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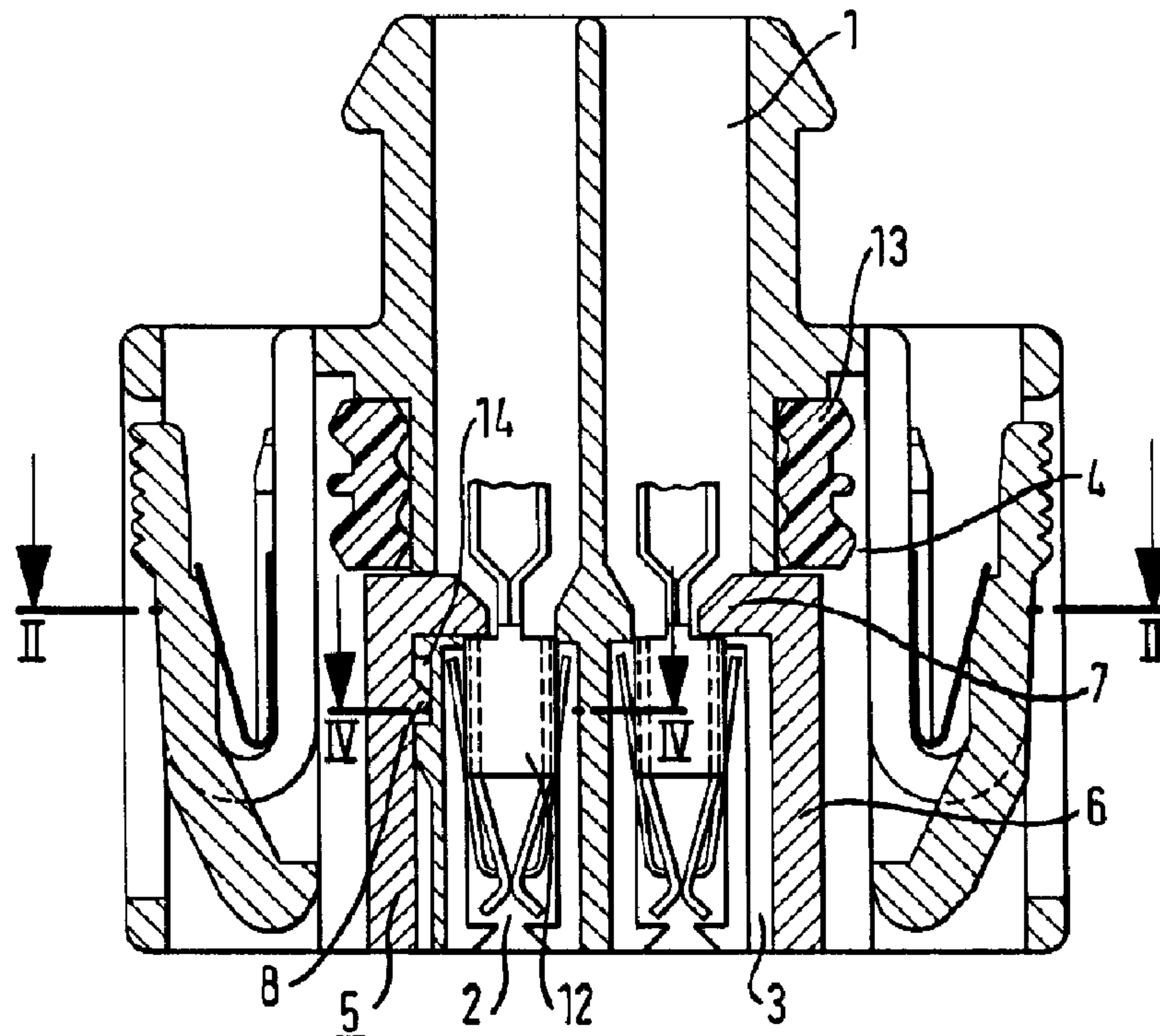
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(54) Titre : BOITE POUR CONNECTEURS ELECTRIQUES, AVEC SYSTEME DE VERROUILLAGE SECONDAIRE

(54) Title: BOX FOR ELECTRICAL CONNECTORS HAVING A SECONDARY LOCKING SYSTEM



(57) Abrégé/Abstract:

This invention relates to a box for electrical connectors comprising: an arrangement of recesses (1) for receiving electrical contacts (2), and a secondary locking system (5) for the electrical contacts (2), such system engaging transversely behind the cylindrical envelope (12) of the contacts (2) in the recesses (1) in order to lock the contacts axially. The arrangement of the recesses (1) forms a central tower (3) in the box. The secondary locking system (5) has a base (6) so disposed on the tower (3) as to be movable transversely to the axis of the contact between two positions, viz. a first position, in which retaining lugs (7) on the top edge of the base (6) are clear of the recesses (1), and a second position, in which the retaining lugs (7) lock the electrical contacts (2) in the recesses (1).

A B S T R A C TA BOX FOR ELECTRICAL CONNECTORS HAVING A SECONDARY
LOCKING SYSTEM

This invention relates to a box for electrical connectors comprising: an arrangement of recesses (1) for receiving electrical contacts (2), and a secondary locking system (5) for the electrical contacts (2), such system engaging transversely behind the cylindrical envelope (12) of the contacts (2) in the recesses (1) in order to lock the contacts axially. The arrangement of the recesses (1) forms a central tower (3) in the box. The secondary locking system (5) has a base (6) so disposed on the tower (3) as to be movable transversely to the axis of the contact between two positions, viz. a first position, in which retaining lugs (7) on the top edge of the base (6) are clear of the recesses (1), and a second position, in which the retaining lugs (7) lock the electrical contacts (2) in the recesses (1).

(Fig. 1)

A BOX FOR ELECTRICAL CONNECTORS HAVING
A SECONDARY LOCKING SYSTEM

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This invention relates to a box for electrical connectors having a secondary locking system.

10 Boxes of this kind are known, for example, from EP-0
007 709 B1. The same discloses a box having a
secondary locking system in which electrical spring
contacts which have been assembled in the box in
recesses provided for them are additionally secured
15 against being pulled out to the rear. To this end,
the contact recesses are in two parts and after
assembly of the push contacts the halves of the
recess are offset laterally from the connector axis.
To facilitate offsetting, the recesses of the box
20 half remote from the plug-in side are of larger
internal diameter and only the bottom end of the
recesses of the latter half is of reduced recess
diameter, so that wedges arise in the region of the
intermediate walls between the recesses and, after
25 the engagement of the secondary locking system engage
in corresponding notches in the plug to be locked.

In this construction the locking of the connector
30 contacts impairs the ability of the whole box to
withstand bending since the box is divided in two
perpendicularly to the plug-in axis substantially in
its centre-plane and is held together only by catch
means. When the box experiences a force acting
35 perpendicularly to the plug-in direction, for
instance, due to a pull on the cable, the connector

halves may disengage from their locking and give the contacts an undefined release.

5 Also known is a secondary locking system wherein
after the assembly of the contacts a locking element
is moved in the plug-in direction from a pre-locking
pre-catch position into a locking position. Since the
10 plug-in direction is the same as the assembly
direction for the contacts, the secondary locking
system may become operative accidentally during or
before the assembly step, so that the contact-
receiving recesses are locked before the contacts
have been assembled in them. Accidental locking or
15 catching may also occur during transportation of the
box, for example, because of rough handling of a
crate so that it hits the ground hard, and
acceleration forces may unlock the secondary locking
elements during transportation . Since it is a
20 difficult job requiring special tools to release
secondary locking systems from the lock position,
entire batches of boxes may be made unsuitable for
automatic assembly because of premature lockings.

25
It is the object of this invention to disclose a box
for electrical connectors which has a reliable
secondary locking system which will not become locked
accidentally during transportation nor during the
30 assembly of contacts before the same have been
assembled in their recesses.

More specifically, according to the present
35 invention, there is provided a box for electrical
connectors comprising an arrangement of recesses for

receiving electrical contacts, and a secondary locking system for these electrical contacts. The locking system engages transversely behind a cylindrical envelope of the contacts in the recesses
5 in order to lock the contacts axially. The box for electrical connectors is characterized in that the arrangement of the recesses forms a central tower in the box, and the secondary locking system has a base so disposed on the tower as to be movable
10 transversely to an axis of the contacts between two positions. These two positions include a first position, in which retaining lugs on a top edge of the base are clear of the recesses, and a second position, in which the retaining lugs lock the
15 electrical contacts in the recesses.

Therefore, the box according to the invention has a secondary locking system which can take up two
20 clearly defined positions. According to an illustrative embodiment, the movement between the two positions takes place in a direction perpendicular to the assembly and plug-in direction inside the rigid box. The risk of accidental locking is thereby
25 substantially excluded, and the ability of the box to withstand forces acting on it from any direction is not impaired.

30 The locking system can be actuated readily and reliably. According to another illustrative embodiment, overcoming of a stud or the like and the engagement in the locking position also gives clear information about whether the locked state has
35 actually been reached.

The foregoing and other objects, advantages and features of the present invention will become more apparent upon reading of the following non
5 restrictive description of illustrative embodiments thereof, given by way of example only with reference to the accompanying drawings in which:

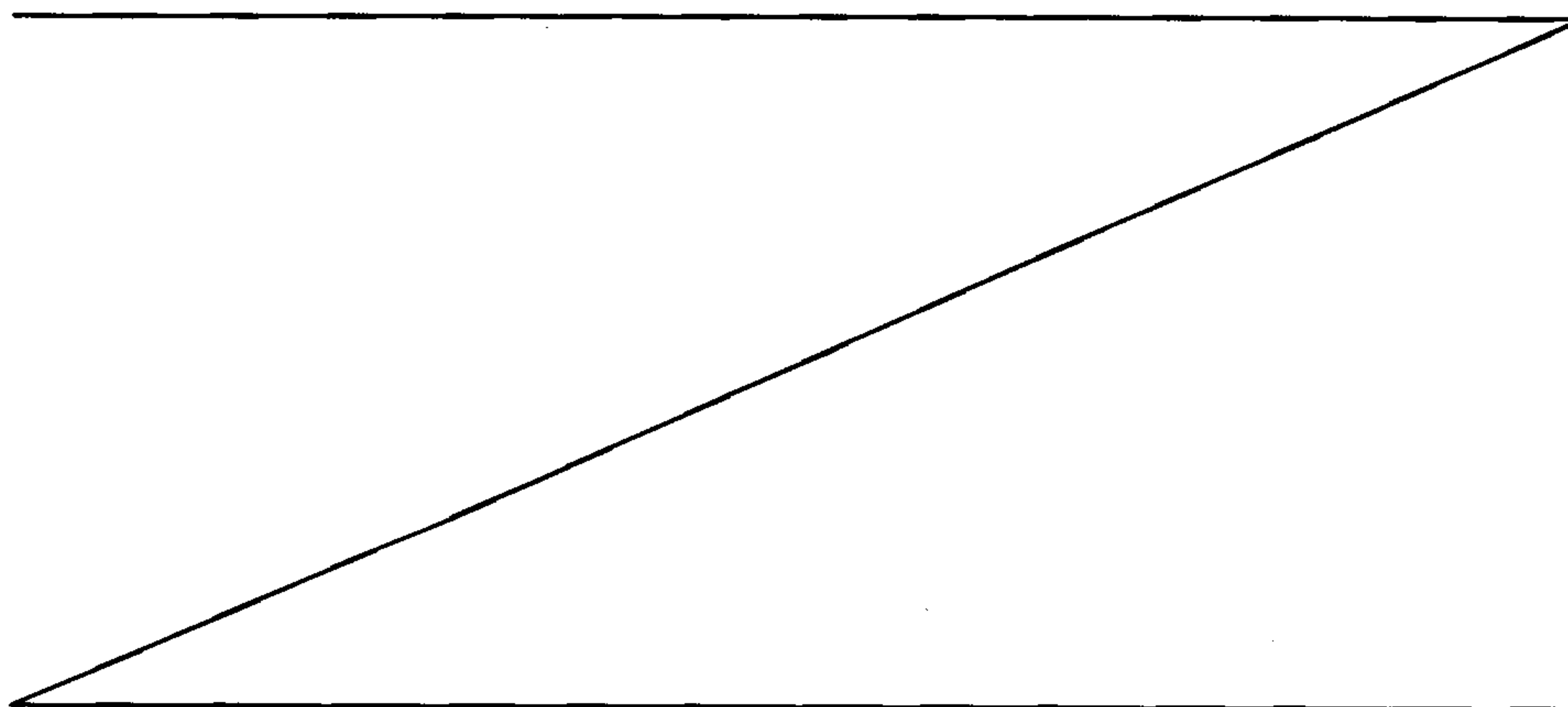
10 Fig. 1 is a longitudinal section through an embodiment of a box according to the invention which has a secondary locking system;

15 Fig. 2 is a cross-section on the line II-II of the box in Fig. 1 in the prelocking position;

Fig. 3 is a section through Fig. 2 in the caught
20 position; and

Fig. 4 is a section on the line IV-IV of Fig. 1.

25 Fig. 1 is a view in longitudinal section of an embodiment of the box according to the invention. Two recesses for connector contacts 2 are present inside



the box. The recesses are combined to form a tower 3 around which an annular gap extends. The same is bounded by the outer walls of the tower 3, the inner walls of the outer casing wall and the base of the annular gap which is at the height of the plug-in side of the box.

The secondary locking system 5 is disposed in the gap 4. It comprises a base 6 on whose top edge retaining lugs 7 are disposed. The system 5 is movable relatively to the tower 3 and perpendicularly to the plug-in axis between two positions, viz. a first position, in which the lugs 7 are clear of the contact-receiving recesses so that the contacts can be moved into their end position, and a second position, in which the lugs 7 partially close the recesses behind the inserted contacts so that the same cannot release to the rear from their end position.

The movement of the system 5 is ensured by appropriate guiding of a stud or the like 8 in a groove 14 in the tower outer wall. Disposed in the groove 14 is a rib 10 which the base 6 of the system 5 abuts in a prelocking position. To actuate the system 5, the base 6 must be deformed resiliently for the stud 8 to overcome the rib 10 in order then to be secured against release in the groove 14. Fig. 4, which is a view on the section line IV-IV of Fig. 1,, shows the prelocking position and the locked or caught position of the secondary locking system 5 according to the invention.

Fig. 2 is a view of the box according to the invention in section on the line II-II of Fig. 1. There can be

seen the base 6 with the retaining lugs 7 in the annular gap 4 which extends around the tower 3 in the box. In Fig. 2 the lugs 7 are clear of the recesses 1, so that the contacts 2 can be assembled therein. The secondary locking system is therefore in the prelocking position in Fig. 2. After insertion of the contacts 2 in the corresponding recesses 1 the secondary locking system 5 is moved through the opening 11 in the box, by slight pressure on the base 6, into the caught or locked position of Fig. 3. In a typical embodiment the locking travel is 1.6 mm. The lugs 7 overlap the apertures of the recesses 1 to some extent so that in response to axial loading in the direction of the connector cable the cylindrical envelope 12 has its rear end face pressed against the lug 7 and is prevented from sliding out of the recess 1.

As Fig. 1 shows, a sealing ring 13 is disposed above the system 5 and ensures complete sealing-tightness of the appliance connection side of the box in respect of the cable-side part thereof.

The box according to the invention represents a reliable stable solution for the secondary locking of plug-in contacts in the box. Accidental locking before insertion of the contacts is virtually impossible and so automatic assembly of contacts in the boxes causes no problems. The stability of the complete box is not impaired by the provision of the secondary locking system according to the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

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1. A box for electrical connectors comprising:
an arrangement of recesses for receiving
electrical contacts;

10 a secondary locking system for the electrical
contacts, said locking system engaging transversely
behind a cylindrical envelope of the contacts in the
recesses in order to lock the contacts axially;
characterized in that

15 the arrangement of the recesses forms a
central tower in the box; and

the secondary locking system has a base so
disposed on the tower as to be movable
transversely to an axis of the contacts between
two positions including:

20 a first position, in which retaining
lugs on a top edge of the base are clear
of the recesses; and

a second position, in which the
retaining lugs lock the electrical
25 contacts in the recesses.

2. A box according to claim 1,
characterized in that

30 in the first position, the locking system
engages by way of a stud or the like a rib on the
tower and by resilient deformation of the base due to
lateral pressure thereagainst overcomes the rib in
order to catch in the second position.

35 3. A box according to claim 1 or 2,
characterized in that

the box is formed with a lateral aperture at a height of the base for displacement of the locking system from the first position into the catch position.

5

4. A box according to any of claims 1 to 3, characterized in that

the locking system is pressed on to a bottom of an annular gap around the tower by a sealing ring
10 disposed on a top edge of the locking system.

5. A box according to any of claims 1 to 4, characterized in that

the tower and the base are of substantially oval
15 cross-section, the retaining lugs being disposed on the top edge of the base in two rows parallel to a displacement direction.

6. A box according to any of claims 1 to 5,
20 characterized in that

the stud is guided in a groove in a wall of the tower in the displacement direction.

FIG. 1

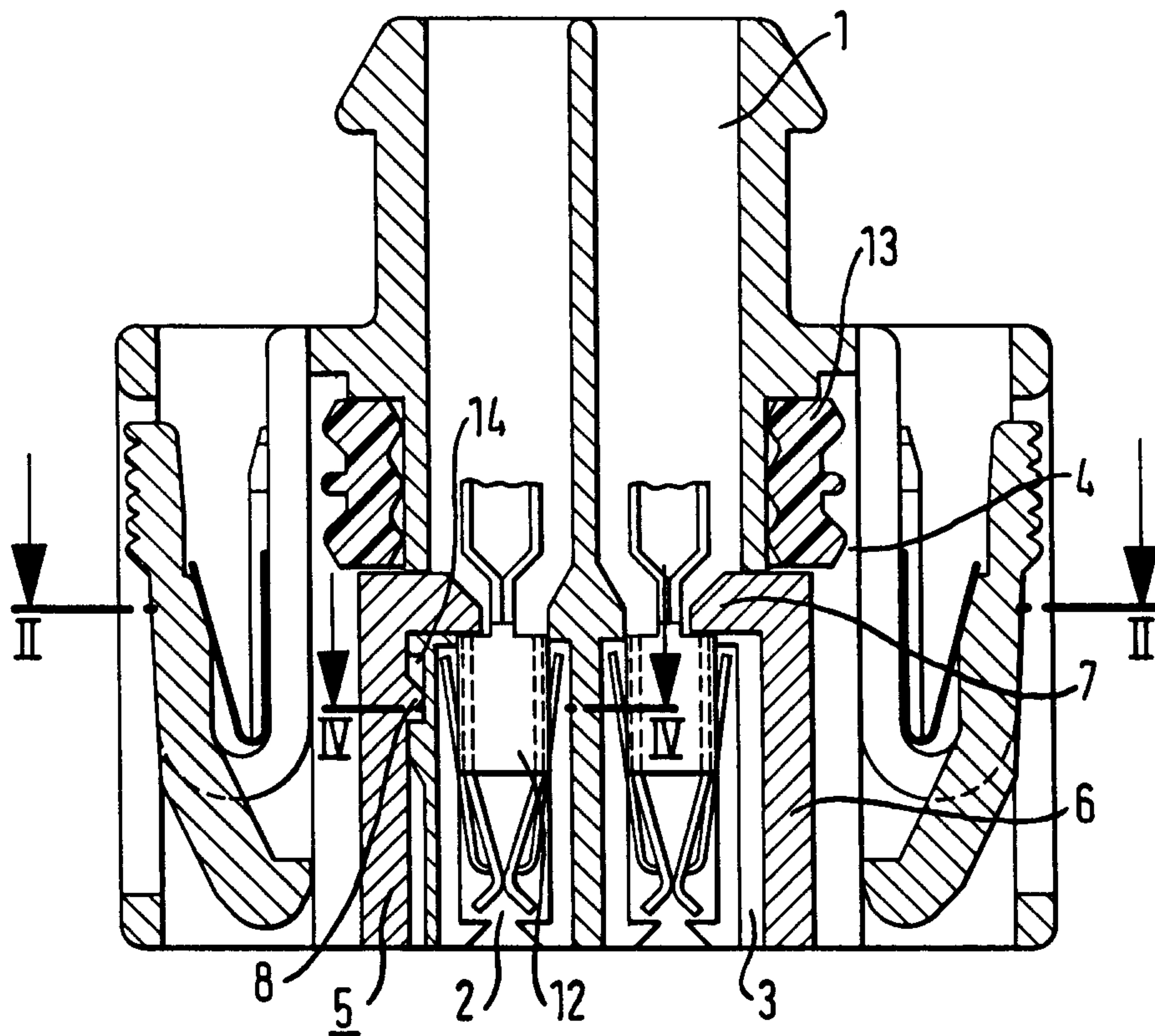


FIG. 4

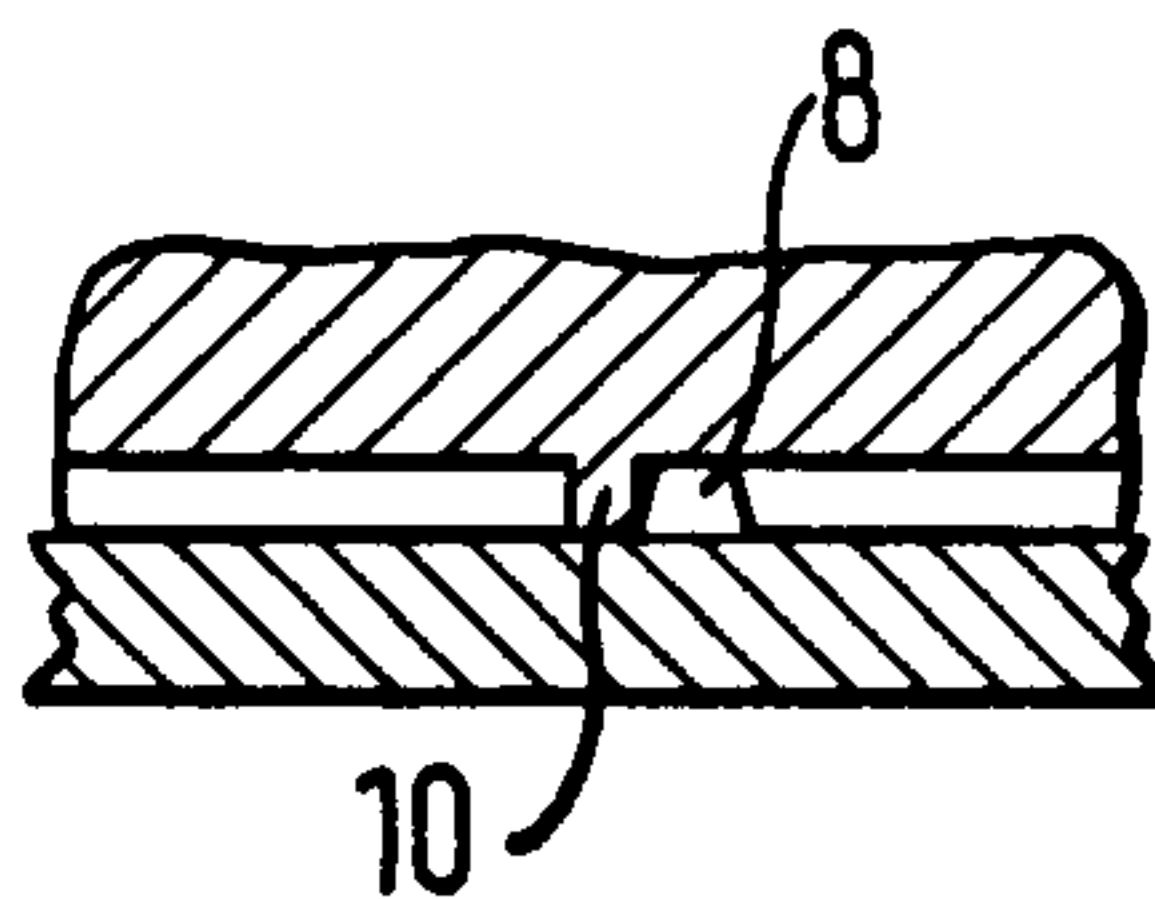
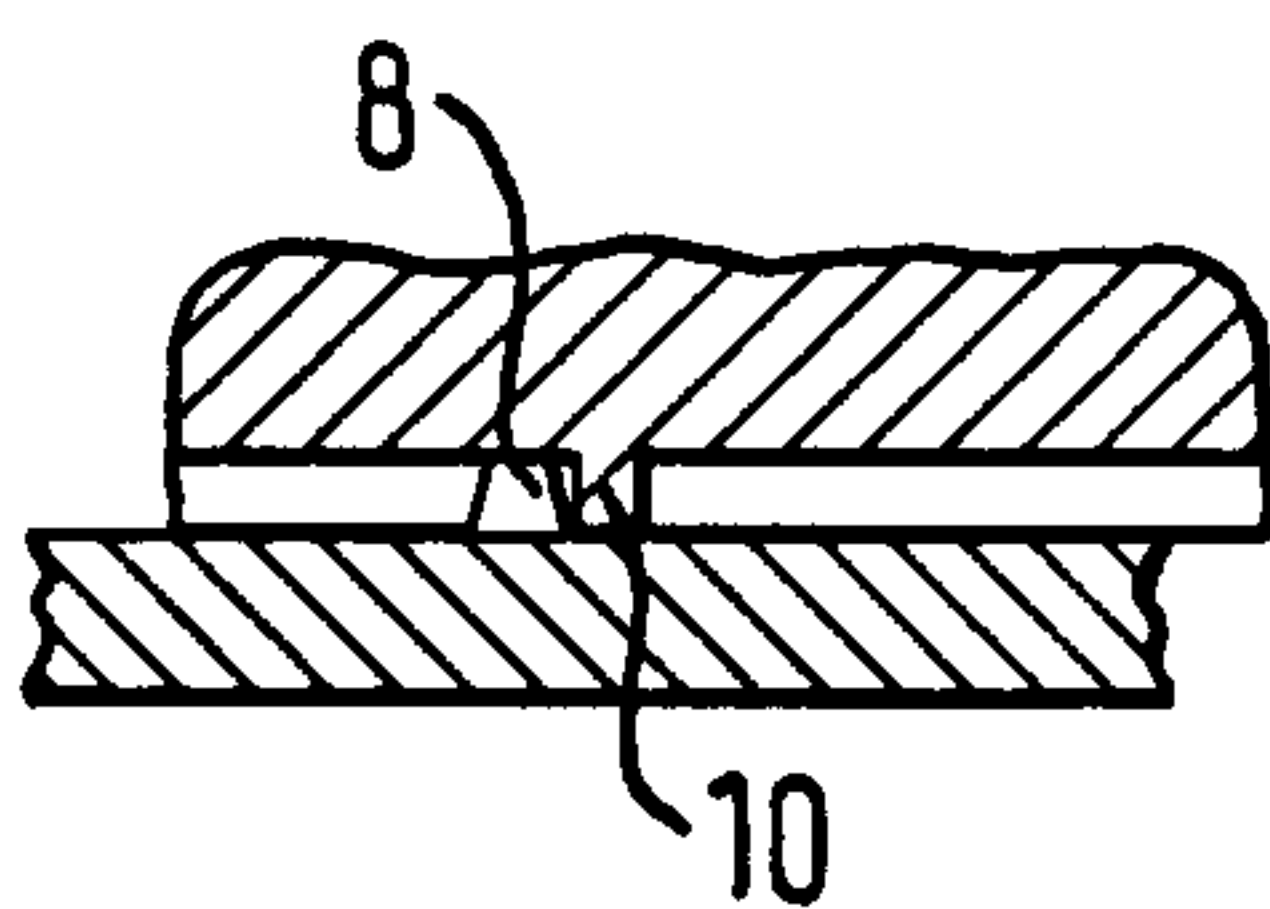


FIG. 2

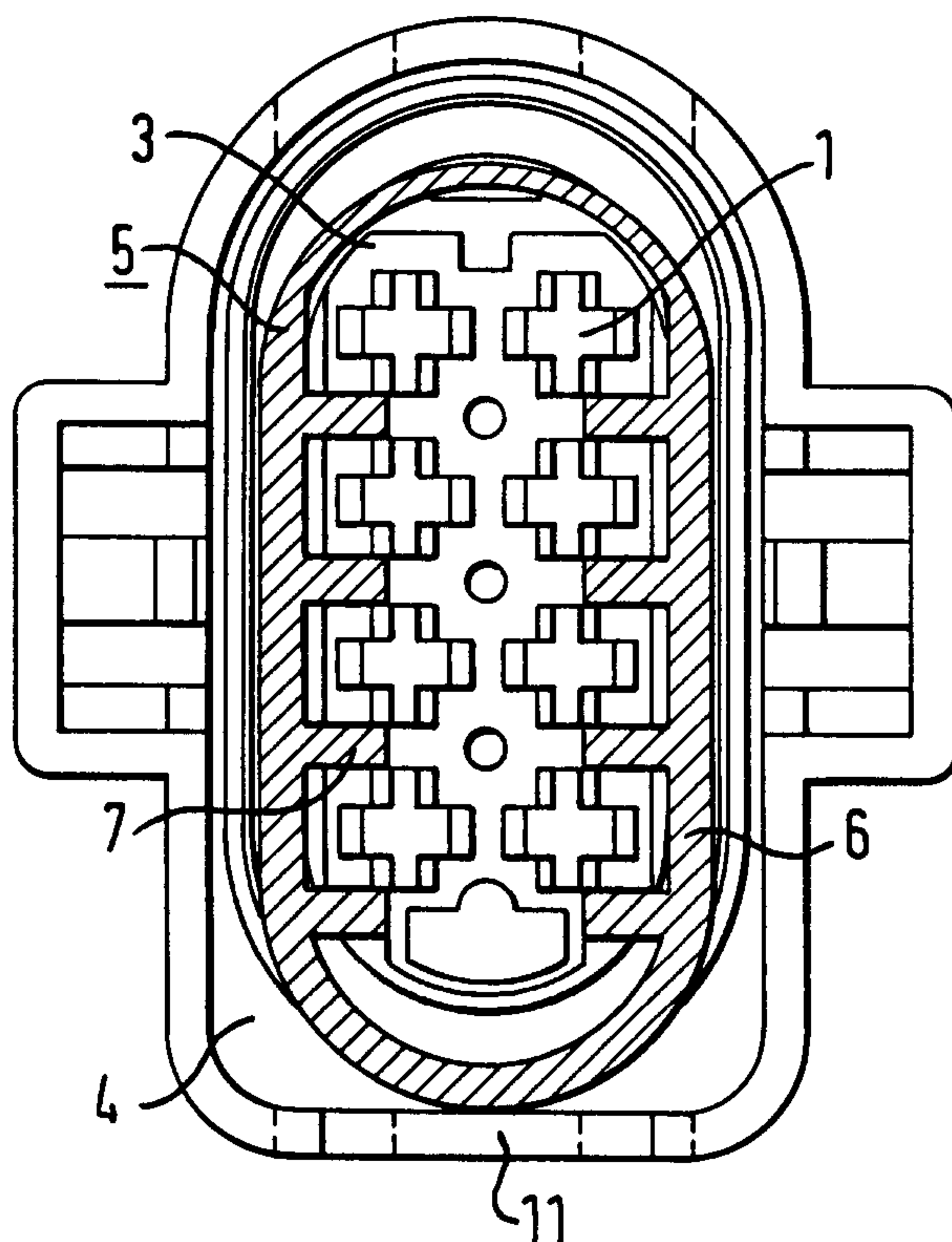


FIG. 3

