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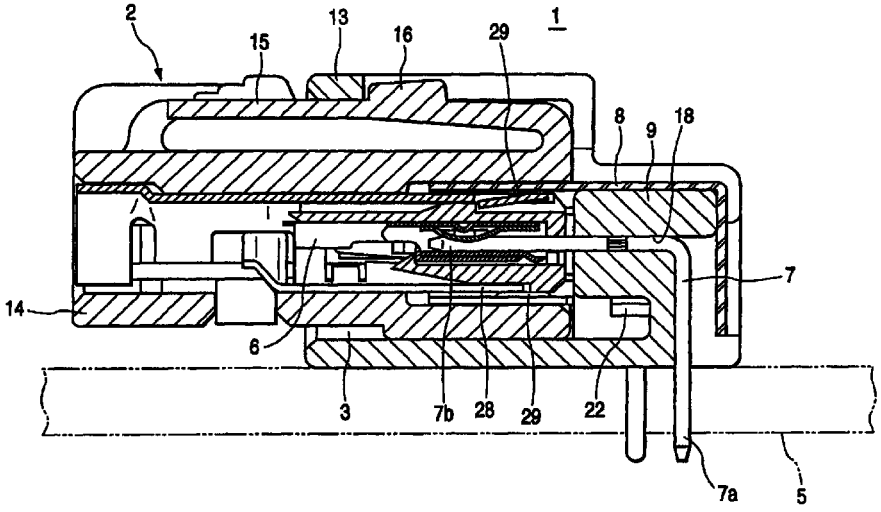
## (54) Coaxial connector

(57) A connector includes an outer housing portion 4, having a connector mounting-receiving chamber 3 into which a mating connector 2 can be fitted, and an inner housing portion 10 which has a terminal mounting-holding portion 9, and is formed integrally with the outer housing portion 4. A terminal 7 and a shield casing 8, surrounding an outer periphery of the terminal 7, are mounted and held on the terminal mounting-holding portion 9, and one end portion 7a of the terminal 7 is adapted to be connected to an on-board printed wiring board 5 whereas the other end portion 7b thereof can be connected to a mating terminal 6 of the mating connector 2. A withdrawal prevention lock portion 13 for retaining the mating connector 2 is formed on the outer housing portion 4.

*FIG. 1*

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## Description

**[0001]** This invention relates to a connector fitting to a connector connected to a coaxial cable, and more particularly to such a connector in which the number of component parts is reduced, and a relative movement (shaking movement) between the parts is reduced so as to enhance high-frequency characteristics.

**[0002]** Japanese Patent Publication Hei.8-306435 discloses a connector (hereinafter referred to as "coaxial connector") connected to a coaxial shielded wire which handles a high-frequency signal used in the connection of a car navigation system, an on-board communication system, an AV equipment, an OA equipment and so on.

**[0003]** As shown in Fig. 14, such a coaxial connector mainly includes: a molded body 101 of a square box-like shape having an open front side; an L-shaped contact pin (male terminal) 102 received in the molded body 101; an insulator 103 receiving and holding the contact pin 102; an L-shaped, tubular inner shield cover 104 of a square cross-section mounted within the molded body 101 in surrounding relation to the contact pin 102; and an outer shield cover 105 fitted on an outer periphery of the molded body 101. This coaxial connector is mounted on a printed wiring board 106, and forms a receptacle connector (socket-type connector).

**[0004]** As shown in Fig. 14, the contact pin 102 is held by the insulator 103 in such a manner that one end portion of this contact pin 102 is exposed to a connector mounting-receiving chamber 108. A mating connector 107 of the plug-type can be fitted into the connector mounting-receiving chamber 108. The contact pin 102 and the insulator 103 are received in the inner shield cover 104 in a surrounded manner.

**[0005]** The contact pin 102, the insulator 103 and the inner shield cover 104 are fixed to the molded body 101 by a retaining member 109 having serration or teeth. The retaining member 109 is held between the insulator 103 and a rear mounting portion 101a of the molded body 101.

**[0006]** The outer shield cover 105 is pressed down from the upper side to be fitted and mounted on the molded body 101. The outer shield cover 105 has a tongue-like connection portion 110 which is inserted in a space between a rear plate portion 104a and a stamped portion 104b of the inner shield cover 104, thereby electrically connecting the outer shield cover 105 to the inner shield cover 104.

**[0007]** An ground terminal 111 extends downwardly from a lower end of a side plate of the inner shield cover 104, and an ground terminal 112 extends downwardly from a lower end of a side plate of the outer shield cover 105. These ground terminals 111 and 112 extend through the printed wiring board 106, and are soldered to a circuit pattern on this board 106, thereby grounding the inner and outer shield covers 104 and 105.

**[0008]** In the coaxial connector of the above construction, the inner shield cover 104 and the outer shield cover 105 can be easily connected together without the need for a cumbersome operation such as a bending operation and a soldering operation, and the grounding of these shield covers can be effected easily.

**[0009]** However, the coaxial connector of the above construction includes the molded body 101, the contact pin 102, the insulator 103, the inner shield cover 104, the outer shield cover 105 and the retaining member 109. Therefore, the number of the component parts is large, so that the cost is high. And besides, in the case where the number of component parts is large, a gap is formed between the parts combined together, because of dimensional tolerances required for facilitating the assembling operation, and such gaps are accumulated to cause a large shaking movement. The above coaxial connector is used particularly for sending and receiving a high-frequency signal relative to an on-board equipment mounted on an automobile or the like, and therefore such a shaking movement lowers high-frequency characteristics.

**[0010]** In the assembling process, after the contact pin 102 is received in and held by the insulator 103, the inner shield cover 104 is connected to this insulator 103, and then these parts are fixed to the molded body 101 through the retaining member 109. Then the outer shield cover 105 is attached to the molded body 101. Thus, much time and labor are required for the assembling operation since the number of the component parts is large, and this is disadvantageous from the viewpoint of the cost.

**[0011]** Japanese Patent Publication Hei.8-153557 and U. S. Patent No. 5,662,480 disclose coaxial connectors of the type in which an inner housing and an outer housing are formed integrally with each other. However, these connectors are ordinary commercial ones, and are not originally designed to be mounted on an automobile, and therefore any countermeasures against the vibration of an engine and a temperature change in a passenger room have not been taken. Therefore, such connectors are not suited for use as an on-board connector required to provide high-frequency characteristics.

**[0012]** As described above, the number of the component parts is large in the conventional coaxial connectors. Therefore, there have been encountered the problems such as the increased cost and the lowered high-frequency characteristics due to a relative movement between the parts, and besides these conventional connectors are not suited for use as an on-board connector.

**[0013]** This invention has been made in order to solve the above problems, and an object of the invention is to provide a connector in which the number of component parts is reduced, and an assembling operation, needed for a single product, is reduced so as to reduce a relative movement between the parts, thereby enhancing high-frequency characteristics and achieving

a low cost design.

**[0014]** The above problems have been solved by a connector of the invention which includes an outer housing portion, having a connector mounting-receiving chamber into which a mating connector can be fitted, and an inner housing portion which has a terminal mounting-holding portion, and is formed integrally with the outer housing portion, wherein a terminal and a shield casing, surrounding an outer periphery of the terminal, are mounted and held on the terminal mounting-holding portion, and one end portion of the terminal is adapted to be connected to an on-board printed wiring board whereas the other end portion of the terminal can be connected to a mating terminal of the mating connector, and a withdrawal prevention lock portion for retaining the mating connector is formed on the outer housing portion.

**[0015]** Since the outer housing portion and the inner housing portion are formed integrally with each other, and therefore the number of the component parts is reduced, and therefore a relative movement (shaking movement) between the parts is suppressed. Therefore, only one assembling operation is needed for the single product, and therefore the cost can be reduced.

**[0016]** The shaking movement is thus reduced by reducing the number of the component parts, and besides the withdrawal prevention lock portion for retaining the mating connector is formed on the outer housing portion, and therefore even in the case where the connector of the invention is mounted on an automobile, this connector can sufficiently withstand the vibration of the automobile, and therefore high-frequency characteristics will not be adversely affected.

**[0017]** In the connector of the invention, a positioning engagement hole is formed in the shield casing, and a shield casing-retaining portion is formed on the inner housing portion, and is engaged in the positioning engagement hole.

**[0018]** The shield casing-retaining portion, formed on the inner housing portion, is engaged in the positioning engagement hole formed in the shield casing, and therefore the shield casing can be fixed to the terminal mounting-holding portion without shaking.

**[0019]** In the connector of the invention, the terminal is insert molded in the terminal mounting-holding portion.

**[0020]** Since the terminal is insert molded in the terminal mounting-holding portion, the number of the component parts of the connector is further reduced, and besides a relative movement between the terminal and the terminal mounting-holding portion is eliminated.

**[0021]** In the connector of the invention, alternatively, the terminal is press-fitted in the terminal mounting-holding portion.

**[0022]** Since the terminal is press-fitted in the terminal mounting-holding portion, a relative movement between the terminal and the terminal mounting-holding portion is eliminated.

**[0023]** In the connector of the invention, the printed wiring board is one for mounting on a vehicle.

**[0024]** Even when the connector of the invention, which has the reduced number of the component parts, and is free from shaking movement, is mounted on the on-board printed wiring board, this connector can sufficiently withstand the vibration of an automobile or the like, and high-frequency characteristics will not be adversely affected.

Fig. 1 is a cross-sectional view of a preferred embodiment of a connector of the invention to which a mating connector is connected.

Fig. 2 is a plan view of the connector of this embodiment.

Fig. 3 is a front-elevational view of the connector of this embodiment.

Fig. 4 is a cross-sectional view of the connector taken along the line A-A of Fig. 3.

Fig. 5 is a plan view of a connector housing from which a shield casing is removed.

Fig. 6 is a front-elevational view of the connector housing from which the shield casing is removed.

Fig. 7 is a cross-sectional view of the connector housing taken along the line B-B of Fig. 6.

Fig. 8A is a plan view of the shield casing.

Fig. 8B is a front-elevational view thereof.

Fig. 8C is a cross-sectional view taken along the line C-C of Fig. 8A.

Fig. 9A is a cross-sectional view of a first process of assembling the connector in which a terminal is press-fitted in a terminal mounting-housing portion showing a condition before the terminal is inserted.

Fig. 9B is a cross-sectional view of the second process showing a terminal-inserted condition.

Fig. 9C is a cross-sectional view of the third process showing a terminal-bent condition.

Fig. 10A is a cross-sectional view of a first process of assembling the connector in which the terminal is press-fitted in the terminal mounting -holding portion showing a condition before the shield casing is mounted.

Fig. 10B is a cross-sectional view of the second process showing a shield casing-mounted condition.

Fig. 11A is a side-elevational view of the terminal of a first process off assembling the connector in which the terminal is insert molded in the connector housing.

Fig. 11B is a side-elevational view of the terminal in a bent condition of second process.

Fig. 12 is a cross-sectional view showing the process of assembling the connector in which the terminal is insert molded in the terminal mounting-holding portion, and more specifically showing a condition in which the bent terminal is inserted molded in the connector housing.

Fig. 13 is a cross-sectional view showing the proc-

ess of assembling the connector in which the terminal is insert molded in the terminal mounting-holding portion, and more specifically showing a condition before the shield casing is mounted.

Fig. 14 is a cross-sectional view of a conventional coaxial connector.

**[0025]** One preferred embodiment of the present invention will now be described in detail with reference to the drawings.

**[0026]** This embodiment of the invention is directed to a coaxial connector for handling a high-frequency signal, in which the number of component parts is reduced, and a shaking movement between the parts is reduced, thereby enhancing the high-frequency characteristics.

(Construction of the Connector)

**[0027]** As shown in Figs. 1 to 4, the connector 1 of this embodiment includes an outer housing portion 4 having a connector mounting-receiving chamber 3 into which a mating connector 2 can be fitted, and an inner housing portion 10 having a terminal mounting-holding portion 9. The outer housing portion 4 and the inner housing portion 10 are formed integrally.

A terminal 7 and a shield casing 8 are mounted and held on the terminal mounting-holding portion 9. One end of terminal 7a of the terminal 7 is adapted to be connected to an on-board printed wiring board 5 while the other end portion 7b of the terminal 7 is adapted to be connected to a metal terminal 6 of the mating connector 2. The shield casing 8 surrounds the outer periphery of the terminal 7.

**[0028]** The mating connector 2 is a female connector to which a shielded wire having a wire braid formed around a conductor through an inner layer is connected.

(Construction of Housing)

**[0029]** The connector housing including the outer housing portion 4 and the inner housing portion 10 is molded into an integral construction, for example, by injection molding of a resin material having excellent insulating properties. As shown in Figs. 5 to 7, the outer housing portion 4 is formed into a square tubular, box-like shape having an open front side, and has the connector mounting-receiving chamber 3 into which the mating connector 2 can be fitted through a front opening 11 thereof.

**[0030]** As shown in Fig. 6, the front opening 11 is formed into a rectangular shape and an upper end of the front opening 11 is formed into a comb-like shape corresponding to the outer shape of the mating connector 2. A pair of hanging portions 12 and 12 having a short length are formed on an inner surface of a top plate portion 4a of the outer housing portion 4, and extends rearwardly from the front opening 11. A withdrawal prevention lock portion 13 is formed on the portion of the top plate portion 4a lying between the pair of hanging portions 12 and 12, and this lock portion 13 serves to prevent the withdrawal of the mating connector 2 from the connector 1 of this embodiment so as to prevent a relative movement (shaking movement) between the two connectors.

**[0031]** As shown in Fig. 1, the withdrawal prevention lock portion 13 is engageable with an engagement projection 16 formed on an elastically-displaceable portion 15 formed on a connector housing 14 of the mating connector 2. The engagement of the engagement portion 16 with the withdrawal prevention lock portion 13 prevents the mating connector 2 from moving or shaking in the connector mounting-receiving chamber 3.

**[0032]** As shown in Figs. 4 and 5, a shield casing-mounting hole 17 is formed in the top plate portion 4a, and the shield casing 8 (described later) is inserted and mounted in the connector housing through this mounting hole 17. The shield casing-mounting hole 17 has a shape corresponding to the outer shape of the shield casing 8 (as seen from the top thereof). This mounting hole 17 serves as an insertion hole for the shield casing 8, and also serves as a hole in which the engagement portion 16 can be disposed.

**[0033]** As shown in Figs. 5 and 7, the inner housing portion 10 is open at its upper and rear sides, and has the terminal mounting-holding portion 9 provided in a projected manner between opposite side walls 10a and 10b extending upright from a bottom plate portion 4b of the outer housing portion 4 which also serves as a bottom plate for the inner housing portion 10. The height of the inner housing portion 10 is smaller than the height of the outer housing portion 4, and the outer housing portion 4 and the inner housing portion 10 jointly forming the connector housing are stepped relative to each other.

**[0034]** As shown in Figs. 5 to 7, the terminal mounting-holding portion 9 is formed into a block-like portion having an inverted L-shape when seen from its side. The terminal mounting-holding portion 9 has a hole 18 extending therethrough in a direction of insertion of the mating connector 2, and the terminal 7 is press-fitted into this hole 18, and hence is held therein. As shown in Figs. 4 and 7, the terminal 7 is in the form of an inverted L-shaped pin having tapering opposite ends. The one end portion 7a of the terminal 7 is connected by soldering to a land on the on-board printed wiring board 5, and the other end portion 7b thereof projects into the interior of the connector mounting-receiving chamber 3.

**[0035]** A terminal mounting notch 19 for enabling the terminal 7 to be press-fitted into the hole 18 is formed in a rear surface of the terminal mounting-holding portion 9 facing away from the connector mounting-receiving chamber 3. The terminal 7 is mounted on the terminal mounting-holding portion 9 through this terminal mounting notch 19. As shown in Fig. 6, relief (or clearance) portions 20 and 20 for shield casing-retaining portions 21 and 21 which serve to position the shield

casing 8 (described later) are formed respectively in the opposite side surfaces of the terminal mounting-holding portion 9 at the proximal end portion thereof.

**[0036]** As shown in Figs. 3, 5 and 6, the shield casing-retaining portions 21 and 21 are formed on the inner surfaces of the opposite side walls 10a and 10b, respectively. These retaining portions 21 and 21 are engaged respectively with positioning engagement holes 31 formed in the shield casing 8 to position and fix the shield casing 8 against shaking movement relative to the terminal mounting-holding portion 9. Each of the shield casing-retaining portions 21 and 21 has a tongue-like shape, and extends downwardly to a position near to the bottom plate portion 4b of the connector housing, and a lock claw 22 is formed at a distal end portion thereof, and projects toward the terminal mounting-holding portion 9.

**[0037]** As shown in Figs. 2 and 3, this connector housing has connector mounting portions 23 and 23 projecting respectively from the opposite sides of the inner housing portion 10, and the connector 1 of this embodiment is fixedly mounted on the printed circuit board 5 by these connector mounting portions 23 and 23. Screw mounting holes 24 and 24 are formed through the connector mounting portions 23 and 23, respectively. The connector mounting portions 23 and 23 are fixedly secured to the printed wiring board 5 by screws or the like passing respectively through these screw mounting holes 24 and 24.

(Construction of Shield Casing)

**[0038]** The shield casing 8 serves to interrupt high-frequency noises. As shown in Figs. 2 to 4, this shield casing 8 has a square tubular shape, and is open at its lower side, and a rear half portion of this square tubular portion is fitted on the terminal mounting-holding portion 9. A front half portion of the shield casing 8 covers the terminal 7 projecting from the connector mounting-receiving chamber 3.

**[0039]** As shown in Fig. 8, the shield casing 8 has the square tubular shape defined by a top portion 24, opposite side portions 25 and 25, and a bottom portion 26. Further the shield casing 8 has ground portions 27 and 27 extend downwardly from lower ends of the opposite side portions 25 and 25, respectively. Bulge portions 29 for contact with a shield terminal 28 provided at the mating connector 2 (shown Fig. 1) are formed at and project inwardly from inner surfaces of the top portion 24, the opposite side portions 25 and 25, and the bottom portion 26.

**[0040]** As shown in Fig. 8, a resiliency portion 30 is provided on one side portions 25, and serves to hold the shield terminal 28 in intimate contact with the shield casing 8 to positively hold them in a mutually-engaged condition. The resiliency portion 30 of a tongue-like shape is formed by forming a notch of a generally U-shape in the side portion 25. A free end portion of this resiliency portion 30 can be displaced into the interior of the square tubular portion. The inwardly-projecting bulge portion 29 is formed on an inner surface of the resiliency portion 30.

**[0041]** As shown in Figs. 8B and 8C, the positioning engagement holes 31 and 31 are formed through the opposite side portions 25 and 25, respectively. The lock claws 22 and 22 of the shield casing-retaining portions 21 and 21 are engaged in these holes 31 and 31, respectively. Each of the positioning engagement holes 31 and 31 has a rectangular shape, and is disposed in opposed relation to the corresponding lock claw 22.

**[0042]** A slit 32 is formed through the bottom portion 26 of the shield casing 8. When the shield casing 8 is mounted on the terminal mounting-holding portion 9, the terminal 7 press-fitted in the terminal mounting-holding portion 9 is introduced into the square tubular portion through this slit 32.

**[0043]** In the connector 1 of the above construction, the outer housing portion 4 and the inner housing portion 10 are formed integrally with each other, and therefore this connector includes three component parts, and thus the number of the component parts is greatly reduced, so that a relative movement (shaking movement) between the parts is suppressed. And besides, only one assembling operation is needed for the single product, and therefore the cost can be reduced.

**[0044]** A shaking movement is reduced by reducing the number of the component parts, and in addition the withdrawal prevention lock portion 13 is formed on the outer housing portion 4. Therefore, even in the case where the connector 1 of the invention is mounted on an automobile, this connector can sufficiently withstand the vibration of the automobile, and high-frequency characteristics (a characteristic impedance, a voltage standing wave ratio (VSWR), a noise resistance and so on) will not be adversely affected.

**[0045]** In the connector 1 of this embodiment, the shield casing-retaining portions 21 and 21 formed on the inner housing portion 10 are engaged respectively in the positioning engagement holes 31 and 31 formed in the shield casing 8, and therefore the shield casing 8 can be fixed to the terminal mounting-holding portion 9 without shaking.

**[0046]** In the connector 1 of this embodiment, the terminal 7 is press-fitted in the terminal mounting-holding portion 9, and therefore a relative movement (shaking movement) between the terminal 7 and the terminal mounting-holding portion 9 is eliminated. This cooperates with the above effect to enhance the high-frequency characteristics. Particularly when the connector 1 of this embodiment is mounted on the on-board printed wiring board 5, this connector can sufficiently withstand the vibration of the automobile, and the high-frequency characteristics will not be adversely affected.

(Connector Assembling Method (1))

**[0047]** A method of assembling the connector 1 of the above construction will now be described. As shown in Figs. 9A, 9B, 9C, first, the terminal 7 is mounted and held on the connector housing constituted by the outer housing portion 4 and the inner housing portion 10 which are formed integrally with each other. More specifically. As shown in Figs. 9A and 9B, the terminal 7 of a straight configuration is inserted into the hole 18 in the terminal mounting-holding portion 9 from the rear side thereof. Then, the terminal 7 projecting a predetermined distance into the connector mounting-receiving chamber 3 is bent substantially perpendicularly (that is, at right angles) intermediate the opposite ends thereof, as shown in Fig. 9C.

**[0048]** As shown in Fig. 10A, 10B, the shield casing 8 is inserted into the connector housing through the shield casing-mounting hole 17, and is mounted on the terminal mounting-holding portion 9. As a result, the lock claws 22 and 22 of the shield casing-retaining portions 21 and 21 formed on the inner housing portion 10 are engaged respectively in the positioning engagement holes 31 and 31 formed in the shield casing 8. Therefore, the shield casing 8 is positioned and held relative to the terminal mounting-holding portion 9 without shaking. When the shield casing 8 is thus mounted and held on the terminal mounting-holding portion 9, the terminal 7 is received within the shield casing 8, so that noises are interrupted.

**[0049]** As will be appreciated from the above assembling process, the connector 1 of this embodiment can be easily assembled merely by press-fitting the terminal 7 into the terminal mounting-holding portion 9, then by bending this terminal 7, and then by mounting the shield casing 8 on the terminal mounting-holding portion 9.

(Connector Assembling Method (2))

**[0050]** In the above assembling method, the terminal 7 is inserted into the hole 18 in the terminal mounting-holding portion 9. However, a method of assembling the connector 1 by insert molding will be described, in which the terminal 7 is incorporated in the connector housing simultaneously when molding the connector housing.

**[0051]** First, the terminal 7 of a straight configuration, as shown in Fig. 11A, is bent substantially perpendicularly (that is, at right angles) intermediate the opposite ends thereof as shown in Fig. 11B. The thus bent terminal 7 is insert molded in the connector housing when molding the outer housing portion 4 and the inner housing portion 10 integrally with each other. As a result, the connector housing of an integral construction, having the terminal 7 held on the terminal mounting-holding portion 9, is formed as shown in Fig. 12.

**[0052]** Then, as shown in Fig. 13, the shield casing 8 is inserted into the connector housing through the shield casing-mounting hole 17, and is mounted on the terminal mounting-holding portion 9. As a result, the lock claws 22 and 22 of the shield casing-retaining portions 21 and 21 formed on the inner housing portion 10 are engaged respectively in the positioning engagement holes 31 and 31 formed in the shield casing 8. Therefore, the shield casing 8 is positioned and held relative to the terminal mounting-holding portion 9 without shaking. When the shield casing 8 is thus mounted and held on the terminal mounting-holding portion 9, the terminal 7 is received within the shield casing 8, so that noises are interrupted.

**[0053]** Particularly in this assembling method, the terminal 7 is insert molded in the terminal mounting-holding portion 9. Therefore there are needed only two parts, that is, the connector housing and the shield casing 8. The connector 1 of this embodiment can be easily assembled merely by mounting the shield casing 8 on the terminal mounting-holding portion 9.

**[0054]** Although one preferred embodiment of the present invention has been described above, the invention is not limited to the above embodiment, but various modifications can be made.

**[0055]** The connector housing is not limited to the configuration shown in the above embodiment, but can have any other suitable shape. For example, the connector housing can have the configuration corresponding to that of the mating connector 2.

**[0056]** The present invention is carried out in the above-mentioned mode, and achieves the following advantageous effects.

**[0057]** In the connector of the invention, the outer housing portion and the inner housing portion are formed integrally with each other, and therefore the number of the component parts is reduced, and therefore a relative movement (shaking movement) between the parts is suppressed. Therefore, only one assembling operation is needed for the single product, and therefore the cost can be reduced. The shaking movement is thus reduced by reducing the number of the component parts, and besides the withdrawal prevention lock portion for retaining the mating connector is formed on the outer housing portion, and therefore even in the case where the connector of the invention is mounted on an automobile, this connector can sufficiently withstand the vibration of the automobile, and therefore high-frequency characteristics will not be adversely affected.

**[0058]** In the connector of the invention, the shield casing-retaining portions, formed on the inner housing portion, are engaged respectively in the positioning engagement holes formed in the shield casing, and therefore the shield casing can be fixed to the terminal mounting-holding portion without shaking, and a relative movement between the parts is suppressed.

**[0059]** In the connector of the invention, the terminal is insert molded in the terminal mounting-holding

portion, and therefore the number of the component parts of the connector is further reduced, and besides a relative movement between the terminal and the terminal mounting-holding portion is eliminated, so that the high-frequency characteristics can be enhanced.

**[0060]** In the connector of the invention, alternatively, the terminal is press-fitted in the terminal mounting-holding portion, and therefore a relative movement between the terminal and the terminal mounting-holding portion is eliminated, so that the high-frequency characteristics can be enhanced.

**[0061]** Even when the connector of the invention, which has the reduced number of the component parts, and is free from shaking movement, is mounted on the on-board printed wiring board, this connector can sufficiently withstand the vibration of an automobile or the like, and the high-frequency characteristics will not be adversely affected.

## Claims

**1.** A connector being connectable to a mating connector and mountable on an printed wiring board, said connector comprising:

an outer housing portion including a connector receiving chamber adapted to receive said mating connector and a withdrawal prevention lock portion adapted to retain said mating connector;
an inner housing portion formed integrally with said outer housing, said inner housing portion including,

a terminal, one end of said terminal connectable to said printed wiring board, the other end or said terminal connectable to a mating connector terminal, and
a terminal holding portion; and

a shield casing surrounding an outer periphery of said terminal and held by said terminal holding portion.

**2.** A connector according to claim 1, wherein said shield casing includes at least one positioning engagement hole, said inner housing portion includes at least one shield casing retaining portion engageable respectively with said at least one positioning engagement hole.

**3.** A connector according to claim 1, wherein said terminal is insert molded in said terminal holding portion.

**4.** A connector according to claim 1, wherein said terminal is press-fitted in said terminal holding portion.

**5.** A connector according to claim 1, wherein said printed wiring board is for mounting on a vehicle.

**6.** A connector according to claim 1, wherein an inner surface of said shield casing includes at least one bulge portion contactable with a shield terminal of said mating connector.

**7.** A connector according to claim 1, wherein an inner surface of said shield casing includes a resiliency portion formed by forming a notch in said inner surface to contact with a shield terminal of said mating connector.

FIG. 1

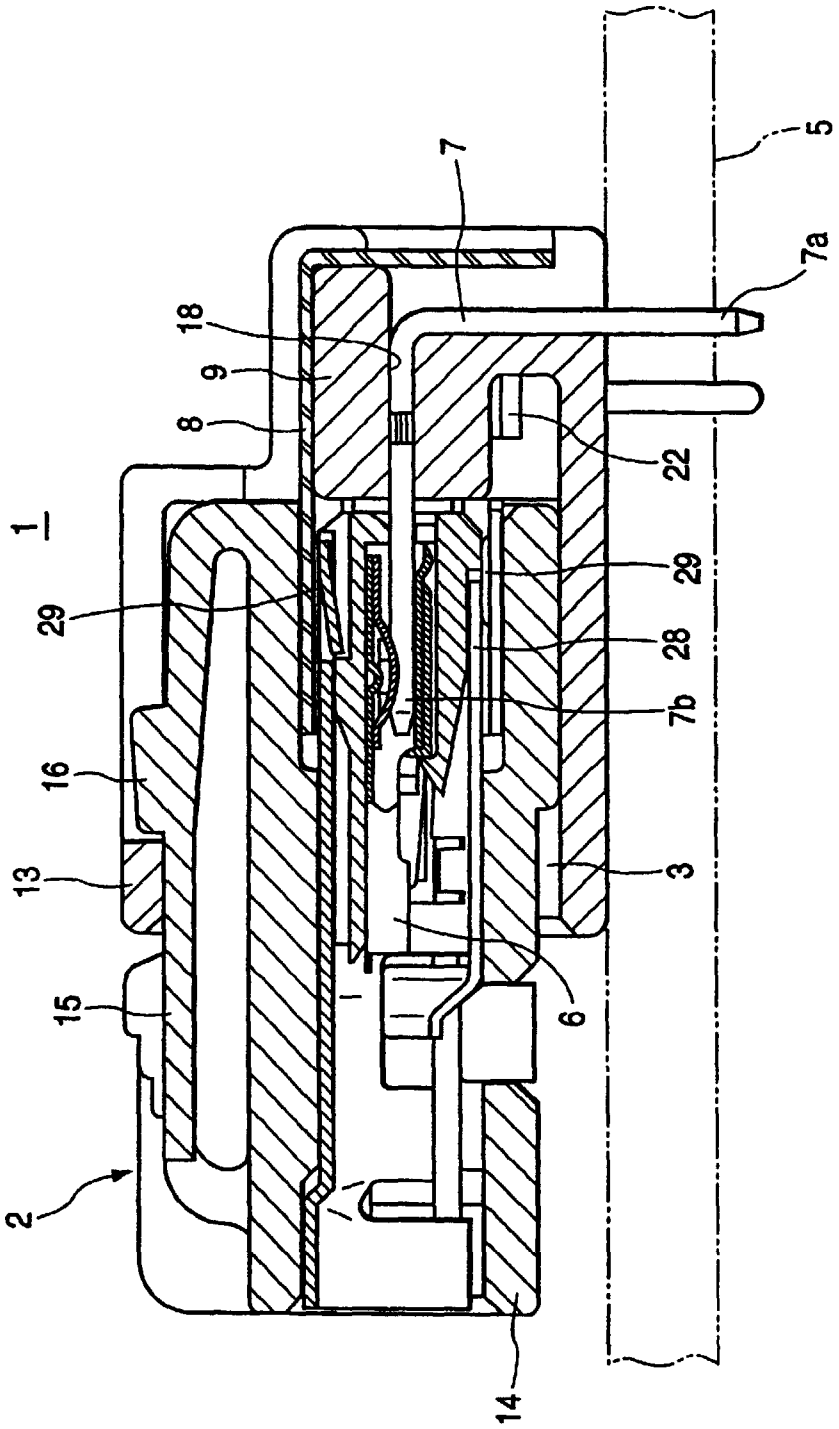

FIG. 2

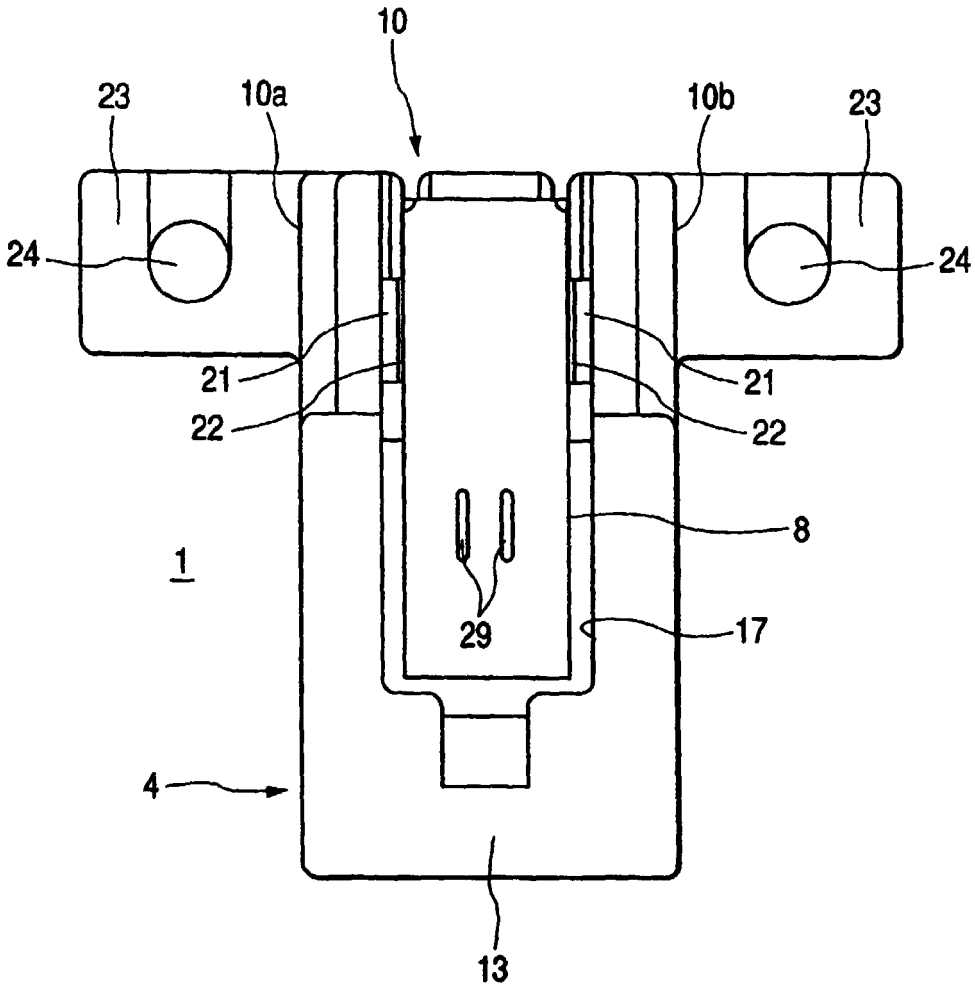

FIG. 3

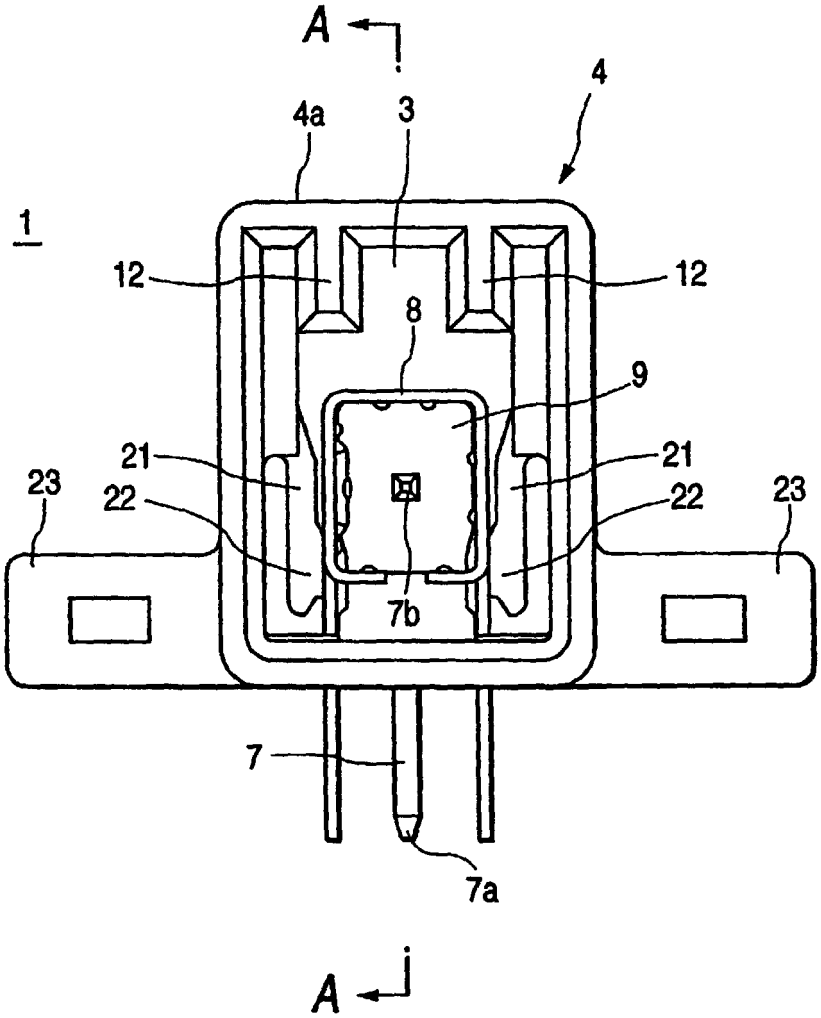

FIG. 4

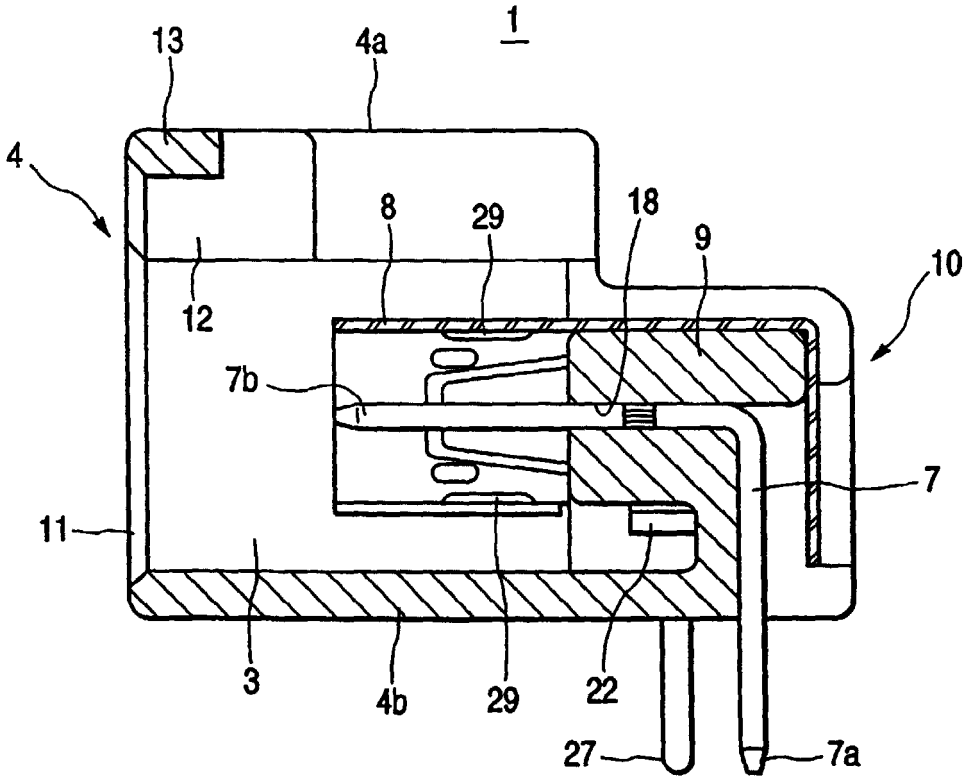

FIG. 5

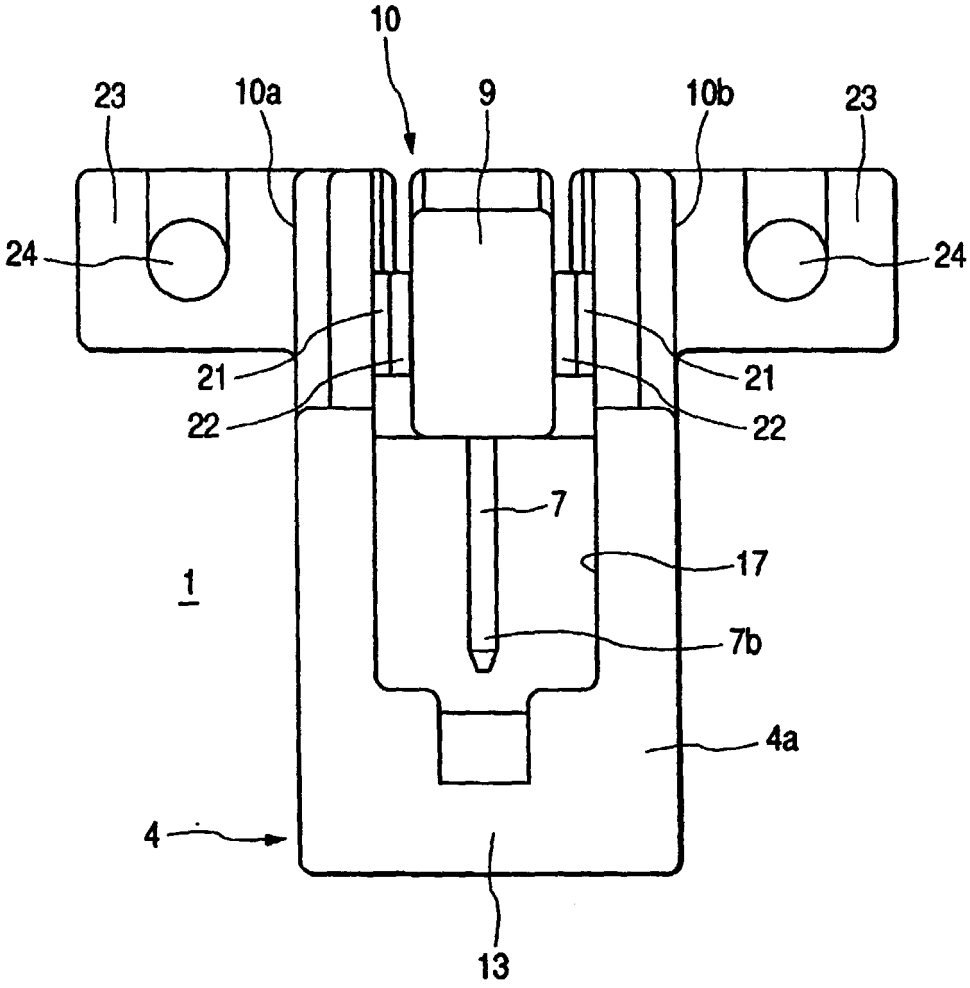

FIG. 6

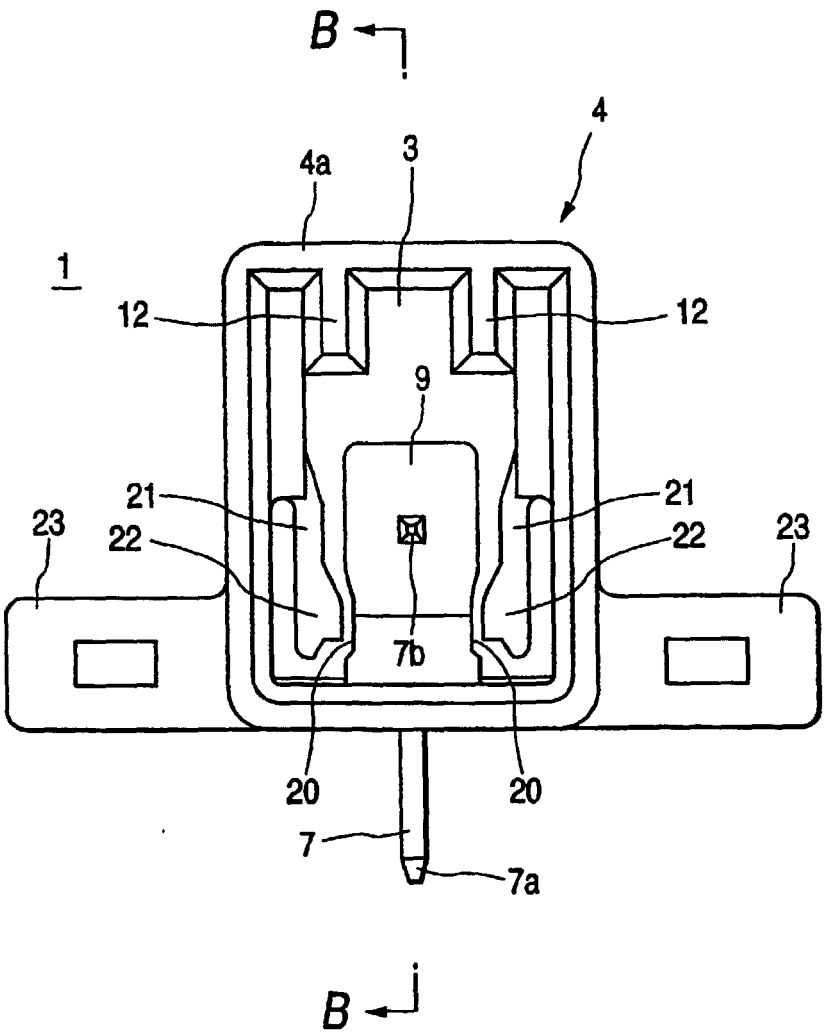

FIG. 7

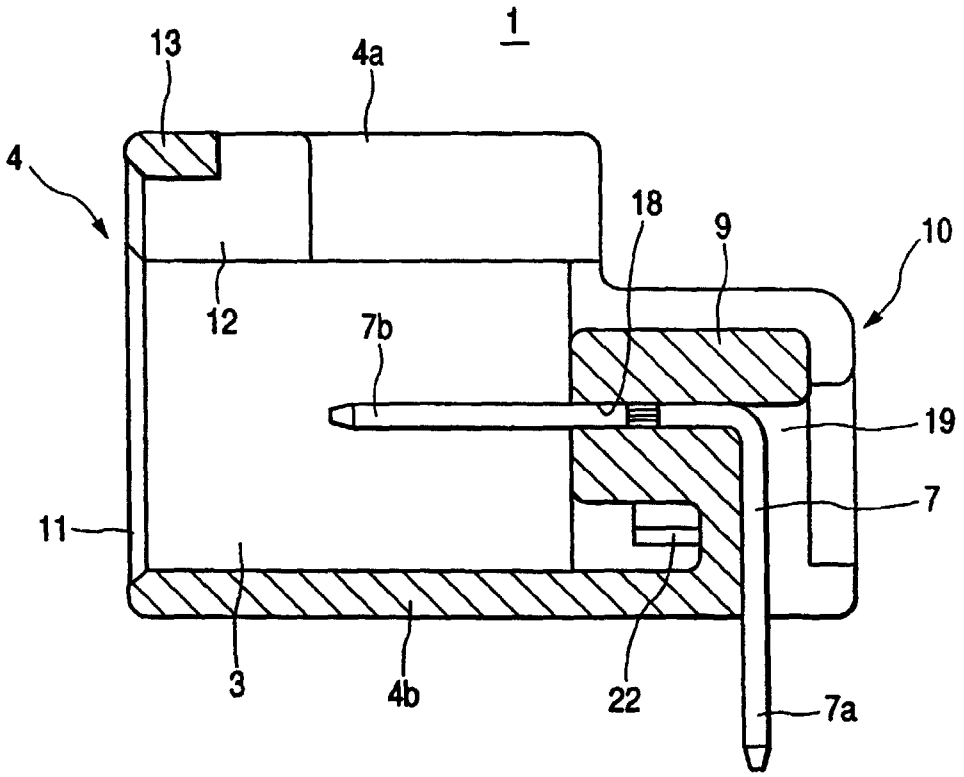

FIG. 8(a)

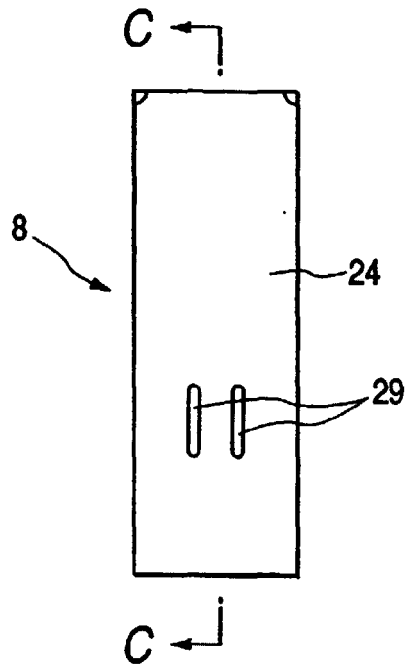


FIG. 8(b)

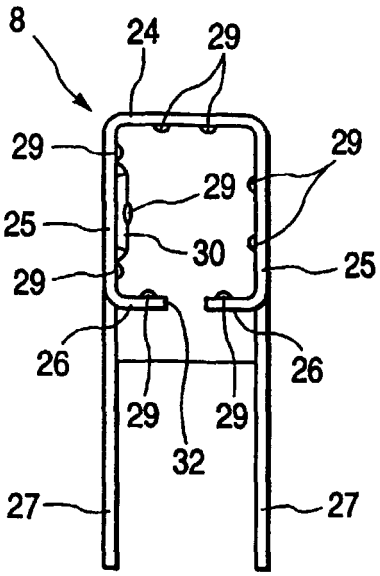


FIG. 8(c)

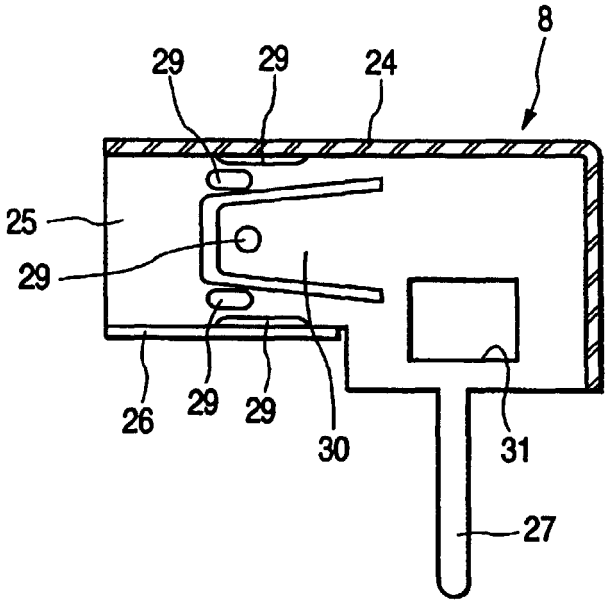

FIG. 9(a)

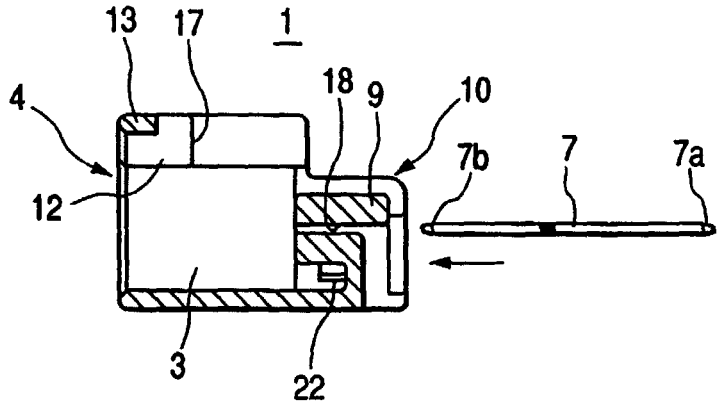


FIG. 9(b)

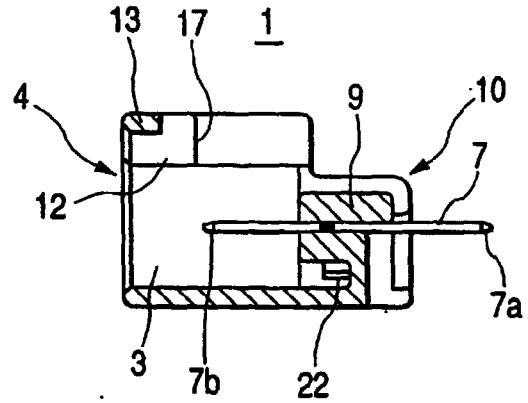


FIG. 9(c)

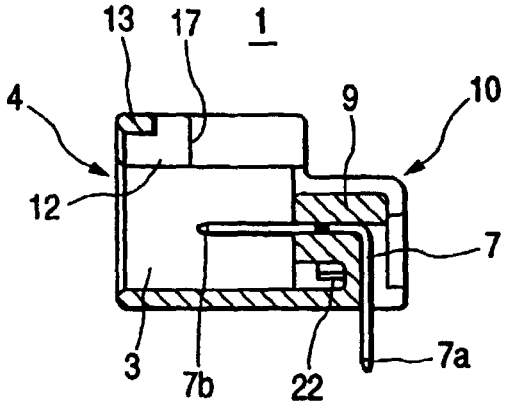

FIG. 10(a)

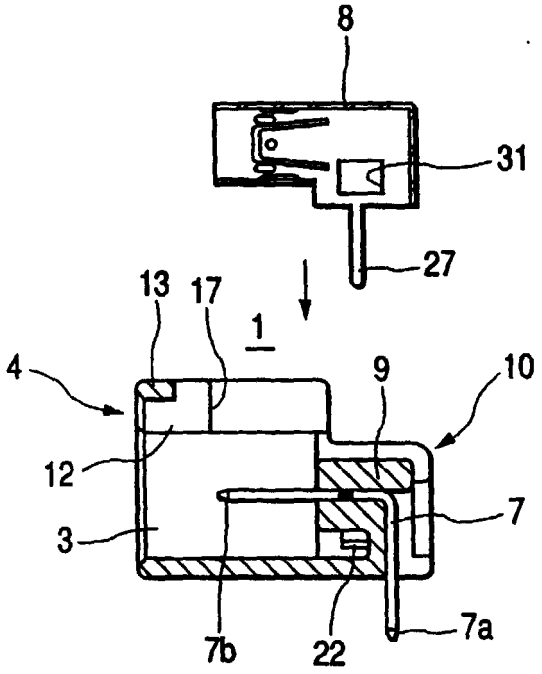


FIG. 10(b)

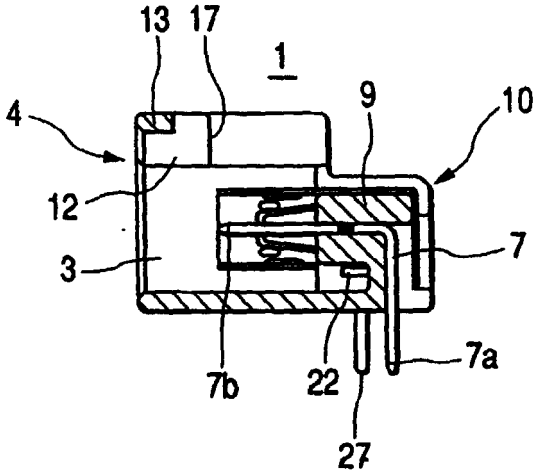

FIG. 11(a)


FIG. 11(b)

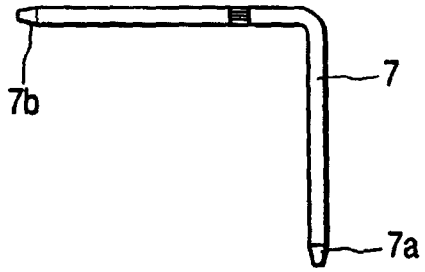


FIG. 12

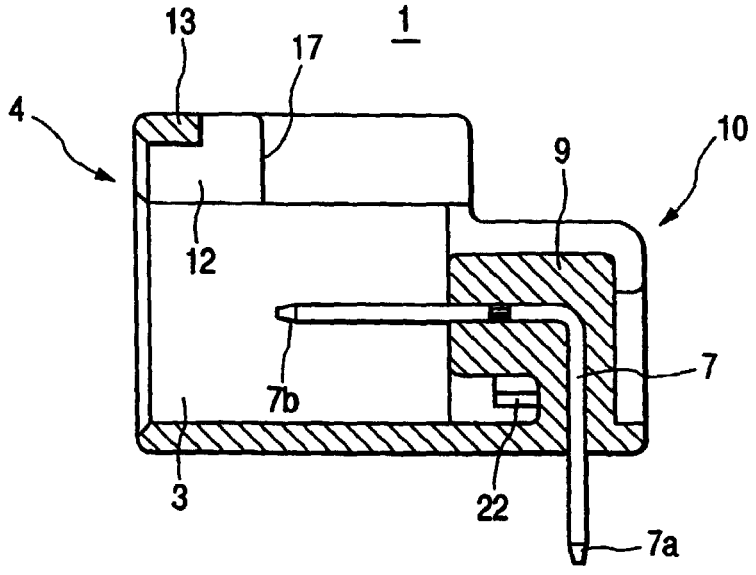

FIG. 13

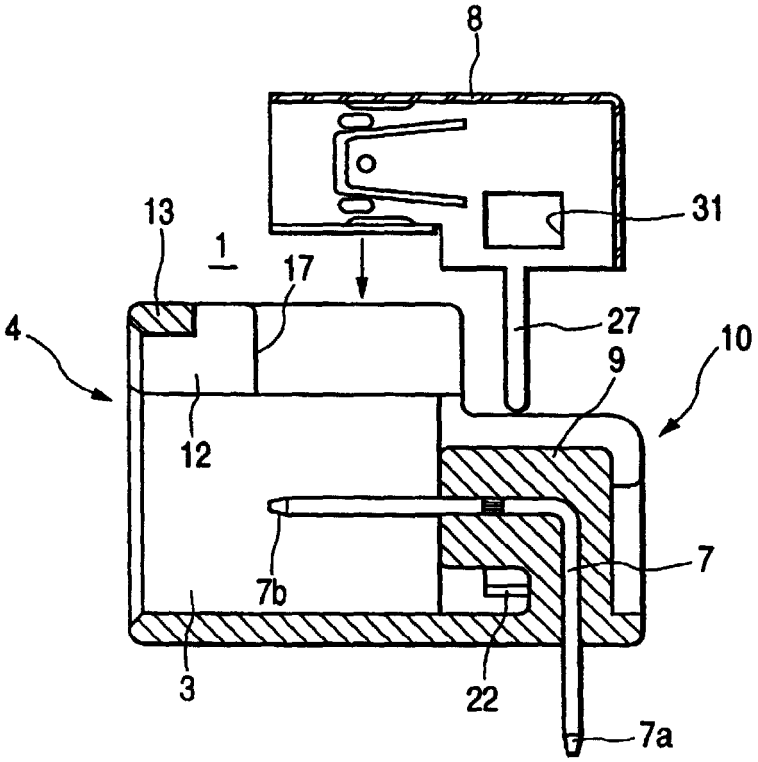
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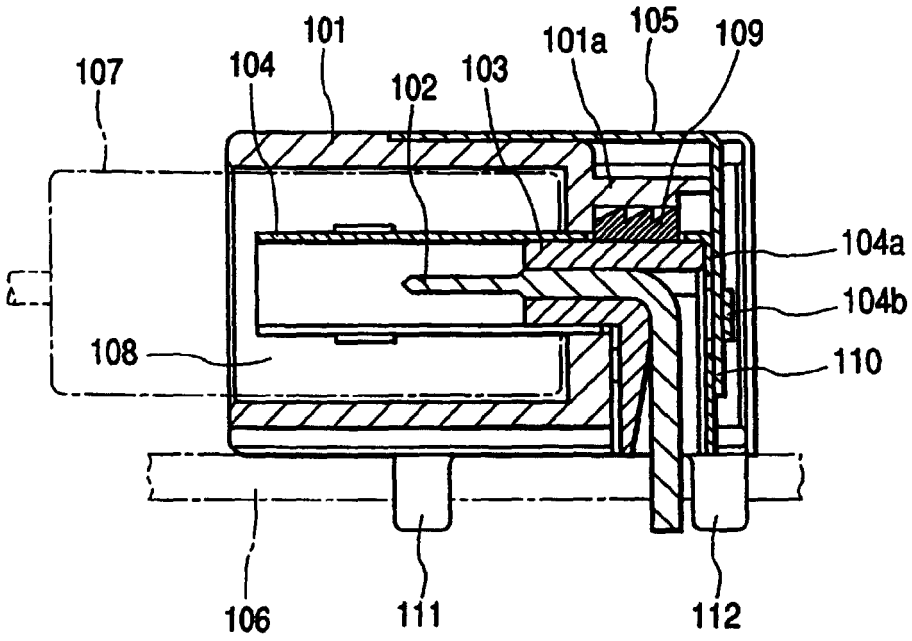
FIG. 14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# EUROPEAN SEARCH REPORT

Application Number
EP 00 30 6093

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| BERLIN | 17 October 2000 | Alexatos, G |

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