

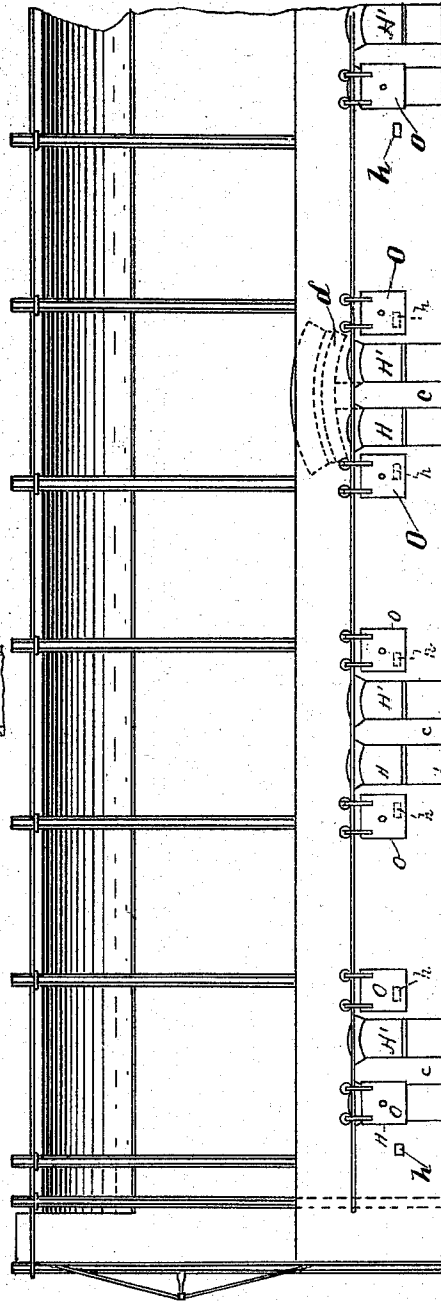
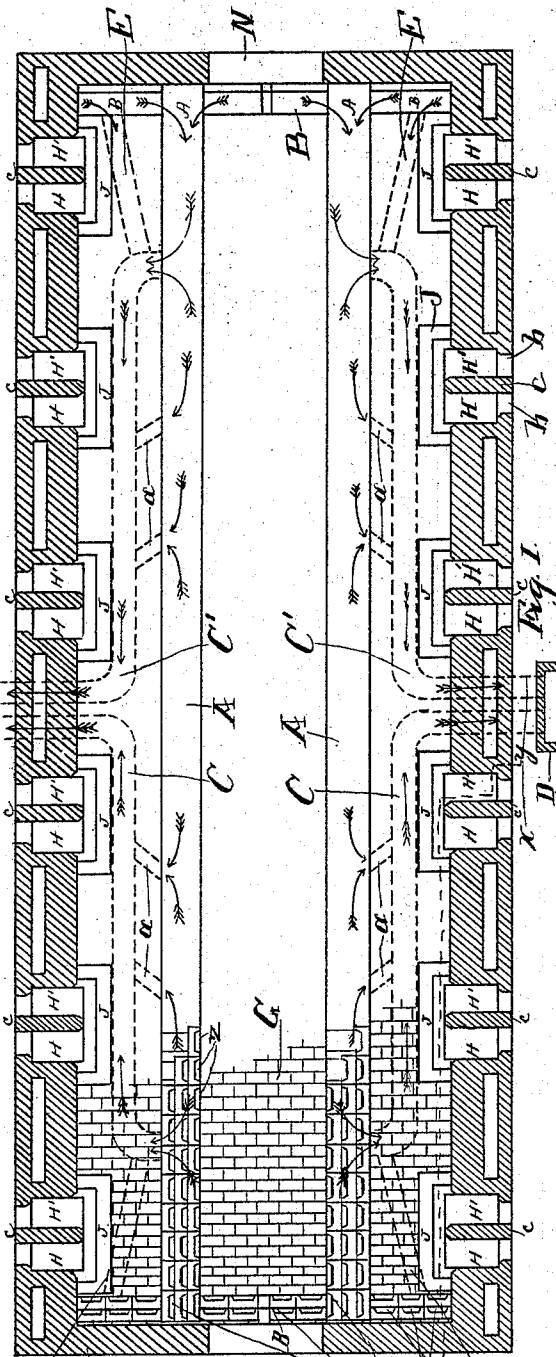
(No Model.)

2 Sheets—Sheet 1.

G. S. M. RUTTER.
BRICK KILN.

No. 528,113.

Patented Oct. 23, 1894.



WITNESSES
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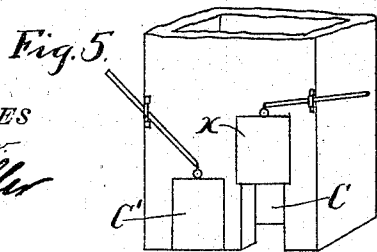
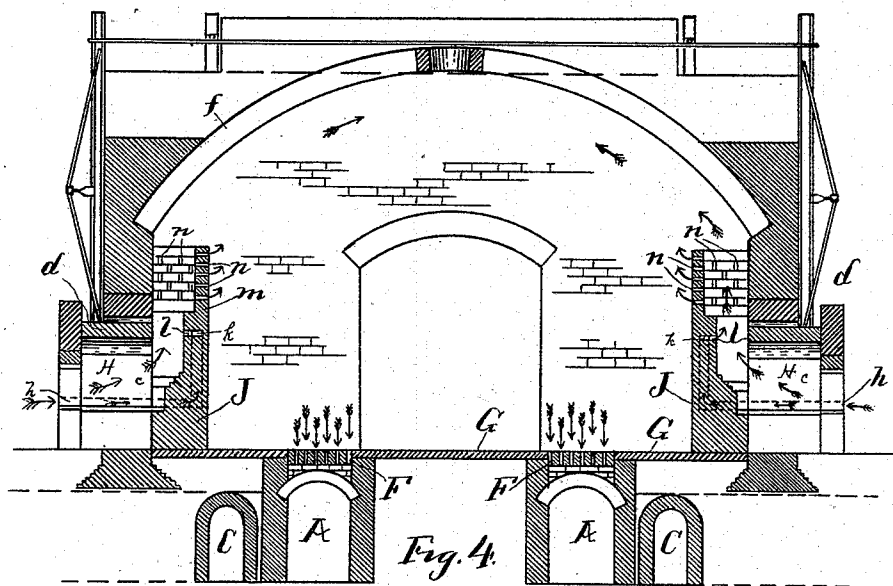
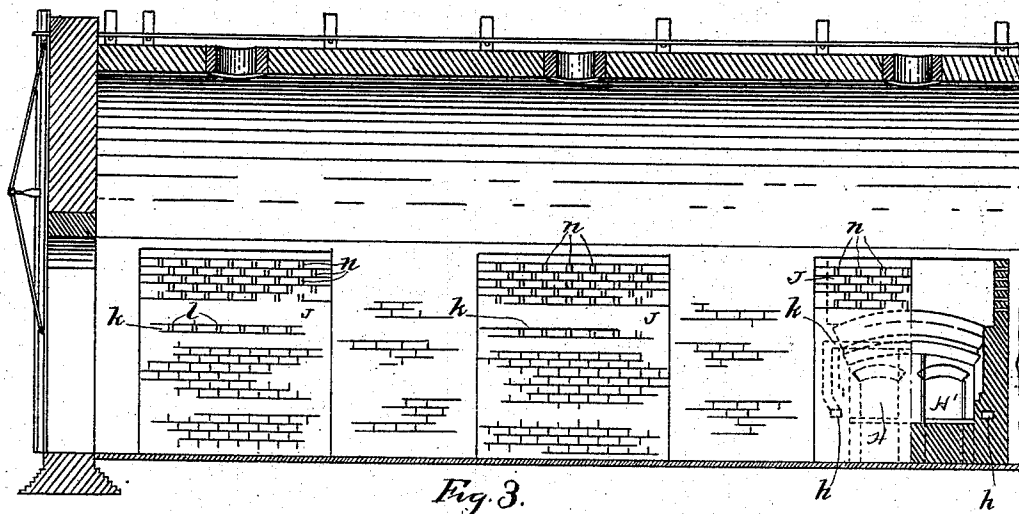
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WITNESSES
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UNITED STATES PATENT OFFICE.

GEORGE S. M. RUTTER, OF CANTON, OHIO, ASSIGNOR OF ONE-HALF TO JACOB J. RENKERT, OF SAME PLACE.

BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 528,113, dated October 23, 1894.

Application filed April 16, 1894. Serial No. 507,665. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. M. RUTTER, a citizen of the United States, and a resident of Canton, county of Stark, State of Ohio, have invented a new and useful Improvement in Brick-Kilns, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements in brick kilns, the object of which is to provide means by which the heat may be directed and controlled, that a better result in burning may be attained, and for the better combustion of fuel, and the consumption of smoke, thereby reducing the cost of burning.

With these objects in view, my invention relates to certain features of construction and combination of parts as will hereinafter be described and claimed.

Figure 1, of the accompanying drawings is a plan view of the bottom of the kiln, showing the position of the flues, intakes and outlets. Fig. 2, is a side elevation, showing a portion of the kiln. Fig. 3, is a longitudinal section on line *y y*, Fig. 1, at rear of fire, showing the bag wall. Fig. 4, is a cross section, through fire box. Fig. 5 is a fragmentary view of the stack showing the valves which control the flues leading thereto.

The body of the kiln may be constructed, braced and stayed, in any of the well known forms, as my invention relates particularly to the construction of the bottom portion of the kiln, and the fire boxes and means for sustaining combustion.

A represents the great longitudinal flues, extending from one end of the kiln to the other, and B, B, are similar cross flues, intercepting the flues A, and extending from side to side, along the end portions of the kiln below the floor.

Subsidiary flues as C and C' are provided, that extend from the end portions of the main flues A to a draft chimney D, outside of and intermediate the ends of the kiln, at the entrance of which are provided gates or valves *z*, by which either one or all of the flues may be closed to control the draft and heat, and direct it from one part of the kiln to another. The end portions of the flues B, B, are con-

nected to the flues C, C', by the connecting flues E, and for the purpose of facilitating the draft and distributing the heat throughout the middle portions of the kiln, intakes or connecting flues as *a* connect the main flue A with the flues C, C'.

The flues A, and B, are covered by an open pavement, formed of bricks, having a recess in one side to form the opening *z*, (see left-hand end of Fig 1,) through which the draft passes to the flues and out to the draft stack or chimney D, of which there are preferably two, one at each side of the kiln; but if preferred, one stack or chimney may be used by conducting the flues C, C', from one side of the kiln under the flues A, to the chimney at the opposite side.

The floor space between and at the sides of the flues A, over flues C and C', and connecting flues E and *a*, is paved with brick as shown at G, on a level with the open pavement F, over the flues.

The operation of the flue structure shown and hereinbefore described, will be hereinafter explained.

The fire boxes H and H' are double or twin form, that is, two separate ash pits *b b'*, and fire boxes H, H', separated by a thin wall *c*, all under one arch *d*, a portion of the wall extending back and connected or joined with the lower front portion of the wall forming the inside flue or bag J, which extends from the floor to a point a distance below the base of the arch *f*. At the outer sides of the fire boxes H and H', and in the fire walls, is provided a flue or conduct *h*, extending back into the heavy part of the bag wall J, and up to a point above the top of the fire boxes, at which point the flues *h* converge and meet at a point central to and in the bag wall J. In that portion of the flue *h*, extending across the bag as shown at *k*, (see Fig. 3,) is provided a series of apertures *l* that open into the bag as shown in Figs. 3 and 4. A distance above the opening *l*, the bag wall of offset, as shown in Fig. 4, and in the upper portion *m* of the wall are provided series of small apertures *n*, that will allow a portion of the flame and heat of the fire to pass out of the bag and into the kiln, at a point below the top of the bag.

The fire box doors O, are of the usual form as shown, supported on rollers that travel on a supporting metal bar. When the doors are moved aside to open the fire box they pass in front of the flues *h* as shown in Fig. 2.

The distinctive object of the double fire boxes, H and H', and the combustion flues *h*, is to provide a more complete combustion of the coal, whereby a better and greater heat is obtained, that is more effective and more easily controlled in the kiln, the smoke consumed and whereby is achieved a great saving of fuel, as well as the abatement of the smoke nuisance about the kiln and yard.

In operation the molded bricks are placed in the kiln in the usual way, and the kiln may be fired in the usual way, until the dampness, or so called water smoke is driven off, at which time the walls of the fire boxes and the front wall of the bag will be incandescent, after which the fire boxes H and H' will be fired alternately, as follows: Presuming that at the start of the alternate firing both boxes are well supplied with fuel in an incandescent state, fresh fuel is, (for an illustration,) passed into box H, at which instant a cloud of smoke or free carbon is passed into the bag without a mixture of air sufficient to support or produce combustion, but this cloud or volume which I will call smoke is met in the lower portion of the bag by a volume of hot air and flame, from the incandescent fuel then in fire box H'. The smoke is ignited and substantially all consumed. This bag or combustion chamber J is common to both furnaces H, H'. When the fuel in fire box H has become incandescent, fresh fuel is thrown into box H'. The smoke arising therefrom is met in the bag by the heat and flame from the fire box H; but to still further provide for the complete consumption or combustion of all the smoke, and thereby a complete consumption of all the fuel, air is passed through the flue *h*, in the now highly heated or incandescent walls of the fire boxes and bags, wherein the air having become highly heated, is injected by the force of atmospheric pressure, at the lower outer end of the flues, through the apertures *l*, in the front wall of the bag, in jets engaging and igniting whatever there may be of smoke or free carbon in the bag, and burning the same in jets of flame, as if a hydro-carbon gas was being injected at that point. At this point of the operation, the top portion of the bag is full of glowing heat and flame, and to utilize a portion of it at a point in the kiln adjacent the bag, the top or upper portion *m* of the bag wall is provided with perforations *n*, through which a portion of the heat and flame may pass from the bag to the interior of the kiln, while the great volume of heat and flame may pass up under the arch of the kiln, and down through the brick, into the flues A, B, and out to the draft stack D, through the subsidiary or continuation of flues C, C', E and *a*.

To regulate or control the heat in the kiln, the side flues C, C', corner flues E, and intersecting flues *a* are provided. In operation it is desired that the heat should pass down through the brick evenly and equally at all parts of the kiln, and the flues are arranged to accomplish that object. The corner portions being the most difficult to heat, the flues E with the flues C and C', are provided to draw the heat down through the brick and the openings *z* in the pavement over the flues A, B, into said flues E; and the cross or intersecting flues *a* are provided to afford relief to the middle portion of the main flues A, by drawing the heat down through the brick in that portion of the kiln; but there are times when the kiln in its normal condition will not heat evenly, because of outside current of air, or for other reasons, one end of the kiln is slow or behind in heating, and should that be the end indicated by the letter N, the gates in the flues C should be closed to increase the draft in the flue C', to draw the heat to the cold end of the kiln. If one corner only of the kiln is cold, three of the gates may be closed. The remaining open flue will draw substantially all of the heat to the cold corner, and by this same manipulation of the flues and gates, if one part of the kiln is too hot or in advance of the remainder of the kiln, the draft may be shut off from that part, and in this manner of manipulation of the flues an even and equal burn may be had throughout the kiln.

If the heat is passing evenly to all parts of the kiln, the gates or valves *x* remain open and the heat will pass from the furnaces over and through the bridge or bag wall J into the kiln, around the bricks, thence downwardly through the openings *z* into flues A and end flues B B; the heat and gases in the ends of flues B B passing through flues E E into the outer ends of flues C C', and the heat and gases in flues A A will also pass into the ends of flues C C' and also into said flues through the short flues, *aa* and the heat and gases will be conducted by flues C C' to the stack D. By regulating the draft as before described, the heat and gases will be drawn directly into the corners of the kiln, owing to the juncture of flues, E E, B B, at those points.

Having thus fully described the nature and object of my invention, what I claim is—

1. A brick kiln provided in its bottom with parallel main longitudinal flues A, transverse end flues B, extending to the corners of the kiln and communicating between their ends with the ends of the flues A, the tops of said flues A, B, being foraminated, or intersticed to receive heat and gases from the kiln, auxiliary longitudinal closed or covered passages C C' communicating with the passages A at different points and leading to a stack, the closed or covered passages E connecting the inner ends of the flues C C' with the ends of the end flues B to regulate the heat in the ex-

treme corners of the kiln, and a damper or gate mechanism for said flues substantially as set forth.

2. A brick kiln comprising the masonry work, the main chamber or kiln proper, a series of twin furnaces in the side walls of the kiln; each pair of furnaces opening at their rear open ends into a common bag or combustion chamber, a transverse air passage *h* in the bag wall and having a series of openings *l* leading from it into the bag or chamber, and inlet passages *h h* extending through the furnace walls and up through the bag wall to the respective ends of the passage *h*, parallel longitudinal flues, *A A* in the bottom of the kiln, transverse end flues *B B* communicating between their ends with said flues *A*; the flues *A, B* having perforated covers, auxiliary longitudinal flues *C, C'* communicating at their one end with the flue *A* and also having transverse passages *a* connecting them therewith, flues *E E* connecting the ends of flues *B, B* with the opposite ends of the flues *C C'* to regulate the heat in the extreme corners of the kiln;

the flues *C C' E* and *a* being closed or covered with respect to the interior of the kiln, a stack into which flues *C C'* discharge and a gate or damper mechanism for the flues substantially as set forth.

3. The combination, in a brick kiln, with twin furnaces built into the side of the kiln, and having a common bag or combustion chamber into which their rear ends open, air inlets in the bag wall and discharging into the bag, and air inlet passages leading through the front walls of the furnaces at opposite sides of the door openings inwardly and upwardly to said air inlets of the sliding doors adapted to close the respective air inlet passages when moved from over the door openings, substantially as set forth.

In testimony whereof I have hereunto set my hand this 4th day of April, A. D. 1894.

GEORGE S. M. RUTTER.

Witnesses:

W. K. MILLER,
BURT A. MILLER.