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(54) **Adaptable insert**

(57) Insert suitable for being mounted in a wall, ceiling, piece of furniture or other element, wherein the insert comprises a housing, where said housing comprises a tube member (1), an end cover (2), where said end cover (2) and one end of the tube is provided with releasable assembly means, and where the opposite end of the tube is open, where said insert comprises means arranged outside of the tube, which means are expandable outside the inserts' outer periphery, and where socket means and electrical connection means are provided in said end cover.

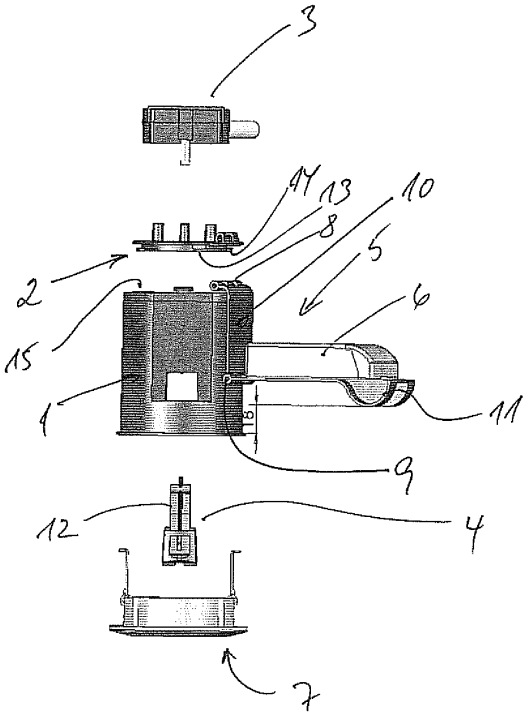

Fig 1

EP 2 157 370 A2

Description

Field of the Invention

[0001] The present invention relates to an insert suitable for being placed in a wall, ceiling or other element.

Background of the Invention

[0002] When mounting electrical equipment in wall, ceilings or other elements such as for example kitchen cupboards, book cases, shelves and the like, it is customary to arrange a box inside a cavity made in said element. The electrical wiring is usually led via appropriate piping systems to the connection boxes whereafter electrical equipment such as lamps, switches etc. are arranged, for example as a cover for the electrical connection box. Especially for lamps, the socket is usually arranged in a wire extending through an aperture in the lid of the electrical connection box, such that there is a physical distance between the electrical connection box and the socket for the lamp. For other types of lamps, especially for the so-called built-in spotlights, a ceiling spaced from the lower side of the horizontal division between two floor is provided. In the ceiling holes are drilled wherein the spots are arranged. On top of the ceiling the wiring is led to connection boxes attached to the underside of the horizontal division, whereby the built-in spots may be supplied with electricity. An example of such a connection box is disclosed in US6168299.

[0003] In buildings where a lowered ceiling cannot be provided, special implements may be inserted on the backside of the ceiling in order to accommodate the built-in spotlights. A number of factors must be taken into consideration when providing such a construction. Among others, the insulation placed immediately adjacent the ceiling as well as the humidity membrane has to be taken into consideration and appropriate measures taken in order for the humidity membrane to stay intact, and also for the insulation to be arranged properly around the build-in spotlight holder.

[0004] An additional problem concerning built-in spotlights in particular is generation of heat from halogen light sources which are predominant in the interior design, especially of stores and shops. In order to minimise the fire hazard, it is desirable to make sure that the temperature behind the halogen light source does not reach a level where ignition of combustible materials in the vicinity of the built-in halogen spot becomes a real risk. Usually, manufacturers of the halogen built-in spotlight devices advise that combustible materials should not be placed within 50 cm of such a device in order to avoid fire hazard. For some suppliers of electrical equipment, the corresponding requirements is that the temperature in the vicinity of the electrical equipment should not be allowed to rise above 90° C in order not to damage the electrical equipment and thereby rendering the electrical equipment the source of a fire hazard.

[0005] A prior art device comprising means for cooling the electrical equipment is known from US5664872. This device comprises two sections with are to be coupled such that first the electrical connections are completed and afterwards a fan unit is fitted to the connection box, whereby activation of the fan causes air to pass by the electrical installation. The connection box is adapted to be screwed into for example a ceiling, and then the light fixture will be mounted by means of a collar which collar is to be snap fitted onto the flange of the connection box, in order to provide the finishing touch necessary for this kind of installations when installed into an interior decoration scheme. The installation requires a number of parts, and furthermore once the connection box and the electrical connections are arranged it is impossible to access the fan unit from below the ceiling. Thereby cleaning and maintenance of the unit is severely hampered as a complete demounting of the unit is required in order to gain access to the unit.

[0006] The prior art devices are also all designed for use with only one particular type of light source in that each prior art device is supplied with one particular type of socket. Furthermore, for a number of applications it is necessary to have the device as such approved by the national authority for electrical installations, and most manufactures are therefore attempts to obtain approval for a series of prior art devices suitable for different light sources.

Object of the Invention

[0007] It is consequently an object of the present invention to provide an insert suitable for being placed in a wall, ceiling, furniture element or other element wherein an electrical installation means such as a lamp socket or the like may be fitted, without this insert causing any of the problems or risks as mentioned above. Also the insert shall be adaptable to include various light sources, in a standardized manner.

Description of the Invention

[0008] The present invention addresses this problem by providing an insert of the kind mentioned above wherein the insert comprises a housing, where said housing comprises a tube section, an end cover, where said end cover and one end of the tube is provided with releasable assembly means, and where the opposite end of the tube is open, where said insert comprises means arranged outside of the tube, which means are expandable outside the inserts' outer periphery, and where socket means and electrical connection means are provided in said end cover.

[0009] By providing separate elements, i.e. a tube section and an end cover, it becomes possible to use the tube section as a standard element for mounting a variety of different types of light fixtures in that the end cover which comprises the socket and the electrical connection

means may be selected according to the desired light source. In this manner it becomes possible to standardize the mounting of the inserts regardless of which type of light source is desirable at that particular position. The different types of light sources are also in most instances necessary to have different power sources and therefore, by using a standardized tube means the physical mounting in the element, for example a ceiling, wall or the like, may be carried out routinely, and the electrical connection means may also be carried out in a routine manner regardless of the power supply provided at that particular position.

[0010] The fastening between the end cover and the tube may for example be a so-called bayonet connection where flanges are provided along part of the periphery extending from the end cover where the part flanges may be inserted into suitable slits provided at the end of the tube and by turning the end cover relative to the tube, the flanges will engage the end of the tube thereby safely and securely holding the tube in relation to the end cover. Optionally adhesives, threads, snap-arrangements between the two parts or other means of fastening may be provided between the two elements.

[0011] In a further advantageous embodiment the end cover is provided on the side facing away from the interior of the tube, with an electrical connection box, which box may be selected according to the power, current, effect or light source needed.

[0012] Typically, the authorities will impose requirements on the means for protecting the surroundings against the possibility of electrical shocks, in particular where connections are provided in wiring. For this purpose, having a standardized connection box suitable and manufactured specifically for being attached to the end cover, it may be possible to use a standard connection box with any type of connection such that a safe and approved construction may be provided by using standard elements making up the insert according to the present invention.

[0013] In a still further advantageous embodiment a double hinge is provided, pivotably fastenable to the end cover, where the hinge comprises flange means for fastening electrical components such as one or more of the following: transformer, electrical switch, remote control circuitry, cooling and/or ventilation means.

[0014] As the insert provides the possibility of mounting the entire light fixture from the side from which the light is supposed to be visible, only an aperture slightly larger than the insert is desirable. For this reason all components need to pass through this aperture which is related to the installation as such. The double hinge mechanism provides for the possibility of having elongated elements such as for example a transformer or the like mounted on the hinge member which may be passed through the opening in the element prior to inserting the insert. The hinge mechanism will thereafter make sure that the components such as for example an electrical transformer, an electrical switch remote control circuitry, cooling and/or ventilation means are positioned immediately adjacent the back side of the element such that the overall construction height is kept at a minimum.

[0015] It is also possible to arranged the fastening of the double hinge on the tube element.

[0016] Naturally, the electrical components mentioned above do not limit the number or types of electrical components which are suitable to be arranged in connection with the double hinge.

[0017] The provision means expandable outside the insert's outer periphery, for example in the shape of resilient means for fastening the insert, does not necessarily need special tools, as in some embodiments the resilient means will be deflected when placing the insert and after the insert has reached its final position the resilient means will flick back into the original position and in this manner maintain the insert in position.

[0018] Furthermore, by providing resilient means, whether or not in the shape of spring like elements or as integrated deformable elements or sections in the insert, a firm and furthermore adaptable fastening method is provided. As the circumstances concerning the building components may vary from installation site to installation site, the advantageous provision of resilient means, i.e. adaptable fastening means, provides the possibility for reliable mounting of the insert in various materials and various circumstances. Thereby the risk of errors during installation is greatly reduced.

[0019] In a further advantageous embodiment of the insert according the present invention, a ventilation means is arranged at the end of the insert opposite the aperture.

By arranging the ventilation means in the end of the insert opposite to where the aperture is arranged, the interior of the insert is completely free and therefore any electrical installation may be installed without any interference from the ventilating means.

[0020] In a further advantageous embodiment, the end of the insert comprises one or more apertures for letting air in or out of the insert. In order for the insert to be able to compensate for the differences in pressure arising due to the ventilating means, apertures may be provided such that the inside of the insert is in communication with the ambient air.

[0021] In a further advantageous embodiment of the invention, the ventilations means is a ventilator comprising a fan and that optionally the current supply to the electrical installation also supplies current to the ventilation means.

[0022] In addition to a fan cooling ribs, for example aluminium ribs, may be provided. Although condensation often occurs due to the cold aluminium surfaces, the air current created by the fan will transport away any moisture, whereby condensation problems are avoided.

[0023] For low voltage installations such as for example 12 or 24 volt, it is possible to buy fans with a very low power consumption which will be able to provide a sufficient air current around the electrical installation in order

to provide a cooling effect. The power consumption is negligible in comparison to the power consumption by the light sources and, additionally, the extra heat generated by the fan is also insignificant in comparison to the cooling air current which may be led through the inside of the insert. For other voltages such as 110 volt or 230 volt, either appropriate fan means or a transformation means may be inserted in the circuit such that the fan is provided with the appropriate current and voltage. By this arrangement it is foreseen that no extra installations or actions are necessary in order to be able to provide the ventilation means with a power supply in that the insert is especially adapted to use with electrical installations and therefore means for providing the electrical power will be present in the insert and thereby available for powering the fan.

[0024] In a further advantageous embodiment the side of the end facing away from the aperture is supplied with distance keeping means as for example legs, protrusions, netting basket or the like. In instances where the insert according to the invention is installed in ceilings where the ceiling construction comprises the visible ceiling cladding behind which a humidity barrier is arranged, behind which the insulation is arranged, for example a soft glass wool, the insert is provided with distance keeping means such that it will be possible to make air available to the fan in order to create the cooling air stream down through the insert in order to cool the electrical installation provided inside the insert.

[0025] The distance keeping means may also comprise a filter such that dust and other particles are not transported into the room through the insert.

[0026] By arranging a fan, for example a low voltage fan comparable to the fans commonly used in order to cool personal computers, an advantageous embodiment may be achieved. These types of fans have a projected life expectancy of up till 200,000 hours at constant load at 70° C. Tests with the present invention have shown that in a set-up where a 35 W halogen light source of the Osram Decostar type was arranged inside the insert, the temperature above the light source, where the light source was connected to the wiring, reached about and stabilised at 91° C for the said 35 W halogen light source. By installing a fan of the type mentioned above used in personal computers, the temperature immediately adjacent the light source was reduced to 54.6° C and around the caballing the temperature was measured and stabilised around 32° C. The temperatures measured were, after the initial heat-up period, stable for the duration of the test which lasted more than four hours.

[0027] The lowering of the temperature has a number of advantageous effects. First of all, the life expectancy of the light source may be increased and at the same time the fire hazard immediately adjacent the installation is reduced dramatically. Furthermore, by arranging the fan such that the air current is directed into the room where the light is emitted, the heat produced by the light source and the fan is ventilated into the room and may therefore be used for heating purposes. Furthermore, as warm air is lighter than cold air, the warm air produced in order to provide a comfortable temperature in the living zone may be lowered in that the light source, due to the fans, will create a circulation of the air immediately adjacent the ceiling such that the warm air gathering along the ceiling will be forced downwards due to the air streams created by the cooling fans.

[0028] In a still further advantageous embodiment of the invention the insert is provided with means for attaching the electrical installation means, and that further means are provided for allowing the air stream created by the ventilation means to pass the electrical installation means.

Description of the Drawing

[0029] The invention will now be explained in detail with respect to the accompanying drawing, wherein

- fig. 1 shows a schematic presentation of an insert in exploded view,
- fig. 2 shows a schematic presentation of an insert, assembled,
- fig. 3 shows a cross-section through an insert in its mounted position,

[0030] In figure 1 is illustrated an exploded view of an insert according to the present invention. The insert comprises a tube member 1, an end cover 2, an electrical connection box 3, flexible and/or resilient expansion means 4, a double hinge construction 5 which in this embodiment is provided with a transformer 6 as well as a cover part 7.

[0031] The cover part is designed to be mounted once the entire insert and its connection have been installed through an aperture in an element such that the cover part 7 will cover the aperture and make an aesthetically pleasing finish finish around the insert.

[0032] The tube member 1 may be cylindrical, but not necessarily, and is in this embodiment provided with an opening in either end which will be explained with reference to the following figures. The double hinge mechanism 5 is provided with two pivot points 8, 9 such that the hinge flanges 10, 11 may relatively pivot such that the flange 11 may be put in a position where it extends in the same line as the tube 1. In this manner it becomes possible to install the entire installation through an aperture in an element which is of a size corresponding to the outside diameter of the tube 1.

[0033] In order to fasten the tube 1 on the backside of the element, flexible fastening means 4 are provided where the fastening means include a resilient member 12 which may be moved outside the periphery of the tube member 1 and into engagement with the backside of the plate member (not illustrated).

[0034] The end plate 2 is provided with a number of flanges 13, 14 which may be interfitted with correspond-

ing recesses provided at the top end 15 of the tube member such that after having placed the flange members 13, 14 inside the apertures provided in the end of the tube member 1 and twisting the end plate 2 a strong connection is established between the end plate 2 and the tube 1.

[0035] When assembling the elements described above with reference to figure 1 an insert as illustrated with reference to figure 2 will be the result. In this embodiment the number "18" written on the body of the tube 1 illustrates the thickness of the plate member into which the insert is to be mounted. With this configuration it is ensured that the transformer 6 will be positioned in a substantially horizontal position. This may be adjusted by the length of the flange 10 or the extent of the protrusions 2 arranged on the other flange 11.

[0036] The flange 11 may advantageously be provided with half circle shaped protrusions. These serve to avoid the flange being entangled in wires, cables or the like placed on the back side of the member into which the insert is mounted. Also when the insert is mounted in ceilings made from wood, the protrusions will act as runners, helping the flange and thereby the insert, passing gaps, grooves and the like which may be present on the surface.

[0037] Turning to the fastening means 4 it may be seen that by moving the member 21 downwards the end 22 of the resilient member 23 will due to the interaction with the fastening means 24 be made to project outside the periphery of the tube 1 such that it is possible to engage the backside of the plate member into which the insert is to be mounted.

[0038] In figure 3 is illustrated an embodiment where the tube member has been removed such that only the cover 7, the hinge 5, the transformer 6, the end plate 2, the fastening means 4 and the connection box 3 are visible. The connection box may be adapted to house 12, 24, 110, 220 or any other voltage installations and is in this embodiment provided with legs 25 such that a distance is maintained between the end plate 2 and the connection box 3 such that the heat developed by the light fixture does not transfer immediately to the electrical connections.

[0039] As may further be seen, the cover plate 7 is arranged inside the tube member (not illustrated) by resilient means in the shape of springs 26 such that variations in the plate thickness "a" may be compensated for by adjusting the distance the cover plate 7 is inserted into the tube member 1. Inside the tube member ridges and grooves may be provided in order to fasten the resilient members 26 in the desired position.

The upper end of the spring 26 may be provided with a point. The ridges/grooves provided on the inside of the tube member may be shaped as a tread, such that the point of the springs may engage the tread. By rotating the cover plate, the point will travel upwards or downwards depending on the threads orientation and the direction of rotation, whereby it becomes possible to adjust the coverplate's position accurately, relative to the surface into which the insert is mounted.

[0040] On the underside of the end plate member 2, (when assembled that is on the inside of the tube member, socket means may be arranged for inserting a desirable light fixture, for example a socket means of the type GU 10 suitable for providing fixture for halogen lights or standard 220 volt sockets.

Claims

1. Insert suitable for being mounted in a wall, ceiling, piece of furniture or other element, wherein the insert comprises a housing, where said housing comprises a tube section, an end cover, where said end cover and one end of the tube is provided with releasable assembly means, and where the opposite end of the tube is open, where said insert comprises means arranged outside of the tube, which means are expandable outside the inserts' outer periphery, and where socket means and electrical connection means are provided in said end cover.

2. Insert according to claim 1 wherein the end cover is provided on the side facing away from the interior of the tube, with an electrical connection box, which box may be selected according to the power, current, effect or light source need.

3. Insert according to claim 1 or 2 wherein a double hinge is provided, pivotably fastenable to the end cover, where the hinge comprises flange means for fastening electrical components such as one or more of the following: transformer, electrical switch, remote control circuitry, cooling and/or ventilation means.

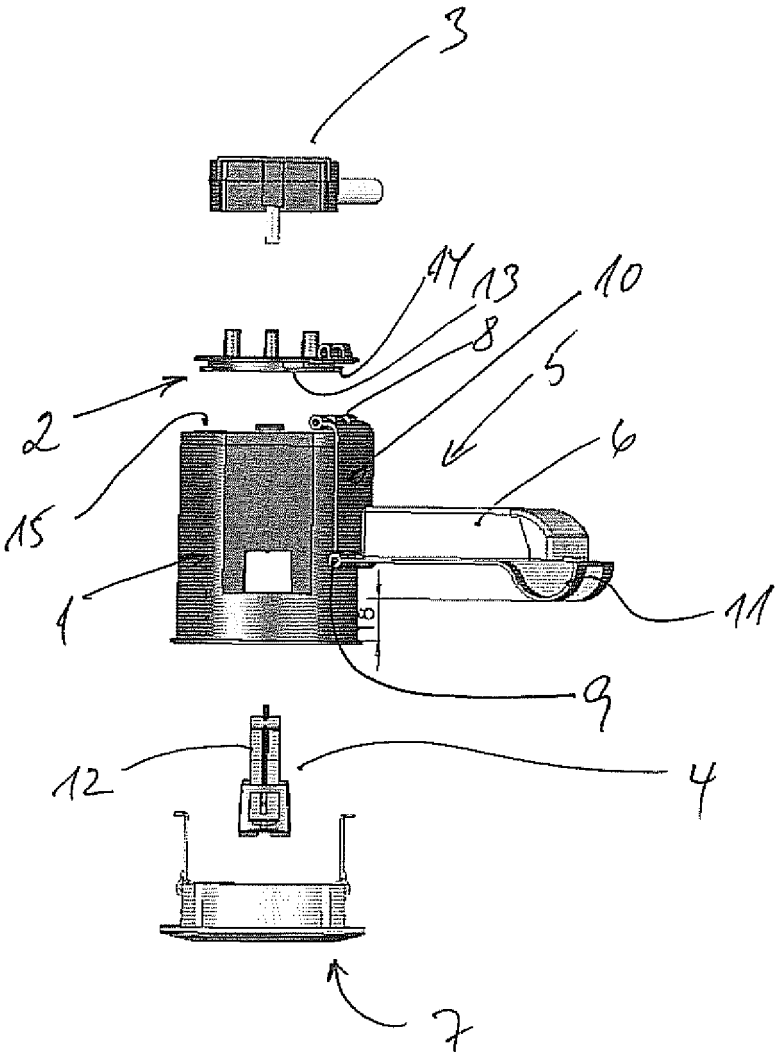

Fig 1

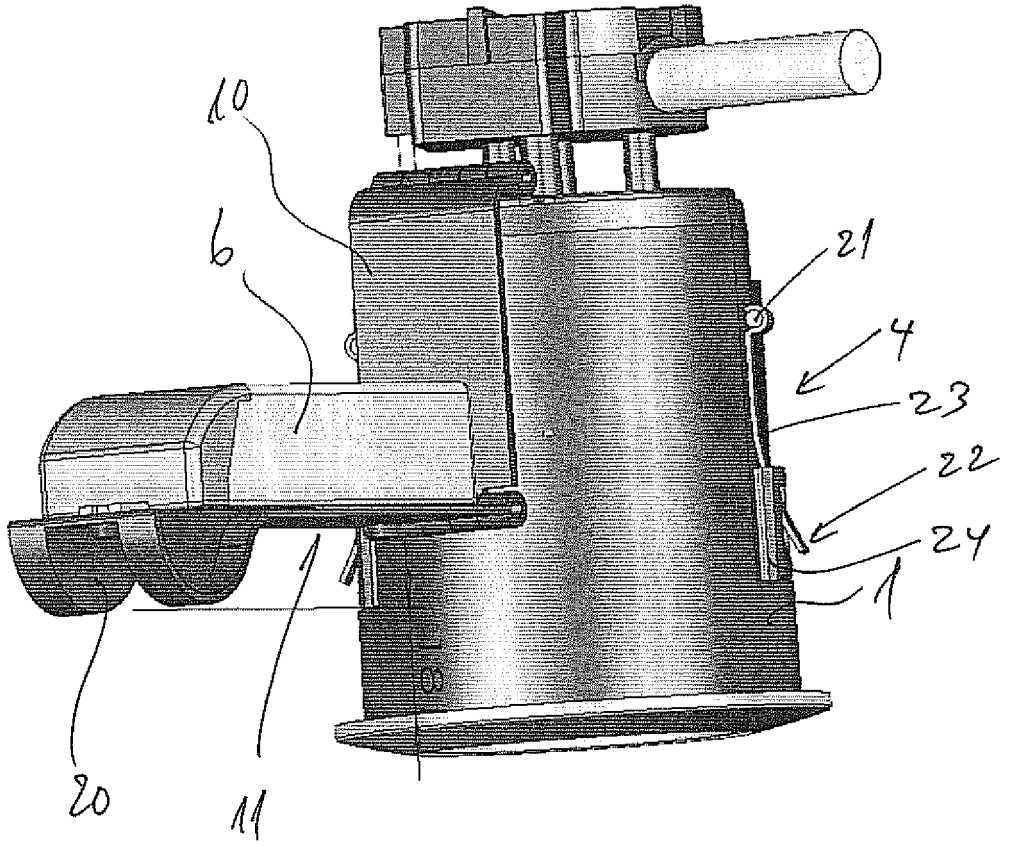

Fig 2

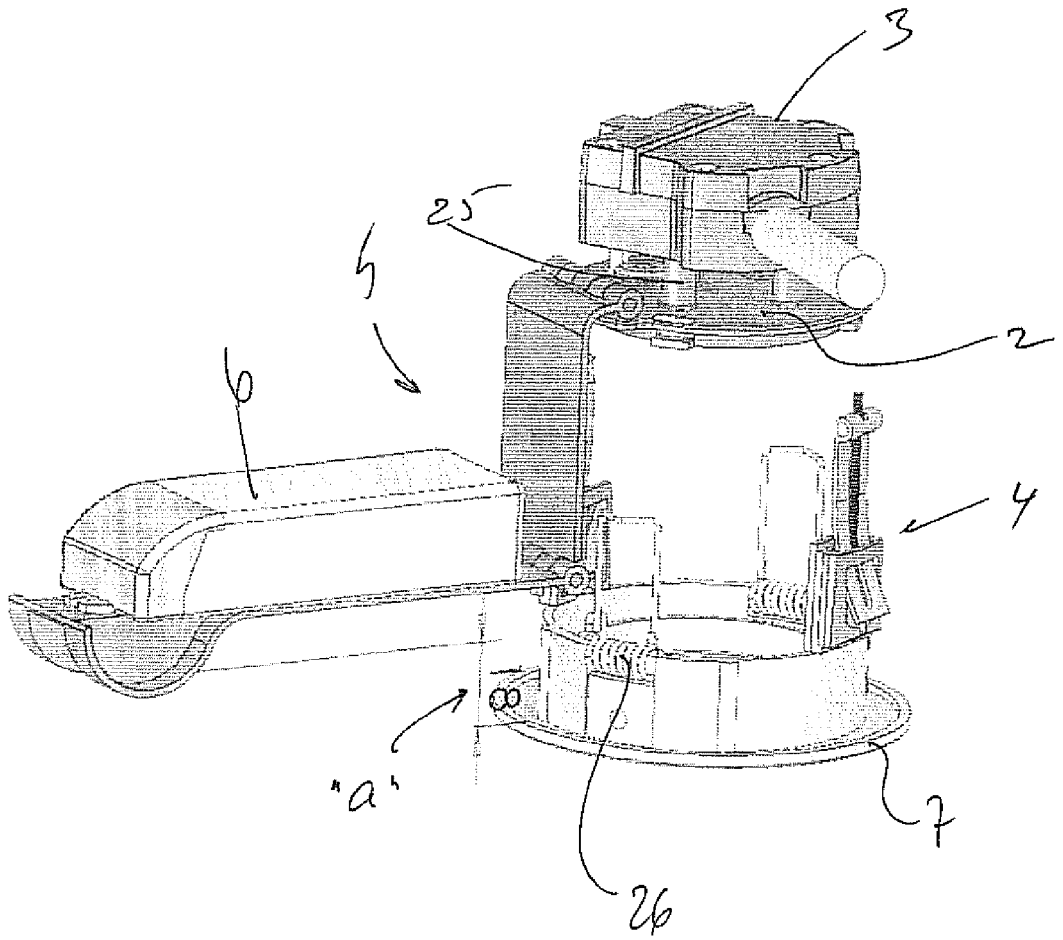

Fig 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6168299 B **[0002]**
- US 5664872 A **[0005]**