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54 Moulded-on electric plug.

57 The plug comprises two contact pins (1) connected to the cores (17) of a connecting cable (19) and fastened in end parts (3) of an elongate bridge piece (5) of electrically insulating synthetic resin, an electrically insulating housing being moulded around the bridge piece (5) and an adjacent part of the connecting cable (19). In order to save the (expensive) material of the bridge piece (5) and to ensure improved anchoring of the bridge piece in the housing (21) without reducing the resistance of the bridge piece to bending, the intermediate part (9) of the bridge piece extending between the two end parts (3) has an I-shaped cross-section along more than half its length.

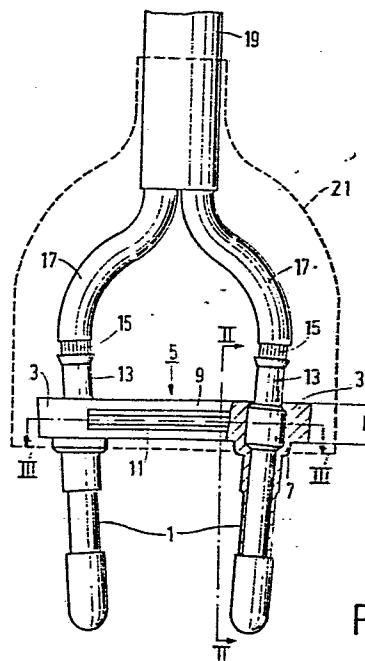


FIG. 1

Moulded-on electric plug.

The invention relates to an electric plug having two electrically conductive contact pins connected to cores of a connecting cable and being fastened in end parts of an elongate bridge piece of electrically insulating synthetic resin, each end part surrounding one of the contact pins throughout the height of the bridge piece, an electrically insulating housing being moulded or cast around the bridge piece and an adjacent part of the connecting cable.

Such a plug is known from German Patent Specification 2532872. One of the functions of the bridge piece is to hold the two contact pins in a manner such that they can resist given mechanical loads. Inspection boards have issued a number of provisions for safety requirements to be satisfied by a plug. For example, contact pins exposed to laterally directed forces are allowed to change their relative positions only to a slight extent. Moreover, the contact pins have to be resistant to a given tensile and torsional force without getting out of the housing. It is, therefore, important for the bridge piece to behave like a rigid beam in which the contact pins are firmly anchored and which itself is firmly anchored in the housing. The bridge piece of the known plug (see Fig. 2 of German Patent 2532872) is a solid beam which fixedly holds the contact pins, it is true and which has the required rigidity, but which has the disadvantage that its manufacture requires a relatively large quantity of expensive material, for example, glass-filled PA (polyamide), PBT (polybutyleneterephthalate) or PET (polyethylene terephthalate), whilst anchoring in the housing is not to the optimum. Fig. 1 of said German Patent shows a bridge piece consisting of two parallel plates one lying above the other, which requires less material, but has the disadvantage that

anchoring of the contact pins in the relatively thin plates is less firm and the thin plates are more likely to bend than a solid beam.

5 The invention has for its object to provide a plug of the kind set forth in the preamble, the bridge piece of which is at least as rigid as a solid beam, but comprises less material and is better anchored in the housing.

10 The plus embodying the invention is characterized in that an intermediate part of the bridge piece extending between the two end parts has an I-shaped cross-section along at least half its length.

Owing to the I-section profile of the intermediate part a considerable amount of material is saved.
15 Moreover, the bridge piece can be made by injection moulding within a shorter time because the smaller thickness of material in the area of the intermediate part involves a shorter curing time. Since the intermediate part has an I-cross-section, it has two recesses along the major part
20 of the length on the sides. When the housing is being formed, said recesses are filled with material of the housing so that the bridge piece is firmly anchored in the housing.

The invention will be described more fully hereinafter with reference to the drawing showing in

25 Figure 1 a side elevation of an embodiment of a plug in accordance with the invention,

Figure 2 a cross-sectional view of the bridge piece of the plus taken on the line II-II in Fig. 1 and

30 Figure 3 a longitudinal sectional view of the bridge piece taken on the line III-III in Fig. 1.

The electric plus shown in Fig. 1 comprises two electrically conductive contact pins 1 fastened in end parts 3 of an elongate bridge piece 5. The bridge piece 5 is made by injection moulding from a strong, electrically
35 insulating synthetic resin, for example, glass-filled PA, PBT or PET. The contact pins 1 are embedded along the whole height of the bridge piece 5 in the end parts 3. In order to ensure satisfactory anchorage of the contact pins

1 in the synthetic resin, the contact pins have a thickened part 7 at the areas of the end parts 3. The contact pins are not precisely parallel; they are at an acute angle to one another so that the connection of the plug with the wall contact box always has some clamping effect.

According to the existing safety provisions the angle between the contact pins 1, when exposed to a lateral force, should not vary beyond given limits. For this purpose it is necessary for the bridge piece to behave as a rigid beam that can be bent only with difficulty. On the other hand, for reasons of cost price, the bridge piece 5 should contain a minimum amount of synthetic resin, since with regard to the high mechanical requirements this synthetic resin is relatively expensive, whilst moreover curing a bridge piece having a large volume takes relatively much time, so that the injection moulding process takes much time. In order to satisfy all these requirements the intermediate part 9 of the bridge piece 5 extending between the two end parts 3 has an I-shaped cross-section. A beam having such a cross-section has at least the same resistance to bending as a solid beam, whilst a considerable amount of material is saved.

The I-cross-section of the intermediate part 9 is clearly shown in Fig. 2. Along the two sides of the intermediate part two recesses 11 extend in the direction of length of said part. From Fig. 3 it is apparent that the depth of these recesses is constant along almost the entire length of the intermediate part 9. In order to obtain a gradual transitional area between the intermediate part 9 and the two end parts 3, the depth of the recesses near said end parts progressively diminishes. It will be obvious that the obtainable saving of cost is higher, the longer are the recesses 11. It has been found that a satisfying saving is already obtained when the recesses extend along at least half the length of the intermediate part 9.

The contact pins 1 are provided at one end with connecting sockets 13. Therein the ends 15 of cores 17 of

a connecting cable, from which the insulating jacket is removed, are fastened, for example, by soldering or crimping. Thus the cores 17 are galvanically and mechanically connected with the contact pins 1. The bridge piece 5 and the adjacent part of the connecting cable 19 are surrounded by a housing 21 (shown in broken lines). The housing 21 may be formed by moulding or casting an electrically insulating synthetic resin. The requirements for this synthetic resin with respect to resistance to bending are very mild so that the material may be relatively inexpensive. A suitable synthetic resin is, for example, soft PVC. During the formation of the housing 21 the synthetic resin also penetrates into the recesses 11 of the bridge piece 5 so that this bridge piece is firmly anchored in the housing.

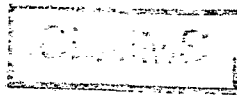
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An electric plug comprising two electrically
conductive contact pins connected to the cores of a con-
necting cable and fastened in ends parts of an elongate
bridge piece of electrically insulating synthetic resin,
5 each end part surrounding one of the contact pins through-
out the height of the bridge piece, an electrically in-
sulating housing being moulded or cast around the bridge
piece and an adjacent part of the connecting cable, char-
acterized in that an intermediate part of the bridge piece
10 extending between the two end parts has an I-shaped cross-
section along at least half its length.

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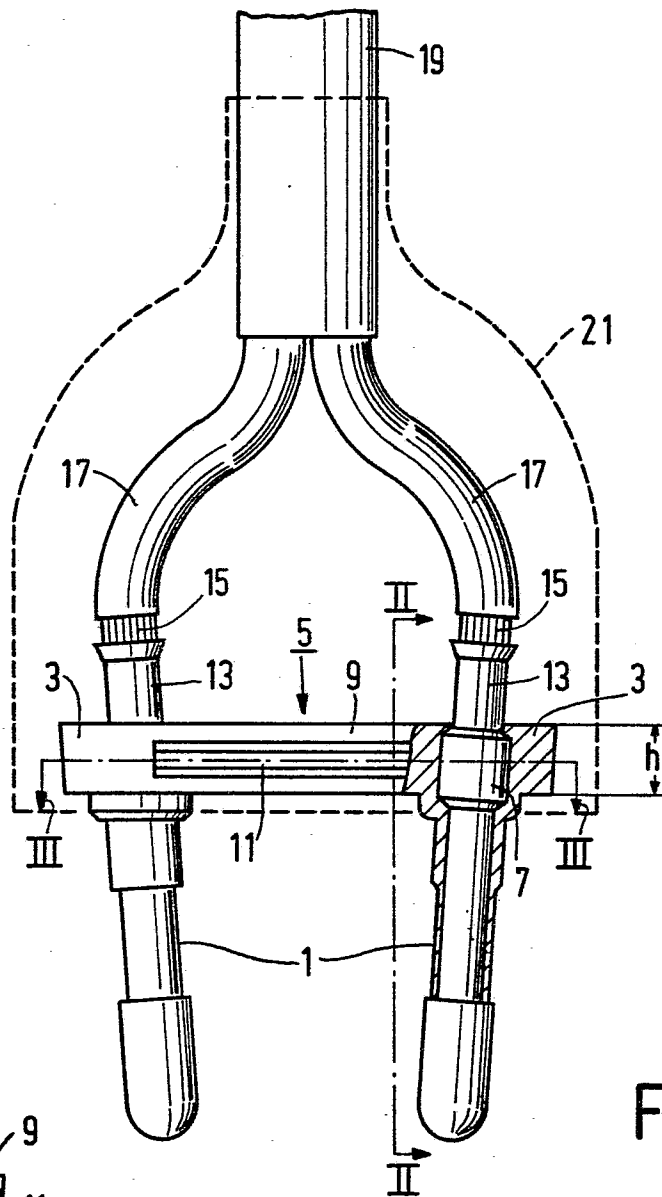


FIG. 1

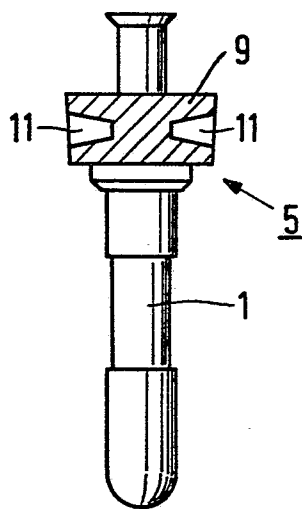


FIG. 2

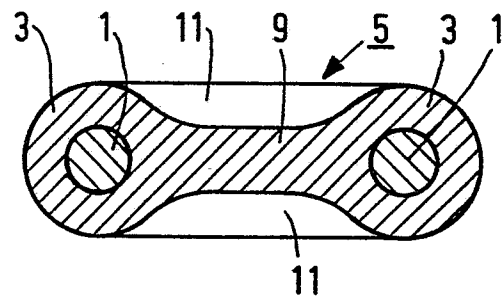


FIG. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	DE-U-1 906 579 (BRAUN) * Whole document *	1	H 01 R 19/04
Y	--- DE-U-1 981 896 (KABELWERKE REINSHAGEN) * Abstract *	1	
Y	--- DE-B-1 153 102 (SIEMENS-SCHUCKERT) * Figures 4,5 *	1	
A	--- DE-C- 538 846 (R. GEIMER) * Figure 2 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			H 01 R
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06-09-1985	Examiner RAMBOER P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	