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(54) Titre : PROCEDE ET DISPOSITIF DE FABRICATION D'UNE ETIQUETTE RFID
(54) Title: METHOD AND DEVICE FOR PRODUCING AN RFID LABEL

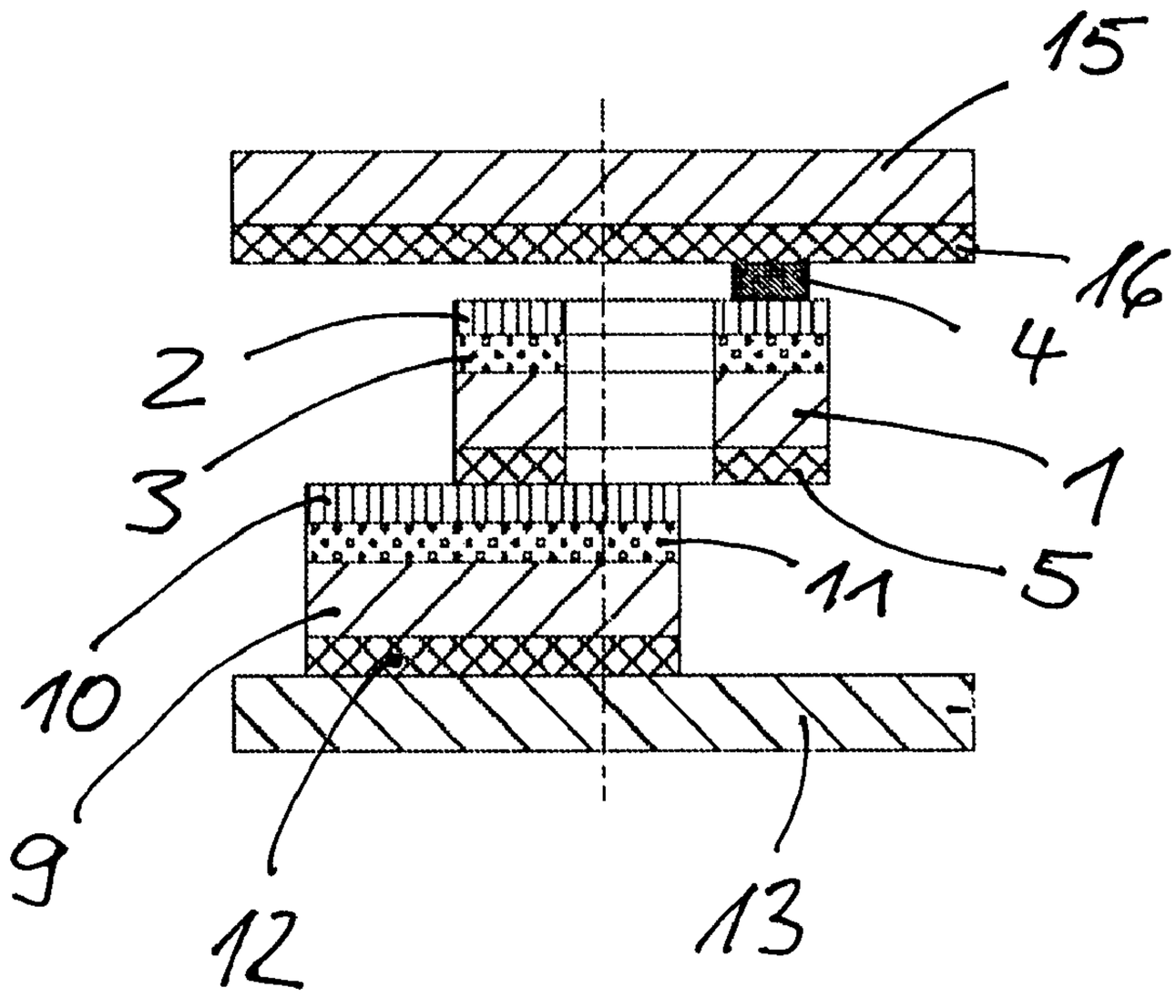

Fig. 4

(57) Abrégé/Abstract:
The invention relates to method for producing an RFID label. According to said method, a coupling antenna (2) arranged on a web-shaped support material (1) comprising an RFID chip (4) arranged thereon is glued onto a secondary antenna (10). The aim of the

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(57) Abrégé(suite)/Abstract(continued):
invention is to provide an RFID label that can be produced from few recyclable materials with little complication and in an environmentally friendly manner. The invention is characterized in that first the coupling antenna (2) comprising the chip (4) is glued onto a self-adhesive secondary antenna (10) in one step, the secondary antenna having a backing adhesive layer (12).

Abstract

The invention relates to method for producing an RFID label. According to said method, a coupling antenna (2) arranged on a web-shaped support material (1) comprising an RFID chip (4) arranged thereon is glued onto a secondary antenna (10). The aim of the invention is to provide an RFID label that can be produced from few recyclable materials with little complication and in an environmentally friendly manner. The invention is characterized in that first the coupling antenna (2) comprising the chip (4) is glued onto a self-adhesive secondary antenna (10) in one step, the secondary antenna having a backing adhesive layer (12).

DESCRIPTION

Method And Device For Producing An RFID Label

The invention relates to a method and a device for producing an RFID label, as well as to an RFID label produced according to the method.

Self-adhesive RFID labels are known which comprise a printable, web-like or sheet-like cover material which is provided with an adhesive layer on its back. The adhesive layer of the cover material is covered by a support material which can be removed for gluing to the label. An RFID inlay, which consists of a web-like or sheet-like inlay material provided with an adhesive layer on the back and on whose upper side an RFID chip and an RFID antenna are arranged, is situated between the cover material and the support material. The RFID inlay is glued with its upper side to the adhesive layer of the cover material. An RFID label of this type and a method for its production are described in WO 2005/076206 A1.

In the German Patent Application 10 2006 052 516, a self-adhesive RFID label and a method for its production are described in which the same material is used for the inlay material of the RFID inlay, including its adhesive layer, as for the cover material of the label.

The German Application 10 2006 052 517 describes a chip module

for an RFID label in which an RFID chip and a coupling antenna which is electrically connected with the RFID chip are arranged on a web-like or sheet-like support material. To produce an RFID inlay for an RFID label, the chip module with its support foil is positioned and glued to a flat RFID antenna in such a way that the coupling antenna and the RFID antenna are inductively coupled.

In the German Application 10 2007 026 672, a self-adhesive antenna for an RFID system, in particular for an RFID label, is described which is punched out of an aluminum foil having a thickness of 1 µm - 20 µm and glued onto the front side of an adhesive material.

The object of the invention is to provide a method and a device with which self-adhesive RFID labels can be easily produced.

A further object is to create an RFID label which can be produced with less equipment and at lower financial cost in an environmentally friendly manner from few recyclable materials.

These objects are solved by the features of the independent claims. The independent claims contain preferred, i.e. especially advantageous embodiments of the invention.

The invention will be described in greater detail in the following with reference to preferred examples of embodiments.

Fig. 1 shows a production method for an RFID label in which a secondary antenna punched out of aluminum foil is used.

Fig. 2 shows a method in which a coupling antenna comprised of

an aluminum/adhesive composite material is used.

Fig. 3 shows a so-called in-pitch RFID label.

Fig. 4 shows a section through the label of Fig. 3.

Fig. 5 shows a so-called off-pitch RFID label.

Fig. 6 shows a section through the label of Fig. 5.

In the method according to Fig. 1, a web-shaped support material 1, to the upper side of which a coupling antenna 2 is glued by means of an adhesive layer 3, is removed in station 1.5 a. An RFID chip 4, which is galvanically connected with the coupling antenna 2, is fastened to the coupling antenna 2. An adhesive layer 5, which is covered by a removable web-like separating material 7, is arranged on the back of the support material 1. Preferably, the support material 1 is made of paper and the separating material 2 of a silicone paper. In the embodiment according to Fig. 1, the coupling antennas 2 can also be arranged on a support material comprised of polyester or imprinted on the support material with an aluminum-containing ink.

After removing the coupling antenna material in station 1.5 a, the separating material 7 of silicone paper is first removed and wound up in the station 1.5 b. In the embodiment according to Fig. 1, the remaining coupling antenna material is conveyed to a vacuum drum in station 1.9, on which a cutter drum 8, is arranged in order to isolate the coupling antennas 2 when required.

In station 1.4, an antenna foil 9 is unwound on the upper side of which secondary antennas 10 are glued at regular intervals by means of an adhesive 11. The antenna foil 9 has an adhesive

layer 12 on its lower side which is covered by a removable separating material 13, preferably made of silicone paper. In station 1.9, a coupling antenna 2 with chip 4, separated by the cutter drum 8, is glued on each secondary antenna 10. In the event that the distance in direction of travel of the coupling antennas 2 with chip 4 and the distance in direction of travel of the secondary antennas 10 is the same, the coupling antenna 2 with chip 4 can also be glued "in-pitch" onto the secondary antenna 10 in an endless manner without separation by the cutter drum 8. In this way, a self-adhesive UHF inlay is produced which can be conveyed for further processing. The self-adhesive secondary antennas 10 conveyed via station 1.4 were produced either by etching, printing or punching. Preferably, the self-adhesive secondary antennas 10 described in the German Patent Application 10 2007 026 720 are used which are punched out of an aluminum foil of 1 µm - 20 µm, preferably about 10 µm, and glued to the front side of an adhesive material 9. On its back, the adhesive material is provided with an adhesive layer 12 which is covered by a removable support material 13. When these so-called aluminum/adhesive antennas are removed in the station 1.4, then an adhesive material 14 is removed in station 1.2 which, subsequent to station 1.9, is laminated onto the antenna material 9 with the punched-out secondary antenna 10 and the already glued-on chip module comprised of coupling antenna 2 and chip in station 2.4. The adhesive material 14 consists of a paper cover material 15 which has an adhesive layer 16 on its lower side which, when removed from the roll in station 1.2, is covered by a separating material 17 of silicone paper. Prior to lamination, the separating material 17 is removed in station 1.1 and wound up into a roll. After the lamination of the cover material 15, a self-adhesive endless UHF inlay is produced which contains all components required for an RFID label. It can be conveyed directly to the punching station 2.5 where the cover material 15

is punched out to form individual sections, so that several spaced, removable and self-adhesive RFID labels are produced on the endless separation material 13, which are shown in Figs. 3 and 4. The punch grating resulting as waste during punching is wound up into a roll in station 2.2. The web-like separating material 13 with the self-adhesive labels found thereon is wound up into a roll as end product in station 2.3.

If an off-pitch RFID label is produced, as shown in Figs. 5 and 6, then the self-adhesive RFID inlay is inserted in a larger label size. For this purpose, in station 2.9, label material consisting of a printable paper cover material 18, which has an adhesive layer 19 on its back that is covered by a separating material 20 of silicone paper, is unwound from a roll. The cover material 18 with the adhesive layer 19 is first separated by the separating material 20 in station 2.7. While the cover material 18 is conveyed back in a large loop, the individual RFID inlays are glued to the separating material in station 2.7 in such a way that, independent of the label length, an RFID inlay is glued on for each label. The separating material 20 with the inlays is then joined again with the cover material 18 at the start of station 2.5. A relamination of the label material takes place. The individual labels are then punched out in station 2.5, wherein the silicone paper 20 remains endless and the removed punch grating is wound up into a roll in station 2.2. The endless silicone paper 20 with the RFID self-adhesive labels adhering thereto is then wound into a roll in station 2.3. Beforehand, each punched-out RFID label is checked for its correct function by means of an HF or UHF reader and perhaps marked or provided with an inscription, for example, by means of an inkjet printer.

In the method according to Fig. 2, a web-like aluminum/adhesive

composite material is used as starting material for the production of the coupling antennas 2, said composite material consisting of a support material to the upper side of which coupling antennas 2 are fastened which are punched out of a thin aluminum foil having a thickness of 1 µm - 20 µm, preferably of about 10 µm, on which an RFID chip electrically connected with them is arranged on each coupling antenna. The back of the support material 1, which preferably consists of paper, has an adhesive layer 5 which is covered by a separating material 7 of silicone paper. The aluminum/adhesive composite is removed from a roll by advancing rolls in station 1.5 a and conveyed to the adhesive material 14 removed in station 1.2. The coupling antennas 2 are glued onto the lower side of the cover material 15 after the silicone support 17 of the adhesive material 14 has been removed and wound in station 1.1. At the same time, the separating material 7 is removed from the aluminum/adhesive composite of the coupling antennas 2 and wound up into a roll in station 1.5 b. In this way, the adhesive layer 5 on the lower side of the coupling antennas 2 is exposed against which the antenna material 9 is then moved "in-pitch" in such a manner that the secondary antenna 10 firmly adheres to the lower side of the cover material 15 with the adhesive layer 16 and the adhesive layer 5 of the coupling antenna 2 and in this way produces an inductive connection with the coupling antenna 2 and the secondary antenna 10. The separating material 13 of the antenna material 9 is subsequently removed and wound into a roll in station 1.7. The distribution into individual RFID labels and the delivery to the silicone support 20 of the label material in station 2.7 takes place subsequently in the manner described in association with the method according to Fig. 1. The same applies for the subsequent relamination, the punching-out of the individual labels in station 2.5, the checking of the proper working order and winding of the end product into a roll in

station 2.3.

Preferably, all support materials of the finished label are made of paper and all antennas of aluminum. This enables a cost-saving and environmentally friendly production as these materials are recyclable and a minimum number of materials is used.

Furthermore, it is advantageous if all adhesive layers exposed after the label has been removed from the silicone paper foil 18 are made of the same adhesive. In the embodiments according to Figs. 4 and 6, these are the adhesive layers 12, 5, 16 and 19 which are at least partially uncovered when the label is glued onto a product. Thus, in the finished RFID label, there is a continuous adhesive layer comprised of one adhesive. In this way, it is ensured that there are no difficulties which could be caused by another adhesive for the RFID inlay when the label is glued on. If the support materials are also all made of paper, then no separate inlay material is required for the RFID inlay. A part of the label material can be separated for the inlay. This applies for the complete inlay material, including the support materials for the coupling antenna and the secondary antenna.

PATENT CLAIMS

1. A method for producing an RFID label in which a coupling antenna (2) arranged on a web-like support material (1) comprising an RFID chip (4) arranged thereon is glued onto a secondary antenna (10), characterized in that the coupling antenna (2) comprising the chip (4) is first glued onto a self-adhesive secondary antenna (10) in one step, the secondary antenna having an adhesive layer (12) on its back.

2. The method according to claim 1, characterized in that an antenna (10) produced from a thin aluminum layer and glued to the front side of an adhesive material (9) is used as self-adhesive secondary antenna (10), wherein the adhesive material (9) is provided with an adhesive layer (12) on its back.

3. The method according to claim 1 or 2, characterized in that the coupling antenna (2) consists of a thin aluminum layer and is arranged on a support material (1) which is provided with an adhesive layer (5) on its lower side.

4. The method according to any one of the claims 1 to 3, characterized in that paper is used for all support materials.

5. The method according to any one of the claims 1 to 4, characterized in that an RFID inlay is inserted between a web-like or sheet-like cover material (18) which has an

adhesive layer (19) on its back and a removable separating material (20), that said RFID inlay consists of a support material (9), a secondary antenna (10) glued to the support material (9), a second support material (1) glued on the secondary antenna and a coupling antenna (2) with RFID chip (4) glued to the support material (1).

6. A self-adhesive RFID label comprising the following features:

- A secondary antenna (10) with a coupling antenna (2) glued thereon, on which an RFID chip (4) is arranged,

- The secondary antenna (10) with the coupling antenna (2) and the chip (4) are covered by a cover material (15) which has an adhesive layer (16) on its lower side.

7. The RFID label according to claim 6, characterized in that the label according to claim 6 is arranged as an RFID inlay between a printable cover material (18) and a separating material (20), wherein the cover material (18) has an adhesive layer on its lower side.

8. A device for producing an RFID label according to claim 6 and 7 with one of the methods according to claims 1 to 5.

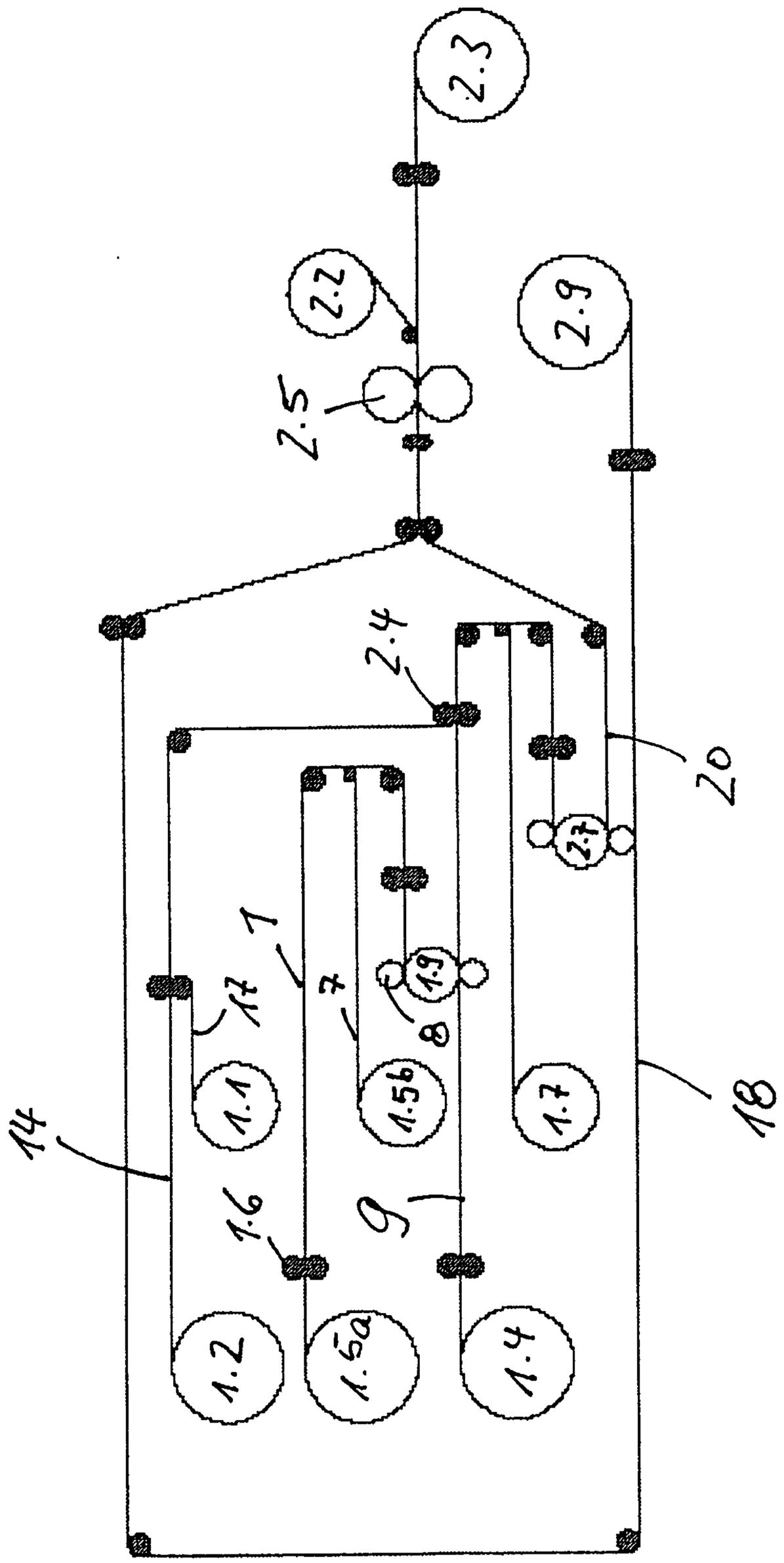

Fig. 1

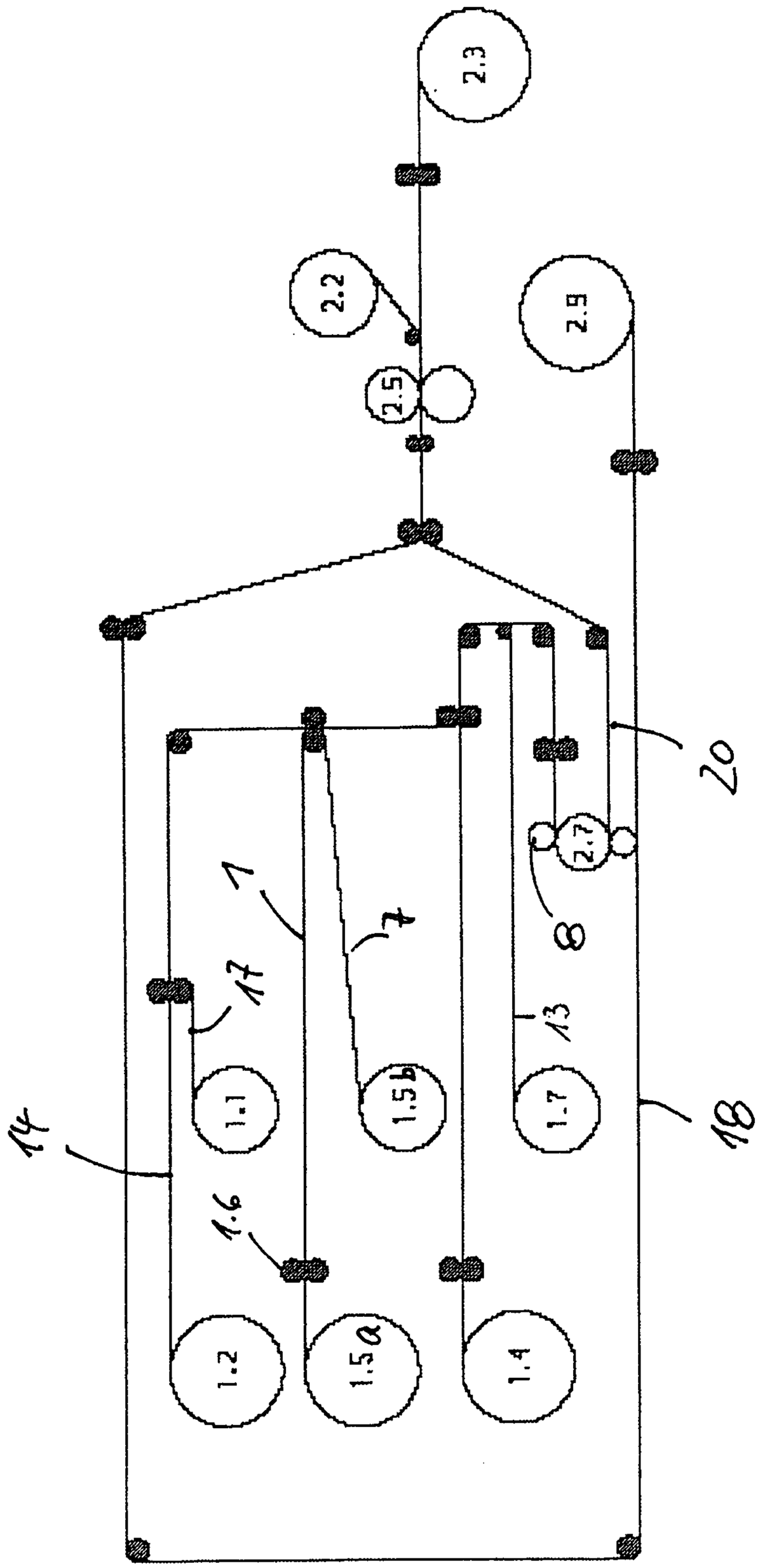

Fig. 2

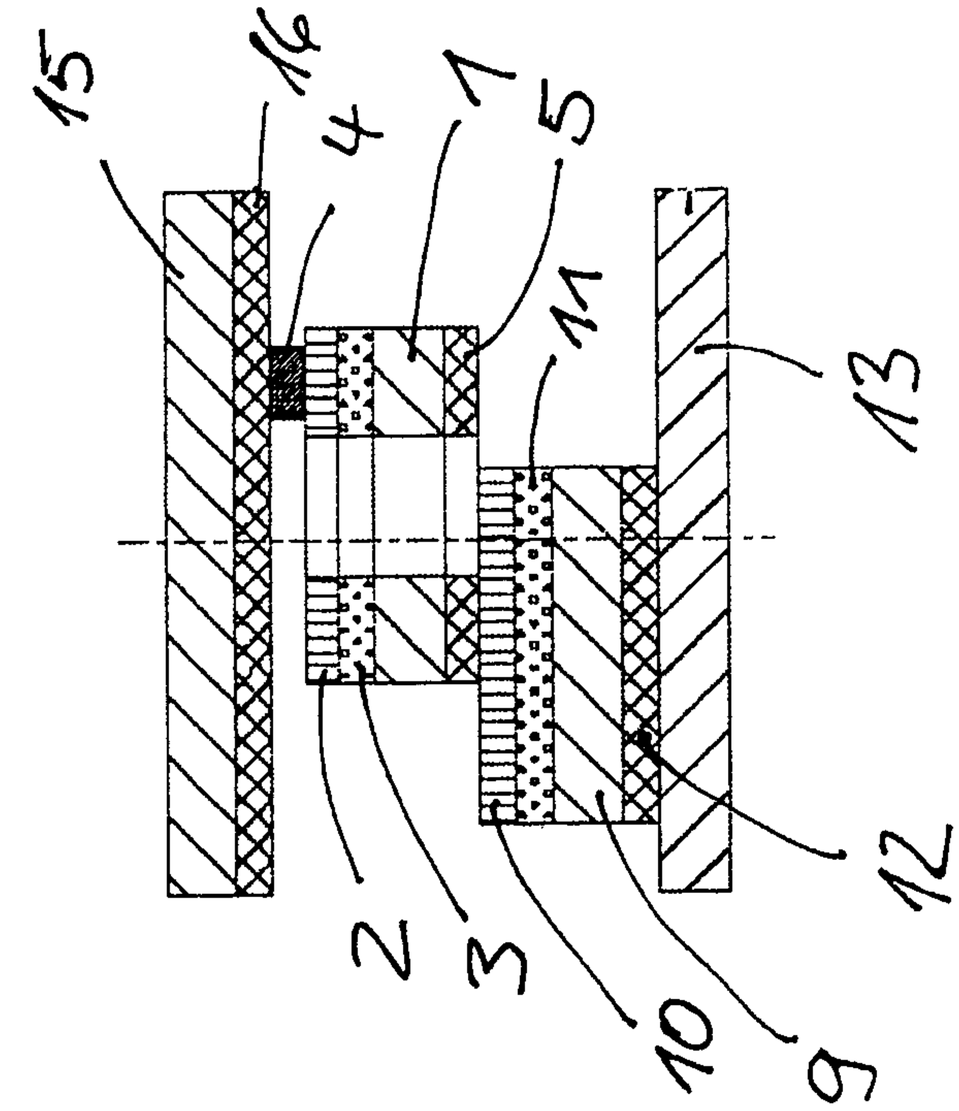

Fig. 4

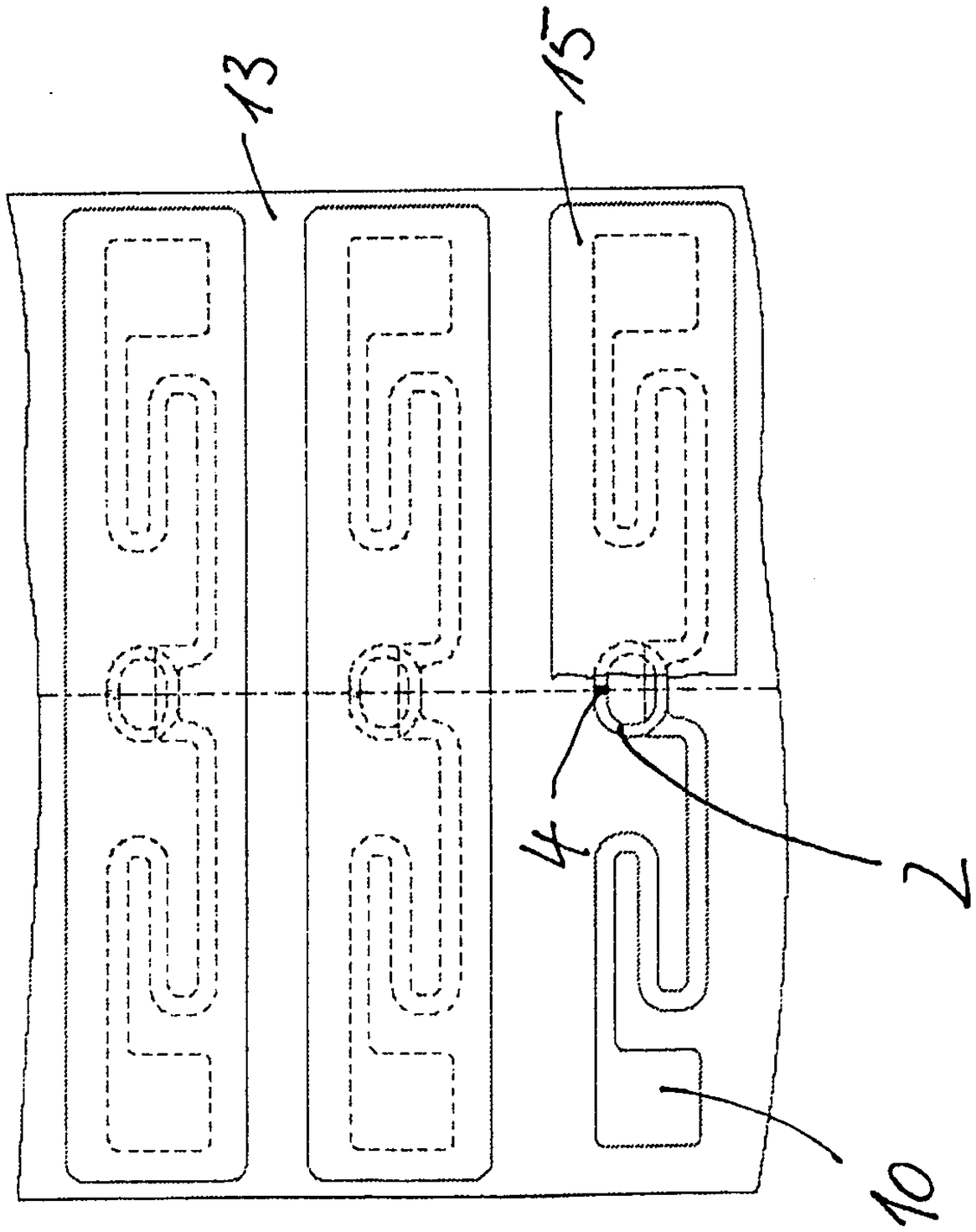

Fig. 3

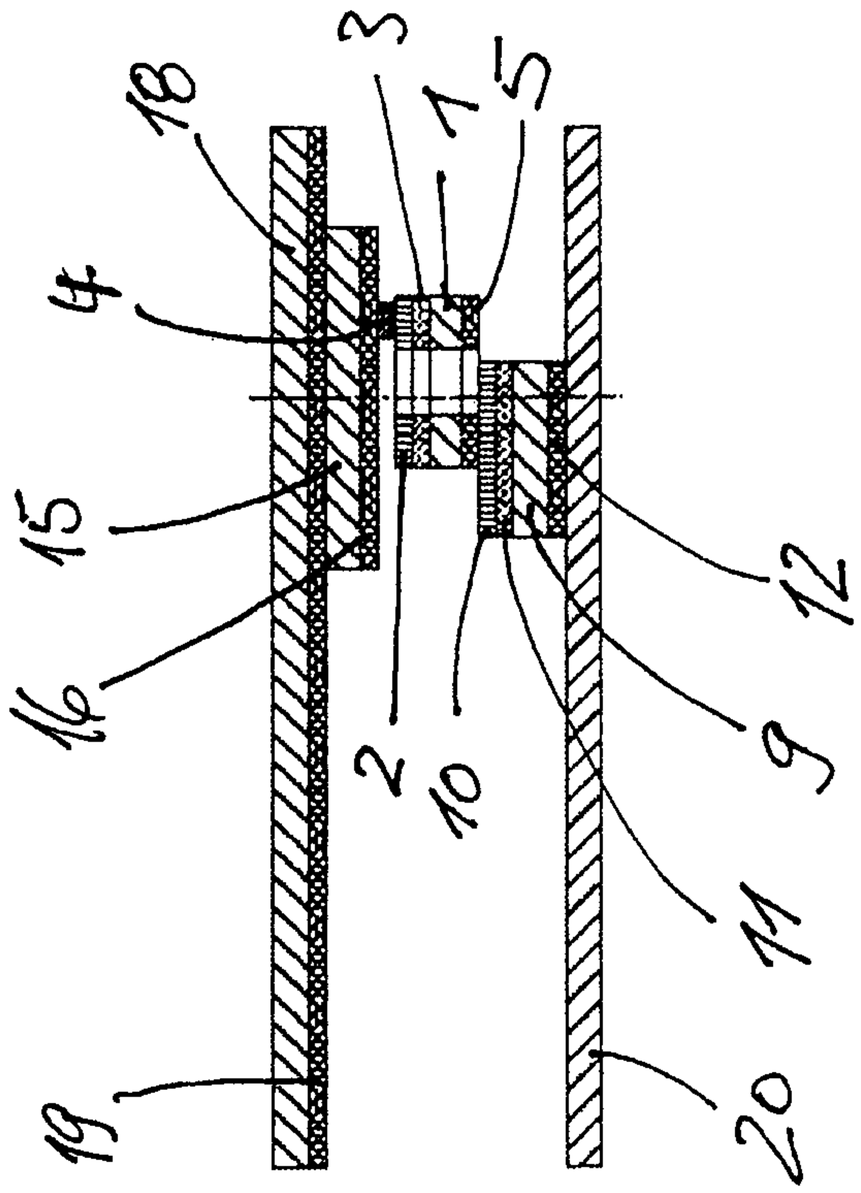

Fig. 6

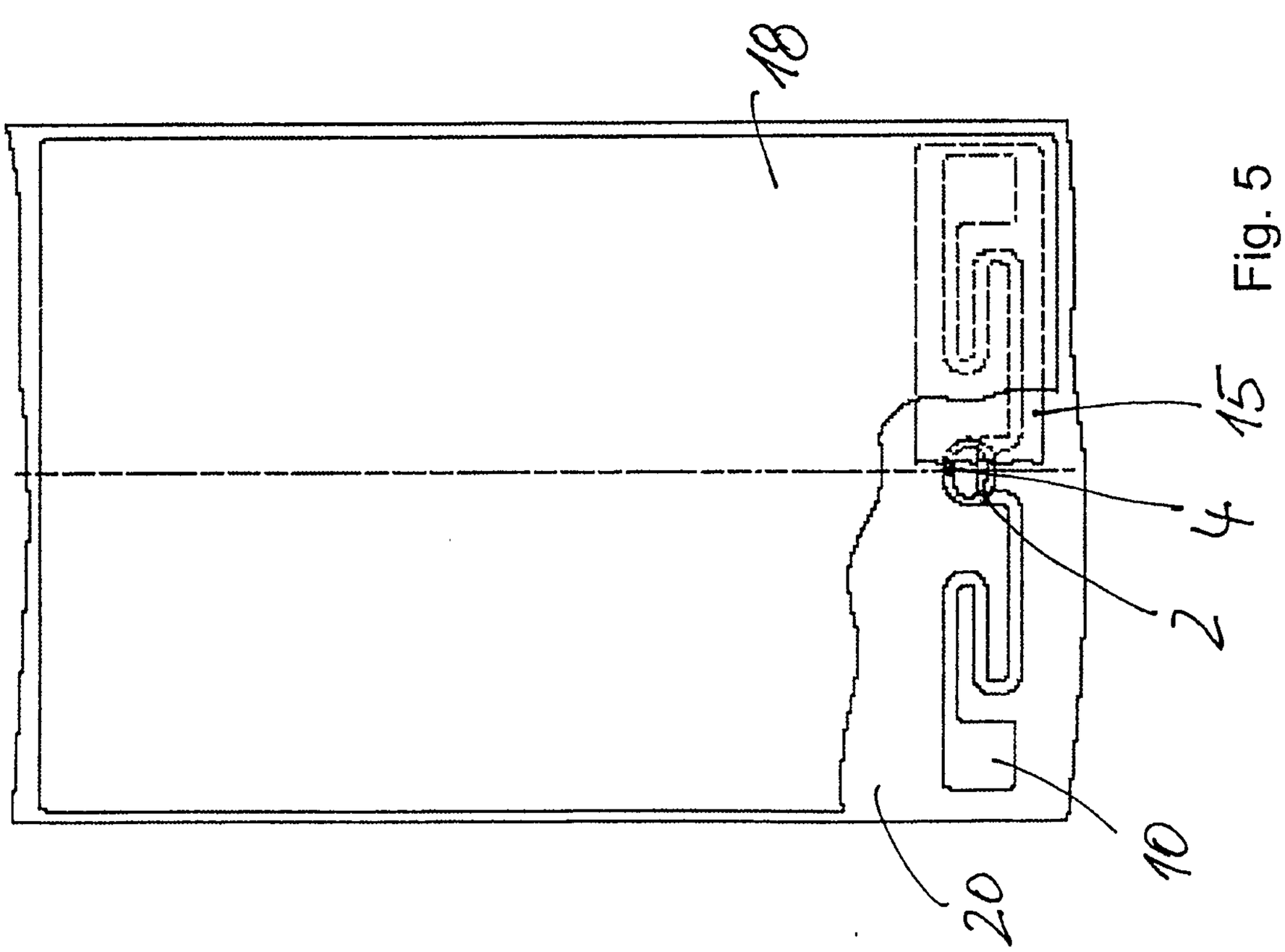

Fig. 5

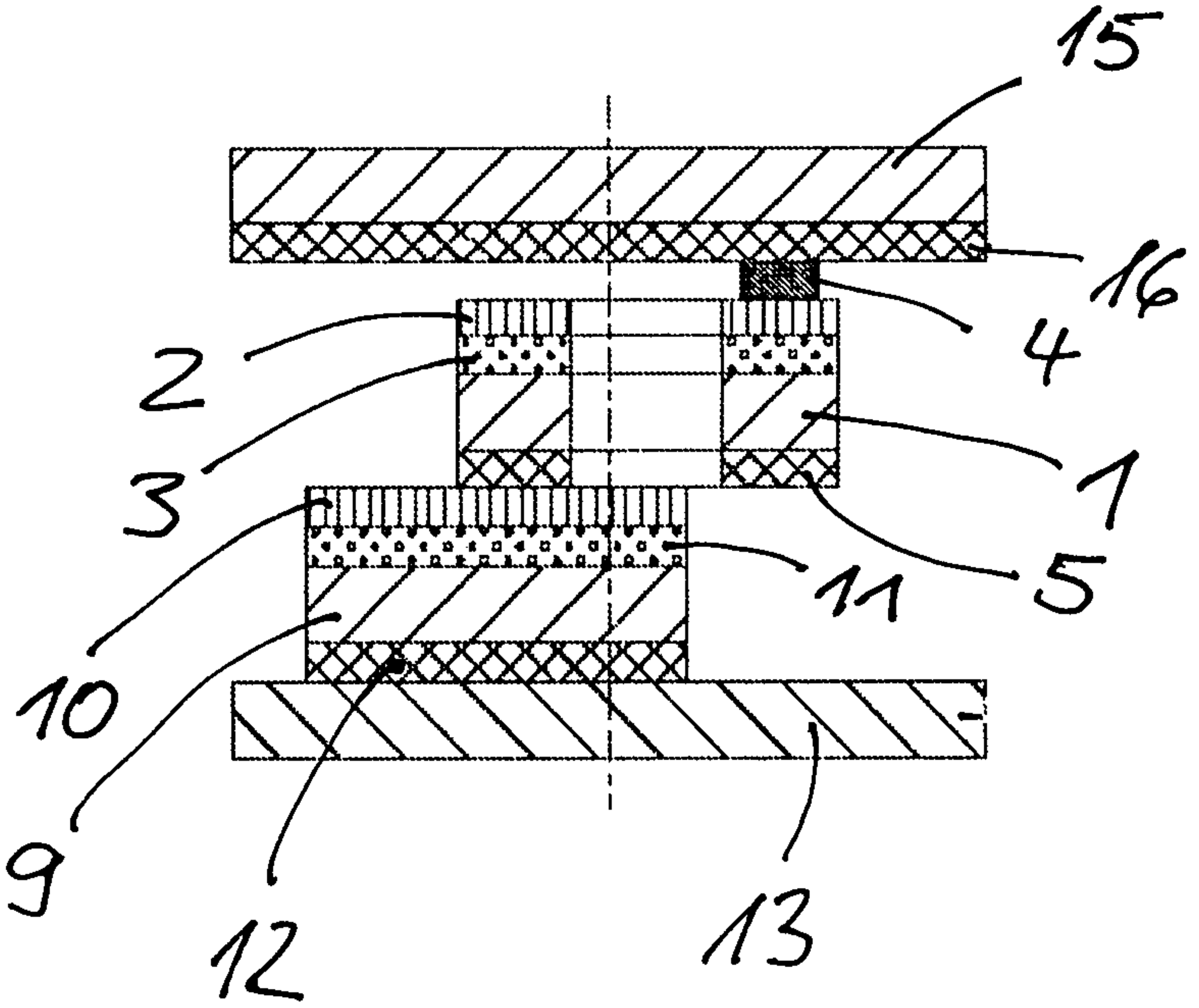

Fig. 4