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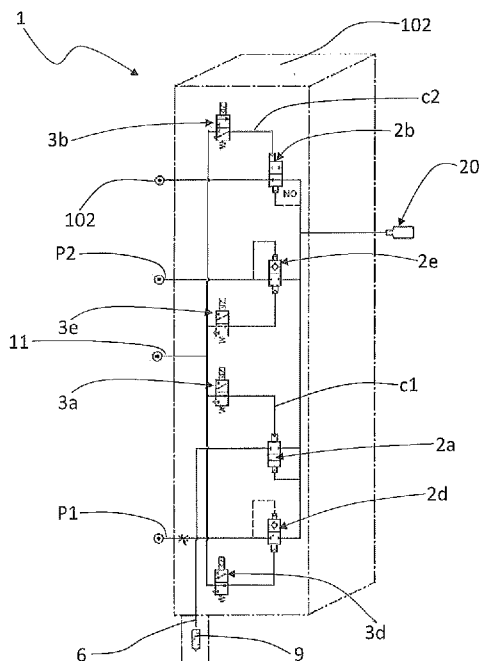
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(54) Title: CIRCUIT FOR EXHAUSTING AIR FROM A PARISON, SYSTEM FOR SUPPLYING AND EXHAUSTING AIR FROM A PARISON AND ASEPTIC MOULDING PROCESS USING SAID CIRCUIT AND SAID SYSTEM

FIG. 1



(57) Abstract: Process of moulding a container in a contamination-controlled environment (102) starting from a parison (20) made of plastic material, comprising the steps of: injecting air into the parison (20) at the maximum pressure of 16 bar and subsequently, at the maximum pressure of 40 bar in such a way as to obtain the container; discharging the air from the parison or from the container (20) externally of the contamination-controlled environment (102) until the air pressure inside the container (20) reaches a predetermined value comprised between 0.5 bar and 3 bar; completing the discharge of the air from the container (20) towards the contamination-controlled environment (102).

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**CIRCUIT FOR EXHAUSTING AIR FROM A PARISON, SYSTEM FOR SUPPLYING AND EXHAUSTING AIR FROM A PARISON AND ASEPTIC MOULDING PROCESS USING SAID CIRCUIT AND SAID SYSTEM**

5 TECHNICAL FIELD AND BACKGROUND ART.

The present invention relates to a circuit for exhausting air from a parison, a system for supplying and exhausting air from a parison and an aseptic moulding process using said circuit and said system. In particular, the invention has application in the field of moulding containers made of plastic material, such as PET bottles, under aseptic conditions.

10 For the sake of clarity, the stretch-blowing process for moulding containers made of plastic material starting from heated parisons is briefly summarised below.

The heated parisons are made to advance towards a rotating carousel having a plurality of moulding stations. In each station there is present a mould consisting of two half-moulds which reproduce the shape of the sides of the container to be obtained. At one of the bases of the mould there is an element for shaping the bottom of the container, known in the art as "mould bottom", which engages with the half-moulds to define a moulding cavity. Once the parison has been laterally clamped, the half-moulds are locked in a closed position

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25

by mechanical systems. Present at every mould there is also a closure element, called "seal", having the task of hermetically sealing the mouth of the parison on the neck thereof and of delivering pressurised air into the parison itself.

In the initial phase of the moulding process, the seal delivers air into the parison at medium pressure (maximum of about 15 bar). While air is being delivered at medium pressure, a stretching rod is progressively inserted into the parison, until reaching the bottom of the same. After touching the bottom, the stretching rod continues its linear stroke in order to stretch the parison until the latter reaches approximately the length of the container to be obtained.

Subsequently, the seal blows air into the parison at high pressure (maximum of about 40 bar) so as to expand it until it adheres to the inner walls of the half-moulds and of the mould bottom. Simultaneously, the stretching rod retracts until it is outside the container. The air inside the container is maintained at a high pressure for a few moments so as to consolidate the moulding thereof.

The air inside the container is subsequently discharged, again through the seal. At the end of the process of emptying out the air, the seal is moved away from the

container. The locking systems disengage from the two half-moulds, which can then be opened, enabling removal of the mould bottom and subsequent extraction of the moulded container.

5 An important part of the moulding apparatus is the circuit supplying air to be blown into the parison, which circuit is described below.

Situated downstream of the compressor which supplies air at a high pressure (up to about 40 bar) there are  
10 filtering means comprising at least a coalescing filter for eliminating aerosols of water and oil and solid particles, and an activated carbon filter for eliminating odours and oil and hydrocarbon vapours. Downstream of the filters, the supply line forks into a  
15 medium pressure circuit (maximum of about 15 bar) and a high pressure circuit (maximum of about 40 bar). Aseptic technology further requires the use of HEPA (acronym of "High Efficiency Particulate Air") filters to remove particles of a size exceeding 0.2  $\mu\text{m}$  from the air.

20 The air at medium pressure and the air at high pressure are delivered to the individual moulding stations by means of a distribution system comprising tubing and a rotating manifold. At each moulding station, near the seal, the presence of a valve assembly is essential in  
25 order to:

establish selective communication between the pathway of the air under medium pressure and the parison placed in the closed mould;

5 establish selective communication between the pathway of the air under high pressure and the parison placed in the closed mould;

enable air to be discharged from the moulded container externally of the mould, passing through a damper.

10 However, the apparatus and systems described thus far pose a number of problems in the case of use under aseptic conditions.

As is well known, aseptic moulding takes place in an environment that is washable, sterilizable and kept under microbiological contamination control. It is thus  
15 fundamental to ensure a correct filtering of the gaseous fluids to be introduced into the controlled environment, correct management of the pressures in the different areas so as to control the path of any unwanted particles, correct monitoring of the environment, and a  
20 correct management and adequate quality of the C.I.P. (acronym of "Cleaning In Place") cleaning and S.I.P. (acronym of "Sterilization In Place") sterilization cycles.

To this end, the Applicant has recently developed an  
25 aseptic moulding apparatus in which the rotating

moulding carousel is protected by an isolator suitable for defining a contamination-controlled environment, whereas the driving means of the carousel and mould are located outside said isolator. For the purpose of  
5 adapting to aseptic technology, "ad hoc" solutions have been conceived for the seal and the stretching rod (European patent application no. 10425259, PCT patent application published as WO2011/030183).

However, the problem of obtaining a complete  
10 sterilization of the circuit supplying air to be blown into the parison has remained unsolved to date. In fact, while the HEPA filters, tubing and rotating manifold are easily sterilizable, that is not the case with the valve assembly.

15 In order to prevent the sterilized moving parts of the valves from coming periodically into contact with non-sterilized surfaces, thereby becoming vehicles of contamination, valves have already been developed which are provided with a membrane capable of isolating the  
20 supply circuit from the drive circuit (see, for example, document WO2011/042184).

However, there still remains the problem of isolating the line for exhausting air from the parison towards the outside environment. During blowing, this exhaust line  
25 would be exposed to contamination originating from the

outside environment, and should thus remain closed.

On the other hand, safety and accident prevention regulations require that a compressed air circuit be completely emptied and maintained empty both during

5 maintenance operations and during emergency shutdowns.

Therefore, the discharge valve should be normally open.

In this context, the technical task at the basis of the present invention is to propose a circuit for exhausting

10 air from a parison, a system for supplying and exhausting air from a parison and an aseptic moulding

process using said circuit and said system, which overcome the above-mentioned drawbacks of the prior art.

#### DESCRIPTION OF THE INVENTION.

15 In particular, the object of the present invention is to propose an air exhaust circuit that can be sterilized so as to meet the requirements of aseptic technology and, at the same time, complies with safety and accident prevention regulations for compressed air systems.

20 The stated technical task and specified objects are substantially achieved by a circuit for exhausting air from a parison, a system for supplying and exhausting air from a parison and an aseptic moulding process using said circuit and said system, comprising the technical features disclosed in one or more of the appended

25 claims.

## BRIEF DESCRIPTION OF THE DRAWINGS.

Additional features and advantages of the present invention of the invention will be more apparent from the approximate, and hence non-restrictive description  
5 of a preferred but non-exclusive embodiment of a circuit for exhausting air from a parison, a system for supplying and exhausting air from a parison and an aseptic moulding process using said circuit and said system, as illustrated in the appended drawings in  
10 which:

- figure 1 illustrates the pneumatic diagram of an air exhaust and supply circuit according to the present invention;
- figure 2 illustrates the pneumatic diagram of an  
15 alternative embodiment of the air exhaust circuit of figure 1;
- figure 3 illustrates a cutaway view of an aseptic moulding apparatus using the air exhaust circuit and supply system of figure 1.

## 20 PREFERRED EMBODIMENT OF THE INVENTION.

The air exhaust circuit proposed here has application in an apparatus 100 for aseptic moulding of containers starting from parisons made of plastic material as a means of evacuating blown air present in the parison or  
25 in the moulded container 20.

For example, the aseptic moulding apparatus 100 comprises a rotating carousel 101, on which there is arranged a plurality of moulds 10 (see figure 3). Said rotating carousel 101 is situated inside a contamination-controlled environment 102 protected by an isolation device 103. The driving means of the rotating carousel 101 and moulds 10 are situated outside the isolation device 103, i.e. in a non-sterile environment.

10 A first aseptic valve 2a is configured so as to establish a selective communication between the inside of the parison or the moulded container 20 and an exhaust line 6 external of said contamination-controlled environment 102. Connected to the external exhaust line 15 6 there is a damper 9 which dampens the shock wave created by the air under pressure. In particular, the damper 9 is situated in a "dirty", i.e. non-sterile zone.

A second aseptic valve 2b is configured so as to establish a selective communication between the inside 20 of the parison or the moulded container 20 and the contamination-controlled environment 102.

The first and second valve 2a, 2b are controlled by piloting means 3a, 3b configured so that the discharge 25 of the air present in the parison or in the moulded

container 20 occurs, respectively, towards the  
contamination-controlled environment 102 through the  
second valve 2b while the air pressure in the parison or  
in the moulded container 20 is maintained below a  
5 predetermined value, and externally of the  
contamination-controlled environment 102 through the  
first valve 2a while the air pressure is maintained  
above said predetermined value.

In other words, the opening and closing of the first  
10 valve 2a and of the second valve 2b take place in an  
alternating manner so that air is discharged through one  
or the other of said valves 2a, 2b.

In particular, the first valve 2a is normally closed and  
receives, during a first exhaust step, an opening  
15 command C1 from the piloting means 3a in response to  
detection of an air pressure in the parison or in the  
moulded container 20 which is greater than the  
predetermined value.

The second valve 3b, in contrast, is normally open and  
20 receives a closing command C2 from the piloting means 3b  
in response to detection of an air pressure in the  
parison or in the moulded container 20 which is above  
the predetermined value.

Preferably, the predetermined value is comprised between  
25 0.5 bar and 3 bar.

Preferably, the piloting means 3a, 3b comprise two pilot valves, i.e. one for each aseptic valve 2a, 2b.

In an alternative embodiment, illustrated in figure 2, the air exhaust circuit comprises a third aseptic valve 2c and a check valve 7, which are respectively arranged  
5 2c and a check valve 7, which are respectively arranged along a first pathway T1 which goes from the first valve 2a towards the external exhaust line 6 and along a second pathway T2 which goes from the first valve 2a towards a recovery circuit 8. The air thus recovered can  
10 be used, for example, for pre-blowing.

In this embodiment there is also an additional pilot valve 3c, belonging to the piloting means, which is configured so as to pilot the third valve 2c.

In both embodiments the piloting means are supplied by a dedicated supply line 11, preferably with pressurised  
15 air at about 6 bar.

With reference to the figures, the number 1 indicates an air supply and exhaust system comprising the exhaust circuit described above.

20 The air supply and exhaust system 1 can be used to blow air into the parison 20 and, subsequently, to evacuate it from the parison or moulded container 20.

The air supply and exhaust system 1 further comprises a fourth aseptic valve 2d and a fifth aseptic valve 2e.

25 The fourth valve 2d is configured so as to establish a

selective communication between a supply line of pre-blown air P1 and the inside of the parison 20. In particular, the supply line of pre-blown air P1 supplies pressurised air at up to a maximum pressure of about 16  
5 bar.

The fifth valve 2e is configured so as to establish a selective communication between a line for supplying blown air P2 and the inside of the parison 20. In particular, the line for supplying blown air P2 supplies  
10 pressurised air at up to a maximum pressure of about 40 bar.

Two additional pilot valves 3d, 3e are provided to control, respectively, the fourth valve 2d and the fifth valve 2e.

15 Each of the aseptic valves 2a, 2b, 2c, 2d, 2e mentioned is a valve provided with an element of separation between the supply circuit and the actuation circuit. Preferably, each aseptic valve 2a, 2b, 2c, 2d, 2e is a membrane valve. For example, valves of the type  
20 indicated in figure 4 of the document WO2011/042184 can be used.

The process of moulding a container under aseptic conditions starting from a parison made of plastic material, according to the present invention, is  
25 described below, with particular reference to figure 1.

Air is initially injected into the parison 20, placed in the corresponding mould 10, at a maximum pressure of 16 bar. This step, called pre-blowing, is carried out by opening the fourth valve 2d, which establishes fluid communication between the inside of the parison 20 and the supply line of pre-blown air P1.

The fifth valve 2e is instead kept closed.

Then follows the actual blowing step, during which air is injected into the parison 20 at the maximum pressure of 40 bar. This is achieved by closing the fourth valve 2d and opening the fifth valve 2e in such a way that the parison 20 enters into fluid communication with the line for supplying blown air P2.

At the end of the blowing step, the container 20 is moulded.

In a first exhaust step, the air is evacuated toward the outside of the contamination-controlled environment 102 until the air pressure inside the container 20 reaches the predetermined value.

This step is performed by opening the first valve 2a which establishes fluid communication between the inside of the parison or container 20 and the external exhaust line 6, and keeping the second valve 2b closed.

In a second exhaust step, the air is evacuated towards the contamination-controlled environment 102.

This step is performed by closing the first valve 2a and opening the second valve 2b.

It should be noted that during the pre-blowing and blowing steps, the second valve 2b is kept closed so as not to compromise the pressure balance inside the contamination-controlled environment 102.

When the air pressure exceeds the predetermined value, the first valve 2a, which is normally closed, is opened so as to enable air to be discharged from inside the parison or container 20 toward the external exhaust line 6. The second valve 2b, in the meanwhile, is kept closed. Practically speaking, air is discharged through the first valve 2a toward the outside of the contamination-controlled environment 102 so as to go from a high pressure (maximum of 40 bar) to the predetermined value.

When the pressure has fallen below the predetermined value, the first valve 2a returns into a closed condition. It should be noted that the closure of the first valve 2a takes place while the flow of air goes from inside the container 20 toward the external exhaust line 6. Practically speaking, when the first valve 2a is open, there is always a flow of air that goes from the inside of the container 20 toward the outside so as to rule out the possibility that any contaminants present

in the exhaust circuit (for example in the damper 9) can migrate toward the inside, i.e. toward the contamination-controlled environment 102.

The second valve 2b, on the other hand, is opened at the same time as the first valve 2a is closed so that the air can be completely discharged from the inside of the container 20, which is sterile, toward the contamination-controlled environment 102. Practically speaking, air is discharged from the second valve 2b at the predetermined value until reaching a pressure equilibrium with the contamination-controlled environment 102.

From the description made, the features of the air exhaust circuit, air supply and exhaust system and aseptic moulding process using said circuit and said system according to the present invention are clearly apparent, as are the advantages thereof.

In particular, thanks to the creation of two different air exhaust pathways, obtained through two valves (first valve and second valve) actuated in an alternating manner, it is possible to obtain an exhaust circuit usable in aseptic moulding processes and capable of complying with safety and accident prevention regulations.

In fact, the closure of the first valve during the

evacuation of air from the container prevents the entry of contaminants into the parison/container. Moreover, the discharge of air towards the contamination-controlled environment is completed by means of the second valve, and thus safety and accident prevention regulations are complied with.

Furthermore, splitting the air exhaust line into two ensures aseptic conditions and avoids penalizing the functioning of the isolation device. In fact, it would not be possible to continuously exhaust air in the contamination-controlled environment without compromising the functioning of the isolation device.

**CLAIMS**

1. Exhaust circuit of air, usable for evacuating blown air from a parison or from a moulded container (20) in a contamination-controlled environment (102), comprising:
- 5 a first aseptic valve (2a) configured such as to establish a selective communication between the inside of the parison or the moulded container (20) and an exhaust line (6) external of said contamination-controlled environment (102);
- 10 a second aseptic valve (2b) configured such as to establish a selective communication between the inside of the parison or the moulded container (20) and the contamination-controlled environment (102);
- 15 piloting means (3a, 3b) of said first and said second aseptic valve (2a, 2b), configured such that the discharge of the air present in the parison or in the moulded container (20) occurs, respectively, towards said contamination-controlled environment (102) through the second valve (2b) while the air pressure in the parison or in the moulded container (20) is maintained below a predetermined value, and externally of the contamination-controlled environment (102) through the first valve (2a) while the air pressure is maintained above said predetermined value.
- 20
- 25 2. Exhaust circuit of air according to claim 1, wherein

said predetermined value is comprised between 0.5 bar and 3 bar.

3. Exhaust circuit of air according to claim 1 or 2, wherein said first valve (2a) is normally closed and receives an opening command (C1) from the piloting means (3a) in response to a detection of an air pressure in the parison or in the moulded container (20) which is greater than said predetermined value.

4. Exhaust circuit of air according to any of the preceding claims, wherein said second valve (2b) is normally open and receives a closing command (C2) from the piloting means (3b) in response to detection of an air pressure in the parison or in the moulded container (20) which is above said predetermined value.

5. Exhaust circuit of air according to any of the preceding claims, comprising a third aseptic valve (2c) and a check valve (7), which are respectively arranged along a first pathway (T1) which goes from said first valve (2a) towards the external exhaust line (6), and along a second pathway (T2) which goes from said first valve (2a) towards a recovery circuit (8).

6. Supply and exhaust system of air (1) usable for insufflating and evacuating blown air from a parison or a moulded container (20) in a contamination-controlled environment (102), comprising:

an exhaust circuit of air having characteristics as in any of the preceding claims;

a fourth aseptic valve (2d) configured such as to establish a selective communication between a supply  
5 line of pre-blown air (P1) and the inside of the parison (20);

a fifth aseptic valve (2e) configured such as to establish a selective communication between a supply  
10 line of blown air (P2) and the inside of the parison (20).

7. Supply and exhaust system of air (1) according to claim 6, wherein said supply line of pre-blown air (P1) supplies pressurised air of up to a maximum pressure of about 16 bar.

15 8. Supply and exhaust system of air (1) according to claim 6 or 7, wherein said supply line of blown air (P2) supplies pressures of up to a maximum pressure of about 40 bar.

20 9. Apparatus (100) for moulding containers in aseptic conditions starting from parisons made of plastic material, said apparatus (100) comprising:

- a contamination-controlled environment (102);
- a mould (10) located in the contamination-controlled environment (102);
- 25 - a supply and exhaust circuit of air according to any

of claims 6 to 8.

10. Apparatus (100) for moulding containers in aseptic conditions starting from parisons made of plastic material, said apparatus (100) comprising:

- 5 i) a contamination-controlled environment (102);
- ii) a mould (10) located in the contamination-controlled environment (102);
- iii) supply and exhaust system of air for insufflating and evacuating blown air from a parison or a moulded container (20) in a contamination-controlled environment (102), said supply and exhaust system of air in turn comprising:
- 10 - an exhaust circuit in the contamination-controlled environment (102) of the blown air from a parison or a moulded container (20), said circuit comprising:
- 15 \_a first aseptic valve (2a) configured such as to establish a selective communication between the inside of the parison or the moulded container (20) and an exhaust line (6) external of said contamination-controlled environment (102);
- 20 \_a second aseptic valve (2b) configured such as to establish a selective communication between the inside of the parison or the moulded container (20) and the contamination-controlled environment (102);
- 25 \_piloting means (3a, 3b) of said first and said second

aseptic valve (2a, 2b), configured such that the discharge of the air present in the parison or in the moulded container (20) occurs, respectively, towards said contamination-controlled environment (102) through the second valve (2b) while the air pressure in the parison or in the moulded container (20) is maintained below a predetermined value, and externally of the contamination-controlled environment (102) through the first valve (2a) while the air pressure is maintained above said predetermined value; said predetermined value being comprised between 0.5 bar and 3 bar; said first valve (2a) being normally closed and receiving, during a first exhaust phase, an opening command (C1) from the piloting means (3a) in response to detection of an air pressure in the parison or in the moulded container (20) which is greater than said predetermined value; said second valve (2b) being normally open and receiving a closing command (C2) from the piloting means (3b) in response to detection of an air pressure in the parison or in the moulded container (20) which is above said predetermined value;

- a fourth aseptic valve (2d) configured such as to establish a selective communication between a supply line of pre-blown air (P1) and the inside of the parison (20);

- a fifth aseptic valve (2e) configured such as to establish a selective communication between a supply line of blown air (P2) and the inside of the parison (20).

5 11. Process of moulding a container in aseptic conditions starting from a parison (20) made of plastic material, comprising the steps of:

placing the parison (20) in a mould (10) located in a contamination-controlled environment (102);

10 injecting air at the maximum pressure of about 16 bar into the parison (20);

injecting air at the maximum pressure of about 40 bar into the parison (20) in such a way as to obtain said container,

15 characterised in that it further comprises the steps of:  
discharging the air from the parison or from the container (20) externally of the contamination-controlled environment (102) until the air pressure inside the container (20) reaches a predetermined value  
20 comprised between 0.5 bar and 3 bar;

completing the discharge of the air from the container (20) towards the contamination-controlled environment (102).

25 12. Moulding process according to claim 11, wherein the step of discharging the air from the container (20)

externally of the contamination-controlled environment (102) is performed by opening a first aseptic valve (2a) which establishes a fluid communication between the inside of the container (20) and an exhaust line (6) external of said contamination-controlled environment (102), and by maintaining closed a second aseptic valve (2b) arranged between the inside of the container (20) and the contamination-controlled environment (102).

13. Moulding process according to claim 12, wherein the step of completing the discharge of the air from the container (20) towards the contamination-controlled environment (102) is performed by closing said first aseptic valve (2a) and by opening said second aseptic valve (2b).

14. Moulding process according to claim 12 or 13, wherein the first aseptic valve (2a) is closed while the air flows from the inside of the container (20) towards the external exhaust line (6).

15. Moulding process according to claims 12 to 14, wherein said second valve (2b) is kept closed during both injecting steps of air into the parison (20).

FIG. 1

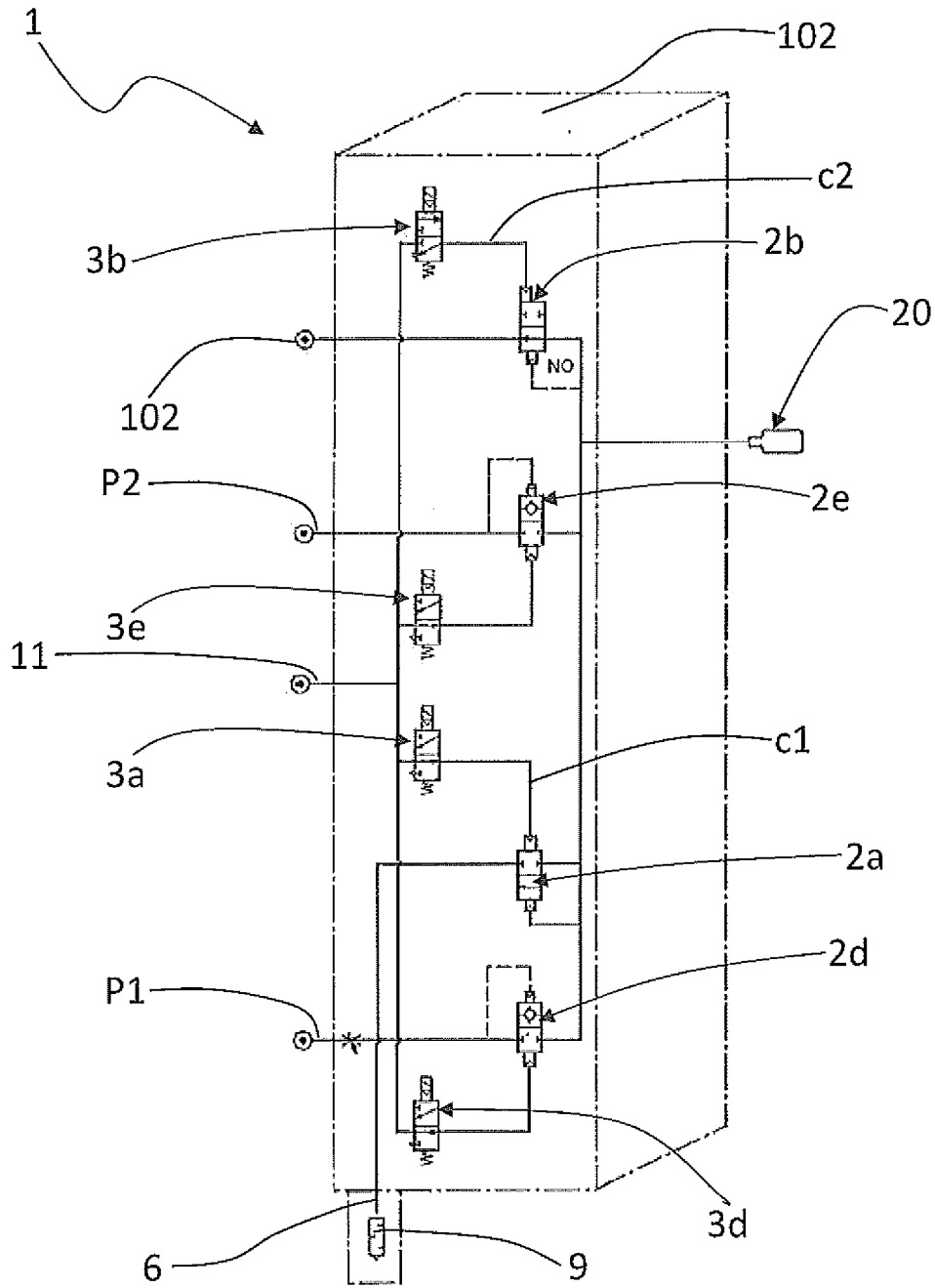


FIG. 2

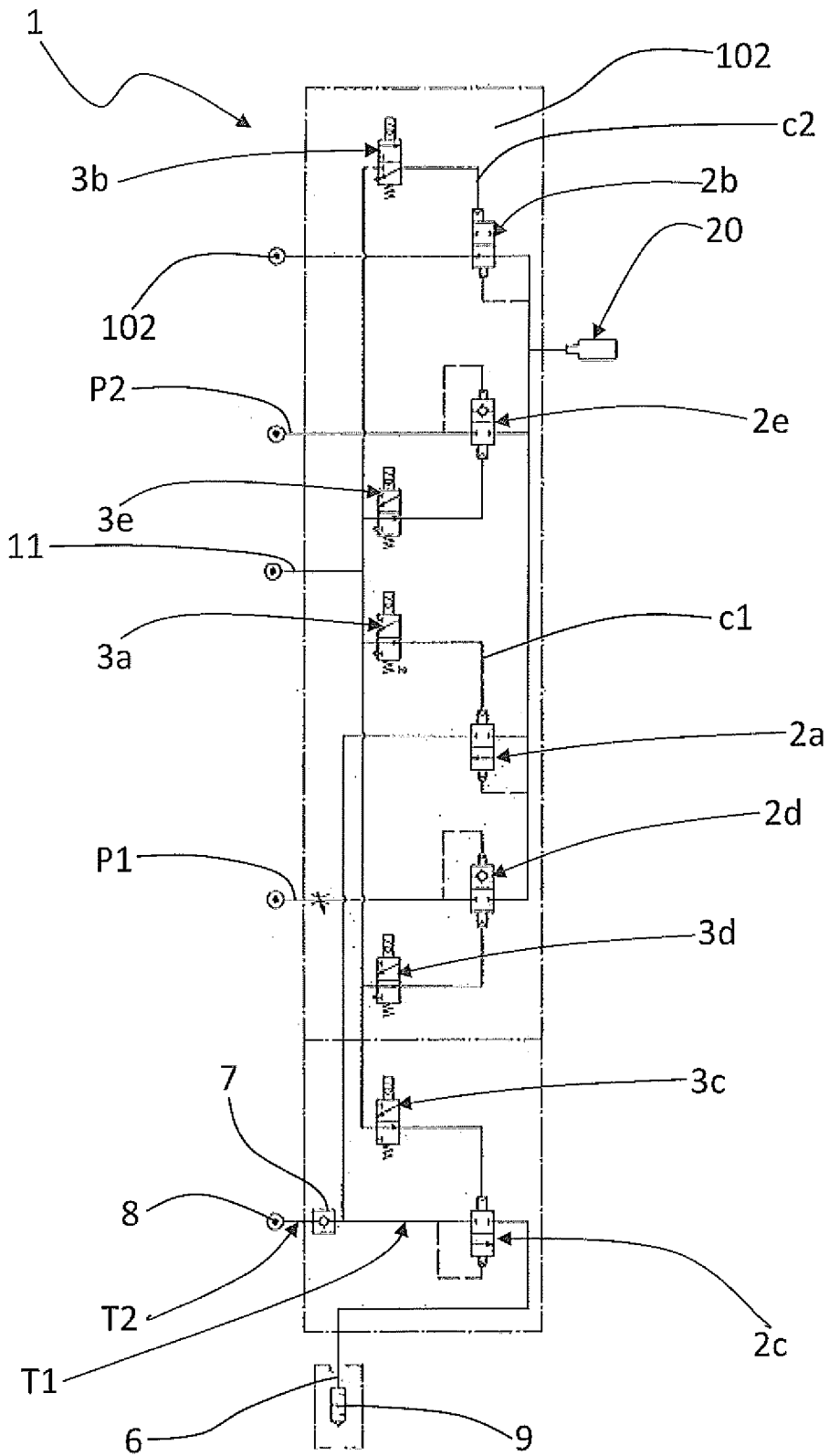
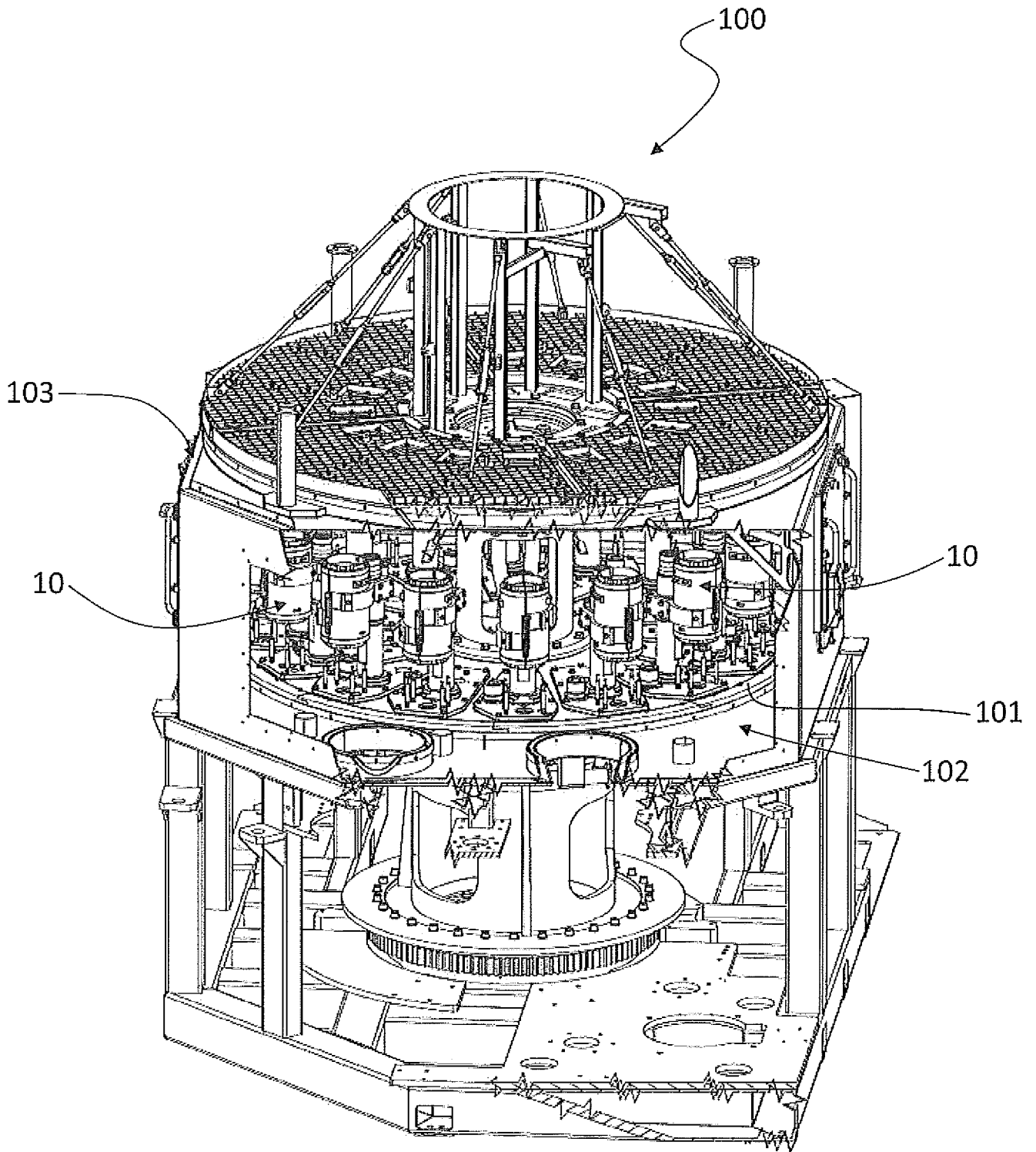


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2012/052286

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B29C49/46  
ADD.  
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED  
Minimum documentation searched (classification system followed by classification symbols)  
B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 63 221027 A (DAINIPPON PRINTING CO LTD) 14 September 1988 (1988-09-14)	9,11
Y	abstract; figure 3	12
Y	----- JP 8 267558 A (SHOWA DENKO KK; SHOWA ENG KK) 15 October 1996 (1996-10-15)	12
A	abstract; figures 1,3	9-11
T	----- US 2008/128958 A1 (LITZENBERG MICHAEL [DE] ET AL) 5 June 2008 (2008-06-05) the whole document	11
A	----- DE 31 11 925 A1 (BOSCH GMBH ROBERT [DE]) 7 October 1982 (1982-10-07) page 8, paragraphs 2,3; figure 1	9
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Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search  
2 July 2012

Date of mailing of the international search report  
11/07/2012

Name and mailing address of the ISA/  
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2012/052286

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2 116 353 A1 (TOYO SEIKAN KAISHA LTD [JP]) 11 November 2009 (2009-11-11) figure 5 -----	9-11
A	US 4 208 852 A (PIOCH MICHEL M R [FR]) 24 June 1980 (1980-06-24) column 9, lines 11-42; figure 6 -----	9-11

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2012/052286

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 1-8  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-8

Claims 1-5 are directed specifically only to the exhaust circuit for air: all features referring to the blow-moulding apparatus do not form part of the claimed subject-matter. Therefore the subject-matter of said claims 1-5 can be considered as consisting in the most complicated case of 3 valves, 1 non-return valve and a controller. The initial phase of the search revealed a very large number of documents relevant to the issue of novelty for these claims. So many documents were retrieved that it is impossible to determine which parts of the claims 1-5 may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search of the whole claimed subject-matter of claims 1-5 could not be carried out. The same objections can be raised for the subject-matter of claims 6-8, where the only additional limitation is that the number of valves increases to five. The extent of the search was consequently limited to the process according to claims 9-15.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/052286

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
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