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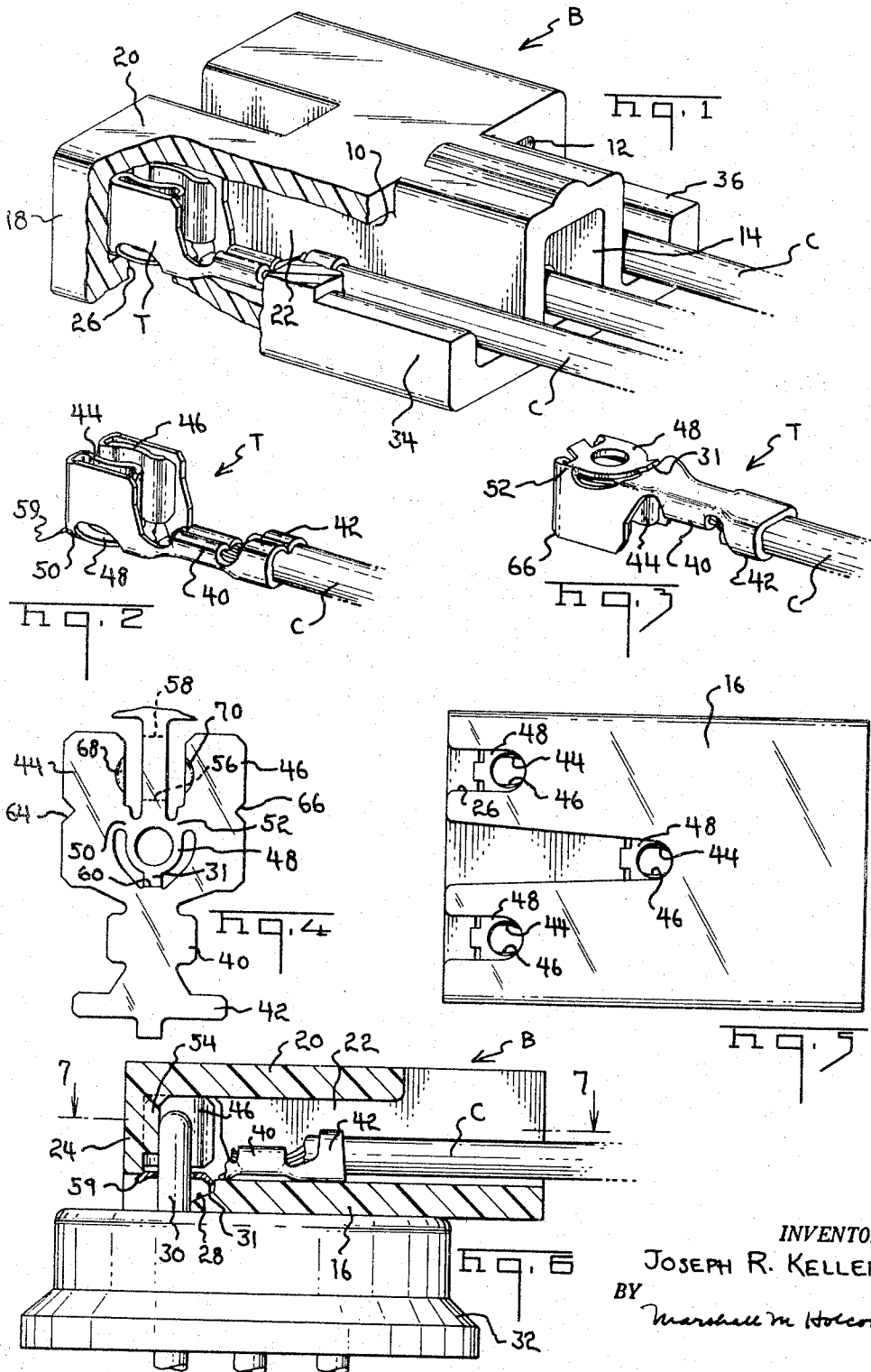
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3,312,931

ELECTRICAL CONNECTOR AND HOUSING

Original Filed Sept. 10, 1962

2 Sheets-Sheet 1



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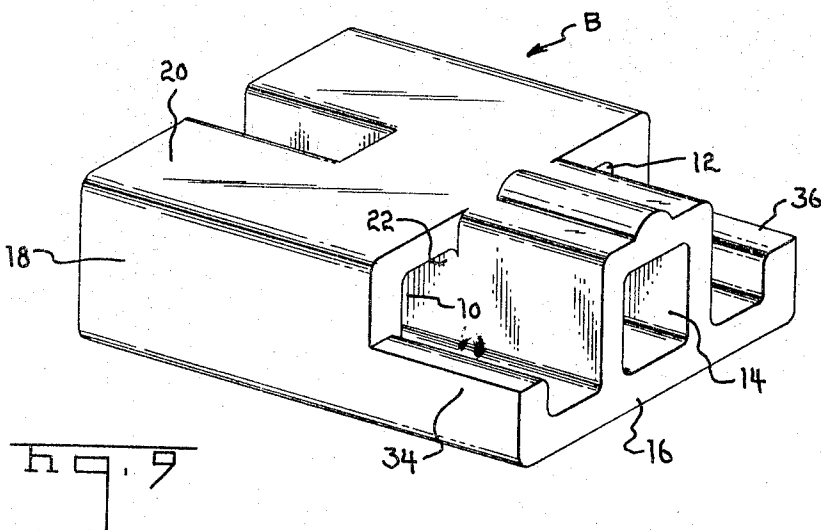
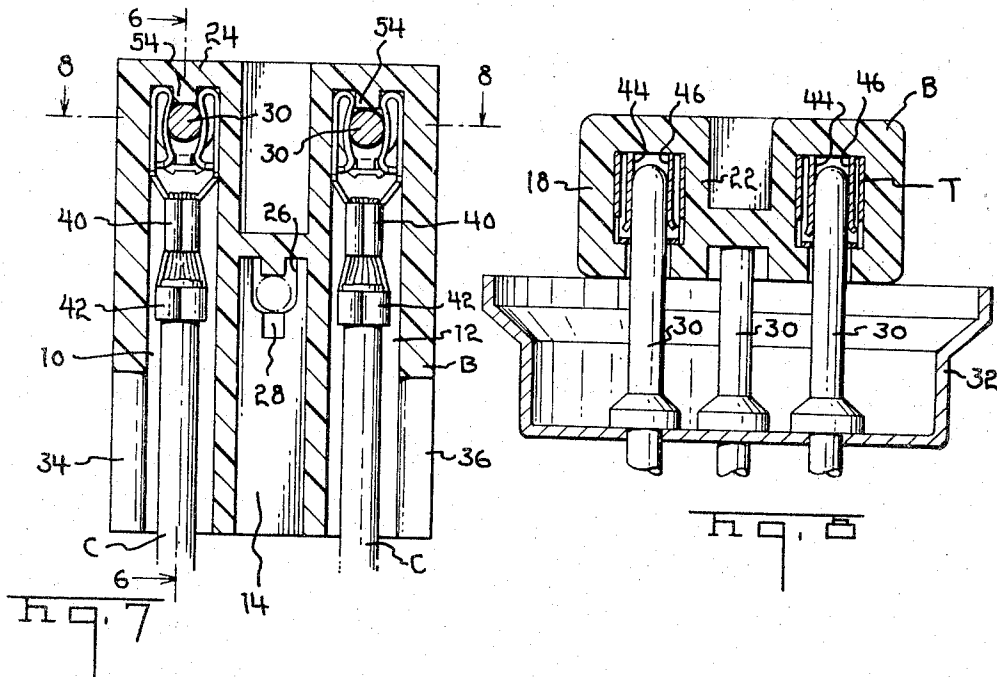
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**ELECTRICAL CONNECTOR AND HOUSING**

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Original application Sept. 10, 1962, Ser. No. 222,604, now Patent No. 3,202,959, dated Aug. 24, 1965. Divided and this application Sept. 23, 1964, Ser. No. 403,686  
2 Claims. (Cl. 339-258)

This is a division of application Ser. No. 222,604, filed Sept. 10, 1962, now Patent No. 3,202,959.

In electrical circuits employing pin-type conductors, e.g., hermetically sealed electrical motors, it is desirable that the wires connected to the motor be equipped with receptacle-type, electrical connectors in an insulated housing. A standard form of motor having a series of pins projecting from the shell is adapted to be secured to an equal number of electrical conductors by means of terminals on the conductors.

It is an object of this invention to provide a receptacle-type, electrical connector which may be secured to a current-carrying pin. It is also an object of this invention to provide a combination of such connectors in a housing member whereby the connectors may be easily inserted into the housing and locked in place, but may also be easily released from the housing.

It is also an object of this invention to provide connectors which align the pins during entry into the housing. It is a further object of this invention to provide a combination of such connectors in a molded, insulating housing, whereby the pins will always be in tight engagement with the connector so that a slight misalignment of the pin during insertion will not damage the receptacle.

It is also an object of this invention to provide a one-piece, molded, insulated housing which may be used in conjunction with connectors, which is easy to manufacture but of a strong, simple design.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 is a perspective view of a block with a plurality of connectors therein, the block being partially cut away to illustrate the connector;

FIGURE 2 is a perspective view of a connector embodying the principles of the invention as secured to a wire;

FIGURE 3 is a view similar to FIGURE 2 illustrating the opposite side of the connector;

FIGURE 4 illustrates the connector of FIGURE 1 to 3 stamped out of sheet metal prior to forming;

FIGURE 5 is a bottom view of the block with connectors therein;

FIGURE 6 is a view taken through plane 6-6 of FIGURE 7;

FIGURE 7 is a view taken through plane 7-7 of FIGURE 6;

FIGURE 8 is a view taken through plane 8-8 of FIGURE 7; and

FIGURE 9 is a perspective view of the block of FIGURE 1.

The assembly may be considered as being comprised of two components, i.e., the block B and the connector T. The block is of thermosetting plastic insulating material of sufficient strength to withstand shock. It consists of three cavities 10, 12 and 14, each adapted to receive a connector therein.

Since the cavities are identical, only one will be described. They are formed by the base 16 of the block B, a side wall 18, a top wall 20, an inside wall 22, and an end wall 24 (FIGURES 1, 5 and 6). An aperture 26 extends through the base 16 of the block at right angles to the passageway in the tubular cavity member 10. A recessed portion 28 (FIGURE 6) is undercut at the junction of the aperture 26 and the cavity.

The cavities 10 and 12 are parallel to each other, with cavity 14 therebetween in staggered relationship. As shown in FIGURE 5, the apertures extending into the cavities are triangularly disposed. The preferred is illustrated in conjunction with a trio of header pins 30 (FIGURE 6), which emanate from a cup-shaped member or shell 32 which forms part of the shell of a hermetically-sealed motor. The assembly may be secured to the outside of the shell (FIGURE 6) and/or the inside of the shell (FIGURE 8).

A pair of walls 34, 36 extend from the base 16 of the block B at each edge, so that conductors C disposed in the cavities 10 and 12 are guided therein.

The connector T (FIGURES 2, 3 and 4) is comprised of a ferrule-forming portion 40 adapted to grasp the bare end of the conductor, and an insulation-securing portion 42 adapted to be formed around the insulation on the conductor. The pin-receiving portion comprises a pair of U-shaped members 44 and 46 which are resilient and engage the pin therebetween.

An aligning and retaining ring 48 is secured to the members 44 and 46 by root portions 50, 52. Ring 48 is adapted to fit over a header pin 30, and a probe 31 on the ring projects into the undercut portion 28 (FIGURE 3) to retain the connector T in the cavity. A post 54 (FIGURE 7) is molded in the end wall 24 of each of the cavities and projects a distance inwardly so that it fits between the U-shaped members 44, 46 of the connector T.

The connector T may be stamped out of sheet metal on a progressive die to from a stamping as shown in FIGURE 4. The ferrule-forming portions 40 and insulation-securing portion 42 are stamped at one end of the terminal, and the ring 48 and U-shaped members 44, 46 comprise the other portion of the stamping. The stamped connector is severed on score lines 56 and 58 (indicated by dotted lines in FIGURE 4) to form a tab 59. The ring 48 is cut along the score line 60 and bent downwardly to provide the probe 31 which fits into the recess 28 (FIGURE 6). The members 44 and 46 are then folded inwardly to provide the U-shaped contour, and then are rolled upwardly so that they are parallel. The bight of each U-shaped contour is beveled, 64, 66, to match the front wall of the block. The pin-engaging sides are slightly beveled, as at 68 and 70, to permit easy insertion of the pin.

When it is desired to secure a plurality of conductors C to an equal number of header pins 30, a connector T is crimped onto each of the conductors. The ring 48 is bent slightly downwardly, and one of the terminals (FIGURE 2) is forced into the cavity 10 (FIGURE 1). In this position, the side wall of the cavity supports the outer arms of members 44, 46. The ring 48 bears against the bottom wall of the cavity until it passes the undercut portion 28. The ring 48 then springs downward-

3

ly so that the probe 31 engages the undercut portion and locks the terminal in the cavity. The tab 59 engages the end wall 24 to prevent upward movement of the connector. Identical terminals are situated in cavities 12 and 14 in the same manner.

With the terminals in the cavities, the block may be snapped onto the header pins 30 (FIGURES 6 and 8). If the block is secured to the inside of the shell (FIGURE 8), then the block will be tilted slightly to provide more secure engagement between the connector and the pins. In this position, each of the rings 48 guides the pins into alignment in the connectors. The posts 54 in the end wall 24 prevent the header pin 30 from deforming the bight of the U-shaped members 44, 46 which would impair resiliency. Each of the connectors engages each pin with a secure fit; however, the block may be forced in a direction away from the header pin 30 to disengage the connectors from the pins. Also, the connector may be withdrawn from the cavity by inserting a thin blade against the probe 31 to force it above the bottom wall of the cavity. In this position, the connector may be withdrawn easily.

It is apparent that this invention provides a simply-designed, insulating block which cooperates with a connector to engage a plurality of pins. Excellent electrical connection is maintained throughout the life of the assembly, and it is so designed as to preclude damage through misuse.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following

4

claims when viewed in their proper perspective against the prior art.

I claim:

1. An electrical connector adapted to receive a pin-type conductor, comprising: a pair of U-shaped members, disposed parallel to each other, each of said members having an inside leg and an outside leg connected by a bight, the inside legs of said members extending in the same direction and arranged to receive a pin in resilient frictional engagement, a ring-shaped member resiliently secured to said U-shaped members adjacent the bights thereof by root portions, the opening of the ring being in alignment with the pin-receiving axis of said inside legs, a probe means on one side of said ring-shaped member, and means for securing said U-shaped members to an electrical conductor.

2. A connector according to claim 1 wherein the securing means connect the outside legs at their ends remote from the bights.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

2,233,718	3/1941	Soreng	339—259
2,428,022	9/1947	Harrison et al.	339—258
2,730,690	1/1956	Harasek	339—258
3,083,345	3/1963	Scheller	339—258 X

##### FOREIGN PATENTS

54,552	10/1949	France.
664,441	8/1938	Germany.

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