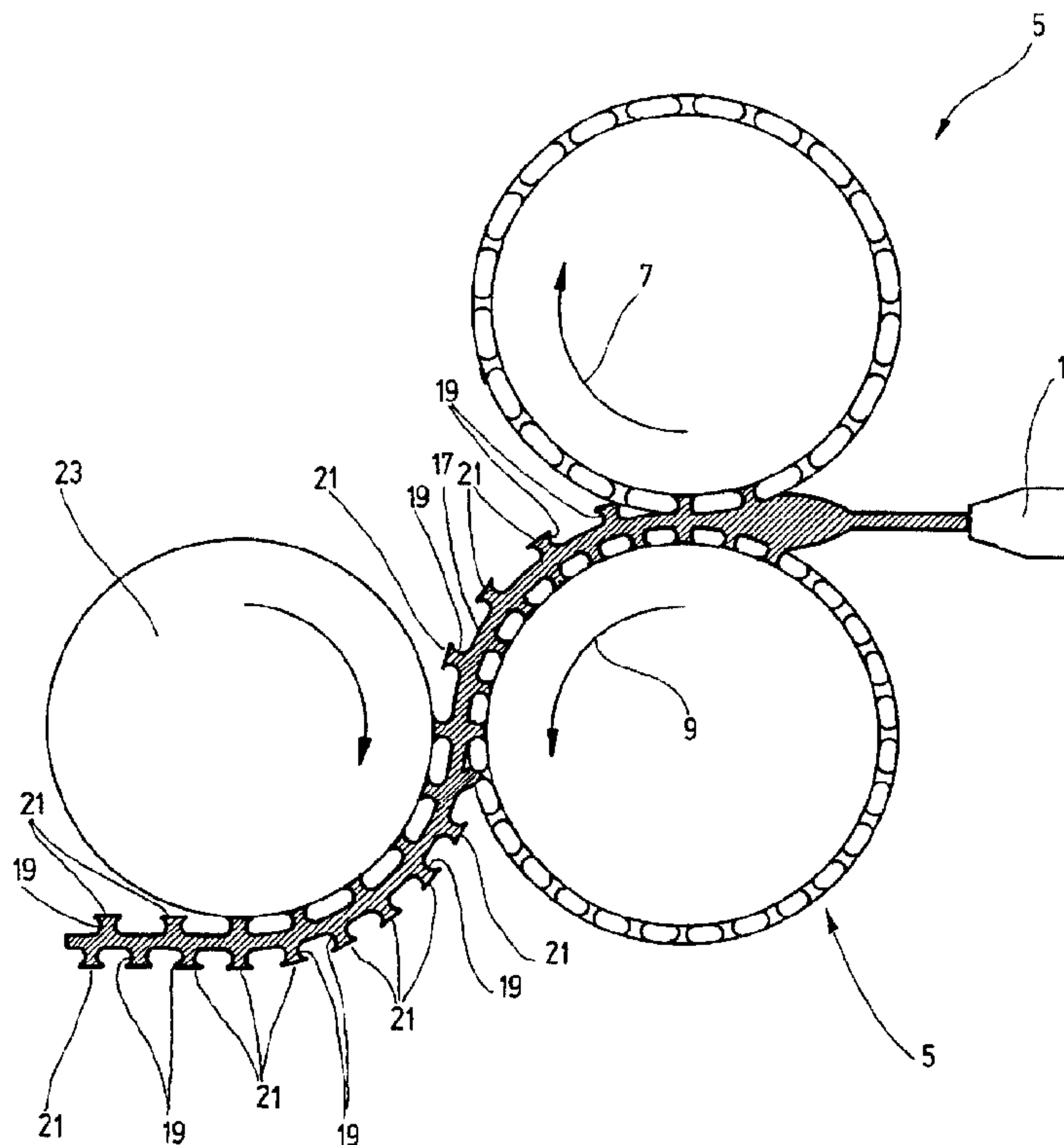




(86) Date de dépôt PCT/PCT Filing Date: 1998/11/02  
(87) Date publication PCT/PCT Publication Date: 2000/05/11  
(45) Date de délivrance/Issue Date: 2005/08/23  
(85) Entrée phase nationale/National Entry: 2001/03/22  
(86) N° demande PCT/PCT Application No.: EP 1998/006929  
(87) N° publication PCT/PCT Publication No.: 2000/025620

(51) Cl.Int.<sup>6</sup>/Int.Cl.<sup>6</sup> A44B 18/00, B29C 43/22  
(72) Inventeur/Inventor:  
TUMA, JAN, DE  
(73) Propriétaire/Owner:  
GOTTLIEB BINDER GMBH & CO., DE  
(74) Agent: MARKS & CLERK

(54) Titre : PROCÉDE POUR PRODUIRE UN ÉLÉMENT DE FERMETURE AUTO-AGRIPPANTE  
(54) Title: METHOD FOR PRODUCING AN ADHESIVE CLOSING ELEMENT



(57) Abrégé/Abstract:

The invention relates to a method for producing an adhesive closing element comprising a plurality of hook elements that form a single piece with a support. Said hook elements are rod-shaped and have enlargements at the ends thereof. A thermoplastic synthetic material is fed into the gap between two moveable tools in a plastic or liquid state. The tools are driven in such a way that a support is formed in the gap and displaced in a direction of conveyance. The hook elements are formed by forming elements acting on said gap. The hook elements are formed on both sides of the support by the forming elements that are active on both sides of the gap.



ABSTRACT

The invention relates to a method for producing an adhesive closing element comprising a plurality of hook elements that form a single piece with a support. Said hook elements are rod-shaped and have enlargements at the ends thereof. A thermoplastic synthetic material is fed into the gap between two moveable tools in a plastic or liquid state. The tools are driven in such a way that a support is formed in the gap and displaced in a direction of conveyance. The hook elements are formed by forming elements acting on said gap. The hook elements are formed on both sides of the support by the forming elements that are active on both sides of the gap.

## METHOD FOR PRODUCING AN ADHESIVE CLOSING ELEMENT

### Field of the Invention

The invention relates to a method for producing an adhesive closing element and more specifically an adhesive closing element, with a plurality of hook elements.

### Background of the Invention

A method of this type is already known from the publication WO 95/01863. The execution of this method takes place in a disadvantageously costly manner when finely structured hook elements are to be produced in great number, and are arranged on the support in correspondingly high packing density. As a result, the production of the forming elements, which form the hook elements, is extraordinarily costly.

### Summary of the Invention

It is an object of the present invention to obviate or mitigate one or more problems associated with conventional methods of producing adhesive closing elements.

The object of the invention is to disclose a method which facilitates a low-cost production of adhesive closing elements with finely structured hook elements, arranged in high packing density.

The invention relates to a method for producing an adhesive closing element with a plurality of hook elements that form a single piece with a support, the hook elements in the form of rods having enlargements on the ends, in which a thermoplastic synthetic resin in plastic or fluid state is fed into the gap between movable tools and this is driven in such a manner that the support is formed in the gap and is conveyed in a direction of conveyance whereby hook elements are formed on both side of the support by forming elements acting on both sides on the gap.

With a method of the aforementioned type this object is attained according to the

invention in that hollow spaces passing through a first screen and a second screen arranged on the interior of the first screen are to serve as forming elements, and the hook elements are formed therein in such a manner that the thermoplastic synthetic resin hardens at least partially in the hollow spaces of the screen.

The construction of the hook elements with use of two screens engaging on one another allows for the advantageous possibility of producing very finely structured hook elements, as they are provided in the micro-adhesive closing elements (see DE 196 46 318 A1), at low cost. The second interior screen engaging on the exterior screen involves an additional forming element during the forming of the rod forming the hook elements, and also involving its end configuration.

In this manner the advantage is obtained that no particular requirements need be met concerning the geometry of the openings of the screen, because the shape and condition of the enlarged end area of the rod formed by the filled-in synthetic resin are obtained exclusively through the hollow spaces of the interior screen, of which the diameter is selected to be somewhat greater than the diameter of the hollow spaces of the exterior screen. The differential of diameter is selected so that the withdrawal of the rod can take place with the end enlargement formed by a hollow space of the interior screen can occur following hardening or partial hardening of the synthetic resin without any difficulties. Costly processing for the formation rounded edges is not required around the hollow spaces of the interior screen or around the hollow spaces of the exterior screen.

MODIFIED PAGE

The method according to the invention can be carried out in such a manner that the hook connection effect of the adhesive closing element is almost identical on the two sides. For this purpose the hook elements of both sides can be configured to be identical, in terms of both their packing density and also their geometry and dimensions. Such an adhesive closing element is suitable particularly for the formation of secure, permanent hooking on two sides.

Adhesive closing elements which have different adhesive properties on the two sides as a result of the different packing densities, form design and/or dimensions of the hook elements on the two sides, can preferably be used with uses in which the detachment of the hooking when desired is to occur on only one side.

This for example is advantageous with its use in the case of carpet-laying systems.

According to an aspect of the present invention there is provided a method for producing an adhesive closing element having a plurality of hook elements configured unitarily as one piece on a support and having the hook elements being rods with end enlargements, comprising the steps of feeding thermoplastic synthetic resin in a plastic or fluid state into a gap between movable tools, driving the tools to form the support in the gap and to convey the support in one direction, forming the hook elements on both sides of the support by forming elements operating on both sides of the gap, the forming elements including first and second screens with first and second hollow spaces, respectively,

passing entirely therethrough, the second screen being arranged on an interior of the first screen, and hardening the thermoplastic synthetic resin at least partially in the hollow spaces of the screens.

Hereinafter the invention is to be described in greater detail relative to the drawings. The drawings show the following :

- Fig. 1            a greatly diagrammatically simplified and partially cutout side view of a device for the execution of the method according to the invention;
- Fig. 2            a perspective representation of two screens fitted into one another with hollow spaces formed by the screen openings represented in exaggerated magnitudes in certain areas for clarity,
- Fig. 3            a diagrammatically simplified longitudinal section of the segment of a forming element with screens fitting into one another according to Fig. 2, and
- Figs. 3a-3c       enlarged scale cross sections of different shapes of hollow spaces formed by the screen openings of the screens which are fitted into one another.

#### Detailed Description

Fig. 1 shows elements of a device for execution of the method according to

the invention having an extruder head 1 as feed device to feed thermoplastic synthetic resin in plastic or fluid state in as a strip of which the width corresponds to that of the adhesive closing element to be produced, said strip being fed into the gap between movable forming tools. The forming tools are forming elements indicated in their entirety as 5. The two forming elements 5 are driven in the direction of rotation shown in Fig. 1 with curved arrows 7 and 9, so that a conveyance gap is formed between them, through which the plastic strip is conveyed in the direction of conveyance, while simultaneously in the gap the plastic strip is formed to be the support 17 of the adhesive closing element and the support 17 on both of its sides engaging on forming elements 5 and by means of the forming elements 5 attains the shaping required for the formation of hook elements.

For this purpose the two forming elements 5 have around each of their peripheries two shaping elements each in the form of a screen, which include an exterior screen 11 and an interior screen 13, which engage on one another, as shown in Fig. 2. As is particularly exhibited in Fig. 3, screens 11 and 13 are fitted into one another in such a manner that the hollow spaces 12 and 14 formed by the screen openings of exterior screen 11 and interior screen 13 are aligned with one another and have one common axis 15, see particularly Fig. 3a.

As the last drawing shows particularly clearly, exterior screen 11 is of greater thickness than that of interior screen 13, of which the hollow spaces 14 in turn are of greater cross section than the hollow spaces 12 of exterior screen 11. Because

of this configuration, the plastic in the gap between forming elements 5 and being pressed into the hollow spaces 12 and 14 is formed so that on both sides of support 17 are formed projecting rods 19 with enlarged ends 21. The difference between the cross sectional dimensions of hollow spaces 12 and 14 is selected so that the enlargement at end 21 is only of sufficient dimensions that withdrawal of rod 19 from hollow spaces 12, 14 can still certainly occur following partial or complete hardening of the plastic, when support 17 is conducted away from bottom forming element 5 over a withdrawal roll 23.

Figs. 3a to 3c show that the shapes of the screen openings forming hollow spaces 12 and 14 can be selected to be different from one another, and especially, as shown in Fig. 3a, that they require no rounding of the edges. Shaping can however, as shown in Figs. 3b and 3c, be provided on the exterior screen 11 either on the exterior side or on both sides. Also interior screen 13 could correspondingly have roundings of its openings. Also, in a different embodiment from the representations shown in Fig. 3, screens 11 and 13 could be of identical thickness. A precise positioning of screens 11 and 13 relative to one another can be obtained by application of adhesive before the withdrawal on the already cooled forming elements 5, for example by means of a two-component adhesive.

The foregoing description of the embodiments of the present invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the application. Many modifications, variations and adaptations are possible without departing from the scope of the invention as defined in the claims.

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

1. A method for producing an adhesive closing element having a plurality of hook elements configured unitarily as one piece on a support and having the hook elements being rods with end enlargements, comprising the steps of:

feeding thermoplastic synthetic resin in a plastic or fluid state into a gap between movable tools;

driving the tools to form the support in the gap and to convey the support in one direction;

forming the hook elements on both sides of the support by forming elements operating on both sides of the gap, the forming elements including first and second screens with first and second hollow spaces, respectively, passing entirely therethrough, the second screen being arranged on an interior of the first screen; and

hardening the thermoplastic synthetic resin at least partially in the hollow spaces of the screens.

2. The method according to claim 1 wherein each of the tools comprises the first and second screens driven through the gap through which the support is moved.

3. The method according to claim 2 wherein the forming elements are tempered.

4. The method according to claim 1 wherein the second hollow spaces have larger cross-sectional dimensions than the first hollow spaces.

5. The method according to claim 4 wherein the screens have hollow spaces of different dimensions.

6. The method according to claim 5 wherein the hollow spaces have cross-sectional forms deviating from circles.
7. The method according to claim 4 wherein the hollow spaces have cross-sectional forms deviating from circles.
8. The method according to claim 4 wherein the first and second screens have different thicknesses.
9. The method according to claim 8 wherein the second screen is thinner than the first screen.
10. The method according to claim 1 wherein the first and second screens have different thicknesses.
11. The method according to claim 10 wherein the second screen is thinner than the first screen.
12. The method according to claim 1 wherein downstream of the gap and releasing of the rods from the forming elements, ends of the rods are deformed to produce the end enlargements.
13. The method according to claim 1 wherein the thermoplastic synthetic resin is a polyolefin.
14. The method according to claim 1 wherein the thermoplastic synthetic resin is a blend of polyamides.
15. The method according to claim 1 wherein respective first and second hollow spaces are coaxially aligned.
16. The method according to claim 1 wherein said screens are concentric cylinders.

WO 00/25620

PCT/EP98/06929

1 / 3

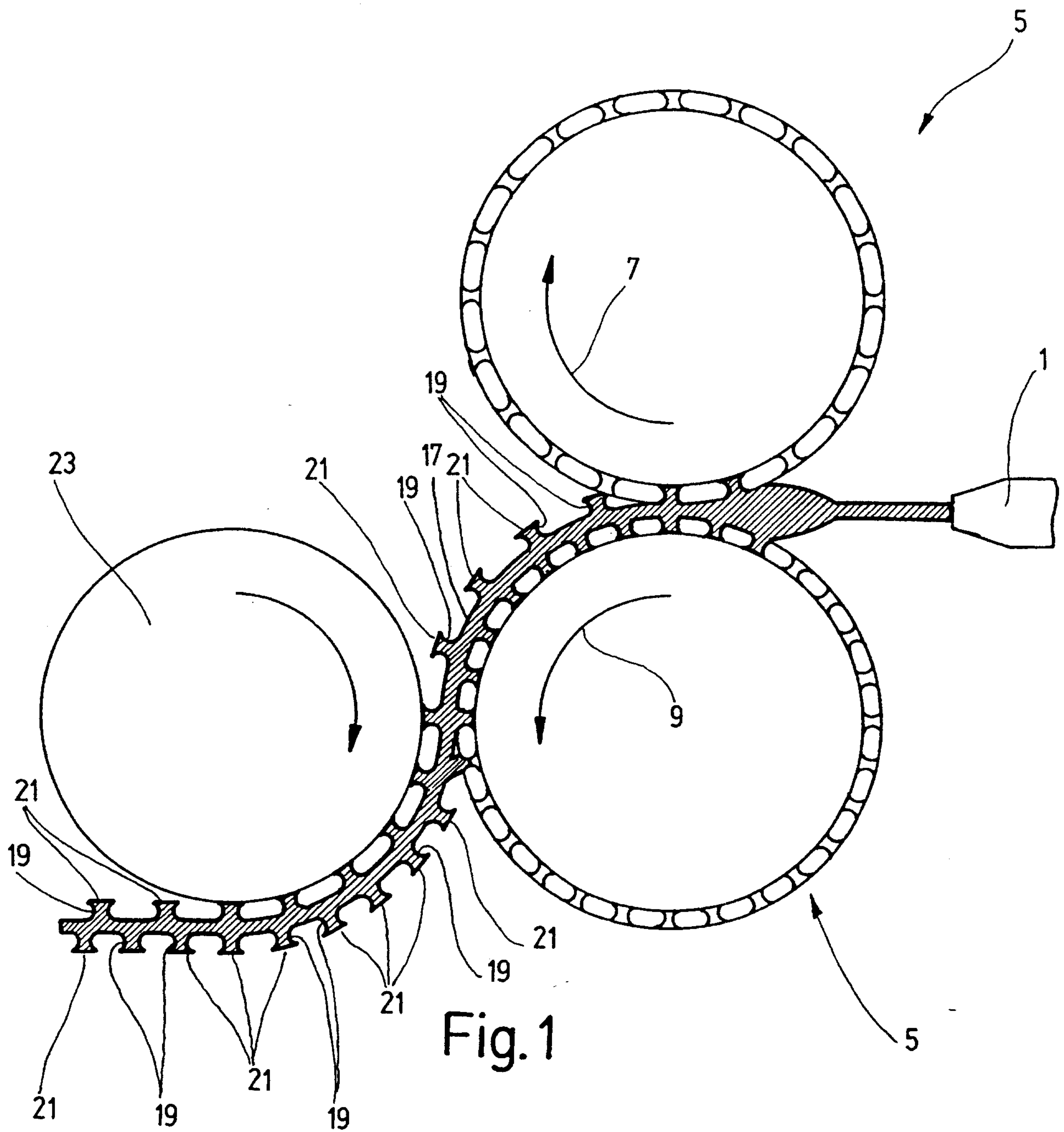


Fig. 1

*Marks & Clerk*

WO 00/25620

PCT/EP98/06929

2 / 3

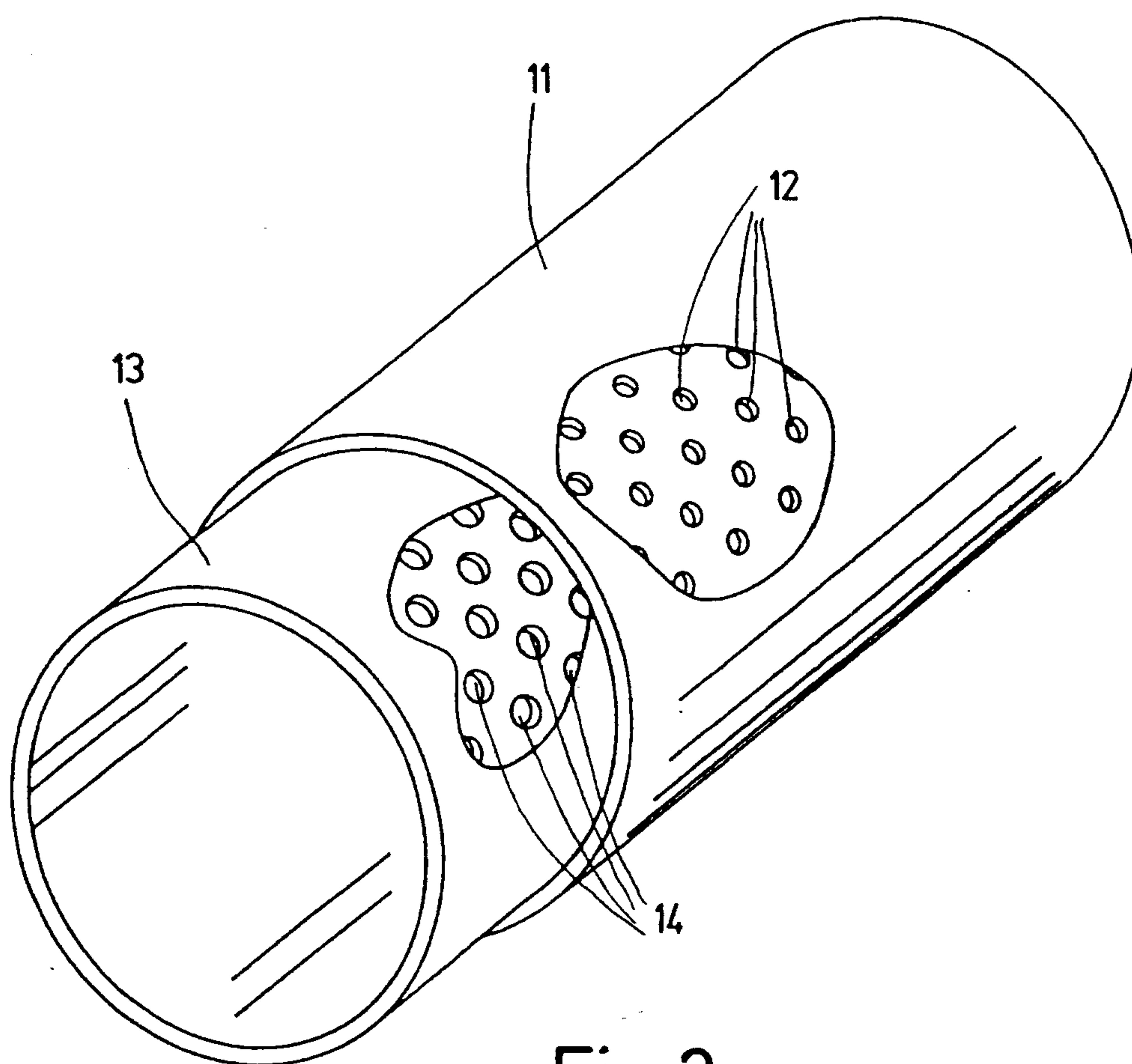


Fig. 2

Marks & Clerk

3 / 3

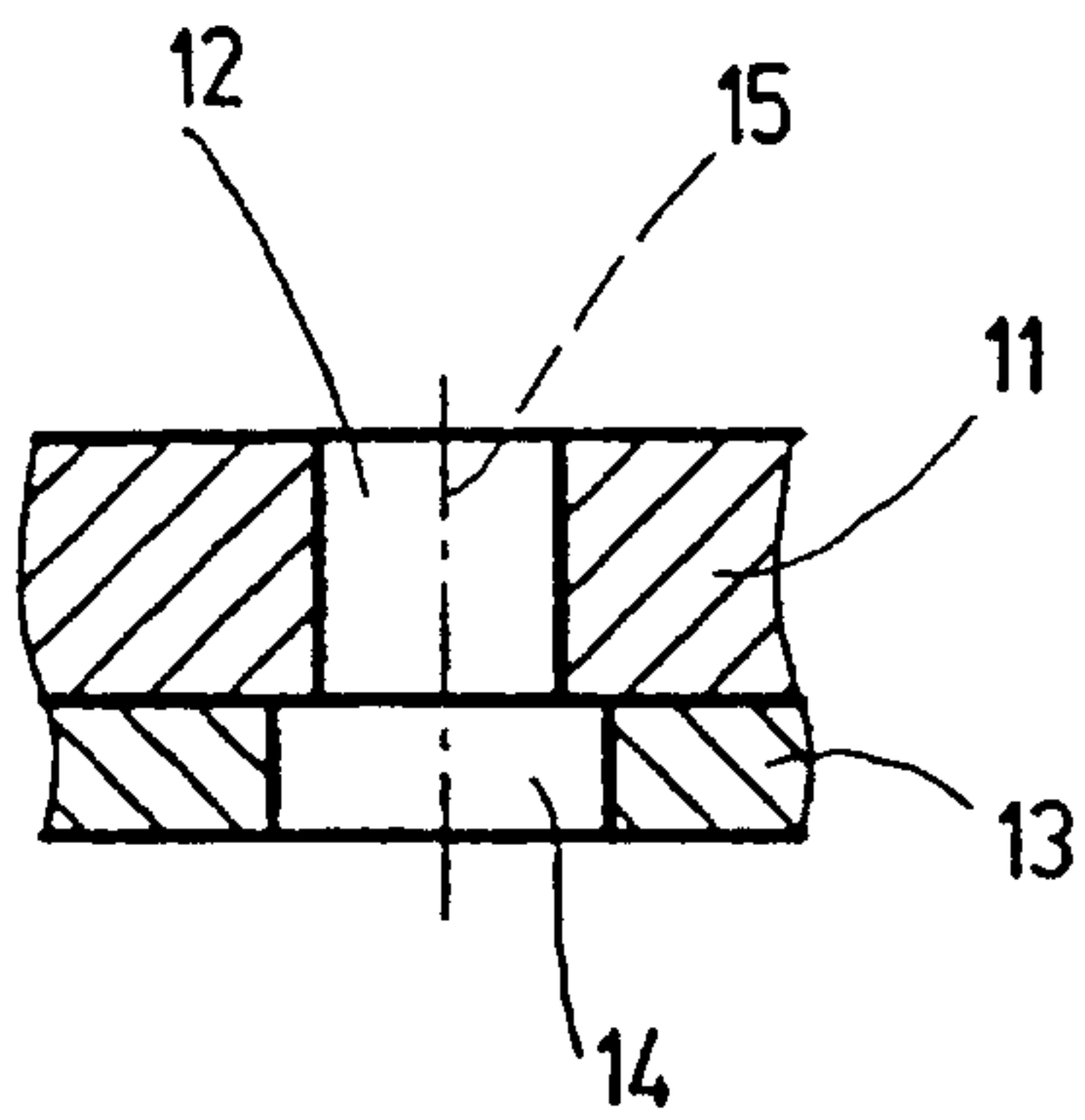


Fig. 3a

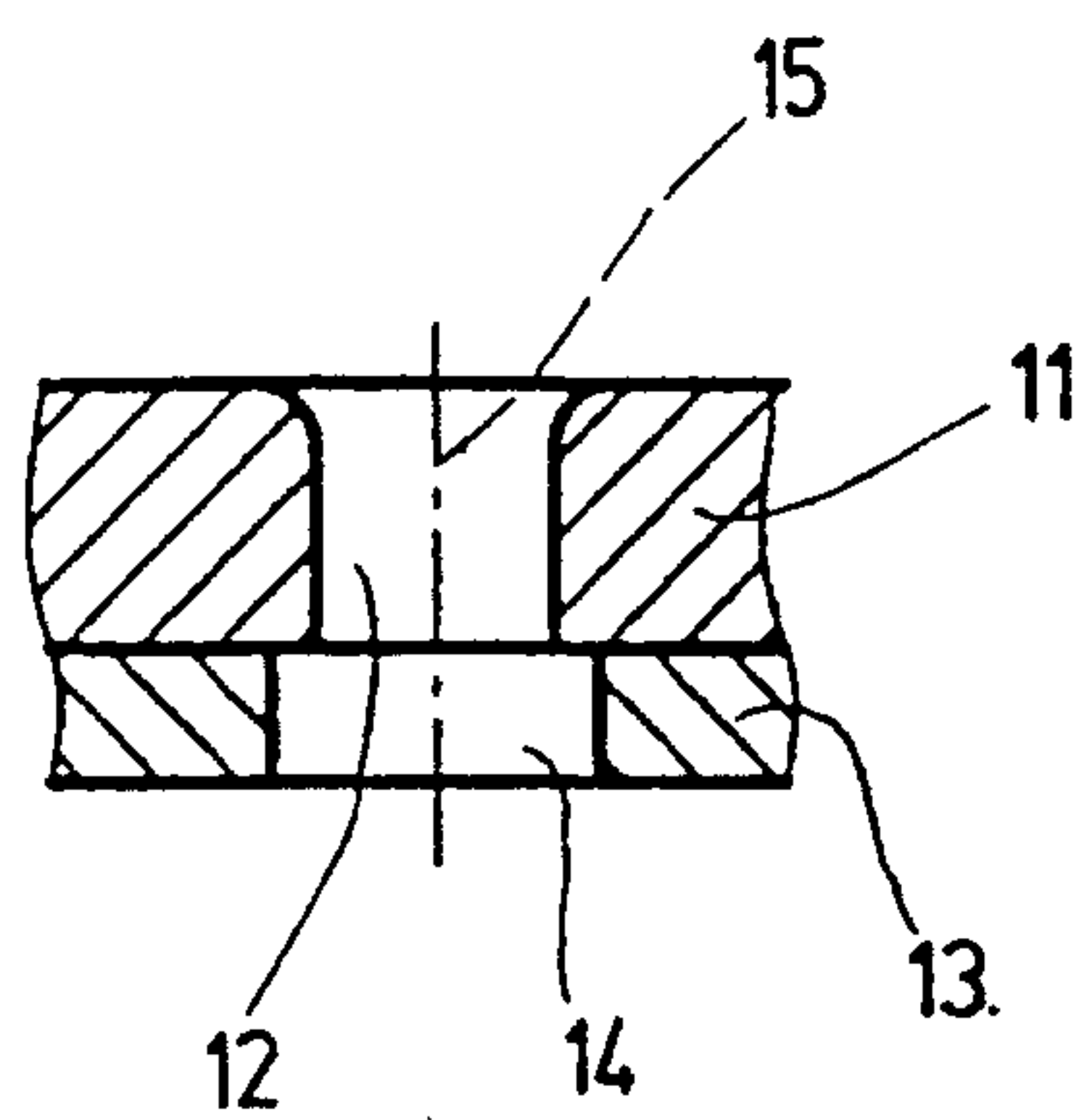


Fig. 3b

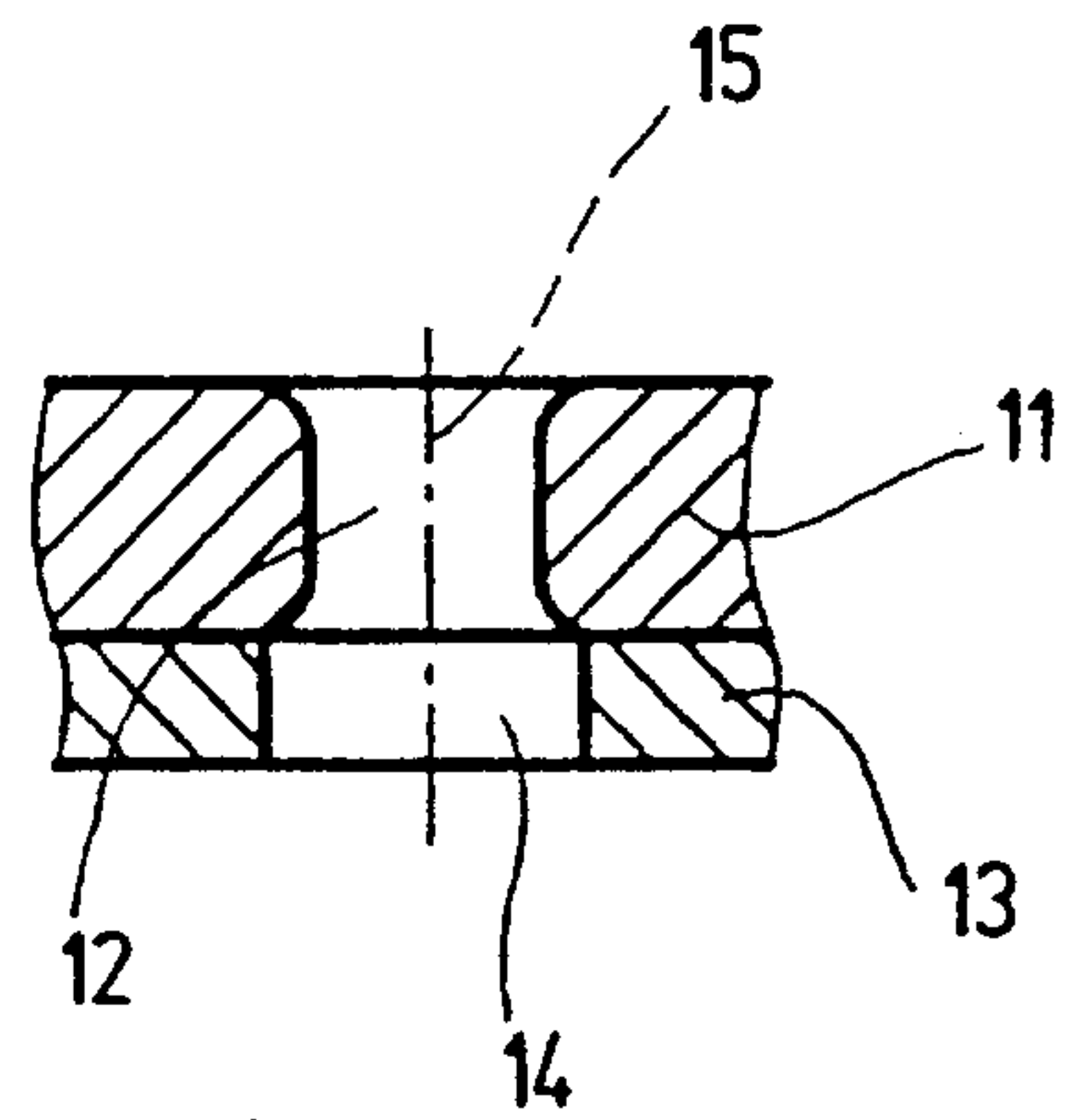


Fig. 3c

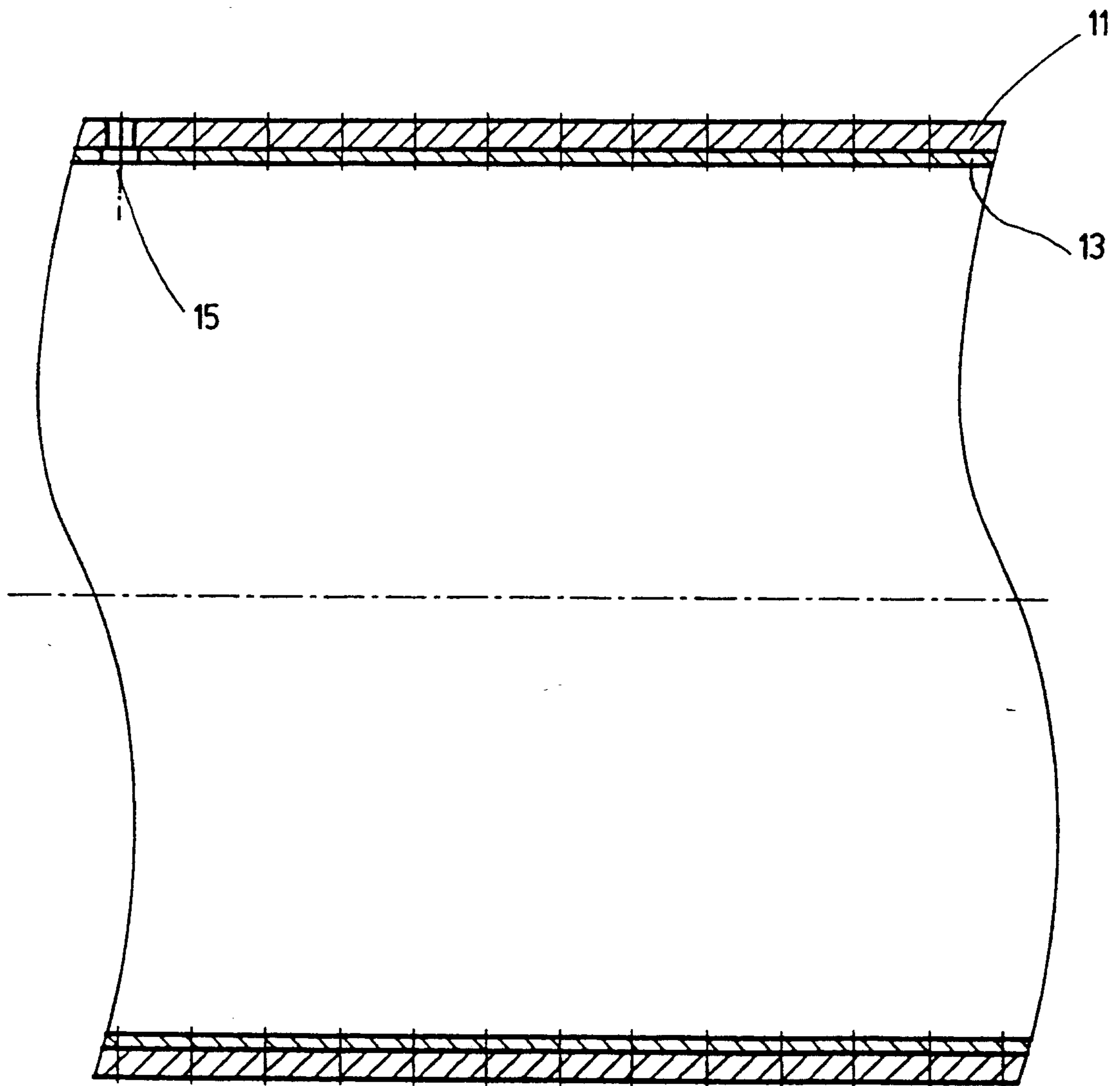


Fig. 3

*Marks & Clerk*

