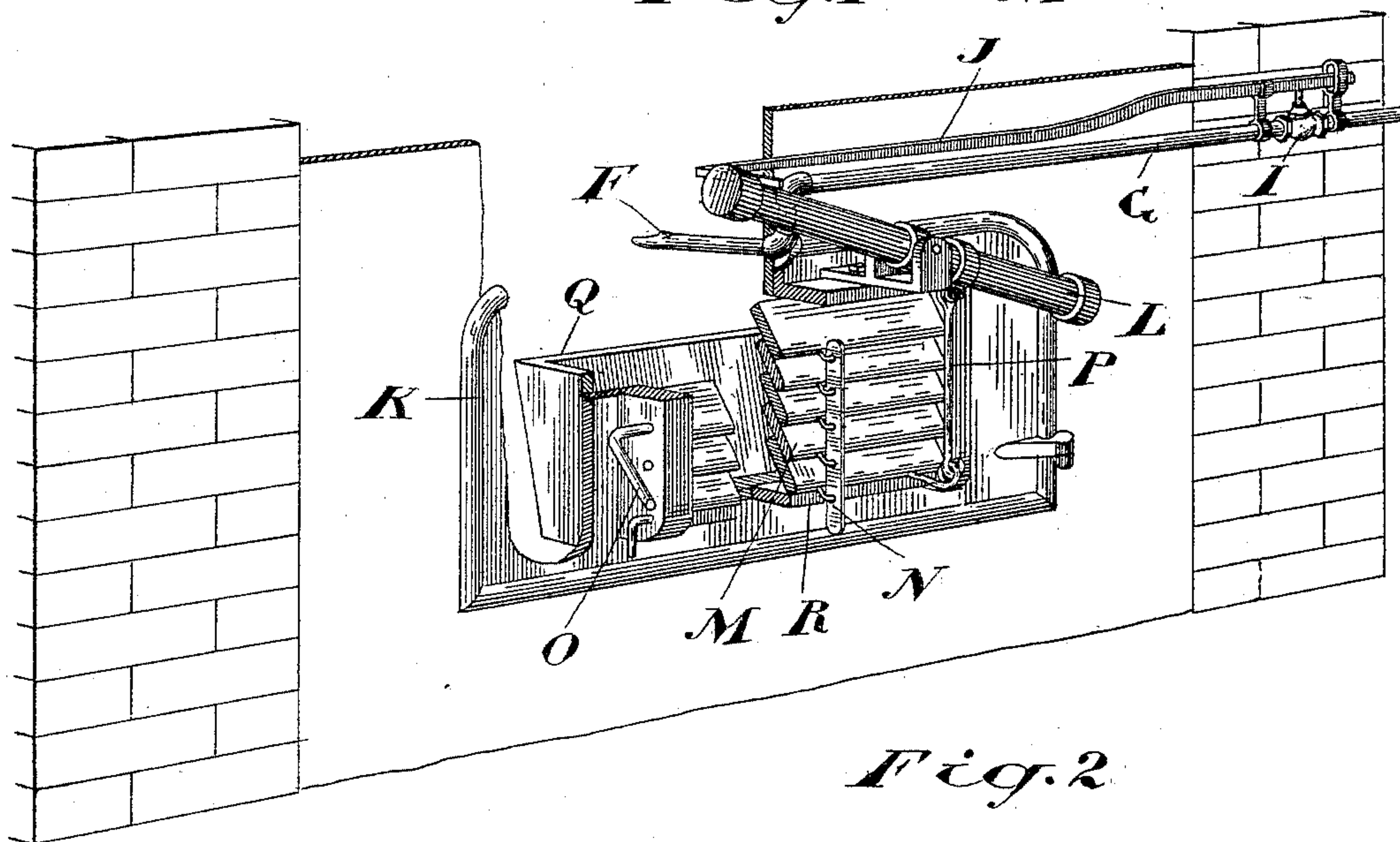
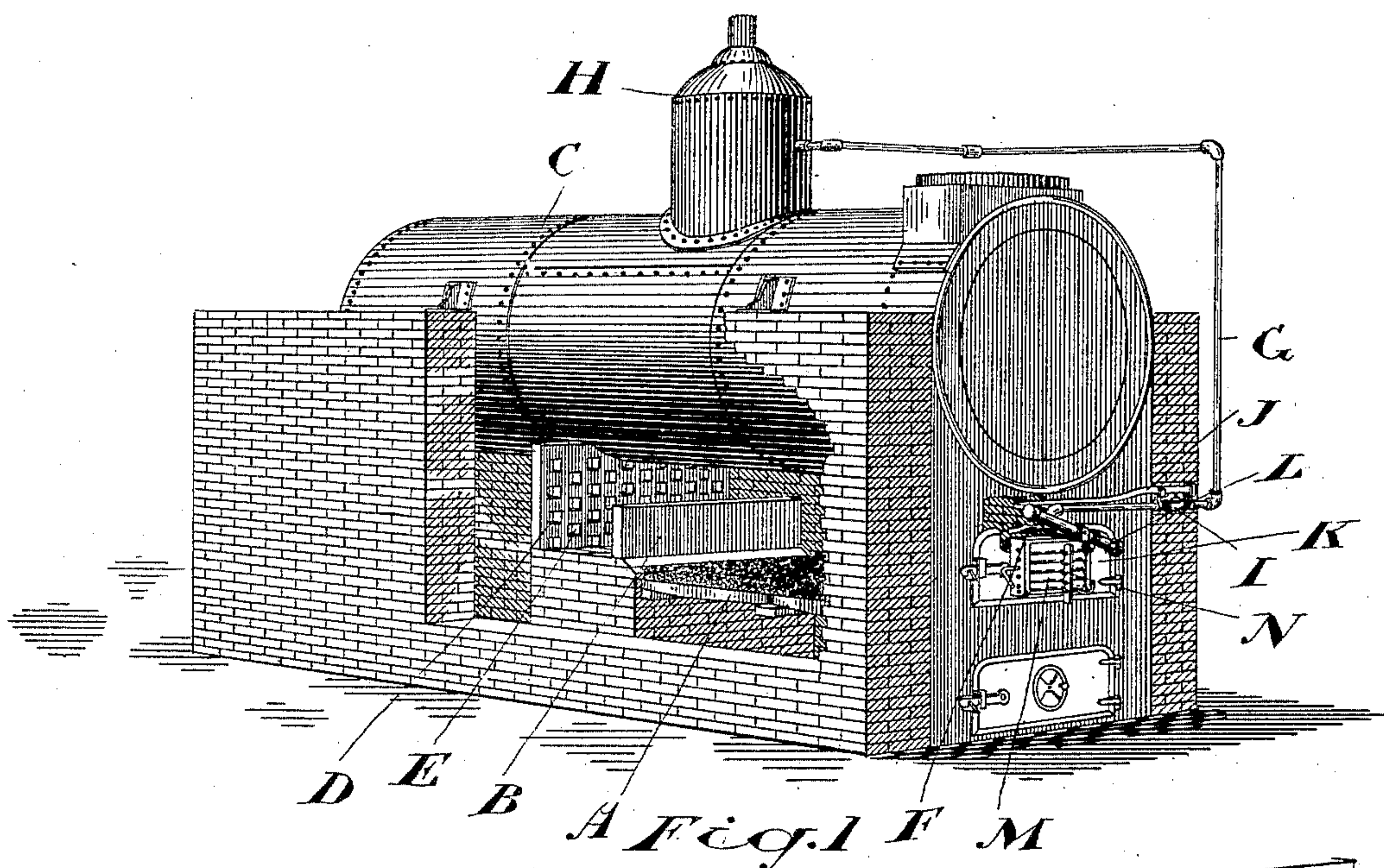


(No Model.)

J. T. ELLIS.  
SMOKE CONSUMER.

No. 491,775.

Patented Feb. 14, 1893.



Witnesses

W. B. Cameron  
John B. Cameron

Inventor:

John T. Ellis.  
by Donald C. Ridout & Co.  
Atty.



# UNITED STATES PATENT OFFICE.

JOHN T. ELLIS, OF TORONTO, CANADA, ASSIGNOR TO JOSEPH RUSE, OF  
SAME PLACE, AND JOHN M. CULLIS, OF BUFFALO, NEW YORK.

## SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 491,775, dated February 14, 1893.

Application filed June 6, 1892. Serial No. 435,680. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN THOMAS ELLIS, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented a certain new and Improved Smoke-Consumer, of which the following is a specification.

The object of the invention is to provide an attachment to a steam boiler by which the smoke shall be effectually consumed before escaping through the smoke stack, and it consists, essentially, in the construction and arrangement of parts hereinafter more particularly explained and then definitely claimed.

Figure 1, is a perspective view of a steam boiler with the brick work partially broken away to expose my improved smoke consumer. Fig. 2, is an enlarged detail of the smoke consumer.

A, represents the grate located in the usual manner and B the ordinary bridge extending as usual to about four or five inches of the boiler C. Immediately behind the bridge B, I place a supplemental bridge D, with a number of holes E, made through it.

F, is a fish-tail shaped mouth formed in the end of the steam pipe G, which extends from the dome H, or from any other suitable point in the boiler.

I, is a valve placed in the pipe G, the normal position of the valve being open.

J, is a pivoted lever, its short end extending over the spindle of the valve I, while its long end extends to the door K, of the furnace. On this door I pivot a tube L, partially filled with quick-silver, oil or some such material, the flow of which can be readily controlled. The door K, has an opening through it protected by a series of shutters M, connected together as indicated by the bar N, and provided with a crank-handle O. The pivoted tube L, is connected to one of the shutters M, by the rod P.

In order to open the door, the crank handle O, is seized and drawn upon, which action opens the shutters and at the same time the rod P, raises the lower end of the tube L, carrying the opposite end of the said tube away from the long end of the lever J, which immediately falls so as to carry its opposite end away from the stem of the valve I, which opens

instantly and allows the steam to pass through the fish-tail shaped mouth of the pipe G, which is set at such an angle as to throw the stream of steam down toward the bridge B.

When the fuel is thrown in on the grates A, a very heavy smoke is instantly created, which smoke is so great that it cannot escape through the holes E, in the bridge D, but is by the said bridge thrown back and met by the steam from the fish-tail shaped mouth F, which creates a sort of eddy and supplies a sufficient quantity of oxygen and hydrogen to produce the necessary combustion to consume the smoke. When sufficient fuel has been placed upon the fire, the door K, is closed and as the combined weight of the bar N, crank-handle O and rod P, are sufficient to commence the closing of the shutters M, the said shutters commence to close as soon as the door is shut and as their closing tilts the tube L, on its pivot, the quick-silver or other material contained in the said tube, will gradually flow to the opposite end of the tube, thus effectually closing the shutters and at the same time tilts the tube L, so that it will come in contact with the lever J, raising the said lever so as cause its other end to close the valve I. In this way the supply of steam is cut off simultaneously with the cutting off of the extra supply of air.

On reference to Fig. 2, it will be observed that a fender Q, is formed on the inside back of the door K, immediately facing the shutters M, where this fender forms a space into which the cold air enters before it reaches the furnace, as it cannot escape therein until it reaches the top of the fender where it enters with the steam from the fish-tail shaped mouth F, thereby entering the furnace in a heated condition and supplying at the proper position the oxygen necessary to produce combustion of the smoke. It will be noticed that these shutters, when opened, or partially opened, will direct the currents of air in thin sheets against the fender Q, in which condition it is more readily heated and is therefore more quickly in condition to act with the steam on the smoke. The supplemental bridge B, is made of brick and the holes E, are made sufficiently large to prevent any stoppage of the ordinary draft. As it is in direct contact with



the fire, it soon becomes heated to a very high degree and thereby intensifies the combustion of all particles of carbon which might otherwise escape through the smoke flue. After  
5 sufficient fuel has been placed in the furnace and the tube has tilted so as to close the shutters M, the door remains closed until the next supply of fuel is to be entered, but in order to be in a position to supply the small quantity of fresh air into the furnace, I make the  
10 bottom shutter R, independent of the other shutters, providing it with means by which it may be independently opened as indicated, the air thus admitted being heated by coming in contact with the heated fender Q.  
15

What I claim as my invention is:—

1. A furnace door, having an opening through it protected by an inwardly projecting fender and provided with a series of hinged  
20 shutters; substantially as and for the purpose specified.

2. A furnace door having an opening through it, protected by an inwardly projecting fender and provided with a series of hinged  
25 shutters, attached together and connected to

a pivoted tube partially filled with quick-silver or some material which will move in the tube; substantially as and for the purpose specified.

3. A steam pipe extending into a furnace, a valve controlling the passage of steam in said pipe and a lever controlling the movement of said valve in combination with a pivoted tube acting directly on said lever, substantially as described. 30

4. A steam pipe extending into a furnace, a valve controlling the passage of steam in said pipe and a lever controlling the movement of said valve, in combination with a pivoted tube supporting one end of said pivoted lever, an opening in the wall of the furnace, a series of shutters for controlling the admission of air through said opening, and a connection between said pivoted tube and the shutters, substantially as described. 35 40

Toronto, May 27, 1892.

JOHN T. ELLIS.

In presence of—

A. M. NEFF,

J. EDW. MAYBEE.