



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**05.05.2010 Bulletin 2010/18**

(51) Int Cl.:  
**B08B 1/00 (2006.01)** **B01F 15/00 (2006.01)**  
**B01F 7/16 (2006.01)**

(21) Application number: **09013401.6**

(22) Date of filing: **23.10.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR**  
Designated Extension States:  
**AL BA RS**

(72) Inventors:  
• **Drocco, Luca**  
**12051 Alba (CN) (IT)**  
• **Drocco, Mario**  
**12051 Alba (CN) (IT)**  
• **Drocco, Matteo**  
**12051 Alba (CN) (IT)**

(30) Priority: **31.10.2008 IT TO20080808**

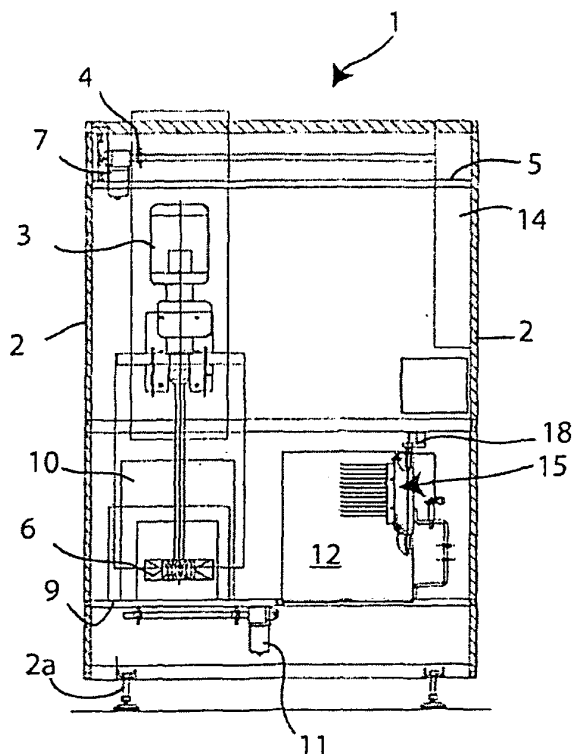
(71) Applicant: **Dromont S.p.A.**  
**12060 Grinzane Cavour (CN) (IT)**

(74) Representative: **Lotti, Giorgio**  
**Corso Vittorio Emanuele II 61**  
**10128 Torino (IT)**

(54) **Device for mixing fluid products contained in substantially rigid containers and associated method**

(57) A device (1) for mixing fluid products contained in substantially rigid containers (10) comprising a frame (2); a first motor (3), movable inside the frame (2); at least one mixing blade (6), which is actuated by said first motor

(3) and being able to mix said fluid product contained into one of the said containers (10); the device (1) possesses some cleaning means (12, 15, 16, 18) of at least one blade (6) being able to remove from it possible traces of fluid remaining after the mixing of the same.



**Fig. 1**

## Description

**[0001]** The present invention refers to the field of fluid product processing and in detail it refers to a device for mixing fluid products contained in substantially rigid containers and to the associated method.

**[0002]** It is known that the fluid products, such as varnishes, paints or generally liquids formed by many components must be stirred or mixed for enabling the components themselves to amalgamate among them.

**[0003]** Mixing devices for allowing the mixing of the components of the fluid products are known. These devices act through a blade, typically helix-shaped, that is immersed into a substantially rigid container that is at least partially filled with the fluid to be mixed.

**[0004]** The devices for mixing fluids of known kind, once the mixing process has been started, provide for the immersion of the blade into the container and then mix the fluid itself for a predetermined period.

**[0005]** However, the devices for mixing fluids contained into substantially rigid containers of known kind present some disadvantages.

**[0006]** Among the disadvantages there is for example the fact that the fluid optimal mixing varies according to the fluid viscosity.

**[0007]** For seeking for an highest possible flexibility of the device for mixing fluids, it is therefore necessary that the mixing time can be defined according to the kind of the fluid used, in such a way as not to oblige to purchase more different devices for each typology of fluid used.

**[0008]** Secondly, during the mixing of the fluid some granulous parts which tend to deposit into the container in a position that is remote with respect to the position of the helix-blade. Typically, this originates a non-uniform mixing, wherein, i.e., into the container, some areas will present a fluid mixed better than the others. This phenomenon is particularly necessary when the mixing fluid is very viscous, and tends to less self-mix through simple agitation due, for example, to the transport of it.

**[0009]** Furthermore, the devices for mixing fluid products contained in substantially rigid containers typically do not allow for an efficient washing of the blade at the end of the fluid mixing operation.

**[0010]** The blade-washing procedure, in particular for fluids such varnishes or similar having different colors, is particularly important for preventing the contamination of the successive fluid product to be mixed with the residuals of the preceding fluid.

## DISCLOSURE OF THE INVENTION

**[0011]** The purpose of the present invention is to realize a device for mixing fluid products contained in substantially rigid containers, that is free from the above described disadvantages.

**[0012]** According to the present invention a device for mixing fluid products contained in substantially rigid containers is realized according to the claim number one.

**[0013]** Another purpose of the present invention is to provide a method of mixing a fluid contained into partially rigid containers that solves the above described disadvantages.

**[0014]** Furthermore, according to the present invention a method of mixing fluid products contained in substantially rigid containers is provided as claimed in claim 12.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0015]** The invention will be now described with reference to the appended drawings, that illustrate a not restrictive example of embodiment, wherein:

- the figure 1 shows a front view of the interior of a device for mixing fluid products contained in substantially rigid containers according to the present invention in a first operative configuration;
- the figure 2 shows a lateral view of the interior of the device of figure 1;
- the figure 3 shows an upper view of the device of figure 1;
- the figure 4 shows a front view of the interior of a device for mixing fluid products contained in substantially rigid containers according to the present invention in a second operative configuration;
- the figure 5 shows a lateral view of the interior of the device according to the present invention in the operative configuration shown in figure 4; and
- the figure 6 shows eventually an upper view of the device according to the present invention in the operative configuration of figure 4.

## DETAILED DESCRIPTION OF THE INVENTION

**[0016]** With reference to figure 1, a device for mixing fluid products contained in substantially rigid containers is generally designated with the reference number 1.

**[0017]** The device 1 comprises:

- a frame 2 that realizes a sustaining means for the parts of the device 1;
- a first motor 3, mounted on a carriage 4 movable on guides 5 in a substantially horizontal direction; the motor 3 allows for the rotation of at least a mixing blade 6 for mixing the fluid;
- a second and a third motor 7, 8 for horizontally and vertically moving the first motor 3 respectively;
- a supporting plane 9 movable through a fourth motor 11 and whose purpose is to support a fluid container 10.

**[0018]** The frame 2 is realized with preferably metallic material section bars and anyhow sufficiently rugged for bearing the weight of the device 1, and its shape is such as to substantially determine the overall dimensions of the device itself.

**[0019]** In the lower part of the device 1 there is a plu-

rality of supporting feet 2a, for separating the frame 2 from the ground; these supporting feet 2a are adjustable in height in such a way as to allow for steadily leaning the device 1 on a floor or on the ground even not perfectly plane.

**[0020]** In detail the first motor 3, preferably of electrical supply type, is coupled to a rotating shaft 3a having a first and a second end; the first end protrudes into the first motor 3, whereas the second end is fixed to the mixing blade 6 in such a way that the rotating shaft 3a and the mixing blade 6 itself integrally rotate.

**[0021]** Depending on the rotation speed of the first motor 3, the coupling with the rotating shaft 3a can be direct or through speed reduction means.

**[0022]** The carriage 4 is movable between a first position of use and a second position of use.

**[0023]** In the first position of use, shown in figures 1-3, the carriage 4 is arranged in proximity of a first side of the device 1; the first position of use is the one wherein the mixing of the fluid contained into the container 10 is made.

**[0024]** In the second position of use, shown instead in figures 4-6, the carriage 4 arranges in proximity of a second side opposed to the first; in the second position of use the washing of the mixing blade 6 is made into a washing tank 12, having a basis positioned at an height substantially equal to the height of the supporting plane 9.

**[0025]** The first motor 3 is also movable in vertical direction. This allows for inserting the fluid container 10 under the mixing blade 6, before the mixing of the fluid itself, thus inserting the container 10 on the supporting plane 9.

**[0026]** Eventually, the device 1 comprises a front plane 13, positioned on the front part of the device itself and substantially horizontally positioned.

**[0027]** This front plane 13 possesses a plurality of idle mounted rollers 13a, substantially oriented in a direction orthogonal to the movement direction of the carriage 4, that allow for easily translating the container 10 filled with liquid.

**[0028]** The front plane 13 protrudes for the maximum part outside of the frame 2, and therefore it is separated from the interior of it. In fact, even if the device 1 is shown as free from closing walls in the appended figures, this representation is made for allowing the representation of the interior of the device 1; however, around the frame 2, that is dotted represented, a plurality of opportunely shaped paintings is arranged, for insulating the interior of the frame 2 from the surrounding environment. These paintings have primarily a protection purpose during the use of the device in such a way as to prevent that during the mixing the fluid does not splash outside the device 1, but they can be provided with flame proof or noise absorbent coverings.

**[0029]** The interior of the frame 2 can be entered from the front plane 13 through a sliding door 14, that substantially horizontally slides on a pair of guides, which is movable between a first closed position and a second

open position. Once it is opened, the sliding door 14 allows for entering into an area vertically coincident to the first position of use of the carriage 4. The sliding door 14 is therefore positioned in proximity of the supporting plane 9.

**[0030]** The dimension of the sliding door 14 is such to allow for the passage of the container of the fluid to be mixed, and in particular, during the planning phase of the device 1, it is designed in such a way as to allow for the passage of the biggest container upon which the device 1 can operate.

**[0031]** In order to comply with the need of operating even on elliptical containers and to allow for correctly mixing the fluid without creating in the interior of the container parts of fluid less mixed than others, during the mixing phase the supporting plane 9 can move.

**[0032]** In detail, the supporting plane 9 can horizontally translate on two substantially orthogonal directions, through the movement imposed by the fourth motor 11.

**[0033]** In detail the stroke that the supporting plane 9 can perform is defined according to the type of fluid container 10 during the planning phase of the device 1, and is limited by one or more position sensors or limit stops of known kind, which send electrical signals to the hardware and/or software control system 14, such that when the end of the abovementioned stroke is reached, the motor 11 is stopped and successively rotated in inverse direction.

**[0034]** During the movement phase of the carriage 4 between the first position of use and the second position of use, by means of the third motor 8 the first motor 3 is raised in such a way as to allow for surpassing the lateral walls of the washing tank 12 without interfering with it.

**[0035]** In the second position of use the carriage 4 is in a position such that to position the mixing blade 6 substantially over the washing tank 12.

**[0036]** Within the washing tank 12 there is a brush 15 having a plurality of bristles, whose purpose is to clean the mixing blade 6 and the part of the rotating shaft 3a that is in contact with the fluid present into the container 10; this brush 15 operates therefore in such a way as to substantially remove all the quantity of fluid possibly left in contact with the shaft 3a and the mixing blade 6 itself because of the viscosity and the adhesiveness.

**[0037]** The washing tank 12 also contains washing liquid which can be water or water added with detergent. The device 1 is optionally provided with a water and/or detergent entry device into the washing tank 12.

**[0038]** As it is shown in figure 6, the brush 15 is fixed to a connection clamp 15a, which possesses a first end pivoted on a shaft 16 and rotates around it and a second end to which the brush 15 is rigidly fixed. Therefore, during the use, the brush 15 is movable between a first position of use and a second position of use switchable between them; in detail in the first position the brush 15 is positioned in such a way as not to interfere neither with the rotating shaft 3a nor with the mixing blade 6 during the descent into the washing tank 12.

**[0039]** In detail the rotation of the shaft 16 to which the brush 15 is constrained takes place through a fifth motor 18, of electrical type too.

**[0040]** When the rotating shaft 3a and the mixing blade 6 are come down into the washing tank 12, the brush 15 is rotated around the axis 16 and arranges in the second position in such a way as to interfere with them through the bristles it is provided with.

**[0041]** For carrying out the cleaning of the mixing blade 6 and of the rotating shaft 3a, the first motor 3 is operated for a predefined time by a control system 14; at the end of a time period set on the control system 14 for the cleaning, the first motor 3 is stopped and lifted up, in such a way as to enable the mixing blade 6 to translate again toward the first position of use.

**[0042]** Eventually, the device 1 comprises a plate for the collection of drops 20, which is pivoted around a vertical axis 21 and moved by its sixth motor 22, in such a way as to rotate at a predetermined angle.

**[0043]** In detail the plate for the collection of drops 20 allows for preventing that fluid drops possibly left on the mixing blade 6 and on the part of the shaft 3a immersed into the fluid itself can fall on the floor during the translation of the carriage 4 between the first and the second position of use.

**[0044]** The plate for the collection of drops 20 is constrained to the carriage 4 in such a way as to move with it and, when rotated, to remain always under the mixing blade 6.

**[0045]** The movement of the motors present within the device 1 is managed by an hardware and/or software electronic system 14, which controls both the rotation speed of the motors and the duration of their rotation; the hardware and/or software electronic system 14 connects and disconnects all the motors of the device 1 from a mains supply (not shown) which, according to the application of the device, of the power and of the country within which it works, can be the traditional domestic supply net at 220V or, for example, industrial three-phase supplies at 380V; furthermore the hardware and/or software control 14 has a memory for containing a functioning routine of the device 1.

**[0046]** Eventually, the control system 14 supervises the operations of the device 1 in its complex.

**[0047]** In detail it is interfaced to:

- a user-interface device 16 comprising a keyboard and a display for entering commands and for visualizing messages during the functioning of the device 1 respectively;
- the motors 3, 7, 8, 11, 18, 22, at least a sensor of presence 17 for allowing the identification of the presence or absence of the container 10 into the frame 2.

**[0048]** In detail this sensor of presence 17 is arranged substantially in front of the sliding door 14 into the frame 2, in a rear area of the device 1. The orientation of the

sensor of presence 17 is such that its action radius comprises the area within which the container 10 is positioned, therefore over the supporting plane 9.

**[0049]** In detail the control system 14 performs the following operations.

**[0050]** On the basis of the program set by the user through the keyboard of the user-interface device 16 it is possible to select:

- the kind of the container 10: cylindrical or elliptic;
- the mixing function of the fluid contained in the container 10.

**[0051]** First of all check whether the sensor of presence 17 detects the presence of the container 10, then the mixing procedure can happen; otherwise it cannot happen.

**[0052]** In a successive step, the control system 14 commands the second motor 7 in such a way as to position the carriage 4 on the first position of use, substantially above the container 10, successively lowering the first motor 3 in such a way as to immerse the mixing blade 6 into the fluid contained in the container 10. The first motor 3 is lowered for a predetermined time memorized into the control system 14. At the same time, the brush 15 is positioned in rest position or, if it is already in it, it is kept in this position. Furthermore, the plate for the collection of drops 20 is remotely positioned with respect to the mixing blade 6, in such a way as not to interfere with the rotation and, equally, not to interfere with the fluid container 10.

**[0053]** In a successive step, the control system 14 starts the first motor 3, which according to the mixing function selected by the user through the keyboard of the user-interface device 16, can:

- rotate for a predetermined time at an height predetermined during the planning phase; or
- rotate for a predetermined time moving up and down in such a way as to carry out the mixing at different heights.

**[0054]** During the mixing phase of the fluid, if the selected program imposes it, the supporting plane 9 can horizontally move or alternatively remain fixed in longitudinal or transversal direction with respect to the position of the first motor 3.

**[0055]** At the end of the mixing phase, the supporting plane 9, if it has moved, returns to the starting position and the first motor 3 is lifted up and stopped.

**[0056]** In a further successive step, the carriage 4 is moved up to the second position of use, for allowing the cleaning of the mixing blade 6 and of the part of the rotating shaft 3a that is in contact with the fluid.

**[0057]** Contemporarily to the translation of the carriage 4, the plate for the collection of drops 20 is brought under the mixing blade 6 through a rotation of the axis 21.

**[0058]** Therefore, another step provides that the con-

trol system 14 commands the lowering of the first motor 3 into the washing tank 12 and, successively, the movement of the brush 15 around the shaft 16, in such a way as to be in contact, through its bristles, with the mixing blade 6 and the rotating shaft 3a.

[0059] Contemporarily, the plate for the collection of drops 20 is moved into a remote position with respect to the vertical with the mixing blade 6.

[0060] In a successive operative step, the control system 14 commands the activation of the first motor 3, for a predetermined time that is fixed during the planning phase of the device 1 but that, equally, can be modified by the user before the beginning of the work cycle of the device itself, acting on the user-interface device 16.

[0061] When the carriage 4 returns into the first position of use, the plate for the collection of drops 20 is again positioned under the mixing blade 6.

[0062] The advantages of the device 1 for mixing fluid products contained in substantially rigid containers are known in the light of the preceding description. In particular the above mentioned device allows for carrying out the mixing of fluid products such that there are no parts less efficiently mixed with respect to the others, in particular in case of very viscous fluids contained in non-cylindrical containers. The movement of the bearing plane upon which the container is positioned, allows for carrying out a uniform mixing even if the container has particular shapes.

[0063] Furthermore the device 1 described up to this point allows for carrying out the washing of the mixing blade and of the part of the rotating shaft that are in contact with the fluid during the mixing operations. This allows for mixing different fluids in two successive time periods, without the need of handily cleaning the mixing blade; this operation is automatically carried out at the end of the fluid mixing session. The device 1 thus reduces the quantity of human effort necessary for ensuring that it correctly works.

[0064] Eventually, the device 1 previously described allows for preventing that some fluid drops, during the movement of the mixing blade from the fluid container to the washing tank, fall on the floor under the device or on other inner parts of the device.

[0065] Some variants can be applied to the device described up to this point. More in detail the rollers 13a can be of non-idle kind, but moved through another electric motor that operates them through for example a belt system.

[0066] Furthermore, the hardware and/or software control system can be provided, in place of a display and of a keyboard, with a touch-screen which allows for integrating in an unique block the function of visualization of the status and of the functioning of the device and the entering of commands from a user.

## Claims

1. Device (1) for mixing fluid products contained in containers (10) substantially rigid comprising

- a frame (2);  
- a first motor (3), movable inside said frame (2);  
- at least one mixing blade (6), said blade (6) being actuated by said first motor (3) and being able to mix said fluid product contained in one of the said containers (10);

the device (1) is **characterized by** the presence of cleaning means (12, 15, 16, 18) of said at least one blade (6) being able to remove from it possible traces of said fluid remaining after the mixing of the same.

2. Device according to claim 1, wherein said cleaning means (12, 15, 16, 18) comprise a brush (15) having a plurality of bristles and a tank (12) being able to be partially filled with a liquid.
3. Device according to claim 2, wherein said cleaning means (12, 15, 16, 18) further comprise a motor (18), having a rotation axis (16) and being capable of permitting the movement of said brush (15).
4. Device according to claim 1, further comprising a carriage (4) for the movement of said first motor (3) between a first position of use and a second position of use; said movement of said first motor (3) being substantially straight-line and horizontally developed; said first position of use being capable of mixing said fluid inside said container (10); said second position of use being capable of cleaning said blade (6).
5. Device according to claim 4, further comprising a couple of motors (7, 8) being capable of moving said carriage (4) upon which said first motor (3) is fixed and of vertically moving said first motor (3), respectively.
6. Device according to claim 4, comprising a supporting plane (9) for said fluid container (10); said supporting plane (9) being positioned inside the area delimited by said frame (2) and lying on a plane substantially parallel to the one of a floor or ground upon which said device (1) lays and also lying at an height lower than said blade (6); said supporting plane (9) being moved by a rotation motor (11) when said first motor (3) is in said first position of use.
7. Device according to any of the previous claims, further comprising controlling means (14), for the control of the functioning of said first motor (3), of the motor (18), of the couple of motors (7, 8), and of the rotation motor (11); said controlling means (14) fur-

ther comprising storage means being capable of containing a procedure for the functioning of said device (1) and being connected to user-interface devices for the input of functioning commands of the device (1) and/or for the display of parameters of functioning.

8. Device according to claim 1, wherein said blade (6) is connected to said first motor (3) by a shaft (3a) having a first end fixed to said blade (6) and a second end substantially constrained to said first motor (3). 5
9. Device according to claims 6 and 7, further comprising one or more sensors of presence (17), being capable of permitting the identification of the presence or absence of said container (10) on said supporting plane (9); said one or more sensors of presence (17) being positioned inside the frame (2) and being orientated in such a way that a radius of action comprises the area wherein the container (10) is positioned. 10
10. Device according to claim 4, further comprising a plate (20) for the collection of drops, pivoted around a vertical axis (21) and moved by its sixth motor (22), so that it can rotate at a predetermined angle; said plate for the collection of drops (20) is constrained to said carriage (4) so that it moves with it and, when rotated, it can always remain under the blade (6); said sixth motor (22) is controlled by the controlling means (14). 15
11. Device according to claims 4 and 6, comprising a front plane (13), fixed upon a frontal part of said device (1) and substantially lying on a plane parallel to the floor or ground underlying said device (1); said front plane (13) is provided with a plurality of rollers (13a) which are idle, substantially orientated in a direction orthogonal to the movement direction of the carriage (4), being capable of facilitate a translation of said container (10) before the placement on said supporting plane (9). 20
12. Method of mixing a fluid contained in containers (10) substantially rigid, comprising a first step of mixing by at least a blade (6) of rotating type and activated by a first motor (3); said method is **characterized in that** it comprises an additional step of cleaning of said blade (6), said cleaning being made by a plurality of cleaning means (12, 15, 16, 18) of said at least one blade (6) being capable of removing from it possible traces of said fluid remaining after the mixing of the same; said cleaning means (12, 15, 16, 18) comprising a tank (12) being capable of being filled at least partially with a cleaning liquid. 25
13. Method according to claim 12, wherein said cleaning means (12, 15, 16, 18) comprise a brush (15) mov-

able between a first and a second position of use and activated by a motor (18) having an axis (16) and wherein during said step of cleaning of said blade (6), said brush (15) is moved from the first position of use wherein it does not interfere with said blade (6) nor with a shaft (3a) by which the blade (6) is connected to said first motor (3).

14. Method according to claim 12, wherein during said first step of mixing of said fluid, said first motor (3) is positioned in a first position of use and wherein a supporting plane (9) being capable of holding said container (10) is moved by a respective motor in horizontal direction having a central position substantially under said first motor (3) when in said first position of use; said movement of said supporting plane (9) being subordinated to the activation of a command being capable of operating on controlling means (14) of the functioning of the device (1). 30
15. Method according to claim 12, wherein after said first step of mixing of said fluid and before said additional step of cleaning of said blade (6), said supporting plane (9), when it has been moved, returns in its starting position and the first motor (3) is heightened and stopped; and wherein after the stopping of said first motor (3), said first motor is moved toward a second position of use by a movable carriage (4); said second position of use being capable of permitting the execution of said additional step of cleaning. 35
16. Method according to claim 15, wherein during the movement of said first motor (3) from said first position of use to said second position of use, a plate (20) for the collection of drops of fluid, constrained to a carriage so that it moves with it is brought under the mixing blade (6) by a rotation of a shaft (21) upon which acts a motor (22). 40

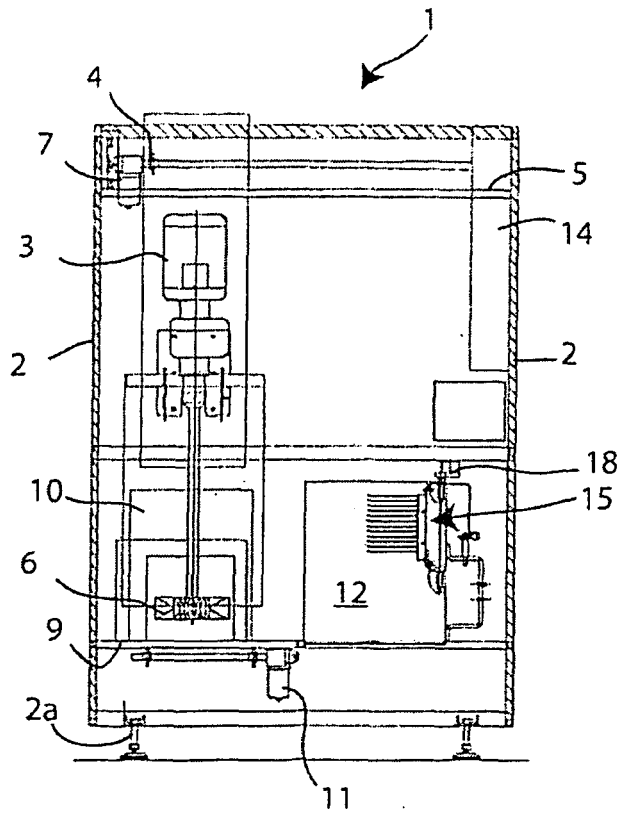


Fig. 1

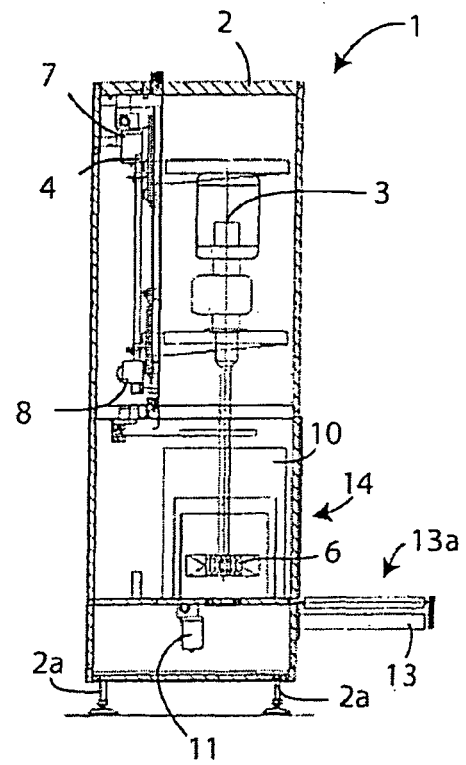


Fig. 2

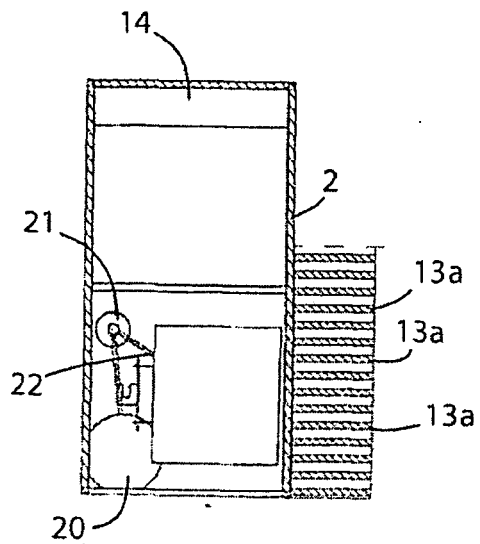


Fig. 3

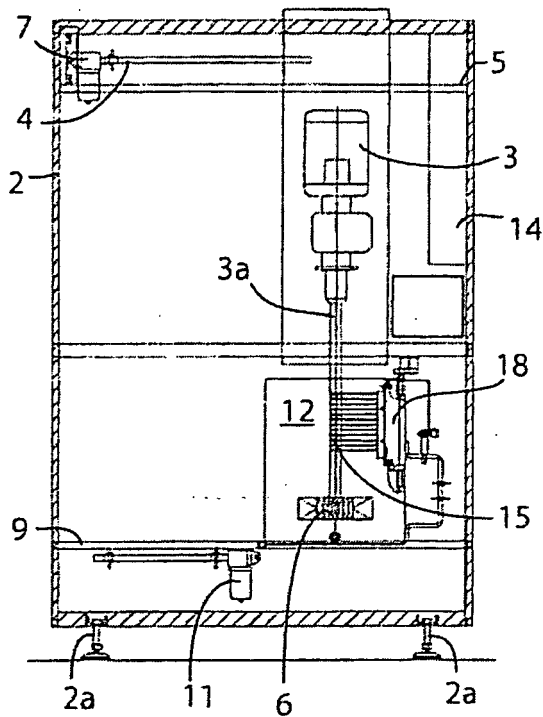


Fig. 4

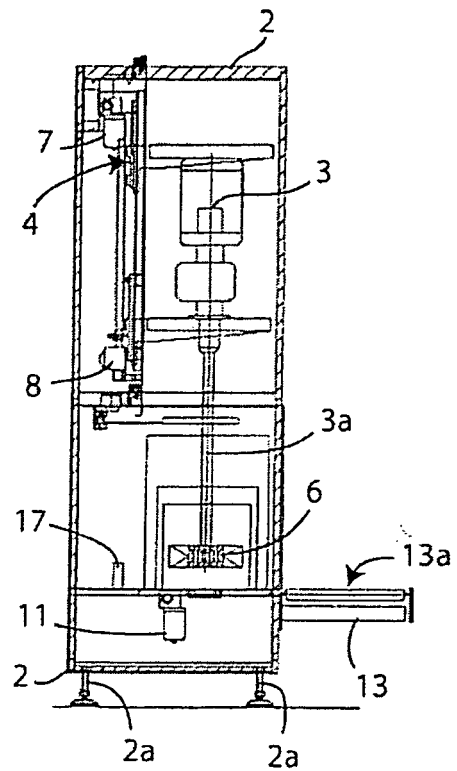


Fig. 5

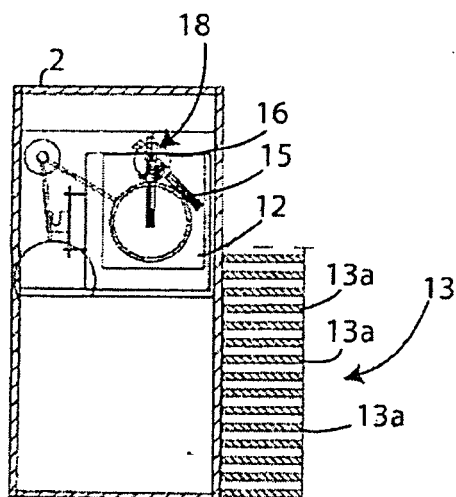


Fig. 6





## EUROPEAN SEARCH REPORT

Application Number  
EP 09 01 3401

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 594 237 A (MUSSO ET AL) 27 April 1994 (1994-04-27) * abstract * * column 3, line 17 - line 47 * * column 4, line 25 - column 5, line 45 * * column 6, line 18 - line 52 * * claims * * figures *	1-16	INV. B08B1/00 B01F15/00 B01F7/16
X	DE 100 52 400 C1 (PLOS�) 31 January 2002 (2002-01-31) * abstract * * paragraph [0001] * * paragraph [0011] - paragraph [0016] * * claims * * figures *	1,2,8,12	
X	NL 7 504 248 A (NAUTAMIX PATENT AG) 12 October 1976 (1976-10-12) * page 1, line 26 - line 28 * * page 1, line 35 - page 2, line 3 * * page 2, line 26 - line 32 * * claims * * figures *	1-3,8,12	TECHNICAL FIELDS SEARCHED (IPC) B08B B01F
A	DE 10 2006 054622 A1 (GRAMMER AG) 21 May 2008 (2008-05-21) * abstract * * paragraph [0029] - paragraph [0034] * * claims * * figures *	1-3,12	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 February 2010	Examiner van der Zee, Willem
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 01 3401

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-02-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0594237 A	27-04-1994	AT 149092 T	15-03-1997
		DE 69308260 D1	03-04-1997
		DE 69308260 T2	28-08-1997
		ES 2099897 T3	01-06-1997
		IT 1256972 B	27-12-1995
-----			
DE 10052400 C1	31-01-2002	NONE	
-----			
NL 7504248 A	12-10-1976	NONE	
-----			
DE 102006054622 A1	21-05-2008	NONE	
-----			