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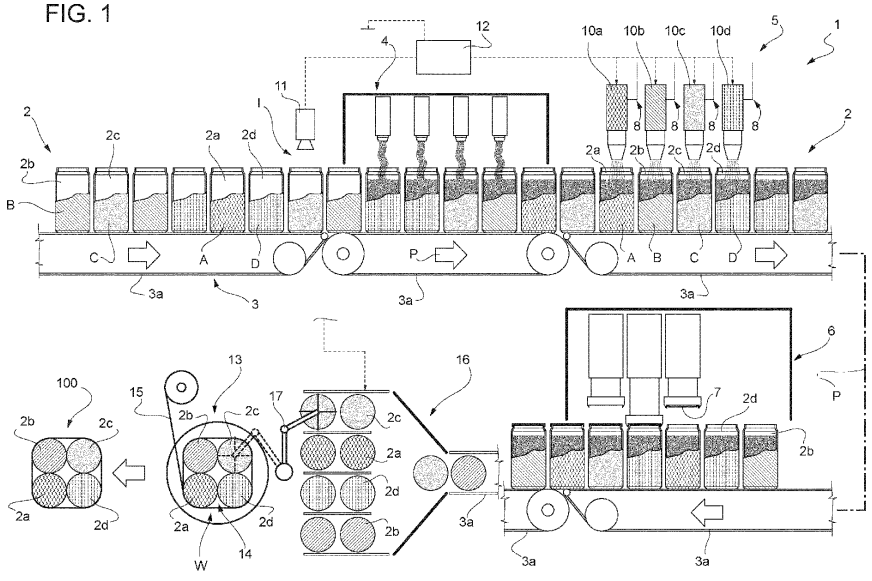
(54) **APPARATUS AND METHOD FOR PACKAGING AN AROMATIZED POURABLE PRODUCT INTO CONTAINERS**

(57) There is described an apparatus (1) for packaging an aromatized pourable product into containers (2), the apparatus comprises a filling machine (4) for feeding a predetermined quantity of pourable product into the containers (2), and a dosing machine (5) for dosing at least two different aromatic products into the containers (2); the dosing machine (5) comprises a plurality of dosing circuits (8), each dosing circuit (8) being dedicated for supplying one respective aromatic product into respective containers (2) other than the containers (2) to be supplied with other aromatic products by the other dosing circuits (8) of the plurality, the dosing circuits (8) being fluidly separated from one another.

FIG. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to an apparatus for packaging an aromatized pourable product, preferably a pourable food product, into containers.

[0002] The present invention also relates to a method for packaging an aromatized pourable product, preferably a pourable food product, into containers.

BACKGROUND ART

[0003] Apparatuses for packaging a pourable product, preferably a pourable food product like tea, water, alcoholic beverages, soft drinks, milk, juice or similar, into containers are known.

[0004] Such packaging apparatuses comprise a number of units or machines, each configured to carry out a specific operation during a packaging process of the aforementioned pourable product.

[0005] A typical packaging apparatus essentially comprises:

- a filling machine configured to fill the containers with a predetermined amount of pourable product; and
- a capping machine configured to apply one cap or closure to each filled container.

[0006] In case the containers are defined by cans, the capping machine applies a top metallic closure to each filled can.

[0007] In case the containers are made of plastic, i.e. they are defined by plastic bottles or flacons, the packaging apparatus further comprises a blower machine configured to form plastic containers starting from known preforms.

[0008] In case the containers are made of glass, i.e. they are defined by glass bottles or jars, the packaging apparatus further comprises a rinsing machine configured to rinse the containers with a rinsing fluid (such as water) prior to the filling operation.

[0009] Dosing an aromatic product into the containers previously filled with the pourable product, which therefore defines a base product, is known in the field.

[0010] To this end, a typical packaging apparatus further comprises a dosing machine for dosing the aromatic product into the previously filled containers.

[0011] In some cases the pourable product fed to the containers is a food product, for example tea, still or sparkling water, or the like; in this case the aromatic product is also a food product, for example a fruit essence (such as lemon, orange, peach, berries or the like) .

[0012] In other cases the pourable product fed to the containers is a non-food product, for example soaps, detergents, room fragrances, or the like; in this case the aromatic product does not need to be a food product.

[0013] The dosing machine is arranged at a dosing station, typically downstream of the filling machine, and generally comprises:

- a fluidic circuit for supplying the aromatic product; and
- at least one dosing valve fluidly connected to the fluidic circuit and configured to sequentially feed a dose, or predetermined quantity, of aromatic product into the containers previously filled with the base product.

[0014] Hence, regardless of the type of container used, a packaging apparatus of the above-mentioned type is configured to produce primary packagings, each primary packaging comprising a container filled with the base product and with a dose of the aromatic product, and a closure applied to such container for sealing it from the external environment.

[0015] The need is felt in the industry for the production of the so-called "multiproduct packs", namely bundles of containers capped and filled with a base product, wherein each container of the bundle is dosed with an aromatic product different than the one of the containers of the same bundle.

[0016] More precisely, each multiproduct pack comprises a plurality of containers, each one capped and filled with a base product and with a dose of aromatic product of a specific aroma or flavour, and a wrapping film made of packaging material, which holds together the plurality of containers.

[0017] Hence, the multiproduct packs define secondary packagings comprising primary packagings of distinct type, i.e. differentiated from one another at least by the aroma of aromatic product contained therein.

[0018] To this end, the packaging apparatus typically comprises a wrapper machine arranged operatively downstream of the capper and configured to:

- receive in input several types of containers filled with base product and aromatic product, i.e. several types of primary packagings;
- sort them by type so as to group them in bundles, each comprising all the types of containers; and
- wrap together the containers of each bundle with the wrapping film, thereby obtaining a multiproduct pack.

[0019] Usually, the different types of primary packaging, i.e. of containers filled with base product and aromatic product, conveniently have different decorations on an outer lateral surface thereof, which allow the containers to be easily identified and associated to the relative aroma or flavour by the user.

[0020] The different decorations can consist in different labels (in case of jars and bottles), different motives or patterns printed on the cans, and/or different colors.

[0021] For example, the primary packagings can be defined by bottles or cans filled with tea flavoured with different aromas. In this case, the different decoration

could be defined by a different color and/or fruit depicted on the outer surface thereof, such as yellow and/or a lemon for lemon tea, rose and/or a peach for peach tea, and so on. Hence, in this case, the multiproduct pack is defined by a bundle of cans or bottles filled with different type of flavoured tea.

[0022] Commonly, the above-mentioned multiproduct packs are obtained by separately producing several lots of primary packagings, i.e. of containers filled with base product and a dose of aromatic product, for each type of primary packaging that has to be included in each multiproduct pack, i.e. in each secondary packaging. This, however, leads to some drawbacks.

[0023] Firstly, each lot of primary packagings needs a dedicated storage space, in order to wait for the production of each lot to be completed.

[0024] This involves also a quite large amount of time for loading and unloading the containers of each lot on and off the packaging apparatus, and for correctly arranging the primary packagings of each lot in the storage space from a logistic point of view.

[0025] Secondly, between each lot, at least the dosing machine has to be cleaned, so that the at least one dosing valve is ready to process and feed each aromatic product without any flavour contamination, which could alter the taste and, thus, the quality of the multiproduct packs. Also this involves a quite large amount of time and effort, thereby leading to an increase of the total production costs.

DISCLOSURE OF INVENTION

[0026] It is therefore an object of the present invention to provide an apparatus and a method for packaging an aromatized pourable product into containers which are designed to overcome at least one of the above-mentioned drawbacks in a straightforward and low-cost manner.

[0027] This object is achieved by an apparatus and a method for packaging an aromatized pourable product into containers as claimed in the respective independent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows, schematically and with parts removed for clarity, a packaging apparatus according to the present invention; and

Figures 2a, 2b, and 2c shows, in a larger scale and with parts removed for clarity, a portion of the packaging apparatus of Figure 1 during three distinct and successive operative conditions.

BEST MODE FOR CARRYING OUT THE INVENTION

[0029] With reference to Figure 1, number 1 indicates as a whole an apparatus for packaging an aromatized pourable product into containers 2, preferably an aromatized pourable food product, such as aromatized or flavoured tea, water, sparkling water, or the like.

[0030] In particular, apparatus 1 is configured for producing primary packagings, each primary packaging comprising a container 2 filled with pourable product and an aromatic product and fluid-tightly sealed from the external environment.

[0031] More in particular, apparatus 1 is configured for producing secondary packagings 100, each secondary packaging 100 comprising a plurality of primary packagings of different types bundled and wrapped together, as better explained below.

[0032] According to this preferred and non-limiting embodiment, containers 2 are defined by cans, in particular metallic cans, more in particular aluminum cans.

[0033] Alternatively, containers 2 may be defined by plastic or glass bottles, jars, flacons, or the like.

[0034] As schematically shown in Figure 1, apparatus 1 comprises:

- a conveyor 3 for advancing containers 2 through the apparatus 1 along a packaging path P;
- a filling machine 4 for feeding a predetermined quantity of pourable product (or "base product") into containers 2, for example tea or water;
- a dosing machine 5 for dosing a plurality of aromatic products, in the example shown four different aromatic products, into containers 2, preferably into the containers 2 previously filled with the pourable product; and
- a capping machine 6, conveniently arranged operatively downstream of filling machine 4 and of dosing machine 5, and which is configured for applying one cap or closure 7 to each container 2 previously filled with the pourable product and with the respective aromatic product.

[0035] Hence, each primary packaging is defined by a container 2 filled, by the filling machine 4, with pourable product, dosed, by the dosing machine 5, with a respective aromatic product, and sealed, by the capping machine 6, with a closure 7.

[0036] Preferably, the dosing machine 5 is arranged operatively downstream of the filling machine 4, so that the aromatic product is dosed into containers 2 which are already filled with pourable product.

[0037] In this way, safety of the apparatus 1 and of the whole packaging process is increased, since the aromatic products are usually flammable.

[0038] According to the preferred and non-limiting embodiment shown, the conveyor 3 is configured for advancing, along the packaging path P, a sequence of at least two types of containers 2, in the example shown, a

sequence of four types of containers 2a, 2b, 2c, 2d, each type of container 2 differing from the other at least by a type of decoration on the outer surface thereof.

[0039] In detail, a first type container 2a has a decoration A; a second type container 2b has a decoration B; a third type container 2c has a decoration C; and a fourth type container 2d has a decoration D.

[0040] In the example shown, the four different type of decorations A, B, C, D consist in different patterns and/or motives and/or colors printed on the cans 2 for defining the different type of cans 2a, 2b, 2c, 2d.

[0041] Alternatively, the different decorations A, B, C, D could consist in different labels applied to the containers 2.

[0042] For example, the primary packagings are defined by cans 2 filled with tea aromatized with different aromatic products. In this case, the different decoration could be defined by a different color and/or fruit depicted on the outer surface thereof, such as yellow and/or a lemon for lemon tea, rose and/or a peach for peach tea, and so on.

[0043] Hence, in this case, each secondary packaging 100 is preferably defined by a bundle of four cans 2a, 2b, 2c, 2d of different type, i.e. filled with different type of flavoured tea and having a different type decoration A, B, C, D, respectively.

[0044] According to an aspect of the present invention, the dosing machine 5 comprises a plurality of dosing circuits 8 (only the terminal part of each being schematically shown in Figure 1), each dosing circuit 8 being dedicated for supplying one respective aromatic product into respective containers 2 other than the containers 2 to be supplied with other aromatic products by the other dosing circuits 8 of said plurality, the dosing circuits 8 being fluidly separated from one another.

[0045] According to this preferred embodiment, the dosing machine 5 comprises at least two dosing circuits 8, in particular four dosing circuits fluidly separated from one another,

> a first dosing circuit 8 being dedicated for supplying, in particular exclusively supplying, a first aromatic product into first containers 2, preferably first type containers 2a,
> a second dosing circuit 8 being dedicated for supplying, in particular exclusively supplying, a second aromatic product into second containers 2, preferably second type containers 2b,
> a third dosing circuit 8 being dedicated for supplying, in particular exclusively supplying, a third aromatic product into third containers 2, preferably third type containers 2c,
> and a fourth dosing circuit 8 being dedicated for supplying, in particular exclusively supplying, a fourth aromatic product into fourth containers 2, preferably fourth type containers 2d.

[0046] The first, second, third and fourth aromatic products are different from one another, for example each is a given aroma or scent or flavour to be added to the pourable product (or base product) to obtain the aromatized pourable product.

[0047] In other words, the dosing machine 5 comprises a plurality (four) of dosing circuits 8 fluidly separated from one another, each dedicated for exclusively supplying a respective aromatic product.

[0048] To this end, dosing machine 5 comprises at least two dosing valves, in particular four dosing valves 10a, 10b, 10c, 10d, fluidly separated from one another, each dosing valve 10a, 10b, 10c, 10d being fluidly connected to one respective dosing circuit 8 for receiving the relative aromatic product therefrom, each dosing valve being configured for feeding a dose of the relative aromatic product to at least one respective container 2a, 2b, 2c, 2d at a time.

[0049] More precisely, a first dosing valve 10a is dedicated to exclusively dose the first aromatic product into first type containers 2a, a second dosing valve 10b is dedicated to exclusively dose the second aromatic product into second type containers 2b, a third dosing valve 10c is dedicated to exclusively dose the third aromatic product into third type containers 2c, and a fourth dosing valve 10d is dedicated to exclusively dose the fourth aromatic product into fourth type containers 2d.

[0050] It is stated that, in the present description, in the appended claims and in the appended drawings, reference numbers 10 or one of 10a, 10b, 10c, 10d can respectively indicate each dosing valves equally.

[0051] In light of the above, each dosing valve 10a, 10b, 10c, 10d corresponds to a type of container 2a, 2b, 2c, 2d and, therefore, to a type of decoration A, B, C, D.

[0052] Preferably, the dosing valves 10a, 10b, 10c, 10d are arranged along packaging path P in respective fixed operatively successive positions, as schematically shown in Figure 1.

[0053] According to a further aspect of the present invention, apparatus 1 comprises a detector device 11 arranged at an inspection station I operatively upstream of the dosing machine 5 for detecting the type of decoration A, B, C, D of the containers 2 passing through the inspection station I.

[0054] Preferably, the detector device 11 comprises a vision system, such as a camera, or an infrared sensor, or a sensor capable of recognizing colors, patterns, or motives, or the like.

[0055] Moreover, apparatus 1 comprises a control unit 12 logically connected to the detector device 11 and to the dosing valves 10.

[0056] According to the invention, the control unit 12 is configured to, sequentially and for each container:

- receive from the detector device 11 a signal S1 correlated to the detected decoration A, B, C, D;
- select one respective dosing valve 10a, 10b, 10c, 10d based on the detected decoration;
- calculate or obtain the time necessary for advancing

the container 2a, 2b, 2c, 2d having the detected decoration from the inspection station I to the selected dosing valve 10a, 10b, 10c, 10d; and

- control the activation of the selected dosing valve 10a, 10b, 10c, 10d, in particular by sending a signal S2 thereto, for feeding a dose of the respective aromatic product into said container 2a, 2b, 2c, 2d, based on said calculation.

[0057] Thanks to the above configuration, secondary packagings 100 defined by multiproduct packs, i.e. packs comprising a bundle of at least two types of containers 2, preferably a bundle of all four types of containers 2a, 2b, 2c, 2d, can be produced more easily and rapidly by apparatus 1. In fact, there is no need for producing the several types of primary packagings, i.e. of containers 2a, 2b, 2c, 2d filled with pourable and aromatic product separately. Moreover, there is no need for temporarily storing the primary packagings, or for repeatedly cleaning the dosing machine 5, because each aromatic product has its own dedicated dosing circuit 8 and dosing valve 10a, 10b, 10c, 10d.

[0058] In light of the above, the apparatus 1 is configured for automatically:

- detecting an advancing order of the first, second, third and fourth type of containers 2a, 2b, 2c, 2d along the packaging path P;
- controlling the dosing machine 5 to selectively activate the respective dosing circuit, e.g. the first or second or third or fourth dosing circuit 8, for feeding the respective aromatic product, e.g. the first or second or third or fourth aromatic product, into the respective type of container 2, e.g. into the first or second or third or fourth type containers 2a, 2b, 2c, 2d, respectively, based on the detected advancing order.

[0059] Preferably, conveyor 3 is configured to advance the containers 2, i.e. the succession of containers 2a, 2b, 2c, 2d, at a predetermined advancing speed.

[0060] Advantageously, control unit 12 is configured to:

- memorize, in particular on a memory support, such as a hard drive and before the start of the packaging process, the position of each dosing valve 10a, 10b, 10c, 10d along the packaging path P, relative to the inspection station I; and
- obtain or measure the advancing speed of the conveyor 3.

[0061] Then, control unit 12 is advantageously configured to calculate or obtain the above-mentioned necessary time based on the (memorized) position of the selected dosing valve 10 and on the obtained or measured advancing speed of the conveyor 3.

[0062] In practice, the control unit 12 is given as input data the position of the dosing valves 10 and the speed of the conveyor 3. From these data, control unit 12 is able to calculate the time each container 2 detected at inspection station I will necessitate to reach the selected dosing valve 10. Only when that time has elapsed, for each container, control unit 12 will send the signal S2 to activate the selected dosing valve 10a, 10b, 10c, 10d.

[0063] In other words, control unit 12 is configured for detecting an inspection time, i.e. the time at which the container 2 transits at the inspection station I for having the respective decoration detected, and for memorizing such inspection time;
then, control unit 12 is configured for determining a dosing time at which the respective dosing valve 10 has to be activated for dosing the relative aromatic product into such container 2.

[0064] The above-mentioned time is the difference of the dosing time less the inspection time.

[0065] Preferably, the detector device 11 is arranged at conveyor 3, in particular in the vicinity of conveyor 3, in a position upstream of filling machine 4.

[0066] In this way, since the type of container 2a, 2b, 2c, 2d is known operatively prior to the filling, a filling with different types of base products can be performed, thereby increasing the possible combinations of secondary packagings 100 to be produced.

[0067] Advantageously, and thanks to the presence of detector device 11, the conveyor 3 is configured to advance a random sequence of the at least two, in particular four, types of containers 2a, 2b, 2c, 2d.

[0068] In this way, the management of apparatus 1 is more simple, in that the loading of containers 2 in the apparatus 1 requires less logistic effort, since there is no need for providing a predetermined sorting or ordering of the types of containers 2 at the input of the apparatus 1 itself.

[0069] Conveniently, conveyor 3 comprises at least one belt 3a, preferably a series of belts 3a, apt to advance the containers 2 at a constant advancing speed.

[0070] In this way, a more simple calculation of the above-mentioned time can be performed, since the speed is known and is always the same for each container 2.

[0071] According to the above, control unit 12 contains as input data which aromatic product is dosed by each dosing valve 10, which aromatic product is associated to each decoration A, B, C, D, i.e. to each type of container 2a, 2b, 2c, 2d, the positioning of each dosing valve 10 with respect to the inspection station I, and the kinematics of the conveyor 3.

[0072] In order to produce the secondary packagings 100, apparatus 1 comprises a wrapper machine 13 arranged downstream of the capping machine 6, and which is configured for:

- receiving in input at least one said first container and one said second container, preferably at least one first type container 2a and one second type container

2b, more preferably at least one of all four type of containers 2a, 2b, 2c, 2d, filled with the pourable product and with the respective aromatic product;

- bundling together the received containers 2 to obtain a bundle 14 of containers 2; and
- wrapping said bundle 14 with a wrapping film 15, thereby obtaining a secondary packaging 100 defined by a multiproduct pack.

[0073] Conveniently, apparatus 1 further comprises a sorting device 16 arranged operatively upstream of wrapper machine 13 and configured to sort the containers 2a, 2b, 2c, 2d for grouping them together by type.

[0074] In detail, the sorting device 16 is configured to be controlled by control unit 12 based on the detection performed by detector device 11, so as to determine, in sequence, in which group, i.e. in which of the four groups, the next container 2 in line has to be sorted.

[0075] Wrapper machine 13 includes a pick device, such as a robotic arm 17, for picking one container 2a, 2b, 2c, 2d from each group and to release it at a wrapping station W, to create the bundle 14 to be wrapped.

[0076] In light of the above, apparatus 1 is configured for producing multiproduct packs, each defined by a secondary packaging 100.

[0077] The operation of apparatus 1 is described hereinafter with reference to Figures 2a to 2c and to a single container, for example a third type container 2c with a decoration type C, to be dosed with the third aromatic product by the third dosing valve 10c, through the third dosing circuit 8.

[0078] The operation is described starting from a condition in which such container 2c, advanced by conveyor 3, arrives at the inspection station I (Figure 2a) .

[0079] In such a condition, detector device 11 detects the type of decoration C on the outer surface of container 2c and sends a signal S1 to the control unit 12.

[0080] Substantially at the same time, control unit 12 selects the third dosing valve 10c, based on the detection of decoration C, and calculates the time necessary for the container 2c to reach the selected third dosing valve 10c (Figure 2b).

[0081] Meanwhile, the conveyor 3 advances container 2c into filling machine 4 for the filling thereof with the pourable (base) product (Figure 2b).

[0082] Then, conveyor 3 further advances container 2c along packaging path P. When container 2c arrives at third dosing valve 10c (Figure 2c), i.e. when the calculated time has elapsed, control unit sends a signal S2 to the third valve 10c for activating it thereby causing a dose of third aromatic product to be fed into container 2c.

[0083] At this point, conveyor 3 advances container 2c at the capping machine 6, through the sorting device 16 and the wrapper machine 13, where it is bundled with other containers 2a, 2b and 2d and wrapped with film 15 to produce a secondary packaging 100.

[0084] The above operation is repeated synchronously and continuously for each type of container 2a, 2b, 2d and for each container 2 of the sequence.

[0085] In light of the above, apparatus 1 allows to implement a method for packaging an aromatized pourable product into containers 2, the method comprising the steps of:

- advancing a sequence of at least two types of containers 2, in particular four types of containers 2a, 2b, 2c, 2d, along the packaging path P, each type of container differing from the other by the type of decoration A, B, C, D on the outer surface thereof;
- feeding a predetermined quantity of pourable product into the containers 2;
- supplying at least two, preferably four, aromatic products through at least two, preferably four, dosing circuits 8 fluidly separated from one another;
- feeding the aromatic products into containers 2a, 2b, 2c, 2d of respective type by respective dosing valves 10a, 10b, 10c, 10d fluidly separated from one another and each fluidly connected to one relative dosing circuit 8;
- detecting the type of decoration A, B, C, D of each container 2a, 2b, 2c, 2d at an inspection station;
- selecting a respective dosing valve 10a, 10b, 10c, 10d based on the step of detecting;
- calculating or obtaining the time necessary for advancing the container 2a, 2b, 2c, 2d having the detected decoration A, B, C, D from the inspection station I to the selected dosing valve 10a, 10b, 10c, 10d; and
- controlling the activation of the selected dosing valve 10a, 10b, 10c, 10d, based on the step of calculating or obtaining.

[0086] Preferably, the method further comprises the steps of:

- obtaining or measuring the advancing speed of the containers 2 along the packaging path P;
- memorizing the position of each dosing valve 10a, 10b, 10c, 10d along the packaging path P, relative to the inspection station I;

wherein the step of calculating is carried out based on the memorized position of the dosing valve 10a, 10b, 10c, 10d selected at the step of selecting and based on the obtained or measured advancing speed.

[0087] Apparatus 1 also allows for implementing a method for producing secondary packagings 100 starting from primary packagings, by carrying out the above method for packaging and further steps related to bundling and wrapping the containers 2.

[0088] The advantages of apparatus 1, and of the method, according to the present invention will be clear from the foregoing description.

[0089] In particular, secondary packagings 100 defined by multiproduct packs, i.e. packs comprising a bundle of at least two types of containers 2, preferably a

bundle of all four types of containers 2a, 2b, 2c, 2d, can be produced more easily and rapidly by apparatus 1. In fact, there is no need for producing the several types of primary packagings, i.e. of containers 2a, 2b, 2c, 2d filled with pourable and aromatic product separately.

[0090] In particular, thanks to the fact that the dosing machine 5 has dedicated dosing circuits 8 (and dosing valves 10) for each aromatic product, it is possible to produce secondary packagings 100 in one production session, without the need for separately producing, in respective production sessions, each type of primary packaging, i.e. of container 2a, 2b, 2c, 2d. Hence, apparatus 1 allows for eliminating the need for unloading and storing the produced type of primary packaging and then reloading it for producing secondary packagings 100 once all the types of primary packagings are produced.

[0091] Moreover, the need for cleaning the dosing machine 5 after each production session is eliminated, since each dosing circuit 8 is dedicated exclusively to a single aromatic product.

[0092] Hence, there is no need for temporarily storing the primary packagings or for repeatedly cleaning the dosing machine 5.

[0093] Furthermore, thanks to the presence of the detector device 11 and of control unit 12 according to the above, apparatus 1 is able to package the aromatized pourable product and produce secondary packagings 100 in an easy and simple manner, reducing the needed time and, therefore, the total costs.

[0094] In fact, apparatus 1 can receive a random sequence of the types of containers 2a, 2b, 2c, 2d. In this way, the management of apparatus 1 is more simple, in that the loading of containers 2 in the apparatus 1 requires less logistic effort, since there is no need for providing a predetermined sorting or ordering of the types of containers 2 at the input of the apparatus 1 itself.

[0095] Clearly, changes may be made to apparatus 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0096] In particular, according to an alternative embodiment not shown, a decoration is applied to containers 2 only after the dosing process.

[0097] Hence, in this case, conveyor 3 feeds to filling machine 1 containers 2 initially identical to one another, i.e. of the same type. Only after the containers 2 are dosed with the different (four) aromatic products, they are provided with a decoration, e.g. by a labeler or a printer downstream of the dosing machine 5.

[0098] In this case, there is no need for a detector device 11, since the sequence and ordering of the types of containers 2 to be decorated is given from the operative sequence and positioning of the dosing valves 10a, 10b, 10c, 10d.

[0099] According to a further alternative embodiment not shown, conveyor 3 feeds to filling machine 1 containers 2 which are already provided with a decoration A, B, C or D, and with a predetermined ordering and sequence, preferably corresponding to the operative positioning of the dosing valves 10a, 10b, 10c, 10d. Also in this case, there is no need for a detector device 11.

[0100] Therefore, in such cases, the wording "first container", "second container" and so on, indicates several distinct containers 2 of the same type, and not different types of containers 2, as in the previous case.

[0101] Also in these embodiments, apparatus 1 is able to produce secondary packagings 100 without the need for producing primary packagings separately, without the need for unloading and storing such primary packagings between one lot and the subsequent one, and without the need for cleaning the dosing between one lot and the subsequent one.

Claims

1. Apparatus (1) for packaging an aromatized pourable product into containers (2), the apparatus comprising:

   - a filling machine (4) for feeding a predetermined quantity of pourable product into the containers (2);
   - a dosing machine (5) for dosing a plurality of aromatic products into the containers (2);
   wherein the dosing machine (5) comprises a plurality of dosing circuits (8), each dosing circuit (8) being dedicated for supplying one respective aromatic product into respective containers (2) other than the containers (2) to be supplied with other aromatic products by the other dosing circuits (8) of said plurality,
   the dosing circuits (8) being fluidly separated from one another.

2. Apparatus as claimed in claim 1, wherein the dosing machine (5) comprises at least two dosing circuits (8), a first dosing circuit (8) being dedicated for supplying a first aromatic product into first containers (2), a second dosing circuit (8) being dedicated for supplying a second aromatic product into second containers (2) other than the first containers,
   wherein the apparatus is configured for automatically:

   - detecting an advancing order of the first and second containers (2) along a packaging path (P) through the apparatus (1);
   - controlling the dosing machine (5) to selectively activate the first or the second dosing circuit (8) for feeding the first or second aromatic product into the first or second containers (2), respectively, based on the detected advancing order.

3. Apparatus as claimed in claim 1 or 2, wherein the dosing machine (5) is arranged operatively down-

stream of the filling machine (4), so that each aromatic product is dosed into the respective containers (2) previously filled with pourable product.

4. Apparatus as claimed in any one of the foregoing claims, wherein the dosing machine (5) comprises at least two dosing valves (10; 10a, 10b, 10c, 10d) fluidly separated from one another, each dosing valve being fluidly connected to one respective dosing circuit (8) for receiving the relative aromatic product therefrom, each dosing valve (10; 10a, 10b, 10c, 10d) being configured for feeding a dose of the relative aromatic product to one respective container (2) at a time.

5. Apparatus as claimed claim 4, and comprising:

- a conveyor (3) for advancing, through the apparatus (1) along a packaging path (P), a random sequence of at least two types of containers (2a, 2b, 2c, 2d), each type of container differing from the other at least by a type of decoration (A, B, C, D) on the outer surface thereof;
- a detector device (11) arranged at an inspection station (I) operatively upstream of the dosing machine (5) for detecting the type of decoration (A, B, C, D) of the containers (2a, 2b, 2c, 2d) passing through the inspection station (I); and
- a control unit (12) logically connected to the detector device (11) and to the dosing valves (10a, 10b, 10c, 10d);

wherein the control unit (12) is configured to, for each container, sequentially:

- receive from the detector device (11) a signal (S1) correlated to the detected decoration (A, B, C, D);
- select one respective dosing valve (10a, 10b, 10c, 10d) based on the detected decoration;
- calculate or obtain the time necessary for advancing the container (2a, 2b, 2c, 2d) having the detected decoration (A, B, C, D) from the inspection station (I) to the selected dosing valve (10a, 10b, 10c, 10d); and
- control the activation of the selected dosing valve (10a, 10b, 10c, 10d) for feeding a dose of the respective aromatic product into said container (2a, 2b, 2c, 2d), based on the calculated or obtained time.

6. Apparatus as claimed in claim 5, wherein the conveyor (3) is configured to advance the containers (2a, 2b, 2c, 2d) at a predetermined advancing speed;

wherein the control unit (12) is configured to memorize the position of each dosing valve (10a, 10b, 10c, 10d) along the packaging path (P), relative to the inspection station (I), and to obtain or measure the advancing speed of the conveyor (3);
and wherein the control unit (12) is configured to calculate or obtain said time based on the position of the selected dosing valve (10a, 10b, 10c, 10d) and on the obtained or measured advancing speed of the conveyor (3) .

7. Apparatus as claimed in claim 5 or 6, wherein the detector device (11) is arranged at said conveyor (3), in a position upstream of the filling machine (4).

8. Apparatus as claimed in any of the claims 5 to 7, wherein the conveyor (3) comprises at least one belt (3a) apt to advance the containers (2a, 2b, 2c, 2d) at a constant advancing speed.

9. Apparatus as claimed in any one of the foregoing claims, and comprising a capping machine (6) arranged operatively downstream of the filling machine (4) and of the dosing machine (5) for applying one closure (7) to each container (2) previously filled with the pourable product and with the respective aromatic product.

10. Apparatus as claimed in claim 9, and comprising a wrapper machine (13) arranged downstream of the capping machine (6), and which is configured for:

- receiving in input at least one first container (2) filled with the pourable product and with a first aromatic product, and at least one second container (2) filled with the pourable product and with a second aromatic product;
- bundling together the at least one first container (2) and one second container (2) to obtain a bundle (14) of containers; and
- wrapping said bundle (14) with a wrapping film (15), thereby obtaining a multiproduct pack (100).

11. Apparatus as claimed in claims 5 and 10, and comprising a sorting device (16) configured to sort the containers (2a, 2b, 2c, 2d) for grouping them by type; wherein the control unit (12) is configured to control the sorting device (16) so that said sorting is performed based on the detected decoration (A, B, C, D).

12. Method for packaging an aromatized pourable product into containers (2), the method comprising the steps of:

- advancing a random sequence of at least two types of containers (2a, 2b, 2c, 2d) along a packaging path (P), each type of container differing from the other by a type of decoration (A, B, C,

D) on the outer surface thereof;
- feeding a predetermined quantity of pourable product into the containers (2a, 2b, 2c, 2d);
- supplying a first aromatic product through a first dosing circuit (8);
- feeding the first aromatic product into first type containers (2a, 2b, 2c, 2d) by a first dosing valve (10a, 10b, 10c, 10d) fluidly connected to the first dosing circuit (8);
- supplying a second aromatic product through a second dosing circuit (8) fluidly separated from the first dosing circuit (8);
- feeding the second aromatic product into second type containers (2a, 2b, 2c, 2d) by a second dosing valve (10a, 10b, 10c, 10d) fluidly separated from the first dosing valve and fluidly connected to the second dosing circuit (8);
- detecting the type of decoration (A, B, C, D) of each container (2a, 2b, 2c, 2d) at an inspection station (I) ;
- selecting a respective said dosing valve (10a, 10b, 10c, 10d) based on the step of detecting;
- calculating or obtaining the time necessary for advancing the container (2a, 2b, 2c, 2d) having the detected decoration (A, B, C, D) from the inspection station (I) to the selected dosing valve (10a, 10b, 10c, 10d); and
- controlling the activation of the selected dosing valve (10a, 10b, 10c, 10d), based on the step of calculating or obtaining.

13. Method as claimed in claim 12, wherein the method comprises the steps of:

- measuring an advancing speed of the containers (2a, 2b, 2c, 2d) along the packaging path (P);
- memorizing the position of each dosing valve (10a, 10b, 10c, 10d) along the packaging path (P), relative to the inspection station (I);

and wherein the step of calculating is carried out based on the memorized position of the dosing valve (10a, 10b, 10c, 10d) selected at the step of selecting and based on the advancing speed measured or obtained at the step of measuring.

FIG. 1

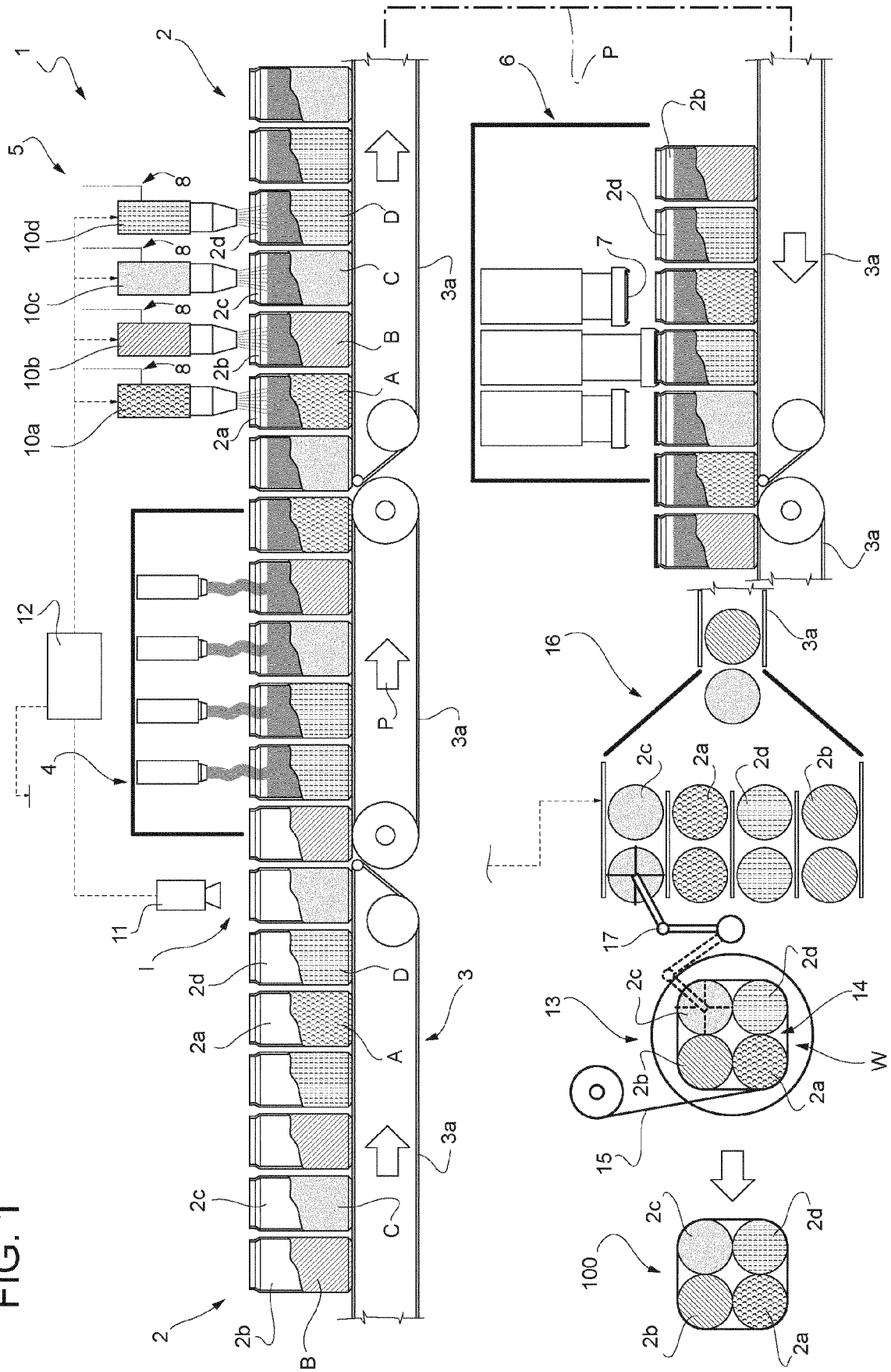

1
2
5
6
P
8
10a
10b
10c
10d
2a
2b
2c
2d
A
B
C
D
3
3a
4
7
11
12
13
14
15
16
17
I
W
100

FIG. 2a

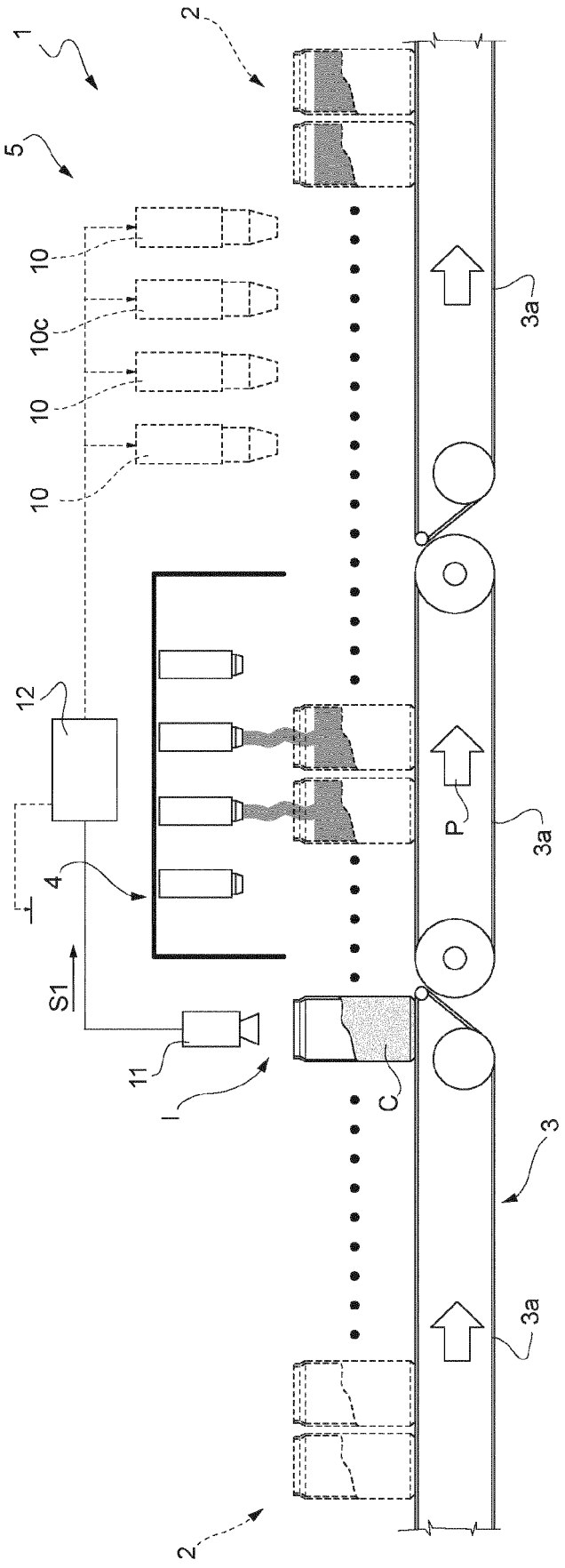
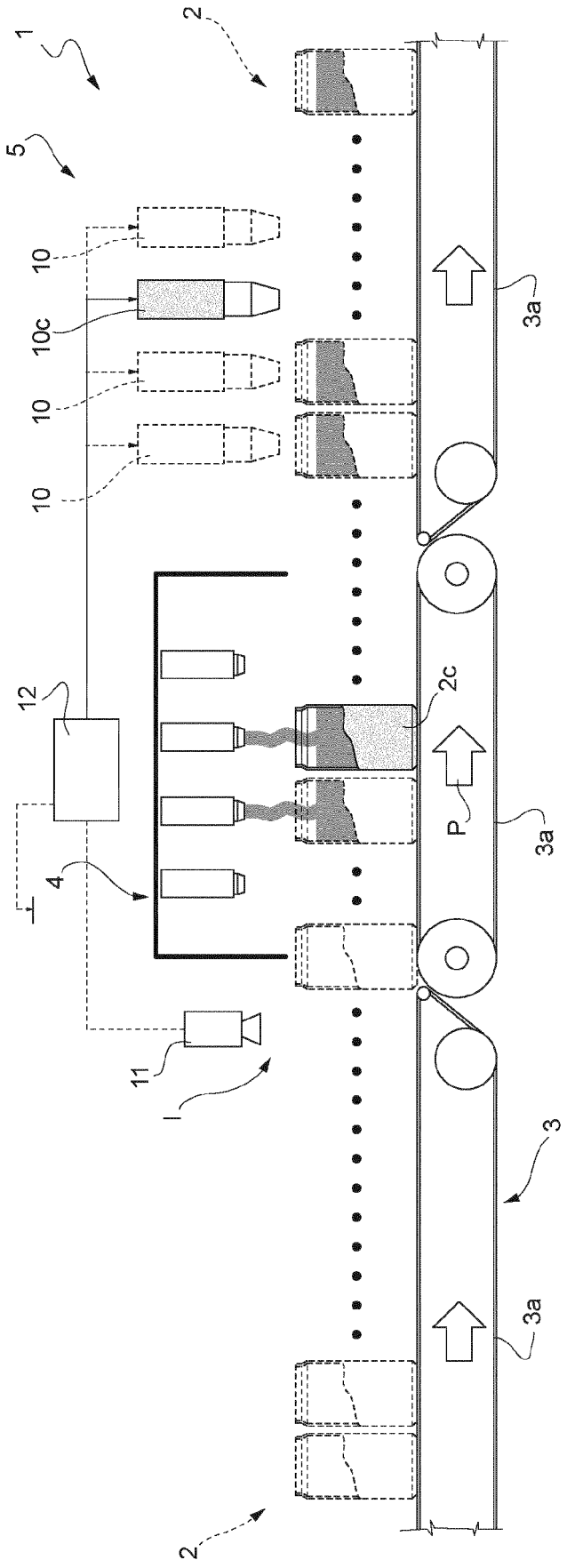


FIG. 2b



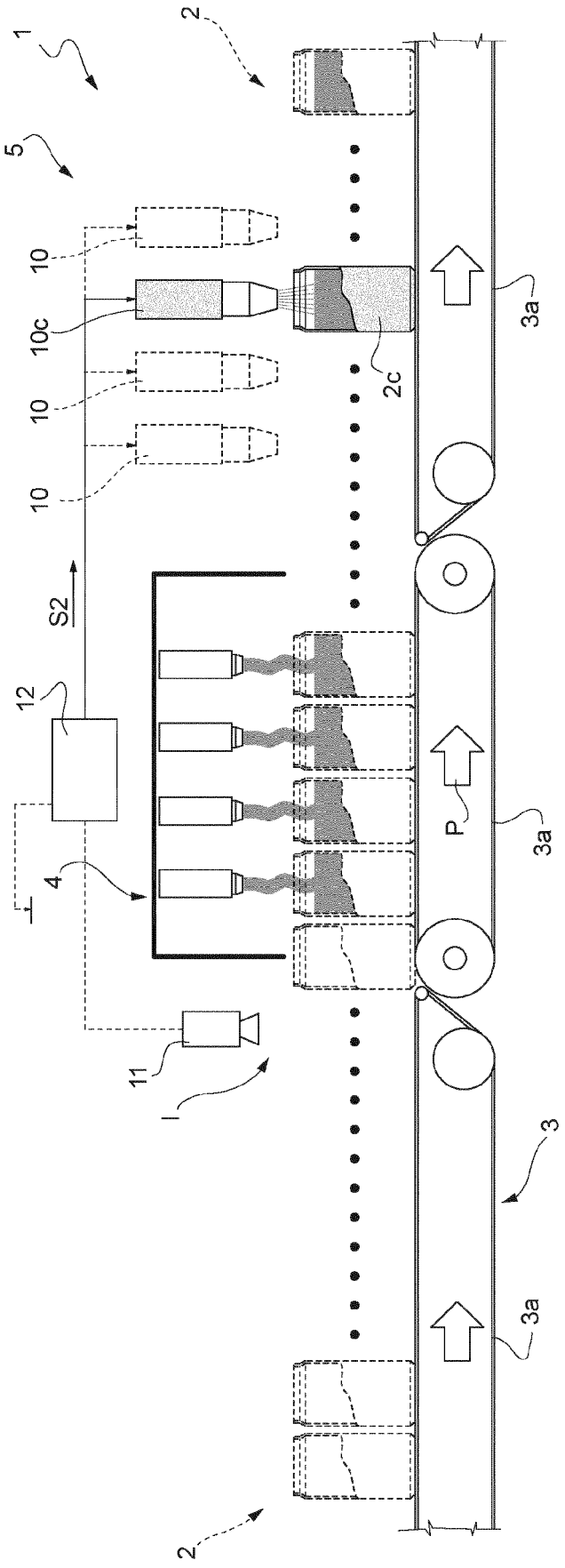


FIG. 2c

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EUROPEAN SEARCH REPORT

Application Number
EP 21 21 0361

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B65B
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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	6 May 2022	Ungureanu, Mirela

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