J. R. SMITH.

BRICK KILN.

APPLICATION FILED AUG. 3, 1911.

1,069,487.

Patented Aug. 5, 1913.

3 SHEETS—SHEET 1.

Fig. 2.

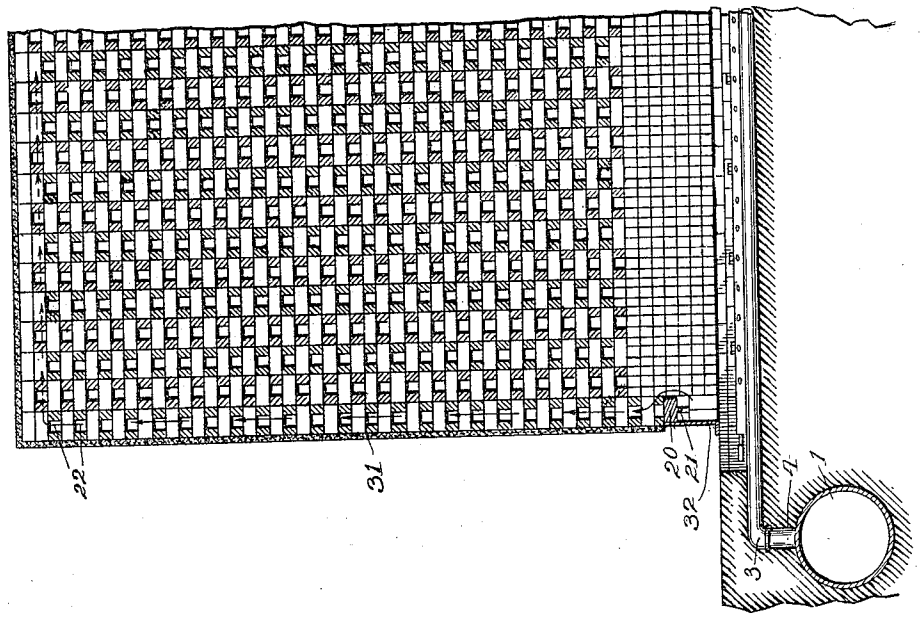
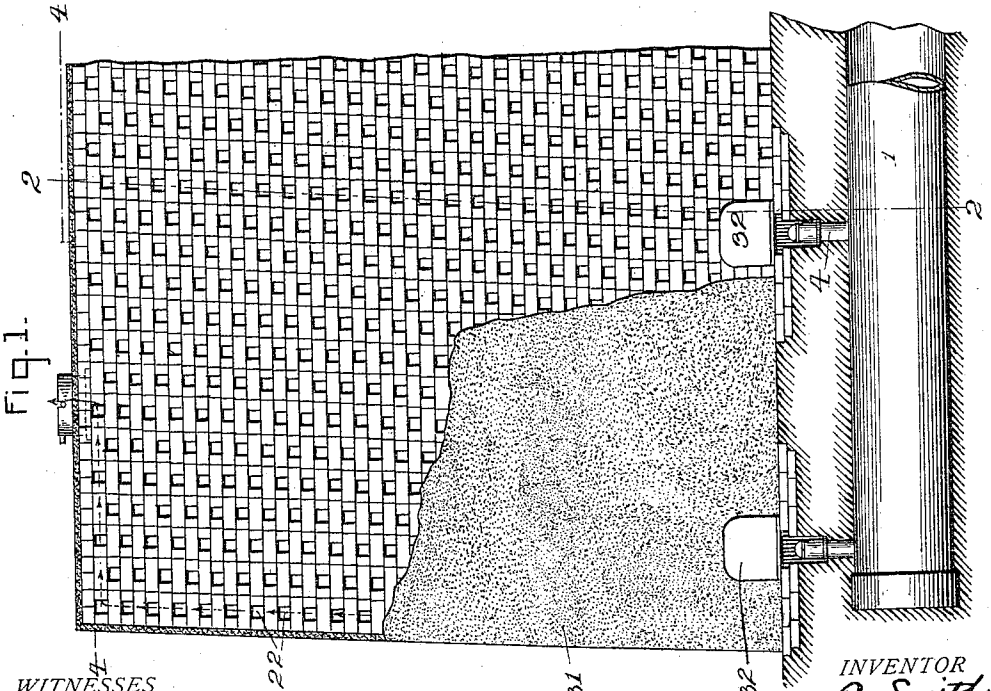


Fig. 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 3.

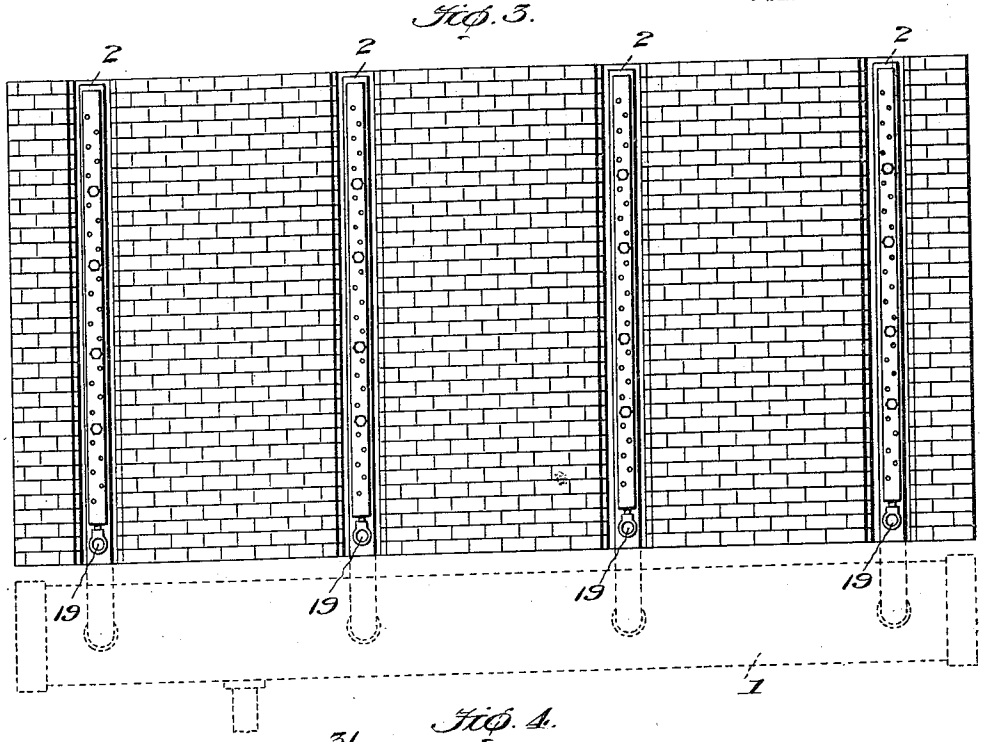
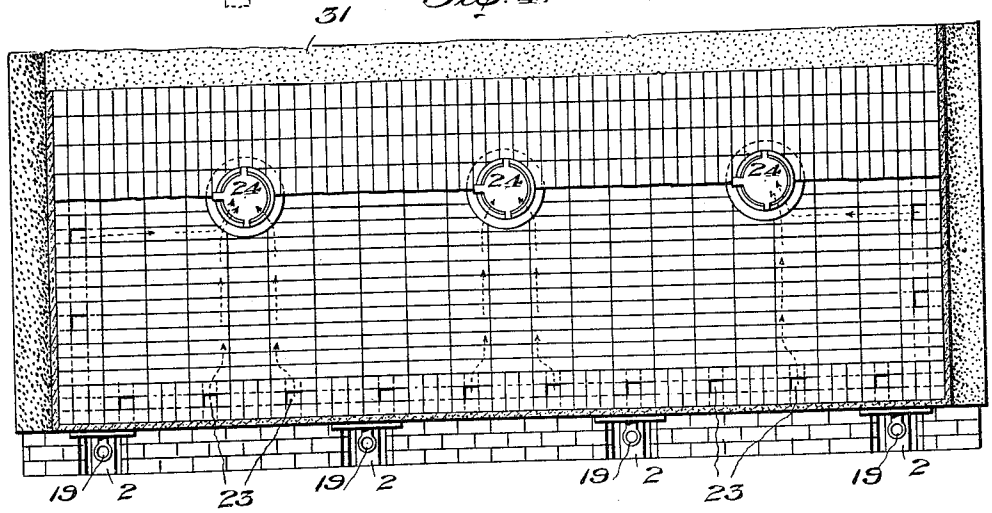


Fig. 4.



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3 SHEETS—SHEET 3.

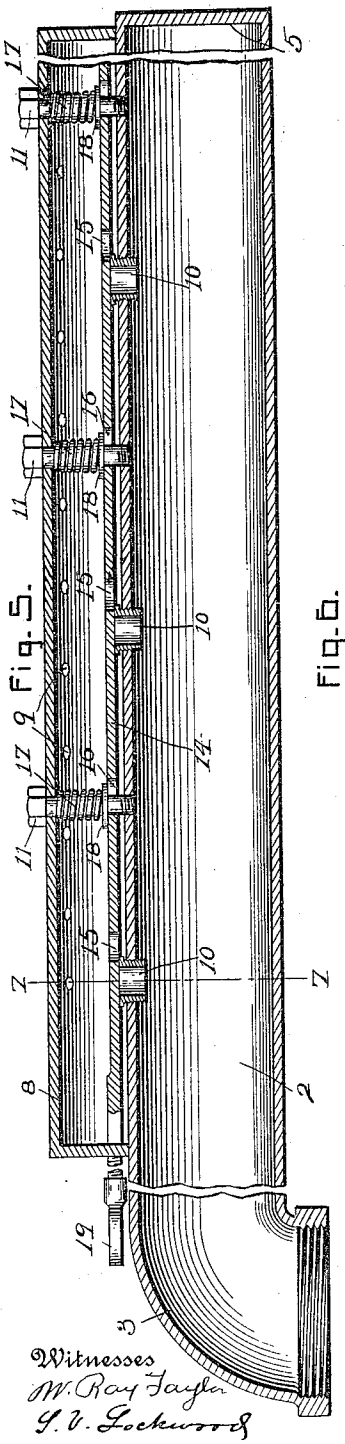

Fig. 5.

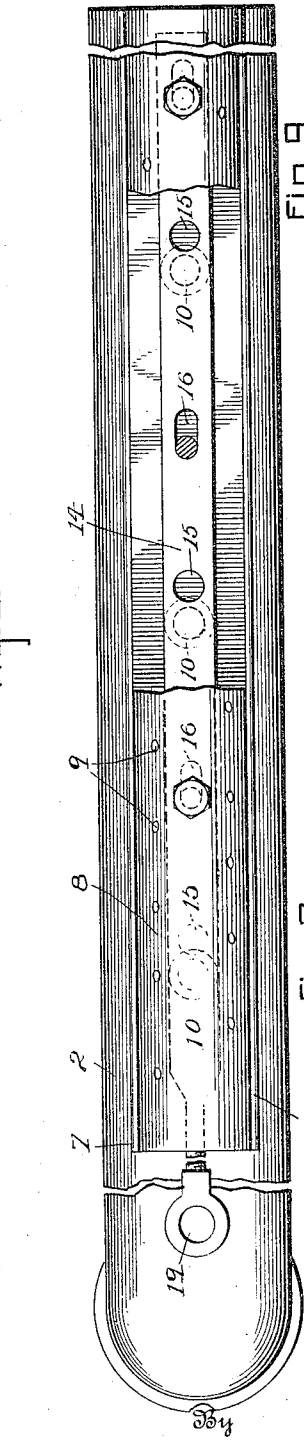

Fig. 6.

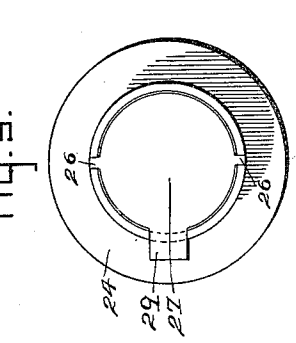

Fig. 9.

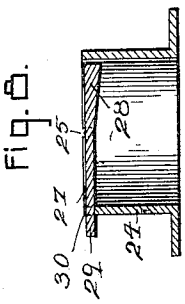

Fig. 8.

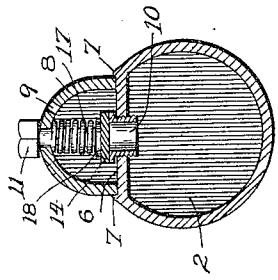

Fig. 7.

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UNITED STATES PATENT OFFICE.

JAMES R. SMITH, OF MECHANICSVILLE, NEW YORK.

BRICK-KILN.

1,069,487. Specification of Letters Patent. Patented Aug. 5, 1913.

Application filed August 3, 1911. Serial No. 642,078.

To all whom it may concern:

Be it known that I, JAMES R. SMITH, a citizen of the United States, residing at Mechanicsville, county of Saratoga, and State of New York, have invented certain new and useful Improvements in Brick-Kilns, of which the following is a specification.

This invention relates to brick kilns.

The present invention has for its object the provision of a brick kiln wherein grates will be dispensed with, the kiln being constructed in a novel manner with the outer course of the brick covered with plastic clay or the like at the sides, ends and top, and having bricks omitted in a certain novel manner, whereby numerous vertical flues are provided in the sides and ends, and other flues provided across the top of the kiln, lidded or valved vents being provided at suitable intervals in the top by the manipulation of which the conditions of pressure and draft within the kiln may be regulated. I propose, further, in carrying out the present invention, to provide novel means for evenly and regularly distributing and controlling air pressure at and under the fires in the arches and to maintain within the kiln a condition of pressure, as contradistinguished from a natural draft, thereby to maintain the fire under forced draft, as it were, and to convey the flames and products of combustion under pressure, through the flues aforesaid, throughout the entire kiln, whereby the bricks are evenly and regularly burned.

In carrying out the present invention, there is provided a novel form of air supplying valve underneath the fire in each arch and suitable means, such as an air compressor, steam jet, turbine blower, or the like, is used to force the air under pressure to the different distributing valves, the valves being arranged underneath the arch in such fashion and being of such novel construction that the same air pressure is delivered, regulated as desired, to all parts of the fire in a given arch. By this means I am enabled to maintain substantially the same pressure throughout the kiln and to insure an even and regular distribution of the heat, flame and products of combustion from the fire in any given arch throughout the brick above it.

By the provision of the air supplying regulating valves aforesaid, it is made possible to use the kiln as a continuous one, permitting different stacks of the bricks to be erected, burned, cooled and taken down as the blast at each arch can be regulated independently of that at all other arches of the kiln.

The invention is set forth fully hereinafter and the novel features are recited in the appended claims.

In the accompanying drawings:—Figure 1 is a side elevation of a portion of a brick kiln embodying my invention, a part of the plastic coating being broken away and the air pipe and distributers being shown; Fig. 2, a section on line 2—2, Fig. 1; Fig. 3, a plan view, more or less diagrammatic, showing how the air distributing or blast pipes are arranged in relation to the sections of the kiln; Fig. 4, a section on line 4—4, Fig. 1; Fig. 5, a longitudinal detail section through one of the air blast or supplying devices; Fig. 6, a plan view of Fig. 5, with certain parts broken away; Fig. 7, a section on line 7—7, Fig. 5; Fig. 8, a vertical section through one of the vents, showing the damper closed; Fig. 9, a plan view of Fig. 8.

In laying out a kiln, it will be decided what distance the arches are to be apart and of what length. Air mains 1 will then be laid, and from these mains, at suitable intervals corresponding to the distance between the arches, there will be laid pipes 2 of such length that they will run part way or the full length of the arches as necessary or required immediately beneath them, below the kiln ground-floor and arranged so that brick or plank may be placed over the pipes 2 to protect them when the kiln ground-floor is used for loading, driving, or is being cleaned. These pipes 2 may be coupled in any preferred manner to the mains 1, but preferably they are provided

with elbows 3 having a screw-threaded coupling to engage nipples 4 on the main. The far end of each pipe is closed, as at 5. The pipes 2 may be made as castings and they are, by preference, provided with a flat top 6 extending lengthwise thereof and with longitudinally extending lips, flanges or beads 7.

Surmounting the pipes or castings 2 are arched distributing conduits 8 having air openings 9 at intervals throughout their length, said openings being preferably arranged just below the highest point of the conduits 8 and in divergent fashion in relation to each other. The openings on opposite sides of the conduit may be in alinement or those on one side may be in staggered relation to those on the other side. As many of these air openings may be employed, and disposed in any fashion in the upper part of the pipe, as may be found necessary to convey the air blast in an upward direction to the fire in the most efficient manner. The conduits 8 in each instance, run substantially the full length of the arch from one end to the other thereof.

The top of the pipe or casting 2 is tapped at suitable intervals and provided with nipples 10 having flat tops, all of the nipples being arranged with their tops in substantially the same plane or in alinement. At suitable intervals bolts 11 which pass through openings 12 in the apex of the conduit 8 and are screwed into the top 6 at 13, hold the conduit 8 firmly down upon the pipe 2. The beads or flanges 7, by their engagement with the conduit 8, make a substantially airtight joint at those points and also prevent any lateral displacement of the conduit. Both ends of the conduit are closed, and hence the air received in the conduit can only escape through the discharge openings 9.

Disposed lengthwise of the conduit 8 is the slide valve 14 which is a flat plate running the full length of the conduit and provided with ports 15 adapted to be brought into register with the openings in the nipples 10 on which the said slide valve lies. The bolts 11 pass through elongated slots 16 in the slide valve 14 and serve to guide it in its reciprocations, and coil springs 17 interposed between the top of the conduit and bearing on washers 18 which surmount the slide valve 14, exert a tension on the slide valve at different points of the length thereof sufficient to hold it firmly down upon the flat tops of the nipples 10. A suitable operating handle 19 is secured to the slide valve and is disposed beyond the end of the arch in convenient position for manipulation.

The main or mains 1 are connected to some suitable air pressure supplying means, such as an air compressor, steam jet, turbine blower, or any other appliance or the like, and in consequence, a pressure, whether steam or air, or a mixture of the two is forced into the pipes or castings 2 ready for entry into the conduits 8 upon the manipulation of the valve 14. Thus, the valves 14 of the respective conduits being adapted for independent control, the blast of pressure under any fire in any given arch of the kiln may be regulated at will by causing the ports 15 to register more or less with the openings in the nipples 10. The ports 15 of any given valve 14 being all arranged in the same relation to the respective nipples 10 of the particular pipe 2, the pressure admitted into the conduit 8 will be the same at all of the ports 15, and consequently, the same blast or pressure is delivered through the distributing openings 9 to all parts of the fire in the arch of the kiln from one end of the arch to the other. This method of controlling the blast has great practical advantages, because it insures an even and regular forcing of the heat, flame and products of combustion from all parts of the fire in a given arch upwardly into the bricks of the kiln, resulting in a superior product. By using a separate control of the pressure for each arch, the control of the heat, flame and products of combustion in different parts of the kiln can be regulated as desired, and thus the kiln may be used as a continuous one, permitting different stacks of the brick to be erected, burned, cooled and taken down.

With my pressure blast apparatus and control, as heretofore set forth, culm, or high or low grade coal can be used in the arches as fuel for supplying the flame and heat for burning the brick, because the introduction of the blast into the fuel forms a gas, constituting an efficient burning medium for the brick.

Having formed the arches of the kiln in an ordinary and well-known manner, but with the utilization of my new arch supports 20 which are provided with a strengthening rib 21, the kiln is formed by stacking the brick in tiers of two bricks to a strata, as it were, the two bricks of alternating strata being arranged crosswise of those above and below, and in each strata there is a space 22 which is left by omitting the third brick, thus forming substantially parallel vertical flues whose direction is indicated by the courses of the arrows, for each tier of brick. Thus, it will be seen that a very large number of these vertical channels are provided throughout the kiln.

At the top of the kiln the bricks are arranged and omitted so that the horizontal channels 23 are provided which lead to metallic vents 24 placed at suitable intervals

over said top, the said vents being provided with notches 25 for the trunnions 26 of dampers 27 having a weighted or thickened portion 28 on one side of a diameter thereof and provided with an extension 29 adapted to lie in a notch 30 and to be held down by placing one or more bricks thereon, which upon being taken off, will permit the heavier part 28 of the damper to immediately tilt the latter to upright position, thus permitting the gases and products of combustion to pass out through the vent 24; thus by opening or closing the different dampers at different parts of the kiln, the burning or cooling thereof may be regulated at will, the steam, water-smoke, and other detrimental gases allowed to escape.

To keep the heat, gases, products of combustion, etc., confined within the kiln and to insure that they cannot escape except through the vents 24, I provide a coating 31 of plastic clay which completely covers the sides, ends and top of the kiln and compels the gases to pass upwardly through the flues formed by the omission of the bricks and across the top of the kiln to the vents.

With the foregoing method of stacking and constructing a kiln, I am enabled to obtain all of the advantages of a closed kiln with none of the disadvantages of expense and construction thereof, as my entire kiln is built up, burned, cooled and taken down, leaving the kiln ground-floor unobstructed for the passage of workmen and vehicles thereover and for the subsequent building of green bricks for burning, besides which this arrangement enables one section of the kiln to be built while another section is being taken down, one section to be burned while another section is cooling, etc., as the supply of the pressure to the fuel can be controlled as may be found desirable.

Having built the kiln, and suitable metal arched doors 32 having been placed at the ends of the arches after previously distributing the fuel along the floor of the arches over the conduits 8 and the fire having been started, the blast at any particular arch can be regulated at will, the pressure being evenly distributed through the fire, causing the formation of gas which, with the products of combustion, passes upwardly through the flues. The culm or high or low grade coal may be heaped or banked on the conduits 8 as the fuel cannot readily pass through the small openings 9 or in any manner clog the ports 15 and the openings in the nipples 10. The conduit 8, with its opening 9, constitutes a guard, therefore, for the ports through which the air is blown. The vents may be disposed at the ends or sides of the kiln and the flues arranged to communicate therewith, as well as being disposed at the top of the kiln.

In my kiln, a condition of pressure, located as desired, prevails throughout the kiln, causing the dissemination of the gases throughout the brick constituting the kiln and I wish it understood that I do not rely upon natural draft to support combustion or to convey the heat or gases through the kiln, and my invention is distinguished from those kilns wherein natural draft is relied upon for that purpose.

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

1. A pressure blast device for brick kilns having, in combination, a pipe or chest, outlets therefor disposed at intervals of the length thereof, means for controlling the discharge of the blast through the said outlets, and a protecting apertured hood or conduit for the said outlets and which houses the said controlling means.

2. A pressure blast device for brick kilns having, in combination, a pipe or chest, outlets therefor disposed at intervals of the length thereof, retaining members on the pipe or chest, an arched apertured hood or conduit which is engaged with the retaining members, and controlling means for the outlets aforesaid which is located within the arched hood or conduit.

3. An air blast device for brick kilns having, in combination, a pipe or chest provided with nipples at intervals of its length for the discharge of the pressure blast, a slide valve bearing on said nipples and provided with ports adapted to be brought into line with the openings in the nipples, and an apertured hood or conduit into which the blast may discharge which serves as a protector.

4. An air blast device for brick kilns having, in combination, a pipe or chest provided with outlets, a sliding valve having ports controlling the outlets, an apertured conduit or hood which houses the valve, and spring devices for holding the valve in the positions to which it is moved.

5. An air blast device for brick kilns having, in combination, a pipe or chest provided with outlets, a sliding valve having ports controlling the outlets, an apertured conduit or hood which houses the valve, fastening bolts connecting the hood or conduit to the pipe or chest, and coil springs surrounding said bolts and interposed between and bearing against the hood or conduit and the valve, thereby to hold the valve in position.

6. An air blast device for brick kilns having, in combination, a pipe or chest, hollow nipples located at intervals lengthwise thereof, retaining members on the pipe or chest, an arched hood or conduit engaged with the retaining members and provided with apertures in its upper part, a slide valve having

ports adapted to control the discharge of the pressure blast through the nipples, said valve being housed by the conduit, bolts securing the conduit to the pipe or chest which pass loosely through the valve, and coil springs surrounding the bolts and bearing on the conduit and the valves which are adapted to hold the valve on the nipples.

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

JAMES R. SMITH.

Witnesses:
MELVILLE L. WELLING,
WILLIAM T. MOORE.