat for movement towards and away from the access opening, a vertical shaft, support means secured to said shaft engaged with a portion of said bracket, means for releasably securing said support means to said bracket, and a dishrack rotatably positioned on said shaft.

3. In a cabinet type domestic dishwasher including a washing vat with top, back, bottom, and side walls, the vat defining an access opening through the front wall thereof and being provided with washing means at the bottom of the vat, an improved extensible and removable rotary dishrack installation comprising guide means secured to the top interior wall of the vat, said guide means extending in fore and aft relationship from the access opening towards the rear wall of the vat, a bracket slidably supported by said guide means for fore and aft movement, a pair of inturned lips at the forward end of said bracket, a cup member positioned by said bracket and supported by said lips, a vertically disposed shaft secured to and depending from said cup member, a releasable latch secured to said bracket in engagement with said cup member for releasing said cup member from engagement with said bracket, and a reticulated dishrack rotatably positioned by said shaft whereby said rack may rotate under the influence of said washing means when said rack is disposed within the vat, and said dishrack may be moved out of the vat to facilitate loading, said dishrack being removable from said bracket by operation of said latch.

4. In a cabinet type domestic dishwasher including a washing vat with top, back, bottom and side walls, the vat defining an access opening through the front wall thereof and being provided with washing means at the bottom of the vat, an improved extensible and removable rotary dishrack installation comprising guide means secured to the interior of the vat, said guide means extending in fore and aft relationship from the access opening towards the rear wall of the vat, a bracket slidably supported by said guide means for fore and aft movement, a vertically disposed shaft removably secured to and depending from said bracket, and a reticulated dishrack rotatably positioned by said shaft whereby said dishrack may rotate under the influence of said washing means when said dishrack is disposed within the vat, and said dishrack may be moved out of the vat to facilitate loading, said dishrack and supporting shaft being removable from said bracket.

5. In combination in a domestic dishwasher, a washing vat defining an excess opening in a side face thereof, a bracket secured to said vat for movement towards and away from the access opening, a dishrack, and means for rotatably and removably supporting said dishrack on said bracket.

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