Trial Decision

Invalidation No. 2015-800030

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The case of trial regarding the invalidation of Japanese Patent No. 5449597, entitled "Contact Terminal" between the parties above has resulted in the following trial

decision.

Conclusion

The correction of the scope of claims of Japanese Patent No. 5449597 shall be approved as described in the corrected scope of claims attached to the written correction request, as for Claims 1 and 2 after correction.

The patent regarding the inventions according to Claims 1 and 2 of Japanese Patent No. 5449597 shall be invalidated.

The costs in connection with the trial shall be borne by the Demandee.

Reason

No. 1 Outline of the case

The Demandee is the patentee of Japanese Patent No. 5449597 (hereinafter, referred to as "the Patent", number of claims: 2). The present case is a case in which the Demandant requests that the patent for the invention according to Claims 1 and 2 of Japanese Patent No. 5449597 should be invalidated.

No. 2 History of the procedures

The outline of history of the procedures relating to the Patent is as follows.

Filing of the Patent	April 19, 2013
(The application according to the Patent is a divisional application filed on April 19, 2013 from Japanese Application No. 2011-271985 filed on December 13, 2011 (Priority claim: September 5, 2011 (hereinafter, referred to as "the priority date").)	
Explanation of circumstances concerning accelerated examination	October 11, 2013
Written amendment	October 11, 2013
Notice of reasons for refusal (drafting date)	October 25, 2013
Written opinion/written amendment	November 8, 2013
Registration	January 10, 2014
Publication of the Gazette containing the patent (Japanese Patent No. 5449597)	March 19, 2014

Demand for trial regarding the invalidation	February 19, 2015
Written amendment (Demandant)	March 11, 2015
Written reply (Demandee)	May 25, 2015
Notification of matters to be examined	June 23, 2015
Oral proceedings statement brief (Demandant)	August 10, 2015

Oral proceedings statement brief (Demandee)	August 10, 2015
Written statement (Demandant)	August 12, 2015
Written statement (Demandee)	August 24, 2015
Oral proceedings	August 24, 2015
Written statement (Demandant)	September 18, 2015
Written statement (Demandee)	September 18, 2015
Advance notice of trial decision	February 12, 2016
Request for correction	April 18, 2016
Notice of conclusion of trial proceedings	July 27, 2016

No. 3 Judgment by the body on suitability of the correction

1 Contents of correction

The request for correction dated April 18, 2016 (hereinafter, referred to as "the correction of the case") requests to correct the scope of claims (at the time of registration) attached to the application as the corrected scope of claims attached to the written correction request, for each group of claims, and specifically consists of the following Corrections A to C.

Hereinafter, the specification attached to the application may be referred to as "the Specification"), and the specification, the scope of the claims for patent, and drawings attached to the application may be referred to as "the Specification, etc.".

(1) Correction A

"A pressing member" of Claim 1 of the scope of claims is corrected to "a ball".

(2) Correction B

"A received coil spring" of Claim 1 of the scope of claims is corrected to "a received coil spring with an insulator film".

(3) Correction C

"The contact terminal according to Claim 1, wherein the pressing member is composed of an insulation ball including an insulation surface" of Claim 2 of the scope of claims is corrected to "a contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a

tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case,

wherein a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case, and

wherein the pressing member is composed of an insulation ball including an insulation surface".

2 Judgment on suitability of the correction

(1) Regarding Correction A

Correction A corrects the description of "a pressing member" to "a ball," thereby correcting the description of "a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin" in Claim 1 before the correction of the case to "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin".

A Although the term "a pressing member" was deleted by the correction of the case, it is understood that "a spherical portion consisting of a spherical surface of a ball" is still "pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin," and "an outer surface of the large diameter portion" of "the plunger pin" is "pressed against the tubular inner peripheral surface of the main body case".

Therefore, since it can be said that Correction A limits a shape of "a pressing member" before the correction of the case, it is recognized that the correction of the case is for the purpose of the matters (restriction of the scope of claims) provided in Article 134-2(1)(i) of the Patent Act.

B Next, in [Claim 1] of the scope of claims attached to the application, it is described that "a contact terminal, wherein a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an

approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," and a member "pressed by the coil spring" and "pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the main body case" is described as "a pressing member".

C Furthermore, in Paragraph [0028] of the Specification, it is described that "The coil spring 31 is a compression spring. A position of one of the end portions of the coil spring 31 is stabilized by the insulation ball 30. Meanwhile, when the coil spring 31 is compressed from both end portions thereof, the center axis of the coil spring 31 is slightly warped. Accordingly, the plunger pin 20 is pressed via the insulation ball 30 by the coil spring 31 in a direction that makes a minute angle with the center axis of the main body case 11. Thereby, the large diameter portion 22 of the plunger pin 20 is securely contacted with the inner surface of the elongate hole 13, and at this time, the contact pressure is not excessively raised," and in Paragraph [0033], it is described that "Preferably, the center axis of the oblique surface 24 is shifted from the center axis of the plunger pin 20. In the present embodiment, as illustrated in FIG. 3(b), the center axis M2 of the oblique surface 24 and the center axis of the pit hole 23 are shifted from the center axis M1 of the plunger pin 20. Thereby, a direction of pressing the plunger pin 20 by the coil spring 31 reliably makes a minute angle with the center axis of the plunger pin 20. For this reason, the large diameter portion 22 can be pressed against the inner surface of the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11". Accordingly, the Specification describes that "the large diameter portion 22 of the plunger 20 is pressed against the inner surface of the elongate hole 13 by the coil spring 31" via "the insulation ball 30".

D In comparison of B above and C above, it can be said that the description of [Claim 1] of the scope of claims attached to the application discloses technical knowledge that a member "pressed by the coil spring" and "pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the main body case" is not limited to "an insulation ball 30" described in the Specification, but may be "a pressing member", which discards both electrical characteristics (insulation) and a shape (ball) from "the insulation ball 30".

E In that case, it is a correction within a range of the above-mentioned technical

knowledge that "a pressing member" described in [Claim 1] of the scope of claims attached to the application is limited to "a ball" only in terms of shape, and it can be said that Correction A is made within the scope of matters described in the Specification, etc. (the specification, the scope of the claims for patent, or drawings).

F Further, Correction A does not substantially enlarge or alter the scope of claims.

G Therefore, it is recognized that Correction A falls under the provisions of Articles 126(5) and (6) of the Patent Act which are applied mutatis mutandis pursuant to Article 134-2(9) of the Patent Act.

(2) Regarding Correction B

Since Correction B limits "a received coil spring" described in Claim 1 before the correction of the case to "a received coil spring with an insulator film," it is described that it aims at the matter (restriction of the scope of claims) prescribed in Article 134-2(1)(i) of the Patent Act.

Further, since in Paragraph [0025] of the Specification attached to the application, it is described that "Against the insulation ball 30, one end portion of a coil spring 31 which is a compression spring is contacted....(Omitted)...Further, an insulator film may be provided on the coil spring 31," it can be said that Correction B is made within the scope of matters described in the Specification, etc.

Also, Correction B does not substantially enlarge or alter the scope of claims.

Therefore, it is recognized that Correction B falls under the provisions of Articles 126(5) and (6) of the Patent Act which are applied mutatis mutandis pursuant to Article 134-2(9) of the Patent Act.

(3) Regarding Correction C

Since Correction C corrects a description which is dependent on Claim 1 before the Amendment to a description which is not dependent on Claim 1, for Claim 2 before the correction of the case, it aims at the matter prescribed in Article 134-2(1)(iv) of the Patent Act.

Further, since Correction C is made within the scope of matters described in the Specification, etc., and does not substantially enlarge or alter the scope of claims, it is recognized that it falls under the provisions of Articles 126(5) and (6) of the Patent Act which are applied mutatis mutandis pursuant to Article 134-2(9) of the Patent Act.

(4) Summary relating to correction

As described above, the correction of the case is a correction requested for each group of claims, aims at the matters prescribed in Article 134-2(1)(i) (Corrections A and B), and (iv) (Correction C) of the Patent Act, and falls under the provisions of Article 126(5) and (6) of the Patent Act which are applied mutatis mutandis pursuant to Article 134-2(9) of the Patent Act.

Therefore, the correction of the case shall be approved.

No. 4 Matters described in claims relating to the Patent

The inventions according to Claims 1 and 2 of the scope of claims relating to the Patent after the correction of the case (hereinafter, referred to as " Corrected Invention 1 " and "Corrected Invention 2 ") are as follows, as specified by the matters described in Claims 1 and 2 of the corrected scope of claims.

(1) Corrected Invention 1 (Claim 1)

"A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring with an insulator film received in a tubular inside of the main body case so as to protrude out from the main body case, and

wherein a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case".

(2) Corrected Invention 2 (Claim 2)

"A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal

direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case,

wherein a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case, and

wherein the pressing member is composed of an insulation ball including an insulation surface".

No. 5 Outline of the reasons for invalidation alleged by the Demandant and the means of proof submitted by the Demandant

1 Reason for invalidation 1 (lack of inventive step)

Invention 1 and Invention 2 could have been easily invented by a person skilled in the art, based on the invention described in Evidence A No. 1 (hereinafter, referred to as "Invention A-1") and well-known arts (Evidence A No. 3 to Evidence No. 9) or invented by a person skilled in the art, based on the invention described in Evidence A No. 2 (hereinafter, referred to as "Invention A-2") and well-known arts (Evidence A No. 3 to Evidence No. 9). Therefore, the Appellant should not be granted a patent for Invention 1 and Invention 2 under the provisions of Article 29(2) of the Patent Act, and the Patent relating to Invention 1 and Invention 2 falls under Article 123(1)(ii) of the Patent Act and should be invalidated.

2 Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for amendment and violation of requirements for division)

Since the Patent relating to Invention 1 and Invention 2 was granted for a patent application that did not satisfy the requirements of Article 17(2)(iii) of the Patent Act, it falls under Article 123(1)(i) of the Patent Act and should be invalidated.

Further, since the application relating to the Patent does not satisfy the requirements prescribed in Article 44(1) of the Patent Act, it is not considered that the application relating to the Patent is made at the filing of the original patent application (Japanese Patent Application No. 2011-271985, hereinafter, may be referred to as "the original application"), and it is made on April 19, 2013 that is the actual filing date. Therefore, Invention 1 and Invention 2 are the inventions described in Evidence A No. 24, and fall under the invention of Article 29(1)(iii) of the Patent Act, and the Appellant

should not be granted a patent for them. Hence, the Patent relating to Invention 1 and Invention 2 falls under Article 123(1)(ii) of the Patent Act, and should be invalidated.

3 Means of proof
(Evidences submitted together with the written demand for trial)
Evidence A No. 1 (Japanese Unexamined Patent Application Publication No. 2004-179066)
Evidence A No. 2 (National Publication of International Patent Application No. 2006-501475)
Evidence A No. 3 (Japanese Unexamined Patent Application Publication No. 2002-40049)
Evidence A No. 4 (Japanese Unexamined Utility Model Application Publication No. S58-72668 and Microfilm thereof)
Evidence A No. 5 (Japanese Unexamined Utility Model Application Publication No. S62-76668 and Microfilm thereof)
Evidence A No. 6 (Japanese Unexamined Patent Application Publication No. H06-168756)
Evidence A No. 7 (Japanese Unexamined Patent Application Publication No. H06-61321)
Evidence A No. 8 (Japanese Unexamined Utility Model Application Publication No. H07-34375 and CD-ROM thereof)
Evidence A No. 9 (Japanese Unexamined Utility Model Application Publication No. H05-43076 and CD-ROM thereof)
Evidence A No. 10 (Explanation of circumstances concerning accelerated examination (October 11, 2013))
Evidence A No. 11 (Written amendment (October 11, 2013))
Evidence A No. 12 (Notification of reasons for refusal (issued on October 29, 2013))
Evidence A No. 13 (Written reply (November 8, 2013))
Evidence A No. 14 (Written amendment (November 8, 2013))
Evidence A No. 15 (Complaint: 2014 (Wa) 20422 the Patent right infringement injunction case)
Evidence A No. 16: (Plaintiff's first brief of December 16, 2014)
Evidence A No. 17 (United States Patent No. 8926376)
Evidence A No. 18 (United States Patent No. 6696850)
Evidence A No. 19 (United States Patent No. 4397519)
Evidence A No. 20 (Notification of reasons for refusal issued in the prosecution history of the corresponding U.S. patent application of the Patent (May 13, 2014))

Evidence A No. 21 (Written amendment submitted in the prosecution history of the corresponding U.S. patent application of the Patent (August 8, 2014))
Evidence A No. 22 (Written opinion submitted in the prosecution history of the corresponding U.S. patent application of the Patent (August 8, 2014))
Evidence A No. 23 (Written statement by Mr. MORI Shuhi who is an employee of the Demandee (December 2, 2014))
Evidence A No. 24 (Japanese Unexamined Patent Application Publication No. 2013-68593)

(Evidences submitted together with the oral proceedings statement brief)
Evidence A No. 25 (Interview record dated November 26, 2013)
Evidence A No. 26 (Patent Technology Terms Collection (3rd Edition))
Evidence A No. 27 (Tokyo District Court Judgment on October 16, 2013 (2010 (Wa) 15810)
Evidence A No. 28 (Intellectual High Court Judgment on September 12, 2007 (2006 (Ne) 10069)
Evidence A No. 29 (Osaka District Court Judgment on April 19. 2007 (2005 (Wa) 12207)
Evidence A No. 30 (Tokyo District Court Judgment on December 25, 2000 (2000 (Gyo-ke) 86)
Evidence A No. 31 (Copy of the drawings created by Mr. MORI Shuhi on August 24, 2011)
Evidence A No. 32 (Written statement of the specialist, Professor David Dawnfeld and its translation (replaced by the written statement dated August 12, 2015 (Demandant)))

No. 6 Demandee's allegation and means of proof submitted

The Demandee requested the trial decision, "The demand for trial of the case was groundless. The costs in connection with the trial shall be borne by the Demandant," and alleges as follows.

1 Regarding Reason for invalidation 1

The well-known arts (Evidence A No. 3 to Evidence A No. 9) cannot be applied to Invention A-1 or Invention A-2, and even if they can be applied, Corrected Invention 1 and Corrected Invention 2 cannot be configured.

Therefore, the Patent relating to Corrected Invention 1 and Corrected Invention 2 does not violate the provisions of Article 29(2) of the Patent Act, and thus it does not fall under Article 123(1)(ii) of the Patent Act and should not be invalidated.

2 Regarding Reason for invalidation 2

The Patent relating to Corrected Invention 1 and Corrected Invention 2 does not violate the requirements for amendment, and thus the Patent relating to Corrected Invention 1 and Corrected Invention 2 was not granted for a patent application that does not satisfy the requirements prescribed in Article 17-2(3) of the Patent Act. Thus, the Patent relating to Corrected Invention 1 and Corrected Invention 2 should not be invalidated under the provisions of Article 123(1)(i) of the Patent Act.

Further, since the application relating to the Patent satisfies the requirements prescribed in Article 44(1) of the Patent Act, it is considered that the application relating to the Patent was made at the filing of the original application. Therefore, the Patent relating to Corrected Invention 1 and Corrected Invention 2 does not violate the provisions of Article 29(1)(iii) of the Patent Act, and thus should not be invalidated under the provisions of Article 123(1)(ii) of the Patent Act.

3 Means of proof

(Evidences submitted together with the written reply)

Evidence B No. 1 (Demandee's Brief (4) (2014 (Wa) 20422 the Patent right infringement injunction case) (February 20, 2015))

Evidence B No. 2 (Demandee's Brief (2) (2014 (Wa) 20422 the Patent right infringement injunction case) (November 10, 2014))

(Evidences submitted together with the oral proceedings statement brief)

Evidence B No. 3 (Patent technology terms collection (engagement))

Evidence B No. 4 (Patent technology terms collection (locking))

Evidence B No. 5 (Japanese Unexamined Patent Application Publication No. S59-195164)

Evidence B No. 6 (Japanese Unexamined Patent Application Publication No. 2002-202323)

(Evidences submitted together with the written correction request)

Evidence B No. 9 (Court decision 2014 (Wa) 20422 (with view restriction))

Evidence B No. 10 (Japanese Unexamined Patent Application Publication No. 2011-27549)

Evidence B No. 11 (Japanese Unexamined Patent Application Publication No. 2010-266373)

Further, Reference Material 1 and Reference Material 2 (technical explanatory materials submitted as "Evidence B No. 7-1," "Evidence B No. 7-2" together with the oral proceedings statement brief, and a supplementary material of a technical explanatory material submitted as "Evidence B No. 8" together with the written statement dated August 24, 2015) are submitted as an attached document of the written statement dated August 24, 2015.

No. 7 Judgment on reasons for invalidation

In consideration of the case, judgement will be made in the order of Reason for invalidation 2 and Reason for invalidation 1.

Although a written amendment by the written amendment dated November 8, 2013 (Evidence A No. 14) on the application relating to the Patent amends the description that "a spherical portion of a pressing member at least partially having a spherical surface" to "a spherical portion consisting of a spherical surface of a pressing member," the amended part was corrected to "a spherical portion consisting of a spherical surface of a ball" by Correction A in the correction of the case.

Therefore, of Reason for invalidation 2 alleged by the Demandant, the reason for invalidation (addition of new matter) that the Patent falls under Article 123(1)(i) of the Patent Act and thus should be invalidated, became groundless.

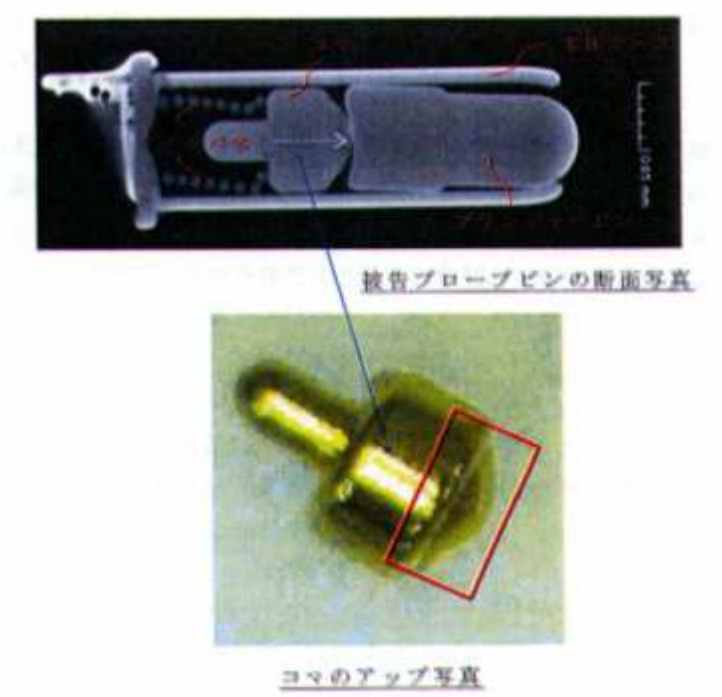
1 Regarding Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)

1-1 The Demandant's allegation (Written demand for trial, page 37, line 12-page 41, line 11) (A described part of the written demand for trial is based on the written demand for trial amended by the written amendment dated March 11, 2015), Oral proceedings statement brief, page 27, line 20-page 30, line 30, and Written statement dated September 18, 2015, page 10, lines 19-30 and Attached document to the Written statement)

A In order to solve the reason for invalidation (Evidence A No. 12) that "it is not recognized that 'a pressing member at least partially having a spherical surface' was also described in the original application," the Demandee, in the written amendment submitted on November 8, 2013 (Evidence A No. 14), amended the description of "a pressing member at least partially having a spherical surface" of Claim 1 to "a spherical portion consisting of a spherical surface of a pressing member," and abandoned "a pressing member at least partially having a spherical surface" from the technical scope thereof.

However, the Demandee, in separated lawsuits (Evidence A No. 15 and Evidence

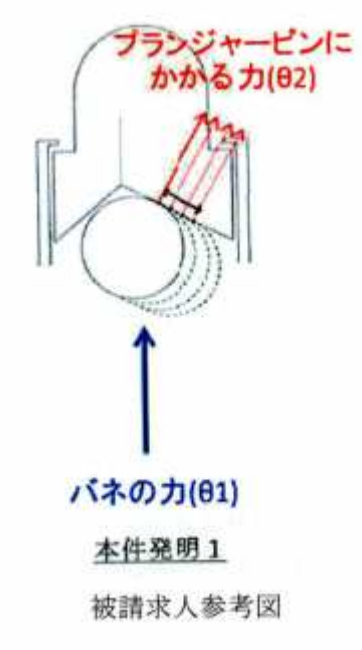
A No. 16), alleges that a pressing member having a comma-shape (See the following reference drawing) that is not spherical is included in the technical scope of "a pressing member" of Invention 1 (before the correction of the case) (Evidence A No. 15 and Evidence A No. 16).



被告プローブピンの断面写真　　Cross-sectional picture of Demandee's probe pin
コマのアップ写真　　Close-up picture of Comma shape

In that case, the technical scope of Invention 1 (before the correction of the case) includes "a pressing member at least partially having a spherical surface," and thus exceeds the acope of matters described in the scope of claims, the specification, or drawings originally at the filing of the original application of the application relating to the Patent (hereinafter, referred to as "the originally attached specification, etc. of the original application").

B　Also, regarding Invention 1 (before the correction of the case), the Demandee alleges that a pressing state of "a spherical portion consisting of a spherical surface of a pressing member" for an oblique recessed portion includes a pressing state such as "contacts only on one side of a cross-section of the oblique surface 24," as shown in the following reference drawing.



プランジャーピンにかかる力（θ２）　Force applied on a plunger pin (θ2)
バネの力（θ１）　Spring force (θ1)
本件発明１　Invention 1
被請求人参考図　Demandee's reference drawing

However, considering the descriptions of Paragraphs [0032] and [0033] of the originally attached specification of the present application, it is obvious that Invention 1 (before the correction of the case) intends to get an effect of certainly shifting a direction pressing the plunger 20 with the coil spring 31 from the center axis of the plunger pin 20, by offsetting the center axis of the oblique surface 24.

Therefore, since Invention 1 (before the correction of the case) may include the pressing state such as "contacts only on one side of a cross-section of the oblique surface 24" alleged by the Demandant, as the pressing state of a pressing member and a spherical portion consisting of a spherical surface of a pressing member, it obviously exceeds the scope of matters described in the originally attached specification, etc. of the original application.

C　Hence, Invention 1 and Invention 2 exceed the scope of the matters described in the originally attached specification, etc. of the original application.

Therefore, since the application relating to the Patent does not satisfy the requirements prescribed in Article 44(1) of the Patent Act, it is not considered to have been filed at the time of the original patent application, and the filing date of the

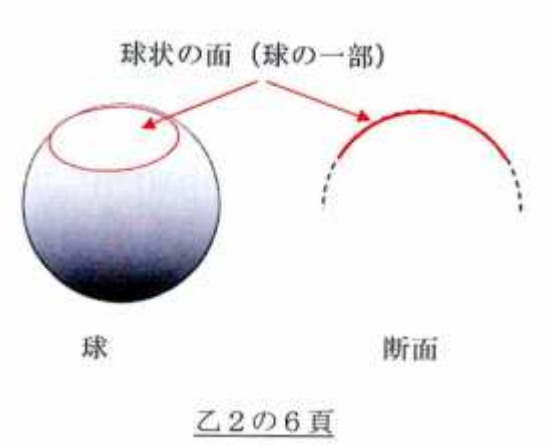
application relating to the Patent is April 19, 2013 that is the actual filing date.

Then, since Invention 1 and Invention 2 are inventions described in the publication of the unexamined original application (Evidence A No. 24), they fall under the inventions of Article 29(1)(iii) of the Patent Act, and the Appellant should not be granted a patent for them. The Patent relating to Invention 1 and Invention 2 falls under Article 123(1)(ii) of the Patent Act, and should be invalidated.

1-2 The Demandee's allegation

(1) The allegation before the correction of the case (Written reply, page 21, line 1-page 22, line 21, Oral proceedings statement brief, page 6, line 12-page 11, line 29, and Written statement dated September 18, 2015, page 10, lines 1-16 and Attached document to the Written statement)

A Concerning "A spherical portion consisting of a spherical surface of a pressing member" of Claim 1 (before the correction of the case) of the Patent, in light of the meaning of a normal term, "pressing member" is satisfied so long as it partially has a spherical surface, and is not limited to a sphere. Then, in [0009], [0024], [FIG. 2], [FIG. 4] and the like of the Specification, "a sphere" is disclosed. The fact that "sphere" is disclosed means that "spherical surface" which means a part of "sphere" is also disclosed (see the below figure on page 6 of Evidence B No. 2).



球状の面（球の一部） Spherical surface (a part of a ball)

球 Ball

断面 Cross-section

乙２の６頁 Page 6 of Evidence B No. 2

Therefore, as long as "a ball" is disclosed in the initial specification, etc. of the application relating to the Patent, it can be said that "a spherical surface" configuring a

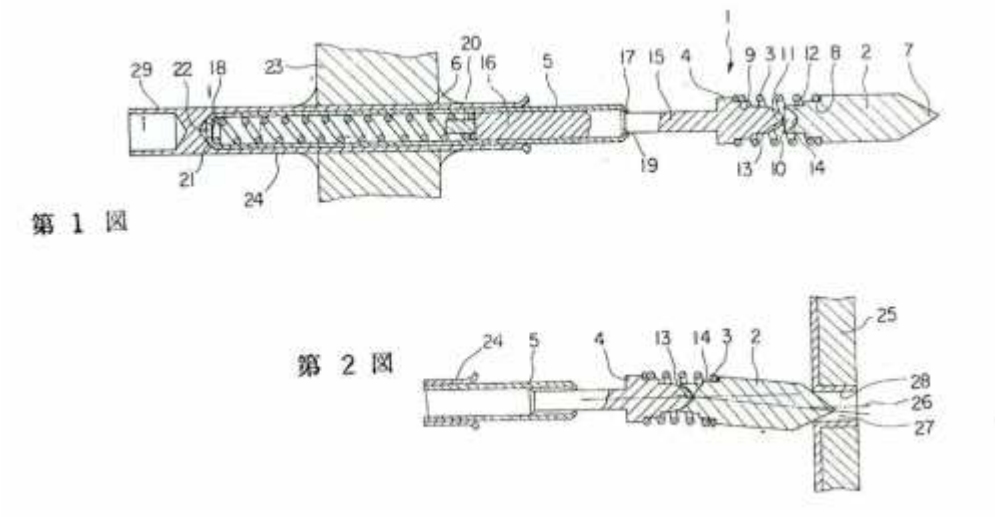
part of "a sphere" is a matter that is explicitly disclosed, so that "a spherical portion consisting of a spherical surface of a pressing member" is an explicitly described matter.

B Invention 1 (before correction) is not an invention essentially characterized in that the pressing member is "a sphere". That is, in order to achieve function and effect that "a direction of pressing the plunger pin 20 by the coil spring 31 reliably makes a minute angle with the center axis of the plunger pin 20. For this reason, the large diameter portion 22 can be pressed against the inner surface of the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11. In other words, a current can more reliably flow from the plunger pin 20 to the main body case 11" of [0033] of the Specification, it is sufficient so long as the pressing member has "a spherical surface," and it does not have to be "a sphere". In other words, in order to realize a technical idea of Invention 1 that the plunger pin is inclined by changing a direction in which the elastic force of the coil spring is applied, it is sufficient so long as it has a spherical surface, and there is no reason for limiting it to "a ball".

In this way, Invention 1 exerts the function and effect that the combination of the offset oblique recessed portion and the spherical surface ensures the inclination of the plunger pin.

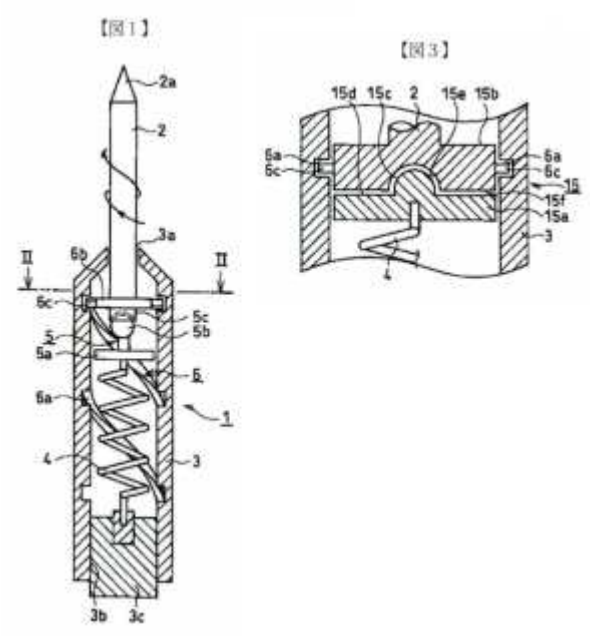
Therefore, even if "a spherical surface" is not a sphere, as long as it exerts the function & effect, it is obvious that the disclosure of the sphere discloses "a spherical surface".

C As described in "A" and "B" above, although "a spherical portion consisting of a spherical surface of a pressing member" is an explicitly described matter, even if it is not, as described in Evidence B No. 5 ("A middle portion 4" equipped with "a protrusion 13 with a conical or spherical rounded shape" corresponds to "a pressing member" of the Invention".), and



第１図　FIG. 1
第２図　FIG. 2

Evidence B No. 6 ("A rotary supporting means 15" with a "semi-spherical" tip end portion corresponds to "a pressing member" of the Invention.), it is common general technical knowledge to adopt "a spherical surface" instead of "a sphere" as a pressing member, and thus, also in the Invention, it is an obvious from the description of the originally attached specification, etc. of the original application that "a spherical surface" is adopted as the pressing member.



【図１】　[FIG. 1]

【図３】　　[FIG. 3]

D　Therefore, Inventions 1 and 2 do not violate requirements for division.

(2) The allegation after the correction of the case (Written correction request, page 3, line 12-page 8, line 31)

A　Since it is described in Paragraph [0024] of the originally attached specification of the present application that "The insulation ball 30 may be made of metal or the like having a conductive property and coated with an insulator film," in the originally attached specification, etc. of the present application, it is suggested that as "a pressing member," not only an insulation ball but also "a sphere such as a conductive metal" (= conductive ball) is used.　Furthermore, it is described in Paragraph [0005], for Description of the Prior Art, that Patent Document 2 discloses a contact probe that is a contact terminal in which ... an insulation ball is arranged between the plunger pin and a coil spring, together with an insulation ball disclosed in Patent Document 1," and it is disclosed that "a conductive ball" is used for "a pressing member" as a matter of prior art.

From the above, in Invention 1, it can be said that the using "a conductive ball" as "a pressing member" is at least suggested in the originally attached specification of the present application.　The Invention aims for more reliably passing a large current from the plunger pin to the main body case, by pressing the plunger pin against the main body case by force that does not prevent sliding between the plunger pin and the main body case ([0033] and [0008] of the originally attached specification of the present application), and in order to solve this problem, although it is essential that the pressing member has a spherical surface at a contact portion with the plunger, it does not matter whether or not it has an insulation property.　Therefore, it is natural and reasonable for a person skilled in the art who has contacted the originally attached specification of the present application to recognize that it is sufficient that a contact part with the plunger pin of "a pressing member" solving the problem of the Invention has a "ball" shape.　Therefore, using "a ball" as "a pressing member" is not a new technical matter in relation to the technical matters described in the originally attached specification of the present application. (Written correction request, page 4, line 16-page 5, line 9)

B　Since there have been many conventional techniques for using "a conductive ball" or "a ball" as a shape having no particular limitation on a material as "a pressing member" (Evidence A No. 2, page 2, Evidence A No. 5, Page 3, line 11, Evidence A No. 6 [0012], and Evidence A No. 8 [0024].　Evidence B No. 10 [0058], and Evidence B No. 11 [0057], [0060], [0066], [0068], [0072], and [0074] disclose "a pressing member" that is not a

sphere and has no particular limitation on a material.), it is a matter of common general technical knowledge. Therefore, it agrees with the common general technical knowledge and it is extremely reasonable to conclude that using "a ball" as "a pressing member" is not a new technical matter from the description of the originally attached specification, etc. of the present application. (Written correction request, page 5, lines 10-19)

C Therefore, "a spherical portion consisting of a spherical surface of a ball" relating to the correction of the case does not introduce a new technical matter in relation to the technical matters derived from the originally attached specification, etc. of the original application.

1-3 Judgment by the body on Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)

Of Reason for invalidation 2, the reason that the Invention lacks novelty on the basis of the matter that the application relating to the Patent does not satisfy the requirements (requirement for division) prescribed in Article 44(1) of the Patent Act (hereinafter, referred to as "Reasons for invalidation 2-1") will be judged below.

Further, unless otherwise stated, "Claim 1" and "Claim 2" respectively refer to Claim 1 and Claim 2 described in the corrected scope of claims attached to the written correction request of the case.

(1) Regarding the point that "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin"

Since Claim 1 of the Patent describes that "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring (Note by the body: the coil spring with an insulator film) in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 is "pressed by the coil spring" and is for "pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the main body case".

Then, in Claim 1 of the Patent, there is no description that can specify a property

of "a spherical portion consisting of a spherical surface of a ball" other than the description of "a spherical portion consisting of a spherical surface of a ball".

Hence, it is obvious that the property specified by the description of "a spherical portion consisting of a spherical surface of a ball" is not limited to a spherical portion consisting of a spherical surface of "an insulation ball" and does not particularly exclude a spherical portion consisting of a spherical surface of "a metal ball with a conductive property".

Therefore, it can be said that "a spherical portion consisting of a spherical surface of a ball" described in Claim 1 for specifying Corrected Invention 1 accepts a spherical portion consisting of a spherical surface of a ball other than "an insulation ball" such as "a metal ball with a conductive property" that is not provided with an insulator film.

(2) Regarding the matters described in the originally attached specification, etc. of the original application

Next, description of the originally attached specification of the original application will be examined to examine whether or not the application relating to the Patent satisfies the requirements (requirements for division) prescribed in Article 44(1) of the Patent Act.

A In the originally attached specification of the original application, for Corrected Inventions 1 and 2, the following matters are described (the underlines were given by the body).

(A) "[0003]

Incidentally, when a relatively large current flows from the contact point or the like via the plunger pin to the main body case, if a current flows also in the coil spring, the coil spring can be burned out by heating due to electrical resistance. For example, when a part of a current flows in the coil spring, from a state where turning parts of the compressed coil spring contact with one another at side surfaces thereof, restoration of the coil spring causes the turning parts to be separated from one another, to decrease a sectional area of a current path. As a result, electrical resistance rapidly increases, and the spring coil is thereby heated excessively to be burned out. For this reason, a contact terminal provided with a mechanism for preventing a current from flowing through a coil spring has been developed".

(B) "[0008]

The present invention was made in view of the above-described circumstances, and an object of the present invention is to provide a contact terminal that enables a

relatively large current to flow therethrough".

(C) "[Means for solving the problem]
[0009]

A contact terminal of the present invention is a contact terminal being provided for making electrical connection by contacting the protrusion end portion protruding from a main body case of the plunger pin received in a non-penetrating elongate hole formed in the main body case with a target part, wherein the plunger pin is a round bar provided with a step, the round bar includes a small diameter portion including the protrusion end portion, and a large diameter portion that slides on an inner surface of the non-penetrating hole to freely move in a longitudinal direction thereof, a cut space is formed to extend from an end of the large diameter portion in the longitudinal direction thereof so as to leave at least a part of a side surface portion of the large diameter portion, and the cut space receives an insulation ball including at least an insulation surface, and a coil spring is arranged between the non-penetrating hole and the insulation ball to press the protrusion end portion of the plunger pin such that the protrusion end portion protrudes from the main body case.
[0010]

According to this invention, while a current does not flow in the coil spring that presses the protrusion end portion of the plunger pin such that the protrusion end portion protrudes from the main body case, a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact terminal."

(D) "[0013]

In the above-described invention, the cut space may be a sac hole. According to this invention, the insulation ball is received in the sac hole so that a position of the insulation ball can be stabilized. Accordingly, while a current does not flow in the coil spring, a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact terminal.
[0014]

In the above-described invention, a bottom surface of the sac hole as the cut space may be a conic surface. According to this invention, the insulation ball can be stably positioned on the center axis of the conic surface. Accordingly, while a current does not flow in the coil spring, a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact

terminal.

[0015]

In the above-described invention, a center axis of the conic surface of the sac hole as the cut space may be shifted from a center axis of the plunger pin. According to this invention, the outer surface of the large diameter portion of the plunger pin can be more strongly pressed on the inner surface of the main body case. Accordingly, a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact terminal."

(E) "[0023]

The plunger pin 20 received in the elongate hole 13 has a round-bar shape provided with a step. The plunger pin 20 includes a pin portion 21 that forms a small diameter portion of the pin 20, a large diameter portion 22, and a step portion 22a that is a boundary portion between the pin portion 21 and the large diameter portion 22. In one example, the pin portion 21 includes an approximately hemispherical tip end portion 21a. However, a shape of the pin portion 21 is not limited to this example. The large diameter portion 22 can move while the large diameter portion 22 contacts with an inner surface of the elongate hole 13 of the main body case 11. In other words, the large diameter portion 22 can freely slide relative to the elongate hole 13 to enable the plunger pin 20 to freely move along the center axis of the main body case 11. The large diameter portion 22 includes a sac-like and approximately column-shaped pit hole 23 that is formed by cutting the large diameter portion 22 from the end thereof along the center axis. In other words, a cut space is provided in the large diameter portion 22 so as to leave a side circumferential portion 25 that is a part of the large diameter portion 22 and that defines the pit hole 23. The large diameter portion 22 includes an approximately cone surface-shaped oblique surface 24 at the bottom of the pit hole 23 (particularly, refer to FIG. 3(b)).

[0024]

In the pit hole 23, an insulation ball 30 made of an insulator such as ceramics is received. The insulation ball 30 may be made of metal or the like having a conductive property and coated with an insulator film. A diameter of the insulation ball 30 is also smaller than an inner diameter of the pit hole 23 so that the insulation ball 30 can be received in the pit hole 23 and is larger than a diameter of the spring receiving hole 14 of the main body case 11. In other words, the spring receiving hole 14 of the main body case 11 is formed by cutting so as to have an inner diameter smaller than the diameter of the insulation ball 30. Accordingly, the spring receiving hole 14 does not receive the insulation ball 30 in the inside thereof.

[0025]

Against the insulation ball 30, one end portion of a coil spring 31 which is a compression spring is contacted. The other end portion of the coil spring 31 is contacted against the oblique surface 15 of the spring receiving hole 14 so that a part of the coil spring 31 at and near the other end portion of the coil spring 31 is received in the spring receiving hole 14. The coil spring 31 is supported by the oblique surface 15 of the spring receiving hole 14 to press the plunger pin 20 via the insulation ball 30 in a direction of urging the plunger pin 20 to protrude from the main body case 11. The opening end portion 16 of the main body case 11 is narrowed to have an inner diameter smaller than the large diameter portion 22 of the plunger pin 20. The opening end portion 16 contacts against the step portion 22a of the plunger pin 20 to hold the large diameter portion 22 in the elongate hole 13. An insulator film may be provided on the coil spring 31".

(F) "[0026]

In other words, as illustrated in FIG. 4, when the contact terminal 10 is assembled, first, the insulation ball 30 is received in the pit hole 23 of the plunger pin 20, and a part of the coil spring 31 at and near one end portion of the coil spring 31 is received in the spring receiving hole 14 of the main body case 11. Next, against the other end portion of the coil spring 31, the insulation ball 30 is pressed to compress the coil spring 31, and at the same time, a part of the plunger pin 20 on the side of the large diameter portion 22 is received in the elongate hole 13 of the main body case 11. Further, a process of narrowing a diameter of the opening end portion 16a of the main body case 11 is performed to form the opening end portion 16. An inner diameter of the opening end portion 16 is smaller than an outer diameter of the large diameter portion 22, and larger than an outer diameter of the pin portion 21. Accordingly, the plunger pin 20 is prevented from falling out of the main body case 11. As a result, the plunger pin 20 can obtain a stroke from a position where the step portion 22a is contacted against the opening end portion 16 to a position where the insulation ball 30 is contacted against the opening portion of the spring receiving hole 14 or to a position where the coil spring 31 is fully compressed.

[0027]

According to the present embodiment, an outer diameter of the coil spring 31 is set to be smaller than the inner diameter of the spring receiving hole 14 as understood from the coil spring 31 received in the coil receiving hole 14. In other words, the insulation ball 30 has an outer diameter larger than an inner diameter of the coil spring 31, so that the insulation ball 30 does not enter an inside of the coil spring 31. Accordingly,

if the coil spring 31 is provided with an insulator film, and this film falls off, the intervening insulation ball 30 securely prevents contact between the coil spring 31 and the plunger pin 20. Thereby, the coil spring 31 can be securely insulated from the plunger pin 20. In other words, if a relatively large current flows in the plunger pin 20, it is possible to securely prevent the coil spring 31 from being burned out.

[0028]

The coil spring 31 is a compression spring. A position of one of the end portions of the coil spring 31 is stabilized by the insulation ball 30. Meanwhile, when the coil spring 31 is compressed from both end portions thereof, the center axis of the coil spring 31 is slightly warped. Accordingly, the plunger pin 20 is pressed via the insulation ball 30 by the coil spring 31 in a direction that makes a minute angle with the center axis of the main body case 11. Thereby, the large diameter portion 22 of the plunger pin 20 is securely contacted with the inner surface of the elongate hole 13, and at this time, the contact pressure is not excessively raised. Since the insulation ball 30 is received in the pit hole 23, the plunger pin 20 includes the side circumferential portion 25 formed by extending the large diameter portion 22 in the axial direction on the outer circumferential side of the pit hole 23. Thereby, the plunger pin 20 has an increased surface area. As a result, it is possible to enable the large diameter portion 22 to more securely contact with the inner surface of the elongate hole 13. In other words, if a relatively large current flows in the plunger pin 20, a current can securely flow from the plunger pin 20 to the main body case 11.

[0029]

In addition, the insulation ball 30 is received in the pit hole 23, so that the insulation ball 30 does not contact with the inner surface of the elongate hole 13 of the main body case 11, and does not slide against the elongate hole 13. Further, although the insulation ball 30 contacts with the pit hole 23, the insulation ball 30 can only slightly slide or rotate in the pit hole 23. For example, even when the insulation ball 30 is made of a substance having higher hardness than the plunger pin 20, it is possible to inhibit generation of abrasion powder or the like due to sliding or rotating of the insulation ball 30 from the pit hole 23. Thereby, a sliding defect of the plunger pin 20 due to the abrasion powder can be prevented".

(G) "[0031]

Furthermore, at the bottom of the spring receiving hole 14, the approximately cone surface-shaped oblique surface 15 is formed. Accordingly, when compression force of the coil spring 31 is large, a center position of the end portion of the coil spring 31 tends

to correspond to a center position of the oblique surface 15, and when compression force of the coil spring 31 is small, the center position of the end portion of the coil spring 31 tends to be shifted from the center position of the oblique surface 15. In other words, when compression force of the coil spring 31 is large, a direction of pressing the plunger pin 20 tends to make a small angle with the center axis of the main body case 11, and when compression force of the coil spring 31 is small, a direction of pressing the plunger pin 20 tends to make a large angle with the center axis of the main body case 11. Thereby, more easily, the plunger pin 20 can be securely contacted with the main body case 11 without excessively raising the contact pressure.

[0032]

Further, at the bottom of the pit hole 23 of the plunger pin 20, the approximately cone surface-shaped oblique surface 24 is formed. Accordingly, the center of the insulation ball 30 can be reliably positioned on the center axis of the oblique surface 24. Thereby, a contact position between the coil spring 31 and the insulation ball 30 can be stabilized so that the coil spring 31 can be reliably insulated. In addition, a position of the insulation ball 30 relative to the pit hole 23 is stabilized, and thereby, the above-described minute sliding or rotating of the insulation ball 30 is further decreased so that generation of the abrasion powder can be inhibited.

[0033]

Preferably, the center axis of the oblique surface 24 is shifted from the center axis of the plunger pin 20. In the present embodiment, as illustrated in FIG. 3(b), the center axis M2 of the oblique surface 24 and the center axis of the pit hole 23 are shifted from the center axis M1 of the plunger pin 20. Thereby, a direction of pressing the plunger pin 20 by the coil spring 31 is more reliably made to be a direction having a minute angle with the center axis of the plunger pin 20. For this reason, the large diameter portion 22 can be pressed against the inner surface of the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11. In other words, a current can more reliably flow from the plunger pin 20 to the main body case 11".

B Then, it will be examined whether or not the originally attached specification, etc. of the original application discloses "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1.

(A) First, in Paragraph [0003] of the originally attached specification, etc. of the original application, the problem that "Incidentally, when a relatively large current flows from the contact point or the like via the plunger pin to the main body case, if a current flows also in the coil spring, the coil spring can be burned out by heating due to electrical resistance"

is indicated, and in Paragraph [0008], regarding the purpose of the invention, it is described that "The present invention was made in view of the above-described circumstances, and an object of the present invention is to provide a contact terminal that enables a relatively large current to flow therethrough". Further, in Paragraph [0010], it is described that "According to this invention, while a current does not flow in the coil spring that presses the protrusion end portion of the plunger pin such that the protrusion end portion protrudes from the main body case, a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact terminal". Accordingly, it can be said that the invention described in the originally attached specification, etc. of the original application is an invention that has a problem to be solved that since "a contact terminal that enables a relatively large current to flow therethrough is provided," "while a current does not flow in the coil spring, a current can be made to reliably flow from the plunger pin to the main body case."

(B) Next, in the originally attached specification of the original application, regarding a member "pressed by the coil spring" in "an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the main body case," it is consistently described only as "an insulation ball," and the term "a spherical portion consisting of a spherical surface of a ball" is not used. Therefore, in the originally attached specification of the original application, it is a precondition of the invention that in order to achieve the problem to be solved described in (A) above; that is, in order to "enable a relatively large current to flow from the plunger pin to the main body case while a current does not flow in the coil spring," the plunger pin and the coil spring are insulated by "an insulation ball," and it is not assumed that a current is made to flow through the coil spring by using, for example, "a metal ball with a conductive property" that is not provided with an insulator film instead of "an insulation ball".

(C) Therefore, the originally attached specification, etc. of the original application does not disclose that "a spherical portion consisting of a spherical surface of a ball" is used as a member "pressed by the coil spring" in "an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the main body case."

(D) Next, since in Corrected Invention 1, "a coil spring" is specified as "a coil spring with an insulator film," this point will be further examined.

In the originally attached specification of the original application, in Paragraph [0025], it is described that "Against the insulation ball 30, one end portion of a coil spring 31 which is a compression spring is contacted....The coil spring 31 is supported by the oblique surface 15 of the spring receiving hole 14 to press the plunger pin 20 via the insulation ball 30 in a direction of urging the plunger pin 20 to protrude from the main body case 11.... An insulator film may be provided on the coil spring 31," and in Paragraph [0027], it is described that "According to the present embodiment, an outer diameter of the coil spring 31 is set to be smaller than the inner diameter of the spring receiving hole 14 as understood from the coil spring 31 received in the coil receiving hole 14. In other words, the insulation ball 30 has the outer diameter larger than an inner diameter of the coil spring 31, so that the insulation ball 30 does not enter an inside of the coil spring 31. Accordingly, if the coil spring 31 is provided with an insulator film, and this film falls off, the intervening insulation ball 30 securely prevents the coil spring 31 from contacting with the plunger pin 20. Thereby, the coil spring 31 can be securely insulated from the plunger pin 20. In other words, if a relatively large current flows in the plunger pin 20, it is possible to securely prevent the coil spring 31 from being burned out". These descriptions indicate the effect that if "an insulation ball" larger than the inner diameter of the coil spring is interposed between the coil spring and the plunger pin, since "the insulation ball" certainly prevents electrical connection of them and ensures the insulation of them, even if the insulator film of the coil spring 31 is peeled off, the coil spring and the plunger pin are not electrically connected; namely, a current does not flow to the coil spring 31, and the coil spring 31 can be reliably prevented from being burned out. It does not teach that if the insulator film is provided on the coil spring, "a metal ball with a conductive property" that is not provided with an insulator film can be used instead of "an insulator film". Rather, it can be said that these descriptions support that the description of the originally attached specification, etc. of the original application which premises the use of "an insulation ball".

Therefore, it cannot be said that the originally attached specification, etc. of the original application describes that "a coil spring" is specified as "a coil spring with an insulator film," and a part of a member "pressed by the coil spring" (coil spring with an insulator film) in "an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and pressing an outer surface of the large diameter portion against the tubular

inner peripheral surface of the main body case" is specified as "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1.

C Considering the description of the written correction request, page 5, lines 4-7 that "Therefore, it is natural and reasonable for a person skilled in the art who has contacted the originally attached specification of the present application to recognize that it is sufficient that a contact part with the plunger pin of 'a pressing member' solving the problem of the Invention has a 'ball' shape," also in case that "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 is interpreted as "a spherical portion" consisting of "a spherical surface of a ball" (that is, in case where it is interpreted that "a ball" does not specify the use of "a ball" itself, and means that it is sufficient if the shape of the part (contact part) pressing the plunger has "a ball" shape), judgment is shown below.

(A) First, it will be examined whether or not there is a description suggesting an article other than "an insulation ball" as a member corresponding to a member having "a spherical portion" consisting of "a spherical surface of a ball" of Invention 1 in the originally attached specification, etc. of the original application.

First, since in Paragraph [0024] of the originally attached specification of the original application, it is described that "In the pit hole 23, an insulation ball 30 made of an insulator such as ceramics is received.... A diameter of the insulation ball 30 is also smaller than an inner diameter of the pit hole 23 so that the insulation ball 30 can be received in the pit hole 23 and is larger than a diameter of the spring receiving hole 14 of the main body case 11. In other words, the spring receiving hole 14 of the main body case 11 is formed by cutting so as to have an inner diameter smaller than the diameter of the insulation ball 30. Accordingly, the spring receiving hole 14 does not receive the insulation ball 30 in the inside thereof," in the originally attached specification, etc. of the original application, it is premised that a member that is not received in the spring receiving hole 14 of the main body case 11 uses a shape whose maximum dimensions and minimum dimensions can be specified by one measure of "a diameter," that is "a ball," and no other shape is assumed to be adopted.

Also, since in Paragraph [0026] of the originally attached specification of the original application, it is described that "In other words, as illustrated in FIG. 4, when the contact terminal 10 is assembled, first, the insulation ball 30 is received in the pit hole 23 of the plunger pin 20, and a part of the coil spring 31 at and near one end portion of the coil spring 31 is received in the spring receiving hole 14 of the main body case 11. Next, against the other end portion of the coil spring 31, the insulation ball 30 is pressed to

compress the coil spring 31, and at the same time, a part of the plunger pin 20 on the side of the large diameter portion 22 is received in the elongate hole 13 of the main body case 11," it is obvious that if a shape of the member has direction dependency, special measures are required so that the member does not roll and can hold a predetermined direction, when assembling the contact terminal 10 as described above. However, in the originally attached specification, etc. of the original application, there is no description found that suggests that such special measures are taken, so that it is understood also from Paragraph [0026] that the use of a "three-dimensionally rotation invariant" shape without requiring special measures; that is, "a sphere", is premised as the shape of the member, and no other shape is used.

Furthermore, even examining other described places of the originally attached specification, etc. of the original application, there is no description found that suggests the use of a member other than "an insulation ball" as the member corresponding to the member having "a spherical portion consisting of a spherical surface of a ball" of Corrected Invention 1.

As described above, in the originally attached specification, etc. of the original application, there is no description that suggests an article other than "an insulation ball" as the member corresponding to the member having "a spherical portion" consisting of "a spherical surface of a ball" of Corrected Invention 1.

(B) In the contact terminal that includes the plunger pin received in the main body case and the coil spring pressing the plunger pin, it cannot be recognized as the technical level of a person skilled in the art at the time of filing the original application that "a pressing member" having "a spherical portion consisting of a spherical surface" other than "an insulation ball" is used as the member interposed between the coil spring and the plunger pin and that the large diameter portion of the plunger pin is pressed against the inner surface of the elongate hole of the main body case, and that by using "a pressing member" having "a spherical portion consisting of a spherical surface," a direction pressed by the elastic force of the coil spring is made to be "a minute angle with the center axis of the main body vase" to incline the plunger pin.

Rather, in Paragraph [0010] in the item of [Means for solving the problem] of the originally attached specification of the original application, it is described that "According to this invention, ... a current can be made to reliably flow from the plunger pin to the main body case. As a result, a relatively large current can be made to flow in the contact terminal," and also, in Paragraph [0028] in the explanation of [Embodiment 1], it is described that "...when the coil spring 31 is compressed from both end portions thereof,

the center axis of the coil spring 31 is slightly warped. Accordingly, the plunger pin 20 is pressed via the insulation ball 30 by the coil spring 31 in a direction that makes a minute angle with the center axis of the main body case 11. Thereby, the large diameter portion 22 of the plunger pin 20 is securely contacted with the inner surface of the elongate hole 13, and at this time, the contact pressure is not excessively raised". In light of this, in the originally attached specification, etc. of the original application, it is described that the coil spring is compressed from both end portions to slightly warp the center axis thereof, and the direction pressed by the elastic force of the coil spring is made to be "a minute angle with the center axis of the main body case" to incline the plunger pin, thereby reliably making the large diameter portion of the plunger pin contact with the inner surface of the elongate hole of the main body case, based on the fact it is not the technical level of a person skilled in the art.

Therefore, it cannot be said that the matter that in order to make the direction pressed by the elastic force of the coil spring 31 become "a minute angle with the center axis of the main body case 11" to incline the plunger pin 20, the member having "a spherical portion" consisting of "a spherical surface of a ball" other than "an insulation ball" is used, is equivalent to being described in the originally attached specification, etc. of the original application.

(C) Accordingly, it cannot be said that in the originally attached specification, etc. of the original application, it is described (or equivalent to being described) that the member that can press the large diameter portion 22 of the plunger pin 20 against the inner surface of the elongate hole 13 of the body case 11 is not limited to "an insulation ball 30" and may be a member having "a spherical portion" consisting of "a spherical surface of a ball".

(D) Therefore, if "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 is interpreted as "a spherical portion" consisting of "a spherical surface of a ball," it can be said that Corrected Invention 1 is not the invention described in the originally attached specification, etc. of the original application, also from the points described in (A) to (C) above.

D Summary

As described above, it can be said that Corrected Invention 1 is an enlarged invention by including new technical matters in the invention described in the originally attached specification, etc. of the original application, on the basis of the new technical

knowledge that the part of the member used so that "the large diameter portion 22 can be pressed against the inner surface of the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11" (Paragraph [0033] of the originally attached specification of the original application) is not limited to an article configured from "an insulation ball," and may be "a spherical portion consisting of a spherical surface of a ball".

Therefore, since Corrected Invention 1, for a person skilled in the art, is an invention made by introducing new technical matters in relation to the technical matters derived by totalizing all the descriptions in the originally attached specification, etc. of the original application, the application relating to the Patent does not satisfy the requirements prescribed in Article 44(1) of the Patent Act.

(3) Regarding the novelty of Corrected Invention 1 and Corrected Invention 2

From the above, the filing date of the patent relating to Corrected Invention 1 and Corrected Invention 2 is April 19, 2013 that is the actual filing date, and the priority claim of the patent relating to Corrected Invention 1 and Corrected Invention 2 cannot be accepted.

Further, the originally attached specification, etc. of the original application was posted in a publication issued on April 18, 2013, which is before the actual filing date of the application relating to the Patent, and the patent was applied and laid-open (Evidence A No. 24).

Consequently, the novelty of Corrected Invention 1 and Corrected Invention 2 will be judged as follows.

A Regarding Corrected Invention 1

The requirements in Corrected Invention 1 that "a spherical portion consisting of a spherical surface is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," do not particularly exclude the use of "a spherical portion consisting of a spherical surface" of "an insulation ball" as "a spherical portion consisting of a spherical surface of a ball".

Also, in Evidence A No. 24, not only is "the insulation ball 30" described, but also it is described in Paragraph [0025] that "Against the insulation ball 30, one end portion of a coil spring 31 which is a compression spring is contacted...(Omitted)...An insulator film may be provided on the coil spring 31," and it is described in Paragraph [0027] that

"Accordingly, if the coil spring 31 is provided with an insulator film, and this film falls off, the intervening insulation ball 30 securely prevents the coil spring 31 from contacting the plunger pin 20. Thereby, the coil spring 31 can be securely insulated from the plunger pin 20. In other words, if a relatively large current flows in the plunger pin 20, it is possible to securely prevent the coil spring 31 from being burned out". As described above, it is also described that "the coil spring" "provided with an insulator film" is used together with "the insulation ball 30".

Therefore, Corrected Invention 1 is an invention described in Evidence A No. 24.

B Regarding Corrected Invention 2

Although Corrected Invention 2 is an invention including the matters specifying the invention that "a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case, and the pressing member is composed of an insulation ball including an insulation surface," since the invention described in Evidence A No. 24 uses "the insulation ball 30," Corrected Invention 2 is an invention described in Evidence A No. 24 and does not have novelty.

Therefore, Corrected Invention 1 and Corrected Invention 2 fall under the invention of Article 29(1)(iii) of the Patent Act, and the Demandee should not be granted a patent therefor.

(4) Summary of Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)

As described above, it cannot be said that the application relating to the Patent is a legal divisional application, and therefore its filing date is the actual filing date. Then, since Corrected Invention 1 and Corrected Invention 2 are inventions described in Evidence A No. 24 that was published before the actual filing date of the application relating to the Patent, they are not new inventions and fall under the invention of Article 29(1)(iii) of the Patent Act, and thus the Demandee should not be granted patent therefor.

Therefore, the Patent relating to Corrected Invention 1 and Corrected Invention 2 falls under Article 123(1)(ii) of the Patent Act and thus should be invalidated.

1-4 Judgment by the body on the Demandee's allegation about Reasons for invalidation

2

(1) Regarding "1-2 The Demandee's allegation" "(2)" "A"

In the originally attached specification, etc. of the original application, it is not described at all that, for example, "a metal ball with a conductive property" that is not provided with an insulator film is used instead of "an insulation ball". Furthermore, as described in "1-3 Judgment by the body on Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)" "(2)" "B" above, in the originally attached specification, etc. of the original application, it is considered as the requirements of the invention to insulate the plunger pin and the coil spring by "an insulation ball," in order to achieve the problem to be solved described in the originally attached specification, etc. of the original application; that is, in order to "enable a current to flow from the plunger pin to the main body case while a current does not flow in the coil spring". Accordingly, it is not assumed that, for example, "a metal ball with a conductive property" that is not provided with an insulator film is used instead of "an insulation ball" to enable a current to flow in the coil spring.

Therefore, the Demandee's allegation is not based on the description of the originally attached specification, etc. of the original application and cannot be accepted.

(2) Regarding "1-2 The Demandee's allegation" "(2)" "B"

In the originally attached specification, etc. of the original application, there is described the prior art that an insulation ball is interposed between the plunger pin and the coil spring to insulate the plunger pin and the coil spring by the insulation ball, thereby preventing a current from flowing through the coil spring, as a background art (Paragraphs [0004] to [0006]). Then, since the originally attached specification, etc. of the original application describes the invention that has a problem to be solved that "while a current does not flow in the coil spring, a current can be made to reliably flow from the plunger pin to the main body case", on the basis of the above-mentioned background art using "an insulation ball," even if there have been many conventional techniques for using "a conductive ball" or "a ball" as a shape having no particular limitation on a material as a member pressing the plunger pin against the main body case (Evidence A No. 4, page 2 ("a sphere (ball)"), Evidence A No. 5, page 3, line 11 ("a metallic sphere"), Evidence A No. 6, Paragraph [0012] ("a metallic aid" recognized as (Note by the body: a mistake of "a metal ball")), Evidence A No. 8, Paragraph [0024] ("a ball member"), Evidence B No. 10, Paragraph [0058] ("a relay member"), Evidence B No. 11, Paragraphs [0057] ("although the material of a piece 28 is glass, a conductive material may be also used"), [0060] ("the case in which the material of the piece 28 is a conductive alloy material"),

[0066] ("although the material of the piece 38 is a sintered material of silicon, a conductive material may be also used.", [0068] ("the case in which the material of the piece 38 is a conductive alloy material"), [0072] ("although the material of the piece 48 is glass, a conductive metal alloy may be also used"), and [0074] ("the case in which the material of the piece 48 is a conductive alloy material), there is no rational reason to read "an insulation ball" consistently described in the originally attached specification, etc. of the original application, for example, as "a conductive ball" (that is not provided with an insulator film).

Therefore, the Demandee's allegation cannot be accepted.

Also, in view of the situation described in "1-3 Judgment by the body on Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)" "(2)" "C" above, in the case that "a spherical portion made from a spherical surface of a ball" in Corrected Invention 1 is interpreted as "a spherical portion" made from "a spherical surface of a ball" (that is, if it is interpreted that "of a ball" is not a description specifying the use of "a ball" itself, but means that it is sufficient if the part (contact part) that presses the plunger has "a ball" shape), the Demandee's allegation of "1-2 The Demandee's allegation" "(1)" "A" to "C" above will be further examined.

(A) Regarding "1-2 The Demandee's allegation" "(1)" "A"

Even though the originally attached specification, etc. of the original application describes "an insulation ball," expressing this as "a spherical portion" made from "a spherical surface of a ball" corresponds to the introduction of new technical matters, as described in "1-3 Judgment by the body on Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)" "(2)" "C" above.

(B) Regarding "1-2 The Demandee's allegation" "(1)" "B"

In the originally attached specification, etc. of the original application (Evidence A No. 24), a member interposed between "an end" of "the large diameter portion 22" of "the plunger pin 20" and "the coil spring 31" is consistently described as "an insulation ball".

Then, as described in "1-3 Judgment by the body on Reason for invalidation 2 (lack of novelty on the basis of violation of requirements for division)" "(2)" "C" and "D" above, the description of Paragraph [0033] in the originally attached specification of the original application premises the use of "the insulation ball 30," and there is no recognition that "a spherical surface" is sufficient, so that the Demandee's allegation above cannot be accepted, on the basis of the description of Paragraph [0033] of the

originally attached specification, etc. of the original application.

Therefore, the Demandee's allegation above is made on the basis of new technical knowledge about the description of Paragraph [0033] in the originally attached specification of the original application, and thus cannot be accepted as the grounds for the application relating to the Patent to satisfy the requirements of division.

(C) Regarding "1-2 The Demandee's allegation" "(1)" "C"

Examining the descriptions of Evidence B No. 5 and Evidence B No. 6, "an middle portion 4" (for example, Evidence B No. 5, page 2, line 19 of the upper left column) described in Evidence B No. 5 is a member with which "when the probe contact 1 is thus applied to a through hole 27 having a center line 26 somewhat offset from the original position on the printed circuit board 25, the body portion 5 and the middle portion 4 of the probe contact 1 maintain a substantially vertical position with respect to the surface of the printed circuit board 25, and only the tip end portion 2 corresponds to the somewhat offset position of the through hole 27 and engages with the through hole 27 while inclining somewhat with respect to a surface of the printed circuit board 25" (Evidence B No. 5, page 3, lines 2-10 of the upper left column), and is not a member for inclining "the probe contact 1" ("plunger pin") to make the large diameter portion thereof contact with a tubular inner peripheral surface of "the pipe-shaped body portion 5" ("main body case").

Further, "the rotation supporting means 5" (for example, Evidence B No. 6, page 4, column 5, line 26) described in Evidence B No. 6 is a necessary member with which "a contact piece 2 receives the energizing force of the spring 4 to move in a direction being projected out from the storage portion 3, the projecting portion 6c slides upward along the groove portion 6a, and the contact piece 2 ascends while rotating about an axis" (Evidence B No. 6, page 4, column 6, lines 26-29), and is not a member for inclining "the contact piece 2" ("plunger pin") to make the large diameter portion thereof contact with the tubular inner peripheral surface of "the storage body 3" ("the main body case").

Therefore, taking the technical matters described in Evidence B No. 5 and Evidence B No. 6 into consideration, it cannot be recognized that in the originally attached specification, etc. of the original application, it is described (equivalent to being described) that there can be achieved the technical knowledge that as long as "a spherical portion" (consisting of "a spherical surface of a ball") partially having "a spherical surface of a ball," the function and effect described in the originally attached specification, etc. of the original application; that is, "a direction of pressing the plunger pin 20 by the coil spring 31 reliably makes a minute angle with the center axis of the plunger pin 20" and "For this reason, the large diameter portion 22 can be pressed against the inner surface of

the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11" (Paragraph [0033] of the originally attached specification, etc. of the original application).

(D) Therefore, if the description of "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 is interpreted as "a spherical portion" consisting of "a spherical surface of a ball," the Demandee's allegation cannot be accepted, also from the points (A) to (C) above.

(3) Summary

As described above, the Demandee's allegations relating to the requirements for division (or replacing with the requirements for division), which are alleged by the Demandee cannot be accepted.

1-5 Summary regarding Reason for invalidation 2

It cannot be said that the application relating to the Patent is a legal divisional application, and its filing date is the actual filing date. Then, since Corrected Invention 1 and Corrected Invention 2 are inventions described in Evidence A No. 24 that was published before the actual filing date of the application relating to the Patent, they are not new inventions and fall under the invention of Article 29(1)(iii) of the Patent Act, and thus the Appellant should not be granted patent therefor.

Therefore, the Patent relating to Corrected Invention 1 and Corrected Invention 2 falls under Article 123(1)(ii) of the Patent Act and thus should be invalidated (Reason for invalidation 2-1).

Consequently, there are grounds for Reason for invalidation 2.

2 Regarding Reason for invalidation 1

Next, Reason for invalidation 1 will be judged.

In view of the case, when judging Reason for invalidation 1, the presence/absence of inventive step of Corrected Invention 1 and Corrected Invention 2 is judged on the basis of the priority date (September 5, 2011, hereinafter, may be referred to as "the pity date of the case") of the original application of the application relating to the Patent.

2-1 Regarding Evidence A No. 1 to Evidence A No. 9

2-1-1 Described matter of Evidence A No. 1 and invention described in Evidence A No. 1

In Evidence A No. 1 distributed before the priority date of the original application of the application relating to the Patent, there is described the following matters together with drawings (the underlines are added by the body).

(A) "[0001]

[Field of the Invention]

The present invention is related to a connector device having a contact connected to a printed circuit board such as a test board or the like for various tests such as a burn-in test of an IC package, and in particular, is related to a connector device having a probe type contact". (Paragraph [0001])

(B) "[0020]

Therefore, an object of the present invention is to provide a connector device, which appropriately machines the movable plunger with eccentric machining, eliminates the need for additional steps, and reduces the number of steps by one step to avoid cost increase, so that contact between the tubular body as the barrel of the contact and the movable plunger is always stably secured to prevent fluctuations in electrical characteristics, in order to solve the above-mentioned conventional problems".

(C) "[0031]

As shown in FIGS. 1 and 2, the connector device according to Example 1 of the present invention is a connector device having a probe-type contact that forms an electrical connection with the IC package" (Paragraph [0031])

(D) "[0067]

(Example 3)

FIGS. 10 to 12 show the contacts according to Example 3 of the connector device of the present invention. FIG. 10 is a perspective view of the movable plunger of the contacts according to Example 3 of the present invention, FIG. 11 is a cross-sectional partial explanatory view showing a state of action of a force between the movable plunger of the contact of FIG. 10 and the end of the cylindrical body, and FIG. 12 is a cross-sectional partial explanatory view showing a contact state of the movable plunger of the contact of FIG. 10 and the external terminal of the IC package.

[0068]

As shown, the contact 40 in Example 3 of the present invention, as in Example 1 and Example 2 described above, has a cylindrical body 42, and a movable plunger 43 on an upper side and another movable plunger (not shown) on a lower side which are slidably

provided at both end portions of the cylindrical body 42. Between the upper movable plunger 43 and the lower plunger, a spring member 45 is provided and presses the movable plunger 43 or the like outward.

[0069]

As shown, in the contact 40 of the present invention, the cylindrical body 42 is formed from a cylindrical member 46 that has a hollow cylindrical shape with both ends open, similarly to the cylindrical bodies 2 and 22 of Example 1 and Example 2. In such a cylindrical body 42, both ends of the opening are slightly narrowed by, for example, drawing or caulking, and a flange-shaped edge 47 facing inward is formed. A small diameter opening 48 is provided by the edge 47, and a space 49 having a constant inner diameter is formed inside.

[0070]

In such a contact 40 according to Example 3 of the present invention, the upper movable plunger 43 and the lower movable plunger (not shown) are oppositely fitted in the cylindrical member 46 of the cylindrical body 42, and between them, a spring member 45 is arranged. Further, the upper movable plunger 43 and the lower movable plunger both have a stepped shape, and have a large diameter portion 52 and a small diameter portion 53. Further, such the large diameter portion 52 and the small diameter portion 53 are connected by a stepped portion 54 and the small diameter portions 53 are oppositely arranged so as to project outward from the openings 48 at both ends of the cylindrical member 46, respectively. Further, the spring member 45 is installed between the recessed portion 55 on the inner end surface 52a of the large diameter portion 52 of the upper movable plunger 43 and the end surface of the large diameter portion of the lower movable plunger, and the upper movable plunger 43 and the lower movable plunger are elastically biased outward by the spring member 45, respectively.

[0071]

Further, the upper movable plunger 43 and the lower movable plunger are different only in that a shape of a tip end of the small diameter portion 53 has a plurality of protrusions 56 or is formed in a conical shape so as to have one protrusion, as in the above-described Example 1 and Example 2, and the other configurations are substantially the same for both members.

[0072]

As shown, in the movable plunger 43, the connecting portion between the large diameter portion 52 and the small diameter portion 53 forming the plunger body is integrally formed with a stepped shape via a stepped portion 54 having a required taper. Further, the large diameter portion 52 of the movable plunger 43 is slidably fitted in the cylindrical

member 46 of the cylindrical body 42 with a margin so that it is formed so as to move the inside of the cylindrical body 42 with a margin. Therefore, the movable plungers 43 are provided so as to be tilted in the cylindrical member 46.

[0073]

Further, these movable plungers 43 are fitted in the cylindrical member 46 so that the small diameter portions 53 project outward from the opening 48, and are elastically biased outward by the pressing force of the spring member 45 such as a coil spring engaged with the conical recessed portion 55 of the inner end surface 52a.

[0074]

In particular, in the contact 40 of Example 3 of the present invention, as shown in FIGS. 10 to 12, a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, and one end of the spring member 45 is locked to the recessed portion 55. As a result, the spring member 45 acts eccentrically at the end of the movable plunger 43 to exert an eccentric load on the upper movable plunger 43 and the lower movable plunger (not shown).

[0075]

That is, the end surface 52a of the movable plunger 43 is provided with a conical recessed portion 55 eccentric by the amount of eccentricity E, and the end of the spring member 45 is locked in the recessed portion 55.

[0076]

As shown in FIGS. 11 and 12, the movable plunger 43 is pressed by the spring member 45 and projects outward from the opening 48 at the end of the cylindrical body 42. Further, in the movable plunger 43, the stepped portion 54 serving as the shoulder portion is locked to the opening 48 portion, and the pressing force of the spring member 45 is applied as an eccentric load by the conical recessed portion 55 provided eccentrically on the end surface 52a portion as the bottom surface. As a result, the axial center of the movable plunger 43 is positioned on the eccentric axial center C_F in an inclined state as shown.

[0077]

In such a state shown in FIG. 11, the reaction force F of the spring member 45 is applied to the movable plunger 43, and the reaction force F is applied along the inclined axial center C_F. Therefore, the reaction force F of the spring member 45 is decomposed into a vertical force F1 along the center line C_R of the contact 40 and a lateral force F2 as an eccentric load, and the lateral force F2 is applied as a contact force that presses and contacts the movable plunger 43 against the cylindrical member 46. As a result, between the cylindrical body 42 and the movable plunger 43, a component force F2 is

generated and the contact force is applied so that the movable plunger 43 presses against and comes into contact with the cylindrical body 42.

[0078]

The force relationship at this time is expressed as follows, as in Example 1 and Example 2.

$F2 = F\sin\theta$

F is the reaction force of the spring member, F2 is the contact force, and θ is the eccentric load angle.

[0079]

Such a state in FIG. 11 is obtained by contact of the movable plunger 43 of the contact 20 with respect to the external terminal 51 of the IC package 50, as shown in FIG. 12.

[0080]

That is, as shown in FIG. 12, the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50, and the movable plunger 43 is pressed into the cylindrical member 46. The reaction force F of the spring member 45 is applied to the movable plunger 43 along the axial center C_F inclined with respect to the center line C_R of the contact 40. Therefore, the reaction force F of the spring member 45 is decomposed into a vertical force F1 along the center line C_R of the contact 40 and a lateral force F2 as an eccentric load, and the lateral force F2 presses the movable plunger 43 against the cylindrical member 46 and is applied as a contact force. In this way, as described above, a component force F2 is generated between the cylindrical body 42 and the movable plunger 43, and the contact force is applied so that the movable plunger 43 is brought into contact with the cylindrical body 42.

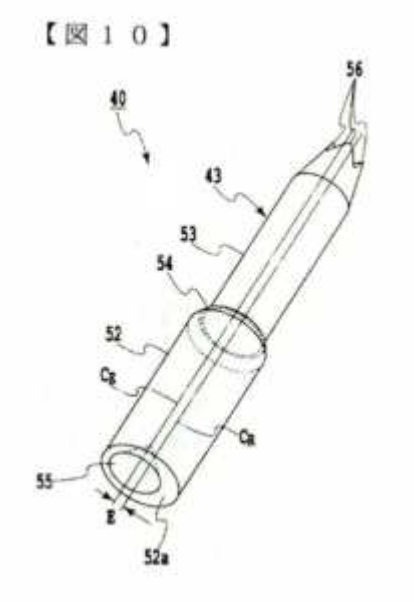
[0081]

Therefore, in the present invention, the contact 40 can prevent fluctuations in electrical characteristics in the contact 40, since the movable plunger 43 is in contact with the cylindrical body 42 as a barrel and can always be stably secured by the lateral component force F2".

(E) "[0119]

In the connector device according to Claim 5 of the present invention, since the end portion of the movable plunger is eccentrically counterbored in a conical shape, it is possible to ensure stable contact between the cylindrical body of the contact and the movable plunger at all times and prevent fluctuations in electrical characteristics. The movable plunger is appropriately machined with eccentric machining to eliminate the need for additional machining and avoid cost increase".

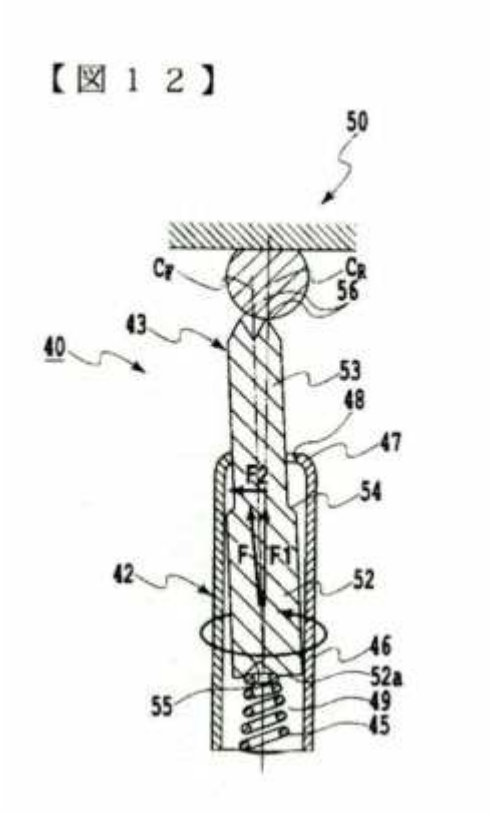
(F) FIG. 10 describes that the movable plunger 43 is a round bar that has the large diameter portion 52 and the small diameter portion 53, and the stepped portion 54 as a shoulder portion.



【図１０】 [FIG. 10]

(G) FIG. 12 describes that the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50, and the movable plunger 43 is pressed into the cylindrical member 46.

【図１２】



【図１２】　　[FIG. 12]

From the described matters above, it is recognized that Evidence A No. 1 describes the following technical matters.

A　From the descriptions of Paragraphs [0001], [0069], and [0070], there can be read the technical matter that "In a contact 40 connected to a printed circuit board such as a test board or the like, a cylindrical body 42 is formed from a cylindrical member 46 that has a hollow cylindrical shape with both ends open, in the cylindrical body 42, at both ends of the opening, a small diameter opening 48 is provided by an edge 47, the upper movable plunger 43 and the lower movable plunger are oppositely fitted in the cylindrical member 46 of the cylindrical body 42, the upper movable plunger 43 and the lower movable plunger both have a stepped shape and have a large diameter portion 52 and a small diameter portion 53, further, such the large diameter portion 52 and the small diameter portion 53 are connected by a stepped portion 54 and the small diameter portions 53 are oppositely arranged so as to project outward from the openings 48 at both ends of the cylindrical member 46, respectively".

B　From the description of FIG. 10, it can be seen that "the movable plunger 43 is a round bar that has the large diameter portion 52 and the small diameter portion 53, and

the stepped portion 54 as a shoulder portion".

C From the descriptions of Paragraphs [0070], [0072], [0073], [0074], and [0076], there can be read the technical matter that "a spring member 45 is installed between a recessed portion 55 on the inner end surface 52a of the large diameter portion 52 of the upper movable plunger 43 and the end surface of the large diameter portion of the lower movable plunger, the upper movable plunger 43 and the lower movable plunger are elastically biased outward by the spring member 45, respectively, further, the large diameter portion 52 of the movable plunger 43 is slidably fitted in the cylindrical member 46 of the cylindrical body 42; therefore, the movable plungers 43 are provided so as to be tilted in the cylindrical member 46 with a margin, and further, these movable plungers 43 are fitted in the cylindrical member 46 so that the small diameter portions 53 project outward from the opening 48, and are elastically biased outward by the pressing force of the spring member 45 such as a coil spring engaged with the conical recessed portion 55 of the inner end surface 52a".

D From the descriptions of Paragraphs [0074] and [0076], there can be read the technical matter that "a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, one end of the spring member 45 is locked to the recessed portion 55, and as a result, the spring member 45 acts eccentrically at the end of the movable plunger 43 to exert an eccentric load on the upper movable plunger 43 and the lower movable plunger, in the movable plunger 43, the pressing force of the spring member 45 is applied as an eccentric load by the conical recessed portion 55 provided eccentrically on the end surface 52a portion as the bottom surface, and as a result, the axial center of the movable plunger 43 is positioned on the eccentric axial center C_F in an inclined state".

E In Paragraph [0079], it is described that "a state in FIG. 11 is obtained by contact of the movable plunger 43 of the contact 20 with respect to the external terminal 51 of the IC package 50, as shown in FIG. 12".

Further, in FIG. 12, it can be seen that "the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50, and the movable plunger 43 is pressed into the cylindrical member 46". Accordingly, from the descriptions of Paragraphs [0077], [0079], [0080] and FIG. 12, there can be read the technical matter that "the reaction force F of the spring member 45 is applied to the movable plunger 43, the reaction force F is applied along the inclined axial center C_F, and

therefore, the reaction force F of the spring member 45 is decomposed into a vertical force F1 along the center line C_R of the contact 40 and a lateral force F2 as an eccentric load, the lateral force F2 is applied as a contact force that presses and contacts the movable plunger 43 against the cylindrical member 46, and as a result, between the cylindrical body 42 and the movable plunger 43, a component force F2 is generated and the contact force is applied so that the movable plunger 43 presses against and comes into contact with the cylindrical body 42, and the same state can be obtained even if the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50 and the movable plunger 43 is pressed into the cylindrical member 46".

F From the description of Paragraph [0081], there can be read the technical matter that "the contact 40 which can prevent fluctuations in electrical characteristics since the movable plunger 43 is in contact with the cylindrical body 42 as a barrel and can always be stably secured by the lateral component force F2".

From A to F above, it is recognized that Evidence A No. 1 describes the following invention (hereinafter, referred to as "Invention A-1").

"A contact 40 connected to a printed circuit board such as a test board or the like, wherein a cylindrical body 42 is formed from a cylindrical member 46 that has a hollow cylindrical shape with both ends open, in the cylindrical body 42, at both ends of the opening, a small diameter opening 48 is provided by an edge 47, an upper movable plunger 43 and a lower movable plunger are oppositely fitted in the cylindrical member 46 of the cylindrical body 42, the upper movable plunger 43 and the lower movable plunger both have a stepped shape and have a large diameter portion 52 and a small diameter portion 53, and further, the large diameter portion 52 and the small diameter portion 53 are connected by a stepped portion 54 and the small diameter portions 53 are oppositely arranged so as to project outward from the openings 48 at both ends of the cylindrical member 46, respectively;

wherein the movable plunger 43 is a round bar that has the large diameter portion 52 and the small diameter portion 53, and a stepped portion 54 serving as a shoulder portion;

wherein a spring member 45 is installed between a recessed portion 55 on the inner end surface 52a of the large diameter portion 52 of the upper movable plunger 43 and the end surface of the large diameter portion of the lower movable plunger, the upper movable plunger 43 and the lower movable plunger are elastically biased outward by the spring member 45, respectively, and further, the large diameter portion 52 of the movable plunger 43 is slidably fitted in the cylindrical member 46 of the cylindrical body 42 with

a margin, and therefore, the movable plungers 43 are provided so as to be tilted in the cylindrical member 46, and further, these movable plungers 43 are fitted in the cylindrical member 46 so that the small diameter portions 53 project outward from the opening 48, and are elastically biased outward by the pressing force of the spring member 45 such as a coil spring engaged with the conical recessed portion 55 of the inner end surface 52a;

wherein a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, one end of the spring member 45 is locked to the recessed portion 55 as a result, and the spring member 45 acts eccentrically at the end of the movable plunger 43 to exert an eccentric load on the upper movable plunger 43 and the lower movable plunger,

wherein in the movable plunger 43, the pressing force of the spring member 45 is applied as an eccentric load by the conical recessed portion 55 provided eccentrically on the end surface 52a portion as the bottom surface, and thus the axial center of the movable plunger 43 is positioned on the eccentric axial center C_F in an inclined state;

wherein the reaction force F of the spring member 45 is applied to the movable plunger 43, the reaction force F is applied along the inclined axial center CF, and therefore, the reaction force F of the spring member 45 is decomposed into a vertical force F1 along the center line CR of the contact 40 and a lateral force F2 serving as an eccentric load, the lateral force F2 is applied as a contact force that presses and contacts the movable plunger 43 against the cylindrical member 46, and as a result, between the cylindrical body 42 and the movable plunger 43, a component force F2 is generated and the contact force is applied so that the movable plunger 43 presses against and comes into contact with the cylindrical body 42, and the same state can be obtained even if the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50 and the movable plunger 43 is pressed into the cylindrical member 46; and

wherein fluctuations in electrical characteristics can be prevented, since the movable plunger 43 is in contact with the cylindrical body 42 as a barrel and can always be stably secured by the lateral component force F2".

2-1-2 Described matter of Evidence A No. 2 and invention described in Evidence A No. 2

In Evidence A No. 2 distributed before the priority date of the original application of the application relating to the Patent, there are described the following matters together with drawings.

(A) "[Scope of Claims]

[Claim 1]
An electrical contact spring probe assembly for communication with an electrical component comprising:

a plunger having a contact tip and an end portion opposite said contact tip;

a tubular barrel for receiving said end portion for movement of said plunger along a longitudinal axis between an extended position where said tip projects from said barrel and a withdrawn position where said tip partially retracts within said barrel,

said plunger having a longitudinally extending aperture therein defining a second axis separate from said longitudinal axis; and

a spring for applying a longitudinal load on said plunger and having a first end engaging said barrel and a second end received within said aperture to translate a portion of said longitudinal load into a side load to bias said plunger against said barrel".

(B) "[Claim 4]
The electrical contact spring probe assembly according to Claim 1,

wherein said second axis is generally parallel to said longitudinal axis".

(C) "[Technical field]
[0001]

This invention relates generally to battery-type contacts and interconnect probes and, in particular, to spring-loaded contact probes and a method for biasing the probes which are used in electrical testing applications and battery contact applications".

(D) "[Problem to be solved by the invention]
[0003]

Battery-type contacts and interconnect probe designs generally require compact, durable, highly reliable designs with circuit paths optimized for the best performance. These contacts are typically employed in battery charging applications, mobile telecommunication applications, docking applications, and other portable electronic devices in addition to applications for testing electronics, such as printed circuit boards and computer chips. They may be used as either power conductors or signal carriers and would be subject to a variety of environmental conditions.
[0004]

As products continue to shrink in size or increase in performance while maintaining current size, the need for smaller contacts continues to grow. Compliancy of a probe contact continues to be important to accommodate the tolerances of many parts

in an assembly. Often this compliancy requires a probe with a plunger travel much longer than a spring can supply in the spaced allotted. This is compensated by back drilling the plunger to supply additional space for the spring. The resultant probe performs well mechanically, but the electrical performance in certain instances is compromised by the action of the spring and device under test. Specifically, if the device under test pushes directly down on top of the plunger and the spring generates a force pushing directly up the desired contact between plunger and barrel, which is required for optimal electrical performance, the force can be very light or nonexistent. The result is a poor, unreliable electrical performance for the probe".

(E) "[0006] In an effort to improve biasing in probes, many designs have been generated. The most popular and successful has been applying a bias cut on the tail of the plunger. A large side force is created from the spring pushing against the bias cut, thereby creating firm and constant contact force between barrel and plunger. This contact force ensures that the current will flow from the plunger to the barrel and not through the spring and also provides the lowest contact resistance between the barrel and plunger. The disadvantage to this type of design is the higher friction that is created between the plunger and barrel, resulting in failure of the probe due to mechanical wear.
[0007]

With a back-drilled plunger, an angled surface cannot be generated to induce this biasing. Thus, other techniques must be employed to generate the biasing. Some techniques involve changing the plunger design on the front end of the plunger to promote biasing, while others require special barrels, tangs, and the like.
[Means for solving the problem]
[0008]

The present invention is a plunger with back-drilled hole or aperture with the centerline of the aperture separate from the plunger's longitudinal axis. The spring force against the plunger is no longer directly in line with the plunger longitudinal axis or centerline. When the plunger encounters the device under test or battery contact, for example, an immediate coupling or moment is created which transfers a portion of the longitudinal force exerted along the plunger axis into a side force. This moment creates the biasing needed by forcing the plunger's bearing surface against the barrel inner diameter. The pivot point is the contact point between plunger and device under test. The larger the spring force, the larger the moment and thus, the higher the contact force.
[0009]

Some spring movement or "snaking" occurs due to the off-centered hole. The

ends of the spring will tend to center themselves in the cavities made for them. Because the two cavities are not aligned, the spring has no choice but to bend in the center of the coils. This bending action further amplifies the biasing of the plunger if the plunger cavity extends to the center of the spring".

(F) "[0013]

FIGS. 3-5 illustrate the electrical contact probe of the present invention generally indicated by reference number 50. The probe 50 includes a hollow barrel 52 for receiving a plunger 54. The plunger 54 includes a top 56, a shoulder or flange 58, and an end portion 60. The plunger 54 is generally circular in cross-section, having a diameter that diminishes from the end portion 60 to the tip 56 across the flange 58. A crimp 62 in the barrel 52 retains the plunger 54 within the barrel 52.

[0014]

The plunger 54 includes a back-drilled hole or aperture 64 to receive a spring 66. In the preferred embodiment, the centerline axis 68 of the aperture 64 is generally parallel to the longitudinal axis; that is, a centerline axis of the plunger 54 and the cavity 53. Because the aperture 64 does not share a common axis with the plunger 54 and the cavity 53, the spring 66 bends slightly as its ends center themselves in the cavity 53 and the aperture 64. The spring force is not directly in line with the plunger centerline 70, and thus when the plunger 54 encounters a device under test or battery contact, for example, an immediate coupling or moment of force is created. The moment transfers a portion of the axial force exerted on the plunger 54 by the spring 66, into a side or trans-axial force generally perpendicular to the longitudinal axis 70 of the plunger 54. This moment or torque creates the biasing by forcing the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of the barrel cavity 53. The pivot point for the moment is the tip 56 of the plunger 54 or the contact point between the plunger 54 and the device under test or electrical device. The larger the spring force, the larger the moment created, which in turn creates a higher contact force between the plunger 54 and the barrel 52.

[0015]

The biasing; that is, contact between the barrel 52 and the plunger 54, is necessary for good electrical conduction between the barrel 52 and the plunger 54".

(G) In FIG. 3, it is shown that a plunger's back-drilled hole or aperture 64 to receive a spring 66 has an inclined recessed portion having a generally conical shape at the top (tip) 56 of the plunger 54.

【図３】

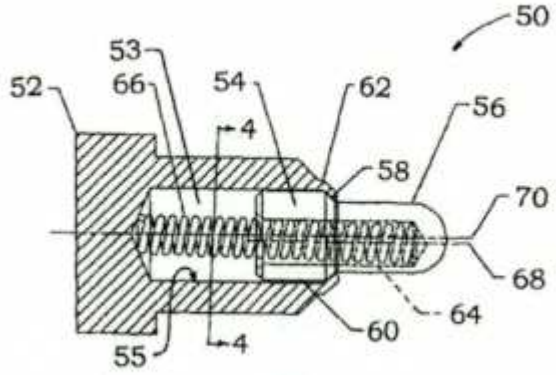


Fig. 3

【図３】 [FIG. 3]

From the described matters above, it is recognized that Evidence A No. 2 describes the following technical matters.

A From [Claim 1], the technical matter "an electrical contact spring probe assembly for communication with an electrical component" can be read.

B From [Claim 1] and [0013], there can be read the technical matter that "an electrical contact spring probe assembly" "comprises a plunger having a contact tip, a shoulder or flange 58 and an end portion opposite said contact tip, and being generally circular in cross-section, and having a diameter that diminishes from the end portion 60 to the tip 56 across the flange 58,

a tubular barrel for receiving said plunger 54 for movement of said plunger along a longitudinal axis between an extended position where said tip projects from said barrel and a withdrawn position where said tip partially retracts within said barrel, and

a spring for applying a longitudinal load on said plunger".

C From [Claim 1], [0014], and FIG. 3, there can be read the technical matter that "the plunger includes a back-drilled hole or aperture 64 to receive a spring 66, and the centerline axis 68 of the aperture 64 is generally parallel to the longitudinal axis; that is, a centerline axis of the plunger 54 and the cavity 53, the plunger having a longitudinally extending aperture therein defining a second axis separate from said longitudinal axis, the plunger's back-drilled hole or aperture 64 to receive a spring 66 having an inclined recessed portion having a generally conical shape at the top (tip) 56 of the plunger 54".

D From [Claim 1], [0014], and [0015], there can be read the technical matter that "the spring has a first end engaging said barrel and a second end received within said aperture to translate a portion of said longitudinal load into a side load to press the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of the barrel cavity 53 and generate a biasing, and the biasing; that is, contact between the barrel 52 and the plunger 54, is necessary for good electrical conduction between the barrel 52 and the plunger 54".

From A to D above, it is recognized that Evidence A No. 2 describes the following invention (hereinafter, referred to as "Invention A-2").

"An electrical contact spring probe assembly for communication with an electrical component comprising:

a plunger having a contact tip, a shoulder or flange 58 and an end portion opposite said contact tip, and being generally circular in cross-section, and having a diameter that diminishes from the end portion 60 to the tip 56 across the flange 58,

a tubular barrel for receiving said plunger 54 for movement of said plunger along a longitudinal axis between an extended position where said tip projects from said barrel and a withdrawn position where said tip partially retracts within said barrel, and

a spring for applying a longitudinal load on said plunger,

wherein the plunger includes a back-drilled hole or aperture 64 to receive a spring 66, and the centerline axis 68 of the aperture 64 is generally parallel to the longitudinal axis; that is, a center axis of the plunger 54 and a cavity 53, and has a longitudinally extending aperture therein defining a second axis separate from said longitudinal axis, and the plunger's back-drilled hole or aperture 64 to receive a spring 66 has an inclined recessed portion having a generally conical shape at the top (tip) 56 of the plunger 54, and

wherein the spring has a first end engaging said barrel and a second end received within said aperture to translate a portion of said longitudinal load into a side load to press the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of the barrel cavity 53 and generate a biasing, and the biasing; that is, contact between the barrel 52 and the plunger 54, is necessary for good electrical conduction between the barrel 52 and the plunger 54".

2-1-3 Technical matter described in Evidence A No. 3

In Evidence A No. 3, there are described the following matters together with

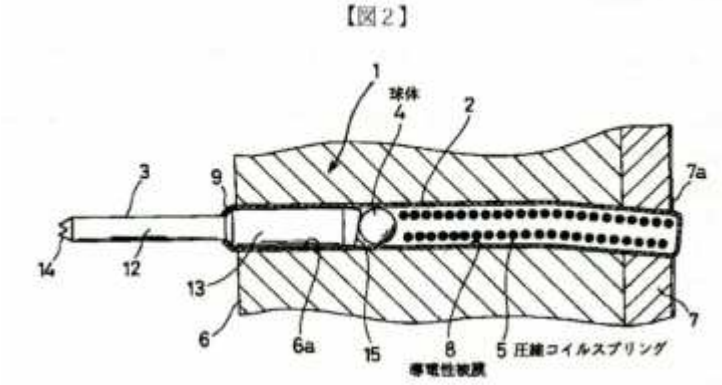
drawings.
"[Scope of Claims]
[Claim 1] A contact probe to be used in a probe test comprising: a barrel; a plunger mounted on the barrel so as to be able to move forward and backward; and a compression coil spring mounted in the barrel to elastically urge the plunger toward the advance side, wherein a conductive film with high electrical conductivity is formed on an inner surface of the barrel, and an insulator film is formed on the entire surface portion of the compression coil spring.
[Claim 2] The contact probe according to Claim 1, wherein a sphere mounted in the barrel and between a base end surface of the plunger and the compression coil spring is provided, and at least the entire surface portion of the sphere is made of an insulating material.
[Claim 3] The contact probe according to Claim 2, wherein the sphere is made of an insulating material".

"[0009] In the invention of Claim 1, the contact probe of Claim 2 is provided with a sphere mounted in the barrel and between the base end surface of the plunger and the compression coil spring, and at least the entire surface portion of the sphere is made of an insulating material. In this way, since at least the entire surface portion of the sphere is made of an insulating material, a high-frequency signal does not flow through the sphere, and the electrical resistance does not increase due to the influence of the sphere".

"[0014] The plunger 3 is, for example, a solid body made of beryllium copper, and is integrally formed with, for example, a plunger main body 12 having an outer diameter of 0.55 mm and a large diameter portion 13 on the base end side slidably mounted in the barrel 2. The plunger 3 is formed so as to move forward and backward with respect to the barrel 2. For example, a sharp quadrant 14 is formed at the tip of the plunger body 12. However, the shape of the tip portion is not limited to this shape. The base end surface of the large diameter portion 13 of the plunger 3 is formed to be an inclined surface 15 which is inclined several degrees from a surface orthogonal to the axis. This is because the pressing force acting on the large diameter portion 13 from the sphere 4 makes the outer peripheral surface of the large diameter portion 13 strongly contact the inner surface of the barrel 2".

"[0017] Next, the operation of the contact probe 1 described above will be described. At the time of the probe test, the plunger 3 is brought into contact with the terminal of the integrated circuit, and a high-frequency signal for testing is supplied from the inspection

device to the barrel 2 via the test circuit 7a of the printed circuit board 7 for testing. At this time, although the high-frequency signal flows through the conductive film 8 with high electrical conductivity and the plunger 3 on the inner surface of the barrel 2, since the insulator film 17 is formed on the entire surface portion of the compression coil spring 5, the high-frequency signal does not flow in the compression coil spring 5. Therefore, the influence of the self-inductance of the compression coil spring 5 does not appear in this high frequency signal. Since the conductive film 8 with high electrical conductivity is formed on the inner surface of the barrel 2, the high-frequency signal of the probe test flows through the conductive film 8 with high electrical conductivity and the plunger 3".



【図２】 [FIG. 2]
球体 Sphere
圧縮コイルスプリング Compression coil spring
導電性被膜 Conductive film

Therefore, Evidence A No. 3 describes the following technical matter.

"A contact probe comprising: a barrel; a plunger mounted on the barrel so as to be able to move forward and backward; and a compression coil spring mounted in the barrel to elastically urge the plunger toward the advance side, wherein a sphere mounted in the barrel and between a base end surface of a large diameter portion 13 on a base end side of the plunger and the compression coil spring is provided, an insulator film is formed on the entire surface portion of the compression coil spring, at least the entire surface portion of the sphere is made of an insulating material, the base end surface of the large diameter portion 13 of the plunger 3 is formed to be an inclined surface 15 which is inclined several degrees from a surface orthogonal to the axis, pressing force acting on the large diameter portion 13 from the sphere 4 makes the outer peripheral surface of the large diameter portion 13 strongly contact the inner surface of the barrel 2, a signal flows through the inner surface of the barrel 2 and the plunger 3, and the high-frequency signal does not

flow in the compression coil spring 5 nor the sphere".

2-1-4 Technical matter described in Evidence A No. 4

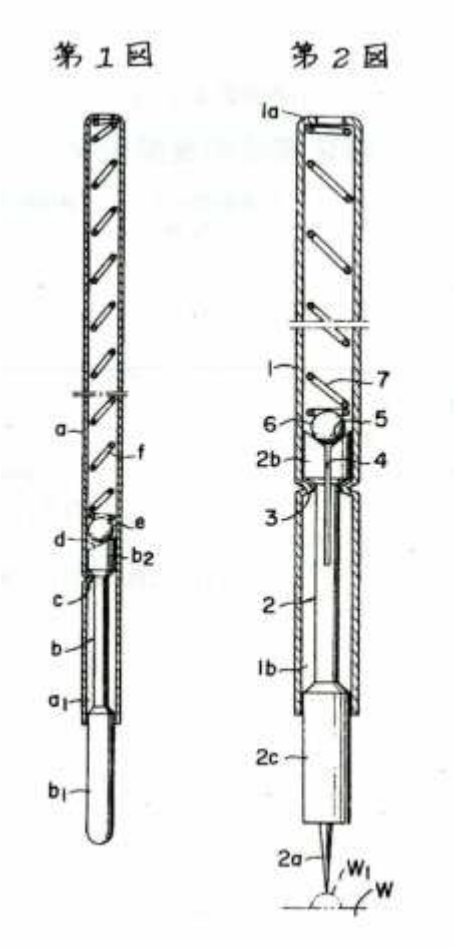
In Evidence A No. 4, there are described the following matters together with drawings.

"Technical background of the invention and problem thereof.

In this type of a conductive contact needle device that has already been proposed, as shown enlarged in FIG. 1, a contact needle body b having a contact needle (probe) b_1 is slidably fitted in a lower opening a_1 of a holding cylinder body a by conductivity so as not to come off with a locking portion c formed at a part of the holding cylinder body a, and a sphere (ball) e is press-contacted on an inclined surface d formed on an upper part b_2 of the contact needle body b by the elastic force of a coil spring f interposed in the holding cylinder body a.

Therefore, the conductive contact needle device mentioned above, if being used as a tester of an electric circuit, for example, makes the contact needle b1 of the contact needle body b contact with a solder portion of a printed circuit board, thereby performing electrical measurement/adjustment or an operation test. In this case, the upper part b_2 of the contact needle body b pushes the inclined surface d to a side part by the pressing force of the sphere e energized by the elastic force of the coil spring f, and thereby is pressed against the inner wall of a conductive holding cylinder body a to be brought into conduction". (Specification, page 2, line 5-page 3, line 4)

"On the other hand, an upper part 2b of a contact needle body 2 is provided with a sliding portion 4 in an axial direction, and the sliding portion 4 enables the upper part 2b to open to both sides. On an upper top surface of the contact needle body 2, an inclined surface 5 is formed toward an axial direction where the sliding portion 4 is located, and the inclined surface 5 forms a conical recessed portion. Furthermore, on the inclined surface 5, a sphere (ball) 6 is placed, and the sphere 6 is pressed by elastic force due to a coil spring 7 provided in the holding cylinder body 1, so that the sphere 6 elastically opens the upper part 2b of the contact needle body 2 to both sides to uniformly contact with an inner peripheral surface of the holding cylinder body 1. Thereby, the conductive holding cylinder body 1 and the contact needle body 2 are contacted while being electrically connected at all times." (Specification, page 6, lines 2-16)



第１図　FIG. 1
第２図　FIG. 2

Therefore, Evidence A No. 4 describes the following technical matters A and B.

A　"A conductive contact needle device, in which a contact needle body b having a contact needle (probe) b_1 is slidably fitted in a lower opening a_1 of a holding cylinder body a by conductivity, a sphere (ball) e is press-contacted on an inclined surface d formed on an upper part b_2 of the contact needle body b by the elastic force of a coil spring f interposed in the holding cylinder body a, and the upper part b_2 of the contact needle body b pushes the inclined surface d to a side part by the pressing force of the sphere e energized by the elastic force of the coil spring f, and is thereby pressed against the inner wall of a conductive holding cylinder body a to be brought into conduction".

B　"A conductive contact needle device, in which an upper part 2b of a contact needle body 2 is provided with a sliding portion 4 in an axial direction, the sliding portion 4 enables the upper part 2b to open to both sides, on an upper top surface of the contact needle body 2, an inclined surface 5 is formed toward an axial direction where the sliding

portion 4 is located, the inclined surface 5 forms a conical recessed portion, furthermore, on the inclined surface 5, a sphere (ball) 6 is placed, the sphere 6 is pressed by elastic force due to a coil spring 7 provided in the holding cylinder body 1, so that the sphere 6 elastically opens the upper part 2b of the contact needle body 2 to both sides to uniformly contact with an inner peripheral surface of the holding cylinder body 1, and thereby, the conductive holding cylinder body 1 and the contact needle body 2 are contacted while being electrically connected at all times".

2-1-5 Technical matter described in Evidence A No. 5

In Evidence A No. 5, there are described the following matters together with drawings.

"2. Scope of claims of utility model registration

(1) A contact probe comprising: a holding cylinder having conductivity at least on an inner layer; a plunger capable of sliding at an opening portion of the holding cylinder so as not to come off and having a rear end formed on a slanting bias-cut surface with respect to a sliding direction, a coil spring elastically energizing the plunger in a direction projecting out from the holding cylinder; and a pressing member interposed between the coil spring and the bias-cut surface of the plunger, wherein the pressing member is configured to be an insulation body.

(2) The contact probe according to Claim 1 of the scope of claims of utility model registration, wherein a member pressing at least against the bias-cut surface of the pressing member is configured by an insulating material with a small friction coefficient.

(3) The contact probe according to Claim 1 or Claim 2 of the scope of claims of utility model registration, wherein the pressing member is configured to be a sphere by coating a surface of a metallic sphere with an insulating material". (Specification, page 1, line 4-page 2, line 2)

"Incidentally, in the above-mentioned conventional contact probe...it is likely that a component force orthogonal to the sliding direction cannot be sufficiently applied to the bias cut surface. In such a case, the rear end of the plunger cannot be certainly brought into the holding cylinder, and dust or plastic that has entered the holding cylinder easily enters the contact area between the plunger and a protection cylinder, so that the conductive path between the plunger and the protection cylinder is cut off, and current easily flows from the plunger to the metallic sphere, and further to coil spring....Consequently, ...there has been a problem that the reliability of inspection is lacking....The invention, which is to solve the problem of the conventional contact probe,

aims to provide a contact probe with high reliability of inspection without configuring a path other than a normal conductive path, by configuring a pressing member interposed between a bias-cut surface of the contact probe and a coil spring to be an insulation body". (Specification, page 3, line 10-page 4, line 18)

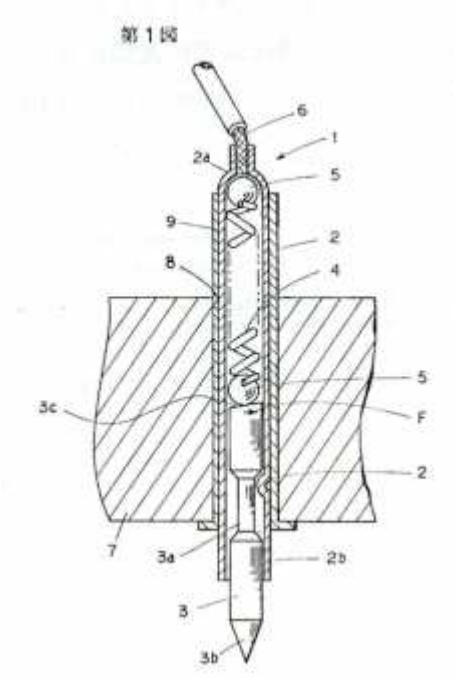
"In FIG. 1, in the contact probe 1, the plunger 3 is slidably inserted and arranged in the opening portion 2b at the other end of the protection cylinder 2 forming a good conductive layer such as gold plating on the inner layer formed with a narrowing portion 2a at one end". (Specification, page 6, lines 5-8)

"Further, by decreasing the friction coefficient of the pressing member 5, rotations between the bias-cut surface 3c and the coil spring 4 are made smooth, component force F orthogonal to the sliding direction by the bias-cut surface 3c can be sufficiently applied to the plunger 3, and thereby the plunger 3 can be reliably brought into contact with the protection cylinder 2. Accordingly, since the contacting force of the plunger 3 to the protection cylinder 2 can be increased, dust or flux entering the protection cylinder 2 can be excluded from the contacting surface, and a normal conductive path can be reliably ensured.

The pressing member 5 may be entirely formed of an insulating material having a small friction coefficient such as Teflon, and a sphere may be formed by coating a surface of a metallic sphere with an insulating material". (Specification, page 7, line 20-page 8, line 13)

"(Function)

Since the pressing member interposed between the bias-cut surface at the plunger rear end and the coil spring is configured to be an insulation body, a current does not flow from the plunger to the coil spring through the pressing member. If the normal conductive path between the plunger and the protection cylinder is shut off, it can be immediately determined that the contact probe is out of order, so that an inspection result that it is a defective product is not obtained with respect to a good printed circuit board or the like, and the reliability of the inspection can be improved". (Page 5, lines 11-20).



第１図　FIG. 1

Therefore, Evidence A No. 5 describes the following technical matter.

"A contact probe comprising: a holding cylinder; a plunger capable of sliding at an opening portion of the holding cylinder and having a rear end formed on a slanting bias-cut surface with respect to a sliding direction; a coil spring elastically energizing the plunger in a direction projecting out from the holding cylinder; and a pressing member interposed between the coil spring and the bias-cut surface of the plunger, wherein the pressing member is configured to be a sphere by coating a surface of a metallic sphere with an insulating material with a small friction coefficient, component force F orthogonal to the sliding direction by the bias-cut surface can be sufficiently applied to the plunger, and thereby the plunger can be reliably brought into contact with the protection cylinder, a current does not flow to the coil spring, and a normal conductive path can be reliably ensured".

2-1-6 Technical matter described in Evidence A No. 6

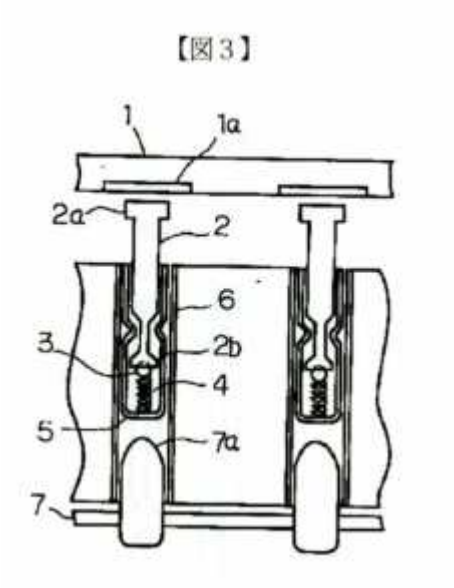
In Evidence A No. 6, there are described the following matters together with drawings.

"[0002]

[Conventional Art] A cross-sectional side view of a conventional contact pin is shown in FIG. 3. By pushing down a head portion 2a of a plunger 2 through a circuit board 1 from an upper part, a spring 4 attached with a ball 3 at a tip end is compressed, and force

for moving the ball 3 in a horizontal direction by the repulsion force of the spring works. In conjunction with the ball, a plunger contact portion 2b is pressed against an inner wall of a barrel 5, and the plunger 2 and the barrel 5 are brought into conduction. Furthermore, by the repulsion force of the spring 4, the plunger head portion 2a is in close contact with an electrode surface 1a of the circuit board 1, and the circuit board 1 and a socket 6 in which a contact pin is inserted are electrically connected. Therefore, it is attached to a lower part by inserting a pin 7a of another circuit board 7 in the socket 6, and finally the upper and lower circuit boards 1 and 7 are electrically connected".

Also, FIG. 3 shows "a contact pin sequentially inserting a spring 4, a ball 3, and a plunger 2 in a bottomed cylindrical barrel 5".



【図３】 [FIG. 3]

Therefore, Evidence A No. 6 describes the following technical matter.
"A contact pin sequentially inserting a spring 4, a ball 3, and a plunger 2 in a bottomed cylindrical barrel 5, in which by pushing down a head portion 2a of a plunger 2, the spring 4 attached with the ball 3 at a tip end is compressed, force for moving the ball 3 in a horizontal direction by the repulsion force of the spring works, and in conjunction with the ball, a plunger contact portion 2b is pressed against an inner wall of the barrel 5, and the plunger 2 and the barrel 5 are brought into conduction".

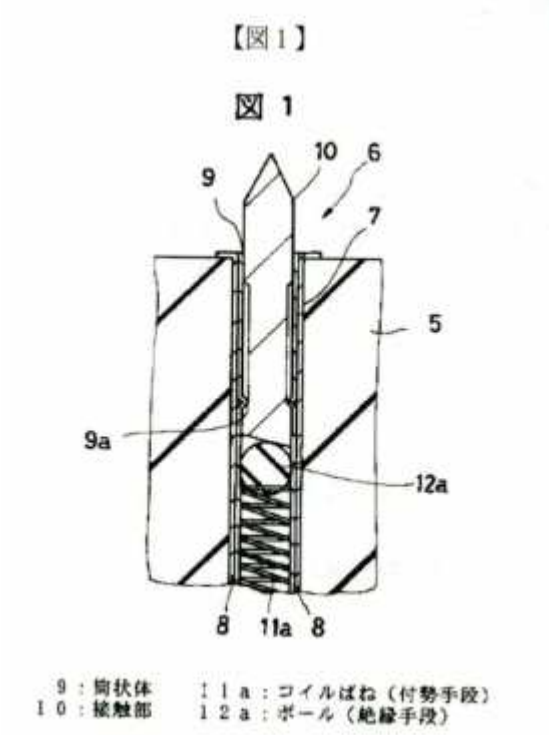
2-1-7 Technical matter described in Evidence A No. 7

In Evidence A No. 7, there are described the following matters together with

drawings.
"[0005] [Problem to be solved by the invention] However, the present inventor has found that the conventional contact probe pins have the following problem.
[0006] That is, conventionally, the outer peripheral wall of the contact portion and the inner peripheral wall of the tubular body have been scraped by long-term use, and even if the direct electrical contact state between the contact portion and the tubular body has actually deteriorated, since the contact portion is electrically connected to the tubular body through the ball and the coil spring, there is a problem that it is difficult to find the deterioration defect in the electrical inspection of the contact probe pin".

"[0022] The contact probe pin 6 includes a tubular body 9, a contact portion 10 housed in a tube of the tubular body 9 with one end protruding, a coil spring (urging means) 11a housed on other end side of the contact portion 10 in the tube of the tubular body 9, and a spherical ball 12a interposed between the contact portion 10 and the coil spring 11a".

"[0025] The coil spring 11a is a component for urging the contact portion 10 to the outside of the tubular body 9, and is made of a predetermined metal in Embodiment 1.
[0026] Incidentally, in Embodiment 1, the ball 12a is composed of, for example, an insulator, and has a function as an insulating means for blocking a conduction path between the contact portion 10 and the coil spring 11a.
[0027] That is, the contact probe pin 6 of Embodiment 1 has a structure in which the electrical connection of the contact portion 10 with the tubular body 9 is limited to direct contact with the tubular body 9".



【図１】 [FIG. 1]
９：筒状体 9: Tubular body
１０：接触部 10: Contact portion
１１ａ：コイルばね（付勢手段） 11a: Coil spring (energizing means)
１２ａ：ボール（絶縁手段） 12a: Ball (insulating means)

"[0033] [Embodiment 2] FIG. 3 is a cross-sectional view of a main part of a contact probe pin according to another embodiment of the present invention.
[0034] In the contact probe pin 6 of Embodiment 2 shown in FIG. 3, instead of the ball 12b being made of a metal conductor, the coil spring 11b is composed of an insulator and the coil spring 11b itself has a function as an insulating means. In FIG. 3, the coil spring 11b is shaded to show its function as an insulating means.
[0035] Therefore, in Embodiment 2 as well, it is possible to obtain the same effects as the effects (1) to (3) obtained in Embodiment 1 above, and the range of material selection for the coil spring 11b is widened, so that the effect that the cost of the contact probe pin 6 is reduced can also be obtained".

Therefore, Evidence A No. 7 describes the following technical matter.

"A contact probe pin 6 including a tubular body 9, a contact portion 10 housed in a tube

of the tubular body 9 with one end protruding, and a coil spring (urging means) 11a housed on other end side of the contact portion 10 in the tube of the tubular body 9, and a spherical ball 12a interposed between the contact portion 10 and the coil spring 11a, in which the ball 12a is composed of, for example, an insulator, and has a function as an insulating means for blocking a conduction path between the contact portion 10 and the coil spring 11a, and the electrical connection of the contact portion 10 with the tubular body 9 is limited to direct contact with the tubular body 9".

Also, Evidence A No. 7 describes in the paragraphs [0033] to [0035] the technology "composing the coil spring by an insulator".

2-1-8 Technical matter described in Evidence A No. 8

In Evidence A No. 8, there are described the following matters together with drawings.

"[Scope of claims of utility model registration]

[Claim 1] A contact probe comprising: a cylindrical housing member constituting a connection part; a plunger member slidably housed in the housing member and having a contact part; and a spring member arranged inside the housing member and constantly energizing the plunger member in a direction projecting out from the housing member, wherein a plurality of ball members having a diameter smaller than an inner diameter of the housing member are arranged between the plunger member and the spring member.

[Claim 2] The contact probe according to Claim 1, wherein the spring member has an outer diameter smaller than a diameter of the ball member energized by the spring member".

"[Claim 7] The contact probe according to Claim 2, Claim 4, Claim 5, or Claim 6, wherein the ball member in contact with the spring member is made of an insulating material".

"[0002]

[Conventional art] Conventionally, a spring type contact probe used for a substrate test of an electronic circuit has been known, and energization or voltage has been checked using that. In recent years, such a contact probe is also used as an automatically detachable connector.

[0003] As such a contact probe, ... it is roughly divided into... and a contact probe B in which as shown in FIG. 9, a plunger member e having a contact part e1 is stored in the housing member d having a connection part d1, the plunger member e is constantly energized in a projecting out direction by the spring member f, and the contact part e1

and the connection part d1 are energized by the contact of the spring member f or the plunger member e and an inner peripheral surface of the housing member d.
[0004] However,...
[0005] In the latter type, even if the contact part e1 is pressed, since the connection part d1 does not move, there are advantages that it is easy to connect, there is no worry of disconnection, and the probe can be easily replaced by inserting it in the socket. On the other hand, there are problems that since the housing member d (connection part d1) and the plunger member e (contact part e1) are separate members, the contact from the contact part e1 to the connection part d1 is unstable; that is, the contact is made for the first time due to an imbalance of force, and in addition, the spring member f may be burnt due to the current flowing through the spring member f.
[0006]

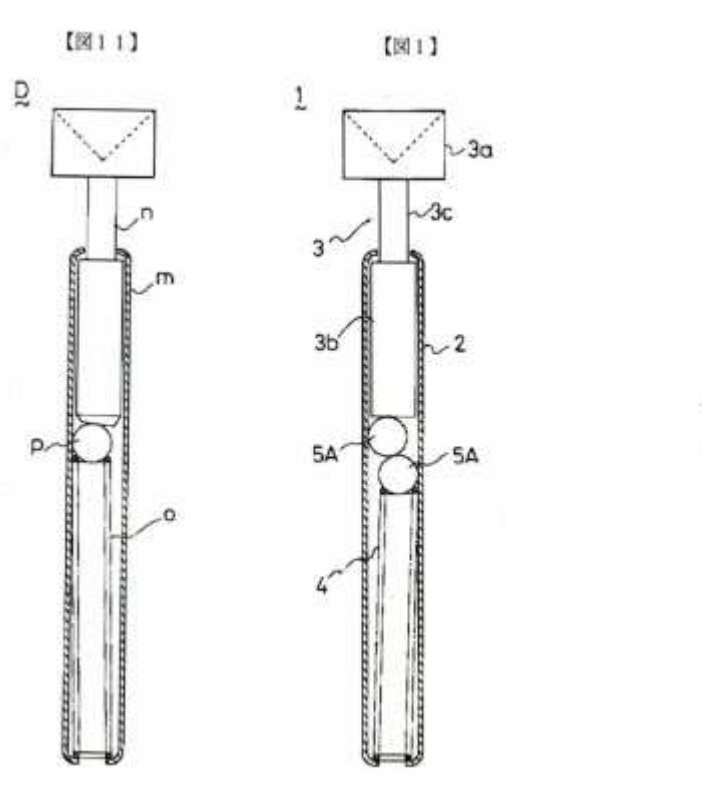
In view of this, like the contact probe C shown in FIG. 10, some contact probes diagonally cut the rear end portion of a plunger member h housed in a housing member g; that is, a part h1 in contact with a spring member k, and make the balance of the force of the plunger member h lost, thereby making the housing member g and the plunger member h in reliable contact with each other, and further, like the contact probe D shown in FIG. 11, some contact probes interpose a ball member p between a plunger member n housed in a housing member m and a spring member o".

"[0033]
[Advantage of the Device]

Since the device of Claim 1, as described above, is arranged with a plurality of ball members between a spring member and a plunger member, the plurality of ball members move smoothly with the movement of the plunger, and the plunger member having the contact part can be reliably contacted with the housing member configuring the connection part through the ball members without impairing durability, and thus reliable energization can be obtained".

"[0039]

In the device of Claim 7, the ball members contacted with the spring member are made of an insulating material, so that a current does not flow through the spring member, and thus the spring member can be prevented from being burned.



【図１１】　[FIG. 11]
【図１】　[FIG. 1]

Therefore, as "Conventional Art," Evidence A No. 8 describes "A contact probe which diagonally cuts the rear end portion of a plunger member n housed in a housing member m, and interposes a ball member p between the plunger member n housed in the housing member m and a spring member o,"

and describes the following technical matter.

"A contact probe comprising: a cylindrical housing member constituting a connection part; a plunger member slidably housed in the housing member and having a contact part; and a spring member arranged inside the housing member and constantly energizing the plunger member in a direction projecting out from the housing member,

wherein a plurality of ball members having a diameter smaller than an inner diameter of the housing member are arranged between the plunger member and the spring member, the spring member has an outer diameter smaller than a diameter of the ball member energized by the spring member, ball members contacted with the spring member are made of an insulating material, the plunger member having the contact part can be reliably contacted with the housing member configuring the connection part through the ball members, and thus reliable energization can be obtained, the ball members contacted with

the spring member are made of an insulating material, so that a current does not flow through the spring member, and thus the spring member can be prevented from being burned."

2-1-9 Technical matter described in Evidence A No. 9

In Evidence A No. 9, there are described the following matters as [Conventional Art] together with drawings.

"[0002]

[Conventional Art]

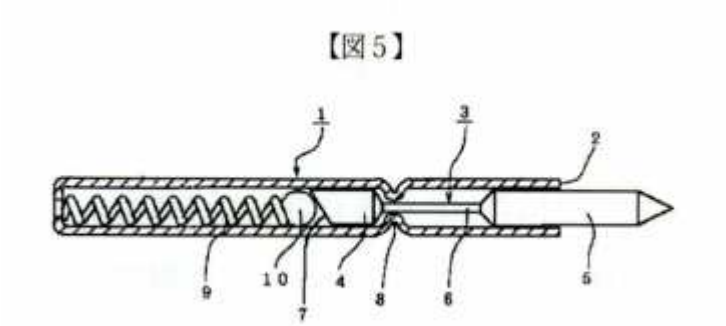
An example of a conventionally used contact probe will be described by the cross-sectional view of FIG. 5, where the right end of a thin tube 1 made of a conductive material is an opening 2, and a plunger 3 is provided inside the thin tube 1.

[0003]

The plunger 3 has a tail end portion 4 slidably inserted into the thin tube 1, a tip end portion 5 having a pointed tip end protruding from the opening 2 of the thin tube 1, and a small diameter portion 6 that connects the tail end portion 4 and the tip end portion 5, and the end surface of the tail end portion 4 opposite to the opening 2 is an inclined surface 7 that is inclined in one direction. A constricted locking portion 8 is formed in the thin tube 1 to prevent the tail end 4 from passing through, and to prevent the plunger 3 from coming out of the thin tube 1. A coil spring 9 and a ball 10 are inserted on the left side of the tail end portion 4 in the thin tube 1, and the coil spring 9 urges the inclined surface 7 to the opening 2 side via the ball 10 to protrude the tip end portion 5 of the plunger 3 from the opening 2 of the thin tube 1.

[0004]

A conductor wire (not shown) is attached to the thin tube 1, and electrical measurement is performed by bringing the tip end portion 5 of the plunger 3 into contact with a portion to be measured such as a soldered portion of a printed circuit board. In this case, a component force that presses the inclined surface 7 against the inner wall of the thin tube 1 by the pressing force of the ball 10 urged by the elasticity of the coil spring 9 acts on the tail end portion 4 of the plunger 3, and the tail end portion 4 is pressed against the inner wall of the conductive thin tube 1 to ensure electrical conduction between the thin tube 1 and the plunger 3".



【図５】 [FIG. 5]

Therefore, Evidence A No. 9 describes the following technical matter.
"A contact probe, in which the right end of a thin tube 1 made of a conductive material is an opening 2; a plunger 3 is provided inside the thin tube 1, the plunger 3 having a tail end portion 4 slidably inserted into the thin tube 1, a tip end portion 5 having a pointed tip end protruding from the opening 2 of the thin tube 1, and a small diameter portion 6 that connects the tail end portion 4 and the tip end portion 5; and the end surface of the tail end portion 4 opposite to the opening 2 is an inclined surface 7 that is inclined in one direction; a coil spring 9 and a ball 10 are inserted on the left side of the tail end portion 4 in the thin tube 1; the coil spring 9 urges the inclined surface 7 to the opening 2 side via the ball 10 to protrude the tip end portion 5 of the plunger 3 from the opening 2 of the thin tube 1; a component force that presses the inclined surface 7 against the inner wall of the thin tube 1 by the pressing force of the ball 10 urged by the elasticity of the coil spring 9 acts on the tail end portion 4 of the plunger 3, and the tail end portion 4 is pressed against the inner wall of the conductive thin tube 1 to ensure electrical conduction between the thin tube 1 and the plunger 3".

2-1-10 Well-known art
(1) Well-known Art 1

According to the technical matters described in Evidence A No. 3 to Evidence A No. 9 above, it is recognized that the following technology was a well-known art before the priority date of the case (hereinafter, referred to as "Well-known Art 1").
The technology that "in a contact probe, a rear end of a plunger pin is made to be a diagonal bias-cut surface (inclined surface) and is pressed by a coil spring via a sphere, and an outer peripheral surface of the plunger pin is bought into contact with an inner peripheral surface of a cylindrical barrel to be in conduction".

(2) Well-known Art 2

According to Evidence A No. 3, Evidence A No. 5, Evidence A No. 7 and Evidence A No. 8, it is recognized that the following technology was a well-known art before the priority date of the case. (Hereinafter, referred to as "Well-known Art 2".)
The technology that "when by using the pressing force of a coil spring, an outer peripheral surface of a plunger pin is bought into contact with an inner peripheral surface of a cylindrical barrel to be in conduction, a sphere whose entire surface portion or entire is configured by an insulating material is interposed between the plunger pin and the coil spring, thereby preventing a current from flowing through the coil spring".

Hereinafter, Well-known Art 1 and Well-known Art 2 may be collectively referred to as "the Well-known Art".

2-A Regarding Corrected Invention 1

Hereinafter, inventive step (Reasons for invalidation 1) of Corrected Invention 1 will be judged.
2-A-1 Regarding lack of inventive step (judgment by the body) based on Evidence A No. 1 and the Well-known art
(1) Corrected Invention 1 and Invention A-1

Corrected Invention 1 is separately described as follows.
"A A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,
B wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof,
C the protrusion end portion of the plunger pin is pressed by a coil spring with an insulator film received in a tubular inside of the main body case so as to protrude out from the main body case, and
D wherein a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case".

Next, Invention A-1 is as described in "2-1-1" above.

(2) Comparison

Hereinafter, for each constituent component separately described, Corrected Invention 1 and Invention A-1 will be compared.

(Regarding Constituent component A)

Since it is described in Paragraph [0034] of the Specification that "In the present embodiment, the pin portion 12 is molded integrally with the main body case 11. The pin portion 12 may be a plunger pin like the plunger pin 20," a configuration composed of "a lower movable plunger" and "a cylindrical member 46 that has a hollow cylindrical shape" of Invention A-1 corresponds to "a tubular main body case" of Corrected Invention 1.

Next, since "an upper movable plunger 43" of Invention A-1 is "fitted in the cylindrical member 46 of the cylindrical body 42," it corresponds to "a plunger pin received in the tubular main body case" of Corrected Invention 1.

Next, "the small diameter portions 53" of "an upper movable plunger 43" in Invention A-1 are "oppositely arranged so as to project outward from the openings 48 at both ends of the cylindrical member 46, respectively". Then, in Invention A-1, the matter that "the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50" is that the contact 40 is electrically "connected" to "a printed circuit board such as a test board or the like".

Therefore, it can be said that "a contact 40 connected to a printed circuit board such as a test board or the like" in which "the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50" of Invention A-1 corresponds to "a contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case with a target part" of Corrected Invention 1.

(Regarding Constituent component B)

The matter in Invention A-1 that "an upper movable plunger 43" "has a stepped shape and has a large diameter portion 52 and a small diameter portion 53, further, and such the large diameter portion 52 and the small diameter portion 53 are connected by a stepped portion 54," "the large diameter portion 52 of the movable plunger 43 is slidably fitted in the cylindrical member 46 of the cylindrical body 42 with a margin" and "the movable plunger 43 is a round bar that has the large diameter portion 52 and the small diameter portion 53, and a stepped portion 54 serving as a shoulder portion," corresponds

to that "the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof".

(Regarding Constituent component C)

Since "a spring member 45" in Invention A-1 is "such as a coil spring," it is common with "a coil spring with an insulator film" of Corrected Invention 1 in the point that they are "a coil spring".

Next, the matter in Invention A-1 that "these movable plungers 43 are fitted in the cylindrical member 46 so that the small diameter portions 53 project outward from the opening 48, and are elastically biased outward by the pressing force of the spring member 45 such as a coil spring engaged with the conical recessed portion 55 of the inner end surface 52a," and the matter in Corrected Invention 1 that "the protrusion end portion of the plunger pin is pressed by a coil spring with an insulator film received in a tubular inside of the main body case so as to protrude out from the main body case" are common in the point that "the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case".

(Regarding Constituent component D)

Since in Invention A-1, "a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E," "a conical recessed portion 55" in Invention A-1 corresponds to "an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin" in Corrected Invention 1.

Next, the matter in Invention A-1 that "the movable plungers 43 are provided so as to be tilted in the cylindrical member 46," "a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, one end of the spring member 45 is locked to the recessed portion 55, as a result, and the spring member 45 acts eccentrically at the end of the movable plunger 43" "to exert an eccentric load" "on the upper movable plunger 43," "and thus the axial center of the movable plunger 43 is positioned on the eccentric axial center C_F in an inclined state," and "the reaction force F of the spring member 45 is applied to the movable plunger 43, the reaction force F is applied along the

inclined axial center C_F, therefore, the reaction force F of the spring member 45 is decomposed into a vertical force F1 along the center line C_R of the contact 40 and a lateral force F2 as an eccentric load, the lateral force F2 is applied as a contact force that presses and contacts the movable plunger 43 against the cylindrical member 46, as a result, between the cylindrical body 42 and the movable plunger 43, a component force F2 is generated and the contact force is applied so that the movable plunger 43 presses against and comes into contact with the cylindrical body 42, and the same state can be obtained even if the protrusion 56 at the tip of the movable plunger 43 comes into contact with the external terminal 51 of the IC package 50 and the movable plunger 43 is pressed into the cylindrical member 46," and the matter in Corrected Invention 1 that "a spherical portion made from a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case" are common in the point that "the pressing force of the coil spring is applied in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the plunger pin is pressed against the tubular inner peripheral surface of the main body case".

Next, "a contact 40" of Invention A-1 corresponds to "a contact terminal" of Corrected Invention 1 except for the following differences.

Then, Corresponding Feature and Different Features of Corrected Invention 1 and Invention A-1 are as follows.

(Corresponding Feature)

A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case, and

wherein the pressing force of the coil spring is applied in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having

a center axis shifted from a center axis of the plunger pin, and an outer surface of the plunger pin is pressed against the tubular inner peripheral surface of the main body case".

(Different Feature 1)

In Corrected Invention 1, the coil spring has "an insulator film," whereas, in Invention A-1, it is not clear whether or not "such as a coil spring" has "an insulator film".

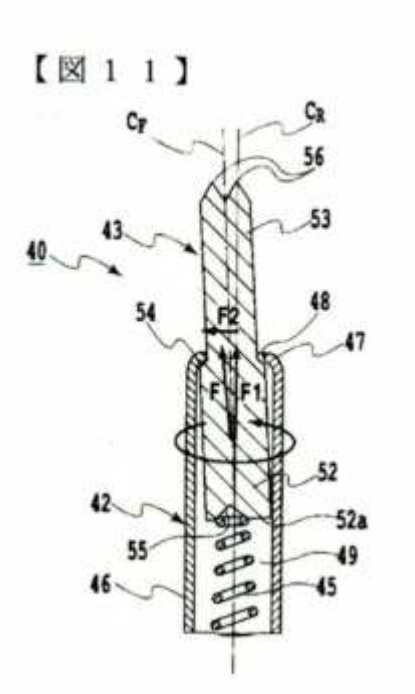
(Different Feature 2)

In Corrected Invention 1, "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," whereas, in Invention A-1, "a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, one end of the spring member 45 is locked to the recessed portion 55 as a result, and the spring member 45 acts eccentrically at the end of the movable plunger 43" "to exert an eccentric load" "on the upper movable plunger 43," "the lateral force F2" of the eccentric load "presses and contacts the movable plunger 43 against the cylindrical member 46," and "the movable plunger 43 presses against and comes into contact with the cylindrical body 42," however, a spherical portion made from a spherical surface of a ball is not pressed by the spring member 45 (coil spring) such as a coil spring in a conical recessed portion 55 (corresponding to "an oblique recessed portion having an approximately cone surface shape" of Corrected Invention 1, hereinafter, corresponding constitutions in Corrected Invention 1 are described in parentheses), and an outer surface of "the large diameter portion" of the movable plunger 43 (plunger pin) is not pressed against "the inner peripheral surface" of the cylindrical body 42 (tubular inner peripheral surface of the main body case).

(3) Judgment

First, (Different Feature 2) will be judged.

A In a state shown in FIG. 11 of Evidence A No. 1, since "the reaction force F of the spring member 45" includes "a lateral force F2" as a component force, it is obvious that a stepped portion 54 having a required taper of the movable plunger 43 presses and contacts the movable plunger 43 against the cylindrical member 46.



【図１１】　　[FIG. 11]

Next, since the reaction force F of the spring member 45 is applied to the movable plunger 43 along the axial center C_F (Evidence A No. 1, Paragraph [0077]), and the axial center C_F is located on the right side of the stepped portion 54 (Evidence A No. 1, FIG. 11), it is understood that the reaction force F of the spring member 45 applied to the movable plunger 43 gives a counterclockwise rotation moment around the stepped portion 54 that presses against and comes into contact with the cylindrical member 46.

Then, by the counterclockwise rotation moment, the movable plunger 43 tries to rotate counterclockwise around the stepped portion 54, and the large diameter portion 52 thereof presses against and comes into contact with the cylindrical member 46 at the end surface 52a side.

Therefore, in Invention A-1, it is obvious that the reaction force F of the spring member 45 presses the large diameter portion 52 of the movable plunger 43 against the cylindrical member 46, at least in a state shown in FIG. 11 of Evidence A No. 1.

B　Next, Well-known Art 1 that is recognized on the basis of the technical matters described in Evidence A No. 3 to Evidence A No. 9 is reposted as follows ("2-1-10" "(1)" above).

The technology that "in a contact probe, a rear end of a plunger pin is made to be a diagonal bias-cut surface (inclined surface) and is pressed by a coil spring via a sphere,

and an outer peripheral surface of the plunger pin is bought into contact with an inner peripheral surface of a cylindrical barrel to be in conduction".

In Well-known Art 1 above, the technical reason for inserting "a sphere" between the coil spring and the plunger pin is that the rear end of the plunger pin is inclined by the diagonal bias-cut surface (inclined surface), so that the sphere rotates between the bias-cut surface and the coil spring to give a component force applied in the bias-cut surface (orthogonal to the sliding direction) to the plunger (see Evidence A No. 5, page 2, line 16-page 3, line 3 "Then, the elasticity of the coil spring causes the sphere to come into contact with the bias-cut surface of the plunger, thereby elastically energizing the plunger in a direction projecting in the sliding direction, and the rear end of the plunger is pressed against the inner wall of the holding cylinder by a component force orthogonal to the sliding direction acting on the bias-cut surface to ensure the electrical connection between the plunger and the holding cylinder," Evidence A No. 5, page 3, lines 13-16 "It is likely that the metallic sphere cannot rotate smoothly between the coil spring and the bias-cut surface, and the component orthogonal to the sliding direction cannot sufficiently act on the bias-cut surface," Evidence A No. 5, page 8, lines 1-4 "Smooth rotation is possible between the bias-cut surface 3c and the coil spring 4, and a component force F orthogonal to the sliding direction due to the bias-cut surface 3c can be sufficiently applied to the plunger 3," and Evidence A No. 5, FIG. 1).

C Considering the above point, if it is examined whether or not Well-known Art 1 could have been easily applied to Invention A-1, in Invention A-1, on "the end surface 52a of the large diameter portion 52 of the movable plunger 43," "a conical recessed portion 55 is provided eccentrically by the amount of eccentricity E," and "a bias-cut surface (inclined surface)" like that in Well-known Art 1 above is not provided. Then, since "a sphere" in Well-known Art 1 can exert its function (giving a component force inclining the plunger pin to the plunger) only when the bias-cut surface (inclined surface) is formed at the rear end of the plunger pin, it is difficult even for a person skilled in the art to grasp "a sphere" as a merely interposed component between the coil spring and the plunger pin, independently of providing the bias-cut surface (inclined surface) on the plunger.

D Therefore, it is difficult even for a person skilled in the art to make the configuration of Corrected Invention 1 according to Difference Feature 2, by applying Well-known Art 1 to Invention A-1; namely, interposing "a sphere" between the spring member 45 such as the coil spring in Invention A-1 and the "conical recessed portion 55 (oblique recessed

portion having an approximately cone surface shape)," and "pressing the sphere" by the spring member (coil spring) such as the coil spring.

E Next, Well-known Art 2 that is recognized on the basis of the technical matters described in Evidence A No. 3, Evidence A No. 5, Evidence A No. 7, and Evidence A No. 8 is reposted as follows ("2-1-10" "(2)" above).
The technology that "when by using the pressing force of a coil spring, an outer peripheral surface of a plunger pin is bought into contact with an inner peripheral surface of a cylindrical barrel to be in conduction, a sphere whose entire surface portion or whose entirety is configured by an insulating material is interposed between the plunger pin and the coil spring, thereby preventing a current from flowing through the coil spring".

Then, it will examined whether or not it was easy for a person skilled in the art to apply Well-known Art 2 to Invention A-1.
(A) As described in Paragraph [0020] of Evidence A No. 1 as "an object of the present invention is to provide a connector device, which appropriately machines the movable plunger with eccentric machining, eliminates the need for additional steps, and reduces the number of steps by one step to avoid cost increase, so that contact between the tubular body as the barrel of the contact and the movable plunger is always stably secured to prevent fluctuations in electrical characteristics, in order to solve the above-mentioned conventional problems," the problem to be solved of the invention is to improve a mechanical structure for constantly stably ensuring contact between the tubular body as the barrel and the movable plunger, and more particularly to decrease a number of machining steps of the movable plunger, but does not aim at electrical improvement such as insulating the spring member so as to prevent a current from flowing.

Against this, Well-known Art 2 aims at "preventing a current from flowing through the coil spring," for various reasons, such as "the high-frequency signal flows in the compression coil spring 5," so that "the influence of the self-inductance of the compression coil spring 5 appears in an inspection (Evidence A No. 3, Paragraph [0017]), "the conductive path between the plunger and the protection cylinder is cut off, and current easily flows from the plunger to the metallic sphere, further to coil spring....Consequently, ...there has been a problem that the reliability of inspection is lacking" (Evidence A No. 5, the specification, page 3, line 20-page 4, line 7), "conventionally, the outer peripheral wall of the contact portion and the inner peripheral wall of the tubular body have been scraped by long-term use, and even if the direct electrical contact state between the contact portion and the tubular body has actually deteriorated, since the contact portion is electrically connected to the tubular body through

the ball and the coil spring, there is a problem that it is difficult to find the deterioration defect in the electrical inspection of the contact probe pin" (Evidence A No. 7, Paragraph [0006]), and "the spring member f may be burnt due to the current flowing through the spring member f" (Evidence A No. 8, Paragraph [0005]). However, in Invention A-1, it is not shown that the high-frequency signal flows in the spring member so that the influence of the self-inductance of the spring member appears in an inspection, and Invention A-1 does not consider that the reliability of inspection is lowered or it becomes difficult to detect deterioration defects due to the current flowing through the spring member, and the problem to be solved of Invention A-1 is not to avoid the possibility of burning the spring member due to the current flowing through the spring member.

Accordingly, the problem to be solved of Invention A-1 is not "preventing a current from flowing through the coil spring".

Therefore, there is no motivation to apply Well-known Art 2 above for "preventing a current from flowing through the coil spring" in Invention A-1, and it cannot be said that it could have been easily conceived by a person skilled in the art.

(B) If there is a motivation to "prevent a current from flowing through the coil spring" in Invention A-1, since Evidence A No. 1 describes a plurality of examples such as Example 1 (FIG. 2, FIG. 5, and FIG. 6), Example 4 (Fig. 13), Example 5 (FIG. 15), etc., in which it is extremely difficult to stably interpose the insulation ball between the spring member and the movable plunger, even if "a recessed portion" is provided at the end portion of the movable plunger of Example 3 (FIG. 11 and FIG. 12), "the recessed portion" is merely "a recessed portion" to which "one end of the spring member 45 is locked" (Evidence A No. 1, Paragraph [0074]), and it is so-called hindsight to recall using this as "a recessed portion" for stably interposing "an insulation ball" and cannot be predicted by a person skilled in the art from the description of Evidence A No. 1.

Also, regardless of judgment on (Different Feature 1), as solving means for "preventing a current from flowing through the coil spring," since the spring member (coil spring) itself may be devised for insulation, such as the insulator film 17 being formed on the entire surface portion of the compression coil spring 5 (see Evidence A No. 3, Paragraph [0017]), and "the coil spring 11b is composed of an insulator and the coil spring 11b itself has a function as an insulating means" (Evidence A No. 7, Paragraph [0034]), it cannot be said that it is inevitable to apply "an insulation ball" that intentionally increases the cost (see Evidence A No. 1, Paragraph [0020], and "avoid cost increase"), as a configuration for "preventing a current from flowing through the coil spring," in Invention A-1.

Therefore, it must be said that it is difficult even for a person skilled the art to

apply Well-known Art 2 above in Invention A-1.

(4) Summary

Consequently, since it cannot be said that Corrected Invention 1 could have been easily invented by a person skilled in the art on the basis of Invention A-1 and the Well-known art without determining Different Feature 1, it was not granted a patent in violation of the provision prescribed in Article 29(2) of the Patent Act.

2-A-2 The Demandant's allegation

Summarizing the descriptions of the written demand for trial, the oral proceedings statement brief, and the written statement, the Demandant alleges that Invention 1 (before the correction of the case) could have been easily invented by a person skilled in the art based of Invention A-1 and the Well-known art, for the following reasons.

A There is no technical significance of pressing the oblique recessed portion of the plunger by "a spherical portion consisting of a spherical surface of a pressing member" (Written demand for trial, page 18, line 11-page 21, line 26, Oral proceedings statement brief, page 4, line 20-page 19, line 22, page 31, line 2-page 33, line 18, and Written statement, page 3, line 10-page 7, line 17, and page 9, line 9- page 10, line 18).

First, the Demandee alleges that it is not necessary that in Invention 1 (before the correction of the case), "a spherical portion consisting of a spherical surface of a pressing member" has an insulation property.

Next, regarding stability in the Invention; that is, a function of stably positioning a pressing member on a bottom portion of the pit hole 23 of the plunger pin 20 (approximately cone surface-shaped oblique surface 24), also in Invention A-1 that does not have "an insulating pressing member," it is possible to achieve the same level of stability as Invention 1 (before the correction of the case) (Evidence A No. 1, FIG. 11), and the function and effect that "the large diameter portion 22 can be pressed against the inner surface of the elongate hole 13 by force that does not prevent sliding between the plunger pin 20 and the main body case 11" (Specification, Paragraph [0033]) are not function and effect caused by being provided with "a spherical portion consisting of a spherical surface of a pressing member".

Furthermore, in the Specification (Paragraph [0028]), since it is clear that it is assumed that the plunger pin is urged by using the distortion (non-linear deformation) from the center axis when the spring is compressed, the operational principal of Invention 1 (before the correction of the case) (the operational principal for "pressing an outer surface of the large diameter portion against the tubular inner peripheral surface of the

main body case") and the operational principal of Invention A-1 are quite the same in the point that the coil spring is forcibly bent by using the offset (non-linear deformation, that is, using distortion) and the force that the bent coil spring tries to return to its original position is transmitted to the plunger pin by "locking" to press the plunger against the inner wall of the tubular main body. When the operational principal appears, the presence/absence of an insulation ball does not become a problem (Evidence A No. 31 and Evidence A No. 32).

Therefore, in Invention 1 (before the correction of the case), there is no technical significance of pressing the oblique recessed portion of the plunger by "a spherical portion consisting of a spherical surface of a pressing member".

B It is a well-known art to press the oblique recessed portion of the plunger by "a spherical portion consisting of a spherical surface of a pressing member" (Written demand for trial, page 21, line 27-page 25, line 6, Oral proceedings statement brief, page 33, line 19-page 34, line 15, and Written statement, page 7, lines 18-24).

As described in Evidence A No. 3 to Evidence A No. 9, it was Well-known art to press the plunger pin by a ball or a sphere; that is, to dispose the ball between the spring member (coil spring) and the plunger bottom surface.

Therefore, in the contact 40 of Invention A-1, it is merely a matter that can be easily conceived by a person skilled in the art that the spring member 45 presses the recessed portion 55 via the ball or sphere of the Well-known art instead of directly pressing the recessed portion 55.

C The application of the Well-known art is not contrary to the problem of Evidence A No. 1 (avoid cost increase) (Oral proceedings statement brief, page 22, line 10-page 26, line 16, and Written statement, page 10, line 30-page 12, line 11)

The cost increase that is the problem of Evidence A No. 1 is generated in the machining of the movable plunger, and when applying the Well-known art (pressing the recessed portion 55 via the ball or sphere), additional machining does not occur and costs of the insulation ball itself are insignificant as compared with insulating the coil spring itself.

Further, Evidence A No. 5, Evidence A No. 7 and Evidence A No. 8 describe that "the pressing member that is an insulator is provided between the probe bottom surface and the coil spring so as to prevent a current from flowing through the coil spring (spring member)," it is merely well-known art applied for solving the conventional problem in this technical field (preventing a current from flowing through a coil spring). Therefore,

in the configuration of Invention A-1, it is merely a design change for a person skilled in the art to apply the Well-known art for solving the conventional problem.

2-A-3 Judgment by the body on the Demandant's allegation

Considering the Demandant's allegation of Invention 1 (before the correction of the case), Corrected Invention 1 will be examined.

A Regarding "2-A-2 The Demandant's allegation" "A"

In Corrected Invention 1, the fact that there is a technical significance in pressing the oblique recessed portion of the plunger by "a spherical portion consisting of a spherical surface of a ball" is as described in Paragraph [0032] of the Specification as "Further, at the bottom of the pit hole 23 of the plunger pin 20, the approximately cone surface-shaped oblique surface 24 is formed. Accordingly, the center of the insulation ball 30 can be reliably positioned on the center axis of the oblique surface 24".

Next, from the descriptions of Paragraphs [0076] and [0077] of Evidence A No. 1, it is understood that in Invention A-1, "the reaction force F of the spring member 45 is applied" along the axial center of "the movable plunger 43" "positioned in an inclined state" "on the eccentric axial center C_F," and "of the reaction force F of the spring member 45," a component force of "the lateral force F2" "is applied as a contact force" "that presses and contacts the movable plunger 43 against the cylindrical member 46".

Then, in comparison of a direction of the reaction force F of Invention A-1 and a direction of the reaction force F based on the operational principal of Invention A-1 alleged by the Demandant (when the spring member 45 is bent in the offset direction, a force that tries to return to the original position acts to press the movable plunger 43 against the cylindrical member in the direction opposite to the offset direction), since the direction of the lateral component F2 of the reaction force F of the spring member 45 becomes opposite to the direction of the component F2 described in FIG. 11 of Evidence A No. 1 in the operational principal alleged by the Demandant, it is understood that they differ in the direction of the reaction force F applied to the movable plunger 43.

Therefore, it cannot be recognized that Evidence A-1 is based on the operational principal alleged by the Demandant.

Furthermore, in Corrected Invention 1, the principal that inclines "the plunger pin 20" makes "a direction of pressing the plunger pin 20 by the coil spring 31 be a direction having a minute angle with the center axis of the plunger pin 20" (Specification, Paragraph [0033]), whereas, in Invention A-1, "the axial center of the movable plunger 43 is positioned on the eccentric axial center C_F in an inclined state as shown" (Paragraph [0076]), and "the reaction force F of the spring member 45" "is applied along the inclined

axial center C_F" (Note by the body: the axial center of the movable plunger)" (Paragraph [0077]). Therefore, the operational principles of the two are the same in terms of superordinate concept in that the force of the spring is not applied to the center of the plunger pin but is applied eccentrically, but differ in the presence/absence of an inclination with respect to the axial center of the plunger pin, so that they are not identical.

Further, according to Evidence A No. 23, Evidence A No. 31 and Evidence A No. 32, no rational explanation can be found to overturn the above judgment.

Therefore, none of the Demandant's allegation can be accepted.

B Regarding "2-A-2 The Demandant's allegation" "B" and "C"

Although the Demandant, from the descriptions of Evidence A No. 3 to Evidence A No. 9, alleges that it is a well-known art to press the plunger pin by the ball or sphere; that is, to dispose the ball between the spring member (coil spring) and the plunger bottom surface, the well-known art alleged by the Demandant is a technology based on the matter that the rear end of the plunger pin is a diagonal bias-cut surface (inclined surface) ("an inclined surface 15" of Evidence A No. 3, "an inclined surface d" of Evidence A No. 4 (Technical matter A), "a diagonal bias-cut surface" of Evidence A No. 5, the description of FIG. 1 about the end surface "on the other end side of the contact portion 10" of Evidence A No. 7, "diagonally cut the rear end portion of a plunger member n" of Evidence A No. 8 (Conventional art), and "an inclined surface 7" of Evidence A No. 9. Further, although there is no disclosure about a specific shape of the rear end of "the plunger 2" in Evidence A No. 6, it is premised that force for moving the ball 3 in a horizontal direction by the repulsion force of the spring works, and in conjunction with the ball, a plunger contact portion 2b is pressed against an inner wall of a barrel 5".).

Then, as described in "2-A-1" "(3)" "B" to "D" above, it cannot be said that Corrected Invention 1 could have been easily invented by a person skilled in the art on the basis of Invention A-1 and Well-known Art 1 premising that the rear end of the plunger pin is a diagonal bias-cut surface (inclined surface).

In Invention A-1, it could not have been easily conceived by a person skilled in the art to prevent a current from flowing through the coil spring by using "an insulation ball" (that is, to use Well-known Art 2), as described in "2-A-1" "(3)" "E" above.

C Summary regarding the Demandant's allegation

As described above, none of the Demandant's allegation can be accepted.

2-A-4 Regarding lack of inventive step (judgment by the body) based on Evidence A No. 2 and the Well-known art

(1) Invention A-2

Invention A-2 is as described in "2-1-2" above.

(2) Comparison

Hereinafter, Corrected Invention 1 and Invention A-2 will be compared for each constituent component.

(Regarding Constituent component A)

"A tubular barrel" of Invention A-2 corresponds to "a tubular main body case" of Corrected Invention 1.

Next, "a plunger" "received" in "the tubular barrel" of Invention A-2 corresponds to "a plunger pin received in the tubular main body case" of Corrected Invention 1.

Next, the matter in Invention A-2 that "a contact tip" that "projects from the barrel" of "the plunger 54" "encounters" a device under test or battery contact (Evidence A No. 2, Paragraph [0014]) to be "electrically contacted" corresponds to "making electrical connection by contacting a protrusion end portion protruding from a main body case with a target part" of Corrected Invention 1.

Next, "an electrical contact spring probe assembly" of Invention A-2 corresponds to "a contact terminal" of Corrected Invention 1, except for the following different features.

(Regarding Constituent component B)

Since "a plunger" of Invention A-2 is "generally circular in cross-section," and "has a diameter that diminishes from the end portion 60 to the tip 56 across the flange 58," it is obvious that a diameter of "an end portion opposite said contact tip" of " the plunger" is large, whereas "a contact tip" that "projects from the barrel" has a contracted diameter.

Further, "a plunger" of Invention A-2 "moves along a longitudinal axis" "between an extended position where said tip projects from said barrel and a withdrawn position where said tip partially retracts within said barrel," and if the plunger 54 encounters the device under test or battery contact, "the end portion" of "the plunger" "presses the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of barrel cavity 53 and generates a biasing".

Therefore, it can be said that "a tip" that "projects from the barrel" in "a plunger" of Invention A-2 and "an end portion 60" correspond to "a small diameter portion

including the protrusion end portion," and "a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof" of Corrected Invention 1.

From the above, it can be said that the matter that "a plunger" of Invention A-2 is "generally circular in cross-section," and "has a diameter that diminishes from the end portion 60 to the tip 56 across the flange 58," corresponds to the matter of Corrected Invention 1 that "the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof".

(Regarding Constituent component C)

Since "a spring" of Invention A-2 "has a first end engaging said barrel and a second end received within the (plunger's back-drilled) aperture", it is common with "a coil spring with an insulator film received in a tubular inside of the main body case" of Corrected Invention 1 in the point that "a coil spring received in a tubular inside of the main body case".

Next, the matter of Invention A-2 that "a spring" "applies a longitudinal load on said plunger" so that "a tip" of "a plunger" "projects from the barrel", and the matter of Corrected Invention 1 that "the protrusion end portion of the plunger pin is pressed by a coil spring with an insulator film received in a tubular inside of the main body case so as to protrude out from the main body case" are common in the point that "the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case".

(Regarding Constituent component D)

In Invention A-2, since "the centerline axis 68 of the aperture 64" "is generally parallel to the longitudinal axis of the plunger 54 and a cavity 53, that is a center axis, and longitudinally extending for defining a second axis separate from said longitudinal axis," it corresponds to "a center axis shifted from a center axis of the plunger pin" of Corrected Invention 1.

Next, the matter in Invention A-2 that "the plunger's back-drilled hole or aperture 64 to receive a spring 66 has an inclined recessed portion having a generally conical shape at the top (tip) 56 of the plunger 54," and "an oblique recessed portion having an approximately cone surface shape of the large diameter portion" of Corrected Invention 1 are common in the point that "an oblique recessed portion having an approximately

cone surface shape".

Next, the matter in Invention A-2 that "the spring has a first end engaging said barrel and a second end received within said aperture to translate a portion of said longitudinal load into a side load to press the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of the barrel cavity 53 and generate a biasing," and the matter in Corrected Invention 1 that "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case" are common in the point that "by applying pressure due to the coil spring, an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case".

Then, Corrected Invention 1 and Invention A-2 are identical or different in the followings points.

(Corresponding Feature)

"A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case, and

wherein pressure due to the coil spring is applied in an oblique recessed portion having an approximately cone surface shape having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is applied against the tubular inner peripheral surface of the main body case".

(Different Feature 1)

In Corrected Invention 1, "an oblique recessed portion having an approximately cone surface shape having a center axis shifted from a center axis of the plunger pin" is provided on "a large diameter portion" of the plunger pin, whereas in Invention A-2, it is provided at "the top (tip) 56 of the plunger"; that is, the top (tip) 56 having a small diameter.

(Different Feature 2)

In Corrected Invention 1, the coil spring has "an insulator film," whereas in Invention A-2, it is not clear whether or not the spring has "an insulator film".

(Different Feature 3)

In Corrected Invention 1, "a spherical portion consisting of a spherical surface of a ball is pressed by the coil spring, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," whereas in Invention A-2, "a spherical portion consisting of a spherical surface of a ball" is not provided between "the second end" of "the spring 66" and "an oblique recessed portion having an approximately cone surface shape", and if the plunger 54 encounters the device under test or battery contact (Evidence A No. 2, Paragraph [0014]), "the spring" "translates a portion of said longitudinal load into a side load to press the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of barrel cavity 53 and generate a biasing".

(3) Judgment

The above-mentioned different feature is examined.

A Regarding (Different Feature 1)

As described in Paragraph [0003] of Evidence A No. 2 that "Battery-type contacts and interconnect probe designs generally require compact, durable, highly reliable designs with circuit paths optimized for the best performance," and as described in Paragraph [0004] of Evidence A No. 2 that "As products continue to shrink in size or increase in performance while maintaining current size, the need for smaller contacts continues to grow. Compliancy of a probe contact continues to be important to accommodate the tolerances of many parts in an assembly. Often this compliancy requires a probe with a plunger travel much longer than a spring can supply in the spaced allotted. This is compensated by back drilling the plunger to supply additional space for the spring," the reason why in Invention A-2 "the plunger has the back-drilled hole or aperture 64 to receive a spring 66" is to achieve "a much longer plunger stroke than that the spring can supply in the allotted space" under a compact design, so that a person skilled in the art cannot be motivated to intentionally shorten the back-drilling of the plunger and provide a position of "an oblique recessed portion having an approximately cone surface shape" formed at the tip of the back-drilled hole or aperture 64 at "the end portion 60," which is a large diameter part of "the plunger 54".

B Regarding (Different Feature 3)

Since in Paragraph [0006] of Evidence A No. 2, it is described that "The disadvantage to this type of design is the higher friction that is created between the plunger and barrel resulting in failure of the probe due to mechanical wear," and "providing an inclined cut portion at the rear of the plunger"; that is, the disadvantages of the design forming the bias cut surface (inclined surface) are explained, it could not have been easily conceived by a person skilled in the art to make the configuration of Corrected Invention 1 relating to Different Feature 3 by applying Well-known Art 1 to Invention A-2, for the same reason described in "2-A-1" "(3)" "B" to "D" above.

Next, in Paragraph [0006] of Evidence A No. 2, it is described that "In an effort to improve biasing in probes many designs have been generated. The most popular and successful has been applying a bias cut on the tail of the plunger. A large side force is created from the spring pushing against the bias cut, creating firm, and constant contact force between barrel and plunger. This contact force ensures that the current will flow from the plunger to the barrel and not through the spring and also provides the lowest contact resistance between barrel and plunger. The disadvantage to this type of design is the higher friction that is created between plunger and barrel resulting in failure of the probe due to mechanical wear". However, "ensures that the current will flow from the plunger to the barrel and not through the spring" is not a description for explaining that it is necessary to prevent a current from flowing through the spring, but a description for explaining the importance of not reducing the contact force between the barrel and the plunger.

Then, as described in "2-A-1" "(3)" "E" above about Different Feature 1 from Invention A-1, it could not have been easily conceived by a person skilled in the art to make Corrected Invention 1 relating to Different Feature 3 by applying Well-known Art 2 (the technology that "when by using the pressing force of a coil spring, an outer peripheral surface of a plunger pin is bought into contact with an inner peripheral surface of a cylindrical barrel to be in conduction, a sphere whose entire surface portion or entire is configured by an insulating material is interposed between the plunger pin and the coil spring, thereby preventing a current from flowing through the coil spring")
to Invention A-2.

(4) Summary

As described above, it cannot be said that Corrected Invention 1 could have been easily invented on the basis of Invention A-2 and the Well-known art, without determining Different Feature 2.

2-A-5 The Demandant's allegation

Regarding Different Features, the Demandant alleges as follows.

A The invention disclosed by Evidence A No. 2 and Invention 1 (before the amendment) exclusively has a conical surface shape having a center axis shifted from the center axis of the plunger pin, thereby achieving the same effect. At that time, in the electrically contact probe 50 disclosed in Evidence A No. 2, the recess of the aperture 64 is provided at the top 56; however, this is for merely lengthening the spring housing space.

Further, in Evidence A No. 2, there is no clear limitation on how far the back must be drilled out.

Therefore, in Invention A-2, where to provide the approximately cone surface shape; that is, whether to provide it at a shallower position (end portion 60) or a deeper position (top 56) is only a matter that can be adjusted as approximately (Written demand for trial, page 31, line 1-page 32, line 8, and Oral proceedings statement brief, page 26, line 17-page 27, line 12).

B The same as the case of Evidence A No. 1, also in Invention A-2, the stability of the same level as Invention 1 (before the amendment) can be achieved (Evidence A No. 2, FIG. 3). It can be easily conceived by a person skilled in the art to press the recess of the aperture 64 via the ball or the sphere of the Well-known art, instead of the matter that the spring in Invention A-2 directly presses the recess of the aperture 64 (Written request for trial, page 32, lines 9-20, and Oral proceedings statement brief, page 27, lines 13-18).

2-A-6 Judgment by the body on the Demandant's allegation

A Regarding "2-A-5 The Demandant's allegation" "A"

As described in "2-A-4" "(3)" "A" above, the reason why in Invention A-2 "the plunger is provided with the back-drilled hole or aperture 64 to receive a spring 66" at "the end (tip) 56 of the plunger"; that is, a top (tip) 56 having a small diameter, is to provide a probe "having a much longer plunger stroke than that the spring can supply in the allotted space".

Therefore, there is a technical ground in that Invention A-2 is provided with "the back-drilled hole or aperture 64" at "the end (tip) 56 of the plunger," and it cannot be said that "merely lengthened the spring storage space," so that the Demandant's allegation cannot be accepted.

B Regarding "2-A-5 The Demandant's allegation" "B"

As described in "2-A-4" "(3)" "B" above, the Demandant's allegation cannot be accepted.

C Although the Demandant alleges that Corrected Invention 1 (before the amendment) has no patentability from Invention A-2 and the Well-known art, from the prosecution history of the corresponding US patent of the Patent (Written demand for trial, page 33, line 1-page 35, line 14, Evidence A No. 17-Evidence A No. 22), from the principle of patent independence of each country in the Paris Convention, the prosecution history of the corresponding US patent of the Patent does not affect the judgment by the body on the different features above.

2-A-7 Summary regarding Corrected Invention 1

As described above, it cannot be said that Corrected Invention 1 could have been easily invented on the basis of Invention A-1 and the Well-known art, or Invention A-2 and the Well-known art, and thus it does not violate the provisions of Article 29(2) of the Patent Act.

2-B Regarding Corrected Invention 2

The inventive step of Corrected Invention 2 (Reason for invalidation 1) will be judged.

(1) Corrected Invention 2

Corrected Invention 2 is reposted as follows.

"A contact terminal providing electrical connection by contacting a protrusion end portion protruding from a main body case of a plunger pin received in the tubular main body case with a target part,

wherein the plunger pin is a round bar provided with a step having a small diameter portion including the protrusion end portion, and a large diameter portion that slides on a tubular inner peripheral surface of the main body case to freely move in a longitudinal direction thereof, and the protrusion end portion of the plunger pin is pressed by a coil spring received in a tubular inside of the main body case so as to protrude out from the main body case,

wherein a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case, and

wherein the pressing member is composed of an insulation ball including an insulation surface".

(2) Comparison / Judgment with Invention A-1

In Corrected Invention 2,

A The requirement of "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 is made to be "a spherical portion consisting of a spherical surface of a pressing member" and it is described that "the pressing member is composed of an insulation ball including an insulation surface".

B It corresponds to one excluding the limitation of "with an insulator film" about "a coil spring" in Corrected Invention 1.

Then, Corrected Invention 2 and Invention A-1 are different in the following point. (Different Feature A)

In Corrected Invention 2, "a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring in an oblique recessed portion having an approximately cone surface shape of the large diameter portion having a center axis shifted from a center axis of the plunger pin, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," and "the pressing member is composed of an insulation ball including an insulation surface," whereas in Invention A-1, "a conical recessed portion 55 is provided on the end surface 52a of the large diameter portion 52 of the movable plunger 43 eccentrically by the amount of eccentricity E, one end of the spring member 45 is locked to the recessed portion 55 as a result, and the spring member 45 acts eccentrically at the end of the movable plunger 43 to exert an eccentric load on the upper movable plunger 43," "the lateral force F2" of the eccentric load "is applied as a contact force that presses and contacts the movable plunger 43 against the cylindrical member 46," and "the movable plunger 43 presses against and comes into contact with the cylindrical body 42," however, a spherical portion made from a spherical surface of a pressing member made from an insulation ball having an insulation surface is not pressed by the spring member 45 (coil spring) such as a coil spring in a conical recessed portion 55 (corresponding to "an oblique recessed portion having an approximately cone surface shape" of Corrected Invention 2, hereinafter, corresponding constitutions in Corrected Invention 2 are described in parentheses), and an outer surface of "the large diameter portion" of the movable plunger 43 (plunger pin) is not pressed against "the inner peripheral surface" of the cylindrical body 42 (tubular inner peripheral surface of the main body case).

Then, examining Different Feature A above, regarding Different Feature 2

between Corrected Invention 1 and Invention A-1 (see "2-A-" "(2)"), Different Feature A further limits the requirement of "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1 and corresponds to "a spherical portion consisting of a spherical surface of a pressing member," "the pressing member being composed of an insulation ball including an insulation surface".

As described in "2-A-1" "(3)" above, Different Feature 2 between Corrected Invention 1 and Invention A-1 could not have been easily conceived by a person skilled in the art, so that it cannot be said that Different Feature A adding further limitation to the configuration relating to Different Feature 2 of Corrected Invention 1 could have been easily conceived by a person skilled in the art, for the same reasons.

Therefore, it cannot be said that Corrected Invention 2 could have been easily invented by a person skilled in the art on the basis of Invention A-1 and the Well-known art.

(3) Comparison / Judgment with Invention A-2

Next, Corrected Invention 2 and Invention A-2 are different in the following point. (Different Feature B)

In Corrected Invention 2, "an oblique recessed portion having an approximately cone surface shape having a center axis shifted from a center axis of the plunger pin" is provided at "a large diameter portion" of the plunger pin, whereas, in Invention A-2, it is provided at "a top (tip) 56 of the plunger"; that is, a top (tip) 56 having a small diameter.

(Different Feature C)

In Corrected Invention 2, "a spherical portion consisting of a spherical surface of a pressing member is pressed by the coil spring, and an outer surface of the large diameter portion is pressed against the tubular inner peripheral surface of the main body case," and "the pressing member is composed of an insulation ball including an insulation surface," whereas in Invention A-2, "a pressing member" is not provided between "the second end" of "the spring 66" and "an oblique recessed portion having an approximately cone surface shape" and if the plunger 54 encounters the device under test or battery contact (Evidence A No. 2, Paragraph [0014]), "the spring" "translates a portion of said longitudinal load into a side load to press the plunger's bearing surface (the outside surface of the end portion 60) against the inner diameter 55 of the barrel cavity 53 and generates a biasing".

First, Different Feature B is a different feature corresponding to Different Feature 1 between Corrected Invention 1 and Invention A-2 (see "2-A-4" "(2)" above), and

Different Feature 1 could not have been easily conceived by a person skilled in the art, as described in "2-A-4" "(3)" "A" above.

Next, regarding Different Feature 3 between Corrected Invention 1 and Invention A-2 (see "2-A-4" "(2)" above), Different Feature C further limits the requirement of "a spherical portion consisting of a spherical surface of a ball" in Corrected Invention 1, and corresponds to "a spherical portion made from a spherical surface of a pressing member," "the pressing member being composed of an insulation ball including an insulation surface".

Then, as described in "2-A-4" "(3)" "B" above, Different Feature 3 between Corrected Invention 1 and Invention A-2 could not have been easily conceived by a person skilled in the art, and thus Different Feature C adding the further limitation to the configuration relating to Different Feature 3 of Corrected Invention 1 could not have been easily conceived by a person skilled in the art, for the same reasons.

Therefore, it cannot be said that Corrected Invention 2 could have been easily invented by a person skilled in the art on the basis of Invention A-2 and the Well-known art.

(3) Summary regarding Corrected Invention 2

As described above, Corrected Invention 2 could not have been easily invented by a person skilled in the art based on Invention A-1 and the Well-known art or Invention A-2 and the Well-known art, and thus does not violate the provisions of Article 29(2) of the Patent Act.

Although the Demandant alleges that "composing the pressing member as an insulation ball having an insulation surface" is merely a matter of Well-known art (Evidence A No. 3, Evidence A No. 5, and Evidence A No. 7) and Invention 2 could have been easily invented by a person skilled in the art based on Invention A-1 and the Well-known art or Invention A-2 and the Well-known art (Written demand for trial page 35, line 27-page 36, line 15, page 36, line 28-page 37, line 7), the Demandant's allegation cannot be accepted, for the above reasons.

2-C Summary regarding Reason for invalidation 1

As described above, since Corrected Invention 1 and Corrected Invention 2 are not granted patents in violation of the provisions of Article 29(2) of the Patent Act, the Patent according to Corrected Invention 1 and Corrected Invention 2 do not fall under the provisions of Article 123(1)(ii) of the Patent Act.

Therefore, with respect to Reasons for invalidation 1, the inventions cannot be

invalidated according to the evidences and reasons submitted by the Demandee, and thus Reasons for invalidation 1 is groundless.

No. 8 Closing

It cannot be said that the application relating to the Patent satisfies the requirement (requirement for division) prescribed in Article 44(1) of the Patent Act, and Corrected Invention 1 and Corrected Invention 2 fall under the invention of Article 29(1)(iii) of the Patent Act, and thus the Demandee should not be granted a patent for it. Therefore, the Patent according to Corrected Invention 1 and Corrected Invention 2 falls under Article 123(1)(ii) of the Patent Act, and should be invalidated.

The costs in connection with the trial shall be borne by Demandee under the provisions of Article 61 of the Code of Civil Procedure as applied mutatis mutandis to the provision Article 169(2) of the Patent Act.

Therefore, the trial decision shall be made as described in the conclusion.

August 16, 2016

Chief administrative judge: SAKAI, Nobuyoshi
Administrative judge: SHIMIZU, Minoru
Administrative judge: SEKINE, Hiroyuki