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(54) Device for automatic and uniform loading of molds of presses for forming ceramic articles, in particular tiles.

(57) The device comprises a material (5) feed assembly (4) which is alternately movable backwards and forwards and has its output front (6a) overlying an accumulation hopper (10) which is supported by a related independent framework (11) and has its bottom constituted by three perforated plates, in sliding contact with one another, a first (10a) upper fixed one, a second (10b) movable middle one actuated by related means, and a third (10c) lower one also fixed, immediately underlying said hopper there being provided a material spreading grid (16) interposed between the same and the molds (2) of the press (3) and actuated horizontally vibrating by independent elements (17) associated with said framework (11).

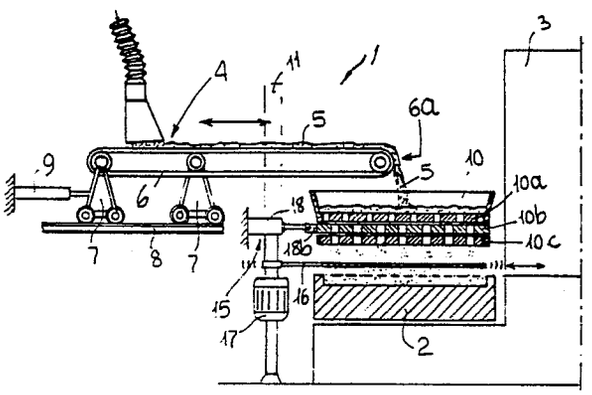

FIG 1

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DEVICE FOR AUTOMATIC AND UNIFORM LOADING OF MOLDS OF PRESSES FOR FORMING CERAMIC ARTICLES, IN PARTICULAR TILES

The present invention relates to a device for automatic and uniform loading of molds of presses for forming ceramic articles, in particular tiles.

The use is known, in the ceramics industry, of presses adapted to form tiles; among these, some are of the so-called rotary type, i.e. presses the molds whereof are provided horizontally in a step-by-step motorized rotor assembly; the latter rotates immediately below the pressing assemblies and forms the raw tiles. The abovementioned type of press is operatively very fast, but however requires feeding assemblies for filling the molds, or assemblies for directly spreading dry enamels on the molds already filled with clay or other material. These assemblies must perform this operation in a rapid and uniform manner, filling even the corners of said molds, this operation being heretofore very complicated due to the circular arrangement of these last and to the similar trajectory which they trace during the operation of said press.

On the other hand, the above described problem has also occurred in presses with ordinary configuration.

The technical aim of the present invention is to eliminate the above described disadvantages by providing a device for automatic and uniform loading of molds of presses for forming ceramic articles, in particular tiles, which is capable of operating at great speed providing, at the same time, the desired accurate and complete filling of said molds.

This aim, as well as other objects, are achieved by a device for automatic and uniform loading of the molds of presses for forming ceramic articles, in particular tiles, characterized in that it comprises a material feed assembly which is movable alternately backwards and forwards and has its output front overlying an accumulation hopper which is supported by a related independent framework and has its bottom constituted by three perforated plates, in sliding contact with one another, a first upper fixed one, a second middle movable one actuated by related means, and a third fixed lower one, immediately underlying said hopper there being provided a grid for spreading the material, interposed between the hopper and the molds of the press and actuated horizontally vibrating by independent elements associated with said framework.

Further characteristics and advantages of the invention will become apparent from the description of a preferred, but not exclusive, embodiment of a device for automatic and uniform loading of molds of presses for forming ceramic articles, in particular tiles, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic lateral view of the invention;

figure 2 is a schematic top view thereof;

figures 3 and 4 are enlarged-scale views of a small accumulation hopper in two configurations of use.

With particular reference to the above described figures, 1 generally indicates a device for automatic and uniform loading of molds 2 of presses 3 for the formation of ceramic articles, in particular tiles.

Said device 1 comprises an assembly 4 for feeding material 5, which is constituted by a conveyor belt 6 movable alternately backwards and forwards on related carriages 7 which are slideably guided on horizontal rails 8 or the like and pushed by means 9, preferably of the conventional fluidodynamic type.

The output front 6a of the conveyor 6 overlies a small accumulation hopper 10 which is supported by a related framework 11 and has its bottom constituted by three plates, a first upper one 10a, a second middle one 10b and a third lower one 10c, provided with through holes, respectively 12, 13 and 14 with preset diameters, said plates being fitted in sliding contact with one another, the first and third thereof being fixed and the second middle one movable, actuated by related means 15.

Immediately underlying the small hopper 10 a small horizontal vibrating grid 16 is provided for spreading the material 5, said grid being moved by related independent elements 17, also coupled to the framework 11.

Said means 15 are constituted, in the preferred embodiment, essentially by a fluidodynamic cylinder 18 which has an end 18a rigidly associated with said framework 11 and the opposite end 18b articulated to an edge of the second middle plate 10b.

The operation of the device is intuitively understandable from the preceding description: the material 5 is conveyed towards the small hopper 10 by the conveyor belt 6 which is moved backwards and forwards by the conventional fluidodynamic means 9 and is supported, partially protruding, by the carriages 7 which are slideable on the horizontal rails 8 or equivalent devices.

This movement leads to the progressive filling of the small hopper 10, the bottom whereof has in this step the holes 12 of the first upper plate 10a and the ones 13 of the second middle plate 10b mutually aligned so as to drop a preset volumetric

amount, according to the diameter of said holes, of material 5 in the sort of vertical chambers which are created; in this step, the third lower plate 10c acts as closed bottom having its own holes 14 axially offset with respect to the holes 12 and 13.

The operation of the cylinder 18 is normally controlled by sensors for the passage of the molds 2 below the small hopper 10 and, in a second operation step, the cylinder 18 moves the second middle plate 10b so that its holes 13 are axially aligned with the holes 14 of the third lower plate 10c; in this movement the material 5 accumulated in the abovesaid chambers is progressively carried along and moved towards the holes 14 through which it falls into the underlying mold 2 after passing through the vibrating grid 16 which provides a uniform spreading.

In said second step, the second middle plate 10b acts as bottom for the upper one 10a, closing its holes 12 and allowing the accumulation of further material in the small hopper 10.

When the mold 2 is complete, the cylinder 1 returns the second middle plate 10b to the preceding position, again aligning its holes 13 with the holes 12 of the upper one and thus repositioning itself for the above described operating cycle.

This leads to a uniform and complete filling of the molds in every part, particularly the corners, so that the subsequent pressing action is exactly perpendicular to the entire surface of the material and the tile produced is free from imperfections of any kind.

Furthermore, by presetting the diameters of the holes 12, 13 and 14 it is possible to volumetrically control the exact amount of material 5 to be spread into each mold.

It should be noted that if the device according to the invention is used for spreading powdered enamel on already-filled molds, it allows the production of new and pleasant chromatic variegations on the surface of the tiles both by intervening, as mentioned, on the diameter of the holes and on their form and/or distribution, and on the loading action of the conveyor 6 into the hopper 10; it is furthermore possible to achieve a deeper interpenetration of said enamels into the material, with consequent production of tiles having a surface colouring thicker and hence considerably more resistant to the wear of time than those currently manufactured.

In practice it has been observed that the invention thus described achieves the intended aims.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

Furthermore, all the details may be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements, without thereby abandoning the scope of the protection of the following claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device for automatic and uniform filling of molds (2) of presses (3) for forming ceramic articles, in particular tiles, characterized in that it comprises a material (5) feed assembly (4) which is movable alternately backwards and forwards and has its output front (6a) overlying an accumulation hopper (10) which is supported by a related independent framework (11) and has its bottom constituted by three perforated plates, in sliding contact with one another, a first (10a) upper fixed one, a second (10b) middle movable one actuated by related means, and a third (10c) fixed lower one, immediately underlying said hopper there being provided a grid (16) for spreading the material, interposed between the hopper and the molds (2) of the press (3) and actuated horizontally vibrating by independent elements (17) associated with said framework (11).

2. Device according to claim 1, characterized in that said second middle plate (10b) is movable from a first position of alignment of its own holes (13) only with those (12) of the first upper plate (10a) to a second position of alignment of its own holes only with those (14) of the third lower plate (10c), defining vertical chambers having previously presettable transverse volumes and cross sections.

3. Device according to one or more of the preceding claims, characterized in that said feeder assembly is constituted by an independently motorized conveyor belt (6) with activation controlled by means for sensing the level of material (5) present within the hopper (10).

4. Device according to one or more of the preceding claims, characterized in that said means (15) for moving the second middle plate (10b) are constituted by a fluidodynamic cylinder (18) having an end (18a) rigidly associated with said framework (11) and the opposite end (18b) articulated to an edge of said second middle plate.

5. Device according to claim 1 or 4, characterized in that said means (15) for the movement of the second middle plate (10b) are constituted by at least one eccentric assembly pivoted on said framework and acting on the edge thereof.

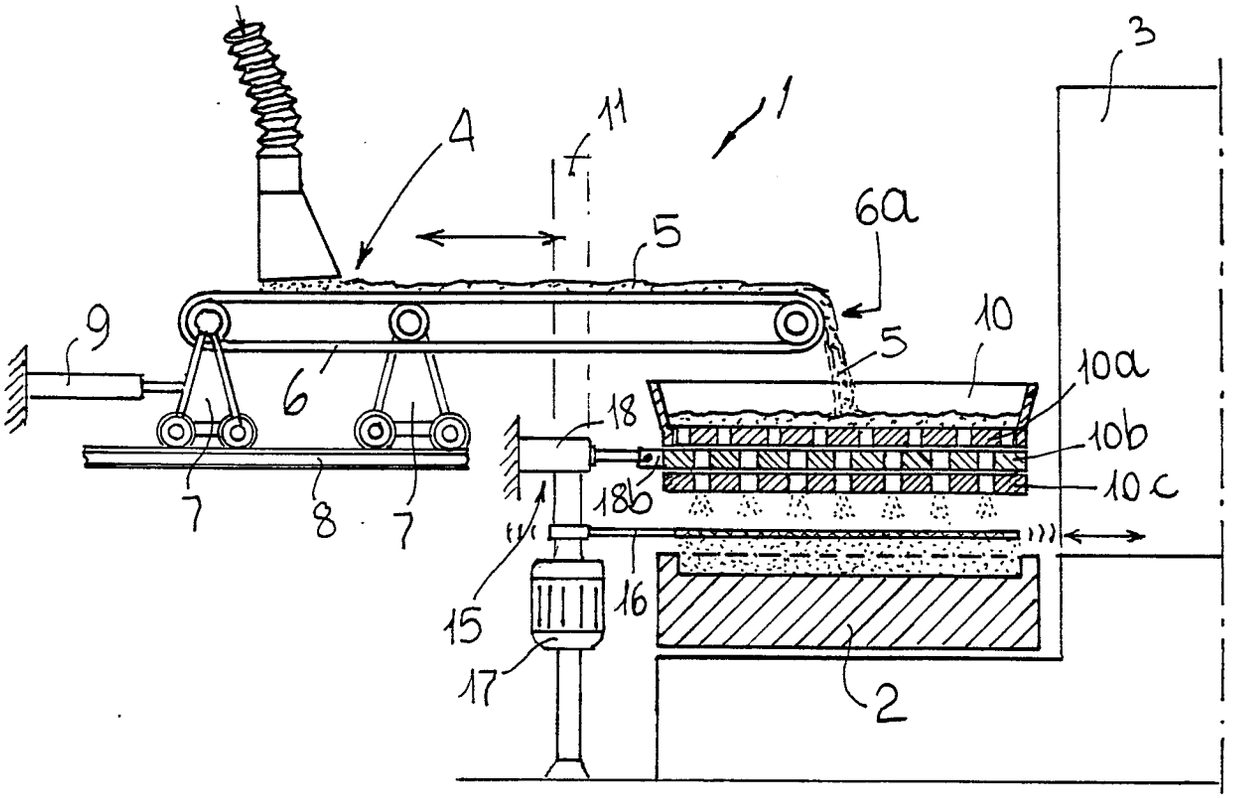
3
4
11
1
6a
5
9
6
5
10
10a
18
10b
10c
18b
7
8
7
15
16
17
2

FIG.1

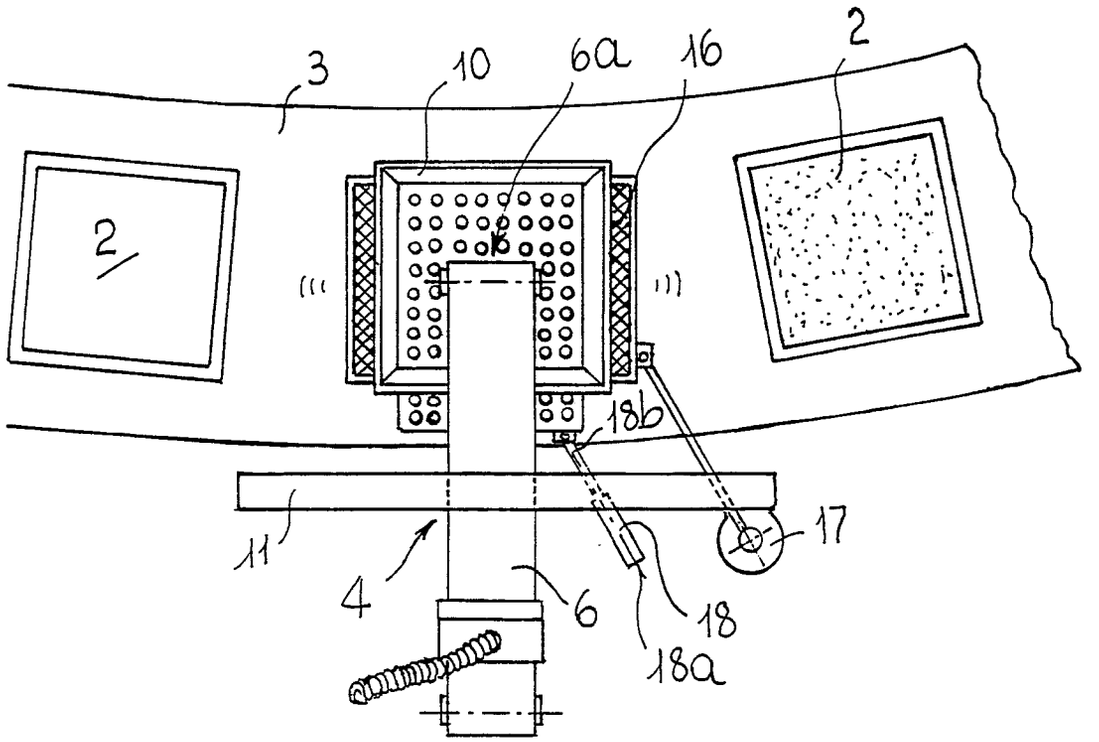
3
10
6a
16
2
2
18b
11
17
4
6
18
18a

FIG.2

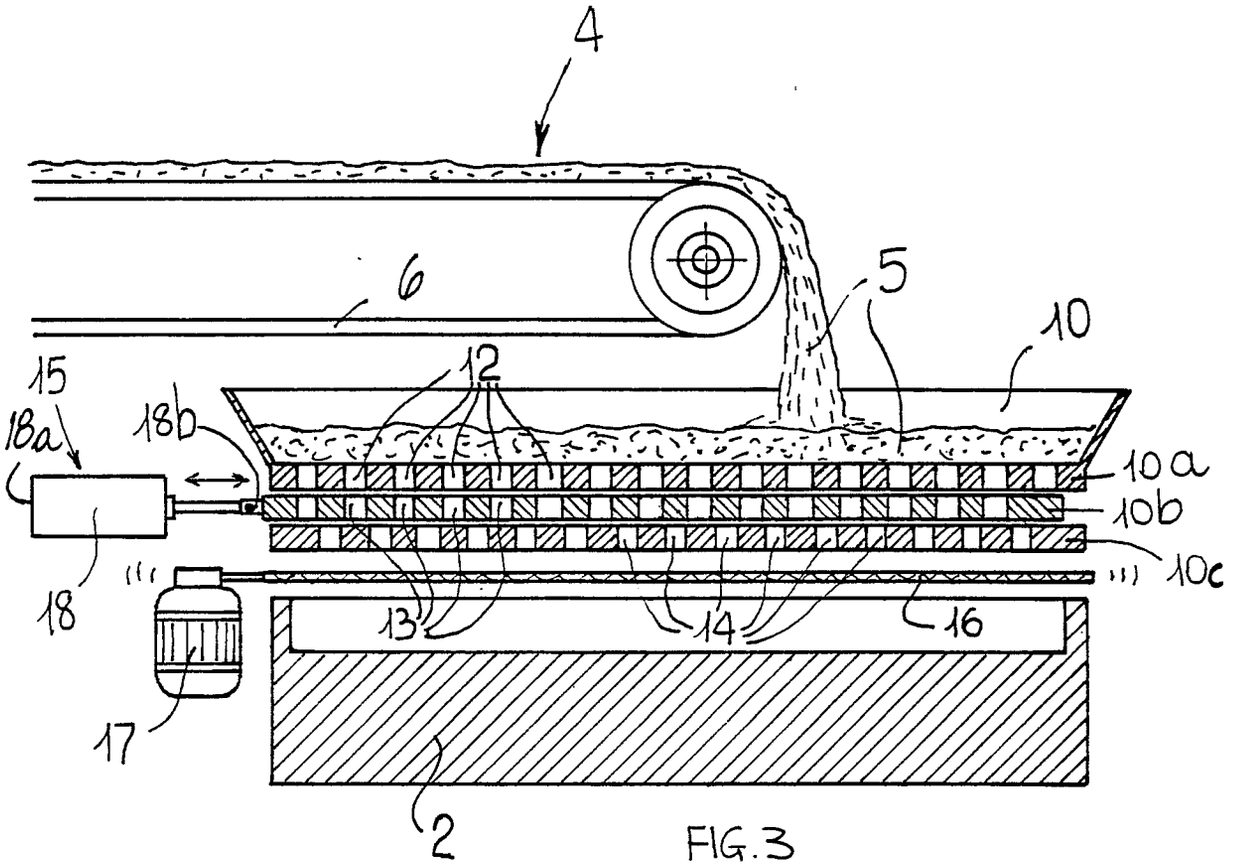
4
6
5
10
15
18a
18b
12
10a
10b
10c
18
13
14
16
17
2

FIG.3

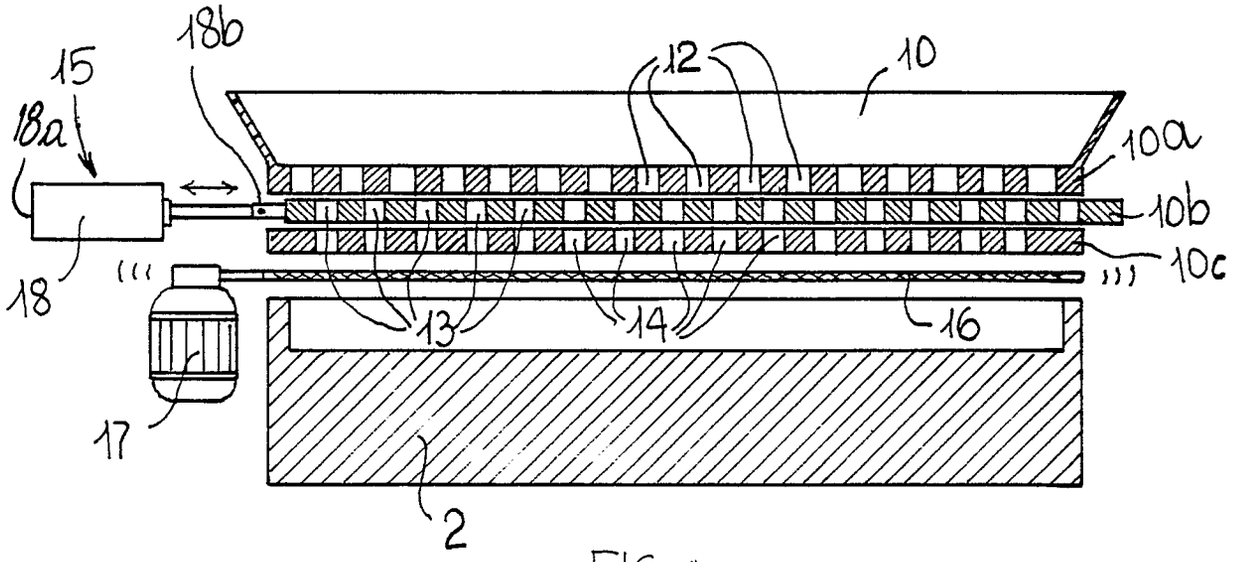
18b
15
18a
12
10
10a
10b
10c
18
13
14
16
17
2

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 88107207.8

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	DE - A1 - 3 151 654 (LONGINOTTI) * Page 5, lines 10-24; fig. 2,3,7 *	1,2,3	B 28 B 13/02
A	DE - A1 - 3 025 511 (BAUAKADEMIE) * Totality *	1,2,4	
A	SOVIET INVENTIONS ILLUSTRATED, section P,Q, week 83/33, September 28, 1983 DERWENT PUBLICATIONS LTD., London P64 * SU-965 777 (ODESS NIKOLAEV ENG) *	1,2,4	
A	US - A - 4 321 028 (VAN DE CAVEYE) * Fig. 1 *	1,3	TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 28 B B 30 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	09-08-1988	GLAUNACH

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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