

(19)



(11)

EP 2 852 792 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

13.07.2016 Bulletin 2016/28

(51) Int Cl.:

F21V 27/00 (2006.01)

(86) International application number:

PCT/IB2013/001005

(21) Application number: **13731867.1**

(22) Date of filing: **21.05.2013**

(87) International publication number:

WO 2013/175291 (28.11.2013 Gazette 2013/48)

(54) **HANGING AND HEIGHT ADJUSTING DEVICE FOR SUSPENSION LAMPS**

HÄNGE- UND HÖHENVERSTELLUNGSVORRICHTUNG FÜR HÄNGELAMPEN

DISPOSITIF DE SUSPENSION ET DE RÉGLAGE DE HAUTEUR POUR LAMPES À SUSPENSION

(84) Designated Contracting States:

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

(72) Inventor: **Gaeta, Marco**

20900 Monza (IT)

(30) Priority: **22.05.2012 IT MI20120885**

(74) Representative: **Riccardi, Sergio**

IPSER S.r.l.

Via M. Melloni 32

20129 Milano (IT)

(43) Date of publication of application:

01.04.2015 Bulletin 2015/14

(56) References cited:

EP-A1- 0 676 586 WO-A1-92/14093

DE-U1- 9 305 844

(73) Proprietor: **Gaeta, Marco**
20900 Monza (IT)

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a hanging and height adjusting device particularly adapted to be used with light sources such as lamps, spots and the like.

[0002] The typical application for the device of the present invention provides for fixing the device at one end to an upper or raised surface such as a ceiling, beam or similar structure, and at the other end to the article to be kept suspended relative to said surface, preferably through a cable, cord or the like, that can be wound inside the device. The regulation of the cable extension, i.e. of the distance of the suspended article from the ceiling, can be made by a friction mechanism operatively connected to the spool or similar item on which the cable may be wound.

[0003] In the lighting field there are many applications in which it is necessary to adjust the distance between the light source and the area to be illuminated by the source. If on one hand it is very clear to identify such a need in household applications (especially for kitchens, reading and working rooms), on the other hand many other applications of a more technical nature may be found, such as gardening or do-it-yourself works. For instance the indoor cultivation of plants requires use of artificial light instead of natural light, and adjustment of the light exposure of the plant according to its growth state.

[0004] Document DE 9305844 U1 discloses a device for hanging and adjusting the height of a lamp, comprising a case containing a spool for winding the suspension cable, having a first flanged end housing a torsion band spring and a second opposite flanged end provided with a ratchet member unidirectionally engaging said spool, where the engagement may be manually removed through a push button disposed outside the case. Therefore the lamp height may be adjusted manually only by holding at the same time the button strongly pushed, in order to separate the two meshing parts of the mechanism. Moreover the device is designed as an intermediate integral part between an overlying box for the cables and an underlying lamp.

[0005] Document WO 92/14093 of the same Applicant of the present invention, discloses an independent device of this kind, which however is not provided with any external means to adjust the friction lock of the ratchet mechanism.

[0006] Document EP 0676586 A1 discloses a spool to wind the suspension cable, having such a conical shape, that during the winding operation the cable turns are orderly arranged one beside the other without overlapping.

[0007] In all the above mentioned applications and others requiring a similar flexibility of use, this meaning applications not strictly connected with the lighting field, the suspension device of the present invention appears as a valid solution.

[0008] With regard to similar prior art devices already available on the market, the suspension device of the

present invention has particular advantages, such as a high operative reliability, to be ascribed both to the choice of the used materials and to the constructional method, a limited cost especially when compared with the quality of the finished product, a high ease of use due to the fastening systems (of both the suspended article and the suspension structure) of ready use and last but not least, a variability of configuration that allows to use several devices of the present invention at the same time, to fit with different shapes of the article to be suspended or even with different loads.

[0009] These and other advantages and characteristics of the suspension and height adjusting device will become apparent from the following detailed description of a preferred embodiment, to be read with reference to the accompanying sheets of drawings, in which:

Fig. 1 is a perspective view of the suspension and height adjusting device in accordance with a preferred embodiment of the present invention;

Fig. 2 is an exploded perspective view of the device of Fig. 1;

Fig. 3 is a perspective front view of some assembled components of the device of Fig. 2;

Fig. 4 is a perspective rear view of the components of Fig. 3;

Fig. 5 is a perspective front view, showing a greater number of components relative to Fig. 3; and

Fig. 6 is a perspective view showing a constructional detail used in the assembling stage of the device.

[0010] With reference now to Fig. 1, a suspension and height adjusting device 10 according to the present invention is shown, wherein one can see the cable 50 coming out from said device, provided for fixing an article (not shown) or a part of it, to be held suspended at a determined distance from the device; said device is in turn fixed to an outer stationary support (not shown) such as a ceiling, a beam and the like, by means of the upper hook 16. Fig. 1 also shows a wing nut 15 or nut with another shape or material, whose tightening degree involves a corresponding friction of the spool on which the cable is wound. Therefore said cable will be able to hold heavier or lighter loads, still remaining free to return back into the device, namely to be rewound on the spool.

[0011] Turning now to Fig. 2, an exploded perspective view shows all the components of device 10, wherein the case is made of two half shells, namely a front shell 12 and a rear shell 14, both provided with upper and lower protrusions. The two half shells are matched above through a snap connection of pin 12a of the front shell into a hole 14a of the rear shell, and below through a ring 19 preventing lower end 12c of the front shell to spread apart from lower end 14c of the rear shell. Moreover the upper ends 12b and 14b are constrained by a member 16, of which a hook 16b is engaged with pin 12a, while a pair of right and left elements 16a are snap holding said upper ends 12b and 14b in the peripheral direction. The

presence of screw threads made on the upper and lower ends of the shells, allow to fasten the device to suitable sleeves fixed to an outer suspension element (for instance a ceiling) or even to specific components such as cable covering sheaths.

[0012] The rear shell 14 is provided in a central position with a circular projection on which two notches 18 and a dead hole are made at its lower protrusion, which has in turn a longitudinal groove for passage of the cable. Into the dead hole adjacent to said groove, a deflection pin 11 is inserted, to guide to the groove the portion of cable 50 coming out from the device 10. On the central projection a torsion band spring 20 is supported, which is obtained by spirally winding a metal strip in such a way that in the assembling configuration, the band has a short central straight portion 24 and after a predetermined number of windings, ends with a curved end 22. Spring 20 is fixed abutting on the central projection of the rear shell, by means of a locking pin 30 having a first end provided with a diametral notch forming a pair of fingers 32 on said first end. The central straight portion 24 is inserted into the notch of the locking pin 30, whose fingers 32 are snap engaged within the notches 18 of the projection of shell 14. Still referring to Fig. 2, there is shown the spool on which the cable 50 is being wound, consisting of two separate parts, namely a drum 40 and a flange 60, which are mechanically assembled and possibly welded, for instance by ultrasounds. Drum 40 has a rear flange 42, in turn provided with at least one almost radial notch 44, where one end 54 of cable 50 is fastened for instance by a simple knot. On the front side drum 40 is provided with four protrusions 46, symmetrically arranged relative to its longitudinal axis, each protrusion having a groove 48, that in this preferred embodiment has a dovetail shape. On each protrusion 46 and flush with the groove 48, integral fingers 47 (figure 6) are provided, which after coupling drum 40 with flange 60, are mechanically deformed by a cold or hot operation, so as to constitute a fixed constraint to the axial creep of these parts, avoiding their mutual extraction. At a central position relative to protrusions 46, a through hole is made on drum 40, dimensioned to match the second end of the spring locking pin 30. As it will be better illustrated and described hereinafter, drum 40 has a rear seat 45 where the torsion spring 20 is positioned. On flange 60 of the spool, four dovetail members 66 are integrally made, arranged in an axially symmetrical mode and adapted to match the dovetail grooves 48 of drum 40. Moreover near each dovetail member 66 there are integral beaks 64 elastically swinging relative the connection point with flange 60, said beaks being turned to an approximately radial direction and adapted to engage the corresponding radial teeth of gear wheel 80.

[0013] An adjustment pin 70 has a flat head 72 at a first end, a recess for lodging the head of pin 30 and at the other end a thread 74 as well as a flat portion for inserting and fixing plate 17; said pin 70 is matching the end of pin 30 passing through hole of drum 40, around

which the pin rotates. After interposition of a washer 76, the adjustment pin 70 is inserted first into a central hole of gear wheel 80, which is provided with a front flange 82, and then into the central hole of a plate 17 preferably made of metal. The threaded end 74 of pin 70 then comes out from a central hole of the front shell 12, to engage the wing nut 15 after interposition of a second washer. More particularly beaks 64 are provided with an end 64a adapted to engage the teeth of gear wheel 80; in such a position an undercut 64b on beak 64 abuts on the side walls of protrusion 46. This connection gives stiffness and strength to the operation of the device, because the load exerted on end 64a is passed and distributed on a broader surface, just as the surface of the side wall of the protrusion.

[0014] In Fig. 3 there is illustrated the spool of the suspension and height regulation device 10 shown inserted into the corresponding dovetail grooves 48 of drum 40. Cable 50 is wound around the spool. In Fig. 4 the same group is shown from the rear side so as to better show the torsion spring 20 lodged in the relevant room 45 in drum 40 and locked by the end of locking pin 30.

[0015] From the detailed description of the device of the present invention, it is possible to understand its operation, wherein at a counterclockwise rotation of the spool, its engagement with the gear wheel 80 is associated, and the winding sense of cable 50 on the spool is so chosen, that an extraction of cable 50 corresponds to a counterclockwise rotation of said cable; in other words the extraction of cable 50 from the device 10 corresponds to a state of engagement of the ratchet mechanism (consisting of gear wheel 80 and beaks 64). At this point it is clear that tightening of wing nut 15, causing the metal plate 17 and washer 76 to compress flange 82 of gear wheel 80, leads to an increasing resistance to rotation of spool 40 from which cable 50 is unwound, thus allowing the mechanism to support different loads of the mass connected thereto. On the contrary, even in a condition of maximum tightening of wing nut 15, return of cable 50 into the suspension device is always possible, because in the clockwise direction of rotation the teeth 64 slide on the corresponding teeth of the gear wheel 80, causing the spring to rewind the cable freely and without friction. Therefore through a simple manual movement upwards or downwards, the cable either unwinds supporting the loaded mass or freely rewinds stopping exactly in the position where it is released. It is also apparent that the device 10 of the present invention may be used in the reverse order, namely using hook 16 for the suspension of the relevant article (lamp) and the end of cable 50 for fixing the device to an external support (such as the ceiling).

[0016] It is to be noted that many alternative embodiments of the suspension and height adjusting device according to the present invention, may be drawn on the basis of the above described preferred embodiments, said alternatives comprising modifications and variations to one or more components as to forms, materials and

dimensions, all these modifications and variations falling however within the scope of the present invention as defined in the appended claims.

Claims

1. A hanging and height adjusting device (10) particularly suitable for hanging lamps comprising a case (12; 14) for housing a spool (40; 60) for winding a hanging rope (50), said spool having at a first flanged end (42) thereof a housing (45) for a torsion spring (20) and at the opposite flanged end (60) at least a unidirectional stop detent (64) engageable with a gear wheel (80) placed into said case coaxially in respect of said spool, **characterized in that** said gear wheel (80) is rotationally friction engageable by a mechanism comprising a nut (15) placed outside said case, a plate (17) and a threaded pin (70) passing through said mechanism and said gear wheel (80), tightening of said nut (15) on said pin (70) allowing the friction stop of the gear wheel (80) against said plate (17).
2. The hanging and height adjusting device according to the preceding claim, wherein said spool comprises a flanged cylindrical body (40) having said spring housing (45) and a flanged ring (60) comprising said at least one stop detent (64), the cylindrical body (40) and the flanged ring (60) being engageable with each other by means of conjugate dovetail members (48, 66), and wherein said cylindrical body (40) and said ring (60) are further welded, preferably by ultrasonic welding.
3. The hanging and height adjusting device according to claim 2, wherein said cylindrical body (40) and said ring (60) are locked to each other by fingers (47) integrally formed on the cylindrical body (40) or ring (60) in a position in which, once deformed during assembling, said fingers avoid mutual sliding of said conjugate members (48, 66).
4. The hanging and height adjusting device according to claim 2, wherein said detent (64) has an undercut (64b) adapted to be engaged by the outer side wall of said dovetail member (48) at the position engaged with said wheel (80).
5. The hanging and height adjusting device according to one or more preceding claims, wherein said spool (40, 60) has at the flanged portion at least one notch (44) for inserting and stopping one end of the hanging rope (50).
6. The hanging and height adjusting device according to one or more preceding claims, wherein said spring (20) is a band torsion spring in which a portion (24)

of the flat strip is fixed to said case (12, 14) and one end (22) of the strip is fixed to said spool (40, 60), preferably at said housing (45).

7. The hanging and height adjusting device according to claim 6, wherein said spool (40, 60) comprises a locking pin (30) provided with a notch for insertion of said strip portion (24), said notch defining a pair of ends (32) in turn engaged in corresponding recesses (18) of the case (14).
8. The hanging and height adjusting device according to one or more preceding claims, wherein said case comprises a pair of half shells (12, 14) to be assembled at their first ends (12b, 14b) by a snap fit engagement (12a, 14a) and two winglets (16a) and at their opposite ends (12c, 14c) by means of a sealing ring (19), said winglets (16a) being provided with a first hook (16b) engageable with said snap fit engagement (12a, 14a) and with a second hook (16) for fixing to an external support.

Patentansprüche

1. Hänge- und Höhenverstellvorrichtung (10) für Hängelampen umfassend ein Gehäuse (12, 14), das eine Trommel (49, 60) für die Aufwicklung einer Hängeschnur (50) enthält, wobei die Trommel an ihrem ersten Ende (42) einen Sitz (45) für eine Drehfeder (20) und an ihrem entgegengesetzten geflanschten Ende (60) mindestens eine Klinke (64) aufweist, worin diese Klinke mit einem im besagten Gehäuse koaxial mit dem Trommel angeordneten Zahnrad (80) in unidirektionaler Weise eingreifen kann, **dadurch gekennzeichnet, dass** dieses Zahnrad (80) durch ein Getriebe reibungsgekoppelt werden kann, worin das Getriebe eine außerhalb des Gehäuses (12, 14) angeordneten Mutter (15), eine Platte (17) und einen das Getriebe und das Zahnrad (80) durchgehenden Gewindestift (70) aufweist, wobei die Einspannung der Mutter (15) auf dem Gewindestift (70) die Reibungssperre des Zahnrads (80) auf der Platte (17) gestattet.
2. Hänge- und Höhenverstellvorrichtung nach Anspruch 1, worin die Trommel aus einem den Feder Sitz (45) enthaltenden geflanschten zylindrischen Körper (10) und einem mindestens eine Klinke (64) enthaltenden geflanschten Ring (60) besteht, wobei der zylindrische Körper (40) und der geflanschte Ring (60) durch zusammenarbeitende Schwalbenschwanzprofile (48, 66) miteinander eingreifen können, und der zylindrische Körper (40) sowie der geflanschte Ring (60) vorzugsweise durch Ultraschallschweißung verbunden werden.
3. Hänge- und Höhenverstellvorrichtung nach An-

spruch 2, worin der zylindrische Körper (40) und der Ring (60) durch am Körper (40) bzw. Ring (60) einteilig gewonnene Zähne (47) aneinander in einer solchen Stellung festgeklemmt werden, dass sie, als verformt während der Zusammensetzung, die entsprechende Gleitung der zusammenarbeitenden Profile (48, 66) verhindern.

4. Hänge- und Höhenverstell Vorrichtung nach Anspruch 2, worin die Klinke (64) einen Unterschnitt (64b) aufweist, der geeignet ist, um mit der äußeren Seitenfläche des Schwalbenschwanzprofils (48) in der mit dem Zahnrad (80) eingegriffenen Lage einzugreifen.
5. Hänge- und Höhenverstell Vorrichtung nach einem bzw. mehreren vorherigen Ansprüchen, worin die Trommel (40, 60) am geflanschten Ende (42) mindestens eine Kerbe (44) aufweist, um ein Ende der Hängeschnur (50) zu stecken und klemmen.
6. Hänge- und Höhenverstell Vorrichtung nach einem bzw. mehreren vorherigen Ansprüchen, worin die Drehfeder (20) eine Bandfeder ist, wobei ein Bandteil (24) an das Gehäuse (12, 14) befestigt wird und ein Bandende (22) an die Trommel (40, 60) vorzugsweise am Sitz (45) befestigt wird.
7. Hänge- und Höhenverstell Vorrichtung nach Anspruch 6, worin die Trommel (40, 60) einen Sperrbolzen (30) enthält, der eine Kerbe für den Eingriff des Bandteils, wobei diese Kerbe ein Paar Enden hat, die an entsprechende Ausnehmungen (18) des Gehäuses (14) eingreifen.
8. Hänge- und Höhenverstell Vorrichtung nach einem bzw. mehreren vorherigen Ansprüchen, worin das Gehäuse zwei Halbschalen (12, 14) aufweist, die an ihren ersten Enden (12b, 14b) mittels einer Auslöseverbindung (12a, 14a) und zweier Rippen (16a) und an ihren entgegengesetzten Enden (12c, 14c) mittels eines Schliessrings (19) zusammengesetzt werden können, wobei die Rippen (16a) einen ersten Haken (16b) für den Eingriff mit der Auslöseverbindung (12a, 14a) und einen zweiten Haken (16) für die Befestigung an eine Aussenhalterung aufweisen.

Revendications

1. Dispositif (10) de suspension et de réglage de hauteur pour lampes à suspension, comprenant un carter (12, 14) pour le logement d'un pignon (40, 60) pour l'enroulement d'une corde (50) de suspension, le dit pignon ayant à sa première extrémité bridée (42) un logement (45) pour un ressort à torsion (20) et à l'extrémité bridée (60) opposée au moins un

cliquet d'arrêt (64) qui peut s'engager de manière unidirectionnelle avec une roue dentée (80) disposée dans le dit carter coaxiale avec le dit pignon, **caractérisé en ce que** la dite roue dentée (80) peut être embrayée en par friction par un mécanisme comprenant un écrou (45) disposé à l'extérieur du dit carter (12, 14), une plaque (17) et un goujon fileté (70) passant au travers du dit mécanisme et de la dite roue dentée (80), le serrage du dit écrou (15) sur le goujon (70) permettant le blocage par friction de la roue dentée (80) sur la plaque (17).

2. Dispositif de suspension et de réglage selon la revendication précédente, dont le dit pignon est formé par un corps (40) cylindrique bridé comprenant le dit logement (45) pour un ressort et une bague bridée (60) comprenant au moins un cliquet d'arrêt (64), le corps cylindrique (40) et la bague bridée (60) pouvant s'engager réciproquement par des profils conjugués (48, 66) en queue d'aronde, dont le corps cylindrique (40) et la bague (60) sont aussi soudés, de préférence par soudage ultrasonique.
3. Dispositif de suspension et de réglage selon la revendication précédente, dont le corps cylindrique (40) et la bague (60) sont bloqués entre eux par dents (47) formées intégraux sur le corps cylindrique (40) ou sur la bague (60) en une telle position qu'ils empêchent l'écoulement relatif des profils conjugués (48, 66), après leur déformation pendant l'assemblage.
4. Dispositif de suspension et de réglage selon la revendication 2, dont le dit cliquet d'arrêt (64) a une contre-dépouille (64b) apte à s'engager avec la surface latérale extérieure du dit profil en queue d'aronde dans la position engagée avec la dite roue dentée (80).
5. Dispositif de suspension et de réglage selon une ou plusieurs revendications précédentes, dont le dit pignon (40, 60) dans l'extrémité bridée (42) est muni d'au moins une entaille (44) pour l'introduction et le blocage d'une extrémité de la corde (50) de suspension.
6. Dispositif de suspension et de réglage selon une ou plusieurs revendications précédentes, dont le ressort est un ressort à torsion en bande, où une partie de la bande est fixée au dit carter (12, 14) et une extrémité de la bande est fixée au dit pignon (40, 60), de préférence en correspondance au dit logement (45).
7. Dispositif de suspension et de réglage selon la revendication 6, dont le pignon (40, 60) comprend un goujon de blocage (30) ayant une entaille pour l'introduction de ladite partie du ressort, où ladite en-

taille établit une paire d'extrémités (32) à son tour engagées dans des cavités (18) du carter (14).

8. Dispositif de suspension et de réglage selon une ou plusieurs revendications précédentes, dont le dit carter comprend deux demi-coquilles (12, 14) qui peuvent être assemblées en correspondance des deux premières extrémités (12b, 14b) par un embrayage à déclic (12a, 14a) et de deux ailettes (16a), et en correspondance des deux extrémités opposées (12c, 14c) par une bague de retenue (19), les dites ailettes (16a) étant munies d'un premier crochet (16b), qui peut s'engager avec le dit embrayage à déclic (12a, 14a), ainsi que d'un deuxième crochet (16) pour la fixation à un support extérieur.

20

25

30

35

40

45

50

55

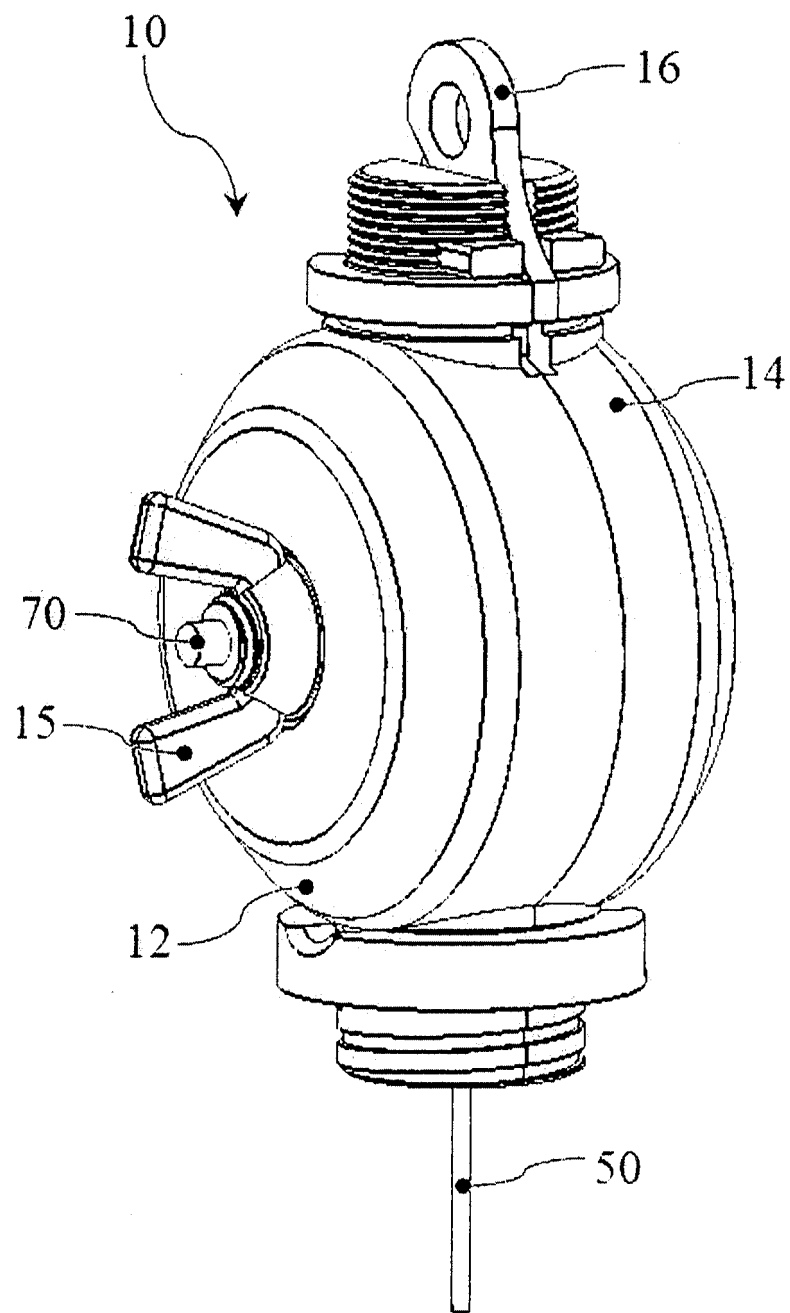


Fig. 1

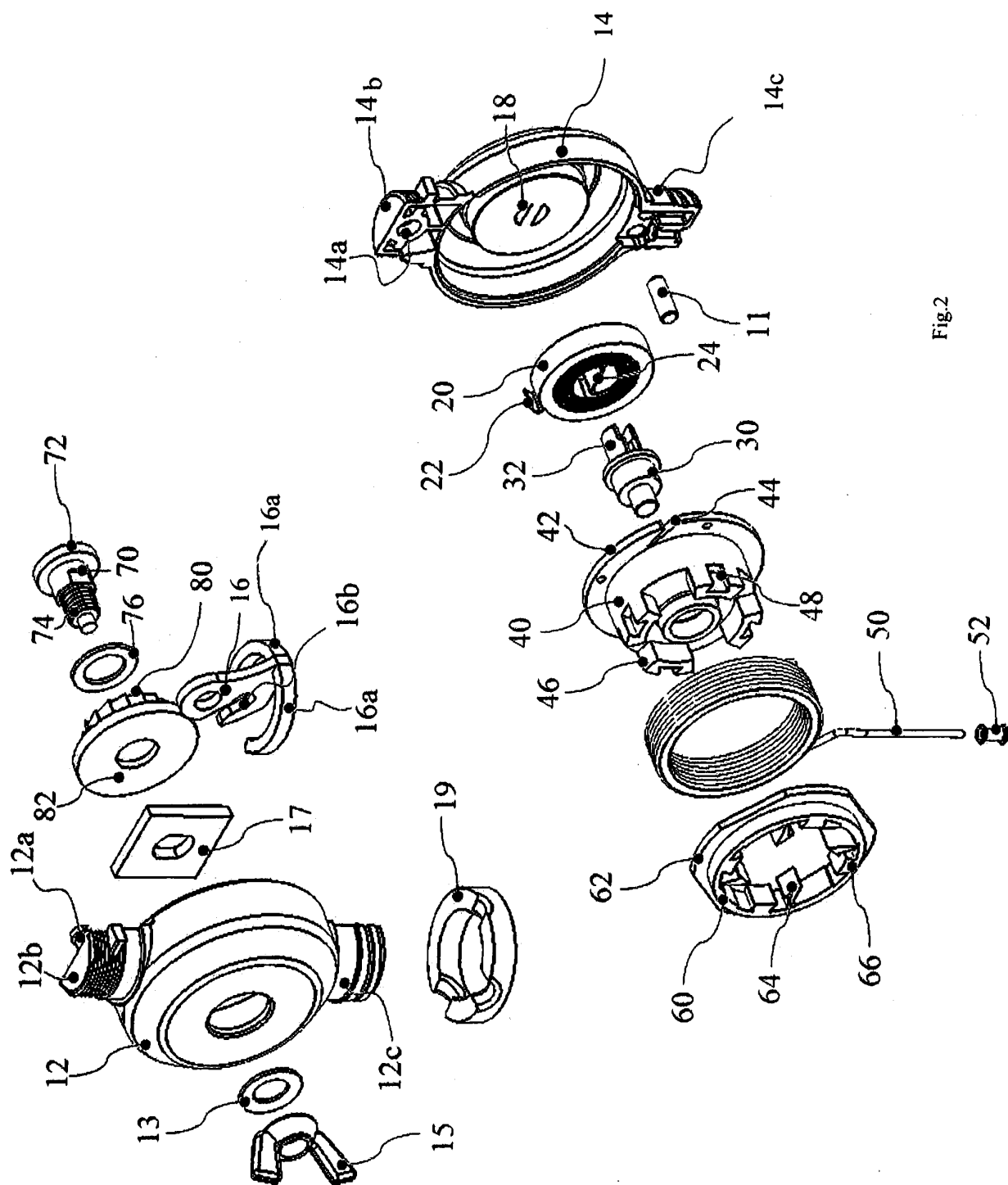


Fig.2

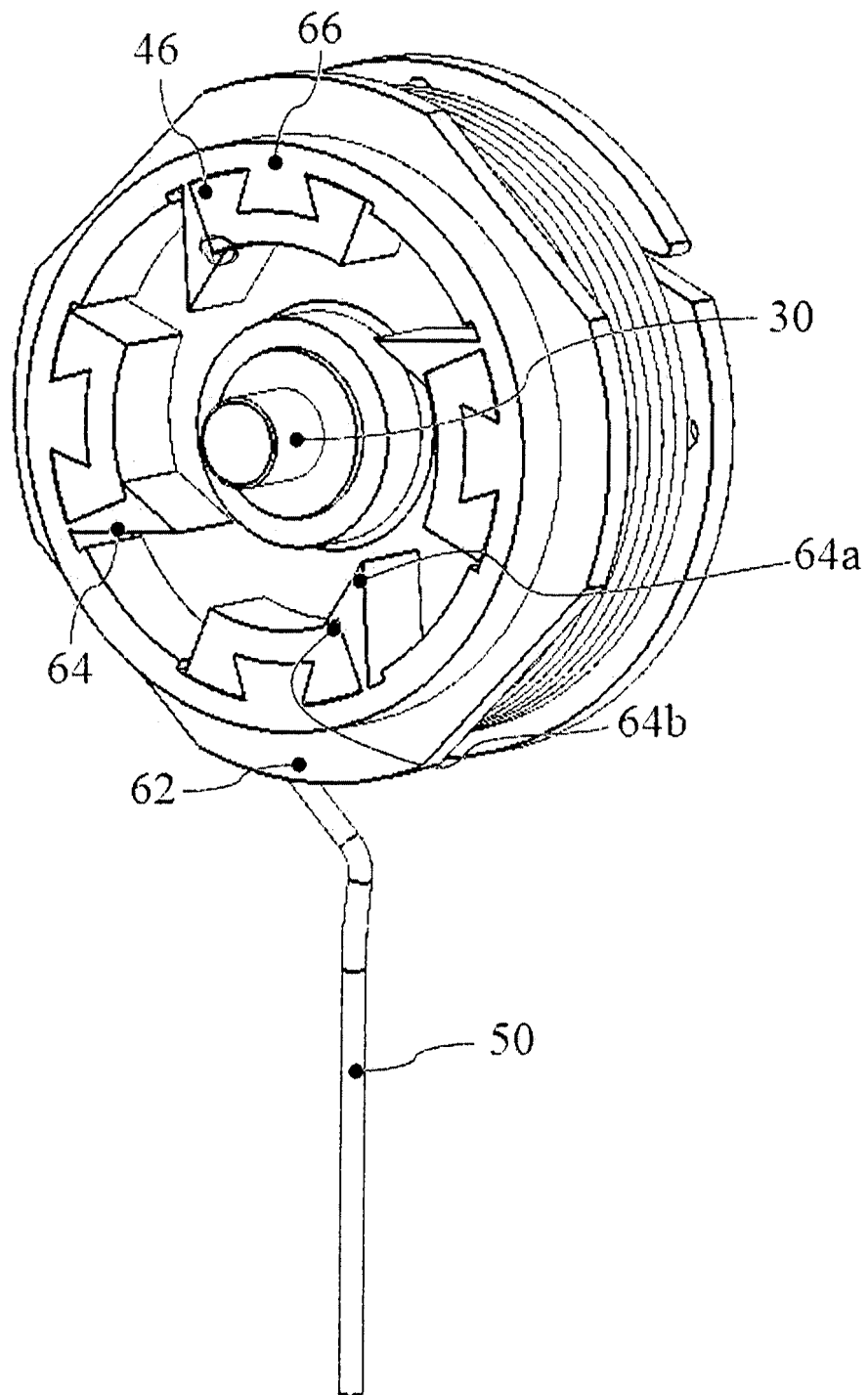


Fig. 3

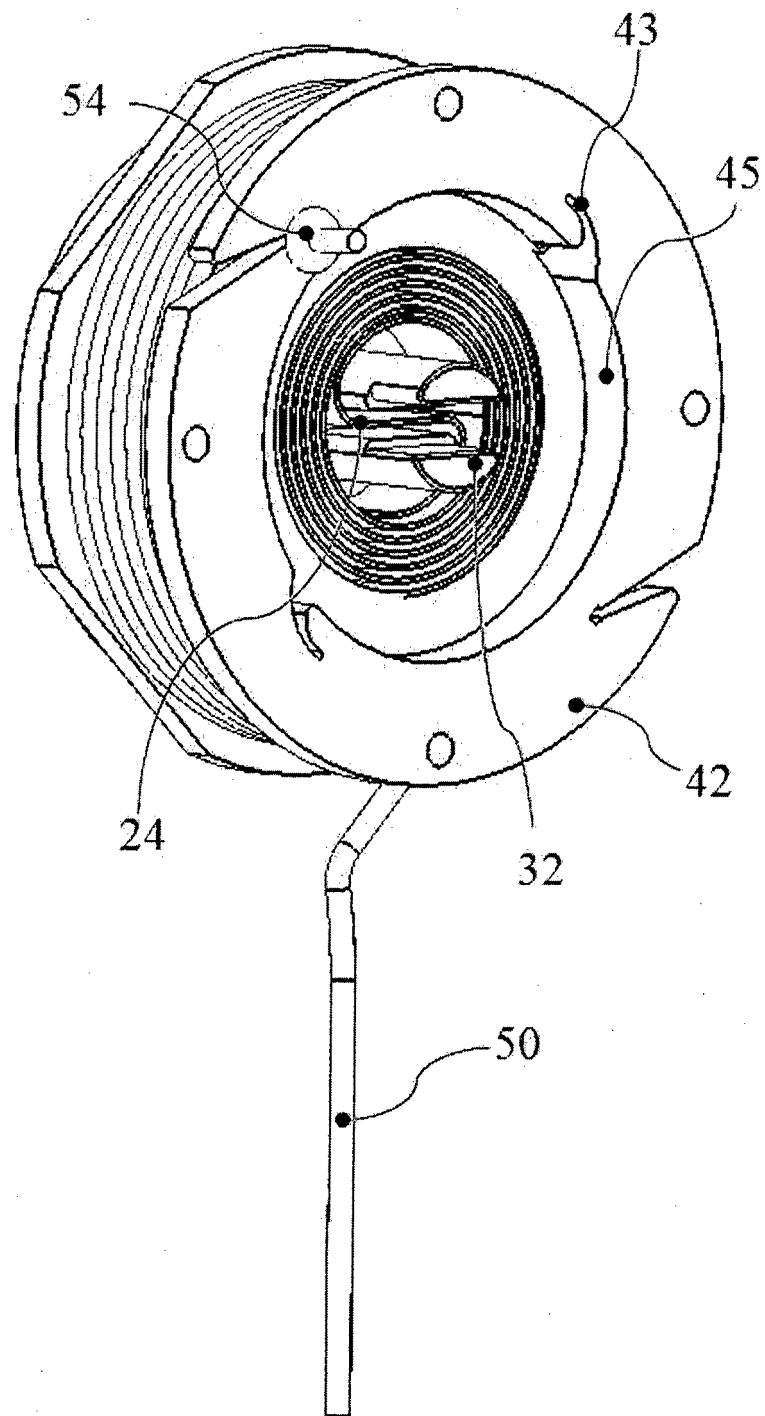


Fig. 4

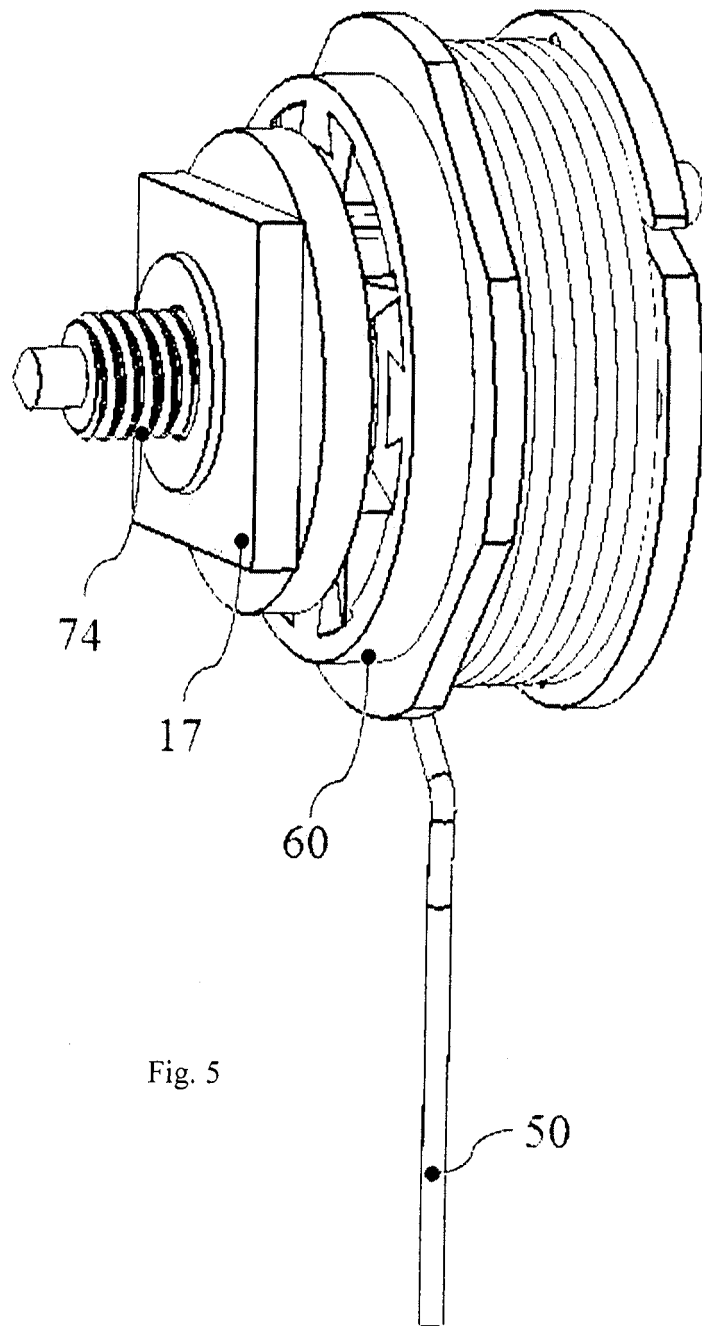


Fig. 5

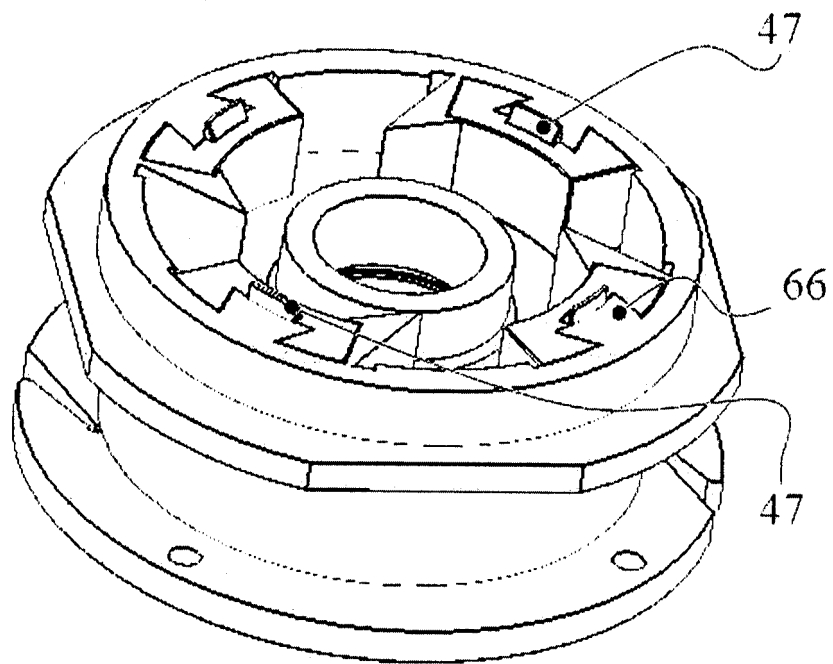


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- DE 9305844 U1 [0004]
- WO 9214093 A [0005]
- EP 0676586 A1 [0006]