(No Model.)

W. J. CHUBB.

APPARATUS THROUGH WHICH AIR IS SUPPLIED TO FURNACES OF STEAM BOILERS.

No. 448,178. Patented Mar. 10, 1891.

FIG. 2.

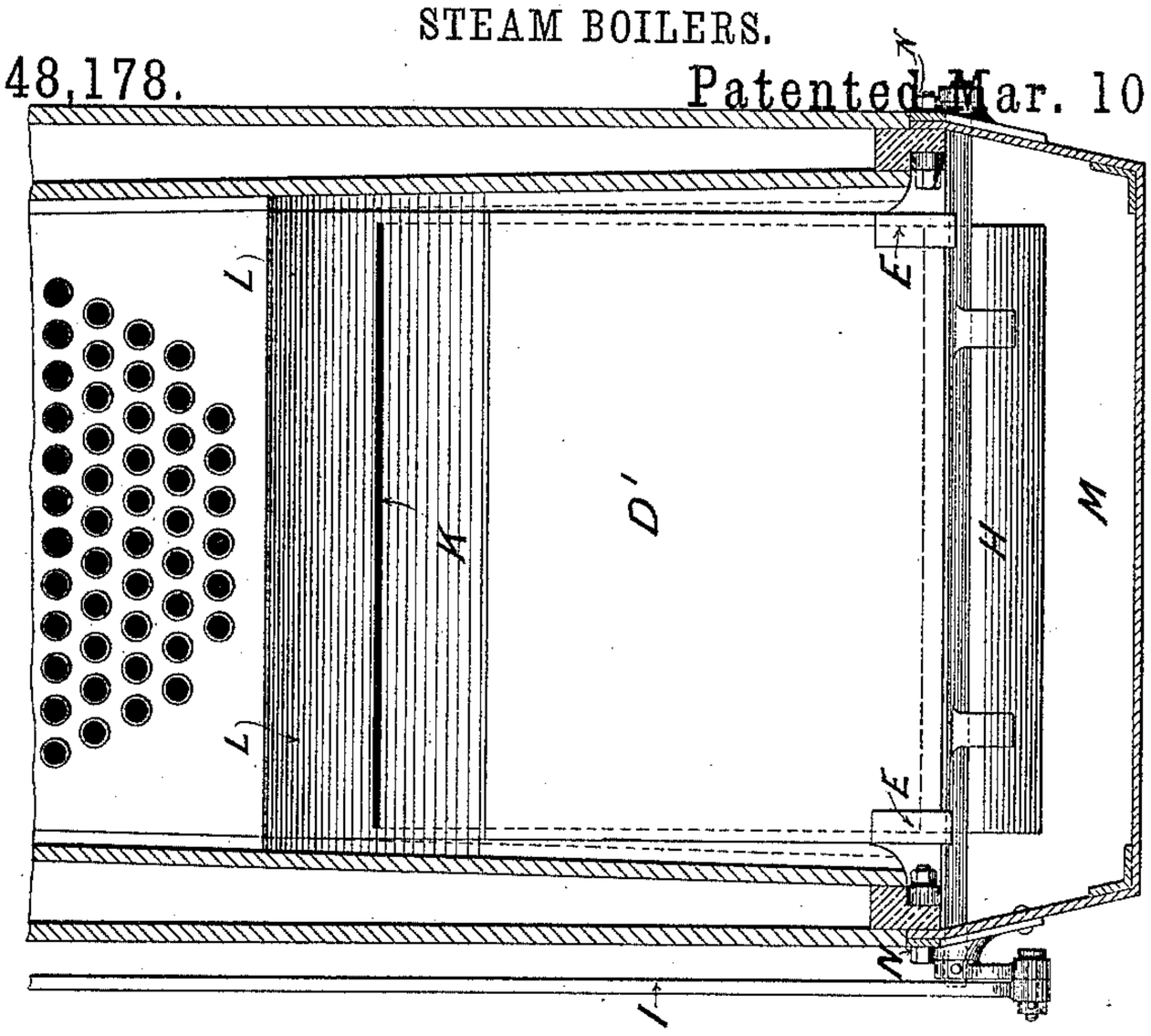
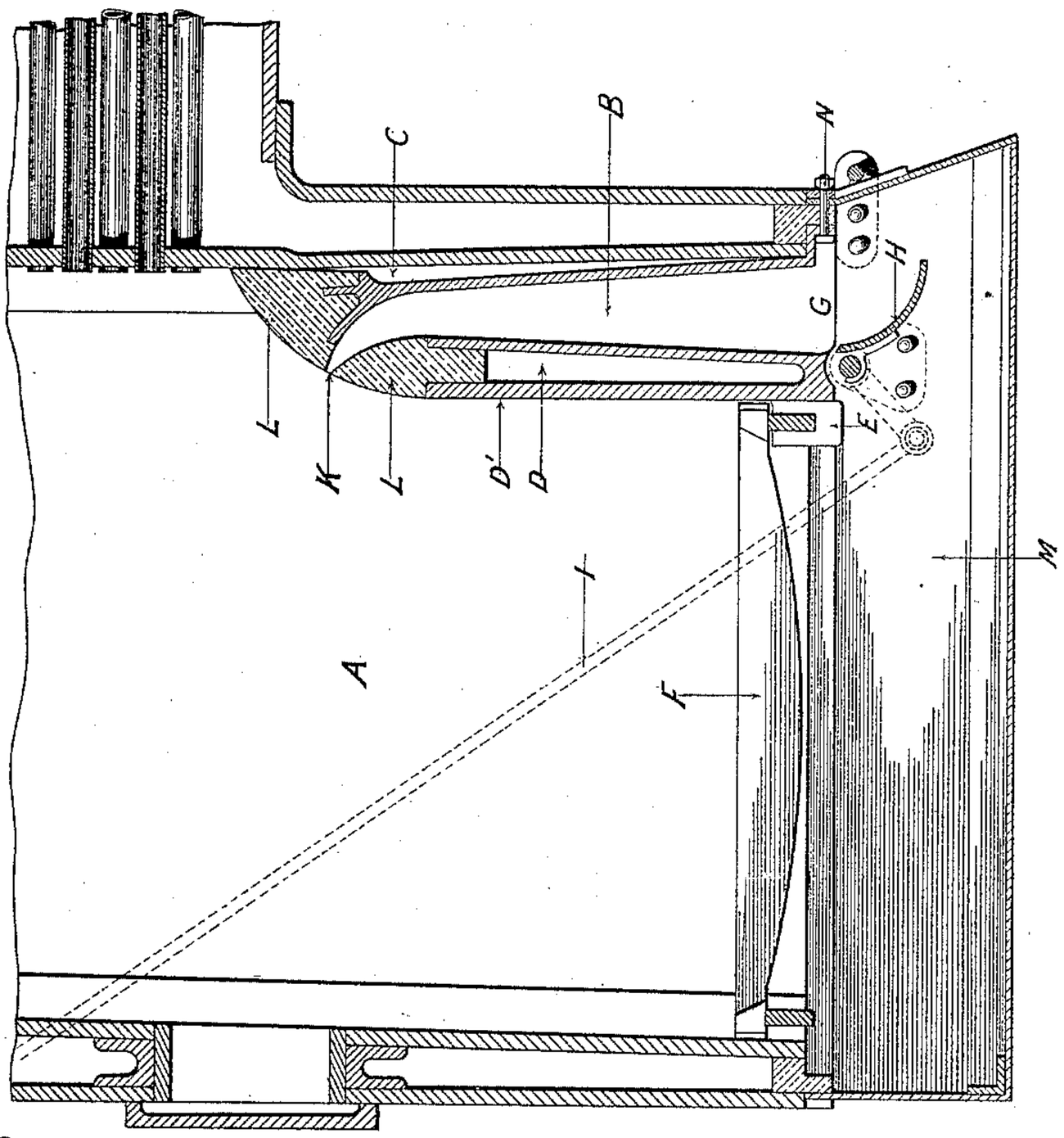


FIG. 1.



WITNESSES.
George Baumann
John Revell

INVENTOR.
William James Chubb.
By his Attorneys
Howson and Howson

UNITED STATES PATENT OFFICE.

WILLIAM JAMES CHUBB, OF LONDON, ENGLAND, ASSIGNOR TO THE VULCAN PATENT SMOKE CONSUMER AND FUEL ECONOMIZER CORPORATION, LIMITED, OF SAME PLACE.

APPARATUS THROUGH WHICH AIR IS SUPPLIED TO FURNACES OF STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 448,178, dated March 10, 1891.

Application filed June 30, 1890. Serial No. 357,288. (No model.) Patented in England May 16, 1884, No. 7,782; in France August 22, 1884, No. 163,891; in Belgium February 15, 1888, No. 80,661; in Cape of Good Hope March 3, 1888, No. 6, and in Austria-Hungary May 9, 1888, No. 6,999 and No. 17,413.

To all whom it may concern:

Be it known that I, WILLIAM JAMES CHUBB, a subject of the Queen of Great Britain and Ireland, and a resident of London, in England, have invented certain Improvements in Apparatus Through which Air is Supplied to the Furnaces of Steam-Boilers, (for which I have obtained a British patent, No. 7,782, dated May 16, 1884; a French patent, No. 163,891, dated August 22, 1884; a Belgian patent, No. 80,661, dated February 15, 1888; a Cape of Good Hope patent, No. 6, dated March 3, 1888, and Austro-Hungarian patents, No. 6,999 and No. 17,413, dated May 9, 1888,) of which the following is a specification.

My invention relates to apparatus for effecting in the furnaces of steam-boilers a more perfect combustion of the fuel and of the gases arising therefrom, thereby economizing the consumption of fuel and preventing the formation of smoke.

This apparatus consists of a tuyere or funnel-shaped passage, which may extend entirely across the fire-box or furnace-chamber, and air is drawn into the tuyere from below the fire-bars and discharged through one or more narrow mouths in such wise as to mingle with the unconsumed gases and smoke that are making their escape from the furnace, whereby the desired more perfect combustion is effected. As hitherto constructed, the apparatus, and especially the delivery mouth or mouths thereof, has very speedily been so damaged by the heat of the furnace as to become useless, and either the whole apparatus must be renewed or the delivery mouth or mouths thereof must be recreated and reformed.

Now the object of this my invention is so to construct and fit the apparatus that it shall not be so liable to be damaged and rendered useless by the heat of the furnace, while any renewal or repair that may be required can easily, quickly, and cheaply be effected, and I carry out this object by forming that part of the apparatus, especially the delivery mouth or mouths thereof, on which the heat of the furnace will chiefly play of fire-brick or other similar and suitable material, while the metal part of the apparatus is so formed as properly to carry this fire-brick or material on the one hand, and on the other hand as easily to be secured to the walls of the fire-box or furnace-chamber, or otherwise to be placed in position.

In the accompanying drawings I have shown my improved apparatus as applied to and in the fire-box or furnace-chamber of a locomotive-boiler.

Figure 1 is a longitudinal vertical section of the lower part of the fire-box of the boiler; and Fig. 2 is a transverse vertical section of the same with the fire-bars removed, showing a front elevation of my apparatus.

In the front end of the fire-box A, I fit a tuyere B, which preferably extends entirely across the fire-box and is made of metal. One side of the tuyere is formed in the shape of a bent plate C, and the other side forms a mid-feather D, on which lugs E may be fitted to support the fire-bars F. This tuyere B is secured to the lower parts of the walls of the fire-box A in any convenient manner, and to the lower and preferably larger entrance-mouth G thereof, which is on a level with the bottoms of the fire-bars F, or thereabout, may be fitted the hinged plate H, actuated by the lever and rod I to regulate the admission of the air. The metal parts of the tuyere B, or that is to say the plate C and the mid-feather D, are so formed—it may be, as shown in Fig. 1—that one or more blocks L, of fire-brick, fire-clay, or other similar and suitable material of the required shape, can be held and secured in suitable seatings made therefor in such wise that in or by the one or more blocks L is or are created the one or more delivery-mouths K, which may be horizontal, as shown in Fig. 2, or may be bent or curved upward or downward, as may be desired, and the front web D′ of the mid-feather D may also be faced with fire-brick or other material, if necessary, or may be entirely removed and replaced by the fire-brick or material. Thus in this apparatus part of the air entering the front of the ash-pan M is

caught by the plate H, and passing through the mouth G is forced along the tuyere B, thence issuing through the mouth or mouths K, and, mixing with the unconsumed gases and smoke arising from the fuel in the fire-box, insures a more perfect combustion, while, as the intense heat of the furnace does not play upon the metal, but on the fire-brick or similar material, the delivery mouth or mouths of the tuyere will not be blocked up or closed, though when any renewal or repair is required it can easily, quickly, and cheaply be effected. When, as is perhaps most convenient, the metal part of this tuyere is made in one piece, it can be secured in position by the bolts N. Again, when the front web D′ of the mid-feather D is removed and replaced by the fire-brick or material it is very convenient to make a number of holes in the other web of the mid-feather to allow the heat of the fire-brick or material freely to pass into the tuyere B and highly heat the air passing therethrough. Again, the mid-feather D may be made entirely of the fire-brick or other material aforesaid and no metal at all be used therein, excepting, perhaps, if necessary or desirable, a transverse bar or stretcher below the level of the fire-bars to support the same. Again, when there are two or more delivery-mouths K they may be arranged at different levels, or may be formed to cause the streams of air issuing therefrom to traverse the fire-box in different directions and at different angles. Again, when the locomotive is intended to travel with either end foremost instead of the hinged plate H a sliding plate may be fitted.

In marine and other boilers I can, if and when required, employ fans or other usual appliances to force a strong draft through the tuyere.

This apparatus, it is evident, can be used in and with all such boilers as have a square, or rectilinear or a high fire-box or furnace-chamber, and in all cases is placed in such proper position in relation thereto as to cause or allow the stream or streams of air that has or have passed through the tuyere to mingle with the unconsumed gases and smoke arising from the furnace, and it may be secured in such position in any usual or other manner, as may be desired in each case.

I claim as my invention and desire to secure by Letters Patent—

1. In a tuyere or apparatus through which air is supplied to the furnace of a steam-boiler, the combination of the plate C and mid-feather D, of metal, with the block or blocks L, of fire-brick or other similar material, fitted to the upper ends of the said plate and mid-feather, substantially as and for the purpose specified.

2. In a tuyere or apparatus through which air is supplied to the furnace of a steam-boiler, the combination of the plate C, of metal, with the mid-feather D and block or blocks L, of fire-brick or other similar material, fitted to the upper ends of the said plate and mid-feather, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM JAMES CHUBB.

Witnesses:

JAS. HART,

JOSEPH E. MOORES.