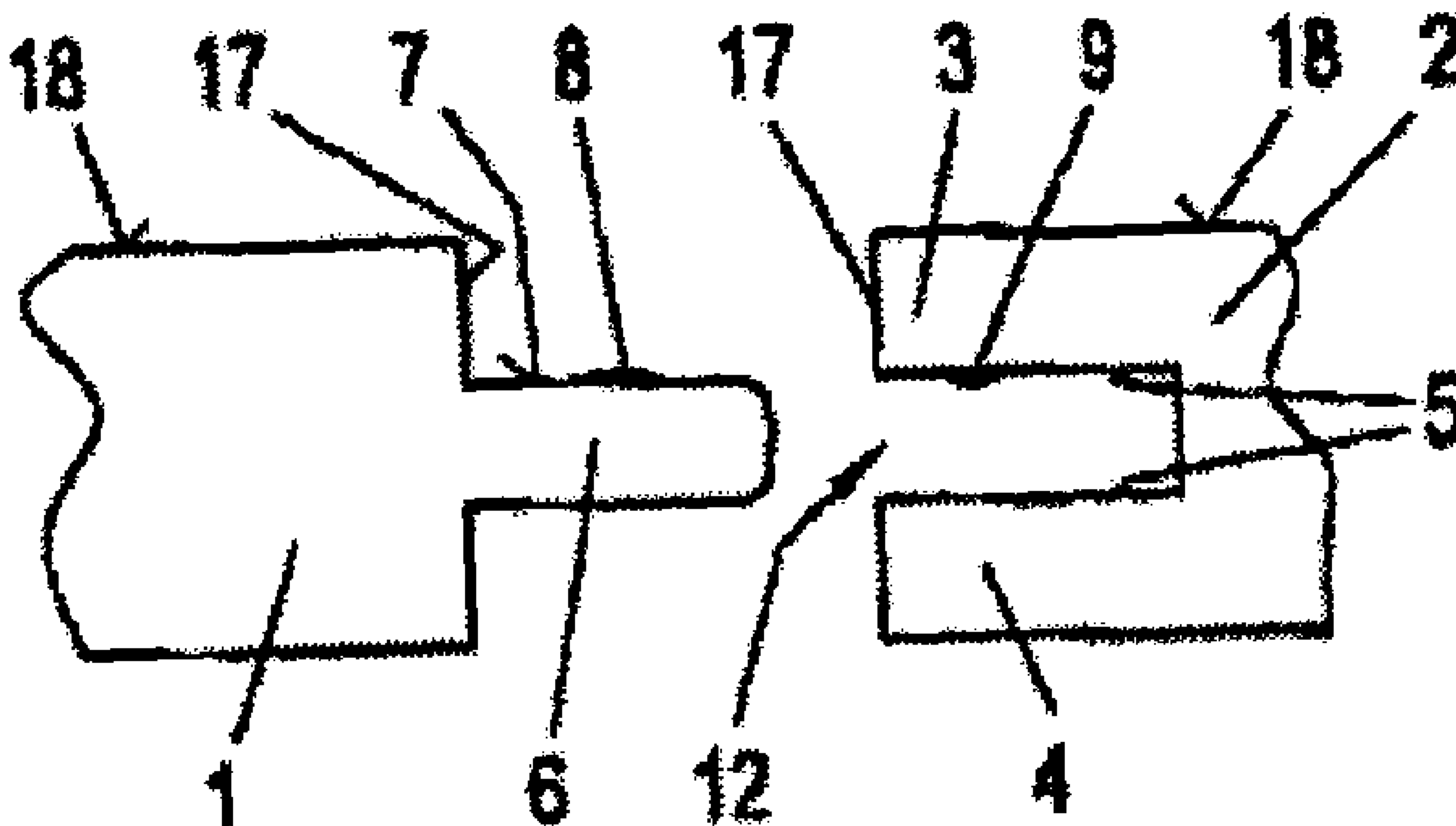




(86) Date de dépôt PCT/PCT Filing Date: 2004/02/18
 (87) Date publication PCT/PCT Publication Date: 2004/09/16
 (45) Date de délivrance/Issue Date: 2014/02/04
 (85) Entrée phase nationale/National Entry: 2005/09/02
 (86) N° demande PCT/PCT Application No.: AT 2004/000049
 (87) N° publication PCT/PCT Publication No.: 2004/079128
 (30) Priorité/Priority: 2003/03/07 (AT A 358/2003)

(51) Cl.Int./Int.Cl. *E04F 13/08* (2006.01),
E04F 15/02 (2006.01), *E04F 15/04* (2006.01)
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(54) Titre : PLAQUE DE REVETEMENT
 (54) Title: COVERING PANEL



(57) **Abrégé/Abstract:**

The invention relates to a covering panel for floors, comprising a groove along at least one edge or end face and a tongue along at least one other edge or end face. The cross-sections of the tongue and groove complement each other and panels that are to be interconnected can be joined by inserting the tongue into the groove. According to the invention, at least one bead of adhesive is attached to at least one wall surface of the groove and/or to at least one tongue surface and at least one additional bead is attached to the surface of the tongue facing the wall surface of the groove provided with the bead and/or to the wall surface of the groove or of the limbs of the latter that faces the tongue surface provided with the bead. The two beads engage with one another after the insertion of the tongue into the groove.



ABSTRACT

The invention relates to a covering panel for floors, comprising a groove along at least one edge or end face and a tongue along at least one other edge or end face. The cross-sections of the tongue and groove complement each other and panels that are to be interconnected can be joined by inserting the tongue into the groove. According to the invention, at least one bead of adhesive is attached to at least one wall surface of the groove and/or to at least one tongue surface and at least one additional bead is attached to the surface of the tongue facing the wall surface of the groove provided with the bead and/or to the wall surface of the groove or of the limbs of the latter that faces the tongue surface provided with the bead. The two beads engage with one another after the insertion of the tongue into the groove.

Covering Panel

Field of the Invention

The invention relates to a cladding panel for floors, walls or ceilings or similar applications.

5 These panels on their side surfaces have grooves and tongues in order to lay these panels in a structure. In order to achieve as stable a structure as possible, it can also be provided that the panels be cemented to one another.

Background and Summary of the Invention

10 The priority objective of the invention is to be able to produce panels of the initially mentioned type as easily and economically as possible, furthermore to enable their storage over longer time intervals without adverse effects and in a space-saving manner, and finally to make the installation and in any case disassembly as quick and simple as possible, in a manner that preserves the panels as much as possible. Another objective is to prepare a stable, durable and solid surface from panels that have been joined to one another; alignment of the panels over a certain time
15 interval will also be possible during installation.

These objectives are achieved in a cladding panel of the initially mentioned type with the features of the invention.

According to the invention, in the tongue or on at least the inside surface of one of the legs of the groove and/or on at least one surface of the tongue, at least one bead or strip is applied, for
20 the locking of which another bead or strip is applied on the respectively assigned, and especially contacting surface of the tongue and/or groove. In this way, in the course of installing the cladding panels or in the course of joining them together, the beads act as locking means; the bead and the other bead interact as catch and locking elements. In the formation of at least one of the two beads

with a cement, an adhesive connection between the groove and the tongue can be achieved. The beads of plastic and/or cement are applied at the factory in a simple and quick procedure, e.g., sprayed on.

A material working process, e.g., milling, to form a locking element is eliminated.

5 It is simply more necessary to make another bead assigned to one bead in the wall surface of the groove and/or in the tongue surfaces. This type of connecting technology and optionally cementing technology can be used for cladding panels of any materials, wood, wood materials, especially MDF, HDF, chips, etc.

10 A series of plastics are known that can be applied as the corresponding bead or strip or the other bead or strip to the surfaces of the groove and/or tongue. In particular, silicone plastics, plastics based on polyalkylene, especially PVC, PE, PP and hot-melt cements based on neoprene can be used for this purpose. It should be possible to deform such plastics by heat or for them to seal by heat and to extrude or shape them in bead form and to make them solidify in an adhesive manner on the respective material of the panel. In use, they are to have corresponding elasticity and
15 viscosity in order to be able to act as a catch element.

Especially thermoplastics, elastomers and thermoplastic elastomers are suitable as thermally deformable plastics. As thermoplastics, polyolefins, vinyl polymers, polyamides, polyesters, polyurethane and ionomers can be used. As elastomers, various types of rubber can be used. As thermoplastic elastomers, TPE, TPR, TPO, SPS, TP-Q, and TP-U are suitable. As plastics, hot-
20 melt cements or hot-sealing cements based on ethylene vinyl chloride, PA, PU, and EVA can also

be used. Other plastics can also be used.

A series of cements are known that have sufficient strength to not be removed or to be damaged in their surface configuration when the tongue is pushed into the groove, but based on the penetrating atmospheric humidity and/or by application of water in the course of installation or use, they can be sufficiently activated to fully develop their adhesive action. After setting of the cement of the cement bead(s), the latter take action, on the one hand, based on the adhesive action, and, on the other hand, based on the locking action that has developed; the beads either interact with respect to their adhesive action and/or interact with the material of the tongue or the groove. It should be possible to apply the cements and plastics used to the respective material of the panel using a nozzle and for them to adhere well there.

Such cladding panels have the advantage that the handling and manipulation steps are greatly reduced when installing the panels on site; it is simply necessary to introduce water into the groove using a corresponding device and/or apply it to the tongue in order to activate the cement if this is desired at all. If it is a cement that hardens as a result of the existing moisture in the air, this procedure also is not necessary.

One special advantage is that due to the mass of the cement that is provided in the cement bead at the factory, a correctly dimensioned or sufficient amount of cement is present, and handling or removal of cement that has been applied in excess in any case or emergence of the cement from the tongue-in-groove connection is eliminated.

To achieve the catch and/or adhesive connection, relatively small amounts of cement are

sufficient. In particular, contact between the groove and the tongues over as large an area as possible is to be achieved.

Here, especially glues that consist of water-soluble, animal (glutin, casein), vegetable (starch, dextrin, cellulose ether) or synthetic (polyacrylic acid derivatives, polyvinyl alcohol, polyvinyl pyrrolidone) polymers and water as solvents are suitable as cements. The latter belong to the class of single-component cold-setting cements in which the solvent (water) during the process of cementing is absorbed or evaporated. These glues harden as they cool, especially in a gelatin-like manner, and generally dry to a transparent mass that dissolves into a gel with high adhesive strength upon contact with water.

It is preferred when a cement that is dispersed in water or processed with water or a glue is applied as a cement bead and is dried in situ or at the factory. By the consumer applying water directly to this dried cement layer or by indirect intense contact with water that has been applied to the panel to be joined or its groove or tongue or by penetrating moisture, the dried cement is activated after the panels are joined to one another and returned into the active, adhesion-ready state. The application of the aqueous activator can take place by spraying or applying by means of a sponge or the like.

In one advantageous approach, first the cement beads are moistened with water, or a water film that at least wets the cement bead is applied or sprayed onto the tongues and/or into the grooves of the panels, and then the panels are joined to one another. The exposed time of the reactivated cement is chosen such that there is enough time for joining the panels to one another.

If the bead or strip is made of plastic, this embodiment has the advantage that the groove and the tongue can be easily locked to one another; if the bead or strip is formed from a cement, locking can take place accompanied by cementing.

5 It is advantageous if the tongue and groove can be connected over at least part of the insertion area of the tongue by a positive connection. In such an execution of the tongue and groove, the cohesion of the two cladding panels to be joined is improved and a coating with an essentially considerable stiffness is achieved. In this case, the cement of the cement beads can support the especially intimate connection between the groove and the tongue.

10 It is advantageous if parts of the bead are countersunk in recesses. In this way, the danger of damage or shearing-off of the cement beads or plastic beads when the tongue is inserted into the groove is reduced and their support on the surface to which the bead adheres is increased. Also, in this connection, it is advantageous if the cement bead adheres strongly in its recess and/or on the wall surfaces of the groove and/or the tongue surfaces. This strong adhesion is not to be entirely lost even when the cement is activated by contact with water; in particular this adhesion is to be made as
15 strong as possible. The beads advantageously need project only slightly out of the recess.

Advantageously it is provided that the groove and the tongue are each made lengthwise or in one lengthwise side and/or lengthwise and in one transverse side of a panel, optionally the tongue and/or the groove and/or the beads or strips extending over the entire length of the respective side surface. Thus, optimum connectability and optimum coherence are achieved over all of the sides of
20 the cladding panels during installation with the cladding panels to be connected.

The connection of the panels to be joined becomes simple when the wall surfaces of the groove and/or the tongue are made planar; joining of the flat surfaces is possible with little expenditure of force; it is simply necessary to overcome the elevations formed by the applied beads in order to insert them into the recesses. To do this, it is provided according to the invention that at least one leg, preferably the lower leg, of the groove can be widened or elastically bent up when the tongue is inserted and/or the plastic and/or cement used has the corresponding elastic behavior or viscosity.

The elastic widening of the legs of the groove undertaken by the locking cement beads can be partially, largely or completely cancelled again in the course of activation of the softening cement; thus the cross-sections of the cement beads can to a certain extent overlap. In this respect, it is advantageous if the cement is deformable.

It is provided according to the invention that the cement of the cement beads or strips be water-soluble or upon contact with or supply of water and/or moisture can be partially dissolved and/or activated and/or formed by water-soluble glue, e.g., white glue, and/or by a pressure cement or a cement that can be activated by pressure or that develops an adhesive action when pressure is applied.

It is furthermore provided according to the invention that the panel is formed from wood material, MDF, HDF, plastic, recycled plastic, chips or chips bonded with resin (particle board) and optionally on its front surface or useful surface and/or on its back is provided in each case with at least one coating, e.g., a decorative coating, especially of plastic, decorative paper, wood, or the

like.

The cross-sectional shape of the bead can be selected in a variety of ways; it is advantageous if the bead or strip and/or the recess and/or the recess in cross-section has a shape that is semicircular, lens-shaped, elliptical or elongated-rectangular, the transitions running rounded or
5 bevelled from the plane surfaces to the beads.

Good coherence of two panels that are to be connected or of the groove and tongue arises parts of the beads project over the tongue surface and wall surfaces of the groove. In such an embodiment, the cement bead is in good contact with the parts that are to be joined, specifically the tongue and groove of two panels that are to be connected.

10 It is especially advantageous if according to the invention the bead has properties of hardness, toughness or viscosity to withstand insertion of the tongue into the groove without deformation. In this way, the beads perform a double function, specifically they act as a locking element and as an element for connecting two panels.

15 It is advantageous if the tongue is an elongated strip-shaped component with a lengthwise bead. With such a component that is designated an external tongue, it is simply necessary to mill out grooves on the peripheral surfaces of a panel; the components can be quickly produced in large amounts. The components are joined to the panels in part at the factory or this remains for the user to do.

20 In one especially advantageous embodiment of the invention, the grooves and tongues are not aligned perpendicular to the side surfaces of the panels, but run perpendicular to the surface of

the panels. Thus, locking of the groove and tongue when the panels are installed can take place by movement that takes place perpendicular to the panel surface. Regardless of this, all the advantages of the above-described tongue-in-groove connection possibilities can be used or provided.

In accordance with one aspect of the present invention, there is provided a covering panel
5 for use in a plurality thereof selectively for floors, walls and ceilings, each panel having two
opposing edges and two opposing front surfaces and comprising a groove defined between an
upper leg and a lower leg and located along at least one of one edge and one front surface and a
tongue along at least one of a different edge and a different front surface, wherein each panel is
interconnectable to an adjacent panel by inserting one tongue of one panel into one groove in the
10 adjacent panel in the course of a displacement in a direction selected from substantially in a plane
of the panel plane, substantially perpendicularly to the plane of the panel, and in the course of
pivoting, and wherein

(i) at least one first bead constructed of a material selected from at least one of an adhesive and a
plastic is secured to a bead location selected from at least one of a groove wall surface, at least
15 one one of the upper and lower legs, and at least one tongue surface;

(ii) at least one second bead constructed of a material selected from at least one of an adhesive
and a plastic is secured onto the tongue at a tongue bead location on a tongue surface
corresponding with the bead location for the groove, such that on insertion of the tongue of the
panel into the groove of an adjacent panel, the at least one first bead and the at least one second
20 bead are engageable in a position selected from at least one of interlocked and interconnected.

8a

In accordance with another aspect of the present invention, there is provided a covering panel for use in a plurality thereof selectively for floors, walls and ceilings, each panel having two opposing edges and two opposing front surfaces and comprising a groove defined between an upper leg and a lower leg and located along at least one of one edge and one front surface and a tongue along at least one of a different edge and a different front surface, wherein each panel is interconnectable to an adjacent panel by inserting one tongue of one panel into one groove in the adjacent panel in the course of a displacement in a direction selected from substantially in a plane of the panel plane, substantially perpendicularly to the plane of the panel, and in the course of pivoting, and wherein

(i) a first bead set constructed of a material selected from at least one of an adhesive and a plastic is secured to a bead location selected from at least one of a groove wall surface, at least one of the upper and lower legs, and at least one tongue surface;

(ii) a second bead set constructed of a material selected from at least one of an adhesive and a plastic is secured onto the tongue at a tongue bead location on a tongue surface corresponding with the bead location for the groove, such that on insertion of the tongue of the panel into the groove of an adjacent panel, the first bead set and the second bead set are engageable in a position selected from at least one of interlocked and interconnected;

and wherein at least one of the tongue, the groove, and the first bead set and the second bead set extend over an entire length of a respective lateral surface and edge.

In accordance with another of the present invention, there is a covering panel, the covering panel being made from any one of wood, wood material, MDF, HDF, plastic, recycled plastic, chips with synthetic resin and bonded chips, and being configured for cooperation with similar covering panels to form floors, walls and ceilings, the covering panel comprising:

8b

a first edge having a tongue with an insertion area extending to a free end associated therewith and a second edge having a groove defined between opposed legs, the tongue and groove having opposed wall surfaces associated therewith, the covering panel being joinable with adjacent similar covering panels upon receiving a tongue of a similar covering panel in the groove and upon inserting the free end of the tongue into the groove of another similar covering panel to form floors, walls or ceilings, the panels each having top surface areas; the tongue and groove being disengageable when the tongue is inserted into the groove;

a first bead set having an interface with and adhered to the wall surface of the tongue, the first bead set having a rear surface spaced a selected first distance from the first end face;

a second bead set having an interface with and adhered to a wall surface of the groove, the wall surface being on at least one of the opposed wall surfaces of the legs forming the groove, the second bead set having a rear surface, spaced a selected second distance from the second end face, the first and second selected distances being at least approximate one another wherein the rear surfaces and face one another to mechanically lock the tongue within the groove when the tongue is inserted into the groove;

the first bead set and the second bead set being comprised entirely of an adhesive, the adhesive comprising an adhesive cement, adhesive plastic or an adhesive composite of cement and plastic; the first bead set and the second bead set being adhered to one another upon the panels being joined;

the first bead set being positioned at a first location on the outer surface of the tongue and the second bead set being positioned at a second location on the inner surface of at least one leg of the groove; wherein when the tongue of the covering panel has been inserted into the groove of an adjacent similar covering panel to bring the edges and into proximity, the first bead set has passed over the second bead set thereby positioning the first bead set behind the second bead set

8c

with the rear surface of the first bead set facing the rear surface of the second bead set and with the edges and in proximity to mechanically lock the tongue within the groove, and wherein when the covering panel receives in the groove the tongue of a similar covering panel, the first bead set on the tongue of the similar covering panel passes over the second bead set on the covering panel
5 and by simultaneous_mechanical and adhesive contact therebetween while the first bead set and the second bead set are within the groove holds the tongue within the groove of the covering panel, whereby a surface is configured that is further extendible by still additional similar covering panels, and wherein the first bead set and the second bead set of the covering panel have been
10 deposited on the outer wall surface of the tongue and on the inner wall surface of the groove during manufacture of the covering panels prior to delivery of the covering panels from a facility making completed panels.

Brief Description of the Drawings

The invention is explained in more detail below using the drawings that constitute, for example, schematic embodiments of the invention, in which:

Figure 1 is a cross-sectional view of panel edges in an embodiment of the invention;

5 Figure 1a shows the panel edges of Figure 1 in an engaged position;

Figures 2 to 8a are cross-sectional views of panel edges in further embodiments of the invention;

Figure 9 is a top view of two panels in an embodiment of the invention in position for being joined together;

10 Figures 10, 10a are cross-sectional views of beads provided to panel edges in an embodiment of the invention;

Figure 11 is a cross-sectional view of panel edges in a further embodiment of the invention including an external tongue;

15 Figure 12 is a cross-sectional view of panel edges in a further embodiment of the invention;

Figure 13 is a view showing the relative dimensions of a bead in an embodiment of the invention;

Figure 14 is a cross-sectional view of panel edges in a further embodiment of the invention; and

20 Figure 15 shows the panel edges of a further embodiment of the invention in an engaged

position.

Detailed Description of the Invention

Figures 1, 1a, 2 to 8 and 8a show schematic sections through cladding panels; Figure 9 schematically shows the joining of two cladding panels to one another; Figure 10 and Figure 10a show sections of beads; Figure 11 shows one embodiment of the invention in which the tongue is made in the form of an "external" tongue and is inserted into the grooves of adjacent panels or panels that are to be joined; Figure 12 shows one especially advantageous embodiment of the invention. Figure 13 shows the dimensions of a bead. Figures 14 and 15 show further embodiments of the invention.

Figure 9 schematically shows two cladding panels 1, 2 that are to be moved onto one another in the direction of the arrow 20 and joined to one another. This joining that takes place by movement can or should take place as the last connection step only in the plane spanned by the two panels 1, 2. The two panels on their lengthwise sides and/or narrow side each have a tongue 6 that projects from the end face 17 and on the opposing lengthwise side and/or narrow side have a groove 12 that is made in the end face 17. The same conditions can prevail on the end faces 17 of the narrow sides; each of the panels 1, 2 can each have one groove 12 and one tongue 6 on the end face 17 of these narrow sides.

The shape of the groove and the shape of the tongue are matched to one another in order to ensure a good connection between the groove and the tongue. This shape allows the tongue 6 to be inserted into the groove 12 when the panels 1, 2 are aligned in the plane of the panel. It is possible

to connect the panels 1, 2 in a checkerboard manner or offset against one another. Both the connection on the lengthwise sides and also on the narrow sides takes place by displacement essentially in the plane that is spanned by the panels 1, 2. The type of connection according to the invention could also be provided only on the transverse and narrow sides of panels that are
5 connected on the lengthwise side in some other way, e.g., by swivelling or pivoting the panel to be connected.

Figure 1 schematically shows a section through two panels 1, 2 that are to be joined. The panel 1 has a tongue 6 that is inserted into a groove 12 of the panel 2 until the end faces 17 adjoin one another in the top area or in the area that is near the surface 18 of the panels 1, 2. The bordering
10 edges of the groove 12 and/or the tongue 6 can be rounded or beveled.

On at least one tongue surface, in this case the tongue surface 7 near the surface, a bead 8 is applied or adheres especially securely to the tongue surface 7. At the corresponding or assigned location of the wall surface 5 of the groove 12 or of the leg 3, which wall surface is near the surface, when the panels have been joined, another bead 9 that is matched to the location of the bead 8 is
15 formed in the otherwise preferably flat wall surface 5. When the two panels 1, 2 are joined or when the tongue 6 is inserted into the groove 12, the bead 8 comes to rest in the area behind the bead 9 or can lock with this other bead 9.

It is advantageously provided that the cement of at least one of the cement beads or strips 8, 9 is water-soluble or upon contact with or supply of water and/or moisture can be partially
20 dissolved and/or activated and/or is formed by water-soluble glue, e.g., white glue, and/or by a

pressure cement or a cement that can be activated by pressure and that develops an adhesive action when pressure is applied. The cement of the cement beads 8, 9 can be activated by wetting the cement beads 8, 9 with water before joining the panels 1, 2 or by delivering water to the groove 12 and/or the tongue 6. Depending on the choice of the cement, it can also be provided that after
5 locking of the cement bead 8 with the bead 9 by the atmospheric humidity that penetrates in the use of the panels 1, 2, the adhesive capacity of the cement beads 8, 9 is activated and thus an adhesive connection between the tongue 6 and the leg 3 of the groove 12 is produced. Fundamentally, cements can also be used that can be activated with substances other than water.

For joining the panels 1, 2 in this case for insertion of the tongue 6 provided with the bead 8
10 into the groove 12, it is provided according to the invention that at least one leg 3, 4 of the groove 12 can be elastically widened or elastically bent up when the tongue 6 is inserted.

Fundamentally, it is possible to form at least one or more bead(s) 8 or 9 that lie parallel next to one another on one or both tongue surfaces 7 or on one or both wall surfaces 5 of the groove 12. It must simply be watched that to each bead 8 is assigned a corresponding other bead 9 at the
15 corresponding location in the wall opposite it, so that these two beads 8, 9 can lock, as is shown in Figure 1a.

Accordingly, in Figure 2, two beads 8 applied to the tongue 6 are made; at the corresponding site on the wall surface 5 of the groove 12, two other beads 9 correspond to these beads 8. In this way, the cementing and/or the locking of the groove and tongue can be improved.

20 In one embodiment of the invention according to Figure 3, it is provided that the two tongue

surfaces 7 converge toward the free end of the tongue 6 and that the wall surfaces 5 of the groove 12 are tilted at the same angle as the tongue surfaces 7 and converge to the inside.

It can apply to this and also to all other embodiments that advantageously the tongue 6 and the groove 12 can be connected at least over one part or optionally over the entire insertion area(s) of the tongue 6 by positive connection or with a snug fit and/or that the area of the tongue 6 that lies in front of the bead or strip 8 toward the free end of the tongue 6 can be inserted by a positive connection or with a snug fit into the groove 12. In all embodiments, it can be provided that the tongue 6 and/or the groove 12 and/or the beads 8 and 9 extend over the entire length of the respective side surface 17, and/or that the beads 8 and 9 and optionally the recess 10 (Figure 8) extend continuously over the length of the groove and/or of the tongue 6 or are made or applied in the form of individual successive sections.

As the material for the panels according to the invention, it is advantageously provided that the panel 1, 2 is formed from wood, wood material, MDF, HDF, plastic, recycled plastic, chips with synthetic resin or bonded chips (particle board) and optionally is provided on its front or useful surface and/or on its back in each case with at least one coating 13, 14, e.g., a decorative coating, especially of plastic or decorative paper. Furthermore, it can be advantageously provided that the groove 12 and the tongue 6 are made from the material of the panels 1, 2 or are milled out of them, or that the tongue 6 is formed integrally with the material of the panels 1, 2. For all embodiments and also in the embodiment according to Figure 3, it can be provided that the bead(s) or strip(s) 8 can be locked to the assigned other bead(s) 9 in the tongue 6 and/or in the groove 12 and the bead(s)

9 or strip(s) 8 and the other bead(s) 9 interact as locking elements.

In the embodiment according to Figure 4, it is provided according to the invention that on one wall surface 5 of the groove 12, a bead 8 that has a somewhat rectangular cross-section is formed; a lens-shaped bead 9 is formed at the corresponding position on the tongue surface 7. Thus, both locking and also cementing of the two panels 1, 2 that are to be joined to one another become possible.

In one embodiment according to Figure 5, it is provided that on the tongue surface 7 near the surface, a bead 9 is formed, and that on the tongue surface 7 away from the surface a bead 8 is applied. Accordingly, one bead 8 is formed on the wall surface 5 of the leg 3 of the groove 12 near the surface, and another bead 9 is formed on the wall surface 5 of the leg 4. As Figure 5 also shows, in each case the bead 8 and the other bead 9 are assigned positionally to one another in order to enable the corresponding locking and optionally cementing.

In the embodiment according to Figure 6, it is provided that on each tongue surface 7, in each case two other beads 9 at a time are made at a distance from the end face 17 of the panel 1; accordingly, on the two wall surfaces 5 of the legs 3 and 4, in each case two beads 8 are formed at a corresponding interval or at the corresponding distance from the end face 17 of the panel 2.

It can be provided according to the invention that some of the bead or strip 8 and 9 is arranged countersunk in a recess 10 that is made in the wall surface 5 of the groove 12 and/or in the tongue surface 7. At the same time, the recess 10 helps the applied bead 8 or 9 to be joined securely to the respective wall surface and not to be sheared off when the tongue 6 is inserted into the groove

12. As shown in Figure 10, the beads 8, 9 can also be extended over the recess 10 onto the surfaces 5 or 7. As shown in Figure 13, the recesses 10 can also have areas 20 that are free of bead material and in any case are filled with bead material when the latter softens in the cementing process.

5 The panels 1, 2 can be provided with coats 13 or 14, e.g., of wood, plastic, paper or the like, in order to configure the useful surface or bottom surface accordingly. These supports, however, do not have any effect on the connecting technique according to the invention.

10 The selected cross-sections of the beads 8 and 9 and of the recesses 10 are optional; the region of the bead 8 or 9 that projects out of the recess 10 or over the wall surface 5 of the groove 12 or the tongue surface 7 is held by the recess 10 especially during cementing or softening or comes into contact with its surfaces and optionally cements the tongue 6 to the legs 3, 4 of the groove 12. The cross-sectional shape of the recess 10 can be oblong, rectangular, triangular, lens-shaped, triangularly elliptical or the like.

15 Fundamentally, at least as shown in Figure 8a, the bead 8 could also be formed by a series of individual beads lying directly next to one another. In this case, there can be the corresponding shaping of the beads 8, 9 and/or the corresponding water application for the cement bead 8, 9 or this cement bead is partially dissolved accordingly so that the latter can soften sufficiently.

20 It is to be generally avoided that the legs 3, 4 of the groove 12 that are elastically widened when the tongue 6 is inserted into the groove 12 remain in the widened position. In the widened state, the joint 16 between the surfaces 18 of the two panels 1, 2 could form a step that would be subjected to increased wear, provided that not only the lower leg remains elastically widened. In

one especially advantageous embodiment of the invention, it is provided that the leg 3 of the groove 12 that is near the surface is made more or less elastic, especially inelastic anyway, and only the leg near the bottom or the lower leg of the groove is made able to deflect elastically. Thus, it can be avoided that the upper leg 3 near the surface will be bent up by more or less deformable beads 8, 9, but only the lower, weaker or thinner leg 4 of the groove 12 is bent down. To prevent the upper leg 3 of a groove 12 from bending up, it can also be advantageously provided that the bead(s) 8, 9 is (are) made simply on the tongue surface 7 that is pointed down and on the wall surface 5 of the lower leg 4 of the groove 12. In this way, both the tongue 6 and also the upper leg 3 of the groove 12 would counteract the arching of the connecting site if the extent or the volume of the bead is made too large or, when a cement is used, the latter is not made soft enough and/or the volume stipulated for it between the groove and tongue is not made large enough.

The shape of recess 10 can be lens-shaped, triangular, semi-elliptical or oblong-rectangular. It is provided that this recess 10 is made as a depression in the otherwise flat tongue surface 7 or the flat wall surface 5 of the groove 12. Thus, the cement application or the amount of plastic for the beads 8, 9 should be defined or limited to certain areas.

In an embodiment of Figure 8 according to the invention, it is provided that in the tongue surfaces 7 of the tongue 6, recesses 10 are made that each accommodate one bead 8. In this case, the two beads 8 can have different cross-sections. It is quite possible to make the beads different that are located in the two wall surfaces 5 of a groove 12 or on the two tongue surfaces 7 of a tongue 6. In the case of Figure 8, the bead 9 that is made in the leg 3 is larger than the recess 9 that

is made in the leg 4.

Advantageously, the beads 8, 9, as shown in Figure 10a, are triangular in cross-section with a rounded edge in order to lock well onto one another. The flank angles are between 30 to 60°, especially between 40 and 50°. If or as long as no cementing action occurs, the joint can also be
5 separated.

It can be advantageous if the front edge areas of the tongue 6 have rounding or bevelling 19 as is shown in Figures 1, 3 or 7 and 8 in order to push the legs 3, 4 or the beads 8, 9 apart from one another as carefully as possible when the tongue 6 is inserted into the groove 12.

In principle or in all embodiments, the tongue 6 can have rounding 19 directly in front of the
10 beads 9. Thus, it also becomes possible to make the tongues 6 shorter and the groove 12 less deep. The joint 16 in the area of the panels 1, 2 that is near the surface is made such that the areas of the end face 17 that is near the surface adjoin one another and a gap is avoided as far as possible. In the area of the panels 1, 2 that is away from the surface or near the bottom, it is provided that the end faces 17 do not touch one another or that a gap 15 is formed between them. This is achieved
15 especially in that the leg 4 of the groove 12 near the bottom is made slightly shorter than the leg 3 near the surface.

It is generally advantageous if the beads or strips 8, 9 are applied roughly in the middle or in the middle area on the tongue surface 7 or on the wall 5 of the groove 12 or of the legs 3, 5.

Figure 13 incorporates different dimensions of the beads, especially a cement bead 8, 9, and
20 of the groove 12. Using this figure, some data with respect to advantageous embodiments of beads,

especially cement beads, are given.

It can be provided according to the invention that the width B of the bead or strip 8 or 9 is one to nine times, preferably one to seven times, especially two to five times, as great as its height H. Furthermore, according to the invention, it can be provided that the cement bead or strip 8, 9
5 comprises an adhesive-latent cement material, preferably a polymer cement that can be emulsified with water, and the cement material can be converted into the adhesive-ready or adhesive state by wetting with water, and/or that the plastic or the cement material of the cement bead or strip 8 and 9 that can be (re)activated by means of water or moisture is applied with an essentially uniform layer thickness of 0.1 to 0.6 mm, especially from 0.2 to 0.5 mm, at thickness tolerances in the range from
10 ± 0.05 to 0.1 mm, and/or that the cement of the cement bead or strip 8 is formed by a quick-setting or mounting glue based on polyvinyl acetate, such as, for example, Dorus MDO 55 from the Henkel Company, or a commercial wood glue, e.g., based on starch and protein. It can be advantageous if the width B of the cement bead or strip 8 corresponds to 5 to 25%, preferably 9 to 21%, especially 12 to 17%, of the thickness D of the groove 12.

15 It should be noted that the attachment of the beads 8, 9 to the corresponding surfaces 5, 7 can take place either directly on these surfaces 5, 7 or in the recesses 10 that were made in the especially flat surfaces 5, 7. Advantageously, the applied beads 8, 9 project roughly 0.1 to 0.2 mm over the respective surface 5, 7.

Advantageously, the tongue 6 on each tongue surface 7 bears a bead 9 and on each leg 3, 4
20 of the groove 12, a cement bead 8 is optionally applied in a recess 10.

The important action of the applied beads 8, 9 consists in their locking action that is used especially in the course of installing and matching of the panels to be joined.

When the edges of the free end of the tongue 6 are rounded accordingly and/or the inner edges of the wall surfaces 5 of the legs 3, 4 of the groove 12 are rounded, it is also possible during
5 installation to first lay the panels 1, 2 to be joined to one another at a certain angle on one another in order to attain entry of the tongue 6 into the groove 12 to a certain extent. The final locking of the tongue 6 and the groove 12 or the last interlocking step that ends with contact of the end faces 17 in the area near the surface is in any case only possible when the panels 1, 2 are moved relative to one another in the plane of the panels.

10 Care should be taken that the cement is softened or becomes soft accordingly so that no unevenness is formed in the joint area of the panels 1, 2 that are to be joined to one another. The amount of cement to be applied in the cement beads 8, 9 depends mainly on the geometrical circumstances between the tongue 6 and the groove 12 or on the size of the recesses 10 and especially also on the viscosity of the reactivated cement.

15 Figure 11 shows one embodiment of the invention in which the tongue construction is made such that the side surfaces 17 on which a panel 1, 2 should have a tongue, which is designed to interact with a groove of a panel that is to be joined, are made such that first a groove 12 is also formed there into which a tongue 6' of an independent component can be inserted. This tongue 6' is an independent component instead of the tongue 6 described in the figures and the description and
20 the claims and is connected or can be connected to one of the panels 1, 2, optionally at the factory.

The tongue 6' is made along its two sides like a tongue 6 and is made on both sides such as is described in conjunction with the description, the drawings and the claims for a tongue 6. It can be provided that the tongue is made as a mirror image. With one side, the tongue 6' is inserted into a groove of the panel 1 and with its other side (during installation) into a groove of the panel 2. The
5 beads 8 and 9 on the tongue surface 7 lock with the beads 8 and 9 in the legs 3, 4 of the respective grooves 12.

The component 6' constitutes a double tongue 6. The advantage of this so-called external tongue is that the panels 1, 2 can be made solely with the corresponding grooves 12 all around on their side surfaces and the external tongues 6' can be inserted into the grooves 12 at the factory or
10 just during installation. The insertion of an external tongue 6' also takes place in the plane of the respective panel 1, 2. The panels 1, 2 are also joined when the external tongues 6' are inserted at least in the last joining step by displacement in the plane of the panel.

All statements regarding the tongues 6 apply both to the left part and also to the right part of the component 6' that is shown in Figure 11.

15 Figure 12 shows one embodiment of the invention in which the grooves 12 are not made perpendicular to the side surfaces 17, but rather run perpendicular to the surface of the panels 1, 2, i.e., turned by 90° . The groove area A is built up or designed in the same manner as grooves 12, which are described in Figures 1 to 11 or the pertinent description and the pertinent claims. A tongue 6 interacts with this groove 12 and likewise corresponds to the tongues 6, as the latter were
20 described in the previous Figures 1 to 11 as well as in the previous description and claims. The

tongue 6 can likewise be regarded as turned by 90° . The area A thus represents nothing other than the connecting area of a tongue 12 with a groove 6 that has long been described, only that in this case the groove 12 and the tongue 6 run perpendicular to the surface of the panel 2. Therefore a connection of the panels 1, 2 takes place not only by displacement in the plane of the panel, but by displacement perpendicular to the surface of the panels 1, 2. It is not easily possible to swivel the panels in; in the final step of joining, a linear movement perpendicular to the plane of the panel takes place.

As already described above in conjunction with Figures 1 to 11, the beads 9 and the beads 8, especially cement beads, are made on the wall surfaces 5 of the groove 12 and/or on the tongue surfaces 7 in order to effect mutual locking of the groove 12 with the tongue 6 and in any case mutual cementing.

Furthermore, the area B can also be defined as a groove area that has been turned by 90° and that is formed in the panel 2 in the sense of the preceding description and Figures 1 to 11 and the claims. The leg 4 of this groove area B interacts, on the one hand, as a tongue 6 with the groove 12 of the area A; the leg, on the other hand, however, also with the body 31 of the panel 2, forms a groove 12' into which the leg 4 of the area A can be inserted. One or both sides of the leg 4 can be provided with beads 8 and 9 that interact with beads 8 and 9 that are made in/or on the wall surfaces 5' of the groove 12'. The design of such beads 8 and the other beads 9 in the groove 12 and/or on the tongue 6 was already described in detail in the preceding description.

If it is provided that the panel 2 in its side end area ends with a boundary surface 30 at a

distance from the outside leg 4 of the groove 12 in order to facilitate joining of the panels 1, 2, the corresponding beads 8 and 9 are provided simply on the tongue 6 that can be inserted into the groove 12 of the area A of the panel 1.

The leg 3 of the groove 12 in the panel 1 is integrated into the panel body of the panel 1 or
5 is represented by the panel body.

The beads 8 and 9 can also be located in recesses 10 here; however, such recesses 10 are not indicated in Figure 12. The above-described cements and/or plastics are used for the beads 8 and 9.

The grooves 12, tongues 6 and recesses 10 are preferably produced by milling.

The shape of the grooves 12 and the tongues 6 are advantageously matched to one another,
10 but this is not absolutely essential. Grooves and tongues that have not been matched to one another in terms of shape can also be held together with the beads 8, 9 provided according to the invention.

The beads 8 and/or 9 can also be applied in the form of successive partial pieces, i.e., optionally with interruptions.

It is advantageous if at least one bead extends parallel to or along the edge of the end face
15 17 or in the lengthwise direction of the panel 1, 2. Fundamentally, the path of the bead, optionally dictated by production or by intention, can deviate from a parallel course with respect to the lengthwise extension of the panel.

Figure 14 shows cladding panels 1, 2 that can be connected to one another by swivelling and by simultaneously bringing them together. According to Figure 14, bottom, one panel 1 on at
20 least one side surface has a groove 12 with inside surfaces that run curved. The tongue 6 of the

panel 2 that is to be joined has tongue surfaces with a curvature that is matched to the curvature of the groove side surfaces 5. Furthermore, the thickness of the tongue 6 corresponds to the width of the groove 12 or is slightly less than the latter.

In this case, the tongue on its tongue surfaces bears at least one bead or strip 8 that can be
5 locked to at least one other bead 9 on the groove side surfaces 5, as is shown in Figure 15.

The mutual connection of the panels 1, 2, as is shown in Figure 14, bottom, takes place as shown in Figure 14, top. The panel 2 to be connected is attached obliquely to the already installed panel 1 and the end area of the tongue 6 is inserted into the groove 12. Thereupon, the attached panel 2 is lowered or swivelled down, the tongue 6 being inserted into the groove 12. At the same
10 time, the panels 1, 2 are brought together. In the final stage of the connecting motion, the beads 8 lock with the other beads 9 and support the prepared connection. Figure 14 schematically shows three positions of the panel 2 that is to be connected. In the uppermost position that is made cross-hatched, the panel to be connected is in a position in which the tongue 6 is inserted into the groove 12 to a certain extent. As the attached panel 2 continues to swivel down, as can be seen from the
15 illustrated middle position, the tongue 6 penetrates deeper into the groove 12 until in the connected position, at least the front areas of the panels on the surface side lie against one another and the tongue 6 is held by the groove 12 such that the beads 8 interact or lock with the other beads 9, as is shown schematically in Figure 15.

It is advantageous here if the radii of curvature of the inside surfaces of the groove 12 and of
20 the surfaces of the tongue 6 are made the same size, or the thickness of the tongue 6 corresponds to

the width of the groove 12 or is kept somewhat smaller.

It is quite generally advantageous if the beads 8 and 9 are directly opposite one another with respect to the tongue 6 and the groove 12.

It is possible to make several beads 8 and other beads 9 interacting with one another on the
5 curved tongue surfaces and on the curved groove side surfaces.

It is furthermore possible for the tongue surfaces and the side surfaces of the groove 12 to have straight and curved segments, the straight segments not preventing or allowing swivelling of the attached panel 2 when two panels 1, 2 are being joined.

Quite generally, the beads 8 and the other beads 9 extend behind one another, or the beads 8
10 on the tongues 6 extend behind the other beads 9 in the groove 12. The location of the beads 8 and of the other beads 9 on the tongue surfaces and the side wall surfaces of the grooves 12 is chosen accordingly. The beads 8, 9 that extend behind one another adjoin one another or can be connected to one another.

The other beads 9 on the wall surfaces of the groove 12 hold the beads 8 securely on the
15 tongue surfaces and thus in the groove 12.

When the tongue 6 is inserted into the groove 12, the groove legs can be slightly, optionally permanently, widened or bent up.

The catch function of the beads 8 and the other beads 9 is essentially the same when they are being inserted and pivoted in.

20 In particular, in Figures 1a, 12 and 15, the beads 8, 9 and the catch gap between the tongue

6 and the groove wall surface were shown overdimensionally large and not to scale, but only schematically in order to explain the locking.

All features relating to the panels that can be joined for insertion in a plane can also be implemented for panels that can be joined by swivelling. This relates especially to the materials as
5 well as the shape and position of the beads.

WE CLAIM:

1. A covering panel for use in a plurality thereof selectively for floors, walls and ceilings, each panel having two opposing edges and two opposing front surfaces and comprising a groove defined between an upper leg and a lower leg and located along at least one of one edge and one front surface and a tongue along at least one of a different edge and a different front surface, wherein each panel is interconnectable to an adjacent panel by inserting one tongue of one panel into one groove in the adjacent panel in the course of a displacement in a direction selected from substantially in a plane of the panel plane, substantially perpendicularly to the plane of the panel, and in the course of pivoting, and wherein

(i) a first bead set constructed of a material selected from at least one of an adhesive and a plastic is secured to a bead location selected from at least one of a groove wall surface, at least one of the upper and lower legs, and at least one tongue surface;

(ii) a second bead set constructed of a material selected from at least one of an adhesive and a plastic is secured onto the tongue at a tongue bead location on a tongue surface corresponding with the bead location for the groove, such that on insertion of the tongue of the panel into the groove of an adjacent panel, the first bead set and the second bead set are engageable in a position selected from at least one of interlocked and interconnected;

and wherein at least one of the tongue, the groove, and the first bead set and the second bead set extend over an entire length of a respective lateral surface and edge.

2. A panel according to claim 1, wherein the panel is constructed of material selected from medium density fibreboard, high density fibreboard, plastic material and recycled plastics.

3. A panel according to claim 1 or 2, wherein each of the first bead set and the second bead set are pre-bonded into the respective locations.

4. A panel according to claim 1, wherein the groove and the tongue are each formed on a

longitudinal side and on a transverse side of the panel at a location selected from a front side and an edge region.

- 5 5. A panel according to claim 4, wherein at least one tongue surface has a configuration selected from converging towards the free end of the tongue and extending parallel to the surface of the panel.
- 10 6. A panel according to claim 4 or 5, wherein at least one wall surface of the groove is inclined under the same angle as the associated or engaging tongue surface and has a configuration selected from converging towards the exterior and extending parallel to the surface of the panel.
- 15 7. A panel according to any one of claims 1 to 6, wherein the tongue and the groove are constructed and arranged to be interconnected, at least over part of an insertion region of the tongue in a fit selected from positive insertion and an interlocking fit.
8. A panel according to claim 7, wherein at least an area of the tongue located between the respective bead and the free end of the tongue is constructed and arranged to be received in the groove in a fit selected from positive insertion and an interlocking fit.
- 20 9. A panel according to any one of claims 1 to 8, wherein at least one of the first bead set and the second bead set extend in a form of successive, spaced bead segments along the respective lateral surface and edge.
- 25 10. A panel according to any one of claims 1 to 9, wherein part of at least one of the first bead set and the second bead set is countersunk in a recess formed in the respective one of the wall surface of the groove and the respective tongue surface.
- 30 11. A panel according to claim 10, wherein at least one of the wall surface of the groove and the tongue surfaces are planar surfaces, and the recesses constitute depressions in the respective planar surfaces.

12. A panel according to claim 10, wherein the recess has a configuration selected from extending continuously over the length of the respective one of the groove and the tongue and comprising a plurality of individual segments.
- 5 13. A panel according to any one of claims 1 to 12, wherein each bead comprises an adhesive selected from a water-soluble adhesive partially activated upon contact by at least one of water and moisture, a water-soluble white glue, a pressure responsive adhesive, a pressure-activated adhesive.
- 10 14. A panel according to claim 13, wherein each bead comprises an adhesive having properties selected from hardness, tenacity and viscosity, to withstand insertion of the tongue into the groove and retain its shape to act as a locking element at least until any adhesive effect occurs.
- 15 15. A panel according to any one of claims 1 to 14, wherein the upper and lower legs defining the groove are of substantially equal length.
16. A panel according to claim 15, wherein one of the legs is elastically movable with a movement selected for bending and widening when the corresponding tongue is inserted.
- 20 17. A panel according to claim 16, wherein the elastically movable leg is the lower leg.
18. A panel according to any one of claims 1 to 17, wherein the panel is constructed in a manner selected from each groove and each tongue being formed of the material of the panel, each groove and each tongue being milled out of the panel, and the tongue being integrally
25 formed with the panel.
19. A panel according to any one of claims 1 to 18, wherein at least one surface comprises a plastic decorative coating.
- 30 20. A panel according to any one of claims 1 to 19, wherein on interconnection with an adjacent panel, a gap is formed between respective lower surfaces of the panels.

21. A panel according to any one of claims 1 to 20, wherein at least one of the first bead set and the second bead set have a cross-sectional shape selected from semi-circular, lenticular, semi-elliptic and elongated rectangular.

5

22. A panel according to claim 10, wherein the recess has a cross-sectional shape selected from semi-circular, lenticular, semi-elliptic and elongated rectangular.

10

23. A panel according to any one of claims 1 to 22, wherein at least one of the first bead set and the second bead set is countersunk in a recess and projects beyond the respective one of the wall surface and the tongue surface, and comprises a projecting portion constructed and arranged to be a retaining element.

15

24. A panel according to claim 23, wherein the projecting portion comprises an element constructed and arranged to develop an adhesive action.

20

25. A panel according to any one of claims 1 to 24, wherein when adjacent panels are interconnected together, cross-sections of the first bead set and the second bead set overlap so that their respective wall regions are in contact.

25

26. A panel according to any one of claims 1 to 25, wherein at least one of the first bead set and the second bead set are located in a mid-region of the respective one of the wall of the groove, the legs and the tongue surface, and spaced from the front surface of the panel.

27. A panel according to claim 26, wherein at least one of the first bead set and the second bead set projects beyond the respective one of the wall surface and the tongue surface, and has a rounded cross-sectional configuration.

30

28. A panel according to any one of claims 1 to 27, wherein at least one of the first bead set and the second bead set comprises a deformable adhesive.

29. A panel according to claim 28, wherein the bead is deformable under the effect of at least one of water action, moisture and pressure.

30. A panel according to claim 28 or 29, wherein the bead is countersunk in a recess and is deformable to adapt to a cross-sectional shape of the recess.

31. A panel according to any one of claim 28 or 29, wherein the bead is deformable while simultaneously developing its adhesive action.

32. A panel according to any one of claims 1 to 28, wherein each bead has a bead width which is between twice and nine times its bead height.

33. A panel according to claim 32, wherein the bead width is between twice and seven times the bead height.

34. A panel according to claim 33, wherein the bead width is between three and seven times the bead height.

35. A panel according to any one of claims 1 to 29, wherein each bead has a bead width which is between 5% and 25% of a thickness of the groove.

36. A panel according to claim 35, wherein the bead width is between 9% and 21 % of the thickness of the groove.

37. A panel according to claim 36, wherein the bead width is between 12% and 17% of the thickness of the groove.

38. A panel according to any one of claims 1 to 37, wherein at least one of the first bead set and the second bead set is constructed and arranged to adhere firmly to the respective one of the surfaces.

39. A panel according to any one of claims 1 to 37, wherein at least one of the first bead set and the second bead set is countersunk in a recess and is constructed and arranged to adhere firmly to the recess.

5 40. A panel according to any one of claims 1 to 39, wherein when adjacent panels are interconnected together, the first bead set and the second bead set are in an adjacent contacting position.

10 41. A panel according to any one of claims 1 to 40, wherein at least one of the first bead set and the second bead set comprises an adhesive-latent adhesive partially activated upon contact by at least one of water and moisture.

42. A panel according to claim 41, wherein the adhesive is a polymer adhesive emulsifiable in water.

15 43. A panel according to claim 41 or 42, wherein the adhesive comprises a glue based on polyvinyl acetate and selected from a quick-setting glue and a mounting glue, and a commercial wood glue, based on at least one of a starch and a protein.

20 44. A panel according to any one of claims 1 to 43, wherein the tongue proximate its free end comprises a chamfered region.

45. A panel according to claim 44, wherein the chamfered region is connected to the second bead set.

25 46. A panel according to any one of claims 1 to 45, wherein the tongue has an elongated, ledge-shaped configuration, comprises at least one second bead longitudinally extending and substantially parallel to a longitudinal dimension of the tongue, and at least one corresponding first bead is provided to at least one leg of the groove.

30 47. A panel according to claim 46, wherein the tongue is symmetric at least with respect to one

of its longitudinal centre planes.

48. A panel according to claim 47, wherein the tongue is symmetric with respect to a centre plane perpendicular to a plane selected from a tongue surface and the plane of the panel.

5

49. A panel according to claim 47 or 48, wherein the tongue is constructed and arranged to be inserted into a groove in a longitudinal side of the panel.

10

50. A panel according to any one of claims 1 to 49, wherein the upper leg of the groove has properties selected from being stronger, thicker and less elastically flexible than the lower leg.

51. A panel according to claim 50, wherein the first bead set is formed only on the lower leg of the groove, and the second bead set is formed only on a downwards directed surface of the tongue surface.

15

52. A panel according to any one of claims 1 to 51, wherein each of the groove and the tongue are formed to extend perpendicularly to the surface of the panel and at least one bead of the first bead set is located to be engageable by a means selected from locking and cementing to the at least one second bead by a movement perpendicular to the panel plane.

20

53. A panel according to claim 52, comprising a second groove extending perpendicularly to the panel surface, having an outer leg constructed and arranged to be inserted into a first groove formed between the tongue of an adjacent panel and the panel body by a movement perpendicular to the panel plane.

25

54. A panel according to claim 53, wherein an upwards open groove is formed along one side of the panel, and a downwards directed tongue is formed along an opposing side of the panel.

55. A panel according to claim 54, wherein the tongue and the groove are formed by milling.

30

56. A panel according to any one of claims 1 to 55, wherein each of the first bead set and the

second bead set are constructed and arranged to be engageable in a manner selected from gripping behind one another, and being pressure biased by a widening of at least one of the legs of the groove during insertion of the tongue into the groove.

5 57. A panel according to any one of claims 1 to 56, wherein the first bead set and the second bead set extend parallel to and along the edges of the panel.

10 58. A panel according to any one of claims 1 to 57, wherein the groove comprises curved surfaces selected from lateral and inner groove surfaces and the tongue comprises curved tongue surfaces.

59. A panel according to claim 58, wherein the curved surfaces of the tongue and the groove have configurations selected from at least one of

- 15 (i) each being curved in the same direction;
(ii) each possessing a radius of curvature which points to the same side of the panel;
(iii) each of the curved surfaces extending parallel to one another; and
(iv) each of the tongue surfaces and the groove surfaces extending parallel to each other.

20 60. A panel according to any one of claims 1 to 59, wherein the tongue and the groove have a compatible configuration selected from uniform thickness over their course, and having decreasing thicknesses such that the groove thickness decreases in a direction towards the groove wall surface, and the tongue thickness decreases in a direction towards the tongue free end.

25 61. A panel according to claim 60, wherein the first bead set and the second bead set are located to be opposite to each other.

62. A panel according to claim 60 or 61, wherein the tongue and the groove have corresponding cross-sectional configurations.

30 63. A panel according to any one of claims 1 to 24, wherein when adjacent panels are interconnected together, cross-sections of the first bead set and the second bead set overlap so

that their respective wall regions are in contact under an action of pressure .

64. A panel according to any one of claims 1 to 63, wherein the first bead set or the second bead set further comprises one or more beads.

5

65. A covering panel, the covering panel being made from any one of wood, wood material, MDF, HDF, plastic, recycled plastic, chips with synthetic resin and bonded chips, and being configured for cooperation with similar covering panels to form floors, walls and ceilings, the covering panel comprising:

10

a first edge having a tongue with an insertion area extending to a free end associated therewith and a second edge having a groove defined between opposed legs, the tongue and groove having opposed wall surfaces associated therewith, the covering panel being joinable with adjacent similar covering panels upon receiving a tongue of a similar covering panel in the groove and upon inserting the free end of the tongue into the groove of another similar covering panel to form floors, walls or ceilings, the panels each having top surface areas; the tongue and groove being disengageable when the tongue is inserted into the groove;

15

a first bead set having an interface with and adhered to the wall surface of the tongue, the first bead set having a rear surface spaced a selected first distance from a first end face;

20

a second bead set having an interface with and adhered to a wall surface of the groove, the wall surface being on at least one of the opposed wall surfaces of the legs forming the groove, the second bead set having a rear surface, spaced a selected second distance from a second end face, the first and second selected distances being at least approximate one another wherein the rear surfaces and face one another to mechanically lock the tongue within the groove when the tongue is inserted into the groove;

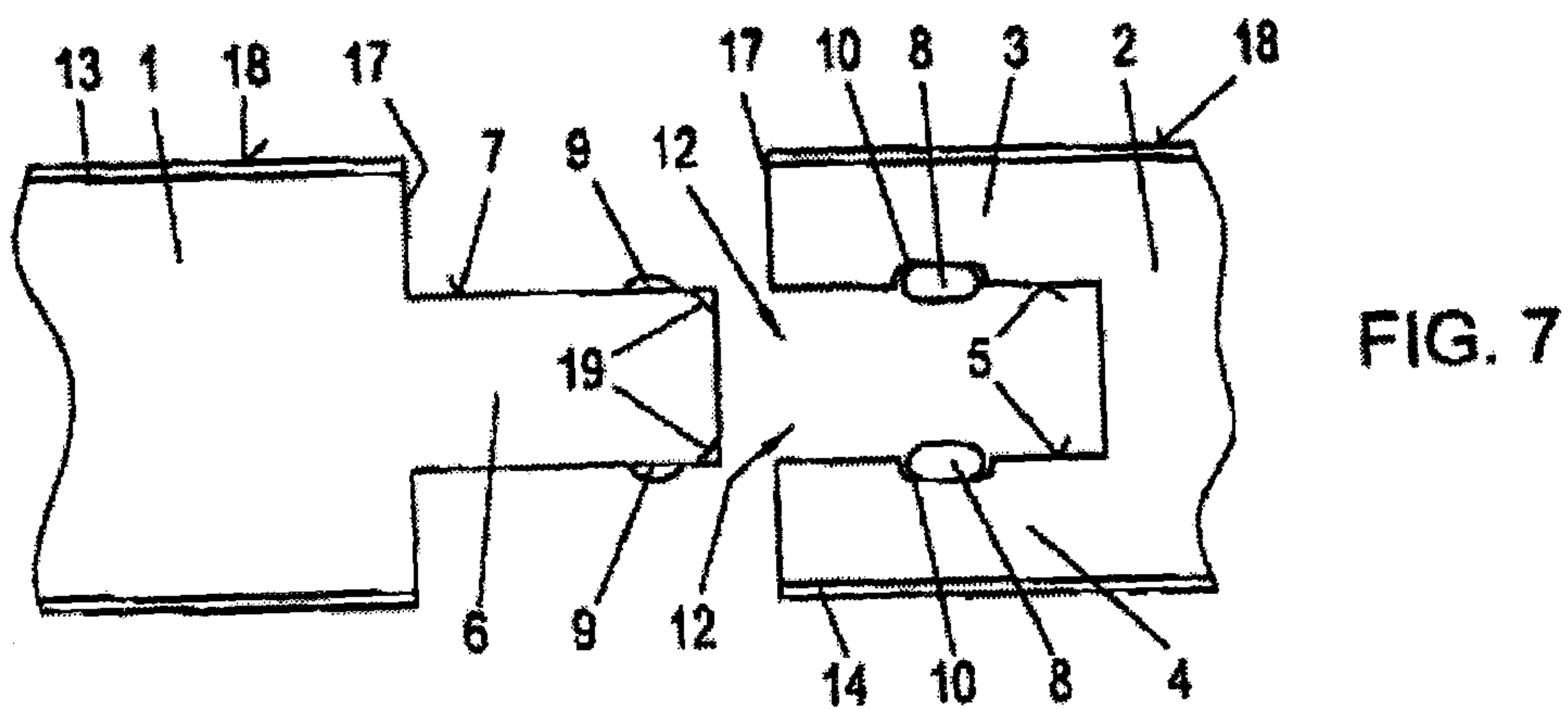
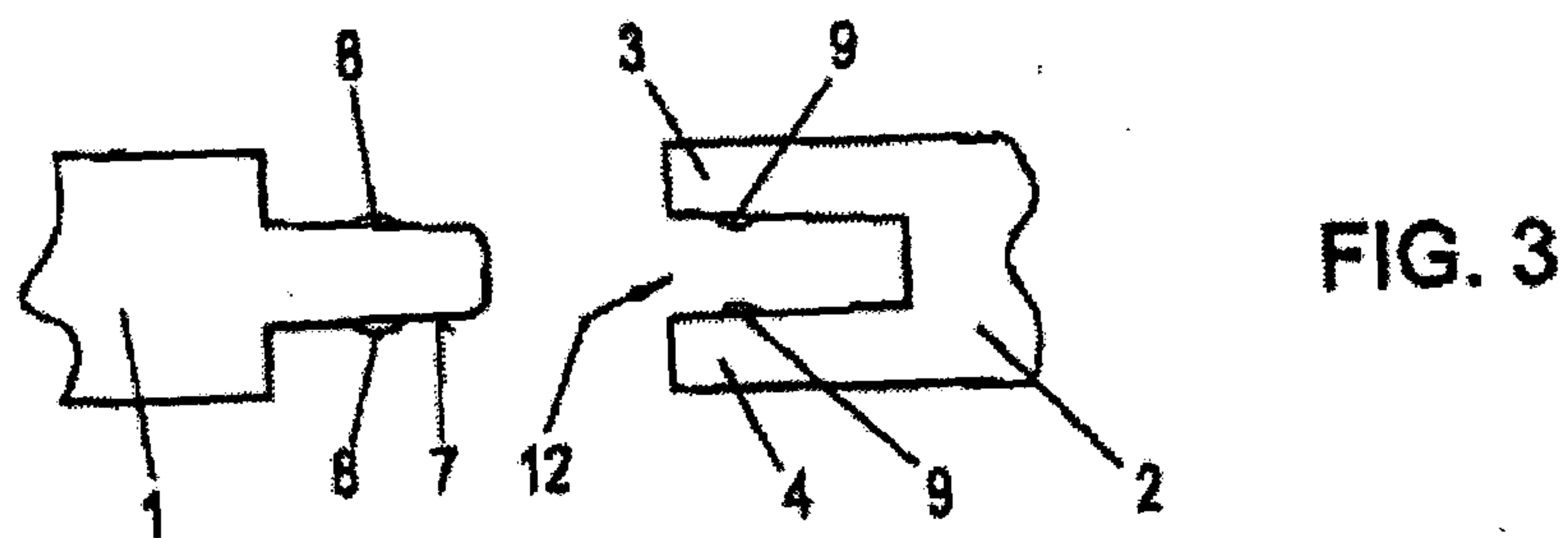
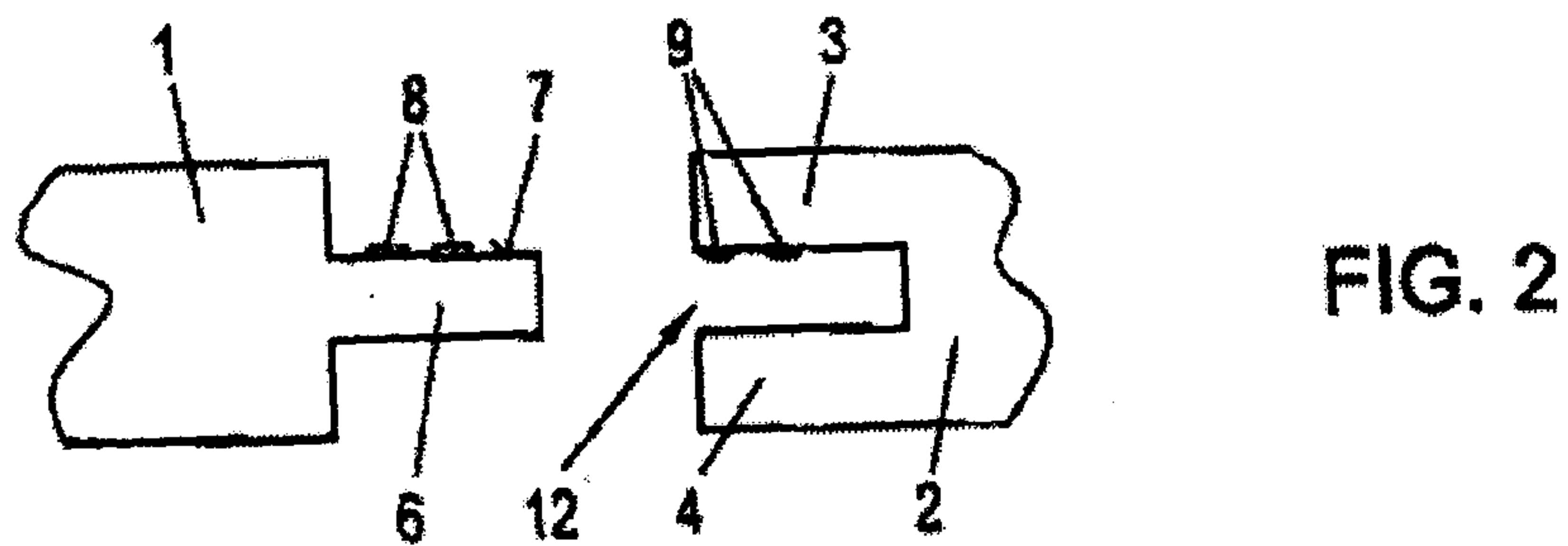
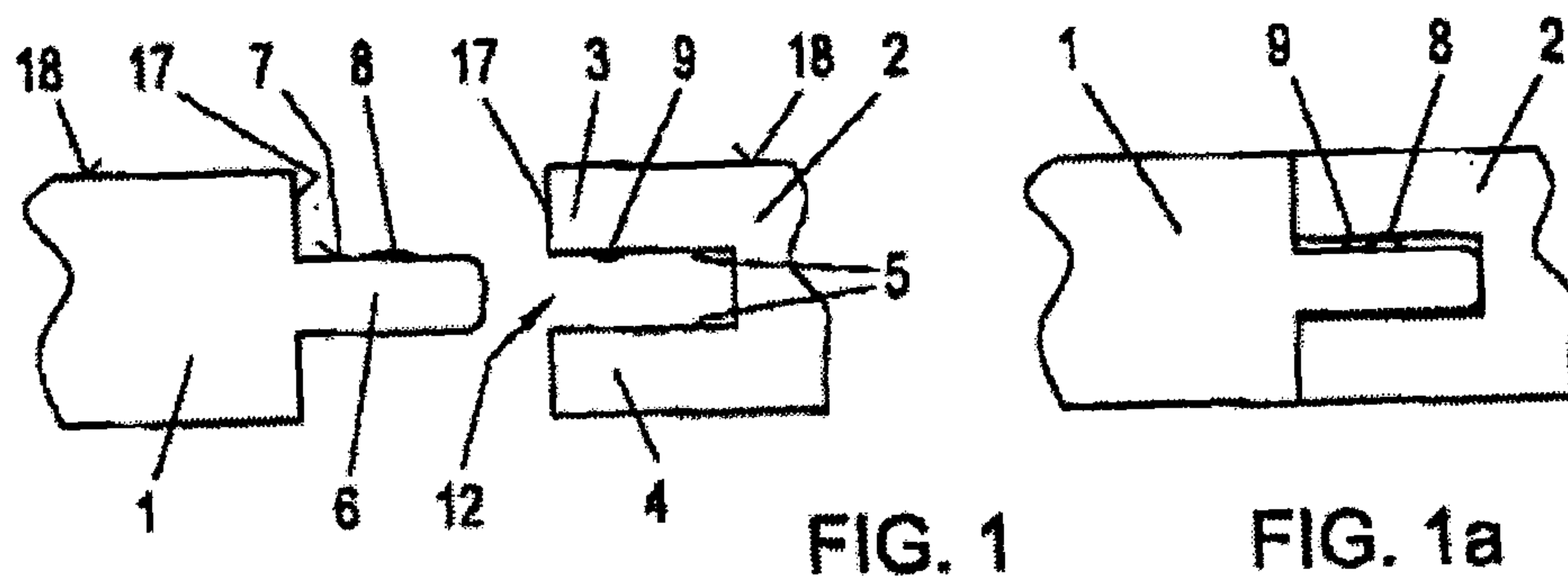
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the first bead set and the second bead set being comprised entirely of an adhesive, the adhesive comprising an adhesive cement, adhesive plastic or an adhesive composite of cement and plastic; the first bead set and the second bead set being adhered to one another upon the

30

panels being joined;

the first bead set being positioned at a first location on the outer surface of the tongue and the second bead set being positioned at a second location on the inner surface of at least one leg of the groove; wherein when the tongue of the covering panel has been inserted into the groove of an adjacent similar covering panel to bring the edges and into proximity, the first bead set has passed over the second bead set thereby positioning the first bead set behind the second bead set with the rear surface of the first bead set facing the rear surface of the second bead set and with the edges and in proximity to mechanically lock the tongue within the groove, and wherein when the covering panel receives in the groove the tongue of a similar covering panel, the first bead set on the tongue of the similar covering panel passes over the second bead set on the covering panel and by simultaneous_mechanical and adhesive contact therebetween while the first bead set and the second bead set are within the groove holds the tongue within the groove of the covering panel, whereby a surface is configured that is further extendible by still additional similar covering panels, and wherein the first bead set and the second bead set of the covering panel have been deposited on the outer wall surface of the tongue and on the inner wall surface of the groove during manufacture of the covering panels prior to delivery of the covering panels from a facility making completed panels.



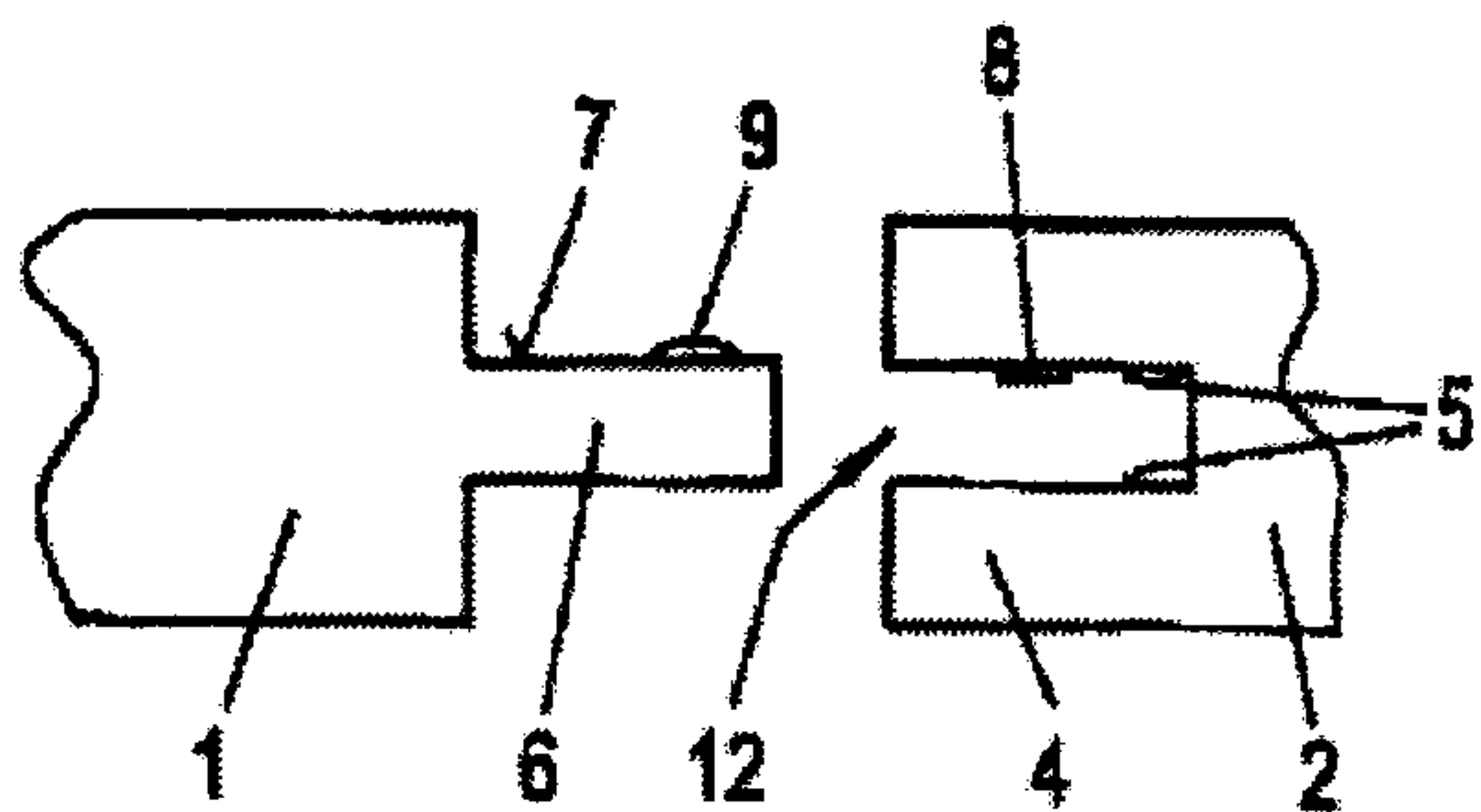


FIG. 4

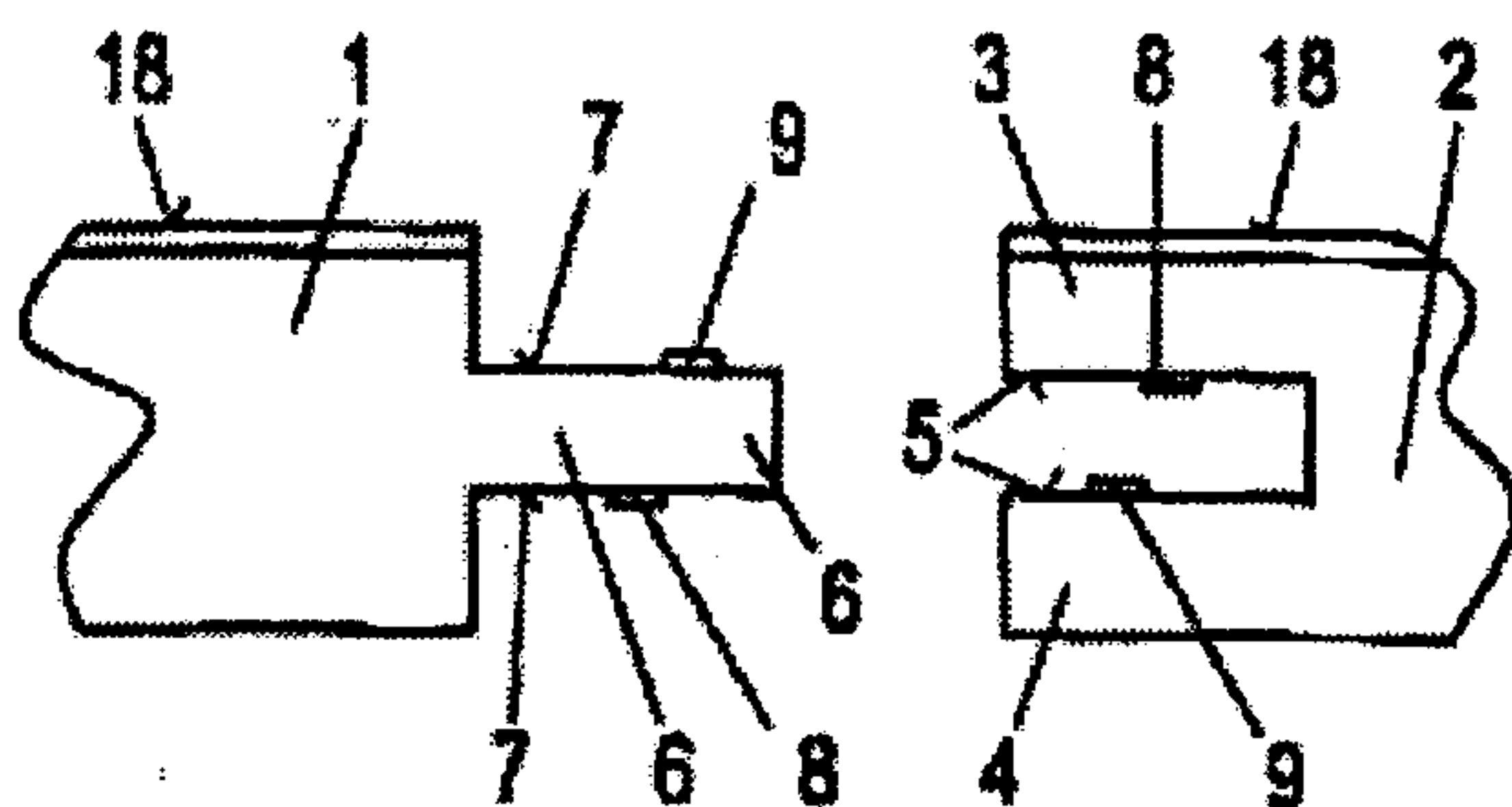


FIG. 5

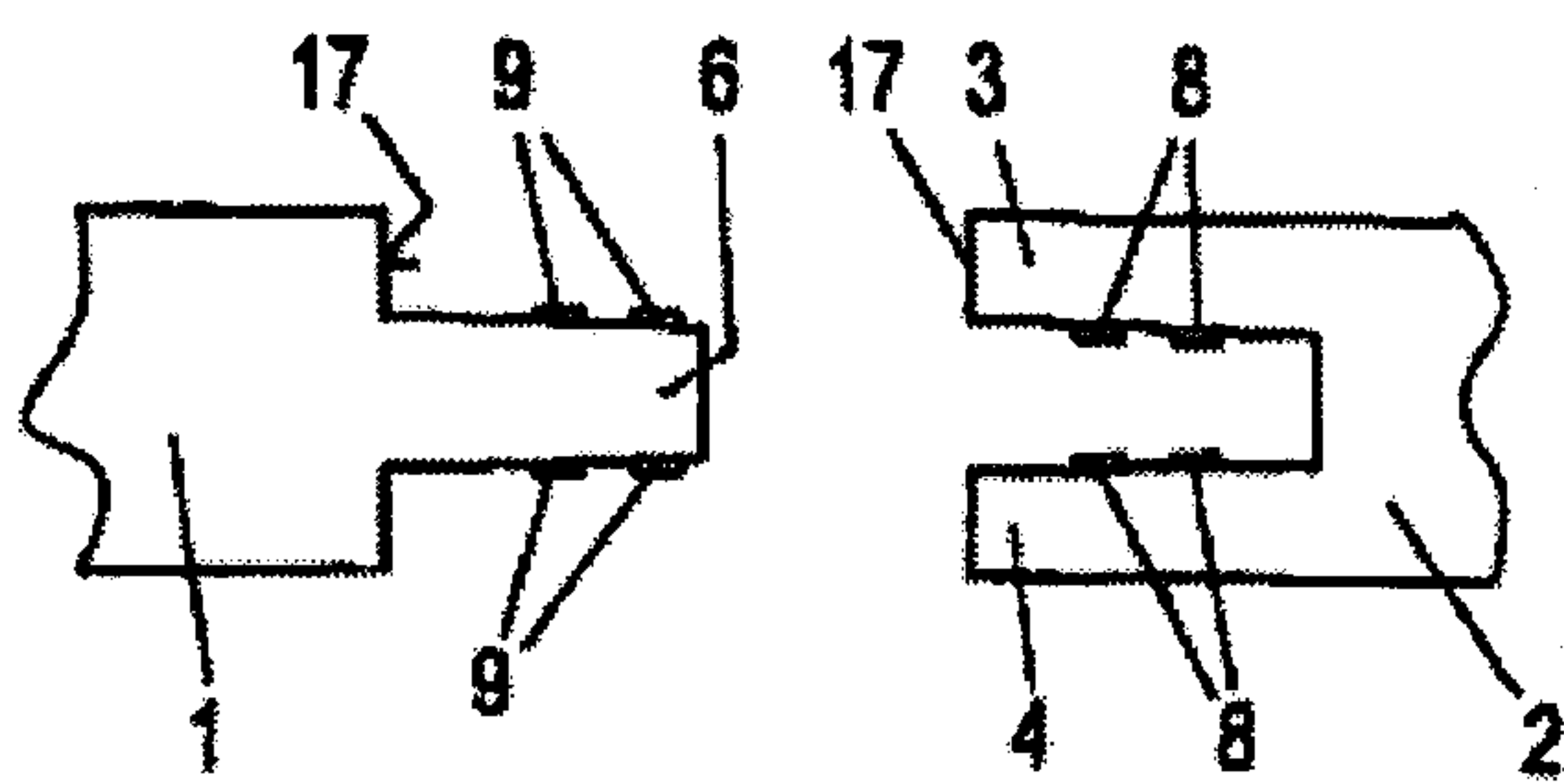


FIG. 6

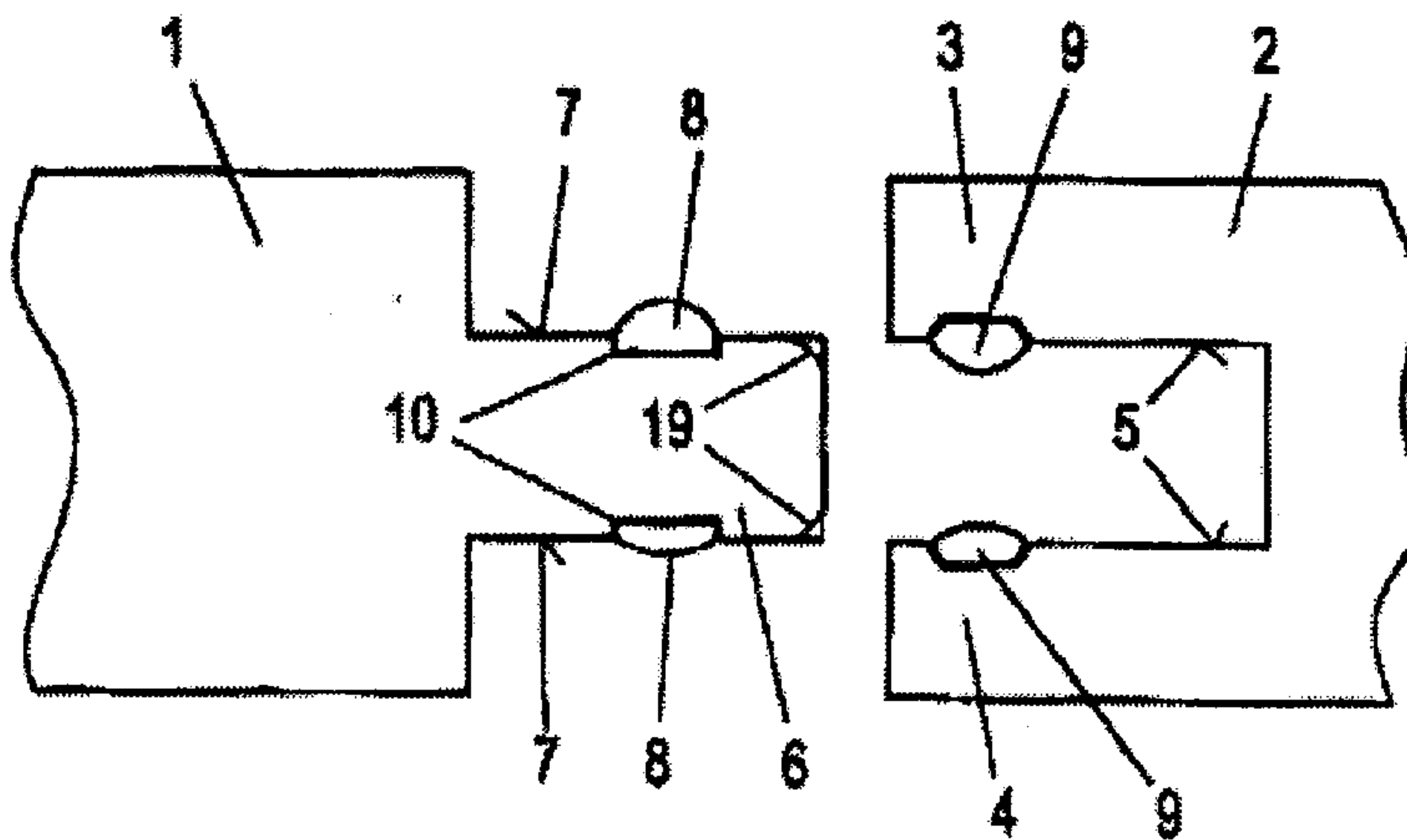


FIG. 8

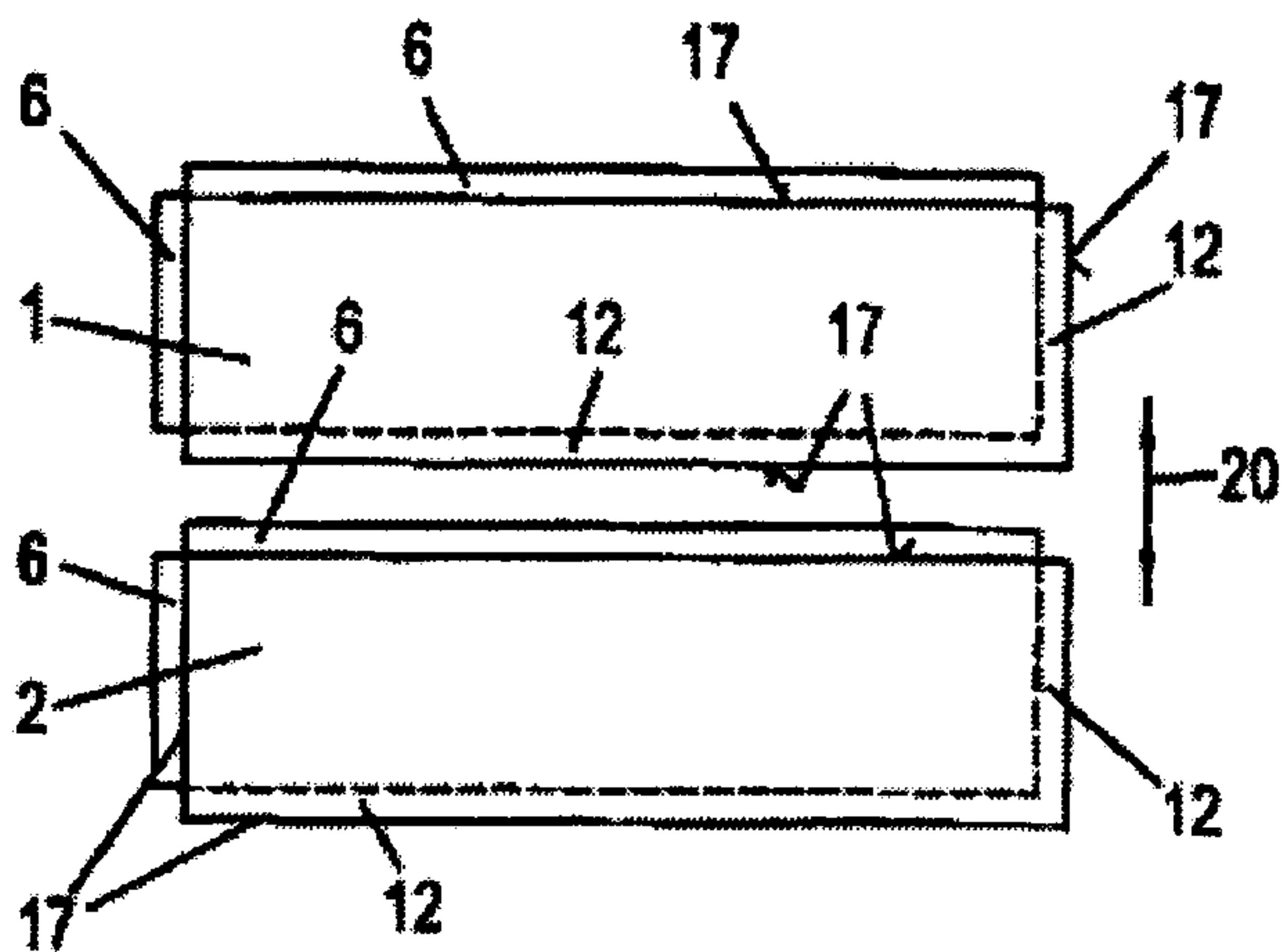


FIG. 9

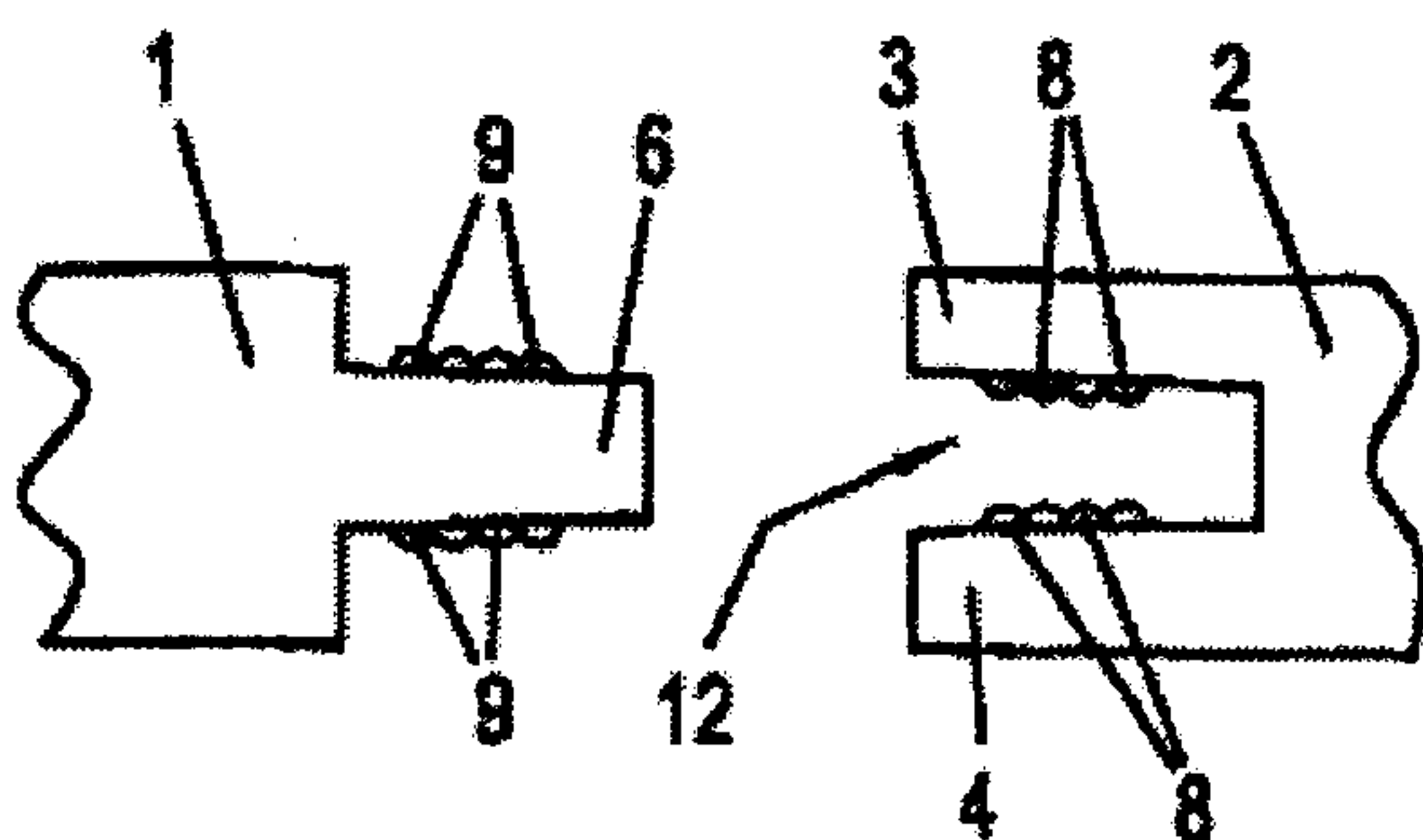


FIG. 8a

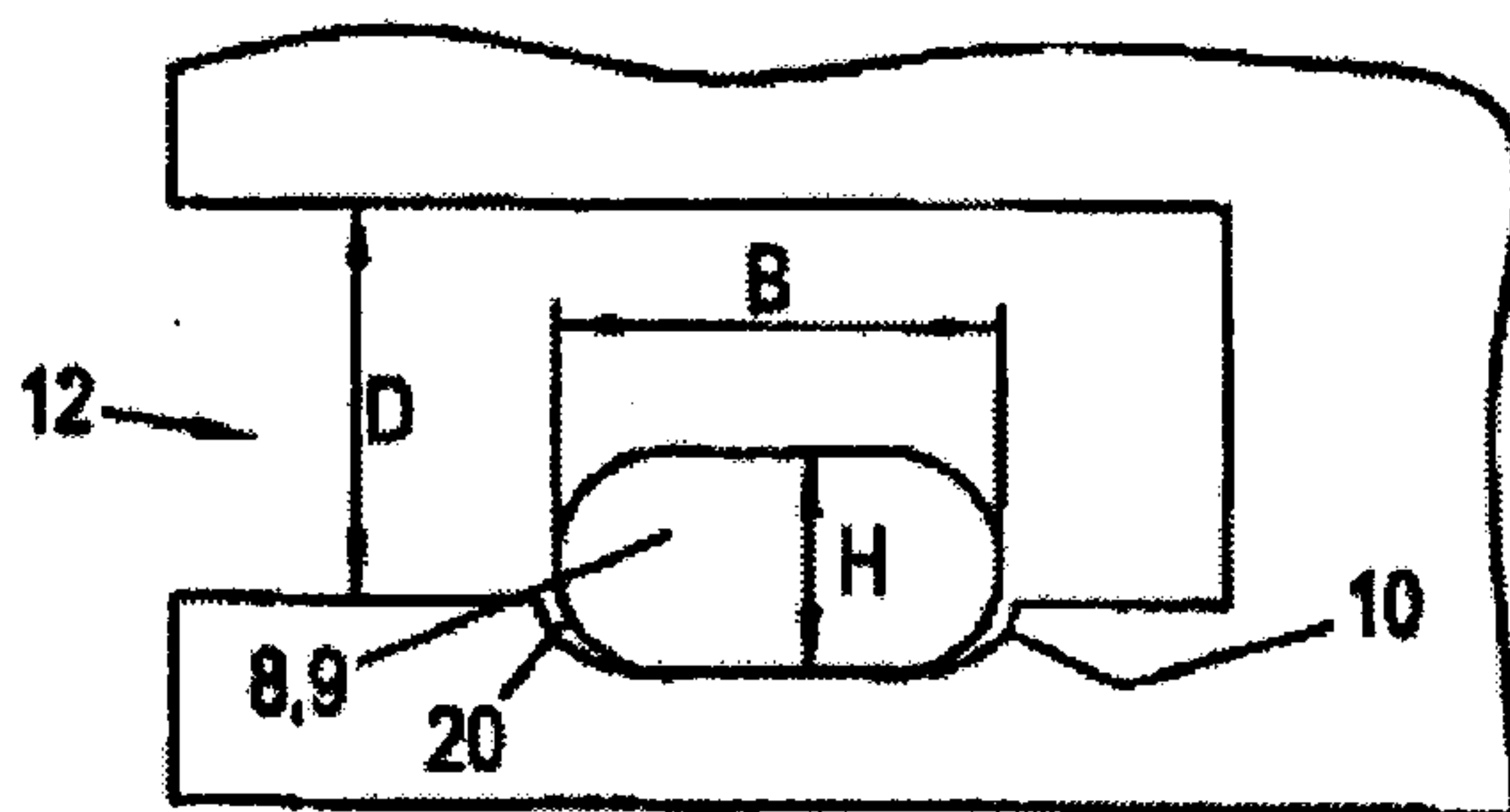


FIG. 13

FIG. 10a

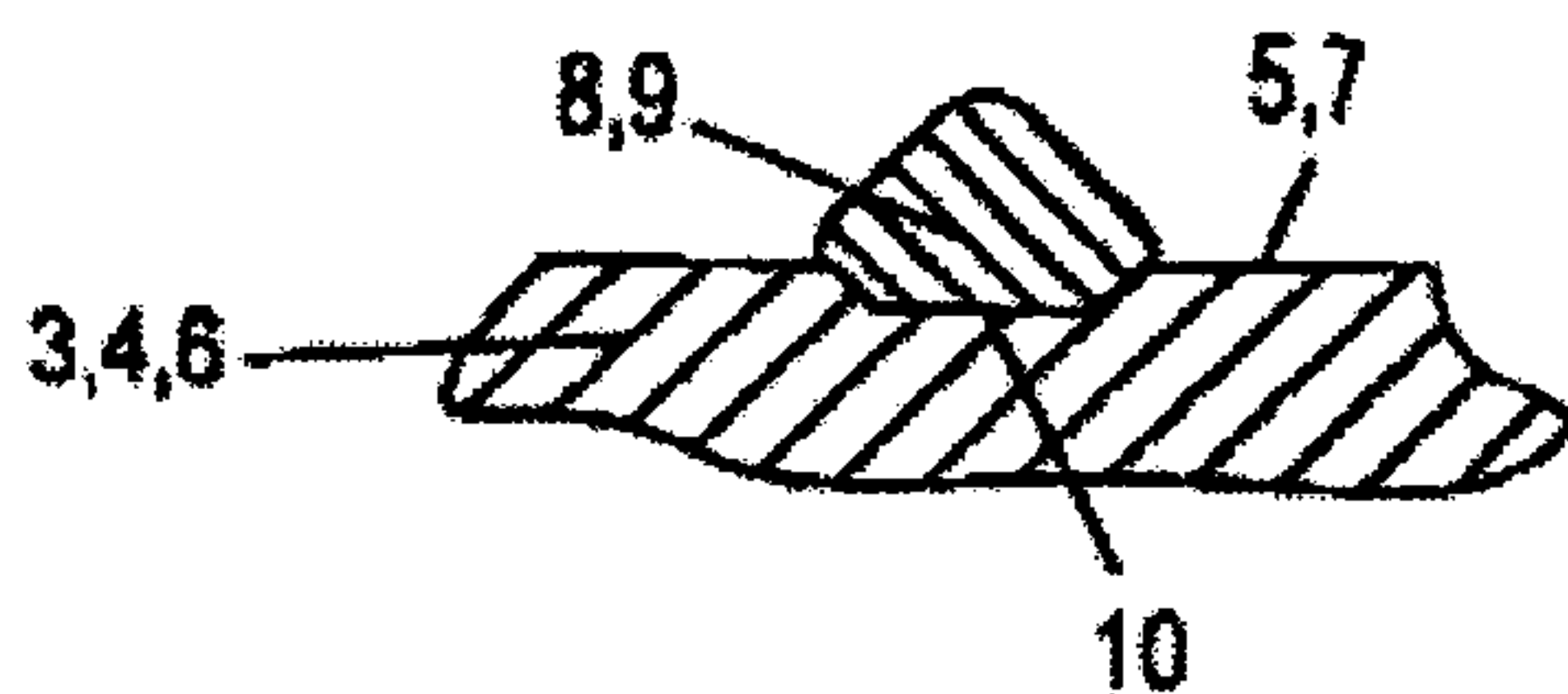
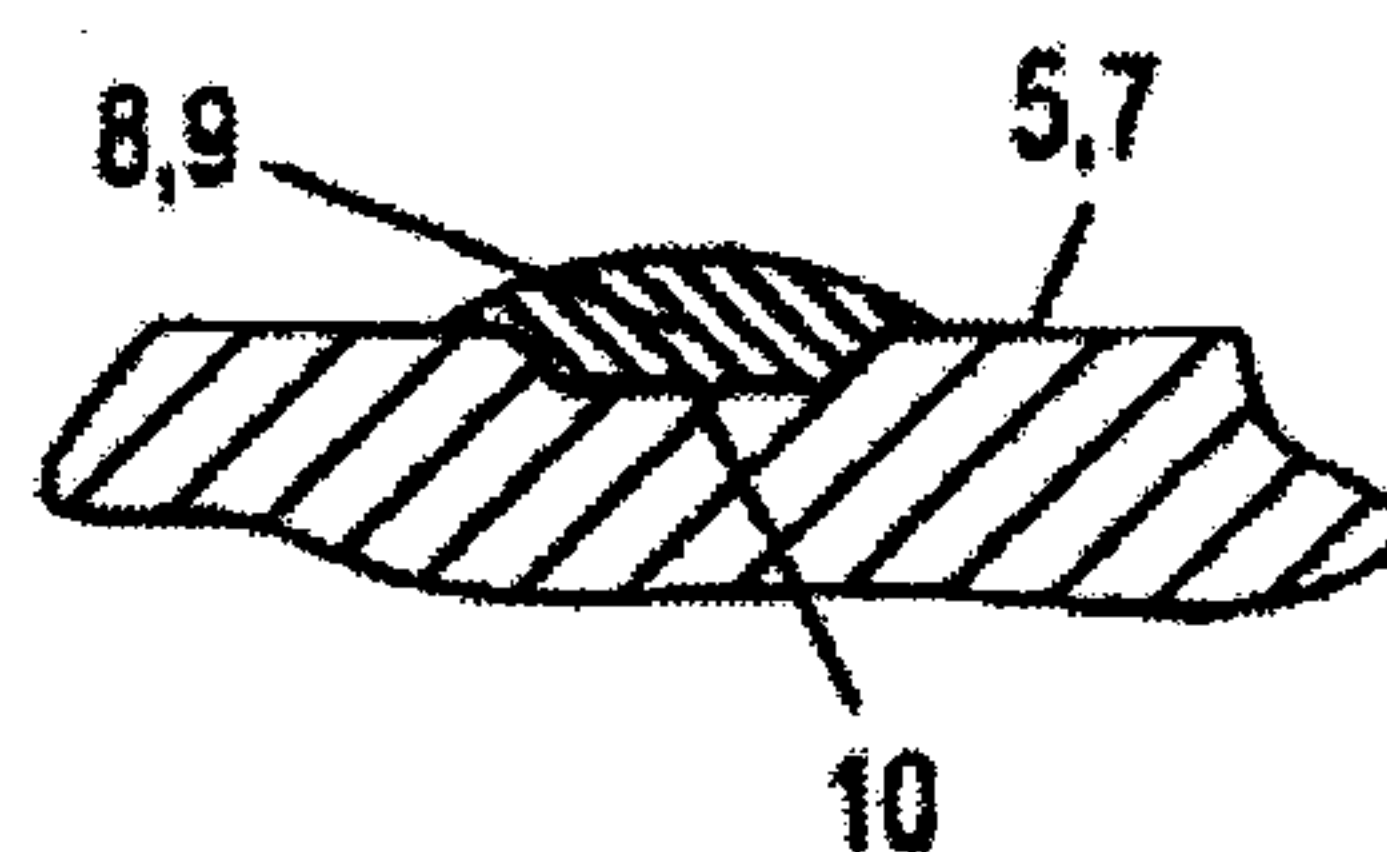


FIG. 10



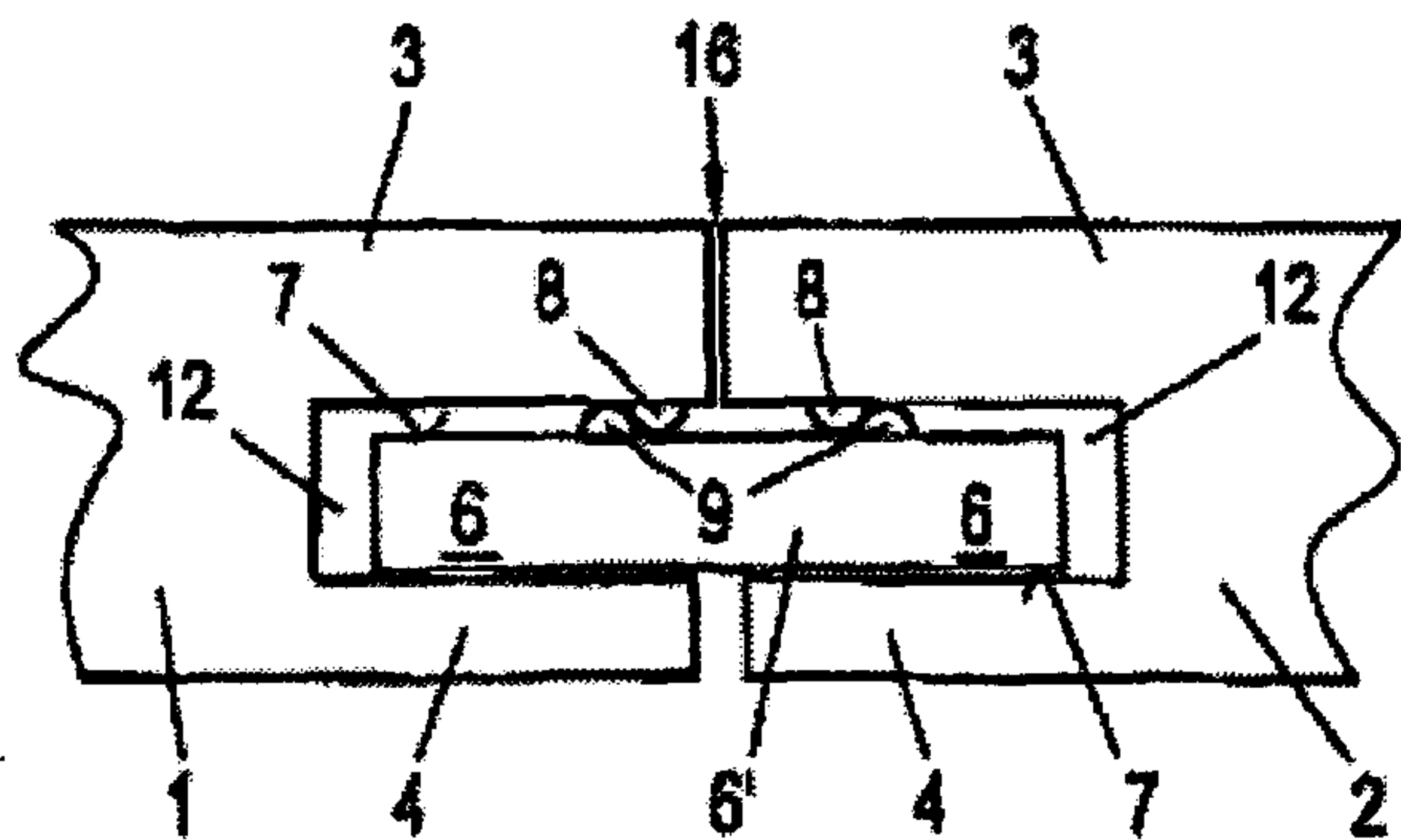


FIG. 11

FIG. 12

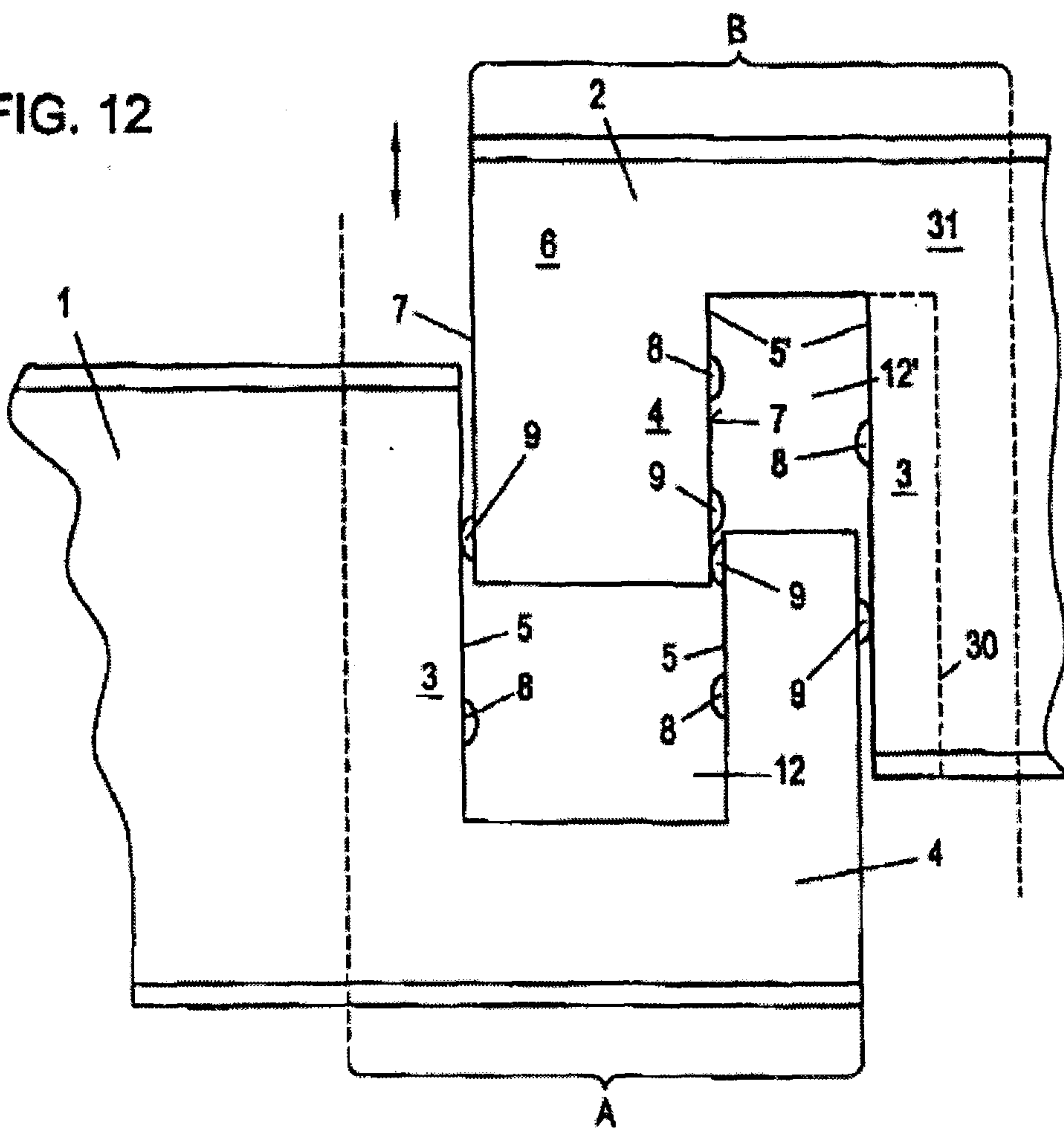


FIG. 14

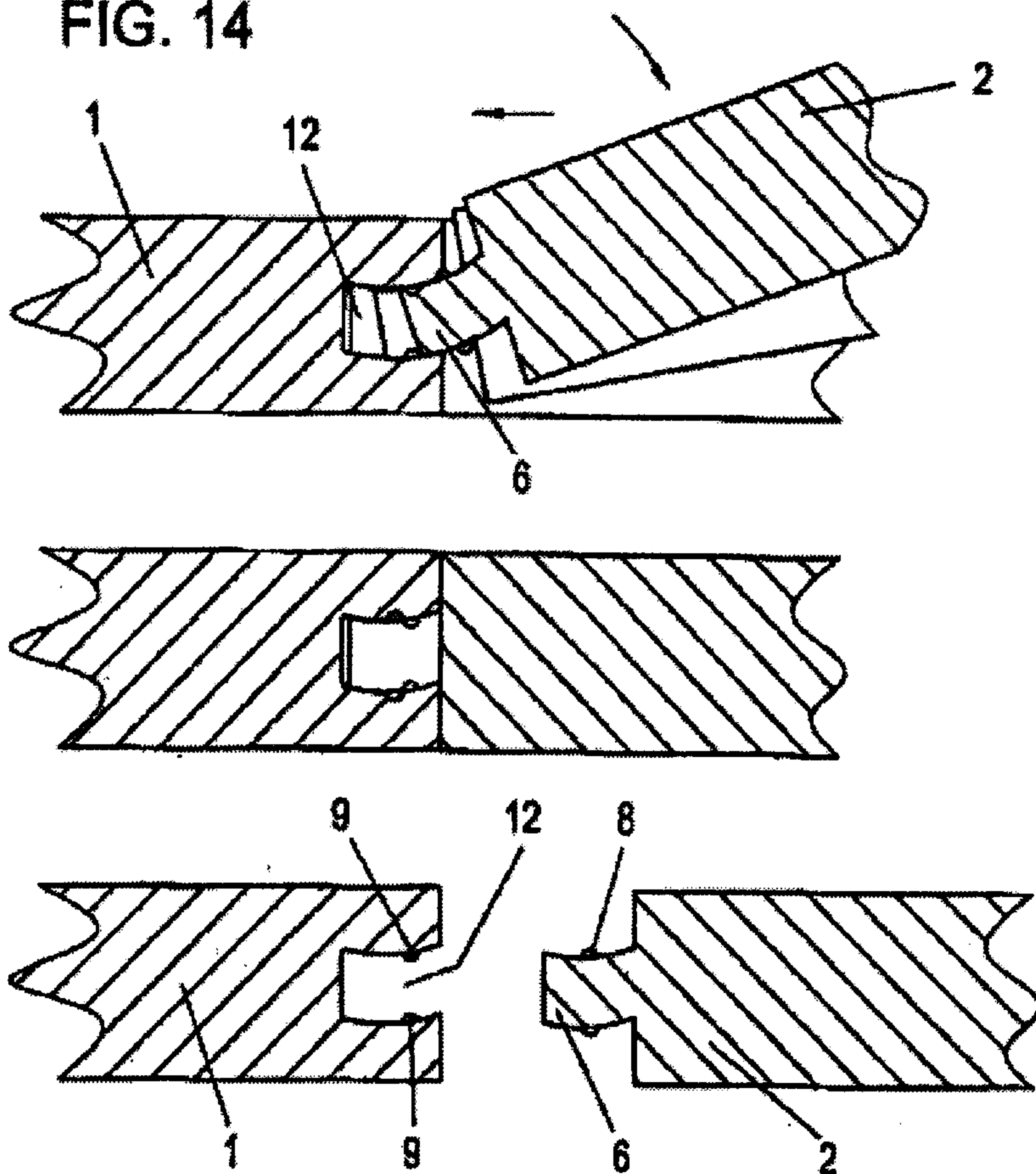


FIG. 15

