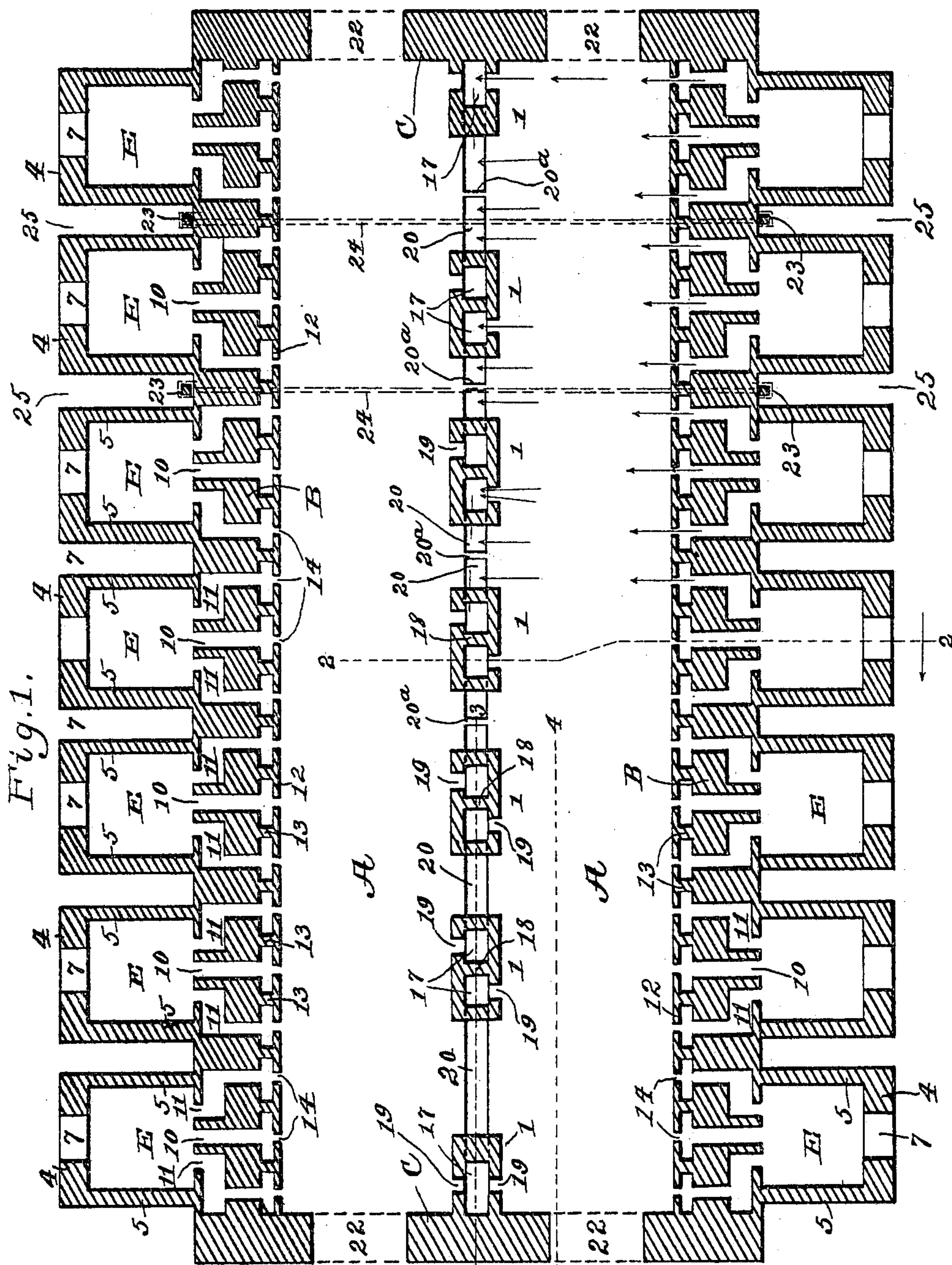


J. W. REAGAN.  
BRICK KILN.

APPLICATION FILED FEB. 1, 1905.

2 SHEETS—SHEET 1.



Witnesses:

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Inventor:

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By Cyrus R. Ehr  
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2 SHEETS—SHEET 2.

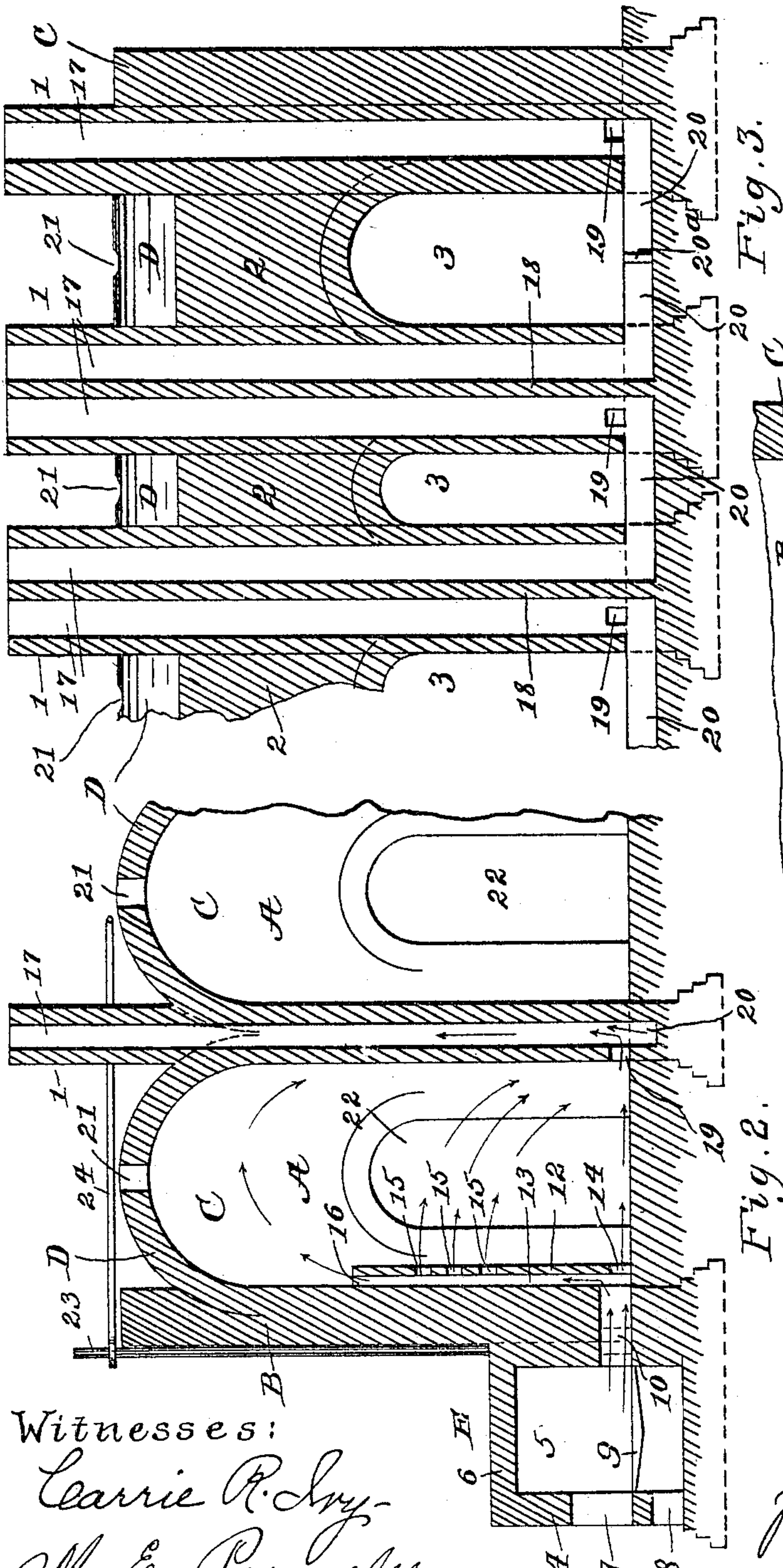


Fig. 3.

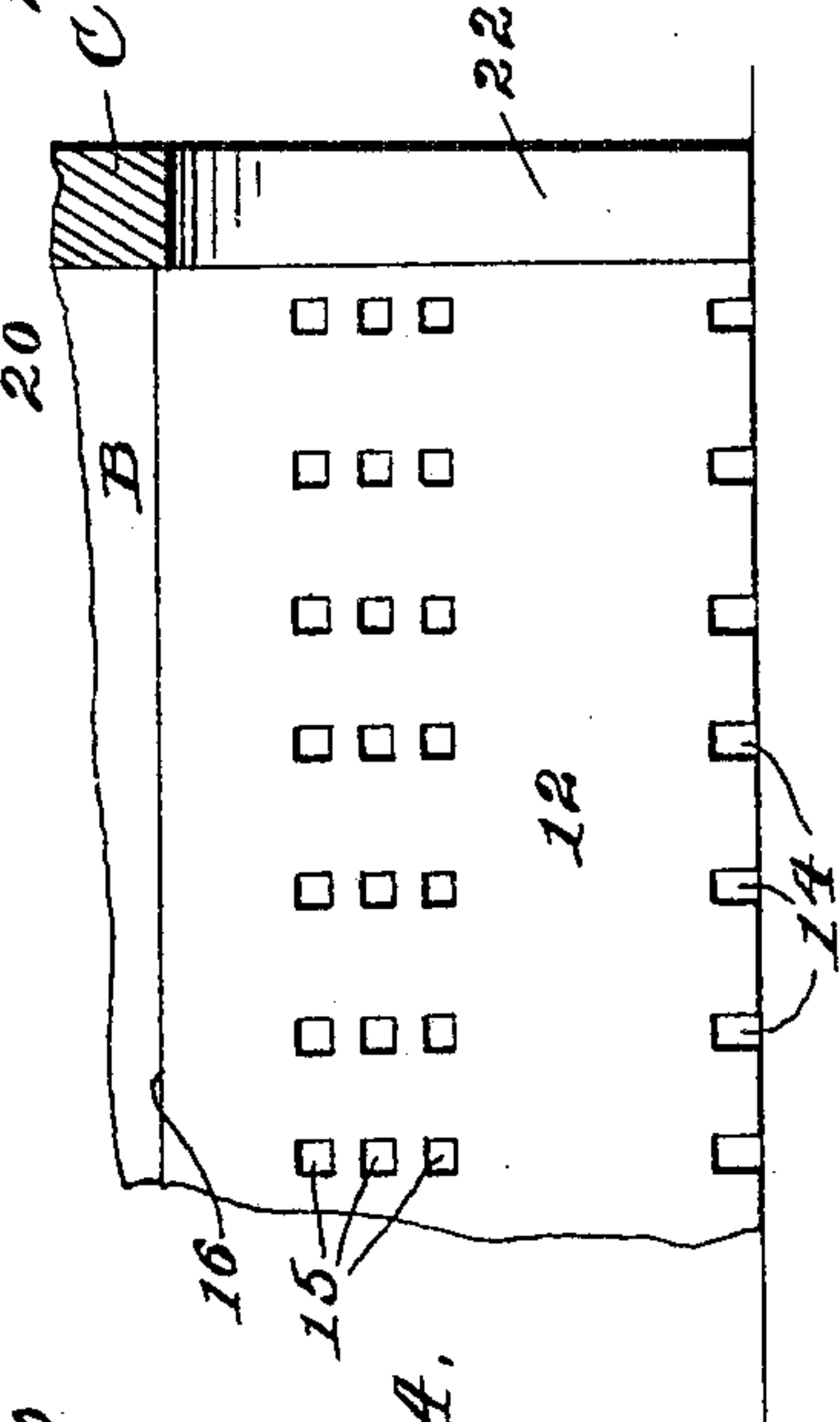


Fig. 4.

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# UNITED STATES PATENT OFFICE.

JOHN WARREN REAGAN, OF POWELL STATION, TENNESSEE.

## BRICK-KILN.

No. 799,091.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed February 1, 1905. Serial No. 243,637.

*To all whom it may concern:*

Be it known that I, JOHN WARREN REAGAN, a citizen of the United States, residing at Powell Station, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Brick-Kilns, of which the following is a specification, reference being had to the accompanying drawings.

My improvement relates particularly to that class of kilns which comprise one or more relatively large compartments for the reception of the brick to be burned and a plurality of external furnaces communicating with said chamber or chambers and a plurality of chimneys or flues for the escape of the products of combustion after emerging from said furnaces into said chamber or chambers and traversing the latter.

The object of my invention is to produce a kiln adapted for an even distribution of heat to all the brick within said chamber or chambers, such even distribution being effected by a mechanical construction and arrangement which compels the products of combustion passing from the furnaces to follow courses on the way to the flues which will bring to all portions of the masses of green brick a due proportion of said products of combustion.

In the accompanying drawings, Figure 1 is a horizontal section of a kiln embodying my improvement, the section being taken just above the floor. Fig. 2 is an upright section on the line 2 2 of Fig. 1 looking in the direction of the arrow. Fig. 3 is an upright section on the line 3 3 of Fig. 1 looking in the direction of the arrow. Fig. 4 is an upright section on the line 4 4 of Fig. 1 looking in the direction of the arrow.

A A are two main parallel chambers bounded on the exterior by side walls B B, end walls C C, and arched ceilings D D, and said chambers are separated by a row of upright chimneys 1 and walls 2, closing the spaces between said chimneys from said ceiling downward far enough to leave the arched openings 3.

E E are furnaces located along the base of the outer portion of the side walls B B and communicating with flues extending through said walls into the chambers A A. Each of said furnaces has a front wall 4, side walls 5 5, a top wall 6, a fire-door 7, an ash-door 8, and a grate 9. These furnaces may be of

any desired or well-known construction adapted to properly burn the fuel and deliver the products of combustion into the flues leading through the adjacent wall B. Said flues are arranged with a view to a delivery of said products of combustion into the adjacent chamber A in a multiplicity of streams properly distributed along the length of the chamber and at such elevations as will effect a delivery of equal quantities of heat to all of the green brick in said chamber, and the arrangement of the chimney-flues and the floor-flues, to be hereinafter described, is such as to induce a proper movement of such multiplicity of streams of products of combustion through the mass of green brick.

From the middle of the base of each furnace E a flue 10 extends horizontally through the adjacent wall B at substantially the level of the floor of the adjacent chamber A. At each side of such central flue 10 a flue 11 extends a short distance into the adjacent wall B parallel to the flue 10 and thence horizontally away from said flue 10 at right angles to the latter and thence again parallel to said flue 10 through the remainder of said wall B into the adjacent chamber A. The discharge ends of said flues 10 and 11 are preferably separated from each other suitable distances to bring the entire series of said openings through the same wall B substantially equidistant from each other.

From the floor of the chamber A near each wall B a flash or deflecting wall 12 extends from one end of the chamber A to the other parallel to the walls B and to approximately half the height of the chambers A, as indicated by Figs. 2 and 4. Between the flues 10 and 11 said flash-wall is joined to the adjacent wall B by upright connecting-walls 13, extending from the floor to the top of the flash-wall. Said connecting-walls serve to impart stability to said flash-wall and also to maintain a separation of the streams of combustion products emerging from the discharge ends of the flues 10 and 11. At the level of the floor in line with the discharge end of each flue 10 and 11 a port 14 extends through the flash-wall. Farther up in said flash-wall in an upright line extending upward from each aperture 14 and between the connecting-walls 13 are more ports 15, corresponding to the ports 14. The drawings show three such ports 15 above each port 14, and between the upper



edge of the flash-wall and the adjacent portion of the wall B there is an opening 16 as long as the horizontal distance between the adjacent connecting-walls 13. The products of combustion issuing from any flue 10 or 11 enter the adjacent space inclosed by the wall B, the flash-wall 12, and the adjacent connecting-walls 13. From said space said products of combustion escape through the adjacent ports 14 and 15 and the adjacent upper opening 16. The flash-wall 12 may embody any well-known provision for expansion.

In an upright plane parallel to the row of chimneys 1 the chimneys intermediate the ends of said row each have two upright flues 17, separated from each other by a partition-wall 18. The chimneys at each end of said row are preferably provided with only one flue 17, and each such end chimney is preferably set close against the adjacent end wall C in order that the products of combustion from the adjacent furnaces may be led across the chambers A close to the end wall C for the complete heating of the bricks stored against said end wall. The flue 17 of each of said chimneys is provided with two ports 19, one being directed toward one of the side walls B and the other toward the other of said side walls B, said ports being at the floor-level. In the others of said chimneys each flue 17 has one similar port 19, the port of one of said flues being directed toward one side wall B, while the port of the adjacent flue is directed toward the other of said side walls.

In each space between two adjacent chimneys are located one or two floor-flues 20, the same being open channels or trenches extending downward from the floor in line with the row of chimneys and into one of the chimneys. There may be only one such floor-flue continuous from one end of the kiln to the other; but it is preferable to make a plurality of such flues by means of the chimney-partitions 18, which separate the flues 17 in the intermediate chimneys, and by means of upright transverse partitions 20<sup>a</sup>.

The arched ceilings D D rest on the side walls B B and the walls 2, which are located between the chimneys. In the crowns of said arches are ports 21, and at each end of each chamber A the end walls are pierced by doors 22, which are to be closed in any suitable manner during the burning of a charge of brick.

Any desired number of buckstays 23 may be set upright against the exterior faces of the walls of the kiln and suitably secured at their bases and connected in pairs by horizontal binding-rods 24, extending across the top of the kiln. In the drawings such buckstays are shown applied to the exterior of the side walls B in the spaces or alcoves 25 between the furnaces E and joined by transverse binding-rods. By reference to Fig. 1 it will be seen that said alcoves are so set that a

horizontal line cutting opposite alcoves will pass between chimneys. This results in the passing of the binding-rods 24 between chimneys. Such location of said alcoves results from placing the furnaces with their middle transverse lines coincident with a horizontal line transversely cutting through the middle of a chimney.

From the foregoing description the operation will be readily understood. It is as follows: After the brick are stored in the chambers A the chimneys are partially covered, so as to limit the down and cross draft, and at the same time the ceiling-ports 21 are opened. The fires in the furnaces are then operated until the brick is dry, the products of combustion passing through the wall-flues 10 and 11 and into the spaces between the side walls B and the flash-walls 12, ports 14 and 15 in the flash-walls, and through the openings 16 at the upper edges of the flash-walls. The products of combustion issuing from the ports 14 (which are at the floor) go horizontally across the chamber A, through the lower portion of the mass of green brick and enter the chimneys through the ports 19 or through the floor-flues 20. It will be observed that said products on entering the floor-flues flow to the right or left in said flues and enter the adjacent chimney-flues 17. If so desired, the chimneys may be covered to such extent that only a portion of said products issuing from the ports 14 will enter the chimneys, the remainder rising through the mass of brick and passing through the ports 21. All or substantially all the combustion products issuing from the ports 15 and openings 16 move laterally and upward through the ports 21. When the bricks are dry, the ports 21 are closed and the chimneys uncovered. Then all the combustion products from the ports 14 go through the chimneys, and the products of combustion issuing from the apertures 15 in said flash-wall move horizontally and downward to the said ports 19 and floor-flues 20. The products of combustion issuing from the openings 16 move across the upper portion of the chambers A, and thence downward to said ports 19 and floor-flues 20.

It will be observed that the products of combustion are divided into a large number of distinct streams. According to the construction shown by the drawings there are in each chamber A one hundred and five such streams or two hundred and ten in the entire kiln, and it will be observed that said streams are well distributed with reference to the length and the height of the charge of brick in each chamber A.

When so desired, the flow of the products of combustion may be varied or modified by opening the ceiling-ports 21. If, for example, it is found that the upper portion of a charge is not sufficiently burned, said ports



may be opened, whereupon a portion or all of the products of combustion after issuing from the flash-wall ports will rise through the upper portion of the charge and pass thence through the ceiling-ports.

I claim as my invention—

1. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings, a series of chimneys arranged in a row along the longitudinal middle of the kiln and having their flues extending below the floor-level, ports in the chimneys immediately above the kiln-floor and in the sides of the chimneys directed toward the side walls of the kiln, and floor-flues in line with said row of chimneys and opening into the flues of adjacent chimneys, substantially as described.

2. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings, a series of chimneys arranged in a row along the longitudinal middle of the kiln and the intermediate of said chimneys having each two flues, the flues of all the chimneys extending below the floor-level, and all the flues of said chimneys having ports immediately above the kiln-floor and directed toward the side walls of the kiln, and floor-flues in line with said row of chimneys and extending from one flue into the adjacent flue of the next chimney, substantially as described.

3. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings, a flash-wall adjacent the inner face of each of said side walls and having a series of ports, a series of chimneys arranged in a row along the longitudinal middle of the kiln and having their flues extending below the floor-level, ports in the chimneys immediately above the kiln-floor and in the sides of the latter and directed toward said side walls, and floor-flues in line with said row of chimneys and opening into the flues of the adjacent chimneys, substantially as described.

4. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged

along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings, chimneys arranged opposite each furnace and in a row along the longitudinal middle of the kiln and having their flues extending below the floor-level, ports located in the chimneys immediately above the kiln-floor and in the sides of the chimneys directed toward said side walls, and floor-flues in line with said row of chimneys and opening into the flues of adjacent chimneys, substantially as described.

5. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings; a series of chimneys arranged in a row along the longitudinal middle of the kiln, the intermediate of said chimneys having an upright partition transverse to said row of chimneys whereby two flues are formed, and the flues of all the chimneys extending below the floor-level, and every flue having a port immediately above the floor-level and directed toward the side walls of the kiln, the intermediate chimneys having the port of one flue directed toward one side wall of the kiln and the port of the other flue directed toward the opposite side wall of the kiln, and floor-flues in line with said row of chimneys and extending from one flue into the adjacent flue of the next chimney, substantially as described.

6. In a kiln, the combination with end walls and side walls, the latter having flue-openings through their bases, of furnaces arranged along the exterior of said side walls and communicating with the interior of the kiln through said flue-openings, chimneys arranged opposite each furnace and in a row along the longitudinal middle of the kiln, ports located in the bases of the chimneys in the sides of the latter directed toward said side walls, and floor-flues in line with said row of chimneys and communicating with the flues of adjacent chimneys, and upright buckstays placed between said furnaces and rods extending transversely across the kiln and joining opposite buckstays, substantially as described.

In testimony whereof I have signed my name, in presence of two witnesses, this 28th day of January, in the year 1905.

JOHN WARREN REAGAN.

Witnesses:

A. C. BRADLEY,  
ADA B. COX.