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(72) Inventor: **Rodriguez, Pablo**
28760 Tres Cantos (ES)

(74) Representative: **De Cuenca, Emmanuel Jaime**
L'Air Liquide S.A.
Direction Propriété Intellectuelle
75 Quai d'Orsay
75321 Paris Cedex 07 (FR)

(71) Applicant: **Athelia Solutions Iberica S.L.**
28760 Tres Cantos (ES)

(54) **Identification device intended to be mounted around a container and related mounting method**

(57) The invention relates to an identification device intended to be mounted on a fluid container (1) comprising a casing (3) carrying a data support (2) for contactless identification of said fluid container (1) and a U-shaped element (4) attachable to said casing (3) for forming a closed collar (8) to be mounted around at least a portion of the fluid container (1), the casing (3) and the U-shaped element (4) comprising a pair of combined attaching elements (5, 6) being shaped for cooperating with each

other by elastic deformation. According to the invention, the pair of combined attaching elements (5, 6) cooperate between a detached position where the casing (3) and the U-shaped element (4) form an open collar (9) and an attached position where said casing (3) and said U-shaped element (4) form a closed collar (8), in the attached position the casing (3) being located only at one side of the closed collar between the two terminal extremities of the U-shaped element (4).

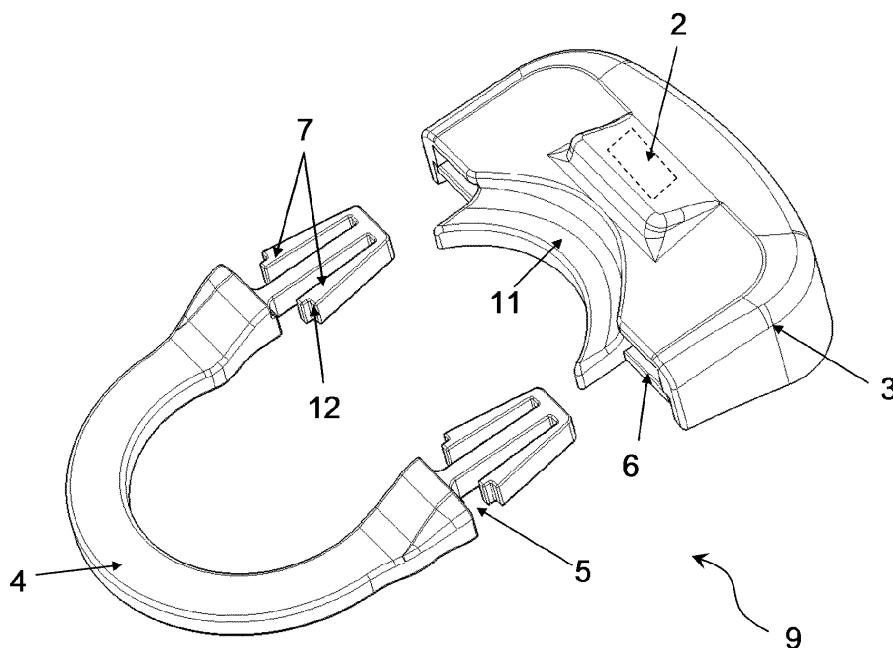


FIG. 1

Description

[0001] The present invention relates to a device for identification of a fluid container, a fluid container comprising such a device and a method of mounting said identification device on a fluid container.

[0002] It is known to mount or attach devices on containers, namely cylinders or bottles, of fluids for remote or contactless identification of said cylinders. Typically, a support data intended to store and read data related to the fluid container is arranged in or on a casing, or a support, said casing being intended to be mechanically mounted on the fluid container.

[0003] A widespread technology for identifying fluid containers relies on electronic identification.

[0004] The electronic identification devices typically use remote antenna for radio frequency identification, more often referred to by the acronym "RFID" (for Radio Frequency Identification).

[0005] The RFID technology is mainly used for managing a stock of containers or bottles, in particular Liquid Petroleum Gas ("LPG") cylinders.

[0006] This technology allows storing and retrieving data remotely using markers called "RFID tags" "RFID tag" or "RFID transponder" or "tag". These RFID tags are small objects which usually include an antenna associated with an electronic chip and possibly a battery to receive and / or respond to queries sent from a radio transceiver.

[0007] The radio labels are usually carried by the casing of the identification device. For example, they can be enclosed in the casing, a resin being arranged around the radio label to protect it.

[0008] RFID devices are usually mounted on fluid containers during the refurbishing or manufacturing processes of said containers. Indeed, due to the typical design of existing identification devices, the valve fixed on each container body to be filled has to be removed before mounting the device on the container.

[0009] A typical solution is disclosed in the document EP-A-1011070. This document discloses a radio identification device attached to a cylinder neck ring arranged at the top of a fluid container, where a valve is intended to be fixed. The disclosed device comprises a holding ring, an electronic data storage medium and an annular antenna, also called loop antenna, arranged within the whole holding ring. The holding ring comprises two half-rings locked together by catch.

[0010] But the design of this identification device raises several issues.

[0011] First, it is mandatory that the valve of the container is removed before mounting the identification. Hence, the process for identifying fluid containers which are already in use or already introduced in the supply chain can take a long time as it can be done only during refurbishing or manufacturing of the container. This would take up to several years for a large number of containers. Thus, it is an obstacle to the use of the RFID

technology for LPG industrial companies.

[0012] Indeed, in order to assemble the device, the ring antenna must be inserted into the first half of the holding ring, placed over the container neck ring and passed through the container neck. Then the second half is pulled over the ring antenna, and plugged to the first half.

[0013] Furthermore, the internal diameter of the holding ring must be adapted so that it engages in a circumferential indentation existing under a thread of the container neck. As the external dimensions of fluid containers varies with their volume or capacity, it is thus necessary to adapt the design of the two half-rings to each existing container design.

[0014] In addition, the annular antenna must be maintained at a minimum separation distance from the cylinder neck ring in order to avoid interference effects during data transmission caused by the cylinder body, which is generally made of metal.

[0015] Indeed, annular antennas are typically excited by induction of a magnetic field from a radio transceiver antenna. As the container body is generally made of metal, it tends to absorb the magnetic field in its neighborhood. Hence, if placed too close to the container body, the annular antenna associated with the tag does not receive a sufficient amount of energy from the transceiver.

[0016] According to other solutions, the identification device can be attached directly to the container body, but this implies mechanical modifications of the container which also have to be carried out during the refurbishing or manufacturing of the container. Furthermore, this leads to assembly processes which are relatively expensive and complex on an industrial scale.

[0017] An alternative solution is disclosed in the document EP-A-2249327 which discloses an identification device comprising an annular housing which can be mounted to a fluid container while the valve is already fixed on said container. The housing is maintained around the valve thanks to a U-shaped pin whose parallel arms extend through the whole body of the annular housing and into the central opening of the annular housing.

[0018] However, this solution is not ideal because the annular housing need to have an internal diameter which is larger than the external dimensions of the valve which is fixed to the container.

[0019] This leads to space saving issues. In particular, fluid packing plants are generally equipped with fluid leakage detection devices for controlling that the valves are fixed correctly to the fluid containers. These devices comprise a sensing element which is intended to cover the valve and adjust around it, and must also adjust to a portion of the cylinder body arranged around the valve to form a sealing chamber. These devices thus need to be adapted to the external dimensions of the annular housing, which implies costly and complicated operations.

[0020] The annular design of the housing is also not ideal since the valves mounted on fluid containers can

have diverse shapes and sizes. It is thus needed to have as much housing designs as valve designs.

[0021] The use of an annular antenna also implies the above-mentioned perturbations of data transmission/receiving due to interferences with the metallic container body. Further, loop inductive antennas are typically manufactured by joining together some hundreds of loops of very thin copper wire, for example with glue. This kind of design is not robust enough and imposes the use of resin within the identification device to ensure the loops are correctly joined.

[0022] An object of the present invention is thus to overcome some or all of the disadvantages of the prior art mentioned above.

[0023] To this end, the solution according to the invention is an identification device intended to be mounted on a fluid container comprising a casing carrying a data support for contactless identification of said fluid container and a U-shaped element attachable to said casing for forming a closed collar to be mounted around at least a portion of the fluid container, the casing and the U-shaped element comprising a pair of combined attaching elements being shaped for cooperating with each other by elastic deformation, **characterized in that** the pair of combined attaching elements cooperate between a detached position where the casing and the U-shaped element form an open collar and an attached position where said casing and said U-shaped element form a closed collar, in the attached position the casing being located only at one side of the closed collar between the two terminal extremities of the U-shaped element.

[0024] Furthermore, other embodiments of the invention may include one or more of the following characteristics:

- the pair of combined attaching elements are located respectively at one of the two terminal extremities of the U-shaped element and in a corresponding opening arranged in said casing, the opening being shaped for accommodating and blocking said terminal extremity by elastic deformation of said opening and/or by elastic deformation of said terminal extremity.
- the terminal extremity comprises a deformable portion which is shaped for retracting when engaging in the corresponding opening and expanding when being accommodated completely in said corresponding opening.
- the deformable portion and the corresponding opening comprise each complementary abutment surfaces, said complementary abutment surfaces being shaped for preventing the exit of said terminal extremity from the corresponding opening once said terminal extremity is accommodated in said corresponding opening.
- the casing and the U-shaped element comprise two pairs of combined attaching elements located at each terminal extremity of the U-shaped element and

in respective openings arranged in the casing.

- one of the two terminal extremities the U-shaped attaching element is rigidly fixed to the casing.
- the data support comprises at least one among: an antenna for radio-frequency identification (RFID), an electronic chip, an electronic memory for storing data.
- the data support is enclosed in the casing, said casing being made of a plastic material such as at least one among: polyamide, polyethylene, polypropylene, polyester, polyacetal, copolymer.
- the casing and/or the U-shaped element are shaped so that, in the attached position, they prevent the reverse elastic deformation of the attaching elements so that an effort for separating the U-shaped element from the casing above a certain threshold generates an irreversible plastic deformation of the identification device.
- the casing 3 comprises a concavity 11 arranged on a surface of said casing 3 facing, in the attached position, the U-shaped element 4.

[0025] The invention also relates to a fluid container, particularly for fluid under pressure, comprising an identification device according to the invention.

[0026] According to other possible features, the fluid container may comprise a valve mounted on said container, the collar being mounted between the container and the valve.

[0027] Advantageously, the container may comprise a longitudinal axis, the valve being mounted along said longitudinal axis, the identification device being maintained longitudinally with respect to the container, the internal dimensions of the collar being inferior to at least one dimension of the valve in a direction transverse to the longitudinal axis.

[0028] The invention also relates to a process for mounting an identification device according to the invention on a fluid container fluid comprising a longitudinal axis and a valve mounted on said container along said longitudinal axis, **characterized in that** it comprises the steps of

- positioning the casing and the U-shaped element on opposite lateral sides of the fluid container, the pair(s) of combined attaching elements being in the detached position where the casing and the U-shaped element form an open collar,
- moving the U-shaped element and the casing toward each other in a general direction transverse to the longitudinal axis, until the pair of combined attaching elements cooperates in the attached position so that said casing and said U-shaped element form a closed collar around a portion of the fluid container.

[0029] According to another aspect, the invention also relates to the use of an identification device according to the invention to store and/or retrieve data related to a

fluid container such as at least one among: the capacity of the fluid container, the date of refurbishing, the tare weight, the filling batch, the expiry date, the nature of the fluid contained in the fluid container.

[0030] The invention may also relate to any device or alternative process comprising any combination of characteristics above or below.

[0031] Other features and advantages will become apparent upon reading the following description with reference to the drawings in which:

- Figure 1 shows a perspective view of a possible embodiment of an identification device according to the invention in a detached position,
- Figure 2 shows a perspective view of the identification device of Figure 1 in another attached position,
- Figure 3 illustrates a half cross-section of the identification device of Figure 1 in the attached position, and
- Figure 4 shows a perspective and partial view illustrating an identification device according to figure 1 mounted on a fluid container.

[0032] Referring to Figures 1 and 2, the identification device according to the invention comprises a casing 3 carrying a data support 2 for contactless identification of a fluid container 1.

[0033] The data support 2 is preferably of an electronic type and may comprise at least one among: an antenna for radio-frequency identification (RFID), an electronic chip, an electronic memory for storing data. The data support 2 preferably comprises a RFID tag which may store and/or transmit data being relevant to fill or distribute the fluid container. Preferably, the data stored in the RFID tag is protected against modification by non-authorized users.

[0034] The electronic data support 2 can be designed to operate at any frequency (from the low frequencies to the microwave frequencies). Advantageously, the data support operates at frequencies which are typically comprised between in the field of Ultra High Frequency (UHF) preferably between 800 and 900 MHz.

[0035] Advantageously, the data support 2 comprises a resonant radio antenna. In a way known per se, this kind of antenna rely on the use of electric fields and can be manufactured as a electronic printed circuit. Hence, such antenna is adapted to be placed close to the container body and to use the container as part of the antenna itself.

[0036] The data support 2 may be arranged within or on the casing 3. Preferably, it is enclosed in the casing 3. Advantageously, the casing 3 is made of a plastic material such as at least one among: polyamide, polyethylene, polypropylene, polyester, polyacetal. The casing 3 may also be made of a copolymer, for example a copolymer of acrylonitrile, butadiene, and styrene (ABS).

[0037] The data support 2 can be for example held in the casing via gluing or any other suitable element known

per se.

[0038] The data support 2 may in particular comprise an antenna, which may have a cubic or parallelepipedic shape or a capsule-shaped antenna or any other suitable electronic device. The data support may have a thickness of between 2 and 8 mm, for example 5 mm.

[0039] Preferably, the casing 3 has a global parallelepipedic shape and has a length of between 3 and 5 cm, a width of between 1.5 and 3 cm and a thickness of between 0.7 and 1.5 cm.

[0040] The identification device further comprises a U-shaped element 4 attachable to the casing 3 for forming a collar 8 to be mounted around at least a portion of the container 1. The U-shaped element comprises two arms connected to a central curved portion, each arm comprising a terminal extremity. Preferably, the arms are generally parallel to each other. The curved portion typically comprises a concave portion which may have a radius of curvature of between 0.3 and 0.7 cm, preferably between 0.33 and 0.66 cm, more preferably between 0.37 and 0.46 cm.

[0041] The casing 3 and the U-shaped element 4 comprise a pair of combined attaching elements 5, 6 being shaped for cooperating with each other by elastic deformation.

[0042] According to the invention, the pair of combined attaching elements 5, 6 cooperate between a detached position where the casing 3 and the U-shaped element 4 form an open collar 9, as illustrated in Figure 1, and an attached position where said casing 3 and said U-shaped element 4 form a closed collar 8, as illustrated in Figure 2.

[0043] In the attached position, the casing 3 is located only at one side of the closed collar 8 and between the two terminal extremities of the U-shaped element 4.

[0044] In this way, the collar 8 can be mounted directly on a fluid without removing the valve fixed to said fluid container.. This prevents the identification device to take too much space around the valve.

[0045] Furthermore, the design of the identification device according to the invention can be easily adapted to different sizes and shapes of valves. For example, when considering LPG containers having different valve diameters, namely 25.4 mm (i. e. 1-inch), 19.05 mm (i. e. ¾-inch) or 12.7 mm (i. e. ½-inch) diameters, it is only necessary to adapt the design of the U-shaped element 4, for example by changing the radius of curvature of the curved portion. This allows setting a standard casing 3 on various containers.

[0046] According to a preferred embodiment of the invention, the pair of combined attaching elements 5, 6 are located respectively at one 5 of the two terminal extremities of the U-shaped element 4 and in a corresponding opening 6 arranged in said casing 3. The opening 6 is shaped for accommodating and blocking said terminal extremity 5 by elastic deformation of said opening 6 and/or by elastic deformation of said terminal extremity 5, hence forming a male/female snap-fastening clipping system.

[0047] A casing 3 and a U-shaped element 4 comprising a pair of combined attaching elements 5, 6 means that the casing 3 and the U-shaped element 4 comprise at least one pair of such elements.

[0048] In the embodiment illustrated on Figure 1, the casing 3 and the U-shaped element 4 comprise two pairs of combined attaching elements 5, 6 located at each terminal extremity 5 of the U-shaped element 4 and in two respective openings 6 arranged in the casing 3.

[0049] Each pair of attaching element thus comprises

- a male/female attaching element located on one terminal extremity 5 of the U-shaped element 4 and
- a female/male attaching element located on the casing for cooperating with the male/female attaching element located on one terminal extremity 5 of the U-shaped element 4.

[0050] In another embodiment (not illustrated), one of the two terminal extremities the U-shaped attaching element 4 may be rigidly fixed to the casing 3. Such terminal extremity may be mechanically attached to the casing 3 and/or movable by translation or pivoting with respect to the casing 3. The terminal extremity may also be integral with said casing 3.

[0051] The opening 6 may be an orifice extending through the body of the casing 3. The opening 6 may also be a cavity comprising a bottom, as illustrated in Figure 3.

[0052] The terminal extremity 5 may comprise a deformable portion 7 being shaped for retracting when engaging in the corresponding opening 6 and expanding when being accommodated completely in said corresponding opening 6.

[0053] For example, the elastic deformation of the portion 7 may take place in the plane of the U-shaped element 4, as in the device illustrated in Figure 1, or in a plane perpendicular to the U-shaped element 4.

[0054] In the example of Figure 1, each terminal extremity 5 comprises two deformable portions 7 arranged symmetrically at said terminal extremity 5 and extending in the direction of the curved portion of the U-shaped element 4. Of course, other designs are possible.

[0055] Referring to Figure 3, the deformable portion 7 and the corresponding opening 6 may comprise each complementary abutment surfaces 12, said complementary abutment surfaces 12 being shaped for preventing the exit of said terminal extremity 5 from the corresponding opening 6 once said terminal extremity 5 is accommodated in said corresponding opening 6.

[0056] Advantageously, the casing 3 and/or the U-shaped element 4 are shaped so that, in the attached position, they prevent, or at least make difficult, the reverse elastic deformation of the attaching elements 5, 6 so that an effort for separating the U-shaped element 4 from the casing 3 above a certain threshold generates an irreversible plastic deformation of the identification device. For example an effort for separating the U-shaped

element 4 from the casing expends the deformable portions 7 within the opening 6 and against the abutments surfaces 12. Hence, the identification device is designed in a way that if it is removed from the fluid container, it is irreversibly damaged and not reusable.

[0057] Further, the casing 3 may comprise a concavity 11 arranged on the surface of the casing 3 which faces the U-shaped element 4 in the attached position. The concavity 11 may have, for example, a radius of curvature between 0.3 and 0.7 cm, preferably between 0.33 and 0.66 cm. Said concavity 11 may be used for reducing at least one internal dimension of the collar 8 and/or to guide and position properly the casing 3 with respect to a valve 15 fixed to a fluid container 1.

[0058] In the example of Figure 1, the thickness of the concavity 11 is less than the global thickness of the casing 3. The attachment surface may have for example a thickness of between 3 and 9 mm, preferably between 3 and 5 mm.

[0059] In this way, when mounting the identification device on a fluid container, the casing 3 can be located or sandwiched between the container 1 and the valve 15 fixed to the container 1. In fact, it may exist a small distance between the valve, said valve being typically mounted on the top of the container 1, and the container 1 on which the device is intended to be mounted. The concavity 11 allows better adjusting the casing 3 to the fluid container 1.

[0060] The Figure 4 illustrates an example of mounting an identification device according to the invention on a fluid container comprising a valve 15 mounted to said container. Preferably, the valve 15 is mounted on the top of the container body. The container 1 may contain a pressurized fluid, or a fluid under pressure, said fluid being in a liquid, gaseous or biphasic state. The container may notably contain Liquid Petroleum Gas (LPG).

[0061] Preferably, the closed collar 8 is mounted between the container's 1 body and the valve 15. Typically, the container 1 comprises a longitudinal axis AA, the valve 15 being mounted along said longitudinal axis AA. The identification device is preferably maintained longitudinally with respect to the container 1, for example using the concavity 11. Preferably, said concavity 11 is arranged between the valve 15 and the container 1.

[0062] Preferably, the collar 8 has at least one internal dimension inferior to at least one dimension of the valve 15 in a direction transverse to the longitudinal axis AA.

[0063] Thanks to the open design of the identification device in the detached dimension, there is no need to remove a valve 15 fixed to the fluid container 1 on which the collar 8 is intended to be mounted. The present invention thus allows an improved mounting process on a fluid container.

[0064] The mounting of the identification device on a fluid container can be performed, either manually and/or automatically. The mounting may be performed easily by an operator, with bare hands.

[0065] Another significant advantage of the identifica-

tion device of the invention is that it does not involve the use of an annular antenna. Thanks to the design of the casing, a resonant radiofrequency antenna, advantageously manufactured as an electronic printed circuit, can be used. This leads to an identification device having a robust, monolithic design and being less sensitive to interferences with the container body. The data stored in the identification device can also be read in all directions with respect to the container body because the cylinder itself is used as part of the antenna of the data support.

Claims

1. Identification device intended to be mounted on a fluid container (1) comprising a casing (3) carrying a data support (2) for contactless identification of said fluid container (1) and a U-shaped element (4) attachable to said casing (3) for forming a closed collar (8) to be mounted around at least a portion of the fluid container (1), the casing (3) and the U-shaped element (4) comprising a pair of combined attaching elements (5, 6) being shaped for cooperating with each other by elastic deformation, **characterized in that** the pair of combined attaching elements (5, 6) cooperate between a detached position where the casing (3) and the U-shaped element (4) form an open collar (9) and an attached position where said casing (3) and said U-shaped element (4) form a closed collar (8), in the attached position the casing (3) being located only at one side of the closed collar between the two terminal extremities of the U-shaped element (4).
2. Identification device according to claim 1, **characterized in that** the pair of combined attaching elements (5, 6) are located respectively at one (5) of the two terminal extremities of the U-shaped element (4) and in a corresponding opening (6) arranged in said casing (3), the opening (6) being shaped for accommodating and blocking said terminal extremity (5) by elastic deformation of said opening (6) and/or by elastic deformation of said terminal extremity (5).
3. Identification device according to claim 2, **characterized in that** said terminal extremity (5) comprises a deformable portion (7) which is shaped for retracting when engaging in the corresponding opening (6) and expanding when being accommodated completely in said corresponding opening (6).
4. Identification device according to claim 3, **characterized in that** the deformable portion (7) and the corresponding opening (6) comprise each complementary abutment surfaces, said complementary abutment surfaces being shaped for preventing the exit of said terminal extremity (5) from the corresponding opening (6) once said terminal extremity (5) is accommodated in said corresponding opening (6).
5. Identification device according to any of claims 1 to 4, **characterized in that** the casing (3) and the U-shaped element (4) comprise two pairs of combined attaching elements (5, 6) located at each terminal extremity of the U-shaped element (4) and in respective openings (6) arranged in the casing (3).
6. Identification device according to any of claims 1 to 4, **characterized in that** one of the two terminal extremities the U-shaped attaching element (4) is rigidly fixed to the casing (3).
7. Identification device according to any of claims 1 to 7, **characterized in that** the data support (2) comprises at least one among: an antenna for radio-frequency identification (RFID), an electronic chip, an electronic memory for storing data.
8. Identification device according to any of claims 1 to 9, **characterized in that** the data support (2) is enclosed in the casing (3), said casing (3) being made of a plastic material such as at least one among: polyamide, polyethylene, polypropylene, polyester, polyacetal, copolymer.
9. Identification device according to any of claims 1 to 10, **characterized in that** the casing (3) and/or the U-shaped element (4) are shaped so that, in the attached position, they prevent the reverse elastic deformation of the attaching elements (5, 6) so that an effort for separating the U-shaped element (4) from the casing (3) above a certain threshold generates an irreversible plastic deformation of the identification device.
10. Identification device according to any of claims 1 to 9, **characterized in that** the casing (3) comprises a concavity (11) arranged on a surface of said casing (3) facing, in the attached position, the U-shaped element (4).
11. Fluid container (1), **characterized in that** it comprises an identification device according to any of claims 1 to 9.
12. Fluid container according to claim 11, **characterized in that** a valve (15) is mounted on said fluid container (1), the collar (8) being mounted between the container (1) and the valve (15).
13. Fluid container according to claim 12, **characterized in that** the container (1) comprises a longitudinal axis (AA), the valve (15) being mounted along said longitudinal axis (AA), the identification device being maintained longitudinally with respect to the contain-

er (1), the internal dimensions of the collar (8) being inferior to at least one dimension of the valve (15) in a direction transverse to the longitudinal axis (AA).

14. Mounting process of an identification device according to any of claims 1 to 10 on a fluid container (1) comprising a longitudinal axis (AA) and a valve (15) mounted on said container (1) along said longitudinal axis (AA), **characterized in that** it comprises the steps of

- positioning the casing (3) and the U-shaped element (4) on opposite lateral sides of the fluid container (1), the pair(s) of combined attaching elements (5, 6) being in the detached position where the casing (3) and the U-shaped element (4) form an open collar (9),
- moving the U-shaped element (4) and the casing (3) toward each other in a general direction transverse to the longitudinal axis (AA), until the pair of combined attaching elements (5, 6) cooperates in the attached position so that said casing (3) and said U-shaped element (4) form a closed collar (8) around a portion of the fluid container (1).

15. Use of an identification device according to any of claims 1 to 10 to store and/or retrieve data related to a fluid container (1) such as at least one among: the capacity of the fluid container (1), the date of refurbishing, the tare weight, the filling batch, the expiry date, the nature of the fluid contained in the fluid container (1).

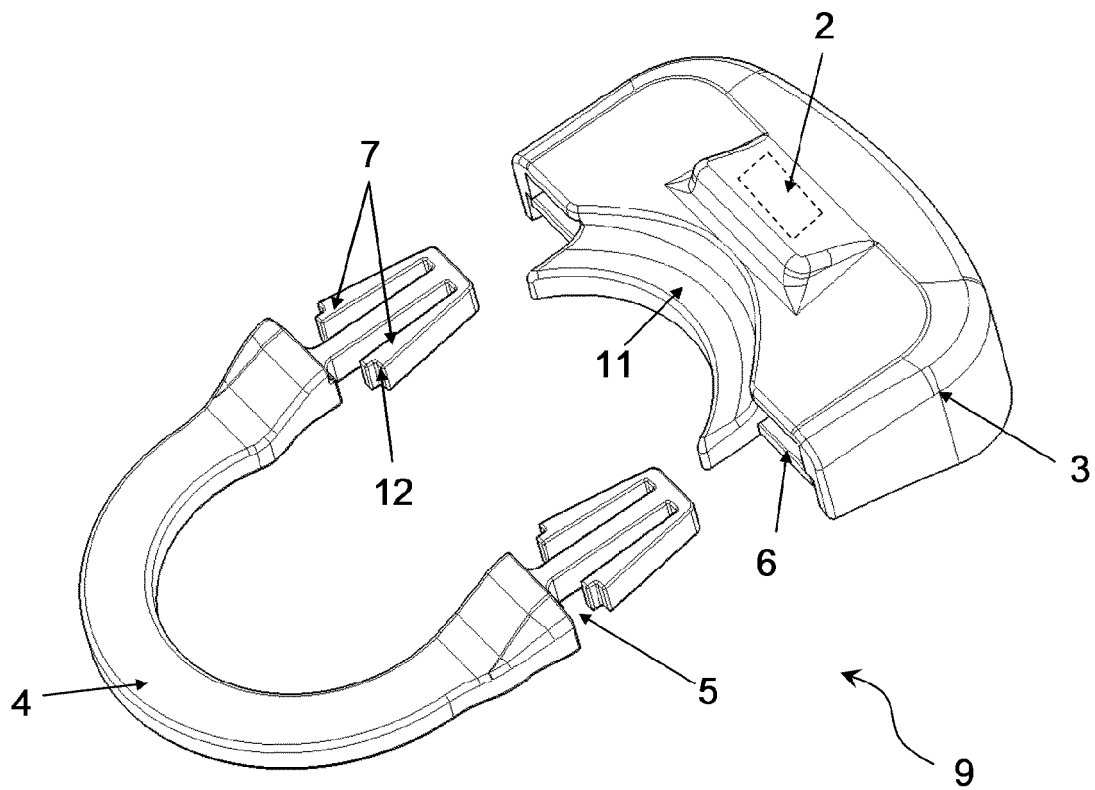


FIG. 1

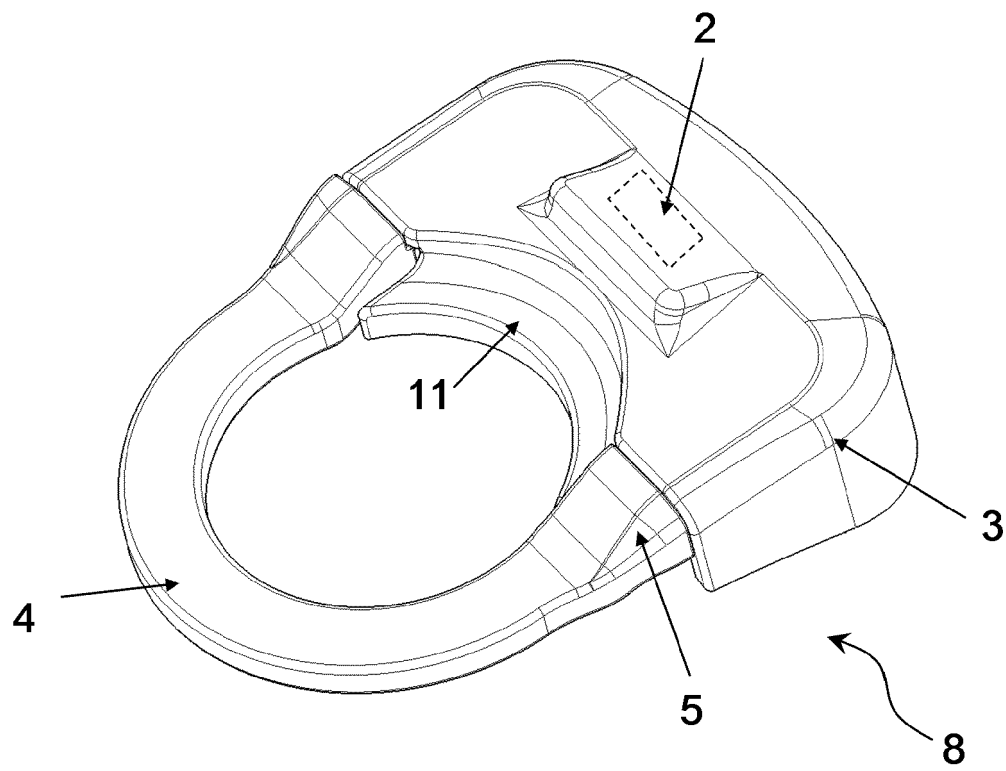


FIG. 2

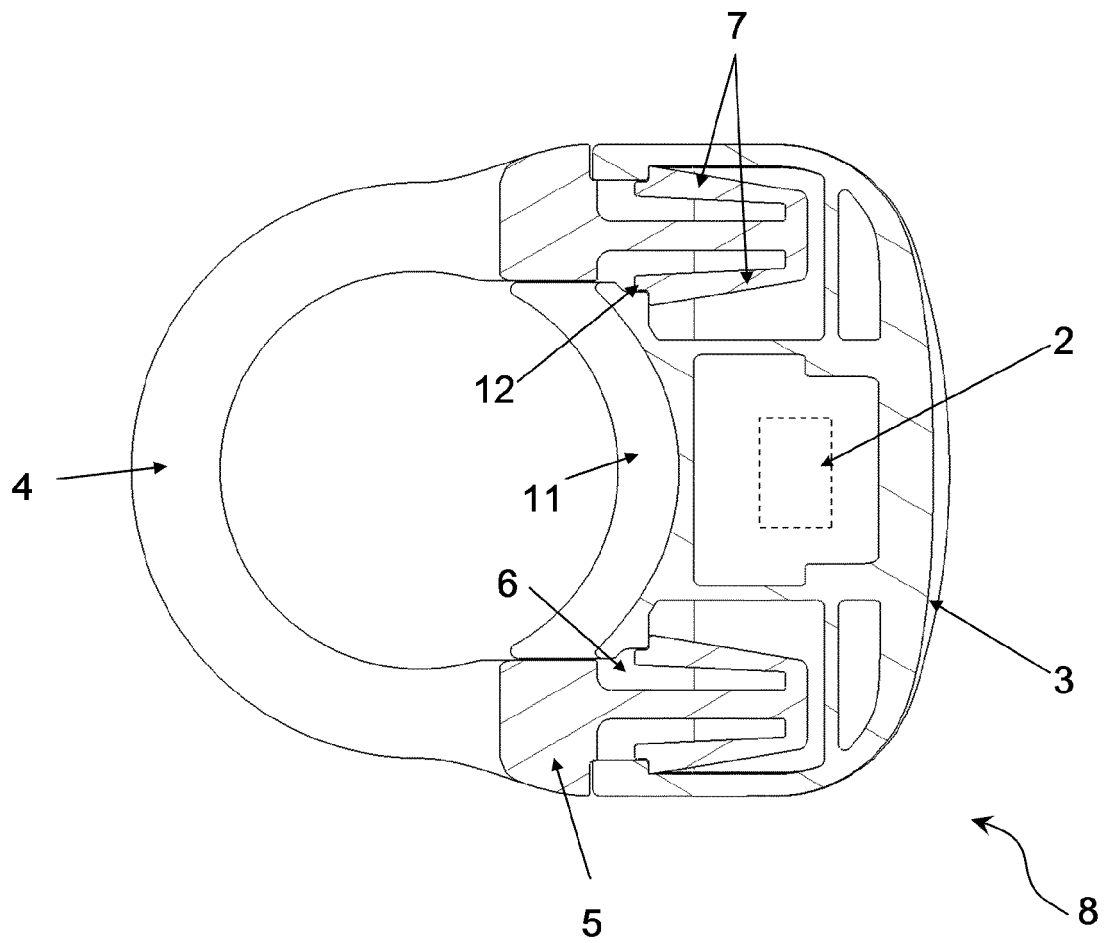


FIG. 3

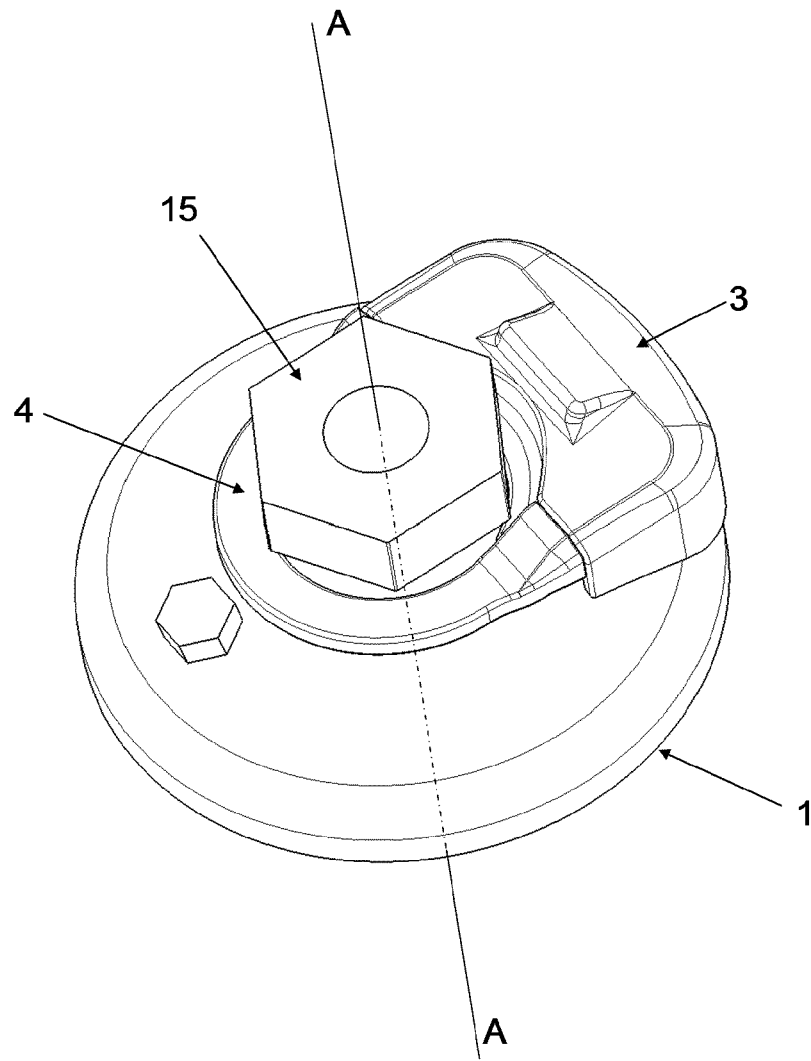


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 13 38 2155

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	US 2010/253524 A1 (KOLTON CHESTER [US] ET AL) 7 October 2010 (2010-10-07) * the whole document *	1-6,9,11,15	INV. F17C13/00
X	WO 2007/042879 A2 (ITW NEW ZEALAND LTD [NZ]; KOO YEONG-HENG [NZ]; WRIGLEY ANDREW NICHOLS) 19 April 2007 (2007-04-19) * the whole document *	1-6,9,11,15	
A,D	EP 2 249 327 A1 (ATHELIA SOLUTIONS IBERICA S L [ES]; ATHELIA SOLUTIONS [FR]) 10 November 2010 (2010-11-10) * paragraphs [0002] - [0007], [0021] *	1	
A	EP 2 508 787 A2 (MESSER GASPAC GMBH [DE]) 10 October 2012 (2012-10-10) * paragraph [0003] *	7	
A	FR 2 868 186 A1 (AIR LIQUIDE ELECTRONICS SYS [FR]) 30 September 2005 (2005-09-30) * page 3, lines 12-23 *	7	
			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 9 April 2014	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			

2
EPO FORM 1503 03.82 (P04C01)



Application Number

EP 13 38 2155

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-7, 9, 11, 15

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION **SHEET B**

Application Number

EP 13 38 2155

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6, 9, 11, 15

Identification device intended to be mounted on a fluid container as defined by claim 1, wherein further details of the attaching means of the casing and the U-shaped element are disclosed, and a fluid container comprising such an identification device, and use of the identification device. The problem to be solved is to attach the casing to the U-shaped element in such a manner that it can not be removed without being damaged.

2. claim: 7

Identification device intended to be mounted on a fluid container as defined by claim 1, wherein the data support (2) comprises at least one among: an antenna for radio-frequency identification (RFID), an electronic chip, an electronic memory for storing data. The problem to be solved is to store data in a particular manner.

3. claim: 8

Identification device intended to be mounted on a fluid container as defined by claim 1, wherein the data support (2) is enclosed in the casing (3), said casing (3) being made of a plastic material such as at least one among: polyamide, polyethylene, polypropylene, polyester, polyacetal, copolymer. The problem to be solved is to build the casing holding the data support in a particular material compatible with the data support for allowing signal transmission.

4. claims: 10, 12-14

Identification device intended to be mounted on a fluid container as defined by claim 1, wherein the casing (3) comprises a concavity (11) arranged on a surface of said casing (3) facing, in the attached position, the U-shaped element (4), and a fluid container comprising such an identification device wherein the collar is mounted between the container and the valve, and process of mounting the identification device to the fluid container. The problem to be solved is to properly attach the identification device to the fluid container.

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

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09-04-2014

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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