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(54) **Tile press equipped with improved charging device**

(57) Tile pressing press comprising a pressing mold into which a charging device (14,114) dumps powder to be pressed. The charging device (14,114) comprises in turn a charging box (18,118) having a bottom (37,137) opening on command and running between a charging position outside the press and a position for dumping into the mold within the press. The box in its charging

position is near means (15,16,17,115,116,117) of input therein of powder to be pressed and the box bottom in its dumping position is opened to dump the powder into the mold. In one embodiment the box bottom is made with a plurality of parallel plates (37) rotting on command between a smooth closed position and an inclined dumping position. In another embodiment the opening bottom is made with a running gate (137).

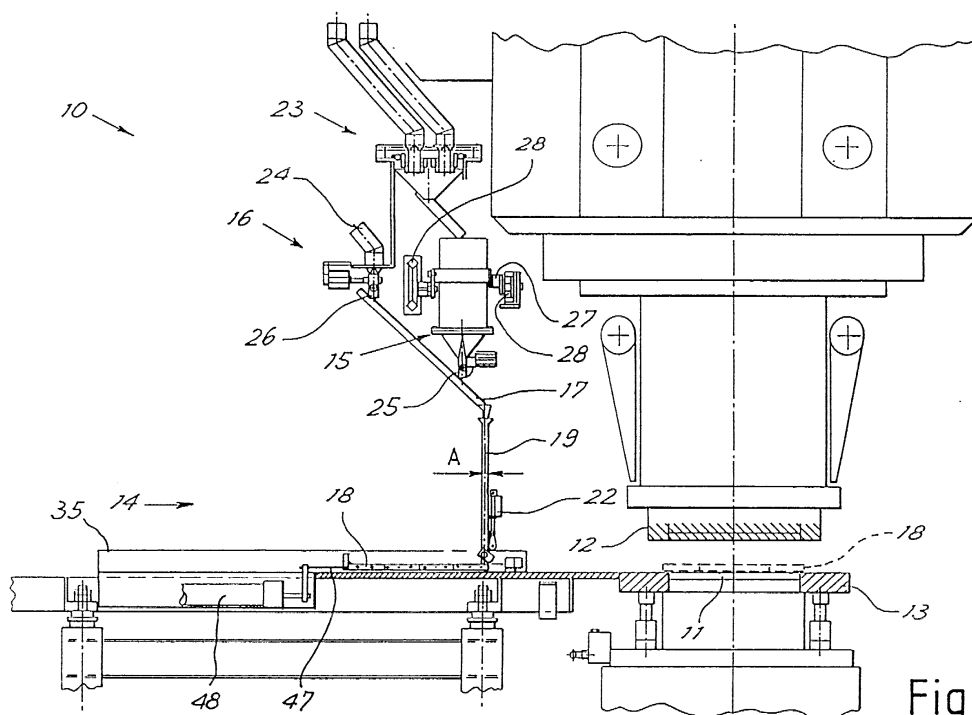


Fig. 1

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Description

[0001] The present invention relates to a press for tile pressing molds having an innovative charging device and in particular for producing colored streaks or veins in the mass.

[0002] In tile production the problem of producing streaks in the mass e.g. to simulate the form and distribution of streaks found in natural stone is known. In the prior art various devices for depositing powder in the pressing mold have been proposed.

[0003] A widely used system comprises a box with dimensions similar to the cavity in the mold to be filled. The box is open at the bottom, has rods for entrainment of the powders to be pressed and runs on a plane from a charging position outside the mold to a dumping position vertically above the mold. The mold has the bottom of the cavity formed by the movable lower plug. When the plug is in the upper position it is level with the running plane of the box so that the box remains closed below, first running on the plane and then running on the plug. Once the full box arrives above the plug the plug is lowered to form the cavity and cause dumping of the powder from the box into the cavity.

[0004] This manner of proceeding has been found to have various disadvantages especially when pressing tiles with color variations in the mass.

[0005] For the production of tiles with color variations in the mass various box filling systems have been proposed seeking to secure the desired effects.

[0006] For example, in Italian patent application No. M199A00719 a press was proposed in which the charging device comprises a vertical accumulation well into which powder is appropriately fed for producing the mass of the tile and powder for production of the streaks in the mass. On command the accumulation well dumps from below into the box arranged beneath it during a traversing movement of the box in relation to the accumulation well. The box thus filled is moved over the mold to dump the powder into the mold.

[0007] If differently colored powders are used in the same mold the remixing performed by known box dumping systems has been found unacceptable.

[0008] The general purpose of the present invention is to make available an improved device for charging a pressing mold in the press and in particular for production of tiles with different colors in the mass.

[0009] In view of this purpose it was sought to provide in accordance with the present invention a tile pressing press comprising a pressing mold into which a charging device dumps powder to be pressed with the charging device comprising a charging box having a bottom opening on command and running between a charging position outside the press and a position for dumping into the mold with the press with the box in its charging position being near means of input therein of powders to be pressed and in its dumping position the box bottom being operated to open and dump the powder into the

mold.

[0010] To clarify the explanation of the innovative principles of the present invention and its advantages compared with the prior art there is described below with the aid of the annexed drawings a possible embodiment thereof by way of non-limiting example applying said principles. In the drawings:

FIG 1 shows a diagrammatic view of a side elevation of a device in accordance with the present invention for charging a tile press,

FIG 2 shows a plan view of a detail of the filling box of the device of FIG 1,

FIG 3 shows a partial cross section view along plane of cut III-III of FIG 2,

FIG 4 shows a cross section view along plane of cut IV-IV of FIG 2 with rotating members arranged in another position than that shown in FIGS 2 and 3, and

FIG 5 shows a diagrammatic view similar to that of FIG 1 of a second embodiment of a device in accordance with the present invention.

With reference to the FIGS a tile pressing press designated as a whole by reference number 10 comprises a pressing mold 11 arranged between press plates 12, 13. A box charging device 14 comprises a charging box 18 running between a first charging position (shown in solid lines in FIG 1) outside the press plates and a second position (shown in broken lines) for dumping into the mold. The box 18 is mounted on a powered carriage 35 moving on command between the two positions by known means not shown because readily imaginable to those skilled in the art.

[0011] The charging device comprises a main hopper 15 into which is fed the powder for producing the tile mass and at least one secondary hopper 16 into which is fed powder for producing the streaks or veins in the mass. The main hopper and the secondary hopper receive powders from feed units and ducts 23, 24 respectively.

[0012] The main hopper 15 and the secondary hopper 16 dump on command (e.g. by means of powered drop gates 25, 26) on a chute 17 for starting the powder toward the underlying box. The main hopper 15 and the secondary hopper 16 traverse transversely along the chute 17 by means of a powered carriage 27 running on guides 28 to distribute the powder dumped on the chute. The dumping from the hoppers takes place in different quantities and at different intervals depending on the specific aesthetic effect it is desired to obtain.

[0013] Between the chute and the box is arranged an intermediate accumulation well 19 extending vertically and having a lower mouth opened on command by means of an actuator 22. The well 19 receives the powder dumped from the chute above and dumps it on command below into the box arranged beneath it during the movement of the box from its rest position to its position

of dumping into the mold.

[0014] The accumulation well 19 is generally in parallelepiped form with its dimension A in the direction of movement of the box virtually near the internal height of the box and transversal width virtually near the transversal internal width of the box. In this manner the accumulation well once filled dumps the exact quantity of powders necessary for correct filling of the box 18.

[0015] FIG 2 shows in greater detail the structure of the box 18.

[0016] The box comprises an outer peripheral frame or rim 36 which defines the vertical walls of the parallelepiped. Opposing side walls support a plurality of rectangular thin plates 37 supported in a rotating manner along parallel axes 38. As may be seen in FIG 3 the thin plates 37 are sized to be superimposed slightly when in horizontal position so as to provide a closed bottom for the box. The pivot axis 38 of each thin plate is virtually coincident with one edge of the thin plate.

[0017] Advantageously the frame 36 supports an internal rim 39, 40 to prevent the powder deposited in the box from leaking to the side beyond the thin plates when the latter are in closed position.

[0018] As may be seen in FIG 3 also each thin plate has one of the supporting pins 41 fitted with a crank 42 engaging in a pin 43 protruding from an operating bar 44 supported by supports 45, 46 to run parallel to the side of the external frame 36 upon command of a rod 47 moved by an actuator 48 supported by the carriage 35. As an alternative the movement can be secured in another manner e.g. with a known rack and pinion system.

[0019] In this manner the box bottom can be opened in the manner of a Venetian blind with all the thin plates 37 rotating synchronously downward to move into an inclined position (advantageously vertical as shown in FIG 4) when the actuator 48 is operated to move the operating bar leftward as shown in the figures.

[0020] During use, powder charging takes place first with charging into the vertical well 19 of appropriate powders coming from the hoppers. Once the well is charged the gate beneath it is opened by operating the actuator 22 to dump along the horizontal box 18 (with bottom Venetian blind) which simultaneously traverses under the well to move into the position of dumping into the mold. The box is thus filled with distribution prearranged in the vertical well during charging.

[0021] After charging, the box terminates its travel to the dumping position. When the box is in position for dumping into the press the actuator 48 is operated to open the Venetian blind bottom and dump the powders into the mold below.

[0022] The carriage 35 can then return to its starting position as shown in FIG 1 and the press can be operated for tile pressing. The cycle can then start over from the beginning.

[0023] Advantageously beneath the thin dumping plates a shaped metal sheet 51 (FIG 3) through which

the powder falls can be provided to improve its distribution and prevent forming of aesthetically unacceptable streaks.

[0024] FIG 5 shows an alternative embodiment of a device in accordance with the present invention. In the alternative embodiment, members similar to those of the embodiment of FIG 1 are designated by the same numbers multiplied by one hundred. There is thus a press with mold 111 between the press plates 112, 113 and a box charging device 114 comprising a charging box 118 mounted on a powered carriage 135 to run between a charging position outside the press plates and a position for dumping into the mold.

[0025] The charging device comprises hoppers 115, 116 mounted on a carriage 27 running on guides 128 and receiving the respective powders from feed units and ducts 123, 124 and dumping them on command onto a chute 117 for starting the powders toward an accumulation well 119 which extends vertically and has a lower mouth which can be opened on command by means of an actuator 122. The well 119 receives the powder dumped from above by the chute and distributes it into the box during movement of the box from its rest position to its position of dumping into the mold.

[0026] Up to this point the structure is the same as that of the foregoing embodiment.

[0027] Differently from the above embodiment the box 118 is closed below by a gate 137 connected by a connection 147 to an actuator 148.

[0028] In use the lower gate is initially closed as shown in FIG 5. During the charging movement the box receives the powders from the well 119 and moves above the mold to the position shown in broken lines in FIG 5. At this point the lower gate opens to perform the dumping into the mold. In this manner the dumping takes place with the box stopped vertically over the mold. This prevents the remixing of the prior art.

[0029] To prevent the gate opening movement from entraining the powder towards the back of the box with reference to the direction of entry of the box into the press it is advantageous to use another gate 149 arranged to run over the box to close it on command of an actuator 150 to define a space between the gates for containing the powders. With this second gate the top of the box is closed after filling with powder and before opening of the lower gate. Thus when the lower gate is opened for dumping, entrainment of the powder toward the back of the mold is prevented.

[0030] It is now clear that the predetermined purposes have been achieved. It has been found that charging performed with the device in accordance with the present invention provides satisfactory powder distribution.

[0031] Naturally the above description of an embodiment applying the innovative principles of the present invention is given by way of non-limiting example of said principles within the scope of the exclusive right claimed her. For example the charging device could be multiple

to serve pressing molds with multiple imprints as readily imaginable to those skilled in the art. In addition the chargers could be two on opposite sides of the mold so as to allow alternating operation of charging and dumping and thus reduce cycle times. Lastly, the movement between box and charging well is to be understood as reciprocal movement of one member relative to the other. To optimize cycle time it can also be provided that the charging well 19 be powered to run in the direction opposite that of the movement of the box toward the mold.

Claims

1. Tile pressing press comprising a pressing mold into which a charging device (14,114) dumps powder to be pressed with the charging device (14,114) comprising a charging box (18) having a bottom (37,137) opening on command and running between a charging position outside the press and a position within the press for dumping into the mold with the press with the box in its charging position being near means (15,16,17,115,116,117) of input therein of powder to be pressed and the box bottom in its dumping position being opened to dump the powder into the mold.
2. Press in accordance with claim 1 characterized in that the box bottom is made with a plurality of parallel thin plates (37) rotating on command between a flat closed position and an inclined dumping position.
3. Press in accordance with claim 2 characterized in that each thin plate (37) is pivoted along an axis (38) virtually coinciding with an edge of the thin plate by means of a pair of end pivots (41) supported on a side frame (36) of the box with one pivot of the pair bearing a crank (42) for rotation of the thin plate around said axis with all the cranks (42) engaging in a rod (44) arranged near one side of the box and running on command to move between a position with the thin plates in the smooth closed position of the box bottom and a position with the thin plates in the inclined position for opening of the box bottom.
4. Press in accordance with claim 1 characterized in that the box has a powered gate (149) running on command parallel to and above the box bottom for closing the top opening of the box.
5. Press in accordance with claim 1 characterized in that the powder inlet means comprise a vertical accumulation well (19,119) into which powder is fed to produce the tile mass and powder for forming the veins in the mass with the well (19,119) dumping from the bottom on command into the box arranged

thereunder during traversing of the box relative to the well.

6. Press in accordance with claim 5 characterized in that the powder input means comprise a chute (17,117) on which they dump powders on command from the hoppers (15,17,115,117) with said chute in turn dumping into said accumulation well (19,119).
7. Press in accordance with claim 1 characterized in that the box bottom is provided with a gate (137) running on command.
8. Press in accordance with claim 1 characterized in that beneath the openable bottom there is a shaped sheet metal member (51) through which the powder falls.

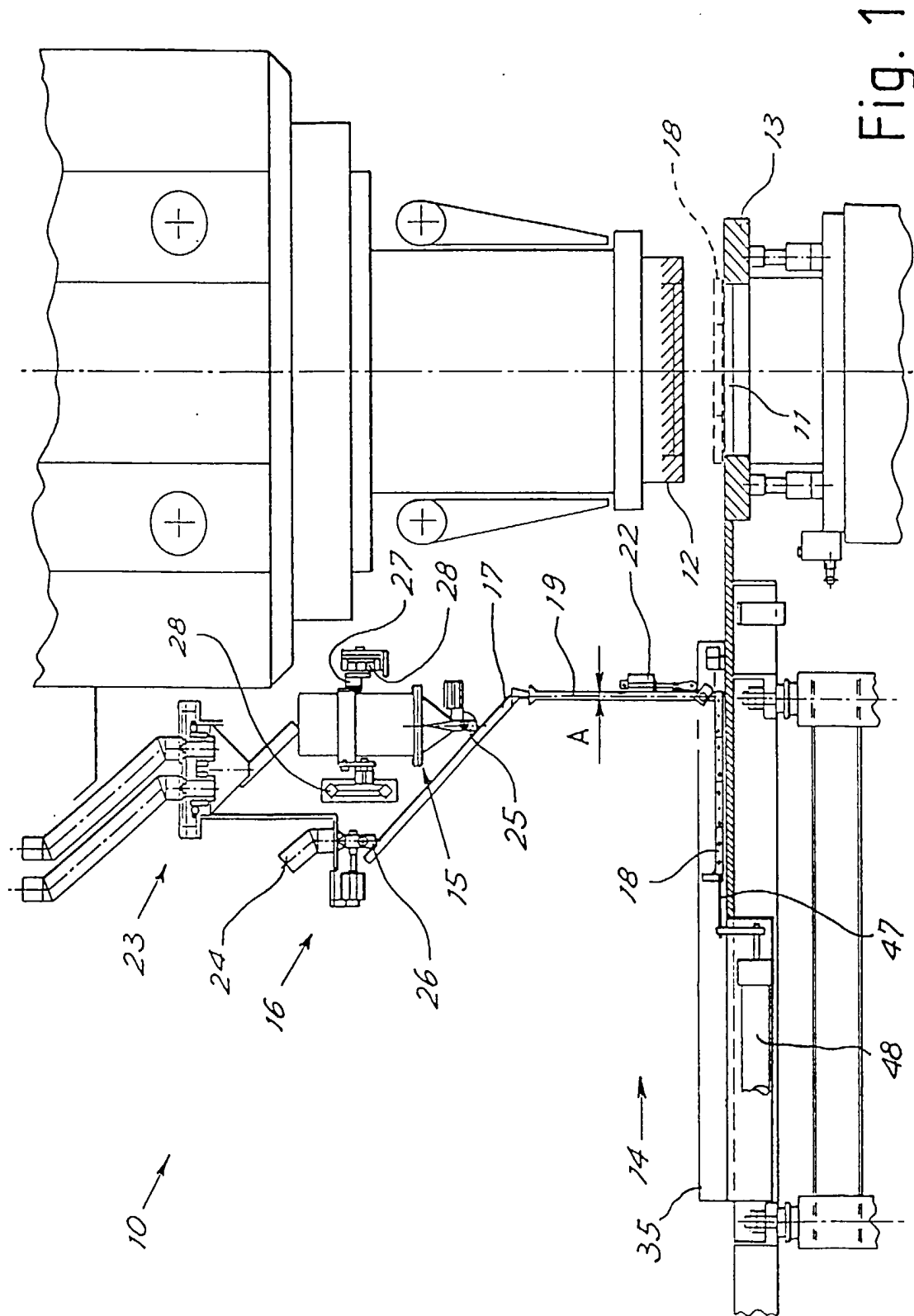
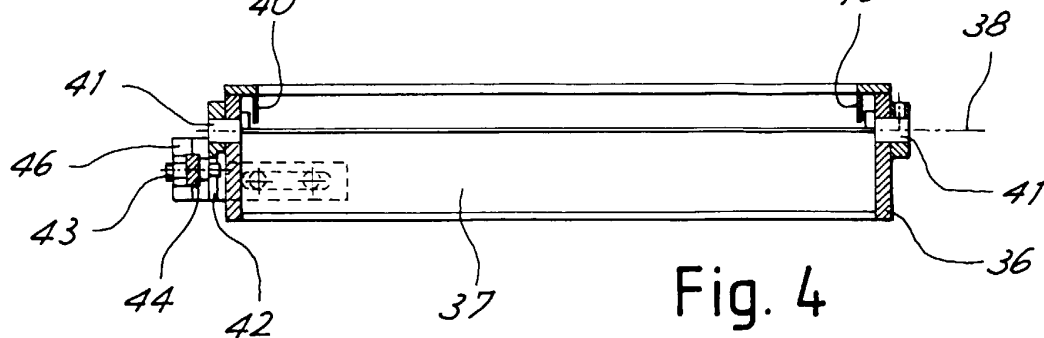
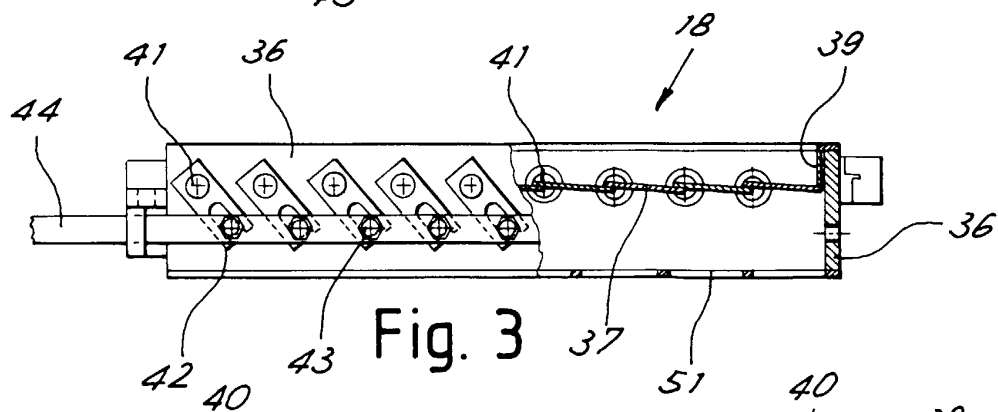
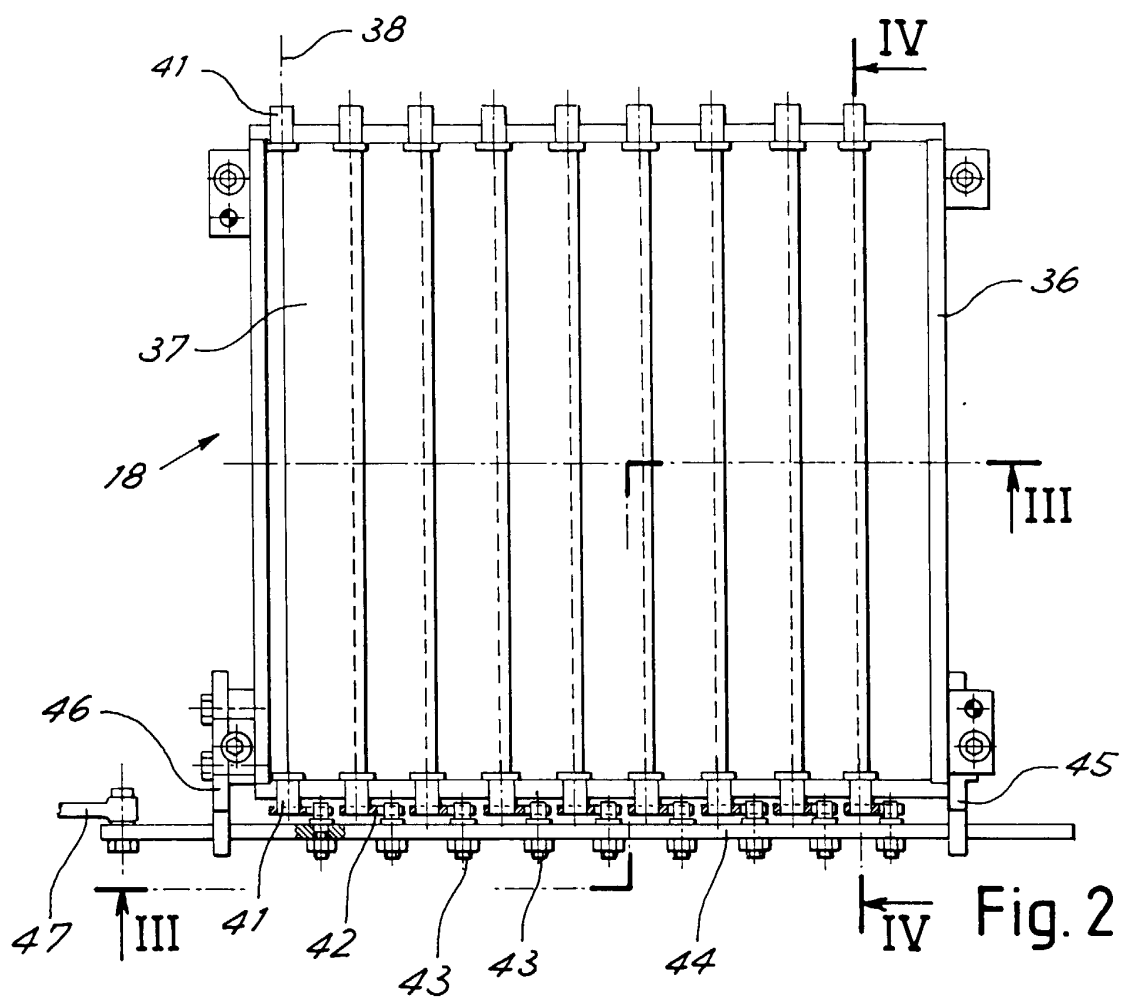


Fig. 1



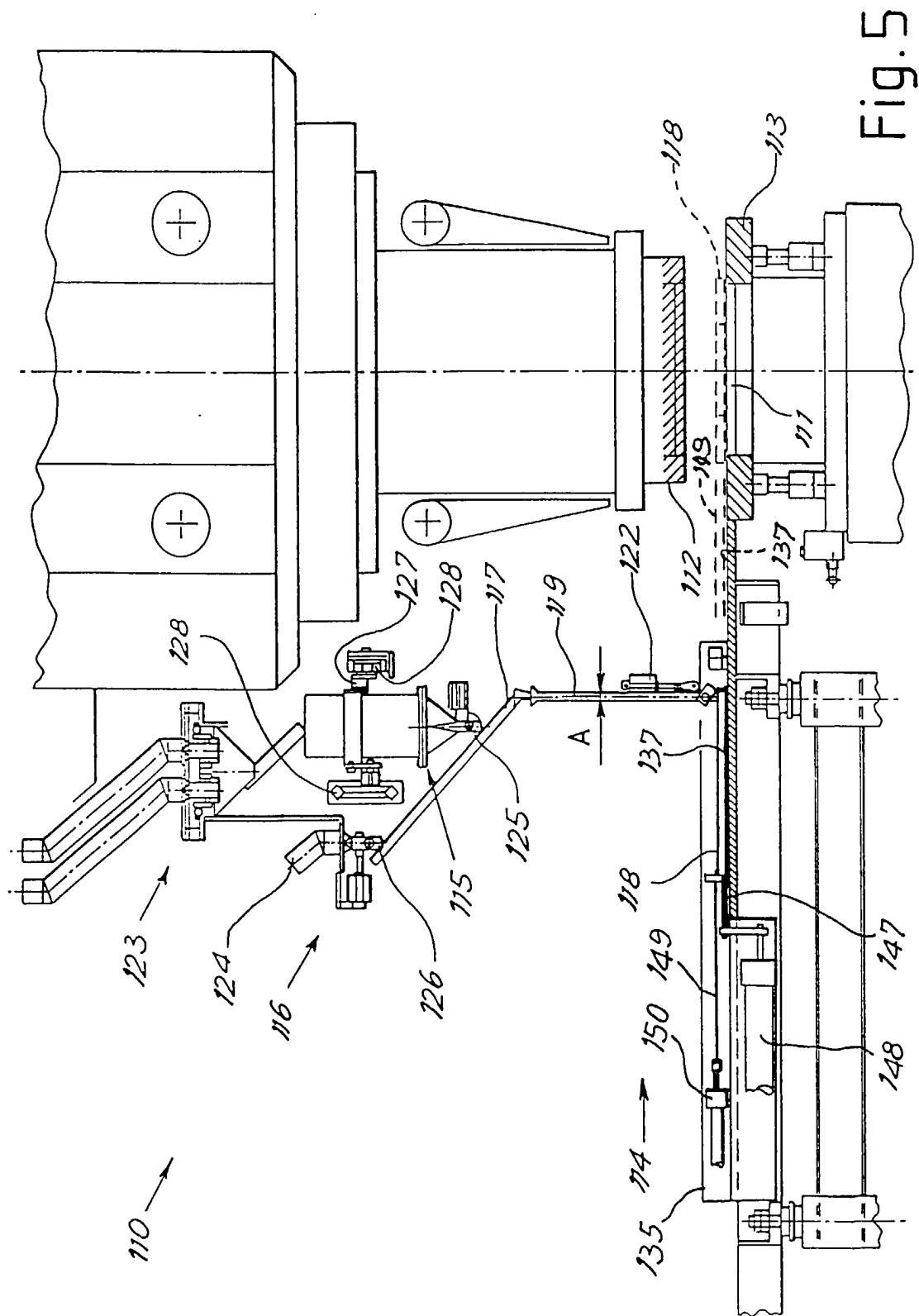


Fig. 5