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(54) **PROTECTOR AND ELECTRICAL SOCKET PROVIDED WITH THE PROTECTOR**

(57) Protector (B) for electrical sockets (P2), which comprises a cover (2) and a cover guiding channel (1) such that the cover (2) is mobile between a lower position (Pinf) and an upper position (Psup) in the channel (1), the protector (B) comprising means for generating a force (F) on the cover (2) directed from the lower position (Pinf) towards the upper position (Psup), wherein the means for generating a force (F) comprise a lower magnet (M1) arranged close to the lower position (Pinf) and/or an upper magnet (M3) arranged close to the upper position (Psup) and a one mobile magnet (M2) fixed to the cover (2) arranged to be repelled by the lower magnet (M1) and/or to be attracted by the upper magnet (M3). The invention also relates to an electrical socket provided with the protector.

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Description

TECHNICAL FIELD

[0001] The present invention relates to protectors for electrical sockets intended to cover the housing of the socket when nothing is plugged in, and more particularly of the type comprising a moving cover that is moved when pressed with a male plug provided with prongs, for which the mobile cover is provided with holes coinciding with the prongs and the electrical contacts of the electrical socket.

STATE OF THE ART

[0002] Known in the art are the electrical sockets comprising a base and a protector, the protector comprising a cover and a cover guiding channel, which coincides with the socket well, such that the cover is mobile between a lower position, where the male plug is coupled to the electrical socket, and an upper position in the channel, where the cover acts as a cover that prevents the dust to enter the housing, and wherein the protector comprises means for generating a force on the cover directed from the lower position towards the upper position. This force is a feeble force that can be easily overcome when pushing with the male plug.

[0003] An example of these electrical sockets is disclosed in EP2456021A1.

[0004] The known electrical sockets present disadvantages. For example, the cover is subjected to a force which presents high variability along the way of the cover between the upper position and the sunken position.

[0005] The need for a spring to push the cover back to the upper position, involves technical restrictions. For example, it is required to provide the electrical socket with additional space for the spring both in the compressed and in the extended state. For example, a spring having a length L_i when it is in the compressed state (i.e. when the cover is in the sunken position) requires an extra length of at least Li within the electrical socket. In addition, as explained by the Hooke's law, a spring exerts a force which varies as the spring is compressed or extended. As shown in the formula below, this force variation is limited by the lengths Li and L_f of the spring:

$$\Delta F = \frac{L_0 - L_f}{L_0 - L_i} \, x \, 100$$

Wherein:

L_i is the length of the spring in the compressed state (i.e. when the cover is in the sunken position).

L_f is the length of the spring in the extended state (i.e. when the cover is in the upper position).

ΔF is the percentage difference of the force exerted by the spring between the extended state and the compressed state.

L_0 is the length of the spring for which the spring exerts a force equal to 0 N.

[0006] Therefore there is a need to overcome the technical limitations imposed by the aforementioned formula and by the length of the spring L_i when it is in the compressed state.

DESCRIPTION OF THE INVENTION

[0007] For overcoming the mentioned drawbacks the present invention proposes a protector for electrical sockets, which comprises a cover and a cover guiding channel such that the cover is mobile between a lower position and an upper position in the channel, the protector comprising means for generating a force on the cover directed from the lower position towards the upper position, wherein the means for generating a force comprise:

- at least one lower magnet arranged close to the lower position; and/or;
- at least one upper magnetic or ferromagnetic element arranged close to the upper position;
- at least one mobile magnet fixed to the cover arranged to be repelled by the lower magnet and/or attracted by the upper magnet.

[0008] In this way, the force pushing back the cover to the upper position is not generated by means of merely a spring mechanically coupled to the cover. A magnetic force exerted by a lower magnet or a magnetic force exerted by an upper magnet generates a force that drives the cover to the covering configuration. This technical difference decreases mechanical wear of the internal parts of the electrical socket and decreases the noise produced when the cover moves between the upper and the sunken position. In addition, since it is not required that the means for generating the force are mechanically coupled to the cover, it is easier to separate the cover from the guide or the socket, making the electrical socket easy to assemble and disassemble.

[0009] Therefore, the invention essentially lies in the use of magnetic forces by means of localized magnets so that a force can be exerted on a mobile magnet arranged in the cover. In this way the same inventive concept covers an embodiment based on a repulsion force, by means of at least one lower magnet arranged in a lower position, or an embodiment based on an attractive force, by means of at least one upper magnet arranged in an upper position, as well as two magnets arranged to exert two summed up forces having the same direction, one that repels from the lower position and another that attracts from the upper position. Obviously the chosen embodiment within the scope of the invention will depend on the type of magnets available, and especially the intensity of the force that can be achieved with them. It will also depend, as will be seen in preferred embodiments,

on the uniformity of the force sought in the stroke of the cover between its two extreme positions.

[0010] In some embodiments, the protector comprises a plurality of pairs of lower magnet and mobile magnet; or

- a plurality of pairs of upper magnets and mobile magnet; or
- a plurality of sets of lower magnet, upper magnet and mobile magnet;

so that the repulsion forces are distributed.

[0011] In this way, a more homogeneous force distribution across the cover can be achieved. In addition, in this way, the plurality of magnets set can be arranged so as to cause a particular user experience. For example, the arrangement of the plurality of pairs/sets of lower magnet (upper magnets) and mobile magnet is such that when the user applies a particular force on a particular section of the cover, the cover moves in a particular manner.

[0012] In some embodiments the protector comprises a side wall enclosing the channel. In embodiments of the invention, the protector is an independent part, and the side wall provides structural support to its components. In other embodiments the protector is integrated in a fixed manner in the electrical socket, the side wall is a lateral wall of the electrical socket itself.

[0013] In some embodiments, the protector comprises cover guiding means in the displacement of the cover between the lower position and the upper position, the guiding means being arranged on a periphery of the cover and on the side wall.

[0014] Preferably, the guiding means have a longitudinal direction.

[0015] It has been found that providing stops to the cover in the upper and lower positions, in combination with the presence of a channel and the force or forces provided by the magnets, is sufficient to guide the cover between said positions. However, by means of additional guides, the degrees of freedom of movement of the cover can be reduced. For example, it is important to ensure that the cover does not rotate and therefore prevent that its holes for the prongs no longer coincide with the holes where the electrical contacts for the prongs are located. Also, the means for guiding the cover can prevent jamming of the cover during movement of the cover along the well between the upper position and the sunken position and between the sunken position and the upper position.

[0016] In some embodiments, the guiding means comprise grooves arranged on the side wall cooperating with projections arranged on the perimeter of the cover.

[0017] In some embodiments, the protector comprises lower and/or upper magnets arranged at the ends of the grooves and the mobile magnets are arranged in the projections.

[0018] Therefore, it is an embodiment in which the guides and the magnet assemblies coincide. However, it can also be envisaged that the magnet sets are arranged in guides, and that other guiding means exclusively intended for mechanical guidance are provided.

[0019] Preferably, the cover comprises holes for the insertion of prongs.

[0020] In some embodiments, the side wall comprises the guiding means, the lower magnets and/or the upper magnets, such that the protector is an independent accessory destined to be engaged in an electrical socket.

[0021] In some embodiments, the protector comprises fastening flaps whose shape is complementary to retaining cavities arranged in the electrical socket.

[0022] As will be emphasized throughout the present description, the protector according to the invention can be conceived in many ways from the point of view of the situation of its basic components. Thus, the protector can be conceived as an independent entity coupled to an electrical socket, as a set of elements that belong in part to an attachable entity and an electrical socket, or as parts of an integrated electrical socket.

[0023] In some embodiments the side wall comprises the guiding means, such that the side wall and the cover form an independent accessory engageable in an electrical socket which comprises the lower magnets and/or the upper magnets. Preferably, the lower magnets are integrated in the bottom of the well of the electrical socket, that is to say the upper surface of the part of the electrical socket containing the electrical contacts.

[0024] In an embodiment, the side wall comprises the upper magnets. As a variant, the upper magnets can be integrated in another independent component, like for example an outer frame, or the external frame of an electrical socket.

[0025] The invention also relates to an electrical socket comprising a base and a protector according to any of the aforementioned inventive variants.

[0026] In some embodiments of the electrical socket, the base comprises a base frame provided with an opening, a lateral wall extending downwards from the base frame and a lower part enclosing electrical connections, such that the lateral wall and an upper surface of the lower part define a well for housing a protector according to the above-mentioned variants.

[0027] In some embodiments the base and the protector comprise mutually coupling means comprising fastening flaps in the protector and, in the base, retaining cavities whose shape is complementary to the fastening flaps.

[0028] In some embodiments of the electrical socket the base comprises a base frame provided with an opening, a lateral wall extending downwards from the base frame and a lower part enclosing electrical connections and an upper surface of the lower part, such that the lateral wall and the upper surface of the lower part define a well, wherein the lateral wall corresponds to the side wall of the protector, the lower magnet(s) being integrated in the lower part close to or in the upper surface or in the lateral wall close to the bottom of the well.

[0029] Therefore, this embodiment corresponds to an electrical socket that is permanently integrated with the protector according to the invention. Repulsion forces can be achieved as long as the lower magnets are arranged below the mobile magnets, so the lower magnets can be placed either on the bottom surface of the well, or close to the intersection between the bottom of the well and the side walls, so they could be behind them, always ensuring that an effective repulsion force results. In the case where the lower magnets are placed in the bottom surface of the well, they can be on the upper surface, flush or projecting, or embedded.

[0030] In some embodiments of the electrical socket the upper magnets are integrated in the base frame.

[0031] Finally, the electrical socket can comprise an outer frame where the upper magnets are integrated.

[0032] Throughout the present invention, magnet means any magnetic element or ferromagnetic element that allows to establish a repulsion magnetic force on the cover with respect to the bottom of the well and / or an attraction magnetic force with respect to the opening of the well.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] To complete the description and in order to provide a better understanding of the invention, a set of drawings is provided. Said drawings form an integral part of the description and illustrate embodiments of the invention, which should not be interpreted as restricting the scope of the invention, but just as an example of how the invention can be carried out. The drawings comprise the following figures:

Figure 1A shows a perspective view from above of a protector, conceived as an independent accessory destined to be engaged to an electrical socket.

Figure 1B shows a perspective view from below of a protector, conceived as an independent accessory destined to be engaged to an electrical socket.

Figure 2A shows a cut lateral perspective view of the protector of Fig. 1A wherein the cover is in the upper position.

Figure 2B shows a cut lateral perspective view of the protector of Fig. 1A wherein the cover is in the lower position or sunken position.

Figure 3A to 3C plan views of the protector.

Figure 4A shows a lateral view of the protector for electrical sockets of Fig. 1A wherein the cover is in the sunken position.

Figure 4B shows a lateral view of the protector for electrical sockets of Fig. 1A wherein the cover is in the upper position.

Figure 5A shows a perspective view from above of an electrical socket and a protector.

Figure 5B shows a perspective view from below of the electrical socket and the protector of Fig. 5A.

Figure 6A shows an exploded view, viewed from below, of the electrical socket and protector of Fig. 5A.

Figure 6B shows an exploded view, viewed from above, of the electrical socket and protector of Fig. 5A.

Fig. 7 shows the dependence of the force exerted by magnets M1 and M3 over mobile magnet(s) M2 depending on the position of the mobile magnet(s) M2.

Figure 8A shows a lateral view of a cross section of an electrical socket wherein the cover is in the upper position.

Figure 8B shows a lateral view of a cross section of an electrical socket wherein the cover is in the sunken position.

Figure 9A shows a lateral view of a cross section of an electrical socket wherein the protector's wall is an integral part thereof and wherein the cover is in the upper position.

Figure 9B shows a lateral view of a cross section of an electrical socket wherein the protector's wall is an integral part thereof and wherein the cover is in the sunken position.

Figure 10 shows a schematic view of an embodiment wherein the protector is an independent accessory, and wherein the accessory is coupled to an electrical socket base.

Figure 11 shows a schematic view of an embodiment wherein the protector is an independent accessory and wherein the base comprises an outer and an inner frame.

Figure 12 shows a schematic view of an embodiment wherein the protector is an independent accessory which comprises the inner frame.

Figure 13 to 23 show different embodiments where the magnets are placed in different components of the base or the protector or in an independent accessory, or distributed among them.

DESCRIPTION OF A WAY OF CARRYING OUT THE INVENTION

[0034] As shown in all the figures, the invention relates to a protector B for electrical sockets P2, which comprises a cover 2 and a cover guiding channel 1 such that the cover 2 is mobile between a lower position Pinf and an upper position Psup in the channel 1.

[0035] As shown in Fig. 2B or in FIG. 4A, the protector B comprises means for generating a force F on the cover 2 directed from the lower position Pinf towards the upper position Psup.

[0036] What makes the difference of this embodiment with the prior art, is that the means for generating a force F comprise:

- at least one lower magnet M1 arranged close to the lower position Pinf; and
- at least one mobile magnet M2 fixed to the cover 2 arranged to be repelled by the lower magnet M1.

[0037] For example, as shown in the embodiments, there are two pairs of lower magnets M1 and two pairs of mobile magnets M2. Obviously, there could be more pairs of magnets, distributed along the periphery of the cover and the side wall.

[0038] In a specially preferred embodiment, shown in the figures, the protector B comprises one or more ferromagnetic elements or upper magnets M3 arranged close to the upper position Psup such that an attractive force is established between each upper magnet M3 and each mobile magnet M2. The effect of putting attractive magnets M3 on the upper end of the cover stroke is that the interactions between mobile magnets M2 and lower magnets M1 on the one hand and the interactions between mobile magnets M2 and upper magnets M3 on the other hand lead to combining the forces of both interactions for obtain the profile of forces in function of the cover stroke shown in figure 7. In this way, more uniformity in the spatial profile of the force is guaranteed, and in particular it is guaranteed that in half a stroke two forces are added that tend to bring the cover 2 to its upper position Psup.

[0039] In all the embodiments shown, the channel 1 is defined by a side wall 11. Obviously, the channel 1 would also be defined in an embodiment consisting of a top ring, which defines the opening and therefore the upper position Psup of the cover 2, top ring from which guides could extend downwards for guiding the cover 2 in its stroke form the upper position to the lower or sunken position and vice versa. In this case it is a version of the invention that would use a minimum of material and that would be intended to be coupled to an electrical socket ES.

[0040] As shown for example in figures 1A to 6B, the protector comprises cover guiding means 14, S2 in its displacement between the lower position Pinf and the upper position Psup, the guiding means 14, S2 having a longitudinal direction and being arranged on a periphery of the cover 2 and on the side wall 11.

[0041] In the depicted embodiments, the guiding means 14, S2 comprise grooves 14 arranged on the side wall 11 cooperating with projections S2 arranged on the perimeter of the cover 2.

[0042] It is noted that in the depictions shown, the magnets M1/M2/M3 and the guiding means S2/14 are arranged angularly in different positions. Now, it can well be conceived that the two functions are carried out in the same guide. For example, it can be seen that the channel disposed between the magnets M1 and M3 of FIGS. 1A to 5B constitute guides by themselves, although they would allow a certain balancing of the cover 2. To avoid that balancing, the mentioned guidance sets are 14 / S2 precisely provided.

[0043] In all the embodiments, the cover comprises holes H1, H2 for the insertion of prongs.

[0044] As shown in figs 1A to 5B, the side wall 11 comprises the guiding means S2, 14 and the lower magnets M1, such that the protector B is an independent accessory destined to be engaged in an electrical socket P2. To this end, the protector B comprise flaps C1 destined to be engaged in complementary cavities arranged in an electrical socket P2 base.

[0045] In the embodiments shown in figures 1A to 5B, the side wall 11 comprises the upper magnets M3. As a variant, the upper magnets can be integrated in another independent component, like for example an outer frame, or the external frame of an electrical socket, as shown in figures 10 to 15.

[0046] A preferred embodiment of the electrical socket is shown in Figs 5A to 6B. Here we can see an electrical socket P2 base which comprises a base frame P21 provided with an opening, the opening defining the upper position of the cover 2.

[0047] A lateral wall P11 extends downwards from the base frame P21 to a lower part P23. This lower part encloses electrical connections and thanks to the invention it does not need space anymore to house a spring for urging the cover 2 towards the opening.

[0048] Therefore, the lateral wall P11 and the upper surface P24 of the lower part P23 define a well O for housing an independent protector B that can be engaged therein.

[0049] In another embodiment, as shown in FIGS 9A and 9B, the electrical socket P2 base comprises a base frame P21 provided with an opening. A lateral wall P11 extends downwards from the base frame P21 to a lower part P23 enclosing electrical connections, such that a well O is defined between the lateral wall P11 and the upper surface P24 the of lower part P23. However, in this embodiment, the lateral wall P11 corresponds to the side wall 11 of the protector B, and the lower magnets M1 are integrated in the lower part P23 close to the upper surface P24 of the well O or in the lateral wall P11 close to the bottom of the well O.

[0050] Figures 10 to 15, which are self-explanatory,

show all the arrangement that are possible depending on the parts that bear the different components of the protector B.

[0051] For example, in Figure 10 an embodiment is shown in which the side walls 11 of an accessory comprise the upper magnets M3, while the lower magnets M1 are joined to a socket base P2.

[0052] In figure 11 the socket is completed with an internal frame and an external frame, so that the set is designed so that the cover 2 is flush with the frames.

[0053] In Figure 13 an arrangement is presented that only comprises a frame.

[0054] Another embodiment consists in placing the upper M3 magnets in the frame instead of arranging them in a separate accessory, as shown in Figure 14.

[0055] The subsequent figures show other configurations that show almost all possible combinations of magnet arrangements.

[0056] In this text, the term "comprises" and its derivations (such as "comprising", etc.) should not be understood in an excluding sense, that is, these terms should not be interpreted as excluding the possibility that what is described and defined may include further elements.

[0057] The invention is obviously not limited to the specific embodiments described herein, but also encompasses any variations that may be considered by any person skilled in the art within the general scope of the invention as defined in the claims.

Claims

1. Protector (B) for electrical sockets (P2), which comprises a cover (2) and a cover guiding channel (1) such that the cover (2) is mobile between a lower position (Pinf) and an upper position (Psup) in the channel (1), the protector (B) comprising means for generating a force (F) on the cover (2) directed from the lower position (Pinf) towards the upper position (Psup), **characterized in that** the means for generating a force (F) comprise:

    - at least one lower magnet (M1) arranged close to the lower position (Pinf); and/or
    - at least one upper magnetic or ferromagnetic element (M3) arranged close to the upper position (Psup);
    - at least one mobile magnet (M2) fixed to the cover (2) arranged to be repelled by the lower magnet (M1) and/or attracted by the upper magnet (M3).

2. Protector (B) according to claim 1, comprising:
a plurality of pairs of lower magnet (M1) and mobile magnet (M2); or

    - a plurality of pairs of upper magnets (M3) and mobile magnet (M2); or
    - a plurality of sets of lower magnet (M1), upper magnet (M3) and mobile magnet (M2);

    so that the repulsion and/or attraction forces are distributed.

3. Protector (B) according to any of the preceding claims, which comprises a side wall (11) enclosing the channel (1).

4. Protector (B) according to claim 3, which comprises cover guiding means (14, S2) in for the cover displacement between the lower position (Pinf) and the upper position (Psup), the guiding means (14, S2) being arranged on a periphery of the cover (2) and on the side wall (11).

5. Protector (B) according to claim 4, wherein the guiding means (14, S2) have a longitudinal direction.

6. Protector (B) according to claim 4 or 5, wherein the guiding means (14, S2) comprise grooves (14) arranged on the side wall (11) cooperating with projections (S2) arranged on the perimeter of the cover (2).

7. Protector (B) according to claim 6, which comprises lower magnets (M1) and/or upper magnets (M3) arranged at the ends of the grooves, and the mobile magnets are arranged in the projections.

8. Protector according to any of the preceding claims, wherein the cover comprises holes (H1, H2) for the insertion of prongs.

9. Protector (B) according to claim 4 and any claim dependent thereof, wherein the side wall (11) comprises the guiding means (S2, 14), the lower magnets (M1) and/or the upper magnets (M3), such that the protector (B) is an independent accessory destined to be engaged in an electrical socket (P2).

10. Protector according to claim 9, which comprises fastening flaps (C1) whose shape is complementary to retaining cavities arranged in the electrical socket (P2).

11. Protector (B) according to any of claims 3 to 8, wherein the side wall (11) comprises guiding means (S2, 14), such that the side wall (11) and the cover (2) form an independent accessory engageable in an electrical socket (P2), the electrical socket (P2) comprising the lower magnets (M1) and/or the upper magnets (M3).

12. Electrical socket (P2) comprising an electrical socket base and a protector (B) according to any of claims 1 to 8.

13. Electrical socket (P2) according to claim 12, wherein the electrical socket base comprises a base frame (P21) provided with an opening, a lateral wall (P11) extending downwards from the base frame (P21) and a lower part (P23) enclosing electrical connections, such that the lateral wall (P11) and a upper surface (P24) of the lower part (P23) define a well (O) for housing a protector (B) according to claim 9.

14. Electrical socket (P2) according to claim 12, wherein the electrical socket base comprises a base frame (P21) provided with an opening, a lateral wall (P11) extending downwards from the base frame (P21) and a lower part (P23) enclosing electrical connections and an upper surface (P24) of the lower part (P23) such that the lateral wall (P11) and the upper surface (P24) define a well (O), wherein the lateral wall (P11) corresponds to the side wall (11) of the protector (B), the lower magnet(s) (M1) being integrated close to the upper surface (P24) of the lower part (23) or in the lateral wall (P11) close to the bottom of the well (O).

15. Electrical socket (11) according to claim 14 and having a protector (B) according to claim 2, wherein the upper magnets (M3) are integrated in the base frame (P21).

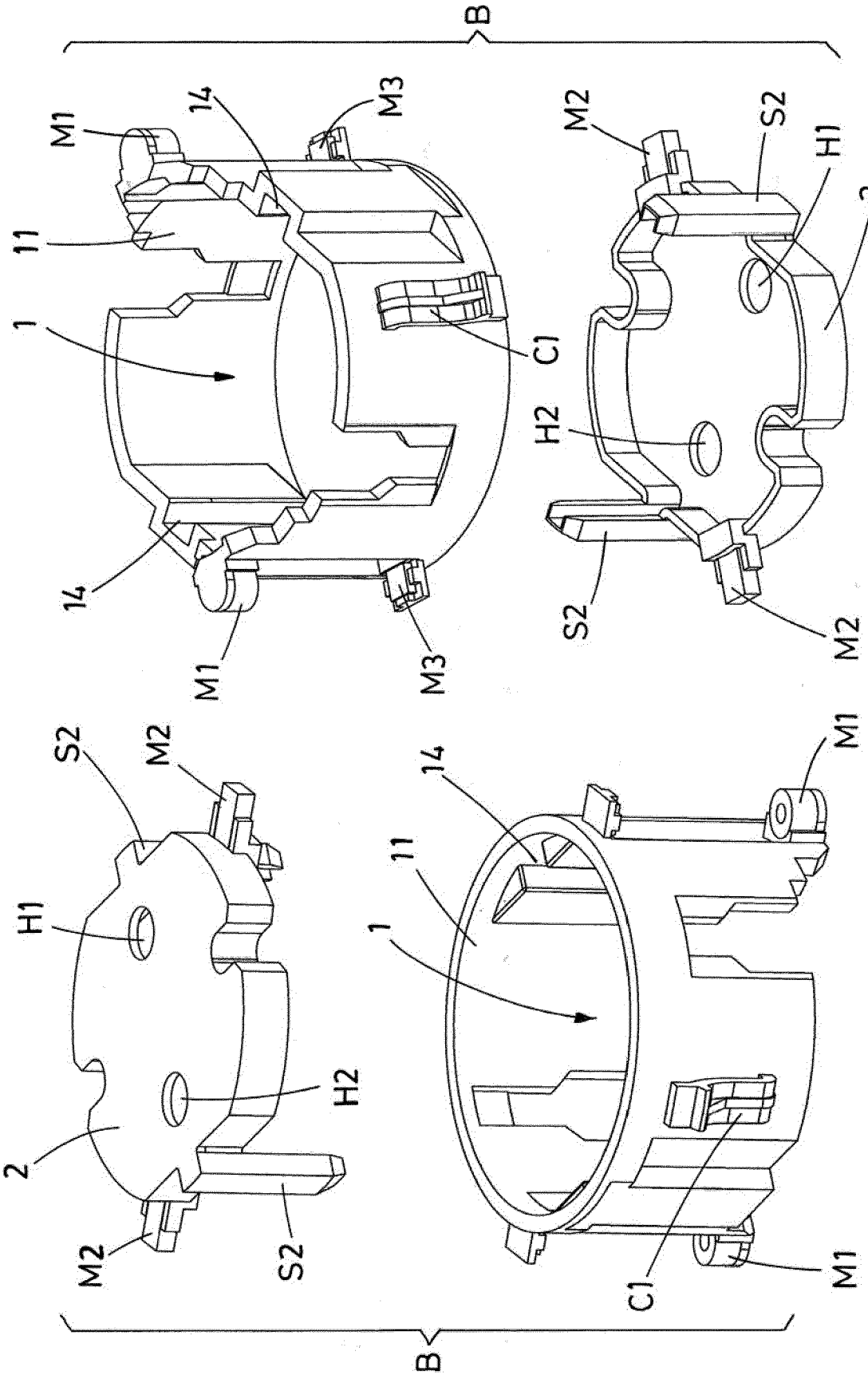


FIG.1B

FIG.1A

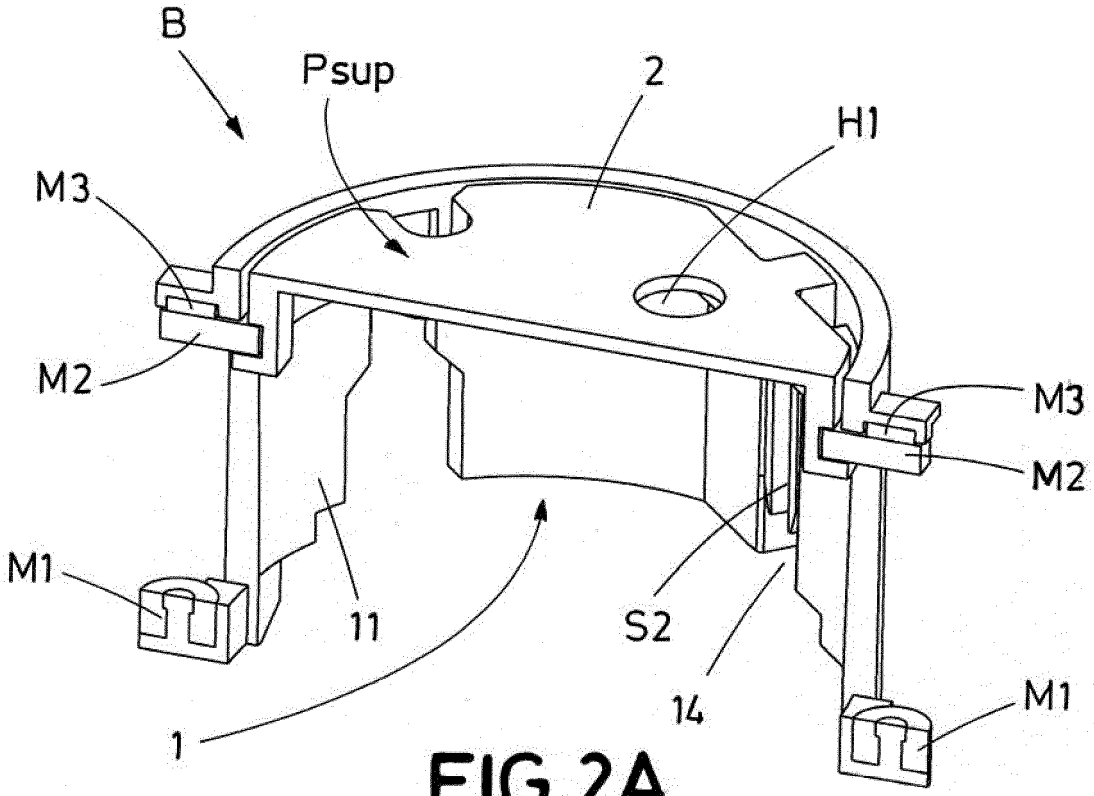

B
Psup
2
H1
M3
M2
M3
M2
M1
11
S2
14
M1
1

FIG.2A

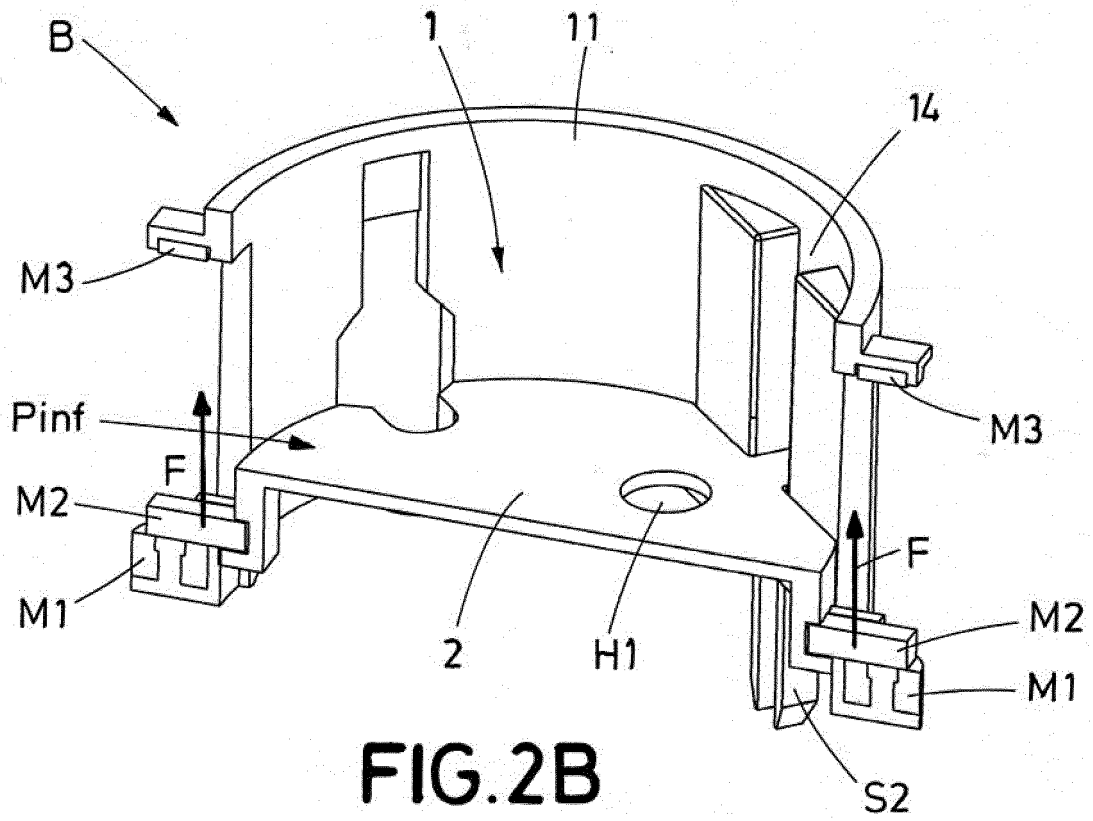

B
1
11
14
M3
M3
Pinf
F
M2
F
M2
M1
2
H1
M1
S2

FIG.2B

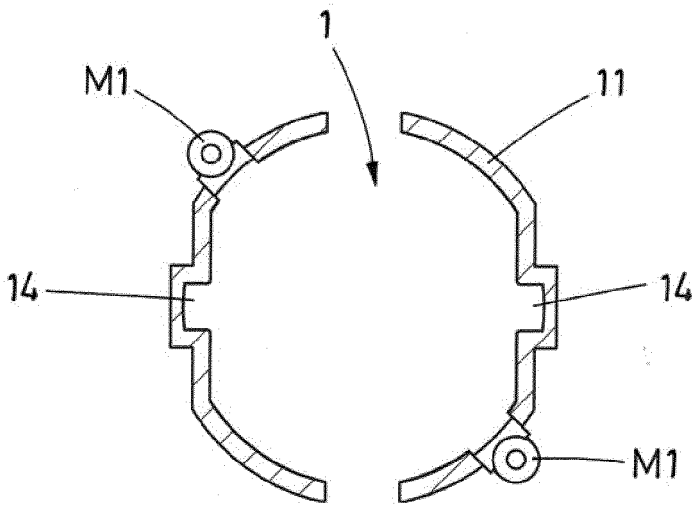


FIG.3A

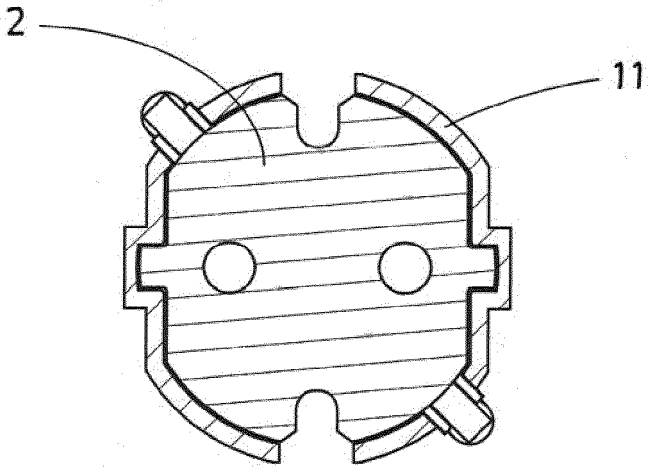


FIG.3B

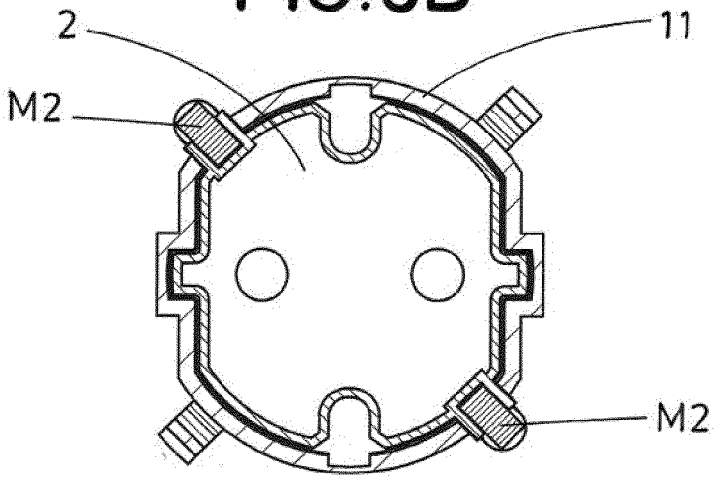


FIG.3C

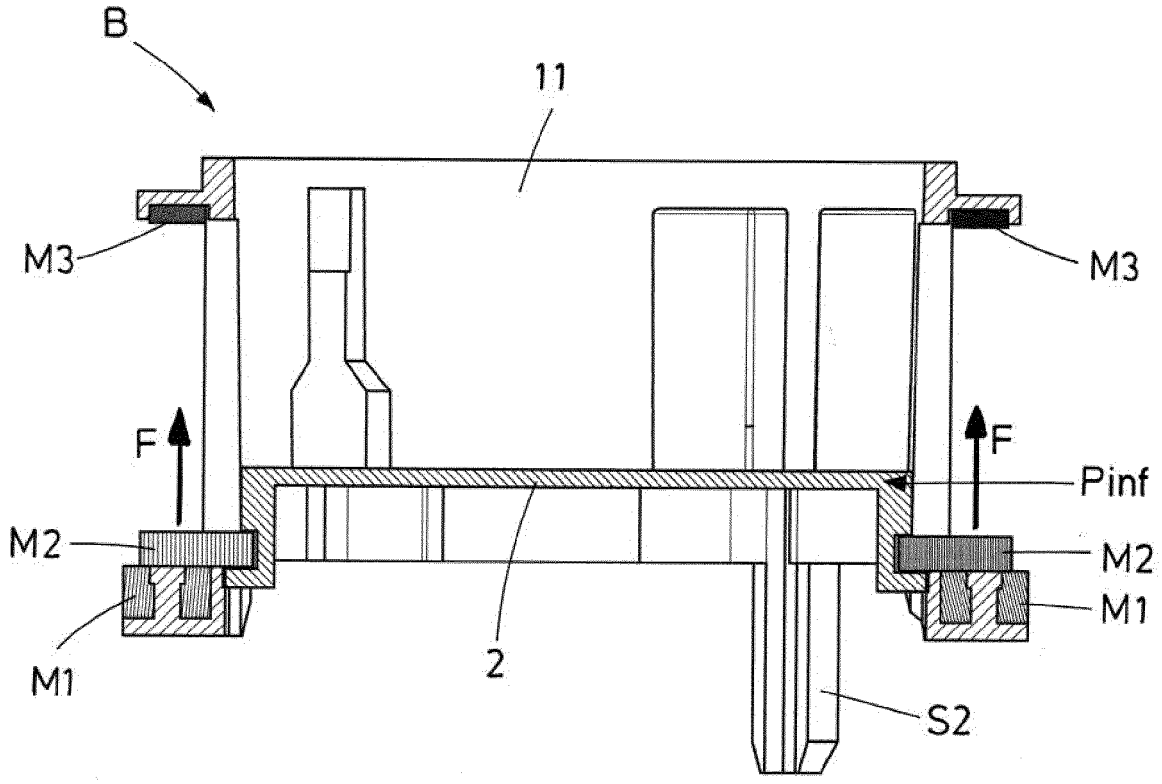


FIG.4A

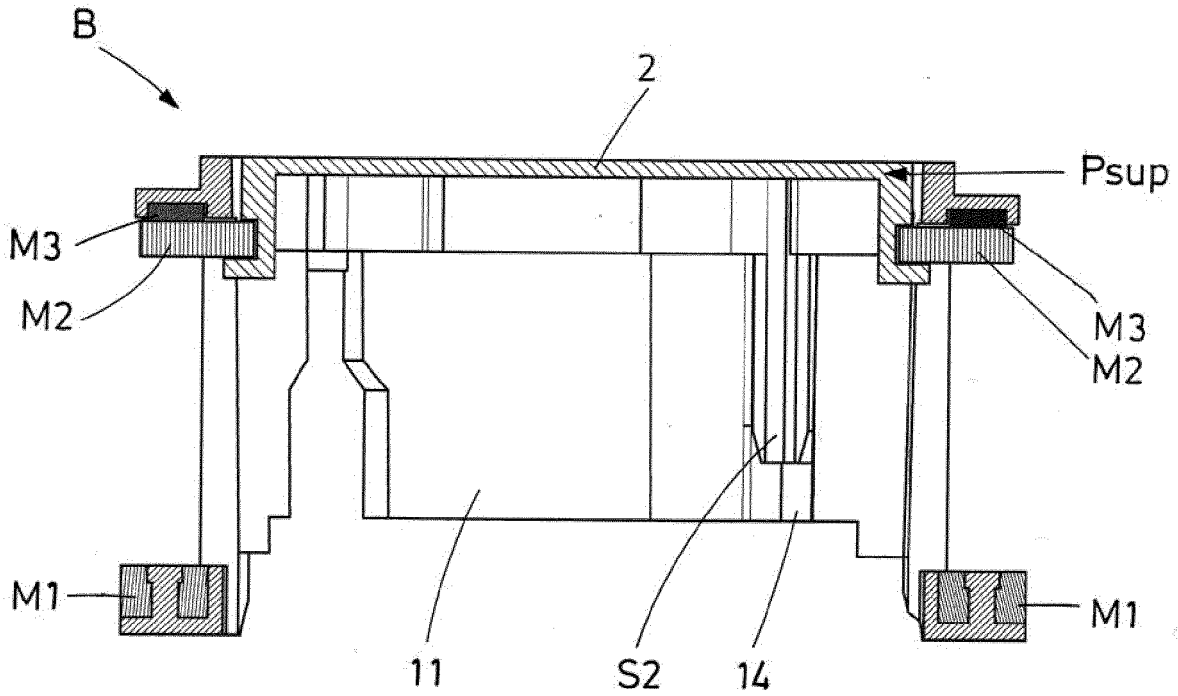


FIG.4B

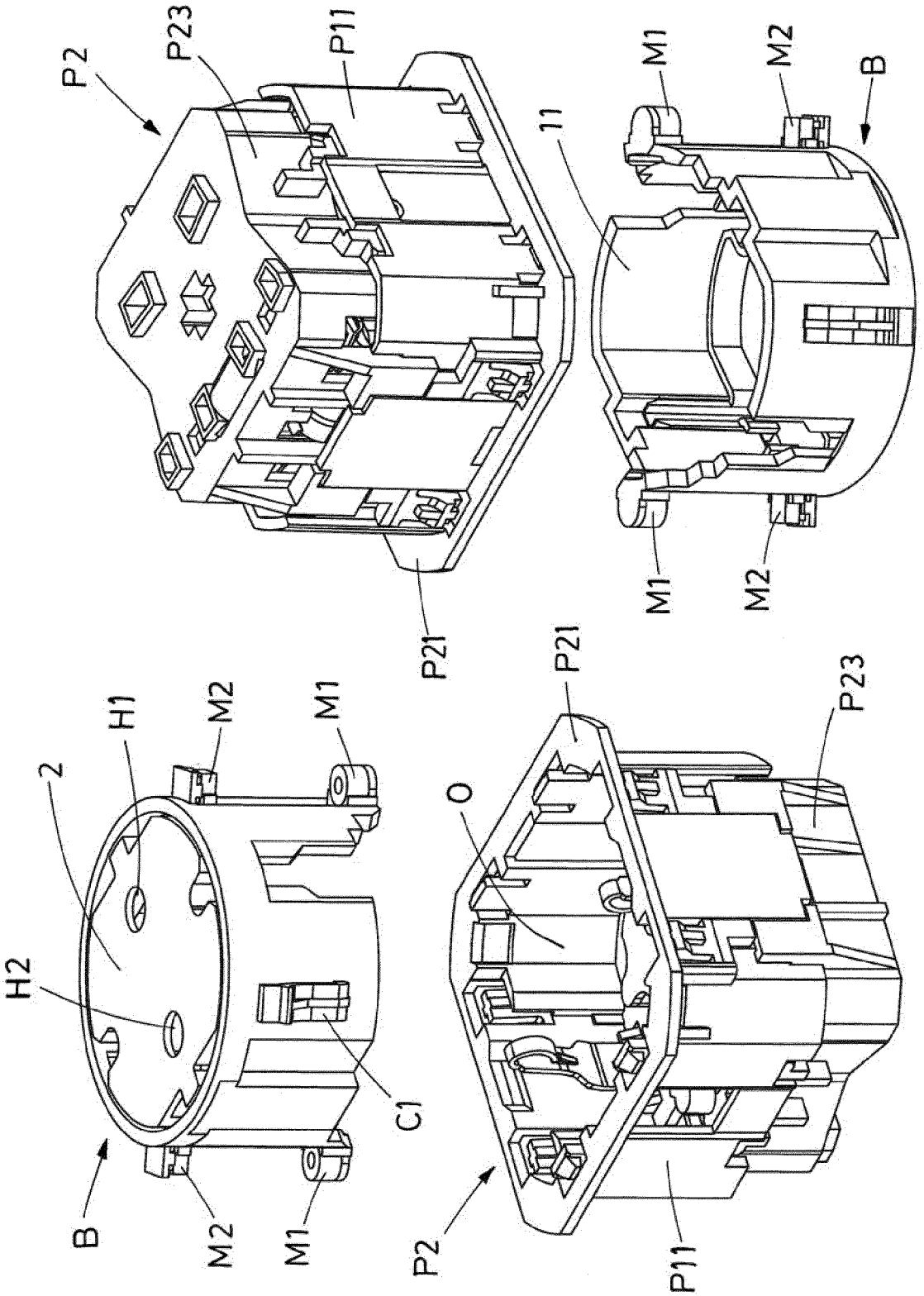


FIG.5B

FIG.5A

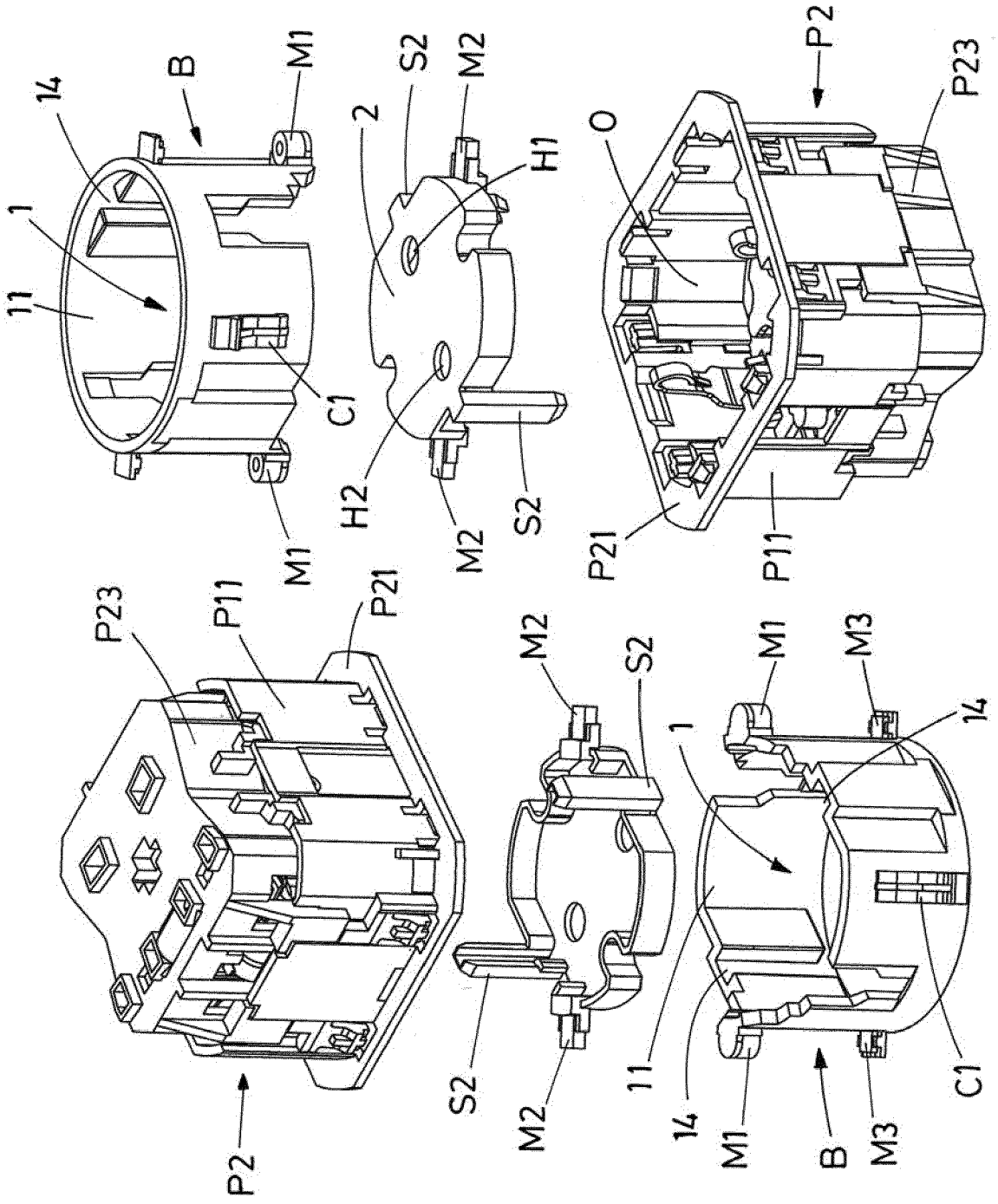

14
B
M1
1
11
C1
M1
2
S2
M2
H1
H2
M2
S2
O
P2
P23
P21
P11
P23
P11
P21
P2
M2
S2
S2
M2
1
M1
M3
14
11
14
M1
B
M3
C1

FIG.6B

FIG.6A

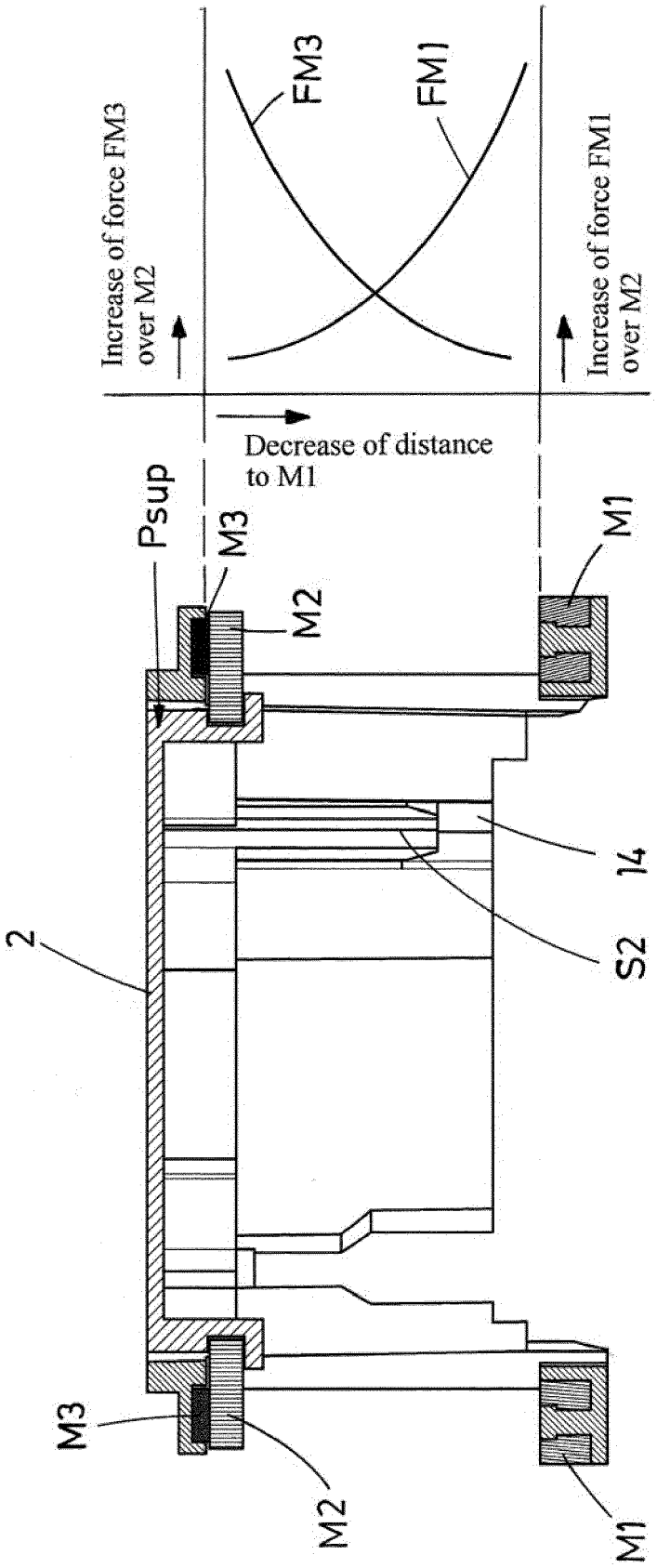

Increase of force FM3 over M2
FM3
FM1
Increase of force FM1 over M2
Decrease of distance to M1
Psup
M3
M2
M1
14
S2
2
M3
M2
M1

FIG.7

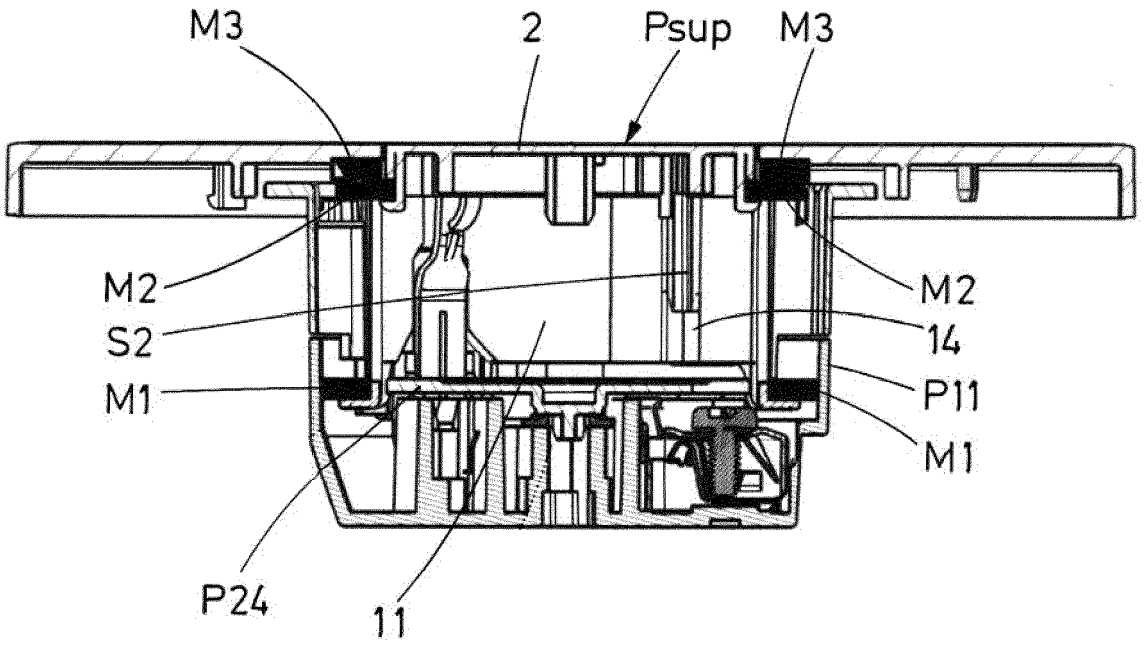

M3
2
Psup
M3
M2
S2
M1
M2
14
P11
M1
P24
11

FIG.8A

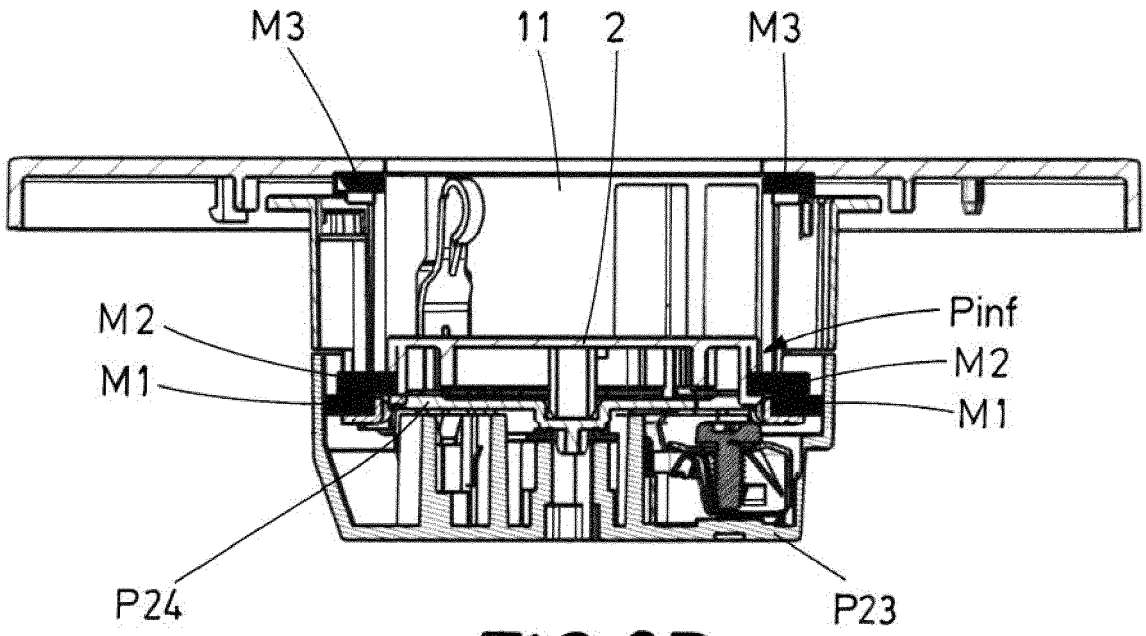

M3
11
2
M3
M2
M1
Pinf
M2
M1
P24
P23

FIG.8B

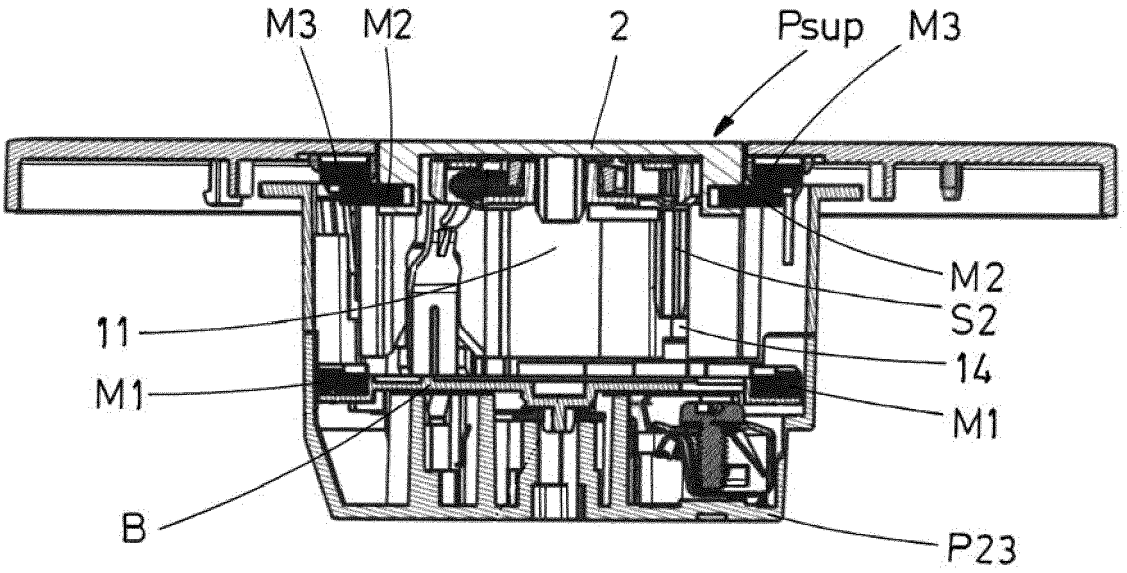

M3
M2
2
Psup
M3
M2
S2
14
M1
11
M1
B
P23

FIG.9A

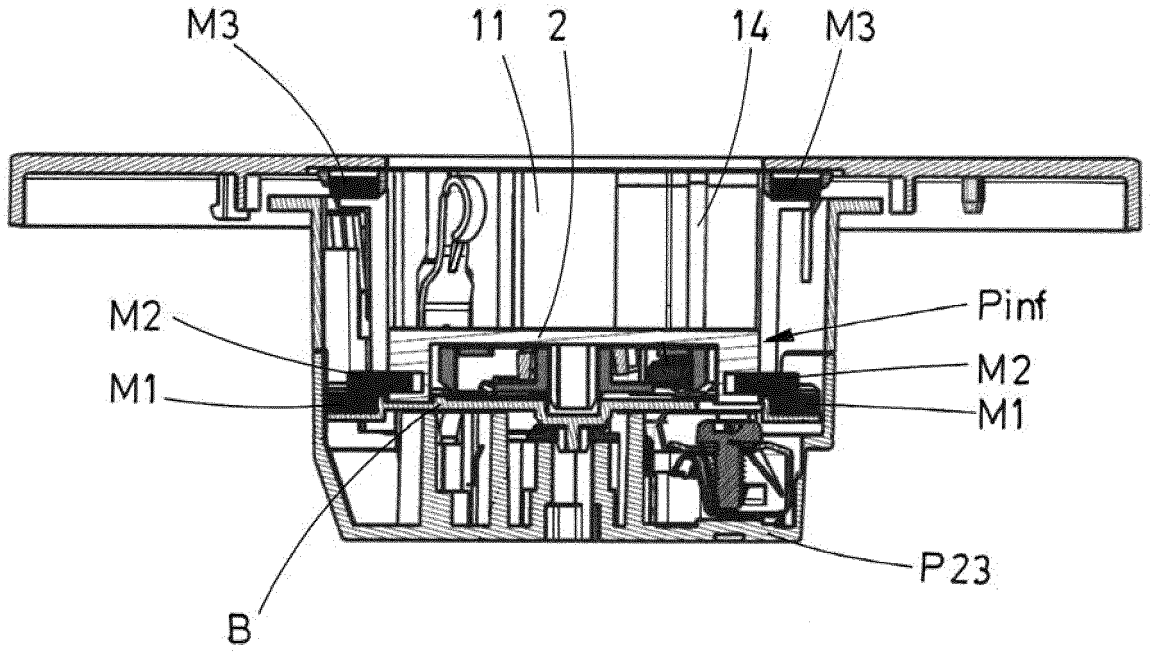

M3
11
2
14
M3
Pinf
M2
M2
M1
M1
P23
B

FIG.9B

Fig. 10

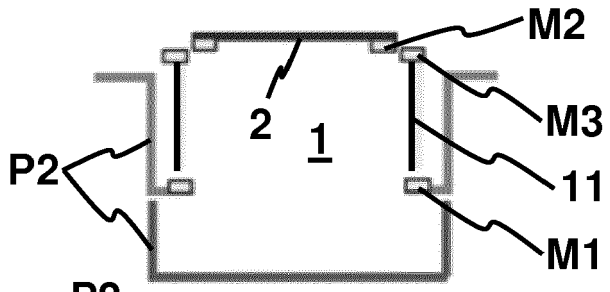


Fig. 11

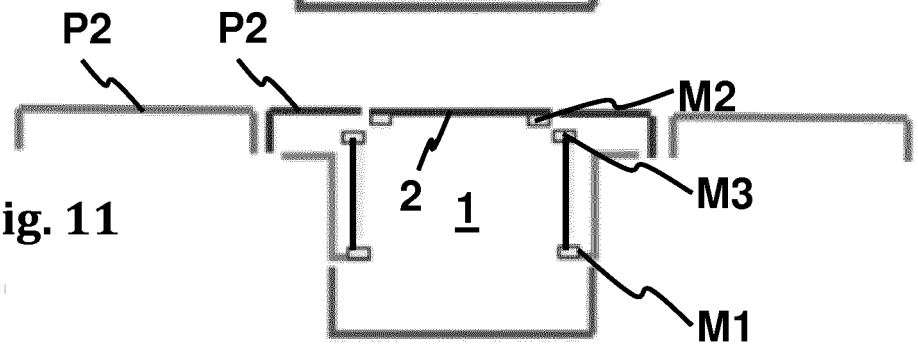


Fig. 12

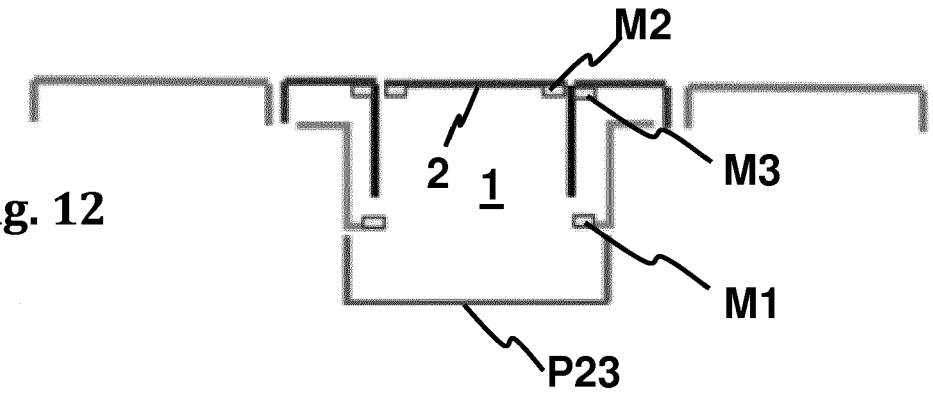
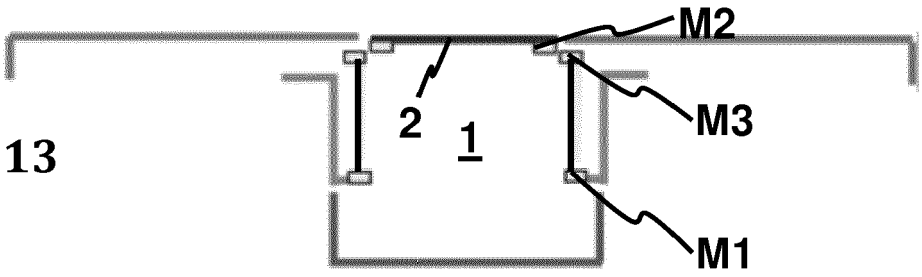


Fig. 13



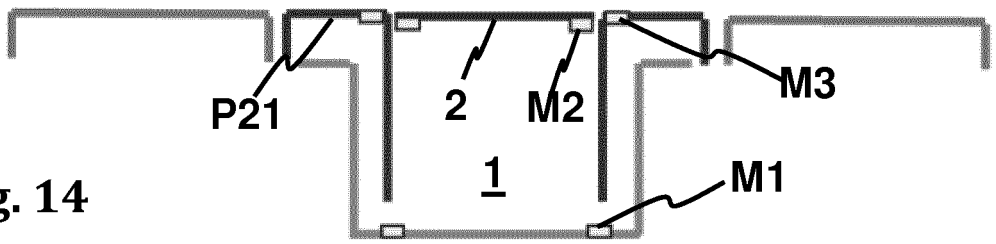


Fig. 14

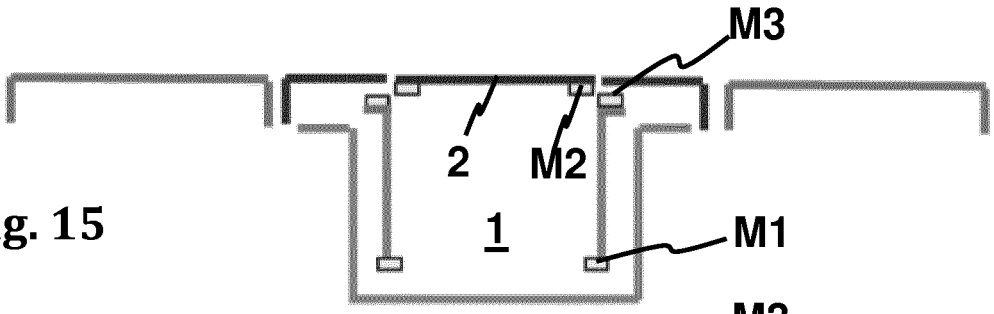


Fig. 15

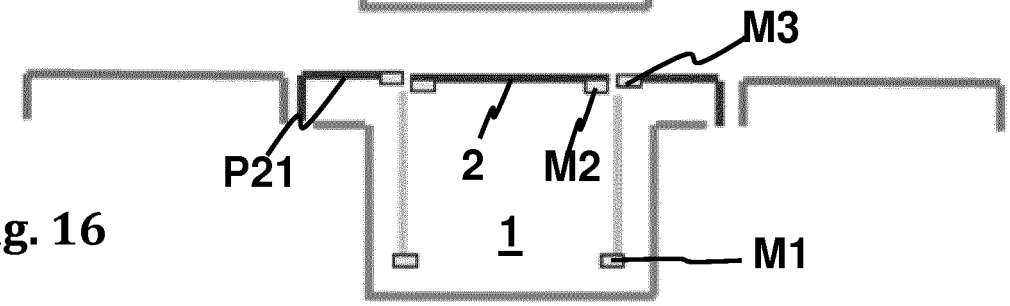


Fig. 16

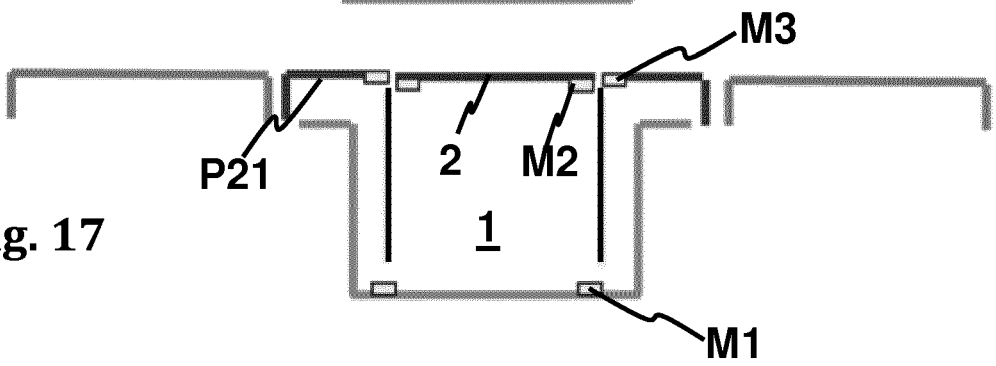


Fig. 17

Fig. 18

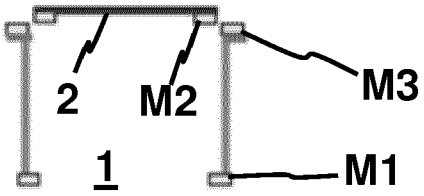


Fig. 19

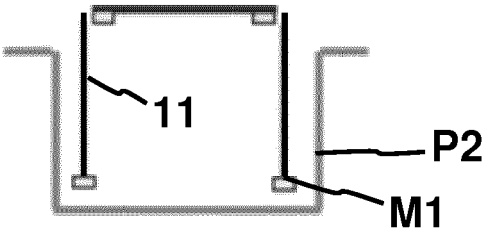


Fig. 20

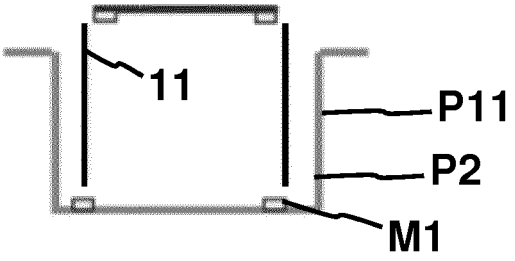


Fig. 21

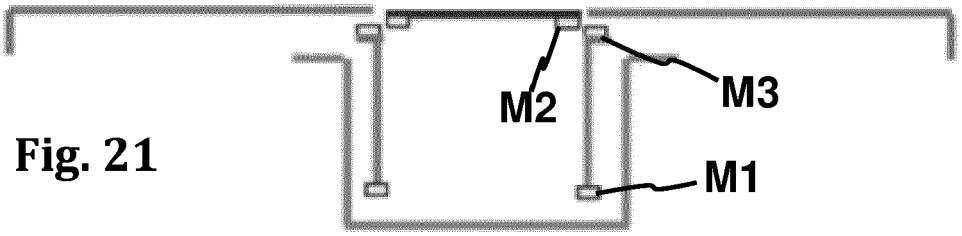


Fig. 22

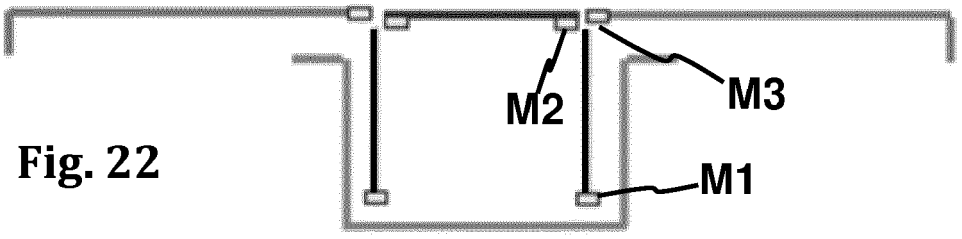
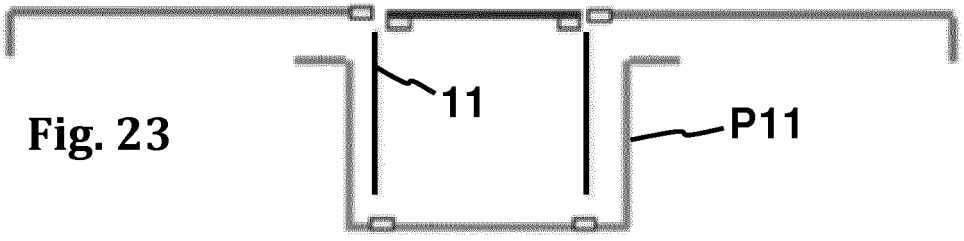


Fig. 23



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Application Number
EP 19 38 2523

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	DE 29 25 849 A1 (BAER ELEKTROWERKE KG) 15 January 1981 (1981-01-15) * claim 1; figures 2a, 2b *	1-3,5,7, 8,10,12, 15	INV. H01R13/453 H01R24/76 H01R13/502 H01R13/74
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X	KR 2016 0024739 A (BAE BONG KWAN [KR]) 7 March 2016 (2016-03-07) * paragraph [0032]; figures 1,2 *	1,3-5,8, 12-15	
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TECHNICAL FIELDS SEARCHED (IPC)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 November 2019	Jiménez, Jesús

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22-11-2019

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