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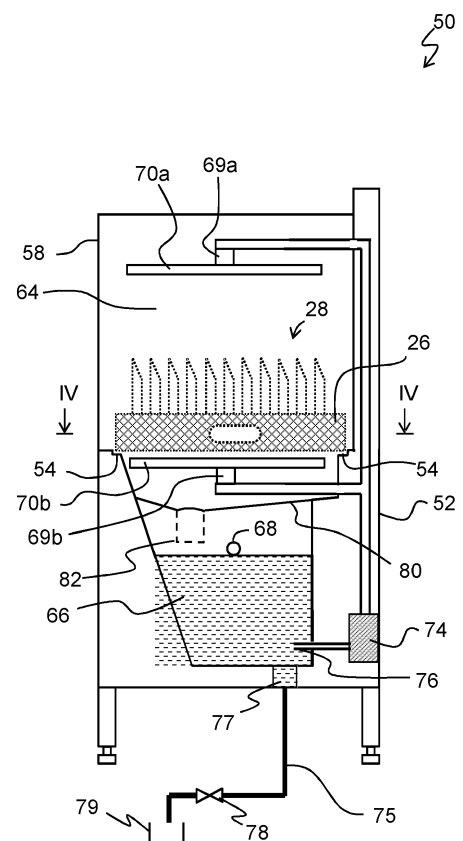
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(54) **PRE-RINSING OF DISHES**

(57) A device for batch-wise pre-rinsing of dishes prior to washing comprises spray means (70a-b) for spraying a rinsing liquid, the spray means (70a-b) being arranged in a rinsing chamber (64), which is adapted to receive and enclose a batch of dishes (28), the rinsing chamber (64) being adapted to be opened after the dishes (28) have been rinsed for removal of the pre-rinsed dishes (28).

Fig. 3



Description

Field of the Invention

[0001] The present invention relates to a device and a method for batch-wise pre-rinsing of dishes prior to washing, the pre-rinsing being effected with the aid of spray means for spraying a rinsing liquid. The invention further concerns a system for cleaning dishes, comprising a device for batch-wise pre-rinsing of dishes.

Background Art

[0002] A process for cleaning soiled dishes, for example kitchen utensils such as plates, glasses, cutlery, pans, etc., usually comprises the steps of

placing the dishes in a dishwasher basket to facilitate the handling of the dishes in batches;
rinsing the dishes in the dishwasher basket in a pre-rinse step, in which large food scraps are removed and dried-on food scraps are loosened by means of a pistol sprayer;
placing the dishwasher basket containing the dishes in a dishwasher;
washing the dishes in a washing process, which typically comprises one or more pre-washing steps, washing steps and rinsing steps; and
removing the dishwasher basket containing the clean dishes from the dishwasher.

[0003] Effective pre-rinsing can facilitate the cleaning work both in the pre-rinsing stage and in the subsequent washing stage.

Summary of the Invention

[0004] An object of the present invention is to provide a more efficient process for the cleaning of dishes. This object is achieved by a device for batch-wise pre-rinsing of dishes prior to washing, which device comprises a spray means for spraying a rinsing liquid, the spray means being arranged in a rinsing chamber, which is adapted to receive and enclose a batch of dishes, the rinsing chamber being adapted to be opened after the dishes have been rinsed for removal of the pre-rinsed dishes. The rinsing chamber enables spraying of the dishes in any optional direction, for example from below, or in more than one direction, while preventing splashing of the dishwasher operator or the surroundings. This allows for a more thorough pre-rinsing of the dishes, whereby the subsequent washing is rendered easier and more effective and/or whereby the wash result is improved. The present invention makes it possible, for example, to reduce the washing time and/or the quantity of detergent used in the subsequent washing operation. A further advantage is that the device can be readily adapted for automatic pre-rinsing, which supports improved working

conditions and allows a dishwasher operator to carry out other tasks while the pre-rinsing is being effected.

[0005] Preferably, the device comprises a rinsing liquid tank, which is arranged to receive collected rinsing liquid which has been sprayed from said spray means, the device being arranged to recirculate, during pre-rinsing, the rinsing liquid from the rinsing liquid tank to said spray means. By virtue of this recirculation of the rinsing liquid, a more efficient pre-rinsing and/or a lower consumption of rinsing liquid, for example water, is/are obtained, since the same liquid can be used for spraying the dishes several times. In addition, in a pre-rinse device that uses heated rinsing liquid the recirculation can save energy, since the quantity of rinsing liquid that needs to be heated is smaller than with a device where the rinsing liquid is not recirculated. Furthermore, owing to the rinsing liquid tank it is possible to store the rinsing liquid for the purpose of pre-rinsing additional batches of dishes later on.

[0006] Preferably, the device comprises an inlet for rinsing liquid that has been used in a washing or rinsing process of a dishwasher. By reusing the dishwater from a dishwasher, the water and electricity consumption can be even further reduced, since no clean water needs to be supplied to the device for pre-rinsing. In addition, the fact that the used dishwater often has already been heated in the washing process results in energy savings and/or added pre-rinsing efficiency. Furthermore, the used dishwater often contains detergent, which helps to loosen dried-on food scraps on the dishes during the pre-rinsing.

[0007] In a preferred embodiment, the rinsing chamber comprises means for receiving a dishwasher basket. This facilitates the introduction and removal of a batch of dishes in the pre-rinse device.

[0008] According to one embodiment, said spraying means is rotatable about a substantially vertical shaft. This embodiment enables the sprayed rinsing liquid to be distributed in an efficient manner over the dishes.

[0009] According to one embodiment, the upper part of the rinsing chamber is delimited by a vertically adjustable hood. It is extremely easy to introduce batches of dishes in this embodiment.

[0010] According to another aspect of the invention, there is provided a more efficient process for cleaning dishes by means of a method for batch-wise pre-rinsing of dishes prior to washing, the method comprising introducing a batch of dishes in a rinsing chamber; closing the rinsing chamber; rinsing the dishes in the rinsing chamber with the aid of a rinsing liquid: opening the rinsing chamber; and removing the batch of dishes. The rinsing chamber enables spraying of the dishes in any optional direction, for example from below, or in more than one direction, while preventing splashing of the dishwasher operator or the surroundings. This allows for a more thorough pre-rinsing of the dishes, whereby the subsequent washing process is rendered easier and more effective and/or whereby the wash result is improved. In addition, if the process is automated, wholly

or in part, the working conditions are improved and the dishwasher operator is able to carry out other tasks while the pre-rinsing is being effected.

[0011] Preferably, the method comprises collecting rinsing liquid from the rinsing chamber, and rinsing the dishes with the aid of the collected rinsing liquid. This enables a more efficient pre-rinsing and/or a lower consumption of rinsing liquid, for example water, since the same liquid can be used for spraying the dishes several times. Moreover, if the pre-rinse method requires heated rinsing liquid the recirculation can help to save energy, since a smaller quantity of rinsing liquid needs to be heated.

[0012] Preferably, the method comprises receiving rinsing liquid from a dishwasher. By reusing the dishwasher or rinsing water from a dishwasher, the water and electricity consumption can be even further reduced, since no clean water needs to be supplied to the device for pre-rinsing. In addition, the fact that the received rinsing liquid often has already been heated in the dishwasher results in energy savings and/or added pre-rinsing efficiency. Furthermore, the received rinsing liquid often contains detergent, which helps to loosen dried-on food scraps on the dishes during the pre-rinsing.

[0013] According to a further aspect of the invention, there is provided a more efficient process for cleaning dishes by means of a system for cleaning dishes, comprising a dishwasher for batch-wise washing of pre-rinsed dishes, which dishwasher is provided with an outlet for used dishwasher, the system further comprising a device for batch-wise pre-rinsing of dishes, which device is provided with an inlet for rinsing liquid, which inlet is connected to the outlet for used dishwasher of the dishwasher. Such a system for cleaning dishes saves electricity and water while offering improved washing results.

Brief Description of the Drawings

[0014] In the following the invention will be described in more detail by means of a preferred but non-limiting embodiment, reference being made to the accompanying drawings.

Fig. 1 illustrates a prior-art device, and the use thereof, for batch-wise pre-rinsing of dishes.

Fig. 2 is a schematic side view of a device for batch-wise pre-rinsing of dishes.

Fig. 3 is a sectional view of the device in Fig. 2.

Fig. 4 is a view along the section IV-IV in Fig. 3.

Fig. 5 is a schematic illustration of a system for cleaning dishes. The system comprises a device for batch-wise pre-rinsing of dishes of the type illustrated in Figs 2-4.

Fig. 6 is a schematic illustration of a further embodiment of a system for cleaning dishes.

Description of Preferred Embodiments

[0015] Fig. 1 illustrates a prior-art device, and the use thereof, for batch-wise pre-rinsing of dishes. The device consists of a pistol sprayer 10, comprising a pistol sprayer hose 12 and a pistol sprayer nozzle 14. The pistol sprayer is connected to a water pipe 16, and fitted to a sink 20 provided with a basin 22. The basin 22 has a bottom strainer (not shown) for preventing large scraps of food from being flushed into the drain.

[0016] Pre-rinsing is effected by an operator 24 placing a dishwasher basket 26 holding a batch of soiled dishes 28 on the sink 20 above the basin 22. The operator 24 then activates the pistol sprayer 10 by means of an operating handle 18, thereby causing the pistol sprayer nozzle 14 to spray a jet of water onto the batch of dishes 28 from above. The operator 24 holds the pistol sprayer nozzle 14 in one hand and by aiming the pistol sprayer nozzle 14 is able to direct the jet of water across the dishes 28.

[0017] When the pre-rinsing of the dishes 28 has been completed the operator 24 transfers the dishwasher basket 26 containing the pre-rinsed dishes 28 to a dishwasher (not shown), in which the dishes 28 are then washed.

[0018] Fig. 2 illustrates an example of an embodiment of a device for batch-wise pre-rinsing of dishes according to the present invention. The figure shows a pre-rinse machine 50. The machine 50 has a frame 52, which is provided with shoulders 54 (Fig. 3) arranged to support a dishwasher basket 26 of the standard width of 500 mm. A vertically adjustable hood 58 is arranged to allow, in its raised position (indicated by a continuous line in Fig. 2), the dishwasher basket 26 containing the soiled dishes 28 to be introduced in the apparatus 50 through a hood gap 62 and positioned on the shoulders 54. In the lowered position (indicated by a dashed line in Fig. 2), the hood 58 is arranged to fit tightly against the frame 52, thereby forming a closed rinsing chamber 64 (Fig. 3). The hood 58 is arranged to be raised and lowered by means of an operating handle 60.

[0019] Fig. 3 is a sectional view of the pre-rinse machine 50. The machine 50 is shown with the hood 58 in the lowered position. The frame 52 comprises a rinsing liquid tank 66, which is filled with a rinsing liquid, for example water, up to a level that is determined by an overflow pipe 68. The overflow pipe 68 is connected to a drain 79 (in a manner not shown).

[0020] An upper, horizontal rinse arm 70a is located at an upper part of the frame 52 and is rotatable about a substantially vertical shaft 69a. The upper rinse arm 70a is provided with a plurality of spray nozzles (not shown), which are directed downwards for spraying rinsing liquid onto the dishes 28 from above. A lower, horizontal rinse arm 70b is located below the shoulders 54, and is, similarly, rotatable about a substantially vertical shaft 69b. The lower, horizontal rinse arm 70b is provided with a plurality of spray nozzles 72b (Fig. 4), which are directed upwards for spraying rinsing liquid onto the dishes 28 from below. A rinsing liquid pump 74 is arranged to pump

rinsing liquid from a pump inlet 76 located in a lower part of the rinsing liquid tank 66 to the rinse arms 70a-b. At the bottom of the rinsing liquid tank 66 there is an outlet 77 which is connected to a drain valve 78 for emptying of the rinsing liquid tank 66, via a pipe 75, into the drain 79, for example at the end of the working day or in preparation of cleaning or maintenance of the machine 50.

[0021] A collecting plate 80 for collecting rinsing liquid ejected from the rinse arms 70a-b covers the rinsing liquid tank 66 and is sloping downwards towards a rinsing liquid strainer 82. The rinsing liquid strainer 82 is arranged to collect food scraps that have been rinsed off from the dishes 28 while allowing the rinsing liquid, when strained, to flow into the rinsing liquid tank 66. Furthermore, to facilitate the removal of food scraps the strainer 82 is adapted to be lifted out of the machine 50. The rinsing liquid strainer 82 shown in Figs 3-6 is relatively small. However, it can advantageously be designed to hold a larger quantity of food scraps in order to extend the intervals between emptying of the strainer 82. It is also possible to provide the collecting plate 80 with perforations, or to design it as a fine-mesh net, so that the collecting plate 80 too contributes to the straining of the rinsing liquid.

[0022] Fig. 4 is a view along the section IV-IV in Fig. 3. For the sake of clarity the dishwasher basket 26 and the dishes 28 are not shown. The view shows the shoulders 54, the lower rinse arm 70b, the collecting plate 80 and the strainer 82. Removal of the strainer 82 is facilitated by virtue of the fact that the strainer 82 is provided with a handle 84.

[0023] Fig. 5 shows a system 100 for cleaning dishes. The system 100 comprises a pre-rinse machine 50, according to that which has been described above with reference to Figs 2-4, and a dishwasher 150 of the kind known in the art. In this example, the dishwasher 150 is of the single tank type and comprises a dishwater tank (not shown) with an outlet 177. The dishwasher 150 can be used for washing dishes 28 which have been pre-rinsed in the pre-rinse machine 50, or for washing dishes 28 which have not been pre-rinsed or which have been pre-rinsed in any other manner. The dishwasher 150 further has an inlet 104 for clean water. The outlet 177 of the dishwasher 150 is connected to the outlet 77 of the pre-rinse machine 50 via a check valve 108. Owing to this design, it is possible, by opening the drain valve 78, to simultaneously discharge the dishwater from the dishwasher 150 and the rinsing liquid from the rinsing liquid tank 66 of the pre-rinse machine 50. If, however, the drain valve 78 is closed, any flow of used dishwater from the dishwasher 150 will instead be pressed into and through the outlet 77 of the pre-rinse machine 50. In this way, the pre-rinse machine 50 can be made to receive used dishwater from the dishwasher 150 and to use this water as rinsing liquid for the pre-rinsing of dishes 28. The maximum dishwater level in the dishwasher 150 is limited by the height of the overflow pipe 68 of the pre-rinse machine 50.

[0024] Fig. 6 shows an alternative system 200 for cleaning dishes. The system 200 comprises a pre-rinse machine 50 and a dishwasher 250 according to that which has been described above with reference to Fig. 5. However, instead of being connected to the pre-rinse machine 50 via a check valve 108, as illustrated in Fig. 5, the dishwasher 250 is connected to the pre-rinse machine 50 via a pump 208. The dishwasher 250 is provided with an overflow pipe 268 disposed in a dishwater tank (not shown). The overflow pipe 268 is connected to a dishwater outlet 277 and the pump 208 is connected between the outlet 277 of the dishwasher 250 and an inlet 209 in the pre-rinse machine 50. The inlet 209 opens into the rinsing liquid tank 66 above the overflow pipe 68 disposed therein and thus above the rinsing liquid level of the rinsing liquid tank 66 when the rinsing liquid tank 66 is full. Whenever more liquid is supplied to the dishwasher 250, for example during a rinsing stage, any excess liquid for which there is no room in the dishwater tank will flow to the pump 208 via the overflow pipe 268. The pump 208 is arranged to be activated when liquid is being supplied to the dishwasher 250. For example, the pump 208 can be arranged to be activated by a control signal which controls the inlet of water through a water inlet 104 to the dishwasher 250. The pump 208 can also be arranged to be automatically activated by a sensor (not shown), which detects the presence of dishwater in the dishwater outlet 277. When the dishwater flows via the overflow pipe 268 down into the dishwater outlet 277 the pump 208 is arranged to pump the dishwater from the outlet 277 of the dishwasher 150 and into the rinsing liquid tank 66 provided in the pre-rinse machine 50. As a result, it is possible to set the desired level of dishwater in the dishwasher 250 independently of the rinsing liquid level in the pre-rinse machine 50. Furthermore, this embodiment supports easier emptying of the rinsing liquid tank 66 of the pre-rinse machine 50 without the dishwater in the dishwasher 250 being discharged at the same time.

[0025] It will be appreciated that the invention can be modified in various ways within the scope of the claims. Thus, it is not necessary, for instance, for the device for batch-wise pre-rinsing of dishes 28 to receive the rinsing liquid from the outlet for used dishwater of a dishwasher. Instead, the rinsing liquid tank 66 can be supplied, for example, with clean water via the hood gap 62 by using a bucket or a hose.

[0026] Moreover, the rinsing chamber 64 need not be defined by a vertically adjustable hood. Instead, the device for pre-rinsing dishes may be of the front-loader type, i.e. where access to the interior of the rinsing chamber for the introduction of dishes is provided via a door in the wall of the rinsing chamber.

ITEMIZED LIST OF EMBODIMENTS

[0027]

1. A device for batch-wise pre-rinsing of dishes prior

to washing, which device comprises a spray means (70a-b) for spraying a rinsing liquid and is **characterised in that**

the spray means (70a-b) is arranged in a rinsing chamber (64), which is adapted to receive and enclose a batch of dishes (28), the rinsing chamber (64) being adapted to be opened after the dishes (28) has been rinsed for removal of the pre-rinsed dishes (28).

2. A device as claimed in claim 1, further comprising a rinsing liquid tank (66), which is arranged to receive collected rinsing liquid which has been sprayed from said spray means (70a-b), the device (50) being adapted to recirculate, during pre-rinsing, the rinsing liquid from the rinsing liquid tank (66) to said spray means (70a-b).

3. A device according to any one of the preceding claims, further comprising an inlet (77, 209) for rinsing liquid that has been used in a washing or rinsing process of a dishwasher (150).

4. A device according to any one of the preceding claims, wherein the rinsing chamber (64) comprises means (54) for receiving a dishwasher basket (26).

5. A device according to any one of the preceding claims, wherein said spray means (70a-b) is rotatable about a substantially vertical shaft (69a-b).

6. A device according to any one of the preceding claims, wherein the upper part of the rinsing chamber (64) is delimited by a vertically adjustable hood (58).

7. A method for batch-wise pre-rinsing of dishes prior to washing, **characterised** by the steps of

introducing a batch of dishes (28) in a rinsing chamber (64);
closing the rinsing chamber (64);
rinsing the dishes (28) in the rinsing chamber (64) with the aid of a rinsing liquid;
opening the rinsing chamber (64); and
removing the batch of dishes (28).

8. The method according to claim 7, further comprising collecting rinsing liquid from the rinsing chamber (64); and rinsing the dishes (28) with the aid of the collected rinsing liquid.

9. The method according to any one of claims 7-8, further comprising receiving rinsing liquid from a dishwasher (150).

10. A system for cleaning dishes, comprising a dishwasher (150, 250) for batch-wise washing of pre-rinsed dishes (28), which dishwasher (150, 250) is

provided with an outlet (177, 277) for used dishwater,

the system (100, 200) further comprising a device (50) for batch-wise pre-rinsing of dishes as claimed in any one of claims 1-6, which device (50) is provided with an inlet (77, 209) for rinsing liquid, which inlet (77, 209) is connected to the outlet (177, 277) for used dishwater of the dishwasher (150, 250).

Claims

1. A pre-rinse device (50) for batch-wise pre-rinsing of dishes prior to washing, which device (50) comprises a spray means (70a-b) for spraying a rinsing liquid and is **characterised in that** the spray means (70a-b) is arranged in a rinsing chamber (64), which is adapted to receive and enclose a batch of dishes (28), the rinsing chamber (64) being adapted to be opened after the dishes (28) has been rinsed for removal of the pre-rinsed dishes (28), wherein the upper part of the rinsing chamber (64) is delimited by a vertically adjustable hood (58), and **in that** the device (50) further comprises an inlet (77, 209) for rinsing liquid that has been used in a washing or rinsing process of a separate dishwasher (150, 250) and an overflow pipe (68) which is connectable to a drain (79).
2. A device as claimed in claim 1, further comprising a rinsing liquid tank (66), which is arranged to receive collected rinsing liquid which has been sprayed from said spray means (70a-b), the device (50) being adapted to recirculate, during pre-rinsing, the rinsing liquid from the rinsing liquid tank (66) to said spray means (70a-b).
3. A device according to any one of the preceding claims, wherein the rinsing chamber (64) comprises means (54) for receiving a dishwasher basket (26).
4. A device according to any one of the preceding claims, wherein said spray means (70a-b) is rotatable about a substantially vertical shaft (69a-b).

Fig. 1
(PRIOR ART)

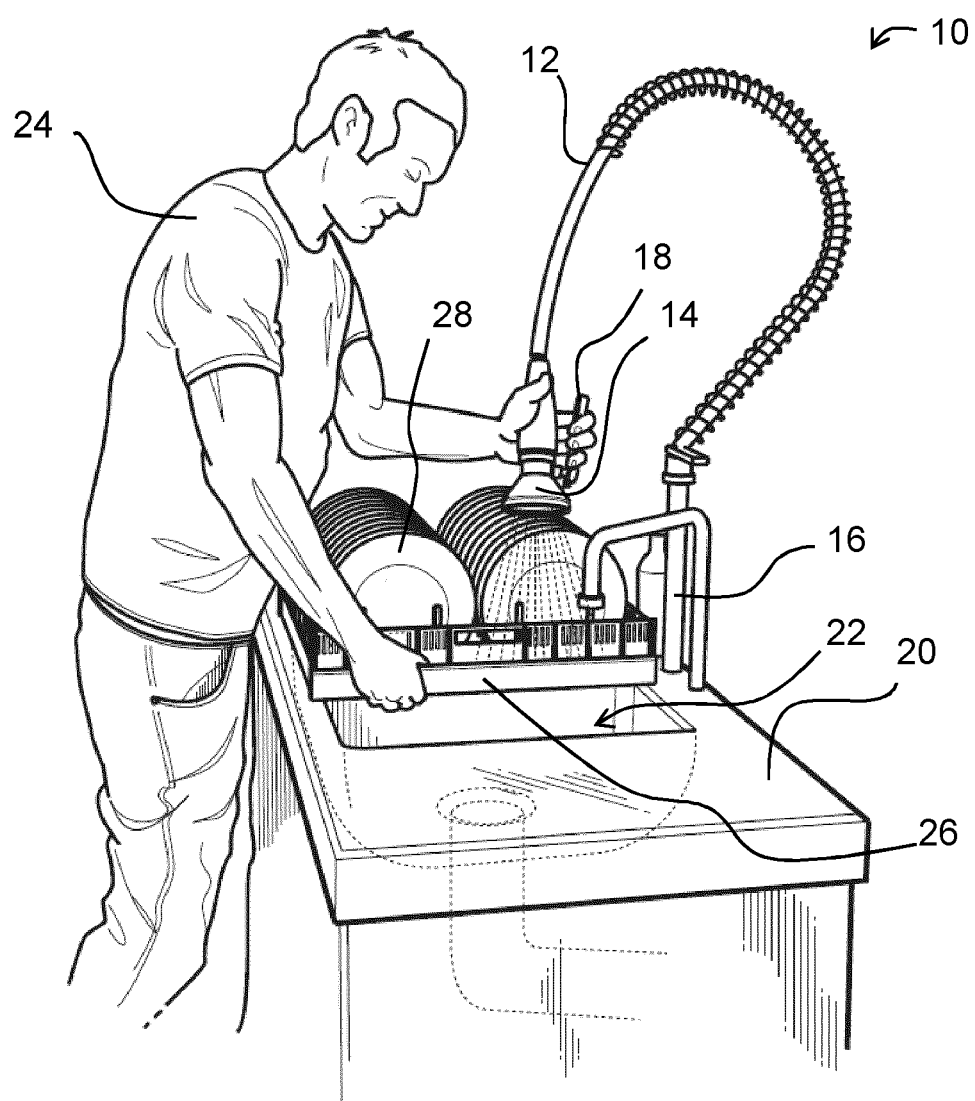


Fig. 2

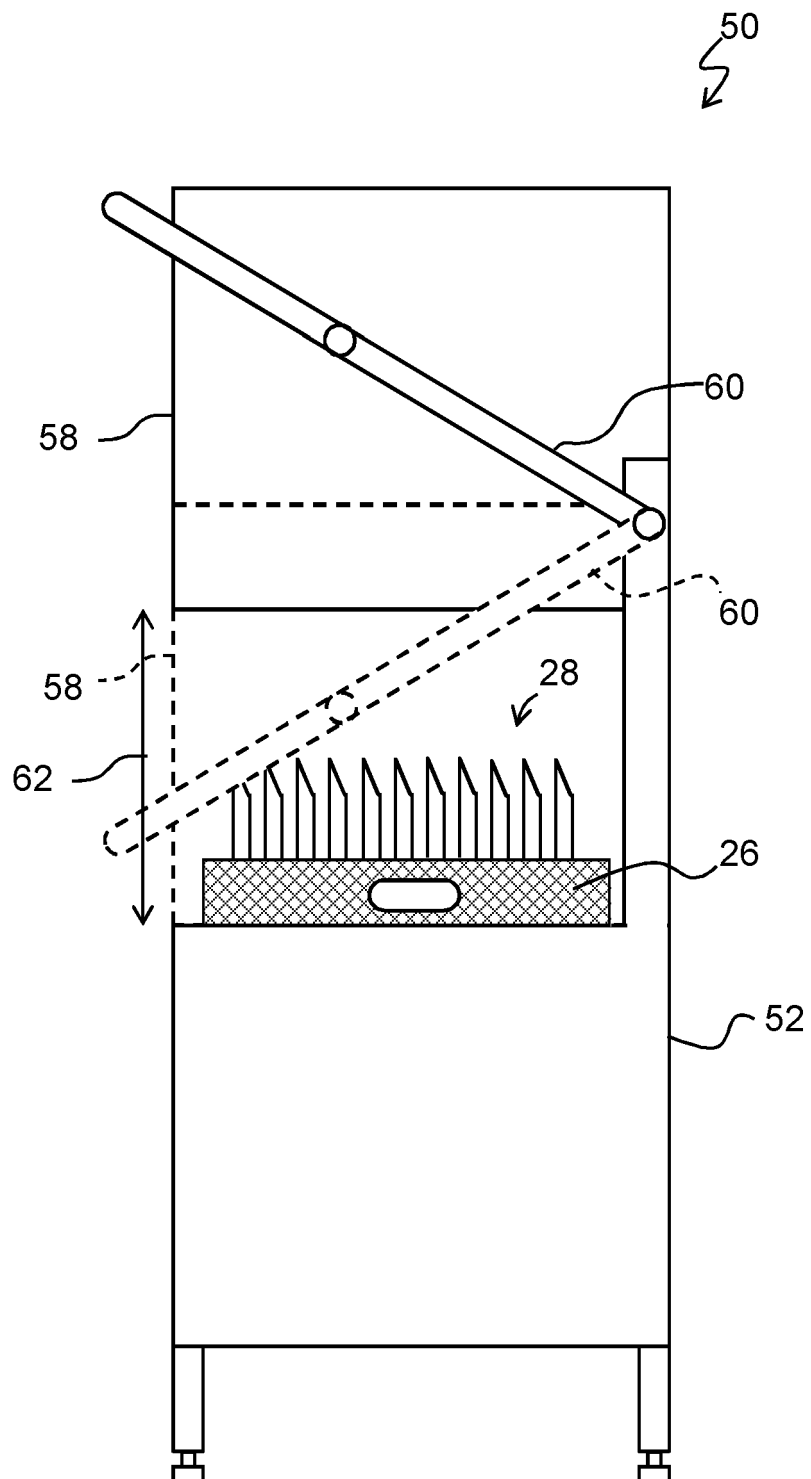


Fig. 3

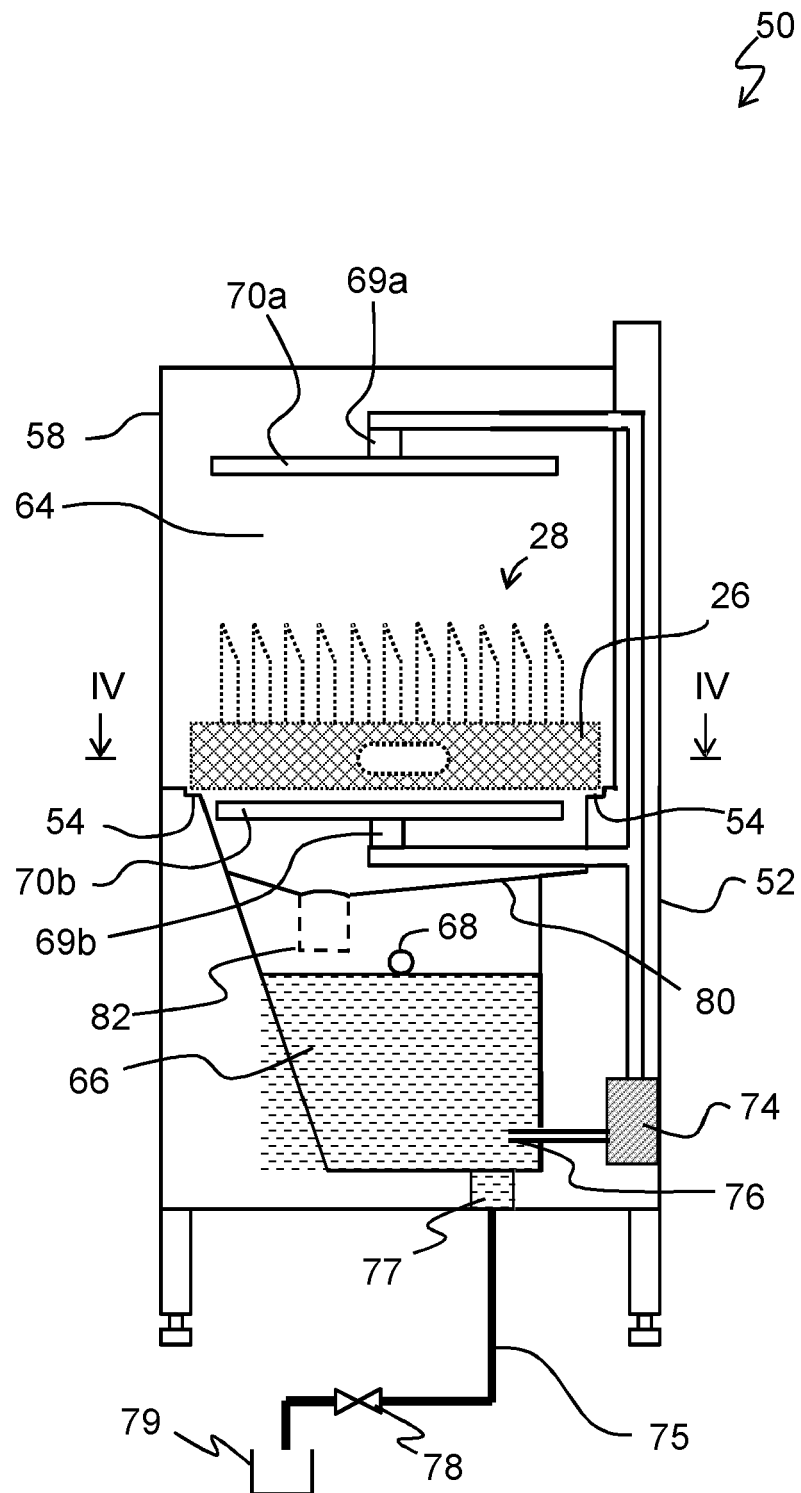


Fig. 4

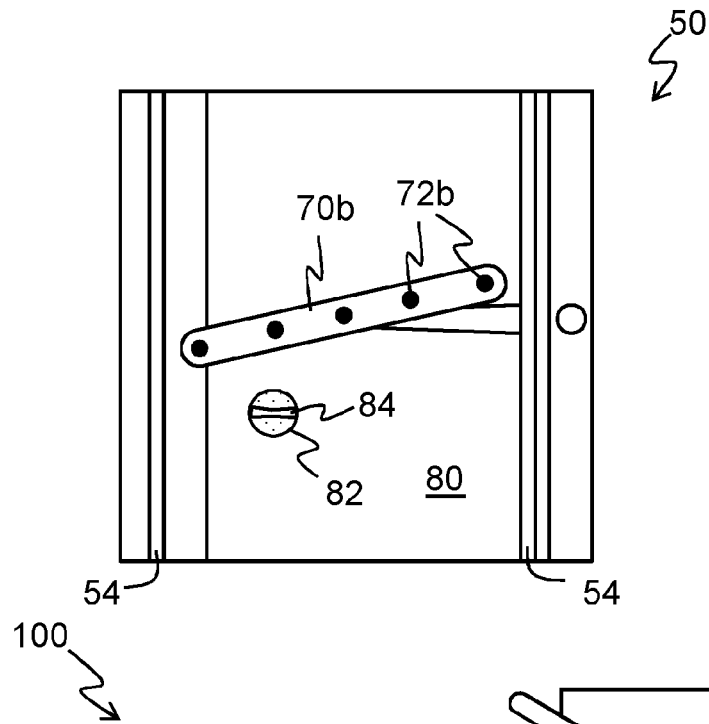


Fig. 5

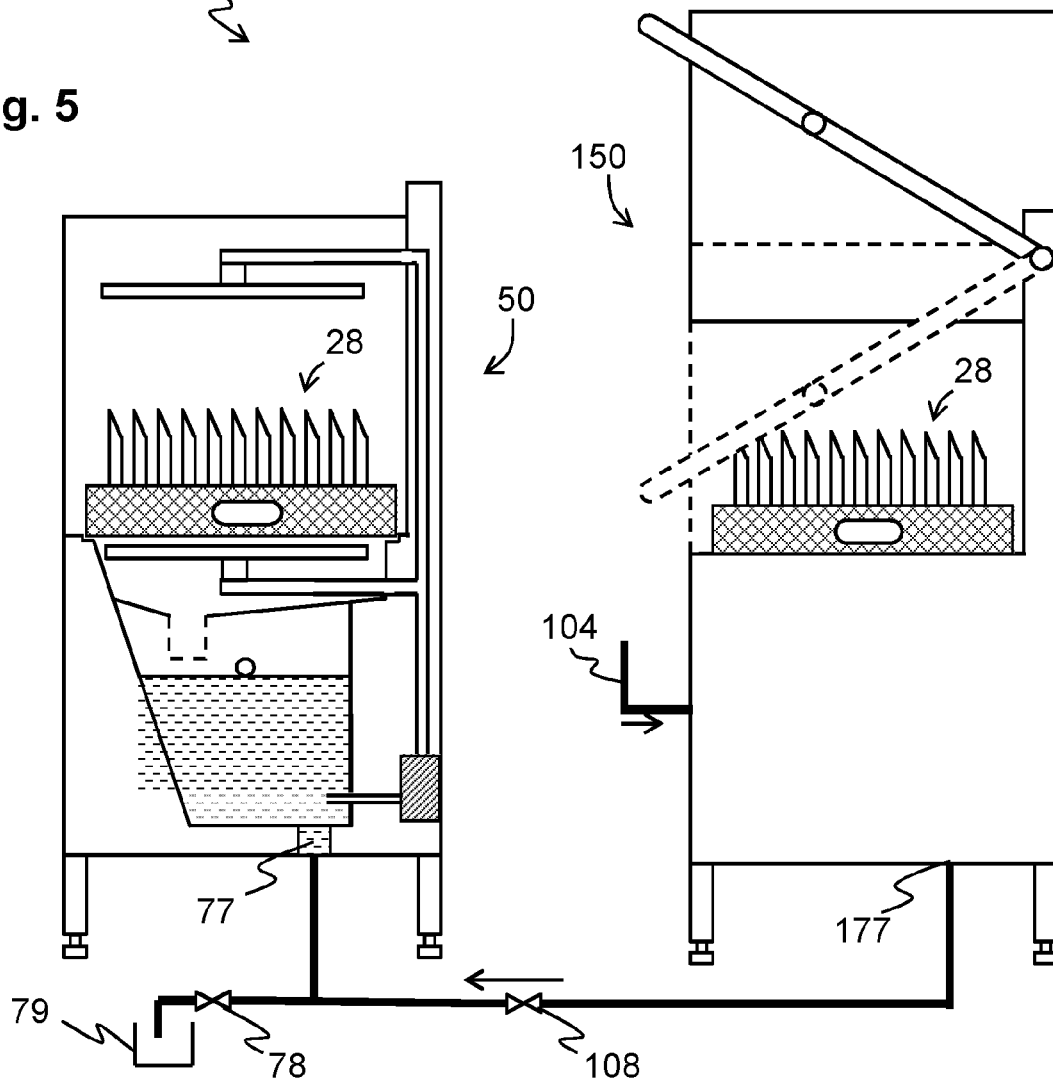


Fig. 6

