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Issuing Date:

Application No. or Publication No. 202010149136.4

Issue No.:

Application or Patentee: Thermo Scientific Co. Ltd.

Title of Invention: CONNECTOR PLATE CARD WITH IMPROVED WIBING

The Second Office Action

1. ☒ The examiner has already received the observation submitted by the applicant on 2023-04-07, based on this, the examiner continues the substantive examination for aforesaid application for a patent for invention.

☐ In accordance with the reexamination decision of the Patent Reexamination Board of the State Intellectual Property Office on _____, the examiner continues the substantive examination for aforesaid application for a patent for invention.

☐ _____

2. ☐ Upon examination, the amendment submitted by the applicant on _____ shall not be accepted for not in conformity with Rule 51.3 of the Implementing Regulations of the Patent Law.

3. Continuation of the examination is performed on the basis of the following applicant documents:

☐ Amended application documents attached to the aforesaid observation.

☒ Application documents to which the last Office Action is directed and replacement sheets of the amended application documents attached to the aforesaid observation.

☐ Application documents to which the last Office Action is directed.

☐ Application documents confirmed by the aforesaid reexamination decision.

☐ _____

4. ☒ This Office Action does not refer to any new reference documents.

☐ The following reference documents are cited in this Office Action (the serial number(s) of which is numbered as before, and it will be used in follow-on examination):

No.	Document number or Document title	publication date (or application date of the conflicting
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5. Conclusive opinions of the examination:

About the description:

☐ The application falls into the scope of subject matter which is nonpatentable according



to Article 5 of the Patent Law.

☐The description fails to comply with the provisions of Article 26.3 of the Patent Law. ☐

☐The description fails to comply with the provisions of Article 33 of the Patent Law. ☐

☐The drafting of the description fails to comply with Rule 17 of the Implementing Regulations of the Patent Law.

☐_____

About the claims:

☐The claim(s) _____ fail(s) to comply with the provisions of Article 2.2 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Article 9.1 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the novelty requested by Article 22.2 of the Patent Law.

☒The claim(s) 1-12 fail(s) to comply with the inventive steps requested by Article 22.3 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the applicability requested by Article 22.4 of the Patent Law.

☐The claim(s) _____ fail(s) into the scope of subject matter which is nonpatentable according to Article 25 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Article 26.4 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Article 31.1 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Article 33 of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Rule 19 of the Implementing Regulations of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Rule 20 of the Implementing Regulations of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Rule 21 of the Implementing Regulations of the Patent Law.

☐The claim(s) _____ fail(s) to comply with the provisions of Rule 22 of the Implementing Regulations of the Patent Law.

☐_____

☐The application fails to comply with the provisions of Article 26.5 of the Patent Law or Rule 26 of its Implementing Regulations.

☐The application fails to comply with the provisions of Article 20.1 of the Patent Law.

☐The divisional application fails to comply with the provisions of Rule 43.1 of the Implementing Regulations of the Patent Law.

The detailed analyses of the above conclusive opinions refer to the text of this Office Action.

6. On the basis of the conclusive opinions, the examiner suggests:

☐The applicant should amend the application documents according to the text of this Office Action.

☐The applicant should state the reasons why the patent application should be granted in the observation, and amend the part which fails to comply with the provisions according to this



Office Action; otherwise the patent application should not be granted.

☒ The substantive content that might be granted can not be found in the application, if the applicant does not state the reasons or the stated reasons are not sufficient, the application shall be rejected.

☐ _____

7. The applicant should pay attention to the followings statements:

(1) In accordance with Article 37 of the Patent Law, the applicant should submit the written opinion within two months from the date of receipt of this Office Action. If, without any justified reason, the time limit for reply is not met, the application shall be deemed to have been withdrawn.

(2) The amendment of the application document by the applicant should be in conformity with Article 33 of the Patent Law, and it should not exceed the scope specified in the initial description and claims. Meanwhile, the amendment of the application document by applicant should be in conformity with Rule 51.3 of the Implementing Regulations of the Patent Law, and in accordance with this Office Action.

(3) The written opinion and/or amendment document of the applicant should be sent by mail or submitted directly to the Receiving Division of the Patent Office of the State Intellectual Property Office, otherwise it will be considered to have no legal effect.

(4) Without appointment, the applicant and/or the agent should not come to the Patent Office of the State Intellectual Property Office to have an interview with the examiner.

8. The text of this Office Action has 6 pages, and the attachments are as follows:

☐ The total number of copies of the reference documents cited is _____ copies and _____ pages.

☐ _____

Name of the Examiner: 陈波

Tel: 0512-
88995816

Examination Department: 专利审查协作江苏中心



The Second Office Action

Application

Number:2020101491364

The Applicant filed the claims and opinion statements on April 7, 2023, and after reading the above document, the Examiner continued the examination of the present document, again presenting the following examination opinions.

Claims 1-12 are not inventive as specified in clause 22, clause 3 of the patent law.

Claim 1 claims a printed circuit board. Comparative document 1 (CN109755840A) discloses an assembly method of a plug connector assembly, and specifically discloses (see description examples, figures 1-11): a circuit board 11 (equivalent to a printed circuit board) comprising at least one surface having contact ends arranged along a first edge (equivalent to an edge connector print) for contacting conductors of a counter connector, a first row of conductive sheets 12 arranged parallel to a second edge (equivalent to an outer set of electrodes) for attaching the core wires 21 in the cable 2; and a second row of conductive sheets 13 (equivalent to an inner electrode set) arranged parallel to the second edge for attaching the exposed ends of the core wires 21 in the cable 2, the first row of conductive sheets 12 being staggered with respect to the second row of conductive sheets 13.

The solution claimed in this claim compares to that disclosed in Comparative Document 1 with the distinguishing features: the core wire is an armour wire; wherein the outer wires each have an outer skin of a given thickness contiguous with the exposed end, and wherein the printed circuit board further comprises one or more recesses in the at least one surface along a path of each outer lead skin between the second edge and the set of outer electrodes, and wherein the one or more recesses can accommodate the skins of a plurality of outer leads. Based on this distinguishing technical feature it can be determined that the technical problem to be solved by the present application is the choice of cable and how to make the connector better performing.

Selecting a more durable armour wire as the core wire is a conventional technique in the art and belongs to common general knowledge in the art for a person skilled in the art.

Comparative document 3 (CN10563771 OA) discloses an electrical device having a circuit board and a differential pair of signal conductors terminated thereto, and specifically discloses (see description examples, Figures 1-14): the communication cables 204 each have a cable jacket 270 of a given thickness contiguous with the exposed end, the circuit board 202 includes a circuit jacket 270 along each communication cable 204 between the second edge and the signal contact 220 provided with a cable recess 260 in each surface (equivalent to the printed circuit board further including one or more recesses in the at least one surface along the path of each conductor skin between the second edge and the set of electrodes), each cable recess 260 receives a cable jacket 270 of a plurality of communication cables 204. And its role in Comparative Document 3, the same as its role in this application, is to



make the connector better performing. That is, Comparative Document 3 gives technical implications for applying it to Comparative Document 1. In light of Comparative Document 3, the skilled person will conceive that the printed circuit board comprises recesses along the path of each outer conductor sheath between the second edge and the outer set of electrodes, such arrangement being conventional and common general knowledge in the art. Furthermore, alternative outer skins such that one recess accommodates a plurality of outer wires are conventional and skilled in the art.

It follows that, the solution claimed by this claim is found on the basis of Comp 1 in combination with Comp 3 and common general knowledge, it will be obvious to one skilled in the art that the claimed subject matter has no outstanding material features and significant advancements, and is devoid of the inventive step specified in clause 22, clause 3 of the patent law.

Claim 2 refers to claim 1. Comparative document 1 also discloses that each conductive sheet in the first row 12 and the second row 13 of conductive sheets are spaced such that the inner cable 2 can pass between the outer cable 2.

Comparative document 2 (CN202564699U) discloses an electrical connector and specifically discloses (see Examples, Figures 1-4) that upper wires pass between lower wires while maintaining contact with one surface of the circuit board 20 as can be seen in connection with Figure 3. And its role in Comparative Document 2, the same as its role in the present application, is to reduce the loop height. That is, Comparative Document 2 gives technical implications for applying it to Comparative Document 1.

It follows that, combining Comparative Documents 2 and 3 on the basis of Comparative Document 1, and the common general knowledge is obvious to a person skilled in the art that the claimed subject matter has no outstanding substantive features and significant advancements without the inventive step specified in clause 22, clause 3 of the patent law.

Claim 3 is dependent upon claim. Comparative document 3 also discloses: the plurality of cable recesses 260 receive a cable jacket 270 of the communication cable 204, the cable recess 260 serves as a seat for one communication cable 204, the depth D1 of the cable recess 260 may be configured such that the wire terminating ends 266 (Figure 7) and 268 are substantially flush with the board surface 216, and capable of contact with signal contacts (220A, 220B) (equivalent to each of the one or more recesses being deep enough to accommodate a given thickness of the outer skin such that each exposed end of the outer conductor can contact an electrode of the outer set while remaining parallel to the at least one surface). And its role in Comparative Document 3, the same as its role in this application, is to make the connector better performing. That is, Comparative Document 3 gives technical



implications for applying it to Comparative Document 1. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 4 depends from claim 3. Comparative document 1 also discloses that the plug card 400 has a second surface, a second outer set of electrodes arranged parallel to said second edge for attaching exposed ends of outer wires of the armor.

Comparative document 3 discloses that the circuit board 202 has a second surface provided with a cable recess 260 extending along a path of the circuit jacket 270 of each communication cable 204 between the second edge and the other side signal contact 220. And its role in Comparative Document 3, the same as its role in this application, is to make the connector better performing. That is, Comparative Document 3 gives technical implications for applying it to Comparative Document 1. In light of comparative document 3, the skilled person will conceive that the recesses extend along the path of the outer skin of each armored outer wire between said second edge and said second outer set of electrodes, such arrangement being conventional and skilled in the art and belonging to common general knowledge in the art. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 5 refers to claim 1. In Comparative Document 1 it is disclosed that the relevant devices are provided on the circuit board and, depending on the actual signal requirements, such that an integrated circuit is also included which recovers and re-modulates the signal between the wires printed through said edge connector and the electrodes of the inner and outer groups is a common technical means of the art and belongs to the common general knowledge of the art. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 6 claims a cable. Comparative document 1 (CN109755840A) discloses an assembly method of a plug connector assembly, and specifically discloses (see description examples, figures 1-11): comprising a cable 2, the cable 3 is connected to a plug connector 1 (equivalent to the first connector) comprising a circuit board 11, the circuit board 11 (equivalent to printed circuit board) comprises at least one surface having contact ends arranged along a first edge (equivalent to edge connector printing) for contacting the conductors of the counter connector, a first row of conducting sheets 12 arranged parallel to a second edge (equivalent to outer electrode set) for attaching the core wires 21 in the cable 2; and a second row of conductive sheets 13 (equivalent to an inner electrode set) arranged parallel to the second edge for attaching the exposed ends of the core wires 21 in the cable 2, the first row of conductive sheets 12 being staggered with respect to the second row of conductive sheets 13.



The solution claimed in this claim differs from that disclosed in Comparative Document 1 by the features that: the core wire is an armor wire, the other end of which is connected to a second connector, the second connector also comprising a printed circuit board provided in the first connector; wherein each printed circuit board further comprises one or more recesses in at least one surface between the second edge and the outer set of electrodes to accommodate a sheath of an armor wire attached to the outer set of electrodes, and wherein the one or more recesses each accommodate a sheath of a plurality of armor wires. Based on this distinguishing technical feature it can be determined that the technical problem to be solved by the present application is the provision of the connection means and how to make the connector better performing.

For a person skilled in the art, choosing a durable armour wire is a common technical means in the art and belongs to common general knowledge in the art; the other end of the armour wire is connected to a second connector, which also comprises a printed circuit board provided in the first connector, according to the connection requirements made, such a connection wire being provided as a conventional technique in the art and belongs to the common general knowledge in the art.

Comparative document 3 (CN10563771 OA) discloses an electrical device having a circuit board and a differential pair of signal conductors terminated thereto, and specifically discloses (see description examples, Figures 1-14): the communication cables 204 each have a cable jacket 270 of a given thickness contiguous with the exposed end, the circuit board 202 includes a circuit jacket 270 along each communication cable 204 between the second edge and the signal contacts 220 provided with a cable recess 260 in each surface (equivalent to the printed circuit board further including one or more recesses in at least one surface along said second edge and between said set of electrodes to accommodate the outer skin of the armour wires), each cable recess 260 receives a cable jacket 270 of a plurality of communication cables 204. And its role in Comparative Document 3, the same as its role in this application, is to make the connector better performing. That is, Comparative Document 3 gives technical implications for applying it to Comparative Document 1. To the person skilled in the art, having the recesses accommodate the outer skin of the armour wires of the outer group of electrodes and, moreover, instead having one recess accommodate the outer skin of a plurality of armour wires is a common technical means in the art and belongs to the common general knowledge in the art.

It follows that, the solution claimed by this claim is found on the basis of Comp 1 in combination with Comp 3 and common general knowledge, it will be obvious to one skilled in the art that the claimed subject matter has no outstanding material features and significant advancements, and is devoid of the inventive step specified in clause 22, clause 3 of the patent law.



It follows that, it will be obvious to a person skilled in the art that the solution claimed in this claim, in combination with the common general knowledge, has no outstanding essential features and significant advancements, without the inventive step specified in clause 22, clause 3 of the patent law, is obtained on the basis of Comparative Document 1.

Claim 7 depends from claim 6. Comparative document 1 also discloses that each conductive sheet in the first row 12 and the second row 13 of conductive sheets are spaced such that the inner cable 2 can pass between the outer cable 2.

Comparative document 2 (CN202564699U) discloses an electrical connector and specifically discloses (see Examples, Figures 1-4) that upper wires pass between lower wires while maintaining contact with one surface of the circuit board 20 as can be seen in connection with Figure 3. And its role in Comparative Document 2, the same as its role in the present application, is to reduce the loop height. That is, Comparative Document 2 gives technical implications for applying it to Comparative Document 1.

It follows that, combining Comparative Documents 2 and 3 on the basis of Comparative Document 1, and the common general knowledge is obvious to a person skilled in the art that the claimed subject matter has no outstanding substantive features and significant advancements without the inventive step specified in clause 22, clause 3 of the patent law.

Claim 8 depends from claim 6. Comparative document 3 also discloses: the plurality of cable recesses 260 receive a cable jacket 270 of the communication cable 204, the cable recess 260 serves as a seat for one communication cable 204, the depth D1 of the cable recess 260 may be configured such that the wire terminating ends 266 (Figure 7) and 268 are substantially flush with the board surface 216, and capable of contact with signal contacts (220A, 220B) (equivalent to each of the one or more recesses being deep enough to accommodate a given thickness of the outer skin such that each exposed end of the outer conductor can contact an electrode of the outer set while remaining parallel to the at least one surface). And its role in Comparative Document 3, the same as its role in this application, is to make the connector better performing. That is, Comparative Document 3 gives technical implications for applying it to Comparative Document 1. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 9 depends from claim 6. Comparative document 1 discloses the provision of relevant devices on the circuit board, but according to the actual signal requirements, such that an integrated circuit is also included, which recovers and re-modulates the signal between the printed wires through said edge connector and the electrodes of the



inner and outer groups, is a common technical means of the art and belongs to the common general knowledge of the art. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 10 claims a printed circuit board manufacturing method. Comparative document 1 (CN109755840A) discloses an assembly method of a plug connector assembly, and specifically discloses (see description examples, figures 1-11): a circuit board 11 (equivalent to a printed circuit board) comprising at least one surface having contact ends arranged along a first edge (equivalent to an edge connector print) for contacting conductors of a counter connector, a first row of conductive sheets 12 arranged parallel to a second edge (equivalent to an outer set of electrodes) for attaching the core wires 21 in the cable 2; and a second row of conductive sheets 13 (equivalent to inner electrode groups) arranged parallel to the second edge, for attachment of the exposed ends of the core wires 21 in the cable 2, the first row of conductive sheets 12 is staggered with respect to the second row of conductive sheets 13, the uncovered ends of the core wires 21 are soldered to the first row of conductive sheets 12 and the second row of conductive sheets 13, and the circuit board 11 is packaged to fit into a mating connector.

The solution claimed in this claim differs from that disclosed in Comparative Document 1 by further comprising a second printed circuit board, the second printed circuit board and the first printed circuit board having the same structure, the second printed circuit board being packaged as a connector adapted to fit into a socket; wherein each printed circuit board further comprises one or more recesses in at least one surface between the second edge and the outer group of electrodes, to accommodate a sheath of armor wires attached to the outer set of electrodes, each recess deep enough to accommodate a full thickness of the sheath near the uncovered end, and wherein the one or more recesses each accommodate a sheath of a plurality of armor wires. Based on this distinguishing technical feature it can be determined that the technical problem to be solved by the present application is the connection arrangement and how to make the connector better performing.

For the person skilled in the art, in Comparative Document 1 it is disclosed that one end of a cable is connected to a first connector, the provision of a first printed circuit board within the first connector and, depending on the actual connection requirements, a second printed board identical to the first printed board and packaged as a connector adapted to fit into a socket is conventional and common knowledge in the art.

Comparative document 3 (CN10563771 OA) discloses an electrical device having a circuit board and a differential pair of signal conductors terminated thereto, and specifically discloses (see description examples, Figures 1-14): the communication cables 204 each have a cable jacket 270 of a given thickness contiguous with the exposed end, the circuit board also includes a signal contact (220A, 220B), the cable recess 260 acts as a seat for one



communication cable 204, the depth D1 of the cable recess 260 may be configured such that the wire terminating ends 266 (Figure 7) and 268 are substantially flush with the board surface 216, and able to communicate with the signal contacts (220A, 220B) (equivalent to each printed circuit board further comprising one or more recesses in at least one surface between the second edge and the set of electrodes to accommodate a skin of an armor wire attached to the set of electrodes, each recess being deep enough to accommodate the full thickness of the skin near the uncovered end), each core wire 21 attached to a signal contact (220A, 220B) has a corresponding cable recess 260. And its role in Comparative Document 3, the same as its role in this application, is to make the connector better performing. That is, Comparative Document 3 gives technical implications for applying it to Comparative Document 1. For the person skilled in the art, only one row of electrode groups close to the second edge of the circuit board is disclosed in Comparative Document 3, in the light of Comparative Document 3 a person skilled in the art will conceive of a cable recess matching a cable arrangement for an outer electrode group close to the second edge, such arrangement being conventional technical means in the art and belonging to common general knowledge in the art; furthermore, alternative outer skins such that one recess accommodates a plurality of outer wires are conventional and skilled in the art.

It follows that, the solution claimed by this claim is found on the basis of Comp 1 in combination with Comp 3 and common general knowledge, it will be obvious to one skilled in the art that the claimed subject matter has no outstanding material features and significant advancements, and is devoid of the inventive step specified in clause 22, clause 3 of the patent law.

Claim 11 depends from claim 10. Providing a related device on a circuit board is disclosed in Comparative Document 1, for better connector performance, those skilled in the art will think of further comprising equipping each of said first and second printed circuit boards with an integrated circuit, the integrated circuit recovers and re-modulates the signal between the printed wires through the edge connector and the electrodes of the inner and outer groups, such a setup is a common technique in the art and belongs to common general knowledge in the art. Thus, to the extent that a claim referred to herein is not inventive, neither is such a dependent claim capable of the inventive step specified in clause 3 of clause 22 of the patent law.

Claim 12 depends from claim 10. Comparative document 1 also discloses that each conductive sheet in the first row 12 and the second row 13 of conductive sheets are spaced such that the inner cable 2 can pass between the outer cable 2.

Comparative document 2 (CN202564699U) discloses an electrical connector and specifically discloses (see Examples, Figures 1-4) that upper wires pass between lower wires while maintaining contact with one surface of the



circuit board 20 as can be seen in connection with Figure 3. And its role in Comparative Document 2, the same as its role in the present application, is to reduce the loop height. That is, Comparative Document 2 gives technical implications for applying it to Comparative Document 1.

It follows that, combining Comparative Documents 2 and 3 on the basis of Comparative Document 1, and the common general knowledge is obvious to a person skilled in the art that the claimed subject matter has no outstanding substantive features and significant advancements without the inventive step specified in clause 22, clause 3 of the patent law.

2. Statements about Applicant's opinion.

The Applicant believes that the technical features of the outer skin of the outer plurality of wires are not disclosed in comparative documents 1-3 by a recess.

The reviewer believes that Comparative Document 3 discloses the provision of recesses on the circuit board, each for receiving a corresponding plurality of wires, while instead a recess is provided, the corresponding recess receiving the outer skin of the plurality of wires, such provision being conventional and common general knowledge in the art.

For the above reasons, none of the claims to the present application are inventive, nor are any other patentable material recited in the specification, and thus the present application is not patentable even if the applicant reassembles the claims and/or further defines them based on what is recited in the specification. Should the Applicant not suggest a sufficient reason, within the answering date prescribed by this notice, for novelty and inventive step of the present application be dismissed.