

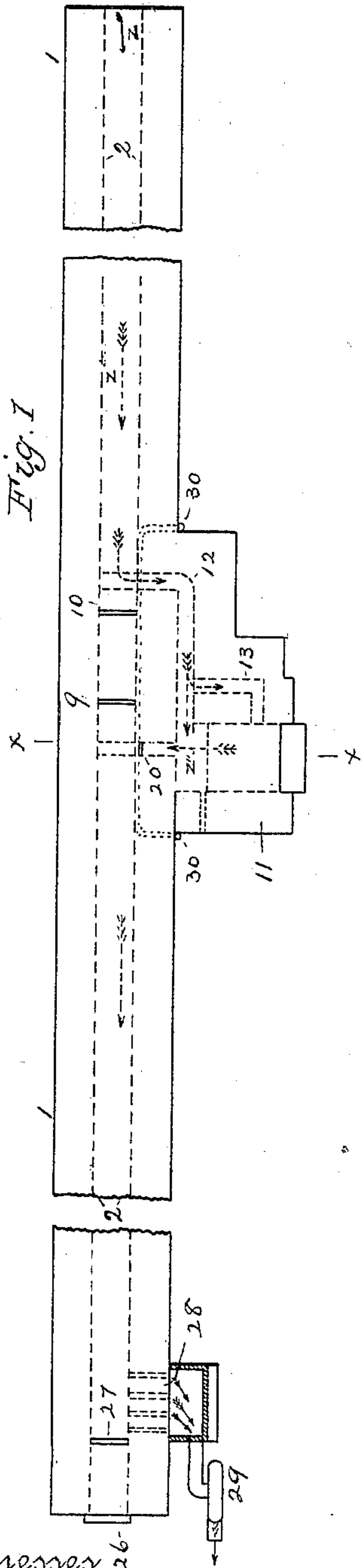
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3 Sheets—Sheet 1.

J. F. BYERS.
BRICK KILN.

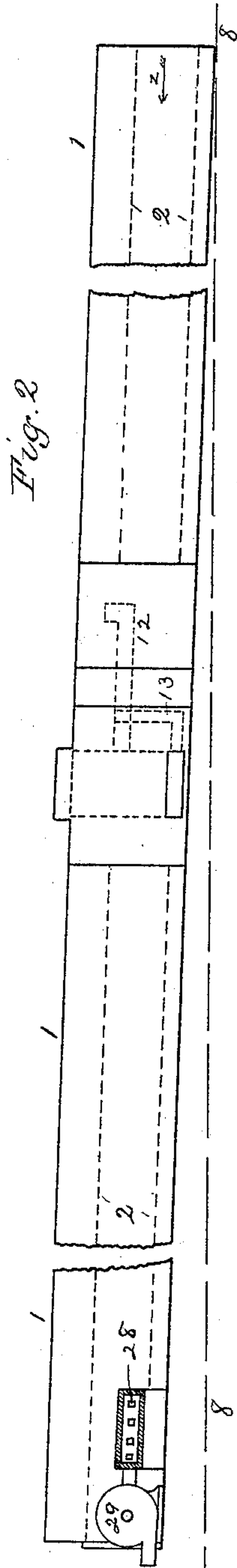
No. 427,550.

Patented May 13, 1890.



Witnesses

E. M. Schumann
J. T. Churchill



Inventor

By *John F. Byers*
Attorney
H. G. Gunkel

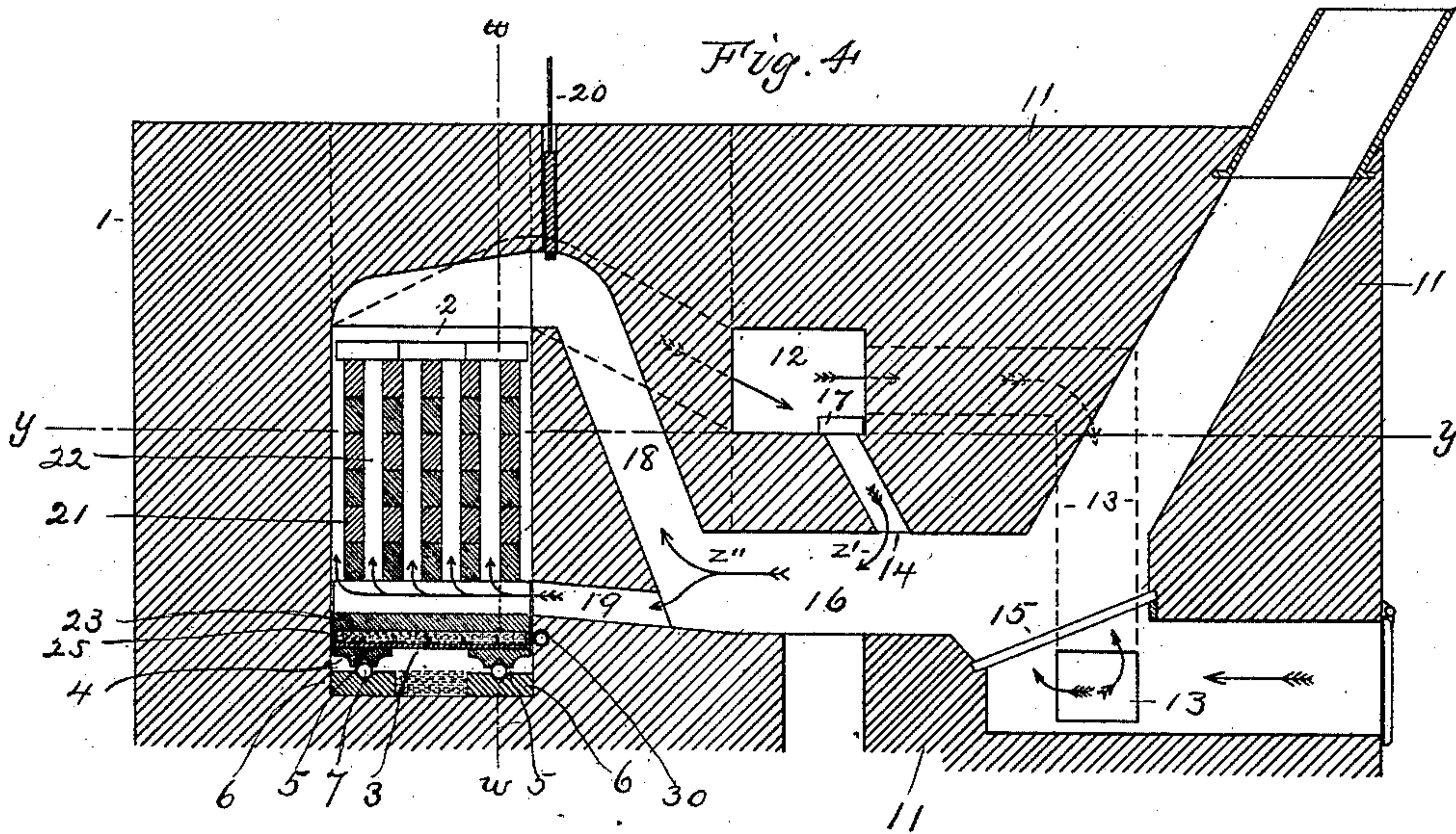
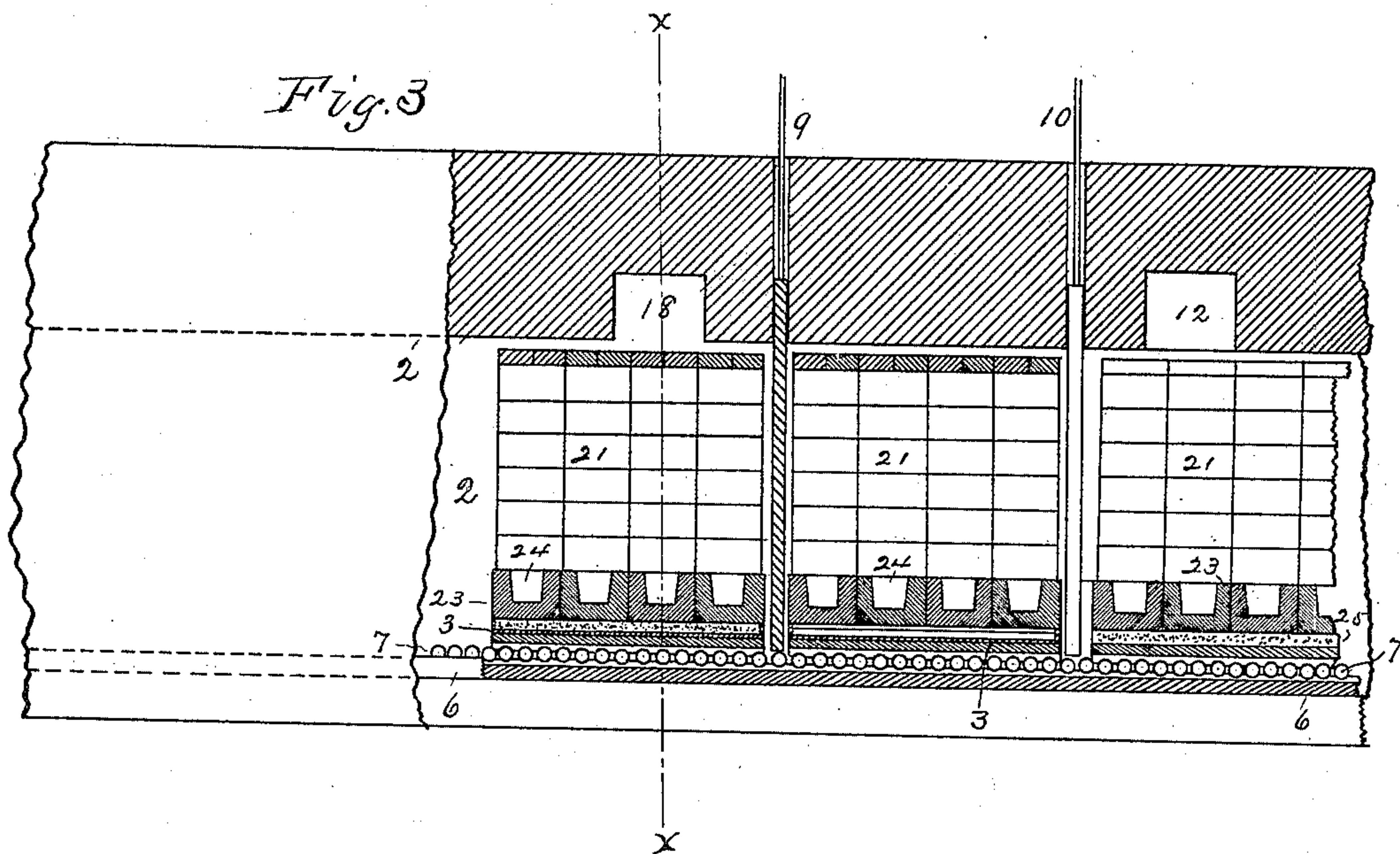
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Attorney *P. H. Gunkel*

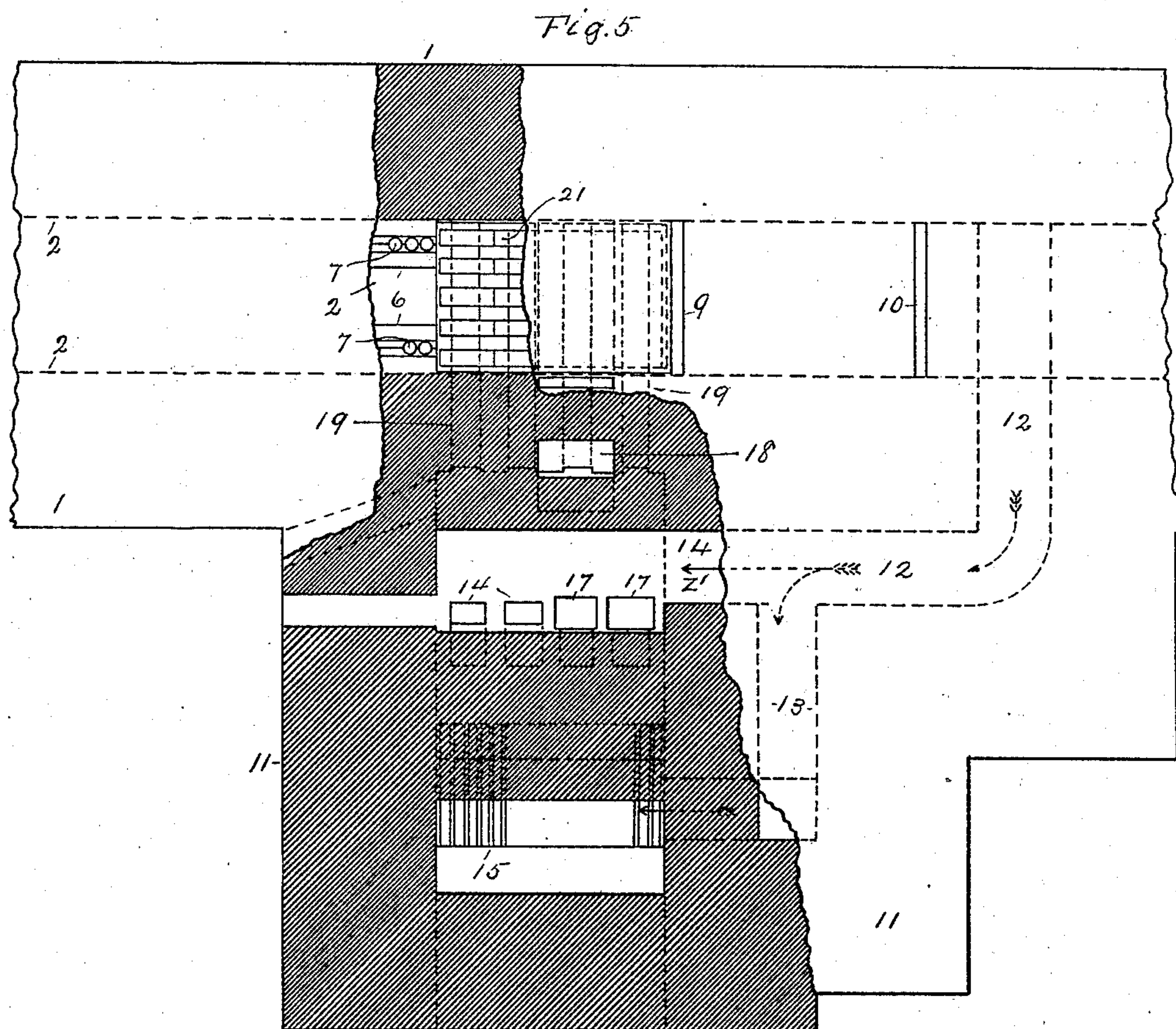
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E. M. Schumann
J. T. Chrischilles

Inventor

By *John F. Byers*
his Attorney *P. H. Guinckel*

UNITED STATES PATENT OFFICE.

JOHN F. BYERS, OF MINNEAPOLIS, MINNESOTA.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 427,550, dated May 13, 1890.

Application filed February 17, 1890. Serial No. 340,662. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. BYERS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Brick-Kilns, of which the following is a specification.

My invention relates to means for using furnaces of the regenerating class in the burning of brick.

The object of the invention is to organize an arrangement of devices whereby the brick may be intermittently moved through a continuous tunnel into which cold air enters at one end and passes among the heated brick to support combustion in a furnace and the heated air conducted thence through the tunnel to be discharged at its opposite end.

The features of invention will be herein after fully described, and particularly pointed out in the claims.

In the accompanying drawings, illustrating my improvements, Figure 1 is an outline plan of a tunnel brick-kiln. Fig. 2 is a side elevation of the same. Fig. 3 is a central longitudinal section (enlarged) of a portion of the tunnel. Fig. 4 is a transverse section on the line $x x$ of Figs. 1 and 3; and Fig. 5 is a top view, with portions broken away, showing the interior of the furnace and tunnel.

In said drawings, 1 designates a housing, of hard brick or any suitable material, inclosing the passage-way 2 for the brick. The bricks are moved through the tunnel or passage-way 2 by means of cars. These cars consist of a platform 3, having sills 4, which are grooved longitudinally, as shown at 5, on their under sides. Tracks 6, extending longitudinally through the tunnel, have corresponding grooves 5, and in these grooves are balls 7, furnishing bearings on which the cars move. These tracks are continuous throughout the length of the tunnel, and the balls are adapted to roll freely thereon, and the tunnel and tracks being at an inclination to the horizontal line 8, as shown in Fig. 2, the cars started at the head or upper end of the tunnel are free to travel its entire length.

The tunnel or kiln may be of any desired length, preferably about three hundred feet, and provided in use with a sufficient number of cars to fill its length. At or near the mid-

dle of the tunnel are valves 9 and 10, which close the tunnel at those points and shut off the intermediate chamber from the passage-way at either side.

At the side of the tunnel near its middle is the furnace 11. The air is introduced to the furnace from the foot of the tunnel, as indicated by the arrows z , and is prevented by the valves or partitions 9 and 10 from passing directly onward through the tunnel. In the rear of the valve 10 is a duct 12, extending from the passage-way 2 to the furnace, where it is divided into branches 13 and 14, the former supplying air to the under side of the grate 15 of the furnace, and the latter branches 14 supplying air to complete the combustion in the combustion-chamber 16, as shown by the arrows z' . These branch ducts 14 may be controlled by valves 17, having suitable handles for operating them from without the furnace, so that the quantity of air introduced to the combustion-chamber can be regulated as desired. From the combustion-chamber 16 the heated products of combustion pass through conduits 18 and 19 into the tunnel or passage-way 2, as indicated by arrows z'' . A valve 20 is provided for controlling the flow of heated products through the conduit 18. Suitable valves may also be provided for controlling the conduits 19. The bricks 21 are preferably piled upon the cars, so as to form continuous openings 22, through which the heated products may pass in their course toward the head of the tunnel. The brick are piled on fire-clay or other suitable tiles 23, which have openings 24 coinciding with the conduits 19. These tiles are secured on the cars, and between these and the metallic bed 3 of the cars is a non-conducting material 25, to prevent undue heating of the car body or trucks. The heated air passes through the passage-ways 22 of the different tiers of brick on the several cars and onward toward the head of the tunnel.

The head of the tunnel is closed by a door 26, and a valve 27, near the door, is used to close the passage-way 2. In the rear of this valve are exit-openings 28 lateral to the tunnel, through which the air may be drawn by a suction-fan 29, or by a suitable chimney.

In operation, the tunnel being filled with a train of cars in which brick are suitably piled,

air is introduced at the foot of the tunnel to the duct 12, acquiring in the passage a considerable degree of heat before reaching the furnace, and after having performed its function of supporting combustion, passes through the several conduits to the brick in the car directly in front of the conduits 18 and 19, and heats them to a high degree. When these bricks are heated to the proper degree, the valves 9 and 10 are raised long enough to permit all of the cars to advance the length of a car, so that the car of brick last in front of the hot-air conduits passes into the chamber between the two valves and a fresh car is presented to the conduits. As the cars proceed on their course, after having passed the valve 10, they become cooled by giving off heat to the inflowing air, so that by the time they reach the foot of the tunnel nearly all of their heat has been given up to be again utilized in the apparatus.

In the construction and operation of such kiln it should be the aim to have the heat, so far as possible, taken off from the outgoing brick and returned to the furnace, and the escaping air at the fan or chimney little, if any, warmer than when first introduced at the foot of the tunnel, so that the maximum quantity of heat may be utilized in the operation of burning the brick. Suitable peep-holes or valves may be provided at intervals for examination of the brick at different stages of progress.

A cold-water pipe 30 may be extended be-

neath the conduits and case to the sides of the cars to prevent undue heating of the car in front of the hot-air conduits.

Having described my invention, what I claim is—

1. In a brick-kiln consisting of a continuous tunnel provided with valves, a regenerating-furnace, a train of cars for carrying the brick through the tunnel, and ducts for conducting the air heated by the outgoing brick to the furnace and thence to the incoming brick to bake them, substantially as set forth.

2. In a brick-kiln having a relatively long continuous tunnel, tracks and cars therein for conveying the brick, valves for shutting off portions thereof, a furnace near the middle, and means for causing the air to enter the tunnel at one end, to pass thence to the furnace and return superheated to another portion of the tunnel and escape at the opposite end, substantially as set forth.

3. In a brick-kiln, a continuous tunnel, inclined tracks therein and cars for conveying the brick, a furnace provided near the middle, valves for partitioning the tunnel transversely, and ducts leading from opposite sides of the valves to the furnace, whereby hot air is supplied to support combustion and superheated air is conducted to the brick, substantially as set forth.

JOHN F. BYERS.

Witnesses:

P. H. GUNCKEL,
E. M. SCHUMANN.