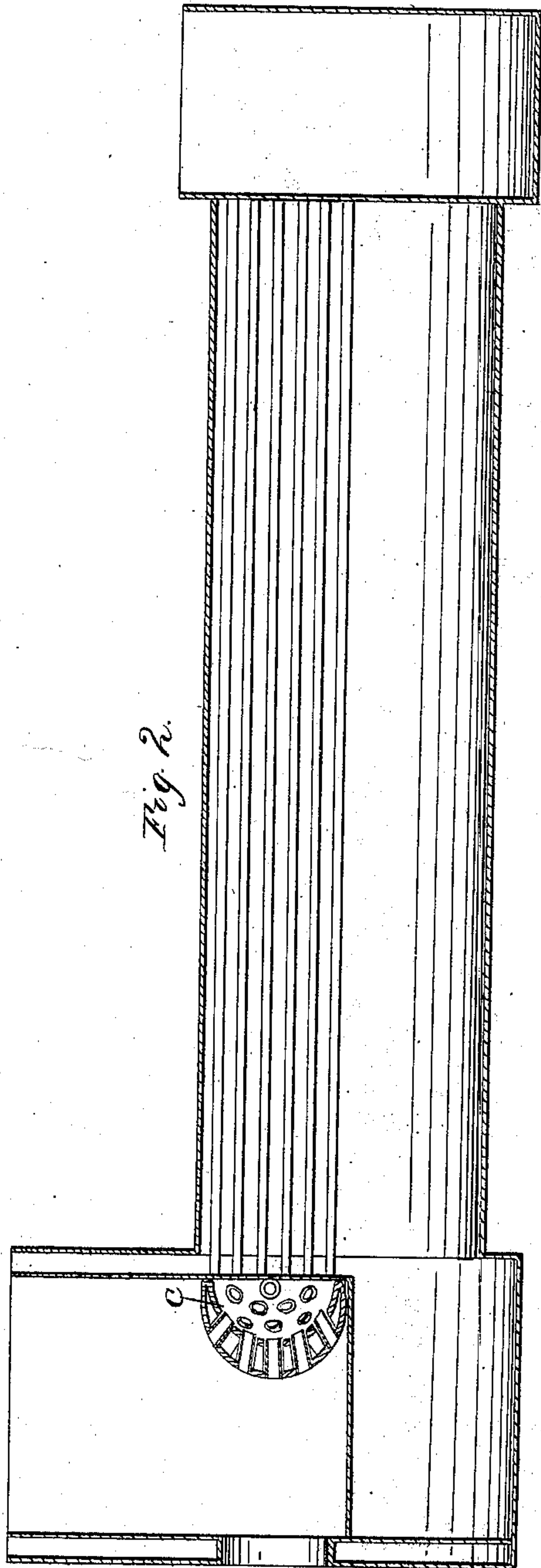
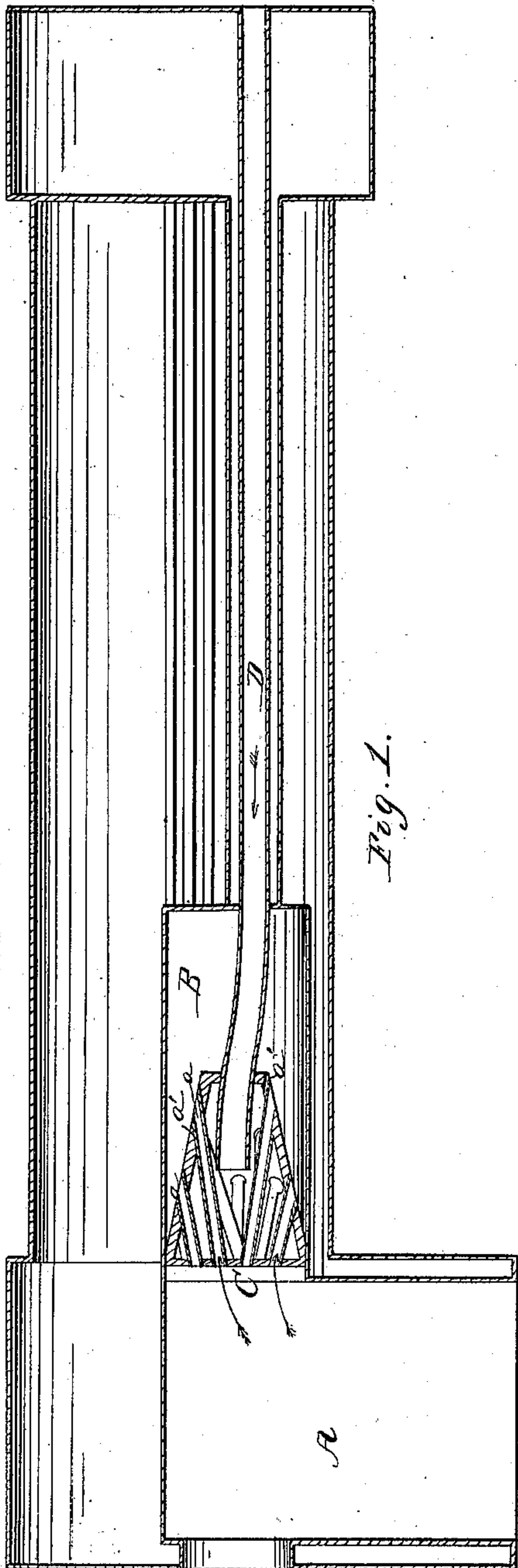


*W. P. Parrott,*  
*Steam-Boiler Furnace.*  
*N<sup>o</sup> 15,742.      Patented Sep. 16, 1856.*





# UNITED STATES PATENT OFFICE.

WILLIAM P. PARROTT, OF BOSTON, MASSACHUSETTS.

## LOCOMOTIVE AND STEAM BOILER FURNACE.

Specification of Letters Patent No. 15,742, dated September 16, 1856.

*To all whom it may concern:*

Be it known that I, WM. P. PARROTT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Locomotive and other Steam Boilers, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a longitudinal section through a locomotive boiler furnished with my improvements. Fig. 2 a modification of the same.

In the application of hot air above the grate for the purpose of obtaining a more perfect combustion of the fuel in steam boilers, several objections have been found in practice—and more especially in locomotive engines where the draft depends upon the exhaust pipe of the engine.

Boilers constructed with combustion chambers are liable to become more or less clogged with ashes and cinders carried over by the blast-pipe; and where the flame passages are small, a serious interference is caused to the draft and a consequent greater effort required from the exhaust pipe, impairing thus the useful effect of the engine. The air is not entirely mixed with the flame in any of the modes at present known and where the draft is quick a large part of the gases escape unburned. In coal burning tubular boilers, the ends of the tubes are exposed to the direct action of the fire in the fire box, and are liable to injury from this cause. And the entire heat generated in burning a large quantity of coal in a small fire box is liable to destroy the plates forming the sides of the box in a short time. To obviate these objections, I have invented an air chamber to be placed in the flue or flues of a boiler or in a recess formed for that purpose in the kind of boilers called locomotive boilers or in the fire box of the same as circumstances may require. The form of the chamber may be such as to be conveniently placed in the boiler. For locomotives having a recessed boiler, I prefer a conical form with the apex toward the tube sheet; if the chamber be placed in the fire box a spherical form may be used as interfering less with the other parts. This chamber is constructed so that it shall be closed against the passage of air except in the direction of the draft. The outside cas-

ing may be made of cast or wrought iron. Through this box are placed tubes of convenient size, the end toward the fire being tight in the casing, the other end to have a narrow air passage concentric with the tube; the box to be constantly supplied with fresh air from the outside of the boiler, thus protecting it from injury from the intense heat. The fire being lighted the products of combustion pass through the tubes and upon issuing at the opposite end, they become mixed with the fresh air from the outside, heated by its passage through the box sufficiently to prevent injury to the effect of the boiler by cooling the gases below the burning point, and the pipes dividing the flame into so many portions insures a more perfect combustion than can be obtained in any other way, as the whole interior surface of the air chamber presents a surface of combustion. The interposition of this chamber between the fire in the furnace and the ends of the tubes protects them from the direct action of the fire. The admission of the air into the smoke and gases at the instant they emerge from the tubes in the air chamber, causes a bright flame which passes immediately into the tubes, so that the combustion is not only rendered more perfect, but is well applied to that part of the boiler beyond the furnace.

In flue boilers or in boilers having a recess, the space around the air chamber renders it easy to remove the ashes which may collect, but in practice it has been found that little if any inconvenience arises from clogging with this arrangement and the area of the tubes furnishes ample space for the draft so that the inconvenience of narrow air passages is thereby obviated.

In the accompanying drawings Fig. 1, A, is the fire box. B, a recess within the boiler in which is placed the cone C, through this cone, and perpendicular to its base, are passed the tubes *a*, through which the smoke and gases from the fire box pass. The interior of the cone is supplied with air through the pipe D, or in any other suitable manner. Through the surface of the cone at the points *a'*, where the tubes *a*, pass through the cone, there are openings concentric with the tubes through which the heated air is permitted to pass from the cone to the recess directly in front of the tube plate. This heated air enters the recess in finely divided streams, and in immediate



contact with the currents of smoke and gas passing through the tubes *a*, which are thus consumed directly in front of the tube plate.

In Fig. 2 is represented a modification of my improvement as applied to an ordinary locomotive fire box, in this case the chamber in which the air is heated, is semi cylindrical and projects into the fire box above the fire, the air being introduced through a pipe *c*, or otherwise, as in the former case, the fire tubes are surrounded by an annular opening through which a jet of heated air passes in immediate contact with the smoke and gases issuing from the tubes *a*, these gases are thus consumed directly in front of the tube plate and enter the tubes in a state of vivid combustion calculated to produce their maximum effect.

Heretofore I have spoken of my improvements as particularly applicable to the furnaces of locomotive boilers; it is evident however that they may be applied to stationary boilers or furnaces of any description where a more perfect combustion of

the fuel is desirable. I do not therefore intend to limit myself to any particular application of my invention.

I am aware that perforated plates for the admission of air have been used in connection with hollow bridges, but in working with a rapid draft the smoke and gases in the fire box or furnace are not properly mixed with the air so as to complete the combustion I do not therefore claim any such combination or arrangement of parts, but

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

The hollow box or cone having tubes for the passage of the smoke and gas and apertures for the admission of heated air so arranged in the manner substantially as herein set forth as intimately to mix the two for the purpose described.

WM. P. PARROTT.

Witnesses:

SAM. COOPER,

P. E. TESCHEMACHER.