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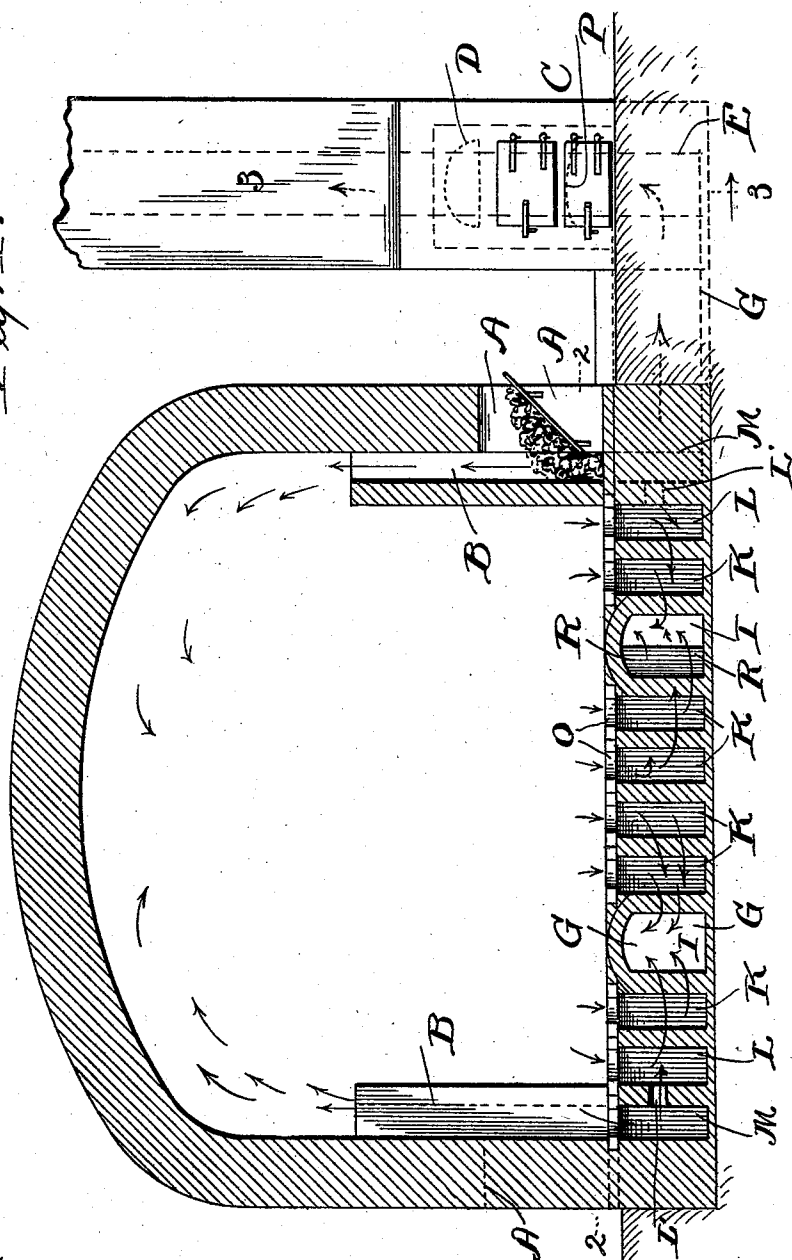
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W. S. WILLIAMS.
KILN.

No. 531,242.

Patented Dec. 18, 1894.

Fig. 1.



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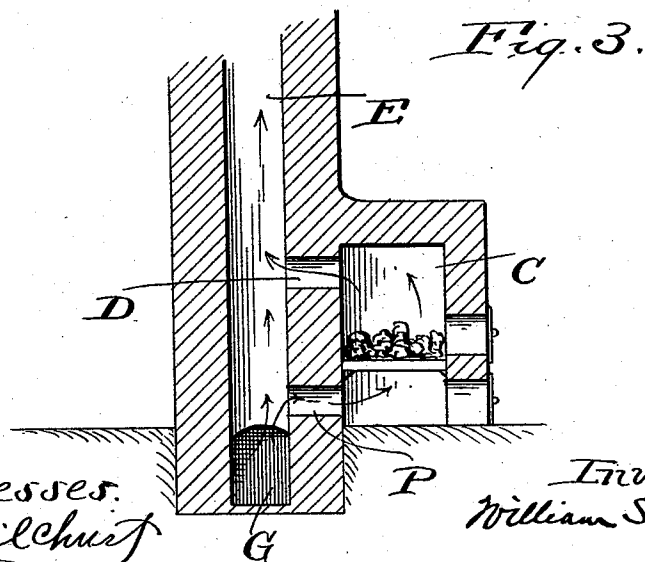
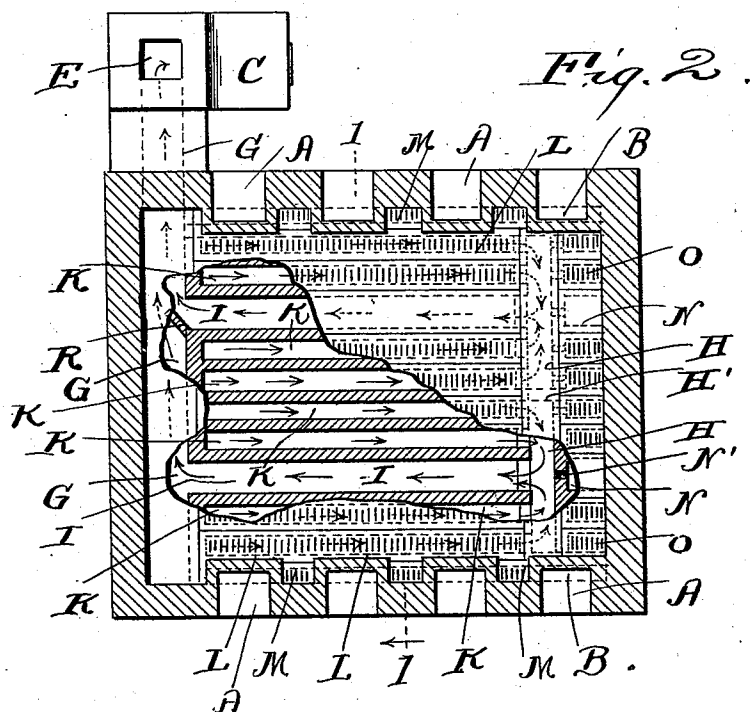
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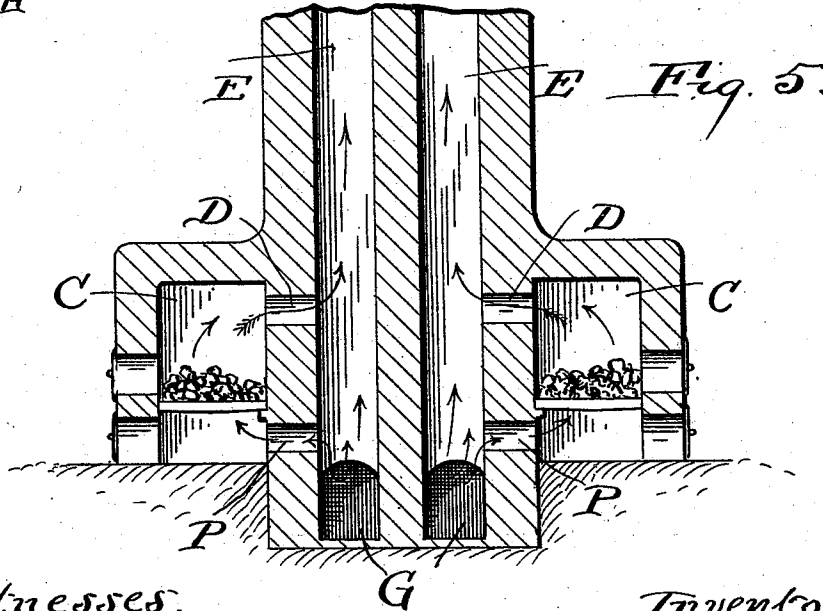
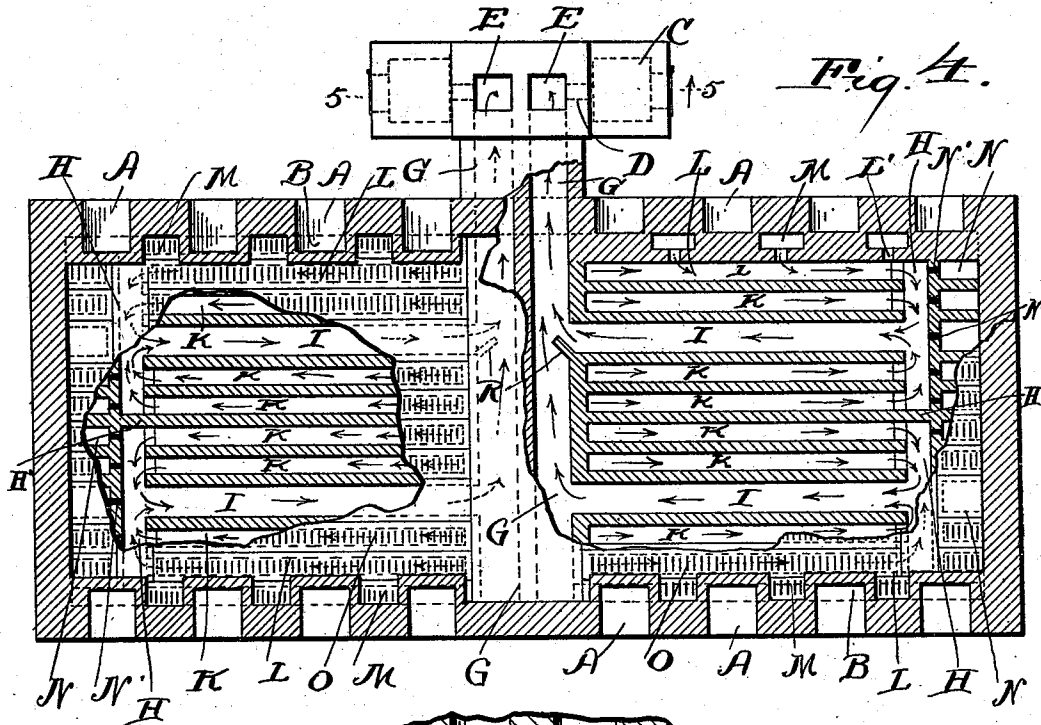
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UNITED STATES PATENT OFFICE.

WILLIAM S. WILLIAMS, OF CANTON, OHIO.

KILN.

SPECIFICATION forming part of Letters Patent No. 531,242, dated December 18, 1894.

Application filed February 27, 1894. Serial No. 501,625. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. WILLIAMS, of Canton, in the county of Stark and State of Ohio, have invented certain new and useful

Improvements in Kilns; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in kilns; and it consists in certain features of construction and in combinations of parts hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section on line 1—1, Fig. 2, of a kiln embodying my invention. Fig. 2 is a top plan of the kiln, partly in section, on line 2—2, Fig. 1, and reduced in size relative to Fig. 1, with portions of the floor of the kiln broken away to more clearly show the construction. Fig. 3 is a vertical section on line 3—3, Fig. 1. Fig. 4 is a top plan, partly in section and broken away, of a kiln substantially the same in construction as the kiln shown in Figs. 1, 2 and 3, excepting that kiln shown in Fig. 4 is considerably larger and involves a duplication of the flues and furnaces employed in the construction of furnace shown in Figs. 1, 2 and 3. Fig. 5 is an enlarged vertical section on line 5—5, Fig. 4.

A simple construction of kiln embodying my invention is shown in Figs. 1, 2 and 3, the kiln shown being quadrangular in plan. Two series of fires or furnaces, A, A, are shown located at opposite sides of the kiln, respectively. The fire or combustion-chamber of each of said furnaces is in open relation, at the rear, with an upright flue, B, constructed at the rear of the furnace. Flues B discharge upwardly preferably into the upper portion of the kiln. Another furnace C is located at one side of the kiln. All of the furnaces are shown situated above the floor of the kiln. The fire or combustion-chamber of furnace C is in open relation, by means of a lateral duct or passage-way D in the rear wall of said chamber, with an upright flue or chimney E that, at its lower end, opens into a horizontal flue or duct G located below the floor of the kiln and arranged between and at right angles to the side-walls at which fur-

naces A are located, said flue or duct G extending from the side of the kiln at which furnace C is located; to near the opposite side of the kiln.

Located a suitable distance from, and arranged parallel with duct or flue G, are located two horizontal ducts or flues H, the latter being arranged preferably in the same vertical plane, and separated by a wall H', said ducts or flues H being also located below the floor of the kiln. Each duct or flue H, preferably at the central portion thereof, is in open relation, by means of a horizontal flue or duct I (also located below the floor of the kiln) with duct or flue G. One or more horizontal ducts or flues K, arranged parallel with ducts or flues I are provided at either side of said ducts or flues I. Ducts or flues K are also located below the floor of the kiln and extend from near duct or flue G to and discharge into the adjacent duct or flue H.

At the rear of each set of furnaces A, and below the floor of the kiln, is a flue L that opens into the adjacent duct or flue H, and is in open relation, by means of passage-ways, L', with short ducts or chambers M located between adjacent furnaces A. At the outer side of each duct or flue, H, and also below the floor of the kiln, is located a series of chambers or short ducts N that are in open relation with the respective flue or duct H by means of lateral holes or perforations N' in the wall between said chambers or short ducts and the respective flue or duct H. Ducts K, L, M and N are in open relation with the interior of the kiln by means of perforations or holes O formed in the floor of the kiln.

I have reduced my invention to practice and the results are very satisfactory.

The products of combustion pass from furnaces A into and up flues B at the rear of said furnaces; thence into the interior of the kiln, where the heat circulates about the ware or objects being treated; thence passes through the perforations in the floor of the kiln into ducts or flues K L M N under the floor; thence into ducts or flues H; thence into flues or ducts I, that, as already indicated, discharge into duct or flue H, and thence to chimney E, all as indicated by arrows.

By the construction hereinbefore described, wherein the products of combustion, upon

their passage from the interior of the kiln, are conducted or caused to circulate underneath the entire or substantially the entire floor of the kiln, before they are conducted to the chimney, it will be observed that the floor of the kiln, in the operation of the latter, is uniformly or approximately uniformly heated and kept in a heated condition, and that practically all of the heat is utilized; that is, the heat escaping to the chimney is reduced to a minimum.

Except the duplication of the number of ducts or flues and furnaces, the construction of kiln shown in Figs. 4 and 5, is substantially the same as that shown in Figs. 1, 2 and 3. Furnace or furnaces C, located adjacent to the chimney or chimneys, as already indicated, will be found useful in starting the fires in furnaces A, in that said furnace or furnaces will effect a rarefaction of the air in the chimney or chimneys, resulting in the creation of a draft through the kiln and through furnaces A, and thereby facilitate an improved combustion in the latter. Some of the heated air discharged into duct or flue G will, however, it will be observed, be carried through passage-way or passage-ways P in the rear-wall or walls of the pit or ash-pits of furnace or furnaces C to the burning fuel of said furnace or furnaces, and thereby facilitate and improve the combustion in said furnace or furnaces.

By my improved construction of kiln hereinbefore described, the bricks, ware or articles placed in the kiln for burning are burned rapidly and satisfactorily. By my extensive distribution of the heat under the floor of the kiln, before conducting the products of combustion to the chimney or chimneys of the kiln, as already indicated, substantially every unit of heat is utilized, and by means of the forced draft through furnaces A and through the kiln, and created by means of furnace or furnaces C, the most complete combustion of the fuel in furnaces A is obtained, so that the liability of discoloring the bricks, ware or objects placed in the kiln for burning is also

reduced to a minimum. I would also remark that deflectors R are preferably provided, at the discharging-ends of those ducts I that are located next adjacent to the chimney or chimneys of the kiln, to direct the heated currents issuing from said ducts or flues into duct or flue G in the direction of the chimney or chimneys.

What I claim is—

1. A kiln having two sets of furnaces on opposite sides, respectively, upright flues or ducts at the rear of said furnaces for conveying the heating-agent into the interior of the kiln, a system of heating-agent distributing-ducts or flues below the floor of the kiln, holes or perforations establishing open relation between said distributing-ducts or flues and the interior of the kiln, a stack or chimney and one or more passage-ways connecting said chimney with the ducts or flues under the floor of the kiln, one or more furnaces whose ash-pit or pits are in open relation with said last-mentioned passage-way or passage-ways and whose fuel-chamber or chambers are in open relation with the aforesaid chimney, substantially as set forth.

2. A kiln having two sets of heating-furnaces located on opposite sides of the kiln, respectively, ducts or flues for conveying the heating-agent from said furnaces to the interior of the kiln, a stack or chimney, flues G and H located below the floor of the kiln and arranged between the two sets of furnaces, and ducts or flues I establishing open relation between the aforesaid ducts or flues G and H, duct or flue G being in open relation with the stack or chimney and ducts or flues H and I being in open relation with the interior of the kiln, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 30th day of December, 1893.

WILLIAM S. WILLIAMS.

Witnesses:

C. H. DORER,
WARD HOOVER.