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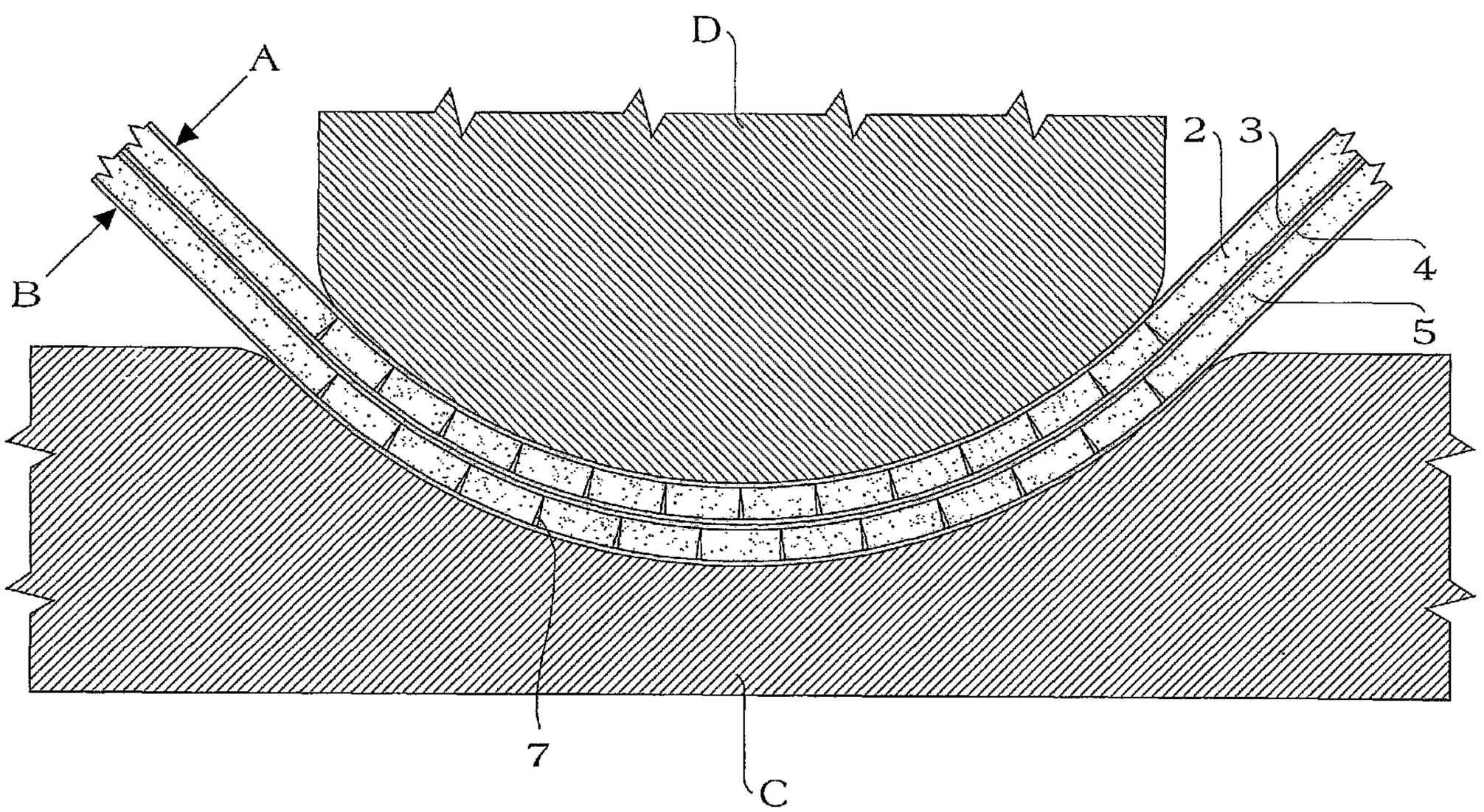
(54) Title: METHOD FOR CURVING PLASTERBOARD PANELS, AND COMPONENTS THUS OBTAINED



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Platerboard panels (A, B) formed by layers of cardboard (1,3) with a sandwiched plaster sheet (2) and by layers of cardboard (4,6) with a further sandwiched plaster sheet (5), are clamped between a female half mold part (C) and a male half mold part (D) of a forming press, are spread with vinyl adhesive or other suitable water-based adhesive at the layers of cardboard (3, 4). In each one of the two panels, the plaster sheet (2, 5) is fractured radially and the layer of cardboard (3) on the outside of the curvature is stretched and the layer (4) on the inside is compressed. The bonding of the layer of cardboard (3) of the first panel (A) to the layer of cardboard (4) of the second panel (B) forces the two panels to a permanent, stable equilibrium of the respective opposite curving tensions.

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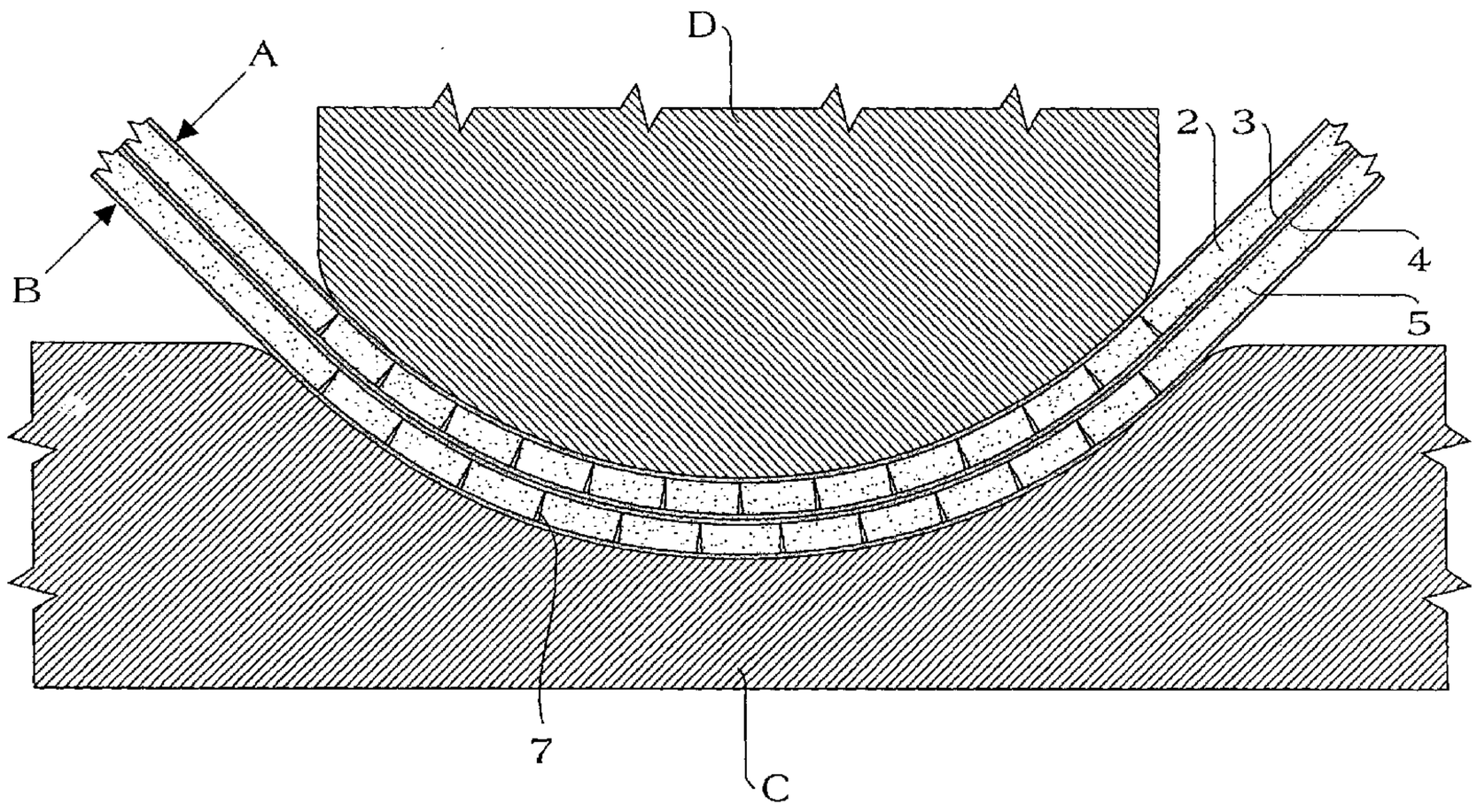
(54) Title: METHOD FOR CURVING PLASTERBOARD PANELS, AND COMPONENT THUS OBTAINED



(57) Abstract: Platerboard panels (A, B) formed by layers of cardboard (1,3) with a sandwiched plaster sheet (2) and by layers of cardboard (4,6) with a further sandwiched plaster sheet (5), are clamped between a female half mold part (C) and a male half mold part (D) of a forming press, are spread with vinyl adhesive or other suitable water-based adhesive at the layers of cardboard (3, 4). In each one of the two panels, the plaster sheet (2, 5) is fractured radially and the layer of cardboard (3) on the outside of the curvature is stretched and the layer (4) on the inside is compressed. The bonding of the layer of cardboard (3) of the first panel (A) to the layer of cardboard (4) of the second panel (B) forces the two panels to a permanent, stable equilibrium of the respective opposite curving tensions.

WO 02/095157 A1

WO 02/095157 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD FOR CURVING PLASTERBOARD PANELS, AND COMPONENTS THUS OBTAINED

Technical Field

The present invention relates to a method for the mass-production of curved components for finishing masonry work or other structures, obtained from normally commercially available flat plasterboard panels, which are already widely used in the building sector for the most disparate uses since in addition to offering good thermal and acoustic insulation they have an appreciable structural strength and are particularly suitable to be completed by simply painting or with any other surface treatment or covering.

The plasterboard panels to which the invention relates are those of the most common type, constituted by a sheet or plate of plaster sandwiched between two layers of cardboard.

Background Art

Currently such panels can be used not only in the original flat shape but also as contoured components which are obtained, by way of a method devised by the same inventor and disclosed in Italian patent application MI 96 A 001586, by bonding together with adhesives two plasterboard panels or two portions of a same folded panel, subjected beforehand to multiple cuts and/or wedge-shaped incisions formed in the cardboard of the faces to be joined and in the layer of plaster in order to be able to fold in a hinge-like fashion, at each one of said cuts and incisions, the intact cardboard of the exposed surfaces of said coupling.

However, this method, which is already widely appreciated in the building sector, does not allow to produce curved surfaces, which still require casting concrete or plaster in appropriate formwork or the use of elements produced on site with plywood, hardboard or other flexible material.

Disclosure of the Invention

The method according to the invention arises from the problem of

providing the workers in the building sector and in the interior-decoration sector the possibility to easily build, at particularly low cost and without specific manual skills, curved surfaces that are perfectly executed because they are formed by means of prefabricated elements to be installed on site and completed in the same manner required by conventional plasterboard panels.

Generally speaking, the method according to the present invention is as simple as it is novel and inventive and consists in curving and joining simultaneously, in appropriate forming presses, two or more plasterboard panels that are superimposed after adequately spreading the surfaces in contact with a suitable bonding agent, which is preferably water-based in order to impregnate and soften more effectively the layers of cardboard to be bonded in a curved configuration.

Brief description of the drawings

In order to better describe the new method and the components obtained thereby, the accompanying drawings show, only by way of non-limitative example:

Figures 1 and 2, illustrate schematically the method according to the invention by showing, together with the forming press in partial cross-section, two plasterboard panels before and after bonding them in a curved configuration;

Figures 3 and 4, illustrate, by way of partial sectional views of the forming press before and during bonding of the two curved panels, additional arrangements for the case in which tighter curves, i.e., having a smaller radius, are required;

Figure 5, is a transverse sectional view of the curved component produced with the forming press as shown in Figures 1 and 2;

Figure 6, is a transverse sectional view of the curved component produced with the forming press as shown in Figures 3 and 4;

Figures 7, 8 and 9, show additional embodiments of components that can

be manufactured with the method according to the invention.

Ways of carrying out the Invention

With reference to the drawings, the plasterboard panels A and B, which in the sectional view of Figure 1 are formed respectively by the layers of cardboard 1 and 3 with the interposed plaster sheet 2 and by the layers of cardboard 4 and 6 with the interposed plaster sheet 5, before their clamping between the female mold part C and the male mold part D of the forming press, are spread with vinyl glue or other suitable water-based bonding agent in the layers of cardboard 3 or 4, i.e., in the contact faces of the two panels to be joined by overlapping and compression.

Such spreading, by impregnating the treated cardboard layers and making them malleable, facilitates their curving, while the plaster sheets 2 and 5, being rigid, undergo a succession of radial fractures 7 that are more or less closely spaced depending on the curving radius, the thickness of said sheets and the consequent difference between the outermost and the innermost circumferences of each sheet.

Continuing pressing of the two curved and superimposed panels A and B, all through the time required for the evaporation of the aqueous base and for the setting of the bonding agent, permanently stabilizes the curving imposed by the forming press. This occurs because in each one of the two plasterboard panels to be joined the plaster sheet is fractured radially, and the layer of cardboard on the outside of the curve is stretched and the layer on the inside is compressed. Accordingly, the bonding of the cardboard layer 3 of the panel A to the cardboard layer 4 of the panel B forces the two to a permanent, stable, equilibrium of the respective opposite curving tensions, i.e., the contraction tension for the cardboard layer 3 and the elongation tension for the cardboard layer 4.

The retention time of the pairs of curved panels inside the forming press can be shortened significantly, and production times can be speeded up, by spreading onto the surfaces to be bonded bands or strips of water-based vinyl

adhesive alternated with bands or strips of hot-melt adhesive, such as self-curing urea resin in an aqueous solution, which sets more quickly than vinyl adhesive.

Figures 3 and 4 show that if the curvature to be imparted by means of the female mold part F and the male mold part G of the molding press is particularly significant or marked, the panels A and B to be curved and bonded simultaneously, after spreading suitable adhesives on the faces 3 and 4 to be joined, are laterally provided, alongside their extension and during their insertion in the forming press, with a flexible metal sheet E, which by being arranged so as to lie on the outside of the curve to be formed, in the specific case in contact with the cardboard layer 6 of the panel B, ensures perfect curving of the panels and a substantially uniform distribution of the radial fractures in the plaster sheets 2 and 5.

A further operational advantage, while performing the described method, can be provided, especially in cases where curving is particularly significant or marked, by a plurality of free rollers H which, being arranged at the margins of the cavity of the mold and so that their axes are parallel to the generatrix of the curve, convert into a rolling friction the friction of the flexible metal sheet E or, if said metal sheet is not present, of the plasterboard panels A and B alone when the assembly, pushed by the male mold part or half-mold G, descends forcibly into the mold part or female half-mold F to assume the shape provided in the forming press.

Although the illustrated examples of embodiment show the production of curved elements by joining two plasterboard panels by compression, this does not rule out the possibility of coupling even more than two panels so as to meet enhanced requirements of insulation, mechanical strength or other requirements.

As regards also the profiles or shapes to be produced, the devised method, compatibly with the ordinary requirements of compression formation, allows the greatest freedom of choice of radii and extent of the

curves (Figures 5 and 6) and in the succession of curves and countercurves (Figures 7 and 8) or also in the combination of curved portions with other straight ones (Figure 9).

Clearly, without altering the general characteristics that have been illustrated and described, the method according to the invention and the elements provided thereby are susceptible of further modifications and variations, which are in any case within the scope of the appended claims.

CLAIMS

1. A method for curving plasterboard panels, comprising the steps of: curving and joining simultaneously, by pressing in a forming press, at least superimposed plasterboard panels, each formed by a sheet of plaster sandwiched between two layers of cardboard, after previously spreading a suitable bonding agent, in order to impregnate and soften more effectively the layers of cardboard to be mated and bonded in a curved configuration.

2. The curving method of claim 1, wherein the bonding agent has an aqueous base.

3. The curving method according to any one of claim 1 and claim 2, wherein the spreading step of the bonding agent comprises impregnating the cardboard layers which are to be bonded so as to make them malleable, and to facilitate curving thereof, while the curving step comprises the formation of a succession of radial fractures in the adjacent plaster sheets, which are rigid, the radial fractures, divaricating toward the outside of the curve at intervals that vary depending on the set radius of curvature and the thickness of said plaster sheets.

4. The curving method according to claim 2, wherein the pressing step carried out for the plasterboard panels to be curved and joined in a superimposed configuration, is performed for the time so required for the evaporation of the aqueous base and for the setting of the bonding agent, and comprises stabilization of the curving imparted by the forming press, by subjecting the layers of cardboard of each plasterboard panel to a deformation, which is a stretching deformation for the layer on the outside of the curve and a compression deformation for the layer on the inside of said curve, to reach permanent, stable, equilibrium of the opposite curving tensions of the two layers

of cardboard that belong to different panels and are directly subjected to affect the bonding.

5. The curving method according to any one of claims 1 to 4, wherein said spreading step comprises spreading the plasterboard panels so to be joined in a curved configuration for bonding, with vinyl adhesive or other suitable water-based bonding agent.

6. The curving method according to any one of claims 1 to 4, wherein the retention time of the plasterboard panels inside the forming press during said pressing step is reduced significantly by way of an additional spreading step comprising spreading onto the surfaces to be joined bands or strips of water-based vinyl adhesive alternated with bands or strips of hot melt glue, which has shorter setting times than the vinyl adhesive.

7. The curving method according to claim 1, wherein the hot melt glue is a self-curing urea resin in aqueous solution.

8. The curving method according to any one of claims 1 to 7, wherein the curving step further comprises, in order to ensure even and exact curving of the plasterboard panels to be joined and a substantially uniform distribution of the radial fractures in the plaster sheets of said panels, during insertion of said panels between a female mold part and a male mold part of the forming press, arranging laterally, alongside said panels, a flexible metal sheet, which is arranged so that after the pressing step, the metal sheet lies on the outside of the curve formed by the plasterboard panels.

9. The curving method according to claim 8, wherein the method further comprises the step of providing a plurality of free rollers, arranged at the margins of the cavity of the female mold part with axes thereof parallel to the

generatrix of the curvature of the female mold part, converting into rolling friction any of the friction with the flexible metal sheet or with the plasterboard panels alone, upon pushing of the plasterboard panels by action of the male mold part, to forcibly descend the plasterboard panels into the female mold part in order to assume the shape that is preset in the forming press.

10. Curved plasterboard panels, constituted by curved components, formed by the compression bonding of two or more superimposed plasterboard panels, each comprising at least one sheet of plaster interposed between two layers of cardboard, having curved portions or profiles of different shapes, said plaster sheets comprising a succession of radial fractures which divaricate toward the outside of the curvature thereof and are arranged at intervals that vary depending on the radius of curvature and the thickness of said plaster sheets.

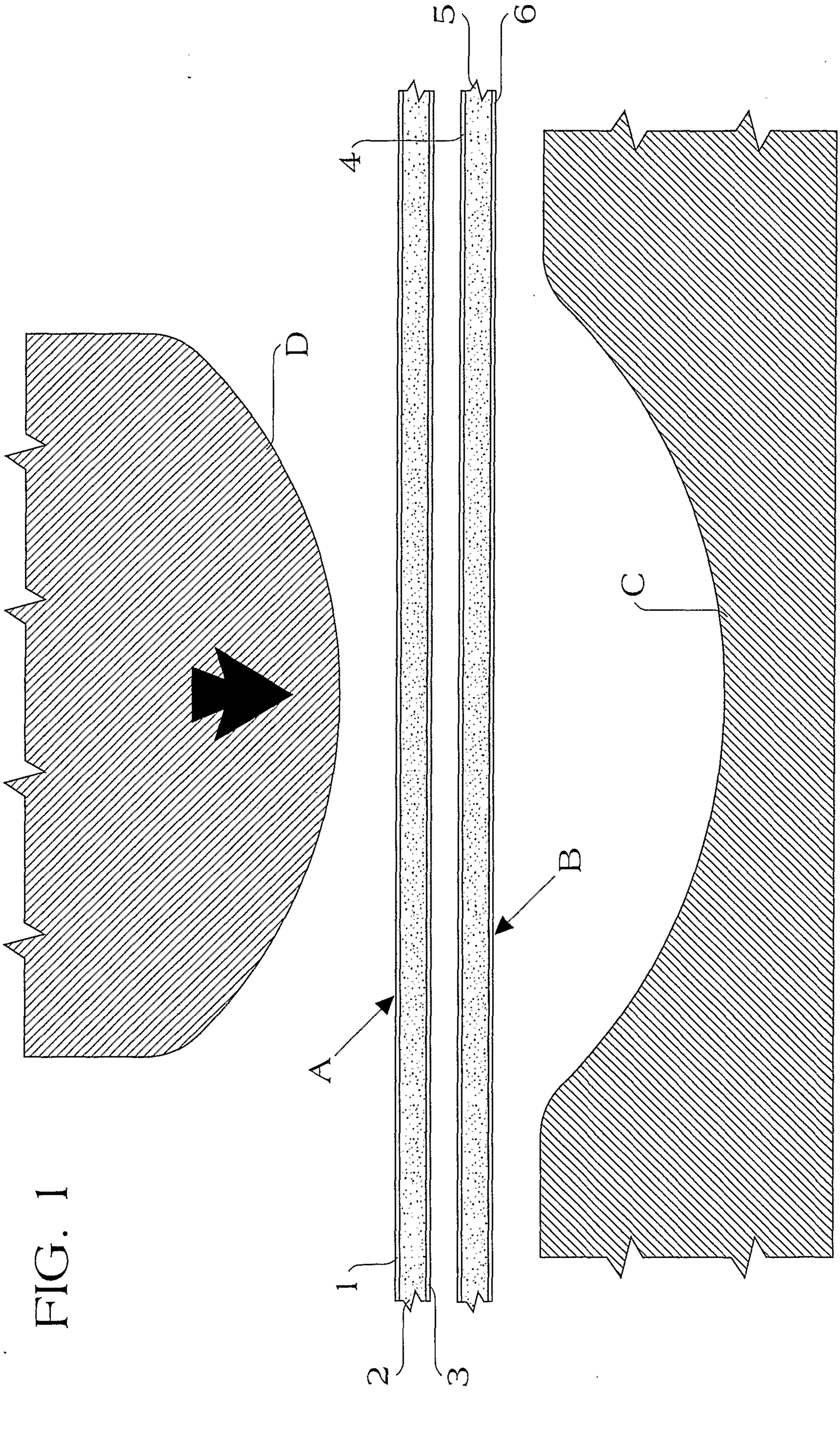


FIG. 1

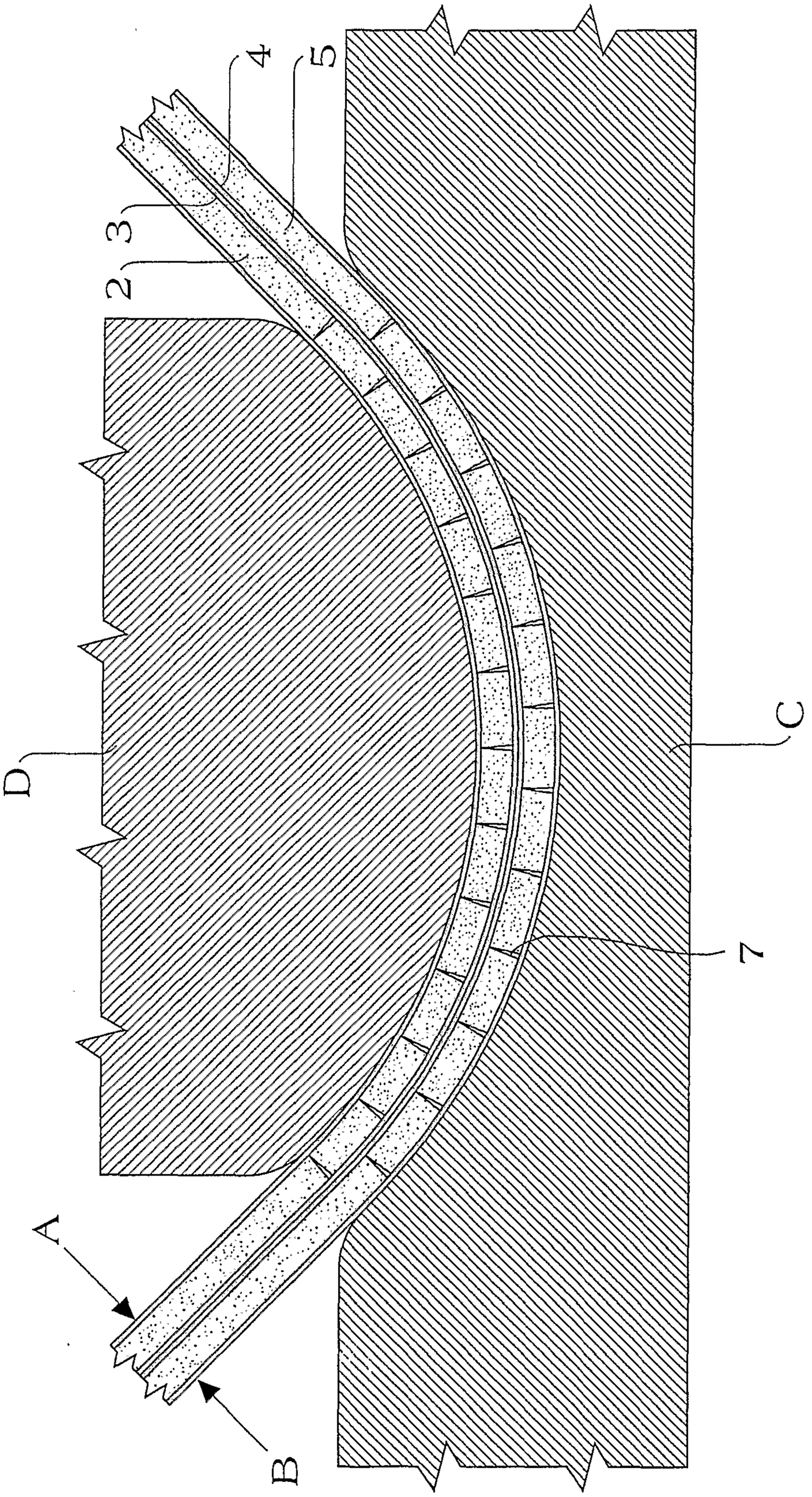


FIG. 2

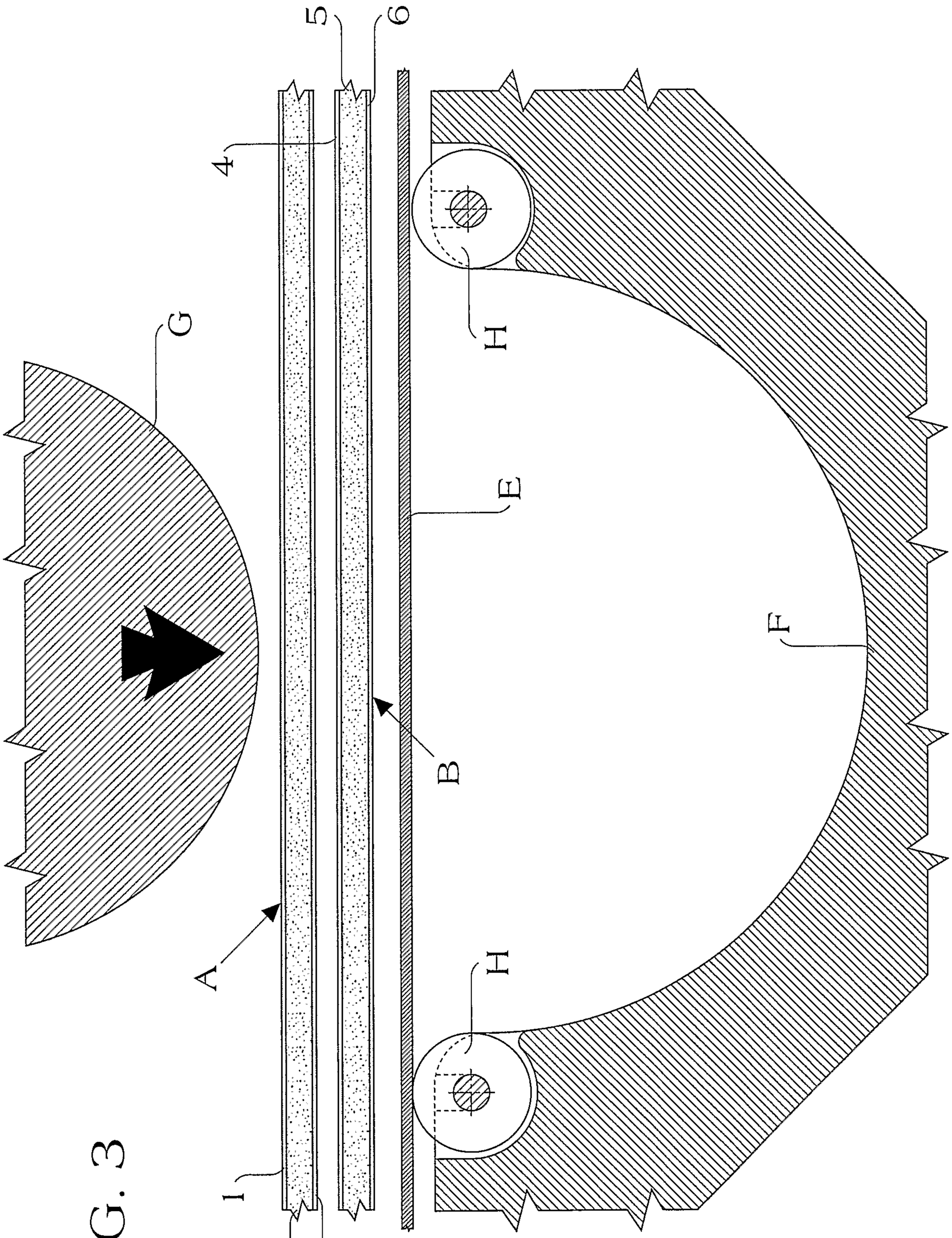


FIG. 3

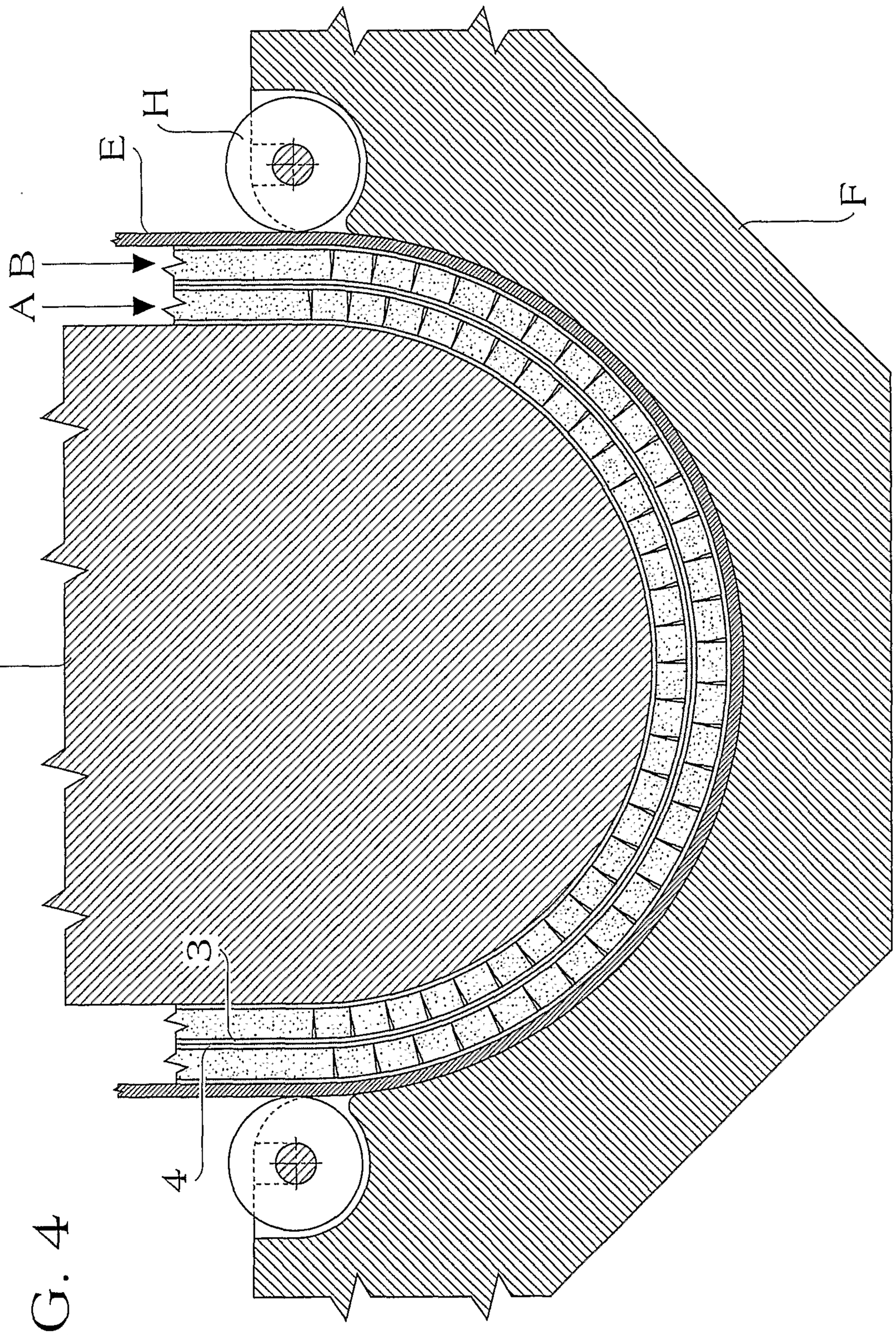


FIG. 4

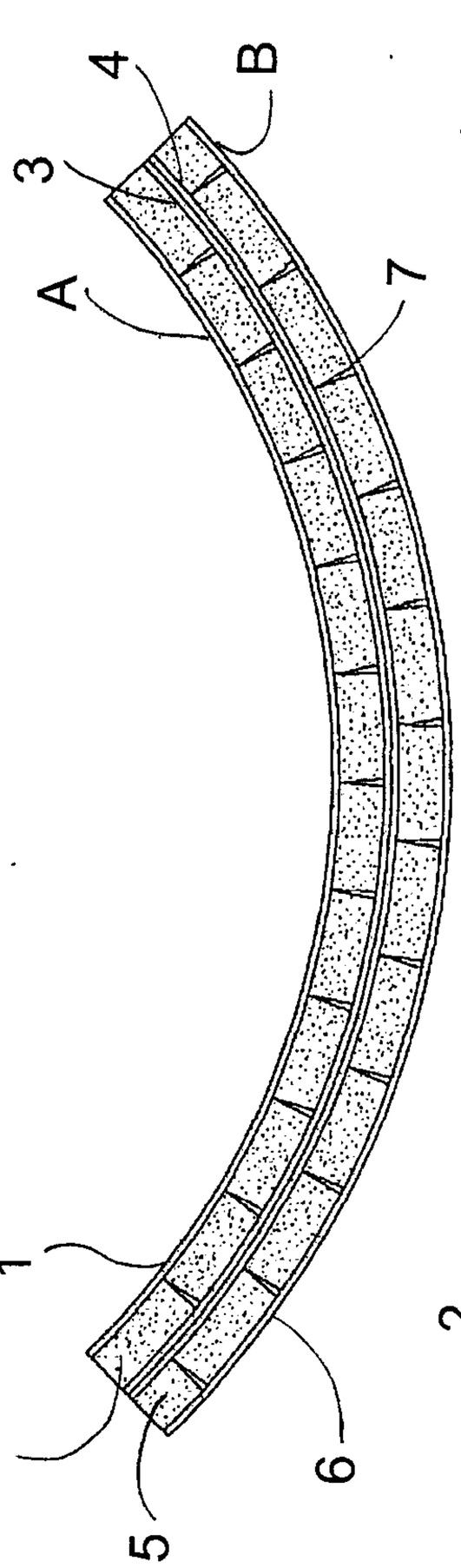


FIG. 5

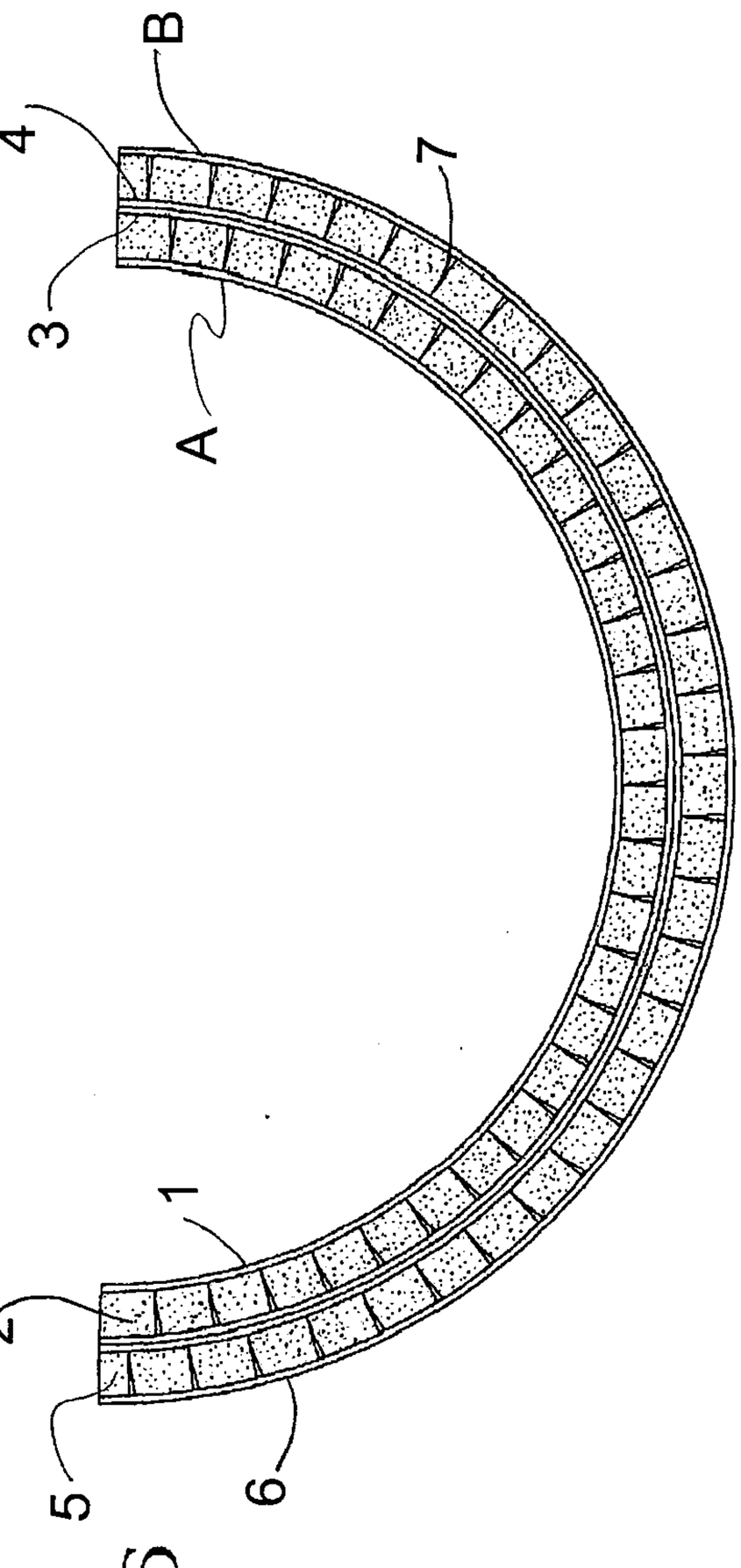


FIG. 6

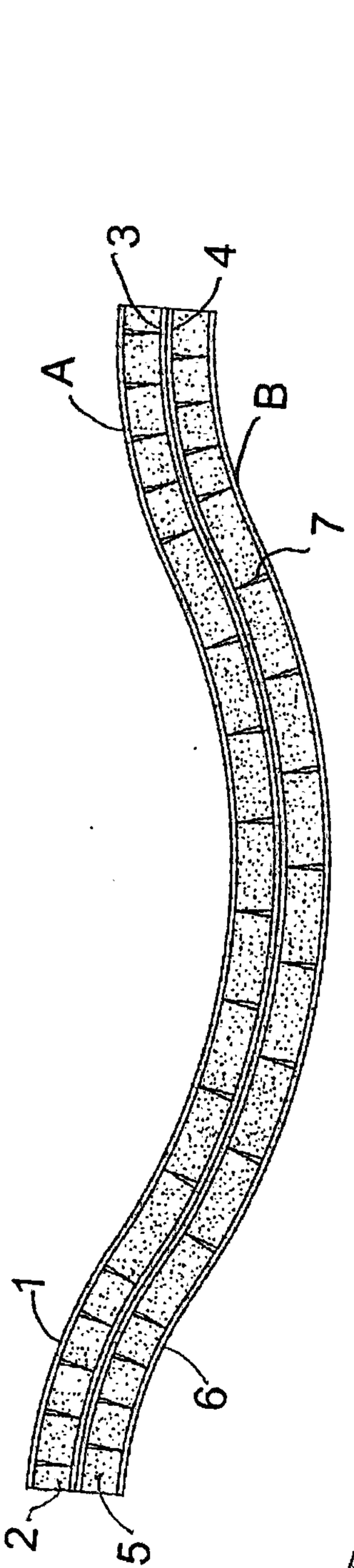


FIG. 7

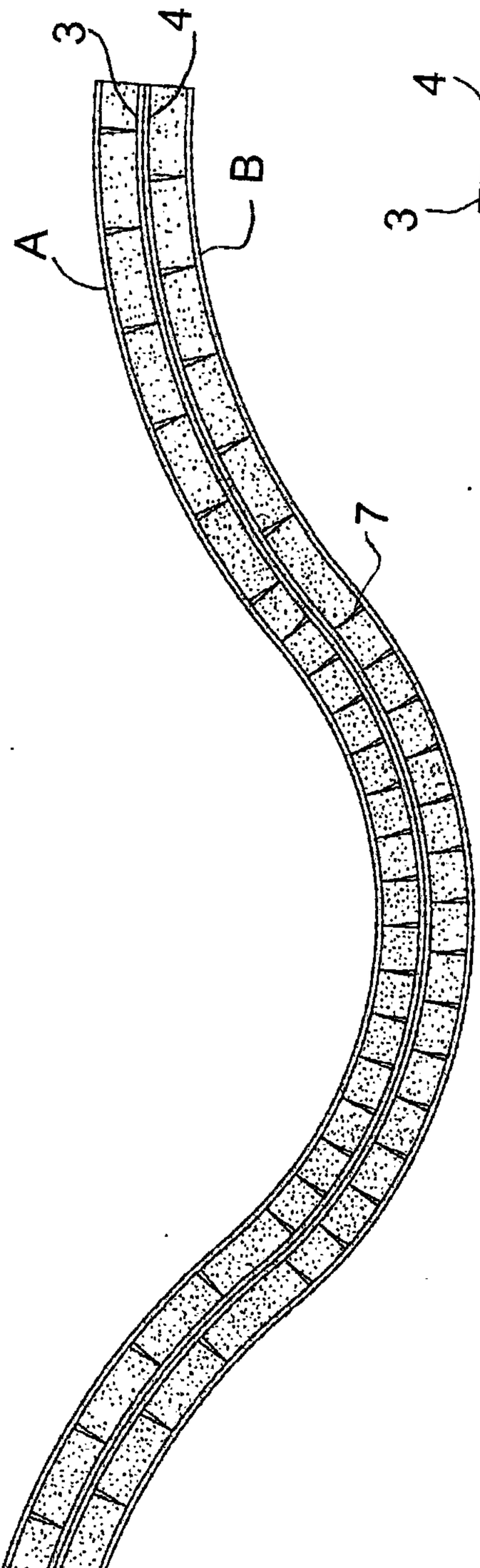


FIG. 8

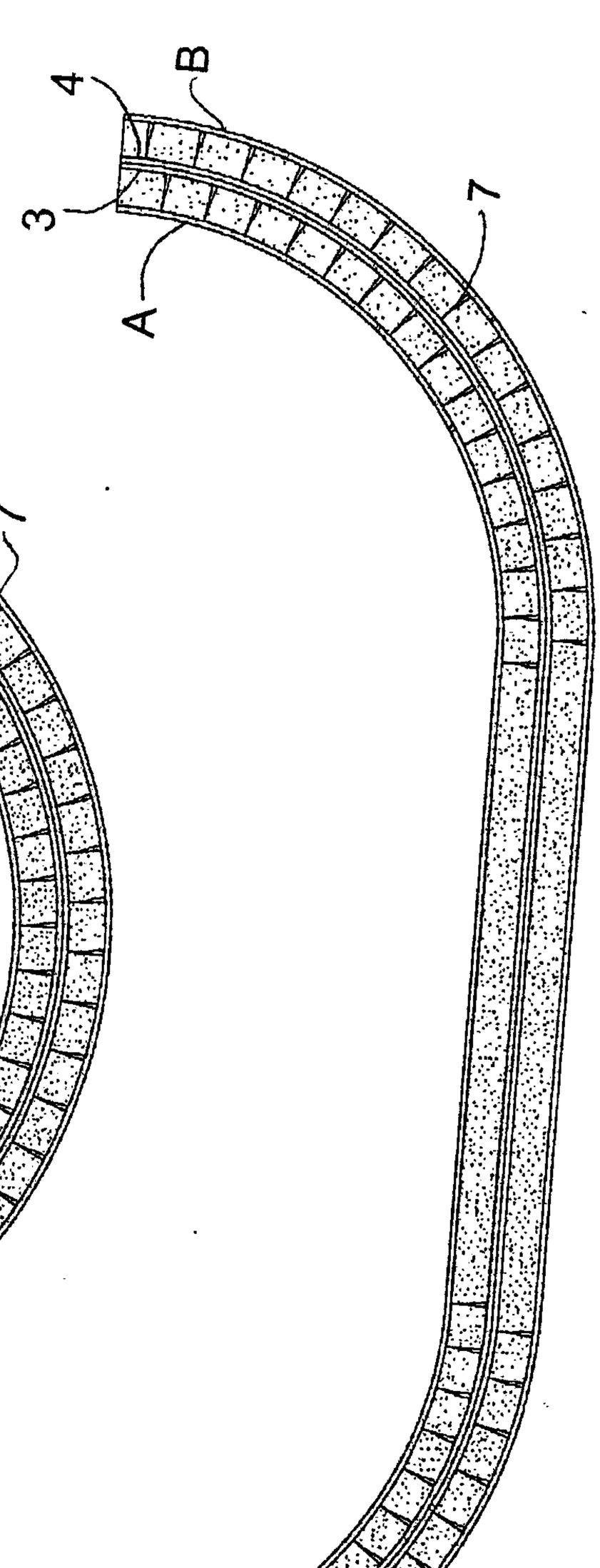
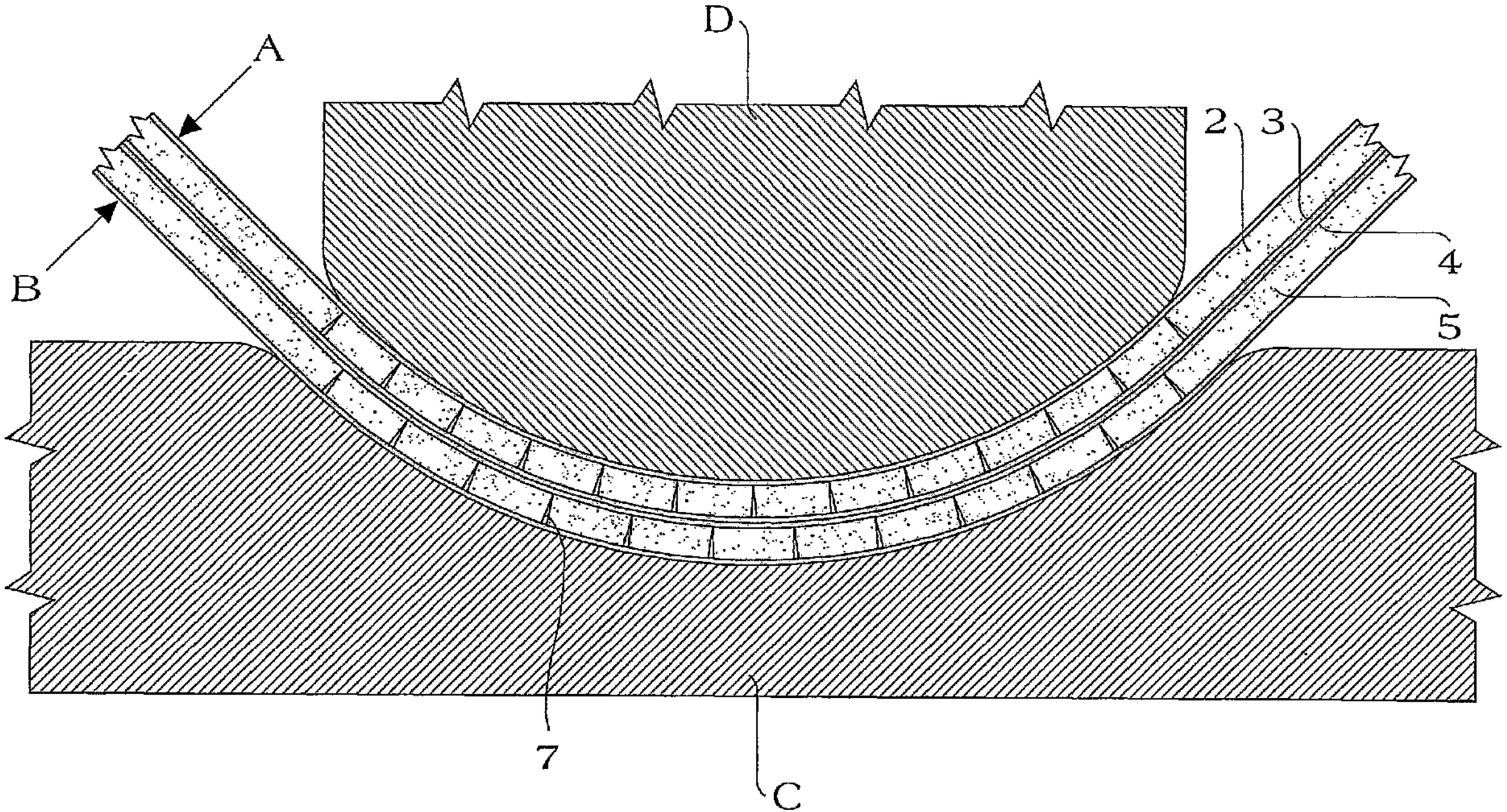


FIG. 9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