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(54) **NECK RING COOLING**

HALSRINGKÜHLUNG

REFROIDISSEMENT D'UN ANNEAU DE GOULOT

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(56) References cited:
EP-A- 0 297 021
EP-A- 0 896 957
DE-A1- 19 838 698
GB-A- 1 122 899
US-A- 4 655 813
US-A- 5 358 542

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Description

Field of the Invention

[0001] The present invention relates generally to glassware forming machines, and more particularly to a device for cooling a neck ring assembly in a glassware forming machine.

Background of the Invention

[0002] Individual section glassware forming machines typically include an invert arm assembly that is oscillated or rotated approximately 180° to transfer a glass parison from a blank mold to a final blow mold in which the glassware is formed into its desired final shape. A glass gob is received in a mold cavity of a blank mold and formed into a parison that is carried by neck ring tooling on the invert arm assembly The invert arm assembly is then inverted by rotation about a longitudinal axis to dispose the parison into the final mold. Thereafter, the invert arm is returned to its starting position adjacent to the blank mold for a subsequent cycle. Considerable heat is required to maintain the formability of the molten glass gobs as they are formed into articles of glassware, such as glass containers. Accordingly, the devices used to form the glass gobs into the glass containers must be capable of continued operation in this high heat environment.

[0003] German patent application DE 198 38 698 A1 describes an apparatus for cooling of a preform and a mouth form in a glassware forming machine. Cooling medium is provided from a.cooling box through channels of an air plenum and cooling channels in the walls of the mouth form.

Summary of the Invention

[0004] A device for directing cooling air onto a neck ring in a glassware molding machine that includes at least one stationary blank mold station having at least one plunger cylinder with an axis and at least one neck ring arm selectively aligned with the blank mold station, and at least one neck ring carried by a neck ring arm and movable into a forming position at the blank mold station coaxially with the axis. The device includes at least one air plenum stationarily disposed at the blank mold station and having an internal cavity for receiving cooling air flowing laterally inwardly toward the axis and having at least one outlet opening adjacent to the axis, and a plunger wear plate stationarily disposed overlying at least a portion of the air plenum, and having an array of axially oriented openings for receiving air directed from the air plenum. The device further includes a plurality of openings in the neck ring arm for receiving air from the openings in the plunger wear plate across a gap between the neck ring arm and the plunger wear plate when the neck ring arm overlies the plunger wear plate, and a plurality of air passages in the neck ring for receiving air from the neck ring arm openings.

[0005] In one presently preferred implementation, the blank mold station is mounted on a hollow section box that is internally pressured with cooling air, and the device further includes an air passage from within the section box to the plenum internal cavity to provide cooling air flow from the section box to the plenum. In this manner, cooling air is immediately provided from the section box to and through the invert arm assembly and onto the neck ring tooling.

[0006] According to another aspect of the present invention, a method is provided for cooling a neck ring in a glassware forming machine that includes a section box providing a supply of cooling air, and a plunger cylinder having an axis. The method includes the steps of providing an air plenum having an internal cavity defining a flow path that extends radially toward the axis and axially to an outlet, providing an air passage adjacent to the said neck ring that is aligned with the outlet of the air plenum, and directing cooling air from the section box to the air passage so the cooling air flows radially in the air plenum toward the axis, and then axially from the outlet to the air passages to cool the neck ring.

Brief description of the Drawings

[0007] These and other objects, features, advantages and aspects of the present invention will be apparent from the following detailed description of the preferred embodiments and best mode, appended claims and accompanying drawings in which:

FIG. 1 is a fragmentary perspective view of a portion of an individual section glassware forming machine and an invert arm assembly with neck ring tooling according to one presently preferred embodiment of the invention;

FIG. 2 is an enlarged fragmentary perspective view illustrating the invert arm assembly of FIG. 1 with some of the neck ring tooling removed;

FIG. 3 is a fragmentary perspective view of a section box top plate and neck ring cooling air plenum assembly;

FIG. 4 is an enlarged perspective view illustrating a portion of the neck ring cooling air plenum and a damper valve assembly that is partially broken away to illustrate details of the damper valve;

FIG. 5 is a fragmentary sectional view of a portion of the neck ring cooling air plenum illustrating a path of air flow therethrough; and

FIG. 6 is a fragmentary perspective sectional view of a portion of the neck ring cooling air plenum.

Detailed Description of the Preferred Embodiments

[0008] Referring in more detail to the drawings, FIG. 1 illustrates a portion of an individual section glassware forming machine 10 including a neck ring cooling assem-

bly 12 according to one presently preferred embodiment of the present invention. The individual section glassware forming machine 10 includes a blank mold station wherein glass gobs are received in blank mold cavities and arc formed into glass parisons carried by neck rings 16 on neck ring arms 14. The neck ring arms 14 are carried by an invert arm assembly (not shown) and are driven 180° about a longitudinal axis to dispose the glass blanks carried by neck rings 16 in cavities of a final blow mold. In the final blow mold the glass blank are blow molded into articles of glassware, such as glass containers. The articles of glassware are released from the neck rings 16 and the neck ring arms 14 are reciprocated back to their starting position adjacent to the blank mold for a subsequent cycle. An invert arm of the type suitable for use with an individual section machine is disclosed in U.S. Patent document 2005/0005647A1. Likewise, the section boxes, blank mold and finish molds may be of generally conventional construction, with exceptions as noted herein.

[0009] The glassware forming machine includes a section box 20 of which a top plate 22 is shown in FIG. 1. The section box 20 is closed and is preferably pressurized with cooling air at a pressure of about 2-3 psi, by way of example without limitation. A valve 24 is disposed adjacent to an outlet 26 (FIG. 5) of the top plate 22 and is adapted to control the flow of cooling air therethrough. The valve 24 may be controlled by a remotely located solenoid, and may be pneumatically driven to its closed position and yieldably biased to its open position. When closed, the valve 24 prevents cooling air flow out of the section box 20 through the outlet 26, and when open, the valve 24 permits flow of cooling air out of the outlet 26.

[0010] A cooling air flow valve assembly, or damper valve assembly 30 is disposed downstream of the outlet 26 and is constructed and arranged to control the rate at which cooling air flows therethrough. The damper valve assembly 30 is carried on a mounting plate 32 fixed to the top plate 22 and includes an annular generally cylindrical collar 34 fixed to the mounting plate 32, a cylindrical housing 36 disposed within the collar 34, and a valve body 38 (FIGS. 4 and 5) disposed within the housing 36. The housing 36 is preferably slidably received within the collar 34 for relative axial movement of the housing 36 relative to the collar 34 and the section box top plate 22. As best shown in FIG. 4, the collar 34 preferably includes a circumferential groove 40 in its inner surface to receive an O-ring or other seal 42 between the collar 34 and housing 36 for a fluid tight seal between them. The housing 36 is connected to a laterally extending bracket or tube assembly 46 which in turn is connected to and moveable with an air plenum 48, as will be set forth in more detail.

[0011] The valve body 38 is received for rotation within the housing 36 on an integral shaft and a bolt 44, and is axially supported by a retaining ring 45 in the housing 36. The valve body 38 is preferably a hollow cylinder having a circumferentially and axially extending opening 50 formed through its side wall 52 defining a portion of the flow path of the cooling air from the section box to the neck rings 16. A detent ball 54 may be carried by the valve body 38 along with a compression spring 55 that forces the detent ball 54 into one or more holes or detents 56 formed in an inner surface 57 of the tube assembly 46 to releaseably retain the valve body 38 in one of a plurality of positions. The maximum rotation of the valve body 38 can be controlled with a screw 60 disposed within a circumferentially extending slot 62 in an upper surface 58 of the valve body 38 such that engagement of the screw 60 with the ends of the slot 62 limits the rotation of the valve body 38.

[0012] The opening 50 in the valve body 38 is selectively and variably aligned with an opening 63 (FIG. 5) in the housing 36 that is communicated with a passage 64 formed in the tube assembly 46. Preferably, the valve body 38 can be rotated so that the opening 50 is completely out of alignment with the passage 64, thereby preventing or at least substantially restricting cooling air flow into the passage 64 when desired. The valve body 38 can also be manually rotated to various positions as preferably determined by the detent arrangement to vary and adjust the flow area of the opening 50 that is aligned with the passage 64 to thereby vary the flow rate through the valve 38 and into the passage 64.

[0013] The tube assembly 46 preferably extends outwardly from and may be part of the air plenum 43 that is stationary and carried on a plunger cylinder housing 70 mounted on the section top plate 22 such as by a plurality of machine screws 72. The plunger cylinder housing 70 includes, in the embodiment shown, three generally cylindrical cavities 74 that define at least in part three separate plunger cylinders 76 each adapted to receive a plunger in a press-and-blow type individual section glassware forming machine. Each plunger cylinder 76 has an axis that is parallel with an axis of the blank mold station. A plunger cylinder cap 78 may be disposed on the plunger cylinder housing 70 and preferably includes an annular and generally cylindrical skirt 80 for each plunger cylinder 76 so that the cap 78 defines part of the plunger cylinders 76. The height of the damper valve housing 36 is changed when the plunger cylinder height is changed which raises or lowers the air plenum 48 that is attached to them. To accommodate such variation in the axial height of the tube assembly 46, the damper valve housing 36 is slidably received within the collar 34 with an airtight seal provided by the seal 42 between them in all positions of the damper valve housing 36.

[0014] At its other end, the passage 64 in the tube assembly 46 communicates with the air plenum 48. The air plenum 48 preferably includes a pair of plates 82, 84 mated together with a passage or internal cavity 86 defined between them to permit air flow from the tube assembly 46 and into the cavity 86. At least one of the plates 82, 84 includes a plurality of generally cylindrical holes 88 coaxially aligned with the plunger cavities 74 and defining in part the plunger cylinders 76. As best shown in

FIG.2, an upper plate 82 of the air plenum 48 preferably includes a plurality of arcuate slots that define outlet openings 90 adjacent to and spaced radially outwardly from the holes 88 each communicating with the air cavity 86 to permit cooling air flow therethrough. Accordingly, the outlet openings 90 are adjacent to the axis of their respective plunger cylinders 76.

[0015] A plunger wear plate 92 is disposed on the upper plate 82 of the air plenum 48 and in use is adjacent to the neck ring arms 14 when the neck ring arms 14 are at the blank mold side of the individual section glassware forming machine 10. The plunger wear plate 92 may be stationarily connected to the air plenum 48 by a plurality of machine screws 94. The plunger wear plate 92 preferably includes a plurality of openings 96, with each opening 96 coaxially aligned with a separate one of the plunger cavities 74 and defining in part a plunger cylinder 76. An array of axially oriented openings 98 in the plunger wear plate 92 are provided spaced radially outwardly from each opening 96 and circumferentially spaced from each other with each opening 98 being aligned with a respective one of the outlet openings 90 in the air plenum 48 to permit air flow from the air plenum 48 through the plunger plate openings 98.

[0016] As best shown in FIG. 2, the neck ring arms 14 are preferably mirror images of each other with each including a plurality of arcuate recesses 100 that when the arms are closed together, define a plurality of circular openings that are preferably coaxially aligned with the plunger cylinders 76. A plurality of sets of neck rings 16 are carried by the arms with each set of tooling including two neck ring halves 102. One neck ring half 102 of each set is carried by a separate one of the neck ring arms 14 so that when the neck ring arms 14 are brought together, the neck rings 16 are moved to a closed position with the halves 102 of each set of neck rings 16 being closed together. The neck ring arms 14 are also moveable away from each other to separate the halves 102 of the neck rings 16 and to release the neck rings 16 from a finish of a molded glassware article.

[0017] As best shown in FIG. 2, each neck ring arm 14 includes a radially inwardly extending arcuate channel 104 in which a portion of the neck rings 16 is received to facilitate mounting and locating the neck rings 16 on the neck ring arms 14. The channel 104 defines in part, upper and lower rims 106, 108, respectively, through which a plurality of aligned openings or bores 110 extend with each bore 110 opening into the channel 104 and being circumferentially spaced from adjacent bores 110. Additionally, each bore 110 is preferably aligned with a through bore 98 in the plunger wear plate 92 to receive air that passes through the plunger wear plate 92 and across a gap between the plunger wear plate 92 and the neck ring arms 14 when the neck ring arms 14 are disposed over the plunger wear plate 92.

[0018] Each half 102 of each set of the neck rings 16 includes a radially outwardly extending flange 112 disposed in the recess 104 of an neck ring arm 14. Axially extending slots 114 formed in the flange 112 each define part of a plurality air passages 115 that permit air flow between the neck ring arm 14 and neck rings 16. The neck rings 16 preferably also include a plurality of slots 116 or cavities extending above the neck ring arms 14 that also define part of the air passage and through which air that passes through the neck ring arms 14 is discharged to the atmosphere. The upper slots 116 or cavities are preferably angled or tapered radially outwardly to direct the air flow away from the finish of containers or blank molds carried by the neck rings 16 to prevent premature cooling of the blank molds or containers. Otherwise, the neck ring arms 14 or neck rings 16 can be of substantially conventional construction including a central bore coaxially aligned with the plunger cylinders when the neck ring tooling is in position to form and hold the finish of the articles of glassware.

[0019] Accordingly, as best shown in FIGS. 5 and 6, cooling air flows from the pressurized section box 20, upward or axially through the flow control valve 24, axially into and radially out of the damper valve 30 toward the axis, radially into and axially out of the passage 64 in the tube assembly 46, axially into, radially within toward the axis of the plunger cylinders, and axially out of the air plenum 48, and axially into and through the plunger wear plate 92 and into the neck ring arms 14. In the neck ring arms 14, the cooling air is passed axially through the bores 110 in the neck ring arms 14 and the slots 114, 116 in the neck rings 16 to cool them in use. Desirably, the cooling air flow path from the section box 20 to the neck ring arms 14 and neck rings 16 is separate from the cooling system used to cool the blank molds or other components of the individual section glassware forming machine 10. Accordingly, the neck rings 16 and neck ring arms 14 can be cooled as desired without regard to the cooling of other components of the individual section glassware forming machine 10.

[0020] While certain preferred embodiments, construction and arrangements of the neck ring cooling system have been shown and described herein, one of ordinary skill in this art will readily understand that modifications and substitutions can be made without departing from the invention as defined by the appended claims.

Claims

1. A device for directing cooling air onto a neck ring (16) in a glassware molding machine (10) that includes at least one stationary blank mold station having at least one plunger cylinder (76) with an axis, at least one neck ring arm (14) selectively aligned with the blank mold station, and at least one neck ring (16) carried by a neck ring arm and movable into a forming position at said blank mold station coaxially with said axis, said device including:

   at least one air plenum (48) stationarily disposed

at said blank mold station, said air plenum having an internal cavity (86) for receiving cooling air flowing laterally inwardly toward said axis and having at least one outlet opening (90) adjacent to said axis,

characterized by

a plunger wear plate (92) stationarily disposed overlying at least a portion of said air plenum, and having an array of axially oriented openings (98) for receiving air directed from said air plenum,

a plurality of openings (110) in said neck ring arm for receiving air from said openings in said plunger wear plate across a gap between said neck ring arm and said plunger wear plate when said neck ring arm overlies said plunger wear plate, and

a plurality of air passages (115, 116) in said neck ring for receiving air from said neck ring arm openings.

2. The device set forth in claim 1 wherein said blank mold station is mounted on a hollow section box (20) that is internally pressured with cooling air, and further includes an air passage from within said section box and communicated with said plenum internal cavity.

3. The device set forth in claim 2 wherein said air passage includes a control valve (24) that is selectively operable to feed cooling air to said plenum when said neck ring arm overlies said plunger wear plate.

4. The device set forth in claim 3 wherein said air passage includes a damper valve (30) for operator adjustment of air flow to said plenum when said control valve is open.

5. The device set forth in claim 4 wherein said damper valve is surrounded by a cylindrical housing (36) that is adjustably and sealingly mounted on said section box.

6. The device set forth in claim 5 wherein said housing (36) is received for axially movement relative to the section box.

7. The device set forth in one of claims 4 to 6 wherein said damper valve (30) includes a detent mechanism (54, 55, 56) that permits the damper valve to be releasably maintained in a plurality of positions corresponding to a plurality of air flow rates through the damper valve.

8. The device set forth in one of claims 4 to 7 including a bracket (46) which supports the damper valve (30) and includes a passage (64) communicating at one end with the damper valve to receive air that flows out of the damper valve and at its other end with the air plenum to direct air from the damper valve to the air plenum.

9. The device set forth in claim 8 wherein said passage (64) in the bracket (46) includes a portion oriented generally radially inwardly toward the air plenum and a portion extending axially to the air plenum.

10. The device set forth in one of the preceding claims wherein said air passages (115, 116) in said neck ring include a portion (116) constructed to direct air radially outwardly therefrom.

11. The device set forth in claim 10 wherein said portion (116) of said air passages in said neck ring extends axially in said neck ring and is tapered radially outwardly.

12. The device set forth in one of the preceding claims wherein the neck ring (16) includes a portion (114) received in the neck ring arm (14) and a portion extending out of the neck ring arm, and said air passage is formed at least in part in each of said portions of the neck ring.

13. The device set forth in claim 2 which also includes a damper valve (30) adapted to control the flow of cooling air from said section box (20) to said air plenum (48).

14. The device set forth in claim 13 wherein said damper valve (30) includes an outlet and is adjustable to vary the flow area of the outlet.

15. The device set forth in claim 13 or 14 wherein the damper valve (30) is carried by the air plenum (48) and is axially adjustable relative to the section box (20).

16. A method of cooling a neck ring (16) carried by a neck ring arm (14) in a glassware forming machine (10) including a section box (20) providing a supply of cooling air, and a plunger cylinder (76) having an axis, including the steps of:

providing an air plenum (48) having an internal cavity (86) defining a flow path that extends radially toward said axis and axially to an outlet,

providing an air passage (115,116) adjacent to said neck ring, said air passage being aligned with the outlet of the air plenum, and

directing cooling air from said section box (20) to said air passage so said cooling air flows radially in said air plenum (48) toward said axis and axially to said outlet, and

characterized in that

said cooling air is then directed axially from said

outlet through an array of axially oriented openings (98) in a plunger wear plate (92) to said air passage to cool the neck ring, wherein said air passage (115, 116) is defined at least in part in said neck ring arm (14) so that said step of directing cooling air also provides cooling air to at least a portion of the neck ring arm, when said neck ring arm overlies said plunger wear plate.

17. The method of claim 16 which also includes the step of providing a damper valve (30) between the section box and the air plenum, said damper valve including an adjustable outlet to control the rate of cooling air flow to the air plenum.

18. The method of claim 16 or 17 wherein said air plenum (48) is adjustable carried on said section box (20) and which also includes the step of adjusting the position of the air plenum relative to the section box.

19. The method of claim 18 which also includes providing a seal in the flow path between the air plenum and the section box that maintains a fluid-tight seal of the flow path between the section box and the air plenum in all positions of the air plenum.

Patentansprüche

1. Vorrichtung zum Leiten von Kuhlluft auf einen Halsring (16) in einer Glaswarenformungsmaschine (10), die mindestens eine stationäre Rohlingsformstation aufweist, die mindestens einen Plungerzylinder (76) mit einer Achse, mindestens einen Halsringarm (14), der sich gezielt mit der Rohlingsformstation ausrichten lasst, und mindestens einen Halsring (16) aufweist, der durch einen Halsringarm getragen wird und in eine Formungsstellung an der Rohlingsformstation koaxial zu der Achse bewegbar ist, wobei die Vorrichtung umfasst:

mindestens einen Luftverteiler (48), der stationär an der Rohlingsformstation angeordnet ist, wobei der Luftverteiler einen inneren Hohlraum (86) zur Aufnahme von Kuhlluft aufweist, die seitlich nach innen, zu der Achse hin strömt, und mindestens eine Auslassoffnung (90) angrenzend an die Achse aufweist,

gekennzeichnet durch

eine Plunger-Verschleißplatte (92), die stationar uber zumindest einem Teil des Luftverteilers liegend angeordnet ist und die eine Anordnung von axial ausgerichteten Offnungen (98) zur Aufnahme von Luft aufweist, die aus dem Luftverteiler geleitet wird,
eine Mehrzahl von Offnungen (110) in dem Halsringarm zum Aufnehmen von Luft aus den Offnungen in der Plunger-Verschleißplatte uber einen Spalt zwischen dem Halsringarm und der Plunger-Verschleißplatte hinweg, wenn der Halsringarm uber der Plunger-Verschleißplatte liegt, und
eine Mehrzahl von Luftkanalen (115, 116) in dem Halsring zur Aufnahme von Luft aus den Offnungen des Halsringarms.

2. Vorrichtung nach Anspruch 1, wobei die Rohlingsformstation auf einem hohlen Abschnittsgehause (20) montiert ist, in dem sich unter Druck stehende Kuhlluft befindet, und die weiterhin einen Luftkanal aufweist, der aus dem Inneren des Abschnittsgehauses herausfuhrt und mit dem inneren Hohlraum des Verteilers in Verbindung steht.

3. Vorrichtung nach Anspruch 2, wobei der Luftkanal ein Regelventil (24) umfasst, das gezielt betatigt werden kann, um dem Verteiler Kuhlluft zuzufuhren, wenn der Halsringarm uber der Plunger-Verschleißplatte liegt.

4. Vorrichtung nach Anspruch 3, wobei der Luftkanal ein Drosselventil (30) aufweist, und zwar zur Einstellung der Luftstromung zu dem Verteiler durch eine Bedienperson, wenn das Regelventil geoffnet ist.

5. Vorrichtung nach Anspruch 4, wobei das Drosselventil von einem zylindrischen Gehause (36) umgeben ist, das einstellbar und abdichtend an dem Abschnittsgehause montiert ist.

6. Vorrichtung nach Anspruch 5, wobei das Gehause (36) zur axialen Verschiebung relativ zu dem Abschnittsgehause aufgenommen ist.

7. Vorrichtung nach einem der Anspruche 4 bis 6, wobei das Drosselventil (30) einen Arretierungsmechanismus (54, 55, 56) umfasst, der ein losbares Halten des Drosselventils in einer Mehrzahl von Positionen ermöglicht, die einer Mehrzahl von Luftstromungsraten durch das Drosselventil hindurch entsprechen.

8. Vorrichtung nach einem der Anspruche 4 bis 7, welche einen Ausleger (46) umfasst, der das Drosselventil (30) halt und einen Kanal (64) umfasst, der an einem Ende mit dem Drosselventil in Verbindung steht, um Luft aufzunehmen, die aus dem Drosselventil ausstromt, und der an seinem anderen Ende mit dem Luftverteiler in Verbindung steht, um Luft von dem Drosselventil zu dem Luftverteiler zu leiten.

9. Vorrichtung nach Anspruch 8, wobei der Kanal (64) in dem Ausleger (46) einen Abschnitt aufweist, der allgemein radial nach innen, zu dem Luftverteiler hin gerichtet ist, sowie einen Abschnitt, der sich axial zu

dem Luftverteiler erstreckt.

10. Vorrichtung nach einem der vorhergehenden Anspruche, wobei die Luftkanale (115, 116) in dem Halsring einen Abschnitt (116) umfassen, der dafur ausgebildet ist, Luft von diesen radial nach außen zu leiten.

11. Vorrichtung nach Anspruch 10, wobei sich der Abschnitt (116) der Luftkanale in dem Halsring axial in dem Halsring erstreckt und radial nach außen schrag ist.

12. Vorrichtung nach einem der vorhergehenden Anspruche, wobei der Halsring (16) einen Abschnitt (114) umfasst, der in dem Halsringarm (14) aufgenommen ist, sowie einen Abschnitt, der sich aus dem Halsringarm heraus erstreckt, und wobei der Luftkanal zumindest teilweise in jedem der Abschnitte des Halsrings ausgebildet ist.

13. Vorrichtung nach Anspruch 2, welche außerdem ein Drosselventil (30) umfasst, das dafur ausgelegt ist, den Kuhlluftstrom von dem Abschnittsgehause (20) zu dem Luftverteiler (48) zu regulieren.

14. Vorrichtung nach Anspruch 13, wobei das Drosselventil (30) einen Auslass aufweist und einstellbar ist, um den Durchflussbereich des Auslasses zu variieren.

15. Vorrichtung nach Anspruch 13 oder 14, wobei das Drosselventil (30) durch den Luftverteiler (48) gehalten wird und in Bezug auf das Abschnittsgehause (20) axial verstellbar ist.

16. Verfahren zum Kuhlen eines Halsrings (16), der durch einen Halsringarm (14) getragen wird, in einer Glaswarenformungsmaschine (10), die ein Abschnittsgehause (20) umfasst, das eine Kuhlluftzufuhr bereitstellt, sowie einen Plungerzylinder (76) mit einer Achse, mit folgenden Schritten:

Bereitstellen eines Luftverteilers (48) mit einem inneren Hohlraum (86), der einen Stromungsweg definiert, welcher sich radial zu der Achse und axial zu einem Auslass hin erstreckt,
Bereitstellen eines Luftkanals (115, 116) angrenzend an den Halsring, wobei der Luftkanal mit dem Auslass des Luftverteilers ausgerichtet ist, und
Leiten von Kuhlluft von dem Abschnittsgehäuse (20) zu dem Luftkanal in solcher Weise, dass die Kuhlluft radial in dem Luftverteiler (48) zu der Achse hin und axial zu dem Auslass strömt, und

dadurch gekennzeichnet, dass

die Kuhlluft danach axial von dem Auslass durch eine Anordnung von axial ausgerichteten Offnungen (98) in einer Plunger-Verschleißplatte (92) zu dem Luftkanal hin geleitet wird, um den Halsring zu kuhlen, wobei der Luftkanal (115, 116) zumindest teilweise in dem Halsringarm (14) gebildet ist, sodass der Schritt des Leitens von Kuhlluft außerdem das Bereitstellen von Kuhlluft an mindestens einem Abschnitt des Halsringsarms umfasst, wenn der Halsringarm uber der Plunger-Verschleißplatte liegt.

17. Verfahren nach Anspruch 16, welches außerdem den Schritt des Bereitstellens eines Drosselventils (30) zwischen dem Abschnittsgehause und dem Luftverteiler umfasst, wobei das Drosselventil einen einstellbaren Auslass zum Regulieren der Durchflussrate des Kuhlluftstroms zu dem Luftverteiler aufweist.

18. Verfahren nach Anspruch 16 oder 17, wobei der Luftverteiler (48) verstellbar auf dem Abschnittsgehause (20) gehalten wird und welches außerdem den Schritt des Einstellens der Position des Luftverteilers relativ zu dem Abschnittsgehause umfasst.

19. Verfahren nach Anspruch 18, welches außerdem das Bereitstellen einer Dichtung in dem Stromungsweg zwischen dem Luftverteiler und dem Abschnittsgehause umfasst, welche in sämtlichen Positionen des Luftverteilers eine fluiddichte Abdichtung des Stromungsweges zwischen dem Abschnittsgehause und dem Luftverteiler aufrechterhalt.

Revendications

1. Dispositif pour diriger de l'air de refroidissement jusque sur un moule (16) de bague dans une machine de moulage (10) d'articles en verre qui comprend au moins un poste à moule ébaucheur fixe ayant au moins un cylindre (76) de plongeur avec un axe, au moins un bras (14) de moule de bague aligné sélectivement avec le poste à moule ébaucheur, et au moins un moule (16) de bague porté par un bras de moule de bague et pouvant venir, coaxialement audit axe, dans une position de formage dans ledit poste à moule ébaucheur, ledit dispositif comprenant :

au moins une chambre (48) de répartition d'air disposée d'une manière fixe dans ledit poste à moule ébaucheur, ladite chambre de répartition d'air ayant une cavité interne (86) pour recevoir de l'air de refroidissement s'écoulant latéralement vers l'intérieur en direction dudit axe et ayant au moins une ouverture de sortie (90) adjacente audit axe,
caractérisé par

une plaque d'usure (92) de plongeur disposée d'une manière fixe par-dessus au moins une partie de ladite chambre de répartition d'air, et ayant une série d'ouvertures (98) à orientation axiale pour recevoir de l'air dirigé depuis ladite chambre de répartition d'air,
une pluralité d'ouvertures (110) ménagées dans ledit bras de moule de bague pour recevoir de l'air depuis lesdites ouvertures ménagées dans ladite plaque d'usure de plongeur via un espace entre ledit bras de moule de bague et ladite plaque d'usure de plongeur lorsque ledit bras de moule de bague se trouve au-dessus de ladite plaque d'usure de plongeur, et
une pluralité de passages (115, 116) d'air ménagés dans ledit moule de bague pour recevoir de l'air issu desdites ouvertures ménagées dans le bras de moule de bague.

2. Dispositif selon la revendication 1, dans lequel ledit poste à moule ébaucheur est monté dans un caisson profilé creux (20) rempli d'air de refroidissement sous pression et comporte en outre un passage d'air s'étendant depuis l'intérieur dudit caisson profilé et communiquant avec ladite cavité interne de la chambre.

3. Dispositif selon la revendication 1, dans lequel ledit passage d'air comporte une vanne de régulation (24) servant à fournir sélectivement de l'air de refroidissement à ladite chambre lorsque ledit bras de moule de bague est par-dessus ladite plaque d'usure de plongeur.

4. Dispositif selon la revendication 3, dans lequel ledit passage d'air comporte un régulateur à registre (30) permettant à un opérateur de régler le débit de l'air vers ladite chambre lorsque ladite vanne de régulation (24) est ouverte.

5. Dispositif selon la revendication 4, dans lequel ledit régulateur à registre est entouré par un logement cylindrique (36) monté d'une manière réglable et étanche sur ledit caisson profilé.

6. Dispositif selon la revendication 5, dans lequel ledit logement (36) est reçu de manière à bouger axialement par rapport au caisson profilé.

7. Dispositif selon l'une quelconque des revendications 4 à 6, dans lequel ledit régulateur à registre (30) comporte un mécanisme de positionnement (54, 55, 56) qui permet au régulateur à registre d'être maintenu d'une manière libérable dans une pluralité de positions correspondant à une pluralité de débits d'air dans le régulateur à registre.

8. Dispositif selon l'une quelconque des revendications 4 à 7, comprenant un support (46) qui supporte le régulateur à registre (30) et comporte un passage (64) communiquant, en une première extrémité, avec la vanne de régulation pour recevoir de l'air qui sort du régulateur à registre et, en son autre extrémité, avec la chambre de répartition d'air afin de diriger l'air depuis le régulateur à registre jusqu'à la chambre de répartition d'air.

9. Dispositif selon la revendication 8, dans lequel ledit passage (64) dans le support (46) comporte une partie orientée globalement radialement vers l'intérieur en direction de la chambre de répartition d'air et une partie d'étendant axialement jusqu'à la chambre de répartition d'air.

10. Dispositif selon l'une quelconque des revendications précédentes, dans lequel lesdits passages (115, 116) d'air ménagés dans ledit moule de bague comportent une partie (116) construite afin de diriger l'air radialement vers l'extérieur de ceux-ci.

11. Dispositif selon la revendication 10, dans lequel ladite partie (116) desdits passages d'air ménagés dans ledit moule de bague s'étend axialement dans ledit moule de bague et est conique radialement vers l'extérieur.

12. Dispositif selon l'une quelconque des revendications précédentes, dans lequel le moule (16) de bague comporte une partie (114) reçue dans le bras (14) de moule de bague et une partie s'étendant hors du bras de moule de bague, et ledit passage d'air est formé au moins en partie dans chacune desdites parties du moule de bague.

13. Dispositif selon la revendication 12, comprenant aussi un régulateur à registre (30) apte à réguler la circulation d'air de refroidissement depuis ledit caisson profilé (20) jusqu'à ladite chambre (48) de répartition d'air.

14. Dispositif selon la revendication 13, dans lequel ledit régulateur à registre (30) comporte une sortie et est réglable pour modifier la section d'écoulement de la sortie.

15. Dispositif selon la revendication 13 ou 14, dans lequel le régulateur à registre (30) est porté par la chambre (48) de répartition d'air et est réglable axialement par rapport au caisson profilé (20).

16. Procédé de refroidissement d'un moule (16) de bague porté par un bras (14) de moule de bague dans une machine (10) à former des articles en verre comprenant un caisson profilé (20) assurant un apport d'air de refroidissement, et un cylindre (16) de plongeur ayant un axe, comprenant les étapes consistant

à :

créer une chambre (48) de répartition d'air pourvue d'une cavité interne (86) définissant un trajet de circulation qui s'étend radialement vers ledit axe et axialement jusqu'à une sortie,
créer un passage (115, 116) d'air adjacent audit moule de bague, ledit passage d'air étant aligné avec la sortie de la chambre de répartition d'air, et
diriger de l'air de refroidissement depuis ledit caisson profilé (20) jusqu'audit passage d'air de façon que ledit air de refroidissement circule radialement dans ladite chambre (48) de répartition d'air vers ledit axe et axialement jusqu'à ladite sortie, et
caractérisé en ce que
ledit air de refroidissement est ensuite dirigé axialement depuis ladite sortie, via une série d'ouvertures (98) à orientation axiale ménagées dans une plaque d'usure (92) de plongeur jusqu'audit passage d'air afin de refroidir le moule de bague, ledit passage (115, 116) d'air étant défini au moins en partie dans ledit bras (14) de moule de bague afin que ladite étape de direction d'air de refroidissement fournisse aussi de l'air de refroidissement, ledit air de refroidissement étant ensuite dirigé axialement depuis ladite sortie, via une série d'ouvertures (98) à orientation axiale ménagées dans une plaque d'usure (92) de plongeur, jusqu'audit passage d'air afin de refroidir le moule de bague, ledit passage (115, 116) d'air étant défini au moins en partie dans ledit bras (14) de moule de bague de façon que ladite étape de direction d'air de refroidissement fournisse aussi de l'air de refroidissement à au moins une partie du bras de moule de bague, lorsque ledit bras de moule de bague se trouve au-dessus de ladite plaque d'usure de plongeur.

17. Procédé selon la revendication 16, comprenant également l'étape consistant à disposer un régulateur à registre (30) entre le caisson profilé et la chambre de répartition d'air, ledit régulateur à registre comportant une sortie réglable pour réguler le débit de l'air de refroidissement vers la chambre de répartition d'air.

18. Procédé selon la revendication 16 ou 17, dans lequel ladite chambre (48) de répartition d'air est portée d'une manière réglable sur ledit caisson profilé (20), et qui comprend aussi l'étape consistant à régler la position de la chambre de répartition d'air par rapport au caisson profilé.

19. Procédé selon la revendication 18, qui comprend également l'étape consistant à disposer, sur le trajet d'air entre la chambre de répartition d'air et le caisson profilé, un joint d'étanchéité qui maintient une étanchéité aux fluides du trajet de circulation entre le caisson profilé et la chambre de répartition d'air dans toutes les positions de la chambre de répartition d'air.

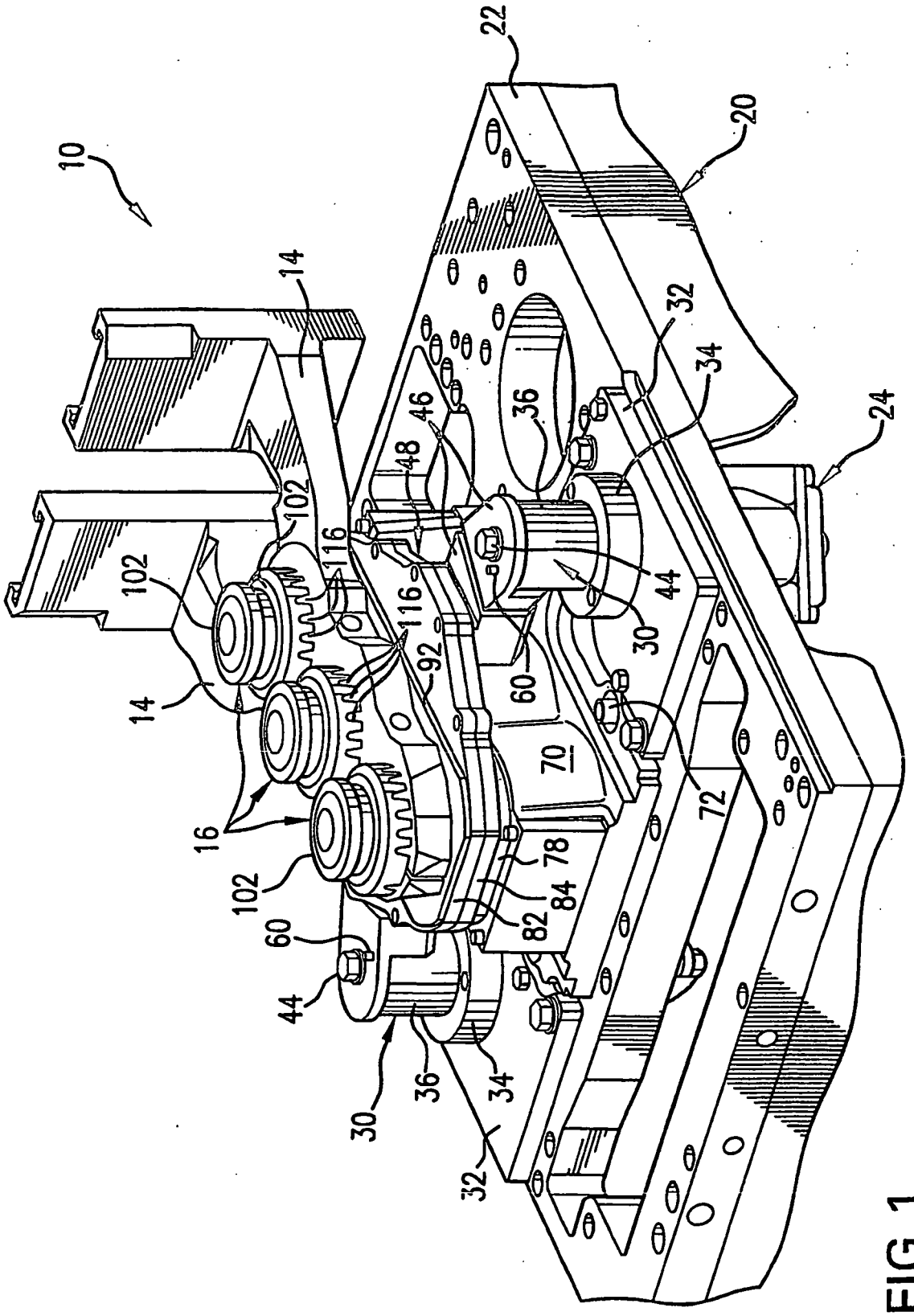
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FIG.1

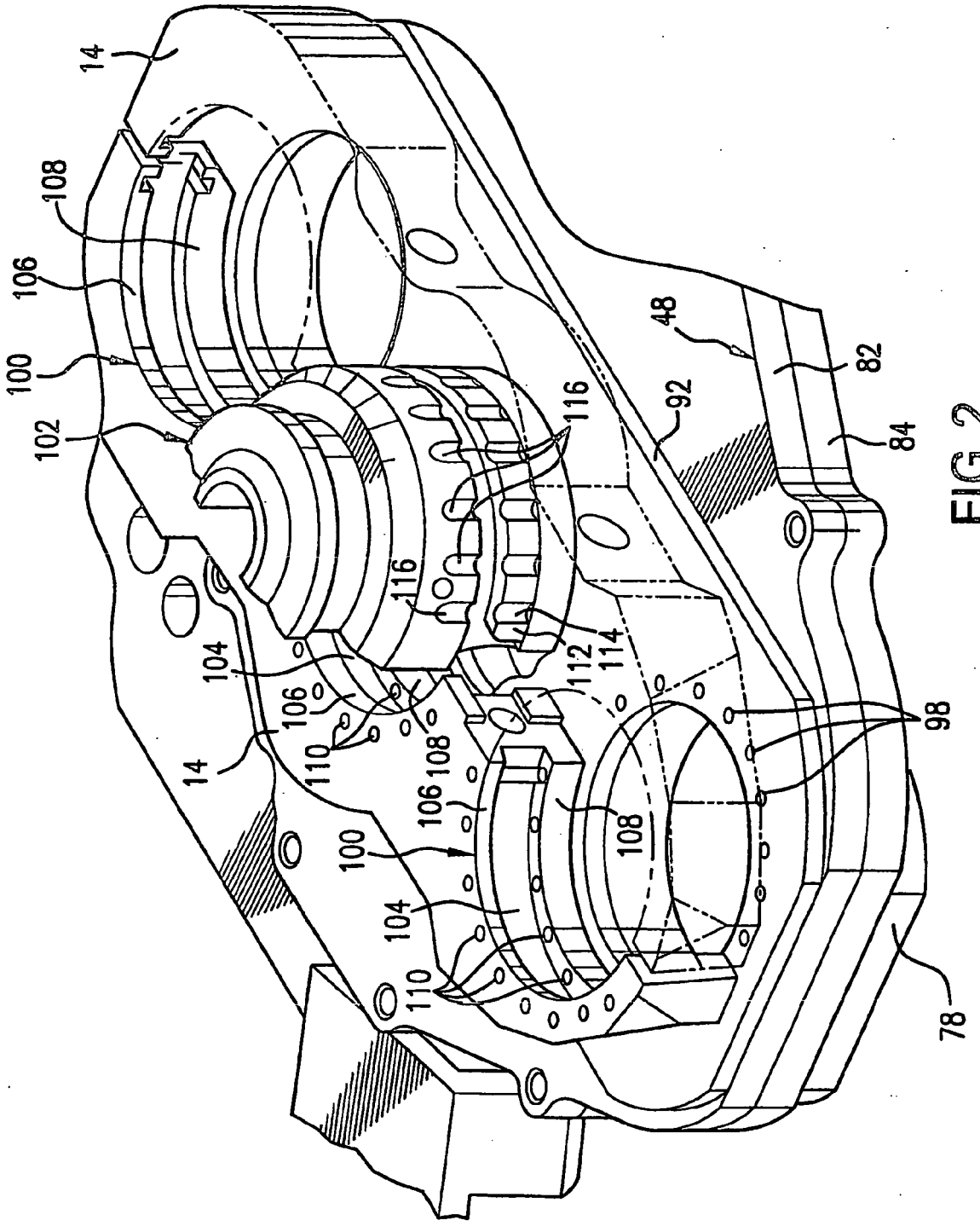
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FIG.2

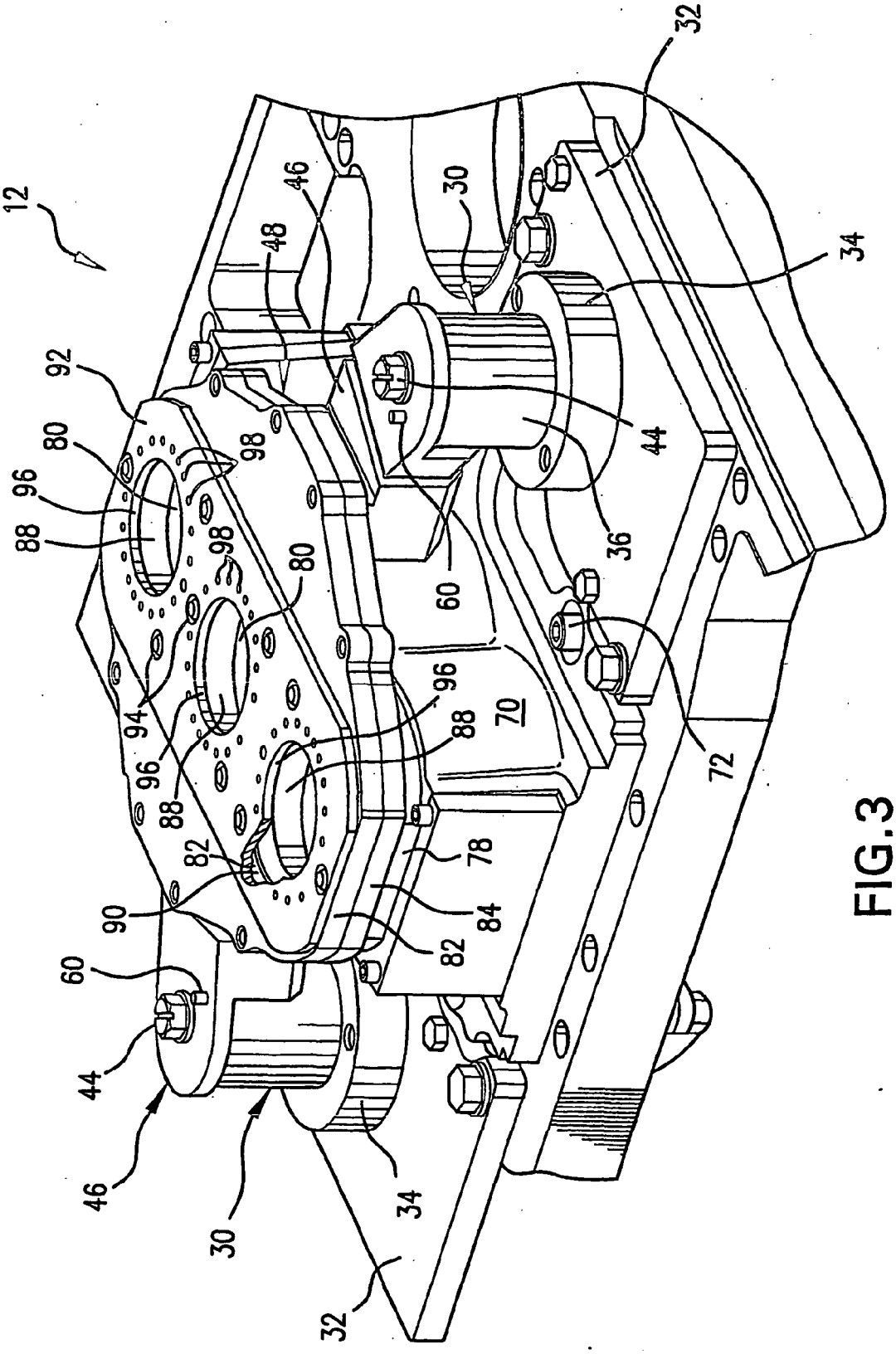

FIG.3

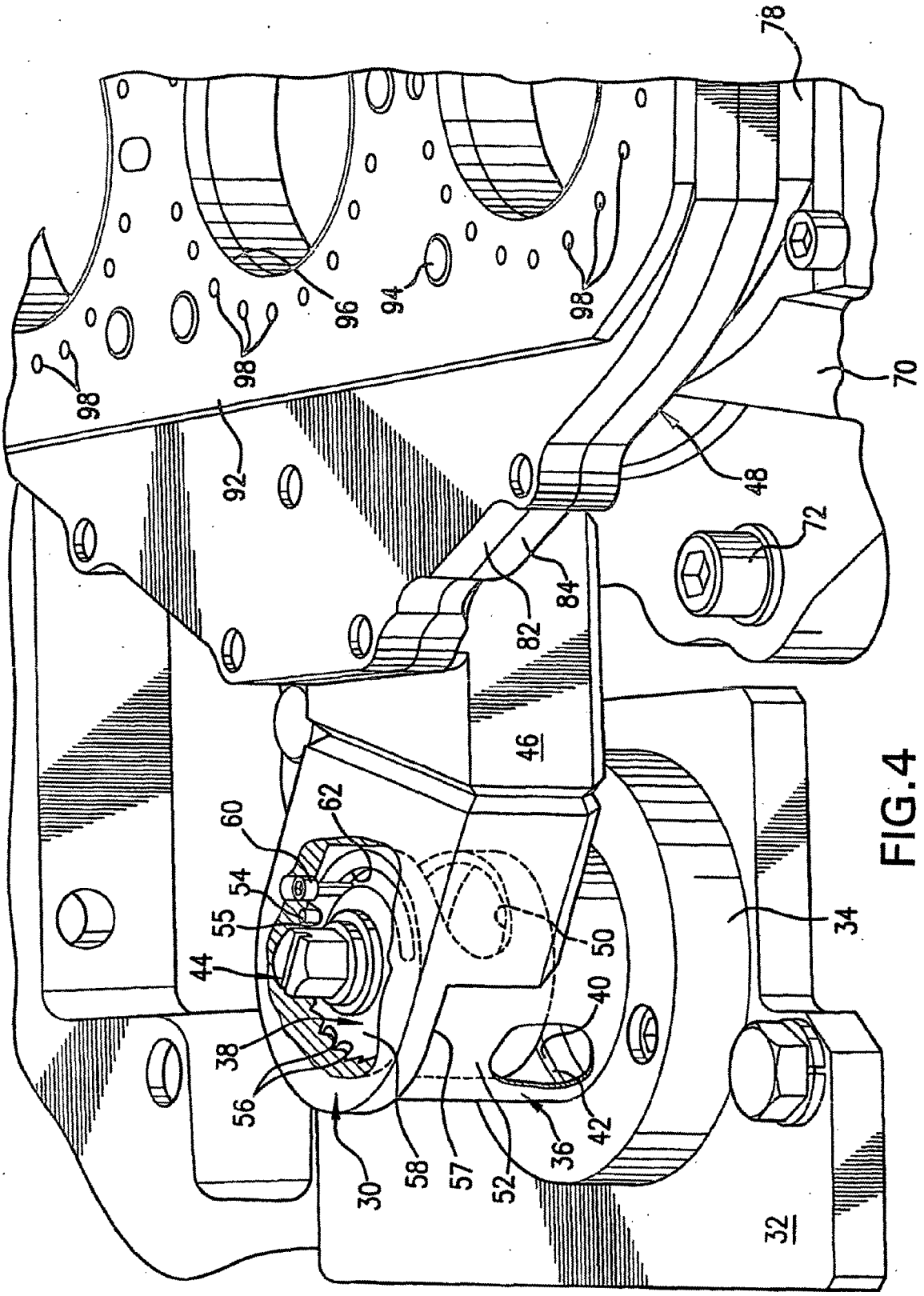
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FIG.4

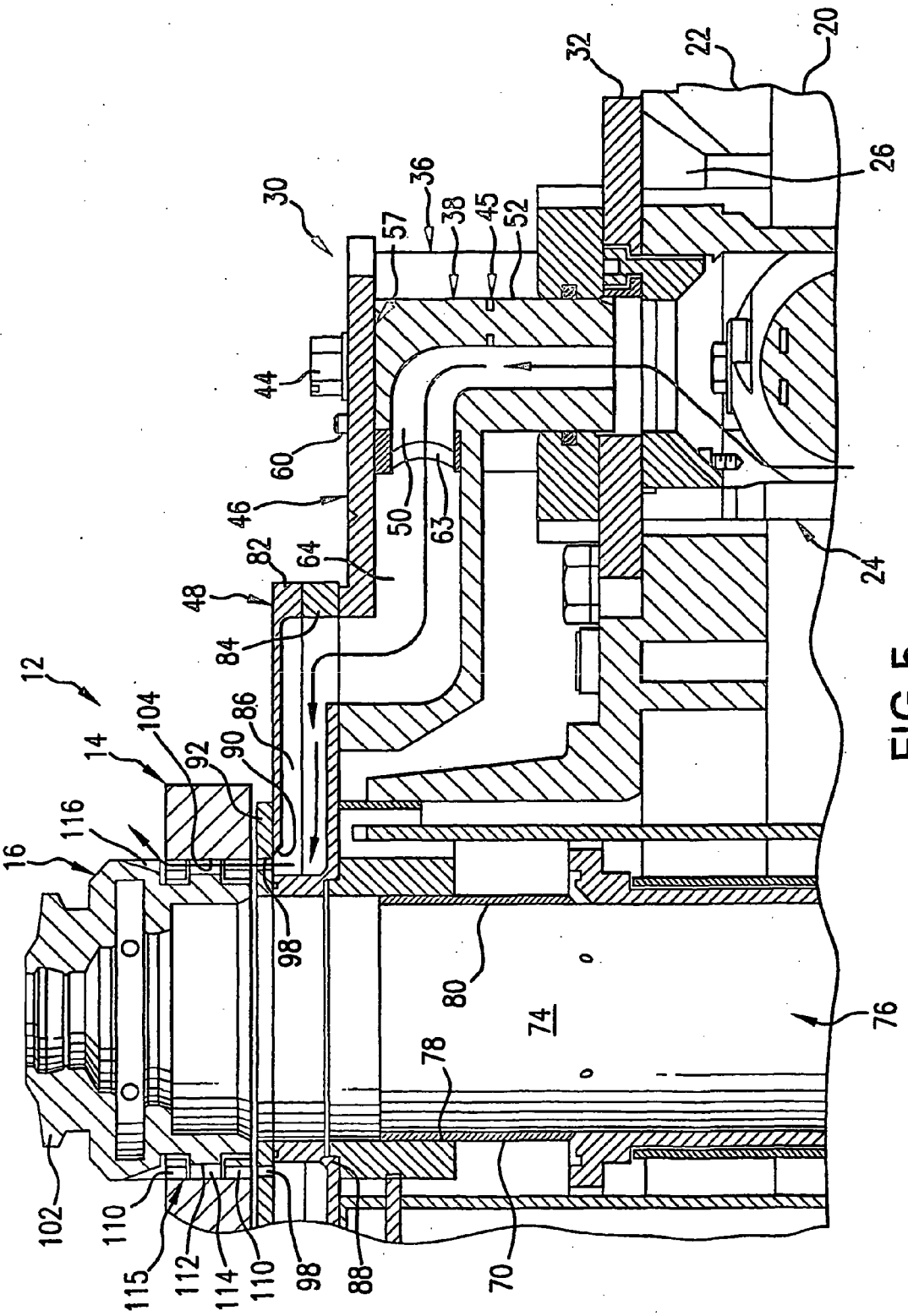
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FIG.5

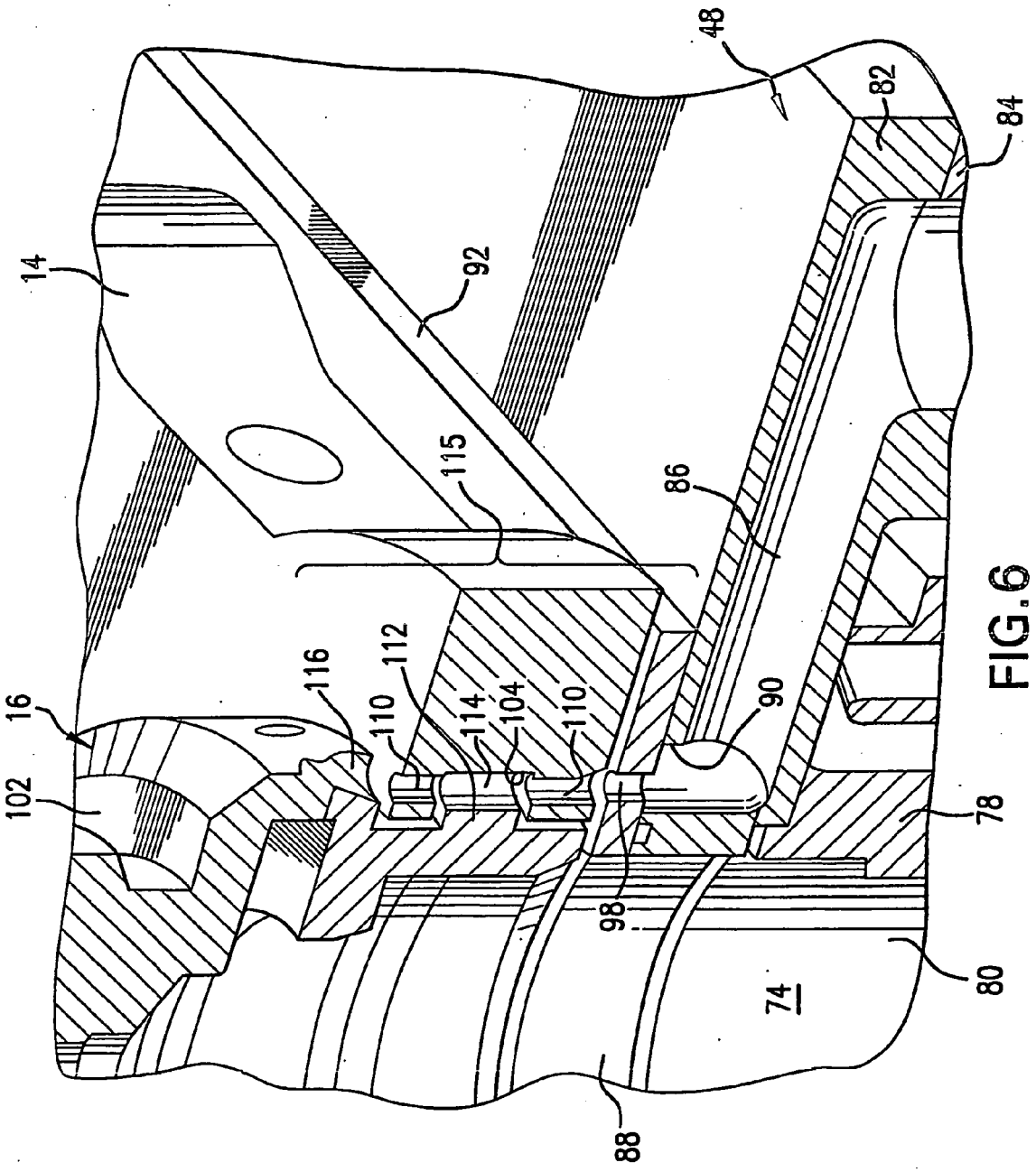
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FIG.6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 19838698 A1 **[0003]**
- US 20050005647 A1 **[0008]**