

(19)



(11)

EP 2 897 771 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
31.10.2018 Bulletin 2018/44

(51) Int Cl.:
B28B 3/02 ^(2006.01) **B28B 7/00** ^(2006.01)
B28B 17/00 ^(2006.01) **B30B 15/02** ^(2006.01)

(21) Application number: **13792449.4**

(86) International application number:
PCT/IB2013/058300

(22) Date of filing: **05.09.2013**

(87) International publication number:
WO 2014/045150 (27.03.2014 Gazette 2014/13)

**(54) PRESSING PUNCH FOR THE PRODUCTION OF TILES AND THE LIKE AND METHOD FOR
EXTRACTING A THIN PLATE OF A PRESSING PUNCH**

PRESSSTEMPEL ZUR HERSTELLUNG VON FLIESEN UND DERGLEICHEN UND VERFAHREN
ZUR ENTNAHME VON EINEM DÜNNEN PLATTE EINES PRESSSTEMPELS

POINÇON DE PRESSAGE POUR LA PRODUCTION DE TUILES ET SIMILAIRES ET PROCEDE
POUR EXTRAIRE UNE PLAQUE MINCE D'UN POINÇON DE PRESSAGE

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **21.09.2012 IT MI20121577**

(43) Date of publication of application:
29.07.2015 Bulletin 2015/31

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Description

[0001] The present invention relates to an innovative pressing punch for the production of ceramic products such as tiles and a method for extracting a thin plate in a pressing punch.

[0002] In the present description reference will be made in particular to tiles, but it is understood that the principles of the invention are also applicable to pressing for the production of other similar ceramic products.

[0003] In the technical sector relating to the production of tiles and the like, pressing punches are known, these comprising a metal plate intended to be mounted on a press structure and having a pressing surface lined with a rubber or resin surface layer vulcanized onto the plate and provided with an impression for one side of the product to be produced.

[0004] During pressing of the powders which will form the product, the surface layer is subject to wear which results in the need for periodic replacement thereof.

[0005] In order to perform replacement, the plate is removed from the press and sent to the manufacturer who will perform removal of the worn layer, vulcanize a new layer and send the plate back again to the client for re-assembly on the press. The operations of removal and reassembly of the plate from/onto the press require time, owing to the not insignificant weight of the plate itself, therefore resulting in inconvenient stoppage of production. The weight of the plate also poses a problem with regard to despatch thereof to/from the manufacturer.

[0006] Moreover, in order to change the impression on the tile, another plate with a surface layer having a new impression is required.

[0007] In the case where production of the various tiles must be periodically repeated, it is necessary to have a stock of several plates with the various impressions.

[0008] Owing to their weight and size, all of this complicates the management of the plate warehouse stock. Furthermore, the cost of each plate is relatively high.

[0009] Both in the case of a plate with a worn layer and in the case of a production change-over, assembly of a new plate also requires a certain amount of work needed to assemble and recalibrate the mould.

[0010] In the case of presses with a top and bottom punches for pressing both sides of the tile with a particular impression, the problems are doubled. WO2006/095254 discloses only an isostatic punch with a yieldable impression layer.

[0011] EP1645380 discloses a pressing punch for the production of ceramic tiles in accordance with the preamble of claim 1 and EP1386705 discloses a mould in which an impressive part is magnetically fixed in the mould.

[0012] EP2394808 discloses a magnetically fixed sliding plates for a pressing station. The general object of the present invention is to provide a pressing punch for the production of tiles, which is able to ensure rapid, relatively low-cost and simple replacement of the layer con-

taining the impression of the tile.

[0013] In view of this object the idea which has occurred, according to the invention, is to provide a pressing punch for the production of ceramic products, as claimed in claim 1.

[0014] A method for raising the thin plate is also claimed.

[0015] In order to illustrate more clearly the innovative principles of the present invention and its advantages compared to the prior art, an example of embodiment applying these principles will be described below, with the aid of the accompanying drawings. In the drawings:

- Figure 1 shows a schematic view, sectioned along the line I-I of Figure 2, of a punch according to the invention;
- Figure 2 shows a schematic plan view of a first embodiment of a punch according to the invention with a top element removed;
- Figure 3 shows a view, similar to that of Figure 1, with the punch during an impression replacement operation;
- Figure 4 shows a schematic view, sectioned along the line IV-IV of Figure 5, of another embodiment of a punch according to the invention;
- Figure 5 shows a schematic plan view of the embodiment of Figure 4 with a top element removed;
- Figure 6 shows a view, similar to that of Figure 4, with the punch during an impression replacement operation.

[0016] With reference to the figures, Figure 1 shows a first embodiment of a punch according to the invention, denoted generally by 10.

[0017] The punch is intended to be housed inside a mould 11, between two press surfaces 12 and 13, so as to define a pressing chamber 14 for pressing powders for manufacturing the tile or similar product.

[0018] The structures of the mould and the press are per se of the known type, which may be easily imagined by the person skilled in the art. They are therefore shown schematically in broken lines in the figure and will not be shown or described here further.

[0019] The punch 10 comprises a base plate or support plate 15 provided at the top with a seat 16 which receives a thin plate 17. The plate 15 will have dimensions comparable to those of the conventional punches which the punch according to the invention will replace. In general, the base plate will be designed so as to withstand the flexural forces which are produced on it during operation of the press and will be stably secured to the press by means of systems which are known to persons skilled in the art and which, for the sake of brevity, will not be shown or described further here.

[0020] The thin plate has a form substantially matching that of the seat 16 and has, on an outer side, the impression to be transferred onto the tiles. In particular, in order to form the impression, the thin plate is advantageously

provided, or at least lined at the top, with a surface layer 18 containing the desired impression for the tile. This layer may be formed and fixed to the thin plate 17 using a conventional method. For example, it may consist of a suitable rubber or resin layer which is bonded, vulcanized or in any case stably fixed onto the thin plate, in a similar manner to that which occurs in general for the rubber layer present on the conventional base plates present in the punches of the prior art.

[0021] The layer 18 is thus firmly attached to the thin plate 17.

[0022] The thin plate may have a suitable thickness sufficient to prevent an unacceptable distortion of the impression. Its exact thickness may therefore also depend on the extension of the impression.

[0023] Advantageously the thin plate may have a thickness which is comparable with the thickness of the layer. For example, the layer may have a thickness ranging from 0.5 mm to 5 mm and the thin plate may have a thickness ranging from 1 mm to 15 mm. The base plate instead has a thickness comparable to that of the conventional plates with punches having a layer vulcanized on the heavy plate. In particular, the thickness of the base plate may be between 17 mm and 50 mm. Different thicknesses are, however, possible for both of them.

[0024] The thin plate with its surface impression forms the removable part of the punch according to the invention.

[0025] Magnetic attraction means are provided between the thin plate and its seat in the base plate in order to perform magnetic fixing once the thin plate is placed in its seat.

[0026] In order to form these magnetic attraction means, the thin plate is advantageously made of ferromagnetic material or contains suitably distributed parts made of ferromagnetic material and magnets 19 which are correspondingly and suitably arranged in the bottom of the seat 16 inside suitable recesses.

[0027] These magnets will be chosen so as to have a force of attraction suitable for keeping the thin plate firmly inside the seat against the normal forces to which the layer 18 is subject during use of the punch.

[0028] The magnets may be arranged spread over or in localized positions on the surface of the seat, depending on their specific magnetic force. For example, as shown in Figure 2, they may be formed by disks of magnetic material which are arranged in the corners of the seat, in a middle position along the edges of the seat and in certain intermediate zones inside the seat (in particular, advantageously in the centre of the seat and in the centre of each of four quadrants into which the seat is ideally divided).

[0029] In order to ensure correct positioning of the impression on the punch and avoid lateral slipping or distortion of the edges of the layer, the seat 16 may have advantageously raised perimetral edges 20 which are inclined outwards and match the peripheral edges 21 of the thin plate 17 with the layer 18, as can be clearly seen

in the enlarged view of Figure 3. The thin plate with the surface layer which forms the impression may be advantageously inset in the seat so as to have the impression surface with perimetral edges which are substantially flush with the top edges of the seat, as can be clearly seen in Figure 1.

[0030] Optionally it is also possible to envisage further centring parts able to favour further optimum engagement between the two parts. These parts may be formed, for example, by projections 31 in the engaging side of the thin plate and matching recesses 32 in the bottom of the seat 16.

[0031] Actuatable pushing means 22 are arranged in the base plate 15 and allow the thin plate to be moved away upon operation from the seat against the retaining action of the magnetic attraction means.

[0032] Advantageously these pushing means comprise pushing pistons 23 which are seated inside chambers 24 in the base plate. Advantageously, the chambers 24 are formed in the base plate on the opposite side to the seat 16 and sealingly closed by suitable stoppers 25, preferably fixed by means of a screw system for easy maintenance.

[0033] Each piston 23 has a pushing end 26 which slides axially inside a passage 27 which emerges in the bottom of the seat 16. The piston is movable upon operation between a retracted or rest position, in which the pushing end 26 is retracted so as not to interfere with the thin plate in the seat 16, as shown in Figure 1, and an advanced or operative position, in which the pushing end 26 is advanced inside the seat 16 and pushes the thin plate so as to raise it from the seat 16, as shown in Figure 3. Raising is sufficient to detach the thin plate from the magnetic retaining means and allow the thin plate to be gripped with the fingers in order to remove it from the base plate.

[0034] The pistons are operated so as to move by means of a suitable network for supplying them. A fluid system with ducts 28 for supplying the pressurised fluid inside the chambers may be advantageously used for the operating movement of the pistons. The fluid may be for example compressed air or oil. Alternatively, the pistons may also be moved by an electromechanical system, for example of the solenoid type. The power supply network may be provided inside the bottom support and comprise a suitable element for connection to the external power source, not shown in that it is known per from the prior art.

[0035] As can be clearly seen in Figure 2 (where for the sake of clarity the thin plate has been removed), the pistons may also be distributed over the surface of the seat 16, between the magnetic elements, so as to exert a pushing force over the entire thin plate. All the pistons may be advantageously activated simultaneously for their simultaneous movement towards the operating position. In this way the thin plate is uniformly raised from its seat.

[0036] By deactivating the pushing system, the pistons

may be left free to retract owing to the pushing force on them of a thin plate 17 which is inserted manually into the seat and is attracted by the magnets, or advantageously a system for active return of the pistons into the rest position may be provided. This active system may comprise, for example, resilient recall elements 29 (for example springs) and/or further ducts 30 for supplying fluid under pressure, so as to create double-acting pistons 23.

[0037] During use, when it is required to change the surface layer (because it is worn or because an impression is to be changed), it is merely required to supply the pistons so as to cause their movement into the operative pushing position. This causes raising and, consequently, separation of the means for magnetically retaining the removable element consisting of the thin plate. The removable element may thus be easily removed (also manually in view of its low weight) and a new removable element (which is the same or different in terms of surface structure from the previous one) may be inserted into the seat. By interrupting the supply to the pistons, lowering of the element into the seat (if necessary assisted by the presence of a retraction system) and consequent engagement of the removable element with the support by means of the magnetic fixing elements is produced.

[0038] The mutually matching shape of the perimetral edges, seat of the support and removable element ensures centring of the two parts and a suitable finish of the tile edge.

[0039] The old removable element may be stored, if necessary reconditioned with a new surface layer or definitively discarded (in view of its relatively low cost).

[0040] Figure 4 shows a possible alternative embodiment, denoted by 110, of a punch applying the principles of the present invention. Parts similar to those of the previous embodiment will be indicated by the same number, increased by 100.

[0041] A base plate or support plate 115 is thus provided, said plate having on top a seat 116 which receives a thin plate 117 which contains the impression to be formed on the tiles. This impression may be again formed by means of a rubber or resin layer 118 which is bonded to the thin plate as described for the previous embodiment.

[0042] Means 119 for mutual magnetic attraction (for example magnets 119 which attract ferromagnetic parts of the plate 117) are provided between the thin plate 117 and seat 116 so as to provide a magnetic fixing system once the thin plate is placed inside the seat, as described above.

[0043] In order to ensure correct positioning of the impression on the punch and avoid lateral slipping or distortion of the edges of the layer, the seat 116 may have advantageously raised perimetral edges 120 which are inclined outwards so as to mate with matching peripheral edges 121 of the removable element 117, 118. Further centring means 131, 132 may be provided in order to favour further optimum engagement between the remov-

able element and the seat.

[0044] As for the previous embodiment, actuatable pushing means 122 are arranged in the base plate 115 and allow the thin plate to be moved away upon operation from the seat against the retaining action of the magnetic attraction means.

[0045] Advantageously, as for the previous embodiment, the pushing means may comprise a pushing piston 123 which is housed inside a chamber 124 in the base plate and provided with a pushing end 126 which slides axially inside a passage 127 which emerges in the bottom of the seat 116 so as to move upon operation the thin plate away from the bottom of the seat. As for the previous embodiment, the piston may be advantageously operated by means of a fluid system (for example, air or oil system) via ducts 128. Alternatively, the pistons may also be moved by an electromechanical system, for example of the solenoid type. As already described, the pistons may be of the freely retracting type or also assisted by resilient means 129 and/or by a further supply 130 of operating fluid.

[0046] Unlike the previous embodiment, one or more ducts 151, advantageously passing inside the base plate, emerge in the bottom of the base plate, in the interface zone between seat and thin plate. These ducts are intended to be connected to a controlled source of pressurised air, so as to inject air directly into the interface between the support consisting of the base plate and the removable element.

[0047] Advantageously, the seat 116 also comprises a perimetral hydraulic sealing element 150. This element (for example a seal of suitable shape and material which is seated inside a suitable recess in the bottom of the seat 116 in the vicinity of its edge) bounds, with an improved hydraulic sealing action, the engaging interface between the thin plate and the bottom of the seat 116 where the duct 151 emerges. The seal is pliable and has dimensions so as not to hinder resting of the thin plate inside the seat and the mutual magnetic engaging action.

[0048] During use of the punch, when it is required to remove the impression, it is sufficient to inject pressurised air into the interface between support and removable element, via the duct 151. This thus creates a pushing force which raises the thin plate from the bottom of the seat.

[0049] Although this may be sufficient to separate the thin plate from the base plate, the advantageous presence of the perimetral seal (which may be suitably deformed) further guarantees the creation of a pressurised chamber under the entire area of the removable element, which is therefore raised and safely released from the magnetically engaged condition.

[0050] At the same time or following the initial supply of air into the interface, the pistons 132 are operated so as to raise the removable element further and/or keep it raised (so that it is not engaged again by the magnets). After the plate has been raised and the pistons 123 form a support for keeping it raised, it is possible to switch off

the air supply in the interface.

[0051] At this point it is possible to proceed as in the previous embodiment, removing and replacing the thin plate.

[0052] Since in this second embodiment the raising pistons may act purely as a support for the removable part (and not necessarily for separating it from the magnets), it is not necessary to use a relatively large number of pistons distributed on the bottom of the seat. For example, it is possible to use also only one pushing piston advantageously arranged in the centre of the seat, as can be clearly seen in Figure 5 (where for the sake of clarity the thin plate has been omitted).

[0053] The complexity and the cost of producing the support base are therefore reduced.

[0054] At this point it is clear how the predefined objects have been achieved providing a punch with rapid change-over of the surface structure (namely of the image which is to be created on the tile). Such a punch is particularly suitable for rapid and frequent change-over of the structures, in particular in the case of very large formats, which otherwise would require the handling and subsequent centring of bulky and heavy punches. The cost of obtaining a certain number (also large number) of different impression patterns to be used alternately is greatly reduced compared to the prior art where for each impression the entire punch is required. Also the management of a stock of impressions is easier and less costly.

[0055] Moreover, the manufacturers of the impressions may produce at a lower cost a large number of thin plates with the various impressions, which may be easily stored and despatched to the client, as required.

[0056] Obviously, the above description of embodiments which apply the innovative principles of the present invention is provided by way of example of these innovative principles and must therefore not be regarded as limiting the scope of the rights claimed herein.

[0057] For example, the thin plate may also be a non-solid plate, in order to improve fixing of the surface layer. For example it may be perforated in various ways and also shaped, advantageously, in the form of a grille cut from a metal sheet. In the figures and the description a bottom punch has been illustrated, but it will be obvious to the person skilled in the art that the punch according to the invention may also be a top punch in a press. The magnetic attraction means may also comprise magnets in the thin plate which attract ferromagnetic parts in the bottom of the seat.

Claims

1. Pressing punch for the production of ceramic products, comprising on one side an impression layer to be impressed onto the product, further comprising a base plate (15, 115) provided with a seat (16, 116) which receives a thin plate (17, 117) having on its

outer side the impression layer, there being provided magnetic attraction means (19, 119) between the thin plate and seat for performing magnetic fixing of the thin plate once it has been placed inside the seat (16, 116), **characterized in that** the base plate (15, 115) also being provided with actuatable pushing means (22, 122, 151) moving upon operation the thin plate (17, 117) away from the seat (16, 116) against the retaining action of the magnetic attraction means (19, 119) so as to allow removal and replacement thereof.

2. Punch according to Claim 1, **characterized in that** the thin plate comprises, arranged thereon, a rubber or resin layer (18, 118) forming the said impression layer.

3. Punch according to Claim 1, **characterized in that** the magnetic attraction means comprise magnets (19, 119) which are arranged in the seat and the thin plate is made at least partially of ferromagnetic material.

4. Punch according to Claim 1, **characterized in that** the seat has a shape matching that of the thin plate.

5. Punch according to Claim 1, **characterized in that** the seat and the thin plate with the impression layer have perimetral edges which match each other and are inclined outwards.

6. Punch according to Claim 1, **characterized in that** the pushing means comprise pushing pistons (23, 123) which are housed in the base plate and with a pushing end (26, 126) which slides axially upon operation inside a passage (27, 127) which emerges in the bottom of the seat (16, 116) so as to move between a retracted rest position, in which the pushing end (26) is retracted so as not to interfere with the thin plate inside the seat (16, 116) and an operative advanced position, in which the pushing end (26, 126) is advanced inside the seat (16, 116) so as to push the thin plate far from the bottom of the seat.

7. Punch according to Claim 1, **characterized in that**, for their movement, the pistons are operated by means of a supply (28, 128) of pressurised fluid.

8. Punch according to Claim 1, **characterized in that** the base plate is provided with means (29, 129, 30, 130) for pushing the pistons towards their rest position.

9. Punch according to Claim 8, **characterized in that** the means for pushing the pistons towards their rest position comprise resilient pushing means (29, 129) and/or a further supply (30, 130) of pressurised fluid.

10. Punch according to Claim 1, **characterized in that** the actuatable pushing means comprise at least one duct (151) which emerges in the bottom of the seat (116) so as to introduce air into an interface between the thin plate and bottom of the seat in order to raise the thin plate from the seat. 5
11. Punch according to Claim 10, **characterized in that** a hydraulic sealing element (150) is provided peripherally on the bottom of the seat (116) between the thin plate and seat so as to sealingly bound said interface between the thin plate and bottom of the seat. 10
12. Punch according to claim 10, **characterized in that** the duct (151) introduces pressurised air into the interface between thin plate (117) and bottom of the seat (116) and at least one pushing piston (123) in the bottom of the seat is operated so as to move the thin plate away by means of pressurised air and provide the plate with support separated from the bottom of the seat by means of the pushing end (126) of the piston in the operating position. 15 20
13. Method for extracting the thin plate in a punch provided in accordance with any one of Claims 1 to 12, wherein the actuatable pushing means are activated to raise the thin plate from the seat so that it may be gripped and removed. 25
14. Method according to Claim 13 wherein the punch is provided with at least one piston according to Claim 6 and at least one duct according to Claim 10 and the method comprises the steps of introducing pressurised air into the interface between the thin plate (117) and bottom of the seat (116) and operating at least one pushing piston in the bottom of the seat so as to move the thin plate away by means of the pressurised air and provide support for the plate by means of a pushing end (126) of the piston in the operating position. 30 35 40

Patentansprüche

1. Pressstempel zur Herstellung keramischer Produkte, welcher auf einer Seite eine auf das Produkt aufzudrückende Pressschicht umfasst, und welcher weiter eine Basisplatte (15, 115) umfasst, die mit einem Sitz (16, 116) ausgestattet ist, der eine dünne Platte (17, 117) aufnimmt, auf deren äußeren Seite die Pressschicht vorhanden ist, worin zwischen der dünnen Platte und dem Sitz magnetische Anziehungsmittel (19, 119) vorgesehen sind, um die dünne Platte magnetisch zu fixieren, sobald diese in den Sitz (16, 116) überführt wurde, **dadurch gekennzeichnet, dass** die Basisplatte (15, 115) weiter mit einem betätigbaren Drückmittel (22, 122, 151) ausgestattet ist, um beim Betrieb die dünne Platte (17, 117) gegen 45 50 55

die Rückhaltekraft des magnetischen Anziehungsmittels (19, 119) weg von dem Sitz (16, 116) zu bewegen, um eine Entfernung und einen Ersatz davon zu ermöglichen.

2. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** die dünne Platte darauf angeordnet eine Gummi- oder Harz-Schicht (18, 118) umfasst, die die Pressschicht ausbilden.
3. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** das magnetische Anziehungsmittel Magnete (19, 119) umfasst, die in dem Sitz angeordnet sind und dass die dünne Platte mindestens teilweise aus ferromagnetischem Material gebildet ist.
4. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** der Sitz eine Form aufweist die zu der der dünnen Platte passt.
5. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** der Sitz und die dünne Platte mit der Pressschicht umlaufende Kanten aufweisen die aufeinander abgestimmt und nach außen geneigt sind.
6. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** das Drückmittel Schubkolben (23, 123) umfassen, die in der Basisplatte vorgesehen sind, und die ein Drück-Ende (26, 126) aufweisen, das beim Betrieb axial in eine Leitung (27, 127) gleitet, die in dem Boden des Sitzes (16, 116) hervortritt, um sich zwischen einer zurückgezogenen Ruheposition, bei der das Drück-Ende (26) zurückgezogen ist, um nicht mit der dünnen Platte in dem Sitz (16, 116) wechselzuwirken, und einer vorgerückten Betriebs-Position, bei der das Drück-Ende (26, 126) in dem Sitz (16, 116) vorgetrieben ist, um die dünne Platte weit weg von dem Boden des Sitzes zu drücken, zu bewegen.
7. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass**, zu deren Bewegung die Kolben mittels einer Zufuhr (28, 128) von unter Druck stehendem Fluid betrieben werden.
8. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Basisplatte mit Mitteln (29, 129, 30, 130) ausgestattet ist, um die Kolben in deren Ruheposition zu bewegen.
9. Stempel nach Anspruch 8, **dadurch gekennzeichnet, dass** die Mittel zum Drücken der Kolben in deren Ruheposition federnde Drückmittel (29, 129) umfassen und/oder eine weitere Zufuhr (30, 130) von unter Druck stehendem Fluid.
10. Stempel nach Anspruch 1, **dadurch gekennzeichnet, dass** die betätigbaren Drückmittel mindestens

eine Leitung (151) umfassen, die in dem Boden des Sitzes (116) hervortritt, um Luft in eine Zwischenschicht zwischen der dünnen Platte und dem Boden des Sitzes zu bringen, um die dünne Platte von dem Sitz anzuheben.

11. Stempel nach Anspruch 10, **dadurch gekennzeichnet, dass** ein hydraulisches Dichtungselement (150) am Umfang am Boden des Sitzes (116) zwischen der dünnen Platte und dem Sitz vorgesehen ist, um die Zwischenschicht zwischen der dünnen Platte und dem Boden des Sitzes dichtend zu binden.
12. Stempel nach Anspruch 10, **dadurch gekennzeichnet, dass** über die Leitung (151) Druckluft in die Zwischenfläche zwischen der dünnen Platte (117) und dem Boden des Sitzes (116) eingebracht wird, und dass mindestens ein Schubkolben (123) im Boden des Sitzes betrieben wird, um die dünne Platte mittels der Druckluft weg zu bringen, und die Platte mit einer Stütze getrennt von dem Boden des Sitzes mittels des Drück-Endes (126) des Kolbens in der Betriebs-Position zu versehen.
13. Verfahren zum Herausbringen der dünnen Platte in einem Stempel gemäß einem der Ansprüche 1 bis 12, worin die betätigbaren Drückmittel aktiviert werden, um die dünne Platte von dem Sitz anzuheben, so dass sie ergriffen und entfernt werden kann.
14. Verfahren nach Anspruch 13 wobei der Stempel mit mindestens Kolben gemäß Anspruch Claim 6 und mindestens einer Leitung nach Anspruch 10 ausgestattet ist, und wobei das Verfahren die Schritte umfasst, Einbringen von Druckluft in eine Zwischenfläche zwischen der dünnen Platte (117) und dem Boden des Sitzes (116) und Betreiben mindestens eines Schubkolbens in dem Boden des Sitzes, um die dünne Platte mittels der Druckluft weg zu bewegen, und Bereitstellen einer Stütze für die Platte mittels eines Drück-Endes (126) des Kolbens in der Betriebs-Position.

Revendications

1. Poinçon de pressage pour la production de produits en céramique, comprenant d'un côté, une couche d'empreinte à reporter sur le produit, comprenant en outre une plaque de base (15, 115) prévue avec un siège (16, 116) qui reçoit une plaque fine (17, 117) ayant, sur son côté externe, la couche d'empreinte, on prévoit des moyens d'attraction magnétique (19, 119) entre la plaque fine et le siège pour réaliser la fixation magnétique de la plaque fine une fois qu'elle a été placée à l'intérieur du siège (16, 116), **caractérisé en ce que** la plaque de base (15, 115) est également prévue avec des moyens de poussée ac-

tionnables (22, 122, 151) s'éloignant du siège (16, 116) après avoir actionné la plaque fine (17, 117) contre l'action de retenue des moyens d'attraction magnétique (19, 119) afin de permettre leur retrait et leur remplacement.

2. Poinçon selon la revendication 1, **caractérisé en ce que** la plaque fine comprend, agencée sur cette dernière, une couche en caoutchouc ou en résine (18, 118) formant ladite couche d'empreinte.
3. Poinçon selon la revendication 1, **caractérisé en ce que** les moyens d'attraction magnétique comprennent des aimants (19, 119) qui sont agencés dans le siège et la plaque fine est réalisée au moins partiellement avec un matériau ferromagnétique.
4. Poinçon selon la revendication 1, **caractérisé en ce que** le siège a une forme correspondant à celle de la plaque fine.
5. Poinçon selon la revendication 1, **caractérisé en ce que** le siège et la plaque fine avec la couche d'empreinte ont des bords périmétraux qui correspondent l'un à l'autre et sont inclinés vers l'extérieur.
6. Poinçon selon la revendication 1, **caractérisé en ce que** les moyens de poussée comprennent des pistons de poussée (23, 123) qui sont logés dans la plaque de base et avec une extrémité de poussée (26, 126) qui coulisse axialement suite à une opération à l'intérieur d'un passage (27, 127) qui sort au fond du siège (16, 116) afin d'être déplacée entre une position de repos rétractée dans laquelle l'extrémité de poussée (26) est rétractée pour ne pas interférer avec la plaque fine à l'intérieur du siège (16, 116) et une position avancée opérationnelle, dans laquelle l'extrémité de poussée (26, 126) est avancée à l'intérieur du siège (16, 116) afin de pousser la plaque fine à distance du fond du siège.
7. Poinçon selon la revendication 1, **caractérisé en ce que**, pour leur mouvement, les pistons sont actionnés au moyen d'une alimentation (28, 128) de fluide sous pression.
8. Poinçon selon la revendication 1, **caractérisé en ce que** la plaque de base est prévue avec des moyens (29, 129, 30, 130) pour pousser les pistons vers leur position de repos.
9. Poinçon selon la revendication 8, **caractérisé en ce que** les moyens pour pousser les pistons vers leur position de repos comprennent des moyens de poussée résilients (29, 129) et/ou une autre alimentation (30, 130) de fluide sous pression.
10. Poinçon selon la revendication 1, **caractérisé en ce**

que les moyens de poussée actionnables comprennent au moins un conduit (151) qui sort au fond du siège (116) afin d'introduire de l'air dans une interface entre la plaque fine et le fond du siège afin de faire monter la plaque fine à partir du siège.

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11. Poinçon selon la revendication 10, **caractérisé en ce qu'un** élément d'étanchéité hydraulique (150) est prévu de manière périphérique sur le fond du siège (116) entre la plaque fine et le siège afin de délimiter, de manière étanche, ladite interface entre la plaque fine et le fond du siège.
12. Poinçon selon la revendication 10, **caractérisé en ce que** le conduit (151) introduit l'air sous pression dans l'interface entre la plaque fine (117) et le fond du siège (116) et au moins un piston de poussée (123) au fond du siège est actionné afin d'éloigner la plaque fine au moyen de l'air sous pression et prévoir la plaque avec un support séparé du fond du siège au moyen de l'extrémité de poussée (126) du piston, dans la position opérationnelle.
13. Procédé pour extraire la plaque fine d'un poinçon prévu selon l'une quelconque des revendications 1 à 12, dans lequel les moyens de poussée actionnables sont activés pour faire monter la plaque fine à partir du siège de sorte qu'elle peut être saisie et retirée.
14. Procédé selon la revendication 13, dans lequel le poinçon est prévu avec au moins un piston selon la revendication 6, et au moins un conduit selon la revendication 10, et le procédé comprend les étapes consistant à introduire de l'air sous pression dans l'interface entre la plaque fine (117) et le fond du siège (116) et actionner au moins un piston de poussée au fond du siège afin d'éloigner la plaque fine au moyen de l'air sous pression et fournir le support pour la plaque au moyen d'une extrémité de poussée (126) du piston dans une position opérationnelle.

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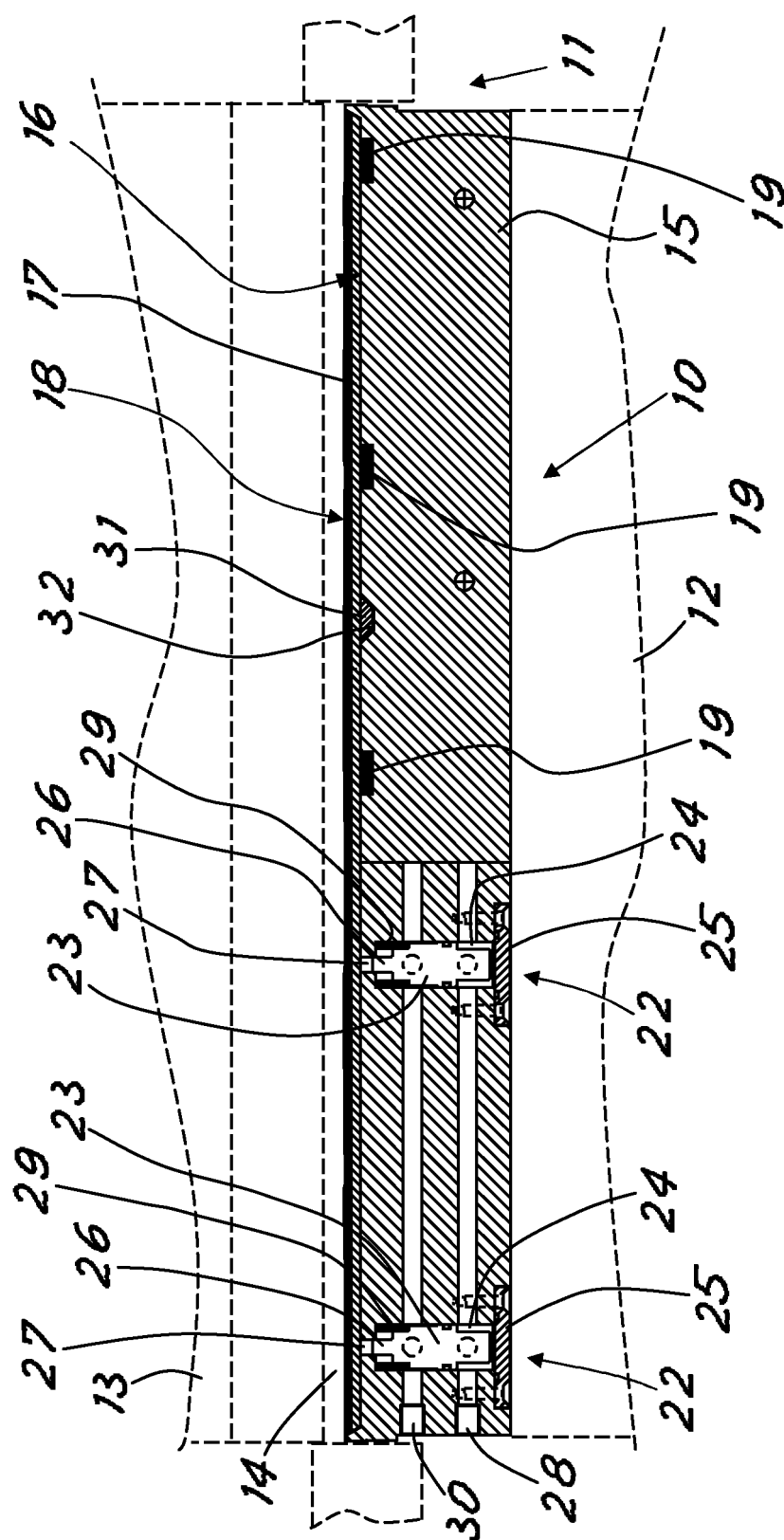


Fig. 1

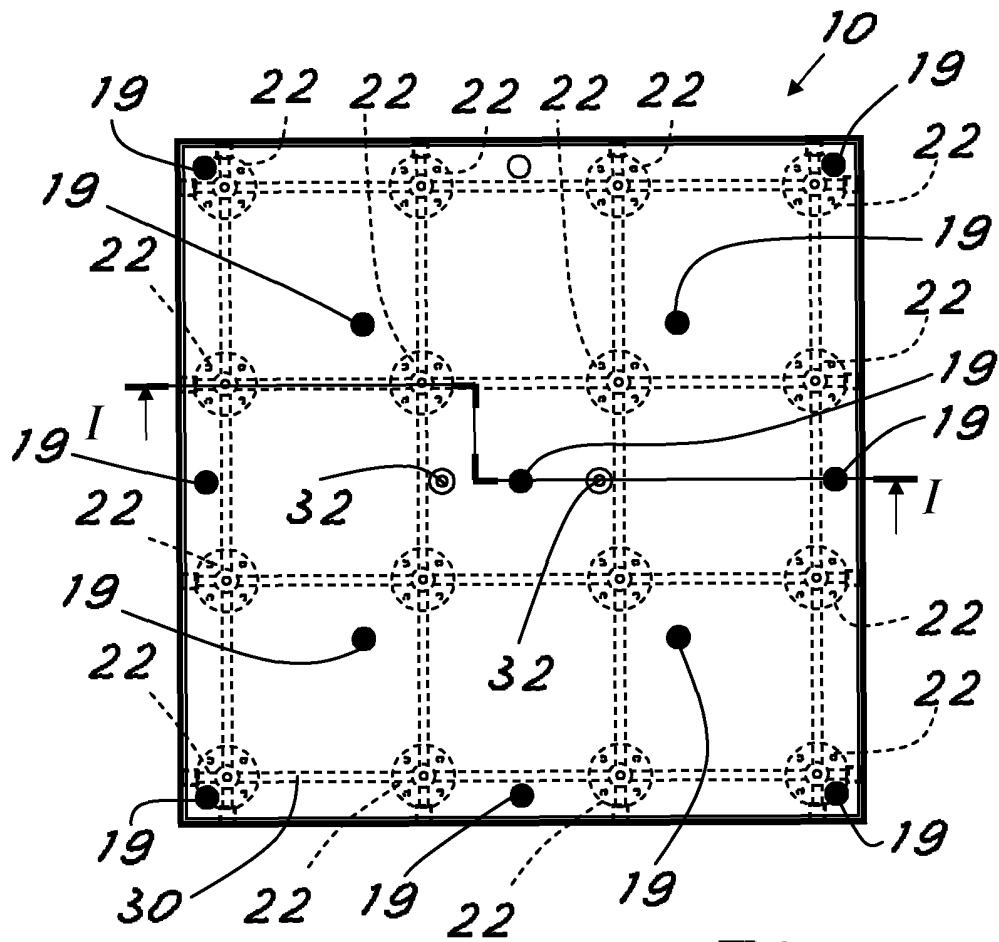


Fig. 2

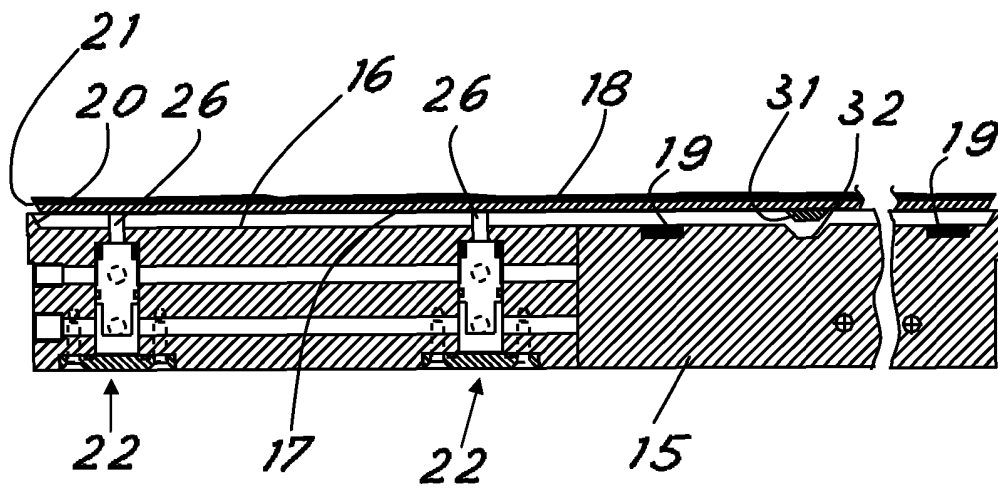
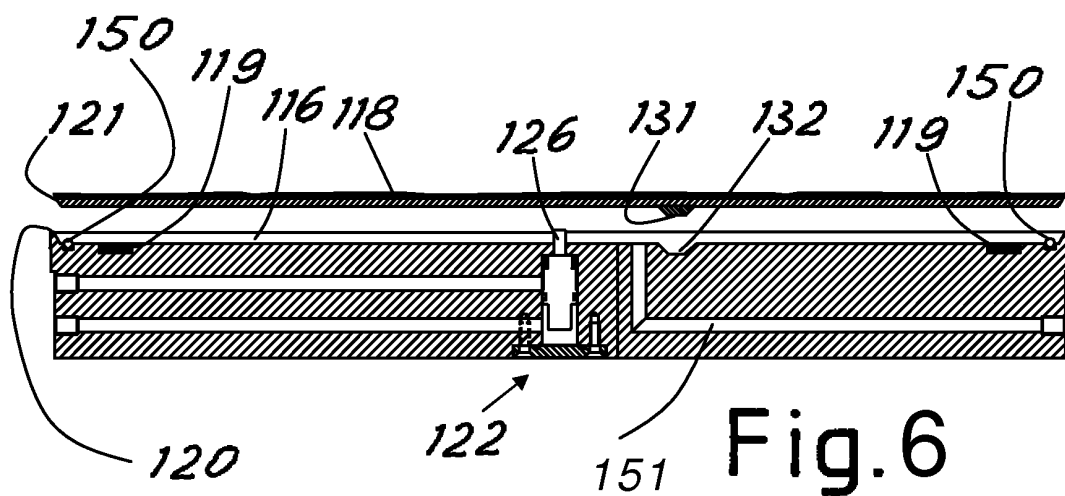
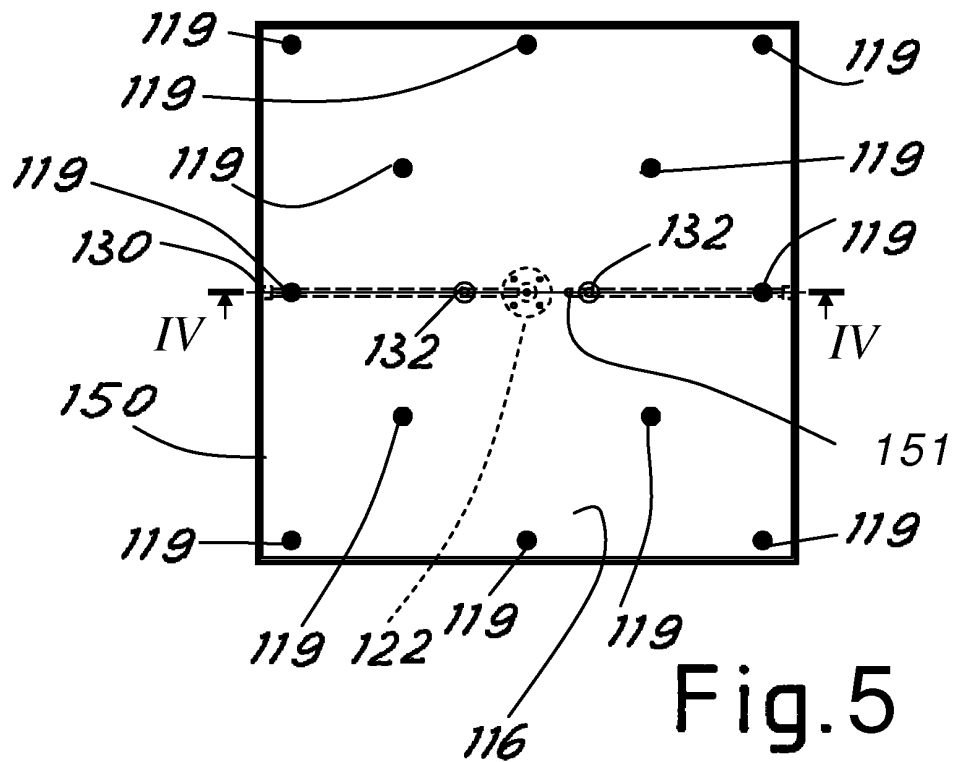
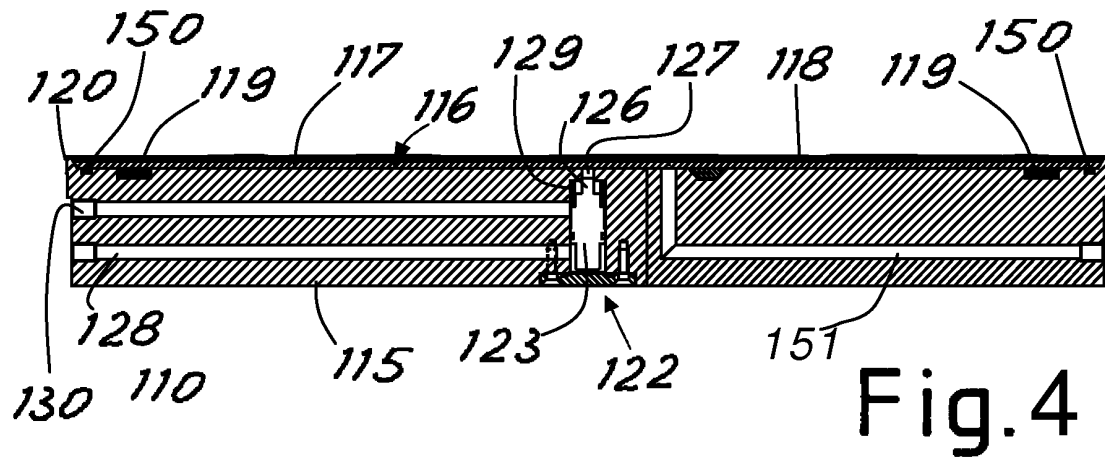


Fig. 3



REFERENCES CITED IN THE DESCRIPTION

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