

(No Model.)

T. K. NICKERSON.
KILN FOR BURNING LIME OR CEMENT ROCK.

No. 509,550.

Patented Nov. 28, 1893.

Fig. 1.

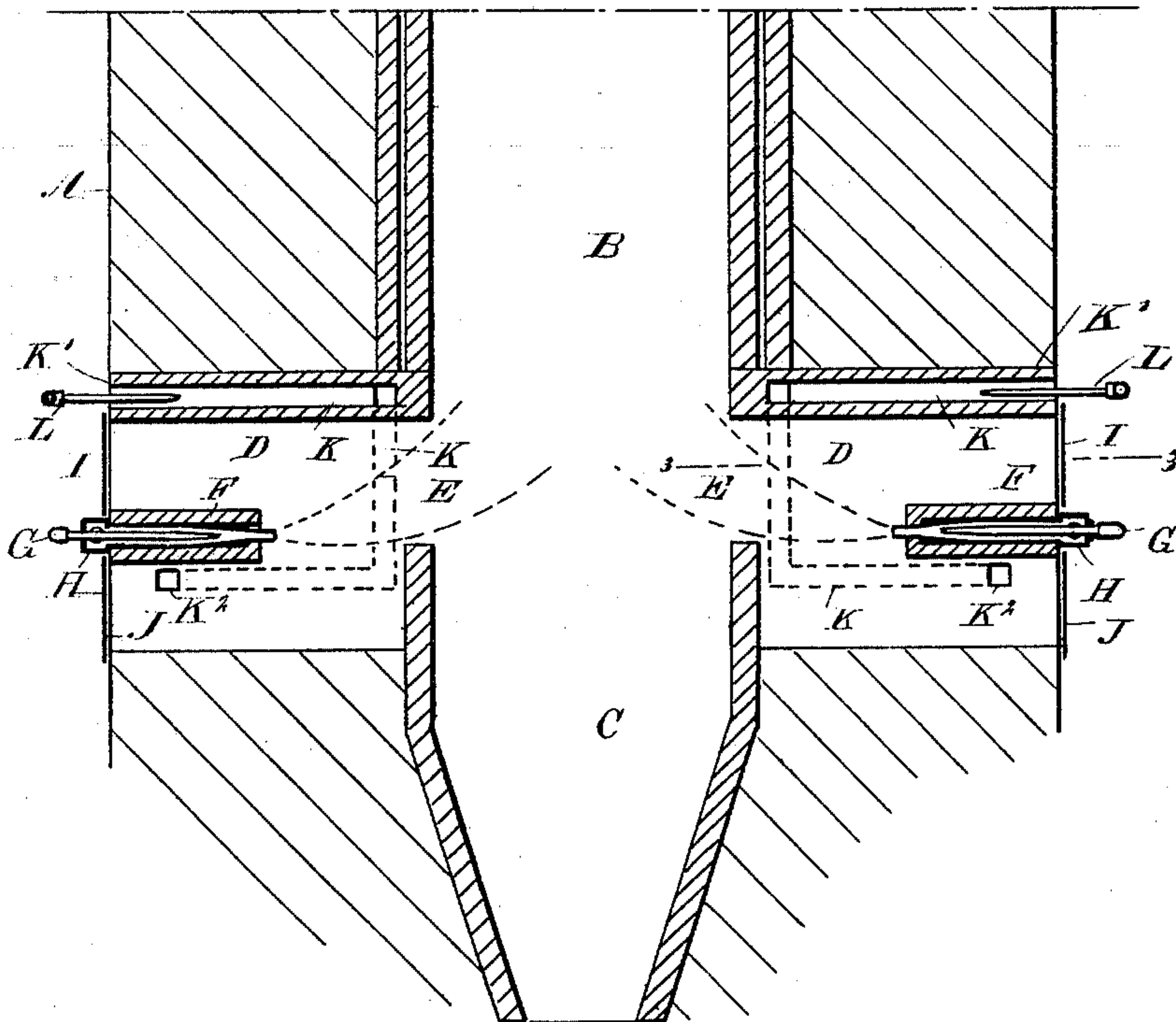
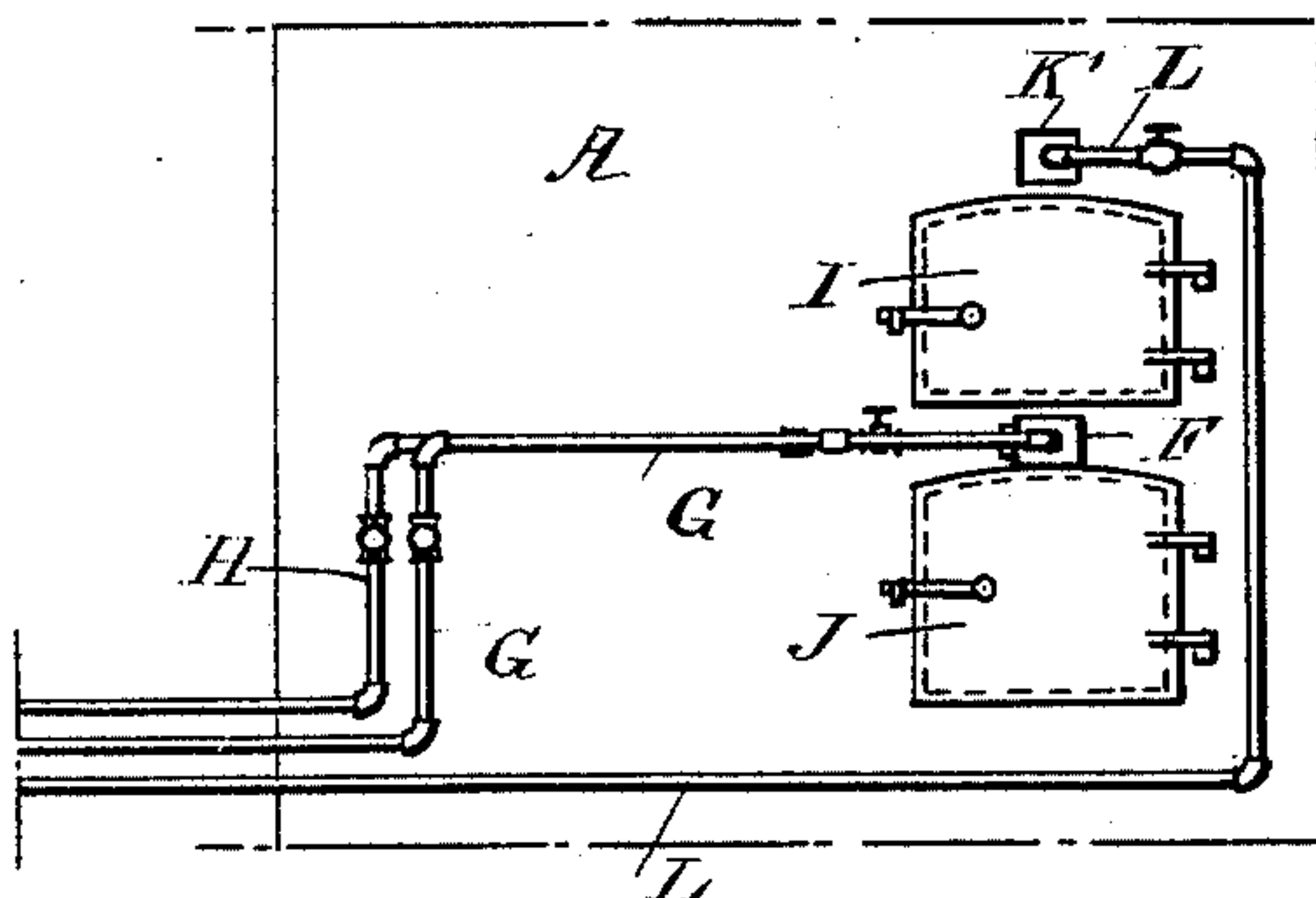


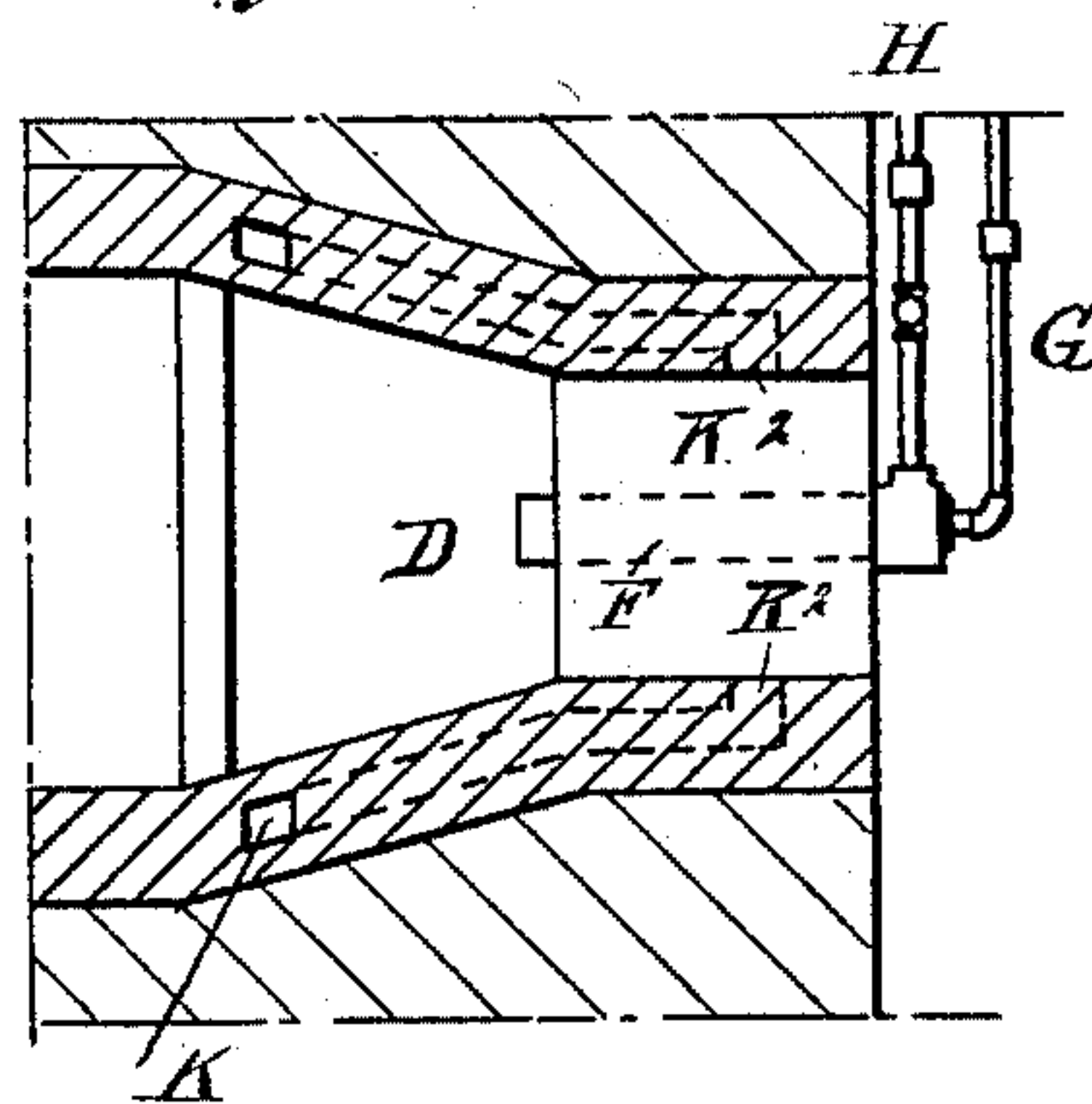
Fig. 2.



WITNESSES:

Donn Twitchell
Co. Sedgwick

Fig. 3.



INVENTOR

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UNITED STATES PATENT OFFICE.

TRUMAN K. NICKERSON, OF MAQUOKETA, IOWA.

KILN FOR BURNING LIME OR CEMENT ROCK.

SPECIFICATION forming part of Letters Patent No. 509,550, dated November 28, 1893.

Application filed February 15, 1893. Serial No. 462,367. (No model.)

To all whom it may concern:

Be it known that I, TRUMAN K. NICKERSON, of Maquoketa, in the county of Jackson and State of Iowa, have invented a new and Improved Kiln, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved kiln, more especially designed for burning lime or cement rock and which is simple and durable in construction, adapted for burning liquid fuel and arranged to equally distribute the heat generated to insure proper and uniform burning of the limestone, cement rock or other material to be treated.

The invention consists in combination with a combustion chamber arranged in the side of the kiln and connected with the cupola or stack and a hydrocarbon burner extending in the said combustion chamber, of an air channel built in the wall of the combustion chamber and opening into the same below the said hydrocarbon burner and in close proximity thereto, and a steam pipe discharging into the outer end of the said air channel to force the air into and through the channel to the combustion chamber.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a front elevation of part of the same; and Fig. 3 is a sectional plan view of part of the same on the line 3—3 of Fig. 1.

The improved kiln A, is provided with the usual masonry and an interior cupola or stack B, discharging at its lower end into a cooler C, contracted as shown, and serving to retain the previously burned material until it is sufficiently cooled for withdrawal and also to form a closed bottom for the cupola B.

In the masonry A are built one or more combustion chambers D, each connected at its inner end by an opening E, with the lower end of the cupola B, as plainly shown in the drawings, so that the heat generated in the said combustion chamber as hereinafter more fully described, can pass through the opening E into the lower end of the cupola B, to

burn the limestone, cement rock, or other material.

In each combustion chamber D is arranged a hydrocarbon burner F, of any approved construction and provided with a suitable air supply pipe G, connected with an air compressor and with an oil supply pipe H, connected with a suitable oil supply, both pipes being properly valved to regulate the flow of the air and oil to the burner F. The discharge nozzle of the latter extends horizontally and inwardly toward the bottom of the opening E so that the flame issuing from the nozzle is directed to the opening E and upwardly in the cupola B, as indicated by dotted lines in Fig. 1.

The casing for the hydrocarbon burner F extends transversely from one side to the other of the combustion chamber D, near the outer end of the latter and the openings above and below the said hydrocarbon burner are closed by suitable doors I and J, as plainly shown in Figs. 1 and 2.

An air channel K, is built directly in the wall of the combustion chamber D, the said channel having its outer end K', located in the top of the combustion chamber and communicating with the outer air while the inner end K², discharges into the sides of the combustion chamber below the hydrocarbon burner F and in very close proximity thereto, as plainly shown in Figs. 1 and 3, it being understood that the main channel K divides into branch channels one for each side of the combustion chamber. Into the outer end K' of the channel K extends the contracted discharge end of a steam pipe jet L, connected with a suitable source of steam supply, so that the steam escaping through the said pipe L passes into the channel K, thus forcing the air inward, thereby drawing air from the outside through the opening K' into the channel, the air with the steam in its passage through the channel K being heated by the heated walls of the combustion chamber, so that finally a heated mixture of steam and air passes into the combustion chamber to fill the same and aid in the combustion of the burning mixture of air and oil at the discharge nozzle of the respective hydrocarbon burner F.

It is understood that the outer end of each combustion chamber is closed by the doors I and J and that the air for combustion of the hydrocarbon burners is supplied through the pipe G connected with an air compressor. The air saturated with steam and entering the combustion chambers at K² assists in the combustion of the hydrocarbon burners, but its main object is to take the excessive heat from the combustion chamber and evenly distribute the same through the limestone or cement rock for reducing the same. Furthermore, the said steam saturated air carries off the carbonic acid liberated from the limestone or cement rock on the reduction thereof by the heat furnished. In order to successfully reduce limestone or cement rock by the use of liquid fuel it is imperative that a powerful draft is produced to properly reduce and carry off the obnoxious gases.

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

The combination of a kiln having a central cupola, side combustion chambers having openings E at their inner ends communicating with the central cupola, and inclosed main hot air channels built in the wall of the kiln

and opening at one end into the outer air, said main channels being provided with separating branch channels leading into each combustion chamber at opposite sides thereof, steam jet pipes L located in the outer open ends of the main hot air channels to heat the air and impel it inward into the combustion chambers, and ordinary incased hydrocarbon burners having their casings arranged transversely within the combustion chamber at a central point to separate the same into upper and lower door-inclosed spaces, said burner casings extending completely across the combustion chambers near their outer ends directly above and in very close proximity to the branch air channels opening thereinto, whereby the heated air escaping from said channels will issue under the burner casings and additionally heat the same to assist in the combustion of the liquid fuel and also to keep up a circulation which relieves the combustion chambers of excessive heat, substantially as set forth.

TRUMAN K. NICKERSON.

Witnesses:

WM. MARTIN,
LEMUEL C. OWEN.