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3,536,870

JACK WITH SPRING PRESSED RESILIENT TERMINAL

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FIG. 1

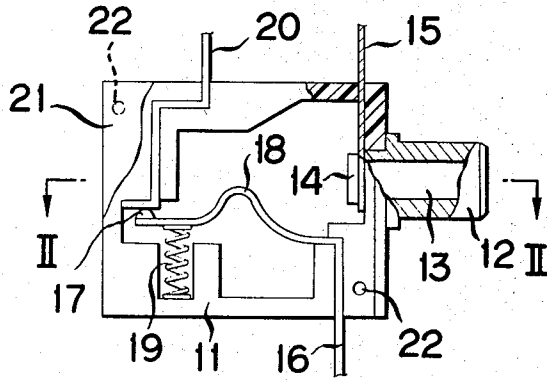


FIG. 2

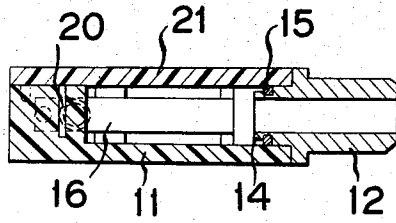
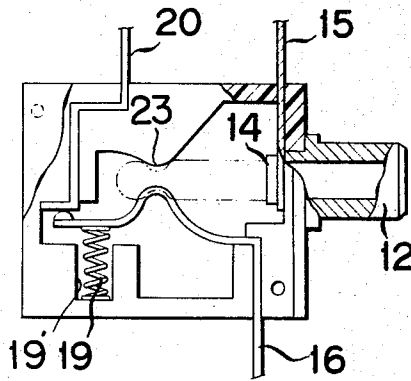


FIG. 3



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JACK WITH SPRING PRESSED RESILIENT TERMINAL

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2 Claims

ABSTRACT OF THE DISCLOSURE

Jacks comprising a case provided with a plug receiving hole through which a plug can be introduced, a first terminal disposed in the case to contact the plug terminal, a second elastic terminal also placed in the case to contact the plug terminal and a third terminal similarly positioned in the case in such relationship to the second terminal as normally to contact it and, when the plug is introduced, to be detached therefrom, the second terminal being pressed upward by a spring so as normally to contact the third terminal.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to jacks well adapted for mechanical and electric contact with and detachment from a plug.

Description of the prior art

Many of the conventional jacks comprise a case provided with a plug receiving hole, the case containing a first terminal to contact one of the plug terminals and a second terminal to contact the other terminal thereof when the plug is introduced through said hole. In such jack, one of the terminals consists of a ring or sleeve located near the plug receiving hole and the other terminal consists of a resilient plate capable of resiliently contacting the terminal of the plug. The latter terminal acts as an element for switching the circuit between second and third terminals disposed in the case and the plug. Thus upon insertion or withdrawal of the plug, the circuit is switched on or off. Accordingly, the terminal consisting of a resilient plate is required to have sufficient resilience as well as conductivity. This terminal which is generally formed of phosphor bronze has poor resilience and is gradually reduced in resilience while the plug is repeatedly inserted and withdrawn, leading to poor contact between said terminal, and the third terminal or plug. While titanium copper and beryllium copper are known to be excellent in this respect, they have the drawbacks that they display wide variations in their properties depending on the conditions under which they are subjected to heat treatment and in addition have poor processability.

SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a jack wherein good contact is maintained with the terminals of the plug when it is inserted and also with the switching mechanism of said jack when the plug is drawn out.

The jack of the present invention consists of three terminals, a plug receiving hole and a case made of plastics material for supporting these terminals. Where the plug is inserted into the jack, first and second terminals are respectively located at such suitable positions within the case. The second terminal is made of resilient material so as to move resiliently in accordance with the in-

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sertion or withdrawal of the plug. This is effected by a spring member interposed between the case wall and said terminal so as to keep it pressed to said other terminal of the plug. Further, the second terminal has a contact point located at the end. The position of said contact point is selected in such a manner that when the plug is drawn out of the jack it contacts the third terminal in the case and when the plug is inserted it is detached therefrom.

In the jack of the present invention, normally or when the plug is not inserted into the jack, the contact point of the second terminal is brought into contact with the third terminal due to the action of the spring member, so as resiliently to conduct the second and third terminals.

On the other hand, when the plug is inserted into the jack, the terminal of the plug downwardly presses the second terminal against the resilience of the spring member, releasing the contact between the second and third terminals and the terminal of the plug is contacted to the first and second terminals of the jack simultaneously.

Under either of the aforementioned conditions of the jack, the second terminal of the jack can unfailingly maintain an electrical contact with the third terminal of the jack or the plug terminals. Accordingly, even after the insertion or withdrawal of the plug is repeated many times, the jack of the present invention is prevented from poor electrical contact therein which, with the prior art jack, often occurred due to the deformation of the given configuration of the second terminal or the fatigue of its resilience.

The spring member interposed between the second terminal and case wall is most preferably formed of a coil spring, but may consist of a plate spring or other types of spring.

BRIEF EXPLANATION OF THE DRAWING

FIG. 1 is a longitudinal partly sectional side view of a jack according to an embodiment of the present invention, with part of the cap member broken away;

FIG. 2 is a section on line II—II of FIG. 1; and

FIG. 3 is a longitudinal partly sectional side view of a modification of a jack according to the present invention, with part of the cap member broken away.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIGS. 1 and 2, numeral 11 represents a case of plastics material having a sleeve 12 fitted to one side thereof, the end portion 14 of the sleeve extending into the cavity formed in the case 11.

A plug receiving hole 13 defined by the sleeve 12 communicates with a cavity formed in the case 11. A first terminal 15 is a flat metal plate, one end of which is supported between the end portion 14 and the inner surface of the case 11, and the other end of which extends through the case 11 to the outside. In the cavity of the case 11 there is disposed a second terminal 16 consisting of a suitably elastic plate made of metal material, for example, Phosphor bronze in parallel relationship for the greater part with the central axis of the plug receiving hole 13.

One end of the second terminal 16 extends outwardly of the case in a state fixed thereto and the other end is provided with a contact point 17. The intermediate portion of the second terminal is formed into a contact section 18 for contact with the terminal of the plug. Between the second terminal and the bottom wall of the case is installed a coil spring 19 disposed in a hole 19', which applies a pressing force to the second terminal 16 in such a direction as to cause it to be removed from the bottom wall of the case 11. Within the case there is also positioned a third terminal 20, one end of which extends outside of the case 11 and the other end of which reaches into

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the cavity within the case 11. That portion of the third terminal 20 which extends into said cavity is arranged substantially parallel with the second terminal at a position facing the contact point 17 of the second terminal.

Accordingly, when the plug is not inserted, the contact point 17 of the second terminal can unfailingly contact the third terminal 20 by the pressing action of the coil spring 19. The cavity of the case 11 is covered with a cap member 21 formed of a plastics plane plate. The cap member 21 is secured in place by causing projections formed thereon to be fitted into a plurality of holes 22 perforated in the case 11.

When a plug is inserted through the plug receiving hole 13 defined by the sleeve into the cavity of the case 11, the terminal of the plug downwardly urges the contact section 18 of the second terminal 16, causing the contact point 17 at the end of the second terminal 16 to be detached from the third terminal 20. At the same time the contact section 18 of the second terminal 16 fits into an annular groove formed on the circumferential surface of the terminal of the plug by the urging action of the coil spring 19 to effect electrical connection between the second terminal and plug, and hold the plug securely at this position.

Under such condition, some part of the circumferential surface of the rear end terminal of the plug contacts the inner surface of the sleeve 12, effecting an electrical contact through the plug terminal between the first and second terminals of the jack. When the plug is drawn out of the jack, the second terminal 16 is brought back to its original position by the action of the coil spring 19.

With the jack of the present invention, even after the plug is repeatedly inserted and drawn out, the excellent resilience of the coil spring assures good electrical contact between the second and third terminals, as well as between the second terminal and one of the plug terminals. This means that even if the second terminal is made of a material which has excellent electrical properties but not so good resilience, for example Phosphor bronze, the jack of the present invention assures good electrical contact over a longer period than is possible with the prior art jack.

There will now be described by reference to FIG. 3 a modification of a jack according to the present invention, in which the same parts as those of FIGS. 1 and 2 are denoted by the same numerals. On the surface of the case 11 facing the upper surface of the second terminal with the plug lying therebetween there is integrally formed a guide wall 23, whose projected portion can be disposed

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into the groove of a plug (which is shown by the dotted line of FIG. 3) when the plug is inserted. This guide wall 23 may be formed by expanding that wall of the case 11 defining the upper portion of the cavity. The guide wall will enable the plug to be securely inserted into the cavity by being guided by the projected surface of said guide wall.

As mentioned above, the jack of the present invention enables good electrical contact to be normally established between the second and third terminals of the jack and, when the plug is inserted, between the second terminal and plug terminals. Accordingly, various types of electrical circuit involving a jack of the present invention will be free from an unsatisfactory operation caused by poor electrical contact within the jack as has often been encountered with the prior art jack when a plug is introduced into it or withdrawn therefrom. Further, the jack of the present invention is of a simple construction and capable of being manufactured easily and at low cost.

What is claimed is:

1. A jack comprising a case provided with a plug receiving hole through which a plug can be introduced, a first terminal disposed in the case to contact the plug terminal, a second resilient terminal similarly positioned in the case elastically to contact the plug terminal, a third terminal located in the case in such relationship to the second terminal as normally to contact it and, when the plug is inserted into the jack, to be detached therefrom, and a spring member interposed between the second terminal and case wall to press the second terminal upward so as to cause it to contact the third terminal.

2. The jack according to claim 1 wherein that portion of the inner surface of the case which faces the second terminal with the plug, when inserted, lying therebetween is provided with a locating means for securely fixing the inserted plug at a prescribed position.

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179—96; 200—51.09; 339—176, 183