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(54) Apparatus for drying external surfaces of containers to be labelled

(57) An apparatus (1) for drying outer surfaces of containers (2) to be labelled comprises a drying tunnel (3), having an entry (4) and an exit (5) and provided with nozzles (6) for blowing air within the tunnel (3) onto the containers (2) transiting in the tunnel, means for transporting the containers (2) within the drying tunnel (3) from the entry (4) to the exit (5), a conduit (8) connecting the tunnel (3) to a labelling device (9), in which the containers (2) are made to transit by the transport means, and air conditioning means (10) operatively active in the conduit (8) to define therein an air conditioned environment within which the containers (2) move between the exit (5) of the drying tunnel (3) and the labelling machine (9), in such a way as to prevent condensation from forming on the outer surface of the dried containers (2).

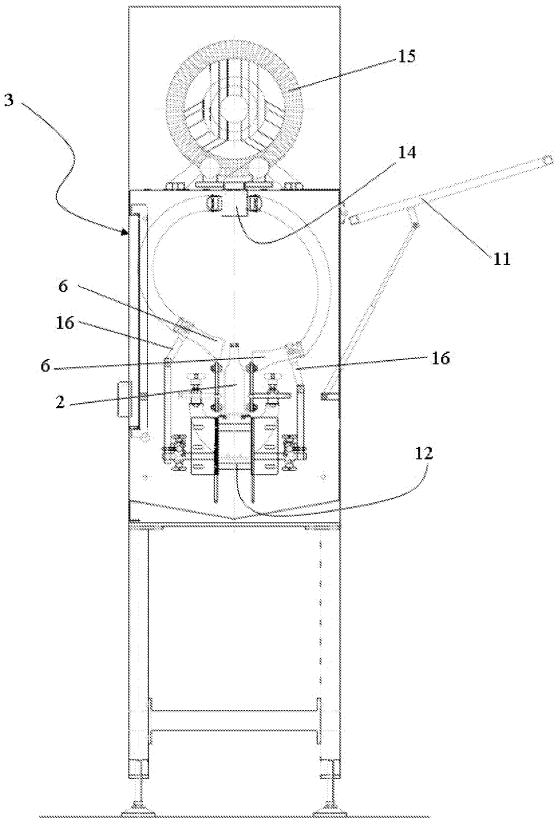

FIG. 2

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Description

[0001] The present invention relates to an apparatus for drying external (i.e. outer) surfaces of containers to be labelled, comprising:

- a drying tunnel having an entry and an exit and provided with nozzles to blow air within the tunnel onto the containers transiting freely in the tunnel itself on a chain belt;
- means for transporting the containers within the drying tunnel from the entry to the exit.

[0002] Within the field of industrial bottling processes, i.e. for the treatment of containers for liquids, systems are used which provide, in succession with a continuous process, for filling, drying and labelling containers.

[0003] The process of drying the containers is very important for an optimal completion of the labelling process.

[0004] The application of a label on the outer surface of a container is accomplished optimally if the surface itself is wholly dry and slightly warm.

[0005] For this purpose, drying apparatuses are known, e.g. of the type comprising a drying tunnel within which the containers (constituted for example by filled and sealed glass bottles) are transported. Within the tunnel is present a plurality of nozzles that blow hot air onto the containers transported within the tunnel. In this way, at the exit of the tunnel the containers have dry and slightly warm outer surfaces, this constituting the optimal condition for the action of the labelling machine. However, it should be noted that the containers, at the exit from the drying tunnel, are not introduced into the labelling machine immediately (especially at high speeds), but, passing on another chain, they undergo a slow-down aimed at preserving the integrity of the labelling machine itself.

[0006] Therefore, a certain time interval elapses from the instant when a container exits the drying tunnel to the instant in which it is introduced into the labelling machine.

[0007] This constitutes a drawback of known systems and it may bring about some problems. During said time interval, condensation may form on the outer surface of the containers, especially if they are filled with a cold liquid. In this case, the formation of condensation compromises the successful outcome of the labelling process, regardless of the effectiveness of the drying step.

[0008] An object of the present invention is to eliminate the aforesaid drawbacks and to make available an apparatus for drying outer surfaces of containers to be labelled, able to maintain said surfaces dry from the instant in which they are dried to the instant in which they are labelled, even if the containers are filled with a very cold liquid.

[0009] Said object is fully achieved by the apparatus of the present invention, which is characterised by the content of the appended claims and in particular in that it comprises, in combination:

- a conduit for connecting the tunnel to a labelling machine, in which the containers are made to transit by the transport means;
- air conditioning means operatively active in the conduit to define therein an air conditioned environment within which the containers move between the exit of the drying tunnel and the labelling machine, in such a way as to prevent condensation from forming on the outer surface of the dried containers.

[0010] This and other features shall become more readily apparent from the following description of a preferred embodiment, illustrated purely by way of non limiting example in the accompanying drawing tables, in which:

- figure 1 schematically shows an apparatus according to the present invention;
- figure 2 shows a detail of the apparatus of figure 1, viewed according to the section AA of figure 1;
- figure 3 shows another detail of the apparatus of figure 1, viewed according to the section BB of figure 1.

[0011] In the figures, the reference 1 indicates an apparatus for drying outer surfaces of containers 2 to be labelled.

[0012] The containers 2 are constituted, for example, by glass bottles, but they may also be of a different kind, e.g. made of PET.

[0013] The apparatus 1 comprises a drying tunnel 3 having an entry 4 and an exit 5 and provided with nozzles 6 to blow air within the tunnel 3 onto the containers 2 transiting in the tunnel 3. The apparatus 1 further comprises means for transporting the containers 2 within the drying tunnel 3 from the entry 4 to the exit 5. Said transport means are constituted, in the illustrated example, by a conveyor belt 7.

[0014] Moreover, the apparatus 1 originally comprises a conduit 8 connecting the drying tunnel 3 a labelling machine 9, in which the containers 2 are made to transit by the transport means. The apparatus 1 also comprises, originally, air conditioning means operatively active in the conduit 8 to define therein an air conditioned environment within which the containers 2 move between the exit 5 of the drying tunnel 3 and the labelling machine 9, in such a way as to prevent condensation from forming on the outer surface of the dried containers 2.

[0015] In particular, the air conditioning means 10 comprise a unit for drying the air within the conduit 3, to maintain the humidity of said air conditioned environment at a predetermined value.

[0016] Moreover, the air conditioning means 10 comprise a unit for heating the air within the conduit 8, to maintain the temperature of said air conditioned environment at a predetermined value.

[0017] It should be noted that the conduit 8 comprises inspection means 11, to allow access to the containers 2 within the conduit 8.

[0018] The transport means comprise a slowing station, positioned within the conduit, to reduce the speed of transit of the containers fed to the labelling machine.

[0019] In particular, in the illustrated example the transport means comprise a conveyor belt 12 (constituting substantially an extension of the conveyor belt 7) and the slowing station comprises a supplementary conveyor belt 13 flanking the conveyor belt 12.

[0020] It should be noted that, in the illustrated preferred embodiment, the drying tunnel 3 comprises one or more manifolds 14, connected to the nozzles 6 and to one or more blowing elements 15 (constituted for example by pushing fans), able to feed the nozzles 6, through the manifold 14, with a forced circulation of air (slightly warm because it is subjected to a certain pressure, e.g. to a pressure of about 200 mbar).

[0021] In this light, it is also provided that the apparatus 1 comprises means for cooling the blowing elements, this guaranteeing, advantageously, a particularly effective and quiet drying process.

[0022] The apparatus 1 comprising also, originally, regulating means, operatively active on the nozzles 6 within the drying tunnel to change their position according to the dimensions of the treated containers 2. For example, said regulating means provide for the use of articulated arms 16 at whose ends are connected the nozzles 6.

[0023] Moreover, the apparatus 1 originally provides for the nozzles 6 within the drying tunnel 3 to define openings to blow air that are shaped according to the shape and size of the treated containers 2, in order to maximise the flow rate of blown air interacting with the outer surfaces of the containers 2.

[0024] It should also be noted that, in the preferred embodiment, the air conditioning means 10 are able to define an air conditioned environment that also extends to an inner portion of the labelling machine 9. In particular, said inner portion of the labelling machine 9 subjected to air conditioning thanks to the effect of the air conditioning means 10 consists of the entry portion of the labelling machine 9, in which the containers 2 are handled, in a step immediately preceding the actual labelling step.

[0025] Moreover, in the preferred embodiment, the apparatus 1 also comprises a sound-proofing structure applied externally to the drying tunnel 3.

[0026] It should be noted that, in a preferred embodiment, the conduit 8 has a length of about 1500 mm and it is so constructed as to assure a perfect continuity between the drying apparatus and the labelling machine.

[0027] Therefore, the apparatus of the present invention assures a transfer of the containers 2 dried by the drying tunnel 3 to the labelling machine 9 in an environment that is air conditioned , i.e. controlled from the viewpoint of humidity and temperature. This advantageously assures that the outer surface of the containers 2 is dry and slightly warm at the time of labelling. The presence of said air conditioned environment prevents condensation from forming on the outer surface of the containers 2, even if they are filled with liquids at particularly low temperature and irrespective of the speed of transfer of the containers 2 within the process.

Claims

1. An apparatus (1) for drying outer surfaces of containers (2) to be labelled, comprising:

- a drying tunnel (3) having an entry (4) and an exit (5) and provided with nozzles (6) to blow air within the tunnel (3) onto the containers (2) transiting in the tunnel itself;
- means for transporting the containers (2) within the drying tunnel (3) from the entry (4) to the exit (5),

characterised in that it comprises, in combination:

- a conduit (8) for connecting the tunnel (3) to a labelling machine (9), in which the containers (2) are made to transit by the transport means;
- air conditioning means (10) operatively active in the conduit (8) to define therein an air conditioned environment within which the containers (2) move between the exit (5) of the drying tunnel (3) and the labelling machine (9), in such a way as to prevent condensation from forming on the outer surface of the dried containers (2).

2. An apparatus as claimed in claim 1, wherein the air conditioning means (10) comprise a unit for drying the air within the conduit (8), to maintain the humidity of said air conditioned environment at a predetermined value.

3. An apparatus as claimed in claim 1, wherein the air conditioning means (10) comprise a unit for heating the air within the conduit (8), to maintain the temperature of said air conditioned environment at a predetermined value.

4. An apparatus as claimed in claim 1, wherein the conduit (8) comprises inspection means (11), to allow access to the containers (2) within the conduit itself.

5. An apparatus as claimed in claim 1, wherein the transport means comprise a slowing station, positioned within the conduit (8), to reduce the speed of transit of the containers (2) fed to the labelling machine (9).

6. An apparatus as claimed in claim 5, wherein the transport means comprise a conveyor belt (7) and the slowing station comprises a supplementary flanking conveyor belt (12).

7. An apparatus as claimed in claim 1, comprising regulating means, operatively active on the nozzles (6) within the drying tunnel (3) to change their position according to the dimensions of the treated containers (2).

8. An apparatus as claimed in claim 1, wherein said nozzles (6) within the drying tunnel (3) define openings to blow air, shaped according to the treated containers (2) in such a way as to maximise the flow rate of blown air interacting with the outer surface of the containers (2).

9. An apparatus as claimed in claim 1, wherein the air conditioning means (10) are configured to define an air conditioned environment that extends also to an inner portion of the labelling machine (9).

10. An apparatus as claimed in claim 1, wherein the drying tunnel (3) comprises blowing elements (15) operatively connected to the nozzles (6) to achieve a forced flow of air blown through the nozzles (6) within the tunnel itself.

11. An apparatus as claimed in claim 10, comprising means for cooling the blowing elements (15).

12. An apparatus as claimed in claim 1, comprising a sound-proofing structure applied externally to the drying tunnel (3).

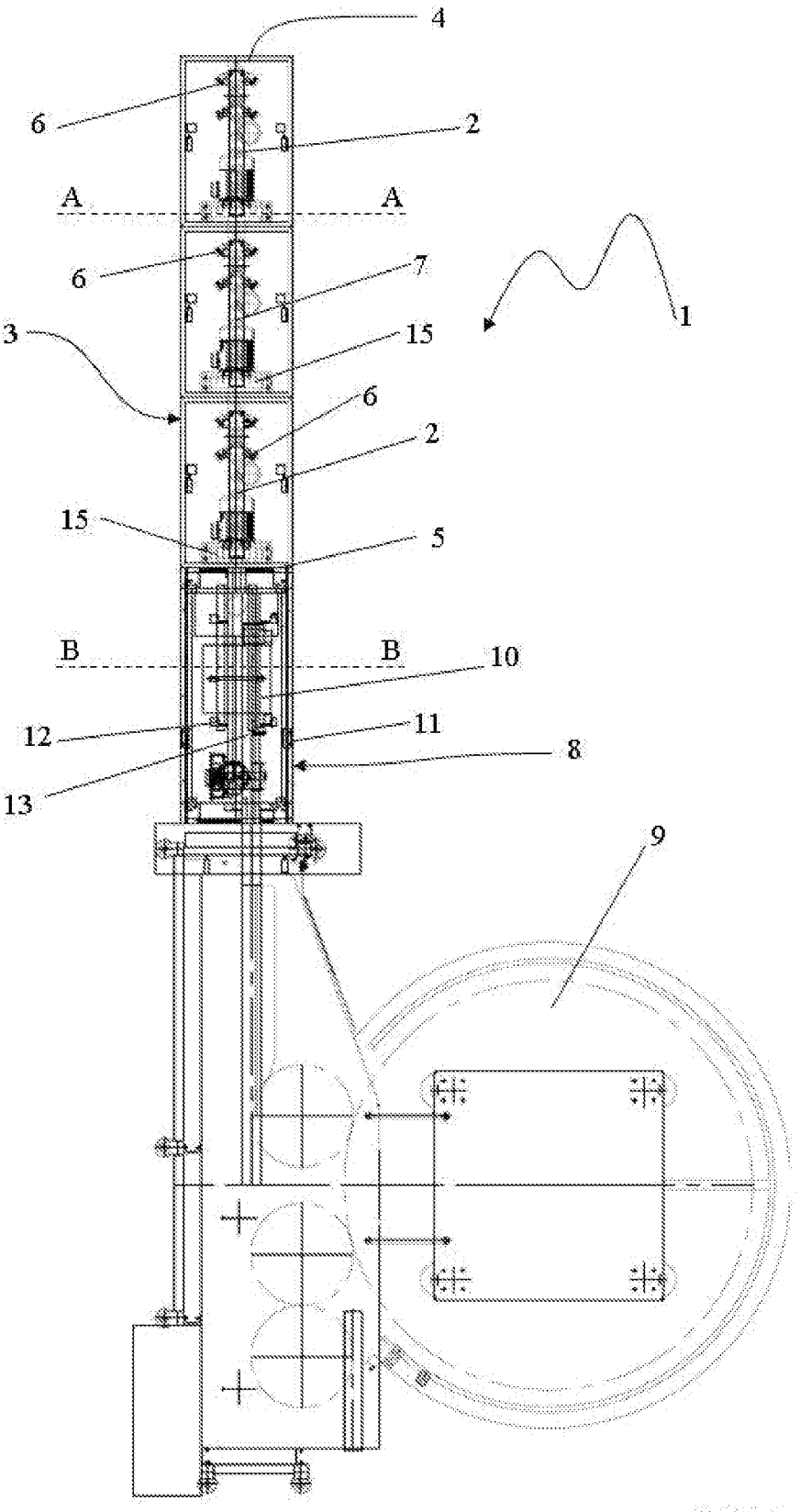

FIG. 1

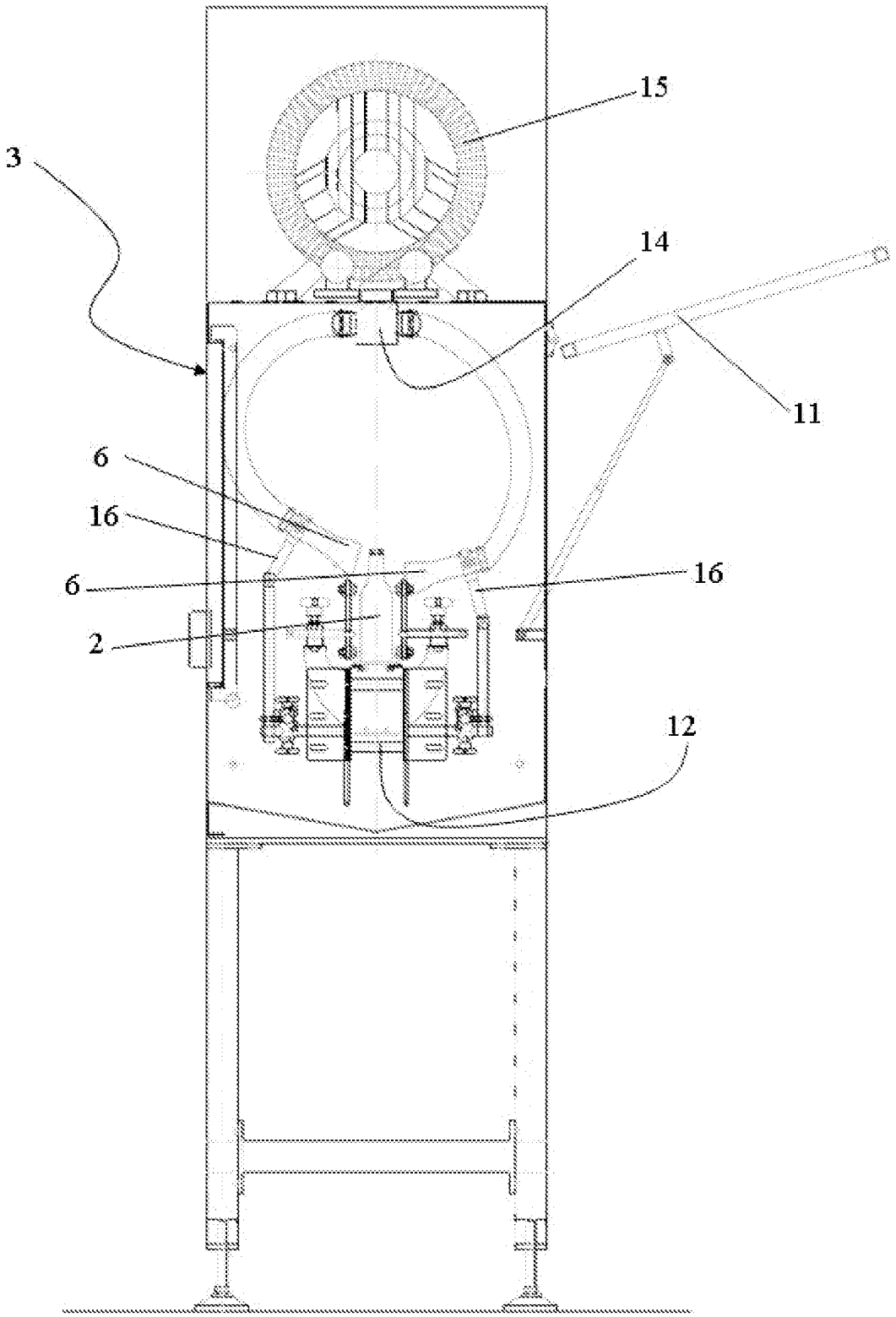

FIG. 2

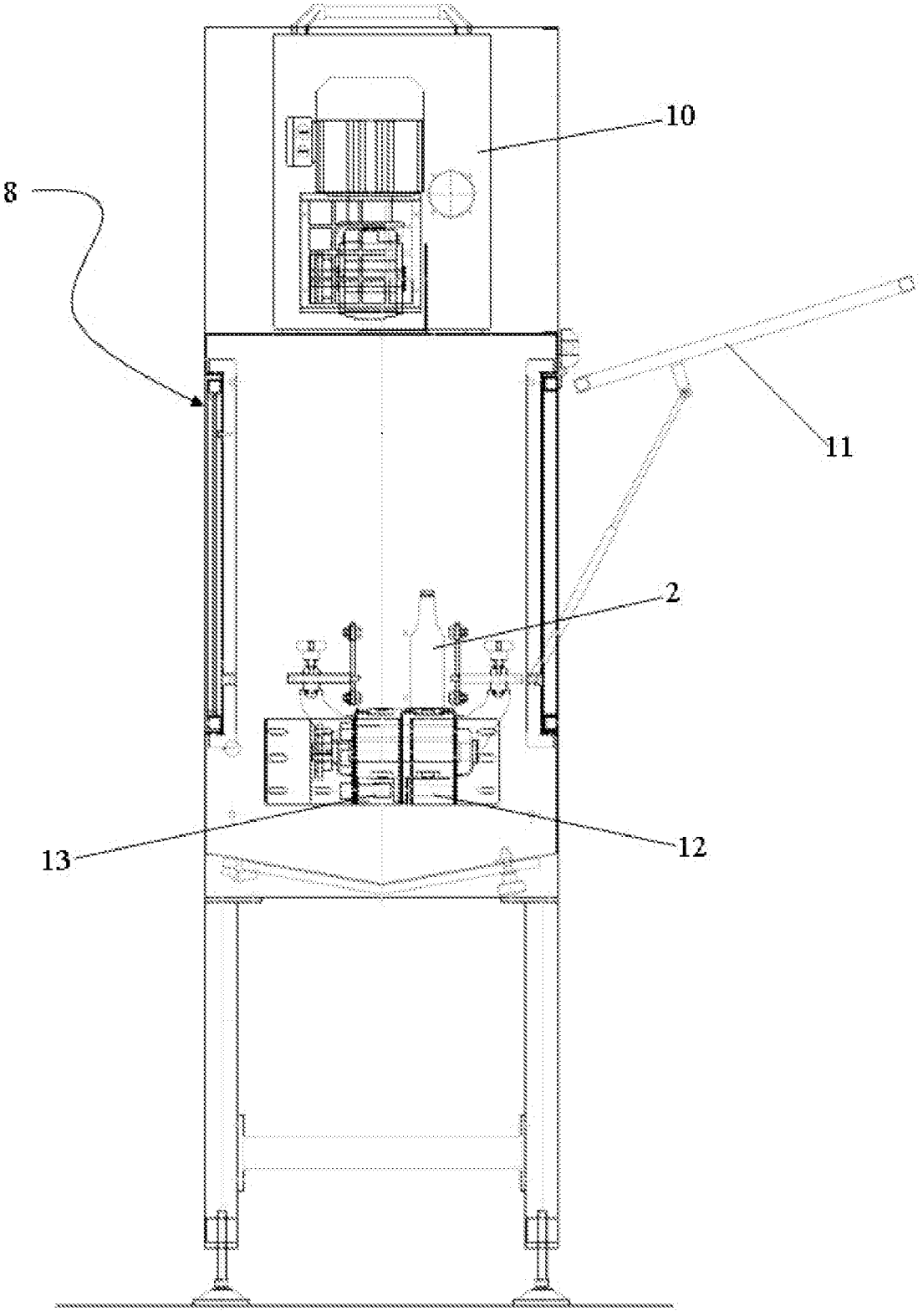

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 07 11 5478

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	US 2 501 367 A (WEHMILLER FREDERICK W ET AL) 21 March 1950 (1950-03-21)		
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TECHNICAL FIELDS SEARCHED (IPC)

B65C
F26B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 March 2008	Wartenhorst, Frank

CATEGORY OF CITED DOCUMENTS

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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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