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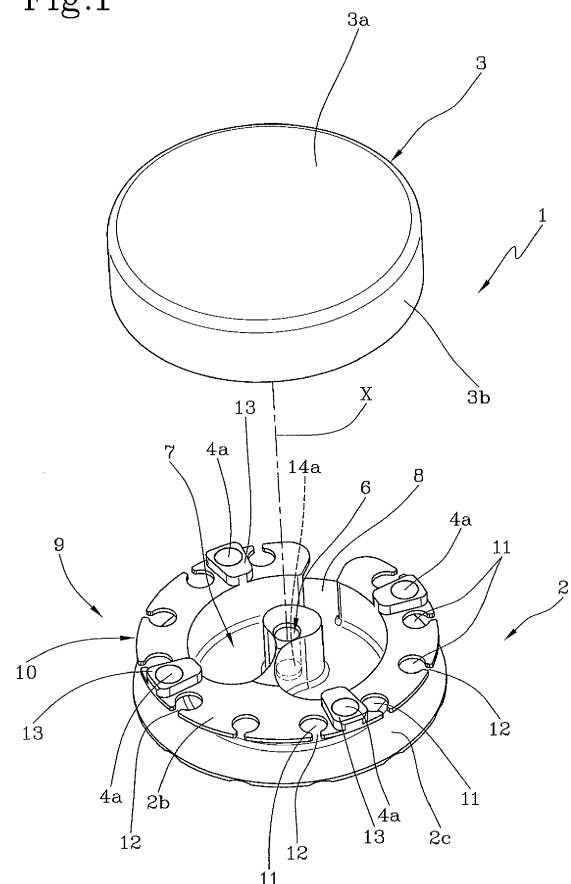
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(54) **Cable reel container for earphone**

(57) A cord reel container comprises a main body (2) around which a cord can be wound and a closure cover (3) couplable with the main body (2). The container (1) further comprises at least one pair of repulsive magnets (14a, 14b), reciprocally interacting by repulsion so as to enable the container to be opened, and at least one pair of attractive magnets (4a, 4b), interacting with each other by attraction so as to enable the container to be closed.

Fig.1



Description

[0001] The present invention relates to a cord reel container.

[0002] There are numerous known cord winding devices, around which it is possible to wind electrical connection cords and cables.

[0003] The present invention has application in particular as a cord winder for earphones, in particular for earphones for mobile phones, tablets, PCs or audio/video reproduction devices in general.

[0004] It is common practice to wind, in a disorderly fashion, the cord of the earphones directly around the electronic device, or fold it into an eight or else knot it around itself in some way and put it away in one's bag without being particularly careful. This lack of care results in a short life of the earphones, since forced and prolonged bending can damage the internal cord, making the earphones unusable.

[0005] In this regard, for several years now cord reel devices have been available on the market; around them it is possible to wind or store one's earphones carefully to protect them from accidental damage.

[0006] The known cord reel devices are generally toothed supports, comb or fishbone shaped, or else fashioned like simple spools or reels made of rubber, silicone or plastic, around which the cord can be wound.

[0007] These devices, as they lack a protective case, are generally provided with fasteners to secure the free ends of the cord, the one with the plug or the ones carrying the earphones, so that the cord does not come unwound when the device is put away, for example in a bag.

[0008] Alternatively, there are also known containers provided with a cover, which is closed over the reel-like body simply by pressing or by means of a thread.

[0009] The ones that are simply pressed closed no longer stay properly closed after repeated use and start coming open, especially if the cord is not wound with particular care; analogously, in the ones that are closed by means of a thread, the cover risks coming unscrewed if not screwed properly or even if the device is carelessly put away in the bag or backpack.

[0010] In both cases, given the presence of the cover, there is no fastening element that secures the free end of the cord; thus an accidental opening of the cover will also provoke a consequent and inevitable unwinding of the cord.

[0011] Finally, the known devices are often made with materials subject to easy accidental breaks if kept, for example, in a trouser pocket or carelessly put away in the bag or backpack.

[0012] In this context, the technical task at the basis of the present invention is to propose a cord reel container, in particular for earphones, which overcomes the above-mentioned drawbacks of the prior art.

[0013] In particular, it is an object of the present invention to provide a cord reel container that enables the cord of earphones to be adequately protected and is resistant

and easy to use.

[0014] Moreover, it is an object of the present invention to produce a cord reel container that does not result in accidental openings with a consequent undesirable unwinding of the cord.

[0015] Finally, it is an object of the present invention to propose a cord reel container which assures that the cord is wound up correctly, thus avoiding any damage.

[0016] The stated technical task and specified object are substantially achieved by a cord reel device, in particular for earphones, comprising the technical features set forth in one or more of the appended claims.

[0017] Additional features and advantages of the present invention will be more apparent from the approximate, and hence non-limiting, description, of a preferred but not exclusive embodiment of a cord reel container, in particular for earphones, as illustrated in the appended drawings, in which:

- figure 1 is an exploded perspective view from above of a cord reel container, in particular for earphones, according to the present invention;
- figure 2 is an exploded perspective view from below of the cord reel container, in particular for earphones, according to the present invention and illustrated in figure 1;
- figure 3 is a side view of the main body of the cord reel container of the present invention and illustrated in the preceding figure;
- figure 4 is a plan view of the inside of the cover of the cord reel container of the present invention.

[0018] With reference to the appended figures, 1 indicates overall a cord reel container, in particular for earphones, in accordance with the present invention.

[0019] The cord reel container 1 is a device comprising a main body 2, around which a cord, for example of an earphone, can be wound, and a closure cover 3 couplable with the main body 2.

[0020] The container 1 further comprises at least one pair of reciprocally repulsive magnets 14a, 14b, of which a first magnet 14a is associated with the main body 2 and a second magnet 14b is associated with the cover 3. In particular, the pair of repulsive magnets 14a and 14b reciprocally interact by repulsion so as to facilitate opening the container 1, as will be explained below.

[0021] These magnets 14a, 14b thus have the same polarity.

[0022] The cover 3 has a central peg 5 extending away from the concave part towards the inside, i.e. toward the main body 2, along an axis X of symmetry of the cover 3; the peg 5 is insertable inside a seat 6 formed in the main body 2. Advantageously, the peg 5 and seat 6 are formed in a central position respectively in the cover 3 and in the main body 2. Advantageously, the pair of repulsive magnets 14a, 14b is associated with the peg 5 and seat 6: in particular, the first magnet 14a of the pair

of repulsive magnets 14a, 14b is positioned in the seat 6, whilst the second magnet 14b of the pair of repulsive magnets 14a, 14b is positioned at the free end 5a of the peg 5.

[0023] The peg 5 serves to ensure the alignment and centring of the cover on the central body 2, as well as supporting the second repulsive magnet 14b, so as to enable rapid and precise opening of the container.

[0024] There is also at least one pair of attractive magnets 4a, 4b interacting with each other by attraction, so as to enable the closure of the container 1. The magnets 4a, 4b thus have opposite polarity.

[0025] Advantageously, there is a plurality of pairs of attractive magnets 4a, 4b, for each of which a first magnet 4a is associated with the main body 2 and a second magnet 4b is associated with the cover 3.

[0026] As illustrated in the annexed figures, the attractive magnets 4a, 4b are peripheral, i.e. preferably arranged along a line near the perimeter of both the cover 3 and the main body 2.

[0027] During closure, the corresponding magnets of each pair of attractive magnets 4a, 4b are brought into reciprocal alignment and are attracted to each other, becoming stably associated with each other to keep the container 1 closed.

[0028] The modulus of the sum of the forces of attraction of each pair of attractive magnets 4a, 4b is greater than the modulus of the force of repulsion produced by the single pair of repulsive magnets 14a, 14b.

[0029] Therefore, when the cover 3 is placed over the main body 2, the pairs of attractive magnets 4a, 4b overcome the repulsive force of the central pair of repulsive magnets 14a, 14b, thus favouring the closure of the container 1.

[0030] In order to open the container 1, on the other hand, the cover 3 must be moved relative to the main body 2, either by sliding or relative rotation, so as to bring the corresponding magnets of each pair of attractive magnets 4a, 4b out of alignment.

[0031] In this situation, the repulsive force generated by the central repulsive magnets 14a, 14b overcomes the residual attractive force of the attractive magnets 4a, 4b, by now unaligned, enabling the cover 3 to be opened by generating an effect as if a small spring working by expansion was present at the centre. In other words, the cover 3 is pushed up by the magnetic force of repulsion.

[0032] In the absence of the central repulsive magnets 14a, 14b, the unalignment of the attractive magnets 4a, 4b might not be sufficient to enable the opening of the container 1, due to the tangential magnetic field of the peripheral attractive magnets 4a, 4b.

[0033] The latter, in fact, also have a tangential magnetic field, so that when each individual pair of attractive magnets becomes unaligned, the influence of the magnetic field produced by one or both the magnets 4a, 4b of the adjacent pairs imposes a twisting moment on the cover 3, attracting it or pushing it towards the closest attractive magnet.

[0034] The central repulsive magnets 14a, 14b, on the other hand, being housed in the seat 6 and in the peg 5, cannot impose any twisting moment on the cover 3 or main body 2 and thus limit themselves to raising the cover 3 when the corresponding peripheral attractive magnets 4a, 4b are no longer superposed, and the sum of the attractive forces of the latter is smaller, in terms of modulus, than the repulsive force of the former. Conversely, when the attractive magnets are superposed in pairs and axially aligned, the repulsive force of the central magnets 14a, 14b, in terms of modulus, is smaller than the attractive force of the peripheral magnets 4a, 4b and hence the former succumb to the greater force generated by the latter, enabling the container 1 to be closed.

[0035] In a preferred embodiment, the attractive magnets 4b of the cover all have the same polarity, opposite that of the magnets 4a present on the main body 2. The magnets 4a of the main body likewise all have the same polarity.

[0036] In this case, any position of the cover 3 on the main body 2 is possible, since the magnets 4b of the cover 3 can mate with any magnet 4a of the main body 2.

[0037] In an alternative embodiment, both the cover 3 and the main body 2 instead have magnets having alternate polarity, i.e. the magnets 4b of the cover 3 do not all have the same polarity, but rather alternate polarity; analogously, the magnets 4a of the main body 2 also have alternate polarity.

[0038] In this second case, only certain relative positions of the cover 3 on the main body 2 are possible, since the magnets 4b of the cover 3 can only mate with the corresponding magnets 4a of the main body 2 having opposite polarity.

[0039] Based on the number of pairs of attractive magnets 4a, 4b the forces of the magnets themselves are suitably calibrated, or else, if magnets with a given force are available, the number of attractive magnets that need to be provided between the cover 3 and main body 2 is determined so as suitably balance, in accordance with what was previously described, the repulsive force of the central pair of magnets 14a, 14b. What is important is to have a value of the total attractive force that is greater than the value of the repulsive force, so as not only to ensure that the cover 3 is kept in a closed position, but also to ensure the correct opening of the cover 3 as needed.

[0040] In the illustrated configuration there are eight pairs of attractive magnets 4a, 4b. However, it is also possible to have a smaller number, there being at least one pair, or also a larger number, though with an increasing number of attractive pairs it will be progressively more difficult to limit the influence of the adjacent attractive magnets.

[0041] The container 1 can preferably have a circular shape (illustrated in the appended figures), in which case the relative sliding between the cover 3 and main body 2 will mean a rotation of one relative to the other, or else a polygonal shape, preferably rectangular, and therefore

the relative movement between the two components takes place by relative linear sliding of the cover 3 over the main body 2.

[0042] As can be seen from figure 1, the main body 2 preferably has a reel shape, thus comprising a cylindrical structure 2a with a circular, elliptical or polygonal cross section, having two opposite flanged base ends 2b and 2c. The cord can be wound externally around the cylindrical structure 2a.

[0043] The main body 2, preferably in a central position, inside the cylindrical structure 2a, has a compartment 7 for accommodating a pair of earphones. On the lateral wall, the cylindrical structure 2a has an aperture 8 to allow the cord of the earphones to be passed from the compartment 7, in which the earphones are placed, to the outside, so as to be wound around the cylindrical structure 2a of the reel.

[0044] The main body 2 has at least one fastening element 9 to which a free terminal end of the cord of the earphones can be constrained after being completely wound around the cylindrical structure 2a.

[0045] Preferably, the fastening element 9 is fashioned on at least a perimeter edge 10 of one of the flanged bases 2b of the main body 2.

[0046] Such perimeter edge 10 comprises a plurality of recesses 11, defining the aforementioned fastening element 9, through which the free end of the cord is passed. Advantageously, after the cord has been completely wound around the cylindrical structure 2a of the reel, the free end, the one fitted with the plug for the electrical connection, is made to pass from the bottom up through a first recess 11, then to pass over the flanged base 2b and be accommodated in the compartment 7 together with the earphones. Alternatively, the plug is made to pass from the bottom up through a first recess 11 and then from the top down through the recess 11 immediately after it, considering, by way of reference, the forward direction to be equal to that in which the cord is wound.

[0047] In this manner, the cord will be secured to the main body, maintaining the connector plug on the inside, between the two flanged bases 2b and 2c of the main body 2.

[0048] In both cases the plug will not be an obstacle to closing the cover 3 over the main body 2.

[0049] These recesses 11 are radial, passing through the flanged base 2b, and have a narrow opening or narrowing 12 in the front part, i.e. toward the outside, having a size such as to allow the cord of the earphones pass through.

[0050] On the flanged base 2b provided with the fastening element 9, preferably in a discrete position, there are raised stations 13 holding the aforementioned first magnets 4a.

[0051] In this manner, on the flanged base 2b an alternation is formed between the fastening elements 9 and first magnets 4a, positioned at slightly different levels to leave a space between two adjacent and consecutive

magnets 4a for the cord to pass through.

[0052] The second magnets 4b, in contrast, are positioned inside the cover 3, on the inner surface of the base 3a along a line proximal to the lateral surface 3b.

5 [0053] When the cover 3 is associated with the main body 2, the magnets 4a associated with the main body 2 attract the magnets 4b present on the cover 3 toward them, thus closing the cord reel container 1.

10 [0054] To open it, it is sufficient to turn the cover 3, or translate it relative to the main body 2 below it, in order to bring the magnets 4a of the main body 2 out of alignment with the magnets 4b of the cover 3.

[0055] The container 1 can be made of metal or plastic material.

15 [0056] The invention achieves the proposed objectives and enables numerous advantages to be obtained compared to the prior art.

[0057] The described container enables the earphones to be put away neatly inside bags, backpacks or even a trouser pocket, protecting the cord and prevented it from being damaged accidentally.

[0058] The device of the present invention assures a total protection of the earphones and of the cord, being provided with a cover, which, thanks to magnetic closing and opening system, prevents involuntary opening of the container.

[0059] In fact, the opening of the cover must be deliberate, it absolutely cannot be accidental, and it is facilitated by the force of repulsion of the pair of magnets.

20 30 [0060] Analogously, the closure of the container is ensured by the magnets that attract each other in pairs.

[0061] The notched flanged edge of the main body forms a convenient element for engaging and fastening the terminal end of the cord, preventing the latter from coming unwound, assuming a disorderly configuration and being an obstacle to the closure of the container.

35 40 [0062] Moreover, the container is advantageously personalizable, as it has an ample base exterior surface, on which it is possible to apply screen printing, laser markings or engravings of logos or text.

Claims

- 45 1. A cord reel container, comprising a main body (2) around which a cord can be wound and a closure cover (3) couplable with said main body (2), **characterized in that** it comprises at least one pair of repulsive magnets (14a, 14b), reciprocally interacting by repulsion so as to enable the container to be opened, and at least one pair of attractive magnets (4a, 4b), interacting with each other by attraction so as to enable the container to be closed.
- 50
- 55 2. The container according to the preceding claim, **characterized in that** a first magnet (14a, 4a) of each pair of repulsive magnets (14a, 14b) and attractive magnets (4a, 4b) is associated with said

main body (2) and a second magnet (14b, 4b) of each pair of repulsive magnets (14a, 14b) and attractive magnets (4a, 4b) is associated with said cover (3).

3. The container according to one of the preceding claims, **characterized in that** said cover (3) has a central peg (5), extending up inside the concavity of the cover (3), insertable inside a seat (6) formed in the main body (2); said pair of repulsive magnets (14a, 14b) having the first magnet (14a) inserted inside said seat (6) and the second magnet (14b) associated with a free end (5a) of the peg (5). 10
4. The container according to one of the preceding claims, **characterized in that** it comprises a plurality of pairs of attractive magnets (4a, 4b), couplable to each other to enable a stable closure of the container. 15
5. The container according to the preceding claim, **characterized in that** the first magnets (4a) of each pair of attractive magnets (4a, 4b) are arranged along a perimeter edge (10) of the main body (2) and the second magnets (4b) of each pairs of attractive magnets (4a, 4b) are arranged on an inside base (3a) of the cover (3). 20 25
6. The container according to one of the preceding claims, **characterized in that** said cover (3) is separable from said main body (2) by sliding one relative to the other and by the repulsive interaction between the magnets of the pair of repulsive magnets (14a, 14b). 30
7. The container according to one of the preceding claims, **characterized in that** said main body (2) has at least one fastening element (9) to which a free terminal end of a cord windable around the main body (2) can be constrained. 35 40
8. The container according to the preceding claim, **characterized in that** said main body (2) comprises at least a perimeter edge (10) comprising a plurality of radial recesses (11) defining said fastening element (9) and having a narrowing (12) at the entry section of each recess (11). 45
9. The container according to one of the preceding claims, **characterized in that** said main body (2) is in the form of a reel, around which a cord can be wound. 50
10. The container according to one of the preceding claims, **characterized in that** said main body has a compartment (7) for accommodating a pair of ear-phones. 55

11. The container according to one of the preceding claims, **characterized in that** it has a circular shape.

12. The container according to one of claims 1 to 10, **characterized in that** it has a polygonal shape.

Fig.1

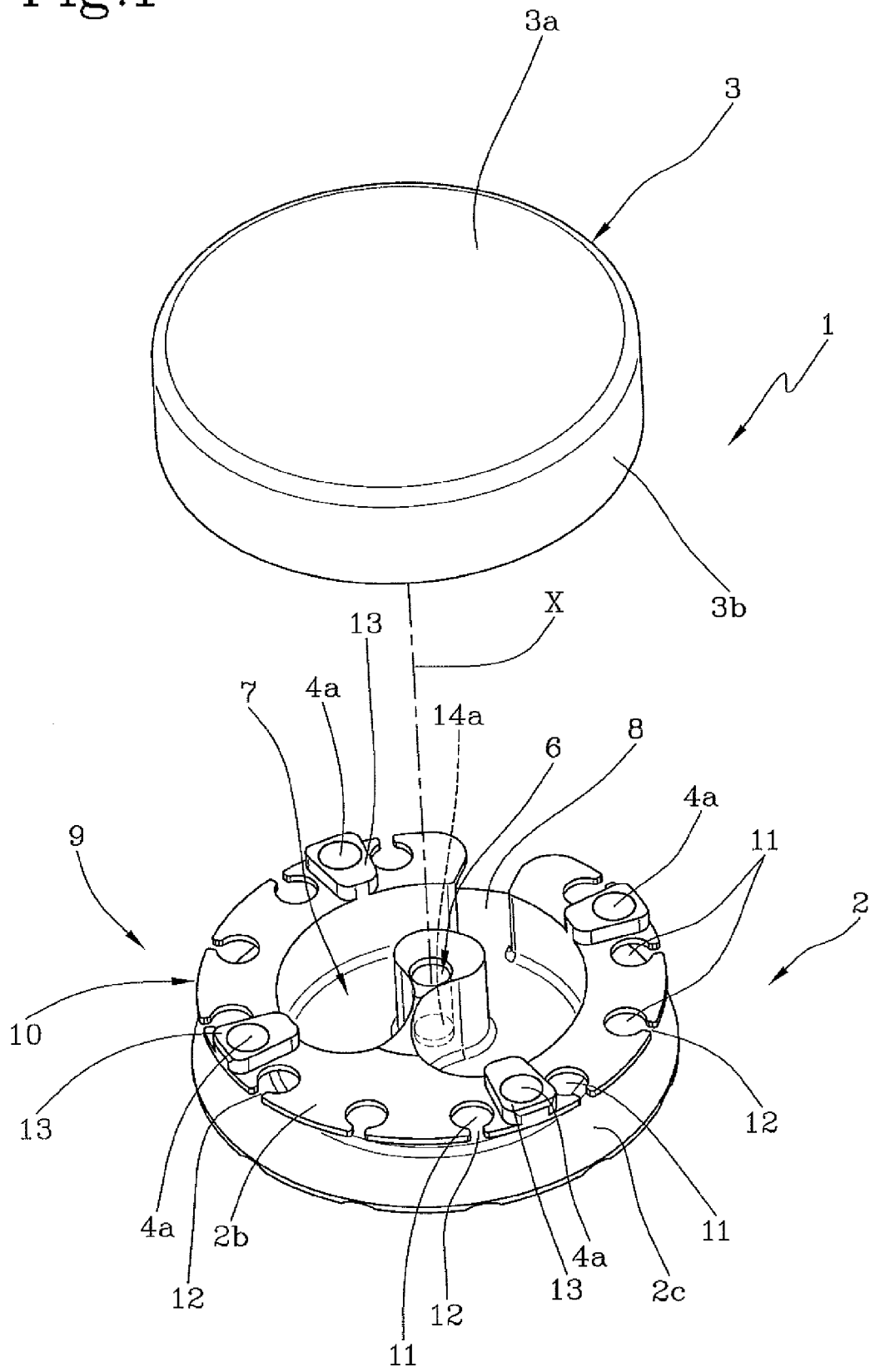


Fig.2

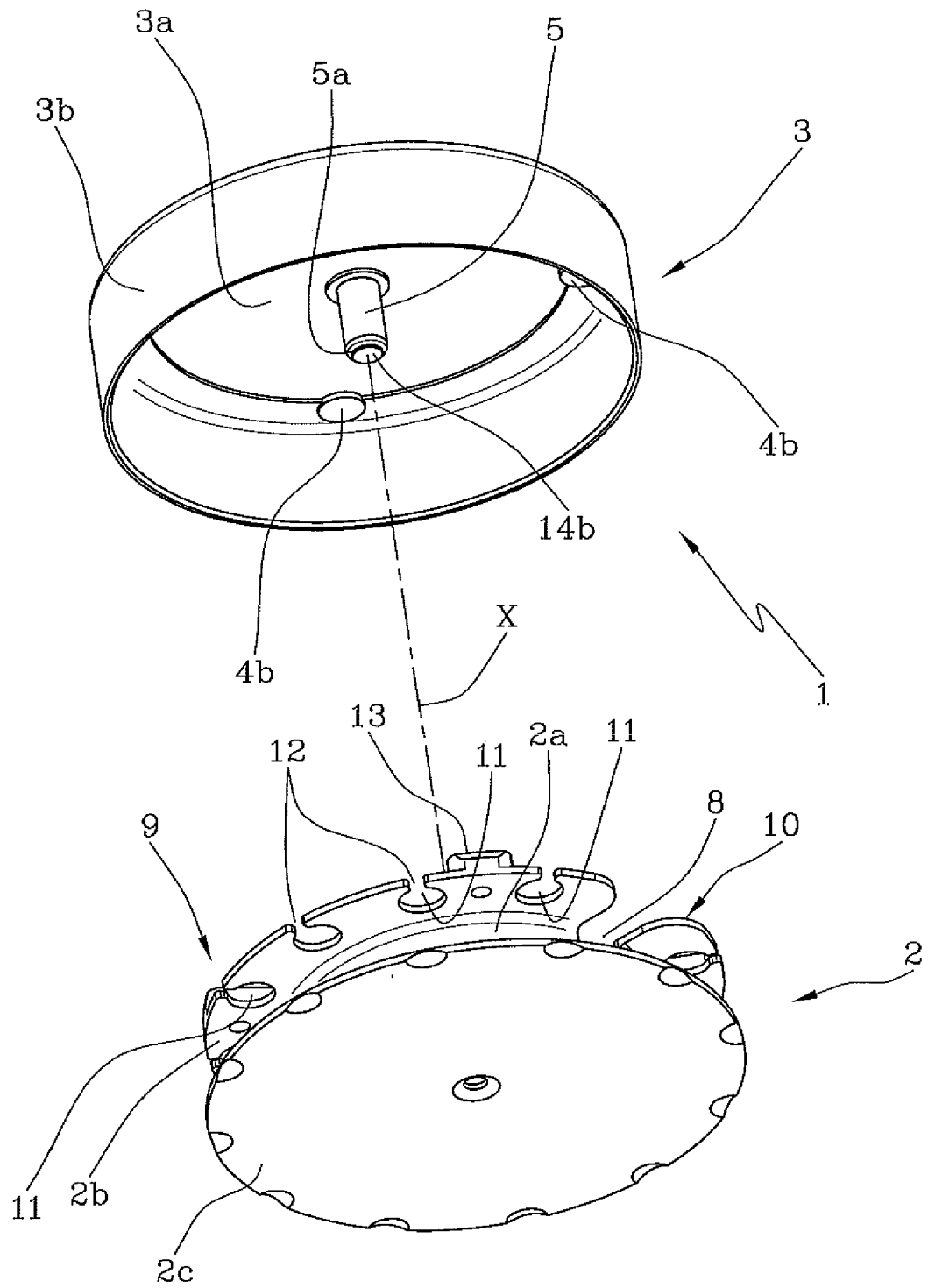


Fig.3

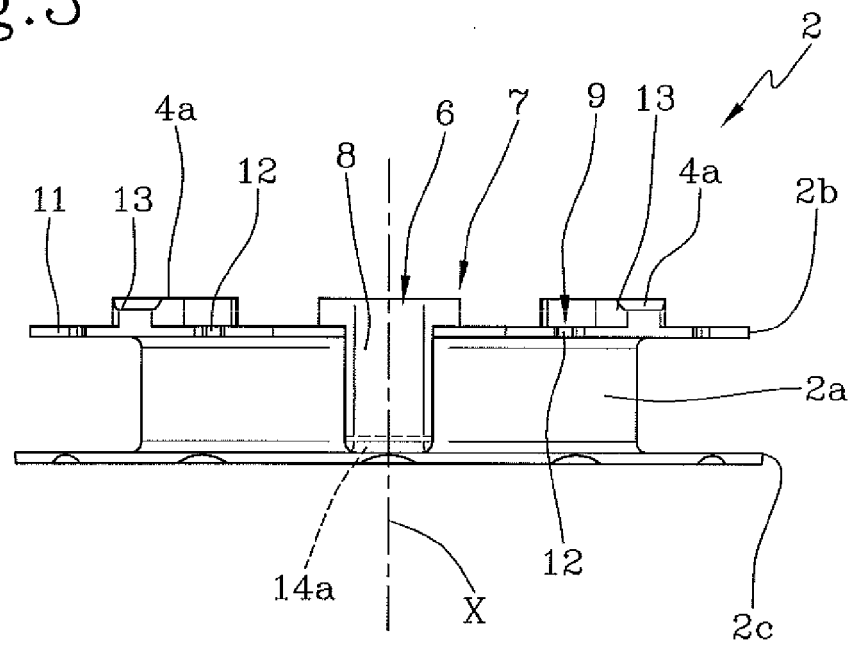
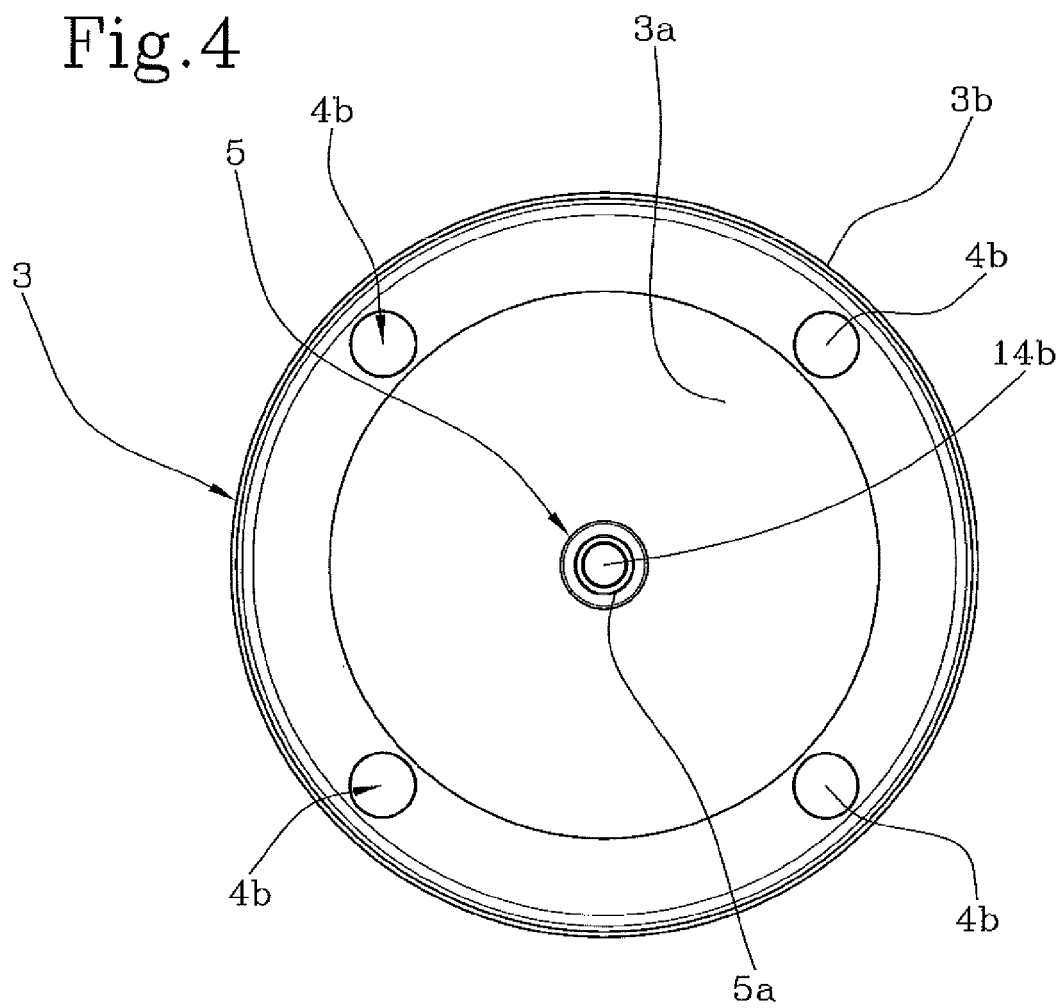


Fig.4





EUROPEAN SEARCH REPORT

 Application Number
 EP 14 17 6920

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* the whole document *	3	
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			H04R
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 November 2014	Examiner Borowski, Michael
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 14 17 6920

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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10-11-2014

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