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(54) Method for batching granular and similar articles and a device for carrying out such method.

(57) A method for batching granular articles (2) provides to supply an suitable amount of such granular articles (2) over a batching cask (8), joined to elastic means (9) designed to form in the upper part an inclined concave surface that acts as a mouth for the same batching cask (8). The mouth is aimed at receiving the granular articles (2) to fill the cask (8). Then the batching cask (8) is moved to a raised position in which said elastic means (9) are kept taut protruding upwards thus forming in the upper part an inclined convex surface, so as to determine spontaneous removal of articles (2) exceeding the prefixed dose, that fall along said inclined surface.

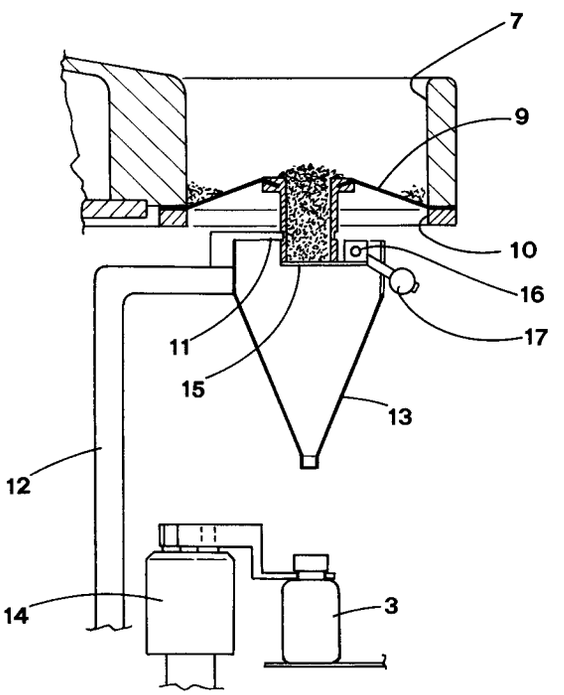

FIG. 3

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The present invention lies in the technical field concerning batching granular and similar articles, in particular delicate and easily perishable articles.

There are used batching devices that fill bottles or other containers with a prefixed quantity of a product, e.g. granular, powdered or similar substances.

Such devices usually have a rotating carousel equipped peripherally with a plurality of batching casks, distributed regularly, in contact with a space or an angular channel that is fed with the product to be put in the bottles.

The lower parts of the casks are closed by a shutter that can be opened, in a special operative station, in order to unload the product into a hopper aimed at filling a bottle that is placed below.

The aforementioned casks are designed to define the dose of the product to be put in each bottle.

The casks are filled with the product put into the feeding channel of the carousel.

There is provided a fixed scraper means that extends vertically in a shutter like fashion inside the carousel channel, that is up to the bottom of the same channel, e.i. at the level of the upper border of the casks.

Therefore, during the rotation of the carousel, the product in the channel of the carousel is pushed by the scraper into the spaces defined by the aforementioned casks.

In fact, the fixed scraper leaves the product in the feeding channel while scraping it at the level of the batching casks.

Such batching method cannot be applied when the bottles are to be filled with delicate products, that cannot be crushed.

In fact, the batching means compresses the product that is forced against it by the carousel rotation. Such mechanical action can crush a part of product and cause its damage.

The object of the present invention is to propose such a method for batching granular and similar products that surely avoids crushing or damage of the product.

The above mentioned object is obtained in accordance with what has been reported in claims.

The characteristics of the invention are pointed out in the following, with particular reference to the enclosed drawing, in which;

- fig. 1 shows a schematic, plan view of the batching device being the subject of the invention;
- fig. 2 shows a view, in vertical section, of such device, in the phase of feeding the product, according to the section line II-II of fig. 1;
- figs. 3, 4 and 5 show subsequent operative phases of the device, in a vertical section view, according to the section lines III-III, IV-IV, and V-V of fig. 1, respectively.

With reference to the above mentioned figures, the reference numeral 1 indicates the whole device for batching granular articles 2 destined to fill relative bottles 3.

The empty bottles 3 are fed along a line 4, in the direction indicated with the arrow A, and they are moved away, after having been filled, along a line 5 aligned with the same feeding line 4.

The device 1 includes a carousel 6 rotating step by step about a vertical axis, in the direction indicated with the arrow B.

The carousel 6 has a peripheral ring-shaped channel 7 in correspondence with which a plurality of batching casks 8, having vertical axis, are situated regularly spaced apart from one another.

Each batching cask 8 is fixed with its upper lip 8a to a respective elastic diaphragm 9.

The diaphragm 9 has the outer border fixed to the edge of a relative circular opening 10 made in the bottom of the channel 7, and is open centrally in correspondence to the zone fixed to the relative batching cask 8.

Below the diaphragm 9, each batching cask 8 is supported, by means of a support bracket 11, by a vertical rod 12 that, as specified in the following, is designed to be moved vertically in accordance with alternate directions.

The rod 12 supports also a respective hopper 13 coaxial with the correspondent batching cask 8.

Therefore, the hopper 13 is movable together with the correspondent batching cask 8.

The hopper 13 is designed to enter into a relative bottle 3 to be filled, that is joined to the carousel 6 in correspondence with each of the batching cask 8.

The bottle 3 is supported on the carousel 6 by respective moving means 14, adapted to move vertically in accordance with alternate directions.

The lower part of batching casks 8 is closed by a shutter 15, swingable on a pin 16 fastened to the hopper 13.

The shutter 15 is normally kept closed by a counter-weight 17, and can be opened at an unloading station 200 by special cam means 18.

The bottles 3 fed by the line 4 are conveyed in an ordered manner to the carousel 6 by a distributing means 19, such as rotating stars, in a suitable phase relation with the same carousel 6.

A similar distributor 20 transports filled bottles 3 from the carousel 6 to the line 5 leading away.

The carousel 6 is fed with the granular articles 2 by a feeding hopper 21, placed over the channel 7, in correspondence with a station 100 for filling the batching casks 8.

A scraper means 22 is placed downstream of such feeding hopper 21, according to the direction

B of the carousel 6 rotation.

According to the method for batching granular products 2, carried out by the described device 1, at the passage of a batching cask 8 in the filling station 100, product is fed by the hopper 21 in a quantity slightly bigger than the pre-established dose, defined by the size of the same batching casks 8.

Therefore, the granular articles 2 fill the batching cask 8 below, that, in this operative phase, is carried by the rod 12 situated in a lowered position, so that the elastic diaphragm 9 is kept taut so as to protrude downwards thus forming, in its upper part, a concave surface that acts as mouth for the same batching cask 8 (fig. 2).

In its lower part, the batching cask 8 is closed by the shutter 15, thus the product is kept inside the same cask 8.

It is to be noted that, since the quantity of the product is bigger than the single dose, the batching cask 8 is certainly completely filled, and the part of the product in excess is collected at the bottom of the mouth formed by the elastic diaphragm 9, over the same cask 8.

In a subsequent station of the carousel 6, the batching cask 8, previously filled, is shifted to the raised position, so that the elastic diaphragm 9 is kept taut to protrude upwards thus forming, in its upper part, an inclined convex surface, that is a truncated cone (fig. 3).

Such displacement causes, in a spontaneous way, the removal of the product in excess that, due to gravity, comes down along the inclined surface formed by the elastic diaphragm 9 and is collected in a peripheral zone.

In this way, the batching cask 8 is filled with a pre-established quantity of product, dose determined by the size of the same cask 8.

Obviously, it is possible to change the dose of product, according to the need, by changing the size of the cask 8.

Otherwise, it is possible to use batching casks made of two joined parts of telescopic form, so as to allow to vary the relative capacity.

Therefore, the filling of the cask 8 with the preestablished quantity of product occurs without any mechanical action on the articles, in particular, without crushing or similar actions that could jeopardise their integrity.

The limited quantity of product remaining over the cask 8 after the raising movement, can be removed by the scraper means 22, in a subsequent station of the carousel 6. (fig. 4)

It is to be noted that, such scraper means 22 skims the upper edge of the batching cask 8, removing the exceeding articles without crushing them, since the articles are pushed to fall freely on the inclined surface of the elastic diaphragm 9.

In the subsequent discharge station 200 then, the cam 18 controls the opening of the shutter 15 of the batching cask 8, so as to allow filling of the relative bottle 3 with the batched product (fig. 5).

Such bottle 3 has been previously displaced to a raised position by the respective moving means 14, so as to come onto the exit of the hopper 13 that convey the articles 2 discharged by the batching cask 8.

The bottle 3 already filled is carried again to the lowered position and directed orderly, by the distributor 20, to the line 5 leading away.

In conclusion, the described method and device allow to fill the bottles 3 with a batched quantity of articles 2, without exerting any mechanical action i.e. compressing or crushing thereon.

The subject method and device are therefore particularly efficient in case of batching products delicate or easily perishable in consequence of mechanical actions as those cited above, in particular granular and similar articles.

It is also to be pointed out that the method in subject is carried out by a device a very simple in its construction, so it is very convenient also economically, either from the point of view of production costs or use cost.

In particular, the articles are batched in a spontaneous way by a single vertical upwards movement, that is imposed on the batching cask.

It is understood that what about has been described as a mere, non limitative example, therefore, possible constructive variations are covered by the protection of the present technical solution, as described above and claimed in the following.

Claims

1. Method for batching granular and similar articles characterised in that it provides for feeding with a suitable quantity of granular articles (2) over a batching cask (8), joined to elastic means (9) designed to form, in the upper part, an inclined concave surface that acts as a mouth for the same batching cask (8), so as to fill said batching cask (8) with said granular articles (2); and for displacing said batching cask (8) in a raised position in which said elastic means (9) are kept taut so as to protrude upwards thus forming in the upper part an inclined convex surface, so as to provoke spontaneous removal of the articles (2) exceeding the preestablished dose, that fall along said inclined surface.

2. Method, according to claim 1, characterised in that the exceeding articles (2), remaining on said filled batching cask (8), are removed by a scraper means (22) that is designed to skim

the upper edge of the same batching cask (8).

3. Device for the batching of granular and similar articles, comprising a rotating carousel (6) that is designed to carry a plurality of bottles (3), located in regular spaced apart relation with respect to each other, characterised in that it comprises a plurality of batching casks (8) carried by said carousel (6) over said bottles (3) and joined respectively to elastic means (9) designed to form, in the upper part, an inclined concave surface that acts as opening for each of said batching casks (8); means (12) designed to operate the motion of said batching casks (8) between a lowered position, in correspondence with a filling station (100), so as to fill said batching casks (8) with an appropriate quantity of articles (2), and a raised position, in which said elastic means (9) are kept taut so as to protrude upwards thus forming, in the upper part, an inclined convex surface, so as to determine the spontaneous removal of the articles (2) exceeding the preestablished dose, by falling along said inclined surface.

4. Device, according to claim 3, characterised in that said elastic means (9) have respectively, an elastic diaphragm that is integral, in correspondence with a central opening, to the top of a relative batching cask (8) and is peripherally fixed to the edge of a relative circular opening (10) made in the bottom of a channel (7) of said carousel (6).

5. Device, according to claim 3, characterised in that it comprises, coaxial with each of said batching casks (8) and below the latter, a respective hopper (13) fastened to said operating means (12) and designed to enter a relative bottle (3) to be filled.

6. Device, according to claim 3, characterised in that it comprises, downstream of said filling station (100), a scraper means (22) designed to skim the upper edge of said filled batching casks (8), remove the articles (2) in excess remaining on said batching casks (8).

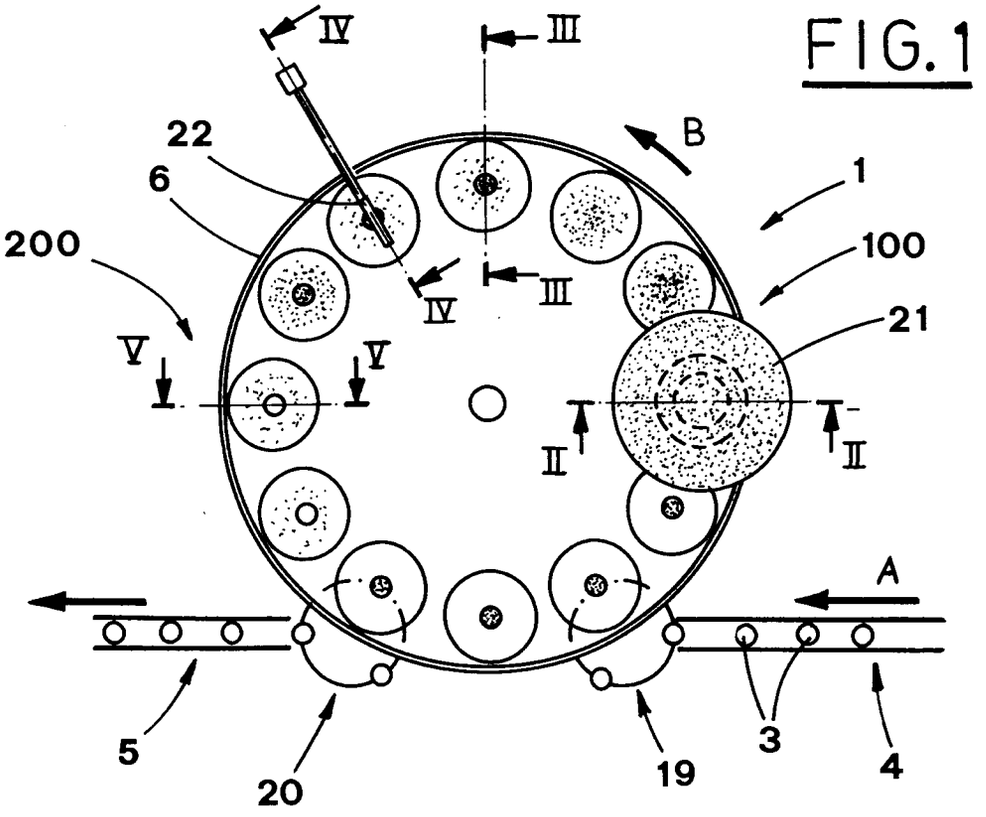
IV
III
22
6
B
1
200
100
IV
III
21
V
V
II
II
A
5
20
19
3
4

FIG. 1

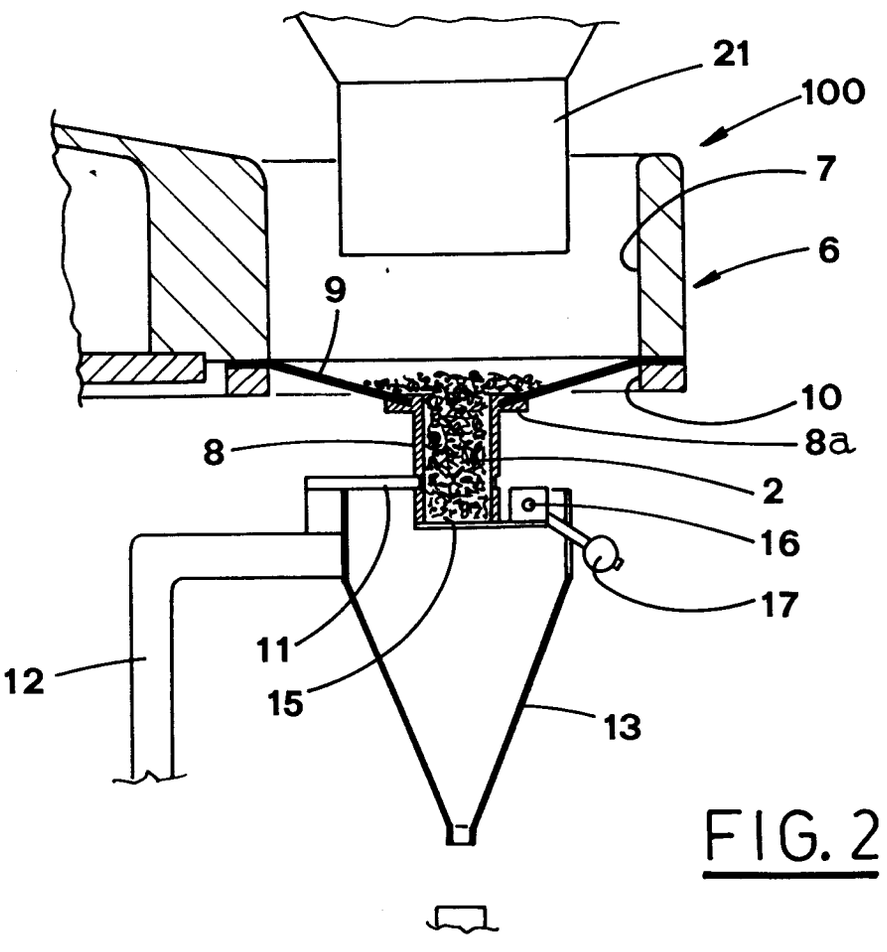
21
100
7
6
9
10
8
8a
2
16
17
11
12
15
13

FIG. 2

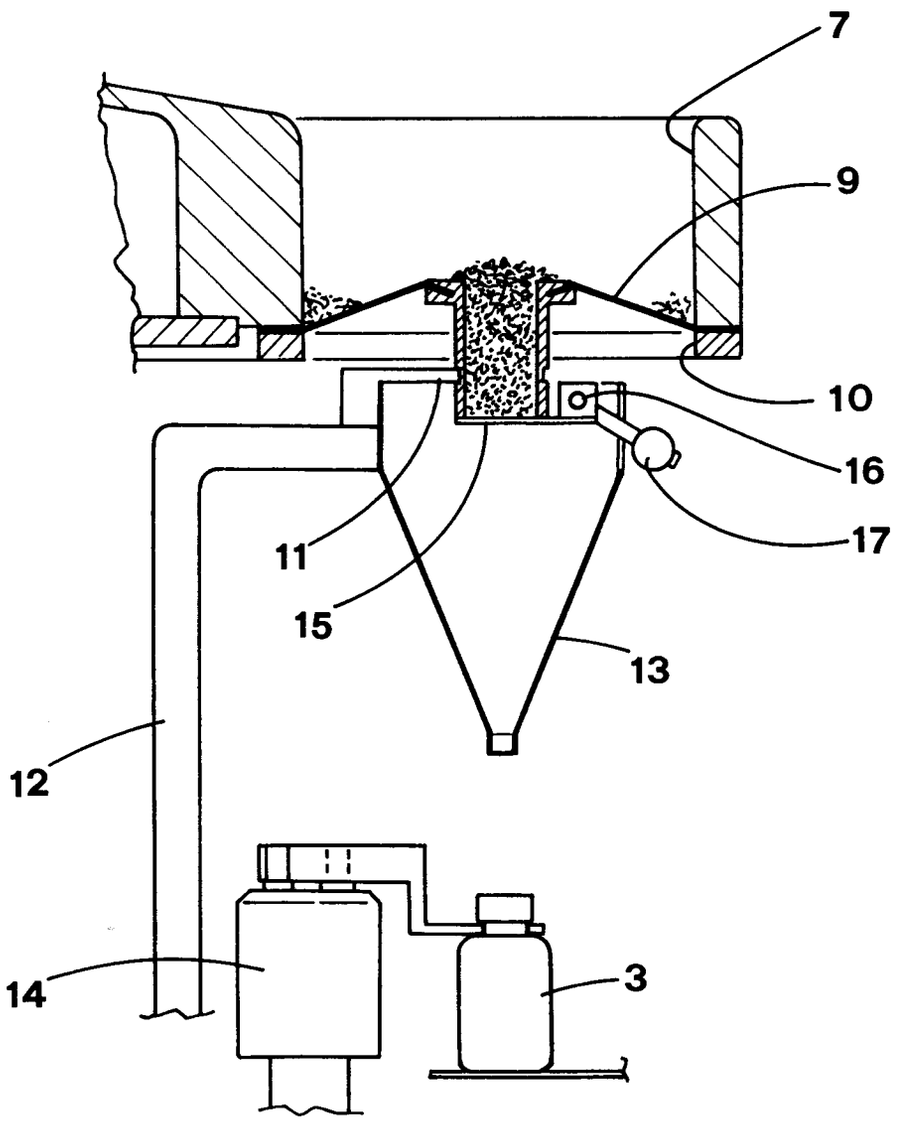

FIG. 3

FIG.5

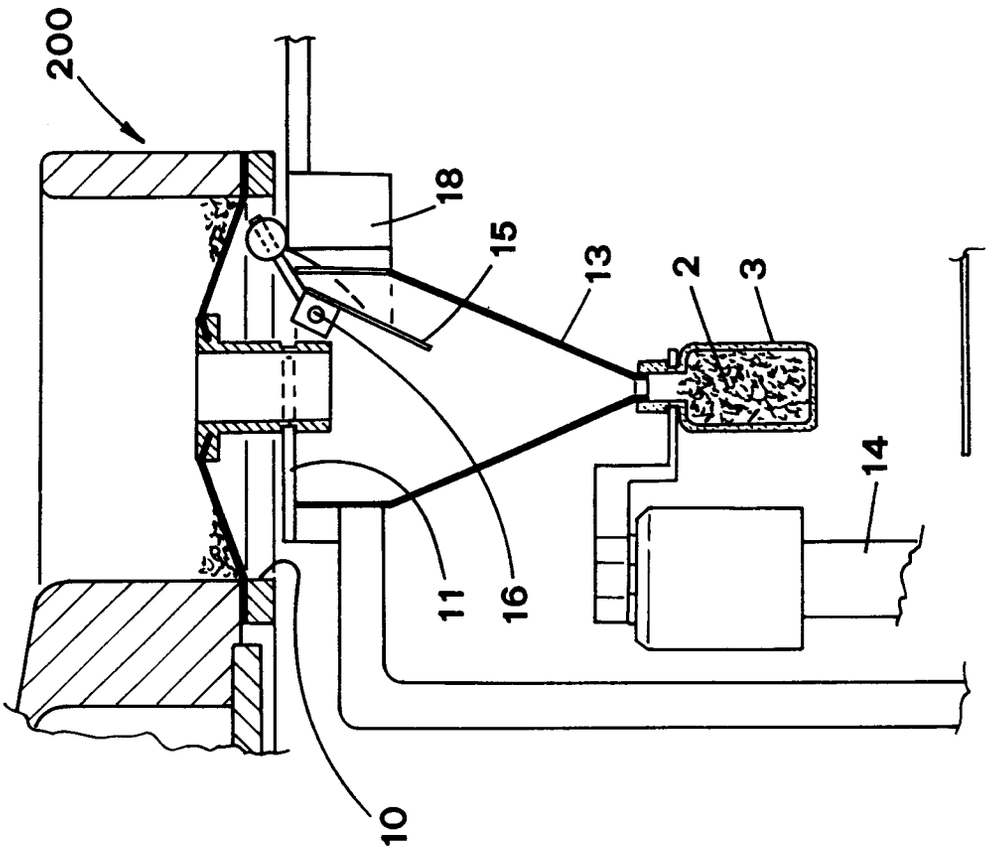

FIG.4