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Double-sided connector for connection to an electrical cable

The invention relates to a double-sided connector for

connection to an electrical cable, comprising two connector parts with
 5 the backs facing one another and provided with connector contacts which
 are accessible at the front, a positioning means for receiving and posi-
 tioning the ends of the cable cores and connecting means for connecting
 the connector contacts of at least one of the connector parts to the
 conductors of the cable cores.

10 Such a connector is disclosed in US Patent Specification
 4,431,249.

In the known connector, the connector contacts are connected to
 one another and to respective cable conductors. For this purpose, a
 positioning means in the form of a separate positioning block is present.

15 The ends of the cable cores are received and positioned in said
 positioning block. The two connector parts are provided with connecting
 means which are designed as insulation-removing contacts which are
 electrically connected to the corresponding connector contacts.

During the assembly of the connector, the two connector parts
 20 are pressed onto the positioning block with the back facing one another,
 in which process the insulation is removed from the cable conductors by
 the insulation-removing contacts and, in doing so, contact is made
 between the cable conductors and the connector contacts of the two
 connector parts. The connector parts pressed onto each other are enclosed
 25 in a two-part housing with the separate positioning block in between.

The object of the invention is to provide a connector of the
 type mentioned at the outset which is simpler and cheaper to construct
 and which can be assembled more easily.

According to the invention, this object is achieved in that the
 30 connector parts are provided at the back with pin contacts and socket
 contacts, respectively, which extend perpendicularly to said backs and
 can be mutually inserted and which are each connected to the
 corresponding connector contacts of the associated connector part.

This achieves the advantage that, as a result of using the
 35 insertable pin contacts and socket contacts, respectively, only one of
 the connector parts needs to be provided with connecting means for
 connecting the connector contacts of the connector parts to the
 conductors of the cable cores. This has the result that the positioning
 means can be of simpler design.

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The embodiments which are preferably to be used are described in the subordinate claims.

The invention will be explained in greater detail below by reference to the drawings, wherein:

5 Figure 1 shows an embodiment of a double-sided connector according to the invention, the connector being shown in disassembled components in Figure 1a and in the assembled state in Figure 1b;

 Figure 2 shows a section through the connector shown in Figure 1 with disassembled components;

10 Figure 3 shows a section through the connector shown in Figure 1, one connector part being locked in the housing; and

 Figure 4 illustrates a section through the assembled connector shown in Figure 1.

15 Figure 5 shows an embodiment of the contacts of the connector parts.

 Figure 6 shows a further elaboration of the connector.

 Figure 7 shows an assembly of two connectors according to the invention, the connector in Figure 7a being shown in the disassembled state and that in Figure 7b in the assembled state.

20 Figure 8 illustrates various contacts of the assembly shown in Figures 7a, b.

25 The connectors shown in the figures represent only particularly advantageous embodiments of the invention and the latter is not restricted thereto. Various embodiments are, of course, possible within the scope of the invention.

 The embodiments shown in the figures of a double-sided connector according to the invention comprise two connector parts 1, 2 and a common housing 3.

30 The connector part 1 comprises a connector part housing 4 in which two rows of bores 5 are provided in which connector socket contacts 6 are received in a locked manner. Connecting pins of a printed circuit board or other connector can be inserted in the connector socket contacts 6 from the front of the connector part 1. Socket contacts 7 which are electrically connected to, or form a single entity with, the connector
35 socket contacts 6 are, moreover, accommodated in the bores 5. The socket contacts 7 are accessible to pin contacts via the back of the connector part 1.

 The connector part 2 comprises a connector part housing 8 in which connector pin contacts 10, which are accessible at the front of the





connector part 2 for interaction with socket contacts of one connector or another, are fitted in bores 9. Also situated in this bore 9 are pin contacts 11 which are electrically connected to, or form a single entity with, the pin contacts 10. In the assembled state of the double-sided
5 connector, the pin contacts 11 are plugged into the socket contacts 7, under which conditions the backs of the connector parts 1, 2 face one another. At two sides of the connector, namely the front of the connector parts 1 and 2, plug-in connections can be made. It is obvious that the connector may also comprise connector parts 1 and 2 which may both be
10 provided with connector socket contacts or connector pin contacts. By the plug-in connection between the socket contacts 7 and the pin contacts 11, an electrical connection is also obtained between the connector contacts of the two connector parts. The cable cores of the cable to be connected therefore need to make contact only with the connector contacts of one of
15 the connector parts 1, 2. Only one of the connector parts therefore needs to be provided with connecting means.

In the connector shown in the figures, the connector part 1 is provided with insulation-removing contacts 12. Said contacts 12 are provided with a slot 13 having sharp edges, whose width is dimensioned so
20 that when a cable core is pressed into the slot, the insulation is removed locally therefrom and contact is made with the conductor of the cable core. The insulation-removing contacts 12 extend perpendicularly to the back face of the connector part 1 concerned and perpendicularly to the positioned cable cores, and are electrically connected to, or form a
25 single entity with, the socket contacts 7.

In order to position and fix the ends of the cable cores 14 of the cable 15 in the correct position, the back of the connector part 2 is provided with positioning slots 16. The slots are bounded by the back of the connector part housing 8 and projections 17 extending from the back
30 of the connector part housing 8.

As a result of mutually inserting the connector parts 1 and 2, the insulation-removing contacts 12 with the slots 13 fit over the cable cores clamped in the positioning slots and make contact with the conductors situated therein. Although it is preferable for the
35 insulating-removing contacts 12 to be provided at the back of the connector parts provided with the socket contacts 7, it is also conceivable that said insulation-removing contacts are situated at the back of the connector part provided with the pin contacts.

Preferably, the socket contacts 7 of the connector part 1 are

provided with two insulation-removing contacts 12 which extend parallel to one another. This achieves a still more reliable connection between the socket contacts 7 and the cable conductors.

The connector parts 1 and 2 can respectively be pushed in from two sides of the common housing 3 which comprises only one part. The connector part 1 is locked to the housing 3 in the final pushed-in position. For this purpose, the connector part 1 is provided with locking projections 18, while the housing is provided with locking recesses 19 which interact therewith. The housing 3 is provided, moreover, with guide pins 20 which, to guide the connector part 1, are received in a space which is bounded by the U-shaped feed part 21 of the connector part 1. The U-shaped feed part 21 fits into the recess 22 in the wall of the housing 3. As a result of the interaction of the feed part 21 of the connector part 1 and the recess 22 in the housing 3, the final pushed-in position of the connector part 1 in the housing 3 is also defined. The connector part 2 is received in the remaining space of the common housing 3 and, if desired, locked therein, which is not shown but may take place in a similar way by means of locking projections and locking recesses. In the connector shown in the figures, the connector part 2 is held in its position because the socket and pin contacts, respectively, present at the back of the connector parts fit into one another in a clamping manner and, in addition, the cable 15 is attached to the housing. For this purpose, the common housing 3 is provided with a channel-type feed part 23 in which a portion of the cable 15 is received when the connector part 2 is fitted in the common housing 3. The channel-type feed part 23 is provided with holes 24 through which a fixing strip 25 can be inserted in order to secure the cable 15 in the channel-type feed part 23. In the embodiment shown, fixing strips 25 known per se are used. In practice, it may be desirable to use an additional locking between connector parts 2 and common housing 3. In this respect, reference is made to Figure 6.

Figures 2, 3 and 4 show various stages of assembly of the connector according to the invention.

The connector is assembled by first pushing the connector part 1 into the common housing 3 until feed part 21 comes up against the innermost edge of the recess 22 of the housing 3. At the same time, the connector part 1 is locked to the common housing 3 in this limited pushed-in position by means of the mutually fitting locking projections 18 and locking recesses 19 (see Figure 1). The cable cores 14 of the cable 15 are bared over a predetermined distance and the ends of the





cable 14 are pressed into, and secured in a clamping manner, in the positioning slots 16 in the back face of the connector part housing 8 (see Figure 3). The connector part 2, provided with the cable 15, is then pressed into the common housing 3, as a result of which a connection is brought about between the connector socket contacts 5 and the connector pin contacts 11 of the respective connector parts 1, 2 by means of the socket contacts 7 and the pin contacts 11.

At the same time, the insulation-removing contacts 12 with the slots 13 thereof are pushed over the secured cable cores 15 and, as a result, the insulation is removed locally from the cable cores 14 and a contact is brought about between, on the one hand, the connector socket contacts 6 and the connector pin contacts 11 of the respective connector parts 1 and 2 and, on the other hand, the conductors in the cable cores 14.

When the connector part 2 is placed in its position in the common housing 3, a portion of the cable 15 falls into the channel-type feed part 23 of the housing 3, after which the fixing strips 25, which are known per se, are inserted into the channel-type feed part 23 and secured.

In particular, the form of the contacts of the connector parts 1 and 2 and also the operation thereof is evident from Figure 5.

The contacts of the connector part 1 are formed from the receiving contacts 6 and the receiving contacts 7 which, in this case, form a single entity with the insulation-removing contacts 12. This entity is received in the recesses 5 of the connector part housing 4 (see Figures 1-4).

The contacts of the connector part 2 are also formed as a single entity in this embodiment. The plug-in contacts 10 and 11 are mutually connected by a central piece 29, on one side of which a locking projection 26 is provided. Said locking projection 26 falls into a locking recess (not shown) associated therewith in the wall of the bore 9 in the connector housing 8 of the connector part 2. When the two connector parts are pushed into one another in the common housing 3, the plug-in contact 11 is pushed into the receiving contact 7. In Figure 5 these contacts are shown in the partly pushed-in state.

The embodiment shown in Figure 6 of the connector according to the invention essentially corresponds to the embodiment of Figure 1 so that corresponding parts are not provided with reference numerals.

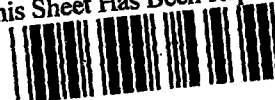
The connector housing 8 of the connector part 2 is provided

with locking projections 28 which are intended to fit into the locking recesses 27 of the common housing 3 when the connector part 2 is pushed into the common housing 3.

In Figure 7a two connectors according to the invention are shown in the disassembled state, while the assembly of said connectors is shown in Figure 7b. Here, again, corresponding parts of the connectors are not provided with reference numerals. Only the locking between the assembled connectors will now be discussed.

For the mutual locking of the assembled connectors according to the invention, a locking element 30 is used. In the state of the connectors where they are pushed onto one another, the locking element 30 is partly received in a space 31 which is bounded by an innermost wall 32 and an outermost wall 33 of one side of the common housing 3. The remaining part of the locking element 30 is received in the corresponding space of the common housing 3 of the other connector. The design of said space 31 can also be clearly seen in Figures 2, 3 and 4. In the embodiment, which is preferably to be used, shown in Figures 7a, b, the locking element 30 is T-shaped, as is the space 31 of the common housing 3. The locking element 30 is provided with a locking recess 34 into which a locking projection 35 provided on the innermost side wall 32 of the common housing 3 fits when the connectors are pushed in to one another. Moreover, the locking element 30 is provided with a locking projection 36 which fits behind the locking projection 37 which is formed in the window 38 in the outermost side wall 33 of the common housing 3. That part of the locking element 30 that is provided with the locking projection 36 is received in the wider portion of the T-shaped space of the common housing 3. This wider portion of the space 31 forms a plug-in limitation of the locking element 30.

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C L A I M S

1. Double-sided connector for connection to an electrical cable, comprising two connector parts (1, 2) with the backs facing one another and provided with connector contacts (6, 10) which are accessible at the front, a positioning means for receiving and positioning the ends of the cable cores and connecting means for connecting the connector contacts of at least one of the connector parts to the conductors of the cable cores, characterized in that the connector parts (1, 2) are provided at the back with pin contacts (11) and socket contacts (7), respectively, which extend perpendicularly to said backs and can be mutually inserted and which are each connected to the corresponding connector contacts (10 and 6, respectively) of the associated connector part.

2. Connector according to Claim 1, characterized in that, for the electrical connection between the connector contacts and the cable conductors, only one of the connector parts is provided with insulation-removing contacts (12) for removing the insulation of the positioned cable cores (14) and making contact with conductors of said cores, which contacts extend perpendicularly to the back face of the connector part concerned and are electrically connected with the connector contacts (6, 7) thereof.

3. Connector according to Claim 2, characterized in that one connector part is the connector part provided with the socket contacts.

4. Connector according to Claim 3, characterized in that the socket contacts at the back of the connector part are provided with two insulation-removing contacts (12) extending at a distance from one another.

5. Connector according to Claim 3 or 4, characterized in that the positioning means is formed by slots (16) in the back of the connector part which is not provided with the connecting means.

6. Connector according to Claim 5, characterized in that the slots are bounded by projections (17) projecting from the back of the connector part.

7. Connector according to one of the preceding claims, in which the connector parts are received back-to-back in a common housing (3), characterized in that the connector parts are received insertably in the one-part housing from two mutually oppositely situated sides thereof and in that at least one of the connector parts can be locked in the housing.

8. Connector according to Claim 7, characterized in that the connector part provided with the insulation-removing contacts (12) has,



on two mutually oppositely situated sides extending in the push-in direction of the connector part, an open recess in the said push-in direction for receiving a guide pin (20), extending in the same direction, of the housing, and also locking projections (18) which fit
5 into locking recesses (18) in the housing.

9. Connector according to Claim 7, characterized in that the connector part (2) is provided with locking projections (28) which fit into respective recesses (27) of the common housing.

10. Connector according to Claim 7 or 8, characterized in that the
10 housing is provided with cable-fixing means.

11. Connector according to one of the preceding claims, characterized in that at least one side of the common housing is at least partly double-walled in order to bound a space (31) which is open at the outside edges of the receiving spaces for the respective connector parts
15 in order to receive a locking element (30) in a lockable manner.

12. Connector according to Claim 10, characterized in that the space (31) is T-shaped.

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