

L. HOUZE.

APPARATUS FOR BAKING, GLAZING, OR ENAMELING BRICK, TILE, OR OTHER

APPLICATION FILED OCT. 12, 1908.

952,196.

Patented Mar. 15, 1910.

3 SHEETS—SHEET 1.

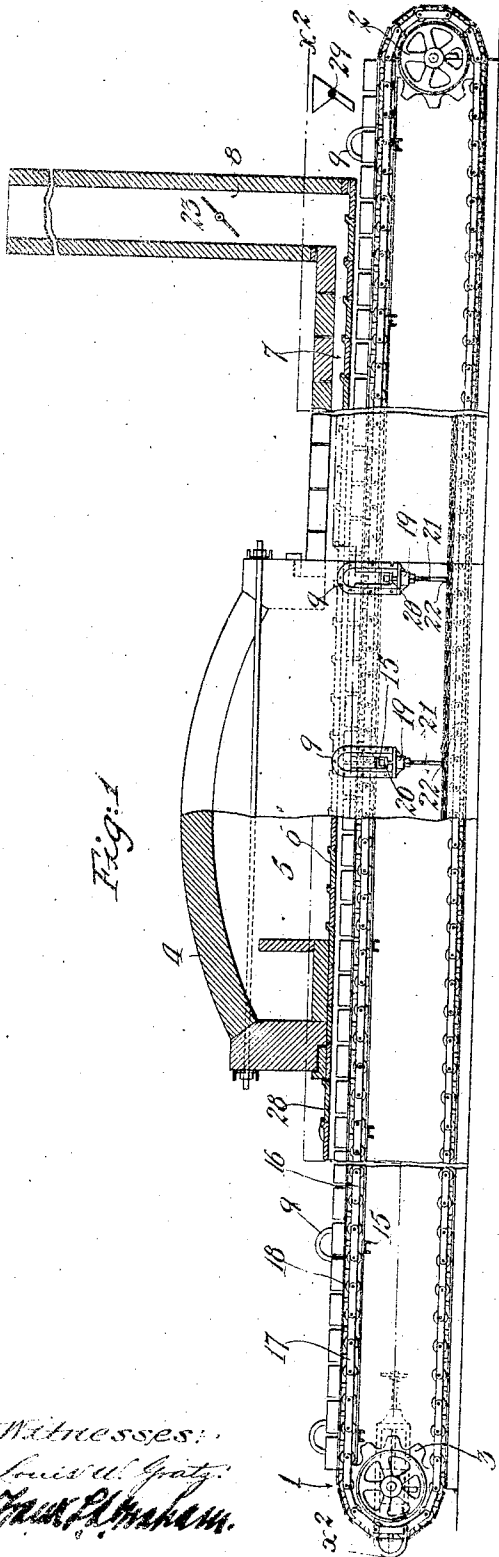


Fig. 1

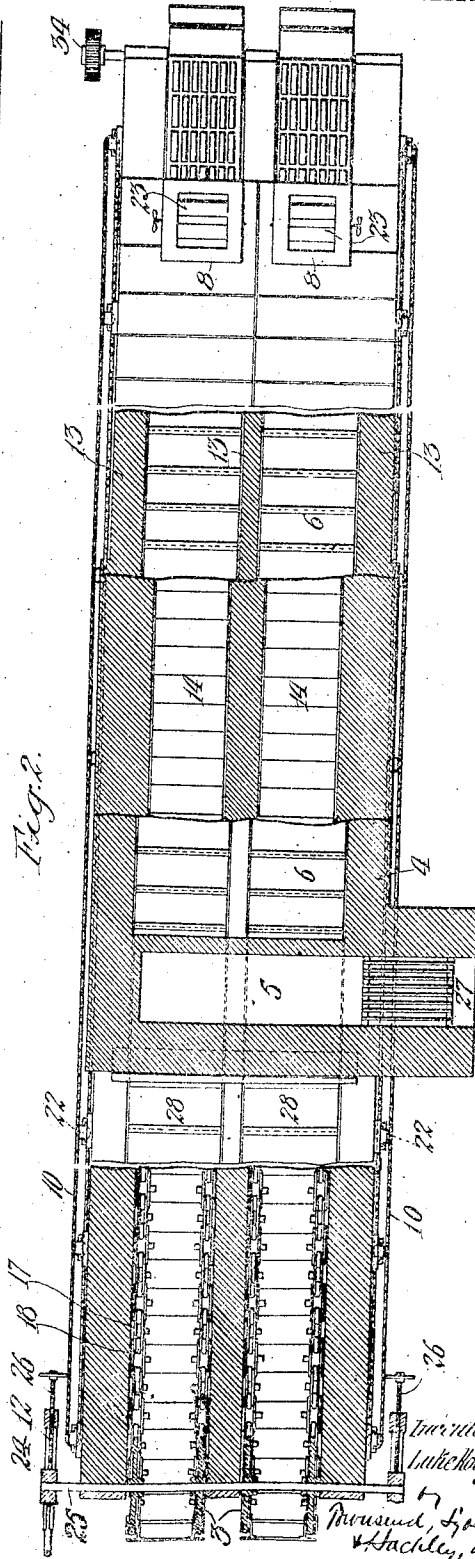
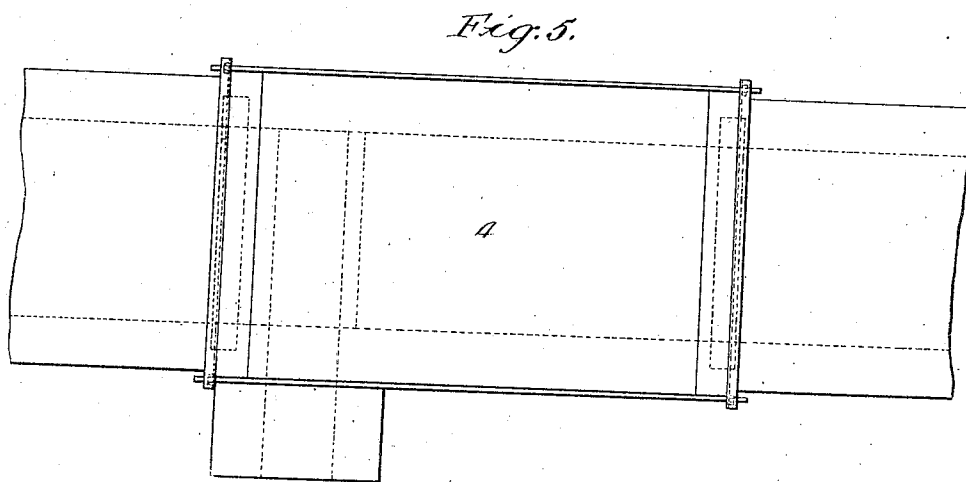
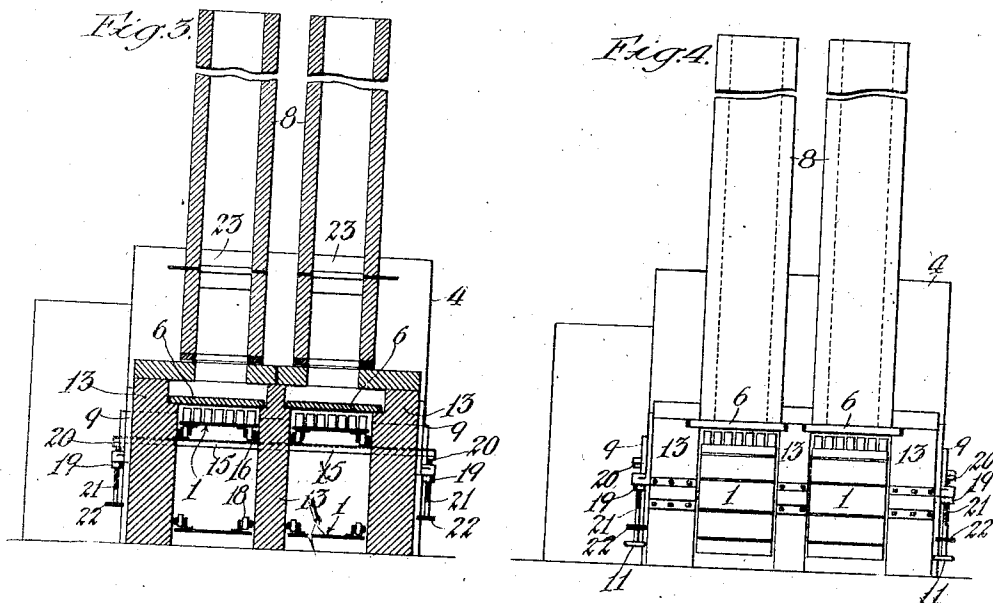


Fig. 2

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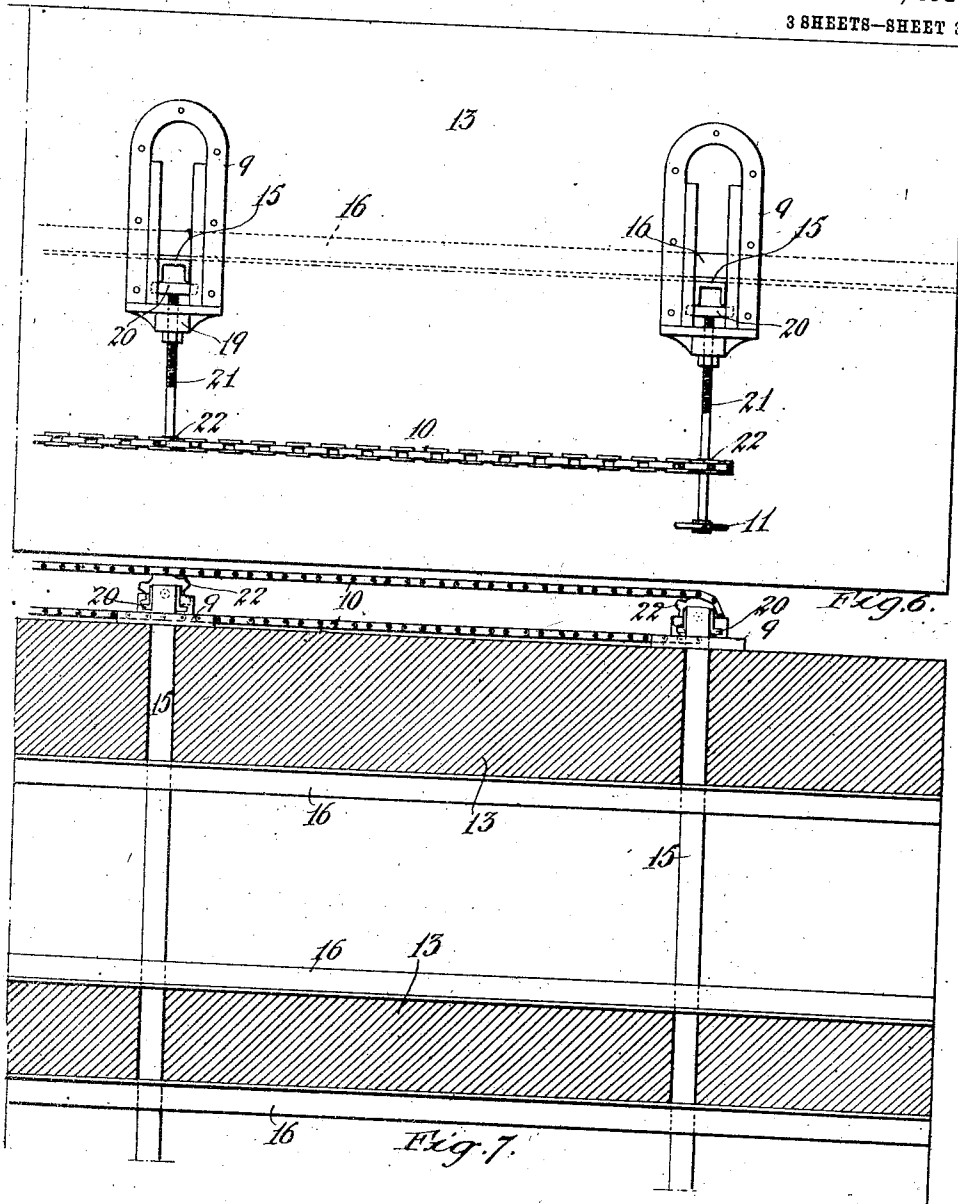
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

LUKE HOUSE, OF MONTEREY, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO E. H. WILLEY, OF MONTEREY, CALIFORNIA, AND ONE-THIRD TO W. J. PIATT, OF BERKELEY, CALIFORNIA.

APPARATUS FOR BAKING, GLAZING, OR ENAMELING BRICK, TILE, OR OTHER ARTICLES.

952,196.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed October 12, 1903. Serial No. 457,450.

To all whom it may concern:

Be it known that I, LUKE HOUSE, a citizen of the United States, residing at Monterey, in the county of Monterey and State of California, have invented a new and useful Apparatus for Baking, Glazing, or Enameling Brick, Tile, or other Articles, of which the following is a specification.

This invention is practically intended for glazing or enameling brick, tile or other articles (by rapid and continuous operation) and it is also applicable for baking or burning tile or other clay products.

The invention provides for continuous and rapid operation in the baking, burning or glazing process in place of the usual slow and expensive wasteful process generally in vogue. The usual process is to stack the articles to be baked or glazed in a kiln, and then close the kiln, and subject the articles for a considerable time to heat sufficient to bake or glaze the same, as the case may be. Such operation is unsatisfactory in that it is slow and expensive and particularly in connection with the glazing of either brick or tile, it is unsatisfactory in that it produces inequality in thickness of coating due to the running of glaze on the vertical glazed surface and in that it produces variation of color by inequality of heat in different parts of the kiln.

The main object of the present invention is to eliminate the above mentioned difficulties, cheapen the cost of manufacture and increase the uniformity of the product by subjecting the brick or tile to the requisite heat for baking or glazing as the case may be, by continuous operation, the articles being passed through the apparatus in such manner that the requisite heat is directed on to the articles successively and in a uniform manner.

The accompanying drawings illustrate the apparatus constituting the invention.

Figure 1 is a longitudinal vertical section of the apparatus partly in side elevation. Fig. 2 is a horizontal section of the apparatus on the line x^2-x^2 in Fig. 1. Fig. 3 is a transverse section through the stack. Fig. 4 is an end elevation. Fig. 5 is a partial plan. Fig. 6 is a side elevation of a part of the mechanism for adjusting the height of the carrier means. Fig. 7 is a plan of a part

of the track means for supporting the carrier means. Fig. 8 is a fragmentary elevation showing the application to baking tile.

The apparatus comprises a carrier or conveyor means 1 for supporting the brick or tile to be glazed or the tile to be baked or glazed, a furnace chamber 4 extending over a portion of said conveyor to heat the brick or tile carried by the conveyor, a warming chamber 7 extending from the furnace chamber and over another portion of the conveyor to warm the brick or tile before they reach the furnace chamber, and a flue or stack means 8 for carrying off the products of combustion from the warming chamber. The machine is shown as in duplicate, two of the conveyers being provided. Chambers 4 and 7 as well as conveyers 1 are supported by walls 13.

Each conveyor 1 consists of an apron carried by two endless chains 17 supported and operated by driving gear wheels 2 and running over a pair of gears 3 at the other end of the apparatus. Truck wheels 18 are journaled on the links or conveyor chains 1 and run on tracks 16 which extend the entire length of each conveyor directly beneath the upper run thereof. The apron 1 consists of plates extending across between the two chains at each side of the conveyor and forms a carrier for supporting the brick or tile. Tracks 16 are supported on cross-beams 15, sliding in vertical guide ways 9 and supported and operated by screws 21 which screw through supports 19 at the lower end of guide ways 9 and rotatably engage boxes 20 which slide vertically on said guide ways and carry the cross-beam 15 aforesaid. The supporting screws 21 carry sprocket wheels 22 connected together by sprocket chain 10 so that all of the lifting devices for any one track can be operated simultaneously by manual or other operating means 11 on one of said screws. Means are also provided for taking up slack in the supporting chains to keep them taut, said means comprising boxes 24 in which the shaft 25 for each pair of sprocket wheels 3 is journaled, guide ways 12 in which said boxes are longitudinally slidable, and tightening screws 26 for adjusting the position of said boxes in said guide ways. Operating pair of sprocket wheels 2 is provided with driving means 34.

The heating or furnace chamber 4 may be of any suitable construction, being for example, formed with a fire box or combustion chamber 5 at one end, which is the end nearer the delivery of the conveyer, and which has a grate or burner means 27. Said furnace chamber is provided with a floor formed, for example of tiles 6 set end to end, said tiles being sufficiently thin to enable them to transmit and radiate the heat from the chamber to the brick or tile passing below the same on the conveyer. These floor tiles are continued in the warming chamber 7 as a floor therefor, so that at no place do the gases or products of combustion come in contact with the brick or tile, but a continuous heating surface is presented above the brick or tile and in proximity thereto. Walls 13 extend downwardly from the furnace chamber and from the warming chamber between the respective conveyers and at the outside of same so that each conveyer travels in a passage 14 separate from the other conveyer. Middle wall 13 also extends to top of the warming portion 7 so as to divide it into two warming chambers 7, and separate stacks 8 are provided for these portions. A damper 23 is provided in each stack for regulating the heat. But a single furnace chamber 4 extends above both conveyer passages 14.

The conveyers 1 extend beyond the end of the warming chamber and extend to a sufficient distance to enable the brick or other articles to be placed thereon. The floor 6 is also extended as at 28 beyond the delivery of the heating chamber to prevent the brick, etc., from being cooled too rapidly and the conveyer 1 is further extended beyond this floor extension to allow the brick to be exposed for cooling sufficiently to enable them to be handled before they reach the end of the conveyer. The supporting walls 13 extend substantially the entire length of the conveyer.

The operation is as follows: In case the machine is being used for glazing or enameling brick, a conveyer is adjusted by the means 9 aforesaid so that when bricks are placed thereon the upper faces of the bricks will travel close beneath the bottom of floor 6. The burner or combustion means 27 in the fire box 5 being set in operation, the heating chamber 4 is brought to a high temperature, so that the floor 6 thereof is at a temperature of from 500 to 2000 degrees Fahrenheit, as needed. The waste gases passing through the warming chamber 7 also heat the floor of said chamber, the temperature decreasing progressively toward the stack. The floor of the heating and warming chambers constitutes the roof of the chambers or passages wherein the conveyers travel, and it will be seen that that roof progressively increases in temperature from the intake end of such

passages to the part which is under the heating chamber. The conveyer being set in motion, the bricks are placed thereon as indicated, side by side, with those uppermost which are to be glazed. The brick may be dipped in glazing material so that the said faces are coated with said material before they are placed on the conveyers or, if desired, the glazing material may be sprinkled or fed on to the top of the bricks by any suitable means, such as indicated at 29 after they are placed on the conveyers and before they pass into the heating apparatus. Bricks so coated are carried by the motion of the conveyer under the heated floor of the warming chamber and the radiation from said floor gradually warms the brick and the glazing material thereon so that by the time the brick reaches the part of the floor which is underneath the furnace chamber 4 it will have been brought to a temperature sufficient to stand the full temperature of operation without cracking, the warming chamber being of sufficient length for this purpose. Further movement of the conveyer carries the brick underneath the heating chamber so that the full heat of the floor of said chamber, is radiated on to the top of the brick and fuses the glazing material uniformly, quickly and effectually. From two to seven minutes suffice for the passage under the heating or furnace chamber, for glazing or enameling brick. The time required for the passage of the brick through the apparatus is only a small part, of the time required for the ordinary kiln operation, and the process being continuous the capacity of the apparatus is much greater than is possible with a kiln of the same size or cost. Furthermore, the heat being applied in the same manner to all the brick, there is uniformity of glazing, and the fact that the glazed surface in each case is extended horizontally, prevents running and inequality of the glaze. Moreover, in case colored glazes or enamels are used which are generally subject to change of color by heat, the uniformity in the operation of heat produces a uniformity in color, which is desirable, as it obviates assorting and prevents a large source of waste by eliminating over-burned or under-burned products. When the bricks reach the delivery end of the heating chamber, the glaze or enamel has been fully fused and a further movement of the conveyer allows the brick to cool first gradually under the cover means 28 and then more rapidly at the exposed portion of the conveyer beyond the cover means, the brick being cool enough to be handled by the time they have reached the end of the conveyer, where they are removed from the conveyer. For different thicknesses of brick the conveyer may be raised or lowered, as required, by the adjusting means 9 so that

the top of the brick always runs close to the floor of the heating and warming chambers.

In applying the invention to baking of tile, the tile, a few of which are indicated at 31 are placed on suitable supporting bricks 32 to hold the same in proper position for treatment without bringing the conveyer apparatus too close to the heating surface, and the tile so placed are run through the conveyer passages underneath the heating surfaces so that the same are warmed below the warming chamber and then brought to a high temperature by passing beneath the heating chamber. The floor of the heating chamber is brought to the temperature of heat required for the operation 1200 to 2000 degrees Fahrenheit, it being understood that in any case the furnace will be brought to the temperature required for the operation in hand. The tile pass out from beneath the delivery end of the heating chamber and are cooled as above described in the case of the brick and eventually removed from the conveyer. In glazing the tile, the process is substantially the same as with the glazing of brick, the temperature being lower for glazing than for burning.

What I claim is:

1. An apparatus for baking clay products for burning or glazing same comprising a conveyer, means for producing continuous longitudinal motion thereof, a furnace chamber extending over part of the conveyer and having a flat floor extending over the conveyer and adapted to transmit and radiate heat from the furnace chamber toward the conveyer, a warming chamber communicating with the furnace chamber and extending over a part of the conveyer in advance of the furnace chamber, and means for leading products of combustion from the furnace chamber through the warming chamber, the said furnace and warming chambers and the floors thereof being wholly above the conveyer, whereby the products on the conveyer are heated only on their upper surfaces to direct the heat from the floor downwardly onto the products on the conveyer.

2. An apparatus for baking clay products for burning or glazing same comprising a conveyer, means for producing continuous longitudinal motion thereof, a furnace chamber extending over part of the conveyer and having a flat floor extending over the conveyer and adapted to transmit and radiate heat from the furnace chamber toward the conveyer, a warming chamber communicating with the furnace chamber and extending over a part of the conveyer in advance of the furnace chamber, and

means for leading products of combustion from the furnace through the warming chamber, the conveyer extending beyond the warming chamber to form a receiving portion and extending beyond the furnace chamber to form a cooling and delivery portion, the said furnace and warming chambers and the floors thereof being wholly above the conveyer, whereby the products on the conveyer are heated only on their upper surfaces to direct the heat from the floor downwardly onto the products on the conveyer.

3. An apparatus for baking clay products for burning or glazing same comprising a conveyer, means for producing continuous longitudinal motion thereof, a furnace chamber extending over part of the conveyer and having a flat floor extending over the conveyer and adapted to transmit and radiate heat from the furnace chamber toward the conveyer, a warming chamber communicating with the furnace chamber and extending over a part of the conveyer in advance of the furnace chamber, means for leading products of combustion from the furnace through the warming chamber, the conveyer extending beyond the warming chamber to form a receiving portion and extending beyond the furnace chamber to form a cooling and delivery portion, and a cover means extending over the first part of said cooling portion of the conveyer, the said furnace and warming chambers and the floors thereof being wholly above the conveyer, whereby the products on the conveyer are heated only on their upper surfaces to direct the heat from the floor downwardly onto the products on the conveyer.

4. An apparatus for baking or glazing clay products for burning or glazing the same comprising two endless chains, carrier means supported by said chains forming a conveyer apron, two pairs of sprocket wheels supporting said chains, means for driving a pair of said sprocket wheels, means for longitudinal adjustment of the other pair of sprocket wheels to tighten the conveyer chains, means for vertical adjustment of a part of the conveyer chains, and a heating chamber extending over a part of the conveyer apron and having a floor adapted to receive and transmit heat from the heating chamber and radiate it toward the conveyer apron the said heating chamber and its floor being wholly above the conveyer apron.

LUKE HOUZE

In presence of—

GEO. S. GOULD, Jr.,
R. H. WILLEY.