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(54) **AUTOMATIC DISPENSER**

AUTOMATISCHE ABGABEVORRICHTUNG

DISTRIBUTEUR AUTOMATIQUE

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EP 2 260 475 B1

Description

[0001] The present invention relates to a automatic dispenser.

[0002] A typical application of the present invention is the field of articles automatic dispensers that are commonly called "vending machines" are used for dispensing, upon payment, various types of products, in particular foods and beverages.The present description will refer in particular to the field of articles dispensers, even though the present invention is not limited to such an application.

[0003] Articles automatic dispensers equipped with an articles ejection assembly are currently available on the market; said assembly comprises at least a "geared motor" (i.e. a unit incorporating an electric motor and a motion reduction mechanism), a metal spiral fitted to the output shaft of the geared motor, a cylindrical element fitted to the output shaft of the geared motor, and a microswitch arranged close to the cylindrical element.

[0004] The articles to be dispensed are inserted between the coils of the metal spiral and generally consist of bottles or packaged snacks; as the spiral makes one full revolution, all products advance axially by a distance corresponding to the spiral pitch, and the article which arrives at the free end of the spiral thus becomes ready to be dispensed, for example, by letting it fall by gravity into a collection cavity.

[0005] An ejection device like the one described above is shown schematically in Fig.1, wherein 1 is the geared motor (10 being the external housing thereof), 11 is the output shaft thereof having an axis of rotation 11A, 2 is the spiral, 3 is the cylindrical element, and 4 is the microswitch (40 being the external housing thereof); the cylindrical element 3 and the microswitch 4 are shown in more detail in Fig.2 and Fig.3 in two different reciprocal positions.

[0006] As can be seen in Fig.2 and Fig.3, the cylindrical element 3 has a radial recess 31; the microswitch 4 is arranged close to the cylindrical element 3 in a manner such that, when the shaft 11 of the geared motor 1 is rotating, the actuator 41 of the microswitch 4 is pressed and released cyclically by the cylindrical element 3; the microswitch 4 is held pressed (Fig.3) for almost one full revolution and is then released (Fig.2) for a short time; by detecting the opening and closing actions of the microswitch 4 it is possible to control the geared motor 1 and obtain the delivery of one article at a time.

[0007] This microswitch-based electromechanical solution has been used in "vending machines" for a long time.

[0008] A first drawback of such a solution is that the microswitch may bounce back to some extent when abruptly pressed and released, thus causing wrong detections of the rotation of the geared motor and therefore of the advance of the articles, hence leading to article delivery problems.

[0009] These problems are generally overcome by using special high-quality microswitches and/or by making the pressing/releasing action less abrupt; in spite of these corrective steps, problems may still arise which require a call to the "vending machine" service technician.

[0010] A second drawback of such a solution is that the ejection assembly sometimes gets stalled or braked due to an anomalous positioning of the articles to be delivered; such anomalous positioning may occur when the articles are being loaded into the dispenser or, more often, during the operation of the dispenser, in particular during the actuation of the ejection assembly; this causes article delivery problems as well as damage to the electric motor of the geared motor, which is stalled or braked just when power is being supplied to it - this anomalous condition of the electric motor may cause even worse material and personal damage.

[0011] These problems can be prevented by checking that the article is delivered correctly every time the ejection assembly is actuated, e.g. through a sensor detecting that the article has fallen or is present in the collection cavity; if delivery has not taken place, the dispense stops, awaiting an intervention by a service technician. However, if the ejection assembly is not stalled, but is only braked, the fault will not be detected and risks of damage will result.

[0012] Document US 5256921 A discloses a gear motor having an output shaft for driving the dispensing mechanism of a vending machine that includes a plurality of magnetically operated switches positioned adjacent one end of the output shaft and a plurality of magnets attached to that end of the output shaft. A DC electric motor is energized by a computer to rotate the output shaft in a first direction until one of the magnetic switches is actuated by a magnet, which instructs the computer to reverse the polarity of power to the DC motor, reversing the direction of the motor and the output shaft. When the output shaft is returned to its standby position, one or more of the switches are again actuated which instructs the computer to terminate power to the DC motor. An enclosure surrounds the switches and magnets and protects them from the ambient.

[0013] Document JP 7249159 A discloses a solution for improving the reliability of an automatic vending machine by allowing a control part to recover to sales standby by abnormality self-restoring operation when an overcurrent detector detects overcurrent and to execute a sales stoppage processing when the overcurrent detector detects overcurrent while abnormality self-restoring operation, so as not to recover to sales standby.

[0014] The known solutions require the presence of long, complex and awkward wirings inside the vending machine in order to provide protection against anomalous electric conditions.

[0015] It is the general object of the present invention to provide a solution which is alternative to the prior art and which overcomes the above-mentioned drawbacks, in particular as far as a regular and reliable articles delivery is concerned.

[0016] These and other objects are achieved through the automatic dispenser having the features set out in the appended claims, which are intended as an integral part of the present description.

[0017] The present invention is based on the innovative concept of detecting the mechanic operation of the ejection device through a magnetic sensor and the electric operation of the ejection device through an overcurrent protection device.

[0018] In particular, the present invention advantageously employs at least one magnet (preferably two or three magnets) mechanically associated with the output shaft of the geared motor, and a Hall effect sensor as well as a PPTC [Polymeric Positive Temperature Coefficient, i.e. a particular type of PTC] connected electrically upstream of the geared motor.

[0019] As an alternative to the Hall effect sensor (but less advantageously), a different type of magnetic proximity sensor may be used: for instance, a Reed contact sensor or an inductive sensor.

[0020] As an alternative to the PPTC (but less advantageously), a different type of overcurrent protection device may be used: for example, a fuse (electric fuse, thermal fuse, ...) or a magnetic switch (magnetothermal switch, relay, ...) or a thermal switch (with a bimetallic foil) or a traditional PTC.

[0021] With this solution, the detection of the movement of the ejection device becomes simple, accurate and reliable; it follows that the automatic dispenser can determine accurately and reliably if an article, for example, has been delivered correctly in a manner substantially independent of the weight and size of the article itself, while preparing itself accurately and reliably for the next delivery operation as well.

[0022] Furthermore, with this solution the automatic dispenser can determine if the electric motor of the geared motor of the ejection assembly is operating in proper conditions, and therefore if delivery can continue regularly.

[0023] A first important advantage offered by the present invention is that it does not require the presence of long, complex and awkward wirings inside the vending machine.

[0024] A second important advantage offered by the present invention is that, should anomalous electric conditions arise, the operation of the ejection device will be automatically stopped electrically; also, when a PPTC (which is a resettable device) is used, the operation of the ejection device can be restored simply by switching off and on the power to the ejection assembly (in particular to the geared motor) without having to replace any component.

[0025] A third important advantage offered by the present invention is that the overcurrent protection device provides protection against anomalous electric conditions due not only to the electric motor of the geared motor getting stalled or braked, but also to any anomalous absorption of electric current (e.g. short circuits).

[0026] The present invention applies to articles dispensers, in particular for foods and/or beverages, as well as to doses dispensers, in particular for powder material (e.g. powder coffee) or granulated material (e.g. granulated coffee or combustible pellets).

[0027] The present invention, and in particular the technical features and advantages thereof, will become more apparent from the following description referring to the annexed drawings, wherein:

Fig.1 shows a much simplified mechanic diagram of an article ejection assembly according to the present invention; this is a general diagram which is applicable, to a large extent, to prior-art assemblies as well as to assemblies according to the present invention,
Fig.2 shows a cylindrical element and a microswitch according to the prior art, in a first reciprocal position,
Fig.3 shows a cylindrical element and a microswitch according to the prior art, in a second reciprocal position,
Fig.4 shows a cylindrical element and a magnetic sensor according to an embodiment of the present invention, in a first reciprocal position,
Fig.5 shows a cylindrical element and a magnetic sensor according to an embodiment of the present invention, in a second reciprocal position,
Fig.6 shows a cylindrical element and a magnetic sensor according to an embodiment of the present invention, in a third reciprocal position,
Fig.7 shows a cylindrical element and a magnetic sensor according to an embodiment of the present invention, in a fourth reciprocal position, and
Fig.8 is a simplified mechanic/electric diagram of an embodiment of the present invention.

[0028] Said description and said drawings are explanatory only and non-limiting; additionally, they are schematic and simplified.

[0029] The present invention will now be described with reference to Fig.1 as well as to Fig.4, Fig.5, Fig.6, Fig.7 and Fig.8.

[0030] The automatic dispenser according to the present invention is equipped with an ejection assembly; said assembly comprises at least:

- a geared motor (1 in Fig. 1),
- an ejection device (2 in Fig.1) fitted either directly or indirectly to the output shaft (11 in Fig.1) of the geared motor (1 in Fig.1),
- detection means (3 and 5 combined together in Fig. 1) adapted to detect the movement of the ejection device (2 in Fig.1);

the detection means comprise:

- at least one magnet (32 and/or 33 in Fig.4, Fig.5, Fig.6 and Fig.7) associated with the output shaft (11 in Fig.1) of the geared motor (1 in Fig.1),

- at least one magnetic sensor (5 in Fig.1) positioned in a manner such as to detect when said at least one magnet (32 and/or 33 in Fig.4, Fig.5, Fig.6 and Fig. 7) passes through a predetermined region (51A in Fig.1),
- an overcurrent protection device (8 in Fig.8) connected electrically upstream of said geared motor (1 in Fig.8).

[0031] According to this solution, the detection of the movement of the ejection device is simple, accurate and reliable; it follows that the automatic dispenser can determine accurately and reliably if an article has been delivered correctly in a manner substantially independent of the weight and size of the article itself, while preparing itself accurately and reliably for the next delivery operation as well. An important advantage offered by the present invention is that it does not require the presence of long, complex and awkward wirings inside the vending machine.

[0032] Furthermore, with this solution the automatic dispenser can determine if the electric motor of the geared motor of the ejection assembly is operating in proper conditions, and therefore if delivery can continue regularly. An important advantage offered by the present invention is that, should anomalous electric conditions arise, the operation of the ejection device will be automatically stopped electrically; also, another important advantage of the present invention is that the overcurrent protection device provides protection against anomalous electric conditions due not only to the electric motor of the geared motor getting stalled or braked, but also to any anomalous absorption of electric current (e.g. short circuits).

[0033] The overcurrent protection device is preferably a PPTC; as a matter of fact, said component increases very much its resistance quickly when a current above a predetermined threshold flows through it, and then such high resistance is maintained until power is cut off; the thermal inertia of the PPTC is sufficient to prevent any short current peaks from cutting off the power supply to the geared motor, in the absence of any dangerous conditions.

[0034] In the example of Fig.1, the ejection device is a metal spiral 2 fitted to the output shaft 11 of the geared motor 1 through a flange 6.

[0035] In the example of Fig.1, the magnetic sensor 5 is connected electrically to an electronic control unit 7 adapted to, among other things, control the rotation of the geared motor 1 and cause the articles to be delivered.

[0036] In the example of Fig.1, the magnetic sensor 5 comprises a small electronic board 50 and a Hall effect sensor 51 fitted to the board 50 (as can be seen only in Fig.4, Fig.5, Fig.6 and Fig.7); the sensor 51 has a detection region 51 A within which the sensor 51 can detect a magnetic field.

[0037] In the example of Fig.1, two magnets 32 and 33 are associated with the output shaft 11 of the geared motor 1 (as can be seen only in Fig.4, Fig.5, Fig.6 and Fig.7); the magnets 32 and 33 are arranged in a manner such as to pass through the detection region 51 A of the sensor 51 when the geared motor 1 is rotating. In Fig.4 no magnet is within the detection region 51A of the sensor 51; in Fig.5 the magnet 32 is within the detection region 51A of the sensor 51; in Fig.6 no magnet is within the detection region 51A of the sensor 51; in Fig.7 the magnet 33 is within the detection region 51A of the sensor 51.

[0038] In the example of Fig.1, the two magnets 32 and 33 are located at such a distance as to form an angle between 30° and 90° with the axis 11A of the shaft 11 (as can be seen only in Fig.4, Fig.5, Fig.6 and Fig.7); in particular, said angle is approximately 45°.

[0039] In the example of Fig.1, as well as in Fig.4, Fig. 5, Fig.6, Fig.7 and Fig.8, the geared motor 1 is adapted to rotate in both directions and to reverse its direction of rotation; as a consequence, this also applies to the shaft 11 and to the device 2; it should be noted that the direction of rotation associated with the normal operation of the ejection assembly is indicated in Fig.4, Fig.5, Fig.6 and Fig.7.

[0040] Said possibility of reversing the direction of rotation is very useful should any articles become trapped in the ejection device; in fact, if the dispenser detects a jam while rotation in the normal working direction is taking place in the ejection assembly, the dispenser can reverse the direction of rotation of the geared motor.

[0041] Advantageously, the reversal of the direction of rotation lasts for a short time and can be controlled by using the two magnets 32 and 33; in fact, between two successive detections of the magnet 32 or magnet 33 by the sensor 51 the shaft 11 and the device 2 make one revolution, whereas between the detection of the magnet 32 and the detection of the magnet 33 the shaft 11 and the device 2 make only a small portion of a revolution, in particular about one eighth of a revolution.

[0042] The article ejection assembly according to the illustrated example may operate as follows. The dispenser receives a request for an article by a user and causes the articles ejection device 2 to make one full revolution by means of the geared motor 1; the rotation of the geared motor 1 takes place in the time interval between two successive detections of the magnet 32; if the dispenser realizes that the article has not been delivered, it will reverse the direction of rotation of the geared motor 1 for a time interval between the detection of the magnet 32 and the detection of the magnet 33, and then it will reverse the direction of rotation of the geared motor 1 again for a time interval between the detection of the magnet 33 and the detection of the magnet 32; such a sequence of two consecutive reversals may even be repeated several times; it may also be provided that, if the article is still not delivered after three repetitions, for example, the dispenser will generate a visual and/or audible error signal.

[0043] The dispenser can be made to operate as described above under the control of the electronic control unit 7, in particular thanks to a program of a microcon-

troller internal to the unit 7.

[0044] A third magnet associated with the output shaft 1 of the geared motor 1 may additionally be employed, arranged in such a position as to pass through the detection region 51A when the geared motor 1 is rotating; in this case, the third magnet is located at such a distance from one of said two magnets 32 and 33 as to form an angle of approximately 180° with the axis 11A of said shaft 11; thus the unit 7 can detect half-turn rotations of the shaft 11 and of the device 2.

[0045] In the example of Fig. 1 there is a cylindrical element 3, which may alternatively be a prismatic one, fitted either directly or indirectly to the output shaft 11 of the geared motor 1; the magnets 32 and 33 are secured onto or within said element 3; this fixing may be realized through only or also the use of glue.

[0046] As aforementioned, the present invention is also applicable to doses dispensers, in particular for powder material (e.g. powder coffee) or granulated material (e.g. granulated coffee or combustible pellets).

[0047] A doses ejection assembly suitable for this application may be, for example, similar to the one shown in Fig.1, provided that the spiral is replaced with a screw; the (rotary) screw is used for creating and ejecting the doses.

[0048] In this case as well, there may be jamming problems (e.g. jammed pellets or coffee grains) and/or problems of incorrect or irregular dose ejection (e.g. due to powder of the material to be delivered getting compacted/cemented in the screw).

[0049] The diagram of Fig.8 shows the geared motor 1 and an electric drive circuitry 71 connected electrically to each other by means of at least two electric conductors C1 and C2; the geared motor thus receives the electric power it needs to operate from the circuitry 71 through the conductors C1 and C2.

[0050] The circuitry 71 is arranged at a first end E1 of the conductors C1 and C2, and belongs to the electronic control unit 7.

[0051] The geared motor 1 (which comprises a direct current electric motor) is arranged at a second end E2 of the conductors C1 and C2, together with the magnetic sensor 51 (which is a Hall effect sensor) and an overcurrent protection device 8 (which is a PPTC); the output signal of the sensor 51 then arrives at the unit 7 (this is not shown in Fig.8).

[0052] At the second end E2 there is also a circuitry 9 for supplying power to the geared motor 1 and to the sensor 51; in particular, the circuitry 9 comprises a sub-circuitry 91 for supplying power to the geared motor 1 and a sub-circuitry 92 for supplying power to the sensor 51; the sub-circuitry 91 may comprise, for example, a diode (connected along the conductor C1) or a diode bridge, and possibly a capacitor (connected across the conductors C1 and C2); the sub-circuitry 92 may comprise, for example, a series connection of a resistor and a Zener diode whose intermediate tap is used for supplying power to the sensor 51.

[0053] With reference to the example of Fig.8, at the end E2 the device 8 is placed first across the conductors C1 and C2, followed by the circuitry 9 and the geared motor 1.

[0054] It is also conceivable that the operation of the PPTC is detected by the dispenser (e.g. by its electronic control unit) and that the dispenser itself generates a visual and/or audible error signal.

[0055] The geared motor 1 is a unit incorporating an electric motor and a motion reduction mechanism; according to the preferred embodiment of the present invention, the geared motor comprises a direct current electric motor, which is small and inexpensive; as an alternative to the direct current motor (but less advantageously), a synchronous motor, an asynchronous motor or a brushless motor may be used instead.

[0056] The component combination of the example shown in Fig.8 (PPTC, Hall effect sensor, direct current electric motor) and the spatial grouping of said components (forming a single electromechanical component) represents an optimal solution especially for (without being limited to) applications in the field of vending machines; in fact, this is a functionally complete, effective and low-cost solution.

[0057] Furthermore, the simultaneous presence in the dispenser of an overcurrent protection device and of the possibility of reversing the direction of rotation of the geared motor is very useful for solving at best any problems related to the operation of the ejection assembly of the dispenser.

Claims

1. Automatic dispenser equipped with an ejection assembly, wherein said ejection assembly comprises at least:

- a geared motor (1),
- an electric drive circuitry (71) for driving said geared motor (1),
- an ejection device (2) fitted to the output shaft (11) of said geared motor (1),
- detection means (3,5) adapted to detect the movement of said ejection device (2), wherein said detection means (3,5) comprise :
  - at least one magnet (32,33) associated with the output shaft (11) of said geared motor (1),
  - at least one magnetic sensor (5) positioned in a manner such as to detect when said at least one magnet (32,33) passes through a predetermined region (51A);

characterized in that said ejection assembly additionally comprises:

- an overcurrent protection device (8) connected electrically upstream of said geared motor (1),
- at least two electric conductors (C1, C2) connected to said electric drive circuitry (71) at a first end (E1) and to said geared motor (1) at a second end (E2);
wherein said magnetic sensor (51) and said overcurrent protection device (8) are arranged at said second end (E2) and connected to said at least two electric conductors (C1, C2).

2. Dispenser according to claim 1, **characterized by** comprising two magnets (32,33) associated with the output shaft (11) of said geared motor (1), said magnets (32,33) being positioned in a manner such as to pass through said predetermined region (51A) when said geared motor (1) is rotating.

3. Dispenser according to claim 2, wherein said two magnets (32,33) are located at such a distance as to form an angle between 30° and 90° with the axis (11A) of said shaft (11).

4. Dispenser according to claim 3, **characterized by** comprising a third magnet associated with the output shaft of said geared motor, said third magnet being positioned in a manner such as to pass through said predetermined region when said geared motor is rotating, and wherein said third magnet is located at such a distance from one of said two magnets (32,33) as to form an angle of approximately 180° with the axis (11A) of said shaft (11).

5. Dispenser according to claim 2 or 3 or 4, wherein said geared motor (1) is adapted to rotate in both directions and to reverse its direction of rotation.

6. Dispenser according to any of the preceding claims, wherein said magnetic sensor is a magnetic proximity sensor and comprises a Hall effect sensor or a Reed contact sensor or an inductive sensor.

7. Dispenser according to any of the preceding claims, wherein said overcurrent protection device comprises a fuse or a magnetic switch or a thermal switch or a PTC.

8. Dispenser according to any of the preceding claims, wherein said overcurrent protection device is a resettable one.

9. Dispenser according to claims 6 and 8, wherein said magnetic sensor comprises a Hall effect sensor and said overcurrent protection device comprises a PPTC.

10. Dispenser according to any of the preceding claims, wherein said geared motor (1) comprises a direct current electric motor.

11. Dispenser according to any of the preceding claims, **characterized by** comprising a power supply circuitry (9) arranged at said second end (E2) for supplying power to said geared motor (1) and/or to said magnetic sensor (51), and wherein said overcurrent protection device (8) is connected electrically upstream of said power supply circuitry (9).

12. Dispenser according to any of the preceding claims, **characterized by** comprising a cylindrical or prismatic element (3) fitted to the output shaft (11) of said geared motor (1), wherein said at least one magnet (32,33) is secured onto or within said cylindrical or prismatic element (3).

13. Dispenser according to any of the preceding claims, wherein said ejection device (2) is either a spiral or a screw.

14. Dispenser according to any of the preceding claims from 1 to 13, **characterized by** being an articles dispenser, in particular a dispenser adapted to dispense foods and/or beverages.

15. Dispenser according to any of the preceding claims from 1 to 13, **characterized by** being a doses dispenser, in particular a dispenser adapted to dispense powder or granulated material.

Patentansprüche

1. Automatische Abgabevorrichtung, die mit einer Ausstoßanordnung ausgestattet ist, wobei die genannte Ausstoßanordnung wenigstens eines der Folgenden umfasst:

- einen Getriebemotor (1),
- eine elektrische Ansteuerschaltungsanordnung (71) zum Ansteuern des genannten Getriebemotors (1),
- eine Ausstoßvorrichtung (2), die an der Ausgangswelle (11) desgenannten Getriebemotors (1) angesetzt ist,
- Erfassungsmittel (3, 5), die zum Erfassen der Bewegung dergenannten Ausstoßvorrichtung (2) ausgelegt sind, wobei diegenannten Erfassungsmittel (3, 5) Folgendes umfassen:

  - wenigstens einen Magnet (32, 33), der der Ausgangswelle (11) des genanntenGetriebemotors (1) zugeordnet ist,
  - wenigstens einen Magnetsensor (5), der zum Erfassen, wann dergenannte wenigstens eine Magnet (32, 33) durch ein vorgegebenes Gebiet (51 A) geht, positioniert

ist;

dadurch gekennzeichnet, dass diegenannte Ausstoßanordnung zusätzlich umfasst:

- eine Überstromschutzvorrichtung (8), die auf der Einlassseite des genanntenGetriebemotors (1) elektrisch verbunden ist,
- wenigstens zwei elektrische Leiter (C1, C2), die an einem ersten Ende (E1) mit dergenannten elektrischen Ansteuerschaltungsanordnung (71) verbunden sind und an einem zweiten Ende (E2) mit demgenannten Getriebemotor (1) verbunden sind; wobei dergenannte Magnetsensor (51) und diegenannte Überstromschutzvorrichtung (8) an demgenannten zweiten Ende (E2) angeordnet sind und mit dengenannten wenigstens zwei elektrischen Leitern (C1, C2) verbunden sind.

2. Abgabevorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sie zwei Magnete (32, 33) umfasst, die der Ausgangswelle (11) desgenannten Getriebemotors (1) zugeordnet sind, wobei diegenannten Magnete (32, 33) in der Weise positioniert sind, dass sie durch dasgenannte vorgegebene Gebiet (51 A) gehen, wenn sich dergenannte Getriebemotor (1) dreht.

3. Abgabevorrichtung gemäß Anspruch 2, bei der diegenannten zwei Magnete (32, 33) in einer solchen Entfernung angeordnet sind, dass sie mit der Achse (11A) dergenannten Welle (11) einen Winkel zwischen 30° und 90° bilden.

4. Abgabevorrichtung gemäß Anspruch 3, **dadurch gekennzeichnet, dass** sie einen dritten Magnet umfasst, der der Ausgangswelle desgenannten Getriebemotors zugeordnet ist, wobei dergenannte dritte Magnet in der Weise positioniert ist, dass er durch dasgenannte vorgegebene Gebiet geht, wenn sich dergenannte Getriebemotor dreht, und wobei dergenannte dritte Magnet in einer solchen Entfernung von einem der genannten zwei Magnete (32, 33) angeordnet ist, dass er mit der Achse (11A) dergenannten Welle (11) einen Winkel von näherungsweise 180° bildet.

5. Abgabevorrichtung gemäß Anspruch 2 oder 3 oder 4, bei der der genannteGetriebemotor (1) dafür ausgelegt ist, sich in beiden Richtungen zu drehen und seine Drehrichtung umzukehren.

6. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, bei dem dergenannte Magnetsensor ein magnetischer Annäherungssensor ist und einen Hall-Effekt-Sensor oder einen Reed-Kontakt-Sensor oder einen induktiven Sensor umfasst.

7. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, bei der diegenannte Überstromschutzvorrichtung eine Sicherung oder einen Magnetschalter oder einen Thermoschalter oder einen PTC umfasst.

8. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, bei der die genannte Überstromschutzvorrichtung eine Rückstellbare ist.

9. Abgabevorrichtung gemäß den Ansprüchen 6 und 8, bei der der genannteMagnetsensor einen Hall-Effekt-Sensor umfasst und diegenannte Überstromschutzvorrichtung einen PPTC umfasst.

10. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, bei der dergenannte Getriebemotor (1) einen Gleichstrom-Elektromotor umfasst.

11. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie eine an demgenannten zweiten Ende (E2) angeordnete Stromversorgungsschaltungsanordnung (9) zum Zuführen von Leistung zu dem genannten-Getriebemotor (1) und/oder zu demgenannten Magnetsensor (51) umfasst und wobei diegenannte Überstromschutzvorrichtung (8) auf der Eingangsseite dergenannten Stromversorgungsschaltungsanordnung (9) elektrisch verbunden ist.

12. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie ein zylindrisches oder prismatisches Element (3) umfasst, das an die Ausgangswelle (11) desgenannten Getriebemotors (1) angesetzt ist, wobei dergenannte wenigstens eine Magnet (32, 33) an oder in demgenannten zylindrischen oder prismatischen Element (3) befestigt ist.

13. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche, bei der diegenannte Ausstoßvorrichtung (2) entweder eine Spirale oder eine Schraube ist.

14. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche von 1 bis 13, **dadurch gekennzeichnet, dass** sie eine Artikelabgabevorrichtung, insbesondere eine Abgabevorrichtung, die zum Abgeben von Nahrungsmitteln und/oder Getränken ausgelegt ist, ist.

15. Abgabevorrichtung gemäß einem der vorhergehenden Ansprüche von 1 bis 13, **dadurch gekennzeichnet, dass** sie eine Dosisabgabevorrichtung, insbesondere eine Abgabevorrichtung, die zum Abgeben von Pulver oder körnigem Material ausgelegt ist, ist.

Revendications

1. Distributeur automatique équipé d'un ensemble d'éjection, où ledit ensemble d'éjection comprend au moins:

- un moteur à engrenage (1),
- un circuit d'entraînement électrique (71) pour entraîner ledit moteur à engrenage (1),
- un dispositif d'éjection (2) ajusté à l'arbre de sortie (11) dudit moteur à engrenage (1),
- des moyens de détection (3,5) aptes à détecter le déplacement dudit dispositif d'éjection (2), où lesdits moyens de détection (3,5) comprennent:
  - au moins un aimant (32, 33) associé à l'arbre de sortie (11) dudit moteur à engrenage (1),
  - au moins un capteur magnétique (5) positionné de manière à détecter lorsque ledit au moins un aimant (32, 33) passe à travers une région prédéterminée (51A);

caractérisé en ce que ledit ensemble d'éjection comprend additionnellement:

un dispositif de protection contre une surintensité (8) connecté électriquement en amont dudit moteur à engrenage (1),
au moins deux conducteurs électriques (C1, C2) connectés audit circuit d'entraînement électrique (71) à une première extrémité (E1) et audit moteur à engrenage (1) à une seconde extrémité (E2); où ledit capteur magnétique (51) et ledit dispositif de protection contre une surintensité (8) sont agencés à ladite seconde extrémité (E2) et sont connectés auxdits au moins deux conducteurs électriques (C1, C2).

2. Distributeur selon la revendication 1, caractérisé en comprenant deux aimants (32, 33) associés à l'arbre de sortie (11) dudit moteur à engrenage (1), lesdits aimants (32, 33) étant positionnés de manière à passer à travers ladite région prédéterminée (51A) lorsque ledit moteur à engrenage (1) tourne.

3. Distributeur selon la revendication 2, dans lequel lesdits deux aimants (32, 33) se situent à une distance suffisante pour former un angle entre 30° et 90° avec l'axe (11A) dudit arbre (11).

4. Distributeur selon la revendication 3, caractérisé en comprenant un troisième aimant associé à l'arbre de sortie dudit moteur à engrenage, ledit troisième aimant étant positionné de manière à passer à travers ladite région prédéterminée lorsque ledit moteur à engrenage tourne, et où ledit troisième aimant se situe à une distance suffisante d'un desdits deux aimants (32, 33) pour former un angle d'approximativement 180° avec l'axe (11A) dudit arbre (11).

5. Distributeur selon la revendication 2 ou 3 ou 4, où ledit moteur à engrenage (1) est apte à tourner dans les deux directions et à inverser sa direction de rotation.

6. Distributeur selon l'une quelconque des revendications précédentes, où ledit capteur magnétique est un capteur de proximité magnétique et comprend un capteur à effet Hall ou un capteur de contact Reed ou un capteur inductif.

7. Distributeur selon l'une quelconque des revendications précédentes, où ledit dispositif de protection contre une surintensité comprend un fusible ou un commutateur magnétique ou un commutateur thermique ou un PTC.

8. Distributeur selon l'une quelconque des revendications précédentes, où ledit dispositif de protection contre une surintensité est un dispositif pouvant être remis à l'état initial.

9. Distributeur selon les revendications 6 et 8, où ledit capteur magnétique comprend un capteur à effet Hall, et ledit dispositif de protection contre une surintensité comprend un PPTC.

10. Distributeur selon l'une quelconque des revendications précédentes, où ledit moteur à engrenage (1) comprend un moteur électrique à courant continu.

11. Distributeur selon l'une quelconque des revendications précédentes, caractérisé en comprenant un circuit d'alimentation (9) agencé à ladite seconde extrémité (E2) pour fournir la puissance audit moteur à engrenage (1) et/ou audit capteur magnétique (51), et où ledit dispositif de protection contre une surintensité (8) est connecté électriquement en amont dudit circuit d'alimentation (9).

12. Distributeur selon l'une quelconque des revendications précédentes, caractérisé en comprenant un élément cylindrique ou prismatique (3) ajusté à l'arbre de sortie (11) dudit moteur à engrenage (1), où ledit au moins un aimant (32, 33) est fixé sur ou dans ledit élément cylindrique ou prismatique (3).

13. Distributeur selon l'une quelconque des revendications précédentes, où ledit dispositif d'éjection (2) est soit une spirale soit une vis.

14. Distributeur selon l'une quelconque des revendications précédentes de 1 à 13, caractérisé en étant un distributeur d'articles, en particulier un distributeur apte à distribuer des aliments et/ou boissons.

15. Distributeur selon l'une quelconque des revendications précédentes de 1 à 13, caractérisé en étant un distributeur de doses, en particulier un distributeur apte à distribuer un matériau en poudre ou granulé.

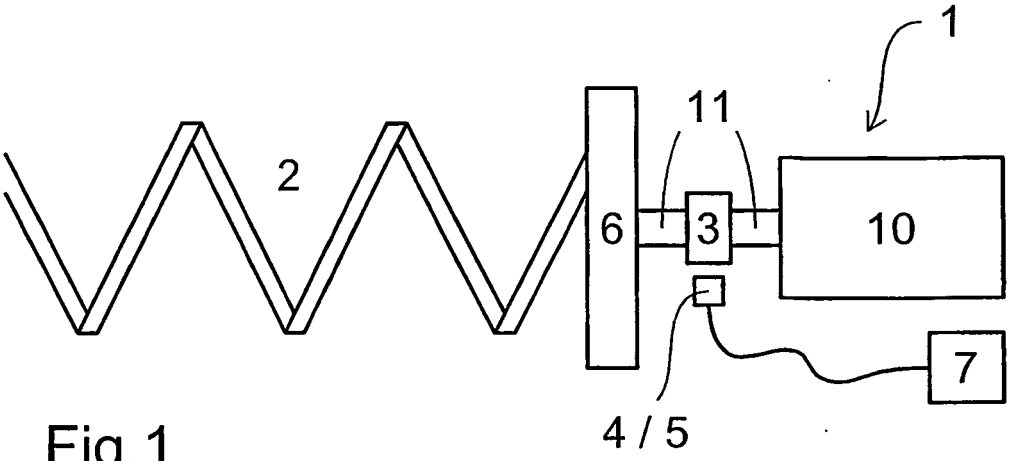

Fig.1

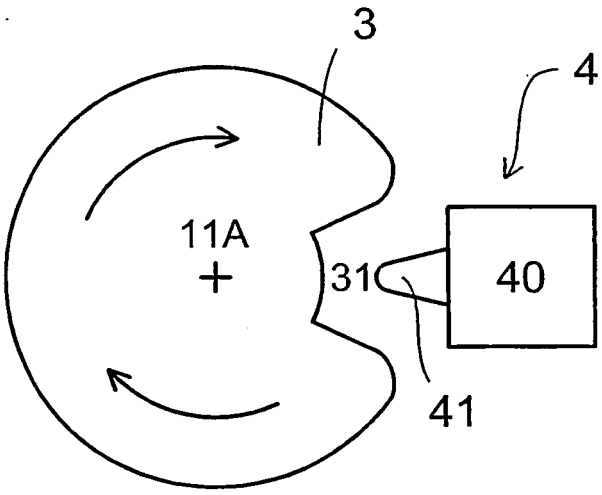

Fig.2

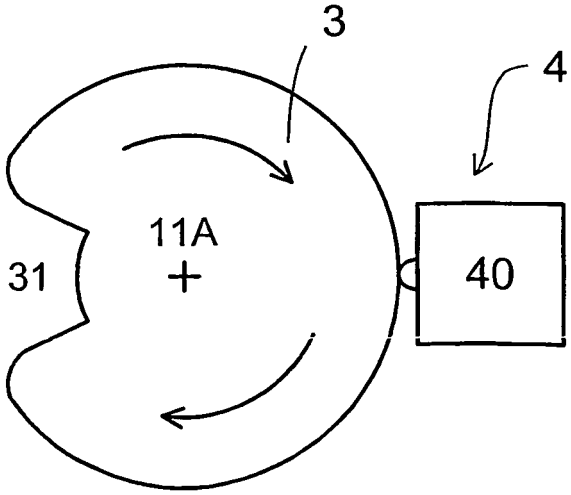

Fig.3

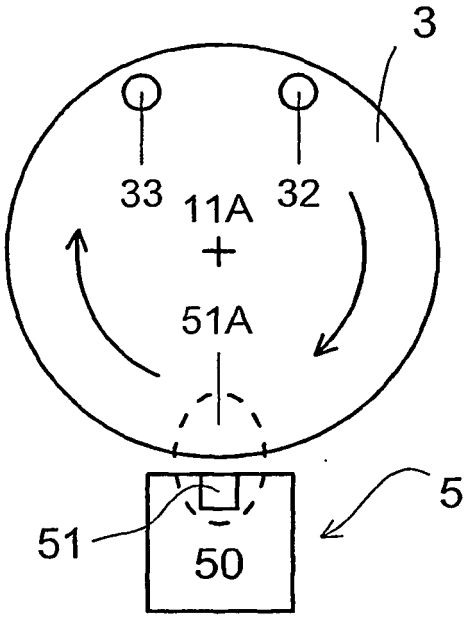

Fig.4

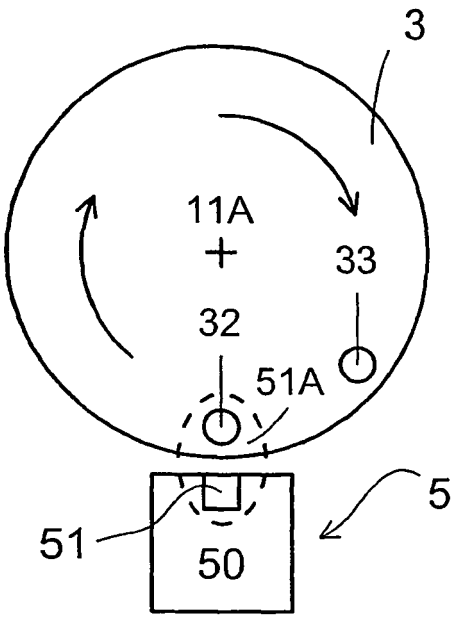

Fig.5

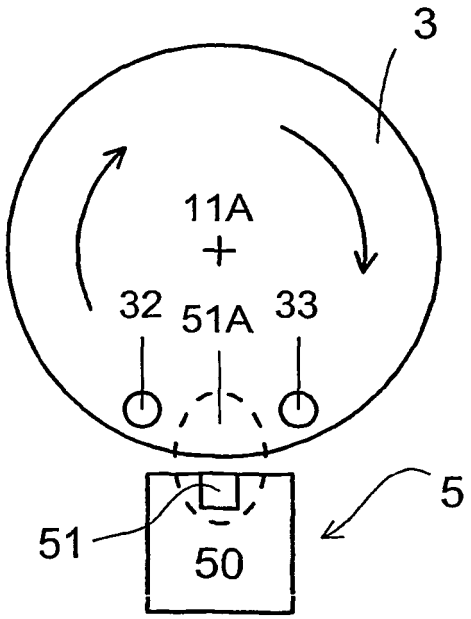

Fig.6

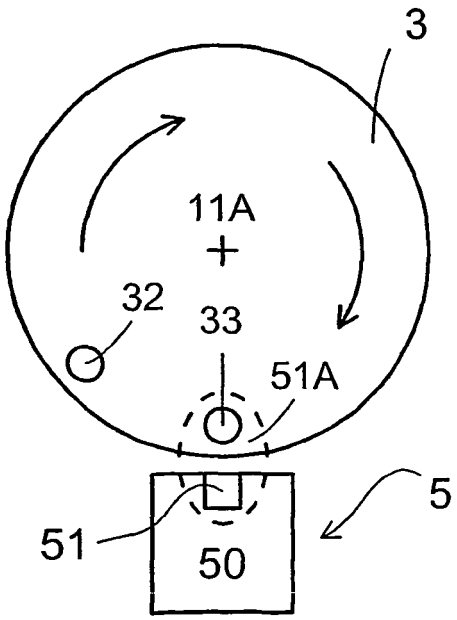

Fig.7

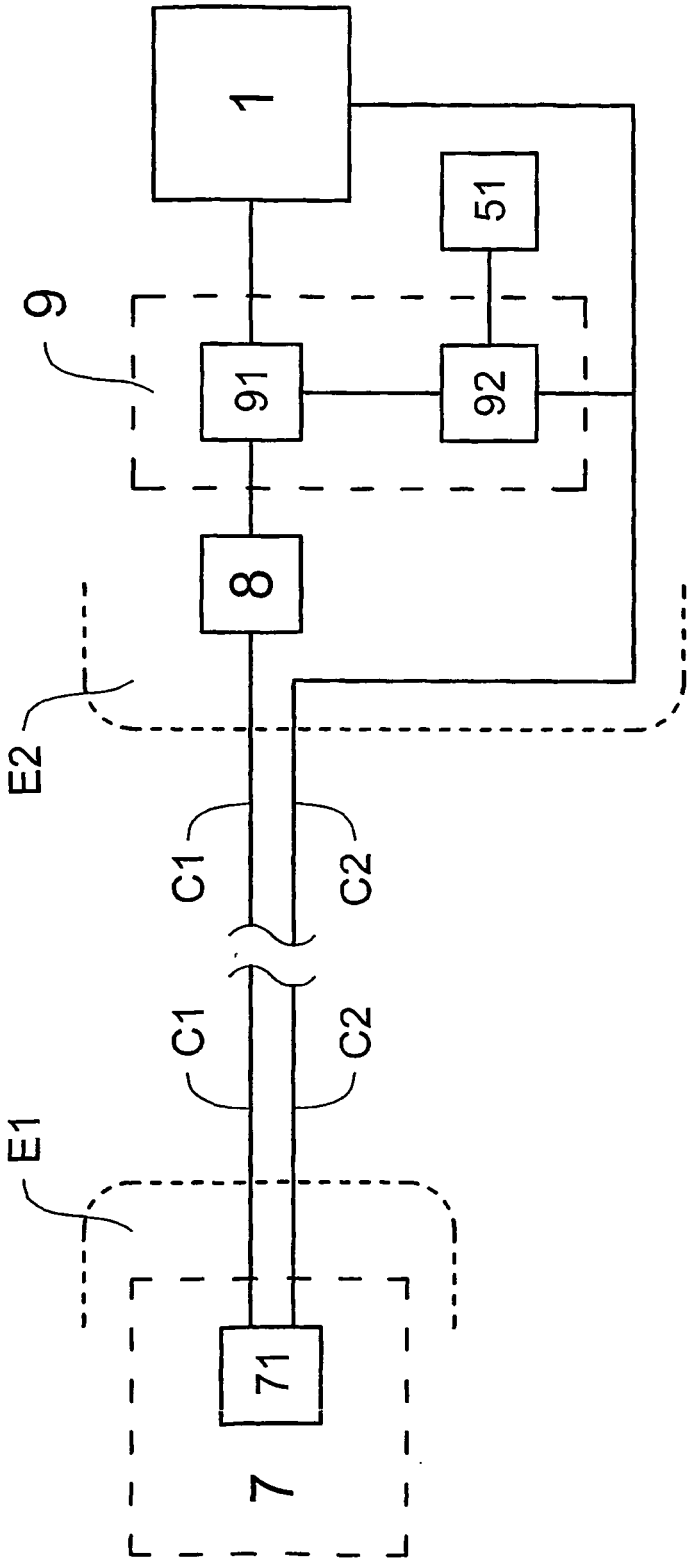

Fig.8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- JP 7249159 A **[0013]**