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Legallais

(54) METHOD OF CONTROLLING THE OPENING AND CLOSING OF A BLOW MOLD AND BLOWING DEVICE FOR IMPLEMENTING SAME

(76) Inventor: **Stephane Legallais**, Octeville Sur Mer (FR)

Correspondence Address:
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W., SUITE 800
WASHINGTON, DC 20037

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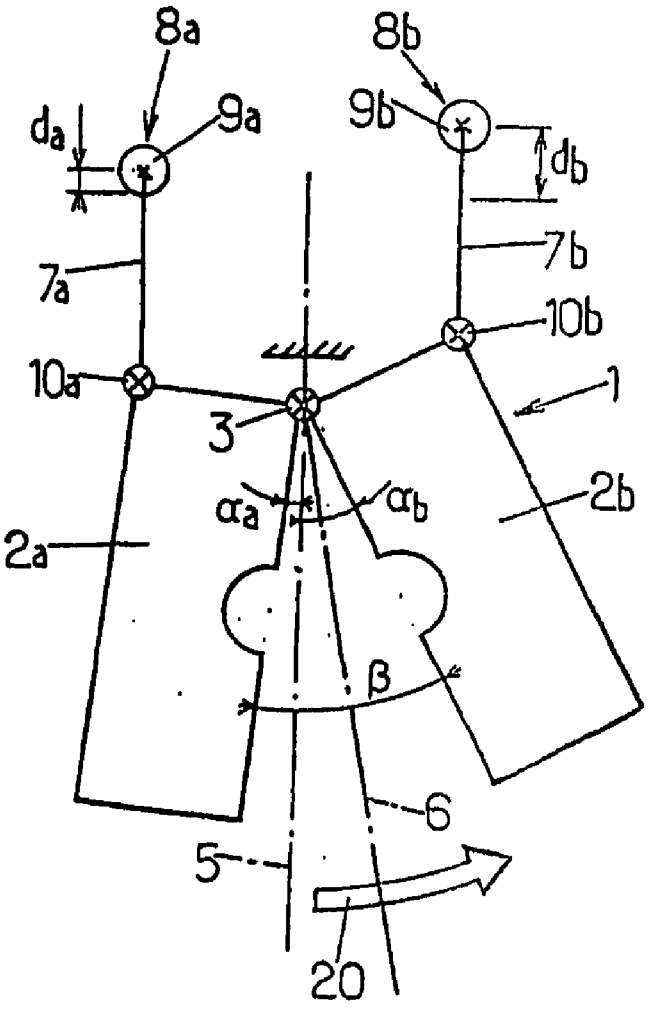
(57) **ABSTRACT**

A method of controlling the opening and closing of a book-type blow mold that is used to produce containers from a thermoplastic material, such as PET, by blowing or blow-drawing heated preforms. The mold includes at least two mold halves which can be moved away from one another by rotating the same around a shared fixed pivot pin. The two mold halves are opened asymmetrically on either side of the parting plane thereof and, as a result, the mold half that is open the most forms a larger passage for introducing an auxiliary member, such as a clamp arm, into the mold.



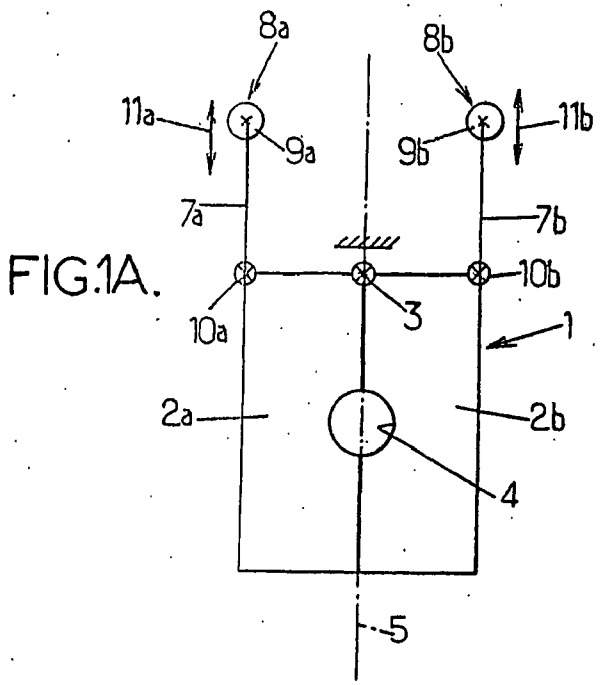


FIG.1A.

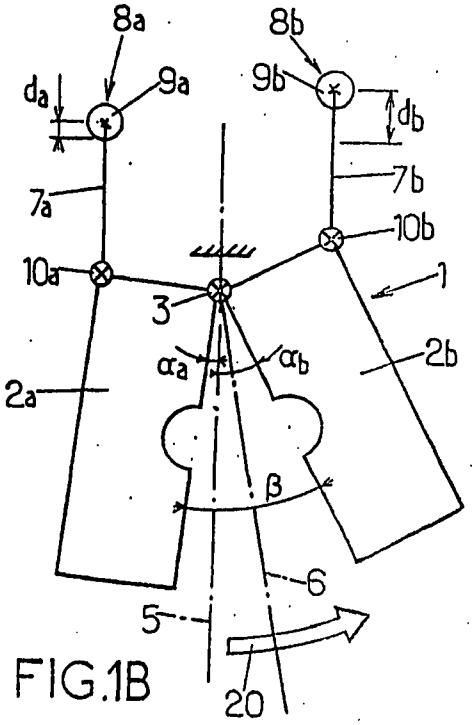


FIG.1B

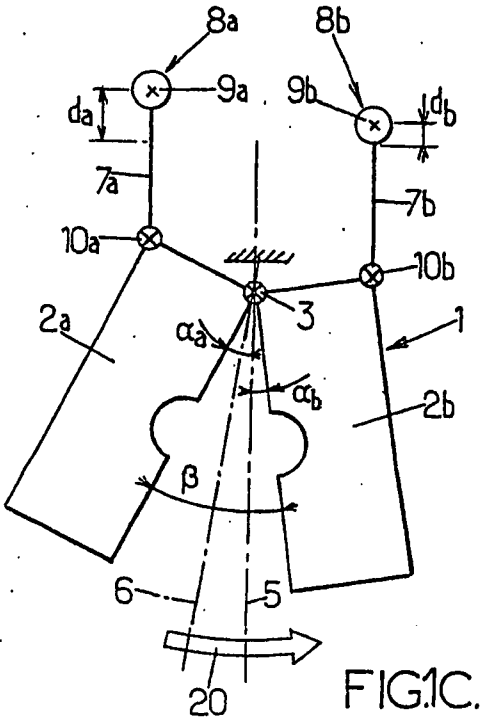


FIG.1C.

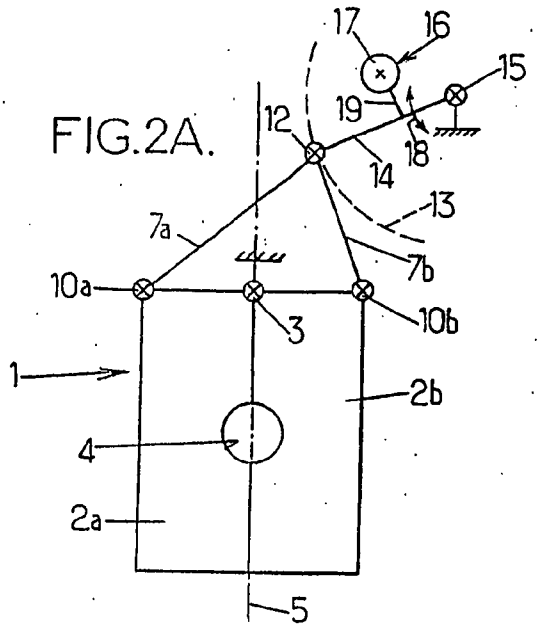


FIG.2A.

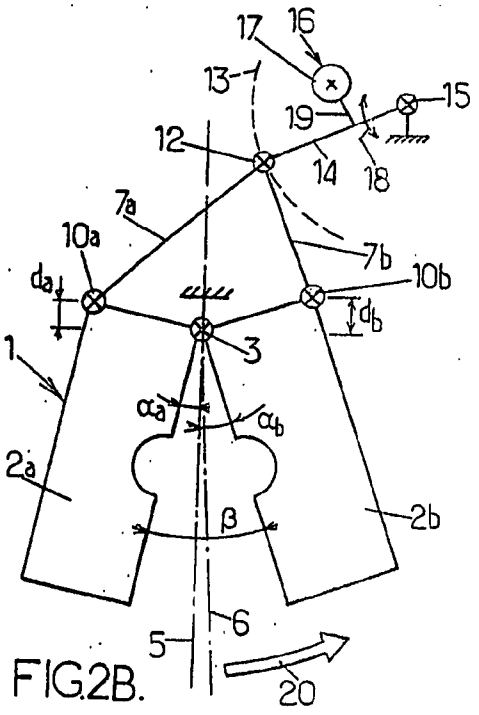


FIG.2B.

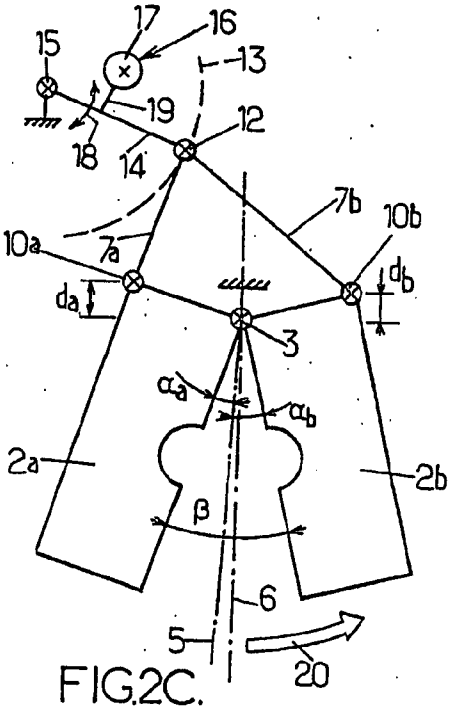
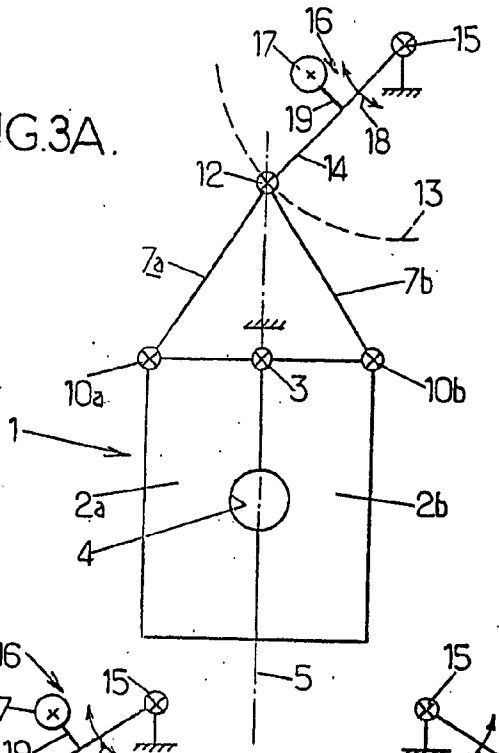


FIG.2C.

FIG.3A.



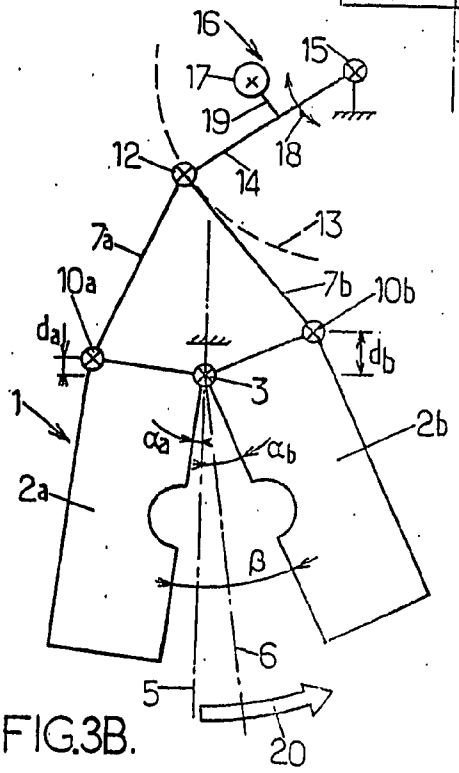


FIG.3B.

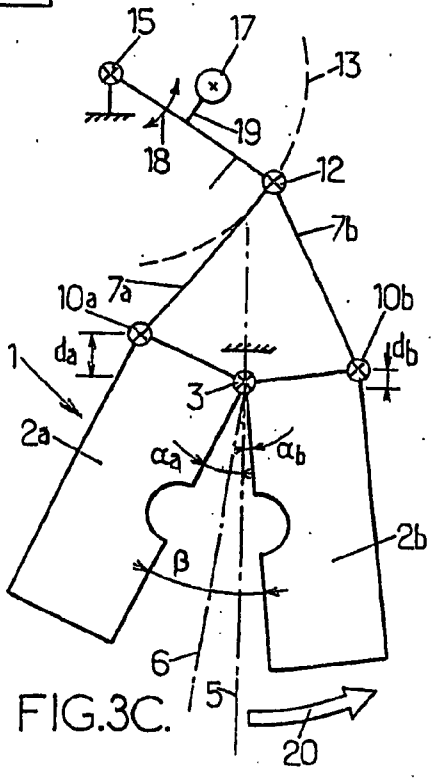


FIG.3C.

METHOD OF CONTROLLING THE OPENING AND CLOSING OF A BLOW MOLD AND BLOWING DEVICE FOR IMPLEMENTING SAME

[0001] The present invention relates to improvements made to the field of the blow-molding of thermoplastic containers, particularly PET containers, by blow-molding or stretch-blow-molding heated parisons in a molding device comprising at least one blow-molding mold of the hinged mold type with at least two mold halves that can be separated from one another by rotation about a common axle of articulation under the action of drive means.

[0002] In the molding devices currently in use today, the two mold halves open substantially symmetrically on each side of the parting plane, this being a solution which, from a technological standpoint, is easy to implement. For their part, insertion or loading means designed to introduce a parison into the mold and extraction means designed to extract a molded container from the mold are arranged in such a way that the movement of the gripper, in both cases, is approximately in the parting plane of the mold in the mold or in close proximity thereto.

[0003] What is more, it is commonplace for the molding device to be arranged in the form of a rotary device of the carousel type, generally equipped with a number of molds distributed about its periphery, the parting planes of these molds being substantially radial. For their part, the insertion means and the extraction means are designed in the form of rotary transfer wheels equipped with grippers supported by approximately radial arms. The time needed by the insertion means to introduce the parison radially into the mold or by the extraction means to extract the container radially from the mold means that each gripper follows the mold over a portion of the rotary path thereof, and, in addition, the gripper also has a movement with a radial component so as to enter or leave the mold, these movements having to be performed without any physical interference between the edges of the mold halves and the grippers and either the parison or the container respectively.

[0004] This results in a relatively complicated arrangement of the insertion and extraction means which are in the form of transfer wheels equipped with gripper support arms driven in a double pivoting and radial movement while the grippers may, for their part, be driven in a pivoting movement at the end of their support arms. These combined movements are obtained mechanically through complex collections of rollers collaborating with fixed cams, and mean that the surroundings of the rotary carousel are very cluttered. In addition, these assemblies cause significant mechanical friction as well as some degree of rebound, and this limits the rate at which the installations can operate.

[0005] Recently, simplified structures have been proposed, these resorting to an arrangement of one-piece gripper and support arm assemblies driven in a single pivoting movement, thus considerably simplifying the controls and removing an appreciable amount of clutter from the immediate confines of the rotary carousel while at the same time allowing appreciably increased operating rates. However, this simplification has only been able to be achieved at the expense of a misalignment which, while admittedly small, is nonetheless real enough, between the axis of the parison or of the container and the parting plane of the mold at the beginning of insertion or, respectively, at the end of extraction. In other words, the movements of the gripper during insertion of the parison and during extraction of the container are now performed in arcs of a circle, rather than strictly radially. This may, at least in certain operating configurations, lead to the risk of physical interference between the edge of one of the mold halves and the gripper and/or the parison or container respectively.

[0006] Admittedly, one solution might have been to increase the angle of opening of the molds with respect to the angle of opening actually used. However, there are at least two reasons why such a solution would not prove satisfactory.

[0007] One first reason is that opening a mold through a larger angle leads to an increase in the time needed for the steps of opening and closing the mold, and this goes against the current demands of users who are wanting increasingly short times in order to increase production rates.

[0008] Another reason is that an increased angle of opening of the molds involves more available space and therefore entails spacing the molds further apart at the periphery of the carousel. That can be achieved only by increasing the diameter, and therefore the inertia, of the carousel which is something which, once again, would go against the current demands of users who are requiring increasingly compact machines and increasingly high production rates. Furthermore, a carousel of a larger diameter would be more expensive.

[0009] It is an object of the present invention to propose solutions capable of avoiding such physical interferences while at the same time resorting to structures that are simple, uncomplicated to implement, and therefore significantly less expensive but capable of allowing an increase in production rates.

[0010] To these ends, according to a first of its aspects, the invention proposes a method for controlling the opening and closing of a blow-molding mold of the hinged mold type for the manufacture of thermoplastic containers, particularly PET containers, by blow-molding or stretch-blow-molding heated parisons, said mold comprising at least two mold halves that can be separated from one another by rotation about a fixed common axle of articulation, which method is, according to the invention, characterized in that the two mold halves are opened asymmetrically on each side of the parting plane.

[0011] By virtue of this arrangement, the widest-open mold half leaves more space for the introduction into the mold of an auxiliary member such as a gripper, while at the same time, as will become more clearly apparent later on, the means of achieving this are simple. In other words, the solution proposed by the invention consists in causing the plane of symmetry of the mold to pivot so that it as closely as possible accompanies the means associated with the mold in order to supply the parison or take away the molded container in such a way that these move approximately along this plane of symmetry rather than along the parting plane of the mold which, in this configuration, no longer coincides with the plane of symmetry except when the mold is in the closed position.

[0012] It will be emphasized that, in the context of the invention, it is possible for the mold to keep its customary angle of opening, or in other words, on the one hand, not to alter the time needed for the operations of opening and closing the mold so that the production rates are not adversely affected and, on the other hand, not to alter the space needed for opening, because in fact one mold half is moved further

and the other is moved less than in the case of the solutions hitherto employed. Furthermore, the available option to employ parison/container movement means of a simplified type in combination with the process of asymmetric mold opening allows production rates to be increased.

[0013] According to a first possible solution, provision is made for the two mold halves to be controlled individually so that they open asymmetrically on each side of the parting plane. This then is the simplest solution in terms of the principles employed, but on the other hand doubling-up on the control means leads to greater bulk and greater cost.

[0014] A second possible solution involves the case where the two mold halves are controlled jointly by means of two respective link rods having first ends coupled rotationally to the respective mold halves and second ends coupled rotationally to one another at a common axle that can move approximately parallel to the parting plane. In this case, according to the invention, provision is made for the two link rods to have different lengths and for the common axle to be moved external to the parting plane, the difference in length of the link rods being related to the difference in the asymmetric angles of opening of the two respective mold halves on each side of the parting plane.

[0015] A third possible solution involves the case where the two mold halves are controlled jointly via two respective link rods of substantially the same length and having first ends coupled rotationally to the respective mold halves and second ends coupled rotationally to one another at a movable common axle. In this case, provision is made for said common axle to be able to move in a direction that is inclined with respect to the parting plane, the angle of this inclination being related to the asymmetry of opening of the two mold halves on each side of the parting plane.

[0016] The second and third solutions proposed according to the invention prove to be remarkably advantageous in that the drive means provided in current molding devices are partially retained, in that the molds are unaffected by the implementation of these solutions and in that, ultimately, the modifications to be made to current molding devices are relatively small.

[0017] In practice, the arrangements according to the invention look likely to find optimum working conditions when the mold belongs to a rotary molding device of the carousel type and when the parting plane of the mold runs substantially along a radius of the molding device. In this case in particular, with a view to use in the Applicant Company's current machines paying consideration to the respective arrangements of the molds and of the means for inserting the parisons and the means for extracting the molded containers, it then becomes advantageous that, for example for inserting the parison into the mold, it is the rear mold half (considered in the direction in which the molding device rotates) that has an angle of opening greater than that of the front mold half; just as, for example, for extracting the molded container, it is the front mold half (considered in the direction in which the molding device rotates) that has an angle of opening greater than that of the rear mold half.

[0018] According to a second of its aspects, the invention proposes a molding device for manufacturing thermoplastic containers, particularly PET containers, by blow-molding or stretch-blow-molding heated parisons, said molding device comprising at least one blow-molding mold of the hinged mold type with at least two mold halves which can be separated from one another by rotation about a common axle of articulation under the action of drive means, said molding device being intended for implementing the method explained hereinabove, which molding device, being arranged according to the invention, is characterized in that the actuating means are designed in such a way that the two mold halves have respective angles of opening on each side of the parting plane of the mold which are not equal.

[0019] A first possible solution may consist in the actuating means comprising two distinct actuating means each functionally associated with a respective one of the two mold halves, and in these two actuating means being functionally associated with individual controls, independent of one another, so as to define respective angles of opening of the two mold halves one on each side of the parting plane which are not equal. This solution has the benefit of leaving many options as to the controls of the two mold halves, but doubling up on the means may, in general, be deemed to be too expensive.

[0020] A second possible solution may find an application when the actuating means comprise two link rods having first ends rotationally connected respectively to the two mold halves and second ends rotationally connected at a common axle and means for driving said common axle capable of moving it in a path running approximately parallel to the parting plane. In that case, according to the invention, provision is made for the two link rods to have different lengths and for the path of the common axle to be external the parting plane, the mold half driven by the shorter link rod having an angle of opening, with respect to the parting plane, which is larger than that of the other mold half.

[0021] In a concrete embodiment, provision may be made for the drive means to comprise a drive arm running approximately perpendicular to the parting plane and for this drive arm to have a first end articulated to a fixed axle and an opposite second end articulated to said axle common to the aforesaid link rods.

[0022] A third possible solution may find an application when the actuating means comprise two link rods of substantially the same length and having respective first ends rotationally connected to the two mold halves respectively and opposite second ends rotationally connected at a common axle, drive means being functionally associated with said common axle in order to move it. In this case, according to the invention, provision is made for said drive means for driving the common axle to be designed to drive said common axle in a path running approximately transversely to the parting plane and inclined at an angle with respect thereto, the angle of inclination of this path being related to the asymmetry of opening of the two respective mold halves.

[0023] In a concrete embodiment, provision may be made for the drive means to comprise a drive arm running approximately transversely to the parting plane but inclined at an angle with respect thereto, and for this drive arm to have a first end articulated to a fixed axle and an opposite second end articulated to said axle common to the aforesaid link rods.

[0024] Whatever the solution adopted, the provisions according to the invention may find a particularly beneficial application in a molding device built in the form of a rotary device of the carousel type, the parting plane of the mold running substantially radially. In this case, in order to equip most of the molding devices of the Applicant Company, it is advantageous, when introducing a parison into the mold, for it to be the rear mold half (considered in the direction in which the carousel rotates) which has an angle of opening, with

respect to the parting plane, which is greater than that of the other mold half; just as, in order to extract a molded container from the mold, it is likewise advantageous for it to be the front mold half (considered in the direction in which the carousel rotates) which has an angle of opening, with respect to the parting plane, which is greater than that of the other mold half.

[0025] The invention will be better understood from reading the detailed description which follows of certain preferred embodiments which are given solely by way of nonlimiting examples. In this description, reference is made to the attached drawings in which:

[0026] FIG. **1**A is a highly schematic depiction, in a view from above, of a first embodiment of a molding device arranged according to the invention;

[0027] FIGS. **1**B and **1**C are depictions similar to that of FIG. **1**A, showing the mold, when it belongs to a rotary device of the carousel type, in two different functional positions;

[0028] FIG. **2**A is a highly schematic depiction, in a view from above, of a second embodiment of a molding device arranged according to the invention;

[0029] FIGS. **2**B and **2**C are depictions similar to that of FIG. **2**A, showing the mold, when it belongs to a rotary device of the carousel type, in two different functional positions;

[0030] FIG. **3**A is a highly schematic depiction, in a view from above, of a third embodiment of a molding device arranged according to the invention; and

[0031] FIGS. **3**B and **3**C are depictions similar to that of FIG. **3**A, showing the mold, when it belongs to a rotary device of the carousel type, in two different functional positions.

[0032] In the attached drawings, the molding device at which the invention is aimed is depicted highly schematically and only those parts or elements that are useful in understanding the invention are illustrated, it being understood that the molding device may be configured in any way compatible with the provisions proposed in the context of the invention.

[0033] Thus, it is an object of the invention to improve the control to open and close a blow-molding mold, illustrated in a view from above in FIG. **1**A in the closed position and denoted in its entirety by the reference **1**, of the hinged mold type, intended for the manufacture of thermoplastic containers, particularly PET containers, using a process of blow-molding or stretch-blow molding heated parisons. A mold **1** such as this comprises at least two mold halves **2***a*, **2***b* which can be separated from one another angularly by rotation about a fixed common axle of articulation **3**. The mold halves have respective hollow impressions which, together, define a cavity **4** (only the top opening of which is visible in FIG. **1**A) for molding the containers or the bodies of the containers (in which case the mold also comprises a third part or mold bottom comprising a hollow impression corresponding to the bottom of the container that is to be manufactured).

[0034] In the closed position depicted in FIG. **1**A, the mating faces of the two mold halves **2***a*, **2***b* define a parting plane **5** which is shown in chain line.

[0035] Actuating means which, in general, involve link rods coupled respectively to the two mold halves, allow the mold halves to be moved between their closed position and their open position and allow them to be held in these positions. Control means, generally in the form of rollers and cams, allow these actuating means to be controlled according to operating sequences. Concrete examples of these will be given later on in conjunction with certain preferred embodiments of the invention.

[0036] In a traditional configuration of mold of the aforementioned type, the mold halves occupy positions that are symmetric with respect to the parting plane, irrespective of their functional position; in other words, they are moved symmetrically one on each side of the parting plane.

[0037] To make it easier to introduce container parisons (particularly preforms) when loading the molds and to extract the finished containers when unloading the molds, particularly when using transfer arms of simplified design which have fewer degrees of freedom than the arms hitherto used (and in which in particular the end grippers do not move strictly along the line of the parting plane between the two mold halves) but by contrast are simpler to control and less expensive, the invention proposes, as illustrated in FIG. **1**B, for the two mold halves **2***a*, **2***b* to be opened asymmetrically on each side of the parting plane **5**, by virtue of which measure the most wide open mold half leaves more space with respect to the parting plane **5** for the introduction into the mold of an auxiliary member such as a gripper arm. Thus, in the example of FIG. **1**B, the angle α_b of opening of the mold half **2***b* with respect to the parting plane **5** is greater than the angle α_a of opening of the mold half **2***a* with respect to the parting plane, whereas the opposite is the case in the example of FIG. **1**C.

[0038] However, it is desirable to keep the same mutual angle of opening β of the two mold halves **2***a*, **2***b* as is found in current molds, which means that the solution proposed by the invention is equivalent to a pivoting of the bisecting plane **6** (depicted in double-dot chain line in FIG. **1**B) of the two mold halves **2***a*, **2***b*. This measure makes it possible to maintain the same parameters, particularly the same times, for controlling the opening and closure of the mold as are found currently, which means that the mold operating conditions are unchanged by implementing the provisions of the invention.

[0039] There are various conceivable technical solutions for bringing about the desired asymmetric movement of the two mold halves. All the solutions proposed hereinafter call upon mold half actuating means that involve two link rods coupled to the two mold halves respectively.

[0040] A first embodiment illustrated in FIG. **1**A employs two link rods **7***a*, **7***b* which are independent of one another, coupled, at one of their ends, to the two mold halves **2***a*, **2***b* respectively by two respective articulated links **10***a*, **10***b* and, at their other end, to respective individual controls **8***a*, **8***b*. These controls may, for example, consist of respective rollers **9***a*, **9***b* which are mounted to turn freely at the respective ends of the link rods **7***a*, **7***b* and which collaborate with respective cams (not depicted) which can move if the molding device is fixed or are fixed if the molding device can move. The link rods **7***a*, **7***b* may, for example, run approximately parallel to one another and to the parting plane **5** and the controls **8***a*, **8***b* are designed to move the link rods **7***a*, **7***b* longitudinally (arrows **11***a* and **11***b* respectively).

[0041] The embodiment that has just been described is the one which offers the greatest number of options for any desired form of actuation of the two mold halves **2***a*, **2***b* both in terms of time and in terms of angle.

[0042] Thus, FIG. **1**B illustrates a control configuration that opens the mold half **2***b* through an angle, measured with respect to the parting plane **5**, which is larger than the angle through which the mold half **2***a* is opened with respect to this parting plane **5**, because the travel d_b of the control **8***b* is longer than the travel d_a of the control **8***a*.

[0043] Likewise, FIG. **1**C illustrates a control configuration that causes the mold half **2***a* to be opened through an angle,

measured with respect to the parting plane **5**, which is larger than the angle through which the mold half **2***b* is opened with respect to this parting plane **5**, because the control **8***b* has a travel d_b that is shorter than the travel d_a of the control **8***a*.

[0044] However, in spite of the advantages afforded by the technical solution that has just been explained in terms of control options, this solution entails doubling up on the control means and this requires more equipment and is therefore expensive; this solution also leads to a greater bulk because of this very doubling up on the control means (particularly on the roller guide cams).

[0045] This being the case, a second embodiment may be preferred because of the savings on equipment and space that it has to offer. In this configuration, recourse is had to two link rods **7***a*, **7***b* which are coupled to one another in an articulated manner at **12** at their free end, in an arrangement that is conventional in this type of device except that here, one of the link rods (in this instance the link rod **7***b*) is made shorter than the other (in this instance the link rod **7***a*).

[0046] In addition, the path (denoted by the reference **13**) of the common axle **12** is external to the parting plane, which means that the mold half **2***b* (in FIG. **2**B) driven by the shorter link rod **7***b* has an angle of opening α_b, with respect to the parting plane **5**, which is larger than that α_a of the other mold half **2***a*, as shown in FIG. **2**B.

[0047] In this configuration, drive means for driving said common axle **12** are able to move the latter in a path **13** running approximately parallel to the parting plane **5**, as depicted in FIG. **2**B; the path **13** of the common axle **12** is external to the parting plane **5**, the mold half **2***b* driven by the shorter link rod **7***b* having an angle of opening α_b, with respect to the parting plane, which is larger than that α_a of the other mold half **2***a*. For preference, the drive means comprise a drive arm **14** running approximately transversely to the parting plane **5** and this drive arm **14** has a first end articulated to a fixed axle **15** and an opposite second end articulated to said axle **12** common to the aforesaid link rods **7***a*, **7***b* so that the path **13** of the axle **12** is an arc of a circle running, on the whole, approximately parallel to the parting plane **5**.

[0048] As regards the control means **16** for instigating the rotational movement of the arm **14**, these may, for example, involve a roller **17** supported by a secondary arm **19** secured to the arm **14** and able to collaborate with a cam (not depicted) to cause the arm **14** to move (arrow **18**) rotationally about the axle **15**.

[0049] In the proposed arrangement with two link rods **7***a*, **7***b* of unequal lengths, the movement of the common axle **12** along the path **13** causes the two mold halves **2***a*, **2***b* to rotate simultaneously, but through different angles: the angular travel of the mold half coupled to the shorter link rod is greater than the angular travel of the mold half coupled to the longer link rod. In the example of FIG. **2**B, the angle α_b through which the mold half **2***b* coupled to the shorter link rod **7***b* travels in a curve is greater than that α_a of the mold half **2***a* coupled to the longer link rod **7***a*.

[0050] When, on the other hand, it is desirable for it to be the mold half **2***a* that has an angular travel α_a greater than that α_b of the mold half **2***b*, all that is required, as illustrated in FIG. **2**C, is to switch the position of the drive arm **14**, of the shorter link rod which becomes the link rod **7***a*, and the position of the path **13** of the axle **12** with respect to the parting plane **5**.

[0051] It must be emphasized that, in this second embodiment, the arrangements of the mold, of the actuating arm **14** and of the control means **16** remain approximately identical to their status in the current conventional configuration, and that the alteration afforded by the invention relates to the shortening of one of the two link rods.

[0052] A third embodiment, illustrated in FIG. **3**A, involves the use of two link rods **2***a*, **2***b* of equal length coupled to one another in an articulated fashion at an axle **12** at their free end, in an arrangement that is conventional in this type of device.

[0053] What is more, the path (denoted by the reference **13**) of the common axle **12** is transverse to the parting plane. In other words, the common axle **12** can move in a direction that is inclined with respect to the parting plane, the angle of this inclination being related to the asymmetry of opening of the two mold halves **2***a*, **2***b* on each side of the parting plane **5**. Thus, when the axle **12** common to the two link rods **7***a*, **7***b* is moved in its path **13** to the left in FIG. **3**B, the mold half **2***b* is driven by the link rod **7***b* through an angle α_b, with respect to the parting plane **5**, which is larger than that α_a of the other mold half **2***a*.

[0054] In this configuration, means for driving said common axle **12** are able to move this axle in a path **13** running transversely to the parting plane **5**, as depicted in FIG. **3**B; the path **13** of the common axle **12** intersects the parting plane **5**. For preference, the drive means comprise a drive arm **14** running approximately transversely to the parting plane **5** and this drive arm **14** has a first end articulated to a fixed axle **15** and an opposite second end articulated to said common axle **12** of the aforesaid link rods **7***a*, **7***b*, so that the path **13** of the axle **12** is an arc of a circle intersecting the parting plane **5**.

[0055] As far as the control means **16** for rotating the arm **14** are concerned, these may, for example, once again involve a roller **17** supported by a secondary arm **19** secured to the arm **14** and able to collaborate with a cam (not depicted) to cause the arm **14** to rotate (arrow **18**) about the axle **15**.

[0056] When, on the other hand, it is desirable for it to be the mold half **2***a* that has an angular travel α_a greater than that α_b of the mold half **2***b*, all that is required, as illustrated in FIG. **3**C, is to switch the position of the drive arm **14** and the position of the path **13** of the axle **12** with respect to the parting plane **5**.

[0057] It must be emphasized that, in this third embodiment, the mold and the link rods retain their current classical structure and the provisions afforded by the invention relate to the drive arm **14** and to the control means **16** in such a way that the path **13** of the axle **12** runs transversely to the parting plane **5**.

[0058] Whatever the embodiment envisioned, the arrangements according to the invention and which have just been explained in detail with reference to FIGS. **1**A-**1**C, **2**A-**2**C and **3**A-**3**C can find an especially beneficial application in molding devices produced in the form of rotary devices of the carousel type, which combine several molding devices distributed about the periphery of a rotary base. Carousels arranged in this way are well known in the art and there is no need to describe them in detail here. FIGS. **1**A-**1**C, **2**A-**2**C and **3**A-**3**C do not show any structural element thereof and illustrate only the single feature that is of benefit in the context of the invention, namely the direction of rotation of the carousel depicted schematically by an arrow **20**. It must also be emphasized that, in general, the parting plane **5** of each mold **1** of the carousel runs substantially radially (the center of rotation of the carousel is not shown in the figures).

[0059] In this context, provision may be made for it to be the rear mold half (considered in the direction **20** in which the

carousel rotates), namely the mold half **2***a*, which has an angle of opening α_a, with respect to the parting plane **5**, which is greater than that α_b of the other mold half **2***b*. This configuration is shown in FIGS. **1**C, **2**C and **3**C. It may be useful in particular to make it easier to load the mold with a parison (such as a preform) from a loading wheel equipped with moving loading arms, particularly arms of simplified structure in which the end gripper cannot be moved, at least over part of its travel, precisely radially within the mold.

[0060] Conversely, provision may also be made for it to be the front mold half (considered in the direction **20** in which the carousel rotates), namely the mold half **2***b*, which has an angle of opening α_b, with respect to the parting plane **5**, which is greater than that α_a of the other mold half **2***a*. This configuration is illustrated in FIGS. **1**B, **2**B and **3**B. It may be useful in particular to make it easier to extract a finished container from the mold, for example to grasp it and move it using an unloading arm of an unloading wheel, particularly when using an arm of simplified structure in which the end gripper cannot be moved, at least over part of its travel, exactly radially within the mold.

[0061] Of course, in the first and third embodiments, the preceding two arrangements can be combined sequentially so that each mold of the carousel, in two angularly shifted positions in the rotary travel of the carousel, undergoes an opening operation in which the rear mold half is opened wider for loading the parison, then an opening operation in which the front mold half is opened wider for extracting the finished container. To this end, all that is required, in the first embodiment, is for the control cams controlling the two rollers **9***a*, **9***b* to be configured accordingly; in the third embodiment, all that is required is for each drive arm **14** to be equipped with two separate rollers **17** arranged as shown in FIGS. **1**C and **1**B or **3**C and **3**B and able functionally to collaborate with two separate respective cams.

1. A method for controlling the opening and closing of a blow-molding mold of the hinged mold type for the manufacture of thermoplastic containers, particular PET containers, by blow-molding or stretch-blow-molding heated parisons, said mold comprising at least two mold halves that can be separated from one another by rotation about a fixed common axle of articulation,

wherein said two mold halves are opened asymmetrically on each side of their parting plane,

whereby the widest-open mold half leaves more space for the introduction into the mold of an auxiliary member such as a gripper arm.

2. The method as claimed in claim **1**, wherein said two mold halves are controlled individually so that they open asymmetrically on each side of the parting plane.

3. The method as claimed in claim **1**, said two mold halves being controlled jointly by means of two respective link rods having first ends coupled rotationally (via the links) to said respective mold halves and second ends coupled rotationally to one another at a common axle that can move approximately parallel to the parting plane,

wherein said two link rods have different lengths, the difference in their lengths being related to the difference in the asymmetric angles of opening of the two respective mold halves on each side of the parting plane, and wherein said common axle moves along a path external to the parting plane.

4. The method as claimed in claim **1**, said two mold halves being controlled jointly via two respective link rods of substantially the same length and having first ends coupled rotationally by links to said respective mold halves and second ends coupled rotationally to one another at a movable common axle,

wherein said common axle can move in a path that is inclined with respect to the parting plane, the angle of inclination of the path being related to the asymmetry of opening of said two mold halves on each side of the parting plane.

5. The method as claimed in claim **1**, said mold belonging to a rotary molding device of the carousel type moving in a direction of rotation, and the parting plane of the mold running substantially along a radius of the molding device, wherein the rear mold half (considered in the direction in which the molding device rotates) has an angle of opening, with respect to said parting plane, which is greater than that of the front mold half.

6. The method as claimed in claim **1**, said mold belonging to a rotary molding device of the carousel type having a direction of rotation, and the parting plane of the mold running substantially along a radius of the molding device, wherein the front mold half (considered in the direction in which the molding device rotates) has an angle of opening, with respect to said parting plane, which is greater than that of the rear mold half.

7. A molding device for manufacturing thermoplastic containers, particularly PET containers, by blow-molding or stretch-blow-molding heated parisons, said molding device comprising at least one blow-molding mold of the hinged mold type with at least two mold halves which can be separated from one another by rotation about a common axle of articulation under the action of actuating means, said molding device being designed for implementing the method as claimed in claim **1**,

wherein the actuating means are designed in such a way that the two mold halves have respective angles of opening on each side of the parting plane of said mold which are not equal.

8. The molding device as claimed in claim **7**, wherein the actuating means comprise two distinct actuating means each functionally associated with a respective one of said two mold halves, and wherein said two actuating means are functionally associated with individual controls, independent of one another, so as to define respective angles of opening of said two mold halves one on each side of the parting plane which are not equal.

9. The molding device as claimed in claim **7**, in which the actuating means comprise two link rods having first ends rotationally connected by links respectively to said two mold halves and second ends rotationally connected at a common axle and control means capable of moving said common axle in a path running approximately parallel to the parting plane,

wherein said two link rods have different lengths and in that the path of the common axle is external to the parting plane, the mold half driven by the shorter link rod having an angle of opening, with respect to the parting plane, which is larger than that of the other mold half.

10. The molding device as claimed in claim **9**, wherein the control means comprise a drive arm running transversely to the parting plane and wherein said drive arm has a first end articulated to a fixed axle and an opposite second end articulated to said axle common to the aforesaid link rods.

11. The molding device as claimed in claim **7**, in which the actuating means comprise two link rods of substantially the same length and having respective first ends rotationally con-

nected by links to the two mold halves respectively and opposite second ends rotationally connected at a common axle, control means being functionally associated with said common axle in order to move it,

wherein said control means for controlling the common axle are designed to drive said common axle in a path running approximately transversely to the parting plane and inclined at an angle with respect thereto, the angle of inclination of this path being related to the asymmetry of opening of the two respective mold halves.

12. The molding device as claimed in claim **11**, wherein the control means comprise a drive arm running approximately transversely to the parting plane Abut inclined at an angle with respect thereto, and wherein said drive arm has a first end articulated to a fixed axle and an opposite second end articulated to said axle common to the aforesaid link rods.

13. The molding device as claimed in claim **7**, built in the form of a rotary device of the carousel type moving in a direction of rotation, the parting plane of the mold running substantially radially, wherein it is the rear mold half (considered in the direction in which the carousel rotates) which has an angle of opening, with respect to the parting plane, which is greater than that of the other mold half.

14. The molding device as claimed in claim **7**, built in the form of a rotary device of the carousel type moving in a direction of rotation, the parting plane of the mold running substantially radially, wherein it is the front mold half (considered in the direction in which the carousel rotates) which has an angle of opening, with respect to the parting plane, which is greater than that of the other mold half.

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