

No. 777,814.

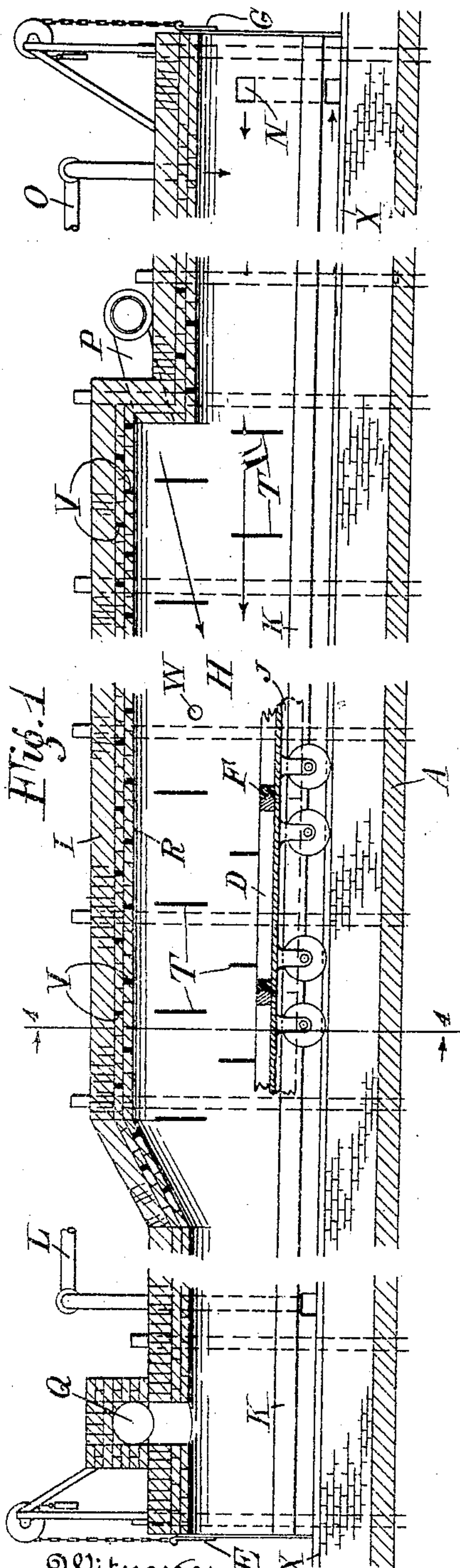
PATENTED DEC. 20, 1904.

W. SIMPKIN.
FURNACE.

APPLICATION FILED APR. 28, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
Ivan Konigsberg.
Chas. H. Davis.

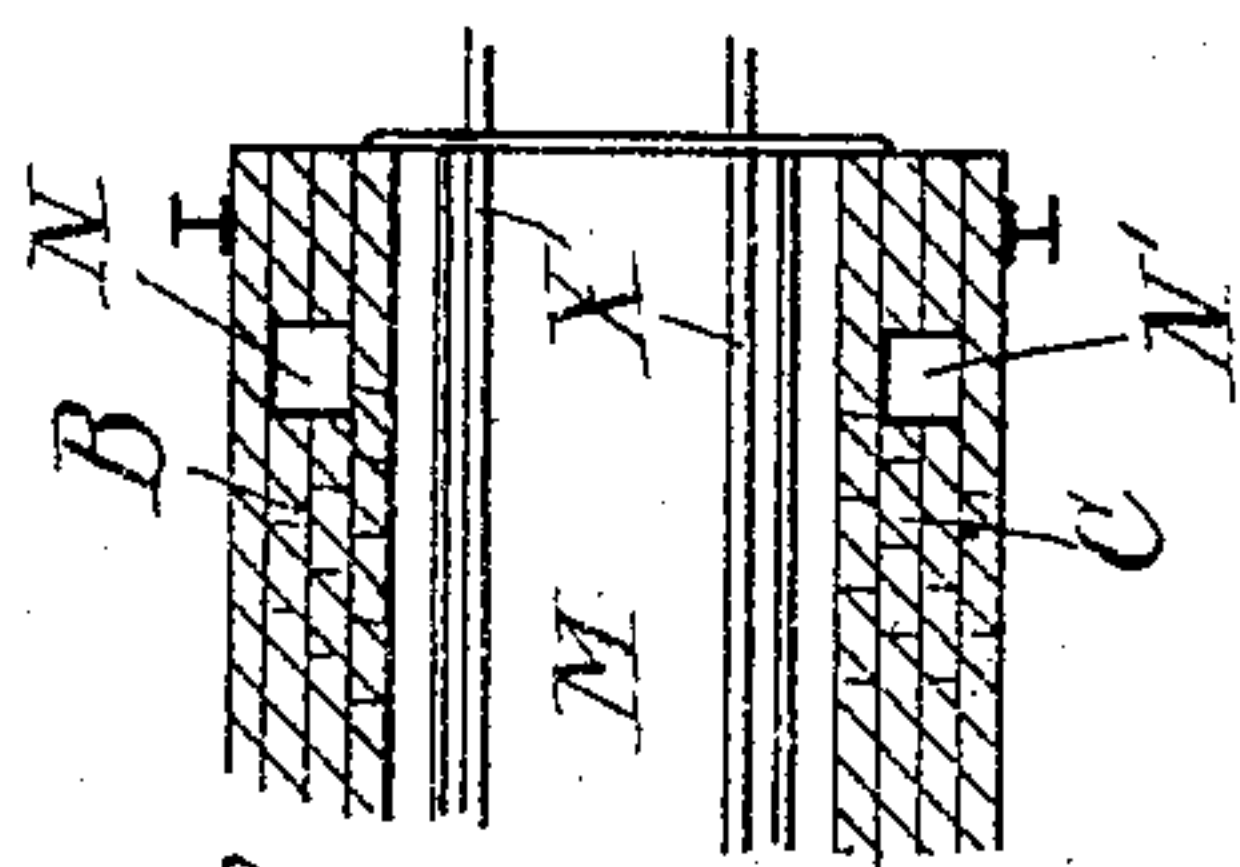


Fig. 3

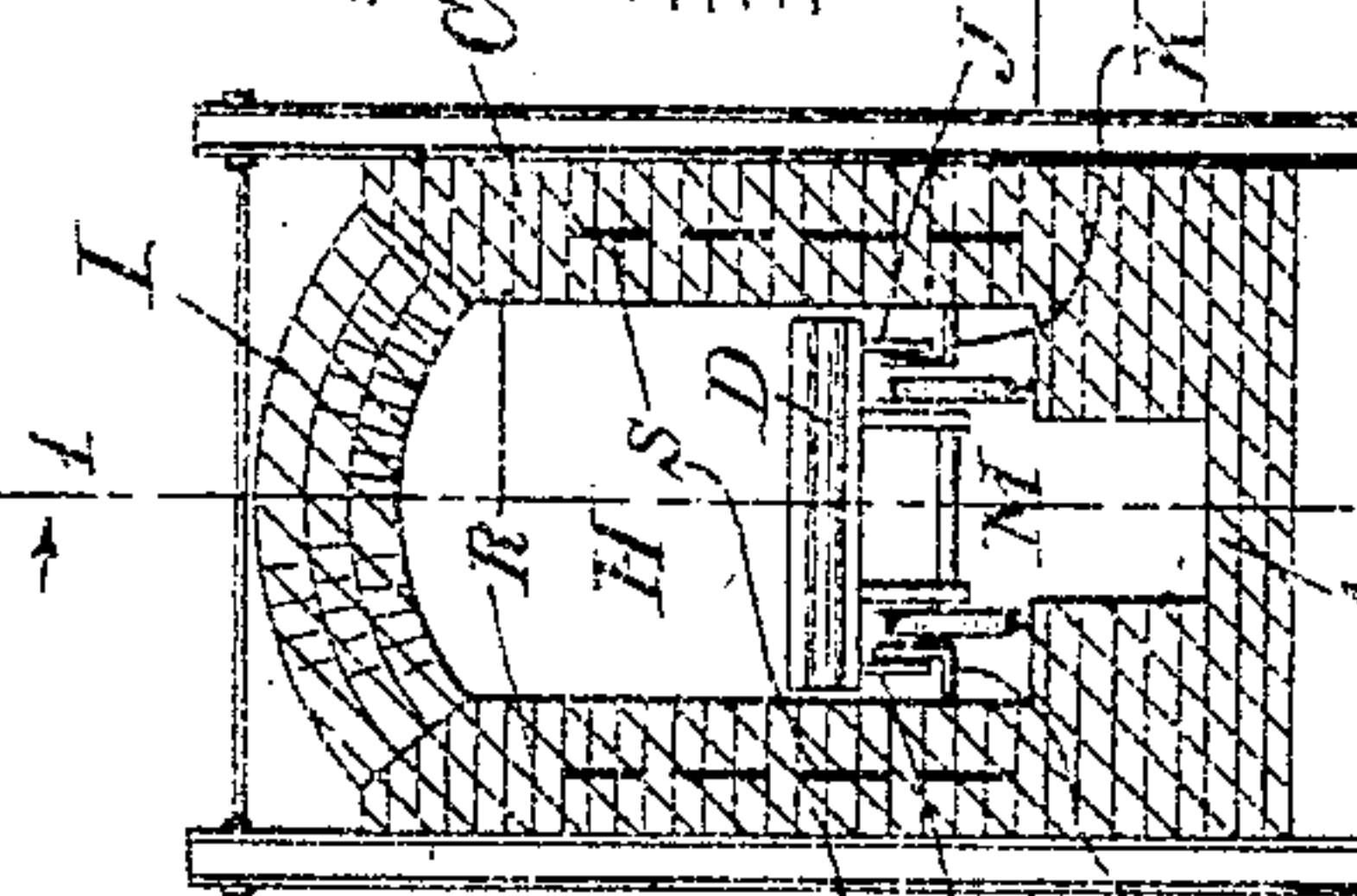
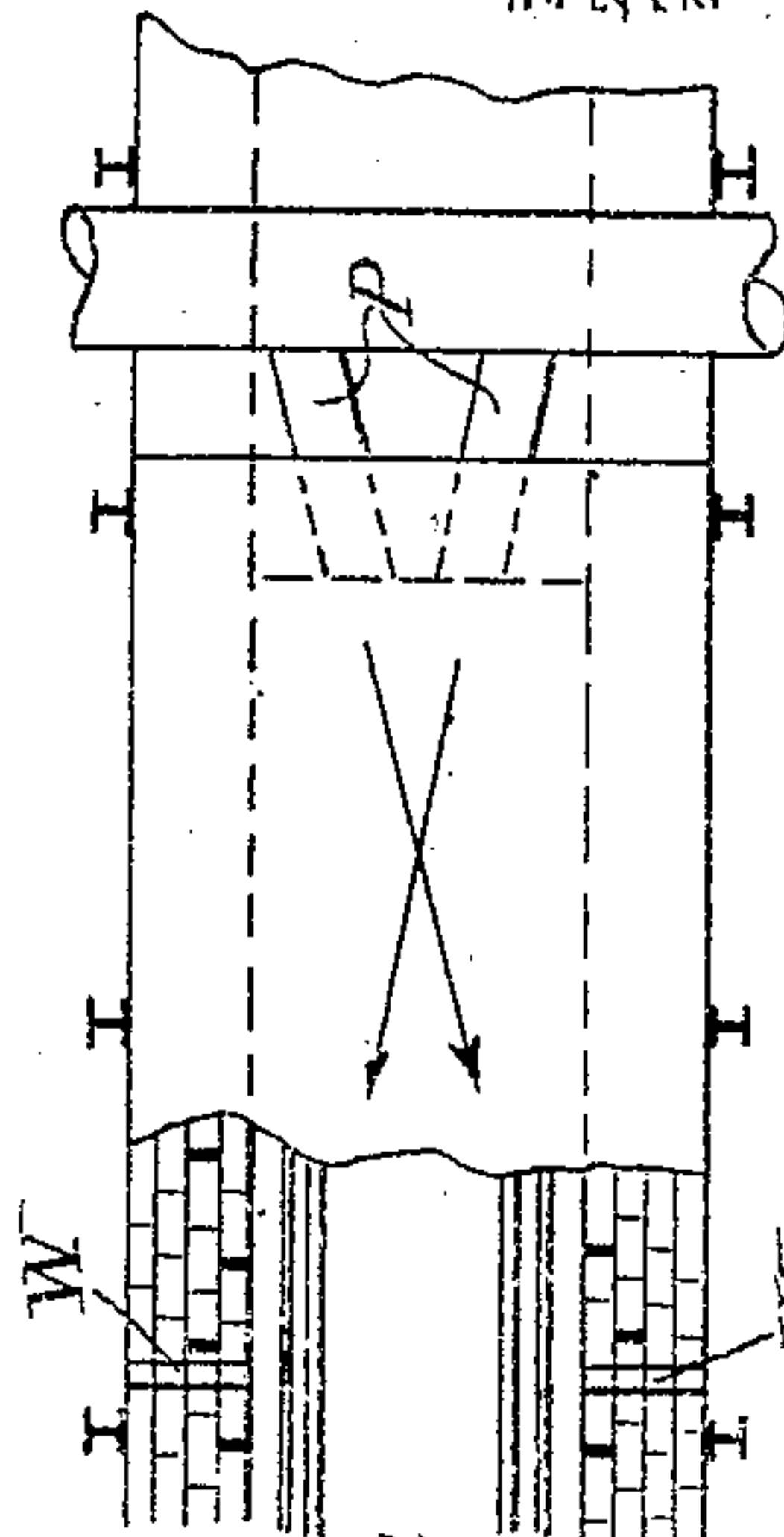


Fig. 4

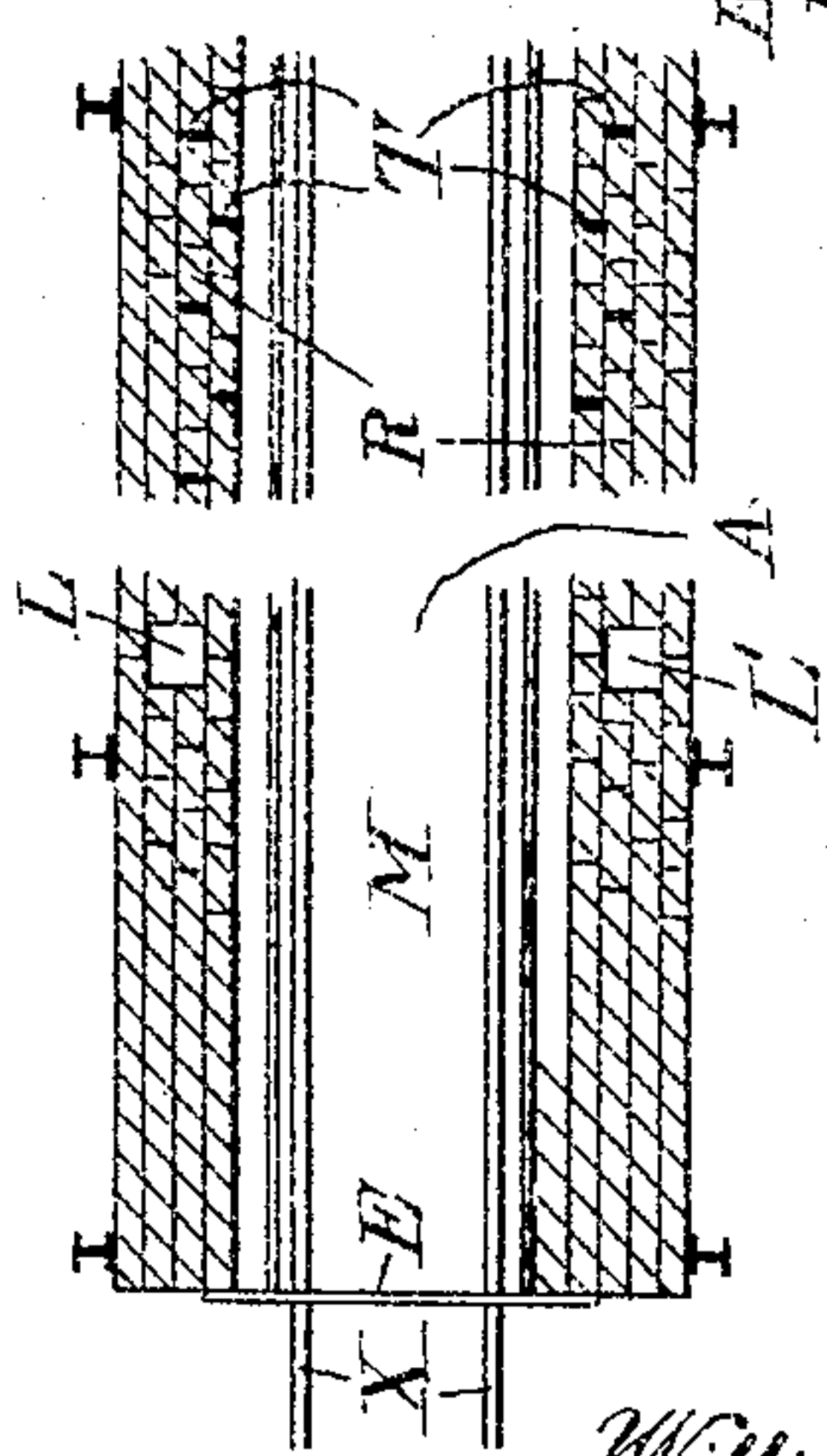


Fig. 5

Inventor
William Simpkin.
By his Attorney
Thomas A. Hill.

No. 777,814.

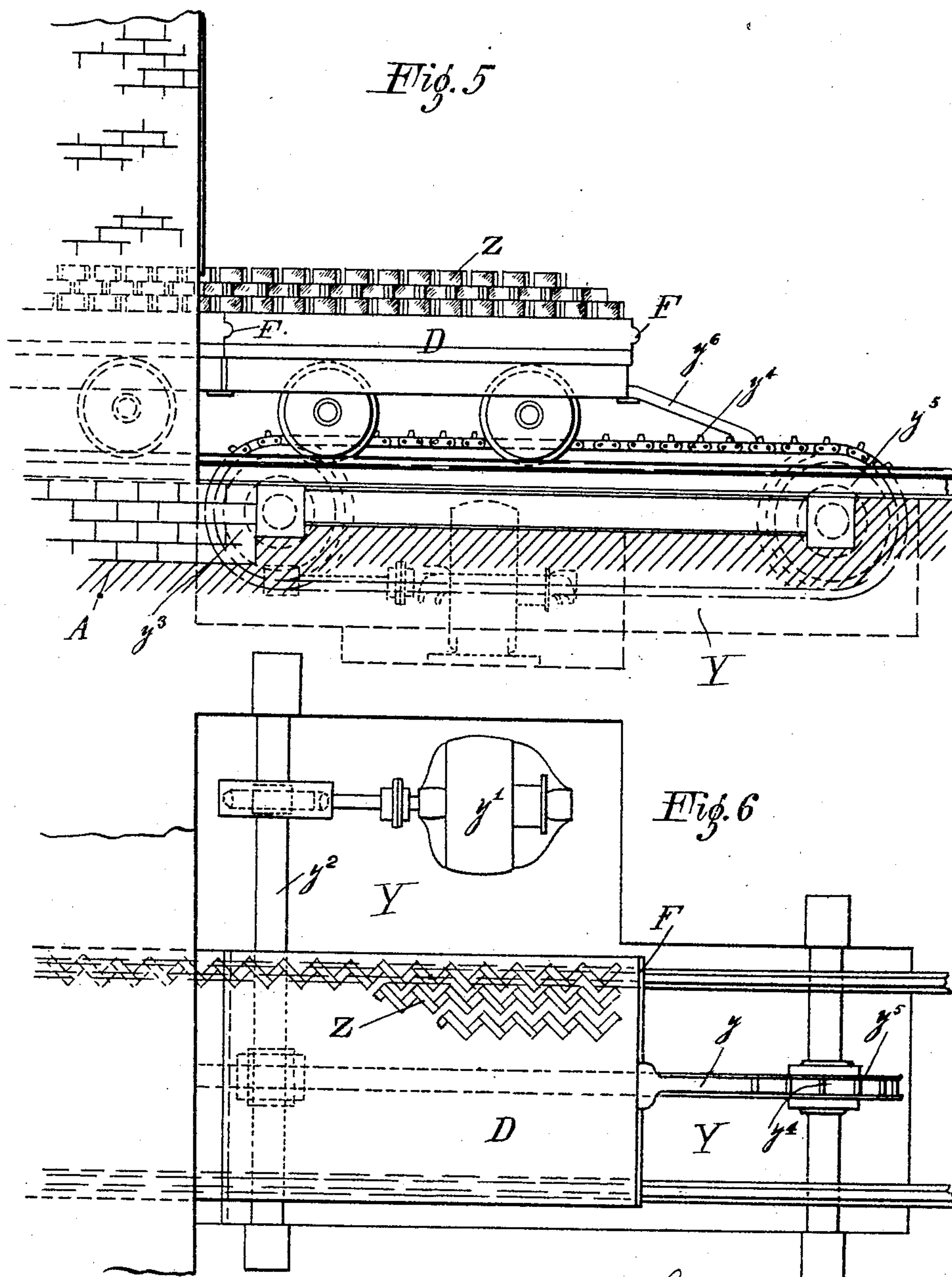
PATENTED DEC. 20, 1904.

W. SIMPKIN.
FURNACE.

APPLICATION FILED APR. 28, 1904.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses
Fran Hönigsberg.
Chas. H. Davis.

William Simpkin Inventor
By his Attorney
Thomas A. Hill.

UNITED STATES PATENT OFFICE.

WILLIAM SIMPKIN, OF ORANGE, NEW JERSEY.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 777,814, dated December 20, 1904.

Application filed April 28, 1904. Serial No. 205,426.

To all whom it may concern:

Be it known that I, WILLIAM SIMPKIN, a citizen of the United States of America, residing at Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in furnaces, and more particularly in furnaces used for making briquets.

One of the main objects of my invention is the construction of a roof and side walls which will not crack and crumble under the high temperatures to which they are exposed, and to this end I employ an inner lining or facing having expansion-pockets or air-spaces.

Another important feature of my invention comprises the introduction of combustible material into the combustion-chamber in such a manner that the fuel enters diagonally and slightly downwardly from both sides of the furnace, where it enters into combustion with air previously warmed by the heat radiated from briquet-carrying cars, to be hereinafter described.

Referring to the accompanying drawings, Figure 1 is a vertical longitudinal section of my furnace on the line 1 1 of Fig. 4. Fig. 2 is a transverse longitudinal section on the line 2 2 of Fig. 4. Fig. 3 is a part section and part plan of the rear of my furnace. Fig. 4 is a vertical transverse section on the line 4 4 of Fig. 1. Fig. 5 is a side elevation of the front end, showing a car being pushed in by a moving chain; and Fig. 6, a plan view of the same.

A is the base or floor, B and C the side walls, and I the roof, of the furnace. D represents the briquet-carrying cars, having airtight coupling F and containing briquets Z. These cars enter beneath the gate E, passing out by the gate G, and have aprons J, extending into sand lutes or troughs K. Air is admitted through the flues L L' and passes down into the space M beneath the cars, cooling their under parts and passing to the end of the furnace, where it rises through the flues N N' and is met by an additional supply of air at O. The air is drawn into the combustion-

chamber H, where it meets a double supply of finely-powdered coal, gas, or other fuel at P, introduced diagonally across the width of the combustion-chamber in a slightly-downward direction, entering into combustion therewith and baking the briquets upon the cars. The products of combustion are drawn out of the combustion-chamber H into the exhaust-flue Q, the fresh briquets absorbing the heat of the burned gases as they pass. From this arrangement it will be seen that the air supplied beneath the front of the furnace absorbs the heat radiated downwardly from the cars within the furnace, thereby cooling the running-gear of and lowering the temperature beneath said cars sufficiently to permit a person to enter the space M without discontinuing the operation of the furnace; also, that after the heated air has been burned within the furnace the products of combustion continue under the influence of the draft to the flue or exhaust Q, passing over the incoming briquets, which absorb the heat therefrom.

The supply of air is controlled by suitable valves, and the exhaust-flue Q is also provided with a gas-valve. In this way the draft may be regulated and a constant temperature maintained. When no valves are used, the draft is subject to changes which cause fluctuations in temperature, thereby submitting some of the briquets to higher temperatures than others—a fault which operates against uniformity in the quality of the product.

The side walls of the furnace have peep-holes W at about the center of the combustion-chamber and are built with a lining or facing R, of fire-brick or other suitable material, which is separated from the outer brickwork by longitudinal air-spaces S, running the whole length of the side walls, with fire-brick headers occasionally. The fire-brick lining is formed in sections separated by spaces or pockets T, the inner sections covering the spaces or pockets formed in the outer sections. The outer arch of the roof is continuous and of red brick, as in the construction of the side walls. It is also lined or faced with fire-brick or other suitable material, built longitudinally in sections of about four feet long each, the spaces or pockets V being about one

inch wide. This provides a series of sections with spaces or pockets between, the spaces or pockets in the upper section of the lining or facing being covered by the lower sections.

5 The spaces or pockets between the sections of the fire-brick lining of the side walls need not reach from the top to the bottom of the furnace, and spaces or pockets at the end of the furnace will not be necessary unless by some
10 modification of the construction shown very high temperatures are at those places.

The rails X on which the cars run are slightly declined from the front to the rear of the furnace, thereby reducing the expenditure of energy necessary to push the loaded cars through
15 the furnace. In loading the cars the briquets are preferably piled obliquely and at right angles—that is to say, each briquet is laid obliquely to the sides of the car and at right
20 angles to the next briquet above, below, or on either side. By this arrangement the greatest surface of each briquet is exposed to the heat of the furnace.

Y is the platform from which the cars enter the furnace, and y' a motor driving the shaft y^2 , upon which is keyed the gear y^3 , carrying the toothed chain y^4 , which also passes around the gear y^5 . To start a car through
25 the furnace, the dog or bar y^6 is set against one of the teeth of the chain y^4 and against the car D and the motor is started.

Before starting the furnace it is filled with empty cars to keep the heat above the sand
30 lutes or troughs K, after which the loaded cars are pushed in one by one, an empty car being withdrawn every time a loaded car enters until all the empty cars have passed through the furnace. As each load of briquets enters the furnace it is heated by the
35 outgoing products of combustion and is pushed forward by each succeeding load until it finally emerges at the rear of the furnace and is removed.

The furnace has its highest temperature
45 at about the center of the combustion-chamber, where the fuel and heated air are thoroughly mixed and ignited, producing a constant whirl of intensely-heated gases around the briquets, the lining of the combustion-
50 chamber being in a state of incandescence.

It will be apparent that the construction herein shown and described is subject to various modifications without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In a furnace, a combustion-chamber having outer walls of continuous brick and an inner lining of fire-brick or other suitable material, said inner lining separated from said
60 outer walls by air spaces or pockets divided by fire-brick headers substantially as described.

2. In a furnace, a combustion-chamber having outer walls of continuous brick and an inner lining of fire-brick or other suitable material having inner and outer sections and separated from said outer walls by air-spaces divided by fire-brick headers, said inner sections covering the spaces or pockets between
65 said outer sections substantially as described.

3. In a furnace, a combustion-chamber having an outer arch or roof of continuous brick and an inner lining of fire-brick or other suitable material having inner and outer sections, said inner sections covering the spaces or
70 pockets between said outer sections substantially as described.

4. A furnace comprising a tunnel structure having a central combustion-chamber higher than the rest of the furnace, portions of the
80 walls and roof of said structure having fire-brick lining containing pockets or spaces substantially as described.

5. A furnace comprising a tunnel structure having a central combustion-chamber, cars
85 within said structure, said cars having air-tight couplings and aprons extending into sand lutes or troughs, air admitted beneath said cars at one end of the furnace, and air admitted above said cars at the other end of the
90 furnace, said air passing over said cars and combining with fuel in the combustion-chamber, and products of combustion escaping over said cars substantially as described.

In testimony whereof I affix my signature in
95 presence of two witnesses.

WILLIAM SIMPKIN.

Witnesses:

CHAS. H. DAVIDS,
REUBEN M. COHEN.