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(54) **Fused interlocked socket with rotary disconnect switch**

(57) A fused interlocked socket (1) with rotary disconnect switch has a front body (2) adapted to contain a base frame to which a contact holder body (4) is applied. The contact holder is wired to a socket (5) that is associated with the front body. The socket has a locking means, which prevents the insertion and disconnection of a plug when electric voltage is present in the system. The locking means is driven by a control knob (3) which is mounted on a door (8) that is hinged to the front body and is provided internally with a fuse holder body (9).

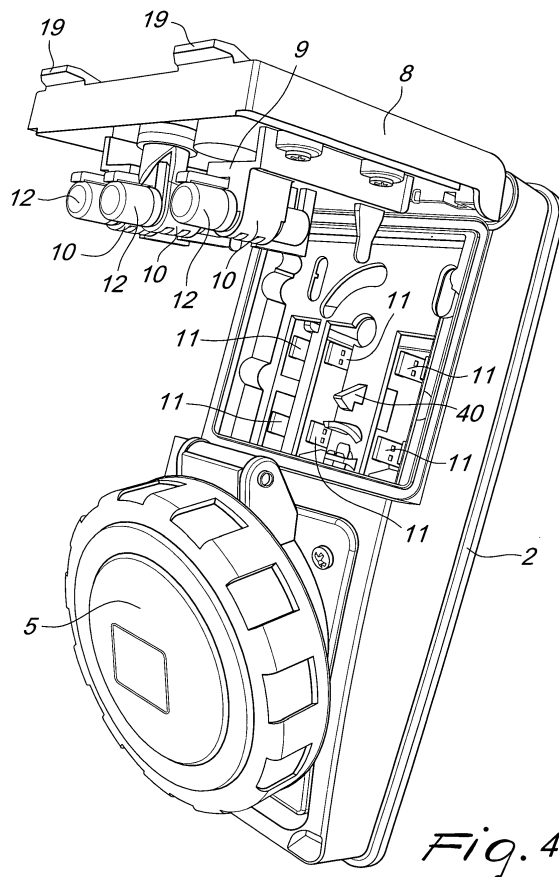


Fig. 4

Description

[0001] The present invention relates to a fused interlocked socket with rotary disconnect switch.

[0002] As is known, an interlocked socket incorporates a locking device, of the mechanical or electrical type, which is connected to a disconnection system, which does not allow the insertion or extraction of the plug when voltage is present.

[0003] Interlocked sockets can be provided with protective fuses in order to ensure the safety of operators and the integrity of the devices and circuits connected thereto.

[0004] The most commonly used fuses, especially in modular devices mounted on DIN rails, are cylindrical, with a size of 10.3 x 38 mm.

[0005] The particularity of those fuses is their cylindrical shape, which allows to extract the fuse, reducing the force applied by the forked contacts that retain the two ends of the fuse, and at the same time moves the two contacts into the disconnection position.

[0006] There are fuse holders that disconnect a single element and others that disconnect three elements, with the same rotary motion.

[0007] The fuses are normally located within the socket body and can be accessed after opening a door, which is transparent or opaque.

[0008] Once the door has been opened, access to the fuse is gained by opening the fuse holder with a rotary operation; at this point the fuse is free from the contacts, is extracted from the fuse holder and is tested to understand whether it actually fused.

[0009] The door is opened almost always with buttons or sliders, which do not ensure that an ill-intentioned individual cannot access the fuses.

[0010] In some cases, the door is locked by self-tapping screws, which act as a deterrent against vandalism.

[0011] To replace a fuse, or even just to test it, it is necessary to extract it with one's fingers from the tilting member after opening it.

[0012] This operation is not always easy and in any case entails that the user inserts his fingers in a recess that is very close to electrical contacts.

[0013] The operations of opening the door, opening the fuse holder, extracting the various fuses, testing and repositioning the intact fuses or replacing them require some time and are tedious.

[0014] The aim of the present invention is to provide a fused interlocked socket that overcomes the drawbacks of the cited prior art.

[0015] Within the scope of this aim, an object of the invention is to provide an interlocked socket in which the operation of testing and optional replacement of a fuse is quicker and safer than in conventional devices.

[0016] Another object of the present invention is to provide an interlocked socket which, by virtue of its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

[0017] This aim and these and other objects, that will become better apparent hereinafter, are achieved by a fused interlocked socket with rotary disconnect switch, comprising a front body adapted to contain a contact holder body that is wired to a socket that is associated to said front body, said socket comprising locking means that prevents the insertion and the disconnection of a plug when electric voltage is present in the system, said locking means being driven by a control knob; characterized in that said control knob is mounted on a door that is hinged to said front body and that comprises a fuse holder body in its interior.

[0018] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is an exploded perspective view of the fused interlocked socket with rotary disconnect switch, according to the present invention;

Figure 2 is a front perspective view of the interlocked socket in the condition in which the fuse holder door is closed and without the plug inserted;

Figure 3 is a perspective view showing the initial opening of the fuse holder door by means of a screwdriver;

Figure 4 is a perspective view of the socket with the fuse holder door fully open, in the condition for testing and optional replacement of the fuses;

Figure 5 is an enlarged-scale perspective view of the control member of the fuse holder door.

[0019] With reference to the cited figures, the interlocked socket according to the invention, generally designated by the reference numeral 1, comprises a front body 2, which is adapted to be applied to a control panel, not shown in the figures, or to another wall-mounted support where one wishes to apply the interlocked socket.

[0020] The front body 2 contains a contact holder body 4, which is wired to the socket 5 associated with the front body 2.

[0021] The socket 5 has a locking means, which prevent the insertion and disconnection of a plug 6 when electric voltage is present in the system, in a per se known manner.

[0022] The locking means is actuated by a control knob 7 by a lever system.

[0023] The control knob 7 is mounted on a door 8, which is hinged to the front body 2 and has the dual function of contact holder body protection door and of fuse holder.

[0024] A fuse holder body 9 is provided on the internal surface of the door 8 and is constituted by a plurality of cylindrical seats 10, each of which is adapted to retain a fuse 12.

[0025] In the operating condition of the socket, the fuses 12 contained in the cylindrical seats 10 of the fuse holder 9 have their ends engaged by forked contacts 11.

[0026] A control member 13 locks the door 8 in the closed position. The door 8 can be opened by means of a tool, for example a screwdriver 14, which can be inserted in a notch 15 provided in the control member 13.

[0027] The control member 13 has a locking tooth 16, which engages an abutting element 40 provided in the front body 2, in order to lock the door 8 in the closed position. The control member 13 also has and a cam-shaped portion 17 which engages a corresponding inclined plane of the front body 2, in order to open the door when the control body 13 is turned.

[0028] The control body 13 also has a return spring 18.

[0029] The door 8 preferably has grip tabs 19, which facilitate its grip in order to lift it.

[0030] The operation of the interlocked socket according to the present invention is as follows.

[0031] After placing the control knob 7 in the "0" position (no electric voltage in the system), the control member 13 is turned by means of a tool releasing the door 8 from the front 2 and partially lifting the door by virtue of the interaction of the cam-shaped portion 17 of the control member with the inclined plane of the front body 2. This operation is shown schematically in Figure 3.

[0032] The rotation of the control member 13 is sufficient to extract the fuses 12 from the corresponding contacts 11 that contained them, thus disconnecting the line.

[0033] By lifting the door 8 completely, the fuses 12 are made available for replacement and can be tested without having to be extracted from the seats 10, as shown in Figure 4.

[0034] Only the fuse that tripped is extracted and replaced with a new fuse.

[0035] Once the fuse has been replaced, the door 8 is closed by pressing the region of the control member 13. By action of the return spring 18, the control member 13 has moved into the closed position and at the tooth 40 on the front 2.

[0036] With this system it is no longer necessary to close the door 8, which is locked by snap action by virtue of the control member 13.

[0037] In practice it has been found that the invention achieves the intended aim and objects, an interlocked socket having been provided in which the fuse holder is integrated in the closure door that protects the fuses.

[0038] The tilting door for access to the fuses is characterized by a control member to which multiple tasks are entrusted. The first one is to ensure the IP67 degree of protection between the door and the front body by virtue of the engagement tooth.

[0039] Secondly, when the door is closed and the control knob is in the "0" position and one wishes to access the fuses, this is made possible only by means of a tool, for example a screwdriver.

[0040] This application claims the priority of Italian Patent Application No. MI2009A001909, filed on November 2, 2009, the subject matter of which is incorporated herein by reference.

Claims

1. Fused interlocked socket with rotary disconnect switch, comprising a front body adapted to contain a contact holder body that is wired to a socket that is associated to said front body, said socket comprising locking means that prevents the insertion and the disconnection of a plug when electric voltage is present in the system, said locking means being driven by a control knob; **characterized in that** said control knob is mounted on a door that is hinged to said front body and that comprises a fuse holder body in its interior.
2. Interlocked socket according to claim 1, **characterized in that** said fuse holder body comprises a plurality of cylindrical seats, each of which is adapted to hold a fuse; in the operating condition of the socket, when said door is in a closed position, said fuses are arranged in said cylindrical seats and their ends are engaged by forked contacts of said contact holder body.
3. Interlocked socket according to claim 2, **characterized in that** it comprises a control member that is adapted to lock said door in the closed position and that allows to open the door by means of a tool, i.e. a screwdriver.
4. Interlocked socket according to one or more of the preceding claims, **characterized in that** said control member comprises means that can be engaged by said tool.
5. Interlocked socket according to one or more of the preceding claims, **characterized in that** said control member comprises a locking tooth that engages an abutting member formed in said front body in order to lock said door in the closed position, and a cam-shaped portion that engages a corresponding inclined plane of said front body in order to make the door open when the control body is rotated.
6. Interlocked socket according to one or more of the preceding claims, **characterized in that** said control body comprises a return spring, said spring allowing closure of the door without using a tool.
7. Interlocked socket according to one or more of the preceding claims, **characterized in that** said door comprises gripping tabs that facilitate the door gripping when it is lifted.
8. Interlocked socket according to one or more of the preceding claims, **characterized in that** said fuses can be tested without being extracted from said cylindrical seats when said panel is completely lifted.

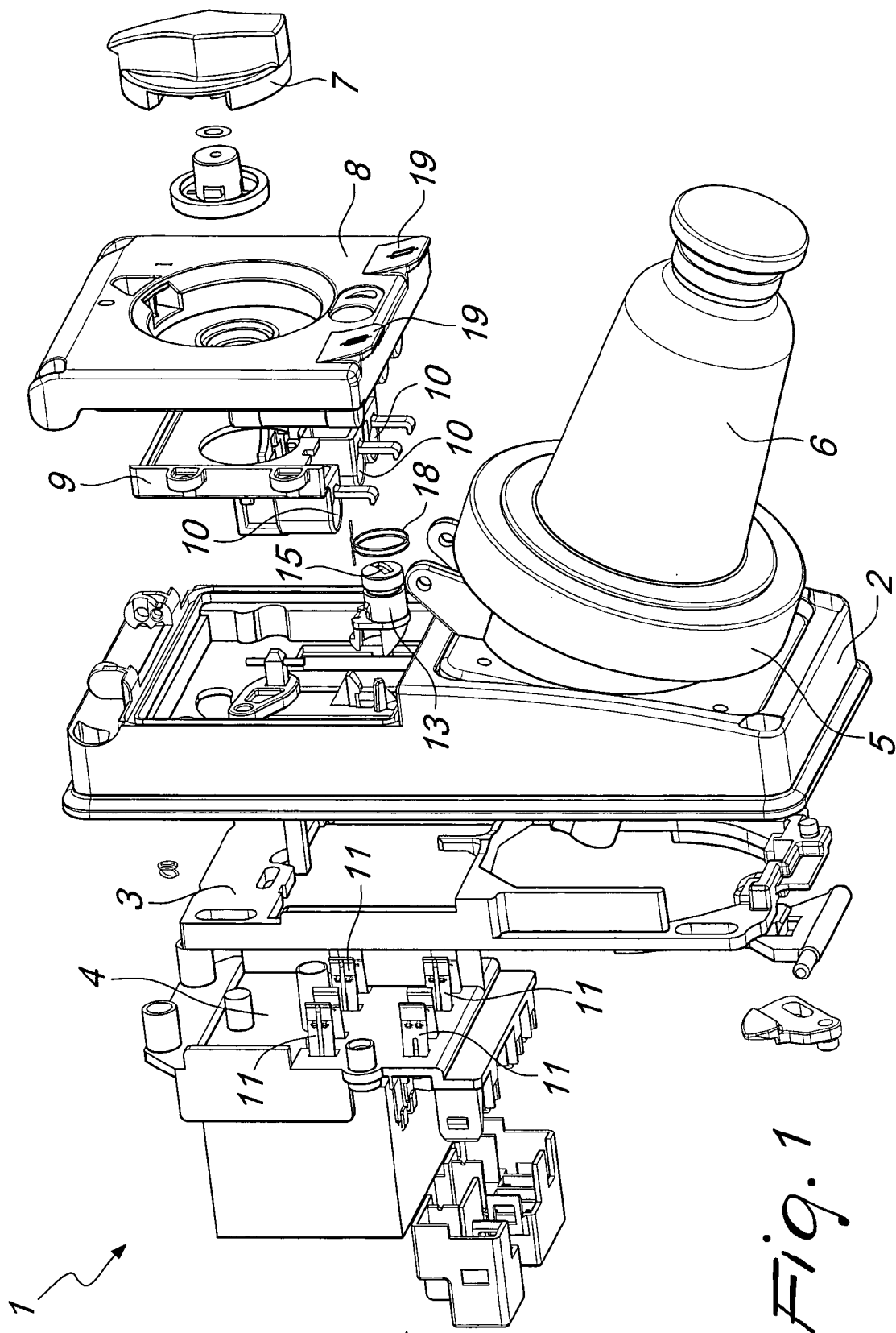


Fig. 1

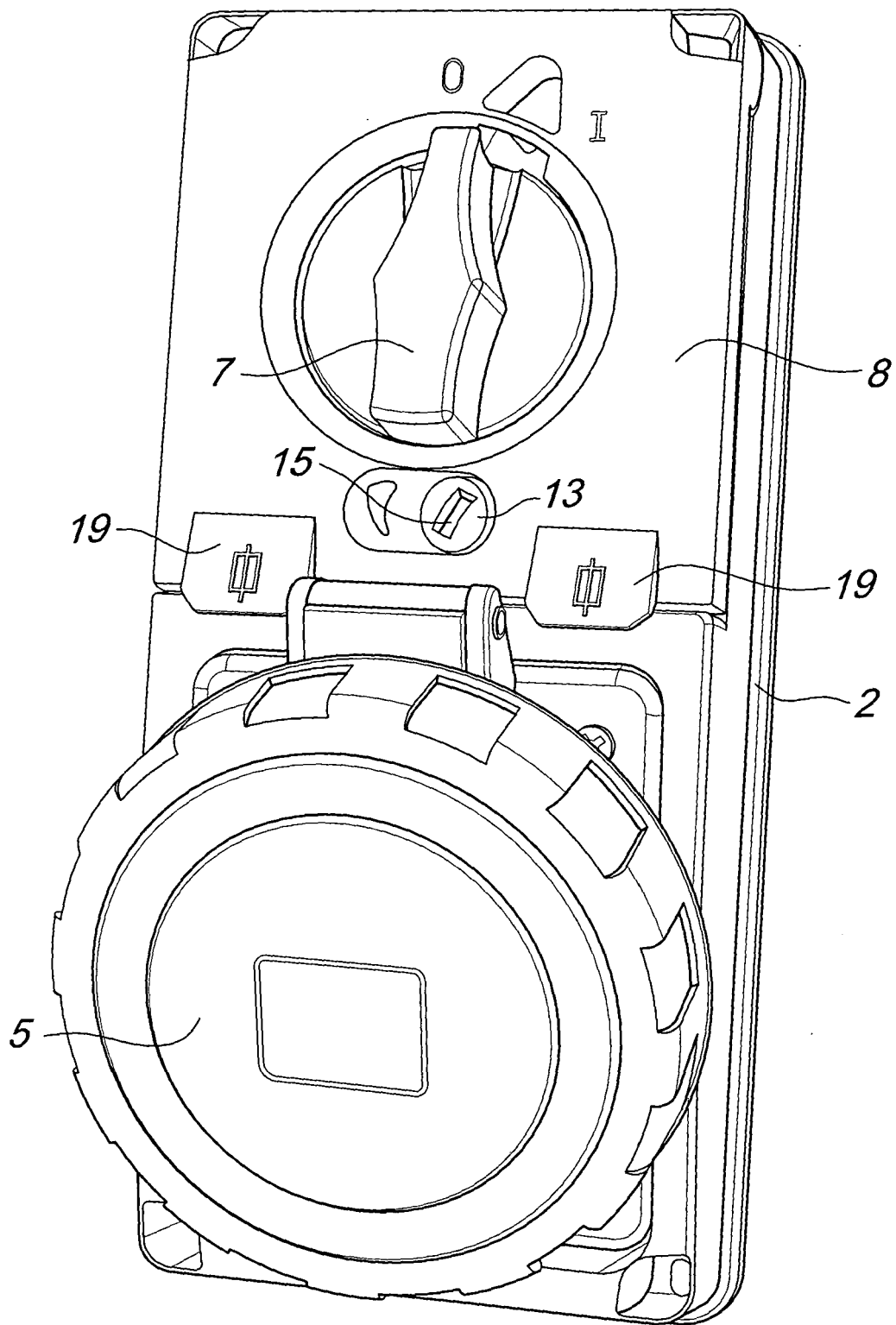


Fig. 2

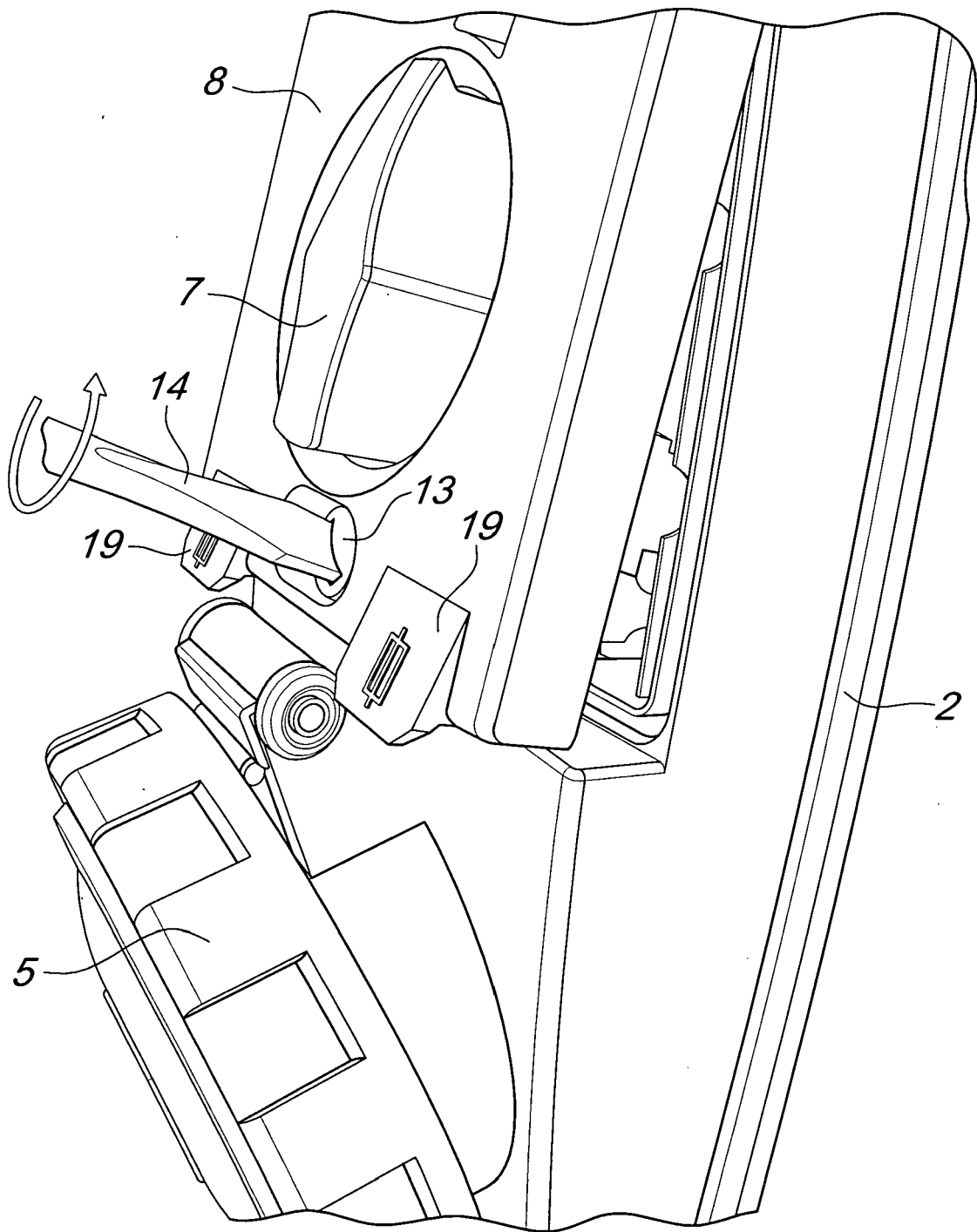


Fig. 3

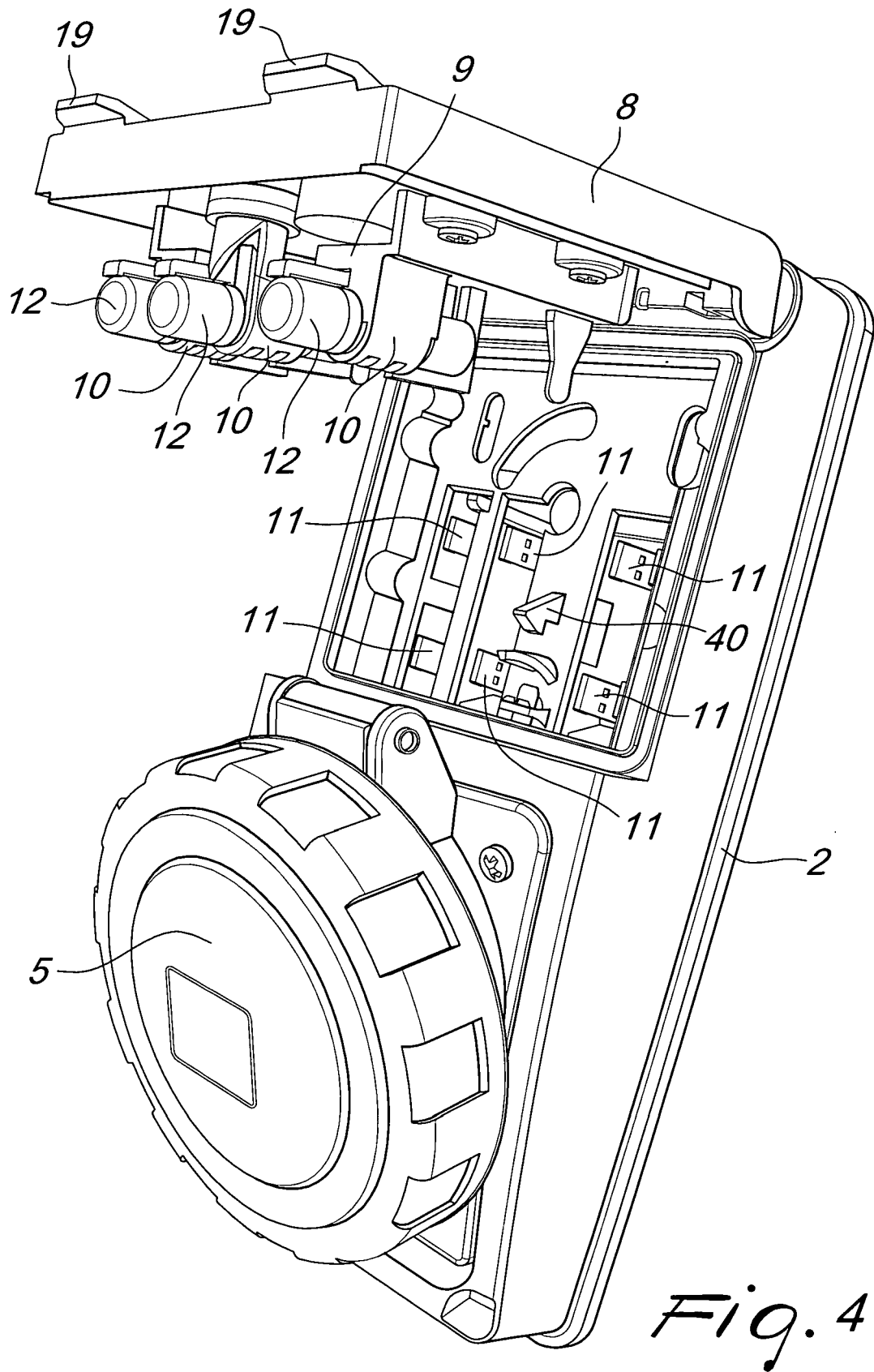


Fig. 4

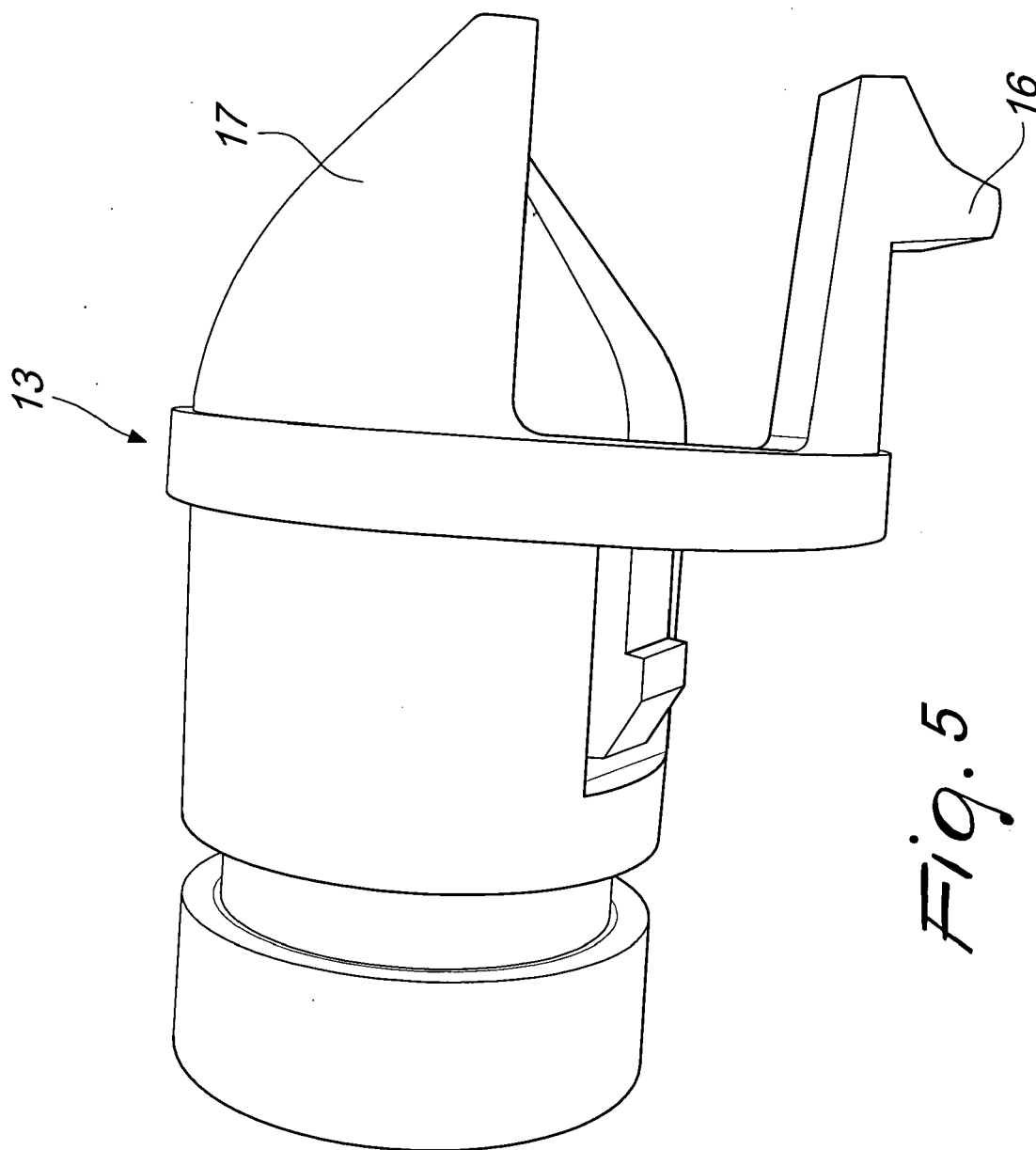


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 10 01 4016

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 385 719 A (ILME SPA [IT]) 27 August 2003 (2003-08-27) * page 1, paragraph 2; figure 1 *	1	INV. H01R13/707 H01R13/68
A	EP 1 542 320 A2 (FANTON S P A [IT]) 15 June 2005 (2005-06-15) * figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01R H02B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 January 2011	Examiner Garcia Congosto, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 01 4016

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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05-01-2011

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB 2385719	A	27-08-2003	FR	2837626 A3	26-09-2003

EP 1542320	A2	15-06-2005	NONE		

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT MI20091909 A [0040]