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(54) **DISPENSER FOR CONTINUOUSLY FEEDING FRYING MACHINES**

(57) The present invention relates to a dispenser for continuously feeding frying machines comprising a rotary hopper in turn comprising at least two sectors, each of them configured for storing therein a maximum volume of product to be fried, and comprising an opening at its bottom, and a driving area configured for receiving the movement caused by rotation of the hopper. The dispenser also comprises a product retention plate securely located below the hopper, which comprises a window forming a product discharge area of the hopper for discharging the product by gravity, control means, and first driving means connected to the control means configured for mechanically cooperating with the driving area of the hopper. The control means are configured for activating the first driving means, rotating the hopper so that each of the openings of each sector coincides with the window of the product retention plate, and allowing the product to fall freely by gravity from said sector. Additionally, the present invention also relates to a frying machine comprising said dispenser.

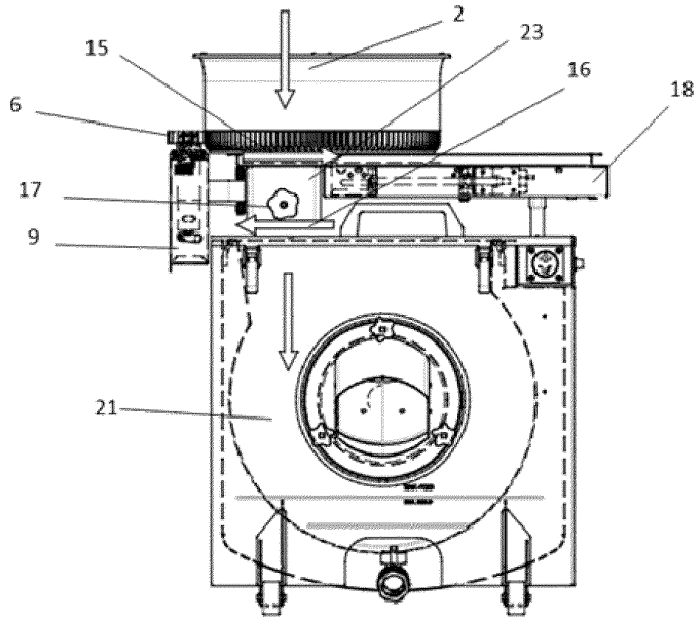


FIG. 4

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## Description

### Object of the Invention

**[0001]** The present invention relates to a dispenser for dispensing product in individual portions for continuously feeding frying machines.

**[0002]** The dispenser comprises a plurality of sectors in which the product to be dispensed is introduced, and feeds the frying machine with portions of the same volume or weight, or smaller volumes, in any of said sectors.

### Background of the Invention

**[0003]** Current fryers have a significant limitation for frying different products in the same frying tub and they were only able to solve this limitation, in the best case scenario, by incorporating two frying baskets in each tub. Each of these frying baskets can contain a product identical to or different from the product in the other frying basket, but the operator will have to be on standby to take out each of the frying baskets when the product it contains is fried, not being able to perform other tasks.

**[0004]** Similarly, the drawback of having an operator introducing the portion in the frying chamber is that they cannot assure that the portions have the same weight and the cost for preparing the product to be served increases.

**[0005]** The operator exposure to the risk of getting burn and getting hot oil splashes on them when handling the frying baskets must be taken into account along with the foregoing problems.

**[0006]** In view of the state of the art, a dispenser for continuously feeding frying machines solving the aforementioned problems is therefore required.

### Description of the Invention

**[0007]** The present invention proposes a solution to the preceding problems by means of a dispenser for continuously feeding frying machines according to claim 1 and a frying machine according to claim 13. Preferred embodiments of the invention are defined in the dependent claims.

**[0008]** In a first inventive aspect, the invention provides a dispenser for continuously feeding frying machines comprising:

- a rotary hopper in turn comprising:
    - at least two sectors, each sector configured for storing therein a maximum volume of product to be fried, and comprising an opening at its bottom, and
    - a driving area configured for receiving the movement caused by rotation of the hopper,
- a product retention plate securely located below the hopper, the retention plate comprising a window forming a product discharge area of the hopper for discharging the product by gravity,
- control means,
- first driving means connected to the control means, configured for mechanically cooperating with the driving area of the hopper,

wherein

the control means are configured for activating the first driving means, rotating the hopper to make each of the openings of each sector coincide with the window of the product retention plate, and allowing the product to fall freely by gravity from said sector.

**[0009]** Throughout this document, it will be understood that driving means are an element which allows transmitting a movement or energy to another element, for example, a motor, a pulley, bearings, gears, or a combination thereof.

**[0010]** Similarly, along the document mechanical cooperation will be understood as the interrelation between two elements for transmitting a movement between them, such as for example, between a geared motor and a cogged surface, between two gears, etc.

**[0011]** Control means refer to an electric or electronic device which is configured for receiving inputs from the different elements making up the dispenser for feeding frying machines.

**[0012]** The inputs can be mechanical inputs, such as a limit switch, and/or electrical inputs, such as an analog or digital signal from sensing means or an information input device. In one embodiment, the information input device can be a keyboard and/or a touch screen, etc. Said information input device allows the user to configure the various parameters of each element making up the dispenser for feeding frying machines, for example, the speed of the driving means, or the time for stopping on the window of the retention plate.

**[0013]** Furthermore, the control means will comprise all the wiring required for being connected to the different elements making up the dispenser for feeding frying machines. An example of control means can be a microcontroller or a microprocessor with the associated electronic circuit.

**[0014]** On the other hand, the control means are configured for generating a response and/or an operating command depending on the inputs received, as indicated in the first inventive aspect.

**[0015]** The hopper of the dispenser comprises at least two sectors which have an opening at its bottom and a retention plate arranged securely below the hopper which will either allow the product to fall by gravity through the window arranged therein, forming the so-called discharge area of the dispenser, or retain the product if the sector does not coincide with said window.

**[0016]** Similarly, the dispenser has first driving means which mechanically cooperate with a driving area provided to that end in the hopper, and which will allow rotation

of the hopper with the help of the first driving means.

**[0017]** The control means in turn activate the first driving means for rotating the hopper by means of said driving area in order to make each of the openings of each sector coincide with the window of the product retention plate, and thereby allowing the product to fall freely by gravity present in the sector.

**[0018]** Therefore, it can be seen that one of the main advantages of the dispenser is the ability to automatically and continuously dispense portions of product without requiring an operator, increasing the distribution efficiency of different products to be dispensed, and providing the frying machine with the desired products according to user's needs.

**[0019]** In a particular embodiment, each sector of the hopper comprises a position sensor for correctly placing the opening coinciding substantially with the window of the retention plate.

**[0020]** Advantageously, the position sensor assures that the sector of the hopper that was selected depending on the product it contains is positioned precisely facing the window of the retention plate, thereby allowing the product to fall correctly by gravity without blockages or obstructions.

**[0021]** In a particular embodiment, the dispenser comprises a double trapdoor system connected to the control means, configured for being coupled in the discharge area of the dispenser for feeding frying machines, wherein the double trapdoor system comprises:

- a case with a first trapdoor and a second trapdoor,
- a cam mechanism connected to second driving means,

wherein
the control means are configured for opening and closing the first trapdoor and the second trapdoor by means of the cam system, such that the control means close the second trapdoor when they open the first trapdoor and open the second trapdoor when they close the first trapdoor.

**[0022]** The double trapdoor system has coupling means which allow coupling to the product discharge area of the hopper. In one embodiment, the coupling means are at least one protuberance configured for being secured to the product discharge area of the hopper. In another embodiment, the coupling means are magnetic coupling means, preferably magnets which allow fixing the double trapdoor system to the hopper.

**[0023]** Advantageously, the double trapdoor system allows isolating the discharge area of the dispenser for continuously feeding frying machines from the outside, preventing vapours and odors from escaping when the product to be fried falls into the frying chamber of the corresponding frying machine where the dispenser is provided and configured to be installed.

**[0024]** In a particular embodiment, the hopper comprises a cylindrical base and the retention plate has a surface coinciding substantially with the cylindrical base of said hopper.

**[0025]** This configuration of the hopper and the retention plate represents a particularly useful arrangement for the placement thereof in the corresponding frying machine, for the arrangement of several sectors in the hopper and for the rotation of the hopper.

**[0026]** In a particular embodiment, the driving area of the hopper is a cogged area.

**[0027]** The cogged area advantageously allows a good and efficient way of transmitting movement that must be imposed by the first driving means on the hopper.

**[0028]** In a particular embodiment, the mechanical cooperation between the first driving means and the cogged area of the hopper is by means of a gear.

**[0029]** Like the cogged area, the gear advantageously allows a good and efficient way of transmitting movement that must be imposed by the first driving means on the hopper. Similarly, the presence of the gear allows being able to remove the hopper from the dispenser for washing by hand, or advantageously by means of automatic washers.

**[0030]** In a particular embodiment, at least one of the sectors of the hopper comprises at least one load cell connected to the control means, the control means being configured for detecting, while the first driving means are activated, if the weight of the content in said sector drops by an amount equal to or greater than a first determined weight, in which case the control means deactivate the first driving means.

**[0031]** Advantageously, this embodiment allows the product dispensed by each sector of the hopper to have the same weight, an operator being prevented from having to control the product to be dispensed, increasing dispenser efficiency and productivity.

**[0032]** In a particular embodiment, the hopper is a refrigerated hopper.

**[0033]** The hopper can be refrigerated at different temperature ranges which allow suitably preserving the product. For example, if the product stored in any of the sectors of the hopper is frozen, the hopper keeps the product frozen therein as a result of said refrigeration. Advantageously, this embodiment allows keeping the properties of the product intact while the product is stored in the hopper.

**[0034]** In a particular embodiment, the maximum volume of product to be fried in each sector is substantially the same.

**[0035]** This embodiment allows obtaining individual portions of the same volume, which is practical from the viewpoint of uniformity of the products to be sold.

**[0036]** In a particular embodiment, the first driving means are an electric motor. In another embodiment, the second driving means are an electric motor.

**[0037]** In a preferred embodiment, the sectors of the hopper are four in number.

**[0038]** This embodiment advantageously allows preparing 4 portions in a frying machine, plus the portions

that the frying machine can fry separately, for example 2, which allows handling a total of 6 individual portions in total.

**[0039]** In a second inventive aspect, the invention provides a frying machine comprising a dispenser for continuously feeding frying machines according to any of the embodiments described in the first inventive aspect.

**[0040]** Advantageously, the frying machine allows frying the products stored in the different sectors of the hopper in individual portions of the same volume without operator intervention, thereby increasing efficiency in the production of individual portions of different or identical products. Furthermore, it allows the operator to safely perform the product frying process.

**[0041]** All the features described in this specification (including the claims, description and drawings) can be combined in any combination, excluding the combinations of such mutually excluding features.

Description of the Drawings

**[0042]** The foregoing and other features and advantages of the invention will be more clearly understood based on the following detailed description of a preferred embodiment provided only by way of an illustrative and non-limiting example in reference to the attached drawings.

Figure 1 shows an exploded view of two of the main elements of an embodiment of a dispenser for continuously feeding frying machines of the present invention.

Figure 2 shows a plan elevational view of the hopper of the dispenser for feeding frying machines of the present invention.

Figure 3 shows a front view of an embodiment of the dispenser for feeding with the double trapdoor system of the present invention.

Figure 4 shows a front view of an embodiment of the dispenser for feeding with the double trapdoor system, the dispenser being connected to a frying machine in which the frying tub can be seen.

Figure 5 shows a front view of an embodiment of the dispenser for feeding placed on the cabinet of a frying machine.

Figure 6 shows a top view of an embodiment of a dispenser for feeding connected to a frying machine.

Detailed Description of the Invention

*Dispenser for continuously feeding frying machines*

**[0043]** Figure 1 shows an exploded view of an embodiment of the dispenser (1) for continuously feeding frying machines of the present invention.

**[0044]** The dispenser (1) comprises a rotary hopper (2), a retention plate (5) placed below the rotary hopper (2), control means (not depicted) and first driving means (9) for imposing movement on the rotary hopper (2).

**[0045]** As can be seen in Figures 1 and 2, the hopper (2) has in this embodiment four sectors (3) configured for storing a maximum volume of product therein, each of the sectors having respective openings (4) at its bottom. The hopper (2) has in the outer area thereof, a driving area (8), preferably a cogged area (8), provided for mechanically cooperating with the mentioned first driving means (9). Preferably, the cogged area (8) is in the lower part of the outer area of the hopper (2).

**[0046]** The product retention plate (5) is placed securely below the hopper (2) and has a window (7) forming the discharge area (10) for discharging the product from each of the four sectors (3) of the hopper (2). Preferably, the placement of the retention plate (5) below the hopper (2) is performed by means of a projection (13) provided in the center of the retention plate fitting with a housing (14) provided to that end in the center of the hopper (2), as can be seen in Figure 2.

**[0047]** On the other hand, the first driving means (6) which is connected to and controlled by the control means are interconnected to the cogged area (8) of the hopper (2) for mechanically cooperating with the same, transmitting movement to said hopper (2) when the control means so command. Preferably, the first driving means (9) is an electric motor and the mechanical cooperation between the electric motor (9) and the cogged area (8) is by means of a gear (6).

**[0048]** Therefore, when the product contained in one of the sectors (3) of the hopper (2) is to be released from said hopper (2), the control means command the rotation of the hopper (2) towards the position in which the corresponding sector (3) is placed above the window (7) of the retention plate (5) such that the product contained therein falls directly by gravity from said sector (3) through the so-called discharge area (10).

**[0049]** The dispenser also has a position sensor (19) in communication with and controlled by the control means, preferably in each sector (3), to assure that the opening (4) of the sector (3) is correctly place above the window (7) of the retention plate (5), and the product correctly falls by gravity without blockages or obstructions through the discharge area (10), accordingly. In one embodiment, the position sensor (19) comprises a magnet in each sector and a magnetic microswitch installed in the cabinet (12) of the frying machine in which the dispenser (1) is placed.

**[0050]** Figure 3 shows an embodiment of the dispenser (1) for feeding frying machines comprising a double trapdoor system (11). The double trapdoor system (11) is connected to the control means and is coupled to the discharge area (10) of the hopper (2).

**[0051]** The double trapdoor system (11) is coupled to the outlet area (10) of the hopper (2) and comprises a first and a second trapdoor (15, 16), and a cam mechanism (17) connected to second driving means (18), in this case an electric motor. The control means operate the double trapdoor system (11) such that they command

the closing of the second trapdoor (16) when they command the opening of the first trapdoor (15), and vice versa, the control means command the opening of the second trapdoor (16) when they command the closing of the first trapdoor (15).

**[0052]** The double trapdoor system is coupled to the discharge area (10) of the hopper (2) by coupling means, preferably a protuberance configured for being secured to said product discharge area (10) of the hopper (2). In another embodiment, the coupling means are magnetic coupling means, preferably magnets which allow fixing the double trapdoor system (11) to the discharge area (10).

**[0053]** This arrangement of double trapdoor (11) allows isolating the discharge area (10) of the dispenser (1) for continuously feeding frying machines from the outside, isolating the product located inside the hopper (2) from possible odors or vapours from the frying tub that may affect the quality of the product to be dispensed.

**[0054]** The dispenser (1) can also comprise in at least one of the sectors (3) of the hopper (2) a load cell (not depicted) connected to the control means. The control means are therefore configured for detecting, while the first driving means (5) are activated, if the weight of the content in said sector (3) of the hopper (2) drops by an amount equal to or greater than a first determined weight, in which case the control means deactivate the first driving means (5).

*Frying machine*

**[0055]** Figure 4 shows an embodiment of a frying machine (20) according to the present invention. The frying machine (20) comprises a dispenser (1) for feeding said frying machine (21) such as the one described in any of the embodiments. Specifically, the structure of the dispenser (1) with the hopper (2), retention plate (5), electric motor (9) and gear (6), and double trapdoor system (11), as well as the frying tub (21) of the frying machine (20) can be seen in this drawing. Likewise, the location of the outlet area (10) for the exit of the product from the hopper (2) to the inlet of the frying tub (21) can be seen.

**[0056]** Additionally, the frying machine (20) comprises a touch screen (22) connected to the control means of the frying machine (20) and the dispenser (1). Advantageously, an operator can control the parameters of the frying machine (20) and the dispenser (1) through the touch screen (22). The touch screen (22) also allows displaying the operating parameters of the frying machine (20) and the dispenser (1) and programming the number and type of individual portions from the corresponding sectors (3) of the hopper (2) to be fried in the frying machine (20).

**[0057]** Figure 5 shows a front view of the same embodiment of the frying machine (20) of Figure 4 in which the outer cabinet (12) of the frying machine (20) is shown.

**[0058]** Figure 6 shows a top view of the frying machine (20) with a dispenser (1) connected thereto. Specifically, the hopper (2) with four sectors (3), each of the position sensors (19) of each sector (3) and the upper part of the trapdoor (15) can be seen.

*Example of dispensing 4 individual portions*

**[0059]** This example envisages dispensing 4 individual portions, specifically of different products. In this manner, an operator programs through the touch screen (22) for the machine (20) to serve those 4 individual portions and fill each sector (3) of the hopper (2) with the corresponding product.

**[0060]** When the load cell of the first sector (3) detects that the weight of the bulk product is above the predetermined weight threshold, the control means activate the first electric motor (9) to bring said sector to the discharge area (10) of the dispenser (1), unless said sector (3) were already in that position.

**[0061]** The control means then activate the second electric motor (18) which opens the first trapdoor (15) and the cam mechanism (17) closes the second trapdoor (16), so the portion to be fried remains inside the case (23) of the double trapdoor system (11). Once the frying machine (20) is ready to fry the portion, the control means of the dispenser (1) activate the second electric motor (13) which opens the second trapdoor (16) and closes the first trapdoor (15). The portion falls into the frying tub (21) and the portion is then fried to serve the product.

**[0062]** Once the first product has been fried, it comes out of the frying machine and the control means again activate the first electric motor (9) to bring the next sector to the discharge area (10) of the dispenser (1). The control means then again activate the second electric motor (18) which opens the first trapdoor (15) and the cam mechanism (17) closes the second trapdoor (16), so the next portion to be fried remains inside the case (23) of the double trapdoor system (11). Since the frying machine (20) is already ready for frying the next portion, the control means of the dispenser (1) activate the second electric motor (13) which opens the second trapdoor (16) and closes the first trapdoor (15). The second portion falls into the frying tub (21) and the portion is then fried in order to serve the product.

**[0063]** The process is repeated for the other two portions, whereas the operator was able to refill the empty sectors with other new products to be fried at the same time.

**[0064]** During the entire process, the double trapdoor system (9) advantageously isolates the inside of the hopper (2) from vapours generated by the frying tub (21).

## Claims

**1.** A dispenser (1) for continuously feeding frying machines comprising,

- a rotary hopper (2) in turn comprising:

• at least two sectors (3), each sector (3) configured for storing therein a maximum volume of product to be fried, and comprising an opening (4) at its bottom, and
• a driving area (8) configured for receiving the movement caused by rotation of the hopper (2),

- a product retention plate (5) securely located below the hopper (2), the retention plate (5) comprising a window (7) forming a product discharge area (10) of the hopper (2) for discharging the product by gravity,
- control means,
- first driving means (9) connected to the control means, configured for mechanically cooperating with the driving area (8) of the hopper (2),

wherein
the control means are configured for activating the first driving means (9), rotating the hopper (2) to make each of the openings (4) of each sector (3) coincide with the window (7) of the product retention plate (5), and allowing the product to fall freely by gravity from said sector (3).

**2.** The dispenser (1) according to claim 1, wherein each sector (3) of the hopper (2) comprises a position sensor (19) for correctly placing the opening (4) coinciding substantially with the window (7) of the retention plate (5).

**3.** The dispenser (1) according to any of the preceding claims, comprising a double trapdoor system (11), connected to the control means, configured for being coupled in the discharge area (10) of the dispenser (1) for feeding frying machines, wherein the double trapdoor system (9) comprises,

- a case (23) with a first trapdoor (15) and a second trapdoor (16),
- a cam mechanism (17) connected to second driving means (18),

wherein
the control means are configured for opening and closing the first trapdoor (15) and the second trapdoor (16) by means of the cam mechanism (17), such that the control means close the second trapdoor (16) when they open the first trapdoor (15), and open the second trapdoor (16) when they close the first trapdoor (15).

**4.** The dispenser (1) according to any of the preceding claims, wherein the hopper (2) comprises a cylindrical base and the retention plate (5) has a surface coinciding substantially with the cylindrical base of said hopper (2).

**5.** The dispenser (1) according to any of the preceding claims, wherein the driving area (8) of the hopper (2) is a cogged area.

**6.** The dispenser (1) according to claim 5, wherein the mechanical cooperation between the first driving means (9) and the cogged area (8) of the hopper (2) is by means of a gear (6).

**7.** The dispenser (1) according to any of the preceding claims, wherein at least one of the sectors (3) of the hopper (2) comprises at least one load cell connected to the control means, the control means being configured for detecting, while the first driving means (5) are activated, if the weight of the content in said sector (3) of the hopper (2) drops by an amount equal to or greater than a first determined weight, in which case the control means deactivate the first driving means (5).

**8.** The dispenser (1) according to any of the preceding claims, wherein the hopper (2) is a refrigerated hopper.

**9.** The dispenser (1) according to any of the preceding claims, wherein the maximum volume of product to be fried in each sector (3) is substantially the same.

**10.** The dispenser (1) according to any of the preceding claims, wherein the first driving means (9) are an electric motor.

**11.** The dispenser (1) according to any of the preceding claims, wherein the second driving means (18) are an electric motor.

**12.** The dispenser (1) according to any of the preceding claims, wherein the sectors (3) of the hopper (2) are four in number.

**13.** A frying machine (21) comprising a dispenser for continuously feeding frying machines according to any of claims 1 to 12.

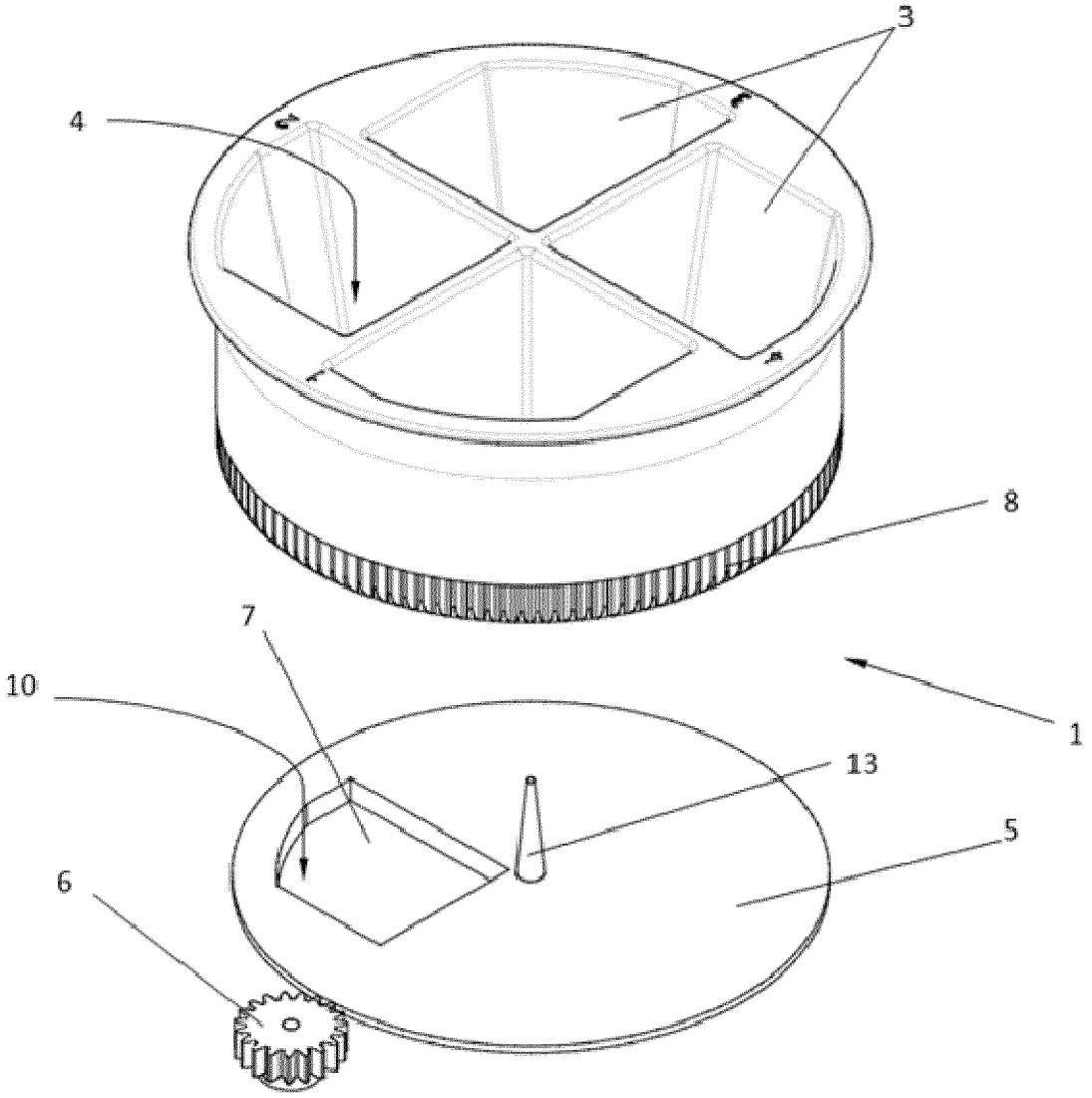


FIG. 1

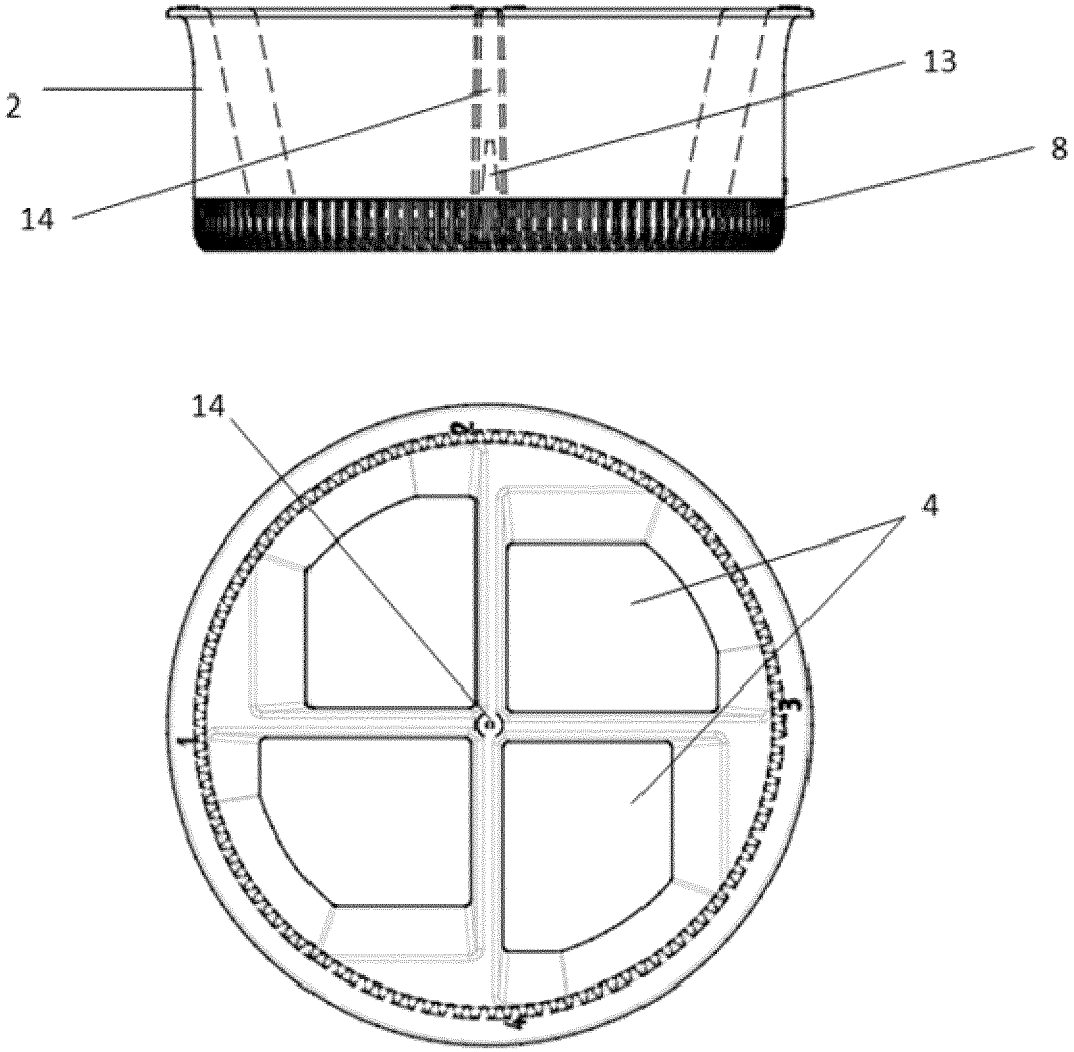


FIG. 2

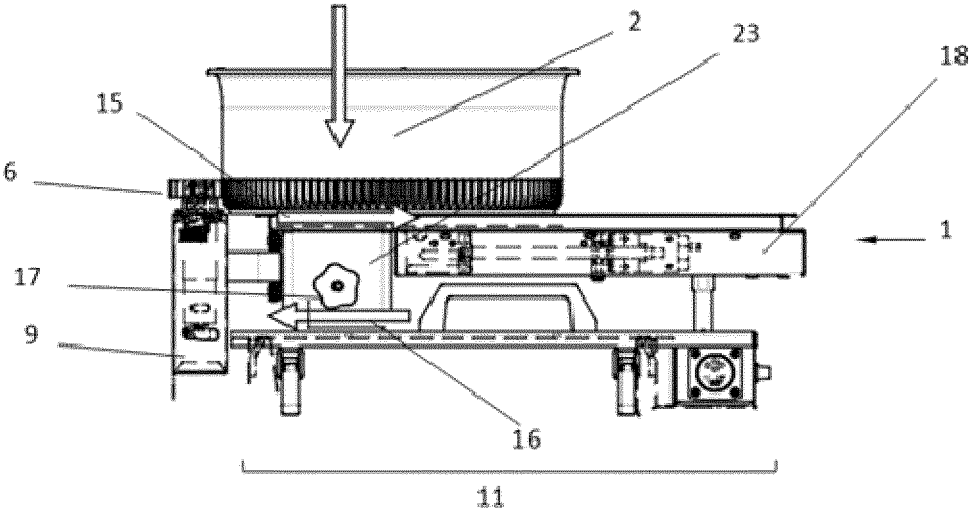


FIG. 3

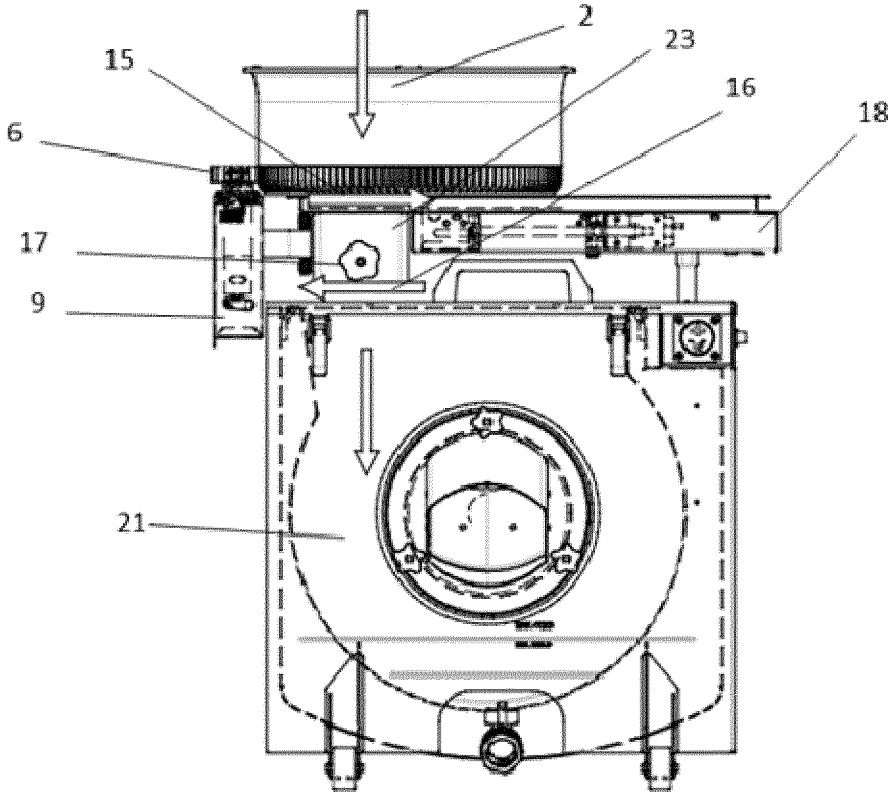


FIG. 4

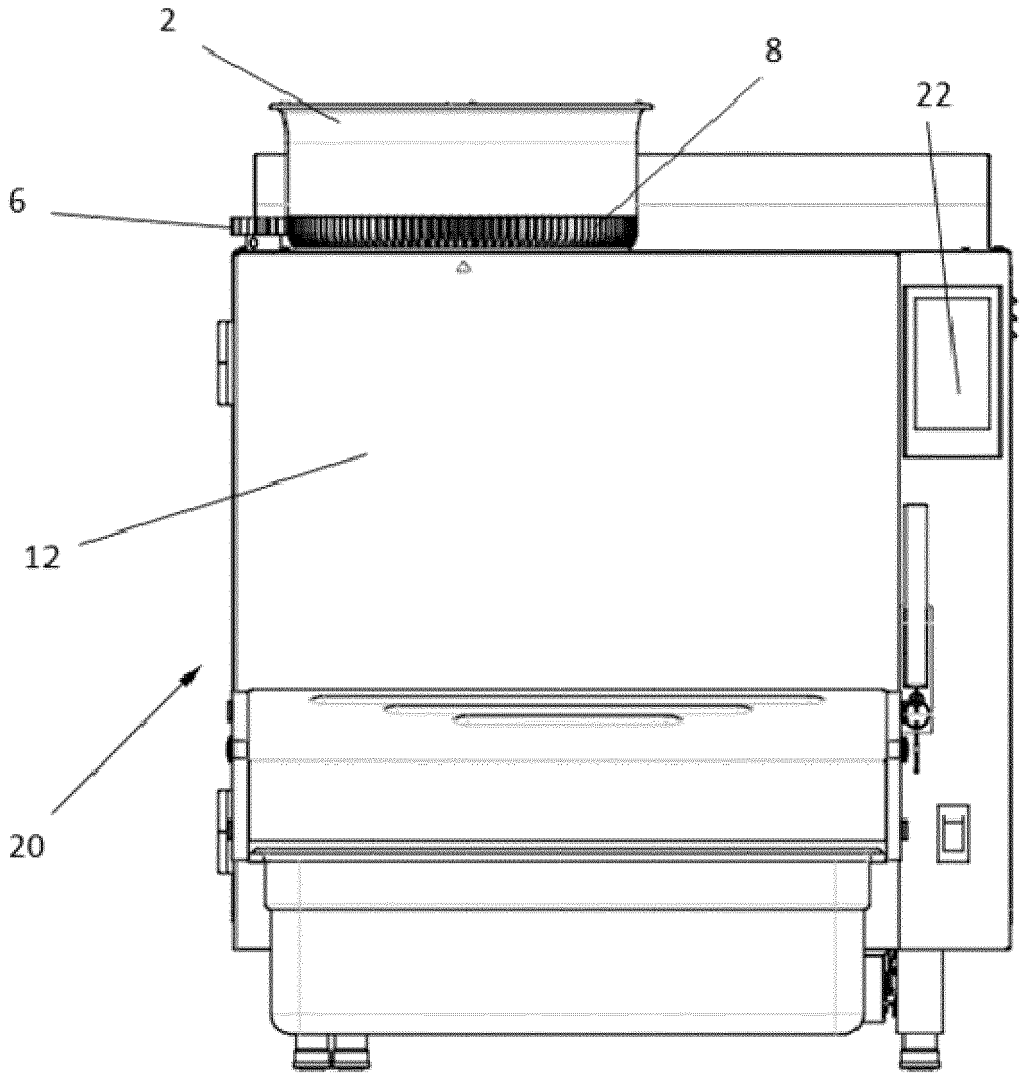


FIG. 5

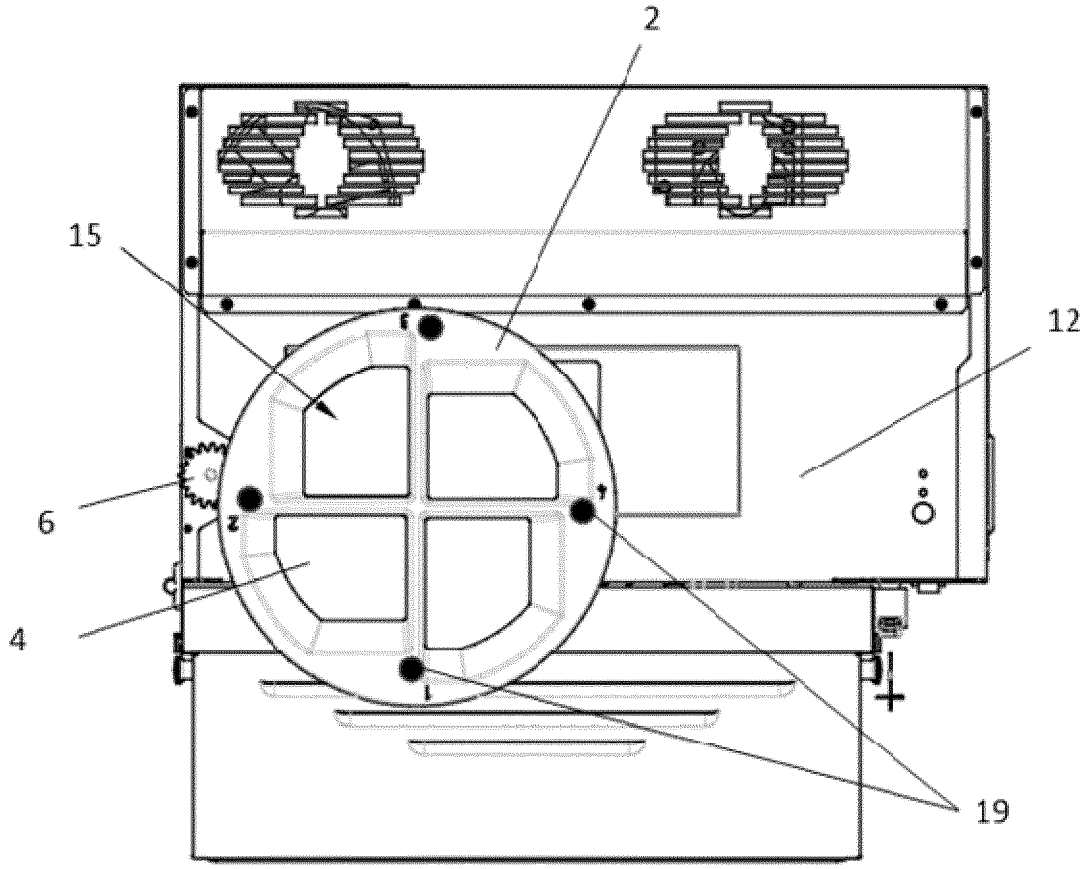


FIG. 6

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# EUROPEAN SEARCH REPORT

Application Number
EP 16 38 2547

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| X | US 2003/121933 A1 (RUDESILL BRIAN R [US]) 3 July 2003 (2003-07-03)<br>* abstract *<br>* paragraphs [0002], [0013], [0046] - [0065]; figures 1,8 * | 1-13 | INV.<br>G07F17/00 |
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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 23 February 2017 | Fyhr, Jonas |

CATEGORY OF CITED DOCUMENTS

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## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 38 2547

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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23-02-2017

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