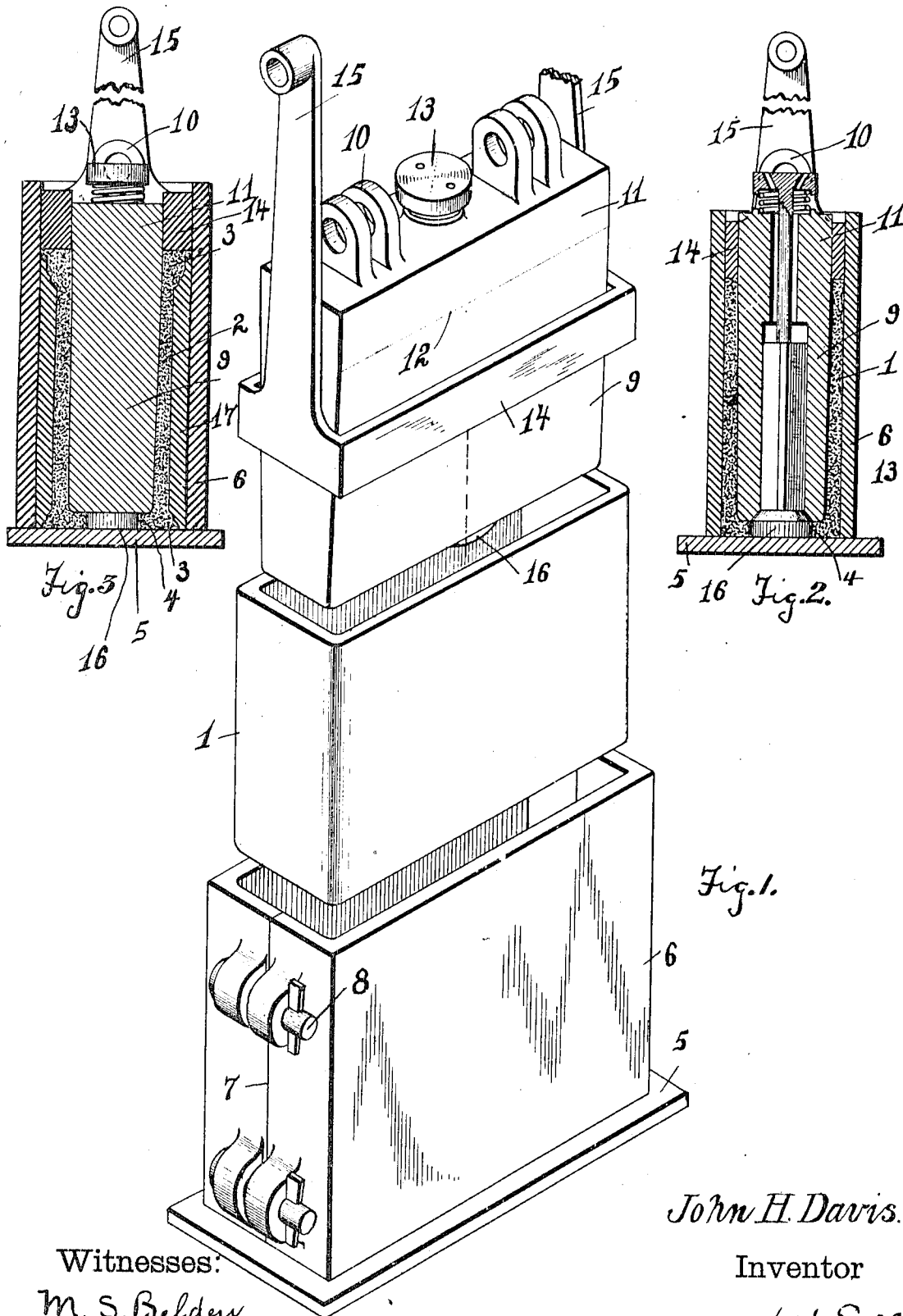


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CLAYWARE PRESS.
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CLAYWARE-PRESS.

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To all whom it may concern:

Be it known that I, JOHN H. DAVIS, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Clayware-Presses, of which the following is a specification.

This invention relates to a press to be employed in the formation of comparatively deep vessels from plastic clay, an exemplification of such vessels being found in closet-tanks.

One method employed in the forming of closet tanks consists in casting the clay in the form of a slip in an absorbent mold. The process is costly and slow, and unless conducted with extreme care, the superior absorption from the two faces of a wall of the tank results in a wall-center of inferior density often resulting in weakness, in distortion, in crazing, and often in breakage in the process of burning.

Another method employed in the formation of such tanks consists in forming the tank-walls and bottom of separate pieces or slabs, the pieces being united by a cementing of slip after which the tank is burned. As the several slabs are likely to be made from separate masses of clay the slabs are apt to vary in density, and the material employed in making the joints may represent still other variations in density of material. This process is also costly and, owing to the variation in density of material, there are frequent losses in structures or in values of structures, due to crazing, breaking, and the opening of the joints.

My present invention provides for the integral formation of such vessels from a single mass of plastic clay to secure a structure of equal density throughout the substance of its walls, and the invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 a perspective view of the molding elements of my improved press, shown separated and in conjunction with a plain closet tank which has been formed therein and partially withdrawn therefrom: Fig. 2 a vertical transverse section of the mechanism illustrated in Fig. 1, the parts being shown in the position occupied by them at the completion of the tank-forming operation: and Fig. 3 is a view similar to Fig. 2 except that the parts are adapted for the

production of a tank having projecting moldings.

In the drawings:—1, illustrates a plain closet-tank formed of burned clayware, and to be assumed as being enameled, this tank being plain by reason of the fact that it has no external projecting molding or other enrichments: 2, a substantially similar tank except for external projections: 3, top and bottom external moldings on tank 2, these moldings illustrating enrichments externally formed upon the tank and preventing the ready withdrawal of the tank endwise from the mold in which it is formed: 4, an aperture in the bottom of the tank, such as is usually provided for the reception of a flush-pipe: 5, a plate forming the base member of a mold and adapted to be rigidly supported by the fixed member of a suitable press: 6, a mold resting on plate 5 and having an interior adapted to define the exterior form of the tank, the top of the mold being open: 7, a vertical line of separation dividing mold 6 into two halves permitting the mold to be opened: 8, joint-bolts for securing the two halves of the mold rigidly together: 9, a generally tapering plunger adapted to define the interior form of the tank: 10, ears carried by the top of the plunger and serving to illustrate the power connections by means of which the moving element of a power press, preferably of hydraulic type, may serve in moving the plunger vertically: 11, the upper portion of the plunger, this portion being straight instead of tapering: 12, the horizontal line of demarcation between the taper portion 9 and the straight portion 11 of the plunger: 13, an air valve arranged vertically in the plunger and normally held in closed position by a light spring, this plunger being adapted to open outwardly and admit air down entirely through the plunger if the plunger be raised somewhat out of the tank being molded so as to create a partial vacuum under the plunger: 14, a rim collar adapted for disposition within the top of the mold and around the straight portion 11 of the plunger, this rim collar having position over the top of the completely molded tank, the collar being preferably movable vertically relative to both the plunger and the mold: 15, ears projecting up from the rim collar and serving as means by which a moving member of the employed press may raise and lower the collar: 16, a boss projecting from

the lower end of the plunger and adapted to form the aperture 4 in the base of the tank, this boss being illustrated in Fig. 2 as being formed by a portion of the air valve projecting below the base of the plunger: and

5 17, in Fig. 3, removable mold-lining plates disposed against the end-walls of the mold. The boss 16 is positioned between the lower end of the plunger and the upper surface of the floor of the mold and determines

10 definitely the thickness of the floor of the article molded. The sides of the boss 16 are free from any portion of the mold or plunger. Attention will first be given to the making of a plain tank, such as is illustrated in Figs. 1 and 2. It is to be assumed that the parts which have been described are mounted in a suitable press, preferably of hydraulic

20 type, by means of which the mold and its co-operating parts can be forced toward each other with sufficient pressure to produce the desired density in the clay of the completely molded tank. Giving consideration to Fig. 1 let it be assumed that the parts are in the position indicated but that the molded tank 1 is absent. A sufficient quantity of plastic clay is to be placed in the mold. The plunger, dis-

30 regarding rim collar 14 is now to be forced down into the mold and into the mass of clay therein, the downward forceful movement of the plunger being continued until its base is at such distance from plate 5 as to give the proper thickness to the floor of the tank. At first thought it might be said that the molding of the tank was now complete and that it was only necessary to withdraw the plunger and then remove the tank from the

40 mold. But, as thus far considered, while at the completion of the descent of the plunger there may possibly have been produced a sufficient density of clay in the floor and lower portions of the walls of the tank, the upper portions of the walls would be of less density owing to the fact that the clay is unconfined vertically at the top of the tank walls. If, now, the rim collar 14 be forced downward with sufficient power

50 the density of the upper portion of the walls of the tank may be made equal to that of the balance of the clay structure. Under the above assumption the plunger has completed its downward stroke before the rim collar came into action. But if preferred the plunger and rim collar may descend together and so act on the clay that the clay structure is complete when the plunger has completed its down stroke, it being understood that while the plunger is making its

60 down stroke, or till near the end of that stroke, the clay will rise around the plunger to an abnormal extent due to the upper portions of the clay not having been subjected to vertical pressure. Indeed, the rim collar

might be a properly positioned integral part of the plunger and move down with it. But this would require the charging of the mold with a very accurately measured volume of clay, and the same would be the case if the rim collar, instead of being separate as shown, or instead of being an integral part of the plunger as just mentioned were an integral part of the mold itself. The independent movability of the rim collar, in addition to other advantages to be mentioned permits of considerable variation in the quantity of clay put in the mold, so long as there is sufficient clay, the two independent pressing agents, represented by the plunger and by the rim collar, then bringing about the desired uniform density notwithstanding the plunger itself may move down only to a definite point, for the rim collar may go down to variable distances consistent with securing the desired density in the clay. In practice it is preferable to charge the mold with an excess quantity of clay, and if the descent of the rim collar to produce the desired density leaves the clay structure higher than is ultimately wanted, as will generally be the case, the surplus height may be removed by trimming.

The main portion of the plunger illustrated is tapered or given some draft in order to permit its ready withdrawal from the completed clay structure, and the tapering form of the plunger serves also in giving the plunger a wedging action upon the clay to increase the side pressure thereon. The upper portion of the plunger is made straight in order that the rim collar, when in active position relative to the plunger, shall fit it closely. The air-valve 13 is to permit the breaking down of the partial vacuum resulting from the withdrawal of the plunger from the tank. The tank having been completed, and the parts in the position indicated in Fig. 2, the rim collar may be pushed farther down, thus pushing the completed tank off of the plunger and out of the mold, it being understood, of course, that the plunger and mold will be suitably supported during this operation and that plate 5 is to be free for downward motion. This pushing system for removing the tank from the plunger and mold is, however, not essential, as the plunger may be withdrawn upwardly from the tank while the latter is held down by the rim collar, and the rim collar may be raised and the mold opened and removed from the tank which may then be entirely removed from the apparatus for further treatment.

If the last-mentioned system were employed in getting the completed tank out of the apparatus it is manifest that it is immaterial whether the tank be plain or have outside enrichments, such as the moldings indicated in Fig. 3. But if the mold

be provided with the separable lining plates 17, indicated in Fig. 3, then the tank may be gotten free from the apparatus either by the method of opening the mold or by the method of punching the tank down out of the mold by means of the rim collar for the lining plates 17 may go down with the tank and be later removed therefrom. The forming of the boss 16 specifically upon the valve is not essential.

The mold has been illustrated as having a vertical disposition, the plunger working vertically downward into the mold, and the description has been made accordingly, but it is manifest that the parts might work in any other direction so long as the clay can be charged into and supported preliminarily by the bottom of the mold. Instead of the plunger being forced into the mold the mold might be forced over the plunger, neither of these matters effecting any material modification in the result. It is therefore to be understood that such terms as top, bottom, upper and vertical, are to be considered in a relative sense.

I claim:—

1. In a clayware press, the combination of a mold, a plunger reciprocating in said mold provided with a longitudinal air-relief passage extending therethrough, a valve-stem within said passage having a combined core and relief-valve upon its forward end, means for centering the valve-stem in the core, and a spring for normally holding said core and valve closed.

2. In a clayware press, the combination of a mold, a plunger reciprocating in said mold provided with a longitudinal air-relief passage extending therethrough, a valve-stem within said passage having a combined core and relief-valve upon its forward end, means for centering the valve-stem in the core, a spring for normally holding said core and valve closed, and a reciprocating rim-collar between the plunger and the mold.

3. In a clayware press, the combination of a mold adapted to receive a mass of clay, a plunger adapted to be forced into the mass of clay and give form to the interior of the molded article, a boss positioned between the floor of the mold and the end of the plunger and free at its sides from any portion of the mold or plunger for forming an opening in the molded article and definitely determining the thickness at that point, and an independently operated rim plunger timed to engage and compress the outer rim of the article only at the concluding portion of the stroke of the main plunger.

4. In a press of the class described, the combination of a mold adapted to be di-

rectly charged with a mass of material, a main forming plunger having the contour of the inside of the article, means for forcing the plunger into the mold, means for stopping the plunger at a definite point to regulate the thickness of the bottom of the article, an independent rim plunger surrounding the main plunger and capable of retraction from the mold and adapted to engage the edge of the material between the mold and the main plunger, and means for forcing the rim plunger into the mold to form the edge of the article and compress the material, the parts so constructed and arranged allowing overcharging of the mold with proper compression of the remaining material into a perfectly formed article.

5. In a press for porcelain mixtures or the like, the combination of a mold having a removable bottom, adapted to be directly charged with a mass of material equal to or greater than the amount in the finished article, a main forming plunger having the shape of the inside of the article, means for forcing the plunger into the mold, means for stopping the plunger at a definite point to regulate the thickness of the bottom of the article, an independent rim plunger surrounding the main plunger and capable of retraction from the mold and adapted to engage the edge of the material between the mold and main plunger, and independent means for forcing the rim plunger into the mold after action of the main plunger to form the edge of the article and complete the compression of the material, the parts being constructed and arranged to permit the article to be ejected through the bottom of the mold.

6. In a press of the class described, the combination of a mold body open at the ends, a removable closure for one end of the body, a main forming plunger, means for forcing the same into the mold to give shape to the interior of the article, a stop for the main plunger, a separate rim plunger adapted to engage the edge of the material between the main plunger and the mold, means for forcing the rim plunger into the mold to form the edge of the article and uniformly compress the article, and a lining piece removably placed and positively located in the body to give form to an exterior part of the article, said lining piece being free from engagement with the body in a longitudinal direction, so that it may be ejected from the body with the completed article in either direction.

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