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Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

(54) A device for making continuous veining of desired patterns extending through the entire thickness of a product, a process of making thereof and the product obtained thereby

(57) The device for making continuous veining of desired patterns extending through the entire thickness of the product and the production process of which are brought about by controlling the materials to form the layered patterns by having the material distributing cartridge to perform the duty of distributing each characteristic of the materials at the desired quantity and position on to the arrangement belt. When the materials flow down into the vertical material receiving-distributing cartridge , there exists the arrangement of the materials in the form of the layered patterns. From then on, all of the materials will be moved to the horizontal material receiving-distributing cartridge which will perform the duty of transferring the patterned materials to the mold in order to be pressed for forming. Both the device and process for making the patterns are capable of making the patterns with accuracy according to the predetermined designs. In addition, the device and process are capable of adjusting or changing the patterns easily, as well as capable of producing the veining of the patterns with a width of 1 millimeter or more. The procedures of the invention and production are disclosed above in their entirety.

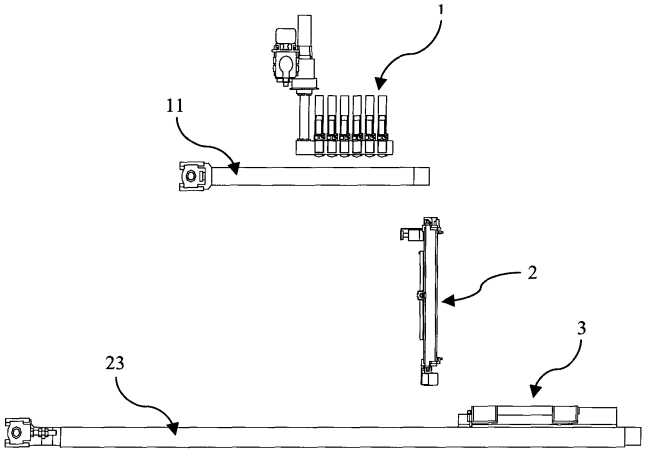

FIGURE 1

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Description

Field of the Invention

[0001] This invention relates to mechanical, electrical, and electronics engineering.

Background of the Invention

[0002] Research in the ceramic tile production sector is currently aimed at obtaining tiles that closely resemble natural stones by using many different technologies. Natural stones, such as marble, sandstones, and other kinds of stones, possess a natural beauty that is highly appreciated by consumers. Not only does the production of ceramic tiles for achieving the resemblance of natural stones have a good point in terms of beauty, but also it is advantageous in terms of properties of hardness and durability, technically much better than natural stones. The traditional art relating to techniques of the production of patterned ceramic tiles involved only a thin layer on the surface of the tiles, such as pattern printings, depositing desired patterns before or after pressing by using either wet or dry powder application method. In the described traditional techniques, the desired patterns only appear on the surface of the tiles. However, abrasion from weathering and use cause deterioration on the surface of the desired patterned ceramic tiles and no longer resembles the original pattern. Due to this limitation of the techniques that patterns appear only on the surface of the tiles, there are considerable requirements for technological development of the production of ceramic tiles, enabling the tiles to possess a continuous veining of desired pattern extending through their entire thickness. Typical examples of said development are referred to hereinafter.

[0003] System S.p.A., an Italian machinery manufacturer, developed a tile forming press for a large format, capable of producing ceramic tiles of up to 3 meters in length. System S.p.A. has detailed its technique for making patterns throughout the mass of the ceramic tiles in European Patent EP 1334811. The technique which is characterized by a double-pressing that comprises first a low pressure compacting. The compacted ceramic tiles are subsequently decorated by an ink-jet system to apply, according to the design, special ceramic colors which can penetrate into the tile mass. By this technique, however, appearance of the patterns in the tile mass is somewhat partial and the level of depth of pattern penetration is not deep enough to provide the pattern to the lowest layer of the tile mass.

[0004] CMF S.r.1 of Italy has introduced a technique of filling tubes with a mixture of powdery materials of different characteristics and then distributing the powdery materials through openings which are of two sizes, small and large. The powder distribution technique creates a continuous veining of patterns stored in a compartment which is in a position perpendicular to the plane. Once the powdery materials are fully filled and arranged in layers of the continuous veining of patterns inside the compartment, the compartment is rotated 90 degrees in order to lie parallel to the plane. The powdery materials in the desired patterns are then transferred into the mold. From this technique, the transfer of powdery materials into the mold is also problematic. It has been found that the powder mass is mixed on the tile surface, requiring the ceramic tiles to be polished after firing in order to obtain the visible veining effect of the patterns. A still further disadvantage of the technique is that the veining pattern is not continuous and appears to zigzag. Since the tubes for holding materials used have openings of only two sizes, it is impossible to control the quantity of the material relative to the changes either in dimension or width of the veining patterns.

[0005] Sacmi of Italy, the world's leading machinery company in the ceramic tile industry, has tried to develop a technique to make continuous veining of patterns extending through the entire thickness of tiles or slabs, as mentioned in European Patent of EP1273408 and the International Publication No. W02004071733. However, there remains the possibility that materials on the surface layer have been mixed, causing the desired pattern to be distorted. There has been, therefore, a necessity to remove those mixed materials at the surface layer by suction before pressing in order to obtain the patterns that are visible without having to polish the upper surfaces of ceramic tiles after firing.

Characteristics and Objectives of the Invention

[0006] The invention is a development of a process and an invention of a device for making patterns from powdery materials or granulated powders which have the quality of a continuous flow in order to bring about the making of continuous veining of patterns extending through the entire thickness of products in a desired format and to be able to adjust or change the patterns easily during production, and more particularly concerns a method for producing the veining of patterns with a width of 1 millimeter or more. The invention is to obviate the limitations and drawbacks of material mix up on the surface which entails the need for polishing after firing, or the need to suction off the mixed-up materials from the surface of the products before pressing.

[0007] The characteristics and outstanding features of the invention as described above will become more apparent from the specification of the invention.

Disclosure of the Invention

[0008] This is a process of making continuous veining of desired patterns extending through the entire thickness of the product from powdery materials or granulated powders which have the quality of a continuous flow. The powdery materials or granulated powders can be either organic or inorganic substances which possess a uniform

flow. The process to bring about the continuous veining of desired patterns is capable of producing veining patterns with a width of 1 millimeter or more. Varying the width of veining of patterns can be done continuously, smoothly, and successfully without appreciable mixing of the powdery materials of different colors at the surface layer of the products. Therefore, the products obtained from this process are well defined and meet with the desired patterns without a further step of surface decoration, either before or after the production process.

[0009] According to one exemplary embodiment, the device and method for making continuous veining of patterns throughout the entire thickness of the products comprises a material distributing control cartridge (1) which is installed to be driven with reciprocating motion above an arrangement belt (11), a vertical material receiving-distributing cartridge (2) which is installed at the farthest end position of and under the arrangement belt (11), but sited above a conveyor belt (23), and a horizontal material receiving-distributing cartridge (3) which is installed on the conveyor belt (23). A detailed description of the apparatus follows:

1. The material distributing control cartridge (1)

[0010] The material distributing control cartridge (1) consists of tubes (12), which are containers for holding the material of different characteristics and different colors. There can be more than one tube depending on the different characteristics and different colors of the materials used. All of the tubes (12) are fixed but movable reciprocally on an axle (13), having the course of movement on the horizontal direction, perpendicularly to the movement direction of the arrangement belt (11). Open-close valves (14) are located at the end of the each tube (12).

2. The vertical material receiving-distributing cartridge (2)

[0011] The vertical material receiving-distributing cartridge (2) consists of a material receiving unit (20) which is a flat rectangular box. This material receiving unit (20) has two connected ridges forming first opening (21) and second opening (22). At the mouth of each opening, there is positioned first open-close flap (24) and second open-closed flab (25) respectively. The vertical material receiving-distributing cartridge (2) is installed under the farthest end position of the movement of the arrangement belt (11) but sited above the conveyor belt (23) by being placed perpendicular to both the arrangement belt (11) and the conveyor belt (23), as well as perpendicular to movement directions of both belts. The vertical material receiving-distributing cartridge (2) can rotate freely with reciprocating movement by having its fulcrum disposed at the mid point of the material receiving unit (20) and its rotating axle perpendicular to the material receiving unit (20).

3. The horizontal material receiving-distributing cartridge (3)

[0012] The horizontal material receiving-distributing cartridge (3) consists of a flat rectangular cover sheet (30) with two ridges on opposite sides forming first exit (31) and second exit (32). At the mouth of first exit (31), there is positioned an open-close member (33); while there is positioned an open-close and excess material removal flap (34) at the second exit (32). Inside the cover sheet (30), there is positioned a pressing sheet (35). The horizontal material receiving-distributing cartridge (3) is laid prone on the conveyor belt (23). The direction of the in-and-out path of materials from the horizontal material receiving-distributing cartridge (3) is the same as the movement direction of the conveyor belt (23).

[0013] The process for making continuous veining of desired patterns extending throughout the entire thickness of the products according to the invention comprises the following three main procedures:

First Procedure Distributing the materials onto the arrangement belt (11). The materials are to be distributed onto the arrangement belt (11) from the tubes (12) that move back and forth along the axel (13) above the arrangement belt (11) which is moving forward in order to control a succession of materials, the quantity of the material, and the position at which the materials are released onto the material receiving unit (20) in accordance with the predetermined patterns. The apparatus which control the work in this procedure are the material distributing control cartridge (1) and the arrangement belt (11).

Second Procedure Allowing the material which is already distributed onto the arrangement belt (11) to flow into the material receiving unit (20) to bring about the patterns. The materials will be allowed to fall down in such a manner as to form layered patterns inside the material receiving unit (20) in accordance with the predetermined patterns, quantity, and position of the materials to form the desired patterns. From then on, the material receiving unit (20) will rotate and perpendicularly transfer the patterned materials onto the conveyor belt (23) which will move forward in order to transfer said materials from the material receiving unit (20). The apparatus which control the work in this procedure are the vertical material receiving-distributing cartridge (2), the arrangement belt (11), and the conveyor belt (23).

Third Procedure Relocating the patterned materials from the conveyor belt (23) to the pressing machine by having the cover sheet (30) protect against damage to the patterns during the relocation. The apparatus which control the work in this procedure are the horizontal material receiving-distributing cartridge (3) and the conveyor belt (23).

Detailed procedures of the device are mentioned hereinafter:

[0014] The work starts from the material distributing control cartridge (1) which performs the duty of distributing the materials onto the arrangement belt (11) in accordance with the predetermined patterns, quantity, and position of the materials through the operation of the open-close valves (14). The open-close valves (14) control the distribution, and the quantity of the materials while the tubes (12) are moving in the reciprocating motion on the axle (13). The movement of the arrangement belt (11) determines the position at which the materials will be distributed.

[0015] After the predetermined materials on the arrangement belt (11) have moved to the farthest position of the arrangement belt (11), those materials fall into the material receiving unit (20) through the first opening (21) which remains open. The materials are formed in such a manner that one layer is placed over another in accordance with the pattern, the quantity of the materials, and the position at which the predetermined patterns is created. The results through this means are the same as when the materials are distributed directly from the tubes (12) to the material receiving unit (20) except that early preparation of the materials helps to increase the speed of running the machine a lot better.

[0016] Since definition of the patterns and width of the veining patterns depend on the quantity of the materials deposited onto the arrangement belt (11), the use of electrical and electronic instruments with high precision and accuracy, such as a servo motor, to regulate the operation of the open-close valves (14) makes the stage and degree of valve opening more continuous, precise and accurate. Suitable use results in the capability to continuously change the width of the veining patterns, as well as to produce veining with a width of 1 millimeter or more.

[0017] After the materials are allowed to flow into the material receiving unit (20) in the predetermined patterns, the first open-close flap (24) at the first opening (21) is closed in order to maintain the pattern and prevent leakage. Then the material receiving unit (20) is rotated to form a 90 degree angle with its rotating axle perpendicular to the plane of the material receiving unit (20) in order to position the second opening (22) above the conveyor belt (23). Rotating 90 degrees and distributing the materials in a perpendicular fashion maintains the definition of the patterns and reduces the distortion of the surface patterns of the material.

[0018] From then on, the second open-close flap (25) at the second opening (22) will open to allow the materials with layered patterns to flow onto the conveyor belt (23). While the materials are flowing out, the conveyor belt (23) will move forward in order to transfer the materials from the material receiving unit (20). After the materials have flowed completely out of the material receiving unit (20), the second open-close flap (25) at the second opening (22) will be closed. Then the material receiving unit (20) will be rotated back to the starting position. The first open-close flap (24) is opened again and the first opening (21) is ready to receive a new batch.

[0019] The patterned materials on the conveyor belts (23) move forward to the horizontal material receiving-distributing cartridge (3) through the first exit (31). After the patterned materials move completely inside the cover sheet (30), the open-close member (33) is closed down. Then the horizontal material receiving-distributing cartridge (3) will move forward to bring the patterned materials to the pressing machine. In order to prevent a mix-up of the veining of patterns at the surface and lower portions of the patterned materials during the movement of the horizontal material receiving-distributing cartridge (3) into the pressing machine , the press sheet (35) moves down to lay flat against the upper surface of the patterned materials while the patterned materials are moving towards the pressing machine so that the powdery materials around the areas are saved from dispersion which damages the surface patterns. While the horizontal material receiving-distributing cartridge (3) is moving, the conveyor belt (23) also moves in order to prevent damage to the lower layer of the patterns.

[0020] Moreover, the forward motion of the horizontal material receiving-distributing cartridge (3) creates a compaction of the materials in the direction that is opposite to its movement. This condition results in insufficient quantity of materials which are to be filled into the mold cavities of pressing machine. Therefore, it is necessary that the open-close and excess material removal flap (34) remains open while the horizontal receiving-distributing cartridge (3) is moving, so that excess materials positioned at the second exit (32) are compacted to move adequately into the horizontal material receiving-distributing cartridge (3). In addition, while the horizontal material receiving-distributing cartridge (3) moves the patterned materials contained inside move backward, causing the quantity and density of the materials to increase in the direction opposite to the direction of the horizontal material receiving-distributing cartridge (3) movement. Therefore, the quantity of the materials is unevenly transferred to the pressing machine in such a manner that the materials are more bulky and denser at the back than the front. When the materials are pressed to form the final product, the front portion is less thick than the back portion. In order to overcome such problem, the pressing sheet (35), which performs the duty of pressing the bulk of the materials in accordance with this invention, is pressed down not exactly parallel to the plane of the conveyor belt (23), but is pressed down in such a manner to make an elevated angle between 0-0.5 degrees so that the quantity of the materials in the front portion are equally compensated for. However, the exact degree of the elevation of the pressing sheet (35), whether it will be more or less, depends on the quantity of the materials needed to be compensated for.

[0021] When the horizontal material receiving-distributing cartridge (3) moves to the position which corre-

sponds to the mold's position of the pressing machine, the pressing sheet (35) presses the materials into the mold along with the downward movement of a lower lift of the pressing machine, and the open-close and excess material removal flap (34) is closed down. After the materials have already been transferred to the mold, the open-close and excess material removal flap (34) moves in a forward direction in order to remove the excess materials. Both the open-close flap (33) and the open-close and excess material removal flap (34) are opened and the horizontal material receiving-distributing cartridge (3) moves back away from the pressing machine to be positioned on the conveyor belt (23). The pressing sheet (35) moves upward and the horizontal material receiving-distributing cartridge (3) returns to the original position to start receiving a new batch of materials.

[0022] After having gone through the process of molding by pressing and firing, the finished product possesses the desired patterns without the necessity to polish the surface. With the characteristics and merits of the invention, each product's patterns can be adjusted and changed in order to meet the requirement.

Brief Discussion of the Drawings

[0023]

Figure 1 shows overall views of the material distributing control cartridge (1), the vertical material receiving-distributing cartridge(2), and the horizontal receiving-distributing cartridge(3).
Figure 2 shows a perspective view of the material distributing control cartridge (1).
Figure 3 shows a perspective view of the vertical material receiving-distributing cartridge(2).
Figure 4 shows perspective and side views of the horizontal receiving-distributing cartridge (3).
Figure 5 shows an operation of the material distributing control cartridge (1) and the vertical material receiving-distributing cartridge (2).
Figure 6 shows a rotating direction of the vertical material receiving-distributing cartridge (2).
Figure 7 shows the distribution of the patterned materials from the vertical material receiving-distributing cartridge (2) into the horizontal receiving-distributing cartridge of the horizontal (3).
Figure 8 shows an operation of the horizontal receiving-distributing cartridge (3) inside which the materials are contained until full.

The Best Mode to Carry out the Invention

[0024] The best mode to carry out the invention is disclosed in the above description.

Claims

1. A device for making continuous veining of desired patterns extending through the entire thickness of products comprising:

a material distributing control cartridge (1) performing the duty of making arrangements for a succession of materials, adequate quantity of materials, and a position at which the materials are released in accordance with the predetermined patterns, where the material distributing control cartridge consists of tubes (12) which are used as containers for holding the materials and each tube (12) is fitted with open-close valves (14) through which the materials will be distributed to an arrangement belt (11) installed below the material distributing control cartridge (1);
a vertical material receiving-distributing cartridge (2), installed at the farthest end position under the arrangement belt (11), which performs the duty of receiving the materials from the arrangement belt (11) and then creates an overlapping of the materials to form patterns, consisting of a material receiving unit (20) which has a first opening (21) with a first open-close flap (24), a second opening (22) with a second open-close flap (25) installed respectively, where the vertical material receiving-distributing cartridge will be rotated to form a 90 degree angle in order to perpendicularly distribute the materials onto a conveyor belt (23) positioned below the vertical material receiving-distributing cartridge (2);
a horizontal material receiving-distributing cartridge (3) positioned on the conveyor belt (23) consisting of a cover sheet (30) which has a first exit (31) installed with an open-close member (33) and at the mouth of the second exit (32), there is positioned an open-close and excess material removal flap (34), and at the ceiling of the cover sheet (30) there is positioned a pressing sheet (35).

2. The device according to Claim 1, wherein the material distributing control cartridge (1) consists of a plurality of the tubes (12), depending on the different characteristics and different colors of the materials used; all tubes (12) are fixed but movable back and forth with the course of movement on the horizontal direction perpendicular to the movement of the arrangement belt (11).

3. The device according to Claim 1, wherein the open-close valves (14) installed at the end of the tubes (12) are capable of controlling the open-close space continuously and accurately from 1 millimeter upward.

4. The device according to Claim 1, wherein the vertical material receiving-distributing cartridge (2) can rotate freely with reciprocating movement by having its fulcrum attached at the mid point of the material receiving unit (20) and its rotating axle perpendicular to the plane of the material receiving unit (20).

5. The device according to Claim 1, wherein the horizontal material receiving-distributing cartridge (3) is installed with the pressing sheet (35) which will be pressed down in a manner to make an elevated angle between 0-0.5 degrees with the plane of the conveyor belt in the direction opposite to the movement of the materials.

6. The device according to Claim 1 or Claim 5, wherein the pressing sheet (35) will press the materials while the materials are moving towards the mold; when the materials move to the position of the mold, the pressing sheet will continue to press the materials along with the downward movement of a lower lift of the pressing machine in order to receive the materials.

7. The device according to Claim 1, wherein the horizontal material receiving-distributing cartridge (3) at the open-close member (33) for receiving the materials will be closed down and the open-close and excess material removal flap (34) remains open while the horizontal material receiving-distributing cartridge (3) moves to bring the materials to the mold; and when the horizontal material receiving-distributing cartridge (3) moves to the position which corresponds to the mold's position, the open-close and excess material removal flap (34) will be closed down along with the downward movement of the lower lift of the mold in order to receive the materials and then, the open-close and excess material removal flap (34) will remove excess materials at the front portion before the horizontal material receiving-distributing cartridge (3) moves back and the pressing process starts.

8. A process for making continuous veining of desired patterns extending through the entire thickness of products obtained by pressing the powdery materials or granulated powders which have the quality of a continuous flow consisting of the following operative steps:

arranging the materials onto the arrangement belt (11) by having the materials released from the material distributing cartridge (1) which moves reciprocally above the arrangement belt (11) onto the arrangement belt (11) that is moving forward in order to make arrangement for the succession of the materials, adequate quantity of the materials, and the position at which the materials are released onto the vertical material receiving-distributing cartridge (2) in accordance with the desired patterns;

creating a bulk of the patterned materials by allowing the materials to fall down in a manner to form layered patterns inside the material receiving unit (20) of the vertical material receiving-distributing cartridge (2) to form patterns in accordance with the succession, quantity, and position which have been predetermined; after which the materials are allowed to flow onto the material receiving unit (20) in the desired patterns until full, the material receiving unit (20) will be closed by the first open-close flap (24) in order to maintain the patterns and prevent leakage of the materials contained inside the material receiving unit (20), and then the vertical material receiving-distributing cartridge (2) will rotate and perpendicularly transfer the patterned materials onto conveyor belt (23) which will move forward in order to transfer said materials to the horizontal material receiving-distributing cartridge (3);

relocating the bulk of the patterned materials to the horizontal material receiving-distributing cartridge (3) by opening the second open-close flap (25) to allow the material to flow onto the conveyor belt (23); after the patterned materials move inside the cover sheet (30), the open-close member (33) will be closed down; and then the patterned materials will move towards the pressing machine in order to be distributed onto the mold for pressing;

relocating the patterned materials to the mold wherein the patterned materials will be pressed by the pressing sheet (35) in order to protect the powdery materials against dispersion, and then the patterned materials will move further to the mold.

9. The process according to Claim 8, wherein the materials for making patterns are organic substances which possess a uniform flow.

10. The process according to Claim 8, wherein the materials for making patterns are inorganic substances which possess a uniform flow.

11. A product which has the continuous veining of desired patterns extending through its entire thickness in accordance with the process for making continuous veining of desired patterns extending through the entire thickness of the product according to Claim 8.

Amended claims in accordance with Rule 86(2) EPC.

1. A device for making continuous veining of desired patterns extending through the entire thickness of products comprising:

- a material distributing control cartridge (1) for making arrangements for a succession of materials, in accordance with predetermined patterns, said cartridge comprising containers (12) for holding the materials, wherein each container (12) is fitted with open-close valves (14) through which the materials will be distributed to an arrangement belt (11) installed below the material distributing control cartridge (1);
- a vertical material receiving-distributing cartridge (2), installed at the farthest end position under the arrangement belt (11), comprising a material receiving unit (20) which has a first opening (21) with a first open-close flap (24), a second opening (22) with a second open-close flap (25) installed respectively, to distribute the materials onto a conveyor belt (23) positioned below the vertical material receiving-distributing cartridge (2);

characterized in that
a horizontal material receiving-distributing cartridge (3) is present, positioned on the conveyor belt (23), said cartridge comprising a cover sheet (30) which has a first exit (31) installed with an open-close member (33) and a second exit (32), at the mouth of which there is positioned an open-close and excess material removal flap (34), wherein at the ceiling of the cover sheet (30) there is positioned a pressing sheet (35), and
wherein the vertical material receiving-distributing cartridge (2) is rotatable by an angle of 90 degrees around an axis perpendicular to the plane of the material receiving unit (20), and is adapted to perpendicularly distribute the materials onto the conveyor belt (23).

2. The device according to Claim 1, wherein the material distributing control cartridge (1) comprises a plurality of containers realized as tubes (12), which are fixed but movable back and forth with the course of movement on the horizontal direction perpendicular to the movement of the arrangement belt (11).

3. The device according to Claim 1 or 2, wherein the open-close valves (14) installed at the end of the tubes (12) are capable of controlling the open-close space continuously and accurately from 1 millimeter upward.

4. The device according to any one of Claims 1 to 3, wherein the vertical material receiving-distributing cartridge (2) can rotate freely with a reciprocating movement, having its fulcrum at the mid-point of the material receiving unit (20) and its rotating axle perpendicular to the plane of the material receiving unit (20).

5. The device according to any one of Claims 1 to 4, wherein the horizontal material receiving-distributing cartridge (3) is installed with a pressing sheet (35) which can be pressed down in a manner to make an elevated angle between 0-0.5 degrees with the plane of the conveyor belt in the direction opposite to the movement of the materials.

6. A process for making continuous veining of desired patterns extending through the entire thickness of products obtained by pressing powdery materials or granulated powders which have the quality of a continuous flow, the process consisting of the following operative steps:

- arranging the materials onto an arrangement belt (11) by having the materials released from a material distributing cartridge (1), which moves reciprocally above the arrangement belt (11), onto the arrangement belt (11) that is moving forward in order to make arrangement for the succession of the materials, adequate quantity of the materials, and the position at which the materials are released onto the vertical material receiving-distributing cartridge (2) in accordance with the desired patterns;
- creating a bulk of the patterned materials by allowing the materials to fall down in a manner to form layered patterns inside a material receiving unit (20) of a vertical material receiving-distributing cartridge (2) to form patterns in accordance with the succession, quantity, and position which have been predetermined;
- closing the material receiving unit (20) by means of the first open-close flap (24) preventing leakage of the materials contained inside the material receiving unit (20);
- rotating the vertical material receiving-distributing cartridge (2) around an axis perpendicular to the plane of the material receiving unit (20) and perpendicular transfer of the patterned materials onto a conveyor belt (23) which transfers said materials to a horizontal material receiving-distributing cartridge (3);
- relocating the bulk of the patterned materials to the horizontal material receiving-distributing cartridge (3) by opening the second open-close flap (25) to allow the material to flow onto the conveyor belt (23), and further relocating the patterned materials to a mold for being pressed.

7. The process according to Claim 6, wherein a

pressing sheet (35) presses the materials while the materials are moving towards the mold, and when the materials move to the position of the mold, the pressing sheet will continue to press the materials along with the downward movement of a lower lift of the pressing machine in order to receive the materials.

8. The process according to Claim 6 or 7, wherein the horizontal material receiving-distributing cartridge (3) at the open-close member (33) for receiving the materials will be closed down and the open-close and excess material removal flap (34) remains open while the horizontal material receiving-distributing cartridge (3) moves to bring the materials to the mold; and when the horizontal material receiving-distributing cartridge (3) moves to the position which corresponds to the mold's position, the open-close and excess material removal flap (34) will be closed down along with the downward movement of the lower lift of the mold in order to receive the materials and then, the open-close and excess material removal flap (34) will remove excess materials at the front portion before the horizontal material receiving-distributing cartridge (3) moves back and the pressing process starts.

9. The process according to any one of Claims 6 to 8, wherein the materials for making patterns are organic substances which possess a uniform flow.

10. The process according to any one of Claims 6 to 8, wherein the materials for making patterns are inorganic substances which possess a uniform flow.

11. The process according to any one of Claims 6 to 10, wherein a pressing sheet (35) of the horizontal material receiving-distributing cartridge (3) is pressed down in a manner to make an elevated angle between 0-0.5 degrees with the plane of the conveyor belt in the direction opposite to the movement of the materials.

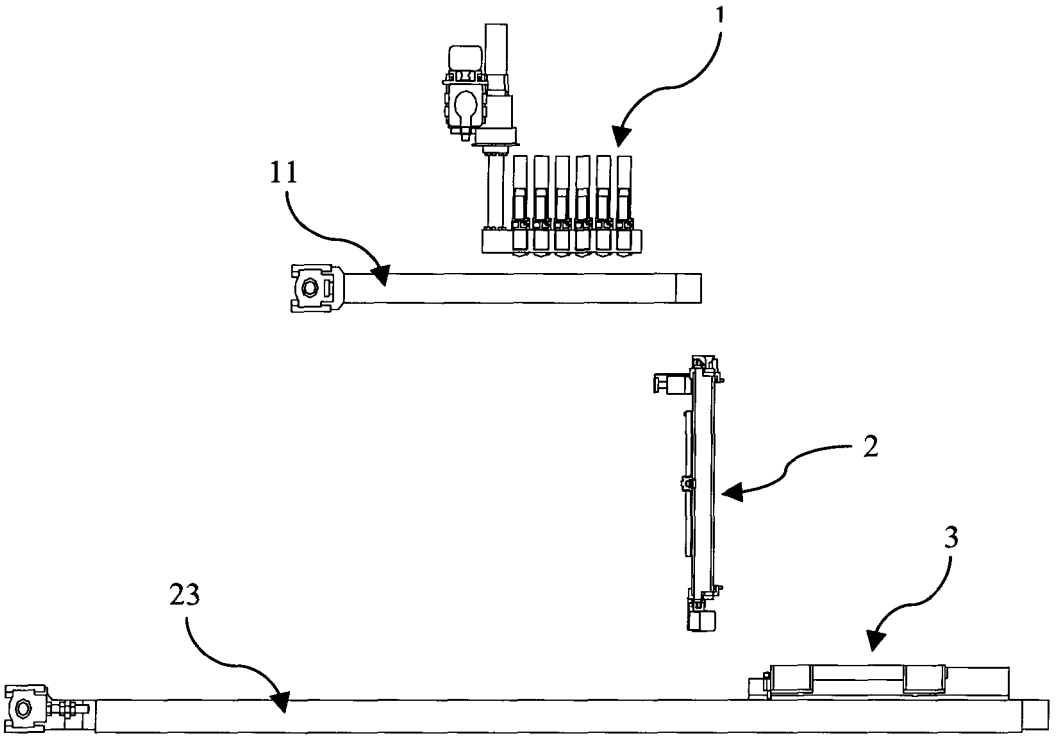

FIGURE 1

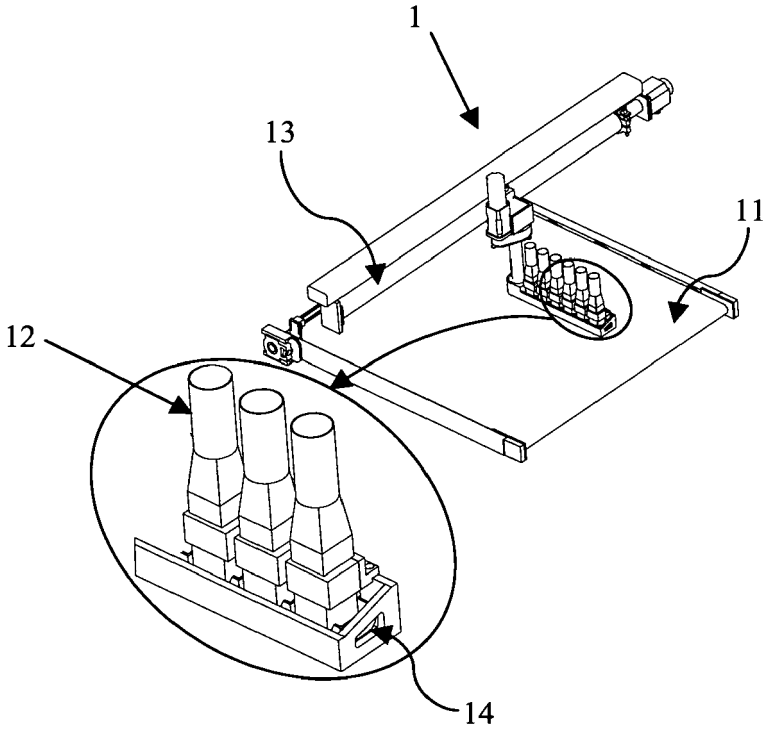

FIGURE 2

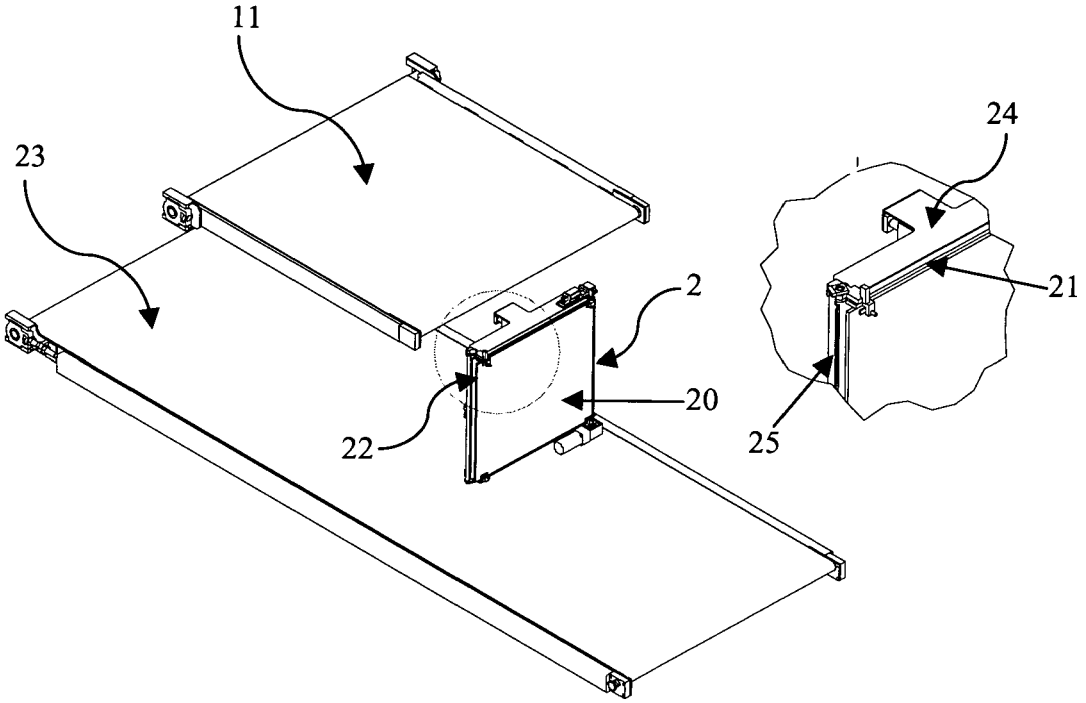

FIGURE 3

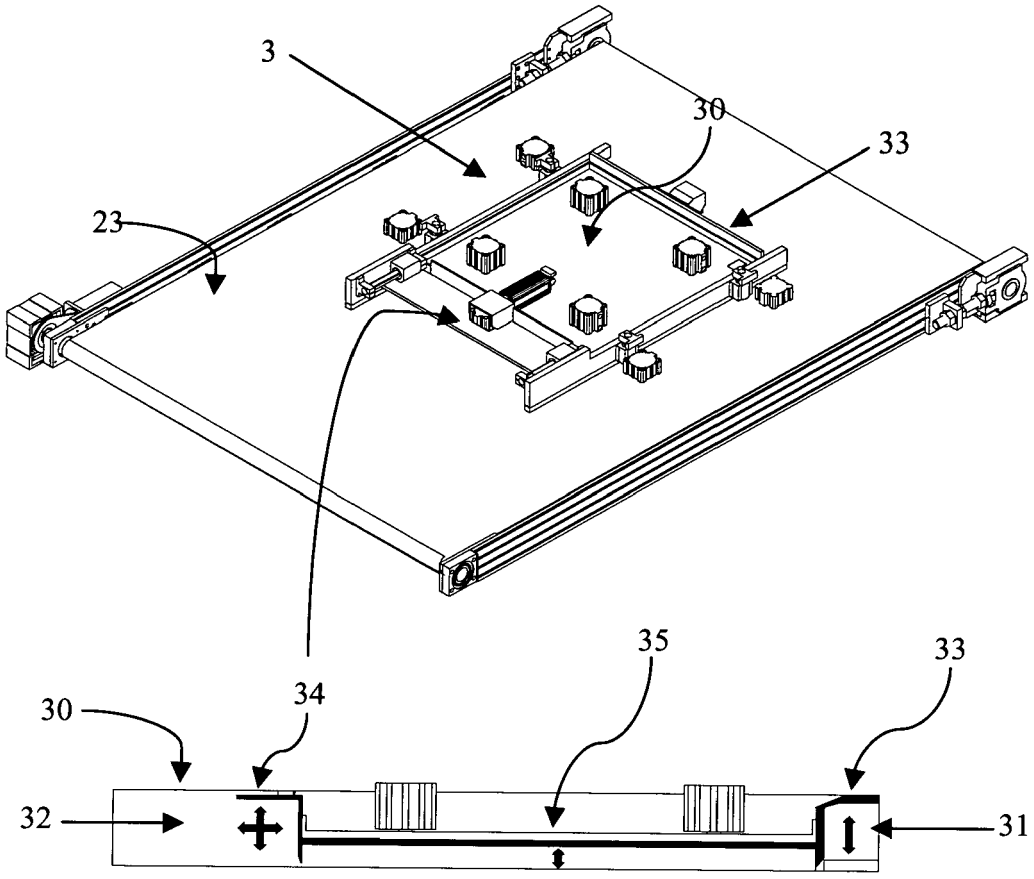

FIGURE 4

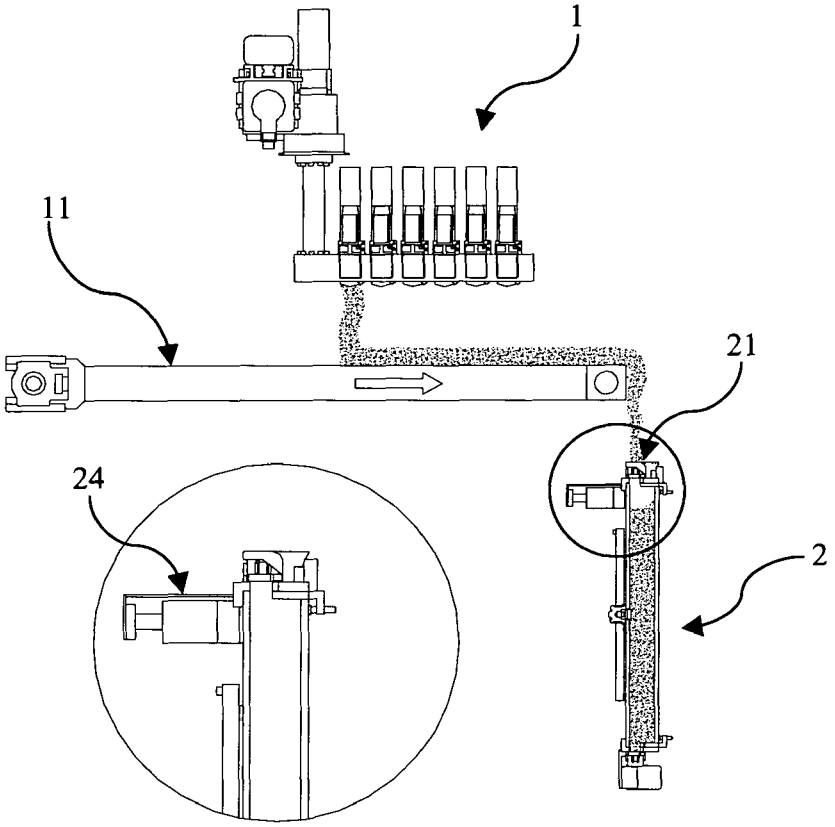

FIGURE 5

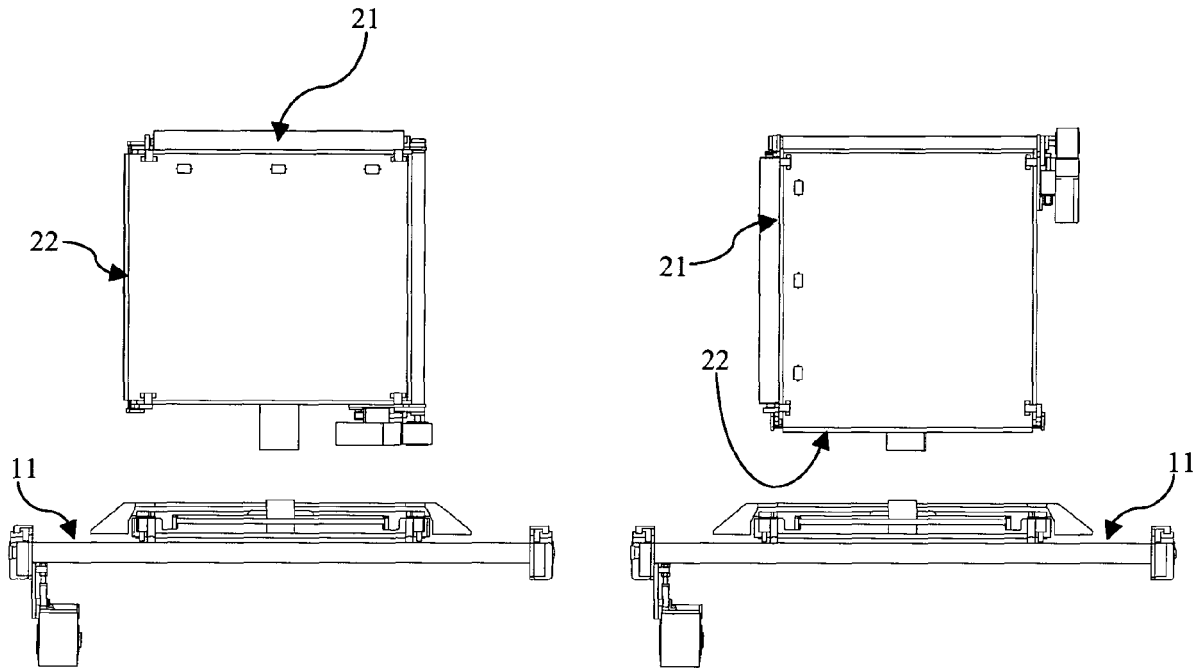

FIGURE 6

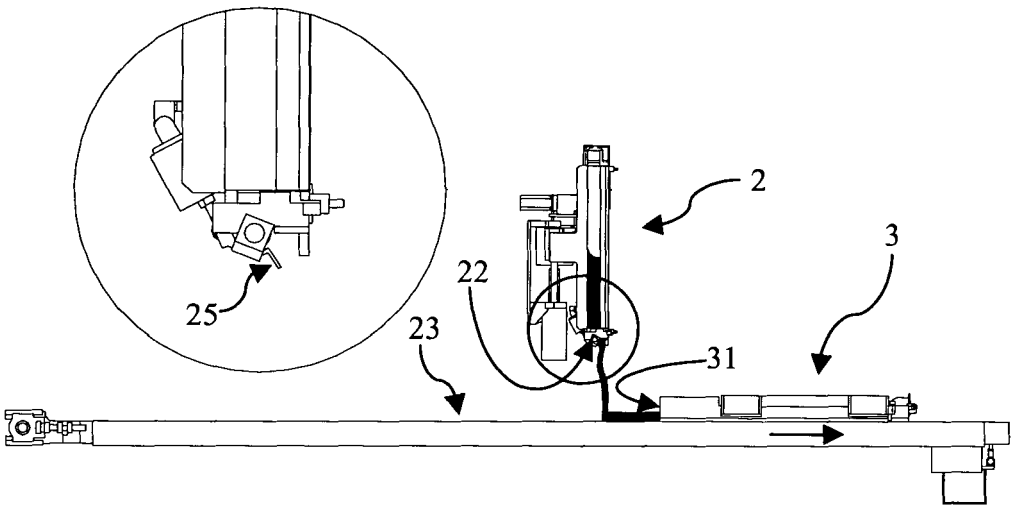

FIGURE 7

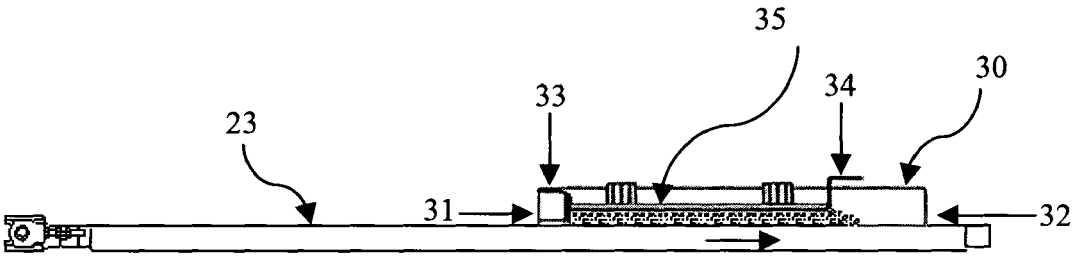

FIGURE 8

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 September 2005	Orij, J

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