

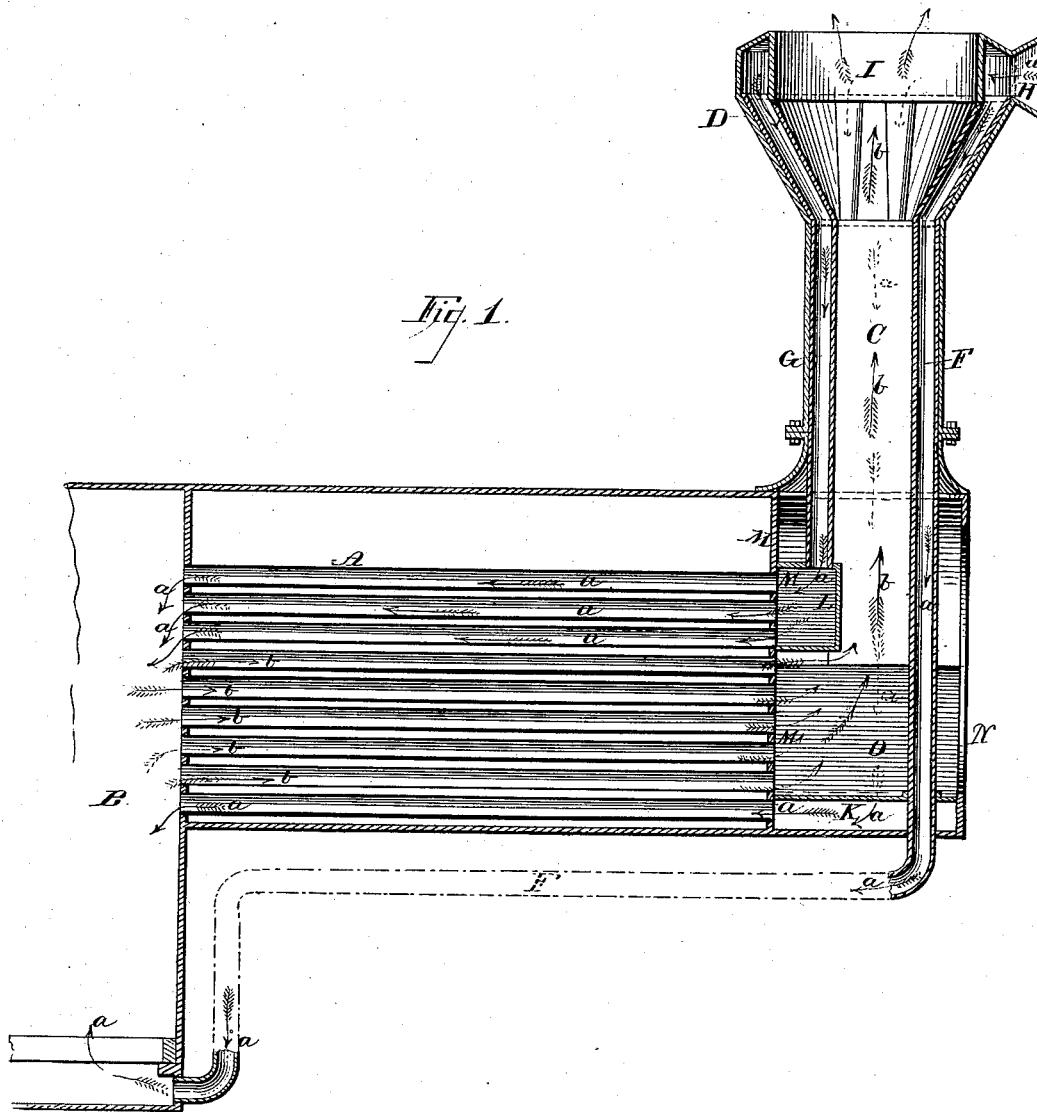
(No Model.)

2 Sheets—Sheet 1.

J. CAMPBELL.  
LOCOMOTIVE BOILER

No. 264,136.

Patented Sept. 12, 1882.



Witnesses:

*E. G. Adams*  
*F. H. West*

Inventor:

*John Campbell*  
By *Jas. B. Ennis*  
Attorney.

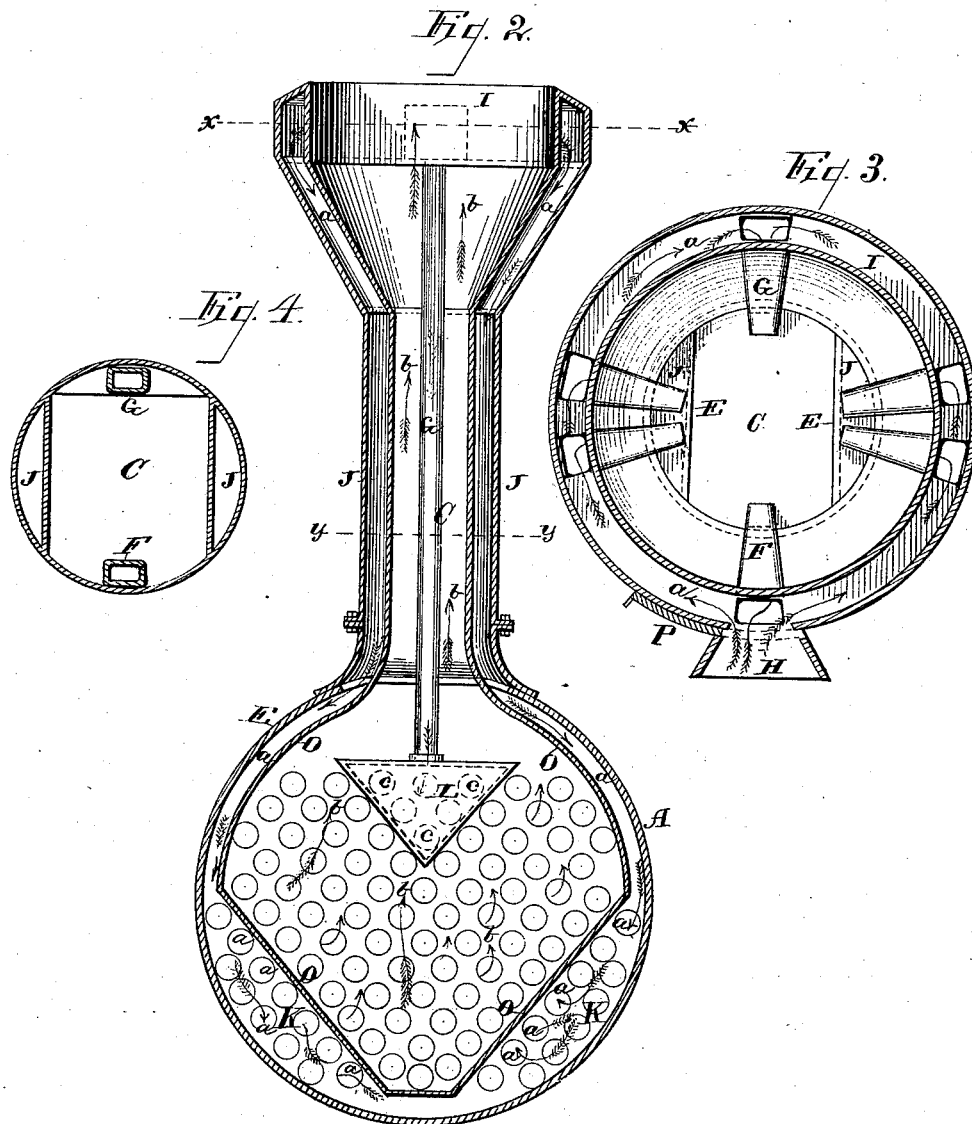
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E. G. Annus  
J. A. West

*Inventor:*

In witness:  
John Campbell  
By Jas. B. Ennis  
Attorney.

# UNITED STATES PATENT OFFICE.

JOHN CAMPBELL, OF BAY VIEW, WISCONSIN.

## LOCOMOTIVE-BOILER.

SPECIFICATION forming part of Letters Patent No. 264,136, dated September 12, 1882.

Application filed February 20, 1882. (No model.)

### *To all whom it may concern:*

Be it known that I, JOHN CAMPBELL, a citizen of the United States, residing at Bay View, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Locomotive-Boilers; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide heated air for the furnaces of locomotive and other boilers, and in so doing to utilize the escaping heat from the boiler, which desired end is accomplished by providing passages in and around the smoke-stack, as well as through and beneath the boiler, for the admission and passage of cold air, which air is thereby brought in contact with the heated surfaces of such passages and becomes heated before reaching the combustion-chamber, whereby a much higher temperature is maintained with a given quantity of fuel than when cold air is admitted directly into the furnace, as in the ordinary manner, all of which is further explained by reference to the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of a locomotive-boiler and smoke-stack embodying my invention. Fig. 2 is a transverse section. Fig. 3 is a top view of the smoke-stack. Fig. 4 is a horizontal section of the smoke-stack below the bilge or head.

Like parts are represented by the same reference-letters throughout the several views.

A is the ordinary tubular boiler.

B is the combustion-chamber.

C is the smoke-stack.

D is the bilge or head of the smoke-stack E E.

F and G are cold-air passages.

H is the mouth or entrance to the cold-air passages.

The arrows *a* indicate the course of the cold air from the entrance H to the combustion-chamber.

Arrows *b* represent the course of the products of combustion through the boiler and smoke-stack to the external air.

A circular passage, I, is provided at the top of the smoke-stack, through which the air, as it enters the inlet H, is conducted to and distributed in the several passages, E E, F, and G. Passages E E, upon the respective sides of the smoke-stack, converge as they extend downward, and terminate in the respective single passages J J. Passages J J extend down and around the front end of the boiler, terminating in chambers K K. Passage G is extended down through the smoke-stack and terminates in chamber L. Passage F extends down through the front end of the boiler and back beneath it, terminating in the combustion-chamber behind the boiler.

As boilers are commonly constructed the product of combustion passes from the combustion-chamber forward through all the tubes alike. By my improvement all the tubes terminating in the chambers L and K K are used to conduct the external air from the smoke-stack back to combustion-chamber B. All the other tubes serve the ordinary purpose as smoke and hot-air passages. The chamber L has its rear end closely fitted to the front end of boiler-plate M, over the mouth of tubes *c c*. The chambers K K are formed by the partitions O O, the ends of which partitions are closely attached to the plates M and N, whereby all communication is closed between the front ends of the tubes terminating in the respective chambers L and K K and those terminating between said chambers. The inlet air-passage, H is provided with a slide, P, which may be opened and closed with ordinary connecting-rods and devices from the cab by the engineer. It is obvious that when the slide P is closed all connection with the exterior air is thereby cut off from those tubes which terminate in chambers K K and L, and that all the products of combustion are thereby compelled to pass out through the intermediate tubes. Also, that when the locomotive is moving rapidly forward, or when a current of air is toward the front of the engine and the slide is open, the current of air is thereby caused to enter the entrance H and pass downward and

rearward, as indicated, to the rear of the boiler, when, by the natural draft of the furnace, it is drawn forward into the fire, thus supplying the required oxygen in a heated condition and  
5 obviating the necessity of admitting cold air to the boiler. When the engine is at rest, or when, by reason of an adverse wind, the rearward current of air is caused to cease, it becomes necessary to close the slide P, that the  
10 products of combustion be prevented from taking the upward course through the air-passages.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

In boilers for engines, the combination of  
circular passage I, inlet-passage H, slide P,  
tubes E, F, and G, passages J J, and chambers  
K K and L, all substantially as and for the pur-  
pose specified.

In testimony whereof I affix my signature in  
presence of two witnesses.

JOHN CAMPBELL.

Witnesses:

JAS. B. ERWIN,

EDITH W. ERWIN.