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(54) Casing for through type electrical connector

(57) A casing (1) for a through type electrical connector (2), the casing being fitted through a through hole (5) in a panel (3) into a lock position, and having a U-shaped outer peripheral flange (8) resting against the panel (3) in the lock position; a number of outer radial engaging members (12a,12b,12c), which define, with the flange (8), respective U-shaped recesses for receiving the panel (3), and are inserted, in an axial insertion direction (I), inside respective grooves (14) having complementary profiles and formed in a lateral edge (15) of the hole (5); and two flexible retaining members (16) extending in the same plane from respective opposite ends of the flange (8), and having respective end projections (18) cooperating with the lateral edge (15) of the hole (5) on the diametrically opposite side to one (12a) of the engaging members (12a,12b,12c) to fix the casing (1) radially with respect to the panel (3) in the lock position; the recesses (13) having respective openings (17), for insertion of the panel (3), facing in an engaging direction (E) crosswise to the insertion direction (I) to permit translation of the casing (1) in the engaging direction (E) when fitting the casing (1) inside the hole (5).

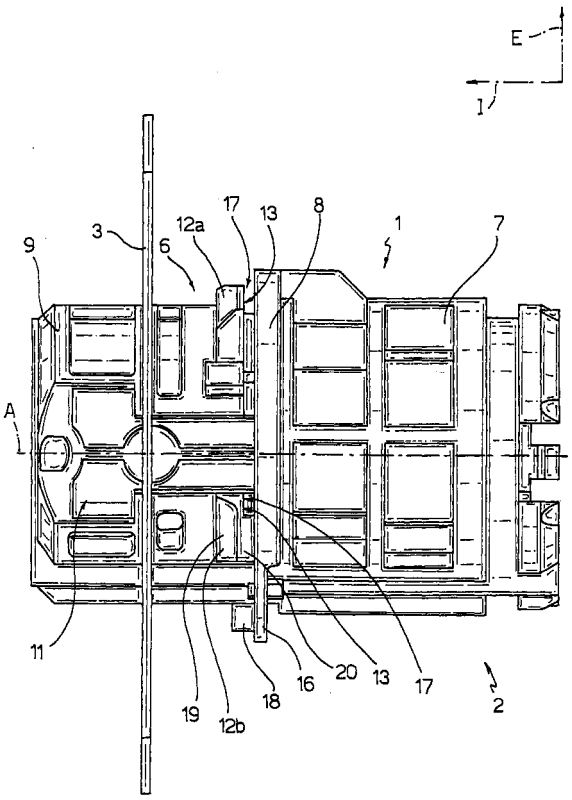

Fig.3

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Description

[0001] The present invention relates to an insulating casing for a through electric connector of the type which is fitted into a lock position through a through hole in a substantially flat panel defined, for example, by a portion of a vehicle body, and mates with a complementary electric connector on the opposite side of the panel.

[0002] Casings for connectors of the above type are known, which are substantially cylindrically symmetrical with respect to a longitudinal axis, and define a number of longitudinal cavities for respective electric terminals. Such casings comprise an outer peripheral flange resting against the panel in the lock position; and a number of outer radial engaging members, which are inserted, in an insertion direction parallel to the axis, inside respective grooves having complementary profiles and formed in a lateral edge of the hole in the panel, and rotate, just beyond the panel and with respect to the grooves, to rest on the opposite side of the panel to the flange, where they are locked angularly in position to define a bayonet connection.

[0003] Casings for connectors of the above type have few practical applications, and, in particular, are unsuitable for use in parts of the vehicle which are difficult to reach and therefore do not allow sufficient room to rotate the casing with respect to the panel.

[0004] It is an object of the present invention to provide a casing for a through electric connector, designed to provide a straightforward, low-cost solution to the aforementioned drawback typically associated with known electric connectors.

[0005] According to the present invention, there is provided a casing for a through electric connector, the casing having a longitudinal axis, being fittable through a through hole in a panel into a lock position, and comprising:

- a number of longitudinal cavities for respective electric terminals;
- a peripheral flange extending from an outer surface of said casing, and which rests against said panel in said lock position;
- at least one engaging member, which projects radially from said outer surface, defines, with said flange, a respective U-shaped recess for receiving said panel, and is insertable, in an insertion direction parallel to said axis, inside a respective groove having a complementary profile and formed in a lateral edge of said hole; and
- retaining means carried by said flange and cooperating with the lateral edge of said hole, when fitting said casing through said panel, so that said engaging member rests against said panel, on the opposite side to said flange, and the panel engages said recess to define said lock position;

  characterized in that said recess comprises a respective opening for insertion of said panel and facing in an engaging direction crosswise to said insertion direction to permit translation of the casing in said engaging direction when fitting said casing inside said hole; and in that said retaining means comprise stop means cooperating with the lateral edge of said hole, on the diametrically opposite side to said engaging member, to exert pressure on said casing in said engaging direction and fix the casing radially with respect to said panel in said lock position.

[0006] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a front view in perspective of a casing for a through electric connector, in accordance with the present invention and fitted in a lock position inside a hole in a panel;
Figure 2 shows a side view in perspective of the Figure 1 casing and panel prior to assembly;
Figure 3 shows a side view of the Figure 1 casing being inserted inside the hole in the panel.

[0007] Number 1 in the accompanying drawings indicates as a whole an insulating casing for a through electric connector 2, i.e. of the type which is fitted to a substantially flat panel 3 defined, for example, by a portion of a vehicle body, and mates with a complementary electric connector (not shown) on the opposite side of panel 3.

[0008] Casing 1 is substantially cylindrically symmetrical with respect to a longitudinal axis A, and defines a number of transverse rows of longitudinal cavities 4 having respective axes parallel to axis A and for receiving respective electric terminals (not shown).

[0009] Casing 1 engages a substantially circular through hole 5 formed in panel 3, and is secured to panel 3 in a lock position (Figure 1) by retaining means 6.

[0010] Casing 1 comprises a rear portion 7, in which cavities 4 for the electric terminals are formed, and which has an outer peripheral flange 8 which rests against panel 3 in the lock position of casing 1; and a hollow front portion 9, which projects axially from hole 5 on the opposite side to flange 8, communicates with cavities 4, and defines a substantially cylindrical cavity 10 for housing a correspondingly-shaped portion of the complementary connector. More specifically, flange 8 is substantially U-shaped, and projects from an outer surface 11 of casing 1.

[0011] Retaining means 6 comprise three engaging members or teeth 12a, 12b, 12c, which project radially from outer surface 11 of casing 1, define, with flange 8, respective U-shaped recesses 13 for receiving panel 3, and are inserted, in an insertion direction I parallel to axis A, inside respective grooves 14 having complementary profiles and formed in a lateral edge 15 of hole

5. Retaining means 6 also comprise two flexible retaining lances 16, which extend, in the same plane, from respective opposite ends of flange 8, and cooperate elastically with the lateral edge 15 of hole 5, as casing 1 is inserted inside hole 5, so that engaging members 12a, 12b, 12c rest against panel 3, on the opposite side to flange 8, and panel 3 engages recesses 13 to define the lock position.

[0012] More specifically, engaging members 12a, 12b, 12c have substantially C-shaped profiles for insertion inside respective grooves 14.

[0013] Lances 16 are substantially arc-shaped, and have respective free ends located side by side.

[0014] An important aspect of the present invention is that recesses 13 comprise respective openings 17 for insertion of panel 3 and facing in an engaging direction E crosswise to insertion direction I to permit translation of casing 1 in engaging direction E when fitting casing 1 inside hole 5; and lances 16 are provided on the free ends with respective substantially parallelepiped-shaped projections 18, which cooperate with lateral edge 15 of hole 5, on the diametrically opposite side to engaging member 12a, to exert pressure on casing 1 in engaging direction E and fix casing 1 radially with respect to panel 3 in the lock position.

[0015] More specifically, engaging member 12a defines respective recess 13 together with flange 8 and with a portion of outer surface 11 of casing 1 interposed between engaging member 12a and flange 8; and engaging members 12a, 12b, 12c are of different dimensions to only enable insertion of casing 1 inside hole 5 in panel 3 in a given predetermined angular position.

[0016] Engaging members 12b, 12c are located on opposite sides of the line joining engaging member 12a and projections 18, and comprise respective insertion portions 19 having profiles complementary with the profiles of respective grooves 14 and facing flange 8, and respective stop portions 20 projecting from insertion portions 19 towards and contacting flange 8, and defining, in the lock position of casing 1, respective one-way stops for the lateral edges of respective grooves 14, to prevent casing 1 from rotating in either direction with respect to panel 3.

[0017] Connector 2 is fitted to panel 3 by inserting casing 1 through hole 5 in insertion direction I, and then moving casing 1 in engaging direction E into the lock position.

[0018] More specifically, when inserting casing 1 through hole 5, engaging members 12a, 12b, 12c slide inside respective grooves 14, and, upon projections 18 contacting lateral edge 15 of hole 5, lances 16 flex, with respect to the plane of flange 8, towards rear portion 7 of casing 1. Once engaging member 12a and insertion portions 19 of engaging members 12b, 12c are through panel 3 in insertion direction I, and flange 8 is positioned resting against panel 3, casing 1 can be moved in engaging direction E into the lock position.

[0019] At this stage, engaging member 12a and insertion portions 19 of engaging members 12b, 12c are positioned resting against panel 3 on the opposite side to flange 8, so that recesses 13 are engaged by respective portions of the lateral edges of respective grooves 14, thus enabling projections 18 to click inside hole 5 to lock casing 1 radially with respect to panel 3 and enable respective lances 16 to return to the undeformed position. At the same time, stop portions 20 of engaging members 12b, 12c are positioned close to respective end portions of the lateral edges of respective grooves 14, so as to prevent - together with the outer surface 11 adjacent to engaging member 12a interacting with the lateral edge of respective groove 14 - casing 1 from rotating in either direction with respect to panel 3.

[0020] The advantages of casing 1 according to the present invention will be clear from the foregoing description.

[0021] In particular, casing 1 is fitted to panel 3 by means of two consecutive linear movements, which, being performable by simply pushing the casing, require very little room for maneuver, so that connector 2 may be used in a wide range of applications, and is especially suitable for use in parts of vehicles that are difficult to reach.

[0022] Clearly, changes may be made to casing 1 without, however, departing from the scope of the present invention.

Claims

1. A casing (1) for a through electric connector (2), the casing having a longitudinal axis (A), being fittable through a through hole (5) in a panel (3) into a lock position, and comprising:

   - a number of longitudinal cavities (4) for respective electric terminals;
   - a peripheral flange (8) extending from an outer surface (11) of said casing (1) and which rests against said panel (3) in said lock position;
   - at least one engaging member (12a), which projects radially from said outer surface (11), defines, with said flange (8), a respective U-shaped recess for receiving said panel (3), and is insertable, in an insertion direction (I) parallel to said axis (A), inside a respective groove (14) having a complementary profile and formed in a lateral edge (15) of said hole (5); and
   - retaining means (16, 18) carried by said flange (8) and cooperating with the lateral edge (15) of said hole (5), when fitting said casing (1) through said panel (3), so that said engaging member (12a) rests against said panel (3), on the opposite side to said flange (8), and the panel (3) engages said recess (13) to define said lock position;

   characterized in that said recess (13) com-

prises a respective opening (17) for insertion of said panel (3) and facing in an engaging direction (E) crosswise to said insertion direction (I) to permit translation of the casing (1) in said engaging direction (E) when fitting said casing (1) inside said hole (5); and in that said retaining means comprise stop means (18) cooperating with the lateral edge (15) of said hole (5), on the diametrically opposite side to said engaging member (12a), to thrust said casing in said engaging direction (E) and fix the casing radially with respect to said panel (3) in said lock position.

2. A casing as claimed in Claim 1, characterized in that said retaining means comprise at least one flexible retaining member (16) coplanar with and extending from said flange (8) and carrying said stop means (18).

3. A casing as claimed in Claim 2, characterized in that said stop means comprise a projection (18) projecting from a free end of said retaining member (16).

4. A casing as claimed in Claim 3, characterized in that said flange (8) has a U-shaped profile; and said casing (1) comprises two said retaining members (16) which project from respective opposite ends of said flange (8), are substantially arc-shaped, and have respective free ends carrying respective side by side said projections (18).

5. A casing as claimed in any one of the foregoing Claims, characterized by comprising a number of said engaging members (12a, 12b, 12c), which project radially from said outer surface (11), are insertable, in said insertion direction (I), inside respective said grooves (14) having respective complementary profiles and formed in the lateral edge (15) of said hole (5), and define, with said flange (8), respective U-shaped said recesses (13) having respective said openings (17) for insertion of said panel (3) and facing in said engaging direction (E).

6. A casing as claimed in Claim 5, characterized in that at least two of said engaging members (12a, 12b, 12c) are of different sizes.

7. A casing as claimed in Claim 5 or 6, characterized in that said engaging members (12a, 12b, 12c) each have a substantially C-shaped profile for insertion inside the respective said grooves (14).

8. A casing as claimed in any one of Claims 5 to 7, characterized in that two said engaging members (12b, 12c), located on opposite sides of a line joining said stop means (18) and said engaging member (12a) diametrically opposite said stop means (18), comprise respective insertion portions (19) having respective profiles complementary to said grooves (14) and facing said flange (8); and respective stop portions (20) which project from the insertion portions (19) towards said flange (8), and define, in said lock position of said casing (1), respective one-way stops for the lateral edges of the respective said grooves (14) to prevent said casing (1) from rotating in either direction with respect to said panel (3).

9. A casing as claimed in any one of the foregoing Claims, characterized by being substantially cylindrical.

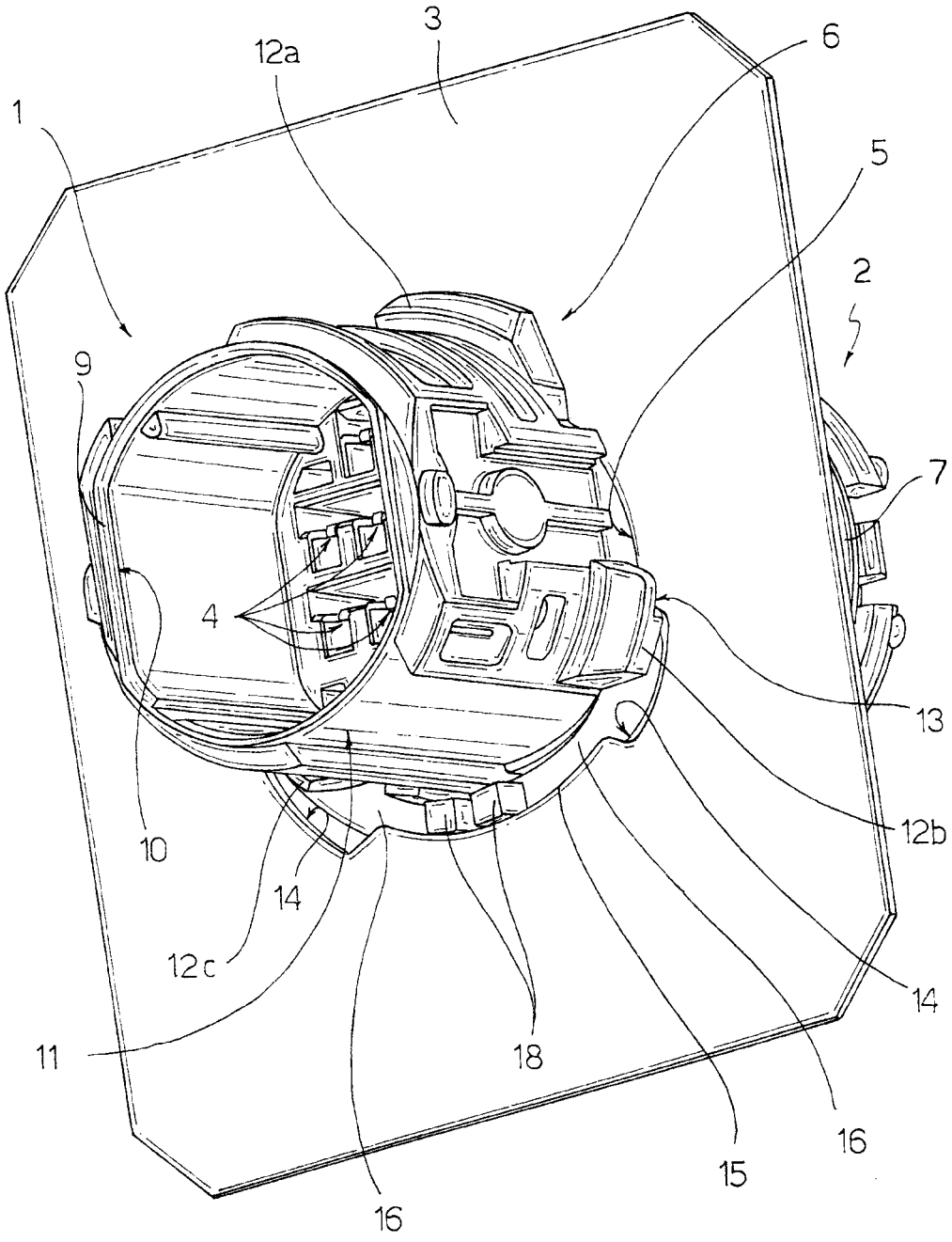

Fig.1

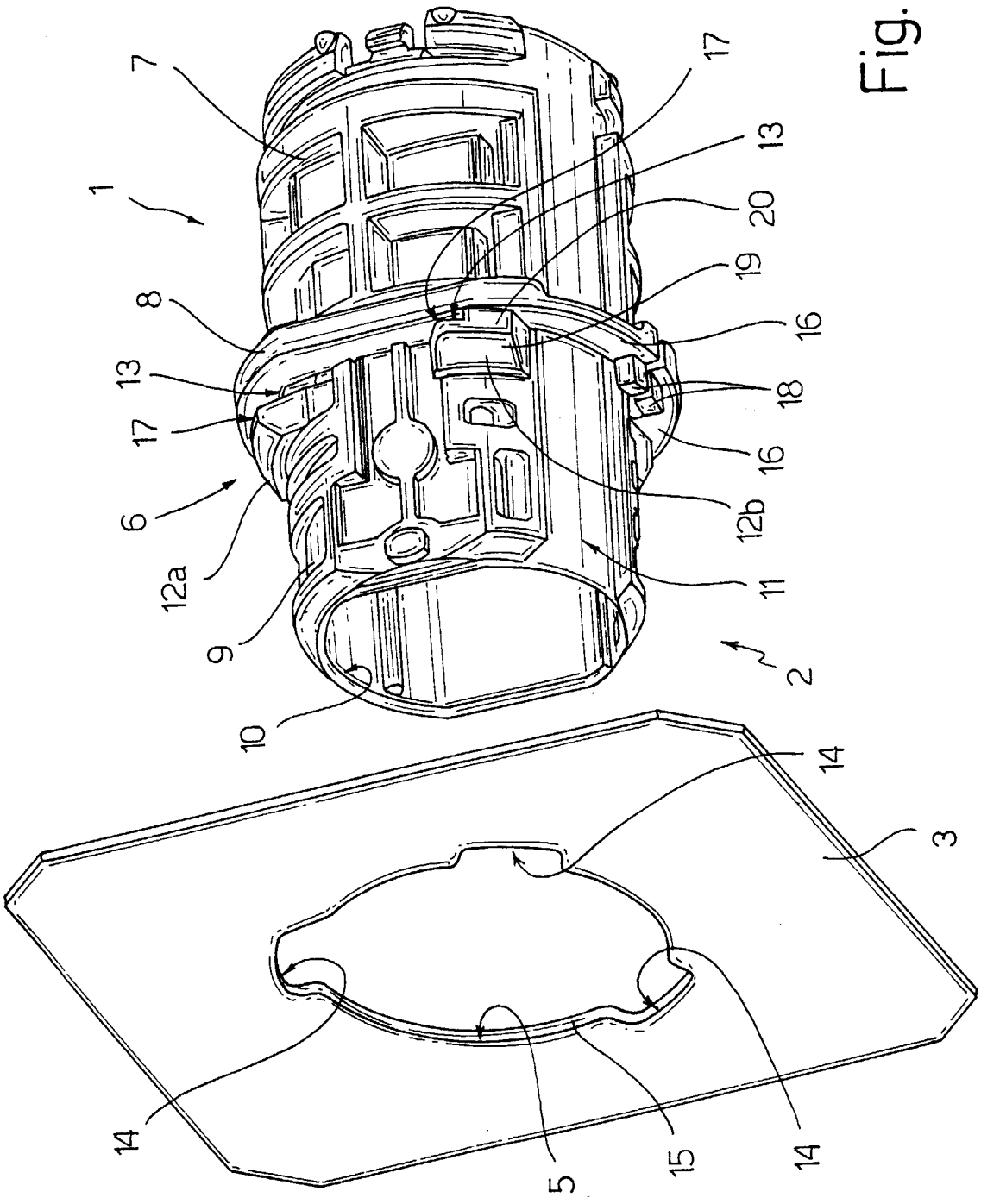

Fig.2

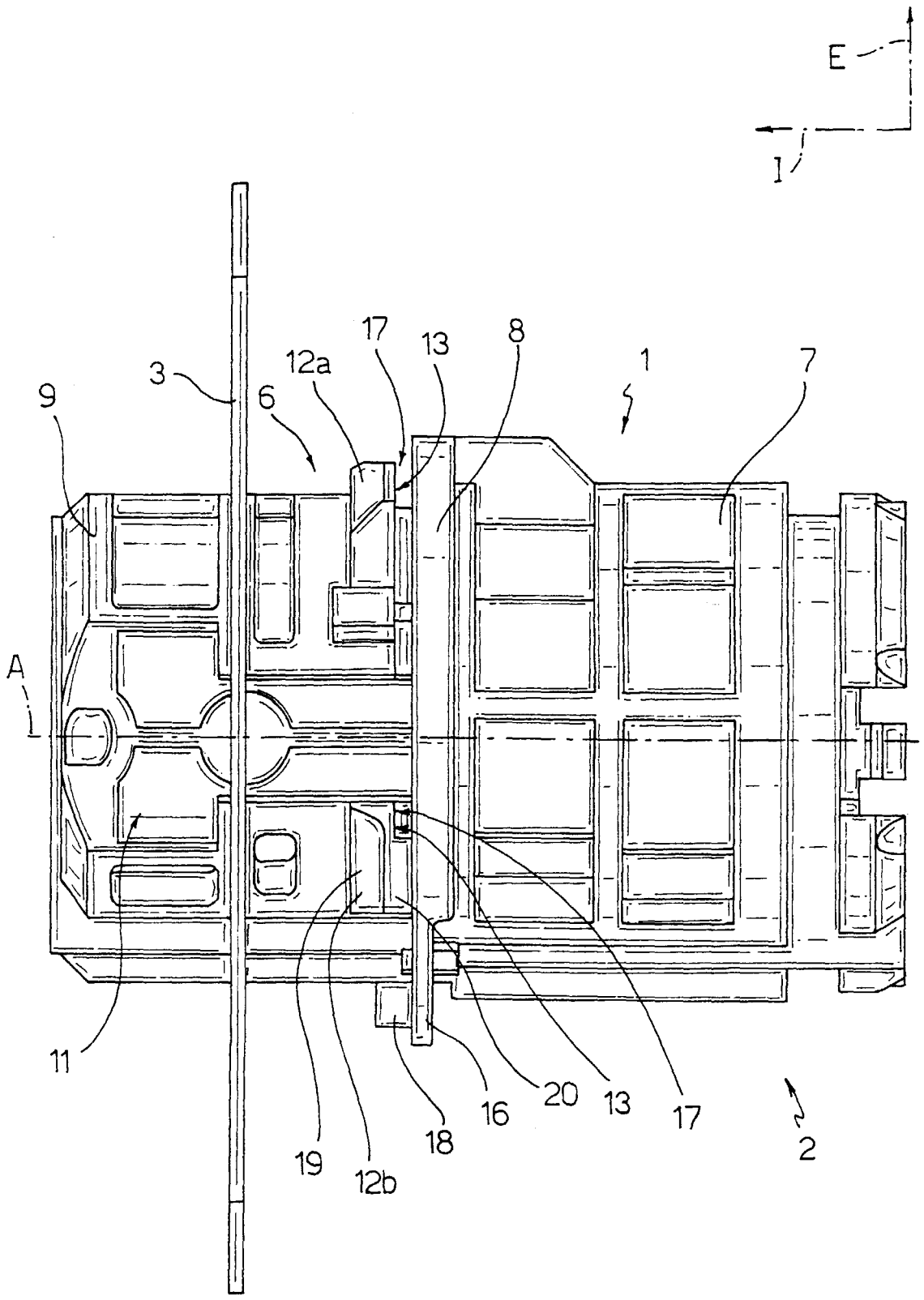

Fig.3