

(No Model.)

T. J. LINNEKIN.
STEAM BOILER.

No. 581,512.

Patented Apr. 27, 1897.

Fig. 1.

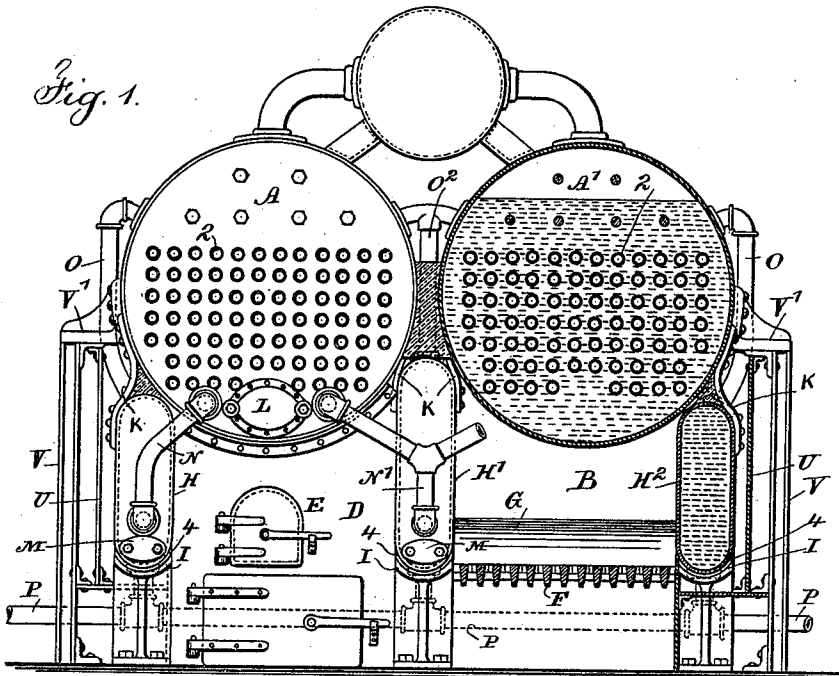
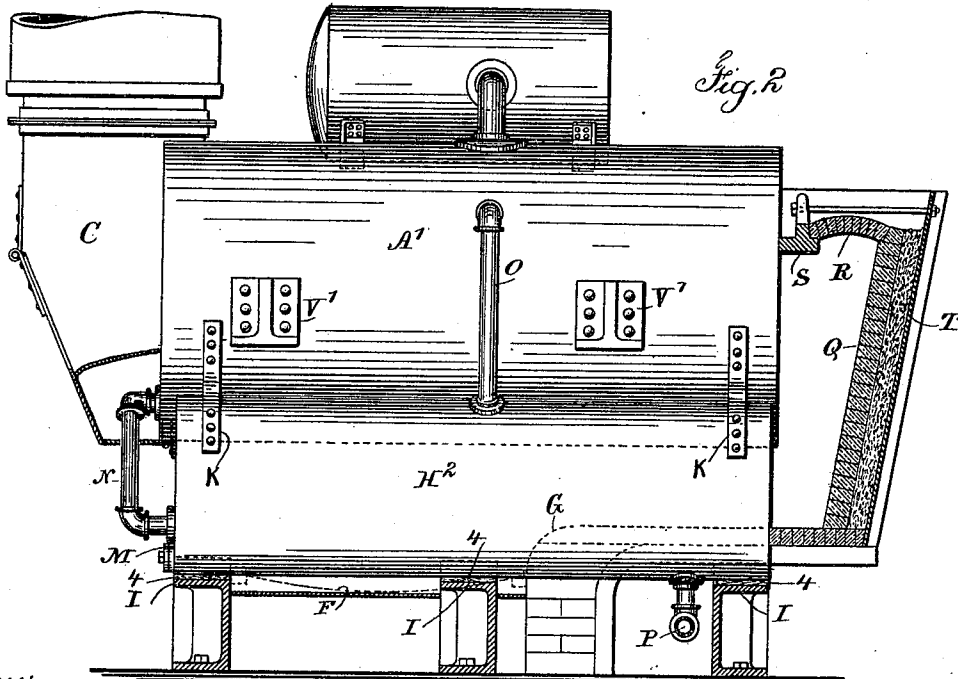


Fig. 2.



Witnesses

Charles Smith
J. Stait

Inventor

Thomas J. Linnekin
per L. W. Perrell & Son
Atty

UNITED STATES PATENT OFFICE.

THOMAS J. LINNEKIN, OF BROOKLYN, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 581,512, dated April 27, 1897.

Application filed January 12, 1897. Serial No. 618,908. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. LINNEKIN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Steam-Boilers, of which the following is a specification.

Locomotive-boilers have been made with water legs or sides around the fire-chamber, and in some instances water legs or sides approximating generally to those in a locomotive have been used with a separate tubular boiler resting upon the top edges of the water legs or sides, and tubular connections have extended from the water-legs to the main boiler for water to circulate from one to the other. In these instances the water legs or sides have been expensive and difficult to construct or to repair.

In my present invention I make use of flattened vertical boiler-sections forming water-walls to the fire-chamber, extending from the front plate of the furnace back to the bridge-wall, or preferably to the extreme rear end of the boiler, and these are elliptical in cross-section, so as to obtain great strength and also to be easy to construct, and the water-walls are supported on concave bearings with yielding material, such as asbestos, between such concave bearings and the under surfaces of the water-walls, and the connections between the water-walls and the main boiler are bolted on, so that the parts are easily separated if repairs become necessary.

By the aforesaid improvements a saving in fuel is effected, because the fire is in direct contact with the water-walls, and the heat, which would otherwise be dispersed through the fire-brick employed with ordinary tubular boilers, is utilized in heating the water in the water-walls, and where the boiler-sections forming the water-walls are liable to injury by the direct contact of the fuel such water-walls can be removed with facility and either repaired or others substituted.

In the drawings, Figure 1 is an end view of a pair of boilers with the hood or base of the smoke-stack removed and one of the boiler and water walls in section. Fig. 2 is a side view of the boiler and one of the water-walls and a section of the back flue.

The boilers A A' are represented as similar

and provided with flues 2 of any desired size or character, and I have represented the present improvement as employed with boilers where the fire is directly beneath the cylinder of the boiler, and the products of combustion pass to the rear flue B and return through the flue-tubes 2 of the boilers and pass up through the hood C or pass to the smoke-stack, as usual, and the front plate D of the furnace is provided with doors E for the insertion of fuel into the fire-chamber and upon the grate-bars F, and the bridge-wall is provided at G, and the flue beyond the same extends beneath the boiler to the rear flue B.

I have shown the present improvements as applied to the two boilers A and A' for an object hereinafter stated, but the water-walls can be applied at the two sides of a single fire-chamber, the water-walls and connections being similar.

The water-walls H H' H² are made as boiler-sections of the proper length and flattened or elliptical in cross-section, so as to extend from the grate-bars or near them up to the sides of the boiler, and these boiler-sections form water-walls, and they are to be of metal sufficiently strong, and tie-bolts or braces are provided, as usual.

Each water-wall rests at its underside upon a concave bearer I, fitting, or nearly so, the curvature of the under edge of the water-wall, and a layer of asbestos or similar yielding material intervenes, as at 4, between the concave bearer and the under side of the water-wall, so as to form a yielding bearing and to allow for the slight motion incident to expansion or contraction. These concave bearers are preferably at the front plate D and near the bridge-wall, and tie-bars K are usually provided between the sides of the boiler and the outer sides of the water-walls. These tie-bars may be riveted upon the sides of the boiler and bolted to the sides of the water-walls to allow for disconnecting the parts, or when rivets are employed at both places they can be cut off, as usual, when it becomes necessary to disconnect the water-walls from the boiler.

Manholes and covers are usually provided at the ends of the boilers, as at L, and hand-holes and plates in the lower portions of the water-walls at the front ends, as shown at M,

to give access to the respective parts for the removal of sediment or for repairs.

The tubular connections between the water-walls and the main boilers are advantageously in the form represented—that is to say, the bent pipes N extend down from the front ends of the boilers to the lower portions of the water-walls at the ends—and they are connected to the respective parts preferably by screw-bolts, and the pipes O extend from the upper portions of the water-walls to the sides of the boiler, near but below the water-line, so that there may be a constant circulation of water down the pipes N and up the pipes O by the action of the heat, and the pipes P extend to the supply-pump, so that the feed-water enters near the bottom of the water-walls and becomes heated as it circulates upward into and through the boiler. In this manner a very rapid circulation is obtained for conveying the heat from the water-walls directly into the boiler in the production of steam.

Where two boilers are used side by side, as shown in the drawings, I prefer to make the intermediate water-wall H' sufficiently high to extend closely to the adjacent surfaces of the boilers in order that the space between the boilers and above the water-wall H' may be filled in with fire-brick, and in this construction the rising pipe O² from the intermediate water-wall H' preferably passes up from the intermediate water-wall and near the back end, so as to be built in with the fire-brick, and the upper end terminates with branches passing to the two boilers, and with this intermediate wall H' the pipe N' is advantageously made, with the branches passing to the respective boilers, as shown in Fig. 1.

The rear wall Q of the rear flue B is advantageously set at an inclination, as represented in Fig. 2, in order that the products of combustion may be kept closely adjacent to the back lower portions of the boilers, and the arch R covers the upper end of the rear flue B, and such arch and the cross-bearer S will not be exposed to undue heat, because the products of combustion have an opportunity to expand into the larger upper end of the rear flue, and they are drawn through the boiler-flues with rapidity, so that this construction increases the efficiency of the products of combustion and at the same time renders the brickwork more durable.

Outside the rear wall Q of the flue B it is advantageous to employ loose non-conducting material, such as asbestos, between the brickwork and the inclosing case T.

In stationary boilers brickwork may be employed outside the water-walls, but in marine boilers it is advantageous to employ side cases U outside of the water-walls and between the same and the angle-iron boiler-supports V,

which may be of any desired character and come up against the under side of the brackets V' upon the boilers A A'.

I claim as my invention—

1. The combination with the main boiler, of water-walls formed of boiler-sections at each side of the fire-chamber, concave bearers and yielding material such as asbestos for supporting the water-walls, tubular connections extending from the lower part of the boiler at the end down to the lower portions of the water-walls, pipes rising from the water-walls and passing into the main boiler below the water-line, substantially as set forth.

2. The combination with the two horizontal boilers placed side by side, of water-walls at the outer sides of the fire-chambers, and a water-wall between the two fire-chambers rising up between the two boilers, tubular connections for the circulating water from the ends of the boilers down to the lower portions of the water-walls, pipes rising from the upper portions of the water-walls and passing into the boilers below the water-line, substantially as set forth.

3. The combination with the horizontal flue-boiler and the front plate, of water-walls formed of flattened boiler-sections and one at each side of the fire-chamber, bearers at the front plate and near the bridge-wall for the water-walls and tubular connections from the boiler to the water-walls for the water to circulate, substantially as set forth.

4. The combination with the horizontal flue-boiler and the front plate, of water-walls formed of flattened boiler-sections and one at each side of the fire-chamber, bearers at the front plate and near the bridge-wall for the water-walls and tubular connections from the boiler to the water-walls for the water to circulate, the water-walls extending to the rear end of the boiler, or nearly so, and a flue with an inclined back wall and arch over the top for the products of combustion to pass from the fire over the bridge-wall below the boiler and between the water-walls to the back flue returning through the tubes of the boiler, substantially as set forth.

5. The combination with the two horizontal boilers and their fire-chambers, of a water-wall between the two fire-chambers extending up between the two boilers, a pipe extending from the lower parts of the boilers at their ends down to the end of the water-wall, and a pipe rising from the top of the water-wall between the two boilers and connected at its upper end to such boilers, substantially as set forth.

Signed by me this 9th day of January, 1897.

THOS. J. LINNEKIN.

Witnesses:

S. T. HAVILAND,
CHAS. H. SMITH.