

(No Model.)

3 Sheets—Sheet 1.

W. P. GRATH.  
BRICK KILN.

No. 455,039.

Patented June 30, 1891.

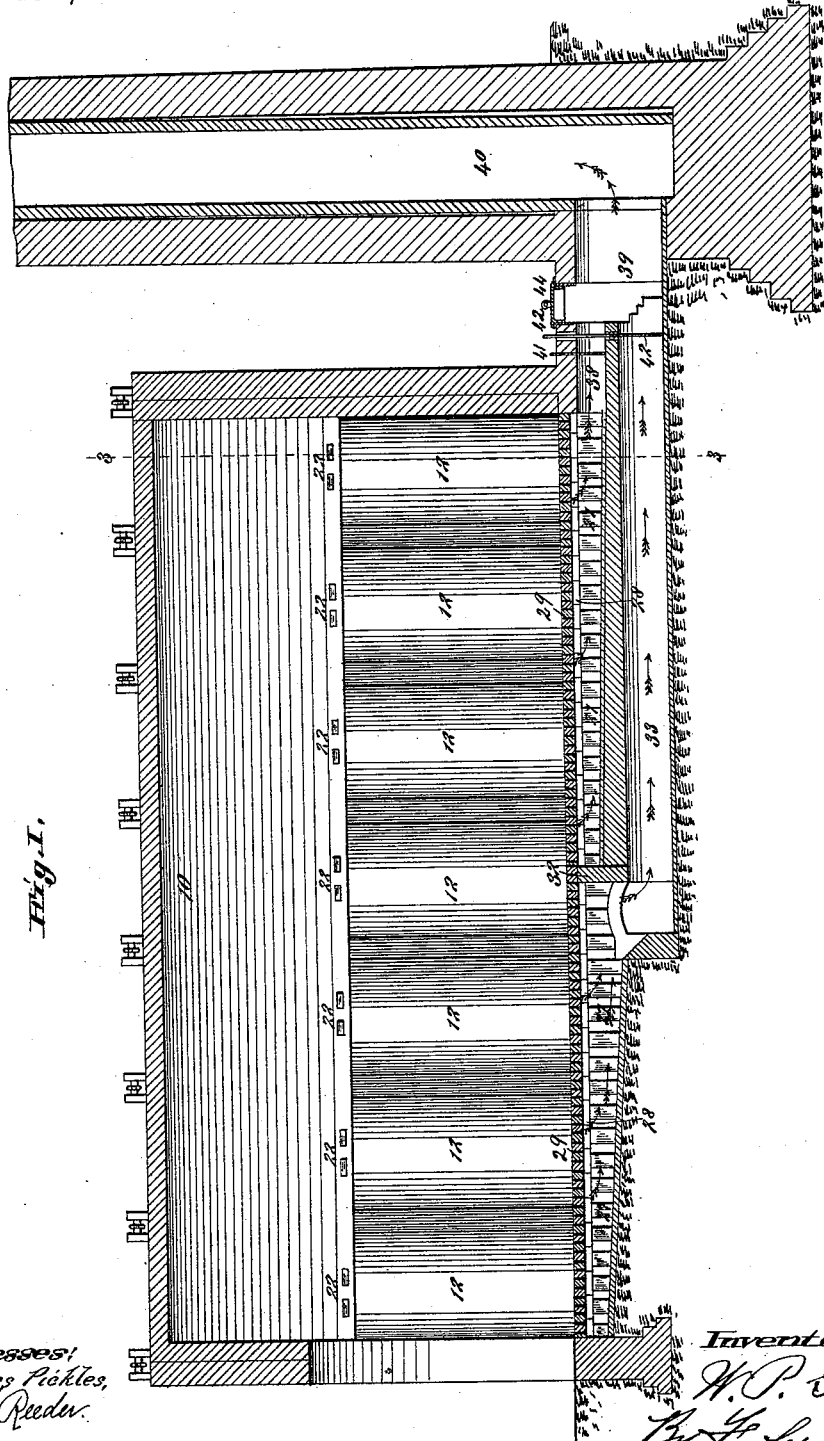


Fig. 1.

Witnesses:  
Charles Fickles,  
M. S. Reeder.

Inventor:  
W. P. Grath,  
By Fowler & Fowler,  
Attorneys.

(No Model.)

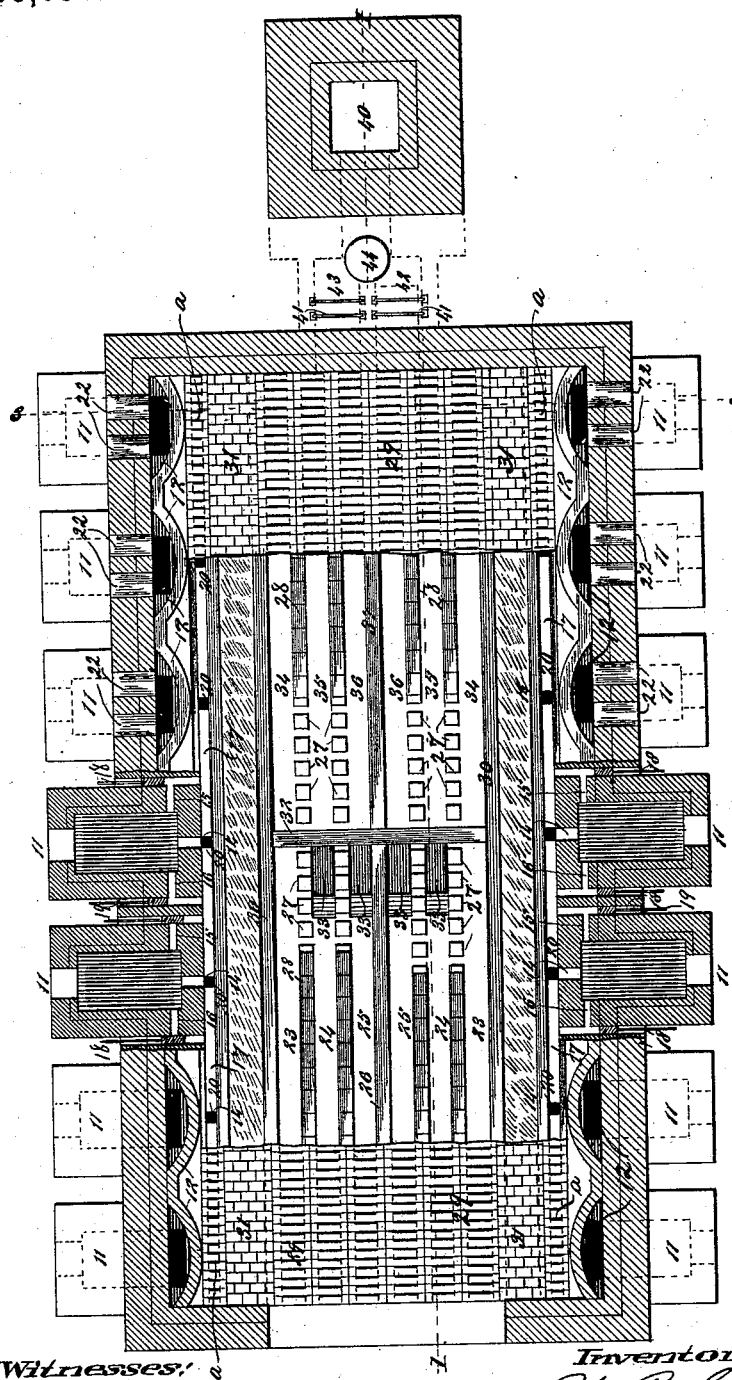
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Fig. 8



Witnesses:  
Charles Pickles,  
M. S. Ruder.

Inventor:  
W. P. Grath,  
By Fowler & Fowler  
Attorneys.

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Fig. 3.

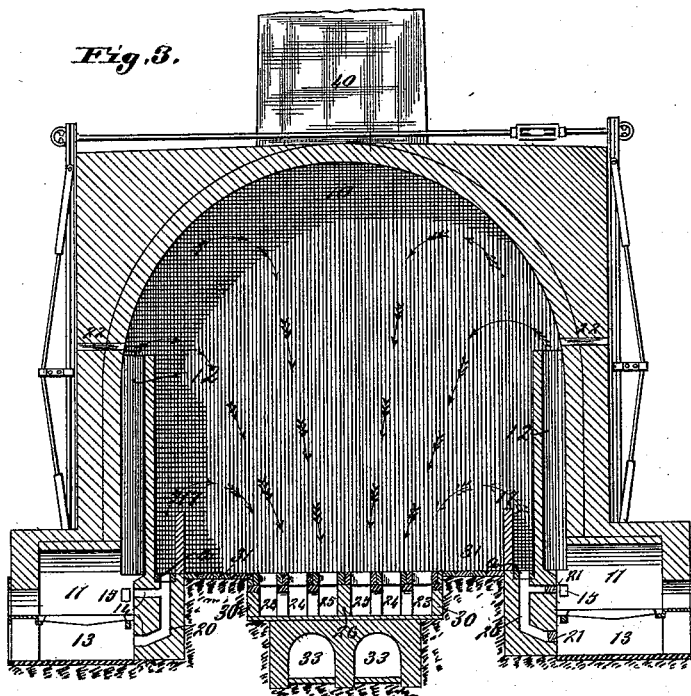


Fig. 4.

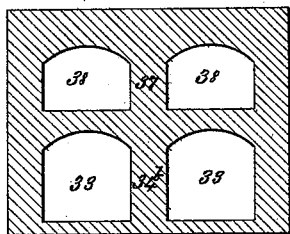


Fig. 5.

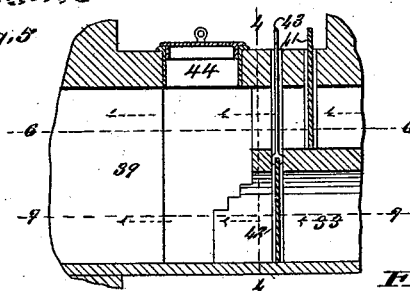


Fig. 6.

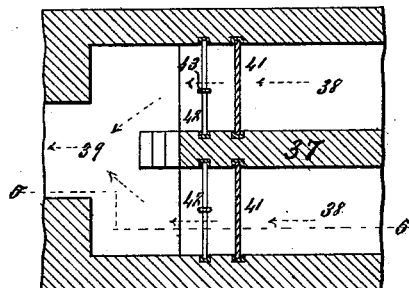
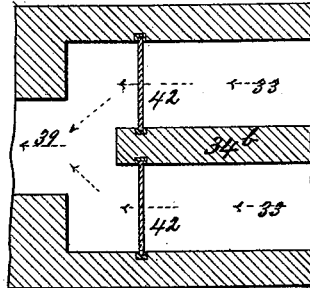


Fig. 7.



Witnesses:  
Charles Pichler.  
M. S. Ruder.

Inventor:  
W. P. Grath,  
By Fowler & Fowler  
Attorneys.

# UNITED STATES PATENT OFFICE.

WALTER P. GRATH, OF ST. LOUIS, MISSOURI.

## BRICK-KILN.

SPECIFICATION forming part of Letters Patent No. 455,039, dated June 30, 1891.

Application filed January 26, 1891. Serial No. 379,020. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER P. GRATH, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a certain new and useful Brick-Kiln, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to construct a brick-kiln in which the heated gases, after being introduced into the kiln, may be controlled so as to pass to any desired part of the kiln.

The invention has also for its object to introduce the heated gases into the kiln through a novel system of passages, whereby the said heated gases may be introduced into the kiln at various places and their introduction may be suitably regulated.

The invention will be best understood by referring to the accompanying drawings, in which—

Figure 1 is a longitudinal central vertical section of a brick-kiln made in accordance with my invention. Fig. 2 is a horizontal section thereof, taken at different levels. Fig. 3 is a cross-section on the line 3 3 of Figs. 1 and 2. Fig. 4 is a section of a detail on the line 4 4 of Fig. 5. Fig. 5 is a section of a detail on the line 5 5 of Fig. 6. Fig. 6 is a section on the line 6 6 of Fig. 5, and Fig. 7 is a section on the line 7 7 of Fig. 5.

The same figures of reference indicate the same parts throughout the several views.

The invention relates to that class of brick-kilns known as "down-draft kilns."

In the drawings, 10 is the dome of a down-draft kiln constructed, except as otherwise stated herein, in the ordinary way.

11 are the furnaces for supplying the heated gases to the kiln through bags 12 in the ordinary way, and 13 are ash-pits beneath the furnaces. From each of the furnaces lead passage-ways 14, 15, and 16, Fig. 2, to bags 17, preferably built of green bricks, and shown only in Fig. 3, in front of the ordinary bags 12, and which extend above the floor of the kiln, the heated gases being admitted to the bags 17 through perforated tiles *a*. These

bags 17 deliver the heated gases to the bricks near the floor of the kiln and adjoining the bags 12, which bricks in ordinary kilns often do not receive sufficient heat. Extending from the outside of the kiln to the passage-ways 15 and 16 are ducts 18, which may be provided with suitable dampers 19 to control the passage-ways 15 and 16, and thereby govern the admission of heated gases to the kiln through said passage-ways. From each of the ash-pits extends a passage-way 26, which also communicates with the additional bags 17. This passage-way 20 affords another means of regulating the degree of heat and volume of the heated gases delivered to the kiln. The passages leading from the furnace and the ash-pit may be provided with suitable plugs or dampers 21, whereby they may be wholly or partially opened or closed to regulate the heat and volume of the gases delivered to the kiln. Preferably above the bags 12 are air-ducts which may be closed by plugs 22. These plugs may be removed or inserted in said air-ducts, so as to admit more or less air from the outside of the kiln to control the volume and heat of the gases delivered to the kiln. The passage-ways, bags, and dampers described afford a convenient and complete means for governing the admission of heated air to the kiln and regulating its degree of intensity.

Below the floor of the kiln and extending from the front to about midway of the same and at each side of the center thereof are two series of flues 23 24 25, the flues of each series being separated by an imperforate wall 26. The flues 23, 24, and 25 of each series communicate with each other. They are made by setting bricks, as 27, on the permanent bottom of the kiln and separated from each other, and then placing bricks 28 end to end upon the separated bricks 27, so as to bring the level of the bricks 28 even with the top of the imperforate partition 26. Perforated tiles 29 of the ordinary kind are now placed on top of the bricks 28, and constitute the floor of the kiln. The outer sides of the flues 23 are formed by walls 30, which extend from end to end of the kiln. The space between the walls 30 and the bags 17 is filled with any suitable material and covered with tiles 31. The flues 23, 24, and 25 extend to a transverse imperforate wall or partition 32 at or

near the center of the kiln. The bottoms of the series of flues are made gradually sloping toward the center of the kiln, as will be seen by reference to Fig. 1. The flues 24 and 25 of each series open into subterranean flues 33, extending to the rear of the kiln at each side of the center thereof, the two flues 33 being separated from each other by an imperforate central wall 34<sup>b</sup>. The two series of flues 23, 24, and 25 and the communicating flues 33, it will therefore be seen, are entirely independent of the other series of flues 23, 24, and 25 and their communicating flues 33. It will be understood that the flues 23 communicate with the flues 33 only through the flues 24.

Above the flues 33 and extending from the central transverse partition 32 to the rear of the kiln are two series of flues 34, 35, and 36, with sloping bottoms and separated by an imperforate partition 37, the said series of flues 34, 35, and 36 being similar to the series of flues 23, 24, and 25. The flues 34, 35, and 36 are built up from the permanent bottom of the kiln and covered with perforated tiles, the same as the flues 23, 24, and 25, before described. The flues of each of this series of flues communicate with each other; but communication between the two series is cut off by the partition 37. Each series of communicating flues 34, 35, and 36 lead into a flue 38, through which the heated gases are conveyed from the kiln.

The two flues 33 and the two flues 38 open into a common flue 39, which passes to a stack 40, by which the products of combustion are conveyed from the kiln and discharged into the atmosphere. Each of the flues 38 is controlled by its own damper 41, and each of the flues 33 is controlled by its own damper 42, operated by rods 43, extending up through the flues 38.

From the foregoing description it will be seen that by suitably operating the dampers 41 and 42 the draft of the heated gases may be caused to pass through the front part of the kiln on one or both sides of the center or through the rear of the kiln on one or both sides. In other words, the current of heated gases may be caused to pass through either series of the flues 23, 24, and 25, or either series of the flues 34, 35, and 36, or through all the flues, or any of the series separately or conjointly in various combinations. I am thus enabled to control the passage of the heated gases through a kiln and to make such gases take any course desired. If upon observation it is seen that the bricks in any

part of the kiln are not receiving a sufficient amount of heat or have received too much heat, the heated gases can be controlled by the passage-ways and dampers described to pass to said or other parts of the kiln, or can be shut off from certain parts of the kiln. The dampers 41 and 42 may be wholly closed or wholly opened, or partially opened and partially closed, so as to graduate the volume of the heated gases passing through any part of the kiln.

44 is a man-hole at the confluence of the flues 33, 38, and 39, in order to permit a person to enter and clean out the flues or repair any part thereof.

So far as at present advised I am not aware that any kiln has ever been constructed in which heated gases can be delivered to the kiln, as hereinbefore set forth, and caused to pass through any part of the kiln at will or be graduated as desired in passing through the different parts of the kiln.

Having fully set forth my invention, what I desire to claim and secure by Letters Patent of the United States, is—

1. A downdraft brick-kiln having bags 12, of the ordinary construction, for delivering heated gases to the kiln, and provided with additional bags 17, rising above the floor of the kiln at the sides thereof in front of and adjacent to the aforesaid bags, furnaces beneath said bags, and passage-ways between said furnaces and bags, substantially as described.

2. The combination, in a downdraft brick-kiln, of a perforated floor, two series of communicating flues 23, 24, and 25 at the front part of said kiln and beneath the perforated floor, two series of communicating flues 34, 35, and 36 at the rear of the kiln, flues 38, into which each of the latter series of flues enter, flues 33, leading from the first series of communicating flues and beneath the second series of flues, dampers 41 and 42 for controlling the draft through said flues 38 and 33, a passage-way 39, and stack 40, through which the heated gases pass from the kiln to the exterior air, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal, this 22d day of January, 1891, in the presence of two subscribing witnesses.

WALTER P. GRATH. [L. S.]

Witnesses:

J. F. WESTON,  
A. C. FOWLER.