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(54) Ceramic mold for forming tiles, and the relative loading means.

(57) A ceramic mold for forming tiles comprises a vertically mobile die-plate (1) provided with at least one forming cavity (2), the base of which is defined by a "reverse-face" die (5), and an overlying counter die-plate (11) which is fixed below the cross-member (10) of the ceramic press and comprises a cavity (22), the base of which is defined by an "exposed-face" die (55). The die (55) is able to move in level between a rearward position for forming the tile (6), and a forward position for its discharge, said die (55) being provided with at least one through aperture (80) which slidingly receives a stationary core (81) of conjugate shape. In the active surface of said core there are provided narrow passages (84) in which vacuum is firstly created to draw a pulverulent material (88) against the free part of said aperture (80), the vacuum then being broken to release this latter material.

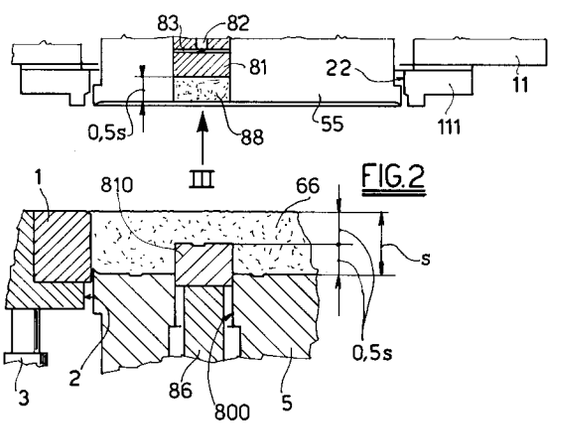

FIG.2

EP 0 569 069 A1

This invention relates generally to the processing of ceramic tiles, and more particularly to a mold and trolley unit for their formation.

More specifically, the invention relates to a mold of the movable die-plate type, the essential features of which will be apparent hereinafter.

In ceramic tile manufacture it is known to use molds comprising an upper plate provided lowerly with at least one pressing die, an intermediate plate or die-plate with a corresponding through forming cavity into which at least one material to be compacted, such as atomized clay, is loaded by a suitable trolley, and a lower plate provided upperly with a pressing die which defines the base of said cavity.

In such ceramic molds the upper plate is supported by the vertically movable cross-member of the press which supports and operates the mold, the die-plate is positioned on the press base and the lower plate moves vertically in order to allow said at least one material to be loaded into said cavity, to allow the plate itself to rest on the press base at each individual "pressing", and to allow the tile to be extracted from said cavity.

In certain types of mold the die-plate is stationary in height relative to the press base or bed, whereas in other types of mold, to which the present invention relates in particular, the die-plate is mounted on yieldable supports such as springs or hydraulic dampers, so that during pressing it is pushed downwards by the mold upper plate.

The advantages of this latter pressing technique are well known to the expert of the art, and therefore no description will be given thereof.

Various kinds of ceramic molds of the movable die-plate type are known, and can be divided into the following three main groups:

- so-called "mirror-plate" molds;
- so-called "reverse mirror" molds; and
- so-called "double mirror" molds.

One of the essential features which differentiates said ceramic mold groups is the relative arrangement of the "reverse-face" dies (ie the dies which form the tile laying face) and the "exposed-face" dies (ie the dies which form the tile exposed face).

The active surface of said dies (reverse-face or exposed-face) can be of either a particularly hard material such as metal, or a relatively soft material such as vulcanized rubber.

The invention relates specifically to a mold of the third of the aforelisted groups, ie a "double mirror" mold.

A mold of this type is well illustrated and described in Italian Patent Application No. 46813 A/89 filed by the present Applicant, to which reference should be made for further details.

In the mold described in said document:

- the die-plate is vertically movable as already stated;
- the "exposed-face" and "reverse-face" dies are associated with the mold upper plate and lower plate respectively;
- the upper (or exposed-face) dies are received within respective forming cavities provided in a counter die-plate fixed to the press cross-member; and
- said upper dies are able to move independently of the counter die-plate between a rearward tile pressing position and a forward tile discharge position.

Various ceramic products can be produced with such molds, for example:

- tiles commonly known as "biscuits" or "supports", which can either be glazed after firing or not,
- particularly high quality tiles which do not require glazing after firing, such as "fine porcelainized ceramic stone",
- tiles of at least two components, such as so-called "grained" tiles, and
- so-called pressure-glazed tiles, which are produced by simultaneously pressing two superposed layers of different materials, typically atomized clay for the lower layer and powdered ceramic glaze for the upper.

A description of the operation of such molds for producing said types of ceramic products will not be given as this is well known to the expert of the art.

As the ceramic products produced by said type of mold have physical, geometrical, mechanical and aesthetic characteristics which are usually much better than those achievable with other known mold types, for obvious reasons various attempts have been made in the past to use such a pressing technique to obtain new types of ceramic products.

These attempts have so far not led to positive or satisfactory results, and hence there is a deep need in this sector for means able to satisfy the aforesaid requirements.

The main object of the present invention is therefore to satisfy the aforesaid requirements within the context of a simple and rational construction.

Said object is attained by a ceramic mold and relative loading means, as defined in the accompanying claims.

According to the invention the proposed mold is of the "double mirror" type as defined in the introduction, with each upper die there being associated at least one core which is slidingly received in a conjugate through aperture provided in the die and is securely fixed to the movable cross-member of the press, so that the active surface of the die lies beyond that of said at least one core when the

die is in its forward position and is coplanar therewith when the die is in its rearward position, in the active surface of said at least one core there being provided narrow passages connected to a suction unit which alternately puts the free part of said through aperture under vacuum when the die is advanced, so as to fill said free part with a pulverulent material drawn from a corresponding service loader, and then breaks the vacuum in said free part, with simultaneous release of said pulverulent material which (on pressing) becomes incorporated into the material, such as atomized clay, present in the cavity of the die-plate.

According to a preferred embodiment, said narrow passages consist of a small transverse clearance provided between the free terminal part of said at least one core and the corresponding through aperture, and having a width less than the particle size of the pulverulent material being worked.

Using this structure, tiles can be obtained with aesthetic and ornamental features never before achieved, by setting into the exposed-face of the tile, in the manner of a mosaic, inserts which:

- are firmly bonded to the surrounding material;
- have well defined marginal edges or contours;
- have a shape which can be chosen at will; and
- can be of any colour.

In addition, the front of the insert can be worked with reliefs or recesses if the active surface of said at least one core has a corresponding decorative motif which is respectively recessed or in relief.

These are just some examples of the possibilities offered by the invention, as will be apparent to the expert of the art.

Means are also provided for feeding the upper die with the material which is to temporarily fill the lower end of the aperture containing said at least one core, said means either being able to move independently relative to the ceramic mold, or being positioned on the trolley which loads the cavity of the die-plate.

The features and constructional merits of the invention will be apparent from the detailed description given hereinafter with reference to the figures of the accompanying drawings, which show a preferred embodiment thereof by way of non-limiting example.

Figure 1 is a partly sectional elevation showing the invention in the open position.

Figure 2 represents part of the preceding figure, showing the invention on termination of loading.

Figure 3 is a partial view to an enlarged scale taken in the direction III of Figure 3.

Figure 4 is a section on the line IV-IV of Figure 3, showing a die with a metal active surface.

Figure 5 is a view similar to the preceding, showing a die with its active surface lined with vulcanized rubber.

Said figures, and in particular Figure 1, show the mold intermediate plate 1 or die-plate, comprising at least one forming cavity 2, which can be of right-angled shape in plan view, or not.

Said die-plate 2 is supported by a perimetral series of damper devices 3, for example of hydraulic type and four in number, of which only one is visible in the figure.

The dampers 3 are positioned on the bed of a usual ceramic press (not shown), the same bed supporting the mold lower plate (not shown) by way of devices for adjusting its height.

Said lower plate is provided upperly with a block 4, on which the is fixed a "reverse-face" die, ie for forming the laying face of the tile 6.

The active (upper) face of the die 5 can be of metal or vulcanized rubber, the die 5 being fixed to the block by any known system.

Said die 5 will be further considered hereinafter.

To the side of the die-plate 1 (to the left in Figure 1) there is a horizontal table 7 located at the level of the die-plate when in its raised position.

With said table 7 there is associated a usual trolley 77 for loading at least one ceramic material, such as atomized clay 66 (see Figure 2), into the cavity 2.

Said trolley 77 comprises a loader 70 of the type consisting of a series of horizontal slats positioned transversely to the trolley travel direction (from left to right and vice versa), a forward scraper 71 for levelling the clay 66 (see Figure 2) deposited into the cavity 2 and for cleaning the upper face of the die-plate 1, and a pusher 72 for removing the formed tile 6.

According to a preferred but not exclusive embodiment, between said scraper 71 and pusher 72 there is a loading device, which will be described hereinafter.

It should be noted that a loader separate from the said loader 70 can be associated with the trolley 77 to deposit a different pulverulent material on the clay loaded by the loader 70.

In Figure 1 the reference numeral 9 indicates the ceramic mold upper plate, which is supported by the overlying vertically mobile cross-member 10 of the ceramic press. The plate 9 is slidingly mounted on a perimetral series of vertical cylindrical bars 12, of which only one is visible in the figure, these being fixed at their upper end to the cross-member 10, whereas at their lower end they support a counter die-plate 11.

This latter has a forming cavity 22 vertically aligned with the cavity 2 of the die-plate 1 and

defined by an underlying metal frame 111 which rests against the die-plate 1 during pressing.

Into said cavity 22 there is slidingly inserted, from above, an "exposed-face" die 55, ie for forming the exposed-face of the tile 6, its active (lower) surface being either of metal or of vulcanized rubber.

The die 55 is fixed to an overlying block 44 by electromagnetic means 40, said block 44 being fixed to the plate 9.

As can be seen, this latter is supported by the cross-member 10 via a perimetral series of pistons 13, of which only one is visible in the figure.

The piston 13 is slidingly received, under sealed conditions, in a cup-shaped body with a holed base, which is housed in a respective lower recess in the cross-member 10.

The plate 9 is fixed to the rod 130 of the piston 13, which lies between a lower chamber 14 and an upper chamber 15.

The upper chamber 15 is connected via a duct 150, and by way of suitable valve means (not shown), to a pressurized hydraulic liquid source, such as the hydraulic circuit of the press.

The lower chamber 14 is directly connected via a respective duct 140 to the base of a pressurized hydraulic vessel (not shown) in which the pressure is maintained by an atmosphere of inert gas.

It should be noted that instead of said pistons 13, control devices can be provided conforming to Italian Patent Application No. RE 92 A 000009 filed in the name of the present Applicant.

It should also be noted that devices conforming to Italian Patent Application No. 46871 A/89 in the name of the present Applicant can also be associated with said pistons. The function of the pistons 13 and the two types of devices conforming to said patent applications is to decelerate or brake the rearward travel of the dies 55 for the reasons which will be apparent hereinafter.

According to the invention, the upper die 55 is provided with at least one perpendicular through aperture 80 which slidingly receives a core 81.

In the illustrated example, best seen in Figure 3, said core 81 has a circular cross-section, however this cross-section can vary both in shape and size.

In said core 81 there is a longitudinal blind hole 82, from the base of which there extends a series of equidistant radial holes 83, four in number in the illustrated example (see Figures 3, 4 and 5), which open into the outer lateral surface of the core 81.

That part of the core 81 lying above (with reference to Figures 1, 2) said holes 83 is inserted into said aperture 80 as a fairly precise fit, possibly with a gasket therebetween, whereas the lower part of the core 81 has a diameter (or transverse dimensions) slightly less than the overlying part.

In this manner, between the lower end of the core 81 and the respective aperture 80 there is a small perimetral gap 84 which in Figures 3 and 4 has been exaggerated for clarity.

The width of said gap 84 can vary from 0.04 to 0.4 mm, this width depending strictly on the characteristics, and in particular the particle size, of the pulverulent materials used in tile manufacture.

As can be seen in Figure 1, said core 81 is fixed to the cross-member 10 by a hollow screw 85 which at one end communicates with the hole 82 and at its other end is connected to a pipe 16.

This latter is connected via a filter 17 and solenoid valve 18 to a vessel 19 with which a vacuum pump 20 is associated.

A loading device, not shown in the figure, is also provided, which is able to slide relative to the mold such as to occupy a rest position to the side of this latter (to the right in Figure 1), and a working position in which it lies between the die-plate 1 and the counter die-plate 11, at a short distance from this latter.

Said device can be a trolley provided with a loader able to feed into the free part of the aperture 80 a suitable material, such as clay 88 (see Figure 2) having a different colour from the material 66 to be deposited in the cavity 2, or clay mixed with powdered ceramic glaze.

In a preferred embodiment, said service loader is associated with a clay trolley 77 as shown in Figure 1.

The loader consists of a relatively narrow, upperly open container comprising a flat horizontal base 21, a lateral surface defined by a bellows 23, and an annular upper frame 24 the front and rear edges of which are suitably bevelled.

The frame 24 is supported by the trolley 77 by way of two cam devices 26, of which only one is shown in the figure, said base 21 being connected to the frame 24 by at least one cylinder-piston unit 25.

At the mouth of the frame 24 there is a probe 27 or the like, an elastic blade 28 also being associated with the frame 24.

Suitable adjustment means are also provided to select the extent of vacuum in the vessel 19 on the basis of the type of material contained in the loader 23.

The described mold operates in the following manner.

On termination of a pressing, the active face of the die 5 is moved to the level of the upper face of the die-plate 1 (see Figure 1), where it supports the tile 6, the cross-member 10 is raised, and the upper die 55 is positioned practically flush with the lower face of the frame 111.

This position of the die 55 corresponds to the expulsion of the tile 6 from the cavity 22.

With this mold configuration, the active surface of the die 55 projects beyond that of the core 81 by a distance of practically 0.5 s, where s is the thickness of clay (or other material) to be loaded into the cavity 2.

At this point the trolley 77 is enabled to advance, by which the pusher 72 removes the tile 6 which has just been formed, then the die 5 is lowered into the loading position shown in Figure 2, in which its active surface is spaced from the upper face of the die-plate 1 by a distance s.

Just before the frame 24 (Figure 1) reaches the mouth of the aperture 80, the cams 26 (or the like) are enabled, for example by an electromagnetic proximity switch or the like, to raise the frame 24 practically to the level of the active surface of the die 55.

Virtually at the same time, the cylinder-piston unit 25 (or the like) raises the base 21 and hence also the overlying clay (or other material), the cylinder-piston unit 25 then halting under the control of the probe 27.

Simultaneously the solenoid valve 18 opens and the vacuum present in the vessel 19, for example of the order of - 0.5 bar, propagates into the free (lower) part of the aperture 80.

In this manner said free part is filled with clay 88 (or other material, see Figure 2), which is levelled by the blade 28. In addition, during this (outward) travel of the trolley 77, the cavity 2 is filled with clay (or other material).

After this the trolley 77 withdraws to return to the position of Figure 1, and at the same time the clay 66 is level led by the scraper 71, the cams 26 and possibly the cylinder-piston unit 25 operating in the reverse manner to that stated.

If necessary, a convenient hopper, not shown, now reloads the container 21, 23.

It should be noted that said double loading (Figure 2) takes place substantially in the same manner if the loader feeding the upper die 55 moves independently of the loader 70 feeding the die-plate 1.

In such a case, the loader 70 operates first, seeing that the previously formed tile 6 has to be removed, after which the other loader (not shown) operates.

On termination of said double loading, the (lower) plate (not shown) which supports the die 5 is lowered to rest on the press bed, after which pressing commences.

During pressing:

- the die 55 and counter die-plate 11 (see Figure 1) are lowered by the cross-member 10;
- with a slight delay the ducts 150 of the chambers 15 are connected to discharge;
- the frame (111) (in lowering) then urges the die-plate 1 downwards, so that the clay 66 is practically completely transferred from the cavity 2 to the cavity 22;
- simultaneously with said transfer the die 55 moves rearwards to progressively insert into the clay 66 that clay 88 (or other material) which is lying against the overlying core 81;
- just before termination of pressing, the vacuum along the ducting 82, 83 and 84 is broken;
- finally the system is repositioned as previously (see Figure 1), to commence a new cycle, which is repeated identically.

In the aforesaid manner, and according to the teachings of the invention, unusual materials of high quality are obtained.

With this aforedescribed method, on termination of pressing, the tile 6 comprises (at least) one insert 8 (Figure 1) firmly bonded to the surrounding material, to form part of the exposed-face of the tile.

More specifically, said insert 8 is virtually "set" into the surrounding material in that its exposed perimetral edge is sharply separated or distinct from this latter, as has been found by tests carried out with a mold prototype according to the invention.

The same tests have shown that inserts 8 of any form can be obtained, hence achieving aesthetic and/or ornamental effects never before achieved. This is particularly so, if two or more cores 81 identically shaped or not, and/or of different dimensions, are associated with the upper die 55.

In addition, if the respective service trolley is provided with corresponding loaders containing materials of different colour, the same tile can have two or more inserts 8 of different colour, shape and dimensions.

From the aforegoing it is apparent that with a mold of the invention a wide variety of new ceramic products can be obtained.

In addition as, as stated, the exposed perimetral edge of said at least one insert 8 is precisely defined, after firing the tiles 6 can be either used as such or be glazed with transparent glaze, however there is nothing to prevent them undergoing surface grinding (or dressing) to better emphasize the setting of the inserts 8 in the manner of a mosaic. Again, the inserts 8 can be formed with reliefs or recesses, by correspondingly making the active surface of the core 81 recessed or in relief respectively.

At this point it should be noted, as stated, that in the illustrated embodiment the depth of the free part of the aperture 80 (Figure 2) before loading the material 88 is practically equal to one half the

loading depth s of the cavity 2, so that the thickness of the insert "set" into the tile 6 (see Figure 1) is substantially one half the thickness of the tile.

This is however in no way to be considered a limiting factor, in that the insert 8 can have any other thickness than that stated. If desired, the insert can be of practically the same thickness as the formed or pressed tile 6.

In the first case it is sufficient merely to choose the depth of the free part of said aperture 80 before loading the material 88. In the second case special means are required, as described hereinafter with reference to an alternative embodiment.

Again, from said tests it has been found that the vacuum induced in said free part of the aperture 80 via the peripheral gap 84 (Figures 3, 4, 5) is usually sufficient to ensure complete filling of said free part with said material 88.

However in some cases it may happen, for example when the core 81 has a relatively extensive transverse shape in relation to the plan shape of the upper die 55, or if the material has a relatively large particle size, that the vacuum induced via said peripheral gap 84 is insufficient to ensure complete filling of the free part of said aperture 80.

According to the invention, to overcome this, the active (lower) surface of said core 81 is provided with a plurality of mutually communicating small incisions which open into the lateral surface of the core 81, and hence into said gap 84.

If the active surface of the upper die 55 is of metal, said incisions consist of small grooves 840 provided in the active surface of the core 81, and indicated by dashed and dotted lines in Figures 3 and 4. The depth and width of said grooves 840 are of the same order of magnitude as the width of said gap 84.

If the active surface of the die 55 consists of a layer 841 of vulcanized rubber, said incisions are in the form of cuts 842 (see Figure 5) which are flared towards their outer mouth and are transversely inclined to the horizontal. The purpose of said flaring and inclination is to prevent the cuts 842 becoming clogged.

The desired suction effect for drawing the material 88 into the lower part of the aperture 80 can also be achieved by providing the lower end of the core 81 with a series of incisions (similar to the aforedescribed grooves 840 or cuts 842) communicating with the overlying ducting 82-83.

In the case of a completely metal die 55 (Figures 3, 4) said incisions can be formed by placing side by side a series of blocks with their facing sides toothed, so that the spaces between the teeth form the connection between said incisions and said ducting 82-83.

In the case of a die 55 lined with vulcanized rubber 841, see Figure 5, said incisions consist of cuts such as 842, the connection between these and said ducting being achieved via a layer of cloth or other air-permeable textile material to which the rubber is fixed, and via a densely perforated metal sheet interposed between said cloth and said ducting 82-83.

In addition, as stated heretofore and in accordance with an advantageous improvement of the invention, with the lower die 5 there is also associated a core 810 fixed at its end to a pillar 86 supported by the press bed. Although not shown it should be noted that when the mold is in its open position illustrated in Figure 1, the pillar 86 is supported by a pack of cup springs or the like, the pillar being lowerly provided with an enlarged retention head which defines its end-of-travel position.

Said pillar 86 is also provided with a support foot to determine its lower end-of-travel position on termination of pressing, when the active surface of the core 810 is practically flush with that of the die 5.

Said core 810:

- is slidingly received as an exact fit in a through aperture 800 in the lower die 5;
- is vertically aligned with the overlying core 81; and
- has the same plan shape as this latter.

As can be seen in Figure 2, on loading the clay 66 into the cavity 2 the lower core 810 projects beyond the active surface of the die 5 by a distance practically equal to the distance (0.5 s) between the active surface of the die 55 and of the core 81.

In this manner before pressing, there is a layer of pulverulent material of practically constant thickness between the two dies 5 and 55, and after the pressing, the core 810 moves rearwards to a position practically flush with the active surface of the core 5, as stated.

Because of said substantial uniformity in the thickness of the layer of material to be compacted, no internal tensions and/or differential compaction are created, which could occur if the lower core 810 were not provided, and could result in defects in the tile 6 on firing.

The invention is not limited to that illustrated and described, but comprises all technical equivalents of the stated means and their combinations, if implemented within the concept of the following claims.

Claims

1. A ceramic mold for tile formation, of the type comprising a die-plate (1) to be located on a

press bed by way of damper devices (3) and is provided with at least one forming cavity (2), the base of which is defined by a vertically slidable die (5) for forming the laying face of the tiles (6), and a counter die-plate (11) to be fixed below the vertically mobile cross-member (10) of the press and having a cavity (22) into which, on pressing, practically all the material (66) present in the underlying cavity (2) is transferred, the base of said cavity (22) being defined by a die (55) for forming the exposed-face of the tiles (6) and vertically slidable between a lowered position in which it expels the tile (6) from said cavity (22) and a raised position in which it rests against said cross-member (10), characterized in that said die (55) is provided with at least one perpendicular through aperture (80) slidingly receiving a conjugately shaped core (81) which is fixed to said cross-member, and of which the active surface becomes positioned to the rear of the active surface of the die (55) when this is in its lowered position, and flush with it when said die (55) is raised, in the active surface of said at least one core (81) there being provided narrow passages (84) connected to a suction unit (19, 20) which puts said passages under vacuum in order to fill the free part of said at least one aperture (80) with a pulverulent material drawn from a corresponding service loader, and then breaks the vacuum in said passages in order to release said material (88).

2. A mold as claimed in claim 1, characterized in that said narrow passages (84) have a width less than the particle size of the pulverulent materials (88) used for forming the tiles (6).

3. A mold as claimed in the preceding claims, characterized in that said narrow passages (84) consist of a perimetral gap which is provided between the lower end of said at least one core (81) and the respective conjugate aperture and is connected to underlying ducting (82, 83) connected to said suction unit (19, 20).

4. A mold as claimed in the preceding claims, characterized in that said narrow passages comprise a series of small incisions (840; 842) provided in the active surface of said at least one core and opening into said perimetral gap.

5. A mold as claimed in claims 3 and 4, of the type in which the active surface of the upper die (55) is of a particularly hard material such as metal, characterized in that said small incisions (840) are formed by placing side by side a series of coplanar blocks with their facing edges toothed, the spaces between the teeth being directly connected to said ducting (82, 83).

6. A mold as claimed in claims 3 and 4, of the type in which the active surface of the upper die (55) is of a relatively soft material such as vulcanized rubber (841), characterized in that said small incisions (842) consist of cuts which pass through said layer from one side to the other and are flared towards the outside and transversely inclined to the horizontal, between said rubber layer (841) and said ducting (82, 83) there being interposed a layer of woven material and a perforated metal sheet.

7. A mold as claimed in the preceding claims, characterized in that said suction unit comprises a vacuum vessel (19) which at one end is connected to a vacuum pump (20) and at the other end is connected to said ducting via valve means (18) and filtering means (17).

8. A mold as claimed in claim 1, characterized in that the active surface of said at least one core (81) is worked with reliefs or recesses.

9. A mold as claimed in claims 1 and 8, characterized in that vacuum adjustment means are associated with said suction unit (19, 20).

10. A mold as claimed in claim 1, characterized in that said die (5) comprises at least one through perpendicular aperture (800) which is vertically aligned with said at least one through aperture (80) provided in the die (55) and has the same cross-section thereas, and which slidingly receives a core (810) the active surface of which projects beyond the active surface of the lower die (5) when in its loading position by a distance practically equal to the distance between the active surfaces of said upper core (81) and of said upper die (55) when this latter is in its lowered position.

11. A mold as claimed in claims 1 to 10, characterized in that said core (810) is provided lowerly with:

- elastic support means, such as a pack of cup springs, arranged to maintain the core constantly urged upwards;
- a retention element arranged to define the raising end-of-travel position of the core; and
- a resting foot arranged to define the lowering end-of-travel position of said core.

12. Means for loading a ceramic mold claimed in claims 1 to 11, in particular for feeding the aperture (80) of the upper die (55) with a material (88) different from that (66) for filling the lower cavity (2), characterized by comprising at least one container arranged to move between a rest position in which it lies to the side of the mold below the level of the lowered upper die (55), and a position in which it lies below this later and at a short distance therefrom.

13. Means as claimed in claim 12, characterized in that said at least one container consists of an upperly open chamber having a horizontal rigid flat base (21) and a deformable lateral surface (23), such as a bellows, said chamber being provided with means (26; 27) for causing said base to rise in accordance with the level of filling of said chamber.

14. Means as claimed in claims 12 and 13, characterized in that with said at least one container there are associated means (28) for levelling the material (88) drawn into the free part of said at least one aperture (80).

15. Means as claimed in claims 12 to 14, characterized in that said at least one container is situated on the trolley (77) for loading at least one material to be compacted within the cavity or cavities of the die-plate (1).

16. A ceramic press for tile forming, characterized by being equipped with a mold claimed in claims 1 to 11 and with loading means claimed in claims 12 to 15.

17. Ceramic tiles, characterized by being molded by a press claimed in claim 16.

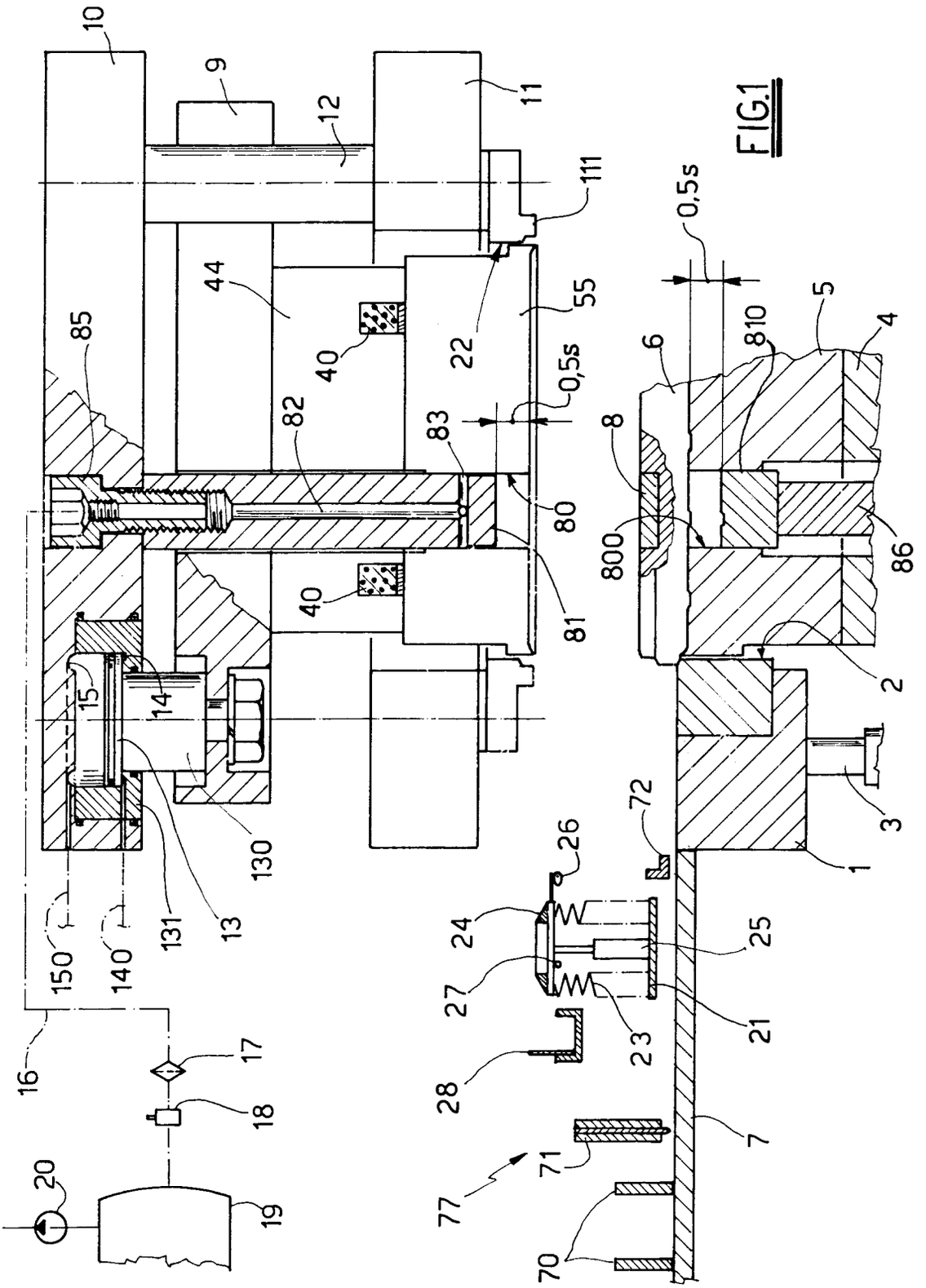
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FIG.1

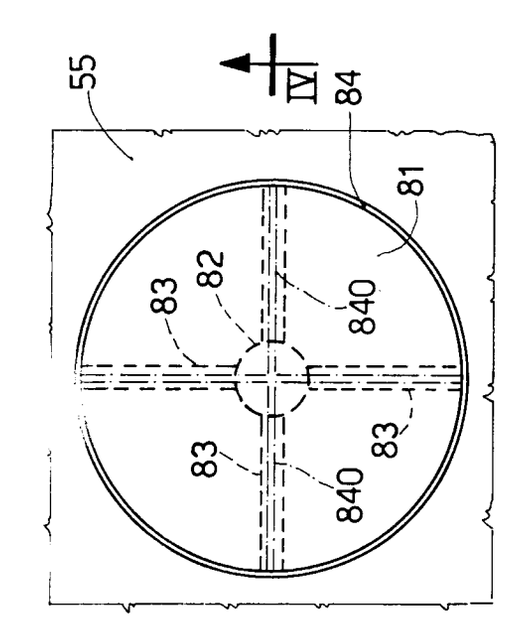

FIG.3

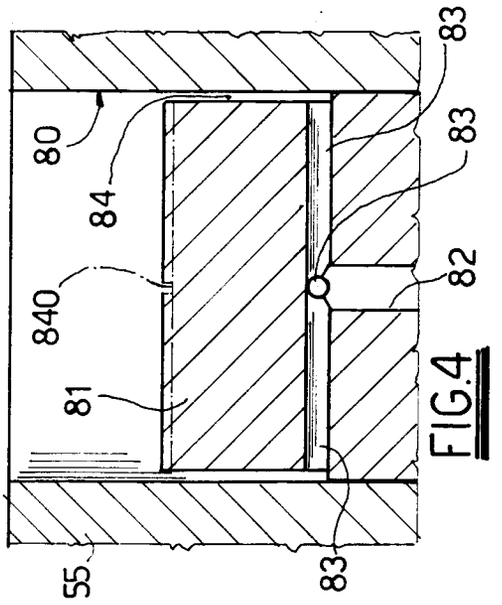

FIG.4

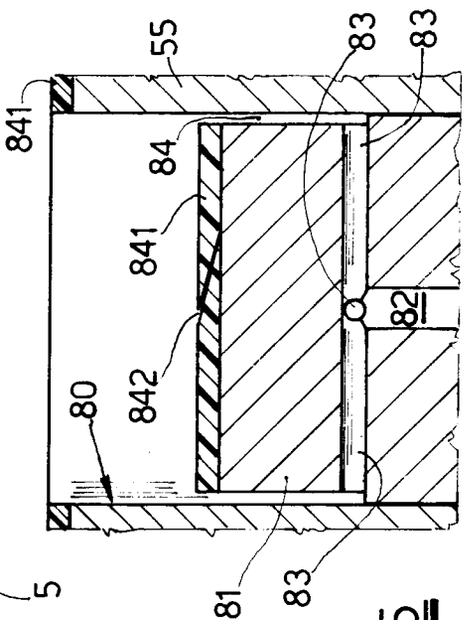

FIG.5

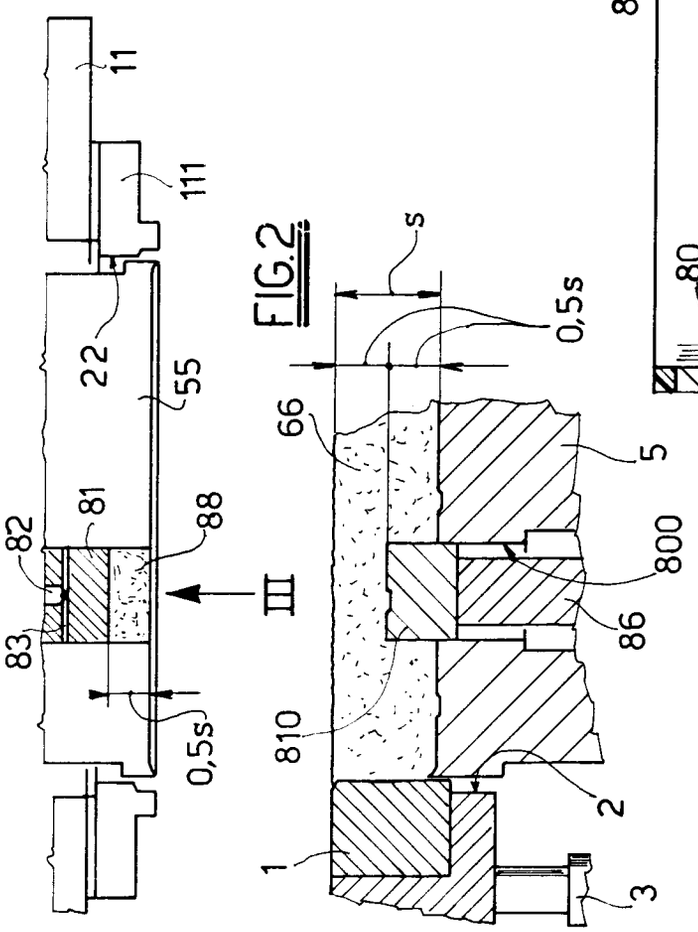

FIG.2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 20 1035

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.5)
A	EP-A-0 414 149 (INAX CORPORATION) * the whole document * ---	1,12,16, 17	B28B13/02 B28B3/02
A	DE-B-1 202 465 (AGROB A. G. FÜR GROB- UND FEINKERAMIK) * the whole document * ---	1,12,16, 17	
A	DE-A-2 513 072 (LONGINOTTI S.P.A.) * the whole document * ---	1,12,16, 17	
A	GB-A-2 148 782 (HUTSCHENREUTHER AG) * page 3, line 3 - page 3, line 55; figure 1 * -----	1,10,12	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B28B
B30B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 JULY 1993	GOURIER P.A.

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