

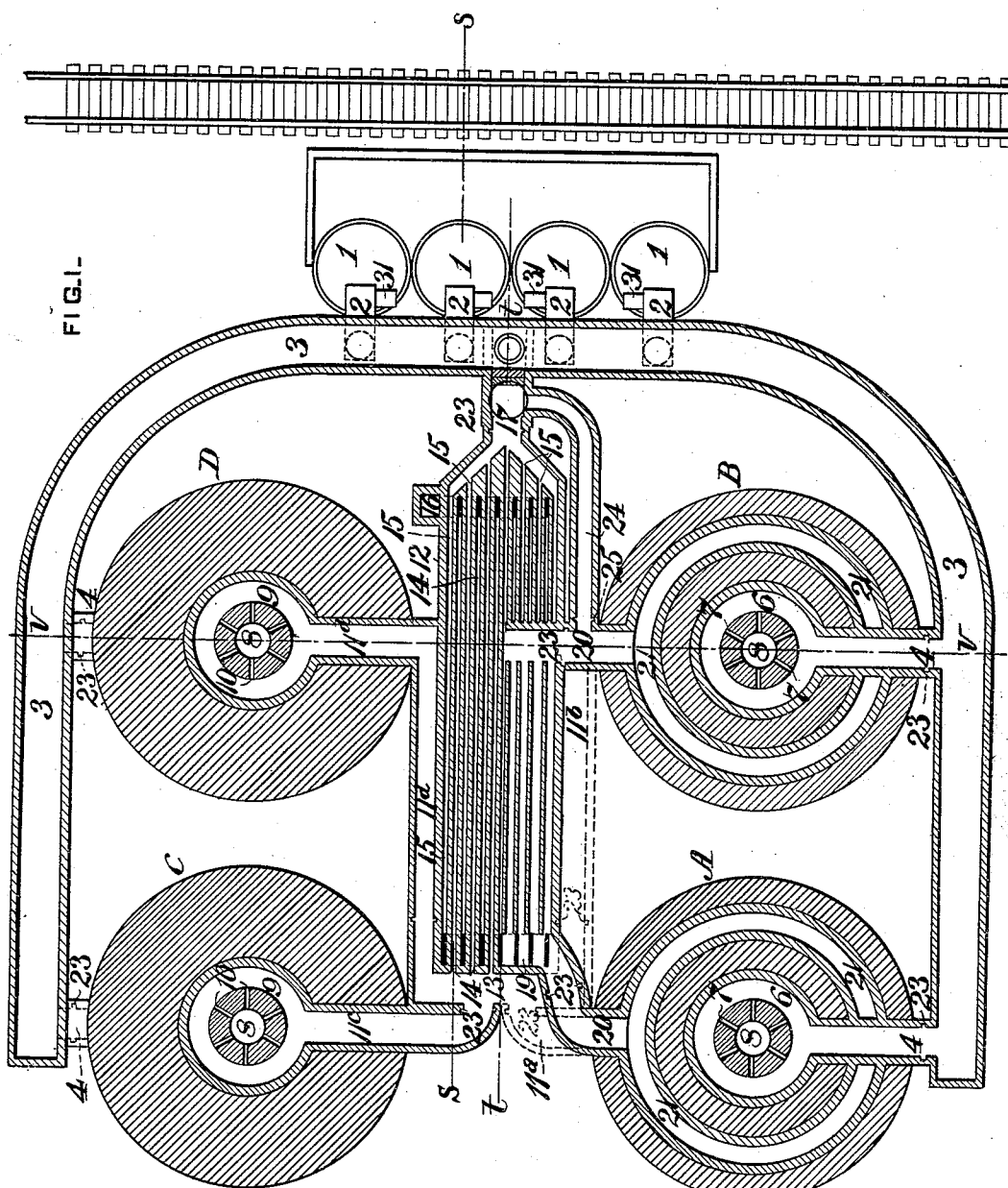
(No Model.)

2 Sheets—Sheet 1.

W. SWINDELL.
BRICK KILN.

No. 479,679.

Patented July 26, 1892.



WITNESSES:

Samuel S. Wolcott
H. E. Gauthier

INVENTOR,

William Swindell
by George H. Christy
Att'y.

(No Model.)

2 Sheets—Sheet 2.

W. SWINDELL.
BRICK KILN.

No. 479,679.

Patented July 26, 1892.

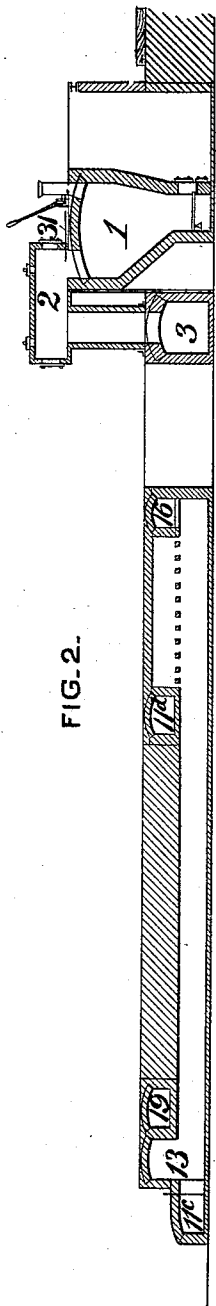


FIG. 2.

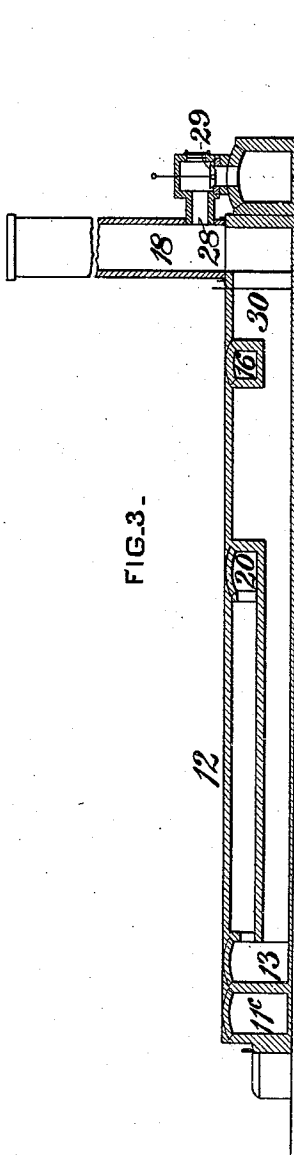


FIG. 3.

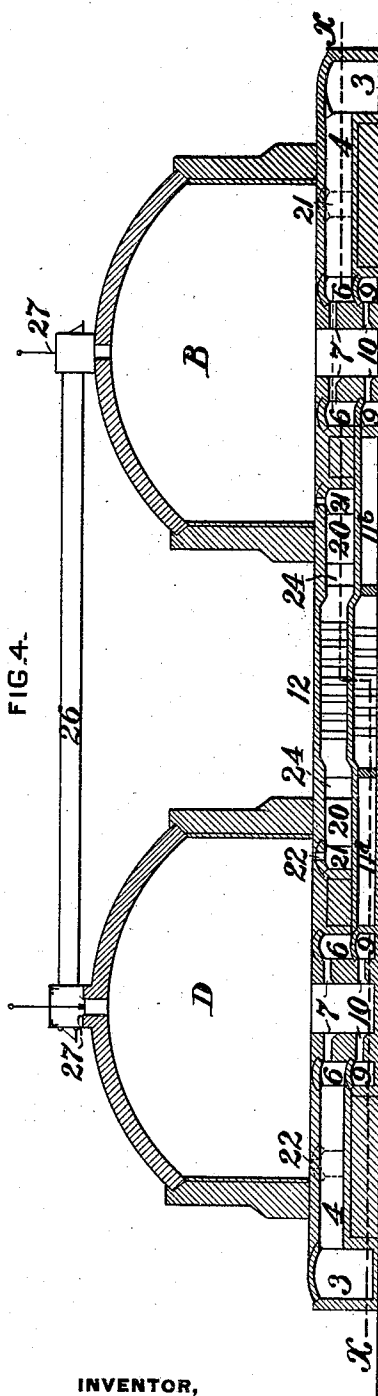


FIG. 4.

WITNESSES:

Samuel S. Wolcott
F. E. Gaither

INVENTOR,

William Swindell,
by George H. Christy
Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 479,679, dated July 26, 1892.

Application filed January 6, 1892. Serial No. 417,153. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SWINDELL, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Kilns, of which improvement the following is a specification.

The invention described herein relates to certain improvements in kilns for burning bricks and earthenware, &c.; and it has for its object an arrangement of kilns in such relation to a common air-regenerating chamber and gas-producers that all the kilns may be heated at the same time or only one or two may be operated, while the others are being charged.

In general terms the invention consists in the arrangement and combination substantially as hereinafter more fully described and particularly claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional plan view of my improved plant, the planes of section being indicated by the lines *α α*, Fig. 4. Figs. 2, 3, and 4 are sectional elevations, the planes of section being indicated by the lines *s s*, *t t*, and *v v*, respectively.

In the practice of my invention I provide a series of two or more producers 1, dependent upon the number and size of the kilns to be heated, and connect them by bonnet-flues 2 with the gas-flues 3, which preferably extend in opposite directions for a short distance and then parallel, or approximately so, with each other for a distance dependent upon the number of kilns to be connected to them. Each of these main gas-flues is provided with branch flues 4, which extend in under the hearths of the kilns A, B, C, and D and connect with annular flues 6, these in turn being connected by radial flues 7 with the vertical inlet-flues 8, arranged, as shown in Figs. 1 and 4, in or approximately in the center of the hearths of the kilns and surrounded by the annular flues 6 and 9. The annular flues 9 are also connected to the inlet-flues 8 by radial flues 10, and from said annular flues extend the horizontal flues 11^a 11^b 11^c 11^d, which converge, as shown in Fig. 1, to one end of the regenerator 12 and connect with a chamber 13.

The flues 11^a and 11^b are represented in dotted lines. The regenerator is constructed with a series of air-passages 14 and alternating passages 15 for the products of combustion. At one end of the regenerator the air-passages connect with the chamber 13 and at the opposite end with an overlying chamber 16, having a suitable opening for the admission of air, as shown in Fig. 1. The passages 15 connect at one end with a flue or chamber 17, which connects with the stack 18, and at their opposite ends with a flue or chamber 19, overlying the passages 14 and 15 of the regenerator. This chamber or flue is connected by flues 20 with the annular flues 21 in the hearths of the kilns. The flues of the kilns C and D, corresponding to the annular flues 21 and flues 20 of the kilns A and B, are not shown, but correspond in location and construction with said flues 20 and 21. The products of combustion pass from the kilns into the annular flues 21 by openings 22 in the hearths of the kilns, as shown in Fig. 4.

In the operation of my improved plant the air enters through the chamber 16, flows along the passages 14 of the regenerator to the chamber 13, thence along the flues 11^a, 11^b, 11^c, and 11^d to the annular flues of the kilns, and thence by the radial flues 10 to the inlet-flues 8. Here it mingles with the gas, which flows from the producers along the flues 3, branch flues 4, annular flues 6, and radial flues 7 to the inlet-flues 8. The gas and air, entering, as they do, in a series of jets, are thoroughly commingled before entering the kilns, where combustion occurs. The products of combustion escape by the openings 22 into the annular flues 21 and flow thence by the flues 20, chamber 19, passages 15, and flue 17 to the stack.

By reference to Fig. 1 it will be seen that each of the branch flues 4, air-flues 11^a, 11^b, 11^c, and 11^d, and flues 20 for the products of combustion are provided with grooves 23 in their side walls for the reception of valves whereby any one or more of the kilns may be cut out for removing a charge from the kilns and recharging the same.

As articles of earthenware, bricks, &c., contain considerable moisture when charged into the kilns, it is necessary to provide for conducting the steam generated during the drying

thereof direct to the stack, as the steam would cool down the regenerators. To this end the flues 20 for the products of combustion are provided with branch flues 24 (only one being shown) direct to the stack or stack-flue, and said flues are provided with grooves 25 in their side walls for the reception of valves, which are closed in the normal operation of the kilns. As soon as a kiln is freshly charged, the valves of the several flues leading thereto having been previously closed, as herein stated, the valves of the gas and air flues 4 and 20 and the branch flue 24 are opened, so that the course of the gas and air will be normal; but the products of combustion will be conducted direct to the stack and not through the regenerator. As soon as all or nearly all the moisture has been driven out the valve in the flue 20 is opened and the valve in the branch flue closed.

It may be desirable at times to subject the articles in the kilns to a milder heat than that generated by combustion of the gas and air in the kiln. I therefore provide for conducting the heat and products of combustion from one kiln to another by connecting the tops of the kilns by a pipe 26, which is provided with suitable regulating valves 27, as shown in Fig. 4.

When a kiln is to be heated by the products of combustion from another kiln, the valves of the gas and air flues of the kiln to be heated and of the flue 20 of the kiln from which the products of combustion are to be drawn are closed, so that the products of combustion pass from one kiln to the other, and thence to the regenerator or direct to the stack by flues 24.

In order to provide for cleaning the gas-flues, the main gas-flues are connected by a flue 28 with the stack, and this flue, as well as the flue 17 and the bonnet-flues 2, are provided with valves 29, 30, and 31, respectively. When the gas-flues are to be cleaned, the valves 30 and 31 are closed, thereby stopping the normal flow of the products of combustion and gas, and the valve 29 is opened. The draft of the stack will then cause the heated air as it enters the inlet-flues 8 to flow out through the radial flues 7 to the annular flues 6 and thence along the flues 4, 3, and 28 to the stack. As soon as the heated air enters the gas-flues the deposits therein will ignite and quickly burn out. This cleansing of the gas-flues can be effected without any material cooling down of the kilns.

It will be readily understood by the skilled furnace-builder that the relative arrangement of the kilns, regenerator, and gas-producers, with their connecting-flues, may be varied without departing from the spirit of my invention—as, for example, the flues connecting the kilns and gas-producers connected midway of its length, so as to insure a more uniform distribution of the gas to all the kilns. While a long traverse of the gas is undesirable, the producers may be connected at any

point along the length of the gas-flue, which may be made straight instead of U shape, as shown.

I claim herein as my invention—

1. The combination of a series of two or more kilns, gas-producers, flues connecting the producers and kilns, and a regenerator having flue connections for air and products of combustion with each of the kilns, substantially as set forth.

2. The combination of a series of two or more kilns, gas-producers, flues connecting the producers and kilns, a regenerator having flue connections for air and products of combustion with each of the kilns, and valves in the flues for the gas, air, and products of combustion, whereby one or more of the kilns may be cut out of operation, substantially as set forth.

3. The combination of a series of two or more kilns, gas-producers, flues connecting the producers and kilns, a regenerator having flue connections for air and products of combustion with the kilns, valves in the flues for the products of combustion, and flues provided with valves for conducting the products of combustion from each kiln direct to the stack, substantially as set forth.

4. The combination of a series of two or more kilns, gas-producers, flues connecting the producers and kilns, a regenerator having flue connections for air and products of combustion with the kilns, valves for opening and closing the air and gas flues of each kiln, and a pipe or flue provided with valves connecting the kilns in pairs at the tops thereof, substantially as set forth.

5. The combination of a series of two or more kilns, gas-producers, flues provided with valves connecting the producers and kilns, a regenerator having flue connections for air and products of combustion with each of the kilns, valves located in said flue connections, a pipe or flue provided with valves connecting the flues in pairs at the tops thereof, and flues provided with valves for conducting the products of combustion direct to the stack, substantially as set forth.

6. The combination of a series of two or more kilns, gas-producers, flues connecting the producers and kilns, valves for stopping the flow of gas from the producers to the flues, a regenerator having flue connections for air and products of combustion with each of the kilns, a valve interposed between the regenerator and stack, and a flue provided with a valve connecting the stack with the gas-flues at or near their junction with the producers, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM SWINDELL.

Witnesses:

DARWIN S. WOLCOTT,
DAVID S. McCANN.