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(54) **A lamp shade made of a spiral coil spring**

(57) A lamp shade (2;23;26;32) is configured as at least one helix (2;23;26;32) having a plurality of coils (7;24;27;33). Simply by pulling one end of the helix (7;24;27;33) the length can be selected as desired. If e.g. much dimming or spreading of light is intended a helix (2;23;26;32) having a large number of windings or coils (7;24;27;33) is chosen or the helix (2;23;26;32) is compressed to the preferred lenght which satisfies the consumers lighting demand. The light penetrating between the coils (7;24;27;33) provides a pleasant illumination of its surroundings or serves as background light for decorative purposes. The lamp shade can be implemented in both ceiling lamps, wall lamps, table lamps, and floor lamps.

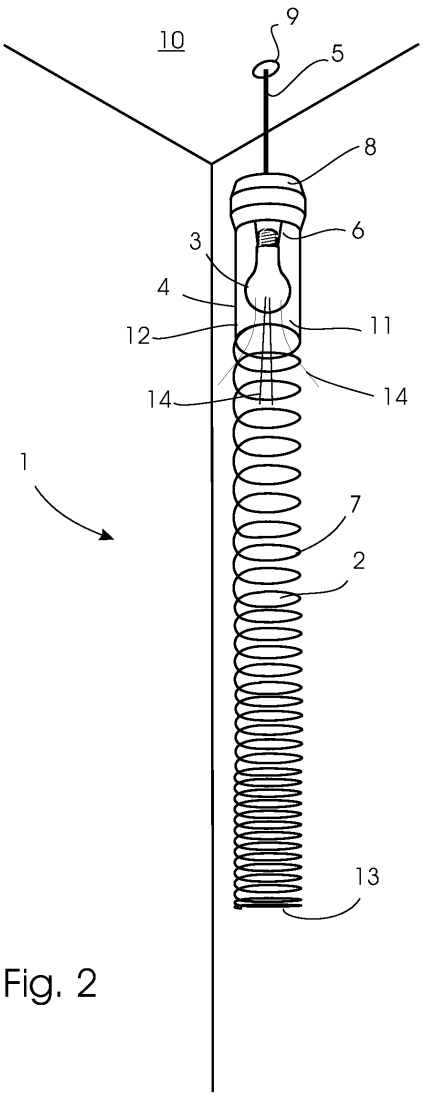

Fig. 2

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Description

[0001] The present invention relates to a lamp shade and lamps including the lamp shade.

[0002] Lamp shades are vital components in lighting fixtures. They serve a number of purposes, such as directing light to a desired surface, reducing glare, and providing an attractive alternative to an unsightly lighting source such as a light bulb. After installation, the lamp shades usually require adjustment to improve the performance and the aesthetic appearance of the fixture. Furthermore, lamp shades require various kinds of lighting fixtures for mounting both on the lamp, e.g. to a lighting source such as a light bulb, and on a subjacent surface.

[0003] Many commercially available lamp shades are voluminous and require a large package volume during storage and shipping. In addition many conventional lamp shades typically have significant aesthetic or mechanical shortcomings, and they make use of fabrics such as paper, linen and silk, which prevent their widespread use indoors and outdoors due to fire hazard and weather conditions.

[0004] It as a first aspect according to the present invention to provide an alternative lamp shape which appeals to the consumers and can be used both indoors and outdoors.

[0005] It is a second aspect according to the present invention to provide a lamp shape having an adjustable extent.

[0006] It is a third aspect according to the present invention to provide a lamp shade which is flexible.

[0007] It is a fourth aspect according to the present invention to provide a lamp shade, which can be folded in a compact size so as to ease packaging and shipment.

[0008] It is a fifth aspect according to the present invention to provide to lamp which is easy to assemble, expand and suspend.

[0009] The novel and unique whereby this is achieved according to the present invention is the fact that the lamp shade is configured as at least one helix having a plurality of coils.

[0010] The helix may be either right-handed or left-handed as may be preferred. Hence, if the line of sight is taken as the helical axis, clockwise movement of the helix corresponds to axial movement away from the observer, corresponding to a right-handed helix. A counter-clockwise movement corresponding to axial movement away from the observer, similarly defines a left-handed helix. A right-handed helix cannot be turned or flipped to look like a left-handed helix and vice versa. The helix may e.g. be conic or circuluar. A conic helix is defined as a spiral on a conic surface, with the distance to the apex being an exponential function of the angle indicating direction from the axis. A circular helix has constant curvature and constant torsion.

[0011] Light will emit in a unique pattern through the open gaps between the windings and provides a luminous effect on the surrounding which has never been seen before. When light beams hits the plurality of coils, the light beams are prevented from passage and caused to change direction. The light beams are diverted, reflected, emitted back and broken up resulting in that beautiful light patterns shows on the surfaces around the helix lamp shade. This pattern can be altered by providing one or more lamp shades of the same or different torsion, length or shape.

[0012] As mentioned above almost all conventional lamp shades have a continous covering, e.g. of linen, paper or glass. Often the light source is too close to the covering which is at risk of getting burned. Additionally, lamps using such lamp shade often is unable to illuminate to a satisfactorily extent. Moreover, such lamp shades have a fixed size which limits the consumers choice of selection between lamps. The consumer may e.g. fall in love with one design which however cannot be fit into a specifik room or space due to spatial limitations. Such coverings serve for dimming the light emission from the enclosed light source and for directing the ligth towards a target areas, but are often not suitable as background illuminitation or as artistic illumination. The at least one helix may also be colored, semi-transparent or fully transparent.

[0013] The consumer cannot change the exterior extent of conventional lamp shades, and as a result not change the overall exterior apperance of such lamp shade, as can be done with the lamp shade according to the present invention, wherein the helix is extendable. Simply by pulling one end of the helix the length can be selected as desired. If e.g. much dimming or spreading of light is intended a helix having a large number of windings is chosen or the helix is compressed to the preferred length which satisfies the consumers lighting demand.

[0014] The length of the helix may be extended or reduced along the central axis of the helix. Furthermore the helix can be made so flexible that it can move sidewise too, e.g. in response to a turbulent flow of air in the room when a person passes the lamp shade, in respons to deliberate touching, or without direct contact with the lamp shade in response to any kind of vibrations and external forces.

[0015] In a modified lamp shade according to the present invention at least one coil of a helix has a least one kink. Alternatively, a continous thread can be folded, kinked and/or bend into various polygional shapes and twistings to create concentric or at leat partly overlaying, ring shaped or polygonal shaped outlines. Thus, within the scope of the present invention a coil can, if preferred, be chosen as other shapes and outline.

[0016] In a preferred embodiment the at least one helix may be a torsion spring, preferably of metal or hard plastic. A spring is defined as a surface of revolution in the shape of a helix with thickness, generated by revolving a circle about the path of a helix. A torsion spring is defined as a spring which has no compression or tension.

[0017] The Slinky, which is a coil-shaped toy invented

by mechanical engineer Richard James in 1943 in Philadelphia, Pennsylvania, and disclosed in US patent no. 2,415,012, is a preferred example of a torsion spring for use as a helix lamp shade suitable for the present invention. The shape of the Slinky is a simple helix, or coil design, of a ribbon of material, originally metal.

[0018] Although a torsion spring may be the preferred helix for a lamp shade according to the present invention a spring which can be given a permanent deformation in response to an external force is also within the scope of the present invention. Such a spring may be compressed, extended, twisted or turned, to preserve a given shape after deformation. Subsequent deformations may be given if the exterior appearance of the lamp shape is desired altered.

[0019] The radius of the helix, which is to be understood as the radial distance from the longitudinal axis of the helix when all coils are arranged concentric above each other may be the same along the longitudinal axis of the helix'. The radius of helix may increase or decrease along the length of the helix, or the length of the helix may comprise sections having the same radius, increasing radius, decreasing radius or combinations of these. The radius to vary may be both the interior radius, the exterior radious or combinations of these.

[0020] Various impressions of light can be obtained if the pitch of the helix and/or helix angle is identical along the length of the helix or varies along the length of the helix. The pitch of a helix is the length of one coil, that is of one complete helix turn, measured along the helix axis. The helix angle is the angle between any winding or coil of the helix and an axial line on the helix cylinder.

[0021] The flexible helix lamp shade according to the present invention may expediently be substantially self-contained, so as to constitute a single unit which can be altered to produce a plurality of light pattern by controlling for example length, direction, shape, torsion and numbers of helices. The helices can be collapsed so that the height of the lamp shade can be minimized for shipping. The lamp shade may then be reliably and easily extended according to the consumers individual decision and need at the time and site of use.

[0022] The coils or windings of the helix can be ribbons as in the Slinky, or the helix can be wound as a continuous thread having any desired cross-section, such a circular, oval, triangular, squared or any other polygonal cross-section. The thread, band or ribbon can in itself be a coiled-up structure, such as a continous coiled wire, with or without strecthability.

[0023] The lamp shade according to the present invention is used on a lamp, e.g. a ceiling lamp, wall lamp, table lamp or floor lamp for use inside or outside, to provide a pleasant illumination of its surroundings or to serve as background light for decorative purposes.

[0024] The lamp may comprise mounting fixtures for mounting on, suspending from, or arranging on a surface. Such mounting fixtures may enclose the electric components, such that cables the lamp socket and the light bulb can be hidden and invisible.

[0025] For example the bulb can be installed in a manner that allows for it to be moved with respect to the lamp shade to adjust and modify the pattern of illumination. It is also possible to insert a fluorescent tube inside the helix, in which case the coils prevent the hard light from the tube from being unpleasant to the eyes of the wiever.

[0026] The mounting fixtures may be configured to distance the lamp shade from the surfaces onto which it is suspended and may be configured to accommodate the light bulb. The preferred distance may e.g. be the distance to the wall which provides a flimsy lamp shade yeilding gently in response to the wind. Other kinds of mounting fixures include a fitting for securing or anchoring an end of the lamp shade to a wall or the ceiling. Such a fitting can e.g. include a magnet or a Velcro® means for simple coupling with a similar means, moveable or not moveable on the subjacent surface.

[0027] A particular beautiful luminous effect can be obtained if the lamp comprises two or more lamp shades. Free ends of two lamp shapes may converge towards a mutual anchoring point on a surface or may diverge to provide a star or chandelier formation where each lamp shade terminates at a free end, which is or is not anchored at an anchoring point.

[0028] As is clear from above the lamp shade according to the present invention can be used for a wall mounted lamp, a hanging lamp, table lamp and/or floor lamp, and can be adjusted and configured in accordance with any spatial conditions.

[0029] The invention will be explained below with reference to the accompanying drawing in which,

fig. 1 shows a perspective exploded view of a principle sketch ceiling lamp provided with a helix lamp shade according to the present invention,

fig. 2 shows the same in an assembled state,

fig. 2a shows a pespective view in an enlarged scale, a fragmentary view of a section of a Slinky helix,

fig. 2b shows a collapsed helix in a perspective enlarged scale,

fig. 2c shows a second helical principle for a lamp shade according to the present invention,

fig. 3 shows, seen from the side, a first embodiment of a wall lamp according to the present invention,

Fig. 4 show a perspective view of a principle sketch of a second embodiment of a ceiling lamp according to the present invention,

Fig. 4a shows, in perspective and in an enlarged scale, a fragmentary view of the helix used a lamp shade for the second embodiment of a celing lamp

shown in fig. 4,

Fig. 5 show a perspective view of a principle sketch of a third embodiment of a ceiling lamp according to the present invention,

Fig. 6 shows a perspective view of a principle sketch of a second embodiment of a the ceiling lamp shown in fig. 1 in an alternative arrangement,

Fig. 7 show a front view of a principle sketch of a wall-mounted lamp, and

Fig. 8 shows a perspective view of a table lamp.

[0030] In the following the dimension of the coils of the helix are shown without substantially width or height. It is however understood that a coil can be given both radial and axial extent. The coils of the helix may be created by sectioning a thin pipe, or a pipe of any suiable wall thickness, into a spiral having a plurality of thin, flat spiral winding, such as ribbons, in which preferred case a coil may have a radius larger than the height of the coil. The opposite arrangement in which the height is larger than the radial extent is also possible. A coil may also be made of a round thread, which is made into a continous helix or spiral. The helix may or may not be made of a material enabling the helix to keep a sustained degree of compression or tension if no external forces are applied to the helix. In the figures the light bulb is visble, as if the fixture is transparent. This is only for sake of illustrative purposes, and it is preferred that the fixtures are not transparent in order to reflect and direct light towards and through the helix. Mirrors may even be inserted into the fixture holding the light bulb to improve reflection of light. Also the helix is indicated as inserted in mounting fixture. Within the scope of the present invention, and end of a helix lamp shade can be arranged to surround a mounting fixture too.

Fig. 1 shows a perspective, principle sketch of an exploded view of a simple embodiment of a ceiling lamp 1. This lamp 1 is seen in assembled state in fig. 2.

The ceiling lamp 1 include a lamp shade 2, a light bulb 3, and a ceiling fixture 4. The celing fixture 4 includes the electric wire 5 and a lamp socket 6 (non visible), for mounting of the light bulb 3. The lamp shade 2 is configured as a helix, in the case shown a torsion spring 2, having a pluraity of coils 7, such as a Slinky, which is right-turned.

As seen better in fig. 2 the celing fixture 4 has a first end 8, which is connected to an electrical wiring 9 runnning in the ceiling 10, and an opposing second end 11 for receiving and securing a first end 12 of the helix 2. The light bulb 3 is mounted in the lamp socket 6 inside the the ceiling fixture 4 to allow light emission through the coils 7 along the axial length of the helix 2 towards the opposing free end 13 of the helix 2. The lighth emission is indicated by spread apart bended lines 14.

The torsion spring used in the ceiling lamp 1, shown in figs. 1 and 2 is preferably a metal torsion spring with no tension or compression. An example of such a torsion spring is seen in the enlarged scale view of fig. 2a, illustrating a section of the coils of a Slinky, in which the thickness or width w of the material of a coil 7 is larger than the height h og the material of the coil 7. Because, the second end 13 of the helix droops from the ceiling fixture the picth of the helix 2 and the distances between the various coils 7 decreases towards this second end 13, simply due to gravity.

Fig. 2b shows in perspective and in an enlarged scale the helix 2 seen in fig. 2 in a collapsed state.

Fig. 2c shows a principle sketch of a second helical principle for use in a lamp shade according to the present invention. The circular coils of the conventional helix is substituted by a plurality of triangles, in the case shown three, which is mutually connected to extend into each other. Hence the triangles are constituted by a continuous, flat band. The band can e.g. be made by continous cutting a triangular pipe into a spring.

Fig. 3 shows a side view of a wall lamp 15 according to the present invention. The wall lamp 15 includes the lamp shade 2 as used for the ceiling lamp 1 shown in fig. 1, namely the same helix 2. The first end 12 of the helix is secured to a top wall fixture 16, accomodating a light bulb 3 (not visible). The light bulb 3 is plugged in the lamp socket 6 (not visible) as for the ceiling lamp 1, and electric wiring 17 is led through a top wall mounting 18 and hidden inside this wall mounting 18. The second end 13 of the helix 2 is secured to a bottom wall fixture 19 for keeping the helix 2 extended to the desired length and/or in the desired direction. The bottom wall fixture 19 has a wall mounting 20 extending perpendicular from the bottom wall fixture 19. The wall mountings 18;20 serves for mounting the lamp 15 on a wall 21, preferable at a distance from the wall 21, to obtain light reflections from both the wall 21 and the coils 7 of the helix 2, to create decorative, artistic and unique light patterns. The bottom wall fixture 19 may also be slidable arranged in a guide rail (not shown) on the wall 21, in order to be able to adjust the length of the helix, and as a result the amount of light passing in between the coils. Magnetic or Velcro arrangements are also possible. Moreover, since the helix is able to move or deflect, e.g. in response to puffs of air or touching, ligth patterns can be unexpectedly altered to create everchanging light sceneries when passing the wall lamp 15. In the case shown the wall mountings 18; 19 extends perpendicular from the wall fixtures 16;19, however within the scope of the present invention any angular relationship between a wall fixture and a wall mounting and any design of said fixtures and mountings are included and foreseen. Because, the second end 13 of the helix 2 is held extended in the bottom wall mounting 20, the pitch of the helix 2 and the axial distance between the two neighbour coils 7 is substantially the same over the entire length of the helix. This is however optional and the helix 2 can be extended to other degrees.

Fig. 4 shows a perspective view of a second embodiment of a ceiling lamp 22 according to the present invention. The main difference between the ceiling lamp 1 seen in fig. 1 and the second embodiment of a celing lamp 22 is that a helix 23 having coils 24 of axial extension larger than the radial extension is used. Thus, as seen best in the fragmentary view of fig. 4a a coil 24 has an axial length or height H, which is larger than the radial thickness R of the spiral ribbon of the helix 23. This embodiment provides yet a novel pattern of light, and by adjusting the length of the helix 23 the ligth emissions can be controlled to either spread light, dim ligth or direct light. The lamp 22 has the same advantages as the ceiling lamp 1.

Fig. 5 show a perspective view of a principle sketch of a third embodiment of a ceiling lamp 25 according to the present invention. The ceiling lamp 25 differs from the first embodiment 1 and the second embodiment 22 in that the lamp shade is a helix 26 having sections of coils 27 having decresing and/or increasing interior and exterior radius or distance from the longitudinal axis.

Fig. 6 shows a perspective view of a principle sketch of a second embodiment of the ceiling lamp 1 shown in fig. 1 in an alternative arrangement where the helix 2 is bent so that the second end 13 of the helix 2 is fixed at the wall 21. Such fixation can be made e.g. by means of a magnetic arrangement.

Other arrangements can be made within the scope of the present invention. For example the second end 13 of a helix 2 suspended at the celing 10 or at a wall 21 can be turned backwards to meet the first end 12. The bended arrangement shown in fig. 6 can quite as well be made with a wall lamp. A plurality of wall lamps kan be mounted side by side, and two helices can be coiled inside or around each other.

Fig. 7 shows a front view of a principle sketch of a wall-mounted lamp 28. The lamp 28 includes a tubular light source holder 29, which in the case shown is turned into a semicircular arrangement in which the open free ends 30,31 of the light source holder 29 from which light is emitted faces opposite ecah other. The lamp shade 32 complete the circular arrangement in that the free ends 33,34 are secured to the respective free ends 30,31 of the light source holder 29 and light is emitted through the coils 35, which coils are converges towards the center of the circular arrangment. The wall-mounted lamp 28 may be fitted with mounting fixtures (not shown) for securing the lamp 28 to a wall.

This wall lamp 28 can alternatively be used as a table lamp if preferred.

Fig. 8 shows in perspective a table lamp 36 with the same helix lamp shade 32 as in the embodiment shown in fig. 6, but in another arrangement. The free ends 33,34 of the helix 32 are secured to socket 37,38, which sockets may include the light emission means (not shown). The table lamp 36 can e.g. be battery powered, to be easy to move around, or can include electrical wiring for an electric plug.

Accordingly, it will be apparent to those skilled in the art that various modifications and variations can be made in and of the lamps and lamp shades of the present disclosure without departing from the scope of the invention. Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and example embodiments be considered as exemplary only.

Claims

1. A lamp shade (2;23;26;32), **characterized in that** the lamp shade (2;23;26;32) is configured as at least one helix (2;23;26;32) having a plurality of coils (7;24;27;33).

2. A lamp shade (2;23;26;32) according to claim 1, **characterized in that** the helix (2;23;26;32) is extendable and/or flexible.

3. A lamp shade (2;23;26;32) according to any of the claims 1 or 2, **characterized in that** at least one coil (7;24;27;33) of a helix (2;23;26;32) has a least one kink.

4. A lamp shade (2;23;26;32) according to any of the preceding claims 1, 2 or 3, **characterized in that** the at least one helix (2;23;26;32) is a torsion spring, preferably of metal or hard plastic.

5. A lamp shade (2;23;26;32) according to any of the claims 1 - 4, **characterized in that** the radius of the helix (2;23;26;32) is the same along the length of the helix (2;23;26;32), the radius of the helix (2;23;26;32) increases or decreases along the length of the helix (2;23;26;32), or the length of the helix (2;23;26;32) comprises sections having the same radius, increasing radius or decreasing radius or combinations of these.

6. A lamp shade (2;23;26;32) according to any of the preceding claims 1 - 5, **characterized in that** the pitch of the helix and/or helix angle is identical along the length of the helix (2;23;26;32) or varies along the length of the helix (2;23;26;32).

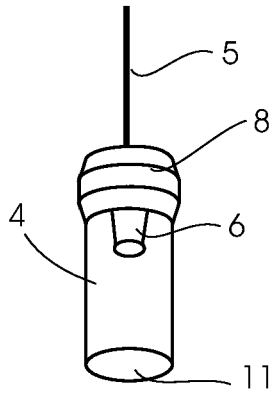
7. A lamp (1;15;22;25;28;36), **characterized in that** the lamp comprises at least one lamp shade (2;23;26;32) according to any of the preceding claims 1 - 6.

8. A lamp (1;15;22;25;28;36) according to claim 7, **characterized in that** the lamp comprises mounting fixtures (4;16,19;27;35;36) for mounting on, suspending from, or arranging on a surface (10;21).

9. A lamp (1;15;22;25;28;36) according to claim 7,

characterized in that the mounting fixtures (4; 16,19;27;29;37;38) is configured to distance the lamp shade (2;15;23;26) from a surface (10;21).

10. A lamp (1;15;22;25;36) according to claim 7, **characterized in that** the lamp comprises at least two lamp shades (2;23;26;32) having a mutual or different anchoring point of at least one end of the helix (2;15;23;26).



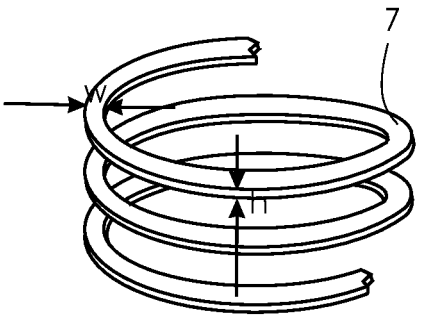


Fig. 2a

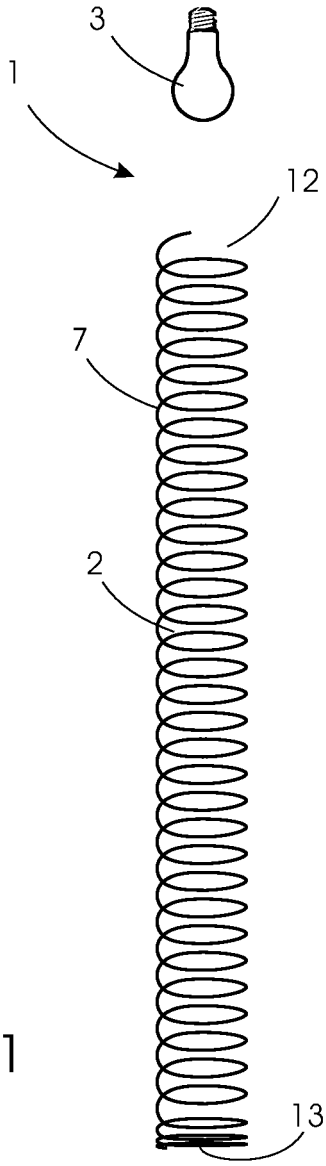


Fig. 1

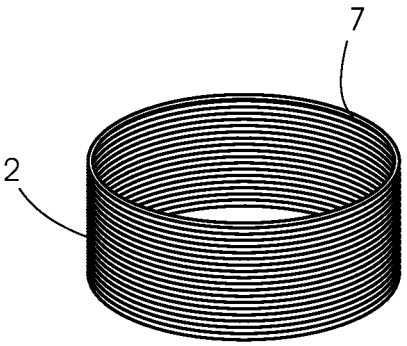


Fig. 2b

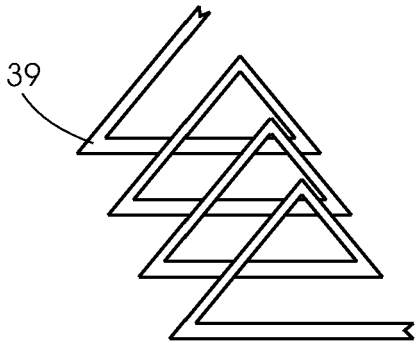


Fig. 2c

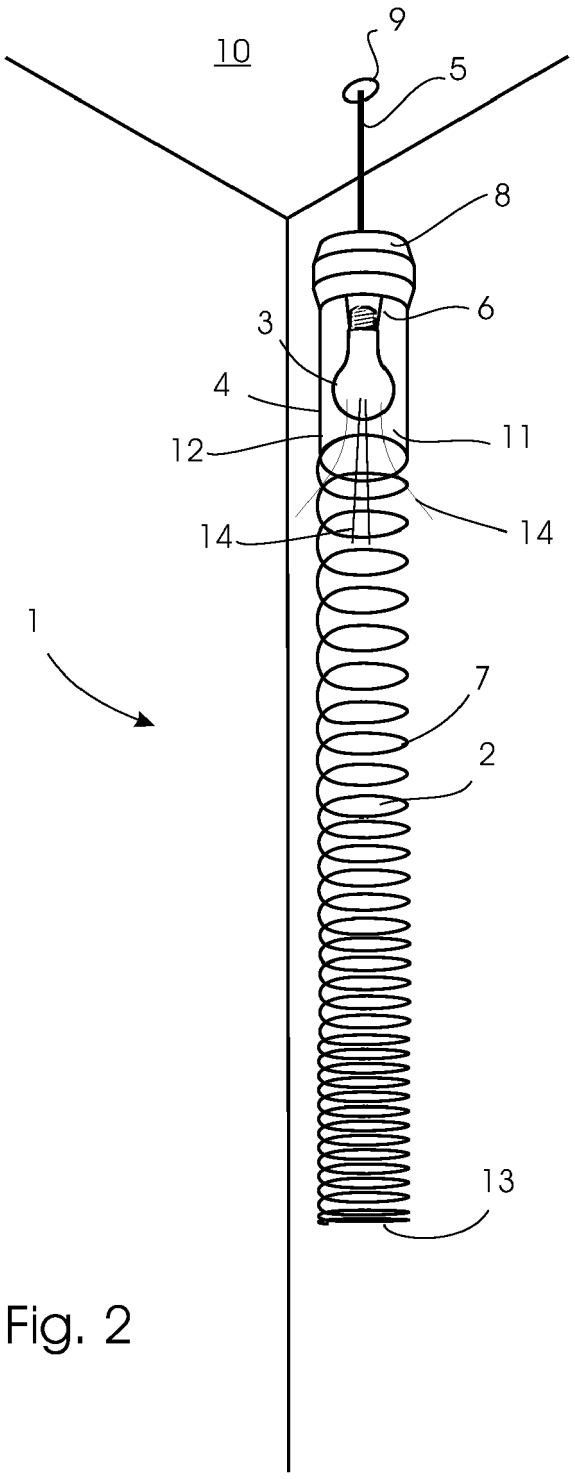


Fig. 2

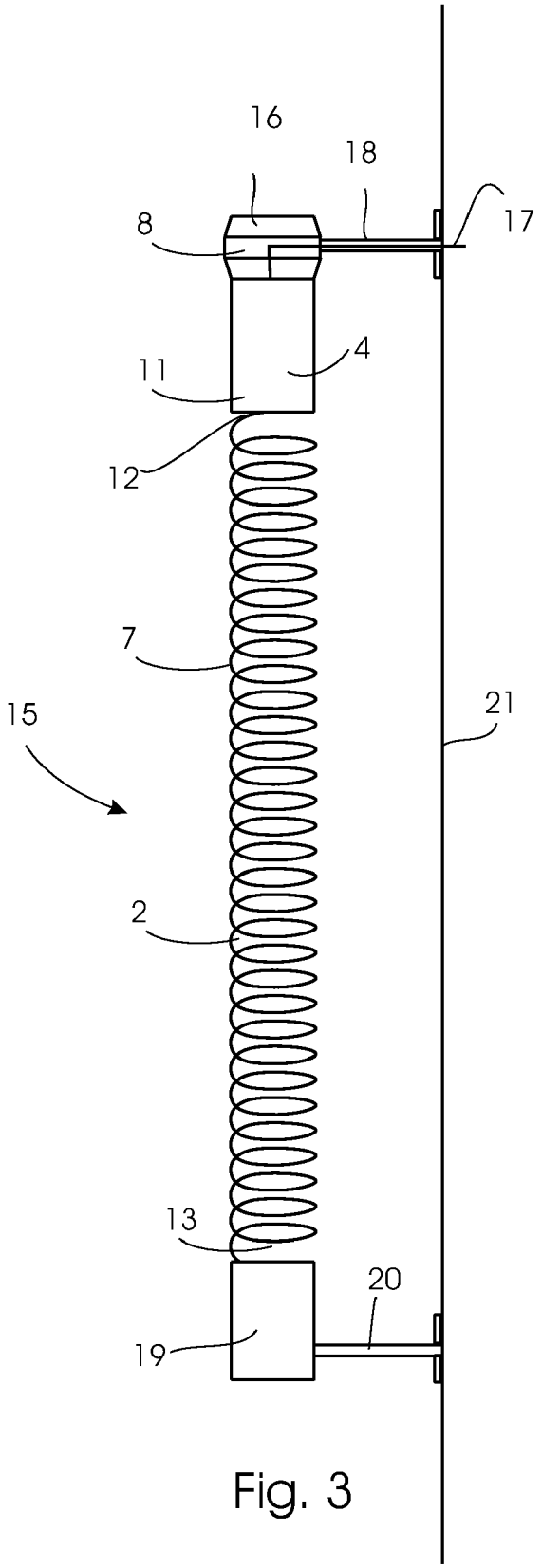


Fig. 3

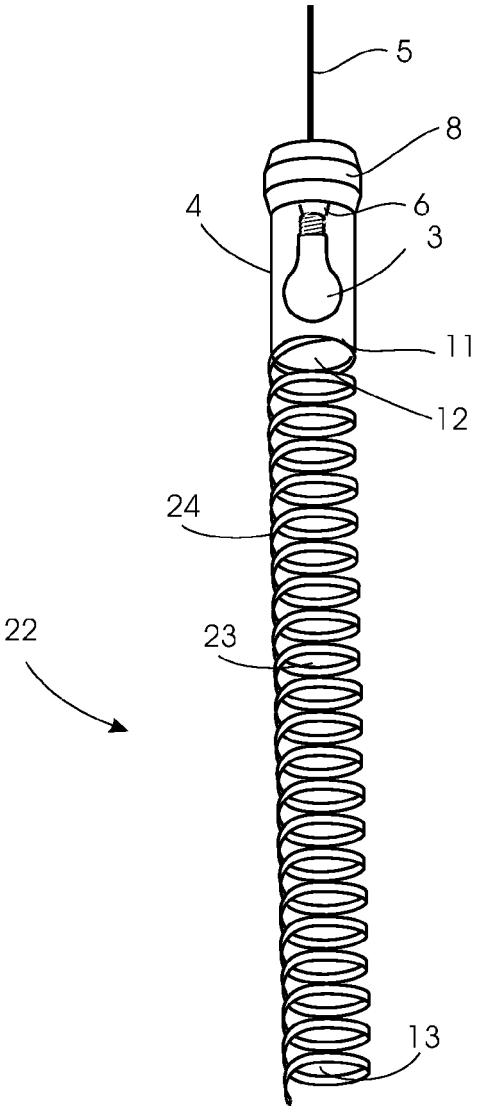


Fig. 4

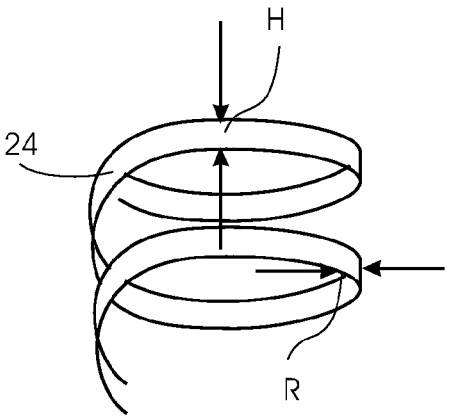


Fig. 4a

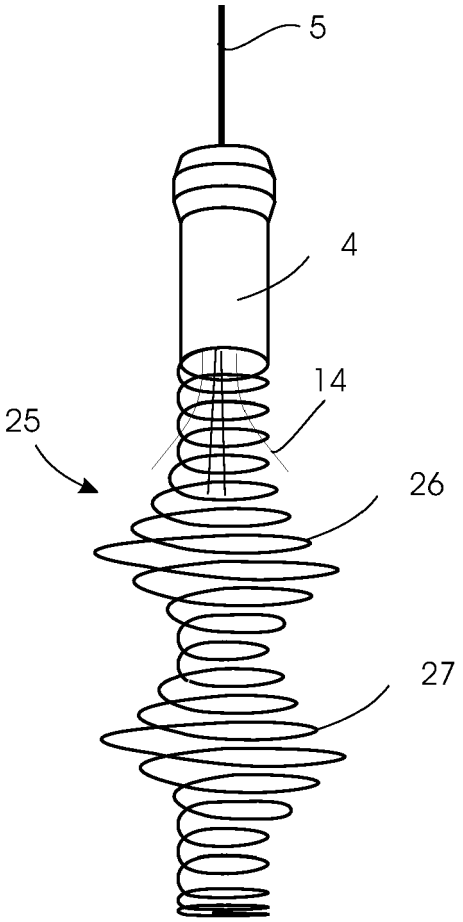


Fig. 5

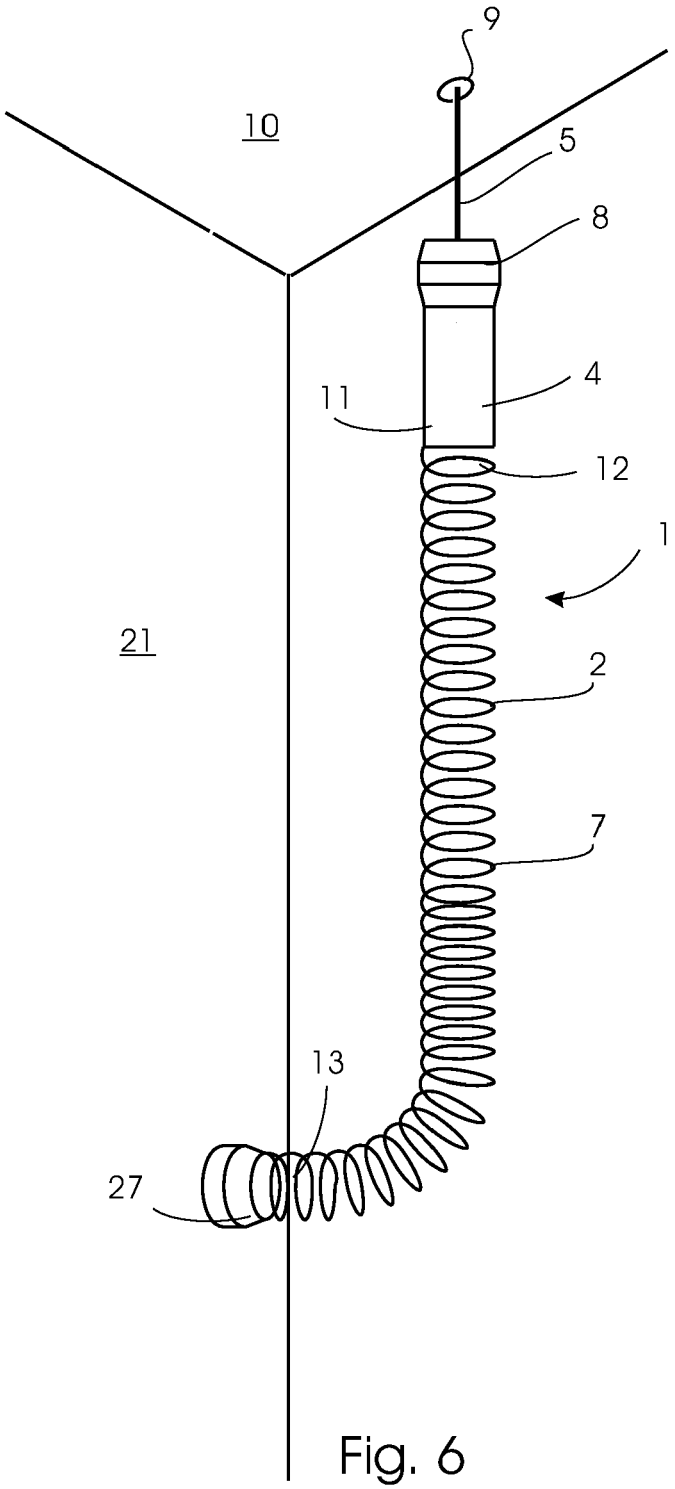


Fig. 6

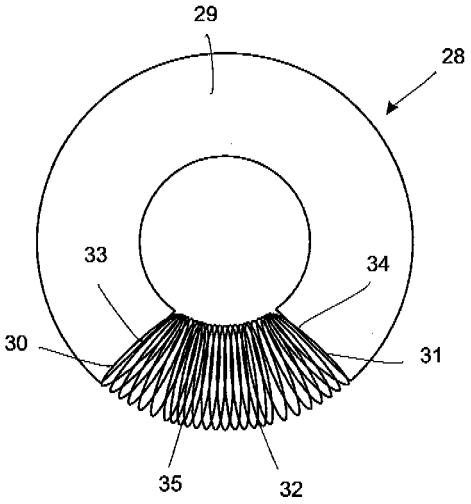


Fig. 7

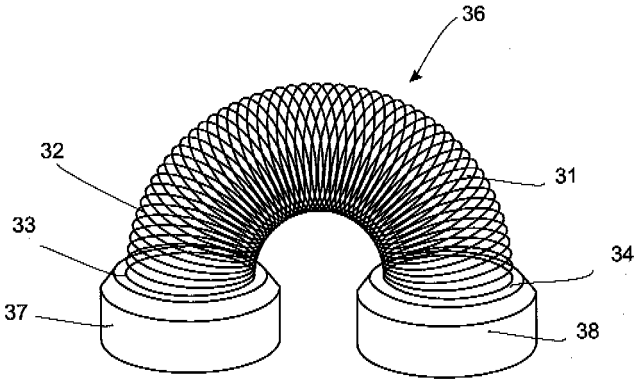


Fig. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 1167

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 11 120808 A (HITACHI LIGHTING LTD) 30 April 1999 (1999-04-30) * paragraphs [0004] - [0006]; figures 1,7,8 *	1-10	INV. F21V1/00 F21V11/00 ADD. F21W121/00
X	AT 178 399 B (BUECHTING ERNST) 10 May 1954 (1954-05-10) * page 1, line 15 - page 2, line 35; figures 1-6 *	1,2,4-10	
X	DE 103 22 800 A1 (HEIN LEHMANN TRENN FOERDER [DE]) 5 January 2005 (2005-01-05) * abstract; figures 1-4 * * paragraphs [0001] - [0011], [0023] *	1,4-9	
X	US 1 085 750 A (J.A. MC MICHAEL) 3 February 1914 (1914-02-03) * page 1, lines 19-74; figure 1 *	1-9	
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X	US 3 427 446 A (KATAVOLOS WILLIAM ET AL) 11 February 1969 (1969-02-11) * figures *	1,2,4-10	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 May 2008	Chaloupy, Marc

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EUROPEAN SEARCH REPORT

Application Number
EP 08 15 1167

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 175 334 A (MARENCO MARIO) 26 March 1986 (1986-03-26) * page 4, line 16 - page 8, line 14; figures 3,7 *	1-7,10	
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The present search report has been drawn up for all claims

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