Nov. 6, 1923. 1,473,152

H. D. LILLIBRIDGE

TUNNEL KILN CAR

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Fig. 1.

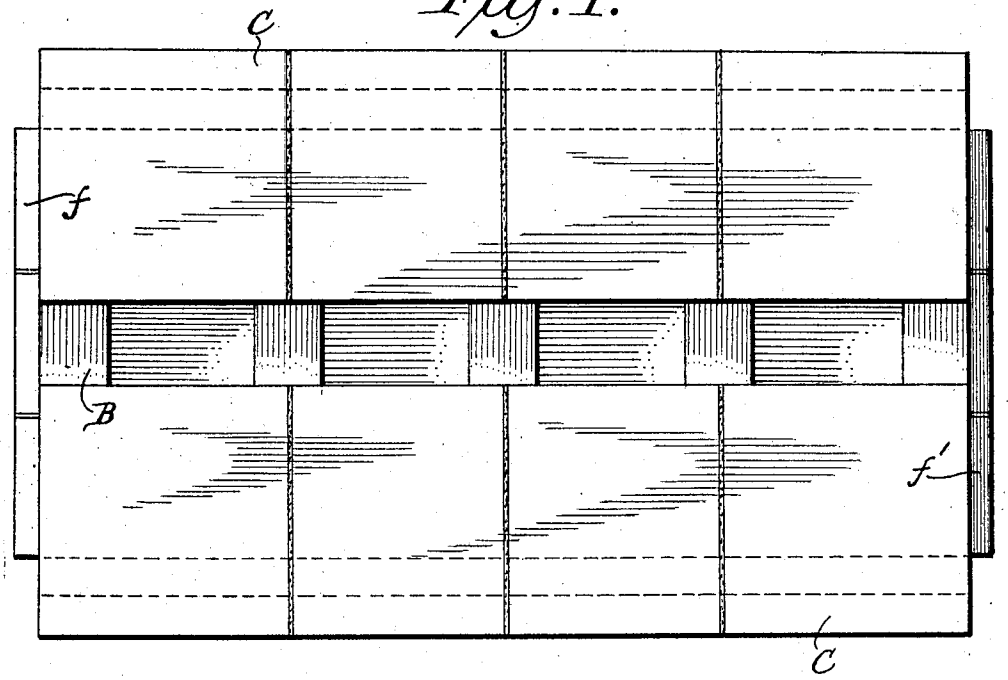
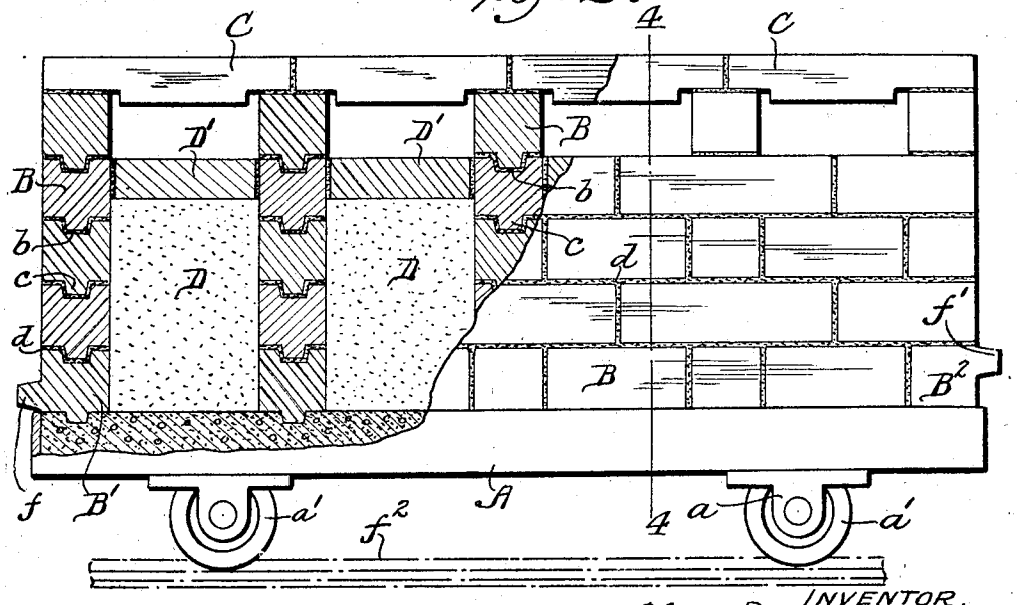


Fig. 2.



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Fig. 3.

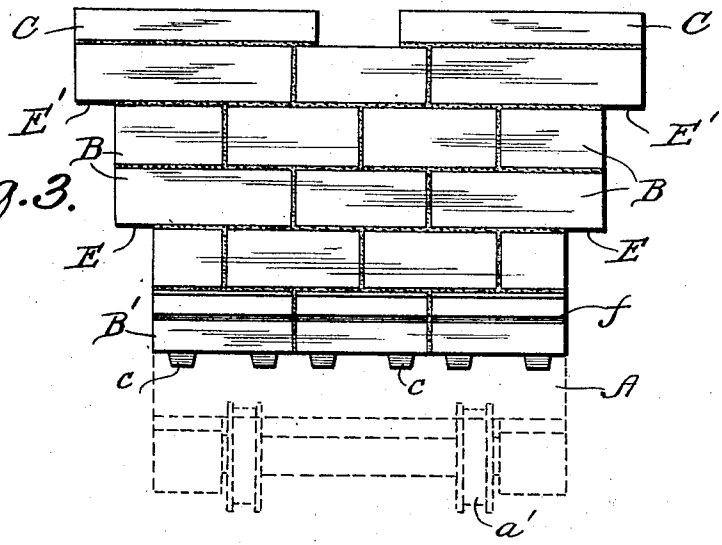
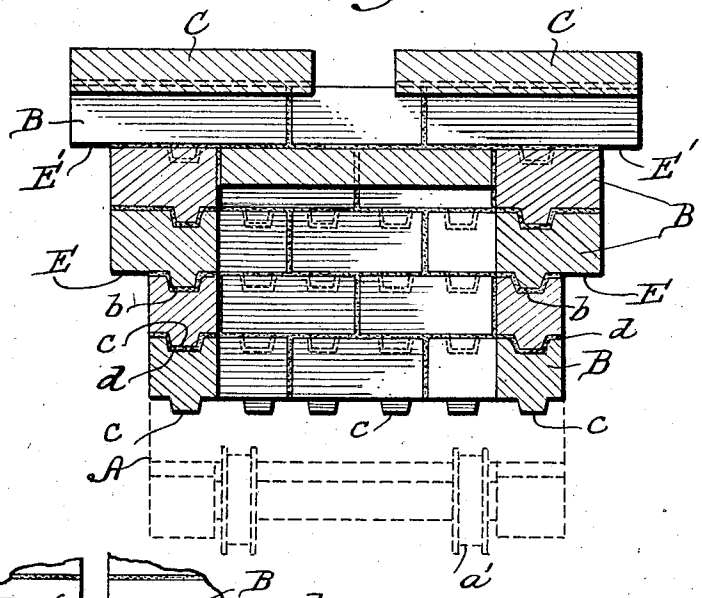


Fig. 4.



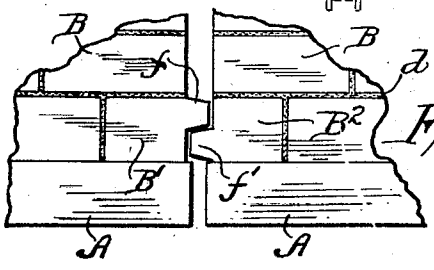


Fig. 5.

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Patented Nov. 6, 1923. 1,473,152

UNITED STATES PATENT OFFICE.

HARRY D. LILLIBRIDGE, OF ZANESVILLE, OHIO, ASSIGNOR TO AMERICAN ENCAUSTIC TILING CO., LTD., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TUNNEL KILN CAR.

Application filed March 21, 1921. Serial No. 454,037.

To all whom it may concern:

Be it known that I, HARRY D. LILLIBRIDGE, a citizen of the United States, residing at Zanesville, in the county of Muskingum and State of Ohio, have invented a certain new and useful Improvement in Tunnel Kiln Cars, of which the following is a specification.

This invention is a kiln car, the same being adapted for use, more particularly, as a vehicle for transporting ceramic material to and from a chamber within which said material is subjected to high temperature for firing or burning the same.

As heretofore constructed, cars for the specified service have embodied a wheeled platform upon which is erected a load-carrying structure composed of fire brick bonded by appropriate material. Owing to the high kiln temperature and the weight of the load imposed upon the cars, the fire brick structure deteriorates with comparative rapidity, experience having shown that the bonding material disintegrates under the service temperature so that the superposed bricks fall apart, as a result of which the cars must be repaired and the load-carrying structure renewed with undesirable frequency.

The object of this invention is to increase the durability of the car or vehicle and to minimize repairs and renewals, thus attaining economy and efficiency in the service of the cars.

According to my invention, the load-carrying structure on the wheeled platform is composed of fire brick or equivalent elements interlocked one to the other for precluding relative displacement upon the deterioration of the bonding material.

Other functions and advantages of the invention will appear from the following description taken in connection with the drawings, wherein—

Figure 1 is a plan view of a kiln car constructed in accordance with the invention.

Figure 2 is a side elevation partly broken away and in section, illustrating the interlocking bricks or slabs.

Figure 3 is an end elevation.

Figure 4 is a vertical transverse section in the plane of the dotted line 4—4 of Figure 2, and

Figure 5 is a fragmentary detail view of the meeting end portions of two abutting cars illustrating the lap joint attained by a certain construction of the brick structures at the respective ends of the cars.

The platform A is provided as usual with wheel hangers a for the wheels a' adapted to the rails f^2 (see dotted lines in Figure 2) whereby the car is movable within a tunnel kiln, or analogous structure.

A load-carrying structure is erected upon the wheeled platform for supporting thereon the load of ceramic material to be fired or burned within the kiln chamber. Said load-carrying structure is composed essentially of interlocked bricks or slabs B superposed and bonded together and supporting top slabs C upon which rest the saggers containing the ceramic material.

As shown in the drawings, each brick B is provided on the top face thereof with a pocket b and on the bottom face with a tenon or projection c, the pocket and the projection occupying corresponding positions on said top and bottom faces in order that the brick may be interlocked with other bricks when a number of said bricks are assembled in superposed order.

The structure is chambered as shown in Figures 2 and 4, for which purpose the bricks are laid to produce continuous walls at the respective sides and at the opposite ends, there being cross walls at intervals between the side walls, see Figure 2, as a result of which a plurality of chambers D are produced within said structure. As shown, the courses of bricks are laid to break joints, and the bricks in each course are bonded together and to the bricks of adjacent courses, the bonding material d extending between the faces of the bricks and within the pockets c so as to encase the tenons b, see Figures 2 and 4, whereby the several bricks are united into a solid unitary structure.

The bricks comprising the side walls and the end walls are so proportioned and assembled as to produce the overhangs E E′ at the respective sides of the brick structure on the vehicle or car. Said overhangs of the brick structure co-operate with appropriate recesses and ledges in the walls of the kiln (not shown), the relation being such as to result in the production between

the opposing surfaces of the car and the kiln walls of baffles by which the flow of heat downwardly is arrested in the narrow spaces intervening the car and said kiln walls.

The bricks in the lower course are laid upon the platform for the tenons *b* of said bricks to enter sockets provided in the platform, see Figure 2, but the bricks in the top course of the structure are provided with flat upper surfaces on which are imposed the top slabs C, the latter being rabbeted to fit the top courses of bricks in the side, end, and cross walls of said structure, the said slabs being bonded to the top courses of bricks.

As usual, the chambers within the load-carrying structure and intermediate the cross walls thereof are filled to a suitable height with sand, or other heat non-conductor D, see Figure 2, and upon the filling material is imposed slabs D′, the latter acting to preclude direct contact of the heat with the non-conducting material and to impose pressure upon said material for compacting the same more or less within the chambers.

At the respective ends of the car, the bricks B′ B^2 in the lower course are provided with tongues *f f′* respectively. At one end of the car, the bricks B′ in the lower course of bricks are provided with tongues *f*, each tongue *f* being positioned on the upper half of one brick B′, which bricks B′ of the lower course extend across one end of the car. At the opposite end of the car, and on the bricks B^2 in the lower course extending across said end, each brick B^2 is provided on the lower half thereof with a tongue *f′*, all as shown in Figure 5, said tongues *f*, *f′* on the bricks B′, B^2 in the lower courses and at the abutting ends of two adjacent cars being relatively positioned so as to horizontally lap one over the other as shown in Figure 5. When the cars are positioned within the kiln, either at rest or moving therein, said cars abut at their ends, and under such conditions of service, the bricks B′ at the end of one car are so related to the bricks B^2 at the adjacent end of the next car that the tongues *f* on B′ overlap the tongues *f′* on B^2, the effect of which is to close the narrow interval or space intermediate the adjacent cars against the downward flow of the heat between said cars.

The cars are moved on the tracks outside of the kiln and to positions convenient for the operators so as to pile or stack the saggers, loaded with ceramic material, upon the top slabs of the brick structure. The loaded car is now moved into the kiln, and it usually co-operates with a series of other similar cars, the introduction of a fresh car operating to advance the other cars within the kiln and to eject from said kiln the car at the end opposite to that end into which the fresh car is introduced.

Upon introducing the car within the kiln chamber, the overhanging portions E E′ at the respective sides of the car overlap corresponding ledges provided on the respective side walls of the kiln chamber, and the bricks B′ at one end of the introduced car overlap the bricks B^2 at the abutting end of the car previously introduced, as a result of which the spaces intermediate the kiln side walls, and the car are closed by the overhangs E E′, and the spaces between the ends of the abutting cars are closed by the overlapping bricks B′ B^2, whereby the downflow of heat through said spaces is minimized.

It will be noted that the tenon *c* is positioned centrally with reference to the width of the under face of the brick, whereby the tenons enter the sockets upon the assemblage of the bricks for the faces of said bricks to have the required bearing one upon the other and to provide for the adhesion of the bonding material. Obviously, the number of tenons and pockets may be increased as demanded by the dimensions of the brick or slab, and such other modifications may be made as will suggest themselves to a skilled mechanic without departing from the spirit of my invention, one of the essential features of which is the provision of means unitary with the bricks to effect an interlocking engagement of the assembled bricks.

In the service of the cars as ordinarily constructed it is found that the heat within the kiln chamber tends to disintegrate the bonding material by which the bricks are united, and the weight of the load imposed upon the brick structure tends to dislodge the bricks and cause them to bulge outwardly from the faces of the walls when such disintegration occurs in the bonding material; but in my invention this tendency of the bricks to bulge outwardly and to become displaced is wholly overcome by the interlocking engagement between the superposed bricks, such interlock of one brick with another precluding the relative displacement of the bricks one to the other whereby the bricks are held securely in their alined relation so that the bricks are not displaced nor do they bulge with respect to the plane of the wall. The car is thus constructed for the brick load-carrying structure to resist the action of the heat and to withstand the pressure of the load, as a result of which the necessity for repairs and replacements at frequent intervals is obviated, and the durability and serviceability of the cars is promoted with an attendant economy of maintenance charges.

Although I have illustrated and described

the car as adapted for use in kilns for firing ceramic materials, it will be understood that the invention is not restricted to this particular service, for the reason that the improved car may be used in other machines wherein cars are exposed to heat and subjected to more or less heavy loads.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a vehicle of the class described, a load-carrying structure embodying bricks or slabs provided on their meeting faces with mortices and tenons, said bricks or slabs being interlocked and bonded to preclude dislodgment of the bricks under the stresses of the load and upon disintegration, more or less, of the bonding medium.

2. In a vehicle of the class described, a load-carrying structure composed of bricks or slabs provided on their meeting faces with mortices and tenons, the courses of said bricks or slabs being interlocked one to the other and bonded together for resisting relative displacement under the disintegration of the bonding medium.

3. In a vehicle of the class described, a load-carrying structure composed of bricks or slabs, bonded together and provided on their meeting faces with mortices and tenons by which said slabs or bricks are interlocked, the side walls of the structure being provided with a succession of protruding ledges adapted to minimize the downflow of heat past said protruding side walls.

4. A vehicle of the class described embodying a wheeled platform and a load-carrying structure erected thereon, said structure being composed of bricks or slabs each provided with a tenon and a socket whereby the superposed bricks or slabs are interlocked when bonded together for precluding relative displacement of said bricks or slabs.

5. A vehicle of the class described embodying a wheeled platform, and a load-carrying structure carried by said platform, said structure comprising bricks or slabs bonded in courses, said bricks or slabs being provided with mortices and tenons for locking the bricks or slabs of one course with the bricks or slabs of an adjacent course, the bricks in the lower course and at the respective ends of the car being provided with members extending beyond the vertical faces of said load-carrying structure.

6. A vehicle of the class described embodying a wheeled platform, and a load-carrying structure carried by said platform, said structure comprising bricks or slabs assembled in courses and said bricks or slabs being provided with mortices and tenons whereby the bricks or slabs in each course are interlocked with bricks or slabs in adjacent courses, the whole being bonded into an unitary structure, the bricks or slabs above the lower course and at each side of the structure protruding from the vertical side faces of said structure and thereby positioned in overhanging relation to the bricks or slabs of said lower course.

In testimony whereof I have hereto signed my name this 18th day of March, 1921.

HARRY D. LILLIBRIDGE.