



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.09.2009 Bulletin 2009/36

(51) Int Cl.:
H01R 13/648 (2006.01)

(21) Application number: **09153089.9**

(22) Date of filing: **18.02.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

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(30) Priority: **28.02.2008 JP 2008048854**

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(54) **Card connector**

(57) A card connector (100) comprises a pair of guide portions (30) and a pair of ground lugs (90). Each of the ground lugs (90) comprises a held portion (91) and a contact tongue (92) extending from the held portion (91). The contact tongue (92) comprises a contact portion (97) to be brought into contact with an electrode (212) of a card (200). The guide portions (30) extend in a first direction. The guide portions (30) are configured to guide the card (200), respectively, along a second direction perpendicular to the first direction. Each guide portion (30)

comprises a hold portion (50) holding the held portion (91) and an accommodation portion (60) accommodating the contact tongue (92). Each accommodation portion (60) comprises a window (62) and a cover portion (64). The window (62) is arranged next to the cover portion (64) in a third direction perpendicular to the first direction and the second direction so that the contact portion (97) of the contact tongue (92) partially projects through the window (62) into a space (110) between the guide portions (30), while the contact portion (97) is partially covered by the cover portion (64) in the first direction.

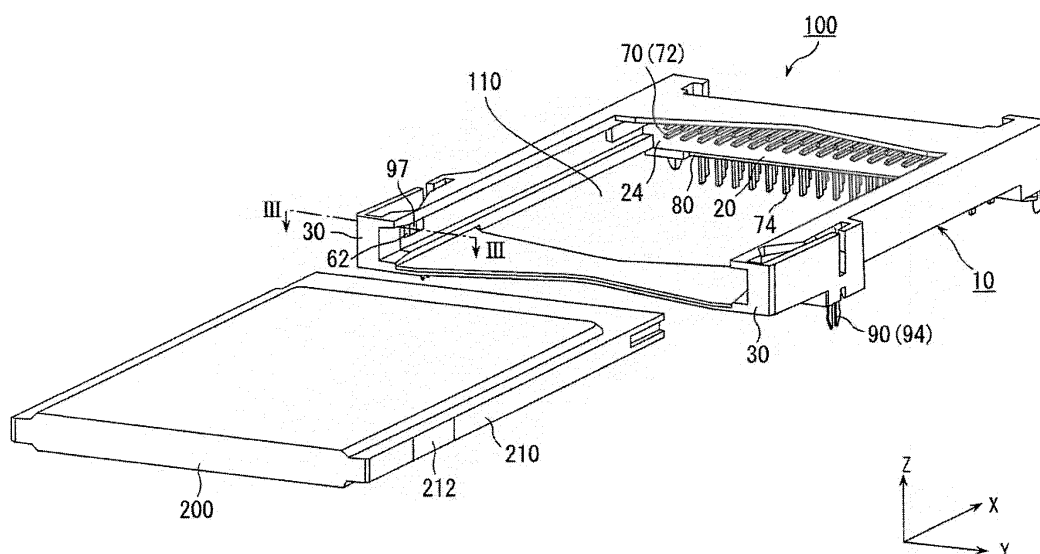


FIG. 1

Description

Background of the Invention:

[0001] This invention relates to a card connector to be electrically connected to a card, such as a PC card, a Compact Flash (CF) card or the like.

[0002] Card connectors of the above-mentioned type are disclosed in, for example, JP-A 2002-075560 and JP-A 2000-058197. Each of the disclosed card connectors comprises a pair of ground lugs and a space for receiving a card. The ground lugs are configured to be connected to ground contacts of the card, respectively.

[0003] However, each of the disclosed card connectors has a problem that the ground lugs may be deformed when a card is inserted into the card connector in an irregular manner, for example, with an unexpected insertion force.

Summary of the Invention:

[0004] It is an object of the present invention to provide a card connector that has a structure for preventing the ground lugs from being deformed.

[0005] An aspect of the present invention provides a card connector having a space for receiving a card. The card comprises two side surfaces and two electrodes formed on the side surfaces, respectively. The card connector comprises a pair of guide portions and a pair of ground lugs. Each of the ground lugs comprises a held portion and a contact tongue extending from the held portion. The contact tongue comprises a contact portion to be brought into contact with the electrode of the card. The guide portions are arranged so that the space is positioned between the guide portions in a first direction. The guide portions are configured to guide the side surfaces of the card, respectively, along a second direction perpendicular to the first direction. Each of the guide portions comprises a hold portion and an accommodation portion formed integrally with the hold portion. The hold portions hold the held portions of the ground lugs, respectively. The accommodation portions accommodate the contact tongues of the ground lugs, respectively. Each of the accommodation portions comprises a window and a cover portion. The window is arranged next to the cover portion in a third direction perpendicular to the first direction and the second direction so that the contact portion of the contact tongue partially projects into the space through the window, while the contact portion is partially covered by the cover portion in the first direction.

Brief Description of the Drawings:

[0006] Fig. 1 is a perspective view showing a card connector according to a first embodiment of the present invention.

[0007] Fig. 2 is an exploded, perspective view showing

the card connector of Fig. 1.

[0008] Fig. 3 is a partial, cross-sectional view showing the card connector of Fig. 1, taken along lines III--III.

[0009] Fig. 4 is a top view showing a part of the card connector of Fig. 3.

[0010] Fig. 5 is a cross-sectional view showing the card connector of Fig. 4, taken along lines V--V.

[0011] Fig. 6 is a partial, perspective view showing the card connector of Fig. 1, wherein a part of the card connector is cut away along lines Fig. 6 VI--VI.

Description of the Referred Embodiments:

[0012] With reference to Fig. 1; a card connector 100 according to a first embodiment of the present invention has an opening and a space 110 for receiving a card 200, for example, a PC card or the like. The opening is positioned at a front end of the card connector 100. The card 200 is inserted into the space 110 through the opening along an X-direction. The card 200 has two side surfaces 210 on which electrodes 212 are formed, respectively.

[0013] The card connector 100 electrically connects the card 200 to a circuit board (not shown). The card connector 100 comprises an insulation frame 10, a plurality of contacts 70, a locator 80 and a pair of ground lugs 90.

[0014] With reference to Figs. 1 and 2, the insulation frame 10 comprises a base portion 20, a pair of guide portions 30 and a connection portion 40. The guide portions 30 extend in the X-direction and are arranged so that the space 110 of the card connector 100 is positioned between the guide portions 30 in a Y-direction. Each of the guide portions 30 has a front end portion and a back end portion in the X-direction. The base portion 20 connects the back end portions of the guide portions 30. The connection portion 40 connects the front end portions of the guide portions 30. The base portion 20 is formed with hold holes 22.

[0015] As shown in Fig. 2, each of the guide portions 30 comprises an upper portion 34, a lower portion 36 and a guide wall 32. The guide wall 32 has an upper end and a lower end in a Z-direction. The upper portion 34 extends from the upper end of the guide wall 32 to the space 110. The lower portion 36 extends from the lower end of the guide wall 32 to the space 110. The guide wall 32, the upper portion 34 and the lower portion 36 define a guide groove 38. The guide groove 38 has an angular U-like shape in cross section in a Y-Z plane and guides one of the side surfaces 210 of the card 200. The guide groove 38 allows the card 200 to be inserted into or ejected from the space 110 along the X-direction.

[0016] The connection portion 40 has a thin plate-like shape and connects the lower portions 36 of the guide portions 30.

[0017] Each of the contacts 70 has a horizontal portion 72 and a vertical portion 74 so that the contact 70 has an L-like shape. The horizontal portions 72 is inserted into and held by the hold holes 22 of the base portion 20,

respectively, so that the horizontal portions 72 extend into the space 110 of the card connector 100 while the vertical portions 74 extend downward in the Z-direction.

[0018] The locator 80 is formed with a plurality of positioning holes 82. The vertical portions 74 are inserted into and held by the positioning holes 82, respectively. In this embodiment, the locator 80 is attached to and held by the insulation frame 10. The locator 80 is positioned in the vicinity of the back ends of the guide portions 30 in the X-direction.

[0019] With reference to Fig. 2, each of the ground lugs 90 comprises a held portion 91 and a contact tongue 92 extending forward from the held portion 91. The held portion 91 is provided with an engage tongue 93 and an engage fork 94. The engage tongue 93 is skewed inward. In other words, the engage tongue 93 extends obliquely to the Y-direction and the Z-direction. The engage fork 94 extends downward in the Z-direction. Each of the contact tongues 92 has a first portion 95, a second portion 96 and a contact portion 97. The contact portion 97 is positioned between the first portion 95 and the second portion 96. In detail, the first portion 95 extends forward and inward from the held portion 91 to the contact portion 97. In other words, the first portion 95 extends obliquely to the X-direction and the Y-direction. The second portion 96 extends forward and outward from the contact portion 97. In other words, the second portion 96 extends obliquely to the X-direction and the Y-directions. With this structure, the contact portion 97 is positioned within the space 110 so that the contact portion 97 can be brought into contact with the electrode 212 of the card 200.

[0020] With reference to Figs. 2 to 6, each of the guide portions 30 has a hold portion 50 and an accommodation portion 60. The accommodation portion 60 is formed integrally with the hold portion 50. The accommodation portion 60 accommodates the contact tongue 92. The hold portion 50 holds the held portion 91. The hold portion 50 has a recess recessed toward the space 110. The recess serves as an engaged portion 52 with which the engage tongue 93 of the ground lug 90 is engaged. The hold portion 50 further has a bottom portion 50a. The bottom portion 50a is formed with a hole 54. As shown in Fig. 5, the held portion 91 of the ground lug 90 is provided with a press-fit portion 91a and a bottom end 91b.

[0021] The held portion 91 is pushed into the hold portion 50 until the bottom end 91b of the held portion 91 is brought into contact with the bottom portion 50a of the hold portion 50 while the engage fork 94 is inserted into the hole 54. The press-fit portion 91a is pressly-fitted in the hold portion 50 so that the held portion 91 of the ground lug 90 is fixed to the hold portion 50 of the guide portion 30. When the held portion 91 is inserted into the hold portion 50, the engage tongue 93 is pushed outwardly in the Y-direction by an inner wall of the hold portion 50. The engage tongue 93 is temporarily deformed. When an end portion of the engage tongue 93 is positioned on the engaged portion 52, the deformed engage tongue 93 recovers its original shape so that the engage

tongue 93 is engaged with the engaged portion 52. Thus, the hold portion 50 can securely hold the held portion 91 by the engage tongue 93 and the press-fit portion 91a.

[0022] With reference to Figs. 3 to 6, the accommodation portion 60 of the present embodiment has a window 62 and a cover portion 64. The window 62 is arranged at a position next to and above the cover portion 64 in the Z-direction. The contact portion 97 has an upper portion 97b and a lower portion 97a. When the held portion 91 of the ground lug 90 is held by the hold portion 50, only the lower portion 97a projects into the guide groove 38 through the window 62. In other words, the lower portion 97a projects in the space 110, while the upper portion 97b is covered by the cover portion 64 in the Y-direction.

[0023] As shown in Figs. 5 and 6, the cover portion 64 of the present embodiment is formed as a part of the upper portion 34 of the guide groove 38. The cover portion 64 comprises a guard portion 64b and a support portion 64a.

[0024] The guard portion 64b is formed near the front end of the guide portion 30. In other words, the guard portion 64b is positioned closer to the opening of the card connector 100 than the contact portion 97 in the X-direction. With this structure, the guard portion 64b prevents the second portion 96 of the contact tongue 92 from being deformed by an irregular card insertion.

[0025] The support portion 64a is positioned farther from the opening than the contact portion 97 in the X-direction. With this structure, even when the card 200 is inserted into the card connector 100 in an irregular direction, the support portion 64a can support the contact tongue 92 of the ground lug 90. Therefore, a deformation of the contact tongue 92 can be prevented. In other words, the support portion 64a of the cover portion 64 restricts a backward movement of the contact portion 97 in the X-direction.

[0026] The cover portion 64 may cover only a part of the upper portion 97b. However, it is preferable that the cover portion 64 covers not a part of the upper portion 97b but the whole of the upper portion 97b so that the cover portion 64 is strengthened and the deformation of the contact tongue 92 can be securely prevented.

[0027] In addition, the cover portion 64 of the present embodiment is formed above the window 62 in the Z-direction. In other words, the cover portion 64 of the present embodiment is formed as a part of the upper portion 34 of the guide portion 30. The cover portion 64 may be formed under the window 62. In other words, the cover portion 64 may be formed as a part of the lower portion 36 of the guide portion 30. The cover portion 64 may also be formed above and under the window 62. In other words, the cover portion 64 may be formed as parts of both the upper portion 34 and the lower portion 36 of the guide portion 30.

Claims

1. A card connector (100) having a space (110) for receiving a card (200), the card (200) comprising two side surfaces (210) and two electrodes (212) formed on the side surfaces (210), respectively, wherein the card connector (100) comprises a pair of guide portions (30) and a pair of ground lugs (90), each of the ground lugs (90) comprising a held portion (91) and a contact tongue (92) extending from the held portion (91), the contact tongue (92) comprising a contact portion (97) to be brought into contact with the electrode (212) of the card (200), the guide portions (30) being arranged so that the space (110) is positioned between the guide portions (30) in a first direction, the guide portions (30) being configured to guide the side surfaces (210) of the card (200), respectively, along a second direction perpendicular to the first direction, each of the guide portions (30) comprising a hold portion (50) and an accommodation portion (60) formed integrally with the hold portion (50), the hold portions (50) holding the held portions (91) of the ground lugs (90), respectively, the accommodation portions (60) accommodating the contact tongues (92) of the ground lugs (90), respectively, each of the accommodation portions (60) comprising a window (62) and a cover portion (64), the window (62) being arranged next to the cover portion (64) in a third direction perpendicular to the first direction and the second direction so that the contact portion (97) of the contact tongue (92) partially projects into the space (110) through the window (62), while the contact portion (97) being partially covered by the cover portion (64) in the first direction.
2. The card connector (100) according to claim 1, wherein the card connector (100) further comprises an opening through which the card (200) is inserted into the space (110), at least a part of the cover portion (64) being positioned farther from the opening than the contact portion (97) in the second direction.
3. The card connector (100) according to claim 1, wherein each of the contact tongues (92) further comprises a first portion (95) and a second portion (96), the first portion (95) connecting the held portion (91) and the contact portion (97), the second portion (96) extending from the contact portion (97) obliquely to the first direction and the second directions, the cover portions (64) comprising support portions (64a), respectively, each of the support portions (64a) supporting a part of the first portion (95) in the first direction.
4. The card connector (100) according to claim 3, wherein the cover portions (64) further comprise guard portions (64b), respectively, each of the guard portions (64b) guarding a part of the second portion (96) in the first direction.
5. The card connector (100) according to any one of claims 1 to 4, wherein each of the guide portions (30) comprises an upper portion (34), a lower portion (36) and a guide wall (32) having an upper end and a lower end, the upper portion (34) extending toward the space (110) from the upper end of the guide wall (32), the lower portion (36) extending toward the space (110) from the lower end of the guide wall (32), the guide wall (32), the upper portion (34) and the lower portion (36) define a guide groove (38) which guides one of the side surface (210) of the card (200), the cover portion (64) being formed as a part of at least one of the upper portion (34) and the lower portion (36).
6. The card connector (100) according to any one of claims 1 to 5, wherein the held portion (91) further comprises an engaging tongue (93) skewed upward, the hold portion (50) comprising an engaged portion (52) with which the engaging tongue (93) is engaged.

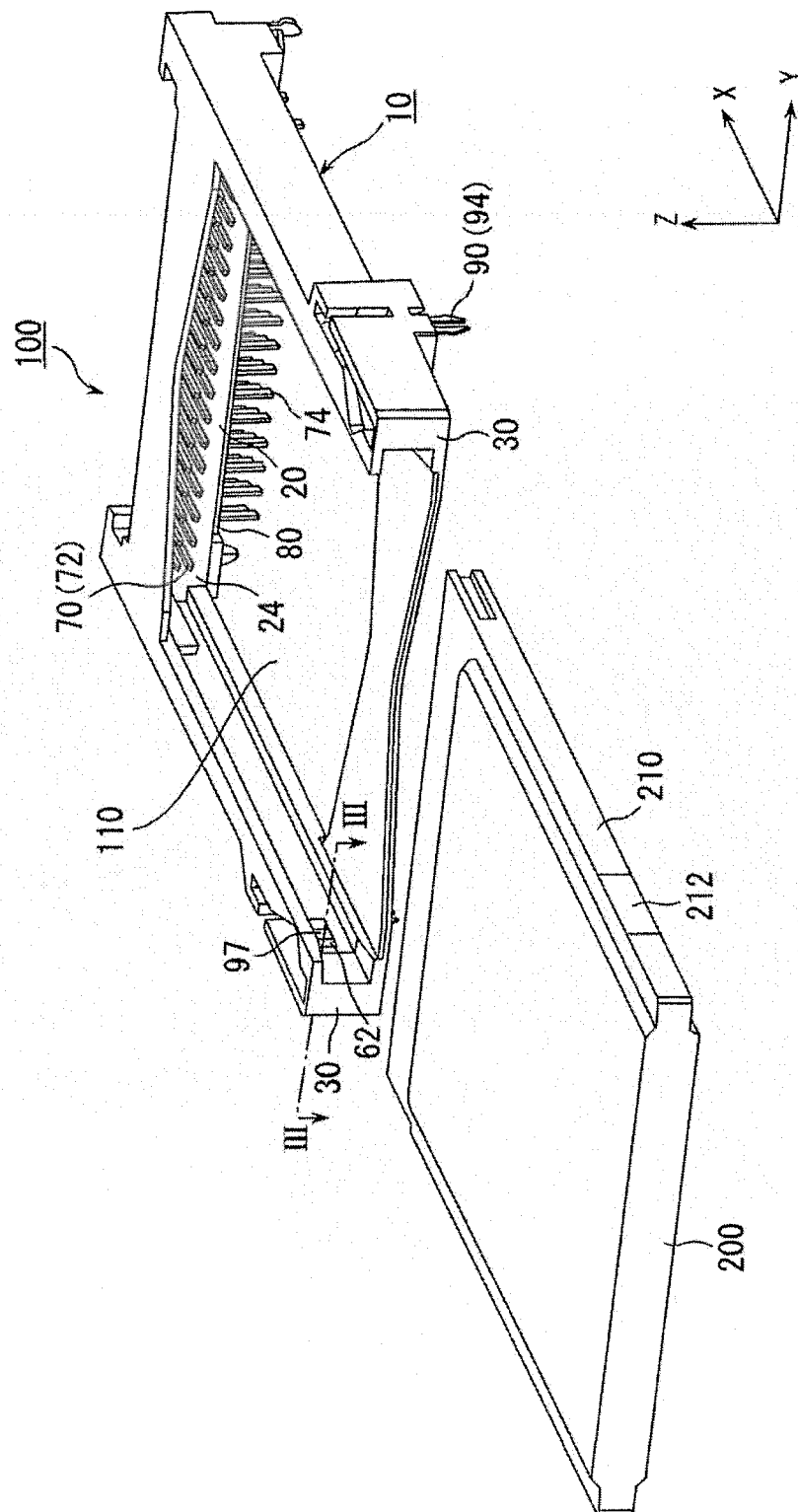


FIG. 1

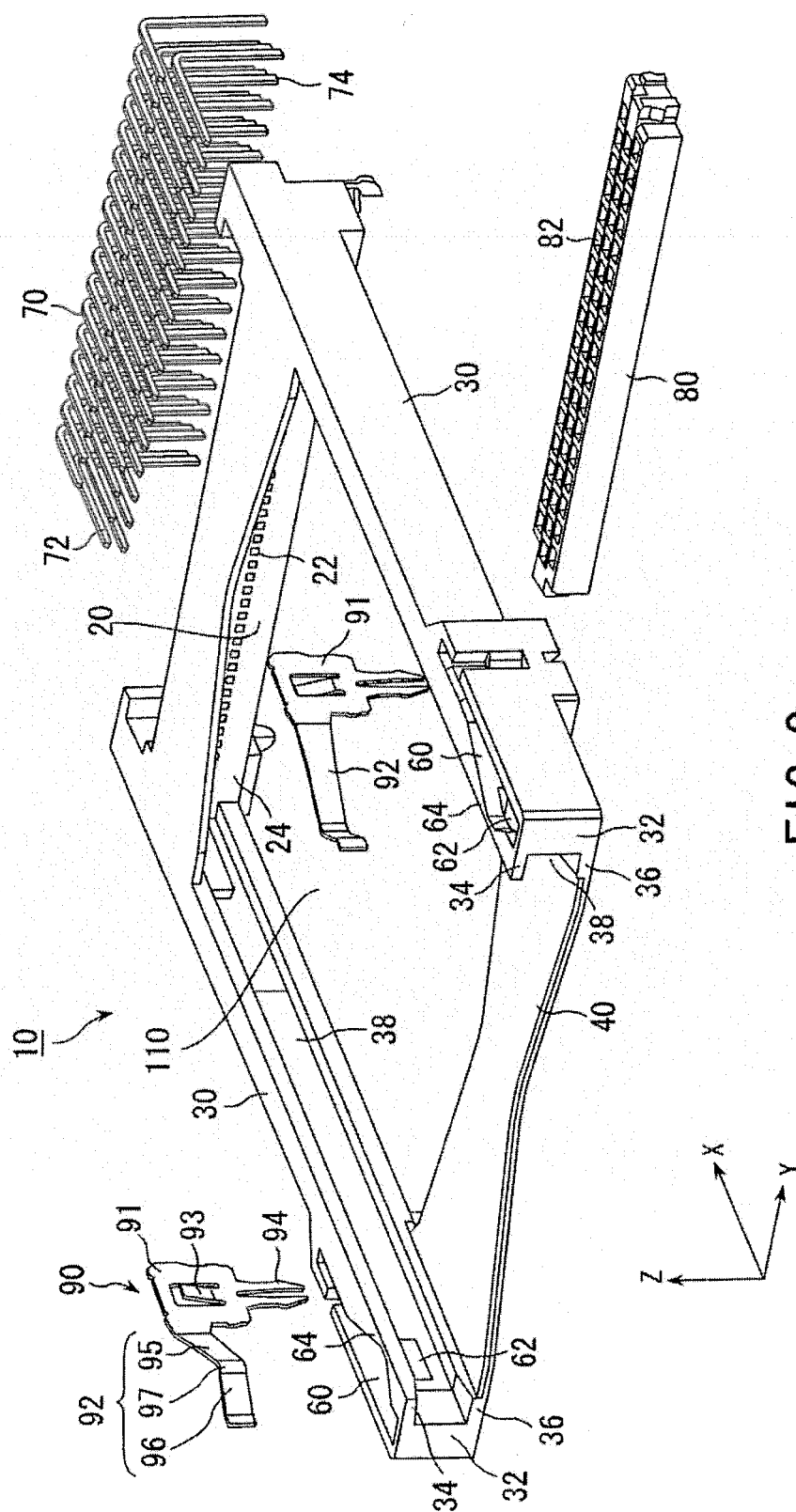


FIG. 2

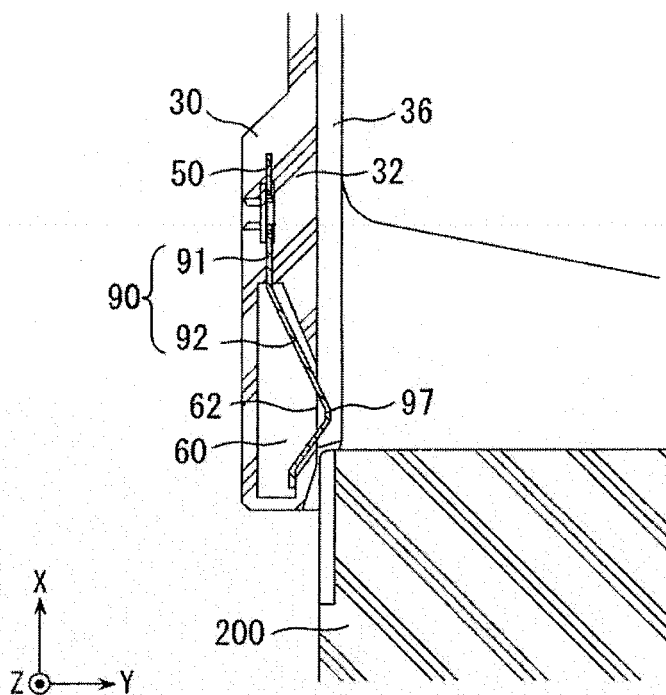


FIG. 3

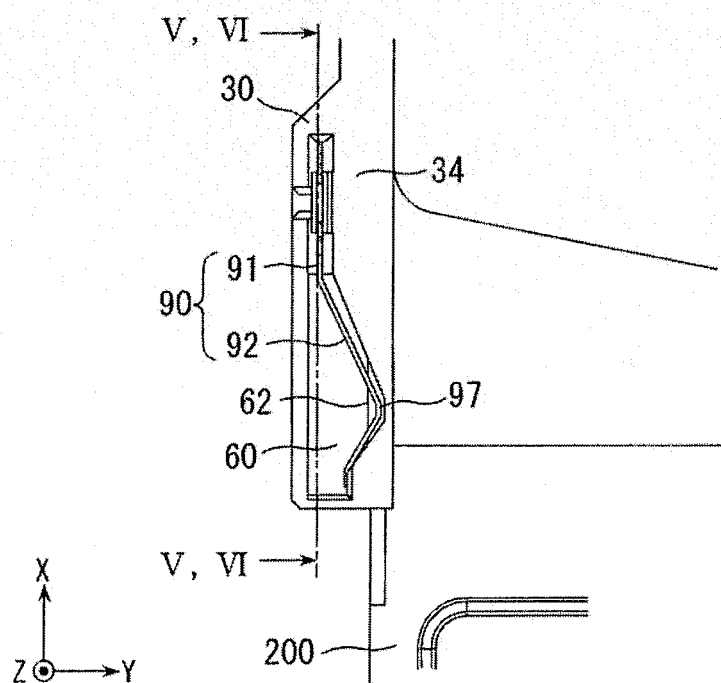


FIG. 4

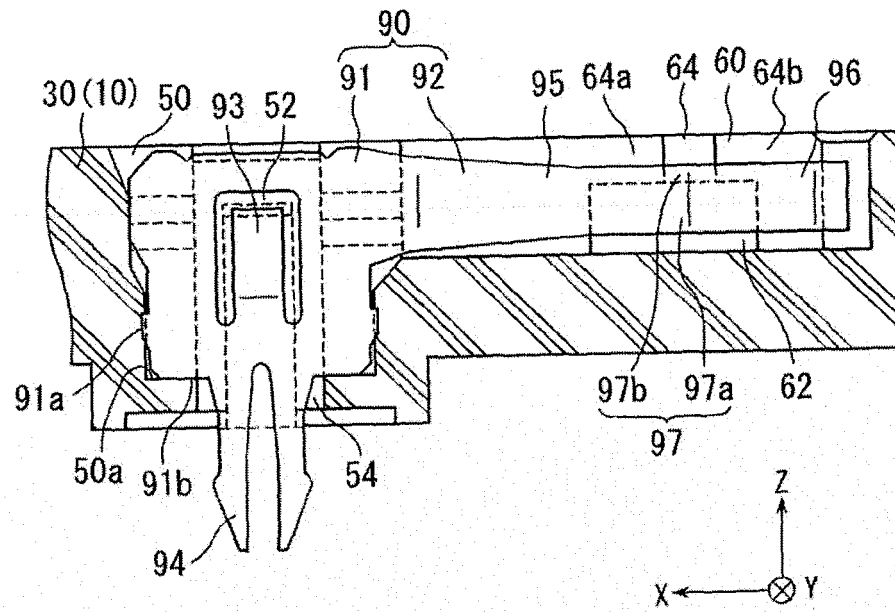


FIG. 5

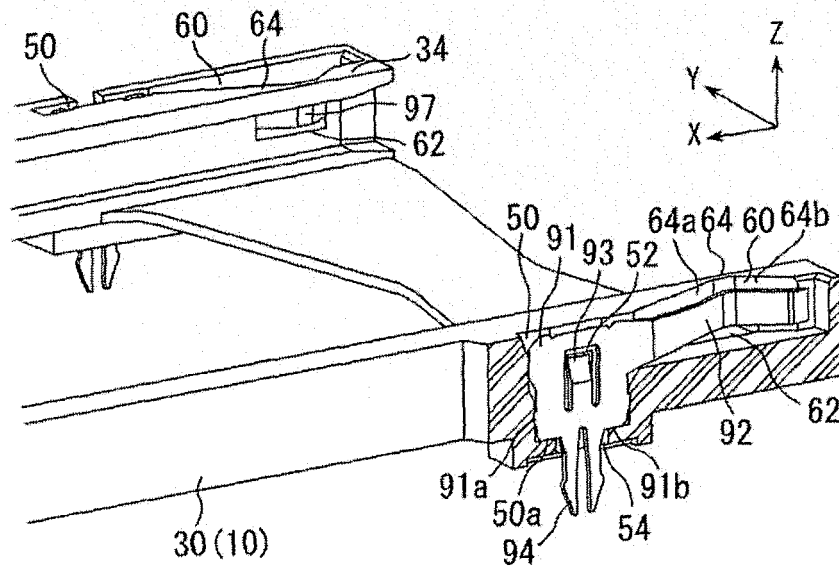


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 3089

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Place of search Munich		Date of completion of the search 13 July 2009	Examiner Serrano Funcia, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 15 3089

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