

Description

BACKGROUND OF THE INVENTION

[Field of the Invention]

This invention relates to a connector for an electric part, in which a finger-like latch member had by a socket body is brought into engagement with an electric part for maintaining a contacting relation.

[Brief Description of the Prior Art]

In a conventional connector, contact elements of an electric part represented by a leadless IC are placed on free ends of contacts had by a connector in order to obtain a contacting pressure. In order to maintain this pressure-contacting state, a presser cover is mounted on one end of the connector such that the presser cover can be opened and closed. By closing the presser cover to an upper surface of the connector and maintaining the closing state of the cover by a lock lever mounted on the other end of the connector, the IC is held and the contacting pressure is obtained.

However, when this presser cover is used, it is required to open and close the cover and to lock the cover every time the IC is mounted on and removed from the connector. This apparently lowers a working performance.

Recently, the work for mounting and removing the IC onto and from the connector is usually performed automatically. However, the above conventional connector having the construction, in which the presser cover is closed and locked by the lock member, it is difficult to automatically perform the work for mounting and removing the IC onto and from the connector. Furthermore, the presser cover is readily turned up or warped upward by elastic force of the contacts, which makes it difficult to obtain a uniform contacting pressure. In addition, this conventional device has the problem that the presser cover prevents a thermal emission of the IC.

GB-A-2,205,007 describes a connector for an IC package having the features of the preamble of Claim 1.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide, in order to solve the above problems, a connector for an electric part, in which a finger-like latch member is operatively connected to a contact shutter means so that the finger-like latch member can be engaged with and disengaged from an electric part.

The invention provides a connector for an electric part, in accordance with Claim 1.

In the present invention thus constructed, when the contact shutter means is operated to displace the contact into a closed state, the finger-like latch member, which is operatively connected to the action of the contact shutter means, is brought into engagement with the electric part thereby to maintain a contacting state between the contact element of the electric part and the contact. On the other hand, when the contact shutter means is operated to displace the contact into the open state, the finger-like latch member, which is operatively connected to the action of the contact shutter means, is disengaged from the electric part to permit the electric part to be removed from or mounted to the connector.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a connector for an electric part according to one embodiment of the present invention, in which a contact is opened and closed by an operating lever, and in which an upper operating member is now in an upper position;

Fig. 2 is a perspective view, similar to Fig. 1, but the upper operating member is now in a lower position;

Fig. 3 is a plan view of the connector of Fig. 1;

Fig. 4 is a side view of the connector of Fig. 1;

Fig. 5 is a sectional view of the connector taken on line A-A of Fig. 1;

Fig. 6 is a plan view of the connector of Fig. 2;

Fig. 7 is a side view of the connector of Fig. 2;

Fig. 8 is a sectional view of the connector of Fig. 2;

Fig. 9 is a sectional view of the connector taken on line B-B of Fig. 1;

Fig. 10 is a sectional view of the connector taken on line A-A of Fig. 1, but showing a state that the contact is now in pressure-contact with an IC;

Fig. 11 is a sectional view of a connector, in which another example of a finger-like latch member;

Fig. 12 is a sectional view of an important part of the connector, showing an embodiment in which the finger-like latch member is engaged and disengaged by a moving plate portion, and in which the finger-like latch member is now pivoted inward;

Fig. 13 is a sectional view of an important part of the connector, in which the finger-like latch member of Fig. 12 is now pivoted outward;

Fig. 14 is a sectional view of an important part of the connector, showing an embodiment in which the finger-like latch member is engaged and disengaged by the upper operating member, and in which the finger-like latch member is now pivoted inward;

Fig. 15 is a sectional view of an important part of the connector, in which the finger-like latch mem-

ber of Fig. 14 is now pivoted inward;

Fig. 16 is a sectional view of an important part of a connector, showing another embodiment in which the finger-like latch member is engaged and disengaged by the operating member, and in which the finger-like latch member is now pivoted inward;

Fig. 17 is a sectional view of an important part of the connector, in which the finger-like latch member of Fig. 16 is now pivoted outward;

Fig. 18 is a perspective view showing an embodiment of a connector, in which the contact and the finger-like latch member are directly operated by the operating member;

Fig. 19 is a sectional view of an important part of the connector of Fig. 18, in which the contact is now displaced upward;

Fig. 20 is a sectional view of an important part of the connector of Fig. 18, in which the finger-like latch member is now pivoted inward;

Fig. 21 is a sectional view of an important part of the connector of Fig. 18, in which the contact is now displaced downward; and

Fig. 22 is a sectional view of an important part of the connector of Fig. 18, in which the finger-like latch member is now displaced outward.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Several embodiments of the present invention will now be described with reference to Figs. 1 through 22.

FIRST EMBODIMENT (see Figs. 1 to 10 inclusive).

This embodiment exemplifies a connector for the use of a leadless IC 1 as an electric part. This IC has a plurality of contact elements 2 on a lower surface thereof. Each of the contact elements 2 is placed on an upper end of corresponding contacts so as to be pressure-contacted thereto.

The connector comprises a base plate 4 formed of an insulating material and having a plurality of contacts each formed of a spring element 3, implanted therein, a braking plate 5 formed of an insulating material and disposed at an upper position of the base plate 4, and a moving plate 6 interposed between the braking plate 5 and the base plate 4. The moving plate 6 is operated to move between the base plate 4 and the braking plate 5 in such a manner as to be in parallel relation therewith. This moving plate 6 acts as a shutter means for opening and closing the spring element 3 in accordance with the movement of the moving plate 6.

The base plate 4, the braking plate 5, and the moving plate 6 are formed as separate parts, and arranged in parallel relation with one another. Altern-

tively, the base plate 4 and the braking plate 5 may be integrally formed as a single part, and the moving plate 6 is formed as a separate part and interposed between the base plate 4 and the braking plate 5.

The base plate 4, the braking plate 5, and the moving plate 6 are arranged at spaces in parallel relation as illustrated, or they are disposed in superimposing relation.

The contact formed of the spring element 3 is implanted in the base plate 4, and a lower end of the contact is allowed to project downward of the base plate 4 to form a male terminal 9 which is subjected to connection with a wiring board. The spring element 3 implanted in the base plate 4 extends generally vertically upwardly of the base plate 4 as shown in Fig. 5. A plurality of through-holes 10 adapted to operate the contacts are formed in the moving plate 6, and the spring elements 3 are inserted in the corresponding through-holes 10, respectively. Furthermore, a plurality of through-holes 11 for contact braking are formed in the braking plate 5, so that distal ends of the spring elements 3 penetrating the through-holes 10 for operating the contacts 3 are received in the corresponding contact braking through-holes 11. The distal end of each of the spring elements 3 is placed under restriction of the corresponding contact braking through-hole 11, and can be expanded and contracted in the vertical direction within the through-hole 11 while a sideward displacement thereof is regulated by an inner wall of the through-hole 11.

As shown in Fig. 8, when the moving plate 6 is laterally moved in one direction, the spring elements 3 are applied with a side pressure by the inner walls of the contact operating through-holes 10, respectively. As a result, the spring elements 3 are bent back while slidably contacting the inner wall surfaces of the braking through-holes 11. As a result, the distal ends of the spring elements 3 are contracted downwardly within the through-holes 11 while being braked by the inner walls of the contact braking through-holes 11. In that state, the leadless IC 1 is placed on the upper surface of the braking plate 5 with the contact elements 2 held opposite the contact braking through-holes 11 and end faces at the distal ends of the spring elements 3. When the leadless IC 1 is placed on the upper surface of the braking plate 5, the contact elements 2 are in contacting or non-contacting relation with the distal ends of the spring elements 3, respectively. The braking plate 5 constitutes a platform for mounting the electric part thereon as mentioned.

When the moving plate 6 is laterally moved in the other direction after the leadless IC 1 is placed on the braking plate 5, each of the spring elements 3 is permitted to be restored to its original state. As shown in Fig. 10, the distal end of each of the spring elements 3 is expanded within the corresponding contact braking through-hole 11, owing to the restoration of the spring element 3, and brought into pressure-contact

with the contact element 2 placed opposite the contact braking through-hole 11 during a process for restoring the spring element 3. In order to maintain this pressure-contact, finger-like latch members 12 had by the base member 4 are brought into engagement with the leadless IC 1 to hold the IC 1.

The finger-like latch members 12 are pivotably mounted each on one end and each on the other end of the base plate 4 by shafts 13, and extends upward from the pivotal portion thereof. Lock tabs 14 are formed each on a foremost end of the extension of each finger-like latch member 12, so that the lock tabs 14 are engageable with one and the other ends of the IC 1 when the IC 1 is placed on the braking plate 5. In other words, when the finger-like latch members 12 are pivoted inward about the shafts 13 respectively, the lock tabs 14 are brought into engagement with the IC 1, and when the finger-like latch members 12 are pivoted outward, the lock tabs 14 are disengaged from the IC 1. Each of the finger-like latch members 12 is resiliently held by a spring 24 and normally biased inward by the spring 24 so that the finger-like latch member 12 is pivoted inward to maintain the engaging state. Therefore, when the finger-like latch members 12 are pivoted outward against the force of the springs 24, they are disengaged from the IC 1.

A contact shutter means is used as a means for causing the finger-like latch members 12 to be engaged with and disengaged from the IC 1. In other words, the finger-like latch members 12 are operatively connected to the contact shutter means so as to be engaged with and disengaged from the IC 1.

One example of the contact shutter means illustrated in the attached drawings will now be described. The contact shutter means comprises, as already mentioned, the moving plate 6, operating levers 15, 16 as means for laterally moving the moving plate 6, and an upper operating member 21 as means for activating the operating levers 15, 16 and capable of moving in the vertical direction.

More specifically, the contact shutter means comprises the moving plate 6 capable of moving in the lateral direction in order to open and close the spring elements 3 serving as the contacts, and a first operating lever 15 and a second operating lever 16 as means for laterally moving the moving plate 6, a lower part of one end of the first operating lever 15 being pivotably supported by a shaft 17 at one side surface of one end of the base plate 4, an upper portion of one end of the operating lever 15 being supported by a transmission shaft 18 at the side surface of one end of the moving plate 6, on the other hand, an upper portion of one end of the second operating lever 16 being pivotably supported by a supporting shaft 19 at a side surface of the other end of the base plate 4, a lower portion of one end of the second operating lever 16 being supported by a transmission shaft 20 at the side surface of the other end of the moving plate 6.

The transmission shafts 18, 20 transmits a lateral movement force to the moving plate 6 for movement in one direction when both the first and second operating levers 15, 16 are pivoted downward about the supporting shafts 17, 19, and also transmits a lateral movement force to the moving plate 6 for movement in the other direction when both the first and second operating levers 15, 16 are pivoted upward. In other words, since the base plate 4 and the moving plate 6 are supported such that the vertical arrangement of the supporting shaft 17 and the transmission shaft 18 at one end of the first operating lever 15 is in a reverse relation with the vertical arrangement of the supporting shaft 19 and the transmission shaft 20 at one end of the second operating lever 16. Detail of the operating lever is shown in USP5002499.

The upper operating member 21 is vertically movably disposed at an upper position of the first and second operating levers 15, 16, and is horizontally supported by the first and second operating levers 15, 16. The first and second operating levers 15, 16 extend in the opposite directions with each other along the side surface of the body of the connector. A free end of the first operating lever 15 supports one end of the upper operating member 21, while a free end of the second operating lever 16 supports the other end of the upper operating member 21.

The upper operating member 21 has an opening 22 corresponding to the upper surface of the moving plate 6 and exhibits a frame shape as a whole. The IC 1 is permitted to be inserted and removed through the opening 22. The frame element of the upper operating member 21 is placed on the free ends of the operating levers 15, 16 so as to be horizontally supported thereon.

The upper operating member 21 is provided with guide elements 23 extending downward from its frame element. The guide elements 23 are disposed along the side surface of the base plate 4 in order to guide a vertical upper and lower part.

When the upper operating member 21 now in an upper position shown in Fig. 1 and Figs. 3-5 is vertically pushed down by robot means or through manual operation, a compressing force is exerted to the operating levers 15, 16 to cause the levers 15, 16 to be pivoted downward about the operating levers 15, 16 as shown in Figs. 2, and 6-8, the pivotal force being transmitted to the moving plate 6 through the transmission shafts 18, 20 to laterally move the moving plate 6 in one direction along the upper surface of the base plate 4, this lateral movement in turn causing the spring elements 3 forming the contacts to be displaced against their elasticity and contracted to create the above-mentioned open state.

At the same time, the finger-latch members 12 are pivoted outward against the springs 24 through operative connection with the contact shutter means, to thereby remove the engaging relation with the IC

1. It is requisite to design such that the finger-like latch members 12 remove the engaging relation with the IC 1 after the spring elements 3 forming the contacts form the open-state. This prevents a spring-up of the IC 1 due to restoration of the spring elements 3. In the open-state, the IC 1 is inserted and removed with no-load.

When the push-down operation of the operating member 21 is released after the IC 1 is placed on the braking plate 5, the moving plate 6 is caused to be laterally moved from the position shown in Fig. 8 to the position shown in Fig. 10 in the opposite direction with respect to the first-mentioned moving direction owing to the elastic restoring force of the spring elements 3 acting as the contacts. Simultaneously, the operating levers 15, 16 and the upper operating member 21 are also restored to the upper positions. The lateral movement of the moving plate 6 in the opposite direction allows the spring elements 3 to be restored and stretched to create a pressure-contacting state with the contact elements 2 of the IC 1.

At the same time, through operative connection with the lateral movement of the moving plate 6 in the opposite direction (that is, operative connection with the restoring movement of the contact shutter means), the finger-like members 12 are pivoted inward in obedience to the springs 24 to cause the lock tabs 14 to be engaged with both ends of the IC 1, thereby holding the IC 1 and maintaining the pressure-contacting state with the spring elements 3. It is requisite that the finger-latch members 12 are brought into engagement with the IC 1 immediately before the spring elements 3 create the closed state (pressure-contacting state).

The operating levers illustrated are only one example, and other suitable push-down means may be employed for the purpose of laterally moving the moving plate. The operating levers are not necessarily limited to the case where two pairs of left and right operating levers are provided. Only one pair of left and right operating levers may be provided.

The operating member 21 can be vertically lowered by robot means or through manual operation. The operating levers 15, 16 can properly be pivoted downward in accordance with the vertical downward movement of the operating member 21.

As discussed above, the finger-like latch members 12 are opened and closed in operative connection with the contact shutter means. In the first embodiment, the finger-like latch members are engaged and disengaged in operative connection with the operating levers 15, 16 forming the contact shutter means.

More specifically, each of the finger-like latch members 12 is provided at a lower end thereof with a pressure-bearing portion 25 projecting sideward. This pressure-bearing portion 25 is located behind each pivotal shaft 13 such that the pressure-bearing por-

tion 25 and lower edges of the free ends of the operating levers 15, 16 are in vertical corresponding relation. The springs 24 used herein are forked springs each of which is attached about each shaft member forming the pressure-bearing members 25.

When the upper operating member 21 is pushed down to cause the operating levers 15, 16 to be pivoted downward in the manner as already described, the operating levers 15, 16 press the pressure-bearing portions 25 downward so that the finger-like latch members 12 are pivoted outward against the springs 24. As a result, the finger-like latch members 12, as shown in Fig. 8, are disengaged from the IC 1. The downward movements of the operating levers 15, 16 cause the moving plate 6 to be laterally moved in one direction to bend the spring elements 3 in order to create a non-contacting state or contact-released state, and therefore the IC 1 can freely be inserted onto and removed from the upper surface of the braking plate 5. In this case, timing is properly set such that the disengaging states of the finger-like latch members 12 are created immediately after their pressure-contacting states with the IC 1 caused by the spring elements 3 are removed in the manner as already described.

Next, when the push-down of the upper operating member 21 is removed, the moving plate 6 is laterally moved in the other direction owing to the restoring force of the spring elements 3. This lateral moving force of the moving plate 6 is exerted to the transmission shafts 18, 20 of the operating levers 15, 16. As a result, the levers 15, 16 are caused to be pivoted upward, which in turn causes the upper operating member 21 to be pushed upward.

At this time, the spring elements 3, as shown in Fig. 10, are urged to contact the contacting elements 2 of the IC 1 which is placed on the braking plate 5 or platform. The push-down force to the pressure-bearing portions 25 is removed by the upward pivotal movements of the operating levers 15, 16 as the contact shutter means. As a result, the finger-like latch members 12 are pivoted inward by the elastic force of the springs 24, so that the lock tabs 14 are engaged with both ends of the IC 1 placed on the upper surface of the braking plate 5.

As a result, the IC 1 is held by the connector, thereby ensuring a pressure-contacting state with each contact element 3.

As mentioned above, timing is properly set such that the finger latch members 12 are engaged with both ends of the IC 1 immediately before the spring elements 3 are urged to contact with the IC 1. If the spring elements 3 are urged to contact the IC 1 before the finger-like latch members 12 are engaged with the IC 1, the IC 1 is idly moved to invite insufficient contact made by the spring elements 3 and insufficient engagement made by the finger-like latch members 12. These problems can be solved by means of the above-mentioned proper timing setting.

SECOND EMBODIMENT (see Figs. 12 and 13)

In this embodiment, the engaging state and non-engaging state are created by means of operative connection between the finger-like latch members 12 and the moving plate 6 as the contact shutter means.

As shown, one end portion of the moving plate 6 is faced with front edges of the finger-like latch members 12, so that when the moving plate is moved in one direction, the pressing force exerted to the finger-like latch members 12 by the end portion of the moving plate 6 is removed to allow the finger-like latch members 12 to be pivoted inward in obedience to the force of the springs, thereby creating the engaging state. When the moving plate 6 is laterally moved in the other direction, the end portion of the moving plate 6 urges the finger-like latch members 12 so that the finger-like latch members 12 are pivoted outward against the springs 24 in order to create the non-engaging state or released state.

THIRD EMBODIMENT (see Figs. 14 to 17)

In this embodiment, the finger-like latch members 12 are operatively connected to the upper operating member 21 forming the contact shutter means, thereby creating the engaging state and releasing state of each finger-like latch member 12.

As one embodiment, as shown in Figs. 14 and 15, a pressure element 26 is extended downward from the frame element of the upper operating member 21, and a distal end of the pressure element 26 is placed opposite the pressure bearing portion 25.

As shown in Fig. 15, when the upper operating member 21 is pushed down, a push-down force is exerted to the pressure bearing portion 25 by the pressure element 26 in order to pivot the finger-like latch member 12 outward, thereby creating an engagement released state. When the push-down force exerted by the upper operating member 21 is removed, the operating member 21 is automatically moved upward owing to the restoring force of the spring element as the contact, thereby creating a state where the pressure bearing portion 25 is no more pushed down by the pressure element 26. As a result, the finger-like latch member 12, as shown in Fig. 14, is pivoted inward by the force of the spring 24, thereby creating an engaging state. The details are the same to those in which the operating levers 15, 16 are acted on the pressure-bearing portions 25.

Next, in the embodiment shown in Figs. 16 and 17, the upper operating member 21 and the finger-like latch member 12 are in cam-engagement with each other, and the finger-like latch member 12 is operatively connected to the vertical movement of the upper operating member 21 so as to be pivoted inward and outward. A cam groove 27 is formed, for example, in the upper operating member 21, and the fin-

ger-like latch member 12 is provided with a slider 28 adapted to be slidably fitted into this cam groove 27, so that the slider 28 is moved along a locus of the cam groove 27 in accordance with the vertical movement of the upper operating member 21, thereby causing the finger-like latch member 12 to be pivoted inward and outward. Of course, it may be designed such that the cam groove 27 is formed at the finger-like latch member 12, and the slider 28 is disposed at the upper operating member 21.

FOURTH EMBODIMENT (see Figs. 18 and 22)

In this embodiment, a spring element 3' forming the contact is opened and closed directly by the upper operating member 21, thereby opening and closing the finger-like latch member 12. Therefore, the moving plate 6 and the operating levers 15, 16 as provided in the first through third embodiments are not required.

The spring element 3' is fixedly implanted at its basal portion into the base plate 4 and extended laterally outwardly from the basal portion side, so that a free end of the spring element 3' can be flexed upwardly and downwardly about the basal portion side. The spring element 3' is provided with a projection 29 projecting from an intermediate portion thereof and adapted to contact the IC 1. The spring element 3' is further provided at its free end with a pressure bearing portion 30 which is subjected to the push-down of the upper operating member 21.

As means for pushing down the pressure-bearing portion 30, the upper operating member 21 is provided with a pressure element 31 directing, for example, downward from the frame element of the upper operating member 21, so that a lower end of the pressure element 31 acts on the pressure-bearing portion 30. As a suitable example, the pressure element 31 is placed on the pressure-bearing portion 30 so that the upper operating member 21 is supported by the spring element 3'. On the other hand, the upper operating member is provided with the pressure element 26 directing downward from its frame element, and the pressure element 26 is placed above the pressure-bearing portion 25 disposed at an outer side of the basal end of the finger-like latch member 12 in such a manner as to face with the pressure-bearing portion 25, so that the pressure-bearing portion 25 is pushed down in accordance with a downward movement of the upper operating member 21.

As shown in Fig. 19, when the upper operating member 21 is in an upper position supported by the spring element 3', the finger-like latch member 12, as shown in Fig. 20, is in a position pivoted inwardly by the spring 24. In the state shown in Figs. 19 and 20, when the upper operating member 21 is pushed down, the pressure element 31 pushes down the pressure-bearing portion 30 as shown in Fig. 21, and

therefore the spring element 3' is displaced downward. As a result, the contacting projection 29 is displaced downward to create a releasing state, and the pressure element 26 of the upper operating member 21 operatively connected thereto is caused to push down the pressure-bearing portion 25, so that the finger-like latch member 12 is pivoted outward against the spring 24 in order to be disengaged from the IC 1. In this state, the IC 1 is inserted and removed. The IC 1 is supported on a platform 32 formed on the upper surface side of the base plate 4, and the finger-like latch member 12 is engaged with and disengaged from both ends of the IC 1 supported on the platform 32.

When the push-down of the upper operating member 21 is removed in the state shown in Figs. 21 and 22, the spring element 3' is restored and displaced upward. This causes the upper operating member 21 supported by the pressure-bearing portion 30 is pushed up. During the restoring process of the spring element 3' in the upward direction, the contacting projection 29 is urged to contact the corresponding contact element (not shown) of the IC 1 supported on the platform 32.

The pressure to the pressure-bearing portion 25 is removed by the upward movement of the upper operating member 21. As a result, the finger-like latch member 12 is pivoted inward in obedience to the spring 24, so that the finger-like latch member 12 is brought into engagement with the end portion of the IC 1, thereby maintaining the pressure contacting state of the spring element 3'. As already mentioned, it is preferable that timing is properly set such that the finger-like latch member 12 is brought into engagement with the end portion of the IC 1 immediately before the spring element 3' is urgedly contacted to the contact element of the IC 1, and that the finger-like latch member 12 is disengaged from the end portion of the IC 1 after the spring element 3' releases the pressure contact to the contact element of the IC 1.

FIFTH EMBODIMENT (see Fig. 11)

A pair of the finger-like latch members 12 may be employed so that they can be engaged with both ends of the IC 1. As shown in Fig. 11, it also may be designed such that the finger-like latch member 12 is operatively connected to the contact shutter means so that it can be engaged with and disengaged from one end of the IC 1, and when the IC 1 is placed on the connector, the other end of the IC 1 is engaged by other means.

As one example, the braking plate 5 as the platform is provided, as shown, at an end portion thereof with a temporary engaging portion 33 so that one end portion of the IC 1 can be engaged therein, and thereafter the finger-like latch member 12 operatively connected to the contact shutter means is brought into

engagement with the other end portion of the IC 1. This embodiment is employed, for example, in the second embodiment shown in Figs. 12 and 13. Specifically, owing to the lateral movement of the moving plate 6 in one direction, the finger-like latch member 12 to be engaged with one end of the IC 1 can be activated, and the other end of the IC 1 can be engaged by the temporarily engaging portion 33 which is engaged with the IC 1 when the IC 1 is placed.

According to the present invention, the finger-like latch member can be automatically engaged with and disengaged from the electric part through operative connection to the operation in which the contact is displaced between a contacting state and a releasing state by the contact shutter means. That is, while creating the closed state of the contact by means of operation of the contact shutter means, the finger-like latch member is brought into engagement with the IC through operative connection thereto, in order to hold the electric part on the connector and to maintain a pressure contact between the electric part and the contact.

When the contact is displaced into an open state by means of operation of the contact shutter means, the engagement of the finger-like latch member with the electric part can be automatically removed through operative connection thereto. As a result, the electric part can be removed and inserted immediately.

By means of the above procedures, the above-mentioned problems inherent in the conventional presser cover can be obviated effectively.

Claims

1. A connector for an electric part having contact shutter means (6) for forming an open state or a closed state of a contact (3), comprising a finger-like latch member (12) able to be engaged with and disengaged from an electric part (1), said finger-like latch member (12) being operatively connected to an action of said contact shutter means (6) for displacing a contact (3) in an open state in order to be disengaged from said electric part (1), said finger-like latch member (12) being operatively connected to an action of said contact shutter means (6) for displacing said contact (3) in a closed state in order to be engaged with said electric part, characterized in that said finger-like latch member (12) is disengaged from said electric part (1) after said contact (3) creates an open state, and in that said finger-like latch member (12) is engaged with said electric part (1) before said contact (3) creates a closed state.
2. A connector for an electric part as claimed in Claim 1, wherein said contact shutter means in-

therefore the spring element 3' is displaced downward. As a result, the contacting projection 29 is displaced downward to create a releasing state, and the pressure element 26 of the upper operating member 21 operatively connected thereto is caused to push down the pressure-bearing portion 25, so that the finger-like latch member 12 is pivoted outward against the spring 24 in order to be disengaged from the IC 1. In this state, the IC 1 is inserted and removed. The IC 1 is supported on a platform 32 formed on the upper surface side of the base plate 4, and the finger-like latch member 12 is engaged with and disengaged from both ends of the IC 1 supported on the platform 32.

When the push-down of the upper operating member 21 is removed in the state shown in Figs. 21 and 22, the spring element 3' is restored and displaced upward. This causes the upper operating member 21 supported by the pressure-bearing portion 30 is pushed up. During the restoring process of the spring element 3' in the upward direction, the contacting projection 29 is urged to contact the corresponding contact element (not shown) of the IC 1 supported on the platform 32.

The pressure to the pressure-bearing portion 25 is removed by the upward movement of the upper operating member 21. As a result, the finger-like latch member 12 is pivoted inward in obedience to the spring 24, so that the finger-like latch member 12 is brought into engagement with the end portion of the IC 1, thereby maintaining the pressure contacting state of the spring element 3'. As already mentioned, it is preferable that timing is properly set such that the finger-like latch member 12 is brought into engagement with the end portion of the IC 1 immediately before the spring element 3' is urgedly contacted to the contact element of the IC 1, and that the finger-like latch member 12 is disengaged from the end portion of the IC 1 after the spring element 3' releases the pressure contact to the contact element of the IC 1.

FIFTH EMBODIMENT (see Fig. 11)

A pair of the finger-like latch members 12 may be employed so that they can be engaged with both ends of the IC 1. As shown in Fig. 11, it also may be designed such that the finger-like latch member 12 is operatively connected to the contact shutter means so that it can be engaged with and disengaged from one end of the IC 1, and when the IC 1 is placed on the connector, the other end of the IC 1 is engaged by other means.

As one example, the braking plate 5 as the platform is provided, as shown, at an end portion thereof with a temporary engaging portion 33 so that one end portion of the IC 1 can be engaged therein, and thereafter the finger-like latch member 12 operatively connected to the contact shutter means is brought into

engagement with the other end portion of the IC 1. This embodiment is employed, for example, in the second embodiment shown in Figs. 12 and 13. Specifically, owing to the lateral movement of the moving plate 6 in one direction, the finger-like latch member 12 to be engaged with one end of the IC 1 can be activated, and the other end of the IC 1 can be engaged by the temporarily engaging portion 33 which is engaged with the IC 1 when the IC 1 is placed.

According to the present invention, the finger-like latch member can be automatically engaged with and disengaged from the electric part through operative connection to the operation in which the contact is displaced between a contacting state and a releasing state by the contact shutter means. That is, while creating the closed state of the contact by means of operation of the contact shutter means, the finger-like latch member is brought into engagement with the IC through operative connection thereto, in order to hold the electric part on the connector and to maintain a pressure contact between the electric part and the contact.

When the contact is displaced into an open state by means of operation of the contact shutter means, the engagement of the finger-like latch member with the electric part can be automatically removed through operative connection thereto. As a result, the electric part can be removed and inserted immediately.

By means of the above procedures, the above-mentioned problems inherent in the conventional presser cover can be obviated effectively.

Claims

1. A connector for an electric part having contact shutter means (6) for forming an open state or a closed state of a contact (3), comprising a finger-like latch member (12) able to be engaged with and disengaged from an electric part (1), said finger-like latch member (12) being operatively connected to an action of said contact shutter means (6) for displacing a contact (3) in an open state in order to be disengaged from said electric part (1), said finger-like latch member (12) being operatively connected to an action of said contact shutter means (6) for displacing said contact (3) in a closed state in order to be engaged with said electric part, characterized in that said finger-like latch member (12) is disengaged from said electric part (1) after said contact (3) creates an open state, and in that said finger-like latch member (12) is engaged with said electric part (1) before said contact (3) creates a closed state.
2. A connector for an electric part as claimed in Claim 1, wherein said contact shutter means in-



cludes a moving plate (6) for opening and closing said contact (3) in accordance with a lateral movement of said moving plate, said finger-like latch member (12) being engaged and disengaged by said moving plate.

3. A connector for an electric part as claimed in Claim 1, wherein said contact shutter means includes a moving plate (6) operated to laterally move to open and close said contact (3), and an operating lever (15) for operating the movement of said moving plate (6), said finger-like latch member (12) being engaged and disengaged by said operating lever.
4. A connector for an electric part as claimed in Claim 1, wherein said contact shutter means includes a moving plate (6) operated to laterally move to open and close said contact (3), an operating lever (15) for operating the movement of said moving plate (6), and an upper operating member (21) for activating said operating lever (15) in accordance with a vertical movement, said finger-like latch member (14) being engaged and disengaged by said upper operating lever.
5. A connector for an electric part as claimed in Claim 1, wherein said contact shutter means includes an upper operating member (21) for opening and closing said contact (3) in accordance with a vertical movement thereof, said finger-like latch member (14) being engaged and disengaged by said upper operating lever.

Patentansprüche

1. Verbinder für ein elektrisches Teil mit einem Kontaktverschlußmittel (6) zur Bildung eines geöffneten oder eines geschlossenen Zustands eines Kontaktes (3), mit einem fingerähnlichen Rastglied (12), das mit einem elektrischen Teil (1) in und außer Eingriff gebracht werden kann, wobei das fingerähnliche Rastglied (12) zum Verschieben eines Kontaktes (3) in einen geöffneten Zustand, um es von dem elektrischen Teil (1) auszurücken, mit einer Betätigung des Kontaktverschlußmittels (6) wirkverbunden ist und wobei das fingerähnliche Rastglied (12) zum Verschieben des Kontaktes (3) in einen geschlossenen Zustand, um es mit dem elektrischen Teil in Eingriff zu bringen, mit einer Betätigung des Kontaktverschlußmittels (6) wirkverbunden ist, dadurch gekennzeichnet, daß das fingerähnliche Rastglied (12) nach Erzeugung eines geöffneten Zustands durch den Kontakt (3) von dem elektrischen Teil (1) ausgerückt wird, und daß das fingerähnliche Rastglied (12) vor Erzeugung eines

geschlossenen Zustandes durch den Kontakt (3) mit dem elektrischen Teil (1) in Eingriff gebracht wird.

2. Verbinder für ein elektrisches Teil nach Anspruch 1, bei dem das Kontaktverschlußmittel eine bewegliche Platte (6) zum Öffnen und Schließen des Kontaktes (3) gemäß einer seitlichen Bewegung der beweglichen Platte enthält, wobei das fingerähnliche Rastglied (12) von der beweglichen Platte in und außer Eingriff gebracht wird.
3. Verbinder für ein elektrisches Teil nach Anspruch 1, bei dem das Kontaktverschlußmittel eine bewegliche Platte (6), die seitlich bewegt wird, um den Kontakt (3) zu öffnen und zu schließen, und einen Betätigungshebel (15) zur Betätigung der Bewegung der beweglichen Platte (6) enthält, wobei das fingerähnliche Rastglied (12) von dem Betätigungshebel in und außer Eingriff gebracht wird.
4. Verbinder für ein elektrisches Teil nach Anspruch 1, bei dem das Kontaktverschlußmittel eine bewegliche Platte (6), die seitlich bewegt wird, um den Kontakt (3) zu öffnen und zu schließen, einen Betätigungshebel (15) zur Betätigung der Bewegung der beweglichen Platte (6) und ein oberes Betätigungsglied (21) zum Ingangsetzen des Betätigungshebels (15) gemäß einer vertikalen Bewegung enthält, wobei das fingerähnliche Rastglied (14) von dem oberen Betätigungshebel in und außer Eingriff gebracht wird.
5. Verbinder für ein elektrisches Teil nach Anspruch 1, bei dem das Kontaktverschlußmittel ein oberes Betätigungsglied (21) zum Öffnen und Schließen des Kontaktes (3) gemäß einer vertikalen Bewegung davon enthält, wobei das fingerähnliche Rastglied (14) von dem oberen Betätigungshebel in und außer Eingriff gebracht wird.

Revendications

1. Connecteur pour composant électrique ayant un moyen de fermeture de contact (6) pour former un état ouvert ou un état fermé d'un contact (3), comprenant un organe de verrouillage de type doigt (12) capable d'être engagé avec et désengagé d'un composant électrique (1), ledit organe de verrouillage de type doigt (12) étant connecté en fonctionnement à une action dudit moyen de fermeture de contact (6) pour déplacer un contact (3) dans un état ouvert afin de le désengager dudit composant électrique (1), ledit organe de verrouillage de type doigt (12) étant connecté en fonctionnement à une action dudit moyen de fer-



meture de contact (6) pour déplacer ledit contact (3) dans un état fermé afin de l'engager avec ledit composant électrique, caractérisé en ce que ledit organe de verrouillage de type doigt (12) est désengagé dudit composant électrique (1) après que ledit contact (3) a créé un état ouvert, et en ce que ledit organe de verrouillage de type doigt (12) est engagé avec ledit composant électrique (1) avant que ledit contact (3) ne crée un état fermé.

2. Connecteur pour composant électrique selon la revendication 1, dans lequel ledit moyen de fermeture de contact comporte une plaque mobile (6) pour ouvrir et fermer ledit contact (3) en corrélation avec un mouvement latéral de ladite plaque mobile, ledit organe de verrouillage de type doigt (12) étant engagé et désengagé par ladite plaque mobile.
3. Connecteur pour composant électrique selon la revendication 1, dans lequel ledit moyen de fermeture de contact comporte une plaque mobile (6) actionnée de manière à se déplacer latéralement pour ouvrir et fermer ledit contact (3), et un levier d'actionnement (15) pour actionner le mouvement de ladite plaque mobile (6), ledit organe de verrouillage de type doigt (12) étant engagé et désengagé par ledit levier d'actionnement.
4. Connecteur pour composant électrique selon la revendication 1, dans lequel ledit moyen de fermeture de contact comporte une plaque mobile (6) actionnée de manière à se déplacer latéralement pour ouvrir et fermer ledit contact (3), un levier d'actionnement (15) pour actionner le mouvement de ladite plaque mobile (6), et un organe d'actionnement supérieur (21) pour actionner ledit levier d'actionnement (15) en corrélation avec un mouvement vertical, ledit organe de verrouillage de type doigt (14) étant engagé et désengagé par ledit levier d'actionnement supérieur.
5. Connecteur pour composant électrique selon la revendication 1, dans lequel ledit moyen de fermeture de contact comporte un organe d'actionnement supérieur (21) pour ouvrir et fermer ledit contact (3) en corrélation avec un mouvement vertical de cet organe, ledit organe de verrouillage de type doigt (14) étant engagé et désengagé par ledit levier d'actionnement supérieur.

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