

(No Model.)

W. LAWRENCE.
SMOKE PREVENTER.

2 Sheets—Sheet 1.

No. 502,496.

Patented Aug. 1, 1893.

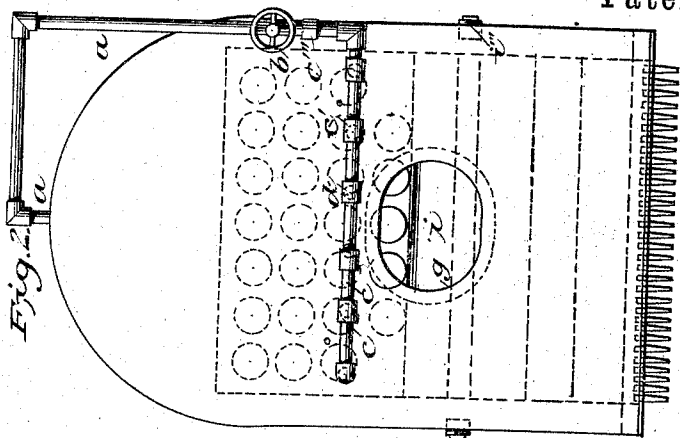


Fig. 2

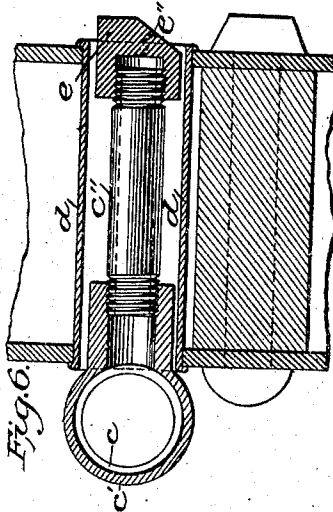


Fig. 6

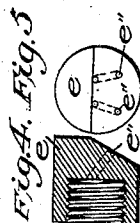


Fig. 4. Fig. 5

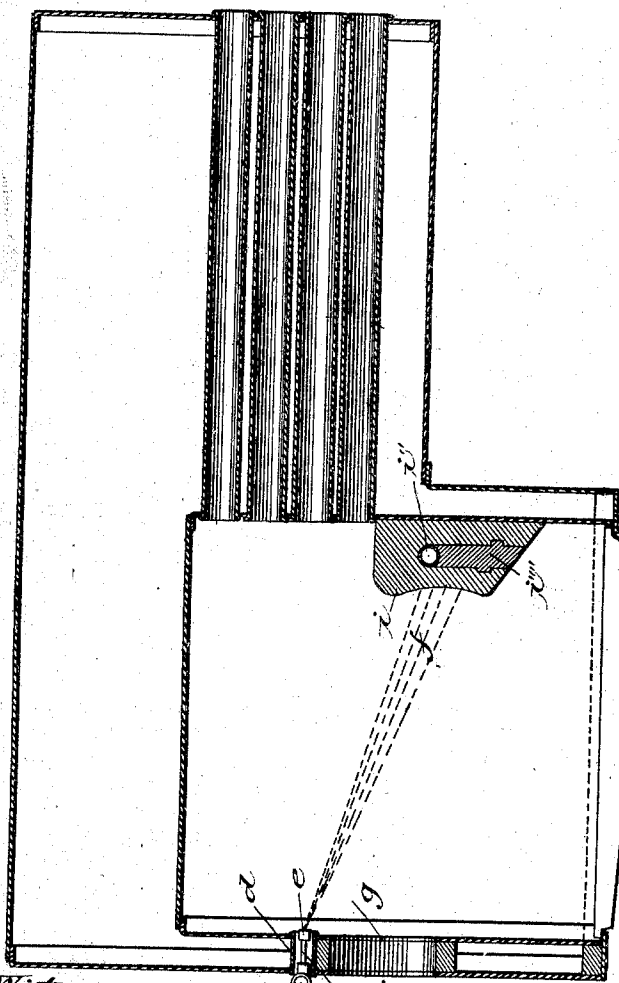


Fig. 7

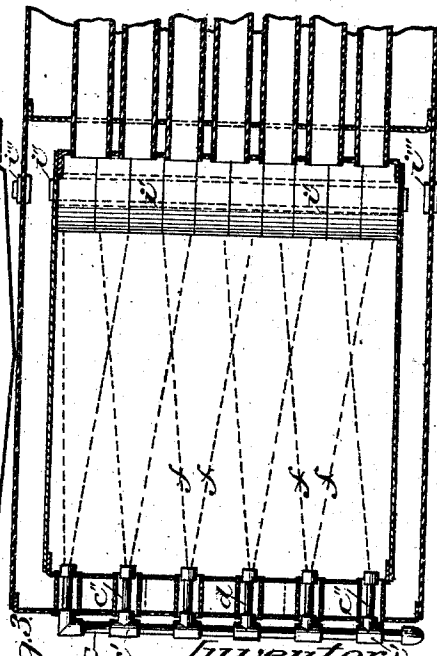


Fig. 3

Witnesses,
Nicolas E. Weidant.
Anthony W. Smith.

Inventor.
William Lawrence

(No Model.)

W. LAWRENCE.
SMOKE PREVENTER.

2 Sheets—Sheet 2.

No. 502,496.

Patented Aug. 1, 1893.

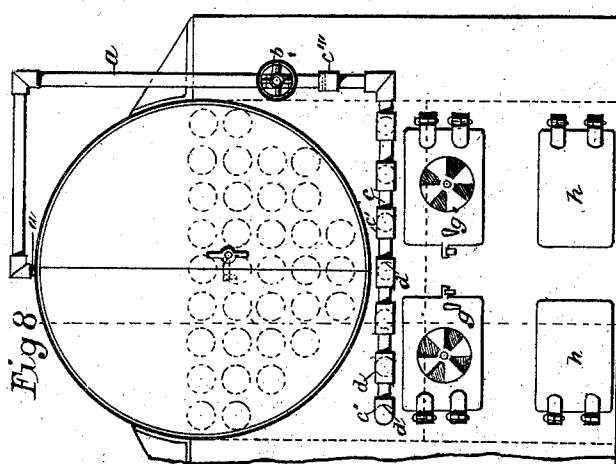
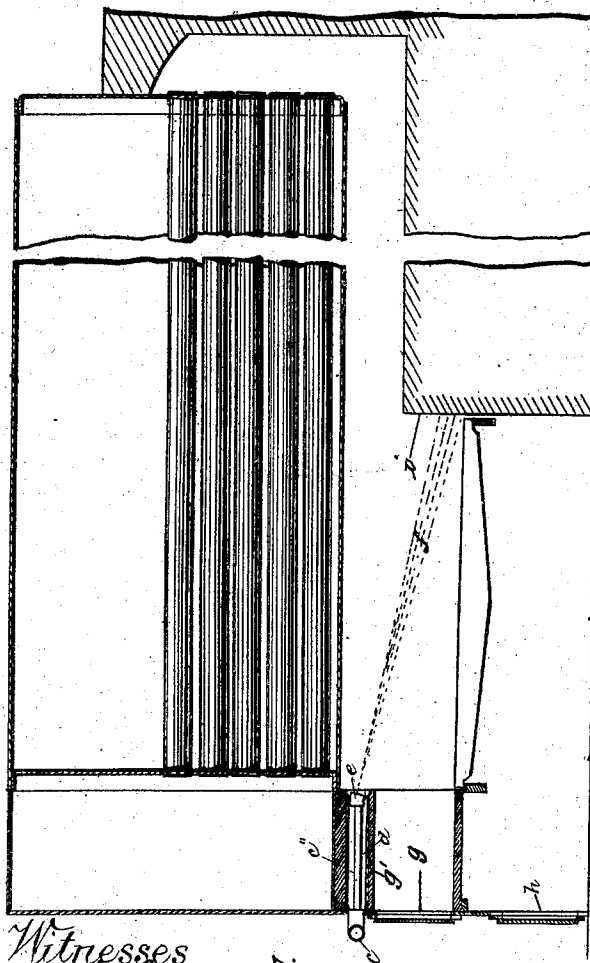


Fig. 8



Witnesses
H. J. Fleming
E. F. Ligare

Fig. 7.

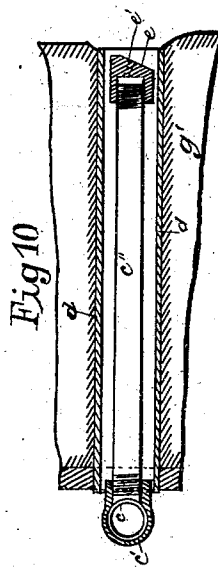


Fig. 10

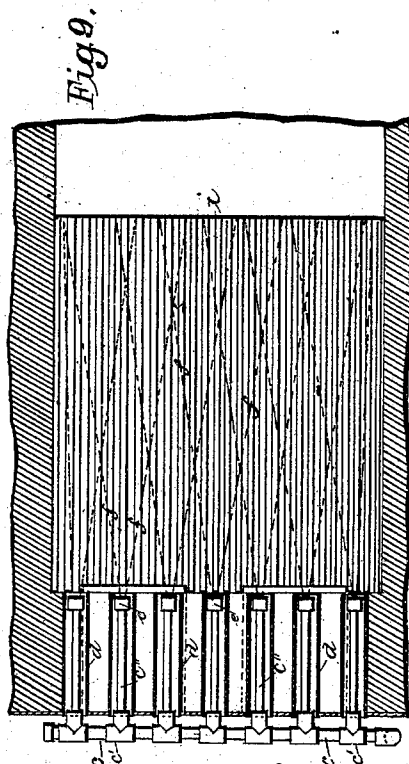


Fig. 9.

Inventor
William Lawrence

UNITED STATES PATENT OFFICE.

WILLIAM LAWRENCE, OF CHICAGO, ILLINOIS.

SMOKE-PREVENTER.

SPECIFICATION forming part of Letters Patent No. 502,496, dated August 1, 1893.

Application filed October 27, 1892. Serial No. 450,179. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LAWRENCE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented a new and useful Smoke-Preventer, of which the following is a specification.

My invention relates to improvements in that class of smoke preventers in which steam is admitted in jets over the fuel bed of a furnace, and the objects of my improvement are, first, to admit the jets and direct their action in such a way as to produce a maximum mixing action over the whole bed of fuel, which causes a rapid admixture of admitted air, and gases of the fuel, and a consequent thorough combustion, thus preventing to a great extent the formation of smoke, second, to so arrange the parts of the apparatus that it can be readily removed for inspection or cleaning at all times. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section showing the device placed in a boiler of the firebox type. Fig. 2 is an end elevation of the same; Fig. 3 a horizontal section of the same; Fig. 4 a section of the nozzle of branch pipes, and Fig. 5, an end view of the same showing arrangement of the steam orifices. Fig. 6 is a longitudinal section of branch pipe and nozzle. Fig. 7 (Sheet No. 2) is a longitudinal section of an externally fired boiler with the device attached. Fig. 8 is an end elevation of the same. Fig. 9 is a horizontal section of the same. Fig. 10 is a longitudinal section of a branch pipe and nozzle applied to said type of boiler.

Similar letters refer to similar parts throughout the different views.

The device consists of a steam pipe (a) connected to steam space of boiler, a distributing pipe (c, c'), branch pipes (c''), the steam nozzles (e), each having two or more holes e'' of small diameter drilled therein in such manner that the axes of said holes are divergent and at the same time inclined downward so that these axes intersect each other and impinge on the bridge wall above inner ends of the grate bars. In the case of a firebox boiler Figs. 1—2 and 3, I hang a firebrick protector (i') so that the blast of the jets cannot injure the boiler plates. The firebrick (i') are supported by one or more water tubes (i'')

extending across the firebox and attached to the plate of water legs at each end; the sleeves (d) secured to the plates of water leg above the firedoor (g) give access to the branch pipes (c); in Figs. 7—8 and 9 (Sheet No. 2), the branch pipes are protected by the inclosing tubes of metal or other suitable material which are embedded in the lining above the firedoors (g). The jets of steam (f) issuing from the orifices (e'') in the nozzles (e) acting on the air admitted through the doors (g) and the hydrocarbon and other products from the fuel bed, produce a violent mixing action owing to the contrary impulses of said jets and the resulting effect is an active combustion of these gases and the free carbon thus, to a great extent, preventing smoke.

In order to remove the device at any time, I connect the distributing pipe (c) and the steam pipe (a) by means of a union or coupling (c''') which, when unscrewed, permits the distributing pipe c and its branch pipes and nozzles (c'' and e) to be withdrawn through the tubes (d) for repair or cleaning. This can be done even when steam is up and the fires going.

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

1. In a smoke preventing device for steam generators, the combination of the steam pipe (a) having a valve (b) and coupling device (c'''), the distributing steam pipe (c), the horizontal or nearly horizontal branch steam pipes (c'') each of which is provided with a nozzle having two holes drilled in such way that the axes of the holes are divergent and inclined downward so as to strike bridge wall above the grate bars, and the inclosing sleeves or tubes for branch pipes to permit of their easy and simultaneous withdrawal, substantially as specified herein.

2. The combination in a boiler of the internally fired or firebox type, of the smoke preventing device having a steam pipe, a distributing pipe, and branch pipes, with a fire resisting protector supported against the firebox plates to receive the impact of steam jet and thereby protecting the said plates from injury.

WILLIAM LAWRENCE.

Witnesses:

E. F. LIGARE,
W. J. FLEMING.