

J.M.

AP

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



DELEGATURA PROPIEDAD INDUSTRIAL

División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

ENTRADA EN FASE NACIONAL

21. EXPEDIENTE No.

05-19561

54. TITULO DISPOSITIVO DE EXTRACCION Y METODO PARA TRASLADAR ENVASES DE VIDRIO

51. CLASIFICACION INTERNACIONAL _____

71. SOLICITANTE OWENS - BROCKWAY GLASS CONTAINER INC.

DOMICILIO TOLEDO. OHIO. ESTADOS UNIDOS DE AMERICA

74. APODERADO JUAN PABLO CADENA SARMIENTO

22. SANTAFE DE BOGOTA, D.C. _____

PETITORIO

AS: 96.449



SUPERINDUSTRIA Y COMERCIO
 Radicación : 858:9561 88888888 Folios: 188
 Fecha (AMB): 2005-03-02 17:11:26
 Trámite : 011 PCT-PATENT 373 FASE VACI 411 PRESENTAC
 Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE PCT ENTRADA EN FASE NACIONAL

1 SOLICITUD DE:

☒ Patente de Invención.

☐ Patente de Modelo de Utilidad.

☐ Capítulo I.

☒ Capítulo II.

2
 SOLICITANTE
 (71)

Nombre: **OWENS - BROCKWAY GLASS
 CONTAINER INC.**

Dirección: One SeaGate, Toledo, OH, 43666,
 Estados Unidos de América

Nacionalidad o Domicilio: Estados Unidos
 Lugar de Constitución: Estados Unidos
 Teléfono: Fax:
 E-mail:

IDENTIFICACION

C.C. ☐ NIT ☐

C.E. ☐ Otro ☐

Cual _____

Número _____

3
 REPRESENTANTE
 O APODERADO

Nombre: **JUAN PABLO CADENA SARMIENTO**

Dirección: Cra. 7 No. 16-56 Piso 9

Teléfono: 380-2200 Fax: 380-2700
 E-mail:

IDENTIFICACION

C.C. ☒ NIT ☐

C.E. ☐ Otro ☐

Cual _____

Número 80.410.337 TP 57492

4
 INVENTOR (ES)
 (72)

Nombre: **Stephen M. Gerber, William F. Mazur, Larry N. Shue**

Dirección: 10690 Center Road, Traverse City, MI 49686, US; 921 Farnsworth, Waterville, OH
 43566, US; 510 North Street, Woodville, OH 43469, Estados Unidos de América
 (Respectivamente)

Nacionalidad o Domicilio: Estados Unidos de América (Respectivamente)

5 PCT (86)

Solicitud Internacional No. PCT/US2003/027703 Fecha 04-09-2003

Publicación Internacional No. WO 2004/022495 A1 Fecha 18-03-2004

Título (54): DISPOSITIVO DE EXTRACCION Y METODO PARA TRASLADAR ENVASES DE VIDRIO

7 Clasificación Internacional (51) C03B 9/447

8 Prioridad

SI ☒ NO ☐

(33) País de
 Origen

US

(32) Fecha

04-09-2002

(31) Número de Solicitud

10/235.188

9 Comprobante de pago No. 05-4.858

Fecha 01-03-2005

Instrucciones para el diligenciamiento del presente formulario, ver reverso de esta página.

10

ANEXOS

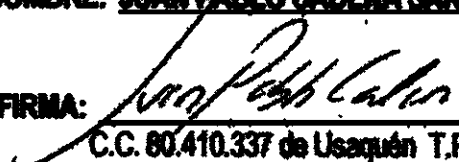
- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$443.000
- ☐ Documento que acredite la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☒ Poderes, si fuere el caso. **Fotocopia Autenticada**
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros: Reivindicaciones Modificadas
Tarjeta de propietarios.

11 FIGURA CARACTERÍSTICA:



12 Solicito la concesión de la patente,

NOMBRE: JUAN PABLO CADENA SARMENTO

FIRMA: 

C.C. 80.410.337 de Usaquén T.P. 57492 del C.S.J.

Instrucciones para la presentación de los anexos, ver reverso de esta página.

M

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 05 - 4,838
FECHA : ENERO 24 DE 2005

SUPERINTENDENCIA Y COMERCIO
Radicacion : 85819561 00000000 Folios: 168
Fecha (AMD): 2005-03-02 17:11:26
Tramite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTA
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

CONSIGNACION

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
BRIGARD & CASTRO LTDA	CONSIGNACION	BANCO POPULAR	030-00110-4	21741640	24/01/2005	20,360,000.00

CONCEPTO

CANT. RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	443,000.00
	TOTAL :	443,000.00

SOM: CUATROCIENTOS CUARENTA Y TRES MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

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

(19) World Intellectual Property
Organization
International Bureau

THE WORLD INTELLECTUAL PROPERTY ORGANIZATION IS AN INTERNATIONAL ORGANIZATION WITH THE OBJECT OF PROMOTING THE PROTECTION OF PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS.

(43) International Publication Date
18 March 2004 (18.03.2004)

PCT

(10) International Publication Number
WO 2004/022495 A1

(51) International Patent Classification: C03B 9/447

(21) International Application Number:
PCT/US2003/027703(22) International Filing Date:
4 September 2003 (04.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/235,188 4 September 2002 (04.09.2002) US(71) Applicant (for all designated States except US):
OWENS-BROCKWAY GLASS CONTAINER INC.
[US/US]: One SeaGate, Toledo, OH 43666 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): GERBER, Stephen,

ML [US/US]: 10690 Center Road, Traverse City, MI 49686 (US). MAZUR, William, R. [US/US]: 921 Farnsworth, Waterville, OH 43566 (US). SHUE, Larry, N. [US/US]: 510 North Street, Woodville, OH 43469 (US).

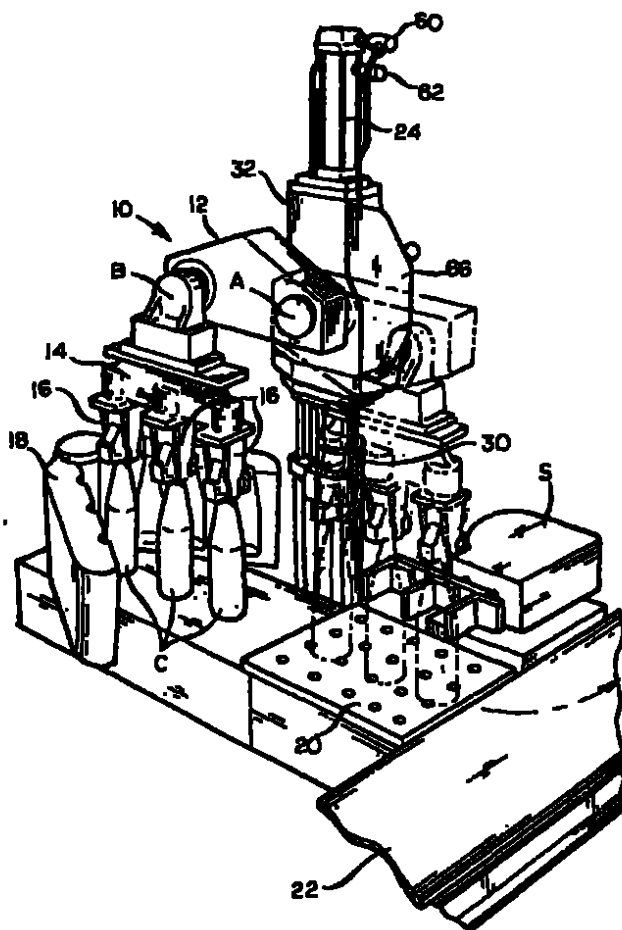
(74) Agents: PARIKH, Nirav, D. et al.; Owens-Illinois, Inc., One SeaGate, 25-LDP, Toledo, OH 43666 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW). Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM). European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: TAKEOUT DEVICE AND METHOD FOR TRANSFERRING GLASS CONTAINERS



(57) Abstract: A takeout device (10) and method for transferring one or more, usually a plurality, of freshly-formed glass containers (C) from molds (18) of a section of an I. S. machine to a deadplate (20) of the machine. The takeout device has an oscillatable arm (12) that carries a head (14) from which a tong (16) for each of the containers is suspended. Oscillation of the arm is powered by a reversible, linearly-acting electrical motor (24), preferably an a.c. servo motor, that causes a rack (28) to reciprocate. The rack drives an oscillatable gear (34) that oscillatingly drives the arm. The motor is mounted at the top of a post (30) at an elevation above the elevations of the molds and the deadplate, and the motor, therefore, is readily accessible for maintenance and adjustment.

BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW. *ARIPO patents* (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), *Eurasian patents* (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), *European patents* (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), *OAPI patents* (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

5
4p**TAKEOUT DEVICE AND METHOD FOR TRANSFERRING GLASS CONTAINERS****FIELD OF THE INVENTION**

This invention relates to a method of, and an apparatus for, transferring, in unison, a plurality of like articles from a first location to a second location. More particularly, this invention relates to a method and apparatus of the foregoing character for transferring a plurality of like, freshly-formed glass containers from opened molds of a glass container forming machine of the I.S. type to a deadplate of the machine for cooling of the containers.

BACKGROUND OF THE INVENTION

As it is explained, for example, in commonly-assigned U.S. Patents 6,076,654 (Leidy) and 6,241,448 B1 (Nicholas), the disclosure of each of which is incorporated by reference herein, or as is otherwise known, most glass containers are manufactured by a machine type known as an individual section (I.S.) machine. Containers are manufactured by an I.S. machine at one or another of a multitude of machine sections, typically, 6, 8, 10, or even 12 sections, and typically 2 or 3 or 4 containers simultaneously at each section depending on container size and desired production rates. As a final step in the manufacture of containers on an I.S. machine, blown containers are transferred, in unison, from opened blow molds of the machine section in which they were formed to a nearby deadplate of the machine to permit the blown containers to partly cool before the containers are transferred to a removal conveyor for further processing.

Containers are transferred from an I.S. machine section blow mold station to a deadplate by a takeout mechanism that employs a multitude of individual takeout tongs. The takeout tongs for each I.S. machine section are suspended from a head that is suspended from an oscillating arm, one such tong for each container to be transferred from the machine section. After

grasping of the containers by the takeout tongs, the arm of the takeout mechanism from which the containers are suspended is turned by approximately 180°, while the containers remain suspended from the tongs, to position the containers over the I.S. machine deadplate. The takeout heads then release the containers to remain on the deadplate, and the arm of the mechanism is then reverted by 180° to begin a repeat of its operating cycle when the next set of glass containers manufactured at the machine section is ready to be transferred.

Heretofore, oscillating motion of the takeout mechanism head-carrying arm was powered by a fluid prime mover, usually a pneumatic cylinder, that was used to impart reciprocating motion to a toothed rack. The rack engaged a rotatable gear attached to the takeout mechanism so that reciprocating motion of the rack as a result of extension or retraction of the pneumatic cylinder resulted in oscillating motion of the gear and the arm to which it was secured. A parallel linkage connection between the arm and the takeout heads carried by it was employed to maintain the heads suspended from the arm in vertical positions at all arcuate positions of the arm, as is explained, for example, in U.S. Patent No. 5, 271,757 (Houben et al.). Typically, the pneumatic cylinder for such a takeout mechanism was positioned within the frame of the I.S. machine where access for maintenance and adjustment is difficult.

The use of pneumatic cylinders to power operation of a glass container takeout mechanism involves certain problems, certain of which are inherent in the use of pneumatic cylinders for a wide variety of motions, and certain of which are specific to the transfer of freshly-formed glass containers. To begin with, pneumatic prime movers tend to be noisy and their use in a relatively confined space requires close attention to regulatory noise standards. Further, freshly-formed glass containers are still somewhat hot, and are, therefore, soft and subject to dimensional distortion if transferred other than by gentle, low inertia motions, which are difficult to achieve with a pneumatic-powered mechanism unless the mechanism is operated slowly, with gentle

6
X

starting and stopping actions. This characteristic limits the obtainable cycle times to times that may unduly limit the productive capacity of an I.S. forming machine.

SUMMARY OF THE INVENTION

To overcome the aforesaid and other problems associated with the use of a fluid powered motor to actuate motion of a takeout arm at a section of an I.S. glass container forming machine, there is provided a takeout arm that is powered by a reversible electric motor, preferably a linearly-acting a.c. servo motor that is preferably positioned above the main frame of the I.S. machine for ready access for maintenance and adjustments. Such a motor may be precisely controlled for proper starting and stopping motions to avoid the imposition of excessively large inertia forces on the freshly-formed glass containers that are being transferred, and without unduly lengthening the container transfer cycle time. The reversible motor of the present invention is preferably mounted at the top of a non-extensible or extensible vertical post. In that regard, an extensible vertical post permits the elevation of the container-grasping heads above the forming machine molds and the deadplate to be adjusted to accommodate the processing of containers of various heights. This function may also be achieved with a non-extensible support post by the use of shims of different thicknesses to change the spacing between the tong-supporting heads and the takeout arm from which they are suspended.

Accordingly, it is an object of the present invention to provide an improved method of and apparatus for transferring one or more articles from a first location to a second location. More particularly, it is an object of the present invention to provide a method and apparatus of the foregoing character for transferring one or more freshly-formed glass containers from forming molds of a glass container forming machine to a deadplate of the machine without imposing excessive inertial forces thereon and without unduly delaying the transfer time.

For a further understanding of the present invention and the objects thereof, attention is directed to the drawing and the following brief description thereof, to the detailed description of the invention and to the appended claims.

IN THE DRAWING

Fig. 1 is a perspective view of a takeout device according to the preferred embodiment of the present invention, in combination with other elements of a glass container forming machine with which it is to be operated;

Fig. 2 is an elevation view, at an enlarged scale and with a portion removed, of a portion of the takeout device of Fig. 1;

Fig. 3 is a sectional view, at a further enlarged scale, taken on line 3-3 of Fig. 2; and

Fig. 4 is a fragmentary elevation view, at an enlarged scale relative to that of Fig. 1, of a portion of the portion of the takeout device that is shown in Fig. 2 from an opposite direction to the direction shown in Fig. 2.

DETAILED DESCRIPTION OF THE INVENTION

A takeout device according to the preferred embodiment of the present invention is generally identified by reference numeral 10 in Fig. 1. The takeout device 10 includes an arm 12 from which a head 14 is pivotably suspended. The head 14 has one or more container engaging tongs 16, shown as 3 container engaging tongs, suspended therefrom, 3 such tongs being the appropriate number for use in connection with an I.S. glass container forming machine that is operated by the triple gob process. In that

7
X

regard, each such tong 16 may be constructed as shown in U.S. Patent 6,241,448 B1 (Nicholas), or in any other known matter. In any case, the tongs 16 are used to grasp containers in a blow mold 18 of an I.S. glass container forming machine, and for then transferring the containers C in unison to a deadplate 20 of the forming machine. As is known, the containers C on the deadplate 20, after partial cooling, are swept to a takeout conveyor 22 for further processing by an oscillatable sweepout device S, which may, for example, operate according to the teachings of commonly-assigned patent 5,904,745 (Nafziger et al.), the disclosure of which is incorporated by reference herein, or by the teachings of a patent application to be filed in the name of D. Wayne Leidy et al. (Attorney Docket No. 17615). In any case, the arm 12 periodically oscillates between the position shown in solid line in Fig. 1, in alignment with the containers C as they are ready to be released from the blow mold 18, to the dotted line position where the containers C are positioned over the deadplate 20, as will be hereinafter described more fully.

The takeout device 10 also has a vertically extending housing 24 in which a rod 26 is able to reciprocate, the rod 26 having a toothed rack 28 suspended therefrom, as is shown more clearly in Figs. 2 and 3. The housing 24 is the housing of a reversible, linearly-acting and vertically-extending electrical servo motor, which imparts reciprocating motion to the rod 26 and the rack 28. The housing/motor 24 is supported on a post 30, which may be extensible to permit vertical adjustment of the rest positions of the head 14, or such function can be obtained with a non-extensible post by the use of shims (not shown) to adjust the spacing of the head 14 below the arm 12. In that regard, it is to be noted that the housing/motor 24 is positioned well above the blow mold 18 and the deadplate 20 for easy access for maintenance and adjustment.

Reciprocation of the rack 28 is effective to oscillate a gear 34 about an axis A, to thereby cause oscillation of the arm 12 about the axis A. In that regard, the arm 12 has a parallel motion connection between the axis A and a

pivot axis B from which the head 14 is suspended, for example, as taught by commonly-assigned U.S. patent 4,494,973 (Perry), to ensure that the central axes of the tongs 16 and the containers C that are carried thereby remain vertically oriented during the motion of the arm 12 from the solid line position in Fig. 1 to its broken line position. Further, the axis A is a longitudinal central axis of an oscillating shaft 36 (Figs. 2 and 3), which is pivotably mounted in a housing 32. A gear 34 is fixed for oscillation with the shaft 36, the shaft 36 having an irregular outer surface and the gear 34 having a complementary irregular inner surface to ensure that the gear 34 and the shaft 36 will oscillate together but not relatively to one another.

To minimize backlash between the rack 28 and the gear 34, and to continuously compensate for any wear occurring in either of them, the rack 28 is continuously resiliently urged against the gear 34 by a compression spring in a housing 38 that acts against a link 40, which is pivoted on each of its ends, the rack 28 being reciprocable relative to the link 40. The link 40, in turn, acts against an end of a lever arm 42 that pivots about a pivot pin 44. A nose portion 50 at an opposed end of the lever arm 42, which is generally C-shaped in cross-section, as shown in Fig. 3, surrounds the rack 28 to continuously permit the rack 28 to reciprocate with respect to the lever arm 34. The lever arm 42 is also provided with a rotatable follower 46 at a location diametrically opposed to the axis A of the gear 34, and the roller 46 rollingly rides against a flange 48 of the rack 28 on the side that is opposed to its toothed side, to thereby permit controlled, low friction contact between the rack 28 and the gear 34 throughout the reciprocation of the rack 28.

To ensure that the head 14 remains level at all times, the circumferential position of the shaft 36, and thereby the circumferential position of the gear 34, is adjustable by means of an adjustment screw 52 (Fig. 4). The screw 54 is threadably received in a nut 54, and is pivotably attached to an arm 56 at an axis C. The arm 56 is releasably secured to the housing 32 by a fastener 58, which passes through an accurate slot 68 in the arm 56. The arm 56 has an opening that engages the portion of the shaft 36,

and when the fastener 58 is released, the arm 56 may be accurately moved to thereby accurately reposition the shaft 36 and the gear 34. Of course, adjustment of the circular positions of the shaft 36 and the gear 34 is done with the rack 28 disengaged from the gear 36.

To accurately track the position of the rod 26 within the housing/motor 24, a resolver 60 is attached to an upper end of the housing/motor 24. Further, an electrical supply fitment 62 for the housing/motor 24 is secured thereto, at an elevation below that of the resolver 60. Electrical cables for the resolver 60 and the fitment 62 pass thru the interior of a C-shaped bracket 64 (Fig. 4) that is secured to the housing 32, a shield 66 being secured to the bracket 64 on a side opposed to that on which the adjustment screw 52 is positioned.

Although the best mode contemplated by the inventors for carrying out the invention as of the filing date herein as been shown and described herein, it will be apparent to those skilled in the art that suitable modifications, variations, and equivalents may be made without departing from the scope of the invention, such scope being limited only by the terms of the following claims and legal equivalents thereof.

CLAIMS

We claim:

- 1. Apparatus for transferring a spaced-apart plurality of like articles from a first location to a second location, said apparatus comprising:**

 - an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location and a second location;**
 - a spaced-plurality of tong assemblies carried by the oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp an article at the first location, to transfer the article to the second location without changing the axial orientation of the article and to release the article at the second location;**
 - a linearly extending rack, said rack having a toothed side and an opposed side and being reciprocable along an axis;**
 - an externally-toothed, oscillatable gear, said oscillatable gear being oscillatable about an axis, being drivingly engaged by said rack, and oscillatingly driving said arm; and**
 - a single reversible electrical motor for powering the reciprocation of the rack.**
- 2. Apparatus according to claim 1 wherein said single reversible electrical motor is a linearly-acting, reversible a.c. servo motor.**
- 3. Apparatus according to claim 2 wherein:**

 - said reversible electrical motor is positioned above the first location and the second location.**
- 4. Apparatus according to claim 1 and further comprising:**

 - means for resiliently biasing said rack into engagement with said oscillatable gear.**

a
/

5. Apparatus according to claim 4 wherein said means for resiliently biasing comprises:

a double-ended link;

resilient biasing means acting on an end of said link;

a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

6. Apparatus according to claim 1 and further comprising:

means for adjustably positioning said tong assemblies relative to one another to maintain said tong assemblies in a horizontal plane.

7. Apparatus for transferring a spaced-apart array of freshly-formed glass containers from open molds of a glass container forming machine to an external location, said apparatus comprising:

an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location above the glass containers in the open molds and a second location above the external location;

a spaced-plurality of tong assemblies carried by the oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp a container at the first location, to transfer the container to the second location and to release the container at the second location;

a linearly extending rack, said rack having a toothed side and an opposed side and being reciprocable;

an externally-toothed oscillatable gear, said oscillatable gear being oscillatable about an axis being drivingly engaged by said rack, and oscillatingly driving said arm; and

a single reversible electrical motor for powering the reciprocation of the rack.

8. An apparatus according to claim 7 wherein, said reversible electrical motor is a linearly-acting reversible a.c. servo motor.

9. An apparatus according to claim 8 wherein said reversible electrical motor is positioned above the first location and the second location.

10. Apparatus according to claim 7 and further comprising:
means for resiliently biasing said rack into engagement with said oscillatable gear.

11. Apparatus according to claim 10 wherein said means for resiliently biasing comprises:

a double-ended link;

resilient biasing means acting on an end of said link;

a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

12. Apparatus according to claim 7 and further comprising:
means for adjustably positioning said tong assemblies relative to one another to maintain said tong assemblies in a horizontal plane.

13. The method of simultaneously transferring a plurality of articles from a first location to a second location, the method comprising:

providing an oscillatable arm;

providing a plurality of article-engaging tongs carried by the oscillatable arm;

providing an oscillatable gear operatively associated with the oscillatable arm;

10
/

providing a reciprocable rack in driving engagement with the oscillatable gear; and
reversibly electrically powering reciprocation of the rack.

14. The method according to claim 13 wherein:

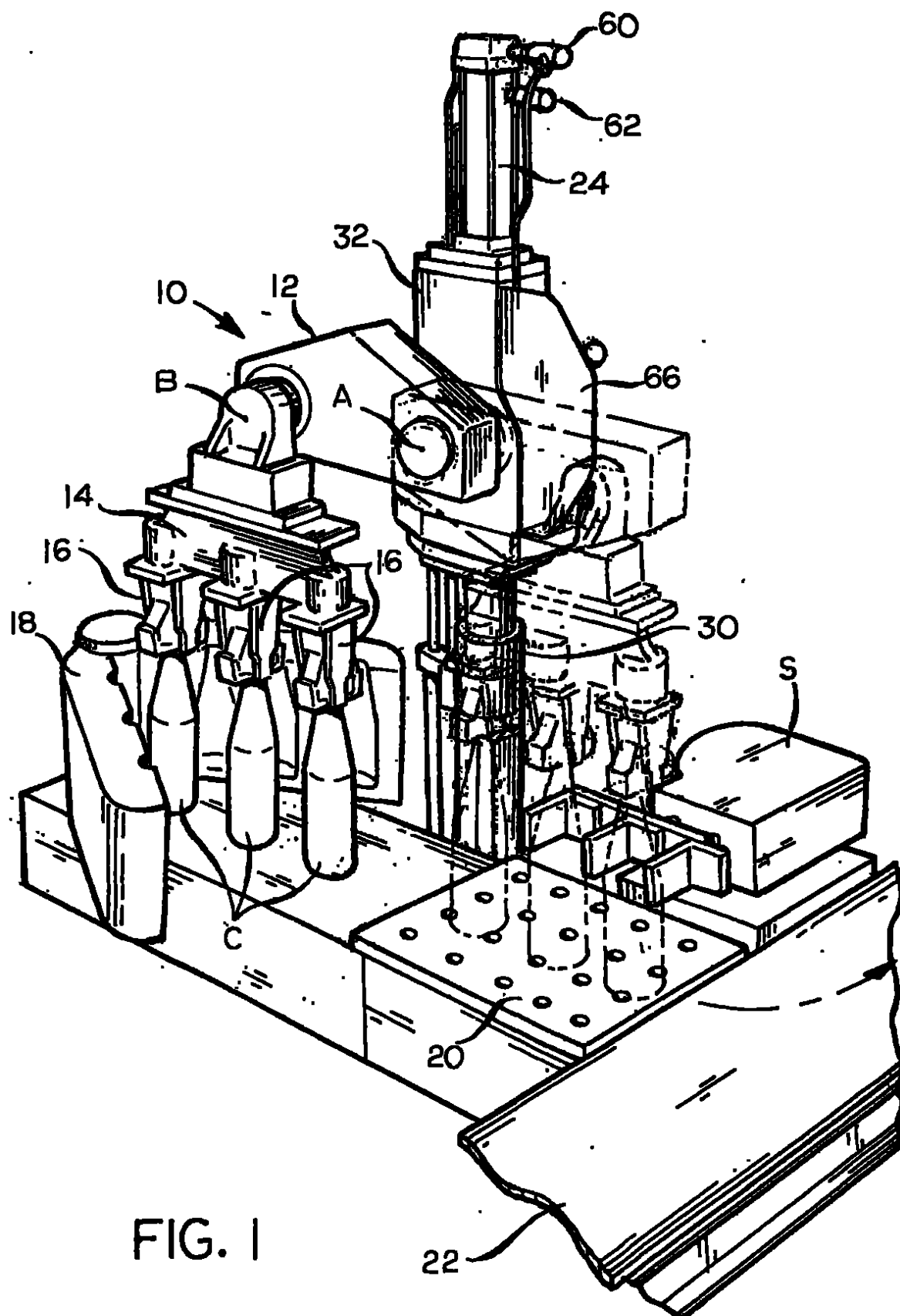
the articles to be transferred are freshly-formed glass containers, the first location is a location at open molds of a glass container forming machine, and the second location is a deadplate of the glass containing forming machine.

15. The method according to claim 17 wherein:

the reciprocation of the rack is reversibly electrically powered from a location that is at an elevation above the first location and above the second location.

16. The method according to claim 13 and further comprising:

resiliently biasing the rack into engagement with the oscillatable gear.



1312

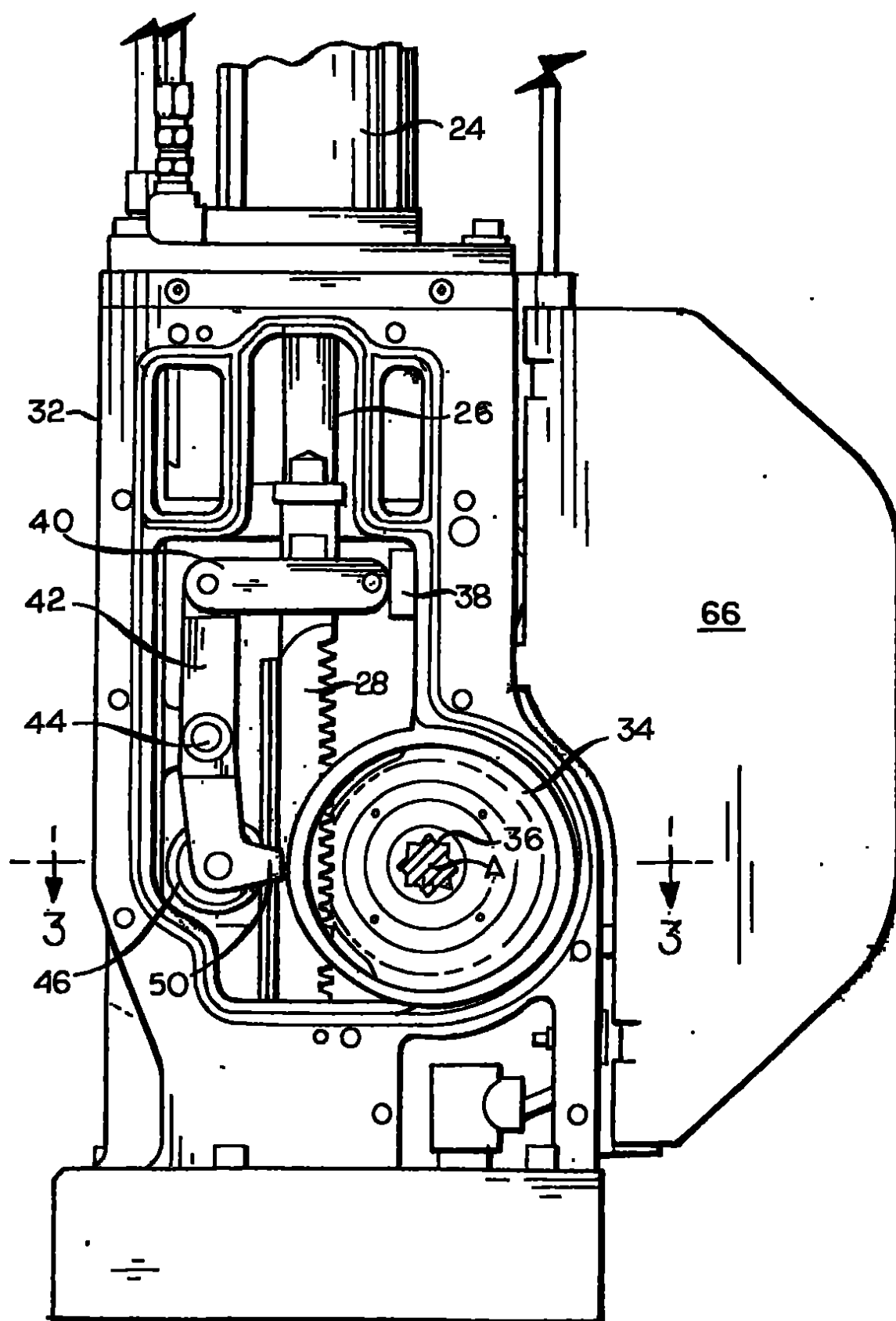


FIG. 2

13
f

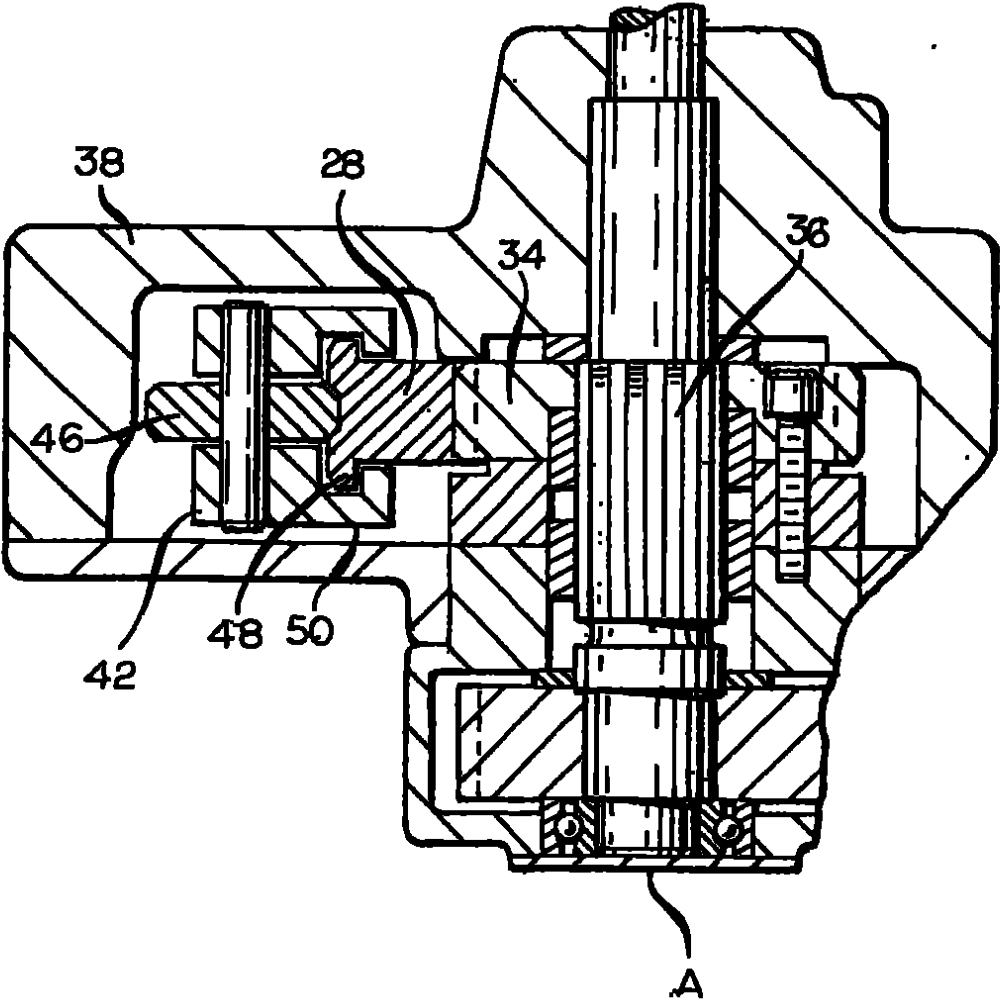


FIG. 3

14

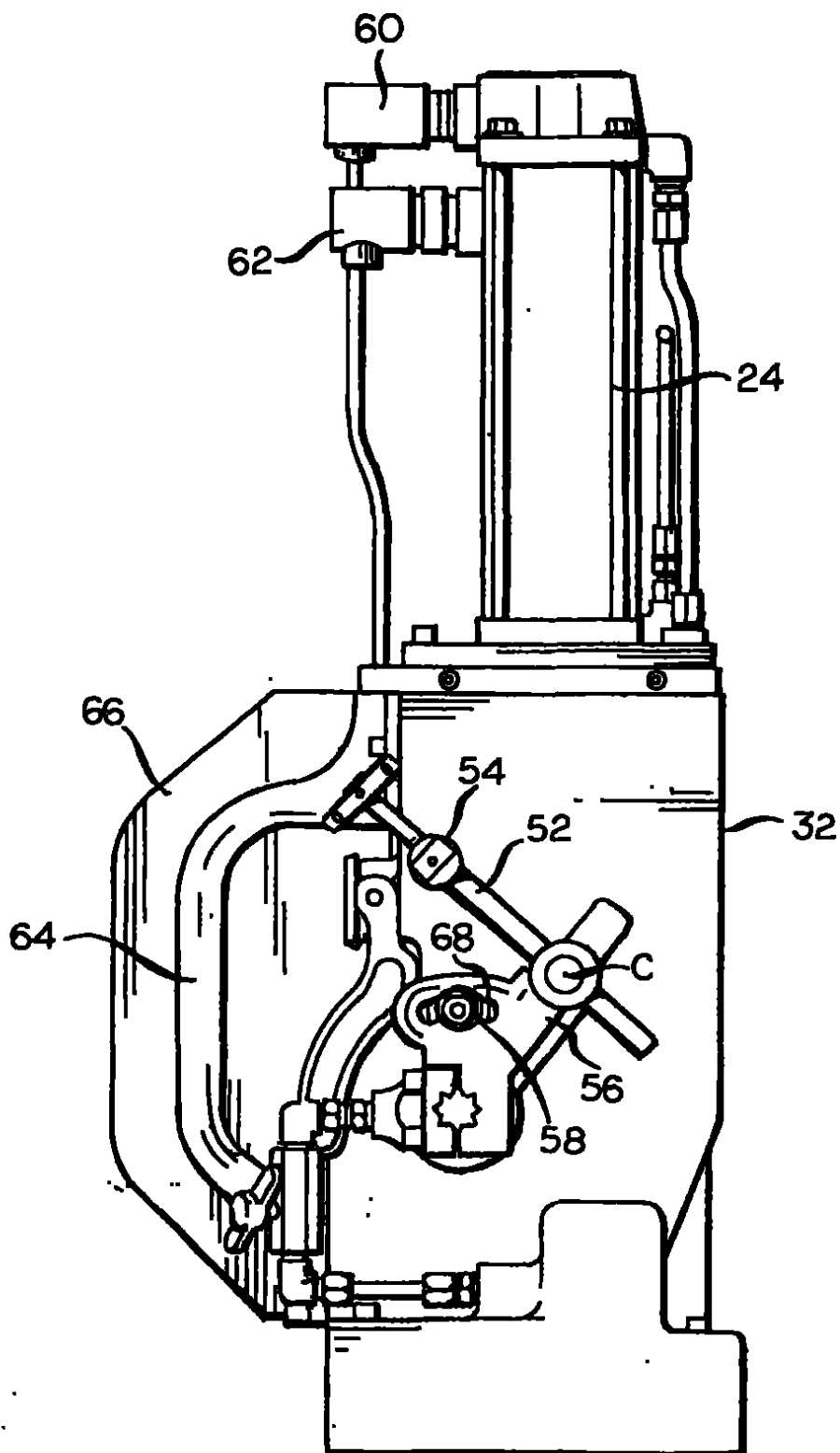


FIG. 4

(12) SOLICITUD INTERNACIONAL PUBLICADA SEGÚN EL TRATADO DE COOPERACIÓN INTERNACIONAL EN MATERIA DE PATENTES (PCT)

(19) Organización Mundial de Propiedad Intelectual
Oficina Internacional(43) Fecha de Publicación Internacional
18 de Marzo de 2004 (18.03.2004)

(10) Número de Publicación Internacional

PCT

WO 2004/022495 A1

(51) Clasificación Internacional de Patentes²: C03B 9/447

(21) No. Solicitud Internacional: PCT/US2003/027703

(22) Fecha de Presentación Internacional:
4 de septiembre de 2003 (04.09.2003)

(25) Idioma de Presentación: Inglés

(26) Idioma de Publicación: Inglés

(30) Datos relativos a la Prioridad:
10/236,166 4 de septiembre de 2002 (04.09.2002) US

(71) Solicitante (para todos los países destinatarios con excepción de US): OWENS-BROCKWAY GLASS CONTAINER INC. [US/US]: One SeaGate, Toledo, OH 43666 (US).

(72) Inventores, e

(75) Inventores/Solicitantes (para US únicamente):

GERBER, Stephen, M. [US/US]: 10690 Center Road, Traverse City, MI 49686 (US). MAZUR, William, F. [US/US]: 921 Farnsworth, Waterville, OH 43566 (US). SHUE, Larry, N. [US/US]: 510 Noth Street, Woodville, OH 43469 (US).

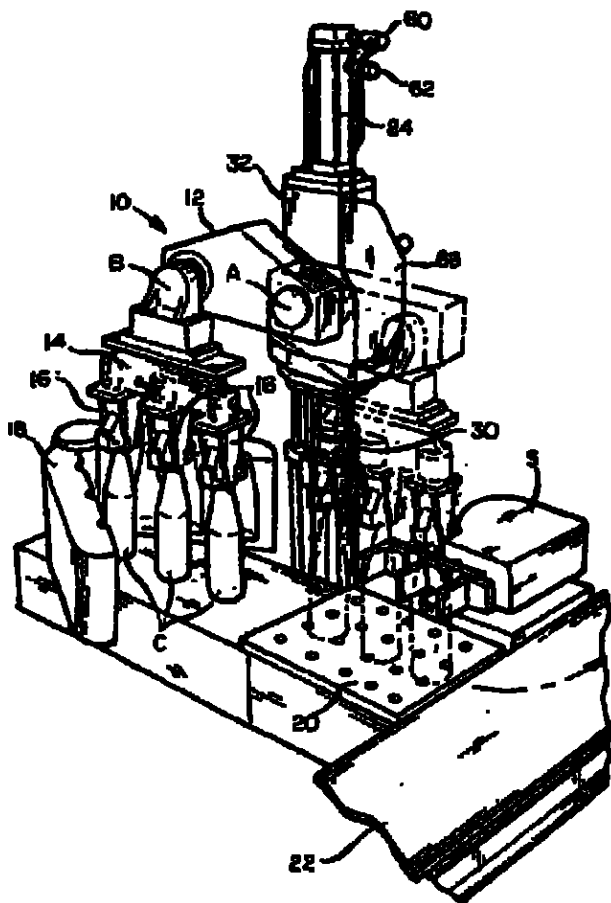
(74) Agentes: PARIKH, Nirav, D. et al.; Owens-Illinois, Inc., One SeaGate, 25-LDP, Toledo, OH 43666 (US).

(81) Países designados (nacional): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Países designados (regional): Patente ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Patente Eursiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Patente Europea (AT, BE,

[Continúa en la página siguiente]

(54) Título: DISPOSITIVO DE EXTRACCIÓN Y MÉTODO PARA TRASLADAR ENVASES DE VIDRIO



(57) Extracto: Un dispositivo de extracción (10) y un método para trasladar de moldes (18) de una sección de una máquina I.S. uno o más, usualmente una pluralidad de, envases de vidrio recién moldeados (C) a una placa neutra (20) de la máquina. El dispositivo de extracción tiene un brazo basculante (12) que sostiene un cabezal (14) del cual se suspende una lengüeta (16) para cada uno de los envases. La oscilación del brazo se produce por un motor eléctrico de acción lineal, reversible (24), preferiblemente un servomotor a. c., que hace que una cremallera (28) se mueva con movimiento alternativo. La cremallera acciona un engranaje oscilante (34) que impulsa el brazo haciéndolo bascular. El motor viene montado en la parte superior de un poste (30) en una elevación encima de los moldes y la placa neutra, y el motor, por lo tanto, es fácilmente accesible para efectos de mantenimiento y ajuste.

WO 2004/022495 A1

BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), Patente OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, patente ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), patente Eursiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), patente Europea (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

Declaraciones bajo la Regla 4.17:

- en cuanto al derecho del solicitante de solicitar y que se le conceda una patente (Regla 4.17(II)) para las siguientes designaciones AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, patente ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), patente Eursiática (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), patente Europea (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- en cuanto al derecho del solicitante a reivindicar prioridad de la solicitud anterior (Regla 4.17(III)) para todas las designaciones AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG,

Publicado:

- con informe internacional de búsqueda
- antes del vencimiento del tiempo límite para modificar las reivindicaciones y para volverse a publicar en el caso de recibo de modificaciones

Para códigos de dos letras y otras abreviaturas, remítase a las "Notas Guía sobre Códigos y Abreviaturas" que aparece al comienzo de cada edición regular del Boletín Oficial PCT.

12
18

DISPOSITIVO DE EXTRACCIÓN Y MÉTODO PARA TRASLADAR ENVASES DE VIDRIO

CAMPO DE LA INVENCION

Esta invención se refiere a un método de, y a un aparato para, trasladar, simultáneamente, una pluralidad de artículos similares de una primera posición a una segunda posición. Más particularmente, esta invención concierne a un método y aparato del carácter precedente para trasladar una pluralidad de envases similares de vidrio, recién moldeados, de moldes abiertos de una máquina de moldeo de envases de vidrio del tipo I.S., a una placa neutra de la máquina para enfriar los envases.

ANTECEDENTES DE LA INVENCION

Como se explica, por ejemplo, en las Patentes de los Estados Unidos 6,076,654 (Leidy) y 6,241,448 B1 (Nicholas), de asignación conjunta, cuya divulgación se incorpora aquí por referencia, o como se conoce en otra forma, la mayoría de los envases de vidrio se fabrican por un tipo de máquina conocida como máquina de sección individual (I.S.). Los envases se fabrican por una máquina I.S. en una u otra de una multitud de secciones de la máquina, típicamente, 6, 8, 10, o incluso 12 secciones y, típicamente, 2 ó 3 ó 4 envases simultáneamente en cada sección dependiendo del tamaño del envase y las velocidades deseadas de producción. Como paso final en la fabricación de envases en una máquina I.S., los envases sopladados se trasladan, simultáneamente, de moldes abiertos de soplado de la sección de la máquina, en los cuales se moldearon, a una placa neutra próxima a la máquina, para permitir que los envases se enfríen parcialmente antes de pasarlos a una cinta transportadora para procesamiento posterior.

Los envases se trasladan de una estación de moldes de soplado de la sección de la máquina I.S. a una placa neutra por un mecanismo de extracción, que emplea una multitud de lengüetas de extracción individuales. Las lengüetas de extracción para cada sección de la máquina I.S. se suspenden de un cabezal que pende de un brazo basculante, previéndose una

18
17

lengüeta similar para cada envase a trasladar de la sección de la máquina. Luego de agarrarse los envases por las lengüetas de extracción, el brazo del mecanismo de extracción, del cual se suspenden los envases, gira en aproximadamente 180°, mientras que los envases permanecen suspendidos de las lengüetas, para depositar los envases sobre la placa neutra de la máquina I.S. Los cabezales de extracción sueltan entonces los envases para que permanezcan sobre placa neutra, y el brazo del mecanismo regresa entonces en 180° para iniciar una repetición de su ciclo de operación, cuando el siguiente juego de envases de vidrio fabricados en la sección de la máquina está listo para ser trasladado.

Hasta ahora, el movimiento basculante del brazo que sostiene el cabezal del mecanismo de extracción se accionaba por un motor hidráulico, usualmente un cilindro neumático, que se empleaba para impartir movimiento alternativo a una cremallera dentada. La cremallera encajaba un engranaje giratorio acoplado al mecanismo de extracción, de modo que el movimiento alternativo de la cremallera, como resultado de la extensión o retracción del cilindro neumático, se traducía en un movimiento basculante del engranaje y el brazo al cual se aseguraba. Una conexión de empalme paralelo, entre el brazo y los cabezales de extracción portados por el mismo, se empleaba para mantener los cabezales suspendidos del brazo en posiciones verticales en todas las posiciones arqueadas del brazo, como se explica, por ejemplo, en la Patente de los Estados Unidos No. 5,271,757 (Houben y colaboradores). Típicamente, el cilindro neumático para tal mecanismo de extracción se situaba en el marco de la máquina I.S., donde es difícil el acceso para fines de mantenimiento y ajuste.

El uso de cilindros neumáticos para la operación mecánica de un mecanismo de extracción de envases de vidrio implica ciertos problemas, algunos de los cuales son inherentes al uso de cilindros neumáticos para una amplia variedad de movimientos, y algunos de los cuales son específicos del traslado de envases de vidrio recién moldeados. Para empezar, los motores neumáticos tienden a ser ruidosos y su uso en un espacio relativamente limitado requiere un estricto cumplimiento de las normas reguladoras de la

21a

emisión de ruidos. Además, en cierta medida los envases de vidrio recién moldeados siguen aún calientes y, por lo tanto, son todavía blandos y están sujetos a distorsión dimensional si se trasladan por movimientos que no sean movimientos suaves de inercia baja, los cuales son difíciles de lograr con un mecanismo accionado neumáticamente, a menos que el mecanismo se opere lentamente, con movimientos suaves de arranque y parada. Esta característica restringe los tiempos de ciclo obtenibles, los cuales pueden limitar indebidamente la capacidad productiva de una máquina de moldeo I.S.

SUMARIO DE LA INVENCION

Para solucionar los problemas anteriores y otros problemas asociados con el uso de un motor hidráulico para activar el movimiento de un brazo de extracción en una sección de una máquina I.S. de moldeo de envases de vidrio, se provee un brazo de extracción que se impulsa por un motor eléctrico reversible, preferiblemente un servomotor a. c. de acción lineal, que se monta preferiblemente encima del marco principal de la máquina I.S., con el fin de obtener un fácil acceso para fines de mantenimiento y ajustes. Tal motor puede controlarse con precisión, en cuanto a sus movimientos de arranque y parada, para evitar la imposición de fuerzas inerciales excesivamente grandes a los envases recién formados que se están trasladando, y sin prolongar indebidamente el tiempo de ciclo de traslado de los envases. El motor reversible de la presente invención se instala preferiblemente en la parte superior de un poste vertical extensible o no extensible. En ese aspecto, un poste vertical extensible permite graduar la elevación de los cabezales de agarre de los envases, por encima de los moldes de la máquina de moldeo y la placa neutra, para adaptar el procesamiento de envases de diferentes alturas. Esta función puede lograrse igualmente con un poste de soporte no extensible mediante el uso de cuñas de diferentes espesores para variar la distancia entre los cabezales, que soportan las lengüetas, y el brazo de extracción del cual están suspendidas.

En consecuencia, es un objeto de la presente invención proveer un método mejorado de, y un aparato para, trasladar uno o más artículos de una

primera posición a una segunda posición. Más particularmente, es un objeto de la presente invención proveer un método y aparato del carácter anterior para trasladar uno o más envases de vidrio recién moldeados de los moldes de una máquina de moldeo de envases de vidrio a una placa neutra de la máquina, sin imponerles fuerzas inerciales excesivas y sin prolongar indebidamente el tiempo de traslado.

Para una comprensión adicional de la presente invención y sus objetos, se llama la atención al dibujo y a la siguiente breve descripción del mismo, a la detallada descripción de la invención y a las reivindicaciones anexas.

EN EL DIBUJO

Fig. 1 es una vista en perspectiva de un dispositivo de extracción de acuerdo con la incorporación preferida de la presente invención, en combinación con otros elementos de una máquina de moldeo de envases de vidrio, con la cual va a operar;

Fig. 2 es una vista en alzado, a escala ampliada y con una parte retirada, de una porción del dispositivo de extracción de Fig. 1;

Fig. 3 es una vista de corte, en una escala adicional ampliada, tomada en la línea 3-3 de Fig. 2; y

Fig. 4 es una vista fragmentaria en alzado, en una escala ampliada en relación con la de la Fig. 1, de una parte de la porción del dispositivo de extracción que se representa en Fig. 2, desde una dirección opuesta a la dirección mostrada en Fig. 2.

DESCRIPCIÓN DETALLADA DE LA INVENCION

Un dispositivo de extracción de acuerdo con la incorporación preferida de la presente invención se identifica generalmente por el

23

numeral de referencia 10 en Fig. 1. El dispositivo de extracción 10 incluye un brazo 12 del cual se suspende un cabezal 14 en un eje. El cabezal 14 tiene una o más lengüetas de agarre de los envases 16, representadas como 3 lengüetas de agarre de envases, suspendidas del mismo, siendo 3 el número apropiado lengüetas de para uso en conexión con una máquina I.S. de moldeo de envases de vidrio, que se opera por el proceso de triple bulbo. En ese aspecto, cada lengüeta 16 puede construirse como se muestra en la Patente de los Estados Unidos 6,241,448 B1 (Nicholas), o en cualquier otro material conocido. En cualquier caso, las lengüetas 16 se usan para sujetar los envases en un molde de soplado 18 de una máquina I.S. de moldeo de envases de vidrio y para trasladar luego los envases C, en forma conjunta, a una placa neutra 20 de la máquina de moldeo. Como se sabe, los envases C sobre la placa neutra 20, después de un enfriamiento parcial, son barridos a una cinta transportadora de acarreo 22, para procesamiento posterior, por un dispositivo de barrido de movimiento oscilatorio S, que puede operar, por ejemplo, de acuerdo con las enseñanzas de la patente de asignación común 5,904,745 (Nafziger y colaboradores), cuya divulgación se incorpora aquí por referencia, o por las enseñanzas de una solicitud de patente a presentarse a nombre de D. Wayne Leidy y colaboradores (Listado de Casos No. 17615). En cualquier caso, el brazo 12 alterna periódicamente entre la posición mostrada en la línea sólida en Fig. 1, en alineación con los envases C cuando están listos para ser sacados del molde de soplado 18, y la posición de la línea punteada en la que los envases C se depositan sobre la placa neutra 20, como se describirá con mayor detalle a continuación.

El dispositivo de extracción 10 cuenta asimismo con una carcasa que se proyecta verticalmente 24, en la cual un vástago 26 puede realizar un movimiento alternativo, teniendo el vástago 26 una cremallera dentada 28 sujeta del mismo, como se muestra más claramente en Figs. 2 y 3. La carcasa 24 es la carcasa de un servomotor eléctrico reversible, que se proyecta verticalmente y que actúa en forma lineal, el cual imparte

22
22

movimiento alternativo al vástago 26 y la cremallera 28. La carcasa/motor 24 se soporta en un poste 30, que puede ser extensible para permitir el ajuste vertical de las posiciones de reposo del cabezal 14, o tal función puede obtenerse con un poste no extensible mediante el uso de cuñas (no representadas) para ajustar la distancia del cabezal 14 debajo del brazo 12. En ese aspecto, hay que anotar que la carcasa/motor 24 se encuentra dispuesta bien por encima del molde de soplado 18 y la placa neutra 20, para brindar un fácil acceso con fines de mantenimiento y ajuste.

El movimiento alternativo de la cremallera 28 tiene la capacidad de hacer girar un engranaje 34 sobre un eje A, para producir así la oscilación del brazo 12 sobre el eje A. En este aspecto, el brazo 12 tiene una conexión de movimiento paralelo entre el eje A y el eje de pivote B del cual se suspende el cabezal 14, por ejemplo, como se enseña por la Patente de los Estados Unidos, de asignación conjunta, 4,494,973 (Perry), para garantizar que los ejes centrales de las lengüetas 16 y los envases C portadas por ellas permanezcan orientados verticalmente durante el movimiento del brazo 12 de la posición de la línea gruesa en Fig. 1 a su posición de línea discontinua. Además, el eje A es un eje central longitudinal de un árbol oscilante 36 (Figs. 2 y 3), que se encuentra montado axialmente en una carcasa 32. Un engranaje 34 se acopla para que oscile con el árbol 36, teniendo el árbol 36 una superficie exterior irregular y teniendo el engranaje 34 una superficie interna complementaria irregular para garantizar que el engranaje 34 y el árbol 36 oscilen juntos pero no relativamente el uno del otro.

Para reducir al mínimo el juego de los dientes entre la cremallera 28 y el engranaje 34, y compensar en todo momento cualquier desgaste que ocurra en uno de los dos, la cremallera 28 se presiona elásticamente y en forma continua contra el engranaje 34 por un resorte de compresión en una carcasa 38, que actúa contra un brazo de conexión 40, que se sujeta en cada uno de sus extremos, alternando la cremallera 28 en relación con el brazo de conexión 40. El brazo de conexión 40, a su vez, actúa contra un extremo de un brazo de palanca 42 articulado sobre un pasador de pivote

23
↓

44. Una nariz 50, en un extremo opuesto del brazo de palanca 42, configurada generalmente con una sección transversal en forma de C, como se representa en Fig. 3, rodea la cremallera 28 para permitir en todo momento que la cremallera 28 alterne con respecto al engranaje 34. El brazo de palanca 42 se provee asimismo con un empujador giratorio 46 en una posición diametralmente opuesta al eje A del engranaje 34, y el rodillo 46 cabalga girando sobre una brida 48 de la cremallera 28 en el lado opuesto a su lado dentado, para permitir así un contacto controlado, de baja fricción, entre la cremallera 28 y el engranaje 34, durante todo el movimiento alternativo de la cremallera 28.

Para garantizar que el cabezal 14 permanezca en todo momento a nivel, la posición circunferencial del árbol 36 y, con ello, la posición circunferencial del engranaje 34, son graduables mediante un tornillo de ajuste 52 (Fig. 4). El tornillo 52 se atornilla en una tuerca 54, y se une en forma pivotante a un brazo 56 sobre un eje C. El brazo 56 se asegura a la carcasa 32 por un sujetador 58, que atraviesa una ranura arqueada 68 en el brazo 56, de manera que pueda aflojarse cuando se requiera. El brazo 56 posee una abertura que encaja la porción del árbol 36 y, cuando se afloja el sujetador 58, el brazo 56 puede moverse en arco para reacomodar así con precisión el árbol 36 y el engranaje 34. Naturalmente, el ajuste de las posiciones circulares del árbol 36 y el engranaje 34 se hace con la cremallera 28 desacoplada del engranaje 36.

Para monitorear con precisión la posición del vástago 26 en la carcasa/motor 24, se conecta un resolutor 60 a un extremo superior de la carcasa/motor 24. También se asegura ella un alimentador eléctrico 62 para la carcasa/motor 24, en una elevación por debajo de la del resolutor 60. Cables eléctricos para el resolutor 60 y el alimentador 62 atraviesan el interior de un soporte en forma de C 64 (Fig. 4), que se fija a la carcasa 32, asegurándose un blindaje 66 al soporte 64 en un lado opuesto a aquel en el que se ubica el tornillo de ajuste 52.

Aunque el mejor modo contemplado por los inventores para llevar a cabo la invención en la fecha de presentación es como se ha mostrado y

descrito aquí, será evidente a los expertos en el arte que pueden hacerse modificaciones, variaciones y equivalentes apropiados sin desviarse del ámbito de la invención, limitándose dicho ámbito únicamente por los términos de las siguientes reivindicaciones y sus equivalentes legales.

REIVINDICACIONES

Reivindicamos:

1. Aparato para trasladar una pluralidad separada de artículos similares de una primera posición a una segunda posición, aparato que comprende:

un brazo basculante, pudiendo oscilar dicho brazo en un arco de sustancialmente 180° entre una primera posición y una segunda posición;

una pluralidad separada de ensambles de lengüeta, portados por el brazo basculante y oscilantes con él, adaptándose cada uno de los ensambles de lengüeta para agarrar un artículo en la primera posición, trasladar el artículo a la segunda posición, sin cambiar la orientación axial del artículo, y soltar el artículo en la segunda posición;

una cremallera que se proyecta linealmente, contando dicha cremallera con un lado dentado y un lado opuesto y desplazándose con movimiento alternativo a lo largo de un eje;

un engranaje oscilatorio, externamente dentado, pudiendo oscilar dicho engranaje oscilatorio sobre un eje, engranándolo dicha cremallera para imprimirle un movimiento impelente y accionar oscilatoriamente dicho brazo; y

un único motor eléctrico reversible para accionar el movimiento alternativo de la cremallera.

2. Aparato de acuerdo con la reivindicación 1 en donde dicho único motor eléctrico reversible es un servomotor reversible a. c. de acción lineal.

3. Aparato de acuerdo con la reivindicación 2 en donde:
dicho motor eléctrico reversible se ubica encima de la primera posición y la segunda posición .

4. Aparato de acuerdo con la reivindicación 1 y que comprende

26
27

además:

medios para presionar elásticamente dicha cremallera, de modo que se acople con dicho engranaje oscilatorio.

5. Aparato de acuerdo con la reivindicación 4 en donde dichos medios para presionar elásticamente comprenden:

un eslabón de doble extremo;

medios para presionar elásticamente, que actúan en un extremo de dicho eslabón;

un brazo de doble extremo, uniéndose un extremo de dicho brazo en forma pivotante a un extremo opuesto de dicho eslabón, montándose dicho brazo para movimiento pivotante sobre un eje entre sus extremos, teniendo un extremo opuesto de dicho brazo un rodillo que se acopla con dicho lado opuesto de dicha cremallera.

6. Aparato de acuerdo con la reivindicación 1 y que comprende además:

medios para situar en forma graduable dichos ensambles de lengüeta en relación unos con otros, para mantener dichos ensambles de lengüeta en un plano horizontal.

7. Aparato para trasladar una serie espaciada de envases de vidrio, recién moldeados, de los moldes abiertos de una máquina de moldeo de envases de vidrio, a una posición externa, comprendiendo dicho aparato:

un brazo basculante, que puede oscilar a través de un arco de sustancialmente 180°, entre una primera posición encima de los envases de vidrio en los moldes abiertos y una segunda posición encima de la ubicación externa;

una pluralidad espaciada de ensambles de lengüeta, portados por el brazo basculante y oscilantes con él, adaptándose cada uno de los ensambles de lengüeta para agarrar un envase en la primera posición,



trasladar el envase a la segunda posición y soltar el envase en la segunda posición;

una cremallera que se extiende linealmente, teniendo dicha cremallera un lado dentado y un lado opuesto y desplazándose con un movimiento alternante;

un engranaje oscilatorio, externamente dentado, pudiendo oscilar dicho engranaje oscilatorio sobre un eje, engranándolo dicha cremallera para imprimirle un movimiento impelente y accionar oscilatoriamente dicho brazo; y

un único motor eléctrico reversible para accionar el movimiento alternante de la cremallera.

8. Un aparato de acuerdo con la reivindicación 7, en donde dicho motor eléctrico reversible es un servomotor a. c. de acción lineal.

9. Un aparato de acuerdo con la reivindicación 8, en donde dicho motor eléctrico reversible se monta encima de la primera posición y la segunda posición.

10. Aparato de acuerdo con la reivindicación 7 y que comprende además:

medios para presionar elásticamente dicha cremallera para acoplarla con dicho engranaje oscilante.

11. Aparato de acuerdo con la reivindicación 10 en donde dichos medios para presionar elásticamente comprenden:

un eslabón de doble extremo;

medios para presionar elásticamente, que actúan en un extremo de dicho eslabón;

un brazo de doble extremo, uniéndose un extremo de dicho brazo en forma pivotante a un extremo opuesto de dicho eslabón, montándose dicho brazo para movimiento pivotante sobre un eje entre sus

extremos, teniendo un extremo opuesto de dicho brazo un rodillo que se acopla con dicho lado opuesto de dicha cremallera.

28
17

12. Aparato de acuerdo con la reivindicación 7 y que comprende además:

medios para situar en forma graduable dichos ensambles de lengüeta en relación unos con otros, para mantener dichos ensambles de lengüeta en un plano horizontal.

13. El método de trasladar simultáneamente una pluralidad de artículos de una primera posición a una segunda posición, método que comprende:

proveer un brazo basculante;

proveer una pluralidad de lengüetas de agarre de artículos, portadas por el brazo basculante;

proveer un engranaje oscilatorio asociado en operación con el brazo basculante;

proveer una cremallera de movimiento alternativo acoplada con el engranaje oscilatorio para imprimirle movimiento impelente; y

accionar eléctrica y reversiblemente el movimiento alternativo de la cremallera.

14. El método de acuerdo con la reivindicación 13 en donde:

los artículos a trasladarse son envases de vidrio recién moldeados, la primera posición es una posición con los moldes abiertos de una máquina de moldeo de envases de vidrio, y la segunda posición es una placa neutra de la máquina de moldeo de envases de vidrio.

15. El método de acuerdo con la reivindicación 17 en donde:

El movimiento alternativo de la cremallera se acciona eléctrica y reversiblemente desde una posición situada en una elevación encima de la primera posición y encima de la segunda posición.

29
Q
M

16. El método de acuerdo con la reivindicación 13 y que comprende además:

presionar elásticamente la cremallera para que se acople con el engranaje oscilatorio.

17770PCT(9196)

Re: International Application No.: PCT/US03/27703

Client Docket No.: 17770 PCT

International Filing Date: 04/09/2003

May 14, 2004

AMENDMENT UNDER ARTICLE 19

Sir:

In view of the International Search Report dated 25/02/2004, Applicants would like to submit replacement claims pages 8 – 11 for originally filed claims pages 8 – 11.

The enclosed replacement pages restrict the claimed scope of the invention of this application to the scope of the allowed claims in the corresponding, priority application, on which U.S. Patent 6,722,488 B2 (April 20, 2004) was granted. In that regard, new claim 1 includes the subject matter of original claims 1 and 4, new claim 5 includes the subject matter of original claims 7 and 10, and new claim 9 includes the subject matter of original claims 13 and 16; the subject matter of original claims 6 and 12 has been canceled; claim 4 corresponds to original claim 5; claims 6 and 7 correspond, respectively, to original claims 8 and 9; claim 8 corresponds to original claim 11; claims 10

10/235,188

02074/020811

231

and 11 correspond, respectively, to original claims 14 and 15; and original claims 2 and 3 remain unchanged. Further, editorial corrections of a minor nature have been incorporated in new claims 1, 4, 5 and 8.

Respectfully submitted,



Susan L. Smith
Attorney for Applicants

32
M
M

**AMENDED
CLAIMS**

33
3CLAIMS

We claim:

- 5 1. Apparatus for transferring a spaced-apart plurality of like articles from a first location to a second location, said apparatus comprising:
- an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location and a second location;
- a spaced-apart plurality of tong assemblies-carried by the
- 10 oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp an article at the first location, to transfer the article to the second location without changing the axial orientation of the article and to release the article at the second location;
- a linearly extending rack, said rack having a toothed side and
- 15 an opposed side and being reciprocable along an axis;
- an externally-toothed, oscillatable gear, said oscillatable gear being oscillatable about an axis, being drivingly engaged by said rack, and oscillatingly driving said arm;
- a single reversible electrical motor for powering the
- 20 reciprocation of the rack; and
- means for resiliently biasing said rack into engagement with said oscillatable gear.
2. Apparatus according to claim 1 wherein said single reversible
- 25 electrical motor is a linearly-acting, reversible a.c. servo motor.
3. Apparatus according to claim 2 wherein:
- said reversible electrical motor is positioned above the first location and the second location.

34
X
M

9

4. Apparatus according to claim 1 wherein said means for resiliently biasing comprises:

a double-ended link;

resilient biasing means acting on an end of said link; and

5 a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

10 5. Apparatus for transferring a spaced-apart array of freshly-formed glass containers from open molds of a glass container forming machine to an external location, said apparatus comprising:

an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location above the glass containers in the open molds and a second location above the external location;

15 a spaced-apart plurality of tong assemblies carried by the oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp a container at the first location, to transfer the container to the second location and to release the container at the second location;

20 a linearly extending rack, said rack having a toothed side and an opposed side and being reciprocable;

an externally-toothed oscillatable gear, said oscillatable gear being oscillatable about an axis being drivingly engaged by said rack, and oscillatingly driving said arm;

25 a single reversible electrical motor for powering the reciprocation of the rack; and

means for resiliently biasing said rack into engagement with said oscillatable gear.

35
20

10

6. An apparatus according to claim 5 wherein, said reversible electrical motor is a linearly-acting reversible a.c. servo motor.

5 7. An apparatus according to claim 6 wherein said reversible electrical motor is positioned above the first location and the second location.

8. Apparatus according to claim 5 wherein said means for resiliently biasing comprises:

10 a double-ended link;
resilient biasing means acting on an end of said link; and
a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

15

9. The method of simultaneously transferring a plurality of articles from a first location to a second location, the method comprising:

providing an oscillatable arm;
providing a plurality of article-engaging tongs carried by the
20 oscillatable arm;
providing an oscillatable gear operatively associated with the oscillatable arm;
providing a reciprocable rack in driving engagement with the oscillatable gear;
25 reversibly electrically powering reciprocation of the rack; and
resiliently biasing the rack into engagement with the oscillatable gear.

10. The method according to claim 9 wherein:

2/1/36

11

the articles to be transferred are freshly-formed glass containers, the first location is a location at open molds of a glass container forming machine, and the second location is a deadplate of the glass containing forming machine.

5

11. The method according to claim 9 wherein:

the reciprocation of the rack is reversibly electrically powered from a location that is at an elevation above the first location and above the second location.

10

Ref.: Solicitud Internacional No.: PCT/US03/27703
Expediente del Cliente No.: 17770 PCT
Fecha de Presentación Internacional: 04/09/2003

37
R

14 de mayo de 2004

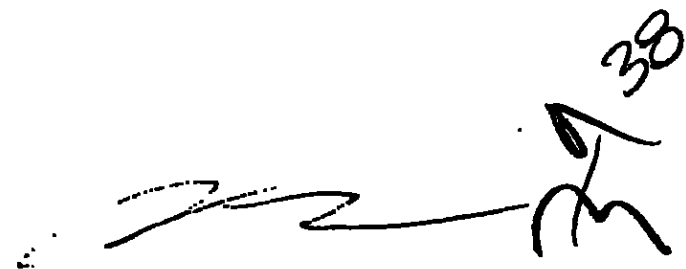
MODIFICACIÓN BAJO ARTÍCULO 19

Señor:

En vista del Informe de Búsqueda Internacional de fecha 25/02/2004, los solicitantes quisieran someter a consideración reivindicaciones de reemplazo páginas 8-11 en sustitución de las reivindicaciones presentadas originalmente páginas 8-11.

Las páginas de reemplazo adjuntas restringen el ámbito reivindicado de la invención de esta aplicación al ámbito de las reivindicaciones admitidas en la solicitud de prioridad correspondiente, con respecto a la cual se otorgó la Patente de los Estados Unidos 6,722,488 B2 (abril 20 de 2004). En ese aspecto, la nueva reivindicación 1 incluye el contenido de las reivindicaciones originales 1 y 4, la nueva reivindicación 5 incluye el contenido de las reivindicaciones originales 7 y 10, y la nueva reivindicación 9 incluye el contenido de las reivindicaciones originales 13 y 16; el contenido de las reivindicaciones originales 6 y 12 ha sido cancelado; la reivindicación 4 corresponde a la reivindicación original 5; las reivindicaciones 6 y 7 corresponden, respectivamente, a las reivindicaciones originales 8 y 9; la reivindicación 8 corresponde a la reivindicación original 11; las reivindicaciones 10 y 11 corresponden, respectivamente, a las reivindicaciones originales 14 y 15; y las reivindicaciones originales 2 y 3 permanecen sin modificación. Además, correcciones de edición de naturaleza menor se han incorporado en las nuevas reivindicaciones 1, 4, 5 y 8.

Respetuosamente,


Susan L. Smith

Apoderada de los solicitantes

39
T

REIVINDICACIONES MODIFICADAS

REIVINDICACIONES

H 40

Reivindicamos:

1. Aparato para trasladar una pluralidad separada de artículos similares de una primera posición a una segunda posición, aparato que comprende:

un brazo basculante, pudiendo oscilar dicho brazo en un arco de sustancialmente 180° entre una primera posición y una segunda posición;

una pluralidad separada de ensambles de lengüeta, portados por el brazo basculante y oscilantes con él, adaptándose cada uno de los ensambles de lengüeta para agarrar un artículo en la primera posición, trasladar el artículo a la segunda posición, sin cambiar la orientación axial del artículo, y soltar el artículo en la segunda posición;

una cremallera que se proyecta linealmente, contando dicha cremallera con un lado dentado y un lado opuesto y desplazándose con movimiento alternativo a lo largo de un eje;

un engranaje oscilatorio, externamente dentado, pudiendo oscilar dicho engranaje oscilatorio sobre un eje, engranándolo dicha cremallera para imprimirle un movimiento impelente y accionar oscilatoriamente dicho brazo;

un único motor eléctrico reversible para accionar el movimiento alternativo de la cremallera; y

medios para presionar elásticamente dicha cremallera para que se acople con dicho engranaje oscilatorio.

2. Aparato de acuerdo con la reivindicación 1 en donde dicho único motor eléctrico reversible es un servomotor reversible a. c. de acción lineal.

3. Aparato de acuerdo con la reivindicación 2 en donde:

dicho motor eléctrico reversible se ubica encima de la primera posición y la segunda posición.

241

4. Aparato de acuerdo con la reivindicación 1 en donde dichos medios para presionar elásticamente comprenden:

un eslabón de doble extremo;

medios para presionar elásticamente, que actúan en un extremo de dicho eslabón;

un brazo de doble extremo, uniéndose un extremo de dicho brazo en forma pivotante a un extremo opuesto de dicho eslabón, montándose dicho brazo para movimiento pivotante sobre un eje entre sus extremos, teniendo un extremo opuesto de dicho brazo un rodillo que se acopla con dicho lado opuesto de dicha cremallera.

5. Aparato para trasladar una serie espaciada de envases de vidrio, recién moldeados, de los moldes abiertos de una máquina de moldeo de envases de vidrio, a una posición externa, comprendiendo dicho aparato:

un brazo basculante, que puede oscilar a través de un arco de sustancialmente 180°, entre una primera posición encima de los envases de vidrio en los moldes abiertos y una segunda posición encima de la ubicación externa;

una pluralidad distanciada de ensambles de lengüeta, portados por el brazo basculante y oscilantes con él, adaptándose cada uno de los ensambles de lengüeta para agarrar un envase en la primera posición, trasladar el envase a la segunda posición y soltar el envase en la segunda posición;

una cremallera que se extiende linealmente, teniendo dicha cremallera un lado dentado y un lado opuesto y desplazándose con un movimiento alternante;

un engranaje oscilatorio, externamente dentado, pudiendo oscilar dicho engranaje oscilatorio sobre un eje, engranándolo dicha cremallera para imprimirle un movimiento impelente y accionar

oscilatoriamente dicho brazo;

un único motor eléctrico reversible para accionar el movimiento alternante de la cremallera. y

medios para presionar elásticamente dicha cremallera para que se acople con dicho engranaje oscilatorio.

6. Un aparato de acuerdo con la reivindicación 5, en donde dicho motor eléctrico reversible es un servomotor a. c. de acción lineal.

7. Un aparato de acuerdo con la reivindicación 6, en donde dicho motor eléctrico reversible se monta encima de la primera posición y la segunda posición.

8. Aparato de acuerdo con la reivindicación 5 en donde dichos medios para presionar elásticamente comprenden:

un eslabón de doble extremo;

medios para presionar elásticamente, que actúan en un extremo de dicho eslabón;

un brazo de doble extremo, uniéndose un extremo de dicho brazo en forma pivotante a un extremo opuesto de dicho eslabón, montándose dicho brazo para movimiento pivotante sobre un eje entre sus extremos, teniendo un extremo opuesto de dicho brazo un rodillo que se acopla con dicho lado opuesto de dicha cremallera.

9. El método de trasladar simultáneamente una pluralidad de artículos de una primera posición a una segunda posición, método que comprende:

proveer un brazo basculante;

proveer una pluralidad de lengüetas de agarre de artículos, portadas por el brazo basculante;

proveer un engranaje oscilatorio asociado en operación con el brazo basculante;

42
3
4

proveer una cremallera de movimiento alternativo acoplada con el engranaje oscilatorio para imprimirle movimiento impelente;

accionar eléctrica y reversiblemente el movimiento alternativo de la cremallera; y

medios para presionar elásticamente dicha cremallera para que se acople con dicho engranaje oscilatorio.

10. El método de acuerdo con la reivindicación 9 en donde:

los artículos a trasladarse son envases de vidrio recién moldeados, la primera posición es una posición con los moldes abiertos de una máquina de moldeo de envases de vidrio, y la segunda posición es una placa neutra de la máquina de moldeo de envases de vidrio.

11. El método de acuerdo con la reivindicación 9 en donde:

El movimiento alternativo de la cremallera se acciona eléctrica y reversiblemente desde una posición situada en una elevación encima de la primera posición y encima de la segunda posición.

43

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

SMITH; Susan L.
Owens-Illinois, Inc.
One SeaGate, 25-LDP
Toledo, OH 43666
ETATS-UNIS D'AMERIQUE

Owens-Illinois, Inc.

JUN 28 2004

INTELLECTUAL
PROPERTY SECTIONNOTIFICATION OF RECEIPT
OF DEMAND BY COMPETENT INTERNATIONAL
PRELIMINARY EXAMINING AUTHORITY(PCT Rules 59.3(e) and 61.1(b), first sentence
and Administrative Instructions, Section 601(a))

+ 1 419 247 8555

Registered

Date of mailing
(day/month/year)

23-06-2004

Applicant's or agent's file reference

17770 PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US03/27703

International filing date (day/month/year)

04/09/2003

Priority date (day/month/year)

04/09/2002

Applicant

OWENS-BROCKWAY GLASS CONTAINER INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority considers the following date as the date of receipt of the demand for international preliminary examination of the international application:

04/06/2004

2. This date of receipt is:

- ☒ the actual date of receipt of the demand by this Authority (Rule 61.1(b)).
☐ the actual date of receipt of the demand on behalf of this Authority (Rule 59.3(e)).
☐ the date on which this Authority has, in response to the invitation to correct defects in the demand (Form PCT/IPEA/404), received the required corrections.

3. ☒ **ATTENTION:** That date of receipt is after the expiration of 19 months from the priority date. Consequently, in respect of some Offices, the demand does not have the effect of postponing the entry into the national phase until 30 months from the priority date (or later in some Offices) (Article 39(1)) and the acts for entry into the national phase must therefore be performed within 20 months from the priority date (or later in some Offices). However, in respect of some other Offices, the time limit of 30 months (or later) may nevertheless apply. See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

- ☒ (If applicable) This notification confirms the information given by telephone, facsimile transmission or in person on:

18.06.2004, by fax

4. Only where paragraph 3 applies, a copy of this notification has been sent to the International Bureau.

Name and mailing address of the IPEA/

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Netherlands
Tel.: (+31-70) 340-2040
Fax: (+31-70) 340-3016

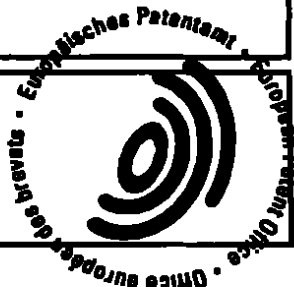
Authorized officer

SMITS A M

Tel. (+31-70) 340-3596

Form PCT/IPEA/402 (April 2002; reprint January 2004)

(18/06/2004)



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 03/27703

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C03B9/447

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C03B

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

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 14, 5 March 2001 (2001-03-05) -& JP 2000 327342 A (TOYO GLASS CO LTD), 28 November 2000 (2000-11-28) abstract; figures 1-4	1-16
X	PATENT ABSTRACTS OF JAPAN vol. 013, no. 187 (C-592), 2 May 1989 (1989-05-02) -& JP 01 014125 A (NIPPON TAISANBIN KOGYO KK), 18 January 1989 (1989-01-18) abstract; figure 3	1-16
E	US 2003/221456 A1 (LEIDY D WAYNE ET AL) 4 December 2003 (2003-12-04) paragraphs '0026!, '0027! -/-	1-16

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

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

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

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

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

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

"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

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

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

"A" document member of the same patent family

Date of the actual completion of the international search

9 February 2004

Date of mailing of the international search report

25/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl,
Fax: (+31-70) 340-3018

Authorized officer

Marrec, P

INTERNATI NAL SEARCH REPORT

International Application No

PCT/US 03/27703

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 895 513 A (ROBERTS DOUGLAS J ET AL) 20 April 1999 (1999-04-20) figures 45-47 	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/27703

46

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2000327342 A	28-11-2000	JP 3140434 B2	05-03-2001
JP 01014125 2 A	26-05-1998	US 5772415 A	30-06-1998
		CN 1186174 A ,B	01-07-1998
		DE 69724070 D1	18-09-2003
		EP 0840011 A1	06-05-1998
		US 6106251 A	22-08-2000
US 2003221456 A1	04-12-2003	CA 2428756 A1	03-12-2003
		CN 1468820 A	21-01-2004
		EP 1380546 A2	14-01-2004
US 5895513 A	20-04-1999	AU 733545 B2	17-05-2001
		AU 9050198 A	27-05-1999
		CZ 9803570 A3	14-07-1999
		DE 19851048 A1	12-05-1999
		FR 2770514 A1	07-05-1999
		GB 2331079 A ,B	12-05-1999
		IT 1303316 B1	06-11-2000
		JP 11263633 A	28-09-1999
		RU 2186041 C2	27-07-2002

PATENT COOPERATION TREATY

4-28-43

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
OWENS-ILLINOIS, INC.
Attn. Parikh, Nirav D.
One SeaGate, 25-LDP
Toledo, Ohio 43666
UNITED STATES OF AMERICA

Owens-Illinois, Inc.

MAR 1 2004

INTELLECTUAL
PROPERTY SECTIONNOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing
(day/month/year)

25/02/2004

Applicant's or agent's file reference

17770 PCT

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/US 03/27703

International filing date
(day/month/year)

04/09/2003

Applicant

OWENS-BROCKWAY GLASS CONTAINER INC.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 48):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Further action(s): The applicant is reminded of the following:

Shortly after 18 months from the priority date, the International application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the International application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for International publication.

Within 18 months from the priority date, a demand for International preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 18 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority

European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3018



Authorized officer

Alex Schmidt

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the letter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/as filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

48
X

49
7

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 36, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 35 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 48.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Office, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

5/50

Applicant's or agent's file reference 17770 PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.	
International application No. PCT/US 03/27703	International filing date (day/month/year) 04/09/2003	(Earliest) Priority Date (day/month/year) 04/09/2002
Applicant OWENS-BROCKWAY GLASS CONTAINER INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

TAKEOUT DEVICE AND METHOD FOR TRANSFERRING GLASS CONTAINERS

5. With regard to the abstract,

the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 03/27703

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The abstract has to be changed as follows:
Line 1: after " device(10) " insert "and method"

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/27703

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C03B9/447

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
IPC 7 C03B

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 14, 5 March 2001 (2001-03-05) - & JP 2000 327342 A (TOYO GLASS CO LTD), 28 November 2000 (2000-11-28) abstract; figures 1-4	1-16
X	PATENT ABSTRACTS OF JAPAN vol. 013, no. 187 (C-592), 2 May 1989 (1989-05-02) - & JP 01 014125 A (NIPPON TAISANBIN KOGYO KK), 18 January 1989 (1989-01-18) abstract; figure 3	1-16
E	US 2003/221456 A1 (LEIDY D WAYNE ET AL) 4 December 2003 (2003-12-04) paragraphs '0026!, '0027! -/-	1-16

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.*** Special categories of cited documents:****"A"** document defining the general state of the art which is not considered to be of particular relevance**"E"** earlier document but published on or after the international filing date**"L"** document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)**"O"** document referring to an oral disclosure, use, exhibition or other means**"P"** document published prior to the international filing date but later than the priority date claimed**"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**"X"** document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone**"Y"** document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art**"A"** document member of the same patent family

Date of the actual completion of the international search

9 February 2004

Date of mailing of the international search report

25/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Marrec, P

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/27703

53

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 895 513 A (ROBERTS DOUGLAS J ET AL) 20 April 1999 (1999-04-20) figures 45-47	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/US 03/27703

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2000327342 A	28-11-2000	JP 3140434 B2	05-03-2001
JP 01014125 2 A	26-05-1998	US 5772415 A	30-06-1998
		CN 1186174 A ,B	01-07-1998
		DE 69724070 D1	18-09-2003
		EP 0840011 A1	06-05-1998
		US 6106251 A	22-08-2000
US 2003221456 A1	04-12-2003	CA 2428756 A1	03-12-2003
		CN 1468820 A	21-01-2004
		EP 1380546 A2	14-01-2004
US 5895513 A	20-04-1999	AU 733545 B2	17-05-2001
		AU 9050198 A	27-05-1999
		CZ 9803570 A3	14-07-1999
		DE 19851048 A1	12-05-1999
		FR 2770514 A1	07-05-1999
		GB 2331079 A ,B	12-05-1999
		IT 1303316 B1	06-11-2000
		JP 11263633 A	28-09-1999
		RU 2186041 C2	27-07-2002

EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 2000327342
PUBLICATION DATE : 28-11-00

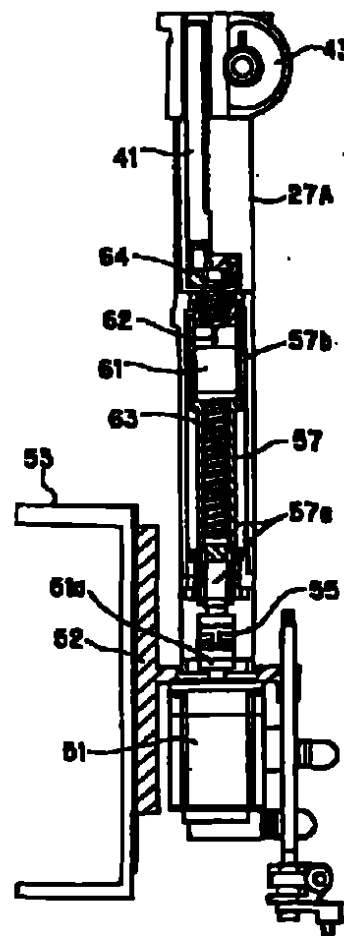
APPLICATION DATE : 14-05-99
APPLICATION NUMBER : 11134192

APPLICANT : TOYO GLASS CO LTD;

INVENTOR : SASAKI TAKESHI;

INT.CL. : C03B 9/447

TITLE : TAKE-OUT MECHANISM OF MACHINE
FOR PRODUCING BOTTLE



ABSTRACT : PROBLEM TO BE SOLVED: To provide the take-out mechanism of a bottle-producing machine, which can arbitrarily change the rotation rate and rotation angle of an arm and can sufficiently absorb an impact on the stoppage of the arm.

SOLUTION: This take-out mechanism of a bottle-producing machine has a vertically movably supported rack gear 41, a pinion gear 43 engaged with the rack gear, and an arm 33 which is attached to the pinion and at whose tip a tongue for holding a glass bottle is disposed, and is used by holding the glass bottle molded using a finishing mold with the tongue at the tip portion of the arm, rotating the arm, and then loading the carried glass bottle on a dead plate. The rack gear 41 is driven with a servo motor 51.

COPYRIGHT: (C)2000,JPO

EUROPEAN PATENT OFFICE

Patent Abstracts of Japan

PUBLICATION NUMBER : 01014125
PUBLICATION DATE : 18-01-89

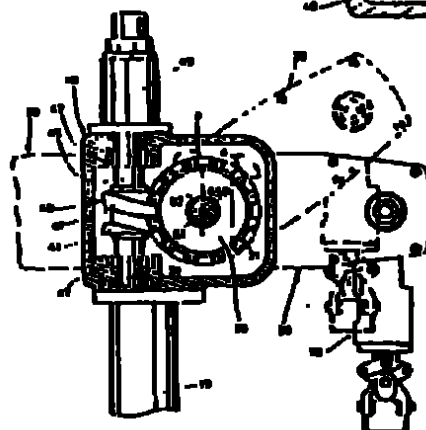
APPLICATION DATE : 08-07-87
APPLICATION NUMBER : 62170702

APPLICANT : NIPPON TAISANBIN KOGYO KK;

INVENTOR : NAKAJIMA MASATADA;

INT.CL. : C03B 35/06 C03B 9/44

TITLE : BOTTLE BODY TRANSFER DEVICE IN
BOTTLE MANUFACTURING MACHINE



ABSTRACT : **PURPOSE:** To transfer bottle bodies without the fear of deformation and to easily adjust the transfer position by providing an engaging member to a revolving shaft part of arm main body provided with a bottle body holding mechanism part and controlling the rotation of cylindrical cam.

CONSTITUTION: The revolving shaft part is provided to the one end of the arm 20 provided with the bottle body holding mechanism part 70, and is rotatably held with a rotatable holding part 11 of main body part. The engaging member, such as an engaging part 30 having plural rollers 31 mounted at equal distances, is provided to the revolving shaft part 21. On the other hand, the cylindrical cam 40 provided with a spiral projecting part 41 meshing with the roller 31 is provided on a main body part 10. When the cylindrical cam 40 is revolved by a servomotor 49, the roller 31 meshed with the projecting part 41 is smoothly moved rolling along on the side wall of projecting part, and the arm 20 is rotated. Consequently, the adjustment of rotating position of the arm 20 is easily and correctly carried out by the rotation control of the servomotor 49.

COPYRIGHT: (C)1989,JPO&Japlo

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号
特開2000-327342
(P2000-327342A)

(43) 公開日 平成12年11月28日 (2000. 11. 28)

(51) Int. Cl.
C 0 3 B 9/447

識別記号

F I
C 0 3 B 9/447

キーワード (参考)

審査請求 有 請求項の数 1 O L (全 6 頁)

(21) 出願番号 特願平11-134192

(22) 出願日 平成11年5月14日 (1999. 5. 14)

(71) 出願人 000222222

東洋ガラス株式会社
東京都千代田区内幸町1丁目3番1号

(72) 発明者 佐々木 武

神奈川県川崎市川崎区夜光3-2-3 東
洋ガラス株式会社内

(74) 代理人 100091823

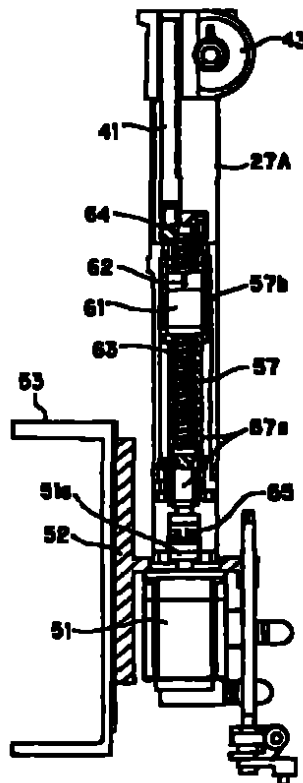
弁理士 柳田 昌之 (外1名)

(54) 【発明の名称】 製びん機のテークアウトメカニズム

(57) 【要約】

【課題】 アームの回転速度や回転角度を任意に変更することができ、しかもアーム停止時の衝撃を十分に吸収することができる製びん機のテークアウトメカニズムを提供する。

【解決手段】 テークアウトメカニズム本体27Aに上下動自在に支持されたラックギア41と、このラックギアに噛み合わされたピニオンギア43と、このピニオンギアに固定され、ガラスびんを把持する tong を先端に設けたアーム33とを備え、仕上り型で成形されたガラスびんをアーム先端の tong で把持して、当該アームを回転させて、当該ガラスびんをデッドプレート上に移載する製びん機のテークアウトメカニズムである。そして、ラックギア41をサーボモータ51で駆動する構成としたものである。



【特許請求の範囲】

【請求項1】 テークアウトメカニズム本体に上下動自在に支持されたラックギアと、このラックギアに噛み合わされたピニオンギアと、このピニオンギアに固定され、ガラスびんを把持する tong を先端に設けたアームとを備え、仕上り型で成形されたガラスびんをアーム先端の tong で把持して、当該アームを回転させて、当該ガラスびんをデッドプレート上に移動する製びん機のテークアウトメカニズムにおいて、

前記ラックギアをサーボモータで駆動する構成としたことを特徴とする製びん機のテークアウトメカニズム。

【請求項2】 前記サーボモータによって回転駆動されるスリーブを備え、このスリーブ内にナットを固定し、このナットのねじ部に上下動自在にねじ軸を螺合し、このねじ軸に前記ラックギアを連結したことを特徴とする請求項1記載のテークアウトメカニズム。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、一般に1Sマシンと呼ばれる製びん機におけるテークアウトメカニズムに関する。

【0002】

【従来の技術】例えば、プレスアンドブロー方式によりガラスびんを成形する場合には、粗型でバリソンを成形した後にブロー（圧縮空気の吹き込み）で仕上り型成形するのが一般的である。この場合、仕上り型で成形されたガラスびんは、テークアウトメカニズムを介してデッドプレート上に移動される。

【0003】従来のテークアウトメカニズムは、その本体にエアーシリングを介して上下動自在に支持されたラックギアと、このラックギアに噛み合わされたピニオンギアと、このピニオンギアに固定され、ガラスびんを把持する tong を先端に設けたアームとを備え、仕上り型で成形されたガラスびんをアーム先端の tong で把持して、エアーシリングを駆動することによりアームを回転させて、ガラスびんをデッドプレート上に移動する構成を採用している。

【0004】

【発明が解決しようとする課題】しかしながら、従来の構成では、エアーシリングによってアームを回転させているので、当該アームの回転速度や回転角度を任意に変更することが困難になるという問題がある。また、従来の構成では、エアーシリングの端部に緩衝装置を設け、この緩衝装置によって当該アーム停止時の衝撃を吸収しているが、この種の緩衝装置にはばらつきがあり、緩衝力が弱い場合等では、ガラスびんをデッドプレート上に移動する時に、このガラスびん口部に衝撃が伝わり、当該口部に亀裂欠陥や変形が生じる等の問題がある。

【0005】そこで、本発明の目的は、アームの回転速度や回転角度を任意に変更することができ、しかもアーム

停止時の衝撃を十分に吸収することができる製びん機のテークアウトメカニズムを提供することにある。

【0006】

【課題を解決するための手段】上記目的を達成するために、請求項1に記載の発明は、テークアウトメカニズム本体に上下動自在に支持されたラックギアと、このラックギアに噛み合わされたピニオンギアと、このピニオンギアに固定され、ガラスびんを把持する tong を先端に設けたアームとを備え、仕上り型で成形されたガラスびんをアーム先端の tong で把持して、当該アームを回転させて、当該ガラスびんをデッドプレート上に移動する製びん機のテークアウトメカニズムにおいて、ラックギアをサーボモータで駆動する構成としたことを特徴とするものである。

【0007】請求項2記載の発明は、請求項1記載のものにおいて、前記サーボモータによって回転駆動されるスリーブを備え、このスリーブ内にナットを固定し、このナットのねじ部に上下動自在にねじ軸を螺合し、このねじ軸に前記ラックギアを連結したことを特徴とするものである。

【0008】これらの発明によれば、ラックギアがサーボモータで駆動されるため、このサーボモータの駆動制御によってアームの回転速度や回転角度が容易に変更される。このアームの回転速度を増大させたとしても、アーム回転中よりもアーム停止時の速度が遅くなるように制御する等して、サーボモータの駆動制御方式を変更することによって、アーム停止時の衝撃が十分に吸収される。従って、ガラスびんをデッドプレート上にスムーズに移動することができ、ガラスびん口部に生じる亀裂欠陥や変形等の発生が防止される。

【0009】

【発明の実施の形態】以下、本発明の一実施形態を図面を参照して説明する。

【0010】図1は製びん機を示している。この製びん機はゴブ供給装置1から供給され、シャー3で切断されたゴブ（ガラス塊）Gを下方に導くためのアッパーファンネル5、ゴブデフレクタ7、ローファンネル9、スクープ11、トロー13、デフレクタ15等を備えている。このデフレクタ15の下方には粗型17が配置され、この粗型17に導かれるゴブGが、下方からのプランジャによって押し上げられて、プレスされてバリソンPが成形される。

【0011】この粗型17で成形されたバリソンPは、その口部が口型19に摺まれ、この口型19毎、インバートメカニズム21により図中時計方向に回転され、仕上り型23にインバートされる。

【0012】この仕上り型23では、ブロー成形によってガラスびん25が成形され、このガラスびん25は、後述するテークアウトメカニズム27を介して振動・搬送され、冷却用のデッドプレート29上に移動される。

そして、このデッドプレート29上から押し出され、コンベア31上に移載され、このコンベア31を通じて徐冷炉（図示せず）に送り出される。

【0013】図2a乃至図2cは、テークアウトメカニズム27を示している。

【0014】このテークアウトメカニズム27は本体27Aを備え、この本体27Aには、図2aに示す状態から図2cに示す状態に向けて180°回転可能なアーム33が設けられている。このアーム33の先端には複数のガラスびん25を同時に把持可能にトング35が取り付けられている。このテークアウトメカニズム27は、図2aに示すように、仕上げ型23で成形されたガラスびん25の口部25aをトング35で把持し、図2bに示すように、アーム33を図中時計方向に90°回転させた後、更にアーム33を90°回転させ、図2cに示すように、ガラスびん25をデッドプレート29上に移載する。

【0015】テークアウトメカニズム本体27Aの構造を説明すると、図3及び図4に示すように、上下動自在に支持されたラックギア41を備え、このラックギア41にはピニオンギア43が噛み合わされている。

【0016】このピニオンギア43には前述したアーム33が固定され、このアーム33の先端にはガラスびん25を把持するトング35が取り付けられている。

【0017】従って、このラックギア41を上下動させることにより、これに噛み合うピニオンギア43が軸中心に回転し、この回転に伴って、前述したアーム33が、図2a乃至図2cに示すように、時計方向に回転される。

【0018】この実施形態では、ラックギア41がサーボモータ51で駆動される。このサーボモータ51はフランジ52を介して架台53に固定されている。サーボモータ51の出力軸51aにはカップリング55を介してスリーブ57の基端57aが一体に連結され、このスリーブ57の基端57aは軸受け59で回転自在に支持されている。このスリーブ57の先端57bは基端57aよりも内径が大きく形成され、この先端57bの内周にはナット61が収納され、このナット61はキー62を介してスリーブ57に回転不能に固定されている。

【0019】このナット61の内周には図示を省略しためねじ部が形成され、このめねじ部には上下動自在にボールねじ等のねじ軸63が螺合し、このねじ軸63には連結部材64を介してラックギア41の基端が連結されている。

【0020】このねじ軸63は、図3に示すように、初期状態でスリーブ57の内部に格納される長さを備えている。このねじ軸63がスリーブ57の内部に格納された状態では、図2aに示すように、アーム33が仕上げ型23の側に位置する。これに対して、図4に示すように、ねじ軸63がスリーブ57を抜け出して、上方に延

出する場合には、図2bに示すように、アーム33が図中で時計方向に回転し、最終的には、図2cに示すように、デッドプレート29の側に移動する。

【0021】この実施形態では、ラックギア41がサーボモータ51で駆動されるため、このサーボモータ51の駆動制御によって、第一に、アーム33の回転速度や回転角度の変更を容易に行うことができる。

【0022】例えば、びん長の大きいガラスびん25をデッドプレート29の側に移載する場合には、通常サイズのびんに比べて、図2a乃至図2cからも明らかなように、アーム33を小さい範囲（180°以下の角度θ1の範囲）で回転させれば、それを移載できることが明らかである。

【0023】また、その反対にびん長の小さいガラスびん25を移載する場合には、通常サイズのびんに比べ、アーム33を大きい範囲（180°以上の角度θ2の範囲）で回転させれば、それを移載できることが明らかである。

【0024】ただし、この場合、仕上げ型23やデッドプレート29の位置をそれぞれ微調整する必要がある。一方、ガラスびん25の移載の速度を変更する場合、アーム33の回転速度を変更すれば、それを変更できることが明らかである。

【0025】ラックギア41をエアーシリンダで駆動する従来の方式では、アーム33の回転角度が180°に限定されており、これを変更する場合には、当該エアーシリンダを交換して、そのストロークを変更しなければならない。

【0026】また、アーム33の回転速度を変更する場合には、エアーシリンダへのエアーの供給圧力を変更する等しなければならない。仮に、その速度を増大させた場合、エアーシリンダの端部に設けた緩衝装置によって、アーム停止時の衝撃を吸収し切れなくなり、ガラスびんをデッドプレート上に移載する時、このガラスびん口部に衝撃が伝わり、当該口部に亀裂欠陥や変形が生じるおそれがある。

【0027】この実施形態では、ラックギア41をサーボモータ51で駆動する方式であるので、エアーシリンダを交換する等の大がかりな工事を必要とすることなく、サーボモータ51の駆動時間、駆動速度等を変更することによって、アーム33の回転角度或いは回転速度をきわめて簡単に変更することができる。

【0028】また、ラックギア41をサーボモータ51で駆動する方式であるので、アーム33の回転速度を増大させたとしても、アーム回転中よりもアーム停止時の速度が遅くなるように制御する等して、サーボモータ51の駆動制御方式を変更することによって、アーム停止時の衝撃を十分に吸収することができる。従って、ガラスびんをデッドプレート上にスムーズに移載することができ、このガラスびん口部に生じる亀裂欠陥や変形等の

発生を防止することができる。

【0029】第二に、この実施形態では、図3に示すように、初期状態でスリーブ57の内部にねじ軸63が格納される。この構成を採用することによって、テークアウトメカニズム本体27Aの上下方向の長さが短くなる。

【0030】従って、テークアウトメカニズム本体27Aの下部スペースに、従来のエアシリンダに比べて大きなサーボモータ51を配置することができ、このサーボモータ51による駆動制御を実現することができる。

【0031】以上、一実施の形態に基づいて本発明を説明したが、本発明は、上記実施の形態に限定されるものではない。例えば、ラックギア41をサーボモータ51で駆動する場合のスリーブ57、ナット61、ねじ軸63等からなる駆動機構は、これに限定されるものでないことは明らかである。

【0032】

【発明の効果】この発明によれば、ラックギアがサーボモータで駆動されるため、このサーボモータの駆動制御によって、アームの回転速度や回転角度を容易に変更することができる。また、ラックギアをサーボモータで駆動するので、アームの回転速度を増大させたとしても、アーム回転中よりもアーム停止時の速度が遅くなるように制御する等して、サーボモータの駆動制御方式を変更することによって、アーム停止時の衝撃を十分に吸収することができる。従って、ガラスびんをデッドプレート上にスムーズに移載することができ、このガラスびん口に生じる亀裂欠陥や変形等の発生を防止することがで

きる。

【図面の簡単な説明】

【図1】製びん機の一実施形態を示す図である。

【図2】aはテークアウトメカニズムの初期状態を示す図、bはテークアウトメカニズムの90°回転状態を示す図、cはテークアウトメカニズムの180°回転状態を示す図である。

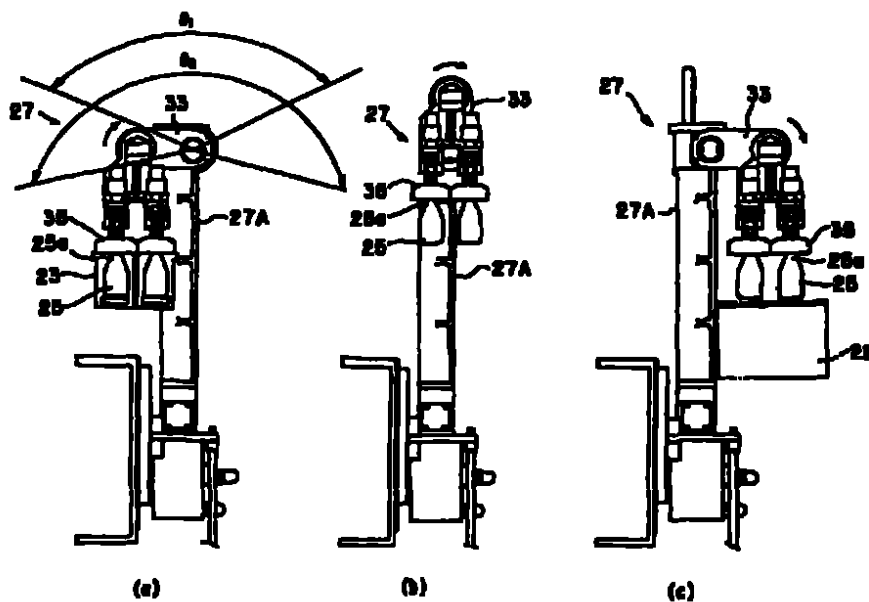
【図3】テークアウトメカニズムの構造を示す図2a対応図である。

【図4】テークアウトメカニズムの構造を示す図2c対応図である。

【符号の説明】

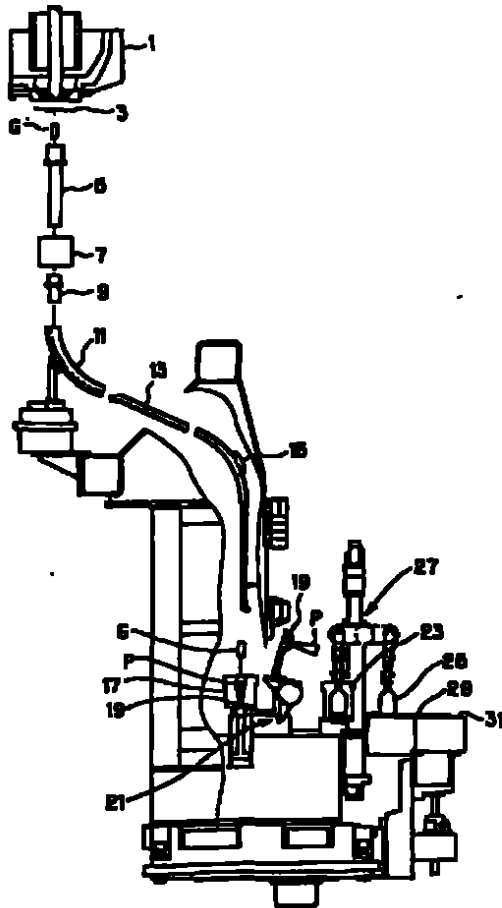
- 23 仕上げ型
- 25 ガラスびん
- 27 テークアウトメカニズム
- 27A 本体
- 29 デッドプレート
- 33 アーム
- 35 トング
- 41 ラックギア
- 43 ピニオンギア
- 51 サーボモータ
- 55 カップリング
- 57 スリーブ
- 59 軸受け
- 61 ナット
- 62 キー
- 63 ねじ軸

【図2】

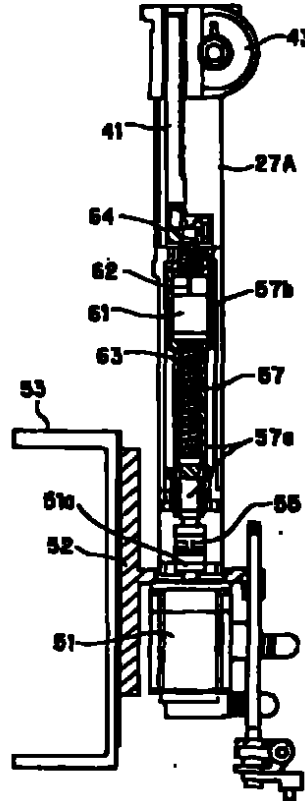


54
9-9

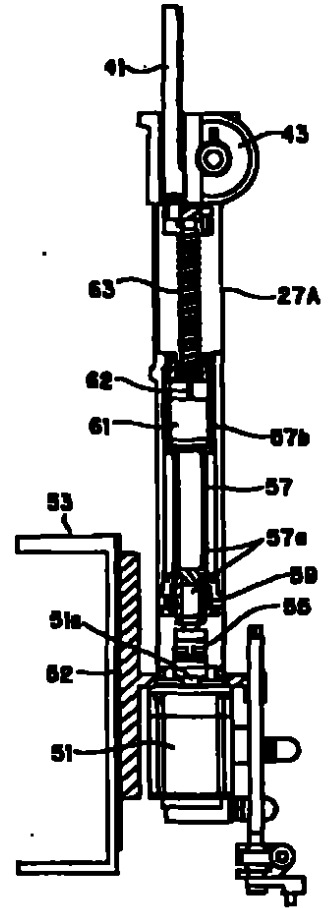
【図1】



【図3】



【図4】



【手続補正書】

【提出日】平成12年6月13日(2000. 6. 13)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】 テークアウトメカニズム本体に上下動自在に支持されたラックギアと、このラックギアに噛み合わされたピニオンギアと、このピニオンギアに固定され、ガラスびんを把持する Tong を先端に設けたアームとを備え、仕上げ型で成形されたガラスびんをアーム先端の Tong で把持して、当該アームを回動させて、当該ガラスびんをデッドプレート上に移載する製びん機のテークアウトメカニズムにおいて、

前記テークアウトメカニズム本体の下部スペースにサーボモータを配置し、

このサーボモータによって回転駆動されるスリーブを備え、このスリーブ内にナットを固定し、このナットのね

じ部に上下動自在にねじ軸を螺合し、このねじ軸に前記ラックギアを連結したことを特徴とするテークアウトメカニズム。

【手続補正2】

【補正対象書類名】明細書

【補正対象項目名】0006

【補正方法】変更

【補正内容】

【0006】

【課題を解決するための手段】上記目的を達成するために、請求項1に記載の発明は、テークアウトメカニズム本体に上下動自在に支持されたラックギアと、このラックギアに噛み合わされたピニオンギアと、このピニオンギアに固定され、ガラスびんを把持する Tong を先端に設けたアームとを備え、仕上げ型で成形されたガラスびんをアーム先端の Tong で把持して、当該アームを回動させて、当該ガラスびんをデッドプレート上に移載する製びん機のテークアウトメカニズムにおいて、前記テークアウトメカニズム本体の下部スペースにサーボモータを配置し、このサーボモータによって回転駆動されるス

リーブを備え、このスリーブ内にナットを固定し、このナットのねじ部に上下動自在にねじ軸を螺合し、このねじ軸に前記ラックギアを連結したことを特徴とするものである。

【手続補正3】

【補正対象書類名】明細書

【補正対象項目名】0007

【補正方法】削除

60
16

① 日本国特許庁(JP) ② 特許出願公開
③ 公開特許公報(A) 昭64-14125

④ Int.Cl.⁴ 識別記号 庁内整理番号 ⑤ 公開 昭和64年(1989)1月18日
C 03 B 35/06 6570-4G
B/44 7344-4G
審査請求 未請求 発明の数 1 (全6頁)

⑥ 発明の名称 製びん機におけるびん体の移送装置

⑦ 特 願 昭62-170702
⑧ 出 願 昭62(1987)7月8日

⑨ 発 明 者 川 地 文 雄 岐阜県大垣市中曾根町610番地 日本耐酸塩工業株式会社
⑩ 発 明 者 中 島 正 忠 岐阜県大垣市中曾根町610番地 日本耐酸塩工業株式会社
⑪ 出 願 人 日本耐酸塩工業株式会 岐阜県大垣市中曾根町610番地
社
⑫ 代 理 人 弁理士 後藤 憲秋

明 細 書

1. 発明の名称

製びん機におけるびん体の移送装置

2. 特許請求の範囲

先述にびん体のための扶持機構部を備えたアームを本体部に対して開閉自在に保持してなるびん体の移送装置において、前記アームの本体部に対する開閉機構に複数の係合子を等間隔で有する係合部を設け、本体部には前記係合子と係合する係合突起を備えた円筒カムを設けてこれをサーボモータによって開閉制御して前記アームを開閉することを特徴とする製びん機におけるびん体の移送装置。

3. 発明の詳細な説明

(産業上の利用分野)

この発明は製びん機におけるびん体の移送装置に関する。

(従来の技術)

びん体の移送装置は、例えばブローモールドにて成形されたびん体を取り出して後工程のデッ

プレートまで移送したり、口集合にてその口部を加熱されたびん体を取り出して口部成形装置へ移送する際などに用いられる装置である。

このびん体の移送装置としては、第4図に開示したように、先述にびん体のための扶持機構部120を備えたアーム110を本体部100に開閉自在に保持し、前記アーム110を所定の角度移動することによって、前記扶持機構部120を所定位置まで移動しびん体を移送する装置が知られている。従来装置においては、前記アーム110の本体部100に対する開閉機構は、アーム110の本体部100に対する開閉機構にピニオン111を設け、本体部100には歯ピニオン111に歯合するラック101を上下動自在に設けて、前記ラック101を本体部下端部のエアシリンダ105により駆動することによってアーム110を開閉していた。

そして、びん体の移送をよりよく行うためにこの従来装置には主に次の3種の機構が備えられていた。第一に保持部の比較的小さいびん体

をその形を損なうことなく移送するためのタッ
 ュン機構100A、第二にびん体の取り出し位置
 ならびに移送位置を調節するためのアーム110
 の駆動機構は調整機構100B、第三にびん体の
 移送サイクルを早めるために移送位置完了後に決
 定の移送位置に合わせてアームをある程度駆動して
 戻しておくリフトアップ機構100Cである。

まず、びん体の形を型うつことなく製造するタッペン機構100Aは、びん体の扶持取り出し時ならびに置入戻り時にのみらかなアーム110の移動動作を行なうものであって、タッパ101の上昇終点位置に設けた上端軸圧タッペン130ならびに下降終点位置に設けた下端軸圧タッペン150からなっていた。第5図は上端軸圧タッペンの断面図、第6図は下端軸圧タッペンの断面図である。

上端軸圧タッパン138は、第5圖に圖示したように、そのロッド131にタッパ101の上端103が当接し、該タッパ101の上昇終点位置でのスピードを感知するものである。圖の符号1

150に固定されたケーシング150に対し上下動できるように構成されている。その上下位置調整機構は前記下軸軸圧クッション150の下座に設けられ155を取り、前記ケーシング150には設けられ159に設置する軸じり部151を有する前記ブロック153を前記ケーシング150に固定自在に保持して、外部からの衝撃動作機構155によって前記前記ブロック153を揺動し下軸軸圧クッション150を移動調整するものであった。

そして、第三のびん体の移送作業完了後アー
ム１１０をある程度まで加熱し戻しておくリフト
アップ機構１００Ｃ（図示しない）は、圧縮ばね
を倒えるものであった。この圧縮ばね体は、上
述したクッション機構１００Ａの上端部クッ
ション１３０とラック１０１との間に介装されるよ
うに設けられていて、びん体の移送にともなうラ
ック１０１の上昇によって前記圧縮ばねを圧縮し、
移送完了後にその付勢力によって前記ラック１０
１を所定量押し下げアーム１１０を戻すものであ

33は前記ロッド131のクッションピストン、133は前記クッションピストン133をラット101の下端方向に付勢するスプリング、137と138は互いにオリフィスを介して連通されたチャンパである。図6別に開示した下部軸座クッション153はそのロッド151にエアースリング105のピストン106が連続しラット101の下端軸座付勢でのスピードを制限するものである。図の符号153はロッド151のクッションピストン、155はスプリング、157と158は互いにオリフィスを介して連通されたチャンパである。

次にびん体の取り出し位置ならびに導出位置の
ためのアーム110の傾動角度長測装機構100
とは、ラック101の上下動ストロークを測装機
構することによって行なうものであって、具体的
にはラック101の下部位置を可変とし上述の下
部減圧クッション150が本体部に対し上下位置
測装に構成されていた。つまり、第6図に図示し
たように下部減圧クッション150は、本体部1

った。したがってその質し量も真正正確に物体の
のばね体の長さやばね定数などにより決められて
いた。

しかしながら、この変遷過程にあっては、以下に述べる問題を有していた。

まず、彼ら集団にあっては、まだやわらかいびん体を形造するためにタッセル機構として上端膨張タッセルおよび下端膨張タッセルを備けていたが、しかしこれだけでは十分でないことがあった。つまりエアースリングによってアームが、等角速度で回転することかつその速度の調節が容易でないことによって、彼らはびん体の状態に合わせた形造を形造状態を得ることが難しく、故にびん体を変形させてしまうおそれがあった。

また、僕達においてはびん体の取り出し位置を
らびに等しい位置のためのアームの運動量測定を、
上述した下胸輪圧タッションの上下位置測定機構
において通知と検知との感測結合を利用してい
て行っているため、経験に頼るところが大きく、
微妙な調整が極めて難しくかった。

6261

特開昭64-14125(3)

さらに、従来の移送装置にアームを反しておくりフトアップ機構は、正確な搬送によるものであるからアームの反し度を調整することや大きい反し度を得ることが難しく、移送サイクルの短縮化を阻む原因の一つとなっていた。

一方、要求装置の装置自体の問題としては、ラックの直進性を出す必要から装置が大型化していたこと、また、上給油圧クッションおよび下給油圧クッションなどを設けなければならず装置が複雑となり、メンテナンスが容易でないという問題があった。

(発明が解決しようとする問題点)

この発明は上述した問題点に鑑みて提案されたものであって、その目的とするところは、びん体の搬送のおそれがない最速な移送動作を行なうことができ、またびん体の移送位置の調整が容易であって、移送サイクルに合わせた簡便なアーム動作が行なえるとともに、装置自体がコンパクトで扱い易く(メンテナンスが容易な)びん体の移送装置を提供することにある。

する。紙面の図面第1図はこの発明の一実施例を示すびん体の移送装置の平面視図面、第2図はその扶持機構を示す第1図のB-B線での切取した断面図、第3図は第1図における背面図である。

このびん体の移送装置は、第1図に図示したように、本体部10と、該本体部10に搬送自在に保持されたアーム20と、該アーム20の先端に備えられたびん体のための扶持機構70とからなっている。

本体部10は、第3図の背面図に図示したように、下部のフレーム11によって必要の高さに設置される。断面図においてアーム20は本体部10に対し図面左右に180度回転し、その先端の扶持機構70が直進動作を保持しながら移動される。

まず、第1図に就いて、この本体部10に対するアーム20の保持構造ならびに回転構造について説明すると、該アーム20の一端には回転軸部21が設けられていて、本体部10の回転保持部11にベアリング12を介して回転自在に保持され

(問題点を解決するための手段)

すなわち、この発明のびん体の移送装置は、先端にびん体のための扶持機構を備えたアームを本体部に対して回転自在に保持してなるびん体の移送装置において、前記アームの本体部に対する回転軸部に複数個の係合子を等間隔で有する係合部を設け、本体部には前記係合子と係合する駆動突子を備えた円筒カムを設けてこれをサーボモータによって回転駆動して前記アームを回転することを特徴とするものである。

(作用)

上述の構成によれば、サーボモータによって円筒カムが回転すると、アームの回転軸部に設けた係合部の係合子は前記円筒カムの駆動突子側壁に沿って自動的にアームの回転方向に移動する。

この発明においてはサーボモータを回転駆動することでアームの回転位置および回転量、角速度等をびん体の最速な移送条件のもとに設定される。

(実施例)

以下この発明の実施例を図面に示したがって説明

している。そして、前記回転軸部21には係合子31を複数個等間隔で有した係合部30が設けられている(第3図参照)。該係合子31は、本実施例では板子によって構成される。この板子は、その回転方向を図中矢印Aで示したように、回転軸部21の回転方向に対し直交方向に回転自在に構成されていて、この板子によれば移送する円筒カム40の駆動突子41に係合しその側壁上を回転しながら自動的に移動することから極めて優れた位置決め動作を行なうことができる。

そして、前記アーム20の回転は、第3図から理解されるように、サーボモータ49によって駆動される円筒カム40によって行なわれる。この円筒カム40の回転軸45は本体部10にベアリング47を介し回転自在に支持されていて、前記アームの回転軸21の直交方向に設置され、その駆動突子41が前記係合部30の係合子31に係合されている。

次にびん体のための扶持機構70は、第2図に図示したようにエアーシリンダ71によって作

動される保持片部73を備えている。図の符号75はエアシリンダ71の戻しばね、77はエア投入口である。

保持機構部70は、びん体の移送の機会から本体部10に回転自在に構成されたアーム20の先端に、該アーム20が回転しても常時垂直姿勢が保たれるように構成されている。

その垂直姿勢を保つ機構について第1図に就いて説明すると、この保持機構部70はアーム20に軸支されているギヤ80に回転され、アーム20に対し回転自在に保持されている。図の符号51はギヤ80の回転軸、52は該回転軸51のためのアーム20の軸受ノット、53は回転軸51を保持機構部70と連結する連結部材である。

前記ギヤ80は、ギヤ55を介して、ギヤ80に歯合されている。図の符号88はアーム20に軸支したギヤ55の回転軸、81はギヤ80の回転軸、82は回転軸81のためのアーム20の軸受ノットである。この機構においてはギヤ80とギヤ80が同じ歯数を有する。そして、ギヤ80

の回転軸81は、アーム20の回転軸82の軸心を通って軸支されている。とともに、この回転軸81は本体部10に対し回転しないように、その軸端部83において本体部10に固定することができる垂直固定部材15が固定されている。したがって前記保持機構部70は、アーム20が回転しても本体部10に固定された回転軸81のギヤ80とこれと歯合しかつ同じ歯数を有するギヤ80とによって常時垂直姿勢に保たれる。また、その垂直姿勢の調整は、垂直調整部材18と本体部10との固定具合を調整して回転軸81の本体部10に対する回転方向の固定位置を調整することで行われる。なお、前記ギヤ80および80を同じ歯数を有するスプロケットとし、両スプロケットをチェーンで連結する構成によっても保持機構部の垂直姿勢を保つことができる。

次に保持機構部70へのエアの供給構造について説明すると、エアは、第1図から理解されるように外面から本体部10のエア供給口17を介して導入される。そして、回転軸81内に放射状

に形成せられた通路85Aと、該通路85Aに連通されて回転軸81の軸方向に設けられた通路85B、および該通路85Bに連通されて前記通路85Aと同様に放射状に形成せられた通路85Cを介して、アーム20に設けた通路89Aに導入される。該アーム20の通路89Aに導入されたエアは、続いてアーム20先端に軸支された回転軸81内に放射状に形成せられた通路84A、および該通路84Aに連通されて回転軸81の軸方向に設けられた通路84Bを介し、保持機構部70のエア投入口77に導入され、その保持片部73が作動される。

(効果)

以上簡単説明したようにこの発明は、サーボモータによってアームを回転制御するようにしたものであるから、びん体の取り出し時ならびに投入時等にはアームを自動的に回転し、さらにびん体がまだやわらかく変形しやすい状態にある移送途中においてはアームを比較的ゆっくりと回転させるなど、びん体の状態に合わせた最適な移送

状態を容易に得ることができる。

また、この発明によればアームの回転位置の制御がサーボモータの制御制御によって簡単にしかも極めて正確に行なうことができるので、たとえばびん体の取り出し位置やその移送先の傾え角度等に高さのずれがあっても簡単に対応できる。あるいは、びん体の移送後に次の取り出し作業にあわせてアームを急激なよい位置に待機させておくなどの細かい位置も柔軟に対応できる。

さらに、この発明によれば、アームの本体部に対する回転軸部に設けた駆動部の低合子を有する低合部と、本体部に設けた前記低合子と低合する駆動歯子を備えた円筒カムと、該円筒カムを回転するサーボモータとから構成すれば足り、従来のように上端軸圧クッションや下端軸圧クッションなど複雑な構成を必要とせず、コンパクトで駆動点検が容易な装置を提供することができる。

4. 図面の簡単な説明

第1図はこの発明の一実施例を示すびん体の移送装置の平面断面図、第2図はその保持機構部を

6362

特開昭64-14125(5)

示す第1図の2-2線で切取した断面図、第3図は第1図における背面図、第4図は従来装置の一部を切り欠いた背面断面図、第5図は従来装置の上端軸圧タッショ、第6図は下端軸圧タッショである。

10…本体部、11…本体部固定保持部、12…本体部フレーム、20…アーム、21…アーム固定軸部、30…低合金部、31…低合金子、40…円筒カム、41…傾斜突子、42…サーボモータ、70…傾斜機構部、73…傾斜片部。

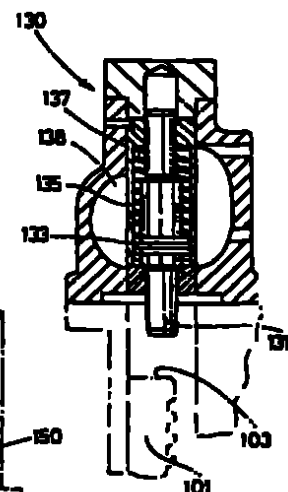
特許出願人

日本鋼管工業株式会社

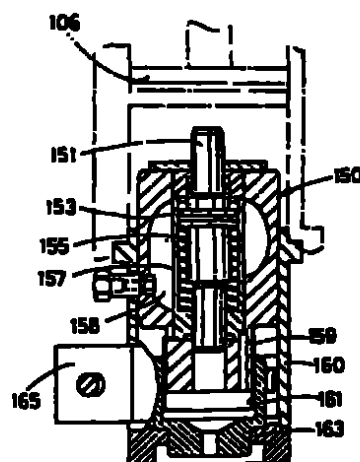
代理人

弁護士 豊 田 誠 一

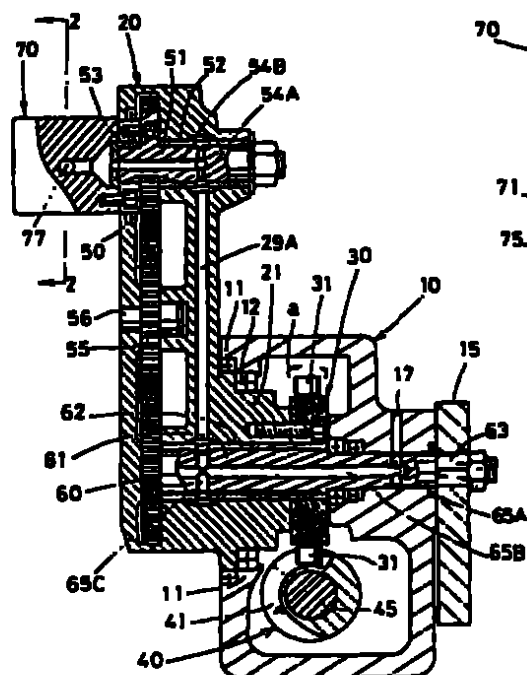
第 5 図



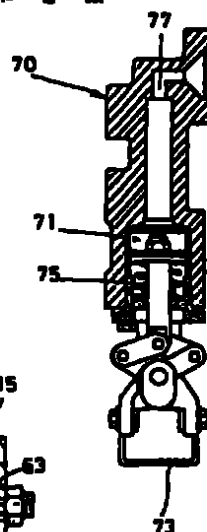
第 6 図



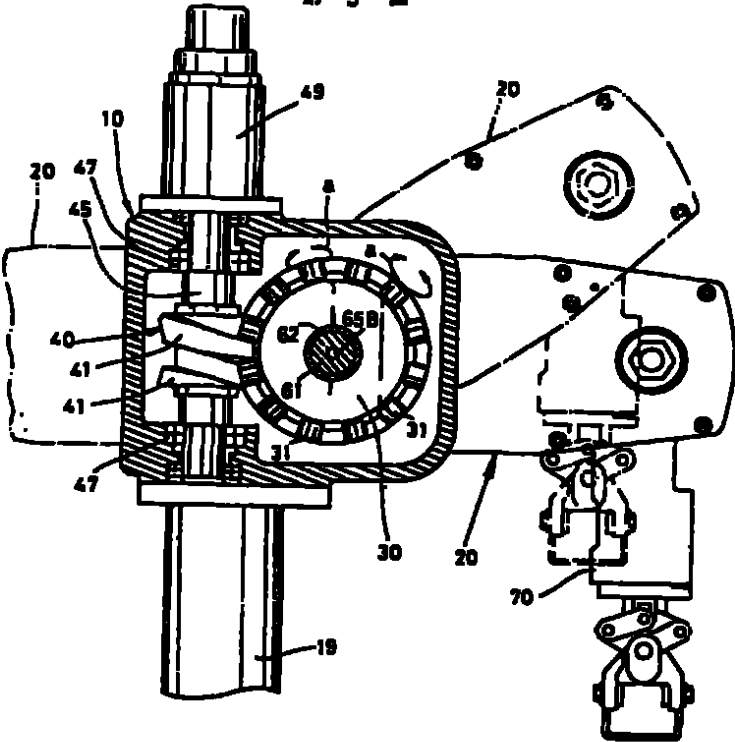
第 1 図



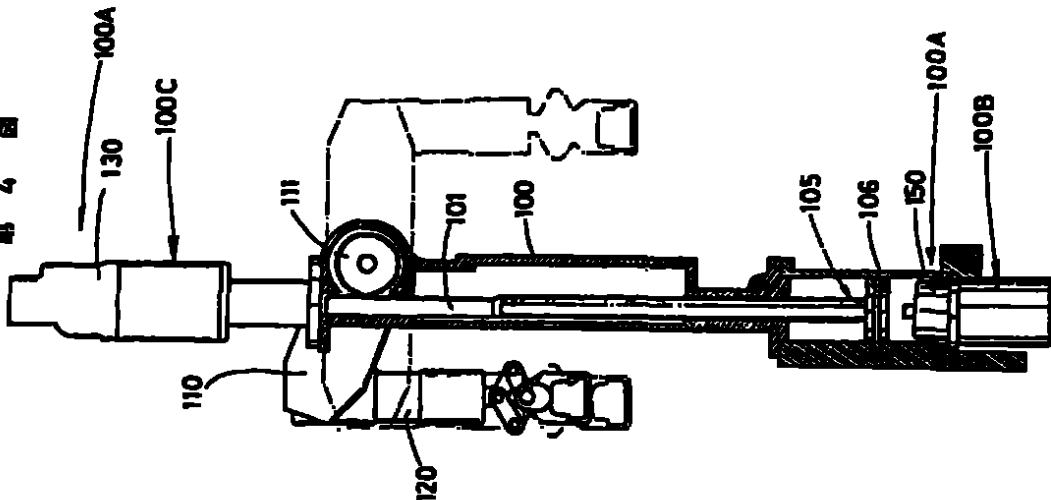
第 2 図



第 3 圖



第 4 圖



(19) United States

(12) Patent Application Publication
Leidy et al.

(10) Pub. No.: US 2003/0221456 A1

(43) Pub. Date: Dec. 4, 2003

(54) METHOD AND APPARATUS FOR BLOWING
AND REMOVING GLASS CONTAINERS

(76) Inventors: D. Wayne Leidy, Perrysburg, OH (US);
Frank J. DiFrank, Toledo, OH (US)

Correspondence Address:
H. G. Brass
Owens-Illinois, Inc.
One SenGate, 25-LDP
Toledo, OH 43666 (US)

(21) Appl. No.: 10/161,966

(22) Filed: Jun. 3, 2002

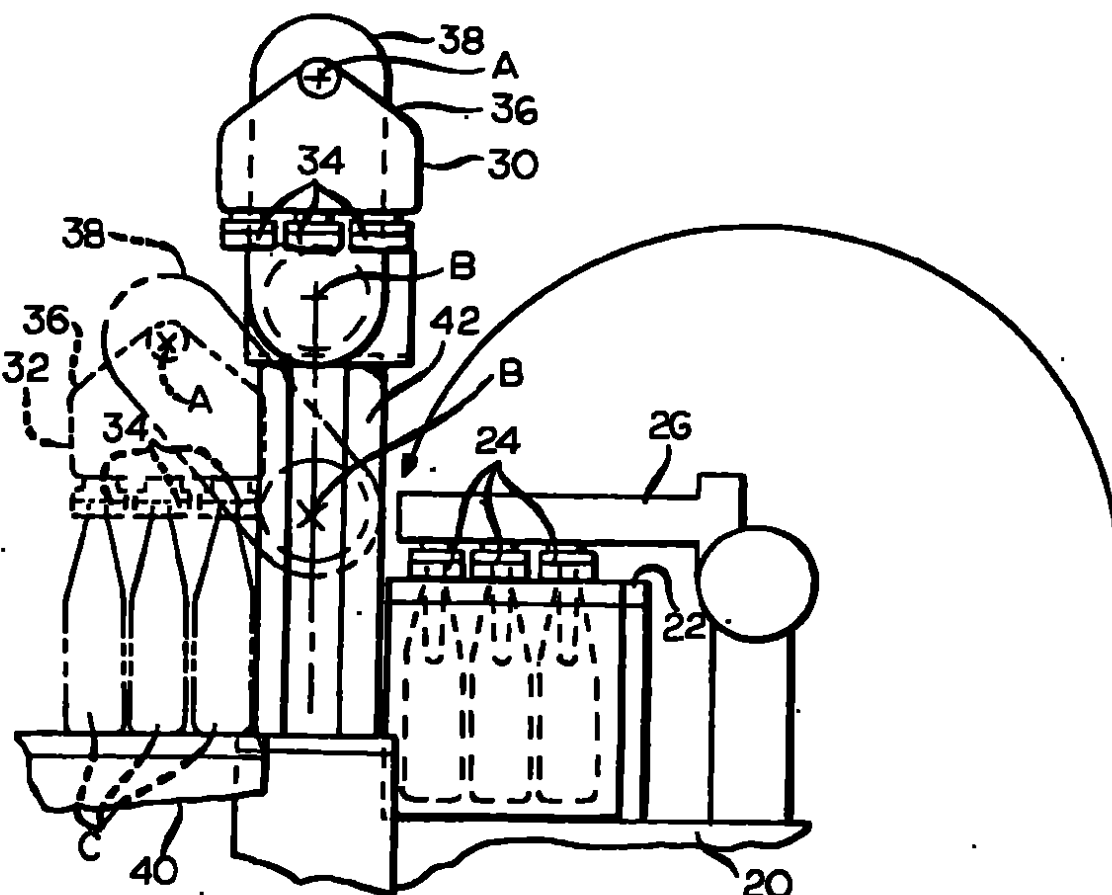
Publication Classification

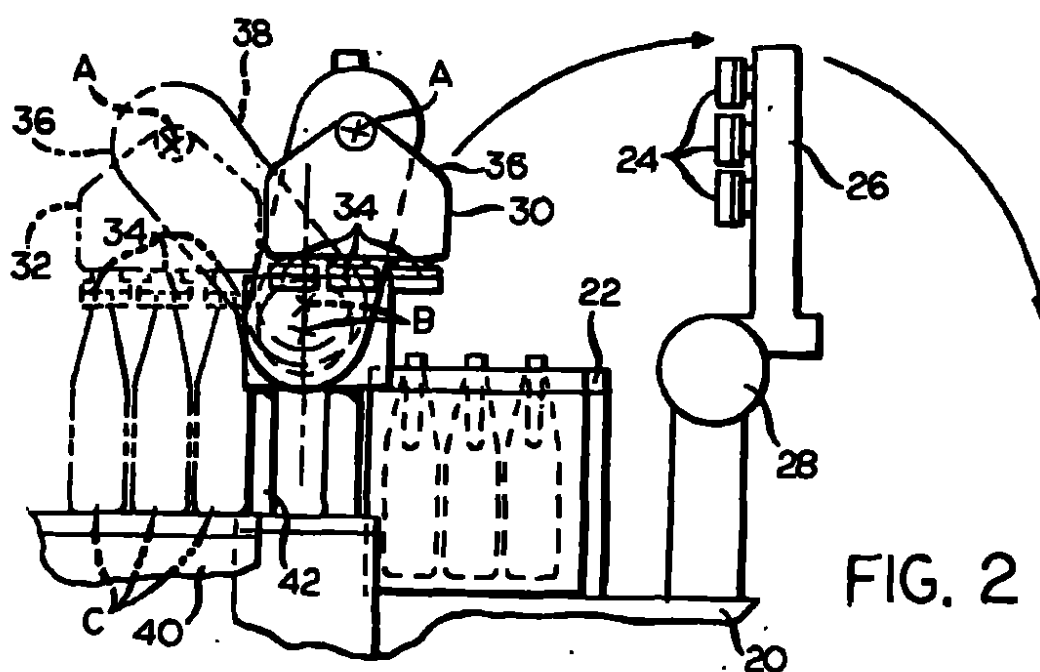
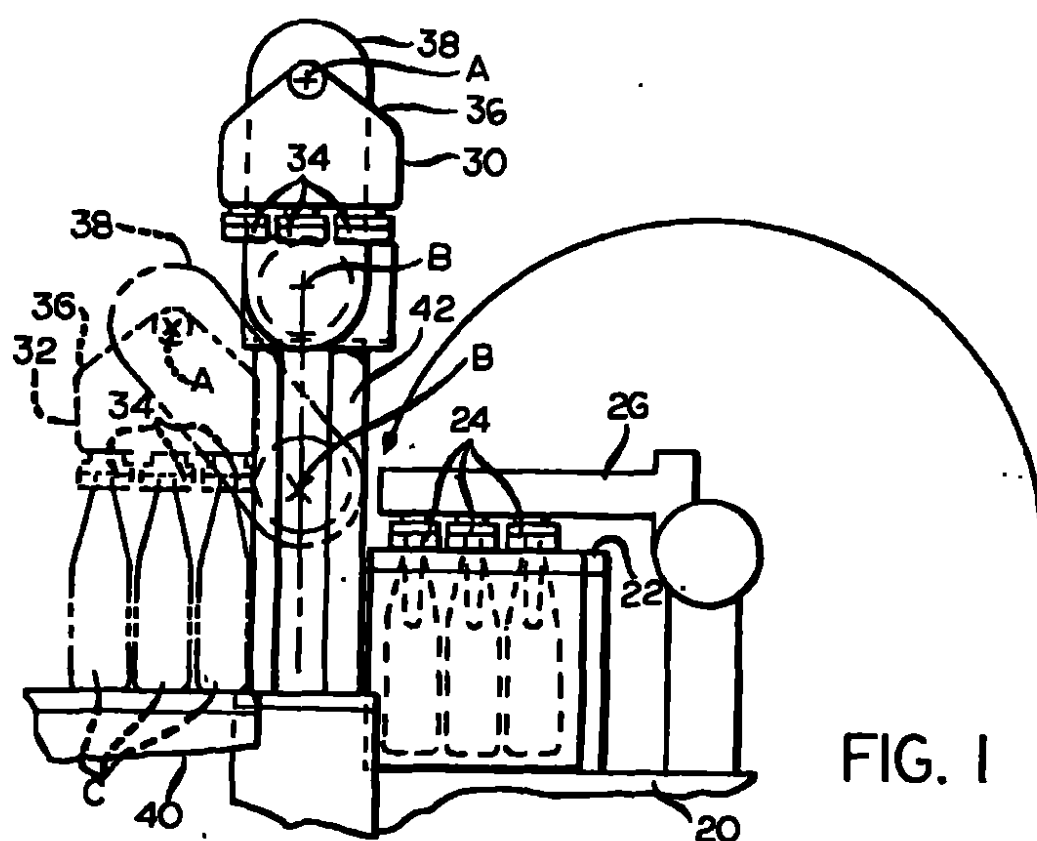
(51) Int. Cl.⁷ C03B 9/447

(52) U.S. Cl. 65/77; 65/260; 65/261

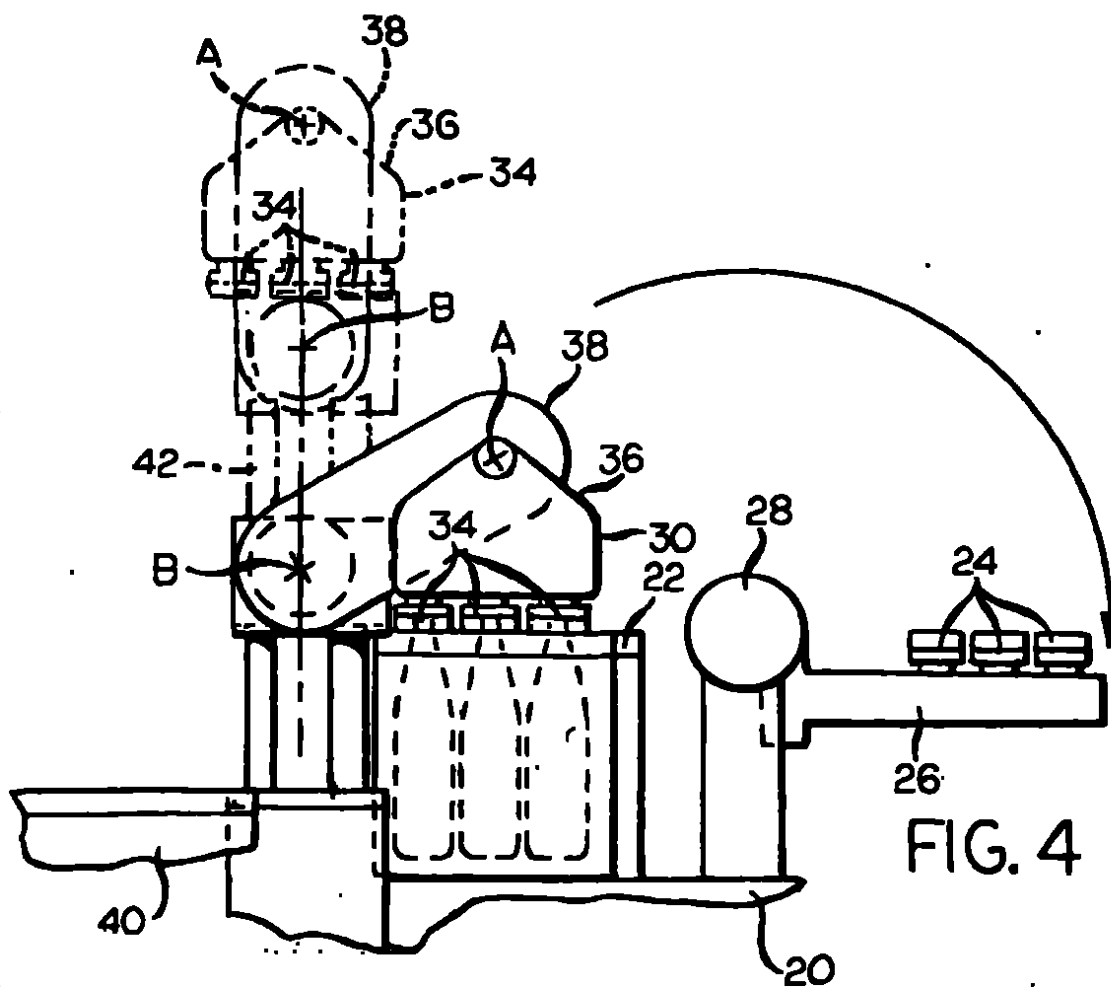
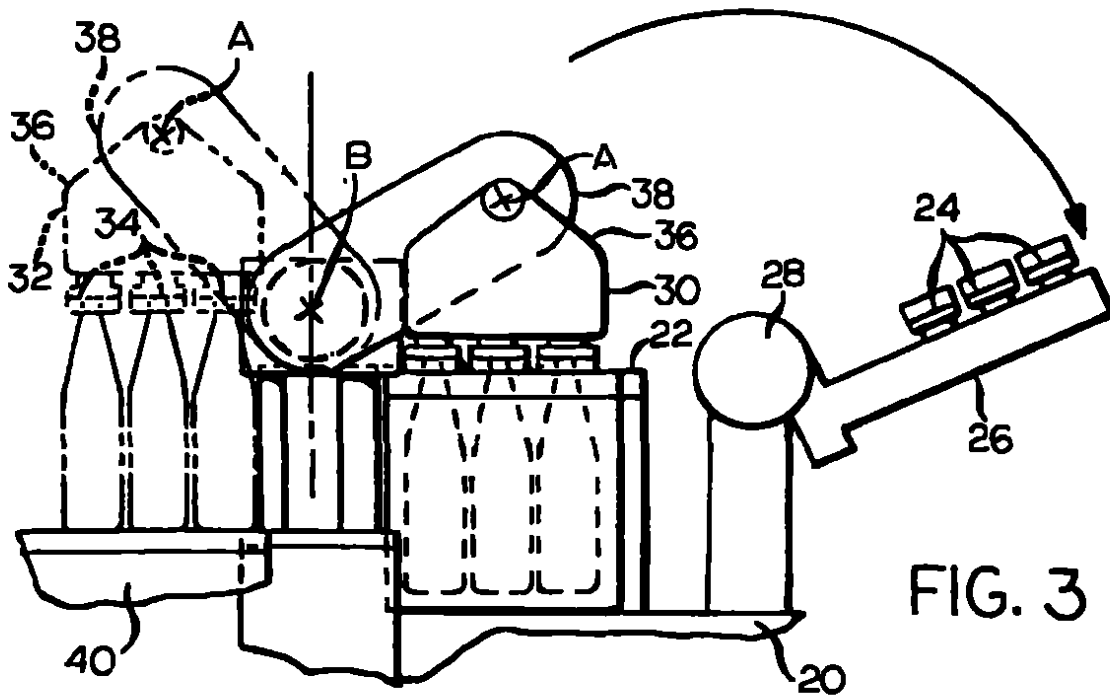
(57) ABSTRACT

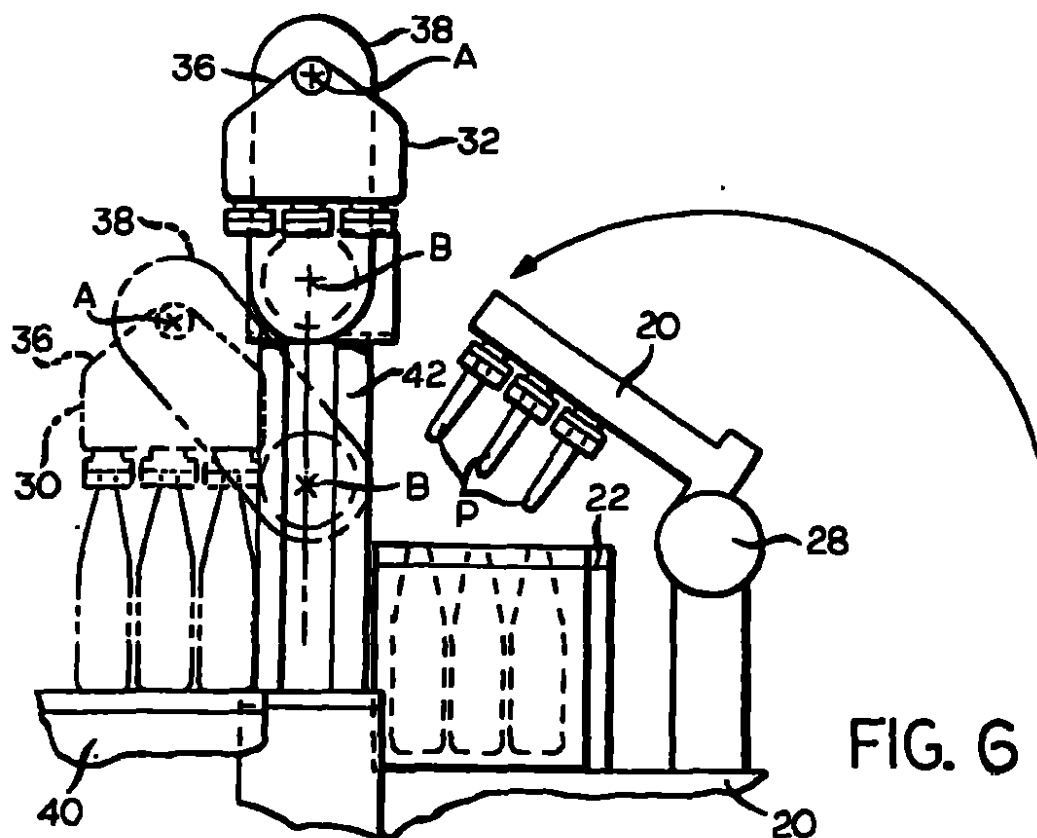
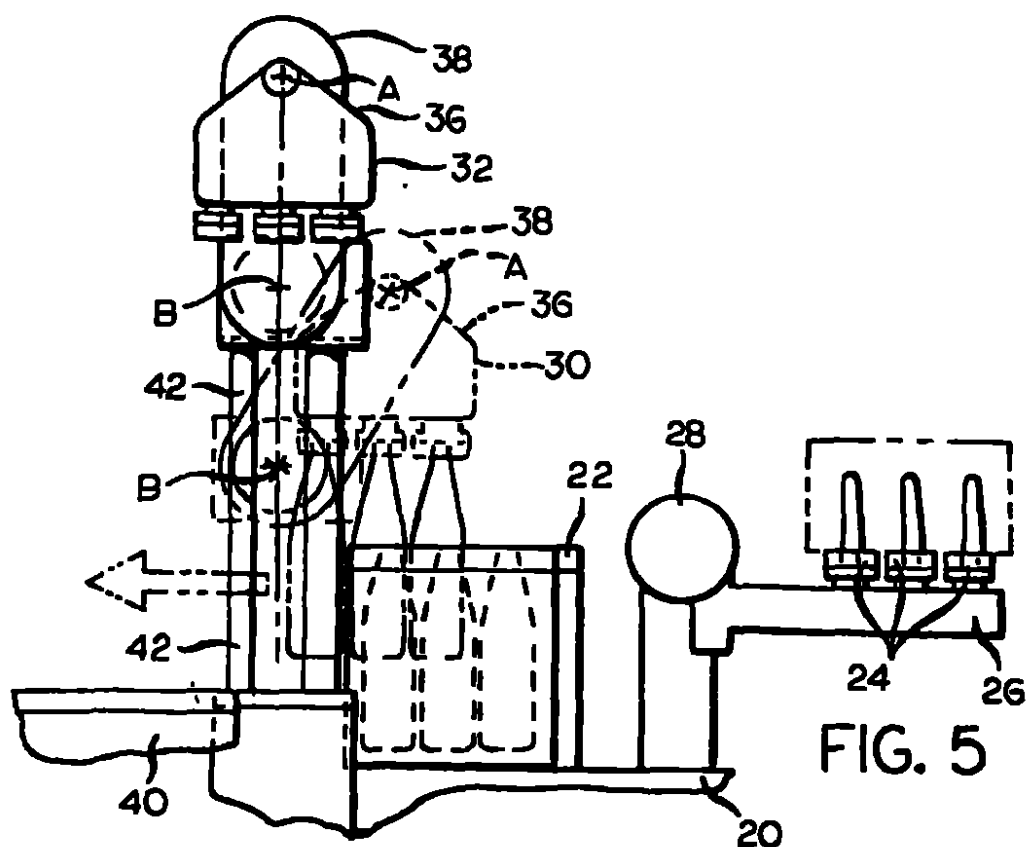
Vertically aligned first (30) and second (32) combined blowhead and takeout mechanisms are provided to sequentially blow glass parisons (P) into containers (C) in a mold set (22) and to transfer blown containers to a deadplate (40) of a glass containing forming machine (20). Each of the combined mechanisms is pivotally suspended about an axis A from a carrier arm (36) that is pivotally attached to an end of an oscillating arm (38), an opposed end of which is pivoted about an axis (B). The axis (B) of each combined blowhead and takeout mechanism is periodically raised and lowered to permit the other combined blowhead and takeout mechanism to oscillate therebeneath, to thereby permit overlapping cycles between the blowhead and takeout mechanisms. Each blowhead and takeout mechanism is provided with a chuck or tong assembly (54) to engage or release each container by its finish (F). Each tong assembly has a plurality of tong elements (74) that are simultaneously moved radially in or out by oscillation of a cam (50) that has a non-circular slot (78) in which a pin (76) carried by each tong element rides.





6564





65
60

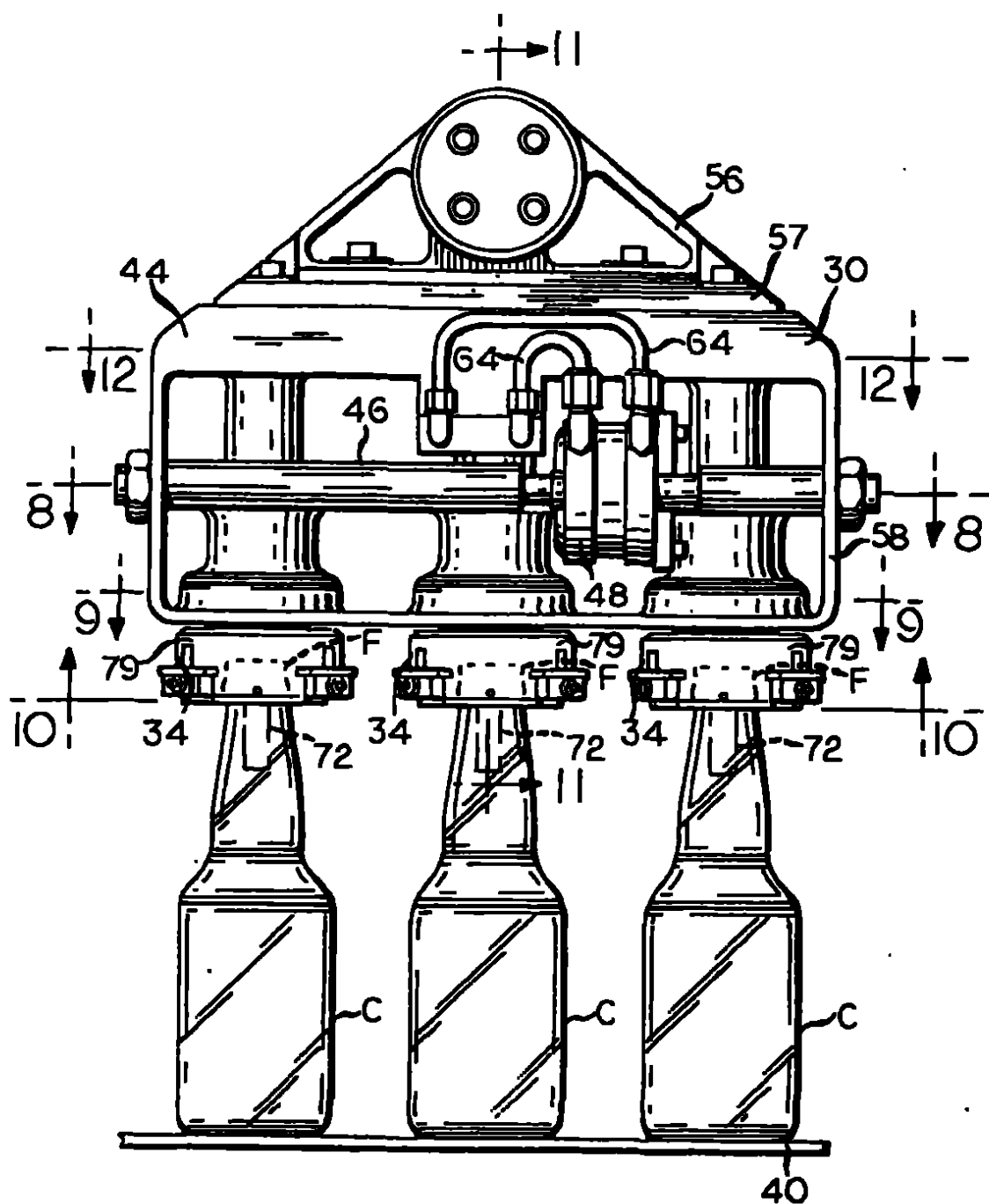


FIG. 7

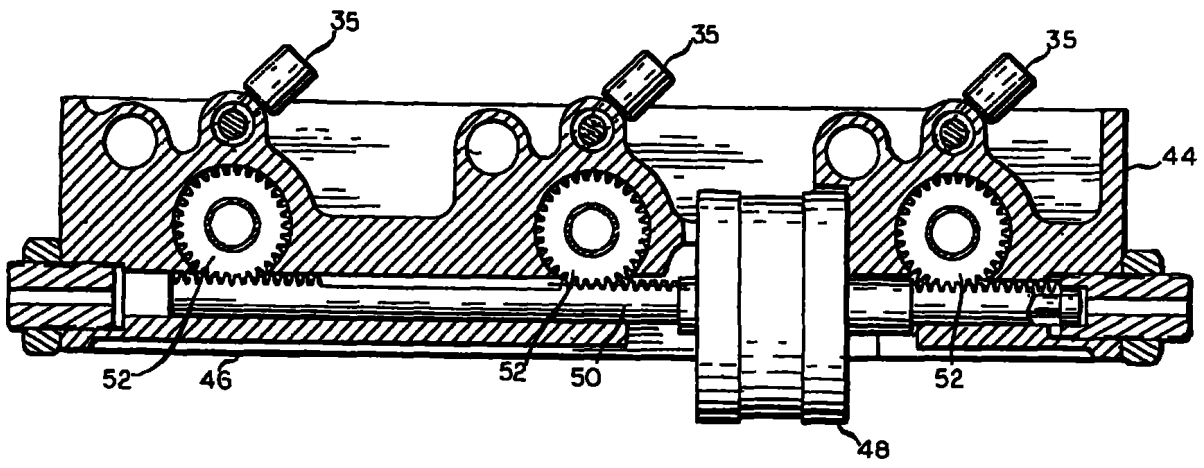


FIG. 8

67

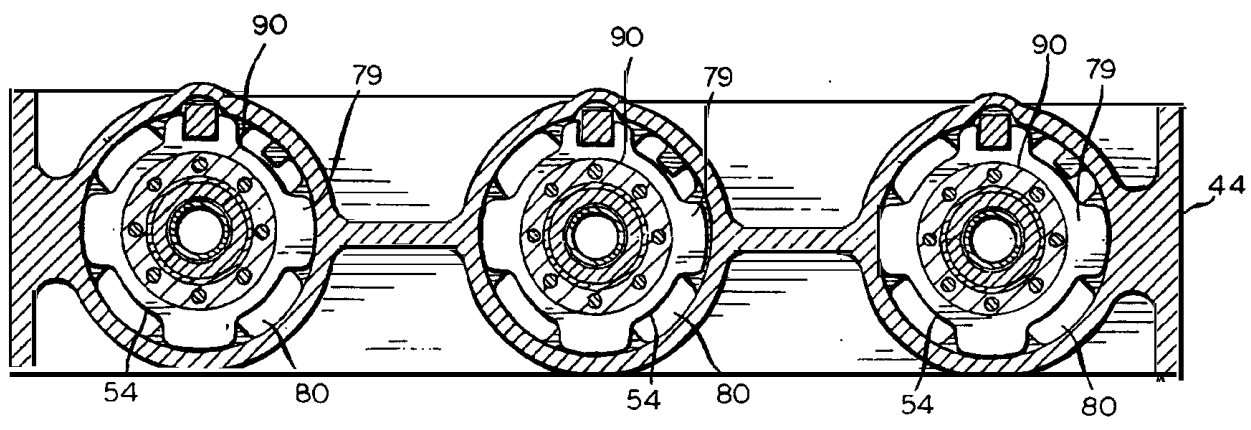


FIG. 9

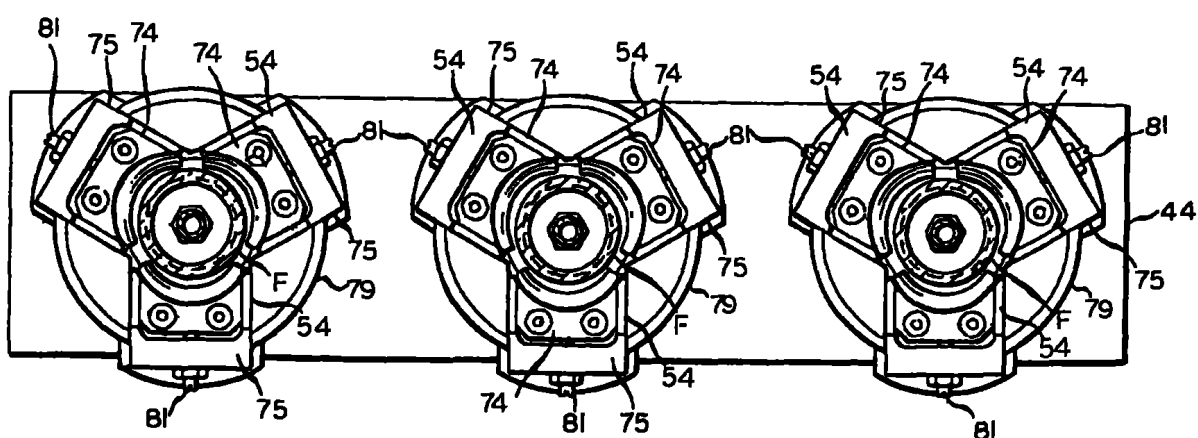


FIG. 10

67

67

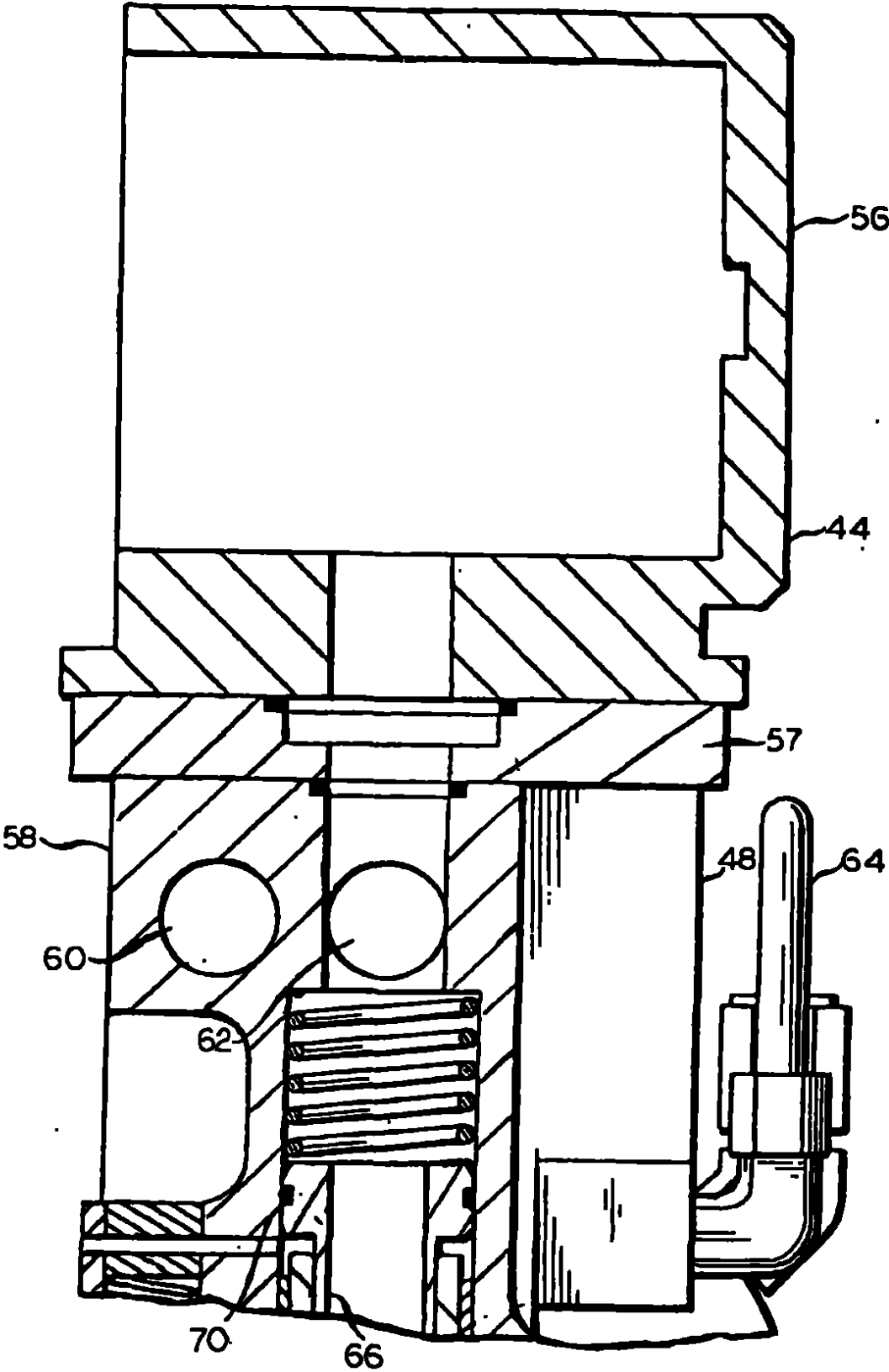


FIG. 11A

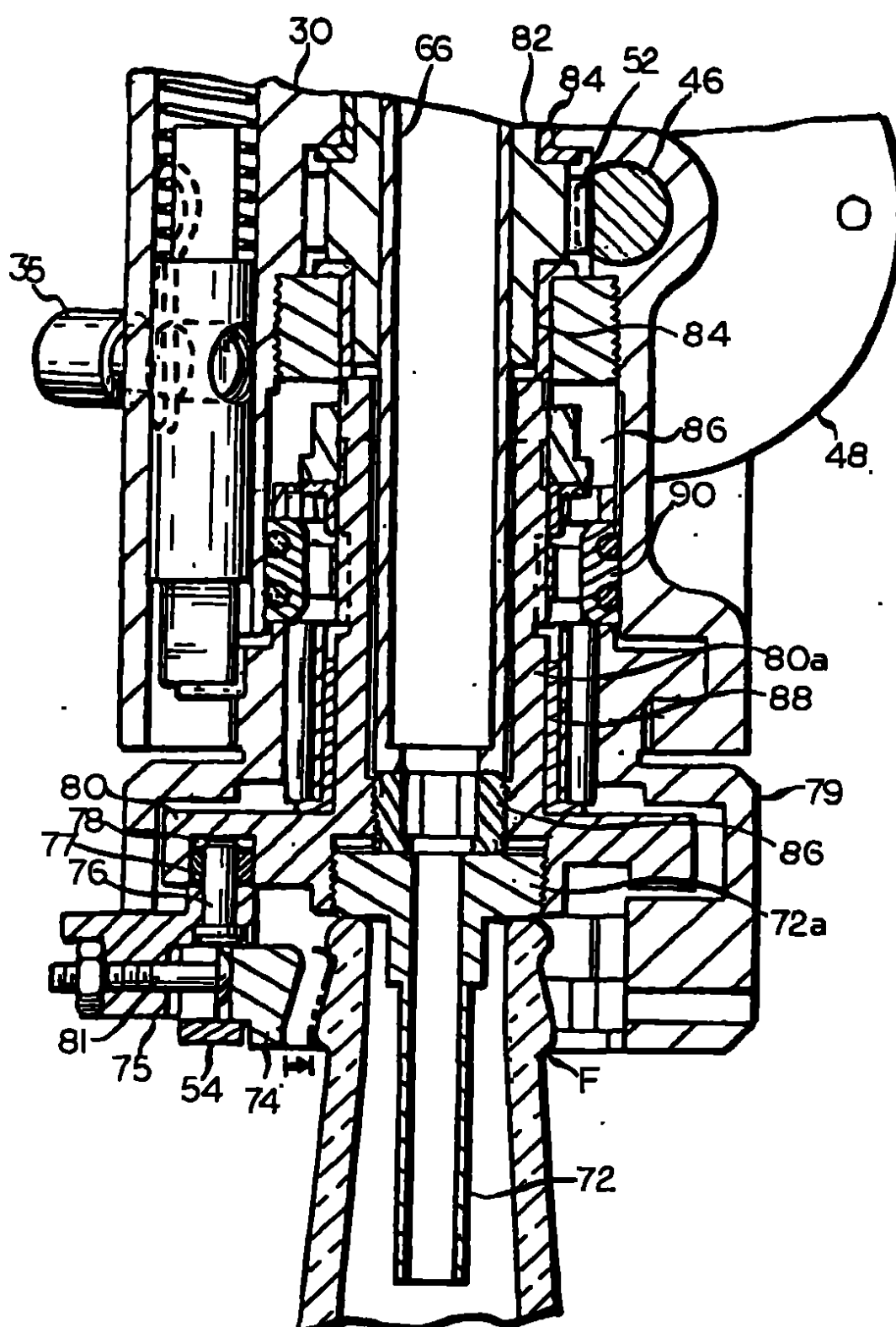


FIG. 11B

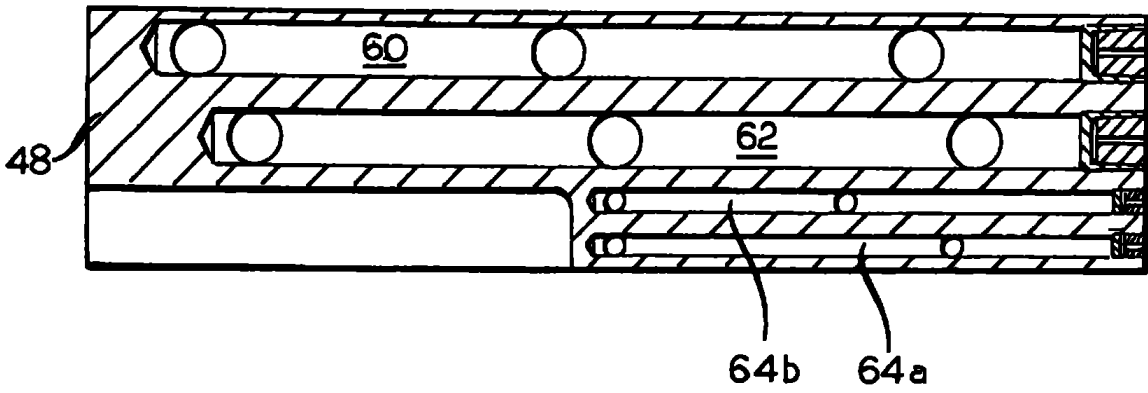


FIG. 12

68

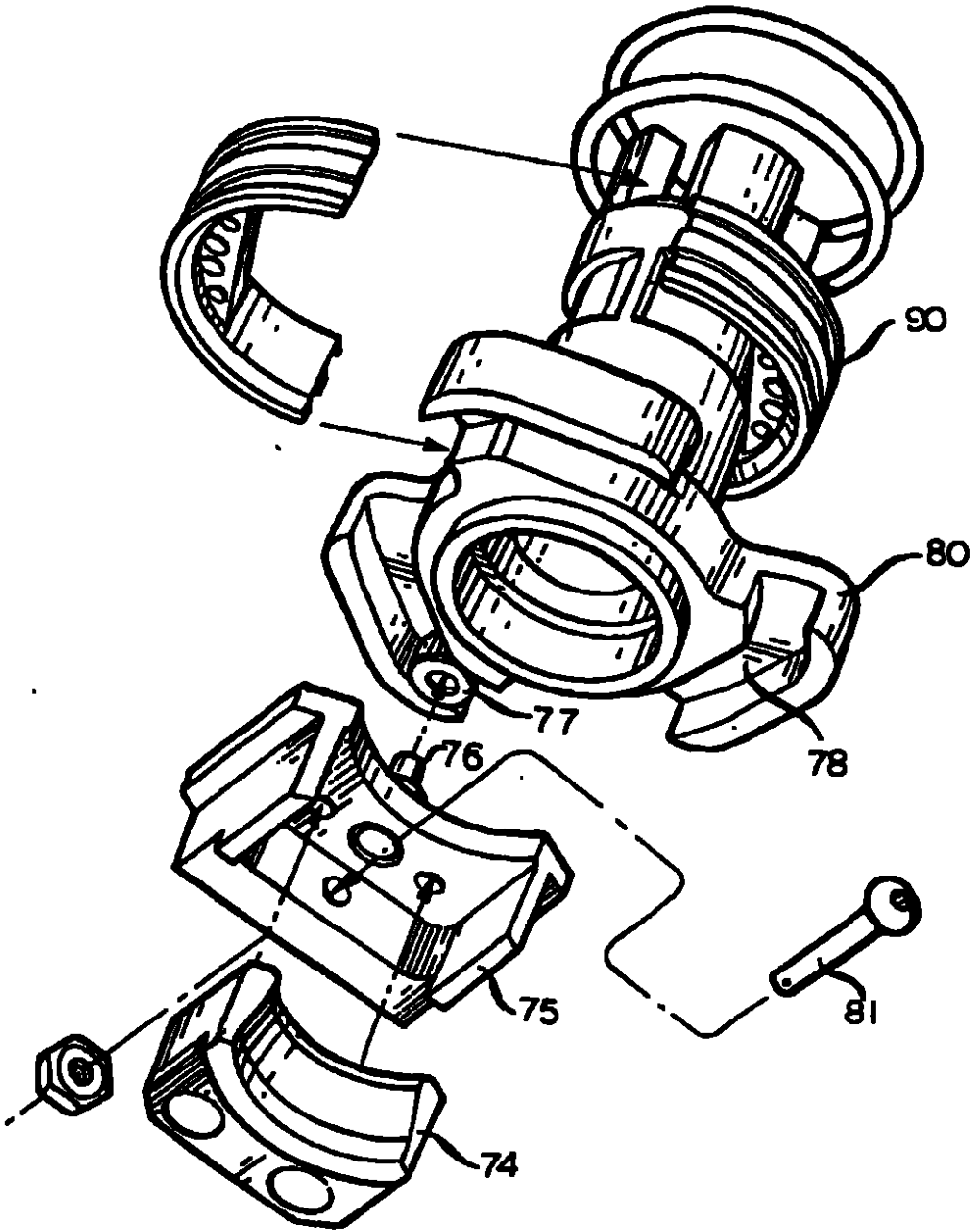
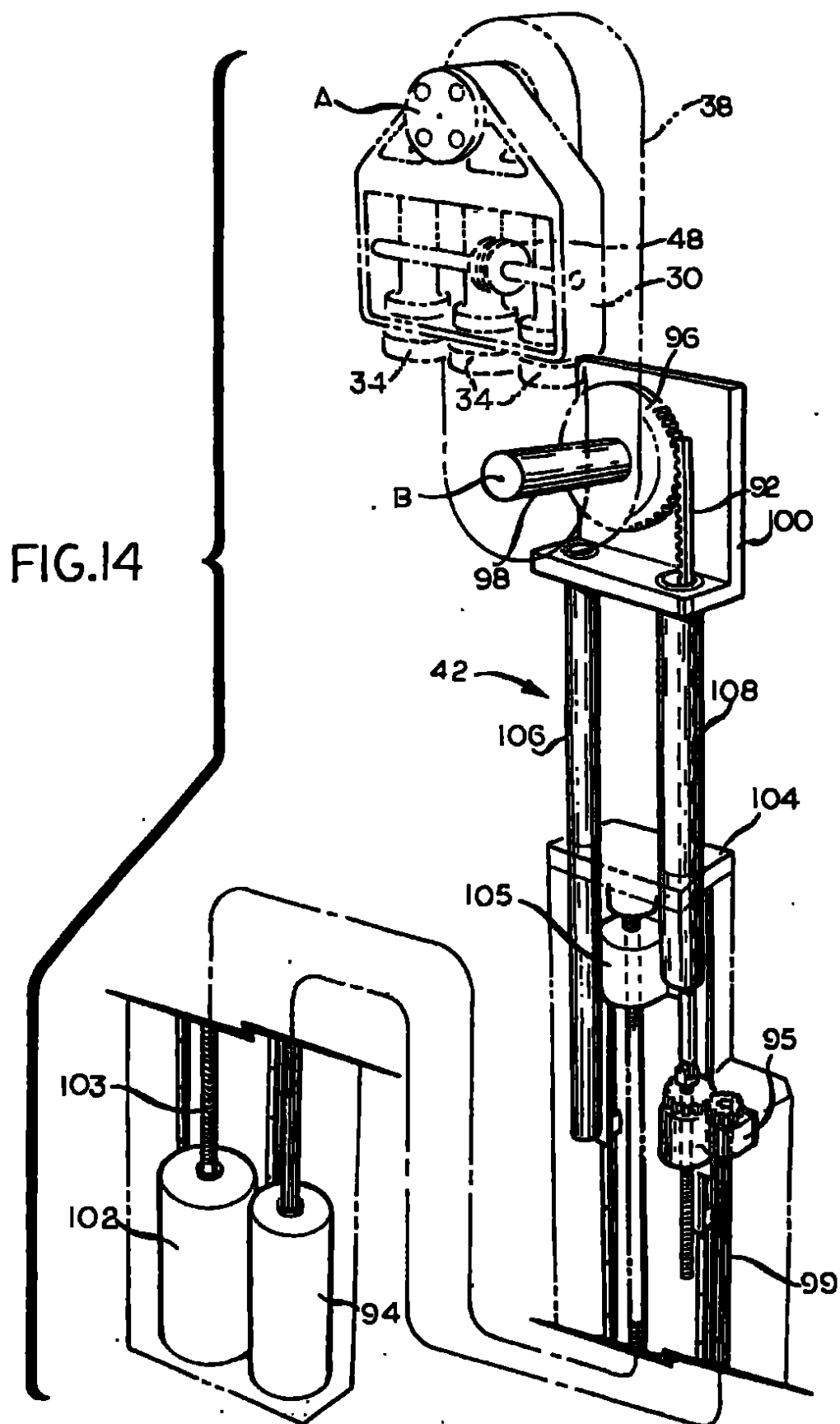


FIG. 13

69



it ensures that a combined blowhead/takeout mechanism will be positioned at the blow molds when the molds close around parisons that were transferred to the molds, without the need to wait for the return of a blowhead from the machine deadplate after depositing previously blown containers thereon.

[0007] Accordingly, it is an object of the present invention to provide an improved apparatus and method for blowing containers from parisons of formable glass in blow molds of a glass container forming machine and for transferring blown containers from the blow molds to a different position for further processing. More particularly, it is the object of the present invention to provide an improved method and apparatus of the foregoing character in which the parisons are blown in blow molds of a glass container forming machine of the I.S. type, and are then transferred to a deadplate of the I.S. machine for cooling and eventual further processing.

[0008] For a further understanding of the present invention and the objects thereof, attention is directed to the drawing and the following brief description thereof, to the detailed description of the invention and to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIGS. 1-6 are schematic elevational views showing apparatus according to the present invention at different positions during the operating cycle of such apparatus.

[0010] FIG. 7 is an elevation view at an enlarged scale, of a portion of the apparatus of FIGS. 1-6;

[0011] FIG. 8 is a sectional view taken on line 8-8 of FIG. 7;

[0012] FIG. 9 is a sectional view taken on line 9-9 of FIG. 7;

[0013] FIG. 10 is a sectional view taken on line 10-10 of FIG. 7;

[0014] FIGS. 11A, 11B, collectively, constitute upper and lower views, respectively, and at an enlarged scale, taken on line 11-11 of FIGS. 7;

[0015] FIG. 12 is a sectional view taken on line 12-12 of FIGS. 7;

[0016] FIG. 13 is an exploded, perspective view of a portion of the apparatus of FIGS. 7-12; and

[0017] FIG. 14 is an exploded, perspective view at an enlarged scale, of another portion of the apparatus of FIGS. 1-6.

DETAILED DESCRIPTION OF THE INVENTION

[0018] As is shown schematically in FIGS. 1-6, an I.S. machine section 20, shown fragmentarily, is provided with a set of blow molds 22 in which containers C are blown from blanks or parisons P of a glass composition at a suitable high temperature to be formable by blowing. FIGS. 1-6 show three containers being formed in each set of blow molds, but it is to be understood that the invention is suited for use in I.S. machines that are designed to simultaneously produce as many as four containers at each machine section (a "quad" machine), or even as few as one container at each such

section. In any case, as is understood in the art, each set of blow molds 22 is made up of an opposed set of split molds that periodically open and close with respect to each other by counteroscillating or counterrectilinear motions to define, when closed, a cavity for each container C to be formed therein.

[0019] The parisons P to be formed into the containers C in the mold set 22 are transferred thereto from a blank molding side of the machine section by neck molds 24, as shown specifically in FIG. 5. The neck molds 24 are carried by an invert or neck mold arm assembly 26 that is connected to an oscillatable invert or neck mold shaft 28, often referred to as a rock shaft, that oscillates in a 180° arc between the position shown on FIG. 1 and the position shown in FIG. 5. Upon the transfer of the parisons P to the mold set 22, the invert arm assembly 26, with the neck molds 24 carried thereby, reverts from the FIG. 1 position to the FIG. 5 position to begin a repeat of the glass container manufacturing process in the mold set 22, following the removal of the previous blown containers C therefrom.

[0020] The I.S. machine section 20 is provided with a side-by-side pair of combined blowhead/takeout mechanisms 30, 32, each of which carries a plurality of individual blowheads 34, one such blowhead 34 for each container C being formed in the mold set 22. The blowhead mechanism 30 is shown in detail in FIGS. 7-13 at the position shown in FIGS. 6, but it is to be understood that the blowhead 32 is of the same construction as the blowhead 30. In any case, each of the blowhead mechanisms 30, 32 is made up of a carrier arm 36, from which the blowheads 34 are suspended, and an oscillating arm 38, from which the carrier arm 36 is suspended for pivoting motion from the oscillating arm 38 about an axis A. Each carrier arm 36 is pivoted from the oscillating arm 38 of the blow head mechanism 30 or 32 of which it is an element by a parallel linkage or other equivalent structure in a known manner, to ensure that it does not change the angular position of the blowheads 34 that are carried by the carrier arm 36 as the oscillating arm 38 oscillates, for example, from the position of the blowhead mechanism 30 in FIG. 1 to its position in FIG. 6.

[0021] FIG. 1 depicts the position of the blowhead mechanism 32 immediately above a deadplate 40 of the I.S. machine section 20 to be able to deposit blown containers C thereon. In this condition of the apparatus, the blowhead mechanism 30 is positioned in vertical alignment with a tower 42 to which the blowhead mechanism 30 is secured for pivoting motion about an axis B. Likewise, the blowhead mechanism 32 is secured for pivoting motion about an axis B to a second tower (not shown), which is immediately behind and a mirror image of the tower 42. In that regard the pivot axis B for each of the blowhead mechanisms 30, 32 is vertically moveable, by structure that will be hereinafter described in greater detail, between a lower position, for example, that of the blowhead mechanism 32 in FIG. 1, to the higher position of the blowhead mechanism 32 in FIG. 4, to permit the blowhead mechanisms 30, 32 to oscillate between the positions shown in FIG. 1 and the positions shown in FIG. 4 without interfering contact between the blowhead mechanisms 30, 32, which are aligned in the same vertical plane. In this manner, the blowheads 34 of the blowhead mechanism 32 will be positioned to immediately engage parisons P in the molds 22 while the blowhead mechanism 30 is enroute to deposit containers C on the

deadplate 40, as can be seen from a comparison, for example, of FIGS. 4 and 6. This permits a substantial calculated reduction in cycle time between the removal of the set of containers C from the mold set 22 and the removal of the next set of containers C from the mold set 22, compared to an installation using only a single blowhead/takeout mechanism, of approximately 13%, and it does so without reducing the time available for the cooling of the containers C on the deadplate 40 before it is necessary to remove partly-cooled containers C from the deadplate 40 to accommodate the transfer of freshly formed containers C to the deadplate 40. Alternatively, cycle improvement can be somewhat reduced by moving the blowheads 30, 32 more slowly to reduce inertial forces on the blown containers C. In any case, the reduction in cycle time can be enhanced by approximately 4%, that is, to a total of approximately 17%, if each pair of combined blowheads/takeout mechanisms is adapted to engage blown containers C by finishes before the split molds of the mold set 22 are separated, without the need to delay the engagement of containers C until the split molds are open, which is required when transferring blown containers from the mold set 22 by engagement of a transfer head by tongs of a conventional takeout mechanism. This phenomenon is described in the aforesaid '488 B1 patent. Further, the use of blowheads to transfer blown containers C to the deadplate 40 permits partial cooling of the containers C by blowing air going to the blowhead 30 or 32 during the transfer step.

[0022] As shown in FIG. 7, the blowhead mechanism 30 has a generally trapezoidal-shaped frame 44 that carries the blowheads 34, each of which is quickly disengageable from the frame 44 by way of a disconnect 35 (FIG. 11B). The frame 44 is provided with a split annular member 46 that extends therethrough, above and parallel to the orientation of the containers C that are carried by the blowhead 30. A reversing, double acting pneumatic cylinder 48 is positioned between the ends of the annular member 46, and the cylinder 48 drives a split rack 50 (FIG. 8) that extends from opposed ends through the annular member 46. The split rack 50, which reciprocates but does not rotate, engages, in a right-angle drive, a screw 52 associated with each of the blowheads 34 to simultaneously open or close a container finish-engaging tong or chuck assembly 54 (FIGS. 9, 10) that is associated with each of the blowheads 34.

[0023] As shown in FIGS. 7, 11A, the frame 44 is made up of a generally triangularly-shaped upper member 56 bolted or otherwise adjustably secured to a lower member 58 with an alignment plate 57 positioned therebetween to ensure proper alignment between the upper member 56 and the lower member 58, which have aligned openings therein. The upper member 56 is affixed to the oscillating arm 38 for oscillation with the oscillating arm 38 between the position shown in FIGS. 3 and 4 and the position shown in FIGS. 6, and the lower member 58 carries the elements associated with each of the blowheads 34. As shown in FIG. 12, cooling air for the cooling of each of the blowheads 34 is circulated through a passage 60 in the lower member 58, and blow air for blowing parisons P into containers C, in the position of the blowhead mechanism 30 shown in FIGS. 3, 4, is introduced through a passage 62 in the lower member 58. The air for the operation of the cylinder 48, which is shown as a pair of like cylinders disposed tail end to tail end, is introduced through inlet lines 64, which receive air from passages 64a, 64b in the lower member 58. Blowing air from

the passage 62 blows downwardly into a parison P that is being blown into a container C through a transfer tube 66, an upper end of which is resiliently biased downwardly by a compression spring 68, an O-ring 70 being provided to permit sealed, sliding motion between an enlarged upper end of the transfer tube 66 and a passage in the lower member 58 in which the upper end of the transfer tube 66 is positioned. A lower end of the transfer tube 66 seats against and discharges into an upper end of a blow air inlet tube 72 (FIG. 11B) that extends into a parison P or a container C, as the case may be, that is engaged by the blowhead 34 with which the air inlet tube 72 is associated.

[0024] Each tong assembly 54 carries a circumferentially-spaced plurality, shown as three, tong elements 74 that simultaneously are powered to move radially either inwardly to grasp a finish F (FIG. 11B) of a container C or outwardly to release the finish F of the container C. While the container C is shown as having a finish F for the application of a crown closure to the container C, it is also contemplated that the finish F engaging surface of the tong elements 74 may be configured to handle containers C with threaded finishes F. In that regard, each of the tong elements 74 is retained within a tong holder 75 and has an upperwardly extending pin 76 that is received in an annular cam follower 77, which rides in a noncircular slot 78 of a lobe of an oscillating cam 80. Oscillation of the cam 80, by the extension and retraction of the split rack 50, is effective to simultaneously move the tong elements 74 of each of tong assembly 54 into or out of engagement with a finish (F) of a container (C). The assembly that includes the tong elements 74 and the tong body 76 is slideable within an annular tong housing 79, and rearward travel of such assembly is limited by a pin 81, whose position along its longitudinal central axis is adjustable.

[0025] The screw 52 of each blowhead 34 is secured to an annular member 82 that surrounds the transfer tube 66, bushings 84 being provided within a recess 86 in the blowhead mechanism 30 at opposed ends of the transfer tube 82 to permit it to oscillate, with the screw 52 and the transfer tube 66, around the longitudinal central axis of the transfer tube 66. A lowermost end of the transfer tube 66 is provided with an externally threaded plug 86, and the cam 80, which has an upstanding annular portion 80a that is rotatable in a bushing 88, is threadably secured to an exterior of the plug 86 to be rotatable therewith. The cam 80 is also threadably secured to an extension of an upper portion 72a of the air inlet tube 72 to be rotatable therewith; thus, reciprocation of the split rack 50 is effective to oscillate the screw 52, and, thereby, to oscillate the cam 80 to move the tong elements 74 inwardly and outwardly, as desired. However, an annular brake assembly 90 is provided surrounding a portion of upstanding portion 80a of the cam 80 to prevent oscillating motion of the cam 80 when desired.

[0026] FIG. 14 illustrates apparatus, which has previously been identified as the lower A2, for raising and lowering the axis of the blowhead mechanisms 30, 32. FIG. 14 illustrates such apparatus specifically in reference to the blowhead mechanism 30, and the tower 42 to which it is pivotably secured, but it is to be understood that apparatus for raising and lowering the blowhead mechanism 32 is the same in design and construction as that for the blowhead mechanism 30. The oscillation of the arm 38 about the axis B is powered by a rack 92, whose rectilinear motion is powered by a

reversible motor 94, preferably an a.c. servo motor for optimum controllability. Oscillation of the motor 94 results in oscillation of a gear assembly 95, which slides upwardly and downwardly on a ball spline 99 that extends to the gear assembly 95 from the motor 94. The rack 92 drives a spur gear 96 that is affixed to a shaft 98, through which the axis 13 extends and to which the arm 38 is connected for turning with the shaft 98.

[0027] The shaft 98 is rotatably mounted in a bracket 100, and the elevation of the bracket 100, and thereby that of the shaft 98 and the oscillating arm 38, is adjustable based on a rotary motor 102, preferably an a.c. servo motor, which engages a screw 103 that elevates or lowers a bracket 104 from which the bracket 100 is supported by vertical support 106, 108, the support 108 being annular and surrounding a lowermost portion of the rack 92. Thus, the oscillation of the shaft 98, and thereby of the oscillating arm 38, is powered by the motor 94, independently of the raising and lowering of the shaft 98, and thereby the oscillating arm 38, which is powered by the motor 102, subject to an electronic or other control system, which may be of conventional construction, that is used to control the operation of the motor 94 and the motor 102 in a timed sequence relative to one another.

[0028] Although the best mode contemplated by the inventors for carrying out the present invention as of the filing date hereof has been shown and described herein, it will be apparent to those skilled in the art that suitable modifications, variations, and equivalents may be made without departing from the scope of the invention, such scope being limited solely by the terms of the following claims and the legal equivalents thereof.

What is claimed:

1. A combined takeout and blowhead assembly for a glass container forming machine, said combined takeout and blowhead assembly comprising:

a first pivoting arm, said first combined takeout and blowhead mechanism for injecting blowing air into glass containers being blown in molds of the forming machine and for then grasping the containers;

a first combined takeout and blowhead mechanism being mounted near a free end of said first pivoting arm and away from a pivot axis of said first pivoting arm;

means for oscillating said first pivoting arm to move said first combined takeout and blowhead mechanism between a position in alignment with glass containers in the molds of the forming machine and a position in alignment with a deadplate of the forming machine;

means for raising and lowering the pivot axis of said first pivot arm;

a second combined takeout and blowhead mechanism for injecting blowing air into a second group of glass containers being blown in the molds of the forming machine and for then grasping the second group of containers;

a second pivoting arm, said second combined takeout and blowhead mechanism being mounted near a free end of said second pivoting arm and away from a pivot axis of said second pivoting arm;

means for oscillating said second pivoting arm to move said second combined takeout and blowhead mechanism between a position in alignment with the second group of glass containers in the molds of the forming machine and a position in alignment with the deadplate of the forming machine; and

means for raising and lowering the pivot axis of said second pivoting arm;

wherein one of the pivot axis of said first pivoting arm and the pivot axis of said second pivoting arm is raised with respect to the pivot axis of the other of said first pivoting arm and the pivot axis of said second pivoting arm when one of said first pivoting arm and said second pivoting arm is being moved to a position in alignment with the glass containers in the molds of the forming machine to avoid contact between said first combined takeout and blowhead mechanism and said second combined takeout and blowhead mechanism during oscillation of said first pivoting arm and during oscillation of said second pivoting arm.

2. Apparatus according to claim 1 wherein said first combined takeout and blowhead mechanism comprises:

a chuck having a circumferentially spaced-apart plurality of chuck elements arranged in an annular array, said chuck elements being simultaneously movable solely in a horizon plane between first positions surrounding a finish of a glass container, but out of contact with the glass container, and second positions in contact with the finish of the glass container; and

means for simultaneously moving the chuck elements between the first positions and the second positions.

3. Apparatus according to claim 2 wherein said means for simultaneously moving the chuck elements between the first positions and the second positions comprises:

an annular cam, said annular cam having a circumferentially spaced apart plurality of double-ended, non-circular slots therein, a noncircular slot for each of said chuck elements;

wherein each of said chuck elements has a pin that is received in one of the non-circular slots of the cam; and

means for oscillating said cam to move the pin of each of said chuck elements from one position in the non-circular slot in which it is received to a second position in a non-circular slot in which it is received.

4. Apparatus according to claim 3 wherein said means for oscillating said cam comprises:

a rack;

means for moving said rack in a rectilinear pattern; and

a gear associated with each of said cam elements and engaging said rack for simultaneously oscillating each of said gears in a common annular direction.

5. The process for blowing glass containers in a mold of a glass container forming machine and for transporting blown containers from the mold to a deadplate of the glass container forming machine, the process comprising:

providing a first combined takeout and blowhead mechanism;

injecting air into a first group of containers through the first combined takeout and blowhead mechanism while the containers are in the mold to blow preforms of the containers into containers;

grasping the first group of blown containers by the first combined takeout and blowhead mechanism;

transferring the first group of blown glass containers grasped by the first combined takeout and blowhead mechanism to a deadplate and releasing the first group of blown glass containers at the deadplate;

providing a second combined takeout and blowhead mechanism;

injecting air into a second group of glass containers being blown in the molds of the forming machine through the second combined takeout and blowhead mechanism while the containers are in the mold to blow preforms of the containers into containers;

grasping the second group of blown glass containers by the second combined takeout and blowhead mechanism; and

transferring the second combined takeout and blowhead mechanism from the deadplate to the blow mold while transferring the first combined takeout and blowhead mechanism from the blow molds to the deadplate without contact between the first combined takeout and blowhead mechanism and the second combined takeout and blowhead mechanism.

6. The method according to claim 5 and further comprising:

reversibly elevating each of the first combined takeout and blowhead mechanism and the second combined takeout and blowhead mechanism while the other of the first combined takeout and blowhead mechanism is transferring containers to the deadplate.

7. The method according to claim 5 and further comprising:

continuing to inject air into the containers being transferred by the first combined takeout and blowhead mechanism while the containers are being transferred to the deadplate; and

Continuing to inject air into the containers being transferred by the second combined blowhead and takeout mechanism while the containers are being transferred to the deadplate.

8. A grasping mechanism for grasping a finish of a vertically upright glass container being blown in the mold of a glass container forming machine, said grasping mechanism comprising:

a chuck, said chuck having a circumferential plurality of chuck elements arranged in an annular array, said chuck elements being simultaneously moveable solely in a horizontal plane between first positions surrounding the finish of the glass container but out of contact with the glass container; and second positions in contact with the finish of the glass container; and

means for simultaneously moving the chuck elements between the first positions and the second positions.

9. A process for removing a vertically upright blown glass container having a finish from a blow mold of a glass container forming machine, the finish being positioned above the blow mold, the blow mold being made up of separable mold halves that are closed with respect to one another during molding of the glass container and are openable with respect to one another after the molding of the glass container to permit a blown glass container to be removed from the blow mold, the process comprising:

providing a chuck, the chuck having a plurality of circumferentially disposed chuck elements, the chuck elements being simultaneously movable solely in a horizontal plane between radially outermost first positions and radially innermost second positions;

positioning the chuck to surround the finish of the glass container in the blow mold with the mold halves closed and the chuck elements in their first positions;

simultaneously moving the chuck elements to their second positions while the mold halves are closed to engage the finish of the glass container in the blow mold; and

then opening the mold halves of the blow mold and moving the chuck relative to the blow mold while the chuck elements are in their second positions to remove the glass container from the blow mold.

* * * * *



US005895513A

United States Patent [19]

Ciriello et al.

[11] Patent Number: 5,895,513

[45] Date of Patent: Apr. 20, 1999

[54] TAKEOUT MECHANISM FOR AN I.S. MACHINE

[75] Inventors: Michael P. Ciriello, Prospect; Steven J. Pinkerton, Avon, both of Conn.; Joseph A. Borbone, Paxton, Mass.; Douglas J. Roberts, Ellington, Conn.

[73] Assignee: Emhart Glass Machinery Investments Inc., Wilmington, Del.

[21] Appl. No.: 08/965,394

[22] Filed: Nov. 6, 1997

[51] Int. Cl.⁶ C03B 35/04

[52] U.S. Cl. 65/159; 65/160; 65/260

[58] Field of Search 65/29.1, 29.11, 65/158, 159, 160, 260

[56] References Cited

U.S. PATENT DOCUMENTS

3,877,915 4/1975 Mylchreest et al. 65/29.11

3,905,793 9/1975 Croughwell 65/163
4,255,179 3/1981 Foster 65/79
4,367,087 1/1983 Franco et al. 65/163
4,685,947 8/1987 Linka et al. 65/29.1
4,705,532 11/1987 Linka et al. 65/158
5,652,490 7/1997 Bradshaw et al. 318/615

Primary Examiner—Stanley S. Silverman

Assistant Examiner—Sean Vincent

Attorney, Agent, or Firm—Spencer T. Smith

[57] ABSTRACT

A takeout mechanism for a section of a I.S. machine which will grip the finish of one or more bottles at a blow station and carry the gripped bottles away from the blow station and deposit them on a deadplate. The bottom of the bottles can be a vertical distance from the finish within a selected distance range. A Z-axis offset is defined for the bottles and an X-Z profile is defined for the Z-axis offset to control their displacement from the blow station to the deadplate.

3 Claims, 34 Drawing Sheets

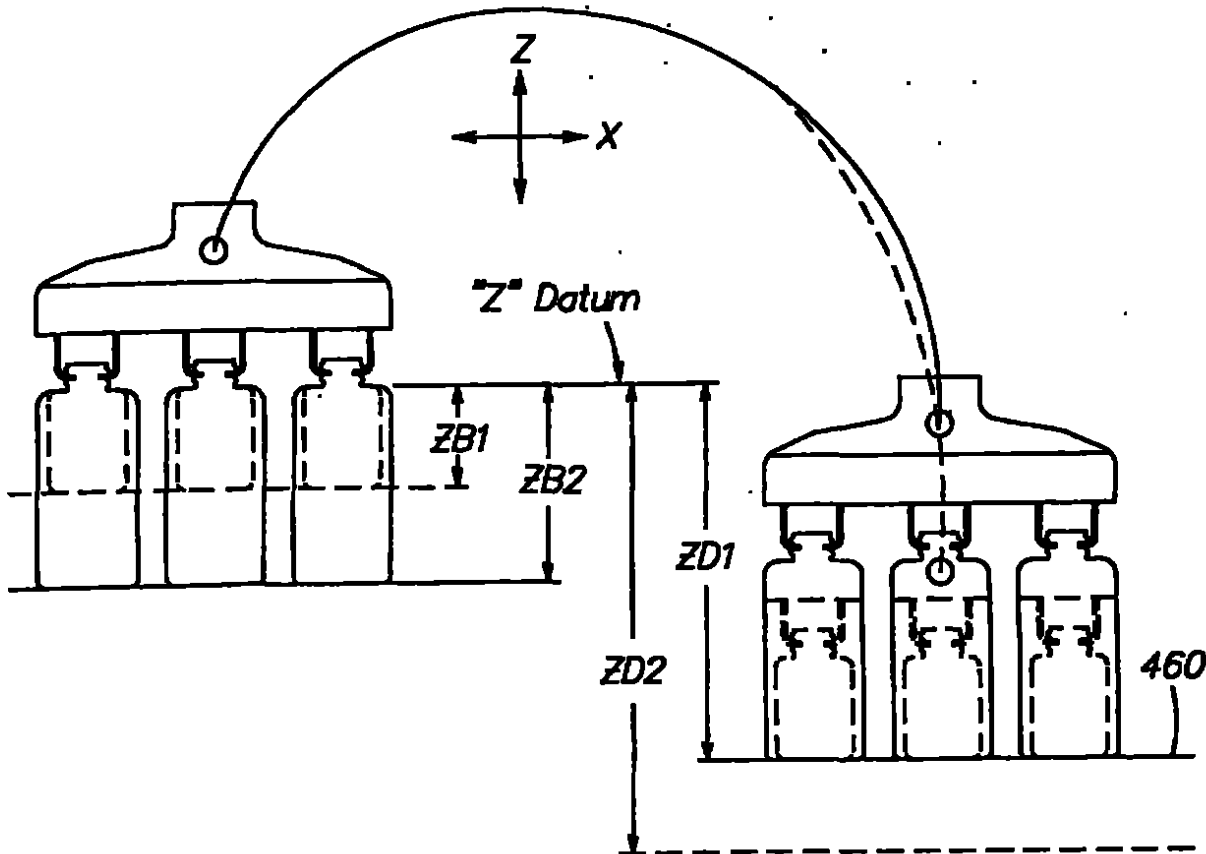


FIG. 1

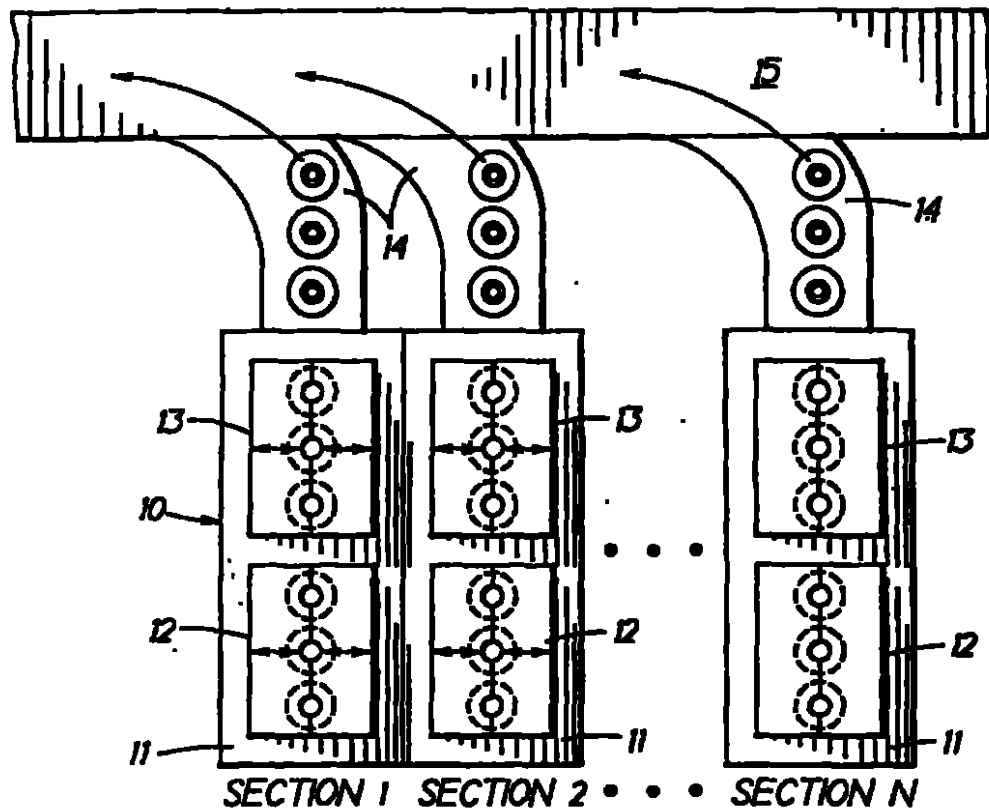
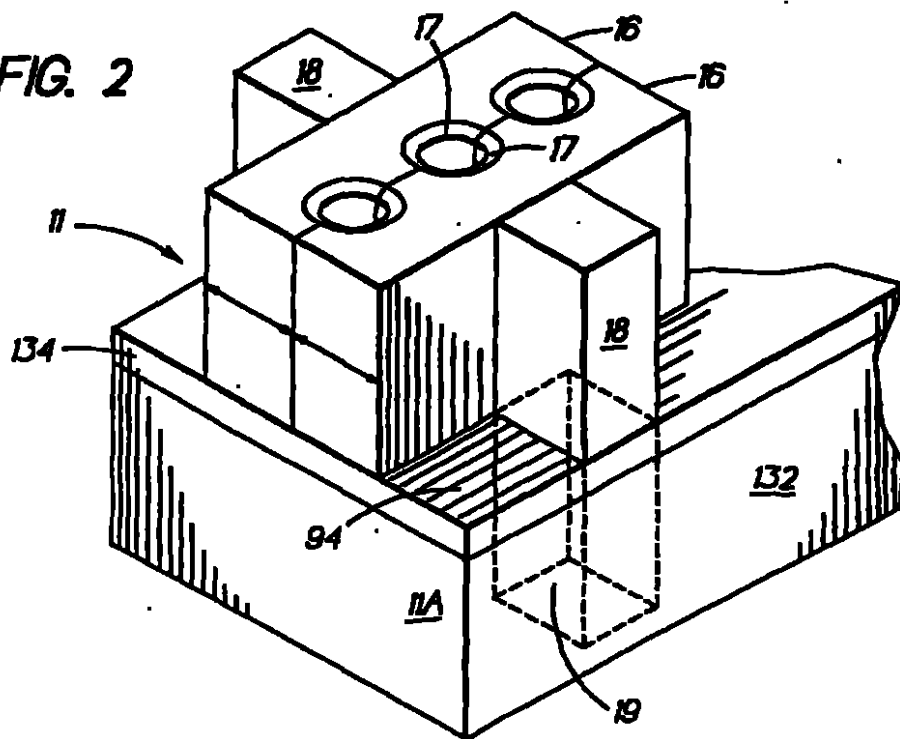


FIG. 2



73

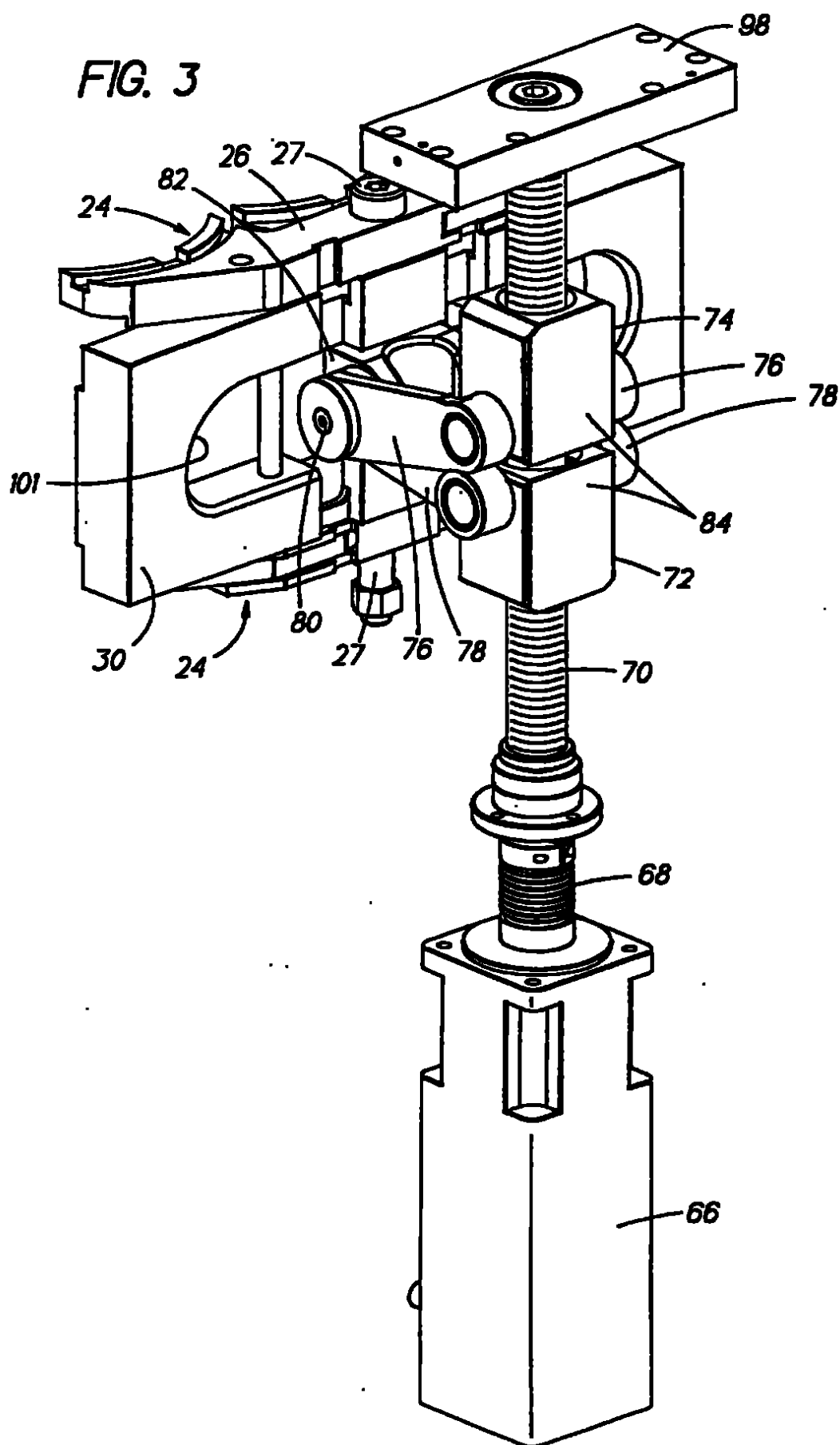
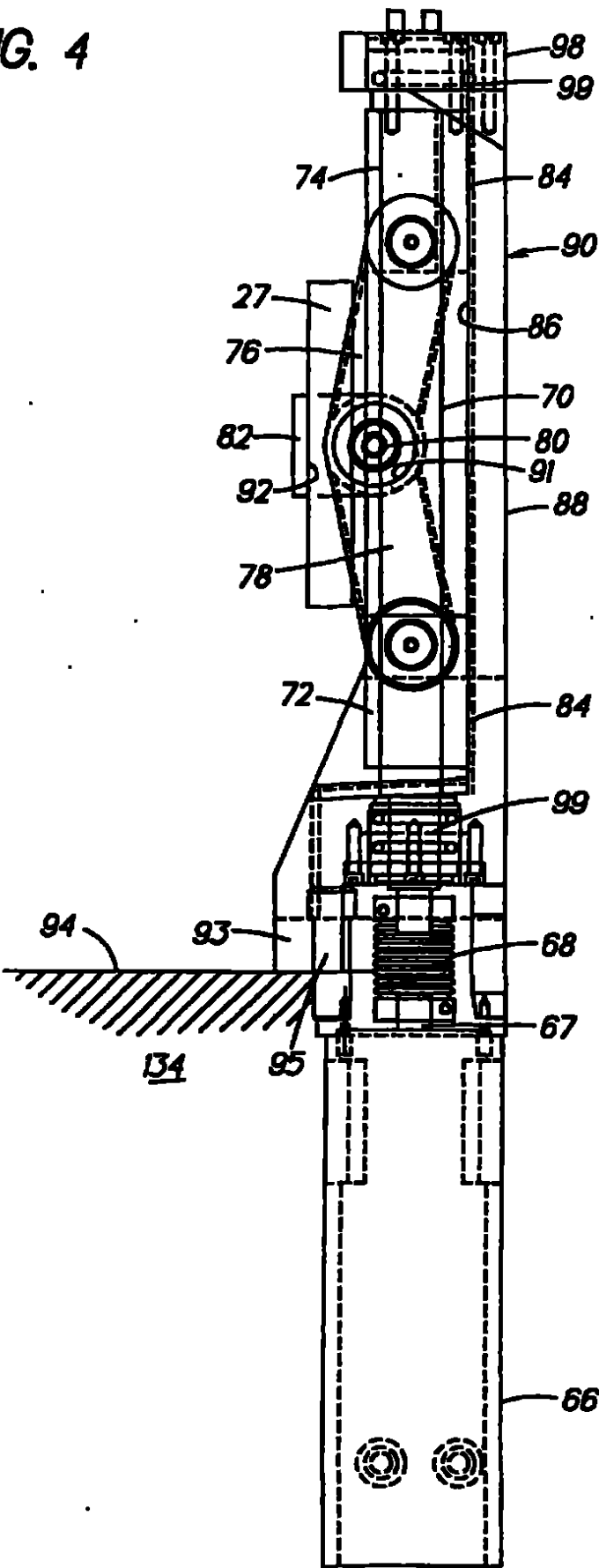
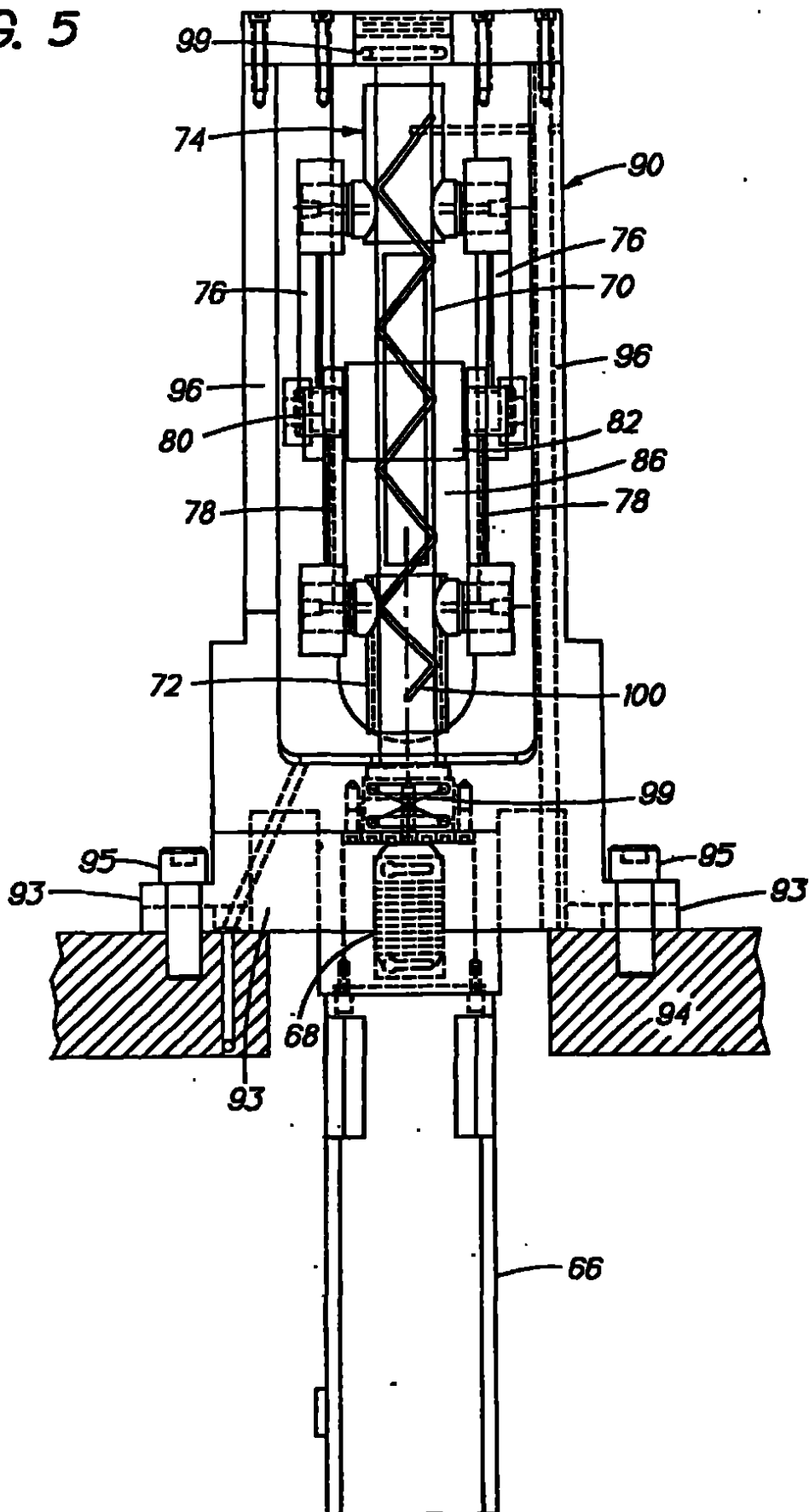


FIG. 4



74

FIG. 5



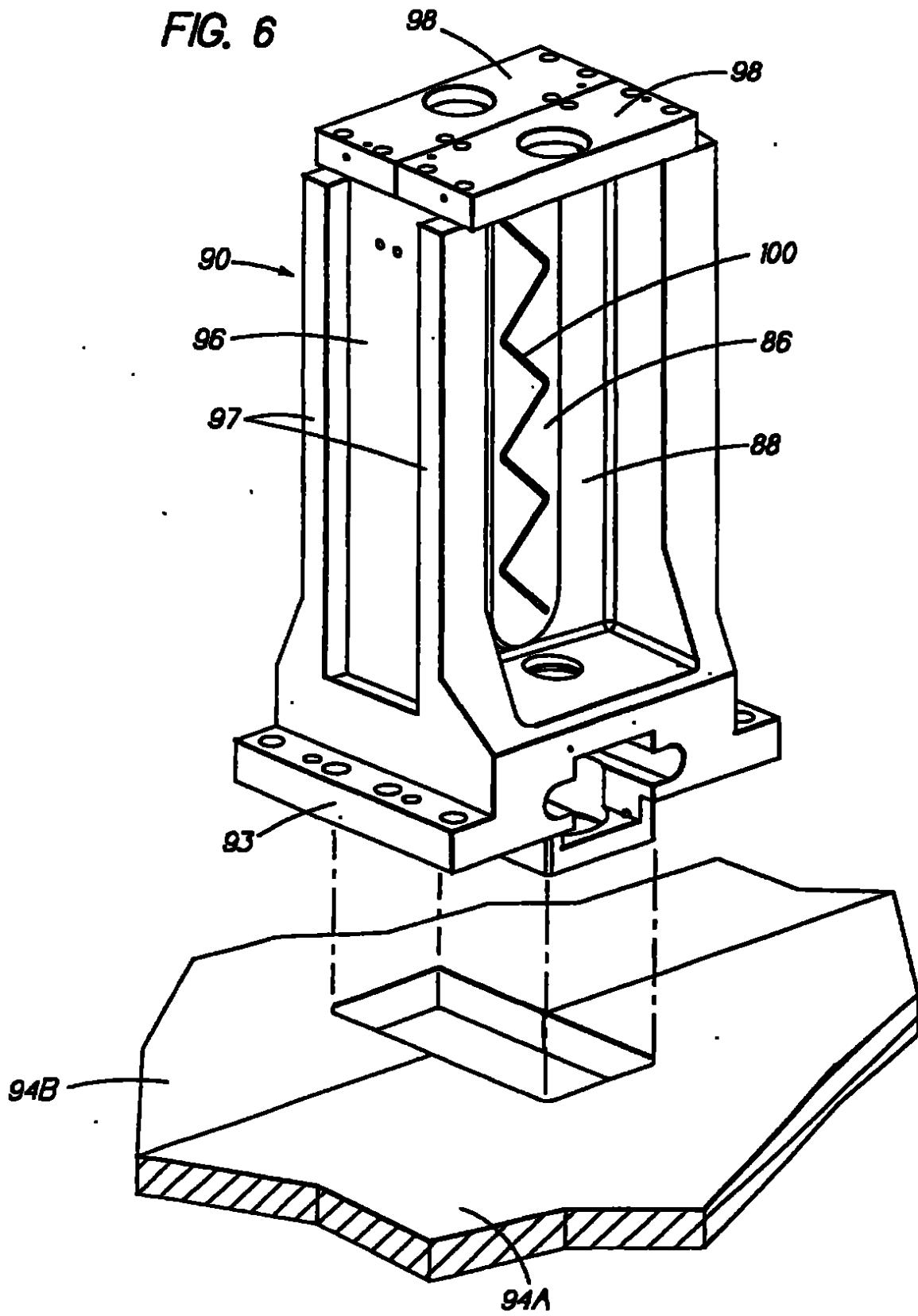


FIG. 7

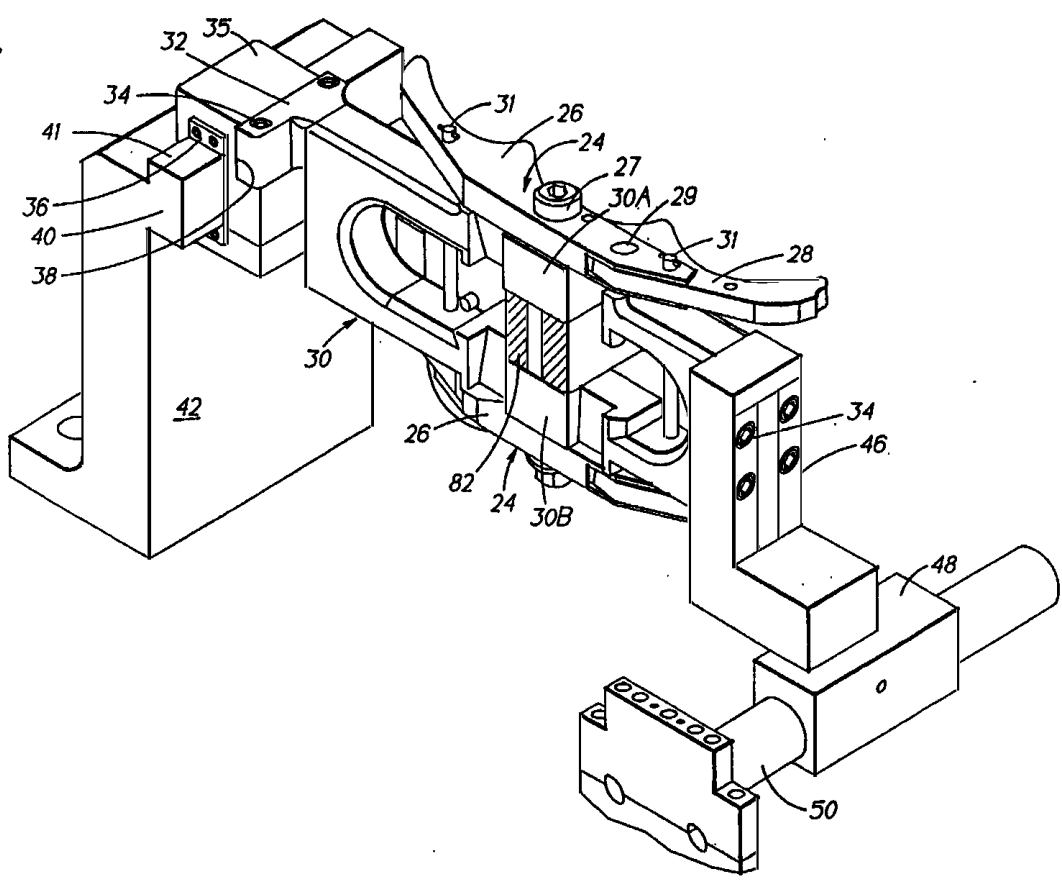


FIG. 8

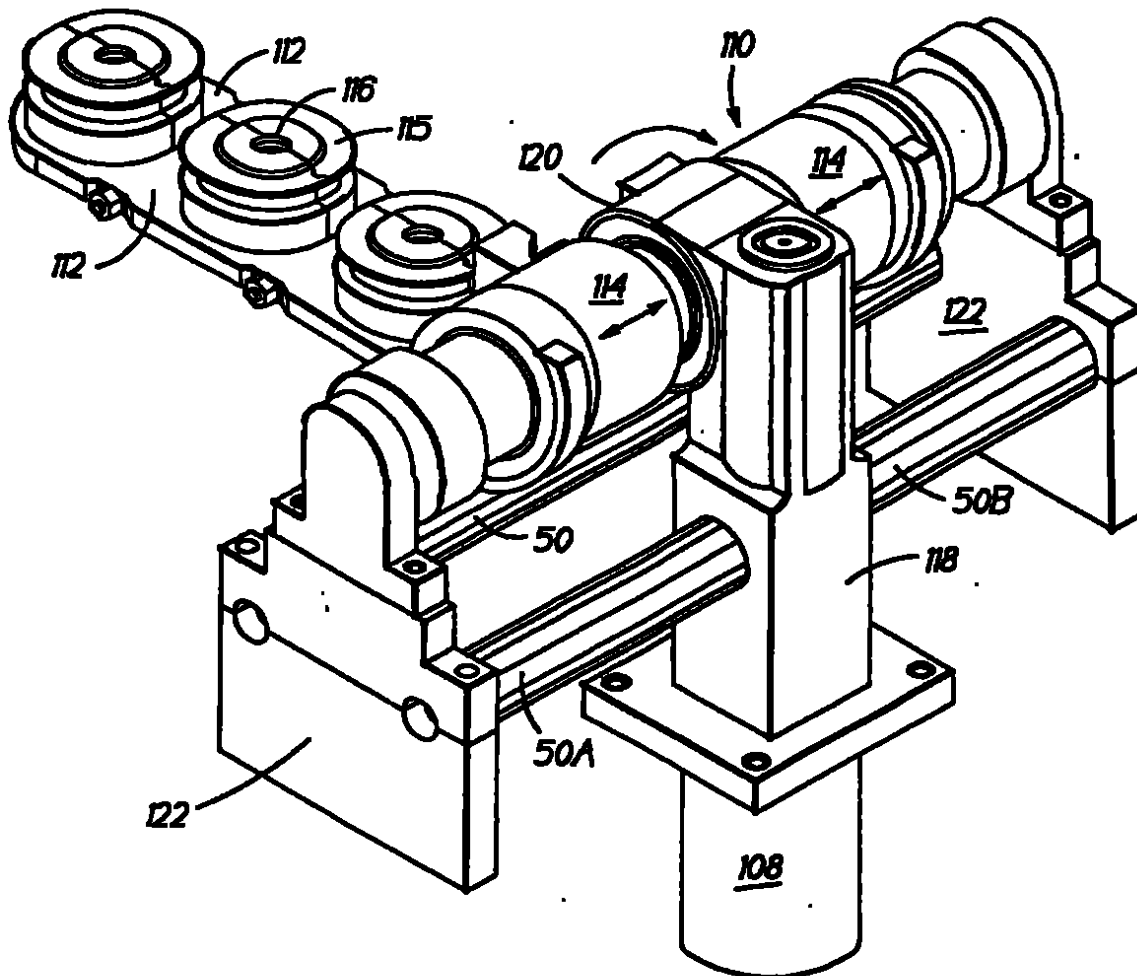


FIG. 9

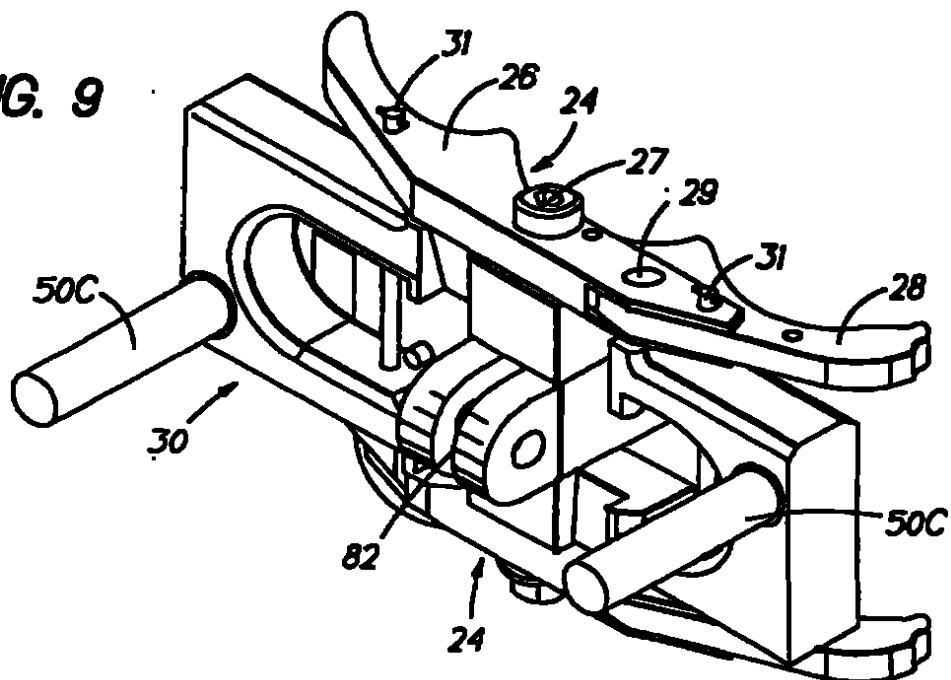
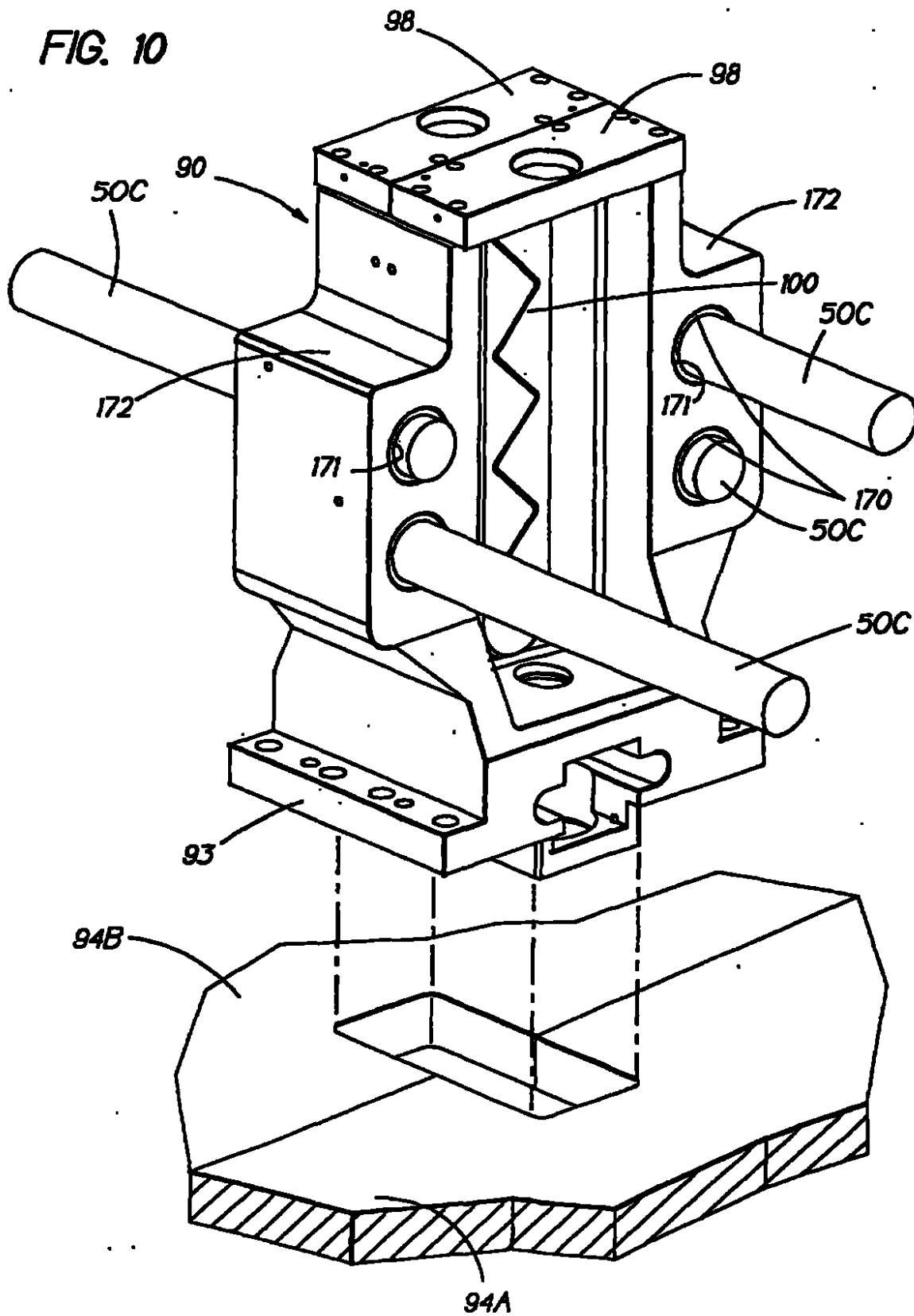


FIG. 10



77

FIG. 12

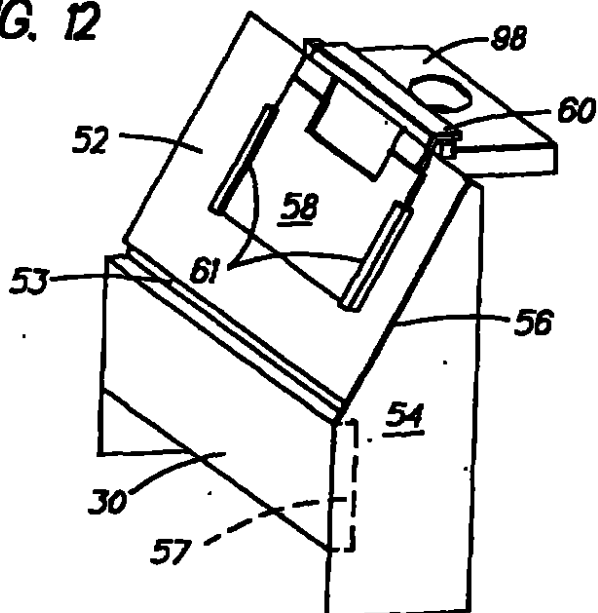


FIG. 14

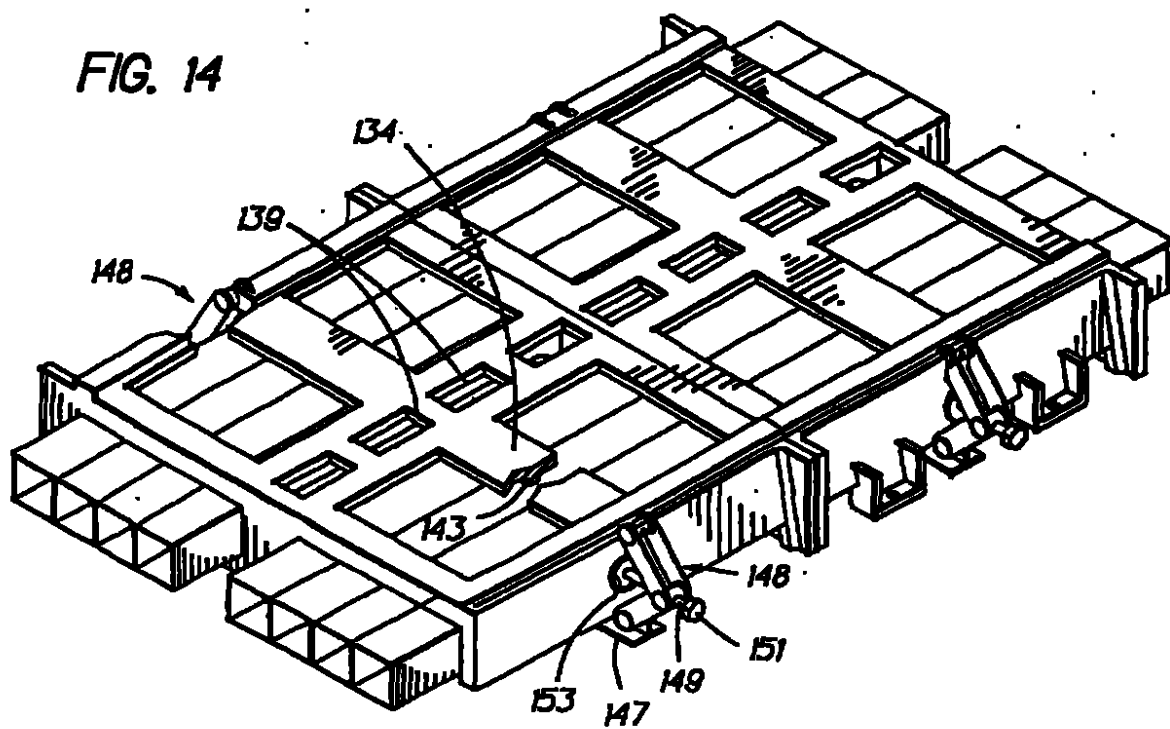
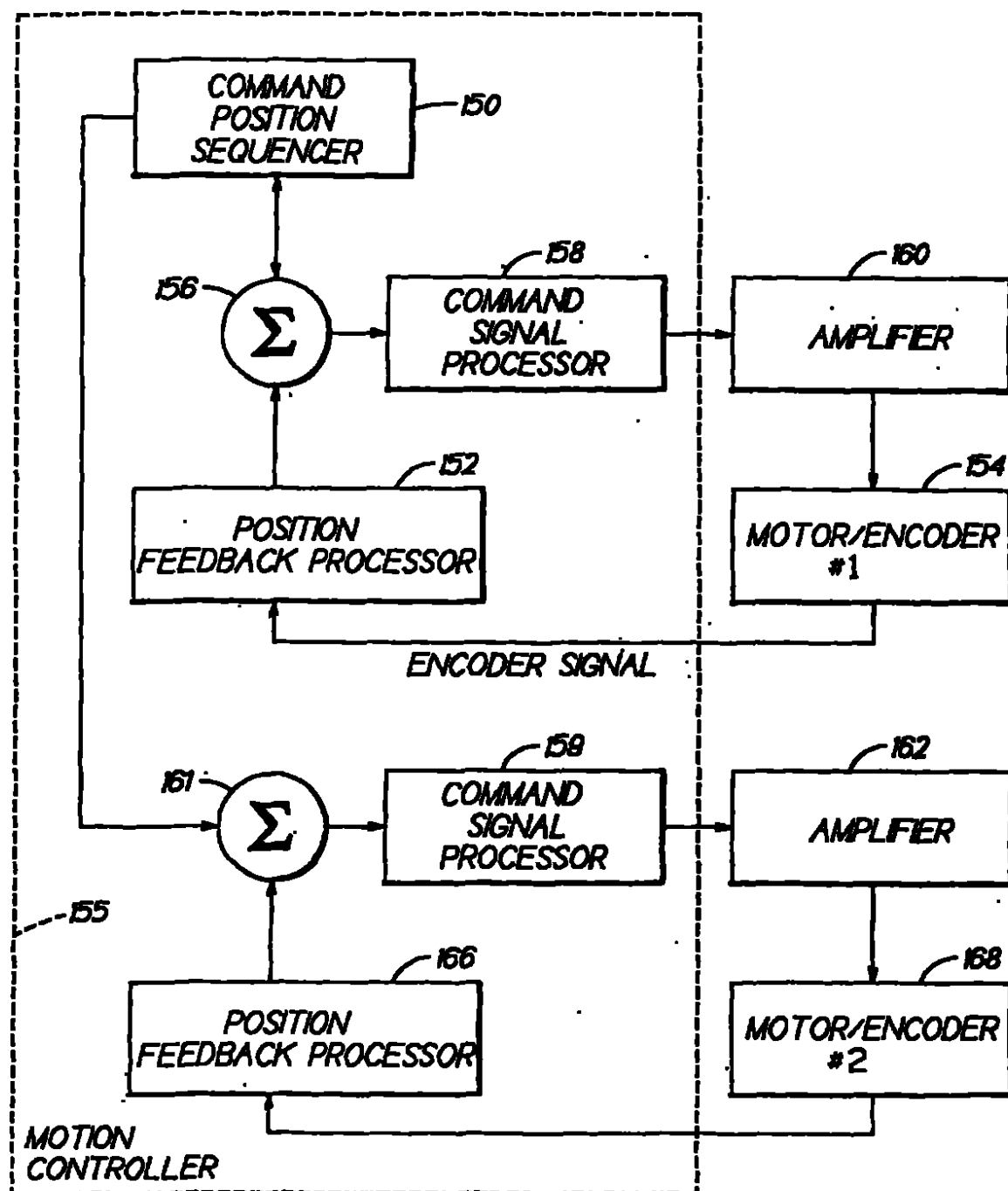


FIG. 15



78
7/

FIG. 15A

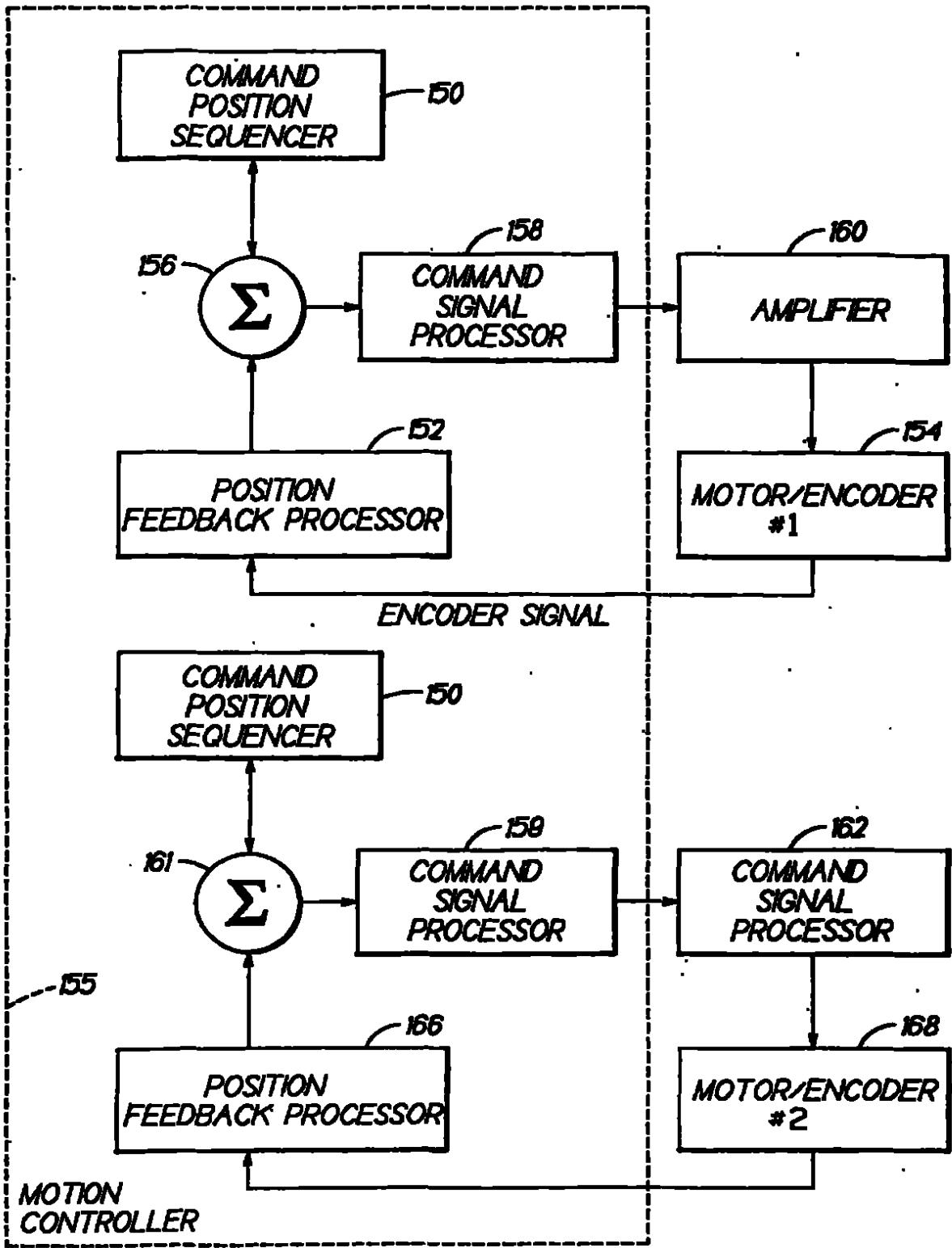
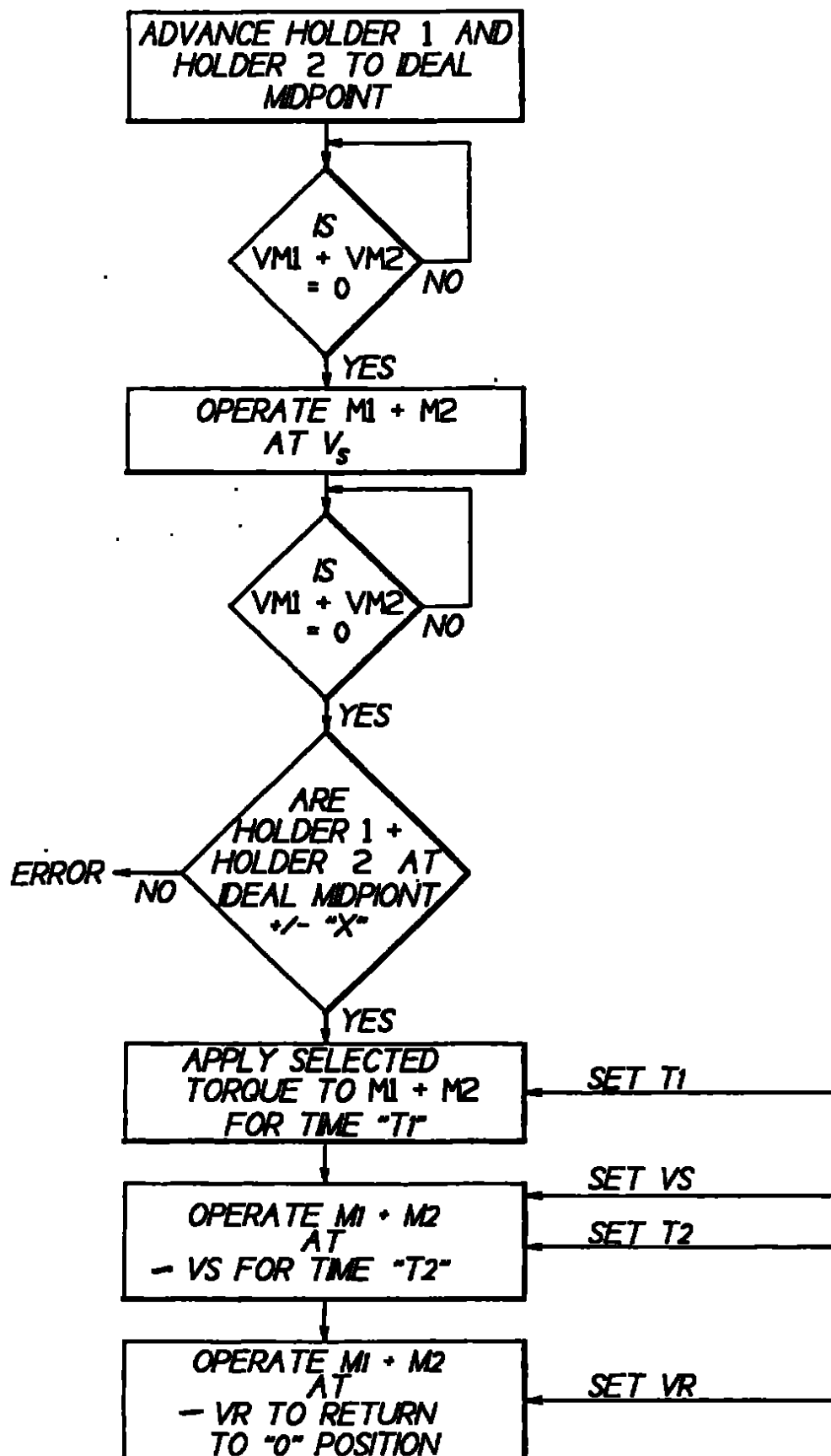
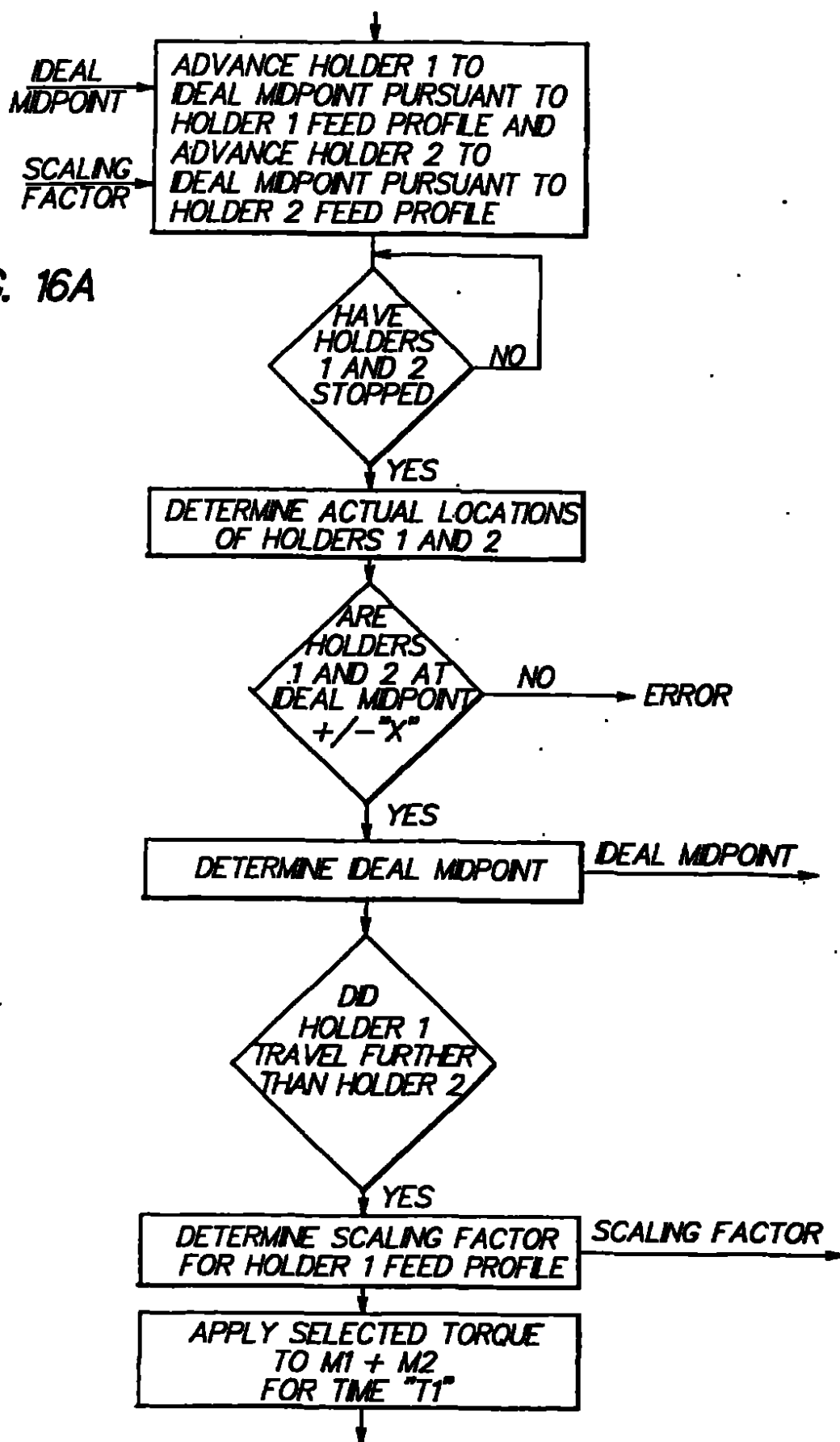


FIG. 16



29

FIG. 16A



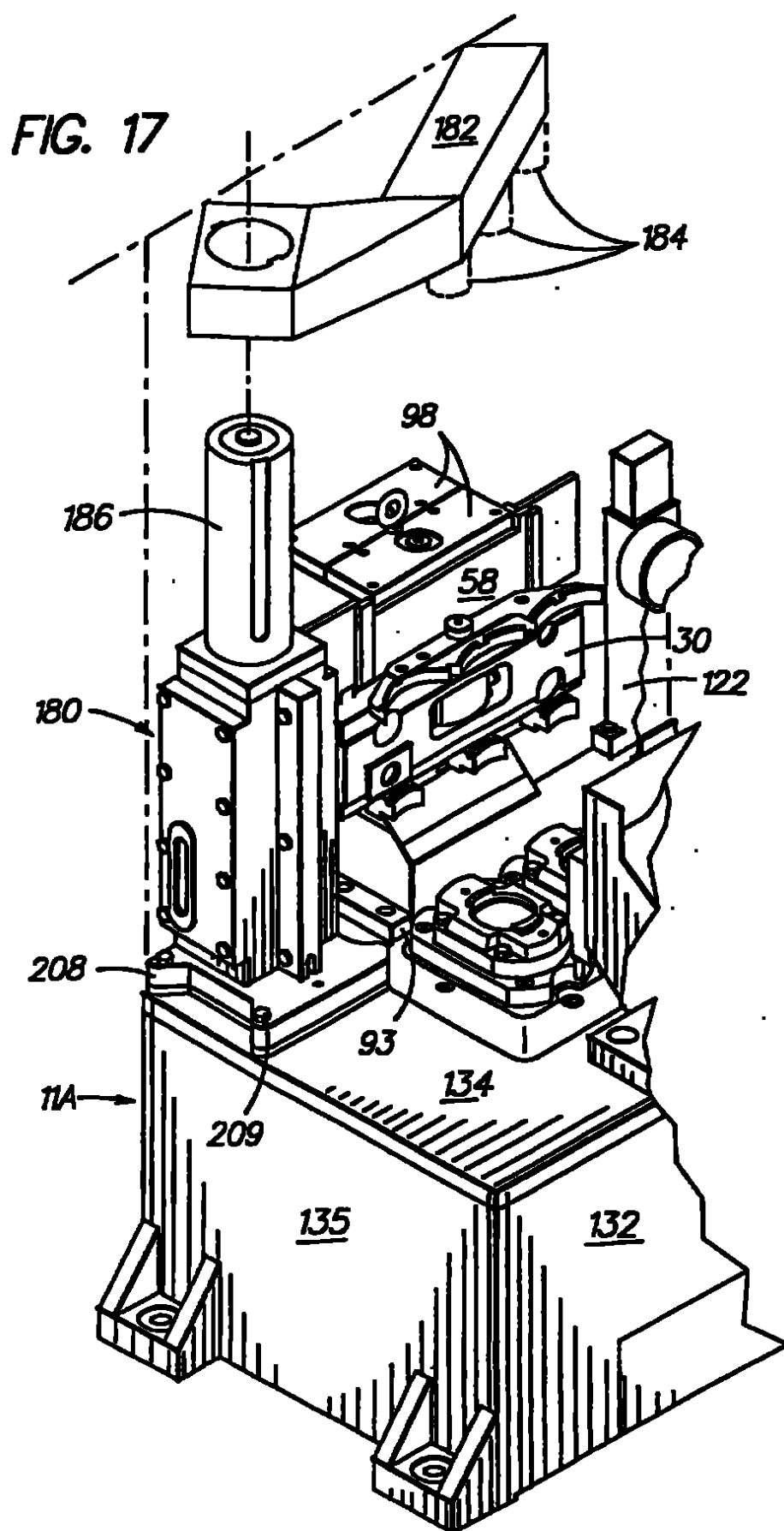
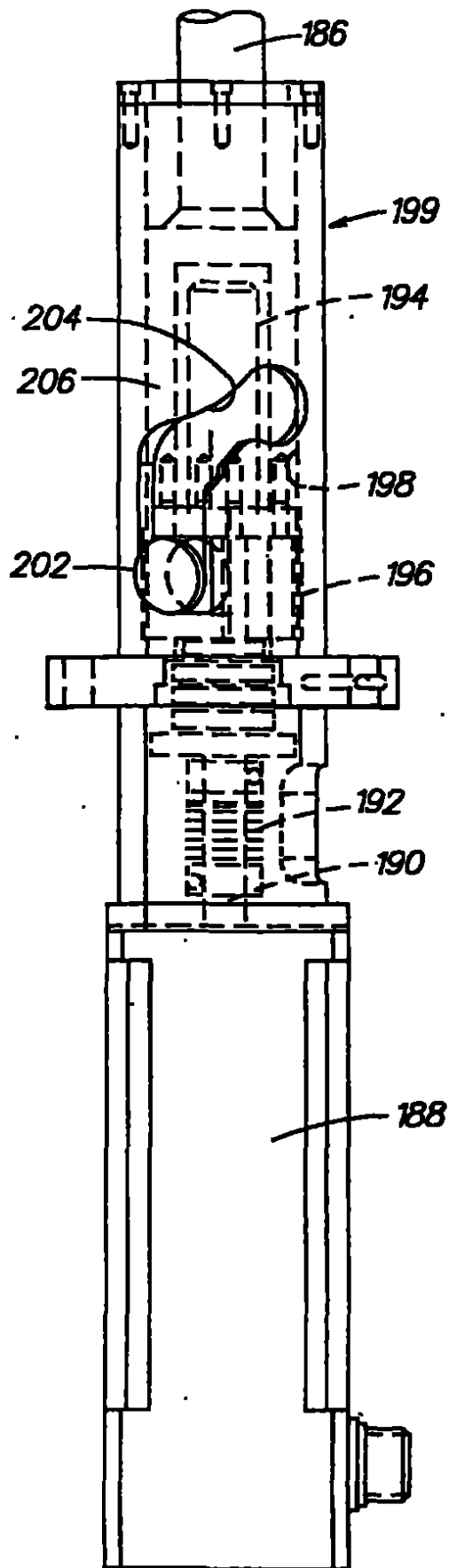
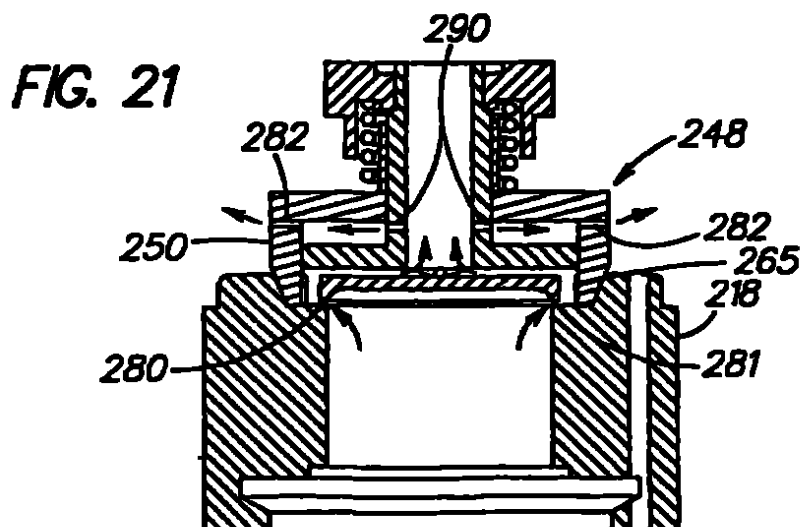
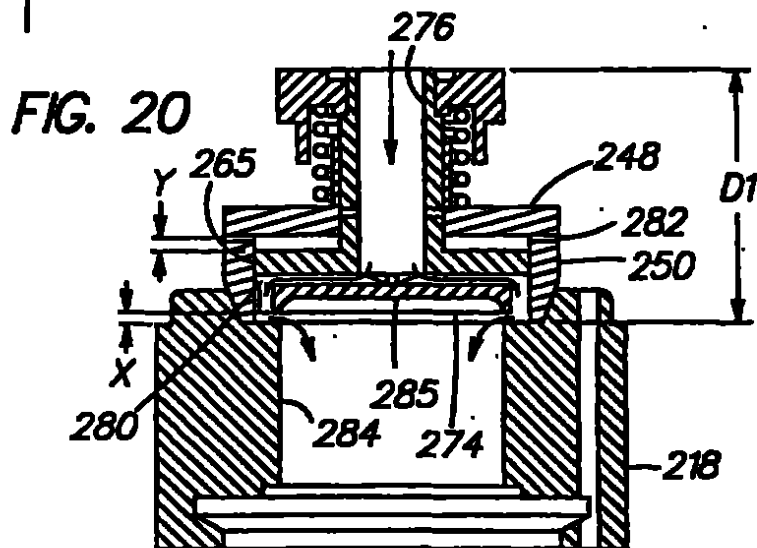
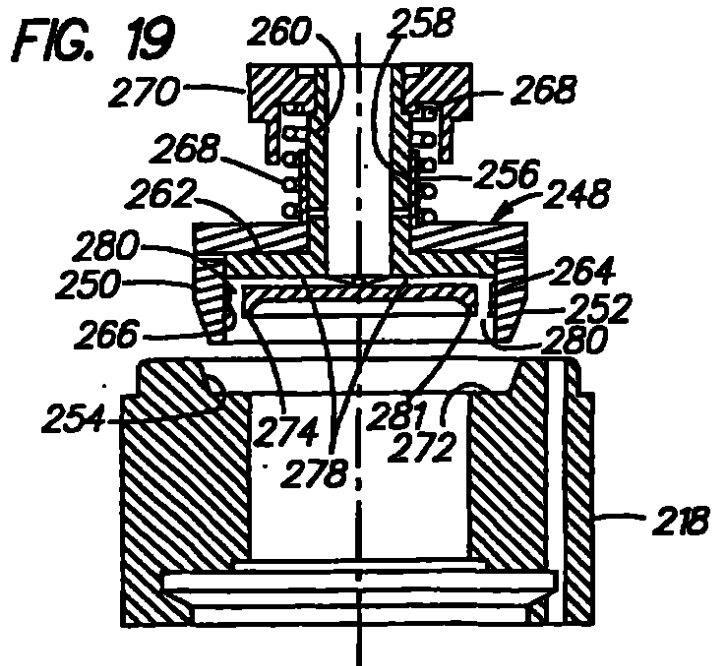


FIG. 18





82 31

FIG. 22

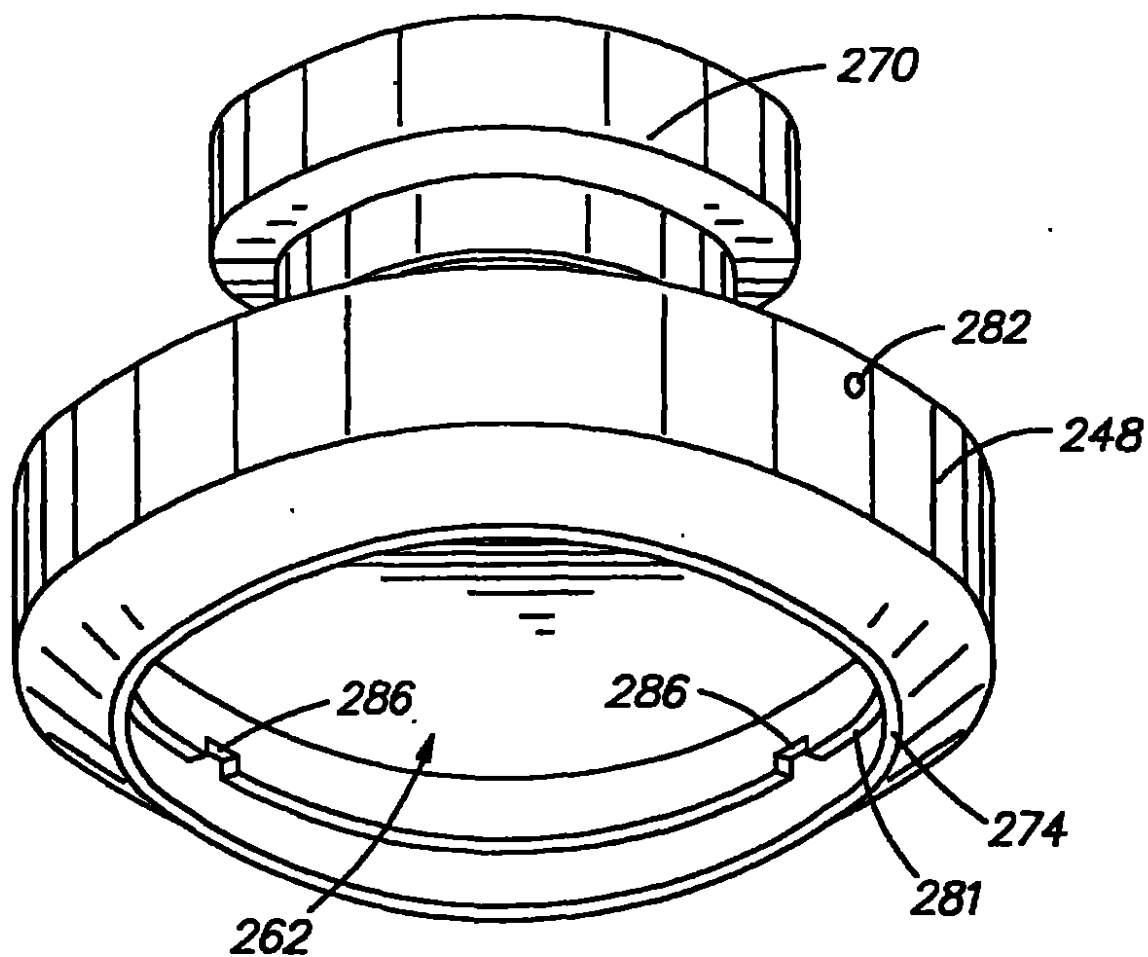
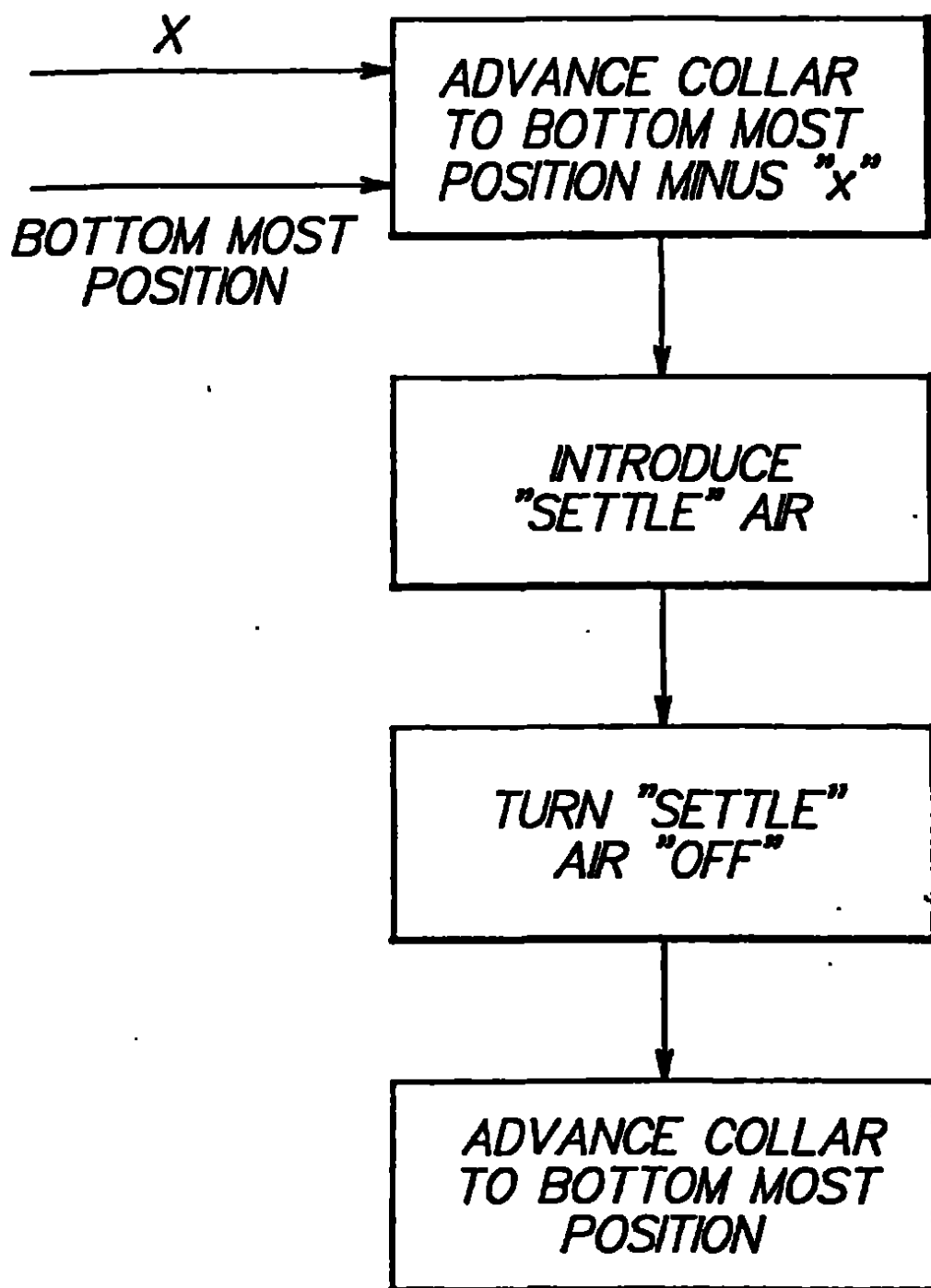


FIG. 23

82

2

FIG. 24

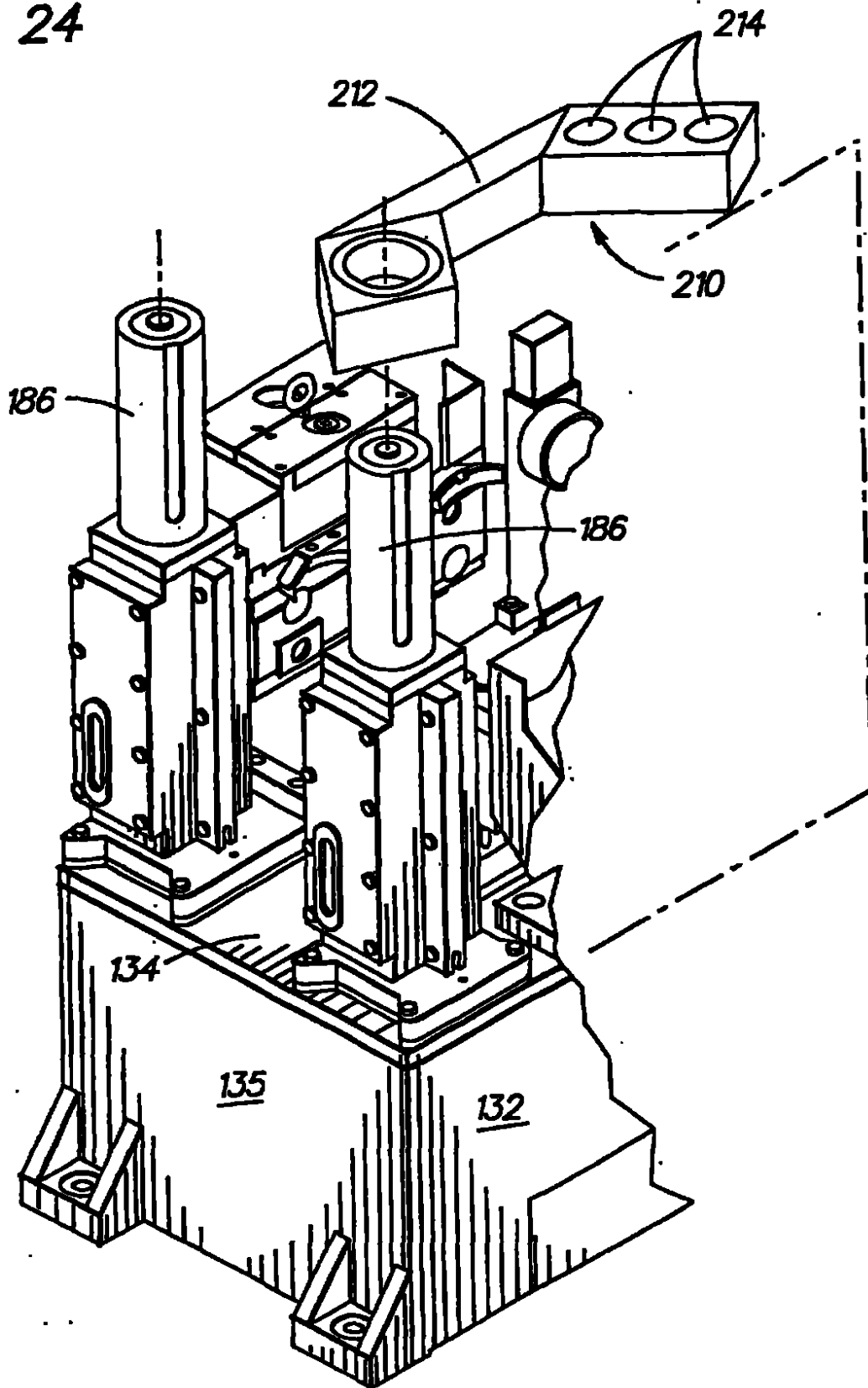


FIG. 25

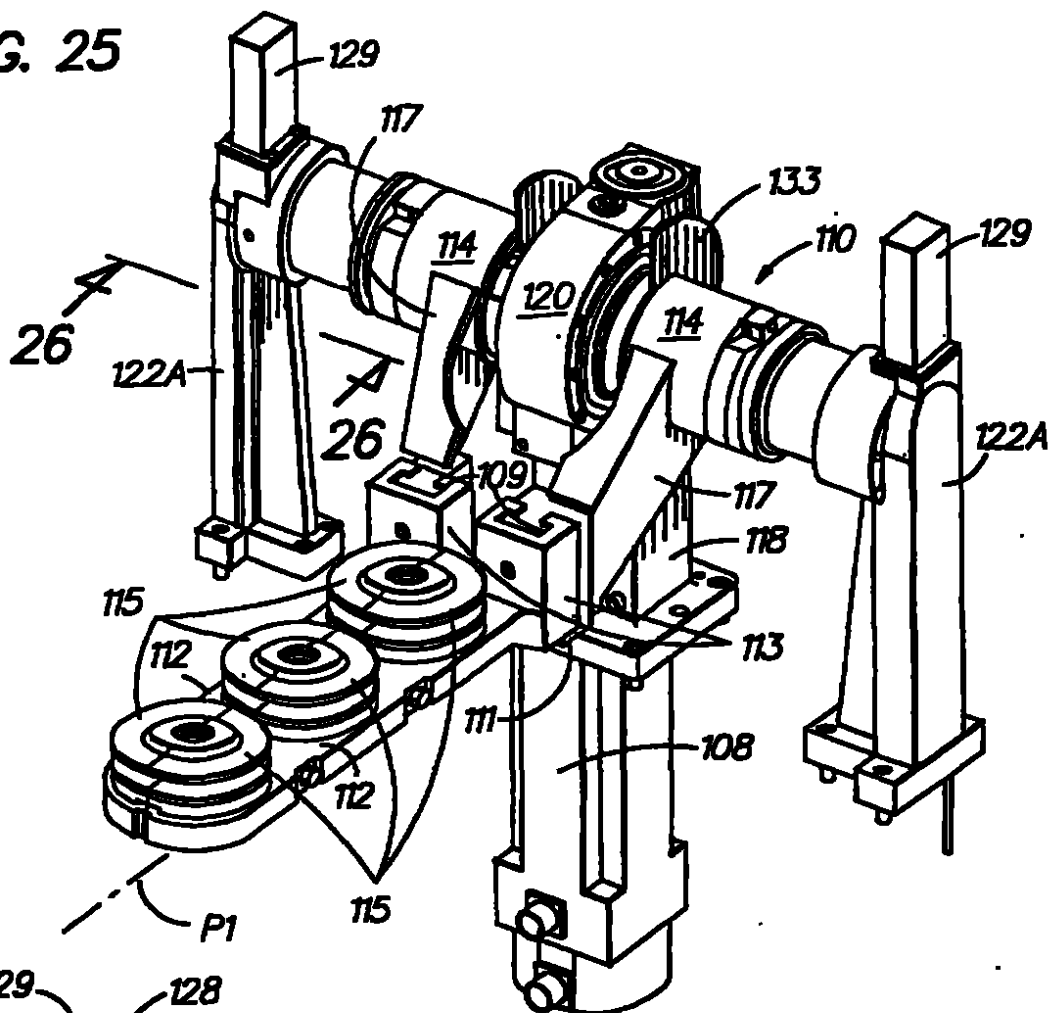


FIG. 26

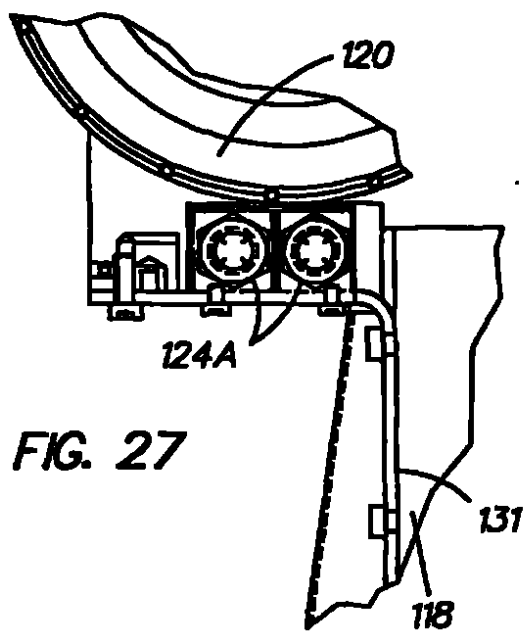
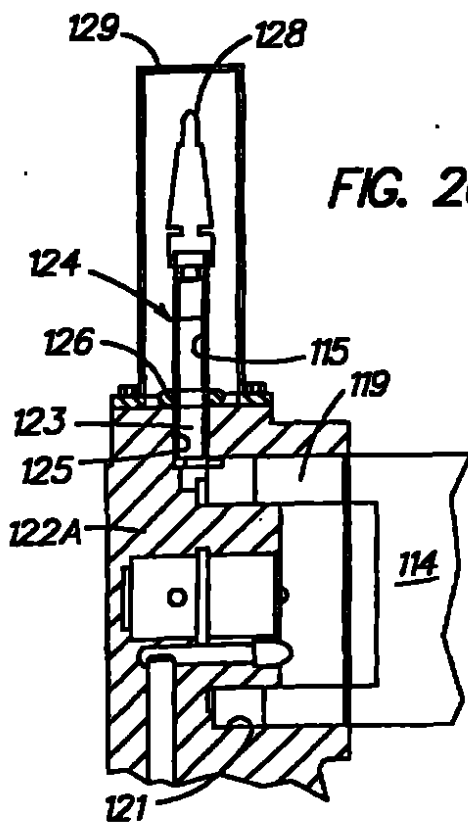


FIG. 27

8/1/83

FIG. 28

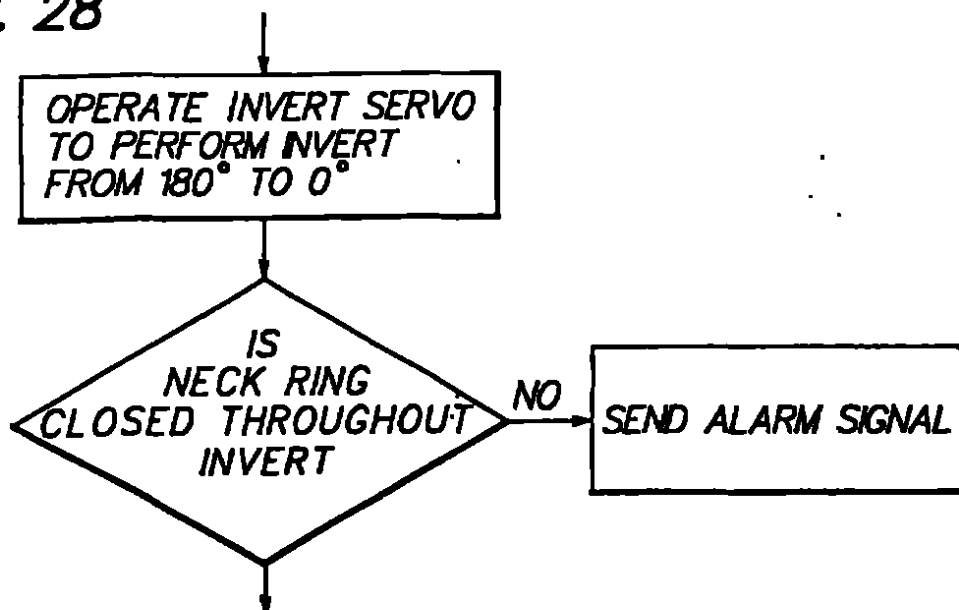


FIG. 29

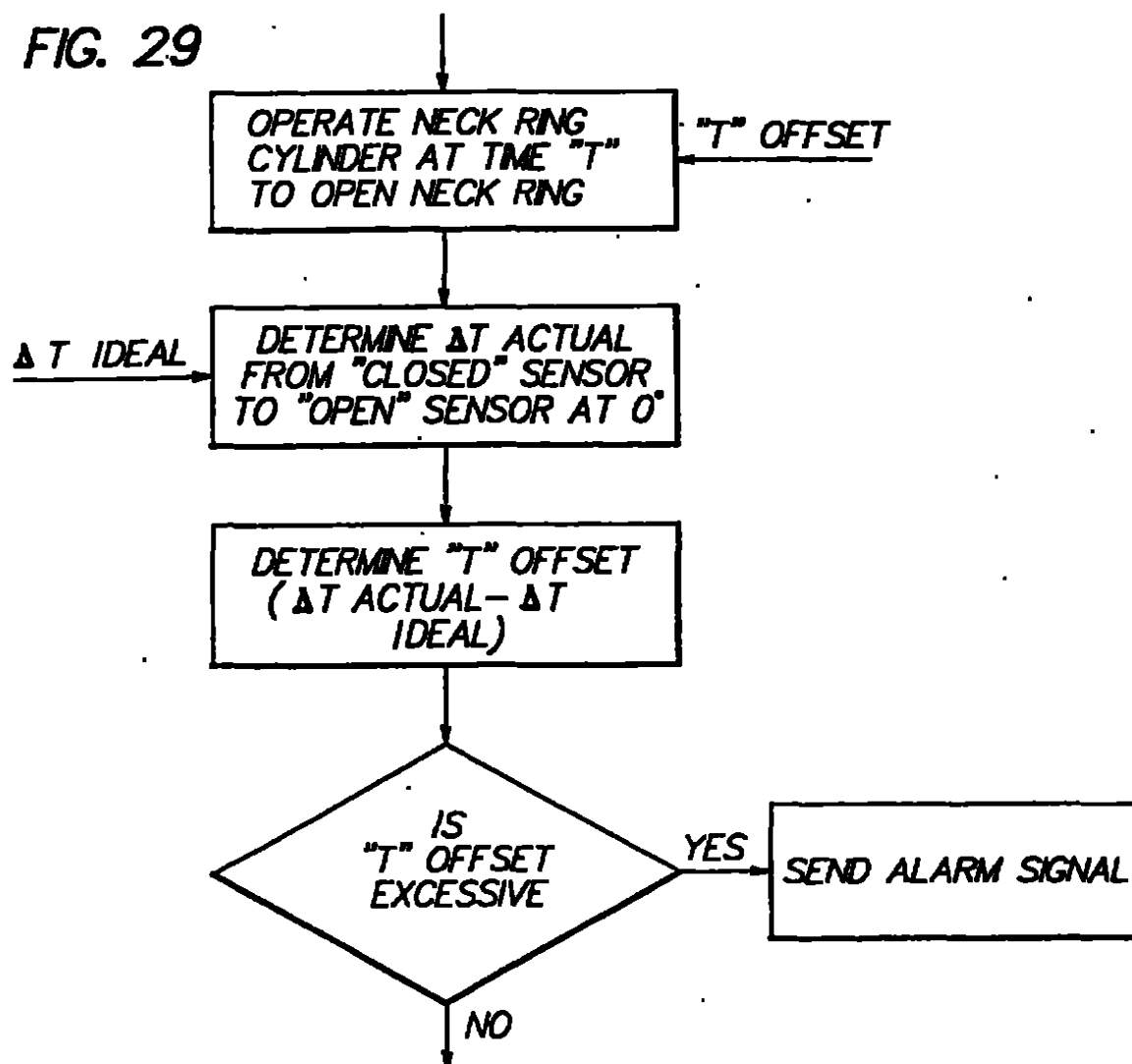
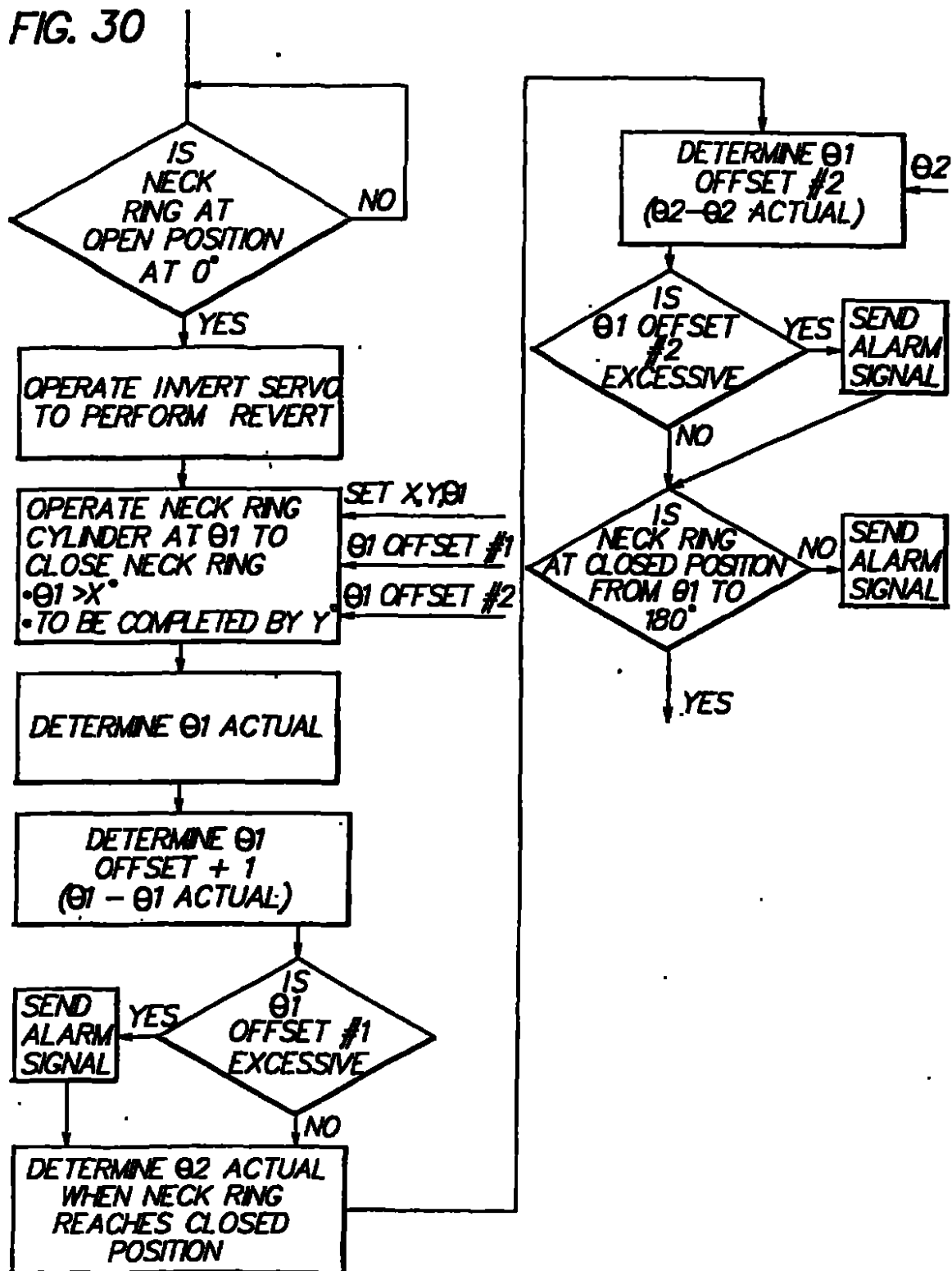


FIG. 30



84

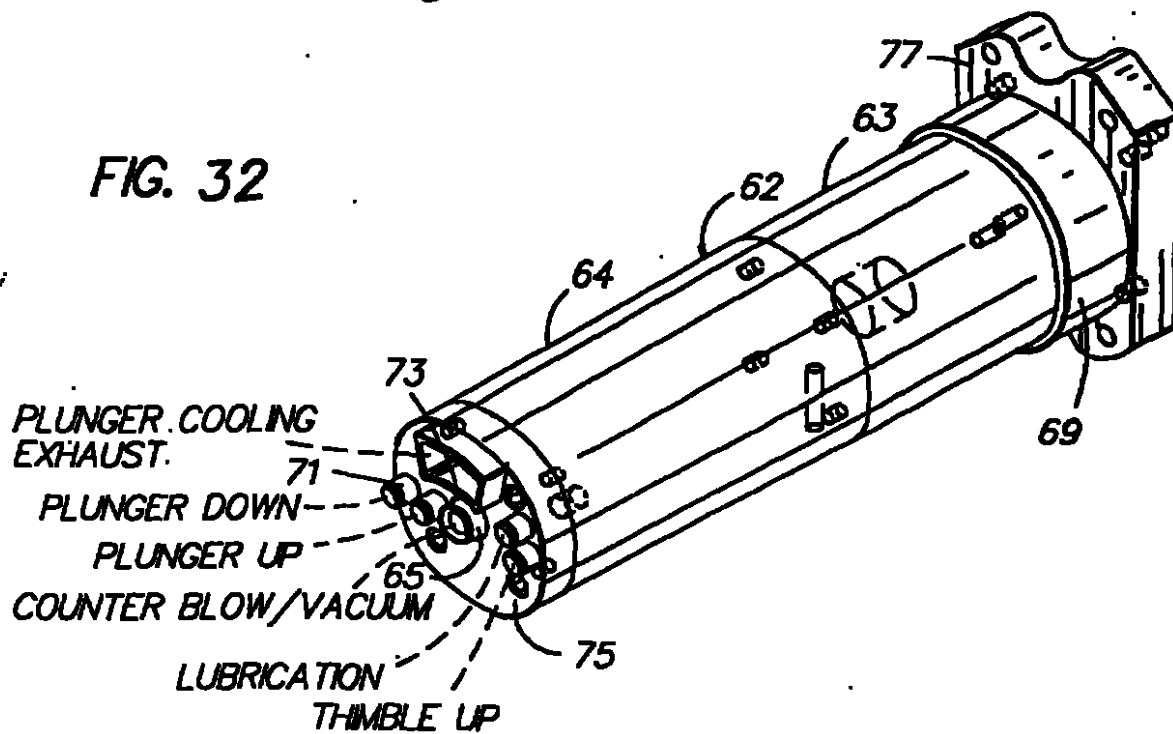
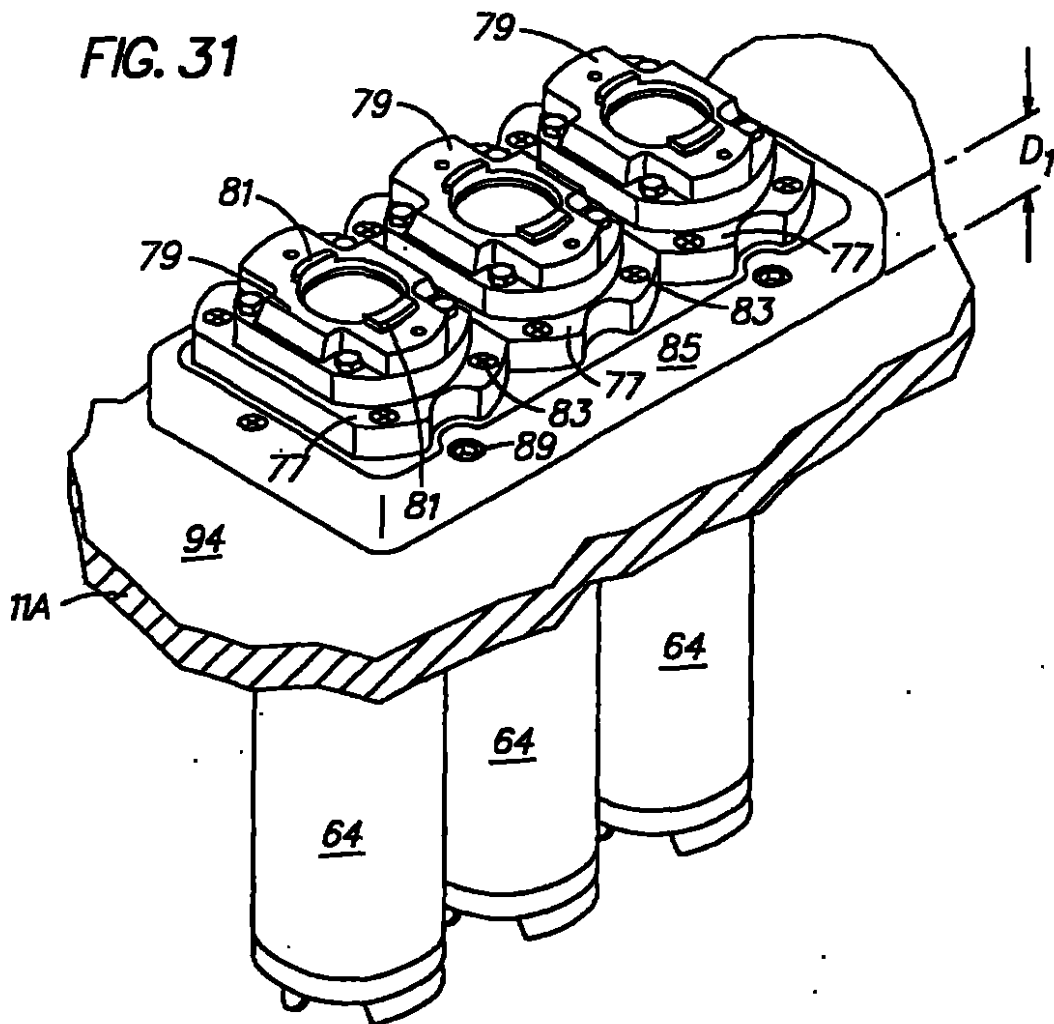


FIG. 33

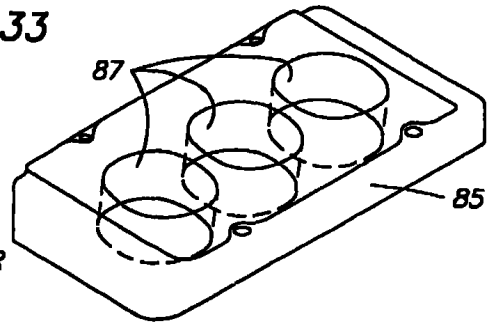
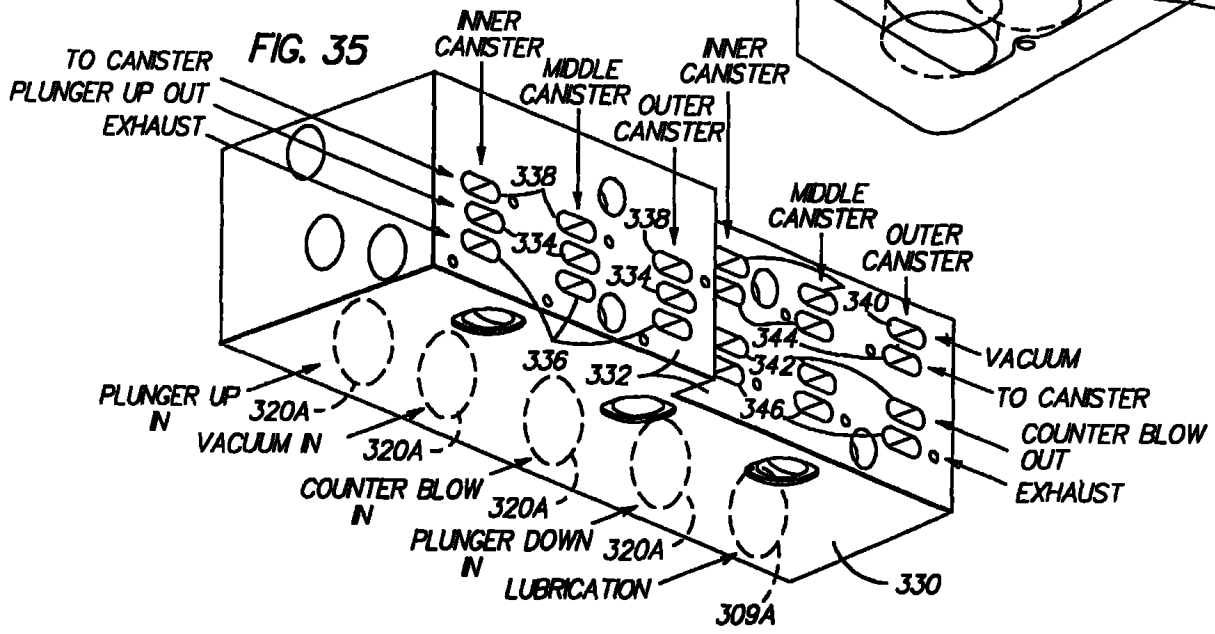


FIG. 35



35

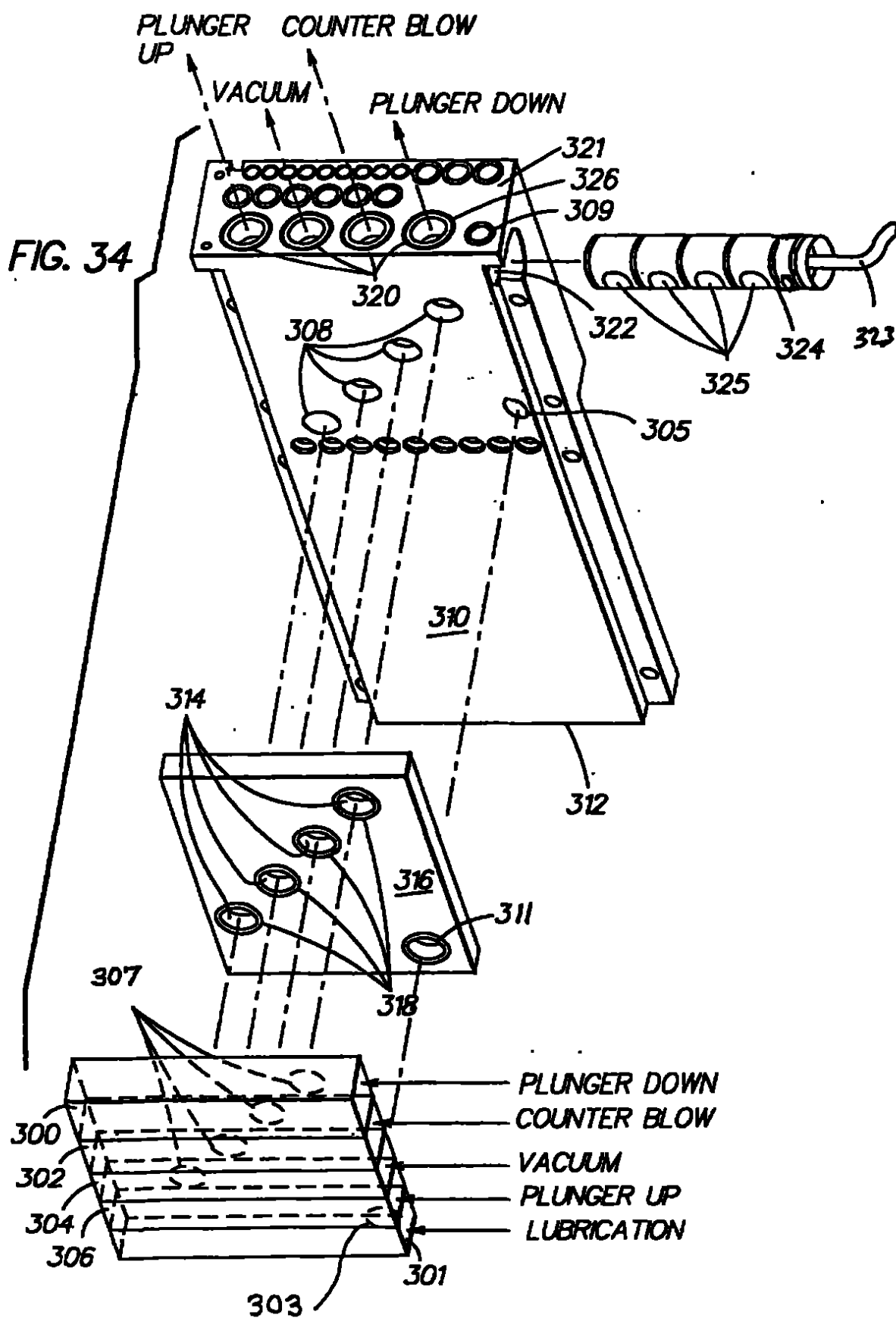
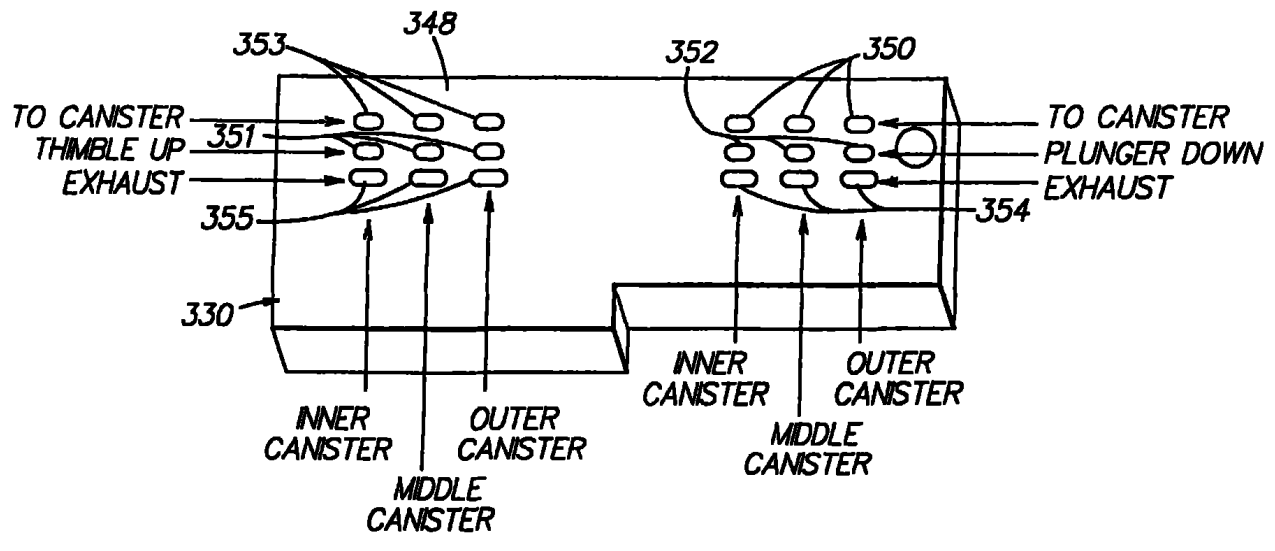
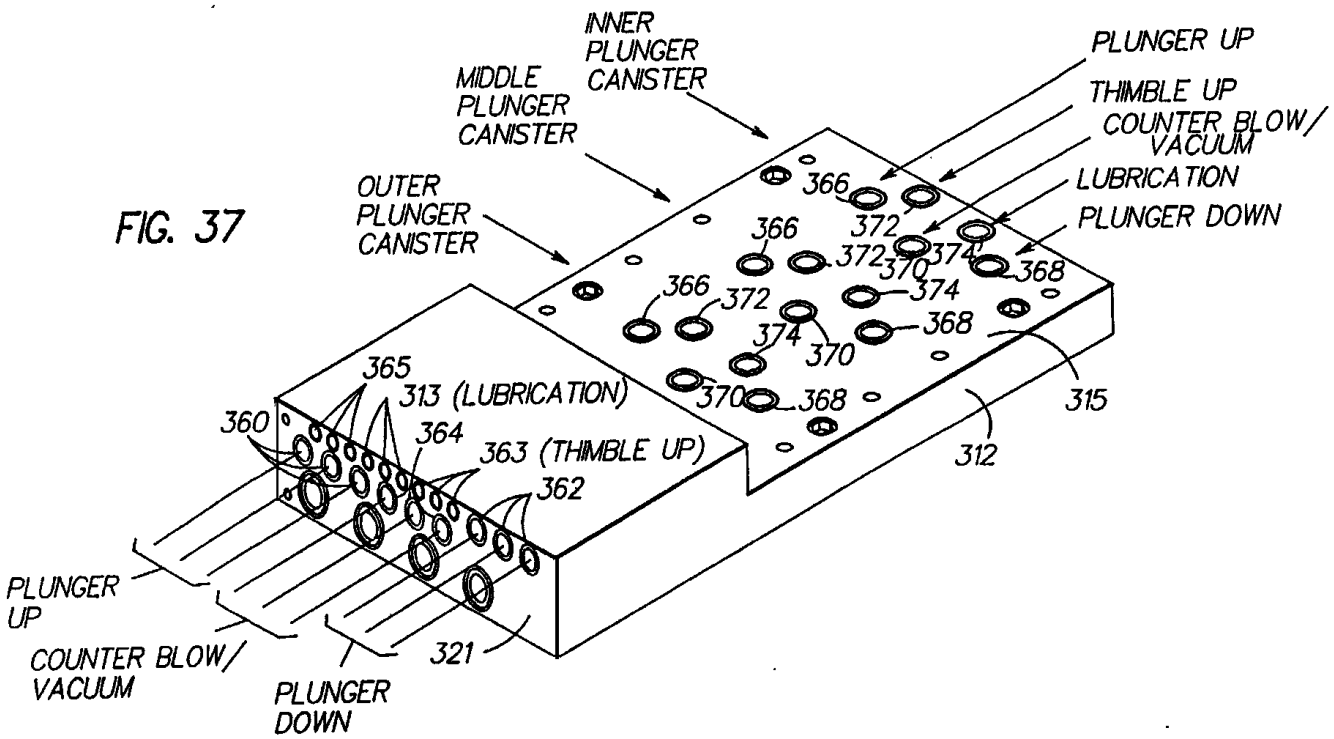


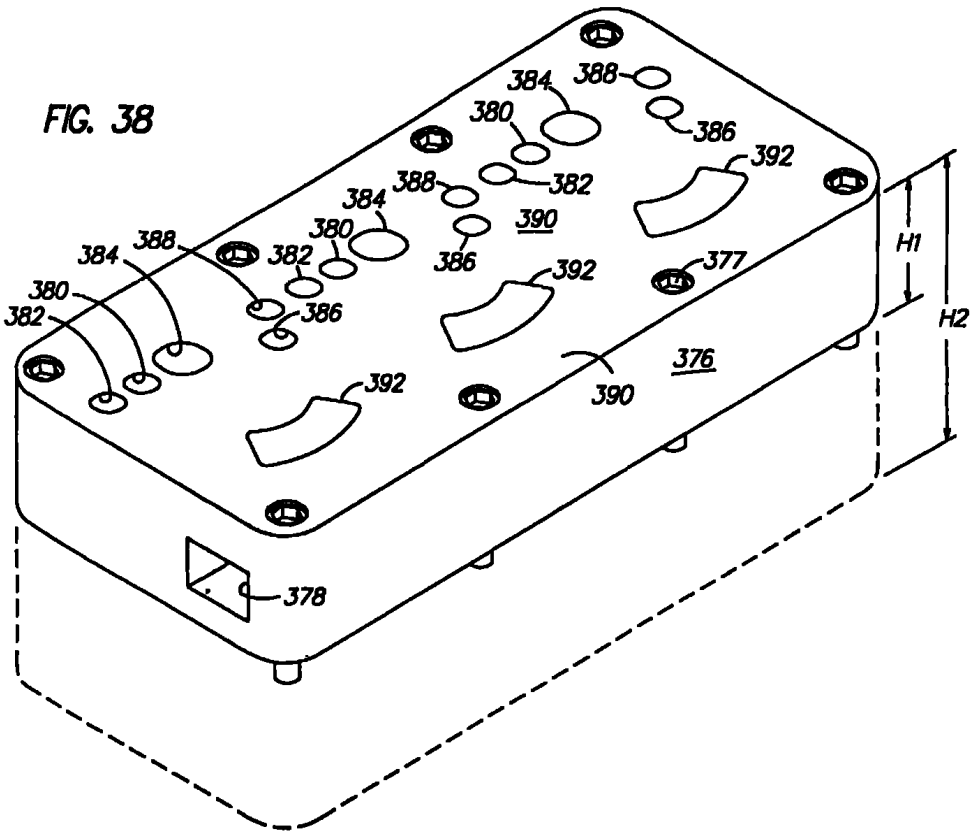
FIG. 36



[Handwritten signature]

FIG. 37





[Handwritten signature]

[Handwritten mark]

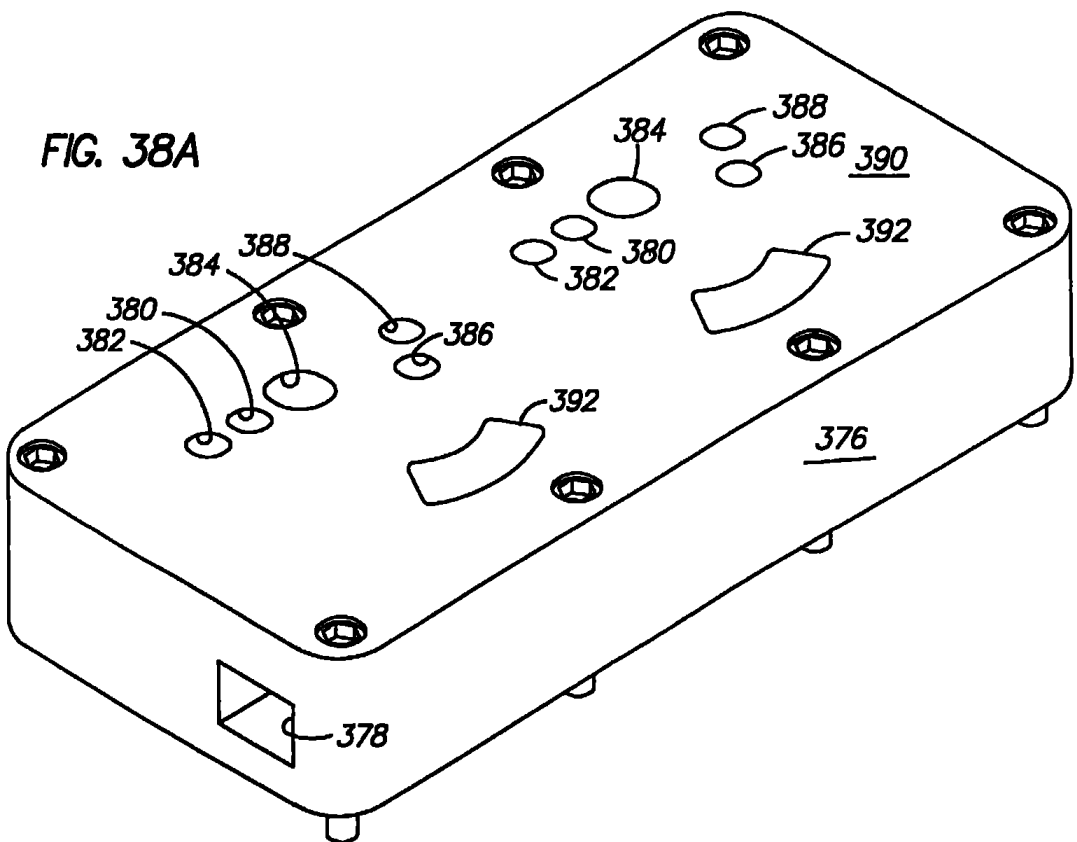


FIG. 39

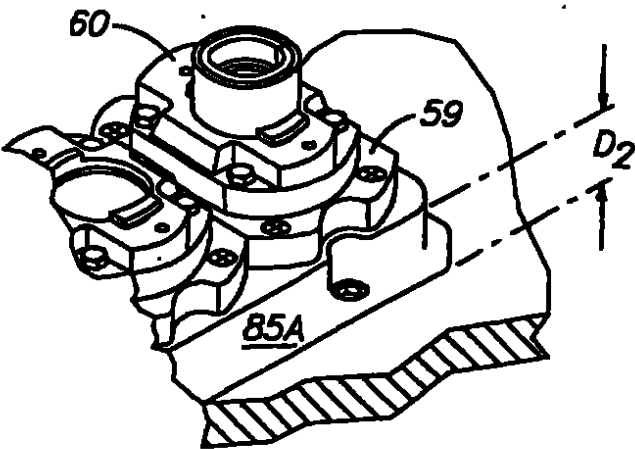


FIG. 40

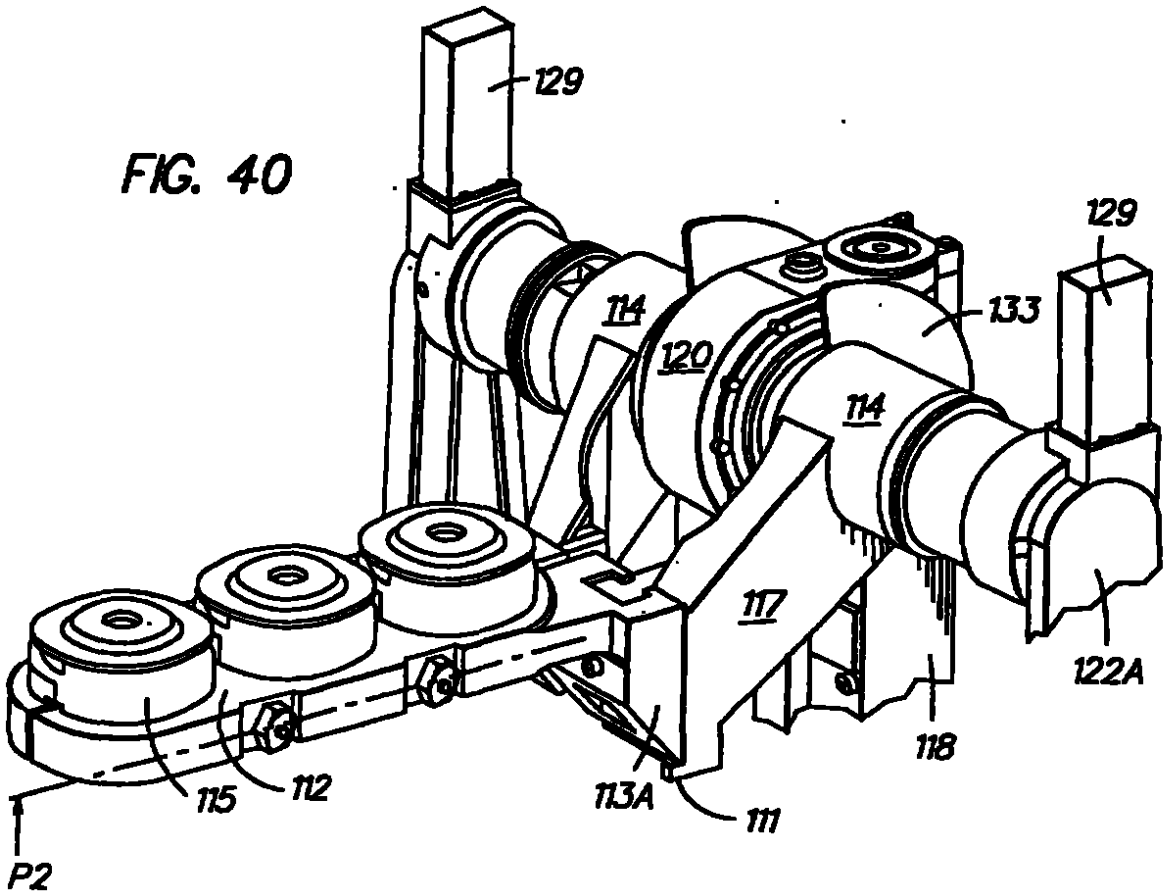


FIG. 41

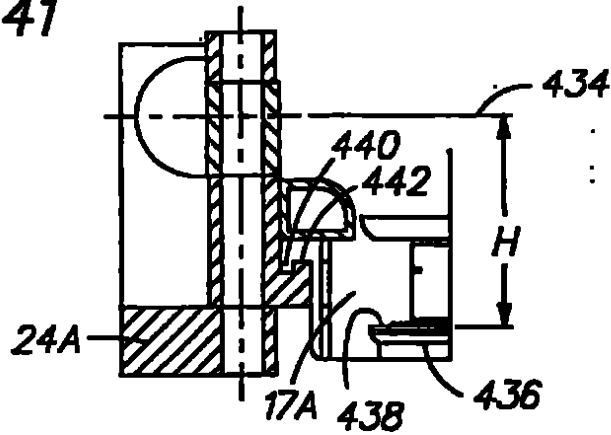


FIG. 42

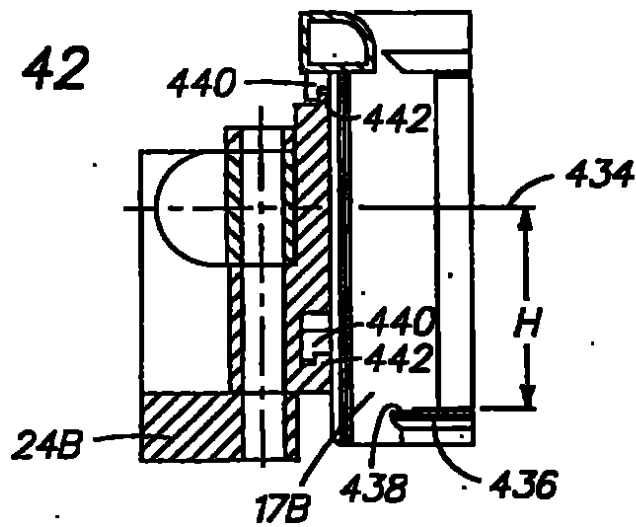


FIG. 43

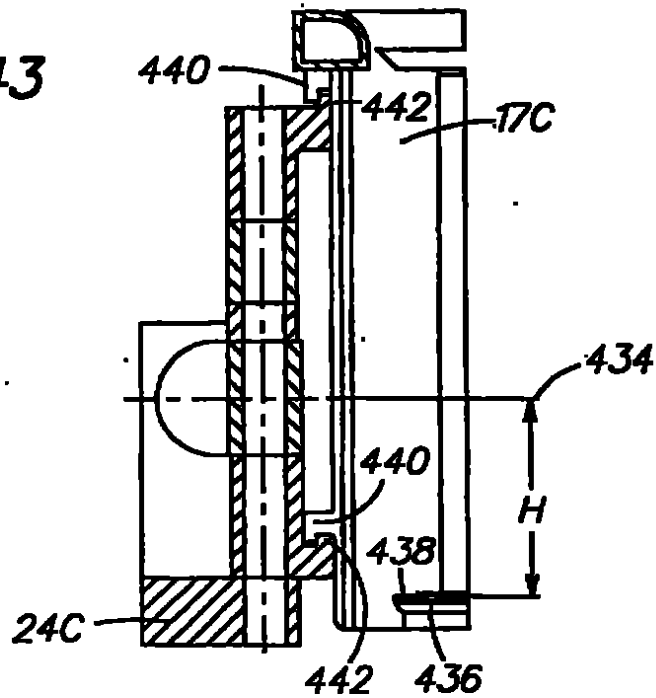
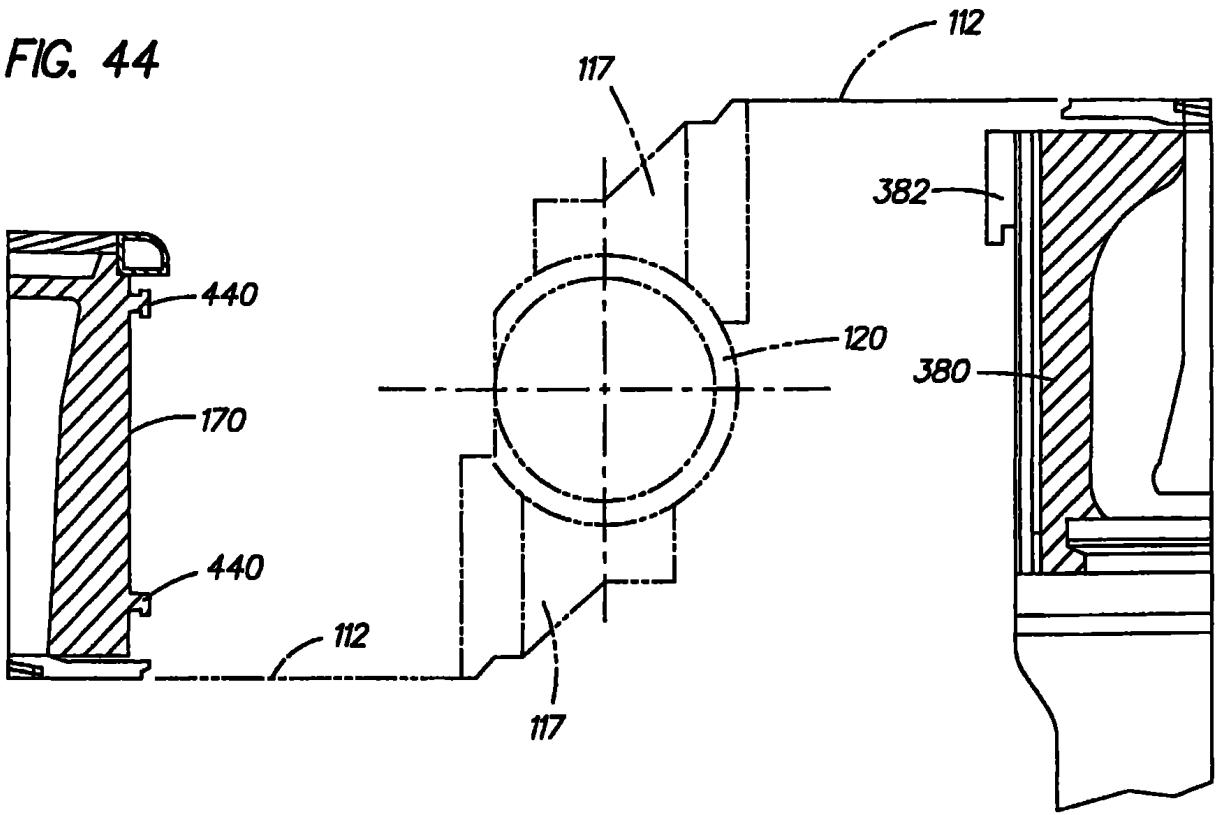
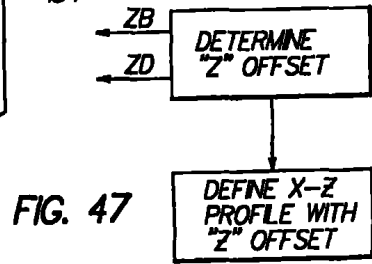
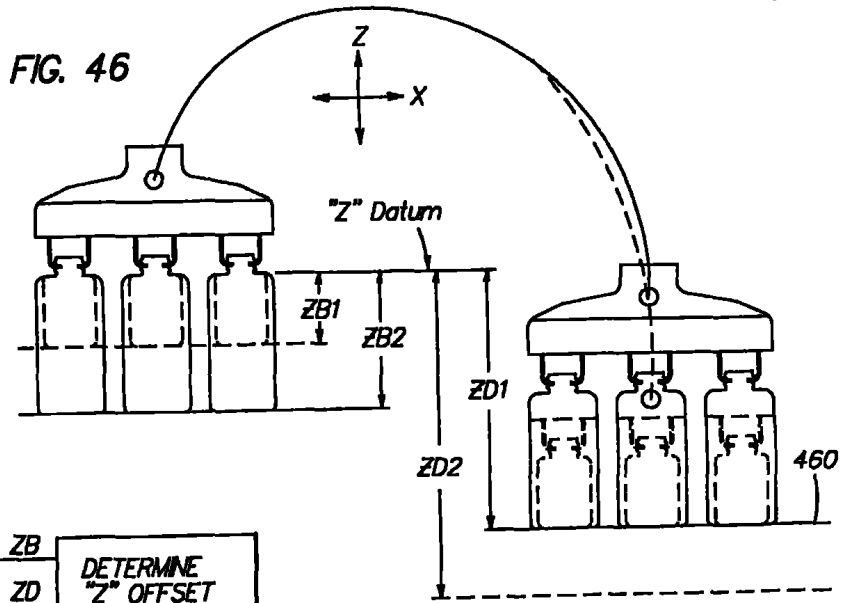
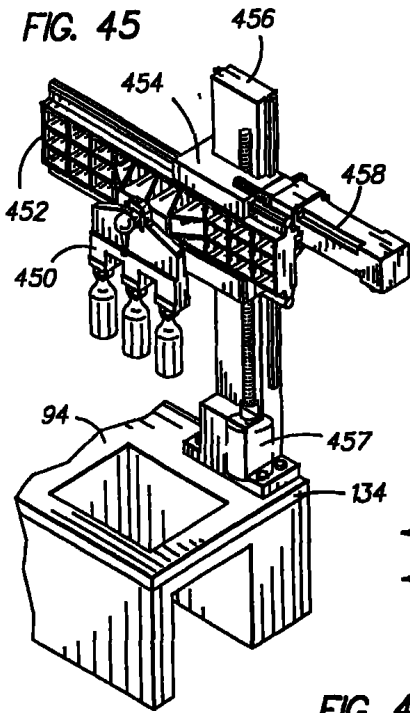


FIG. 44



89

70



TAKEOUT MECHANISM FOR AN L.S. MACHINE

The present invention relates to a takeout mechanism which transfers bottles from the blow station of an L.S. (individual section) machine to a deadplate.

BACKGROUND OF THE INVENTION

The first L.S. machine was patented in U.S. Pat. Nos. 1,843,159, dated Feb. 2, 1932, and 1,911,119, dated May 23, 1933. Today more than 4000 L.S. machines, manufactured by a number of companies, are in use worldwide, producing more than a billion bottles every day of the year. An L.S. (individual section) machine has a plurality of identical sections (a section frame in which and on which are mounted a number of section mechanisms) each of which has a blank station which receives one or more gobs of molten glass and forms them into parisons having a threaded opening at the bottom (the finish) and a blow station which receives the parisons and forms them into bottles standing upright with the finish at the top. An invert and neck ring holder mechanism which includes an opposed pair of arms, rotatable about an invert axis, carries the parisons from the blank station to the blow station inverting the parisons from a finish down to a finish up orientation in the process. A bottle formed at the blow station is removed from the section by a takeout mechanism.

In state of the art takeout mechanisms which include a takeout tong head which can either be displaced 180° through a mechanically defined X-Z arc or through an electronically (individual X and Z electronic motors) defined arc, each bottle at the blow station will be displaced 180° from a location at the blow station to a deadplate. The bottom surface of the bottle at the blow station is at the same vertical location as is the bottom surface of the bottle on the deadplate.

OBJECT OF THE INVENTION

It is accordingly an object of the present invention to provide a takeout mechanism which can grip bottles at the blow station that can have a bottom surface at any location within a selected vertical range, and deposit them on a deadplate that has a fixed vertical location so that the deadplate and conveyor do not have to be adjusted when the bottom surface of a formed bottle is at a different vertical location than the vertical location of the deadplate.

Other objects and advantages of the present invention will become apparent from the following portion of this specification and from the accompanying drawings which illustrate a presently preferred embodiment incorporating the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings:

FIG. 1 is a schematic drawing of an L.S. machine having a number of identical sections each having a blank station and a blow station;

FIG. 2 is an oblique view of one of the section stations schematically showing a mold open and close mechanism;

FIG. 3 is an oblique view showing the interconnection of one of the mold support mechanisms shown in FIG. 2 with its lead screw drive assembly;

FIG. 4 is a side elevational cross sectional view of the lead screw drive assembly shown in FIG. 3;

FIG. 5 is a front view of the lead screw drive assembly shown in FIG. 3;

FIG. 6 is an oblique view of a transmission housing design separated from its support;

FIG. 7 is an oblique view illustrating how a mold support mechanism is supported for linear displacement in a direction perpendicular to the clamping plane;

FIG. 8 is an oblique view of the invert and neck ring holder mechanism for delivering parisons from the blank molds to the blowmolds;

FIG. 9 is a view similar to that of FIG. 7 illustrating a second way for a mold support mechanism to be supported for linear displacement;

FIG. 10 is a view similar to that of FIG. 6 illustrating the transmission housing design for the embodiment shown in FIG. 9;

FIG. 11 is a cross sectional view of a portion of the mold support mechanism illustrated in FIG. 9 showing how one of the round shafts can compensate for heat growth;

FIG. 12 is an oblique view illustrating a shield for the lead screw and transmission;

FIG. 13 is an oblique view illustrating the machine bed for supporting the individual sections of the L.S. machine;

FIG. 14 is an oblique view of a portion of the machine bed;

FIG. 15 is a first electronic schematic diagram for the drive for a mold opening and closing mechanism;

FIG. 15A is an alternate electronic schematic diagram for the drive for a mold opening and closing mechanism;

FIG. 16 is a first flow chart illustrating the control algorithm for a mold opening and closing mechanism;

FIG. 16A is a second flow chart illustrating an alternate control algorithm for a mold opening and closing mechanism;

FIG. 17 is an oblique view looking at the blank station end of the section showing a baffle mechanism mounted to the top wall of the section frame at a corner thereof;

FIG. 18 is a side elevational view of the drive portion of the baffle mechanism shown in FIG. 17;

FIG. 19 is an elevational cross sectional view showing a baffle above a blankmold of the L.S. machine;

FIG. 20 is a view similar to FIG. 19 showing a baffle engaging a blankmold in a first condition;

FIG. 21 is a view similar to FIG. 19 showing a baffle engaging a blankmold in a second condition;

FIG. 22 is an oblique view of a baffle; and

FIG. 23 is a flow chart illustrating the operation of the control for the baffle mechanism.

FIG. 24 is a view similar to FIG. 17 showing a funnel mechanism mounted on the section frame;

FIG. 25 is an oblique view of an alternate embodiment of an invert and neck ring holder mechanism for use with the mold opening and closing mechanism shown in FIGS. 9 and 10;

FIG. 26 is a view taken at 26—26 of FIG. 25;

FIG. 27 is an axial view of the juncture of the worm gear housing and the motor housing;

FIG. 28 is a flow diagram illustrating the invert algorithm;

FIG. 29 is a flow diagram illustrating the neck ring open algorithm;

FIG. 30 is a flow diagram illustrating the revert algorithm;

FIG. 31 is an oblique view of the blank station plunger mechanism shown partially in FIG. 17;

FIG. 32 is an oblique view of a single plunger canister;

FIG. 33 is an oblique view of the plunger mounting plate;

FIG. 34 is an oblique, separated view illustrating the connection of the first four service ducts to bottom of a plunger distribution base;

FIG. 35 is an oblique view looking at the front face of a conjunction box;

FIG. 36 is an oblique view of the top surface of the conjunction box;

FIG. 37 is an oblique view looking at the top and front faces of the plunger distribution base;

FIG. 38 is an oblique view of the plunger transition plate;

FIG. 38A is a view similar to FIG. 38 showing an alternate plunger transition plate;

FIG. 39 is a view similar to FIG. 31 showing an alternate mounting plate;

FIG. 40 is an oblique view of a portion of an neck ring holder having an alternate configuration;

FIG. 41 is a side elevational view of a first mounting assembly showing a first mold half supported by a mold support insert;

FIG. 42 is a side elevational view of a second mounting assembly showing a second mold half supported by a mold support insert;

FIG. 43 is a side elevational view of a third mounting assembly showing a third mold half supported by a mold support insert; and

FIG. 44 is a schematic side elevational view showing a blankmold supported at a blank station and a blowmold supported at the corresponding blow station;

FIG. 45 is an oblique view of a takeout mechanism made in accordance with the teachings of the present invention;

FIG. 46 is a schematic illustration of the displacement of the takeout arm of the takeout mechanism shown in FIG. 45; and

FIG. 47 is a flow diagram of the "Z" offset algorithm of the takeout mechanism control.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

An I.S. machine 10 includes a plurality (usually 6, 8, 10, or 12) of sections 11. A conventional section is made up of a box-like frame or section box 11A (FIG. 2) which houses or supports section mechanisms. Each section has a blank station including a mold opening and closing mechanism 12 carrying blankmolds which receive discrete gobs of molten glass and forms them into parisons and a blow station including a mold opening and closing mechanism 13 carrying blowmolds which receives the parisons and forms the parisons into bottles. One, two, three or four gobs can be processed in each section, each cycle and the machine will be referred to as a single gob, double gob, triple gob (the illustrated embodiment) or quadruple gob machine depending on the number of gobs simultaneously processed in each section during a cycle. The formed bottles are removed from the blow station by a take out mechanism (FIG. 40) and transferred to a dead plate 14 and then transferred by a pusher mechanism (not shown) to a conveyor 15 which takes the bottles away from the machine. The front of the machine (or section) is the end remote from the conveyor, the back of the machine is the end adjacent the conveyor and the sides of the machine or sections extend perpendicularly to the conveyor. Side to side movement is movement parallel to the conveyor.

FIG. 2 shows a portion of a section 11 of a triple gob machine made in accordance with the teachings of the

present invention schematically showing either molding station. The section 11 comprises a section frame 11A which is generally in the form of a box, having a top wall 134 with a top surface 94 and side walls 132. Each mold open and close mechanism includes an opposed pair of mold support mechanisms 16. Each mold support mechanism is connected to and operated by a drive assembly means comprising a rotary to linear transmission 18, mounted on top of the section frame 11A and driven by a drive system 19 having a rotary output to displace the associated mold support mechanism 16, linearly in a sideways direction, between a retracted separated position and an advanced position where the mold halves carried on an opposed pair of mold support mechanisms will forcefully engage. The mold support mechanisms for the blank station are identical and the mold support mechanisms for the blow station are identical but a mold support mechanism at the one station may be dimensionally different from a mold support mechanism at the other station as a result of differences in the process which would be well known to a man skilled in this art. Since the illustrated machine is a triple gob machine, each mold support mechanism at the blank or blow station will support three mold halves (blankmolds or blowmolds) 17.

The interconnection of a mold support mechanism to its drive and the means for displacing a mold support mechanism between advanced and retracted positions will now be described with reference to FIGS. 3, 4 and 5. FIGS. 4 and 5 show only a mold support mechanism which supports mechanism associated with a single section, whereas FIG. 6 shows an alternate housing which will support two mold support mechanisms when two sections are adjacent and only one when no section is adjacent. The drive system 19 includes a servo motor 66 (with any gearbox and/or direction changer) having a rotary output in the form of a spindle 67 (FIG. 4) which is connected to a lead screw 70 (ball or Acme, for example), which has upper right hand and lower left hand thread portions, via a coupling 68. A housing 90 supports the lead screw 70. The lead screw is supported at its ends in the housing 90 in a vertical orientation in suitable single radial or duplex ball bearing assemblies 99. The housing has a base portion 93 which is secured to the top surface 94A, 94B (FIG. 6) of two adjacent section frames (the top wall of the section will be extended outwardly to support the housing when there is no adjacent section) by suitable screws 95, opposed side walls 96 which include reinforcing ribs 97 and removable top portions 98. The lead screw is connected to a rotary to linear transmission which includes nut means comprising a lower left hand nut 72 and an upper right hand nut 74 received by the lead screw. The rotary to linear transmission additionally comprises means for interconnecting the nuts 72, 74 with a mold support mechanism, comprising a first pair of jack links 76 connected at one end to the upper nut 74, a second pair of jack links 78 connected at one end to the lower nut 72, and a yoke 82 having a horizontal bore 91 supporting a transverse, horizontal pivot shaft 80 to which the other ends of the jack links 76, 78 are pivotally connected (sleeve or flange bushings are utilized to extend link life). The yoke 82 also has a vertical bore 92 which pivotally receives a vertical pivot shaft 27 of the mold support mechanism. Rotation of the lead screw 70 in one direction will accordingly advance the mold support mechanism towards the opposed mold support mechanism and vice versa. It can be seen that the jack links 76 and 78 provide a toggle linkage movable between an extended and a retracted condition and acting horizontally between the housing 90 and the mold support mechanism.

Each mold support mechanism has a carrier 30 and upper and lower inserts 24 which support the mold halves and

which are supported on the carrier 30 by the shaft 27 which passes through vertical holes in the carrier 30, the inserts 24, and the yoke 82. The yoke 82 is received in a pocket 101 in the carrier 30. As can be seen from the drawings, the lead screw is vertical and adjacent the mold support mechanism and the rotary to linear transmission, which interconnects the rotary output of the servo motor (the lead screw) and the mold support mechanism, is positioned compactly between the lead screw and the mold support mechanism on top of the section top wall 134. The rotary to linear transmission is located completely above the top of the section frame and applies a load to the mold support mechanism through the yoke approximately at the center (vertically and horizontally) of the mold support mechanism (vertically, the axis of horizontal shaft 80 lies midway between the upper insert 24 and the lower insert 24 and horizontally, the axis of vertical shaft 27 is located at the center of mass of the carrier 30 (and inserts 24). The load which is transferred directly from the vertical shaft 27 to the upper and lower inserts 24 lies in a plane extending normally to the engagement plane of the molds and intersecting the center of the molds (the center of the center mold or where there are an even number of molds, midway between the center molds). The direction of this load is perpendicular to the plane of engagement between the opposed mold halves (the clamping plane) and since the vertical pivot shaft 27 rotatably receives both the inserts 24 and the yoke 82, and the yoke additionally rotatably supports the horizontal pivot shaft 80, which is connected to the toggle links, the inserts 24 are not subjected to any twisting forces when a clamping load is applied. The force applied by the rotary to linear transmission will accordingly be transmitted directly to the inserts 24—the carrier 30 is not in the force path of clamp loading.

Each nut 72, 74 comprises a flat rear bearing surface 84 which is associated with a flat elongated vertical machined bearing surface 86 defined on a rear wall 88 of the transmission housing (casting) 90. When the mold support mechanism is retracted, a selected spacing (clearance) separates the rear bearing surface of the nuts 72, 74 from the vertical bearing surface 86 defined on the rear wall. The lead screw is selected to have such a rigidity that when the mold supporting mechanisms are advanced to bring the supported mold halves into clamping engagement with the opposing mold halves and a desired load is applied therebetween, the lead screw 70 will deflect sufficiently to bring the nut bearing surfaces 84 into engagement with the wall bearing surface 86. The lead screw housing 90 has sufficient rigidity to assure that this load can be applied and the removable top portion 96 can be adjusted, prior to fastening in place, to set the desired clearance between the bearing surface of the nuts and the wall bearing surface. The mold halves, the mold support mechanisms, the opposed transmissions, and the housing 90 will accordingly define a truss (made up of triangular structures) supported above the top surface of the section frame to inhibit both vertical displacement (the truss will accordingly isolate the support shafts from a downward load) or sideways (horizontal) separation of the mold halves from vertical loads applied during the forming process. To provide lubrication for the bearing surfaces 84, 86, an oil groove 100 may be defined in the rear wall surface 86 and oil can be supplied to this groove through suitable passages extending through the lead screw housing 90. To minimize stiction, the machined surface may be impregnated with solid lubricant. To provide greater strength the lead screw housing 90 (FIG. 6) may be duplexed so that it can support lead screws from adjacent sections which will be connected to rotary to linear transmissions from those adjacent sections.

Each insert 24 (FIG. 7) comprises a first portion 26 which is pivotal about the vertical pivot shaft 27 and which carries one of the mold halves and a second portion 28 which carries the other two mold halves and is connected via a pivot pin 29, to the first portion 26 at a location that will assure that forces will be applied equally to each mold. The pivot shaft 27 slidably passes downwardly through the first insert portion 26 of the upper insert 24, through an upper wall 30A of a carrier 30, through the transmission yoke 82, through a lower wall 30B of the carrier 30 and finally through the first portion 26 of the lower insert 24. A pair of pins 31, which extend downwardly through the upper insert 24, through carrier 30 and through the lower insert 24, have a selected clearance relative to the insert portions to limit the desired motion of the first and second insert portions 26, 28.

The mold support mechanisms are, as will now be described, slidably mounted for movement on two parallel shafts 40, 50. The carrier 30, which extends in a direction parallel to the clamping plane, has an outboard (remote from the invert and neck ring holder mechanism—FIG. 8) mounting flange 32 on one end. The mounting flange is secured by suitable fasteners 34 to a block 35 which has a suitable cutout 38 for receiving the flange and has a flat horizontal bearing surface 36 for riding on a flat horizontal bearing surface (way) 41 defined on a the shaft 40 which is square and is part of a bracket 42 which is secured to the section frame proximate an end (the bracket 42 could optionally be formed as part of some other mechanism housing). Wipers (not shown) will keep the way surface clean and lubricant can be supplied to the block so that the bearing surfaces can be lubricated. The inboard (proximate the invert and neck ring holder mechanism) end of the carrier 30 is secured by suitable fasteners 34 to an "L" shaped block 46 which is integral with a bearing block 48 and has a cylindrical bearing surface which slides on the cylindrical bearing surface of shaft 50.

An invert and neck ring holder mechanism 110 (FIG. 8) is mounted on the top surface of a section box between the blank station and the blow station. This mechanism has a pair of opposed neck ring holders 112 which can be displaced from a separated position to the shown closed position by suitable horizontally oriented pneumatic cylinders 114. These neck ring holders support opposed pairs of neck ring halves 115 which close the bottom of the blankmolds when the mold halves are closed and which, when the neck rings are closed, define the finish (threads) 116 of the parison and ultimately the bottle. When the finish has been formed, the neck ring holders 112 will be rotated 180° by the invert and neck ring holder mechanism by operating a servomotor 108 to rotate a drive shaft in the form of a worm (not shown) supported by a worm housing 118 which rotates a worm gear which is supported within a suitable worm gear housing 120. The invert and neck ring holder mechanism cylinders 114 are suitably supported between opposed spaced vertical supports or brackets 122 and the worm gear housing. The vertical worm housing 118 and the invert brackets 122 are secured to the top surface of the section frame.

As can be seen from FIG. 8, the round shaft 50 for the blank side mold opening and closing mechanism, which is located proximate the invert and neck ring holder mechanism, is supported at either end by the opposed invert brackets 122. The round shaft for the blow side mold opening and closing mechanism is a two part round shaft 50A, 50B. These shafts are mounted coaxially and each is supported at one end by an invert bracket 122 and at the other end by vertical worm housing 118. The square shafts 40 enable the carrier, whether at the blank station or at the

blow station, to expand with an increase in temperature in a uniform direction away from the invert axis (the center of the section).

Alternatively, as shown in FIGS. 9-11, two round shafts 50C can be mounted directly on the carrier 30. The free end of these shafts is slidably received by suitable bearings 170 (FIG. 10) located within suitable bores 171 in a pair of mounting blocks 172 which are designed to be integral with the lead screw housing 90. Each mounting block has a pair of vertically spaced bearings 170 for receiving a round shaft 50C from mold support mechanisms of adjacent sections. Each pair of round shafts associated with a particular section (one upper and one lower) are vertically located equidistant above and below the axis of the horizontal yoke pivot shaft 80. Since heat growth of the drive housing will not be as great as heat growth of the carrier 30 a compensation mechanism is built into the carrier so that a carrier, whether at the blow station or at the blank station, will expand with an increase in temperature in a uniform direction away from the center (the invert axis) of the section. As shown in FIG. 11, a screw 174 interconnects a key 176 on one side of the carrier 30, which is slidable horizontally in an elongated horizontal keyway 177, with the outboard round shaft 50C on the other side of the carrier. The carrier bores 178 and 179 that receive the round shaft and the screw have sufficient clearance to permit the key to slide horizontally in its keyway (relatively) to enable this round shaft to maintain its parallelism with the other round shaft through a range of environment temperatures.

In both the embodiment shown in FIG. 8 and the embodiment shown in FIGS. 9 and 10, each carrier is supported on a round shaft located between the invert axis and the center of the mold open and close mechanism while being supported on the other side of the center of the mold open and close mechanism on a shaft which can accommodate a temperature driven expansion away from the invert and neck ring holder mechanism axis. This means that temperature expansion at both the blow station and the blank station will proceed in the same direction (away from the invert and neck ring holder mechanism axis). This has never been previously achieved. In all prior I.S. machines, expansion at the blank side occurs towards the invert and neck ring holder mechanism whereas expansion at the blow side occurs away from the invert and neck ring holder mechanism. In this regard, the expansion at the blank and blow stations is always in the same direction as the neck ring holder allowing for better machine alignment.

FIG. 12 illustrates a shield structure for one of the lead screw housings. As shown, the carrier is fully retracted. The shield has a front inclined wall 52 which is coextensive with the top of the carrier 30 and which is connected to the rear top edge of the carrier by a hinge 53. The shield also has sides 54 which are integral with the inclined top portion along each edge 56 of the top portion. Each side has a vertical portion 57 which covers the end of the carrier in this retracted position. A shield control, in the form of a flap 58 connected to the front edge of the top portion 90 at a hinge 60, is received within opposed inwardly projecting brackets 61 secured to the inclined front wall 52 of the shield. At the retracted position the top edge of the shield is proximate the hinge 60. When the carrier is advanced, the top portion of the shield (and the flap) will become less inclined and the flap and the top portion will move relatively to accommodate the displacement.

With the transmissions of the mold open and closed mechanisms located above the top wall of the section frame and with the transmissions powered by electronic motors

which are mounted, as shown, to extend downwardly from the top wall of the section frame, the floor portion of the section frame, which conventionally is filled with these motors (air cylinders) and transmissions (linkages), becomes open. The section frames 11A of the machine (there may be 6, 8, 10, etc.) are mounted on the machine base, which is defined by a number of two-section beds 130 (FIG. 13) which are connected together. Each two-section bed 130 has side 132 and top 134 walls. The two-section bed has passage means extending from one side to the other side of the bed continuous with rectangular openings 136 in the bed sides 132, which are separated by a side wall rib 137 for slidably receiving a plurality (eight in the preferred embodiment) of seamless square fluid ducts 138 which extend the entire width of the machine. The ducts are supplied with pneumatic services, cooling air, process air, lubrication, and process vacuum, etc., as required. The top wall 134 has blank station openings 140 and blow station openings 142 which expose these fluid ducts 138 within each of the section boxes. Section cables and wiring extend beneath the fluid ducts in suitable conduits and come up through the space between the duct groups and through wiring ports 145 defined in the bed top wall 134 for connection to individual mechanisms.

The ducts 138, which run from one end of the machine to the other and which are connected to suitable sources, are releasably clamped to each two section bed by a clamping structure (FIG. 14) which includes an "T" beam 147, which underlies all of the ducts, and a toggle device 148 at the front and back of the bed which is connected between the "T" beam and the top wall of the bed. Each toggle device has a toggle operating screw 149 which has an engagable head 151, and which can access the ducts 138 through suitable bed openings 153. Rotation of the operating screw in one direction will push the ducts against the side wall ribs 137 and elevate them upwardly into forced engagement with a rib 143 which projects downwardly from the top wall 134 of the two section base. Should it be necessary to remove one of these ducts and replace it with two ducts, for example, the duct clamping mechanism can be released by rotation of the engagable head of the toggle mechanisms in the opposite direction so that the duct can be slidably removed and replaced with multiple side by side ducts (ducts can be added or deleted to define the number of ducts desired).

Referring to FIGS. 15 and 16, each motor of a mold opening and closing mechanism operates in a conventional manner where feedback signals are supplied to a motion controller, which controls the servo amplifiers that operate the motors (servo motors). As shown, the motors are electronically geared together. Motor/encoder number 1 (the master) M1/154 follows the demand signal from the motion controller 155 command position sequencer 150. The signal from the motion controller position feedback processor 152 which receives a digital feedback signal from the encoder portion of motor/encoder number 1 is supplied to the summing circuit 156. The summing circuit outputs to the command signal processor 158 a digital signal which is supplied to the amplifier 160 which operates the number 1 motor/encoder. The motion controller command position sequencer receives a signal from the summing circuit 156 which is processed into a demand signal and sent to a second summing circuit 161 which also receives a signal from the position feedback processor 166 which receives a digital feedback signal from the encoder portion of motor/encoder no. 2 (M2/168) and outputs a digital signal. This signal is converted by the second amplifier command signal processor 159 which supplies the signal to the second amplifier 162 which operates motor/encoder number 2 (the slave) 168.

The separation between the mold halves, when the mold carriers are fully retracted (each is at the start position), can be determined and halfway therebetween is the ideal center point of mold movement. The initial step of the feed program is for the Command Position Sequencer 150 to define a displacement profile that will operate the motors (M1, M2), which are electronically geared together, to displace the molds associated with those motors to that ideal center point. To verify that the displacement of both mold carriers has been completed, the velocity of each motor is tested and if the velocity of one motor (MV1) and the velocity of the other motor (MV2) is zero the next step in the feed program will begin with the Command Position Sequencer issuing a velocity profile that will drive both motors at a very slow velocity (V_s)—this can be any command that will cause the motors to run. When the actual velocity of each motor again becomes zero, a determination is made to verify that the actual end position of the advanced mold carrier is within an acceptable error ($\pm X$ from the ideal center point). The encoder associated with each motor provides data from which the actual end position can be determined. If the mold carriers are acceptably located, the third step of the feed program proceeds with the running of each motor to apply a selected torque for a set period of time ("T1") which can be inputted via a computer. This time period is the time period when the mold halves will be clamped together. When this time runs out, each mold carrier is returned to its "0" or start position. As shown, to return the mold support mechanisms to their start positions, each motor is operated at a slow velocity $-V_s$, with the minus sign signifying rotation in the opposite direction (which can be set—the arrow represents a computer input) for a limited period of time T2 (which also can be set—the arrow represents a computer input) to "crack" the molds before the mold holders are withdrawn to the "0" position at a rapid velocity $-V_R$ (an open profile—a constant acceleration segment followed by a constant deceleration segment ending at the start position, for example).

A second algorithm for controlling the two servo motors is shown in FIG. 15A. In this embodiment the Motion Controller includes a Command Position Sequencer for each motor. The motors are accordingly not electronically geared together. As shown in FIG. 16A, each motor is simultaneously operated to displace its associated mold holder, in accordance with a predetermined feed profile (displacement/velocity/acceleration profile) to an ideal center position (one half the total distance plus a selected distance which should result in the opposed mold holders engaging and thereby coming to a stop). The fact that the two mold holders have stopped is verified (the error signal can be monitored) and the actual position of each mold holder is determined and compared to the ideal midpoint position. If the actual position of each mold holder is located $\pm X$ from the ideal midpoint position, indeed is acceptable. If this is not the case an error signal will be produced. The actual midpoint is determined (the total distance traveled by both mold holders divided by two) and defines a new ideal midpoint. If one mold holder traveled farther than the other (more than an acceptable difference) the control will define a scaling factor for the feed profile for one of the motors that will either speed up the displacement or slow down the displacement to reduce the difference in the distance traveled by the two mold holders. The control will then apply the required torque to the motors and continue the program shown in FIG. 16.

FIG. 17 shows a baffle mechanism 180 mounted on the top wall 134 of a section frame 11A. A carrier arm 182 which

supports three baffles 184 (the baffle mechanism is shown schematically since there are a great variety of specific designs) is connected to a vertical actuating rod 186. This actuating rod will be elevated and rotated during the uppermost portion of its elevation so that the baffles can be displaced between an elevated, retracted position and a lowered advanced position where the baffles will be located on top of the blank molds. This compound displacement is effected by a servomotor 188 (FIG. 18) which has a rotary output 190 which is connected via a coupling device 192 to a screw 194. The screw is threadedly connected to a nut 196 which is free to rotate within a suitable bore 198 in a cam housing 199. A cam follower, in the form of a roller 202 rides in a barrel cam 204 defined in the wall 206 of the cam housing. The vertical actuating rod 186 is mounted on the top of the nut. As can be seen from FIG. 17, the cam housing has a base 208 which is bolted 209 to the top wall 134 of the section frame 11A at a front corner of the section frame defined by a side wall 132 and the front wall 135. At the advanced location, the axes of the baffles are coaxial with the axes of the closed blankmolds and on top of the blankmolds. When the cam is operated the baffles will first partially elevate away from the blankmolds and then while the baffles are elevated the rest of the way, the baffles will be displaced away from the center of the blankmolds so that the invert and neck ring holder mechanism can transfer formed portions to the blowmolds. The baffle mechanism can be located at the front of the section frame in either corner and unlike conventional baffle mechanisms, the fully elevated and retracted baffle arm can be located fully within the section as shown in FIG. 17 and not over an adjacent section.

A baffle (FIG. 19) has a body 248 which includes a cup shaped portion 250 having an annular inclined sealing surface 252 extending around its open bottom for engaging and sealing a corresponding surface 254 at the top of the open blankmold. The body 248 also includes a vertical tubular sleeve portion 256 which defines a cylindrical bearing surface 258 for slidably receiving the rod 260 of a piston element 262. The cylindrical head 264 of the piston element 262 has an annular sealing surface 265 which is slidably displaceable within the bore 266 of the cup shaped portion 250. A spring 268, which is located around the vertical tubular sleeve portion 256, is compressed between a collar 270 which is releasably secured to the carrier arm and which is secured to the piston rod 260 and the top of the cup shaped portion 250, to maintain the top surface of the cylindrical head 264 in engagement with the adjacent surface of the cup shaped portion when the baffle is separated from the blankmold.

When the baffle is lowered onto a blankmold as shown in FIG. 20, the control (FIG. 23) will displace the collar 270 downwardly until the top of the collar is located a first distance D1 from the top surface 272 of the blankmold where the cylindrical head will be lowered, relative to the cup shaped portion, to define a desired clearance "X" between the bottom annular surface 274 of the piston cylindrical head and the top surface of the blankmold (the cylindrical head has moved relative to the cup shaped portion a vertical distance "y"). This applies a desired compressive force between the piston element and the blankmold to establish the desired seal between the engaging inclined annular surfaces 252, 254. Now settle air introduced into the blankmold through the central bore 276 in the piston rod will pass through a number of radially extending holes 278 in the cylindrical head into a corresponding number of vertical holes 280 and through the

annular gap between the annular bottom surface 281 of the cylindrical head and the top surface 272 of the blowmold into the blankmold (suitable holes 282 which connect the interior of the body to atmosphere assure that the cylindrical head can move smoothly relative to the body). When settle blow is complete and the gob is to be formed into a parison, the collar is displaced until the top of the collar is located a second distance D2 from the top surface 272 of the blankmold. This results in the bottom annular surface 281 of the cylindrical head forcefully engaging the top surface 272 of the blankmold to close the blankmold. As the parison is formed (forced to fill the internal cavity defined by the inner surface of the blankmold and the bottom surface of the cylindrical head) air can escape through a number (four in the preferred embodiment) of small notches 286 defined in the bottom annular surface 281 of the cylindrical head (FIG. 22) into the vertical holes 289, through the radial holes 278 into the piston rod bore 276 and out through now exposed escape bores 290 into the space between the top of the piston and the cup shaped portion 250 and out the relief openings 282.

When a funnel mechanism 210 is required it can be mounted in the other front corner. As can be seen from FIG. 24, the baffle and funnel mechanisms are identical except for the direction of the barrel cam and except that a funnel carrier 212 supporting three funnels 214 is mounted on the other actuator rod. The funnel mechanism, like the baffle mechanism, can be always located within the territory of its own section.

FIG. 25 illustrates an alternate invert and neck ring holder mechanism 110. As shown, this invert and neck ring holder mechanism can be used with the embodiment shown in FIGS. 8-10. The end of each neck ring holder adjacent the worm gear housing 120 ends in a slotted mounting bracket 113 which is slidably received by the keyed end 109 of a support bracket 117 secured to an invert cylinder 114. The annular outboard end 119 of a cylinder 114 (FIG. 26) slides within a corresponding annular groove 121 in the top of the related outboard side bracket 122A. The threaded end 123 of a proximity switch or sensor 124 is threaded into a suitable bore 125 in the side bracket and secured by a nut 126 at the location where it will sense the cylinder at its fully inserted position (neck ring holder retracted). The proximity switch cable 128 extends downwardly through a hole (not shown) in the side bracket and the proximity switch is protected by a cover 129. An additional pair of proximity switches 124A (FIG. 27) are mounted on a bracket 131 which is secured to the worm housing 118. These proximity switches are located beneath the worm gear housing 120 with one facing each cylinder. Secured to the end of each cylinder, proximate the worm gear housing, is a semi circular target 133 which will operate an associated one of these proximity switches when that cylinder is located against the worm gear housing from the location where the neck ring holder is at a first orientation whereat the neck ring halves carried by the neck ring holder are on top of the plunger mechanism (the 180° invert start position) to a second orientation (about 180° away from the first orientation) whereat the neck ring halves are holding parisons at the blow station (the 0° invert end position). Hereinafter, the phrases neck ring closed and neck ring open will be used to describe the position of the neck ring holder/bracket/cylinder and the controls will be described with reference to one neck ring holder but the other neck ring holder is controlled in the same manner. Since the servo motor 108 has an encoder which generates a position feedback, the angular position of the neck ring holder is known throughout its angular displacement.

The algorithm illustrated in FIG. 28 will identify operational problems during invert. The status of the neck ring closed sensor 124A will be continuously monitored as the invert servo 108 advances the worm to rotate the gear and the neck ring from the start invert location (180°) to the end invert location (0°). Should the neck ring not maintain its closed position throughout this 180° displacement, an alarm signal will be sent. This signal could either stop the cycle or initiate any desired lesser action.

The algorithm illustrated in FIG. 29 will assure that the time of arrival of the neck ring at the open position will be constant. The neck ring cylinder will be operated at a set time in the cycle (time T) to displace the neck ring from the closed position sensed by sensor 124A on the gear housing to the open position sensed by sensor 124 on the end bracket. The time between these two signals is timed "AT" and compared to an ideal time difference (the original time difference) and a time ("T") offset, which is the difference between the actual and ideal time difference, is supplied to the control which operates the neck ring cylinder. In the event that the "T" offset becomes excessive or erratic, an alarm signal will be issued to effect any desired consequence from cycle stoppage, to an operator warning that maintenance is required.

FIG. 30 illustrates the revert algorithm. The neck rings will be opened at the blow station to release a completed bottle and before the arm can be rotated 180° to the blank station, the control must verify that the neck ring is at the open position. With such verification, the invert servo will be operated to effect the desired angular displacement. At a selected angle of rotation (θ1 ideal) the control will operate the neck ring cylinder to displace the cylinder (the neck ring) from the open position to the closed position. Such action will be confined by limits including the limits that θ1 has to be greater than X° and that the movement of the neck ring must be complete by Y°. X, Y, and θ1 are individually settable. The control determines the actual angle (θ1 actual) when the neck ring open sensor 124 is switched off and determines a θ1 offset #1 by subtracting θ1 actual from θ1 ideal. This offset is supplied to the control to correct the location where the neck ring cylinder is operated. When this offset becomes excessive or erratic an alarm signal is sent.

The control additionally monitors when the neck ring reaches the closed position determining the angle θ2 actual when the neck ring closed sensor 124A senses the neck ring. The cylinders are conventionally air operated and the time for a cylinder to be pneumatically displaced from the neck ring open position to the neck ring closed position can depend on the condition of the pneumatic cylinder. As the operation of the cylinder degrades, it can take longer for the desired displacement to take place and such lateness may cause the moving structure (the neck ring structure) to impact the blank molds that normally would be out of the way. The control determines a second θ1 offset (θ2 ideal-θ2 actual) and makes a second correction to the angle when the neck ring is operated. When this degradation reaches a selectable angle indicative of the need for action, the control will issue a suitable signal indicating that repair and/or maintenance is in order. Since each angular displacement of the encoder is a function of time, these offsets could be correlated to tracked differences of time. These offsets assure that cycle events occur at constant times.

A plunger mechanism, which is part of the blank station of a section, is shown in FIGS. 31 and 32, and includes three plunger canisters 62, as shown, where the machine is a triple gob machine. Each plunger canister has an upper cylinder portion 63 and a lower cylinder portion 64 with plugs 65

22
3

supporting "O" ring seals 71 and an exhaust duct 73 extending axially downwardly from the bottom surface 75 of the lower cylinder to connect the plunger canister to required services (plunger cooling, exhaust, plunger down, plunger up, counterblow/vacuum (in blow and blow machines) or plunger cooling (in press and blow machines), lubrication, separate thimble up). The canister may exhaust through the upper cylinder and in that case the exhaust duct and associated ducting shown would not be required. For clarity the plunger mechanism will be described in a blow and blow machine but where counterblow/vacuum is described it should be understood that this would be plunger cooling in a press and blow machine. Secured to the top of each upper cylinder is a mounting plate or flange 77 and tooling 79 which has opposed ears 81 to capture the opposed neck ring halves as the neck ring holders are closed. These mounting plates 77 are secured with suitable fasteners 83 to the top surface of a mounting block or plate 85 which has holes 87 (FIG. 33) through which the upper/lower cylinders can pass and the mounting block is fastened to the top surface 94 of the section frame 11 with suitable bolts 89. On the top portion of the upper cylinder is located a locating diameter 49. The top surface of the section frame has a large opening (not shown) which can accommodate the plunger cartridges whether single, double or triple goli. The top surface 94 of the section frame is accordingly the master surface. It is preferably machined, at the location where the mounting block is to be secured, to define a precisely horizontal mounting pad. The top (or an area or pad on which the flanges are to be mounted) and bottom surfaces of the mounting block preferably are machined to be parallel and the height of the mounting block is defined to locate the tooling at the desired height. By also defining the mounting block cylindrical openings 87 to matingly receive the locating diameter of the plunger canisters, the axes of these plunger canisters will be precisely located upon insertion. By locating diamond and round pins (not shown) on the top wall of the section frame and defining suitable holes in the bottom surface of the mounting plate, the mounting plate will be automatically located. Since the top of the plunger canister is secured to the top wall of the section frame, growth resulting from heat will not significantly vary the location of top of the tooling.

The first four fluid ducts underlying the blank side of a section (FIG. 34) are pneumatic services for plunger down (duct 300-approximately 3.1 Bar), counterblow (duct 302-approximately 2-3 Bar), vacuum (duct 304) and plunger up (duct 306-approximately 1.5-2.5 Bar). Connection of these services, via holes 307 in the top wall of the ducts, is established to vertical inlets 308 in the bottom surface 310 of a plunger distribution base 312 via corresponding holes 314 in a connection plate 316. The four pneumatic services are routed through the plunger distribution base to outlet ports 320 in the front face 321 of the plunger distribution base. A fifth fluid duct 301 underlying the bottom wall of the blank station of a section (FIG. 34) carries pressurized lubrication fluid. The lubricant passes through a hole 303 in the top wall of the lubrication duct, through a hole 311 in the connection plate and into a lubrication inlet 305 in the bottom surface of the plunger distribution base which supplies the lubrication via an outlet port 309 on the front face. Effective sealing is achieved with "O" rings 318 compressively located between either surface of the connection plate 316 and the top surface of the ducts and the bottom surface 310 of the plunger distribution base when the plunger distribution base is bolted onto the bottom wall of the section frame. A cross hole 322 is defined in the plunger distribution

base for receiving a crank 323 operated isolation rod (valve) 324 which can be rotated from an open orientation where the pneumatic services and lubrication can flow through holes 325 to the outlet ports, to a closed orientation where such flow is blocked.

Connected to the front face 321 of the plunger distribution base is a conjunction box 330 (FIG. 35) which includes five service inlet ports (320A, 309A) on the rear face which communicate with the service outlet ports 320 and 309 of the plunger distribution base ("O" rings 326 provide the sealing). The illustrated embodiment is a triple gob configuration which means that the blank station of each section includes three plunger canisters such as shown in FIG. 32, i.e., an inner plunger canister (the one nearest the invert and neck ring holder mechanism axis), a middle plunger canister and an outer plunger canister. Each individual pneumatic service input (plunger up, vacuum, counterblow, plunger down) and the lubrication line is split in the conjunction box into three outputs, one for each of the three plunger canisters. On the left portion of the front face 332 of the conjunction box are located, for the inner, middle and outer plunger canisters (the vertical arrows, "inner canister", etc., in FIG. 35, identify vertically arranged groups of ports on the front face that are associated with a particular canister and the horizontal arrows, "to canister", etc., identify horizontal groups of ports that are associated with a particular function), three outlet ports 334 for the plunger up service, which originate with the single plunger up inlet port, three exhaust ports 336 which communicate with exhaust and three "to canister" inlet ports 338 which communicate with three corresponding outlet ports defined in the rear face of the conjunction box (not shown) which communicate with corresponding "plunger up" inlet ports 340 defined in the front face 321 of the plunger distribution base (FIG. 37). Flow for each vertically arranged group of ports on this left portion of the front face may be controlled by a device which can regulate the pressure such as regulator/valve and receiver tank (not shown for clarity) which will either connect the "to canister" line to plunger up service or to exhaust. On the right portion of the front face of the conjunction box (FIG. 35) also are located, for the inner, middle and outer plunger canisters, three service outlet ports 340 for vacuum, each originating with the single vacuum inlet port, three counterblow outlet ports 342 each originating with the single counterblow inlet port for counterblow service services, three "to canister" inlet ports 344 which communicate with three corresponding outlet ports defined in the rear face of the conjunction box which communicate with corresponding "counterblow/vacuum" inlet ports 346 defined in the front face 321 of the plunger distribution base (FIG. 37) and three exhaust ports 348 communicating with exhaust. Here a regulator and valve (not shown) operates in conjunction with a pilot operated valve (not shown) to connect the "to canister" inlet ports either to vacuum or counterblow or to exhaust. Located on the right side of the top face 348 of the conjunction block (FIG. 36) are, for the inner, middle and outer plunger canisters, three plunger down service outlet ports 352 which originate with the single plunger down inlet port for plunger down service, three inlet ports 350 communicating with three corresponding outlet ports defined in the rear face of the conjunction box which communicate with corresponding "plunger down" inlet ports 362 defined in the front face 321 of the plunger distribution base (FIG. 37) and three exhaust ports 354 which communicate with exhaust. The flow of each vertical group of ports is controlled by an individual regulator and valve (not shown for clarity) which will either

connect the "to canister" line to plunger down service or to exhaust. Located on the left side of the top face 348 of the conjunction block are, for the inner, middle and outer plunger-canisters, three thimble up service outlet ports 351 for the thimble up service which communicate with a plunger down line, three "to canister" inlet ports 353 communicating with three corresponding outlet ports defined in the rear face of the conjunction box which communicate with corresponding "thimble up" inlet ports 363 defined in the front face 321 of the plunger distribution base (FIG. 37) and three exhaust ports 355 which communicate with exhaust. The flow of each vertical group of ports is controlled by an individual regulator and valve (not shown for clarity) which will either connect the "to canister" line to thimble up service or to exhaust. The conjunction box also splits the lubrication line into three lines which supply three lubrication input ports 313 (FIG. 37) on the front face of the plunger distribution base.

Referring to FIG. 37, the front face of the plunger distribution base also includes a number of additional inlets 365 for additional fluid functions such as neck ring cooling, take out tong closing, cooling air, neck ring open/close, etc., which connect with corresponding conduits in the conjunction box. These conjunction box lines can connect to outlets in the top surface of the conjunction box (not shown) which are connected to corresponding outlets in a corresponding number of individual regulators and valves (not shown for clarity) which distribute air from the plunger down line, regulated to the desired pressures.

The top surface 315 of the plunger distribution plate has three sets of outlet ports each having a plunger up outlet port 366, a plunger down outlet port 368, a counterblow/vacuum outlet port 370, a thimble up outlet port 372 and a lubrication outlet port 374. These outlet ports are universal (permanent), i.e., the number of sets of outlet holes corresponds to the maximum number of gobs to be processed in the section.

To define a specific plunger configuration (single, double or triple gob) and to define a defined plunger spacing (5/4", 6" for example), in the event there are multiple plungers, a transition plate 376 (FIG. 38) is secured to the top surface 315 of the universal plunger distribution plate via suitable bolts 377. The transition plate has, for each canister, a plunger up outlet hole 380, a plunger down outlet hole 382, a counterblow/vacuum outlet hole 384, a thimble up outlet hole 386 and a lubrication services outlet hole 388 in the top surface 390 for receiving the downwardly projecting connecting stubs 65 on the plunger canisters (an "O" ring 71 establishes the seal between a downwardly projecting stub and its receiving hole—any movement of a plunger canister, either within its mounting plate hole or as a part of the mounting plate, will not result in the tilting of the canisters since sufficient float is assured via the "O" ring seals on the receiving holes of the transition plate) and a plunger exhaust hole 392 is shaped to receive the depending plunger exhaust pipe 73 of a plunger canister. The plunger exhaust holes communicate with a discharge opening 378.

To change the section from one configuration to another, i.e., to change from the illustrated triple gob operation to double gob operation, for example, the illustrated triple gob transition plate will be removed and replaced with a double gob transition plate (FIG. 38A) which will seal off one of the three sets of plunger output ports on the top surface of the plunger distribution plate while establishing connections to the third set of ports (the plunger mechanism control will be modified so that only the valves, etc. associated with the two sets of ports in the transition plate will be operated).

To accommodate the manufacture of bottles having a substantial height variation, the neck rings/plunger canister

(s) can be elevated by approximately 70 mm. The original transition plate having a height H1 and the mounting plate having a thickness D1 can be replaced with a transition plate and mounting plate each having a height increased by 70 mm (H2—FIG. 38 and D2—FIG. 39, respectively) and the neck ring holder can be replaced with alternate arms wherein the mounting bracket 113A elevates the neck ring holder 112 70 mm from position P1 (FIG. 25) to position P2 (FIG. 39). The fixed stop 111, which locates the mounting brackets, is shown in FIG. 40.

As can be seen from FIGS. 41-43, the machine, with a given pair of neck ring holders, can use blankmolds having a wide range of heights to produce bottles having a wide range of heights. While the blankmold half 17A, 17B, 17C, 17D (FIGS. 41-43) and the insert can take various forms, the interconnection of the blankmold half and the insert is defined to establish a fixed vertical dimension "H" between the invert center 434 and the top surface 438 of the blankmold half neck ring groove 436 (the top surface of the neck ring). For a neck ring holder located at P1 (FIG. 25), this dimension could for example be 100 mm whereas this dimension could for example be 30 mm when the neck ring is located at P2 (FIG. 40). Each blankmold half has a downwardly projecting annularly extending hook shaped lip 440 proximate the bottom surface which can have a number of annular portions or segments and which is received by a corresponding upwardly projecting annularly extending hook shaped lip 442 in the outer wall of the insert which vertically locates the blankmold halves (the blankmold is vertically located at the horizontal plane of engagement between the downwardly projecting blankmold lip and the upwardly projecting lip of the mold support insert). The blankmold half may be of sufficient size that a stabilizing button 442 may be required vertically above the lower lip which operates with an upper mold half lip 440 to stabilize the mold during its movement (as shown, the stabilizing button 442 does not support the weight of the blankmold half). Since the blankmold halves are supported proximate the neck ring groove at the location where the mold lip is supported by the lip on the mold support, substantially all growth of the blankmolds due to heat will occur upwardly from this location and any growth from this location downwardly will be insignificant (without requiring any adjustment of the plunger mechanism or neck ring, which is conventionally required in prior art structures where the blankmolds are supported proximate the top of the mold. Additionally, by using conventional blowmolds 380 (FIG. 44) which are hung from the top via a downwardly projecting, annularly extending lip 382 having a number of segments supported by a corresponding upwardly projecting, annularly extending lip on the blow mold support insert (not shown), which also can have a number of segments (at a location proximate the neck ring groove), expansion of the blowmold halves due to heat will also occur in the direction away from the finish (the threaded portion) thereby being consistent at both stations.

As can be appreciated, while in the prior art, to shift from one configuration (single, double, triple gob) at one center distance to the same or a different configuration at a different center distance, often required the purchase of a different I.S. machine or a substantial rebuilding of an existing machine. The primary reason for this is the complicated mold open and close linkages which defined different geometries. The disclosed I.S. machine is a universal center distance machine. It can be changed from any desired configuration/center distance to any other desired configuration/center distance simply by replacing a number of parts which define

43
44

17

a desired configuration/center distance; i.e., by replacing the quick change mold carrier assembly of the mold opening and closing mechanism, the mounting plate, transition plate and perhaps the plunger canisters of the plunger mechanism, the neck ring holders and at the blow station the mold cooling mechanism would as is conventional be changed to change machine's configuration.

The takeout mechanism, which is shown in FIGS. 45-47, is mounted on the top surface 94 of the top wall 134 of the section frame and has a takeout tong head 450 which can releasably grip the bottle(s) at the blow station and which is supported by an X-axis slide 452 slidably carried by a "Z" axis mounting housing or slide 454 which is slidably displaceable along a Z-axis column 456. The X and Z axes are controlled by suitable servomotors 457, 458. The bottles formed at the blow station, whatever their height, will always have their finish located at a fixed vertical location ("Z" datum) and the bottom surface of a bottle may be located at different vertical locations (ZB1, ZB2) relative to this Z datum within the vertical height range of the bottles. These bottles are gripped by the takeout tong head, removed from the blow station and deposited on a deadplate 460 which may be located at a variety of Z locations (ZD1, ZD2). A short bottle will travel a different Z distance (Z1) than will a tall bottle (Z2). The takeout control (FIG. 47) defines an X-Z displacement profile for the takeout tong head for any "Z" offset (ZB-ZD), and effects the desired displacement.

We claim:

1. A takeout mechanism for a section of a L.S. machine which will grip the finish of one or more bottles at a blow

18

station and carry the gripped bottles away from the blow station and deposit them at a deposit location, wherein the bottom of the bottles can be a vertical distance from the finish within a selected distance range, comprising

a takeout tong head for releasably gripping the finish of the one or more bottles at the blow station,

means for locating said takeout tong head at a selected vertical location at the blow station to grip the finish of said bottles which can have a bottom at any vertical distance from the finish within said range,

means for displacing said takeout head from said selected vertical location at the blow station whereat the bottles are gripped to said deposit location including

means for defining a Z-axis offset, and

means for defining a displacement profile with said Z-axis offset for displacing said takeout tong head from said selected vertical location at the blow station to said deposit location.

2. A takeout mechanism for a section of a L.S. machine according to claim 1, wherein said deposit location is defined by a deadplate which can be located at a plurality of heights.

3. A takeout mechanism for a section of a L.S. machine according to claim 1, further comprising means for defining a Z-axis datum wherein said Z-axis offset is defined by subtracting the vertical distance between the bottom of the bottle and said Z-axis datum from the vertical distance between the deposit location and the same Z-axis datum.

* * * * *

ASSIGNMENT

WHEREAS, I, Stephen M. Gerber, of, 10690 Center Road, Traverse City, Michigan 49686, U.S.A., together with William F. Mazur and Larry N. Shue, have jointly invented an improvement in "Method and Apparatus for Transferring Articles in Unison"; and

WHEREAS, I, as a joint applicant with said William F. Mazur and Larry N. Shue, have executed an Application for United States Patent based thereon, on the 6 day of February, 2003; and

WHEREAS, Owens-Brockway Glass Container Inc., a corporation of Delaware, is desirous of acquiring certain rights thereunder;

NOW, THEREFORE, for One Dollar (\$1.00) and other valuable considerations, receipt of all of which is hereby acknowledged, I have agreed to and do hereby sell, assign, and transfer unto said corporation my entire right, title, and interest in and throughout the United States of America (including its territories and dependencies) and all countries foreign thereto, in and to said invention, said application and any and all patents (including extensions thereof) of any country, which have been or may be granted on said invention or any part thereof, or on said application or any divisional, continuing, renewal, reissue, or other patent application, based in whole or in part thereon, or based upon said invention.

TO BE HELD AND ENJOYED by said corporation, its successors and assigns, to the full ends of the respective terms for which said patents or any of them have been or may be granted, as fully and entirely as the same would have been held and enjoyed by me had no sale and assignment of said interest been made;

AND I hereby covenant and agree for myself, my heirs, and my legal representatives, to assist my said assignee in the prosecution of said application and in any interference which may arise involving said invention, and, upon request, to execute without further consideration all necessary and desirable divisional, continuing, renewal, reissue, or other applications for patents in any country, that might be deemed necessary by said assignee fully to secure to said assignee its interest as aforesaid in and to said invention or any part thereof, and in and to said several patents or any of them. Further, I hereby authorize the above-mentioned assignee to insert in this instrument the identifying serial number and filing date of my said application when received.

AND I do hereby authorize and request the Commissioner of Patents of the United States of America to issue any and all United States patents which may be granted upon said United States applications or any of them, or upon said invention or any part thereof, to said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 6 day of February, 2003.


Stephen M. Gerber

STATE OF _____)
COUNTY OF _____) ss:

On this _____ day of _____, 2003, before me, a Notary Public, personally appeared the above-named Stephen M. Gerber, personally known to me and known by me to be the one who executed the foregoing instrument and subscribed the same in my presence, and acknowledged the same to be his free act and deed.

[SEAL

EDWARD NAGY
Notary Public, Insc County, MI
My Commission Expires Jul. 7, 2008


Notary Public

U.S. Serial No. 10/235,188 Filing Date 09/04/2002

95
96

ASSIGNMENT

WHEREAS, I, William F. Mazur, of, 921 Farnsworth, Waterville, Ohio 43566, U.S.A., together with Stephen M. Gerber and Larry N. Shue, have jointly invented an improvement in "Method and Apparatus for Transferring Articles in Unison"; and

WHEREAS, I, as a joint applicant with said Stephen M. Gerber and Larry N. Shue, have executed an Application for United States Patent based thereon, on the 4 day of February, 2003; and

WHEREAS, Owens-Brockway Glass Container Inc., a corporation of Delaware, is desirous of acquiring certain rights thereunder;

NOW, THEREFORE, for One Dollar (\$1.00) and other valuable considerations, receipt of all of which is hereby acknowledged, I have agreed to and do hereby sell, assign, and transfer unto said corporation my entire right, title, and interest in and throughout the United States of America (including its territories and dependencies) and all countries foreign thereto, in and to said invention, said application and any and all patents (including extensions thereof) of any country, which have been or may be granted on said invention or any part thereof, or on said application or any divisional, continuing, renewal, reissue, or other patent application, based in whole or in part thereon, or based upon said invention.

TO BE HELD AND ENJOYED by said corporation, its successors and assigns, to the full ends of the respective terms for which said patents or any of them have been or may be granted, as fully and entirely as the same would have been held and enjoyed by me had no sale and assignment of said interest been made;

AND I hereby covenant and agree for myself, my heirs, and my legal representatives, to assist my said assignee in the prosecution of said application and in any interference which may arise involving said invention, and, upon request, to execute without further consideration all necessary and desirable divisional, continuing, renewal, reissue, or other applications for patents in any country, that might be deemed necessary by said assignee fully to secure to said assignee its interest as aforesaid in and to said invention or any part thereof, and in and to said several patents or any of them. Further, I hereby authorize the above-mentioned assignee to insert in this instrument the identifying serial number and filing date of my said application when received.

AND I do hereby authorize and request the Commissioner of Patents of the United States of America to issue any and all United States patents which may be granted upon said United States applications or any of them, or upon said invention or any part thereof, to said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 4 day of February, 2003.

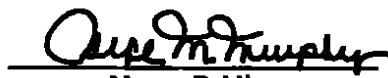


William F. Mazur

STATE OF OHIO)
) ss:
COUNTY OF WOOD)

On this 4 day of FEBRUARY, 2003, before me, a Notary Public, personally appeared the above-named William F. Mazur, personally known to me and known by me to be the one who executed the foregoing instrument and subscribed the same in my presence, and acknowledged the same to be his free act and deed.

[SEAL



Notary Public

JOYCE M. MURPHY
Notary Public, State of Ohio
Commission Expires 11-28-04

U.S. Serial No. 10/235,188 Filing Date 09/04/2002

1

96

ASSIGNMENT

WHEREAS, I, Larry N. Shue, of, 510 North Street, Woodville, Ohio 43469, U.S.A., together with Stephen M. Gerber and William F. Mazur, have jointly invented an improvement in "Method and Apparatus for Transferring Articles in Unison"; and

WHEREAS, I, as a joint applicant with said Stephen M. Gerber and William F. Mazur, have executed an Application for United States Patent based thereon, on the 23 day of January, 2003; and

WHEREAS, Owens-Brockway Glass Container Inc., a corporation of Delaware, is desirous of acquiring certain rights thereunder;

NOW, THEREFORE, for One Dollar (\$1.00) and other valuable considerations, receipt of all of which is hereby acknowledged, I have agreed to and do hereby sell, assign, and transfer unto said corporation my entire right, title, and interest in and throughout the United States of America (including its territories and dependencies) and all countries foreign thereto, in and to said invention, said application and any and all patents (including extensions thereof) of any country, which have been or may be granted on said invention or any part thereof, or on said application or any divisional, continuing, renewal, reissue, or other patent application, based in whole or in part thereon, or based upon said invention.

TO BE HELD AND ENJOYED by said corporation, its successors and assigns, to the full ends of the respective terms for which said patents or any of them have been or may be granted, as fully and entirely as the same would have been held and enjoyed by me had no sale and assignment of said interest been made;

AND I hereby covenant and agree for myself, my heirs, and my legal representatives, to assist my said assignee in the prosecution of said application and in any interference which may arise involving said invention, and, upon request, to execute without further consideration all necessary and desirable divisional, continuing, renewal, reissue, or other applications for patents in any country, that might be deemed necessary by said assignee fully to secure to said assignee its interest as aforesaid in and to said invention or any part thereof, and in and to said several patents or any of them. Further, I hereby authorize the above-mentioned assignee to insert in this instrument the identifying serial number and filing date of my said application when received.

AND I do hereby authorize and request the Commissioner of Patents of the United States of America to issue any and all United States patents which may be granted upon said United States applications or any of them, or upon said invention or any part thereof, to said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal this 23 day of January, 2003.


Larry N. Shue

STATE OF OHIO)
) ss:
COUNTY OF WOOD)

On this 23 day of JANUARY, 2003, before me, a Notary Public, personally appeared the above-named Larry N. Shue, personally known to me and known by me to be the one who executed the foregoing instrument and subscribed the same in my presence, and acknowledged the same to be his free act and deed.

[SEAL]

U.S. Serial No. 10/235,188 Filing Date 09/04/2002


Notary Public
JOYCE M. MURPHY
Notary Public, State of Ohio
Commission Expires 11-29-04



US006722488B2

92

17770

(12) **United States Patent**
Gerber et al.

(10) Patent No.: **US 6,722,488 B2**
(45) Date of Patent: **Apr. 20, 2004**

(54) **METHOD AND APPARATUS FOR
TRANSFERRING ARTICLES IN UNISON**

(75) Inventors: Stephen M. Gerber, Traveras City, MI
(US); William F. Mazur, Waterville,
OH (US); Larry N. Shue, Woodville,
OH (US)

(73) Assignee: Owens-Brockway Glass Container
Inc., Toledo, OH (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: 10/235,188

(22) Filed: Sep. 4, 2002

(65) Prior Publication Data

US 2004/0050665 A1 Mar. 18, 2004

(51) Int. Cl.⁷ B65G 47/34

(52) U.S. CL 198/468.2; 65/260

(58) Field of Search 198/468.2, 750.11;
65/260

(56) References Cited

U.S. PATENT DOCUMENTS

3,095,082 A * 6/1963 Allgeyer 198/468.2

4,494,973 A 1/1985 Perry
5,429,651 A * 7/1995 Bolin 65/260
5,895,513 A 4/1999 Ciriello et al.
5,904,745 A 5/1999 Nafziger et al.
6,076,654 A 6/2000 Leidy
6,241,448 B1 6/2001 Nicholas

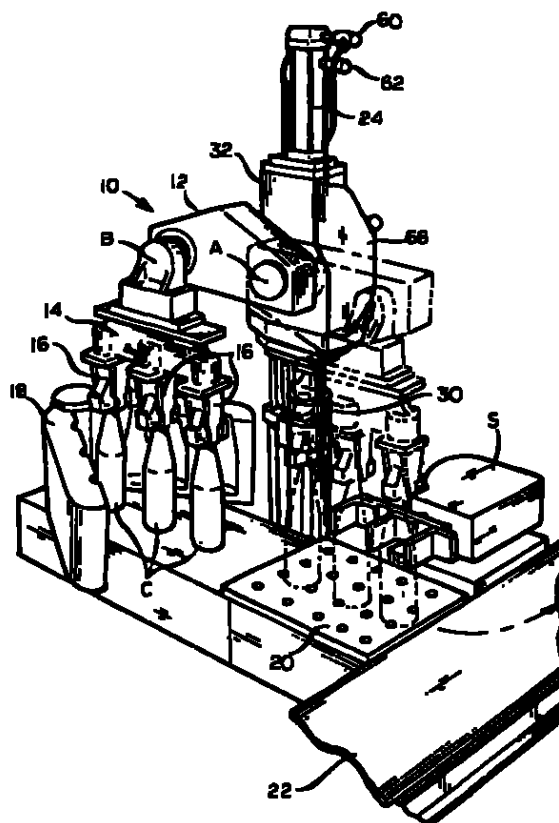
* cited by examiner

Primary Examiner—Joseph E. Valenza

(57) **ABSTRACT**

A takeout device (10) for transferring one or more, usually a plurality, of freshly-formed glass containers (C) from molds (18) of a section of an I.S. machine to a deadplate (20) of the machine. The takeout device has an oscillatable arm (12) that carries a head (14) from which a tong (16) for each of the containers is suspended. Oscillation of the arm is powered by a reversible, linearly-acting electrical motor (24), preferably an a.c. servo motor, that causes a rack (28) to reciprocate. The rack drives an oscillatable gear (34) that oscillatingly drives the arm. The motor is mounted at the top of a post (30) at an elevation above the elevations of the molds and the deadplate, and the motor, therefore, is readily accessible for maintenance and adjustment.

11 Claims, 4 Drawing Sheets



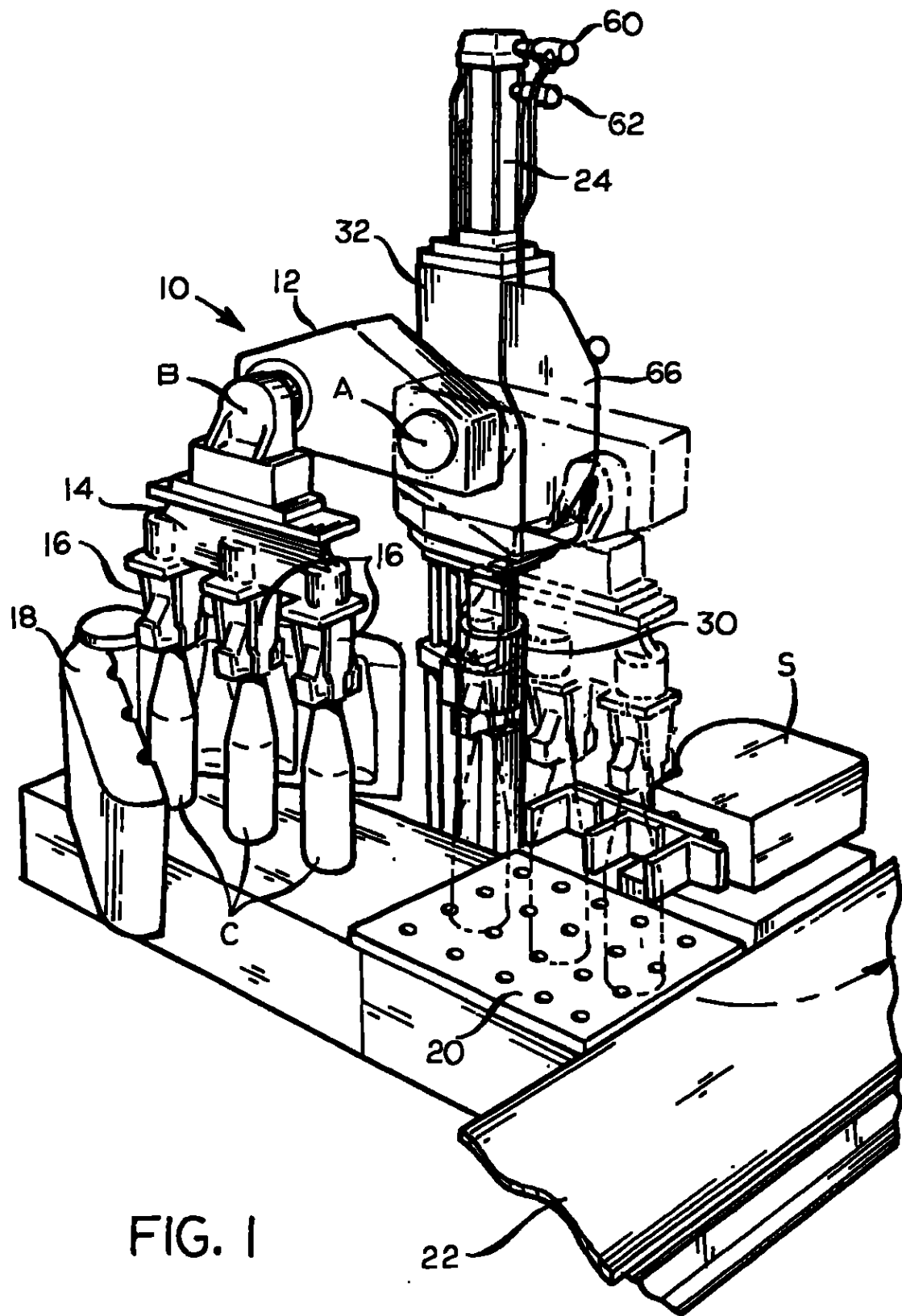


FIG. 1

99 98

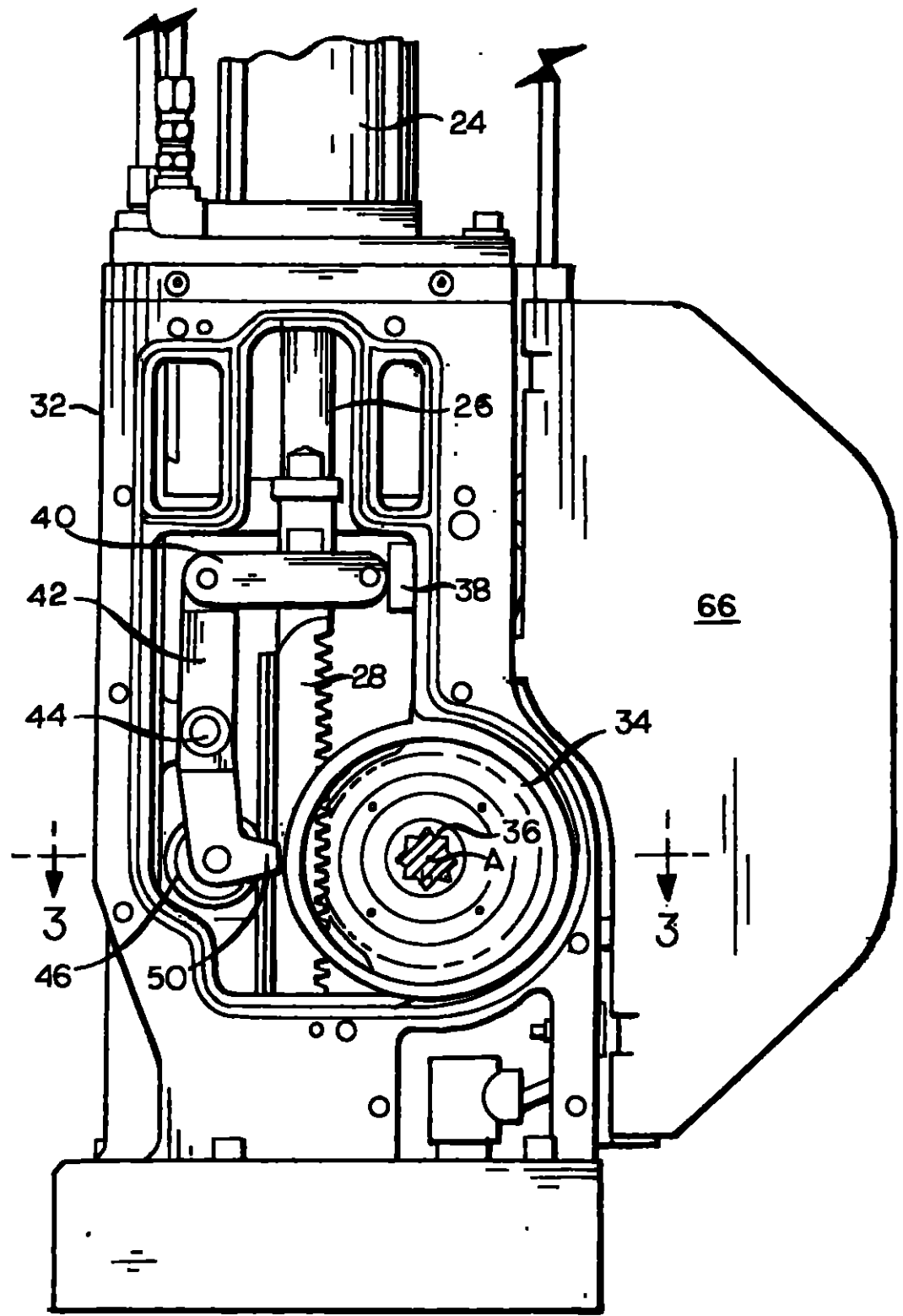


FIG. 2

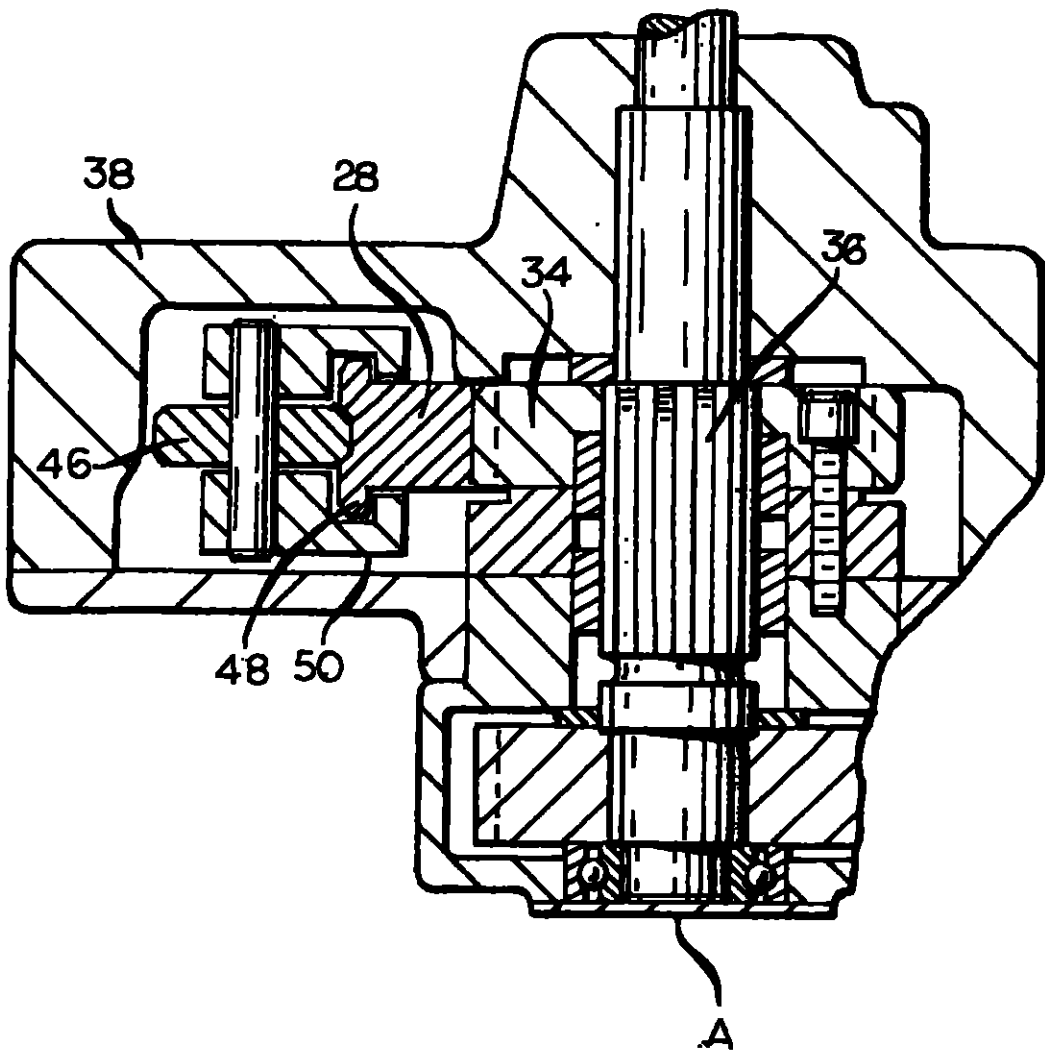


FIG. 3

10099

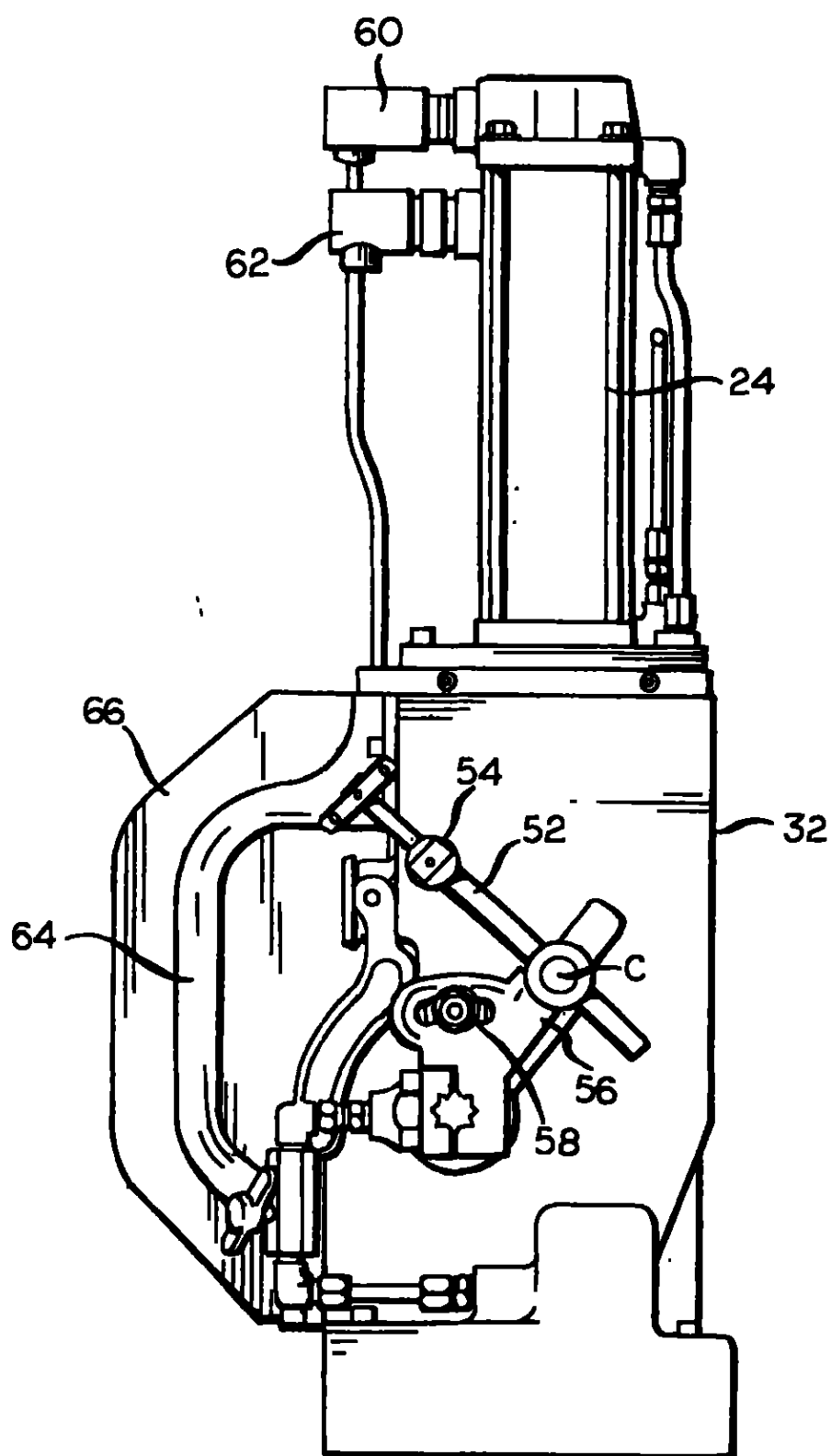


FIG. 4

1

METHOD AND APPARATUS FOR TRANSFERRING ARTICLES IN UNISON

FIELD OF THE INVENTION

This invention relates to a method of, and an apparatus for, transferring, in unison, a plurality of like articles from a first location to a second location. More particularly, this invention relates to a method and apparatus of the foregoing character for transferring a plurality of like, freshly-formed glass containers from opened molds of a glass container forming machine of the I.S. type to a deadplate of the machine for cooling of the containers.

BACKGROUND OF THE INVENTION

As it is explained, for example, in commonly-assigned U.S. Pat. No. 6,076,654 (Leidy) and U.S. Pat. No. 6,241,448 B1 (Nicholas), the disclosure of each of which is incorporated by reference herein, or as is otherwise known, most glass containers are manufactured by a machine type known as an individual section (I.S.) machine. Containers are manufactured by an I.S. machine at one or another of a multitude of machine sections, typically, 6, 8, 10, or even 12 sections, and typically 2 or 3 or 4 containers simultaneously at each section depending on container size and desired production rates. As a final step in the manufacture of containers on an I.S. machine, blown containers are transferred, in unison, from opened blow molds of the machine section in which they were formed to a nearby deadplate of the machine to permit the blown containers to partly cool before the containers are transferred to a removal conveyor for further processing.

Containers are transferred from an I.S. machine section blow mold station to a deadplate by a takeout mechanism that employs a multitude of individual takeout tongs. The takeout tongs for each I.S. machine section are suspended from a head that is suspended from an oscillating arm, one such tong for each container to be transferred from the machine section. After grasping of the containers by the takeout tongs, the arm of the takeout mechanism from which the containers are suspended is turned by approximately 180°, while the containers remain suspended from the tongs, to position the containers over the I.S. deadplate. The takeout heads then release the containers to remain on the deadplate, and the arm of the mechanism is then reverted by 180° to begin a repeat of its operating cycle when the next set of glass containers manufactured at the machine section is ready to be transferred.

Henceforth, oscillating motion of the takeout mechanism head-carrying arm was powered by a fluid prime mover, usually a pneumatic cylinder, that was used to impart reciprocating motion to a toothed rack. The rack engaged a rotatable gear attached to the takeout mechanism so that reciprocating motion of the rack as a result of extension or retraction of the pneumatic cylinder resulted in oscillating motion of the gear and the arm to which it was secured. A parallel linkage connection between the arm and the takeout heads carried by it was employed to maintain the heads suspended from the arm in vertical positions at all arcuate positions of the arm, as is explained, for example, in U.S. Pat. No. 5,271,757 (Houben et al.). Typically, the pneumatic cylinder for such a takeout mechanism was positioned within the frame of the I.S. machine where access for maintenance and adjustment is difficult.

The use of pneumatic cylinders to power operation of a glass container takeout mechanism involves certain

2

problems, certain of which are inherent in the use of pneumatic cylinders for a wide variety of motions, and certain of which are specific to the transfer of freshly-formed glass containers. To begin with, pneumatic prime movers tend to be noisy and their use in a relatively confined space requires close attention to regulatory noise standards. Further, freshly-formed glass containers are still somewhat hot, and are, therefore, soft and subject to dimensional distortion if transferred other than by gentle, low inertia motions, which are difficult to achieve with a pneumatic-powered mechanism unless the mechanism is operated slowly, with gentle starting and stopping actions. This characteristic limits the obtainable cycle times to times that may unduly limit the productive capacity of an I.S. forming machine.

SUMMARY OF THE INVENTION

To overcome the aforesaid and other problems associated with the use of a fluid powered motor to actuate motion of a takeout arm at a section of an I.S. glass container forming machine, there is provided a takeout arm that is powered by a reversible electric motor, preferably a linearly-acting a.c. servo motor that is preferably positioned above the main frame of the I.S. machine for ready access for maintenance and adjustments. Such a motor may be precisely controlled for proper starting and stopping motions to avoid the imposition of excessively large inertia forces on the freshly-formed glass containers that are being transferred, and without unduly lengthening the container transfer cycle time. The reversible motor of the present invention is preferably mounted at the top of a non-extensible or extensible vertical post. In that regard, an extensible vertical post permits the elevation of the container-grasping heads above the forming machine molds and the deadplate to be adjusted to accommodate the processing of containers of various heights. This function may also be achieved with a non-extensible support post by the use of spacers of different thicknesses to change the spacing between the tong-supporting heads and the takeout arm from which they are suspended.

Accordingly, it is an object of the present invention to provide an improved method of and apparatus for transferring one or more articles from a first location to a second location. More particularly, it is an object of the present invention to provide a method and apparatus of the foregoing character for transferring one or more freshly-formed glass containers from forming molds of a glass container forming machine to a deadplate of the machine without imposing excessive inertial forces thereon and without unduly delaying the transfer time.

For a further understanding of the present invention and the objects thereof, attention is directed to the drawing and the following brief description thereof, to the detailed description of the invention and to the appended claims.

IN THE DRAWING

FIG. 1 is a perspective view of a takeout device according to the preferred embodiment of the present invention, in combination with other elements of a glass container forming machine with which it is to be operated;

FIG. 2 is an elevation view, at an enlarged scale and with a portion removed, of a portion of the takeout device of FIG. 1;

FIG. 3 is a sectional view, at a further enlarged scale, taken on line 3—3 of FIG. 2; and

FIG. 4 is a fragmentary elevation view, at an enlarged scale relative to that of FIG. 1, of a portion of the portion of

3

the takeout device that is shown in FIG. 2 from an opposite direction to the direction shown in FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

A takeout device according to the preferred embodiment of the present invention is generally identified by reference numeral 10 in FIG. 1. The takeout device 10 includes an arm 12 from which a head 14 is pivotably suspended. The head 14 has one or more container engaging tongs 16, shown as 3 container engaging tongs, suspended therefrom, 3 such tongs being the appropriate number for use in connection with an I.S. glass container forming machine that is operated by the triple gob process. In that regard, each such tong 16 may be constructed as shown in U.S. Pat. No. 6,241,448 B1 (Nicholas), or in any other known matter. In any case, the tongs 16 are used to grasp containers in a blow mold 18 of an I.S. glass container forming machine, and for then transferring the containers C in unison to a deadplate 20 of the forming machine. As is known, the containers C on the deadplate 20, after partial cooling, are swept to a takeout conveyor 22 for further processing by an oscillatable sweepout device S, which may, for example, operate according to the teachings of commonly-assigned U.S. Pat. No. 5,904,745 (Nafziger et al.), the disclosure of which is incorporated by reference herein, or by the teachings of a patent application to be filed in the name of D. Wayne Leidy et al., now application Ser. No. 10/235,181. In any case, the arm 12 periodically oscillates between the position shown in solid line in FIG. 1, in alignment with the containers C as they are ready to be released from the blow mold 18, to the dotted line position where the containers C are positioned over the deadplate 20, as will be hereinafter described more fully.

The takeout device 10 also has a vertically extending housing 24 in which a rod 26 is able to reciprocate, the rod 26 having a toothed rack 28 suspended therefrom, as is shown more clearly in FIGS. 2 and 3. The housing 24 is the housing of a reversible, linearly-acting and vertically-extending electrical servo motor, which imparts reciprocating motion to the rod 26 and the rack 28. The housing/motor 24 is supported on a post 30, which may be extensible to permit vertical adjustment of the rest positions of the head 14, or such function can be obtained with a non-extensible post by the use of shims (not shown) to adjust the spacing of the head 14 below the arm 12. In that regard, it is to be noted that the housing/motor 24 is positioned well above the blow mold 18 and the deadplate 20 for easy access for maintenance and adjustment.

Reciprocation of the rack 28 is effective to oscillate a gear 34 about an axis A, to thereby cause oscillation of the arm 12 about the axis A. In that regard, the arm 12 has a parallel motion connection between the axis A and a pivot axis B from which the head 14 is suspended, for example, as taught by commonly-assigned U.S. Pat. No. 4,494,973 (Perry), to ensure that the central axes of the tongs 16 and the containers C that are carried thereby remain vertically oriented during the motion of the arm 12 from the solid line position in FIG. 1 to its broken line position. Further, the axis A is a longitudinal central axis of an oscillating shaft 36 (FIGS. 2 and 3), which is pivotably mounted in a housing 32. A gear 34 is fixed for oscillation with the shaft 36, the shaft 36 having an irregular outer surface and the gear 34 having a complementary irregular inner surface to ensure that the gear 34 and the shaft 36 will oscillate together but not relatively to one another.

To minimize backlash between the rack 28 and the gear 34, and to continuously compensate for any wear occurring

4

in either of them, the rack 28 is continuously resiliently urged against the gear 34 by a compression spring in a housing 38 that acts against a link 40, which is pivoted on each of its ends, the rack 28 being reciprocable relative to the link 40. The link 40, in turn, acts against an end of a lever arm 42 that pivots about a pivot pin 44. A nose portion 50 at an opposed end of the lever arm 42, which is generally C-shaped in cross-section, as shown in FIG. 3, surrounds the rack 28 to continuously permit the rack 28 to reciprocate with respect to the lever arm 34. The lever arm 42 is also provided with a rotatable follower 46 at a location diametrically opposed to the axis A of the gear 34, and the roller 46 rollingly rides against a flange 48 of the rack 28 on the side that is opposed to its toothed side, to thereby permit controlled, low friction contact between the rack 28 and the gear 34 throughout the reciprocation of the rack 28.

To ensure that the head 14 remains level at all times, the circumferential position of the shaft 36, and thereby the circumferential position of the gear 34, is adjustable by means of an adjustment screw 52 (FIG. 4). The screw 54 is threadably received in a nut 54, and is pivotably attached to an arm 56 at an axis C. The arm 56 is releasably secured to the housing 32 by a fastener 58, which passes through an accurate slot 68 in the arm 56. The arm 56 has an opening that engages the portion of the shaft 36, and when the fastener 58 is released, the arm 56 may be accurately moved to thereby accurately reposition the shaft 36 and the gear 34. Of course, adjustment of the circular positions of the shaft 36 and the gear 34 is done with the rack 28 disengaged from the gear 36.

To accurately track the position of the rod 26 within the housing/motor 24, a resolver 60 is attached to an upper end of the housing/motor 24. Further, an electrical supply filament 62 for the housing/motor 24 is secured thereto, at an elevation below that of the resolver 60. Electrical cables for the resolver 60 and the filament 62 pass thru the interior of a C-shaped bracket 64 (FIG. 4) that is secured to the housing 32, a shield 66 being secured to the bracket 64 on a side opposed to that on which the adjustment screw 52 is positioned.

Although the best mode contemplated by the inventors for carrying out the invention as of the filing date herein as been shown and described herein, it will be apparent to those skilled in the art that suitable modifications, variations, and equivalents may be made without departing from the scope of the invention, such scope being limited only by the terms of the following claims and legal equivalents thereof.

We claim:

1. Apparatus for transferring a spaced-apart plurality of like articles from a first location to a second location, said apparatus comprising:

an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location and a second location;

a spaced-plurality of tong assemblies carried by the oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp an article at the first location, to transfer the article to the second location without changing the axial orientation of the article and to release the article at the second location;

a linearly extending rack, said rack having a toothed side and an opposed side and being reciprocable along an axis;

an externally-toothed, oscillatable gear, said oscillatable gear being oscillatable about an axis, being drivingly engaged by said rack, and oscillatingly driving said arm;

100
100

5

a single reversible electrical motor for powering the reciprocation of the rack; and
means for resiliently biasing said rack into engagement with said oscillatable gear.

2. Apparatus according to claim 1 wherein said single reversible electrical motor is a linearly-acting, reversible a.c. servo motor.

3. Apparatus according to claim 2 wherein:

said reversible electrical motor is positioned above the first location and the second location.

4. Apparatus according to claim 1 wherein said means for resiliently biasing comprises:

a double-ended link;

resilient biasing means acting on an end of said link;

a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

5. Apparatus for transferring a spaced-apart array of freshly-formed glass containers from open molds of a glass container forming machine to an external location, said apparatus comprising:

an oscillatable arm, said arm being oscillatable through an arc of substantially 180° between a first location above the glass containers in the open molds and a second location above the external location;

a spaced-plurality of tong assemblies carried by the oscillatable arm and oscillatable therewith, each of the tong assemblies being adapted to grasp a container at this first location, to transfer the container to the second location and to release the container at the second location;

a linearly extending rack, said rack having a toothed side and an opposed side and being reciprocable;

an externally-toothed oscillatable gear, said oscillatable gear being oscillatable about an axis, being drivingly engaged by said rack, and oscillatingly driving said arm; and

a single reversible electrical motor for powering the reciprocation of the rack; and

means for resiliently biasing said rack into engagement with said oscillatable gear.

6

6. Apparatus according to claim 5 wherein, said reversible electrical motor is a linearly-acting reversible a.c. servo motor.

7. Apparatus according to claim 6 wherein said reversible electrical motor is positioned above the first location and the second location.

8. Apparatus according to claim 5 wherein said means for resiliently biasing comprises:

a double-ended link;

resilient biasing means acting on an end of said link;

a double-ended arm, an end of said arm being pivotably attached to an opposed end of said link, said arm being mounted for pivoting motion about an axis between its ends, an opposed end of said arm having a roller in engagement with said opposed side of said rack.

9. The method of simultaneously transferring a plurality of articles from a first location to a second location, the method comprising:

providing an oscillatable arm;

providing a plurality of article-engaging tongs carried by the oscillatable arm;

providing an oscillatable gear operatively associated with the oscillatable arm;

providing a reciprocable rack in driving engagement with the oscillatable gear;

reversibly electrically powering reciprocation of the rack; and

resiliently biasing the rack into engagement with the oscillatable gear.

10. The method according to claim 9 wherein:

the articles to be transferred are freshly-formed glass containers, the first location is a location at open molds of a glass container forming machine, and the second location is a deadplate of the glass containing forming machine.

11. The method according to claim 9 wherein:

the reciprocation of the rack is reversibly electrically powered from a location that is at an elevation above the first location and above the second location.

* * * * *

Brigard & Castro

BOGOTA - COLOMBIA

PODER

POWER OF ATTORNEY

Yo (nosotros) OWENS - BROCKWAY GLASS CONTAINER INC.

I (We) OWENS - BROCKWAY GLASS CONTAINER INC.

domiciliado(s) en One SeaGate, Toledo Ohio 43686, Estados Unidos de América

domiciled in One SeaGate, Toledo Ohio 43686, United States of America

Nombro(amos) a: JUAN PABLO CADENA SARMIENTO y/o BEATRIZ JARAMILLO y/o CARLOS H. PALACIO EASTMAN y/o HECTOR GOMEZ MEJIA, de Bogotá, Colombia, apoderados verdaderos y legales con poder especial, amplio y suficiente, para recabar de las oficinas y autoridades colombianas administrativas, judiciales y de policía, en cualquier instancia o recurso, la obtención de patentes de invención, registros de marcas, diseños industriales, modelos de utilidad, depósitos de nombres comerciales y enseñas, registros de derechos de autor y contratos sobre los mismos, obtención de certificados de obtentor de variedades vegetales, así como sus prórrogas, renovaciones, anotaciones de traspaso, cambios de nombre y/o domicilio; elaborar, tramitar y registrar contratos de licencia y licencias de cualesquiera clases; intervenir como demandante o como demandado en cualquier instancia y recurso ante cualquier juez, corporación, funcionario público o autoridad en acciones judiciales, administrativas y de policía tales como: oposiciones al registro de marcas; acciones de caducidad, cancelación y nulidad; acciones reivindicatorias, acciones derivadas de la obtención o explotación de licencias; acciones de competencia desleal; demandas penales; acciones de indemnización de perjuicios, reclamos y observaciones a solicitudes de patentes, diseños industriales, modelos de utilidad, en el ejercicio de medidas cautelares y en otras acciones y medidas similares.

A este efecto, lo(s) faculto(amos) para elevar solicitudes formular descripciones, enmiendas, declaraciones, oposiciones, cancelaciones, nulidades, apelaciones y reclamos; pagar impuestos, cuotas y gravámenes prescritos por la ley; renunciar o desistir a derechos concedidos o en curso de concesión; recibir toda clase de documentos y valores, dando el descargo respectivo, y, en general, para dar ante dichas autoridades todos los pasos necesarios al efecto indicado y tomar todas las medidas que creyeran conducentes al resguardo de mis (nuestros) intereses, con todas las demás facultades legales necesarias.

Este poder comprende la facultad de ratificar o confirmar en mi (nuestro) nombre lo actuado así como la facultad de desistir, transigir, comprometer, y la de sustituirlo en todo o en parte y revocar sustituciones. Asimismo nombro(amos) a: JUAN PABLO CADENA SARMIENTO y/o BEATRIZ JARAMILLO y/o CARLOS H. PALACIO EASTMAN y/o HECTOR GOMEZ MEJIA, domiciliado(s) en la Carrera 7 No. 18-56 Piso 9, mis (nuestros) apoderados en Colombia, con facultades para recibir notificaciones y designar apoderados judiciales o extrajudiciales.

Otorgado y firmado en

hoy de de 200_

Firma
Nombre
Cargo

Hereby appoints JUAN PABLO CADENA SARMIENTO and/or BEATRIZ JARAMILLO and/or CARLOS H. PALACIO EASTMAN and/or HECTOR GOMEZ MEJIA, of Bogotá, Colombia, my (our) true and lawful attorneys with special, ample and sufficient power to obtain from the Colombian administrative, judicial and police offices and authorities, in any instance, privileges of patents of invention, registration of trademarks, industrial designs and utility models; registration of commercial names and emblems, registration of copyright and contracts related thereto, certificates of obtainers of vegetables varieties, as well as extensions, renewals and recordal of assignments and changes of name and domicile related to the above; to prepare, prosecute and register licenses of any kind; to act as plaintiff or defendant in any instance or recourse, and before any judge, corporation, public official or authority in judicial, administrative and police actions, such as: oppositions to the registration of trademarks; caducity, cancellation and nullity actions; claim actions derived from the obtaining or exploitation of licenses, action of unfair competition; criminal proceedings, actions for payment of damages; claims or observations on patent applications, models, industrial designs and utility models; in the exercise of preventive measures and in other actions or similar

To that effect they hereby empowered to file applications, formulate descriptions, amendments, declarations, oppositions, cancellations, nullities, appeals and claims; to pay taxes, quotas and assessments prescribed by law, renounce or waive the rights granted or in the process of granting; to receive all kinds of documents and valuables, giving the respective release of receipt, and, in general, to take before said authorities the necessary steps to such effect, and any measures that they may deem pertinent to the safeguard of my (our) interest(s) with all the other necessary legal powers.

This power includes the faculty to ratify or confirm desist, settle and compromise on my (our) behalf, and to substitute this power in whole or in part and to revoke substitutions. At the same time I (We) hereby appoints JUAN PABLO CADENA SARMIENTO and/or BEATRIZ JARAMILLO and/or CARLOS H. PALACIO EASTMAN and/or HECTOR GOMEZ MEJIA, domiciled in Carrera 7 No. 18-56, Piso 9, my (our) attorney(s) in fact, with powers to receive notifications and to designate judicial and extrajudicial attorneys.

Granted and signed in PERRYSBURG, OHIO

this 2 day of DEC. 2004

Signature
Name
Title

ROBERT E. LACHMILLER
VICE-PRESIDENT

CERTIFICADO NOTARIAL (SOCIEDAD)

NOTARIAL CERTIFICATE (CORPORATION)

Hoy de
personalmente compareció ante mí

a quien conozco, y de quien me consta que firmó el anterior documento, debidamente juramentado declaró y dijo que él (ella) es

de OWENS - BROCKWAY GLASS CONTAINER INC

Sociedad legalmente constituida para un período de duración que aún no ha terminado; que el declarante está autorizado por dicha compañía para conferir este poder; que el sello estampado por él al pie de tal poder, en nombre y representación de la expresada compañía, es el sello oficial de ella; y, que el objeto para el cual se confiere este instrumento está comprendido dentro del objeto social de la sociedad.

El suscrito Notario hace constar que tuvo a la vista las pruebas de la existencia de la sociedad.

Estado de
con fecha

y que quien confiere el presente poder es su representante.

On this 2 day of DECEMBER 2004 at
personally appeared before me

ROBERT E. LACHMILLER
to me known, and known to me to be the person who signed the foregoing instrument who being by me duly sworn did depose and say that he (she) is the

VICE-PRESIDENT

of OWENS - BROCKWAY GLASS CONTAINER INC

Which is legally constituted for a term not yet expired, that deponent is authorized by said Company to confer this Power of Attorney: that the seal affixed hereunto by the deponent in the name and on behalf of said Corporation is the corporate seal thereof; and that the purpose for which this instrument is granted is included within the corporate purpose of company.

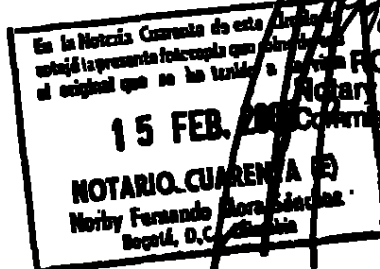
The undersigned Notary Public attests that he has seen the documents that prove the existence of the company.

State of Ohio
under date of 12-2-04

and that he (she) who grants this power of attorney is its Representative.

Notario Público (sello)

**CERTIFICADO NOTARIAL
PERSONA NATURAL**



**NOTARIAL CERTIFICATE
NATURAL PERSON**

Hoy de de , compareció(eron)
ante mí

On this day of of
personally appeared before me

a quien (es) conozco y me consta que es(son) la(s) persona(s) firmante(s) del documento que precede y quien(es) declara(n) que otorgan el mismo para los fines y propósitos que en él se expresan.

who is(are) known to me and who I attest executed the foregoing document and he (they) declared he (they) grant(s) the document for the uses and purposes therein expressed.

Notario Público (sello)

Notary Public (Seal)

LEGALIZACION POR APOSTILLA ES REQUERIDA.

LEGALIZATION BY APOSTILLE IS REQUIRED.

APOSTILLE

(Convention de la Haye du 5 octobre 1961)

1. Country: United States of America

This public document

2. has been signed by REBECCA E. BHAER

3. acting in the capacity of Clerk of Court of Common Pleas

4. bears the seal/stamp of Court of Common Pleas, Wood County

CERTIFIED

5. at Columbus, Ohio

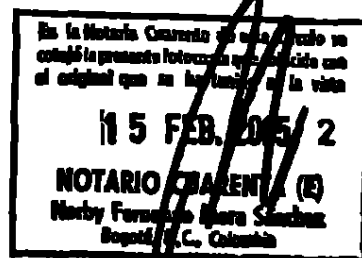
6. December 20, 2004

7. by the Secretary of State of Ohio.

8. No. 200417

9. Seal/Stamp:

10. Signature:



J. Kenneth Blackwell
J. Kenneth Blackwell
Secretary of State of Ohio

This certification certifies only the authenticity of the signature of the official who signed the document, the capacity in which that official acted, and where appropriate, the identity of the seal or stamp which the document bears. This certification does not imply that the contents of the document(s) are correct, nor that they have the approval of this office.

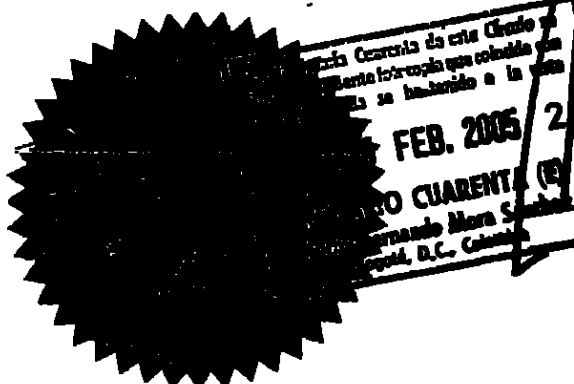
104

WOOD COUNTY

I, THE UNDERSIGNED Clerk of the Court of Common Pleas, a Court of Law and Record of said County, do hereby certify that **ROBIN S. RAYNER** before whom the annexed instrument was taken and whose name is subscribed in the certificate of proof thereof, was, at the time of taking the same, a Notary Public in and for said County, duly sworn and acting as such, and authorized to take the same that had authority to take the proofs and acknowledgments of deeds to be recorded in the State; that the impression of HIS/HER official seal is not required by the laws of the State of Ohio to be filed in my office; and that HIS/HER commission expires **FEBRUARY 17, 2008**. And further that I am well acquainted with HIS/HER handwriting, and verily believe the signature thereto to be HIS/HER genuine signature; and further, that the annexed instrument is executed and acknowledged according to the laws of the State of Ohio.

In Testimony Whereof, I hereunto subscribe my name and affix the seal of said Court at Bowling Green, Ohio, this 8th day, of December, 2004.

Rebecca E. Bhaer
Rebecca E. Bhaer
Clerk of Courts, Wood County, OH



TRADUCCION OFICIAL NO. 033/2004.-

TRADUCCION DE LOS SELLOS QUE SE ENCUENTRAN EN EL PODER OTORGADO POR OWENS - BROCKWAY GLASS CONTAINER INC., COMPAÑIA DOMICILIADA EN ONE SEA GATE, TOLEDO OHIO 43666, ESTADOS UNIDOS DE AMERICA, A LOS DOCTORES JUAN PABLO CADENA SARMIENTO Y/O BEATRIZ JARAMILLO Y/O CARLOS H. PALACIO EASTMAN Y/O HECTOR GOMEZ MEJIA.

OTORGADO Y FIRMADO EN PERRYSBURG, OHIO, A LOS 2 DIAS DEL MES DE DICIEMBRE DE 2004.

FIRMADO: ROBERT E. LACHMILLER, VICEPRESIDENTE

CERTIFICADO NOTARIAL (SOCIEDAD)

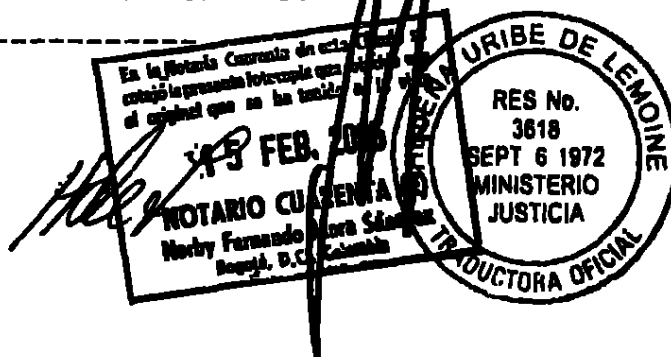
EL DIA 2 DE DICIEMBRE DE 2004 PERSONALMENTE COMPARECIÓ ANTE MI ROBERT E. LACHMILLER, VICEPRESIDENTE DE OWENS -- BROCKWAY GLASS CONTAINER INC., UNA SOCIEDAD LEGALMENTE CONSTITUIDA PARA UN PERIODO DE DURACIÓN QUE AUN NO HA TERMINADO; QUE EL DECLARANTE ESTA AUTORIZADO POR DICHA COMPAÑIA PARA CONFERIR ESTE PODER; QUE EL SELLO ESTAMPADO POR EL AL PIE DE TAL PODER, EN NOMBRE Y REPRESENTACIÓN DE LA EXPRESADA COMPAÑIA, ES EL SELLO OFICIAL DE ELLA; Y QUE EL OBJETO PARA EL CUAL SE CONFIERE ESTE INSTRUMENTO ESTÁ COMPRENDIDO DENTRO DEL DE LA SOCIEDAD. EL SUSCRITO NOTARIO HACE CONSTAR QUE TUVO A LA VISTA LAS PRUEBAS DE LA EXISTENCIA DE LA SOCIEDAD.

ESTADO DE OHIO, EL 2 DE DICIEMBRE, 2004.

Y QUE QUIEN CONFIERE EL PRESENTE PODER ES SU REPRESENTANTE.

FIRMADO: ROBIN S. RAYNER, NOTARIO PUBLICO, ESTADO DE OHIO, CON COMISIÓN HASTA EL 17 DE FEBRERO DE 2008.

HAY SELLO EN RELIEVE DEL NOTARIO.



CERTIFICADO CON CARÁCTER OFICIAL
ESTADO DE OHIO – CONDADO DE WORD
TRIBUNAL DE ASUNTOS COMUNES

El suscrito funcionario de la Corte de Asuntos Comunes, una Corte de Derecho y Registro de dicho Condado, por medio del presente certifico que ROBIN S. RAYNER ante quien se celebró el anterior documento y cuyo nombre figura en el certificado de prueba era, en el momento de ejecutar dicho acto, Notario Público en y para dicho Condado, debidamente juramentado y autorizado para celebrar dicho acto. Que la ley del Estado de Ohio no exige que su sello sea registrado en este despacho; y que su comisión expira el 17 de Febrero de 2008. Certifico además que estoy familiarizado con la firma de dicho Notario Público y creo que la firma en el documento es la suya; y además, certifico que el instrumento adjunto ha sido ejecutado y reconocido de conformidad con las leyes del Estado de Ohio.

En testimonio de lo anterior, firmo y suscribo mi nombre y coloco el sello de la Corte en la ciudad de Bowling Green, Ohio, a los 8 días del mes de Diciembre del año 2004.

FIRMADO: REBECCA E. BHAER

SECRETARIO DE LAS CORTES, CONDADO DE WOODS, OHIO.

HAY SELLO EN RELIEVE DE LA CORTE



107
107

APOSTILLA

CONVENIO DE LA HAYA DEL 5 DE OCTUBRE DE 1961

1. PAIS: ESTADOS UNIDOS DE AMERICA
EL PRESENTE DOCUMENTO PUBLICO
2. HA SIDO FIRMADO POR: REBECCA E. BHAER
3. ACTUANDO EN SU CAPACIDAD DE: SECRETARIO DE LA CORTE DE
ASUNTOS COMUNES
4. LLEVA FIRMA Y SELLO DE: CORTE DE ASUNTOS COMUNES, ESTADO DE OHIO.

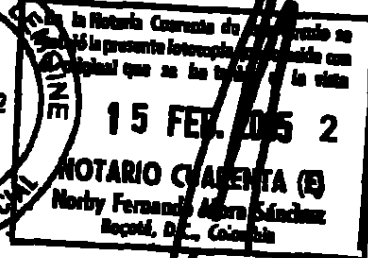
CERTIFICADO

5. EN: COLUMBUS, OHIO
6. EL: 20 DE DICIEMBRE, 2004
7. POR: EL SECRETARIO DE ESTADO DE OHIO
8. BAJO EL NO.: 200417
9. SELLO: SECRETARIO DE ESTADO DE OHIO
10. FIRMADO: J. KENNETH BLACKWELL, SECRETARIO DE ESTADO DE OHIO

LA TRADUCTORA OFICIAL

Helena Uribe de Lemoine

HELENA URIBE DE LEMOINE



REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCION ✓		
MODELO DE UTILIDAD	()	(✓)
- Indicación de que se solicita la concesión de una patente.	()	(✓)
- Datos de identificación del solicitante o de la persona que se presenta la solicitud.	()	(✓)
- Descripción de la invención.	()	(✓)
- Dibujos de ser estos pertinentes.	()	(✓)
- Comprobante de Pago de las tasas establecidas.		
COMPLETA ()	INCOMPLETA ()	()
DISEÑO INDUSTRIAL ()		
- Indicación de que se solicita el registro de Diseño Industrial	()	()
- Datos de identificación del solicitante o de la persona que presenta la solicitud.	()	()
- Representación gráfica o fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	()	()
- Comprobante de pago de las tasas establecidas	()	()
COMPLETA ()	INCOMPLETA ()	()
ESQUEMA DE TRAZADO ()		
- Indicación de que solicita el registro de un Esquema de trazado.	()	()
- Datos de identificación del solicitante o de la persona que presenta La solicitud.	()	()
- Representación gráfica del esquema de trazado	()	()
- Comprobante de pago de las tasas establecidas.	()	()
COMPLETA ()	INCOMPLETA ()	()

Firma Responsable:

Claudia M Nueva

Fecha:

2020
Bogotá, D.C.,

Doctor:
JUAN PABLO CADENA SARMIENTO
Apoderado
OWENS-BROCKWAY GLASS CONTAINER INC.

Oficio: N° J-12486

ASUNTO:	Radicación N°	05-19561
	Solicitud internacional	PCT/US2003/027703
	Fecha inicio fase nacional	04/04/2005
	Trámite	011
	Evento	379
	Actuación	430
	Folios	001

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

- La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486).
- La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.


ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones.

El anterior requerimiento fue notificado por fijación en lista de fecha, 01 APR 2005

202030

CALLE 13 NO. 27-00 Piso 5 y 10
Bogotá 111321-23-4
Fax: 31 31 25 e-mail: info@sic.gov.co
SIC de Bogotá D.C. - Colombia