W. C. FORD.

APPARATUS FOR FEEDING AIR TO THE FURNACES OF STEAM BOILERS.

No. 170,165. Patented Nov. 23, 1875.

Fig: 1

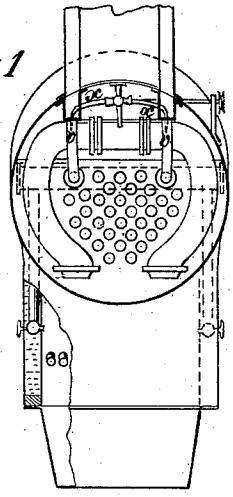


Fig: 2

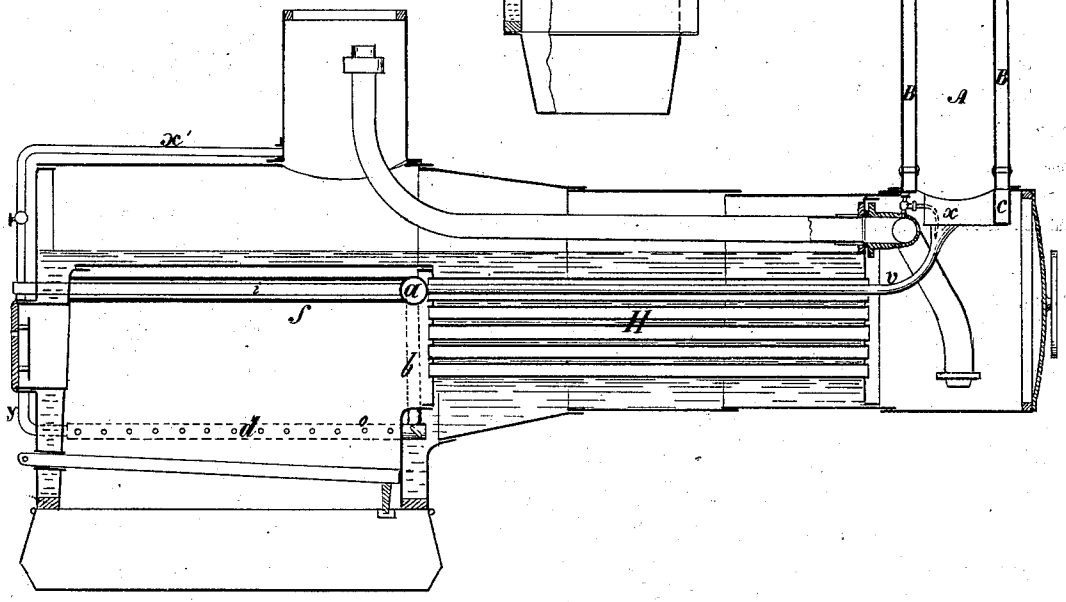
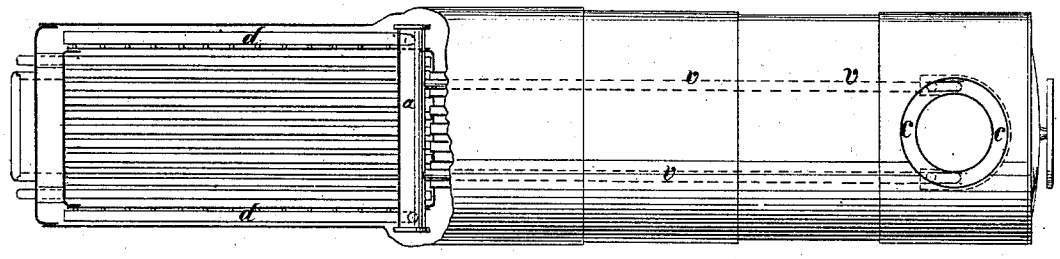


Fig: 3



Witnesses:
James E. Carpenter.
A. Van Gieson Jr

Inventor:
William C. Ford By his Atty
Thos. Woodward

UNITED STATES PATENT OFFICE.

WILLIAM C. FORD, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN APPARATUS FOR FEEDING AIR TO THE FURNACES OF STEAM-BOILERS.

Specification forming part of Letters Patent No. **170,165**, dated November 23, 1875; application filed May 8, 1875.

To all whom it may concern:

Be it known that I, WILLIAM C. FORD, of the city of Brooklyn, county of Kings and State of New York, have invented certain new and useful improvements in the method of introducing a current of hot air, or hot air and steam, upon the surface of the fire in the furnace of a steam-boiler; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawing making part of this specification, in which—

Figure 1 is a transverse vertical section through the smoke box and pipe of a locomotive-boiler; Fig. 2, a longitudinal vertical section through a locomotive-boiler; and Fig. 3 a top rim of the boiler, showing, also, a section through the furnace, each figure showing the application of my invention to the boiler.

The object of my invention is to cause a current of hot air to flow or blow in the furnace of a steam-boiler upon the surface of the fire; and my invention consists of a series of pipes for superheating air, combined with a steam-pipe applied thereto to throw a jet of steam in the air-pipes in the direction it is desired to draw or force the air, and by which the air is drawn or forced through the hot pipes to the fire.

The practical application of the invention is shown in the drawing. Let A represent the smoke-pipe of the locomotive-boiler, which in this case is incased in an air-funnel, by which a flue, B, is created around the outside of the pipe. This smoke-pipe and air-flue are set upon a cylindrical air-chamber, (shown by *c*,) fitted in the top of the smoke-box. From this air-chamber there lead two pipes (shown by *v v*) through the heating tubes or flues H of the boiler. These pipes *v v* connect to a larger pipe, *a*, fitted in the rear of the furnace, across the rear part thereof, near the furnace-crown, the ends of which pipe penetrate the sides of the furnace and reach in the water-space of the boiler, the ends thereof being capped to make a steam-tight joint. To this pipe *a* there are connected two pipes, *b b*, which reach down in the water-space to opposite the surface of the fire, and there connect to a pipe, *d d*, on each side of the furnace, which last-mentioned pipes are fitted with jet-tubes, which screw through the side of the furnace into said pipes. These jet-pipes are shown by *e e e*. Now, it will be seen that by this arrangement of pipes there is a channel or air-passage opened between the chamber *c* under the air-drum B to the surface of the fire in the furnace, and that the air will commence to heat from the time it enters the air-drum at *o o* until it reaches the pipes *d* in the water-space of the boiler, where it will be raised or reduced to the temperature of the water in the boiler.

It is believed that the motion of the locomotive through the air will be sufficient to force the air through these pipes to the fire without the aid of any auxiliary force; but in case it should not, then it is proposed to introduce a jet of steam in the pipes *v v* by means of a jet-pipe, H, introduced in the rear end thereof, whereby a jet of steam will be blown toward the fire, by which the air will be drawn down the drum and carried forward with the steam to the fire, the steam and air being both superheated as they flow through the hot pipe to the pipe as above described.

It may be found, upon experience, that the temperature of the air is too much reduced by passing through the pipe *d d* in the water-space, in which case the intention is to carry the pipe *v v* directly forward under the furnace-crown, through the water-space to the front of the boiler, down the front to the surface of the fire, and back into the furnace on each side of the door, as shown by *i* and *y*, the pipe *i* to be protected by a fire-tile pipe, (shown by *f*,) to save it from burning out, the tile pipe to be made considerably larger than the iron pipe *i*, to permit a circulation of heat between the two pipes, while at the same time the fire is kept from impinging upon the iron pipe to destroy it.

In case the last-described arrangement of pipe be adopted, the jet of steam can, and perhaps should, be introduced at *z* through the pipe *x'* tapped in the steam-drum of the boiler, the pipes of course in any case to be fitted with suitable cocks and handles to enable the engineer to apply the steam-jet with facility. Of course it does not matter just where the steam-jet is applied to the air-pipes;

provided it be so applied as to effectually draw or force the air to the fire the object of the invention will be practically accomplished.

The application of this invention can of course be made to any kind of boiler or furnace. I have described its application to the furnace of a locomotive-boiler for the purpose of showing the practical application of the invention without intending to limit it to the furnace of this variety of boiler, or to the furnace of any boiler, as it is applicable to any furnace where a perfect combustion and an intense heat are desirable.

Having now described the nature and extent of my invention, I claim as new herein and desire to secure by Letters Patent—

The combination of the smoke-stack and its outer casing, provided with deflectors, with an air-pipe leading to the fire-box, and a steam-pipe, which is inserted in the air-pipe near the stack, substantially as and for the purpose set forth.

WM. C. FORD.

Witnesses:
AMOS BROADNAX,
A. VAN GIESON.