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(54) **SAFETY DEVICE FOR BELTS**

(57) It comprises at least two bases, one bottom (1) and one removable top (2) that defines a housing (30) inside it, a rod (3) integral with bottom base (1) that is fixed to top base (2), a key (31) with first magnetic means (32) that is provided on top base (2) and in that it comprises: a groove (5) around rod (3), which when rod (3) attaches to top base (2), leaves said groove (5) inside top base (2), in housing (30), some locking means, with two metallic, opposite strips (8, 9), in housing (30), which in the locked position fit inside groove (5).

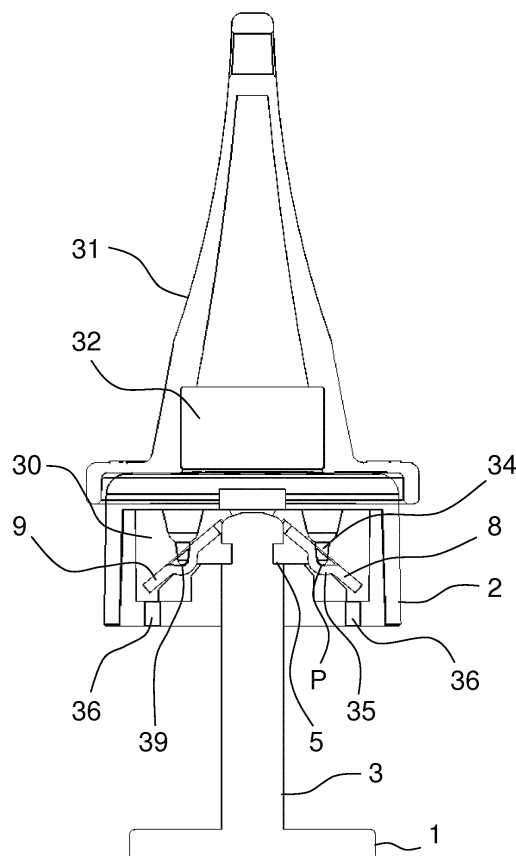


FIG. 2

Description

[0001] Safety device for belts, of the type comprising at least two bases, a bottom one and a top removable one that defines a housing inside it, a rod integral to the bottom base which attaches to the top base, a key with first magnetic means that is provided on the top base and in that it comprises: a groove around the rod, which when the rod is attached to the top base remains inside the top base, in the housing, some locking means, with two opposite metallic strips, in the housing, which in the locked position fit inside the groove, characterised in that it comprises: some second magnetic means inside the housing, provided under the strips with a lesser attraction force than the first magnetic means of the key, and some retaining means that retain the strips, located above said strips and which come into contact with said strips at point P, where in the locked position said strips due to the action of the second magnetic means fit inside the groove preventing the release of the rod from inside the housing and where in the unlocked position, the first magnetic means overcome the attraction of the second magnetic means on the strips attracting the strips that swing on point P, with said strips releasing themselves from inside the groove and also releasing the rod from the top base.

BACKGROUND OF THE INVENTION

[0002] Various patents and designs are known in the state of the art that protect safety devices for belts.

[0003] Thus, Utility Model No. 201230982 (ES1077804) "SAFETY CATCH FOR PATIENT SUPPORT BELTS WITH COIN-OPERATED OPENING", from the year 2012, in the name of UBIOTEX ESPAÑA, S.L., which relates to a safety catch for patient support belts with coin-operated opening characterised in that it consists of a cylindrical rod with a circular base where the axis has a longitudinal groove and another circular periphery groove near its flat end and a pivot in the shape of a cylindrical ring with a side groove and a central circular hole for attaching the rod. Inside this ring has a V-shaped spring or hook held by two pins one in the apex of the V and another surrounded by one of its ends while the other end is free.

[0004] Also the so-called button catches are known, like Spanish Industrial Model No. 136873, from the year 1996, in the name of the same applicant company, which consists of a body and a cover and adopts an octagonal prism shape with rounded edges, with a low height with respect to its maximum scale, and which on one of its bases has a slight circular groove that covers practically the whole surface and on the other base has a circular hole with a small diameter, centred with respect to the octagonal surface. The cover is released from the body using a magnetised key.

[0005] Said button catches are already described but not claimed in Spanish Utility Model N. 0234178 "DE-

VICE FOR SUPPORTING A HUMAN BODY IN A PRE-DETERMINED POSITION ON A BED", from the year 1978, in the name of SEGUFIX-SYSTEM BANDAGEN-UND FIXIERGURTE GMBH & CO, at present public knowledge, where the button catches appear under reference number 13, described as "clips".

[0006] The button catches in general consist of a lower base integral with a rod, with the rod being inserted into the top base and being released by means of a key that comprises a magnet, as illustrated in the above-mentioned Industrial Model.

[0007] Along these lines we know European Patent EP2463459 "BUTTON CATCH AND MAGNETIC KEY FOR A MAGNETIC LOCK", in the name of Wysozki, Roman et al., from the year 2010 that relates to a button catch for a magnetic lock that has to be opened with a magnetic key with: at least one first magnet that is housed in the rotary button catch around a rotation axis, and at least one interlocking element that is coupled at least to a first magnet so that by turning at least one first magnet around the rotation axis it can move from a locked position to an open position; characterised in that the button catch has first guiding means that are made so that, when a magnetic key that has second guiding means adapted to the bottom catch approaches the button catch along the rotation axis to a final position, they guide the magnetic key and the button catch to a predetermined rotary position with respect to the rotation axis and between them.

[0008] Said patent EP2463459 mentions another patent by one of the applicants, EP1355550 that relates to a button catch on which a magnet is housed in a rotary manner around a rotation axis. The magnet is coupled by a rotary disc that has drag stops with some interlocking elements. Each interlocking element is tensed previously by a spring in an interlocking position. By turning the magnet around the rotation axis, the interlocking elements move to an open position. To open this known button catch, a magnetic key is provided in the button catch. The magnetic key contains various magnets, which generate a magnetic field with an intensity that varies in a circle around a longitudinal axis of the magnetic key. Thanks to this by turning the magnetic key it is possible to exert a torque on the magnet provided in the button catch to rotate it and move the interlocking elements to the open position. Magnetic locks of this type offer a great level of safety by preventing unauthorised opening, since the torque necessary for the opening cannot be produced only with conventional magnets and because, generally, neither can the button catch provided in the magnet be turned by hitting or knocking it. However, also since the appropriate magnetic key is used, it is more difficult to open than in the case of the simpler magnetic locks explained above, because the magnetic key must turn selectively with respect to the button catch. In order to be able to carry out this movement with one hand, in the known magnetic lock a safety element is provided that prevents turning the button catch in the rod of the

socket, as well as preventing turning the socket with respect to the belt, which in turn requires a relatively complex structure.

[0009] Finally, it is worth mentioning Patent US5600977 "MAGNETIC LOCKING DEVICE", in the name of PINEL MEDICAL INC, from the year 1995, which relates to a locking device that has a non-magnetic pin and a button, the non-magnetic pin has a base and a rod projecting in the perpendicular direction therefrom, which extends to a free end, with a toothed part near the free end.

[0010] The button is a closed, non-magnetic unit, that has a hole in the lower surface adapted to receive the free end of the rod, and it also comprises a plurality of locking plates each one supported on an outer part by a compressible support material, and adapted to retain the pin in the toothed part in a locked position inside the button, and to rotate upwards and release the pin in response to a magnetic force directed at the top surface of the button. The magnetic force can be applied by a magnet provided inside a key adapted to fit on the button.

BRIEF DESCRIPTION OF THE INVENTION

[0011] This invention is an improvement in the sector of safety devices for medical belts, also known in the sector as buttons catches.

[0012] The closest document is Patent US5600977. Said document comments on the problems of the risk of interferences by the magnets with other equipment. Therefore it configures a key with some magnets which when coupled to the button is configured to reduce the distances between the key magnet and the button, this way it can reduce the magnetic capacity of the actual magnet and prevent the risk of interferences.

[0013] Therefore, said patent uses two half-moon strips, which displace and move by the action of the key magnet, therefore allowing the rod to leave the head of the button. To facilitate the strips returning to their initial position, a material is used that can be compressed, preferably foam, which is located under the strips, this way, when the rod is released, the strips compress said foam, and when the attraction by the magnet ends, the foam, which decompresses, forces the strips to position themselves again in the operational position.

[0014] And it is in this return means where the problem lies. The main thing is that it cannot get wet or be immersed, because the foam deteriorates to the point that it becomes useless.

[0015] Also, if the foam is full of liquid it will not work in the same way, it will not allow itself to be compressed, and so these devices cannot be used when the patient bathes, and neither can they be used if they have been stained by any kind of body fluids.

[0016] Another problem is positioning the strips, because, due to the action of the magnet and the foam they move to the point that they stop working properly, because when the foam decompresses, it pushes the strips

randomly.

[0017] This way, the inventor proposes a new invention which solves the problems of the closest document.

[0018] So, first of all, the foam return means of the closest patent are eliminated. This means that this device can get wet, it can be used immersed in water with the patient, and the patient can be bathed with detergent, etc., as there is no foam to deteriorate.

[0019] Also, the strips never lose their position, they are always well placed, because the retaining means act on them and prevent them from moving.

[0020] Another advantage of this invention is that with this arrangement the strips, in the locked position, are at rest, which is the position they are going to be in usually, going into the rest position automatically when the key is removed from the top base.

[0021] Also, is ensured that the strips return to the initial rest position, and therefore reduce the possible malfunctioning of the device.

[0022] An object of this invention is a safety device for belts, of the type comprising at least two bases, a lower one and a top removable one that defines a housing inside it, a rod integral to the lower base which attaches to the top base, a key with first magnetic means provided on the top base and in that it comprises: a groove around the rod, which when the rod is attached to the top base, remains inside the top base, in the housing, some locking means, with two opposite metallic strips, in the housing, which in the locked position fit inside the groove, characterised in that it comprises: some second magnetic means inside the housing, provided under the strips with a lesser attraction force than the first magnetic means of the key, and some retaining means that retain the strips, located above said strips and which come into contact with said strips at point P, where in the locked position said strips, due to the action of the second magnetic means fit inside the groove preventing the release of the rod inside the housing and where in the unlocked position, the first magnetic means overcome the attraction of the second magnetic means on the strips attracting the strips swinging at point P, with said strips releasing themselves from inside the groove and also releasing the rod from the top base.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] In order to facilitate the explanation this specification is accompanied by six sheets of drawings showing a practical embodiment, which is mentioned as a non-limiting example of the scope of this invention:

- Figure 1 is an elevation view of the object of this invention with a key applied,
- Figure 2 is a cross-section of Figure 1 in the unlocked configuration,
- Figure 3 is a plan view of the top base of Figure 1 without the cover that covers it in the unlocked configuration,

- Figure 4 is a cross-section of Figure 1 in the locked configuration and without the key,
- Figure 5 is a plan view of the top base of Figure 1 without the cover that covers it in the locked configuration, and
- Figure 6 is a bottom perspective view, of an embodiment with a milled rod.

SPECIFIC EMBODIMENT OF THIS INVENTION

[0024] This way, Figure 1 shows a bottom base 1 with its rod 3, a top base 2 and a key 31.

[0025] Figure 2 illustrates bottom base 1 with its rod 3 and a groove 5, a top base 2 with a housing 30 inside which some strips 8, 9 are provided comprising notches 39 and projections 35, some retaining means 34, some perforations 36, key 31 with some first magnetic means 32.

[0026] Figure 3 shows top base 2, rod 3, housing 30, strips 8, 9 with their notches 39, some second magnetic means 33 and some separating means 40.

[0027] Figure 4 illustrates bottom base 1 with its rod 3 and groove 5, top base 2 with housing 30 inside which strips 8, 9 are arranged comprising notches 39 and projections 35, retaining means 34, and perforations 36.

[0028] Figure 5 shows top base 2, rod 3, housing 30, strips 8, 9 with their notches 39, second magnetic means 33 and separating means 40.

[0029] Lastly, Figure 6 shows bottom base 1, rod 3 with its milled part 37, and top base 2 with the opening 38.

[0030] For the sake of clarity, top base 2 has been given a numeral reference to point out that it forms a unit. In terms of construction, it can be made up of two structures (top housing and bottom housing) which can be seen in some figures and which when joined define the housing 30. As this is known, and in order to facilitate reading, the whole ensemble has been called top base 2.

[0031] So, in a particular embodiment, the device that is the object of this invention would function in the following way.

[0032] Initially, in the locked position (Figs. 4 and 5), strips 8 and 9 are fitted into groove 5 of rod 3. This way, if it were attempted to separate top base 2 from the bottom 1, it would not be possible, since strips 8 and 9, which are locking rod 3, would not release rod 3, as said strips 8, 9 are also locked by the second magnetic means 33 (for example magnets).

[0033] The locking means that are two metallic, opposite strips (8, 9), are located inside housing 30.

[0034] It also has second magnetic means 33 inside housing 30, provided under strips 8, 9 with a lesser attraction force than the first magnetic means 32 of key 31.

[0035] This characteristic of magnetic means 32 is very important as this way it is possible for first magnetic means 32 to overcome the attraction towards strips 8, 9 by second magnetic means 33.

[0036] Retaining means 34 that retain strips 8, 9 (Fig. 2 and 4), are provided above said strips 8, 9 and come

into contact with said strips 8, 9 at point P.

[0037] So, in the locked position said strips 8, 9, due to the action of second magnetic means 33, fit inside groove 5 preventing the release of rod 3 from inside housing 30, as indicated above.

[0038] On the other hand, in the unlocked position, first magnetic means 32 provided in key 31, overcome the attraction of second magnetic means 33 on strips 8, 9, attracting towards said first magnetic means 32 strips 8, 9 that swing at point P, releasing said strips 8, 9 from inside groove 5 and also releasing rod 3 from top base 2.

[0039] At this point, retaining means 34 fulfil the function of allowing a part of strips 8, 9, the part that is inside groove 5, to rise, but on the other hand, the retaining means prevent the whole strip 8, 9 from being attracted, by influencing on point P, with strips 8, 9 therefore swinging as shown in Figure 3.

[0040] To facilitate the movements indicated in the paragraph above, strips 8, 9 optionally comprise a projection 35 on which strips 8, 9 swing in the locking-unlocking movements, which facilitate the swinging movement, with respect to the base on which strips 8, 9 rest.

[0041] Furthermore, also optionally, strips 8, 9 comprise respective notches 39 on their top surface for housing one part of retaining means 34, with said point P being located in the inside thereof. This way, strips 8, 9 will stay in their position more reliably, with the exception of the swinging movement.

[0042] The inventor has ascertained that if second magnetic means 33 are provided between both strips 8, 9, optimum results are achieved.

[0043] Said retaining means 34 could be made in the same material used for top base 2.

[0044] Said top base 2 could be made in a resistant material. There is a wide range of resistant materials and, merely as a non-limiting example, some kind of metal, hardened plastic, etc. could be used.

[0045] As indicated above, one of the problems that is overcome with this invention is the fact that as the foam does not exist, there is no problem of water possibly entering housing 30.

[0046] Also, this implies the advantage of allowing the patient to be immersed in water, or even cleaning the device with cleaning products, as they do not affect the magnetic properties of the device of this invention. This means that the device will not damage, and that it is very reliable with a longer working life.

[0047] Also it has been envisaged, optionally, in top base 2 to make holes 36 that connect housing 30 with the outside. Initially, as shown in Figures 2 and 4, said perforations 36 would be provided in the bottom of top base 2, to facilitate the complete drainage of housing 30.

[0048] This way, these devices are adapted to be used even underwater, as the magnetic or magnetic means are not affected and any liquid is removed via said perforations 36.

[0049] To increase reliability even further, the inventor has envisaged that optionally rod 3 comprises at least

one milled part 37, at least on the part inserted into top base 2. Said top base 2 comprises an opening 38 with a perimeter which is the one that the milled part 37 of rod 3 defines. This way rotation of rod 3 with respect to top base 2 is avoided.

[0050] Strips 8, 9 adopt a half-moon configuration, in this embodiment, since the shape of top base 2 is cylindrical.

[0051] It has also been envisaged to place some separating means 40 for strips 8, 9 between them, this increases the reliability that strips 8, 9 are always going to return to the locked position correctly adjusted. In other words, the centring of strips 8, 9 is improved in the locking and unlocking operations of rod 3, which leads to the advantage that strips 8, 9 are always well placed when returning to the locked position.

[0052] This way, if it were necessary to separate the device, in other words, bottom base 1 from top base 2, it would proceed as follows:

Key 31 would be provided on top base 2, so that first magnetic means 32, for example a magnet, are close enough that their attraction force can move metallic strips 8, 9.

[0053] This way as first magnetic means 32 have a stronger attraction force than second magnetic means 33 they attract strips 8, 9 which, as indicated above, are metallic, and they tilt, coming out of groove 5.

[0054] As explained in greater detail above, strips 8, 9 only tilt, due to the effect on them by retaining means 34, that retain strips 8, 9 at point P and prevent them from moving.

[0055] Once said strips 8, 9 are outside groove 5, rod 3 is free and it can be removed from inside top base 2.

[0056] Then key 31 is removed from top base 2 and strips 8, 9 return to their rest position.

[0057] If it is desired to position a device on a patient to fasten a hospital belt, rod 3 would be inserted through opening 38 (milled as shown in Figure 6 or not milled) and it would be pushed inside until it overcomes the resistance of strips 8, 9.

[0058] Then said strips 8, 9 are repositioned by placing a part of them inside groove 5, obtaining the rest position, and accordingly leaving rod 3 locked inside top housing 2 by strips 8, 9.

[0059] This way, the device is fully locked, preventing the rotation of rod 3, if the patient wanted to rotate it and try to release him/herself.

[0060] This invention describes a new safety device for belts. The examples mentioned herein are non-limiting of the present invention, therefore it can have different applications and/or adaptations, all within the scope of the following claims.

Claims

1. Safety device for belts, of the type comprising at least two bases, a bottom one (1) and a top removable one (2) that defines a housing (30) inside it, a rod (3) integral with bottom base (1) which is attached to top base (2), a key (31) with first magnetic means (32) provided on top base (2) and in that it comprises:

- a groove (5) around rod (3), which when rod (3) is fixed to top base (2), leaves said groove (5) provided inside top base (2), in housing (30),
- locking means, with two metallic, opposite strips (8, 9), in housing (30), which in the locked position fit inside groove (5),

characterized in that it comprises:

- second magnetic means (33) inside housing (30), provided under strips (8, 9) with a lesser attraction force than that of the first magnetic means (32) of key (31), and
- retaining means (34) that retain strips (8, 9) provided above said strips (8, 9) and which come into contact with said strips (8, 9) at point P,

where in the locked position said strips (8, 9), due to the action of second magnetic means (33) fit inside groove (5) preventing the release of rod (3) inside housing (30) and where in the unlocked position, first magnetic means (32) overcome the attraction of second magnetic means (33) on strips (8, 9) attracting strips (8, 9) swinging at point P, releasing said strips (8, 9) from inside groove (5) and releasing also rod (3) from top base (2).

2. Device, according to claim 1, **characterised in that** strips (8, 9) comprise a projection (35) on which strips (8, 9) swing in the locking-unlocking movements.

3. Device, according to claim 1 or 2, **characterised in that** strips (8, 9) comprise respective notches (39) on their top surface for housing a part of retaining means (34).

4. Device, according to claim 1, **characterised in that** second magnetic means (33) are provided between both strips (8, 9).

5. Device, according to claim 1, **characterised in that** top base (2) comprises perforations (36) that connect housing (30) with the outside.

6. Device, according to some of the preceding claims, **characterised in that** rod (3) comprises a milled part (37), at least on the part inserted inside top base (2), and said top base comprises an opening (38) with a perimeter which is the one that the milled part (37)

of rod (3) defines.

7. Device, according to claims 2 and 3, **characterised in that** strips (8, 9) adopt the half-moon configuration.

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8. Device, according to claim 7, **characterised in that** it comprises separating means (40) between strips (8, 9).

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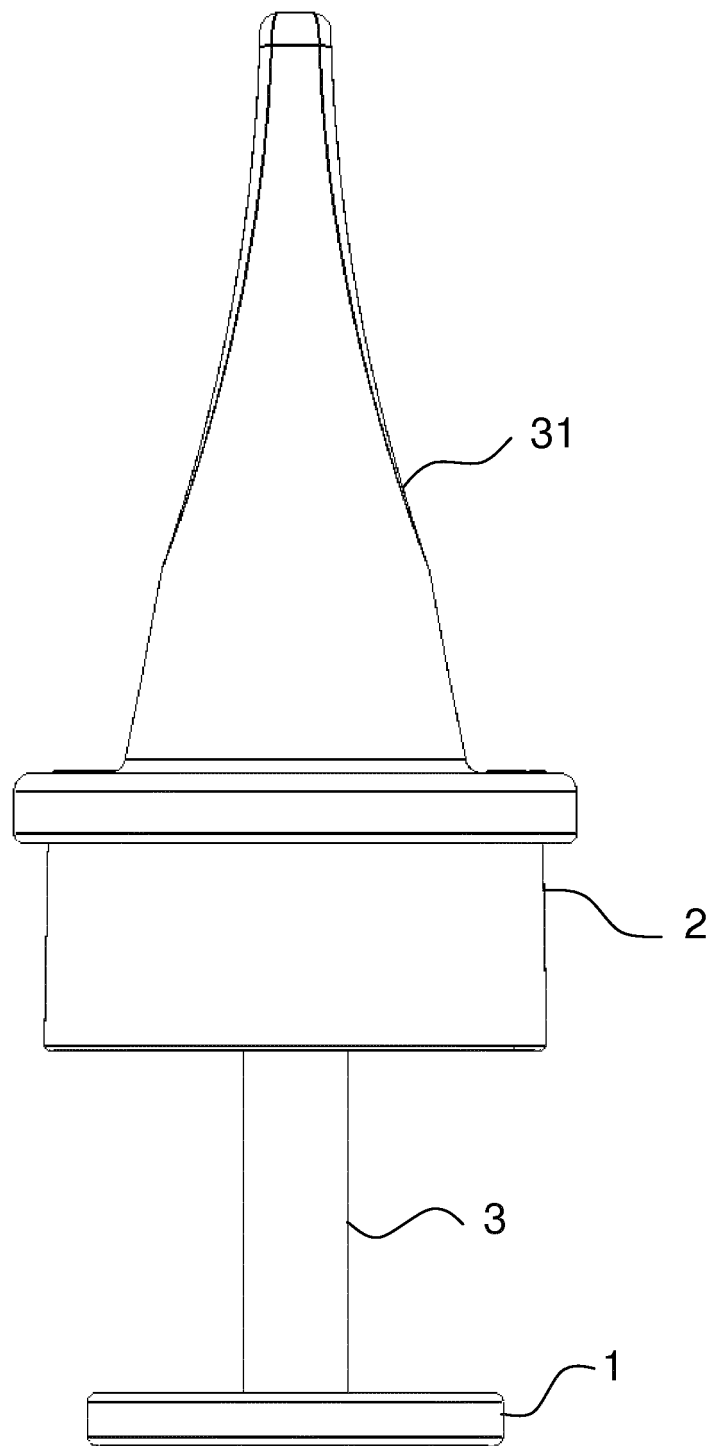


FIG. 1

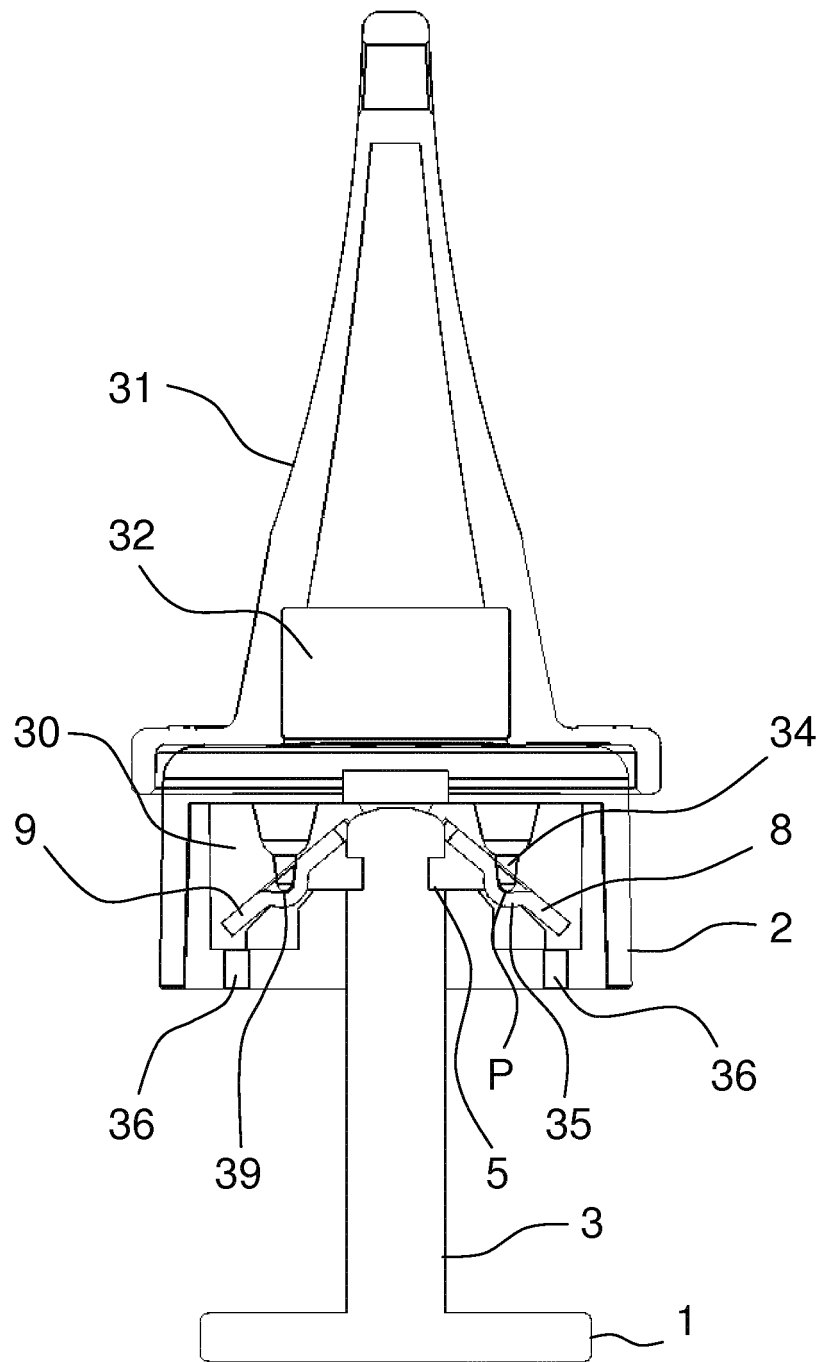


FIG. 2

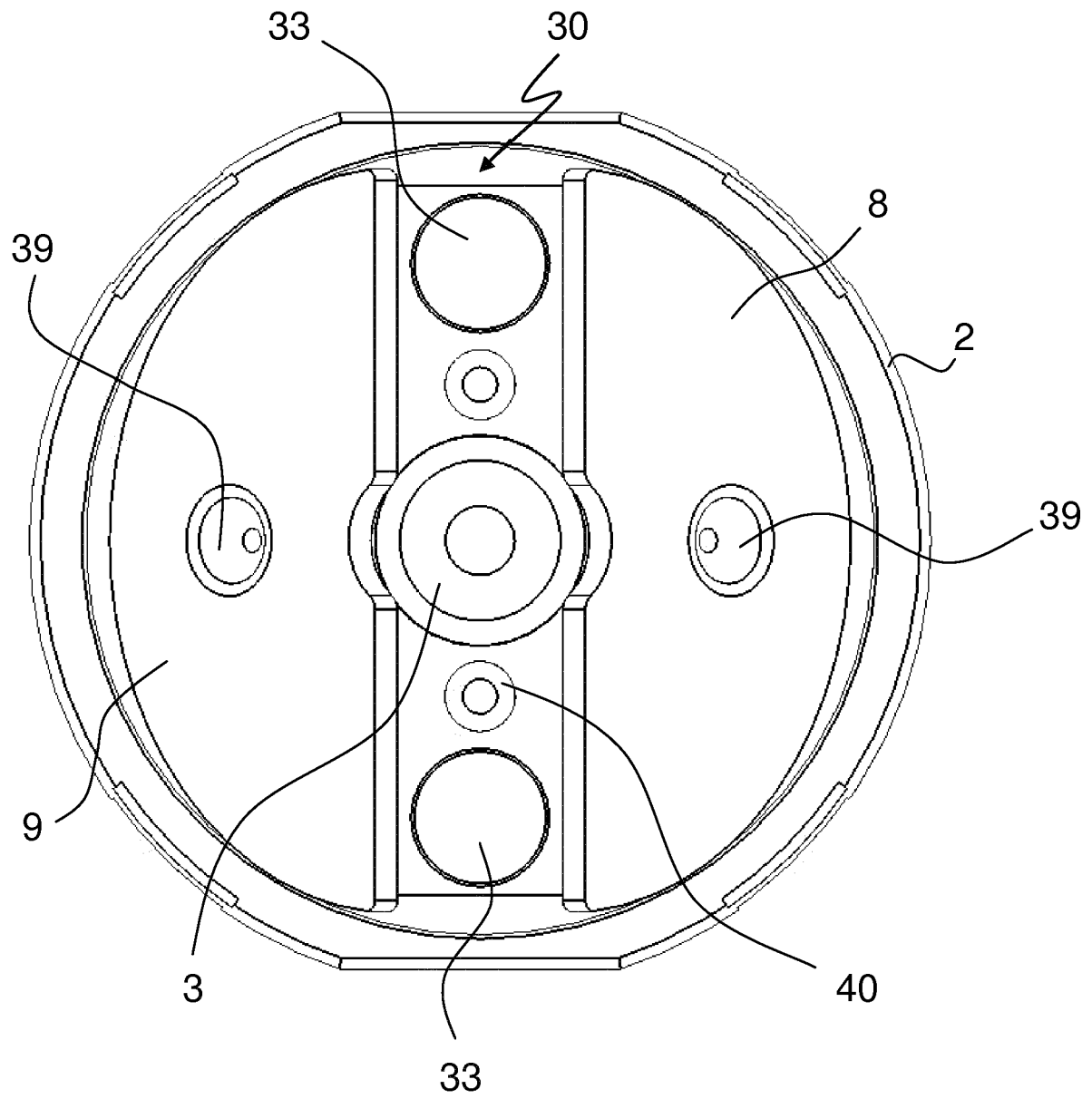


FIG. 3

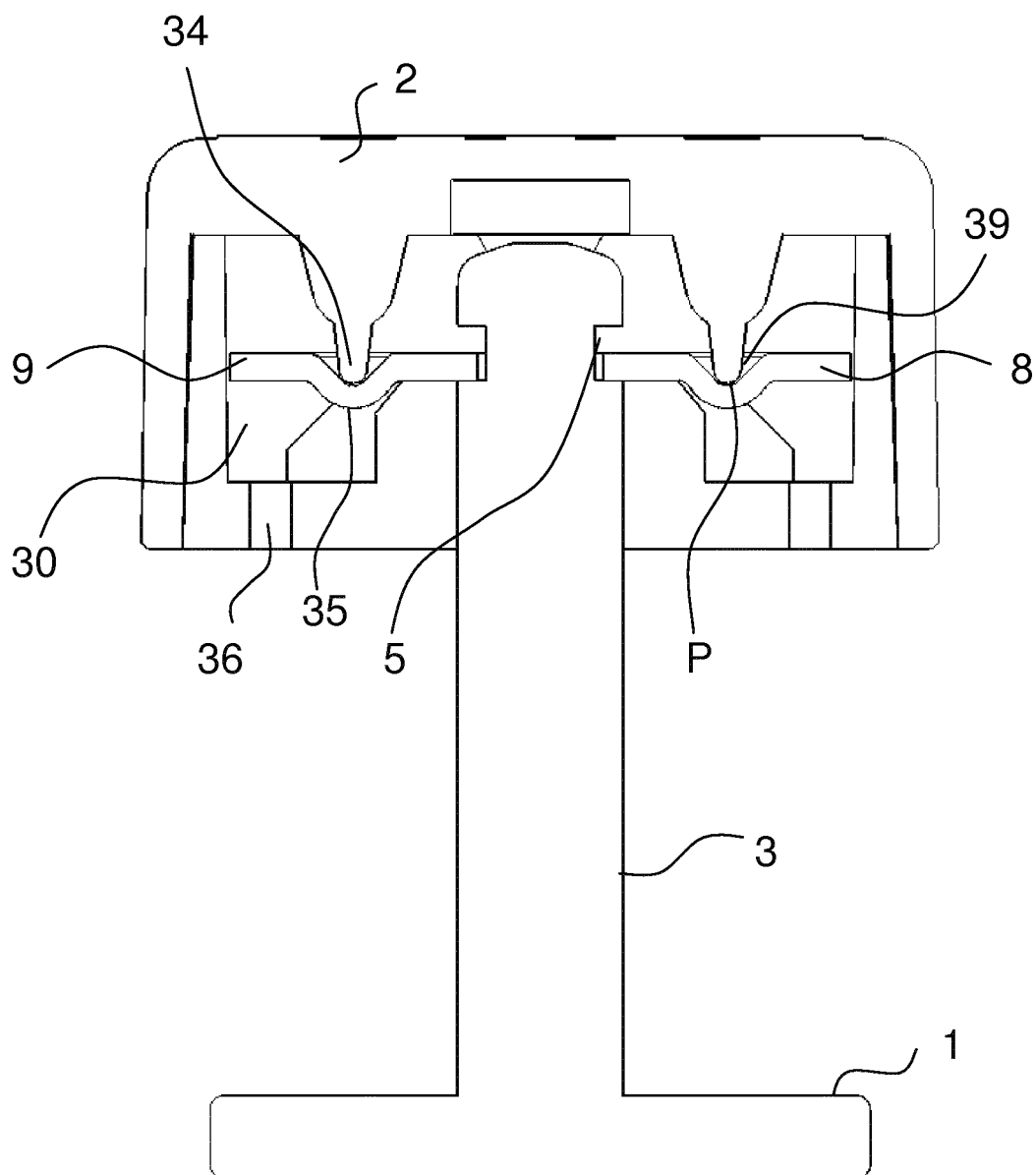


FIG. 4

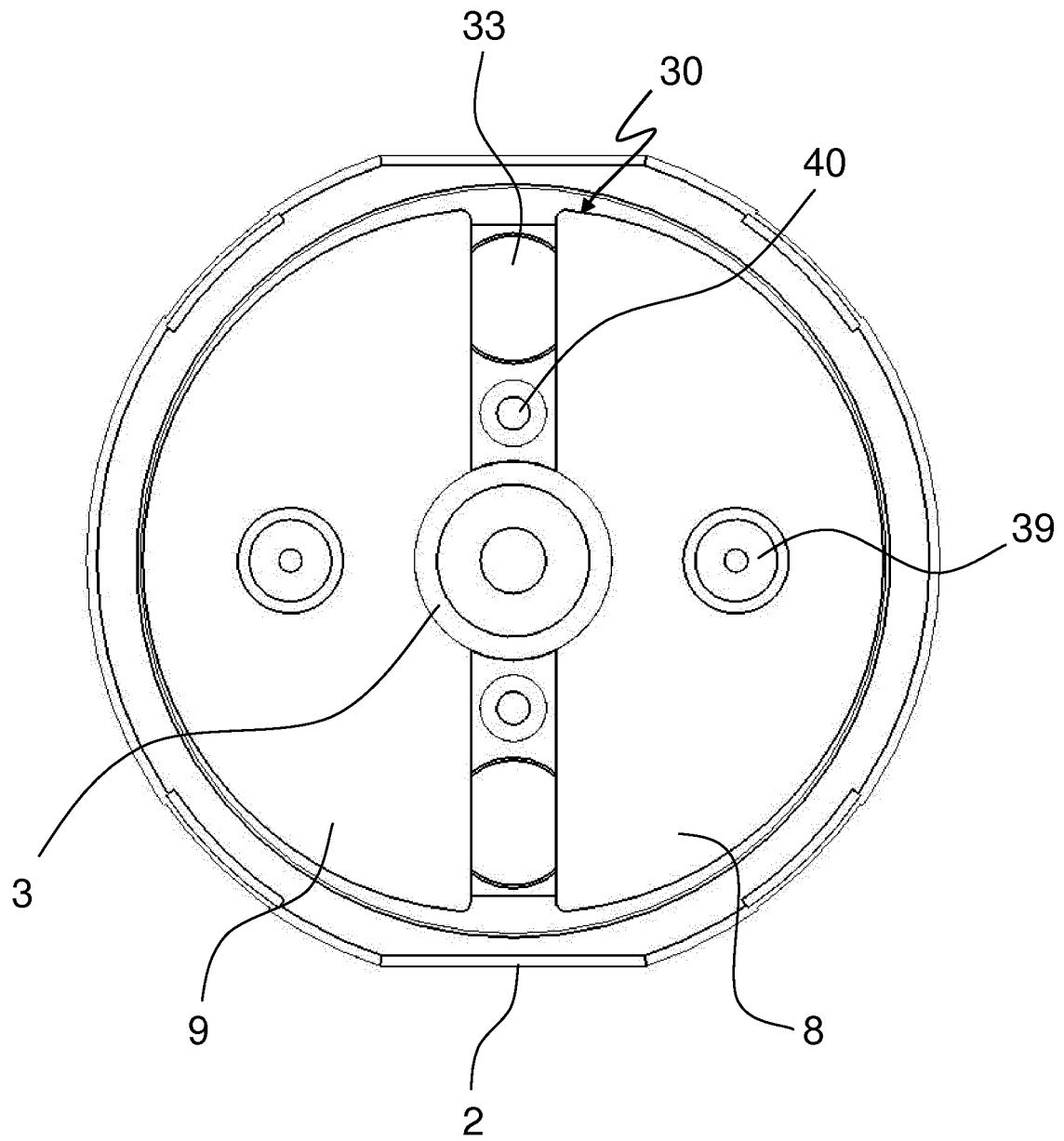


FIG. 5

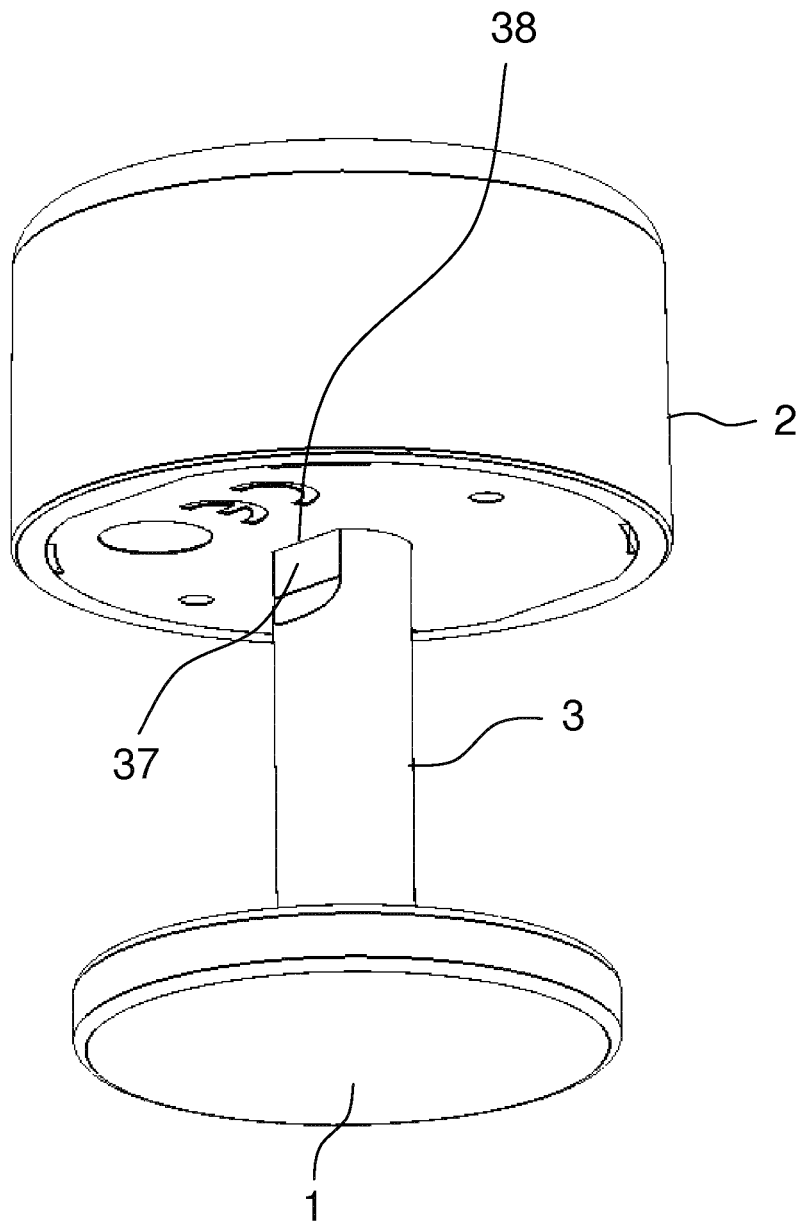


FIG. 6

INFORME DE BÚSQUEDA INTERNACIONAL

Solicitud internacional N°

PCT/ES2015/070057

A. CLASIFICACIÓN DEL OBJETO DE LA SOLICITUD

INV. E05B67/06 A41F1/00 E05B73/00

De acuerdo con la Clasificación Internacional de Patentes (CIP) o según la clasificación nacional y CIP.

B. SECTORES COMPRENDIDOS POR LA BÚSQUEDA

Documentación mínima buscada (sistema de clasificación seguido de los símbolos de clasificación)

E05B A41F

Otra documentación consultada, además de la documentación mínima, en la medida en que tales documentos formen parte de los sectores comprendidos por la búsqueda

Bases de datos electrónicas consultadas durante la búsqueda internacional (nombre de la base de datos y, si es posible, términos de búsqueda utilizados)

EP0-Internal, WPI Data

C. DOCUMENTOS CONSIDERADOS RELEVANTES

Categoría*	Documentos citados, con indicación, si procede, de las partes relevantes	Relevante para las reivindicaciones N°
A	US 5 600 977 A (PIRON LUDWIG [CA]) 11 Febrero 1997 (1997-02-11) Citado en la aplicación Figuras 1-4	1-8
A	US 2012/131967 A1 (SANCHEZ GIRALDEZ JOSE HUMBERTO [DE]) 31 Mayo 2012 (2012-05-31) párrafo [0087]	1-8

☐ En la continuación del Recuadro C se relacionan otros documentos ☒ Los documentos de familias de patentes se indican en el Anexo

* Categorías especiales de documentos citados:	"I"	documento ulterior publicado con posterioridad a la fecha de presentación internacional o de prioridad que no pertenece al estado de la técnica pertinente pero que se cita por permitir la comprensión del principio o teoría que constituye la base de la invención.
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"O" documento que se refiere a una divulgación oral, a una utilización, a una exposición o a cualquier otro medio.		
"P" documento publicado antes de la fecha de presentación internacional pero con posterioridad a la fecha de prioridad reivindicada.		

Fecha en que se ha concluido efectivamente la búsqueda internacional.

17/09/2015

Fecha de expedición del informe de búsqueda internacional

25/09/2015

Nombre y dirección postal de la Administración encargada de la búsqueda internacional

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N° de fax

N° de teléfono

Formulario PCT/ISA/210 (segunda hoja) (Enero 2015)

INFORME DE BÚSQUEDA INTERNACIONAL

Información relativa a miembros de familias de patentes

Solicitud internacional N°

PCT/ES2015/070057

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REFERENCES CITED IN THE DESCRIPTION

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