

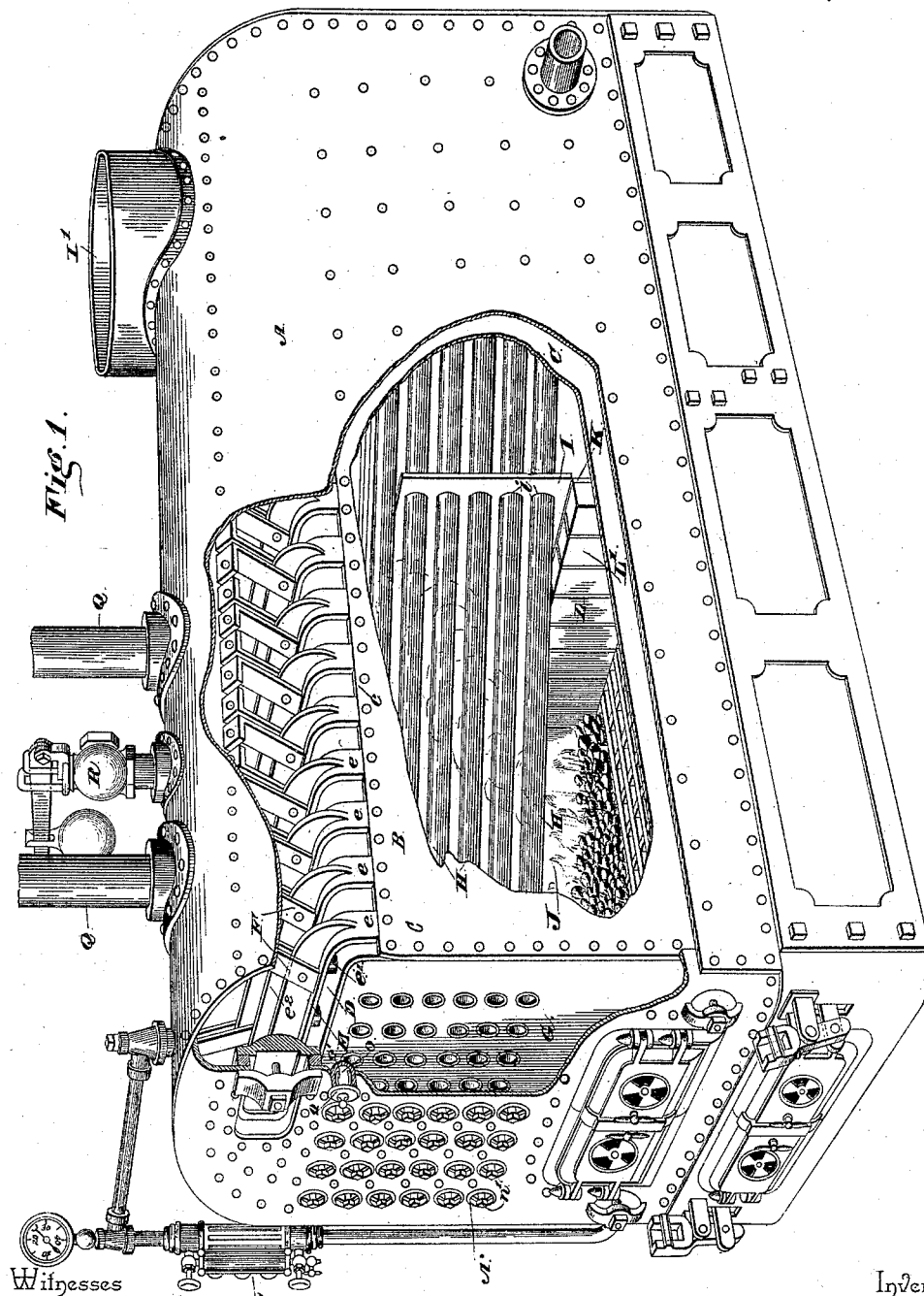
(No Model.)

2 Sheets—Sheet 1.

H. H. LINDEMUTH.
WATER TUBE BOILER.

No. 492,499.

Patented Feb. 28, 1893.



Witnesses

Inventor

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A. P. Volkmann

By his Attorneys,

Harry H. Lindemuth

C. A. Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

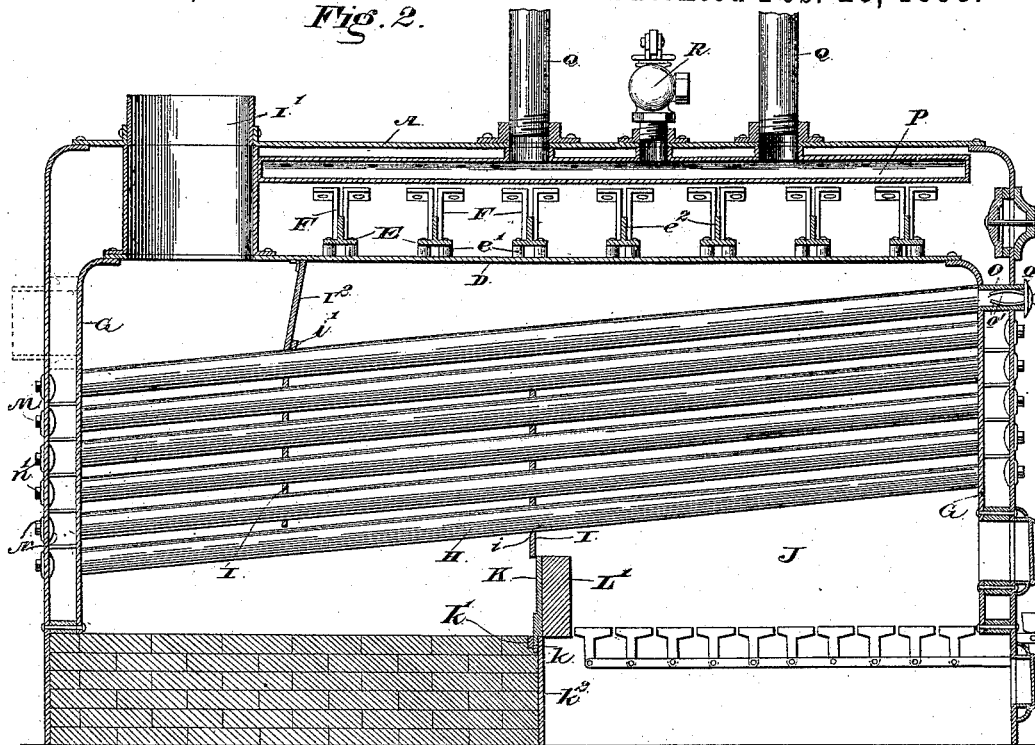


Fig. 3.

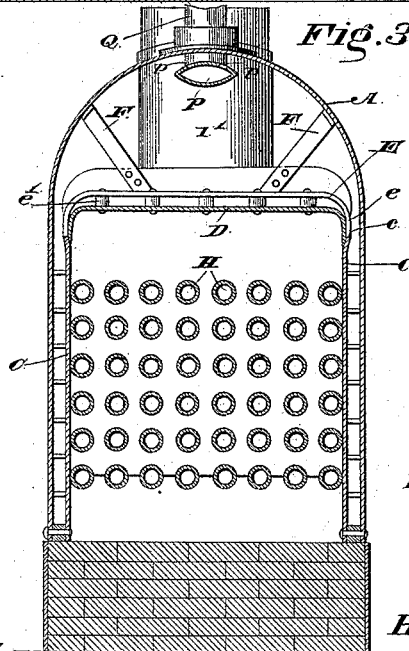
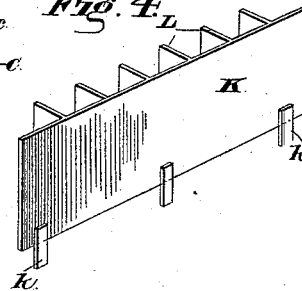


Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY H. LINDEMUTH, OF HARRISBURG, PENNSYLVANIA.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 492,499, dated February 28, 1893.

Application filed April 25, 1892. Serial No. 430,532. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. LINDEMUTH, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and useful Water-Tube Boiler, of which the following is a specification.

This invention relates to steam boilers; and it has for its object to provide an improvement in that class of boilers generally known as water tube and jacket boilers, and particularly to provide improvements over a former patent granted to me July 29, 1890, No. 433,315.

To this end it is the main object of the invention to improve upon the construction of such boilers and to provide the same with improved devices and fastening means which not only render the same stronger and more durable yet at the same time much more efficient in use.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a perspective view partly broken away, of a steam boiler constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a vertical transverse sectional view of the same. Fig. 4 is a detail in perspective of the removable bridge.

Referring to the accompanying drawings;—A represents the outer inclosing casing of my improved boiler which together with the inner walls or casing B inclose a water jacket in which water circulates and the steam is generated in the usual manner.

The inner casing or walls B are provided with the side walls C, which side walls extend from the bottom of the boiler to a sufficient height and overlap the downturned edges of the crown sheet D, the squared upper edges *c* of said side walls C being upon the outside of the overlapped edges of the crown sheet for the purposes to be presently described.

Located at regular spaced intervals upon and over the crown sheet D in any number desired or required are the transverse anchoring bars or plates E, which extend trans-

versely across the top of the crown sheet and have the opposite downturned ends *e*, the edges of which rest directly upon the upper squared edges *c*, of the inner side walls C and the entire strain of said anchor bars or plates is thus placed upon said side walls. The anchoring bars or plates E are securely riveted to the crown sheet but spaced by means of the spacing blocks *e'* a suitable distance above the crown sheet so that there may be a free circulation of water between the crown sheet and said bars, to prevent the accumulation of mud and sediment around said bars or plates and also to preserve the same from the intense heat to which the crown sheet is subjected.

Each of the anchoring bars or plates is provided with the integral vertical flanges or ribs longitudinally disposed thereon and extending from end to end and which are engaged by the lower ends of the opposite pairs of bracing plates F, which are securely riveted to both sides of said ribs or flanges and to the top of the outer casing of the boiler, thus it will be readily seen that the crown sheet of the boiler is securely braced and anchored to the outer casing and all strain and pressure relieved entirely therefrom, which is a most essential feature and advantage gained in boilers. The longitudinally disposed ribs not only provide for firmly connecting the plates or bars F to the bars E, but also allow the connection to be shifted so that the said bracing plates or bars can be secured at any angle desired or position under the outer crown sheet, to accommodate the construction to the boiler, it will also be noted that the plates are spaced at regular intervals apart so that the water can not only circulate under the same but can also circulate there-between.

The opposite heads G of the water jacket formed by the outer and inner casing are communicated with by the series of inclined or diagonally arranged water tubes H, which are secured in the opposite inner ends of the inner casing and pass through the vertical tube plates I, arranged directly in rear of the fire box J and between such point and the rear end of the boiler. Each of the said vertical tube plates is pierced with a series of tube receiving openings *i* which openings are cut at the same angle therein as the angle

of the tubes so that when the tubes are expanded in the openings, the same meet even edges and therefore have a perfectly even and flat bearing in the same and are thus prevented from being impaired by being expanded across the edges of an opening which is cut at a different angle from the disposition of the tube, as is the case in my former patent, No. 433,415. The tubeplate I adjacent to the fire box J leaves a space between the upper ends of the same and the crown sheet so that the smoke and other products of combustion pass through the water tubes directly over the fire box over the top of said tube plates and under the intermediate tube plate, which leaves a space between the lower end of the same and the bottom of the boiler. The smoke and other products of combustion therefore tortuously pass from the fire box around the tube plate and out through the escape pipe I' suitably located at the rear end of the boiler and opening into the heat chamber. The intermediate tube plate adjacent to the rear head or end of the boiler, also terminates short of the crown sheet and is provided with an angled or beveled end against which fits the lower end of the door I² loosely connected to the crown sheet and normally closing the space between the upper end of said tube and the crown sheet. Thus it will be seen that ready access may be had to the entire crown sheet in front of said door and above the water tube for the purpose of repair or inspection. This is an important point inasmuch as boilers of this type have no means for gaining such access to the crown sheet without the removal of the tubes.

Instead of the necessity of building an ordinary bridge wall, I dispense with the same and employ a removable metallic bridge wall plate K, which is located at the back of the grate and fire box directly under the first tube plate I and meets the lower edge of said tube plate to complete the back wall of the fire box. The said bridge wall K is provided with a series of depending lugs *k* engaging suitable sockets *k'*, in the back of the ash pit plate *k*², and the said bridge wall plate is further provided with a series of forwardly extending parallel flanges L, which form separate and independent open cells which receive the fire brick L', which snugly fit within the cells and form a substantial bridge wall, and provide means whereby a defective brick can be easily replaced and the entire wall set up easily and without skill being required. The opposite end of the outer inclosing casing A, is provided with a series of cleaning holes M directly opposite the open ends of the flues opening into the front and back heads of the boiler. Said openings are inclosed by the opposite disk caps N, which are securely clamped together by the clamping screws *n'*, which pass through one of said disks and into the other. I provide the boiler with a blast opening O, or several if necessary, which may be located in the front head of the boiler and

opens into the fire chamber, so that the dirt &c., can be easily blown off of said tubes when necessary. Said opening is inclosed by the cap *o* fitting over the outer end thereof and provided with the spring arms *o'* clamping into the opening or short tube to hold said cap in place.

Directly above the crown sheet and supported near to the top of the casing A, is the horizontal oval shaped separating tube P. The said separating tube P extends horizontally along near the top of the casing and is provided with a longitudinal series of steam receiving openings *p* in the top thereof, which are designed to collect the steam from the highest point possible and thereby separate the water therefrom and collect it in as dry a condition as possible. The steam passes from said separating tube out of the ordinary steam pipes Q to the point of use and the pressure of the same is vented by the ordinary safety valve R connected therewith.

The usual gage attachment S is connected with the boiler and otherwise than that already particularly specified the same is similarly constructed in other respects, with fire doors, grates, &c., as other boilers.

It is now thought that the construction and many advantages of the herein described boiler are apparent without further description.

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

1. In a boiler, the combination with the outer casing; of the inner casing having a top crown sheet provided with down-turned ends, and the opposite side walls having their upper squared edges lapping said down-turned ends of the crown sheet, a parallel series of separate and independent anchoring bars or plates arranged above the top crown sheet of the inner casing and having opposite downturned ends resting directly upon the upper squared edges of said side walls, and integral longitudinally disposed vertical attachment ribs extending from end to end thereof, spacing blocks interposed between said anchoring bars and said crown sheet to provide a water circulation, and opposite pairs of bracing plates securely riveted to both sides of said vertical ribs and the top of the outer casing of the boiler, substantially as set forth.

2. In a boiler the combination with the water jacket, inclosing the fire chamber, of the front and rear tube receiving and baffle plates arranged directly back of the fire box and intermediate of such point and the back end of the jacket, one of said plates being provided with an angle or beveled upper end, and an inspection door loosely connected to the crown sheet of the jacket and normally resting against said angled end, for the purposes set forth.

3. In a boiler, the combination with the inclosing casing and the fire box, of the ash pit wall or plate having sockets, a metallic bridge

wall plate located directly back of the fire box and provided with depending securing lugs removably fitting into said sockets, and a series of forwardly extending parallel
5 flanges forming separate and independent brick cells adapted to removably receive the bricks, substantially as set forth.

4. In a boiler, the combination with the water jacket and the water tubes connecting the
10 opposite heads of said jacket, of a short blast tube or opening extending through one of the heads of said jacket above or in a line with

said tubes, and an inclosing cap fitted over the outer end of said tube and provided with spring arms clamping in the same, substantially as set forth. 15

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HARRY H. LINDEMUTH.

Witnesses:

MINNIE S. HEISTAND,
GEO. W. TRUMP.