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(54) Handle fastening system for locks

(57) The handles are of the type that are fixed to the square-section shaft of the lock by means of a radial screw.

According to the invention the end of the square-section shaft (1) has a threaded axial hole (3) for a securing screw (8) of an elastic laminar element (4) folded into a "U", the core of which contains a passage hole for the screw (8) and its arms (5) are located in separate recesses (6) of two opposing faces of that shaft (1).

The bottom of the recesses (6) has a "V" shaped section and there is a longitudinal groove (9) along the edge.

The radial screw (10) has a protuberance (11) which elastically arches the arm (5) and afterwards pierces it and bites into the walls of the groove (9). This arrangement axially and radially locks the handle (2).

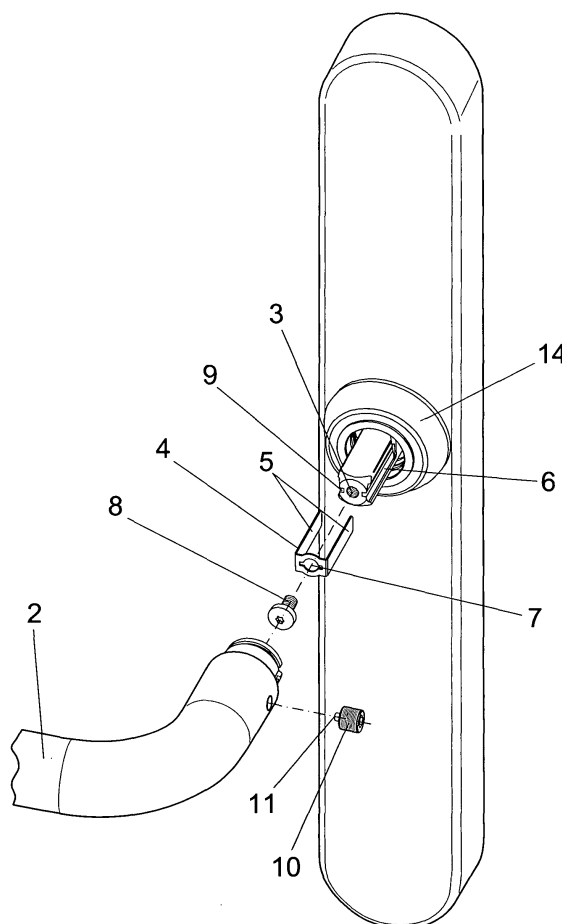


FIG. 1

EP 1 705 319 A2

Description

OBJECT OF THE INVENTION

[0001] As stated in the title of this specification, this invention relates to a handle fastening system for locks, with which solid securing is ensured of the handle to the square-section shaft of the lock, without any maladjustments taking place even if the handle is repeatedly removed. The handle has a radial screw which presses against said square-section shaft.

[0002] It has to be borne in mind that this type of handle can be applied to locks that are electronically operated and which incorporate a cell which has to be replaced as it runs out, for which the handle needs to be removed from the shaft.

PRIOR ART OF THE INVENTION

[0003] A system for fastening the handle to the shaft for operating the lock is known in which an additional piece is used for achieving the locking, defined by a small plate with two bent and flexible lugs which fit into the ends of a deep longitudinal groove made in one of the side faces of said square-section shaft. As the radial screw is tightened it is prevented from being able to be displaced axially due to penetrating the sheet.

[0004] Even though this is an advantageous solution aimed at achieving the fastening of the handle to the shaft, the problem presented is not satisfactorily solved. The process for its manufacture is complex, it greatly weakens the square-section shaft and, although it permits change of handedness in mechanical locks simply by rotating the shaft before fitting it, it is not possible to do this in electronic locks in which the shaft is already fixed to the electromechanism.

DESCRIPTION OF THE INVENTION

[0005] In general terms, the handle fastening system for locks of the invention optimally solves the problem raised, by including at the end of the shaft of the handle a threaded axial hole for fixing of a securing screw of an elastic laminar element folded into a "U", the core of which presents a passage hole for the screw and whose arms back onto two of the lateral faces of the square-section shaft, precisely where for that purpose the latter incorporates some depressions or recesses of equal contour for preventing it from sticking out. The bottom wall of this recess has a "V" shaped section so that just the corresponding arm of the elastic lamina will rest via its longitudinal edges.

[0006] Moreover, in correspondence with the edge originating at the vertex of that "V" shaped section, there exists a narrow groove or channel in which the end of the radial screw penetrates, the latter being provided with a coaxial cylindrical protuberance which first compels the arm of the elastic lamina to bend or arch and then per-

forates it, finally being pierced between the walls of the groove or channel.

[0007] As there exists an equal configuration in both opposing faces of the square-section shaft and the elastic lamina has a "U" shape, so the handle can be easily fitted for one hand or the other. Also, when necessary and following prolonged use, if it starts to become slack, the elastic lamina can be removed and turned around in order to use the other arm, thus notably increasing the life of the fastening device.

[0008] The radial screw that traverses the wall of the handle attacks and becomes pierced in a point of the square-section shaft distant from the end of the latter, to a greater degree than the depth of the coaxial fastening screw for the elastic lamina, due to which this zone of the shaft is not affected and thereby weakened and can be made solid.

[0009] As the lamina is well secured to the axial screw, the position of the radial screw is consequently fixed and so too therefore is the solidity of the handle. The shape of the elastic lamina and its deformation jointly caused by the pressure of the radial screw and the "V" shaped section of the side recesses of the square-section shaft eliminates any slack between the shaft and handle.

[0010] In order to facilitate an understanding of the characteristics of the invention and forming an integral part of this specification, some sheets of drawings are attached in whose figures, by way of illustration only and not limiting, the following has been represented.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Figure 1 is an exploded perspective view of the operating shaft of a lock and associated elements for fastening of the handle, also showing the escutcheon through which it emerges, in accordance with the invention.

Figure 2 is a partial view of that shown in figure 1, in an intermediate phase of assembly.

Figure 3 is a partial plan view of the end of the square-section shaft to which the handle is coupled, in accordance with the invention.

Figure 4 is a section along the cutting line A-A of figure 3.

Figure 5 is a partial view in side elevation of that shown in figure 1 with all the elements fitted.

Figure 6 is view similar to that of figure 5, with the handle removed.

Figure 7a is a section along the cutting line B-B of figure 5, when the tightening of the radial screw is starting.

Figure 7b is view similar to that of figure 7a, with the radial screw now tightened.

Figure 8 is view similar to that of figure 7a, with another embodiment of the radial screw.

Figure 9 is view similar to that of figure 3, in which

the point can be seen where the radial screw has attacked and the mark it has left once the handle and the "U" shaped elastic lamina have been removed. Figure 10 is a section along the cutting line C-C of figure 9.

DESCRIPTION OF THE PREFERRED MANNER OF EMBODIMENT

[0012] Making reference to the numbering adopted in the figures, we can see how the handle fastening system for locks proposed by the invention provides for the construction of a square-section shaft 1, whose connection end to the handle 2 contains a threaded axial hole 3 for securing of the lamina 4 folded into a "U", which defines the intermediate accessory piece for locking the handle 2 with respect to the shaft 1.

[0013] The arms 5 are housed in separate depressions 6 provided in two of the opposing faces of the square-section shaft 1 and do not project out as can be clearly seen in figure 7a. The reference 7 designates the hole provided in the core or union section of the arms 5 of the elastic element 4, for the passage of the securing screw 8 for the latter to the square-section shaft 1.

[0014] In figures 3 and 4 can be seen the depressions or recesses 6 of that square-section shaft 1 and how the bottom has a "V" shaped section in correspondence with the vertex existing in the longitudinal groove 9.

[0015] with this arrangement, the handle 2 becomes locked with the tightening of its radial screw 10 as can be seen in figures 7a and 7b.

[0016] The radial screw 10, of the Allen type in this example of embodiment, has a cylindrical axial protuberance 11 of slightly greater diameter than the width of the groove 9 (see figure 7a). It is via this screw 10 with its protuberance 11 and the action of the elastic element 4 that the integral fastening of the handle 2 to the shaft 1 is carried out without there existing any maladjustments. On starting to tighten the radial screw 10, a curved deformation is produced in the transverse direction of the arm 5 of the elastic element 4, as can be seen in figure 7a, since it was only supported via its longitudinal edges owing to the "V" shaped bottom of the recess 6. A moment is reached when this arm 5 is perforated by the action of the cylindrical protuberance 11, which penetrates the groove 9 and bites its walls. The perforation can be seen referenced with 12 in figure 6 and the mark made in the shaft 1 can be seen in figures 9 and 10, referenced with 13.

[0017] Given that the tendency of this arm 5 of the elastic element 4 is to return to its initial flat position, so there exists a thrust outwards against the radial screw 10 which makes the fastening very solid.

[0018] As the width of the arm 5 corresponds to that of the depression or recess 6, the screw 10 becomes sufficiently rigidised and is unable to come loose due to axial displacement nor due to rotation, this rigidising being reinforced by the penetration of the cylindrical protu-

berance 11 in the side walls of the groove 9, as shown in figures 9 and 10.

[0019] The swelling of the arm 5 pressed by the radial screw 10 in the transverse direction likewise produces a thrust towards the outside against the radial screw 10.

[0020] In figure 9 it can be seen that the threaded axial perforation 3 of the shaft 1 does not reach the point of piercing 13 of the radial screw 10, thus increasing its solidity.

[0021] Figure 8 shows a variant of the radial screw 10, referenced with 10', where there exists a conical point instead of the cylindrical protuberance 11.

[0022] The reference 14 designates the embellishing escutcheon of the lock.

[0023] Moreover, when the arm 5 of the elastic lamina 4 is perforated by the cylindrical protuberance 11 of the radial screw 10 and the actual pressure exerted by the body thereof, a small lifting takes place of the end part of that arm, which, under pressure, makes contact with the walls of the axial hole of the handle 2, of square section, which reinforces the fastening and eliminates any possible slack between the square-section shaft and handle.

[0024] The square-section shaft 1 has its end zone depressed, which is easily obtained by moulding, injection, stamping, or by very simple machining by means of going over with a milling cutter.

Claims

1. HANDLE FASTENING SYSTEM FOR LOCKS, the shaft of the lock being of the square-section type to which is fixed the handle with a radial screw, **characterised in that** the end of the square-section shaft (1) to which the handle (2) is connected presents a thread axial hole (3) for securing of a "U" shaped laminar elastic element (4) whose core presents the corresponding hole (7) for the passage of the screw (8), of such shape that the arms (5) are located tightly fitting in separate recesses (6) provided for the purpose in two opposing faces of that square-section shaft (1), with provision having been made for the bottom of those recesses (6) to have a "V" shaped section with the edge containing a longitudinal groove (9) and with the radial screw (10) attacking a point of the corresponding arm (5) lying beyond the threaded axial hole (3).

2. HANDLE FASTENING SYSTEM FOR LOCKS, according to claim 1, **characterised in that** the radial screw (10) of the handle (2) bears a coaxial cylindrical protuberance (11) able to perforate the corresponding arm (5) of the "U" shaped elastic lamina (4) once deformed into an arched shape by the pressure of the radial screw (10) and said cylindrical protuberance (11) piercing the said longitudinal groove (9), biting its walls due to having a slightly larger di-

ameter, immobilising the handle (2) both in the axial and the angular directions, with respect to the square-section shaft (1).

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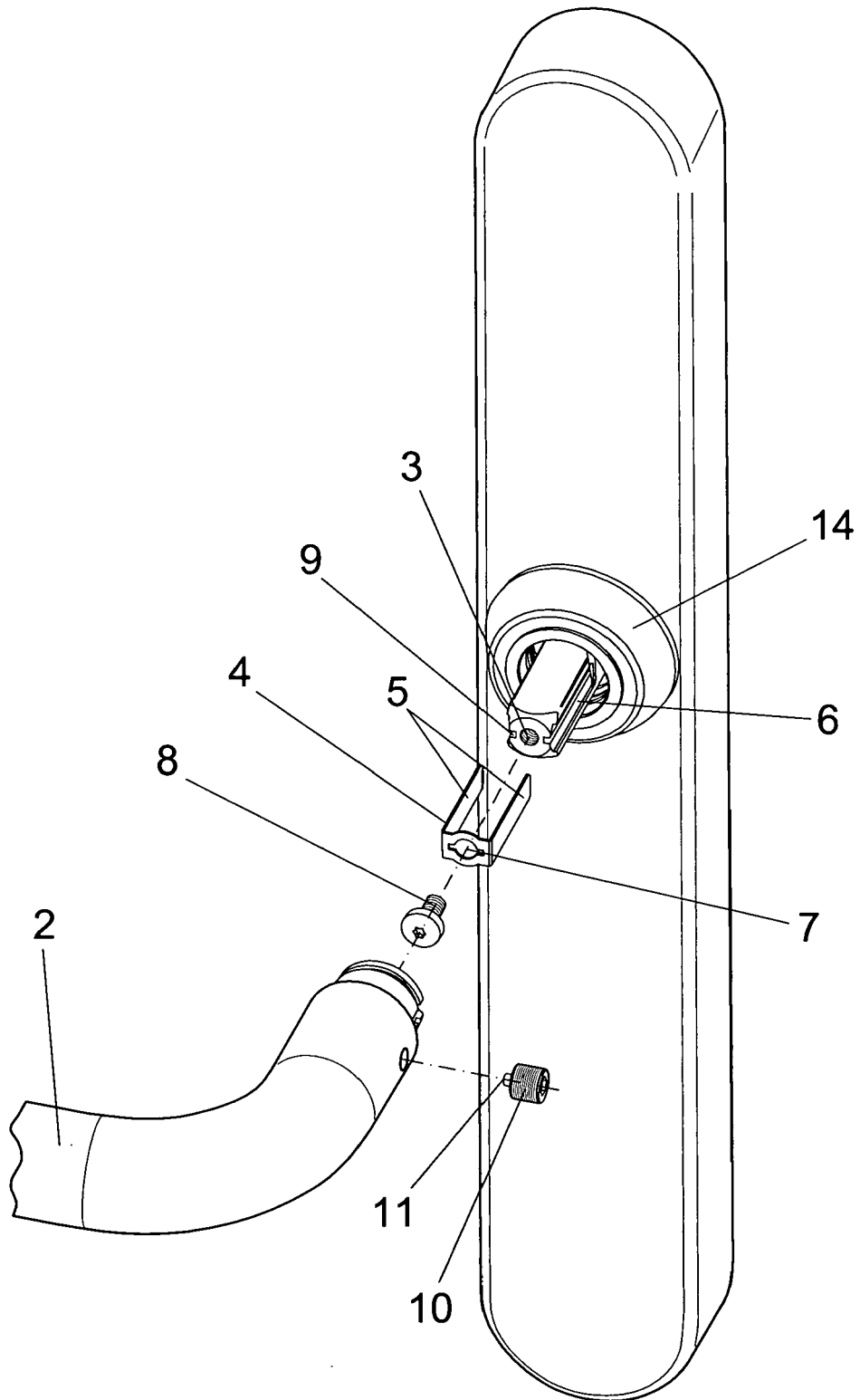
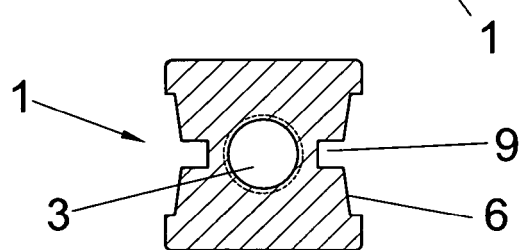
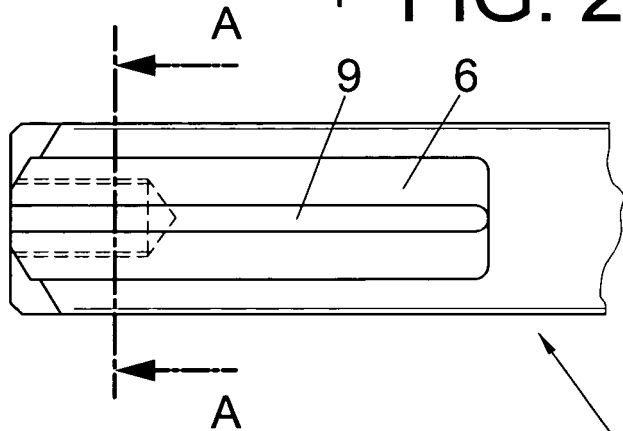
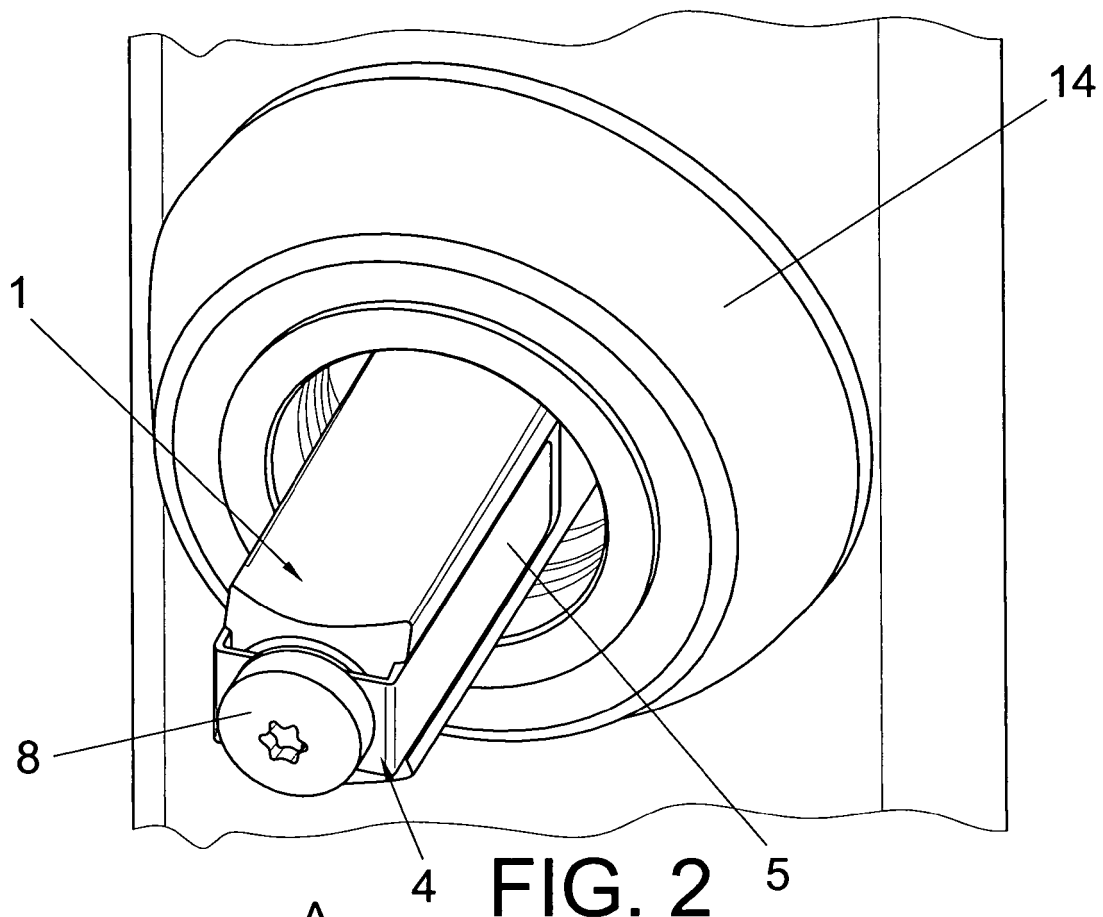
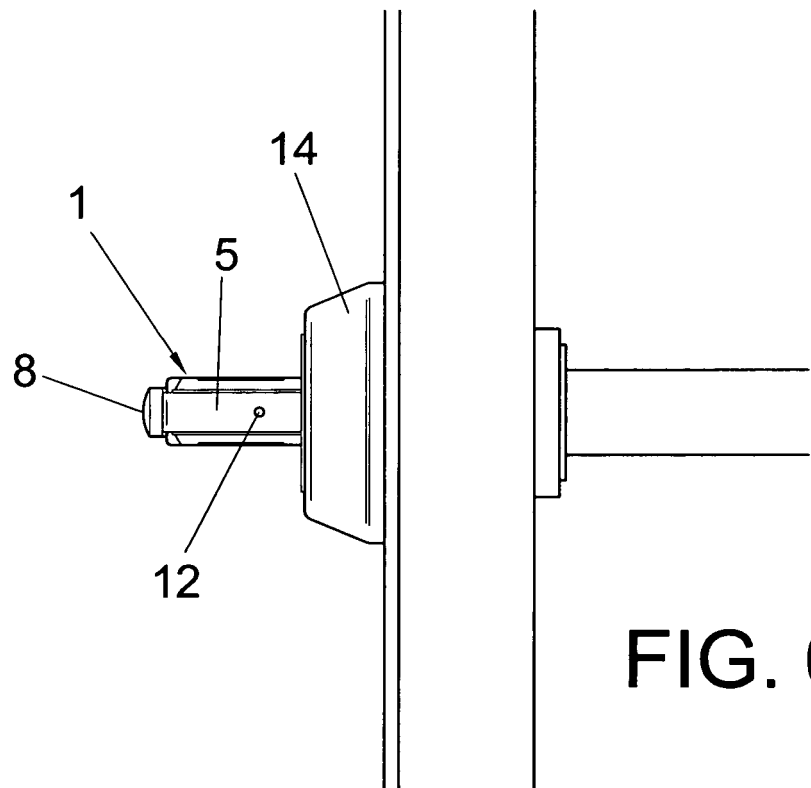
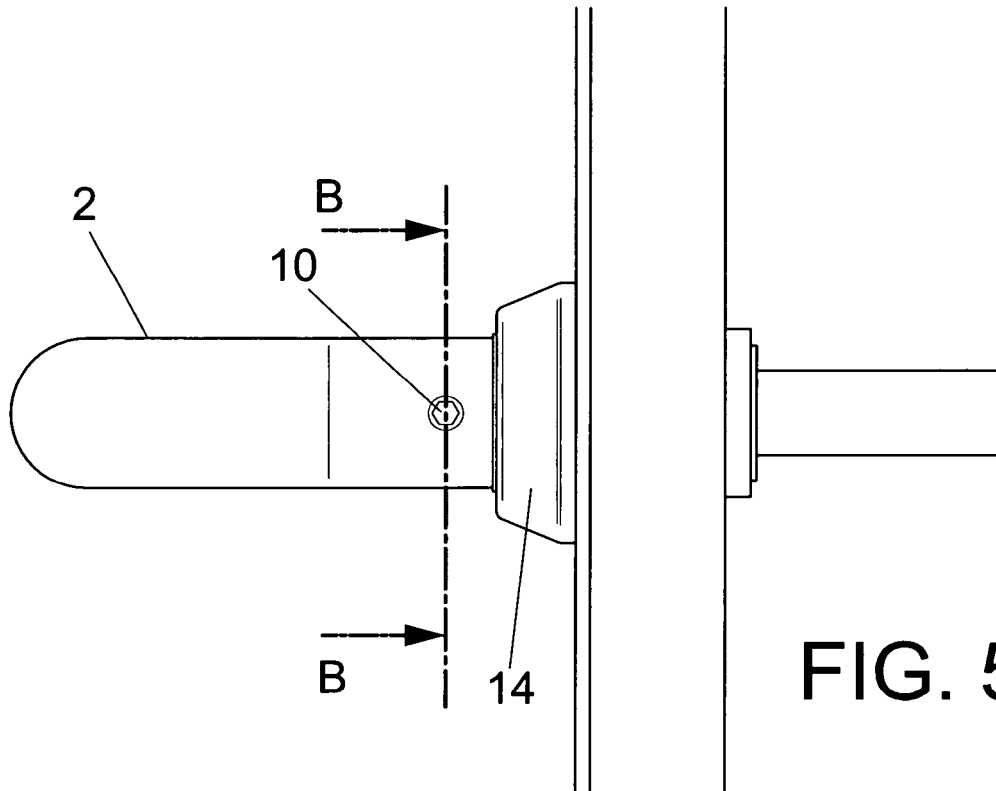


FIG. 1



A-A



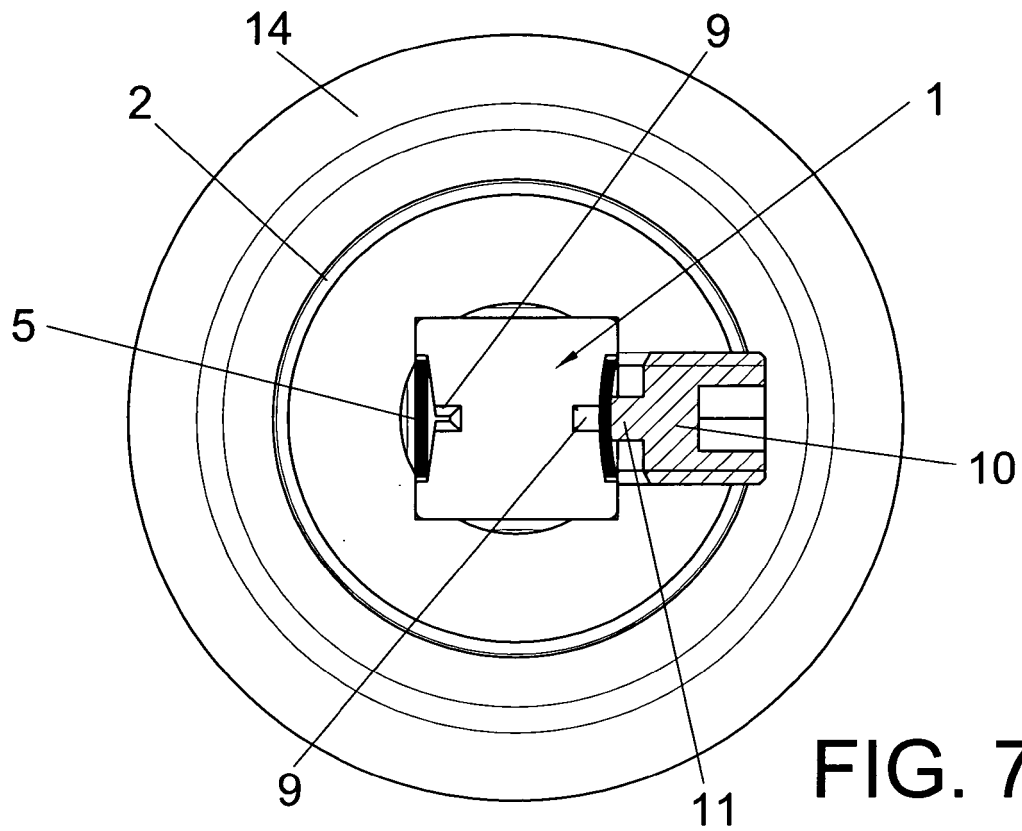


FIG. 7a

B-B

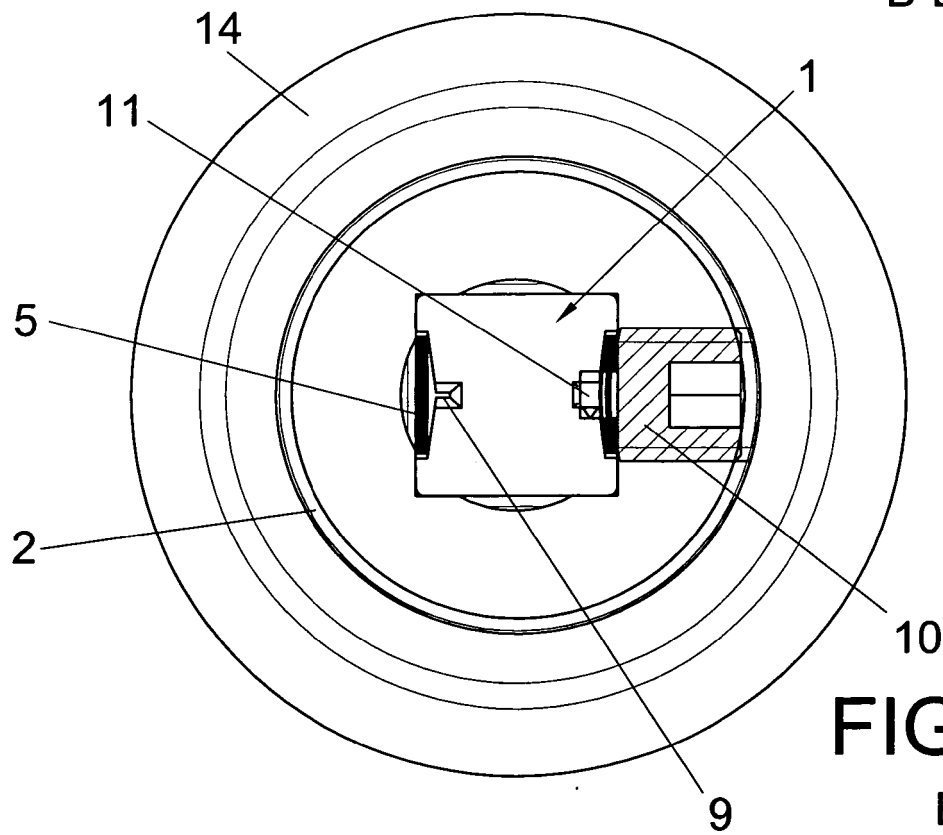


FIG. 7b

B-B

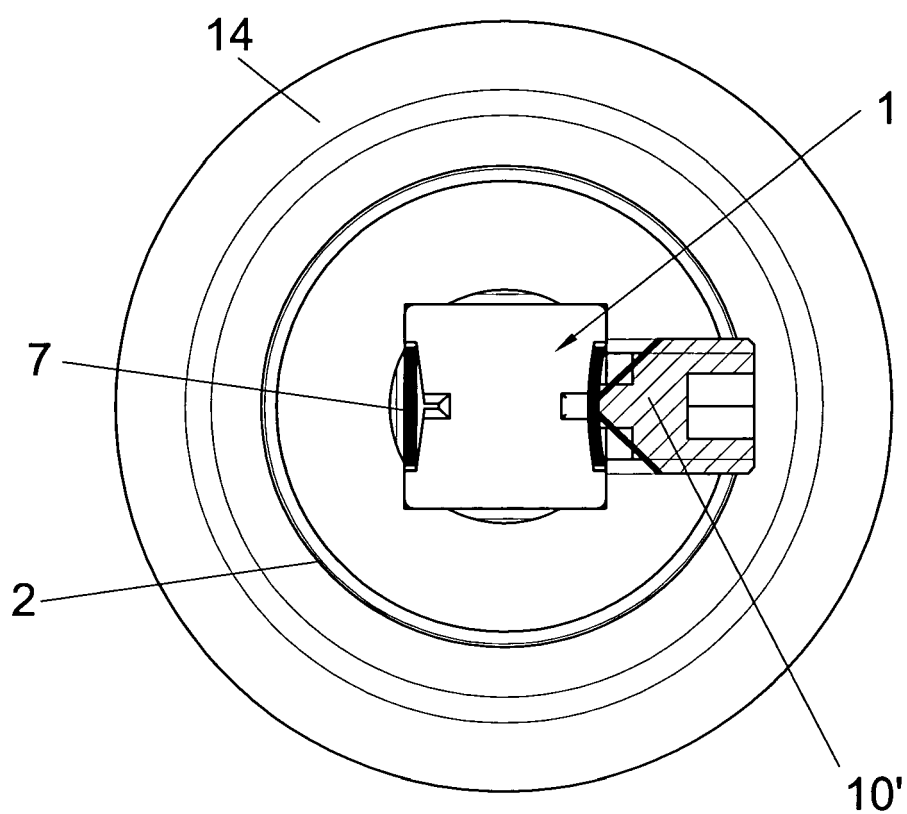


FIG. 8
B-B

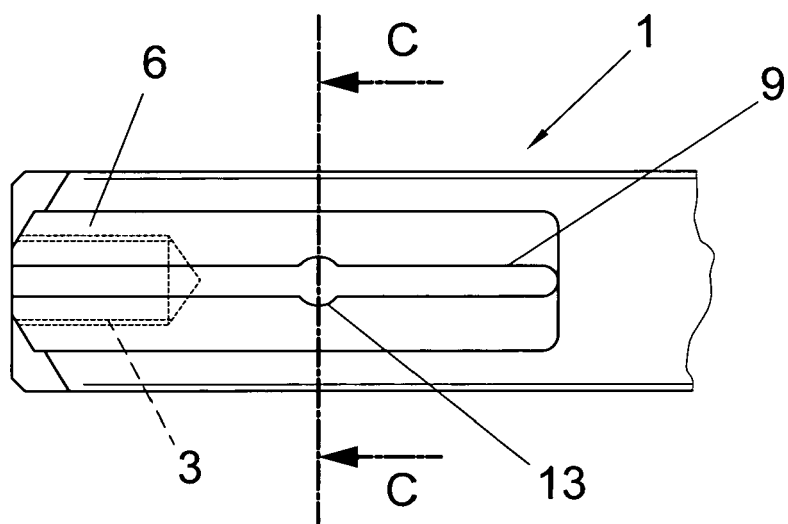


FIG. 9

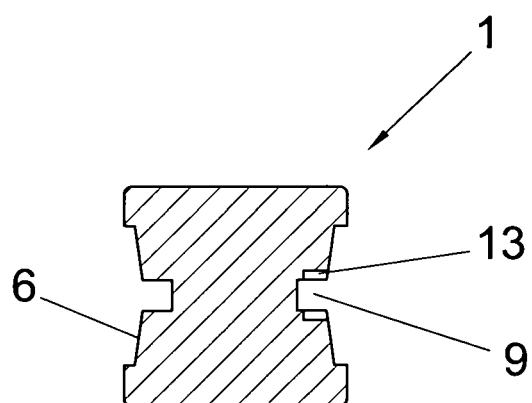


FIG. 10

C-C