E. DOR-DELATTRE.
HYDRAULIC PRESS FOR PRODUCING HOLLOW EARTHENWARE BODIES.
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4 SHEETS—SHEET 1.
UNITED STATES PATENT OFFICE.

EMILE DOR-DELATTRE, OF LIEGE, BELGIUM.

HYDRAULIC PRESS FOR PRODUCING HOLLOW EARTHENWARE BODIES.


Application filed February 7, 1911. Serial No. 607,127.

To all whom it may concern:

Be it known that I, EMILE DOR-DELATTRE, subject of the King of Belgium, residing at Liege, Belgium, have invented certain new and useful Improvements in Hydraulic Presses for Producing Hollow Earthenware Bodies; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a hydraulic press for producing hollow earthenware bodies, such as retorts for zinc furnaces, retorts for the distillation of coal and other substances, earthenware pipes and the like, and has for its object to facilitate the work of the operatives and at the same time to render these apparatus more efficient in use, consequently insuring a better working of the paste or material from which the articles are to be made.

It consists in replacing the removable draw plate of the known hydraulic apparatus by a fixed draw plate of greater height.

Figures 1, 2 and 3 of the accompanying drawings are vertical sections through the improved press, showing three different positions of the compressor plungers and which correspond to three principal stages in the operation. Fig. 4 is a vertical section similar to that in Fig. 1, but taken at right angles to the latter. Fig. 5 is a horizontal section on A-B (Fig. 4), while Fig. 6 shows the drawplate, from below, in a section taken on line C-D (Fig. 4).

The press comprises a fixed drawplate 4 and a paste cylinder 8 movable vertically and carried by the plungers 20 of the hydraulic cylinders 21.

10 is the central compressor plunger; it is connected to the hydraulic plungers 12 and 13 by the cross-head 11 and can work through the interior of the annular piston 9 in one piece with the hydraulic plunger 17 of the press 15. The horizontal section of the central plunger 10 presents externally the form that the article to be made should have internally; the annular piston 9 presents internally the external form of the plunger 10, while externally it is of a diameter equal to that of the earthware cylinder 8. 18 and 19 are longitudinal slots made in the annular piston 9 to allow of the movement of the cross-head 11. The draw plate 4 is closed at the top by a cover 3, fixed on posts 6 and 7 by nuts 1 and 2. The pillars 22 connect the draw plate 4 to the three hydraulic presses 14, 15 and 16. The cylinder 8, movable vertically, carries a platform 5 movable with it, on which is a trolley 23 carrying the charge of earth or material t.

Water under pressure from any convenient source, is supplied to the hydraulic presses 14 and 16, to the press 15, and to the two presses 21 by appropriate valves; these three groups of presses being independent of one another.

When the plungers 20 are raised (Figs. 1 and 4), the platform 5 is on a level with the track along which runs the trolley 23 with the load of earth t (Fig. 1). The plungers 20 are then allowed to descend so that the charge t can be introduced, by simply sliding it, between the cylinder 8 and the fixed drawplate 4 (Fig. 2); the upper faces of the plungers 9 and 10 are then in the same horizontal plane, as also in the following operation, which consists in raising the cylinder 8 with the platform 5 by the aid of the plungers 20, 20 by admitting hydraulic pressure to the presses 21, 21, which takes the piston 8 against the drawplate 4. Pressure is then admitted under the plungers of the hydraulic presses 14, 16, and 15 so that the compressor plungers 9 and 10 are raised simultaneously and force the material t into the drawplate 4, the cover 3 being removed. This displacement is effected without the material t losing its shape or being fissured, except slightly at the top portion, which is removed by means of a suitable tool so that the material comes exactly level with the top of the drawplate and presents no holes or fissures. The cover 3 is then replaced and secured by the nuts 1 and 2. Hydraulic pressure is then admitted to the presses 14, 16, and 15, until the maximum pressure is attained that the latter press can support; the heads of the compressor plungers 9 and 10 always remain at the same level during the stage of the operations. At this instant, as with the former apparatus, the press 15 is connected to a hydraulic accumulator, which maintains in this press the maximum pressure previously attained. The pressure is then increased in the presses 14 and 16, which forces the plunger 10 into the material t, which is penetrated without the creation of fissures. The annular piston 9 is thus forced downward by the displaced material until the cross-head 11 abuts.
against the lower end of the cylinder 8. The completion or drawing through of the crucible, pipe, or the like is effected by removing the cover 8 and causing the annular piston 2 to rise, while the plunger 10 is maintained in its raised position.

When the piston 9 has reached the limit of its upward movement the body of the finished article which projects above the upper surface of the plate 4 is cut through, as by means of a suitable wire, and the article removed from the press. The short cylinder of material treated which surrounds the portion of the piston 10 within the draw-plate 4 at the end of the operation above described, can be readily removed or will be ejected from said plate during the next succeeding operation. The advantages resulting from this arrangement are as follows:

1. **Facility of working for the operators.**—
   a. The operators do not have to replace the drawplate after the completion of each crucible, work often repeated and very fatiguing especially in the case of presses making crucibles or retorts of large size.  
   b. When the drawplate is fixed the screwing-up and unscrewing of the nuts 1 and 2 is considerably facilitated, as in this arrangement the cover being only fixed by the nuts the pressure that it exerts on them is simply proportional to the area of the end of the crucible; in the former apparatus this pressure is proportional to the area of the paste cylinder, which is always much greater than that of the crucible.

2. **Centering of the drawplate always perfect.**—It is very difficult, when the drawplate is removable, to replace and maintain it exactly in the position that it should occupy, especially when the apparatus is already somewhat worn; it follows that the walls of the retorts or crucibles have not exactly the thickness that they should have, and this thickness varies in the same article. With the draw plate fixed, on the other hand, this centering is readily effected when assembling the apparatus, and it always remains exact, however worn the apparatus may be.

3. The joint between the paste cylinder and the drawplate is always easily kept perfectly tight, since the tightness only depends on the pressure exerted by the hydraulic presses against the drawplate, which is unlimited. The wear resulting from want of tightness of the joints is also obviated.

4. The fixed drawplate can have a greater height than the removable drawplate, which produces a more complete working of the paste, a greater height given to the drawplate requires a greater force for the drawing-through of the crucible.

Moreover, in modern installations, where a hydraulic accumulator is arranged between the press and the pressure pumps, there is a great advantage in utilizing, in the different operations, all the power of this accumulator. In order to allow of this during the drawing-through, it is necessary to have a high drawplate, so as to sufficiently increase the resistance to the drawing-through, which is not practical with a removable drawplate.

I claim:

1. In a press for the purpose described, the combination of a vertically movable casing for the material to be pressed, a stationary draw-plate arranged to limit the upward movement of and form a top for said casing, a removable cover for the passage in the draw-plate, concentric plungers within the casing, and means for moving said plungers toward the stationary drawplate and projecting one thereof into the passage in said plate.

2. In a press for the purpose described, the combination of a vertically movable casing for the material to be pressed, a stationary draw-plate arranged to limit the upward movement of and form a top for said casing, a removable cover for the passage in the draw-plate, two concentric plungers within the casing, and hydraulic means for moving both plungers toward the stationary drawplate and projecting the central plunger into the passage in said plate.

3. In a press for the purpose described, the combination of a vertically movable casing for the material to be pressed, a stationary draw-plate arranged to limit the upward movement of and form a top for said casing, a removable cover for the passage in the draw-plate, a platform projecting laterally from and movable with the casing, two concentric plungers within the casing, and means for moving said plungers toward the stationary drawplate and projecting the central one into the passage in said plate.

In testimony whereof I affix my signature in presence of two witnesses.

**EMILE DOR-DELATTRE.**

**Witnesses:**

A. MARÉCHAL,  
Ed. SEPULCHRE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."