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CA 2506922 C 2009/07/28

(11)(21) 2 506 922

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2005/05/09

(41) Mise à la disp. pub./Open to Public Insp.: 2005/11/07

(45) Date de délivrance/Issue Date: 2009/07/28

(30) Priorité/Priority: 2004/05/07 (DE20 2004 007 300.5)

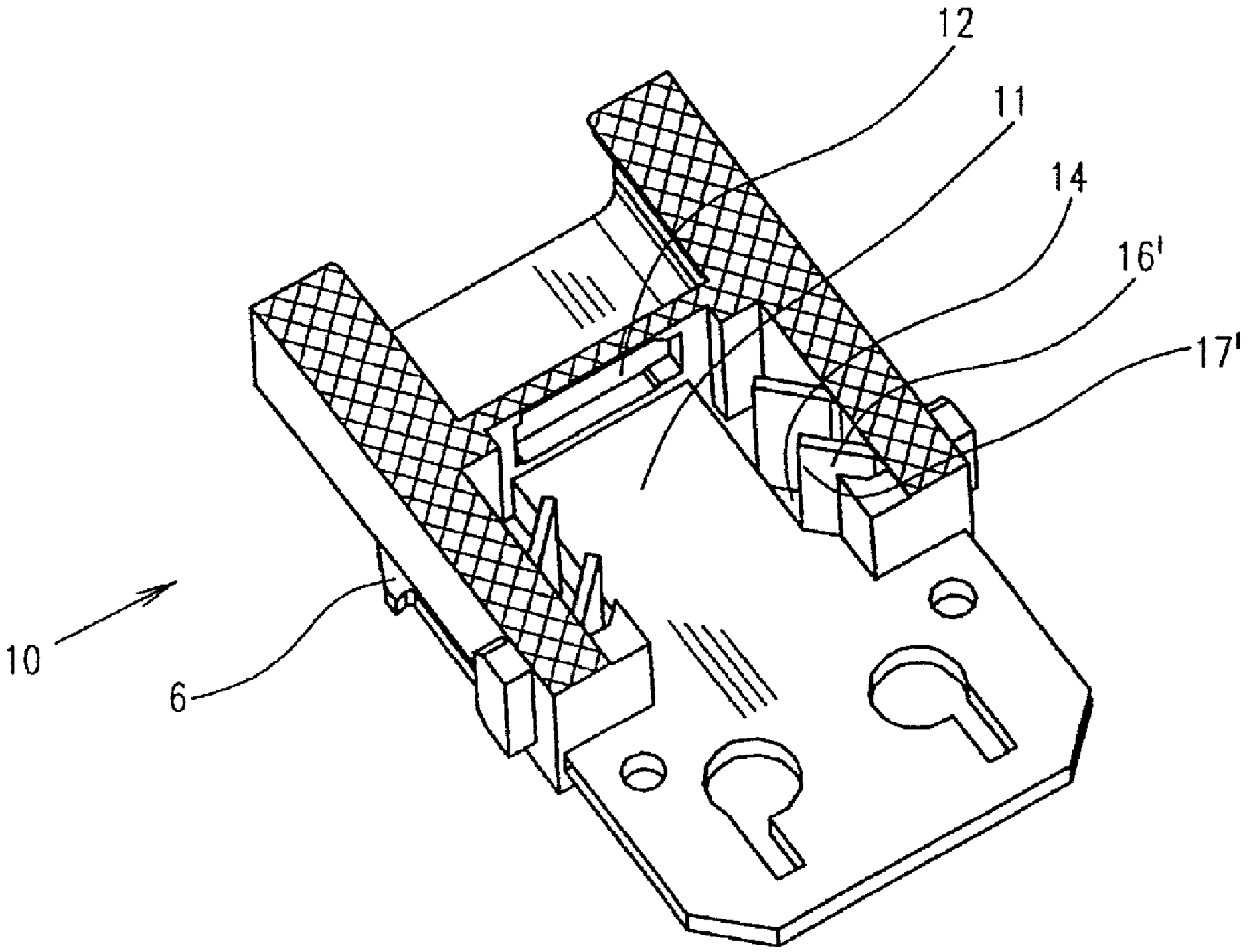
(51) Cl.Int./Int.Cl. *H01R 13/432* (2006.01),
H01R 13/627 (2006.01)

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(54) Titre : DISPOSITIF POUR ASSUJETTIR UN CONNECTEUR
(54) Title: DEVICE FOR SECURING A CONNECTOR



(57) Abrégé/Abstract:
In order to secure connectors, particularly USB connectors, in a module housing of a modular connector, the invention proposes to arrange locating springs in the connecting region of the module housing, wherein said locating springs are aligned in the connecting direction and secure the connector inserted therebetween.

ABSTRACT

In order to secure connectors, particularly USB connectors, in a module housing of a modular connector, the invention proposes to arrange locating springs in the connecting region of the module housing, wherein said locating springs are aligned in the connecting direction and secure the connector inserted therebetween.

Figure 1

DEVICE FOR SECURING A CONNECTOR

Technical Field

The invention pertains to a device for securing a connector in an insulating module housing of a modular connector.

A device according to the invention is required for automatically interlocking a connector with a module housing or a mating connector.

Background of the Invention

Conventional connector locking mechanisms utilize, among other things, screws, hooks, clamping devices or holding clips and always require corresponding manual activities. In the field of office communication interfaces, there is an increasing demand for a simple connecting mechanism that can be operated by any layman.

Brief Summary of the Invention

Consequently, the invention is based on the objective of developing a device of the initially cited type for securing a connector in such a way that the connector and a corresponding module are automatically interlocked when the connection is produced.

This objective is attained in that the module housing contains a connecting region with at least one locating spring arranged therein, wherein the end of said locating spring is aligned in the connecting direction and protrudes into the connecting region.

The advantage attained with the invention can be seen, in particular, in that the connector to be inserted into a module is automatically interlocked therewith when this connection is produced, namely without requiring any additional activities to be performed by the person producing the connection.

There are no exact specifications or requirements with respect to the dimensions of the connectors that are usually delivered in the form of ready-made goods with extrusion-coated cables connected thereto, e.g., analogous to so-called USB connectors.

Symmetrically arranged locating elements are advantageously provided in the module housing for receiving such a connector housing, wherein said locating elements comprise locating springs that are directed into the connecting region of the module housing at a flat angle and secure the connector housing on both sides.

The module housing, in turn, can be engaged with or screwed to the frame of a modular connector that accommodates several modules.

When the connection is produced, the locating spring aligned in the connecting direction initially slides along the narrow sides in the connecting region of the connector housing, but immediately interlocks in the relatively soft housing wall of the connecting region when attempting to pull out the connector.
It is also advantageous that connector housings with largely non-standardized outside dimensions can be secured in the module housing even if they have a certain bandwidth.

Brief Description of the Drawings

One embodiment of the invention is illustrated in the figures and described in greater detail below. The figures show:

Figure 1, a perspective representation of a sectioned module housing;

Figure 2, a connector that is partially inserted into the module housing, and

Figure 3, an individual spring element.

Detailed Description of the preferred Embodiment

Figure 1 shows a perspective representation of a sectioned module housing 10. Locating hooks 6 are integrally formed onto the respective outer edges in order to engage the module housing with the frame of a (not-shown) modular connector that also accommodates other module housings arranged in a row.

The module housing 10 contains a connecting region 11, as well as an opening 12, through which an inserted connector 1 protrudes in order to be contacted with a mating connector.

The connector 1 used is delivered in the form of a ready-made cable connection together with an electric cable 4. The cable connection is formed by the connector 1 consisting of a connector housing 2 with a connecting region 3, as well as a cable 4 connected thereto.

The connecting region 3 is delivered by the various connector manufacturers with a certain bandwidth, but with different dimensions. Consequently, one variably designed interlocking device can be advantageously utilized for securing a connector.

Such an interlocking device is provided in the connecting region 11 of the module housing, wherein at least one locating spring 16' – that extends into a de-

pression 14 in the bottom of the module housing - is integrally formed onto the respective narrow sides of the module housing.

In this case, two successively arranged locating springs 16' are integrally formed in a graduated fashion onto both sides of the connecting region, wherein the ends 17' of said locating springs are directed into the connecting region 11 and aligned in the connecting direction at an angle of approximately 45° relative to the wall.

When the connector housing 2 is inserted into the module housing 10, the spring ends 17' initially slide along the narrow housing sides in the connecting region 5, but generate a wedge effect when attempting to pull out the connector.

Figure 2 shows a perspective representation of a connector 1 that already is partially inserted into a module housing 10 illustrated in the form of a section. A variation of the interlocking device shown in Figure 1 is provided on this module, wherein two opposing spring elements 15 are arranged in the connecting region 11 such that they respectively point into the connecting region 11 with a locating spring 16 or with their end 17.

The spring elements 15 are secured in slots 13 with their ends 19 and captively inserted into the module housing through an installation opening 14 provided on one side.

When the connector 1 is additionally inserted into the module housing 10 until the connecting region 3 of the connector housing protrudes into the opening 12 in the module housing, the narrow sides of the connector housing slide along the locating springs 16, wherein the connector is prevented from sliding back out due to the alignment of the locating springs in the connecting direction.

Figure 3 shows a spring element 15 that has a slightly U-shaped curvature, wherein a locating spring 16 that is cut out on three sides protrudes from the center of said spring element. The locating spring is initially bent in accordance with the curvature of the spring element, but protrudes from the opening 18 opposite to the curvature with the spring ends 17.

The curvature is required in order to hold the locating element within the slots 13 in the module 10 with a certain tension.

In order to separate the connector, the locating springs 16 need to be bent back from outside. This is achieved by inserting a flat tool for bending back the locating springs into the bottom opening 14 in the module housing 10.

However, this effort is quite justifiable in light of the fact that these connectors are incorporated into a system interface equipped with several modular connectors and, as a rule, only manipulated when a new system is installed. In other respects, the connectors held in the modular connector are also disengaged when the two halves of the modular connector are separated from one another.

CLAIMS:

1. A female electrical connector part comprising:

a first wall;

a second wall connected to the first wall, the second wall being substantially perpendicular to the first wall;

a third wall connected to the first wall, the third wall being substantially perpendicular to the first wall and substantially parallel to the second wall, the second wall and third wall defining a connection region therebetween, the connection region for receiving a male electrical connector part inserted in the connection region by pushing the male connector part into the female connector part in an insertion direction; and

a biasing means secured to the second wall, the biasing means protruding in the connection region, the biasing means for engaging the male electrical connector part and for applying a force against the male electrical connector part upon a user pulling on the male electrical connector part in a direction opposite the insertion direction, the force applied by the biasing means having a force component along the insertion direction, the first wall and the second wall defining an access opening adjacent the biasing means, the access opening for receiving along a direction substantially perpendicular to the insertion direction, a removal tool to disengage the biasing means from the male electrical connector part.

2. The female electrical connector part of claim 1 wherein the biasing means includes at least one leaf spring, each leaf spring being integrally formed with the second wall.

3. The female electrical connector part of claim 2 wherein each leaf spring is slanted towards the insertion direction.

4. The female electrical connector part of claim 2 further comprising at least one additional leaf spring being integrally formed with the third wall, the at least one

additional leaf spring for engaging the male electrical connector part and for applying an additional force against the male electrical connector part upon the user pulling on the male electrical connector part in the direction opposite the insertion direction, the additional force applied by the biasing means having a force component along the insertion direction.

5. The female electrical connector part of claim 4 wherein the first wall and the third wall define an additional access opening adjacent the at least one additional leaf spring, the additional access opening for receiving the removal tool to disengage the at least one additional leaf spring from the male electrical connector part.

6. The female electrical connector part of claim 1 wherein the biasing means includes a leaf spring element, the leaf spring element having a main part secured to the second wall and a resilient hook part integrally formed with the main part, the resilient hook part having an end portion protruding in the connection region, the resilient hook part being located adjacent the access opening, the removal tool for engaging the resilient hook part to force the resilient hook part towards the second wall.

7. The female electrical connector of claim 6 further comprising an additional leaf spring element, the additional leaf spring element having a main part secured to the third wall and a resilient hook part integrally formed with the main part, the resilient hook part having an end protruding in the connection region, the first wall and the third wall defining an additional access opening adjacent the resilient hook part of the additional leaf spring element, the additional access opening for receiving the removal tool to engage the resilient hook part of the additional leaf spring element and to force the resilient hook part of the additional leaf spring element towards the third wall.

8. The female electrical connector part of any one of claims 1 to 7 further comprising a recessed fourth wall connected to the second wall and to the third wall, the recessed fourth wall being substantially perpendicular to the second wall and to the third

wall, the recessed fourth wall defining an aperture for receiving a portion of the male electrical connector part.

9. An electrical connector assembly comprising:

a male electrical connector part; and

a female electrical connector part, the female electrical connector part including:

a first wall;

a second wall connected to the first wall, the second wall being substantially perpendicular to the first wall;

a third wall connected to the first wall, the third wall being substantially perpendicular to the first wall and substantially parallel to the second wall, the second wall and third wall defining a connection region therebetween, the connection region for receiving the male electrical connector part upon the male electrical connector part being inserted in the connection region by pushing the male connector part into the female connector part in an insertion direction; and

a biasing means secured to the second wall, the biasing means protruding in the connection region, the biasing means for engaging the male electrical connector part and for applying a force against the male electrical connector part upon a user pulling on the male electrical connector part in a direction opposite the insertion direction, the force applied by the biasing means having a force component along the insertion direction, the first wall and the second wall defining an access opening adjacent the biasing means, the access opening for receiving along a direction substantially perpendicular to the insertion direction, a removal tool to disengage the biasing means from the male electrical connector part.

10. The electrical connector assembly of claim 9 wherein the male electrical connector part is a Universal Bus Interface (USB) connector part.

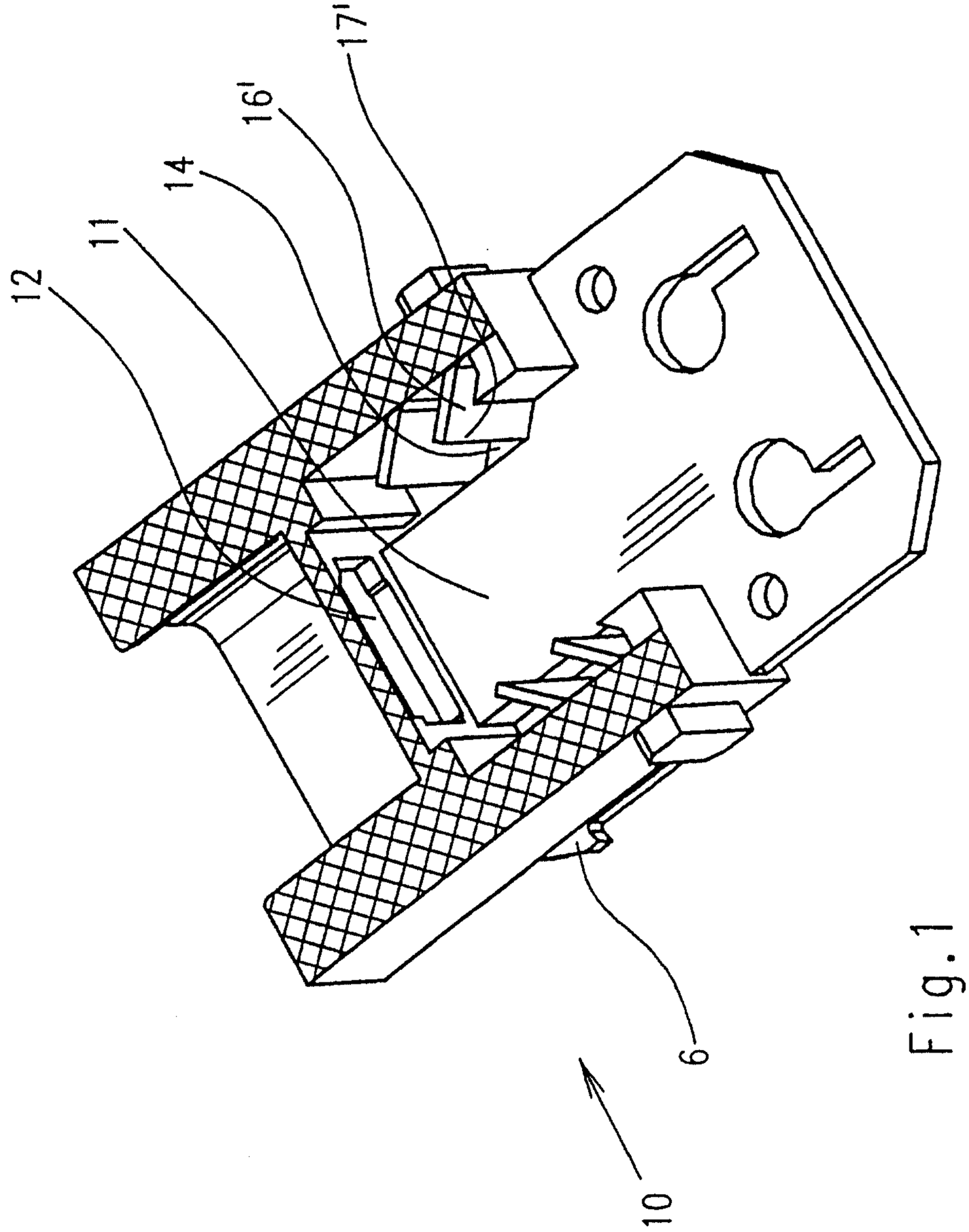


Fig.1

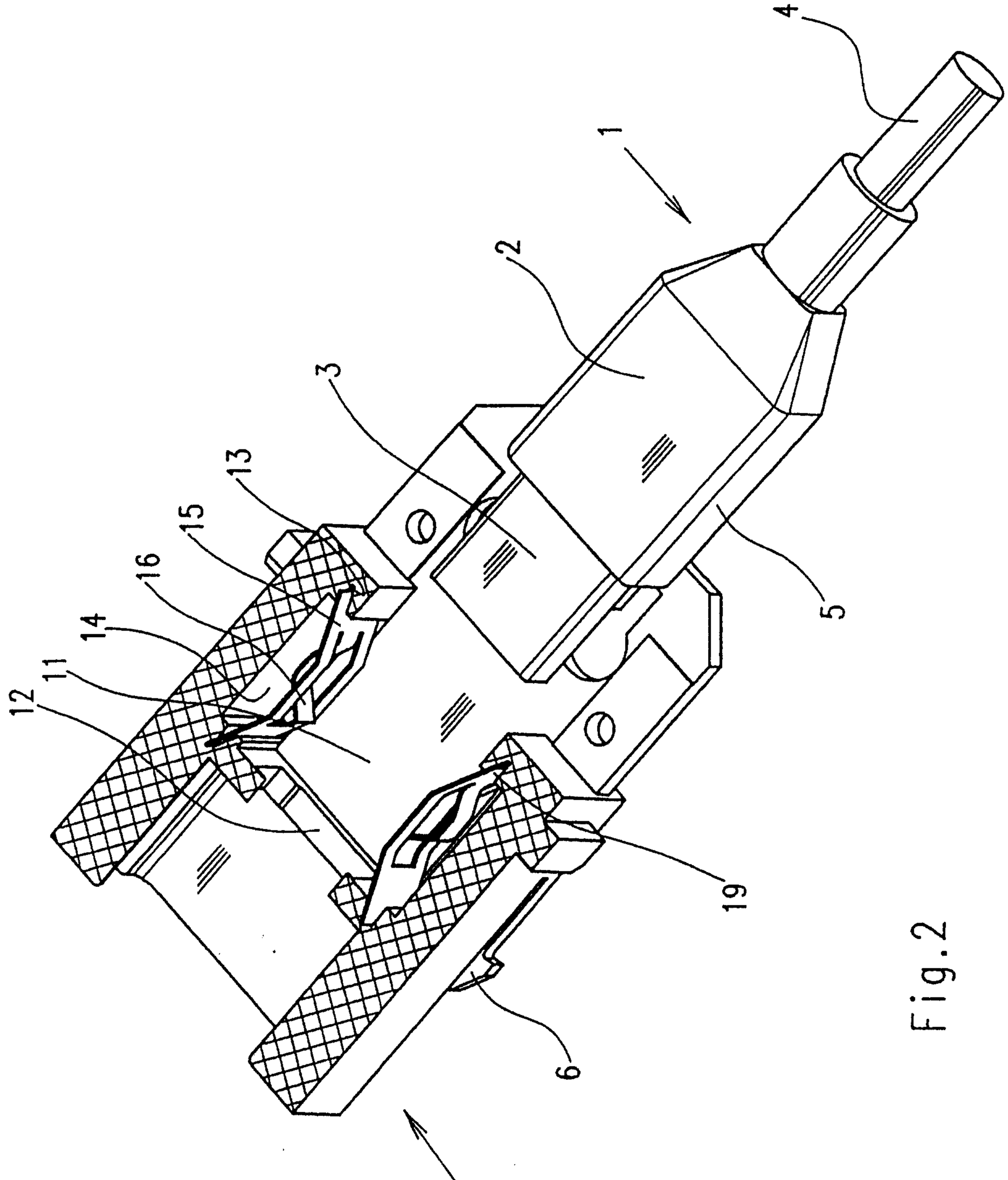


Fig.2

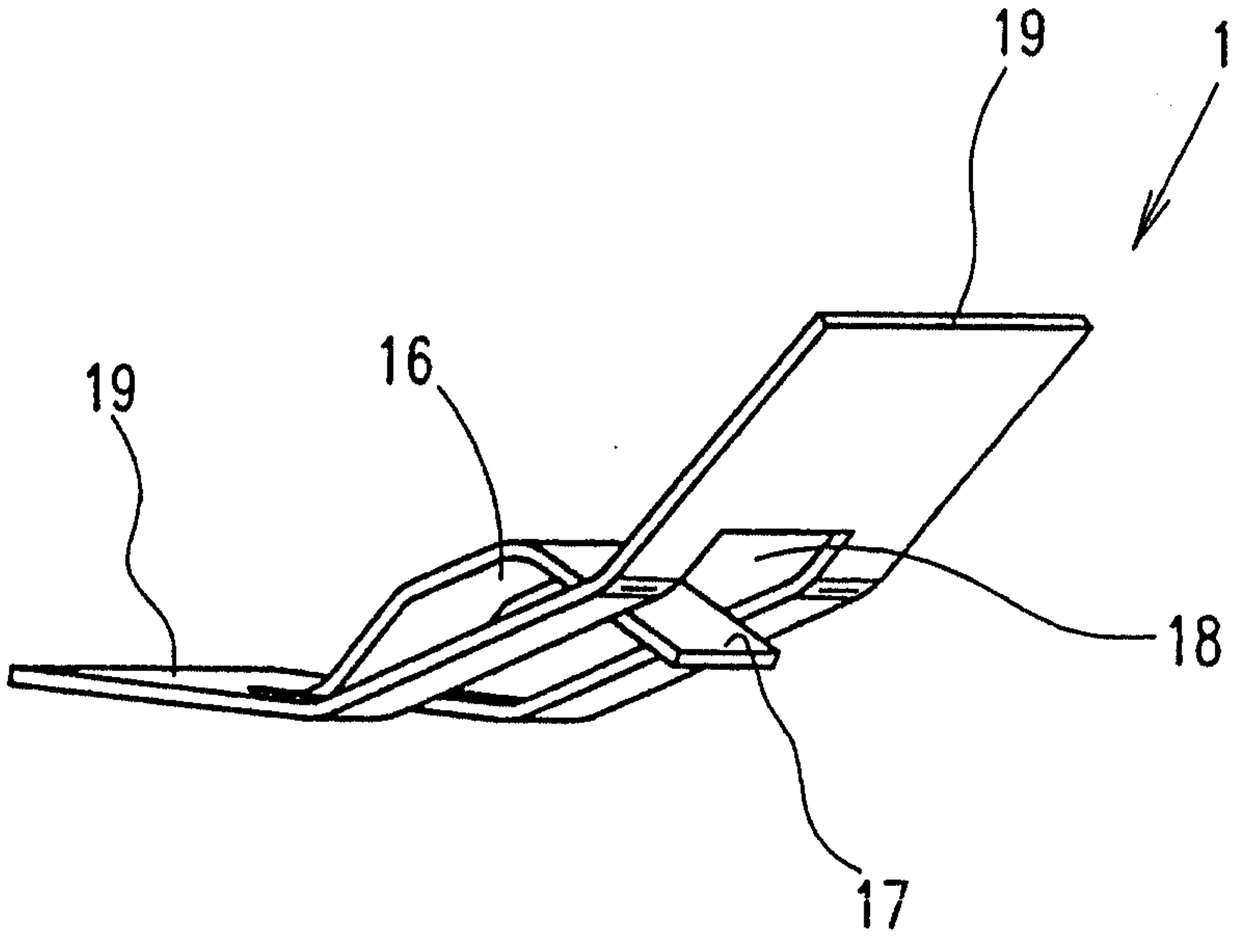
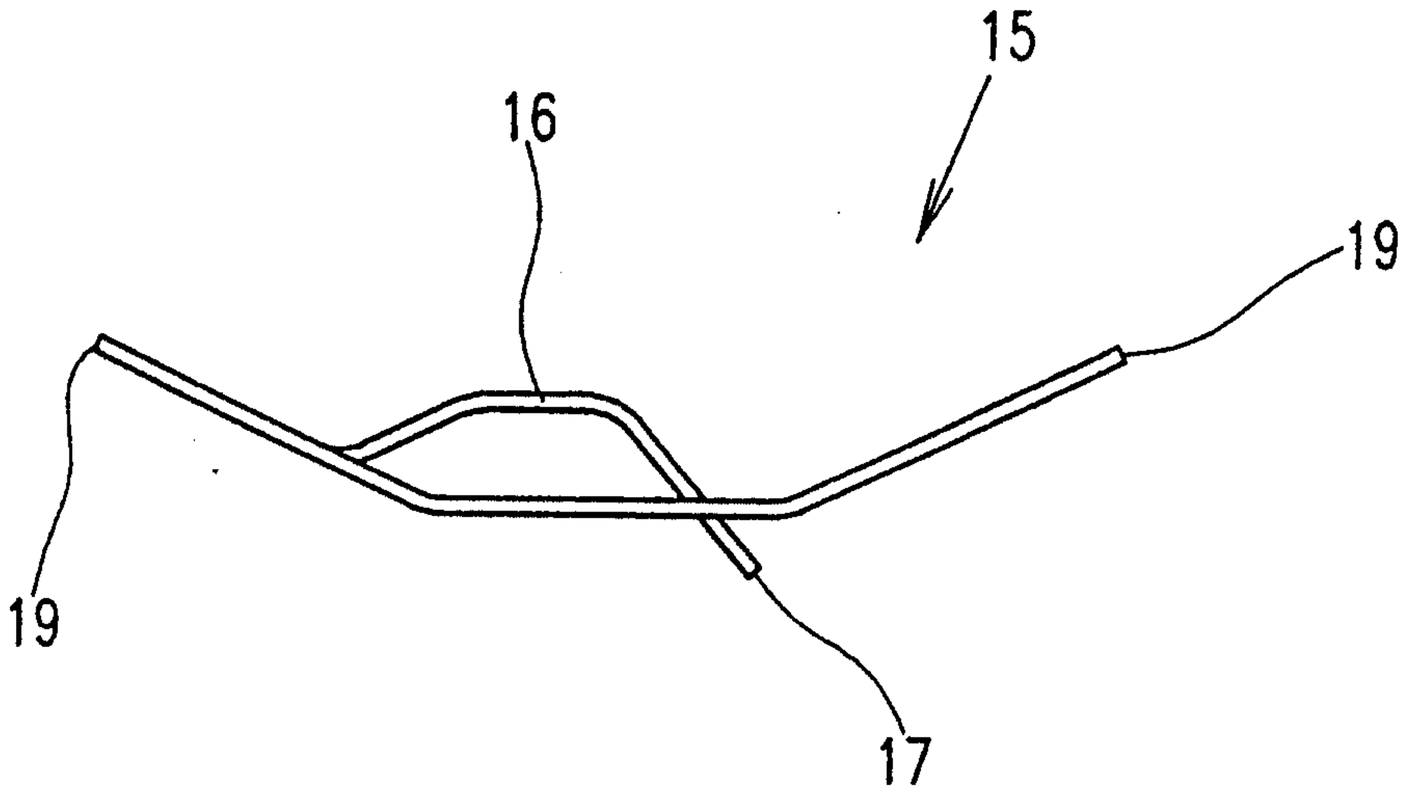
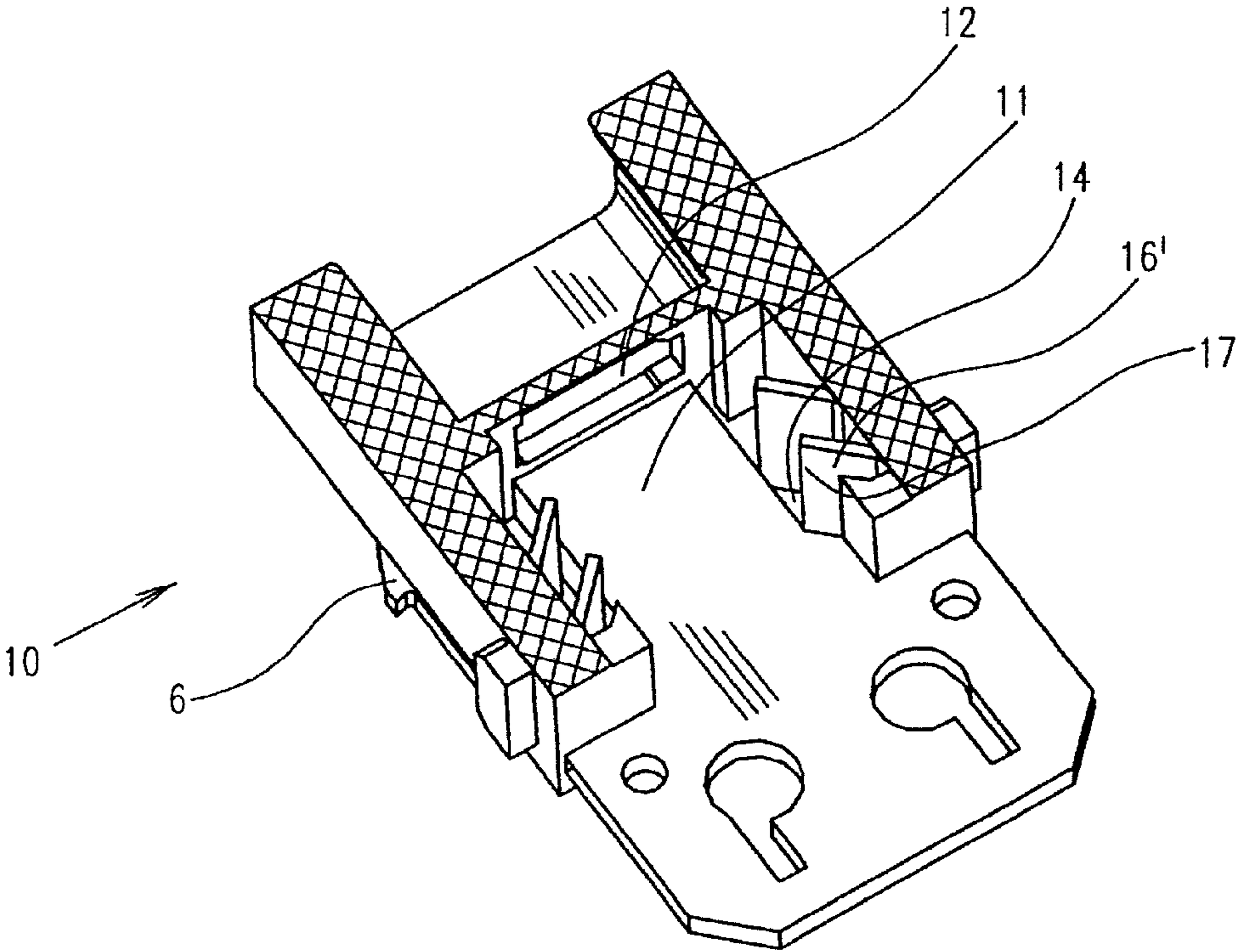


Fig.3




12
11
14
16'
17'
10
6