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(54) Jack Adapter in the Field of Telecommunication and Data Transmission

(57) The invention provides a jack adapter 1 in the field of telecommunication and data transmission for providing access to a telecommunication socket 2 with a housing 3 with a front side 4 and a rear side 5, a socket portion 7 for making an electrical connection with a plug, a plug portion 6 at the rear side 5 of the housing 3 for making an electrical connection with the socket 2, a fastener for detachably fixing the plug portion 6 in the socket 2 and release means for releasing the fastener from the socket 2. For easy handling in particular easy removing the jack adapter out of the socket the direction to activate the release means is substantially the same as the direction to pull the plug portion 6 out of the socket 2.

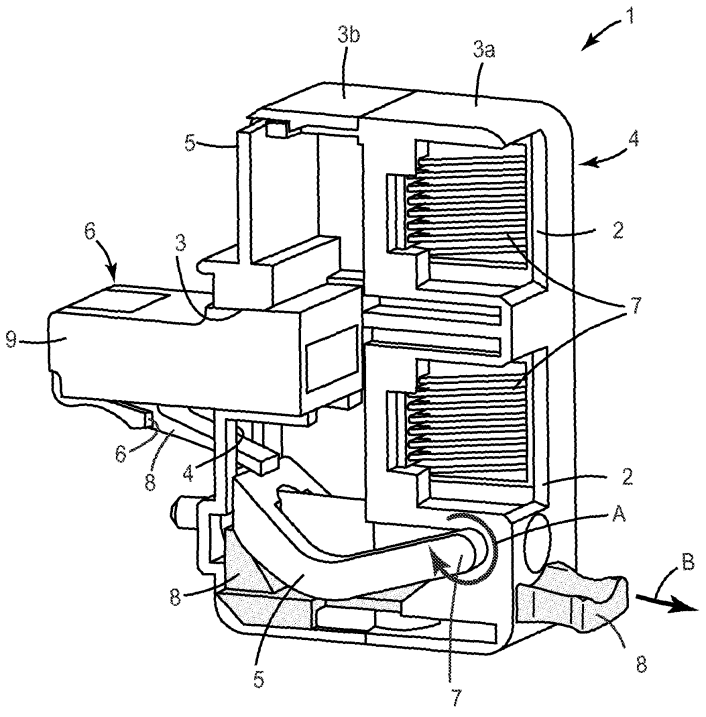


FIG. 2

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Description

Technical Field

[0001] The invention relates to a jack adapter in the field of telecommunications and data transmission for providing access to a telecommunication socket.

Background

[0002] In the field of telecommunication, and in the field of data transmission and processing, numerous connections are established for telecommunications and/or data lines. These connections can be made by wires.

[0003] Plural wires can be integrated in a cable and can be put together at a connector, such as a plug or a socket. By connecting two connectors of this type with each other plural connections between the wires, which are connected with each of the connectors, are established. Such a type of connection can also be used in networks, such as local area networks, for any connections between devices being part of the network. Such a network may have an outlet with a face plate in a work area and a patch panel in a data room. Connectors may be mounted in the outlets and/or the patch panels. Typical connectors are described in European Standard IEC 60603-7-1.

[0004] In the field of telecommunication and data transmission recent advances in ADSL-technology allow transmission of at least two different signals on a single telecommunication line. This is achieved by transmitting the different signals at different frequencies along the same line. In particular, on the subscriber side, separate voice and data signals are combined and sent to the central office via the same transmission line where it may be split. The voice signal is then directed to the other subscriber(s) on the telephone call, and the data signal is directed to the other subscriber(s) participating in the data exchange. For the transmission of voice and data signals to the subscriber, separate voice and data signals are combined at the central office, sent to the subscriber and split at the subscriber side. For connecting two telecommunication apparatus - one for receiving voice signals and one for receiving data signals - a jack adapter may be connected to a socket of the telecommunication line transmitting the two different signals.

[0005] The jack adapter may address a Ethernet network for voice and data transmission in an enterprise or an residential network. In such applications voice and data are travelling on different pair of copper wires. In a standard enterprise network cables are containing four pairs of wires to transmit data at a speed of 1000 Mbits. For speed transmission up to 100 Mbits only two pars are required. Therefore two pairs are available and it is possible to use them for other applications.

[0006] US 2005/0 180 561 A1 discloses a jack adapter for outlets e.g. for outlets of telecommunication lines. The jack adapter described in that document has a plug portion for making an electrical connection with the outlet and at least one socket portion for making an electrical connection with a plug. The known jack adapter further has a release lever which when being depressed releases the plug portion out of the outlet. The jack adapter according to US 2005/0 180 561 A1 may comprise an additional fastener in the shape of a bayonet latch comprising a rotating plug having two positions, namely "open" and "locked".

[0007] In the prior art according to US 2007/0 093 136 A1 a connector in the field of telecommunication is disclosed. The connector comprises a housing and a release tab. The housing obstructs at least one portion of the release tab from fully depressing. A supplemental lever is used to activate the release tab.

[0008] US 5,328,390 discloses a modular telecommunication jack adapter with a standard modular telephone jack and a standard modular telephone plug. The two parts are connected by a coupling member. The assembly further comprises an integral latch member for releasably retaining the adapter in a connected engagement.

[0009] Further is known a RJ 45 Doubler in the field of telecommunication for providing access for more than one telecommunication apparatus to a telecommunication socket, with a housing having a front side and a rear side, at least two socket portions at the front side for making an electrical connection with a plug of a cable of the telecommunication apparatus, a plug portion at the rear side of the housing for making an electrical connection with the socket, a latch for detachably fixing the plug portion in the socket and a pivot mounted handle for releasing the latch from the socket. For removing the jack adapter out of the socket it is necessary to first turn the handle for releasing the latch and than to pull at the handle for removing the plug portion out of the socket. Modules of this type are sold by the applicant. Further is known a jack adapter also called RJ 45 Doubler that is sold by INFRA PLUS, France that may be fixed to a face plate by a screw nut system. The screw of this module is embedded in the jack adapter and the nut is embedded in the face plate.

Summary of the Invention

[0010] The present invention provides a jack adapter in the field of telecommunication and data transmission for providing access to a telecommunication socket that is easy to handle in particular easy to remove out of the socket. The present invention may also provide a jack adapter in the field of telecommunication and data transmission for providing access for more than one telecommunication apparatus to a telecommunication socket that is easy to handle in particular easy to remove out of the socket.

[0011] The jack adapter according to the invention comprises

- a housing with a front side and a rear side,

- a socket portion for making an electrical connection with a plug for example a plug of a cable of the telecommunication apparatus,
- a plug portion at the rear side of the housing for making an electrical connection with the socket,
- a fastener for detachably fixing the plug portion in the telecommunication socket and
- release means for releasing the fastener from the socket.

[0012] According to the invention the direction to activate the release means of the jack adapter is substantially the same as the direction to pull the plug portion out of the telecommunication socket.

[0013] The jack adapter according to the invention with a housing, a socket or female port, a plug portion or male port and a fastener may be attached to a telecommunication socket by putting the plug portion of the jack adapter into the telecommunication socket. The housing further includes wiring and printed circuit boards for electrical continuity between the plug portion and the socket. The jack adapter is fixed in the telecommunication socket with the fastener. The fastener is detachable. For releasing the fastener from the telecommunication socket the jack adapter provides release means. Additional release means may be necessary because the fastener may be situated on a part of the housing where they could not easily be reached by hand, for example at the rear side of the housing next to the plug portion. The release means interacts with the fastener in the way that the direction to activate the release means is substantially the same as the direction to pull the plug portion of the jack adapter and therewith the jack adapter out of the telecommunication socket. That means that for example by pulling at the release means the fastener is detached from the telecommunication socket and when the fastener is detached the jack adapter itself can be pulled out of the telecommunication socket. The advantage of the jack adapter according to the invention is that only one movement or two movements in substantially the same direction is or are necessary to detach and to pull the jack adapter out of the socket. That can easily be done by one hand.

[0014] To provide a jack adapter with a fastener has the advantage that in use the plug of the jack adapter is securely attached to the socket and therefore handling of the jack adapter is easier, e.g. it is possible to insert and to pull out plugs with one hand, without holding the jack adapter. Furthermore a securely attached jack adapter has the advantage that it offers a secure connection and therefore facilitates a reliable interconnection between for example a plug of a cable and the telecommunication socket. This may be very important in a network.

[0015] Depending on the geometrical shape of the jack adapter it may be difficult to reach the fastener by hand, e.g. parts of the housing may cover the fastener or may obstruct at least one portion of the fastener. Therefore the invention provides release means that cooperate with the fastener. By activating the release means the fastener is moved from a fixing position into an open position thereby releasing the plug portion of the jack adapter out of the telecommunication socket.

[0016] The jack adapter according to the invention may also have more than one socket portion for example two socket portions. In this case the jack adapter would split one port at the entry into two ports at the exit side and may be advantageously be used for connecting two telecommunication apparatus to the telecommunication socket for example one apparatus for receiving and/or transmitting voice signals and one apparatus for receiving and/or transmitting data signals.

[0017] The housing of the jack adapter may be made out of plastic. The use of this material has the advantage that it is cheap and that the housing can easily be manufactured for example by mould injection. A further advantage of using plastic is that it is an insulating material and therefore the housing may also be used to insulate the contacts and cables that are arranged inside of it. Of course any other known suitable materials can be used as well such as for example all materials with insulating properties. The housing comprises at least one socket portion for making an electrical connection with a plug for example with a plug of a cable of a telecommunication apparatus. When the socket portion is situated on the front side of the housing it can easily be reached with the plug of a cable. It is possible to arrange the socket portion or the socket portions on other sides of the housing for example on the top and/or on the bottom side or any other arrangement one can think of. It is also possible to have more than two socket portions for making an electrical connection with more than two plugs. In this case any arrangement of socket portions at the housing is possible as well. The sides of the housing that are easily accessible are preferred for arranging the socket portions.

[0018] The fastener may be a resilient latch. The resilient latch may be made out of plastic as well. If the housing is made out of plastic as well a cost advantage in the production is achieved because both parts are made out of the same material. When using for example a mould injection process for producing the housing and the latch they could be made out of one piece with the advantage that only one piece needs to be produced and no assembly is necessary. The latch may be designed as a snap fit element that interacts with a corresponding element of and/or in the telecommunication socket. Other materials are possible as well such as for example metal with resilient properties.

[0019] For easily fixing the jack adapter to a telecommunication socket the latch may be positioned next to the plug portion of the jack adapter. With this arrangement it is possible to use the opening of the telecommunication socket for receiving the plug portion of the jack adapter and the fastener. In other words the fastener is inserted into the same opening of the telecommunication

socket as the plug portion. In this case the opening of the socket needs to have an element corresponding to the fastener that holds the fastener when the plug portion with the fastener is inserted into the opening and thereby holds or fixes or secures the whole jack adapter. The fastener may be positioned at an outer edge of the plug portion of the jack adapter.

[0020] For easily accessing the fastener the jack adapter comprises releases means. The release means of the jack adapter according to the invention may comprise a lever. A lever is a simple mechanical part which is easy to produce and therefore cheap. The lever may be made out of plastic having the same advantages as a housing and/or a fastener out of plastic. Of course the use of any other suitable material as for example any materials with insulating properties may be possible as well.

[0021] The movement of the lever may result in an interaction between the lever and the fastener or latch. In other words a movement of the lever may result in a movement of the latch. This is a simple mechanical solution for indirect activating a part that is easy to manufacture, easy to use and it provides a dependable solution.

[0022] In addition the release means may comprise a handle. The release means may include of a lever and a handle or the release means may comprise two or even more parts. Depending on the structure and/or the shape of the jack adapter it is also possible that the release means may consists of only one part or of more than two parts.

[0023] A movement of the handle may result in a movement of the lever. The handle may be used to activate the lever or to transfer a movement to the lever, which is used to push the fastener from its fixing position into its open or releasing position. A translational movement of the handle may result in a pivotal movement of the lever. This is one possible solution of mechanically activating the above mentioned chain of movements. Any other solution is possible as well such for example a solution without a lever where a movement of the handle would directly result in a movement of the fastener.

[0024] The handle may be located partly inside and partly outside of the housing. Thereby the handle is protected by the housing and it can be moved without interacting with other components such as for example other jack adapters or other plugs and the handle can be reached by hand. The handle may also be guided by the housing. The handle may further exit the housing for example at its front side. This is a place where the handle can easily be reached by hand and therefore the jack adapter can easily be released and pulled out of a telecommunication socket. The handle may also exit the house at any other side that is easy to reach by hand and where the direction to activate the release means is substantially the same as the direction to pull the plug portion out of the telecommunication socket.

[0025] The plug portion may comprise a registered jack (RJ), for example a RJ45 and/or a RJ11 or RJ 12. The two sockets of the jack adapter may also comprise a registered jack or several registered jacks.

[0026] The jack adapter according to the invention may comprise an additional fastener for securely fixing the jack adapter to the socket and thereby guaranteeing a reliable connection between the jack adapter and the socket. This is very important for example inside a network where every disconnection should be avoided. An additional fastener helps to keep socket and jack adapter fixedly arranged to each other even when plugs are inserted into or extracted from the jack adapter. The additional fastener may be a mechanical fastener, for example a screw with an anchor. This screw and the anchor may be embedded inside of the housing of the jack adapter. The anchor may have a main portion and two leg portions. The two leg portions may comprise each a protrusion at their outer ends for engaging behind a faceplate and thereby fixing the jack adapter to the faceplate. The two legs may have resilient properties so that they can be deformed and always move back into a start position. Therefore the two legs can be opened for example by a screw and they close caused by their resilient properties. The advantage of such an additional fastener is that it may be used with any known face plate by only slightly modifying the face plate e.g. by putting a hole in it.

Brief Description of the Drawings

[0027] The invention will now be described in more detail with reference to the following figures exemplifying particular embodiments of the invention:

- Fig. 1: shows a perspective side view of one embodiment of a jack adapter according to the invention and a telecommunication socket;
- Fig. 2: shows a sectional view of the jack adapter of the embodiment shown in Fig. 1 with a handle and a lever in a close position;
- Fig. 3: shows a sectional view of the jack adapter of the embodiment shown in Fig. 3 with a handle and a lever in an open position;
- Fig. 4: shows a sectional view of another embodiment of a jack adapter according to the invention with an additional fastener;
- Fig. 5: shows the additional fastener of the embodiment shown in Fig. 4;
- Fig. 6a, 6b: show face plates the jack adapter according to the invention may be attached to, that are modified for receiving the additional fastening element and
- Fig. 7: shows a patch panel the jack adapter according to the invention may be attached to, that is modified for receiving the additional fastening element of the jack adapter.

Detailed Description of the Preferred Embodiments

[0028] Herein below various embodiments of the present invention are described and shown in the drawings wherein like elements are provided with the same reference numbers.

[0029] Figure 1 shows a jack adapter 1 according to the invention and a telecommunication socket 2. The telecommunication socket 2 is usually situated in a wall and covered by a face plate 10 or a patch panel. The socket 2 and the faceplate 10 are state of the art and known by a person skilled in the art of telecommunication connectivity and therefore will not be described in detail. The socket 2 may comprise a registered jack. The jack adapter 1 has a housing 3. The housing 3 has a front side 4 and a rear side 5. On the rear side 5 the jack adapter 1 has a plug portion 6 or male port for making an electrical connection with the telecommunication socket 2. On the front side 4 the jack adapter 1 has two socket portions 7 or female ports for making an electrical connection with a plug (not shown in the drawings), for example a plug of a cable of a telecommunication apparatus (both parts are not shown in the drawings). The plug and the socket portions 7 are adapted for registered jacks: The two socket portions 7 can better be seen in figures 2 and 3. The housing 3 further comprises wiring and printed circuit boards for connecting the plug portion 6 with the two socket portions 7. Wiring and printed circuit boards are not shown in the drawings since they are known. As can be seen in figure 1 the jack adapter 1 comprises a fastener for detachably fixing the jack adapter 1 in the opening of the telecommunication socket 2. The fastener is located at the rear side 5 of the jack adapter 1 close to the plug portion 6. In this aspect of the invention the fastener is designed as a resilient latch 8 which is fixed at the outer edge 9 of the plug portion 6. In this context the outer edge 9 does mean the edge of the plug portion 6 that faces away from the rear side 5 of the housing 3 of the jack adapter 1. The latch 8 may be brought in a fixing position where it holds the jack adapter 1 in the telecommunication socket 2 and in an open position where it gives the jack adapter 1 free. The resilient latch 8 interacts with the opening of the telecommunication socket 2 in a way that will be described in connection with figure 2 and thereby fixes the plug portion 6 of the jack adapter 1 and therewith the whole jack adapter 1 detachably in the opening of the telecommunication socket 2.

[0030] Figure 1 further shows a handle 18 that is at least partially located outside of the housing 3 (see front side 4 of the housing 3). The handle 18 and its function will be described in more detail with reference to figure 2.

[0031] Figure 2 shows a sectional view of the jack adapter 1 along the longitudinal axis of the housing 3. The housing 3 is made up of two parts, the front part 3a is facing to the front side 4 and the rear part 3b is facing to the rear side 5. The front part 3a has two openings 12 for the two socket portions 7. The rear part 3b has an opening 13 for the plug portion 6. The plug portion 6 is a separate part that extends from inside of the housing 3 to the outside of the housing 3. At the bottom side of the plug portion 6 the resilient latch 8 is situated. It is fixed at the outer edge 9 of the plug portion 6 and it extends with its free end into the direction of the rear side 5 of the housing 3 of the jack adapter 1. The latch 8 is long enough that it enters the housing 3 at a further opening 14.

[0032] Inside of the housing 3 is a pivot mounted lever 15. The lever 15 is almost L-shaped and it is fixed with its long leg at a swivel axis 17 near the front side 4 of the housing 3. Its short leg or free end is facing the rear side 5 of the housing 3 and is positioned next to the latch 8. Figure 2 shows the resilient latch 8 in its closing position. In this position the free end of the latch 8 is spaced apart from the plug portion 6 of the jack adapter 1. In this position two recesses 16 (only one of them can be seen in figure 2) of the latch 8 are also spaced apart from the plug portion 6 and thereby interacting with corresponding recesses (not shown in the drawings) of the opening of the telecommunication socket 2. For annulling the interaction between the recesses 16 of the latch 8 and the recesses of the opening of the socket 2 the free end of the latch 8 has to be moved closer to the plug portion 6 as is shown in figure 3. This is done by swivelling the L-shaped lever 15 around its swivel axis into the direction of the arrow A and thereby moving the short leg of the lever 15 closer to the plug portion 6 and thereby moving the latch 8 from its fixing position into its open position. The lever 15 is positioned completely inside of the housing 3.

[0033] The jack adapter 1 according to the invention comprises the handle 18 that is located partly inside and partly outside of the housing 3. The handle 18 has an elongated shape. One end - the front end - of the handle passes through the housing 3 at its front side 4. The opposite end - the rear end - is located inside of the housing 3. This end has an angular shape, that is positioned closed to the short leg of the L-shaped lever 15. When the handle 18 is moved into the direction of the arrow B, e.g. by pulling at the handle 18 it is moved into the position that is shown in figure 3 thereby first contacting the L-shaped lever 15 with its angular rear end and further pushing it around its swivel axis 17 in the direction of the arrow A. The lever 15 thereby first contacts the latch 8 and further pushes it into its open position towards to the plug portion 6 as is shown in figure 2. Thereby the recesses 16 of the latch 8 are released from the recesses of the opening of the telecommunication socket 2. By that the fixing of the jack adapter 1 is loosened and by further pulling at the handle 18 into the direction of the arrow B the jack adapter can be pulled out of the socket 2.

[0034] Figure 4 shows a sectional view of another embodiment of a jack adapter 1 according to the invention with an additional fastener. The additional fastener is a screw 21 with an anchor 22. Screw 21 and anchor 22 are embedded inside of the housing 3 of the jack adapter 1. In this embodiment the screw 21 is situated in the region of the lever 15. The lever 15 has two L-shaped flanks 15

a and 15 b that are connected with each other over a bar 23. Each flank 15 a and 15 b of the lever 15 has a rounded end that functions as swivel axis 17. The screw 21 and the anchor 22 are embedded between the two flanks 15 a and 15 b of the lever 15. The anchor 22 is situated partly inside of the housing 3 and partly outside of the housing 3. It exits the housing 3 at an opening in the rear side 5 that can not be seen in the drawings. The head 25 of the screw 21 is situated in the housing 3. The anchor 22 that is screwed onto the shaft 24 of the screw 21 is positioned on the end of the screw 21 opposing the head 25 and exits the housing 3 at its rear side 5. The head 25 of the screw 21 may be reached by a screwdriver through another opening in the housing 3 on its front side 4.

[0035] Figure 5 shows the additional fastener of the embodiment shown in figure 4. It consists of a screw 21 with a shaft 24 and a head 25 and an anchor 22 with a main portion 26 and two leg portions 27. The two leg portions 27 each have a protrusion 28 extending outside of the anchor 22. The side of the leg portions 27 that faces away from the head 25 of the screw 21 are conical. In the following the function of the additional fastener will be described. By turning the screw into the direction of the arrow C the two legs 27 are forced apart from each other and thereby expand into the direction of its protrusions 28 (see arrow D). The legs 27 are opened mechanically due to the insertion of the screw 21 in between the two legs 27. The anchor 22 and the protrusions 28 of the legs 27 are designed to cooperate with an opening in a face plate 10 or a patch panel 31. In an expanded stage of the anchor 22 the protrusions 28 engage behind the opening of the face plate 10 or the patch panel 31 thereby securely fixing the jack adapter 1 to the telecommunication socket 2. For releasing the jack adapter 1 the screw 21 has to be turned into the direction of the arrow E. Thereby the leg portions 27 move into the direction oft the arrows F caused by a resilient characteristic of the leg portions 27 or a spring effect and the jack adapter 1 can be pulled out of the socket 2 again. The interaction of the additional fastener and the faceplate 10 or a patch panel 31 can be seen in figures 6a, 6b and 7. The advantage of the additional fastener is that the face plate 10 or the patch panel 31 do not have to be modified and do not have to provide additional fastening elements. They only have to comprise an opening 29 or openings 29.

REFERENCE NUMBERS

[0036]

1 jack adapter
2 telecommunication socket
3 housing
3a front part
3b rear part
4 front side
5 rear side
6 plug portion
7 socket portion of the jack adapter
8 resilient latch
9 outer edge of the plug portion
10 face plate
12 opening for socket portion
13 opening for plug portion
14 opening for the resilient latch
15 lever
16 recess
17 swivel axis
18 handle
21 screw
22 anchor
23 bar
24 shaft
25 head
26 main portion
27 leg portion
28 protrusion
29 opening
31 patch panel

A swivel direction of lever
B pull direction of handle
C turn direction of screw
D opening direction of leg portion
E turn direction of screw
F closing direction of leg portion

Claims

1. A jack adapter (1) in the field of telecommunication and data transmission for providing access to a telecommunication socket (2) , comprising:

- a housing (3) with a front side (5) and a rear side (4),
- a socket portion (7) for making an electrical connection with a plug,
- a plug portion (6) at the rear side (4) of the housing (3) for making an electrical connection with the socket (2),
- a fastener for detachably fixing the plug portion (6) in the socket (2) and
- release means for releasing the fastener from the socket (2),

characterized in that
the direction to activate the release means is substantially the same as the direction to pull the plug portion (6) out of the socket (2).

2. The jack adapter according to claim 1, wherein the fastener is a resilient latch (8).

3. The jack adapter according to claim 2, wherein the resilient latch (8) is positioned next to the plug portion (6).

4. The jack adapter according to claim 2 or 3, wherein the resilient latch (8) is positioned at an outer edge (9) of the plug portion (6).

5. The jack adapter according to any of the preceding claims, wherein the release means comprises a lever (15).

6. The jack adapter according to claim 5, wherein a movement of the lever (15) results in an interaction between the lever (15) with the latch (8).

7. The jack adapter according to any of the preceding claims, wherein the release means comprises a handle (18).

8. The jack adapter according to claim 7, wherein a movement of the handle (18) results in a movement of the lever (15).

9. The jack adapter according to claim 8, wherein a translational movement of the handle (18) results in a pivotal movement of the lever (15).

10. The jack adapter according to any of the claims 7 to 9, wherein the handle (18) is located partly inside of the housing (3) and exits the housing (3) at its front side (4).

11. The jack adapter according to any of the preceding claims, wherein the jack adapter (1) comprises an additional fastener.

12. The jack adapter according to claim 11, wherein the additional fastener comprises a screw (21) with an anchor (22).

13. The jack adapter according to claim 12, wherein the anchor (22) has a main portion (26) and two leg portions (27).

14. The jack adapter according to claim 13, wherein the leg portions (27) each comprise a protrusion (28) at their outer ends.

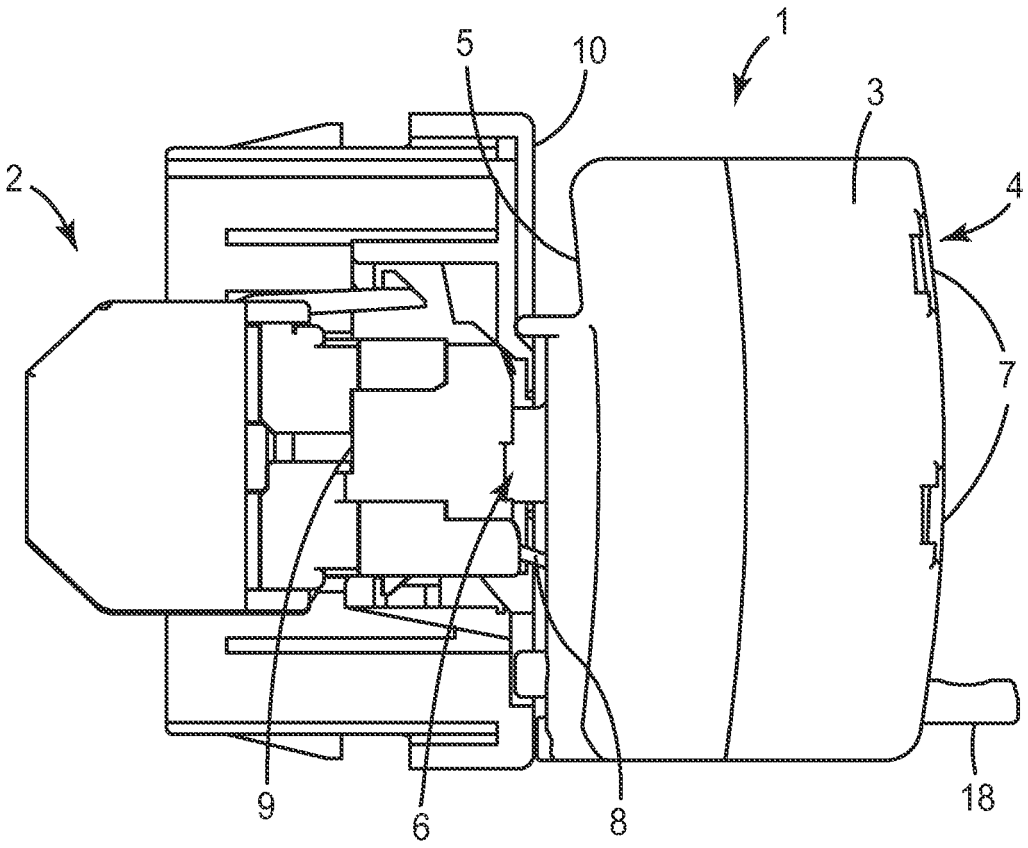


FIG. 1

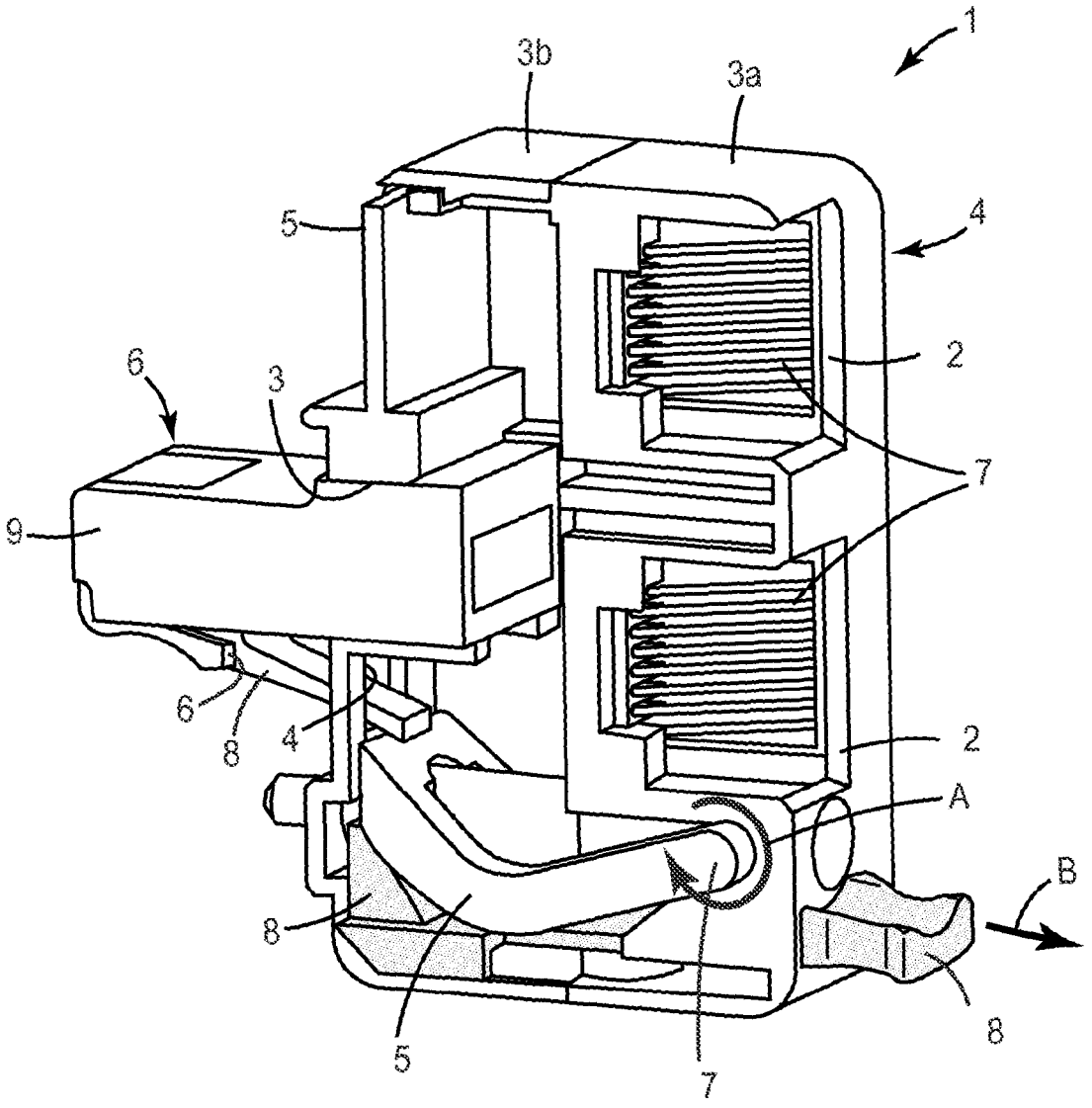


FIG. 2

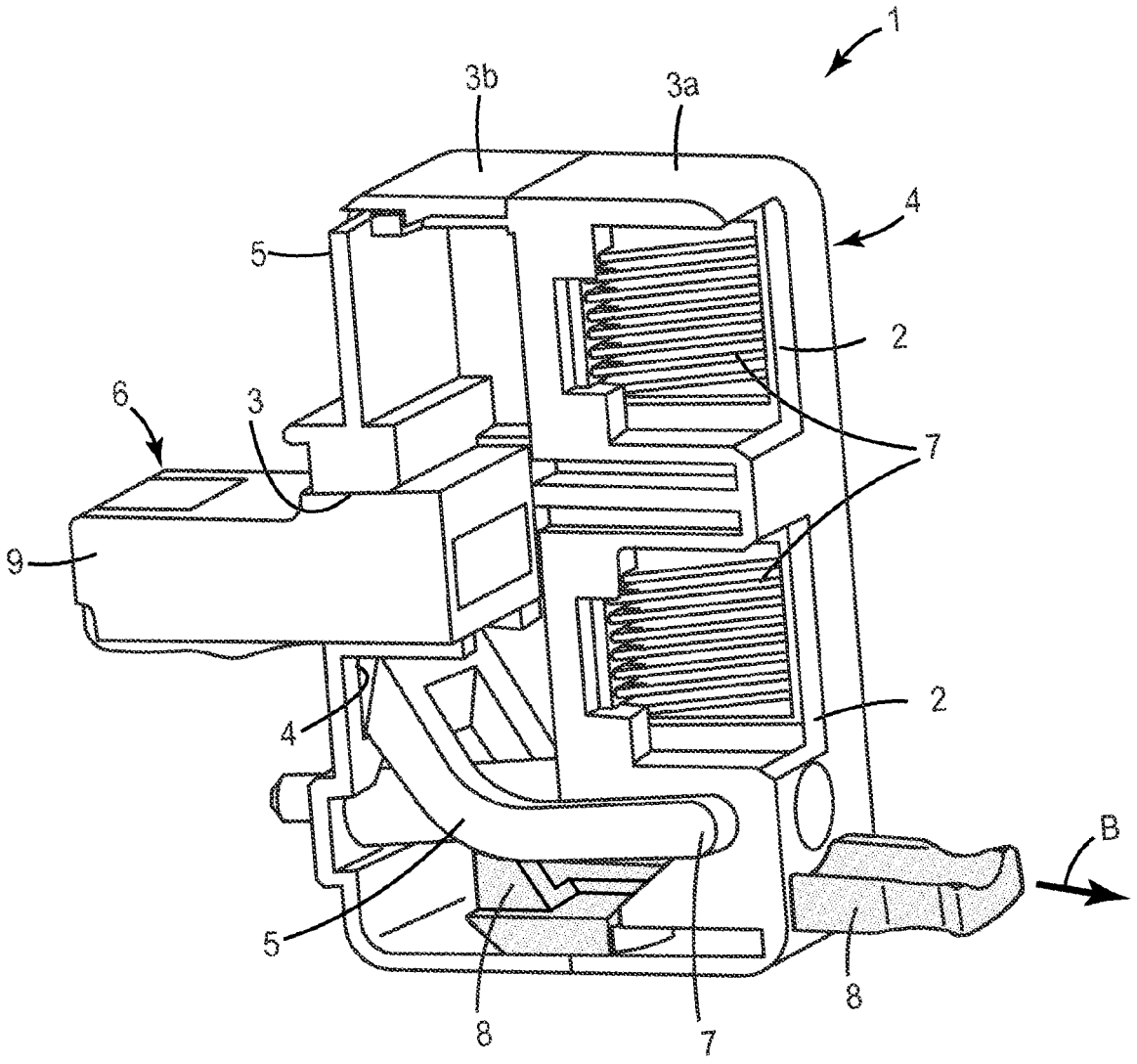


FIG. 3

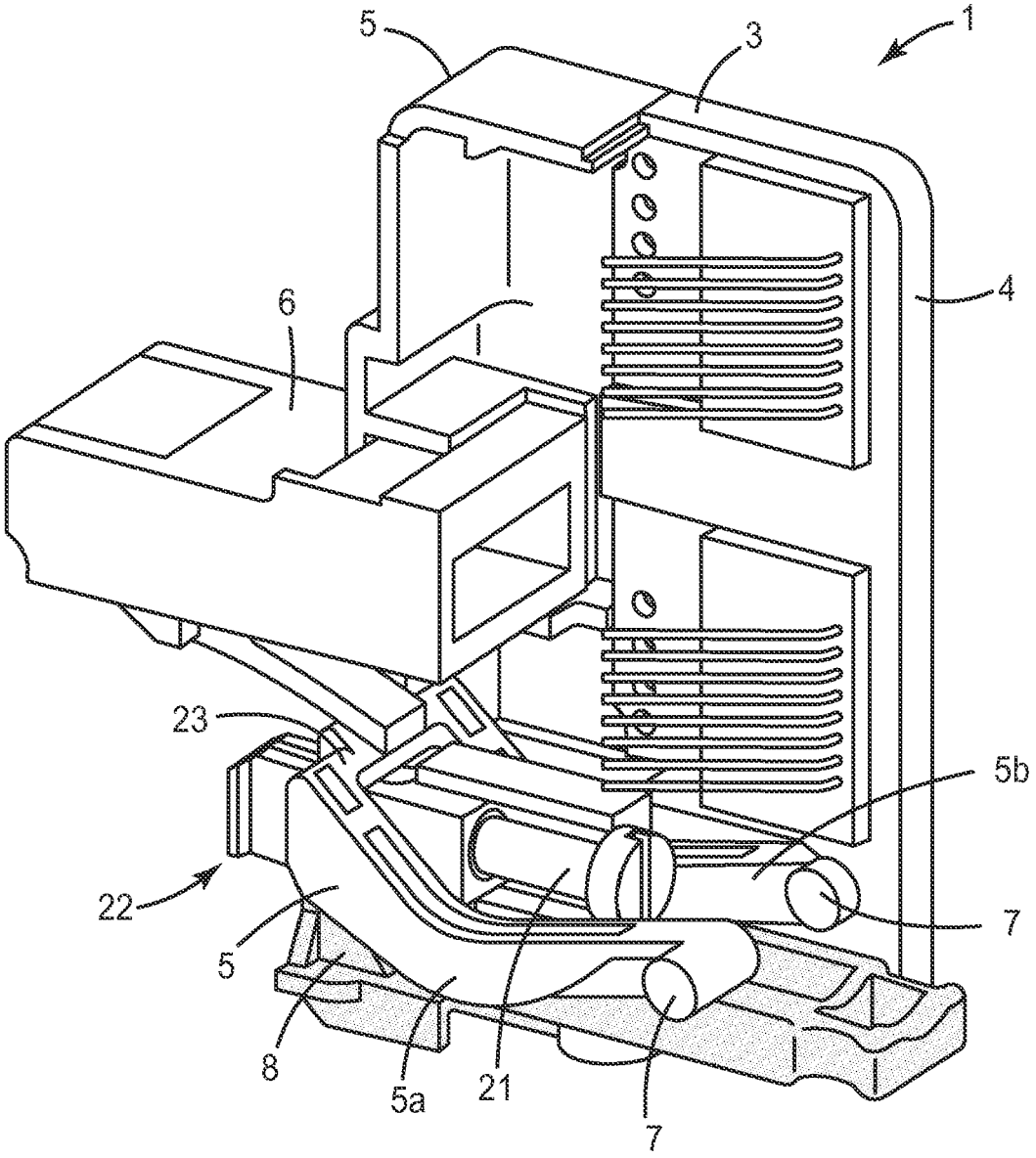


FIG. 4

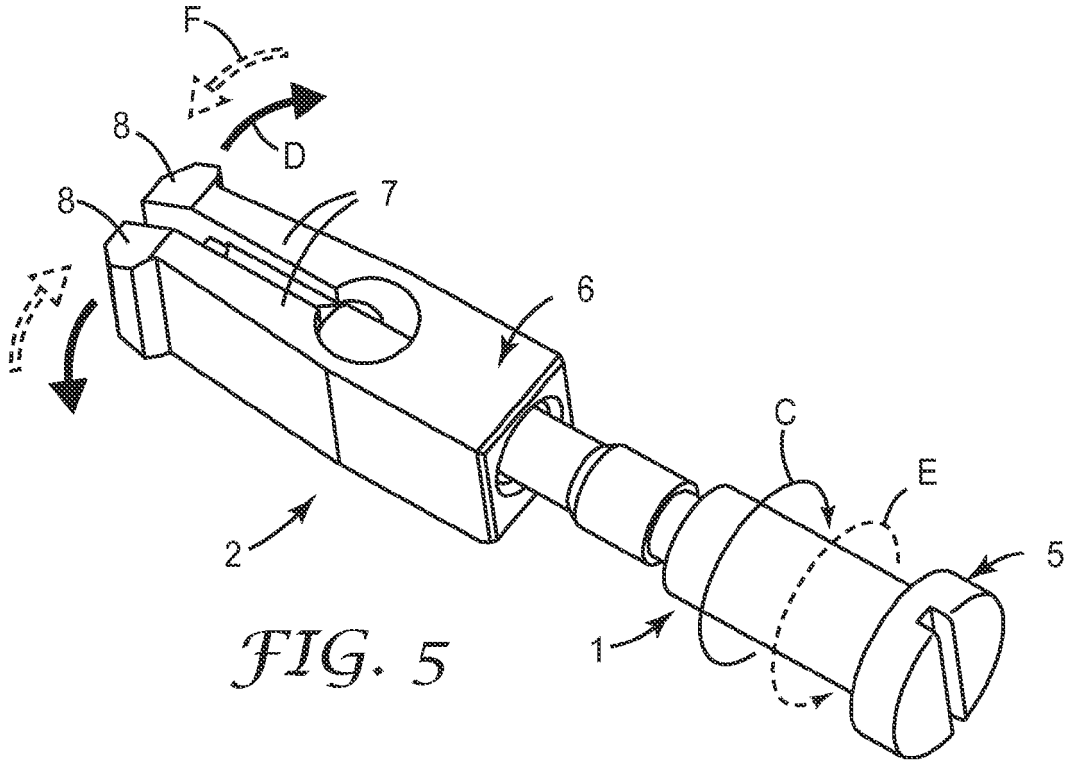


FIG. 5

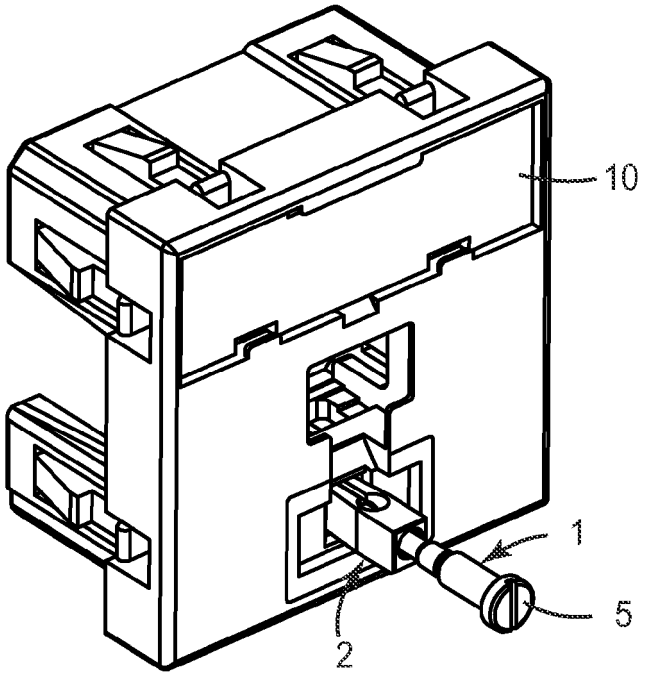


FIG. 6a

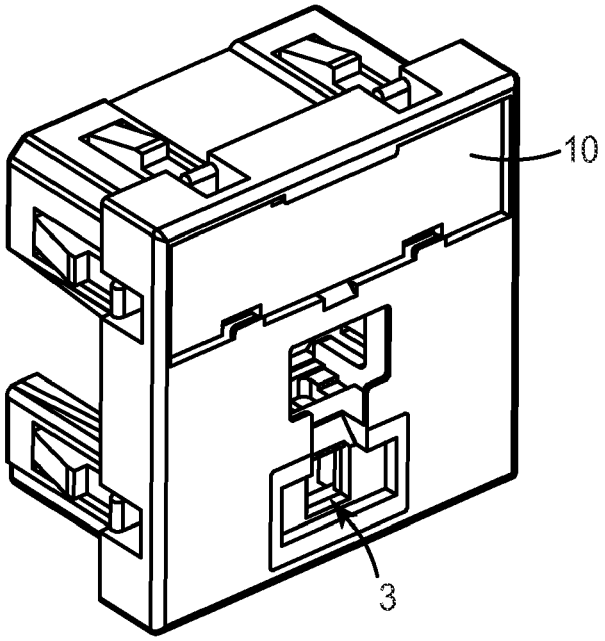


FIG. 6b

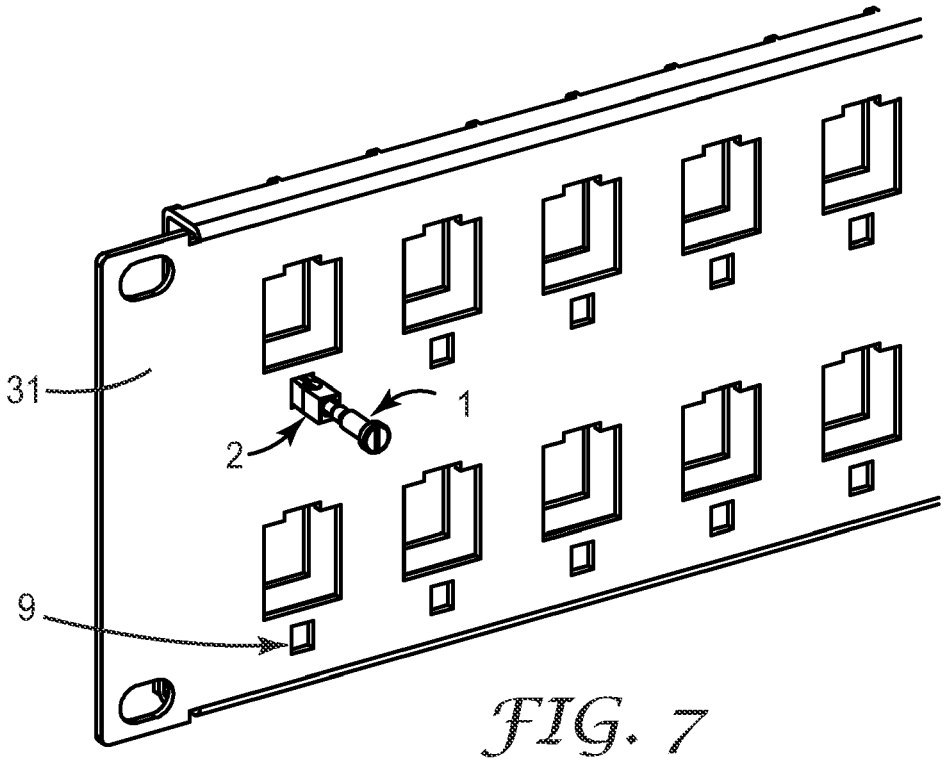


FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 08 15 7265

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 Y	GB 2 305 025 A (HUBBELL INC [US]) 26 March 1997 (1997-03-26) * the whole document *	1-10 10-14	INV. H01R31/02 H01R24/04 H01R13/633
X	US 5 308 260 A (JOHNSTON JAMES J [US] ET AL) 3 May 1994 (1994-05-03) * the whole document *	1-4,7,10	H01R13/639
A	EP 0 018 654 A (WESTERN ELECTRIC CO [US]) 12 November 1980 (1980-11-12) * the whole document *	1	
Y	US 5 194 013 A (PROPP MORRIS [US]) 16 March 1993 (1993-03-16) * the whole document *	10-14	
A	US 6 699 058 B1 (ESTRELA PETER [US] ET AL) 2 March 2004 (2004-03-02) * the whole document *	1,12	
A	DE 84 20 805 U1 (MEYER, JUERGEN, DIPL.-ING., 5100 AACHEN, DE) 25 October 1984 (1984-10-25)	10-14	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
Munich	19 November 2008	Arenz, Rainer

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-11-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2305025 A	26-03-1997	US 5651690 A	29-07-1997
US 5308260 A	03-05-1994	CA 2099087 A1	02-03-1994
EP 0018654 A	12-11-1980	CA 1114470 A1	15-12-1981
		DE 3065018 D1	03-11-1983
		ES 8104654 A1	01-07-1981
		HK 14486 A	07-03-1986
		JP 56500476 T	09-04-1981
		JP 63050822 B	12-10-1988
		US 4241974 A	30-12-1980
		WO 8002475 A1	13-11-1980
US 5194013 A	16-03-1993	NONE	
US 6699058 B1	02-03-2004	NONE	
DE 8420805 U1		NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20050180561 A1 **[0006]**
- US 20070093136 A1 **[0007]**
- US 5328390 A **[0008]**