

July 30, 1940.

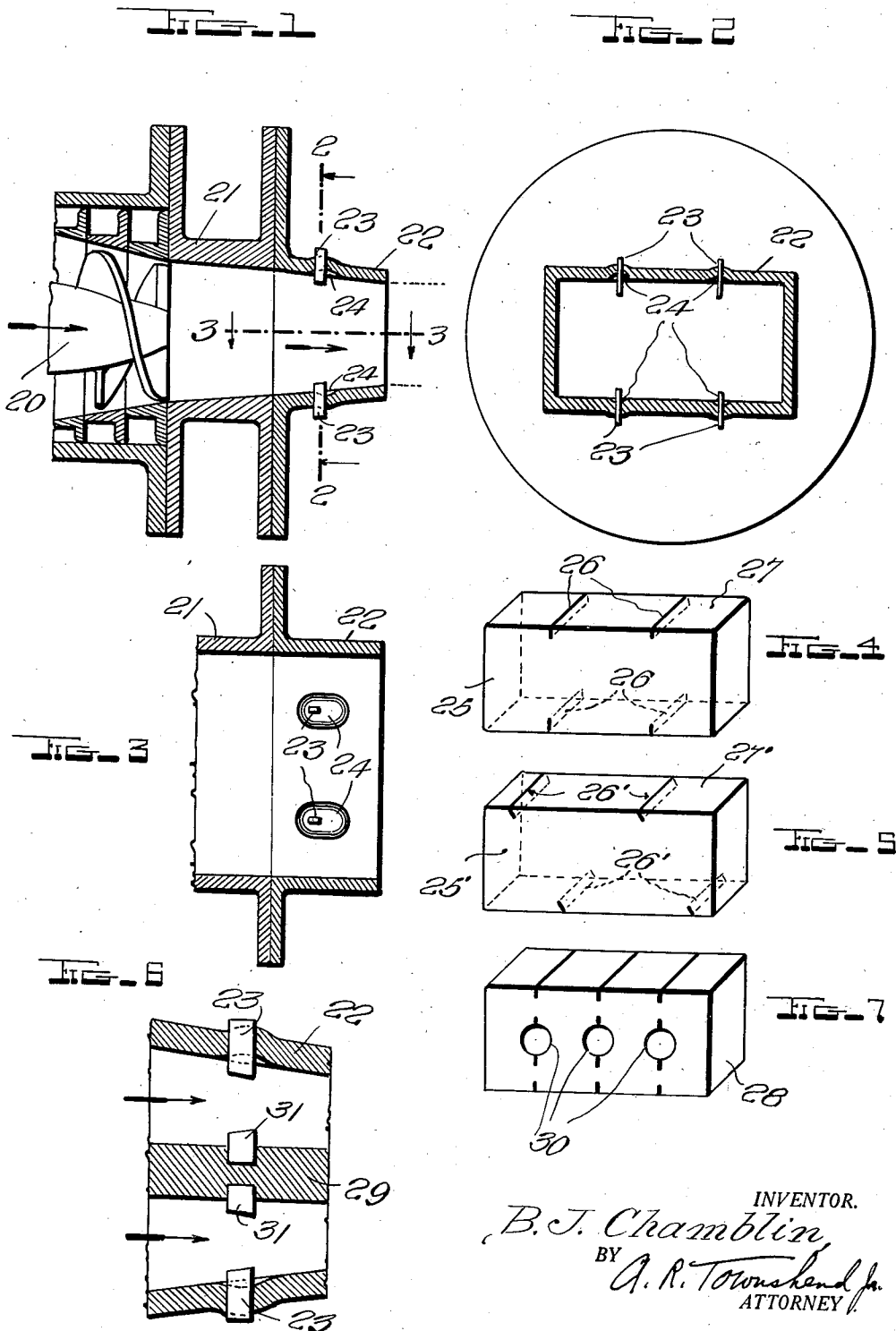
B. J. CHAMBLIN

2,209,643

METHOD AND MEANS OF FORMING BRICK AND TILE

Filed Aug. 19, 1936

3 Sheets-Sheet 1



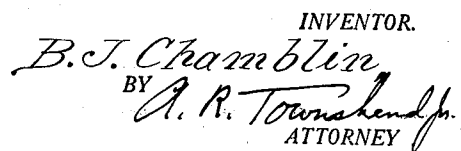
INVENTOR.
B. J. Chamblin
BY *A. R. Townsend Jr.*
ATTORNEY

B. J. CHAMBLIN

METHOD AND MEANS OF FORMING BRICK AND TILE

Filed Aug. 19, 1936

3 Sheets-Sheet 2



July 30, 1940.

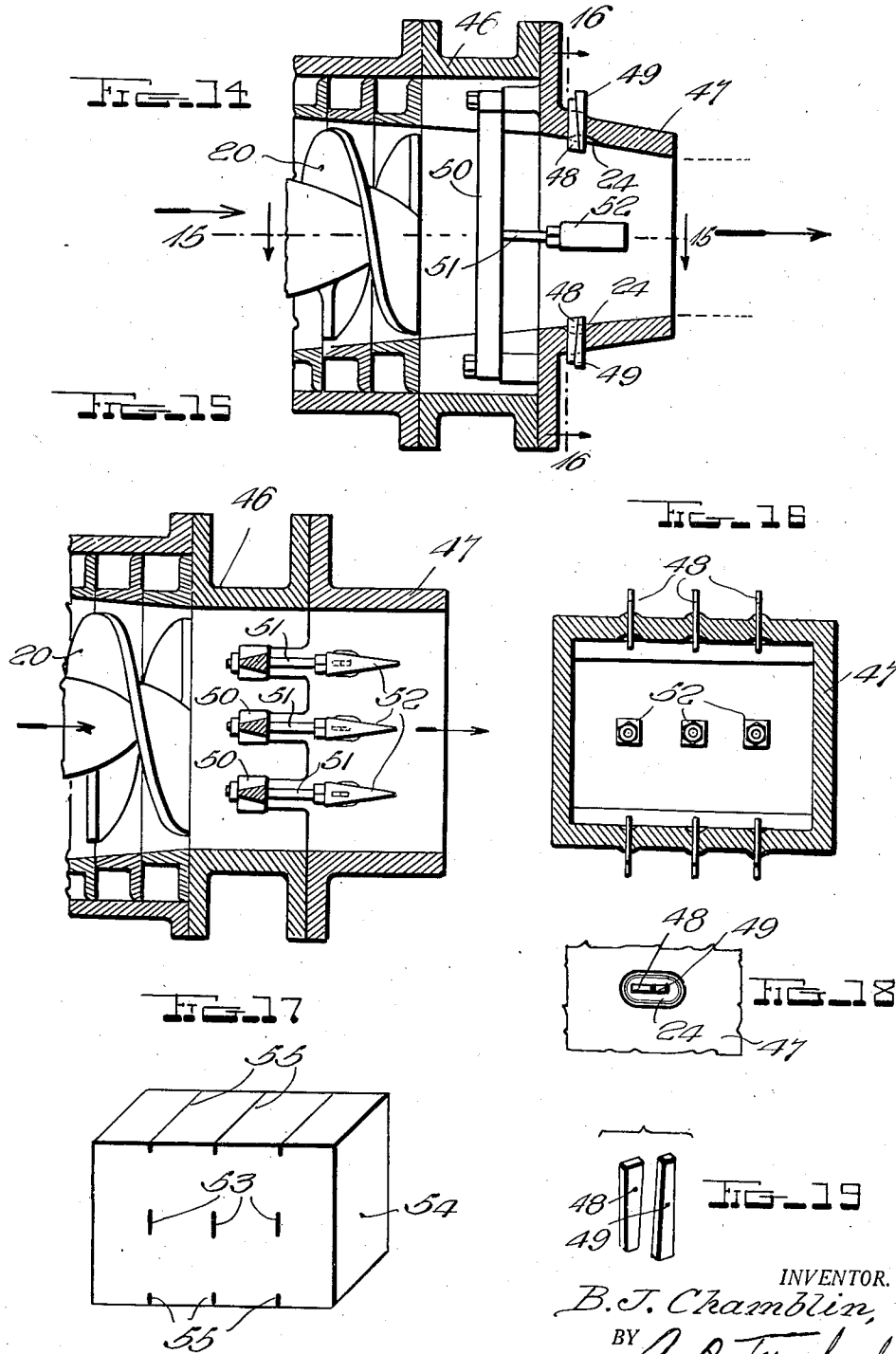
B. J. CHAMBLIN

2,209,643

METHOD AND MEANS OF FORMING BRICK AND TILE

Filed Aug. 19, 1936

3 Sheets-Sheet 3



INVENTOR.
B. J. Chamblin,
BY *A. R. Townsend Jr.*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,209,643

METHOD AND MEANS OF FORMING BRICK
AND TILE

Baylus J. Chamblin, Little Rock, Ark.

Application August 19, 1936, Serial No. 96,865

2 Claims. (Cl. 25—17)

This invention relates to the art of brick and tile manufacture, particularly to the formation thereof while in a plastic state prior to being placed in kilns. A primary object of the invention is the provision of a method formatively setting up defined lines of cleavage in ceramic material prior to its shaping and finishing in article form whereby the finished article may be broken at lines of cleavage as desired for service conditions requiring various shapes and sizes, the break producing sharply defined clear cut edges and corners without chipping or breaking away of the material. Another object resides in the provision of a method and means for creating such lines of cleavage without visible effect upon the wear face of the finished article. Other objects will be apparent from the description to those skilled in the art.

The present disclosure constitutes embodiments of the best means I have thus far devised for reducing the invention to practice, and it is to be understood that the structural details of such embodiments shall not constitute limitations inconsistent with the scope of the invention as claimed.

Figure 1 of the drawings is a longitudinal section through the die end of a clay column forming apparatus equipped with structural elements of the invention.

Figure 2 is a section taken on the line 2—2 of Figure 1.

Figure 3 is a section taken on line 3—3 of Figure 1.

Figure 4 is a prespective view of a formed article as extruded from the apparatus of Figure 1.

Figure 5 is a perspective view of an alternative embodiment of formed article resulting from a modification of the apparatus shown in Figure 1.

Figure 6 is a vertical longitudinal section through an alternative embodiment of finishing die.

Figure 7 is a perspective view of a formed article as extruded from the die of Figure 6.

Figure 8 is a vertical longitudinal section through a clay column forming apparatus for hollow tiles.

Figure 9 is a section on line 9—9 of Figure 8.

Figure 10 is a perspective of a formed article as extruded from the apparatus shown in Figure 8.

Figure 11 is a vertical longitudinal section through an alternative embodiment of finishing die.

Figure 12 is an illustration of an apparatus for practicing the invention by a punch process.

Figure 13 is a perspective view of a brick as produced by the apparatus shown in Figure 12.

Figure 14 is a vertical longitudinal section through an alternative embodiment of brick forming apparatus.

Figure 15 is a section on the line 15—15 of Figure 14.

Figure 16 is a section on line 16—16 of Figure 14.

Figure 17 is a perspective view of a brick as extruded from the apparatus shown in Figure 14.

Figure 18 is a fragmentary elevation from the entrant end of one of the scoring knife elements employed.

Figure 19 is a group perspective of one of such knives and its mounting key.

In the manufacture of brick and tile by the generally used stiff mud process the clay is processed, wetted and mixed, and is subsequently forced in a plastic state through forming dies in an extruded column which is subsequently cut into desired sizes and given kiln treatment. A common type of apparatus that is well known in the art includes an auger machine, the die end of which is shown as at 20 in Figures 1, 8, 14 and 15. On brick machines the auger has associated therewith a die extension member 21, as in Figure 1, provided with a tapering bore for compressing a clay column forced therethrough by action of the auger 20. The die extension has mounted thereon by any suitable means a forming or finishing die 22 provided with a bore tapered as a continuation of the die extension whereby the clay column is compressed to the desired consistency when it is extruded from the die mouth, the die 22 determining the length and width of the brick, and the thickness being determined by external cutting means, not shown, which cuts the extruded column into separate bricks.

In order to facilitate the breaking of brick into halves, quarters, and varied shapes, I provide within the finishing die means for establishing definite lines of cleavage within the clay column as it passes through the die and before it is extruded from the die mouth, which lines of cleavage are not visible on the brick face and which remain inherent in the completely finished article. One such means, as shown in Figures 1, 2 and 3, consists of scoring knives 23 carried by the walls of the finishing die 22 considerably inwardly of its mouth and extending through the die walls a predetermined distance part way across the bore, the distance of extent into the bore determining the depth of the scoring cut.

In the figures noted four knives are shown arranged as vertically aligned opposed pairs, but their number, position and inclination may be varied as desired for the production of special shapes.

As the clay column passes through the die bore the knives 23, having their blades presenting cutting edges in planes parallel to the axis of travel of the column, cut thin, relatively deep scores into those faces of the column which represent the wear face and back of the bricks to be cut therefrom. Due to the taper of the die bore and the distance of the knives relative to the die mouth the clay will flow together behind the knives as laminations pressed together. The consistency of the damp clay as it passes through the finishing die is such that while the laminations produced by the knives will flow together and adhere the bond is not complete and a definite weakness constituting a line of cleavage remains inherent in the column and of course, in the finished article.

In the manufacture of the so called "textile" brick, the faces are scored slightly by means external of the finishing dies, and in such brick concealment of the cleavage line scoring would be unnecessary. In the case of smooth face brick evidence of the cleavage line scoring would be detrimental to appearance and in order to close over the cleavage line scoring on such brick I provide the die walls with substantially elliptical depressions 24 surrounding the knives 23 with the knives lying in the planes of their major axes and their minor axes lying behind the knives in the direction of the die mouth. The depressions may be made circular if desired.

The depressions 24 provide for a greater concentration of material directly behind the knives at the face surfaces of the column so that a higher degree of compression is effected and which is sufficient to smooth over and completely obliterate the line of scoring from the face of the brick column as it issues from the die mouth, thus providing a smooth face article with a definite line of cleavage inherent therein. In Figure 4 is shown a formed brick 25 in which the scoring cuts 26 in the back and in the wear face 27 are emphasized for purposes of illustration. In the product the scoring lines 26 would not be visible on the face 27. The brick 25' shown in Figure 5 illustrates an alternative product wherein the scorings 26' are angled to procure inclined lines of cleavage for special shapes, the wear face being indicated as 27'. This arrangement is effected by proper angling of the scoring knives within the die.

Certain type of brick are produced, such as cored brick, wherein transverse bores are formed through the body to reduce weight and material. One such brick is shown as at 28 in Figure 7. In producing such brick the finishing die 22, see Figure 6, in addition to its scoring knives 23 is provided with central core means 29 designed to form the bores 30 in the product 28 the core means carrying scoring knives 31 aligned with and opposed to the knives 23, the knives cooperating to fix the line of cleavage with respect to the bores 30.

An adaptation of the invention to the manufacture of hollow tile is shown in Figures 8 and 9 wherein the auger machine 20 has an extension 32 to which is secured a finishing die 33 provided with a tapering bore and carrying a vertical bridge piece 34 within the extension, which bridge has a lateral stem 35 extending axially

outward of the die and on which is secured an outwardly flared core 36, all of which is usual construction in hollow tile machines, there generally being three such bridges and cores in a die, as shown in Figure 9. In this adaptation the desired cleavage line scoring is accomplished internally by disposing scoring knives 37 on the cores 36 to effect the scorings 38 in the bore faces of the formed product 39.

In some types of brick and tile clay a relatively high degree of compression is required immediately in back of the scoring knives in order to smooth over the line of cut on the face of the column. This is secured by providing on the inner walls of the finishing die 22, see Figure 11, internally extending rounded baffles 40 which form internal lips at the rear edges of the depressions 24 surrounding the knives 23, these lips 40 serving further to compress the clay behind the knives as it leaves the depressions 24.

Figures 12 and 13 illustrate an adaptation of the invention to the dry press method of brick making in which plungers are used, as at 41, to compress the material into bricks 42 in molds, not shown, carried on a platen 43. In this method the cleavage line formation is effected by providing the plungers with knives 44 which punch small slots 45 in the body of the bricks just within the front and back faces thereof.

I have found that in the case of extremely hard burned brick, scoring alone may be insufficient to insure accurate cleavage without internal weakening along the projected line of cleavage. In order to provide for such internal weakening in the case of bricks, as distinguished from hollow tile manufacture, I make use of the apparatus as shown in Figures 14, 15 and 16 wherein the auger machine 20 is provided with an extension 46 to the outer end of which the finishing die 47 is attached, with the usual tapered bore and scoring knives 48 positioned by wedge keys 49. As in the case of hollow tile practice, the die 47 mounts a desired number of bridges 50 having centrally disposed lateral stems 51 carrying wedge shaped cores 52 with their tapers directed toward the mouth of the die and terminating sufficiently far inwardly of the die mouth to allow the clay column to reunite after passing the cores and before leaving the mouth of the die. The bridges and cores are aligned with the knives so that the clay column is not only scored at its faces to the desired depth, but is internally laminated in alignment with the score cuts by the dividing action of the bridges and cores. These internal laminations provide central areas of weakening along the lines 53 of the formed brick 54 in alignment with the scoring cuts 55.

In practice the desired depth of scoring cut is secured by any suitable adjustment of the knives, and the internal cores arranged, where necessary, to effect internal lamination. The clay is then forced through the apparatus under pressure from the auger machine and is compressed by the taper of the die being cut at the same time to provide definite lines of cleavage which remain in the formed product although the clay has reunited without bonding behind the knives and cores, where used, before the column issues from the mouth of the finishing die.

I claim:

1. In a finishing die for brick and tile forming machines, a cutter member projecting through a wall of the die into the bore of said

die inwardly of the die mouth, and the wall adjacent said cutter being provided with a material expansion recess.

5 2. In brick and tile manufacture, the method of creating established lines of cleavage in the finished product, which consists in forcing plastic material through forming means prior to hard-

ening, partially separating the material while in the forming means along defined lines, expanding the surface area of the separated material immediately after separation, and immediately thereafter reuniting the separated material by 5 pressure within the forming means.

BAYLUS J. CHAMBLIN.