



(51) International Patent Classification:  
**B65G 17/46** (2006.01)

(21) International Application Number:  
PCT/EP2017/054948

(22) International Filing Date:  
2 March 2017 (02.03.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
62/308,432 15 March 2016 (15.03.2016) US

(71) Applicant (for AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, EG, GB, GD, GH, GM, IE, IL, IN, KE, KN, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SA, SC, SD, SG, SL, SZ, TT, TZ, UG, VC, ZA, ZM, ZW only): **UNILEVER PLC** [GB/GB]; a company registered in England and Wales under company no. 41424 of Unilever House, 100 Victoria Embankment, London Greater London EC4Y 0DY (GB).

(71) Applicant (for all designated States except AE, AG, AU, BB, BH, BN, BW, BZ, CA, CY, DJ, EG, GB, GD, GH, GM,

IE, IL, IN, KE, KH, KN, KW, LC, LK, LS, MT, MW, MY, NA, NG, NZ, OM, PG, QA, RW, SA, SC, SD, SG, SL, SZ, TT, TZ, UG, US, VC, ZA, ZM, ZW): **UNILEVER N.V.** [NL/NL]; Weena 455, 3013 AL Rotterdam (NL).

(71) Applicant (for US only): **CONOPCO, INC., D/B/A UNILEVER** [US/US]; 800 Sylvan Avenue AG West, S. Wing, Englewood Cliffs, New Jersey 07632 (US).

(72) Inventors: **QUICK, Dean**; Unilever Home & Personal Care, 2900 W. Truman Blvd., Jefferson City, Missouri 65109 (US). **JONES, Stuart, Michael, Ruan**; PA Consulting Group, Cambridge Technology Centre, Melbourn, Hertfordshire, SG8 6PD (GB). **LITTEN, Neil, Anthony**; PA Consulting Group, Cambridge Technology Centre, Melbourn, Hertfordshire, SG8 6PD (GB). **SYKES, George, Edward**; PA Consulting Group, Cambridge Technology Centre, Melbourn, Hertfordshire, SG8 6PD (GB).

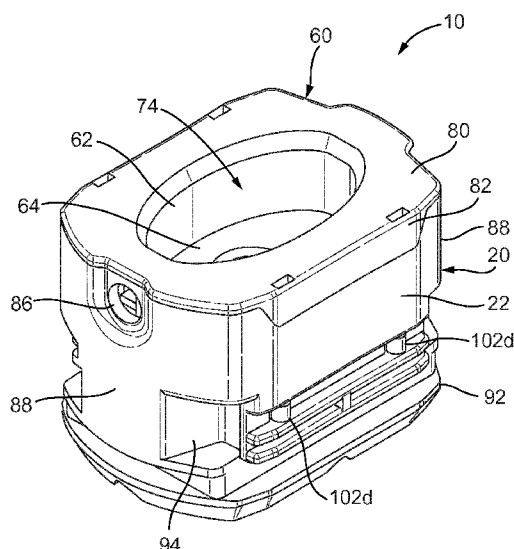
(74) Agent: **WHALEY, Christopher**; Unilever PLC, Unilever Patent Group, Colworth House, Sharnbrook, Bedford, Bedfordshire, MK44 1LQ (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

[Continued on next page]

(54) Title: PUCK FOR HOLDING A PRODUCT CONTAINER

Fig. 1



(57) Abstract: A carrier puck (10) that includes a removable insert (60), a base (20) and a plurality of fasteners (100, 102), the removable insert having an upper rim (80) that extends outward from an insert sidewall (62) and engages with an upper end (40) of the base, and the fasteners individually including (a) a spring-loaded carriage (102a) and that engages with a corresponding carriage track (95) on the base and (b) a latching arm (102b) associated with the spring-loaded carriage, the latching arm including a first locking member (102c) that engages with a mating second locking member (85) of the upper rim of the insert.



BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT,

LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

**Published:**

- with international search report (Art. 21(3))

- 1 -

## PUCK FOR HOLDING A PRODUCT CONTAINER

### Technical field

The present disclosure relates to a puck for holding a product container in an orientation for product filling, capping, labeling, and/or other processing as the container moves along an automated line and, in particular, to a puck that includes a removable insert in which a product container is received and held.

### Background

Pucks for holding product containers, herein alternatively referred to as "carrier pucks" or "pucks" are used, typically in automated production lines, to hold containers in a desired orientation, e.g., an upright position. Use of a puck simplifies movement of a container along a production line and is of assistance in regulating line operations.

In automated operations, a container is commonly inserted in a puck in an inbound staging area. The container-bearing puck then moves through one or more processing stations where different operations are performed, among others, one or more of the following: the container may be filled with one or more materials, the container may be subjected to pre- and/or post-filling procedures or treatments, for example, heating and/or cooling, the container may have a tamper-resistant seal and/or a cap affixed thereto, one or more labels or other container indicia may be applied, and/or the container may undergo one or more quality control operations, for example, weight and/or label verification, and the like. When processing is complete, the puck and container are moved to an outbound staging area, the container is removed from the puck and the puck is rerouted back to the inbound staging area, or other designated station. It is not uncommon for an automated production line to have hundreds of pucks in use at a single time.

Many of the pucks used commercially are designed for containers of a particular configuration, i.e., they are container specific. In instances where a production line employs different container configurations for different production runs, having a puck that is

- 2 -

adaptable for use with containers of a variety of different shapes and sizes can help reduce production costs, including downtime for puck changeovers.

Among the various approaches suggested with respect to providing pucks that may  
5 be adapted for use with containers of a variety of different sizes and/or shapes, is the use of separate container-holding and base components. US Pat. No. 8,695,791, for example, discloses a carrier puck that includes a circular lower body on which is mounted an upper body. As therein illustrated, the upper body is mounted to the lower body via a pair of opposing bayonet side mountings. JP5659780 discloses a carrier puck having inner and  
10 outer holder components. As illustrated, the inner holder includes a moveable interior wall that can be adjusted to brace a container within the inner holder.

The use of pucks having a base and a separate component for holding a container, more particularly a removable insert, is limited by several real-world considerations. The  
15 environment created by automated production can be hard on pucks. In use, there is a tendency for pucks to collide with one another. These collisions can occur with considerable force given the speed at which many automated production operations are run, with collision force being increased when containers are filled and the weight of the container-bearing pucks increased.

20

A puck having a removable insert should withstand the rigors of automated processing without premature release or displacement of the insert. Conversely, to accommodate container changeover, the puck should facilitate engagement and disengagement of the removable insert. There remains a need for pucks that provide a  
25 balance between these competing requirements.

One aspect of this invention is to provide a carrier puck for use in an automated production line, the carrier puck having a removable insert for receiving and holding a product container. Another aspect of this invention is to provide a carrier puck that provides  
30 robust engagement of a removable insert. Another aspect of this invention is to provide a carrier puck that resists premature release of a removable insert. A further aspect of this

- 3 -

invention is to provide a carrier puck that provides engagement of a removable insert that withstands the vertical pull forces of container removal. Another aspect of this invention is to provide a carrier puck that allows for expeditious engagement and disengagement of a removable insert.

5

One or more of these and other aspects of this invention may be achieved by providing a puck as hereinafter more particularly described.

### Summary of the invention

10 In one embodiment there is provided a carrier puck that comprises:

A) a removable insert comprising:

I) an insert sidewall,

II) an insert bottom wall, and

III) an upper rim that extends outward from the insert sidewall;

15

B) a base comprising:

I) a base sidewall having an upper end that engages with the upper rim of the removable insert, and

II) a base bottom wall; and

C) a plurality of fasteners that individually comprise:

20

I) a spring-loaded carriage that engages with a corresponding carriage track on the base and

II) a latching arm associated with the spring-loaded carriage, the latching arm including a first locking member that engages with a mating second locking member of the upper rim.

### 25 Brief description of the drawings

The foregoing and other features and advantages of the present invention will become apparent upon consideration of the following description with reference to the

- 4 -

accompanying drawings. Drawings are representative only; the present invention is not limited to the embodiments exemplified therein. Unless otherwise indicated, throughout the drawings, like reference numerals refer to like parts.

FIG. 1 a perspective view from above of one embodiment of a puck of the present  
5 invention;

FIG. 2a is a simplified sectional view of the puck of FIG. 1 with the insert in a locked configuration;

FIG. 2b is a simplified sectional view of the puck of FIG. 1 with the insert in an unlocked configuration;

10 FIG. 3 perspective view from above of the puck of FIG. 1 without the insert; and

FIG. 4 is a perspective view from below of the puck of FIG. 1 without the insert.

## Detailed description of the invention

Except as otherwise indicated, or evident from a description illustration, throughout this specification, terms of reference are used as follows in relation to the instant carrier puck or its components or features. The terms “upper” and “lower” as applied to the puck or a component or feature thereof are used in relation to an orientation in which the upper end of the carrier puck is at the top and the lower end of the carrier puck is at the bottom; such an orientation is shown, for example, in FIG. 1. Other terms of reference such as “above” and “below” are also applied in relation to the above described orientation. The terms “downward” and “downwardly” are used interchangeably in relation to the above described orientation, in reference to a direction that generally extends away from a puck feature or component, or away from a position of a puck feature or component, toward a lower point or position. The terms “upward” and “upwardly” are used interchangeably in relation to the above described orientation, in reference to a direction that generally extends away from a puck feature or component, or away from position of a puck feature or component, toward a higher point or position. Except as otherwise indicated, in relation to the description of components or other features that define an interior space, the term “interior surface” is used in relation to a surface that generally faces into the interior space.

All numerical ranges employed in this description ought to be understood as modified by the word “about”. Where the puck of the subject invention or components or other features thereof are described as “including” or “comprising” specific elements, narrower embodiments that “consist essentially of” or “consist of” the recited elements are also contemplated.

The puck of the subject invention combines a number of elements that together enable the production of a container-holding/transport device having a removable insert and a separate base.

The subject puck comprises a removable insert (alternatively referred to as “insert”), a base that holds the removable insert, and a plurality of fasteners that secure the insert to the base. By changing out the removable insert, the puck is adaptable to use with containers of different configuration.

- 6 -

The insert comprises a sidewall and bottom wall that together generally define a cavity, the insert cavity, for holding a container. In one embodiment, to help standardize production operations, it may be desirable to configure the cavity of different sets of inserts to provide consistent fill heights for the containers that the inserts are designed to hold.

5           The insert includes an upper rim (alternatively referred to as the “insert rim” or “rim”) that extends outward from the insert sidewall. In one embodiment, the rim generally defines the perimeter of the upper end of the insert. The rim may be continuous or may include one or more gaps or regions of discontinuity, i.e., the rim may be discontinuous.

10           Optionally, the rim includes a downwardly extending skirt (alternatively referred to as “rim skirt”). When present, the rim skirt may extend downward from the rim as a full skirt; alternatively, the skirt may extend downward from one or more portions of the rim.

15           Optionally, one or more container support arms (alternatively referred to as “support arms”) may extend upward from the insert rim and/or insert sidewall. In one embodiment, the insert is provided with first and second support arms positioned on opposing sections of the insert rim and/or insert sidewall.

20           To reduce the space needed to store the inserts when not in use on pucks, it may be desirable to taper or otherwise configure the insert sidewall and, when present, features such as support arms, to enable the inserts to be stacked or nested one within the other. Providing inserts that are able to be stacked or nested aids in their organization and handling.

25           Optionally the insert bottom wall includes one or more drainage holes. Drainage holes may assist in removing product that misses or overflows from the container during filling or other processing. Where periodic washing or rinsing is part of a puck’s maintenance regimen, drainage holes may be an aid to drying. When drainage holes are present, the bottom wall may be tapered to channel overflow to such holes.

          Optionally, the insert includes one or more projections that extend outward from the insert sidewall and engage with an interior surface of the base sidewall and/or an interior



- 7 -

structure of the base. The inclusion of such projections may help to stabilize and/or support the removable insert in the base.

The base comprises a sidewall and a bottom wall that together generally define a cavity, the base cavity, for holding the removable insert. The base has an outside perimeter  
5 (the "base perimeter") that, in one embodiment, is generally defined by the base sidewall.

In an orientation where the upper end of the base is at the top and the lower end of the base is at the bottom, the base sidewall is, in one embodiment, generally parallel to the central vertical axis of the base. In one embodiment, the base sidewall is of varying height; i.e., the sidewall is higher in some places and lower in other places. Excluding appendages  
10 that extend above and generally do not define the base cavity, the height of the base sidewall at a given location is commonly the vertical distance between the top of base sidewall and the bottom of the base sidewall. In one embodiment, the base sidewall may have a stepped or castellated appearance.

The base sidewall includes an upper end (in one embodiment, such upper end is an upper edge) that engages with the insert rim. The configuration of the upper end of the base  
15 sidewall and the insert rim may be such that these components fit together in complementary fashion, i.e., the insert rim mates with the upper end, in one embodiment the upper edge, of the base sidewall. Providing a base sidewall of varying height and a mating insert rim, particularly a rim, at least a portion of which includes a downwardly depending skirt, may aid  
20 in interlocking the insert to the base and/or distributing load to the base sidewall. Additionally, a mating configuration of the insert rim and base sidewall may assist in aligning the removable insert with the base and, particularly when the base sidewall is of varying height, may contribute to a robust base/insert attachment.

In one embodiment, the base further includes one or more interior structures that  
25 extend upward from the base bottom wall and/or inward from the base sidewall; one such structure is a platform. These structures may aid in supporting the insert.

In one embodiment, the platform is positioned interior to the base sidewall and below the upper edge thereof. In one embodiment the platform is positioned in what is generally

- 8 -

the center of the base perimeter. In one embodiment the platform is closer to the base bottom wall than to the upper edge of the base sidewall. In one embodiment, the platform comprises a platform top wall and a platform sidewall. In one embodiment, the platform defines a space that opens into the bottom of the base. In one embodiment, the platform  
5 forms a portion of the base bottom wall.

Optionally, the platform includes a recess (the "platform recess") and/or aperture (the "platform aperture"). The platform recess may, for example, be provided as a depression, concavity, hollow or sink in the platform. Optionally, the insert bottom wall further includes  
10 one or more features, for example, a recess and/or a downwardly extending collar, that align with and extend into an platform recess and/or a platform aperture. The inclusion of such features may contribute to robust engagement of the insert and base.

The puck further comprises a plurality of fasteners that secure the removable insert  
15 to the base. The fasteners are spring-loaded fasteners situated in the base of the puck. In one embodiment the puck includes two to six fasteners. In another embodiment the puck includes two to four fasteners. In another embodiment the puck includes four fasteners. In one embodiment the fasteners are employed in pairs in what are generally opposing sections of the puck base.

20 The fasteners individually comprise a spring-loaded carriage (alternatively referred to as "carriage") and a latching arm associated with the spring-loaded carriage. The latching arm may, but need not, be molded as part of the carriage or may be attached thereto as a separate component. The latching arms of the fastener individually further include a first locking member that engages with a mating second locking member of the upper rim. In  
25 one embodiment, the first locking member generally faces outward from the latching arm in a direction toward the base sidewall. In a locked configuration, the spring-loaded carriage forces the latching arm into a position of engagement with the insert rim, thereby engaging the first locking member with the second locking member. In one embodiment, the rim skirt includes the second locking member. Non-limiting examples of the first and second locking  
30 members are tabs, lugs, hooks, ledges, catches, and the like.

- 9 -

The spring-loaded carriage engages with a corresponding carriage track (herein alternatively referred to as "track") of the base. In one embodiment, the carriage track comprises first and second rails that extend upward from the base bottom wall and between which is positioned a spring. In one configuration the spring is compressed between the carriage and a spring stop interior to the base sidewall. In one embodiment the base  
5 includes a platform that comprises a platform top wall and a platform sidewall, and the platform sidewall functions as the spring stop.

In one embodiment the base further includes a carriage stop that engages with the carriage when the carriage is in an outermost position on the carriage track. In one  
10 embodiment the carriage stop is proximate to the base sidewall. The carriage stop may extend inward from the base sidewall and/or upward from the base bottom wall.

The carriage is engaged with the carriage track by a connection that allows the carriage to travel the carriage track. In one embodiment, the bottom wall includes a generally parallel slot on either side of the carriage track, and the carriage is configured with  
15 a mating connection, for example, a snap fit, that slidably engages with the slot.

In one embodiment, the fasteners individually further comprise a release tab. In an alternative configuration, two or more fasteners are associated with a release tab. The release tab may be integral with one or more fastener carriages or may be attached thereto as a separate component. In one embodiment, pushing the release tab inward moves the  
20 carriage of a fastener associated with the release tab in a direction away from the base sidewall, releasing the first locking member of the fastener from the second locking member of the upper rim of the insert. In one embodiment the release tab is configured as part of the carriage; in another embodiment the release tab is configured as a separate component. In one embodiment, the release tab is accessible from a port in the base sidewall.

25 In one embodiment, the puck may include one or more features that minimize the potential for premature engagement of the release tab. For example, the release tab may be positioned away from regions most likely to bear the force of puck collisions, for example, leading and trailing ends of the puck; the release tab may be recessed inward from the

access port and/or may be protected by one or more guards; and/or the release force of the tab may be engineered to be relatively high.

The latching mechanism of the subject puck may be engaged in synchronous manner with insert placement or removal. More particularly, a suitable tool for lifting the insert onto or off the base may be in place and engaged with the insert as the fastener is being unlocked. This is of assistance in reducing insert changeover times, particularly in systems where insert changeover is frequent. In one embodiment, the inclusion, in the insert base wall, of an insert recess or similar feature provides a site of access for a lifting tool to engage with the insert.

Pneumatic grippers, vacuum grippers, and mechanical grippers are examples of tools for lifting the insert onto or off the base. Pneumatic grippers include, but are not limited to, pneumatic picking heads. A pneumatic picking head includes a bellows that can be inserted into and expanded in the insert such that the expanded bellows conforms to an interior surface of the insert, enabling the insert to be lifted and otherwise moved. Mechanical grippers include, but are not limited to, tools with mechanically expandable fingers or other picker configurations.

The puck includes components that may be molded from plastic materials. Plastic materials that may be considered for molding puck components include, for example, polyacetal, polyamide, polyarylate, polyarylsulfone, polyolefin, polyester, butadiene-styrene and acrylonitrile-styrene-butadiene copolymers, and the like. Moldable components include the base, removable insert and one or more components of the fasteners. Material selection depends on factors that include configuration of a component and the mechanical and/or physical requirements thereof, e.g., hardness, impact strength, modulus, flexural strength, dimensional stability, chemical and/or heat resistance and the like, as well as requirements related to mold design and/or mold fill. For example, while the material employed in the base of the puck will typically need to provide sufficient toughness and impact strength to withstand the collision forces and other requirements of an automated production line, it may be desirable that the material from which the insert is fabricated is more elastic and flexible, with tactile characteristics that enable it to better grip a container. In one embodiment the

- 11 -

use of thermoplastic resins is of particular interest. In one embodiment, it is desirable that the insert and/or base are fabricated from a polyolefin such as, for example, polyethylene or polypropylene.

5 The puck may be configured for use with containers for a variety of consumer, commercial, industrial and institutional products. Non-limiting examples of such products are personal care products, household care products, beverages and other foodstuffs, pharmaceuticals, nutraceuticals, automotive products, marine products, veterinary products, industrial products, and the like.

10 The puck is adaptable to many different sizes and configurations, depending upon factors that include, for example: the dimensions, configuration and weight of the container the puck is intended to hold; the material the container is intended to hold and the fill volume thereof; the center of gravity of the container and its contents; and production line considerations, including, for example, line bends, curves, gradients, drops, discontinuities, speeds, collision forces, guide rail dimensions, and the like, as well as puck positioning, 15 transport and handling requirements related thereto.

In one embodiment, the puck comprises a base having a length of from 50mm to 300mm and a width of from 50mm to 300mm. In another embodiment, the puck comprises a base having a length of from 70 to 200 mm and a width of from 50 to 200mm. In yet another embodiment, the puck comprises a base having a length of from 80 to 150mm and 20 a width of from 50 to 120mm. In yet another embodiment the puck comprises a base having a length of from 90 to 150mm and a width of from 70 to 110mm. Larger or smaller base dimensions are possible, depending upon the containers with which the pucks are to be used. In one embodiment, the base has a generally rectangular perimeter.

25 Non-limiting embodiments of the subject puck and components thereof are described in further detail with reference to the appended drawings which are furnished by way of illustration only and should not be construed as limiting the invention to the embodiments so depicted.

One exemplary embodiment of a puck **10** of the present invention is shown in FIGS. 1, 2a and 2b. As shown in FIG. 2a, puck **10** includes a base **20**, removable insert **60**, and fasteners **100**.

As shown in FIGS. 3 and/or 4, base **20** includes base sidewall **22**, platform **24** and a base bottom wall **26**. Base sidewall **22** forms what, is generally the perimeter of base **20**. The perimeter of base **20** is generally rectangular in shape, with eased corners. In the illustrated embodiment, the base sidewall comprises a pair of generally opposing short walls and a pair of opposing long walls. Base sidewall **22** includes upper end **40** which includes upper edge **42**. The base sidewall includes access ports **23**.

Platform **24** extends upward from base bottom wall **26** and includes platform sidewall **27**, platform top wall **28**, and platform aperture **50**.

In FIG. 4, bottom wall collar **25** is shown to extend downward from base bottom wall **26**. The inclusion of a bottom wall collar may be helpful in holding, positioning and/or orienting a puck, as it is not uncommon for a production line to include orientation tools that can be extended upward from a conveyor surface or production station to engage with the base of a puck. The perimeter of bottom wall collar **25** shown in FIG. 4 is of similar shape to the perimeter of platform **24** shown in FIG. 3. Having the perimeter of the bottom wall collar generally correspond to the perimeter of the platform may simplify mold design; it should be appreciated that the perimeters of such components are not required to so correspond.

As illustrated, base sidewall **22** includes grip ports **86**, guides ridges **92** and orientation slots **94**. Grip ports provide a site of access for an automated claw or similar implement to engage with and lift or otherwise move the puck from one location to another. The presence of guide ridges is of particular interest when the production line includes guide rails in one or more regions thereof. Typically, guide rails are a pair of opposing rails or bars that the puck fits between. Orientation slots provide additional sites for gripping, holding and/or positioning the puck.

- 13 -

The base sidewall optionally includes one or more bumpers. The bumpers may function as end-pieces and may be integral with or extensions of the base sidewall. In one embodiment, bumpers are positioned on opposing sections of the base sidewall as a leading bumper and trailing bumper; in such a configuration, the bumpers may be aligned such that  
5 when a plurality of pucks are facing end-to-end on a production line, the trailing bumper of a leading puck engages with the leading bumper of a trailing puck. In one embodiment, the bumpers are fabricated of a shock absorbing material such as an elastomeric resin or rubber. The inclusion of bumpers, particularly when fabricated of a shock absorbing material, may help to reduce line noise. In FIG 3, base sidewall **22** is shown as including  
10 bumpers **88**.

Optionally, the base includes a holder (not shown) for a radio-frequency identification detection (RFID) chip. The RFID chip can be used to incorporate information about a container that a puck holds. In use, it may serve as an identifying or tracking tag that allows for the wireless identification or monitoring of a container/puck in a production  
15 line.

Removable insert **60** is shown to include insert sidewall **62** and insert bottom wall **64**. Removable insert **60** includes insert cavity **74** for holding a container (not shown). Insert **60** further includes rim **80** which, as illustrated, extends outward of sidewall **62**. To assist in directing a container into the insert, the rim may angle into the insert cavity.  
20 Optionally, the rim further includes one or more container easement areas (not shown) to assist in maneuvering a container into the insert. Container easement may take the form of concavities or indentations that reduce the clearance height of the puck.

In FIG. 1, rim skirt **82** extends downward from rim **80**. When removable insert **60** is fastened to base **20**, rim **80** engages with upper end **40** and, more particularly, upper edge  
25 **42** of base sidewall **22**. The uneven height of base sidewall **22** and the mating configuration of rim **80**, including rim skirt **82**, aids in securing insert **60** to base **20**.

Optionally, a detection post (not shown) may extend upward from the insert sidewall and/or rim. Alternatively, a detection post may be included on the base. A production line

- 14 -

may be equipped with optical scanners to detect the post and monitor puck position, for example, the arrival at the puck at a processing station.

Puck **10** further includes a plurality of fasteners **100** that secure removable insert **60** to base **20**. As shown in FIG. 2a, fastener **100** includes carriage **102a** and spring **120**; additionally fastener **100** includes latching arm **102b** that extends upward from carriage **102a** and includes first locking member **102c**, shown as a locking lug. In the locked configuration shown in FIG. 2a, spring **120** is tensioned against carriage **100a**, engaging latching arm **100b** with rim **80** and, more particularly, engaging first member **100c**, with second locking member **84** (shown as an inwardly extending ledge) of rim skirt **82**. As illustrated, platform sidewall **27** includes region **27a** that functions as a spring stop and base sidewall **22** includes carriage stop **22a**.

Fastener **100** further includes release tab **102d**, shown as integral with carriage **100a**. In the unlocked configuration shown in FIG. 2b, release tab **102d** has been pushed inward, moving carriage **100a** inward from base sidewall **22**, further compressing spring **120**, and disengaging first locking member **100c** from second locking member **84**. In an automated line, a tool such as release peg may be used to apply a force that pushes the release tab inward for assembly or disassembly of the insert with the base.

As shown in FIGS. 3 and/or 4, carriage **100a** engages with and travels on carriage track **95**. As illustrated, carriage track **95** includes first rail **95a** and opposing second rail **95b**, between which is positioned spring **120**. Connection **100e** engages carriage **100a** with carriage track **95**. Connection **100e** is shown as a pair of snap connections that pass through corresponding slots **103a** and **103b** of base bottom wall **26**.

As further shown in FIG. 2a, carriage **100a**, latching arm **100b** and first locking member **100c**, together with release tab **100d** and connection **100e**, form combined carriage/latching assembly **102** of fastener **100**.



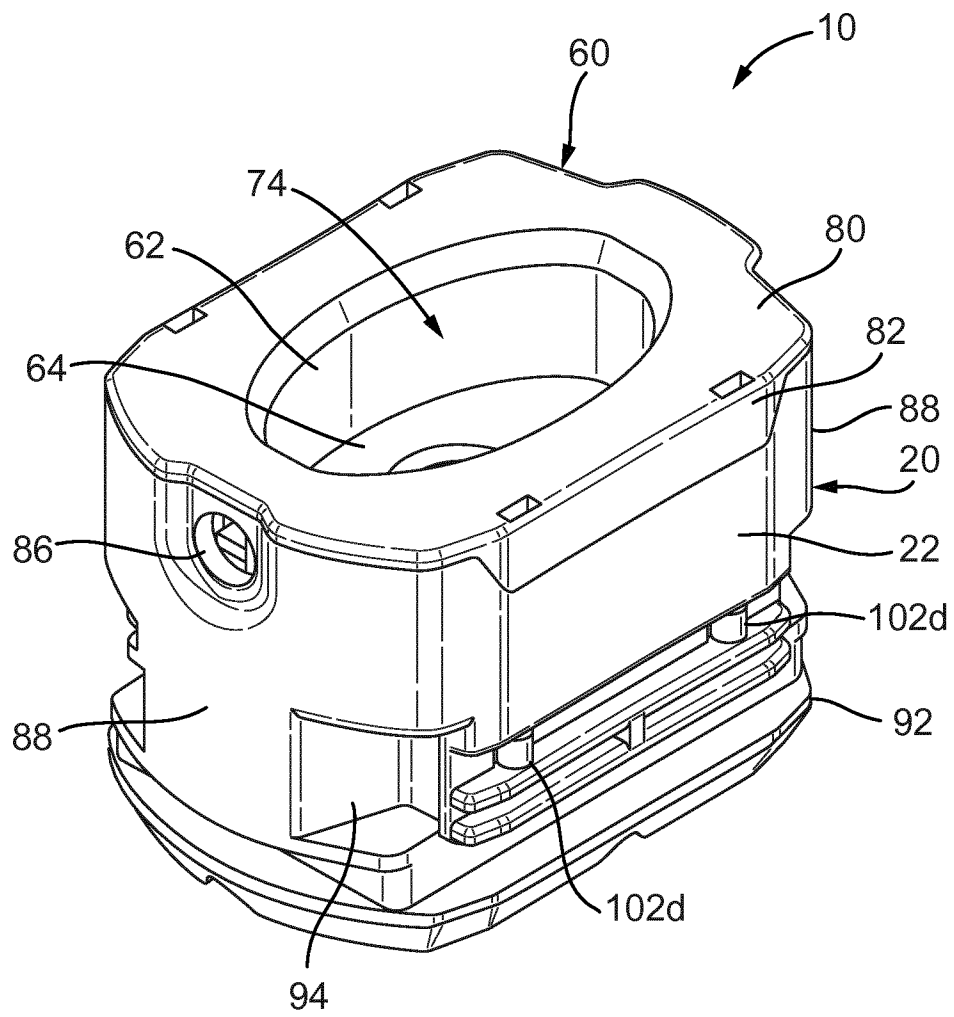
**Claims**

1. A carrier puck that comprises:
  - A) a removable insert comprising:
    - I) an insert sidewall,
    - II) an insert bottom wall, and
    - III) an upper rim that extends outward from the insert sidewall;
  - B) a base comprising:
    - I) a base sidewall having an upper end that engages with the upper rim of the removable insert, and
    - II) a base bottom wall; and
  - C) a plurality of fasteners that individually comprise:
    - I) a spring-loaded carriage that engages with a corresponding carriage track on the base and
    - II) a latching arm associated with the spring-loaded carriage, the latching arm including a first locking member that engages with a mating second locking member of the upper rim.
2. The carrier puck of claim 1 wherein the base sidewall is of varying height.
3. The carrier puck of claim 1 wherein spring-loaded carriage is associated with a release tab that is accessible from a port in the base sidewall.
4. The carrier puck of claim 1 wherein the carriage tracks individually comprise a first rail and a second rail.
5. The carrier puck of claim 4, wherein a spring is positioned between the first rail and the second rail.
6. The carrier puck of claim 5 wherein the base further comprises a spring stop interior to the base sidewall, and wherein the spring is compressed between the carriage and the spring stop.

- 16 -

7. The carrier puck of claim 6 wherein the base includes a carriage stop that engages with the carriage when the carriage is in an outermost position on the carriage track.
8. The carrier puck of claim 6 wherein the base further comprises a platform comprising a platform sidewall and a platform top wall.
9. The carrier puck of claim 8 wherein a region of the platform sidewall forms the spring stop.
10. The carrier puck of claim 1 wherein the first locking member comprises a lug that extends outward from the latching arm.
11. The carrier puck of claim 1 wherein the insert rim further comprises a downwardly extending skirt.
12. The carrier puck of claim 1 wherein the base has a generally rectangular perimeter, and wherein the base sidewall comprises a pair of generally opposing long sidewall sections and a pair of generally opposing short sidewall sections.
13. The carrier puck of claim 11 wherein there are at least two fasteners proximate to each long sidewall section.
14. The carrier puck of claim 1 wherein the second locking member comprises an inwardly extending ledge.

Fig. 1



2/3

Fig. 2a

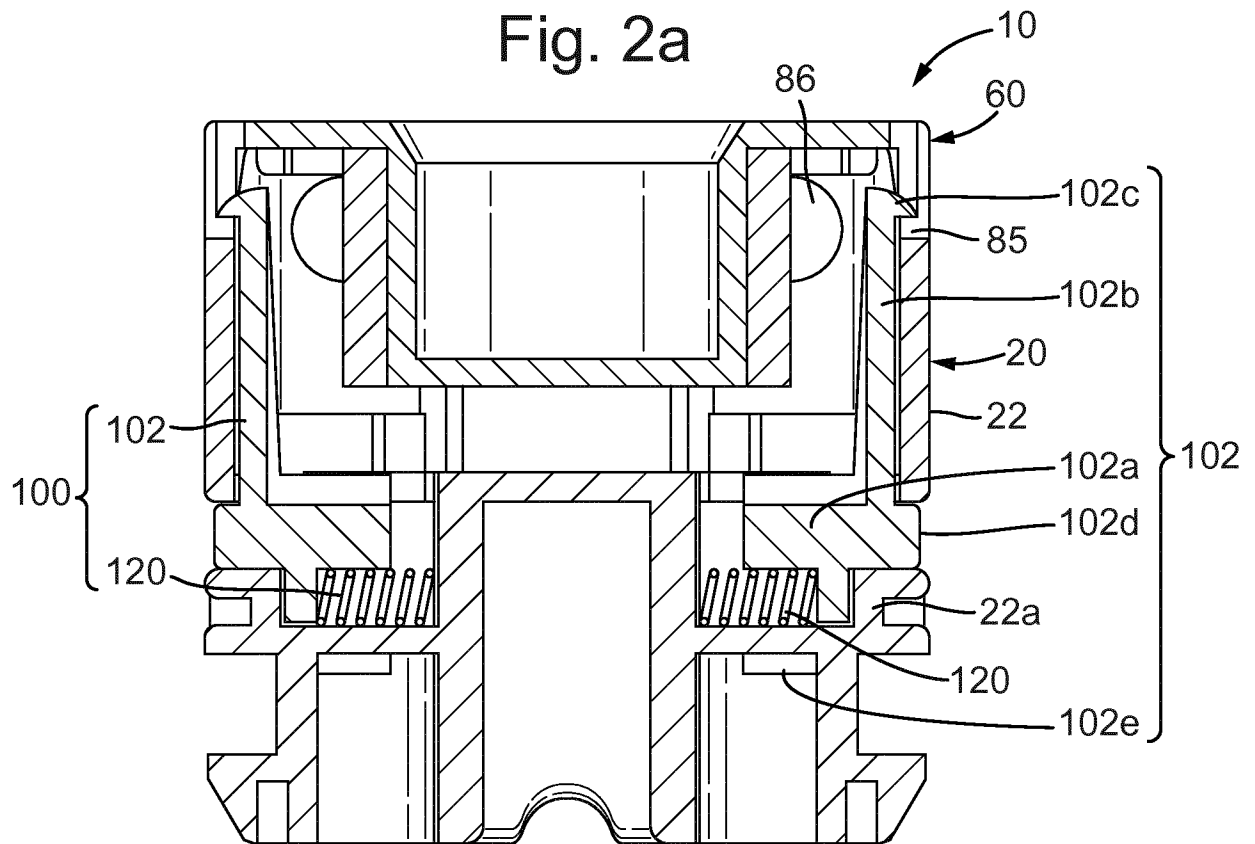
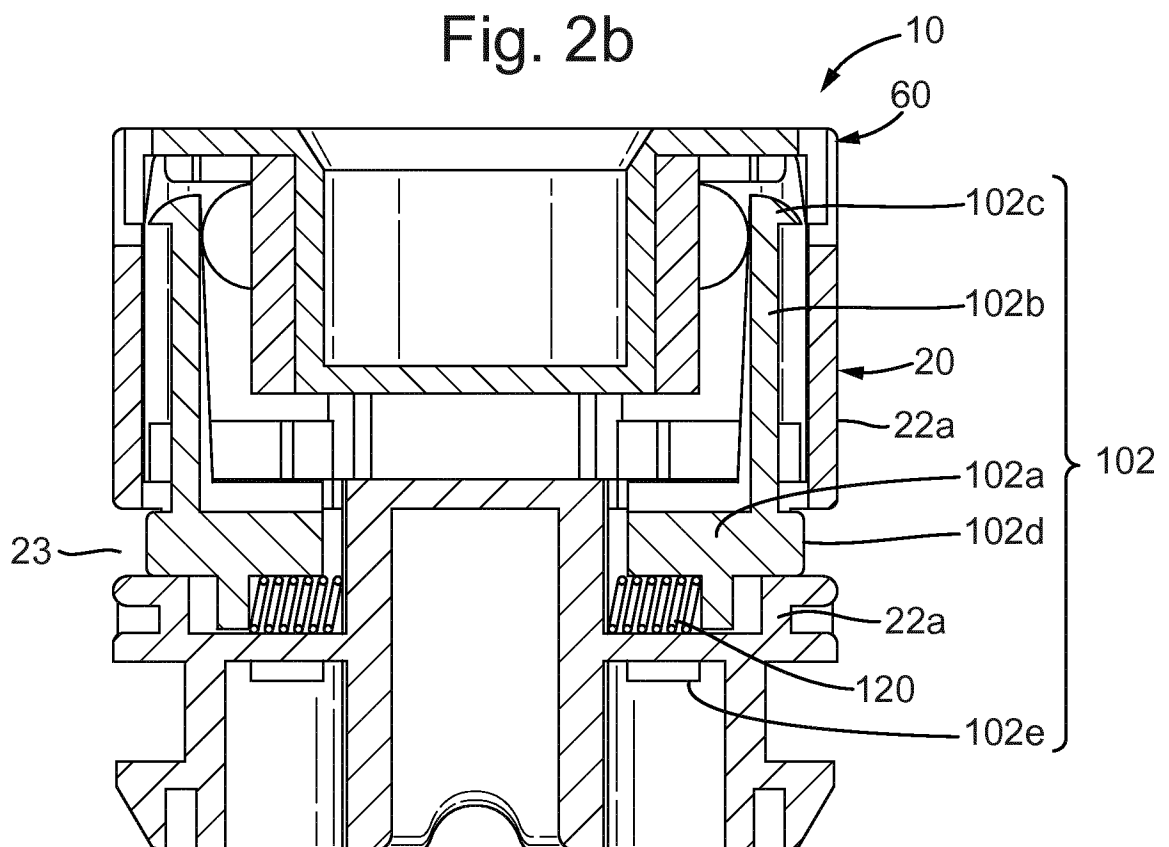


Fig. 2b



3/3

Fig. 3

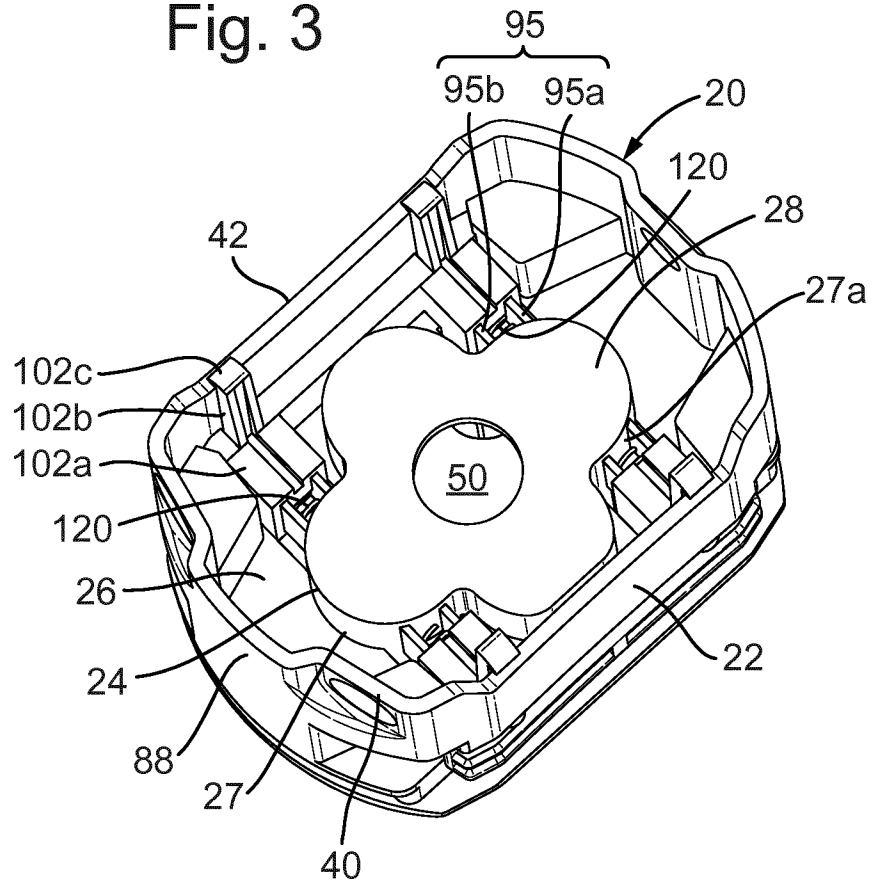
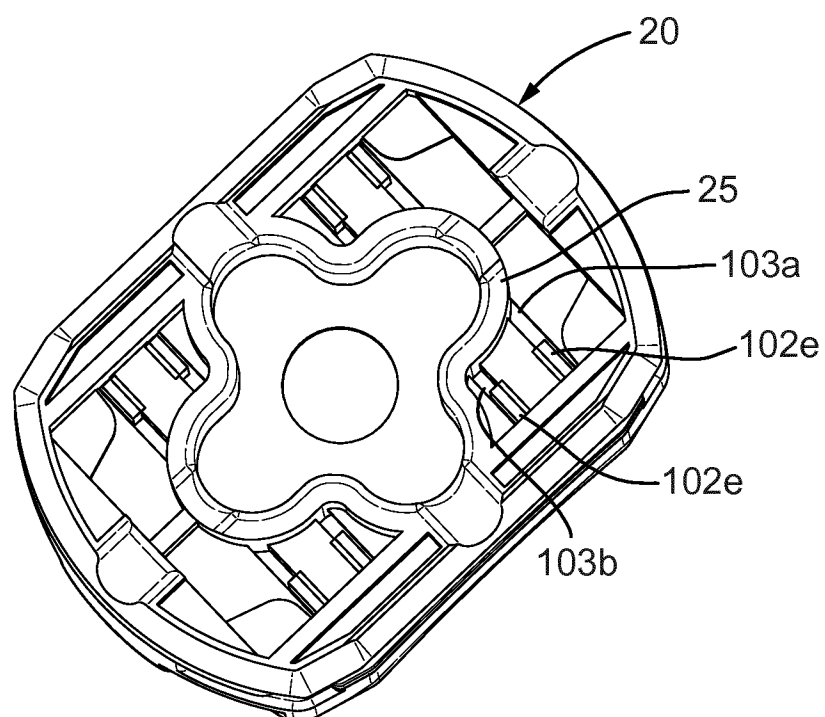


Fig. 4



## INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2017/054948

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B65G17/46  
ADD.

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)  
B65G B65B

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 practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                         | Relevant to claim No. |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | US 3 342 304 A (GREULICH MAX A)<br>19 September 1967 (1967-09-19)<br>column 2, line 49 - column 5, line 20<br>figures 1-13                                                 | 1-14                  |
| A         | -----<br>US 8 695 791 B2 (OEHRMAN MICHAEL [SE])<br>15 April 2014 (2014-04-15)<br>cited in the application<br>column 3, line 61 - column 6, line 39<br>figures 1,2<br>----- | 1-14                  |



Further documents are listed in the continuation of Box C.



See patent family 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 application or patent 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

"&" document member of the same patent family

Date of the actual completion of the international search

11 May 2017

Date of mailing of the international search report

22/05/2017

Name and mailing address of the ISA/

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

Authorized officer

Papathoeofrastou, M

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2017/054948

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)  | Publication<br>date       |
|-------------------------------------------|---------------------|-----------------------------|---------------------------|
| US 3342304                                | A                   | 19-09-1967                  | NONE                      |
| -----                                     |                     |                             |                           |
| US 8695791                                | B2                  | 15-04-2014                  | CN 102648136 A 22-08-2012 |
|                                           |                     | EP 2473425 A1 11-07-2012    |                           |
|                                           |                     | JP 5515158 B2 11-06-2014    |                           |
|                                           |                     | JP 2013503799 A 04-02-2013  |                           |
|                                           |                     | SE 0950635 A1 05-03-2011    |                           |
|                                           |                     | US 2012228094 A1 13-09-2012 |                           |
|                                           |                     | WO 2011028166 A1 10-03-2011 |                           |
| -----                                     |                     |                             |                           |