

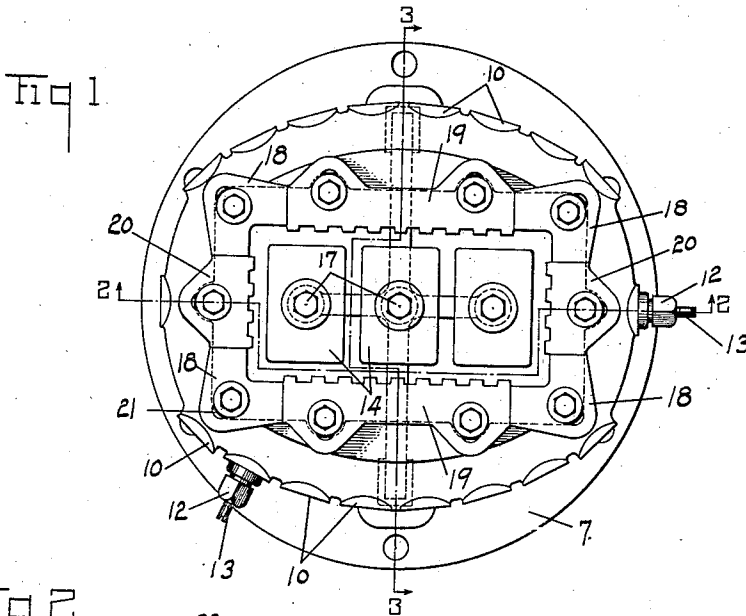
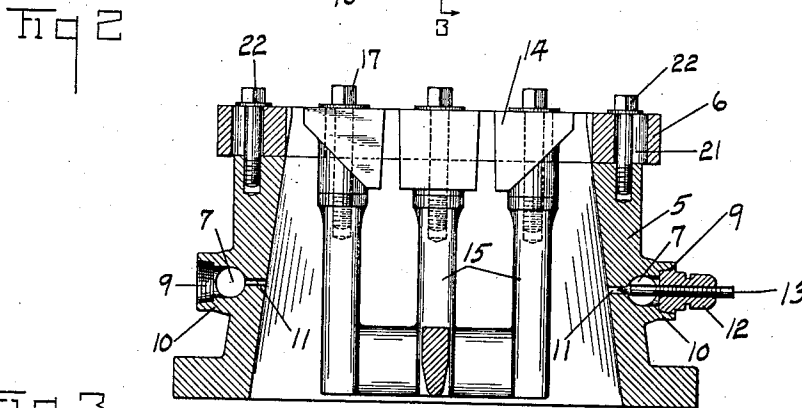
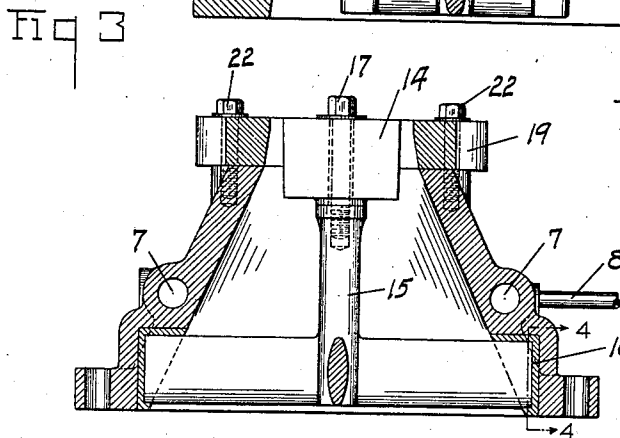
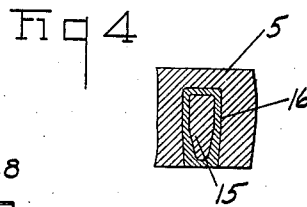
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D. BROWN

CLAY FORMING DIE

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INVENTOR
Davis Brown
by

Owen Owen & Crampton.

UNITED STATES PATENT OFFICE.

DAVIS BROWN, OF BUCYRUS, OHIO.

CLAY-FORMING DIE.

Application filed July 18, 1923. Serial No. 652,222.

To all whom it may concern:

Be it known that I, DAVIS BROWN, a citizen of the United States, and a resident of Bucyrus, in the county of Crawford and State of Ohio, have made an Invention Appertaining to a Clay-Forming Die, which invention is fully set forth in the following specification.

My invention has for its object to provide in a clay forming die, such as for producing hollow ware of different kinds, such as that used in making fire proof walls and partitions of buildings and in forming conduits and the like, a means whereby the expressed clay will be extruded at a uniform rate in all parts of the die. My invention thus provides a means whereby the clay will be compressed to a uniform degree and gaps or voids will be entirely eliminated, and the clay formed will be produced without internal strains that cause fracture or cleavage when or after the clay has been fired. The invention also provides a sectional die plate or finisher, parts of which may be used in connection with dies of different sizes to produce hollow ware of different sizes, and the other parts being so constructed that they may be readily ground to adjust them to variations in the clay shrinkage and to slight variations in the sizes caused by wear in the use of the die to maintain production of ware of standard or uniform sizes.

The invention may be contained in dies of different shapes and forms. To illustrate a practical application of the invention I have selected a die as an example of structures containing the invention and shall describe it hereinafter. The particular structure selected is illustrated in the accompanying drawings.

Figure 1 of the drawings is an end view of the die. Fig. 2 is a sectional view taken on the line 2—2 indicated in Fig. 1. Fig. 3 is a sectional view taken on the line 3—3 indicated in Fig. 1. Fig. 4 is a sectional view taken on the line 4—4 indicated in Fig. 3.

The die comprises the former 5 and the finisher or sizer 6. The former 5 is usually made of cast iron and is provided with a flange 27 for connecting the die to a machine for forcing the clay into and through the die, such as an auger located in a cylinder. When the clay is forced into the die it follows the law of fluids and tends to flow in the paths of least resistance. The clay

thus tends to flow through the central portions rather than through the end portions. This produces variations in the clay density and internal strains in the clay when formed, which appear after the clay has been fired. It produces mechanical weakness that causes fracture upon a comparatively slight jar or external strain. In order to produce free movement at the walls of the former 5 and, substantially, the same movement that is produced in the central areas of the moving clay I have provided a means for lubricating the surfaces of the former. The wall of the former is cored at a point slightly remote from the smaller end of the former so as to form an opening 7 that is located within the wall and extends completely around the former. The opening 7 is connected with a pipe 8 which may be connected to a source of a lubricant under pressure, such as oil, water or steam. A plurality of openings 9 may be formed from the exterior surface of the wall of the former to the opening 7 at a number of points around the former. The openings 9 may be formed in bosses 10. Smaller openings 11 may be formed in the wall of the former 5 to establish a communication between the passageway 7 and the interior of the former. A plug 12 may be threaded into each opening 9 and a needle valve 13 may be threaded into the plug 12 and so as to control the flow of the oil from the passageway 7 through the openings 11. Oil, if oil is used, may be supplied through the pipe 8 to the passageway 7 and through the openings 11 at a pressure sufficient to overcome the pressure produced by the clay at the point of the openings 11 sufficient to cause a very small quantity of the oil to enter the space between the clay and the inner surface of the former and thus to lubricate the clay and permit it to slip along the surface of the former with substantially the same readiness that it moves through the central portions of the former.

By this means the wear on the inner edges of the finisher is greatly reduced, and furthermore, localization of the wear is practically eliminated. This greatly increases the life of a given size of the finisher. Thus finishers of different sizes may be used for very much longer periods of time.

The resistance to the clay movement is greatly increased in the formation of hollow ware since in order to form the hollow ware,

cores are located in the former that constrict the moving clay and requires a greater increase of pressure to express the clay. This magnifies the diversion of the clay from the surface of the former and increases locally the wear on the die. The use of the lubricator is therefore of particular value when used in machines for forming hollow ware of the character described.

10 In the form of construction shown, the cores 14 are secured to a frame 15 which is locked from forward movement in the former 5, the ends of one of the cross bars of the frame 15 being stepped or secured in the recesses 16 formed in the former 5. The cores 14 are secured to the frame 15 by means of the bolts 17. They may be made of any suitable shape in order to properly direct and shape the clay as it exudes from the machine.

20 Finishers or sizers of different sizes could be used, but to compensate for the wear of the finisher or sizer I have provided a sectional finisher or sizer. This is of particular advantage since the wear of the ordinary finisher or sizer may be comparatively slight to render it useless for the particular size for which it is intended, that is, the size may soon become too large for the particular size tile or other hollow ware that is intended to be produced by it and yet the sizer will still be too small for the next larger size tile or hollow ware. Furthermore, the wear may be local, as at the sides of the finisher. This slight change in size is readily compensated for in the use of the sectional finisher or sizer involving my invention. A further advantage of the sectional finisher or sizer is that parts may be used for a number of sizes of finishers or sizers, the differences in the sizes being provided for in the dimensions of the other parts. These parts when put together may thus be utilized for producing finisher or sizers to produce hollow ware of different standard sizes, and for different clay contractions.

The finisher or sizer 6 is provided with four parts or corner pieces 18, two side

pieces 19 and two side end pieces 20. The parts 18 to 20 are provided with suitable bosses in which are located slots 21. They are secured in position on the delivery end of the former 5 by means of cap screws 22 that pass through the slots 21. The slots 21 provide for adjustment of the parts 18 to 20 relative to the cap screws 22 and the end of the former 5. The parts are placed together so as to form a rectangle, that is, so as to form the finisher or sizer and to place the finisher or sizer thus formed in its proper relation to the end of the former 5. Inasmuch as the clay is formed by being expressed between the core heads 14 and the inner edges of the finisher or sizer the inner edge is subject to wear, with the result that the hollow ware will in time become oversized. Instead of requiring a new finisher or sizer, in order to maintain the hollow ware produced at a standard size, all that is necessary is to grind the ends of parts of the sectional finisher or sizer in order that the edges may be placed closer towards the center of the finisher or sizer. The worn outlet may thus be constricted to the original size, that is, the size that will produce hollow ware of a given standard size. Preferably the ends of the corner pieces 18 are ground down so that the size of the finisher may be maintained.

Another advantage of the sectional finisher or sizer is that hollow ware of different sizes may be produced by providing merely a set of corners and using different sized side pieces 19 and end pieces 20, or by using different sized central pieces. A set of corner pieces may then be used with central pieces of different lengths to produce the different sizes of hollow ware.

I claim:

In a clay forming die, a former, a finisher formed of corner and side sections, and means for adjustably securing the sections relative to the former and to each other.

In testimony whereof, I have hereunto signed my name to this specification.

DAVIS BROWN.