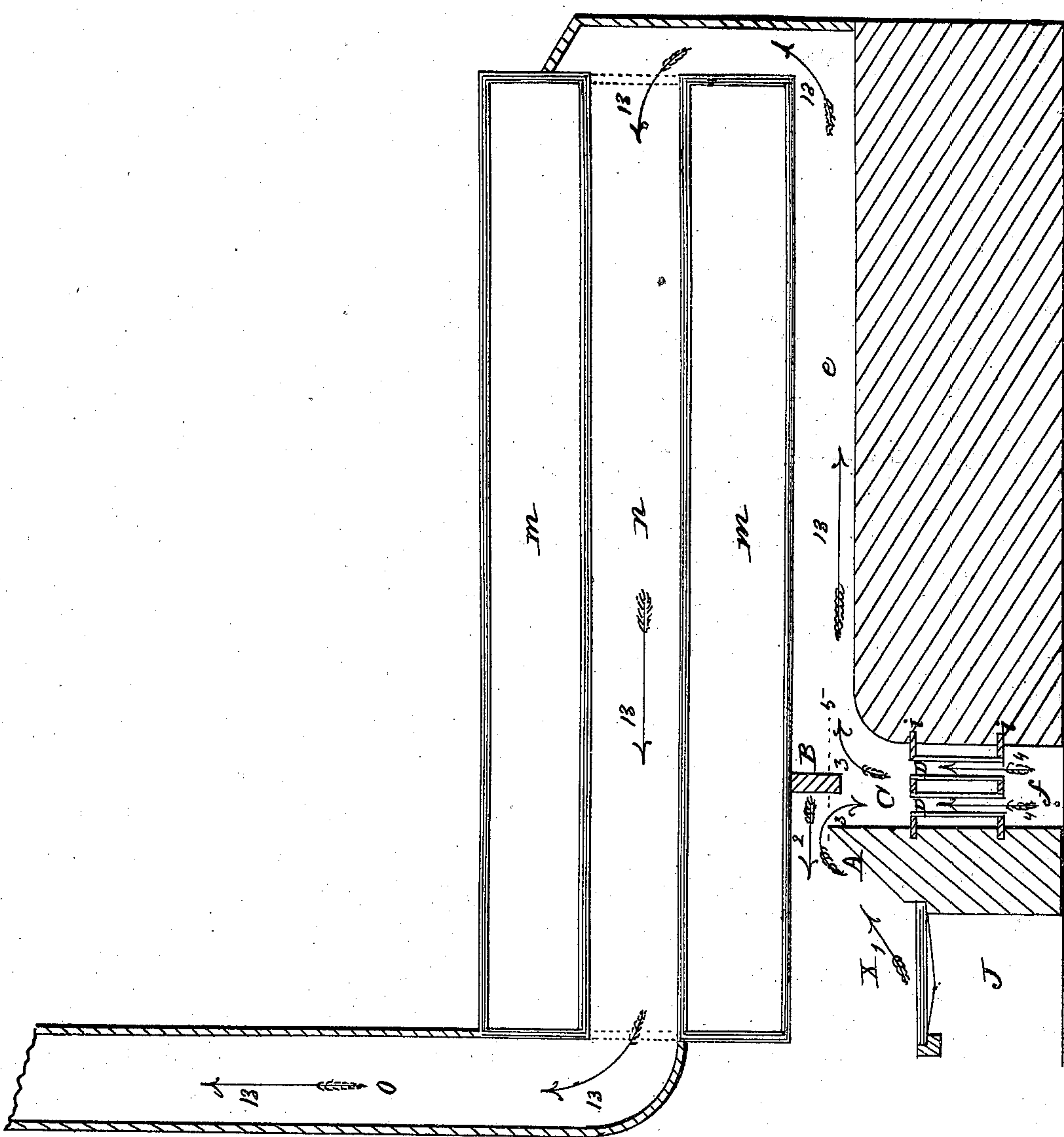


*J. C. Grijp.*

*Boiler Furnace.*

*No. 113,424.*

*Patented Apr. 4, 1871.*



Witnesses:

*James J. Johnston*  
*John C. Donaldson*

Inventor:

*John C. Grijp*

# United States Patent Office.

JOHN C. GRIPP, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 113,424, dated April 4, 1871.

## IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, JOHN C. GRIPP, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Furnace for Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists in the combination of a bridge-wall, arch-wall, and air-chamber with a furnace and air-tubes, constructed, arranged, and operating in the manner hereinafter described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The accompanying drawings represent a longitudinal section of an ordinary flue-boiler and its furnace.

*m* represents the boilers.

*n* represents the flue of the boiler.

*x* represents the fire-chamber.

*J* represents the ash-pit.

*A* represents the bridge-wall, which is made in the form represented in the drawings.

*B* represents an arched wall, which should be made of good fire-brick, and should extend from the boiler down into the air-chamber *C*, so that its lower edge will be below the top edge of the bridge-wall *A*, as indicated by the dotted lines marked 5.

*f* represents a cold-air passage.

*D* represents a series of air-tubes, which is secured in the plates marked *i*. These tubes should be small and extend the full width of the furnace in at least two rows.

*C* represents the air-chamber.

*e* represents the furnace-flue.

*o* represents the chimney or stack.

As the construction and arrangement of the different parts of the furnace will readily be understood by reference to accompanying drawings without further description, I will proceed to describe the operation of my improved furnace.

The fire is placed in the fire-chamber *x*, and the draught of the furnace and form of the bridge-wall will cause the flame and smoke to rise, as indicated by the arrow marked 1, and strike against the arched wall *B*, which will cause the flame and smoke to react back toward the fire, as indicated by the arrow marked 2, and the draught of the furnace will cause said flame and smoke to return back and down into the air-chamber *C*, as indicated by the arrows marked 3.

The flame and smoke, as they enter chamber *C*, will come in contact with the air which passes through the pipes *D*, as indicated by arrows marked 4, and the smoke which has been heated by the reaction caused by the draught and the arched wall, as above described, will ignite and be consumed, and the unconsumed gas and other light refuse of combustion will pass off through the furnace-flue *e*, boiler-flue *n*, and up through the chimney or stack *o*, as indicated by the arrow marked 13.

The advantages of my improvement consist in consuming the smoke, and thereby saving greatly in the expense of fuel.

I wish it clearly understood that I do not claim, broadly, the use of the arch-wall *B*, for such wall may be seen in the patent granted H. F. Baker, May 30, 1846.

Having thus described the nature, construction, and operation of my improvement,

What I claim as of my invention is—

The solid bridge-wall *A*, having its top inclined to the solid arch-wall *B*, projecting from the bottom of the boiler immediately in rear of the bridge-wall, the cold-air tubes *D*, supported by the plates *i* between the bridge-wall and bed of the furnace, so as to leave the combustion-chamber *C* above them and immediately beneath the arch-wall *B*, all constructed and combined as described, for the purpose specified.

JOHN C. GRIPP.

Witnesses:

JAMES J. JOHNSTON,  
ALEXANDER HAYS.