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(54) Title: FOOD OR BEVERAGE PACKAGE AND CONTAINER CLOSURE

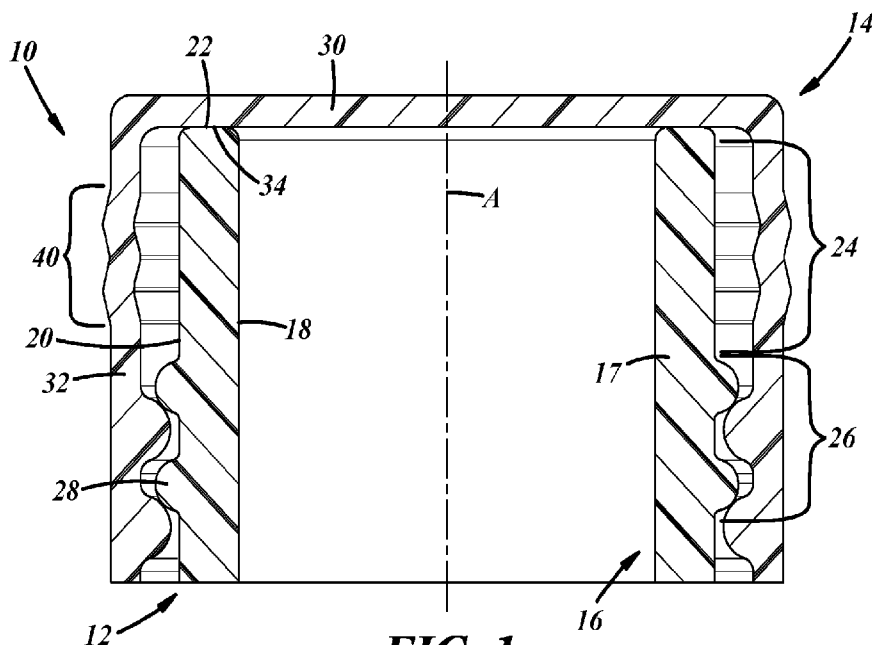


FIG. 1

(57) Abstract: A package is disclosed that includes a container and a closure. The container includes a container neck finish having a radially inner surface, a radially outer surface, and an axial outward end surface extending between the radially inner and outer surfaces. The radially outer surface includes a straight cylindrical upper portion and a threaded cylindrical lower portion. The closure includes a base wall engaging the axial outward end surface of the container neck finish, an external skirt extending away from the base wall and having a threaded section with internal threads engaging the container neck finish, and a pleated section between the threaded section and the base wall.

LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI,
SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
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FOOD OR BEVERAGE PACKAGE AND CONTAINER CLOSURE

Technical Field

[0001] This patent application discloses innovations to packages and container closures and, more particularly, to food or beverage packages and container closures.

Background

[0002] A typical food or beverage package includes a container that usually includes a base, a body extending axially away from the base, a shoulder extending axially away from the body, and a neck extending axially away from the shoulder and terminating in neck finish. The neck finish includes a sealing lip and typically includes circumferentially extending external threads proximate the lip to cooperate with corresponding features of an internally threaded closure applied to the container to seal the package. Although such packages are ubiquitous in commerce, closure options are very limited for certain so-called “wide mouth” containers that are capable of holding internal pressure.

Brief Description of the Drawings

[0003] FIG. 1 is a fragmentary cross-sectional view of a package in accordance with an illustrative embodiment of the present disclosure, and including a container, and a closure in accordance with an illustrative embodiment of the present disclosure;

[0004] FIG. 2 is a cross-sectional view of the closure of FIG. 1 shown in an applied and stretched state; and

[0005] FIG. 3 is a cross-sectional view of the closure of FIG. 1 shown in an unapplied and contracted state.

Detailed Description

[0006] In general, the present disclosure illustrates and describes a novel package including a container, and a novel closure having a base wall and a pleated skirt extending away from the base wall. The pleated skirt may provide a spring-like feature to impose a desired bias force from the base wall onto a lip of a neck finish of the container. In some cases, the pleated closure

skirt may serve as a lockdown feature to urge the base wall against the container lip for good sealing between the closure and the container to allow the package to hold higher internal pressures exhibited in certain types of packages. In other cases, the pleated section may serve as a pressure relief feature to allow the base wall to separate from the container lip to allow the package to vent in the presence of excessive internal pressures in the package.

[0007] With specific reference to the drawing figures, FIG. 1 is a fragmentary cross-sectional view of an illustrative embodiment of a package 10 including a container 12 and an illustrative embodiment of a closure 14 applied to the container 12. The package 10 includes a central longitudinal axis A along which the container 12 generally longitudinally extends, also along which the closure 14 may be applied to and removed from the container 12, and about which the closure 14 may be rotated when being applied to and removed from the container 12. In one embodiment, the package 10 may include a beverage package, and may be used to contain pressurized liquid, for example, carbonated beverages, like beer, soda, etc., or an unpressurized or still liquid, like wine, water, coffee, etc. Accordingly, the package 10 may be a closed bottle. In other embodiments, the package 10 may include any other suitable type of closed container for any suitable purpose. As used herein, directional words such as top, bottom, upper, upward, downward, lower, radial, circumferential, lateral, longitudinal, transverse, vertical, horizontal, and the like are employed by way of description and not necessarily limitation.

[0008] The container 12 may be of one-piece integrally formed construction, preferably of glass, plastic, or metal construction. The container 12 may be fabricated in press-and-blow or blow-and-blow glass container manufacturing operations, in plastic injection and/or blow molding operations, in a metal drawing operation, or in any other suitable manner. The container 12 includes a base (not shown) on which the container 12 may be supported, a body (not shown) extending in a direction axially away from the base, a shoulder (not shown) extending in a direction radially and axially from the body, and a neck 16 extending in a direction axially from the shoulder and terminating in a neck finish 17. As used herein, the term “axial” includes oriented along the longitudinal axis A of the closure 14, container 12, or package 10 and may include, but is not limited to, a direction that is strictly parallel to the axis A.

[0009] The neck finish 17 includes a radially inner surface 18, a radially outer surface 20, and an axial outward end surface or a sealing lip 22 extending between the radially inner and outer surfaces 18, 20. The container 12 may be provided in any suitable sizes, and may include a wide mouth bottle. In a wide-mouth bottle embodiment, an overall inner diameter (or “mouth”) of the radially inner surface 18 may be between 30 mm and 100 mm including all ranges, sub-ranges, endpoints, and values in that range, or more narrowly between 40 mm and 70 mm. The radially outer surface 20 includes a straight cylindrical upper portion 24 and a threaded cylindrical lower portion 26 including one or more external threads 28. As used herein, the term “thread” includes one or more whole, partial, and/or interrupted helical threads, thread segments, bayonet lugs, or any other suitable rotatable closure retention features. The straight cylindrical upper portion 24 has an outer surface that may be smooth, with no threads, no grooves, no ribs, and the like, so as to provide good “lip feel” to a consumer who consumes food or beverage with their mouth directly from the container 12.

[0010] The closure 14 may be provided to close the container 12 and thereby retain contents of the container 12 in the container 12. The closure 14 may include a cap or any other suitable type of closure, and may be composed of polymeric, metallic, or any other material suitable for use with the various aspects of the present disclosure. In the illustrated embodiment, the closure 14 is composed of a metal, for example, aluminum. Or the closure 14 may be composed of another metal having a higher yield strength than aluminum to impose a desired lockdown force on the lip 22 of the container 12. In any case, the closure 14 includes a base wall 30 and an annular outer skirt 32 extending away from the base wall 30.

[0011] The base wall 30 includes an axially inner surface 34 that may seal to the lip 22 of the container neck finish 17. In other embodiments, the closure 14 may also include a separate or integrated seal (not separately shown) disposed between the base wall 30 and the neck finish 17. Such a seal may be carried on, partially in, or otherwise by the base wall 30 of the closure 14. In still other embodiments, and although not illustrated, the closure 14 may include multiple closure components, for example, an outer shell and an inner shell that, for instance, may be configured in a child-resistant mode of operation. In any case, as used herein, the terminology “base wall” includes the illustrated bare base wall 30, or a base wall with a seal carried on or partially in its axially inner surface 34.

[0012] With reference to FIG. 2, in general, the skirt 32 of the closure 14 is internally threaded, and is also pleated, as described in further detail below. More specifically, in the illustrated embodiment, the skirt 32 may include a first or proximate portion 36 extending directly away from the base wall 30, and a second or intermediate portion 38 extending away from the proximate portion 36 and including a pleated section 40 with multiple pleats 41 (aka bellows, accordionlike folds, or convolutions). The skirt 32 also includes a third or distal portion 42 extending away from the intermediate portion 38 and having a threaded section 43 with one or more internal threads 44 for cooperating with the one or more external threads 28 of the container neck finish 17 (FIG. 1), and terminating in an open end 46. Again, the thread(s) 44 include one or more whole, partial, and/or interrupted helical threads, thread segments, bayonet lugs, or any other suitable rotatable container retention features. In the illustrated embodiment, the external threads 28 (FIG. 1) and internal threads 44 are helical, but may be of any style and configuration suitable for use with the inventive aspects of the present disclosure. As used herein, the term “proximate” is used in accordance with its ordinary meaning; e.g., something that is closer to one end than it is to an opposite end. Likewise, as used herein, the term “distal” is used in accordance with its ordinary meaning; e.g., something that is further from one end than it is to an opposite end.

[0013] With reference to FIG. 3, the closure 14 is shown in an as-manufactured relaxed state wherein the pleated section 40 has an original outer diameter, an original inner diameter, and/or an original length. The particular geometry of the illustrated pleated section 40 is merely an example of many potential pleated configurations. In the illustrated embodiment, and proceeding in a direction from the base wall 30 toward the open end 46 of the skirt 32, the pleated section 40 includes a first outward bend 48, a first outwardly extending segment 50, a first inward bend 52, a first inwardly extending segment 54, a second outward bend 56, a second outwardly extending segment 58, a second inward bend 60, a second inwardly extending segment 62, and another outward bend 64. Additionally, the pleated section 40 includes first and second outer apexes 66, 68 and an outer nadir 67 axially therebetween, and first and second inner nadirs 70, 72 and an inner apex 71 axially therebetween. Accordingly, the pleats are relatively coarse such that surfaces of the pleats are not necessarily folded in direct contact with one another, but could be in other embodiments where pleats are of finer configuration.

[0014] In use, and with reference again to FIG. 1, the closure 14 is positioned over the neck finish 17 of the container 12, axially lowered down onto the neck finish 17, and rotated so as to threadingly engage the internal thread(s) 44 of the closure 14 with the external thread(s) 28 of the container 12. As the closure 14 is threaded to the container 12, eventually the base wall 30 of the closure 14 contacts the lip 22 of the container neck finish 17. With conventional closures, the contact of a base wall with a lip of a container neck finish generally limits further rotation and axial travel of the closure with respect to the neck finish, and the axial spacing between an axially lower end of a container thread and the lip of the neck finish is merely that which is necessary to ensure sealing contact between the lip and the base wall of the closure. In contrast, with the presently disclosed closure and container, an axially lower end of the container thread 28 may be spaced a distance away from the lip 22 of the neck finish 17 that is further than a conventional distance to ensure not only initial sealing contact between the lip 22 and the base wall 30 of the closure 14 but also to ensure that continued rotation of the closure 14 results in unfolding and elongation of the pleated section 40 of the closure 14.

[0015] From the above, and with continued reference to FIG. 1, those of ordinary skill in the art will recognize that the pleated section 40 of the closure 14 provides a spring-like feature that biases the base wall 30 of the closure 14 down on the lip 22 of the neck finish 17 of the container 12. In one embodiment, and in contrast to unpleated conventional closure skirts, the pleated closure skirt 32 may enable an increase in tension within the closure 14 and an increase in axial force exerted by the closure 14 on the container 12 to thereby create a stronger seal between the closure 14 and the container 12. This configuration results in increased pressure retention characteristics of the package 10, such that the closure 14 is capable of holding higher internal pressures in wide mouth container packages. In this case, those of ordinary skill in the art would recognize that various design parameters of the pleated section 40 and/or the choice of material for the skirt 32 may be selected to achieve the aforementioned functionality. For example, the radial wall thickness, the number of pleats, the angles of the pleats, and other suitable design parameters of the pleated section 40 may be chosen to achieve a desired lockdown force of the closure 14 on the container 12. Conversely, in another embodiment, and also in contrast to unpleated conventional closure skirts, the pleated section 40 may serve as a pressure relief feature wherein the closure skirt 32 is intentionally yieldable to allow the skirt 32 to elongate when excessive pressure in the package 10 pushes on the closure base wall 30 such that the seal

between the closure base wall 30 and the container lip 22 “breaks” thereby allowing internal pressure in the package 10 to vent.

[0016] The disclosure has been presented in conjunction with several illustrative embodiments, and additional modifications and variations have been discussed. Other modifications and variations readily will suggest themselves to persons of ordinary skill in the art in view of the foregoing discussion. For example, the subject matter of each of the embodiments is hereby incorporated by reference into each of the other embodiments, for expedience. The disclosure is intended to embrace all such modifications and variations as fall within the spirit and broad scope of the appended claims.

Claims

1.

A package, comprising:

a container including a container neck finish having a radially inner surface, a radially outer surface, and an axial outward end surface extending between the radially inner and outer surfaces, wherein the radially outer surface includes a straight cylindrical upper portion and a threaded cylindrical lower portion including one or more external threads; and

a closure including a base wall engaging the axial outward end surface of the container neck finish, an external skirt extending away from the base wall and having a threaded section with internal threads engaging the external threads of the container neck finish, and a pleated section between the threaded section and the base wall.

2.

The package of claim 1, wherein, in use, as the closure is threaded to the container, the base wall of the closure engages the axial outward end surface of the container neck finish, and, as the closure continues to be threaded to the container, the pleated section elongates to accommodate the continued threading and to ensure continued contact between the closure base wall and the container neck finish.

3.

The package of any of claims 1 to 2, wherein the container is a wide-mouth glass container and the closure is a metal closure.

4.

The package of any of claims 1 to 3, wherein the metal closure is composed of aluminum.

5.

The package of any of claims 1 to 4, wherein the pleated closure skirt serves as a lockdown feature to urge the base wall of the closure against the axial outward end surface of the neck finish for desired sealing between the closure and the container.

6.

The package of any of claims 1 to 4, wherein the pleated closure skirt serves as a pressure relief feature to allow the base wall of the closure to separate from the axial outward end surface of the neck finish to allow the package to vent excess internal pressures.

7.

A threaded and pleated closure, comprising:

a base wall; and

an external skirt extending away from the base wall and including:

an open end distal the base wall,

an internally threaded section distal the base wall and proximate the open end, and

a pleated section axially between the internally threaded section and the base wall.

8.

The closure of claim 7, wherein the closure is composed of metal.

9.

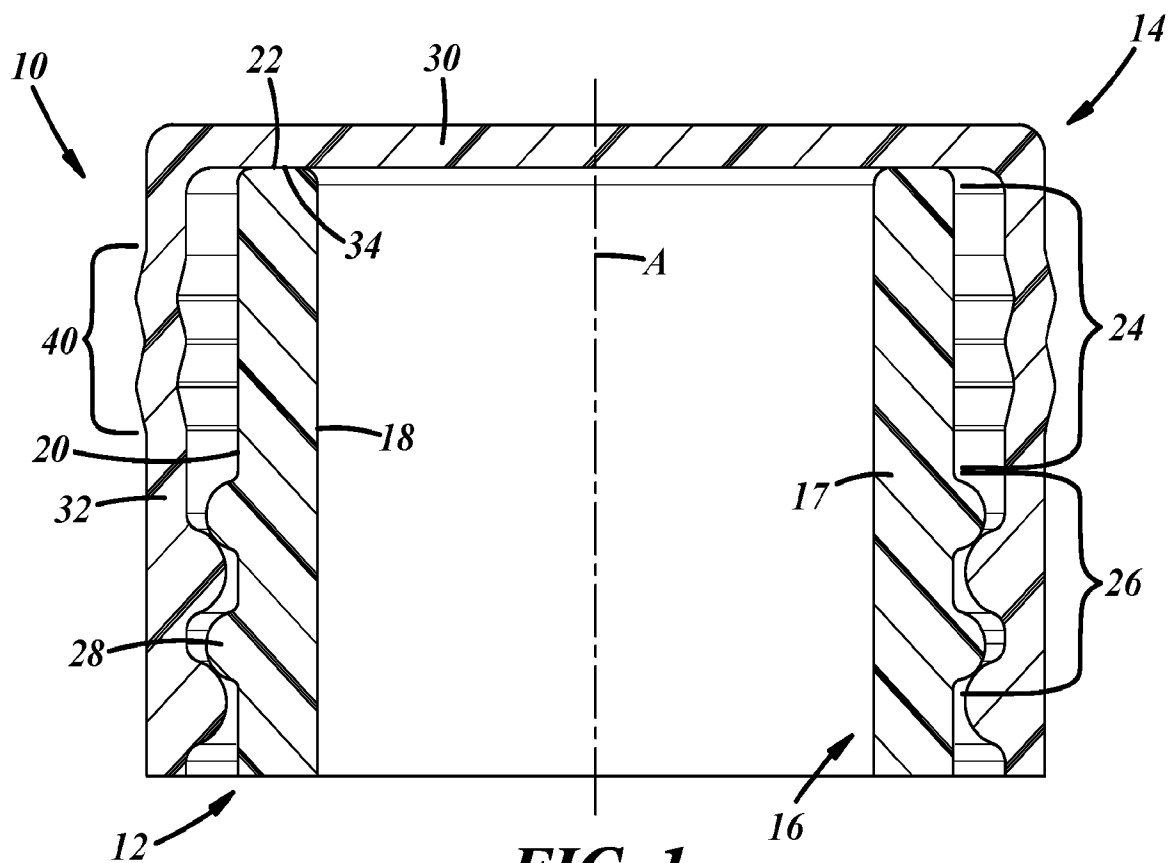
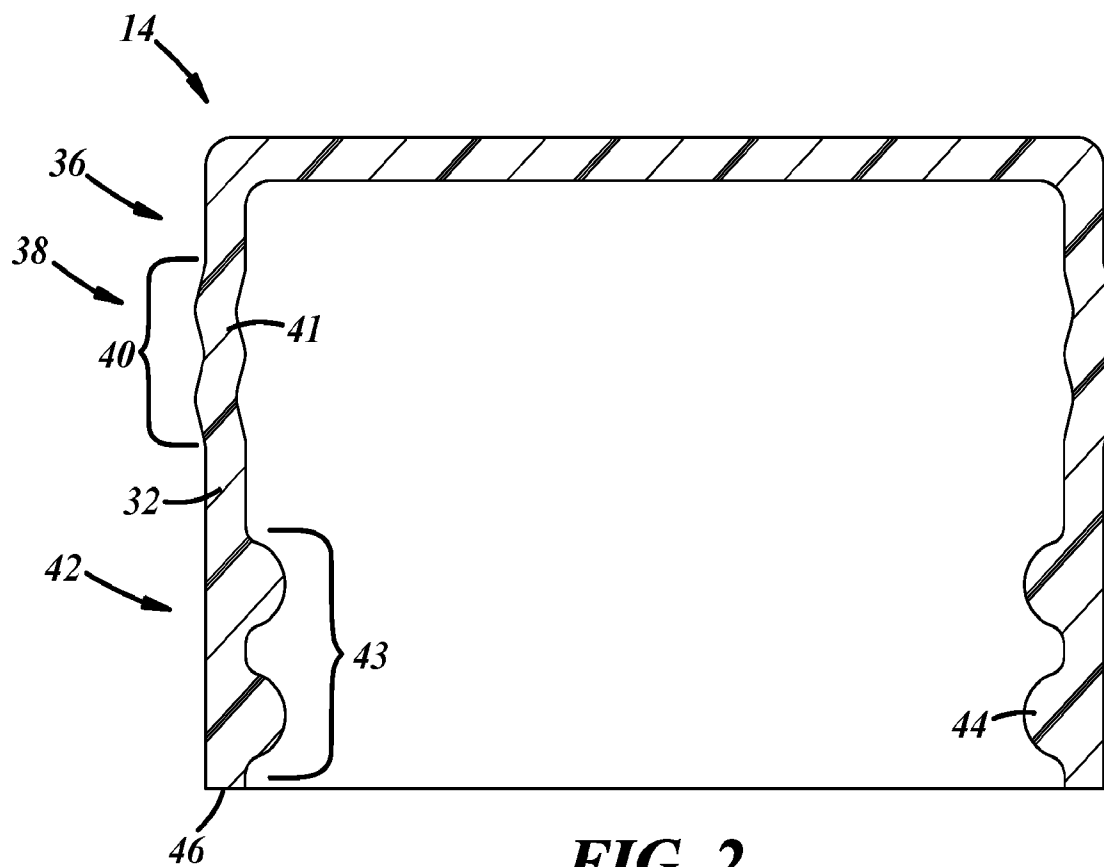
The closure of claim 8, wherein the metal closure is composed of aluminum.

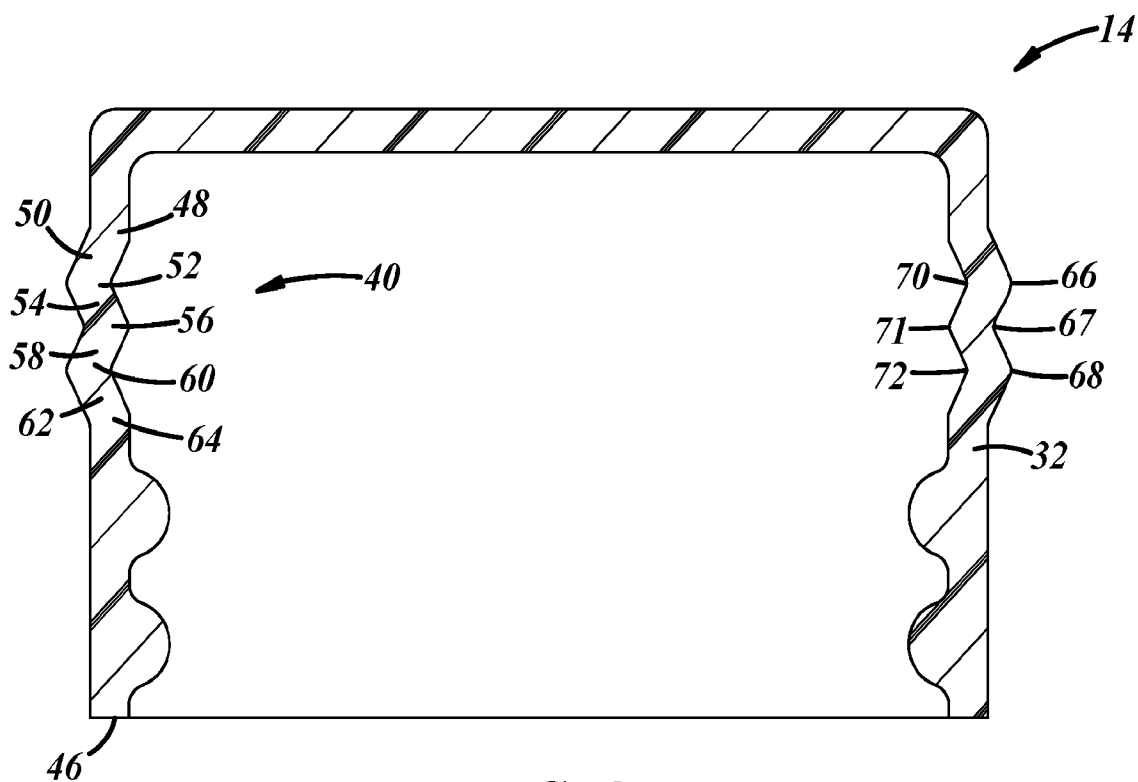
10.

The closure of any of claims 7 to 9, wherein the pleated section includes a plurality of pleats.

11.

The closure of any of claims 7 to 10, wherein the pleated section is elongated during application of the closure to a container impose an axial bias force on a lip of the container by the base wall of the closure.

**FIG. 1****FIG. 2**

**FIG. 3**

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. B65D51/16 B65D79/02 B65D41/04 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) B65D		
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.
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A	column 3, line 10 - column 7, line 27; figures	6-10
	-----	2, 5
X	US 4 887 730 A (TOUZANI WILLIAM [US]) 19 December 1989 (1989-12-19)	7, 10
	column 3, line 27 - column 6, line 52; figures	

X	DE 195 15 687 A1 (PATZELT HELMUT [DE]; BINDER PETER [DE]) 21 November 1996 (1996-11-21)	1, 6, 7
	column 1, line 48 - column 3, line 27; figures	

☐ 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		Date of mailing of the international search report
13 February 2023		21/02/2023
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 Fournier, Jacques

INTERNATIONAL SEARCH REPORT

Information on patent family members

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