W. T. HURD.

BRICK KILN.

APPLICATION FILED JUNE 23, 1909.

974,969.

Patented Nov. 8, 1910.

2 SHEETS—SHEET 1.

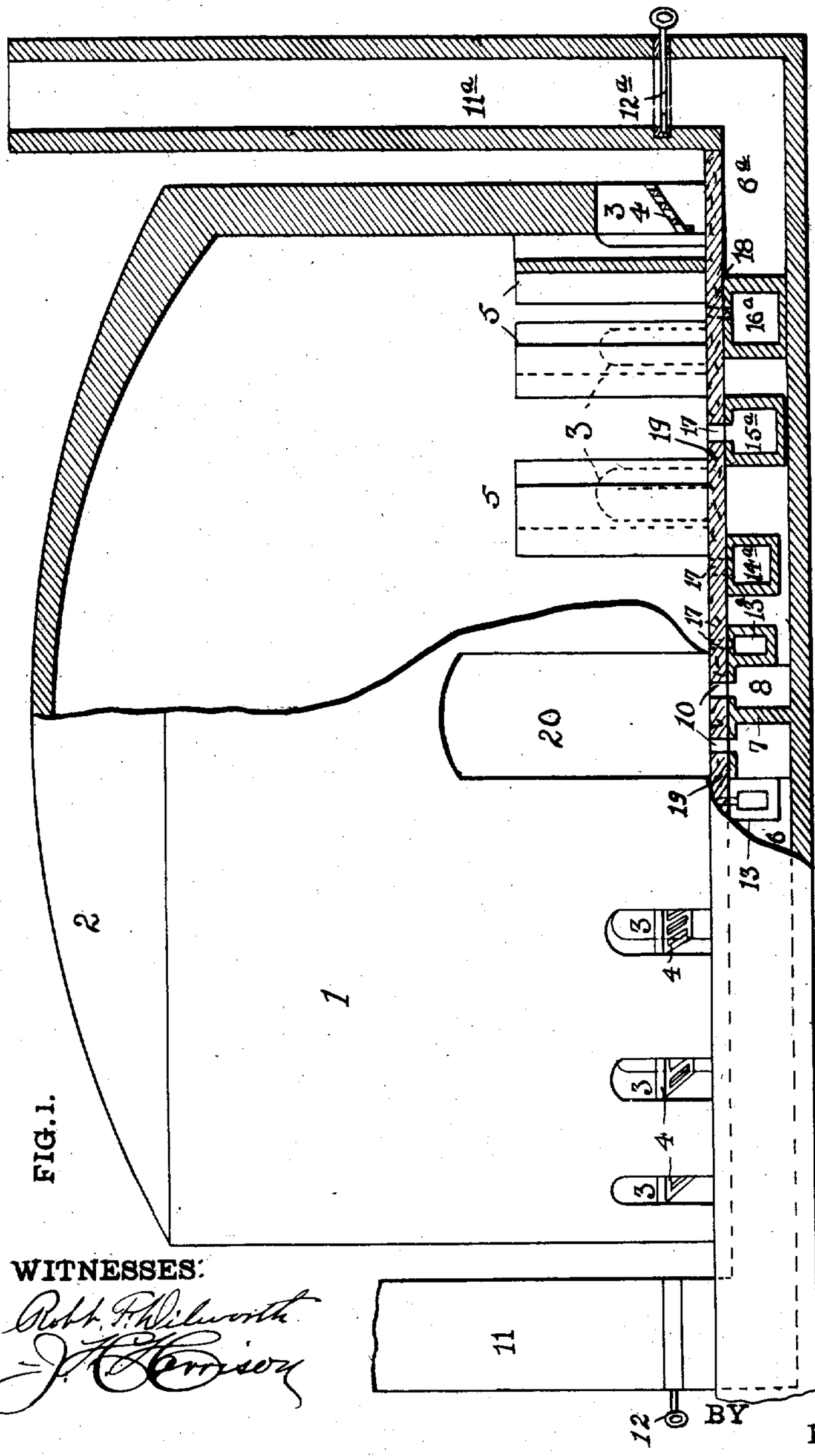

FIG. 1.

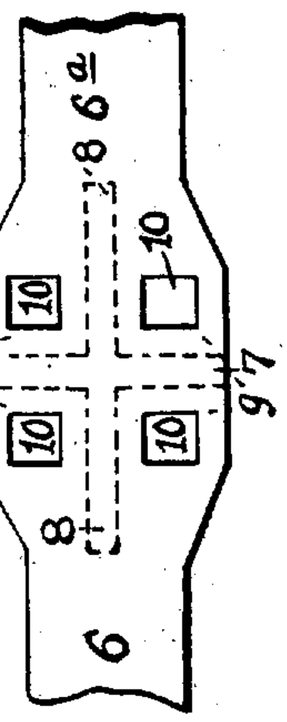

FIG. 2.

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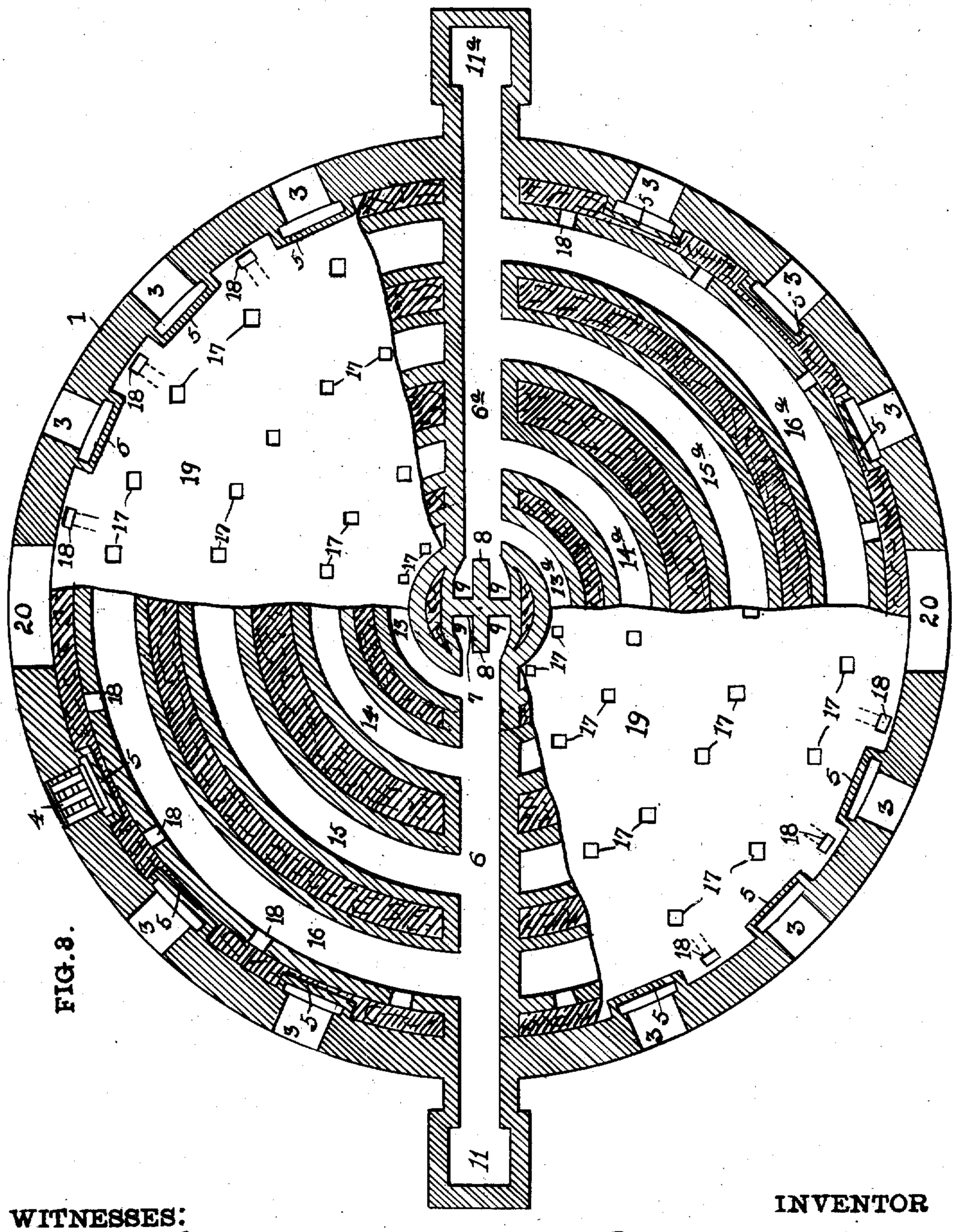

FIG. 8.

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BRICK-KILN.

974,969. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed June 23, 1909. Serial No. 503,786.

To all whom it may concern:

Be it known that I, WILLIAM T. HURD, a citizen of the United States, and residing in the borough of Rochester, in the county of Beaver and State of Pennsylvania, have invented or discovered new and useful Improvements in Brick-Kilns, of which the following is a specification.

My invention consists in a new and improved kiln for burning brick and similar material.

In the forms of kilns now in general use, it is impossible to properly distribute the heat in the interior of the kiln to uniformly burn the brick contained therein so that the brick contained in the bottom eight or ten courses come out of the kiln improperly burned and cannot be used. In my improved kiln the heat is thoroughly and uniformly diffused throughout the interior so that the bricks contained in the bottom courses are as thoroughly burned as those at the top of the pile. I accomplish this end by constructing in the floor of my kiln two series of concentric semi-annular flues, one of which series discharges into a radial flue leading to a vertical chimney, while the other series discharges into a second radial flue leading to a second vertical chimney, said radial flues being preferably in alinement but separated from each other at their adjacent ends. Dampers are provided to regulate the drafts in said flues. Ports lead downwardly from the floor surface of the kiln into said semi-annular flues whereby the products of combustion arising from the fire arches of the kiln to the crown thereof are drawn down through said ports which are so distributed that the heat is diffused uniformly over the floor, thus reaching every portion thereof. Inclined ports are also provided leading from the surface of the floor between the fire bags into the outer members of said series of flues.

In the accompanying drawings Figure 1 is an elevation of my kiln, partly in vertical section to show construction; Fig. 2 is a broken plan view showing the adjacent ends of the two radial flues, while Fig. 3 is a floor plan of the kiln with portions of the floor and the tops of the flues removed and the outer wall of the kiln shown in horizontal section through the upper portions of the fire arches.

The following is a detailed description of the drawings, which, however, are merely illustrative of the principles of my invention and not intended to limit the scope thereof to the construction shown.

1 represents the outer circumferential wall of the kiln substantially constructed of brick or other suitable material and supporting the usual domed roof, 2.

3—3 are the usual fire arches provided with grates 4—4 upon which the fires are maintained. Any number of fire arches required may be provided. In the drawings which represent a kiln thirty feet in diameter, I have shown twelve fire arches as the preferable number.

5—5 are the bags built within the wall 1 at each fire arch. Said bags consist of a rear wall spaced about eighteen inches inside the wall 1 and two side walls connecting said rear wall to the wall 1 at a point about a foot on each side of the fire arches. Said bags are built up for about five feet or between one and two feet above the top of the fire arch. It is evident that said bags prevent the direct impact of the fire upon the green bricks in the kiln and direct the products of combustion toward the top of the kiln.

Beneath the floor of the kiln I construct two radial flues, 6 and 6^a, preferably in alinement but prevent communication between their inner ends by means of a vertical wall 7. The cross sectional size of said flues is preferably enlarged at their inner ends, as shown in Figs. 2 and 3 and spur walls, 8—8, are provided, dividing the extremities of the flues into two compartments, 9—9, to which ports 10—10 lead down from the central portion of the kiln floor. The flues 6 and 6^a lead through the wall 1 of the kiln and discharge into vertical chimneys, 11 and 11^a, respectively, which chimneys are provided with suitable dampers, 12 and 12^a, respectively, to control the drafts.

Beneath the floor of the kiln I build of brick or other suitable material two concentric series of substantially semi-annular flues, 13, 14, 15 and 16 and 13^a, 14^a, 15^a and 16^a. The flues 13, 14, 15 and 16 are closed at one end and the other end discharges into the radial flues 6, while the series 13^a, 14^a, 15^a and 16^a are similarly constructed but discharge into radial flues 6^a. It is evident that each radial flue draws from a series as above described. The size of the flues increases from the center, as shown in Figs. 1 and 3. 17—17 illustrate series of ports

leading down through the floor of the kiln into said flues, the size of the ports being proportioned to the size of the flues. These ports are distributed over the floor of the kiln, and to reach the portions of said floor between the bags 5—5, I provide inclined ports 18—18 leading from such portion of the floor into the outer flues 16 and 16[a]. The spaces between the flues and between the outer flues, 16 and 16[a] and the wall 1, are tamped tightly with dirt and a floor, 19, of clay is tamped down on top of the flues to give a level surface broken only by the ports 10—10, 17—17 and 18—18.

20—20 are two doors to afford entrance to the kiln placed diametrically opposite each other in the wall 1.

The operation of my improved kiln is as follows:—The kiln is filled with green brick built up with interstices for the passage of the heat to conform generally with the interior contour of the kiln. The doors 20—20 are now bricked up to prevent the entrance of cold air and fires are started and maintained in the fire arches 3—3 on the grates 4—4. The heat and products of combustion pass up through bags 5—5 to the top of the kiln and are then drawn downwardly by the draft from the chimneys 11 and 11[a] through ports 10—10, 17—17 and 18—18 into the radial flues 6 and 6[a] whence they pass into the chimneys. The tendency of the heat is to pass down in the center of the kiln so that the ports through which the heat and products of combustion pass into the flues are increased in size from the center of the kiln toward the outer wall 1, so that this increased draft thus provided aids in distributing the heat uniformly over the kiln floor. In case the heat becomes greater on one side of the kiln than on the other, this may be corrected by the adjustment of the proper damper to reduce the draft on that side so that each side draws equally, and an equal amount of heat is secured for each side of the kiln.

I have shown two series of concentric, substantially semi-annular flues and two radial flues, thus providing a double draft system, but it will be understood that the concentric flues may be of a less arc than that shown and any number of concentric series may be provided, each series being connected up with a radial flue and vertical draft chimney.

Actual use of my improved kiln has shown that the bricks are burned uniformly throughout the pile contained in the kiln without regard to their location therein, the bricks in the bottom courses being of the same good quality as the rest of the product. The combustion of fuel is perfect, no smoke issuing from the chimneys, and the process of buring the bricks is shortened by several days compared to the forms of kilns now in general use.

What I desire to claim is:—

A kiln having, in combination, unconnected radial flues in its floor dividing said floor into segments, a vertical chimney leading from the outer end of each of said radial flues, means for regulating the draft in said chimneys, a series of concentric flues occupying each floor segment and extending from the circumference to the center thereof, the same ends of all the members of each series of concentric flues being closed and all the opposite ends opening into a radial flue, all the open ends of each series of concentric flues being adjacent all the closed ends of the next series of flues, and each radial flue communicating with but one series of concentric flues at one side thereof, and the floor having openings therethrough leading to said concentric flues.

Signed at Pittsburg, Pa. this 19th day of June, 1909.

WILLIAM T. HURD.

Witnesses:
A. W. Forsyth,
E. A. Laurence.