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(54) **ACCURATE POSITIONING OF SOLDER TAIL LEADS IN AN ELECTRICAL CONNECTOR**

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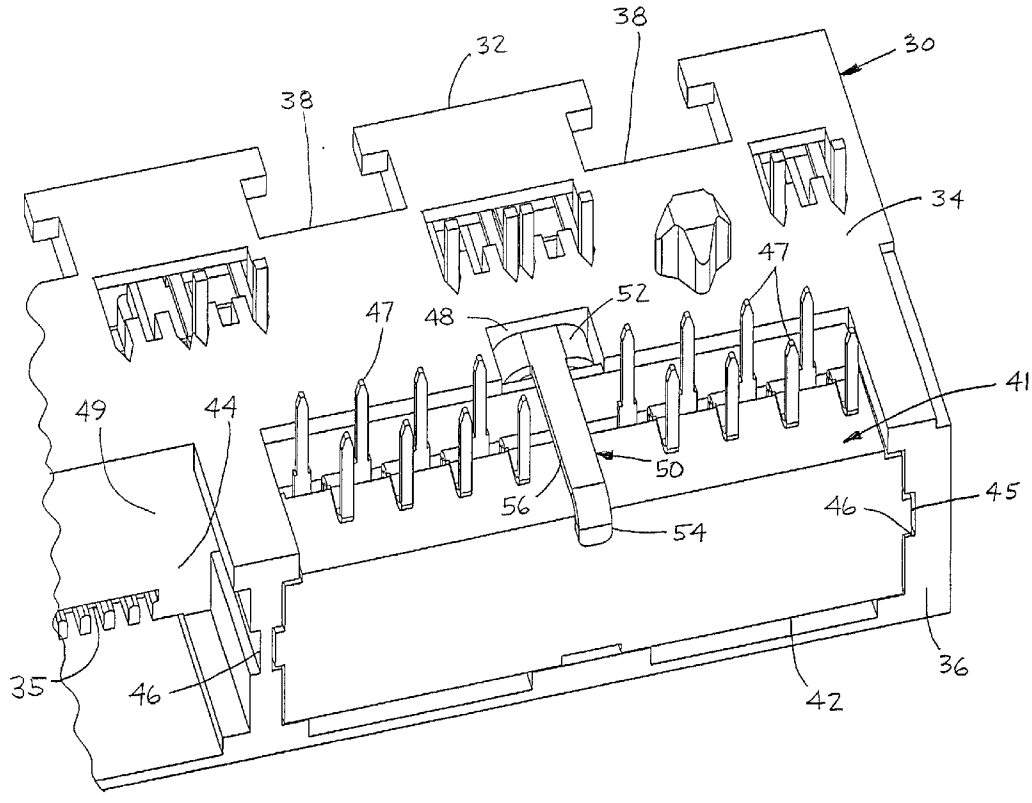
(52) **U.S. Cl.** **439/701**

(57) **ABSTRACT**

An electrical connector comprises a housing (**30, 60, 80, 100**) and a contact insert (**41, 61, 81, 101**) that includes contacts (**43, 63, 83, 103**) carried by a molding (**42, 62, 82, 102**). A lock member (**50, 70, 90, 105**) cooperates with the housing to secure the contact insert in the housing and to bias the molding against a wall of the housing. In one embodiment, the lock member (**50**) has a head (**52**) that is interference fitted in a stall (**48**) in the housing, and the lock member has a tail (**54**) that is arranged to urge the molding toward the head. In another embodiment, the lock member (**60, 80**) is wedged between the molding and a portion of the housing. The lock member has a main portion, and nose portions (**76, 92**) that project from the main portion, and the nose portions engage the molding. In another embodiment, the lock member (**105**) includes a protrusion of the molding that is interference fitted in an aperture (**106**) in the housing.



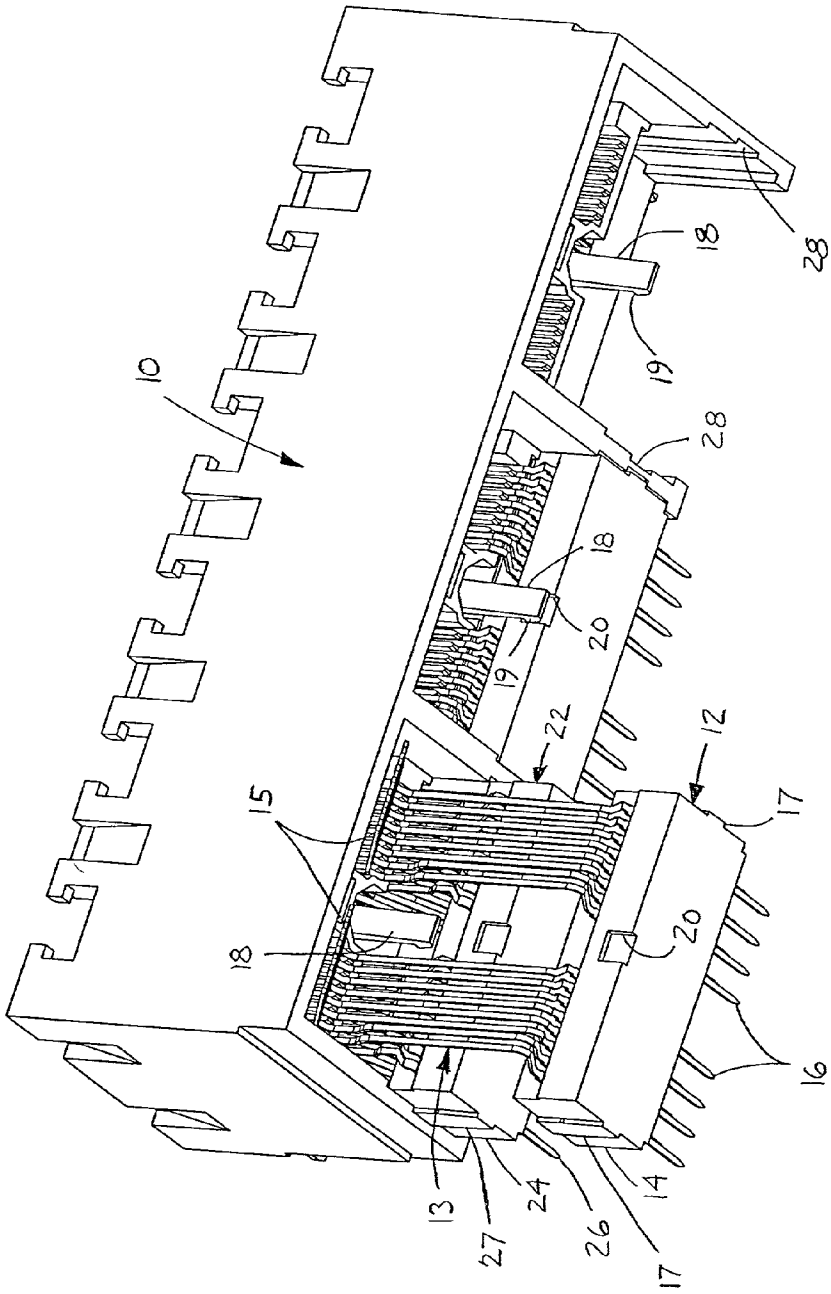


Fig. 1 (PRIOR ART)

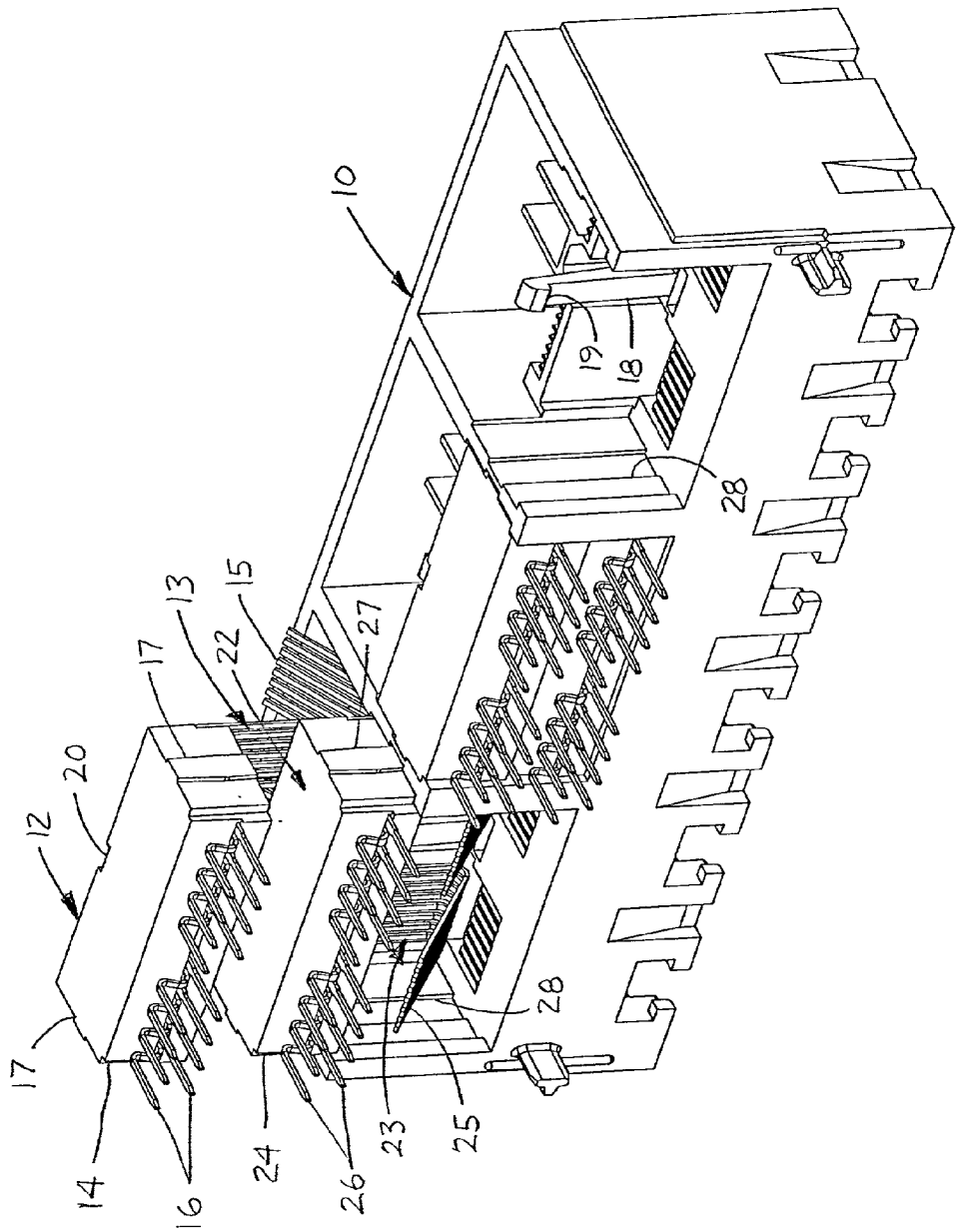


Fig. 2 (PRIOR ART)

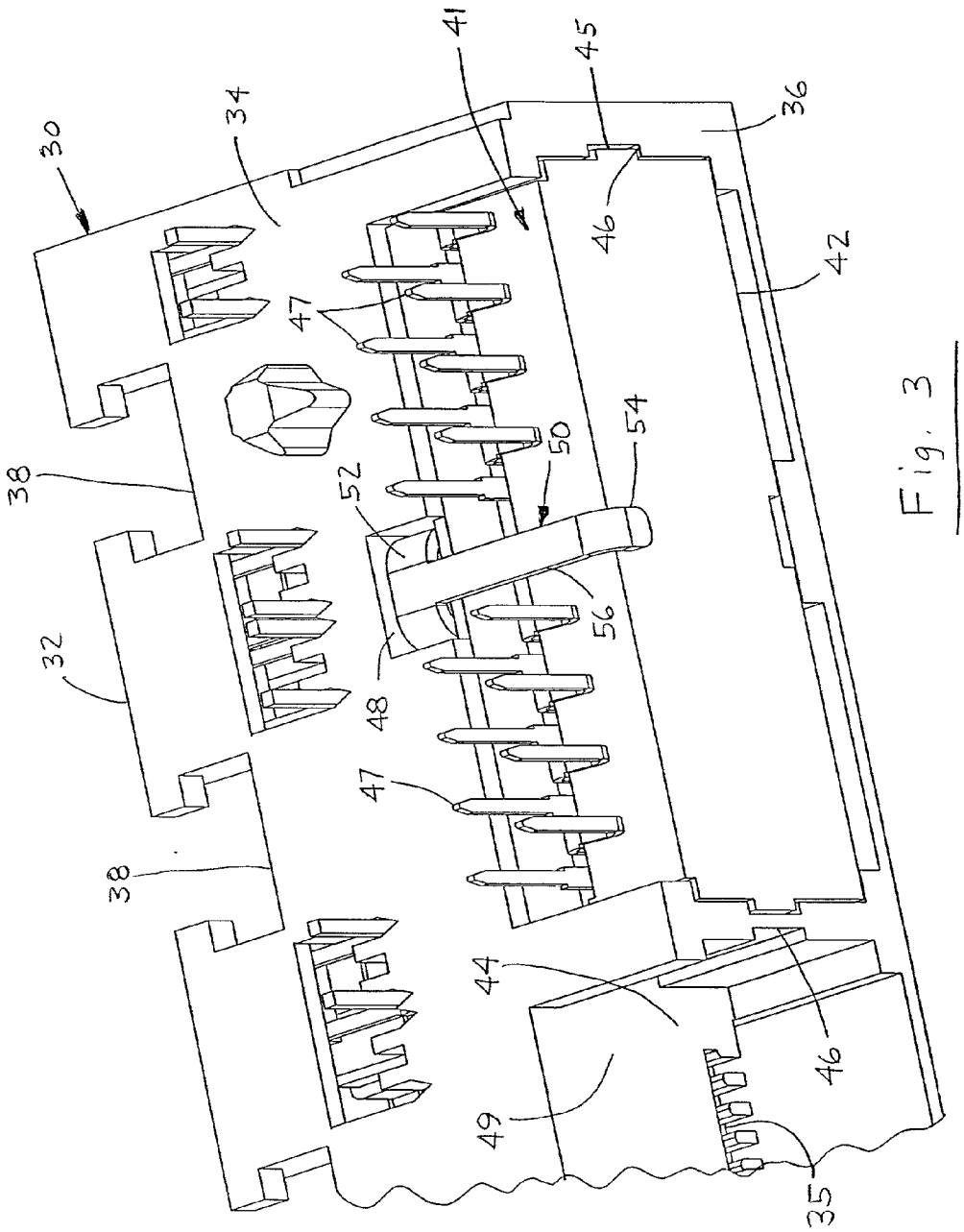


Fig. 3

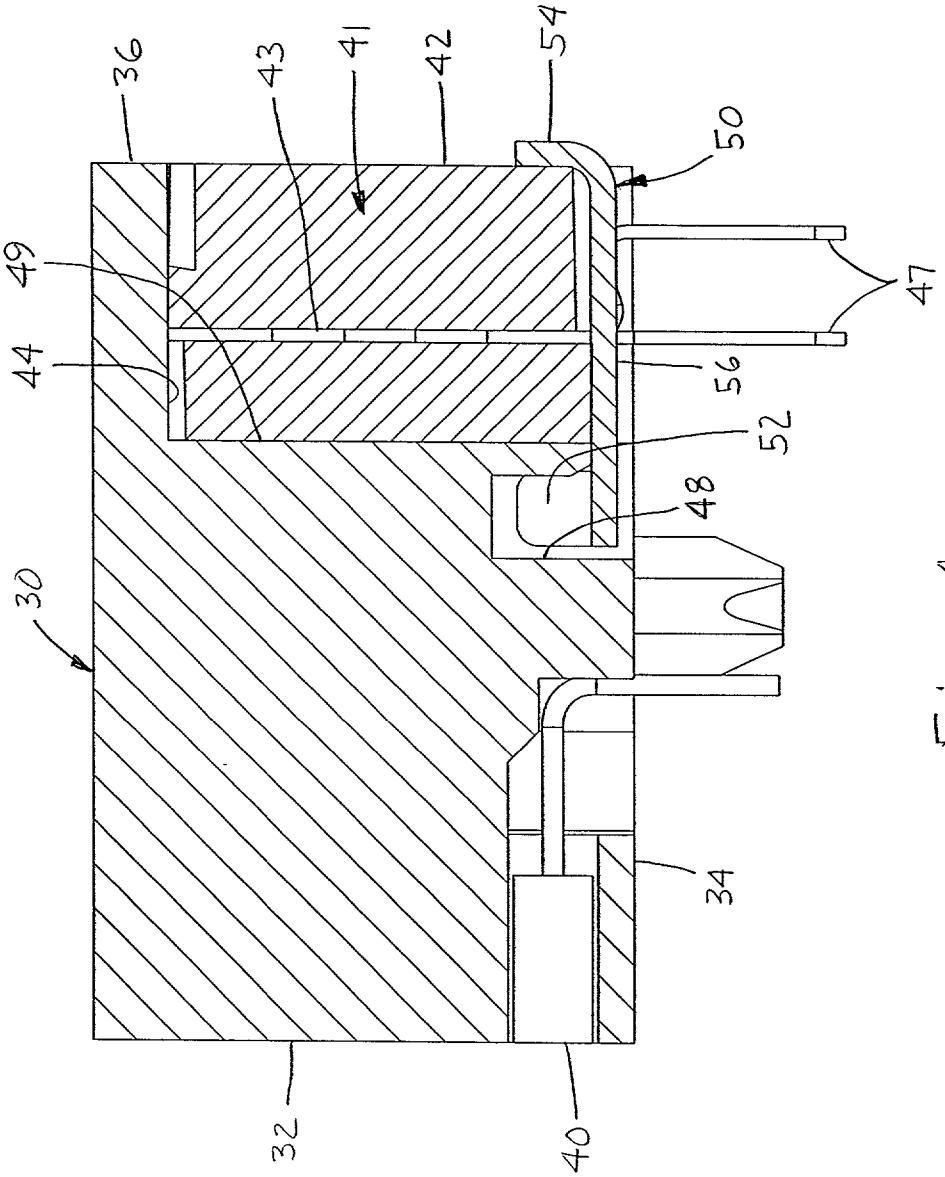


Fig. 4

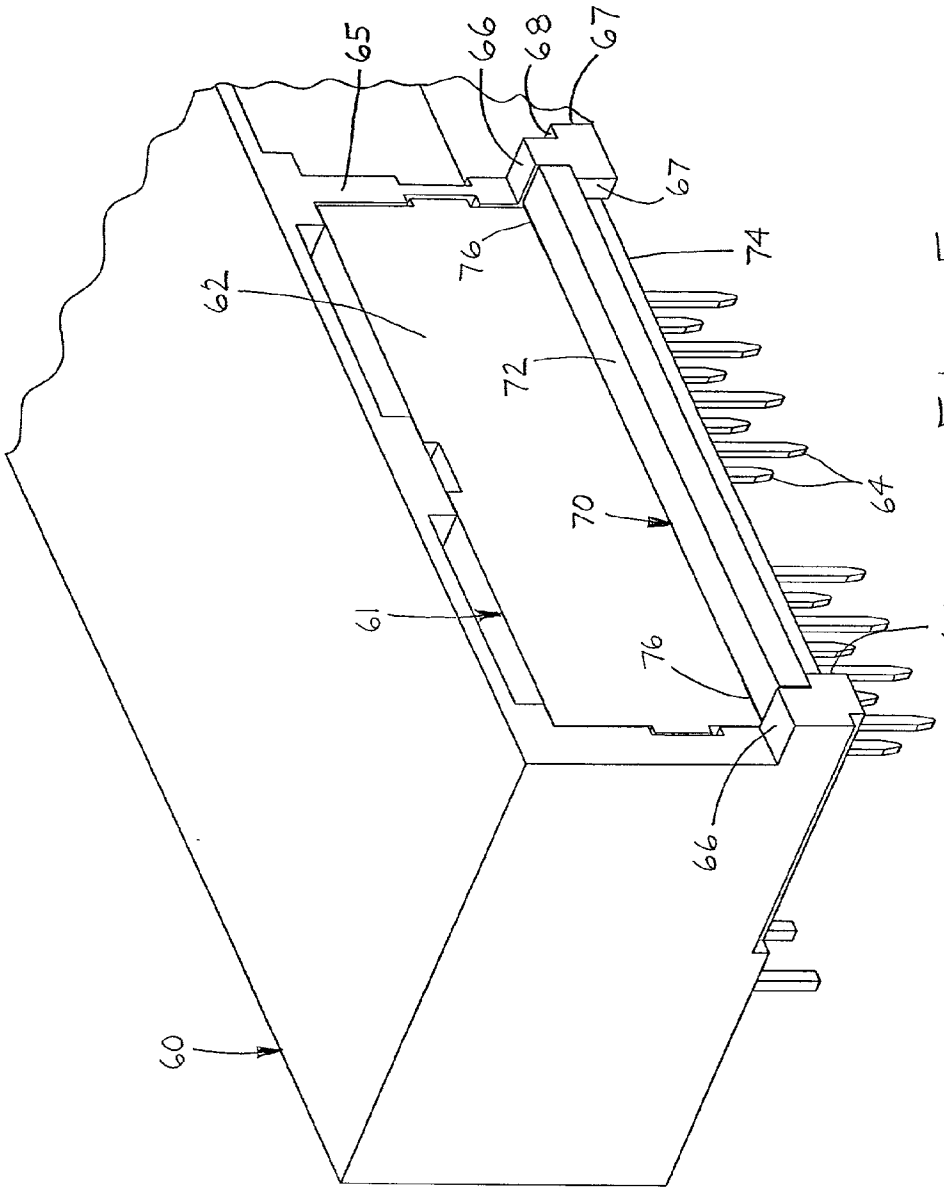


Fig. 5

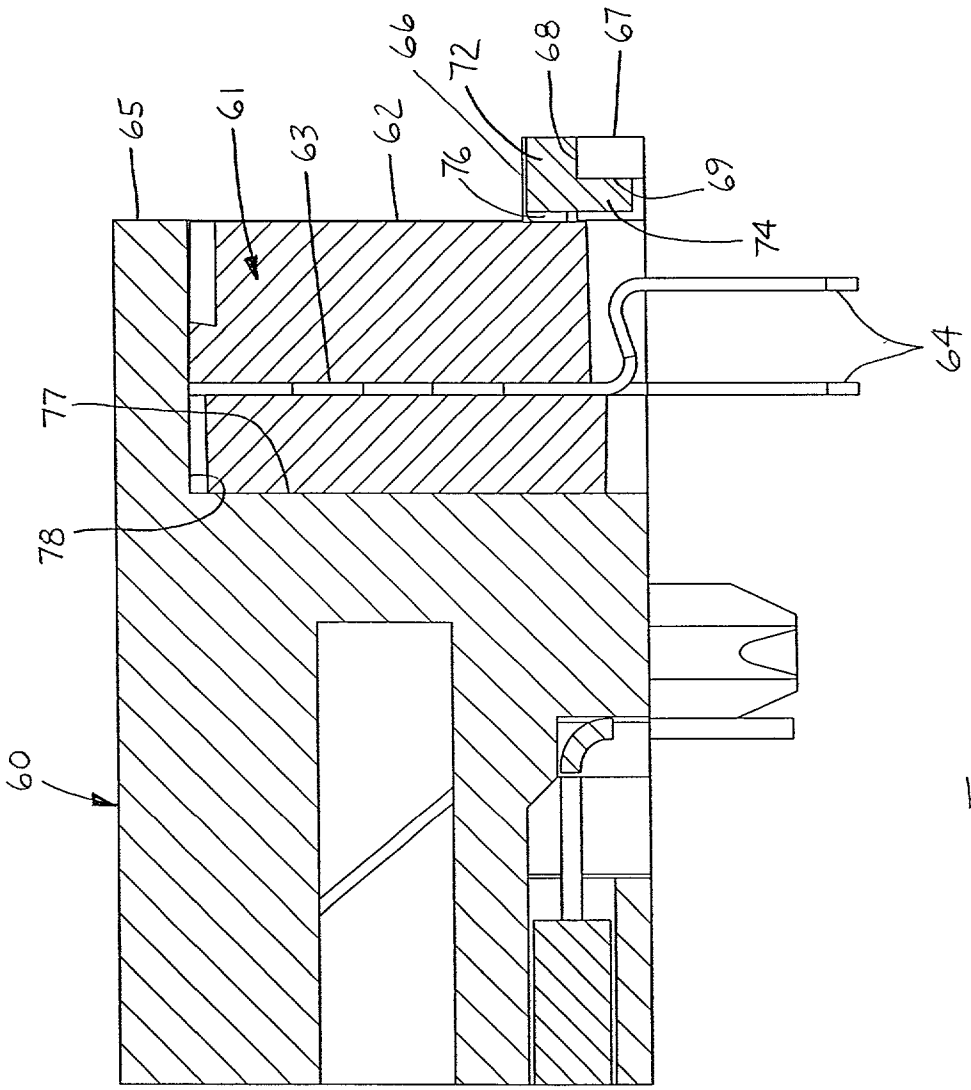


Fig. 6

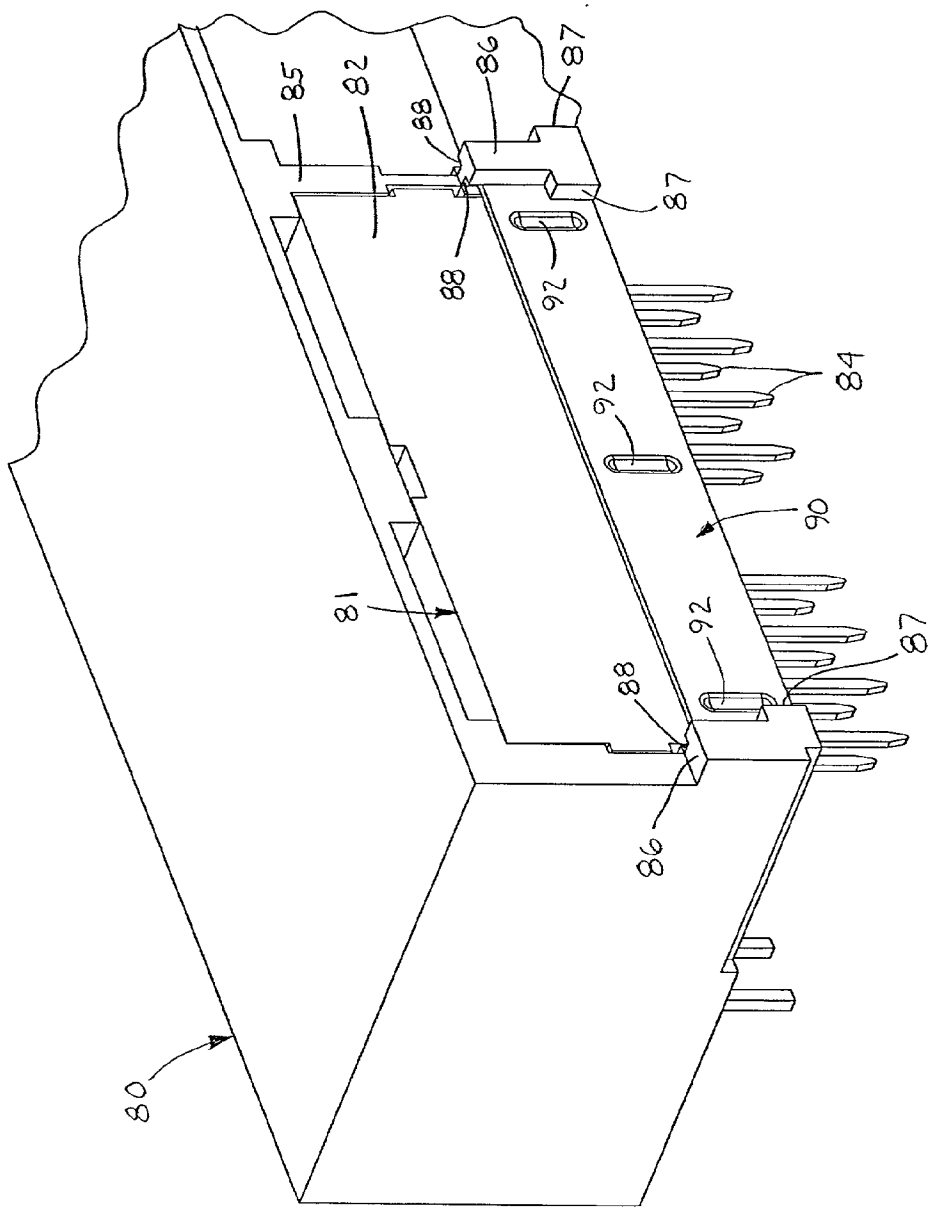


Fig. 7

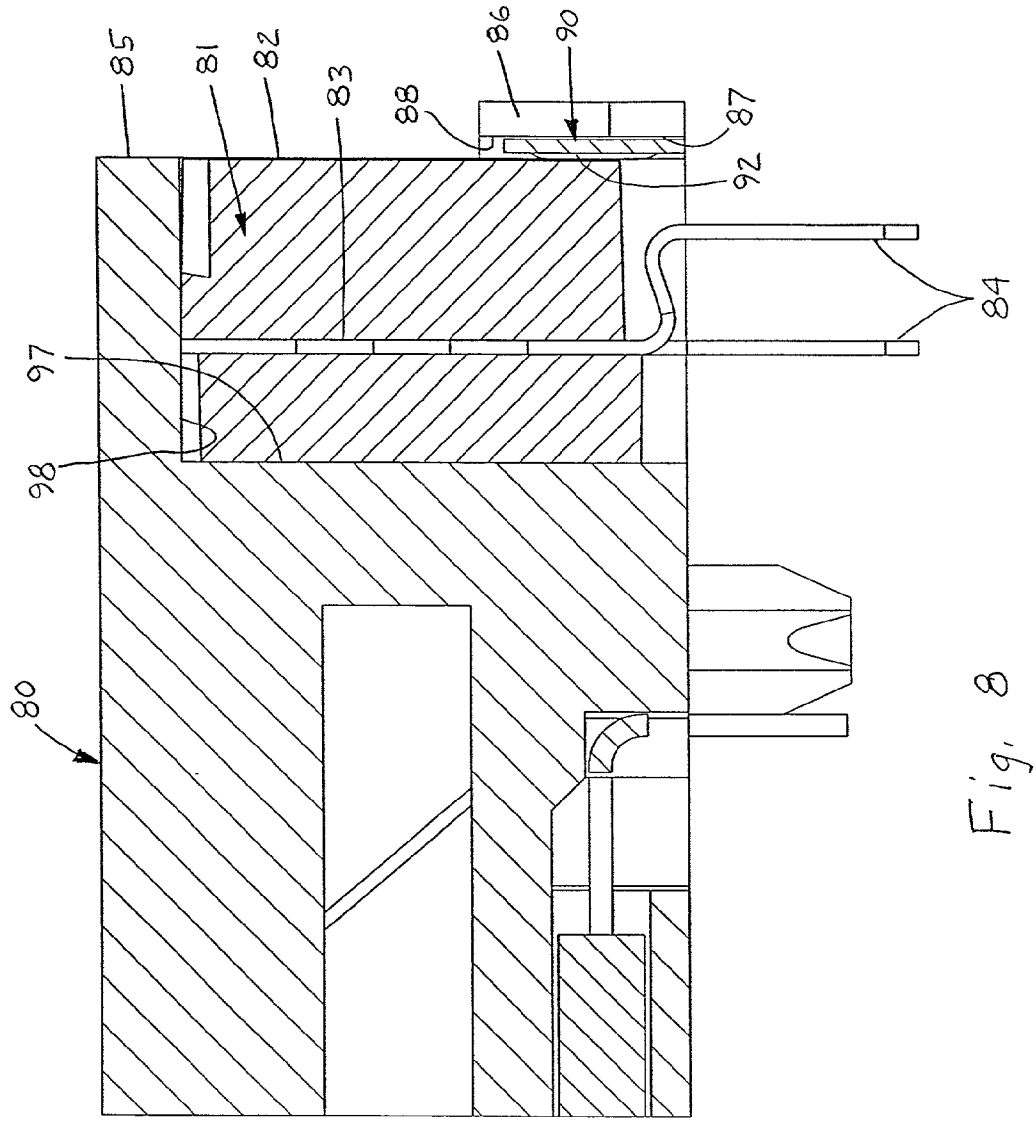


Fig. 8

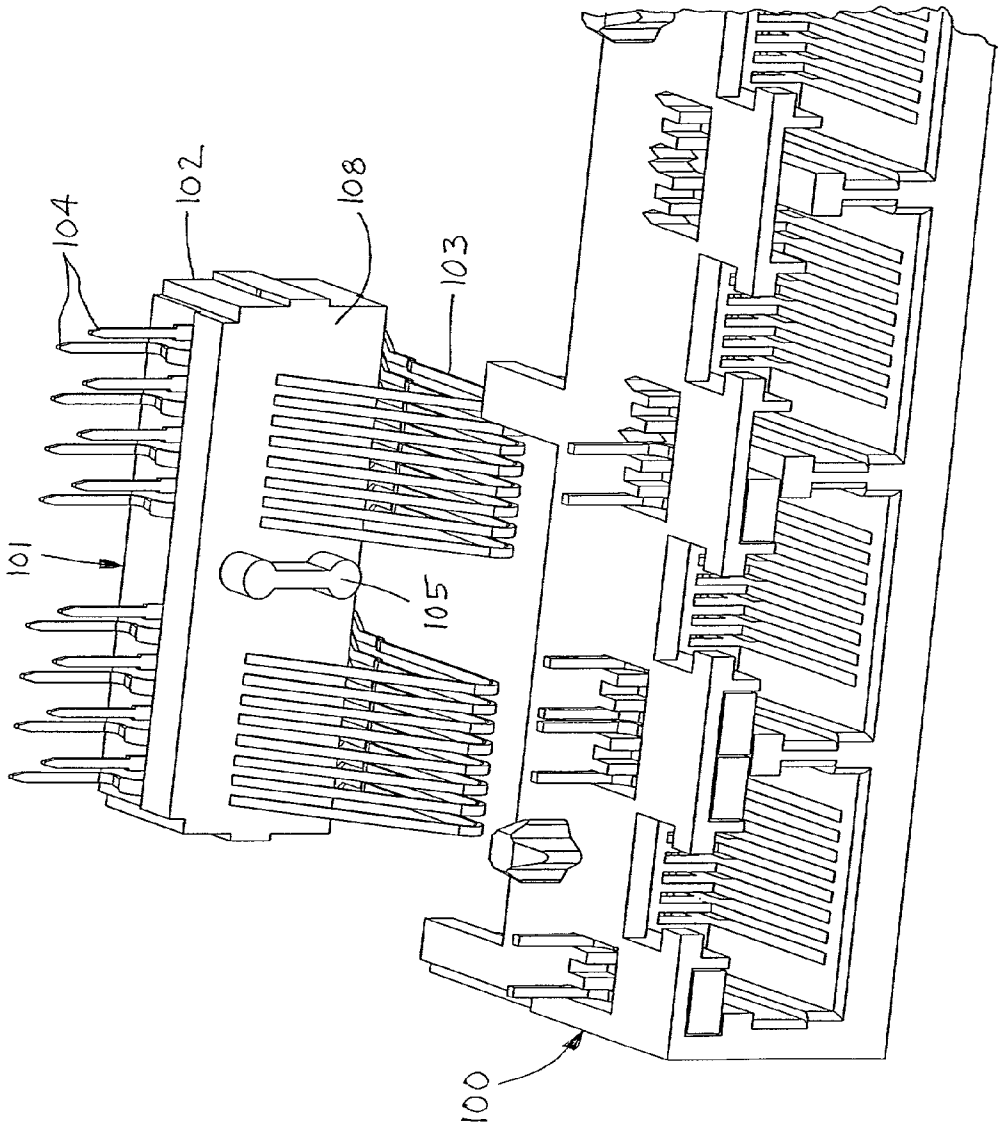


Fig. 9

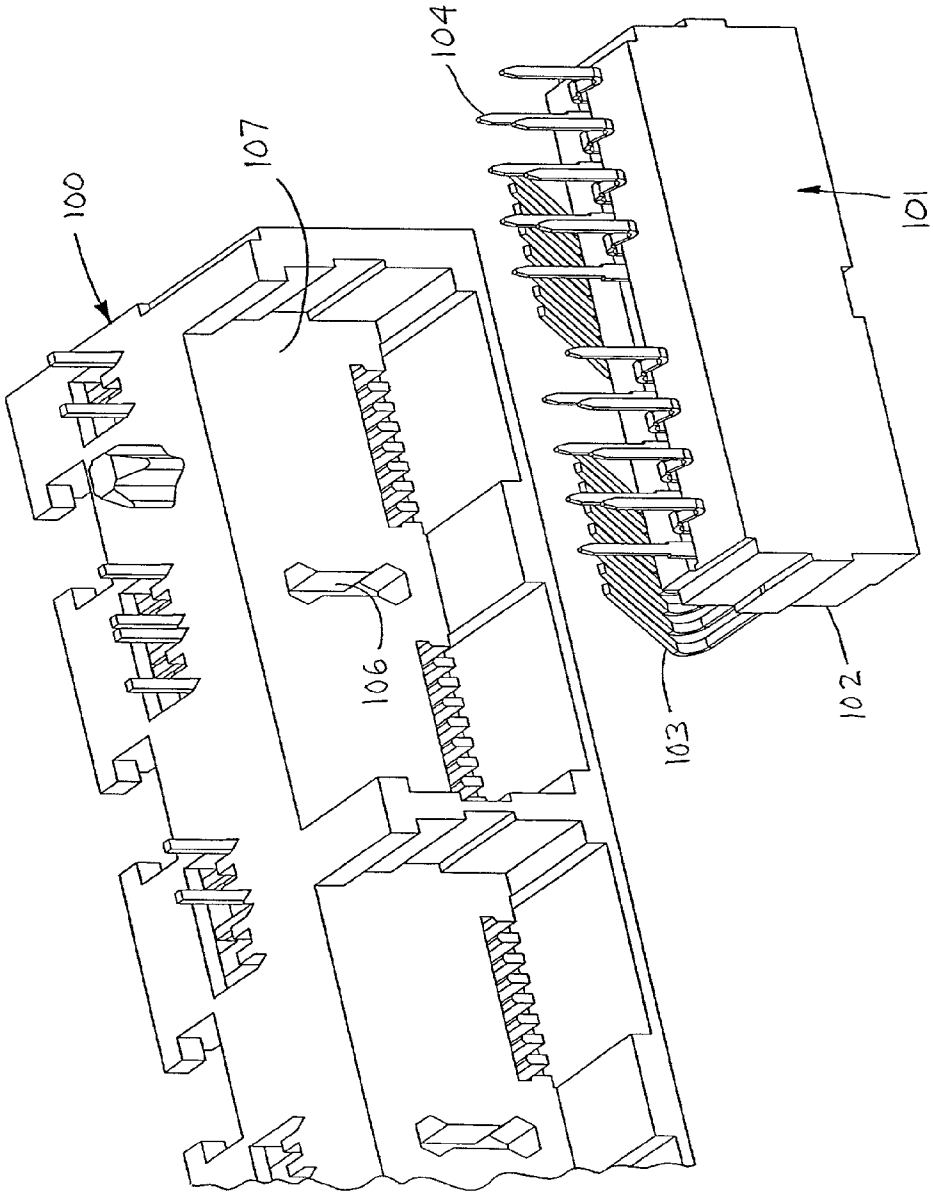


Fig. 10

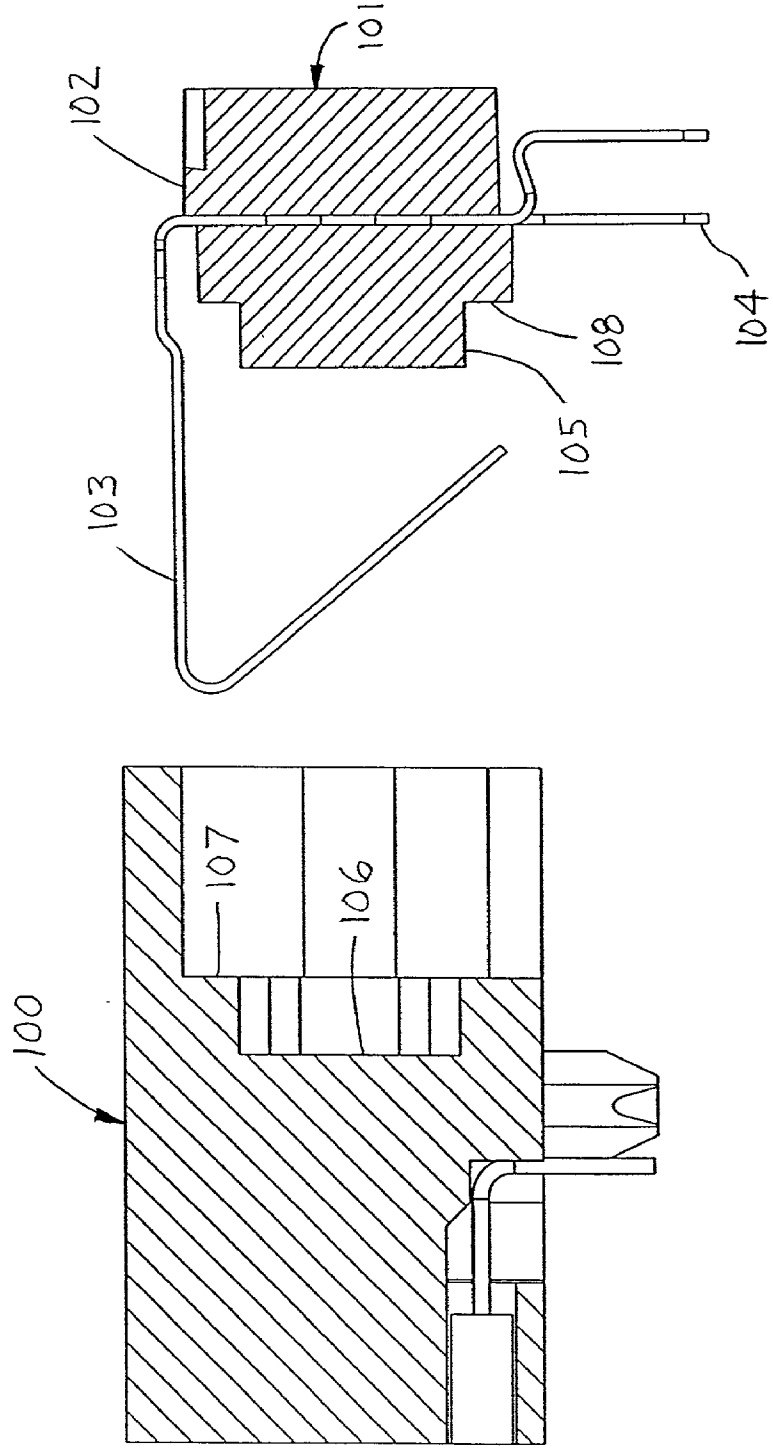


Fig. 11

ACCURATE POSITIONING OF SOLDER TAIL LEADS IN AN ELECTRICAL CONNECTOR

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/233,809 filed Sep. 20, 2000.

FIELD OF THE INVENTION

[0002] The invention relates to an electrical connector including a housing that holds an array of contacts which are formed as a contact insert, and in particular, to a structure for holding a contact insert accurately in position in a connector housing.

BACKGROUND OF THE INVENTION

[0003] An electrical connector housing that holds a number of contacts may have the contacts pre-assembled in the form of a contact insert, or subassembly, that can be installed into the housing as a unit. In a prior art electrical connector as shown in **FIGS. 1 and 2**, a connector housing **10** holds upper contact inserts **12** and lower contact inserts **22**. Each of the contact inserts **12, 22** comprises an array of contacts **13, 23** having portions which are surrounded by a dielectric molding **14, 24**, respectively, such that the contacts **13, 23** in each array are held in fixed relative positions. The contacts **13, 23** include mating portions **15, 25** that are engagable with contacts of a mating electrical connector (not shown), and board-mounting portions in the form of solder tails **16, 26** that are arranged for insertion into through-holes in a circuit board (not shown). Pairs of upper and lower contact inserts **12, 22** are installed into the housing **10** through an open rear of the housing, with the molding **14** of the upper contact insert being positioned behind the molding **24** of the lower contact insert. The moldings **14, 24** have rails **17, 27** that are received in channels **28** in the housing **10**. Each pair of upper and lower contact inserts **12, 22** is secured in the housing by a molded latch arm **18** of the housing which has a latch tab **19** that engages in a pocket **20** at the rear of the molding **14** of the upper contact insert **12**. A problem arises in that dimensional tolerances on the parts permit the contact inserts **12, 22** to have some free play in the connector housing **10**, thereby resulting in a positional variation of the solder tails **16, 26** with respect to the connector housing **10**. If the positional variation of the solder tails **16, 26** is too great, assembly operations will not be able to insert the solder tails into their respective through-holes in the circuit board. There is a need for a device that will hold the contact inserts accurately in position relative to the connector housing.

SUMMARY OF THE INVENTION

[0004] It is an object of the invention to secure a contact insert in a connector housing.

[0005] It is another object of the invention to eliminate free play between a contact insert and a connector housing.

[0006] It is yet another object of the invention to accurately position contact solder tails relative to a connector housing.

[0007] The invention is an electrical connector comprising a dielectric housing and a contact insert carried by the housing, the contact insert including contacts carried by a molding, and a lock member that cooperates with the housing to secure the contact insert in the housing and to bias the molding against a wall of the housing.

[0008] According to one embodiment, the lock member has a head that is secured to the housing, and a tail that is arranged to urge the molding toward the head. The head is interference fitted in a stall in the housing, and the stall is open through a board-mounting face of the housing.

[0009] According to another embodiment, the lock member is wedged between the molding and a portion of the housing. The lock member has a main portion, and nose portions that project from the main portion, and the nose portions engage the molding.

[0010] According to another embodiment, the lock member includes a protrusion of the molding that is interference fitted in an aperture in the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The invention will now be described by way of example with reference to the accompanying drawings wherein:

[0012] **FIG. 1** is a top rear isometric view of a prior art electrical connector;

[0013] **FIG. 2** is a bottom rear isometric view of the prior art electrical connector of **FIG. 1**;

[0014] **FIG. 3** is a bottom rear isometric view of an electrical connector having a contact insert lock member in one embodiment according to the invention;

[0015] **FIG. 4** is a cross-sectional view through the electrical connector of **FIG. 3**;

[0016] **FIG. 5** is top rear isometric view of an electrical connector having a contact insert lock member in a first alternate embodiment according to the invention;

[0017] **FIG. 6** is a cross-sectional view through the electrical connector of **FIG. 5**;

[0018] **FIG. 7** is a top rear isometric view of an electrical connector having a contact insert lock member in a second alternate embodiment according to the invention;

[0019] **FIG. 8** is a cross-sectional view through the electrical connector of **FIG. 7**;

[0020] **FIG. 9** is a bottom front isometric view of an electrical connector having a contact insert lock member in a third alternate embodiment according to the invention;

[0021] **FIG. 10** is a bottom rear isometric view of the electrical connector in **FIG. 9**; and

[0022] **FIG. 11** is a cross-sectional view through the electrical connector of **FIG. 9**.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

[0023] In one embodiment as shown in **FIGS. 3 and 4**, the invention comprises a dielectric housing **30** having a front face **32**, a bottom or board-mounting face **34**, and a rear face **36**. The housing has cavities (not shown) in the front face **32** that are configured as receptacles for mating RJ-type modu-

lar plug connectors (not shown). The housing has cutouts **38** in the bottom face **34** which are configured to receive projections on resilient latch arms of the modular plug connectors. The housing may carry visual indicators **40** such as LED's which illuminate to indicate the status of an electrical circuit.

[**0024**] The housing **30** carries a contact insert **41** which includes a molding **42** that holds a plurality of contacts **43**. The molding is installed in a chamber **44** that is open through the bottom face **34** and through the rear face **36** of the housing. The molding has guide rails **45** that are slidingly received in channels **46** of the chamber **44**. The contacts **43** extend through passages **35** in the housing that connect the chamber **44** with the cavities that are open through the front face **34** of the housing. The contacts **43** have leads in the form of solder tail leads **47** that are receivable in through-holes in a circuit board (not shown).

[**0025**] The housing has a stall **48** that receives a lock member **50** that secures the contact insert **41** to the housing. The lock member **50** has a head portion **52** that is dimensioned to be interference fitted in the stall **48**, and a tail portion **54** that is configured to grip the bottom rear edge of the molding **42**. The lock member **50** is a discrete article that is preferably made from metal which has been stamped to provide a T-shaped profile and then formed to provide the head portion **52** and the tail portion **54**. The head portion **52** is formed by upwardly bending two arms of the T-shaped profile. The tail portion **54** is connected to the head portion **52** by a leg **56**. The length of the leg is selected such that when the head portion **52** is fitted in the stall **48**, the tail portion **54** will urge the molding **42** against a rearward-facing wall **49** in the chamber **46**, thereby eliminating any gap between the molding **42** and the rearward-facing wall **49**. In this way, the molding is firmly engaged against the rearward-facing wall of the chamber. The rearward-facing wall **49** has a known accurate position with respect to the housing. Thus, the solder tail leads **47** are accurately positioned relative to the housing, and the solder tail leads will be aligned with their respective through-holes in the circuit board when the housing is properly positioned on the circuit board.

[**0026**] Another embodiment of the invention is shown in **FIGS. 5 and 6**. Connector housing **60** holds a contact insert **61** that includes molding **62** and contacts **63** having solder tail leads **64**. The housing **60** has a rear face **65**, rearward extensions **66** and lateral lugs **67**. Each of the lugs **67** has a top surface that forms a seat **68**, and a forward-facing surface **69** that is spaced rearwardly from the molding **62** of the contact insert, as shown in **FIG. 6**.

[**0027**] A lock member **70** is installed behind the molding **62** of the contact insert. The lock member spans a distance between an opposed pair of the lugs **67**. The lock member has a main portion **72** that resides on the seats **68** of the lugs **67**, and a projecting portion **74** that is installed in gaps between the forward-facing surfaces **69** and the molding **62**. The lock member **70** also has nose portions **76** that are arranged to engage the molding **62** when the projecting portion **74** is engaged against the forward surfaces **69** of the lugs. The lock member **70** is wedged between the molding **62** and the lugs **67** such that the nose portions **76** bias the molding **62** against a rearward-facing wall **77** of a chamber **78** in the housing, thereby accurately positioning the solder tail leads **64** relative to the connector.

[**0028**] Another embodiment of the invention is shown in **FIGS. 7 and 8**. A connector housing **80** holds a contact insert **81** including a molding **82** and contacts **83** having solder tail leads **84**. The connector housing **80** has a rear face **85**, rearward extensions **86**, and opposed pairs of lugs **87**. Slots **88** are formed in the rearward extensions **86** adjacent to the rear face **85**. A lock member **90** which is installed behind the molding **82** has end portions which are slidingly received in the slots **88**. The lock member is preferably formed from a metallic strip. The lock member has protrusions or nose portions **92** which are arranged to engage the molding **82**. The nose portions **92** may be formed as embossments which have been deformed from the plane of the lock member **90**. The lock member **90** is wedged in the slots **88** such that the nose portions **92** bias the molding **82** against a rearward-facing wall **97** of a chamber **98** in the connector housing. The nose portions **92** may have any of numerous different shapes in addition to the shape which is shown in the drawings.

[**0029**] Another embodiment of the invention is shown in FIGS. **9-11**. A connector housing **100** holds a contact insert **101** including a molding **102** that holds contacts **103** having solder tail leads **104**. The molding has a forward facing protrusion **105** which is received in a correspondingly shaped aperture **106** in a rearward-facing wall **107** of the housing. The protrusion **105** is dimensioned for an interference fit within the aperture **106**. The interference fit serves to lock the contact insert in a fixed position with a front face **108** of the molding **102** adjacent to the rearward-facing wall **107** of the housing.

[**0030**] A lock member according to the invention has been disclosed in various embodiments, and still other variations may now become apparent to those skilled in the art. Whereas the invention is intended to encompass the foregoing preferred embodiments as well as a reasonable range of equivalents, reference should be made to the appended claims rather than the foregoing discussion of examples, in order to assess the scope of the invention in which exclusive rights are claimed.

We claim:

1. An electrical connector comprising:

a dielectric housing;

a contact insert carried by the housing, the contact insert including contacts carried by a molding; and

a lock member that cooperates with the housing to secure the contact insert in the housing and to bias the molding against a wall of the housing.

2. The electrical connector of claim 1 wherein the lock member is a discrete article separate from the housing.

3. The electrical connector of claim 1 wherein the lock member has a head that is secured to the housing, and a tail that is arranged to urge the molding toward the head.

4. The electrical connector of claim 3 wherein the head is interference fitted in a stall in the housing.

5. The electrical connector of claim 4 wherein the stall is open through a board-mounting face of the housing.

6. The electrical connector of claim 1 wherein the lock member is wedged between the molding and a portion of the housing.

7. The electrical connector of claim 6 wherein the lock member has a main portion, and nose portions that project from the main portion, and the nose portions engage the molding.

8. The electrical connector of claim 6 wherein the lock member is formed from a metallic strip.

9. The electrical connector of claim 8 wherein the lock member has nose portions that engage the molding, and the nose portions are embossments in the metallic strip.

10. The electrical connector of claim 1 wherein the lock member includes a protrusion of the molding that is interference fitted in an aperture in the housing.

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