



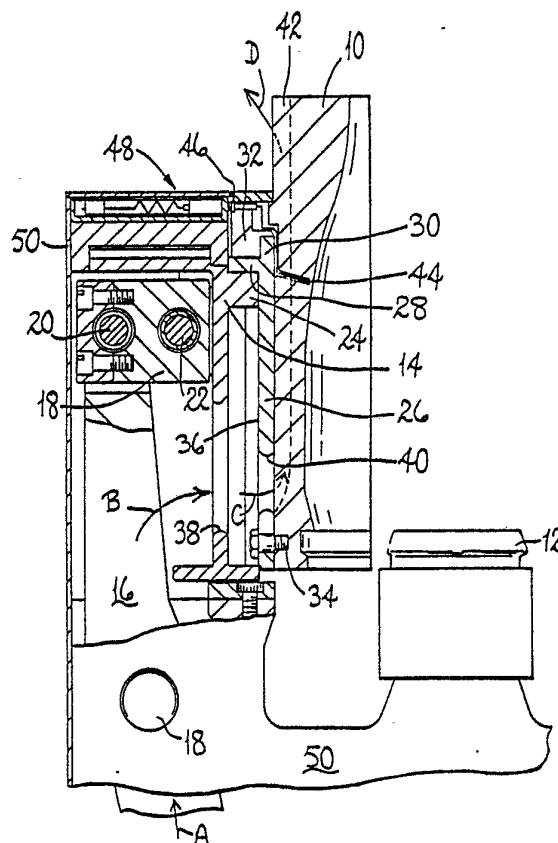
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>3</sup> : <b>C03B 9/38, 9/353</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 82/ 02883</b> (43) International Publication Date: 2 September 1982 (02.09.82)</p>
<p>(21) International Application Number: PCT/GB82/00057 (22) International Filing Date: 22 February 1982 (22.02.82) (31) Priority Application Number: 8106259 (32) Priority Date: 27 February 1981 (27.02.81) (33) Priority Country: GB</p> <p>(71) Applicant (for all designated States except US): EM-HART INDUSTRIES, INC. [US/US]; 426 Colt Highway, Farmington, CT 06032 (US).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): FOSTER, Thomas, Vincent [GB/GB]; 10 Meaburn Close, Cantley, Nr. Doncaster (GB).</p>		<p>(74) Agents: DRURY, Peter, Lawrence et al.; P.O. Box 88, Belgrave Road, Leicester, LE4 5BX (GB).</p> <p>(81) Designated States: AU, JP, US.</p> <p><b>Published</b> <i>With international search report.</i></p>

(54) Title: A METHOD OF COOLING A MOULD

(57) Abstract

A method of cooling a mould in a glassware forming machine wherein an intermediate support (26) supports a mould portion (10) and defines a space (36) which serves to insulate a movable support (14) of mould opening and closing mechanism of the machine from the mould portion (10). The mould portion (10) is cooled by blowing air into the space (36). The air blown into the space (36) increases the insulating effect of the space (36) and also can be blown through an aperture (40) in the intermediate support (26) on to the mould portion (10) so as to cool that portion of the mould portion (10).



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A method of cooling a mouldTechnical Field

This invention is concerned with a method of  
5 cooling a mould in a glassware forming machine wherein at  
least one portion of the mould is supported on a movable  
support which is moved to bring the mould portion supported  
thereby into engagement with other mould portions to form  
a closed mould or out of engagement with the other mould  
10 portions to open the mould.

The invention is also concerned with a mould  
arrangement of a glassware forming machine comprising a  
mould opening and closing mechanism operable to move at  
least one portion of the mould into engagement with other  
15 mould portions to form a closed mould or out of engagement  
with the other mould portions to open the mould, the  
mechanism comprising a mould portion support arranged to  
support the mould portion, and moving means operable to  
move the mould portion support to move the mould portion  
20 as aforesaid.

Background Art

The moulds used in the manufacture of glassware  
articles require to be cooled during manufacture so as to  
avoid the moulds becoming overheated due to heat received  
25 from the glass. In the event that the moulds do become  
overheated, the glass may stick to the mould and satisfactory  
articles of glassware will not be produced.

There are various known methods of cooling moulds  
in glassware forming machines. In some of these methods  
30 cooling air is blown over the outside of the mould and in  
others the cooling air is passed through passages in the  
mould. In these methods while the mould may be satis-  
factorily cooled the cooling means does not insulate the

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1 mould from the mould opening and closing mechanism which  
may therefore become overheated. In other cooling methods,  
the mould is surrounded by a chamber into which cooling air  
is passed. This method insulates the mould opening and  
5 closing mechanism from the mould but requires the provision  
of very complicated mould supports which are only practical  
for certain types of mould.

Disclosure of invention

In a method of cooling a mould in accordance with  
10 the invention, the mould portion is supported by an  
intermediate support which is removably supported on the  
movable support and defines a space which serves to insulate  
the movable support from the mould portion, and the mould  
portion is cooled by blowing air into the space.

15 In a mould arrangement in accordance with the  
invention, an intermediate support is removably mounted on  
the mould support, the intermediate support supporting the  
mould portion and defining a space which serves to insulate  
the mould support from the mould portion, and a passage  
20 through the mould support, provides access to the space  
so that cooling air can be blown into the space.

In order to enable the mould portion to be cooled  
to a greater extent in certain areas thereof, the inter-  
mediate support has at least one aperture therein through  
25 which cooling air, blown into the space defined by the  
intermediate support, passes to impinge on the mould portion.

In order to increase the cooling effect on the  
mould portion, the cooling air blown through the aperture  
in the intermediate support passes between fins on the  
30 outer surface of the mould portion.

In order to provide greater control of the  
cooling process, the quantity of cooling air blown into the  
space is controlled in accordance with the reading of a

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1 thermocouple embedded in the mould portion.

Brief description of Drawing

The accompanying drawing is a side elevational view, partially in section, of a portion of a mould arrangement of a glassware forming machine in accordance with the invention.

Best mode of carrying out the invention

The mould arrangement shown in the drawing is positioned at the blow station of an individual section glassware forming machine. The mould arrangement comprises a mould portion 10 which forms a side portion of a completed mould for making a glass bottle. The completed mould also comprises a further mould portion similar to the portion 10 (not shown) and a bottom portion 12. The mould arrangement also comprises a mould opening and closing mechanism operable to move the mould portion 10 into engagement with the other mould portions to form a closed mould or out of engagement with the other mould portions to open the mould.

The mould opening and closing mechanism comprises a mould portion support 14 which is arranged to support the mould portion 10, and moving means operable to move the mould portion support 14 to move the mould portion 10 as aforesaid. The moving means comprises a piston and cylinder assembly (not shown) which is operable to cause a lever 16 to pivot about a pivot pin 18 thereof. The lever 16 is secured at an upper end thereof to a block 18. The block 18 being connected to the lever 16 by a pivot pin 20. The block 18 is also connected to the support 14 by means of a pivot pin 22 which enters side portions of the support 14 which extend on each side of the block 18 (the side portions of the support 14 are not visible in the drawing).

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1           The mould support 14 has a lateral projection 24  
which is T-shaped in plan view (not shown) and on to which  
an intermediate support 26 is removably mounted with the  
projection 24 received in a T-shaped slot (not shown) in  
5 the support 26. The projection 24 is a loose fit in  
the T-shaped slot to allow the support 26 to move slightly  
sideways relative to the support 14. A portion 28 of  
the support 26 projects over the projection 24 to support  
the support 26 on the support 14. The intermediate support  
10 26 has an upstanding lip portion 30 over which a hook  
portion 32 of the mould portion 10 fits so that the mould  
portion 10 is mounted on the support 26 and hence on the  
support 14. A bolt 34 also interconnects the intermediate  
portion 26 and the mould portion 10. The intermediate  
15 support 26 defines a space 36 between itself and the mould  
portion support 14. This space 36 serves to insulate the  
mould support 14 from the mould portion 10. The insulating  
effect of the space 36 reduces the possibility of over-  
heating of the support 14 due to heat from the hot glass  
20 in the mould.

The glassware forming machine of which the mould  
arrangement forms part comprises blowing means located  
beneath the mould arrangement operable to blow mould cooling  
air past the lever 16 in the direction of the arrow A in  
25 the drawing this air as indicated by the arrow B passes  
through a passage 38 formed in the mould support 14.  
This passage 38 provides access to the space 36 so that the  
cooling air can be blown into the space 36. The cooling  
air received in the space 36 increases the insulating  
30 effect of the space 36.

The intermediate support 26 also has at least  
one aperture 40 therein through which the cooling air  
blown into the space 36 leaves the space 36, as indicated

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1 by the arrow C. This air passes through the aperture 40  
and impinges on the mould portion 10, thereby cooling the  
portion of the mould portion 10 which is aligned with the  
aperture 40 to a greater extent than the remainder of the  
5 mould portion 10 is cooled. The air passing through the  
aperture 40 passes upwardly between fins 42 of the  
mould portion 10 and eventually escapes to atmosphere as  
indicated by the arrow D. As the cooling air passes  
between the fins 42 on the outer surface of the mould  
10 portion 10 the cooling effect on the mould portion 10 is  
increased.

A thermocouple 44 is embedded in the mould portion  
10 and is connected to electrical contact members 46 which,  
when the mould portion is in its open position (shown in  
15 the drawing), make contact with an electrical contact  
device 48 which is fixedly mounted on a framework 50 of  
the machine. When the contacts 46 make contact with the  
device 48, the electrical signal of the thermocouple 44  
is read and the cooling means is adjusted in accordance  
20 with the reading of the thermocouple 44 to control the  
quantity of cooling air blown into the space 36.

The mould portion 10 can readily be removed from  
the mould arrangement merely by lifting the mould portion  
10 vertically away from the projection 24, the intermediate  
25 support 26 being removed with the mould portion 10. The  
intermediate support 26 may readily be replaced with another  
such support having its aperture 40 differently located  
so that a different cooling arrangement can be achieved.

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## 1            Claims:

5            1.     A method of cooling a mould in a glassware forming machine wherein at least one portion (10) of the mould is supported on a movable support (14) which is moved to bring the mould portion (10) supported thereby into engagement with other mould portions (12) to form a closed mould or out of engagement with the other mould portions to open the mould, characterised in that the mould portion 10 (10) is supported by an intermediate support (26) which is removably supported on the movable support (14) and defines a space (36) which serves to insulate the movable support (14) from the mould portion (10), and the mould portion (10) is cooled by blowing air into the space (36).

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          2.     A method according to claim 1, characterised in that the air is blown through at least one aperture (40) in the intermediate support (26) on to the mould portion (10) so as to cool that portion of the mould portion 20 (10).

          3.     A method according to claim 2, characterised in that, cooling air blown through the aperture (40) in the intermediate support (26) passes between fins (42) 25 on the outer surface of the mould portion (10).

          4.     A method according to any one of claims 1 to 3, characterised in that the quantity of cooling air blown into the space (36) is controlled in accordance with 30 the reading of a thermocouple (44) embedded in the mould portion (10).

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1           5.     A mould arrangement of a glassware forming  
machine comprising a mould opening and closing mechanism  
(16, 18) operable to move at least one portion (10) of the  
mould into engagement with other mould portions (12) to  
5 form a closed mould or out of engagement with the other  
mould portions (12) to open the mould, the mechanism  
comprising a mould portion support (14) arranged to support  
the mould portion (10), and moving means (16, 18) operable  
to move the mould portion support (14) to move the mould  
10 portion (10) as aforesaid, characterised in that an inter-  
mediate support (26) is removably mounted on the mould  
support (14), the intermediate support (26) supporting the  
mould portion (10) and defining a space (36) which serves  
to insulate the mould support (14) from the mould portion  
15 (10), and a passage (38) through the mould support (14)  
provides access to the space (36) so that cooling air can  
be blown into the space (36).

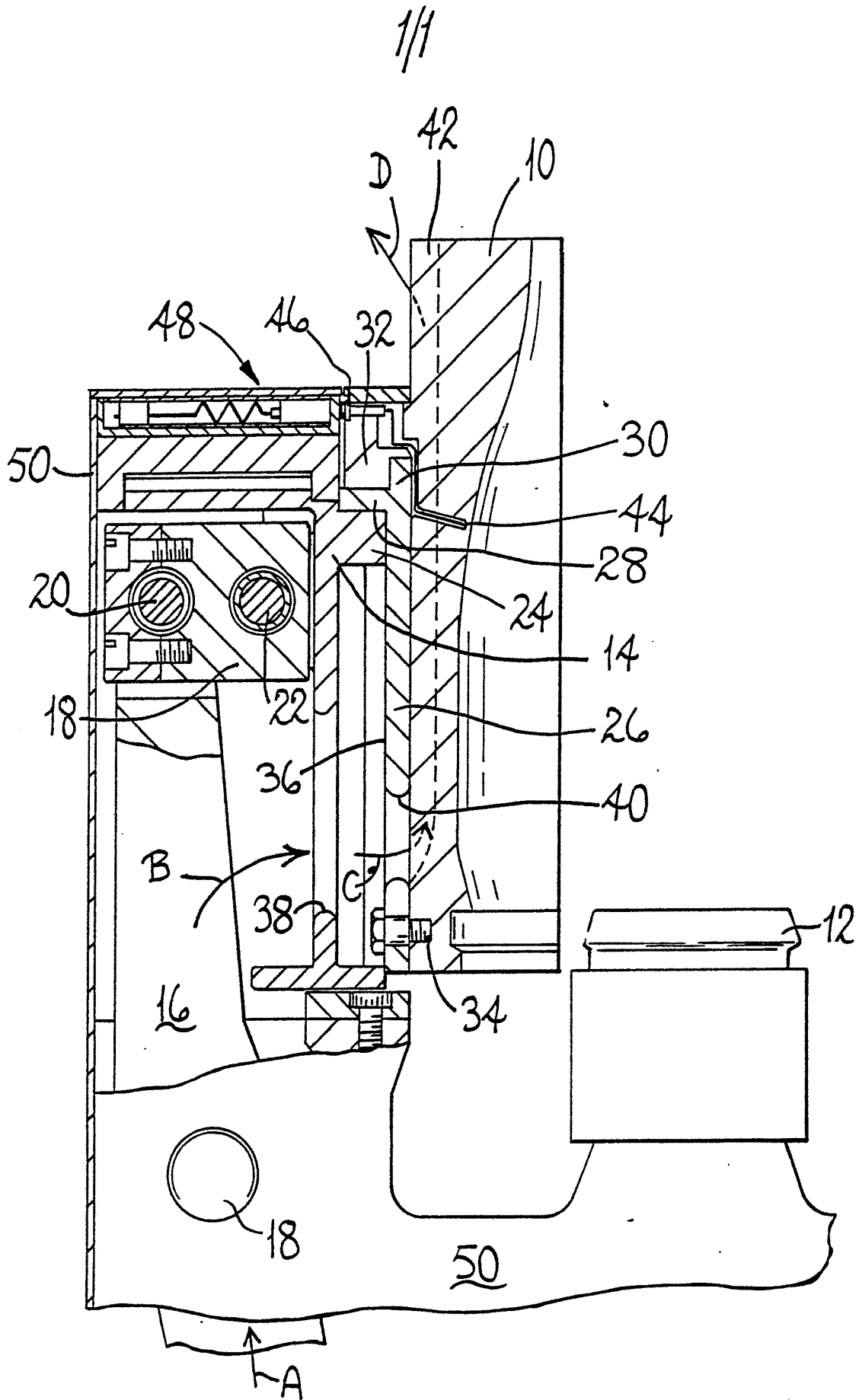
          6.     A mould arrangement according to claim 5,  
20 characterised in that the intermediate support (26) has  
at least one aperture (40) therein through which cooling  
air, blown into the space (36) defined by the intermediate  
support (26), passes to impinge on the mould portion (10).

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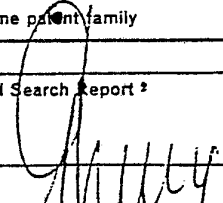




# INTERNATIONAL SEARCH REPORT

PCT/GB 82/00057

International Application No

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>3</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC <sup>3</sup> : C 03 B 9/38; C 03 B 9/353		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
IPC <sup>3</sup>	C 03 B 9/00	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category *	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
A	US, A, 3666433 (NEBELUNG) 30 May 1972 see the complete specification ---	1,5
A	US, A, 3133807 (DENMAN) 19 May 1964 see the complete specification ---	1,5
A	US, A, 3586491 (MENNITT) 22 June 1971 see the complete specification ---	1,5
A	GB, A, 1491859 (EMHART) 16 November 1977 see the complete specification ---	
A	US, A, 4137061 (MALLORY) 30 January 1979 see figures 2,4 -----	
<p>* Special categories of cited documents: <sup>15</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>1</sup>	Date of Mailing of this International Search Report <sup>2</sup>	
26th April 1982	10th May 1982	
International Searching Authority <sup>1</sup>	Signature of Authorized Officer <sup>20</sup>	
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