

[54] **BRICK PRESS WITH MEANS FOR
WITHDRAWING AIR FROM BRICK RAW
MATERIAL**

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425/78, 425/405

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[58] Field of Search..... 425/352, 408, 405,
425/406, 388, 78

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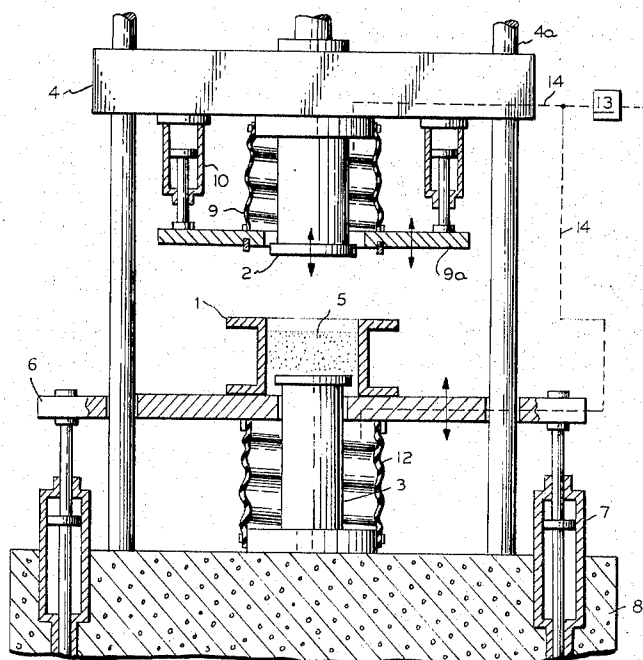
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[57] **ABSTRACT**

A lower fixed frame has a lower fixed piston thereon. An upper movable frame has thereon an upper movable piston adapted to be moved toward and away from the lower frame such that the upper and lower pistons oppose each other. A mold having a cross-section corresponding to that of the pistons is positioned to support brick raw material between the upper and lower pistons. A pair of bellows surround the upper and lower pistons in an air tight manner. The upper bellows has its lower end connected to a plate which is supported by servo-cylinders. An air tight ring is fixed to the bottom of the plate and is adapted to create an air tight seal with the top of the mold when the servo-cylinders are actuated to move the upper bellows downwardly. A suitable vacuum pump is connected by vacuum lines to the areas within each of the bellows.

1 Claim, 2 Drawing Figures



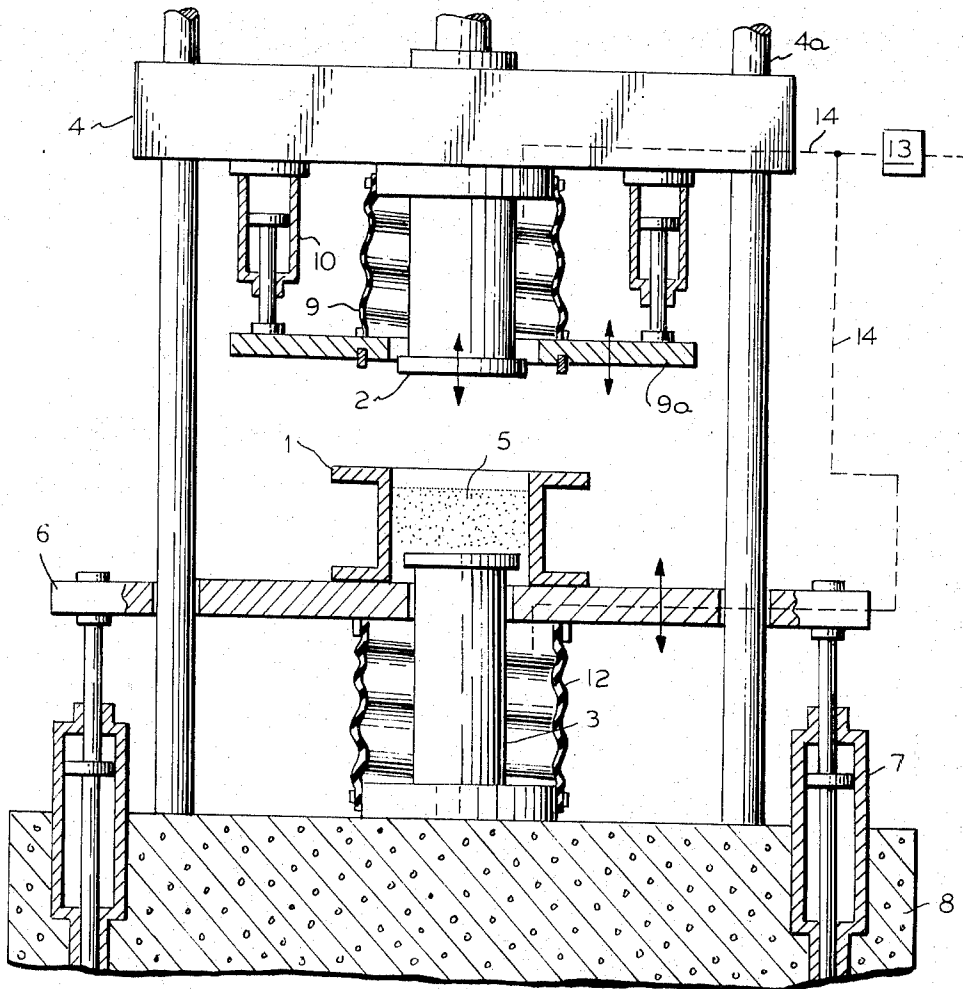


FIG. 1

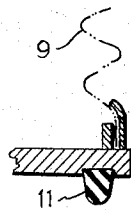
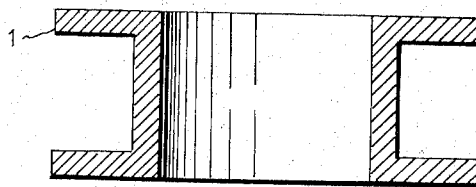


FIG. 2



BRICK PRESS WITH MEANS FOR WITHDRAWING AIR FROM BRICK RAW MATERIAL

BACKGROUND OF THE INVENTION

The present invention relates to a brick press of the type wherein a brick is formed by pressing a powdered brick raw material in a mold by opposed pistons. More particularly, the present invention is directed to such a brick press which includes provision for eliminating air from the raw material during compression thereof by the pistons.

There are presently known many types of brick presses of the type wherein the raw material is pressed in a mold between a pair of pistons. However, all such known presses inherently suffer from the disadvantage that during the pressing operation air is entrained in the material and compresses. The compressed air tends to counter the pressure of the pistons, thereby reducing production efficiency. Furthermore, the air tends to become entrained in the brick, thereby reducing the quality of bricks produced.

OBJECTS AND BRIEF DESCRIPTION OF THE INVENTION

With the above discussion in mind, it is a principle object of the present invention to provide a brick press of the type wherein raw material is pressed between opposed pistons in a mold and which include provision for avoiding entrainment and compression of air in the raw material during the pressing operation.

It is a further object of the present invention to provide such a press including means to withdraw air from the raw material prior to and/or during the pressing operation.

It is a still further object of the present invention to provide such a press having higher production efficiency and capable of producing bricks of better quality than heretofore known brick presses.

These objects are achieved in accordance with the present invention by the provision of a lower fixed frame having a lower fixed piston thereon. An upper movable frame having thereon an upper movable piston is adapted to be moved toward and away from the lower frame such that the upper and lower pistons oppose each other. A mold having a cross-section corresponding to that of the pistons is positioned to support brick raw material between the upper and lower pistons. A pair of bellows surround the upper and lower pistons in an air tight manner. The upper bellows has its lower end connected to a plate which is supported by servo-cylinders. An air tight ring is fixed to the bottom of the plate and is adapted to create an air tight seal with the top of the mold when the servo-cylinders are actuated to move the upper bellows downwardly. A suitable vacuum pump is connected by vacuum lines to the areas within each of the bellows. The servo-cylinders are actuated to cause the air tight ring to create a seal with the top of the mold. The vacuum pump is then actuated to withdraw air from the chamber within the bellows and enclosing the raw material and to create a vacuum therein. The upper piston is then actuated to compress the raw material. However, since this pressing operation is conducted on the raw material in a vacuum, no air becomes entrained in the brick raw material.

Other objects, features and advantages of the present invention will be made clear from the following de-

tailed description taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view partially in cross-section of a preferred embodiment of the present invention; and

FIG. 2 is an enlarged view, partially in cross-section of the manner in creating seal with the mold of the device shown in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

With reference now to the drawings, a preferred embodiment of the present invention will be described in more detail.

A stationary lower frame 8 has mounted thereon a stationary lower piston 3. An upper movable frame 4 has an upper movable piston 2 mounted thereon and is adapted to be moved toward and away from frame 8 and guided by suitable means such as guide columns 4a. A support plate 6 is connected to the piston rods of servo-cylinders 7 and is accordingly, movable upwardly and downwardly. A mold 1 is attached to the upper surface of support plate 6 and is movable therewith. Mold 1 has a cross-section corresponding to the cross-section of upper and lower pistons 2 and 3 and is adapted to accommodate brick raw material 5. By the above structure, it is possible after a brick is formed to lower support plate 6 and mold 1 such that the formed brick is positioned above the top of mold 1. This facilitates removal of the brick. It is to be understood that an alternative arrangement is to maintain mold 1 stationary while lifting frame 8 and piston 3 to move the formed brick above the top of mold 1.

The above described structures are known in the art. As discussed above, in the use of such a structure, air becomes entrained and compressed in raw material 5 during the pressing operation.

In accordance with the present invention, this problem is eliminated by providing the following means for creating a vacuum in the raw material 5. A first upper bellows 9 has its upper end attached in an air tight manner to the under surface of frame 4 or to the outer surface of piston 2. The lower end of bellows 9 is attached in an air tight manner to a plate 9a which is supported by the piston rods of servo-cylinders 10. On the under surface of plate 9a is an air tight resilient ring 11 which is adapted to create an air tight seal with the upper surface of mold 1 when servo-cylinders 10 are actuated in a downwardly directed manner.

A second lower bellows 12 has its lower end attached in an air tight manner to the upper surface of frame 8 or to the outer surface of piston 3. The upper end of bellows 12 is attached in an air tight manner to the under surface of support plate 6.

Therefore, it will be apparent that when upper bellows 9 is lowered to create an air tight seal between ring 11 and mold 1, an air tight chamber is formed inwardly of bellows 9 and 12 and encloses raw material 5. A conventional vacuum pump 13 is connected to the areas within bellows 9 and 12 by means of lines 14.

It is believed that the operation of the device of the present invention will be clear from the above description. However, the operation and use of the device will be described in more detail below.

Plate 6 and mold 1 are positioned approximately in the position illustrated in FIG. 1. Raw material 5 is then filled into mold 1. At this time, servo-cylinders 10 are

3

actuated to lower bellows 9 and cause an air tight seal to be created between ring 11 and the upper surface of mold 1. Thereafter, vacuum pump 13 is actuated to create a desired degree of vacuum within bellows 9 and 12 and raw material 5. When a suitable vacuum is achieved, upper frame 4 and upper piston 2 are moved downwardly in a conventional manner to press raw material 5 between pistons 2 and 3 and thus form a brick. However, since a vacuum has been created within bellows 9 and 12 and raw material 5, there will be no compression of air during the pressing operation. It will be apparent that as a result the quality of the bricks produced will be improved and the efficiency of the pressing operation will be substantially increased.

After the brick is shaped, bellows 9 and upper piston 2 are moved upwardly. At such time, servo-cylinders 7 may be actuated to lower support plate 6 and mold 1, leaving the shaped brick above the top level of the mold. The formed brick may then readily be removed in a conventional manner.

Although a preferred embodiment of the present invention has been described in detail, such description is intended to be illustrative only, and not restrictive, since many details of the various elements may be altered or modified without departing from the spirit or scope of the invention.

What is claimed is:

1. In a brick press of the type including a lower piston

4

mounted on a lower frame, an upper piston mounted on an upper frame to oppose said lower piston, a mold for supporting brick raw material between said pistons, and means for moving one of said pistons toward the other for pressing therebetween said raw material; the improvement comprising:

a first bellows means surrounding said one piston; means for moving said first bellows means to create an air tight seal with said mold, said means for moving said first bellows means comprising a plate sealed to said first bellows, at least one servo-cylinder supporting said plate on said frame supporting said one piston, said servo-cylinder movable to selectively move said plate toward and away from said mold, and a resilient ring positioned on said plate and adapted to contact said mold when said servo-cylinder moves said plate toward said mold;

a second bellows means surrounding said other piston;

said first and second bellows means forming an air tight chamber enclosing said raw material when said first bellows means is moved to create said air tight seal with said mold; and

means to create a vacuum in said chamber and within said raw material.

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