

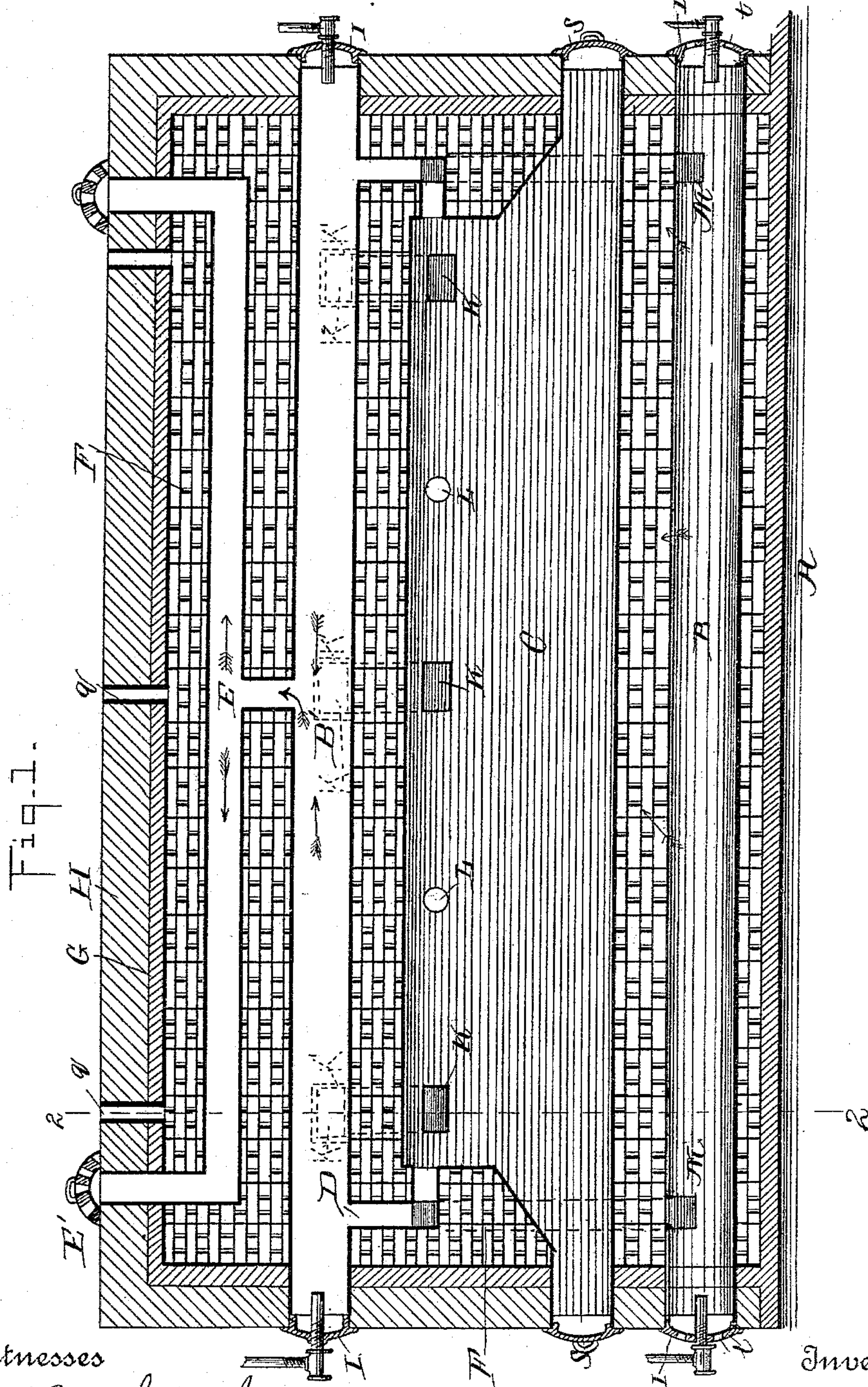
(No Model.)

2 Sheets—Sheet 1.

B. C. HEAVEY.
GARBAGE FURNACE.

No. 411,963.

Patented Oct. 1, 1889.



Witnesses

Will E. Aughinbaugh
Bruce S. Elliott.

Inventor

Bernard C. Neavey

By His Attorneys

Superficial Deposition

(No Model.)

2 Sheets—Sheet 2.

B. C. HEAVEY.
GARBAGE FURNACE.

No. 411,963.

Patented Oct. 1, 1889.

Fig. 2.

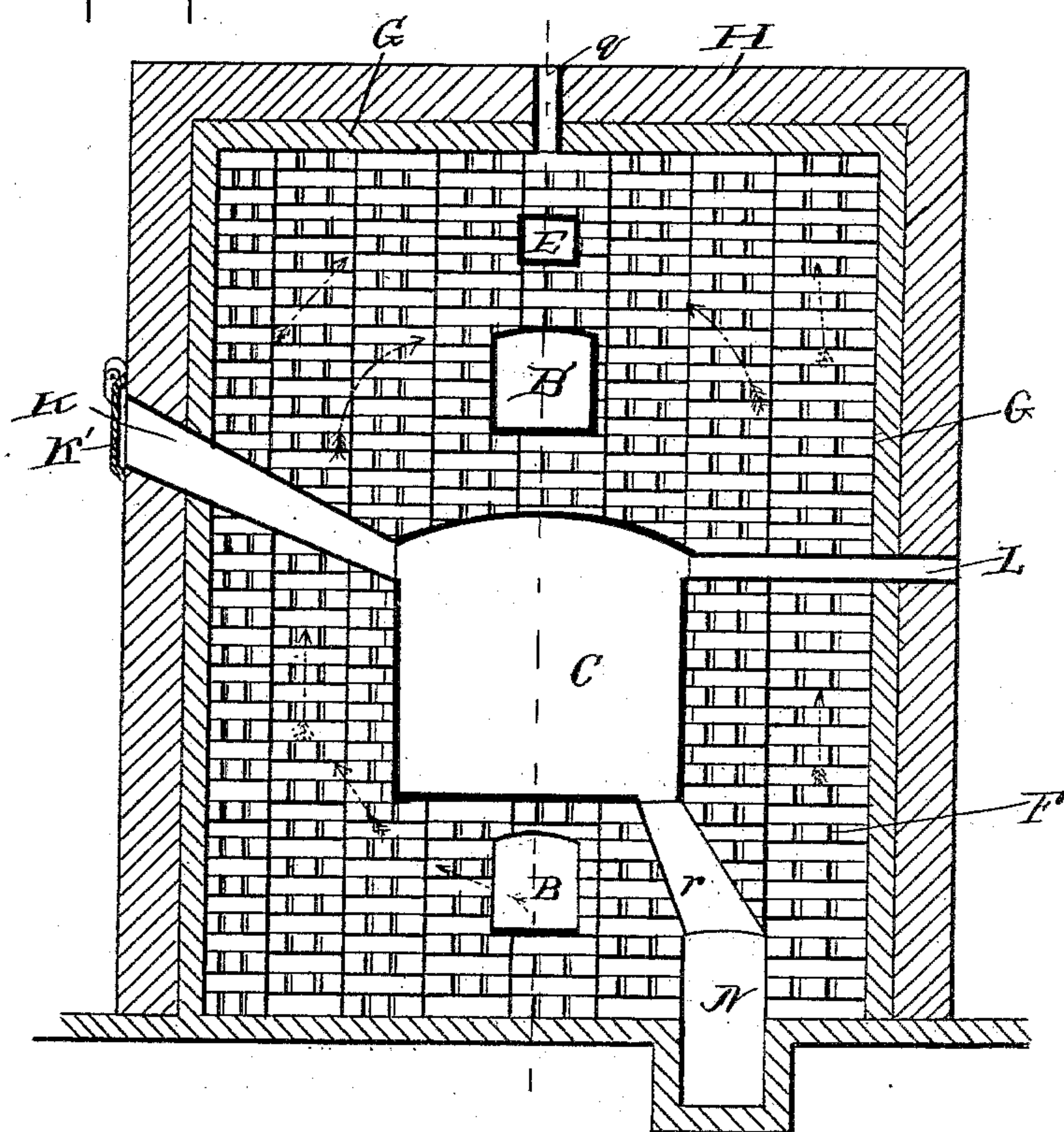
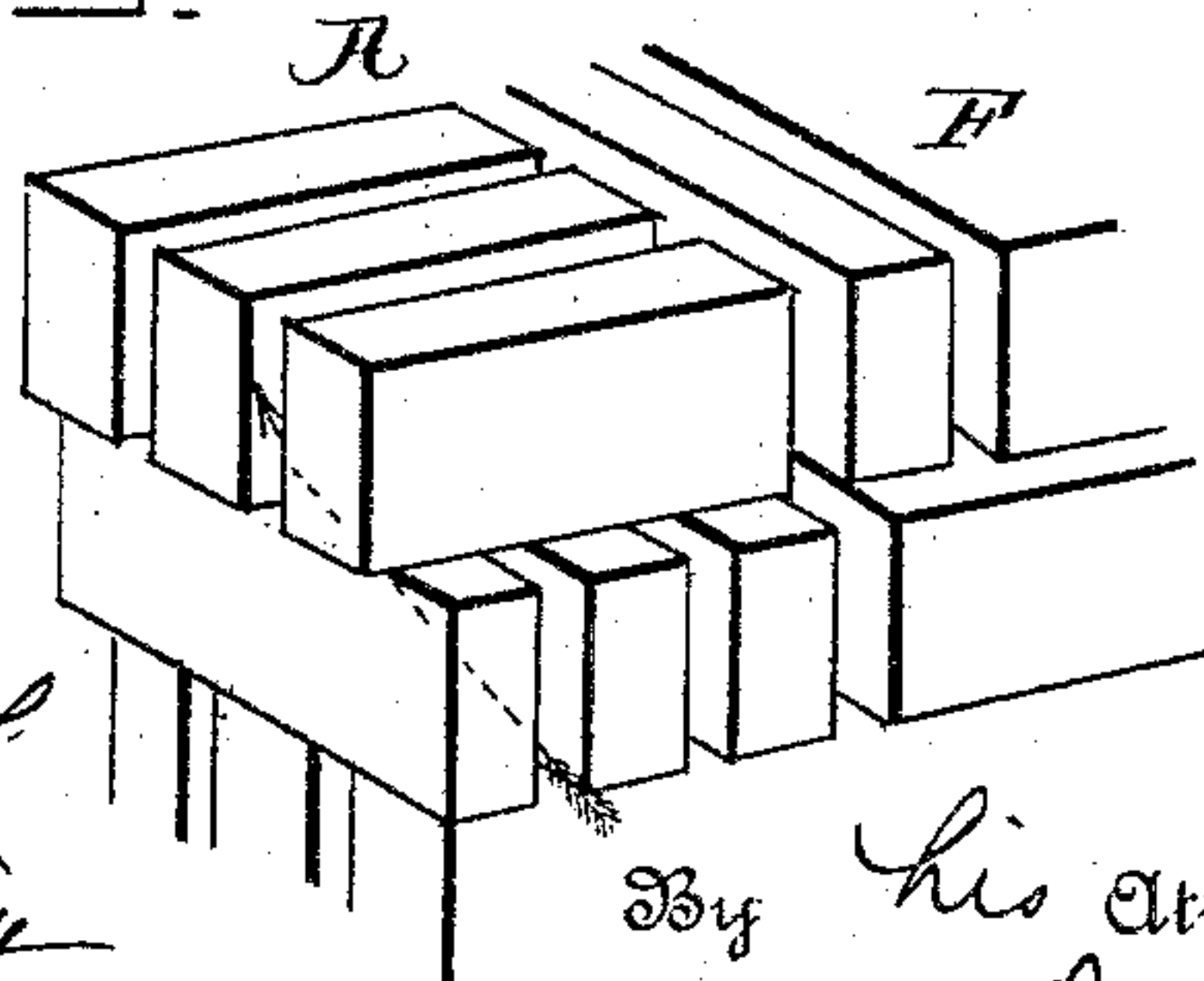


Fig. 3.



Witnesses

Will E. Anglinbaugh

Bruce Elliott.

Inventor

Bernard C. Beavey

By His Attorneys

Деревушка Деревушка

UNITED STATES PATENT OFFICE.

BERNARD C. HEAVEY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-THIRD TO
MORTIMER SCANLAN, OF SAME PLACE.

GARBAGE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 411,963, dated October 1, 1889.

Application filed February 1, 1889. Serial No. 298,333. (No model.)

To all whom it may concern:

Be it known that I, BERNARD C. HEAVEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Garbage-Furnaces, of which the following is a specification.

My invention relates to an improvement in furnaces especially designed for the consumption of garbage, and my object is to provide a furnace of comparatively simple and inexpensive construction which may be employed to destroy with the minimum amount of fuel and with great rapidity garbage in large quantities and thoroughly decompose the noxious gases and vapors arising therefrom before they escape to the atmosphere.

To this end my invention consists in the general construction of my improved furnace; and it also consists in details of construction and combinations of parts hereinafter more fully set forth and claimed.

In the drawings, Figure 1 is a vertical section through the furnace, taken on the line 1 1 of Fig. 2 and viewed in the direction of the arrows; Fig. 2, a section on the line 2 2 of Fig. 1 and viewed in the direction of the arrows, and Fig. 3 a broken perspective view illustrating a detail of construction of the furnace.

In its general construction the furnace shown comprises a mass of highly refractory spaced fire-brick incased in a wall of material non-conductive of heat and containing toward its base a fire-chamber, and above the said fire-chamber a retort, into which the garbage is thrown, and a second fire-chamber above the retort and communicating with the latter, into which the gaseous and vaporous products of combustion which are not destroyed in the retort may enter and be further subjected to heat to decompose them, and thereby deprive them of obnoxious odor.

A is the furnace; B and B', respectively, the lower and upper fire-chambers; C, the retort; D D, flues leading from the opposite upper extremities of the retort to the upper fire-chamber, and E a bifurcated flue leading from the upper side of the chamber B' toward its middle, out through the top of the furnace, near opposite ends of the latter, where it is provided with dampers E'.

F represents the internal mass of fire-brick, which is spaced, as shown in Fig. 3, by placing the brick on edge close to each other, but touching, as a rule, only at their upper and lower edges in a manner to permit the heat currents to rise freely through the mass and thoroughly heat the brick, which may be eventually reduced to a white heat. Immediately surrounding the mass of spaced brick on all sides is a layer G, several inches in thickness, of non-heat-conducting material, composed, preferably, of fine ashes, and outside the layer G is the shell H, comprising a solid wall of brick. One or more flues *g* extend through the top of the furnace and afford outlets from the mass F.

The dimensions of my improved furnace may vary according to requirement; but to convey an idea of the size I intend to be common for the device its length, width, and height may be stated to be, respectively, about thirty-five, twelve, and seventeen feet.

The fire-chambers B and B' are designed for burning oil, which is injected at opposite ends from oil-burners I by means of steam in a common manner, and therefore not herein more definitely described, nor illustrated in detail in the drawings. I prefer to employ oil in this connection on account of the intense heat which may be readily generated thereby, the ease with which it may be controlled, and the economy of its use.

The sides and top of the fire-chamber B are of spaced brick forming part of the mass F.

On opposite sides of the furnace are inclined chutes K, leading downward from the exterior of the furnace-wall to the upper parts of the sides of the retort C and provided at their outer extremities with fire-proof doors K'. They are arranged, preferably, three on one side alternating with two on the other.

L L are air-supply flues leading at opposite sides into the upper part of the retort from the exterior of the furnace, and M M are flues leading from the flues D to the fire-chamber B, adjacent to its oil-burners I. Surrounding the oil-burners I of the chamber B are dampers *t* to control the admission of air. The upper part of the retort C is considerably shorter than the body of the furnace. The lower part, however, extends the full length of the structure and is closed at opposite ex-

tremities by doors *s s*. Adjacent to the doors *s* are chutes *r*, leading downward from the retort to ash-pits *N* at opposite ends of the furnace.

5 The fire-chamber *B* opens at its sides and top into the mass of spaced brick, while the chamber *B'*, retort, and all flues and chutes are lined with closely-set fire-brick to make them substantially gas-tight.

10 The operation is as follows: The oil being turned on and ignited, the steam is caused to project the flame from each burner *I* toward the centers of the respective chambers *B B'*. Both flames may be caused to draw
15 their oxygen from the air which enters at the ports *L*, and thereby create drafts through the flues *D* and *M*, or the dampers *t* may be opened and the flames in the chamber *B* supplied in that manner. The intense heat of
20 the flames causes the whole mass *F* to become gradually heated to a very high temperature, and the heat having no avenue of escape, owing to the surrounding non-heat-conducting layer *G*, except through the flues pro-
25 vided for maintaining the necessary draft, the interior of the furnace may at the end of several hours be caused to attain a temperature of 3,000° to 3,500° Fahrenheit. The mass *F* of spaced brick, owing to its structure,
30 while rapidly receiving and distributing the heat from the fire-chambers, will not expand, as would a more solid mass, and injure the outer shell *H*. The hot products of combustion from the burning oil in the
35 chamber *B* rise between the spaced brick and escape through the flues *q*, while the hot products of combustion from the chamber *B'* escape through the flue *E*. When the retort has reached a temperature of about 3,000°, the
40 garbage to be destroyed is thrown into it through the chutes *K*, the said chutes being utilized one after another for this purpose to cause the garbage to become more or less evenly distributed throughout the extent of the retort.
45 The intense heat of the retort and surrounding mass causes rapid reduction of the garbage and to a great extent decomposition of the gases and vapors eliminated therefrom. The gases from the retort enter the flues *D* and
50 are carried by the downward draft through the flues *M* to the fire-chamber *B* and by the upward draft into the fire-chamber *B'*, where in each case the undecomposed gases are met by a live flame and are rapidly separated into
55 their elements by the additional heat to which they are thus subjected. The gases which enter the chamber *B'* escape through the flue *E*, while those which are carried down through the flues *M* to the chamber *B* rise through the
60 mass *F* to the outlets *q*.

The burners *I* are regulated to keep the retort and mass of spaced brick constantly at the required temperature.

65 When the ashes of the garbage have accumulated to an extent to make it advisable to clean out the retort, this may be done by opening the doors *s* and inserting long-handled

scrapers, by means of which the ashes may be swept into the chutes *r* and deposited in the ash-pits. 70

With my improved furnace of the size I prefer to employ, garbage in large quantities may be destroyed at a minimum expense of fuel, as substantially all the heat generated is utilized, while, owing to the quantity and intensity of the heat presented to the garbage, which heat the oil-burners may be regulated to replenish as fast as it is absorbed, the noxious gases are raised to a temperature which decomposes them before they travel the pre-
75 scribed distance through the heated mass. A chimney to carry off undecomposed gases is therefore unnecessary, whereby the initial cost of the plant is materially reduced. 80

The fire-chamber *B* and retort *C* constitute, 85 with the circulating-flues *M* and *D*, a furnace in themselves, which, owing to the quantity and intensity of the heat capable of being presented by the surrounding mass of spaced brick, could be employed to decompose the
90 gases eliminated from the garbage without the second fire-chamber *B'*, and would answer its purpose, while not so thoroughly, at least to an extent which would make it highly desirable, being less expensive to construct and
95 operate. While, therefore, I prefer to use the upper chamber *B'*, I do not wish to confine myself to its employment.

What I claim as new, and desire to secure by Letters Patent, is— 100

1. In a garbage-furnace, the combination of a shell formed with material non-conductive of heat, a fire-chamber *B*, and a retort *C* above the fire-chamber, surrounded by a mass of spaced brick, substantially as described, within the shell, and inlet and outlet passages extending from the retort and fire-chamber to the exterior of the furnace, substantially as and for the purpose set forth. 105

2. In a garbage-furnace, the combination of 110 a shell formed with material non-conductive of heat, a fire-chamber *B*, and a retort *C* above the fire-chamber, surrounded by a mass of spaced brick, substantially as described, with-
115 in the shell, one or more passages *M*, connecting the fire-chamber and retort, and one or more flues and chutes extending from the exterior of the furnace to the retort, substantially as set forth.

3. In a garbage-furnace, the combination of 120 a shell formed with material non-conductive of heat, a fire-chamber *B*, and a retort *C* above the fire-chamber, surrounded by a mass of spaced brick, substantially as described, within the shell, a passage *M*, connecting the
125 fire-chamber and retort, a chute *K*, and flue in the furnace-wall provided with a port *L*, the said chute, port, and flue extending from the exterior of the furnace to the retort, a door *s*, affording access to the retort from with-
130 out the furnace, an ash-pit *N*, and a chute *r*, extending from the retort to the ash-pit, substantially as described.

4. In a garbage-furnace, the combination of

a shell formed with material non-conductive of heat, a fire-chamber B, a retort C above the fire-chamber, surrounded by a mass of spaced brick, substantially as described, with-
5 in the shell, a second fire-chamber B', inter-communicating with the retort, and inlet and outlet passages extending from the retort and fire-chambers to the exterior of the furnace, substantially as and for the purposes set forth.
10 5. In a garbage-furnace, the combination of a shell formed with material non-conductive of heat, a retort C, fire-chambers B and B', respectively below and above the retort, pas-
15 sages D and M, affording communication between the fire-chambers and the retort, a mass F of spaced brick, substantially as described,

about the chambers B' C and the chamber B, which opens into the mass F, a flue q, extending through the shell, a chute K in the furnace-wall, provided with a port L, the said 20 chute and port extending from the exterior of the furnace to the retort, a door s, affording access to the retort from without the furnace, an ash-pit N, a chute r, extending from the retort to the ash-pit, and a flue E, extend- 25 ing from the fire-chamber B' to the exterior of the furnace, substantially as described.

BERNARD C. HEAVEY.

In presence of—

J. W. DYRENFORTH,
M. J. BOWERS.