

A. J. WORKS.

Brick Kiln.

No. 92,923.

Patented July 20, 1869.

fig. 2.  
A<sup>2</sup>

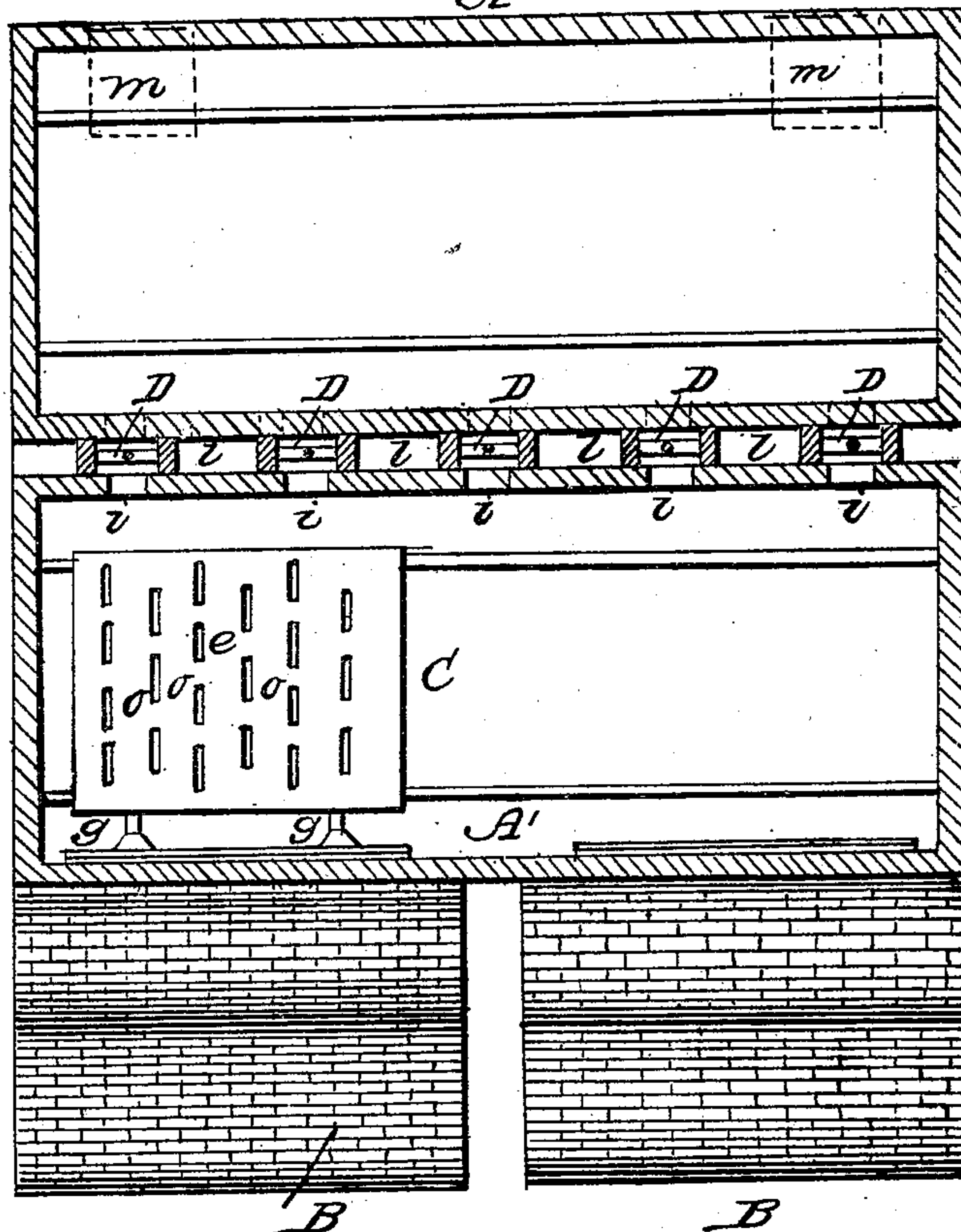
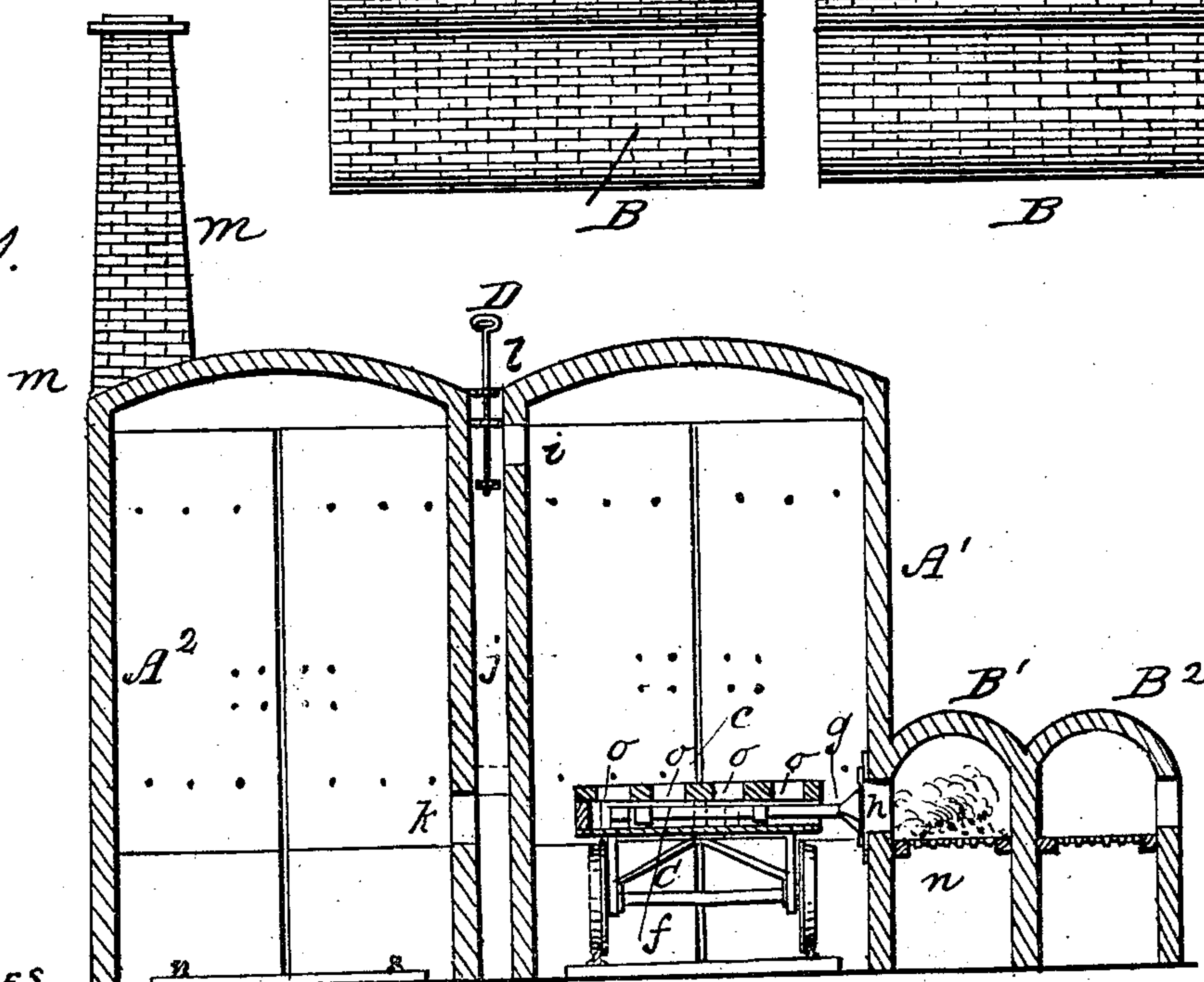


fig. 1.



WITNESSES

*Am. Parker*  
*Lawyer*

INVENTOR

*Alfred J. Works*



# United States Patent Office.

ALFRED J. WORKS, OF FAIR HAVEN, CONNECTICUT.

Letters Patent No. 92,923, dated July 20, 1869; antedated January 20, 1869.

## IMPROVED BRICK-KILN.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ALFRED J. WORKS, of Fair Haven, county of New Haven, and State of Connecticut, have invented a new and useful Method of Constructing and Operating Kilns and Furnaces, adapted to the use of liquid and other fuels, for the manufacture of brick, glass, porcelain, pottery-ware, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, forming part of this specification, wherein—

Figure 1 is a transverse section, in perspective, of my invention.

Figure 2 is a horizontal view of the same.

Similar letters of reference denote the same parts in both views.

This invention consists, in part, of a furnace and kiln constructed separate and apart from each other, but operating together. Each kiln, or rather series of kilns, when intended for brick, is constructed in two or more compartments, with double partition-walls, enclosing a sufficient space between to allow the ready passage of heat from one chamber to the other, the same being regulated by valves or dampers therein, and thus, while the bricks are being burned in the chamber nearest the furnace, the waste heat is all conducted into the adjoining compartment, and there saved and made to do duty again in drying and preparing the wet bricks for burning.

But a most novel and useful feature of this invention consists of a heat-distributing reservoir, upon and forming part of each truck or platform-car, and used alike in the drying and burning-chambers.

The great advantage secured by this invention may, perhaps, be better understood by adverting briefly to existing methods for burning brick, and their admitted serious defects.

The system of burning and drying almost universally in use now, is identical with that in vogue two thousand years ago, little or no improvement being visible.

Weather permitting, the bricks are dried in the sun, then burned in immense out-door stacks, where it is well known that only about one-fifth ( $\frac{1}{5}$ ) part of the heat generated is made available; four-fifths ( $\frac{4}{5}$ ) of the fuel used, therefore, are entirely wasted, besides, in rainy seasons, much time, labor, and money are lost.

Several attempts have been made, and various contrivances for enclosed kilns have been patented. Only one has achieved even a small degree of success, and the enormous cost attending its construction places it entirely beyond the reach of moderate means, and hence precludes its general use; while all the rest, so far as they have been practically tested, utterly fail, from the unequal application of the heat, a portion of

the bricks being burned black, cracked, and warped, while others are "salmon"-colored. This results solely from an imperfect distribution of the heat generated.

To avoid these and other defects of existing methods, and to secure advantages not hitherto attained, is the object of this invention.

As above intimated, the grand feature of this improvement is the "heat-distributing reservoir" upon the car or truck. By this novel and important device, the heat is evenly and properly distributed throughout the entire mass of bricks, as above, and the platform upon which they are piled, being constructed of tile or other fire-proof material, receives unharmed the first force of the incoming flame and heat. No bricks are spoiled, but all within the kiln are of necessity baked to a uniform hardness and color, while, by means of the dampers on one side, and the fuel-feed on the other, the amount of heat necessary, at different stages, can be instantly diminished or increased to any degree required, and its intensity graduated with the ease and facility of an ordinary gas-light.

The various other advantages of this, over all other known plans for drying and burning bricks, will more fully appear in the following detailed description of the several parts of my invention, and which will also enable others skilled in the art to make and use the same, reference being made to the annexed drawing for a fuller illustration thereof.

A<sup>1</sup> A<sup>2</sup> indicate the extreme outer walls in both figs. 1 and 2, A<sup>1</sup> being the burning, A, the drying-compartment.

The entire kiln, including the division-walls, may be constructed of any kind of brick desired or most convenient. The outer walls and roof should be made either double or very thick, in order to avoid loss of heat by radiation.

The main doors of the kilns, represented by sundry dots, o o o o, must be nearly the full size of the end of the kiln, should be made double, with space between, and may be constructed of sheet-iron, or other suitable material. If the kiln be quite small, a door at one end will answer; if large, there should be doors at each end.

B<sup>1</sup> B<sup>2</sup> represent the furnaces, at the side of the kiln, and connected therewith by suitable "eyes" or openings, h, for the passage of the fire and heat into the "distributing-chamber" f, and g is a large pipe or heat-conductor, made of incombustible materials, properly connected with said "opening" h in such manner as to readily allow all the flame and heat to pass into the "distributing-chamber" f, at the same time be easily detachable when necessary to move the car C.

D indicates the valves or dampers within and at the



top of the flues, formed by capping over the narrow space between the division-walls at *l* of the drying and burning-compartments.

*i* denotes the outlet from the burning-kiln into the flue *j*.

At *k* is seen the inlet for the heat from said flue to the drying-kiln, or rather through similar heat-conductors, *g*, into the distributing-chamber thereof.

By means of these dampers, working on the top of the kiln, as seen in figs. 1 and 2, the heat in both compartments is at all times under the most perfect control, any desired amount may be accumulated and retained within the burning-chamber, or it may be equally divided between the two, or by a proper regulation of the dampers, the whole thrown out, or any required degree of heat may be kept in both compartments, and its intensity regulated to a perfect nicety.

As a general rule, there may be two outlets (dampers) and two "eyes" or openings to each car of five thousand bricks.

*m m* denote the smoke-stacks, placed one at each further angle of the drying-kiln; and if the kilns be very long, other flues may be required, in order to preserve the equilibrium of the draught. A damper placed in each stack is sometimes found useful.

I use any suitable platform-car, strongly made, and run upon light rails, in the usual manner.

This car consists of a double platform. The lower one may be composed of iron, the upper one, and its supports, of fire-tile or slabs, or any incombustible material, so arranged as to leave a sufficient space between the two, say six to ten inches in depth, for the reception of the heat from the furnace, led therein through a pipe, *g*, as seen in fig. 1. This upper platform or top of the chamber is thickly perforated with long, narrow holes, as clearly seen at *E* in fig. 2 *o o o o*. All over this platform are piled the bricks, in the usual manner, for burning.

The three sides of the distributing-chamber farthest from the furnace are enclosed with similar materials, which may be perforated in the same manner. The upper platform should be made of good material, and be very strongly supported upon numerous standards or legs resting upon the platform beneath.

Into this chamber or distributor, thus formed, are forced the fire and heat from the furnace, when their own pressure drives them through the slits in the slabs, and they are evenly distributed through all the mass of bricks above. The fire-proof material of the car or chamber receiving the first force of the fire, none of

the bricks are overdone, while all are baked to uniform consistency and color.

Attached to furnace *B*<sup>2</sup> are supposed to be two other similar kilns, it being a duplicate system throughout.

The furnaces are adapted and designed for the consumption of coal, wood, or pet, and also petroleum or other liquid fluid, by simply removing the grate-bars, and placing in their stead, at trifling cost, the requisite oil-burning apparatus.

Other modes of distributing the heat may be used in this connection, and the above system is also applicable where no other material is used for a chamber than the bricks themselves.

Whenever desirable, an extra draught may be always had by using a small jet of waste steam, if available, in the furnace, thus greatly accelerating the combustion of the fuel and intensifying the heat.

When it is desired to use this improvement for other purposes than making bricks, slight alterations only in the manner of placing, stacking, &c., of the material to be burned will be necessary to adapt this system to the purpose required.

The following are briefly some of the advantages derived from the use of my improvement:

A saving of four-fifths of all the fuel formerly used.

A saving of all the heat from the burning-chamber, usually wasted, and using it up in the drying-compartment.

No blackened, warped, cracked, nor "salmon" bricks, but the heat being equalized throughout the entire mass, all are baked to a uniform hardness and color.

A saving of one and two handlings of the bricks.

Making a better quality of bricks at a cheaper rate, especially when liquid fuel is used.

Its simplicity, durability, cheapness, and the ease and facility with which it is worked and regulated.

Having thus described and illustrated my invention,

What I claim as new, and desire to secure by Letters Patent of the United States, is—

The combination and arrangement herein described of the drying-chamber *A*<sup>2</sup>, burning-chamber *A*<sup>1</sup>, with valves or damper *D*, the perforated movable platform or car *C*, with a heat-distributing reservoir, consisting of chamber *f* and pipe *g*, and furnaces *B*<sup>1</sup> and *B*<sup>2</sup> all constructed and operating substantially as set forth.

ALFRED J. WORKS.

Witnesses:

WM. BARKER,  
DANIEL F. JOHNSON.