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(54) **Vending machine for hot beverages**

(57) The present invention concerns a vending machine (1) equipped with an inner frame (14) movable with respect to the outer frame (2) of the vending machine (1)

and with a drip collector (8) suitable for collecting the liquid emerging from the dispensing unit and for preventing it from fouling the inner cavity (3) of the vending machine (1) itself.

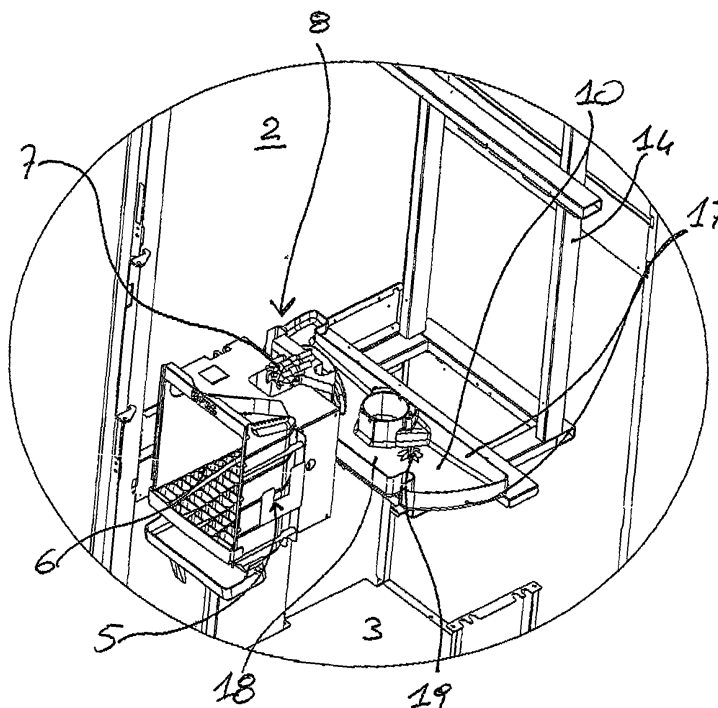


Fig. 2a

Description

[0001] The present invention refers to a vending machine for hot beverages.

[0002] Vending machines for hot beverages are capable of vending beverages based on coffee, milk, chocolate (or mixtures thereof) or tea; for this reason they are particularly widely used in travel premises and offices.

[0003] Such vending machines, like any mechanical apparatus, may require maintenance cycles, in which it is necessary to open the vending machine and, if necessary, replace the elements which are faulty or not functioning perfectly.

[0004] At the end of the maintenance operations it is necessary to check the correct operation of all the parts; since the final user will require the dispensing of the beverage, the best way of carrying out such a check is performing a test dispensing of the beverage.

[0005] The test dispensing may be carried out with the vending machine open, so that the skilled maintenance staff can act promptly to solve any problem which may arise.

[0006] However, when the vending machine is open, both the support for the cups and the normal channels which allow the removal of the residues of the beverage after the cup has been removed are no longer located beneath the dispensers; moreover, precisely for this reason, the cup dispensing devices are not functioning. There is therefore the problem of where to allow the beverage dispensed for the test to flow.

[0007] The problem has hitherto been solved by employing a cup held in position manually by the skilled maintenance staff. This method is however uncomfortable and tiring and involves the risk of soiling the internal parts of the vending machine in the event of accidental overturning of the cup or in the event of dripping of the dispensers.

[0008] It would therefore be desirable to have a vending machine in which there is no risk of soiling the internal parts during the test dispensing of beverages carried out during the maintenance operations.

[0009] In view of the state of the art described, it is an aim of the present invention to provide a vending machine for hot beverages which at least partly solves at least some of the aforementioned drawbacks.

[0010] According to the present invention, this aim is achieved by a vending machine according to claim 1.

[0011] The features and advantages of the present invention will become clear from the following detailed description of a practical embodiment, provided by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1a shows a partial perspective view of the interior of a vending machine according to a preferred embodiment of the present invention, in an open configuration;
- Figure 1b shows a top view of the vending machine

of Figure 1a;

- Figure 1c shows a top view of the inner frame inserted into the vending machine of Figure 1a;
- Figure 1d shows a perspective rear view of the frame of Figure 1c, separated from the vending machine;
- Figures 2a-2d show the same subjects as Figures 1a-1d, but in a closed configuration.

[0012] The vending machine 1 for hot beverages shown in the drawings comprises an outer frame 2, which defines an inner cavity 3, provided with a front opening 4, which can be closed by a suitable front panel (not shown). The front panel prevents unwanted access to the inner cavity, allows the normal working operations of the vending machine 1, and may be removed or displaced into an open position to allow an operator to gain access to the inner cavity 3, for example for ordinary and/or extraordinary maintenance operations.

[0013] The vending machine 1 further comprises a withdrawal unit 5, arranged at least partially in the inner cavity 3 and defining a withdrawal volume 6 in which a user can withdraw the beverages distributed by the vending machine 1. The withdrawal unit 5 may be movable between a first, working position (shown in Figures 2a-2d) and a second, service position (shown in Figures 1a-1d).

[0014] When it is in the working position, the withdrawal unit 5 defines a volume within which, after selection by the user, a cup (or some other container) is arranged into which the selected beverage is dispensed. A front portion of the withdrawal unit 5 is open or openable in such a way that the user may easily withdraw the product dispensed.

[0015] The withdrawal unit 5 further has an opening facing towards the inner cavity 3, to allow the dispensing of the beverage by a suitable dispensing unit 7.

[0016] The dispensing unit 7 is therefore suitable for dispensing within the withdrawal unit 5 the beverages of the vending machine 1.

[0017] When the withdrawal unit 5 is in the service position, it is far enough from the working position to allow to carry out the maintenance operations, but also too far from the working position to receive the beverages dispensed by the dispensing unit.

[0018] According to the invention, the vending machine 1 comprises a drip collector 8, advantageously movable between a first, closed configuration, assumed when the dispensing unit 7 can dispense the beverages within the withdrawal unit 5, and a second, open configuration, in which the drip collector 8 can receive the liquid emerging from the dispensing unit 7.

[0019] In other words, the vending machine 1 comprises a withdrawal unit 5 and a drip collector 8 which are alternately capable of collecting the liquid emerging from the dispensing unit 7. In this way, the desired technical effect is obtained of always being able (or both during normal operation and during the maintenance operations) to convey, in a preselected volume, the liquid com-

ing out of the dispensing unit 7, whether it be beverages, or liquid of another type.

[0020] Preferably, the drip collector 8 comprises thrust means, for example a spring, which tend to maintain it in the open configuration.

[0021] The drip collector 8 shown in the drawings comprises a first conveyor 9 and a second conveyor 10; the two conveyors 9, 10 are movable with respect to each other and, with their reciprocal movement, define the open and closed configurations of the drip collector 8.

[0022] The first conveyor 9 may be mounted or hinged on the same frame on which the dispensing unit 7 is fixedly mounted.

[0023] The first conveyor 9 may be substantially comma-shaped, as shown in the drawings, with a first portion 11 widened so as to be able to collect the liquid emerging from the dispensing unit 7, and/or a tapered portion 12, of substantially U-shaped section, suitable for conveying the liquid to the second conveyor 10 via an end opening 13 which permits the discharge of the liquid from the first to the second conveyor 9, 10.

[0024] The tapered portion 12 may advantageously be curved, so as to reduce the risk that the liquid in transit may, owing to turbulence, escape from the first conveyor 9 itself.

[0025] As can be seen in the drawings, the first and the second conveyor 9, 10 are open at the top.

[0026] The drip collector 8 is integrally arranged on a frame, which may be an inner frame 14 separate from the outer frame 2, or may be fixed to and integral with the outer frame 2 itself.

[0027] In the embodiment in the drawings, the drip collector 8 is integral with an inner frame 14 separate from the outer frame 2. Advantageously, the inner frame 14 is movable in rotation and/or in translation with respect to the outer frame 2.

[0028] When the drip collector 8 is in the open configuration, the first conveyor 9 is partially superposed on the second conveyor 10, and the dispensing unit 7 is partially superposed on the first conveyor 9, such that the first conveyor 9 can receive liquid from the dispensing unit 7 and convey it into the second conveyor 10.

[0029] The inner frame 14 supports, movably with respect to the outer frame 2, substantially all the internal components necessary and/or functional for the preparation of the beverages.

[0030] For example, the components for the preparation of the beverages may be regarded as being all the components for the distribution and heating of the water, the mixing with milk, tea or coffee, and the transfer of the beverage thus formed to the dispensing point, where it will be put into a cup, optionally provided with a stirrer, and sugar as desired.

[0031] The inner frame 14 shown may comprise a sliding base, mounted so as to slide with respect to the outer frame 2, for example by means of small wheels which run in horizontal guides fixed to the outer frame 2, and a rotating frame, rotatably mounted, for example about a

vertical axis of rotation, with respect to the outer frame 2.

[0032] The sliding base may therefore pass from a withdrawn position, corresponding to the end limit of its movement path remote from the front panel of the dispenser 1, to a forward position.

[0033] Advantageously, the rotating frame is rotatably mounted on the sliding base, for example with its own axis of rotation passing through the centre of the sliding base. The rotating frame may therefore be rotatable/translatable with respect to the outer frame 2.

[0034] The rotating frame may rotate more easily about its own axis when the sliding base is in the forward position.

[0035] The rotating frame may comprise two uprights fixed to a base. In the drawings, two cross-members fixed respectively to the uprights and to the base are shown. One of the cross-members may further comprise a C-shaped member, for the mounting of the reservoir for the coffee beans.

[0036] The uprights define a front side and a rear side of the rotating frame: they are arranged symmetrically in the rear half of the base itself.

[0037] Both the base and the sliding base have an opening, suitable for allowing the passage of the physical means of connection between the internal components and the rest of the vending machine.

[0038] The opening is large enough to allow the passage of some or all of the physical means of connection (not shown in the drawings) such as: pipes for filling and emptying the water, electrical supply cables, the tube for discharging the coffee grounds, the data transmission cables (if present), the means for discharging the second conveyor 10. These physical means of connection are known in the art and will not therefore be described further.

[0039] The opening has a diameter of around 200-280 mm, but other dimensions are possible.

[0040] The inner frame 14 is secured to the outer frame 2 by suitable locking means so that it can be locked in the working position, for example by means of screws, bolts or spring systems, such that an operator can easily render them movable with respect to each other and, optionally, separate them; the two frames 2, 14, are not therefore irreversibly connected to each other, for example by means of welding, brazing, adhesive securing or the like.

[0041] Between the rotating frame and the sliding base there are connecting means which permit relative rotation, while preventing relative axial movement.

[0042] Preferably, the connecting means comprise a bearing block, so as to permit the passage of the physical means of connection. In order to facilitate relative rotation between the rotating frame and the sliding base, the connecting means comprise rolling means, such as, for example, wheels.

[0043] Advantageously, the outer frame 2 and/or the inner frame 14 may comprise stop means for preventing excessive rotation of the rotating frame with respect to

the outer frame 2 from twisting excessively the pipes within the bearing block.

[0044] The angle through which the rotating frame is free to rotate with respect to the sliding base is such as to allow an operator access to the whole of the rear part of the rotating frame itself. The angle is advantageously greater than 100°, for example greater than 180° in each direction, and is preferably less than 270°.

[0045] It is also possible to render the rotating frame movable in only one direction; in that case, the angle of rotation may be at least 270°, advantageously around 360°.

[0046] Optionally, indexing means are also conceivable for identifying preferred angular positions of relative stability in the rotation between sliding base and rotating frame.

[0047] On the inner frame 14 may be mounted some internal components accessible from the front side and some internal components accessible from the rear side, that is, after the inner frame 14 has been rotated with respect to its actual working position.

[0048] In such an embodiment, the components mounted on the inner frame 14 so as to be accessible at the front may be: the reservoirs for the products and the corresponding pipes for dispensing, with the exception of stirrers, sugar and cups, the system for distributing the ground coffee, including the grinder and the proportioner, the mixers for the products, the pipes for discharging the coffee grounds, and the pipes for transporting the prepared beverage from the mixer to the dispensing point.

[0049] The components mounted on board the inner frame 14 so as to be accessible at the rear may be: the motors of the mixers for the products, the hydraulic equipment comprising the boiler, the water pump, the solenoid valves for mixing and regulation, the motor of the system for distributing the ground coffee, the gearings of the dispensers for the products arranged at the front, the mains voltage transformer, the electrical panel with the fuses and/or the power control card, with the corresponding connections.

[0050] The components which may be fixed directly onto the outer frame 2 are the selection electronics, the money control and storage means and/or the systems for collecting and temporarily storing the solid and liquid wastes, while the dispensers for cups, sugar and stirrers may also be mounted directly on the front panel.

[0051] For example, the inner frame 14 may be the inner frame described in Patent Application EP 07425356.8, in the name of the same patent proprietor as the present application. The inner frame 14 described therein, and in particular the components mounted on the inner frame 12 and the means by which the inner frame 14 can be connected to the outer frame 2, are an explicit subject of the present description, and the possibility of adding them in the claims is reserved.

[0052] According to one mode of construction, the first conveyor 9 rotates with respect to an axis, for example vertical, integral with the inner frame 14, while the second

conveyor 10 is fixed with respect to the inner frame 14.

[0053] The first conveyor 9 advantageously comprises a portion 15 in contact with a portion 16 of the withdrawal unit 5. In this way, the displacement of the withdrawal unit 5 from the service position to the working position and vice versa automatically permits the displacement of the drip collector 8 from the open configuration to the closed configuration and vice versa.

[0054] According to the embodiment shown in the drawings, the withdrawal unit 5 is hinged about a vertical axis integral with the outer frame 2; the axis may also coincide with the axis of rotation of the outer panel, such that it is not necessary to separate the withdrawal unit 5 and the outer panel during the maintenance operations.

[0055] The second conveyor 10 is substantially in the shape of a tray, having a width corresponding substantially to the width of the inner frame 14 and with the lateral edges rounded so as to allow rotation of inner frame 14.

[0056] The lateral edges 17 are raised, while the base 18 is inclined so as to convey the liquid contained therein towards a drain 19.

[0057] On the lower part of the second conveyor 10, at the drain 19, suitable means (for example flexible pipes) may be connected which guide the discharged liquid to a desired point, for example into the bin (not shown) which is normally used for collecting the waste or another container.

[0058] The presence of a flexible pipe is particularly advantageous in combination with an inner frame 14 movable with respect to the outer frame 2, while if the second conveyor were fixed with respect to the outer frame 2, it would be possible to omit it, and arrange the collecting container immediately below the drain 19.

[0059] In order to satisfy contingent and specific requirements, a person skilled in the art may apply to the configurations described above many modifications and variants, all contained however within the scope of protection of the invention as defined by the following claims.

Claims

1. A vending machine (1) for hot beverages, comprising:

- an outer frame (2), defining an inner cavity (3) provided with a front opening (4),
- a front panel removably arranged to close said front opening (4);
- a withdrawal unit (5), arranged at least partially in said inner cavity (3) and defining a withdrawal volume from which a user can withdraw the beverages distributed by said vending machine (1);
- a dispensing unit (7), suitable for dispensing the hot beverages distributed by said vending machine (1) within said withdrawal unit (5);

characterized in that

said vending machine (1) comprises a drip collector (8), movable between a first, closed configuration, in which said dispensing unit (7) is capable of dispensing said beverages into said withdrawal unit (5), and a second, open configuration, in which said drip collector (8) can receive liquid coming out of said dispensing unit (7).

2. A vending machine (1) according to the preceding claim, wherein said drip collector (8) comprises means which urge it into said open configuration. 10
3. A vending machine (1) according to the preceding claim, wherein said means comprise a spring. 15
4. A vending machine (1) according to any one of the preceding claims, wherein said drip collector (8) comprises a first and a second conveyor (9, 10), said first conveyor (9) being movable with respect to said second conveyor (10), such as to define said first, open configuration and said second, closed configuration. 20
5. A vending machine (1) according to the preceding claim, wherein said first conveyor (9) is substantially comma-shaped, comprising a first, widened portion (11) and a second, tapered portion (12), of substantially U-shaped section and provided with an end opening (13). 25 30
6. A vending machine (1) according to the preceding claim, wherein, when said drip collector (8) is in said open configuration, said first conveyor (9) is partially superposed on said second conveyor (10) and said dispensing unit (7) is partially superposed on said first conveyor (9), such that said first conveyor (9) can receive liquid from said dispensing unit (7) and convey it into said second conveyor (10). 35
7. A vending machine (1) according to any one of claims 4 to 6, wherein said second conveyor (10) comprises a drain (19). 40
8. A vending machine (1) according to any one of claims 4 to 7, wherein said first conveyor (9) rotates about a substantially vertical axis. 45
9. A vending machine (1) according to any one of the preceding claims, comprising an inner frame (14) movable in rotation and/or in translation with respect to said outer frame (2), said drip collector (8) being mounted on said inner frame (14). 50
10. A vending machine (1) according to any one of the preceding claims, wherein said withdrawal unit (5) is movable between a first, working position, in which said vending machine (1) is capable of dispensing said beverages within said withdrawal unit (5), and 55

a second, service position, in which said vending machine (1) is not capable of dispensing said beverages within said withdrawal unit (5).

- 5 11. A vending machine (1) according to any one of the preceding claims, wherein said drip collector (8) comprises a portion in contact with a portion of said withdrawal unit (5), such that, when said portions are in contact, a movement of said drip collector (8) corresponds or may correspond to a movement of said withdrawal unit (5).
12. A vending machine (1) according to any one of the preceding claims, wherein said withdrawal unit (5) is in contact with a portion of said first conveyor (9), such that the displacement, by an operator, of said withdrawal unit (5) from the first to the second configuration or vice versa entails the displacement of said first conveyor (9) from the closed configuration to the open configuration, or vice versa.

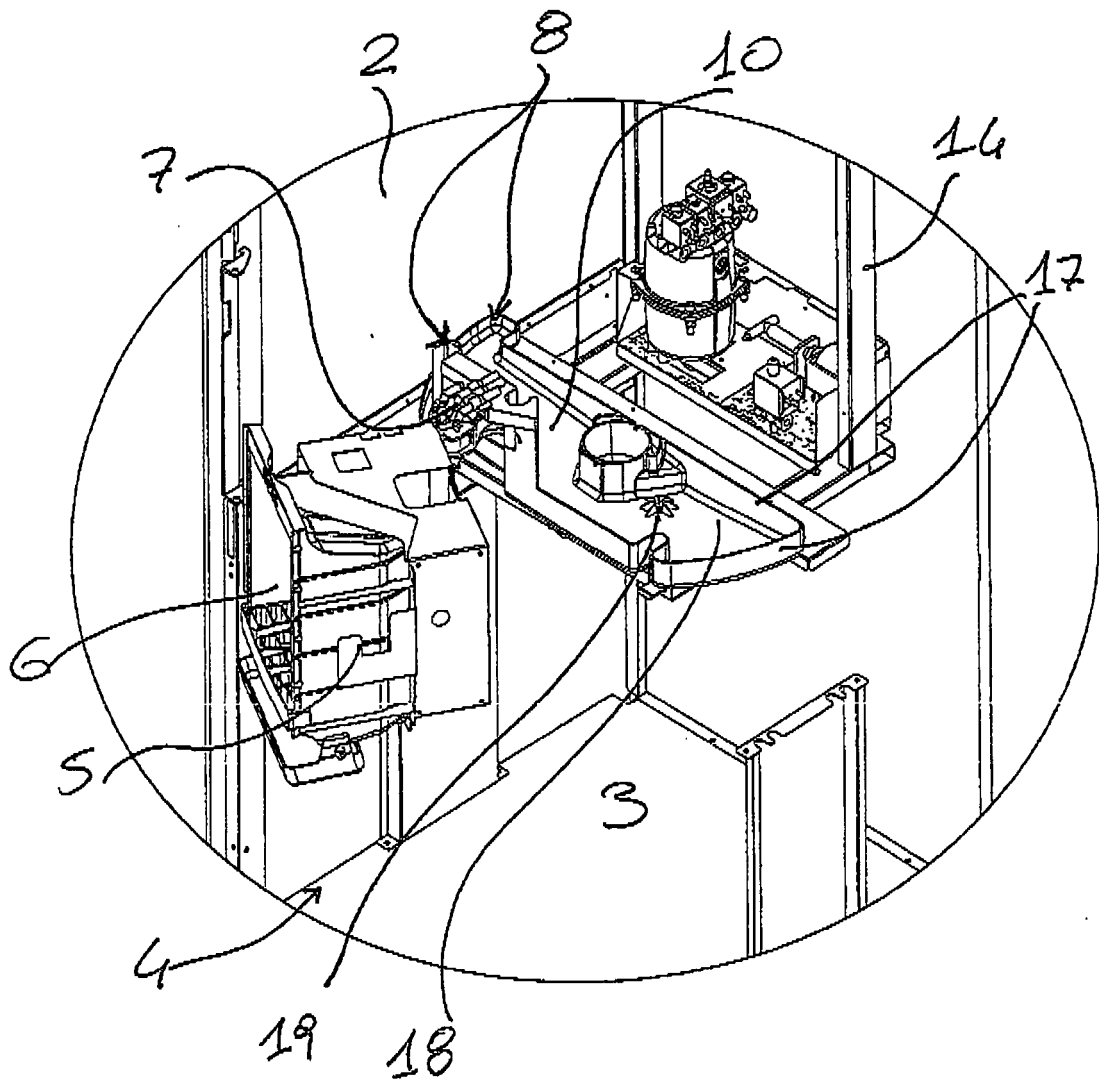


Fig. 1a

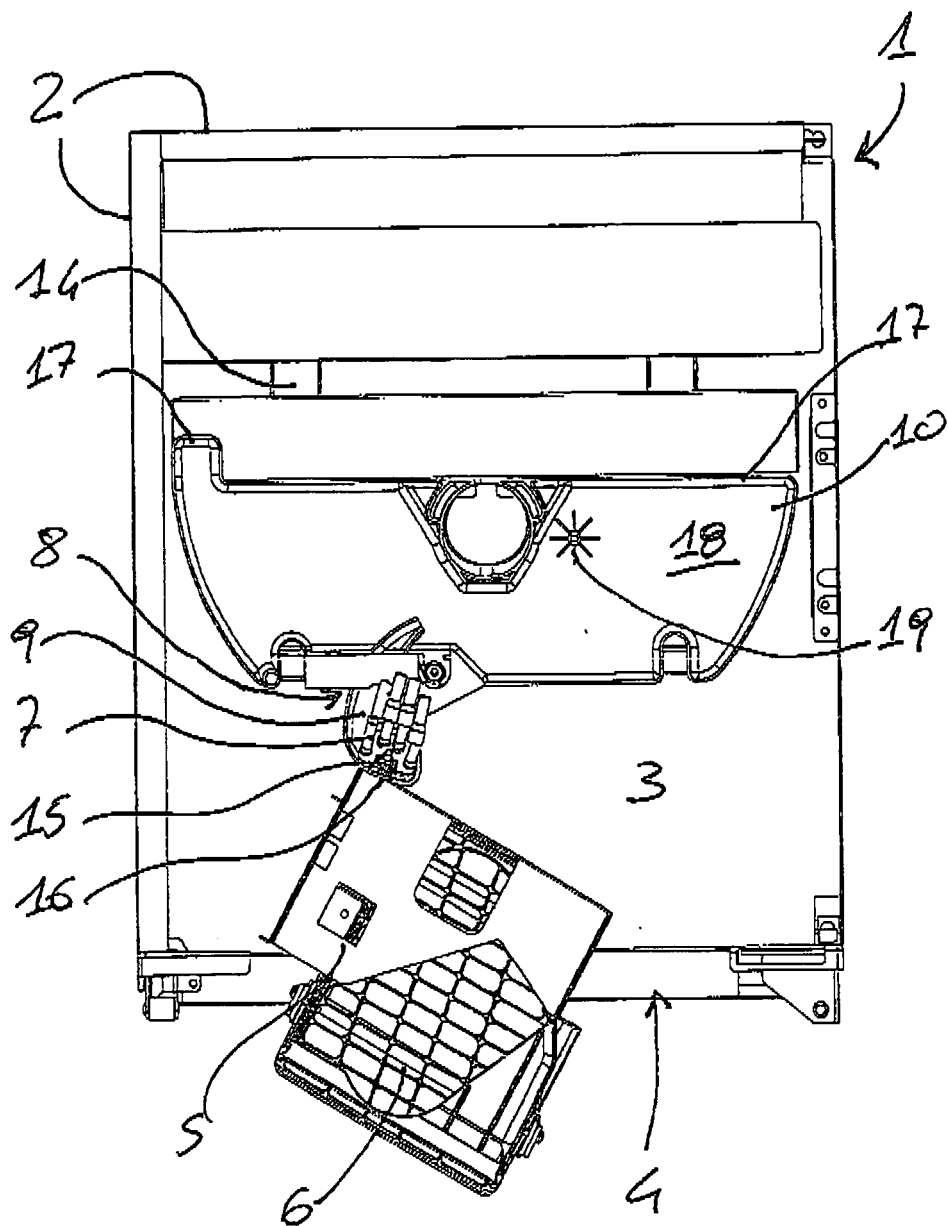


Fig. 1b

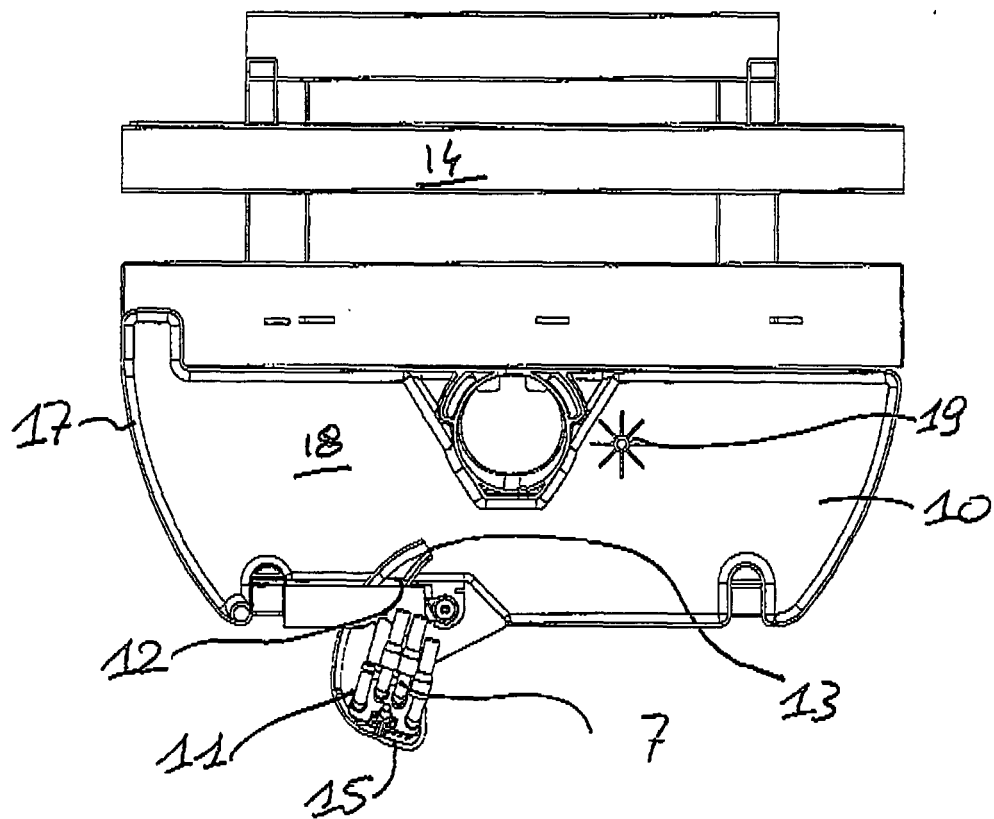


Fig. 1c

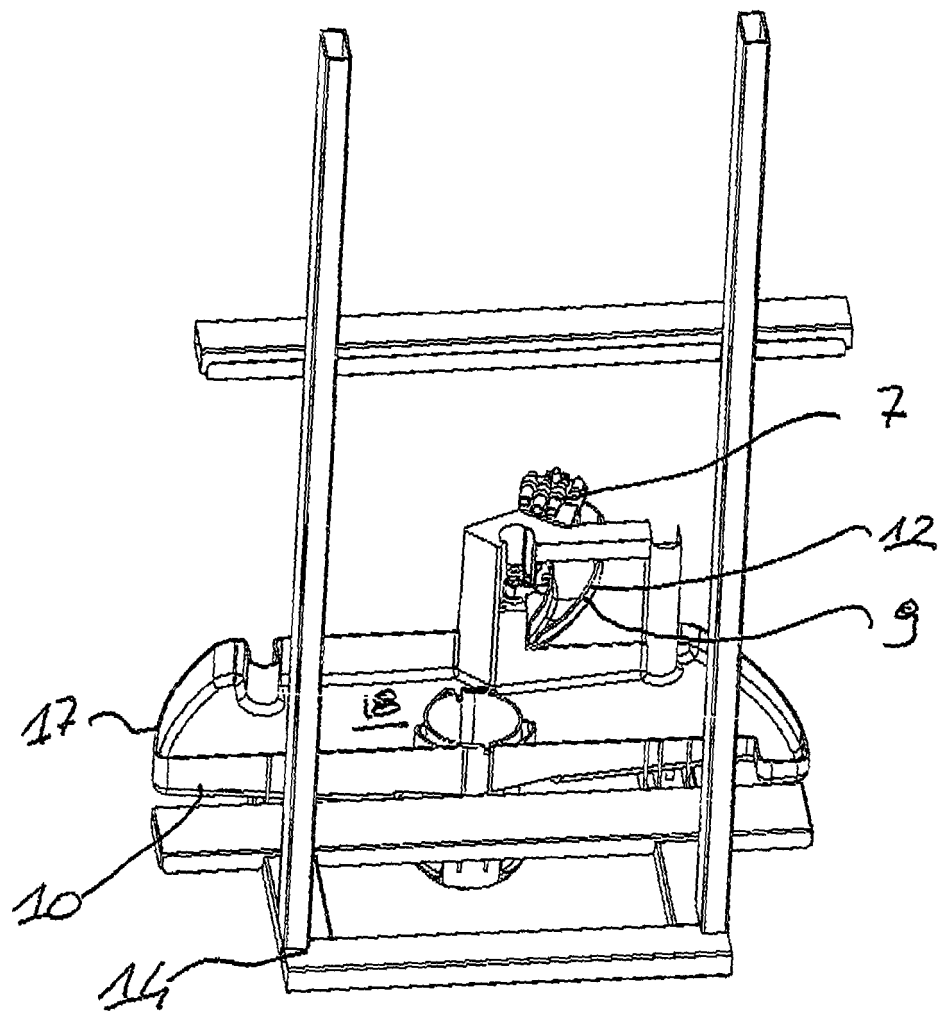


Fig. 1d

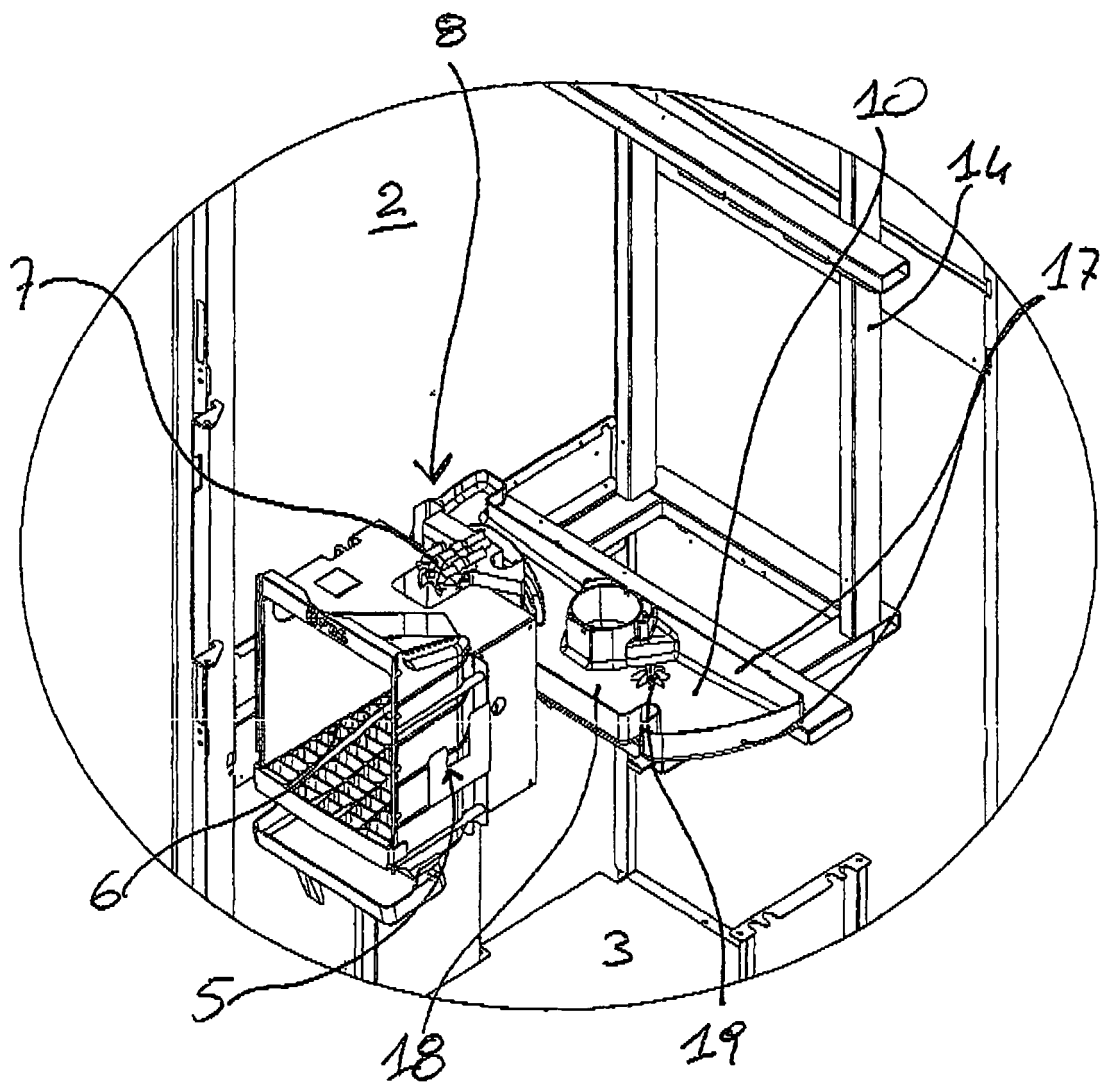


Fig. 22

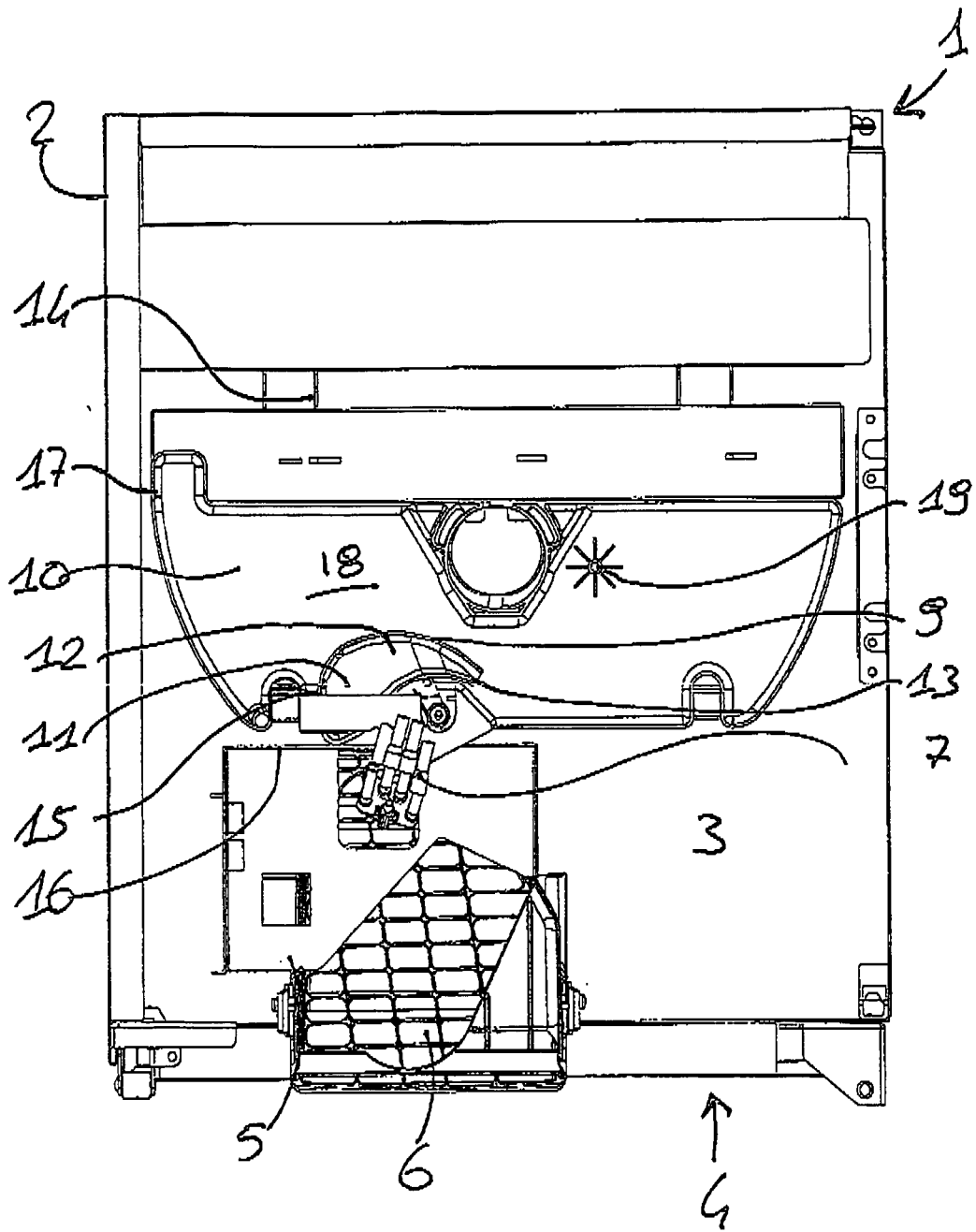


Fig. 2b

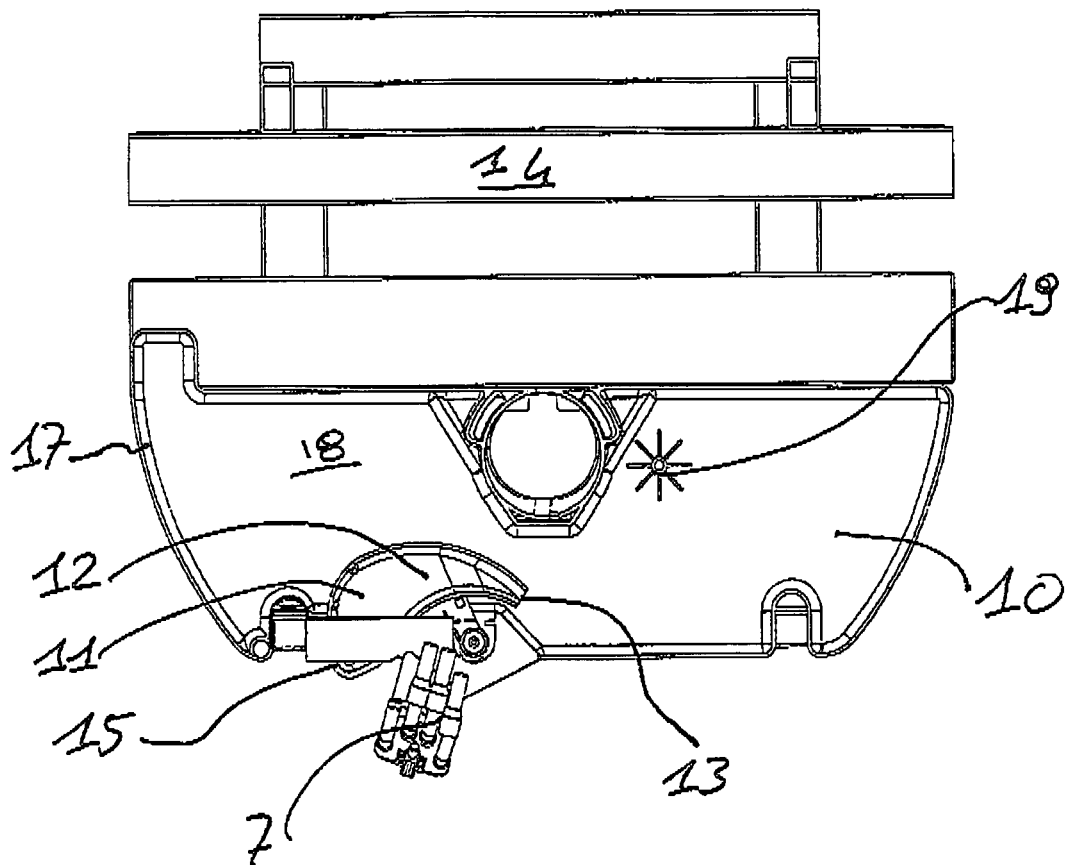


Fig. 2c

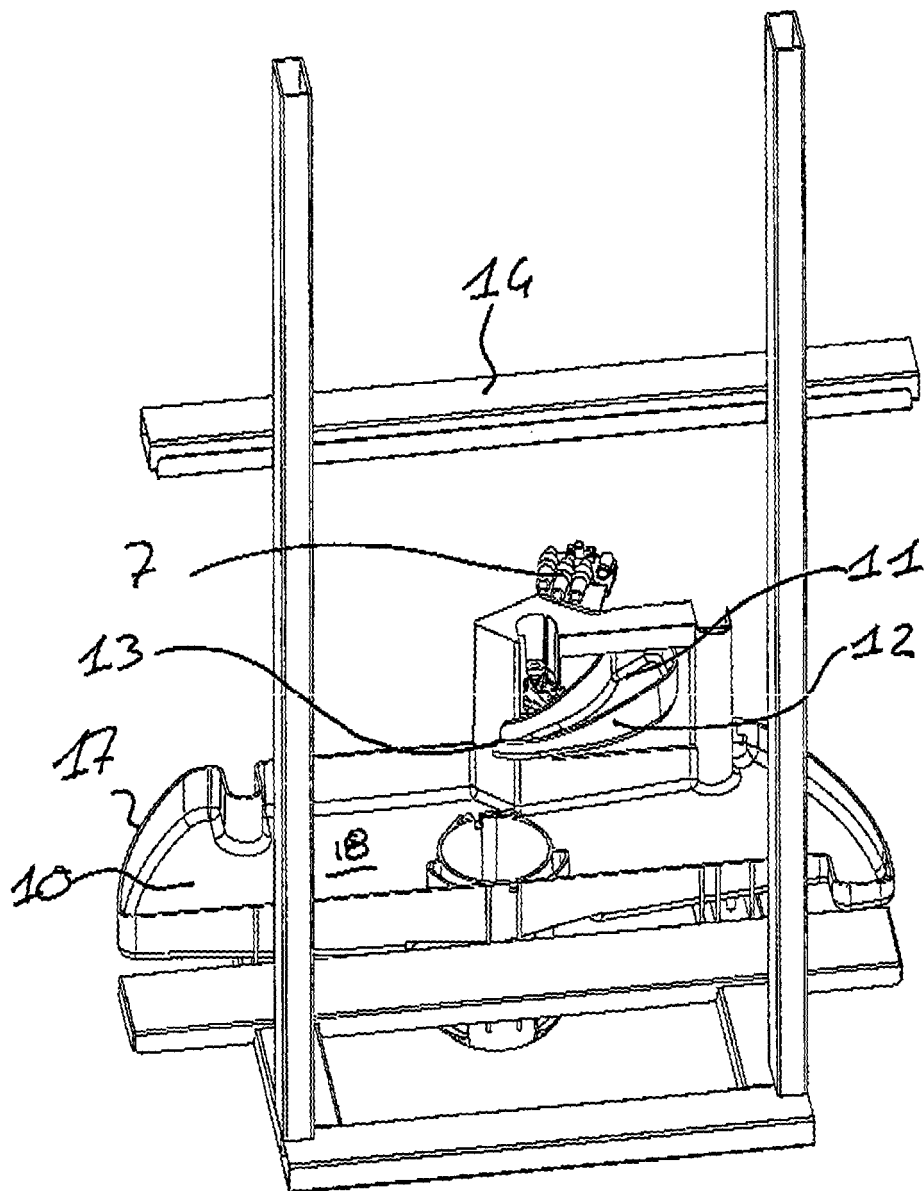


Fig. 2d



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 02 0463

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 155 907 A (SANKEY VENDING LTD) 2 October 1985 (1985-10-02) * page 1, line 96 - page 2, line 26; figures 1,2 *	1-12	INV. G07F13/10
A	EP 0 793 935 A (BUNN O MATIC CORP [US]) 10 September 1997 (1997-09-10) * column 7, line 15 - column 8, line 52 * * column 13, line 56 - column 14, line 58; figures 1,10,12 *	1-12	
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E	WO 2008/067843 A (SAECO IPR LTD [IE]; RIGHETTI MARCO [IT]) 12 June 2008 (2008-06-12) * page 5, line 12 - page 7, line 29 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			G07F
Place of search		Date of completion of the search	Examiner
Munich		25 August 2008	Aupiais, Brigitte
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 02 0463

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25-08-2008

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REFERENCES CITED IN THE DESCRIPTION

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