

[54] **BOTTLE GRIPPER FOR PACKING AND UNPACKING MACHINES**

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[51] Int. Cl. **B66c 1/46**

[58] Field of Search..... 294/63 A, 64 R, 65, 87,
294/90, 93, 99 R; 53/95, 247, 307, 367;
214/1 BS, 1 BT, 1 BH, 1 BV, 6 FS, 8.5 D, 309

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Assistant Examiner—Johnny D. Cherry

Attorney, Agent, or Firm—Toren, McGeedy and Stanger

[57] **ABSTRACT**

A bottle gripper for packing and unpacking machines is formed of an upwardly extending double collar including an inner elastic wall and an outer elastic wall spaced radially outwardly from the inner wall with the two walls connected together at their lower ends. The space between the walls can be charged with a pressure medium. A connecting piece extends across the upper end of the outer wall with a bead formed on the outer wall which seats within a groove formed in the connecting piece. The outer wall is tightly enclosed by an upwardly extending inelastic sleeve. In one arrangement webs extend between the inner and outer walls dividing the space therebetween into individual cavities. In another arrangement, a guide is formed on the interconnected lower ends of the two walls and the inner surface of the guide has a frusto-conical shape.

5 Claims, 4 Drawing Figures

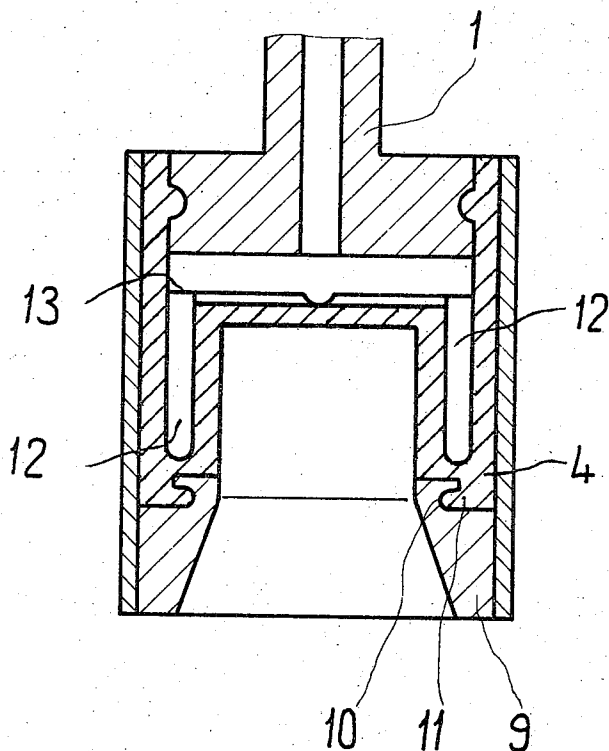
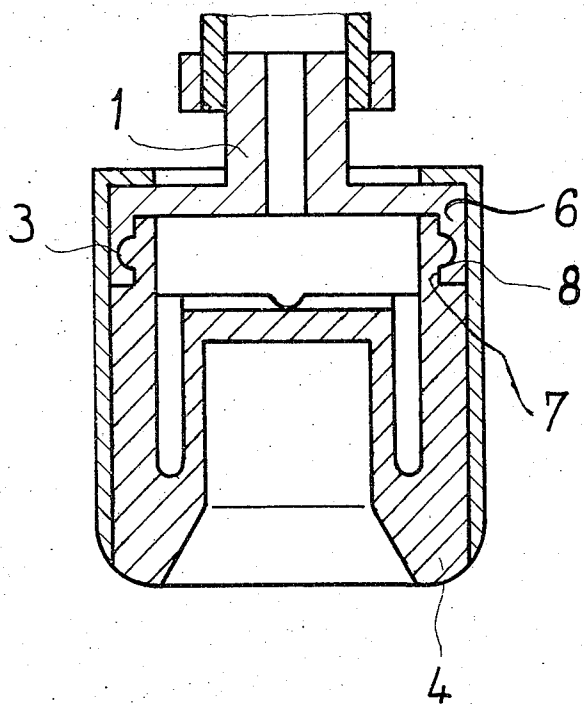


Fig. 1

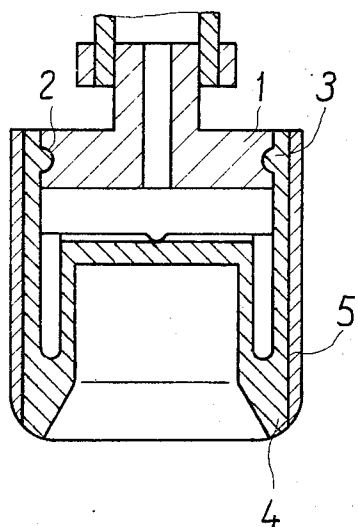


Fig. 2

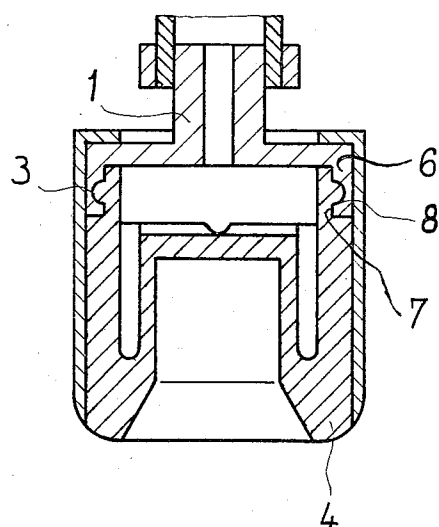


Fig. 3

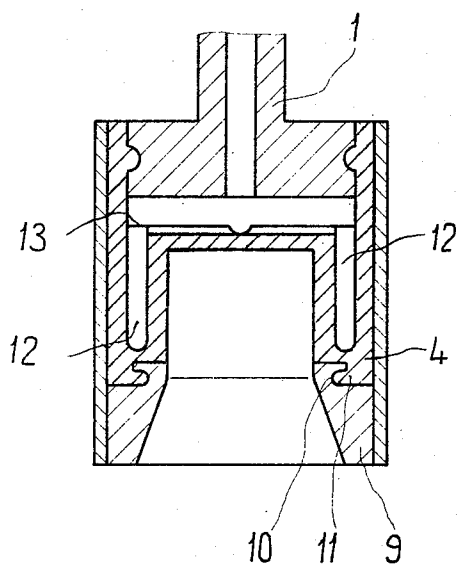
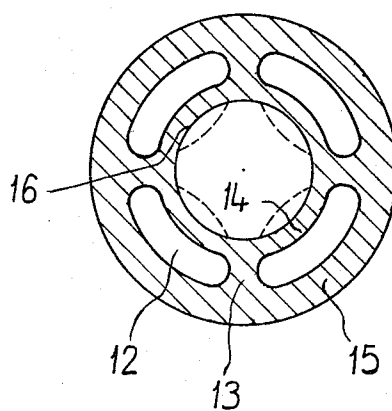


Fig. 4



BOTTLE GRIPPER FOR PACKING AND UNPACKING MACHINES

SUMMARY OF THE INVENTION

The present invention is directed to a bottle gripper for packing and unpacking machines and, more particularly, it concerns a double collar open at the bottom and closed at the top and with the upper part of the collar closed by a connecting piece and with the double collar formed by an inner and outer wall spaced apart to provide a space which can be charged with a pressure medium.

Bottle grippers formed as a double collar and containing a space which can be charged with a pressure medium are known. In such bottle grippers an inner jacket can be inflated with a pressure medium and is screwed tightly into a holder supporting the outer jacket. The holder is cylindrically shaped and has a passage for a pressure medium and a threaded extension into which the fastening elements for the double collar can be screwed. Such a bottle gripper consists of a plurality of parts, and the production and assembly of these parts is rather costly. Further, it has been found in practice that, particularly at the fastening point of the inner jacket, which is subjected to constant deformation, leaks appear relatively frequently and, as a result, the double collar must be replaced.

Therefore, based on the double collar bottle grippers known in the past, the present invention is directed to an arrangement which avoids the disadvantages experienced in the past and provides a bottle gripper formed of a relatively small number of parts and which is particularly simple to produce and also affords easy replacement of damaged collars. Another feature of the invention is to provide an inner wall or collar free of fastening elements inside the bottle gripper.

In accordance with the present invention, a bottle gripper is formed of a cylindrically shaped upwardly extending double collar having an inner wall spaced radially inwardly from an outer wall and with a connecting piece extending transversely across the upper end of the outer wall. The outer wall has a bead which seats within a groove formed in the connecting piece and a sleeve tightly laterally encloses the outer wall of the double collar.

In one embodiment of the invention, the bead is formed on the inner surface of the outer wall and seats within a groove formed in the circumferential peripheral surface of the connecting piece. Alternatively, the bead can be formed on an outwardly facing surface of the outer wall and seat within an inwardly directed groove on the connecting piece.

Basically, the bottle gripper of the present invention consists of only two main parts which can be assembled together without the use of any tools. Further, the collar can be replaced in a simple manner also without the use of any tools.

In still another embodiment of the invention, a guide is secured to the lower interconnected ends of the inner and outer walls of the double collar and the inner surface of the guide has a frusto-conically shaped configuration. The guide is provided with a groove in an outwardly facing portion of its outer surface which receives a bead formed on the inwardly facing surface of the interconnected parts at the lower ends of the inner and outer walls.

By spacing the inner and outer walls of the double collar apart, a space is provided into which a pressure medium can be charged and, further, radially extending webs can be provided between the inner and outer walls subdividing the space into individual cavities.

This arrangement results in a particularly great natural elasticity for the collar, which makes additional fastenings of the inner collar unnecessary.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a cross-sectional view of the bottle gripper embodying the present invention;

FIG. 2 is a cross-sectional view, similar to FIG. 1, of another bottle gripper embodying the present invention;

FIG. 3 is a cross-sectional view of still another bottle gripper having a guide arranged on the vessel side, which embodies the present invention; and

FIG. 4 is a transverse cross-sectional view of a double collar embodying the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In FIG. 1 a bottle gripper is shown including a horizontally arranged connecting piece 1 to which is connected an elastic tube suspended from a gripper head, not shown. The outer circumferential periphery of the connecting piece 1 has a circumferentially extending groove 2. A double collar 4, formed of an outer wall and an inner wall spaced radially inwardly from the outer wall and connected to it at its lower end, extends downwardly from the connecting piece 1. The upper end of the inner wall is spaced below the connecting piece 1 and has a transversely extending section which closes off the upper end of the inner wall. On the inwardly facing surface of the outer wall, a bead 3 is provided which seats within the groove 2 in the connecting piece. In place of the single circumferentially extending groove 2 shown in FIG. 1, several grooves of this type could be used with a similar number of beads 3 on the inner surface of the outer wall fitted into the grooves.

The double collar 4 is formed of an elastic material and is supported and tightly enclosed on the outer circumference of the outer wall by an inelastic sleeve 5. The tightly enclosing effect of the sleeve assures that the bead 3 is tightly fitted into the groove 2. At the lower end of the double collar the inner surface of the section which interconnects the inner and outer wall has a frusto-conically shaped surface converging inwardly in the upward direction.

In the embodiment of the elastic double collar 4 shown in FIG. 2, the connecting piece 1 has a transversely extending section located above the upper end of the inner wall and an annular flange 6 extending downwardly from the radially outer edge of the transverse section. The inner surface 7 of the flange has a circumferentially extending groove 8 into which the

bead 3, on the outwardly facing surface of the outer wall, seats. The portion of the outer wall forming the bead 3 extends upwardly from and is spaced radially inwardly from the remainder of the outer surface of the outer wall. In this embodiment the sleeve 5 has an inwardly directed flange at its upper end which extends over the outer portion of the transversely extending section of the connecting piece. In this embodiment an additional tension ring for pressing the bead 3 tightly into the groove 8 is unnecessary, since a tight engagement of the bead is achieved by charging a pressure medium into the space formed between the inner and outer walls of the double collar and the downwardly facing surface of the connecting piece. However, the inwardly directed flange of the sleeve results in a further stiffening of the bottle gripper. Additionally, thread-like contours can be provided on the inner surface of the sleeve 5, consisting preferably of plastic, which engage corresponding counter-contours on the outer surface of the outer wall of the double collar. As in the embodiment shown in FIG. 1, the lower ends of the inner and outer wall of the double collar are interconnected and the inner surface of the interconnected portion has a frusto-conical shape.

In FIG. 3, a bottle gripper is shown similar to the one in FIG. 1, however, a guide 9 is arranged on the lower end of the double collar extending downwardly from the portion which interconnects the inner and outer walls of the double collar. The guide 9 is located on the end of the double collar to which the vessels or bottles are introduced and the radially inner surface of the guide has a frusto-conical configuration with its surfaces converging inwardly in the upward direction. Further, the guide is shaped at its top surface to provide an outwardly directed circumferentially extending groove 10 into which a bead 11, formed on the lower end of the double collars, seats.

In FIG. 4, radially extending webs 13 are located in the space 12 extending between the inner and outer walls 14, 15 of the double collar. When the space 12 is charged with a pressure medium, the outer collar is firmly supported by the sleeve 5 and the webs 13 prevent a portion of the inner wall from deforming inwardly. Only the free portion 16 of the inner walls extending between the webs 13 are displaced inwardly by the pressure medium and move into the positions indicated in FIG. 4 by the broken lines. These inwardly directed portions of the inner wall enclose the neck of a bottle inserted within the double collar in a tight manner.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A bottle gripper for use in packing and unpacking machines, comprising a vertically extending double collar including a vertically extending annular inner elastic wall and a vertically extending annular outer elastic wall spaced radially outwardly from and laterally enclosing said inner wall, said inner wall and outer wall being integrally connected together at their lower ends, a separate horizontally arranged connecting piece disposed horizontally and extending across the upper end of said outer wall and disposed in surface contact with said outer wall, said double collar includes

a horizontally arranged section integrally formed with and extending across the upper end of said inner wall for forming a seal for forming a sealed closure for the upper end of the space laterally enclosed by said inner wall, the combination of said inner wall and said horizontally arranged section thereof along with said outer wall and connecting piece forming a closed space within said double collar which can be charged with a pressure medium and said connecting piece arranged to provide a passageway for supplying the pressure medium into the closed space, wherein the improvement comprises that said horizontally arranged section integrally formed with said inner wall is spaced below and separate from said connecting piece, said outer wall has a circumferentially extending annular bead located adjacent to and spaced below its upper end, said connecting piece has an annular groove formed therein spaced intermediate its upper and lower horizontal surfaces and extending in the circumferential direction thereof and disposed in juxtaposition to said annular bead on said outer wall so that said annular bead seats within said annular groove, and an elastic sleeve tightly laterally encloses the radially outer surface of said outer wall and provides an inelastic support for the engagement of said annular bead in said annular groove, the radially inner surface of said inelastic sleeve located below the upper horizontal surface of said connecting piece being of a uniform diameter over its length and the radially outer diameter of said outer sleeve being of a uniform diameter for its length below said connecting member, the upper end of said outer wall being held against flexural displacement by the cooperating relationship of said outer wall with said connecting piece and inelastic sleeve so that the pressure medium introduced into the closed space formed within said double collar does not deform said inner and outer walls relative to a supporting or holding member whereby leakage through said double collar could develop due to failure at the locations of flexural displacement, a guide connected to and extending downwardly from the interconnected lower ends of said inner and outer walls, the inner surface of said guide having a frusto-conical configuration converging inwardly from the lower end thereof in the upward direction, said guide having a first outwardly facing surface extending from its lower end and disposed in contact with the inner surface of said inelastic sleeve and a second outwardly facing surface extending upwardly above and spaced radially inwardly from said first outwardly facing surface, a groove formed in said second outwardly facing surface, and a bead formed on the integrally connected portions of said lower end of said inner and outer walls and facing radially inwardly and being seated within the groove in said second outwardly facing surface of said guide.

2. A bottle gripper, as set forth in claim 1, wherein said sleeve has an annular flange formed on its upper end with said flange extending radially inwardly over and in contact with the upper surface of said connecting piece.

3. A bottle gripper for use in packing and unpacking machines, comprising a vertically extending double collar including a vertically extending annular inner elastic wall and a vertically extending outer elastic wall spaced radially outwardly from and laterally enclosing said inner wall, said inner wall and outer wall being integrally connected together at their lower ends, a separate

rate horizontally arranged connecting piece disposed horizontally and extending across the upper end of said outer wall and disposed in surface contact with said outer wall, said double collar includes a horizontally arranged section integrally formed with and extending across the upper end of said inner wall for forming a sealed closure for the upper end of the space laterally enclosed by said inner wall, the combination of said inner wall and said horizontally arranged section thereof along with said outer wall and said connecting piece forming a closed space within said double wall collar which can be charged with a pressure medium and said connecting piece arranged to provide a passageway for supplying the pressure medium into the closed space, wherein the improvement comprises that said horizontally arranged section integrally formed with said inner wall is spaced below and separate from said connecting piece, said outer wall having a circumferentially extending annular bead located adjacent to and spaced below its upper end, said connecting piece has an annular groove formed therein spaced intermediate its upper and lower horizontal surfaces and extending in the circumferential direction thereof and disposed in juxtaposition to said annular bead on said outer wall so that said annular bead seats within said annular groove, an inelastic sleeve tightly laterally encloses the radially outer surface of said outer wall and provides an inelastic support for the engagement of said annular bead in said annular groove, the radially inner surface of said inelastic sleeve located below the upper horizontal surface of said connecting piece being of a uniform diameter over its length and the radially outer diameter of said outer sleeve being of a uniform

diameter for its length below said connecting member, the upper end of said outer wall being held against flexural displacement by the cooperating relationship of said outer wall with said connecting piece and inelastic sleeve, so that the pressure medium introduced into the closed space formed within said double collar does not deform said inner and outer walls relative to a supporting or holding member whereby leakage through said double collar could develop due to failure at the locations of flexural displacement, said outer wall having a section projecting upwardly from its upper end with the outer surface of said section spaced radially inwardly from said sleeve, said bead is formed on the outer surface of said upwardly projecting section, said connecting piece comprises a wall extending transversely of the upward direction and an annular flange extending downwardly from the outer edge of said transversely extending wall, and the groove in said connecting piece is formed in the inwardly facing surface of said annular flange.

4. A bottle gripper, as set forth in claim 3, wherein a plurality of angularly spaced upwardly extending webs are arranged between and integrally connected to the outer surface of said inner wall and the inner surface of said outer wall for dividing the space therebetween into separate upwardly extending cavities.

5. A bottle gripper, as set forth in claim 3, wherein the integrally connected lower end portions of said inner and outer walls are frusto-conically shaped with the frusto-conically shaped surfaces converging in the upward direction.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,856,343 Dated December 24, 1974

Inventor(s) FRIEDHELM MÜLLER

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading of the patent, insert:

--[30] Foreign Application Priority Data

November 27th, 1971 Germany.....P 21 58 922.0--

Signed and sealed this 11th day of February 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
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