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(54) **DISH WASHING MACHINE**

**GESCHIRRSPÜLMASCHINE**

**LAVE-VAISSELLE**

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## Description

### Technical Field

[0001] The present invention relates to a dishwashing machine having a steam generator mounted therein, and a steam nozzle for spraying steam into the dishwashing compartment or space. More specifically, the present invention relates to fixing (i.e., securing) the steam nozzle.

### Background Art

[0002] A conventional dishwashing machine sprays wash water onto the dishes and other items placed in the dishwashing machine. In general, the dishwashing machine uses high water pressure to remove foreign matter, such as food particles and other waste, on the dishes and other items. The foreign matter is filtered so that the wash water can be re-used (i.e., recirculated). Detergent is dissolved in the wash water to break up and/or loosen the foreign matter so that it can more easily be removed from the dishes and other items. It will be understood that these other items may include, pots, pans, utensils, glassware, and the like. However, for purposes of discussion only, the disclosure herein below refers only to dishes.

[0003] One example of a conventional dish washing machine is disclosed in GB 775975.

### Disclosure of Invention

#### Technical Problem

[0004] To improve the functionality of the dishwashing machine, the wash water may be heated. Doing so makes the detergent more effective, thereby, improving the washing efficiency of the dishwashing machine. However, even if the dishwashing machine heats the wash water, the most stubborn waste, e.g., baked-on food waste, is still difficult to remove. Pre-soaking the dishes using high temperature wash water may help, but the soaking process requires a great deal of time and the operational cycle of the dishwashing machine must then be extended accordingly.

#### Technical Solution

[0005] In accordance with one aspect of the present invention, the aforementioned and other advantages are achieved by a dish washing machine comprising a tub having an inner surface that defines a dish washing space, a steam generator, a nozzle assembly that sprays steam, supplied by the steam generator, into the dish washing space; and a coupling member. The coupling member is coupled to the nozzle assembly. The coupling member applies a force such that the nozzle assembly is fixed to and in direct contact with the inner surface of the tub. The nozzle assembly comprises a body part that

includes a spray port on a first side of the body part; and a coupling part formed on a second side of the body part, the coupling part projecting through a coupling hole formed in the tub, wherein coupling member is coupled to the coupling part by a plurality of connection members

[0006] In accordance with another aspect of the present invention, the aforementioned and other advantages are achieved by a dish washing machine that comprises a tub defining a dish washing space, a steam generator, a coupling member, and a nozzle assembly. The nozzle assembly comprising a body part including at least one spray port on a first side of the body part, where the spray port sprays steam, generated by the steam generator, into the dish washing space. The nozzle assembly also comprises a coupling part formed on a second side of the body part, where the coupling part is coupled to the coupling member such that a force is applied on the tub thereby fixing the nozzle assembly to the tub.

[0007] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory. The description is intended to provide further explanation of the invention, as set forth in the appended claims.

#### Advantageous Effects

[0008] The present invention involves a dishwashing machine that employs steam to obviate the aforementioned and other limitations associated with the related art. Generally, dishwashing machines that employ steam more effectively wash dishes due to the high-temperature, high-humidity characteristics associated with steam. These characteristics permit moisture to more effectively penetrate and loosen food particles and other residue on the dishes. Consequently, when the dishes are subsequently washed and/or rinsed with high-pressure water, the dishwashing machine can more effectively remove the food particles and other waste.

[0009] In the present invention, steam is delivered to the dish washing compartment or space by the steam nozzle. Positioning and fixing the steam nozzle is very important. Thus, in accordance with a first exemplary embodiment of the present invention, the steam nozzle is advantageously fixed to the tub in such a way that wash water cannot get behind the steam nozzle, nor penetrate the tub and seep into the space between the tub and the outer case of the dishwashing machine. Furthermore, the steam nozzle is advantageously fixed in such a way that the steam nozzle does not limit the size of the dishwashing space, or the shape and size (i.e., the design) of the dish washing racks. Finally, the steam nozzle is advantageously fixed to the tub such that it is much less likely to break.

[0010] In accordance with a second exemplary embodiment of the present invention, the steam nozzle is fixed to achieve each of the aforementioned advantages, and in addition, prevent any possible warping or deformation of the steam nozzle due to high-temperature wash water

and/or high-temperature steam.

**[0011]** Accordingly, one advantage of the present invention is that it provides a nozzle assembly for spraying steam into the dishwashing compartment that is easily fixed to the dishwashing machine tub.

**[0012]** Another advantage of the present invention is that it provides a nozzle assembly that is fixed in such a way that water cannot penetrate the tub and seep into the space between the tub and the dishwashing machine cabinet.

**[0013]** Still another advantage of the present invention is that it provides a nozzle assembly that is fixed in such a way that it does not limit the dish washing compartment or space.

**[0014]** Yet another advantage of the present invention is that it provides a nozzle assembly that is fixed in such a way that it does not limit the size or shape of the dishwashing machine racks.

**[0015]** Another advantage of the present invention is that it provides a nozzle assembly that is fixed in such a way that it is less likely to break.

**[0016]** Another advantage of the present invention is that it provides a nozzle assembly that is fixed in such a way that warping or deformation of the steam nozzle is prevented.

**[0017]** Additional advantages, objectives, and features of the present invention will be set forth, in part, in the following description, including the claims and the drawings, and in addition, set advantages, objects, and features will become apparent to those having ordinary skill in the art from practicing the invention.

### Brief Description of the Drawings

**[0018]** The accompanying drawings, which are included to provide a further understanding of the invention, are incorporated in and constitute a part of this disclosure. They illustrate different aspects of the exemplary embodiments of the present invention, and together with the description, serve to explain the present invention.

**[0019]** In the drawings:

FIG. 1 is a perspective view of a dishwashing machine according to exemplary embodiments of the present invention;

FIG. 2 is a vertical, sectional view of the dishwashing machine illustrated in FIG. 1;

FIG. 3 is a view illustrating a nozzle assembly fixed to the tub of a dishwashing machine in accordance with a first exemplary embodiment of the present invention;

FIG. 4 is an exploded, rear perspective view of the nozzle assembly illustrated in FIG. 3;

FIG. 5 is a rear view of the nozzle assembly illustrated in FIG. 3;

FIG. 6 is a sectional view illustrating a nozzle assembly fixed to the tub in accordance with a second exemplary embodiment of the present invention;

FIG. 7 is a perspective view of the nozzle assembly illustrated in FIG. 6;

FIG. 8 is a perspective view illustrating a coupling member in accordance with the second exemplary embodiment of the present invention; and

FIG. 9 is a rear view of the nozzle assembly and coupling member of illustrated in FIGS. 6-8 in accordance with the second exemplary embodiment of the present invention.

### Mode for the Invention

**[0020]** Reference will now be made in detail to exemplary embodiments of the present invention, which are illustrated in the accompanying drawings. Whenever possible, the same reference numbers will be used throughout the drawings to refer to same or like parts.

**[0021]** FIG. 1 is a perspective view of a dishwashing machine according to exemplary embodiments of the present invention. The dishwashing machine includes a case 1, which defines the external appearance of the dishwashing machine. Case 1 is open in the front to accommodate a door 2, through which, the user may access the dish washing space or compartment inside the dishwashing machine. The door 2 includes a door grip 4 to aid in opening the door 2, and a steam discharge port 6, which provides an outlet for high temperature air and/or steam to be discharged from within dishwashing space or compartment.

**[0022]** The dishwashing machine also includes a control panel 3 integrated into the top portion of the door 2. The control panel 3 includes a power switch 5 for turning the dishwashing machine on and off; a function selection part 7, which is used to select the desired dishwashing operation; and a display part 8 for displaying the operational state of the dishwashing machine.

**[0023]** FIG. 2 is a vertical, sectional view of the dishwashing machine illustrated in FIG. 1. As shown, the dishwashing machine includes a tub 18 mounted inside case 1, where tub 18 defines the dish washing space or compartment. The dishwashing machine also includes a sump 16 mounted at the bottom of the tub 18. Sump 16 collects the wash water so that the wash water can be re-circulated.

**[0024]** The sump 16 includes a pump (not shown) for pumping the wash water in the sump 16 back into the dish washing compartment. The sump 16 preferably includes a heater (not shown) for heating the wash water in the sump 16. Heating the wash water tends to make the detergent more effective in terms of dissolving food waste on the dishes.

**[0025]** The dishwashing machine further includes an upper dishwashing machine rack 11 and a lower dishwashing rack 12. Also included, are spray arms 14 and 15, which spray wash water onto the lower rack 12 and the upper rack 11, respectively. A separate spray arm 24 is employed for spraying wash water from the top and downward into the dish washing compartment.

**[0026]** Associated with sump 16 is a filter 17. When wash water passes through filter 17, food particles and other waste in the wash water are filtered out. A wash water flow channel 19, mounted to tub 18, transports the filtered wash water from sump 16 to the spray arms 14 and 24.

**[0027]** Still further, the dishwashing machine includes a steam generator 100. Steam generator 100 generates and supplies steam to the dish washing compartment, via steam flow channel 110 and at least one steam nozzle, for example, steam nozzle 200. The steam generator 100 is, preferably, mounted below the tub 18. This allows the steam to be more easily supplied to the dish washing compartment. That is because steam is lighter than air. Therefore, the steam tends to rise upward through the steam flow channel 110 and the steam nozzle 200 into the dish washing compartment. However, the present invention is not limited to this particular positioning generator 100. For example, the steam generator 100 may be mounted to the side of tub 18, or in any other preferable location. The steam generator 100 includes a case 102, a heater 104 for heating the water contained in the steam generator 100, a water level sensor 106, and a fuse (not shown) for preventing the heater 100 from overheating.

**[0028]** The dishwashing machine also includes a water supply pipe 22 which is connected to a water supply source external to the dishwashing machine. As shown, the water supply pipe 22, in this exemplary embodiment, branches in order to supply water to the dish washing compartment, via sump 16, and the steam generator 100. The dishwashing machine also includes a water drainage pipe 23 for draining dirty wash water after the wash water has been used to wash the dishes. The water supply pipe 22 has a tub valve 40 and a steam valve 41 to control the flow of water to the dish washing compartment and the steam generator 100, respectively.

**[0029]** The general operation of the dishwashing machine illustrated in FIGS. 1 and 2, in accordance with exemplary embodiments of the present invention, will now be described. First, the user places the dishes on the upper rack 11 and/or the lower rack 12, as desired. The user then closes the door 2. The user then selects the desired dishwashing operation using the function selection part 7 and initiates the operation of the dishwashing machine. The dish washing operation is then performed based on the user's selection, while the operational state of the dishwashing machine is displayed on the display part 8.

**[0030]** The operation of the dishwashing machine with respect to the flow sequence of the wash water will not be described. The spray arms 14, 15, and 24 spray the wash water onto the dishes positioned in the racks. The wash water eventually drips downward through filter 17 and into the sump 16. The pump mounted in sump 16 then recirculates the wash water by pumping it back into the spray arms 14, 15, and 24.

**[0031]** During the circulation of the wash water, food particles and other waste are filtered out by filter 17, as

previously mentioned. This allows clean wash water to be recirculated, and it also minimizes the risk of blocking or clogging the spray arms or nozzles associated with the spray arms.

**[0032]** As stated, the dishwashing machine may use steam dulling the dishwashing operation. The steam is generated by steam generator 100, as stated. The steam is supplied to the dish washing compartment through the steam flow channel 110 and the steam nozzle 200. Using steam makes for a more efficient and effective dishwashing operation. This is due to the high-temperature, high-humidity characteristics of steam. For example, when dishes are exposed to steam, food particles and other waste on the dishes are more thoroughly soaked by the high-temperature, high-humidity steam. Accordingly, steam helps to loosen the food particles and waste adhering to the dishes. Then, when high-pressure wash water is sprayed on the dishes, the food particles and other waste are more easily removed from the dishes.

**[0033]** FIG. 3 illustrates the nozzle assembly 200 fixed (i.e., secured) to the tub wall 18 in accordance with a first exemplary embodiment of the present invention. FIG. 4 is an exploded, rear perspective view of the nozzle assembly 200 shown in FIG. 3. As illustrated, the nozzle assembly 200 in accordance with this exemplary embodiment includes a body part 210 having at least one spray port 211 through which steam, supplied by the steam generator 100, is sprayed into the dish washing compartment or space. The nozzle assembly 200 also includes coupling part 220 which projects rearward from the body part 210. The coupling part 220 is used to fix the nozzle assembly to the tub wall 18.

**[0034]** In this exemplary embodiment, the at least one spray port 211 is formed on a first side of the body part 210 facing towards the dish washing space. Thus, nozzle assembly 200 sprays steam into the dish washing space.

**[0035]** The nozzle assembly 200 further includes an introduction part 230. The introduction 230 guides the steam, generated by the steam generator 100, into the nozzle assembly. In this exemplary embodiment, as illustrated in FIGS. 3 and 4, the introduction part 230 is formed on and projects from the coupling part 220. Referring back to FIG. 2, the introduction part 230 may connect to the steam flow conduit 110, where the steam conduit is disposed between the tub wall 18 and the case 1. Thus, in this exemplary embodiment, the introduction part 230 protrudes into the space between case 1 and tub wall 18.

**[0036]** Further in accordance with this exemplary embodiment, a coupling hole 260 is formed in a predetermined position through the tub wall 18. The introduction part 230 passes through the coupling hole 260. Likewise, coupling part 220, or a portion thereof, passes through coupling hole 260.

**[0037]** In this exemplary embodiment, the coupling part 220 is threadedly engaged with a coupling member 240. To this end, a thread may be formed on the outer surface of the coupling part 220, or a portion thereof, and

a nut having a threaded inner surface may be used as the coupling member 240. As, in this exemplary embodiment, the coupling part 220 passes through coupling hole 260 formed in the tub wall 18, and is threadedly engaged with coupling member 240, and as described above, the nozzle assembly 200 is easily fixed to the tub 18.

**[0038]** Specifically, the process of fixing the nozzle assembly 200 to the tub 18 first involves inserting the coupling part 220 through the coupling hole 260. The coupling part 220 is then threadedly engaged with the coupling member 240, as explained above, until the coupling member 240 is brought into tight contact with the outer surface of the tub 18. The nozzle assembly 200, as a result, is securely fixed to the inner surface of tub 18.

**[0039]** As shown in FIGS. 3 and 4, the nozzle assembly 200 accordingly to this exemplary embodiment of the present invention may further include a sealing member 250 disposed between the inner surface of the tub 18 and a rear surface of the body part 210. The sealing member 250 prevents water from getting behind and seeping through the coupling hole 260 and into the space between the tub 18 and the cabinet 1. The sealing member 250 may be constructed out of rubber, or a rubber-like material, having a predetermined elastic force. Furthermore, the sealing member 250 may be formed in a shape of a ring, as shown.

**[0040]** FIG. 5 further illustrates the nozzle assembly 200 when viewed from the rear. Again, the nozzle assembly 200, according to this exemplary embodiment, is fixed to the inner surface of the tub wall 18 using the threaded engagement between the coupling part 220 and the coupling member 240. As shown, the coupling part 220 may be formed at the center of the nozzle assembly 200. However, the present invention is not limited to placing the coupling part at the center of the nozzle assembly 200. When the coupling part 220 is threadedly engaged with the coupling member 240, the nozzle assembly 200 is fixed to the tub 18 as a result of a localized force applied to the tub wall in and around the center of the nozzle assembly 200.

**[0041]** There are many advantages associated with this exemplary embodiment. First, by fixing the steam nozzle 200 to the inner wall of tub 18, the steam nozzle 200 is not taking up unnecessary space inside the dish washing compartment. Second, by fixing the steam nozzle 200 to the tub wall 18, there are no limitations placed on the size and shape of the rack or racks used for storing the dishes within the dish washing space. Third, by fixing the steam nozzle to the tub 18, the steam nozzle is less likely to break. Finally, the first exemplary embodiment is a relatively simple solution for fixing the steam nozzle to the tub, but at the same time, it prevents water from getting behind the steam nozzle, through the coupling hole 260, and into the space between the tub 18 and the case 1, as stated above. Despite these several advantages, the steam nozzle 200 might be subject to deformation, due to prolonged exposure to high-temperature

wash water, and high-temperature steam, depending on the type of material that is used to construct the steam nozzle. If deformation is to occur at all, it is likely to manifest itself by the peripheral edges of the steam nozzle warping forward towards the dish washing space as indicated by arrows 280 in FIG. 5.

**[0042]** FIG. 6 is a sectional view illustrating a nozzle assembly 300 in accordance with a second exemplary embodiment of the present invention. FIG. 7 is a perspective view of the nozzle assembly 300 shown in FIG. 6. FIG. 8 is a perspective view of a coupling member 400 that may be used in conjunction with the nozzle assembly 300, shown in FIG. 6. FIG. 9 is a rear view of the coupling member 400 illustrated in FIG. 8. As will be explained in greater detail below, the nozzle assembly 300 and the coupling member 400 are configured such that the peripheral edges of the nozzle assembly body part 310 are firmly and directly fixed against the inner surface of tub 18. This second exemplary embodiment achieves all the aforementioned advantages associated with the first exemplary embodiment, and in addition, prevents the potential of warping or deformation of the nozzle assembly 300 due to high-temperature wash water and/or high-temperature steam.

**[0043]** Referring to FIGS. 6-9, the dishwashing machine according to this second exemplary embodiment of the present invention, includes a coupling member 400 for fixing the nozzle assembly 300 to the tub 18. In this exemplary embodiment, coupling member 400 applies a pressing/fixing force at or near the periphery or peripheral edge portion of the body part 310 associated with nozzle assembly 300. The nozzle assembly 300 shown in FIGS. 6-8 is different from the nozzle assembly 200 shown in FIGS. 3-5 in that the nozzle assembly 200 is fixed to the tub 18 by a pressing/fixing force applied at or near the center of the body part 210, as a result of the threaded engagement between the coupling part 220 and the coupling member 240. In contrast, the nozzle assembly 300 is fixed to the tub 18 by a pressing/fixing force applied at or near the periphery or peripheral edge portion of the body part 310, as a result of a number of connection members 412 (e.g., four connection members) passing through the coupling member 400 and into the coupling part 320. In accordance with this second exemplary embodiment, the coupling member 400 and the connection members 412 act in concert with the coupling part 310 to prevent deformation of the nozzle assembly 300.

**[0044]** Further in accordance with this second exemplary embodiment, the coupling member 400 may be constructed such that when the aforementioned pressing/fixing force is applied at or near the edge portion 312 of the body part 310, as shown for example in FIG. 6, the peripheral edge portion of the body part 312 is securely pressed against the interior surface of the tub wall 18. Consequently, the nozzle assembly 300 is prevented from being deformed due to high-temperature wash water and high-temperature steam. More specifically, this configuration prevents the outer portion or peripheral

edge portion of the nozzle assembly 300 from warping inward toward the dish washing space, as illustrated, for example, by arrows 280 in FIG. 5.

**[0045]** As shown, coupling member 400 includes a rear panel portion 410 and extension tabs 420, where extension tabs 420 make contact with and apply a substantially equal force around the exterior surface of the tub wall in the vicinity of the peripheral edge portion 312 of the body part 310. As a result, the tub wall 18 is securely fixed between the extension tabs 420 of coupling member 400 and the rear surface of body part 310 when the connection members 412 are securely in place. Therefore, the entire nozzle assembly 300 directly presses against the interior surface of the tub 18, which prevents for deformation of the nozzle assembly 300 due to high-temperature wash water and high-temperature steam.

**[0046]** The body part 310 of nozzle assembly 300 includes at least one spray port 311, through which the steam is sprayed into the dish washing space. In FIG. 7, the nozzle assembly 300 has 2 spray ports for purposes of illustration.

**[0047]** Nozzle assembly 300, accordingly to this second exemplary embodiment also includes a coupling part 320. As illustrated in FIGS. 6 and 7, coupling part 320 extends rearward away from body part 310 such that coupling part 320 is inserted through a coupling hole 360 formed in the tub wall 18 as illustrated by the dash lines in FIG. 6. The coupling member 400 may then be connected to coupling part 320 by connection member 412. In this second exemplary embodiment, connection members 412 are illustrated as being screws. However, one skilled in the art will readily appreciate that connection members 412 can take on other forms, such as threaded studs that extend from the rear surface of coupling part 300 which may be secured through coupling member 400 by threaded nuts. Again, the result is that the edge portion 312 of body part 310 of nozzle assembly 300 securely and directly presses against the inner surface of the tub 18, thereby preventing deformation.

**[0048]** As stated, the coupling member 400 includes a rear panel portion 410. In this second exemplary embodiment, the inner surface of the rear panel portion 410 contacts the coupling part 320 when the connection members 412 are securely in place. The extension tabs 420 generally extend a predetermined length from the rear panel portion 410 so that they press against and apply a pressing/fixing force at the exterior surface of the tub 18 when the connection members 412 are securely in place.

**[0049]** The rear panel portion 410 of coupling member 400 includes a plurality of coupling holes 411. The coupling holes 411 are illustrated, for example, in FIGS. 8 and 9. The connection members 412 pass through coupling holes 411 when securely in place.

**[0050]** As illustrated in FIGS. 8 and 9, the coupling member 400 may further include auxiliary extension tabs 430. When the rear panel portion 410 is connected to the coupling part 320 by the connection members 412, the

auxiliary extension tabs 430 further press against the coupling part 320. The auxiliary extension tabs 430 help to further secure the coupling part 320 and, therefore, the nozzle assembly 300.

**[0051]** According to this second exemplary embodiment, the nozzle assembly 300 also includes an introduction part 330, through which steam is supplied from the steam generator 100. In this second exemplary embodiment, the introduction part 330 may be disposed at the side or the rear of the coupling part 320 if, for example, a substantial portion of the rear surface of the coupling part 320 is in contact with the coupling member 400, as illustrated in FIGS. 6 and 7.

**[0052]** Again, it will be understood that in accordance with this second exemplary embodiment, the entire nozzle assembly 300 is prevented from becoming deformed. It will also be understood that when the peripheral edge portion 312 of the nozzle assembly 300 is fixed to the inner surface of tub 18, in accordance with this second exemplary embodiment, water on the inner surface of the tub 18 or flowing around the steam nozzle 300 will be prevented from getting between the inner surface of tub 18 and the nozzle assembly 300, and into the coupling hole 360.

## Claims

### 1. A dish washing machine comprising:

a tub (18) having an inner surface that defines a dish washing space;  
a steam generator (100);  
a nozzle assembly (300) that sprays steam, supplied by the steam generator (100), into the dish washing space; and  
a coupling member (400) coupled to the nozzle assembly (300), the coupling member (400) applying a force such that the nozzle assembly (300) is fixed to and in direct contact with the inner surface of the tub (18),  
**characterized in that** the nozzle assembly (300) comprises:

a body part (310) that includes a spray port (311) on a first side of the body part; and  
a coupling part (320) formed on a second side of the body part, the coupling part (320) projecting through a coupling hole (260) formed in the tub (18), wherein coupling member (400) is coupled to the coupling part (320) by a plurality of connection members (412).

### 2. The dish washing machine of claim 1, wherein the nozzle assembly (300) includes a peripheral edge portion (312), and wherein the force applied by the coupling member (400) is such that the peripheral

edge portion (312) is fixed to and in direct contact with the inner surface of the tub (18).

3. The dish washing machine of claim 1, wherein the coupling member (400) comprises:

a rear panel portion (410); and  
a plurality of extension tabs (420), wherein the plurality of connection members (412) pass through holes formed in the rear panel portion (410) and into the coupling part (320) of the nozzle assembly (300), and wherein each of the plurality of extension tabs (420) extend from the rear panel portion (410) to the tub (18), thereby applying a force on the tub (18) such that a peripheral edge portion (312) of the nozzle assembly (300) is fixed to and in direct contact with the inner surface of the tub (18).

4. The dish washing machine of claim 1, wherein the coupling member (400) comprises:

a rear panel portion (410); and  
a plurality of extension tabs (420), wherein the plurality of connection members (412) pass through holes formed in the rear panel portion (410) and into the coupling part (320) of the nozzle assembly (300), and wherein each of the plurality of extension tabs (420) extend from the rear panel portion (410) to the tub (18), thereby applying a force on the tub (18) such that a rear surface of the nozzle assembly (300) is fixed to and in direct contact with the inner surface of the tub (18).

5. The dish washing machine of claim 1, wherein the nozzle assembly (300) further comprises:

an introduction part (330) through which steam, supplied by the steam generator (100), is introduced into the steam nozzle.

6. The dish washing machine of claim 5, wherein the introduction part (330) is formed on a side portion of the coupling part (320).

## Patentansprüche

1. Geschirrspülmaschine, die aufweist:

einen Zuber (18) mit einer inneren Oberfläche, die einen Geschirrspülraum definiert;  
einen Dampfgenerator (100);  
eine Düsenanordnung (300), die Dampf, der von dem Dampfgenerator (100) geliefert wird, in den Geschirrspülraum sprüht; und  
ein mit der Düsenanordnung (300) gekoppeltes

Kopplungselement (400), wobei das Kopplungselement (400) eine Kraft anwendet, so dass die Düsenanordnung (300) an der inneren Oberfläche des Zubers (18) befestigt wird und in direktem Kontakt mit ihr ist,

**dadurch gekennzeichnet, dass** die Düsenanordnung (300) aufweist:

einen Körperteil (310), der eine Sprühöffnung (311) auf einer ersten Seite des Körperteils umfasst; und  
einen Kopplungsteil (320), der auf einer zweiten Seite des Körperteils ausgebildet ist, wobei der Kopplungsteil (320) durch ein in dem Zuber (18) ausgebildetes Kopplungsloch (260) vorsteht, wobei das Kopplungselement (400) durch mehrere Verbindungselemente (412) mit dem Kopplungsteil (320) gekoppelt ist.

2. Geschirrspülmaschine nach Anspruch 1, wobei die Düsenanordnung (300) einen Umfangsrandabschnitt (312) umfasst und wobei die von dem Kopplungselement (400) angewendete Kraft derart ist, dass der Umfangsrandabschnitt (312) an der inneren Oberfläche des Zubers (18) befestigt und in direktem Kontakt damit ist.

3. Geschirrspülmaschine nach Anspruch 1, wobei das Kopplungselement (400) aufweist:

einen Rückwandabschnitt (410); und  
mehrere Erweiterungsansätze (420), wobei die mehreren Verbindungselemente (412) durch Löcher, die in dem Rückwandabschnitt (410) ausgebildet sind, und in den Kopplungsteil (320) der Düsenanordnung (300) gehen, und wobei jeder der mehreren Erweiterungsansätze (420) sich von dem Rückwandabschnitt (410) zu dem Zuber (18) erstreckt, wodurch eine Kraft auf den Zuber (18) angewendet wird, so dass ein Umfangsrandabschnitt (312) der Düsenanordnung (300) an der inneren Oberfläche des Zubers (18) befestigt und in direktem Kontakt mit dieser ist.

4. Geschirrspülmaschine nach Anspruch 1, wobei das Kopplungselement (400) aufweist:

einen Rückwandabschnitt (410); und  
mehrere Erweiterungsansätze (420), wobei die mehreren Verbindungselemente (412) durch Löcher, die in dem Rückwandabschnitt (410) ausgebildet sind, und in den Kopplungsteil (320) der Düsenanordnung (300) gehen, und wobei jeder der mehreren Erweiterungsansätze (420) sich von dem Rückwandabschnitt (410) zu dem Zuber (18) erstreckt, wodurch eine Kraft auf den Zuber (18) angewendet wird, so dass eine hin-

tere Oberfläche der Düsenanordnung (300) an der inneren Oberfläche des Zubers (18) befestigt und in direktem Kontakt mit dieser ist.

5. Geschirrspülmaschine nach Anspruch 1, wobei die Düsenanordnung (300) ferner aufweist:  
  
einen Einleitungsteil (330), durch den von dem Dampfgenerator (100) gelieferter Dampf in die Dampfdüse eingeleitet wird.  
  
6. Geschirrspülmaschine nach Anspruch 5, wobei der Einleitungsteil (330) auf einem Seitenabschnitt des Kopplungsteils (320) ausgebildet ist.

## Revendications

1. Lave-vaisselle comprenant :  
  
une cuve (18) comportant une surface intérieure qui définit un espace de lavage de vaisselle ;  
un générateur de vapeur (100) ;  
un assemblage de buse (300) pulvérisant de la vapeur fournie par le générateur de vapeur (100) dans l'espace de lavage de vaisselle ; et  
un organe de couplage (400) couplé à l'assemblage de buse (300), l'organe de couplage (400) appliquant une force telle que l'assemblage de buse (300) soit fixé à la surface intérieure de la cuve (18) et en contact direct avec celle-ci,  
**caractérisé en ce que** l'assemblage de buse (300) comprend :  
  
une partie de corps (310) qui comprend un orifice de pulvérisation (311) sur un premier côté de la partie de corps ; et  
une partie de couplage (320) formée sur un deuxième côté de la partie de corps, la partie de couplage (320) faisant saillie à travers un trou de couplage (260) formé dans la cuve (18), dans lequel l'organe de couplage (400) est couplé à la partie de couplage (320) par une pluralité d'organes de liaison (412).  
  
2. Lave-vaisselle selon la revendication 1, dans lequel l'assemblage de buse (300) comprend une portion de bord périphérique (312), et dans lequel la force appliquée par l'organe de couplage (400) est telle que la portion de bord périphérique (312) soit fixée à la surface intérieure de la cuve (18) et soit en contact direct avec celle-ci.  
  
3. Lave-vaisselle selon la revendication 1, dans lequel l'organe de couplage (400) comprend :

une portion de face arrière (410) ; et

une pluralité de pattes d'extension (420), dans lequel la pluralité d'organes de liaison (412) traversent des trous formés dans la portion de face arrière (410) et dans la partie de couplage (320) de l'assemblage de buse (300), et dans lequel chacune de la pluralité de pattes d'extension (420) s'étend de la portion de face arrière (410) jusqu'à la cuve (18), en appliquant ainsi une force sur la cuve (18) telle qu'une portion de bord périphérique (312) de l'assemblage de buse (300) soit fixée à la surface intérieure de la cuve (18) et en contact direct avec celle-ci.

4. Lave-vaisselle selon la revendication 1, dans lequel l'organe de couplage (400) comprend :

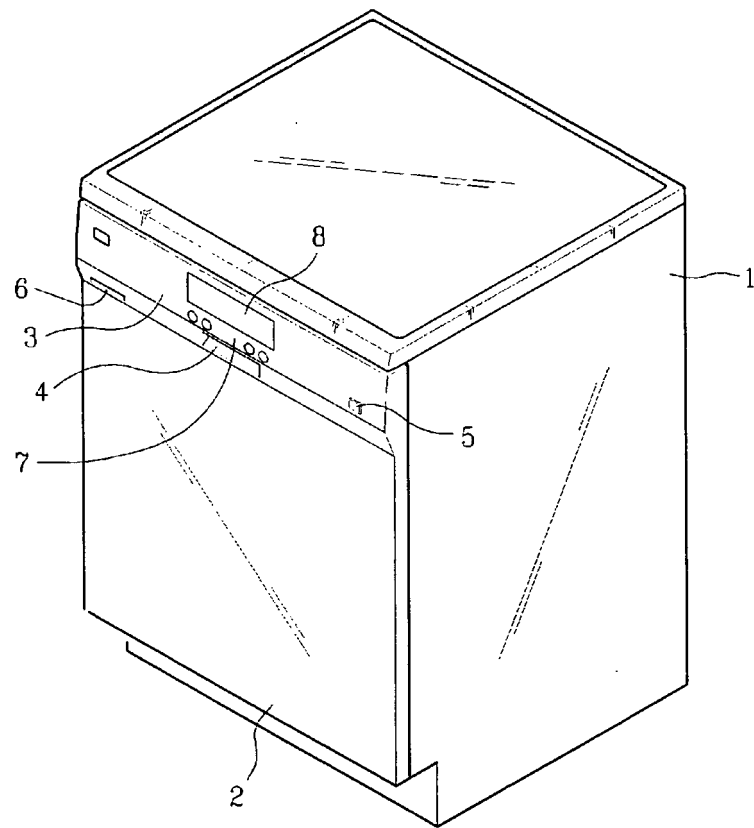
une portion de face arrière (410) ; et  
une pluralité de pattes d'extension (420), dans lequel la pluralité d'organes de liaison (412) traversent des trous formés dans la portion de face arrière (410) et dans la partie de couplage (320) de l'assemblage de buse (300), et dans lequel chacune de la pluralité de pattes d'extension (420) s'étend de la portion de face arrière (410) jusqu'à la cuve (18), en appliquant ainsi une force sur la cuve (18) telle qu'une surface arrière de l'assemblage de buse (300) soit fixée à la surface intérieure de la cuve (18) et en contact direct avec celle-ci.

5. Lave-vaisselle selon la revendication 1, dans lequel l'assemblage de buse (300) comprend en outre :

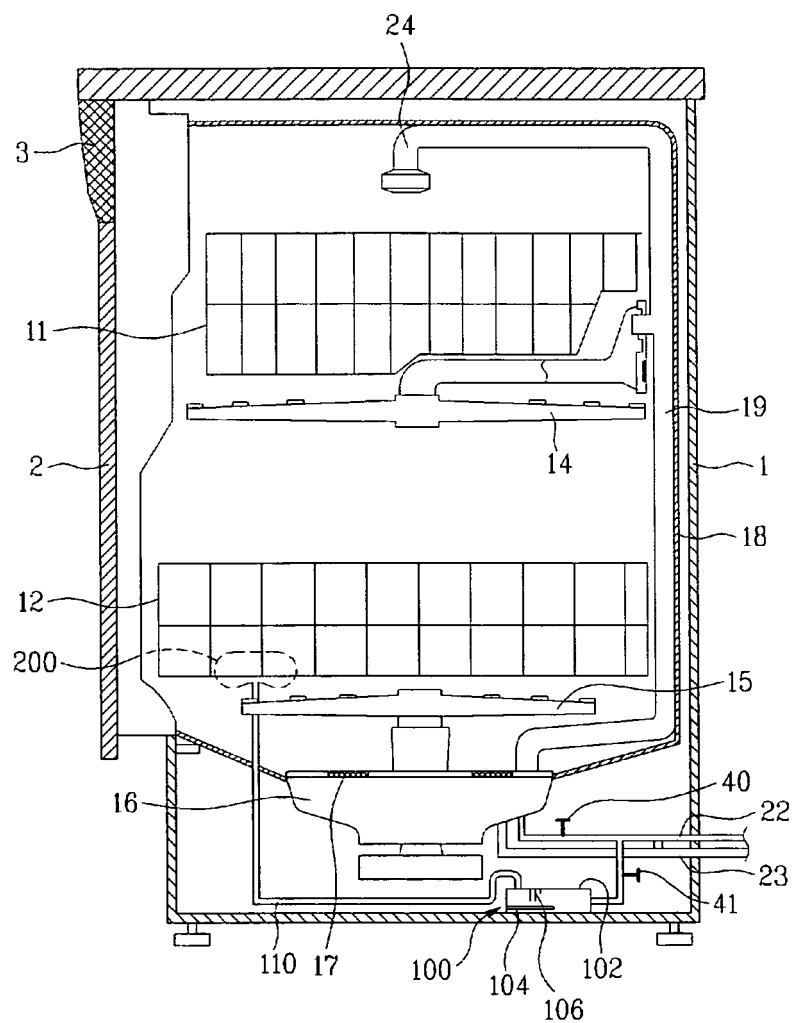
une partie d'introduction (330) à travers laquelle de la vapeur fournie par le générateur de vapeur (100) est introduite dans la buse de vapeur.

6. Lave-vaisselle selon la revendication 5, dans lequel la partie d'introduction (330) est formée sur une portion latérale de la partie de couplage (320).

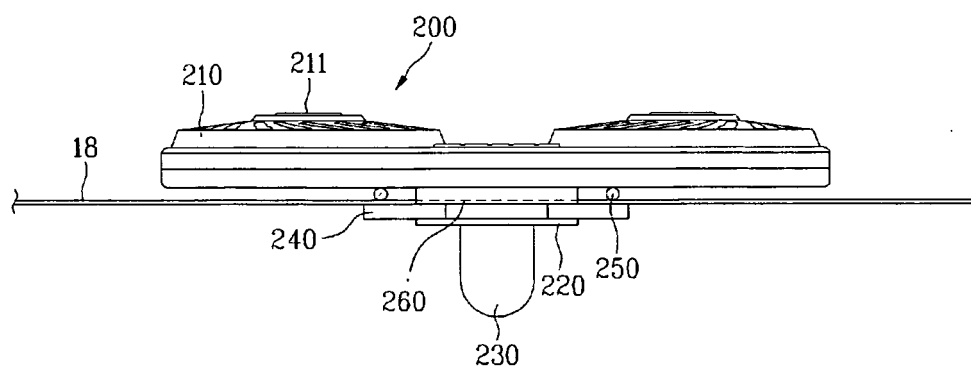
[Fig. 1]



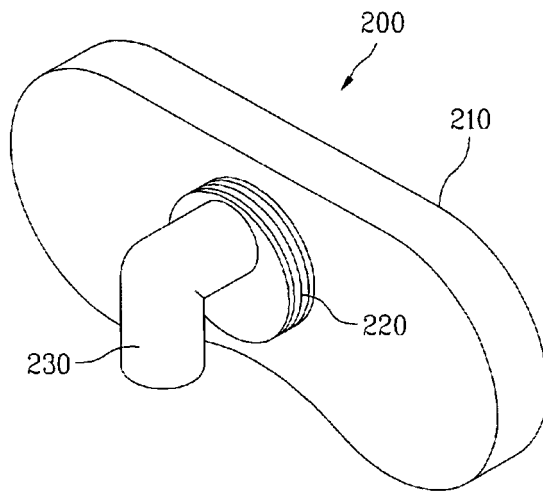
[Fig. 2]



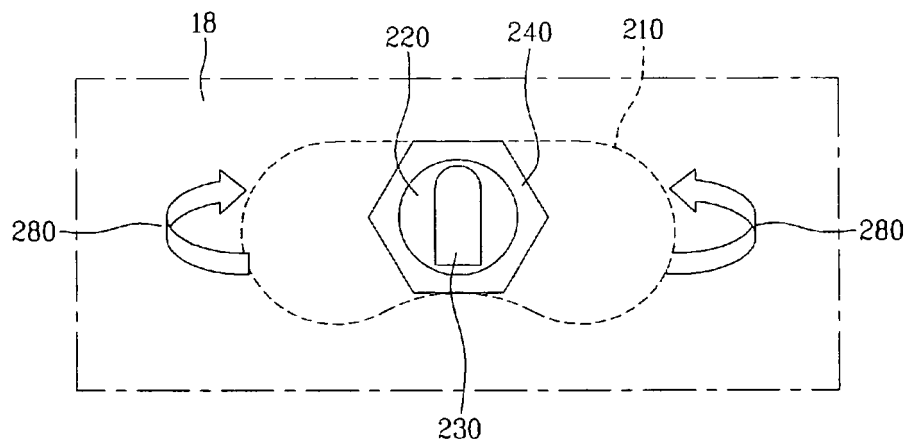
[Fig. 3]



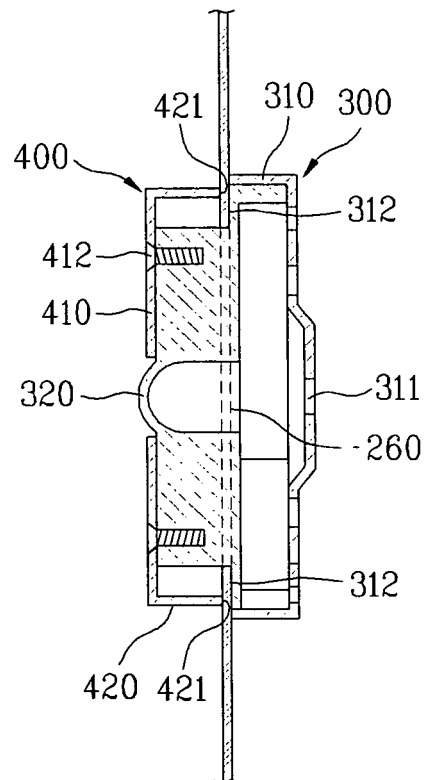
[Fig. 4]



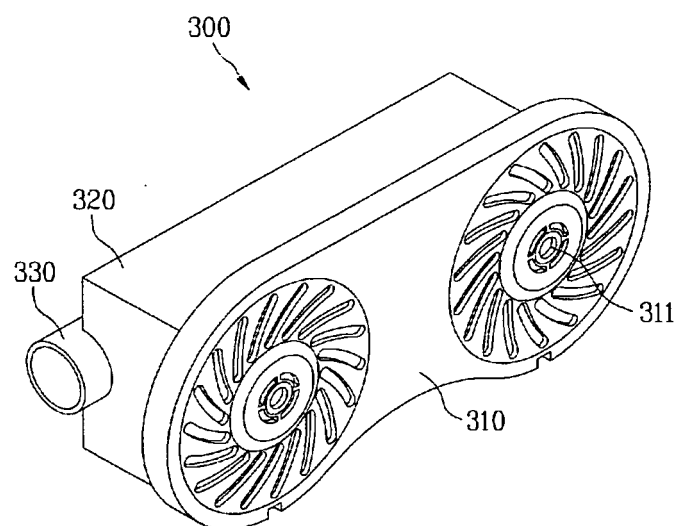
[Fig. 5]



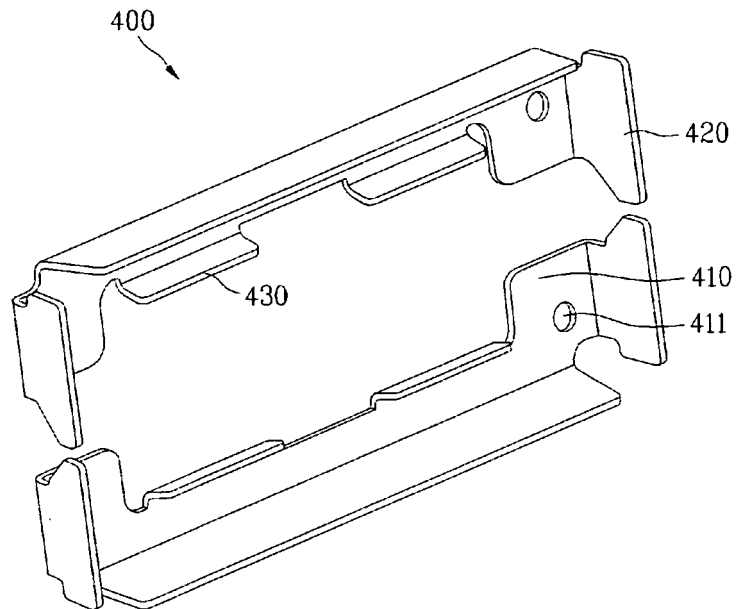
[Fig. 6]



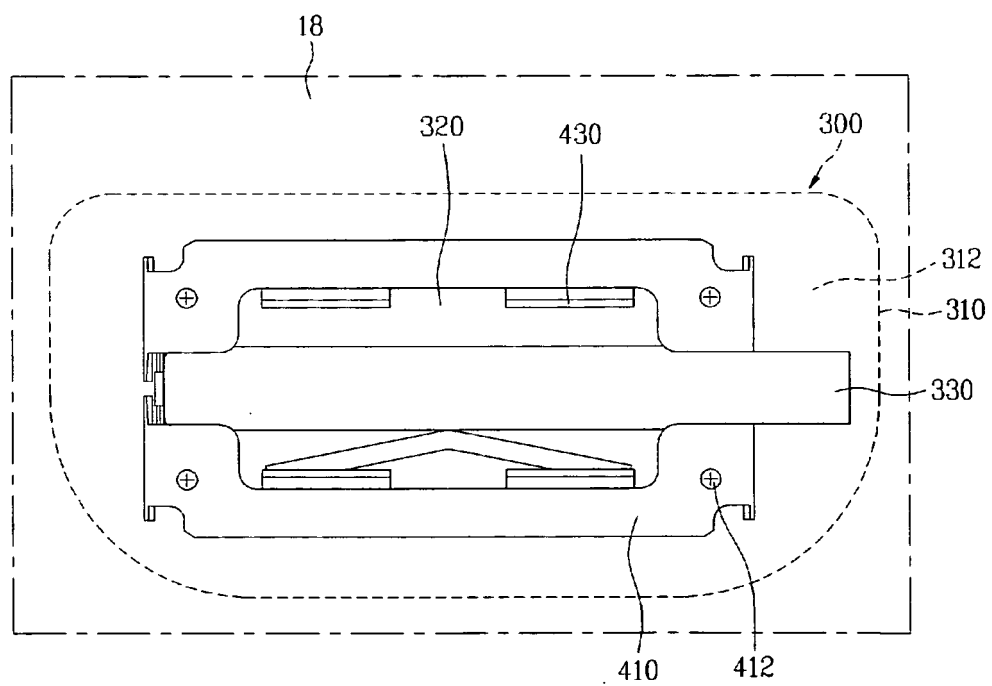
[Fig. 7]



[Fig. 8]



[Fig. 9]



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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