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(54) **MACHINE FOR MAKING ICE CUBES**

MASCHINE ZUR HERSTELLUNG VON EISWÜRFELN

MACHINE A FORMER DES GLA ONS

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- **PATENT ABSTRACTS OF JAPAN vol. 1995, no. 03, 28 April 1995 (1995-04-28) & JP 06 347147 A (HOSHIZAKI ELECTRIC CO LTD), 20 December 1994 (1994-12-20)**
- **PATENT ABSTRACTS OF JAPAN vol. 2000, no. 11, 3 January 2001 (2001-01-03) & JP 2000 213836 A (HOSHIZAKI ELECTRIC CO LTD), 2 August 2000 (2000-08-02)**

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Description

[0001] The present invention refers to a machine for making ice cubes as defined in the preamble of claim 1.

[0002] Such a machine is known from US-A-3 289 430.

[0003] It is known that such machines often have the drawback of substantially complicating the access to the inner parts for inspection, maintenance and cleaning, foreseeing an assembly of the machine which hinders or even prevents the subsequent disassembly of one or more of its parts.

[0004] Indeed, many of the internal components of the machine must frequently be checked to ensure the correct operation of the machine, for example the recirculation pump must be easily accessible for the cleaning of the relative filter, just as it is necessary to access the inside of the storage tank for the water to be transformed into ice for the removal of limescale which has progressively been able to form.

[0005] As is known, machines for producing ice cubes exploit the force of gravity to expel the left-over water at the end of every ice production cycle as well as the water resulting from the melting of the ice cubes present in the storage tank.

[0006] For the correct operation of the leftover water drainage system, therefore, the drain for water from the machine must be placed at a certain height above the connection point to the water drainage network, a thing which often means having to keep the machine in a raised position which is particularly bulky and inconvenient.

[0007] The technical task proposed of the present invention is, therefore that of realising a machine for making ice cubes which allows the aforementioned technical drawbacks of the prior art to be eliminated.

[0008] In this technical task a purpose of the invention is that of realising a machine for realising ice cubes which is easy to disassemble into its constituent parts to ease the maintenance, inspection and cleaning operations.

[0009] Another purpose of the invention is that of realising a machine for making ice cubes which allows the complete drainage of the left-over water even in conditions of negative height difference between the drain for the left-over water from the machine and the connection point to the external water drainage network, in other words even if such a connection point to the external water drainage network is higher with respect to the drain for the left-over water from the machine.

[0010] The last but not least purpose of the invention is that of realising a machine for making ice cubes which is structurally simple and cost-effective.

[0011] The technical task, as well as these and other purposes, according to the present invention are accomplished by realising a machine for making ice cubes as defined in claim 1.

[0012] Other characteristics of the present invention are defined, moreover, in the subsequent claims.

[0013] Further characteristics and advantages of the invention shall become clearer from the description of a preferred but not exclusive embodiment of the machine for making ice cubes according to the finding, illustrated for indicating and not limiting purposes in the attached drawings, in which:

- figure 1 shows a front view of the ice cube maker;
- figure 2 shows a top side section view of the ice maker taken out from the support frame; and
- figure 3 shows in detail the attachment system between the spraying device and the connection pipe of the recirculation pump;
- figure 4 shows in detail another embodiment of the attachment system between the spraying device and the connection pipe of the recirculation pump.

[0014] With reference to the quoted figures, a machine for making ice cubes is shown.

[0015] The machine comprises an ice cube production unit wholly indicated with 3 supported by a framework of the machine wholly indicated with 5.

[0016] The ice cube production unit 3 has a casing 18 and comprises a spraying device 7 formed from a plurality of nozzles for spraying water into a plurality of ice formation cells 9 externally associated, that is on the opposite side to that where ice is formed, with the evaporator 10 of a refrigerator group (not shown) in which the refrigerating fluid circulates.

[0017] The cells 9 are externally heat insulated to keep the temperature as low as possible thus limiting the melting of the ice as it progressively forms.

[0018] The refrigerating group comprises a compressor suitable for feeding the condenser equipped with a fan, and the compressor is also connected to an accumulator in turn connected with the evaporator and then once more with the compressor.

[0019] The unit 3 comprises at least one, in particular just one recirculation pump 11 which through at least one pipe, in particular just one connection pipe 13, feeds the spraying device with water to be transformed into ice taken from at least one tank, in particular just one storage tank 15 in turn comprising a portion, in particular its base portion 27 engaged with the rest of the body 29 of the storage tank 15. The unit 3 also has a zone 17 for conveying the ice cubes towards an ice cube storage compartment 19 from which it is separated through a front hatch 21.

[0020] The hatch 21 comprises a first fixed and removable element 22 and a second rotatable and also removable element 24.

[0021] The fixed element 22 supports the front part of the evaporator 10 and protects the storage compartment 19 from splashes coming from the sprayer 7.

[0022] The rear part of the evaporator 10 is, on the other hand, supported by an inner shoulder of the casing 18 of the evaporator 10.

[0023] Preferably, the rotatable element 24 is formed from a panelled flap supported canti-levered about a substantially horizontal rotation pin 23.

[0024] The panels of the flap 24 are kept slotted on the rotation pin 23 by a pair of stops mounted at the opposite ends of the rotation pin 23.

[0025] The rotation pin 23 of the flap 24 can be supported directly by the fixed element 22, by the casing 18 of the evaporator 10 or by a part 16 integral with it.

[0026] The spraying device 7, present in the conveying zone 17, comprises an inclined plate 25 for sliding the ice cubes towards the build-up compartment 19.

[0027] The machine 1 foresees at least one first removable connection means for connecting at least one from the hatch 21, the spraying device 7 and the base 27 of the water storage tank 15 in such a way that it can be removed from the machine 1.

[0028] More specifically, the machine 1 comprises first connection means for connecting the elements 22 and 24 of the hatch 21 in such a way that they can be removed from the machine 1.

[0029] Such first removable connection means are in the form of attachment screws of the first element 22 of the hatch 21 to an insert 16 fixed to the casing 18 of the evaporator 10 and snap means comprising snap housing seats suitable for housing the stops on the ends of the rotation pin 23 of the second element 24 of the hatch 21.

[0030] As an example, such snap seats can be open bushes 33 having a throttle for opening to slightly less than the diameter of the stops at the ends of the rotation pin 23 so that such stops can be snap inserted there exploiting elastic deformation.

[0031] Such snap seats, as stated, can be formed from the insert 16 of the casing 18 of the evaporator 10, as illustrated, or alternatively even directly from the casing 18 or from the element 22 of the hatch 21, just as such a fixed element 22 can be fixed directly to the casing 18.

[0032] The machine 1 also has second removable connection means for connecting the spraying device 7 in such a way that it can be removed from the machine 1.

[0033] Such second removable connection means comprise at least one shoulder 37, in particular a single support shoulder, and at least one locking seat 39, in particular a single locking seat, for the sliding plate 25 of the spraying device 7.

[0034] The support shoulder 37 is formed from an inclined inner surface of the rear wall 39' of the casing 18 on which the rear edge of the plate 25 abuts, whereas the locking seat 39 comprises a substantially vertical front wall of the casing 18, arranged substantially below the hatch 21, in which an upturned U-shape of the front edge of the plate 25 can be locked.

[0035] For the complete removal of the spraying device 7 from the machine 1 it is necessary to remove the coupling between the spraying device 7 and the connection pipe 13 to the recirculation pump 11.

[0036] Such second removable connection means thus also comprise removable coupling means between the connection pipe 13 and the recirculation pump 11.

[0037] In figure 3 such coupling means are of the snap type and comprise a discharge joining element 41 of the connection pipe 13 and a return joining element 43 to a collection chamber 45 of the spraying device 7.

[0038] Still in figure 3, the joining element 41 has a substantially square plate 47 capable of sliding in a guide 49 of the joining element 43 up to an end stop in which an elastically yielding tab 51 of the joining element 41 is snap locked in a relative snap seat (not illustrated) of the joining element 43.

[0039] Alternatively, in figure 4 such coupling means are of the pressure locking type and comprise, for example, a tubular T-shaped joining element 42, which is connected at a first end to the discharge of the connection pipe 13, at a second end to an axially open locking element 44 which extends from a collection chamber 45 of the spraying device 7, and which is fixed, for example glued, at the third end of the tank 29. Still in figure 4, the locking element 44 carried sealing means, in particular an O-ring which creates a seal inside the tubular joining element 42.

[0040] The machine 1 also has third removable connection means for connecting the base 27 of the water storage tank 15 to the rest 29 of the body of the storage tank 25.

[0041] Such connection means can be in the form of screw, bayonet or mechanical locking coupling means between the base 27 and the remaining body 29 of the water accumulation tank 15.

[0042] The machine 1 also foresees indication means for periodically indicating the need for maintenance, inspection or cleaning.

[0043] Such indication means (not shown) can be in the form of warning lights, in particular LEDs, which light up after a certain number of hours of operation and/or of lifetime of the machine 1 or after a number of hours that takes into account these and other operating parameters taken individually or in combination..

[0044] An extremely advantageous characteristic of the machine is that of foreseeing at least one drainage tank (not shown) for the water which melts from the ice cubes present in the ice storage tank and from the cells during the production of ice cubes, and at least one drainage pump (not shown) suitable for conveying the leftover water coming from the drainage tank towards the mains water drainage network.

[0045] The machine for producing ice cubes thus conceived is susceptible to numerous modifications and variants, all covered by the inventive concept as defined in the claims.

[0046] In practice, the materials used, as well as the sizes, can be whatever according to the requirements and the state of the art.

Claims

1. Machine (1) for making ice cubes comprising a device (7) for spraying water into a plurality of ice formation cells (9) in said machine, at least one recir-

culation pump (11) which through at least one connection pipe (13) feeds the spraying device (7) with water to be transformed into ice taken from at least one storage tank (15), and an access hatch (21) to a storage compartment (19) for the formed ice cubes at least first connection means being foreseen for connecting at least one of said hatch (21) said spraying device (7) and at least one portion of said tank (15) for storing the water to be transformed into ice in such a way that it can be removed from the machine (1),
said spraying device (7) comprising an inclined plate (25) for sliding the ice towards said ice cube accumulation compartment (19), said removable coupling means between said spraying device (7) and said at least one pipe (13) being snap joining means or pressure locking joining means, **characterised in that** it has a zone (17) for conveying the ice cubes containing said spraying device (7) and separated through said hatch (21) from the ice cube accumulation compartment (19),

2. Machine (1) for making ice according to the previous claim, **characterised in that** first connection means are foreseen to connect said hatch (21) in such a way that it can be removed from the machine (1).

3. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** second connection means are foreseen to connect said spraying device (7) in such a way that it can be removed from the machine (1).

4. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** third connection means are foreseen to connect said at least one portion of said storage tank (15) for the water to be transformed into ice in such a way that it can be removed from the machine (1).

5. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said hatch (21) comprises a first removable fixed element (22) and a second rotatable element (24) which is also removable.

6. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said connection means comprise attachment screws of said first element (22) of the hatch (21) to the casing (18) of the evaporator (10) or to an insert (16) fixed to the casing (18) of the evaporator (10).

7. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said first connection means comprise snap means comprising snap housing seats suitable for housing a rotation pin (23) of said second element (24) of the hatch (21).

8. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said snap housing seats are formed from the casing (18) of the evaporator (10) or from an insert (16) fixed to the casing (18) of the evaporator (10).

9. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said snap housing seats are formed from the first element (22) of the hatch (21).

10. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said second connection means comprise at least one support shoulder (37) and at least one locking seat (39) for said plate (25) of said spraying device (7) formed in said conveying zone (17).

11. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said second connection means also comprise removable coupling means between said spraying device (7) and said at least one pipe (13).

12. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said third connection means are in the form of screw, bayonet or mechanical locking coupling means between a base portion (27) of said accumulation tank (15) for water to be transformed into ice and the remaining body (29) of the accumulation tank (15) for water to be transformed into ice.

13. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** indication means are foreseen to periodically indicate the need for maintenance, inspection or cleaning of the machine (1).

14. Machine (1) for making ice according to one or more of the previous claims, **characterised in that** said indication means are of the type which lights up.

Patentansprüche

1. Maschine (1) zur Herstellung von Eiswürfeln, umfassend eine Vorrichtung (7) zum Sprühen von Wasser in eine Vielzahl von Eisbildungszellen (9) in der genannten Maschine, mindestens eine Umwälzpumpe (11), die mittels mindestens eines Verbindungsrohrs (13) die Sprühvorrichtung (7) mit in Eis zu verwandelndem Wasser speist, das aus mindestens einem Speichertank (15) entnommen wird, und eine Zugangsklappe (21) zu einem Speicherbereich (19) für die in dieser Maschine gebildeten Eiswürfel, wobei

mindestens erste Verbindungsmittel vorgesehen sind, um mindestens entweder die genannte Klappe (21) oder die genannte Sprühvorrichtung (7) sowie mindestens einen Abschnitt des genannten Tanks (15) zum Speichern des in Eis zu verwandelnden Wassers so zu verbinden, dass diese(r) von der Maschine (1) entfernt werden kann, wobei die genannte Sprühvorrichtung (7) eine geneigte Platte (25) umfasst, um das Eis zum genannten Eiswürfelspeicherbereich (19) zu schieben, es sich bei den genannten entfernbaren Kupplungsmitteln zwischen der genannten Sprühvorrichtung (7) und dem genannten mindestens einem Rohr (13) um Schnappverbindungsmittel order Druckverriegelungsverbindungsmittel handelt, **dadurch gekennzeichnet, dass** darin ein Bereich (17) besteht, um die Eiswürfel, die die genannte Sprühvorrichtung (7) enthält und die durch die genannte Klappe (21) vom Eiswürfelspeicherbereich (19) getrennt sind, zu fördern.

2. Maschine (1) zur Herstellung von Eis nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** erste Verbindungsmittel vorgesehen sind, um die genannte Klappe (21) so zu verbinden, dass sie von der Maschine (1) entfernt werden kann.

3. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** zweite Verbindungsmittel vorgesehen sind, um die genannte Sprühvorrichtung (7) so zu verbinden, dass sie von der Maschine (1) entfernt werden kann.

4. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** dritte Verbindungsmittel vorgesehen sind, um den genannten mindestens einen Abschnitt des genannten Speichertanks (15) für das in Eis zu verwandelnde Wasser so zu verbinden, dass dieser von der Maschine (1) entfernt werden kann.

5. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannte Klappe (21) ein erstes entfernbar befestigtes Element (22) und ein zweites drehbares Element (24) umfasst, das ebenfalls entfernbar ist.

6. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Verbindungsmittel Anschlussschrauben des genannten ersten Elements (22) der Klappe (21) an das Gehäuse (18) des Verdampfers (10) an einem Einsatz (16) umfassen, der am Gehäuse (18) des Verdampfers (10) befestigt ist.

7. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten ersten Verbindungsmittel Schnappmittel umfassen, die Schnappaufnahmen umfassen, die dazu geeignet sind, einen Drehstift (23) des genannten zweiten Elements (24) der Klappe (21) aufzunehmen.

8. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten Schnappaufnahmen aus dem Gehäuse (18) des Verdampfers (10) oder aus einem Einsatz (16), der am Gehäuse (18) des Verdampfers (10) befestigt ist, gebildet sind.

9. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten Schnappaufnahmen aus dem ersten Element (22) der Klappe (21) gebildet sind.

10. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten zweiten Verbindungsmittel mindestens eine Halteschulter (37) und mindestens einen Verriegelungssitz (39) für die genannte Platte (25) der genannten Sprühvorrichtung (7), gebildet im genannten Förderbereich (17), umfassen.

11. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten zweiten Verbindungsmittel ebenfalls entfernbare Kupplungsmittel zwischen der genannten Sprühvorrichtung (7) und dem genannten mindestens einen Rohr (13) umfassen.

12. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten dritten Verbindungsmittel in Schrauben-, Bajonett- oder Verriegelungskupplungsmittelform zwischen einem Basisabschnitt (27) des genannten Speichertanks (15) für in Eis zu verwandelndes Wasser und dem restlichen Körper (29) des Speichertanks (15) für in Eis zu verwandelndes Wasser sind.

13. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** Anzeigemittel vorgesehen sind, um den Wartungs-, Inspektions- oder Reinigungsbedarf der Maschine (1) regelmäßig anzuzeigen.

14. Maschine (1) zur Herstellung von Eis nach einem oder mehreren der vorhergehenden Ansprüche, **da-**

durch gekennzeichnet, dass die genannten Anzeigemittel vom aufleuchtenden Typ sind.

Revendications

1. Machine (1) à former des glaçons comprenant un dispositif (7) pour pulvériser de l'eau dans une pluralité de cellules de formation de glace (9) dans ladite machine, au moins une pompe de recirculation (11) qui alimente le dispositif de pulvérisation (7) en eau, prélevée dans un réservoir de stockage (15) et destinée à être transformée en glace, par l'intermédiaire d'au moins une conduite de raccordement (13) ; et une trappe d'accès (21) à un compartiment de stockage (19) pour les glaçons formés dans ladite machine, au moins des premiers moyens de raccordement étant prévus pour relier au moins l'une desdites trappes (21), ledit dispositif de pulvérisation (7) et au moins une partie dudit réservoir (15) pour stocker l'eau à transformer en glace, de sorte à pouvoir les retirer de la machine (1), ledit dispositif de pulvérisation (7) comprenant une plaque inclinée (25) pour faire glisser la glace vers ledit compartiment d'accumulation des glaçons (19), lesdits moyens d'accouplement amovibles entre ledit dispositif de pulvérisation (7) et ladite au moins une conduite (13) étant des moyens de raccordement par encliquetage ou des moyens de raccordement à verrouillage par pression, **caractérisée en ce qu'**elle présente une zone (17) pour acheminer les glaçons contenant ledit dispositif de pulvérisation (7) et séparée par ladite trappe (21) du compartiment d'accumulation des glaçons (19).

2. Machine (1) à former de la glace selon la revendication précédente, **caractérisée en ce que** les premiers moyens de raccordement sont prévus pour relier ladite trappe (21) de sorte à pouvoir la retirer de la machine (1).

3. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** les seconds moyens de raccordement sont prévus pour relier ledit dispositif de pulvérisation (7) de sorte à pouvoir le retirer de la machine (1).

4. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** les troisièmes moyens de raccordement sont prévus pour relier ladite au moins une partie dudit réservoir de stockage (15) de l'eau à transformer en glace, de sorte à pouvoir la retirer de la machine (1).

5. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite trappe (21) comprend un premier élément fixe amovible (22) et un second élément pivotant (24) qui est également amovible.

6. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits moyens de raccordement comprennent des vis de fixation dudit premier élément (22) de la trappe (21) sur le carter (18) de l'évaporateur (10) ou sur une pièce (16) fixée au carter (18) de l'évaporateur (10).

7. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits premiers moyens de raccordement comprennent des moyens d'encliquetage comprenant des logements par encliquetage pouvant accueillir un pivot de rotation (23) dudit second élément (24) de la trappe (21).

8. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits logements par encliquetage sont réalisés à partir du carter (18) de l'évaporateur (10) ou d'une pièce (16) fixée au carter (18) de l'évaporateur (10).

9. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits logements par encliquetage sont réalisés à partir du premier élément (22) de la trappe (21).

10. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits seconds moyens de raccordement comprennent au moins un épaulement de support (37) et au moins un siège de verrouillage (39) pour ladite plaque (25) dudit dispositif de pulvérisation (7) réalisé sur la zone d'acheminement (17).

11. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits seconds moyens de raccordement comprennent également des moyens d'accouplement amovibles entre ledit dispositif de pulvérisation (7) et ladite au moins une conduite (13).

12. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits troisièmes moyens de raccordement se présentent sous la forme de moyens d'accouplement par vis, à baïonnette ou par verrouillage mécanique, entre une partie de base (27) dudit réservoir d'accumulation (15) pour l'eau à transformer en glace et ladite portion restante (29) du réservoir d'accumulation (15) pour l'eau à transformer en glace.

13. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** des moyens d'indication sont prévus pour indiquer régulièrement l'exigence d'entretien, de contrôle ou de nettoyage de la machine (1).

14. Machine (1) à former de la glace selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** lesdits moyens d'indication sont du type qui s'allume.

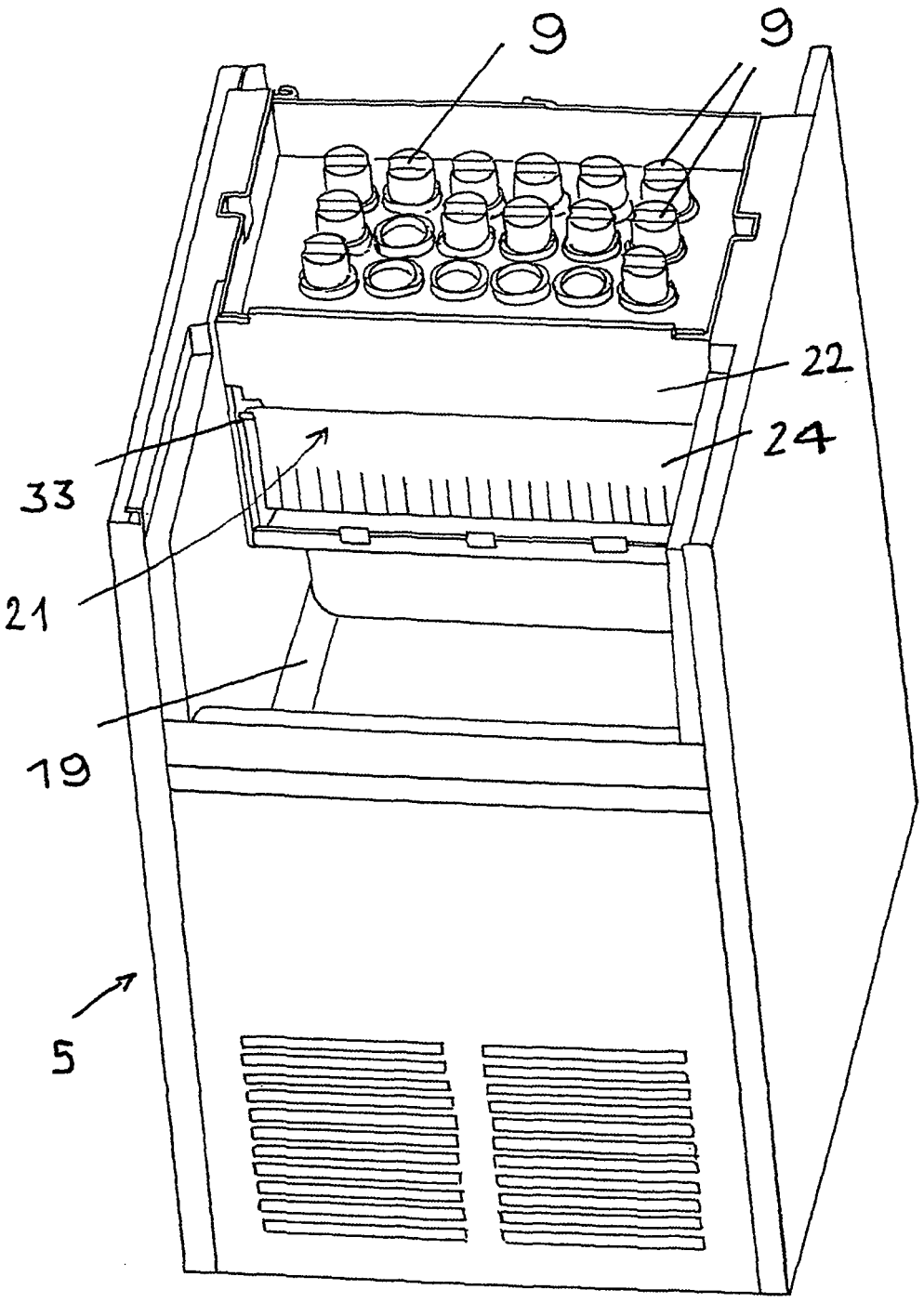


FIG. 1

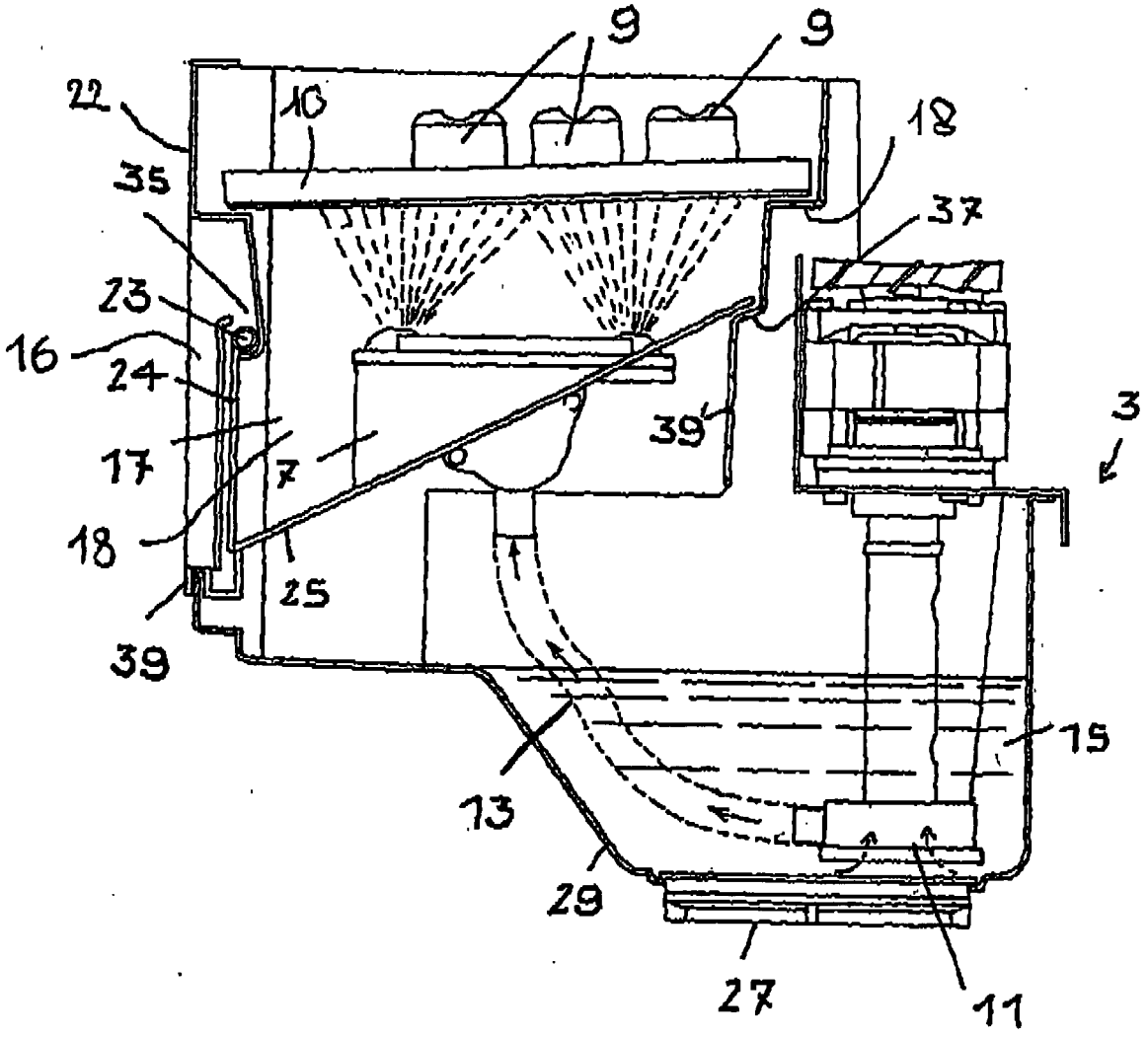


FIG. 2

Fig.3

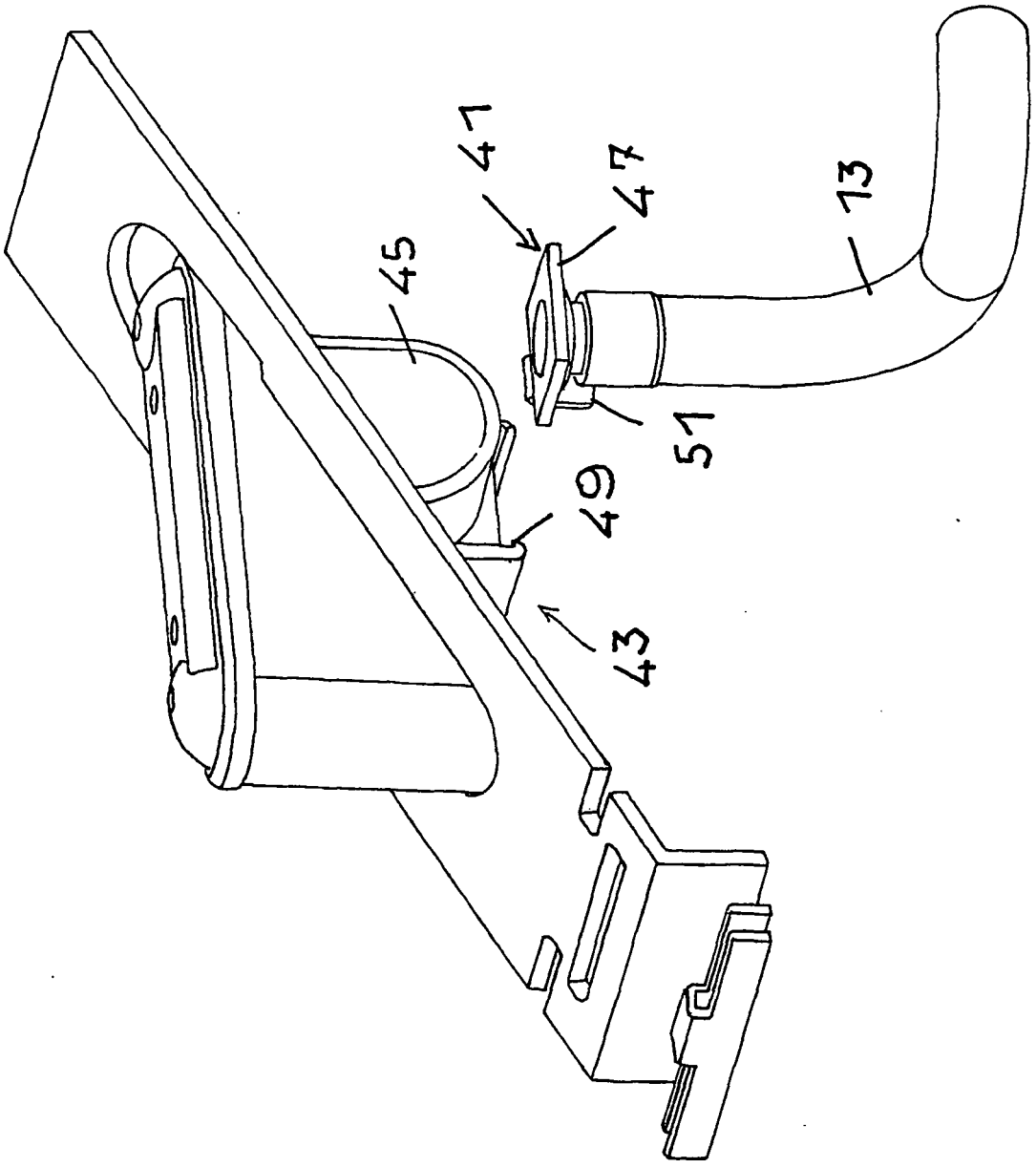
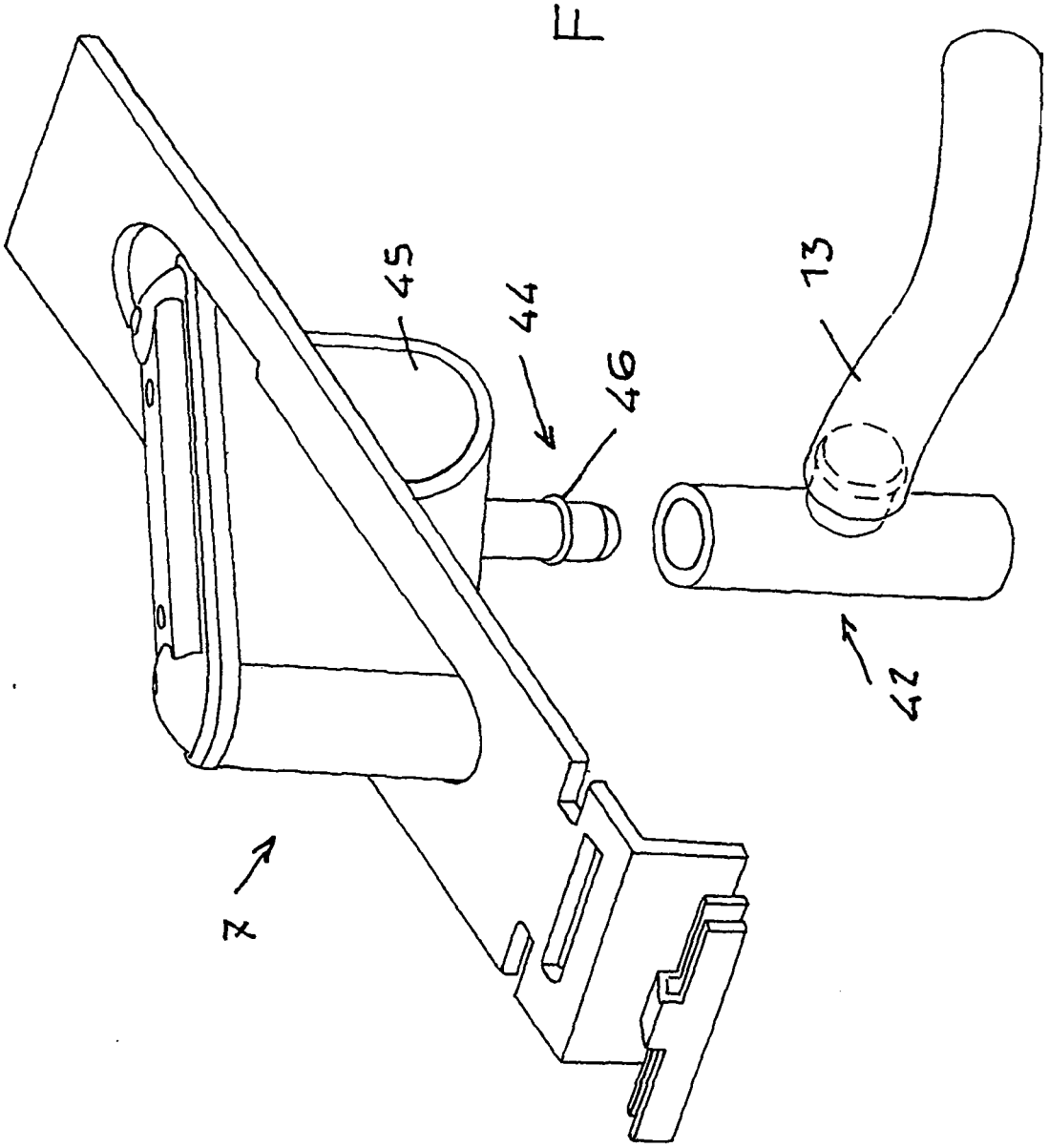


FIG 4



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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