

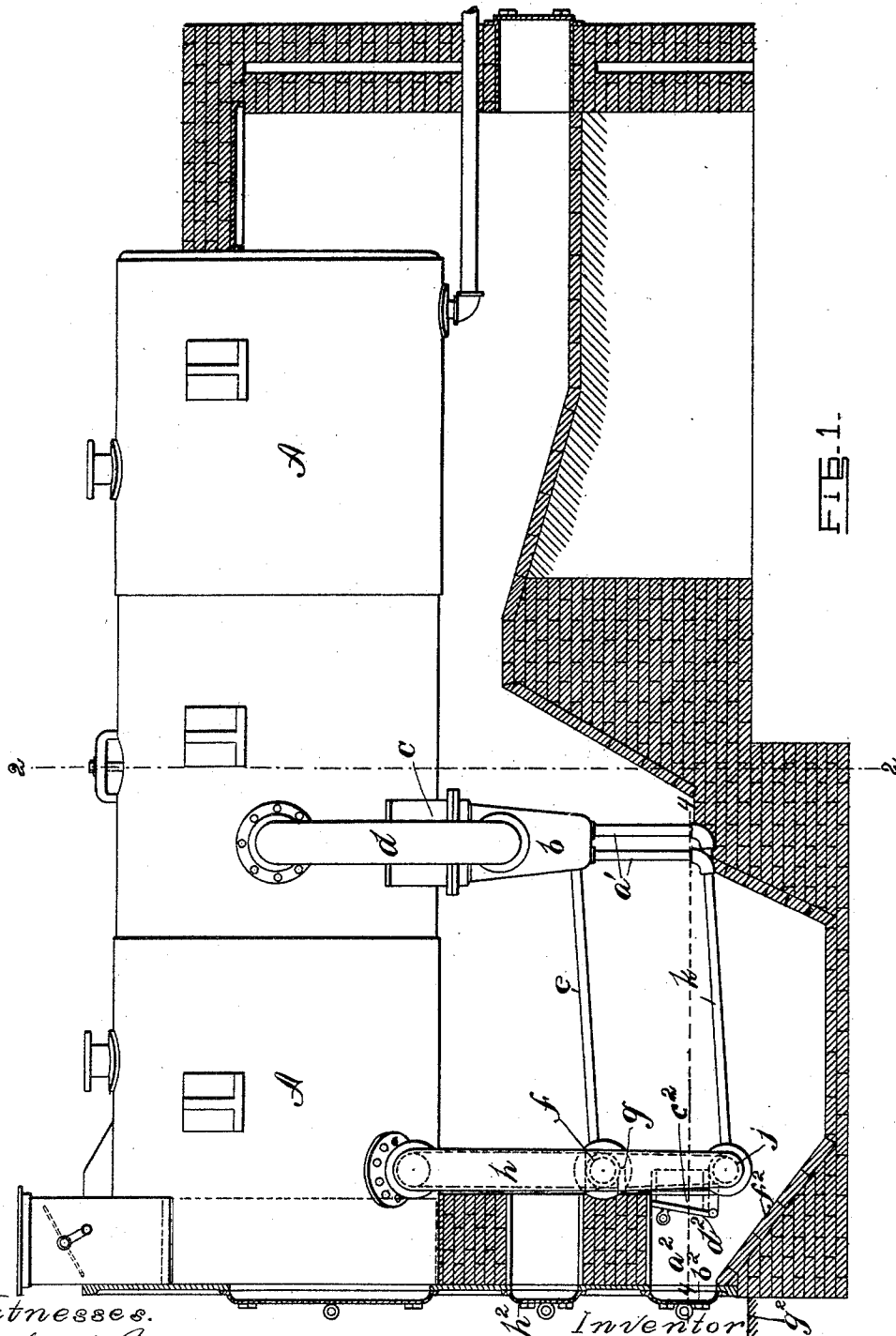
(No Model.)

3 Sheets—Sheet 1.

E. B. PARKHURST.
ATTACHMENT FOR BOILERS.

No. 497,725.

Patented May 16, 1893.



Witnesses.

Arthur F. Randall.
Robert Wallace.

Inventor
Edward B. Parkhurst
By Macleod Calver Randall
his Attorneys

(No Model.)

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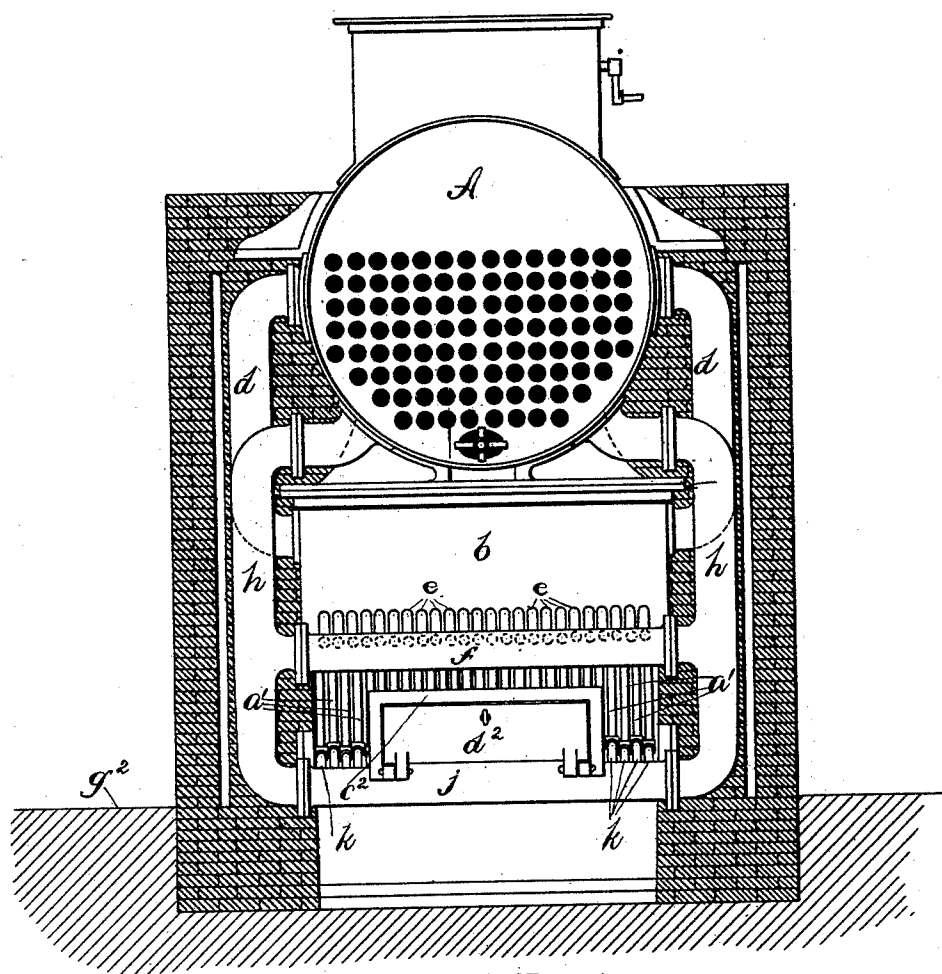


FIG. 2.

Witnesses.

Arthur F. Raudall
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Edward B. Parkhurst
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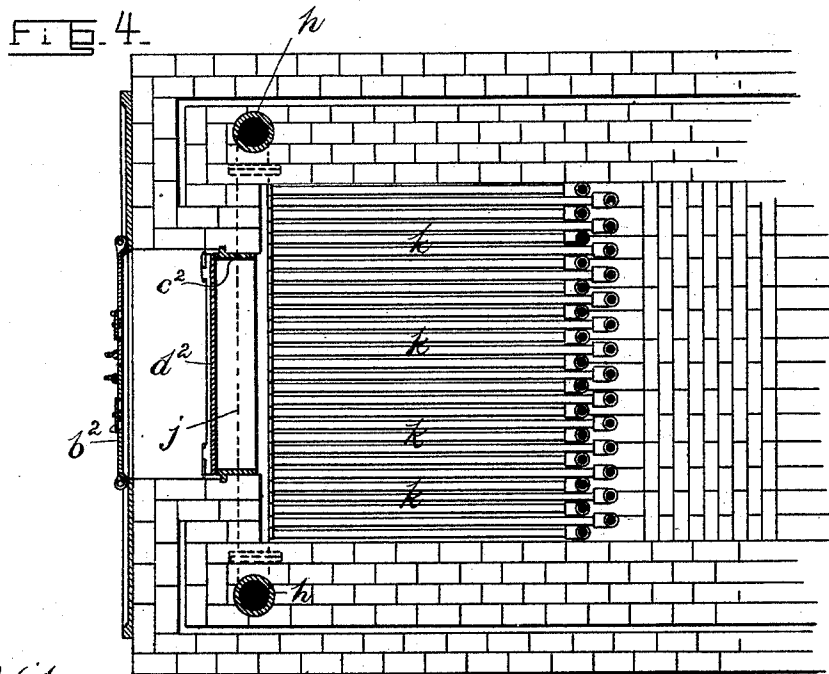
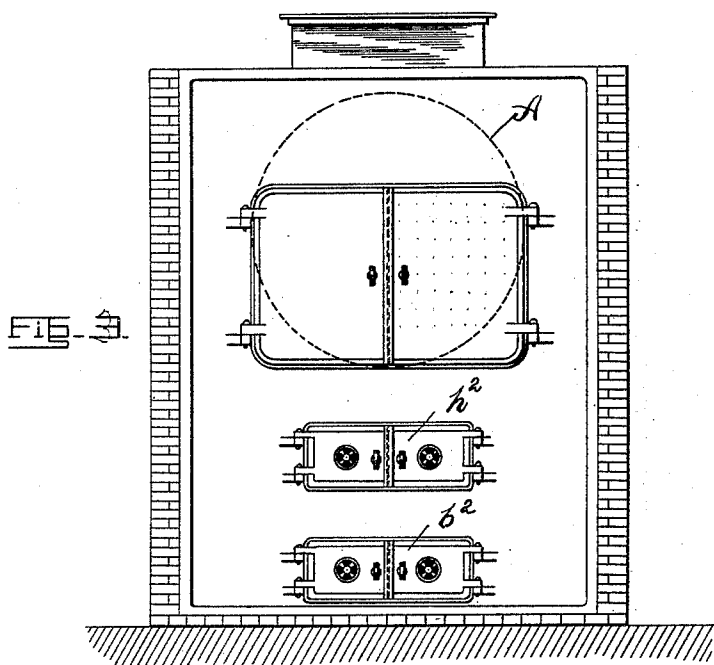
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UNITED STATES PATENT OFFICE.

EDWARD B. PARKHURST, OF WOBURN, MASSACHUSETTS.

ATTACHMENT FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 497,725, dated May 16, 1893.

Application filed October 10, 1892. Serial No. 448,322. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. PARKHURST, a citizen of the United States, residing at Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Attachments for Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide an attachment which may be applied to an ordinary horizontal steam boiler and by the use of which the steam-forming capacity of the boiler will be considerably increased without an increase in the amount of fuel consumed and it consists in the device hereinafter set forth which is adapted to be attached to the boiler, and which consists of a water leg and suitable connections therefor with the boiler, a series of tubular water grates connected at their rear ends with said water leg, and at their front ends with a horizontal pipe or manifold, said manifold being provided with connections by means of which it may be supplied with water from the boiler, a series of tubular water grates placed below the water grates first named, said lower water grates being each connected at the rear end with the said water leg and at the front end with a cross pipe or manifold located below the manifold first mentioned, said lower manifold being also provided with suitable connections by means of which it may be supplied with water from the water space of the boiler.

My invention embraces certain other details of construction all of which are more particularly set forth.

The novel features of my device are pointed out in the claims which are appended hereto and made a part hereof.

I have shown my invention in the best form now known to me in the accompanying drawings to which reference is made in the following description, and in which—

Figure 1 is a horizontal boiler of ordinary construction having my attachment applied thereto and showing the brick setting in section to more fully disclose the construction of the parts. Fig. 2 is a front view with that part of the brick setting in front of line 2—2 Fig. 1 removed. Fig. 3 is a front elevation.

Fig. 4 is a transverse section on line 4—4 Fig. 1.

A represents an ordinary horizontal boiler. 55

b is a water leg provided with flanged connections c which are riveted to the bottom of the boiler and by means of which the water leg is secured thereto. It will be noted that in securing this leg to the boiler in this manner no cutting of the boiler is necessary. The water leg b is connected preferably at both ends by means of pipes d with the waterspace of the boiler, the pipes d entering said waterspace well up toward the surface of the water which is contained therein. 65

The upper grate bars are shown at e and their rear ends enter the water leg preferably at the lower portion thereof as shown. The forward ends of said grate bars, which are preferably somewhat lower than their rear ends so that the bars are in a slightly inclined position, enter a water box or manifold f which may be supported or partially supported on pins g, which are set in the front brick setting. 75

The water box f extends across the front of the furnace horizontally, or substantially so, and is connected preferably at both ends by means of pipes h with the lower front portion of the water space of the boiler where the water is ordinarily the coolest. By this arrangement the circulation is obtained from the cooler portions of the water space of the boiler through the pipes h, water box f, upper grate bars e, water leg b, pipes d, to a portion of the water space of the boiler where the water is warmer. As a considerable portion of the fuel which is used on the upper grates falls through the space between the bars and results in loss I provide for the burning of this fuel on a set of lower grate bars, the draft of the lower grate being upwardly. In this way a very large percentage of the fuel employed may be consumed while the lower grate bars, being water grates, and having a rapid circulation through them, are not liable to be burned out even although the volume of air admitted to them be comparatively small, as it must ordinarily be in order not to interfere with the downward draft of the upper grates. In order to provide proper connections and supports for the lower grates k I extend the pipes h downwardly a proper distance making 100

ing them preferably of smaller diameter at the upper ends since these portions of the pipes are designed to supply the lower grates only. The lower ends of the pipes h are secured to a lower water box or manifold j similar in form and construction to the water box f . The lower grate bars are preferably set in one line or plane slightly inclined and close together in order that the finer parts of the fuel which may drop through the upper grates shall be retained and burned on the lower grate.

The forward ends of the lower grate bars h enter the lower water box or manifold j and their rear ends are turned by means of an ordinary bend or elbow connection and connected by means of a vertical pipe a' with the bottom of the water leg b . As the lower grates are set close together if they were of the same length the vertical connections a' would be in a line in the same plane and there would not be a sufficient space for the combined drafts of the upper and lower grates to pass. In order to avoid this difficulty I make the alternating bars of the lower grate longer, as shown clearly in Figs. 1 and 4, so that the vertical pipes a' are set staggering thus giving ample space for the passage of the draft.

By using the bent connections or elbows as previously described, and connecting each one of the lower grate bars with a vertical connecting pipe a' a considerable saving in the cost is effected over the employment of a manifold at the rear ends of the lower bars. A manifold may, however, be employed in this space provided it be made of sufficient size to permit of the staggering arrangement of the vertical connecting pipes a' . The elbows or bent connections are further preferred by me to a manifold in that they offer no opportunity for the collection of sediment which is frequently deposited in manifolds and is an objectionable feature. Where such a deposit occurs, the parts are, as is well known, apt to be burned out and rendered less durable.

I consider the staggered arrangement of the vertical connections a' of great importance not only because it permits ample space for the passage of the draft but also because the water in these vertical pipes is exposed to the fiercest heat of the fire. This assists materially in maintaining a rapid circulation and increasing the steam forming power capacity of the boiler.

The supply pipes h and main outlet pipe d may be constructed as shown more clearly in Fig. 2 and are preferably set in the side brick setting as there shown. It is necessary that the fire on the lower grate be reached for the purpose of raking and the like. It is also necessary that the draft should ordinarily pass under and come up through the lower grates. To provide for these conditions I extend the ash-pit opening a^2 upwardly above

the lower grate bars and locate the door b^2 thereof about on a level with the fire on the lower grate. I then provide a door frame c^2 and a door d^2 in front of the fire on the lower grate and inside the ash-pit door as shown in Fig. 1. The door d^2 is preferably hinged at its lower edges so that it will open or swing downwardly. By opening the ash-pit door and the door d^2 entrance is had to the fire on the lower grate. The door d^2 is normally closed and the draft for the lower grate passes under the front lower manifold or water box j and up through the grate. By making the front portions of the ash-pit sloping as shown at f^2 the ashes may be readily raked out or withdrawn while at the same time the ash pit does not extend in front of the boiler and the level of the floor in the boiler room is not changed but may remain at the ordinary level which is indicated by the line g^2 . The fuel door is shown at h^2 .

The device herein shown and described may be constructed and applied to boilers such as are in common use and the advantages of an increased steam forming capacity as also the power to consume the smoke and other products of combustion in a very complete manner are obtained.

What I claim is—

1. An attachment for boilers consisting of a water leg and suitable connections therefor with the boiler, a series of grate bars connecting at their rear ends with said water leg, a water box or manifold with which the front ends of said grate bars are connected, a lower water box or manifold, a series of lower grate bars connected at their front ends with said lower manifold, suitable connections whereby said manifolds are connected with the water space of the boiler, and a series of vertical connections one for each of the lower water grate tubes, whereby said lower water grate tubes are connected with the water leg, the alternate tubes of the lower water grate being longer than the others, and said vertical connections being set staggering or in two lines, substantially as and for the purposes set forth.

2. In an attachment for boilers comprising upper and lower tubular water grates and suitable supply connections therefor with the water space of the boiler, the combination therewith of a water leg secured to the boiler and suitably connected therewith, and a series of vertical connections, one for each of the lower water grate tubes, said vertical connections being located between the rear ends of said lower water grate tubes and the water leg, substantially as set forth.

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

EDWARD B. PARKHURST.

Witnesses:

WM. A. MACLEOD,
ROBT. WALLACE.