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T. S. CURTIS

APPARATUS FOR BURNING BRICK

Filed Aug. 9, 1919

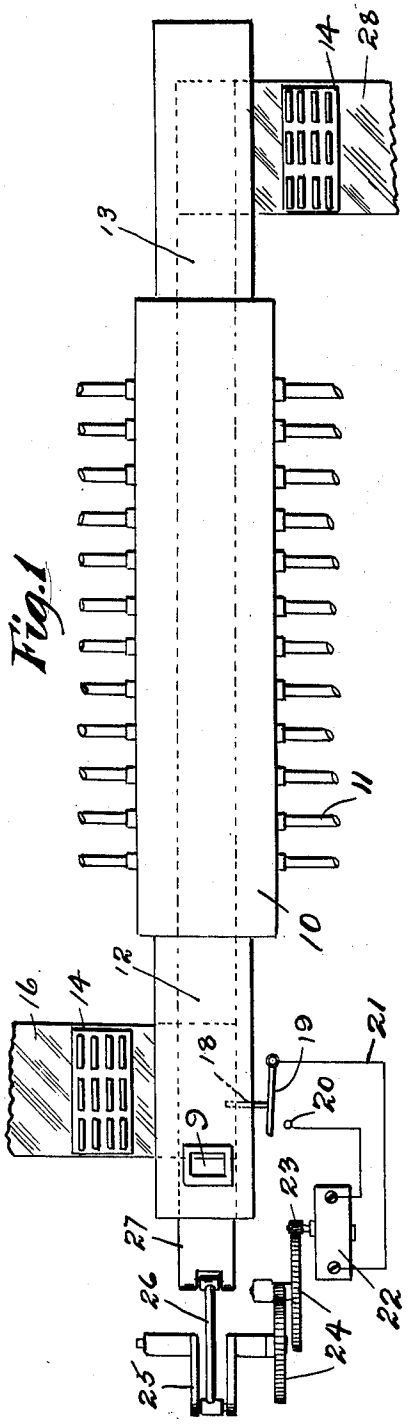

Fig. 1

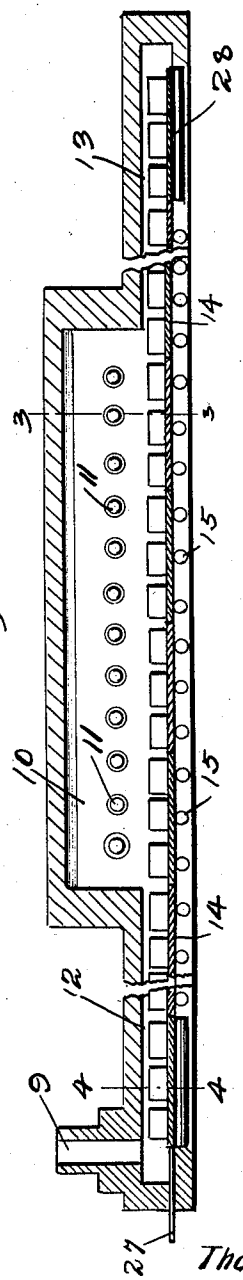

Fig. 2

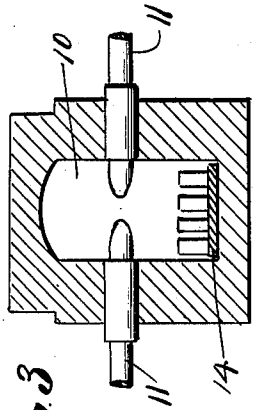

Fig. 3

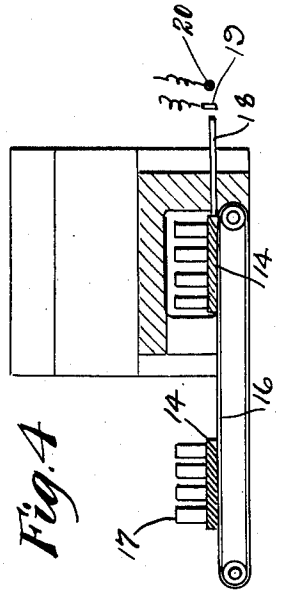

Fig. 4

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING BRICK.

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To all whom it may concern:

Be it known that I, THOMAS STANLEY CURTIS, a citizen of the United States, and resident of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Apparatus for Burning Brick, of which the following is a specification.

This invention relates to apparatus for burning or baking bricks or other pieces of material, and has for its object to provide means whereby the bricks or pieces may be spread out or separated and not operated upon in the usual pile or stack and heat being applied so as to gradually raise their temperature to the desired degree to greatly reduce the time required for burning the brick and eliminate the inefficient methods of handling the brick now employed.

In burning brick by the old pile or stack process but a small percentage of the bricks will receive approximately the required temperature, the remainder being either over or under heated depending on their location relative to the heat applied whereas by my improved process every brick receives exactly the same baking, sintering and cooling as that of every other brick, with the result that the quality of the production is absolutely uniform.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1—is a plan view of my improved furnace, illustrating the supply feed, the method of advancing the lots to be burned and the discharge conveyor.

Figure 2—is a sectional side elevation of the apparatus.

Figure 3—is a section on line 3—3 of Figure 2 through the main heat chamber.

Figure 4—is a section on line 4—4 of Figure 2 showing the means for feeding the different lots to the carrier.

Referring to the drawings, 10 designates the main heat chamber of my improved kiln or brick burning or baking apparatus which is constructed of suitable refractory or high heat resisting material, the same being elongated and provided with a multiplicity of electrodes 11 arranged in pairs and extending inwardly through the opposite side walls of this chamber. These electrodes may be arranged in two sets of six each if desired whereby alternate sets may be operated during the renewing or repairing of the members of the other set.

At either end of this chamber are elongated communicating passageways 12 and 13 respectively of a size in cross section just large enough to receive the brick receiving platens or trays 14 when set end to end, the passageways being so arranged as to receive and be heated by the exhaust or escaping gases from the main heating chamber 10, which gases are conducted away through a chimney or gas flue 9 at the entering end of passageway 12 the heat in this passageway serving to preheat or gradually raise the temperature of the bricks as they approach the highly heated chamber 10.

In the floor of both of these passageways and also in the main chamber are set spaced apart rolls 15 on which the platens or trays rest to reduce the frictional resistance of moving them and their loads of bricks from the entering end of one passageway to the discharge opening at the opposite end of the other passageway.

In order to feed the different lots of bricks to the kiln at the desired intervals, I have provided a conveyor 16 on which the trays 14 are placed by the attendant, each carrying the desired number of green bricks 17 set on edge. The conveyor being timed to feed the tray to the furnace at predetermined intervals.

As these trays are carried forward by this conveyor and upon reaching the desired position in the passageway 12 the tray engages and moves a pin 18 to in turn move the contact arm 19 into engagement with the contact 20 to close the electric circuit indicated by wires 21 and energize the motor 22 which acts through the pinion 23 and train of gears 24 to rotate the crank 25 which is connected through the rod 26 to the slide 27. This slide then advances and pushes the tray forward with its load of bricks one of its lengths into the passageway 12. The mechanism continues to operate until the crank 25 has made one complete revolution, when it is arrested by suitable means (not shown)

back in the position in which it originally started ready for the next pushing operation.

After the desired interval the next tray is caused to be advanced into the passageway and starts the operating mechanism in the manner above described, causing the same to push this second tray together with those previously fed, one length ahead. This operation is repeated passing each tray ahead at intervals or step by step first through the preheating chamber where the temperature of the bricks is gradually raised by the heat in this passageway or chamber then through the main chamber beneath the arcs formed therein by the electrodes 11 then out through the discharge passageway 13 where they are gradually cooled and finally forced onto the discharge conveyor 28 by which these trays carrying their now thoroughly treated or burned contents are conducted away.

By this apparatus and my improved method of burning or baking, it will be seen that each lot or tray full of bricks is advanced step by step and the heat increased gradually until they reach the electric arcs in the main chamber and continue to advance out through passageway 13 where they are gradually cooled as they recede from the source of heat, thus preventing any possibility of cracking which would be the case if they were permitted to be heated or cooled too quickly. This method produces the very highest quality of bricks which are most uniform in character and are of the highest quality.

While my improved kiln offers many inducements to those who desire to burn the standard fireclay brick at a lower cost and with greater uniformity in quality than is possible with ordinary methods, its greatest field of application is probably in the burning of very high refractory brick which requires extreme care in handling and very high temperature applied in a particular manner. In the case of brick which cannot be handled in stacks or piles, my improved method provides for passing the green pieces through the kiln on trays which move very slowly, and without excessive jars or vibrations and upon which the pieces are placed without coming into contact one with the other.

Where a special treatment is necessary, as in the case of especially difficult compositions, my electric kiln offers exceptional advantages as the brick may be given any required amount of burning, preheating or cooling without the necessity of making any change in the kiln itself or its electrical apparatus; this change in length or time of treatment is effected merely by altering the speed of the belt conveyor 16 which feeds the trays loaded with green bricks to the preheating passageway 12.

I have shown and described one means by which the bricks or analogous objects may be passed through the furnace but I do not wish to be restricted to this particular means of conveying the objects as any suitable means may be employed for this purpose.

It is found in practice that by the application of electric heat for burning bricks of refractory material by my improved process that the very high temperature I am thus able to maintain renders the product much more satisfactory and uniform in quality than is possible to be obtained by burning it in a batch or kiln, or by the use of wood, coal, oil or gas as fuels, and the time required for burning is also materially reduced.

In the specification and claims I have referred to the apparatus and the method as adapted to operate upon bricks, but I do not wish to be restricted or limited to the use of this apparatus for baking or burning bricks as it is most obvious that the same is capable of operating upon many other types of articles; and by the term "bricks" I wish to be considered as covering such articles as may be operated upon by my improved method and apparatus; and by the term "burning" I mean to cover baking or otherwise treating the articles to a high degree of heat.

Having thus described one illustrative embodiment of my invention and the best mode known to me for carrying out my method, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for the purpose of limitation, the scope of the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A kiln comprising a highly-heated chamber, means for localizing the heat in said chamber, means for conducting the work to be treated at a predetermined speed past the high temperature point, means for automatically introducing the work into the heating chamber through an opening in the side thereof, means for automatically and intermittently feeding the work as introduced at a predetermined speed to the furnace, and means for automatically conducting the treated work from the furnace.

2. A kiln for baking brick or the like comprising a highly-heated chamber, a preheating passageway for the work leading to said chamber, platens on which a plurality of the bricks are deposited, a feeder for automatically introducing the bricks and platens into the heating chamber through an opening in the side thereof, means for conducting said platens step-by-step at a predetermined speed through said passageway and chamber, and means for automatically feeding the platen from the furnace intermittently at predetermined intervals.

3. In a brick kiln, a plurality of trays each adapted to carry a plurality of bricks, means for automatically feeding the trays intermittently and successively to the kiln through an opening in the side thereof, means for advancing the trays step-by-step through the kiln as fed, means whereby the advancing movement of the entering tray is caused to force the preceding trays through the kiln, and means for discharging the trays from the kiln upon reaching a predetermined point therein.

4. In a brick kiln, a plurality of trays each adapted to carry a plurality of bricks, means for automatically feeding the trays intermittently and successively to the kiln through an opening in the side thereof, reciprocating means for automatically advancing the trays through the kiln as fed, means whereby the advancing movement of the entering tray is caused to force the preceding trays through the kiln, and means for discharging the trays from the kiln upon reaching a predetermined point therein.

5. A brick kiln comprising a highly heating chamber, passageways leading to and from said chamber, heated to a lesser degree, spaced-apart antifriction rollers mounted along the passageways and chamber, a plurality of trays, each adapted to carry bricks, a belt for feeding said trays to one of said passageways, means for automatically transferring said trays from said belt to and feeding them intermittently through said passageways as they are presented thereto, and a belt for automatically removing said trays after having passed through said heating chamber and the other of said passageways.

In testimony whereof I affix my signature.

THOMAS STANLEY CURTIS.