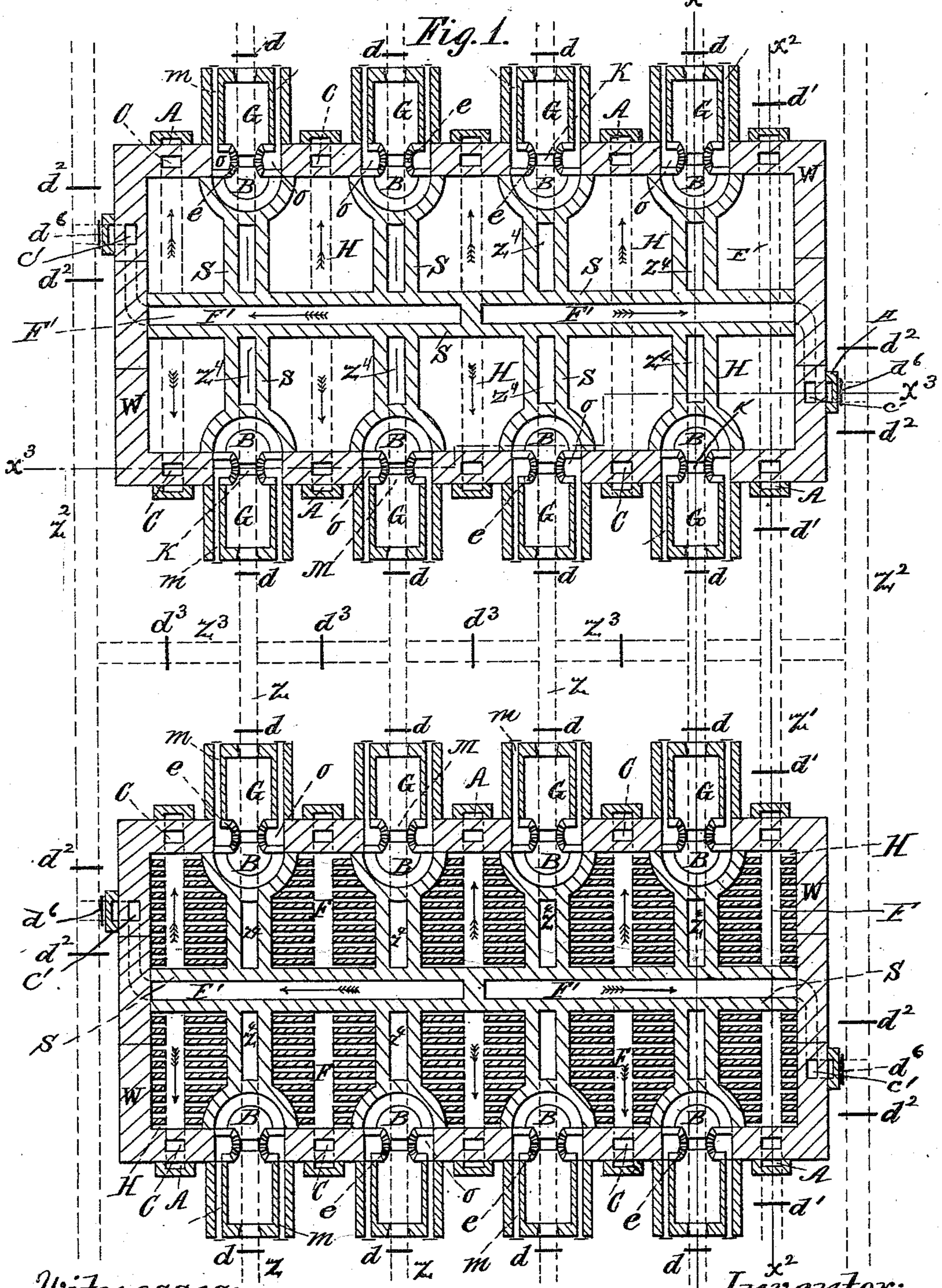
(No Model.) 2 Sheets—Sheet 1.

W. A. EUDALY.

BRICK KILN.

No. 437,983. Patented Oct. 7, 1890.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

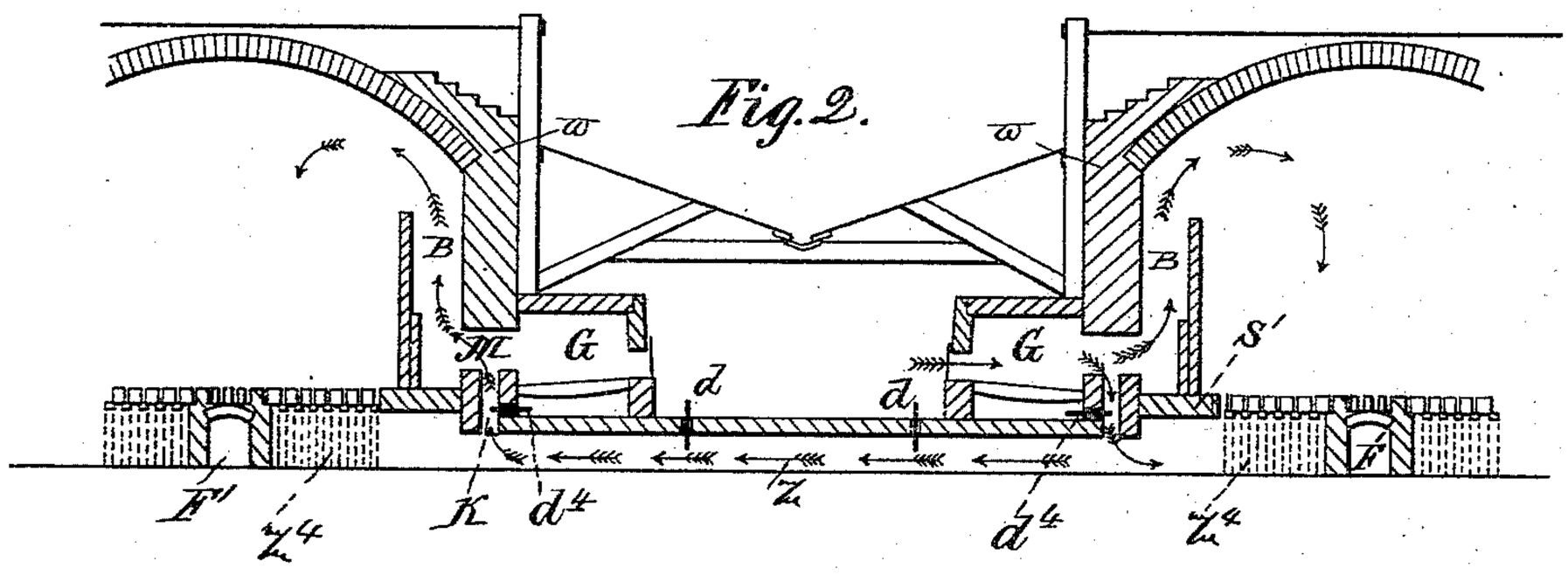


Fig. 3.

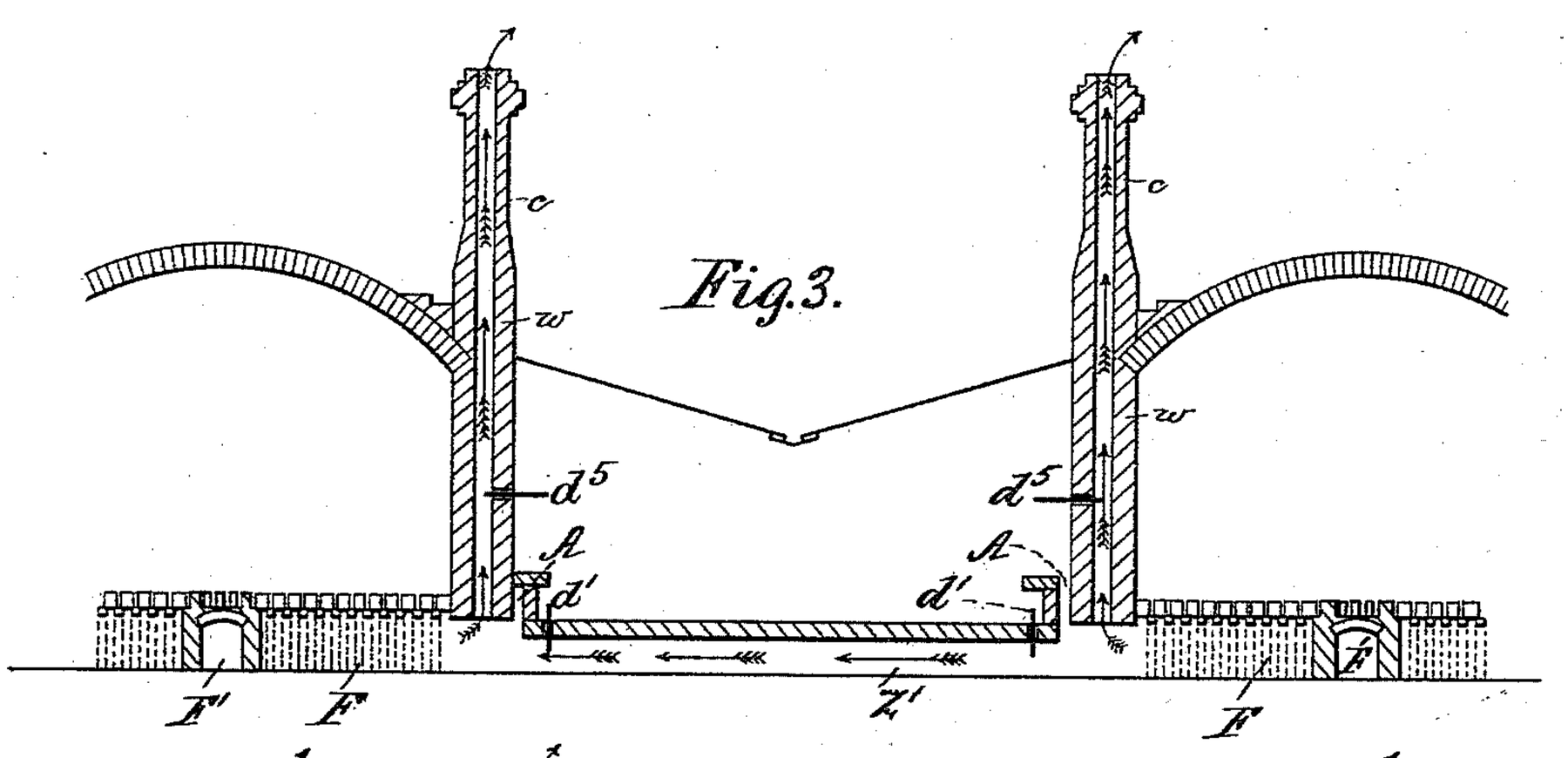
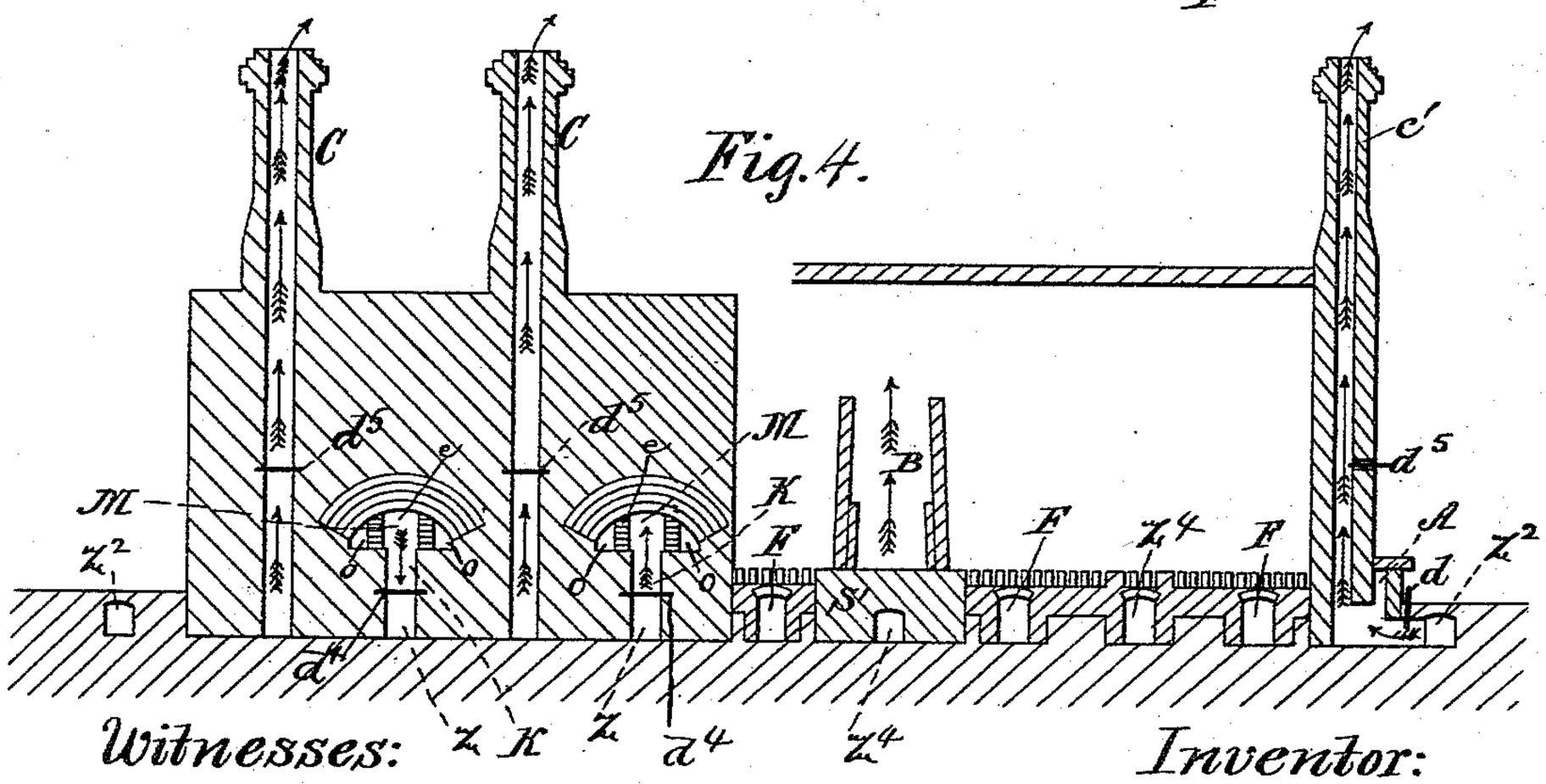


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM A. EUDALY, OF CINCINNATI, OHIO.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 437,983, dated October 7, 1890.

Application filed October 29, 1889. Serial No. 328,568. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. EUDALY, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Kilns; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to certain improvements in kilns for burning brick, pottery, and other ceramic products.

The object of the invention is to provide an improved kiln having in view economy of fuel with a maximum production of heat and work from a minimum quantity of fuel and labor.

The invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a horizontal section of two connected kilns, taken in a plane with the grate-bars and bottoms of the kiln, the lower kiln being shown with a perforated bottom. Fig. 2 is a vertical section of portions of the kilns in the plane of the line $x\,x$, Fig. 1. Fig. 3 is a similar section in the plane of the line $x^2\,x^2$, Fig. 1. Fig. 4 is a longitudinal section of a kiln in the plane of the line $x^3\,x^3$, upper kiln of Fig. 1.

In the drawings, the reference-letter W indicates the outer or inclosing wall of each kiln. Each kiln is provided with a series of furnaces G, located upon the exterior of the wall W and opening through the same into the interior of the kiln by means of the throat M, the wall on each side of each throat being provided with air-heating chambers *o o*, opening into the throats by means of passages *e* and supplied with fresh air through the flues or passages *m*. The inner ends of the throats M open into the lower ends of fire pockets or bags B within the kilns to conduct the heat, &c., therefrom up to the top of the kiln and there discharge the same. These pockets or bags have the foundations S′ S′.

The bottom of each kiln is divided into a suitable number of compartments H by the division-walls S, which also separate the induction-flues Z^4 and eduction-flues F′ F′ of the kiln from each other.

Each compartment H in the bottom of the kiln is preferably provided with a discharge-chimney C in the kiln-walls, having a large flue F, leading thereto and conducting the heat from said kiln into said chimney, and said chimneys are controlled by the dampers d^5, so that the exit through these chimneys can be closed or opened.

F′ F′ indicate two large flues in the bottom of the kiln, extending longitudinally and centrally the length of the kiln to the chimneys C′ C′ in the opposite ends of the kiln. These chimneys C′ are also controlled by dampers d^5.

The furnaces and bottoms on the adjoining sides of the two kilns are connected by the underground flues Z Z, controlled by the dampers *d*. These flues extend beneath a furnace and throat of each kiln, and are connected with the throats of each furnace by vertical flues K, controlled by dampers d^4. Each compartment H is provided with a flue Z^4, opening into the kiln and forming a continuation of an underground connecting-flue Z and adapted to conduct heat into the bottom of the kiln directly from a furnace of that kiln through throat N and flue K, or from the other kiln through underground flue Z.

The kilns are connected at the ends of the main flues F by underground flues Z′, opening into the ends of said flues F and controlled by dampers *d′*.

The ends of the kilns and flues F′ are connected by the underground flues Z^2 Z^2, controlled by dampers d^2 d^2 and d^6.

Z^3 Z^3 indicate a series of cross underground flues between the kilns and connecting the kilns through the flues Z, Z′, or Z^2 and controlled by the dampers d^3.

Cold air is admitted to the kiln through the air-inlets A, opening into the top ends of the flues F and F′ at the exterior of the wall of the kiln.

The kilns can be square, oblong, or round in shape without varying from the spirit or scope of this invention.

When it is desired to conduct a portion of

the heat from a furnace directly to the articles in the bottom of the kiln, dampers d^4 are opened and dampers d closed, whereby the heat is divided in the funnel-shaped throat M, a portion of it being carried up through the pocket B into the top of the kiln, and the remainder is carried directly into the bottom of the kiln through the flues K and Z^4, and the heat, &c., from the kiln is discharged through the flues F F′ in each compartment. If it is desired to conduct the heat from a burning or cooling kiln directly to the bottom of a burning-kiln, dampers d are opened and dampers d^4 are closed, and the heat will pass into the flues Z^4 of one kiln, through the flues Z to the flues Z^4 of the other kiln, and from this into the bottom of the kiln; or, if it is desired to introduce a portion of the heat at the bottom and a portion at the top of the kiln, open dampers d^4 and the heat will divide, a portion going through flue Z^4, and the heat will pass up flue K, throat M, and the pocket B, and then down through the articles to be burned to the flues F and F′ and out through chimneys C and C′; or, if desired, dampers d in flues Z and dampers d^5 in the chimneys of one kiln may be closed and the dampers d' in flues Z′ opened, so that the heat will pass from one kiln to the other, and the first kiln will burn as a downdraft and the last one as an updraft; or, if desired, all the dampers except d^4 and d^5 can be opened and the first kiln will supply heat to partially burn the second kiln as an updraft-kiln. When it is desired to carry the heat beyond the second kiln to a third kiln, open dampers d^2 and d^6 in the first kiln and close dampers d^3 and d^6 in the second kiln and open the same in the third kiln. The heat will then be drawn from the first kiln through the flues F′ and carried beyond the second kiln to the third kiln, into which it can be introduced through any of the flues Z, Z′, or F.

It is evident that various changes might be made in the form and construction of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the precise construction herein set forth.

It will be observed that by this arrangement and method all the waste heat from a burning or cooling kiln is utilized and conveyed to another burning-kiln, materially raising the temperature of the last kiln and economizing in fuel.

What I claim is—

1. In a downdraft-kiln, the combination of an exterior furnace, a fire-pocket opening into the upper portion of the kiln, a throat from the furnace to said pocket, a transverse horizontal flue in the bottom of the kiln opening into the same, and a vertical flue from said throat to said horizontal flue provided with a damper, substantially as described.

2. In combination, a pair of kilns, horizontal transverse flues in the bottom of the same opening into the kiln, an underground flue connecting said two kilns and opening into the ends of corresponding transverse flues therein, dampers for said connecting-flue, exterior furnaces for said kilns, a fire-pocket in each kiln opening into the upper portion thereof, a throat connecting each furnace and pocket, and a flue from each throat to a transverse bottom flue provided with a damper, substantially as described.

3. In a kiln, the combination of the exterior furnaces therefor, the fire-pockets from each furnace into the top of the kiln, a separate horizontal transverse flue in the bottom of and opening into the kiln for each furnace, the main longitudinal discharge-flue in the bottom of the kiln opening into a chimney, and the separate transverse bottom discharge-flues provided with chimneys, substantially as described.

4. The combination, with two or more downdraft-kilns provided with furnaces communicating with fire-pockets opening into the tops of the kilns, of one or more flues connecting the bottoms of said kilns and communicating with said pockets, and means to control said flues, so that the heat can be drawn from the bottom of one kiln into the bottom or top of the other kiln, substantially as described.

5. In combination, two kilns, furnaces for the same, separate transverse inlet-flues in the bottom of each kiln from the furnaces, underground flues connecting said two kilns and opening into the ends of corresponding inlet-flues in the same, transverse separate discharge-flues in the bottom of each kiln communicating with chimneys, separate underground connecting-flues opening into the ends of corresponding discharge-flues in each kiln, and dampers for said flues, substantially as described.

6. In combination, two or more kilns, furnaces for the same, a longitudinal discharge-flue in the bottom of each kiln opening into the kiln and into chimneys at one or both ends of the kiln, and an underground flue extending past the ends of said kilns and connected with the ends of the longitudinal discharge-flue of each kiln, and dampers for controlling said flues, as set forth.

7. A downdraft-kiln having its bottom divided into compartments, in combination with two sets of non-communicating flues in each compartment, one set discharging heat into the kiln and the other conveying it out, substantially as described.

8. In combination, two or more kilns, furnaces for the kilns, each kiln having separate transverse inlet-flues in its bottom from the furnaces opening into the kiln, separate flues in its bottom communicating with chimneys, and a longitudinal bottom discharge-flue connecting with chimneys at the ends of the kiln, the separate underground flues connecting, respectively, the corresponding

transverse inlet-flues in opposite kilns, underground flues connecting corresponding transverse discharge-flues in opposite kilns, underground flues connecting the ends of the longitudinal discharge-flues in said kilns, cross-flues connecting said underground flues, and dampers controlling said flues, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM A. EUDALY.

Witnesses:
J. D. MACNEALE,
L. W. PIERCE.