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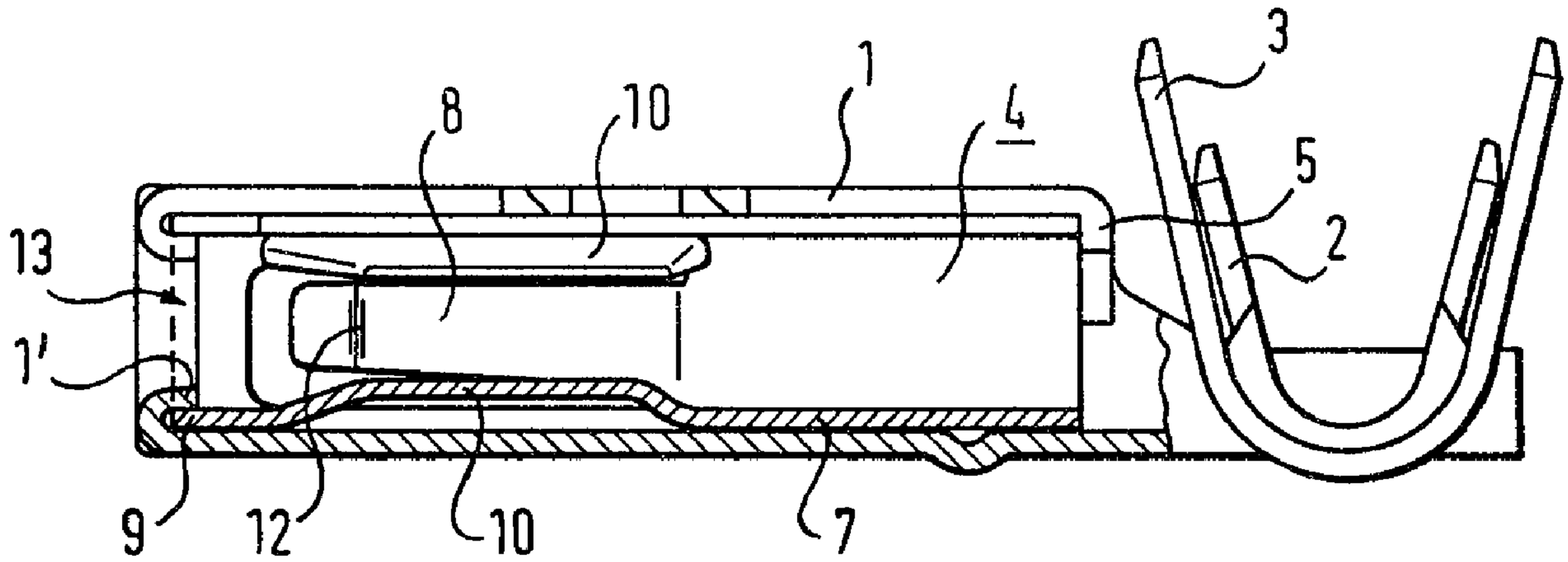
(54) Title: ELECTRIC SOCKET CONTACT FOR INSERTION INTO A SOCKET HOUSING



(57) Abrégé/Abstract:
In the case of an electric socket contact for insertion into a socket housing with a sleeve body and a laminated cage, which is attached axially to said sleeve body, for the displaceably pressing reception of a contact pin and attachment means, which are designed at the sleeve body, e.g. crimp extensions for connecting leads, there are for the purpose of making early contact and a reliable central guide of the contact pin the laminated cage (4), which is formed by a cylindrically rolled flat sheet metal blank (6), which exhibits a cylindrical base member (7) with two contact tongues (8), which are punched diametrically to each other and which are bent into the laminated cage in the direction of the free end and then are bent back toward the outside; and a cylindrical annular member (9) reaches at a distance over the free ends (8') near the plug opening (13); and wherein at a distance there are strip elements (14), which are connected rigidly to the annular member (9) and the base member (7) next to the contact tongues (8) and which exhibit depressions (10), hollows or the like, which point in the direction of the center longitudinal axis of the laminated cage, as mechanical guide members for the contact pin (11).

Abstract

In the case of an electric socket contact for insertion into a socket housing with a sleeve body and a laminated cage, which is attached axially to said sleeve body, for the displaceably pressing reception of a contact pin and attachment means, which are designed at the sleeve body, e.g. crimp extensions for connecting leads, there are for the purpose of making early contact and a reliable central guide of the contact pin the laminated cage (4), which is formed by a cylindrically rolled flat sheet metal blank (6), which exhibits a cylindrical base member (7) with two contact tongues (8), which are punched diametrically to each other and which are bent into the laminated cage in the direction of the free end and then are bent back toward the outside; and a cylindrical annular member (9) reaches at a distance over the free ends (8') near the plug opening (13); and wherein at a distance there are strip elements (14), which are connected rigidly to the annular member (9) and the base member (7) next to the contact tongues (8) and which exhibit depressions (10), hollows or the like, which point in the direction of the center longitudinal axis of the laminated cage, as mechanical guide members for the contact pin (11).

Figure 1

ELECTRIC SOCKET FOR INSERTION INTO A SOCKET HOUSING

The invention relates to an electric socket contact for insertion into a socket housing with a sleeve body and a laminated cage, which is attached axially to said sleeve body, for the displaceably pressing reception of a contact pin and attachment means, which are designed at the sleeve body, for example crimp extensions for connecting leads.

In the case of a socket contact (P 35 31 845.7-34) it is well-known to insert a laminated cage so as to be fixed axially in order to improve the contact in a sleeve body of the socket contact. The ends of the strip-shaped lamellas of the laminated cage are attached to annular strips and their length is bent in the direction of the center longitudinal axis of the laminated cage. When a contact pin is inserted into the laminated cage, the laminated cage allows only relatively late contacts and is not suited for preventing the contact pin from tilting and wobbling.

An object of the present invention is to cause for a socket contact of the above class the contacts near the plus opening and to provide a reliable central guide for the contact pin in the laminated cage.

This problem is solved according to the invention by means of an electric socket contact for insertion into a socket housing and having a sleeve body, a laminated cage for displaceably pressing reception of a contact pin, and means for attaching the laminated cage axially within the sleeve body, this sleeve body being attached to extensions for connecting leads. The laminated cage is formed from a cylindrically rolled flat sheet metal blank comprising a cylindrical base member with two contact tongues having respective free ends, extending diametrically opposite to each other and bent into the laminated cage in the direction of the free ends and then bent back outwardly, and a cylindrical

annular member spaced from and extending over the free ends adjacent a plug opening, and strip elements spaced from the contact tongues and rigidly connected to the annular member and the base member adjacent to the contact tongues and which comprise depressions projecting towards the central longitudinal axis of the laminated cage and constituting mechanical guide means for the contact pin.

Thus, it is guaranteed that the contact between contact pin and socket contact are caused essentially with the start of the plugging operation; and upon insertion of the contact pin said contact pin is prevented from tilting motions and wobbling motions due to the interaction with the depressions in the laminated cage. The early contacts produced during the insertion operation make the socket contact especially suitable, e.g., for use between a generator and an electronic controlling device for inflatable retaining systems (airbags) in motor vehicles. As well known, contacts must be made in these systems before a jumper is lifted off; or the closing movement of the jumper must occur before the contact pin completes the contact with the contact socket. In addition, the socket contact gives a plug-in and plug-out protection for the contact pins owing to the depressions that extend as guide members directly next to the spring tongues and the prerequisite for a relatively tilt-free seat of the contact pin in the laminated cage.

In accordance with illustrative embodiments:

- the entire length of the contact tongues is designed with the same width in the longitudinal direction;

- the contact tongues are designed with a width that decreases in the direction of the free ends of the tongues in the longitudinal direction;

- the contact tongues are designed with a width that decreases in the direction of the free ends of the tongues and are defined in the longitudinal direction by side faces extending asymmetrically to each other.

According to another illustrative embodiment, for a reliable guide of the contact pin in the laminated cage, the depressions extend at least over the entire length of the

contact tongues so as to project into the laminated cage. The depressions can also be designed with sublengths or the depressions can be designed by means of depression members that are spaced in succession.

According to a further illustrative embodiment of the present invention, the means for attaching the laminated cage axially within the sleeve body comprises a bend of the sleeve body, wherein the base member of the laminated cage is braced against this bend of the sleeve body, and an end of the sleeve body extends clampingly over an outer edge of the annular member facing away from the base member. Thus, the end of the sleeve body can be guided with a short sublength internally over the annular member and forced against the annular member. The sleeve body end formed thus results in additional guide surfaces for the contact pin in the region of the plug opening of the socket contact.

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

Figure 1 is a side view of the socket contact, part of which is depicted as a sectional view.

Figure 2 is a side view of the laminated cage, part of which is depicted as a sectional view.

Figure 3 is a top view of a laminated cage.

Figure 4 is a schematic drawing of a laminated cage with a contact pin; and

Figure 5 depicts an unwinding of a laminated cage.

The socket contact exhibits a sleeve body 1, to which are attached crimp extensions 2 and 3 for the purpose of connecting connecting leads. A laminated cage 4 is pushed into the sleeve body 1; the inner end of said laminated cage is braced against a bend 5 of the sleeve body 1 in order to attach it axially in the sleeve body; and a bend 1' of the sleeve body 1 reaches clampingly over the outer end of said laminated cage (Figure 1). The laminated cage 4 can be rolled from a flat blank 6, according to Figure 5. It exhibits a base member 7 and two punched spring tongues 8. Between the spring tongues 8 are strip elements 14, which connect rigidly the base member 7 to an annular member 9 extending over the free ends of the spring tongues 8. The strip elements 9 are provided with depressions 10, which project as mechanical guide elements for a contact pin 11 into the interior 1'' of the laminated cage 4. While in the embodiment of Figure 1 the depressions 10 extend essentially over the entire length of the spring tongues 8, there is the option of designing the depressions 10 with sublengths or by means of segments designed in rows (not illustrated). The spring tongues 8 are bent, as apparent especially in Figure 4, toward each other and in the direction of the free end, whereas the free ends 8' themselves are bent back toward the outside. The free ends 8' form incoming inclines in order to facilitate the introduction of the contact pin 11 into the laminated cage 4. The length of the spring tongues 8 can be designed with identical width. In the embodiment the spring tongues 8 are designed with decreasing width in the direction of the free ends 8' and they are designed asymmetrically. The asymmetric shape of the spring tongues 8' results in especially reliable contacts.

The contact areas 12 of the spring tongues 8 extend as far as near the plug opening 13, thus enabling the earliest possible contact between contact pin 11 and laminated cage 4 during the

plugging operation. Upon insertion of the contact pin 11 (Figure 4), the contacting commences virtually directly behind the plug opening 13, thus swinging outwardly the spring tongues 8 out of a tight position into a wide position. Simultaneously the contact pin 11 makes active contact with the depressions 10, whereby the contact pin can be plugged reliably in a straight line and without wobbling motions into the socket contact.

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

1. An electric socket contact for insertion into a socket housing and having a sleeve body, a laminated cage for displaceably pressing reception of a contact pin, and means for attaching the laminated cage axially within the sleeve body, said sleeve body being attached to extensions for connecting leads, wherein said laminated cage is formed from a cylindrically rolled flat sheet metal blank comprising a cylindrical base member with two contact tongues having respective free ends, extending diametrically opposite to each other and bent into said laminated cage in the direction of the free ends and then bent back outwardly, and a cylindrical annular member spaced from and extending over said free ends adjacent a plug opening, and strip elements spaced from said contact tongues and rigidly connected to said annular member and said base member adjacent to said contact tongues and which comprise depressions projecting towards the central longitudinal axis of said laminated cage and constituting mechanical guide means for said contact pin.

2. A socket contact according to claim 1, wherein the entire length of the contact tongues is designed with the same width in the longitudinal direction.

3. A socket contact according to claim 1, wherein the contact tongues are designed with a width that decreases in the direction of the free ends of said tongues in the longitudinal direction.

4. A socket contact according to claim 1, wherein the contact tongues are designed with a width that decreases in the direction of the free ends of said tongues and are defined in the longitudinal direction by side faces extending asymmetrically to each other.

5. A socket contact according to claim 1, wherein the depressions extend at least over the entire length of the contact tongues so as to project into the laminated cage.

6. A socket contact according to claim 1, wherein the means for attaching the laminated cage axially within the sleeve body comprises a bend of the sleeve body, wherein the base member of the laminated cage is braced against said bend of the sleeve body, and wherein an end of said sleeve body extends clampingly over an outer edge of said annular member facing away from said base member.

Fig.1

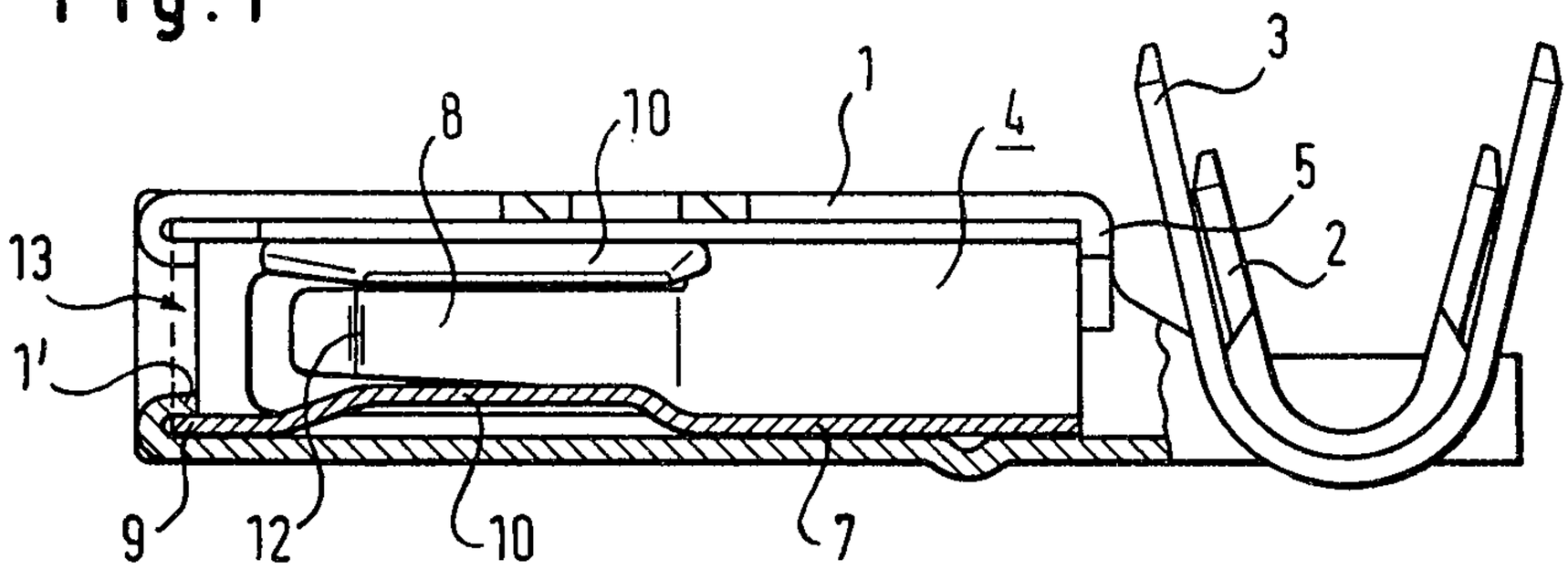


Fig.2

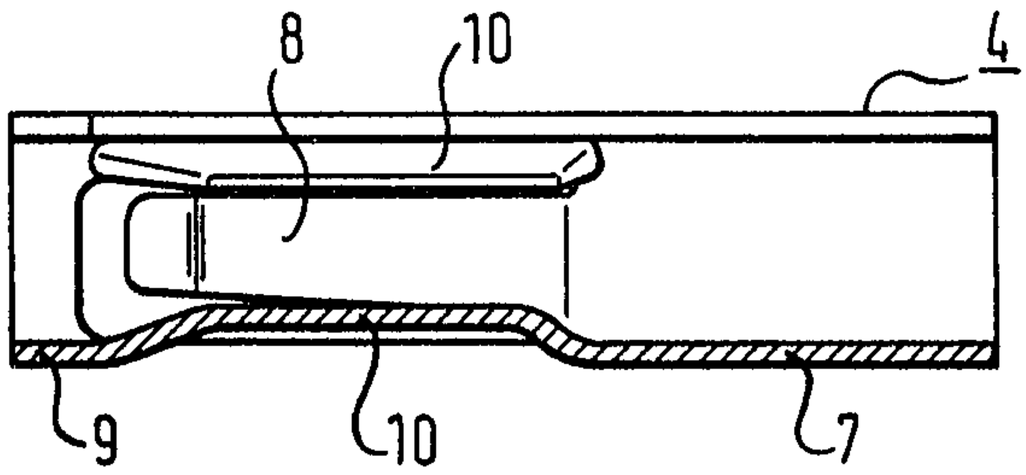


Fig.3

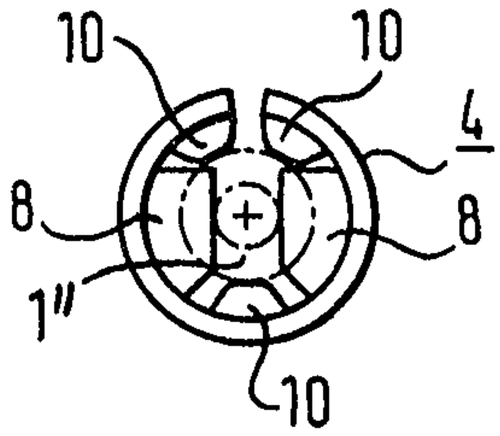


Fig.4

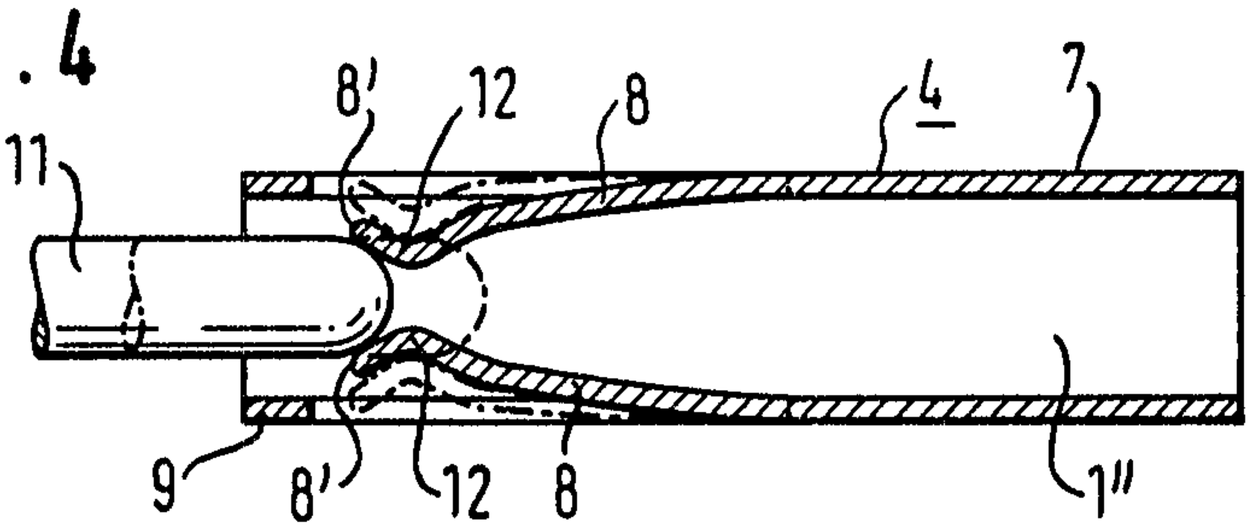
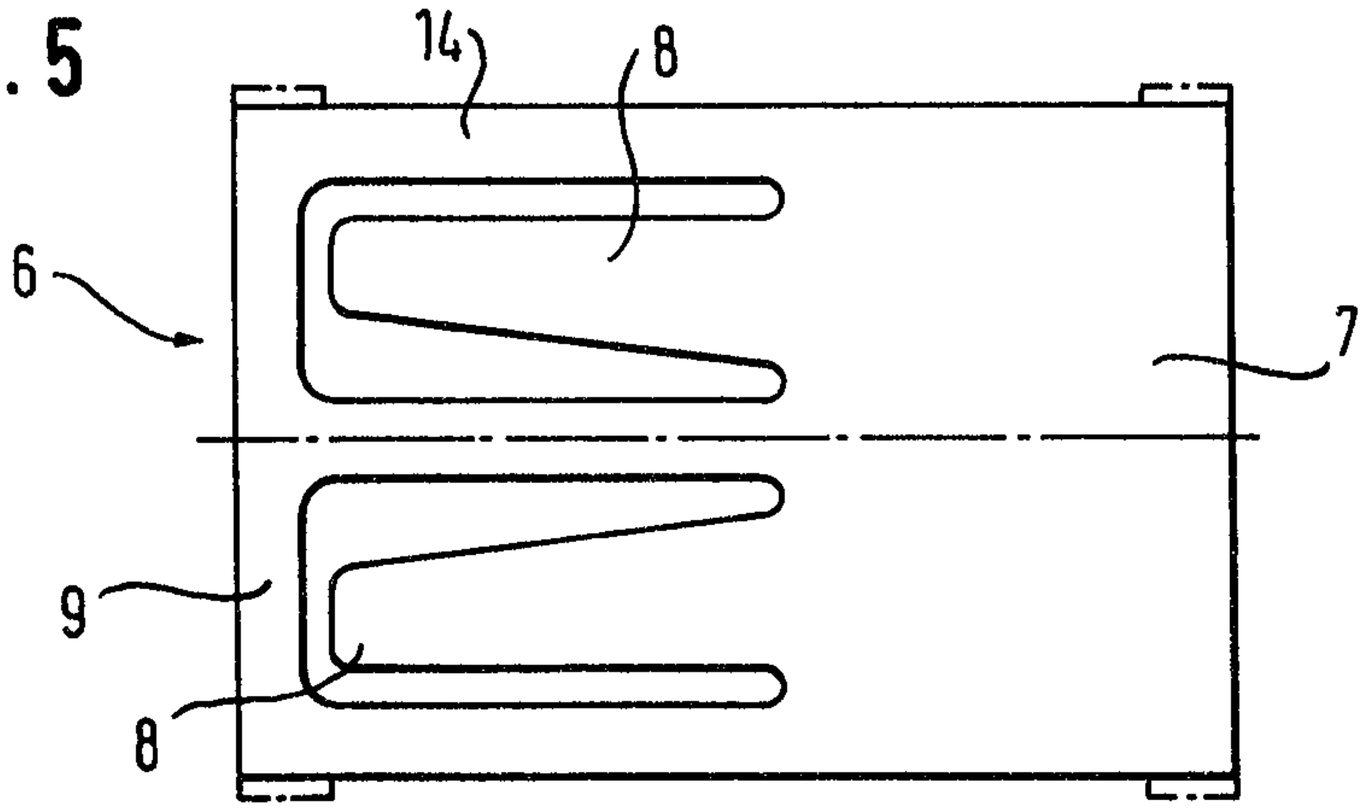


Fig.5



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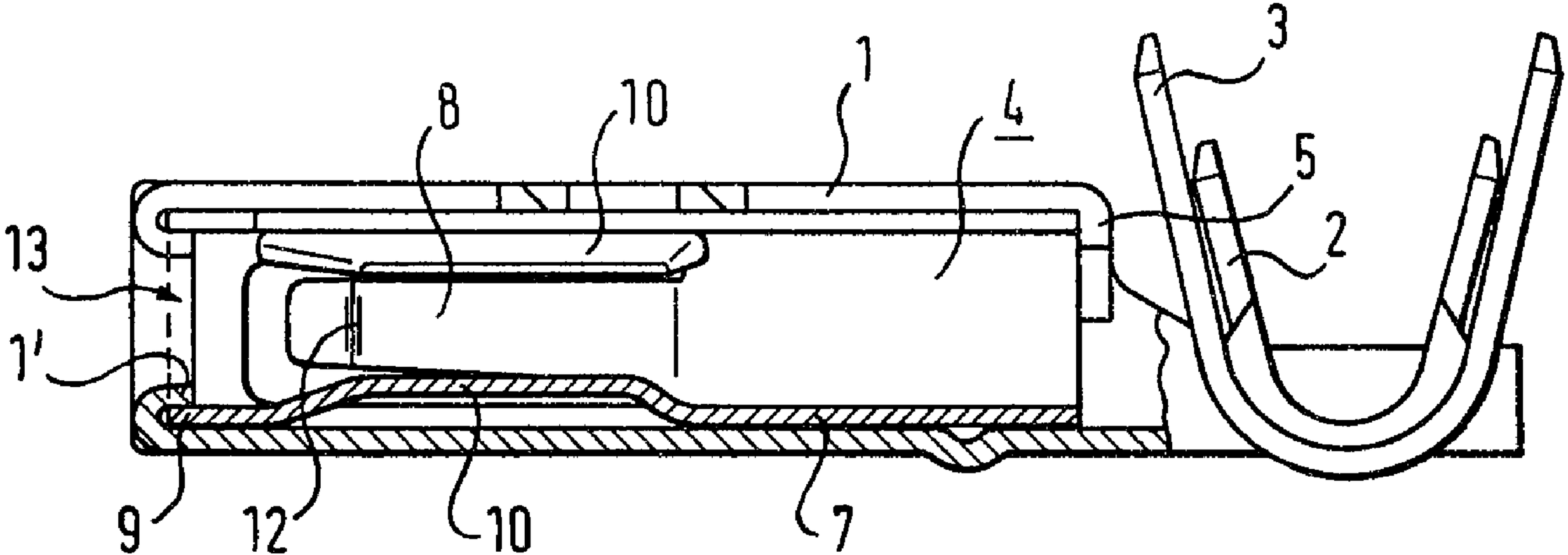
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