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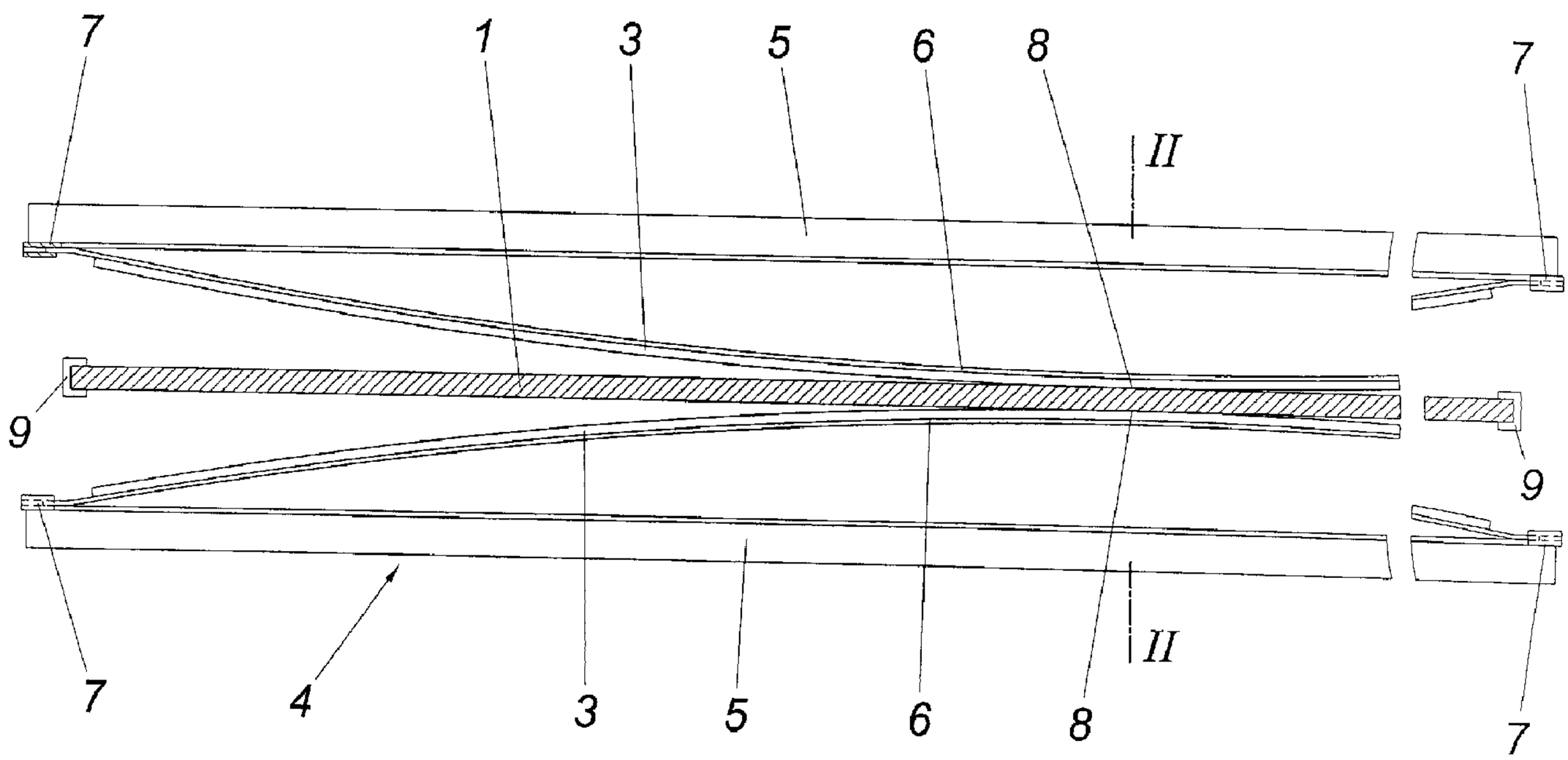
(54) Titre : METHODE D'APPLICATION D'UNE BANDE PROTECTRICE A UNE PLAQUE CATHODE POUR OBTENIR PAR ELECTROLYSE UN METAL A PARTIR D'UN FLUIDE ELECTROLYTIQUE

(54) Title: A METHOD FOR APPLYING A PROTECTIVE STRIP ONTO A CATHODE PLATE FOR OBTAINING A METAL IN AN ELECTROLYTIC MANNER FROM AN ELECTROLYTIC FLUID



(57) Abrégé/Abstract:
The invention relates to a method for applying a protective strip (3) to a cathode sheet (1) for electrolytically obtaining a metal from a electrolytic fluid. The plastic protective strip presses onto the warmed cathode sheet with the aid of a pressing tool (4), said cathode sheet being arranged below a melt of the surface thereof facing the cathode sheet and is subsequently cooled over the cathode sheet. The protective strip is applied to an elastically flexible pressing tool, which is pre-curved counter to the cathode sheet, in the direction of pressing in order to ensure a tight fitting thereof, and is pressed, in an outwardly progressive manner, onto the cathode sheet by the curving of the pressing tool in a defined positioning area.

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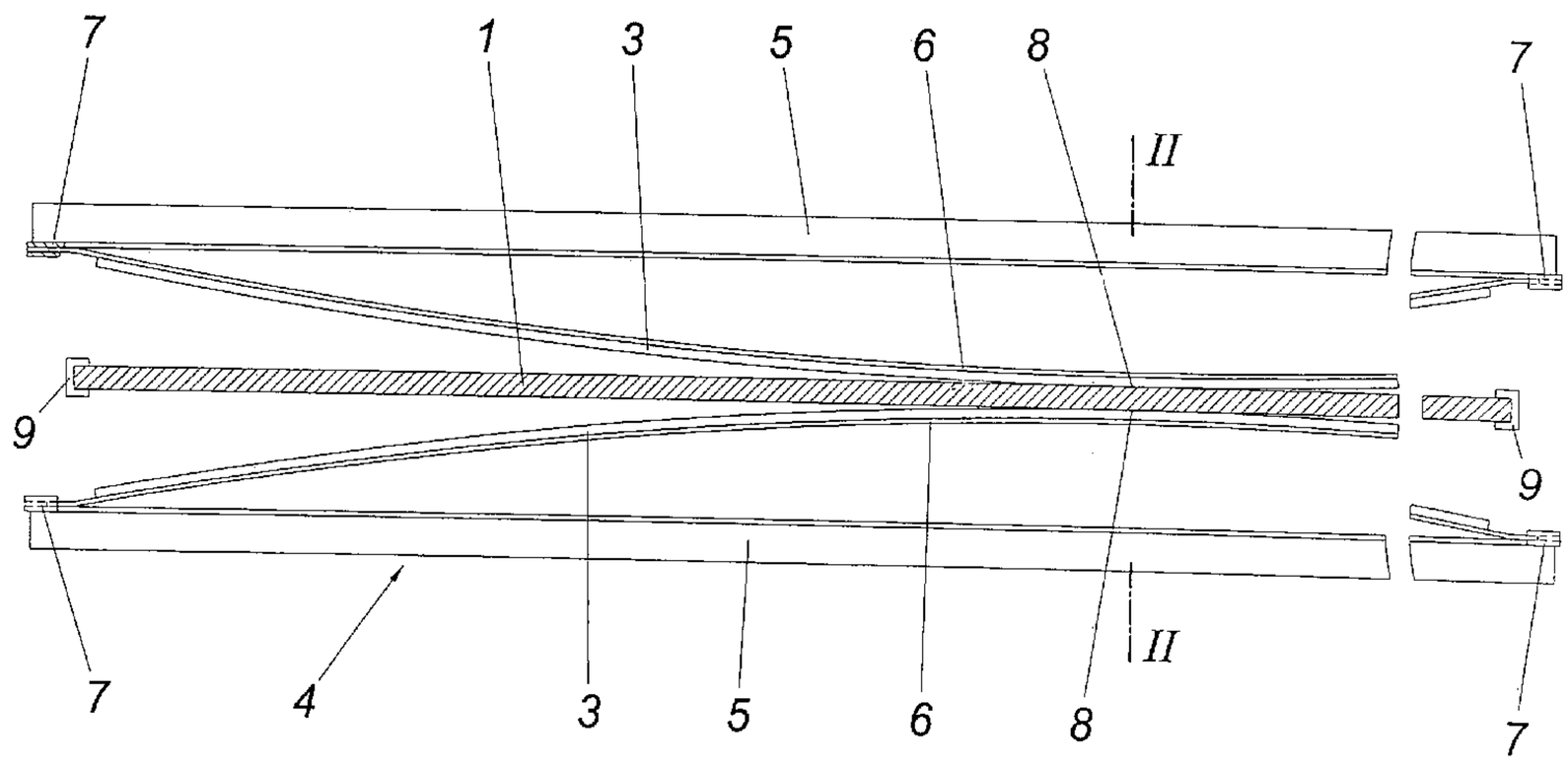
(54) Title: METHOD FOR APPLYING A PROTECTIVE STRIP TO A CATHODE SHEET FOR ELECTROLYTICALLY OBTAINING A METAL FROM A ELECTROLYTIC FLUID

(54) Bezeichnung: VERFAHREN ZUM AUFBRINGEN EINER SCHUTZLEISTE AUF EIN KATHODENBLECH ZUR ELEKTROLYTISCHEN GEWINNUNG EINES METALLS AUS EINER ELEKTROLYTFLÜSSIGKEIT



(57) Abstract: The invention relates to a method for applying a protective strip (3) to a cathode sheet (1) for electrolytically obtaining a metal from a electrolytic fluid. The plastic protective strip presses onto the warmed cathode sheet with the aid of a pressing tool (4), said cathode sheet being arranged below a melt of the surface thereof facing the cathode sheet and is subsequently cooled over the cathode sheet. The protective strip is applied to an elastically flexible pressing tool, which is pre-curved counter to the cathode sheet, in the direction of pressing in order to ensure a tight fitting thereof, and is pressed, in an outwardly progressive manner, onto the cathode sheet by the curving of the pressing tool in a defined positioning area.

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— *mit internationalem Recherchenbericht*

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Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(57) Zusammenfassung: Es wird ein Verfahren zum Aufbringen einer Schutzleiste (3) auf ein Kathodenblech (1) zur elektrolytischen Gewinnung eines Metalls aus einer Elektrolytflüssigkeit beschrieben, wobei die Schutzleiste aus Kunststoff mit Hilfe eines Preßwerkzeuges (4) an das erwärmte Kathodenblech unter einem Anschmelzen ihrer dem Kathodenblech zugekehrten Oberfläche angedrückt und anschließend über das Kathodenblech gekühlt wird. Um ein sattes Anliegen der Schutzleiste zu gewährleisten, wird sie auf ein im Andrücksinn elastisch nachgiebiges, gegen das Kathodenblech vorgewölbtes Preßwerkzeug aufgebracht und von einem durch die Wölbung des Preßwerkzeuges bestimmten Aufsetzbereich (8) ausgehend fortschreitend an das Kathodenblech angedrückt.

A method for applying a protective strip onto a cathode plate for obtaining a metal in an electrolytic manner from an electrolytic fluid

1. Field of the Invention

The invention relates to a method for applying a protective strip onto a cathode plate for obtaining a metal in an electrolytic manner from an electrolytic fluid, with the protective strip made of plastic being pressed by means of a pressing tool against the heated cathode plate by melting on its surface facing the cathode plate and thereafter being cooled through the cathode plate.

2. Description of the Prior Art

In order to prevent corrosion of the cathode plate in the region of the bath level of the respectively employed electrolyte in the case of cathode plates for obtaining a metal electrolytically, especially of zinc, it is known to apply protective strips made of a copolymer polyolefin onto the cathode plate in the region of the corrosive attack (AT 403 808 B). For this purpose, the cathode plate is heated and the protective strip is pressed by means of a pressing tool against the cathode plate, so that the protective strip is molten onto the cathode plate in the region of contact and joins with the cathode plate under cooling which is achieved by air cooling of the cathode plate. During the cooling the pressing pressure of the protective strip against the cathode plate is maintained. The disadvantageous aspect in this known method for applying a protective strip to a cathode plate is especially that the bonding of the protective strip on the cathode plate can be impaired by trapped air pockets which are obtained during the pressing of the protective strips over their entire surface area against

the heated cathode plate. Notice must be taken in this connection that the protective strips not only prevent corrosion of the cathode plates but also are provided to protect the cathode plate from mechanical damage during the shaving of the metal deposited in an electrolytic manner on the cathode plate in the boundary region of the metal deposits, thus placing considerable demands on the bonding capabilities of the protective strips on the cathode plates.

SUMMARY OF THE INVENTION

The invention is thus based on the object of providing a method for applying a protective strip on a cathode plate for obtaining a metal in an electrolytic manner from an electrolyte fluid of the kind mentioned above in such a way that a joint between the protective strip and the cathode plate can be ensured which is capable of withstanding even higher loads.

This object is achieved in accordance with the invention in such a way that the protective strip is applied onto a pressing tool which is elastically resilient in respect of pressing and bulges forwardly against the cathode plate and is pressed against the cathode plate in a progressive manner starting from a contact section determined by the bulging of the pressing tool.

Since as a result of this measure the protective strip is applied at first onto a pressing tool which bulges forwardly against the cathode plate and is pressed with the help of said pressing tool against the cathode plate, a contact section is obtained at first in the apex of the bulging, with the pressing section extending gradually during the pressing travel to the entire extension of the pressing tool as a result of the elastic resilience of the pressing tool in respect of pressing, so that as a result of the progressing pressing of the protective strip against the cathode plate the likelihood of trapped air pockets can be excluded by the progressive pressing of the protective strip against the cathode plate despite the melting of the protective strip in the contact section. The air between the heated cathode plate and the protective strip is displaced to the outside as a

result of the bulge in the direction of bulge of the pressing tool, starting from the apex of the bulge in the direction of the bulge over the surface of the protective strip. A snug fit of the protective strip on the cathode plate is ensured as a precondition for favorable bonding.

Especially advantageous pressing conditions are obtained for the protective strip when it is pressed against the cathode plate in a progressive manner starting from the middle section to both sides of the length and/or the width, because in this case the protective strip merely needs to be applied to the cathode plate merely over half the extension section away from the contact section as measured in the direction of bulging of the pressing tool.

In order to ensure even cooling of the cathode plate and thus preventing thermal distortion of the cathode plate, the cathode plate is cooled by applying cooling plates after the pressing of the protective strip against the same, which cooling plates also provide a reduction of the cooling time.

For performing the method for applying a protective strip to a cathode plate, an apparatus with a pressing tool can be provided which comprises at least one pressing jaw for pressing a protective strip to one side of the cathode plate. In order to enable a pressurization with simple constructional means of the protective strip starting from a contact section and progressing in the longitudinal direction, the pressing jaw comprises a leaf spring bulging forwardly against the cathode plate for the purpose of receiving the protective strip. The leaf spring which places the received protective strip in the apex section of the bulge of the leaf spring onto the cathode plate during a pressing stroke of the pressing tool will be pressed flat during the further progress of the pressing, with the protective strip being pressed in the direction of the bulging progressively against the cathode plate starting from the contact section. Said progressive pressing of the protective strip against the cathode plate not only avoids air pockets between the cathode plate and the protective strip, but also offers advantages for any shaping of the protective strip which is softened over the heated cathode

plate because said shaping need not be performed simultaneously over the extension of the protective strip in the direction of bulging of the leaf spring. The leaf spring can be provided with a profile corresponding to the desired cross section of the protective strip in connection with such a shaping of the protective strip during the pressing against the cathode plate.

BRIEF DESCRIPTION OF THE DRAWINGS

The method in accordance with the invention will be explained in closer detail by reference to the drawings, wherein:

Fig. 1 shows an apparatus in accordance with the invention for applying a protective strip to a cathode plate in a schematic top view of the pressing jaws of a pressing tool, and

Fig. 2 shows a sectional view along line II-II in Fig. 1 on an enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In order to protect a cathode plate 1 which is suspended with the help of a carrying strip 2 in an electroplating bath for depositing a metal from an electrolytic fluid from corrosive attack by the electrolytic fluid in the region of the bath level, the cathode plate 1 is covered in the section of the bath level threatened by corrosion on both sides of the plate with a protective strip 3 made of a suitable thermoplastic material, preferably with a copolymer polyolefin. For preparation purposes, the cathode plate 1 can be brushed in the region of the later protective strips 3 prior to its heating in order to clean the surface of the cathode plate 1 in this region and to obtain on the other a surface structure which improves the bonding with the protective strips 3.

The connection of the protective strips 3 with the cathode plate 1 occurs by pressing the protective strips 3 against the respectively heated cathode plate 1,

with the protective strips 3 being molten against the surface facing the cathode plate 1, so that during the subsequent cooling a favorable bonding is obtained when the inclusion of air pockets between the cathode plate 1 and the protective strips 3 can be prevented. This is managed with a pressing tool 4 which comprises two press jaws 5 with leaf springs 6 bulging forwardly against the cathode plate 1 for receiving the protective strips 3. Said leaf springs 6 are held on the press jaws 5 in guide shoes 7 to be displaceable lengthwise in order to enable pressing flat the leaf springs 6 during the pressing travel.

When the press jaws 5 are applied from opposite sides against the cathode plate 1, the protective strips 3 clamped on the bulging leaf springs 6 are pressed at first in the apex region of the leaf spring bulging against the heated cathode plate 1, as is shown in Fig. 1. During the following press travel, the protective strips 3 are pressed starting from said middle contact section 8 progressively lengthwise against the cathode plate 1 because the leaf springs 6 are increasingly pressed flatly in order to finally be held pressed against the cathode plate 1 over the entire length. After the cooling of the cathode plate 1, preferably with the help of cooling plates, the cathode plate 1 can be removed with the applied protective strips 3 from the pressing tool 4.

As is shown in Fig. 2, the leaf springs 6 can be profiled according to the desired cross section of the protective strips 3 in order to achieve a rounding of the longitudinal edge in the region of the longitudinal sides of the protective strips 3 facing the electrolytic bath during the pressing of said protective strips 3 against the cathode plate 1. Such a plastic deformation is easily possible as a result of the heating of the protective strips 3 by the cathode plate 1.

It has been seen that a heating of the cathode plate to 175°C to 195°C is sufficient to melt on the protective strips 3. The pressing pressure is preferably between 4 to 6 bar and is held for approximately 1 minute before the cathode plate 1 is cooled via cooling plates to a stacking temperature.

When the side edges of the cathode plate 1 are protected by edge strips 9 which are profiled in a U-shaped way, the pressing of the protective strips against the cathode plate 1 which occurs progressively against the ends of the protective strips 1 will also ensure an interlocking connection of the protective strips 3 to the edge strips 9 without having to fear any likelihood of corrosion in the connecting region for the cathode plate 1.

CLAIMS:

1. A method for applying a protective strip onto a cathode plate for obtaining a metal in an electrolytic manner from an electrolytic fluid, with the protective strip made of plastic being pressed by means of a pressing tool against the heated cathode plate by melting on its surface facing the cathode plate and thereafter being cooled through the cathode plate, characterized in that the protective strip is applied onto a pressing tool which is elastically resilient in respect of pressing and bulges forwardly against the cathode plate and is pressed against the cathode plate in a progressive manner starting from a contact section determined by the bulging of the pressing tool.

2. A method according to claim 1, characterized in that the protective strip is pressed against the cathode plate in a progressive manner starting from the middle section to both sides of the length and/or the width.

3. A method according to claim 1 or 2, characterized in that the cathode plate is cooled after the pressing of the protective strip by application of cooling plates.

4. An apparatus for performing the method according to one of the claims 1 to 3 with a pressing tool which comprises at least one press jaw for pressing a protective strip to one side of the cathode plate, characterized in that the press jaw (5) comprises a leaf spring (6) which is bulged forwardly against the cathode plate (1) for receiving the protective strip (3).

5. An apparatus according to claim 4, characterized in that the leaf spring (6) comprises a profile corresponding to the desired cross section of the protective strip (3).

FIG.1

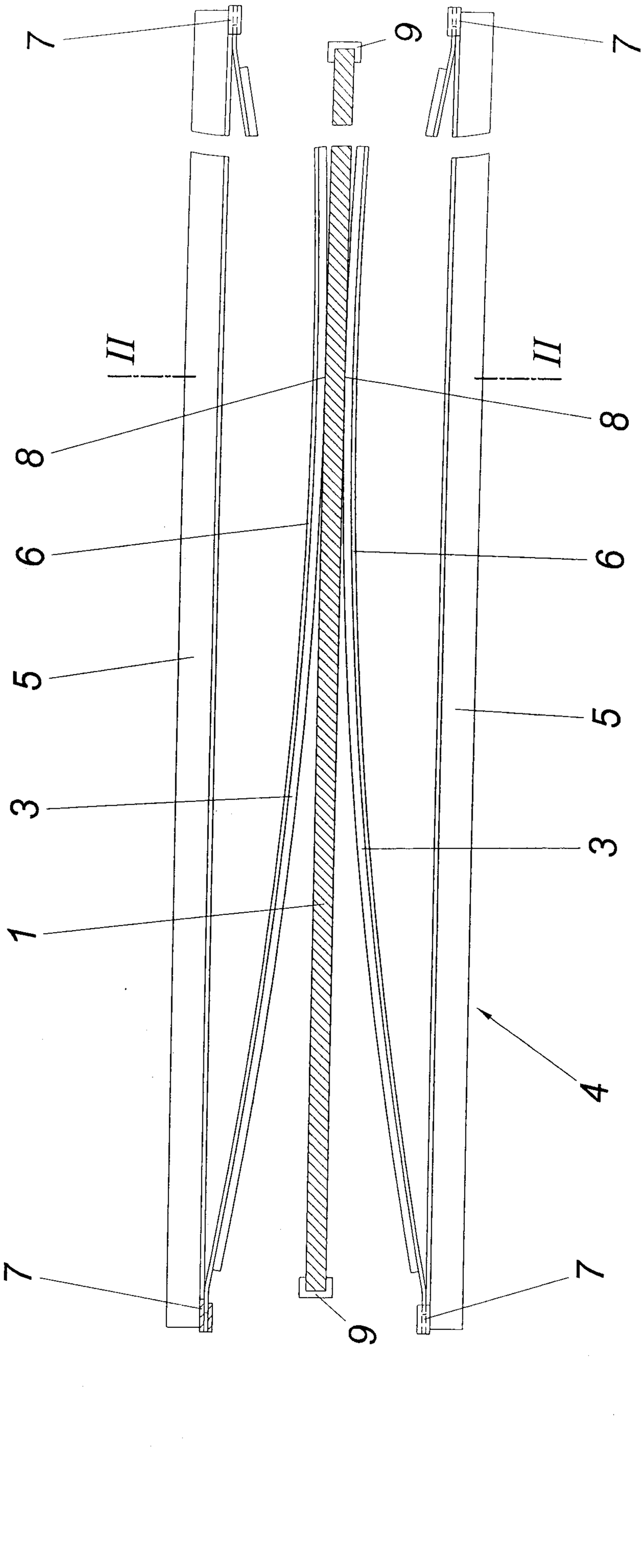
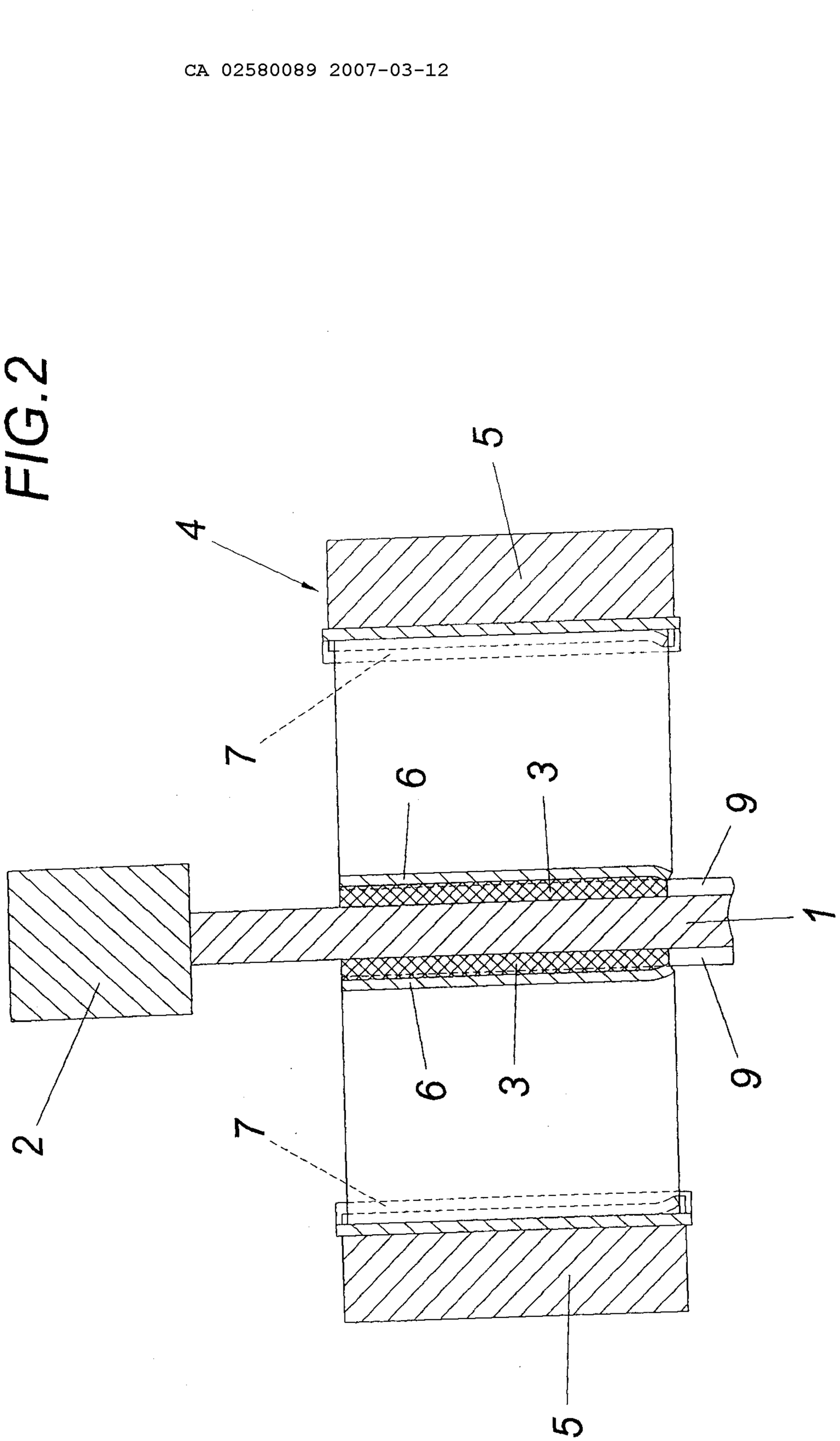
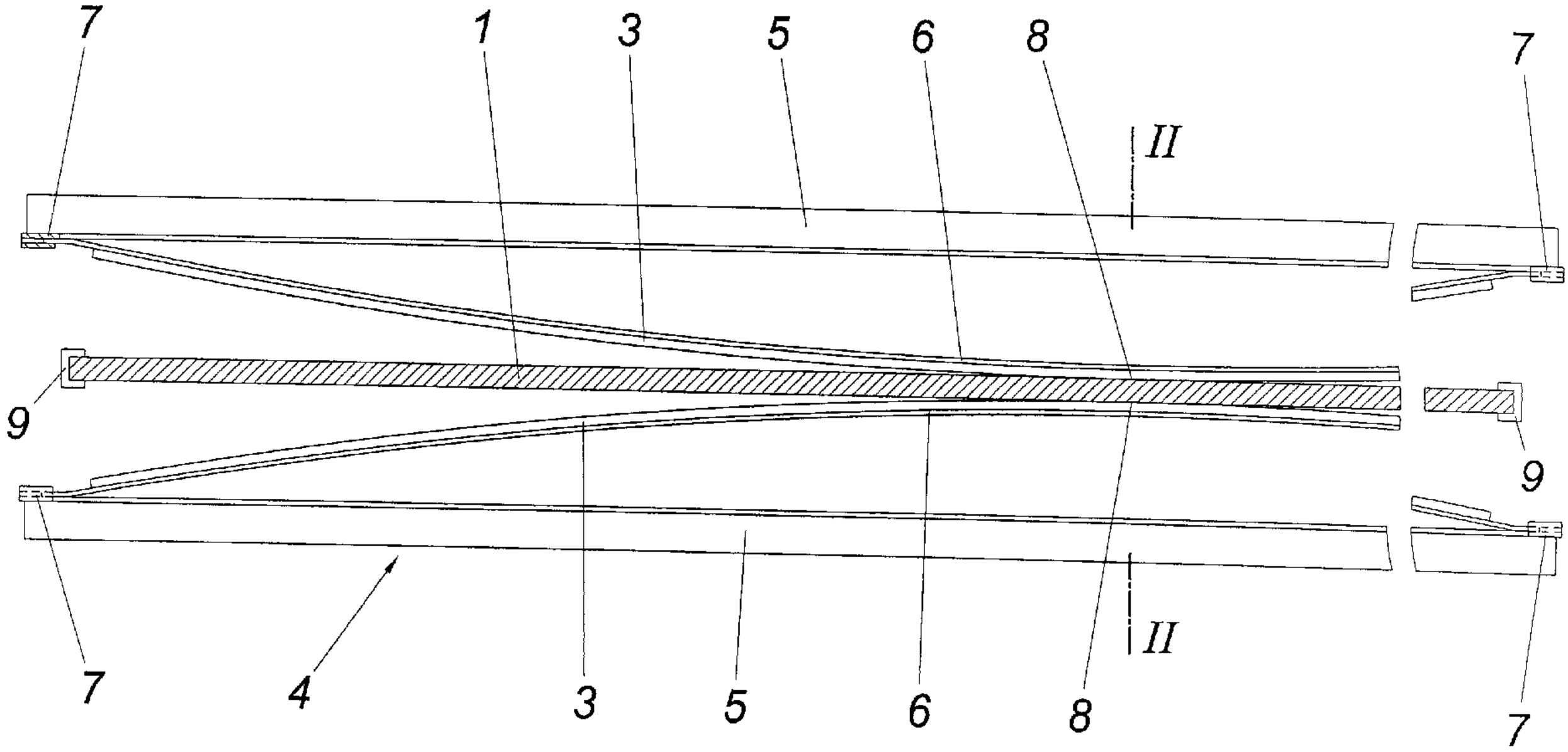


FIG.2

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