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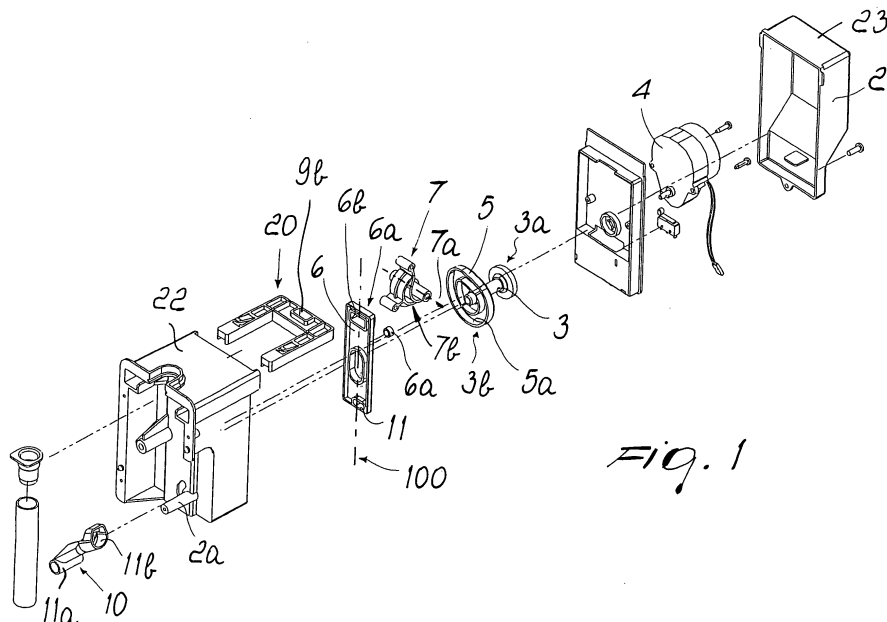
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(54) **Sugar and stir-stick dispenser**

(57) A sugar and stir-stick dispenser, comprising a supporting structure (2) for an actuation shaft (3), which is connected kinematically to motor means (4) and is connected, through first kinematic connection means, to a sugar dispensing element (10). The dispenser has an actuation cam (5), connected in input to the actuation shaft (3) and in output, through second kinematic connection means, to a stir-stick dispensing element (20); the second kinematic connection means comprising an actuation element (6), actuatable by the actuation cam (5) and having a first actuation portion (6b), associated with a pusher (7), which is supported so as to be rotat-

able about a pivoting axis (7a) by the supporting structure (2) and is designed to actuate with a back-and-forth motion the stir-stick dispensing element (20) in order to dispense the stir-stick into a cup. The pusher (7) comprises a main body (7b), which is associated, through a first articulation arm (8a), with a motion receiving element (8), which can engage the first actuation portion (6b) and, by interposition of a second articulation arm (9a), is associated with a pusher portion (9), which engages the stir-stick dispensing element (20), the pusher (7) being elastically deformable by torsion about the pivoting axis (7a).



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Description

[0001] The present invention relates to a stir-stick and sugar dispenser, particularly suitable for vending machines for hot beverages (tea, coffee, chocolate, etc.).

[0002] Hot beverage vending machines are already known which are provided with devices intended to dispense sugar and with devices intended to dispense stir-sticks: each one of such devices has its own separate motor means, connected to respective dispensing elements by way of various kinds of kinematic connection means.

[0003] In order to try to reduce overall costs and dimensions, several actuation devices have already been marketed which allow, with the aid of a single motor, to actuate both the sugar dispensing element and the stir-stick dispensing element.

[0004] However, these actuation devices, though being based on various constructive criteria, often cause overloads on the motor means, which can compromise their operation.

[0005] The sugar dispensing element is generally connected directly to the driving shaft, whereas loading means (often of the elastic type), intended to prevent any blocking of sugar dispensing if the stir-stick dispensing element jams, are interposed between the stir-stick dispensing element and the actuation shaft.

[0006] Although these devices in any case ensure correct dispensing of the sugar, they are not devoid of drawbacks.

[0007] These embodiments, while being valid from a conceptual standpoint, have in fact proved to be scarcely practical from a constructive standpoint, since they are complicated to manufacture.

[0008] Moreover, the motor means must generally load the elastic loading means at each dispensing cycle, and accordingly it is necessary to use oversized motors for the cyclic peaks that must be withstood.

[0009] Finally, it has been found that the stir-sticks intended to be dispensed by the dispensing device often have thicknesses that vary, albeit slightly. This circumstance can entail blocking or jamming during the dispensing of the stir-sticks, due to the inaccurate match between the thickness of the stir-stick and the slot through which the stir-sticks must pass during dispensing.

[0010] The aim of the present invention is to eliminate or at least reduce drastically the drawbacks noted above in known types of sugar and stir-stick dispensers.

[0011] Within this aim, an object of the present invention is to provide a sugar and stir-stick dispenser that can achieve higher operating reliability.

[0012] Another object of the present invention is to provide a sugar and stir-stick dispenser that has a very simple structure, is highly durable, easy to use, and competitive in terms of production cost, so that it is also advantageous from an economical standpoint.

[0013] Another object of the invention is to provide a

sugar and stir-stick dispenser that can be adapted simply and precisely to stir-sticks having different thicknesses.

[0014] This aim and these and other objects that will become better apparent hereinafter are achieved by a sugar and stir-stick dispenser according to appended claim 1.

[0015] According to another aspect, the present invention provides an adjustment device for a stir-stick dispenser according to appended claim 10.

[0016] Further characteristics and advantages of the invention will become better apparent from the description of some preferred but not exclusive embodiments of a sugar and stir-stick dispenser according to the present invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is an exploded view of the dispenser according to the present invention;

Figure 2 is an enlarged-scale view of a portion of the exploded view of Figure 1;

Figure 3 is a perspective view of the pusher;

Figure 4 is a partially exploded perspective view of an adjustment device;

Figure 5 is a front elevation view of the adjustment device in a first step of adjustment;

Figure 6 is a view, similar to Figure 5, but with the adjustment device set in a second step of adjustment;

Figure 7 is a perspective view of a stir-stick dispensing element; and

Figure 8 is a partially exploded perspective view of a stir-stick dispensing device during the dispensing step.

[0017] In the examples of embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other examples of embodiments.

[0018] Moreover, it is noted that anything found to be already known is understood not to be claimed and to be the subject of a proper disclaimer.

[0019] With reference to the figures, a sugar and stir-stick dispenser, generally designated by the reference numeral 1, comprises a supporting structure 2 for an actuation shaft 3.

[0020] The actuation shaft 3 is connected, at a first input end 3a, to motor means 4 and, at a second output end 3b, to an actuation cam 5.

[0021] In the example of embodiment shown in the figures, the actuation cam 5 is keyed directly at the second output end 3b of the actuation shaft 3.

[0022] Moreover, the actuation shaft 3 is connected, by way of first conventional kinematic connection means, to a sugar dispensing element 10.

[0023] According to the present invention, the actuation cam 5 is connected, by way of second kinematic

connection means, to a stir-stick dispensing element 20, so that as a consequence of the rotation of the actuation shaft 3 (and therefore of the actuation cam 5), the stir-stick dispensing element 20 can move with an alternating back-and-forth motion, so as to allow to dispense a stir-stick inside the cup.

[0024] In greater detail, the second kinematic connection means comprise an actuation element 6, which can be actuated by the actuation cam 5: in particular, as clearly shown in the exploded views of Figure 1 and Figure 2, the actuation element 6 can be advantageously constituted by a laminar element, which is slidably supported by two lateral guides supported by the supporting structure 2, so that it can move along an actuation axis 100.

[0025] Conveniently, a connecting pin 6a protrudes from the face of the actuation element 6 that is directed toward the actuation cam 5 and is designed to slide in engagement within a guide 5a formed on said actuation cam 5.

[0026] A first actuation portion 6b is formed on the actuation element 6 (in the illustrated example, at its upper end and is associated with a pusher 7, which is supported, so that it can rotate about a pivoting axis 7a, by said supporting structure 2.

[0027] In particular, the pusher 7 is designed to actuate with a back-and-forth motion the stir-stick dispensing element 20 in order to dispense the stir-stick into a cup.

[0028] Conveniently, the pusher 7 has a main body 7b provided with a first articulation arm 8a, which supports, at its free end, a motion receiving element 8; the pusher 7 further has a second articulation arm 9a, which is associated, at its free end, with a pusher portion 9.

[0029] In greater detail, the motion receiving element 8 is associated with a first seat, which constitutes the first actuation portion 6b, while the pusher portion 9 is associated with a respective pusher seat 9b formed on the stir-stick dispensing element 20.

[0030] According to the present invention, the pusher 7 is elastically deformable by torsion about its own pivoting axis 7a.

[0031] In particular, the first articulation arm 8a and/or the second articulation arm 9a can be provided so as to yield elastically about the pivoting axis 7a, so as to avoid blocking, for example if the stir-stick dispensing element 20 (and therefore the pusher portion 9) is blocked, the rotation of the actuation shaft 3, ensuring in any case dispensing of the sugar by the sugar dispensing element 10.

[0032] Conveniently, with particular reference to the embodiment shown in Figures 1 and 2, the first kinematic connection means can be constituted by a second actuation portion 11, which is also supported by the actuation element 6 and is kinematically connected to an actuation lever system, which is associated with the sugar dispensing element 10.

[0033] In particular, the sugar dispensing element 10

can be mounted so that it can oscillate about an oscillation axis 2a, which is supported by the supporting structure 2 at an intermediate pivoting portion 11a thereof; moreover, the sugar dispensing element 10 has, on opposite sides with respect to said intermediate pivoting portion 11a, a spoon-shaped dispensing portion 11b and a control portion that engages the second actuation portion 11, so as to allow, as a consequence of the sliding of the actuation element 6 along the actuation axis 100, the oscillation (with consequent dispensing of sugar in the cup) of the sugar dispensing element 10.

[0034] Conveniently, the first actuation portion 6b and the second actuation portion 11 are constituted by a respective seat, which is formed at substantially terminal portions (with respect to the direction defined by the actuation axis 100) of said actuation element 6.

[0035] With particular reference to the perspective view shown in Figure 3, the main body 7b of the pusher 7 is constituted by at least one connection portion 12, which is shaped like a portion of a spiral from which the first articulation arm 8a and the second articulation arm 9a protrude radially with respect to the pivoting axis 7a.

[0036] In particular, in the example shown in Figure 3, the main body is provided with a first internal spiral portion 12a, from the free end 12b whereof the second articulation arm 9a protrudes, and with a second external spiral portion 12c, from which the first articulation arm 8a protrudes at an intermediate portion.

[0037] Advantageously, the first articulation arm 8a and the second articulation arm 9a (and accordingly the motion receiving element 8 and the pusher portion 9) are substantially angularly spaced through 90°, so as to allow the direction of the back-and-forth motion of the stir-stick dispensing element 20 to be substantially perpendicular with respect to the actuation axis 100 of the actuation element 6.

[0038] As clearly illustrated in the figures, the stir-stick dispensing element 20 is substantially fork-shaped and has, at its tip portions 20a, respective pusher protrusions 20b, which are designed to engage at least one stir-stick 200 arranged at the bottom of a stack of stir-sticks 201.

[0039] In particular, as already known, the tip portions 20a can slide within a pair of sliding rails 21 formed on the supporting structure 2, which in the illustrated example is constituted by two half-shells 22 and 23 provided with mutual connection means so as to obtain a box-like body in which the sugar and stir-stick dispenser 1 according to the invention is accommodated in a compact manner.

[0040] According to another aspect, as clearly shown in Figures 4 to 8, the present invention provides an adjustment device 1a for a stir-stick dispenser.

[0041] The stir-stick dispenser 1a (shown in Figure 4) can comprise, as mentioned above, the stir-stick dispensing element 20, which is designed to act by pushing, for example by means of its pusher abutments 20b, against a respective stir-stick to be dispensed, which is

arranged at the bottom of a stack of stir-sticks stacked along a stacking direction, which in the illustrated example of embodiment coincides with a substantially vertical direction.

[0042] According to the present invention, the adjustment device 1a has at least one supporting portion 110 for the stir-stick to be dispensed and means for moving the supporting portion or portions 110 along the stacking direction.

[0043] In particular, the adjustment device 1a can be provided with a supporting wall 105 (which in the illustrated example lies on a substantially vertical plane), which supports two lateral guides 106 that can be engaged by the longitudinal end portions of the stacked stir-sticks.

[0044] Preferably, the supporting wall 105 further has one or more slots 107, which can be crossed, during the dispensing step, by at least one respective portion of the stir-stick dispensing element 20.

[0045] Moreover, the supporting wall 105 is associated, on the opposite side with respect to the stir-stick dispensing element 20, with an adjustment element 111, which supports the supporting portion 110; advantageously, it is possible to provide two supporting portions 110 for the stir-stick to be dispensed that lies at the bottom of the stack of stacked stir-sticks.

[0046] Advantageously, said adjustment element 111 is associated with actuation means.

[0047] With particular reference to the embodiment shown in Figure 4, between the first supporting portion 110 and the second supporting portion 110 there is at least one insertion seat 112 for the lower portion or portions of the portion or portions of the dispensing elements 2 during the dispensing step.

[0048] Advantageously, the stir-stick dispensing element 20, by being for example fork-shaped, has two tip portions 20a, which have a respective pusher abutment 20b adapted to act by pushing against a respective stir-stick to be dispensed, which is arranged at the bottom, and a respective lower portion, which is designed to engage within the insertion seat 112.

[0049] According to a preferred example of embodiment, the actuation means of the adjustment element 111 can comprise an eccentric element 120, which is supported rotatably by the supporting structure and can engage, by means of a lifting portion, against the respective engagement seat formed on the adjustment element 111.

[0050] With reference to the illustrated example, the rotation of the eccentric element 120 about the respective rotation axis is adapted to move the adjustment element 111 along said stacking direction, so as to move the supporting portion or portions 110 toward/away from the pusher 20 and in particular its pusher abutments 20b.

[0051] Advantageously, the eccentric element 120 can be provided with a radial tab 121, which can be associated with a graduated scale 122: said graduated

scale 122 is associated with a plurality of engagement notches, which are arranged along a portion of a circle and can be engaged by an end portion of the radial tab 121 in order to keep the eccentric element 120 locked in the intended position.

[0052] The adjustment device described above and shown in Figures 4 to 7 can also be combined with the sugar and stir-stick dispenser 1 described and illustrated earlier in Figures 1 to 3.

[0053] Operation of a sugar and stir-stick dispenser according to the invention is as follows.

[0054] If the selected beverage dispenses the sugar (and accordingly the stir-stick) into the cup, the motor means drive the actuation shaft 3 and therefore the actuation cam 5.

[0055] If no blockage or operating anomaly of the stir-stick dispensing element 20 occurs, the pusher 7 behaves like a rigid body: in practice, it undergoes no deformation and transfers the back-and-forth motion of the actuation element 6 along the actuation axis into a back-and-forth motion of the stir-stick dispensing element 20 within the rails formed on the supporting structure 2.

[0056] At the same time, the actuation element 6 also moves (with an oscillating motion) the sugar dispensing element 10.

[0057] In case of anomalies of the stir-stick dispensing element 20, the particular shape of the pusher 7 allows it to undergo a torsional deformation, allowing in any case the actuation element 6 to move (accordingly dispensing sugar) without this causing an excessive overload of the motor means.

[0058] As regards the adjustment device 1a, it has been found that by acting on the eccentric element 120 by turning the radial tab 121, a relative translational motion along the stacking direction of the adjustment element 1a is produced with respect to the stir-stick dispensing element 20. In this manner, it is possible to move the supporting portion or portions 110 toward/away from the upper edge of the pusher abutments 20b until there is a perfect match between the thickness of the stir-sticks used and the distance between the supporting portions 110 and the upper edge.

[0059] The terms "upper" and "lower" refer to the position in which the device and its parts are shown in the figures and are not intended as limiting the invention to such position only.

[0060] All the characteristics of the invention mentioned above as advantageous, convenient or the like may also be omitted or be replaced with equivalents.

[0061] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0062] In practice, it has been found that the invention has achieved the intended aim and objects in all of its embodiments.

[0063] In particular, it is evident that a sugar and stir-stick dispenser allows to dispense, by means of a single motor, both the sugar and the stir-sticks without subject-

ing the motor to overloads at each cycle, since the second kinematic connection means, when no anomalies in stir-stick dispensing occur, behave like a rigid connection.

[0064] Moreover, it has been found that thanks to the adjustment device it is possible to adapt simply and effectively the stir-stick dispensing device to the thickness of the stir-sticks used, so as to further reduce the possibility of any jamming and/or anomalies in operation.

[0065] In practice, the materials used, so long as they are compatible with the contingent use, as well as the shapes and the dimensions, may be any according to requirements.

[0066] All the details may further be replaced with other technically equivalent elements.

[0067] The disclosures in Italian Patent Application No. VR2004A000061 from which this application claims priority are incorporated herein by reference.

[0068] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A sugar and stir-stick dispenser, comprising a supporting structure (2) for an actuation shaft (3), which is connected kinematically to motor means (4) and is connected, by way of first kinematic connection means, to a sugar dispensing element (10), **characterized in that** it comprises an actuation cam (5), which is connected in input to said actuation shaft (3) and in output, by way of second kinematic connection means, to a stir-stick dispensing element (20), said second kinematic connection means comprising an actuation element (6), which can be actuated by said actuation cam (5) and has a first actuation portion (6b), associated with a pusher (7), which is supported so that it can rotate about a pivoting axis (7a) by said supporting structure (2) and is designed to actuate with a back-and-forth motion said stir-stick dispensing element (20) in order to dispense the stir-sticks, said pusher (7) comprising a main body (7b) which is associated, by way of a first articulation arm (8a), with a motion receiving element (8), which can engage said first actuation portion (6b) and, by interposition of a second articulation arm (9a), with a pusher portion (9), which engages said stir-stick dispensing element (20), said pusher (7) being elastically deformable by torsion about said pivoting axis (7a).
2. The dispenser according to claim 1, **characterized in that** said first kinematic connection means comprise a second actuation portion (11), which is supported by said actuation element (6) and is kinematically connected to an actuation lever system, which is associated with said sugar dispensing element (10).
3. The dispenser according to one or more of the preceding claims, **characterized in that** said actuation element (6) can move, as a consequence of the rotation of said actuation cam (5) about its respective rotation axis, along a respective actuation axis, said first actuation portion (6b) and said second actuation portion (11) comprising a respective seat, which is formed at substantially terminal portions of said actuation element (6).
4. The dispenser according to one or more of the preceding claims, **characterized in that** said pusher (7) comprises a portion (12) for connection between said main body (7b) and such pusher portion (12) that is substantially shaped like a spiral.
5. The dispenser according to one or more of the preceding claims, **characterized in that** said main body (7b) comprises a first internal spiral portion (12a), from the free end whereof said second articulation arm (9a) protrudes, and a second external spiral portion (12c), from which said first articulation arm (8a) protrudes at an intermediate portion.
6. The dispenser according to one or more of the preceding claims, **characterized in that** said actuation element (6) comprises a connecting pin (6a), which can slide in engagement within a guide (5a) formed on said actuation cam (5).
7. The dispenser according to one or more of the preceding claims, **characterized in that** said sugar dispensing element (10) can oscillate about an intermediate pivoting portion (11a), a spoon-shaped dispensing portion (11b) and a control portion engaged with said second actuation portion (11) being provided on opposite sides with respect to said intermediate pivoting portion (11a).
8. The dispenser according to one or more of the preceding claims, **characterized in that** said pusher portion (9) and said motion receiving element (8) are substantially angularly spaced through 90°, the direction of back-and-forth movement of said stir-stick dispensing element (20) being substantially perpendicular to the direction of extension of said actuation axis (100).
9. The dispenser according to one or more of the preceding claims, **characterized in that** said stir-stick dispensing element (20) is fork-shaped and has, at its tip portions (20a), respective portions (20b) that

are intended to engage at least one stir-stick arranged at the bottom of a stack of stir-sticks.

10. An adjustment device for a stir-stick dispenser, said stir-stick dispenser (20) comprising a supporting structure (2) for an actuation shaft (3), which is kinematically connected to motor means (4) and is adapted to actuate, by interposition of second kinematic connection means (6), a stir-stick dispensing element (20), which is provided with at least one pusher portion (20b), which is designed to push against a respective stir-stick to be dispensed, which is arranged at the bottom of a stack of stir-sticks stacked along a stacking direction, **characterized in that** it comprises at least one supporting portion (110) for said stir-stick to be dispensed and means for actuating said at least one supporting portion (110) along said stacking direction.
11. The adjustment device according to claim 10, **characterized in that** it comprises a substantially vertical supporting wall (105), which supports two lateral guides (106) for said stack of stacked stir-sticks and a respective slot (107) for said at least one pusher portion, said supporting wall (105) being associated, on the opposite side with respect to said stir-stick dispensing element (20), with an adjustment element (111), which supports a first supporting portion (110) and a second supporting portion (110) for said stir-stick to be dispensed, means for actuating said adjustment element (111) being provided.
12. The adjustment device according to one or more of claims 10 to 11, **characterized in that** between said first supporting portion (110) and said second supporting portion (110) there is at least one insertion seat (112) for the lower portion of said stir-stick dispensing element (2) during the dispensing step.
13. The adjustment device according to one or more of claims 10 to 12, **characterized in that** said stir-stick dispensing element (20) is fork-shaped and has two pusher abutments (20b), which have a respective upper portion, which is adapted to push against a respective stir-stick to be dispensed that is arranged at the bottom, and a respective lower portion, which is designed to engage within said insertion seat (112).
14. The adjustment device according to one or more of claims 10 to 13, **characterized in that** said actuation means of said at least one supporting portion (110) comprise an eccentric element (120), which is supported by said supporting structure and can be engaged within a respective seat carried by said adjustment element, the rotation of said eccentric element about a respective rotation axis being adapted to move said adjustment element (111)
- along said stacking direction.
15. The adjustment element according to claim 14, **characterized in that** said eccentric element (120) comprises a radial tab (121), which can be associated with a graduated scale (122).
16. The sugar and stir-stick dispenser according to claim 1, comprising a stir-stick dispensing element (20), which is provided with at least one pusher portion (20b) designed to push against a respective stir-stick to be dispensed, which is arranged at the bottom of a stack of stir-sticks stacked along a stacking direction, and an adjustment device (1a), which has at least one supporting portion (110) for said stir-stick to be dispensed and means for actuating said at least one supporting portion (110) along said stacking direction.
17. The sugar and stir-stick dispenser according to claim 16, **characterized in that** it comprises a substantially vertical supporting wall (105), which supports two lateral guides (106) for said stack of stacked stir-sticks and a respective slot (107) for said at least one pusher portion (20b), said supporting wall (105) being associated, on the opposite side with respect to said stir-stick dispensing element (20), with an adjustment element (111), which supports a first supporting portion (110) and a second supporting portion (110) for said stir-stick to be dispensed, means for actuating said adjustment element being provided.
18. The adjustment device according to one or more of claims 16 to 17, **characterized in that** at least one insertion seat (112) for the lower portion of said stir-stick dispensing element (20) during dispensing is formed between said first supporting portion (110) and said second supporting portion (110).
19. The adjustment device according to one or more of claims 16 to 18, **characterized in that** said stir-stick dispensing element (20) is fork-shaped and is provided with two pusher abutments (20b), which have a respective upper portion adapted to push against a respective stir-stick to be dispensed, which is arranged at the bottom, and a respective lower portion, which is designed to engage within said insertion seat (112).
20. The adjustment device according to one or more of claims 16 to 19, **characterized in that** said means for actuating said at least one supporting portion (110) comprise an eccentric element (120), which is supported by said supporting structure and can be engaged within a respective seat supported by said adjustment element (111), the rotation of said eccentric element (120) about a respective rotation

axis being adapted to move said adjustment element (111) along said stacking direction.

21. The adjustment device according to claim 20, **characterized in that** said eccentric element (120) comprises a radial tab (121) that can be associated with a graduated scale (122).

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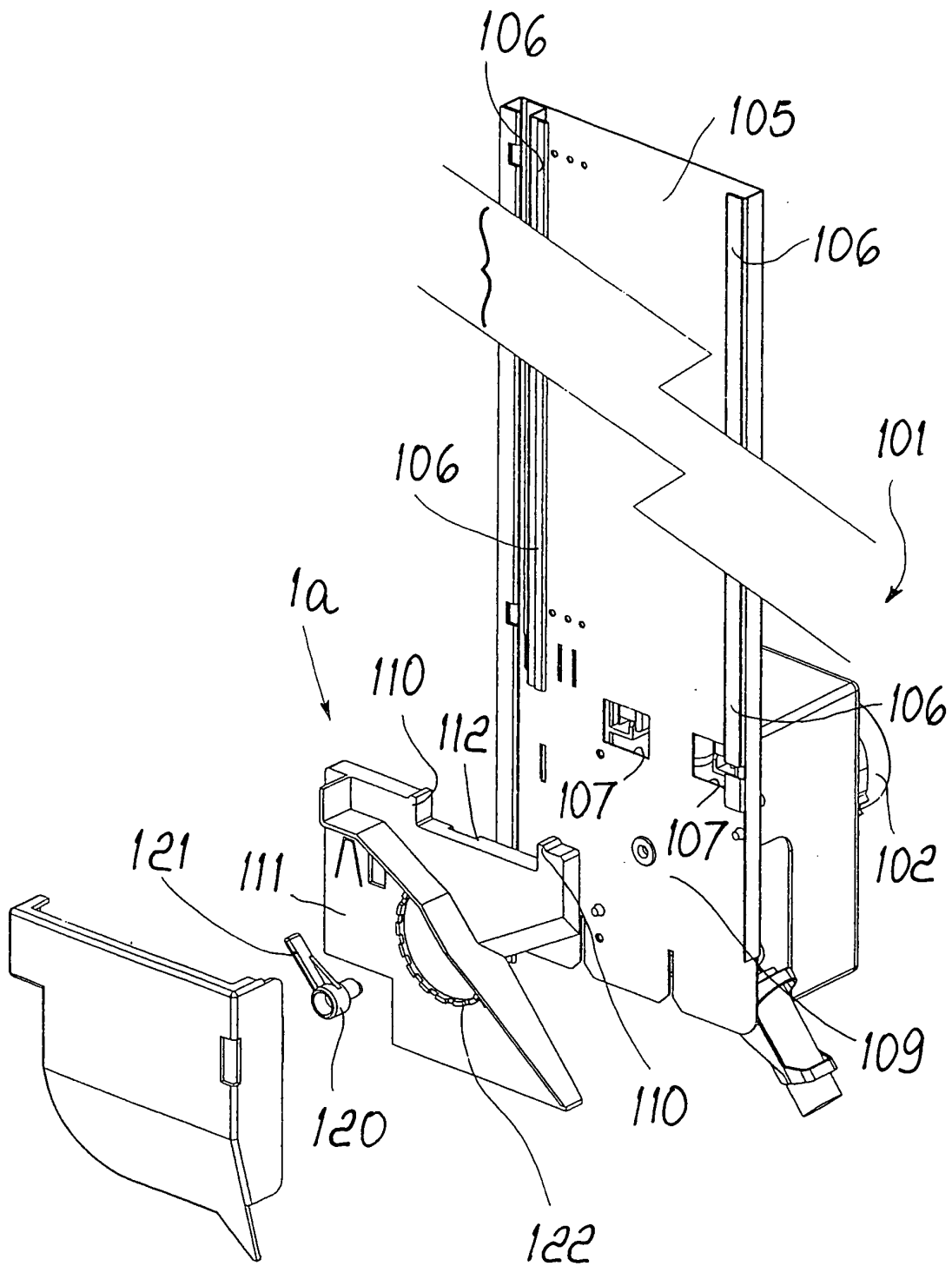


FIG. 4

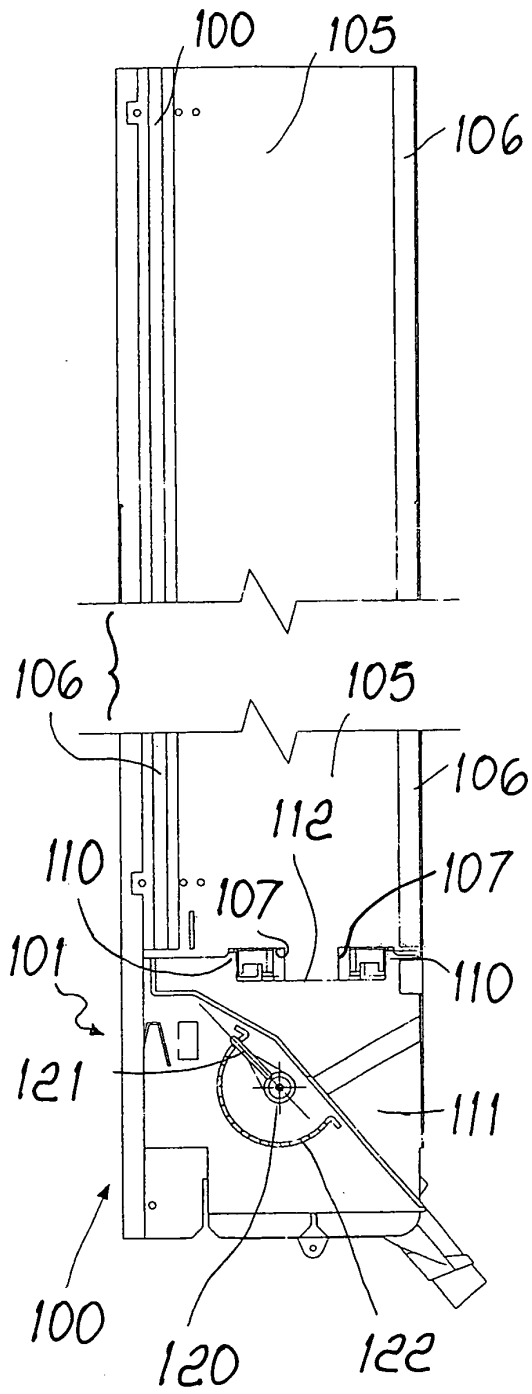


Fig. 5

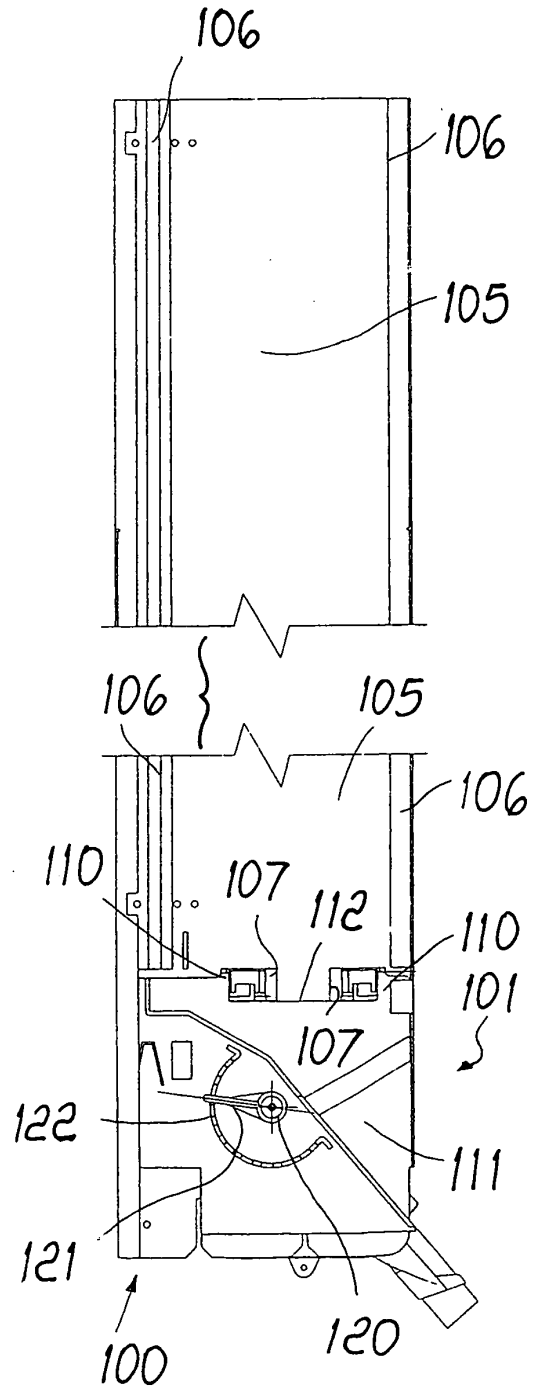


Fig. 6

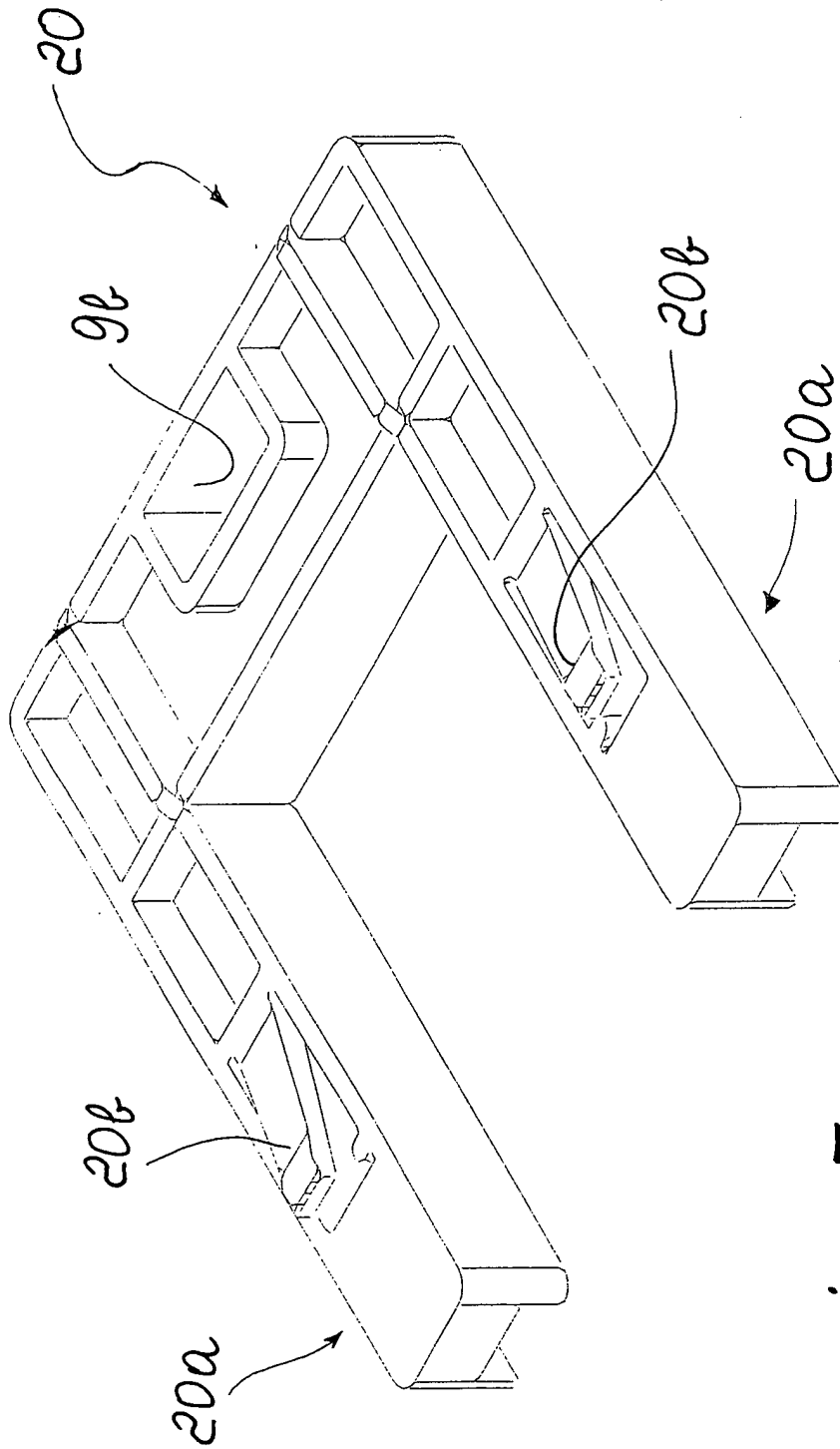


Fig. 7

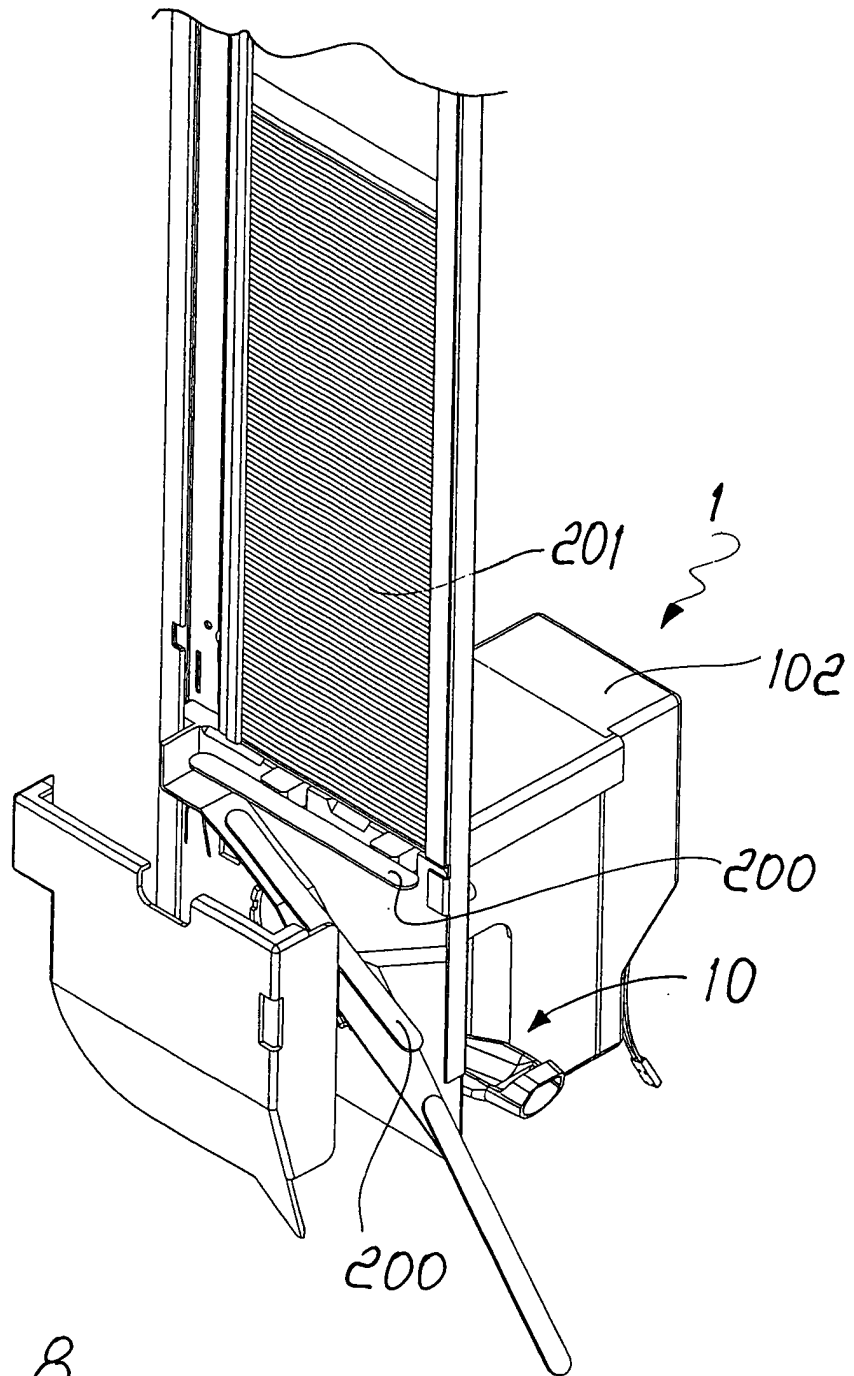


Fig. 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 1 107 200 A (NECTA VENDING SOLUTIONS S.P.A) 13 June 2001 (2001-06-13) * abstract * -----	1,10	A47F1/00 A47F1/03 A47F1/10 G07F13/10
A	US 4 266 695 A (RUPEREZ ET AL) 12 May 1981 (1981-05-12) * abstract * -----	1	
A	DE 23 39 678 A1 (GENERAL PROPERTIES ANSTALT; MECARBO S.A., VADUZ, LI) 20 February 1975 (1975-02-20) * page 10, paragraph 2; figure 4 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A47F G07F
Place of search		Date of completion of the search	Examiner
The Hague		10 June 2005	Pineau, A
<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 & : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

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

EP 05 00 8318

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
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10-06-2005

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82