

Description

[0001] This application relates to a washing machine of the commercial cabinet type used for speedy washing of multiple glasses in locations such as pubs, bars and restaurants.

[0002] Machines of this type often take the form of an outer cabinet and an inner wash tank such that the machine has in effect a double skin which makes it quiet and provides for good heat retention. The outer cabinet has a loading door to enable glasses and other vessels to be loaded into the wash tank which has one or more racks for supporting the vessels. A second tank for holding washing liquid is located in the outer cabinet below the level of the loading door. A spray mechanism includes a spray pump for supplying washing liquid to the wash tank and spraying the liquid over the vessels. The spray mechanism also operates to subsequently spray rinsing water from an external supply over the vessels.

[0003] Generally a wash cycle only comprises spraying washing liquid over the vessels and then rinsing the washing liquid from the vessels by spraying them with rinse water. The cycle lasts for a short period, for example two minutes, in distinction from domestic dishwashing machines in which the wash cycle lasts for at least 20 minutes and often longer.

[0004] The rack or racks on which the vessels are supported in the inner wash tank generally have a planar base and a surrounding rim. The result is that the vessels are held in upright orientation which may cause rinse water to be retained on top of the vessels.

[0005] Most commercial washing machines have wash tanks with a square configuration. The rack used to support the vessels has a rectangular or square configuration or a circular configuration. The disadvantage of the latter is that the number of vessels which can be loaded is not maximised. Square and rectangular racks also have a disadvantage however, which is that with common spray mechanisms, vessels positioned in the corners of the rack receive a less aggressive wash. This is because common spray mechanisms have spray arms which rotate around a mid-point and are invariably shorter than the distance between the corners of the rack. The geometry of the spray produced by the spray nozzles on the arms is compromised for the vessels in corner locations and those vessels may not be properly cleaned.

[0006] The present invention provides a washing machine for drinking vessels comprising an outer cabinet, an inner wash tank forming a washing compartment, a door providing access to the washing compartment, a generally rectangular rack supported within the washing compartment and having a base and walls, and a spray arm mounted above and below for spraying water on vessels held in the rack, wherein the rack is divided transversely and parallel to the door into a number of lanes each for holding a number of vessels arranged side by side, and wherein the bases of at least the lanes

closest and furthest from the door are inclined such as to tilt vessels held therein.

[0007] The washing machine has a rectangular rack which optimises vessel capacity for a given machine size. The spray mechanism is of known form including a spray arm is employed. However by making the base of at least two of the lanes inclined such as to tilt the vessels, the spray arm/rectangular rack combination is enabled to properly clean all the vessels including in particular those vessels held at the corners of the rack. The inclination of the lane bases tips the vessels which allows proper spraying of vessels in those lanes.

[0008] Preferably, the bases of the lanes closest to and furthest from the door are oppositely inclined. This gives optimal spraying and so cleaning.

[0009] The bases of the intermediate lanes may also be inclined. This has the advantage that liquid will not be retained on the tops of any of the vessels which could result in wet or streaked vessels and so a poor wash result.

[0010] The inclination of the base of at least the lane nearest the door is preferably upwardly sloping such as to tilt vessels held therein towards the door whilst the inclination of the base of at least the lane furthest from the door is preferably downwardly sloping such as to tilt vessels held therein away from the door. The advantages of oppositely inclining the bases of the lanes nearest and furthest from the door as noted above is optimal spraying and so cleaning. Inclining the other lanes bases prevents liquid retention and so the potential for streaks. In addition, inclining the bases of the intermediate lanes may facilitate loading and/or optimise spraying and so cleaning of vessels held in those intermediate lanes.

[0011] The rack may be formed from a plurality of interconnected bars, the walls comprising spaced border bars linked by upright bars and the base comprising a grid of transverse bars and crossbars connected to the lowermost border bar, the transverse bars being shaped to provide the inclination of the bases of the lanes. This preferred configuration allows the desired inclination of the bases of the lanes to be obtained in a simple cost-effective manufacturing process.

[0012] The rack may be generally square.

[0013] The machine may be of the type comprising pumps for pumping wash water and rinse water to the spray arms, the spray arms being self-propelling to spray the water in a generally circular pattern from above and below the rack. The outer cabinet may be formed from stainless steel and the wash tank from polyethylene. The advantage of forming the wash tank from polyethylene or another plastics material is that this reduces the overall weight of the dishwasher and facilitates manufacture of the wash tank as it can be made by rotational moulding.

[0014] The invention will now be further described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a side view, partly cut away, of a washing machine in accordance with the invention;

Figure 2 is a perspective view from the bottom and rear of the washing machine of Figure 1 without the outer cabinet;

Figure 3 is a perspective view of a spray mechanism of the washing machine of Figure 1;

Figure 4 is a plan view taken generally along line A-A of Figure 1, and,

Figure 5 is a perspective view of a rack forming part of the washing machine of Figure 1.

[0015] The washing machine 2 as shown in Figures 1 and 2 is of the commercial type used for cleaning plural glasses and other vessels.

[0016] The washing machine 2 has a steel outer cabinet 6. An opening in the outer cabinet 6 is closed by a door 8. The outer cabinet 6 is omitted from Figure 2 for clarity.

[0017] An inner wash tank 10 is mounted within the outer cabinet 6 and has a lower portion 12 forming a wash tank sump, i.e. a reservoir in which washing water is stored. Wash detergent is mixed in the reservoir which is connected via a wash pump 13 to a lower wash arm bearing manifold 14 in the wash tank 10. An upper manifold wash arm bearing manifold 15 is connected via an interconnecting manifold pipe 16.

[0018] A rinse water boiler 17 containing water and rinse agent is connected via a rinse pump 18 a rinse manifold pipe 19 and thence to the lower wash arm bearing manifold 14 and the upper wash arm bearing manifold 15.

[0019] The machine 2 includes a spray mechanism shown in Figure 3 for spraying vessels with firstly washing liquid and then rinsing water. The spray mechanism comprises lower and upper rotating arms 22, 24 mounted in the bottom and top of the inner wash tank 10 and connected to the lower and upper wash arm bearing manifolds 14, 15.

[0020] The spray arms 22, 24 have spray nozzles 26. They are self-propelling under the pressure of liquid supplied thereto which causes them to rotate and liquid to be sprayed from the spray nozzles 26 in a generally circular pattern.

[0021] A rack 28 is slidable into and out of the inner tank 10 along rails 30 formed by side walls of the inner tank 10. The rack 28 is shown in detail in Figures 4 and 5. As illustrated in Figure 5, the rack 28 comprises walls formed from spaced border bars 32 linked by upright bars 34. The rack 28 has a base which comprises a grid of transverse bars 36 and cross bars 38 connected to the lowermost border bar 32. The rack 28 is divided laterally by divider elements 39 which are carried by the topmost and middle border bars 32. The divider ele-

ments 39 each comprise a pair of cross bars 40 linked by upright bars 41. In the illustrated embodiment, the rack 28 is divided by the divider elements 39 into five sections or lanes, each running widthways across the rack 28. However the number of lanes can be varied according to the overall dimensions of the rack 28. For example, the five lane illustrated embodiment would be suitable for a rack sized 500 mm x 500 mm whilst for a rack 400 mm x 400 mm, the division might be into four lanes.

[0022] The transverse bars 36 of the base of the rack 28 are shaped such that the section which forms the base of each lane is inclined. In the illustrated embodiment the bases of the two lanes closest to the door 8 slope upwardly such as to tilt vessels 42 held therein towards the door 8 as is illustrated in Figure 1. The base of the other three lanes which are furthest from the door 8 are inclined to slope downwardly and so tilt vessels 42 therein away from the door 8.

[0023] The inclination of the lane bases has two effects. The first can be appreciated best from consideration of Figures 1 and 4. As shown in the latter the wash arms 22, 24 are shorter than the distance between the corners of the rack 28. With a rack arranged to hold vessels upright, those vessels at the corner of the rack may not be properly cleaned. By inclining the lane bases and so tilting the vessels 42 in the lanes closest and furthest from the door 8, all the vessels in those lanes are fully covered by the spray nozzles 26 of the wash arms 22, 24 and proper cleaning of all the vessels 42 including the corner vessels is ensured. This is illustrated by the arrows 44 in Figure 1 which show the direction of water sprayed from the outermost nozzle 26 of the lower spray arm.

[0024] The second effect of inclining the lane bases is that water is not retained on the top of the vessels 42 which could otherwise result in wet or streaked vessels and a poor wash result.

Claims

1. A washing machine for drinking vessels comprising an outer cabinet, an inner wash tank forming a washing compartment, a door providing access to the washing compartment, a generally rectangular rack supported within the washing compartment and having a base and walls, and a spray arm mounted above and below for spraying water on vessels held in the rack, wherein the rack is divided transversely and parallel to the door into a number of lanes each for holding a number of vessels arranged side by side, and wherein the base of at least the lanes closest and furthest from the door are inclined such as to tilt vessels held therein.
2. A washing machine as claimed in claim 1 wherein the bases of the lanes closest to and furthest from

the door are oppositely inclined.

3. A washing machine as claimed in either claim 1 or claim 2 wherein the bases of the intermediate lanes are inclined. 5
4. A washing machine as claimed in any preceding claim wherein the inclination of the base of at least the lane nearest the door is upwardly sloping such as to tilt vessels held therein towards the door. 10
5. A washing machine as claimed in any preceding claim wherein the inclination of the base of the at least the lanes furthest from the door is downwardly sloping such as to tilt vessels held therein away from the door. 15
6. A washing machine as claimed in any preceding claim wherein the rack is formed from a plurality of interconnected bars, the walls comprising spaced border bars linked by upright bars and the base comprising a grid of transverse bars and cross bars connected to the lowermost border bar, the transverse bars being shaped to provide the inclination of the basis of the lanes. 20
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7. A washing machine as claimed in any preceding claim wherein the rack is generally square.
8. A washing machine as claimed in any preceding claim comprising pumps for pumping wash water and rinse water to the spray arms, the spray arms being self-propelling to spray the water in a generally circular pattern from above and below the rack. 30
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9. A washing machine as claimed in any preceding claim wherein the outer cabinet is formed from stainless steel and the wash tank is formed from polyethylene. 40

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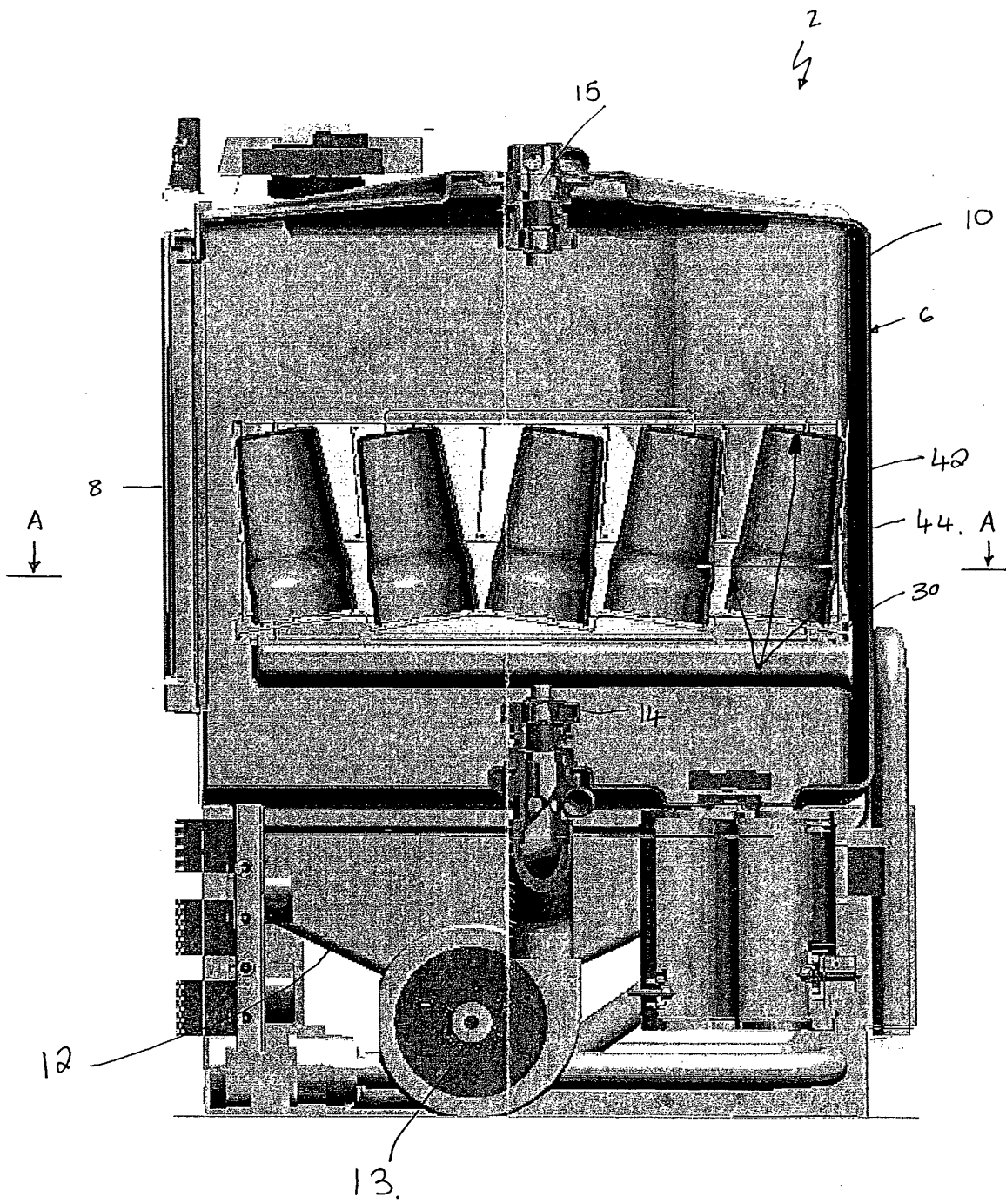


Figure 1.

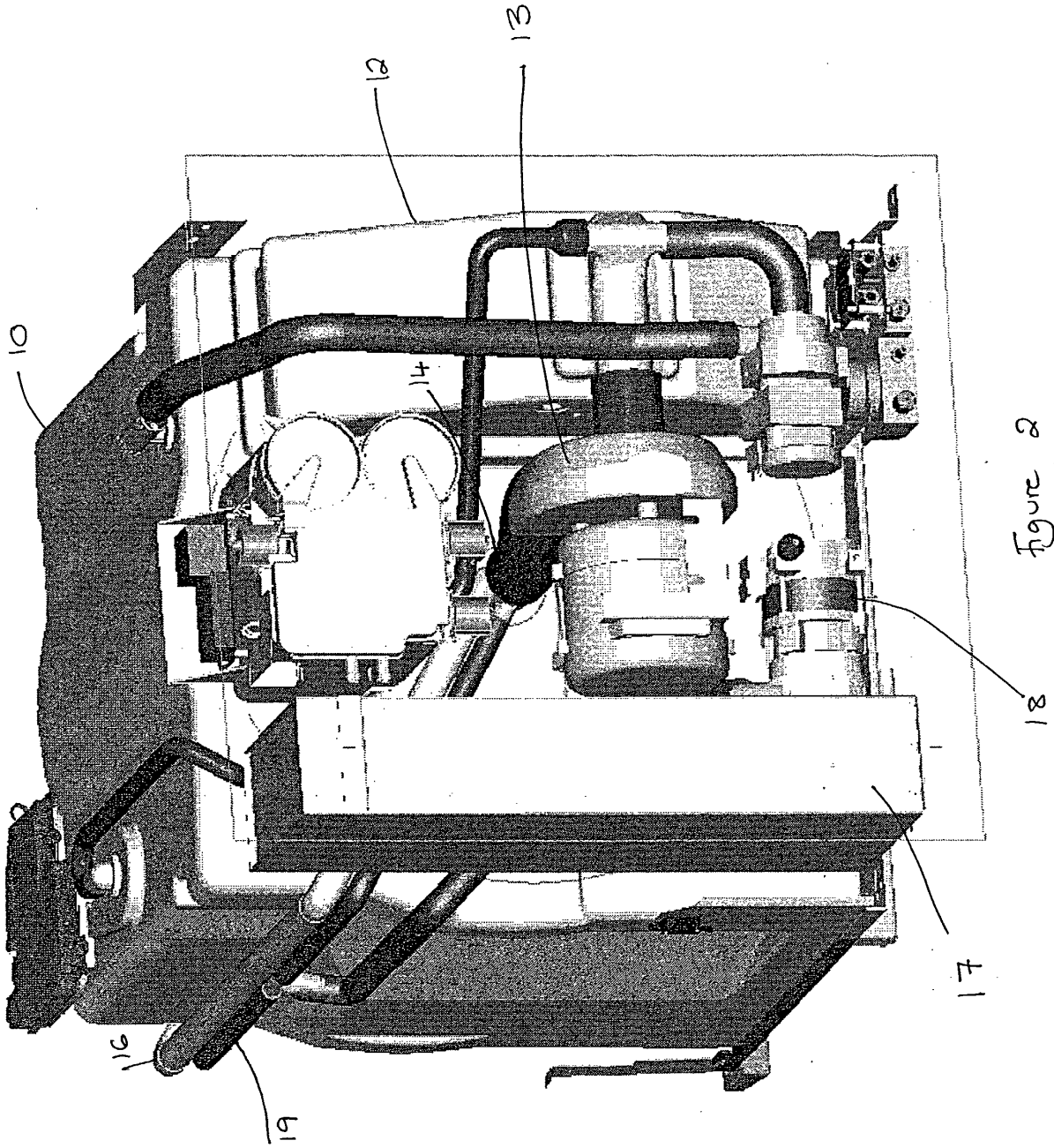


Figure 2

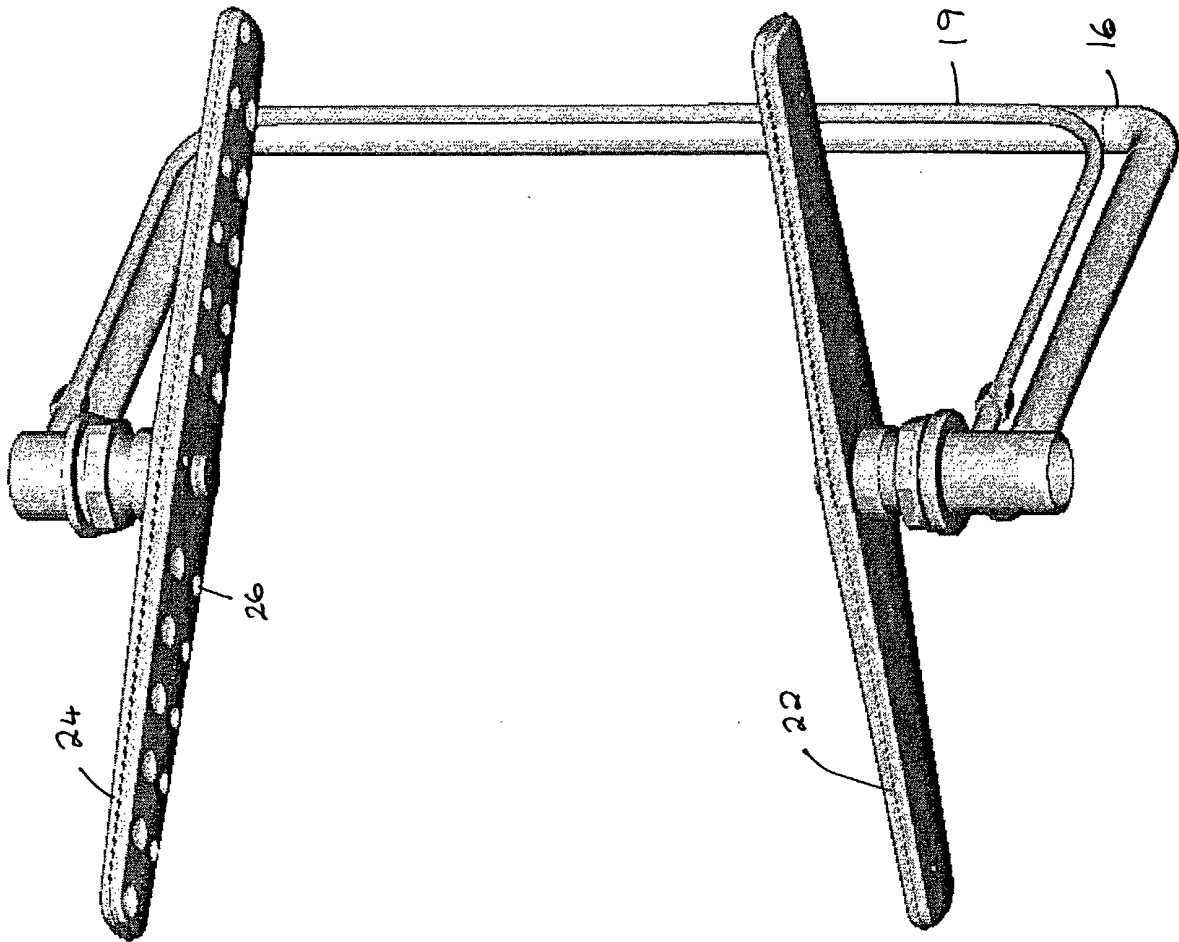


Figure 3

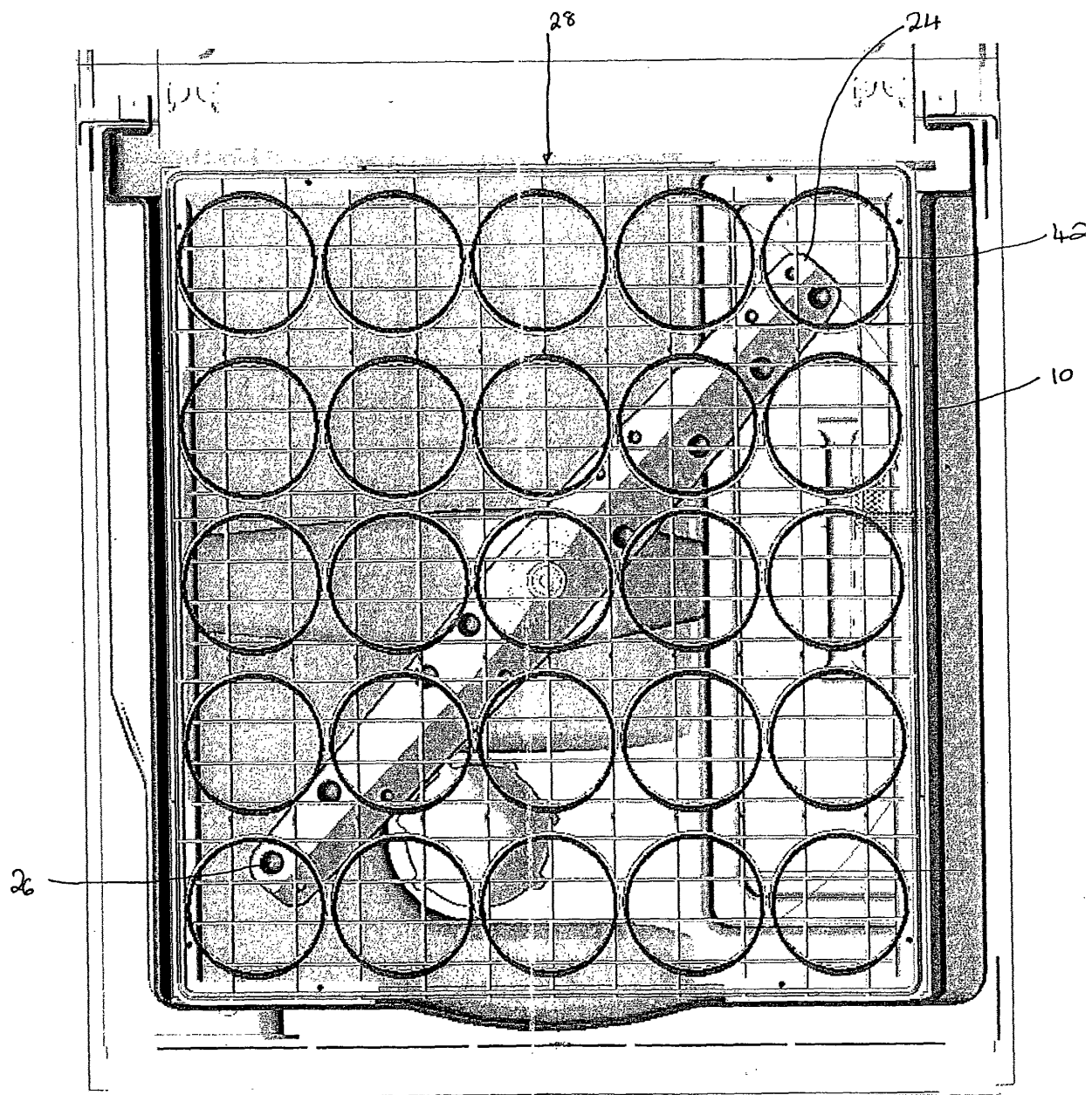


Figure 4

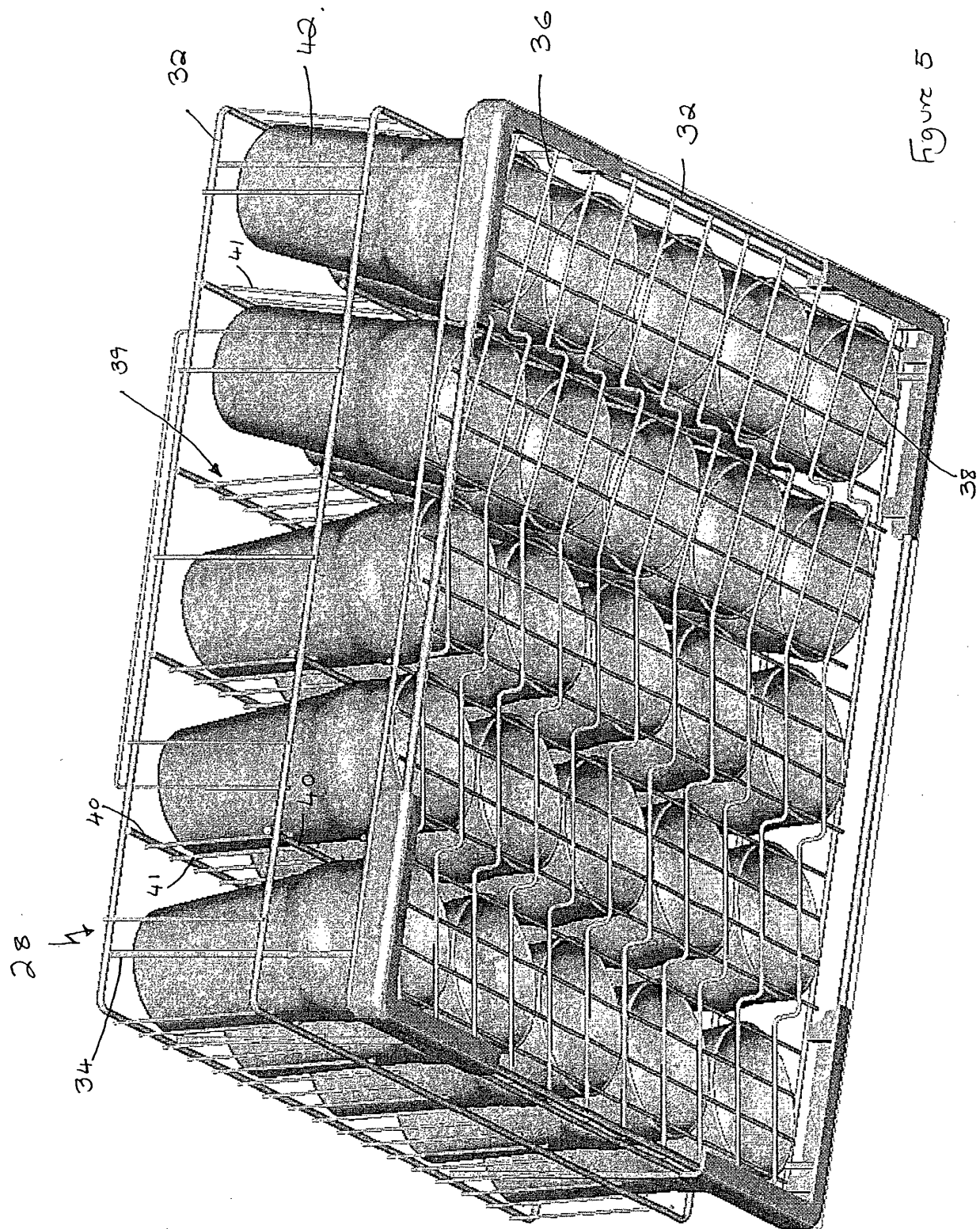


Figure 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 8573

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		4 March 2002	Norman, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 30 8573

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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04-03-2002

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