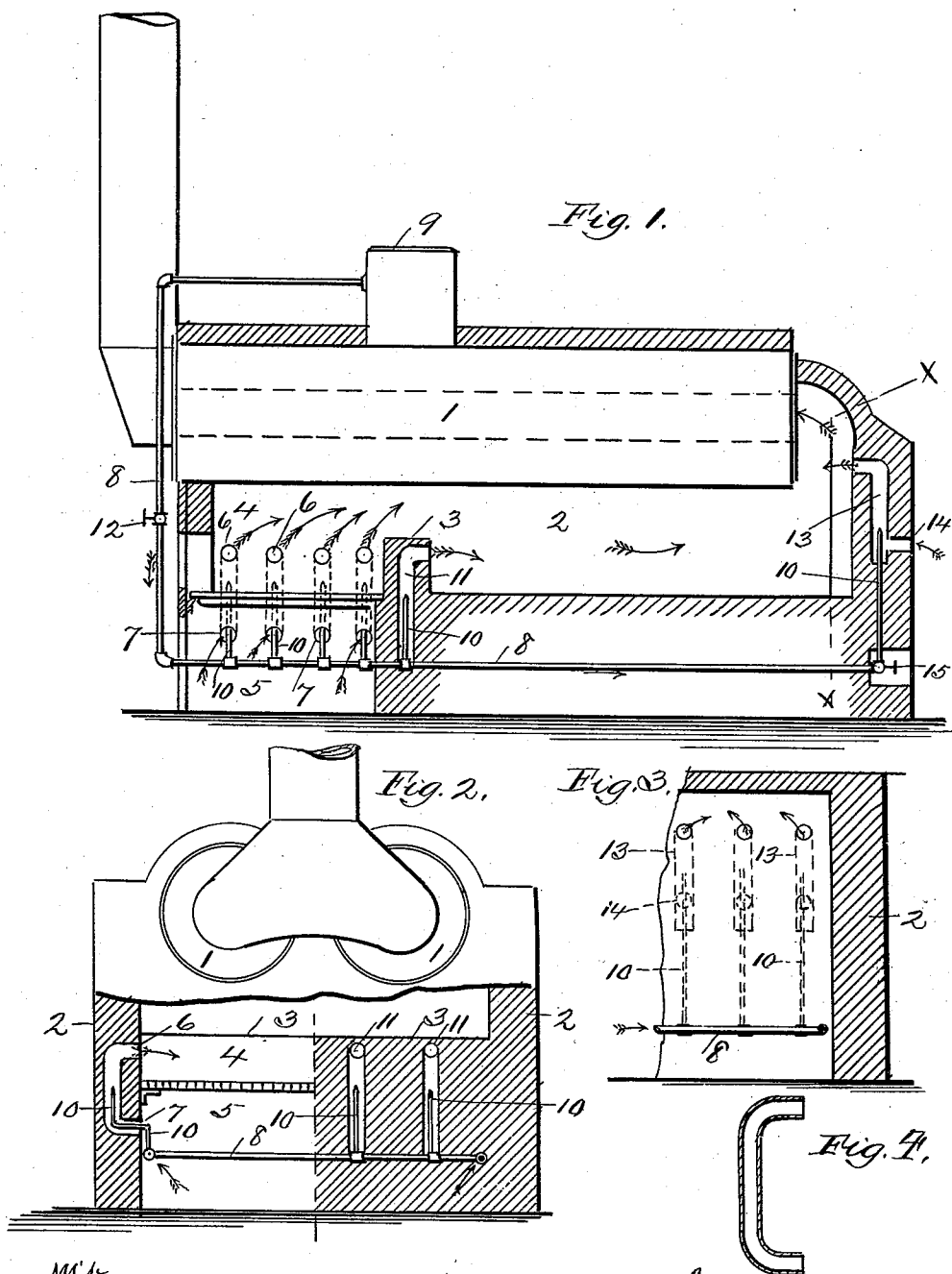


(No Model.)

J. A. CRAWFORD.
SMOKE CONSUMER.

No. 540,780.

Patented June 11, 1895.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN A. CRAWFORD, OF PITTSBURG, PENNSYLVANIA.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 540,780, dated June 11, 1895.

Application filed May 19, 1894. Serial No. 511,783. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. CRAWFORD, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Smoke-Consumers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improvement in smoke consumers and means for aiding combustion in furnaces, and it consists in certain details of construction, and combination of parts as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a side sectional elevation of a boiler-furnace provided with my improved smoke-consumer and device for aiding combustion, which is constructed and arranged in accordance with my invention. Fig. 2 is a sectional end elevation of the same, a part of said section being taken through the grate-bars and the other portion through the bridge-wall of the furnace. Fig. 3 is a sectional elevation taken on the line *xx* of Fig. 1. Fig. 4 is a sectional side elevation of a modified form of the flues for conveying air and steam to burn the smoke and aid combustion in the furnace.

To put my invention into practice with a boiler furnace of ordinary construction, consisting of the boiler 1, the combustion chamber 4, the bridge wall 3, and boiler setting 2, and other well known features common to this class of furnaces, I arrange in the side walls 2 at each side of the fire chamber 4 a series of flues or pipes, each of which is open to the ash pit 5, and to the fire chamber 4 above. These flues I prefer to form of cast metal as shown at Fig. 4 on the drawings and build the same in the walls of the furnace in a manner that the one end 6 will open into the said fire chamber and the other end 7 into the ash pit 5.

Leading from the steam dome 9 of the boiler 1 is a pipe 8 fitted with a suitable valve 12, which enters into the ash pit 5 and is fitted with a number of branches 10 entering the opening 7 of the air flues to form steam jets. These steam jets 10 will serve to siphon the

air from the ash pit and discharge the same into the fire chamber 4, and thereby give the unconsumed gases a fresh supply of oxygen to aid in the combustion.

Arranged in the bridge wall 3 of the furnace is another series of flues or pipes 11, each of which is provided with a steam jet 10 leading from the pipe 8, or from an independent pipe connected to the steam dome 9. These flues 11 will discharge a small quantity of steam at the rear of the bridge wall 3, and further aid the combustion of the gases.

At the rear wall of the boiler setting are another series of flues, (see Figs. 1 and 3) in which are steam jets 10 leading from the supply pipe 8. These flues 13 are provided with an opening 14 leading to the atmosphere which may be closed by means of a sliding door (not shown), and the said flues used for the purpose of supplying air, steam, or a mixture of air and steam to the unconsumed gases at the rear of the boiler.

By thus supplying air, steam, or air and steam combined at various points beneath the boiler 1, the unconsumed gases arising from the combustion of the fuel in the fire chamber is constantly supplied with fresh oxygen, and any smoke, heated gases and other products of combustion are consumed before passing into the smoke stack.

By careful manipulation of the valve 15 of the steam pipe 8 at the rear of the setting the operator may supply air, steam, or a combination of air and steam at the rear entrance of the flues of the boiler, and thereby consume any smoke or unconsumed gases from the fire chamber 4.

This device constructed as described not only consumes the smoke but aids combustion, and thereby saves the fuel as in the boiler setting described the fuel is burning the entire length of the boiler, making the rear end about the same temperature as the front.

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

In a steam generator furnace, the smoke consumer consisting of the series of flues in one side of the combustion chamber, with their ends communicating with the ash-pit and combustion chambers, respectively, the bridge-wall having flues with their upper ends

opening into the flame chamber, just in rear
of the combustion chamber, and flues in the
rear wall of the boiler setting, opening into
the flame chamber and communicating with
5 the external air, and the steam pipe connect-
ing with the steam boiler dome and having
series of branches arranged in said flues, sub-
stantially as set forth.

In testimony that I claim the foregoing I
hereunto affix my signature this 24th day of 10
April, A. D. 1894.

JOHN A. CRAWFORD. [L. S.]

In presence of—

JAS. J. MCAFEE,

ALBERT J. WALKER.