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(54) **A cylinder**

Ein Behälter

Un réservoir

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Description

Technical Field

[0001] This invention relates to pressure cylinders used for the transportation and storage of liquefied petroleum gas or other hydrocarbons.

Prior Art

[0002] In the prior art, liquefied petroleum gas (LPG) to be used at residences and offices, is offered for sale in cylinders, the bodies of which are manufactured by welding together two or more metal parts.

[0003] Hot worked steel sheets, thickness of which varies in the range of 1.5-2 mm, are deep drawn in hydraulic presses to manufacture the upper and lower bodies of the cylinder. Then the body halves, on which edge-cutting processes and bending are applied, are passed through the cleaning pool together with auxiliary body parts such as the footring and the handle in order to make them ready for the welding processes. Before the welding processes, the bushing is welded onto the top of the body so as to place the valve opening. Body welding is performed in submerged and mig/mag welding machines whereas the attachment of the footring and the handle to the cylinder body is performed in mig/mag welding machines.

[0004] In accordance with the related standards, the permanent internal stresses which build up as a consequence of the welding processes, are released by applying stress relief and/or normalisation heat treatment on the cylinders. Completed cylinders are subjected to first visual inspection then to welding, body damage inspections, and hydrostatic tests. After the tests, the surfaces of the cylinders are cleaned in the grit/shot blasting unit. Ready surfaces of the cylinders are coated with zinc and/or an undercoat painting against oxidation. In the next step, the surfaces of the cylinders are painted.

[0005] Manufactured cylinders are transported several times between various places including the manufacturing plant, the filling station, the sales unit and the final consumption site. The metal handles and the feet of the cylinders that are stacked at storage sites, transportation vehicles and places of use, experience permanent deformation due to the over-weight and their repair or renewal processes are costly. Moreover, as they contact each other and the bodies of other cylinders, the deformed handles and feet cause the paintings of the cylinders to be worn easily, and even the porter to be wounded while carrying the cylinders.

[0006] To avoid damage to the cylinders and to provide them with a more aesthetic appearance, plastic handles have been developed in the prior art, devised to be used on the upper parts of the bodies of cylinders that contain 6 kg. of LPG. However, the plastic handle which is used with cylinders with a plastic ingredient, cannot be used with high-capacity cylinders since its strength is insufficient even though it is a cheaper component as compared to a metal handle.

[0007] Furthermore, elements must be attached onto the cylinders, which bear information such as the sign of the manufacturer or the dealer firm or the operating directives. Various problems are observed when elements are attached onto the cylinders used in the prior art.

[0008] These sign plates and elements are sometimes bonded to the body using an adhesive and sometimes hung to the handle of the cylinder. However, said attachments may wear out, break and consequently get lost during transportation and use. In order to prevent these problems, some methods have been developed in the prior art. An example is embossing the name of the firm on the steel body. However, because embossing is performed under high pressure onto the surface, it is quite probable that the wall thickness of the metal gets thinner.

[0009] In the state of the art German Utility Model No DE20010514U1 discloses a gas pressure container made of metal to contain the pressurized media, such as gas cylinder for combustion gases with the capacity "V", consisting essentially of a cylindrical shell, two outwardly curved final grounds and equipment for setting up and carrying the container, in which at least a central final ground comprises one connecting piece.

Brief Description of the Invention

[0010] The object of the present invention is to realise a cylinder which absorbs the impacts directed to its top or bottom parts much better when compared to those in the prior art.

[0011] A further object of the present invention is to attain a cylinder which is rustproof, does not require maintenance or painting, and which does not get dirty quickly.

[0012] A still further object of the present invention is to realise a cylinder onto which signs and/or trademarks can be applied easily.

[0013] A further object of the present invention is to realise an ergonomic cylinder which is easy to handle.

[0014] Another object of the present invention is to realise a cylinder with an aesthetic appearance which enhances customer satisfaction.

[0015] The cylinder, which is subject to the present invention, in its most basic form, comprises a steel body in which liquefied petroleum (LPG) gas is carried and stored, a regulator for the gas to exit, a valve, a handle on the top, which enables it to be carried easily by the user, a lid placed on the handle and which covers the recesses and provides an aesthetic appearance, a base at the bottom which enables it to stand in balance, and is characterised by two internal pieces, one for the handle and one for the base, which absorbs external impacts and protect the cylinder from external factors.

Detailed Description of the Invention

[0016] The cylinder realised to attain the objects of the present invention is illustrated in the annexed drawings,

wherein;

Figure 1 is an exploded perspective view of the cylinder which is subject to the present invention,
Figure 2 is a front schematic view of the lid of the cylinder which is subject to the present invention,
Figure 3 is a top schematic view of the lid of the cylinder which is subject to the present invention,
Figure 4 is a top perspective view of the lid of the cylinder which is subject to the present invention,
Figure 5 is a bottom perspective view of the lid of the cylinder which is subject to the present invention,
Figure 6 is a front schematic view of the handle of the cylinder which is subject to the present invention,
Figure 7 is a bottom schematic view of the handle of the cylinder which is subject to the present invention,
Figure 8 is a top perspective view of the handle of the cylinder which is subject to the present invention,
Figure 9 is a bottom perspective view of the handle of the cylinder which is subject to the present invention,
Figure 10 is a front schematic view of the base of the cylinder which is subject to the present invention,
Figure 11 is a bottom schematic view of the base of the cylinder which is subject to the present invention,
Figure 12 is a top perspective view of the base of the cylinder which is subject to the present invention,
Figure 13 is a bottom perspective view of the base of the cylinder which is subject to the present invention,
Figure 14 is a front schematic view of the internal piece of the cylinder which is subject to the present invention,
Figure 15 is a side schematic view of the internal piece of the cylinder which is subject to the present invention,
Figure 16 is a top perspective view of the internal piece of the cylinder which is subject to the present invention,
Figure 17 is a bottom perspective view of the internal piece of the cylinder which is subject to the present invention.

[0017] The components in the figures have each been numbered corresponding to the following:

1. Cylinder
2. Body
3. Internal piece (damper)
4. Handle
5. Base
6. Lid
7. Tooth
8. Cut-out
9. Protrusion
10. Channel
11. Recess
12. Stud
13. Column
14. Bushing recess
15. Groove

[0018] The cylinder of the present invention comprises a body (2) which is manufactured from steel by a known technique, and which has a suitable geometry, preferably the form of a cylinder with rounded (torispherical, elliptical, hemispherical) upper and lower ends. There exists a bushing recess (14) on the top of the body which enables placement of accessories such as the valve, regulator, etc. By making use of composite stud welding technology, studs (12) are welded on the top and bottom of the cylinder, which are sufficient in numbers, preferably four on each side, to provide the necessary strength. At least one internal piece (3) is attached to each group of studs (12) at the top and at the bottom.

[0019] In order to damp the stresses resulting from any kind of impacts and damages originating from the outside, protrusions (9) are placed on said internal pieces (3), which have the sufficient number to provide strength, and which are preferably step-formed. Said protrusions (9), by seating into corresponding channels (10) of the handle (4) at the top and the base (5) at the bottom, absorb impacts and mechanical stresses on all mounting pieces, behave like a spring so as to enable distribution of the load and thereby avoid breaks and material damages occurring during stacking and loading-unloading of the cylinders.

[0020] The internal piece (3) has preferably a circular form the diameter of which decreases from the centre to the top. The external diameter is a few millimetres larger than the diameter of the body (2) of the cylinder (1). Hence, the pressurised containers carrying the LPG are protected from colliding with each other and with other objects, during the transportation, stacking, storage and use of the cylinder (1).

[0021] In order to facilitate its mounting to the base (5) and the handle (4), the internal piece (3) comprises recesses (11) on its body, into which the studs (12) on the body (2) of the cylinder (1) seat. The internal piece (3) comprises cut-outs (8) (on its top and bottom surfaces so as to provide optimum material usage, to allow passing-through of rain water and other liquids, and to provide

space for placement of equipments like the valve and the regulator.

[0022] The cylinder (1) which is subject to the present invention, comprises a handle (4) on top of the internal piece (3), which has a form fitting to that of the internal piece (3). The handle (4) enables the cylinder (1) to be carried easily, protects the accessories mounted on the body (2) of the cylinder (1) such as the valve and the regulator, and allows markings to be made in accordance with the standards and legislation which is compulsory in cylinder (1) manufacturing.

[0023] The handle (4) comprises a groove (15) on its upper surface. The surface area of the groove (15) is equal to the circular area of the lid (6) which involves a recess extending over an arc of a certain angle, and its depth is equal to the wall thickness of the lid (6). Inside said groove (15), there are a certain number of membrane-like channels (9) which prevent massive polymer material collapse, improve strength and provide material saving. Furthermore, there are recesses (11) inside said groove (15), into which the studs (12) on the body (2) of the cylinder (1) seat, so that the handle (4) can be mounted. The number of recesses (11) is preferably four.

[0024] The handle (4) further comprises ergonomic columns (13) which enable the cylinder (1) to be carried easily and into which the studs (12) seat. The bottom surface of the handle (4) is flat so as to enable marking.

[0025] A lid (16) is employed to hide the four recesses on the handle (4), to carry information relating to the properties of LPG, the filling station, security warnings, etc. The lid (16) may be of a colour different than the rest of the design and thereby allows for geographical, regional or technical differentiation of the products.

[0026] The geometry of the lid (16) matches the geometry of the handle (4), has a circular form, and comprises at the bottom a number of teeth (10), preferably four, for its attachment to the handle (4). All these parts are integral, i.e. mono-block, and manufactured in a single plastic injection mould and/or in separate injection moulds.

[0027] The cylinder (1) of the present invention comprises a base (5) which enables standing upright on the floor and being stacked on top of each other. The diameter of said base (5) decreases from the centre to the bottom. The base (5) comprises a number of channels (10) which match with the protrusions (9) of the internal piece so as to provide the necessary strength. The base (5) further comprises recesses (11) into which the studs (12) on the body (2) of the cylinder (1) are inserted during the assembly. For the assembly of the base (5), the studs (12) are first inserted into the recesses (11) and then they are fixed with nuts. The base (5) further comprises cut-outs (8) on its body, to provide optimum material usage and also to allow draining of rain water or other liquids. The surface of the base (5) has a flat form that enables marking to be made in accordance with the standards and legislation which is compulsory in cylinder (1) manufacturing.

[0028] The internal piece (3), the handle (4), the base (5) and the lid (16) are made of a rustproof material which does not require repair or painting, does not get dirty quickly, and has high impact and mechanical strength. The material is preferably ethylene propylene diene terpolymer added copolymer polypropylene, however other polypropylene derivatives and suitable additives may also be used. Said polymers, may be selected from a group comprising polymers such as PBT, ABS, PE, POM, PC, or mixtures of these in certain ratios.

Industrial Applicability

[0029] The polymer pieces of the cylinder (1), which is subject to the present invention, protect critical areas which are prone to collisions and impacts. As a result, the body (2) part of the cylinders (1), which are placed side by side at various places such as storage and consumption sites, are not allowed to contact each other. Thus, risks experienced in the prior art, such as paint removal, wearing of the coating, and damaging of the body (2) of the cylinder (1). When all these factors are taken into consideration, it will be readily understood that, as compared to its equivalents in the prior art, the cylinder (1) of the present invention has a higher strength, and also higher resistance against collision, impact and corrosion.

[0030] The cylinder (1) further allows attaching of parts bearing information relating to the signs of the manufacturer and dealer firms, the operational directives, etc. Moreover, said polymer pieces give the cylinder an aesthetic form and the opportunity for more clean use. Thanks to its plastic base (5), the present cylinder (5) does not harm the floor on which it stands.

[0031] The manufacture of the cylinder (1), which is subject to the present invention, meets the standards and is in accordance with all necessities.

[0032] It is possible to develop wide range of embodiments for the cylinder (1) which is the subject of the invention without departing from this main concept and the invention is principally as disclosed in the claims and it cannot be restricted with the examples stated herein.

Claims

1. A cylinder (1) comprising a steel body (2) in which liquefied petroleum (LPG) gas is carried and stored, a regulator for the gas to exit, a valve, a handle (4) on the top, which enables it to be carried easily by the user, the handle (4) having recesses (11), a base (5) at the bottom which enables it to stand in balance, and **characterized by** a lid (6) placed on the handle which covers the recesses and provides an aesthetic appearance, and by at least two internal pieces (3), one of which is attached to the handle (4) and the other is attached to the base (5), having protrusions (9) which are sufficient in number to provide strength,

and which are preferably step-formed, in order to damp the stresses resulting from any kind of impacts and damages directed from the outside.

2. A cylinder (1) according to Claim 1, **characterized in that** it comprises studs (12) welded on the top and bottom of the steel body, which have a sufficient number, preferably four on each side, to provide the necessary strength.

3. A cylinder (1) according to Claim 1 and 2, **characterized in that** an internal piece (3) has preferably a circular form, the diameter of which decreases from the centre to the top.

4. A cylinder (1) according to Claim 3, **characterized in that** an internal piece (3) has a external diameter which is a few millimetres larger than the diameter of the body (2) of the cylinder (1).

5. A cylinder (1) according to Claim 4, **characterized in that** an internal piece (3) has recesses (11) in order to facilitate its assembly to the base (5) and the handle (4) and wherein the studs (12) on the body (2) of the cylinder (1) are inserted.

6. A cylinder (1) according to Claim 5 **characterized in that** the internal pieces (3) have cut-outs (8) to provide optimum material usage, to allow draining of rain water or other liquids, and to provide space for placement of equipments like the valve and the regulator.

7. A cylinder (1) according to any one of the preceding claims **characterized in that** the handle (4) has a groove (15) on its upper surface, the surface area of which is equal to the circular area of the lid (6) which involves a recess extending over an arc of a certain angle, and the depth of which is equal to the wall thickness of the lid (6).

8. cylinder (1) according to Claim **characterized in that** the handle (4) has a number of channels (10) into which the protrusions (9) of the internal piece (3) are inserted, and the number of which is enough to provide the necessary strength.

9. A cylinder (1) according to any one of the preceding claims **characterized in that** the handle (4) has recesses (11) into which the studs (12) are seated so that the handle (4) can be mounted.

10. A cylinder (1) according to Claim 9 **characterized in that** the handle (4) has ergonomic columns (13) which enable the cylinder (1) to be carried easily.

11. A cylinder (1) according to Claim 10 **characterized in that** the handle has a (4) bottom surface which is flat so as to enable labelling.

12. A cylinder (1) according to any one of the preceding claims **characterized in that** the lid (6), which is circular in form fitting the geometry of the handle (4), which hides the recesses (11) on the handle (4), carries information relating to the properties of LPG, the filling station, security warnings, etc., and the colour of which is different than the rest of the design so as to enable geographical, regional or technical differentiation.

13. A cylinder (1) according to Claim 12 **characterized in that** the lid (6) has at its bottom a number of teeth (10), preferably four, for attaching it to the handle (4).

14. A cylinder (1) according to any one of the preceding claims **characterized in that** the base (5) has a central diameter which decreases downwards and which enable standing in balance on the floor and being stacked on top of each other.

15. A cylinder (1) according to Claim 14 **characterized in that** the base (5) has a number of channels (10) into which the step-formed protrusions (9) on the internal piece (3) are seated, and the number of which is sufficient to provide the necessary strength.

16. A cylinder (1) according to Claim 15 **characterized in that** the base (5) has recesses (11) into which the studs (12) on the body (2) of the cylinder (1) are inserted during assembly.

17. A cylinder (1) according to Claim 16 **characterized in that** the base (5) has cut-outs (8) to provide optimum material usage and also to allow draining of rain water or other liquids.

18. A cylinder (1) according to Claim 17 **characterized in that** the base (5) has a surface which is flat so as to enable markings to be made in accordance with the standards and legislation which is compulsory in cylinder (1) manufacturing.

19. A cylinder (1) according to any one of the preceding claims **characterized in that** the internal pieces (3), the handle (4), the base (5) and the lid (6) are made of a strong material, namely of polymers such as PBT, ABS, PE, POM, PC, or mixtures of these in certain ratios, preferably ethylene propylene diene terpolymer added copolymer polypropylene.

Patentansprüche

1. Ein Behälter (1) umfassend ein Stahlgehäuse (2), in welchem verflüssigtes Erdölgas (LPG) aufgenommen und gelagert wird, einen Regler für das austre-

tende Gas, ein Ventil, oberseitig einen Griff (4), der eine Ausnehmung (11) aufweist und es ermöglicht vom Benutzer ohne Umstände getragen zu werden, einen Deckel (6), der auf dem Griff angeordnet ist und die Ausnehmung abdeckt und ein ästhetisches Aussehen verleiht und unterseitig einen Boden (5), der es ermöglicht im Gleichgewicht aufgestellt zu werden und **gekennzeichnet durch** mindestens zwei innere Teile (3), von denen ein Teil an den Griff (4) und das andere an den Boden (5) befestigt ist, der Vorsprünge (9) aufweist, die zahlenmäßig ausreichend sind, um Festigkeit zu verleihen und die vorzugsweise gestuft gebildet sind um die Beanspruchungen aufgrund Belastungen und Schädigungen vom Aussen von irgendeiner Art zu dämpfen.

2. Ein Behälter (1) nach Anspruch 1, **dadurch gekennzeichnet, daß** er eine ausreichende Anzahl von Ansatzbolzen (12), vorzugsweise vier auf jeder Seite, aufweist um erforderliche Festigkeit zu ermöglichen, welche im obersten Teil und im untersten Teil des Stahlgehäuses aufgeschweißt sind.

3. Ein Behälter nach Ansprüchen 1 und 2, **dadurch gekennzeichnet, daß** ein inneres Teil (3) vorzüglich eine kreisrunde Form aufweist, deren Durchmesser von der Mitte bis zum obersten Teil abnimmt.

4. Ein Behälter nach Anspruch 3, **dadurch gekennzeichnet, daß** ein inneres Teil einen Außendurchmesser aufweist, der einigen Millimeter größer als der Durchmesser des Gehäuses (2) des Behälters (1) ist.

5. Ein Behälter (1) nach Anspruch 4, **dadurch gekennzeichnet, daß** ein inneres Teil (3) Aussparungen (11) aufweist, um dessen Anordnung auf dem untersten Teil (5) sowie dem Griff (4) zu erleichtern und in die die Ansatzbolzen (12) auf dem Gehäuse (2) des Behälters (1) eingebracht sind.

6. Ein Behälter (1) nach Anspruch 5, **dadurch gekennzeichnet, daß** die inneren Teile (3) für optimalen Materialeinsatz Durchbrüche (8) besitzen, um Ablaufen vom Regenwasser oder von anderer Flüssigkeiten zu gestatten und die Anordnung der Einrichtungen wie Ventil und Regulator Raum zu beschaffen.

7. Ein Behälter (1) nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, daß** der Griff eine Nut (15) auf seiner Oberfläche aufweist, wobei deren Oberfläche der kreisrunden Fläche des Deckels (6) entspricht, welcher eine Aussparung umfasst, die sich über einen Bogen von einer bestimmten Winkel erstreckt und deren Tiefe der Wanddicke des Deckels (6) entspricht.

8. Ein Behälter (1) nach Anspruch 5, **dadurch gekennzeichnet, daß** der Griff (4) eine bestimmte Anzahl von Kanäle (10) aufweist, in die die Vorsprünge (9) des inneren Teils (3) eingebracht sind und deren Anzahl ausreichend ist um die erforderliche Festigkeit zu erbringen.

9. Ein Behälter (1) nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, daß** der Griff (4) Aussparungen (11) aufweist, in die die Ansatzbolzen (12) gelegt sind, so daß der Griff (4) angebaut werden kann.

10. Ein Behälter (1) nach Anspruch 9, **dadurch gekennzeichnet, daß** der Griff ergonomische Ständer (13) besitzt, die es ermöglichen, daß der Behälter leict getragen wird..

11. Ein Behälter (1) nach Anspruch 10, **dadurch gekennzeichnet, daß** der Griff (4) eine untere Oberfläche aufweist, die flach ist um die Beschriftung zu ermöglichen.

12. Ein Behälter (1) nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, daß** der Deckel (6), der in kreisrunder Form für die Geometrie des Griffes (4) angebracht ist, welche auch die Aussparungen (11) auf dem Griff (4) verdeckt, Angaben über die Eigenschaften von LPG, Abfüllstation, Sicherheitswarnungen usw. trägt und dessen Farbe sich von dem übrigen Teil der Anordnung unterscheidet, so daß die geographische, regionale oder technische Unterscheidung gewährleistet wird.

13. Ein Behälter (1) nach Anspruch 12, **dadurch gekennzeichnet, daß** der Deckel (6) zur Verbindung an den Griff (4) auf seinem unterstem Teil eine Anzahl von Zähnen (10), vorzugsweise vier Zähne aufweist.

14. Ein Behälter (1) nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, daß** der Boden (5) eine zentralen Durchmesser aufweist, der nach unten abnimmt und ermöglicht im Gleichgewicht auf den Fußboden aufgestellt und aufeinander aufgestapelt zu werden.

15. Ein Behälter (1) nach Anspruch 10, **dadurch gekennzeichnet, daß** der Boden eine Anzahl von Kanäle (10) aufweist, in die die gestufte Vorsprünge (9) auf dem inneren Teil (3) eingesetzt sind und deren Anzahl ausreichend ist um die nötige Festigkeit zu ermöglichen.

16. Ein Behälter (1) nach Anspruch 15, **dadurch gekennzeichnet, daß** der Boden (5) Aussparungen (11) aufweist, in die die Ansatzbolzen (12) auf dem Gehäuse (2) des Behälters (1) während der Montage

eingebaut sind.

17. Ein Behälter (1) nach Anspruch 16, **dadurch gekennzeichnet, daß** der Boden (5) Durchbrüche (8) aufweist, um einen optimalen Materialeinsatz zu gewährleisten und auch Ablauf vom Regenwasser bzw. anderer Flüssigkeiten zu ermöglichen.

18. Ein Behälter (1) nach Anspruch 17, **dadurch gekennzeichnet, daß** der Boden (5) eine Oberfläche aufweist, die flach ist um die Markierungen zu ermöglichen, die bei der Herstellung von Gasbehältern gemäß den Normen und Gesetzgebungen pflichtmäßig vorgenommen sollen.

19. Ein Behälter (1) nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, daß** die inneren Teile (3), der Griff (4), der Boden (5) und der Deckel (6) aus einem starken Material, nämlich aus Polymeren wie PBT, ABS, PE, POM, PC oder Mischungen davon in bestimmten Anteilen, vorzugsweise Äthylen Propylen Dien Terpolymer hinzugefügte Kopolymer Polypropylen hergestellt werden.

Revendications

1. Un cylindre comprenant un corps en acier (2) dans lequel est transporté et maintenu le gaz pétrolier liquide (LPG/GPL), et un régulateur et une valve assurant la sortie du gaz, possédant une tige (4) au sommet afin d'assurer son transport facile, ladite tige (4) comprenant des rainures (11), comportant une base (5) sur le fond inférieur assurant la stabilité et comprenant une couverture (6) située sur ladite tige et assurant son apparence esthétique et recouvrant lesdites rainures, **caractérisé en ce qu'**il comprend au moins deux pièces intérieures (3), l'une étant reliée à ladite tige (4) et l'autre à ladite base, et possède des saillies en nombre suffisant pour apporter la puissance et qu'elles sont installées graduellement afin de diminuer pressions causées par toutes sortes de chocs et dommages qui pourraient venir du dehors.

2. Cylindre (1) selon la revendication 1, **caractérisé en ce qu'**il comprend les écrous (12) soudés sur la partie supérieure et inférieure du corps en acier, de préférence, quatre pour chacun de ses cotés afin d'assurer une puissance suffisante.

3. Cylindre (1) selon la revendication 1 ou 2, **caractérisé en ce qu'**il comprend une pièce intérieure (3) de préférence d'une forme circulaire dont le diamètre diminue du centre vers l'amont.

4. Cylindre (1) selon la revendication 3, **caractérisé en ce qu'**il comprend une pièce intérieure dont le diamètre extérieur est quelques millimètres supérieur du celui du corps (2) dudit cylindre (1).

5. Cylindre (1) selon la revendication 4, **caractérisé en ce qu'**il comprend une pièce intérieure (3) possédant des rainures (11) assurant l'installation des écrous (12) et de la tige (4) sur le corps (2) du cylindre (1) à ladite base (5).

6. Cylindre (1) selon la revendication 5, **caractérisé en ce qu'**il comprend des coupures (8) permettant l'usage optimal de matériaux afin d'assurer le drainage des eaux de pluie et d'autres liquides des pièces intérieures (3) et l'installations des équipements tels que les valves et le régulateur.

7. Cylindre (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend un canal (15) sur la surface supérieure de la tige (4), une superficie équivalente à l'aire circulaire de la couverture (6) contenant une cavité s'étendant sur la courbure d'un certain angle, et dont la profondeur est équivalente à l'épaisseur de paroi de la couverture (6).

8. Cylindre (1) selon la revendication 7, **caractérisé en ce qu'**il comprend plusieurs canaux (10) auxquels les saillies (9) de la pièce intérieure (3) de la tige (4) peuvent être ajoutées et qu'il possède des canaux en nombre suffisant pour fournir la puissance nécessaire.

9. Cylindre (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend les cavités (11) dans lesquelles les écrous (12) de la tige (4) sont installés pour qu'on puisse assembler ladite tige (4).

10. Cylindre (1) selon la revendication 9, **caractérisé en ce que** ladite tige (4) comprend des colonnes ergonomiques pour qu'on porte ledit cylindre (1) facilement.

11. Cylindre (1) selon la revendication 10, **caractérisé en ce que** la surface inférieure de la tige (4) est plate afin qu'il puisse être favorable pour l'étiquetage.

12. Cylindre (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend une couverture circulaire (6) compatible avec la forme géométrique de la tige (4) en couleur dans une manière différente du reste du design afin d'assurer les distinctions géographiques, régionaux, et techniques, et cachant lesdites cavités (11) sur ladite tige (4) et portant les renseignements tels que les caractéristiques de LPG/GPL, station essence, avertissements de sécurité, etc.

13. Cylindre (1) selon la revendication (12), **caractérisé en ce qu'**il comprend plusieurs ongles (10) sous la couverture, de préférence, quatre pièces d'ongles pour permettre la fixation de ladite couverture (6) à ladite tige (4).

14. Cylindre (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il assure la stabilité de sa base (5) sur place et l'empilage les unes sur les autres et qu'il comprend un diamètre central se réduisant vers le bas.

15. Cylindre (1) selon la revendication 14, **caractérisé en ce que** sa base (5) comprend plusieurs canaux (10) et dans lesquels sont placés les pièces intérieures en nombre suffisant pour assurer la puissance nécessaire, et les saillies échelonnées étant installées à l'intérieur desdits canaux.

16. Cylindre (1) selon la revendication 15, **caractérisé en ce que** sa base (5) comprend les cavités (11) dans lesquelles on peut placer les écrous (12) sur le corps (2) dudit cylindre (1) pendant le montage.

17. Cylindre (1) selon la revendication 16, **caractérisé en ce que** sa base (5) comprend des coupures (8) permettant le drainage des eaux de pluie et d'autres liquides et afin d'assurer l'usage optimal des matériaux.

18. Cylindre (1) selon la revendication 17, **caractérisé en ce qu'**il comprend une surface plate dans une manière favorable pour le marquage de sa base (5) conformément aux standards et règlements nécessaires pour la fabrication de cylindres (1).

19. Cylindre (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les pièces intérieures (3), la tige (4), la base (5), et la couverture (6) sont produits des polymères tels que PBT, ABS, PE, POM, et PC, c'est-à-dire du matériau rigide, ou de l'éthylène - propylène - diène - terpolymère contenant co-polymère polypropylène.

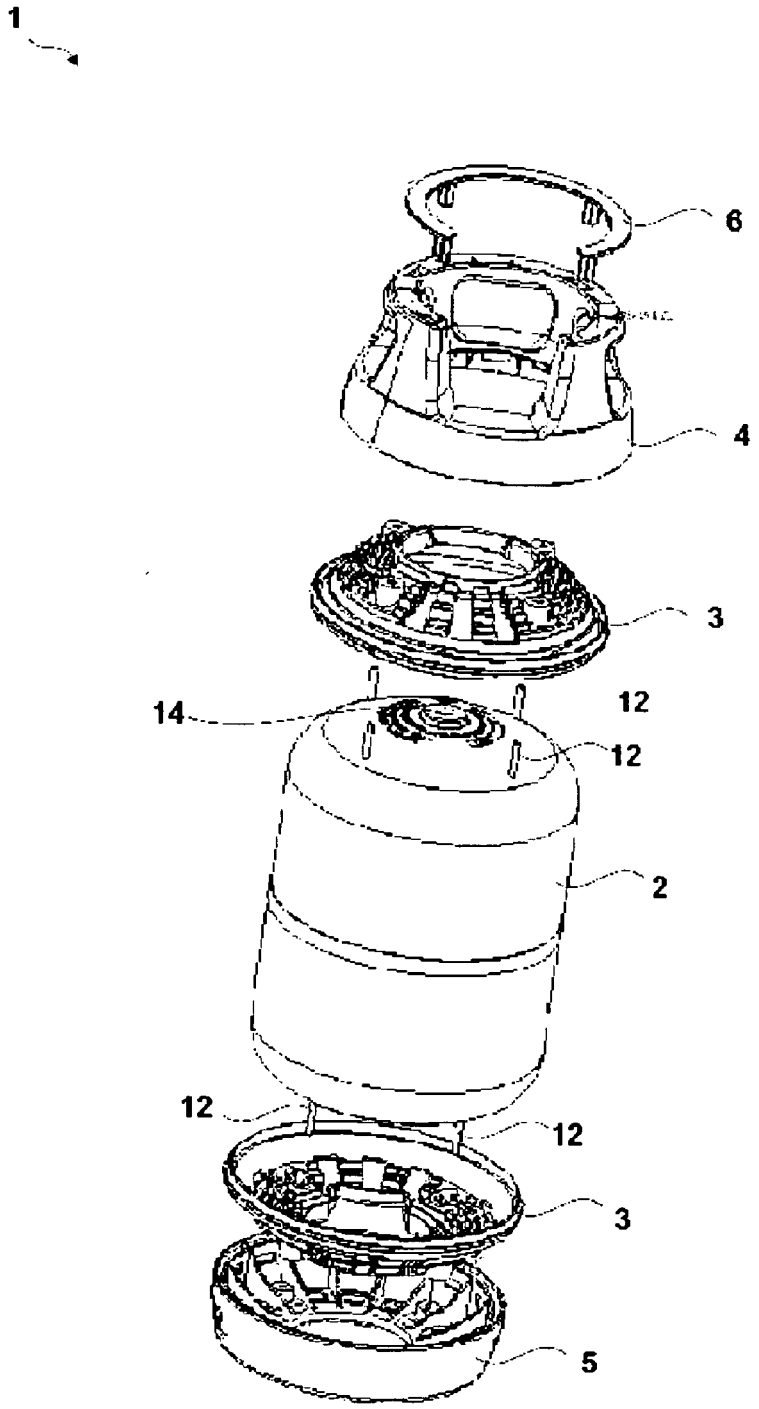


Fig. 1

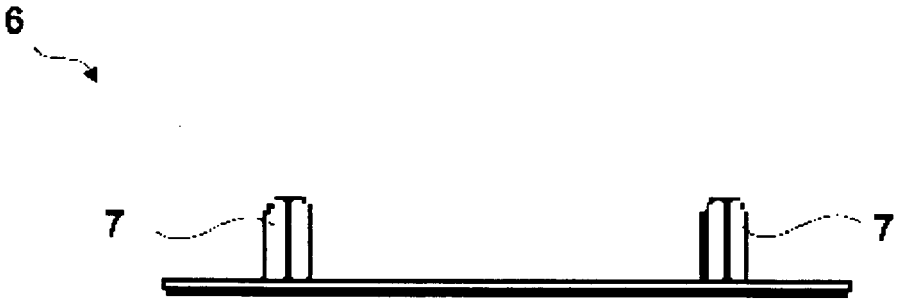


Fig. 2

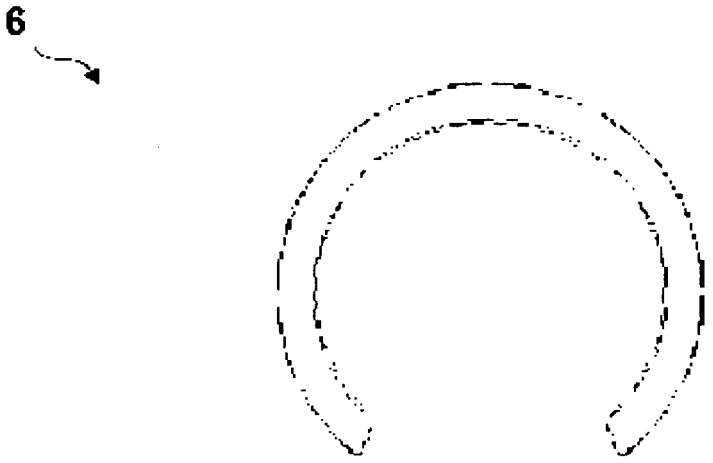


Fig. 3

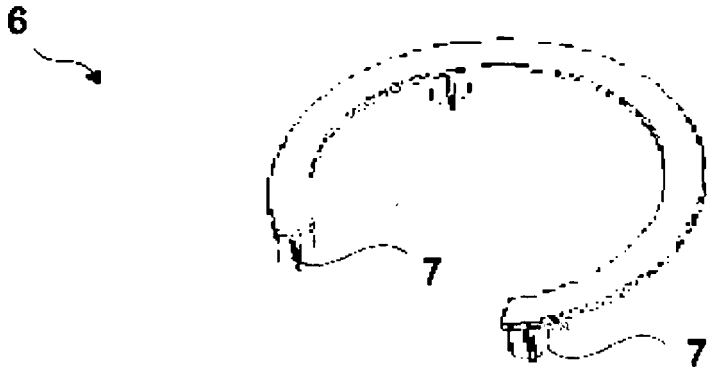


Fig. 4

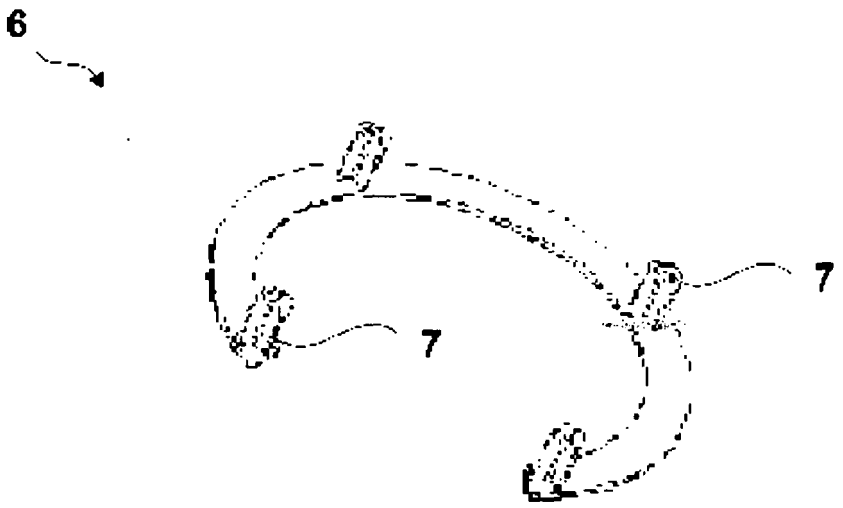


Fig. 5

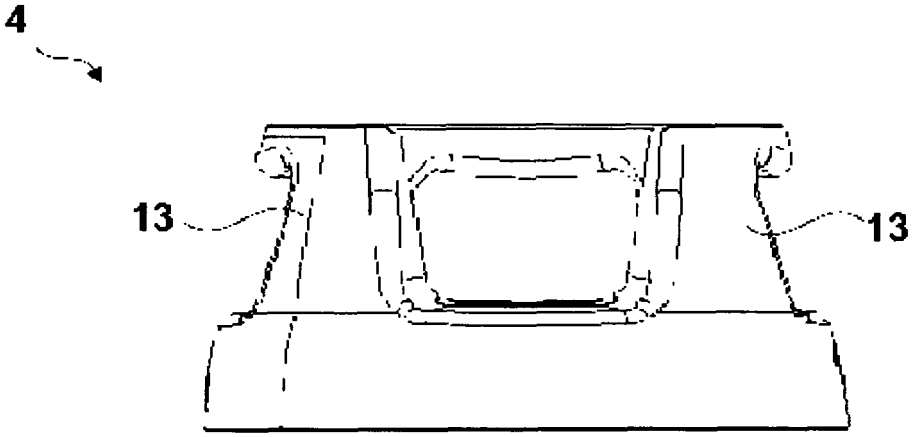


Fig. 6

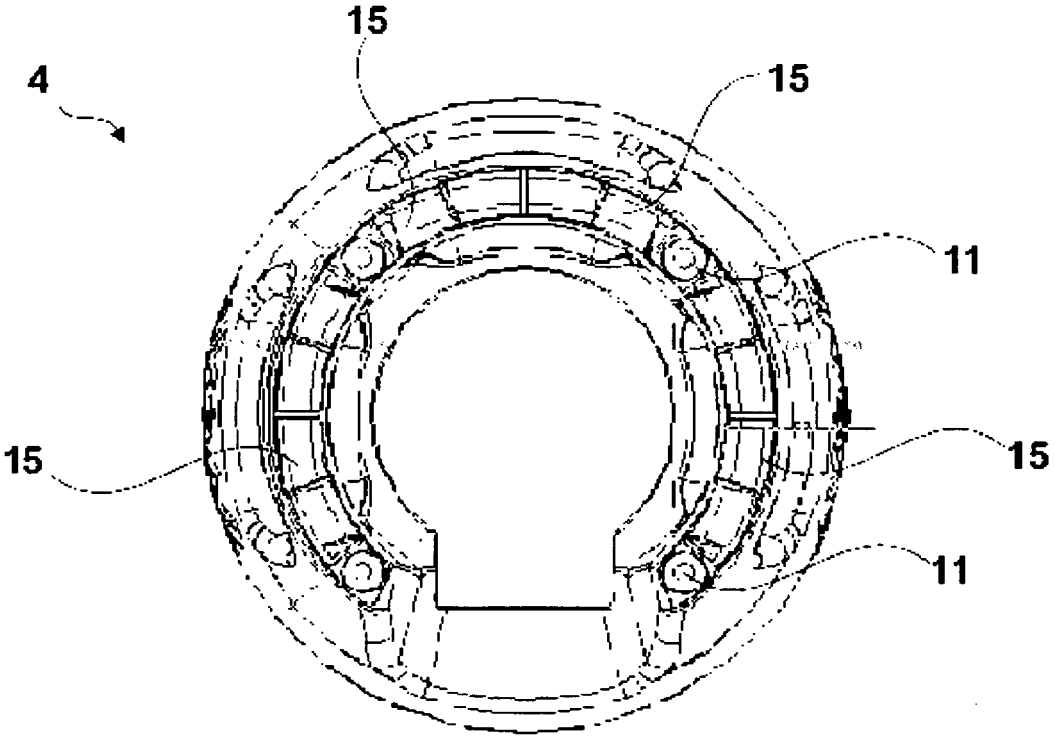


Fig. 7

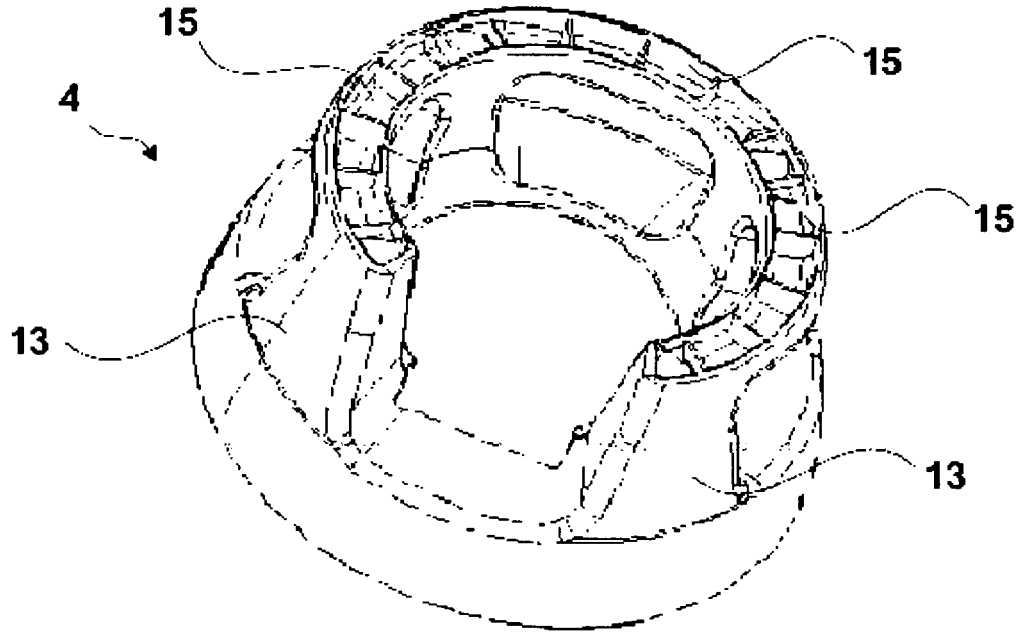


Fig. 8

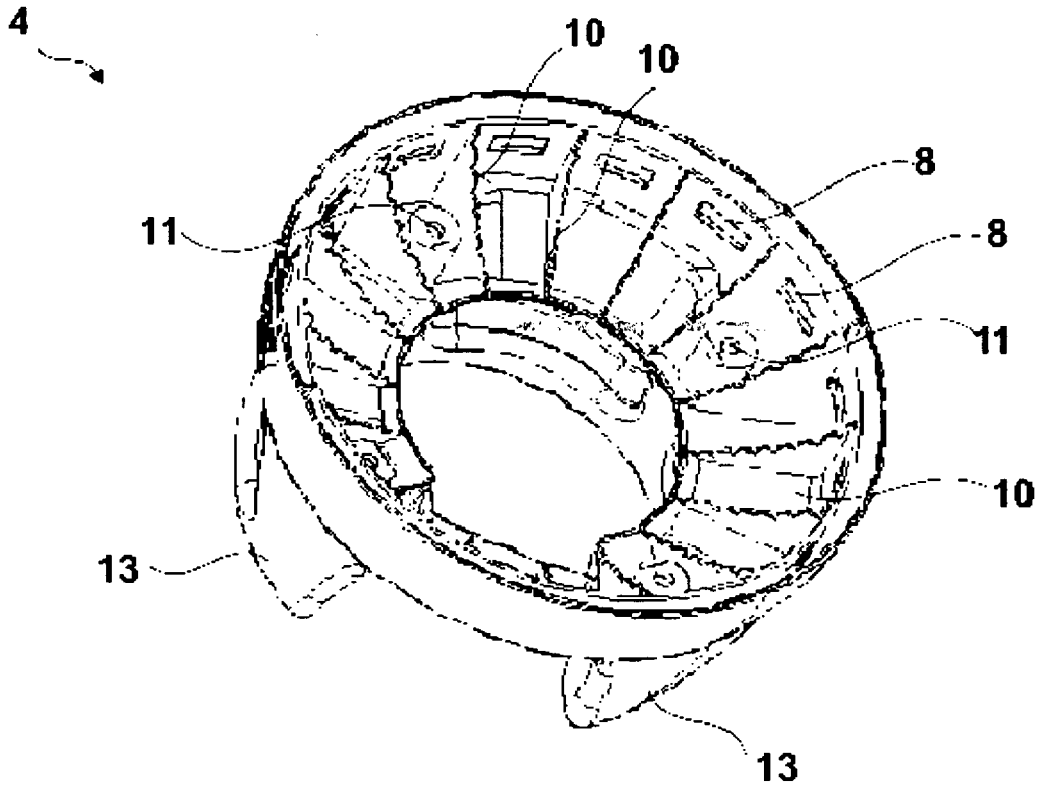


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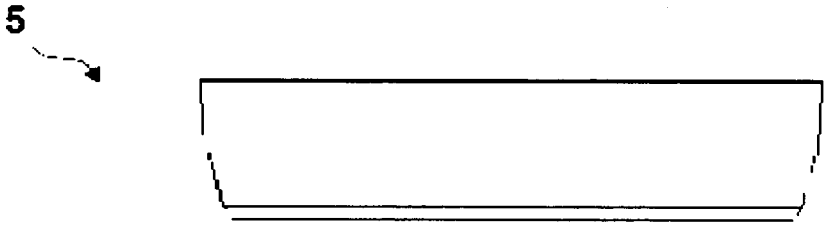


Fig. 10

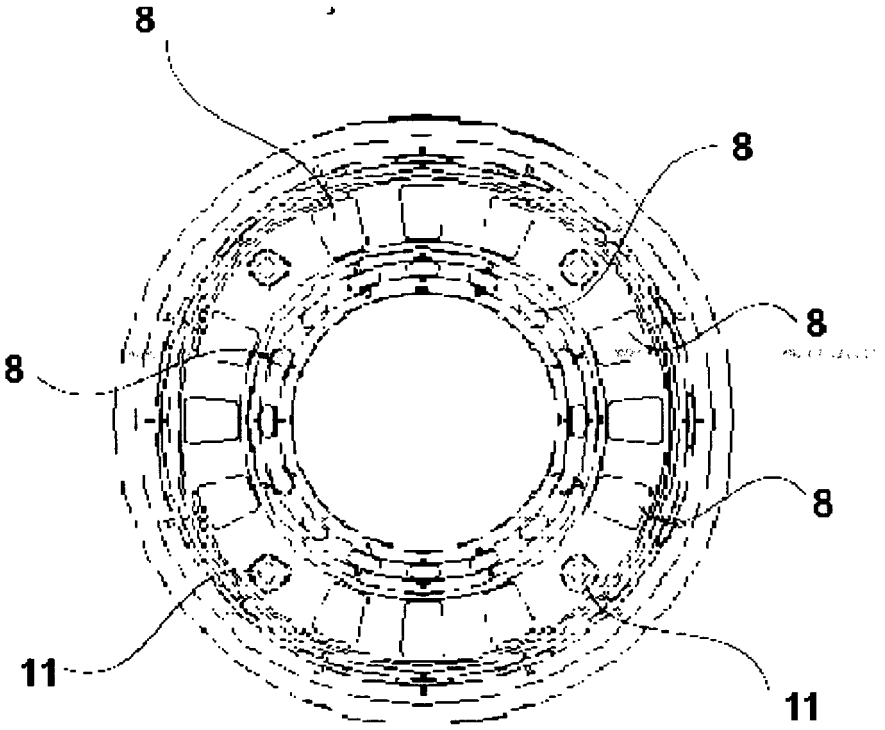


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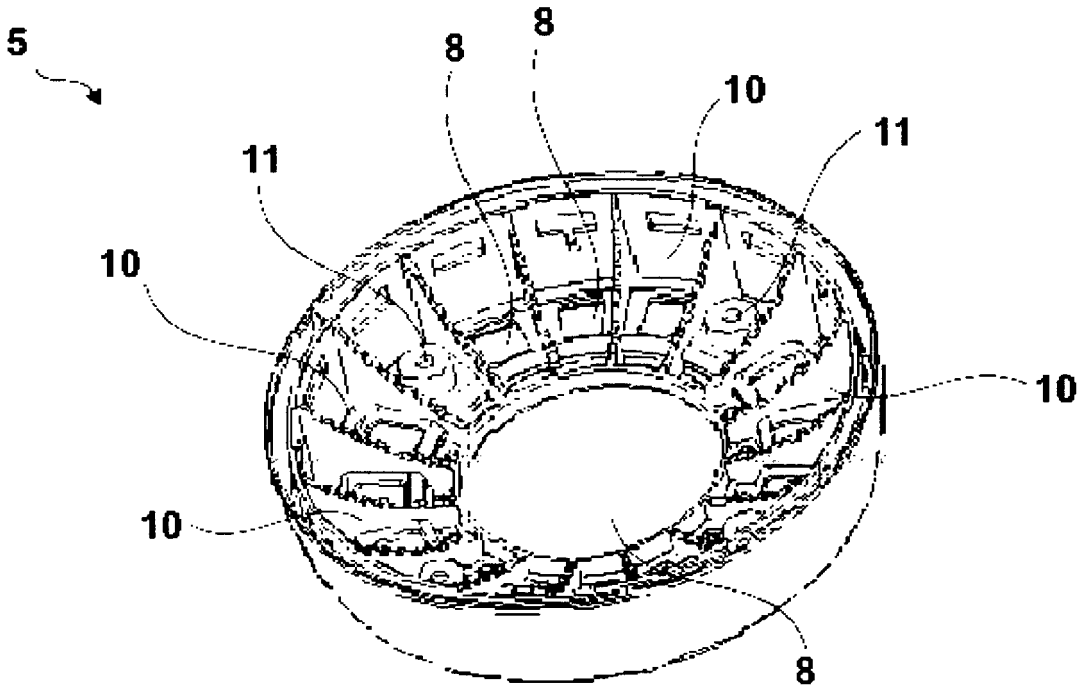


Fig. 12

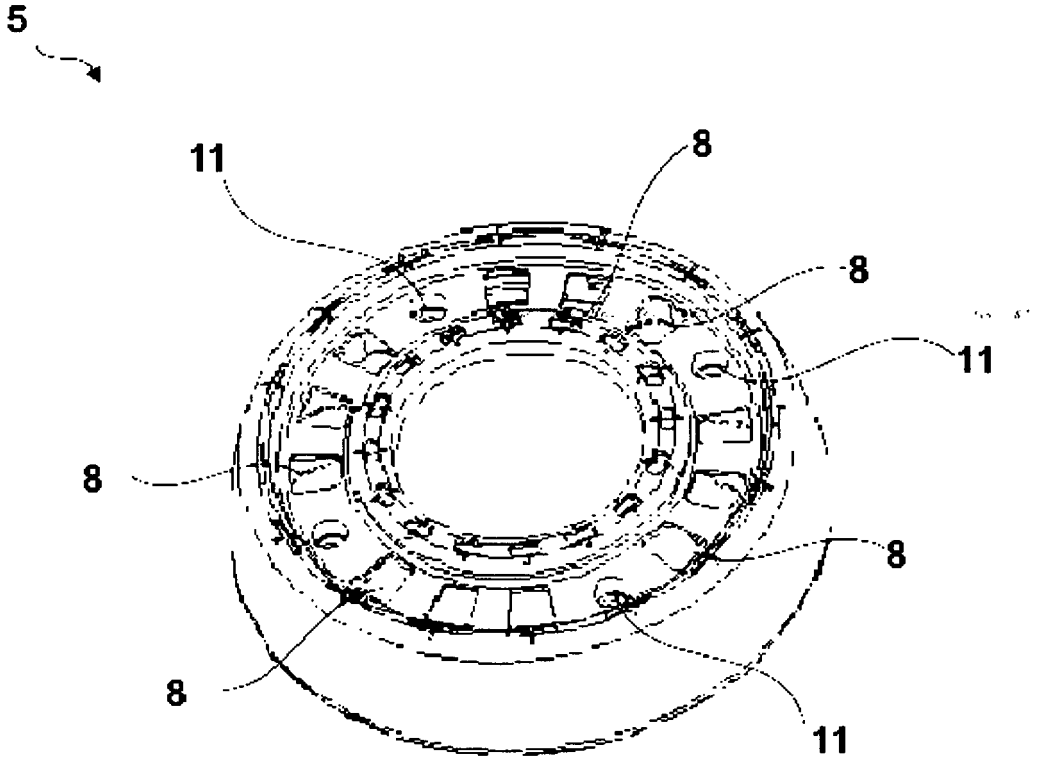


Fig. 13

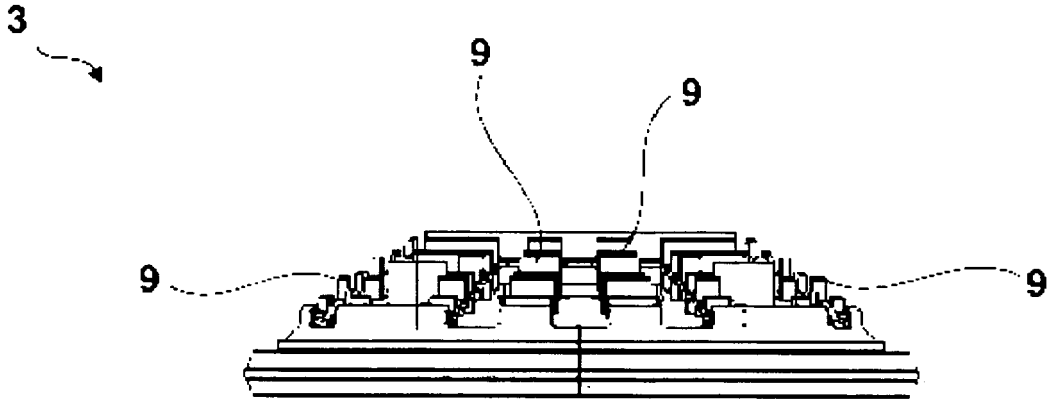


Fig. 14

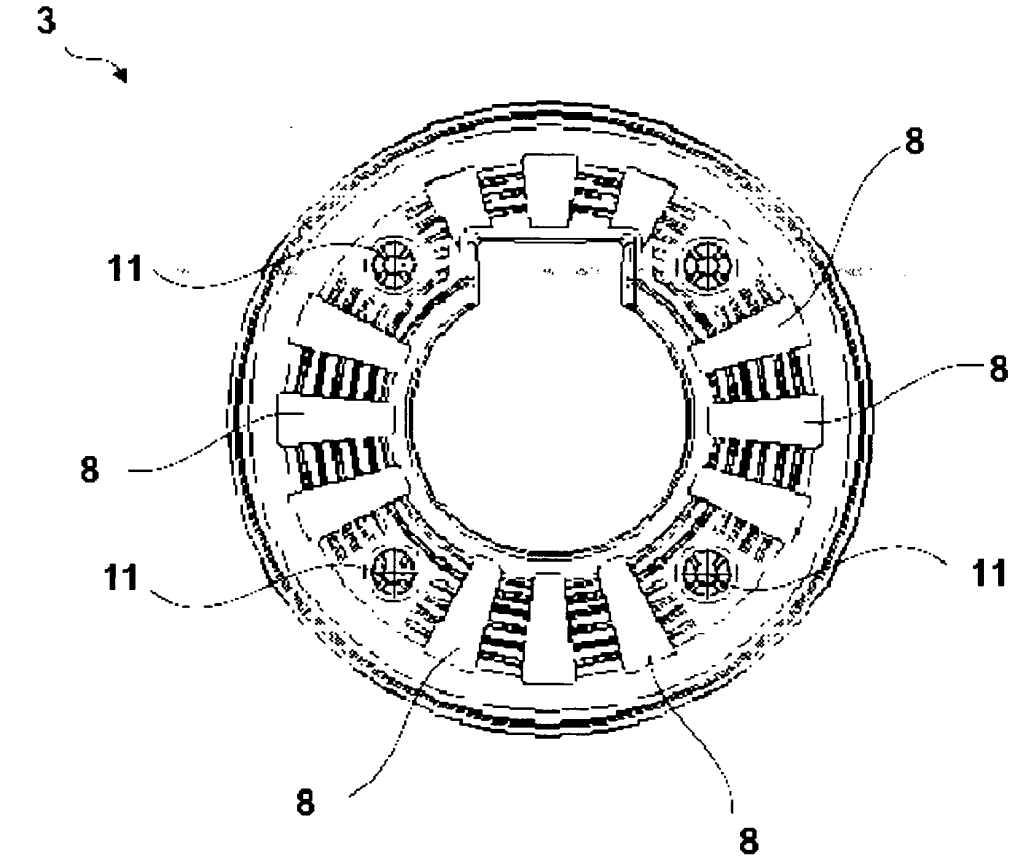


Fig. 15

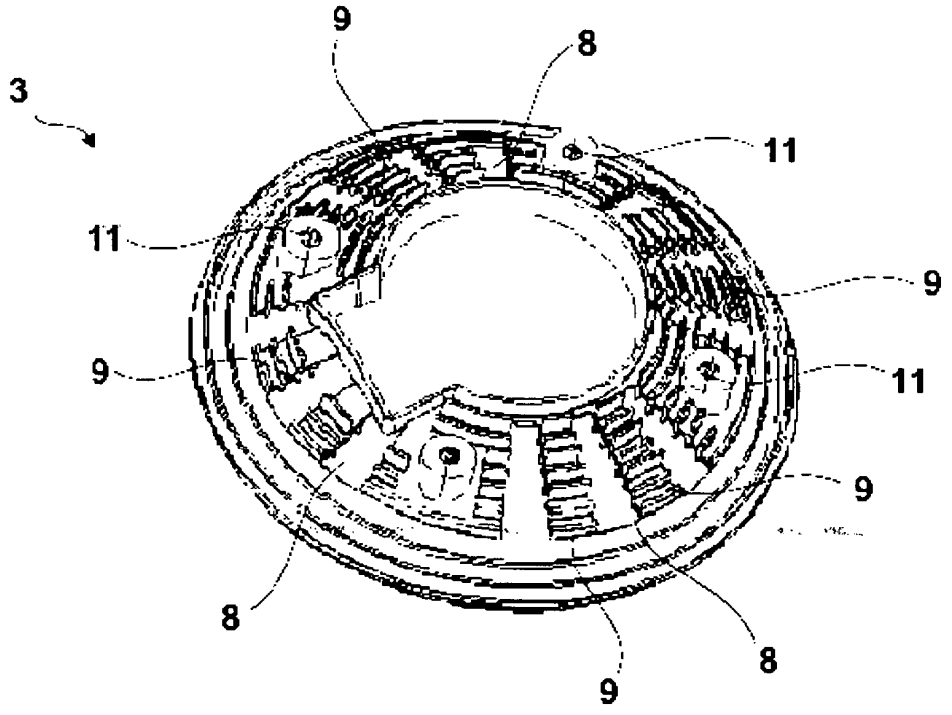


Fig. 16

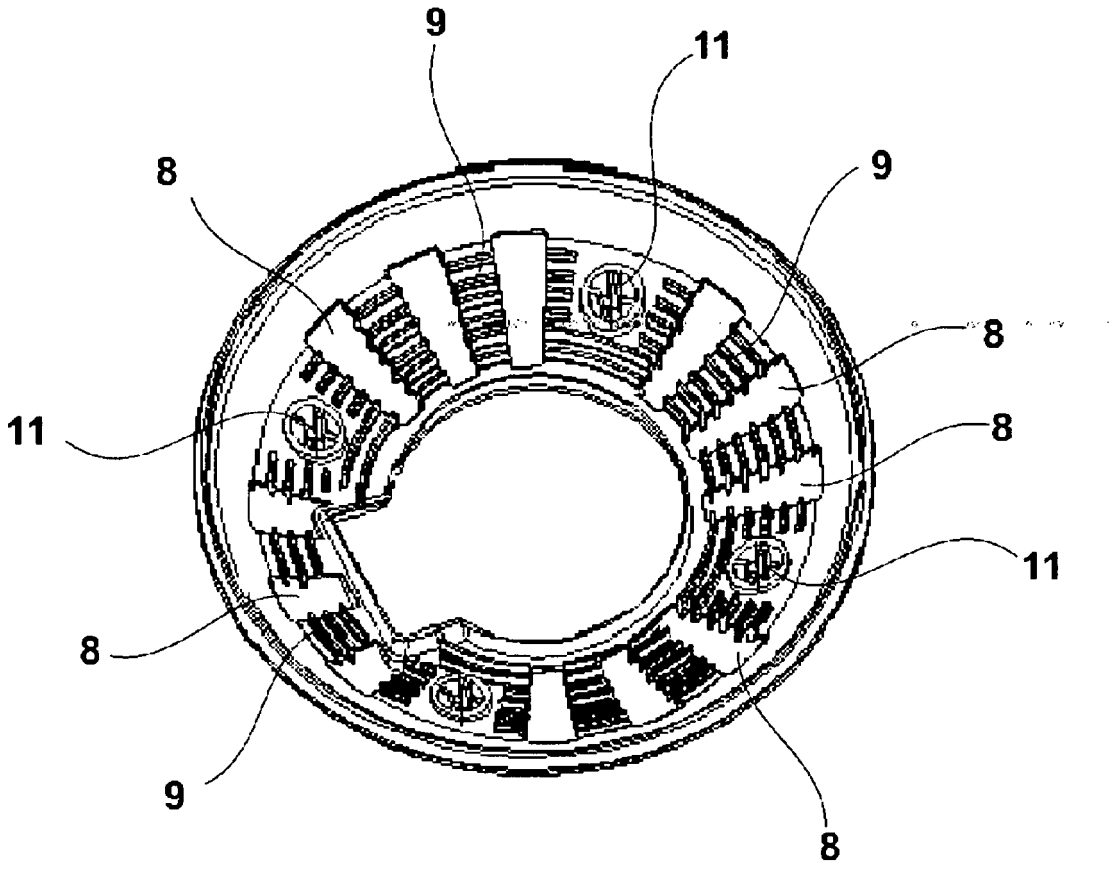


Fig. 17

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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