

(19)



(11)

**EP 2 284 433 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**16.02.2011 Bulletin 2011/07**

(51) Int Cl.:  
**F17C 13/00 (2006.01)**

(21) Application number: **09167936.5**

(22) Date of filing: **14.08.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
 HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL  
 PT RO SE SI SK SM TR**  
 Designated Extension States:  
**AL BA RS**

- **Schnell, Markus**  
82140 Olching (DE)
- **Clemens, Walter**  
51429 Bergisch Gladbach (DE)
- **Kemmerich, Franz Josef**  
51789 Lindlar (DE)

(71) Applicant: **IDtek Track-and-Trace S.A.**  
**1005 Lausanne (CH)**

(74) Representative: **Grosfillier, Philippe**  
**Andre Roland S.A.**  
**Avenue Tissot 15**  
**P.O. Box 1255**  
**1001 Lausanne (CH)**

(72) Inventors:  
 • **Zielasch, Andreas**  
**1095 Lutry (CH)**

**(54) Tag for bottles, such as gas bottles and gas cylinders**

(57) The support for a tag, such as an RFID tag, for marking gas bottles or cylinders (1) with a standardized flange (3) comprises a main ring (10) containing the tag and intended to be mounted on said flange (13) and a blocking ring that is force-fitted between said flange (3) and said main ring (10).

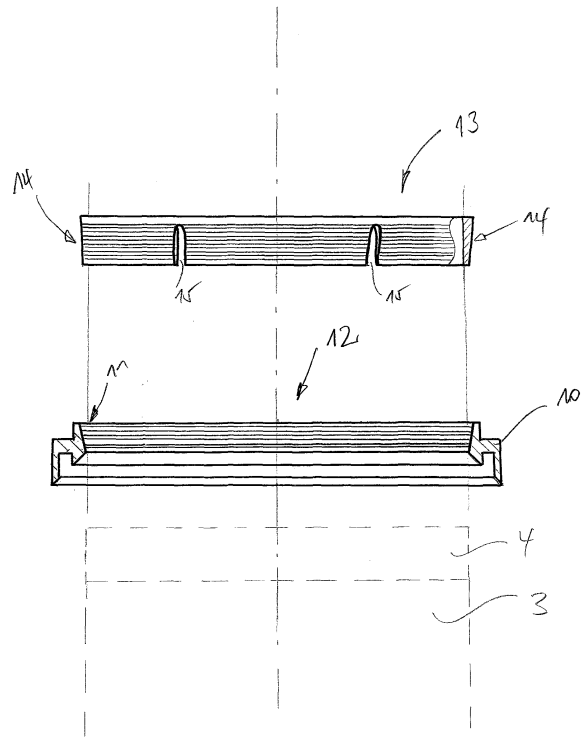


Figure 2

**EP 2 284 433 A1**

**Description**TECHNICAL FIELD

**[0001]** The present invention concerns tags, in particular RFID tags, for gas bottles and cylinders and a method for fixing RFID tags on such bottles and cylinders.

BACKGROUND ART

**[0002]** The principle of tagging objects, for example gas bottles and cylinder, with RFID tags is known in the art.

**[0003]** RFID tags (or transponders) are devices that allow an electronic, machine readable identification of the object carrying said tag. A tag usually includes an RFID chip and an antenna in order to be able to transmit information (for example an identity code) to an RFID reader.

**[0004]** Usually, to allow the reading of a tag, the reader respectively antenna must be placed close to the tag (respectively with fixed readers the tag be placed within the magnetic field of the RFID reader antenna).

**[0005]** Typical examples of gas bottles/cylinders comprising a tag given for example in WO 2006/075309, WO 2007/057874 and WO 2007/141733, all incorporated by reference in the present application.

**[0006]** In WO 2007/057874, the invention relates to an assembly comprising a bottle of gas and a rod shaped transponder (metal rod RFID tag), wherein the bottle has a convex upper face and a metal valve. The transponder is located above and close to the upper surface and is oriented in an essentially radial direction this increasing the reading distance of such tags.

**[0007]** In WO 2007/141733, the idea is to use the presence of a metal pull-ring fixed to the bottle by metal plates to attach the tag to one of said metal plates such that the tag is in a protected position. However, in this example, the pull-ring must be present on the bottle otherwise the tag cannot be mounted in a protected position.

**[0008]** A further example is given in GB 2 288 103. In this publication, a magnetic transponder is mounted around the valve fitting on the ferrous body of a compressed gas bottle to enable remote identification of the bottle. A metal valve guard encircles the valve filling, for the protection of the filling during transportation, which shields the bottle transponder from an external reader/exciter. In order to couple RF signals between the reader/exciter, which is outside of the valve guard and the transponder, which is inside of the valve guard, a coupler is provided having a first receive and transmit antenna outside of the valve guard and a second transmit receive and transmit antenna inside of a valve guard adjacent the transponder antenna. Electrical current carrying wires interconnect the two coupler antennae and extend through a wire receiving aperture formed in the valve guard.

**[0009]** In this example, the transponder has to be at-

tached by some means to the valve fitting and it has the further disadvantage that it needs a coupler to transmit signals through the valve guard.

**[0010]** Another example is given in DE 199 11 034 which discloses a ring holder made of two parts, one part of the ring containing the transponder that is a separate part from the rings. More specifically, the ring is made of two identical parts (half-rings) that can be fitted together. Each half ring comprises a projecting part that is intended to penetrate into a corresponding slot part of the bottle for attachment of the ring to the bottle (a slot that usually does not exist on such bottles). This implies the machining of such a slot on the bottle to meet this condition. For mounting the assembly on a bottle, the transponder is placed in a chamber of one of the half-rings and these parts are placed on a bottle in the desired position. The second half ring is brought laterally and attached to the first half ring. This mounting procedure is quite complicated with at least three parts (two half rings and a transponder), the machining of a slot and also is not easy to carry out since the antenna is not always protected. In addition, the first half ring placed on the bottle must be maintained in position while the second half ring is being attached.

**[0011]** A problem one is confronted with, especially with such gas bottles and cylinders is to find away to place the tag in a protected position on the bottle/cylinder and to dispose of a fixing methodology that allows to equip gas cylinder park that often consist of several 100'000 or several millions of cylinders in an economically feasible way.

**[0012]** Another problem is once one is able to tag in a quick and easy way such cylinders to ensure that the tag remains into its position and cannot be removed without destruction.

SUMMARY OF THE INVENTION

**[0013]** The aim of the present invention is therefore to propose an improved tag fixation system and tagging method with respect to the prior art.

**[0014]** More particularly, an aim of the present invention is to propose a tag system and method that is simple, efficient and easy to apply while resisting to all environmental and mechanical solicitation of several decades of the filed use of gas cylinders.

**[0015]** According to the invention, the tag system comprises a main ring that contains a tag (for example a RFID tag) and that is placed on the gas bottle or cylinder, preferably around a neck or flange of the bottle (in the case of industrial bottles, the standard flange on which the protection cap is screwed as shown in Fig. 1, part 3), and a blocking ring that is force fitted between the gas bottle or cylinder and the main ring. This assembly results in a tag readable from 360 degrees that is securely fitted to the bottle or cylinder in a very simple manner and that can not be taken away without violence respectively destruction of the tag, a further safety feature.

**[0016]** The invention will be better understood from the following description of different embodiments and from the appended illustrative drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

##### **[0017]**

Figure 1 shows a gas bottle/cylinder as used with the present invention;

Figure 2 illustrates an embodiment of the tag system according to the invention;

Figure 3 illustrates a detail of a side of a blocking ring according to the invention.

#### DETAILED DESCRIPTION

**[0018]** In figure 1, as typical gas bottle/cylinder is illustrated. This bottle/cylinder comprises a body 1 (with a general cylindrical shape) with a cylinder dome (also called shoulder) part 2. Said top part 2 comprises a neck or standardized flange 3 which on a part of it, comprises a thread 4 (for screwing a valve cover (not shown). As is usual in the art, the valve 5 comprises an outlet 6 for the gas.

**[0019]** According to the invention, the system is preferably mounted directly on the flange 3 (which is illustrated with dashed lines in figure 2) of the bottle in order to avoid problems when mounting the valve cover. This in particular allows to avoid the problems mentioned in GB 2 288 103 where the tag cannot be read anymore without additional transmission means when the cover is in place. According to the invention, the tag system comprises a main ring 10 that carries the tag, typically a 360° RFID tag which is overmoulded by the main ring and thereby protected from mechanical and environmental wear. Preferably, the tag and the antenna are embedded into said ring 10 for ease of manipulation.

**[0020]** Said main ring 10 is introduced over the valve 5 of the bottle 1 until it rests against the top part 2 of the gas bottle/cylinder 1 on its standardized flange (part 3). The main ring has a sufficient internal diameter for being easily slid over the said flange. This flange, although standardized, has a manufacturing tolerance in diameter up to several mm and may comprise numerous successive paint layers also contributing to a larger diameter by several millimetres.

**[0021]** Considering the bottle of figure 1, the ring 10 is thus around the flange 3.

**[0022]** The ring further comprises a set of small steps 11 that are distributed inside its main opening 12. Preferably, the inner sides of this opening 12 are of a hollow profile as will be explained in more detail below.

**[0023]** Then a blocking ring 13 is used to block the main ring 10 in position on the bottle/cylinder. The blocking ring 13 also comprises a set of steps 14 (see the

detail illustrated in figure 3) that are designed to force fit with the steps 11 of the main ring 10. Preferably, the steps 11 of the main ring 10 are similar to the steps 14 of the blocking ring 13.

**[0024]** This blocking ring is equipped with one or several vertical openings or slots (part 15) whose depth may arise to 90% of the blocking ring's height, slots that induce the flexibility of the blocking ring to cope with different cylinder flange diameters.

**[0025]** Due to the fact that the blocking ring has a vertical conicity, this flexibility is applied to the thinner part of the blocking ring.

**[0026]** The fixation of the blocking ring, and of both rings on the bottle/cylinder, is made by force-fitting the blocking ring 13 between the main ring 10 and the external surface of the flange 3. The steps 11 and 14 then blockingly cooperate together making both rings tightly fixed to the flange 3 of the bottle 1.

**[0027]** The slots 15 are used to compensate tolerances of the diameter of the flanges 3 of different bottles/cylinders, in case of presence of paint, difference of size etc. There can be one or more such slots 15.

**[0028]** The advantage of the system of the present invention are the following:

- ) pure mechanical mounting with no additional parts or particular tools needed (screws, rivets, glue, etc.);
- ) although not being a system with mechanical fixation, it copes with different cylinder flange diameters (as caused by the mechanical tolerances of the cylinder flange and a more or less numerous paint layers with different thicknesses)
- ) the first ring is always in the same position since it bears against the cylinder shoulder and therefore provides more security against abusive action;
- ) long term fixation, that survives all cylinder working conditions;
- ) easy and quick procedure with only two parts;
- ) safety feature in that to remove a tag, it must be destroyed.
- ) readability of an RFID tag on 360 degree around the cylinder flange.

**[0029]** Of course, the embodiment described is only one possible way of realising the invention and other equivalent ways are possible. For example, the position of the rings could be inverted, with the blocking ring placed first on the flange of the bottle then the main ring being force-fitted over the blocking ring. In this embodiment, the blocking ring 13 should be the other way round with respect to its illustration of figure 2 and underneath the main ring 10. Also the flaring of the steps 11 should be inverted with respect to the representation of figure 2 to take account of the position of the blocking ring.

**[0030]** The rings 10, 13 are preferably made of flame proof and UV resistant materials such as Polyamid reinforced with glass or other fibers. Of course any other equivalent materials may be envisaged.

**[0031]** Also, equivalent shapes other than steps 11, 14 may be used, such as flanges, lips, threads etc. In addition even if not necessary, a glueing step or other equivalent step may be carried out between the rings.

**[0032]** As one will understand, the examples given in the present description are purely illustrative and should not be construed as limiting the scope of the invention. 5

## Claims 10

1. A support for a tag, such as a RFID tag, for marking gas bottles or cylinders (1) with a standardized flange (3), wherein said support comprises a main ring (10) containing the tag and intended to be mounted on said flange (3) and a blocking ring that is force-fitted between said flange (3) and said main ring (10). 15
2. A support as defined in claim 1, wherein said main ring (10) comprises steps (11) having a particular form for forming a force fit connection with the corresponding steps (14) on said blocking ring (13). 20
3. A support as defined in claim 1 or 2, wherein the zone of the main ring (10) comprising the steps (11) is of a hollow profile for lodging a 360 degree tag antenna or other RFID tag. 25
4. A support as defined in one of the preceding claims wherein the blocking ring comprises at least one vertical slot (15). 30
5. A support according to one of the preceding claims, wherein the main ring (10) is placed first on the flange (3) of the bottle (1) and then the blocking ring is force fitted between the flange (3) and the main ring (10). 35
6. A support as defined in one of claims 1 to 4, wherein the blocking ring (13) is placed first on the flange (3) of the bottle (1) and then the main ring (10) is force fitted over the blocking ring (13). 40
7. A method of marking a gas bottle/cylinder with a tag wherein a first ring is placed on the flange of a bottle, then a second ring is placed by force-fitting to attach the assemble of ring on said bottle/cylinder. 45
8. A method as defined in claim 7, wherein the first ring is a main ring carrying the tag and the second ring is a blocking ring. 50
9. A method as defined in claim 7, wherein the first ring is a blocking ring and the second ring is a ring carrying the tag. 55

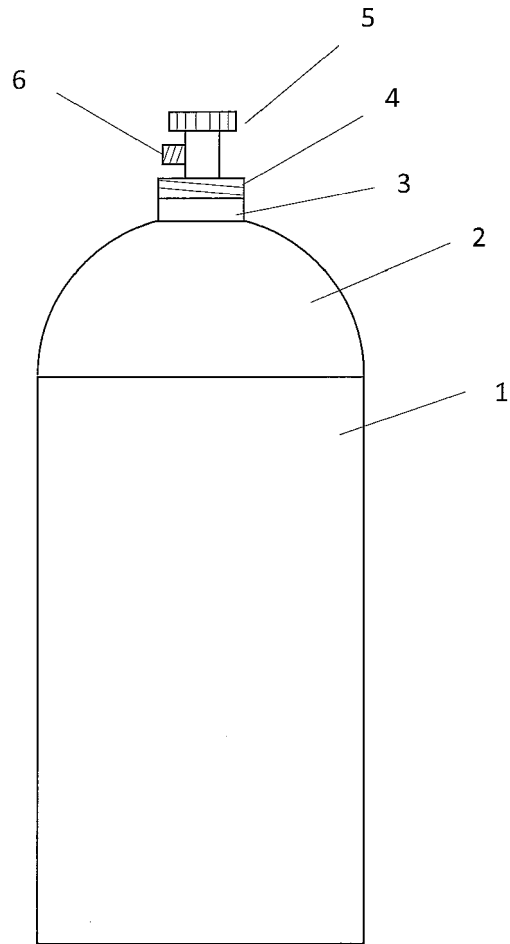


FIGURE 1

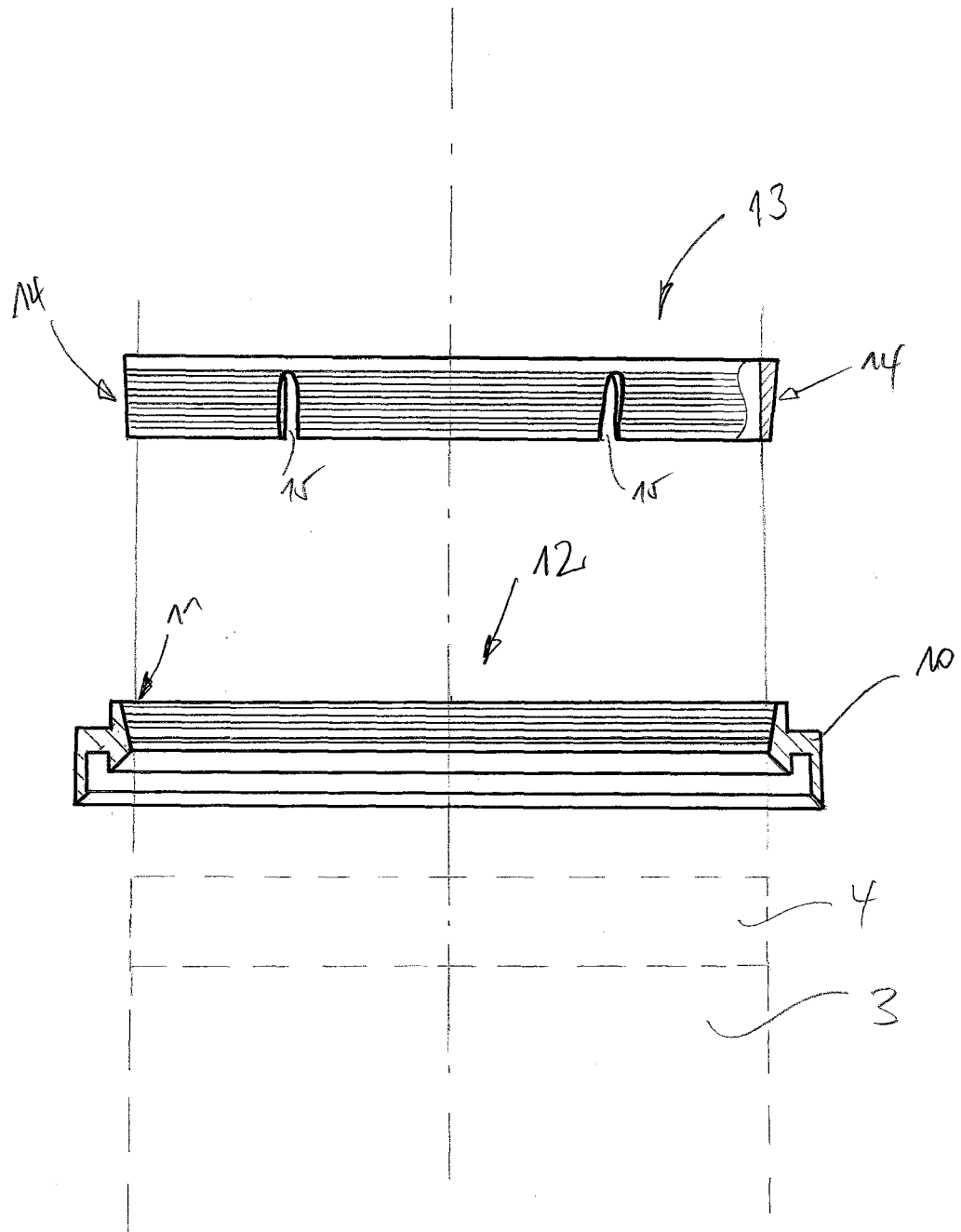


Figure 2

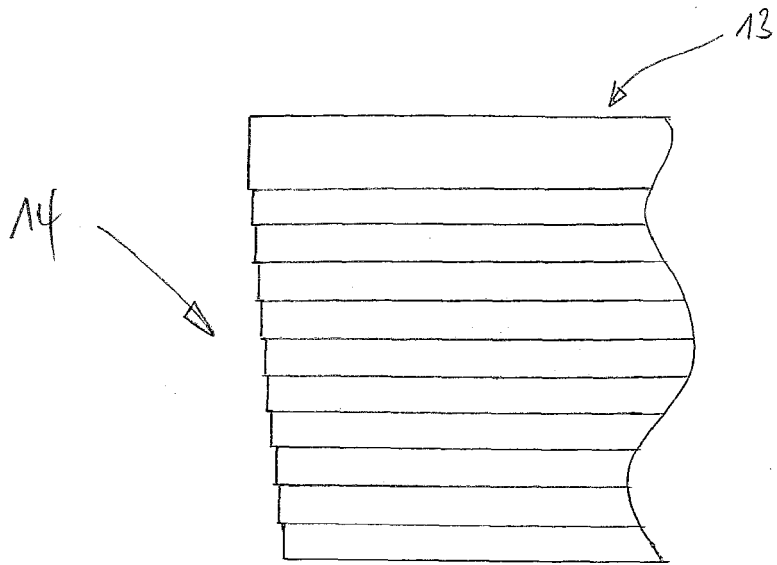


Figure 3



EUROPEAN SEARCH REPORT

Application Number  
EP 09 16 7936

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 860 648 A (MILLIPORE CORP [US]) 26 August 1998 (1998-08-26) * columns 7,8; figures 6,6A *	1-9	INV. F17C13/00
X	US 5 697 173 A (MCCARRICK HENRY JEMISON [US] ET AL) 16 December 1997 (1997-12-16) * the whole document *	1-9	
X	EP 0 586 083 A (HUGHES MICROELECTRONICS EUROPA [GB] HUGHES MICROELECTRONICS EUROPA [CU]) 9 March 1994 (1994-03-09) * columns 2-5; figures 2,3 *	1-3,5,6	
X	EP 1 011 069 A (MESSER GRIESHEIM GMBH [DE]) 21 June 2000 (2000-06-21) * paragraph [0022]; figures 1-3 *	1-3,5,6	
			TECHNICAL FIELDS SEARCHED (IPC)
			F17C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 January 2010	Examiner Nicol, Boris
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

1  
EPO FORM 1503 03.82 (P04C01)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 16 7936

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-01-2010

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0860648	A	26-08-1998	CN 1191309 A	26-08-1998
			JP 10267198 A	09-10-1998
			TW 436857 B	28-05-2001
			US 5953682 A	14-09-1999
-----				
US 5697173	A	16-12-1997	NONE	
-----				
EP 0586083	A	09-03-1994	NONE	
-----				
EP 1011069	A	21-06-2000	CN 1257258 A	21-06-2000
			DE 19857717 A1	29-06-2000
-----				

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- WO 2006075309 A [0005]
- WO 2007057874 A [0005] [0006]
- WO 2007141733 A [0005] [0007]
- GB 2288103 A [0008] [0019]
- DE 19911034 [0010]