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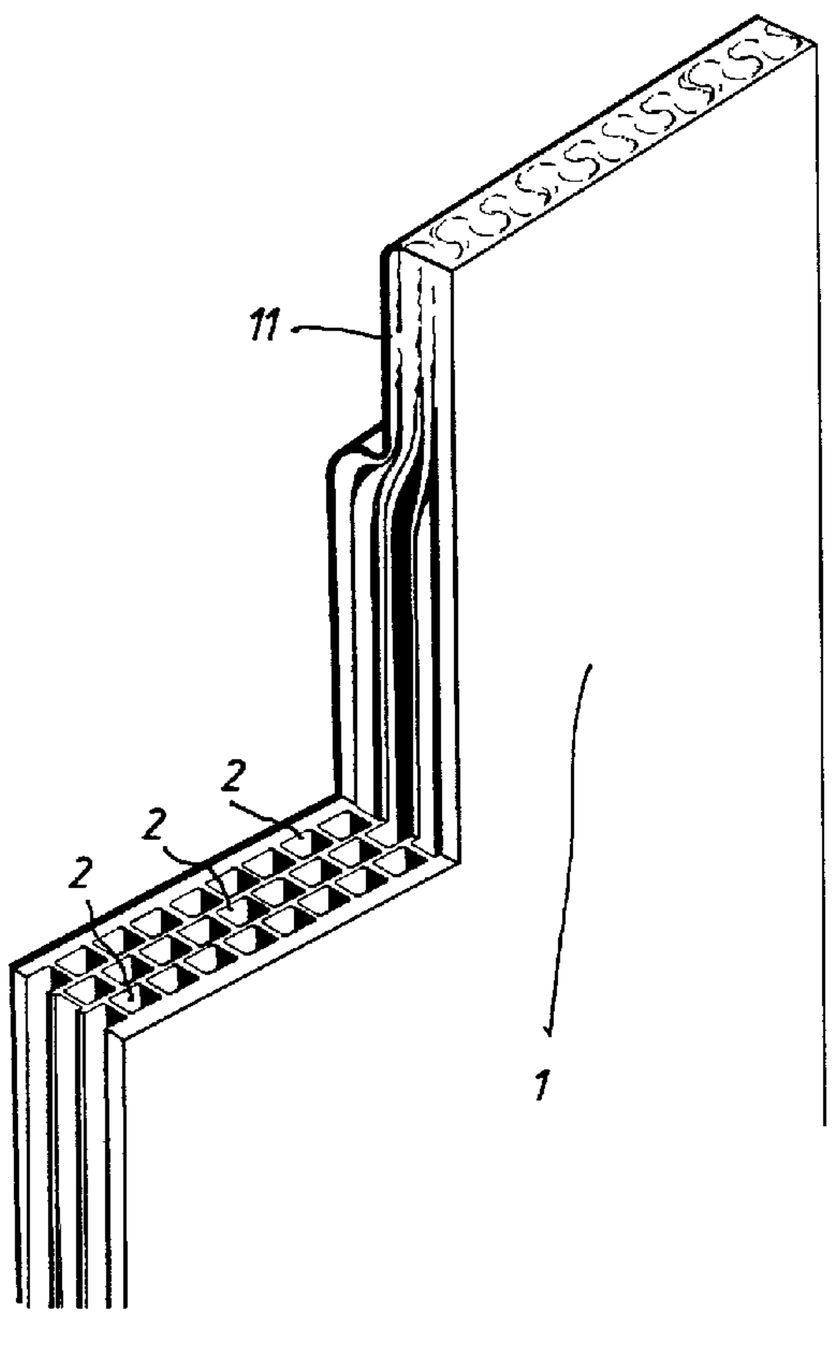
(54) **PROCEDE DE FABRICATION D'UN CONDUIT INTERNE DE CHEMINEE EN CERAMIQUE, LE CONDUIT INTERNE ETANT MUNI DE FEUILLURES A SES EXTREMITES**

(54) **A PROCESS FOR MANUFACTURING A CERAMIC INTERNAL PIPE FOR A CHIMNEY, WHICH INTERNAL PIPE ELEMENT HAS REBATES AT ITS PIPE ENDS**



(57) 1.0 A process for manufacturing a ceramic internal pipe element for a chimney, which internal pipe element has rebates at its pipe ends for joining it to the next chimney internal pipe element. 2.0 It is known that chimney internal pipe elements of this type can be manufactured from a ceramic by an extrusion method, with the rebates being cut out of the end sections of the pipe ends after the chimney internal pipe elements have been cut into lengths. 2.1 In order that chimney internal pipe elements having rebates for joining them to the next chimney internal pipe element can be manufactured inexpensively, it is proposed that a chimney internal pipe element, which consists of a material comprising voids, is compresses all round from the inside to the outside to about half its wall thickness to form a rebate at one of its end sections, and is compressed all round from the outside to the inside to about half its wall thickness to form a rebate at the ether of its end sections.

Abstract

1.0 A process for manufacturing a ceramic internal pipe element for a chimney, which internal pipe element has rebates at its pipe ends for joining it to the next chimney internal pipe element.

2.0 It is known that chimney internal pipe elements of this type can be manufactured from a ceramic by an extrusion method, with the rebates being cut out of the end sections of the pipe ends after the chimney internal pipe elements have been cut into lengths.

2.1 In order that chimney internal pipe elements having rebates for joining them to the next chimney internal pipe element can be manufactured inexpensively, it is proposed that a chimney internal pipe element, which consists of a material comprising voids, is compressed all round from the inside to the outside to about half its wall thickness to form a rebate at one of its end sections, and is compressed all round from the outside to the inside to about half its wall thickness to form a rebate at the other of its end sections.

Description

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Title: A process for manufacturing a ceramic internal pipe for a chimney, which internal pipe element has rebates at its pipe ends

This invention relates to a process for manufacturing a ceramic internal pipe element for a chimney, which internal pipe element has rebates at its pipe ends for joining it to the next chimney internal pipe element, and relates to a chimney internal pipe element manufactured by said process.

It is known that chimney internal pipe elements of this type can be manufactured from ceramics by an extrusion method, with the rebates being cut out of the end sections of the pipe ends after the chimney internal pipe elements have been cut into lengths. However, this is only possible if the pipe is of adequate wall thickness. A thick wall thickness has the disadvantage of the considerable weight and the high usage of material which are associated therewith.

The object of the present invention is to propose a process by which a chimney internal pipe element having rebates for joining it to the next chimney internal pipe element can be manufactured inexpensively, wherein the chimney internal pipe element which is manufactured in this manner exhibits improved mechanical and thermal properties. The object is also that a chimney internal pipe element which is manufactured in this manner should have an intrinsic weight which is less than that of a comparable chimney internal pipe element which is extruded by known manufacturing methods.

This object is achieved in that the chimney internal pipe element, which consists of a material comprising voids, is compressed all round from the inside to the outside to about half its wall

thickness to form a rebate at one of its end sections, and is compressed all round from the outside to the inside to about half its wall thickness to form a rebate at the other of its end sections.

The chimney internal pipe element advantageously consists of a material comprising 50 % by volume of voidage.

The rebates are advantageously provided all round with a groove for receiving a seal.

A chimney internal pipe element which is manufactured by the process according to the invention is preferably produced by an extrusion method.

The voids are preferably formed as channels which extend in the longitudinal direction of the pipe and which are situated side by side spaced apart from each other.

In a further advantageous embodiment, the voids are situated between at least two pipe shells which are spaced apart from each other and which are disposed concentrically with each other.

The pipe shells advantageously have spacer ribs which are spaced apart from each other and which extend approximately radially towards the adjacent shell.

The chimney internal pipe element is preferably manufactured from a ceramic material, which consists of a plastic binder material and consists of a grog material which has a granular structure and the maximum grain diameter of which amounts to about 1/10 to 1/4 of the wall thickness of the walls between the voids/channels. The binder material is preferably clay and the grog material is preferably chamotte.

The invention is illustrated by way of example in the drawings, where:

Figure 1 is a perspective view of a section through the wall of a chimney internal pipe element with a rebate;

Figures 2 to 5 illustrate pipe walls with different cross-sections;

Figure 6 is a longitudinal section through a pipe wall with a rebate; and

Figures 7 and 8 illustrate two mutually adjacent pipe ends of two chimney internal pipe elements.

As shown in Figures 1 to 7, the wall of a ceramic internal pipe element 12 for a chimney comprises voids 2 which occupy about 50 % of the total volume of the wall. As shown in the Figures with the exception of Figures 5 and 6, the voids 2 are formed as channels which extend in the longitudinal direction of the pipe and which are situated spaced apart from each other. The voids/channels 2 have a square, rectangular or parallelogram-like cross-section, and are generally disposed offset in relation to each other.

In the embodiment shown in Figure 4, the wall 1 of the chimney internal pipe element consists of a plurality of shells 3, 4, 6, 7, which extend concentrically and are spaced apart from each other, with the outer shells 3 and 4 having spacer ribs 8 which are spaced apart from each other and which extend approximately radially towards the adjacent shell. The two inner shells 6 and 7 each have spacer ribs 8 on both sides.

In the embodiment shown in Figure 5, the voids 2 are of irregular form and are distributed over the entire cross-section of the wall 1.

In the embodiment shown in Figure 3, the wall 1 consists of two shells 3 and 4, which are spaced apart from each other and which are disposed concentrically with each other.

In order to manufacture the rebates, the pipe ends are reshaped in a simple manner, as shown in Figures 1 and 6, by compressing them to half the wall thickness plus half the gap thickness between the rebates, so that it is possible easily to assemble the chimney internal pipe elements. It is possible to effect said reshaping in a simple manner since it is only the voids/channels 2

which are compressed, so that only a slight expenditure of force is necessary. Moreover, no material has to be removed from the pipe.

In chimney internal pipe elements which are manufactured from ceramic materials by an extrusion method, a pronounced texturing of the wall occurs parallel to the voids/channels 2. Due to the compressed interposed channels 2, the reshaped end sections therefore exhibit a layer structure, as can be seen in particular from Figures 1 and 8. This layer structure results in a very high stability of the chimney internal pipe elements according to the invention.

As can be seen from Figures 7 and 8 in particular, the rebates at the pipe ends of a chimney internal pipe element 12 are formed by reshaping one end section from the inside to the outside to form a rebate 11 and by reshaping the other inner section from the outside to the inside to form a rebate 10. The rebates which are formed in this manner can comprise encircling grooves 13 for receiving a seal, as shown in Figure 7.

The void volume, which is formed axially in relation to the direction of pressing or in relation to the longitudinal direction of the pipe, can be formed with any profile. Depending on the application, a pipe column made of the chimney internal pipe elements may be subjected to high temperatures. In general, steady-state temperature profiles cause no problems, even at temperatures up to 600°C. In practice, however, rates of heat-up of up to 50°C per minute can occur. In the chimney internal pipe elements which have been known hitherto, the tensile stresses which thereby occur due to the relatively poor thermal conductivity can exceed the strength of the material and can result in the formation of cracks.

The design according to the invention, which comprises voids/channels 2 in the chimney internal pipe element according to the invention, results in the widening of notch roots and therefore prevents the propagation of cracks. The volume of voids/channels can definitely be considered as a replacement for a coarse grog structure. This has the advantage that significantly finer grain size distributions can be used.

Due to the extrusion method, a pronounced texturing of the wall occurs parallel to the voids/channels. This results in an anisotropic prolongation of the vapour diffusion path. The vapour diffusion resistance of the body is thus increased compared with that of a solid body made from the same material.

Furthermore, said texturing also results in high mechanical stability of the chimney internal pipe element according to the invention, particularly in the region of the rebates 10, 11 also, due to the layer formation of the channels which are pressed into one another and which extend in the longitudinal direction of the pipe. Moreover, the chimney internal pipe element according to the invention has the advantage that only 50 % of the material has to be used, which furthermore results in a 50 % reduction in weight.

If predetermined breaking points are provided in the radially extending wall regions of the wall 1 of the chimney internal pipe element, fissures occur at these predetermined breaking points under the effect of thermal stresses. This results in a chimney internal pipe element which consists of a plurality of shells, similar to the chimney internal pipe element comprising two shells 3, 4 which is illustrated in Figure 3. In particular, pipes of this type can be subjected to very high thermal stresses.

Furthermore, due to the proposed formation of the rebates a pipe can be obtained which is smooth both internally and externally, so that favourable conditions of flow are present.

Claims

1. A process for manufacturing a ceramic internal pipe element for a chimney, which internal pipe element has rebates at its pipe ends for joining it to the next chimney internal pipe element, characterised in that the chimney internal pipe element, which consists of a material comprising voids, is compressed all round from the inside to the outside to about half its wall thickness to form a rebate at one of its end sections (11), and is compressed all round from the outside to the inside to about half its wall thickness to form a rebate at the other of its end sections (10).

2. A process according to claim 1, characterised in that the chimney internal pipe element consists of a material comprising 50 % by volume of voidage.

3. A process according to claims 1 or 2, characterised in that the rebates (10, 11) are provided all round with a groove (13) for receiving a seal.

4. A chimney internal pipe element according to any one of process claims 1 to 3, characterised in that the chimney internal pipe element (12) is produced by an extrusion method.

5. A chimney internal pipe element according to claim 4, characterised in that the voids (2) are formed as channels which extend in the longitudinal direction of the pipe and which are situated side by side spaced apart from each other.

6. A chimney internal pipe element according to claim 5, characterised in that the voids (2) are situated between at least two pipe shells (3, 4) which are spaced apart from each other and which are disposed concentrically with each other.

7. A chimney internal pipe element according to claim 6, characterised in that the pipe shells (3, 4, 6, 7) have spacer ribs (8) which are spaced apart from each other and which extend approximately radially towards the adjacent shell.

8. A chimney internal pipe element according to any one of claims 1 to 7, characterised in that the chimney internal pipe element is manufactured from a ceramic material, which consists of a plastic binder material and which consists of a grog material which has a granular structure and the maximum grain diameter of which amounts to about 1/10 to 1/4 of the wall thickness of the walls between the voids/channels.

9. A chimney internal pipe element according to claim 9, characterised in that the binder material is clay and the grog material is chamotte.

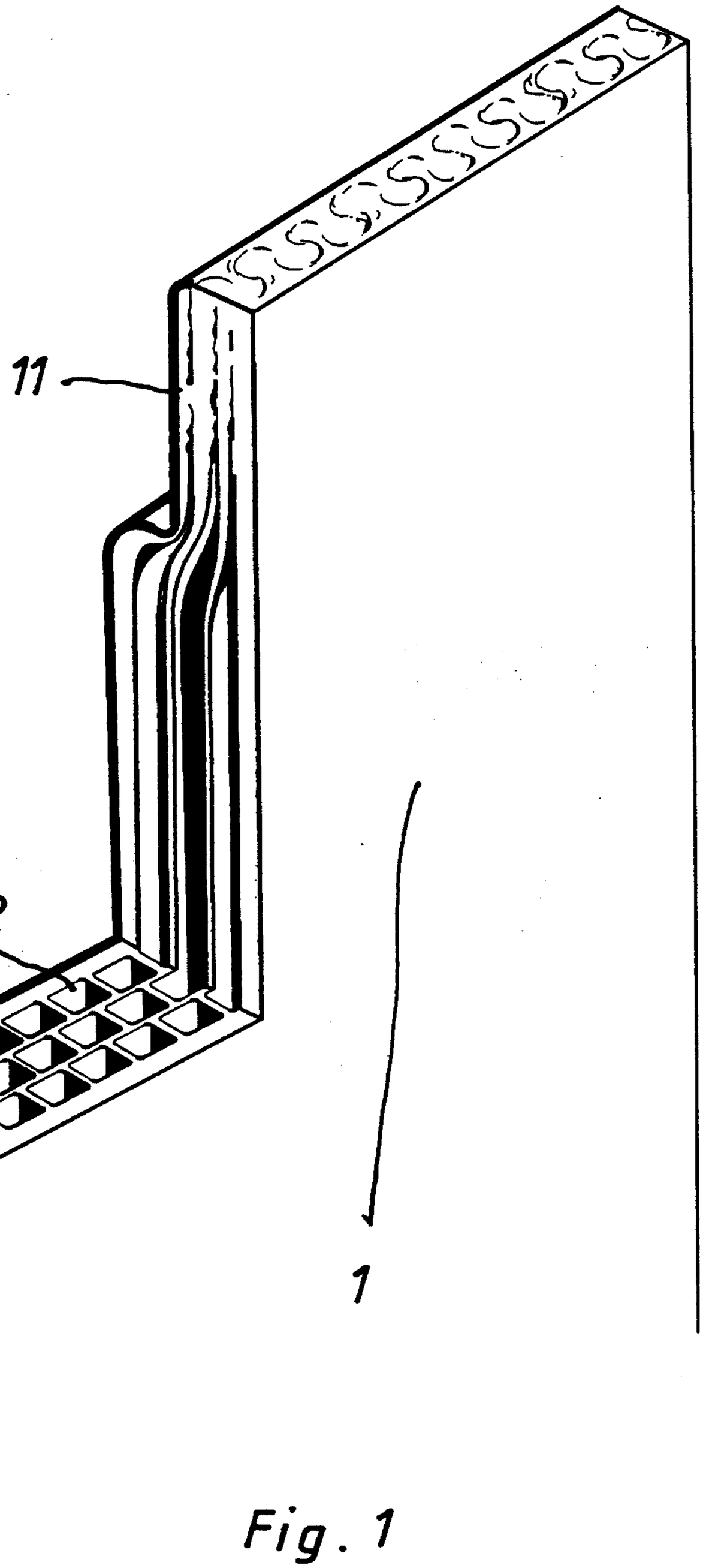


Fig. 1

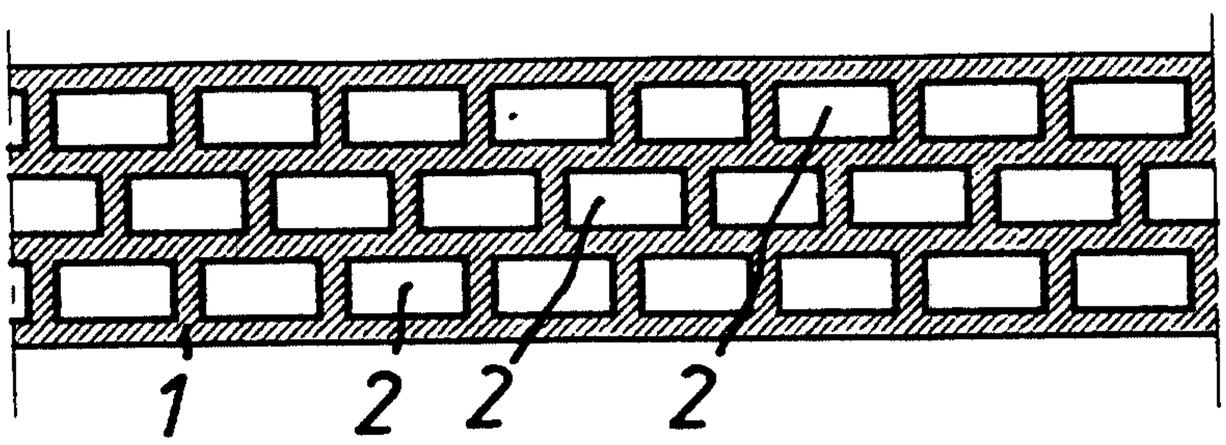


Fig. 2

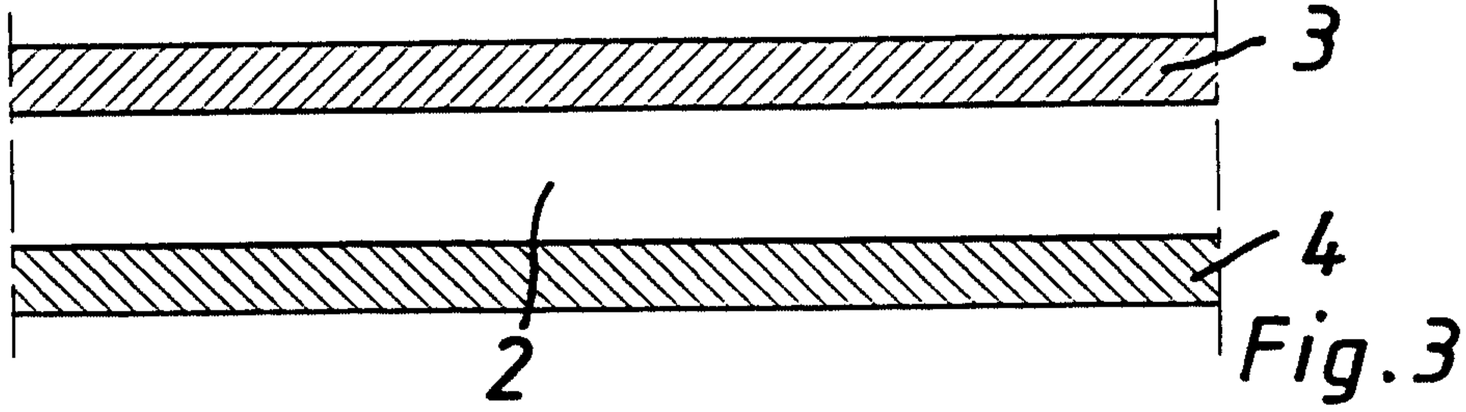


Fig. 3

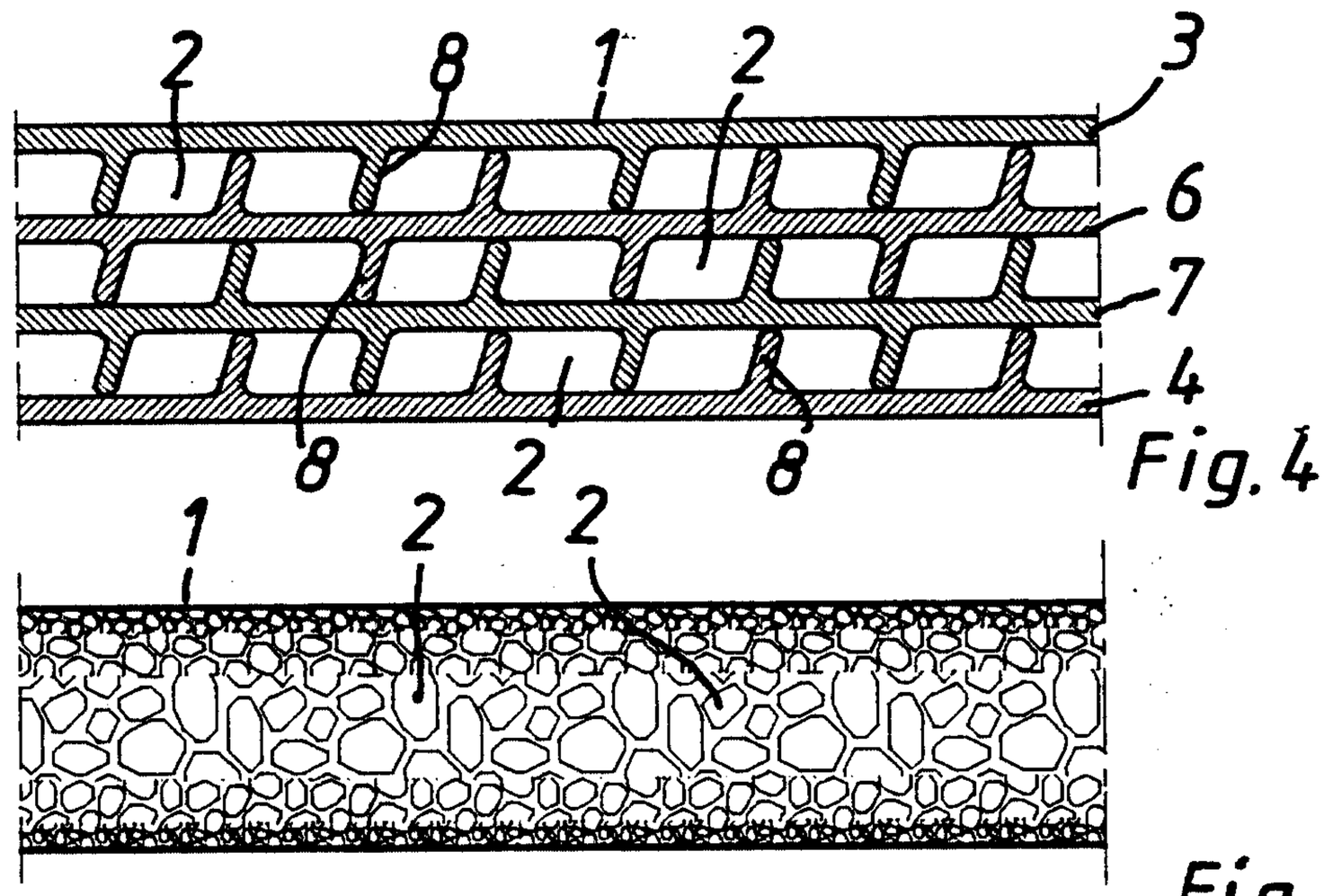


Fig. 4

Fig. 5

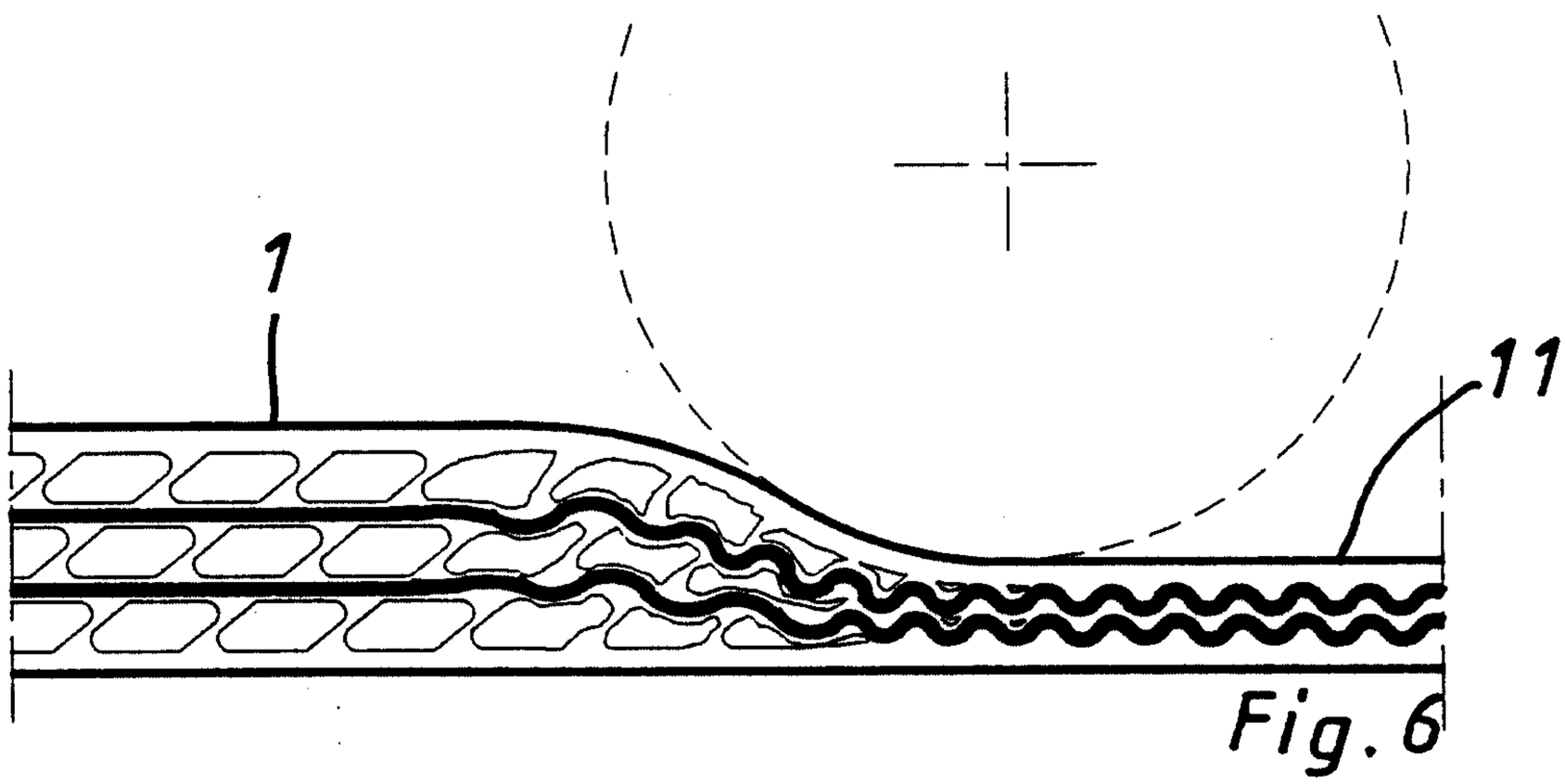


Fig. 6

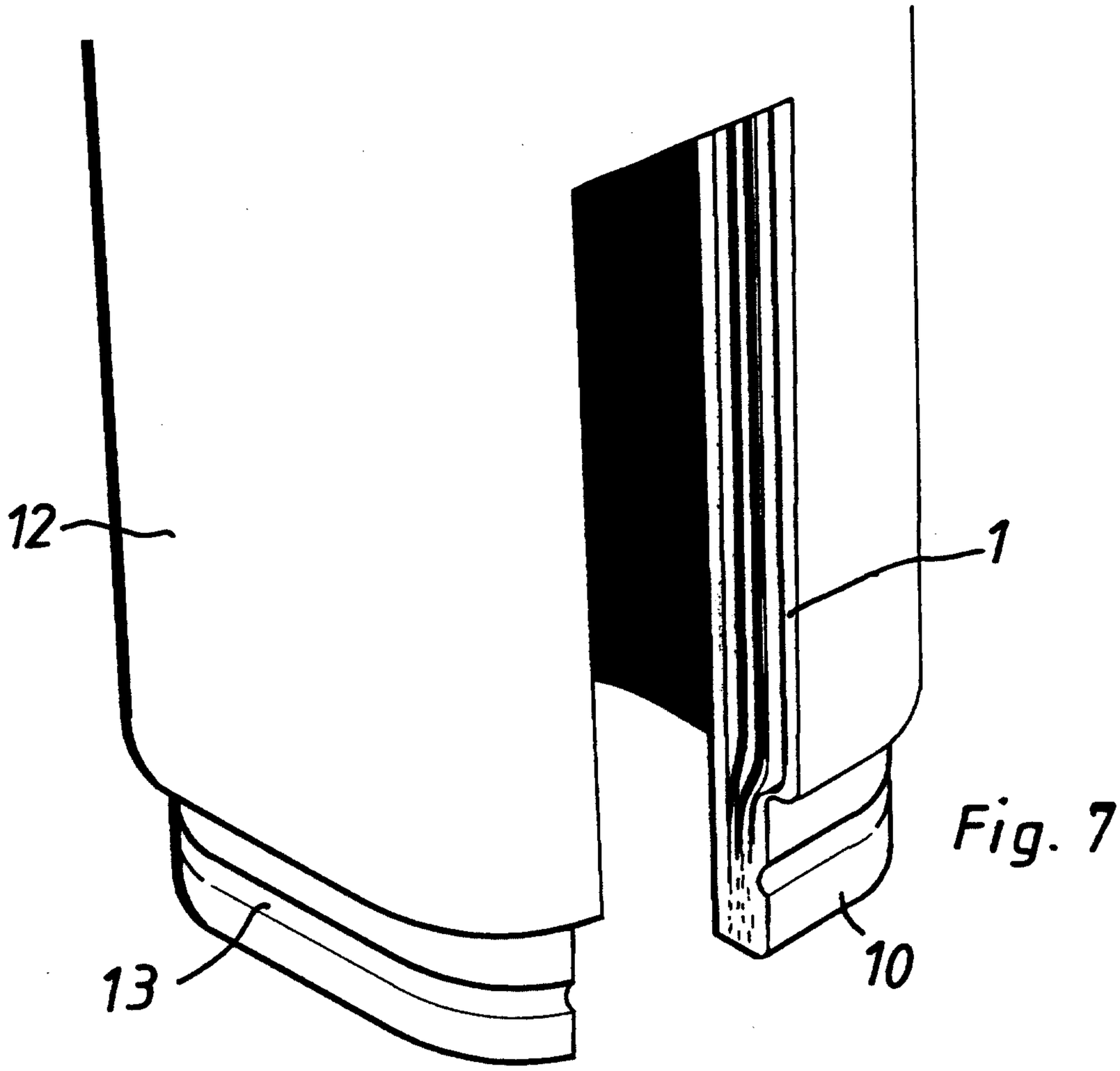


Fig. 7

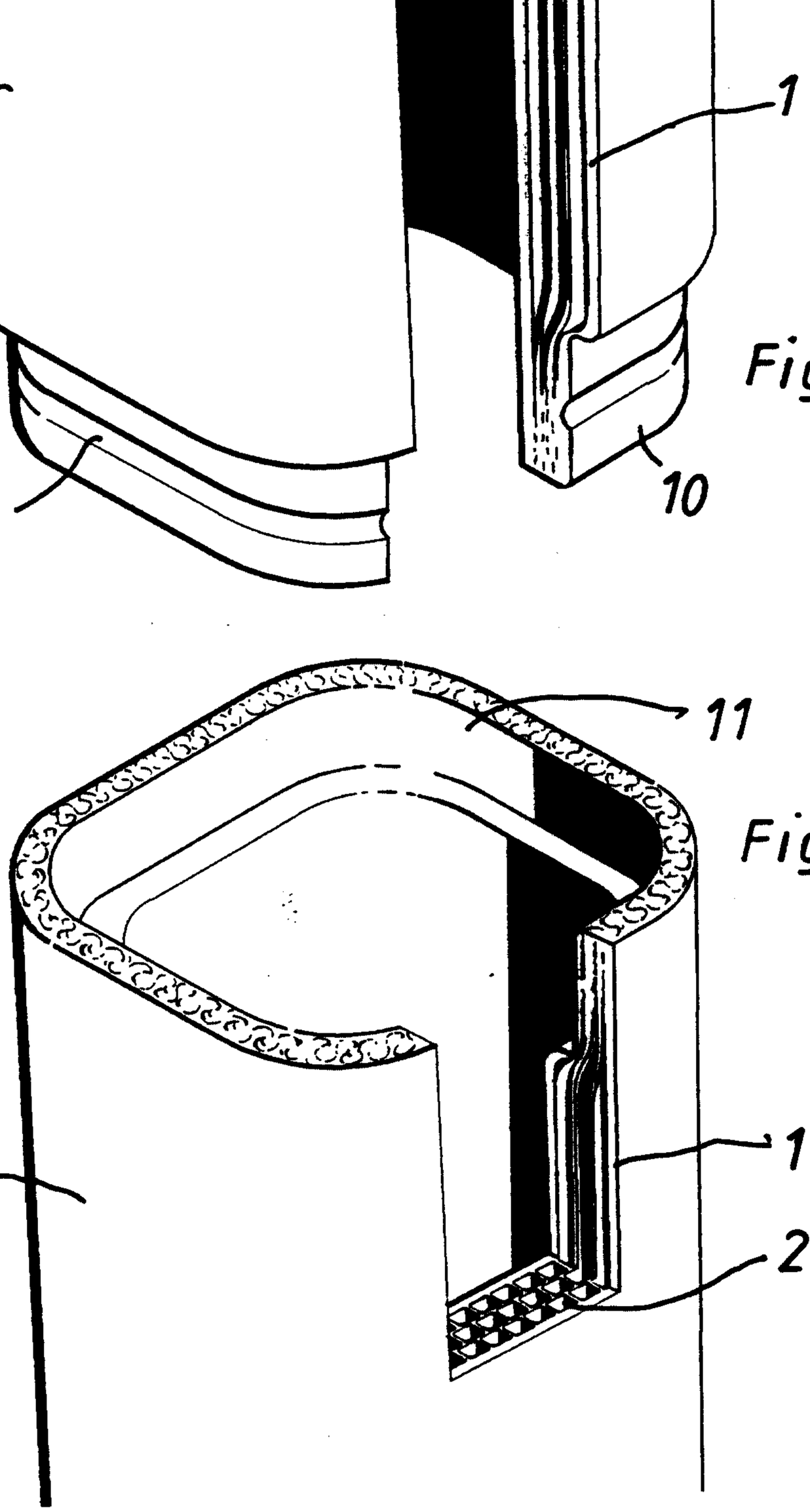
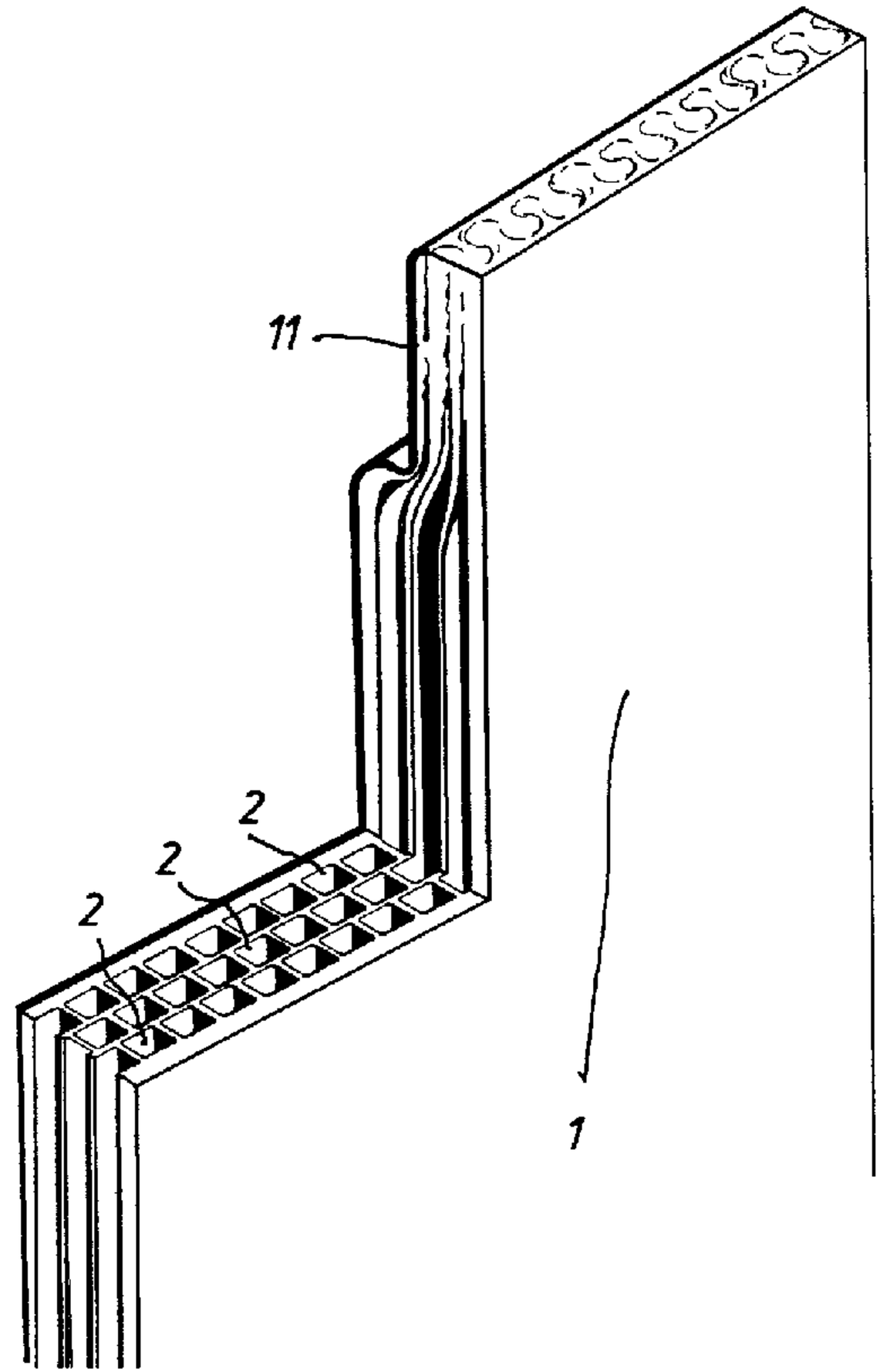


Fig. 8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