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(54) **Device to check locking cover closure in electrical connectors**

(57) Device to check closure of the locking cover in electrical connectors of the type consisting of a bed plate prepared for its installation on a desk, provided with a casing antagonist to the electrical connector to be checked, with electrical contact metallic terminals at the bottom of the casing. The device has a guided metallic bolt that slides lengthways over the lateral surface of the connector fitted with the locking cover, whose bolt is connected to a phase in an electrical circuit, having fitted a terminal at the end of the run of the bolt to carry out electrical continuity in the circuit when it reaches the aforementioned position.

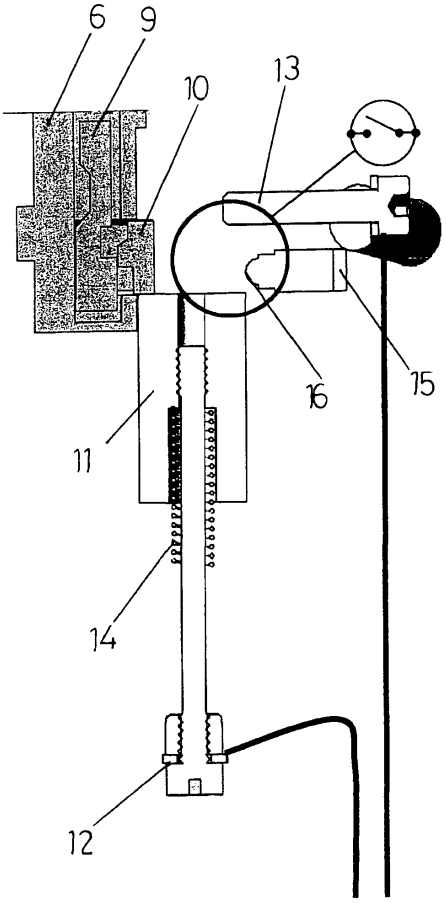

FIG3

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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a device to check the closure of the locking cover in electrical connectors of the type consisting of one or several metallic terminals provided with an electrically isolating, protective casing.

[0002] The object of the invention focuses on a device that besides checking electrical continuity of the terminals, verifies that the locking cover of the casing that holds the terminal is correctly closed.

BACKGROUND OF THE INVENTION

[0003] Industry in general, especially the car sector, requires wiring manufacturers to guarantee that connectors inserted into the ends of wires have electrical continuity and are correctly inserted. The existence of a faulty connection, once the wiring has been fitted, may lead to an important problem in the final product, difficult to solve.

[0004] To check the correct wiring connection of the metallic terminals to the electrical wire, devices fitted with an antagonist casing already exist, in which the assembled connector is inserted in order to check its electrical continuity. To this end, an electrical current that goes through the wiring and therefore the connector is made to pass through terminals situated at the bottom of the antagonist casing, making contact with each of its metallic terminals. If there is electrical continuity in the circuit, it means that the terminals are connected correctly, and if there is no continuity, it means that there is some terminal that is not correctly connected.

[0005] Checking of the wiring is generally carried out on a desk on which there are as many checking devices as connectors that the wiring has to its respective antagonist casing. All wires are connected to their respective antagonist casings and the electrical continuity "test" is carried out, as well as other electrical checks.

[0006] Electrical connectors are made up of several independent metallic terminals set inside a protective, isolating casing, whose unit really makes up the connector. The above-mentioned casing is made up of a unit of isolating, generally plastic material, provided with screw holes in which the metallic terminals are locked into place, thanks to the existence of a lateral blocking cover, known in the slang of this technical sector as "spacer" or "secondary lock", that keeps them in their working position. The existence of the above-mentioned locking cover gives the connector greater security, since, if the metallic terminals are not well "clamped", that is to say, are not correctly placed in their casing, the locking cover or "spacer" does not close, obliging the worker to check them.

[0007] Generally, this "clamping" operation and locking cover closure is carried out in a mechanical way, for which reason this cover may occasionally remain open, or badly closed because some terminal has been badly "clamped" and the cover has been forced in order to close it.

[0008] This error may lead to many problems since when the electrical continuity "test" previously explained is undertaken, it will validate it as correctly connected Nevertheless, under operating conditions, when the connector must be inserted, the aforementioned terminal could be displaced from its casing and not carry out the desired electrical contact.

DESCRIPTION OF THE INVENTION

[0009] The device to check locking cover closure in electrical connectors that the invention proposes, solves the previously explained problem on having means to check its correct closure.

[0010] To this end, and in more concrete way, the device to check locking cover closure in electrical connectors, is of the type made up of a bed plate prepared for its installation on a desk and provided with a casing antagonist to the electrical connector to be checked, with various electrical contact metallic terminals at the bottom of the casing, comprising a guided metallic bolt that slips longitudinally over the lateral surface of the connector with the locking cover, whose bolt is connected to a phase in an electrical circuit, having previously provided a contact terminal at the end of bolt run, to carry out the electrical continuity of the circuit when it reaches the aforementioned position.

[0011] In order to produce electrical continuity in the aforementioned circuit, the metallic bolt has a spiral spring that permanently drives it against the contact terminal placed at the end of its running movement.

[0012] Thus, when the metallic bolt slides over the surface of the connector with the locking cover, and is correctly closed, the bolt will continue moving until it makes contacts with the terminal positioned at the end of the stroke, producing the electrical continuity of the circuit for its conformity.

[0013] In the opposite case, that is to say, that the locking cover is open or closed incorrectly, it will jut out from the surface of the connector and stop the metallic bolt from sliding, avoiding its contact with the terminal at the end of the run, and, therefore, will not produce electrical continuity in the circuit. The lack of electrical continuity will mean the existence of a failure in the connector, which will activate the corresponding warning sign.

[0014] Since the metallic bolt will have to detect the minimum rebound that could be caused by the incorrect closing of the locking cover, the device has means to regulate the distance passed between the surface of the connector and the contact surface of the bolt.

[0015] The above-mentioned means of regulation consists of a set of ball-screws screwed into the verification unit, whose inner ends limit the transversal movement of the metallic bolt, coinciding with the position of the connector's locking cover.

DESCRIPTION OF THE DRAWINGS

[0016] To complete the description that is being given and in order to help give a better understanding of the invention's characteristics, with the idea to provide an essential example of its practical undertaking, a set of drawings with illustrative, not limitative character is attached as an integral part of the aforementioned description, showing the following:

Figure 1 shows a partly-cut exploded view of the device to check closure of the locking cover in electrical connectors.

Figure 2 shows a partly-cut view of the fitted device carrying out the checking of an incorrectly closed connector.

Figure 3 shows an outline view of the device in which the connector with the locking cover open, the metallic bolt and the contact terminal at the end of the run are shown.

Figure 4 shows the same view as the previous figure, but with the locking cover correctly closed.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] In view of the outlined figures, it may be seen that the device to check closure of the locking cover in electrical connectors is made up of a bed plate 1, fitted out for its installation on a verification desk, with screws through screw-holes 2.

[0018] Under bed plate 1, corresponding to window 3, is checking-unit 4, provided with antagonist casing 5 of connector 6 to be checked Evidently, casing 5 will be given the antagonist role and shape of the connector in question, regardless of whether it is a uni- or multi-polar connector

[0019] The bottom of the antagonist casing 5 includes contact terminals 7, longitudinally-moveable and helped by inner springs fitted into terminal package 8, not shown in the drawings

[0020] These metallic terminals are responsible for establishing contact with the electrical terminals 9 of the connector 6, in order to check its electrical continuity. There shall be as many studs 7 as terminals 6 that the connector to be checked has.

[0021] To check the closure of the locking cover or "spacer", the device is fitted with a prismatically-configured guided metallic bolt 11, which slips lengthways and in parallel across the lateral surface of the connector 6 comprising the locking cover 10, to detect its position.

[0022] To this end, the lower end of the bolt 11 is connected, through a terminal 12, to a phase in the electrical circuit, which makes a circuit with another phase, through a terminal 13 at the end of the stroke that the bolt 11 makes. Thus, when contact is made between the end of the bolt 11 and the terminal 13, electrical continuity is made in the circuit.

[0023] The device includes a spiral spring 14 that permanently drives the bolt 11 against the terminal 13 at the end of the run it makes.

[0024] When the locking cover 10 is correctly closed, the metallic bolt 11 slides over the surface of the connector 6 and will continue moving until it makes contacts with the terminal 13 positioned at the end of the stroke, producing electrical continuity in the circuit for its conformity.

[0025] In the opposite case, that is to say, that the locking cover 10 is open or closed incorrectly, it will jut out from the surface of the connector 6 and stop the metallic bolt 11 from sliding, avoiding its contact with the terminal at the end of the run, and, therefore, will not produce electrical continuity in the circuit. The lack of electrical continuity will mean the existence of a failure in the connector, which will activate the corresponding warning sign.

[0026] So that the metallic bolt 11 may detect the minimum rebound that could be caused by the incorrect closing of the locking cover 10, the device has means to regulate the distance passed between the surface of the connector 6 and the contact surface of the bolt 11.

[0027] In the present example of preferred embodiment, these means of adjustment consist of a set of ballscrews 15 screwed into the verification unit 4, whose inner ends 16 limit the transversal movement of the metallic bolt 11, coinciding with the position of the connector's 6 locking cover 10.

[0028] To carry out verification, the worker inserts the connector 6 into antagonist casing 5, pushing it to the end, at which moment pneumatic cylinder 17 activates grip pin 18, responsible for keeping it in the above-mentioned position. The corresponding sensor will activate the pneumatic cylinder 19, which will axially shift to the terminal packet 8 up to the verification unit 4 so that the terminals 7 establish contact with the respective metallic terminals 9 of the connector 6. With the terminal packet 8, the metallic bolt 11 will move, which will slide over the lateral surface of the connector 6 to detect the position of the locking cover 10.

[0029] In the same way as has been previously indicated, if the locking cover 10 is open or closed incorrectly, it will cause a rebound on surface of the connector 6 and stop the metallic latch 11 from sliding, avoiding its electrical contact with the terminal 13, and, therefore, will not produce electrical continuity, the failure in the connector being alerted.

[0030] Having sufficiently described the nature of the invention, as well as the way to embody it in practice, it must be emphasized that the previously indicated layouts, represented in the attached drawings, may be modified as long as they do not alter the fundamental principle.

Claims

1. Device to check locking cover closure in electrical connectors, of the type made up of a bed plate pre-

pared for its installation on a desk and provided with a casing antagonist to the electrical connector to be checked, with various electrical contact metallic terminals at the bottom of the casing, **characterized by** having a guided metallic latch that slips lengthways over the lateral surface of the connector fitted with the locking cover, whose latch is connected to a phase in an electrical circuit, having previously provided a terminal at the end of stroke of the bolt to carry out electrical continuity in the circuit when it reaches the aforementioned position.

2. Device to check closure of the locking cover in electrical connectors, according to claim 1, **characterized by** the metallic latch having a spiral spring that permanently drives it against the terminal placed at the end of its stroke.

3. Device to check closure of the locking cover in electrical connectors, according to claim 1, **characterized by** the device possessing means to regulate the distance passed between the surface of the connector and the contact surface of the bolt.

4. Device to check closure of the locking cover in electrical connectors, according to claim 3, **characterized by** the aforementioned means of adjustment having a set of ball-screws screwed into the verification unit, whose inner ends limit the transversal movement of the metallic bolt in the position coinciding with the connector's locking cover.

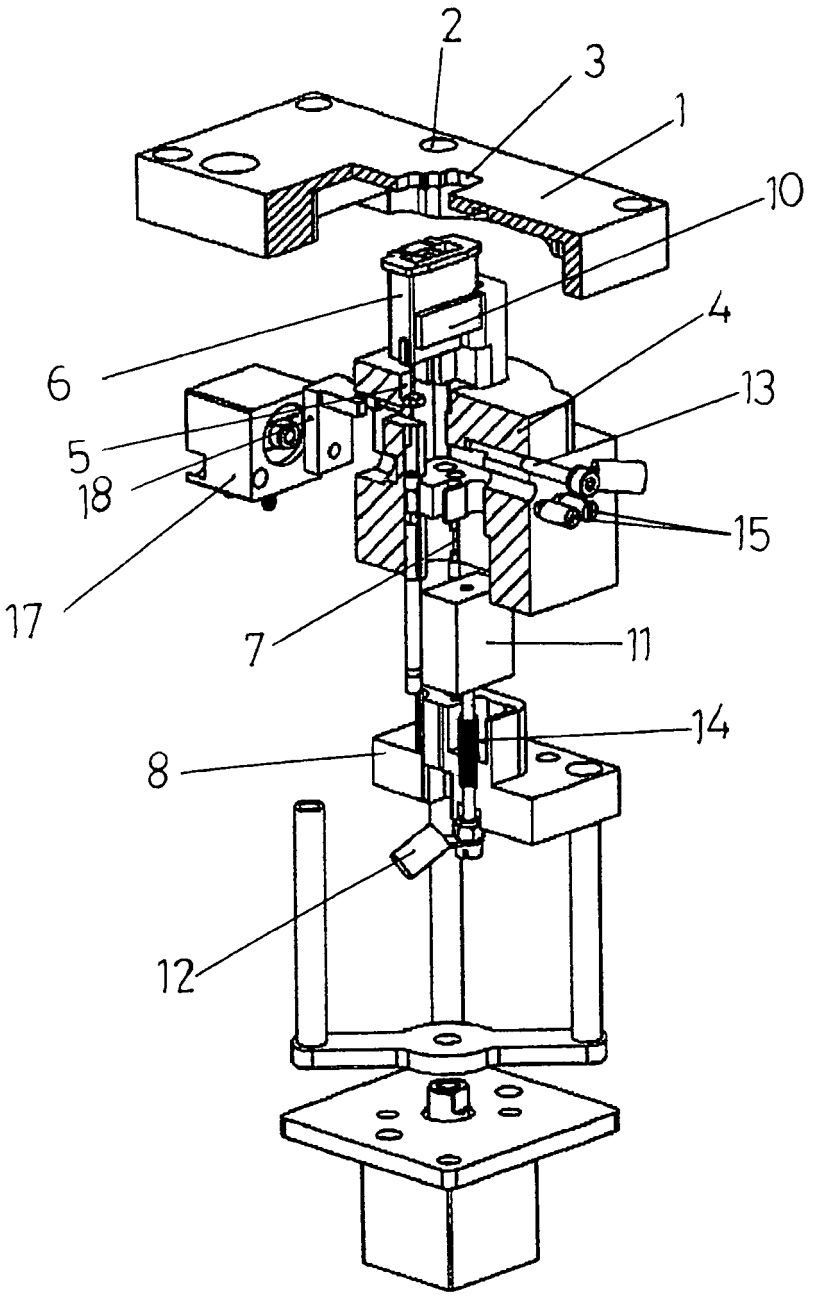

FIG1

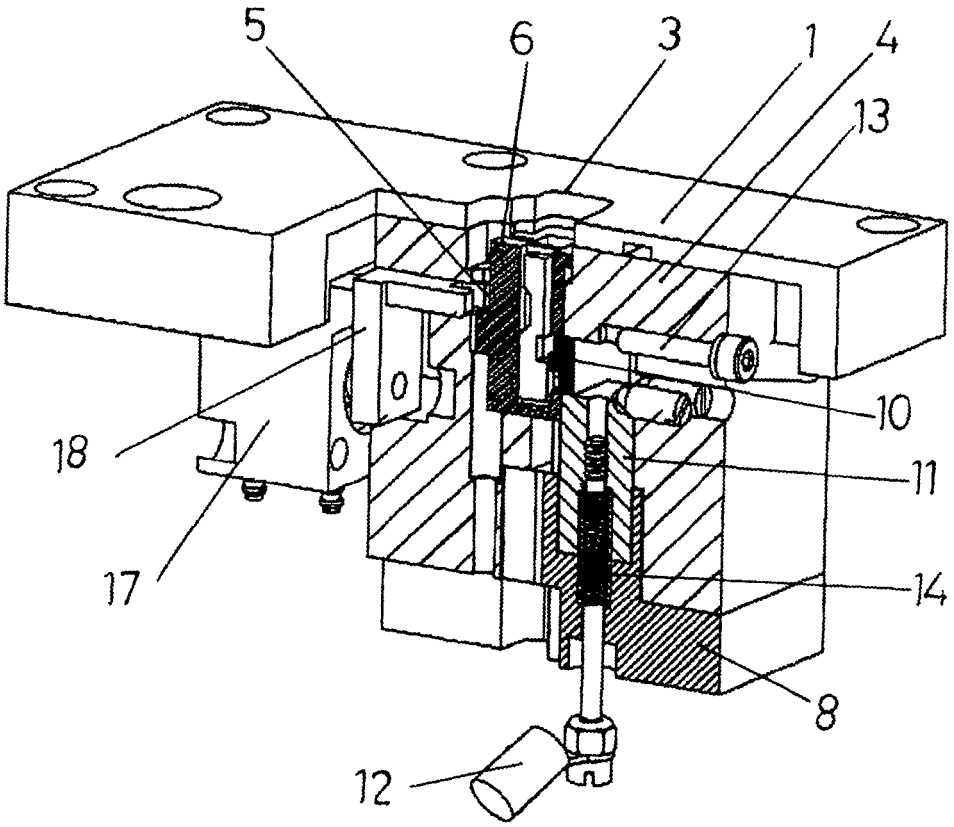

FIG2

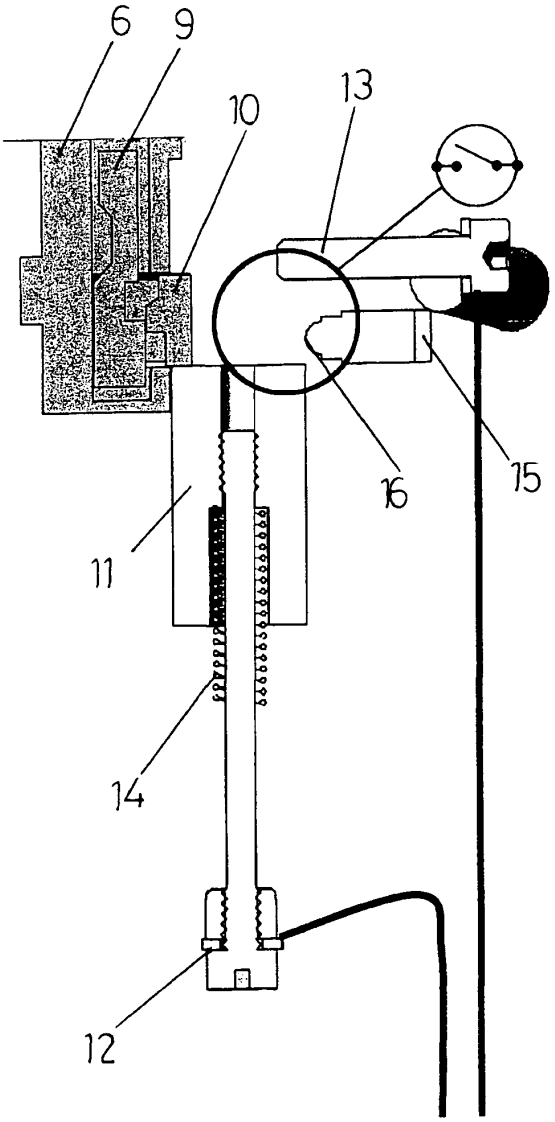

FIG3

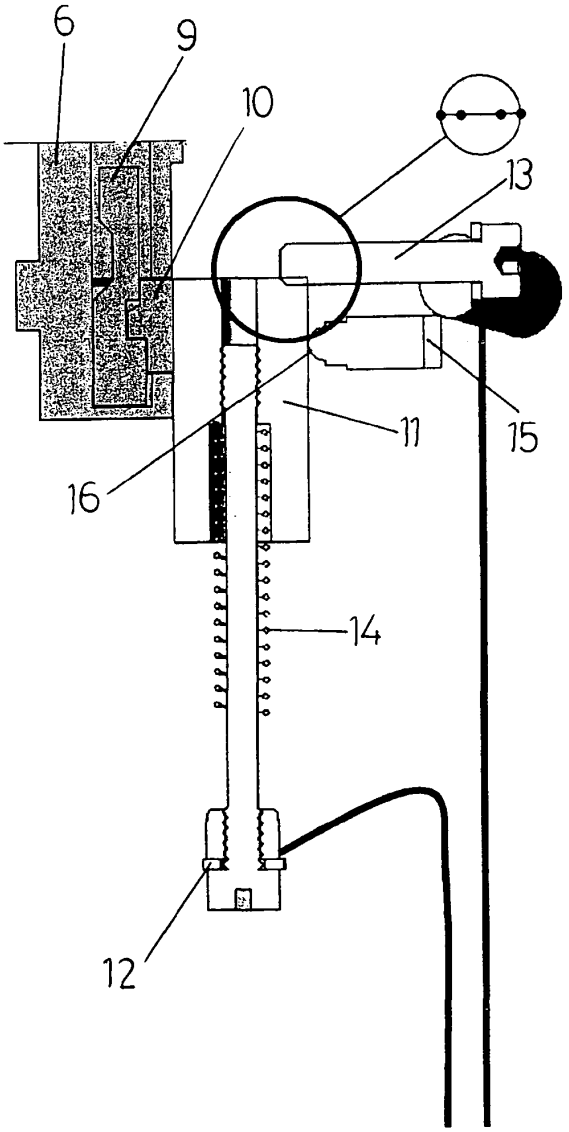

FIG4