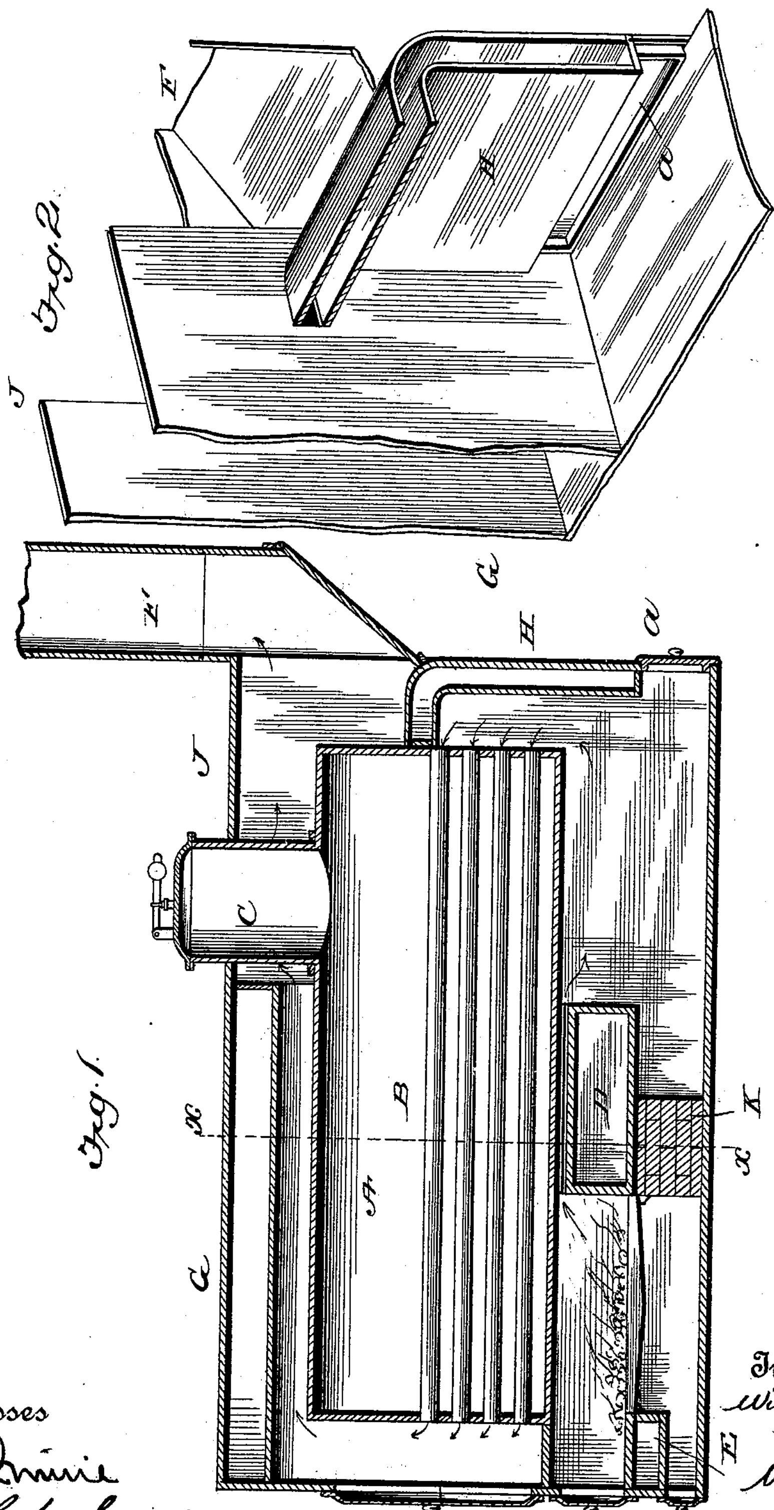
(No Model.) 2 Sheets—Sheet 1.

W. SAUR.

STEAM BOILER.

No. 520,742. Patented May 29, 1894.



Witnesses

John Dinnie

G. M. Copenhaver

Inventor

William Saur

by

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(No Model.)

2 Sheets—Sheet 2.

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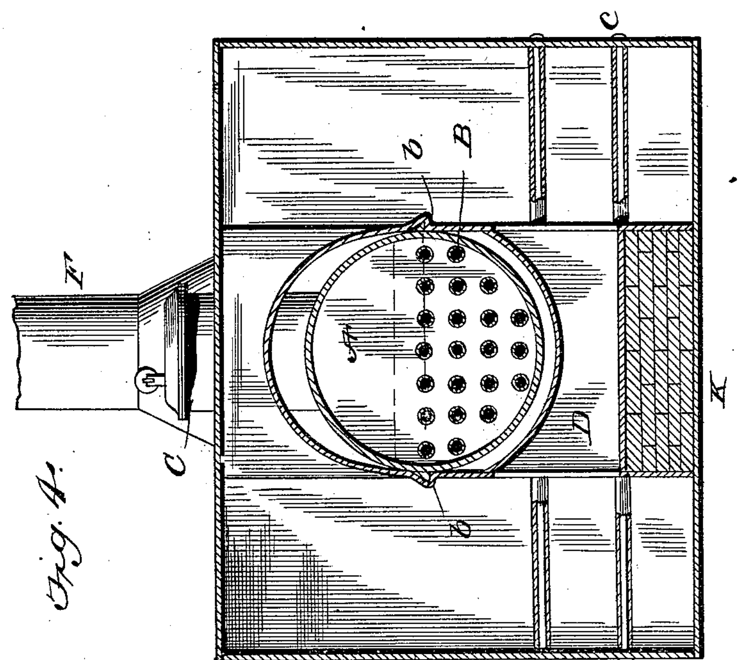

Fig. 4.

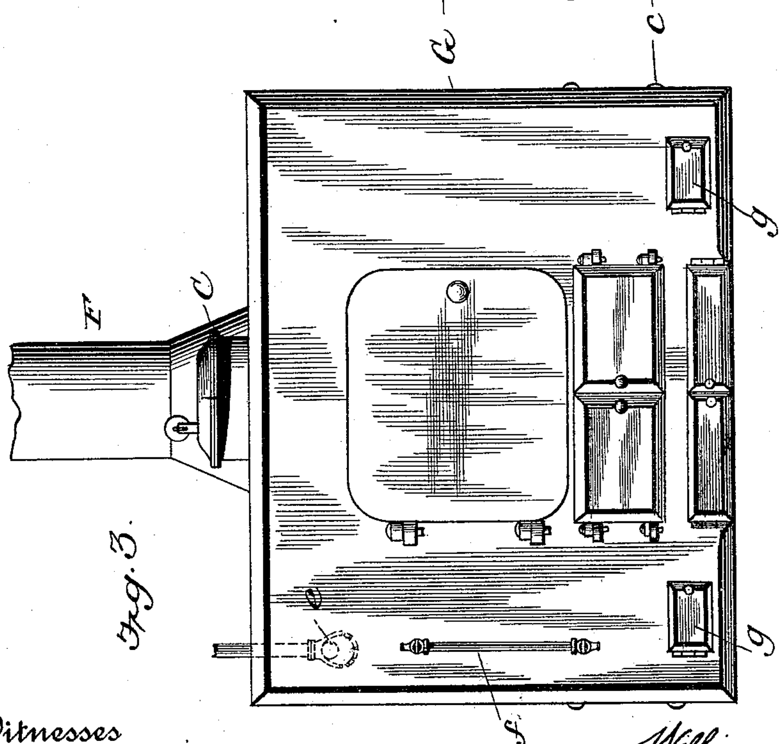

Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM SAUR, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO GEORGE H. HAMMER, WILLIAM H. YEATMAN, AND JACOB J. BECK, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 520,742, dated May 29, 1894.

Application filed February 7, 1894. Serial No. 499,394. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SAUR, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Steam-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.

As is well known the brick walls of the furnaces or fire boxes of steam boilers require to be frequently rebuilt owing to the intense heat to which they are subjected burning them out. Aside from the expense attached to the rebuilding of the walls the owners or users of the boilers are frequently caused great inconvenience and, often serious loss by reason of the loss of the use of the boiler while cooling off preparatory to rebuilding and during the time necessarily occupied in rebuilding. Beside the objections just noted to the use of masonry for the purpose named a further objection exists in that the masonry absorbs a large proportion of the heat generated in the furnace, which heat is wasted and serves no useful purpose whatever and is frequently the cause of injury to the boiler shell when the boiler is blown off before the walls of the furnace and setting of the boiler have cooled down sufficiently.

Now, it is the object of my invention to provide a casing or setting for steam boilers which is more durable than brick and not so liable to be injured by the heat, and in which the heat now wasted on the masonry may be utilized to heat large quantities of water for use in the boiler or for other purposes, as in laundries, or factories requiring heated water in large quantities, without the use of additional fuel, the water so heated being at the same time greatly purified.

With these objects in view my invention consists in providing a hollow metal casing adapted to cover and protect the boiler and to form the walls of the furnace or fire box, the sides of said casing being connected by a hollow bridge, a hollow dead plate, and a hollow return plate or diaphragm, whereby a free and uninterrupted flow or circulation of water may be maintained throughout the casing at all times, all of which will be more fully hereinafter described and claimed.

In the accompanying drawings forming a part of this specification—Figure 1 is a longitudinal vertical section through a boiler provided with my improved casing; Fig. 2 a perspective detail view showing the connection between the return plate and casing; Fig. 3 a front elevation of the boiler; and Fig. 4 a vertical cross section on the line *x*—*x*, Fig. 1.

Similar letters refer to similar parts throughout the several views.

Referring to the drawings A represents the boiler, proper, which is provided with the tubes B and steam dome C as is usual. The fire box or furnace is arranged as usual directly below the boiler and its grate bars rest at one end on the bridge D and at the other end on the hollow dead plate E, and the products of combustion pass first along the under side of the boiler to its end and are returned forward through the tubes B to the front of the boiler and then over the top thereof to the smoke stack F at the rear. The casing G within and on which the boiler rests or is supported consists of metal plates cast in the desired form and rigidly secured together to form a water tight reservoir independent of the boiler and forming a jacket or setting therefor. In the present instance I have shown the jacket or casing as extending the entire length of and slightly beyond the rear end of the boiler at its sides, said casing being connected at its rear end by a hollow diaphragm or return plate H which is bent at right angles at its upper end and attached or rests against the rear end of the boiler so as to direct the products of combustion into the tubes B. The diaphragm or return plate serves to brace and strengthen the sides of the casing and does not extend quite to the bottom of the combustion chamber I, sufficient space being left below it to provide for the cleaning of the combustion chamber through a door or manhole *a* at the rear end of the casing. The casing extends over and

across the top of the boiler and back to the steam dome and is fitted or connected to an extension piece, J, which extends back to the smoke stack and forms a cover for the rear end of the top of the boiler. The hollow bridge D is formed of metal and is curved on its upper surface to conform to the shape of the boiler and is, preferably, of greater area than the ordinary bridge and extends back farther into the combustion chamber and communicates at each end with the hollow side walls of the casing. While the bridge may be made so as to extend to the floor of the furnace I prefer to make it of less depth than this would require and support it on a brick wall K, as shown. At its front the casing is hollow throughout, that portion thereof which extends down on each side of the doors of the furnace being connected by the transverse hollow dead plate E, so that the boiler, and fire box or furnace is completely surrounded by a hollow covering or casing which takes the place of the ordinary brick setting therefor. The boiler rests on the side walls of the casing at *b*, and the plates forming the walls of the casing are held together and braced by means of bolts *c* which pass through tubes *d* arranged between the plates and are headed over at the outside of the walls as shown in Fig. 4. The water is fed to the casing at the front end thereof at the top, an automatic float or other valve, *e*, being employed to control the admission of the water thereto. A suitable glass gage, *f*, is also mounted at the front end of the casing so that the height of the water in the casing may be ascertained at a glance. Near the bottom of the front end of the casing hand holes, *g*, are formed and suitable covers or doors provided therefor through which access may be had to the bottom of the casing to clean out the same. I also provide suitable injectors or pumps for the casing whereby the water heated in said casing may be fed to the boiler or conducted or drawn off to be used for other purposes.

From the above description it will be understood that the mud or other heavy impurities contained in the water will settle at the front and along the bottom of the casing at the sides and may be readily removed therefrom through the doors or openings *g* at the front of the casing, thus enabling me to feed a comparatively pure water to the boiler, thus lessening the liability of the boiler becoming incrusted. Also as I provide a complete water covering for the boiler and furnace it is evident that the heat playing on the walls of the cover or casing will have less injurious effect thereon as the water filling the casing will constantly change or circulate therein so as to present at all times to the heated interior wall of the casing a body of water of less temperature than the heated wall itself, thereby utilizing the heat heretofore wasted and at the same time rendering the setting more durable.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A steam boiler and furnace setting or covering, consisting of a hollow metal casing independent of said boiler and fire box and non-communicating therewith adapted to surround the boiler and fire box and to be filled with water, substantially as described.

2. A casing or setting for steam boilers and furnaces, consisting of hollow metal covering or top, and rear and front walls all communicating with each other and independent of the boiler, adapted to be filled with water, substantially as described.

3. A casing or setting for steam boilers, consisting of a hollow metal casing independent of and surrounding the boiler and fire box, a hollow dead plate, a hollow bridge and a hollow return plate all communicating with said casing, substantially as described.

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

W. SAUR.

Witnesses:
W. H. YEATMAN,
G. H. HAMMER.