

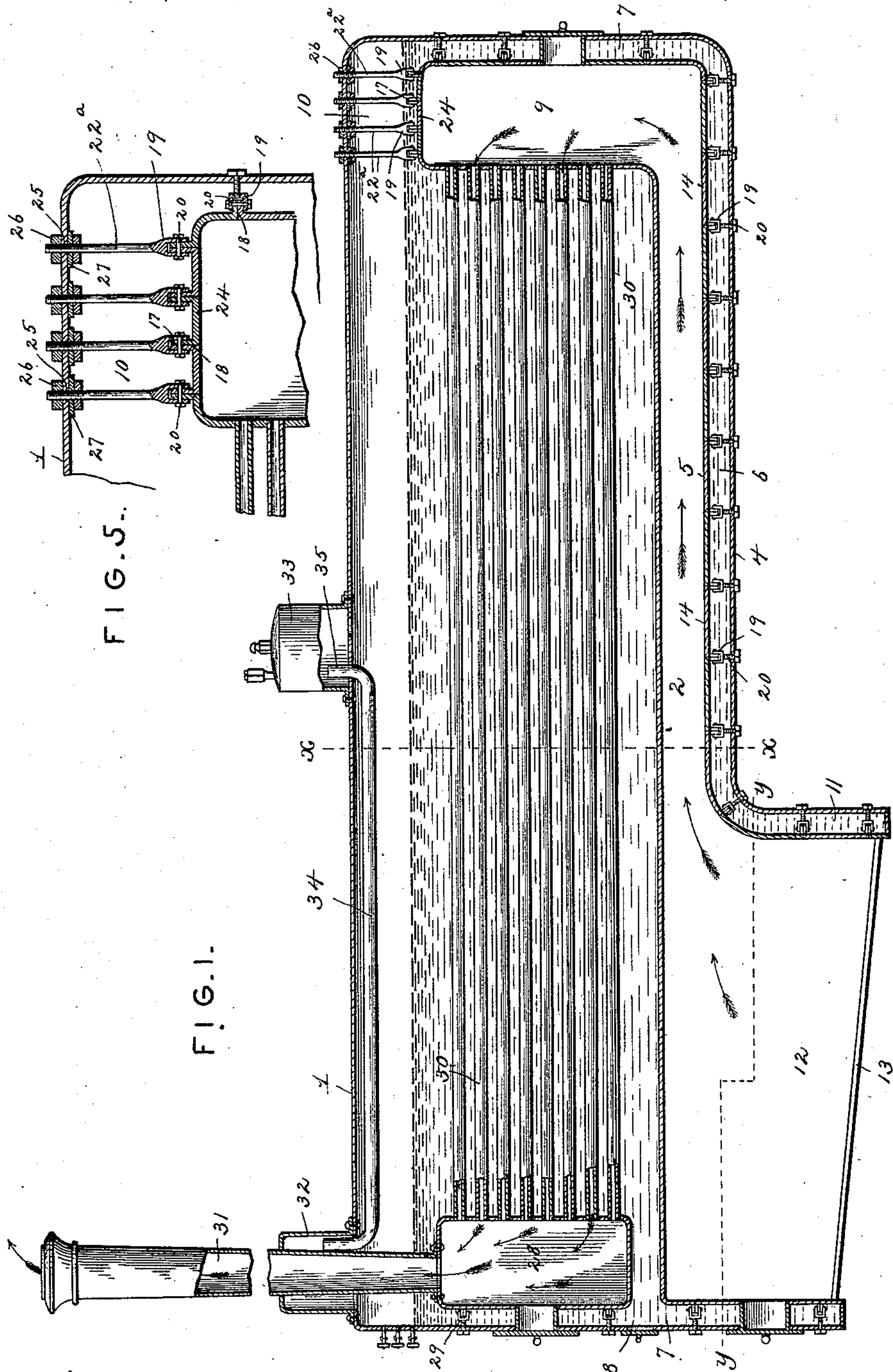
(No Model.)

2 Sheets—Sheet 1.

L. WILSON.  
STEAM BOILER.

No. 539,844.

Patented May 28, 1895.



Witnesses

Harry L. Amer.

D. P. Holman

By his Attorneys.

Luther Wilson,

C. A. Snow & Co.

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FIG. 3.

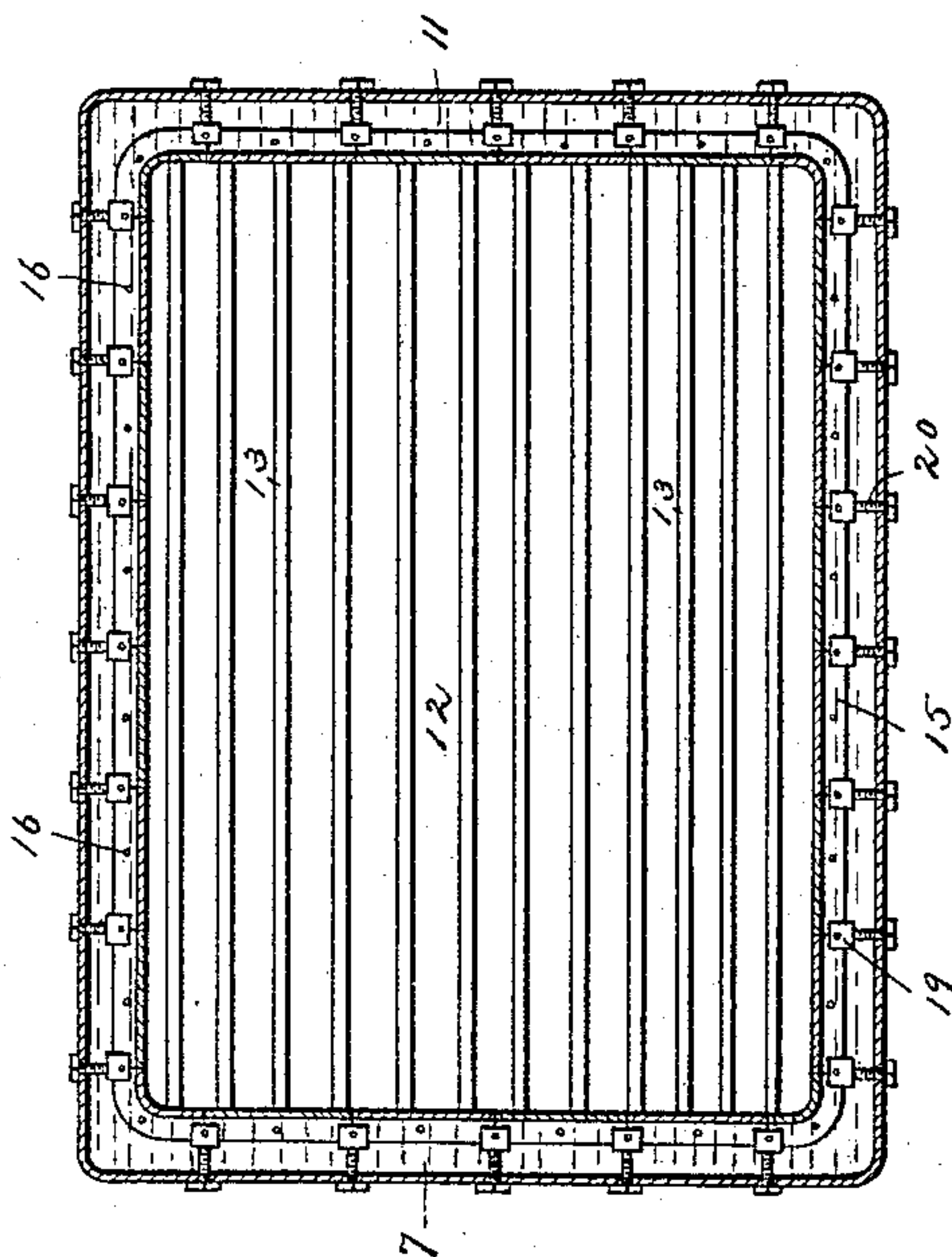


FIG. 4.

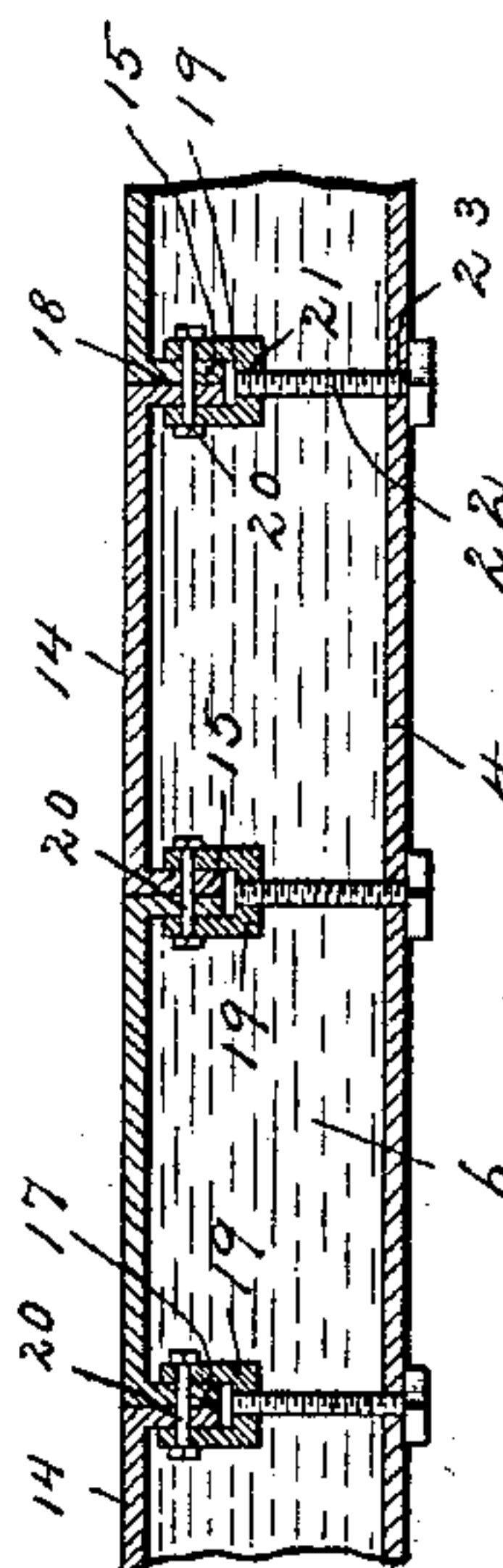
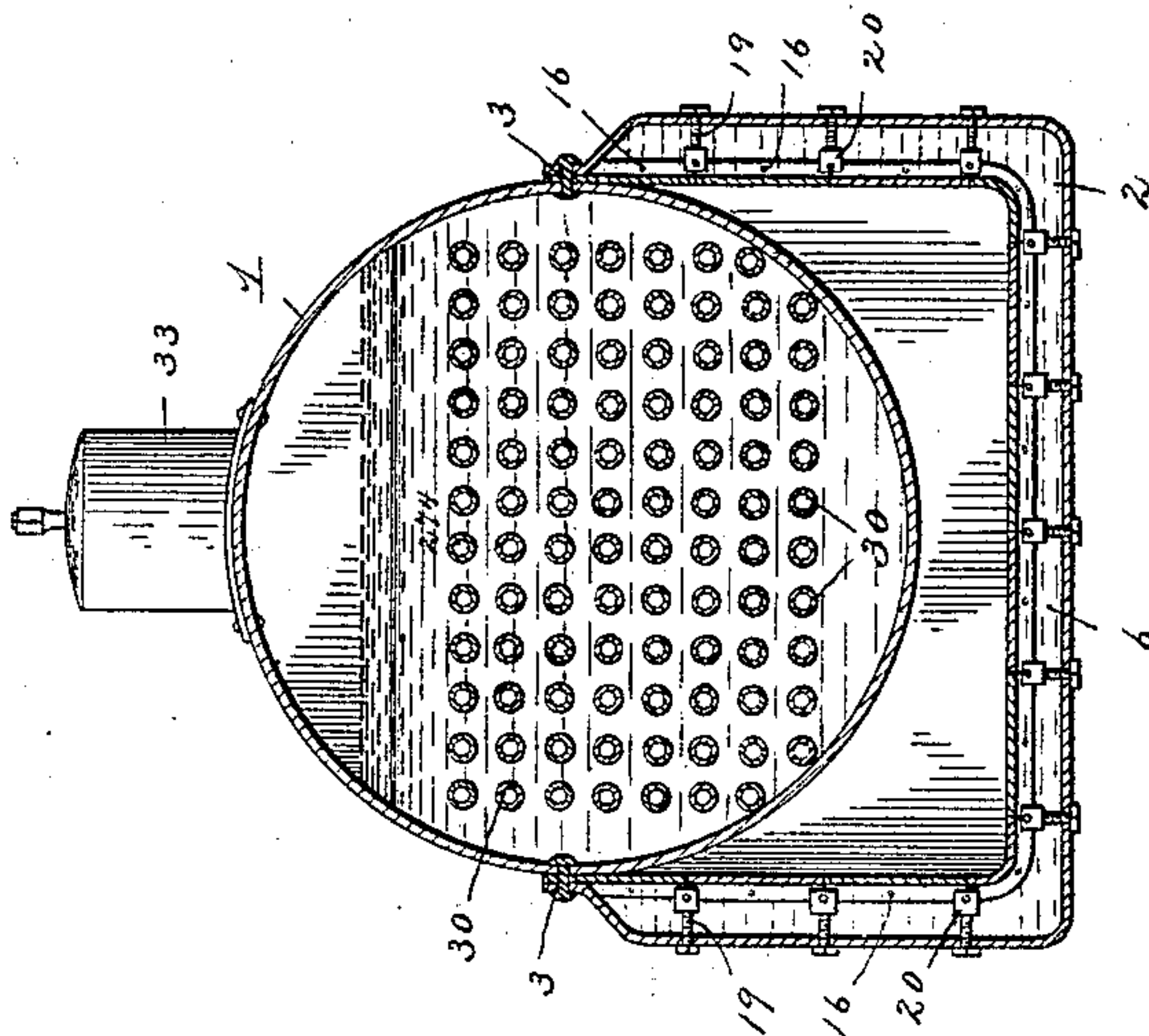


FIG. 2.



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# UNITED STATES PATENT OFFICE,

LUTHER WILSON, OF LOUISVILLE, KENTUCKY.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 539,844, dated May 28, 1895.

Application filed November 13, 1894. Serial No. 528,658. (No model.)

*To all whom it may concern:*

Be it known that I, LUTHER WILSON, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Steam-Boiler, of which the following is a specification.

This invention relates to steam boilers; and it has for its object to provide a new and useful construction of steam boiler and the setting thereof, whereby a large water and heating area will be secured to increase the capacity of the boiler both for holding water and for generating large quantities of steam, and the invention also contemplates a construction of boiler wherein all of the fastenings and stays therefor are not exposed to the burning out action of the fire, and thereby greatly increasing the life of the boiler.

The invention also contemplates a novel means of fastening and staying the sectional parts of the boiler to allow for contraction and expansion.

With these and 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 drawings, Figure 1 is a central vertical longitudinal sectional view of a steam-boiler constructed in accordance with this invention. Fig. 2 is a transverse sectional view on the line *x x* of Fig. 1. Fig. 3 is a horizontal sectional view on the line *y y* of Fig. 1. Fig. 4 is an enlarged detail sectional view of a section of the water-jacket casing, showing the stay-fastenings connecting the inner and outer walls thereof. Fig. 5 is a similar view showing the stay-fastenings for the crown-sheet of the combustion-chamber of the boiler.

Referring to the accompanying drawings, 1 designates the boiler proper which is of the ordinary tubular shape, and in the present invention, the said boiler is set within a squared U-shaped water jacket casing 2, that is secured at its upper side edges as at 3, to diametrically opposite sides of the boiler in perfectly tight joints. The said squared U-shaped water jacket casing 2, for the boiler, consists of the outer and inner walls 4 and 5 respectively that confine therebetween a

water space 6, to hold and circulate the water of the boiler, and said water jacket casing 2, is provided at both of its opposite ends with the end portions 7, that form a water front and water back respectively at the opposite ends of the boiler, thereby providing a construction of casing for the boiler wherein the boiler is surrounded at the sides, ends, and bottom by a water jacket.

One of the end water jackets 7, of the water jacket casing is arranged flush with one end of the boiler proper 1, and communicates with such end of the boiler at the bottom as at 8, and the opposite end water jacket 7, of the water jacket casing is spaced from the adjacent end of the boiler to form the ordinary end combustion chamber 9, which, in the present invention, by reason of the specific arrangement of the parts of the boiler, is located at the front end of said boiler.

The end water jacket 7, at the front end of the boiler, is connected at its upper end to the boiler neck 10, extended from the upper side of the boiler at one end thereof to provide communication between the upper part of the boiler and one of the end water jackets, thereby completing the connections between the boiler proper and the water jacket casing therefor, whereby a greatly increased water and heating area will be secured.

At the rear end of the boiler, the water jacket casing 2, is provided with an enlarged rectangular portion 11, that incloses an ordinary fire box 12, within which is arranged the usual grate bars 13, and the rectangular portion 11, of the water jacket provides a water jacket for all four sides of the fire box, as clearly illustrated in Fig. 3, of the drawings, whereby the heat generated in the fire box will be communicated to the water in all four sides thereof, so that in every part of the boiler with which the heat comes in contact it will be observed that there is located a water space to receive the direct action of such heat.

The inner wall 5, of the water jacket casing 2, including the end water jacket portions 7, thereof, consists of a series of boiler plate sections 14, that are provided at their ends with the out turned abutting flanges 15. The flanges of all of the boiler plate sections 14, closely abut together and each pair of abutting flanges is securely riveted by the fasten-



ing rivets 16, secured in the abutting flanges throughout their entire length, and the abutting edges of the flanges 15, outside of the line of rivets, are securely welded or brazed together as at 17, thereby leaving the portions of the flanges inside of the rows of rivets as at 18, free to accommodate themselves to contraction and expansion within the boiler, thereby relieving the boiler from undue strain on this account. By reason of the outturned disposition of the abutting flanges 15, such flanges will be disposed entirely within the water jacket or space of the boiler and will not be exposed to the burning out action of the heat which passes between the boiler proper and the water jacket casing therefor.

The outturned abutting flanges of the inner wall sections 14, are embraced by the U-shaped clamp stirrups 19, that are secured to said flanges by the bolts 20, and are provided in their closed sides with the threaded openings 21 to receive the threaded bolt screws 22, that are also threaded through the screw openings 23, formed in the outer wall 4, of the casing jacket, and these connections form stay fastenings between the outer and inner walls of the casing jacket to secure the same firmly positioned and connected together, and these fastenings are disposed entirely within the water space of said water jacket casing.

The inner wall 5, of the water jacket casing 2, is extended to form the crown sheet 24, of the combustion chamber 9, and said crown sheet 24, also forms one of the walls of the boiler neck 10, and at this point the connection between the outturned abutting flanges to allow for contraction and expansion is particularly useful on account of the intense heat that is always prevalent within the chamber 9, and at this point of the boiler, the stay fastenings are slightly modified on account of the transverse circular shape of the boiler neck 10, and the difficulty of threading bolt screws in place. In providing the stay fastenings for the crown sheet 24, the U-shaped clamp stirrups 19, are formed integral with the inner ends of the bolts 22<sup>a</sup>, the outer threaded ends of which project through openings 25, in the outer wall of the neck 10, and receive thereon the outer and inner clamp nuts 26, and between the inner of said clamp nuts and the outer wall of the neck 10, is interposed the copper washers 27, which provide water tight connections between the bolts 22<sup>a</sup>, and the outer shell of the boiler.

The boiler 1, accommodates within one end thereof opposite the combustion chamber 9, the smoke box 28, one side of which is connected with one end of the boiler by stay fastenings 29, similar to those already described, and the inner side of said smoke box 28, that is arranged entirely within the boiler and is entirely surrounded by the water therein, has connected thereto one end of the return flues 30, the outer ends of which are fitted in the tube sheet forming one side of the combustion chamber 9, to provide communication

between said combustion chamber and the smoke box. The smoke box 28, has connected to the top thereof the lower end of the stack 31, which passes through and above an end steam dome 32, that is arranged on the boiler at one end thereof, and by reason of disposing the stack within a steam dome the steam that accumulates within such dome is superheated by the smoke and other products of combustion passing out of the stack.

The boiler is provided at a point intermediate of its ends with the ordinary main steam dome 33, and in the present invention the two steam domes 32 and 33, are connected by an intermediate steam pipe 34, provided with upturned ends 35, that project respectively up into the said steam domes from within the boiler. By reason of employing the pipe 34, it will be understood that the pressure of steam within the top part of the boiler is equalized and is not concentrated in either of the domes, and by this means priming, which is a necessary incident to drawing steam from one dome, is positively avoided.

From the above it is thought that the construction, operation and many advantages of the herein described boiler will be readily apparent to those skilled in the art, and particularly that the boiler is well adapted for locomotive, marine, or stationary use.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, and at this point it is to be additionally noted that the outturned abutting flanges 15, of the inner wall of the water jacket casing act in the capacity of stiffeners for the interior of the boiler to resist the compression therein and thereby serve to greatly strengthen the boiler and prolong the life thereof.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. The combination of a tubular boiler provided with a top steam dome at one end and a neck portion extended from its upper side at the end opposite the dome, a squared U-shaped water jacket casing embracing the lower side of the boiler and attached to diametrically opposite sides thereof, said water jacket casing being provided with opposite end water jacket portions, one of which is disposed flushed with and connected with one end of the boiler, and the other of which end water jacket portions is spaced from one end of the boiler and is connected at its upper end to said boiler neck to inclose in a combustion chamber at one end of the boiler stay connections between the inner and outer walls of the water jacket, a smoke box supported entirely within the boiler at the end opposite the combustion chamber and directly under the end steam dome, the return flues connecting the smoke box and combustion chamber, and the stack connected directly to



the top of the smoke box and passed upwardly through said steam dome to provide for superheating the steam in the latter, substantially as set forth.

5 2. The combination of a tubular boiler, a water jacket casing attached to opposite sides of the boiler and embracing the lower side of the same, said water jacket casing consisting of outer and inner walls, the inner wall of  
10 which comprises a series of plate sections provided at their ends with outturned abutting flanges riveted together and welded or brazed outside of the line of rivets, and stay fastenings connected with each pair of flanges and  
15 the outer wall of the casing, substantially as set forth.

3. The combination of a tubular boiler, a

water jacket casing embracing the lower side of the boiler and consisting of outer and inner walls, the inner of which comprises a series of plate sections having outturned abutting flanges at their meeting ends, U-shaped clamp stirrups embracing each pair of abutting flanges, and bolts connected with said stirrups and the outer wall of the casing, substantially as set forth. 20 25

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

LUTHER WILSON.

Witnesses:

JOHN H. SIGGERS,  
E. G. SIGGERS.