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SUPERINTENDENCIA Y COMERCIO
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Trámite : 002 PATENTES D I REGISTRO/ 229 CANCELACION
AS: 88.626 Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

Señores

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIVISION DE NUEVAS CREACIONES

E. S. D.

REF: Expediente No.02 066.121 - Solicitud de Patente
a favor de OWENS - BROCKWAY GLASS CONTAINER INC.

**Titulada: APARATO Y METODO PARA INSPECCIONAR RECIPIENTES
NO REDONDOS**

RAMIRO CASTRO DUQUE, vecino de Bogotá, portador de la tarjeta profesional No. 1003, obrando como apoderado de la Sociedad OWENS - BROCKWAY GLASS CONTAINER INC., según lo acredita el documento de poder presentado en esa División, me permito anexar al presente escrito los siguientes documentos:

1. Copia certificada por la Oficina de Patentes de los Estados Unidos de la primera solicitud presentada para la misma invención, de la cual REIVINDICAMOS PRIORIDAD, junto con su correspondiente traducción del inglés al castellano.

Del señor Jefe atentamente,


RAMIRO CASTRO DUQUE
C.C. No. 170.322 de Bogotá
Código 340
Cra 7a. No. 16-56 Piso 9

Bogotá, Septiembre 18, 2002
CPB/hsr.

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THE UNITED STATES OF AMERICA

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UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

July 23, 2002

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 09/919,705

FILING DATE: August 01, 2001



**By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS**

**N. WOODSON
Certifying Officer**

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PTO/BB/09 (11-00)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 17613 DBA
First Inventor Stephen M. Garber
Title ..Inspecting Non-Round Container
Express Mail Label No. EL 507167825 US

APPLICATION ELEMENTS

See MPEP chapter 800 concerning utility patent application contents.

- ☒ Fee Transmittal Form (e.g., PTO/BB/17)
(Submit an original and a duplicate for fee processing)
- ☐ Applicant claims small entity status.
See 37 CFR 1.27.
- ☒ Specification [Total Pages 13]
(Submitted in accordance with 37 CFR 1.52)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table, or a computer program listing appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawing(s) (38 U.S.C. 113) [Total Sheets 4]
5. Oath or Declaration [Total Pages 6]
 - ☒ Newly executed (original or copy)
 - ☐ Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 18 completed)
 - ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s)
named in the prior application, see 37 CFR 1.63(b)(2) and 1.33(b)
- ☐ Application Data Sheet. See 37 CFR 1.76

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

- ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
- Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
 - ☐ Computer Readable Form (CRF)
 - Specification Sequence Listing on:
 - ☐ CD-ROM or CD-R (2 copies); or
 - ☐ paper
 - ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

- ☒ Assignment Papers (cover sheet & document(s))
- ☐ 37 CFR 3.72(b) Statement
(when there is an assignee) ☐ Power of Attorney
- ☐ English Translation Document *(if applicable)*
- ☐ Information Disclosure Statement (IDS)/PTO-1448 ☐ Copies of IDS Citations
- ☐ Preliminary Amendment
- ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
- ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
- ☒ Request and Certification under 35 U.S.C. 122
(b)(2)(B)(i) Applicant must attach form PTO/BB/35 or its equivalent.
- ☒ Other: PTO/BB/81 (3)

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)

of prior application No. _____

Prior application information

Examiner

Class Art Unit

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation may only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

18. CORRESPONDENCE ADDRESS

☐ Customer Number or Bar Code Label

or ☒ Correspondence address below

Name	H. G. Bruss 25 LDP				
	Owens-Illinois, Inc.				
Address	One SeaGate				
City	Toledo	State	OH	Zip Code	43666
Country	USA	Telephone	419-247-8547	Fax	247-8555

Name (Print/Type)	H. G. Bruss	Registration No. (Attorney/Agent)	24,389
Signature		Date	7/31/01

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FEE TRANSMITTAL for FY 2001

Patent fees are subject to annual revision

Complete if Known

Application Number	
Filing Date	
First Named Inventor	Stephen M. Garber
Examiner Name	
Group Art Unit	
Attorney Docket No.	17613 USA

TOTAL AMOUNT OF PAYMENT (\$)
710

METHOD OF PAYMENT

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to

Deposit Account Number: 15-0875

Deposit Account Name: Owens-Illinois, Inc.

☒ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☐ Applicant claims small entity status See 37 CFR 1.27

2. ☐ Payment Enclosed:

☐ Check ☐ Credit card ☐ Money Order ☐ Other

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Fee Code	Large Entity Fee (\$)	Small Entity Fee (\$)	Fee Description	Fee Paid
105	130	65	Surcharge - late filing fee or oath	
127	30	15	Surcharge - late provisional filing fee or other defect	
139	130	65	Non-English specification	
147	2,530	1,265	For filing a request for an extra examination	
112	920*	460*	Requesting publication of BIR prior to Examiner action	
113	1,840*	920*	Requesting publication of BIR after Examiner action	
118	110	55	Extension for reply within first month	
119	380	190	Extension for reply within second month	
117	880	440	Extension for reply within third month	
118	1,390	695	Extension for reply within fourth month	
128	1,880	940	Extension for reply within fifth month	
119	310	155	Notice of Appeal	
120	310	155	Filing a brief in support of an appeal	
121	270	135	Request for oral hearing	
138	1,810	905	Petition to institute a public use proceeding	
140	110	55	Petition to revive - unavoidable	
141	1,240	620	Petition to revive - unintentional	
142	1,240	620	Utility claim fee (for response)	
143	440	220	Design claim fee	
144	800	400	Plant claim fee	
122	130	65	Petitions to the Commissioner	
123	80	40	Processing fee under 37 CFR 1.17(b)	
125	180	90	Submission of Information Disclosure Sheet	
881	40	20	Regarding each patent assignment per property (unless number of properties)	
148	710	355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	710	355	For each additional invention to be examined (37 CFR § 1.129(b))	
179	710	355	Request for Continued Examination (RCE)	
188	800	400	Request for expedited examination of a design application	

Other fee (specify):

SUBTOTAL (3) (\$)
0

FEE CALCULATION

1. BASIC FILING FEE

Fee Code	Large Entity Fee (\$)	Small Entity Fee (\$)	Fee Description	Fee Paid
101	710	355	Utility filing fee	710
108	330	165	Design filing fee	
107	480	240	Plant filing fee	
108	710	355	Response filing fee	
114	180	90	Provisional filing fee	

SUBTOTAL (1) (\$)
710

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from Table	Fee Paid
8	-30** = 0	0	0
2	-3** = 0	0	0

Large Entity Small Entity
Fee Fee Fee Fee
Code (\$ Code (\$ Code (\$ Code (\$
102 15 305 0
103 80 352 40
104 270 304 126
105 80 308 40
110 15 310 0

Fee Description
Claims in excess of 25
Independent claims in excess of 3
Multiple dependent claims, if not paid
** Reserve independent claims over original patent
** Reserve claims in excess of 25 and over original patent

SUBTOTAL (2) (\$)
0

*or number previously paid, if greater; For Responses, see above

*Reduced by Basic Filing Fee Paid

SUBMITTED BY		Complete if Applicable	
Name (Print/Type)	H. G. Garber	Registration No.	24,389
Signature	<i>[Signature]</i>	Telephone	419-247-8547
		Date	7/31/01

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PTO/SB/25 (11-20)

Approved for use through 10/31/2002, OMB 0551-0031

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**REQUEST AND CERTIFICATION
UNDER
35 U.S.C. 122(b)(2)(B)(i)**

First Named Inventor	Stephen M. Gerbar
Title	...for Inspecting Non-Round Containers
Atty Docket Number	17613 USA

I hereby certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. I hereby request that the attached application not be published under 35 U.S.C. 122(b).

7/31/01
Date


Signature

H. G. Brues
Typed or printed name

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application upon filing.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant must notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(ii)).

Burden Hour Statement: This collection of information is required by 37 CFR 1.312(a). The information is used by the public to request that an application not be published under 35 U.S.C. 122(b) and the PTO to process that request. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This form is estimated to take 5 minutes to complete. This time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEE OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

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APPARATUS AND METHOD FOR INSPECTING NON-ROUND CONTAINERS

The present invention is directed to inspection of glassware articles such as glass containers, and more particularly to an apparatus and method for transporting non-round containers through a series of inspection stations.

Background of the Invention

5 In the manufacture of glassware, such as glass containers, various anomalies or variations can occur that affect commercial acceptability of the containers. These anomalies, termed "commercial variations," can involve dimensional characteristics of the container such as at the container finish, surface characteristics that can affect acceptable operation of the container such as surface variations at the container sealing surface, or variations such as stones or checks within the container finish, sidewall or bottom. It is also conventional practice to mold indicia on each container indicative of the mold of origin of the container for inspection and quality control purposes. U. S. Patent 4,378,493 illustrates a starwheel-type conveyor or transporter for accepting containers in sequence from an in-feed conveyor and transporting the containers through a series of inspection stations. At at least some of the inspection stations, the
15 container is held in position and rotated about its central axis while being electro-optically inspected for commercial variations and/or mold code. The term "inspection" is used to its broadest sense to encompass any optical, electro-optical, mechanical or electrical observation of or engagement with the container to measure or determine a potentially variable characteristic, including but not necessarily limited to mold codes and commercial variations.

20 U. S. Application Serial No. 09/679,584 filed October 4, 2000 and assigned to the assignee hereof, discloses an apparatus for indexing glassware through a series of angularly

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FOOTNOTES - 3026166U

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spaced stations. The apparatus includes first and second arrays of glassware gripping fingers mounted on associated carriers that are rotatable on a common axis, both conjointly and with respect to each other. Each carrier is connected to an associated servo motor, which in turn are connected to a controller for rotating the carriers with respect to each other to grip and release glassware between the fingers, and to rotate the carriers conjointly to index the glassware between apparatus stations. Drive rollers are located at at least some of the stations, and are pivotal into and out of position for rotating the containers about their axes for inspection and other purposes. The apparatus and method disclosed in such patent are particularly well suited for inspection of round containers, but are not as well suited for inspection of non-round containers such as flasks, which must be tightly gripped for transport between stations but loose gripped at the stations to permit rotation of the containers about their axes. It is a general object of the present invention to provide a method and apparatus for transport and inspection of non-round containers.

U. S. Patent 4,124,112, assigned to the assignee hereof, discloses a transporter for indexing non-round containers through a circumferential array of inspection stations. The containers are loosely encircled by cam-operated mechanisms and slid along a plate between inspection stations. Thus, the apparatus disclosed in the noted patent is not suited for use in conjunction with a container transport and inspection system in which the containers must be tightly gripped and transported between stations, as distinguished from being loosely gripped and slid along a support plate.

Summary of the Invention

Apparatus for inspecting non-round containers at a plurality of inspection stations in accordance with a presently preferred embodiment of the invention includes first and second circumferential arrays of glassware gripping fingers disposed in pairs having opposed part-

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5 circular arms. The first and second finger arrays are mounted on respective first and second carriers that are rotatable on a common axis. First and second motors are respectively coupled to the first and second carriers for rotating the carriers independently of each other on their common axis to close the part-circular arms about a container body tightly to grip the container body, to transport the container between inspection stations, partially to open the arms to permit rotation of the container at an inspection station while confining the body of the container, and fully to open the fingers with respect to each other to permit insertion and removal of a container between the fingers. A drive roller may engage the finish of the container at at least one of the inspection stations to rotate the container about the axis of its finish while the container body is confined by the fingers.

A method of transporting non-round containers, from a load station through at least one inspection station to an unload station in accordance with a preferred embodiment of the invention, includes providing first and second circumferential arrays of glassware gripping fingers and positioning the fingers in opposed pairs having part-circular arms. At least one of the arrays is moved toward the other at the load station to close the part-circular arms tightly around a container body. The container is transported to the inspection station by rotating the arm arrays simultaneously on a common axis. At least one of the arrays is then moved away from the other at the inspection station partially to open the arms to permit rotation of the container while confining the container between the arms. At least one of the arrays is moved away from the other at the unload station fully to open the arms and permit removal of the container from between the fingers.

Brief Description of the Drawings

The invention, together with additional objects, features and advantages thereof, will be best understood from the following description, the appended claims and the

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accompanying drawings in which:

FIG. 1 is a schematic diagram for inspecting the sealing surface of containers transported through an inspection station by a conveyor in accordance with a presently preferred embodiment of the invention;

5 FIG. 2 is a perspective view of the carrier drive unit subassembly in the conveyor of FIG. 1;

FIG. 3 is a fragmentary perspective view of the carrier subassembly of FIG. 2 gripping non-round containers for purpose of transport between stations;

FIG. 4 is a fragmentary perspective view of the conveyor tightly gripping a non-round container body for transport between stations; and

FIGS. 5A, 5B and 5C are fragmentary perspective views that illustrate a portion of the conveyor configured for receiving or releasing containers at in-feed, out-feed or reject stations (FIG. 5A), tightly gripping the container for transport between stations (FIG. 5B), and loosely confining the container for rotation at an inspection station (FIG. 5C).

Detailed Description of Preferred Embodiments

The disclosure of above-noted U.S. Application Serial No. 09/679,584 filed October 4, 2000 and assigned to the assignee hereof, is incorporated herein by reference.

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FIG. 1 of the present application illustrates a conveyor or transporter 10 for transporting non-round containers 12 between and through a plurality of angularly spaced stations. These stations preferably are spaced at equal angular increments around a common axis. An in-feed conveyor 14 (FIG. 3), such as an endless belt conveyor, brings containers 12 in sequence to one of the stations. In general, transporter 10 grips container 12 as they are presently on in-feed conveyor 14, and incrementally transports the containers to each station in turn around the apparatus. At at least some of the stations, containers 12 are held in position and rotated

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about their axes for inspection or other purposes. Containers 12 are ultimately indexed to an out-feed conveyor 16 (FIG. 3), or a cullett or reject chute 18 for removing containers that do not pass inspection, or to a sampling or other device for sampling containers from a specific mold, for example. The in-feed, out-feed and reject conveyors are illustrated in greater detail in the above-referenced U.S. Application.

In the preferred implementation of the present invention, the containers are subject to inspection for commercial variations at at least one of the stations between the in-feed and reject stations. FIG. 1 illustrates an exemplary station 20 for inspecting a container finish 22. A light source 24 and a camera 26 are coupled to an information processor 28 for directing light energy onto the container finish and scanning the camera at increments of container rotation. A container rotation device 30, such as a drive roller, is positioned to engage container finish 22 and to rotate the container about the axis of the container finish while the container is held in fixed position by conveyor 10. An encoder 32 is coupled to container rotation mechanism 30 and to information processor 28 to provide to the information processor signals indicative of increments of container rotation. Such container rotation increments may comprise increments of angular position, or time increments as the container is rotated at constant velocity. Information processor 28 is also connected to a display 34 for displaying the results of the inspection operation to an operator, and to conveyor 10 and reject station 18 for controlling operation of the conveyor and reject station. Container finish inspection station 20 is disclosed in greater detail in U.S. Patent 6,025,909. Other container dimensional or other parameters can also be inspected as shown, for example, in U.S. 2,682,802 (finish check detection), U.S. 3,880,750, U.S. 5,896,195 or EP 0,961,113 (sealing surface inspection), U.S. 4,378,493, 4,378,495, 4,584,469, 5,233,186, 5,291,271 or 5,637,864 (container sidewall inspection), or EP 0,764,846 (container bottom inspection). Successive containers can also be inspected to

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determine or read the code molded into the container for indicating container mold of origin, as illustrated for example in U.S. 4,644,151. Although electro-optical inspection techniques are currently preferred, the apparatus and method of the present invention can also accommodate mechanical inspection techniques, such as illustrated in U.S. 5,414,939 in which the container is contacted by one or more rollers or fingers as it is rotated about its axis. Electrical inspection techniques, as illustrated, for example, in U.S. 4,046,258, are also envisioned.

Transporter 10 in accordance with the present invention includes a carrier drive unit or subassembly 40 (FIGS. 2 and 3), mounted on a fixed or moveable support frame. Carrier drive unit 40 includes a central support 42 that is mounted on the frame. A first rotary electric servo motor 44 and an associated gear box 46 are mounted on the underside of support 42, and are coupled to a shaft that extends upwardly through the support. The axis of rotation of the shaft defines the central axis of carrier drive unit 40 and transporter 10. The upper end of the shaft is coupled to a first or upper carrier 48. A second rotary electric servo motor 50 and an associated gear box 52 are mounted beneath support 42 laterally offset from the axis of the shaft. Gear box 52 is rotatably coupled to a second or lower carrier 54. Thus, first or upper carrier 48 is rotatable about the axis of the shaft under control of motor 44 and gear box 46, while second or lower carrier 54 is rotatable about the axis of the shaft under control of motor 50 and gear box 52 independently of rotation of upper carrier 48.

Referring to FIGS. 3 - 5C, upper carrier 48 has a plurality of angularly equally spaced radially extending legs 56. A container gripping finger 58 is secured to the outer end of each leg 56. Each finger 58 is inverted L-shaped in elevational view, having a straight vertical leg and a pair of vertically spaced radially extending horizontal legs 62. Horizontal legs 62 are semi-circular in geometry, as best seen in FIGS. 5A - 5C. Likewise, lower carrier 54 includes a plurality of angularly equally spaced radially extending legs 64, at the outer ends of which are

mounted a corresponding container-gripping finger 66. Each finger 66 is generally inverted L-shape, in elevational view having a straight vertical leg secured to radial leg 56 and a radially extending semi-circular leg 68 that is disposed in assembly between legs 62 of each finger 58. A coil spring 70 is coupled to each finger 66 rotatably to bias each finger 66 toward the associated opposing finger 58 and thereby accommodate size variations among the bodies of containers 12 transported by the conveyor. A layer or coating of resilient elastic material such as polyurethane is provided on the inside surface of each leg 62, 68 for engaging the containers without damage to the containers and to enhance frictional gripping of the containers for transport between stations. Information processor 28 (FIG. 1), is connected through a motor control unit 72 (FIG. 2) for controlling operation of motors 44, 50, and thereby controlling rotation of upper and lower carriers 48, 54, as will be described.

In operation, with the containers at the various inspection stations resting on a support 80 (FIG. 1), at least one of the carriers 48, 54, and preferably both of the carriers, are simultaneously rotated about their common axes, by control of motors 44, 50 (FIG. 2), to move fingers 58, 66 away from each other (FIG. 5A) to accept new containers from in-feed conveyor 14 (FIG. 3), deposit containers on out-feed conveyor 16, and release containers at reject station 18. At least one of the carriers 48, 54, and preferably both carriers, are then simultaneously rotated about their common axes toward each other tightly to grip all containers between fingers 58, 66 (FIG. 5B). The carriers are then simultaneously rotated by their associated motors, in the counterclockwise direction in FIG. 3, incrementally to transport the containers between adjacent angularly spaced stations. It will be noted that there is no support plate or the like between supports 80 at the inspection stations and along which the containers may be slid. Thus, it is necessary tightly to grip the containers for transport between stations, and the resilient layers on the fingers enhance such gripping action. When the containers are at the next stations, at least

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one of the carriers 48, 54, and preferably both carriers, are then simultaneously rotated to move fingers 58, 66 slightly away from each other (FIG. 5C) to release the containers for rotation while confining the bodies of the containers during rotation. The finish of the container or containers under inspection can be engaged by associated drive rollers 30 (FIG. 1) for rotating the containers about their axes during the inspection process. (Containers may, of course, be inspected while in stationary position at some of the inspection stations, if desired.) After inspection has been completed at all inspection stations, fingers 58, 66 are moved to the position of FIG. 5A by rotation of the associated carriers so that inspected containers are released to the reject or out-feed conveyors and new containers are received for inspection. These steps are repeated in sequence for transporting a continuing series of containers through the successive stations.

Details of upper carriage 48, lower carriage 54, support 80, mounting of arms 58, 66 on the carriers, coupling of motors 44, 50 to the carriers, mounting of subassembly 40 on a support frame, and mounting of drive roller 30 for engagement with the container finish are disclosed in the above-referenced copending U.S. Application.

There have thus been disclosed an apparatus and method for indexing glassware, such as containers, through a series of stations, such as container inspection stations, that fully satisfy all of the objects and aims previously set forth. A number of modifications and variations have been discussed. For example, a container under inspection could be rotated other than by rollers that engage the finish, such as by gripping the container at an inspection station between top and bottom pads, one or both of which are driven to rotate the container. Other modifications and variations will readily suggest themselves to persons of ordinary skill in the art. The invention is intended to embrace all such modifications and variations as fall within the spirit and broad scope of the appended claims.

Claims

1.

Apparatus for inspecting containers, having a non-round body and a cylindrical finish, at a plurality of inspection stations, comprising:

first and second circumferential arrays of glassware gripping fingers, said fingers being disposed in pairs having opposed part-circular arms,

first and second carriers respectively mounting said first and second finger arrays for rotation about a common axis, and

first and second motors respectively coupled to said first and second carriers for rotating said carriers independently of each other about said common axis to close said part-circular arms about a container body, transport the container between inspection stations, partially open said arms to permit rotation of the container while confining the body of the container, and fully open the fingers with respect to each other to permit removal of a container from between said fingers.

2.

The apparatus set forth in claim 1 further comprising a drive roller to engage a container finish at at least one of said inspection stations and rotate the container about the axis of the finish.

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3.

1 The apparatus set forth in claim 1 further comprising springs carried by one of
2 said carriers and engaged with the fingers on that carrier for resiliently urging such fingers toward
3 the fingers on the other carrier to accommodate variation in container size.

4.

1 The apparatus set forth in claim 1 wherein said part-circular arms comprise semi-
2 circular arms.

5.

 The apparatus set forth in claim 1 wherein said first and second motors comprise
 electric motors, and wherein said apparatus includes control electronics coupled to said electric
 motors for rotating said carriers about said common axis independently of each other.

6.

 A method of transporting non-round containers from a load station through at least
 one inspection station to an enclosed station, which comprises the steps of:

- 3 (a) providing first and second circumferential arrays of glassware gripping fingers,
4 (b) positioning said fingers in pairs having opposed part-circular arms,
5 (c) moving at least one of said arrays toward the other at said load station to close
6 said part-circular arms tightly around a container body,
7 (d) transporting the container to the inspection station by rotating said arm arrays
8 simultaneously on a common axis,
9 (e) moving at least one of said arrays away from the other at said inspection
10 stations partially to open said arms to permit rotation of the container while confining the
11 container between said arms, and

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1 (f) moving at least one of said arrays away from the other at said unload station
2 fully to open said arms and permit removal of the container from between said fingers.

7.

1 The method set forth in claim 6 wherein said step (c) comprises rotating both of
2 said arrays simultaneously toward each other, wherein said step (e) comprises rotating both of
3 said arrays simultaneously away from each other, and wherein said step (f) comprises moving
4 both of said arrays simultaneously away from each other.

8.

The method set forth in claim 6 wherein said step (a) includes providing semi-
circular arms on said fingers.

2025 RELEASE UNDER E.O. 14176

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Abstract of the Disclosure

An apparatus for inspecting non-round containers includes a pair of carriages coupled to associated motors for rotation independently of each other on a common axis. Each carriage carries a corresponding plurality of semi-circular gripping fingers, which may be moved toward and away from each other by controlled rotation of the carriages. The fingers are widely separated from each other to accept non-round containers at an in-feed station, and to permit removal of the containers at out-feed and reject stations. For transporting the containers between stations, the finger are brought closely together to grip the containers for indexing, and springs on one of the carriages resiliently urge the associated fingers toward the fingers on the opposing carriage for accommodating size variations among the containers. At inspection stations, the fingers are moved slightly away from each other, but remain together so as to define a circular perimeter for capturing the non-round body and confining the body of the container during rotation. The container may be rotated by a drive roller engaged with the cylindrical container finish. The container finish can be inspected, as can portions of the sidewall, base and heel.

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Enclosures:

Application drawings (FIGS. 1-5)

101080-50261660

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PTO/SB-01 (1C-00)
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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☒ Declaration
Submitted
with Initial
Filing OR ☐ Declaration
Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket Number **17613 USA**
First Named Inventor **Steve M. Garber**

COMPLETE IF KNOWN

Application Number

Filing Date

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

APPARATUS AND METHOD FOR INSPECTING NON-ROUND CONTAINERS

(Title of the invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(e) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/028 attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(a) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/028 attached hereto

[Page 1 of 2]

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17613 USA

PTO/SB/01, 1C-07

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Address **Owens-Illinois, Inc.**

Address **One SeaGate**

City **Toledo**

State **OH**

ZIP **43666**

Country **USA**

Telephone **419-247-8547**

Fax **419-247-8555**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR:

☐ A petition has been filed for this unsigned inventor

Given Name

Stephen M.

Family Name

Gerber

(first and middle (if any))

or Surname

Inventor's
Signature

Stephen M. Gerber

Date **7-20-01**

Residence: City **Petersburg**

State **MI**

Country **USA**

Citizenship **USA**

Mailing Address **3292 Wells Road**

Mailing Address

City **Petersburg**

State **MI**

ZIP **49270**

Country **USA**

NAME OF SECOND INVENTOR:

☐ A petition has been filed for this unsigned inventor

Given Name

George A.

Family Name

Nickay

(first and middle (if any))

or Surname

Inventor's
Signature

Date

Residence: City **Maumee**

State **OH**

Country **USA**

Citizenship **USA**

Mailing Address **7449 Cedar Road**

Mailing Address

City **Maumee**

State **OH**

ZIP **43537**

Country **USA**

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

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17613 USA

PTO/SB/03A (11-00)

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Under the Patent and Trademark Act of 1980, no action shall be taken by the Patent and Trademark Office to initiate a prosecution of a claim in a patent application unless it contains a valid oath or declaration.

DECLARATION

ADDITIONAL INVENTOR(S)

Supplemental Sheet

Page 1 of 1

Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))

Family Name or Surname

Noel D.

Wendt

Inventor's Signature

Noel D. Wendt

Date 7-20-01

Residence: City Toledo

State OH

Country USA

Citizenship USA

Mailing Address 4954 Valencia Drive

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City

Toledo

State OH

ZIP 43623

Country

USA

Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))

Family Name or Surname

Inventor's Signature

Date

Residence: City

State

Country

Citizenship

Mailing Address

Mailing Address

City

State

ZIP

Country

Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))

Family Name or Surname

Inventor's Signature

Date

Residence: City

State

Country

Citizenship

Mailing Address

Mailing Address

City

State

ZIP

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	17613 USA
	First Named Inventor	Steve M. Gerber
	COMPLETE IF KNOWN	
	Application Number	/
	Filing Date	
	Group Art Unit	
☒ Declaration Submitted with Initial Filing	OR	☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)
Examiner Name		

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

APPARATUS AND METHOD FOR INSPECTING NON-ROUND CONTAINERS

(Title of the invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT International filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

(Page 1 of 2)

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09919705-080101

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17613 USA

PTO SB 01-01

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DECLARATION — Utility or Design Patent Application

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Name **H. G. Bruus 25-LDP**

Address **Owens-Illinois, Inc.**

Address **One SeaGate**

City **Toledo**

State **OH**

ZIP **43666**

Country **USA**

Telephone **419-247-8547**

Fax **419-247-8555**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR :

☐ A petition has been filed for this unsigned inventor

Given Name **Steve M.**
(first and middle (if any))

Family Name **Garber**
or Surname

Inventor's
Signature

Date

Residence: City **Petersburg**

State **MI**

Country **USA**

Citizenship **USA**

Mailing Address **3292 Wells Road**

Mailing Address

City **Petersburg**

State **MI**

ZIP **49270**

Country **USA**

NAME OF SECOND INVENTOR:

☐ A petition has been filed for this unsigned inventor

Given Name **George A.**
(first and middle (if any))

Family Name **Nickey**
or Surname

Inventor's
Signature

Date **7-30-01**

Residence: City **Marion**

State **OH**

Country **USA**

Citizenship **USA**

Mailing Address **7449 Cedar Road**

Mailing Address

City **Marion**

State **OH**

ZIP **43537**

Country **USA**

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

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17613 USA

PTO SA-224 (11-02)

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 1 of 1

Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Noel D.		Wendt	
Inventor's Signature		Date	
Residence: City	Toledo	State	OH
Country	USA	Citizenship	USA
Mailing Address 4954 Valencia Drive			
Mailing Address			
City	Toledo	State	OH
ZIP	43623	Country	USA
Name of Additional Joint Inventor, if any:		☐ A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City		State	
Country		Citizenship	
Mailing Address			
Mailing Address			
City		State	
ZIP		Country	
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Given Name (first and middle (if any))		Family Name or Surname	
Inventor's Signature		Date	
Residence: City		State	
Country		Citizenship	
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Mailing Address			
City		State	
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PTO/SB/61 (10-00)
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POWER OF ATTORNEY OR AUTHORIZATION OF AGENT

Application Number	
Filing Date	
First Named Inventor	Steve M. Gerber
Group Art Unit	
Examiner Name	
Attorney Docket Number	17613 USA

I hereby appoint:

- ☐ Practitioners at Customer Number OR
☒ Practitioner(s) named below:

Place Customer
Number Bar Code
Label here

Name	Registration Number
Principal Attorney: H. G. Bruce	24,389
Associate Attorney: R. C. Collins	27,430

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

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Telephone	Fax			

I am the:

- ☒ Applicant/Inventor.
☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/90).

SIGNATURE of Applicant or Assignee of Record

Name	Steve M. Gerber
Signature	<i>Steve M. Gerber</i>
Date	7-20-01

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 3 forms are submitted.

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PTO/SB/81 (10-92)

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	Filing Date	
	First Named Inventor	Steve M. Garber
	Group Art Unit	
	Examiner Name	
	Attorney Doctist Number	17613 USA

I hereby appoint:

☐ Practitioners at Customer Number

OR

☒ Practitioner(s) named below:

Name	Registration Number
Principal Attorney: E. G. Bruce	24,389
Associate Attorney: R. C. Collins	27,430

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I am the:

☒ Applicant/Inventor.

☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/98).

SIGNATURE of Applicant or Assignee of Record

Name	George A. Nickey
Signature	<i>George A. Nickey</i>
Date	7-30-01

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 3 forms are submitted

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Application Number	
Filing Date	
First Named Inventor	Steve M. Gerber
Group Art Unit	
Examiner Name	
Attorney Docket Number	17613 USA

I hereby appoint:

☐ Practitioners at Customer Number OR

☒ Practitioner(s) named below:

Name	Registration Number
Principal Attorney: H. G. Bruss	24,389
Associate Attorney: R. C. Collins	27,430

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Address

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I am the:

☒ Applicant/Inventor.

☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

SIGNATURE of Applicant or Assignee of Record

Name

Noel D. Wendt

Signature

Noel D. Wendt

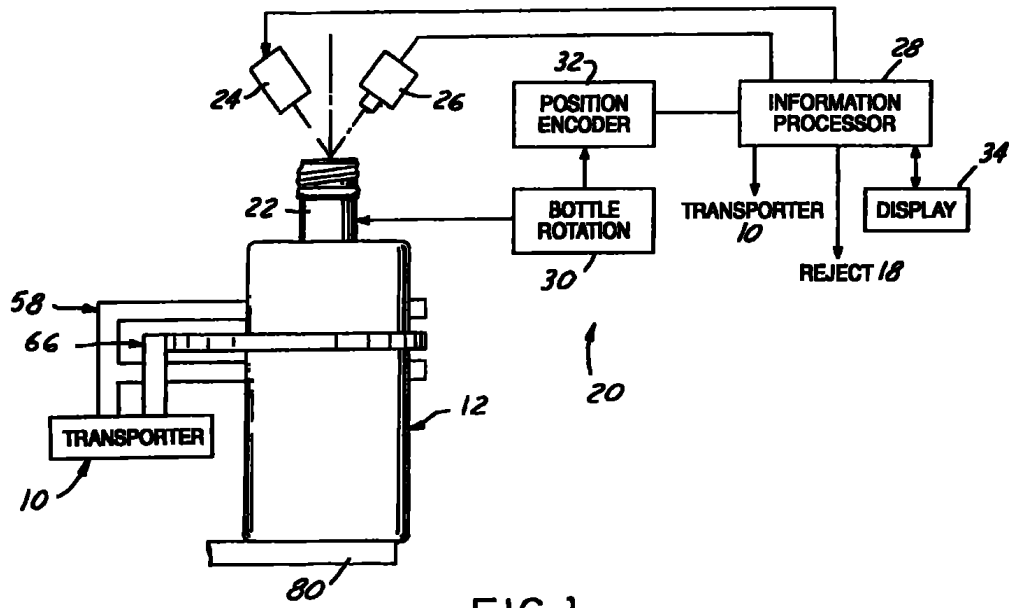
Date

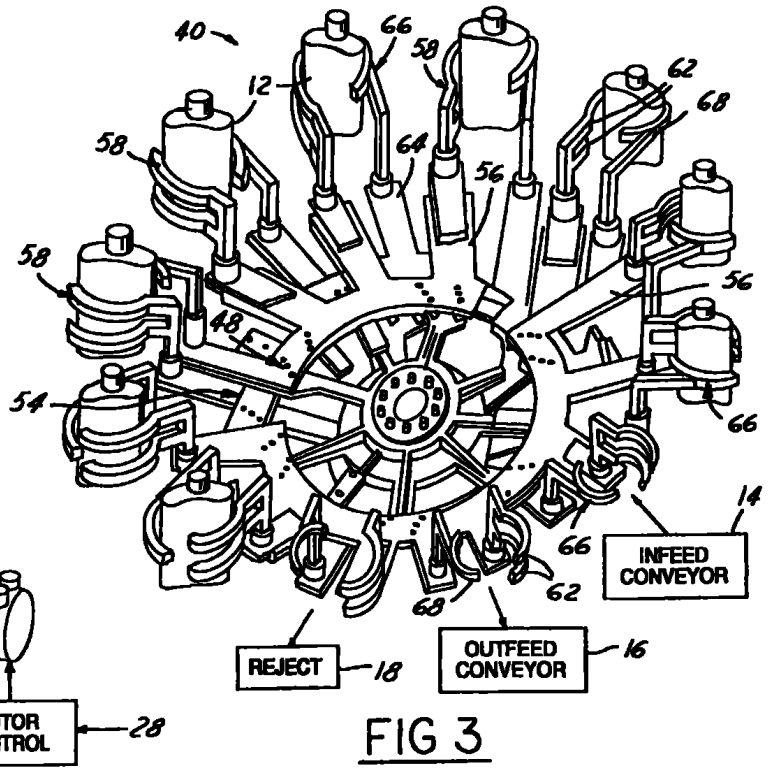
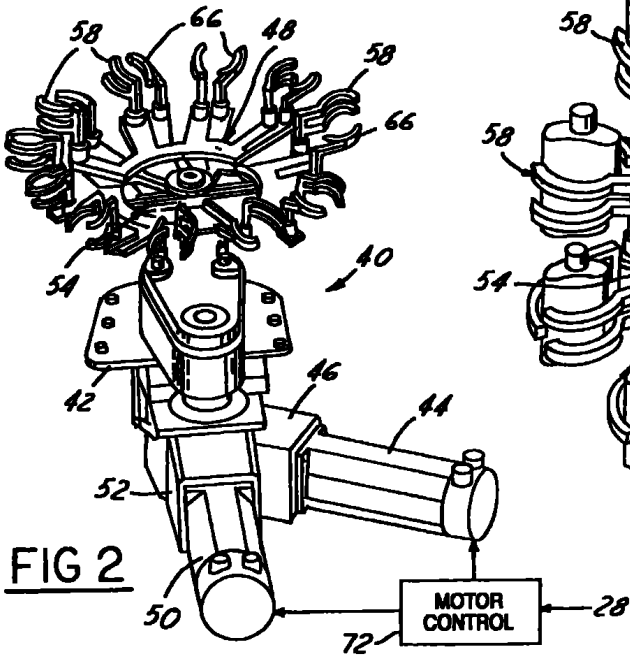
7-20-01

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

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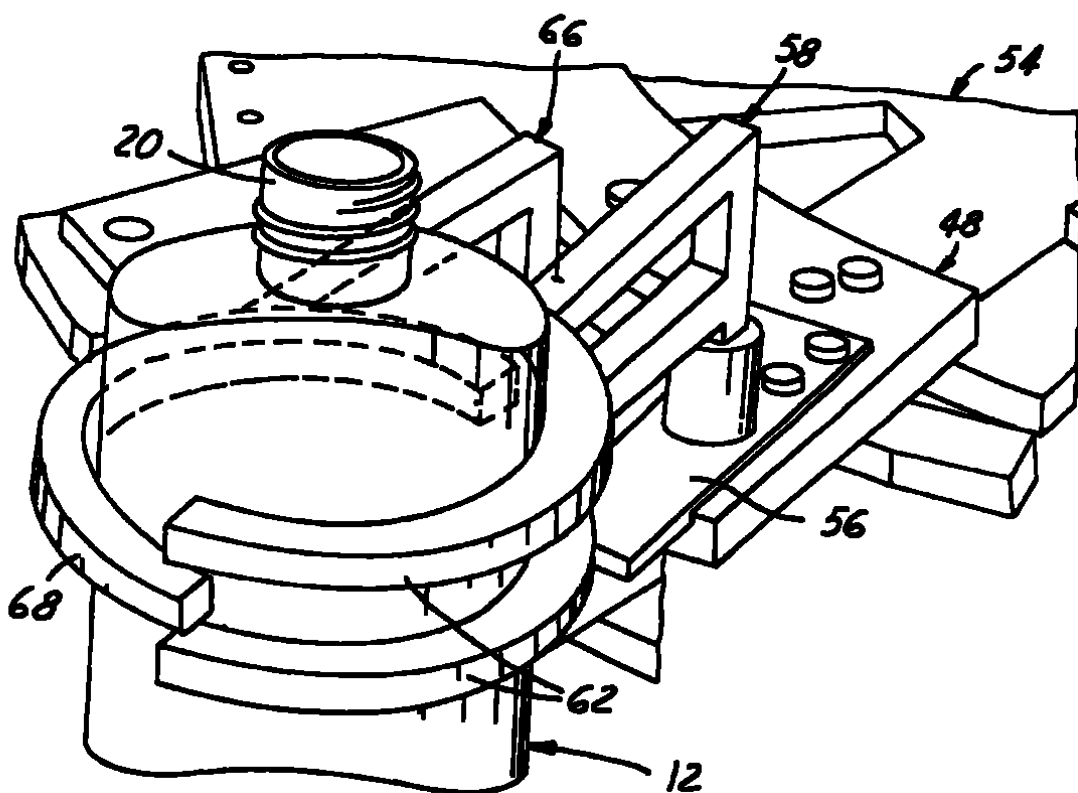


FIG 4

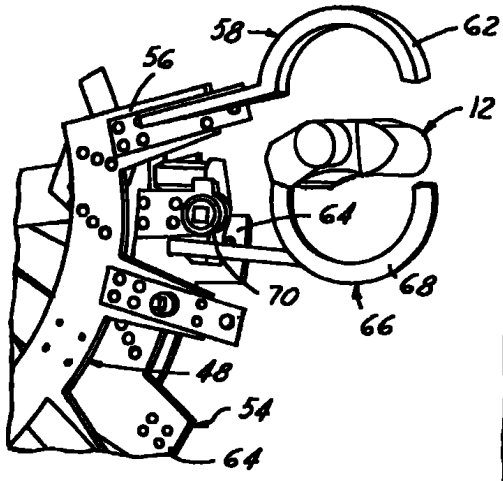


FIG 5A

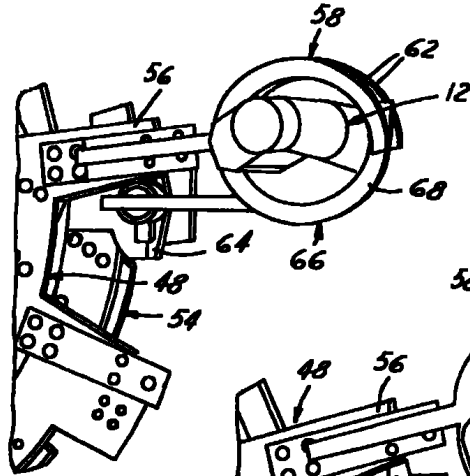


FIG 5B

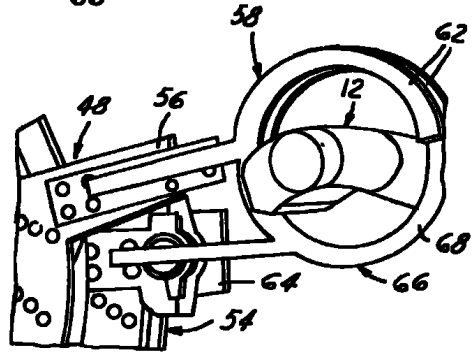


FIG 5C

1

**TRADUCCIÓN DEL INGLÉS AL CASTELLANO de la Solicitud de
Patente de los Estados Unidos No.09/919,705 relacionada con:**

**APARATO Y MÉTODO PARA INSPECCIONAR RECIPIENTES NO
REDONDOS**

**ANEXOS. La Solicitud de Patente de los Estados Unidos Serie No.09/
919,705 arriba mencionada, Declaración y Poder, Solicitud de Patente,
Certificación del Comisionado de Patentes y Marcas de los Estados
Unidos de América.**

LOS ESTADOS UNIDOS DE AMÉRICA

**DEPARTAMENTO DE COMERCIO DE LOS ESTADOS UNIDOS DE
AMÉRICA**

Oficina de Patentes y Marcas de los Estados Unidos

Julio 23, 2002

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UNIDOS DE AQUELLOS DOCUMENTOS DE LA SOLICITUD DE
PATENTE IDENTIFICADA ABAJO LA CUAL CUMPLE LOS
REQUISITOS PARA CONCEDERLE UNA FECHA DE
PRESENTACIÓN BAJO LA NORMA 35USC 111.**

**NUMERO DE SOLICITUD: 09/919,705
FECHA DE PRESENTACION: Julio 01, 2001**

**Por autorización del
COMISIONADO DE PATENTES Y MARCAS
N. Woodson (Firmado)
N. WOODSON
Funcionario de Certificaciones**

SELLO ADHERIDO

RCC/mtc

17613

**APARATO Y MÉTODO PARA INSPECCIONAR RECIPIENTES NO
REDONDOS**

La presente invención está dirigida hacia la inspección de artículos

de vidrio tales como recipientes de vidrio, y más particularmente hacia un aparato y un método para transportar recipientes no redondos a través de una serie de estaciones de inspección.

Antecedentes de la Invención

En la fabricación de artículos de vidrio, tales como recipientes de vidrio, varias anomalías o variaciones pueden ocurrir que afectan la aceptabilidad comercial de los recipientes. Estas anomalías, denominadas "variaciones comerciales" pueden involucrar características dimensionales del recipiente tal como en la parte superior del recipiente, características superficiales que afectan la operación aceptable del recipiente tal como variaciones superficiales en la superficie de cierre del recipiente o variaciones tales como piedras o grietas dentro de la parte superior, pared lateral o fondo del recipiente. Es además práctica convencional moldear indicios sobre cada recipiente indicativos del molde de origen del recipiente con propósitos de inspección y control de calidad. La Patente US No. 4,378,493 ilustra un transportador del tipo de rueda en estrella para aceptar recipientes en secuencia desde un transportador de alimentación y transportar los recipientes a través de una serie de estaciones de inspección. En por lo menos algunas de las estaciones de inspección, el recipiente es sostenido en posición y rotado alrededor de su eje central mientras que es inspeccionado electro-ópticamente en cuanto a variaciones comerciales y/o código del molde. El término "inspección" se usa en su más amplio sentido para tener en cuenta cualquier observación óptica, electro-óptica, mecánica o eléctrica de, o un arreglo con el recipiente para medir o determinar una característica potencialmente variable, incluyendo pero no necesariamente limitada a códigos del molde y variaciones comerciales.

La solicitud US Serie No. 09/679,584 presentada en Octubre 4, 2000 y cedida al cesionario de la presente solicitud divulga un aparato para indexar artículos de vidrio a través de una serie de estaciones espaciadas angularmente. El aparato incluye primer y segundo arreglos de dedos de agarre de artículos de vidrio montados en portadores asociados que son rotativos sobre un eje común, tanto conjuntamente como el uno con respecto al otro. Cada portador está conectado a un servo motor asociado, el cual a su vez está conectado a un controlador para rotar los portadores los unos con respecto a los otros para agarrar y soltar los artículos de vidrio entre los dedos, y para rotar los portadores conjuntamente para indexar los artículos de vidrio entre las estaciones del aparato. Los rodillos de accionamiento están localizados en por lo menos algunas de las estaciones, y pivotan dentro y fuera de posición para rotar los recipientes alrededor de sus ejes con propósitos de inspección y otros. El aparato y el método divulgados en dicha patente están particularmente

bien adaptados para inspección de recipientes redondos, pero no están adaptados para inspección de recipientes no redondos tales como frascos, los cuales deben agarrarse herméticamente para transporte entre estaciones pero pierden el agarre en las estaciones para permitir la rotación de los recipientes alrededor de sus ejes. Es un objetivo general de la presente invención proporcionar un método y un aparato para transporte e inspección de recipientes no redondos.

La Patente US No. 4,124,112, cedida al presente cesionario, divulga un transportador para indexar recipientes no redondos a través de un arreglo circunferencial de estaciones de inspección. Los recipientes están rodeados en forma suelta por mecanismos operados por levas y se deslizan a lo largo de una placa entre estaciones de inspección. Consecuentemente, el aparato divulgado en la patente anotada no es apropiado para uso en conjunción con un sistema de transporte e inspección de recipientes donde los recipientes deben estar agarrados herméticamente y transportados entre estaciones, distinguiéndose de estar agarrados sueltos y deslizándose a lo largo de una placa de soporte.

Resumen de la Invención

Un aparato para la inspección de recipientes no redondos en una pluralidad de estaciones de inspección de acuerdo con una modalidad actualmente preferida de la invención incluye primer y segundo arreglos circunferenciales de dedos de agarre de artículos de vidrio colocados en pares que tienen brazos opuestos de partes circulares. Los primer y segundo arreglos de dedos están montados sobre respectivos primer y segundos portadores que rotan sobre un eje común. Primer y segundo motores están acoplados respectivamente a los primer y segundo portadores para rotar los portadores independientemente los unos de los otros sobre su eje común para cerrar los brazos de partes circulares alrededor de un cuerpo de recipiente herméticamente para agarrar el cuerpo del recipiente, para transportar el recipiente entre estaciones de inspección, parcialmente para abrir los brazos para permitir la rotación del recipiente en una estación de inspección mientras se confina el cuerpo del recipiente, y completamente para abrir los dedos con respecto a cada uno para permitir la inserción y el retiro de un recipiente entre los dedos. Un rodillo de accionamiento puede agarrar la parte superior del recipiente en por lo menos una de las estaciones de inspección para rotar el recipiente alrededor del eje de su parte superior mientras el cuerpo del recipiente está confinado por los dedos.

Un método de transportar recipientes no redondos desde una estación de carga a través de por lo menos una estación de inspección hasta una estación sin carga de acuerdo con una modalidad preferida de

la invención, incluye proporcionar primer y segundo arreglos circunferenciales de dedos de agarre de artículos de vidrio y colocar los dedos en pares opuestos que tienen brazos de partes circulares. Por lo menos uno de los arreglos se mueve hacia el otro en la estación de carga para cerrar los brazos de partes circulares herméticamente alrededor del cuerpo del recipiente. El recipiente es transportado a la estación de inspección rotando los arreglos de brazo simultáneamente sobre un eje común. Por lo menos uno de los arreglos se mueve entonces lejos del otro en la estación de inspección parcialmente para abrir los brazos para permitir la rotación del recipiente mientras se confina el recipiente entre los brazos. Por lo menos uno de los arreglos se mueve lejos del otro en la estación sin carga para abrir los brazos y permitir el retiro del recipiente de entre los dedos.

Breve Descripción de los Dibujos

La invención, conjuntamente con sus objetivos, características y ventajas adicionales, se entenderá en mejor forma a partir de la siguiente descripción, las reivindicaciones del apéndice y los dibujos que se acompañan, en los cuales:

la Figura 1 es un diagrama esquemático para inspeccionar la superficie de sellado de recipientes transportados a través de una estación de inspección mediante un transportador de acuerdo con una modalidad actualmente preferida de la invención;

la Figura 2 es una vista en perspectiva del subconjunto de la unidad de accionamiento del portador en el transportador de la Figura 1;

la Figura 3 es una vista en perspectiva fragmentada del subconjunto del portador de la Figura 2 agarrando los recipientes no redondos con propósito de transporte entre estaciones;

la Figura 4 es una vista en perspectiva fragmentada del agarre hermético del transportador de un cuerpo de recipiente no redondo para transporte entre estaciones; y

las Figuras 5A, 5B y 5C son vistas en perspectiva fragmentadas que ilustran una porción del transportador configurado para recibir o liberar recipientes en estaciones de alimentación, salida o rechazo (Figura 5A), agarrando herméticamente el recipiente para transporte entre estaciones (Figura 5B), y confinar en forma libre el recipiente para rotación en una estación de inspección (Figura 5C).

Descripción Detallada de las Modalidades Preferidas

La divulgación de la arriba anotada Solicitud Serie US No. 09/679,584 presentada en Octubre 4, 2000 y cedida al presente cesionario, se incorpora aquí a modo de referencia.

La Figura 1 de la presente solicitud ilustra un transportador 10 para transportar recipientes no redondos 12 entre y a través de una pluralidad de estaciones angularmente espaciadas. Estas estaciones están espaciadas preferiblemente a incrementos angulares iguales alrededor de un eje común. Un transportador de alimentación 14 (Figura 3), tal como un transportador de correa sinfin, lleva recipientes 12 en secuencia hacia una de las estaciones. En general el transportador 10 agarra los recipientes 12, cuando están actualmente en el transportador de alimentación 14, y transportan a incrementos los recipientes a cada estación a su vez alrededor del aparato. En por lo menos algunas de las estaciones, los recipientes 12 son sostenidos en posición y rotan alrededor de sus ejes para inspección u otros propósitos. Los recipientes 12 son indexados en últimas hacia un transportador de salida 16 (Figura 3), o una caída de rechazo o collarín 18 para retirar recipientes que no pasan la inspección, o a un dispositivo de muestreo u otro dispositivo para muestrear recipientes de un molde específico, por ejemplo. Los transportadores de entrada o alimentación, y de salida se ilustran en mayor detalle en la solicitud US arriba referenciada.

En la implementación preferida de la presente invención, los recipientes son sometidos a inspección en cuanto a variaciones comerciales en por lo menos una de las estaciones entre las estaciones de entrada y rechazo. La Figura 1 ilustra un estación de ejemplo 20 para inspeccionar una parte superior del recipiente 22. Una fuente de luz 24 y una cámara 26 están acopladas a un procesador de información 28 para dirigir energía luminosa hacia la parte superior del recipiente y escruta la cámara a incrementos de rotación del recipiente. Un dispositivo de rotación de recipiente 30, tal como un rodillo de accionamiento, está acoplado para agarrar la parte superior del recipiente 22 y rotar el recipiente alrededor del eje de la parte superior del recipiente mientras es sostenido en posición fija mediante el transportador 10. Un codificador 32 está acoplado al mecanismo de rotación del recipiente 30 y al procesador de información 28 para proporcionar al procesador de información señales indicativas de los incrementos de la rotación del recipiente. Dichos incrementos de la rotación del recipiente pueden comprender incrementos de la posición angular, o incrementos de tiempo, a medida que el recipiente rota a velocidad constante. El procesador de información 28 está también conectado a una pantalla 54 para mostrar en pantalla los resultados de la operación de inspección a un operador, y al transportador 10 y la estación de rechazo 18 para controlar la operación del transportador y la estación de rechazo. La estación de inspección 20 de la parte superior de los recipientes se divulga en mayor detalle en la Patente de los Estados Unidos US 6,025,909. Otros parámetros dimensionales del recipiente u otros parámetros pueden también inspeccionarse tal como se muestra, por ejemplo, en las Patentes

US 2,682,802 (detección de fallas en las partes superiores), US 3,880,150, US 5,896,495 o EP 0,961,113 (inspección de superficies de sellado), US 4,378,493, 4,378,495, 4,584,469, 5,233,186, 5,291,271 o 5,637,864 (inspección de paredes laterales de recipientes), o EP 0,764,846 (inspección de fondos de recipientes). Sucesivos recipientes pueden también inspeccionarse para determinar o leer el código moldeado en el recipiente para indicar el molde del recipiente de origen, tal como se ilustra por ejemplo en US 4,644,151. Aunque las técnicas de inspección electro-ópticas se prefieren corrientemente, el aparato y el método de la presente invención puede también acomodarse a técnicas de inspección mecánica, tal como se ilustra en la US 5,414,939 donde el recipiente es contactado por uno o más rodillos o dedos a medida que rota alrededor de su eje. Las técnicas de inspección eléctrica, tal como se ilustra, por ejemplo, en US 4,046,258, también se visualizan.

El transportador 10 de acuerdo con la presente invención incluye una unidad o subconjunto 40 de accionamiento del portador (Figuras 2 y 3), montado en una estructura de soporte fija o móvil. La unidad 40 de accionamiento del portador incluye un soporte central 42 que está montado sobre la estructura. Un primer servo motor 44 eléctrico rotativo y una caja de engranajes 46 asociada están montados sobre el lado inferior del soporte 42, y están acoplados a un árbol que se extiende hacia arriba a través del soporte. El eje de rotación del árbol define el eje centrado de la unidad 40 de accionamiento del portador y el transportador 10. El extremo superior del árbol está acoplado a un primer portador o portador superior 48. Un segundo servo motor 50 eléctrico rotativo y una caja de engranajes 52 asociada están montados debajo del soporte 42 lateralmente fuera de registro del eje del árbol. La caja de engranajes 52 está acoplada en forma rotativa a un segundo portador o portador inferior 54. Consecuentemente, el primer portador o portador superior 48 rota alrededor del eje del árbol bajo control del motor 44 y la caja de engranajes 46, mientras que el segundo portador o portador inferior 54 rota alrededor del eje del árbol bajo control del motor 50 y la caja de engranajes 52 independientemente de la rotación del portador superior 48.

Haciendo referencia a las Figuras 3 a 5C, el portador superior 48 tiene una pluralidad de piernas 56 angularmente espaciadas igualmente que se extienden radialmente. Un dedo 58 de agarre de recipientes está asegurado al extremo exterior de cada pierna 56. Cada dedo 58 es de forma de L invertida en vista en elevación, con una pierna vertical recta y un par de piernas horizontales 62 espaciadas verticalmente que se extienden radialmente. Las piernas horizontales 62 son de geometría semi-circular, tal como se observa en mejor forma en las Figuras 5A a 5C. Similarmente, el portador inferior 54 incluye una pluralidad de

piernas 64 angularmente espaciadas iguales que se extienden radialmente, en cuyos extremos exteriores está montado un correspondiente dedo 66 de agarre de recipientes. Cada dedo 66 tiene generalmente forma de L invertida en la vista en elevación con una pierna vertical recta asegurada a la pierna radial 56 y una pierna 68 semicircular que se extiende radialmente, que está colocada en conjunto entre las piernas 62 de cada dedo 58. Un resorte de arrollamiento 70 está acoplado a cada dedo 66 en forma rotativa para inclinar cada dedo 66 hacia el dedo 58 opuesto asociado y así acomodan las variaciones en tamaño entre los cuerpos de los recipientes 12 transportados por el transportador. Una capa o recubrimiento de material resiliente elástico tal como poliuretano se proporciona en la superficie interior de cada pierna 62, 68 para agarrar los recipientes sin daño de los recipientes y para mejorar el agarre de fricción de los recipientes para el transporte entre estaciones. El procesador de información 28 (Figura 1), está conectado a través de una unidad de control 72 del motor (Figura 2) para controlar la operación de los motores 44, 50, y consecuentemente controlar la rotación de los portadores superior e inferior 48, 54, tal como se describirá.

En operación, con los recipientes en las varias estaciones de inspección descansando sobre un soporte 80 (Figura 1), por lo menos uno de los portadores 48, 54, y preferiblemente ambos portadores, rotan simultáneamente alrededor de sus ejes comunes, mediante el control de los motores 44, 50 (Figura 2), para mover los dedos 58, 66 lejos los unos de los otros (Figura 5A) para aceptar nuevos recipientes del transportador de entrada o alimentación 14 (Figura 31), depositar los recipientes en el transportador de salida 16, y liberar recipientes en la estación de rechazo 18. Por lo menos uno de los portadores 48, 54, y preferiblemente ambos portadores, son rotados entonces simultáneamente alrededor de sus ejes comunes uno hacia el otro herméticamente para agarrar todos los recipientes entre los dedos 58, 66 (Figura 5B). Los portadores se rotan entonces simultáneamente mediante sus motores asociados, en la dirección contra las manecillas del reloj en la Figura 3, en forma de incrementos para transportar los recipientes entre estaciones adyacentes espaciadas angularmente. Se notará que no hay placa de soporte o similar entre los soportes 80 en las estaciones de inspección y a lo largo de los cuales los recipientes pueden deslizarse. Consecuentemente, es necesario agarrar herméticamente los recipientes para transporte entre estaciones, y las capas resilientes sobre los dedos mejoran dicha acción de agarre. Cuando los recipientes están en las siguientes estaciones, por lo menos uno de los portadores 48, 54, y preferiblemente ambos portadores, rotan entonces simultáneamente para mover los dedos 58, 66 ligeramente lejos el uno del otro (Figura 5C) para liberar los recipientes para rotación mientras se confinan los cuerpos de los recipientes durante la rotación. La

parte superior del recipiente o recipientes bajo inspección puede acoplarse mediante rodillos de accionamiento asociados (Figura 1) para rotar los recipientes alrededor de sus ejes durante el proceso de inspección. (Los recipientes pueden, por supuesto, inspeccionarse mientras están en posición estacionaria en algunas de las estaciones de inspección, si se desea.) Después de que la inspección se ha completado en todas las estaciones de inspección, los dedos 58, 66 se mueven a la posición de la Figura 5A mediante rotación de los portadores asociados en forma tal que los recipientes inspeccionados son liberados hacia los transportadores de rechazo o transportadores de alimentación y nuevos recipientes son recibidos para inspección. Estos pasos se repiten en secuencia para transportar una serie continua de recipientes a través de estaciones sucesivas.

Los detalles del carruaje superior 48, el carruaje inferior 54, el soporte 80, el montaje de los brazos 58, 66 sobre los portadores, el acoplamiento de los motores 44, 50 a los portadores, el montaje del subconjunto 40 sobre una estructura de soporte, y el montaje del rodillo de accionamiento 30 para acople con la parte superior del recipiente se divulgan en la solicitud US copendiente arriba referenciada.

Se ha divulgado así un aparato y un método para indexar artículos de vidrio, tales como recipientes, a través de una serie de estaciones, tales como estaciones de inspección de recipientes, que satisfacen completamente todos los objetivos y demandas previamente establecidos. Un número de modificaciones y variaciones se han discutido. Por ejemplo, un recipiente bajo inspección puede rotarse en forma diferente a mediante rodillos que acoplan la parte superior, tal como mediante el agarre del recipiente en una estación de inspección entre las almohadillas superior e inferior, de las cuales una o ambas son accionadas para rotar el recipiente. Otras modificaciones y variaciones serán sugeridas por sí mismas a personas de experiencia ordinaria en el arte. La invención pretende abarcar todas estas modificaciones y variaciones en tanto que caen dentro del espíritu y amplio alcance de las reivindicaciones del apéndice.

Reivindicaciones

1. Un aparato para la inspección de recipientes, que tiene un cuerpo no Redondo y una parte superior cilíndrica, en una pluralidad de estaciones de inspección, que incluye:

primer y segundo arreglos circunferenciales de dedos que agarran artículos de vidrio,

primer y segundo portadores que montan respectivamente

dichos primer y segundo arreglos de dedos para rotación alrededor de un eje común, y

primer y segundo motores acoplados respectivamente a dichos primer y segundo portadores para rotar dichos portadores independientemente uno de otro alrededor de dicho eje común para cerrar dichos brazos de partes circulares alrededor de un cuerpo del recipiente, transportar el recipiente entre estaciones de inspección, y abrir completamente los dedos el uno con respecto al otro para permitir el retiro de un recipiente de entre dichos dedos.

2. El aparato establecido en la reivindicación 1 que incluye adicionalmente un rodillo de accionamiento para agarrar una parte superior del recipiente en por lo menos una de las dichas estaciones de inspección y rotar el recipiente alrededor del eje de la parte superior.

3. El aparato establecido en cualquiera de las reivindicaciones precedentes que incluye adicionalmente resortes llevados por uno de dichos portadores y acoplados con dichos dedos en ese portador para urgir en forma resiliente dichos dedos hacia los dedos en el otro portador para acomodar las variaciones en el tamaño del recipiente.

4. El aparato establecido en la reivindicación 1 donde dichos brazos de partes circulares incluyen brazos semi-circulares.

5. El aparato establecido en la reivindicación 1 donde dichos primer y segundo motores incluyen motores eléctricos y donde dicho aparato incluye electrónicos de control acoplados a dichos motores eléctricos para rotar dichos portadores alrededor de dicho eje común independientemente el uno del otro.

6. Un método de transportar recipientes no redondos desde una estación de carga a través de por lo menos una estación de inspección hacia una estación sin carga, que incluye los pasos de:

(a) proporcionar primer y segundo arreglos circunferenciales de dedos que agarran artículos de vidrio,

(b) colocar dichos dedos en pares que tienen brazos opuestos de partes circulares,

(c) mover por lo menos uno de dichos arreglos hacia el otro en dicha estación de carga en dicha estación de carga para cerrar herméticamente dichos brazos de partes circulares alrededor de un cuerpo de recipiente,

(d) transportar el recipiente hacia la estación de inspección rotando dichos arreglos de brazos simultáneamente sobre un eje común,

(e) mover por lo menos uno de dichos arreglos lejos del otro en dichas estaciones de inspección parcialmente para abrir dichos brazos para permitir la rotación del recipiente mientras se confina el recipiente entre dichos brazos, y

(f) mover por lo menos uno de dichos arreglos lejos del otro en dicha estación sin carga completamente para abrir dichos brazos y permitir el retiro del recipiente de entre dichos

7. El método establecido en la reivindicación 6 donde dicho paso (c) incluye rotar ambos arreglos simultáneamente uno hacia el otro, y donde dicho paso (e) incluye rotar ambos arreglos simultáneamente lejos uno del otro, y donde dicho paso (f) incluye mover ambos arreglos simultáneamente lejos uno del otro.

8. El método establecido en la reivindicación 6 donde dicho paso (a) incluye proporcionar brazos semi-circulares en dichos dedos.

Extracto de la Divulgación

Un aparato para la inspección de recipientes no redondos incluye un par de portadores acoplados a motores asociados para rotación independientemente el uno del otro sobre un eje común. Cada carruaje lleva una correspondiente pluralidad de dedos de agarre semi-circulares, los cuales pueden moverse hacia y lejos uno del otro para rotación controlada de los carruajes. Los dedos están separados unos de otros ampliamente para aceptar recipientes no redondos en una estación de alimentación, y para permitir el retiro de los recipientes en las estaciones de salida y de rechazo. Para transportar los recipientes entre estaciones, los dedos ase llevan cercanos conjuntamente para agarrar los recipientes para indexado, y resortes sobre uno de los carruajes urgen en forma resiliente los dedos asociados hacia los dedos en el carruaje opuesto para acomodar las variaciones de tamaños entre los recipientes. En las estaciones de inspección los dedos se mueven ligeramente lejos uno del otro, pero permanecen juntos en forma tal de definir un perímetro circular para capturar el cuerpo no redondo y confinar el cuerpo del recipiente durante la rotación. El recipiente puede rotarse mediante un rodillo de accionamiento acoplado con la parte superior cilíndrica del recipiente. La parte superior del recipiente puede inspeccionarse, como lo pueden ser las porciones de la pared lateral, la base y el talón.

ES TRADUCCIÓN FIEL Y COMPLETA DEL DOCUMENTO ANEXO
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