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(54) Manual call point for fire alarm systems

(57) Described herein is a manually operated call point (1) for fire protection systems, comprising a boxed casing (2), a switch(6) and an LED (7) both positioned inside the boxed casing (2), and a moving activation panel (8) which can be pressed by a user so as to translate along an axis (A) perpendicular to the panel (8) itself, in order to activate the switch(6) and generate an alarm signal; the call point (1) furthermore, comprises a waveguide (9), positioned inside the boxed casing (2), between the LED (7) and the activation panel (8) to confine/direct the light emitted by the LED (7) towards a predetermined area (11)of the activation panel (8) so as to project a ring of light upon the activation panel itself.

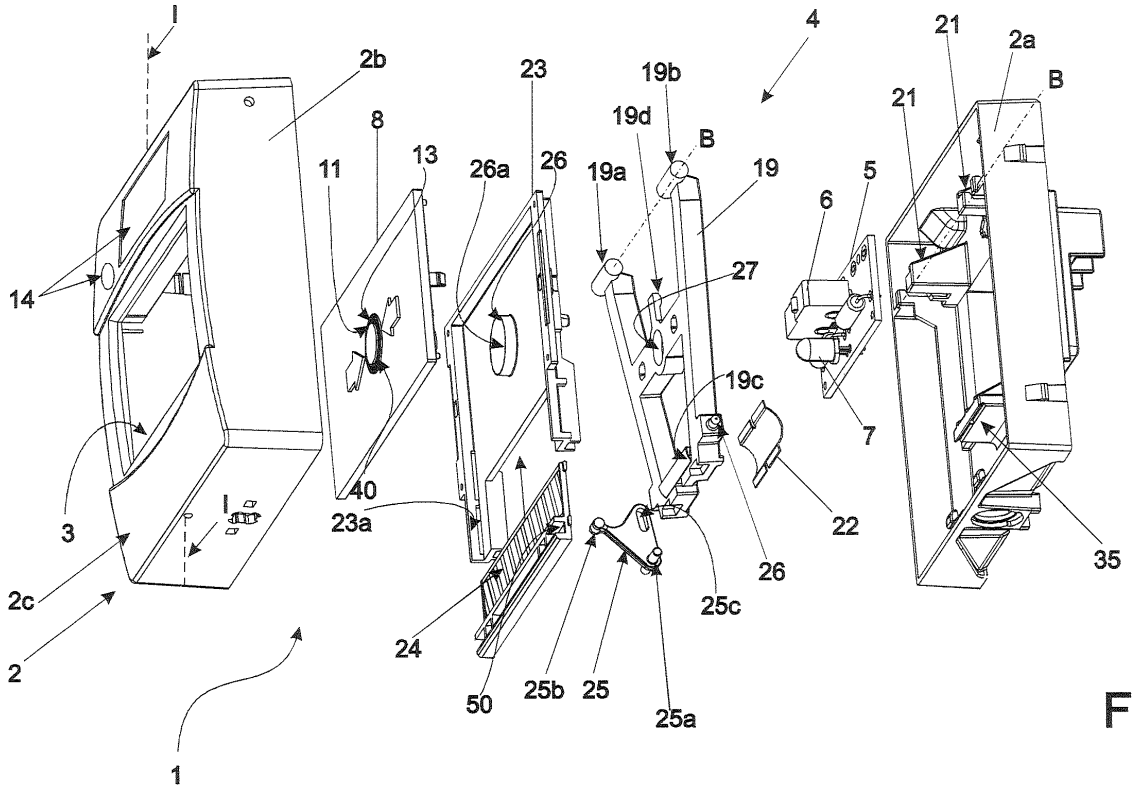

Fig. 1

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Description

[0001] The present invention relates to a manually call point for fire alarm systems.

[0002] As is known, manual action call points are signal buttons which are used in fire protection systems in buildings to permit a person to promptly signal a situation of alarm due to the presence of a fire.

[0003] The call points currently in use typically comprise a frontally opening boxed casing, an alarm module located within the body of the box, which in turn comprises a switch for the generation of an alarm signal, an LED diode to visibly signal the event of operation of the call point, and a movable activation panel, which is typically positioned on the frontal opening of the boxed casing, and when an alarm is signalled, is designed to be pressed towards the inside of the boxed housing against the action of an elastic contrast mechanism, from a position of rest, in which the panel remains positioned in the opening, and an operative alarm position, in which the panel activates the switch, thereby generating the electrical signal which indicates the situation of alarm.

[0004] In some call points of the type described above, the LED is positioned corresponding to a housing created on the lateral wall in view of the boxed casing, so as to be at least partially facing towards the outside. Such a configuration enables the user to perceive the illumination of the LED only from a point of observation within the cone of emission of the LED. Thus, a user who is positioned laterally to the call point, in a point of observation beyond the cone of light emission, is not able to immediately perceive a state of occurred activation of the alarm, which is clearly critical whenever the user needs to act in extremely reduced times.

[0005] Furthermore, the elastic contrast mechanism of the above-described call points is created by means of an internal structure including torsion springs, which, as is known, are subject to a progressive loss of elastic efficiency over the course of time, which has a significant bearing on the frequency of the inspections and maintenance to be performed on the call points.

[0006] There is also a known requirement of carrying out periodical inspections to verify the correct operation of the call point.

[0007] However, up to now there has been an objective difficulty for operators assigned to perform such checks, which is to be able to rapidly and precisely individuate those call points that require immediate inspection, due to the expiry of their respective verification inspection deadlines, from the other call points.

[0008] The aim of the present invention is, therefore, to provide a call point which can overcome the above-described drawbacks.

[0009] Provided according to the present invention is a call point for fire protection systems as specified in Claim 1 and preferably, but not necessarily, in any one of the claims that depend either directly or indirectly upon Claim 1.

[0010] The present invention will now be described with reference to the annexed drawings, which illustrate a non-limiting example of embodiment thereof, and in which:

- Figure 1 is an exploded view of the components of the call point, built according to the teachings of the present invention;
- Figure 2 illustrates the call point on a large-scale, according to a I-I section of figure 1, in which the relative activation panel is situated in the rest position;
- Figure 3 illustrates the call point on a large-scale, according to a I-I section of figure 1, with the relative activation panel in an operative position;
- Figure 4 schematically shows a frontal view of the activation panel of the call point shown in figure 1;
- Figure 5 schematically shows a lateral view with parts in section and some parts removed for clarity of some components of the call point shown in figure 1;
- Figure 6 shows a block scheme of the signalling circuit comprised in the call point shown in figure 1; while
- Figure 7 illustrates, on an enlarged scale, a lever mechanism of the call point in a position of rest, according to a I-I section of figure 1; while
- Figure 8 illustrates on an enlarged scale a lever mechanism of the call point in an operative position, according to a I-I section of figure 1.

[0011] With reference to Figure 1 , the reference number 1 designates as a whole a call point corresponding to a signalling button, which can be used in a fire protection system (not shown) to permit a user to promptly signal a situation of alarm due to the presence of a fire.

[0012] The call point 1 comprises a boxed casing 2 comprising a housing case 2a, and a front cover 2b, which couples with the housing case 2a and features a frontal opening 3 created on the visible panel 2c of the front cover 2b.

[0013] The call point 1, furthermore, comprises an alarm module 4 positioned inside the boxed casing 2 and comprising, in its turn, a circuit board 5, which is stably fixed to the housing case 2a, and is provided with an switch 6 designed to generate an alarm signal, following the activation of the call point 1, and an LED 7, or any other similar light-emitting source, to generate a luminous signal indicating a condition of occurred activation of the call point 1, or of occurred generation of the signal of alarm.

[0014] The alarm module 4 also comprises an activation panel 8, which is designed to be abutted against the side casing 2b facing the opening 3, and is designed to be moved towards the inside of the boxed casing, along a direction D, substantially perpendicular to the plane on which the activation panel 8 itself sits, from a position of rest (shown in figure 2), in which the activation panel 8

is abutting against the opening 3, and an operative position (shown in figure 3), in which the activation panel 8 engages the switch 6, thereby causing its activation.

[0015] With reference to Figures 2,3,4 and 5, unlike common call points, the call point 1 comprises a waveguide 9, which is positioned inside the boxed casing 2, between the LED 7 and the activation panel 8, to conveniently confine/direct the light emitted by the LED 7 towards a predetermined activation area 11 depicted on the activation panel 8.

[0016] In detail, with reference to figures 2 and 3, the waveguide 9 comprises a tubular body of transparent material, which protrudes from the inner face 8a of the activation panel 8 towards the housing case 2a, along an axis A substantially perpendicular to the panel 8 itself.

[0017] In greater detail, in the example shown in figure 4, the waveguide 9 is made from vitreous or polymeric material, it has a substantially cylindrical form, and has one extremity 9a which is stably fixed to the internal wall 8a of the activation panel 8, corresponding to the area of activation 11, and its opposite extremity 9b gives onto the LED 7, so as to capture and convey the light it emits in order to backlight the external edges of the area of activation 11.

[0018] With reference to the example shown in figure 5, the end 9a has a substantially tapered form, and has internal conic protrusion 12, coaxial to the axis A, which is moulded so as to receive the rays of light generated by the LED 7 and reflect them towards the tapered portion of the extremity 9a, which in turn reflects them in a direction parallel to the axis A so as to project a ring of light 13 onto the activation panel 8, encircling the activation area 11.

[0019] In greater detail, in the example illustrated, the tubular body of the waveguide 9 has an external surface preferably, but not necessarily, grained or milled so as to reflect the light towards the inside of the waveguide 9 itself, while the external surface of the portion 9a is suitably inclined by an angle of around 45° to the axis A, so as to conveniently reflect the rays of light towards the area 11.

[0020] As regards the conic protrusion 12, it has a substantially smooth, or rather shiny, surface, so as to be able to reflect the light towards the inside of the waveguide 9, and is conveniently inclined at an angle of around 45° in respect to the axis A, to reflect the rays of light towards the tapered portion 9a.

[0021] In the example illustrated in figure 4, the activation area 11 also comprises a portion of preferably circular form, centrally fixed on the activation panel 8 in a coaxial position to the axis A, and has a clearly visible external surface, which can, for example, be black, and an internal reflective surface, designed to receive and reflect the light emitted from the LED 7 towards the tapered portion of the extremity 9a, which in turn serves to reflect the light itself towards the perimeter border of area 11, so as to project the luminous ring 13 (see figure 4).

[0022] It is worth pointing out that on the centre of the activation panel 8 is a ringed relief 40 which surrounds the circular portion of the area 11 and is designed to be hit by the rays of the ring of light 13.

[0023] In the example shown in figures 4 and 5, some rays of light conveyed by the waveguide 9, rather than being projected on the ringed relief 40, travel across the activation panel 8 in a substantially transversal direction to the axis A, so as to illuminate one or more of the auxiliary signalling windows 42 situated on the boxed casing 2, in correspondence with one or more outer edges of the activation panel 8 itself.

[0024] In the example shown in figures 4 and 5, the call point 1 has a window 42, which is positioned on a lateral portion of the cover 2b, and which can be backlit by rays of light "dispersed" by the waveguide 9 in a transversal direction to the axis A, so as to signal the occurred activation of the call point 1. The window 42 can comprise, for example, a flat portion in semitransparent coloured plastic material, or any other similar material able to at least partially emit light on one side when its opposite side is hit by light.

[0025] Unlike other common types of call points, the call point 1, furthermore, comprises a photo-luminous source 14, which is able to radiate light to make the call point 1 itself, or some parts of the call point 1, visible to the user in poor light conditions.

[0026] According to a possible embodiment, shown in figure 4, the photo-luminous source 14 is integrated in the activation panel 8 so as to make it visible. In particular, the photo-luminous source 14 can comprise a photo-luminous pigment, preferably applied to the panel, so as to partially or entirely cover its outer face 8b.

[0027] According to a possible embodiment, shown in figure 1, the photo-luminous source 14 can be located on the boxed casing 2 and be defined by a photo-luminous pigment deposited on predetermined visible portions of the boxed casing itself.

[0028] It is worth pointing out that the photo-luminous source 14 can be integrated in the call point 1 independently of the presence or otherwise of the waveguide 9 described above.

[0029] With reference to figure 6, unlike other known call points, the call point 1 comprises a signalling circuit 15, which serves to generate a signal indicating a state of missed maintenance. In particular, the signalling circuit 15 comprises an indicator module 16, for example an LCD display or an LED, or any other similar device, which can generate a message or a luminous signal to indicate a state of required maintenance, and a processing module 17, which serves to activate the indicator module 16 when the time period calculated from the previous maintenance performed on the call point 1 has surpassed a pre-established limit.

[0030] In this case, the elaboration module 17 can comprise a memory module 17a containing the maintenance time limit St, a housing module 17b, for example a timer, which provides the time interval elapsed, moment by moment, since the last maintenance of the call point

1, and a comparator module 17c, which, when the time interval elapsed Tt reaches the maintenance time limit St, activates the indication through the module indicator 16. It is worth pointing out that the counter module 17b can begin to count when the activation panel 8 changes position, for example, passes from its operative condition to the rest position, and/or when it receives an activation signal from a suitable confirmation button (not shown) fitted on the call point 1.

[0031] From what has been described above, it is worth pointing out that the signalling circuit 15 can be comprised in the call point 1, independently from the presence, or otherwise, of the photo-luminous light source 14 and of the waveguide 9 described above.

[0032] With reference to figures 2 and 3, the alarm module 4 moreover comprises a snap mechanism 18 which, in its turn, comprises a support frame 19 of the activation panel 8, which is hinged to the housing case 2a of the boxed casing 2, to turn around an axis B perpendicular to the axis A, and an elastic device which is placed between the boxed casing and the supporting frame 19 and is structured to make the activation panel 8 assume two positions, the position of rest (shown in figure 2) and the operative position (shown in figure 3) of activation of the switch 6.

[0033] In particular, in the example illustrated in figure 1, the supporting frame 19 is moulded substantially in an A shape, and has two ends 19a and 19b designed to be hinged to corresponding support appendages 21 which extend from the internal face of the housing case 2a, parallel to the axis A, at a certain distance apart, while the elastic bistable device 20 comprises a toggle spring 22, which has one end fixed to the free end 19c of the supporting frame 19, and the opposite end fixed to a support appendage 35 joined to the internal face of the housing case 2a of the casing.

[0034] In particular, the toggle spring 22 comprises a metal plate, bent substantially into a U-shape with both of its ends fixed respectively to the end 19c and to the support appendage 35. Thanks to its U-shaped section, the metal plate has an elastic behaviour similar to that of a spring, and contextually turns out to be different from a traditional bistable plate. In this case, during operation, when pressure is applied to the activation panel 8 in the direction D, the toggle spring 22 is radially compressed, up to the point of "maximum compression", after which it extends radially outwards. And so the force that the toggle spring 22 exercises on the free end 19c of the supporting frame 19 has a radial direction, whose component, at a tangent to the circle of rotation traced by the free end 19c, changes direction in correspondence to the point of "maximum compression" of the same. In other word, while the end 19c is moving between the position of rest of the activation panel 8 and the point of maximum compression of the Toggle spring 22, the latter undergoes a radial compression and generates a force which linearly contrasts the movement of the panel 8, in such a way to bring it to the relative position of rest, while, when the end 19c goes beyond the point of maximum compression, the Toggle spring 22 expands radially and thereby pulls the end 19c in rotation towards the internal wall of the housing case 2a, bringing the activation panel to the operative position and determining the activation of the switch 6.

[0035] From what has been described above, it is worth pointing out that the snap mechanism 18 can be comprised in the call point 1, independently of the presence, or otherwise, of the signalling circuit 15, of the photo-luminous light source 14 and of the waveguide 9 described above.

[0036] With reference to figures 1, 2 and 3, the supporting frame 19, furthermore, has a small arm 19d near its centre, which, when the activation panel 8 is brought into the operative position, is positioned to press the switch 6, thereby activating it.

[0037] With reference to figure 1, the call point 1 is furthermore provided with an intermediate panel 23, perpendicular to the axis A, and parallel to the face 2c, which is located between the activation panel 8 and the supporting frame 19, and there is an flag or gate element 24 for supplementary signalling, which is fitted to move freely upon lateral guides 23a of the intermediate panel 23, from a retracted position (shown in figure 2)in which the flag of gate element 24 is positioned facing the back portion of the panel 2c of the cover 2b, so as not to be visible from the outside through the opening 3, and an extended position (shown in figure 3) in which the flag element or the gate 24 is raised compared to the retracted position, so as to face the opening 3 in order to be visible from the outside.

[0038] It is worth pointing out that the gate 24 has a graphic representation similar to a "flag" on its external face, which indicates an event of activation of the call point 1.

[0039] Unlike other known call points, the call point 1 also comprises at least one lever mechanism 25 (shown in figure 78) joining the supporting frame 19 to the gate 24, and structured to transmit the oscillating movement of the support frame 19 around the axis B when the gate 24 moves on the intermediate panel 23, between the respective retracted and extended positions.

[0040] In particular, the lever mechanism 25 comprises a substantially triangular-shaped element, with three corners, in which the first corner 25a is hinged to the housing case 2a of the boxed housing, a second corner 25b is inserted in a housing 50 created on the gate 24, while a third corner has a cam or eyelet 25c, which is employed by a cam follower pivot 26, placed on the end 19c of the support frame 19.

[0041] In this case, in the example shown in figures 7 and 8, the call point 1 comprises two levers mechanisms 25 of the type described above (only one of which is illustrated) in which, the respective first corners 25a both have pivots, and are hinged to the wall of the housing case 2a, the respective second corners 25b also have pivots, both of which engaged in corresponding housings

50 created on the lower border, not in view of the gate 24, and whose cams or eyelets 25c are engaged by respective cam follower pivots 26 which protrude from the free end 19c of the supporting frame 19.

[0042] As regards the intermediate panel 23, it is made from non-transparent plastic material, and is designed to couple stably with the internal face of the activation panel 8 and has a central invite 26 (figure 1), which has a passage hole 26a coaxial to the axis A into which the waveguide 9 of the activation panel 8 inserts.

[0043] As regards the supporting frame 19, it has a central passage hole 27: coaxial to the axis A (figure 1) and to the passage hole 26a of the intermediate panel 23 and is designed to receive the waveguide 9 so as to permit the LED 7 to be inserted into the internal shaft of the waveguide 9.

[0044] From what has been described above, it is worth pointing out that the lever 25 can be comprised in the call point 1, independently of the presence, or otherwise, of the snap mechanism 18, of the signalling circuit 15, of the photo-luminous light source 14 and of the waveguide 9, described above.

[0045] The functioning of the call point 1 is easily inferable by what has been described above and therefore does not require further explanations.

[0046] The advantages of the above-described call point 1 are many. In the first place the call point 1, thanks to the waveguide, guarantees the user an excellent visualisation of the light emitted by the LED onto the activation panel. In this case the tapered configuration of the extremity of the waveguide, in combination with the internal conic protrusion, guarantee an excellent projection of the light emitted by the LED onto the activation panel, thereby generating a perfectly circular luminous ring which can be easily seen by the user from any observation point. Furthermore, thanks to the presence of the photo-luminous source, the user is able to locate the call point immediately, even in poor lighting conditions.

[0047] Another particular advantage of the call point is that, thanks to the signalling circuit, it permits maintenance personnel to immediately notice a condition of required maintenance to the call point itself.

[0048] The toggle spring system of the call point is particularly robust, and is not subject to loss of elastic efficiency over time, and thereby reduces the quantity of maintenance work required.

[0049] Thanks, furthermore, to the auxiliary signalling window and to the ringed relief moulding, the call point is able to amplify the luminous signal of occurred activation, making it perceptible to the user, even at significant distance from the call point.

[0050] Finally, thanks to the cam lever mechanism, the call point exploits the movement of the activation panel to activate the gate, which indicates the activation of the call point, without the help of extra springs.

[0051] It is therefore clear that changes and variations can be made to the call point described and illustrated herein, without departing from the scope of the present invention defined by the appended claims.

Claims

1. Call point (1) for fire alarm systems comprising a boxed casing (2), switching means (6) and at least one luminous source (7) disposed inside said boxed casing (2), and an activation panel (8), which is mobile along a first predetermined axis (A) perpendicular to the activation panel itself (8) to switch said switching means (6) to thereby generate an alarm signal; said call point being **characterised by** the fact of comprising a waveguide (9), which is disposed inside said boxed casing (2) between said luminous source (7) and said activation panel (8) to confine/direct the light emitted by said luminous source (7) towards a predetermined area (11) of said activation panel (8).

2. The call point according to Claim 1, wherein said waveguide (9) comprises a cylindrical body made of transparent material, which extends from the internal wall (8a) of said activation panel (8) towards the internal space of said boxed casing (2) along said first axis (A) so as to engage, at least partially, said light source (7).

3. The call point to either Claim 1 or Claim 2, wherein said waveguide (9) has a substantially tapered end (9a) shaped to reflect the luminous rays emitted from said luminous source (7) towards the activation panel (8) so as to project a ring of light (13) on the activation panel (8) itself.

4. Call point according to Claim 3, wherein said waveguide (9) has a corrugated or knurled external surface.

5. The call point according to Claim 4, comprising a conic protrusion (12) which is coaxial to said first axis (A) and is moulded in such a way to reflect the rays of light towards said tapered portion of said end (9a).

6. The call point according to any one of the previous Claims, comprising a photo-luminous means (14) designed to emit a photo-luminous radiation source to make said call point at least partially visible (1) in conditions of poor ambient lighting.

7. The call point according to Claim 6, wherein said photo-luminous means (14) are stably fixed to said activation panel (8).

8. The call point according to either Claim 6 or Claim 7, wherein the said photo-luminous means (14) comprise a photo-luminous pigment deposited on a face of said activation panel (8).

9. The call point according to any one of the Claims 6, or Claim 7, wherein said photo-luminous means (14) comprise a photo-luminous pigment deposited at least partially on said housing box (2).

10. The call point according to any one of the previous Claims, comprising signalling means (15) which are able to detect a state of missed maintenance when a time interval (Tt), determined in respect to previous maintenance of the said call point, has surpassed a predetermined time threshold (St); following the detection of said state of missed maintenance, said signalling means (15) being able to generate a visual signal.

11. The call point recited in claim 10, comprising indicator means (16) to visualise a message and/or a luminous signal indicating said state of missed maintenance, and processing means (17) designed to detect said state of missed maintenance and to activate said indicator means (16).

12. The call point according to any one of the previous claims comprising a support frame (19) of said activation panel (8), which is hinged on the boxed casing (2) to turn around a second axis (B) perpendicular to the said first axis (A), and a bistable spring (20) which is interposed between said boxed casing (2) and said support (19) to place said activation panel (8) in a position of rest or, alternatively, an operative position of switching of the said switch (6).

13. The call point according to Claim 12, wherein said bistable spring 22 comprises a metal plate substantially bent into a U-shape and has its two ends connected to a free end (19c) of said support frame (19) and to said boxed casing (2) respectively.

14. The call point according to any of the Claims 12 or 13, comprising an intermediate panel (23), which is interposed between said activation panel (8) and said supporting frame (19); and a gate (24), which is mounted to move freely on said intermediate panel (23); said call point comprising a least one lever system (25), structured for transmitting the oscillating movement of said support frame (19) around said second axis (B) in a translation of the flag (24) along a direction parallel to said intermediate panel (23) and substantially perpendicular to said first axis (A).

15. The call point according to Claim 14, wherein said lever (25) comprises an element of substantially triangular shape presenting three corners wherein a first corner (25a) is able to be hinged to said boxed casing (2), a second corner (25b) is designed to engage a housing (50) created on the said gate (24), while a third corner has a cam or eyelet (25c), which is designed to be engaged by a cam follower pivot (26) placed on the end (19c) of said support frame (19).

16. The call point according to any of the previous Claims, comprising a window (42), which is positioned on a lateral portion of the said body casing (2) and is able to be retro-illuminated, at least partially, by the light conveyed by said waveguide (9) so as to signal an occurred activation of said call point.

17. The call point according to Claim 16, wherein said window (42) comprises a flat portion in semitransparent coloured plastic material able to emit light at least partially through a portion of its own surface when the opposite surface of the same flat portion is struck with light.

18. The call point according to any one of the previous Claims wherein said light source (7) contains a least one LED (7).

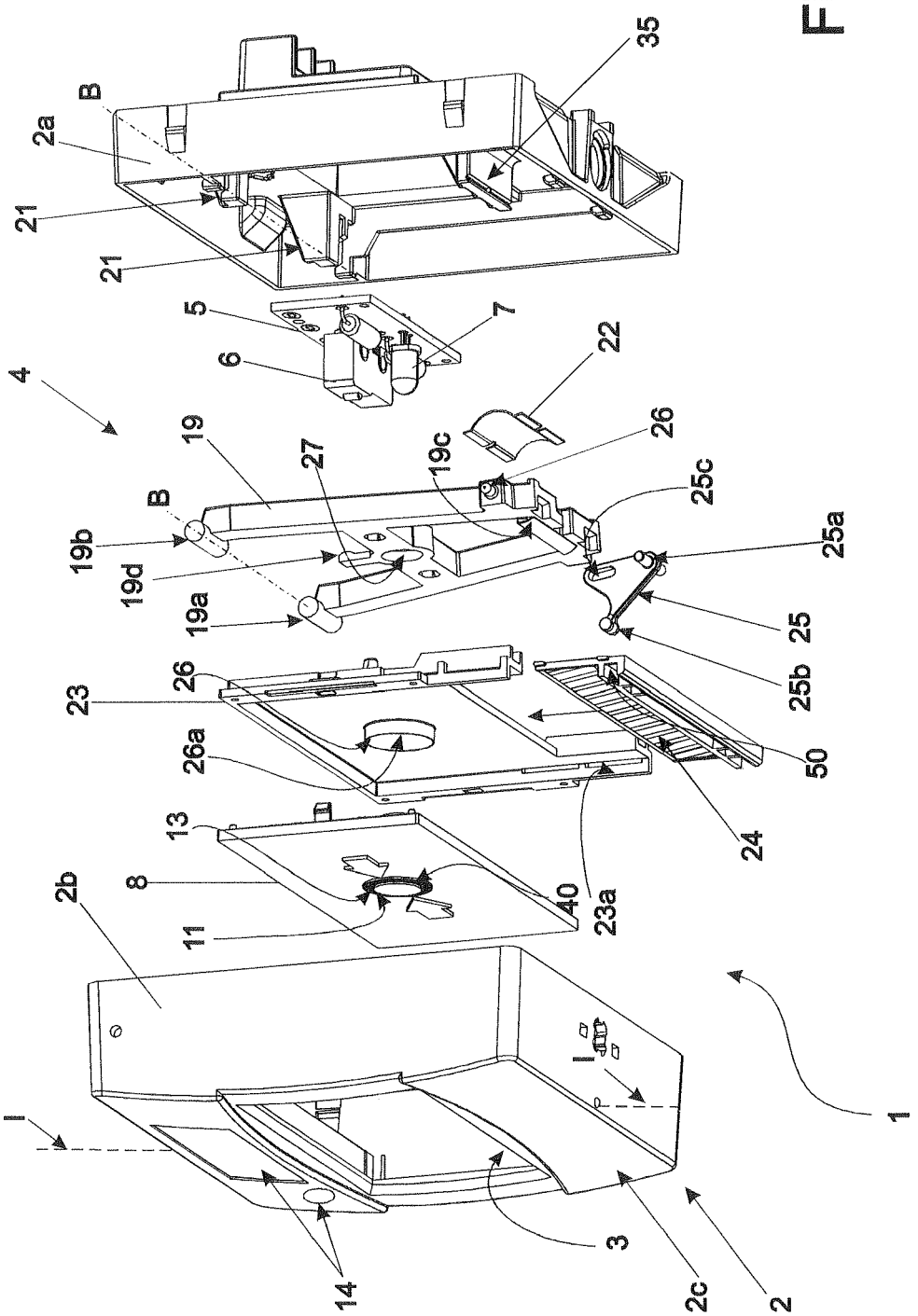
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Fig. 1

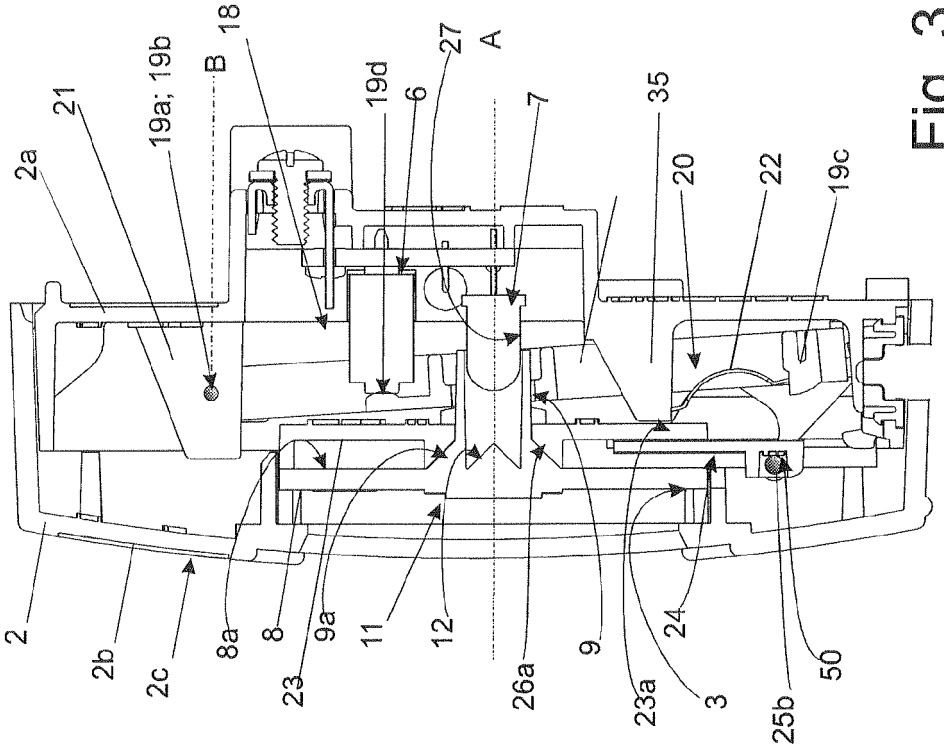
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Fig. 3

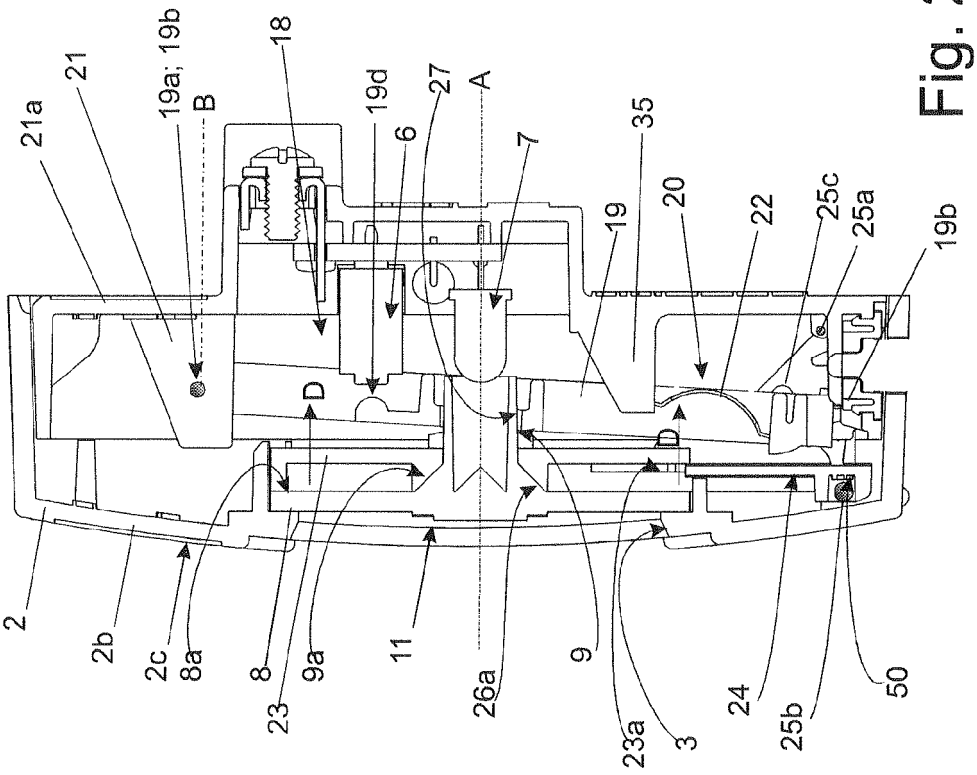
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Fig. 2

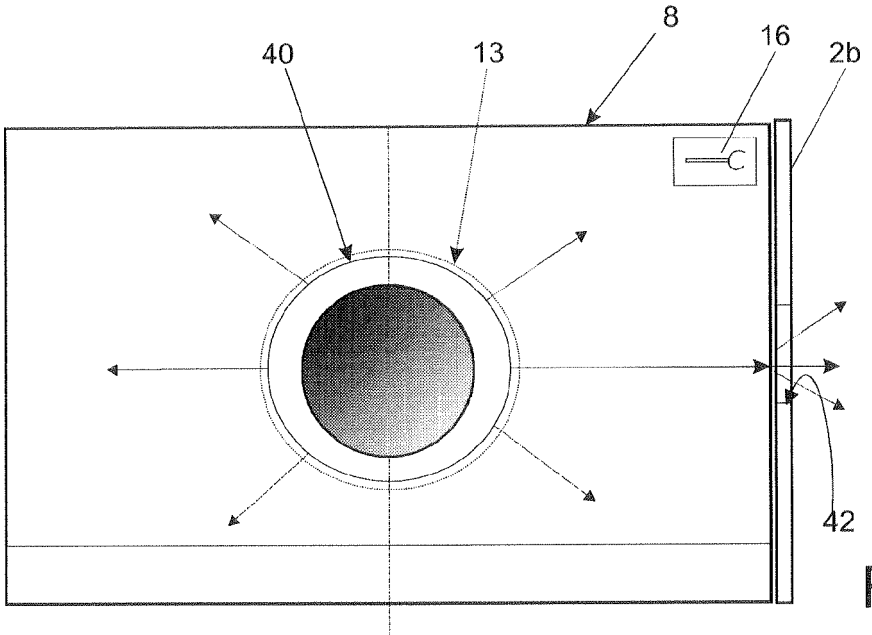

Fig.4

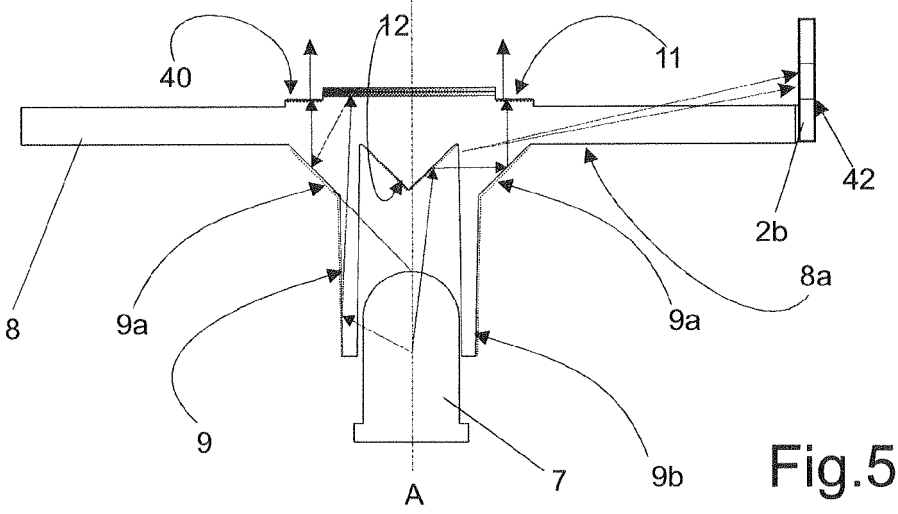

Fig.5

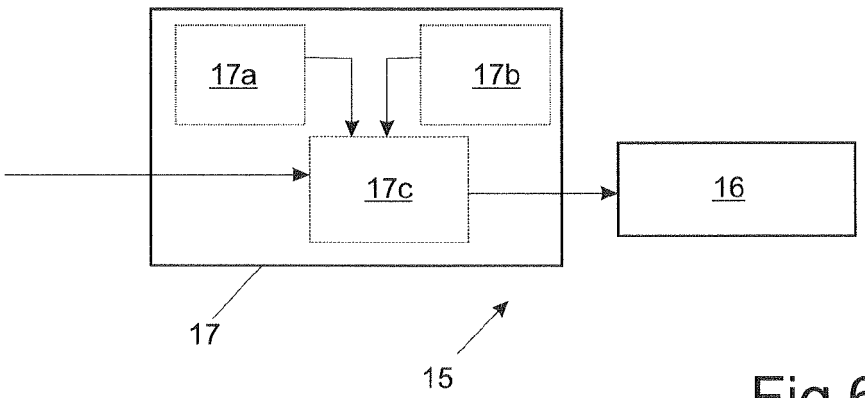

Fig.6

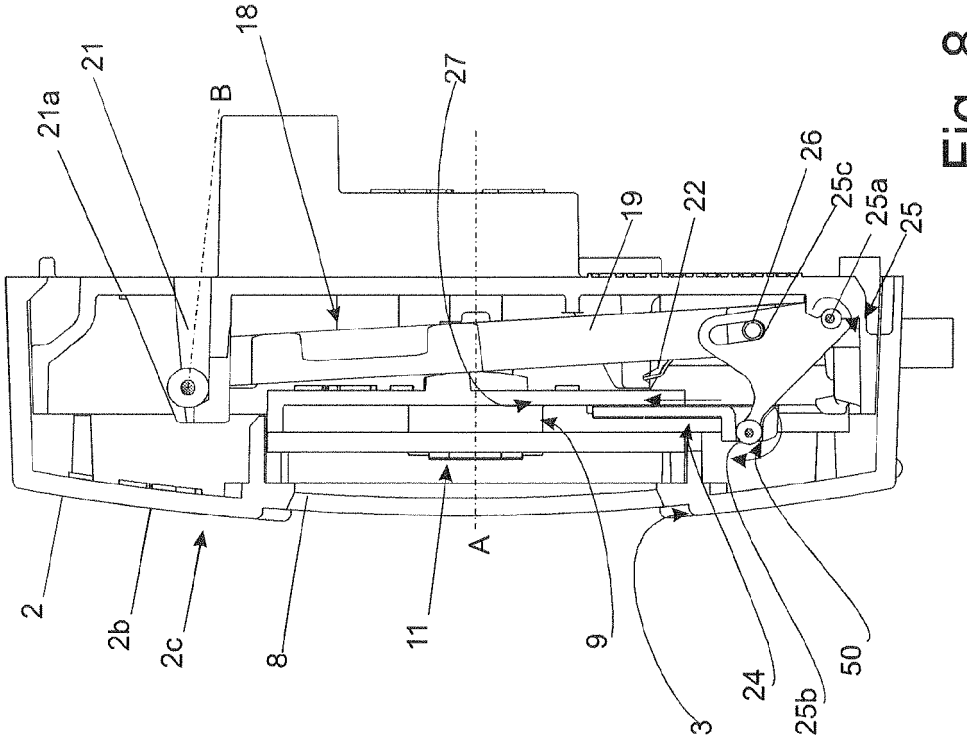
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Fig. 8

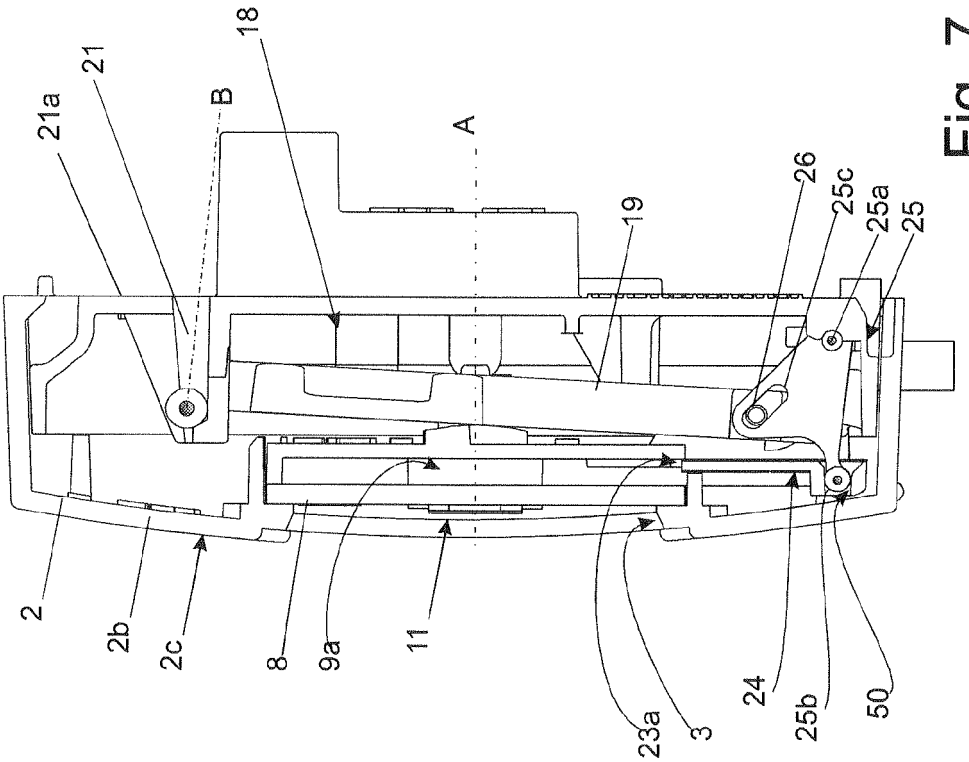
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Fig. 7