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(71) Applicant: **GB Foods Belgium**
2870 Puurs, Sint-Amands (BE)

(72) Inventors:
• **SANCHO, Felix**
1200 Woluwe Saint Lambert (BE)
• **DEKKER, Bernardus Martinus**
2804 HZ Gouda (NL)

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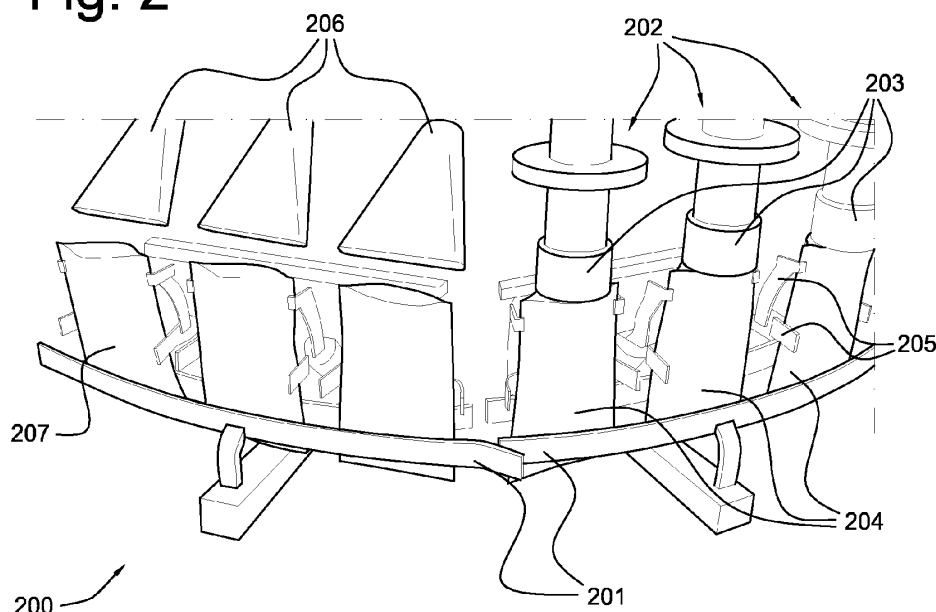
(74) Representative: **Nederlandsch Octrooibureau**
P.O. Box 29720
2502 LS The Hague (NL)

(54) **DEVICE AND METHOD FOR FILLING A FOOD PACKAGING WITH DRY INGREDIENTS**

(57) According to one embodiment of the invention, an assembly is published for the filling of food packaging (103, 204) with food consisting of dry or dried ingredients, the food packaging being a pouch shaped and primarily beam-shaped material with an open side, the assembly comprising a dosing machine (102, 202) for the dosed filling of food packaging (103, 204), a first funnel-shaped or flat nozzle (104, 206) connected to a compressed air

line and configured for applying a stream of a first laminar stream along a surface comprising the width of the open side, a second funnel-shaped or flat nozzle (105, 302) connected to the compressed air line for flowing a second laminar stream along a surface comprising the middle of the open side, whereby a direction of the first laminar stream is transverse to the direction of the second laminar stream.

Fig. 2



Description

Technical area

[0001] The current invention relates to an assembly and method for filling food packaging with food, and more specifically filling the food packaging with dry or dried ingredients.

State of the Art

[0002] Filling food packaging, also called a food holder, such as a bag, can and/or bottle with food is done according to a methods whereby on the one hand one avoids great variation in the quantity and composition of the food in the food packaging, and on the other hand, that the strict requirements in the area of food safety are met. It is also of essential importance that the filling of the food packaging with food is performed with the greatest care.

[0003] One has a suitable packaging for each type of food to ensure optimal hygienic protection. It is known in the food industry that one can differentiate between two groups of food, being wet food, such as sauces, for example mayonnaise, or bouillon and dry or dried food such as chips, spices, sugar as well as dry soup, dry sauces and dry desserts.

[0004] It must also be understood that other classifications of food are possible, as well as further refinement, such as semi-dry food. The current invention will be described with reference to food containing dry or dried ingredients, whereby it is understood that this involves solid material as opposed to liquids or solid ingredients mixed with liquids.

[0005] A method for filling a food package is known, such as from document US 4,899,790, in which a method is published for the filling of containers with food in powder form.

[0006] In US 11,089,894 B2, a bulk dispenser for food is published in which the formation of fine product particles as the result of product breakage and rough handling is minimized. This bulk dispenser can be used to fill food packaging with food consisting of dry or dried ingredients.

[0007] One disadvantage of these published methods is, however, that after the food packaging is filled with the food, it cannot be guaranteed that product residues stick to the edge of an opening through which the package is filled. Considering the strict hygienic requirements, it is not desirable to have such product residue present. This can have another negative effect when the package is sealed for further transport. A poor or defective seal can then also result in accelerated and/or undesired spoilage of the food in the packaging.

[0008] There is a need for a method and assembly for filling food packaging with food consisting of dry or dried ingredients whereby the presence of product residues after filling is minimized.

[0009] It is also an objective of the current invention to

provide a method and assembly for the filling of food packaging with foods made up of dry or dried ingredients that addresses one or more of the described disadvantages of the solutions from the state of the art of technology. More specifically, it is an objective of the current invention to provide a method and assembly that leads to filling a food package that meets the strict requirements of the food industry, but still remains viable regarding economics in terms of speed and efficiency.

Summary of the invention

[0010] According to the current invention, the objective described above is realized according to a first aspect of the invention by providing a method for filling food packaging with food consisting of dry or dried ingredients according to claim one, the food packaging being a pouch shaped and primarily beam-shaped material with an open side, the method comprising the steps of volumetrically dosed filling of food packaging with a part of the food via the open side, applying a first laminar stream along a surface comprising the width of the open side, and a second laminar stream along a surface comprising the middle of the open side, whereby a direction of the first laminar stream is transverse to the direction of the second laminar stream.

[0011] The food to be packaged consists of dry or dried ingredients, which means that there are no wet ingredients present in it. The complete composition of the food is thus that these ingredients are to be handled as a solid material, which also can be divided into various parts or even in powder form.

[0012] The food packaging, further referred to as packaging, is made of a pouch-shaped and primarily beam-shaped material. This is, for example, a bag consisting of paper, cardboard, composite or some material suitable for containing dry and/or dried ingredients.

[0013] The package has an opening on one side, called the open side, along which the ingredients can be filled. During the process, this side is then held open with a mechanical arm, for example.

[0014] The pouch-shaped characteristic of the packaging means that one can hold the packaging open on one side, thus the open side, to insert the food, and after this step, seal the packaging.

[0015] The primarily beam-shaped characteristic of the package means that the package can have a length, depth and width as usual for a packaging material. It must be noted that the shape of the package at the start is not an essential characteristic of the invention, but that the invention involves the efficient and hygienic filling of the package with a food. As a result, the packaging can also be spherical, as long as the packaging has only one open side for filling.

[0016] In a first step, the packaging is volumetrically filled with the food via the open side. For this, one has a container or drum wherein the food in bulk is found, higher up in the process. A volume is dosed from the container

using a dosing machine, which is suitable for filling into the packaging. This volume is between five and eighty-five percent of the total internal volume of the packaging, preferably between sixty-five and seventy-five percent of the latter volume. In other words, the packaging is not completely filled, but there will be a residual volume so that the packaging can be optimally sealed after it is filled.

[0017] The dosing machine can be adjusted so that the dosed volume can be adjusted to the packaging.

[0018] The packaging is mechanically filled, whereby the dosed volume falls through the open side of the package via the force of gravity. This implies that during the filling process, the open side is kept pointing up, as is the norm.

[0019] In the following steps, and this according to an innovative and new characteristic with regard to the known filling processes in the state of the art of technology, it has been noted that in order to further optimally run the filling process, one must stream at least two laminar streams over and along the open side. A first laminar stream must stream along a surface where the width of the open side is also located. Formulated otherwise, the first laminar stream must stream over the entire width of the open side. This first laminar stream can flow horizontally in the surface perpendicular to the transverse or longitudinal direction of the package when the open side is held upright. Preferably, this laminar stream streams at an angle between forty and fifty degrees, even more preferably forty-five degrees to the surface according to the longitudinal direction of the beam-shaped packaging.

[0020] The advantage of this laminar stream is that the dosed volume of the food is blown further into the packaging after falling into the packaging under the force of gravity. Through this, fewer product residues remain stuck on the inside of the packaging, thus in the area of the open side, but are forced lower into the packaging.

[0021] It is also necessary for the flows to be laminar and not turbulent. Through this, the packaging will not start to deform through the presence of a turbulent stream and one can better control and monitor the method.

[0022] The same effect can be achieved by vibrating the packaging after it has been filled via the dosing machine, but it appears that this technique is less efficient because it causes undesired side effects, such as the unintended detachment of the packaging from the machine arm on which it is hung during the filling process.

[0023] In a subsequent step, one needs a second laminar stream flowing over the package, and this according to a surface that contains the middle of the open side, and whereby the direction of the first laminar stream is transverse to the direction of the second laminar stream. In other words, the first laminar stream streams over the width of the open side, while the second laminar stream streams transverse to this along the middle of the open side and following the lengthways direction of the packaging. Formulated even more differently, the first laminar stream streams according to a primarily horizontal direction, whether or not at an angle of forty-five degrees as

previously stated, while the other laminar stream streams vertically.

[0024] The second laminar stream further ensures that the last residue products are removed on the inside and this time in the middle of the packaging. From research it appears that the provision of a single laminar stream along the middle of the packaging in the longitudinal direction does not result in sufficient removal of residual product. Another disadvantage is that there may be too much loss of the food itself, primarily through the compression and sealing of the packaging when there is no second laminar stream.

[0025] According to one embodiment and preferably, the method also involves the steps of compression of the open side and the sealing of the open side. If the first laminar stream does not stream over the width of the open side, and thus only one laminar stream will stream along the middle in the longitudinal direction, when the packaging is compressed, part of the food will be pushed out. This may result in a significant loss in terms of ingredients. In addition, there still may be residues on the interior of the open side that may stick to the edge when the packaging is sealed.

[0026] In order to further optimize the published method, one lets the second laminar stream preferably stream even or simultaneously with the compression of the open side. Through this, the last residues are removed and one achieves a closed package in which no residual product is found on the inside.

[0027] The closure of the package occurs, for example, by providing the package with a seal seam. Thus the packaging can be hermetically sealed, which again has a beneficial effect on the shelf life of the food that is packaged.

[0028] By providing these two different laminar streams, the seal can be optimally applied and the risk of the presence of residual product between the edges of the seal seam is reduced to a minimum.

[0029] Considering that the laminar streams stream over the packaging, one works with food-safe compressed air. This compressed air preferably originates from food-grade oil or oil-free compressors, whereby one can use compressed air filters. Food-grade oil contains no or hardly any transient toxic components. In addition, the compressed air can still be dried and use can be made of sterile filtration. This minimizes the risk of the use of contaminated air. Furthermore, the two different laminar stream streams may originate from the same input channel.

[0030] According to a second aspect of the invention, a food packaging containing dry or dried ingredients is achieved according to the method according to the first aspect of the invention as published.

[0031] The food packaging involves the ingredients being closed and packaged, and this in a food-safe manner.

[0032] According to a third aspect of the invention, an assembly is published for the filling of food packaging with food consisting of dry or dried ingredients, the food

packaging being a pouch shaped and primarily beam-shaped material with an open side, the method comprising the steps of volumetrically dosed filling of food packaging with a part of the food via the open side, a first funnel-shaped or flat nozzle connected to a compressed air line and configured for applying a stream of a first laminar stream along a surface comprising the width of the open side, a second funnel-shaped or flat nozzle connected to the compressed air line for flowing a second laminar stream along a surface comprising the middle of the open side, whereby a direction of the first laminar stream is transverse to the direction of the second laminar stream.

[0033] The first funnel-shaped or flat nozzle is preferably just as wide as the width of the open side, but seeing that the assembly can be used for packages of various sizes, this is not a strict requirement. The second funnel-shaped or flat nozzle has the same measurements as the first funnel-shaped or flat nozzle and is situated in a transverse direction.

[0034] The packaging is then first taken under the dosing machine with a mechanical arm to be filled with the ingredients. Then the packaging is moved to the first funnel-shaped or flat nozzle where the first laminar stream will stream over the packaging, and in particular over the open side. Then the packaging is moved to the second funnel-shaped or flat nozzle to let the second laminar stream stream over it. Preferably, at the height of the second funnel-shaped or flat nozzle there is also a closure device present to compress the open side, or the packaging in general. Then the packaging is further moved to apply a seal seam to the open side. Then the package is completely closed and can be further processed for further transport, such as stacking or sorting various packages into a large package, such as a cardboard box.

[0035] In order to allow the packaging to undergo the various steps of the method according to the first aspect, the assembly also has a conveyor belt to move the packages along the various parts, being the dosing machine, the first and second funnel-shaped or flat nozzle and the closure device.

[0036] By preference, this conveyor belt is configured to transport two or more food packages simultaneously. This then implies that the various parts must also be designed in multiples. When, for example, three packages are transported simultaneously, you have three dosing guns on the dosing machine, three nozzles for the first laminar stream, three nozzles for the second laminar stream and three closure devices for the compression and closure of the packages. By designing the conveyor belt in multiples, one increases the economic efficiency of the entire filling process.

[0037] The conveyor belt can be made, for example, in a straight line or follow a circular path. It must be understood that the design of the conveyor belt is not a significant part of the previously described assembly for the implementation of a method for filling food packaging

with dry or dried ingredients in terms of its line.

Summary description of the figures

[0038] The invention will be illustrated in more detail with reference to the figures, whereby

Fig. 1 schematically illustrates a method for the filling of food packaging with food according to one embodiment of the invention; and

Fig. 2 illustrates a practical embodiment for the filling of a food package with food whereby a first laminar stream streams over the width of the food packaging;

Fig. 3 illustrates an additional step in the practical embodiment as illustrated in fig. 2, whereby a second laminar stream streams over the width of the food packaging; and

Fig. 4 illustrates an additional step in the practical embodiment as illustrated in fig. 2 and fig. 4, whereby in this step the food packaging is compressed.

Detailed description of the embodiments

[0039] The current invention will be described with regard to particular embodiments and with reference to certain figures, but the invention is not limited to these and is only determined by the claims. The figures described are only schematic and nonlimiting. In the figures, the size of certain element is exaggerated and not drawn to scale for illustrative purposes. The dimensions and the relative dimensions are not necessarily consistent with actual practical designs of the invention.

[0040] Furthermore, the terms first, second, third and the like are used in the description and claims to differentiate between similar elements and not necessarily to describe a sequential or chronological sequence. The terms are interchangeable under fitting circumstances and the embodiments of the invention can be applied in sequences other than those described or illustrated here.

[0041] Moreover, the terms, top, bottom, over, under and the like are used in the description and conclusions are used for illustrative purposes and not necessarily to describe relative positions. The terms used are interchangeable under fitting circumstances and the embodiments of the invention described can be applied in other orientations than described or illustrated here.

[0042] Furthermore, the various embodiments, even though called "preferred designs" must be considered rather as a manner of example of how the invention can be designed than as a limitation of the range of the invention.

[0043] The term "comprising", used in the conclusions, must not be interpreted as being limited to the resources or steps listed after it. The term does not exclude other elements or steps. The term should be interpreted as

specifying for the presence of the listed features, elements, steps or components which are referenced, but does not exclude the presence or addition of one or more other features, elements, steps or components or groups thereof. The range of the expression "a design encompassing resources A and B" must thus not be limited to designs that consist only of A and B. The intention is that, with regard to the current invention, only the components A and B of the design are summarized, and the conclusion must be further interpreted as they also contain equivalents of these components.

[0044] Fig. 1 schematically 100 illustrates a method for the filling of food packaging with food according to one embodiment of the invention. Reference 103 illustrates a set of food packages with an open side along the top. To the left of the illustration, the storage vessel 101 is illustrated with a dosing unit 102 that contains the food consisting of dry or dried ingredients. The storage vessel 101 is located higher up in the industrial process for the filling of the food packaging 103. Higher up does not mean higher than the dosing unit 102 from a mechanical standpoint, but that this storage vessel 101 is located in prior steps in the chain of the industrial process to come to an end result of acquiring a food that is packaged in suitable packaging being food packaging 103 and that this packaging is closed.

[0045] Multiple other dosing units can also be connected to the storage vessel 101 other than dosing unit 102.

[0046] The food is dosed into the packaging from dosing unit 102. This means that a certain volume is dosed into the food packaging 103 which is suitable for this. In other words, this volume must be smaller than the maximum permitted internal volume of the food packaging 103.

[0047] In a subsequent step, a laminar stream is blown over the packaging via a first funnel-shaped or flat nozzle 104, and this following a direction along the longitudinal direction of the open side, thus over the width of the food packaging 103. In addition, the nozzle 104 is positioned at an angle between 40° and 50°, preferably 45° to a surface following the longitudinal direction of the package 103.

[0048] In a third step, a second laminar stream is blown over the open side, this time via the nozzle 105. The difference between the first and second step is that the direction of the second laminar stream is different from the direction of the first laminar stream, as illustrated in fig. 1 and in the following figures, and more specifically, transverse to it.

[0049] Because the first and second flows are both laminar, they can originate from the same compressed air line as illustrated in reference 107.

[0050] In a last step, the packaging is then closed, as illustrated by reference 106. In this, the top side of the package is closed 106, such as with a sealing seam.

[0051] Fig. 2 illustrates a practical embodiment of the invention and according to the schematic illustration in fig. 1.

[0052] In this practical embodiment 200, the process for filling the food packaging is performed multiple times, in this case suitable to simultaneously handle and process three packages.

5 **[0053]** Reference 202 refers to three dosing units, also called "dosing mouths". In addition, one has three packages 203 that are each held up top facing up by a mechanical arm, such as mechanical arm 205. Thus, one can fill these three packages simultaneously.

10 **[0054]** Furthermore, there is a conveyor belt in this embodiment that follows a circular track. This conveyor belt is located behind the packages 204 and ensures that the mechanical arm can be moved for each package to the following step in the filling process. The three packages 204 that are located under the three dosing units are simultaneously moved so that they are located under the nozzles 206. A nozzle 206 as illustrated in fig. 2 thus corresponds in function to the nozzle 104 in fig. 1.

15 **[0055]** Furthermore, the assembly 200 has safety rails 201 to keep the food packages 204 in their place. Because these are filled and sequentially two transversal laminar streams are blown over them, one prevents packages becoming detached from the conveyor belt.

20 **[0056]** It must also be noted further that the illustrations in fig. 2, 3 and 4 serve to illustrate the method of filling the packages. For this reason, some mechanical parts of the assembly 200 are not illustrated for the sake of clarity. These unillustrated mechanical parts are essential for the proper operation of the complete assembly, but do not have to be considered essential to understand the principle of the innovative method. The professional will understand that in the practical embodiment, these parts must be present.

25 **[0057]** As seen on the left side of the illustration in fig. 2, the packages 204 are located under the nozzles 206, whereby the nozzles 206 are included at an angle of 45° to the packages, as already explained.

30 **[0058]** The nozzles 206 stream a laminar stream over the open side of the packaging, such as the packaging 207, so consistent with the nozzle 104 in fig. 1.

35 **[0059]** Fig. 3 illustrates the following step 300 in the method, being the flowing of a laminar stream through a second set of nozzles 302 over the packaging 204 on the open side. In fig. 3 note that the nozzles 203 are positioned transverse to the nozzles 206, so the laminar streams also stream transverse to each other.

40 **[0060]** Fig. 4 illustrates a last step 400 in the process, whereby the packages 204 can be compressed or pushed to be closed by a closure device for the packages 204 to be closed on the top side in a subsequent, non-illustrated step. These closed packages are then suitable for further transport.

45 **[0061]** As illustrated in fig. 3 and fig. 4, the second laminar stream can stream via the nozzle 302 over the package 204 simultaneously with the compression by device 301.

[0062] The embodiments of the invention and its aspects are further characterized in the following clauses:

1.- Method for filling a food packaging (103, 204) with food consisting of dry or dried ingredients, the food packaging (103, 204) consisting of a pouch-shaped and primarily bar-shaped material with one open side, the method comprising the steps of:

- the volumetrically dosed (102) filling of a food packaging with a quantity of food via the open side;
- flowing the first laminar stream (104, 206) along a surface comprising the width of the open side;
- flowing the second laminar stream (105, 302) along a surface comprising the middle of the open,

whereby the direction of the first laminar stream (104, 206) is transverse to the direction of the second laminar stream (105, 302).

2.- Method according to claim 1, wherein the first laminar stream (104, 206) streams in one surface at an angle of 40° to 50°, preferably 45° opposite a surface along the longitudinal direction of the bar-shaped material.

3.- Method according to one of the previous claims, wherein the second laminar stream (105, 302) flows in a surface perpendicular to a surface along the longitudinal direction of the bar-shaped material.

4.- Method according to one of the previous claims, further comprising the steps of:

- compressing (301) the open side;
- closing (106) the open side.

5.- Method according to claim 4, wherein allowing the second laminar stream occurs simultaneously with the pushing together of the open side.

6.- Method according to claim 5, wherein closure occurs by providing a sealing seam.

7.- Method according to one of the previous claims, wherein the first (104, 206) and second (105, 302) laminar stream contain food-safe compressed air.

8.- Method according to one of the previous claims, wherein the volume of food is 5 - 85%, preferably 65 - 75% of the volume of the food packaging.

9.- Food packaging (103, 204) comprising dry or dried ingredients acquired using the method according to one of the claims 1 to 8.

10.- Assembly for filling food packaging (103, 204) with food consisting of dry or dried ingredients, the food packaging (103, 204) comprising a pouch-

shaped and primarily bar-shaped material with one open side, the assembly comprising:

- a dosing machine (102, 202) configured for the volumetric dosed filling of food packaging (103, 204) with a part of the food via the open side;
- a first funnel-shaped or flat nozzle (104, 206) connected to a compressed air line and configured for flowing a first laminar stream along a surface comprising the width of the open side;
- a second funnel-shaped or flat nozzle (105, 302) connected to a compressed air line and configured for flowing a first laminar stream along a surface comprising the middle of the open side,

whereby the direction of the first laminar stream is transverse to the direction of the second laminar stream.

11.- Assembly according to claim 10, the assembly further comprising:

- a closure device (106, 301) configured to push the edges of the open side of the food packaging together and apply a sealing seam.

12.- Assembly according to claim 11, the assembly further configured to allow the second laminar stream to flow along the surface containing the middle of the open side while simultaneously compressing the open side.

13.- Assembly according to one of the claims 11 to 12, the system further comprising a transport conveyor configured for transporting the food packaging (103, 204) successively along the dosing machine (102, 202), the first funnel-shaped or flat nozzle (104, 202), the second funnel-shaped or flat nozzle (105, 206), and the closure apparatus (106).

14.- Assembly according to claim 13, wherein the conveyor belt is also configured to transport two or more food packages (103, 204) simultaneously.

15.- Assembly according to one of the claims 13 to 14, wherein the conveyor belt comprises a circular track.

Claims

1. Method for filling a food packaging (103, 204) with food consisting of dry or dried ingredients, the food packaging (103, 204) consisting of a pouch-shaped and primarily bar-shaped material with one open side, the method comprising the sequential steps of:

- the volumetrically dosed (102) filling of a food

packaging with a quantity of food via the open side;

- allowing a first laminar stream flow along a surface comprising the width of the open side using a first flat nozzle (104, 202) with a first nozzle opening that extends in a first transverse direction and a first longitudinal direction, wherein the width is defined as a line that connects the two ends of the open side;

- allowing a secondary laminar stream flow along a surface comprising the middle of the open side using a second flat nozzle (105, 302) with a second nozzle opening that extends in a second transverse direction and a second longitudinal direction,

wherein the first longitudinal direction is transverse to the second longitudinal direction so that a direction of the first laminar stream is transverse to a direction of the second laminar stream.

2. Method according to claim 1, wherein the first laminar flow (104, 206) streams in one surface at an angle of 40° to 50°, preferably 45° opposite a surface along the longitudinal direction of the bar-shaped material.

3. Method according to one of the previous claims, wherein the second laminar stream (105, 302) flows in a surface perpendicular to a surface along the longitudinal direction of the bar-shaped material.

4. Method according to one of the previous claims, further comprising the steps of:

- pushing together (301) of the edges of the open side; and
- closing (106) the open side.

5. Method according to claim 4, wherein allowing the second laminar stream flow occurs simultaneously with the pushing together of the open side.

6. Method according to claim 5, wherein closure occurs by providing a sealing seam.

7. Method according to one of the previous claims, wherein the first (104, 206) and second (105, 302) laminar stream contain food-safe compressed air.

8. Method according to one of the previous claims, wherein the volume of food is 5 - 85%, preferably 65 - 75% of the volume of the food packaging.

9. Food packaging (103, 204) acquired using the method according to one of the claims 1-8.

10. Assembly for the filling of a food packaging (103,

204) with food consisting of dry or dried ingredients according to one of the previous claims 1 through 8, the assembly comprising in sequence:

- a dosing machine (102, 202) configured for the volumetric dosed filling of a food packaging (103, 204) with foods;

- a first flat nozzle (104, 206) with a first nozzle opening extending in the first transverse direction and a first longitudinal direction, attachable to a first compressed air line and configured for the flow of a first laminar stream;

- a second flat nozzle (105, 302) with a second nozzle opening extending in the second transverse direction and a first longitudinal direction attachable to a second compressed air line and configured for the flow of a second laminar stream,

wherein the first longitudinal direction is transverse to the second longitudinal direction so that a direction of the first laminar stream is transverse to a direction of the second laminar stream.

11. Assembly according to claim 10, the system further comprising:

- a closure device (106, 301) configured to push the edges of the open side of the food packaging together and apply a sealing seam.

12. Assembly according to claim 11, the assembly further configured to allow the second laminar stream to flow along the surface containing the middle of the open side while simultaneously pushing together the open side.

13. Assembly according to one of the claims 11 to 12, the system further comprising a transport conveyor configured for transporting the food packaging (103, 204) successively along the dosing machine (102, 202), the first flat nozzle (104, 202), the second flat nozzle (105, 206), and the closure apparatus (106).

14. Assembly according to claim 13, wherein the transport conveyor is also configured to transport two or more food packages (103, 204) simultaneously.

15. Assembly according to one of the claims 13 to 14, wherein the transport conveyor comprises a circular track.

Fig. 1

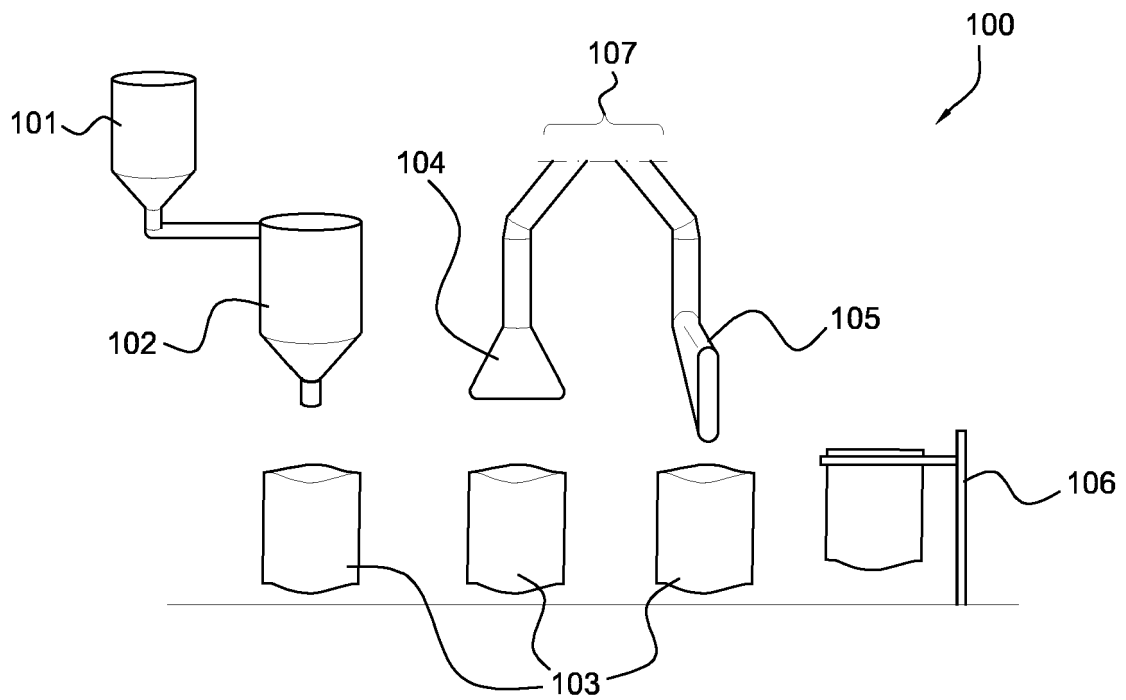


Fig. 2

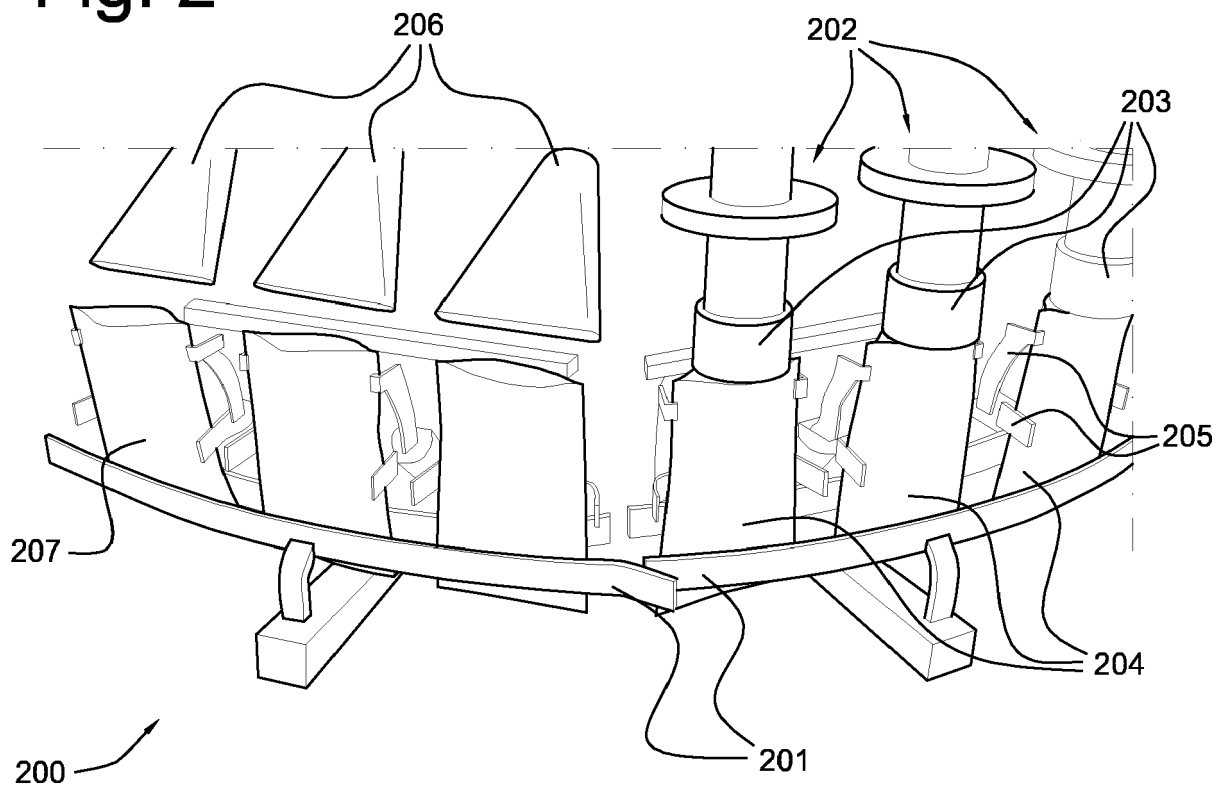


Fig. 3

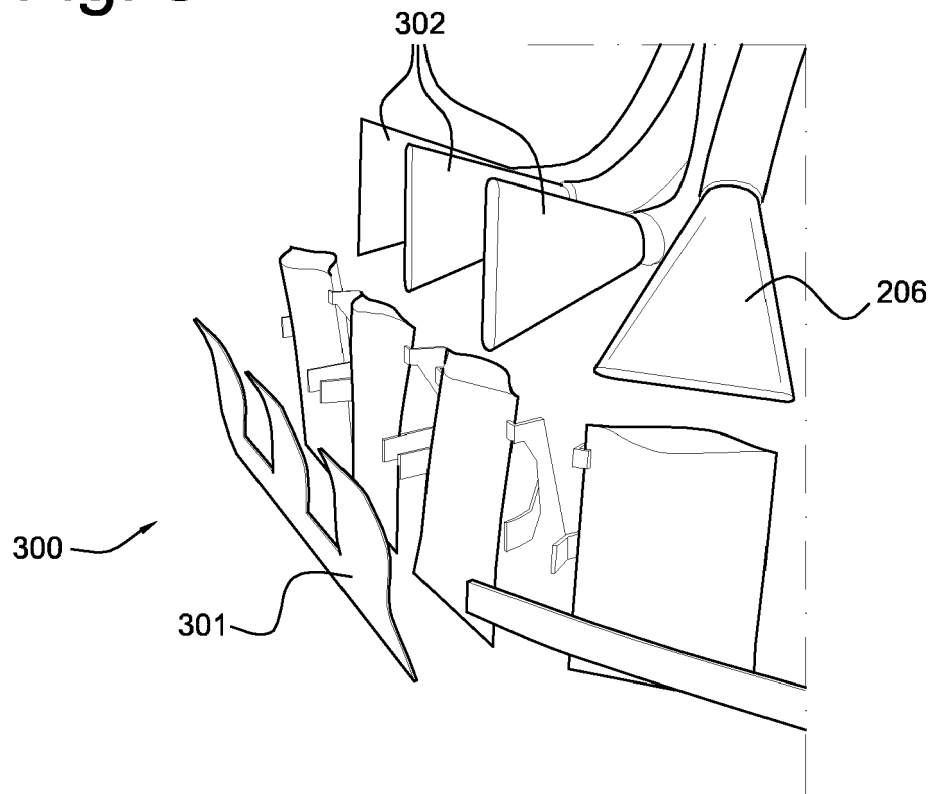
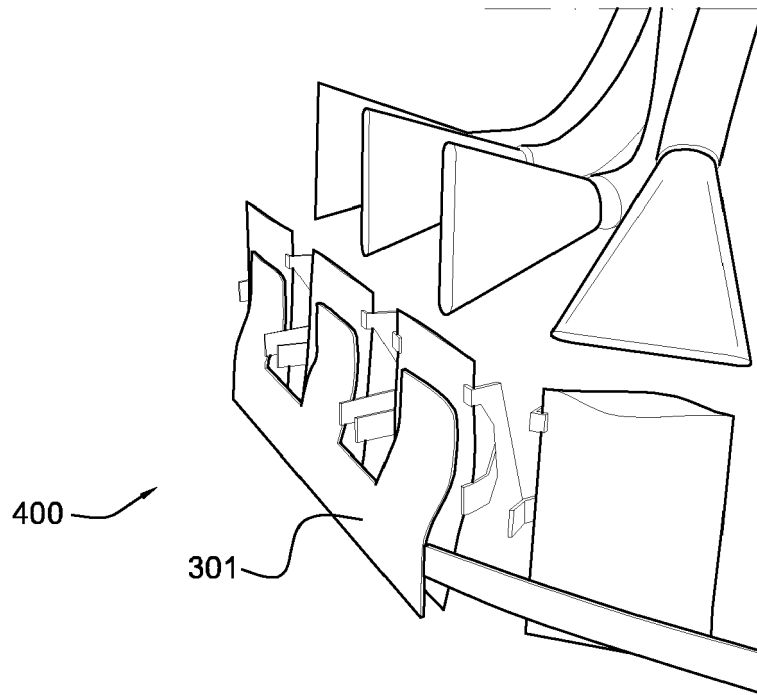


Fig. 4





EUROPEAN SEARCH REPORT

Application Number

EP 23 18 8423

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EPO FORM 1503 03.82 (P04C01)

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 4 074 507 A (RUF WALTER ET AL) 21 February 1978 (1978-02-21)	9	INV. B65B1/26
A	* column 1, line 8; figures 1-6 *	1-8, 10-15	B65B55/24
A	----- US 5 195 298 A (BARANOWSKI JOHN [US]) 23 March 1993 (1993-03-23) * figures 1-9 *	1-15	
A	----- EP 1 312 547 A1 (ARODO BVBA [NL]) 21 May 2003 (2003-05-21) * figures 1-4 *	1,10	
A	----- US 4 418 513 A (PLAHM JACK E [US]) 6 December 1983 (1983-12-06) * figures 1-7 *	10	

			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 January 2024	Examiner Garlati, Timea
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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

EP 23 18 8423

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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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