(12) STANDARD PATENT (11) Application No. **AU 2006254390 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Vessel having pressurized CO2 gas source

(51) International Patent Classification(s)
B67D 1/04 (2006.01)

(21) Application No: **2006254390** (22) Date of Filing: **2006.05.27**

(87) WIPO No: **WO06/128653**

(30) Priority Data

(31) Number	(32) Date	(33) Country
05011896.7	**2005.06.02**	**EP**

(43) Publication Date: **2006.12.07**
(44) Accepted Journal Date: **2010.05.13**

(71) Applicant(s)
Kurt Oberhofer;Timm Oberhofer

(72) Inventor(s)
Oberhofer, Kurt;Oberhofer, Timm

(74) Agent / Attorney
Phillips Ormonde Fitzpatrick, 367 Collins Street, Melbourne, VIC, 3000

(56) Related Art
BE 1004020 A3
WO 1990/015377 A

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
7. Dezember 2006 (07.12.2006)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2006/128653 A1

(51) Internationale Patentklassifikation:
B67D 1/04 (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2006/005089

(22) Internationales Anmeldedatum:
27. Mai 2006 (27.05.2006)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
05011896.7 2. Juni 2005 (02.06.2005) EP

(71) Anmelder und
(72) Erfinder: **OBERHOFER, Kurt** [DE/DE]; Hoehenweg 24, 69259 Wilhelmsfeld (DE). **OBERHOFER, Timm** [DE/DE]; Hoehenweg 24, 69259 Wilhelmsfeld (DE).

(74) Anwalt: **MEYER-ROEDERN, Giso**; Bergheimer Strasse 10-12, 69115 Heidelberg (DE).

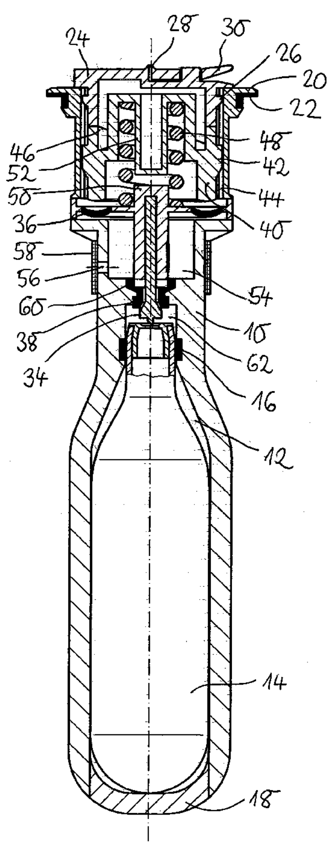
(81) **Bestimmungsstaaten** *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,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

(84) **Bestimmungsstaaten** *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC,

[Fortsetzung auf der nächsten Seite]

(54) Title: VESSEL HAVING PRESSURIZED CO_2 GAS SOURCE

(54) Bezeichnung: BEHÄLTER MIT CO_2-DRUCKGASQUELLE



(57) Abstract: The pressurized CO_2 gas source is an insert which can be attached with sealing in an orifice of the vessel. The insert has a high-pressure CO_2 cartridge (14), a pressure control valve for delivering CO_2 therefrom and a rotary knob (24) accessible from the outside. The rotary knob (24) interacts with an axial pusher (40), actuation of which allows the high-pressure CO_2 cartridge (14) to be pierced by a piercing needle (34).

(57) Zusammenfassung: Die CO_2-Druckgasquelle ist ein Einsatz, der sich unter Abdichtung in einer Öffnung des Behälters festlegen laßt. Der Einsatz weist eine CO_2-Hochdruckpatrone (14), ein Druckregelventil zum Ausgeben von CO_2 daraus und einen von außen zugänglichen Drehknopf (24) auf. Der Drehknopf (24) wirkt mit einem axial geführten Schieber (40) zusammen, durch dessen Betätigung sich die CO_2-Hochdruckpatrone (14) mit einer Anstechnadel (34) anstechen laßt.

WO 2006/128653 A1

NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Veröffentlicht:

— *mit internationalem Recherchenbericht*

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

PCT/EP2006/005 089
WO 2006/128 653 A1

Vessel having CO_2 compressed gas source

Description

The invention relates to a vessel that can be filled with liquid and closed in pressure-tight condition, and from which liquid can be withdrawn. Examples of such vessels are drums, small drums (party kegs) or cans, in which CO_2-containing liquids, especially beverages, are filled under pressure. In particular, it relates to party beer kegs.

There exist tap fittings that operate with high-pressure CO_2 cartridges and that can be used to tap such vessels in order to withdraw liquid therefrom by means of CO_2 pressure. This corresponds to the standard tapping technique in gastronomy, wherein CO_2 from high-pressure CO_2 bottles is used and very good wholesomeness and shelf life of the beer are achieved.

In some consumer groups, however, tap fittings with CO_2 high-pressure cartridges have not become popular. For persons who buy party beer kegs only occasionally, it is not worthwhile to procure an expensive tap fitting. Some people are even uncomfortable handling high-pressure CO_2 cartridges. Others worry about the replacement supply of cartridges.

There have therefore been developed party beer kegs equipped with an integrated outlet tap in the bottom region of the keg, whereby the beer can be drawn by the internal pressure and gravity alone. Usually air is admitted to the party keg above the liquid surface therein, in order to permit pressure equalization. This can be achieved by puncturing with a can opener. However, other party beer kegs have an integrated outlet tap and a hand-operated air-admission valve in the top end plate of the keg, forming part of a bunghole closure (see WO 99/23008 A1).

A disadvantage of such party kegs is that the wholesomeness and shelf life of the beer are impaired by the ingress of air into the top space of the keg.

2006254390 06 Aug 2009

When a party keg of this type is tapped, the contents must be consumed quickly, so that the beer does not become flat and stale.

Several suggestions have been made as regards improving the shelf life of beer in a tapped party keg. For example, WO 99/47451 A1 teaches integrating an aerosol can that contains CO_2 bound to active carbon under low pressure into the party keg and building up a CO_2 pressure in the top space of the keg sufficient to equal or exceed the partial pressure of the CO_2 dissolved in the beer. A disadvantage is the large volume of the can.

From DE 19952379 A1 there is provided a CO_2 dispenser for party kegs in the form of a separate manual device, with which the party keg is pierced above the liquid surface therein in order to pump CO_2 into the top space of the keg. The dispenser contains a high-pressure CO_2 cartridge and a pressure-regulating valve. It is intended for multiple uses and can be transferred from party keg to party keg. Even if the CO_2 consumption may be smaller than in the case of a tap fitting operating with CO_2, such a CO_2 dispenser ultimately raises similar concerns in consumer groups.

There can be introduced into the top space of a party beer keg a pressure bag, which expands when the pressure in the top space drops, thereby on the one hand filling the empty space being formed and on the other hand exerting a contact pressure on the liquid surface in the keg greater than the partial pressure of the CO_2 dissolved in the beer. The pressure bag comprises multiple plies of plastic film that is impermeable to oxygen diffusion. It has a plurality of chambers that contain gas-forming chemicals, such as baking powder and citric acid. The chambers are successively activated as the pressure drops in the top space of the party keg and are inflated by the gas evolved during the reaction of the chemicals.

A disadvantage of the pressure bag is the unsteady application of pressure on the beer. The pressure rises suddenly when the respective next chamber of the pressure bag is activated, and it then drops successively. This results in irregular tap behaviour. The tap behaviour fluctuates between discharge of the beer in a strong stream and a mere trickle.

A desirable outcome of the invention is to provide a vessel of the type mentioned hereinabove having an integrated compressed CO_2 gas source of small overall volume, from which discharged CO_2 exerts a steady pressure on the liquid in the vessel and improves its shelf life and wholesomeness.

The above outcome can be achieved by a vessel having an insert that can be fixed in sealed manner in an opening of the vessel and a high-pressure CO_2 cartridge, a pressure-regulating valve for discharging CO_2 therefrom and a control element that is accessible from the outside and that can be actuated to piece the high-pressure CO_2 cartridge with a piercing needle. The control element is a rotary knob, which cooperates with an axially guided slide for actuating the piercing needle.

By virtue of its small overall volume, the insert is suitable for replacing the bunghole closure with pressure-equalizing valve according to WO 99/23008 A1, without necessitating any substantial modifications to the shape and size of the respective vessel to be equipped therewith, such as a party beer keg. The processes at a filling plant are altered slightly at most. The insert can be made of plastic materials, which for years have proved most suitable for a bunghole closure with pressure-equalizing valve and an outlet tap. The configuration of the control element as a rotary knob corresponds to that of the widely used pressure-equalizing valve according to WO 99/23008 A1. The operation of the compressed CO_2 gas source is routinely so simple that a user familiar with actuation of a conventional pressure-equalizing valve hardly notices any difference. The user does not directly handle a high-pressure CO_2 cartridge, which would probably make him uncomfortable. The cartridge is designed for one-time use in a single vessel and will be disposed of together therewith. In particular, the shelf life of beer in a tapped party keg will be extended by several days without concern by filling the top space with CO_2 instead of air.

Commercial pierceable CO_2 cartridges in a size suitable for the inventive compressed CO_2 gas source contain approximately 16 g of CO_2 at a pressure of approximately 80 bar. The reduction and precise regulation of the pressure of the CO_2 discharged into the top space of the vessel imposes considerable requirements on the construction of a compressed CO_2 gas source in the form of a compact insert. The pressure is

2006254390 06 Aug 2009

typically between 0.5 and 0.7 bar. It is equal to or slightly higher than the partial pressure of the CO_2 dissolved in the liquid.

Especially for beer, the CO_2 content is one of the factors that determines the taste. The CO_2 content varies from beer variety to beer variety. If the CO_2 pressure in the top space of the party keg is too low, CO_2 escapes from the beer. If the CO_2 pressure in the top space is too high, the beer becomes overcarbonated and its taste and wholesomeness are impaired. The compressed CO_2 gas source described in detail hereinafter ensures that neither one nor the other occurs.

A reference herein to a patent document or other matter which is given as prior art is not to be taken as an admission that that document or matter was, in Australia, known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

Accordingly, the invention provides a vessel that can be filled with liquid and closed in pressure-tight condition and from which liquid can be withdrawn, which vessel has an insert that can be fixed in sealed manner in an opening of the vessel and a high-pressure CO_2 cartridge, a pressure-regulating valve for discharging CO_2 therefrom and a control element that is accessible from the outside and that can be actuated to pierce the high-pressure CO_2 cartridge with a piercing needle wherein the control element is a rotary knob which cooperates with an axially guided slide for actuating the piercing needle; and wherein the rotary knob is mounted to rotate in axially fixed manner, and in that the rotary knob and the slide are in contact with inclined surfaces extending in circumferential direction.

In a preferred embodiment, the inclined surfaces rise with the same slope, in proportion to the circumferential angle. The inclined surfaces merge into one another at step-like axial setbacks.

In a preferred embodiment, four inclined surfaces disposed in a square configuration are provided.

2006254390 06 Aug 2009

In a preferred embodiment, the slide comes into flush contact with the piercing needle during piercing of the high-pressure CO_2 cartridge, such that end face is against end face.

In a preferred embodiment, the piercing needle for piercing the high-pressure CO_2 cartridge is structurally combined with a valve member of the pressure-regulating valve, which is axially adjustable between a sealing position and a passing position at a valve seat of the pressure-regulating valve.

In a preferred embodiment, the pressure-regulating valve has a lateral outlet opening, in front of which there is disposed an annular elastic sleeve having non-return function. The sleeve ensures that no liquid can enter the insert. An elastic O-ring may also be used for the same purpose.

In a preferred embodiment, the piercing needle occupies a sealing position directly downstream from the valve seat of the pressure-regulating valve just before piercing takes place. Thereby the volume of the valve space to which the maximum pressure of the high-pressure CO_2 cartridge is admitted after it has been pierced is very small.

In a preferred embodiment, the vessel has a tightly sealed chamber, in which the head of the high-pressure CO_2 cartridge has a snug fit at the opening of the vessel. The tight seal of the chamber is preferred for hygiene reasons.

In a preferred embodiment, the chamber is closed with a bottom cover, which is welded or bolted to the wall of the chamber. The joint is tight. The high-pressure CO_2 cartridge does not come into contact with the liquid constituting the contents of the vessel.

In a preferred embodiment, the high-pressure CO_2 cartridge is sealed against the wall of the chamber, around the circumference of its small diameter neck. Thereby the axial forces to which the cartridge is subjected during piercing are limited.

In a preferred embodiment, the insert occupies a top opening of the vessel. The CO_2 from the high-pressure CO_2 cartridge is discharged into a top space of the vessel above the liquid surface therein.

In a preferred embodiment, the opening that receives the insert is a bunghole, through which the vessel is filled with liquid. The insert functions as the bunghole closure.

The CO_2 from the high-pressure CO_2 cartridge can be discharged into the top space of the vessel above the liquid surface therein. However, it is also possible to connect a pressure bag to the insert. The pressure bag is pulled on by applying vacuum to the housing of the insert and is tightly heat-sealed to the housing. The pressure bag is ultimately disposed in direct contact with the housing of the insert in the interior of the vessel. It is inflated by the discharged CO_2. Compared with the prior art pressure bag mentioned hereinabove, the advantage is then achieved that the filling pressure of the pressure bag is constant, or in other words no pressure fluctuations and irregularities in tapping behavior occur. The filling pressure can be set at a somewhat higher value than the partial pressure of the CO_2 dissolved in the liquid, which pressure therefore remains completely unaffected and neutral as regards taste.

In the variant with the pressure bag, a compressed gas other than CO_2 may also be injected from a high-pressure cartridge.

In a preferred embodiment, the vessel has an outlet tap at the bottom. Withdrawal of the liquid then takes place by internal pressure and the effect of gravity. The CO_2 from the high-pressure CO_2 cartridge prevents a reduced pressure from developing in the top space of the vessel. This is possible in the variants with and without pressure bag.

In the variant with the pressure bag, the vessel can have, instead of the outlet tap, a top spigot to which there leads a riser line extending to the bottom of the vessel. The liquid is conveyed by the pressure of the CO_2 discharged from the high-pressure CO_2 cartridge to the spigot. Tapping at the top of the vessel is more convenient than at the bottom.

In a preferred embodiment, an outlet spout together with a hose connection is provided on the outside of the spigot. The outlet spout is added to the vessel as a separate part. It is clipped onto the said vessel after the spigot has been removed.

The invention will be explained in more detail hereinafter on the basis of exemplary embodiments illustrated in the drawing, wherein:

Fig. 1 shows a compressed CO_2 gas source in longitudinal section;

Fig. 2 shows the side view of a cut-away vessel containing the compressed CO_2 gas source, to which a pressure bag is connected, as a bunghole closure;

Fig. 3 shows the corresponding view of a vessel containing the compressed CO_2 gas source in a separate opening of the top end plate of the vessel; and

Fig. 4 shows the corresponding view of a vessel containing the compressed CO_2 gas source in an opening of the bottom end plate of the vessel.

The compressed CO_2 gas source shown in Fig. 1 is constructed as an insert, which fits in the bunghole of a vessel, extends into the vessel and tightly closes the bunghole. The compressed CO_2 gas source can take the place of the bunghole closure with pressure-equalizing valve according to WO 99/23008 A1.

The vessel is filled under pressure with CO_2-containing liquid through the bunghole usually disposed at the middle of its top end plate. Thereafter the bunghole is tightly closed with the insert. To withdraw the liquid, there can be used an integrated outlet tap, which is disposed on the side wall of the vessel at the height of the bottom end plate thereof. The liquid flows out under the action of internal pressure and gravity, until a reduced pressure is reached in the top space of the vessel above the liquid surface therein. To adjust this correctly and maintain it in controlled manner, the compressed CO_2 gas source is activated. The compressed CO_2 gas source injects CO_2 into the top space of the vessel under a pressure that corresponds to the partial pressure of the CO_2 dissolved in the liquid or that slightly exceeds this partial pressure. Thereby steady emptying of the vessel is ensured. No air is admitted into the top space of the vessel. The CO_2 content of the liquid remains constant.

The insert has slender elongated shape, and for the most part is radially symmetric relative to a central axis. It is made largely of plastic. The plastic materials used for its manufacture have proved effective for years for bunghole closures and outlet taps of relevant vessels. The two-component plastic injection-molding technique can be used for manufacture. The hard, inflexible plastic parts are shown as hatched areas in the drawing, and the soft, elastic plastic parts are illustrated as solid black areas.

When the insert is in installed condition, closing the bunghole of the vessel, it projects with a housing 10 into the vessel. At its inside end housing 10 has a chamber 12 for receiving a high-pressure CO_2 cartridge 14 in a snug fit. The head of cartridge 14, at the end face of which it can be pierced, is proximal to the bunghole. Cartridge 14 has its smallest diameter at a straight cylindrical neck. Here it is sealed with a circumferential seal 16 against the wall of housing 10.

The inside end of chamber 12 is closed with a cover 18, which is welded or bolted to the wall of housing 10.

Housing 10 is supported externally with a circumferential collar 20 on the beaded rim of the bunghole. On collar 20 there is formed a seal 22, with which the insert seals the bunghole.

A rotary knob 24 countersunk in housing 10 protrudes outwardly beyond collar 20, and can be actuated to pierce the CO_2 cartridge. By means of a circumferential shoulder 26 that projects radially outward, rotary knob 24 is mounted in a circumferential groove of housing 10 to rotate in axially fixed manner.

A pull tab 30, which can be bent upward, is linked by a film hinge 28 to the outer end face of rotary knob 24. Pull tab 30 is connected to rotary knob 24 via predetermined break points, which break in clearly visible manner when first bent upward. The predetermined break points constitute a tamper-proof seal.

To pierce CO_2 cartridge 14 there is used a piercing needle 34, which is structurally combined with the valve member of a pressure-regulating valve. The valve member is mounted together with an elastic diaphragm 36 at the center of the axis of housing 10. The tip of piercing needle 34 is disposed only a short distance from the end face of CO_2 cartridge 14.

During axial positioning movement of piercing needle 34 on CO_2 cartridge 14, the valve member lifts from a valve seat 38 of the pressure-regulating valve. Valve seat 38 is made from elastic sealing material and molded onto housing 10.

Piercing needle 34 is urged by a slide 40, which is disposed between rotary knob 24 and piercing needle 34. Slide 40 is guided in longitudinal sliding relationship in housing 10. For this purpose there are used cams 42, which extend radially outward from the surface of slide 40 and engage in axial grooves 44 of housing 10.

Rotary knob 24 and slide 40 are in contact with inclined surfaces 46 extending in circumferential direction. Four inclined surfaces 46 disposed in a square configuration are provided, rising with the same slope in proportion to the circumferential angle and merging into one another at step-like axial setbacks. Slide 40 is displaced axially by turning rotary knob 24.

A helical compression spring 48 is clamped between slide 40 and piercing needle 34. The helical compression spring is disposed around a central, plug-like extension 50 on the outside of piercing needle 34 distal from diaphragm 36 and around a central, axial tappet 52 on the inside of slide 40. Extension 50 and tappet 52 have plane end faces, which are disposed opposite one another with a short distance between. Before piercing takes place, therefore, slide 40 is kept apart from piercing needle 34 by means of helical compression spring 48.

Diaphragm 36 bounds a working space 54 downstream from valve seat 38 of the pressure-regulating valve. Working space 54 has a lateral outlet opening 56, in front of which there is disposed an annular elastic sleeve 58. Sleeve 58 has the function of a non-return valve. It prevents liquid from entering the insert.

To pierce CO_2 cartridge 14, pull tab 30 is bent upward and rotary knob 24 is turned by approximately 90°. Slide 40 is moved axially inward against the force of helical compression spring 48. Its tappet 52 comes into flush contact with extension 50 of piercing needle 34, such that one end face is against the other end face. Piercing needle 34 is moved axially inward under elastic deformation of diaphragm 36. Just before it achieves piercing, it occupies a sealing position on a seal 60 directly downstream from valve seat 38 of the pressure-regulating valve. The valve member lifts from valve seat 38. After piercing, a very small valve space 62 upstream from the head of CO_2 cartridge 14 fills with CO_2 under high pressure.

After rotary knob 24 has turned a complete 90° or more, slide 40 springs axially back outward under the force of helical compression spring 48. Piercing needle 34 is also retracted axially by the elastic return deformation of diaphragm 36, the pressure-regulating valve is closed and a small amount of CO_2 under high pressure is admitted into working space 54. Further opening and closing of the pressure-regulating valve is determined by an equilibrium of forces across diaphragm 36, established by the elastic properties of diaphragm 36, the spring constant of helical compression spring 48 and the CO_2 pressure in working space 54. The determining factor for the pressure of the discharged CO_2 is the spring constant of helical compression spring 48.

Usually the user will activate the compressed CO_2 gas source when the internal pressure in the vessel has dropped so much that the stream of liquid emerging through the outlet tap is too weak. However, the compressed CO_2 gas source can already be activated beforehand without difficulty even if the internal pressure in the vessel is still high. Introduction of CO_2 into the top space of the vessel does not take place as long as the high internal pressure is acting on sleeve 58 in front of outlet opening 56.

According to Fig. 2 to Fig. 4, sleeve 58 is omitted. Instead, the compressed CO_2 gas source is connected to a pressure bag 66, which surrounds housing 10 and can be inflated by the discharged CO_2.

Instead of an outlet tap, the vessel has an integrated spigot 68, which is disposed on the side wall of the vessel at the height of its top end plate. A riser line 70 that extends to the bottom end plate of the vessel leads to spigot 68. Riser line 70 has surface holes 72 in the manner of a drainage line. An actuating part 74 and an outlet spout 76 together with a hose connection are provided externally on spigot 68.

In Fig. 2, the compressed CO_2 gas source functions as a bunghole closure of a bunghole, which is disposed at the center of the top end plate of the vessel and is used for filling the vessel. In Fig. 3, the compressed CO_2 gas source is seated in a separate lateral opening of the top end plate of the vessel, and in Fig. 4 it is seated in an opening of the bottom end plate of the vessel.

List of reference numerals

10	Housing
12	Chamber
14	High-pressure CO_2 cartridge
16	Seal on cartridge
18	Cover
20	Collar
22	Seal on collar
24	Rotary knob
26	Shoulder
28	Film hinge
30	Pull tab
34	Piercing needle
36	Diaphragm
38	Valve seat
40	Slide
42	Cam
44	Axial groove
46	Inclined surface
48	Helical compression spring
50	Extension
52	Tappet
54	Working space
56	Outlet opening
58	Sleeve
60	Seal for needle
62	Valve space
66	Pressure bag
68	Spigot
70	Riser line
72	Surface hole
74	Actuating part
76	Outlet spout

2006254390 06 Aug 2009

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A vessel that can be filled with liquid and closed in pressure-tight condition, and from which liquid can be withdrawn, which vessel has an insert that can be fixed in sealed manner in an opening of the vessel and a high-pressure CO_2 cartridge, a pressure-regulating valve for discharging CO_2 therefrom and a control element that is accessible from the outside and that can be actuated to pierce the high-pressure CO_2 cartridge with a piercing needle, wherein the control element is a rotary knob, which cooperates with an axially guided slide for actuating the piercing needle, and wherein the rotary knob is mounted to rotate in axially fixed manner, and in that the rotary knob and the slide are in contact with inclined surfaces extending in circumferential direction.

2. A vessel according to claim 1, wherein the inclined surfaces rise with the same slope, in proportion to the circumferential angle, and merge into one another at step-like axial setbacks.

3. A vessel according to claim 1 or 2 including four inclined surfaces disposed in a square configuration.

4. A vessel according to one of claims 1 to 3, wherein the slide comes into flush contact with the piercing needle during piercing of the high-pressure CO_2 cartridge, such that end face is against end face.

5. A vessel according to one of claims 1 to 4, wherein the piercing needle is structurally combined with a valve member of the pressure-regulating valve, which is axially adjustable between a sealing position and a passing position at a valve seat of the pressure-regulating valve, which is axially adjustable between a sealing position and a passing position at a valve seat of the pressure-regulating valve.

6. A vessel according to one of claims 1 to 5 wherein the pressure-regulating valve has a lateral outlet opening, in front of which there is disposed an annular elastic sleeve or an O-ring having non-return function.

7. A vessel according to one of claims 1 to 6, wherein the piercing needle occupies a sealing position directly downstream from the valve seat of the pressure-regulating valve just before piercing takes place.

8. A vessel according to one of claims 1 to 7, wherein it has a tightly sealed chamber, in which the head of the high-pressure CO_2 cartridge has a snug fit at the opening.

9. A vessel according to claim 8, wherein the chamber is closed with a bottom cover which is welded or bolted to the wall of the chamber.

10. A vessel according to claim 8 or 9 wherein the high-pressure CO_2 cartridge is sealed against the wall of the chamber around the circumference of its small diameter neck.

11. A vessel according to one of claims 1 to 10, wherein the insert occupies a top opening of the vessel, and in that the CO_2 from the high-pressure CO_2 cartridge can be discharged into a top space of the vessel above the liquid surface therein.

12. A vessel according to one of claims 1 to 11, wherein the opening is a bunghole, through which the vessel can be filled with liquid, and in that the insert functions as the bunghole closure.

13. A vessel according to one of claims 1 to 12, wherein a pressure bag which can be inflated by the discharged CO_2 is connected to the insert.

14. A vessel according to one of claims 1 to 13, wherein it has an outlet tap at the bottom.

15. A vessel according to one of claims 1 to 13, wherein it has a top spigot to which there leads a riser line extending to the bottom of the vessel.

16. A vessel according to claim 15, wherein an outlet spout together with a hose connection is provided on the outside of the spigot.

2006254390 06 Aug 2009

17. A vessel, substantially as hereinbefore described with reference to any of the embodiments in the accompanying drawings.

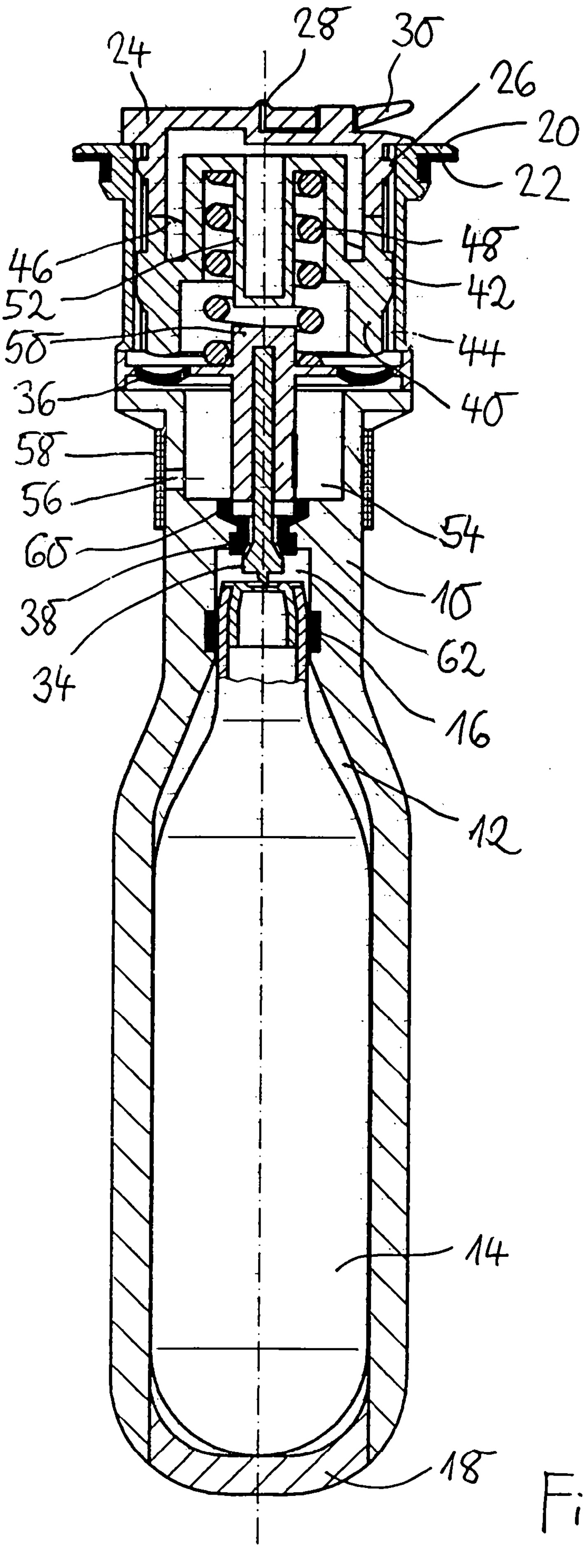

24
28
30
26
20
22
46
48
52
42
50
44
36
40
58
56
54
60
10
38
62
34
16
12
14
18

Fig. 1

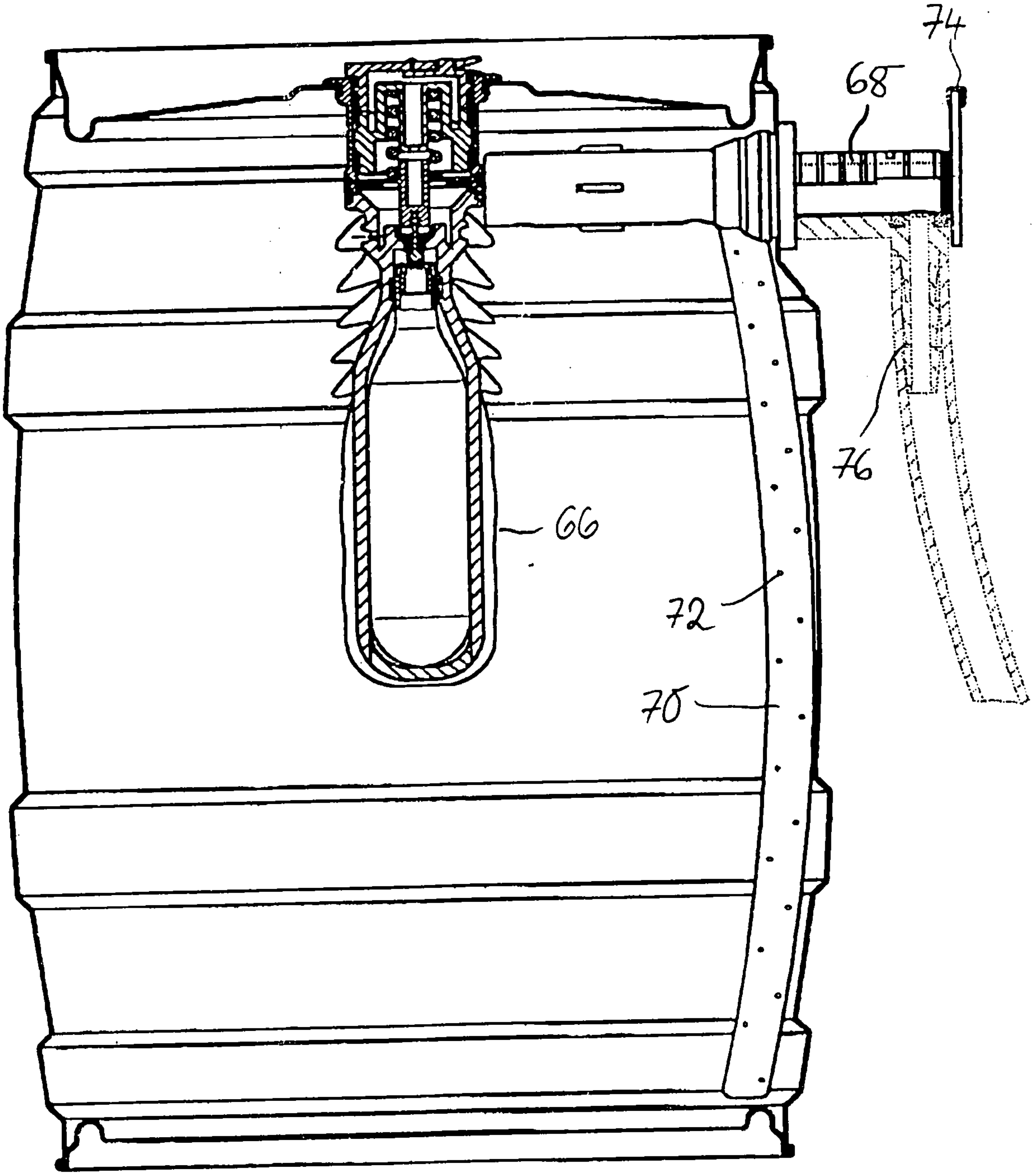


Fig. 2

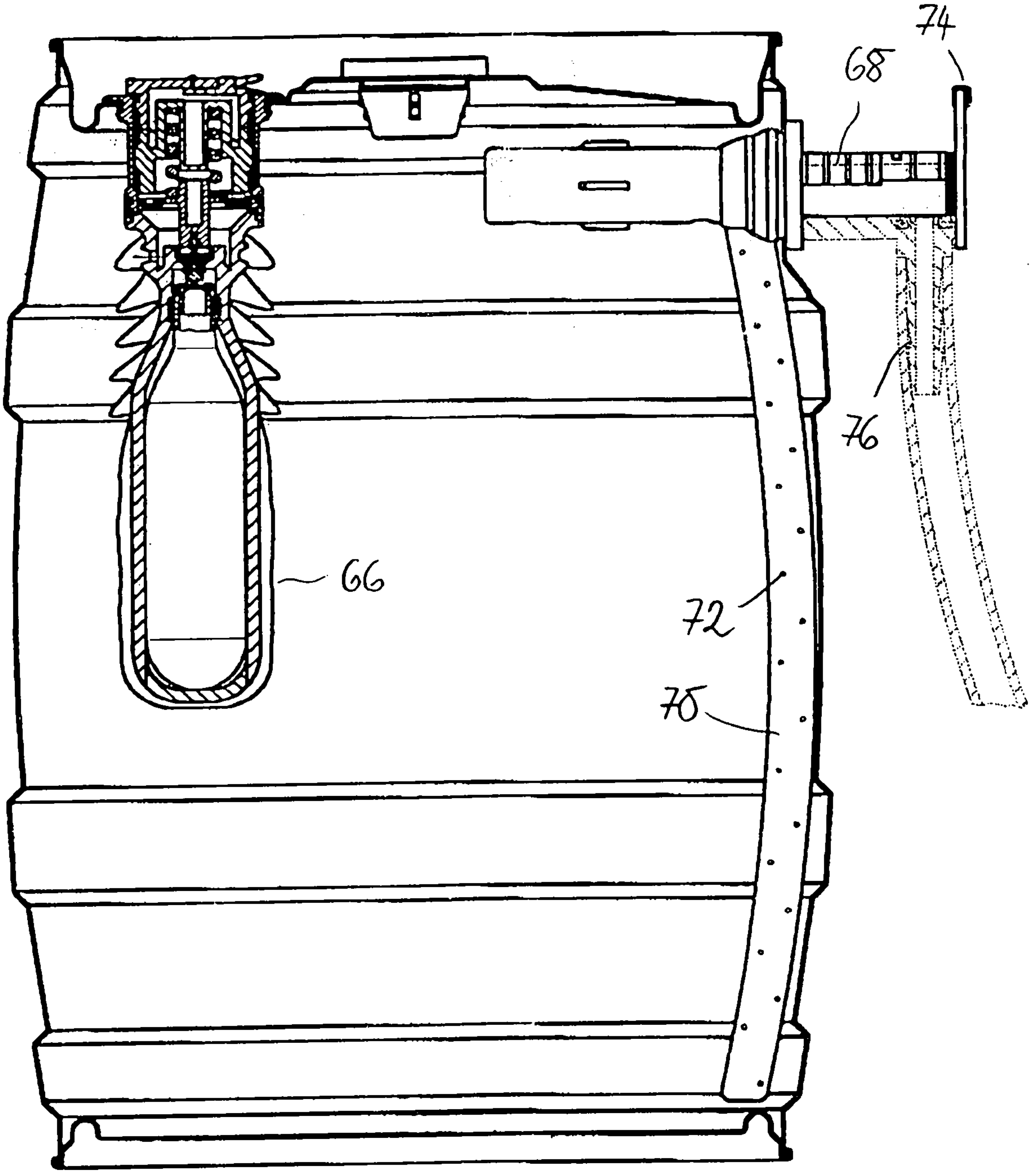


Fig. 3

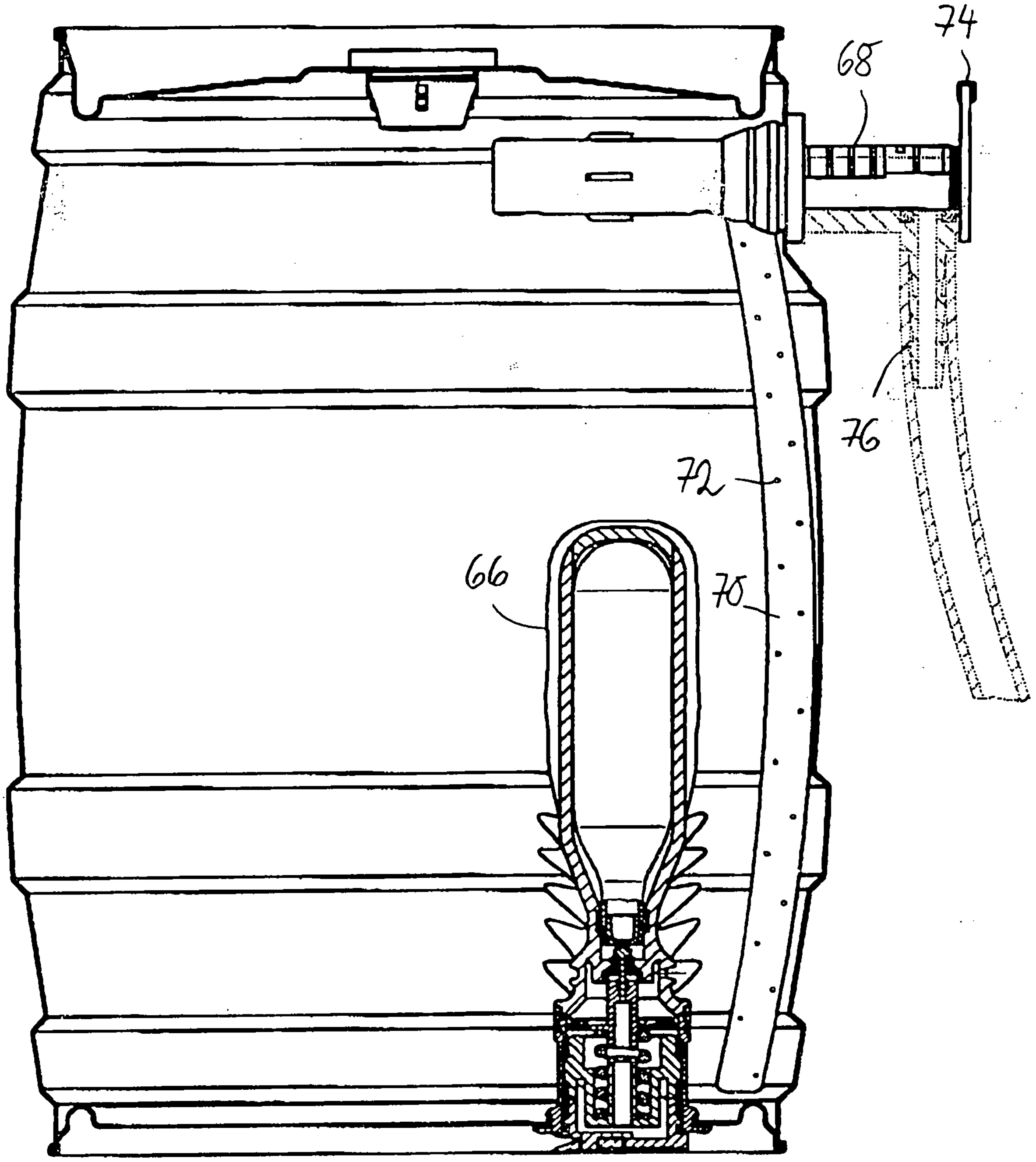


Fig. 4