

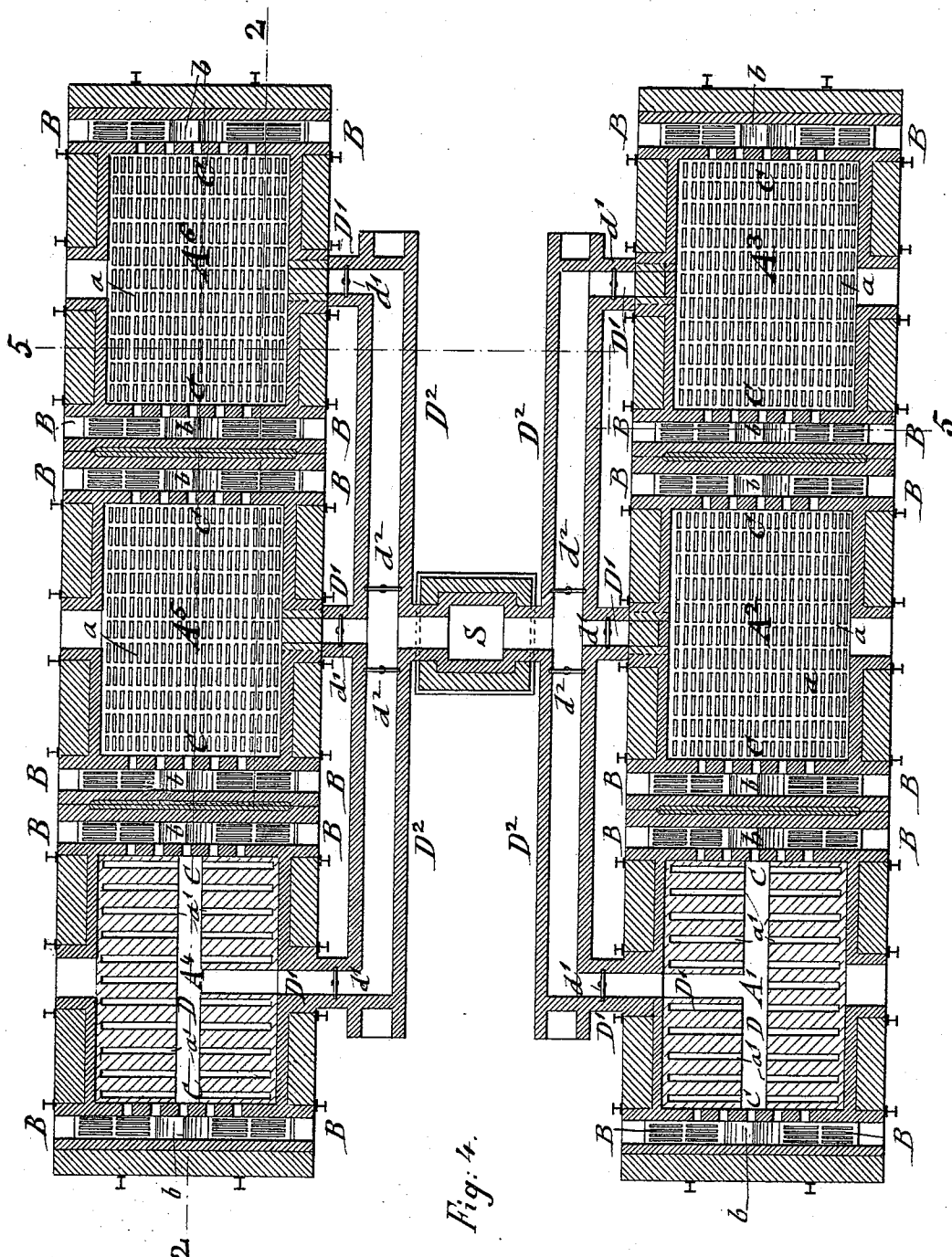
(No Model.)

C. KRAHE.
BRICK KILN.

4 Sheets—Sheet 3.

No. 519,677.

Patented May 8, 1894.



WITNESSES:

Charles Schroeder.
Adolph Scherer.

INVENTOR

Carl Krahe
BY *James P. Rogers*
ATTORNEYS.

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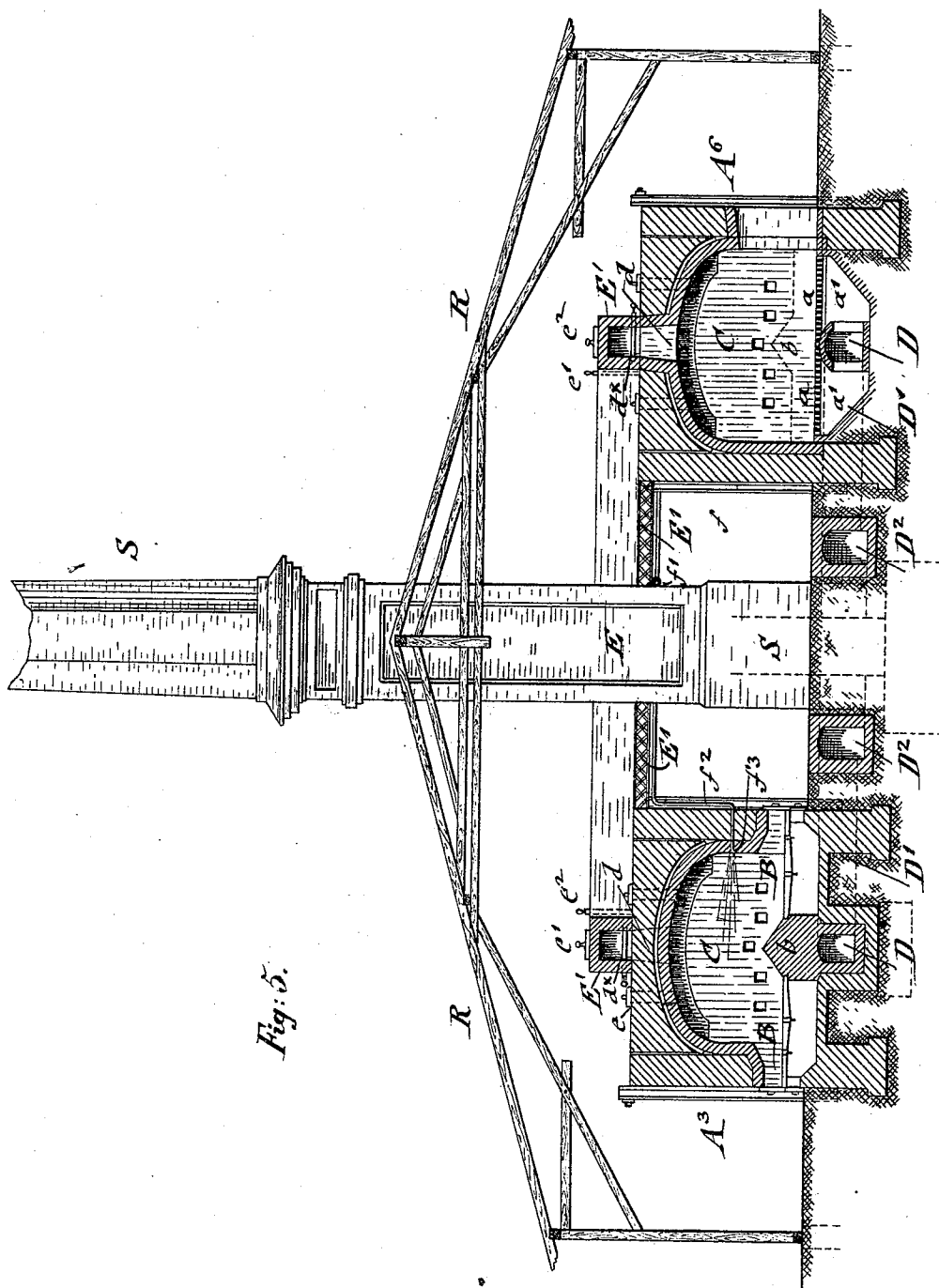


Fig. 5.

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UNITED STATES PATENT OFFICE.

CARL KRAHE, OF ROSSVILLE, NEW YORK, ASSIGNOR TO THE CERAMIC
PAVING STONE COMPANY, OF NEW YORK.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 519,677, dated May 8, 1894.

Application filed June 12, 1893. Serial No. 477,272. (No model.)

To all whom it may concern:

Be it known that I, CARL KRAHE, a citizen of the Empire of Germany, residing in Rossville, in the county of Richmond 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 certain improvements in the construction of kilns for burning building-bricks, pavement-blocks, fire-bricks, ornamentally-shaped blocks, flooring-slabs, conduits, troughs and artificial stoneware generally, to which, by the burning in the kiln, the following characteristics are imparted: a well-vitrified body, a closely-grained texture, great durability and hardness, resistance to the absorption of moisture and the possession of a clear ringing sound when struck.

My invention consists of certain features of construction and combinations of parts to be hereinafter described and then specified in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved kiln for burning stoneware. Fig. 2 is a vertical longitudinal section on line 2 2, Fig. 4. Fig. 3 is a plan-view, partly in horizontal section on line 3 3, Fig. 1. Fig. 4, is a horizontal section on line 4 4, Fig. 2, and Fig. 5 is a vertical transverse section of the kiln, on line 5 5, Fig. 4.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A', A², A³, &c., represent a number of individual kilns or combustion-chambers that are arranged in two groups, which are connected to one central smoke-stack S, and placed under one common roof R, which is supported in any suitable manner, as shown in Fig. 5.

Each kiln or combustion-chamber A is provided, for the purpose of producing as intense a heat as possible, with a fire-place B at each corner. The fire-places B are provided at opposite sides of the kilns with fire-doors through which the fuel is supplied to the grates of the fire-places, two adjacent fire-places having one common fire-bridge *b* between them. The air is drawn in through the ash-pit and ash-pit doors in the usual

manner, it being heated in the ash-pit by contact with the heated walls of the fire-places.

In the interior of each kiln A are arranged near the fire-places B, transverse partition-walls C, which are provided with a number of openings above the fire-bridges *b*. These partition walls C serve to some extent for intercepting any coarse particles of fuel which are carried along by the fire-gases, but mainly for deflecting the greater portion of the products of combustion toward the arched top of the kiln, from which they are then conducted in a downward direction over and around the stone-ware to be burned in the kiln, the gases being drawn off through slotted openings *a* in the floor or bottom of the kiln and through transverse channels *a'* below the floor into a main-flue D that extends longitudinally below the bottom of the kiln, as shown at the left of Fig. 2 and at the right of Fig. 5. The main-flue D of the kiln is connected by a transverse flue D' with a longitudinal flue D², which communicates with a central smoke-stack S, as shown clearly in Fig. 4. The transverse and longitudinal flues D' and D² are provided respectively with dampers *d'* *d*² by which the connection of any one kiln with the smoke-stack may be established or interrupted. The transverse partition-walls C are extended nearly to the arched top of the kiln, and preferably arched at their upper ends, the combustion-chamber proper being formed in the space between the transverse partition-walls in each kiln. From the center of the arched top of each combustion-chamber extend vertical openings *e e*, which are closed by suitable covers, that are removed whenever it is necessary to permit the heat to pass off into the atmosphere for cooling off the kiln.

Each combustion-chamber has a central vertical top-flue *d* which is provided with a horizontal damper *d*^x and which is connected with an auxiliary flue E which extends longitudinally over each group of kilns said longitudinal auxiliary flues E being connected at their ends by transverse flues E' that extend from the end-kilns of one group to the end-kilns of the other group, as shown clearly in Fig. 3 and 5, the transverse flues E' being preferably supported by suitable wrought-

iron girders as shown in Fig. 5, or by arches, pillars or otherwise. The auxiliary flues E, E', are provided at each side of the top-flue $\bar{d}$ of each combustion-chamber with sliding dampers e^1 and e^2 , so that any combustion-chamber of one group may be connected with any other combustion-chamber of the same or the adjacent group, by simply placing the dampers of the draft-flues D D' D² and the dampers of the top-flues $\bar{d}$ and auxiliary-flues E E' in proper positions.

When the articles in one kiln are burned, the products of combustion are drawn from the fire-places of the same through the openings in the transverse partition-walls and over the same into the combustion-chamber and conducted in a downward direction through the openings a in the floor and the lateral channels a' below the floor into the longitudinal main-flue D, and from the same by the lateral flue D' and longitudinal connecting flue D² to the chimney S. Whenever any one of the other kilns is supplied with a new charge which has to be dried preparatory to burning, the dampers of the flues D D' D² of the kiln are closed and the products of combustion are drawn through the top-flue $\bar{d}$ and the auxiliary flue E or E' into the newly-charged kiln, in which they are drawn in downward direction and over and around the articles in the same, so that the articles are subjected to a preparatory heating before they are subjected to the final burning. By this arrangement, the heat contained in the products of combustion drawn from any one kiln can be utilized for the preparatory heating of the articles in any other kiln of either group, as by the arrangement of the dampers in the main and connecting flues and in the top and auxiliary flues any suitable connection can be made. Heretofore, in kilns of this class, the preparatory heating was accomplished by conducting the products of combustion from the bottom of the kiln toward the top, while in my improved kiln the preparatory heating is accomplished by conducting the products of combustion from the top-flue in a downward direction to and through the bottom of the kiln. By the arrangement of the auxiliary flue, not only adjacent kilns may be connected, but any two kilns in the same group or in different groups, which is of considerable advantage, as thereby any desired kiln can be charged with the articles to be burned; and subjected to preparatory heating by the heat of the products of combustion from any other kiln in which the final burning is completed or nearly so. Another advantage of subjecting the newly-charged articles in the kiln to the heat of the products of combustion that are conducted from the top in a downward direction through the same, consists in the facts that the injurious influence of the aqueous vapors which were heretofore collected in the upper part of the kiln is entirely prevented.

By arranging the auxiliary flue, on the top

of the kilns, the different articles that are in the different kilns, can be subjected for any length of time required to the burning process, such as, for instance, paving-blocks for from ten to twelve days, for front-blocks for from five to seven days, &c., without interfering with the continuous working of the kiln. In other words, it is not necessary that one kiln after the other be charged with bricks, and a regular succession in the burning of any kind and quality of bricks be kept up, but any kiln may be charged with the ware to be burned and connected with any other kiln in which the final burning has taken place so that the preparatory and final burning of different wares may be accomplished with great facility and comparative freedom of succession.

For the purpose of increasing the heat of the fire-gases and producing a more perfect combustion of the fuel burned in the fire-places, a closed water-receptacle F is arranged on each group of kilns, said water-receptacle being preferably made of boiler-iron and provided with suitable safety-valves, pressure-gages and other accessories. Of the water-receptacles that one which is located above or near the kiln in which the final burning takes place, is partly filled with water—which is evaporated by the heat of the kiln, the steam in the same being conducted by a transverse connecting pipe f into the second receptacle F of the other group of kilns and conducted from the same by distributing steam-pipes f' f^2 to the different fire-places. The pipes f^2 are conducted through the side-walls of the fire-places and the steam discharged through nozzles f^3 into the fire-places above the fire-bridges b , as shown clearly on the left-hand side of Fig. 5. The steam mingles with the fire-gases and is dissociated by the heat of the same into oxygen and hydrogen, so that not only a more perfect combustion of the fire-gases and a more intense heat is produced, but also the carrying along of unburned coal-particles in the kiln by the products of combustion and the injuring of the articles in the kiln by means of said particles, is prevented. The steam supply-pipes are provided with suitable stop-cocks, so that the steam can be supplied to the different fireplaces as required.

As all the steam-pipes are on the outside of the kilns, they are readily accessible, so that leaks or other damage to the same can be readily repaired.

The side walls of the kiln are provided with suitable peep-holes, by which the progress of the burning operation in the kiln can be readily observed from the outside.

By my improved kiln a considerable saving of fuel is obtained, owing to the perfect combustion of the fuel in the fire-places by the supply of steam to the same. Secondly, the heat of the kilns is utilized for the preparatory heating and drying of the unburned articles charged into any one of the kilns in

a group. Thirdly, the heat is uniformly distributed in the combustion-chamber of the kiln, owing to the arrangement of the large number of small bottom-openings and the larger transverse channels below the same. Fourthly, the kiln is of comparatively simple construction, as by the arrangement of the auxiliary top-flue the cost of erecting the kiln is considerably reduced.

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

15 1. In a kiln for burning stoneware, the combination, of a combustion-chamber having a fireplace arranged at each corner of the same, a transverse partition-wall adjacent to said fireplaces, a closed water-receptacle on the top of the kiln, and steam-pipes connecting the steam space of said receptacle with the
20 fireplaces, substantially as set forth.

2. The combination, with a number of kilns arranged in one or more groups, each kiln being provided with fireplaces at the corners of the same and with transverse partition-walls adjacent to said fireplaces, of closed water-receptacles supported on top of the kilns, a pipe connecting the steam space of one receptacle with the other, and steam supply-pipes leading from the connecting steam-pipe to the different fireplaces, so as to supply steam to the same, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CARL KRAHE.

Witnesses:

PAUL GOEPEL,

CHARLES SCHROEDER.