

GEORGE H. DIEHL.

Improvement in Steam Boiler Furnaces.

No. 121,933.

Patented Dec. 19, 1871.

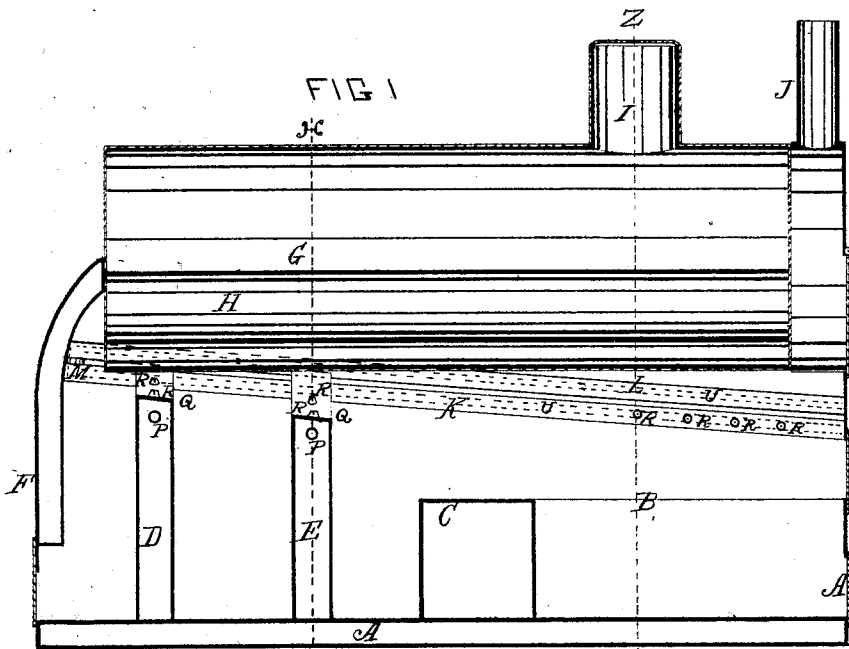


FIG II

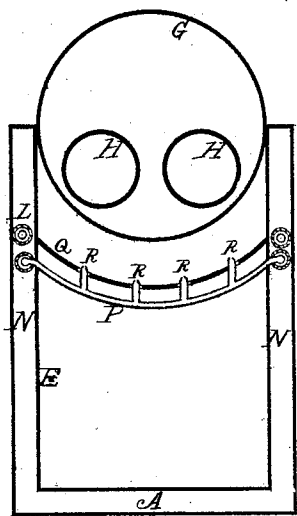
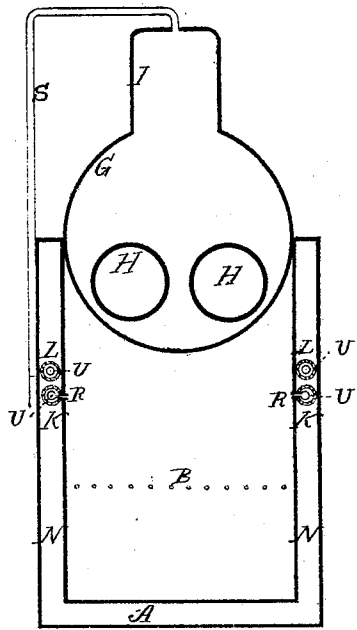


FIG III



WITNESSES

John H. Rickerts

A. Hayward

Scale of one foot.
Figs 1, 2, 3, 4 and 5.

INVENTOR

George H. Diehl,
By G. S. Chapman, atty.

GEORGE H. DIEHL. Improvement in Steam Boiler Furnaces.

No. 121,933.

Patented Dec. 19, 1871.

FIG. IV

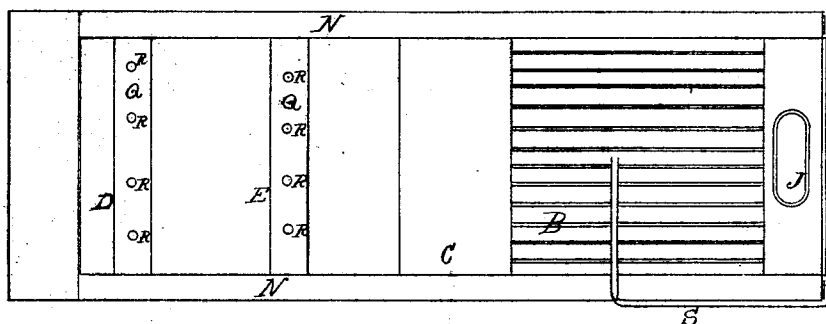


FIG. V

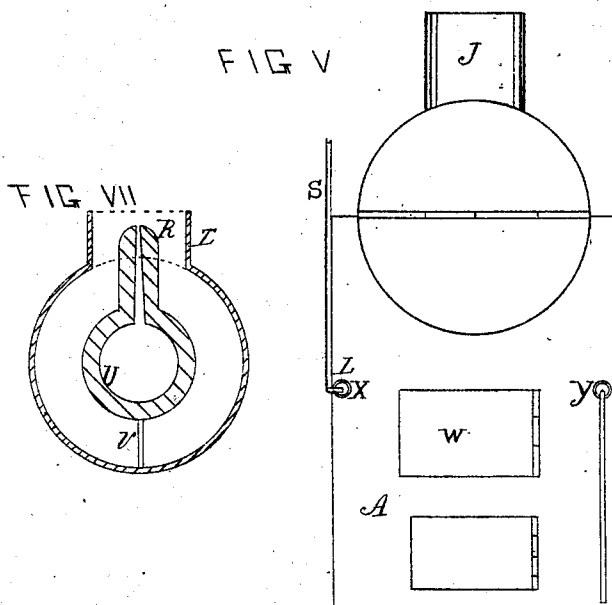


FIG. VII

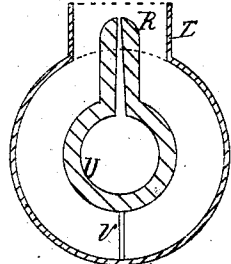
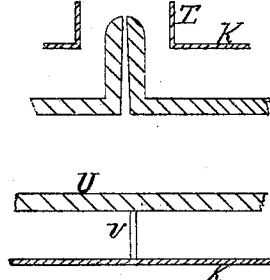
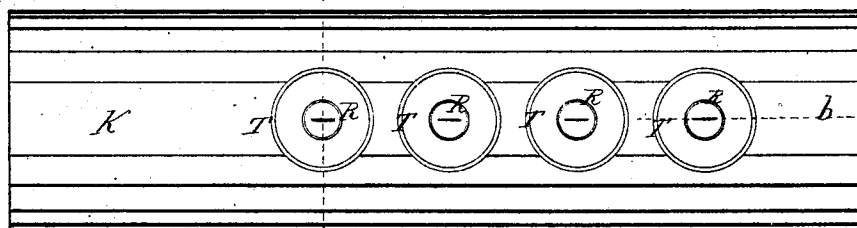


FIG. VIII



Scale of one inch for
Fig 8, 6 and 7,

FIG. VI



WITNESSES

Thos. H. Ricketts
A. Hayward

INVENTOR

George H. Diehl
By his attorney
G. A. Chopin

UNITED STATES PATENT OFFICE.

GEORGE H. DIEHL, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND THOMAS H. RICKETTS, OF SAME PLACE.

IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. 121,933, dated December 19, 1871.

To all whom it may concern:

Be it known that I, GEORGE H. DIEHL, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Smoke-Burning Fire-Box for Steam-Boilers, of which the following is a specification:

The object of the present invention is to provide more convenient means for consuming the smoke in the fire-box or near thereby, and secure a more perfect combustion of the fuel. This I accomplish by the introduction of superheated steam and hot air, the mechanism for this purpose being novel, as hereinafter fully shown.

In the drawing, Figure 1 is a sectional elevation of a fire-box casement-boiler to which my improvement is attached; Fig. 2, a section of Fig. 1 on line *x*; Fig. 3, a section of Fig. 1 on line *z*; Fig. 4, Drawing 2, is a plan view of the fire-box casement and my improvements, the boiler being removed to give a clearer view of the parts; Fig. 5, Drawing 2, is a front end elevation of the furnace, fire-box, &c.; Fig. 6, an enlarged view of the air and steam pipes; Fig. 7, a transverse section of Fig. 6 on line *a*; Fig. 8, a broken longitudinal section taken on line *b*, Fig. 6.

A represents the bottom, F the rear part, and N the sides of the casement of the boiler; C B, the grate and bridge walls; and A' represents the front end of the furnace, all of which are constructed similarly to those parts of furnaces now in common use, except such modifications as the improvements hereinafter mentioned necessitate. In the inner longitudinal parts of the casement-sides N N are formed recesses or grooves of suitable size to receive pipes L K and have the peripheries of the pipes come about flush with insides of said casements. The upper pipe U within pipe K communicates, by means of a pipe, S, with the dome I, and receives steam therefrom. The steam so taken from the dome is conveyed in said pipe U to the rear of the casement, where, by means of a communicating pipe, M, Fig. 1, it returns in the lower pipe U situated within pipe L and communicating with pipes P P in chambers D E. These chambers are placed in the rear of the fire-box and near the rear end F of the casement, and serve the purpose of concentrating the heat at that point and containing the hot air before it passes out at openings hereinafter described; and, as will be seen at Fig. 1, the rear chamber is the highest, to concentrate

the heat at two points in the rear of the fire-box before it escapes. By reference to Figs. 2, 3, 7, and 8 it will be seen that the steam-pipes U are placed inside of the hot-air pipes K L and held in place by metal skirtings or strips V; and at Figs. 6, 7, and 8 are shown the short conducting-pipes T, through which the air passes from the pipes K into the furnace, and which surround the steam-tubes R projecting out from the pipes U. At Fig. 1 is shown the position of the tubes R and pipes T at the sides of the fire-box and over the grate B, at which place superheated steam and hot air are made to strike the flame and intensify the heat, and consequently increase the combustion. The unconsumed smoke and gas passing backward to the flues H of the boiler are brought in contact with superheated steam and hot air at two points before they can escape, viz., at the tops of chambers E D, where they are supplied with air and steam in sufficient quantities to produce almost perfect combustion, and thereby save a large amount of fuel and prevent the annoyance of smoke. The steam as taken from the boiler is superheated by the fire in the furnace before it passes out at the tubes R, and the cold air entering the pipes K is also heated in the same manner.

The object of having the hot air pass through the pipes T surrounding the tubes R is that the steam and air may combine before coming in contact with the carbonic-acid gas escaping from the coal; and the object of making the chambers D E concave on their top parts is to cause the escaping gases to pass through a space of uniform width so that said gases will be uniformly supplied with air and steam. The cold air enters the pipe L at X, Fig. 5.

Having thus described my invention, what I claim, is—

1. The steam-pipes U placed inside of the air-pipes L K, and provided with tubes R, in combination with the short pipes T for combining superheated steam and hot air as they enter the fire-box, as set forth.

2. The hot-air chambers D E for concentrating heat at two points back of the fire-box, when combined with steam-pipes P and escape-tubes R, substantially as described.

GEORGE H. DIEHL.

Witnesses:

G. L. CHAPIN,
THOS. H. RICKETTS.

(149)