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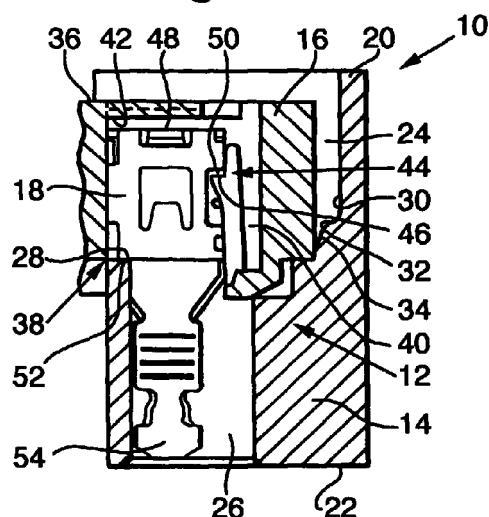
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(54) **Electrical connector**

(57) An electrical connector (10) comprising a housing (12) having a first part (14) and a second part (16); and an electric contact (18); wherein the first part of the housing has a front face (20) and a rear face (22), a channel (24) formed in the front face and having an internal wall (28) remote from the front face and a side wall (30) with a shoulder (32) directed towards the front face and an angled surface (34) between the shoulder and the internal wall, and a through bore (26) extending between the rear face and the channel; wherein the second part of the housing has a front face (36), a rear face (38), and a through bore (40) extending between the front and rear faces and having a resilient latch tang (44) within the bore directed towards the front face with a lip (46) directed towards the front face; wherein the second part is positioned in the channel in the first part and is movable between an initial assembly position in which the rear face of the second part engages the shoulder in the channel and the bores are substantially aligned, and a fully assembled position in which the rear face of the second part engages the internal wall of the channel and the bores are out of alignment, the rear face of the second part engaging the angled surface during movement from the initial assembly position to the fully assembled position; and wherein the electric contact has a first rearwardly directed shoulder (50) and a second rearwardly directed shoulder (52), the contact being positioned in the bores with the first shoulder engaging the lip on the latch tang and the second shoulder engaging the internal wall of the channel when the second part of the housing is in the fully assembled

position. Provides a double lock for the contact without the need for additional parts.

Fig.2.



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DescriptionTechnical Field

[0001] The present invention relates to an electrical connector in which an electric contact is locked in position.

Background of the Invention

[0002] It is known to provide electrical connectors in which the or each electric contact is locked in position in the connector housing by an additional part. Such known connectors are difficult and expensive to assemble.

Summary of the Invention

[0003] It is an object of the present invention to provide an improvement to the known arrangements.

[0004] An electrical connector in accordance with the present invention comprises a housing having a first part and a second part; and an electric contact; wherein the first part of the housing has a front face and a rear face, a channel formed in the front face and having an internal wall remote from the front face and a side wall with a shoulder directed towards the front face and an angled surface between the shoulder and the internal wall, and a through bore extending between the rear face and the channel; wherein the second part of the housing has a front face, a rear face, and a through bore extending between the front and rear faces and having a resilient latch tang within the bore directed towards the front face with a lip directed towards the front face; wherein the second part is positioned in the channel in the first part and is movable between an initial assembly position in which the rear face of the second part engages the shoulder in the channel and the bores are substantially aligned, and a fully assembled position in which the rear face of the second part engages the internal wall of the channel and the bores are out of alignment, the rear face of the second part engaging the angled surface during movement from the initial assembly position to the fully assembled position; and wherein the electric contact has a first rearwardly directed shoulder and a second rearwardly directed shoulder, the contact being positioned in the bores with the first shoulder engaging the lip on the latch tang and the second shoulder engaging the internal wall of the channel when the second part of the housing is in the fully assembled position.

[0005] The present invention provides a double lock for the electric contact to prevent withdrawal of the contact from the electrical connector in one direction, without the need for an additional part.

Brief Description of the Drawings

[0006] The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a cross-sectional view of an electrical connector in accordance with the present invention partially assembled with an electric contact having a first lock engaged;

Figure 2 is a cross-sectional view of the electrical connector of Figure 1 fully assembled with the electric contact having first and second locks engaged;

Figure 3 is a cross-sectional view of the electrical connector of Figure 1 partially assembled with the electric contact having neither lock engaged;

Figures 4 and 5 are a cross-sectional views of the electrical connector of Figure 3 during stages of assembly with the electric contact having the second lock engaged in Figure 5; and

Figure 6 is a cross-sectional view of the electrical connector of Figure 3 fully assembled with the electric contact having first and second locks engaged as in Figure 2.

Description of the Preferred Embodiment

[0007] Referring to Figure 1, the electrical connector 10 in accordance with the present invention comprises a housing 12 having a first part 14 and a second part 16; and one or more electric contacts 18 (only one is shown in the drawings).

[0008] The first part 14 of the housing has a front face 20 and a rear face 22. A channel 24 is formed in the front face 20, and a number of through bores 26 (only one is shown in the drawings) extend between the rear face 22 and the channel 24 in a direction substantially perpendicular to the rear face. The channel 24 has an internal wall 28 which is remote from the front face 20 and preferably substantially parallel to the rear face 22. One of the side walls 30 defining the channel 24 has a shoulder 32 directed towards the front face 20, and an angled surface 34 extending between the shoulder and the internal wall 28. The shoulder 32 is preferably at a small angle compared to the internal wall 28. The angled surface 34 is at a greater angle relative to the internal wall 28 than the shoulder 32.

[0009] The second part 16 of the housing 12 has a front face 36 and a rear face 38, and a number of through bores 40 (only one of which is shown in the drawings) which extend between the front and rear faces in a direction substantially perpendicular to the rear face. Adjacent the front face 36, an internal shoulder 42 is formed in each bore 40. A resilient latch tang 44 is also positioned in each bore 40. The latch tang 44 extends towards the front face 36 and has a lip 46 formed adjacent the free end directed towards the front face and the internal shoulder 42. On initial assembly,

the second part 16 of the housing 12 is positioned in the channel 24 in the first part 14 of the housing, with the rear face 38 of the second part resting on the shoulder 32 in the channel, as shown in Figure 1. In this initial position, the bores 26,40 in the first and second parts 14,16, respectively, are substantially aligned.

[0010] Each electric contact 18 has a front face 48 and first and second rearwardly directed shoulders 50,52. The contact 18 is connected to an electrical conductor (not shown) in any suitable manner, such as by way of crimping to a crimp portion 54 on the contact. In the initial position of the first and second parts 14,16 of the housing 12, the electric contact 18 is inserted in the direction X into the bore 26 of the first part from the rear face 22 and into the bore 40 of the second part, with the front face 48 of the contact directed towards the internal shoulder 42 in the bore of the second part. The contact 18 is inserted until the lip 46 on the latch tang 44 makes a snap fit with the first shoulder 50 on the contact to provide a first lock for the contact, as shown in Figure 1. The first lock substantially prevents movement of the contact 18 relative to the housing 12 in a direction opposite to direction X. The internal shoulder 42 prevents over insertion of the contact 18 into the bores 26,44 and substantially prevents further movement of the contact relative to the housing 12 in the direction X after the first lock has been achieved. In the first lock position of the contact 18, the second shoulder 52 on the contact is substantially aligned with the rear face 38 of the second part 16 of the housing 12.

[0011] After the contact 18 reaches the first lock position, the second part 16 of the housing 12 is pushed towards the first part 14. During this relative movement, the rear face 38 of the second part 16 slides on the shoulder 32 and the angled surface 34 so that the second part moves in a direction opposite to direction X, and in a direction Y substantially perpendicular to direction X, relative to the first part 14 to move the bores 26,40 out of alignment and to bring the rear face 38 of the second part 16 of the housing 12 into engagement with the internal wall 28 of the channel 24 (as shown in Figure 2). This also brings the second shoulder 52 on the contact 18 into engagement with the internal wall 28 of the channel 24 to provide a second lock for the contact. As with the first lock, the second lock substantially prevents movement of the contact 18 relative to the housing 12 in a direction opposite to direction X. With the first and second locks engaged, the connector 10 is fully assembled. Any suitable means (not shown) may be used to lock the first and second parts 14,16 of the housing 12 in the fully assembled position. The contact 18 is mateable with a corresponding contact (not shown) which enters the bore 40 of the second part 16 of the housing 12 through the front face 36 of the second part.

[0012] The electrical connector 10 of Figures 3 to 6 is identical to the electrical connector 10 of Figures 1 and 2. Figures 3 to 6 illustrate alternative assembly

steps before reaching the fully assembled position. With the first and second parts 14,16 of the housing 12 in the initial assembly position (Figure 3), the electric contact 18 is inserted in the direction X into the bore 26 of the first part from the rear face 22 and into the bore 40 of the second part, with the front face 48 of the contact directed towards the internal shoulder 42 in the bore of the second part as before. However, the first lock for the contact 18 is not engaged, and the second shoulder 52 of the contact is not aligned with the rear face 38 of the second part 16 of the housing 12. The second part 16 of the housing 12 is then pushed towards the first part 14. During this relative movement, the rear face 38 of the second part 16 slides on the shoulder 32 (Figure 4) and the angled surface 34 (Figure 5) so that the second part moves in a direction opposite to direction X, and in a direction Y substantially perpendicular to direction X, relative to the first part 14. This relative movement moves the bores 26,40 out of alignment and brings the second shoulder 52 on the contact 18 into engagement with the internal wall 28 of the channel 24 to provide the second lock for the contact, as before, but before the first lock is established. Further relative movement of the second part 16 relative to the first part 14, as above, brings the rear face 38 of the second part 16 of the housing 12 into engagement with the internal wall 28 of the channel 24 (as shown in Figure 6), and moves the contact 18 in the direction X relative to the bore 40 in the second part until the lip 46 on the latch tang 44 makes a snap fit with the first shoulder 50 on the contact to establish the first lock for the contact. With the first and second locks engaged, the connector 10 is fully assembled.

[0013] The present invention therefore provides an electrical connector in which the or each electric contact has a double lock (first and second locks) in one direction to prevent withdrawal of the electric contact after the electrical connector is fully assembled. No additional parts are required to establish the double lock. Alternative assembly steps still ensure a double lock for the electric contact in the fully assembled position of the electrical connector. The present invention provides an electrical connector which is easier and cheaper to assemble, and lends itself to automated assembly.

Claims

1. An electrical connector (10) comprising a housing (12) having a first part (14) and a second part (16); and an electric contact (18); wherein the first part of the housing has a front face (20) and a rear face (22), a channel (24) formed in the front face and having an internal wall (28) remote from the front face and a side wall (30) with a shoulder (32) directed towards the front face and an angled surface (34) between the shoulder and the internal wall, and a through bore (26) extending between the rear face and the channel; wherein the second

part of the housing has a front face (36), a rear face (38), and a through bore (40) extending between the front and rear faces and having a resilient latch tang (44) within the bore directed towards the front face with a lip (46) directed towards the front face; wherein the second part is positioned in the channel in the first part and is movable between an initial assembly position in which the rear face of the second part engages the shoulder in the channel and the bores are substantially aligned, and a fully assembled position in which the rear face of the second part engages the internal wall of the channel and the bores are out of alignment, the rear face of the second part engaging the angled surface during movement from the initial assembly position to the fully assembled position; and wherein the electric contact has a first rearwardly directed shoulder (50) and a second rearwardly directed shoulder (52), the contact being positioned in the bores with the first shoulder engaging the lip on the latch tang and the second shoulder engaging the internal wall of the channel when the second part of the housing is in the fully assembled position.

(28) of the channel (24) before the second part (16) of the housing (12) is in the fully assembled position.

2. An electrical connector as claimed in Claim 1, wherein the shoulder (32) in the channel (24) is at a small angle relative to the internal wall (28) of the channel, and the angled surface (34) is at a greater angle relative to the internal wall.
3. An electrical connector as claimed in Claim 1 or Claim 2, wherein the bore (40) in the second part (16) of the housing (12) has an internal shoulder (42) adjacent the front face (36) of the second part which acts as a stop for the electric contact (18).
4. An electrical connector as claimed in any one of Claims 1 to 3, wherein the internal wall (28) of the channel (24) is substantially parallel to the rear face (22) of the first part (14) of the housing (12).
5. An electrical connector as claimed in any one of Claims 1 to 4, wherein the bore (26) in the first part (14) of the housing (12) is substantially perpendicular to the internal wall (28) of the channel (24); and wherein the bore (40) in the second part (16) of the housing is substantially perpendicular to the rear face (38) of the second part.
6. An electrical connector as claimed in any one of Claims 1 to 5, wherein the first shoulder (50) of the electric contact (18) engages the lip (46) on the latch tang (44) when the second part (16) of the housing (12) is in the initial assembly position.
7. An electrical connector as claimed in any one of Claims 1 to 5, wherein the second shoulder (52) of the electric contact (18) engages the internal wall

Fig.1.

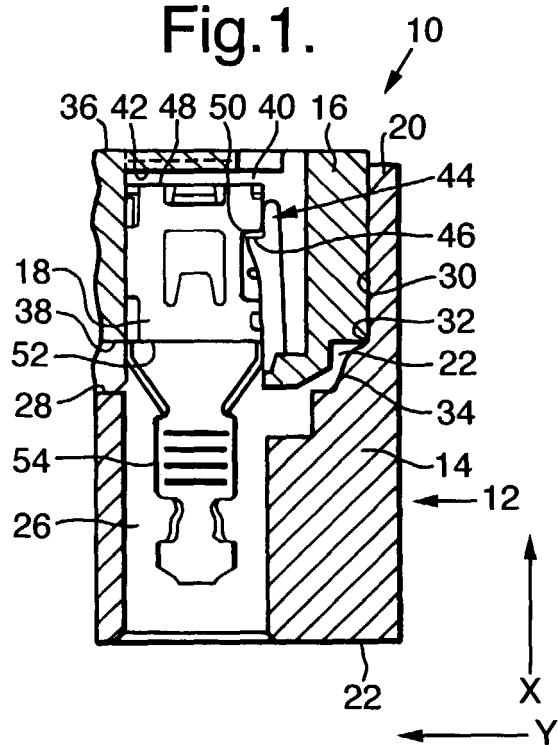


Fig.2.

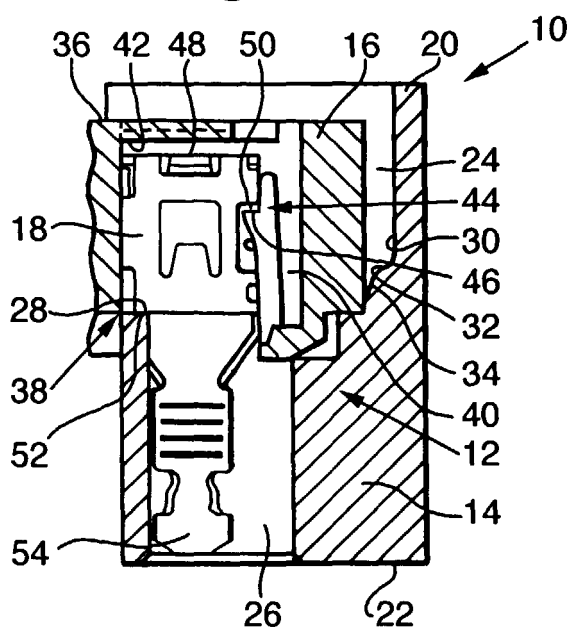


Fig.3.

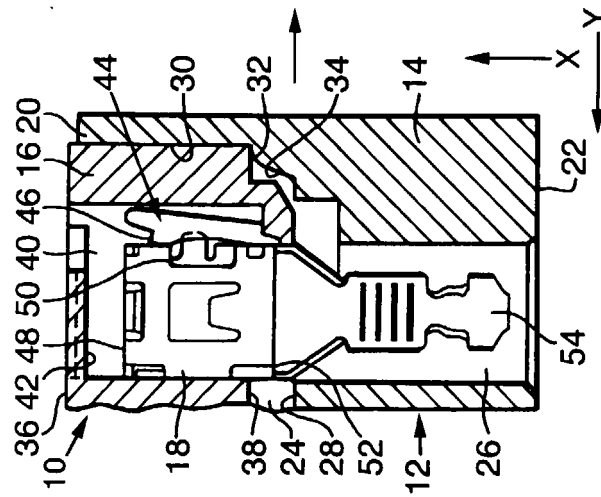


Fig.4.

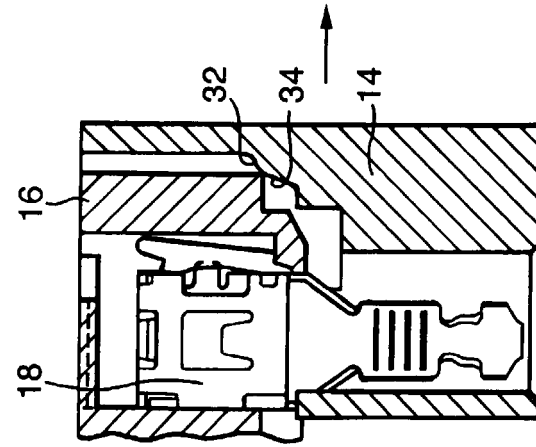


Fig.5.

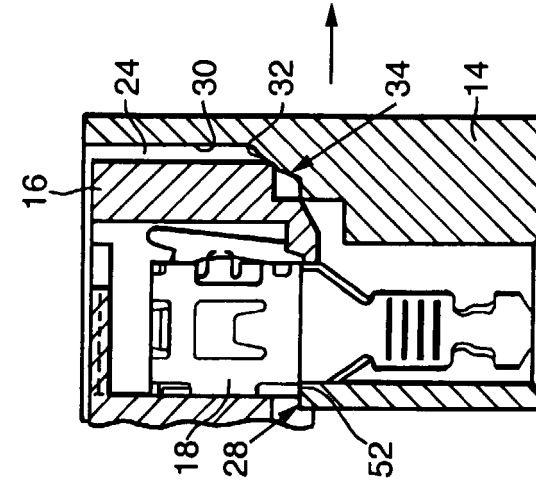


Fig.6.

