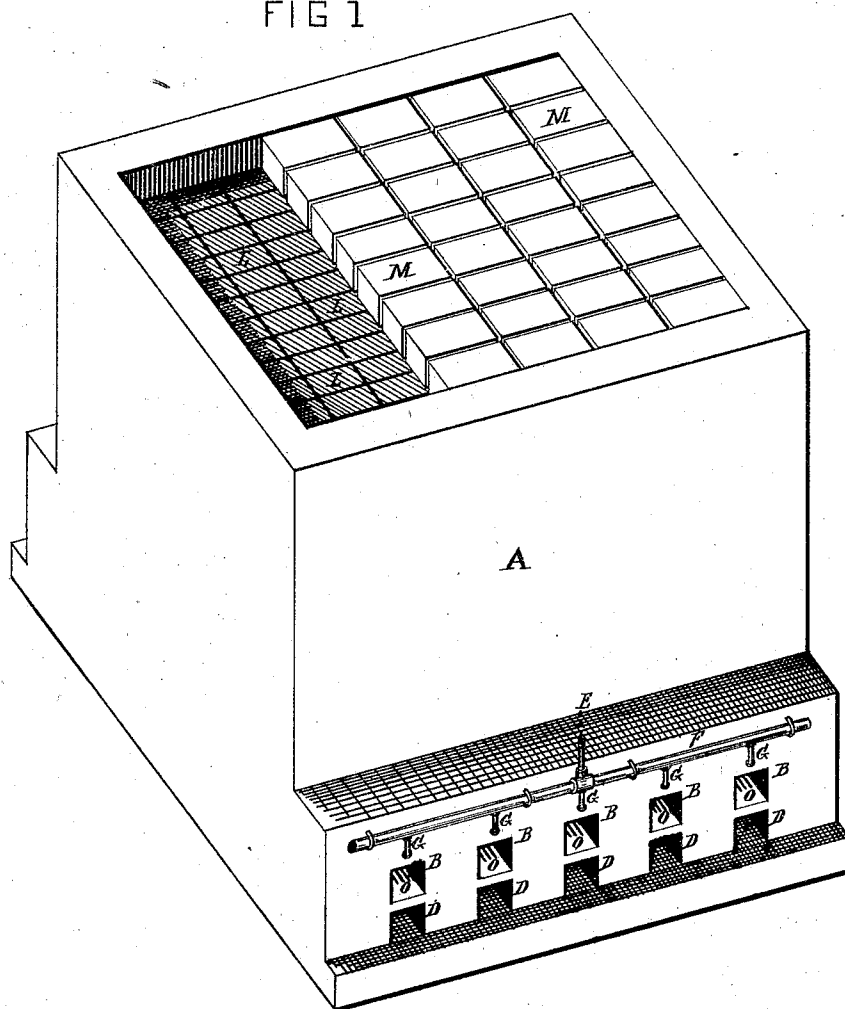


H. W. ADAMS, Jr.
BRICK-KILN.

No. 170,148.

Patented Nov. 23, 1875.

FIG 1



WITNESSES.

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Alexander H. Morgan

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FIG 2

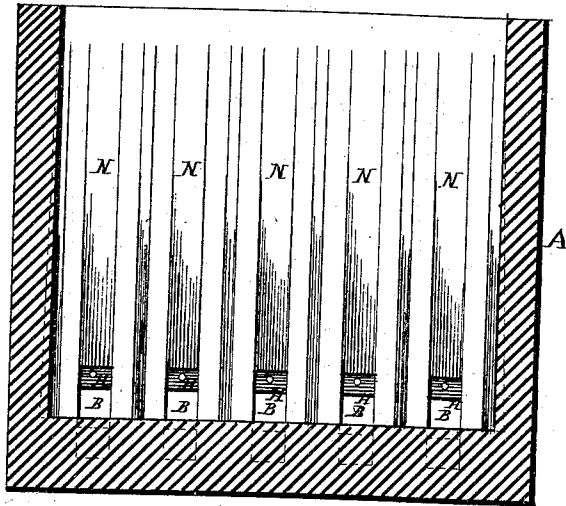
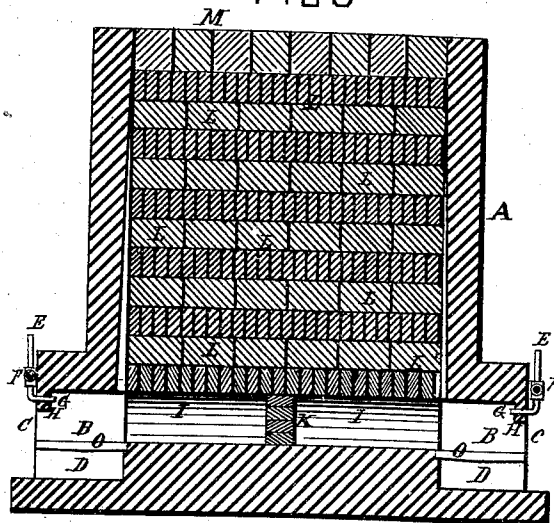


FIG 3



WITNESSES.

WITNESSES.
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Alexander H. Morgan.

INVENTOR_

Henry H. Adams Jr

UNITED STATES PATENT OFFICE.

HENRY W. ADAMS, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN BRICK-KILNS.

Specification forming part of Letters Patent No. **170,148**, dated November 23, 1875; application filed October 25, 1875.

To all whom it may concern:

Be it known that I, HENRY W. ADAMS, JR., of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Brick-Kilns, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to burn bricks and other materials requiring calcination in a more uniform manner, and in less time than is done in the old kilns in common use.

The kiln is illustrated more in detail in the following figures: Figure 1 is a perspective view of my improved steam-kiln, showing the arrangement of furnaces provided with steam-pipes, the bricks to be burned set in the kiln, and the cover on them, shown in section. Fig. 2 is a longitudinal sectional elevation of my said kiln, showing the inside of it, when empty, with a special view to represent the several recesses made in the inside walls of the said kiln, from the bottom to near the top, for the purpose of letting the heat ascend up the walls without obstruction, and heat them quicker and hotter than usual. Fig. 3 is a sectional view through my kiln, as set for burning, and showing the furnaces, the arches, the middle cut-off between the furnaces, the cover, and steam-pipes.

A represents my improved steam brick-kiln; B, the furnaces constructed on the outside of an ordinary brick-kiln; C, the doors; D, the ash-pits; E, the pipe for receiving the steam from the boiler; F, the distributing-pipe fastened to the wall over the furnace-doors; G G G G G, the several branch pipes looking into the furnaces B B B B B over the doors of the same. H H H H H show the parts of the respective furnaces over the doors, and through which the steam-pipes pass which deliver forcible jets of steam over the burning fuel into the furnaces. I I I I I represent the arches of my improved kiln, when set with green bricks, preparatory to burning; K, the cut-off wall between the furnaces; L, the bricks set in the kiln, and M the cover of the said kiln. N shows the recesses in the inside walls, reaching from the bottom to near the top of the kiln. They are

deeper at the bottom and grow shallower toward the top. O shows the grate-bars.

The kiln A may be built of any ordinary size. It may be formed out of an old-fashioned kiln, such as is commonly used by brick-makers, by building the furnaces B outside of the walls of the same, and in front of the fire-doors, and in such manner that they shall be a prolongation of the arches or firing-chambers of an old kiln, as commonly constructed. These furnaces I make about two feet long, more or less, and use the thickness of the wall or old fire-door as a part of this length. This outside furnace is necessary to make the combustion of fuel outside of the kiln, in order that the forcible jets of steam escaping from the branches G may have length of drive sufficient to become mingled with the hot products of combustion before entering the kiln, and drive into the kiln and under the arches the flames and hot gases to be disseminated and distributed through the whole mass of the bricks.

If these branch steam-pipes were inserted over the doors of an old-fashioned brick-kiln, with a view to blow steam into the arches of the same, the jets of steam would blow the heat all away from the ends of the arches next to the inside walls, and the bricks would be burned soft.

By building the furnaces B outside of the old fire-doors room is given to make the products of combustion white-hot before they pass into the kiln, that the bricks may be burned hard close to the wall, contiguous to the mouths of the furnaces B. They are simply the prolongation of the furnaces of an old brick-kiln through the doors of the said furnaces, and to a distance of two feet, more or less, outside of the walls. They are supplementary furnaces, and are to be used as hereinafter described.

K represents a cut-off wall between the opposite furnaces. This is necessary to arrest the two opposing blasts entering the kiln from the two opposite furnaces B B, and prevent them from acting against each other. This wall is built up where the kiln and the arches I I are set with unburned bricks. If the kiln is thirty feet wide inside, the arches I I

may be twelve feet long each, and the solid portion, set in the ordinary way, may be six feet through from arch to arch, more or less. This cut-off breaks the force of the two opposite blasts, and yet the heat penetrates the interstitial spaces between the bricks composing it sufficiently to burn them hard.

The recesses N are made from the bottom to the top, or near the top, of the wall on the inside of the said kiln. They are four inches, more or less, deep at the bottom, and gradually become shallower as they ascend. Those over the mouths of the furnaces B are as wide as the said furnaces. On all other parts of the inside walls these recesses are four inches wide, more or less, and eight inches apart, more or less.

Recesses extending up a few feet directly over the doors of an old brick-kiln have been used. I disclaim these. My improvement consists in extending these recesses up to the top of the kiln, or nearly so, and in covering the whole inside walls of a brick-kiln with these recesses, equally spaced apart, for the purpose of allowing the heat to circulate up these open spaces in contact with the wall, for the purpose of heating the same and burning the bricks hard which are in contact therewith. As these heating chambers or channels shallow out near the top of the kiln-walls they form ovens all over the inside walls of the kiln, and distribute the heat more uniformly.

Having described the different parts of my improved steam-kiln, I will now describe the process of using its different parts, and causing them to unite in burning a kiln of bricks, or other materials requiring calcination, in a rapid, economical, and uniformly hard and excellent manner.

The kiln being set in the usual way, I proceed to drive off the water smoke and get a clearing heat through the kiln in the ordinary manner of managing an old brick-kiln. I do not build any fires in the furnaces B at first, nor use any steam until I have raised the heat in the kiln sufficiently to do so. I throw in fuel through the furnaces B under the arches I I, and gradually heat up the kiln in the old-fashioned way. Light fires may be made, also, in the furnaces B; but when I have got a moderately good clearing heat through the whole kiln by means of the fires under the arches I I I I I, which fires may be made of wood or any suitable fuel in the manner of burning an old brick-kiln, I then commence a new method of burning, and bring into use the furnaces B B and the cover M.

I now discontinue the firing with fuel under the arches I I, and build fires in the furnaces B B outside of the kiln; and on the grates O O I also let on steam from the boiler into the inlet-pipe E and distributing-pipe F.

The steam passes into the branches G G G G and escapes from their ends through

nozzles of about one-eighth and one-sixteenth of an inch in diameter in forcible jets, over the fires, and drives the intensified heat into the kiln under the arches I I. These jets of steam, sweeping across the top of the fires, cause large quantities of air to rush up through the grate-bars near the furnace-doors and produce intense combustion. The incandescent gases are also driven with great power under the arches I I to be disseminated in every direction through all the interstitial spaces between the bricks in the kiln. At this point it is necessary to bank down the top of the kiln to prevent the too rapid escape of this abundant heat, and thus create a pressure of incandescent gases in the kiln, in order to make the said gases insinuate themselves into every crevice of the kiln, fill every part, and wrap every brick with the necessary settling heat.

It is not new to put a cover on the top of a brick-kiln when the kiln is set. I do not, therefore, claim such a cover; but it will be seen that a necessary relation exists between the outside furnaces B B when used with the steam-blast pipes F and G G G G G. The said furnaces and blast create a new and extraordinary heat of white-hot gases, and drive them forcibly, under great pressure, under the arches I I. It is now, and not before, that a cover of some sort is needed to hold in this new heat, and thus convert the kiln into an oven heated uniformly from top to bottom and from side to side, so as to burn the products of the kiln hard.

It is believed, therefore, that it is both new and useful to combine any kind of cover with the furnaces and steam-blast aforesaid, when both are employed together in the manner and for the purposes described.

This cover may be made in any way now known.

It is not new to use steam in a brick-kiln. I do not claim it therefore in any broad sense. But it is believed to be new to use the steam-blast pipes F and G G G G G in combination with the furnaces B B, when built outside of an old brick-kiln with an upward draft, and when said furnaces are prolongations of the firing-arches I I of an ordinary kiln now in common use.

Steam-jets have been used to blow hot gases against the end of a kiln burning with a horizontal draft, and having no arches, as is the case with an old brick-kiln, and as shown in my improved kiln.

It is believed that the furnaces B B and blast-pipes F and G G G G G and the arches I I form a new and useful combination.

Steam superheated in furnaces B B and arches I I tempers and distributes the heat so perfectly that the lower bricks of my kiln are protected from overburning, and the top and side courses are all calcined ringing hard.

Having thus described my improved steam-kiln and pointed out what I consider to be its

novelties and uses, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the furnaces B B B B B, the blast-pipes F and G G G G G, and arches I I I I I, and cover M, substantially in the manner and for the purposes set forth.

2. The combination of the furnaces B B B B B, and blast-pipes F, and G G G G G, and

arches I I I I I, and the cut-off wall K, substantially in the manner and for the purposes shown and described.

HENRY W. ADAMS, JR.

Witnesses:

ALEXANDER H. MORGAN,
ISAAC R. OAKFORD.