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(54) **A method for disposing of the washing liquid in a machine for washing items and the washing machine used to implement the method**

Verfahren zur Entsorgung der Waschflüssigkeit in einer Maschine zum Waschen von Gegenständen und Waschmaschine zum Durchführen des Verfahrens

Procédé pour l'élimination du liquide de lavage dans une machine pour laver des objets et machine de lavage pour mettre en oeuvre le procédé

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(73) Proprietor: **Caroli, Aurelio**
40064 Ozzano Emilia (Bologna) (IT)

(72) Inventor: **Caroli, Aurelio**
40064 Ozzano Emilia (Bologna) (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Goito, 18
40126 Bologna (IT)

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Description

[0001] The present invention relates to the washing machine sector and, in particular, to the problem of disposing of the used washing liquid.

[0002] Machines for washing components, in particular metal components for industrial use, are currently known, comprising a supporting frame which defines a tank or washing chamber and a mobile lid that can be opened and closed to allow insertion of the components in the tank, support means for the components in the tank and means which spray water and detergents dissolved in said water onto the components.

[0003] In such known washing machines the water is stored in the bottom of the tank or in a separate tank and repeatedly recirculated over the components. Thus, after a given number of washing cycles, despite the presence of filters which attempt to purify the washing water, said water becomes overloaded with washing residues, such as dust, grease, metal chippings and various residues present on the components before washing. When the water contains an excessive level of residues - for example every 15 - 30 days - it is substituted with clean water in which fresh detergent is dissolved. The remaining waste water contains a high level of pollutants and disposing of it is problematic and expensive. Companies which carry out this type of washing must install special chemical - physical purifiers outside the facility in order to subject the waste water to costly purification processes before disposing of it in the sewer network. If they are not equipped with such purification plant, they must acquire storage tanks for the temporary storage of the waste water, which must subsequently be transported to purifiers located at a distance from the working facility. Such waste water purification operations are expensive and inconvenient.

[0004] DE 19506017 discloses a machine for washing workpieces comprising a washing chamber in which the workpieces are washed and a collector for a condensate to be recirculated into the washing chamber. In the machine is provided a second chamber for the distillation of the washing liquid which is quite separated from washing chamber and the collector for the condensate.

[0005] US 5549128 discloses an apparatus for washing articles with a cleaning solution comprising a wash basin in which the article is manually washed by a spout or a hose having a wash brush. The washing apparatus further comprises a cleaning solution holding tank from which the washing solution is recirculated through a pump and a return conduit to the spout or the hose with the wash brush and a distillation chamber separated by said cleaning solution holding tank.

[0006] The present invention, provides a method for disposing of the washing liquid in a machine for washing items in accordance with the enclosed claim 1.

[0007] The present invention also relates to a washing machine which implements the method according to the present invention.

[0008] The dependent claims refer to preferred embodiments.

[0009] Further characteristics of the invention and its advantages are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate preferred embodiments of the invention, without limiting the scope of its application, and in which:

- 10 - Figure 1 is a schematic cross-section of a first preferred embodiment of the washing machine which implements the method according to the present invention;
- 15 - Figure 2 is a schematic cross-section of a second preferred embodiment of the washing machine which implements the method according to the present invention.

[0010] Figure 1 illustrates a first preferred embodiment of the machine according to the present invention. The machine 10 for washing items comprises a supporting frame 12, with feet 8, 9 which rest on the floor, defining a chamber 14 in which the items to be washed are housed by means of outer side walls, only walls 109, 110 and 111 illustrated in Figure 1, a base wall 11 and a mobile upper wall 15, defining a mobile lid, hinged to the wall 110 at 113.

[0011] The washing machine 10 also comprises means which support at least one item 18, in the form of a basket or support surface 16 located within the washing chamber 14 and rotated by a suitable motor 116 by means of a suitable transmission system, schematically illustrated using dashes and dots and labelled 117 in Figure 1.

[0012] In the washing machine disclosed, the washing liquid (labelled with the numeral 20) is stored in a lower compartment or tank 14' in the chamber 14, and to bring the washing liquid into contact with the item to be washed, spray nozzles 21 are envisaged on the pipes 22, located around the support for the item 18 to be washed. In a further embodiment, the item to be washed may be brought into contact with the liquid by immersing it directly in the latter rather than using a spray system.

[0013] In the machine disclosed, the washing liquid, preferably water and detergent and any other washing agents, is recirculated several times over the items to be washed and is used in several washing cycles to wash different components. After a given number of washing cycles, when the liquid is too dirty due to residues removed from the components washed - said residues, for example, comprising various substances present on the components, such as greasy or oily substances, dust, metal chippings and other substances - the used washing water is eliminated from the machine and substituted with fresh, clean washing water.

[0014] According to the present invention, to allow the washing liquid to be eliminated from the machine 10,

means 26 are envisaged for evaporating, at least partially, said washing liquid 20, so as to at least partially reduce the quantity or volume of liquid to be removed from the chamber, for example, through the lower tap 27.

[0015] Said means for evaporating the liquid are a heating element 26 which heats the liquid and can also be used at a lower operating temperature to heat the liquid during the normal component washing stages. Means for evaporating the washing liquid other than the electrical heating element may also be used for the present invention.

[0016] The present machine also comprises suitable means for controlling said means 26 which evaporate the washing liquid, comprising a control unit 28 electrically connected to the heating element 26 and a control knob 30 which allows said evaporation stage to be started.

[0017] In accordance with a preferred control method, the means 26 for evaporating the washing liquid 20 are left on at least until all of the washing liquid has substantially evaporated.

[0018] To implement the preferred method, the control knob 30 can be used to start the evaporation stage, for example, at night, outside of normal working hours, and the heating element left on until the start of the next shift.

[0019] In this case, the heating element is of the type which operates without causing any damage, even when the chamber is empty, that is to say, in the absence of water to be heated. This guarantees the almost total elimination of the washing water and a "dry" residue with greatly reduced volume is obtained, allowing easy treatment of the residues. As indicated, the storage compartment 14' for the washing liquid extends below the washing chamber 14 and has a base wall 13 and outer side walls, of which only walls 149, 151, 152 are illustrated in Figure 1.

[0020] The top of said compartment 14' opens into the chamber 14, from which it is separated by a removable wall or panel 11' with a central trap filter 29 through which the liquid 20 sprayed onto the item descends into the compartment 14'.

[0021] The present machine also comprises means 32 for recirculating the liquid 20 from the storage compartment 14' to the sprayers 21, said means comprising a recirculating pump 33 with an intake pipe 34 whose inlet, fitted with a filter 36, is located in the lower compartment 14' which stores the washing liquid, and a delivery pipe 38 directly connected to the pipes 22 of the sprayers 21.

[0022] Moreover, as indicated, in order to completely evaporate the used washing liquid, the liquid evaporation means 26 are located close to the base 13 of said lower liquid storage compartment 14'.

[0023] To improve the evaporation cycle, means 40 are envisaged to allow the discharge of the vapour produced by the evaporation of the washing liquid 20 within the chamber 14.

[0024] Said means for the discharge of the washing liquid 20 vapour take the form of a centrifugal extractor 40 which draws the vapour through an opening 42 in the side wall 110 of the chamber 14 and, through a pipe 44, which may be fitted with filters for the vapour, directs it to the outside of the building in which the machine is installed. The vapour extracted by the extractor could also be condensed in a separate condensation tank 70, as illustrated in Figure 1.

[0025] As indicated, the extractor means for the vapour produced are advantageously activated and controlled by the means 28 and 30 which control the heating element 26.

[0026] According to the present embodiment means 46 are also envisaged for collecting and supporting the solid or pasty residue which remains after the washing liquid has evaporated.

[0027] Said means 46 for collection of the residue are a bag whose lower part 48 is at the base 13 of the liquid storage compartment 14'. The side 50 of the residue collection bag extends over at least part of the side walls of the compartment 14'.

[0028] The collection bag 46 extends alongside the heating means 26, which are covered by a protective cage 31 to prevent contact with the bag 46.

[0029] In order to allow the liquid to make contact with the heating element 26, the bag 46 is made of a material which is permeable or porous, allowing the passage of the washing liquid, for example a fabric such as cotton or others, designed to filter the liquid.

[0030] As indicated, the inlet 36 of the washing liquid recirculating means is located above the collection means 46.

[0031] The bag 46 can be extracted or removed from the machine, so that it can be substituted with a new bag for the residues.

[0032] Means for supporting the collection means 46 are envisaged, in the form of a quadrangular bracket 52 which, thanks to projections 54 can be attached to or removed from the lower compartment 14' inside the chamber 14. The bag 46 is fixed to the bracket 52 in such a way that it may be removed, allowing easy substitution.

[0033] The bag is removed by the operator, who reaches through the upper opening, of the chamber normally closed with the lid 15, and, after removing the mobile base wall 11', lifts the bracket 52 with the solid residues held inside the bag 48.

[0034] Figure 2 illustrates a second preferred embodiment of the washing machine according to the present invention. In Figure 2, illustrating the second preferred embodiment of the machine, the elements similar to those in the first preferred embodiment are labelled using the same numerals as in the previous figure and, so that the present description is not too lengthy, are not described again.

[0035] The second preferred embodiment differs from the first preferred embodiment in that, at the base 13 of

the compartment 14', below said first means 46 for collection of the residues, there are second means 202 for collection of the residues, which pass across said first collection means 46.

[0036] Said second collection means are a bag 202, made of a plastic material impermeable to the liquid, supported by a quadrangular supporting bracket 204 which can be attached to projections 206 substantially at the base 13 of the compartment 14' and can be detached from said projections to allow the removal and substitution of the plastic bag 202 following removal of the upper bag 46.

[0037] The second preferred embodiment also envisages that the part 50 of the porous bag 46 extends completely above the protective cage 31 over the heating element 26.

[0038] In the preferred embodiments illustrated, the washing chamber 14 is quadrangular in shape and the compartment or tank 14' is also quadrangular, although shorter, leaving a lateral space below the chamber 14 so that the various means used to drive the machine can be housed there. However, the compartment 14' could have a different shape to the quadrangular shape illustrated, for example, cylindrical, conical, or other shapes.

[0039] The machine referred to in the present invention is preferably used to wash metal components for industrial use. However, it could be adapted to make it suitable for washing any type of item, such as pans, crockery, fabrics and others.

[0040] The washing machine could also use and evaporate solvent washing liquids other than the water described herein.

Claims

1. A method for disposing of the washing liquid in a machine for washing items, the machine comprising a chamber (14) for washing the items, means (16) for supporting at least one item (18) in the washing chamber (14), means (14') for storing a given volume of washing liquid, means for bringing the washing liquid in the storing means (14') into contact with the item to be washed, means for eliminating the washing liquid from the machine, the method being **characterised in that** the washing liquid is at least partially evaporated in the storing means (14'), in order to eliminate the washing liquid from the machine.
2. The method according to claim 1, **characterised in that** the evaporation of the washing liquid is continued until all of the washing liquid has substantially evaporated.
3. The method according to any of the foregoing claims, **characterised in that** the evaporation of the washing liquid is effected after the machine has

completed a preset number of washing cycles.

4. The method according to any of the foregoing claims, **characterised in that**, during the evaporation stage, the vapour produced by the evaporation of the washing liquid is discharged from the washing chamber (14).
5. The method according to any of the foregoing claims from 2 to 4, **characterised in that** the residue obtained following evaporation of the washing liquid is removed, using removable means (46) for the collection of the residues envisaged on the machine.
6. A machine for washing items, the machine (10) comprising a chamber (14) which houses the items to be washed, means (16) for supporting at least one item (18) in the washing chamber (14), means for storing (14') a given volume of washing liquid (20), means for bringing the washing liquid into contact with the item to be washed, the machine being **characterised in that** to allow the elimination of the washing liquid from the machine (10), there are means (26) which at least partially evaporate the washing liquid (20) in the storing means (14'), reducing the volume of the liquid to be eliminated.
7. The machine according to claim 6, **characterised in that** means are envisaged for controlling the means (26) for evaporating the washing liquid, said control means activating the means (26) for evaporating the washing liquid (20) at least until all of the washing liquid has substantially evaporated.
8. The machine according to any of the foregoing claims from 6 to 7, **characterised in that** the means for evaporating the liquid are heating means.
9. The machine according to claim 8, **characterised in that** the heating means consist of at least one electrical heating element.
10. The machine according to any of the foregoing claims from 6 to 9, **characterised in that** the means for storing the washing liquid comprise a storage compartment (14') for the washing liquid, said compartment being created below the washing chamber (14).
11. The machine according to any of the foregoing claims from 6 to 10, **characterised in that** the means for evaporating the liquid are envisaged at the base (13) of the storage compartment (14') for the liquid.
12. The machine according to any of the foregoing claims from 6 to 11, **characterised in that** the

means for bringing the washing liquid (20) into contact with the item to be washed (18) comprise means (32) for recirculating the liquid (20) from the storage compartment (14'), said means having the inlet (36) for the washing liquid in the lower compartment (14') which houses the washing liquid.

13. The machine according to any of the foregoing claims from 6 to 12, **characterised in that** it comprises a mobile lid (15) for closing the washing chamber (14), and **characterised in that** means (40) are envisaged for discharging the vapour produced by the evaporation of the washing liquid (20) present in the washing chamber (14).

14. The machine according to claim 13, **characterised in that** the means for discharging the vapour produced by the evaporation of the washing liquid (20) are extractor means (40), said means extracting the vapour through an opening (42) in a wall of the chamber (14).

15. The machine according to any of the foregoing claims from 6 to 14, **characterised in that** means (46) are envisaged for collecting and supporting the residue obtained following evaporation of the washing liquid (20).

16. The machine according to claim 15, **characterised in that** the means (46) for collecting the residues are means which can be removed from the machine.

17. The machine according to claim 16, **characterised in that** the collection means (46) are envisaged at the base (13) of the liquid storage compartment (14').

18. The machine according to claim 17, **characterised in that** the means (46) for collecting the residues extend over at least part of the side walls of the compartment (14') and/or chamber (14).

19. The machine according to any of the foregoing claims from 15 to 18, **characterised in that** the collection means (46) consist of a bag made of a porous filtering material, allowing the passage of the washing liquid (20).

20. The machine according to any of the foregoing claims from 15 to 19, **characterised in that** the collection means (46) are located above the heating means (26).

21. The machine according to any of the foregoing claims from 15 to 20, **characterised in that** the inlet (36) of the washing liquid recirculating means is located above the collection means (46).

22. The machine according to claim 21, **characterised in that** means (52) are envisaged for supporting the collection means (46), it being possible to attach said support means to the inside of the chamber (14) at the lower compartment (14') for storage of the washing liquid (20).

23. The machine according to any of the foregoing claims from 15 to 22, **characterised in that**, at the base (13) of the compartment (14') for collection of the washing liquid, below said first means (46) for collection of the residues, second means (202) for collection of the residues are envisaged, passing across the first collection means (46).

24. The machine according to claim 23, **characterised in that** the second collection means consist a bag (202) made of an impermeable material.

25. The machine according to claim 24, **characterised in that** the second collection means (202) are supported by support means (204), it being possible to attach the support means to and detach them from the compartment (14') substantially at the base (13) of the latter.

Patentansprüche

1. Verfahren zur Entsorgung der Waschflüssigkeit in einer Maschine zum Waschen von Gegenständen, wobei die Maschine eine Kammer (14) zum Waschen von Gegenständen enthält, Mittel (16) zum Halten von wenigstens einem Gegenstand (18) in der Waschkammer (14), Mittel (14') zum Speichern eines bestimmten Volumens von Waschflüssigkeit, Mittel, um die Waschflüssigkeit in der Speichermitteln (14') in Kontakt mit dem zu waschenden Gegenstand zu bringen, Mittel zum Entsorgen der Waschflüssigkeit aus der Maschine, wobei das Verfahren **dadurch gekennzeichnet ist, dass** die Waschflüssigkeit wenigstens teilweise in den Speichermitteln (14') verdampft wird, um die Waschflüssigkeit aus der Maschine zu entsorgen.

2. Verfahren nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die Verdampfung der Waschflüssigkeit solange weitergeht, bis im wesentlichen alle Waschflüssigkeit verdampft ist.

3. Verfahren nach einem beliebigen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die Verdampfung der Waschflüssigkeit durchgeführt wird, nachdem die Maschine eine bestimmte Zahl von Waschzyklen vervollständigt hat.

4. Verfahren nach einem beliebigen der vorstehenden Patentansprüche, **dadurch gekennzeichnet,**

dass während der Verdampfungsphase der durch die Verdampfung der Waschflüssigkeit erzeugte Dampf aus der Waschkammer (14) abgelassen wird.

- 5 5. Verfahren nach einem beliebigen der vorstehenden Patentansprüche von 2 bis 4, **dadurch gekennzeichnet, dass** der infolge der Verdampfung der Waschflüssigkeit verbliebene Rückstand unter Verwendung von an der Maschine vorgesehenen herausnehmbaren Mitteln (46) zum Sammeln der Rückstände entfernt wird.
- 10 6. Maschine zum Waschen von Gegenständen, wobei die Maschine (10) eine Kammer (14) enthält, welche die zu waschenden Gegenstände aufnimmt, Mittel (16) zum Halten von wenigstens einem Gegenstand (18) in der Waschkammer (14), Mittel (14') zum Speichern eines bestimmten Volumens von Waschflüssigkeit (20), Mittel, um die Waschflüssigkeit in der Speichermitteln (14') in Kontakt mit dem zu waschenden Gegenstand zu bringen, wobei die Maschine **dadurch gekennzeichnet ist, dass** sie das Entsorgen der Waschflüssigkeit aus der Maschine (10) erlaubt, wobei Mittel (26) vorhanden sind, welche wenigstens teilweise die Waschflüssigkeit (20) in den Speichermitteln (14') verdampfen, wobei das Volumen der zu entsorgenden Flüssigkeit reduziert wird.
- 20 7. Maschine nach Patentanspruch 6, **dadurch gekennzeichnet, dass** Mittel zum Steuern der Mittel (26) zum Verdampfen der Waschflüssigkeit vorgesehen sind, wobei die genannten Steuermittel die Mittel (26) zum Verdampfen der Waschflüssigkeit (20) wenigstens solange aktivieren, bis im wesentlichen alle Waschflüssigkeit verdampft ist.
- 25 8. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 7, **dadurch gekennzeichnet, dass** die Mittel zum Verdampfen der Flüssigkeit Heizmittel sind.
- 30 9. Maschine nach Patentanspruch 8, **dadurch gekennzeichnet, dass** die Heizmittel aus wenigstens einem elektrischen Heizelement bestehen.
- 35 10. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 9, **dadurch gekennzeichnet, dass** die Mittel zum Speichern der Waschflüssigkeit einen Speicherabschnitt (14') für die Waschflüssigkeit enthalten, der unterhalb der Waschkammer (14) hergestellt ist.
- 40 11. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 10, **dadurch gekennzeichnet, dass** die Mittel zum Verdampfen der Flüssigkeit am Boden (13) des Speicherabschnitts

(14') für die Flüssigkeit vorgesehen sind.

- 45 12. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 11, **dadurch gekennzeichnet, dass** die Mittel, welche die Waschflüssigkeit (20) mit dem zu waschenden Gegenstand (18) in Kontakt bringen, Mittel für den Umlauf der Flüssigkeit (20) aus dem Speicherabschnitt (14') enthalten, wobei die genannten Mittel den Einlass (36) für die Waschflüssigkeit (20) in dem unteren Abschnitt (14') haben, welcher die Waschflüssigkeit enthält.
- 50 13. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 12, **dadurch gekennzeichnet, dass** sie einen beweglichen Deckel (15) zum Verschliessen der Waschkammer (14) enthält, und **dadurch gekennzeichnet, dass** Mittel (40) zum Ablassen des durch die Verdampfung der in der Waschkammer (14) vorhandenen Waschflüssigkeit (20) erzeugten Dampfes vorgesehen sind.
- 55 14. Maschine nach Patentanspruch 13, **dadurch gekennzeichnet, dass** die Mittel zum Ablassen des durch die Verdampfung der Waschflüssigkeit (20) erzeugten Dampfes Abzugsmittel (40) sind, wobei die genannten Mittel den Dampf durch eine Öffnung (42) in einer Wand der Kammer (14) abziehen.
15. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 6 bis 14, **dadurch gekennzeichnet, dass** Mittel (46) zum Sammeln und Halten des Rückstandes vorgesehen sind, erhalten infolge der Verdampfung der Waschflüssigkeit (20).
16. Maschine nach Patentanspruch 15, **dadurch gekennzeichnet, dass** die Mittel (46) zum Sammeln der Rückstände solche Mittel sind, die aus der Maschine herausgenommen werden können.
17. Maschine nach Patentanspruch 16, **dadurch gekennzeichnet, dass** die Sammelmittel (46) am Boden des Speicherabschnitts (14') für die Flüssigkeit vorgesehen sind.
18. Maschine nach Patentanspruch 17, **dadurch gekennzeichnet, dass** die Mittel (46) zum Sammeln der Rückstände sich über wenigstens einen Teil der Seitenwände des Speicherabschnitts (14') und/oder der Waschkammer (14) erstrecken.
19. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 15 bis 18, **dadurch gekennzeichnet, dass** die Sammelmittel (46) aus einem Sackelement bestehen, hergestellt aus einem porösen Filtermaterial, welches das Durchlaufen der Waschflüssigkeit (20) erlaubt.
20. Maschine nach einem beliebigen der vorstehenden

Patentansprüche von 15 bis 19, **dadurch gekennzeichnet, dass** die Sammelmittel (46) oberhalb der Heizmittel (26) angeordnet sind.

21. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 15 bis 20, **dadurch gekennzeichnet, dass** der Einlass (36) der Umlaufmittel für die Waschflüssigkeit oberhalb der Sammelmittel (46) angeordnet ist.
22. Maschine nach Patentanspruch 21, **dadurch gekennzeichnet, dass** Mittel (52) zum Halten der Sammelmittel (46) vorgesehen sind, wobei es möglich ist, die genannten Haltemittel im Inneren der Kammer (14) an dem unteren Abschnitt (14') zum Speichern der Waschflüssigkeit (20) anzubringen.
23. Maschine nach einem beliebigen der vorstehenden Patentansprüche von 15 bis 22, **dadurch gekennzeichnet, dass** am Boden (13) des Abschnitts (14') zur Aufnahme der Waschflüssigkeit unterhalb der genannten ersten Mittel (46) zum Sammeln der Rückstände zweite Mittel (202) zum Sammeln der Rückstände vorgesehen sind, die durch die ersten Sammelmittel (46) gehen.
24. Maschine nach Patentanspruch 23, **dadurch gekennzeichnet, dass** die zweiten Sammelmittel aus einem Sackelement (202) aus undurchlässigem Material bestehen.
25. Maschine nach Patentanspruch 24, **dadurch gekennzeichnet, dass** die zweiten Sammelmittel (202) von Haltemitteln (204) getragen werden, wobei es möglich ist, die Haltemittel an dem Abschnitt (14') anzubringen und von diesem abzunehmen, und zwar im wesentlichen am Boden (13) von letzterem.

Revendications

1. Un procédé pour l'élimination du liquide de lavage dans une machine pour laver des objets, la machine comprenant une chambre (14) pour laver les objets, des moyens (16) pour supporter au moins un objet (18) dans la chambre de lavage (14), des moyens (14') pour stocker un volume donné de liquide de lavage, des moyens pour amener le liquide de lavage contenu dans les moyens de stockage (14') au contact de l'objet à laver, des moyens pour éliminer le liquide de lavage de la machine, ledit procédé étant **caractérisé en ce que** le liquide de lavage est au moins partiellement évaporé dans les moyens de stockage (14') de manière à éliminer le liquide de lavage de la machine.
2. Le procédé selon la revendication 1, **caractérisé**

en ce que l'évaporation du liquide de lavage dure jusqu'à ce que tout le liquide de lavage se soit substantiellement évaporé.

3. Le procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'évaporation du liquide de lavage est effectuée une fois que la machine a exécuté un nombre prédéterminé de cycles de lavage.
4. Le procédé selon l'une quelconque des revendications précédentes, **caractérisé en ce que**, durant la phase d'évaporation, la vapeur produite par l'évaporation du liquide de lavage est évacuée de la chambre de lavage (14).
5. Le procédé selon l'une quelconque des revendications précédentes de 2 à 4, **caractérisé en ce que** le résidu obtenu suite à l'évaporation du liquide de lavage est enlevé par l'intermédiaire de moyens amovibles (46) de récupération des résidus prévus sur la machine.
6. Une machine pour laver des objets, ladite machine (10) comprenant une chambre (14) pour loger les objets à laver, des moyens (16) pour supporter au moins un objet (18) dans la chambre de lavage (14), des moyens (14') pour stocker un volume donné de liquide de lavage (20), des moyens pour amener le liquide de lavage au contact de l'objet à laver, ladite machine étant **caractérisée en ce que**, pour permettre l'élimination du liquide de lavage de la machine (10), des moyens (26) sont prévus pour évaporer au moins partiellement le liquide de lavage (20) dans les moyens de stockage (14') de manière à réduire le volume de liquide à éliminer.
7. La machine selon la revendication 6, **caractérisée en ce que** des moyens sont prévus pour commander lesdits moyens (26) d'évaporation du liquide de lavage, lesquels moyens de commande activent lesdits moyens (26) d'évaporation du liquide de lavage (20) au moins jusqu'à évaporation substantielle de tout le liquide de lavage.
8. La machine selon l'une quelconque des revendications précédentes de 6 à 7, **caractérisée en ce que** lesdits moyens d'évaporation du liquide sont des moyens de chauffage.
9. La machine selon la revendication 8, **caractérisée en ce que** lesdits moyens de chauffage sont constitués par au moins un élément chauffant électrique.
10. La machine selon l'une quelconque des revendications précédentes de 6 à 9, **caractérisée en ce que** lesdits moyens de stockage du liquide de lavage comprennent un compartiment (14') de stockage du

liquide de lavage, ledit compartiment étant réalisé au-dessous de la chambre de lavage (14).

11. La machine selon l'une quelconque des revendications précédentes de 6 à 10, **caractérisée en ce que** lesdits moyens d'évaporation du liquide sont prévus au niveau du fond (13) du compartiment (14') de stockage du liquide. 5
12. La machine selon l'une quelconque des revendications précédentes de 6 à 11, **caractérisée en ce que** lesdits moyens de mise en contact du liquide de lavage (20) avec l'objet (18) à laver comprennent des moyens (32) de recirculation du liquide (20) depuis le compartiment (14') de stockage, ces moyens ayant l'entrée (36) d'admission du liquide de lavage située dans le compartiment inférieur (14') qui contient le liquide de lavage. 10
13. La machine selon l'une quelconque des revendications précédentes de 6 à 12, **caractérisée en ce qu'elle** comprend un couvercle mobile (15) destiné à fermer la chambre de lavage (14) et **en ce que** des moyens (40) sont prévus pour évacuer la vapeur produite par l'évaporation du liquide de lavage (20) présent dans la chambre de lavage (14). 15
14. La machine selon la revendication 13, **caractérisée en ce que** lesdits moyens d'évacuation de la vapeur produite par l'évaporation du liquide de lavage (20) sont des moyens aspirants (40), lesquels moyens aspirent la vapeur à travers une ouverture (42) réalisée dans une paroi de la chambre (14). 20
15. La machine selon l'une quelconque des revendications précédentes de 6 à 14, **caractérisée en ce que** des moyens (46) sont prévus pour récupérer et contenir le résidu obtenu suite à l'évaporation du liquide de lavage (20). 25
16. La machine selon la revendication 15, **caractérisée en ce que** lesdits moyens (46) de récupération des résidus sont des moyens qui peuvent être enlevés de la machine. 30
17. La machine selon la revendication 16, **caractérisée en ce que** lesdits moyens (46) de récupération sont prévus au niveau du fond (13) du compartiment (14') de stockage du liquide. 35
18. La machine selon la revendication 17, **caractérisée en ce que** lesdits moyens (46) de récupération des résidus s'étendent sur au moins une partie des parois latérales du compartiment (14') et/ou de la chambre (14). 40
19. La machine selon l'une quelconque des revendications précédentes de 15 à 18, **caractérisée en ce** 45

que lesdits moyens (46) de récupération sont constitués par un sac réalisé dans un matériau filtrant poreux permettant le passage du liquide de lavage (20).

20. La machine selon l'une quelconque des revendications précédentes de 15 à 19, **caractérisée en ce que** lesdits moyens (46) de récupération sont disposés au-dessus des moyens de chauffage (26). 50
21. La machine selon l'une quelconque des revendications précédentes de 15 à 20, **caractérisée en ce que** l'entrée d'admission (36) des moyens de recirculation du liquide de lavage est disposée au-dessus des moyens (46) de récupération. 55
22. La machine selon la revendication 21, **caractérisée en ce que** des moyens (52) sont prévus pour supporter lesdits moyens (46) de récupération, ces moyens de support pouvant être fixés à l'intérieur de la chambre (14) au niveau du compartiment inférieur (14') de stockage du liquide de lavage (20).
23. La machine selon l'une quelconque des revendications précédentes de 15 à 22, **caractérisée en ce que**, au niveau du fond (13) du compartiment (14') de stockage du liquide de lavage, en dessous des premiers moyens (46) susmentionnés de récupération des résidus, des deuxièmes moyens (202) de récupération des résidus sont prévus, qui passent à travers ces mêmes premiers moyens (46) de récupération.
24. La machine selon la revendication 23, **caractérisée en ce que** lesdits deuxièmes moyens de récupération sont constitués par un sac (202) réalisé dans un matériau imperméable.
25. La machine selon la revendication 24, **caractérisée en ce que** lesdits deuxièmes moyens (202) de récupération sont supportés par des moyens de support (204), lesquels moyens de support peuvent être fixés à et détachés du compartiment (14') au niveau, en substance, du fond (13) de ce dernier.

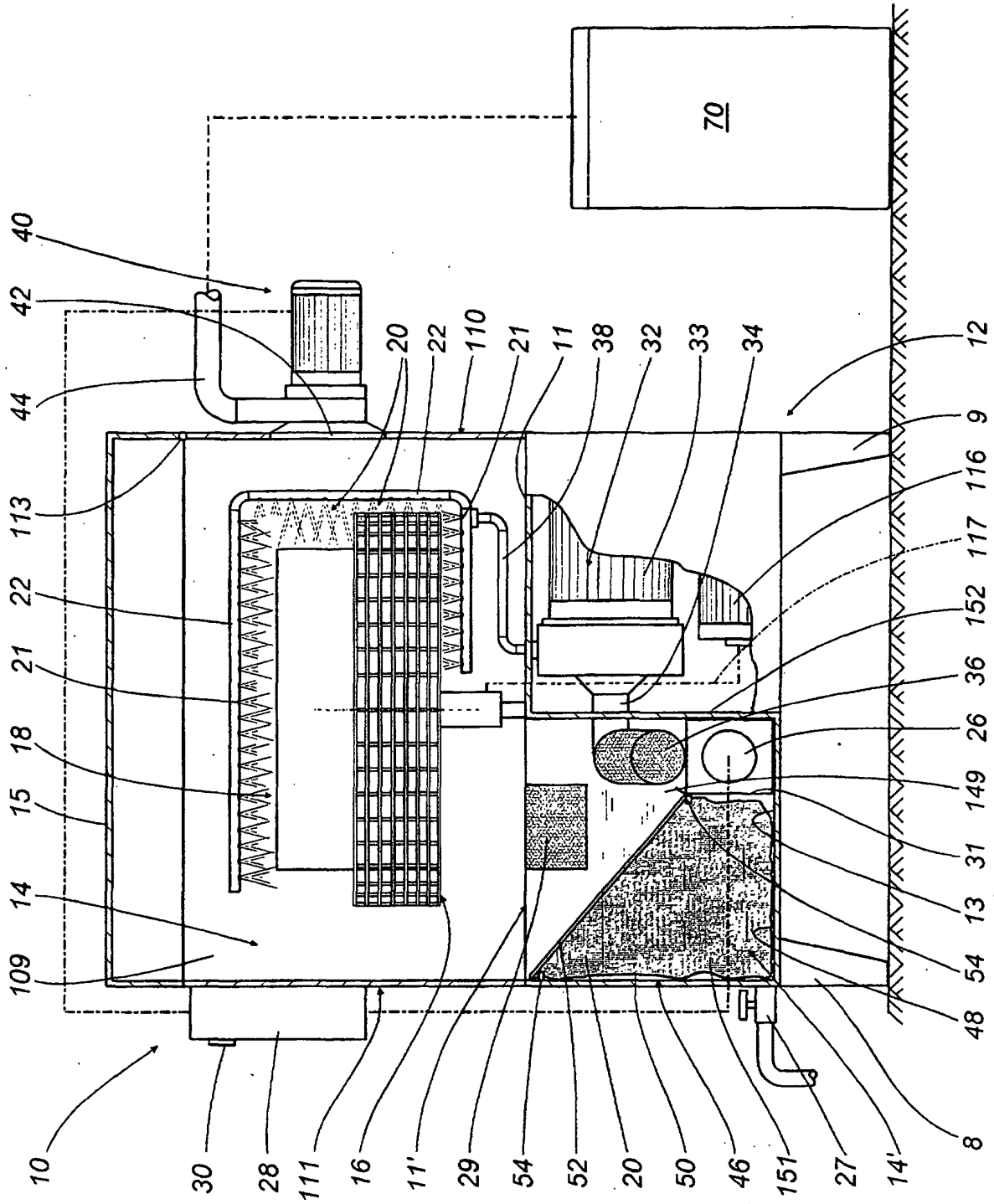


FIG. 1

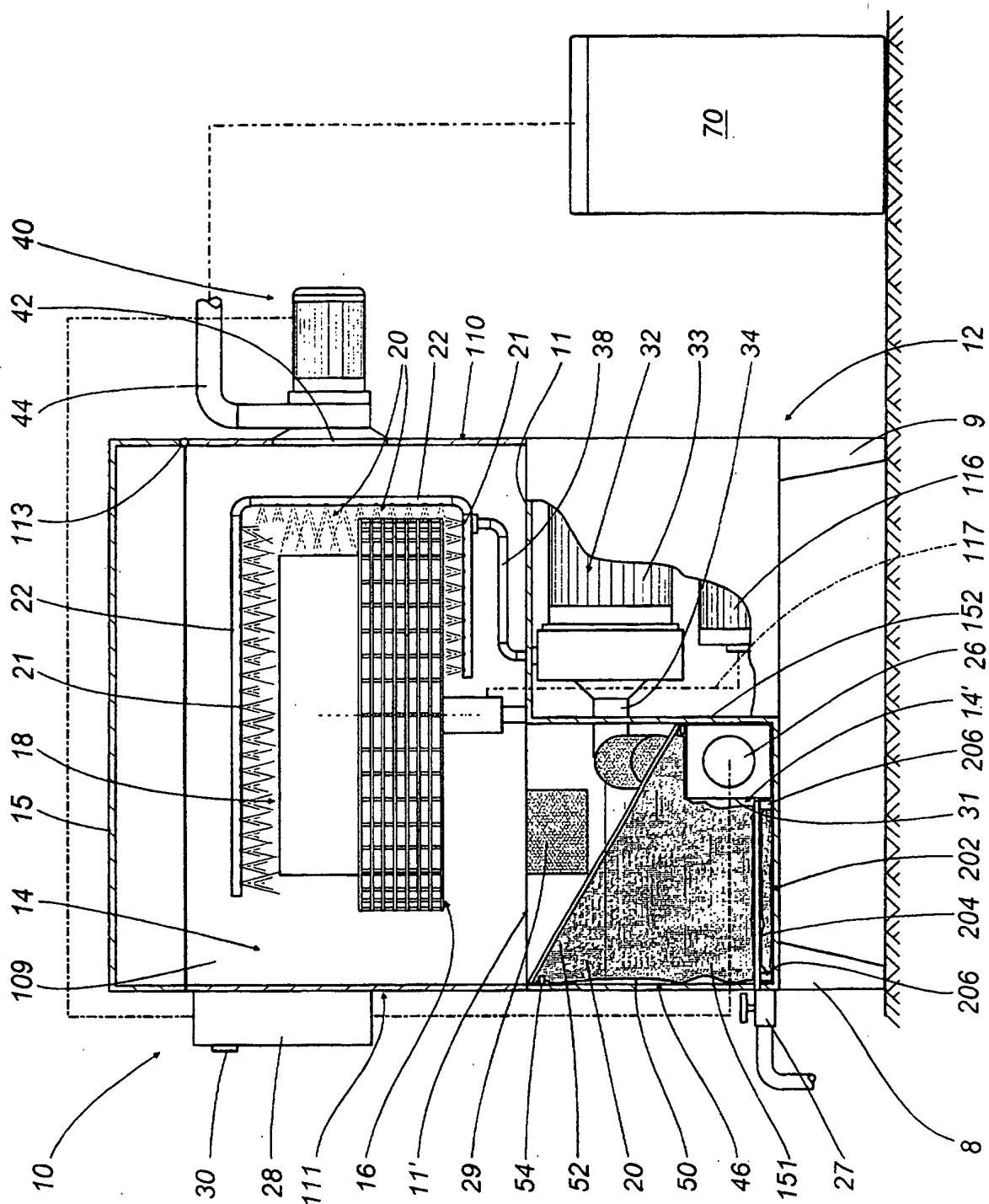


FIG. 2