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(11)

EP 1 375 099 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.01.2004 Bulletin 2004/01

(51) Int Cl.7: **B28B 13/02**

(21) Application number: **03425318.7**

(22) Date of filing: **16.05.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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(30) Priority: **20.06.2002 IT MO20020175**

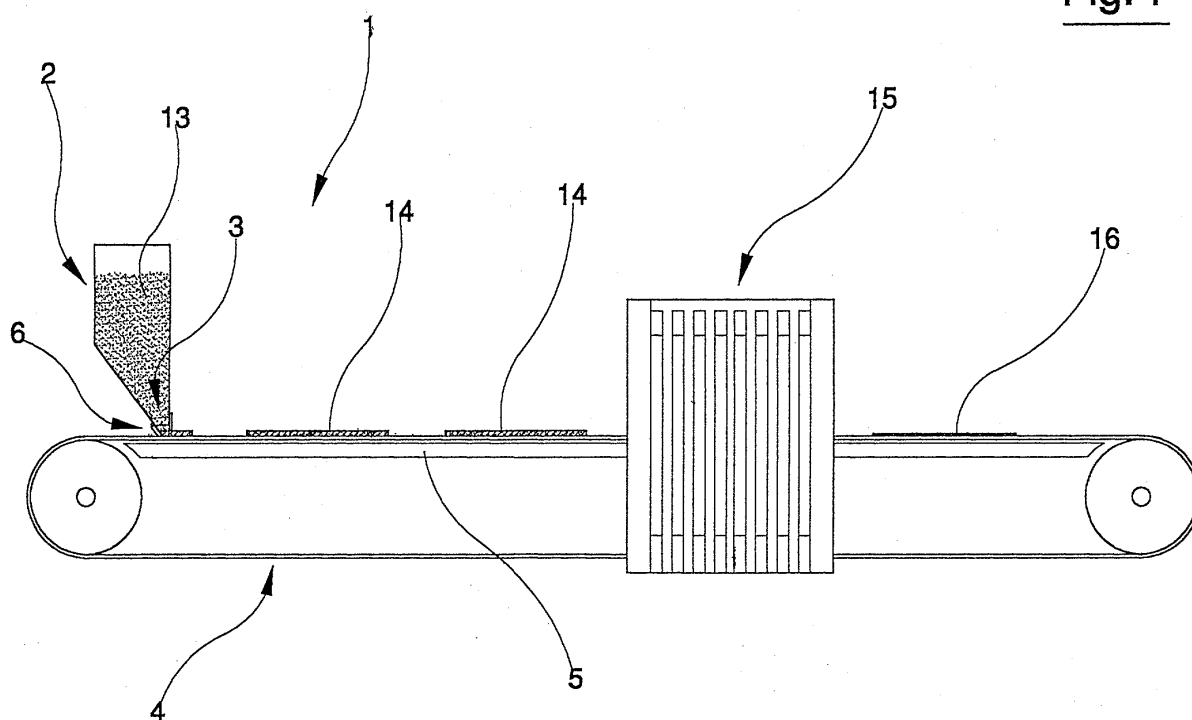
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(54) **A device for loading powders**

(57) The device comprises a box-shaped container (2) functioning as a hopper and inferiorly exhibiting an elongate opening (3). At least one conveyor belt (4) runs below a bottom of the container (2) in a perpendicular direction to the elongate development of the opening (3). The conveyor belt (4) runs on an underlying rest

plane (5). Pressors are (6) inferiorly constrained to the container (2), at least some of which pressors (6) are mobile between an active work position thereof in which the pressors (6) are in contact with the conveyor belt (4) and press the conveyor belt (4) against the rest plane (5), and an inactive position in which the pressors (6) are in contact with the conveyor belt (4).

Fig. 1



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Description

[0001] The device of the invention is for depositing powders on a moving conveyor belt.

[0002] Devices for loading and depositing ceramic powders on a conveyor belt are normally used in ceramic tile production lines, for supplying loose material to at least one press. The loose material, made up of ceramic powders, is deposited on a conveyor belt in contiguous layers separated by suitable intervals. Each of the layers of powder undergoes a loading cycle in at least one press and is compacted into a single tile.

[0003] The prior art teaches device comprising a container for the ceramic powders which has an opening to cause the powders to fall, and which is provided with means for occluding and freeing the opening. By opening and closing the opening the powders fall onto a conveyor belt in contiguous and successive layers, each of which defines a single tile, whose structure is at this point still loose. The conveyor belt carries the layers of powder into a press, which, together with the belt, performs a first low-intensity pressing stage with loads of around 20-50 kg/cm². At these pressure levels the powder is compacted sufficiently to be manipulated in some ways. In particular the preformed tile is taken by driven roller planes into a die of a second press, where final compacting is realized, with pressure of around 600 kg/cm².

[0004] The above-described devices include some drawbacks. The conveyor belt, if subjected to total pressure loads, is subject to permanent deformations which affect the planarity thereof which is needed in order to have a homogeneous laying of the powders. A deformed belt cannot therefore be re-used, so the pressing cycle has to be divided into two successive stages, one preforming stage with low pressing loads, and one final compacting stage with high pressing loads. The final tile pressing stage cannot be done directly on the belt, so it is necessary to remove the preformed tiles from it. This aspect implies the presence of at least one additional press for compacting the tiles and a supplementary system of transport constituted, for example, by a driven roller plane for distancing the tiles from the conveyor belt.

[0005] A further known device comprises a container for ceramic powders provided with an opening for allowing the powders to fall and including means for closing and opening the opening, which functions in the same way as the device described above. The powders are taken to the press by an open conveyor which is subjected to the main pressing load together with the powders to be compacted and which is gathered on a winder located downstream of the press. The belt is therefore subjected to the described permanent deformations, which make it unusable for successive pressing cycles.

[0006] Devices of the above type exhibit the drawback of requiring a high level of waste as regards the conveyor belt, which is in effect a single-use element; a further

problem is how to dispose of this belt.

[0007] The main aim of the present invention is to obviate the above drawbacks by providing a device for loading powders, for depositing a layer of powders on a moving conveyor belt, which enables a high-pressure pressing cycle to be carried out on the powders directly on the conveyor belt, and to re-use the same conveyor belt in successive pressing cycles.

[0008] 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 a device for loading powders depositing a layer of powders on a moving conveyor belt, illustrated purely by way of a nonlimiting example in the accompanying figures of the drawings, in which:

figure 1 is an overall view of the device of the invention in operation;

figure 2 is a first lateral view of the device;

figure 3 is a second lateral view of the device;

figure 4 is a front view of the device;

figure 5 is a second view of a detail of figure 4.

[0009] With reference to figure 1, 1 denotes in its entirety the device of the present invention.

[0010] The device 1 comprises a box-shaped container 2 which functions as a hopper and inferiorly exhibits an elongate opening 3. At least one conveyor belt 4 runs below the bottom of the container 2 in a perpendicular direction to the longitudinal development of the opening 3. The conveyor belt 4 runs on an underlying rest plane 5.

[0011] Pressors 6 are inferiorly constrained to the container, at least some of which pressors 6 are mobile between an active working position, at which they are in contact with the conveyor belt 4 and press it against the rest plane 5, and an inactive position at which they are not in contact with the conveyor belt 4.

[0012] The pressors 6 comprise (see figure 4) two lateral containment elements 7 for the powders, laterally constrained in opposite positions to the container 2 and inferiorly projecting with respect to the opening 3 of the container 2. The two lateral containment elements 7 respectively comprise a skate 8, longitudinally L-shaped, which exhibits a first portion 8a thereof which is arranged parallel to the conveyor belt 4 and a second portion 8b arranged perpendicular to the conveyor belt 4. A rod 9 is connected to the first portion 8a of the skate 8, at about the halfway line of the skate 8, and is slidably constrained vertically in a guide element 10, which is in turn connected to the container 2. A spring 11 is wound about the rod 9, which spring at one end strikes the guide element 10 and at the other end the first portion 8a of the skate 8. The spring 11 presses the skate 8 onto the underlying conveyor belt 4 with a force that is adjustable by means of a known-type device which is not illustrated.

[0013] The pressors 6 also comprise (figures 2, 3) an

elongate flat element 12 having a first side 12a and a second side 12b which are reciprocally parallel and opposite. The flat element 12 is hinged at a first side thereof 12a to the rear edge of the opening 3 which is located transversally to the advancement direction of the conveyor belt 4. The flat element 12 is mobile between a closed position, at which it is positioned in order to close the opening 3, and an open position, at which, apart from keeping the opening open 3, places the second side 12b thereof in contact with the conveyor belt 4 in order to keep the conveyor belt 4 pressed onto the rest plane 5.

[0014] With reference to the figures of the drawings, the device operates as follows. The ceramic powders 13 contained internally of the container 2 are deposited on the conveyor belt 4 in a plurality of layers 14 deposited at regular intervals. The layers 14 enter successively into the cell of a press 15 where they are compacted to produce formed tiles 16 which are thereafter unloaded from the conveyor belt.

[0015] The depositing of a layer 14 is done by controlled opening and closing of the flat element 12. The time interval between the opening and closing of the flat element 12 determines the longitudinal development of a layer 14.

[0016] The opening of the flat element 12 advantageously leads the second side 12b to press the conveyor belt 4 onto the underlying rest plane 5. The action of the second side 12b, together with the action of the skates 8, effectively scrapes the conveyor belt 4 before another layer of powders 14 is deposited. The skates 8, through their second portions 8b, have the important function of lateral containment of a layer 14 during the relative depositing stage.

[0017] The device of the invention offers the following important advantages.

[0018] The first advantage is that it enables a considerable structural simplification of the tile-forming operations inasmuch as the forming is done directly on the conveyor belt. In particular it is not necessary to subdivide the pressing load into two successive operations, the first a low-load preforming operation and the second the real high-load press, in order to safeguard the planarity of the conveyor belt itself. Consequently it is not necessary to use a further press and a supplementary movement system to transfer the pre-formed tiles to the final forming press.

[0019] A second important advantage is that the invention enables the conveyor belt to be re-used for an elevated number of pressing cycles, limiting waste of material and costs of disposal.

[0020] A third important advantage is that the invention guarantees a depositing of a layer of ceramic powders which is homogeneous in thickness and perfectly planar on the surface thereof, thus ensuring a high product quality.

Claims

1. A device for loading powders, for depositing a layer of powders on a moving conveyor belt, comprising: a box-shaped container (2) functioning as a hopper and inferiorly exhibiting an elongate opening (3); at least one conveyor belt (4) running below a bottom of the container (2) in a perpendicular direction to the elongate development of the opening (3), the conveyor belt (4) running on an underlying rest plane (5); **characterised in that** it further comprises: pressors (6) inferiorly constrained to the container (2), at least some of which pressors (6) are mobile between an active work position thereof in which the pressors (6) are in contact with the conveyor belt (4) and press the conveyor belt (4) against the rest plane (5), and an inactive position in which the pressors (6) are in contact with the conveyor belt (4).
2. The device of claim 1, **characterised in that** the pressors (6) comprise two lateral containment elements (7) for the ceramic powders, laterally constrained in opposite positions with respect to the container (2) and laterally projecting inferiorly of the opening (3) of the container (2).
3. The powder loading device of claim 1, **characterised in that** the pressors (6) comprise an elongate flat element (12) having a first side (12a) and a second side (12b) which are parallel and opposite one another; the flat element (12) being hinged at the first side (12a) thereof to a rear edge of the opening (3) which is located transversally to an advancement direction of the conveyor belt (4); the flat element (12) being mobile between a closed position, at which the flat element (12) is positioned to close the opening (3) and an open position in which, apart from maintaining the opening (3) in an open position, the second side (12b) thereof is in contact with the conveyor belt (4) and keeps the conveyor belt (4) pressed against the rest plane (5).

Fig. 1

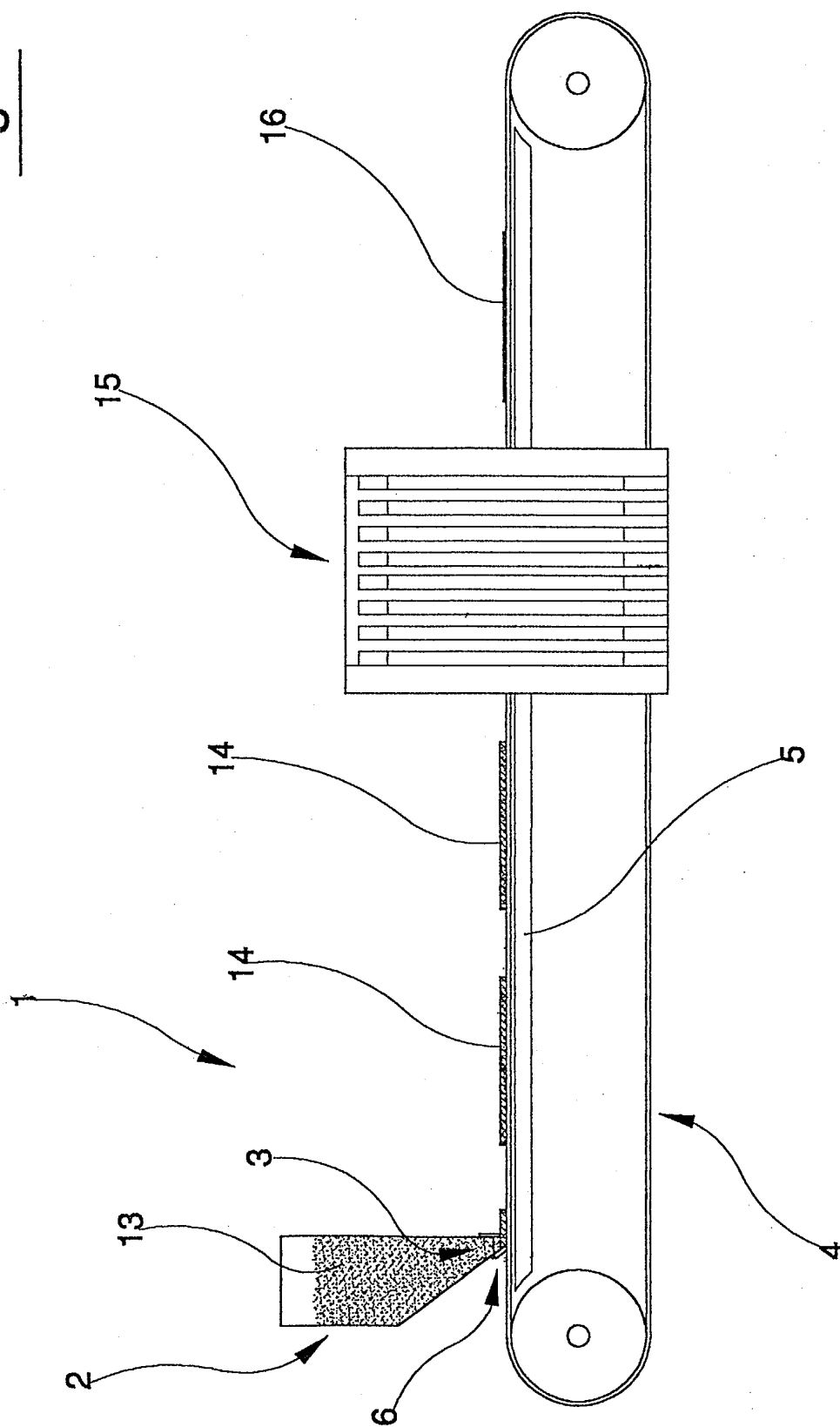


Fig. 2

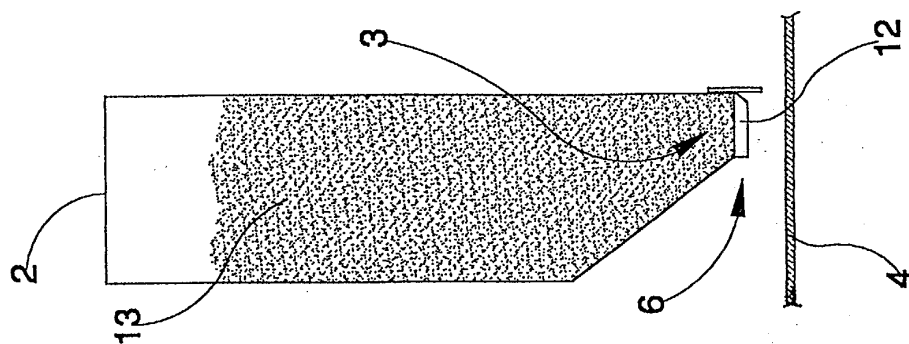


Fig. 3

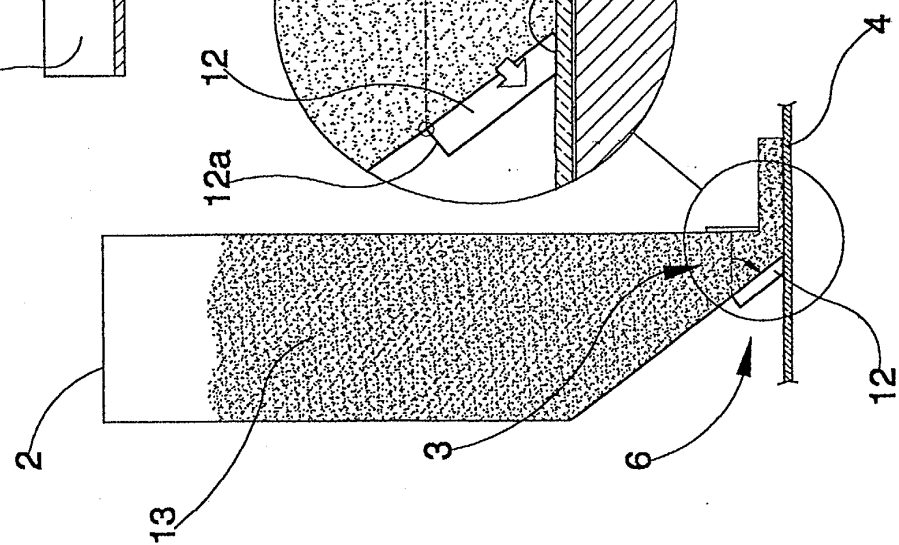


Fig. 5

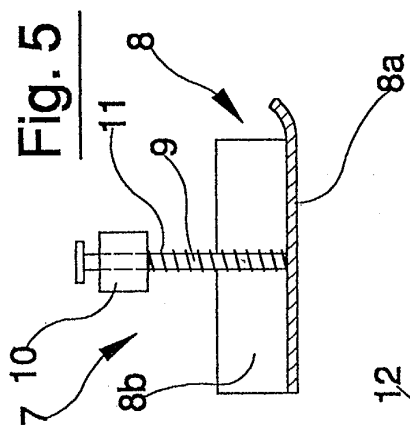


Fig. 4

