

No. 687,798.

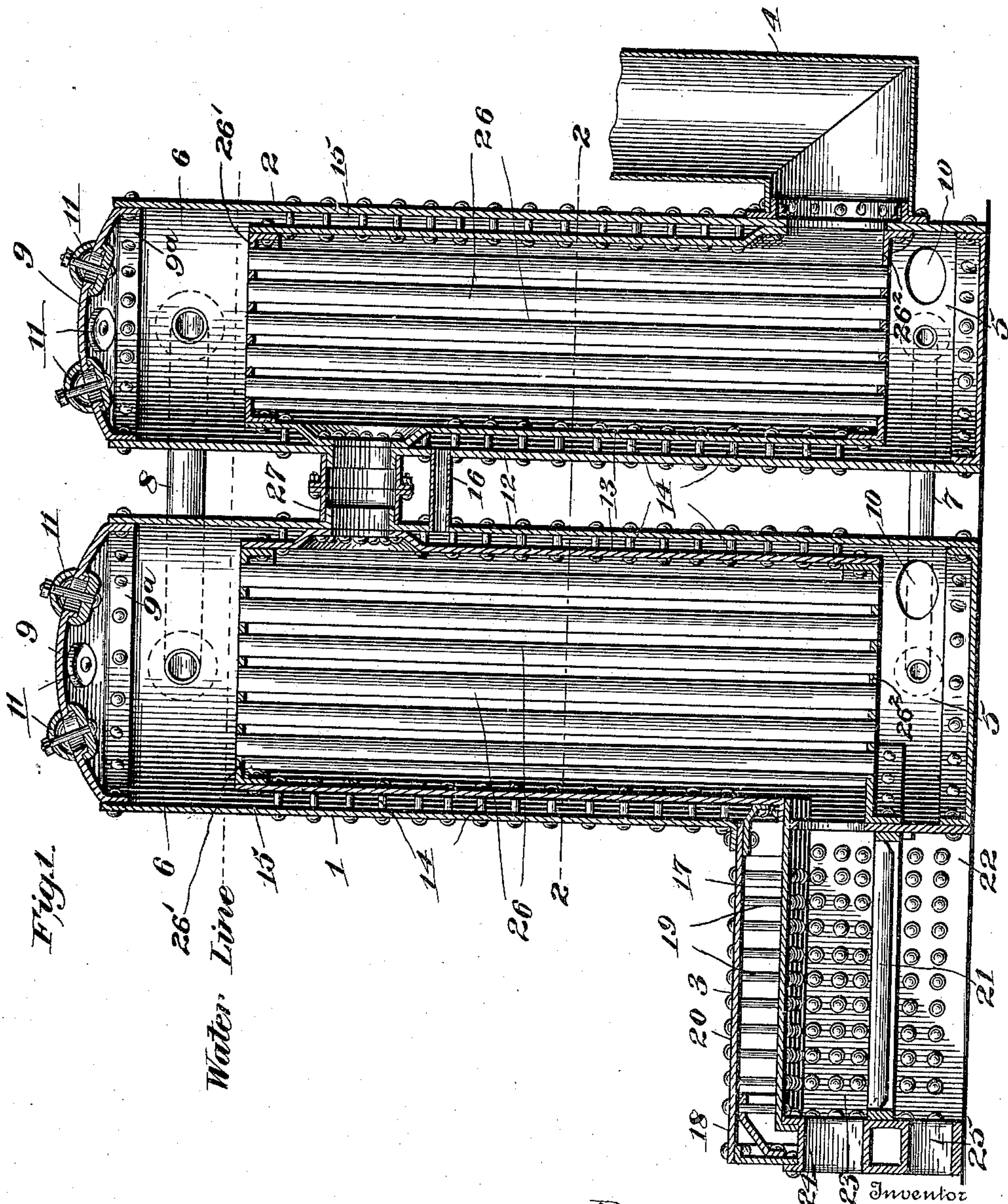
Patented Dec. 3, 1901.

R. J. VAN LIEW.
WATER TUBE BOILER.

(Application filed May 9, 1901.)

(No Model.)

3 Sheets—Sheet 1.



Roy J. Van Liew,

Inventor

Witnesses

Elmer Levey,
Attorney

By

A. B. Wilson & Co.

Attorneys

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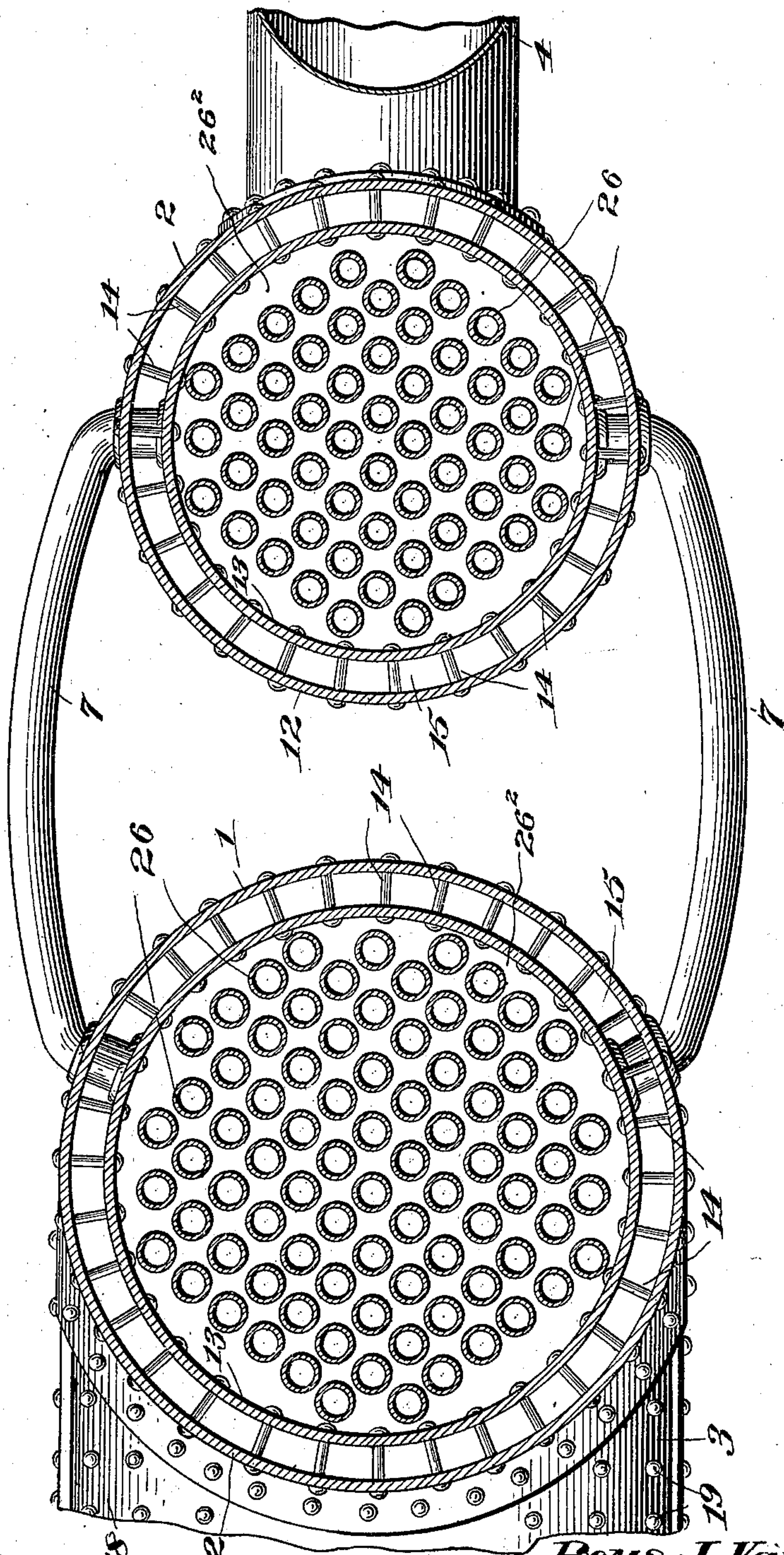
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Fig. 2.



Witnesses

Inventor

Elmer Seavey
J. C. Wilson

Roy J. Van Liew.

A. B. Wilson & Co.

Attorneys

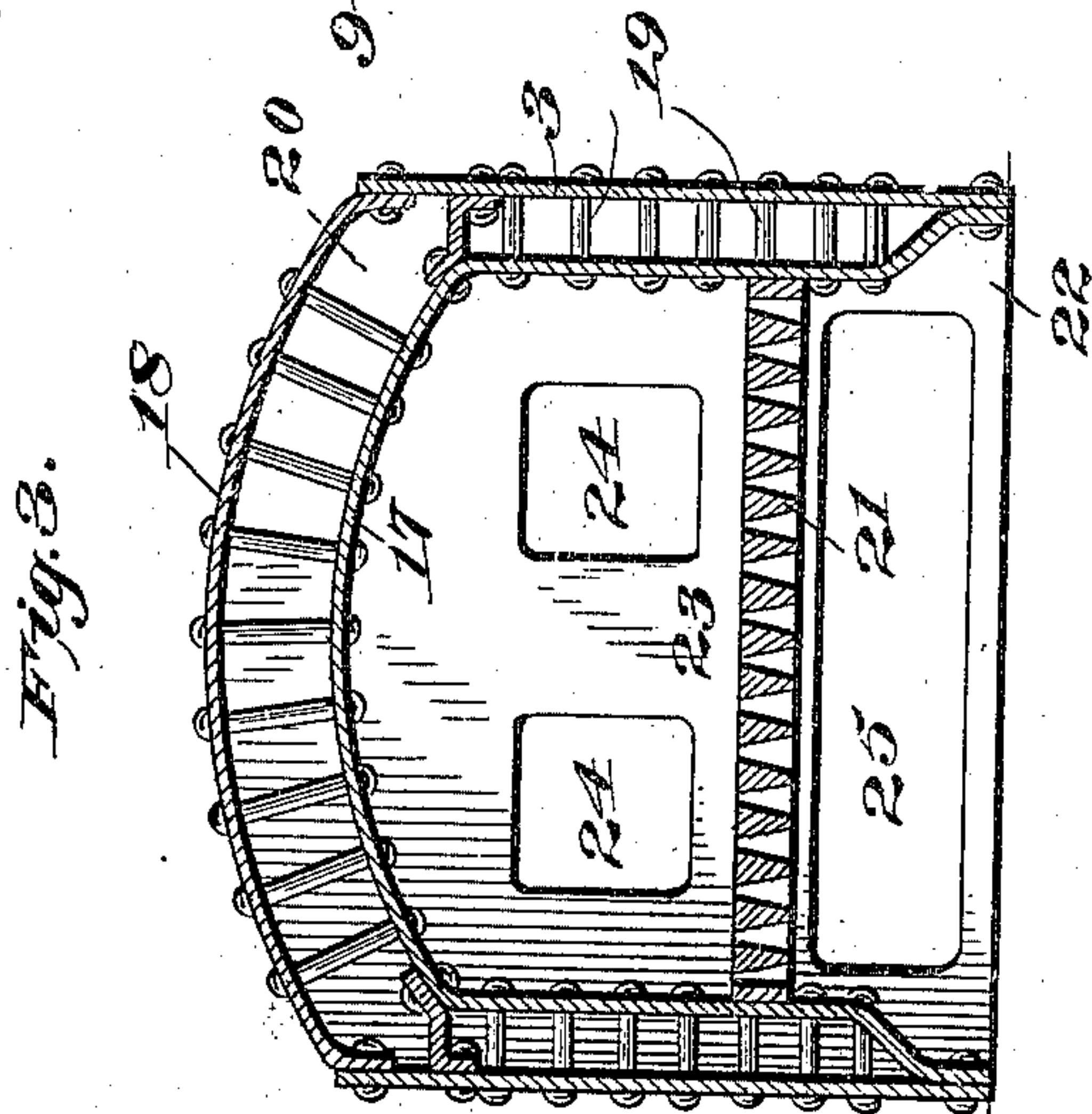
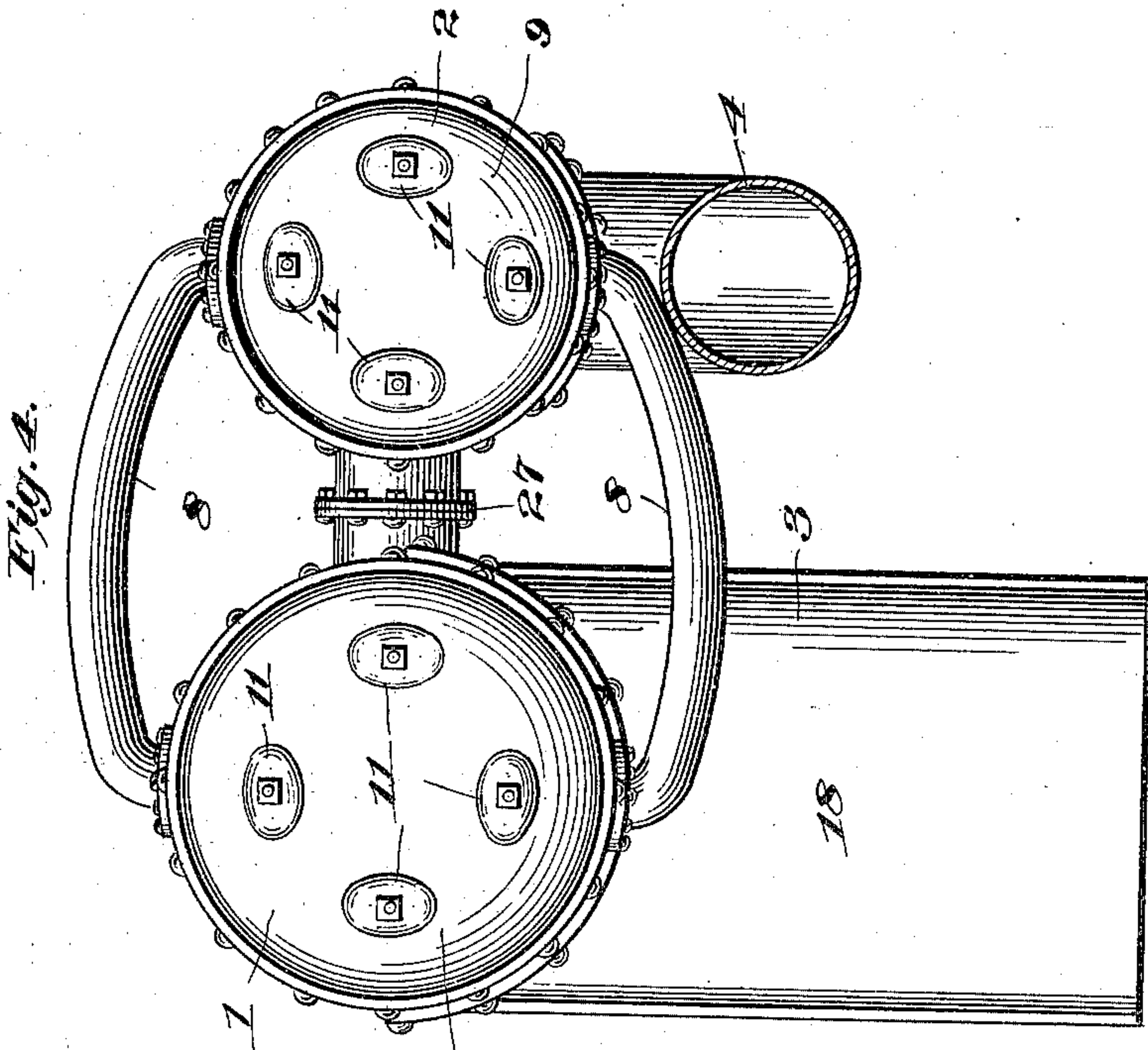
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Inventor

Roy J. Van Liew,

By

A. B. Wilson & Co.

Attorneys

Witnesses
Elmer Seaver,
J. B. Wilson

UNITED STATES PATENT OFFICE.

ROYS J. VAN LIEW, OF PORT HURON, MICHIGAN, ASSIGNOR OF TWO-THIRDS
TO LAURA A. VAN LIEW, OF PORT HURON, MICHIGAN.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 687,798, dated December 3, 1901.

Application filed May 9, 1901. Serial No. 59,451. (No model.)

To all whom it may concern:

Be it known that I, ROYS J. VAN LIEW, a citizen of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Water-Tube Boilers; and I do 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.

This invention relates to improvements in water-tube boilers.

The objects of the invention are, first, to provide a boiler of this type which will give a larger heating-surface than ordinarily with small shells and produce a high pressure of steam with lighter material in shells; second, a boiler in which the heating-surface is inclosed by water-circulating channels formed between the inner and outer shells; third, to produce a duplex boiler receiving heat from a common furnace, and, fourth, to generally simplify the construction and increase the practical efficiency of boilers of this class, so as to secure a larger heating-surface with less consumption of fuel for the floor-space used than is possible with boilers of the constructions heretofore in use.

With these and other ends in view, which will appear as the nature of the invention is better understood, the invention consists in certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is a vertical longitudinal section of a water-tube boiler constructed in accordance with my invention. Fig. 2 is a horizontal section on the line 2-2 of Fig. 1. Fig. 3 is a front elevation of the furnace, and Fig. 4 is a view showing a modification.

Referring now more particularly to the drawings, the numerals 1 and 2 represent the two separate shells of the herein-described duplex boiler, with one of which communicates a furnace 3 and with the other a smoke-stack 4. Each of these shells is formed at its bottom with a water and sediment chamber 5 and at its top with a steam-dome 6. A pipe

7 connects the two water-chambers 5 and a pipe 8 the two steam-domes 6, thus establishing communication between the water and steam spaces of the two shells to equalize the circulation of the water and the steam-pressure. A cap or head 9 closes the top of each boiler-shell and is reinforced by stay-rods 10. Access to each water and sediment chamber and steam-dome is afforded by a manhole closed by a manhole-plate 11.

The body of each boiler-shell is composed of inner and outer plates 12 and 13, which are held spaced by stay-bolts 14 and form annular water-circulating spaces 15, the water-circulating spaces of the two boilers being in communication at top through a connecting tube, pipe, or passage-way 16, through which water may pass from one to the other, and thus equalize the circulation. By forming these spaces or passages which inclose the heating-space of each boiler no loss of heat occurs, as radiation is prevented or reduced to the minimum by the water in said spaces, which absorbs all the available heat which is ordinarily lost by radiation. The top and sides of the wall of the furnace 3 are likewise formed of inner and outer plates 17 and 18, held spaced by stay-bolts 19 to provide a water-circulating space or passage-way 20, which communicates with the passage-way 15 in the boiler 1 and allows water therefrom to circulate therein to take up heat from the furnace and prevent loss of heat by radiation. By this construction a larger proportion than usual of the available heat units from the bed of fuel on the furnace is utilized in making steam.

21 represents the grate, 22 the ash-pit, and 23 the combustion-chamber, of the furnace, which, as shown, are surrounded at top and sides by a hollow metallic shell, and 24 and 25 are the fire and ash pit doors in the front wall of the furnace.

The water-tubes 26 extend vertically within the heating-chamber of each boiler, and these chambers are connected near their upper ends by a flue or passage 27. The hot air, gases, and products of combustion from the bed of fuel on the furnace-grate are thus caused to pass upwardly about the tubes in the boiler 1, thence through the flue or passage 27, then

downwardly about the tubes in the boiler 2, and finally out through the smoke-stack 4, whereby the water-tubes of both boilers are heated from a common furnace, thus securing economy in floor-space and in the use of fuel and utilizing all of the available heat units from the smoke and gases.

As shown in Fig. 1, the boilers may be arranged in tandem style, with the furnace at the front and smoke-stack at the rear; but where the floor-space is too limited for this arrangement I may place the boilers side by side and locate both the furnace and the smoke-stack at the front, as shown in Fig. 4.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of my invention will be readily understood, and it will be seen that by its use desirable advantages in point of simplicity of construction and economy in operation are secured.

While the preferred embodiment of the invention is as herein described, it will of course be understood that changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

1. A duplex water-tube boiler comprising companion shells, each having a body composed of spaced inner and outer headed cylinders, the inner cylinder being shorter than the outer one and suspended therein and forming therewith an internal flue-heating chamber, a base sediment-chamber, a superposed steam-dome and a water-circulating space surrounding said internal flue-heating chamber, water-tubes arranged within each heating-chamber and communicating with the sediment-chamber and steam-dome, a tube connecting the water-spaces of the two shells, a flue connecting the heating-cham-

bers of the two shells, pipes connecting the sediment-chambers and steam-domes of the shells, a furnace in communication with the heating-chamber of one shell, and a smoke-stack in communication with the heating-chamber of the other shell, substantially as described.

2. A duplex water-tube boiler comprising companion shells, each having a body composed of spaced inner and outer headed cylinders, the inner cylinder being shorter than the outer one and suspended therein and forming therewith an internal flue-heating chamber, a base sediment-chamber, a superposed steam-dome and a water-circulating space surrounding said internal flue-heating chamber, water-tubes arranged within each heating-chamber and communicating with the sediment-chamber and steam-dome, a tube connecting the water-spaces of the two shells, a flue connecting the heating-chambers of the two shells, pipes connecting the sediment-chambers and steam-domes of the shells, a furnace having a fire-box and a hollow metallic frame forming a water-passage, said fire-box and water-passage being, respectively, in communication with the heating-chamber and water-circulating passage of one shell, and a smoke-stack in communication with the heating-chamber of the other shell, substantially as described.

3. In a water-tube boiler, a boiler having a body formed of spaced plates forming a water-passage, and a furnace having a hollow metallic frame forming a water-passage communicating with the said water-passage of the boiler, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROYS J. VAN LIEW.

Witnesses:

D. MCARRON,
W. W. STEWART.