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(54) LOW-WATER-CONSUMPTION RINSING AND/OR WASHING DEVICE, AND DISHWASHING MACHINE FEATURING SUCH A DEVICE

KLARSPÜL- UND/ODER REINIGUNGSVORRICHTUNG MIT GERINGEM WASSERVERBRAUCH UND GESCHIRRSPÜLMASCHINE MIT EINER SOLCHEN VORRICHTUNG

DISPOSITIF DE LAVAGE ET/OU DE RINÇAGE À FAIBLE CONSOMMATION EN EAU ET LAVE-VAISSELLE PRÉSENTANT UN TEL DISPOSITIF

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Description

TECHNICAL FIELD

[0001] The present invention relates to a rinsing and/or possibly washing device for an electric household appliance, specifically for a dishwashing machine of the professional type, capable of drastically reducing the consumption of water. The invention further relates to the electric household appliance equipped with such a device.

BACKGROUND

[0002] From EP1050263, it is known a washing/rinsing device for dishwashing machines including a rotating arm (also named "lance" in technical language) provided with spray nozzles and epicyclic movement in order to carry out an improved distribution of washing/rinsing fluid inside the washing chamber of the dishwashing machine, usually accessible through a pivoting front door.

[0003] However, the known device, in addition to being costly and complex to be implemented, has large dimensions and does not always solve the problem of drastically reducing the amount of water needed by the machine to particularly perform the rinsing cycle. Other washing/rinsing devices for dishwashing machines are known for example from US 5964232 A and FR2350084 A. It has been experimentally found that a great amount of water, both in the washing cycle and in the rinsing cycle, is sprayed around the basket and not onto it, therefore wetting the bottom and the walls of the washing chamber. If during the washing cycle this "waste" could be tolerable, because the "wasted" water actually washes the walls of the washing chamber, thus contributing to maintain it clean, it is not so in the rinsing cycle, where it is a plain loss of hot water and therefore a considerable economic cost, the more severe the first situation and the more considerable the second one, considering that the volumes of rinsing water fed to the dishwasher are larger than the volumes of washing water, that the rinsing water must be heated to a relatively high temperature, and that the "waste" increases with the increasing of the distance between the nozzles of the arm and the basket, or better, between the upper edge of the dishes to be washed accommodated in the basket and, thus, becomes higher when relatively low dishes are washed.

DISCLOSURE OF INVENTION

[0004] It is the object of the present invention to provide an improved rinsing (and possibly washing) device for an electric household appliance, in particular a dishwashing machine for professional or commercial use, which overcomes the aforesaid drawbacks, allowing a noticeable reduction of water and energy consumptions of the dishwashing machine, during the rinsing cycle, and which is at the same time simple and cost effective to be made and handled, of reduced dimensions and high reliability. Specifically, it is an object of the invention to make a device of the aforesaid type in which the wetted area (also named "coverage") of the jets of water ejected by the nozzles is independent of the size of the dishes and the distance between the basket and the rotating arm carrying the nozzles themselves.

[0005] Finally, it is a further object of the invention to provide a dishwashing machine provided with such a device and which, therefore, has reduced energy and water consumption.

[0006] According to the invention, a rinsing (and possibly washing) device for an electric household appliance, in particular a dishwashing machine, is thus provided as defined in claim 1.

[0007] The invention further relates to an electric household appliance, as defined in claim 9.

[0008] In particular, the device comprises at least one arm rotationally mounted about a generally vertical axis within a washing chamber of the electric household appliance, immediately over a container basket for the dishes to be washed. The arm delimits a cavity therein, which cavity is connected in use to dispensing means of a pressurized service fluid, e.g. rinsing water, of the electric household appliance and is provided, on a first surface thereof oriented in use towards the dishes, with a plurality of spray nozzles, reciprocally spaced lengthwise along the arm and communicating with the internal cavity of the latter, so as to determine in use the exiting of the service fluid from the arm in the form of jets directed towards the dishes.

[0009] According to the main aspect of the invention, the arm is shaped so that its opposite ends, which radially and overhangingly extend from the rotation axis, in a diametrically opposite manner with respect to the rotation axis itself, according to a generally known configuration, are provided with at least first nozzles radially arranged more externally along the arm and oriented at an angle, on the side of the first face of the arm, towards the rotation axis, so as to be adapted to eject in use, towards the dishes, corresponding operative fluid jets oriented obliquely to the dishes and converging towards the rotation axis, so that the surface wetted (i.e. "covered") in use by the nozzles of the arm is delimited within a circle covered in use, about the rotation axis, by the opposite overhanging ends of the arm.

[0010] The rotation axis of the arm is further positioned at the middle line of the arm itself, the latter having a mounting portion for securing it to the rotation axis indeed arranged substantially on the middle line of the arm itself, so that opposite longitudinal portions of the arm, delimited at their lower part by the first surface and, on the latter, provided with said nozzles, ending with the aforesaid opposite ends, protrude in use in a substantially symmetric manner from the mounting portion in a radial direction with respect to the rotation axis.

[0011] In this manner, the water ejected from the most external nozzles is almost completely contained within

the circle covered in use by the opposite ends of the arm, which approximately corresponds to the exact dimensions of the basket, thus avoiding the water from being wasted by wetting the side and bottom walls of the washing chamber of the dishwasher.

[0012] According to a first, preferred embodiment, all the nozzles of the arm, including the first nozzles, are substantially identical to one another and are oriented substantially coplanar with the first surface of the arm, the required inclination of the orientation of the first nozzles being obtained because the opposite ends of the arm are shaped so as to be bent by a desired angle towards the rotation axis (A) on the side of said first surface, e.g. because they consist of the ends of an originally rectilinear arm which have been bent by plastic deformation, to form an angle or a curve and without obstructing said internal cavity of the arm, towards the rotation axis, on the part of said first surface of the arm.

[0013] The required orientation is thus obtained without additional costs, as compared to a traditional arm or lance, because a simple bending operation which may be performed either automatically or manually, for example by means of appropriate templates, is additionally required.

[0014] In addition to the first nozzle obliquely oriented, the rotating arm or lance carries second nozzles, different from the first ones, the second nozzles being all radially arranged along the arm, more internally as compared to the first nozzles and being shaped so as to be adapted to deliver jets substantially directed perpendicularly to the first surface, instead of obliquely to the same, as the jets delivered by the first nozzles. According to a further aspect of the invention, the first nozzles are further shaped so as to eject in use a conical or a flared blade-shaped jet having a smaller opening angle than that of the corresponding jets, also conical or flared blade-shaped, ejected in use by the second nozzles.

[0015] In this manner, a further improvement of water saving may be obtained and/or smaller inclination angles of the jet delivering axis of the first nozzles may be used, if required.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Further objects and advantages will be apparent from the following description of a non-limitative embodiment thereof, provided only by way of example and with reference to the accompanying drawings, in which:

- figure 1 diagrammatically shows a perspective view of a dishwashing machine provided with a rinsing (and/or washing) device;
- figure 2 diagrammatically shows a side elevation view of a first embodiment of the rinsing device in figure 1, the jets of rinsing water generated therefrom in use being highlighted;
- figure 3 shows a diagrammatic, bottom plan view of the rinsing device in figure 2; and
- figure 4 diagrammatically shows a side elevation view of a second embodiment of the rinsing device in figure 1, the jets of rinsing water generated therefrom in use and a detail of the most radially external nozzles of the device on an enlarged scale being highlighted.

BEST MODE FOR CARRYING OUT THE INVENTION

[0017] In figures from 1 to 3, numeral 1 indicates as a whole a rinsing (and/or washing) device for an electric household appliance 2, in particular a dishwashing machine for professional use, of the front loading type in the example shown.

[0018] In particular, the dishwashing machine 2 comprises a washing chamber 3 accommodating at least one container basket 4 (known) for the dishes 5 to be washed, the washing device 1 and delivering means 7 of a pressurized service fluid 80, e.g. rinsing water, towards the device 1, in this case towards an outlet 10 arranged in the washing chamber 3 with a symmetry axis A thereof arranged substantially vertical and connected to the rinsing device 1 in the manner disclosed below.

[0019] The dispensing means 7 of the pressurized water are known and comprise, in this case, a pump 11, a tank 12 in which the water delivered onto the dishes 5 through the outlet 10 and the device 1 is collected in use, and network-water feeding means 13, the pump 11 being able to use both the network-water (during the rinsing cycle) and, possibly, the water in the tank 12 (during the washing cycle).

[0020] The device 1 comprises at least one arm 20 rotationally mounted about the axis A, which is generally vertical, within the washing chamber 3 of the electric household appliance 2 immediately over the container basket 4, in this case idly and fluid-tightly mounted, in a known manner and therefore not described in detail for simplicity, to the outlet 10 with a central assembly portion 21 thereof.

[0021] The arm 20 delimits a cavity 22 therein (figure 3) connected in use to the water dispensing means 7 through the outlet 10 and is integrally provided with a plurality of spray nozzles 23, each adapted to generate a corresponding jet 8.

[0022] In particular, the nozzles 23 are obtained on a first surface 24 of the arm 20, in this illustrated case the lower surface, which may be either flat, in the case of flat, "biscuit"-shaped, or paddle-shaped arms 20, or curved, in the case of tubular arms 20 having a circular or elliptical section. In all cases, the surface 24 is oriented in use towards the dishes 5 and the nozzles 23, which are carried by the same, may be arranged substantially coplanar or flushed with the surface 24, and are arranged reciprocally spaced lengthwise along the arm 20 and communicating with the internal cavity 22 of the latter.

[0023] Opposite ends 25,26 of the arm 20 extend radially and overhangingly, on opposite sides, from the rotation axis A, which is placed at the middle line of the arm

20, the latter having the assembly portion 21 for securing it to the rotation axis A substantially arranged indeed on the middle line of the arm 20 itself, so that opposite longitudinal portions 27,28 of the arm 20, delimited at their lower part by the surface 24 and which are provided, on the latter, with the nozzles 23, end with the opposite ends 25,26 and protrude in use in a substantially symmetric manner from the assembly portion 21 in a radial direction with respect to the rotation axis A.

[0024] According to the main aspect of the invention, at least first nozzles 23b radially and more externally arranged along the arm 20 as compared to the other nozzles 23, are oriented inclined, on the side of the face 24, towards the rotation axis A, so as to be adapted to eject in use, towards the dishes, corresponding jets 8b of operative fluid 80 (rinsing water) oriented obliquely to the dishes 5 and converging towards the rotation axis A, so that the surface wetted in use by the nozzles 23, 23b of the arm 20 is delimited within a circle C (figure 3) covered in use about the rotation axis A by the opposite overhanging ends 25,26 of the arm 20.

[0025] In particular, the aforesaid first nozzles 23b are exactly arranged at the opposite ends 25,26 of the arm 20, so as to be integrally carried by the same, and all the nozzles 23, thus including the nozzles 23b, are oriented substantially coplanar with the surface 24 of the arm 20 and in the most simple embodiment (known and not shown) may consist of simple holes or slots made through the side wall portion of the arm 20 defining the lower surface 24.

[0026] According to this first embodiment shown in detail in figures 2 and 3, in order to obtain the aforesaid inclined orientation of the nozzles 23b, the opposite ends 25,26 of the arm 20 are shaped so as to be folded by a desired angle a (figure 2) towards the rotation axis A on the side of the surface 24, i.e. downwards and towards the basket 4 underneath. In particular, the opposite ends 25,26 of the arm 20 consist of originally rectilinear ends of an originally rectilinear arm which have been bent by plastic deformation, to form an angle or a curve and without obstructing the internal cavity 22 of the arm 20, towards the rotation axis A on the side of surface 24.

[0027] With reference now to figure 4, where the details similar or equal to those already described are indicated for simplicity with the same reference numbers, according to the different and possible embodiment 100 of the device, the arm 20 is substantially rectilinear even at the ends 25,26 and these are provided on the surface 24 with nozzles 23d made with a symmetry axis D thereof, along which there are adapted to eject a jet 8b of operative fluid 80, oriented, with respect to the surface 24, inclined in a direction and at an angle such that the axis D is converging towards the rotation axis A.

[0028] Furthermore, in both the two described and shown embodiments 1 and 100, the arm 20 carries the nozzles 23b or 23d obliquely oriented to the surface 24 and the other nozzles 23, oriented instead in a substantially perpendicular manner to the surface 24 and which are arranged for differentiating themselves from the nozzles 23b,23, placed so that all the nozzles 23 different from the nozzles 23b,23d are arranged along the arm 20 radially most internally as compared to the nozzles 23b,23d.

[0029] Furthermore, according to another aspect of the invention, the nozzles 23b,23d are shaped so as to eject in use a flared blade-shaped or conical jet 8b, having an opening angle β which is smaller than the angle γ of the other jets 8, which are also flared blade-shaped or conical, ejected in use by the nozzles 23 which are different from the nozzles 23b or 23d.

[0030] Finally, the arm 20 may be provided with reaction thrust generation means to determine in use the rotation about the axis A, in the direction of the arrows (figure 3), in the example shown (figure 3) consisting of propulsion nozzles 30 appropriately oriented and made so as to determine a tangential exiting of service fluid 80 therethrough. Alternatively, the nozzles 30 may be missing and the nozzles 23 themselves may be oriented slightly askew with respect to the axis A, so as to also determine in use, by means of the ejection of the jets 8, the reaction rotation movement of the arm 20 about the axis A.

Claims

1. A rinsing and/or washing device (1) for an electric household appliance (2) comprising an arm (20) mounted rotating about a substantially vertical axis (A) within a washing chamber (3) of the electric household appliance, e.g. immediately over a container basket (4) for dishes (5), the arm delimiting a cavity (22) therein that is connectable in use to dispensing means (7) of a pressurized operative fluid (8) and being provided on a first surface thereof, oriented in use towards the dishes, with a plurality of spray nozzles including first nozzles (23b;23d) and second nozzles (23) arranged reciprocally spaced lengthwise along the arm and communicating with the internal cavity of the latter; opposite ends (25,26) of the arm radially and overhangingly extending on opposite sides from the axis of rotation (A); **characterized in that** the first nozzles (23b;23d) are arranged radially more externally along the arm than the second nozzle (23); at least the first nozzles (23b;23d) are oriented at an angle towards the axis of rotation (A), so as to eject in use corresponding jets (8b) of operative fluid towards the dishes, oriented obliquely to the dishes and always converging towards the axis of rotation (A), so that the surface wetted in use by said first and second opposite overhanging ends of the arm.

2. A device (1) according to claim 1, **characterized in that** said rotation axis (A) of the arm is positioned in the middle of the arm (20) itself; the latter displaying

a mounting portion (21) for securing it to said rotation axis (A) arranged essentially in the middle of the arm itself, so that opposite longitudinal portions (27,28) of the arm, provided with said first surface and said nozzles (23) and ending with said opposite ends (25,26) of the arm, protrude in use in an essentially symmetric manner from the mounting portion (21) in a radial direction with respect to the rotation axis (A).

3. A device (1) according to claim 1 or 2, **characterized in that** said first nozzles are arranged at said opposite ends of the arm.

4. A device (1) according to claim 3, **characterized in that** all said nozzles, including said first nozzles, are essentially oriented coplanar with said first surface of the arm; said opposite ends of the arm being shaped so as to result to be bent by a desired angle towards the rotation axis (A) on the side of said first surface.

5. A device (1) according to claim 4, **characterized in that** said opposite ends of the arm consist in ends of an originally rectilinear arm which have been bent by plastic deformation, to form an angle or a curve and without obstructing said internal cavity of the arm, towards the rotation axis (A) on the side of said first surface of the arm.

6. A device (1) according to claim 3, **characterized in that** said arm (20) is essentially rectilinear; said first nozzles being made with a symmetry axis (D) thereof, along which they are adapted to eject a said jet of operative fluid, oriented with respect to said first surface, with an inclined direction and at an angle such as to converge towards the rotation axis.

7. A device (1) according to any of the preceding claims, **characterized in that** said arm carries said first nozzles and second nozzles different from the first ones, the second nozzles being all radially arranged along said arm more internally with respect to the first nozzles; the latter being shaped so as to eject a conical or a flared blade-shaped jet, having a smaller opening angle than that of corresponding jets, also conical or flared blade-shaped, ejected in use by said second nozzles.

8. A device (1) according to any of the preceding claims, **characterized in that** said arm (20) is provided with reaction thrust generation means (30; 23) to determine in use the rotation thereof about said axis (A).

9. An electric household appliance (2), specifically a front-loading dishwashing machine, comprising a washing chamber (3) accommodating at least one container basket (4) for the dishes (5) to be washed, and dispensing means (7) of a pressurized service fluid (8), e.g. rinsing water, towards an outlet (10) arranged in the washing chamber (3) with an essentially vertical symmetric axis (A) thereof, **characterized in that** it comprises a device (1) according to any of claims from 1 to 8, wherein said arm (20) is idly and fluid-tightly mounted on said outlet (10) with a central mounting portion (21) thereof, immediately over said basket (4).

Patentansprüche

1. Spül- und/oder Waschvorrichtung (1) für ein elektrisches Haushaltgerät (2), welche einen Arm (20) umfasst, der drehbar um eine im Wesentlichen vertikale Achse (A) innerhalb einer Waschkammer (3) des elektrischen Haushaltgeräts gelagert ist, z. B. unmittelbar über einem Aufnahmekorb (4) für Geschirr (5), wobei der Arm einen in ihm ausgebildeten Hohlraum (22) begrenzt, welcher im Gebrauch mit Abgabemitteln (7) für ein druckbeaufschlagtes Betriebsfluid (8) verbindbar ist, und auf einer ersten Fläche des Arms, die im Gebrauch dem Geschirr zugewandt ist, mit einer Vielzahl von Sprühdüsen versehen ist, welche erste Düsen (23b; 23d) und zweite Düsen (23) umfassen, die voneinander beabstandet in Längsrichtung entlang des Armes angeordnet sind und mit dem inneren Hohlraum des Letzteren kommunizieren; wobei einander gegenüberliegende Enden (25, 26) des Armes sich radial und auskragend auf gegenüberliegenden Seiten von der Drehachse (A) aus erstrecken; **dadurch gekennzeichnet, dass** die ersten Düsen (23b; 23d) radial weiter außen entlang des Armes als die zweiten Düsen (23) angeordnet sind; wobei wenigstens die ersten Düsen (23b; 23d) unter einem Winkel zu der Drehachse (A) hin ausgerichtet sind, um im Gebrauch entsprechende Strahlen (8b) von Betriebsfluid in Richtung des Geschirrs auszustoßen, die schräg zu dem Geschirr ausgerichtet sind und stets zu der Drehachse (A) hin zusammenlaufen, so dass die Fläche, die im Gebrauch von den ersten und zweiten Düsen (23b; 23d, 23) des Armes befeuchtet wird, innerhalb eines Kreises um die Drehachse (A) begrenzt ist, welcher im Gebrauch von den einander gegenüberliegenden auskragenden Enden des Armes überdeckt wird.

2. Vorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Drehachse (A) des Armes in der Mitte des Armes (20) selbst positioniert ist; wobei der Letztere einen Montageabschnitt (21) zu seiner Befestigung an der Drehachse (A) aufweist, der im Wesentlichen in der Mitte des Armes selbst angeordnet ist, so dass einander gegenüberliegende Längsabschnitte (27, 28) des Armes, die mit der ersten Fläche und den Düsen (23) versehen sind und mit den einander gegenüberliegenden Enden (25, 26) des Armes enden, im Gebrauch auf eine im We-

sentlichen symmetrische Weise von dem Montageabschnitt (21) aus in einer radialen Richtung bezüglich der Drehachse (A) vorstehen.

3. Vorrichtung (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die ersten Düsen an den einander gegenüberliegenden Enden des Armes angeordnet sind.

4. Vorrichtung (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** die sämtlichen Düsen, einschließlich der ersten Düsen, im Wesentlichen koplanar mit der ersten Fläche des Armes ausgerichtet sind; wobei die einander gegenüberliegenden Enden des Armes so geformt sind, dass sie infolgedessen auf der Seite der ersten Fläche um einen gewünschten Winkel zu der Drehachse (A) hin gebogen sind.

5. Vorrichtung (1) nach Anspruch 4, **dadurch gekennzeichnet, dass** die einander gegenüberliegenden Enden des Armes aus Enden eines ursprünglich geraden Armes bestehen, welche durch plastische Verformung, um einen Winkel oder eine Kurve zu formen, und ohne den inneren Hohlraum des Armes zu versperren, auf der Seite der ersten Fläche des Armes zu der Drehachse (A) hin gebogen worden sind.

6. Vorrichtung (1) nach Anspruch 3, **dadurch gekennzeichnet, dass** der Arm (20) im Wesentlichen gerade ist; wobei die ersten Düsen mit einer Symmetrieachse (D) ausgebildet sind, entlang welcher sie einen besagten Strahl von Betriebsfluid auszustoßen in der Lage sind, der bezüglich der ersten Fläche mit einer geneigten Richtung und unter einem solchen Winkel ausgerichtet ist, dass die Strahlen zur Drehachse hin zusammenlaufen.

7. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Arm die ersten Düsen und zweiten Düsen, die von den ersten verschieden sind, trägt, wobei die zweiten Düsen alle entlang des Armes radial weiter innen angeordnet sind als die ersten Düsen; wobei die Letzteren so geformt sind, dass sie einen konischen oder sich trichterförmig erweiternden blattförmigen Strahl ausstoßen, der einen Öffnungswinkel aufweist, der kleiner als derjenige entsprechender, ebenfalls konischer oder sich trichterförmig erweiternder blattförmiger Strahlen ist, die im Gebrauch von den zweiten Düsen ausgestoßen werden.

8. Vorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Arm (20) mit Mitteln zur Erzeugung von Reaktionsschub (30; 23) versehen ist, um im Gebrauch die Rotation desselben um die Achse (A) zu bewirken.

9. Elektrisches Haushaltgerät (2), insbesondere Frontlade-Geschirrspülmaschine, welche eine Waschkammer (3), die wenigstens einen Aufnahmekorb (4) für das zu waschende Geschirr (5) aufnimmt, und Mittel (7) zur Abgabe eines druckbeaufschlagten Betriebsfluids (8), z. B. von Spülwasser, in Richtung eines in der Waschkammer (3) angeordneten Auslasses (10) mit einer im Wesentlichen vertikalen Symmetrieachse (A), umfasst, **dadurch gekennzeichnet, dass** es eine Vorrichtung (1) nach einem der Ansprüche 1 bis 8 umfasst, wobei der Arm (20) mit einem zentralen Montageabschnitt (21) desselben frei beweglich und fluiddicht an dem Auslass (10) gelagert ist, unmittelbar über dem Korb (4).

Revendications

1. Dispositif de rinçage et/ou de lavage (1) pour un appareil ménager électrique (2), comprenant un bras (20) monté de façon rotative autour d'un axe sensiblement vertical (A) à l'intérieur d'une chambre de lavage (3) de l'appareil ménager électrique, par exemple immédiatement au-dessus d'un panier de rangement (4) pour des plats (5), le bras délimitant une cavité (22) dans celui-ci qui peut être connectée lors de l'utilisation à des moyens de distribution (7) d'un fluide actif sous pression (8) et qui est prévue sur une première surface de celui-ci orientée lors de l'utilisation en direction des plats avec une pluralité de buses de pulvérisation comprenant des premières buses (23b; 23d) et des secondes buses (23) agencées de façon alternée espacées dans le sens de la longueur le long du bras et communiquant avec la cavité interne de ce dernier; des extrémités opposées (25, 26) du bras s'étendant radialement et en surplomb sur des côtés opposés à partir de l'axe de rotation (A); **caractérisé en ce que** les premières buses (23b; 23d) sont agencées radialement plus à l'extérieur le long du bras que les secondes buses (23), au moins les premières buses (23b; 23d) sont orientées avec un certain angle en direction de l'axe de rotation (A) de manière à projeter lors de l'utilisation des jets correspondants (8b) de fluide actif en direction des plats, orientés en oblique par rapport aux plats et convergeant toujours en direction de l'axe de rotation (A), de telle sorte que la surface mouillée lors de l'utilisation par lesdites premières et secondes buses (23b; 23d, 23) du bras soit délimitée à l'intérieur d'un cercle autour de l'axe de rotation (A) qui est couvert lors de l'utilisation par lesdites extrémités en surplomb opposées du bras.

2. Dispositif (1) selon la revendication 1, **caractérisé en ce que** ledit axe de rotation (A) du bras est positionné au milieu du bras (20) lui-même; ce dernier comprenant une partie de montage (21) afin de fixer celui-ci audit axe de rotation (A) agencé essentiel-

lement au milieu du bras lui-même, de telle sorte que des parties longitudinales opposées (27, 28) du bras, pourvues de ladite première surface et desdites buses (23) et se terminant avec lesdites extrémités opposées (25, 26) du bras, fassent saillie lors de l'utilisation d'une manière essentiellement symétrique à partir de la partie de montage (21) dans une direction radiale par rapport à l'axe de rotation (A).

3. Dispositif (1) selon la revendication 1 ou 2, **caractérisé en ce que** lesdites premières buses sont agencées auxdites extrémités opposées du bras.

4. Dispositif (1) selon la revendication 3, **caractérisé en ce que** la totalité desdites buses, comprenant lesdites premières buses, sont essentiellement orientées de façon coplanaire avec ladite première surface du bras; lesdites extrémités opposées du bras étant configurées de manière à être pliées d'un angle souhaité en direction de l'axe de rotation (A) sur le côté de ladite première surface.

5. Dispositif (1) selon la revendication 4, **caractérisé en ce que** lesdites extrémités opposées du bras consistent en des extrémités d'un bras initialement rectiligne qui a été plié par déformation plastique, pour former un angle ou une courbe et sans obstruer ladite cavité interne du bras, en direction de l'axe de rotation (A) sur le côté de ladite première surface du bras.

6. Dispositif (1) selon la revendication 3, **caractérisé en ce que** ledit bras (20) est essentiellement rectiligne; lesdites premières buses étant conçues avec un axe de symétrie (D) de celui-ci, le long duquel elles sont aptes à projeter ledit jet de fluide actif, orienté par rapport à ladite première surface, avec une direction inclinée et selon un angle tel qu'il converge en direction de l'axe de rotation.

7. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit bras porte lesdites premières buses et lesdites secondes buses différentes des premières buses, les secondes buses étant toutes agencées radialement le long dudit bras plus intérieurement par rapport aux premières buses; ces dernières étant configurées de manière à projeter un jet conique ou évasé en forme de lame, qui présentent un angle d'ouverture plus petit que celui de jets correspondants, eux aussi coniques ou évasés en forme de lame, projetés lors de l'utilisation par lesdites secondes buses.

8. Dispositif (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ledit bras (20) est pourvu d'un moyen de génération de poussée de réaction (30; 23) servant à déterminer lors de l'utilisation la rotation de celui-ci autour dudit axe (A).

9. Appareil ménager électrique (2), spécifiquement lave-vaisselle à chargement frontal, comprenant une chambre de lavage (3) contenant au moins un panier de rangement (4) pour les plats (5) à laver, et des moyens de distribution (7) d'un fluide de service sous pression (8), par exemple de l'eau de rinçage, en direction d'une sortie (10) ménagée dans la chambre de lavage (3) avec un axe de symétrie essentiellement vertical (A) de celle-ci, **caractérisé en ce qu'**il comprend un dispositif (1) selon l'une quelconque des revendications 1 à 8, dans lequel ledit bras (20) est monté de façon inactive et étanche au fluide sur ladite sortie (10) avec une partie de montage centrale (21) de celui-ci située immédiatement au-dessus dudit panier (4).

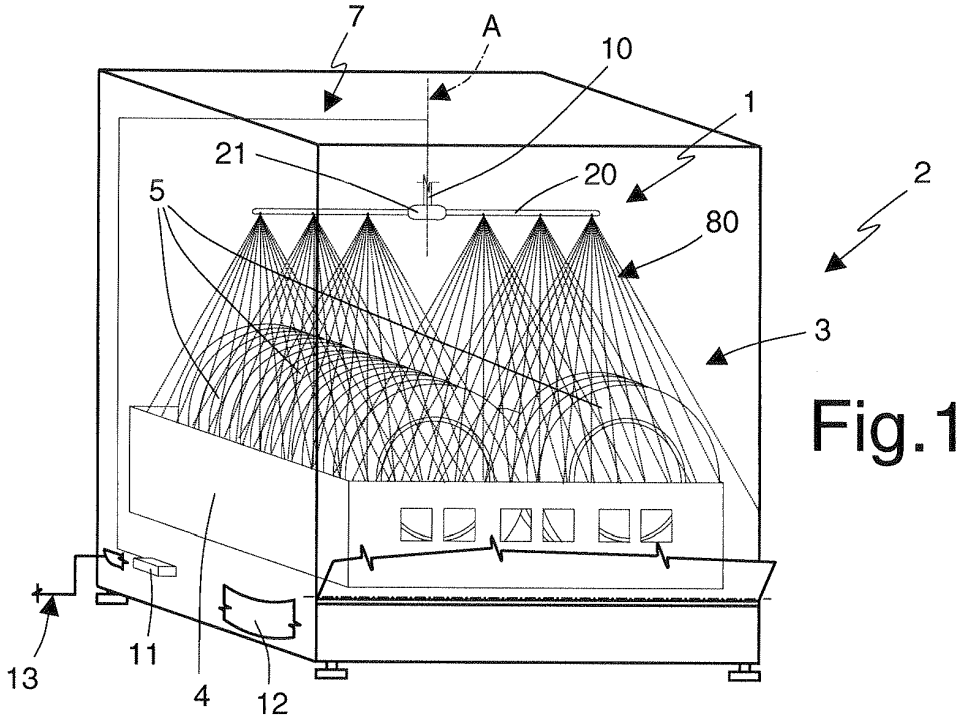


Fig.1

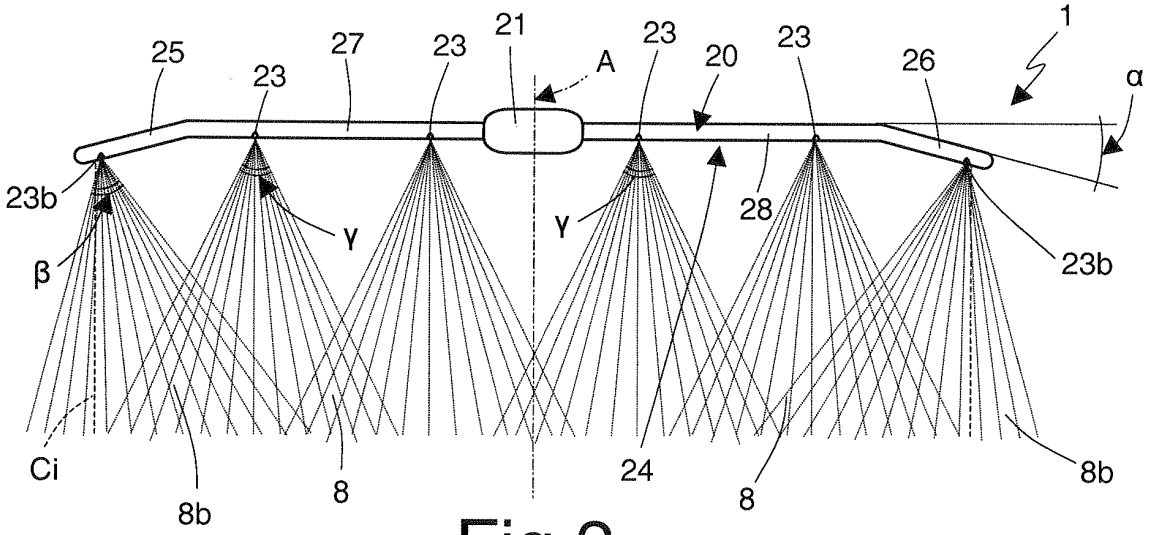


Fig.2

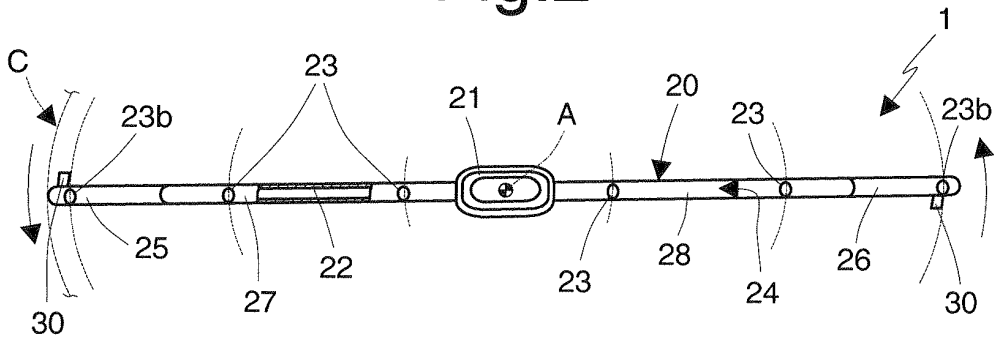


Fig.3

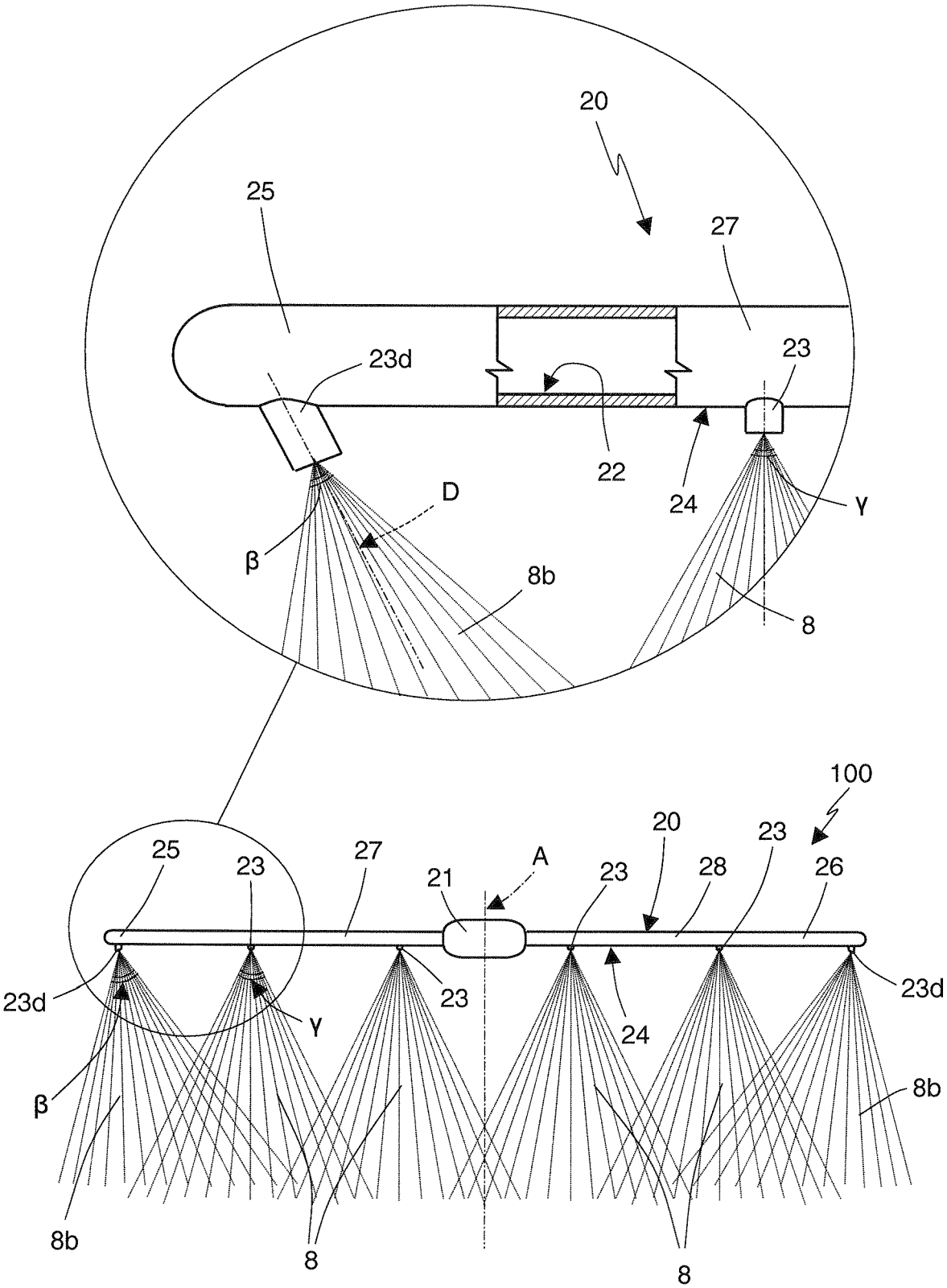

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26
23d
23
24
23d
γ
β
8b
8b
8
8

Fig.4

REFERENCES CITED IN THE DESCRIPTION

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