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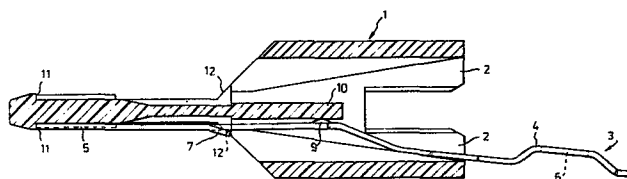
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54 Electrical connectors.

57 An electrical connector has a moulded plastics housing (1) holding a plurality of electrical contacts (3). The contacts (3) are retained in the housing by contact at the rear with an abutment (11) moulded in the housing (1) and at the front by spring tines (7) co-operating with an abutment (12). The contacts (3) may each be removed from either the front or the rear of the housing (1). For forward extraction the respective spring tine (7) is depressed while for rearward extraction the contact (3) is pivoted on an embossment (9) which causes the rear of the contact (3) to come clear of the abutment (11).



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The present invention relates to electrical connectors and more particularly but not exclusively to such connectors for effecting the connection of printed circuit cards.

5 Printed circuit cards have in the past had the ends of the tracks thereon coated with noble metal for direct connection to edge connectors in a mounting frame. If for any reason it is necessary for the cards to be removed and replaced many times, it is likely that wear of the
10 noble metal coating will lead to a high resistance or open circuit contact. Such a fault on one or two of the contacts may necessitate replacement of the entire card.

More recently indirect connectors have been introduced in which the noble metal contacts are provided
15 separately from the printed circuit tracks in a stiffened housing and are soldered to the track ends thus individual replacement is possible.

It will be appreciated that contacts of any connector should be firmly located within their housings to
20 facilitate the assembly of the housing which, depending on the particular design, necessitates inserting each contact in channels in the housing from either the front or rear of the connector. Such location is usually achieved on assembly by providing in the housing a shoulder
25 or abutment to which a portion of the contact comes up in the direction of insertion. A spring portion of the contact then enters an aperture in the housing or a resilient portion of the housing moves behind a portion of the contact to prevent the withdrawal of the contact in the
30 opposed direction. To replace a contact the spring portion (or resilient portion) is moved aside by use of a suitable tool to enable the contact to be withdrawn from the same end of the connector as that through which it was inserted.

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It will be realised that in certain circumstances it will be inconvenient to withdraw an inserted contact from the rear of a housing whilst in other circumstances it will be inconvenient to withdraw such a contact from
5 the front of the housing. Thus two kinds of edge connectors are required - one for front withdrawal and one for rear withdrawal.

It is an object of the present invention to provide an electrical connector having contacts which may be
10 individually withdrawn and/or inserted from either the front or the rear of the housing.

According to the present invention in an electrical connector of the kind comprising a one-piece moulded housing of electrically insulating material shaped to
15 receive an electrically conductive contact member, the housing has a first abutment arranged to co-operate with a resilient tine of a fully inserted contact to prevent movement of said contact in one direction and a second abutment arranged to co-operate with a portion of a fully
20 inserted contact to prevent movement of said contact in an opposed direction, said tine being positioned such that it may be displaced clear of said first abutment to permit removal of said contact member in said one direction and said contact being arranged to pivot under pressure to
25 cause said portion to be displaced clear of said second abutment to permit removal of said contact member in said opposed direction.

Preferably the contact member includes a part-spherical embossment arranged to co-operate with a surface
30 provided in said housing to provide the pivot point for said contact.

Said housing may be arranged to hold a plurality of contact members each arranged to be withdrawn as aforesaid.

The electrical connector may be an edge connector for
35 use with printed circuit cards.



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An electrical connector in accordance with the invention will now be described with reference to the accompanying drawings of which:-

Figure 1 is a view of the connector from one
5 direction,

Figure 2 is a view of the connector at right angles to the view of Figure 1,

Figure 3 is a sectional view of the housing of the connector at one of the contact positions showing a contact
10 member in elevation,

Figure 4 is a side view of a contact member of the connector; and

Figure 5 is a plan view of the contact member of Figure 4.

15 Referring to the drawings, the connector has a one piece moulded plastics housing 1 which has a number of connector segments 2 arranged vertically in pairs. Each of the connector segments 2 is arranged to hold an electrical contact 3 a first section 4 of which is for connection to a printed circuit board 5.
20

At the opposed end of the contact to the section 4 a plated section 5 is provided which is for insertion in a typical printed circuit board edge connector (not shown).

Referring specifically to Figures 4 and 5 of the
25 drawings the contact 3 which is formed by for example pressing out from a phosphor bronze strip has an aperture 6 in the section 4 to facilitate soldering to a printed circuit board and is pre-stressed as shown in the diagram. It will be noted that the pre-stressing causes the rear
30 of the contact to be displaced from the section 4 to assist locking of the contact 3 when it is inserted in a housing. Two resilient tines 7 are provided one on either side of the contact 3 also for locking purposes.

Towards the centre of the contact 3 a partially
35 spherical embossment 9 is provided, the purpose of which

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is to facilitate removal of the contact 3 as hereinafter described.

Referring again to Figure 3 a contact 3 may be inserted in one of the segments 2 from either the front
5 or rear of the connector in the following manner:-

If the connector is inserted from the front (the right as shown in the diagram) the rear of the contact 3 is inserted and passes through an aperture in the housing 1 and along a dividing wall 10 of the housing 1. The tines
10 7 will flatten under the resilience of the material of the contact member so that they also pass through the aperture.

When the contact 3 is fully inserted the end of the contact will come up against an abutment 11 which prevents further rearward movement of the contact. In substantially
15 the same position the tines 7 will return to their pre-stressed state and will lock behind an abutment face 12, thus preventing movement of the contact in a forward direction.

Removal of the contact is a matter of causing the
20 tines 7 to adopt a flattened position so that they are clear of the face 12. The contact may then be pulled forward.

If the contact 3 is inserted from the rear of the connectors (the left as shown), the front end of the contact
25 member is inserted in the aperture of the housing 1 and the contact is pushed forward until the tines 7 meet the face 12. Releasing the rear of the contact 3 causes the rear of the contact 3 to drop into its respective channel under the pre-tensioning with its end adjacent the abutment 11.

30 Removal of the contact 3 in the rearward direction is dependent upon the effect of the partially spherical embossment 9 being in contact with the wall 10. It will be realised that the contact 3 will act as a centre loaded beam with the embossment 9 acting as a pivot. Thus if the section 4 of the contact 3 is moved towards the centre line of
35 the connector the opposed end of the contact will lift clear of the abutment 11 and the contact may then be removed.

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It will be appreciated that whilst as herein described the contact 3 has two tines 7, a single tine could be provided. However, if two tines 7 are provided as shown the centre of the aperture through which the contact passes
5 may be larger than the outer edges thus facilitating insertion of the contact without overstressing of the material.

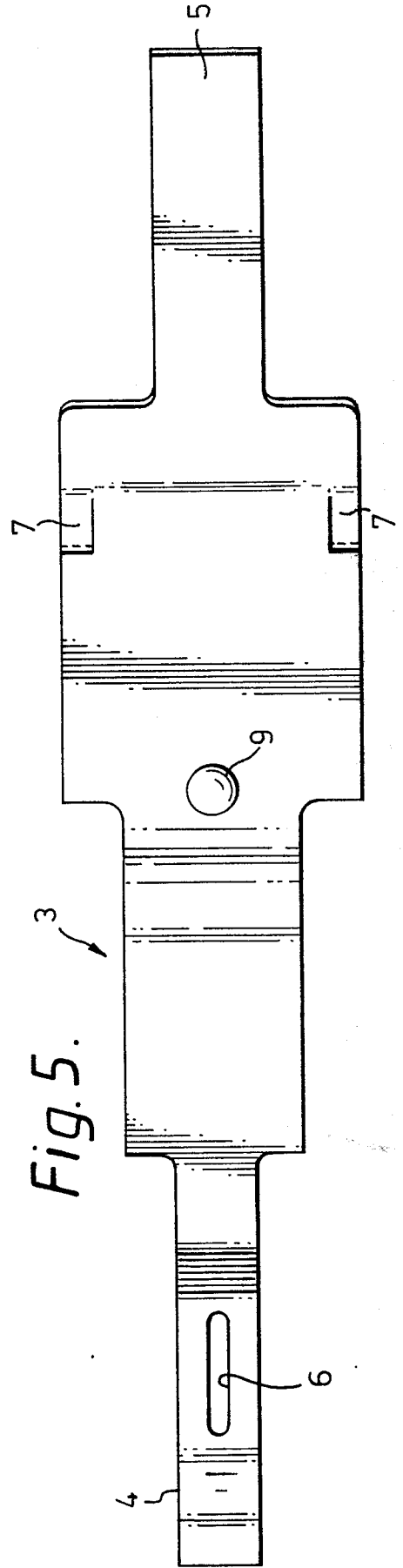
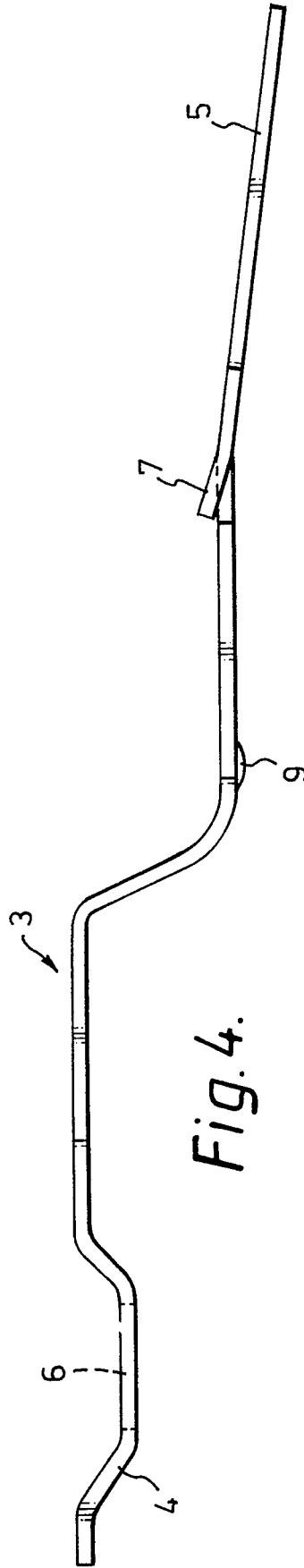
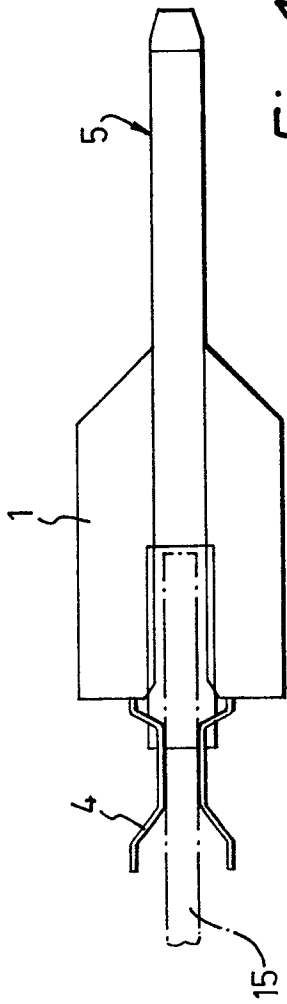
It will also be realised that although the connector herein described is a particular form of intermediate connector between a printed circuit board and an edge connector,
10 the design of the contact may be varied to provide for example an edge connector to which the present connector may be fitted.

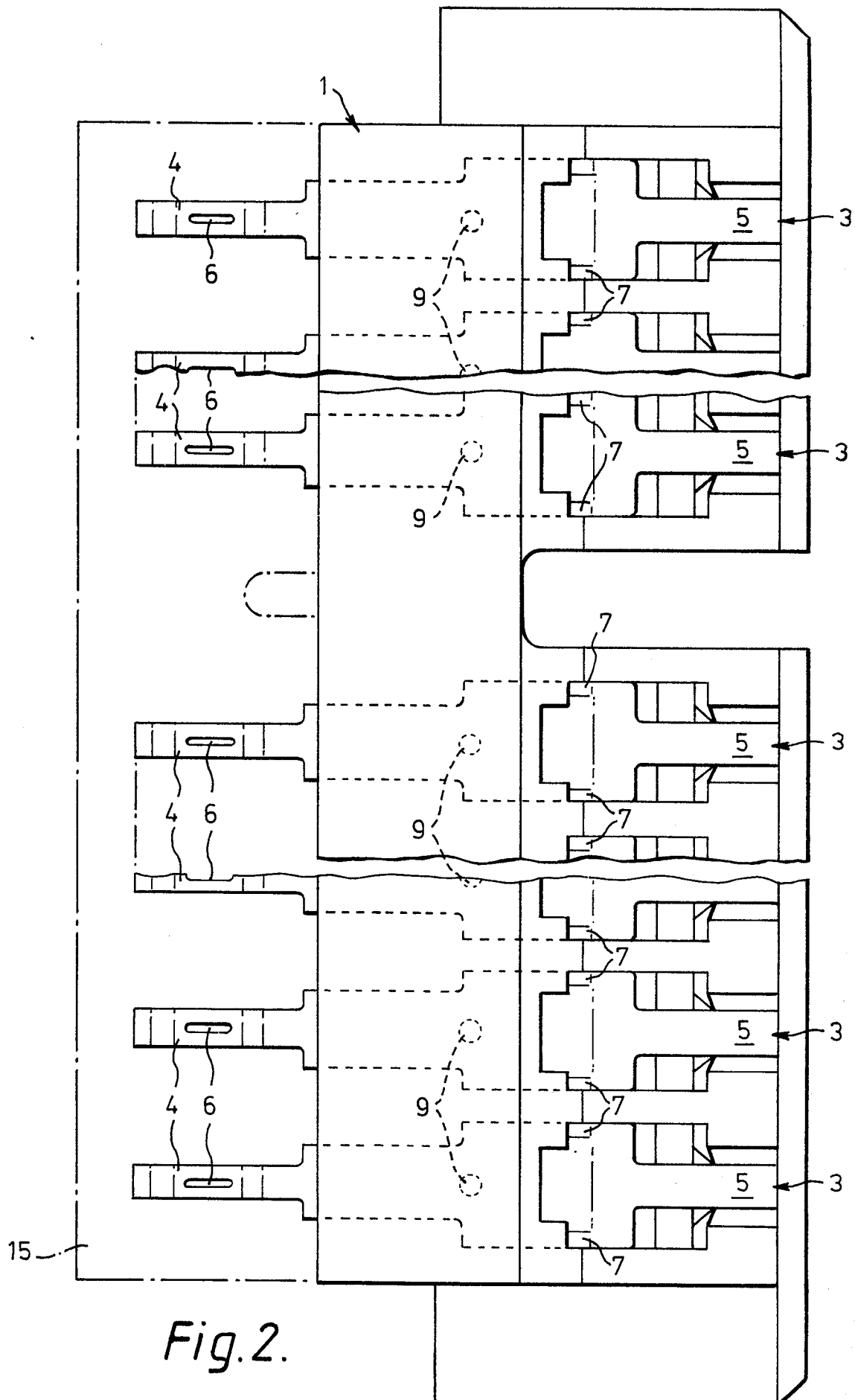
The abutment 11 could be provided forward of the rear of the housing 1 and could be arranged to lock with a corresponding shaped abutment of the contact so that the contact 3
15 could be clear of the housing to facilitate connection thereto by wire-wrapping or soldering for example.



CLAIMS.

1. An electrical connector of the kind comprising a one-piece moulded housing of electrically insulating material shaped to receive an electrically conductive contact member characterised in that the housing (1) has a first abutment (12) arranged to co-operate with a resilient tine (7) of a fully inserted contact (3) to prevent movement of said contact (3) in one direction and a second abutment (11) arranged to co-operate with a portion of a fully inserted contact to prevent movement of said contact in an opposed direction, said tine (7) being positioned such that it may be displaced clear of said first abutment (12) to permit removal of said contact member (3) in said one direction and said contact (3) being arranged to pivot under pressure to cause said portion to be displaced clear of said second abutment (11) to permit removal of said contact member in said opposed direction.
2. An electrical connector according to Claim 1 further characterised in that the contact member (3) includes a part-spherical embossment (9) arranged to co-operate with a surface (10) provided in said housing (1) to provide the pivot point for said contact.
3. An electrical connector according to Claim 1 or Claim 2 further characterised in that said housing (1) is arranged to hold a plurality of contact members (3) each arranged to be withdrawn as aforesaid.
4. An electrical connector according to Claim 1, Claim 2 or Claim 3 further characterised in that a plurality of tines (7) spaced apart widthways of the contact member are provided each of said tines (7) being arranged to co-operate with the first abutment (12) when the contact member is fully inserted in the housing (1).
5. An electrical connector according to any preceding claim further characterised in that the connector is arranged to be an edge connector for use with a printed circuit board.





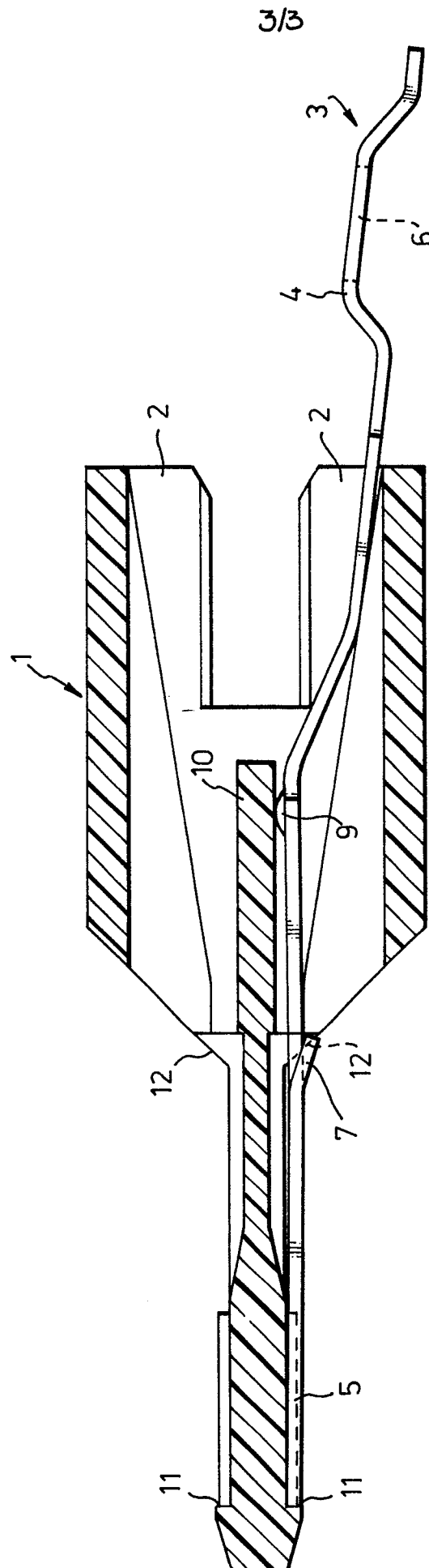


Fig. 3.



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EUROPEAN SEARCH REPORT

0112705

Application number

EP 83 30 7714

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. ³)
X	FR-A-2 080 252 (CIT) * Figure 6; page 1, lines 23-30 *	1,3-6	H 01 R 23/70 H 01 R 13/432
A	FR-A-2 239 839 (CHAUCHAT) * Figure 10; page 3, line 34 - page 4, line 14 *	1,3-5	
A	GB-A-1 151 800 (PHILIPS) * Figures 1,2; page 2, lines 23-59 *	1,3-5	
A	FR-A-2 060 282 (FRANCELO) * Figure 7; page 3, line 1 - page 5, line 12 *	1,3-5	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			H 01 R 13/00 H 01 R 23/00 H 01 R 31/00 H 01 R 43/00
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15-02-1984	Examiner WAERN G.M.
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	