

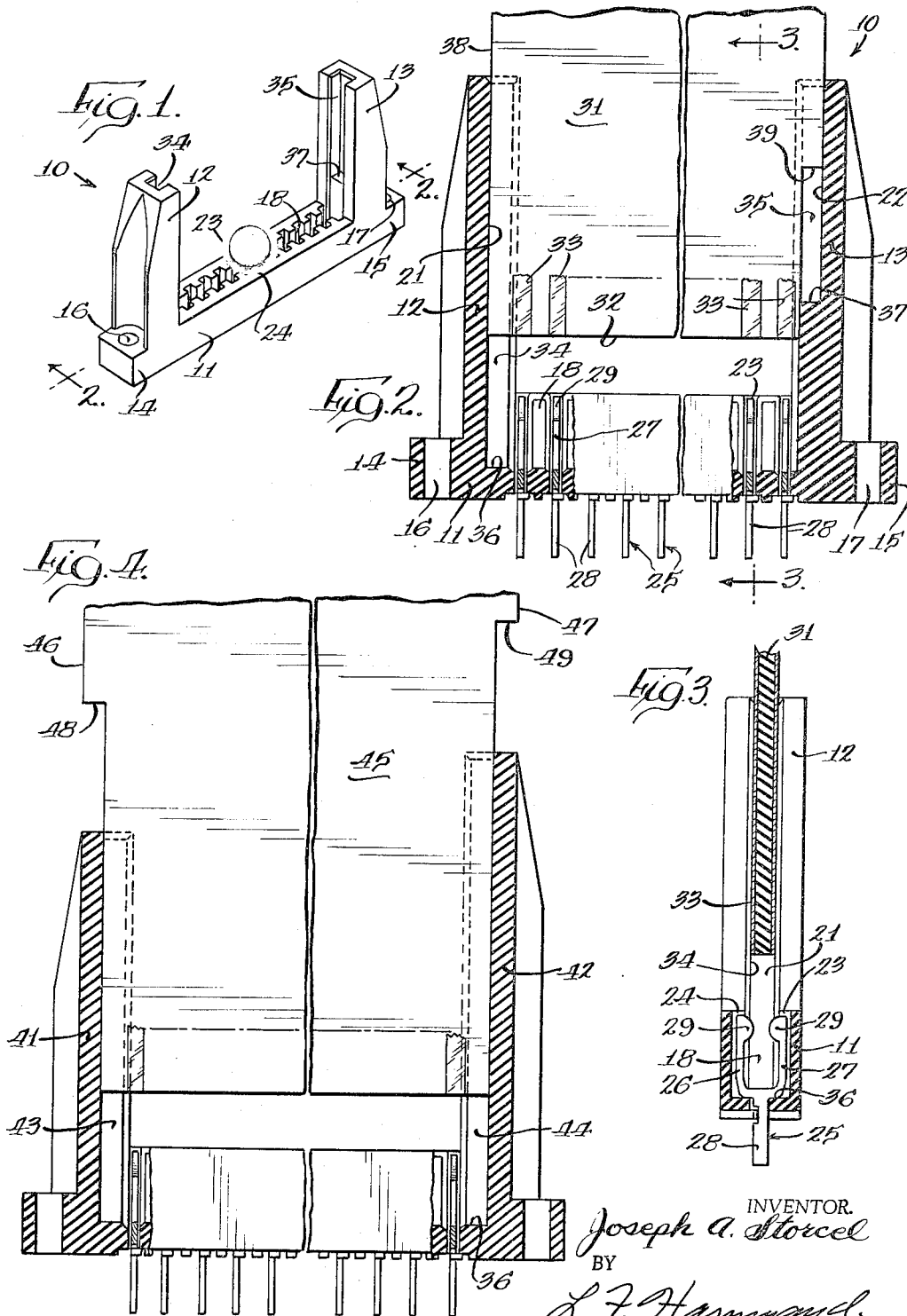
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ELECTRICAL CONNECTORS

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ELECTRICAL CONNECTORS

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The present invention relates to electrical connectors and particularly to printed circuit connections. In such connectors, the receptacle is designed to receive the leading edge of a printed circuit board having conductive segments disposed therealong, so that the board itself functions as the plug of the connector.

It is among the primary objects of the invention to provide a printed circuit receptacle of improved design, capable of supporting the circuit board mated therewith in a manner to provide better electrical contact, better physical support and consequently greater reliability than obtainable with printed circuit receptacles of types heretofore commonly employed.

A further object of the invention is to provide an improved receptacle for a printed circuit connector wherein the several parts are so arranged and related that the leading edge of the circuit board is accurately guided into engagement with the individual contacts of the connector so that any likelihood of damage to the parts in coupling or uncoupling is substantially reduced. Also, greater uniformity of insertion and withdrawal forces is obtained.

A still further object of the invention is to provide a unique and simplified arrangement for polarizing a printed circuit connector so that the printed circuit card or board may be quickly, easily and conveniently inserted, yet will not be received by the receptacle if improperly oriented or in reverse position.

The foregoing and other related objects are accomplished according to the present invention by an electrical connector as illustrated in the drawings attached to and forming a part of this specification, wherein:

FIGURE 1 is a perspective view of the receptacle of a printed circuit connector constructed in accordance with the present teachings;

FIGURE 2 is a cross-sectional view taken substantially on the plane of the line 2-2 of FIGURE 1;

FIGURE 3 is a cross-sectional view taken substantially on the plane of the line 3-3 of FIGURE 2; and

FIGURE 4 is a cross-sectional view similar to FIGURE 2, but showing a slightly modified form of the invention.

The connector receptacle, generally indicated at 10 in the drawings, includes an elongated body portion 11 extending between a pair of oppositely disposed vertical uprights 12 and 13. Mounting pads 14 and 15 are ordinarily provided and these are illustrated as including screw holes 16 and 17, as is common practice in the connector art.

The connector body or central portion 11 includes a relatively long, narrow, deep contact channel 18, arranged to receive the leading edge of a mating circuit board which may be of any conventional construction. As illustrated, the contact channel 18 is centrally disposed in the connector body and extends the entire distance between the opposed inner faces 21 and 22 of the uprights 12 and 13, respectively. The contact channel 18 may be of any conventional conformation, but as illustrated it is provided with multiple pairs of contact recesses 23 and 24, each extending from the upper surface of the body portion 11 to the bottom of the channel 18, so that each pair of recesses 23, 24 coact to receive a metallic contact of the "tuning-fork" type, as best shown at 25 in FIGURE 3.

The conventional tuning-fork contact illustrated in-

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cludes a pair of tines 26 and 27, the lower end of each of which is joined to a terminal shank 28 extending through an aperture in the bottom of the channel so that the shank 28 is exposed for connection to the circuit wiring. The tines 26 and 27 each have an inwardly projecting hump or button 29 projecting slightly into the channel 18 so that they may engage opposed conductive metallic strips carried on one or both faces of a single or double-sided printed circuit board, which may be of the shape illustrated at 31 (FIGURE 3). It is understood, of course, that the leading edge 32 of the board 31 will be provided with an aligned series of conductive surfaces 33, generally in somewhat parallel arrangement. These serve as mating contacts with the tuning fork contacts 25 of the receptacle.

The uprights 12 and 13 are each provided with a guide slot, as illustrated at 34 and 35, the slots being positioned centrally of uprights 12 and 13 respectively, and extending from the top of each upright partially or entirely to the contact channel 18 of the receptacle. The slots may be of the same length, if desired, but it has been found advantageous to make them of unequal lengths for purposes of polarizing the connectors so that the receptacle will not accept its mating printed circuit board unless properly oriented. Thus, as illustrated in FIGURE 2, the slot 34 intersects at the bottom 36 of channel 18, while the slot 35 terminates at 37. Thus, a circuit board provided with one straight edge 38 and having a notch 39 at the opposite corner may be readily inserted if properly oriented, but will not be received in the receptacle if reversed.

If desired, polarization may be equally well accomplished by other dimensional variations as to placement of slots, width thereof in relation to thickness of the board, or by forming the upright members of the receptacle of unequal length, as illustrated at 41 and 42 of FIGURE 4, even though the slots 43 and 44 extend the full length of each upright. Thus the opposite sides 46 and 47 of the circuit board 45 may be notched at 48 and 49 respectively, with the notch 48 of a length corresponding to the depth of slot 43 and the length of the notch 49 corresponding to the depth of slot 44.

From the foregoing it will be apparent that by the utilization of the teachings of the present invention a connector receptacle has been provided which not only serves as an adequate support for a printed circuit board inserted therein, but also simultaneously functions as a guide whereby the perfect mating of the contacting members is assured. In addition, the receptacle is so designed as to properly polarize the connector and prevent the board from being improperly inserted. Straight-line coupling motion is accomplished by the combination of guides between the board and receptacle, increasing the reliability of electrical contacting members and increasing uniformity of insertion and withdrawal forces. Also, by providing circuit boards and receptacles having different combinations of guide slot dimensions, combined with corresponding notches or other dimensional variations in the circuit board of each, it is quite practicable to key a group of connectors in a manner such that any given circuit board will be received only in the specific receptacle designed for it.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

An electrical connector adapted to receive printed circuit boards and comprising, in combination, an elongated receptacle body

formed of molded dielectric material and having a long, narrow, deep, central contact channel;
said contact channel being open at the top, and having a pair of opposite side walls;

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a plurality of conductive contacts spaced-apart from each other along said channel;
 a pair of uprights perpendicular to the receptacle body said uprights being carried on the receptacle body adjacent the opposite ends of the central contact channel and molded integrally with said body;
 each of said uprights having a narrow vertical guide slot along its inner surface
 whereby the open sides of said guide slots in said pair of uprights face each other;
 said guide slots each lying in the plane of the central contact channel; and
 each slot extending from the top of one of the uprights at least part of the way toward said contact channel,
 whereby the upper end of said slots may coact to receive opposite edges of a circuit board entering the receptacle and thus guide the leading edge of the board into the contact channel thereof;
 the slot in one of the uprights terminating at a point above the contact channel whereby the

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slots in said uprights are of unequal vertical dimensions, whereby said slots coact with dimensional variations of the opposite edges of the circuit board for polarizing the receptacle with respect to the board.

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