APPROXIMATE AND METHOD OF LABELLING FILLED CONTAINERS

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ABSTRACT

An apparatus for the treatment of containers may include a filling device, which fills the containers with a flowable medium, and a labelling device, which is arranged downstream with respect to this filling device in a conveying direction of the containers and which provides an outer wall of the filled containers with labels. The apparatus further includes a conveying device, which conveys the containers from the filling device to the labelling device; provided between the filling device and the labelling device, and a drying device, which dries the containers and acts upon them with a gaseous medium, is arranged along the conveying path of the containers between the filling device and the labelling device.
APPARATUS AND METHOD OF LABELLING FILLED CONTAINERS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority of German Patent Application No. 10 2009 052 289.1, filed Nov. 9, 2009, pursuant to 35 U.S.C. 119(a)-(d), the disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to an apparatus and a method of labelling filled containers.

BACKGROUND

[0003] Various methods of labelling containers are known from the prior art. In this way it is known first to produce plastics-material containers from plastics-material pre-forms, then to label them and fill them in an already labelled state, and finally to close them. This procedure has the drawback that the containers are frequently difficult to label, particularly if the plastics material has very thin walls, since they can give way under the pressure of the labelling devices.

[0004] In addition, it is known from the prior art first to fill the containers and to close them, and then to label the filled and closed containers. This procedure is referred to as post-labelling. Particularly in those cases in which filling takes place at a low temperature and in which there is a high degree of air humidity or a high ambient temperature at the same time, condensation can occur on the wall of the bottle before the labelling. As a result, labelling of the containers is adversely affected.

[0005] It may be desirable to provide an apparatus and method of labelling already-filled containers that prevents restrictions by condensation, for example, on the outer wall of the containers.

[0006] It may be desirable to provide a device and a method which can fill a continuously mixed product comprising at least two different media loss-free into containers.

SUMMARY

[0007] According to various aspects of the disclosure, an apparatus for the treatment of containers may comprise a filling device, which fills the containers with a flowable medium, and a labelling device, which is arranged downstream with respect to the filling device in a conveying direction of the containers and which provides an outer wall of the containers with labels. In addition, a conveying device, which conveys the containers from the filling device to the labelling device, is provided between the filling device and the labelling device.

[0008] According to the disclosure, a drying device, which dries the containers, for example, an outer wall of the containers, and acts upon them with a gaseous medium, is arranged along the conveying path of the containers between the filling device and the labelling device.

[0009] This drying device is provided in order to dry an outer wall of the containers again. The flowable medium is, in particular, foostuffs and, in particular, beverages. It would also, however, be possible for viscous media to be used.

[0010] In some aspects, the conveying device may be designed in such a way that it conveys the containers separately. In this way, it is known from the prior art for example for the filling device and the labelling device to have arranged between them conveyor belts and the like which convey the containers in a continuous flow and which in this way can also compensate short-term failures of the filling device or the labelling device, in particular as the distances between the containers vary.

[0011] In some aspects, the gaseous medium may prevent condensation on the wall of the bottles.

[0012] In some exemplary aspects of the apparatus, the labelling device and the filling device are arranged in a block, that is, the labelling device and the filling device may be synchronized with each other in a permanent manner. In addition, in various aspects, buffering devices or the like are not arranged between the filling device and the labelling device.

[0013] The drying of the individual containers is simplified by the separate conveying of the containers, since the latter can be dried more easily from all sides. In some aspects, the containers may be conveyed in such a way that specified intervals occur between them, so that the drying device can also arrive between the individual containers in a simple manner and can carry out the drying there.

[0014] In some embodiments, the drying device is arranged immediately in front of the labelling device along the conveying path of the containers. In this case, for example, further conveying devices are no longer arranged between the drying device and the labelling device in the conveying direction of the containers. The drying device could thus be provided in an end region of a conveying device which conveys the containers from the filling device to the labelling device. In this way, re-condensation of the containers is prevented. In addition, it would also be possible for the conveying path of the containers to be housed downstream of the drying device and, in particular, for dried air to be blown in at the same time.

[0015] In some exemplary embodiments, the apparatus has a shaping device which shapes plastics-material pre-forms to form plastics-material containers, and this shaping device may be arranged upstream with respect to the filling device in the conveying direction of the containers. The present disclosure may thus be used, for example, on apparatuses for the treatment of plastics-material containers. It is thus also pointed out that an application to glass containers is also possible. The special suitability for plastics-material containers, however, is due to the fact that, in particular, post-labelling is recommended in this case.

[0016] It may be desirable, in the filling block according to the disclosure with post-labelling, i.e. an arrangement of a blow-moulding machine, a filling device and a labelling device, for condensation before the labelling to be prevented by dried air being blown into the block in front of the labelling device.

[0017] In some exemplary embodiments, the apparatus has a supply device which supplies a gaseous medium occurring in the shaping device to the drying device. In this way it is proposed here that the usually very dry exhaust air of the blow-moulding machine should be used in order to dry the containers. The shaping device is thus understood as being on the one hand the blow-moulding machine itself which shapes the plastics-material pre-forms to form plastics-material containers, and also, however, further units to be associated with it, such as for example a heating device or a furnace which heats the plastics-material pre-forms. In this heating device too, hot dry exhaust air is formed in considerable quantities,
which can be used for drying the plastics-material containers. The supply device can be for example a line in which the gaseous medium can flow.

[0018] In some aspects, the apparatus may also have a fan in order to convey the exhaust air of the shaping device to the containers.

[0019] In this case the supply device can be arranged in such a way that it supplies the hot air to the containers from above, so that in this way the drying procedure can be simplified, since in this way the liquid can be blown away downwards.

[0020] In some aspects, the apparatus may also have a removal device in order to quickly remove any liquid which may possibly drip down.

[0021] In some exemplary embodiments, the apparatus has a closure device arranged between the filling device and the labelling device for closing the containers with closures, and the drying device is arranged downstream of this closure device along the conveying path for containers. In this case, too, however, the containers already closed are dried by the aforesaid drying device.

[0022] It some aspects, the apparatus may have a temperature-measuring unit in order to determine the temperature of the air used for drying. It would also be possible, however, for heating devices to be provided which heat the air arriving at the containers, and in a converse manner it would also be possible for cooling devices (active or passive) to be provided which cool the air arriving at the containers.

[0023] In this case, air/water heat exchangers could also be used for example.

[0024] In some exemplary embodiments, a conveying device for conveying the containers from the filling device to the labelling device is provided between the filling device and the labelling device, in which case, as mentioned above, this conveying device conveys the containers separately. In this case this conveying device conveys the containers, for example, in a straight line. It would also be possible, however, for this area to have star conveyors provided in it, which guide the containers along a circular-segmental path. It may be desirable for the drying device to be arranged in the region of this conveying device.

[0025] As mentioned, the block arrangement between the units can be maintained by the separate guidance, so that in this case the containers always have a pre-determined distribution, in which case, however, the degree of this distribution can be varied in a deliberate manner by specified types of conveying devices. It may be desirable for the conveying device to be a so-called screw conveyor.

[0026] In some exemplary embodiments, the filling device forms a block with the labelling device, i.e., as mentioned above, it is synchronized therewith in a permanent manner.

[0027] In some aspects, the filling device is synchronized with the labelling device in an operating stroke of the plant. In this case, however, it is also possible for the synchronization to be discontinued in a deliberate manner in particular in the event of a fault.

[0028] In some exemplary embodiments, the filling device, the labelling device, and the shaping device form a block with one another, i.e. they are synchronized with one another.

[0029] In various embodiments, the apparatus has a drying element which dries the containers by mechanical contact. In this case it may be a sponge or the like for example. In this way it would be possible for moisture already present on the container to be wiped, brushed, or blown off from the container into the transfer region between the filling device and the labelling device and, in some aspects, between the closure device and the labelling device. When a screw is used as a conveying device or in the inlet of the labelling device, it can be additionally provided that the screw is provided with a sponge or the like in order to wipe the container and in particular the label area of the container and thus to keep it dry.

[0030] In this case this drying element can be provided instead of or in addition to the air drying. The present disclosure further relates to a method of treating containers. In this case, in a first method step, the containers are filled with a flowable medium by means of a filling device. In a further method step, the containers are conveyed from the filling device to a labelling device, in which case the containers are conveyed separately. In a further method step, labels are attached to the filled containers.

[0031] According to the disclosure, at least one area of the outer wall of the containers and, in particular, an area of the containers to be labelled is dried by means of a drying device after the filling, the containers in this case being acted upon, for example, with a gaseous medium.

[0032] It is also proposed according to the method that drying of the filled and, in some aspects, also closed containers should take place before the labelling.

[0033] In this case it may be desirable for the containers to be blown in particular, but it would also be possible for them to be dried at least in part with mechanical drying means such as sponges or the like.

[0034] It may be desirable for the containers to be shaped from plastics-material pre-forms by a shaping device before they are filled.

[0035] In some exemplary embodiments, the containers are dried by means of a gaseous medium occurring in the shaping device. In some aspects, this gaseous medium is hot air occurring in the context of the lasting procedure or a heating procedure for the plastics-material pre-forms (expressed more precisely, hot air which is heated in the shaping device or by the working operation of the shaping device). In the prior art this hot air is merely removed.

[0036] It would also be possible, however, for the hot air formed, which is already very dry, to be additionally dried by further drying appliances.

[0037] As a result of using the hot air which occurs in the blow-moulding machine and which—as mentioned above—occurs as exhaust air, considerable savings in energy can be achieved, since this air is also supplied to a further purpose, namely the drying of containers.

[0038] Some further advantages and embodiments may become evident from the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] In the drawings:

[0040] FIG. 1 is a diagrammatic illustration of an apparatus according to the disclosure; and

[0041] FIG. 2 is an illustration of a conveying device for an apparatus according to the disclosure.

DETAILED DESCRIPTION

[0042] FIG. 1 is a diagrammatic illustration of an apparatus according to the disclosure. In the case of this apparatus, the containers are conveyed along the arrow P1, i.e. from right to left in FIG. 1.
[0043] The reference number 2 designates a shaping device which forms plastics-material containers from plastics-material pre-forms. The reference number 24 designates a heating device which is used for heating the plastics-material pre-forms, this heating device also being a component part of the shaping device 2. The containers are transferred from this heating device 24 to the actual shaping device 2 by way of a conveying device 26. In this case this shaping device 2 has a carrier 22 on which a plurality of receiving elements or blow moulds for the containers are arranged. In some instances, individual blow-moulding stations also have stretch rods, i.e. the shaping device is a stretch blow-moulding machine.

[0044] After running through the shaping device 2, the containers 10 (shown only separately) produced in this way are transferred to a filling device 4 and there they are filled with a flowable medium, for example, a liquid such as a beverage.

[0045] In this case, this filling device 4 also has a carrier 42 on which a plurality of filling stations are arranged.

[0046] Further elements such as for example sterilization units, which sterilize the containers and in particular sterilize an inner wall of the containers, can also be provided between the shaping device 2 and the filling device 4. In this case it is possible for different sterilization methods to be used, such as for example sterilization methods by means of UV light, sterilization methods by means of hydrogen peroxide \((\text{H}_2\text{O}_2)\) and the like.

[0047] The filling device 4 is adjoined in the conveying direction \(P_1\) by a closure device 9, with the aid of which the containers are closed with closures. In this region too, sterilization of the containers and also of the closures can again take place.

[0048] The closure device 9 is in turn adjoined by a conveying device 12, which conveys the now assembled containers, filled and closed, to a labelling device 6. In this case this conveying device 12 can be designed for example in the form of a screw conveyor, but it would also be possible for rotary stars or the like to be used at this point. In some aspects, however, this conveying device 12 conveys the containers separately and, in various aspects, also at a specified distance from one another.

[0049] The reference number 8 designates a drying device (shown only diagrammatically), which dries the containers or the outer wall of the containers respectively. In this case this drying device 8 can be connected by means of a connecting line 16 to the shaping device 2 or even the heating device 24 respectively, so that the dry hot air formed in the last-named plants, for example, the shaping device 2 and/or the heating device 24, can be used for drying the containers 10. A fan 18 can also be provided in an area of the line, as mentioned above.

[0050] After the drying procedure, the containers are transferred to the labelling device 6 and are provided with labels there. That is, the labelling device 6 attaches labels to an outer surface of the containers, as would be understood by persons skilled in the art.

[0051] FIG. 2 shows an example of a conveying device 12. This conveying device 12 is designed in this case in the form of a screw conveyor, which has two opposed screws 52a and 52b, between which the containers 10 (in this case only the closures 10a thereof) are conveyed in a recognizable manner. This screw conveyor is also used in this case in order to increase the distribution \(T\) between the individual containers. In this case the drying device 8, which dries the containers or the cylindrical wall thereof or optionally also the base area, can be arranged in an end region of the screw conveyor. The reference numbers 54a and 54b designate driving devices which may be synchronized with each other and which drive the two screws 52a and 52b.

[0052] In this case it would also be possible for these screws to have locally on the surface 58 thereof sponges which also dry a thread region 10a of the containers. In addition, it would also be possible for a plurality of drying devices to be provided which dry the outer wall of the containers in a multiplicity of steps.

[0053] It will be apparent to those skilled in the art that various modifications and variations can be made to the apparatus and method of labelling filled containers of the present disclosure without departing from the scope of the invention. Throughout the disclosure, use of the terms “a,” “an,” and “the” may include one or more of the elements to which they refer. Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only.

What is claimed is:

1. An apparatus for the treatment of containers comprises:
   a filling device that fills containers with a flowable medium;
   a labelling device arranged downstream with respect to this filling device in a conveying direction of the containers, the labelling device providing an outer wall of the filled containers with labels;
   a conveying device between the filling device and the labelling device, the conveying device conveying the containers from the filling device to the labelling device; and
   a drying device arranged along the conveying path of the containers between the filling device and the labelling device, the drying device drying the containers by acting upon said containers with a gaseous medium.

2. An apparatus according to claim 1, wherein the gaseous medium prevents condensation on the wall of the bottles.

3. An apparatus according to claim 1, further comprising a shaping device arranged upstream with respect to the filling device, the shaping device shaping plastics-material pre-forms to form plastics-material containers.

4. An apparatus according to claim 3, further comprising a supply device that supplies a gaseous medium occurring in the shaping device to the drying device.

5. An apparatus according to claim 1, wherein said conveying device conveys the containers separately.

6. An apparatus according to claim 5, wherein the conveying device comprises a screw conveyor.

7. An apparatus according to claim 1, wherein the filling device forms a block with the labelling device.

8. An apparatus according to claim 1, further comprising a drying element that dries the containers by mechanical contact.

9. A method of treating containers, the method comprising the steps of:
   filling the containers with a flowable medium by means of a filling device;
   conveying the filled containers from the filling device to a labelling device, wherein the containers are conveyed separately;
drying at least one area to be labelled of an outer wall of the filled containers by means of a drying device after the filling step, wherein the containers are acted upon with a gaseous medium; and

attaching labels to said at least one dried area to be labelled of an outer wall of the filled containers.

10. A method according to claim 9, further comprising shaping said containers from plastics-material pre-forms via a shaping device before the containers are filled.

11. A method according to claim 10, wherein said drying step comprises drying the containers by means of a gaseous medium occurring in the shaping device.