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A DEVICE FOR CONTINUAL DISPENSING OF IDLI BATTER AND LIKE MATERIALS

FIELD OF INVENTION

This invention relates to a device for continual dispensing of idli batter and like materials.

- 5 The present invention particularly relates to a device wherein an idli batter depositor which can deposit a pre-determined quantity of batter (a ground mixture of rice and black-gram cotyledons) on to a moving pan continuously and consistently without tailing from the said batter deposit.



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BACKGROUND AND PRIOR ART REFERENCES

- Idli is popular breakfast staple food consumed in Indian subcontinent especially in southern parts. Idli is prepared from the mixture of raw rice and black gram cotyledons soaked in water at room temperature. The soaked mixture is ground to a coarse viscous batter with the addition of water and required quantity of salt to taste. The prepared batter is fermented overnight. The fermented batter deposited on to the idli pans for steam cooking. In this context, depositing the know the quantity accurately at the right time, at the right place, in hygienic manner and at the lowest cost possible is a very critical operation to derive an acceptable product.
- 15 In olden days idlis were also produced traditionally using mud pots, wherein a mud pot was filled 1/4th of its volume with water, was kept on the open Chula fired with fire wood. The fermented batter was manually deposited in to the traditionally prepared round miniature bamboo basket with a piece of cloth spread on it in order to avoid stickiness and steaming in the pot. But in the present scenario, idlis are produced in a batch type as well as continuous process using stainless steel container with or without pressure. Reference may be made to Indian patent application of the same applicants No. 950/del/94.
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The fermented batter is deposited manually with the help of a ladle on to the pan cradle or moving pans and steams cooked to produce idlis.

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With the growing demand for breakfast foods, the need for large scale production of idlis is felt by many catering institutions like Defense, Railways, Industrial canteens and Restaurants. In order to meet the large-scale production of idlis, batch type units are readily available in the market.

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In the patent application of the same applicants No. 950/DEL/94, a device was claimed for Continuous Production of Idlis capable of producing 1000-1200 idlis/hr.

10 Large scale production of idlis with these machines is facing a major constraint in depositing the idli batter on to the pans cradle or moving pans manually, ie; a pre-determined quantity at the right place, at the right time and in hygienic manner. This poses many problems like drudgery to the operator, unhygienic due to manual handling, inconsistent deposition, time consuming and the shape of the final product may not be as desired.

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There are a number of depositing machines commercially available in the market for volumetric filling/depositing of liquids/ materials such as milk, edible oils and bakery products. One such example is the single drop depositor. Reference may be made to Dominic Man, 1990, Process Engineering in the Food Industry, edited by R.W. Field & J.A. Howell, published by Elsevier Applied Science, New York. Vol-2, pp 75-87. Wherein these machines are basically operated and controlled pneumatically. The machine essentially consists of a cylinder and a piston for measuring the deposit, and a mechanically operated rotary valve and facility for adjusting the speed and stroke length of the piston.

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Reference may be made to US. Patent No. 4494920, Positive Displacement Volumetric Depositor and A New Universal Depositor (Ann \ on, 1989) suitable for fruits, nuts, chocolate and minced meat and automatic butter dispenser (US patent No. 3437238). Yet another reference may be made to Nagaraju et al.(1999) No. 1976/Del/98. This machine is suitable for dispensing of idli batter and similar food materials, basically operated and

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controlled by electromagnetic solenoid. The machine essentially consists of a four-chambered trough with valve stem and valve, and vertical movement of the valves with the help of the solenoid does deposition.

5 Though the above machines can be used for idli batter, some of the drawbacks encountered are as follows:

1. Machines are complicated with the presence of pneumatic system and cylinder and piston arrangements.
- 10 2. Dismantling and cleaning of the system is difficult due to their complicated design.
3. Consumes more electrical energy and the cost is also high.
4. Presence of suck-back arrangement to the system for avoiding the trailing has made the machine costlier.
5. Presence of the electromagnetic solenoid makes more noise due to vibration while
15 lifting the valve and releasing the valve and there is a possibility of valve to get struck during the operation while it is moving through a valve sleeve.
6. Occupies more space.

OBJECTS OF THE INVENTION

20 The main object of the present invention is to provide a device useful for continuous dispensing of idli batter and like materials, which obviate the drawbacks as detailed above. Another object of the present invention is to eliminate the complicated design such as pneumatic system and suck-back arrangement and to provide a simple device for deposition.

25 Yet another object of the present invention is to provide an economically cheaper device for deposition of idli batter and similar materials.

Still another object is to provide continuous and consistent operation of the unit for on-line production without noise, vibration, contaminated free deposition

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SUMMARY OF THE INVENTION

This invention provides a device for continual dispensing of idli batter and like materials.

The present invention more particularly provides a device wherein an idli batter depositor which can deposit a pre-determined quantity of batter (a ground mixture of rice and black-gram cotyledons) on to a moving pan continuously and consistently without tailing from the said batter deposit.

DETAILED DESCRIPTION OF THE INVENTION

Accordingly, the present invention provides a device for continuous dispensing of idli batter and like materials, said device comprising:

- (a) a horizontal cylindrical stainless steel hallow trough (1) with a cylindrical solid rotor(2) having a plurality of vertical through openings called ports(3) for batter feeding at its bottom side;
- (b) the rotor being securely mounted on bearings at its ends for smooth rotating motion,
- (c) the hallow steel trough is connected to a feed hopper (4) with level controller to admit the required quantity of the material to the feeding hopper(4) from a storage tank (5);
- (d) the rotor rotates by means of a torque motor assembly with limit switches(6) in both the directions(clock wise as well as anti-clock wise), opening, closing and holding time of the ports are controlled by the electronic controls (7)with limit switches;
- (e) the feed hopper is connected to a reservoir/ surge tank (5) through a regulating valve (9) for holding idli batter for continuous operation; and
- (f) the whole assembly is mounted on a rigid mild steel (MS) frame(8).

An embodiment of the present invention, wherein the unit is having plurality of ports provided (3) at bottom of the hollow trough (1) that are circular in shape and accurate for deposition of regulated quantity of batter.

Yet another embodiment of the present invention, wherein the rotary motion of the rotor for opening and closing of the ports is provided by means of a torque motor and a control system.

5 Still another embodiment of the present invention, wherein the movement of rotor is regulated by means of limit switches embedded in the system.

Yet another embodiment of the present invention, wherein the deposition of batter is controlled by means of electronic controls.

10 Further embodiment of the present invention, wherein said device provides continuous and consistent operation of the unit for on-line production without noise, vibration and a deposition free from contamination.

Yet another embodiment of the present invention, wherein the closing and opening of the ports and time for deposition are controlled by means of setting time with electronic timer and limit switches.

15 Still another embodiment of the present invention, wherein the operation of closing and opening of the ports is suitably synchronized to deposit pre-determined material at the right place.

Yet another embodiment of the present invention wherein the required quantity of batter intake is controlled by the electronic level controller in the surge tank.

20 Further embodiment of the present invention, wherein the idli batter depositor deposits a pre-determined quantity of batter (a ground mixture of rice and black-gram cotyledons) on to a moving pan continuously and consistently without tailing from the said batter deposit.

The operation of the device of the present invention is as follows:

25 The fermented batter of standard compositions is filled to the surge tank in bulk (60-80 kg) required quantity for 1-2 hours operation.

The closing and opening of the ports and time for deposition are being achieved by means of setting the time with electronic timer and limit switches. The material level in the
30 feeding hopper is maintained constantly by operating the valve, which is provided between

the feed hopper and the surge tank. The operation of the closing and opening of the ports and the time of opening of the ports is suitably synchronized to deposit pre-determined quantity of material at right place. And the feed point at which the deposition starts on the pan is identified and switched on the main unit and electronic control unit simultaneously.

- 5 Lastly care should be taken in avoiding air locking in the feeding hopper which may affect the deposition. This problem can be avoided by frequent stirring the batter in the hopper.

BRIEF DESCRIPTION OF THE ACCOMPANIED DRAWINGS

- 10 In the drawing(s) accompanying this specifications, Fig 1. Depicts the front view and Fig 2 shows the side view of an embodiment of the device of the present invention.

ADVANTAGES

1. The unit is suitable for continuous operation.
2. Adjusting the time of opening and closing of the ports by means of electronic controls
15 can suitably vary the amount of deposition.
3. The unit is simple to operate and deposits continuously a pre-determined quantity of material.
- 4 The unit is cheaper and hygienic.
5. No tailings and droppings during deposition throughout the process.
- 20 6. The unit can also be used for other products similar to the idli batter.
7. Easy dismantling system and easy to clean.
8. Occupies lesser space and can be suitably mounted on to the main unit.

CLAIMS

1. A device for continuous dispensing of idli batter and like materials, said device comprising:
 - (a) a horizontal cylindrical stainless steel hallow trough (1) with a cylindrical solid rotor(2) having a plurality of vertical through openings called ports(3) for batter feeding at its bottom side;
 - (b) the rotor being securely mounted on bearings at its ends for smooth rotating motion;
 - (c) the hallow steel trough is connected to a feed hopper (4) with level controller to admit the required quantity of the material to the feeding hopper(4) from a storage tank (5);
 - (d) the rotor rotates by means of a torque motor assembly with limit switches(6) in both the directions(clock wise as well as anti-clock wise), opening, closing and holding time of the ports are controlled by the electronic controls (7)with limit switches;
 - (e) the feed hopper is connected to a reservoir/ surge tank (5) through a regulating valve (9) for holding idli batter for continuous operation; and
 - (f) the whole assembly is mounted on a rigid mild steel (MS) frame(8).
2. A device according to claim 1 wherein the device consisting of plurality of ports provided (3) at bottom of the hollow trough (1) that are circular in shape and accurate for deposition of regulated quantity of batter.
3. A device according to claim 1 wherein the rotary motion of the rotor for opening and closing of the ports is provided by means of a torque motor and a control system.
4. A device according to claim 1, wherein the movement of rotor is regulated by means of limit switches embedded in the system.
5. A device according to claim 1, wherein the deposition of batter is controlled by means of electronic controls.

6. A device according to claim 1, wherein said device provides continuous and consistent operation of the unit for on-line production without noise, vibration and a deposition free from contamination.
7. A device according to claim 1, wherein the closing and opening of the ports and time
5 for deposition are controlled by means of setting time with electronic timer and limit switches.
8. A device according to claim 1, wherein the operation of closing and opening of the ports is suitably synchronized to deposit pre-determined material at the right place.
9. A device according to claim 1, wherein the idli batter depositor deposits a pre-
10 determined quantity of batter (a ground mixture of rice and black-gram cotyledons) on to a moving pan continuously and consistently without tailing from the said batter deposit.