

W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.

Fig. 2.

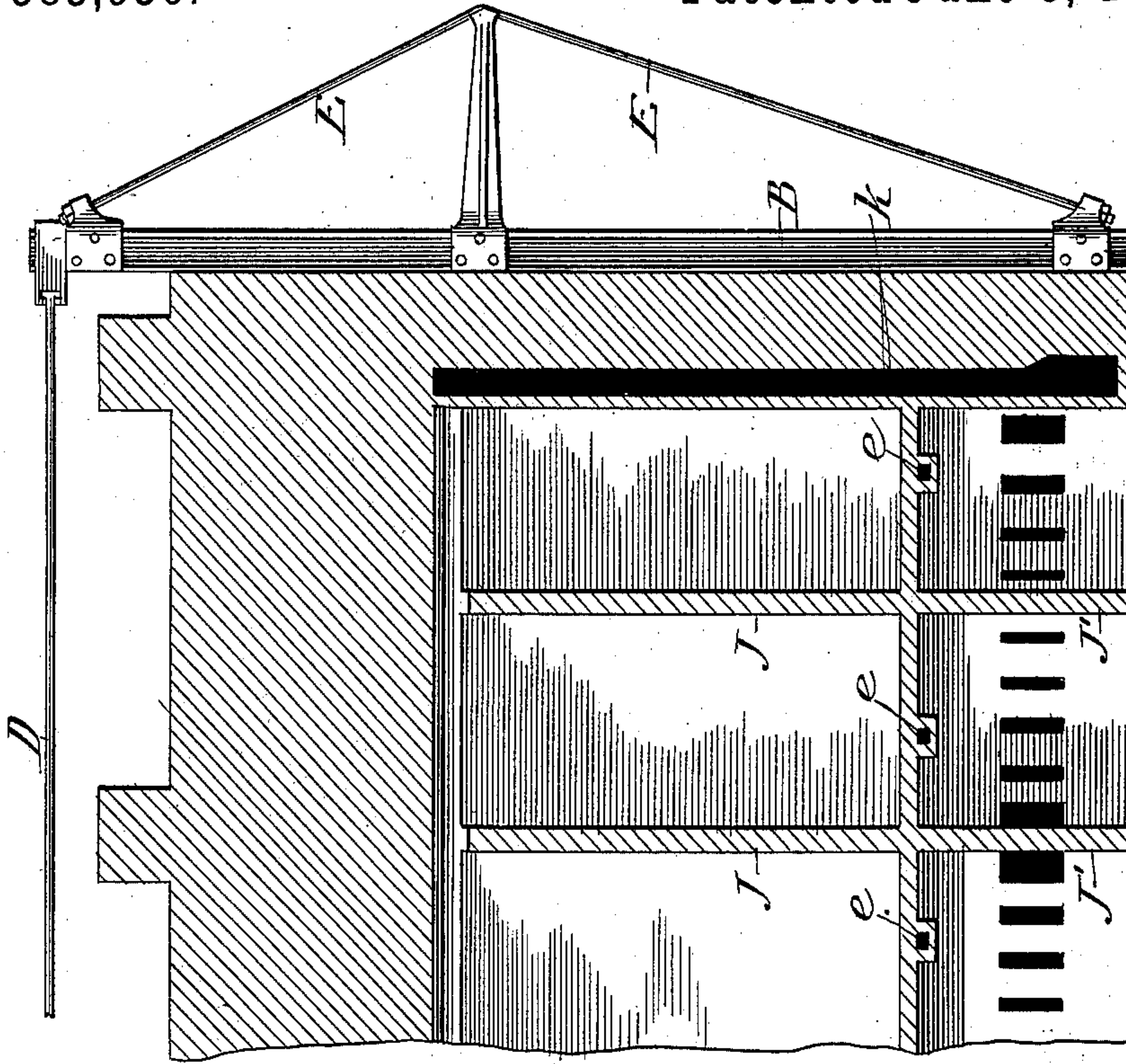
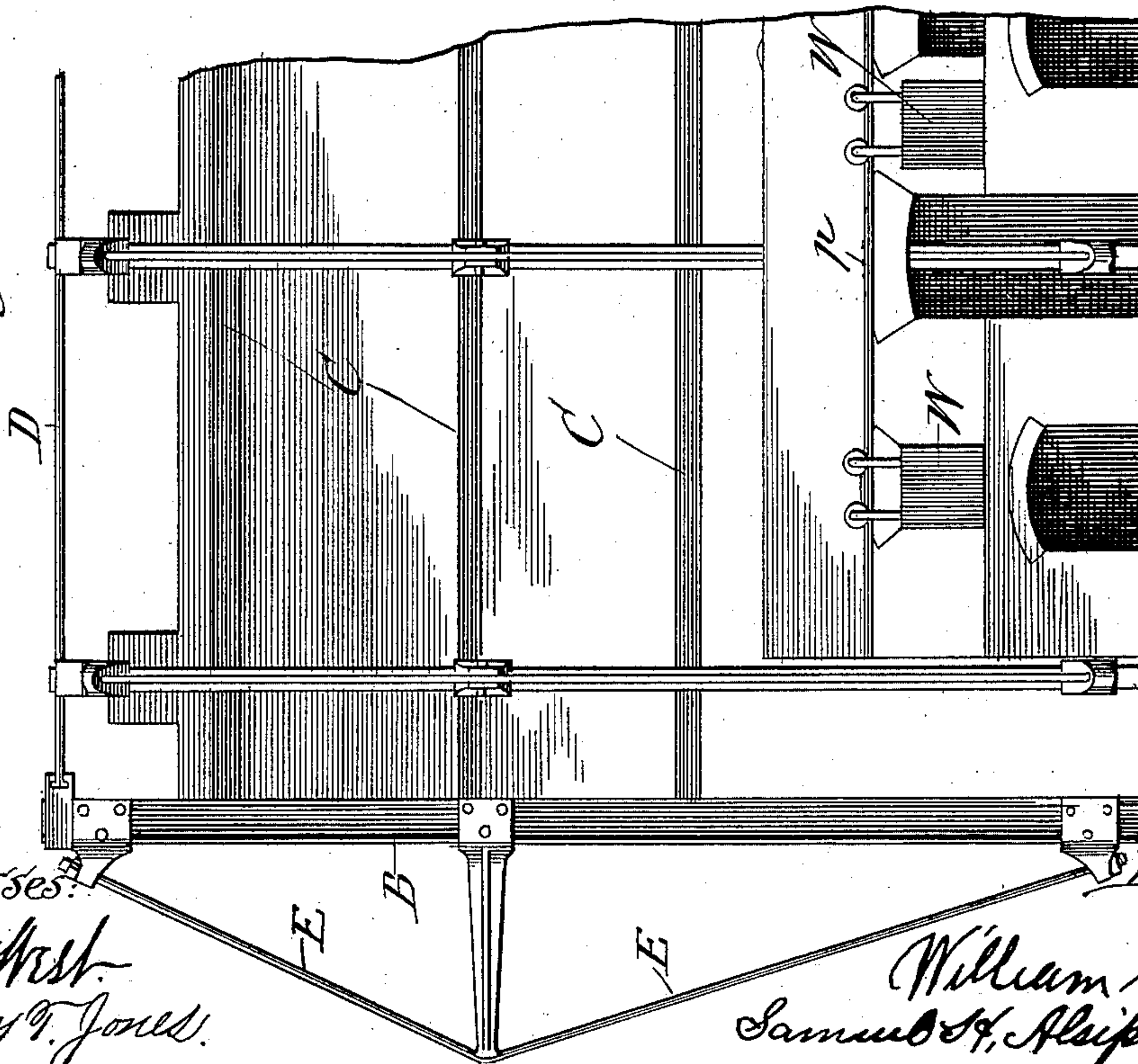


Fig. 1.



Witnesses:  
C. A. West.  
Harry T. Jones.

Inventors:  
William Alsip.  
Samuel H. Alsip.

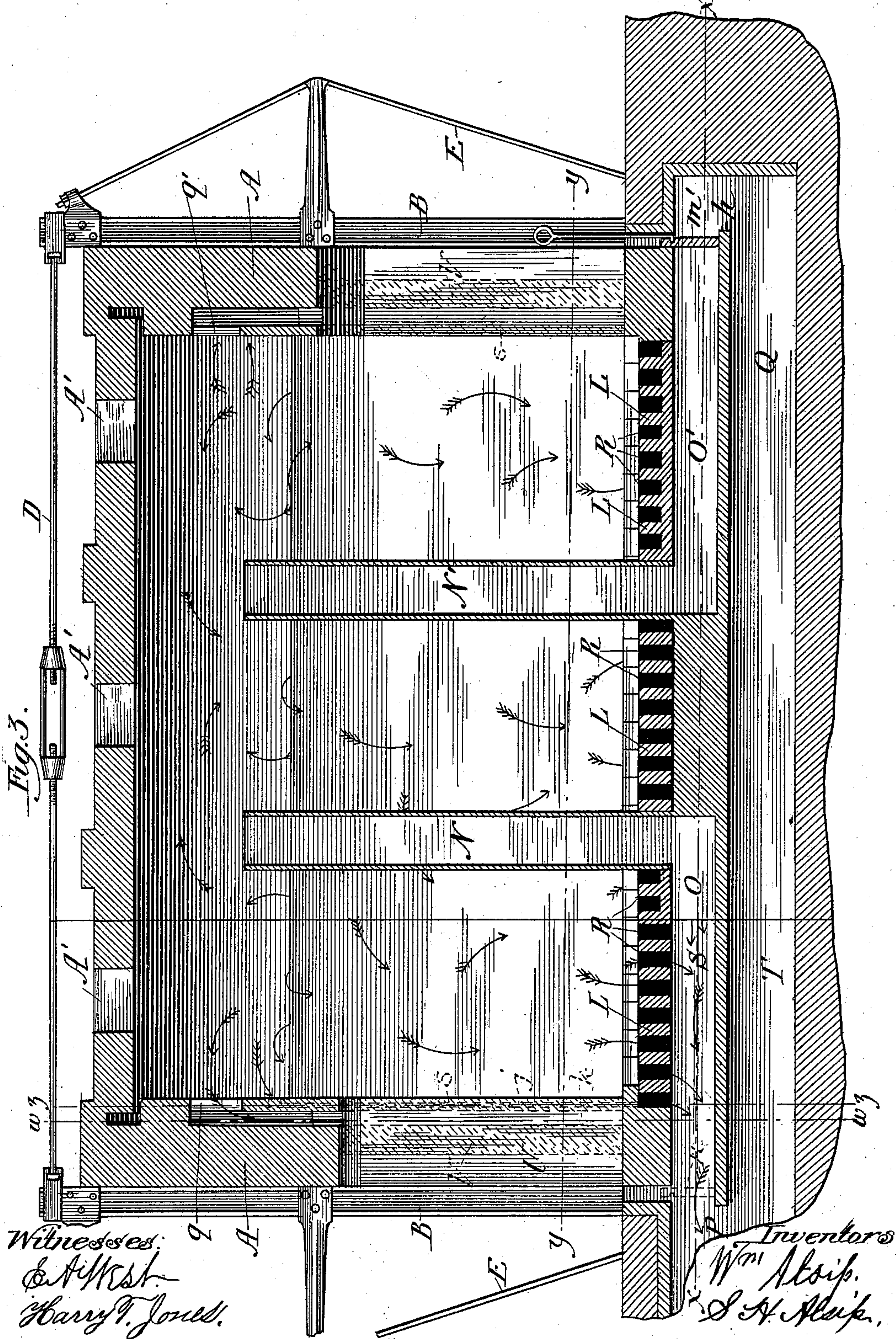


W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.





(No Model.)

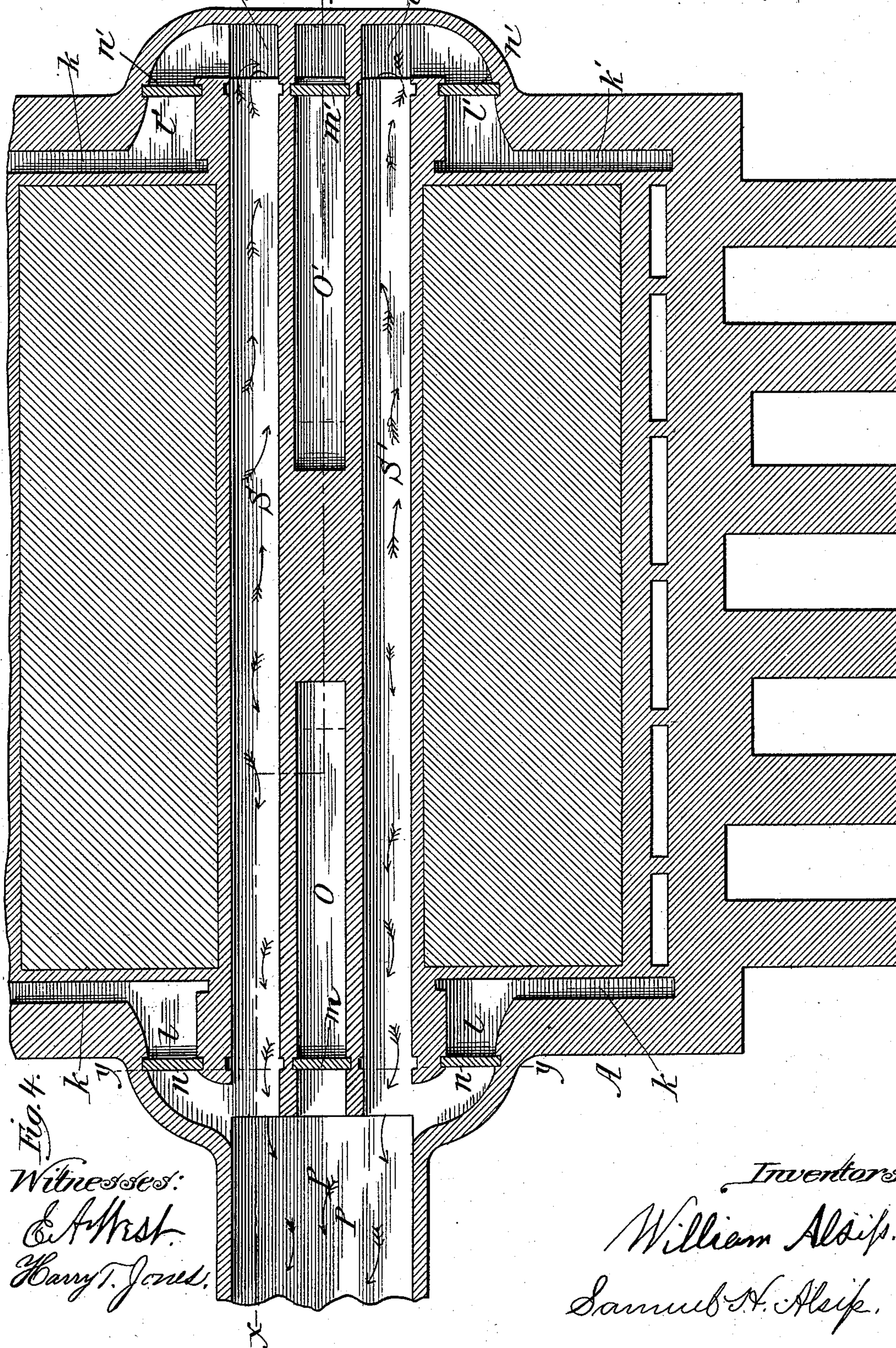
7 Sheets—Sheet 3.

W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.





W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.

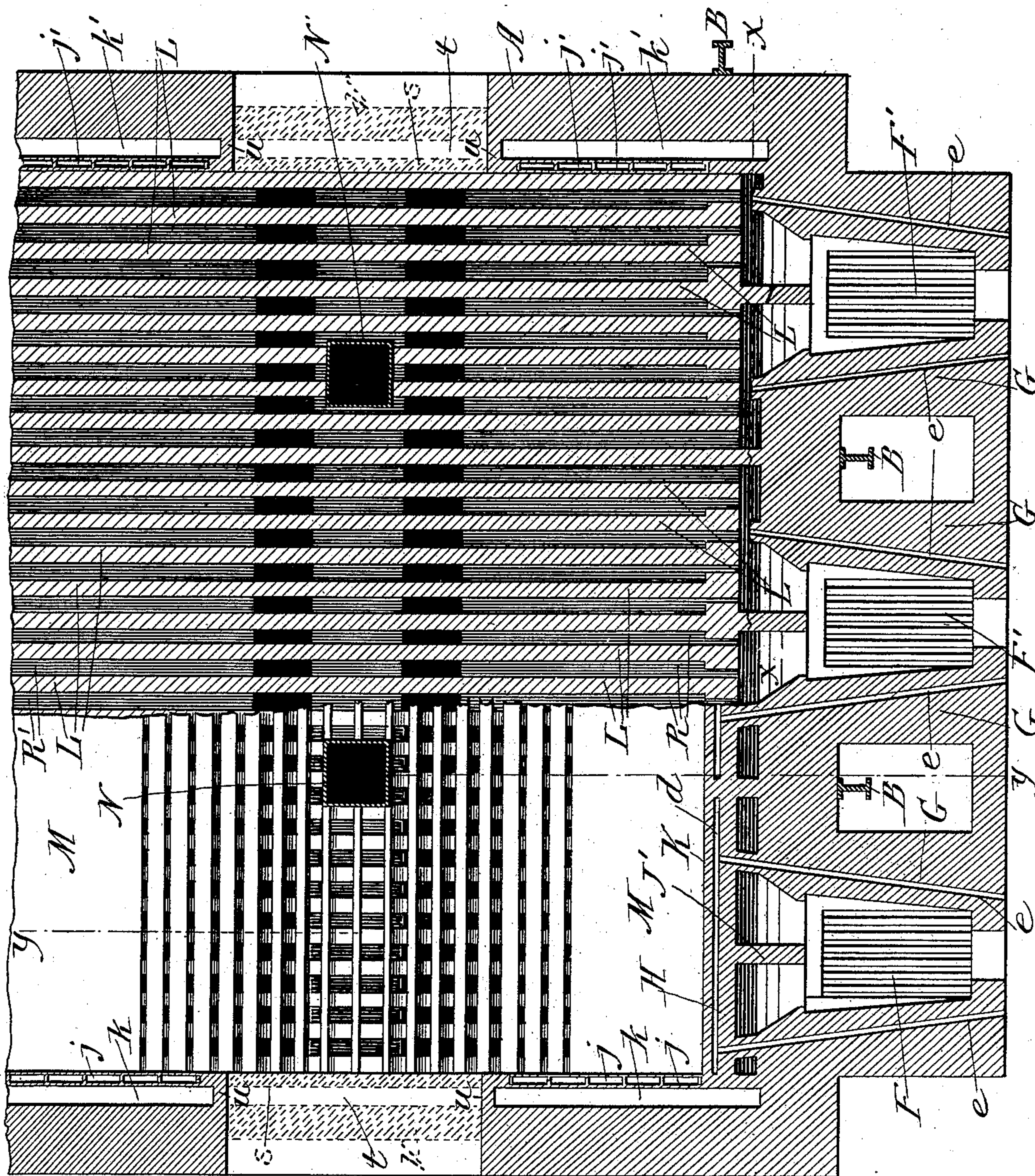
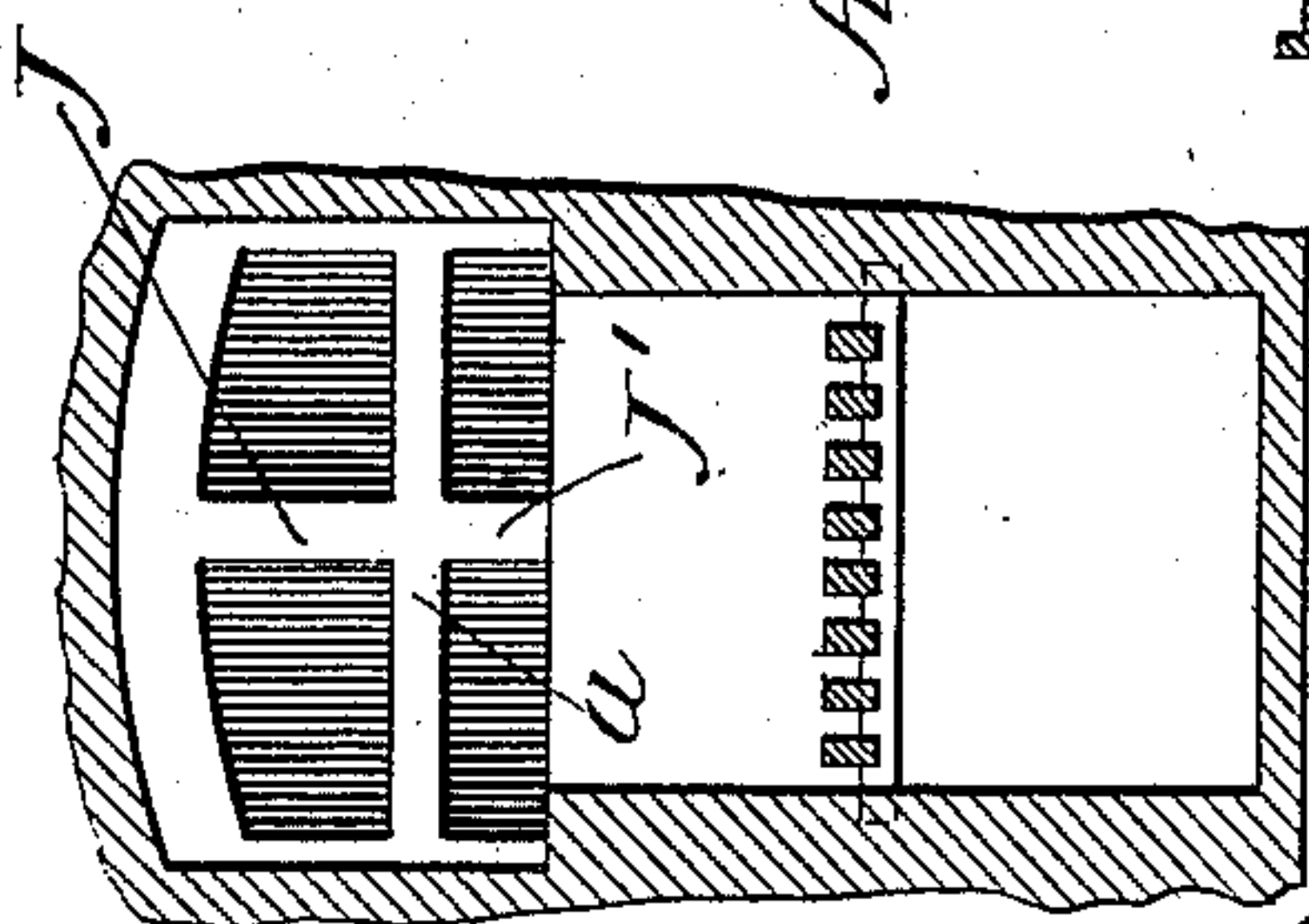


Fig. 5.

Witnesses:  
E. A. West.  
Harry T. Jones.

Fig. 6.



Inventor:  
William Alsip.  
Samuel H. Alsip.



(No Model.)

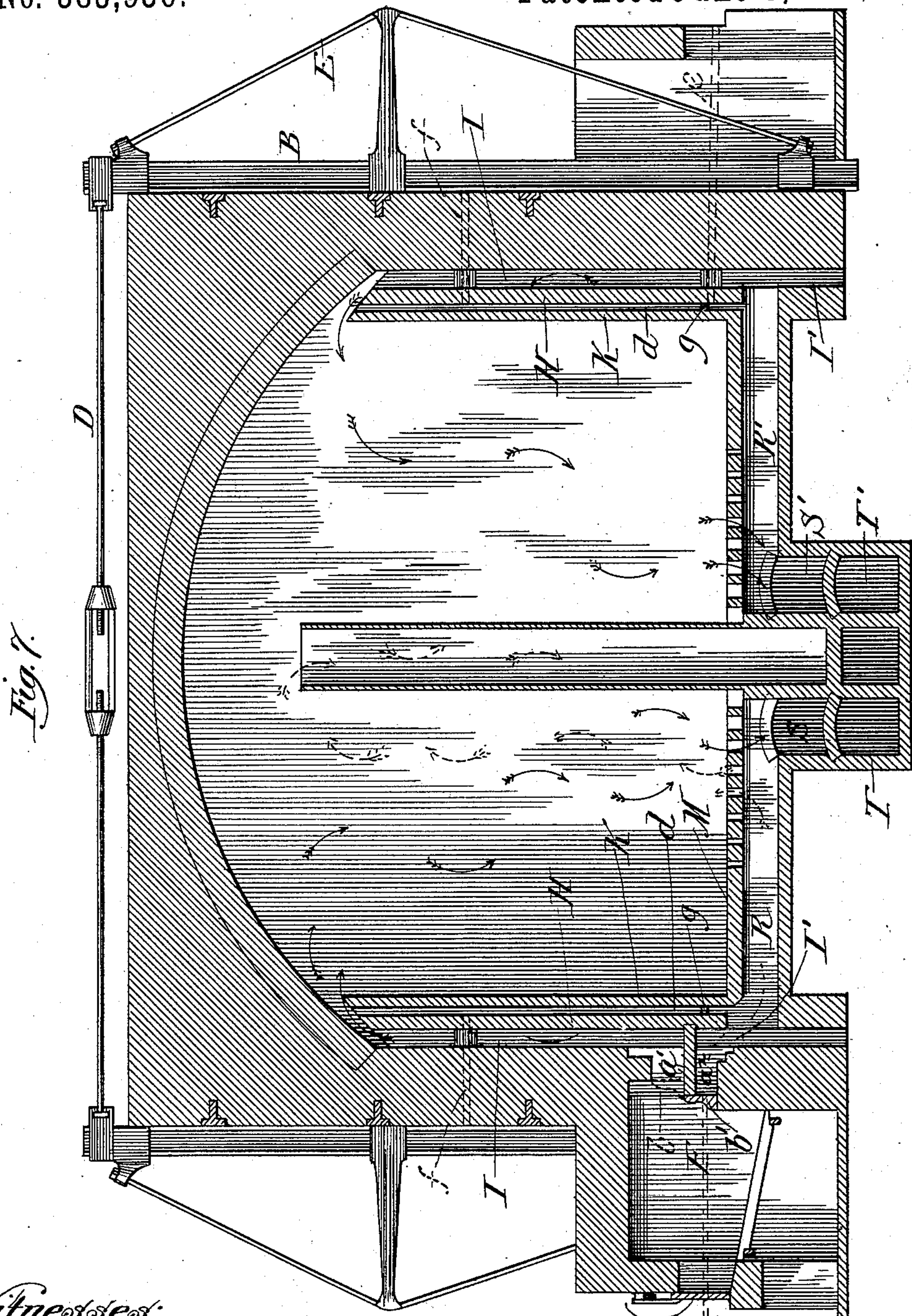
7 Sheets—Sheet 5.

W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.



*Witnesses:*

E. A. West.

Harry T. Jones.

*Inventor:*

William Alsip.

Samuel H. Alsip.



(No Model.)

7 Sheets—Sheet 6.

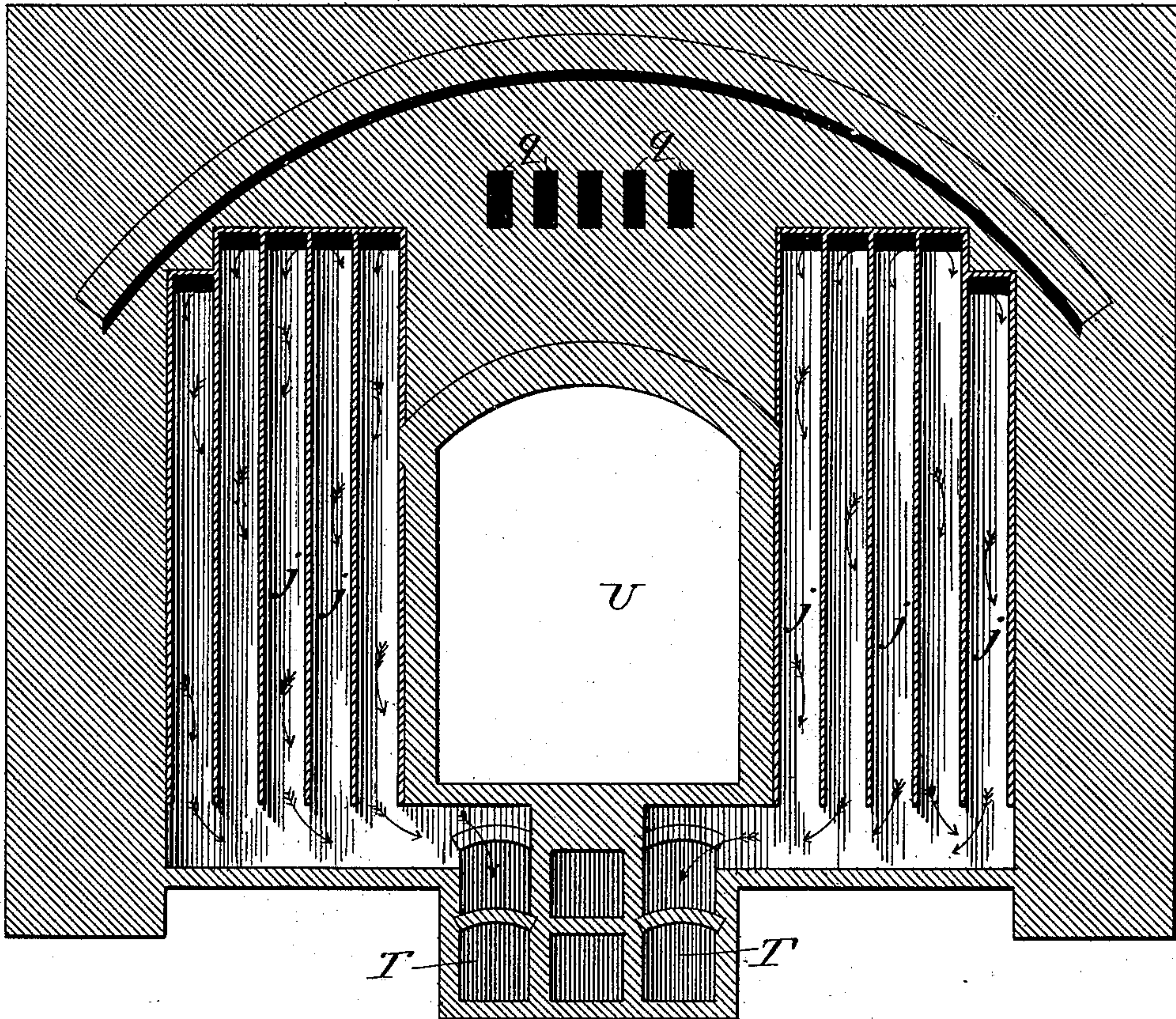
W. & S. H. ALSIP.

BRICK KILN.

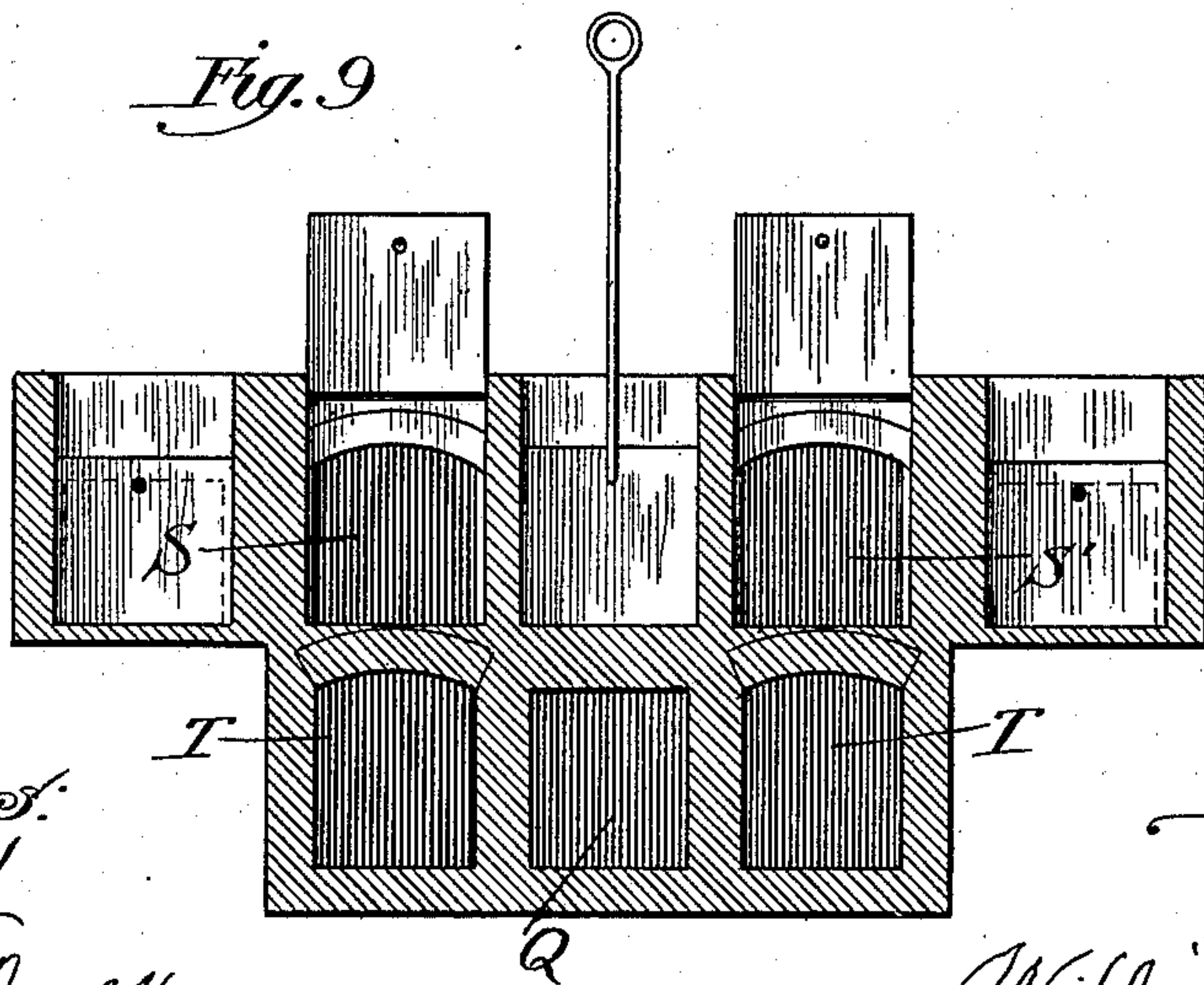
No. 383,936.

Patented June 5, 1888.

*Fig. 8.*



*Fig. 9*



*Witnesses:*

*E. A. West.*  
*Harry T. Jones.*

*Inventors:*

*William Alsip.*  
*Samuel H. Alsip.*



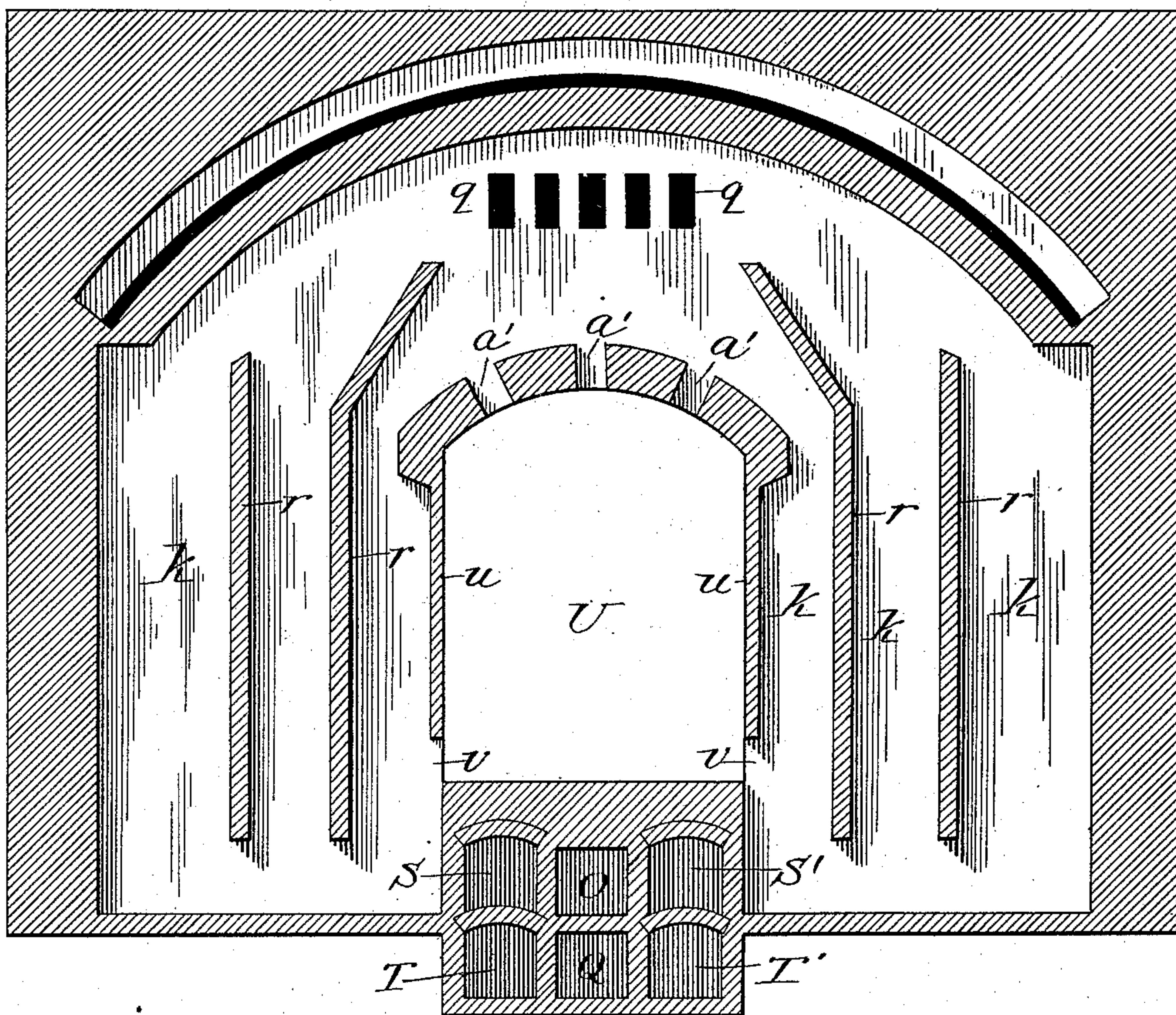
W. & S. H. ALSIP.

BRICK KILN.

No. 383,936.

Patented June 5, 1888.

*Fig. 10.*



*Witnesses:*  
*E. A. West.*  
*Harry T. Jones.*

*Inventors:*  
*William Alsip.*  
*Samuel H. Alsip.*



# UNITED STATES PATENT OFFICE.

WILLIAM ALSIP AND SAMUEL H. ALSIP, OF MOMENCE, ILLINOIS.

## BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 383,936, dated June 5, 1888.

Application filed May 26, 1887. Serial No. 239,500. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM ALSIP and SAMUEL H. ALSIP, residing at Momence, in the county of Kankakee and State of Illinois, and citizens of the United States, have invented a new and useful Improvement in Brick-Kilns, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, showing, however, only part of the kiln. Fig. 2 is a vertical longitudinal section through a portion of the kiln at line *x* of Fig. 5. Fig. 3 is a vertical longitudinal section taken at line *x* of Fig. 4. A portion of this section is central. The remainder is not central. Fig. 4 is a horizontal section at line *x* of Fig. 3. Fig. 5 is a horizontal section at line *y* of Fig. 3, a portion on the right-hand side being cut away. Fig. 6 is a detail, being a section through one of the furnaces, and showing in elevation the flues or passages leading from the furnace to the kiln. Fig. 7 is a vertical section at line *y* of Fig. 5. Fig. 8 is a section at line *z* of Fig. 3, looking to the right. Fig. 9 is a detail, being a section at line *y* of Fig. 4, and is enlarged. Fig. 10 is a section at line *w* of Fig. 3 looking to the right.

Our invention relates to that class of kilns in which both the downdraft and the updraft are used.

The leading objects of our invention are to provide improved devices by the use of which the draft can be made to pass either down or up between and around the bricks at pleasure; to provide an improved arrangement of heat-passages for the purpose of heating all parts of the kiln more uniformly than heretofore; to provide for the admission of air to the hot gases from the furnaces to aid combustion; to provide improved means for readily directing and controlling the course of the heat, and to provide an improved door for the furnaces, all of which we accomplish, as illustrated in the drawings, and as hereinafter fully described. Those things which we claim to be new will be set forth in the claims.

In the drawings, A represents the outer walls of the kiln, which, as shown, are strengthened and stayed by means of metal posts B, strips C, and tie-rods D.

E are brace-rods.

F F' are furnaces. Both sides of the kiln are provided with these furnaces; but they are shown only on one side in some of the figures.

G is brick-work between the furnaces.

H are walls a little distance from the main wall A.

Each furnace is provided with two flues, *a'* *a''*, which communicate, respectively, with passages I I', so that the heat from the furnaces can go up to the top of the kiln through a passage, I, or down to the bottom of the kiln through a passage, I'. These passages from the furnaces to the kiln are each divided into two parts by vertical partitions J J', Fig. 6, so that there are in effect four passages from each furnace to the kiln—two leading to the upper part and two to the bottom.

*b b'* are blocks or dampers of fire-clay used to close the passages from the furnaces to the kiln, and these blocks or dampers rest on ledges, as shown in Fig. 7, and can be removed and replaced by means of a rod, *c*, Fig. 7, the inner end of which is forked and can be made to enter holes in the dampers *b b'*.

K are other walls at a little distance from the walls H, leaving an air-space, *d*, between K and H. (See Fig. 7.)

*e* are air-passages leading from the outside to the air-passages *d*.

*f* are air-passages leading also to the air-passages *d*, which passages *d* are each divided into two parts by a horizontal partition, *g*. (See Figs. 5, 7.)

L are walls or partitions, a few inches only in height, which rest on a suitable floor or foundation, and extend from one side of the kiln to the other, on which the floor of the kiln rests. A part, M, of the floor on each side of the kiln is solid, as shown in Fig. 5. The remaining part of the floor has open spaces for the passage of heat, as usual.

N is a flue, the upper end of which is open and the lower end of which communicates with a passage, O, beneath the kiln, which leads to a large horizontal flue, P, which leads to the smoke-stack. (Not shown in the drawings.) N' is another flue, similar to N, the upper end of which is open, and the lower end of which communicates with a flue, O', from the right-



hand end of which there is a passage, *h*, to the horizontal passage *Q*, which leads to the flue *P*. (See Fig. 3.)

*R R'* are passages between the walls *L*, through which the heat passes from the furnaces beneath the floor of the kiln when the draft is up through the kiln, and into which passages the heat passes from the kiln when the draft is down through the kiln. (See Figs. 5 and 7.)

*S* is a passage into which heat and smoke from the kiln can pass. The left-hand end of this passage (see Fig. 4) communicates directly with the flue *P*, and the other end communicates, by means of a passage, *i*, with the flue *T* directly below *S*, which flue *T* leads directly to the flue *P*.

*S'* is another flue or passage similar to *S*, the left-hand end of which (see Fig. 4) communicates with the flue *P*, and the right-hand end of which communicates, by means of a passage, *i'*, with *T'*, which leads to the flue *P*.

Each end of the kiln is provided with a doorway, *U*, through which brick can be placed in and removed from the kiln. When the kiln is filled each door is closed with a wall, *V*. (See Fig. 3.) On each side of each doorway there is, as shown, a narrow passage, *j*. (See Fig. 5.) These passages, as shown in the drawings, are of hollow tile, and heat can pass up or down through these passages *j*. (These passages are also indicated in dotted lines in Fig. 3.)

*k* are passages at the left-hand end of the kiln, the lower ends of which communicate with passages *l*, which lead to the flue *P*. *k'* are similar passages at the opposite end of the kiln, which communicate, by means of passages *l'*, one with the flue *T* and the other with the flue *T'*, through the passages *i i'*. The upper ends of these passages *k k'* communicate with the kiln through openings *q q'*. (See Fig. 3.)

*m* is a sliding valve by which the outlet from the passage *O* to the flue *P* can be closed. *m'* is a similar valve, controlling the outlet from the passage *O'*.

*n* are valves which control communication from the two passages *l* to the flue *P*. Similar valves control the communication from the passages *l'* to the flues which lead to the chimney. The outlet from each end of each of the passages *S S'* is also controlled by a similar valve.

In Fig. 10 we have shown binders *r* between the two walls of the passages *k*. Similar binders are used in the passages *k'* at the opposite end of the kiln, which binders are omitted in Fig. 5.

Closing the doorway of the kiln preparatory for burning, we put in an inner wall, *s*, (indicated in Fig. 5,) as well as the outer wall, *V*, leaving a passage, *t*, between such two walls, similar to the passages *k*. In order to furnish a support for the arch over the doorway, we build a wall, *u*, on each side of the doorway in the passages *k*, as shown in Figs. 5 and 10, leaving, however, openings *v* at the bottom of

such walls *u* for the passage of heat. The arch over each doorway is provided with passages *a'*.

*A'* are openings in the top of the kiln for ventilation and cooling, Fig. 3.

*W* are doors for the mouths of the furnaces. These doors are made of fire-clay tile, and each is provided with a metal rim. The doors are supported by hangers secured to the metal rim and by rollers supported on a metal rod or bar, *p*, Fig. 1.

The operation is as follows: If it be desired to have the heat pass from the furnaces up through the passages *I* of the kiln the passages which lead from the furnaces to the bottom of the kiln must be closed, which can be done by means of the dampers *b'*. The dampers *m m'*, which control the outlets from the passages *O O'*, and the dampers *n n' n'*, which control the passage of heat through the passages *l* and *l'* to the flue *P*, must also be closed. Then the heat which goes into the kiln through these passages *I* will pass down between and around the brick through the open floor into the passages *R R'*, and from these passages into the passages *S S'*, and if the dampers at both ends of these passages *S S'* be open a part of the heat will go directly to the flue *P* and a part will go to the other end of the kiln and down through the passages *i i'* and through the flues *T T'* to the flue *P*. At the same time a small portion of the heat will pass down through the passages *t t*, aiding to maintain a proper heat at the ends of the kiln. Either one of the dampers *S S'* can be partially closed for the purpose of causing more heat to go to one end of the kiln than to the other. Either one of the two passages which lead from each furnace to the upper part of the kiln can also be closed, as may be found desirable, and thus the heat which passes from the furnaces to the upper part of the kiln can be directed to either side of the vertical partitions *J J'*.

To conduct the heat from the furnaces to the bottom of the kiln instead of the top, the dampers *b*, which control the two upper passages from the furnaces, are to be closed and the dampers *b'* are to be opened. The dampers of the passages *S S'* are also to be closed. The dampers *m m' n n'* are to be opened. Then the heat will pass down through the passages *I'* to the passages *R R'*, thence up around the brick in the kiln. Then the greater portion will pass down through the flues *N N'* to the passages *O O'*. The heat which goes to *O* will go directly to the flue *P*. That which goes to the passage *O'* will go to the flue *Q* and then to the flue *P*. Some of the heat also will pass through the openings *q q'* down through the passages *k k'* at the ends of the kiln, and a small portion will also pass through the passages *a'* in the arches over the doorways and down through the passages *t* out through *v* to the main flue.

By means of the described flues and passages the heat from the furnaces can be directed either to the top or bottom of the kiln and to various parts thereof in such a manner that



the brick in all parts of the kiln will be quite evenly burned, no part of the kiln being likely to be very much overheated or underheated.

We make the floor M tight along the sides 5 of the kiln, as described, for the reason that those portions of the kiln are near the furnaces, and a large quantity of radiated heat will reach the brick which are placed near the sides.

10 The passages  $j j'$  are useful to create a draft at the ends of the kiln and draw a portion of the heat to the ends, thus insuring a better burning of the brick at the ends of the kiln, whether the draft be up or down. The pas- 15 sages  $k k'$  are useful when the draft is up through the bottom of the kiln for the purpose of drawing a part of the heat to the ends of the kiln, burning the brick more evenly at the ends than otherwise.

20 If the dampers  $m n n'$  be closed, a greater portion of the heat will go to the right-hand end of a kiln. If the dampers  $m' n' n'$  be closed, leaving  $m n n'$  open, then a greater portion of the heat will be thrown to the left-hand end 25 of the kiln. If the dampers  $m m'$  be closed, leaving  $n n'$  and  $n' n'$  open, a large portion of the heat can be made to pass to both ends of the kiln, but not into the passages O O'. Thus the passages  $j j'$  and  $k k'$  are of great service 30 in heating the ends of the kiln.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a brick-kiln, the combination of a 35 chamber to receive the bricks to be burned, a series of furnaces, each of which is provided with two flues,  $a'$  and  $a''$ , located directly at the rear of the fuel-chamber and having dampers  $b b'$ , the walls H and K, the vertical pas- sages I and I', leading from said flues in oppo-

site directions on the outside of the wall H, 40 the cold-air passages  $d$ , located between said walls H K and communicating with both the passages I I', the partitions  $g$  in the passages  $d$ , and the air-passages  $e f$ , leading from the outside of the kiln to the passages  $d$ , substan- 45 tially as described.

2. In a brick-kiln, the combination of a burning-chamber, a series of furnaces or fire- 50 boxes, passages leading from the furnace both to the top and to the bottom of the kiln, dampers for such passages, flues N N', O O', and Q, dampers to control the outlets from the passages O O', flues R R' S S' T T', and dampers to control the flues S S', substantially 55 as and for the purposes specified.

3. In combination with the burning-cham- 60 ber of a brick-kiln, the passages  $j j'$  at the ends of the kiln, communicating at their upper ends with the burning-chamber and at their lower ends with passages R R', which com- 65 municate with passages S S', whereby heat, through  $j j'$ , can pass either up or down according to the direction of the draft, substan- tially as and for the purposes specified.

4. In a brick-kiln, a burning-chamber, in 65 combination with passages  $k k'$  at the ends of the kiln, which passages communicate at their upper ends with the burning-chamber and at their lower ends with passages or flues  $l l'$ , which are controlled by dampers  $n n'$ , and 70 which lead to a flue, P, which goes to the smoke stack, substantially as and for the purpose specified.

WILLIAM ALSIP.  
SAMUEL H. ALSIP.

Witnesses:

E. A. WEST,  
HARRY T. JONES.