



(11) **EP 1 832 218 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
21.01.2009 Bulletin 2009/04

(51) Int Cl.:
A47L 15/00 ^(2006.01) **A47L 15/44** ^(2006.01)
A47L 15/42 ^(2006.01)

(21) Application number: **07103652.9**

(22) Date of filing: **07.03.2007**

(54) **Machine for washing objects**

Vorrichtung zum Spülen von Gegenständen

Appareil pour le lavage d'objets

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE
SI SK TR**

(30) Priority: **08.03.2006 IT UD20060054**

(43) Date of publication of application:
12.09.2007 Bulletin 2007/37

(73) Proprietor: **DIHR SPA CON SOCIO UNICO
31033 Castelfranco Veneto (TV) (IT)**

(72) Inventors:
• **Spinetti, Alberto
16030, Cogorno (GE) (IT)**

• **Beraldo, Gianni
31033, Castelfranco Veneto (TV) (IT)**
• **Pasqualotto, Stefano
31033, Castelfranco Veneto (TV) (IT)**

(74) Representative: **Petraz, Gilberto Luigi et al
GLP S.r.l.
Piazzale Cavedalis 6/2
33100 Udine (IT)**

(56) References cited:
WO-A-80/02105 US-A- 3 553 895
US-A- 4 801 333

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 832 218 B1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a machine for washing objects by means of a washing substance consisting of liquid and granular elements, for example grains of plastic material. In particular, after delivery onto the objects to be washed, the machine according to the present invention is suitable to put the washing substance into circulation, separating the liquid from the granular elements.

BACKGROUND OF THE INVENTION

[0002] A machine is known for washing objects by means of a washing substance consisting of a liquid and of granular elements.

[0003] The known machine is provided with a washing chamber in which the objects to be washed are disposed, with pumps suitable to make the washing substance circulate, and with a plurality of nozzles connected to the outlet pipes of the pump.

[0004] The washing chamber comprises a lower container, in which the washing substance is collected after it has been delivered onto the objects to be washed.

[0005] The lower container is provided with a first compartment able to contain only the liquid, and with a second container able to contain the granular elements and the liquid.

[0006] The known machine has the disadvantage that it requires at least two pumps: a first pump connected to the first compartment to pick up the liquid only, and a second pump connected to the second compartment to pick up the granular elements mixed with the liquid.

[0007] A machine for washing objects is known, from the US patent US-A-4 801 333, in which the cleaning liquid is circulated alternatively with or without granules entrained therein. The cleaning liquid is drawn from a tank by means of a pump to be discharged therefrom under pressure towards the objects to be cleaned.

[0008] A machine for washing objects is also known, from the international patent application WO-A-80/02105, in which inside a liquid container is provided a liquid-preamble compartment or cassette providing a magazine for the granules and connected to a bottom outlet in a treatment chamber wherein the blasting shall take place. The compartment or cassette is connected by a valve-controlled opening to the suction side of a pump for sucking-in liquid from the liquid container via the cassette while carrying granules therefrom, and for supplying the liquid containing granules to the treatment chamber from which the granules are again supplied to the cassette through the bottom outlet.

[0009] One purpose of the present invention is to achieve a machine for washing objects that has a reduced number of components and little complexity.

[0010] Another purpose of the present invention is to

achieve a machine that is very reliable and that requires little or substantially no maintenance, with a consequent saving in the running costs of the machine.

[0011] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0012] The present invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0013] In accordance with the above purposes, a machine according to the present invention is able to be used for washing objects.

[0014] The machine according to the present invention comprises at least:

- a washing chamber in which the objects to be washed are disposed;
- pumping means able to make a washing substance circulate, consisting of at least a liquid and of granular elements, for example made of plastic material; and
- delivery means connected to the pumping means and able to deliver the washing substance towards the objects.

[0015] According to a characteristic of the present invention, the washing chamber comprises a first compartment able to contain the liquid, and a second compartment able to contain the granular elements and the liquid. The pumping means comprises a pump able to selectively pick up both the liquid contained in the first compartment, and also the granular elements and the liquid contained in the second compartment, in order to put them into circulation towards the delivery means.

[0016] The machine according to the present invention allows to selectively pick up the liquid and the granular elements with a single pump, and therefore has a reduced number of components and little complexity, advantageously using components normally available on the market, easily accessible and simple to repair.

[0017] Advantageously, the machine according to the present invention comprises valve means associated both with the first and also with the second compartment which, in cooperation with the pump, are able to be activated to determine the pick-up from each compartment.

[0018] According to one form of embodiment of the invention, the pump outlet is connected to the delivery means, while the pump intake is connected to both the first and also to the second compartment.

[0019] The machine comprises a single command member having a central shaft connected on opposite sides with two valves of the valve means, so that when one valve of the valve means is open, the other valve is closed, and vice versa.

[0020] According to an arrangement, the pump intake is connected to the first compartment only, and the machine according to the invention also comprises at least a connection element, connected to the second compartment and disposed between the pump and the delivery means.

[0021] The connection element defines, in cooperation with the liquid taken in by the pump, a depression able to pick up the granular elements and the liquid contained in the second compartment, according to the so-called Venturi effect.

[0022] This variant allows to transport a volume of liquid with a greater concentration of granular elements compared to known machines, given that the granular elements do not pass through the pump.

[0023] According to one embodiment of the invention, the two compartments are separated from each other by separation means able to prevent the granular elements from passing from the second compartment to the first compartment, while still allowing the liquid to pass between the two compartments.

[0024] Thanks to the separation means, the two compartments allow to separate the granular elements simply, economically and without requiring any type of maintenance, and substantially without using any part that is movable or to be moved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a schematic view of a machine according to the present invention for washing objects;
- fig. 2 is a lateral view, partly sectioned, of a machine according to the present invention;
- fig. 3 is a front view, partly sectioned, of the machine in fig. 2;
- fig. 4 is a plane view, partly sectioned, of the machine in fig. 2;
- fig. 5 is a schematic view of a first variant of the machine in fig. 1;
- fig. 6 is a lateral view, partly sectioned, of a machine according to the variant in fig. 5;
- fig. 7 is a front view, partly sectioned, of the machine in fig. 6;
- fig. 8 is a plane view, partly sectioned, of the machine in fig. 6;
- fig. 9 is a lateral view, partly sectioned, of a second variant of the machine in fig. 1;
- fig. 10 is a front view, partly sectioned, of the machine in fig. 9;
- fig. 11 is a plane view, partly sectioned, of the machine in fig. 9;
- fig. 12 is a lateral view, partly sectioned, of a third

variant of the machine in fig. 1;

- fig. 13 is a front view, partly sectioned, of the machine in fig. 12;
- fig. 14 is a plane view, partly sectioned, of the machine in fig. 12.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0026] With reference to fig. 1, a machine 10 according to the present invention can be used to wash objects 12, for example dishes, saucepans, pots and not only.

[0027] The machine 10 (figs. 1 to 4) comprises at least a containing structure 14, inside which a washing chamber 16 is made, in which the objects 12 to be washed are disposed. For example, the sizes of the washing chamber 16 are such as to contain a basket 17, of standard sizes, to contain the objects 12.

[0028] The machine 10 also comprises a pump 18, for example of the centrifugal type, able to make a washing substance 20 circulate, consisting of at least a liquid 22 and of granular elements 24, preferably but not necessarily having a greater specific weight than that of the liquid 22.

[0029] The liquid 22 for example comprises water with a detergent material added, specific for the use of the machine 10, and the granular elements 24 comprise grains of plastic material, of a known type.

[0030] The machine 10 also comprises a plurality of delivery nozzles 26, connected to the pump 18 and able to deliver the washing substance 20 to the objects 12.

[0031] The delivery nozzles 26 are shaped advantageously so that they are not obstructed by the washing substance 20.

[0032] The washing chamber 16 comprises a first compartment 30 able to contain the liquid 22, and a second compartment 32 able to contain the granular elements 24 and the liquid 22.

[0033] The first compartment 30 is separated from the second compartment 32 by means of a holed wall 34, for example made of sheet metal, and advantageously kept in a fixed position.

[0034] The holed wall 34 is provided with transverse holes, not shown in the drawings, having a size such as to prevent the granular elements 24 from passing from the second compartment 32 to the first compartment 30, but such as to allow the passage of the liquid 22 between the two compartment 30 and 32.

[0035] Each compartment 30, 32 is provided with a lower aperture connected by means of a sleeve to a corresponding valve 36, 38.

[0036] The two valves 36 and 38 are advantageously connected to two outputs 39a, respectively 39b, of a single command member 39, of a known type and commanded electrically. For example, the two outputs 39a and 39b belong to the same central shaft of the command member 39, able to rotate around its own axis, so as to open and close the valves 38, 39. Advantageously, the

two valves 36 and 38 are connected to the outputs 39a and 39b so as to be angularly offset with respect to each other by 90°, so that when one is open the other is closed, and vice versa.

[0037] Each valve 36, 38 is connected to a common collector 40 which is in turn connected to the intake of the pump 18.

[0038] When the pump 18 is activated, it selectively picks up the liquid 22 from the first compartment 30 and the granular elements 24 and the liquid 22 from the second compartment 32, by means of the collector 40, in order to put them into circulation to the delivery nozzles 26.

[0039] If the first valve 36 is open and the second valve 38 is closed, the pump 18 only picks up liquid 22 from the first compartment 30.

[0040] On the contrary, when the second valve 38 is open and the first valve 36 is closed, the pump 18 picks up both the liquid 22 and also the granular elements 24. The quantity of the granular elements 24 is proportional to the aperture of said second valve 38.

[0041] The washing substance 20, obtained from the mixture of a determinate quantity of liquid 22 and a determinate quantity of granular elements 24, is thrown under pressure by the delivery nozzles 26 against the objects 12 to be washed, thus generating a mechanical action combined with the detergent action of the liquid 22.

[0042] The washing substance 20 then falls back into the second compartment 32, where the granular elements 24 are stopped by the holed wall 34, whereas the liquid 22 continues towards the first compartment 30.

[0043] At the top of the second compartment 32 a filter 28 is advantageously disposed, of the removable type, able to block the entry of extraneous objects into the second compartment 32 of a size greater than that of the granular elements 24.

[0044] According to a first variant shown in figs. 5 to 8, in a machine 110, the second compartment 32 is defined by a hopper 134, consisting of a holed lateral wall 135 and a bottom wall 136. According to said first variant, the machine 110 also comprises a connection element, for example an ejector 42, connected to the lower aperture of the second compartment 32. In this configuration, the lower aperture of the first compartment 30 is connected to the intake of the pump 18.

[0045] The ejector 42 is connected to the outlet of the pump 18 and defines, due to the Venturi effect, a depression able to pick up the granular elements 24 mixed with the liquid 22, and contained in the second compartment 32, in cooperation with the liquid 22 taken in by the pump 18 from the first compartment 30.

[0046] The machine 110 also comprises an interceptor valve 44 disposed between the lower aperture of the second compartment 32 and the ejector 42 and able to be activated to determine the picking up of the granular elements 24 and the liquid 22 from the second compartment 32 and to regulate the quantity of granular elements 24 picked up from the second compartment 32 with re-

spect to the overall quantity of washing substance 20 picked up.

[0047] According to a second variant, shown in figs. 9 to 11, a machine 210 according to the present invention comprises a washing chamber 216 having sizes such as to obtain a capacity substantially double that of the washing chamber 16 in fig. 2 or fig. 6, so that two baskets 17, of standard sizes, can be inserted into the washing chamber 216 adjacent to each other.

[0048] According to this second variant, the machine 210 comprises two independent pumps 18, each connected to a series of delivery nozzles 26, disposed inside the washing chamber 216, associated with the opposite vertical walls. The two pumps 18 are both connected to the collector 40, common with the two valves 36 and 38, which are connected, as in the solution shown in fig. 1, one to the first compartment 30 and the other to the second compartment 32, and are commanded by the same command member 39.

[0049] According to a third variant, shown in figs. 12 to 14, a machine 310 according to the present invention comprises a washing chamber 316 identical to that in the washing chamber 216.

[0050] In this third variant, however, apart from comprising two independent pumps 18 as in the second variant described above, the machine 310 also comprises two groups of valves 36 and 38 (fig. 14), each commanded by a command member 39. Moreover, each group of valves 36 and 38 is connected to the corresponding pump 18 by a specific collector 40a, respectively 40b, instead of by a single common collector.

[0051] Moreover, in this third variant, a single compartment 32 is provided, disposed centrally, to contain the granular elements 24, which functions as a "second compartment" and which is connected to the two valves 38. At the two opposite sides of the central compartment 32 and separated therefrom by holed walls, two compartments 30 are disposed for the liquid 22, each of which functions as a "first compartment". Each of the two first compartments 30 is connected to one of the two valves 36. In this way we achieve two independent circuits, one for the series of delivery nozzles 26 on the right and the other for those on the left of the washing chamber 316.

[0052] It is clear that modifications and/or additions of parts may be made to the machines for washing objects as described heretofore, without departing from the scope of the present invention as defined in the appended claims.

[0053] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of machines for washing objects, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Machine for washing objects (12) comprising at least a washing chamber (16, 216, 316) in which said objects (12) to be washed are able to be disposed, pumping means (18) able to make a washing substance (20) circulate, consisting at least of a liquid (22) and of granular elements (24), and delivery means (26) connected to said pumping means (18) and able to deliver said washing substance (20) to said objects (12), wherein said washing chamber (16, 216, 316) comprises a first compartment (30) able to contain said liquid (22), and a second compartment (32) able to contain said granular elements (24) together with said liquid (22), the pumping means comprising a pump (18) able to selectively and/or simultaneously pick up both said liquid (22) and also said granular elements (24), in order to put them into circulation towards said delivery means (26), wherein valve means (36, 38, 44) are connected to at least one of said first and second compartment (30, 32) and are able to be selectively activated in order to determine the picking up of said granular elements (24) and of said liquid (22), **characterized in that** the machine further comprises a single command member (39) having a central shaft connected on opposite sides (39a, 39b) with two valves (36, 38) comprised in said valve means, so that when one valve (36, 38) of said two valves is open, the other valve (38, 36) is closed, and vice versa.
2. Machine as in the claim hereinbefore, **characterized in that** it also comprises separation means (34, 134) able to separate from each other said first compartment (30) and said second compartment (32), and able to prevent said granular elements (24) from passing from said second compartment (32) to said first compartment, while allowing said liquid (22) to pass freely between said two compartments (30, 32).
3. Machine as in claim 2, **characterized in that** said separation means comprises a holed wall (34, 134) disposed in a fixed position.
4. Machine as in claim 1, wherein said washing chamber (216, 316) has sizes such as to be able to contain two baskets (17) of standard size, one adjacent to the other, and wherein said delivery means are nozzles (26), said nozzles (26) being divided into at least two series, wherein said pumping means comprises a second (18), each of said two pumps (18) being connected in output to one of said series of delivery nozzles (26), and in intake to said first and second compartment (30, 32) by means of said valve means (36, 38).
5. Machine as in claim 1, **characterized in that** it comprises a second pump (18) and two of said first com-

partments (30), both said first compartments (30) being disposed on opposite sides with respect to said second compartment (32), wherein said valve means comprise two further valves (36, 38) connected to a single command member (39), and **in that** each group of said valves (36, 38) is connected, on one side, to said second compartment (32) and to a different one said two first compartments (30), and on the other side, to one of said two pumps (18), by means of a corresponding collector (40a, 40b).

Patentansprüche

1. Gerät zum Spülen von Gegenständen (12), enthaltend wenigstens eine Spülkammer (16, 216, 316), in der die zu spülenden Gegenstände (12) angeordnet werden können, eine Pumpeinrichtung (18), die in der Lage ist, eine Spülsubstanz (20) umzuwälzen, die wenigstens aus einer Flüssigkeit (22) und körnigen Elementen (24) besteht, und eine Zuführeinrichtung (26), die mit der Pumpeinrichtung (18) verbunden und in der Lage ist, die Spülsubstanz (20) den Gegenständen (12) zuzuführen, wobei die Spülkammer (16, 216, 316) ein erstes Abteil (30), das die Flüssigkeit (22) aufnehmen kann, und ein zweites Abteil (32) enthält, das die körnigen Elemente (24) zusammen mit der Flüssigkeit (22) aufnehmen kann und die Pumpeinrichtung eine Pumpe (18) enthält, die in der Lage ist, wahlweise und/oder gleichzeitig sowohl die Flüssigkeit (22) als auch die körnigen Elemente (24) aufzunehmen, um sie in Umwälzung zur Zuführeinrichtung (26) zu versetzen, wobei Ventileinrichtungen (36, 38, 44) mit dem ersten und/oder dem zweiten Abteil (30, 32) verbunden und in der Lage sind, wahlweise aktiviert zu werden, um die Aufnahme der körnigen Elemente (24) und der Flüssigkeit (22) zu bestimmen, **dadurch gekennzeichnet, dass** das Gerät weiterhin ein einziges Steuerelement (39) enthält, das eine zentrale Welle hat, die auf gegenüberliegenden Seiten (39a, 39b) mit zwei Ventilen (36, 38) verbunden ist, die in den Ventileinrichtungen enthalten sind, so dass, wenn ein Ventil (36, 38) der beiden Ventile geöffnet ist, das andere Ventil (36, 38) geschlossen ist und umgekehrt.
2. Gerät gemäß dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** es zudem eine Trenneinrichtung (34, 134) enthält, die in der Lage ist, das erste Abteil (30) und das zweite Abteil (32) voneinander zu trennen, und verhindern kann, dass die körnigen Elemente (24) vom zweiten Abteil (32) in das erste Abteil gelangen, während die Flüssigkeit (22) frei zwischen den beiden Abteilen (30, 32) passieren kann.
3. Gerät nach Anspruch 2, **dadurch gekennzeichnet,**

dass die Trenneinrichtung eine mit Löchern versehene Wand (34, 134) enthält, die an einer unveränderlichen Position angeordnet ist.

4. Gerät nach Anspruch 1, bei dem die Spülkammer (216, 316) Größen hat, die derart beschaffen sind, dass sie in der Lage ist, zwei Körbe (17) einer Standardgröße nebeneinander aufzunehmen, und wobei die Zuführeinrichtung Düsen sind, wobei die Düsen (26) in wenigstens zwei Abfolgen unterteilt sind, die Pumpeinrichtung eine zweite Pumpe (18) enthält und jede der beiden Pumpen (18) am Ausgang mit einer der Abfolgen von Zufühdüsen (26) und am Eingang mit dem ersten und dem zweiten Abteil (30, 32) mit Hilfe der Ventileinrichtungen (36, 38) verbunden ist.
5. Gerät nach Anspruch 1, **dadurch gekennzeichnet, dass** es eine zweite Pumpe (18) und zwei der ersten Abteile (30) enthält, wobei beide erste Abteile (30) auf gegenüberliegenden Seiten im Bezug auf das zweite Abteil (32) angeordnet sind, wobei die Ventileinrichtungen weiterhin zwei Ventile (36, 38) enthalten, die mit einem einzigen Steuerelement (39) verbunden sind, und **dadurch**, dass jede Gruppe der Ventile (36, 38) auf einer Seite mit dem zweiten Abteil (32) und mit einem anderen der beiden ersten Abteile (30) und auf der anderen Seite mit einer der beiden Pumpen (18) mit Hilfe einer entsprechenden Sammeleinrichtung (40a, 40b) verbunden ist.

Revendications

1. Appareil pour le lavage d'objets (12), comprenant au moins une chambre de lavage (16, 216, 316) dans laquelle peuvent être placés lesdits objets (12) à laver, des moyens de pompage (18) aptes à faire circuler une substance de lavage (20) constituée au moins d'un liquide (22) et d'éléments granulaires (24), et des moyens de distribution (26) reliés auxdits moyens de pompage (18) et aptes à distribuer ladite substance de lavage (20) auxdits objets (12), appareil dans lequel ladite chambre de lavage (16, 216, 316) comprend un premier compartiment (30) pouvant contenir ledit liquide (22), et un second compartiment (32) pouvant contenir lesdits éléments granulaires (24) conjointement audit liquide (22), les moyens de pompage comprenant une pompe (18) apte à prélever sélectivement et/ou simultanément ludit liquides (22) ainsi que lesdits éléments granulaires (24), afin de les mettre en circulation vers lesdits moyens de distribution (26), dans lequel des systèmes de vannes (36, 38, 44) sont reliés à l'un au moins desdits premier et second compartiments (30, 32) et peuvent être actionnés sélectivement afin de déterminer le prélèvement desdits éléments granulaires (24) et dudit liquide (22), **caractérisé en ce**

que l'appareil comprend en outre un organe de commande unique (39) ayant un axe central relié, sur les côtés opposés (39a, 39b), à deux vannes (36, 38) appartenant auxdits systèmes de vannes, de sorte que lorsque l'une (36, 38) desdits deux vannes est ouverte, l'autre vanne (38, 36) est fermée, et vice-versa.

2. Appareil selon la revendication précédente, **caractérisé en ce qu'il** comprend aussi un moyen de séparation (34, 134), apte à séparer ledit premier compartiment (30) dudit second compartiment (32) et à empêcher lesdits éléments granulaires (24) de passer dudit second compartiment (32) audit premier compartiment, tout en permettant audit liquide (22) de passer librement entre lesdits deux compartiments (30, 32).
3. Appareil selon la revendication 2, **caractérisé en ce que** ledit moyen de séparation comprend une paroi perforée (34, 134) placée en position fixe.
4. Appareil selon la revendication 1, dans lequel ladite chambre de lavage (216, 316) est de dimensions telles qu'elle peut contenir deux paniers (17) de taille standard, placés côte à côte, et dans lequel lesdits moyens de distribution sont des buses (26) divisées en au moins deux séries, lesdits moyens de pompage comprenant une seconde pompe (18), chacune desdites deux pompes (18) étant reliée en sortie à l'une desdites séries de buses de distribution (26), et en entrée auxdits premier et second compartiments (30, 32) par lesdits systèmes de vannes (36, 38).
5. Appareil selon la revendication 1, **caractérisé en ce qu'il** comprend une seconde pompe (18) et deux desdits premiers compartiments (30), lesdits deux premiers compartiments (30) étant placés de part et d'autre dudit second compartiment (32), appareil dans lequel lesdits systèmes de vannes comprennent deux vannes supplémentaires (36, 38) reliées à un organe de commande unique (39), et **en ce que** chaque groupe desdits vannes (36, 38) est relié, d'un côté, audit second compartiment (32) et à un compartiment différent desdits deux premiers compartiments (30) et, de l'autre côté, à l'une desdites deux pompes (18), par l'intermédiaire d'un collecteur correspondant (40a, 40b).

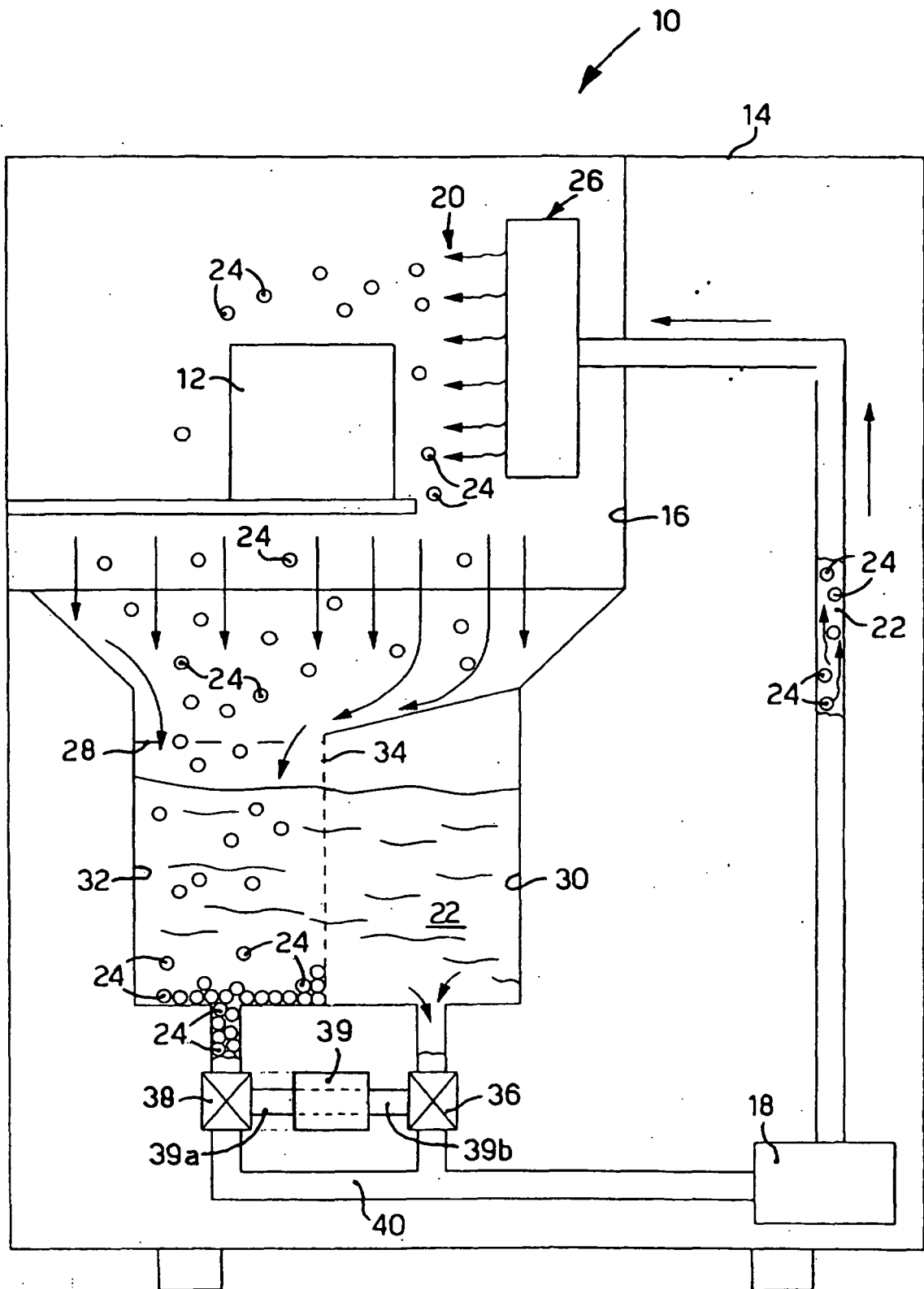
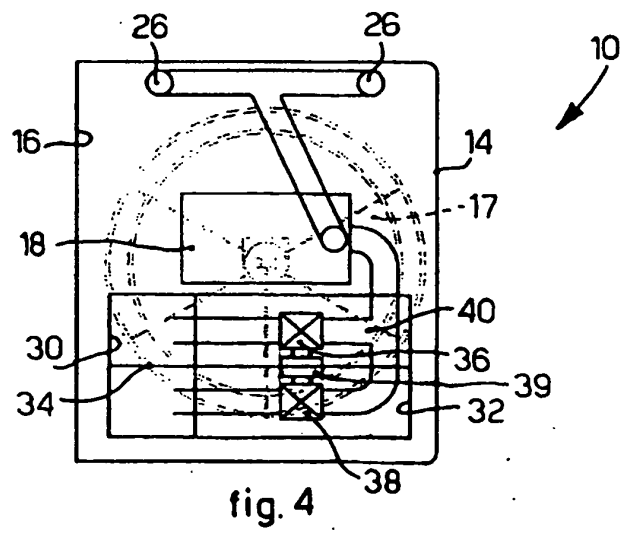
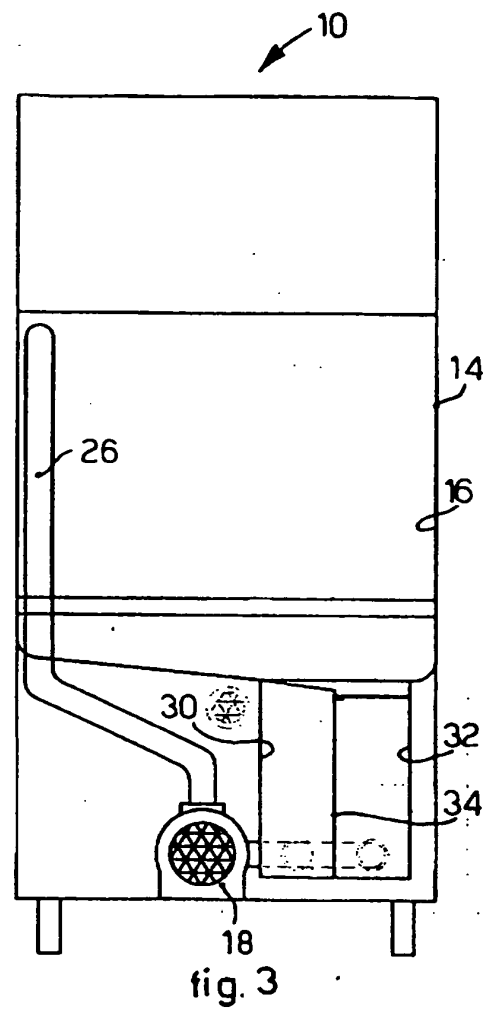
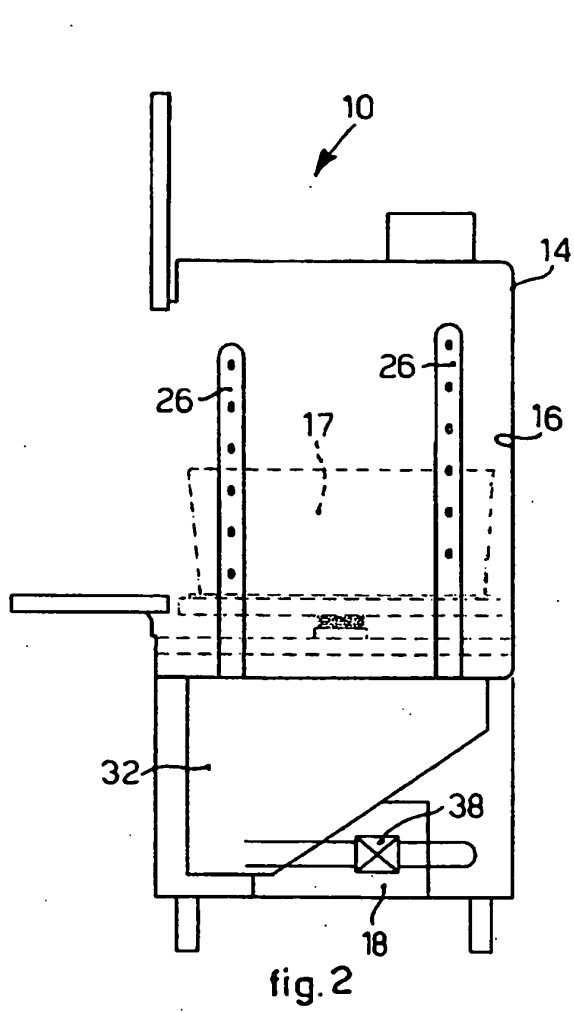


fig.1



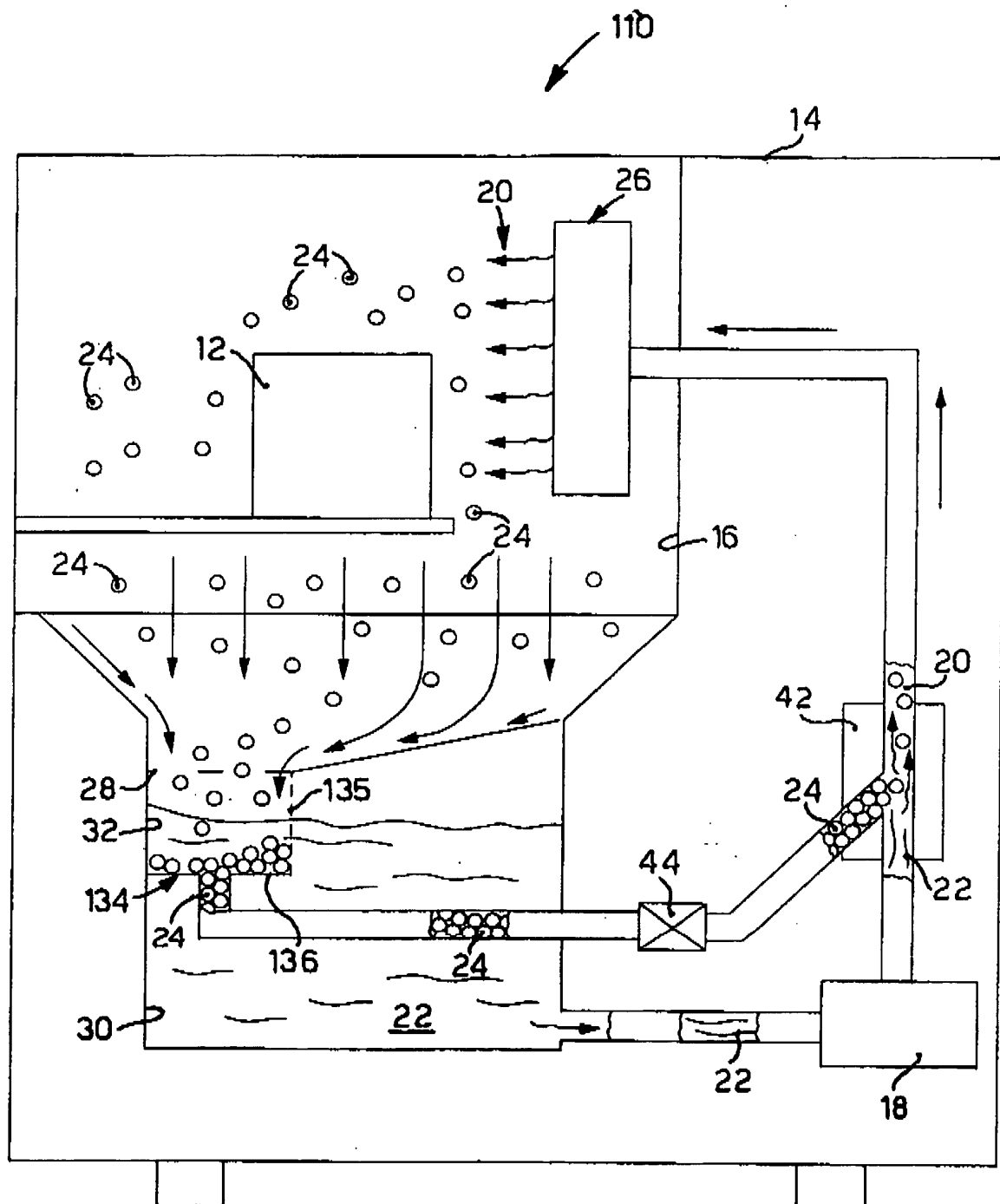
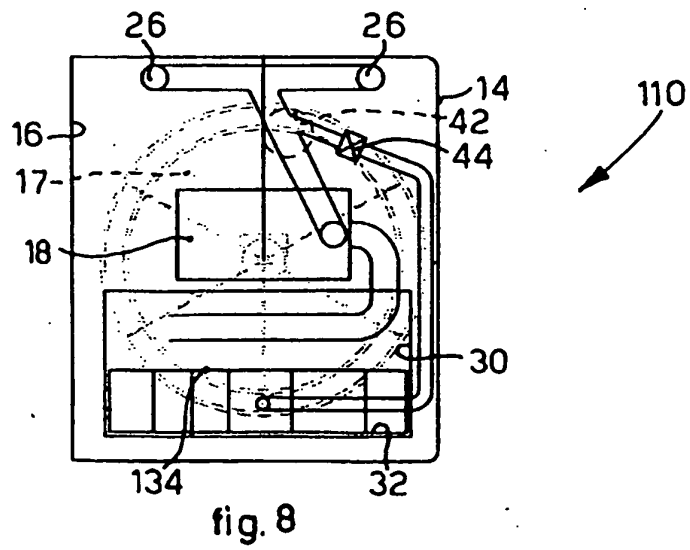
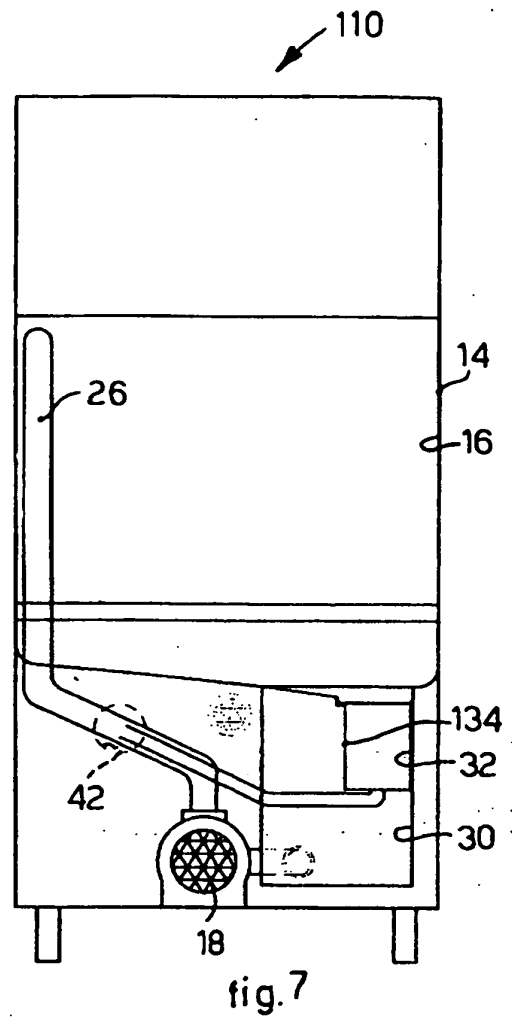
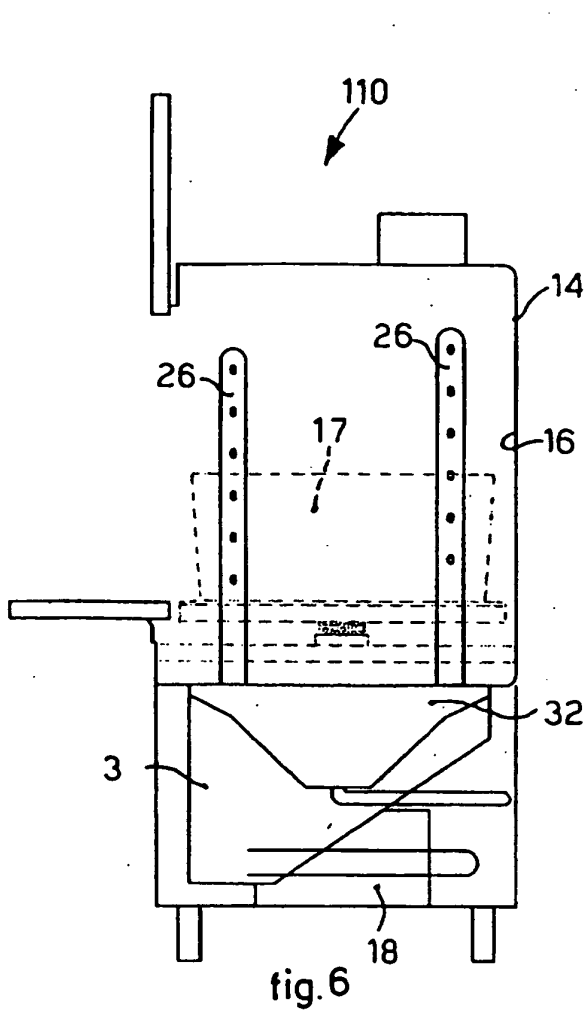
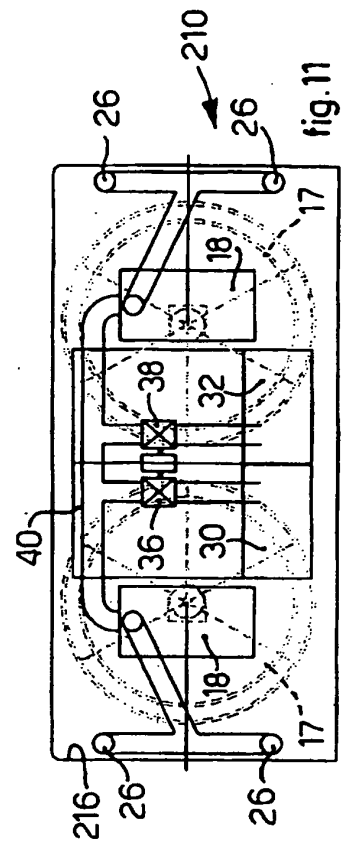
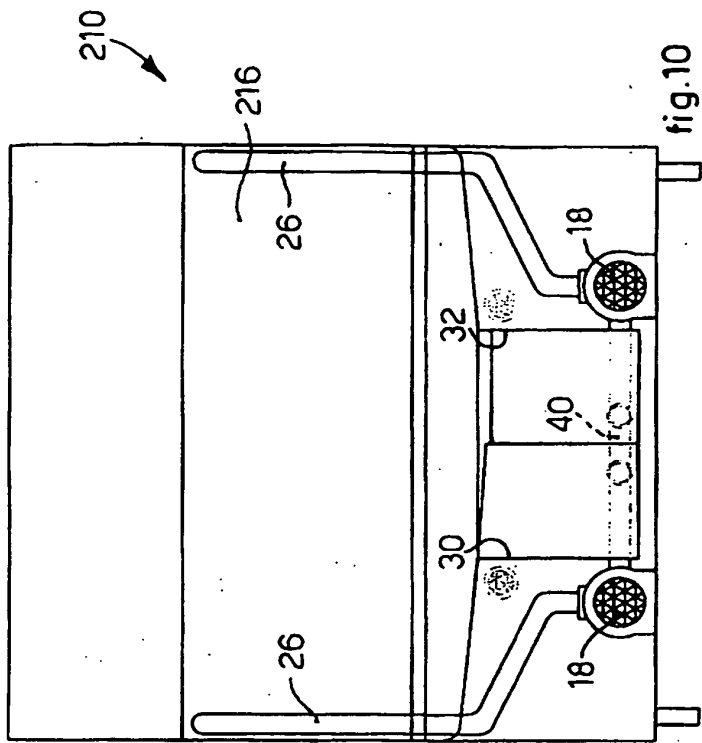
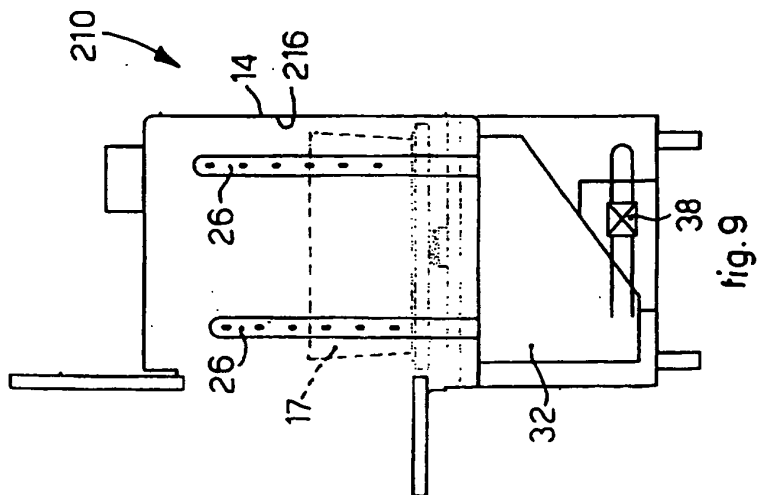
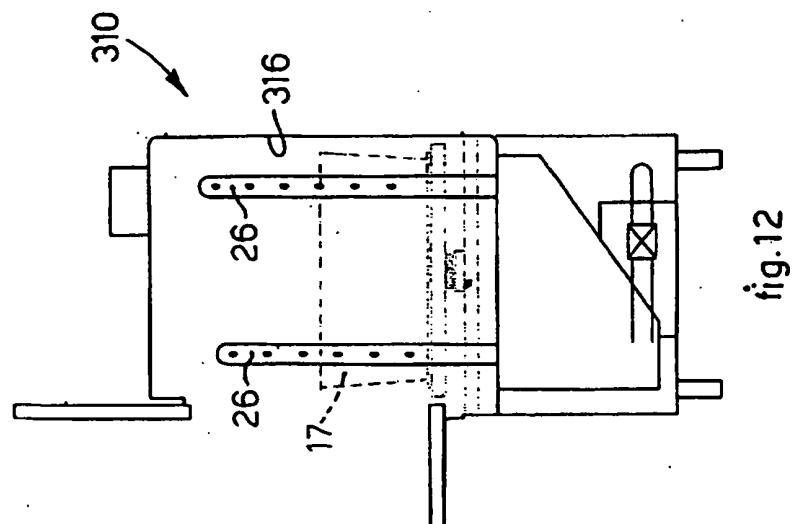
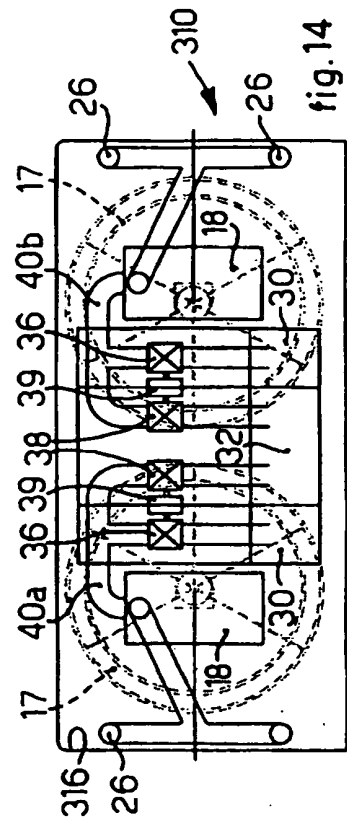
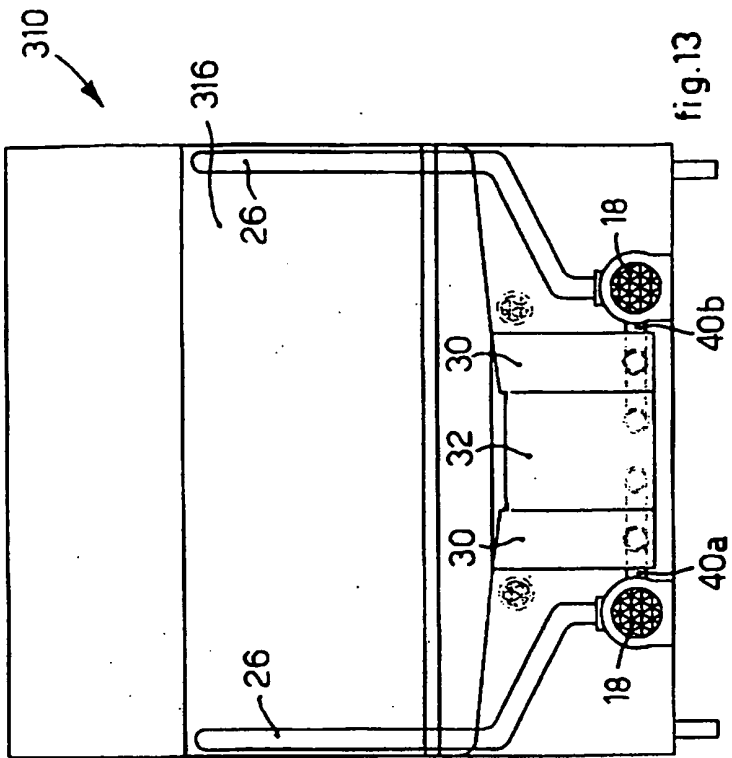


fig. 5







REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4801333 A [0007]
- WO 8002105 A [0008]