

(No Model.)

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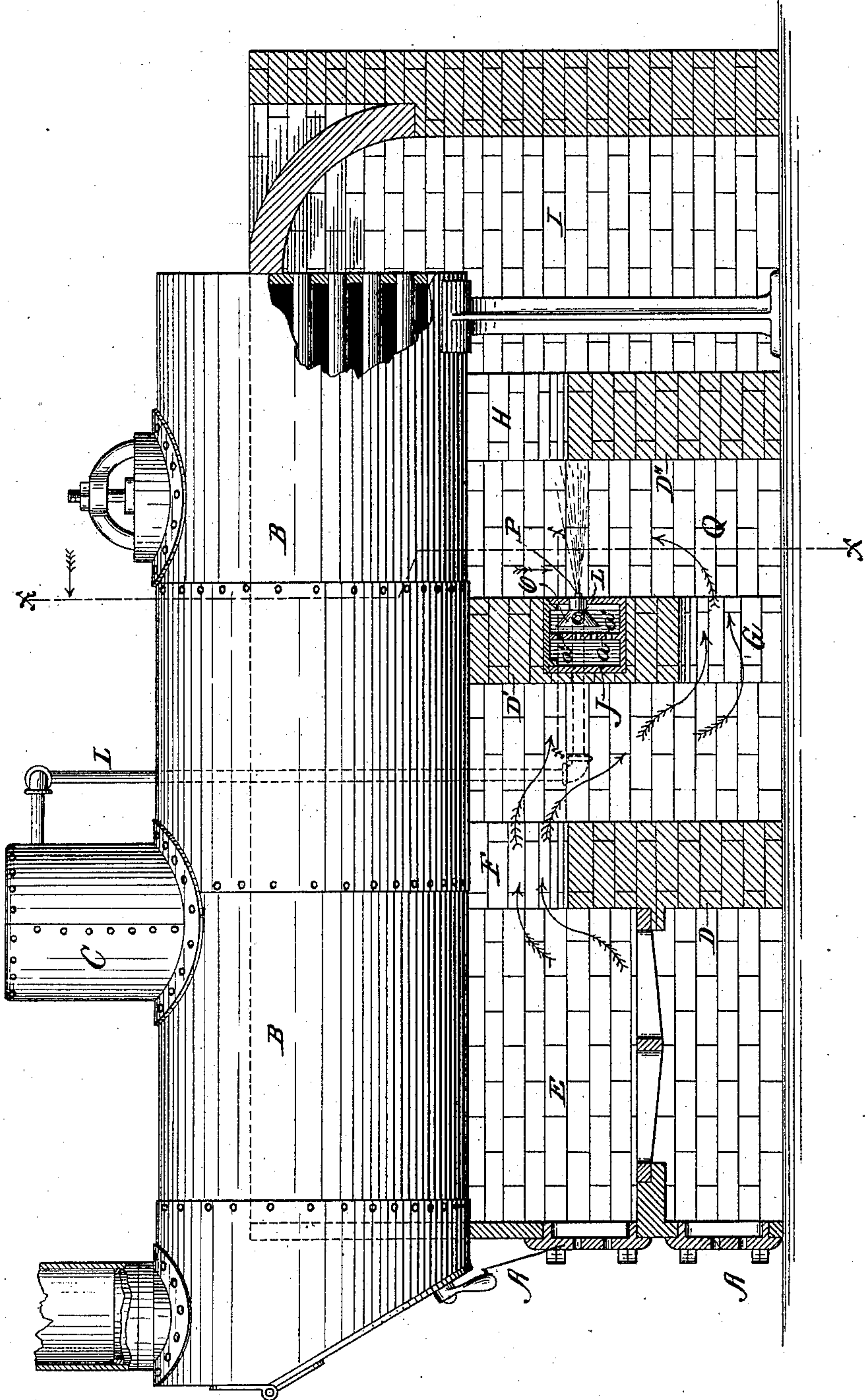
H. M. BRADY.

SMOKE AND GAS CONSUMING FURNACE.

No. 294,007.

Patented Feb. 26, 1884.

*Fig. 1.*



Witnesses,  
*Henry Frankfurter,*  
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Inventor,  
*Henry M. Brady*  
per *Gridley & Co.*  
*his Attorneys.*

(No Model.)

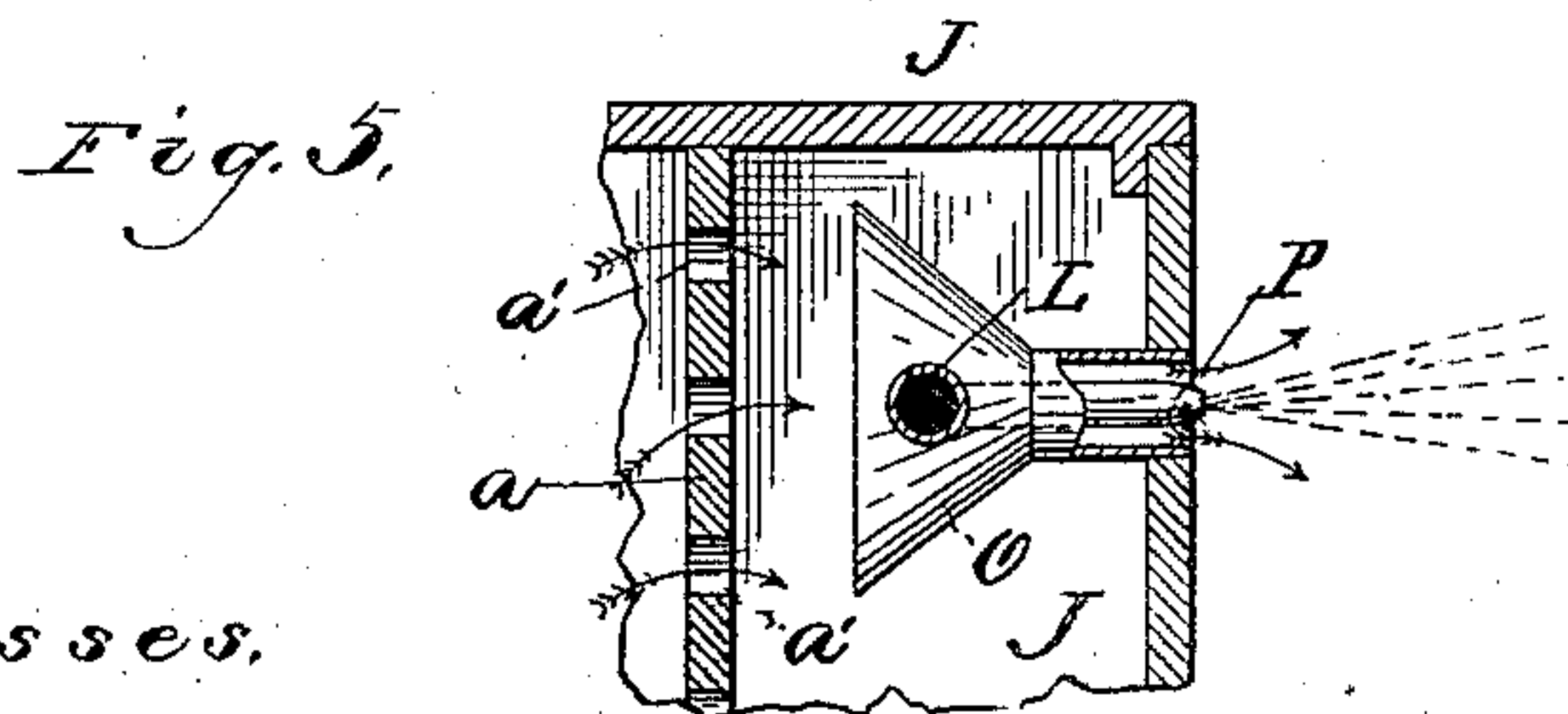
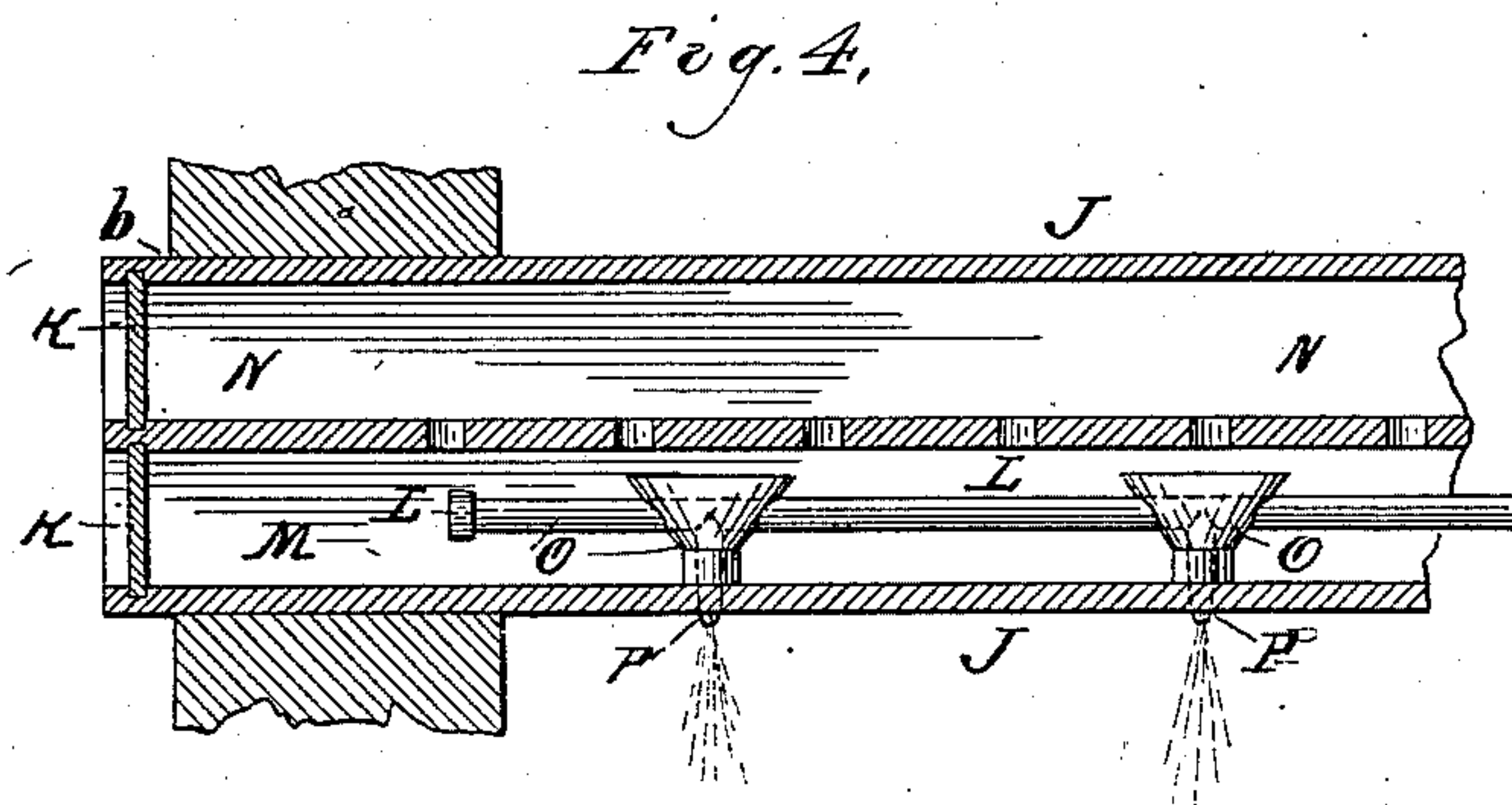
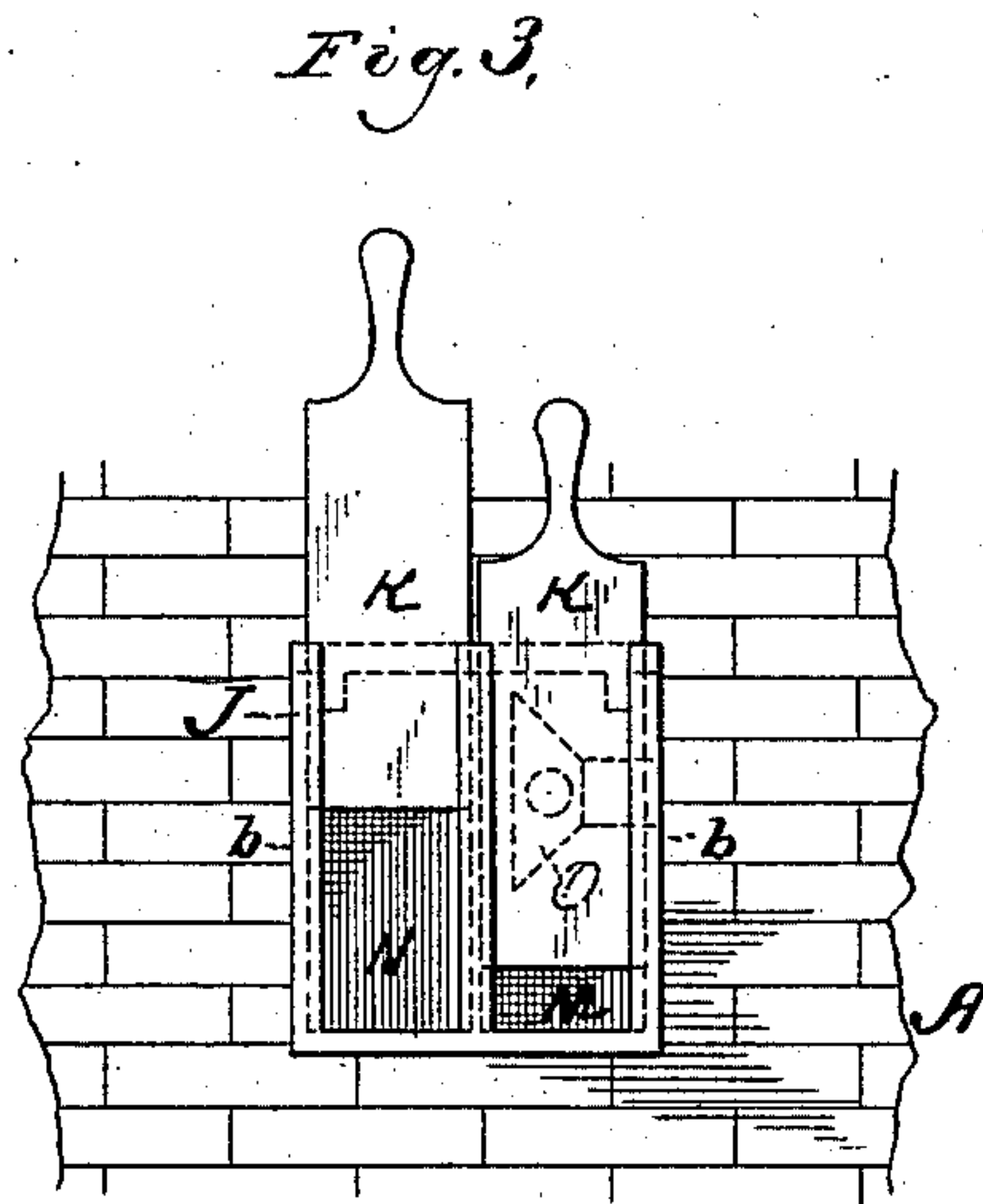
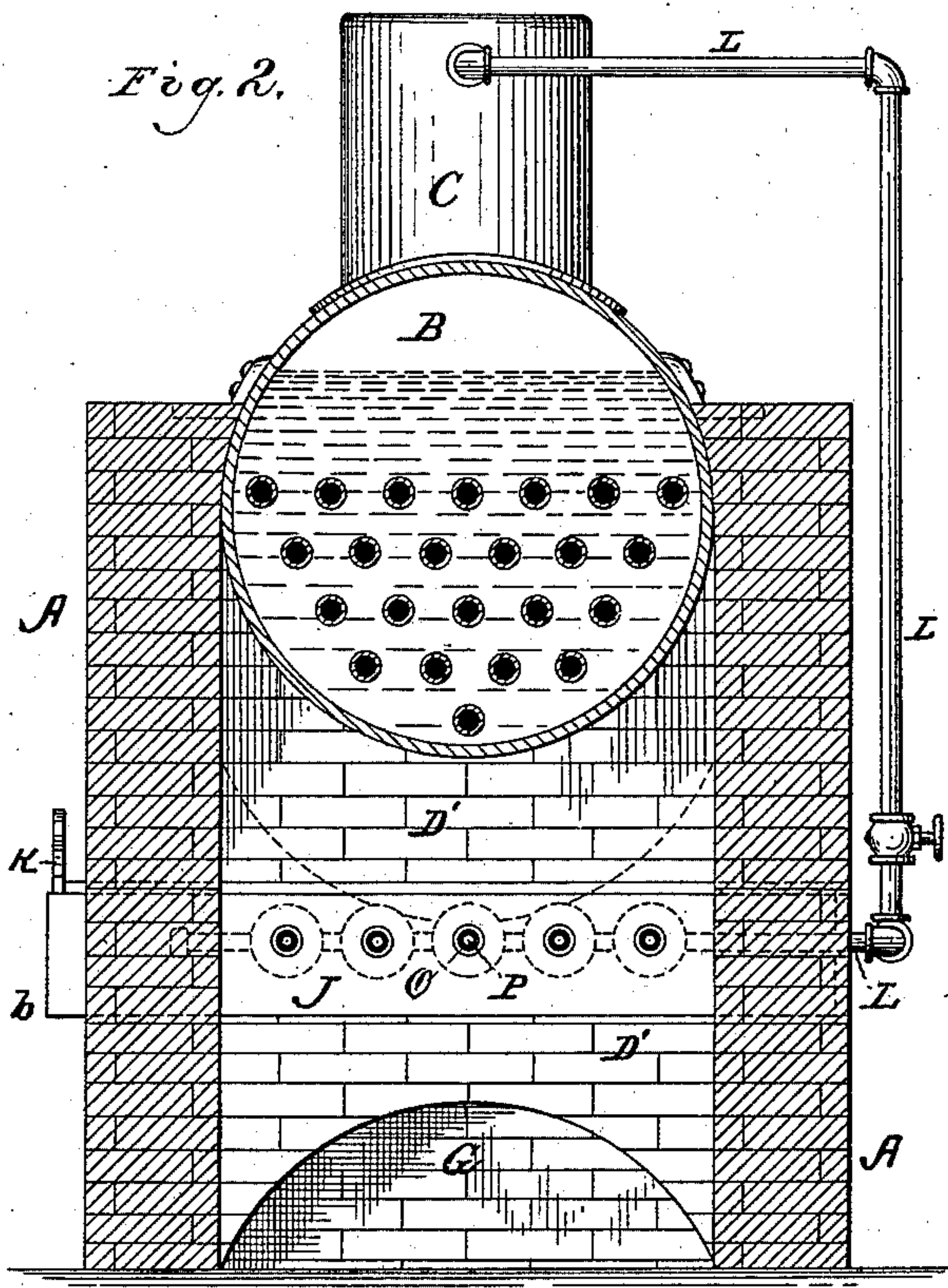
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# UNITED STATES PATENT OFFICE.

HENRY M. BRADY, OF DALTON, ILLINOIS.

## SMOKE AND GAS CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 294,007, dated February 26, 1884.

Application filed November 5, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY M. BRADY, of Dalton, in the county of Cook and State of Illinois, have invented certain new and useful  
5 Improvements in Smoke and Gas Consuming Furnaces, of which the following, in connection with the accompanying drawings, is a specification.

In the drawings, Figure 1 is a longitudinal  
10 vertical central section of a boiler-furnace containing my improvements. Fig. 2 is a section in the plane of the line  $xx$  of Fig. 1, viewed in the direction indicated by the arrows there shown. Fig. 3 is a detail showing the slides  
15 for regulating the entrance for cold air. Fig. 4 is a section in the plane of the line  $x'x'$ , viewed from above; and Fig. 5 is a sectional detail showing the air-funnels.

Like letters of reference indicate like parts.

20 A represents the furnace, and B is the boiler. C is the dome. D, D', and D'' are bridge-walls. E is the fire-box. F is a space or opening over the wall D. G is a like space or arch underneath the wall D', and H is a like space  
25 over the wall D''. I is the hot-air chamber. J is a box, made preferably of cast-iron, and located in the wall D'.  $a$  is a partition dividing the box J into two compartments, and  $a'$   
30  $a'$  are perforations in the said partition. This box extends at one end through one of the side walls of the furnace, as indicated at  $b$  in Figs. 2, 3, and 4, and K K are slides closing  
35 the projecting ends of the said box more or less, as may be desired. L is a steam-pipe passing from the dome into one of the cham-  
40 bers of the box J, and that chamber is thereby heated, and may be termed the "hot-air chamber" of the said box. The other chamber may be termed the "cold-air chamber" of  
45 the said box. These two chambers I have designated by the letters M and N, respectively. In the chamber M are funnels O O, the larger ends or mouths of which are in the said chamber, and the smaller ends of which extend  
50 through the outer side of that chamber, as is indicated in Figs. 1, 4, and 5. The pipe L passes through the funnels O O, and is closed at its inner end. P P are nipples extending from the pipe L outwardly through the fun-  
nels O O.

The furnace is stoked or supplied with coal in the usual manner, and after combustion be-

gins the heat, gases, particles of carbon, and other matter there unconsumed pass over the bridge-wall D, under the bridge-wall D', and  
55 into the chamber Q, between the bridge-wall D' and D''. In the chamber Q the products of combustion referred to meet the horizontal sheet of steam or vapor escaping from the nipples P P, and also meet a blast of air escap-  
60 ing from the funnels O O. The tendency of these steam-jets and of this injection of air is to retard the unconsumed products of combustion in their passage through the furnace, so that they will be exposed longer than oth-  
65 erwise to the action of the heat before escaping. The air also, being supplied at this point, aids combustion by furnishing a new supply of oxygen. The heat, however, passes the  
70 steam-jets and air-blast and escapes over the wall D'' into the chamber I, and passes thence out and through the boiler-flues and smoke-stack and chimney. The result of this tortu-  
ous course of the heat and particles which constitute what is commonly termed "smoke,"  
75 and of the impingement upon these particles of the steam and air, before referred to, causes a much more complete combustion of the said particles than would otherwise occur, and the chimney will be comparatively if not entirely  
80 smokeless. The escape of steam through the nipples P P may be regulated by means of a cock in the pipe L, and the entrance of air may be controlled by means of the slides or doors  
85 K K. It will be perceived that a volume of air will enter the chamber N directly from the outside of the furnace, and pass thence through the perforations  $a' a'$  into the chamber M,  
90 where it becomes heated to a greater or less degree before passing out through the funnels O O. It will also be perceived that a volume of air may be admitted directly into the chamber M through its slide or door K, the said air being inducted by suction.

Having thus described my invention, what I  
95 claim as new, and desire to secure by Letters Patent, is—

1. In a boiler-furnace, the combination of the boiler, the fire-grate, the two bridge-walls with passages thereover, the intermediate  
100 bridge-wall having a passage thereunder, the transverse air-chamber located in the intermediate wall, means for controlling the admission of air into said chamber, and steam-



ejector nozzles located in said chamber, and arranged, as described, to deliver the air in a backward direction.

2. In a boiler-furnace, a bridge-wall provided with a transverse air-chamber divided longitudinally, as described, into two compartments, in combination with means for controlling the admission of air to said compartments independently, a steam-pipe provided with nozzles, and located in the rear compartment, and nozzles O, also located in said compartment and arranged to deliver the air in a backward direction, as described.

3. In a boiler-furnace, a bridge-wall provided with a transverse air-passage divided longitudinally into two communicating compartments, the rear compartment being provided with a steam-pipe and with nozzles, as described, for delivering the air in a backward direction.

4. The combination, in a furnace, of the bridge-wall D, having over it the space or

passage F, and the wall D', having under it the space or passage G, and a steam-injector arranged in an air-supplying chamber, the said injector and air-supplying chamber communicating with the chamber behind the wall D', substantially as and for the purposes set forth.

5. The combination, in a furnace, of the bridge-wall D, having over it the space or passage F, the bridge-wall D', having under it the space or passage G, the bridge-wall D'', having over it the space or passage H, and the box J, located in the wall D', and containing the chambers N and M, with their slides or doors K K, the said chambers being separated by means of a perforated partition, and the chamber M containing the injector L P and the funnels O O, substantially as and for the purposes specified.

HENRY M. BRADY.

Witnesses:

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