

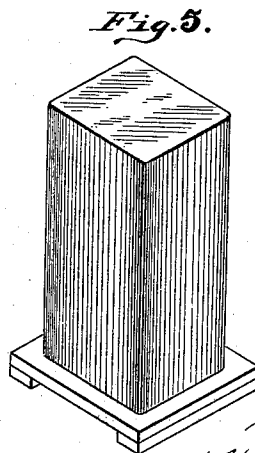
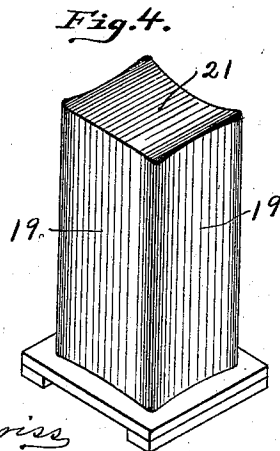
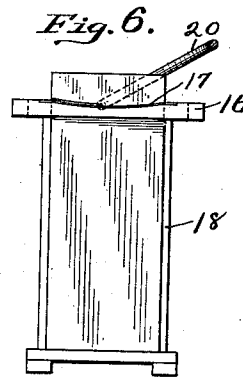
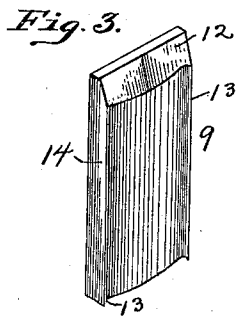
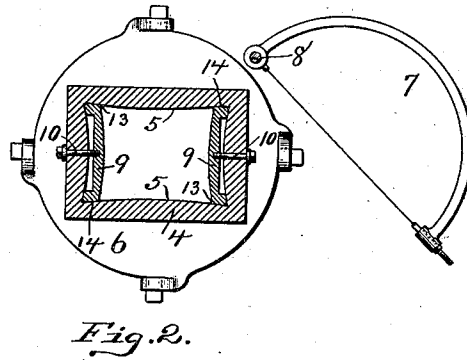
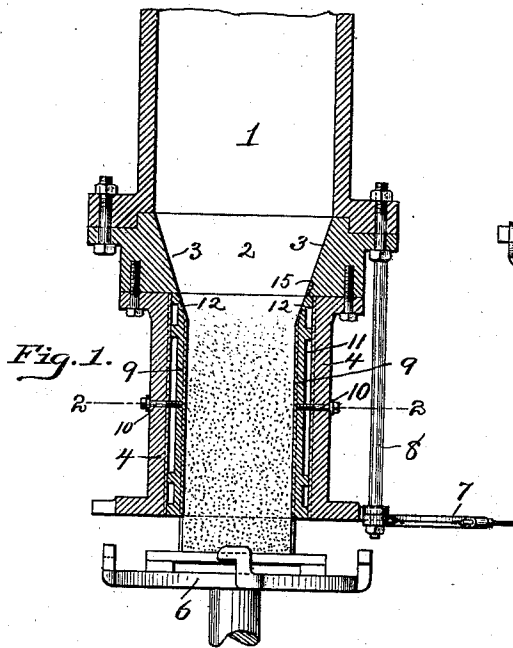
No. 663,140.

Patented Dec. 4, 1900.

W. WALKER & H. W. CROFT.
DIE FOR FORMING CLAY.

(Application filed June 18, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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DIE FOR FORMING CLAY.

SPECIFICATION forming part of Letters Patent No. 663,140, dated December 4, 1900.

Application filed June 18, 1900. Serial No. 20,687. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM WALKER, a resident of Allegheny, and HARRY W. CROFT, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dies for Forming Clay; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to apparatus for the manufacture of sewer-pipe, bricks or blocks, or other objects made by forcing clay or fire-clay into or through molds, dies, or nozzles for the purpose of forming the same into the desired shape. Heretofore these blocks or bricks have been made by forming them with flat parallel faces in dies conforming exactly to the finished block to be produced. It is found, however, that after the block leaves the die the sides assume a slightly-convex shape, so that the blocks will not fit close to each other, as is particularly desirable in connection with the building of glass-furnaces, blast-furnaces, hearths, and like work, where it is important for the blocks to fit closely to prevent flux materials from working into the joints. This defect is particularly noticeable in heavy large blocks containing a large mass of clay. The reason for this is not absolutely understood, though it is believed to arise from the air occluded in the mass of clay and brought under compression in passing through the die and which gradually thereafter expands and changes the form of the block. In order to make such bricks or blocks fit closely, it has been found necessary to grind their surfaces to a straight line after the material was dried. This, however, destroys the natural glaze given the material in the die and not only weakens the blocks, but also diminishes their power to resist the action of flux materials.

One object of our invention is to overcome this defect and provide apparatus whereby such blocks or bricks may be so shaped that when dried and burned the faces thereof shall be substantially flat and parallel. This object we secure by providing the die by which

the blocks are molded with convex inner surfaces.

A further object of our invention is to provide the die with removable lining-plates, so that worn-out plates can be replaced by new ones or the shape or size of the die changed by inserting lining-plates of the desired size or shape.

Our invention has been found to be especially advantageous in the manufacture of large heavy fire-clay blocks, and the manufacture of such blocks has therefore been illustrated in describing the invention. The invention, however, is not limited to the manufacture of such blocks, but may advantageously be used in the manufacture of various objects made by compressing clay or the like.

To enable others skilled in the art to make and use our invention, we will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the press and die used for forming the blocks. Fig. 2 is a cross-section of the die on the line 2-2, Fig. 1. Fig. 3 is a perspective view of one of the removable lining-plates. Fig. 4 is a perspective view of a block, showing its shape as it passes through the die, the concavity of the sides of the block being exaggerated somewhat. Fig. 5 is a perspective view of the same block after the sides thereof have expanded to form substantially flat faces; and Fig. 6 is a view in side elevation of the stool used to shape the end of the block, with a block therein to illustrate the manner in which it is used.

Like reference-numerals indicate like parts in each view.

In the drawings, 1 indicates an ordinary fire-clay press having the bowl 2 at the base thereof, with gradually-tapering sides 3 and the die or nozzle 4 secured thereto. The clay is forced from the press into the bowl and through the die by any suitable means. The inner faces of the die are made slightly convex, as shown at 5, the degree of convexity depending generally upon the width and

thickness of the blocks and the bulk of clay present, it being possible to ascertain practically the proper amount of convexity to be given to the die to produce the flat sides on a block of given bulk. For example, with a stiff body of clay a convexity of three thirty-seconds of an inch in a width of about fourteen inches is found to be substantially correct in order to produce the straight sides or faces of the blocks, though of course this is to be varied as found necessary.

The block is received upon the receding table 6 and when of sufficient length is cut off by the wire knife 7, secured to the rock-shaft 8, journaled in the side of the die and press. These parts are old and well known in machines of this class, and their operation will be readily understood without further description.

The die may be provided with removable lining-plates 9, secured therein by means of the bolts 10. As shown in the drawings, two lining-plates are provided; but it is obvious that any suitable number may be employed. In case it is desired to form blocks with substantially flat or parallel sides the lining-plates will be provided with convex inner surfaces in the same manner as the die. As illustrated, these plates are cut away at the back, as shown at 11, in order to lighten them and to insure a better seating on the inner surface of the die. They are beveled or flared at their upper ends, as shown at 12, in order to form a continuation of the inclined inner surface of the bowl 2. They are likewise provided with projecting lips 13 on their edges to form slightly-rounded corners on the blocks. When the inner faces of the die are convex, the edges of the plates are formed on lines acute to the back face, as shown at 14, to fit closely the convex inner surfaces of the die. In the specific form illustrated the bowl 2 has a projecting shoulder 15, under which the lining-plates are secured, so that the inclined walls 3 of the bowl and the inclined portion 12 of the plates form an unbroken surface.

The stool illustrated in Fig. 6 consists of a horizontal rectangular frame 16, having two of its side members provided with concave top surfaces, as shown at 17, and provided with four depending legs 18, and it is adapted to fit over the block after it is pressed to shape and form a guide for cutting a concave top face 21, a wire knife 20 being employed for this purpose.

In the operation of the apparatus the clay is brought to the proper consistency and is fed to the press and forced into the bowl 2 and through the die or nozzle 4, the blocks being received upon the receding table 6, and when of proper length are cut off by the wire knife 7. In passing through the die or nozzle the side faces of the blocks are formed slightly concave, as illustrated at 19, Fig. 4. When it is also desired to provide the burned

blocks with flat end faces, the stool is slipped over the block, as shown in Fig. 6, and by means of the wire knife 20, guided on the concave surfaces 17, the end of the block is cut off and the desired concave end face formed, as shown at 21, Fig. 4. This face is then smoothed with a paddle or other suitable tool to impart the desired glaze thereto. After the blocks are so formed they are placed on a suitable drying-floor and permitted to dry before baking. It is found that in drying they expand through the occluded air under compression in the blocks or from some other cause, so that the concave faces 19 and 21 are brought out practically parallel or flat, as shown in Fig. 5.

By replacing the removable lining-plates 9 by others of different shapes or sizes a single machine may be used to form blocks of different sizes or shapes. Furthermore, when a lining-plate becomes worn it can be replaced by a new one at a less expense than if the entire die or nozzle had to be replaced. The construction illustrated is of such a nature that the plates can be readily removed and replaced by others by merely loosening and again fastening the bolt 10. This feature is of considerable value in presses that are used for making merely rough blocks or bricks which need not be provided with absolutely flat surfaces. In such cases the lining-plates would be provided with flat faces and merely serve as wearing-surfaces for the die. By the use of a die provided with convex inner surfaces it is possible to form blocks having side faces which when dried or burned are substantially flat or parallel, thereby obviating the necessity of grinding the faces, as has heretofore been done.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In apparatus for forming fire-clay or like blocks, the combination of a die provided with convex inner faces, removable lining-plates for said die, provided with convex inner faces and acute-angled edges corresponding to and adapted to closely fit the curved inner faces of the die.

2. In apparatus for forming fire-clay or like blocks, the combination of a die and removable lining-plates for said die, provided with projecting lips 13 on the edges thereof.

3. In a press for forming fire-clay or like blocks, the combination with a press, of the bowl provided with inclined sides, the die or nozzle secured thereto, and the removable lining-plates fitted in the die and provided at their upper ends with beveled or inclined surfaces to form a continuation of the inclined sides of the bowl.

4. In a press for forming fire-clay or like blocks, the combination with a press, of the bowl provided with inclined sides and projecting shoulders 15, the die or nozzle secured thereto, and the removable lining-plates fitted

in the die and abutting against said shoulders, and provided at their upper ends with beveled or inclined surfaces to form a continuation of the inclined sides of the bowl.

- 5 5. A stool for use in forming fire-clay or like blocks, comprising a horizontal frame and depending legs secured thereto, two opposite sides of said frame being provided with slightly-concave top surfaces.

In testimony whereof we, the said WILLIAM 10
WALKER and HARRY W. CROFT, have here-
unto set our hands.

WILLIAM WALKER.
HARRY W. CROFT.

Witnesses:

S. C. WALKER,
ROBERT C. TOTTEN.