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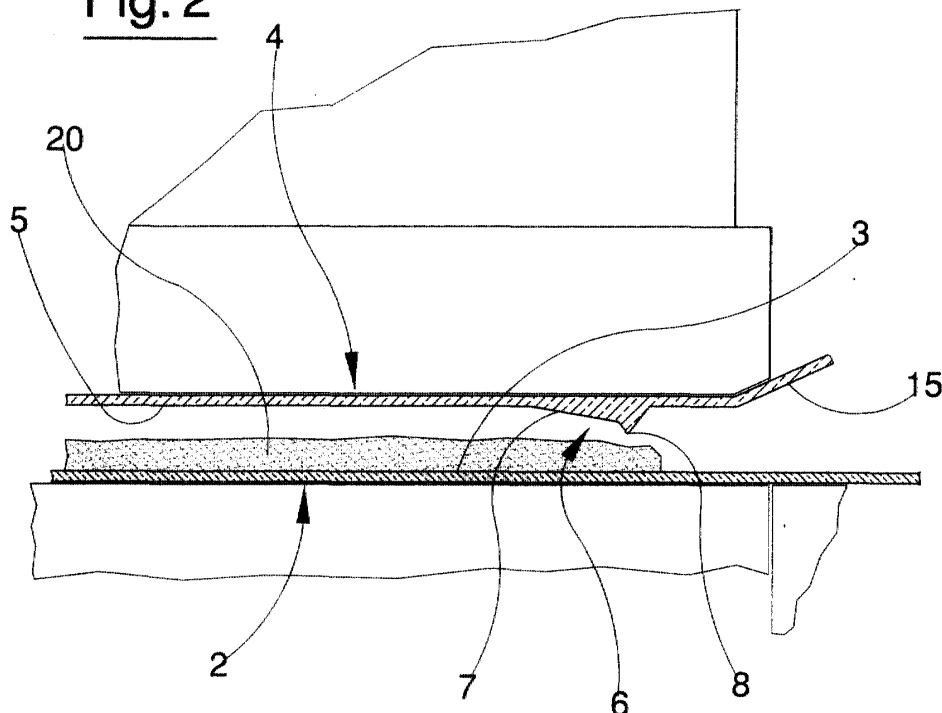
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(54) **A device for forming ceramic products, including slabs, tiles and the like, by powder pressing**

(57) The device of the invention comprises: a lower element (2) bearing a lower rest plane (3) for supporting a powder to be pressed (20), the lower rest plane (3) also functioning as a bottom die of the device; an upper element (4) having at least one active surface (5), predisposed facing the lower rest plane (3), the at least one active surface (5) being provided with a forming frame

(6) which projects inferiorly and which is predisposed in such a way as to delimit a perimeter of a closed pressing zone. The forming frame (6), as well as delimiting a perimeter of a closed pressing zone and therefore also delimiting a corresponding final pressed product (21), also generating an edge (22) of the final pressed product (21) which is characterised by a greater density than a density of internal zones of the final pressed product (21).

Fig. 2



Description

Description.

[0001] The prior art in the field of forming ceramic tiles is based on the use of dies inserted into presses. The dies are, schematically speaking, constituted by a cavity into which powders are deposited, and by at least one punch having the task of pressing the deposited powders.

[0002] Also known is the use of dies in which the cavity is not made in the bottom die; this is instead used for depositing a layer of powders which is then pressed by the top die or punch. Delimitation and lateral containment of the material to be pressed to form the tile or slab is performed by a forming frame associated to the punch or top die, which projects from the top die so that it can remain in contact with the bottom plane (bearing the powders to be pressed) during the pressing operation.

[0003] This solution exhibits a number of constructional complexities due to the need to predispose devices for vertically moving the frame with respect to the punch, and is subject to problems of wear on the moving parts.

[0004] A further and not easy-to-solve drawback concerns the need to provide a device for cleaning the punch between one pressing operation and a next.

[0005] The main aim of the present invention is to provide a device for forming ceramic products, such as slabs, tiles and the like, by power pressing, which will obviate the above-described drawbacks and limitations inherent in the prior art.

[0006] The invention is constructionally simple and functional.

[0007] A further advantage of the invention is the fact that it enables a punch-cleaning operation to be carried out between one pressing operation and a next both away from the pressing zone and easily.

[0008] These aims and advantages and more besides are all attained by the object of the invention, as it is characterised in the appended claims.

[0009] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of a preferred but non-exclusive embodiment of the invention, illustrated purely by way of a nonlimiting example in the accompanying figures of the drawings, in which:

figure 1 is a schematic longitudinal section made according to a vertical plane which is parallel to the advancement direction of the materials being pressed;

figure 2 is an enlarged-scale drawing of a detail of figure 1;

figure 3 is the same detail as in figure 2, in a different operative configuration. With reference to the above-mentioned figures, 1 denotes in its entirety a device for forming ceramic products, such as

slabs and tiles and the like, by powder pressing, which is schematically constituted by a press 11 with a central aperture crossed through by a lower element 2, constituted by a lower continuous belt 12 exhibiting a rest plane 3 to support the powder 20 to be pressed, and an upper element 4, constituted by the horizontal branch of an upper continuous belt 15, ring-wound and stretched between two drums 16 having parallel axes and being positioned externally, which upper continuous belt 15 constituting the upper element 4 is driven in synchrony with the lower continuous belt 12 constituting the lower element 2.

[0010] The lower element 2 lies and slides along an upper surface of the piston 10 of the press 11 and is commanded by the piston 10 to displace upwards in order to exert the pressing action.

[0011] The upper element 4 is provided with a plurality of active surfaces 5, located and distributed in a predetermined order along the upper continuous belt 15. At each pressing event the active surfaces 5 are brought into contact with the rest plane 3 of the lower continuous belt 12.

[0012] Each active surface 5 is characterised in that it is provided with a forming frame 6 which projects inferiorly (when the active surface 5 is in contact with the rest plane 3) and is predisposed in such a way as to delimit at its perimeter a closed pressing zone.

[0013] A plurality of forming frames 6 can be predisposed on the upper continuous belt 15, each different from another, so that the type of surface to be obtained on the pressed product can be alternated.

[0014] The forming frame 6 exhibits an internal part 7 which carries out the pressing of the edge 22 of the final pressed product 21. This internal part 7 is externally delimited by an edge 8 having a depth, measuring in the pressing direction, which is not less than or is equal to that of the central body of the final pressed product 21.

[0015] In particular, the internal part 7 inferiorly projects with respect to the active surface 5 and presents a breadth which gradually decreases as it distances from the edge 8.

[0016] The whole forming frame 6 is constituted by a material provided with a consistent elastic deformability (rubber or another elastomer).

[0017] The upper branch of the lower continuous belt 12 is moved in concordance with the lower branch of the upper continuous belt 15.

[0018] In the described structure, the lower rest plane 3 also functions as the bottom die of the forming device.

[0019] During the pressing phase, the piston 10 rises, raising the part of the lower element 2 on which the powder to be pressed has been deposited, thus pressing the powder against the active surface 5 delimited by the forming frame 6 of the upper continuous belt 15.

[0020] While the edges 8 have mainly the task of perimetally defining the area of compression, the internal

parts 7 have the function of realising, at the edge of the powder, a perimeter area of greater compression with respect to the central part of the powders, thus creating a more compacted zone at the edge of the pressed slab or tile.

[0021] The presence of this more compressed zone, which is removed by a cut after firing, and especially in the case of slim slabs or tiles, has essentially the very important task of preventing formation of fissures or cracks in the body of the slabs or tiles themselves.

[0022] An advantage of the present invention is that the slab- or tile-forming operation is rendered very simple and rapid, especially when the slabs or tiles are of large dimensions but are relatively slim.

Claims

1. A device for forming ceramic products, including slabs, tiles and the like, by powder pressing, **characterised in that** it comprises:

a lower element (2) bearing a lower rest plane (3) for supporting a powder to be pressed (20), the lower rest plane (3) also functioning as a bottom die of the device;

an upper element (4) having at least one active surface (5), predisposed facing the lower rest plane (3), the at least one active surface (5) being provided with a forming frame (6) which projects inferiorly and which is predisposed in such a way as to delimit a perimeter of a closed pressing zone;

the forming frame (6), as well as delimiting a perimeter of a closed pressing zone and therefore also delimiting a corresponding final pressed product (21), also generating an edge (22) of the final pressed product (21) which is **characterised by** a greater density than a density of internal zones of the final pressed product (21).

2. The device of claim 1, **characterised in that** the forming frame (6) exhibits an internal part (7) which presses the edge (22) of the final pressed product (21) and which is delimited externally by a delimiting edge (8) having a depth which, measured in a pressing direction, is not less than or is equal to a depth of the final pressed product (21).

3. The device of claim 2, **characterised in that** the internal part (7) projects inferiorly with respect to the active surface (5) and gradually decreases in depth in a direction going from the delimiting edge (8) towards the active surface.

4. The device of claim 3, **characterised in that** the upper element (4) having at least one active surface

(5) delimited by the forming frame (6) is constituted by a lower branch of an upper continuous belt (15) which is ring-wound and stretched between two drums (16) having parallel axes and being externally positioned.

5. The device of claim 4, **characterised in that** at least the forming frame (6) is constituted by a material having considerable elastic deformability properties.

6. The device of claim 5, **characterised in that** the ring-wound upper continuous belt (15) bears a plurality of active surfaces (5) delimited by an equal plurality of forming frames (6), distributed along the upper continuous belt (15).

7. The device of claim 6, **characterised in that** the lower element (2) bearing the lower rest plane (3) for supporting the powder to be pressed (20) is constituted by an upper branch of the lower continuous belt (12), which belt (20) moves in synchrony with the lower branch of the upper continuous belt (15).

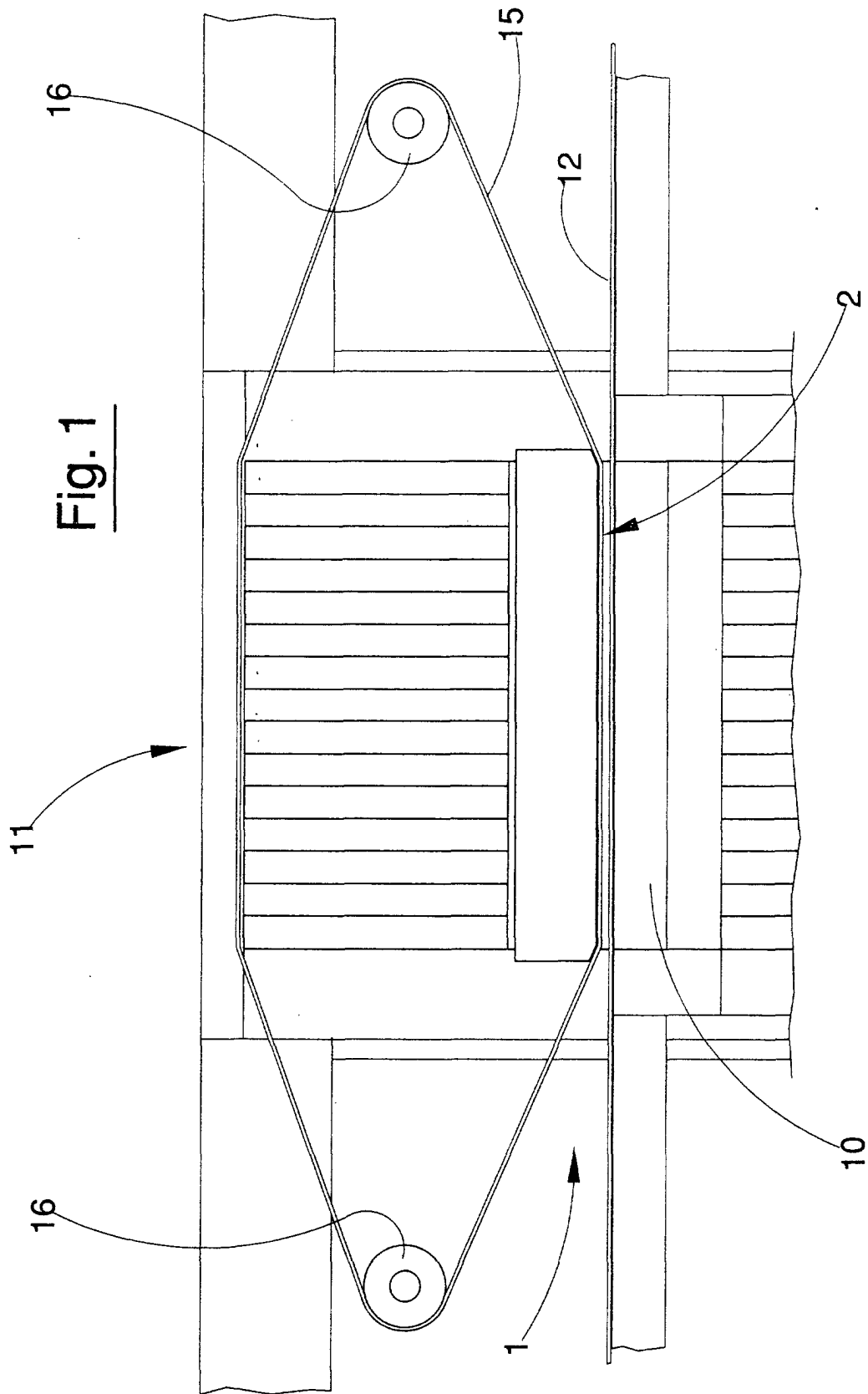


Fig. 2

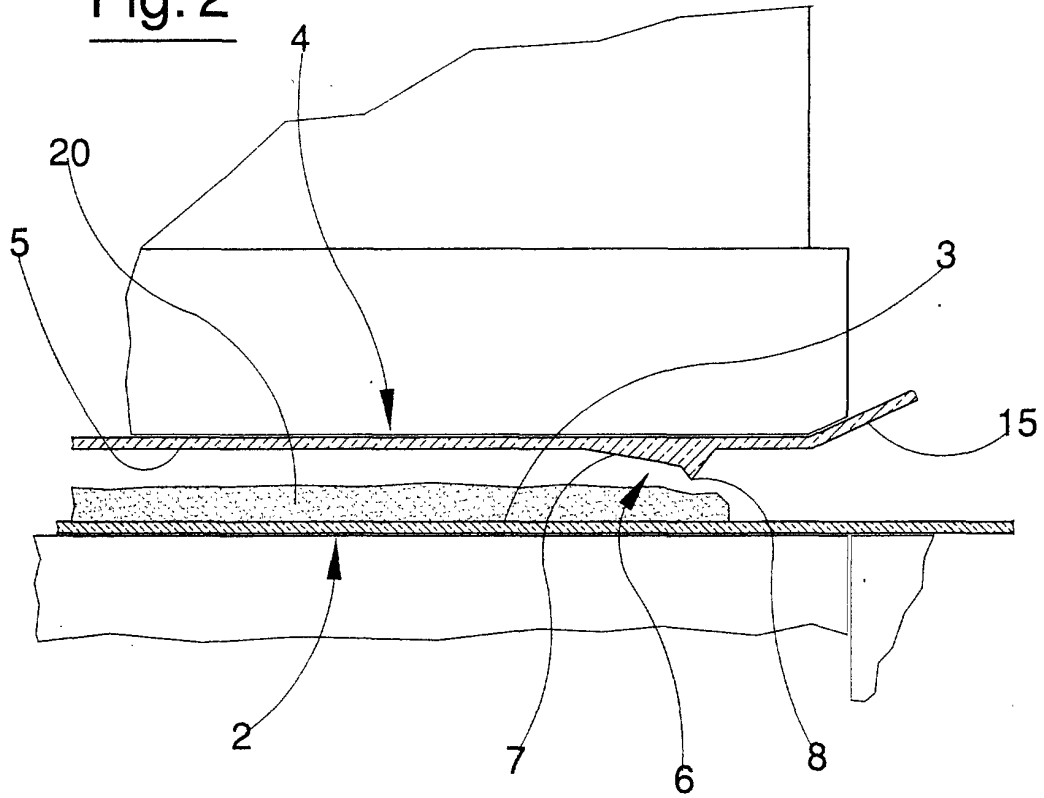
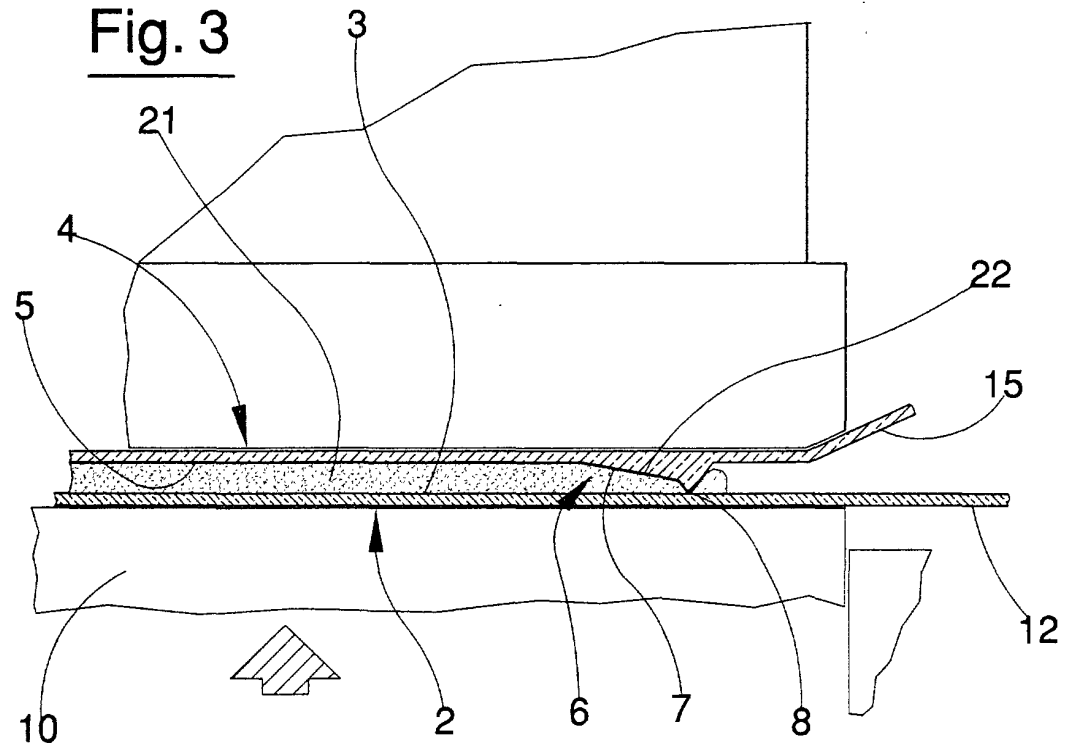


Fig. 3





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 1036

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Place of search THE HAGUE		Date of completion of the search 14 August 2000	Examiner Gourier, P		
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EP 00 20 1036

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