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(54) Device with improved mould cavity, and container part provided therewith

(57) The invention relates to a device, comprising:
- a mould container part (52) with at least one mould container (54) for forming therein a green brick from clay;
- an ejecting device (60) for pressing out of the mould container (54) the green brick to be formed in the mould container (54), the ejecting device (60) comprising:
- an ejector base (58);
- an ejector shaft (62) which is connected to the ejector base (58) with a first outer end and is provided with a stop (76) at a second outer end;
- tensioning means (68) which are arranged around the ejector shaft (62) and which can be engaged with the stop (76); and
- wherein the mould container (54) comprises upright walls (56) which form a mould cavity, and wherein a plate (98) can be arranged against an upright wall in the mould cavity.

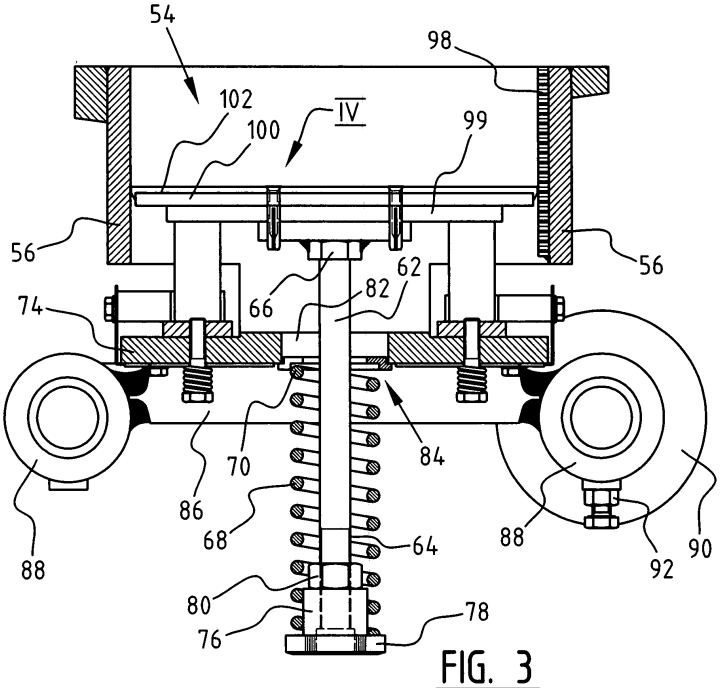

FIG. 3

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Description

[0001] The present invention relates to a device and an improved mould cavity, and to a mould container part provided therewith.

[0002] In so-called mould container presses, to which the present invention relates, deformable clay is pressed in mould containers (usually covered with sand). The green brick formed in the mould container is then released in order to be dried and fired. Such a mould container press comprises a chain conveyor which is assembled from a large number of mutually connected mould container parts. Each mould container part generally comprises a plurality of mould containers in which the green bricks are formed.

[0003] It may be necessary to adjust the internal volume of the mould containers in order to implement corrections in the brick size, as is for instance necessary if the clay displays varying shrinking behaviour during drying and firing. Such adjustments are very labour-intensive and for instance comprise of welding or adhering plates in the mould containers, and even extend to replacing an entire mould container part.

[0004] A mould container press with 24 mould containers per mould container part, which comprises a total of 50 mould container parts, has a total of no less than 1200 mould containers. Modification of all these mould containers is very labour-intensive, whereby the mould container press cannot be employed for the production of bricks for a considerable length of time.

[0005] In addition, the ejector bases of the ejectors are usually provided with insert plates which must be replaced regularly. Due to the repeated exposure to hot and moist clay and under the compression forces of the mould container press the screws with which the insert plates are attached to a mother plate of the ejector have a tendency to become rust-bound. Replacement of an insert plate in practice often involves time-consuming operations such as drilling out an old screw and tapping a new screw thread before a new screw can be applied for the purpose of fastening a new insert plate.

[0006] An object of the present invention is to provide a device with an ejecting device and methods therefor which is improved relative to the prior art and wherein at least one of the above stated problems is obviated.

[0007] Said object is achieved with the device according to the present invention, comprising:

- a mould container part with at least one mould container for forming therein a green brick from clay; and
- wherein the mould container comprises upright walls which form a mould cavity, and wherein a plate can be arranged against an upright wall in the mould cavity.

[0008] The mould container comprises upright walls which form a mould cavity, and a plate can be arranged against an upright wall in the mould cavity. By arranging the plate against a wall in the internal volume of the mould cavity the internal volume of the mould cavity can be adapted in order to implement corrections in the brick size, as is necessary for instance if the clay displays varying shrinking behaviour during drying and firing. Because the dimensions of the green brick can be corrected according to the invention by simply replacing a plate, it is possible to reduce the period of time for which the mould container press cannot be utilized for manufacturing bricks as a consequence of operations for adjusting the size of the mould container.

[0009] According to a preferred embodiment, the device further comprises:

- an ejecting device for pressing out of the mould container the green brick to be formed in the mould container, the ejecting device comprising:
  - an ejector base;
  - an ejector shaft which is connected to the ejector base with a first outer end and is provided with a stop at a second outer end; and
  - tensioning means which are arranged around the ejector shaft and which can be engaged with the stop.

[0010] According to a further preferred embodiment, the mould container part comprises an opening through which it is possible to displace the ejecting device with its shaft having tensioning means arranged therearound and stop, and an intermediate member can be arranged and removed between the tensioning means and the opening in the mould container part.

[0011] Because according to the invention an assembled ejecting device can be displaced through the opening in the mould container part, this ejecting device can already be preassembled elsewhere. According to the invention the period of time for which the mould container press cannot be utilized for manufacturing bricks as a result of repair or replacement operations on the ejecting devices is reduced.

[0012] In a preferred embodiment the intermediate member is adapted, in the situation arranged between the tensioning means and the opening, to function as stop for the at least slightly biased tensioning means.

[0013] In a further preferred embodiment the intermediate member is a spring washer with a recess, whereby the intermediate member can be arranged round the ejector shaft after the tensioning means and the stop have been arranged. It is hereby possible to apply a preassembled ejecting device.

[0014] In a preferred embodiment the ejector shaft is connected in fixed manner to the ejector base, this having the advantage that according to the invention a welded connection can now be applied instead of a connection with screw thread. Such a welded connection is robust, and the step of assembling shaft and bottom plate is unnecessary, which results in time-saving during replace-

ment.

[0015] It is noted, perhaps unnecessarily, that 'connected in fixed manner' is understood to mean that the connection is 'non-releasable', or that the connection can be released only in a destructive manner, such as for instance with a saw or flame cutter.

[0016] In a further preferred embodiment the ejector shaft is provided with a screw thread at least on its outer end remote from the ejector base.

[0017] In a further preferred embodiment the ejector shaft comprises a bolt which is attached in fixed manner to the ejector base with a head end of the bolt, for instance by means of a weld connection.

[0018] In yet another preferred embodiment the tensioning means comprise a compression spring which is arranged around the ejector shaft and which pulls the ejector base downward in the mould container until the ejector shaft is displaced for pressing out of the mould container a green brick formed therein.

[0019] In yet another preferred embodiment the stop comprises at least a nut arranged on the screw thread. This nut, which is for instance a cap nut, can be displaced over the screw thread to a position in which the tensioning means have a desired bias.

[0020] In a further preferred embodiment the position of the cap nut can be secured with a lock nut.

[0021] In a further preferred embodiment an insert plate is arranged on the ejector base, which plate is connected to the ejector base with a plug and screw connection, this further reducing the period of time for which the mould container press is unavailable for the production of bricks. When an old insert plate is replaced, only the screw need be removed from the old plug and a new plug optionally arranged. This takes considerably less time than retapping a screw thread, which has been found to be regularly necessary in practice because the screws tended to become rust-bound due to the repeated exposure to hot and moist clay and under the compression forces of the mould container press. Such rust-bound screws had to be drilled out in order to remove an old insert plate.

[0022] In yet another preferred embodiment the insert plate is a rubber plate. Such rubber plates are flexible, and sand and clay adhere less to rubber than to for instance wood or plastic. The mould containers hereby wear less when rubber plates are used than when wooden or plastic plates are used.

[0023] The present invention further relates to an (ejecting) device for pressing a green brick out of a mould container, comprising:

- an ejector base;
- an ejector shaft which is connected to the ejector base with a first outer end and is provided with a stop at a second outer end;
- tensioning means which are arranged around the ejector shaft and which can be engaged with the stop;
- wherein the ejector shaft is connected in fixed manner to the ejector base.

[0024] The present invention further relates to an ejecting device for pressing a green brick out of a mould container, comprising:

- an ejector base;
- an ejector shaft which is connected to the ejector base with a first outer end and is provided with a stop at a second outer end;
- tensioning means which are arranged around the ejector shaft and which can be engaged with the stop;
- wherein an insert plate is arranged on the ejector base, which plate is connected to the ejector base with a plug and screw connection.

[0025] The present invention further relates to a mould container part, comprising:

- at least one mould container arranged in the mould container part for forming a green brick therein from clay;
- wherein the mould container comprises upright walls; and
- wherein a plate adapted to adjust the internal dimensions of the mould container can be arranged in the mould container against an upright wall thereof and can be removed therefrom.

[0026] The present invention further relates to a device for manufacturing green bricks from clay for the brick manufacturing industry, comprising:

- a circulating conveyor carrying mould container parts with one or more mould containers;
- a reservoir for clay arranged above the mould containers;
- clay arranging means for arranging clay from the reservoir in the mould containers;
- means for covering an open side of the mould containers with take-off plates;
- at least one ejecting device arranged on the conveyor and movable relative to the conveyor;
- wherein the ejecting device is adapted to eject a green brick present in the mould container onto an associated take-off plate during a release stage; and
- wherein the mould container comprises upright walls which form a mould cavity, and wherein a plate can be arranged against an upright wall in the mould cavity.

[0027] The present invention further relates to a method for assembling one or more mould containers with an ejecting device for forming bricks, comprising the following steps of:

- placing an ejecting device through an opening in a bottom of the mould container, wherein the ejecting device comprises at least a preassembled ejector base, shaft, spring and stop for the spring;
- temporarily compressing the spring in order to provide a space between the spring and the bottom of the mould container;
- arranging an intermediate member in the space between the spring and the bottom;
- allowing the pressure on the spring to be eased, wherein the spring is left biased to at least some extent between the stop and the intermediate member.

[0028] In a preferred embodiment of the method the ejecting device is a preassembled ejector base, shaft, spring and stop for the spring as described above.

[0029] In yet another preferred embodiment of the method the preassembly of the ejecting device takes place at least partly mechanically, this providing a reproducible assembly and reducing the manual labour required.

[0030] The present invention further relates to a method for fixing an insert plate to an ejector base, comprising the following steps of:

- positioning the insert plate on the ejector base such that holes arranged in the insert plate are aligned with holes arranged in the ejector base;
- placing a plug through the aligned holes; and
- arranging a screw in the plug in order to fix the insert plate to the ejector base.

[0031] The present invention further relates to a method for adjusting the dimensions of a green brick to be formed in a mould container, comprising the step of arranging against one or more upright walls of the mould container a plate which is adapted to adjust the internal dimensions of the mould container.

[0032] Preferred embodiments of the present invention are further elucidated in the following description with reference to the drawing, in which:

Figure 1 shows a perspective view of a prior art device;
Figure 2 shows a cut-away side view of the device according to the present invention;
Figure 3 is a cut-away side view in assembled state of the device shown in figure 2;
Figure 4 is a perspective detail view of the spring washer shown in figures 2 and 3; and
Figure 5 is a detail view of the plug connection shown in figure 3.

Prior art

[0033] Figure 1 shows a cut-away view of a prior art mould container part 2, which shows a mould container 4 which is enclosed by upright walls 6 and a displaceable ejector base 8 of an ejector 10. Once a green brick (not shown) has been arranged in mould container 4, the top side is covered with a cover plate (not shown) on which the green bricks - after being released from mould container 4 using ejector 10- are discharged to for instance a drying chamber for further treatment.

[0034] Prior art ejector 10 comprises an ejector shaft 12 which is provided with an external screw thread on its outer ends 14, 16. Using external screw thread 14 the ejector shaft 12 is fastened in a hole with internal screw thread in ejector base 8.

[0035] Ejector 10 lies under bias of a spring 18, which presses with its one outer end 20 against a bottom wall 24 of mould container part 2. With its other outer end 22 the spring 18 presses against a press-out beam 28 on which ejector shaft 12 is mounted using nuts 30, 32 and lock nut 34. When press-out beam 28 is displaced, ejector bases 8 are displaced via ejector shafts 12 for the purpose of pressing a green brick out of mould container 4.

[0036] As figure 1 shows, ejector base 8 is assembled from a mother plate 36 and a releasable plate 38 arranged thereon. In prior art ejector 10 the connection between mother plate 36 and releasable plate 38 takes place using screws 40.

Description of the invention

[0037] Figure 2 shows a cut-away side view of an ejector 60 and a mould container part 52 according to the present invention. Mould container part 52 comprises different mould contains 54 combined to form a unit. Mould container part 52 further comprises a chain part 86 onto which link parts 88 are welded. When different mould container parts 52 with chain parts 86 are placed adjacently of each other and a shaft 94 is inserted through the link parts, these mould container parts 52 are combined to form a chain conveyor (not shown). Situated on the end of shaft 94 is a runner 90. A bolt 92 is also provided to lock the shaft 94 through link parts 88.

[0038] Ejector 60 is assembled from an ejector base 58 and an ejector shaft 62 which is provided with screw thread 64 on at least its side remote from ejector base 58. In a very advantageous embodiment ejector shaft 62 forms part of a bolt which is fixedly welded with its bolt head 66 to ejector base 58. Such bolts are commercially available in different lengths and can be applied without machine-finishing being required.

[0039] It is noted that it is also possible to envisage the ejector shaft 62 comprising a threaded end of a bolt. Instead of fixedly welding a bolt head 66, a nut (not shown) is in this case welded fixedly to ejector base 58. Ejector shaft 62 is then screwed with its screw thread fixedly into this nut.

[0040] Arranged round the ejector shaft is a spring 68 which engages with its outer end 72 on an edge 78 of a cap nut 76 screwed onto the outer end of ejector shaft 62 provided with screw thread 64. This cap nut 76 is

preferably a hollow cap nut so that it can be displaced freely over screw thread 64 of ejector shaft 62 in order to provide a flexible length adjustment. Once set to the desired length, the position of cap nut 76 is secured with a lock nut 80.

[0041] Ejector base 58 is arranged displaceably in mould container 54 of mould container part 52, as will be elucidated hereinbelow.

[0042] Mould container part 52 comprises in its bottom wall 74 a hole 82 which has dimensions such that the assembled ejector 60, i.e. mounted with cap nut 76 and spring 68, can be displaced through this hole (arrow A in figure 2). Hole 82 therefore has a diameter which is at least slightly larger than the outer diameter of edge 78 of cap nut 76 and spring 68. Because an assembled ejector 60 is displaceable according to the invention through the hole, this ejector 60 can already be preassembled elsewhere. The period of time for which the mould container press is unavailable for the production of bricks can therefore be reduced considerably.

[0043] After the assembled ejector 60 has been inserted through hole 82, spring 68 is compressed so far with a tool (not shown) that the upper outer end 70 of spring 68 is situated below bottom wall 74 of mould container part 52.

[0044] A spring washer 84 is then arranged around ejector shaft 62 in the space between the upper outer end 70 of compressed spring 68 and bottom wall 74 (arrow B in figure 2).

[0045] This spring washer 84 comprises two annular parts 85 and 87 offset relative to each other (figure 4). A recess 89 is further arranged so that spring washer 84 can slide around ejector shaft 62. The first annular part 85 has an outer diameter slightly smaller than the diameter of hole 82 in bottom wall 74 of mould container part 52, so that annular part 85 fits into hole 82 (see figure 3). The second annular part 87, which is offset relative to the first annular part 85, has a larger diameter than hole 82 in bottom wall 74, so that annular part 87 can function as contact surface with bottom wall 74, while annular part 85 is situated in hole 82.

[0046] Once spring washer 84 has been arranged around ejector shaft 62 between bottom wall 74 and outer end 70 of spring 68, the tool (not shown) which compresses spring 68 is removed. The pressure will be eased on spring 68 which is left biased to at least some extent between the cap nut 76 with stop 78 and the spring washer 84. Annular part 85 of spring washer 84 functions as contact surface for outer end 70 of spring 68. Because spring 68 lies biased to at least some extent between the bottom wall 74 with spring washer 84 and the cap nut 76 with stop 78, spring washer 84 is pressed into hole 82. Because annular parts 85, 87 are offset relative to each other, annular part 87 functions as contact surface with bottom wall 74 while annular part 85 prevents spring washer 84 being able to move out of hole 82.

[0047] Ejector base 58 comprises a bottom plate 99, a mother plate 100 and a plate 102 arranged releasably thereon. The plug connection according to the present invention shown in detail in figure 5 comprises a plug 106 which can be placed through a drilled hole 104, after which releasable plate 102 is fastened to bottom plate 99 and mother plate 100 by arranging a screw 108 in plug 106. Bottom plate 99 and mother plate 100 can be manufactured integrally. In contrast to the screw connections 40 known from the prior art (figure 1), the plug connection according to the present invention has the advantage that an old plug 106 can easily be removed and replaced with a new plug 106. Time-consuming operations, such as retapping a screw thread 42 after a rust-bound screw 40 has been drilled out, are avoided with the plug connection according to the invention. The period of time for which the mould container press is unavailable for the production of bricks can therefore be reduced considerably.

[0048] It is noted that in a preferred embodiment the plug 106 also extends at least through mother plate 100 to the interface between mother plate 100 and releasable plate 102, or even to the upper surface of releasable plate 102 (position a in figure 5). This has the advantage that, when the screw connection of plug 106 is used to secure protrusions (not shown), so-called frogs, to be arranged in mould container 54, plug 106 ensures the position of mother plate 100 relative to fixed bottom plate 99 while crew 108 is temporarily removed. It is of course also possible to envisage an application wherein the plug extends to the interface between fixed bottom plate 99 and mother plate 100 (position b in figure 5).

[0049] According to the invention a brick length correction plate 98 is arranged on upright wall 56 (figures 2 and 3). This brick length correction plate 98 comprises a plate which is fixed against wall 56 in mould container 54. The length dimension of the green brick (not shown) to be arranged in mould container 54 is reduced by the thickness of correction plate 98. The size of the green bricks to be formed can be corrected by the simple operation of arranging such a correction plate 98 in each mould container 54. This correction is for instance desirable so as to anticipate the shrinking behaviour of the clay during the drying and firing by adjusting the size of the green brick beforehand to the measure of shrinkage expected during drying and firing of the respective clay composition. Because only a few plates have to be placed, removed or exchanged according to the present invention, a correction of the size of the green brick can be realized in relatively simple manner and at low cost. Suitable materials for correction plate 98 are for instance wood, plastic and metal.

[0050] Although they show preferred embodiments of the invention, the above described embodiments are intended only for the purpose of illustrating the present invention and not to limit the scope of the invention in any way. It is particularly noted that the skilled person can combine technical measures of the different embodiments. The scope of the invention is therefore defined solely by the following claims.

Claims

1. Device, comprising:

- a mould container part with at least one mould container for forming therein a green brick from clay; and
- wherein the mould container comprises upright walls which form a mould cavity, and wherein a plate can be arranged against an upright wall in the mould cavity.

2. Device as claimed in claim 1, further comprising:

- an ejecting device for pressing out of the mould container the green brick to be formed in the mould container, the ejecting device comprising:
  - an ejector base;
  - an ejector shaft which is connected to the ejector base with a first outer end and is provided with a stop at a second outer end; and
  - tensioning means which are arranged around the ejector shaft and which can be engaged with the stop.

3. Device as claimed in claim 2, wherein:

the mould container part comprises an opening through which it is possible to displace the ejecting device with its shaft having tensioning means arranged therearound and stop; and

- wherein an intermediate member can be arranged and removed between the tensioning means and the opening in the mould container part.

4. Device as claimed in claim 2 or 3, wherein the intermediate member is adapted, in the situation arranged between the tensioning means and the opening, to function as stop for the at least slightly biased tensioning means.

5. Device as claimed in any of the claims 2-4, wherein the intermediate member is a spring washer with a recess.

6. Device as claimed in any of the claims 2-5, wherein the ejector shaft is connected in fixed manner to the ejector base.

7. Device as claimed in claim 6, wherein the ejector shaft is provided with a screw thread at least on its outer end remote from the ejector base.

8. Device as claimed in claim 6 or 7, wherein the ejector shaft comprises a bolt which is attached in fixed manner to the ejector base with a head end of the bolt.

9. Device as claimed in any of the claims 2-8, wherein the tensioning means comprise a compression spring arranged around the ejector shaft.

10. Device as claimed in any of the foregoing claims, wherein an insert plate is arranged on the ejector base, which plate is connected to the ejector base with a plug and screw connection.

11. Device as claimed in claim 10, wherein the insert plate is a rubber plate.

12. Mould container part, comprising:

- at least one mould container arranged in the mould container part for forming therein a green brick from clay;
- wherein the mould container comprises upright walls; and
- wherein a plate adapted to adjust the internal dimensions of the mould container can be arranged in the mould container against an upright wall thereof and can be removed therefrom.

13. Device for manufacturing green bricks from clay for the brick manufacturing industry, comprising:

- a circulating conveyor carrying mould container parts with one or more mould containers;
- a reservoir for clay arranged above the mould containers;
- clay arranging means for arranging clay from the reservoir in the mould containers;
- means for covering an open side of the mould containers with take-off plates;
- at least one ejecting device arranged on the conveyor and movable relative to the conveyor;
- wherein the ejecting device is adapted to eject a green brick present in the mould container onto an associated take-off plate during a release stage; and
- wherein the mould container comprises upright walls which form a mould cavity, and wherein a plate can be arranged against an upright wall in the mould cavity.

14. Method for adjusting the dimensions of a green brick to be formed in a mould container, comprising the step of arranging against one or more upright walls of the mould container a plate which is adapted to adjust the internal dimensions of the mould container.

15. Method as claimed in claim 14, wherein a device according to any of the claims 1-13 is applied.

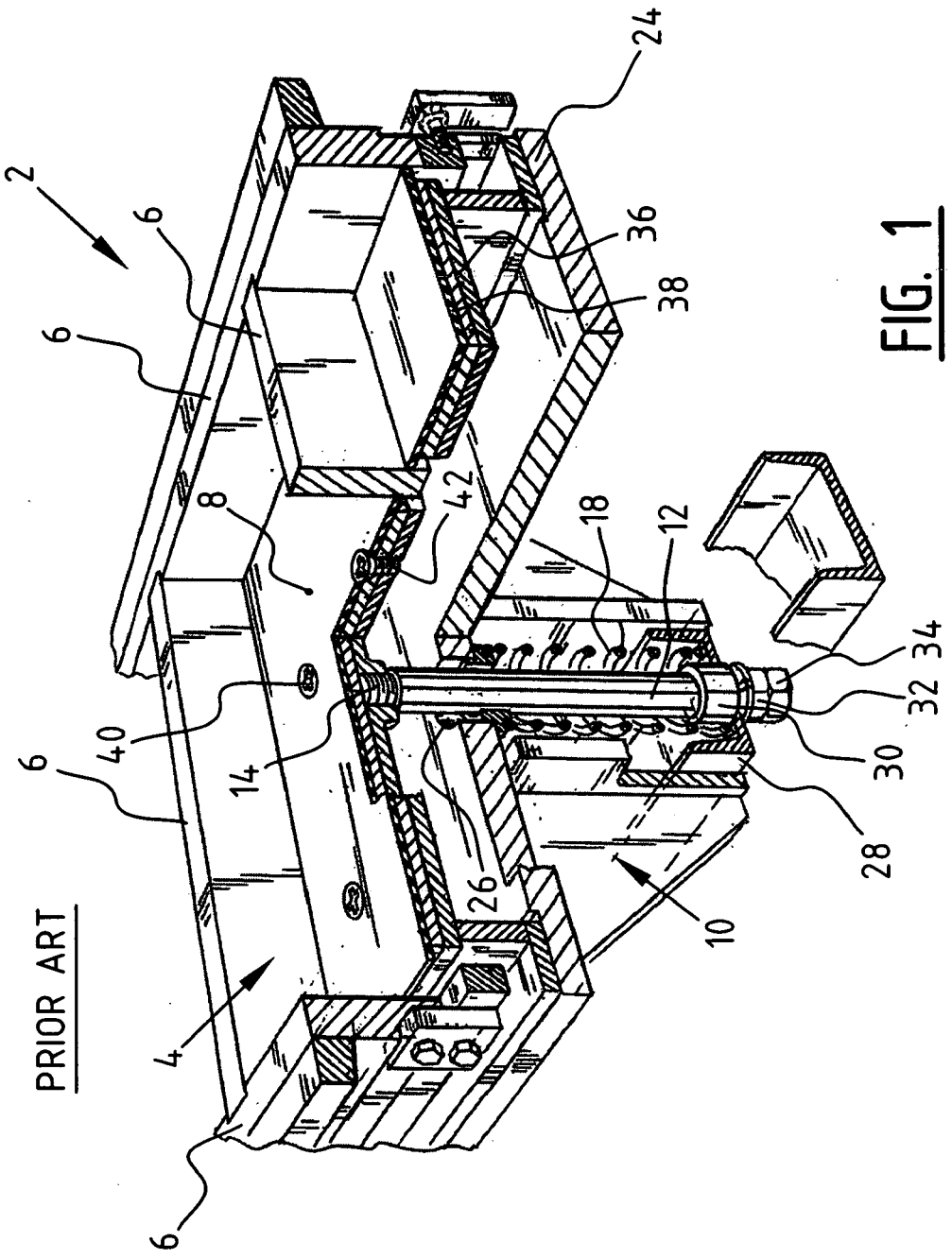

FIG. 1

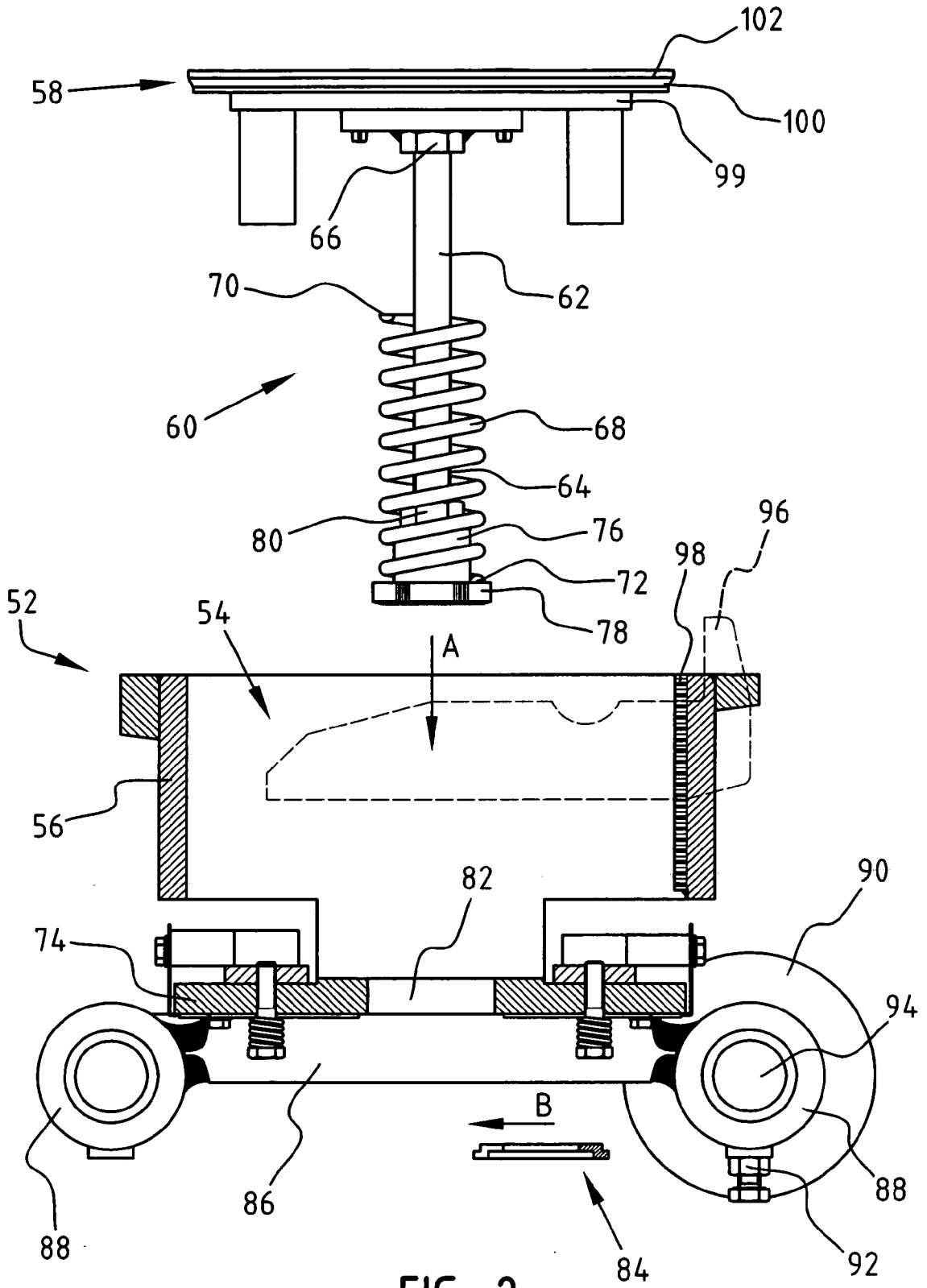
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FIG. 2

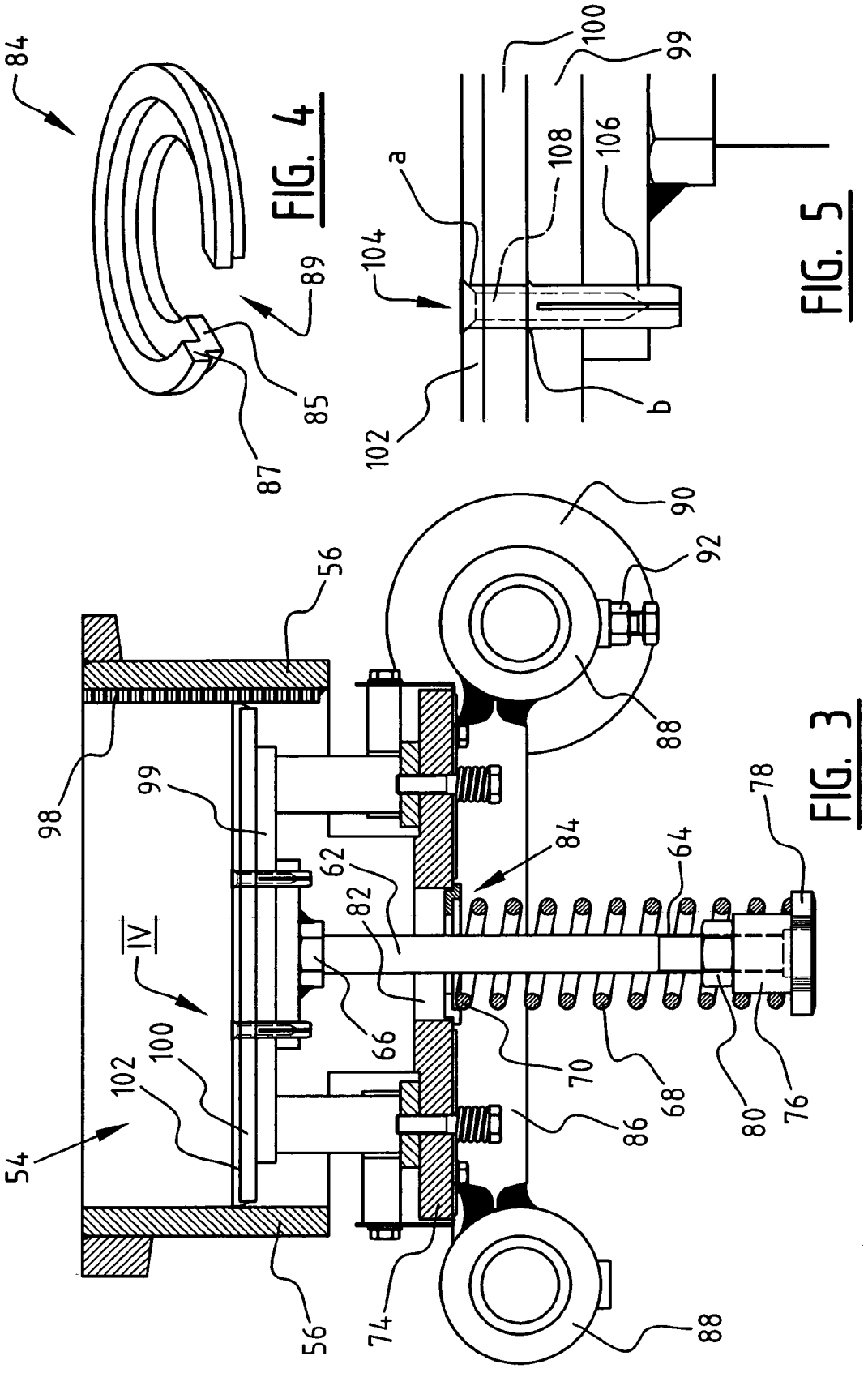
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FIG. 4
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FIG. 5
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FIG. 3