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Published:
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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

[Continued on next page]

(54) **Title:** METHOD FOR RECYCLING ENERGY IN A BLOW MOULDING MACHINE FOR BLOW MOULDING CONTAINERS

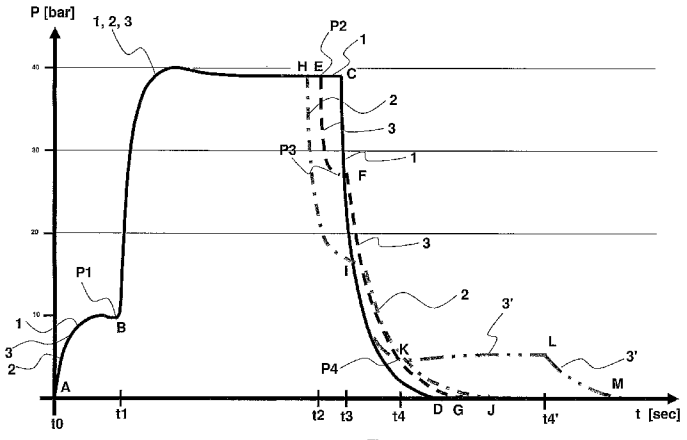

Fig. 1

(57) **Abstract:** A method for recycling energy and related blow moulding machine- for blow moulding plastic material containers including a recycling system for recycling the pneumatic energy of the discharge air coming from the blowing cavities of said machine, capable of recycling the discharge air making it available at a given pressure for a subsequent blowing in a cavity.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. B29C49/78 B29C49/66

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 practical, 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	DE 20 2005 020967 U1 (SIG TECHNOLOGY AG [CH]) 7 December 2006 (2006-12-07) paragraphs [0001], [0009], [0042], [0047] - [0060]; figures	1-6, 16-19
X	EP 1 777 056 A (EBAC LTD [GB]) 25 April 2007 (2007-04-25) paragraphs [0008] - [0010], [0013] - [0021]; figures	1-6, 16-19
X	DE 10 2004 014653 A1 (KRONES AG) 13 October 2005 (2005-10-13) paragraphs [0015], [0016], [0021], [0023], [0030], [0036], [0040], [0044]; figures	1-6, 16-19

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/	Authorized officer
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 11 207808 A (YOSHINO KOGYOSHO CO LTD) 3 August 1999 (1999-08-03) abstract; figures paragraphs [0001], [0009] - [0011], [0017], [0021] - [0026]	1,2,4, 16,17,19
X	WO 2007/023349 A (TECHNOPLAN ENGINEERING SA [CH]; JOVER DANIEL [CH]; STORIONE SAVINO [CH) 1 March 2007 (2007-03-01) pages 9-10; figures 2,3	1-5,16, 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2008/001752

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.:
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:

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:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable 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 reportcovers 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.:

1 - 6, 16 - 19

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

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6,16-19

A method for recycling blowing air from a blow moulding machine for blow moulding plastic material containers wherein the air recycled by the first recycling means is directly recycled in the primary air tank (13) to provide primary air in a stage a) of a subsequent blowing cycle (claim 2) (see also below). And
A blow moulding machine for blow moulding plastic material containers (4), adapted to carry out the method according to any one of the claims from 1 to 6, wherein said first recycling means comprise the primary air tank (13) and a valve (13') for-inputting primary air into said cavities, said valve (13') being of the two-way type and adapted to allow a direct recycling of the blowing air in said primary air tank (13) (claim 17) (see also below).

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2. claims: 7-11, 13,20,21

A method for recycling the blowing air from moulding machines for blowing plastic material containers, wherein the air recycled by the first recycling means is recycled in a recycling tank, different from the primary air tank (13), to provide primary air in a stage a) of a subsequent blowing cycle (claim 7), or
wherein the air recycled in stage c) is recycled in either a first recycling tank (9) or directly in the secondary air tank (14) to supply a part of secondary air in blowing stage b) until a fourth pressure (P5) is reached in the containers which is higher than the first pressure (P1) and lower than the second pressure (P2) (claim 8), and
a blow moulding machine for blow moulding plastic material containers, wherein said first recycling means comprise a recycling tank, different from the primary air tank (13), to supply primary air into said cavities (claim 20), or
wherein said first recycling means comprise a first recycling tank (9), a recycling valve (9") and the corresponding recycling piping (9') and are adapted to allow an input of part of the secondary air in the blowing stage b) within the containers so as to generate said fourth pressure (P5) in the cavities themselves (claim 21).

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3. claims: 12, 25

A method for recycling the blowing air from moulding machines for blowing plastic material containers, wherein during stage d) when a sixth pressure (P4) is reached, there is provided the maintaining of the air in the cavity at said sixth pressure for implementing a step of recirculating-in the cavities up to a third time (t4') (claim 12), and a blow moulding machine for blow moulding plastic material containers, wherein there are provided input means for inputting recycling air (5) in said containers, placed in the cavities of said moulds, comprising a recirculating valve (5) and a corresponding recirculating piping (5') (claim 25).

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4. claim: 14

A method for recycling the blowing air from moulding machines for blowing plastic material containers, wherein the third pressure (P3) has a value between 25 and 28 bar or between 22 and 25 bar, said second predetermined pressure (P2) has a value equal to approximately 40 bar and said first predetermined pressure (P1) has a value equal to approximately 10 bar (claim 14).

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5. claim: 15

A method for recycling the blowing air from blow moulding machines for blowing plastic material containers, wherein the duration of the stage c) is in the range between 0,05 and 0,15 sec (claim 15).

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6. claims: 22-24

A method for recycling the blowing air from blow moulding machines for blowing plastic material containers, wherein the duration of the stage c) is in the range between 0,05 and 0,15 sec (claim 15).

INTERNATIONAL SEARCH REPORT

International application No
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