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(54) **A front plate for a socket**

Frontplatte für eine Steckdose

Plaque avant de prise

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Description

[0001] The present invention relates to a front plate for a socket, such as a socket for receiving a plug of an electrical cable or the like.

[0002] Though the present invention is more widely applicable, it takes its starting point in electrical outlets comprising sockets. Electrical outlets with sockets come in many different variations, and the term is here to be construed in the broadest sense, covering *inter alia* electrical mains outlets, outlets for telephones and telecommunications, television, radio, audio etc. mounted in or on walls, cable conduits and the like as well as part of switch cabinets.

[0003] Electrical outlets for some applications, and thus the sockets comprised therein are more prone to malfunction due to contamination with moist and dirt than others. This is in particular the case when the outlet is for small signal purposes, i.e. with low voltage and current, such as telecommunication outlets. It is, however, also the case for mains outlets in humid and moist conditions, e.g. in wet rooms and outdoors.

[0004] In these cases there is a desire to protect the socket against such contamination when not in use, i.e. when no plug is inserted in the socket. In this respect, it has been suggested to cover the socket with a front cover comprising a lid. US-B-7651346 discloses a socket with a front cover comprising a lid. The lid is slideable with respect to an aperture in the front cover so as to allow access to the socket behind the front plate, and insertion of a plug therein. The lid is biased towards a position where it covers the aperture, i.e. automatically returning the lid to the closed position protecting the socket, when a plug is removed from the socket.

[0005] US 2009/017656 discloses the preamble of independent claim 1.

[0006] One problem identified in the prior art front covers with slidable lids is that the minimum size of the cover is restricted by the fact that sufficient space has to be allotted to the lid and return mechanism behind the front cover, so as to allow the lid to occupy both the open and the closed positions.

[0007] Front covers with hinged lids are also known, be it hinged to swing outward or hinged to swing inward with respect to the front cover. The latter suffer for the drawback that plenty of space is required in front of the socket to accommodate the swinging motion, whereas the former suffer from the drawback that they require two hands for inserting the plug, i.e. one for opening and holding the lid and the other for insertion of the plug.

[0008] It is the object of the present invention to overcome at least these problems with the prior art.

[0009] According to the present invention, this object is achieved by a front plate for a socket, said front plate comprising a front surface having at least one first plane surface part and at least one aperture through which a plug may be inserted into said socket, at least one lid adapted to close said aperture when no plug is inserted in the socket, said lid being adapted to perform a sliding motion between a first position where said aperture is closed and a second position where said aperture is open so as to allow insertion of the plug, characterized in that said sliding motion is a non-linear sliding motion between said first position and said second position, the lid being, in the second position, located in front of and overlapping said front surface.

[0010] According to a preferred embodiment, the lid comprises a substantially plane surface, said substantially plane surface being, in the first position, parallel to, and preferably flush with, said at least one plane surface part. This allows the lid to occupy a well protected yet easily accessible first position, which moreover does not take up much height.

[0011] According to a further preferred embodiment, said aperture is located in the bottom of a recess in the front surface for accommodating the lid in the first position, said recess having guide means adapted for guiding the lid through said non-linear motion. This allows for easy guidance of the lid through the non-linear motion whilst still keeping the overall height low.

[0012] According to a further preferred embodiment biasing means are provided for the at least one lid, so as to automatically return the at least one lid to said first position when no plug is inserted in the socket. This is advantageous in that no attention need be given to the closing of the lid when removing a plug from the socket. Instead, the lid automatically closes and protects the socket against dirt humidity and other pollution.

[0013] According to another preferred embodiment, the front plate further comprises side walls arranged at an angle with respect to said front surface, where at least one of said side walls comprises an opening adapted for insertion of said biasing means. This allows for easy insertion of the biasing means during initial assembly as well as for replacement purposes.

[0014] According to yet a further preferred embodiment, the biasing means comprise an omega-shaped spring. The use of an omega-shaped spring is advantageous in that it is flat, extending in one plane only and thus allows for a low height of the front plate. Moreover it may readily be held in position by appropriate configuration of the lid and the internal walls of the front plate.

[0015] According to yet another preferred embodiment, the lid comprises a protrusion extending from said substantially plane surface. This allows for engagement with the plug to be inserted, by means of a single-handed movement of the lid into the open second position using the plug only.

[0016] According to a further preferred embodiment, the protrusion comprises a wall with a centrally recessed top wall part. Recessing the top wall part is particularly advantageous because it provides easy access of possible locking means of the plug which may need to be released before removal of the plug.

[0017] The invention will now be described in greater detail based on non-limiting exemplary embodiments in

conjunction with the appended drawings, on which:

Fig. 1 shows a front perspective view of the front plate according to the invention with two lids, one lid slightly open and one lid in a open position,
Fig. 2 shows a front perspective view of the front plate of Fig. 1 with one lid removed and one lid partially open,
Fig. 3 shows a front perspective view of the front plate of Fig. 1 with both lids closed,
Fig. 4 shows a cross-section of the front plate taken along the line IV-IV of Fig. 2,
Fig. 5 shows a plan view of the rear side of the front plate of Fig. 1,
Fig. 6 shows a perspective front view of the lid, and
Fig. 7 shows a perspective rear view of the lid.

[0018] In Fig. 1 a cover plate 1 according to the invention is shown. The cover plate of Fig. 1 is adapted for mounting as the closing member of a box comprising the at least one socket, such as a wall mounted installation box, a cable guide or the like, and has means 5 for engaging such a box. The cover plate 1 furthermore comprises an optional window 6 for e.g. presenting information about the connections related to the socket. The window 6 is optional, and it is evident for the skilled person that the omission thereof would further reduce the front area of the cover plate 1.

[0019] As can be seen, in Fig. 1, the cover plate 1 comprises a front surface with at least one first plane surface part 2 but may have further plane surface parts such as a plane surface part 3 surrounding the first plane surface part 2. In the front surface two apertures 4 through which a respective plug may be inserted into a matching socket are provided. Neither the plugs nor the sockets are shown, as the actual type of matching plugs and sockets are of minor importance for the invention. The outset of the present invention, however, is data cables with RJ45 plugs and sockets, but the invention is applicable to numerous other plug and socket connections, such as USB and other data cables, electrical mains, optical cables, etc.

[0020] As indicated above, the cover plate 1 comprises two slidable lids 7 adapted to cover a respective aperture 4. In Fig. 1, the lid 7 on the right-hand side has been slid in front of the front surface so as to uncover the aperture 4, whereas he lid 7 on the left-hand side is located in an intermediate position in front of an aperture 4 so as to almost cover it. It will be understood that the arrangements of the respective lids 7 and the apertures 4 of Fig. 1 are essentially identical to each other. It will thus be appreciated that the lids 7 on both the right-hand side and the left-hand side are accommodated in respective recesses 8 in the bottom of which the apertures 4 are located. Preferably the lid 7 is accommodated in such a way in the recess 8 that the front surface is flush with or at least parallel with the first plane surface 2, when in the closed position, as illustrated in Fig. 3.

[0021] Each lid 7 is a rigid, preferably integral piece, made by an appropriate manufacturing method, such as injection molded in one piece from a suitable thermoplastic material, e.g. ABS. At one end the lids 7 comprise a protrusion 9 for engagement by a plug to be inserted or by a finger, in order to slide the lid 7 from a first position accommodated in the recess 8 as depicted in Fig. 3 to a second position corresponding to the position depicted on the right-hand side of front cover 1 of Fig. 1. Preferably the protrusion 9 is a raised wall part serving as an engagement means for a plug to be inserted. Preferably, the raised wall part has a centrally arranged cut-out or a recess 10 allowing for easy access to the locking tab of a plug, such as the locking tab of an RJ45 plug, when the plug is to be removed from the socket.

[0022] As will be explained in greater detail below, the lids 7 are biased to return automatically to the first position illustrated in Fig 3, where they are accommodated in the recess 8. Thus, to insert a plug, the plug is brought into proximity of the front surface 2, then slid along the front surface into engagement with the protrusion 9. Then through a further sliding motion the plug moves the lid 7 from the first position as depicted in Fig. 3 to the second position depicted on the right-hand side of the front cover of Fig. 1, thus uncovering the aperture 4 and allowing for insertion of the plug perpendicular to the front surface 2.

[0023] Turning now to Fig. 5, the biasing means will be explained. Fig. 5 is a rear plan view of the front cover 1 with both lids 7 in the closed position, i.e. as shown in Fig. 3. The rear sides of both the lids 7 are partially visible through the apertures 4. Also partially visible is the biasing means 11 for biasing the lids towards the first position which they both occupy in Fig. 5. As will be explained below, the biasing means 11 on the right-hand side of Fig. 5, is in the mounted position, whereas the biasing means 11 on the left-hand side is in a position found only during insertion.

[0024] The biasing means 11 is preferably a flat spring so as to allow the overall height of the front cover 1 to be kept low. In the preferred embodiment the illustrated biasing means 11 is a generally omega-shaped steel spring with two legs, adapted to either engage a groove formed as an undercut protruding wall part 12 on the rear side of the lids 7, or engaging an upstanding wall part 13 of the rear of the front cover 1, as illustrated on the right-hand side of Fig. 5. Though the use of an omega-shaped steel spring is currently preferred, the skilled person will realize that other types of spring or biasing means 11 could be used instead. One reason that the omega-shaped spring is currently preferred is also that it allows for easy insertion into the front cover 1 during manufacture or in case it becomes necessary to replace the spring. In order to easily insert the omega-shaped spring an opening in the form of a slit 14 is provided in appropriate ones of the outer side walls 15. As illustrated on the left-hand side of Fig. 5, the omega-shaped spring may be inserted through the slit 14, into the position illustrated on the right-hand side of Fig. 5.

[0025] The lid is allowed to move at least partially in front of the front surface of the front cover 1, thus freeing the lid 7 from internal space constraints of the front cover 1. For this purpose the recess 8 is provided with guiding surfaces 16, 17, 18, 19, 20 (best seen in Fig. 2), of which at least some are contiguous. In the present example the guiding surfaces 16 and 17 are not contiguous in the sense that two surfaces 21, 22 which do not perform any function as guiding surfaces are present. These guiding surfaces cooperate with running surfaces 23 and 24 located on the rear side of the lid 7, such as a tapered front end surface 23 and inclined end surface 24. Runner-like side walls 25 are also provided, but do not actually engage the guiding surfaces 16, 17, 18, 19, 20 in illustrated embodiment of the present invention. Furthermore, the lid 7 comprises a pair of lateral bosses 26 engaging and guided in corresponding lateral grooves 27 in the recess 8, thereby preventing the lid 7 from separating from the remainder of the front cover 1 and falling out of the recess 8.

[0026] When engaging the protrusion 9 with a plug or a finger and pressing or pulling the lid 7 in the downward direction (in the sense of Fig. 1), the tapered front end surface 23 will, guided by the guide surface 16, easily slide over the edge of the recess 8. Upon further motion the inclined end surface 24 will move down the ramp surface 20 and onto the surface 19, forcing the tapered front surface 23 out of engagement with the guiding surfaces in an outward turning motion of the lid 7 with respect to the recess 8. Subsequently, the inclined end surface 24 will slide along the surface 19, until it reaches the next ramp surface 18, where the lid 7 will be forced to a slight inward turning motion with respect to the recess 8. However, in the position just before or when it reaches the next ramp surface 18, the plug may be inserted.

[0027] If it is desired to remove the plug the inclined surface 24 of the lid 7 may be moved onto the surface 19 and further onto the surface 17, in a new turning motion of the lid 7, allowing the lid 7 to be pressed deep down into the recess 8, so as to allow good access to grasping the plug and disengaging possible locking means of the plug.

[0028] As will be understood the above motions provide a non-linear sliding motion, which may moreover comprise not only a translator motion but preferably also some rotary motion. This allows the lid 7 to move in front of the front cover into an open position where a plug may easily be inserted as well as removed. Moreover the lid 7 will be well protected in the first position, i.e. located in the recess 8, when no plug is inserted.

Claims

1. A front plate (1) for a socket, said front plate (1) comprising
   a front surface having at least one first plane surface part (2) and at least one aperture (4) through which a plug may be inserted into said socket,
   at least one lid (7) adapted to close said aperture (4) when no plug is inserted in the socket, said lid being adapted to perform a sliding motion between a first position where said aperture (4) is closed and a second position where said aperture (4) is open so as to allow insertion of the plug,
   said sliding motion is a non-linear sliding motion between said first position and said second position,
   characterized in that
   the lid (7) being, in the second position, located in front of and overlapping said front surface.

2. A front plate (1) according to claim 1, wherein the lid (7) comprises a substantially plane surface, said substantially plane surface being, in the first position, parallel to, and preferably flush with, said at least one plane surface part (2).

3. A front plate (1) according to any one of the preceding claims, wherein said aperture (4) is located in the bottom of a recess (8) in the front surface for accommodating the lid (7) in the first position, said recess (8) having guide means (16-20; 27) adapted for guiding the lid (7) through said non-linear motion.

4. A front plate (1) according to any one of the preceding claims, wherein biasing means (11) are provided for the at least one lid (7), so as to automatically return the at least one lid (7) to said first position when no plug is inserted in the socket.

5. A front plate (1) according to claim 4, further comprising side walls (15) arranged at an angle with respect to said front surface, where at least one of said side walls (15) comprises an opening adapted for insertion of said biasing means (11).

6. A front plate (1) according to any one of claims 4 or 5, wherein the biasing means (11) comprise an omega-shaped spring.

7. A front plate (1) according to any one of claims 2-6, wherein said lid (7) comprises a protrusion (9) extending from said substantially plane surface.

8. A front plate (1) according to claim 7, wherein said protrusion (9) comprises a wall with a centrally recessed top wall part (10).

Patentansprüche

1. Frontplatte (1) für eine Steckdose, wobei die Frontplatte (1) aufweist:

   eine Frontfläche mit mindestens einem ersten planen Oberflächenteil (2) und mindestens einer

Öffnung (4), durch die ein Stecker in die Steckdose eingeführt werden kann,
mindestens einen Deckel (7), der dazu geeignet ist, die Öffnung (4) zu verschließen, wenn kein Stecker in die Steckdose eingeführt ist, wobei der Deckel dazu geeignet ist, eine Gleitbewegung zwischen einer ersten Position, in der die Öffnung (4) geschlossen ist, und einer zweiten Position auszuführen, in der die Öffnung (4) offen ist, um die Einführung des Stekkers zu ermöglichen, wobei die Gleitbewegung eine nichtlineare Gleitbewegung zwischen der ersten Position und der zweiten Position ist,
dadurch gekennzeichnet, dass
der Deckel (7) in der zweiten Position vor der Frontfläche und diese überdeckend angeordnet ist.

2. Frontplatte (1) nach Anspruch 1, wobei der Deckel (7) eine im Wesentlichen plane Oberfläche **aufweist, wobei die im Wesentlichen** plane Oberfläche in der ersten Position parallel zu und vorzugsweise bündig mit dem mindestens einen planen Oberflächenteil (2) ist.

3. Frontplatte (1) nach einem der vorhergehenden Ansprüche, wobei sich die Öffnung (4) in der Unterseite einer Aussparung (8) in der Frontfläche zum Aufnehmen des Deckels (7) in der ersten Position befindet, wobei die Aussparung (8) Führungsmittel (16 bis 20; 27) aufweist, die zum Führen des Deckels (7) durch die nichtlineare Bewegung geeignet sind.

4. Frontplatte (1) nach einem der vorhergehenden Ansprüche, wobei Vorspannmittel (11) für den mindestens einen Deckel (7) vorgesehen sind, um den mindestens einen Deckel (7) in die erste Position rückzusetzen, wenn kein Stecker in die Steckdose eingeführt ist.

5. Frontplatte (1) nach Anspruch 4, ferner aufweisend Seitenwände (15), die in einem Winkel bezüglich der Frontfläche angeordnet sind, wobei mindestens eine der Seitenwände (15) eine Öffnung aufweist, die zur Einführung des Vorspannmittels (11) geeignet ist.

6. Frontplatte (1) nach einem der Ansprüche 4 oder 5, wobei das Vorspannmittel (11) eine omegaförmige Feder aufweist.

7. Frontplatte (1) nach einem der Ansprüche 2 bis 6, wobei der Deckel (7) einen Vorsprung (9) aufweist, der sich von der im Wesentlichen planen Oberfläche aus erstreckt.

8. Frontplatte (1) nach Anspruch 7, wobei der Vorsprung (9) eine Wand mit einem mittig ausgesparten oberen Wandteil (10) aufweist.

Revendications

1. Plaque avant (1) pour une prise, ladite plaque avant (1) comprenant
une surface avant ayant au moins une première partie de surface plane (2) et au moins une ouverture (4) à travers laquelle une fiche peut être insérée dans ladite prise,
au moins un couvercle (7) prévu pour fermer ladite ouverture (4) lorsqu'aucune fiche n'est insérée dans la prise, ledit couvercle étant prévu pour effectuer un mouvement de coulissement entre une première position dans laquelle ladite ouverture (4) est fermée et une deuxième position dans laquelle ladite ouverture (4) est ouverte de manière à permettre l'insertion de la fiche, ledit mouvement de coulissement est un mouvement de coulissement non linéaire entre ladite première position et ladite deuxième position,
caractérisée en ce que
le couvercle (7), dans la deuxième position, est situé devant ladite surface avant en chevauchant cette dernière.

2. Plaque avant (1) selon la revendication 1, dans laquelle le couvercle (7) comprend une surface substantiellement plane, ladite surface substantiellement plane, dans la première position, est en parallèle, et de préférence en affleurement avec ladite au moins une partie de surface plane (2).

3. Plaque avant (1) selon l'une quelconque des revendications précédentes, dans laquelle ladite ouverture (4) est située au fond d'un renfoncement (8) dans la surface avant pour recevoir le couvercle (7) dans la première position, ledit renfoncement (8) ayant des moyens de guidage (16-20 ; 27) prévus pour guider le couvercle (7) au cours de son mouvement non linéaire.

4. Plaque avant (1) selon l'une quelconque des revendications précédentes, dans laquelle des moyens de précontrainte (11) sont prévus pour l'au moins un couvercle (7), de manière à ramener automatiquement l'au moins un couvercle (7) dans ladite première position lorsqu'aucune fiche n'est insérée dans la prise.

5. Plaque avant (1) selon la revendication 4, comprenant en outre des parois latérales (15) agencées suivant un certain angle par rapport à ladite surface avant, au moins l'une desdites parois latérales (15) comprenant une ouverture prévue pour l'insertion desdits moyens de précontrainte (11).

6. Plaque avant (1) selon l'une quelconque des revendications 4 ou 5, dans laquelle les moyens de précontrainte (11) comprennent un ressort en forme d'oméga.

7. Plaque avant (1) selon l'une quelconque des revendications 2 à 6, dans laquelle ledit couvercle (7) comprend une saillie (9) s'étendant depuis ladite surface substantiellement plane.

8. Plaque avant (1) selon la revendication 7, dans laquelle ladite saillie (9) comprend une paroi avec une partie de paroi supérieure en retrait centralement (10).

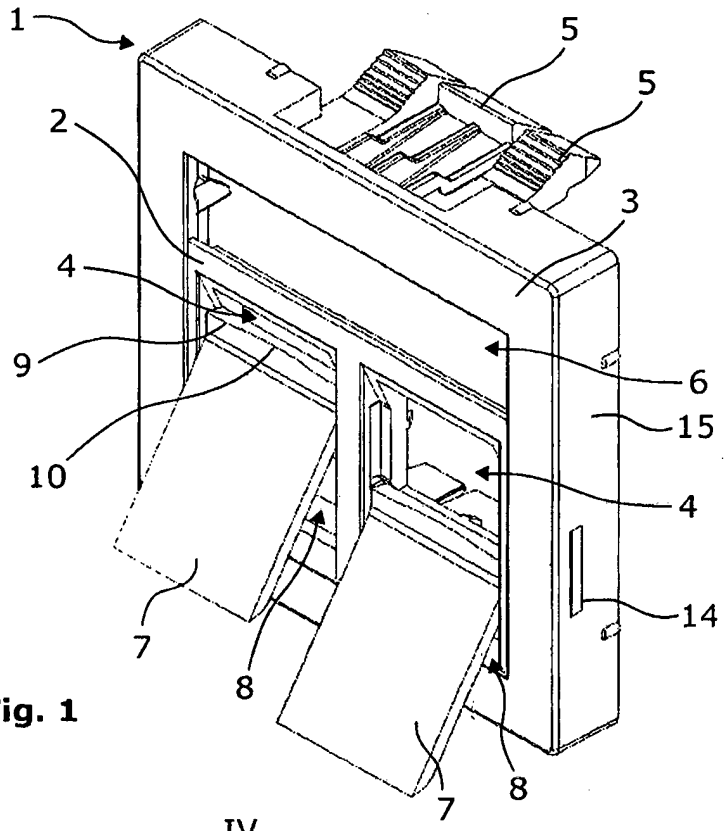

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Fig. 1

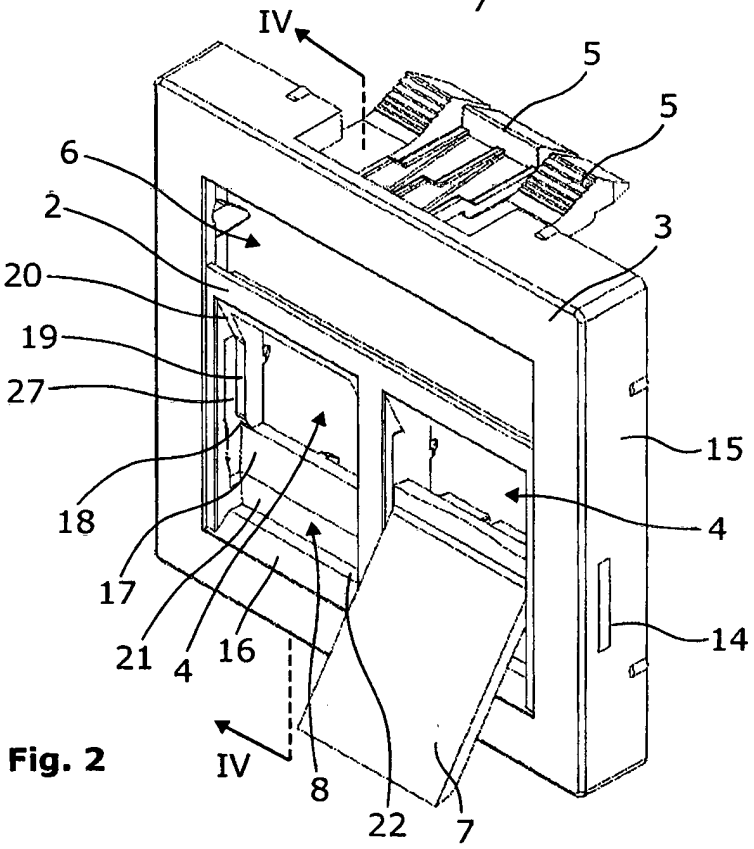

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Fig. 2

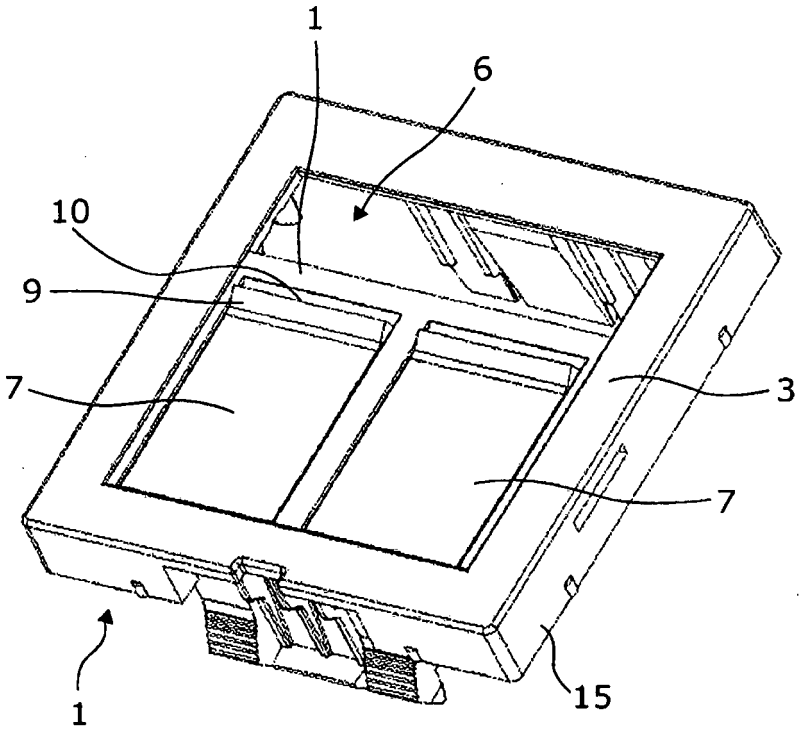


Fig. 3

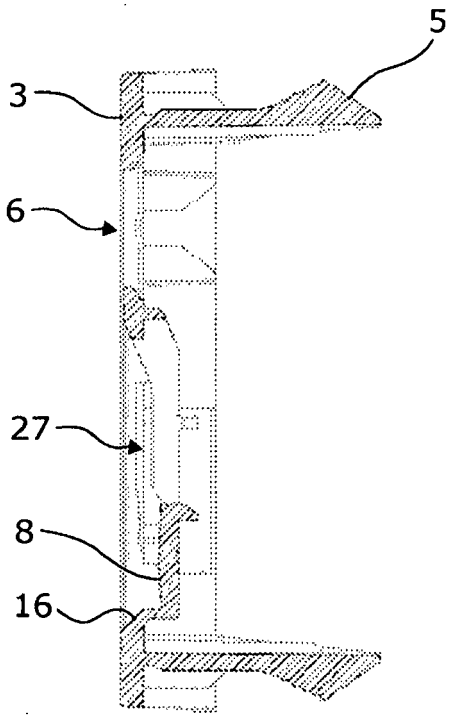


Fig. 4

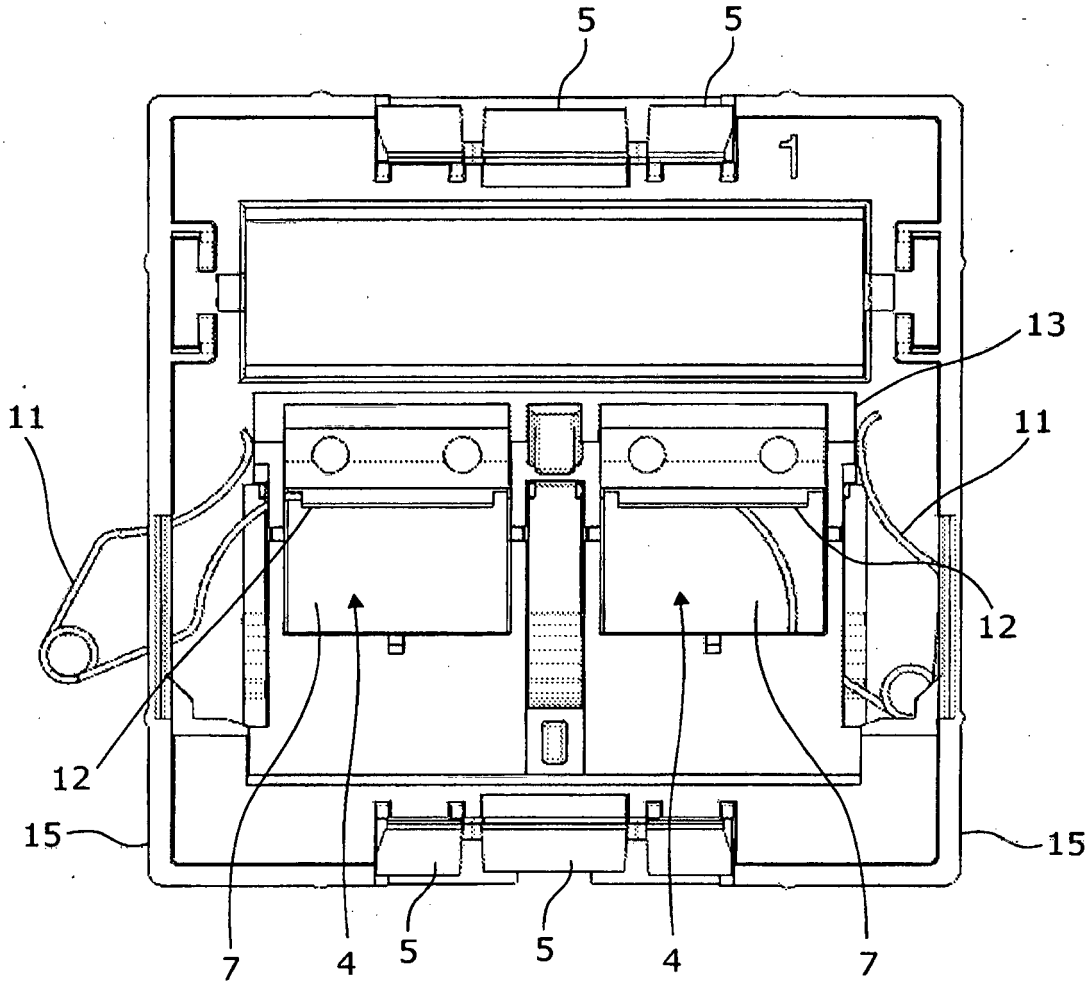


Fig. 5

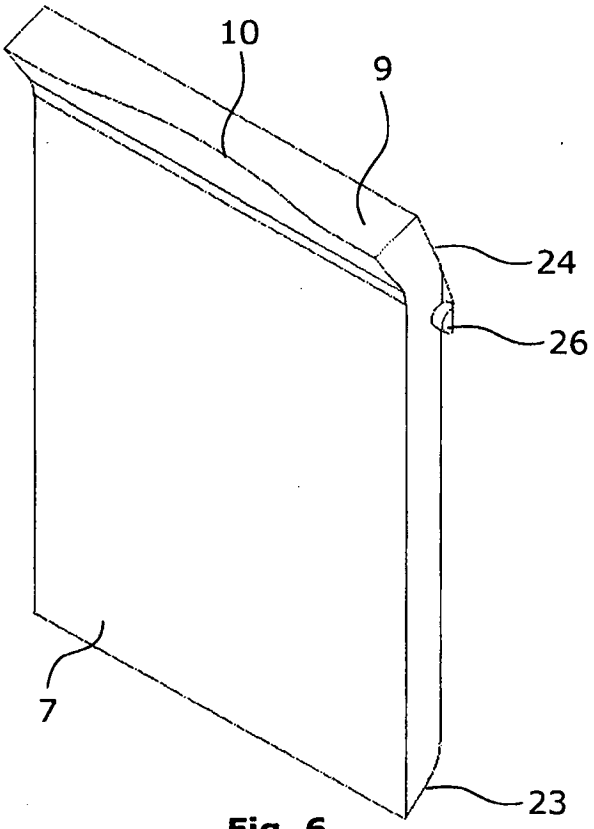


Fig. 6

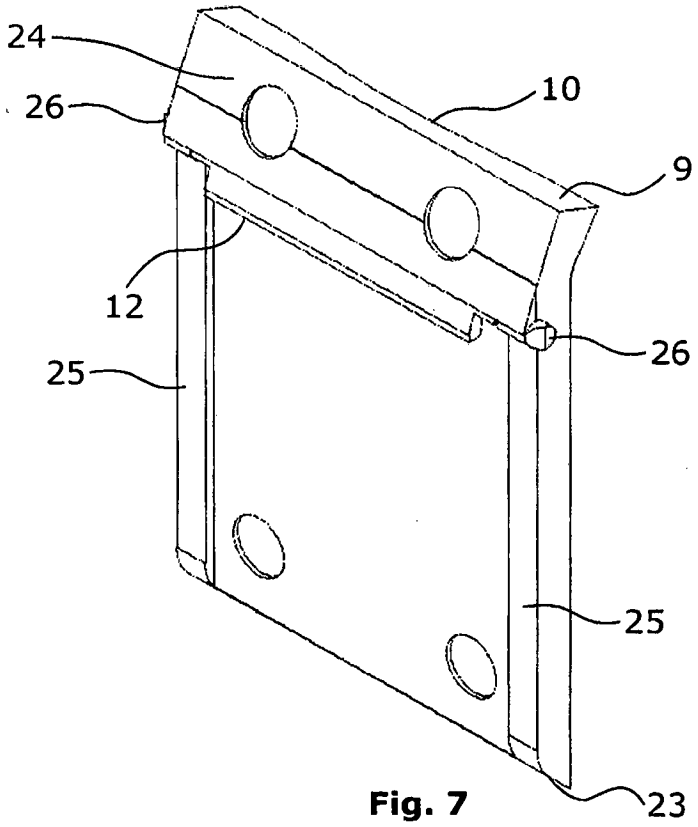


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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