

No. 711,645.

Patented Oct. 21, 1902.

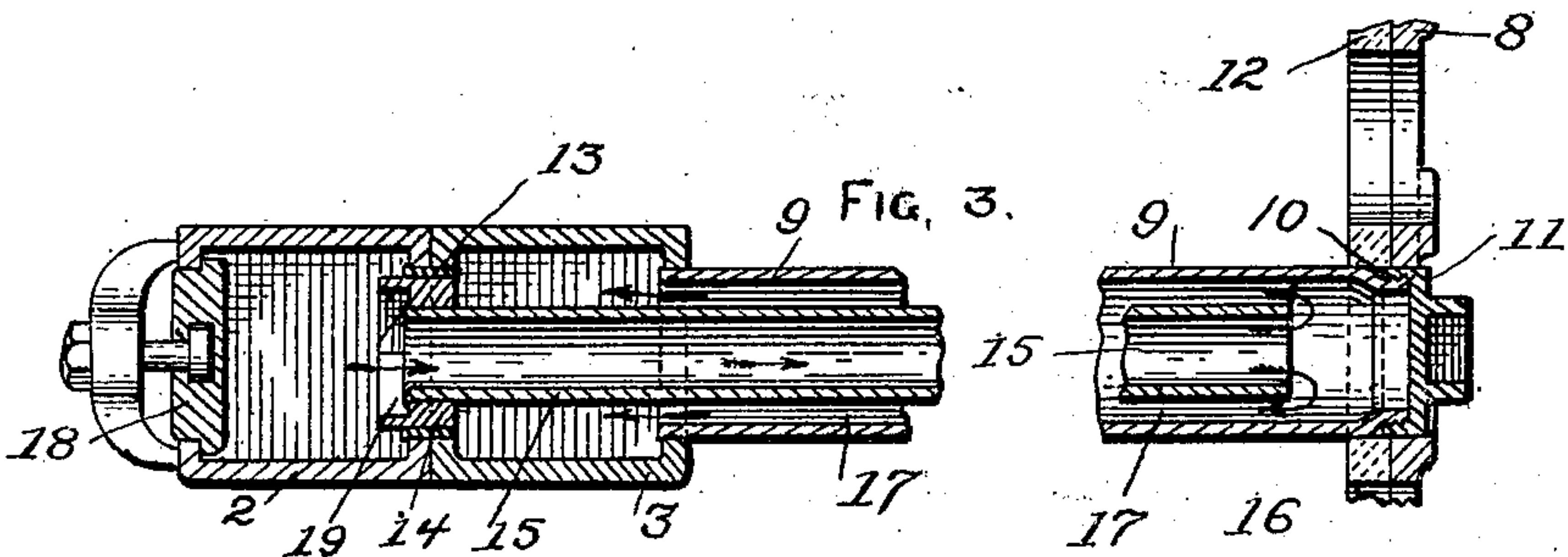
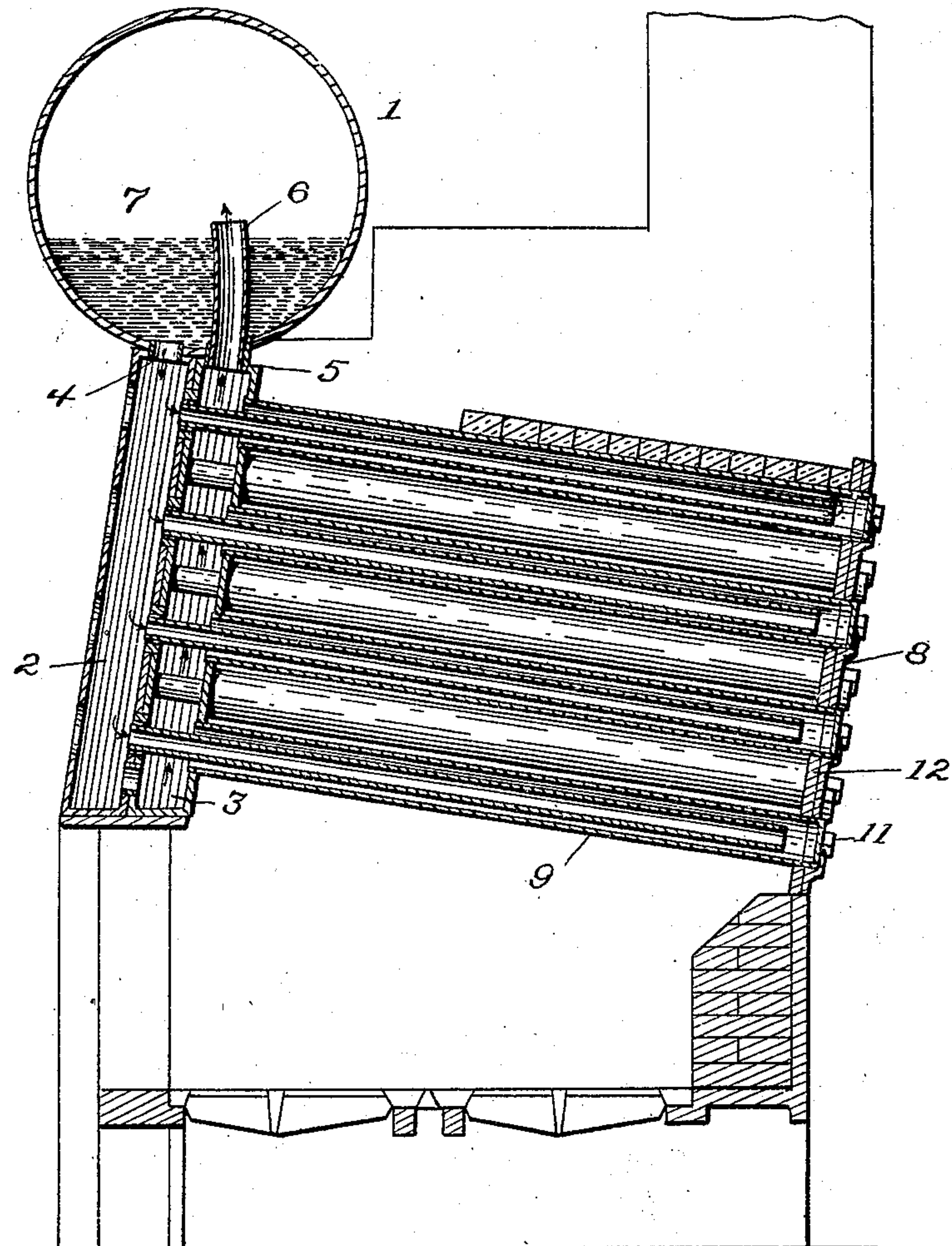
M. H. PLUNKETT.
WATER TUBE BOILER.

(Application filed May 8, 1901. Renewed Feb. 3, 1902.)

(No Model.)

FIG. 1.

2 Sheets—Sheet 1.



WITNESSES:

John H. Webb
John F. Kelly

INVENTOR
M. H. PLUNKETT.

BY *S. Brashers*
ATTORNEY.

No. 711,645.

Patented Oct. 21, 1902.

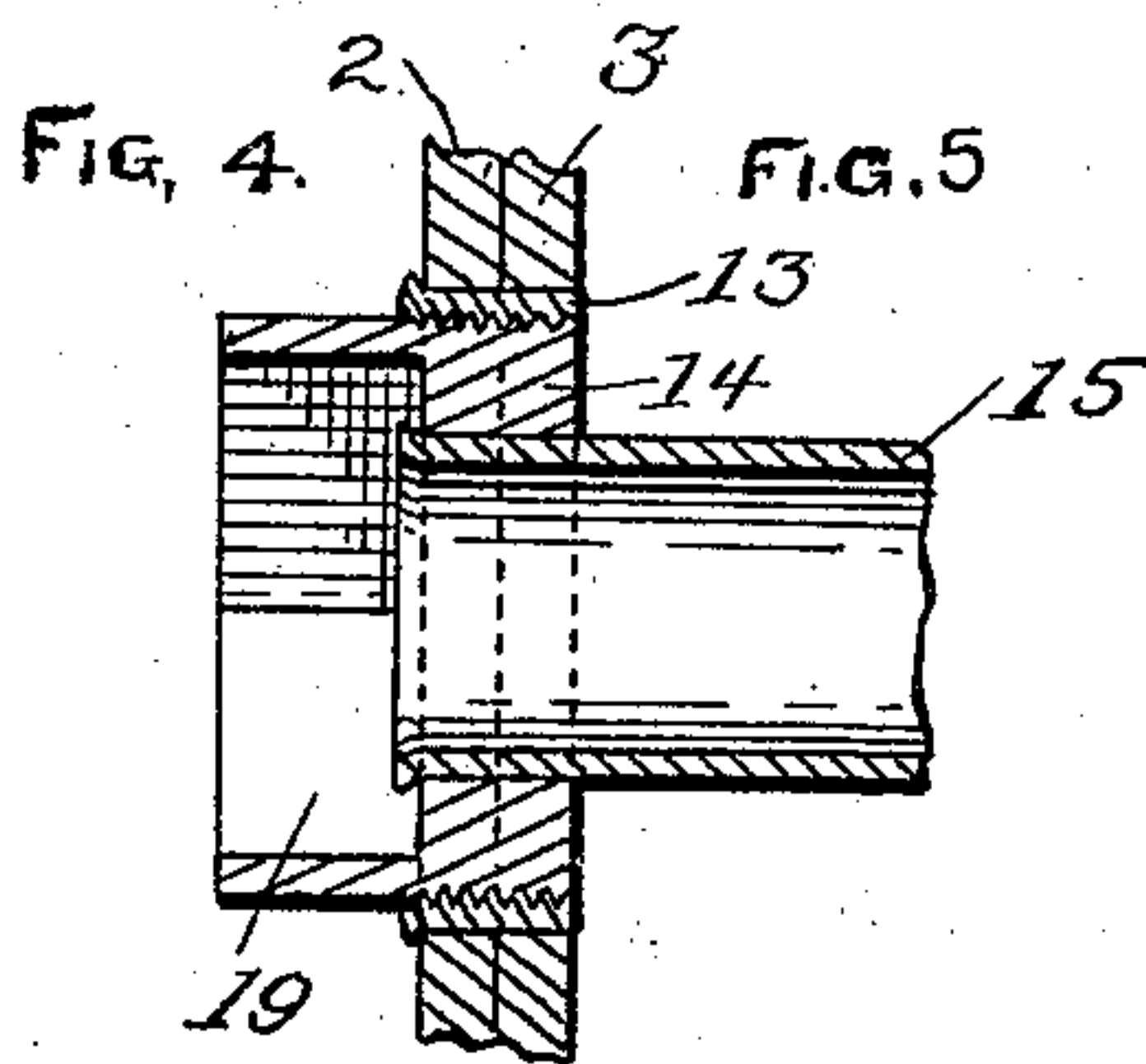
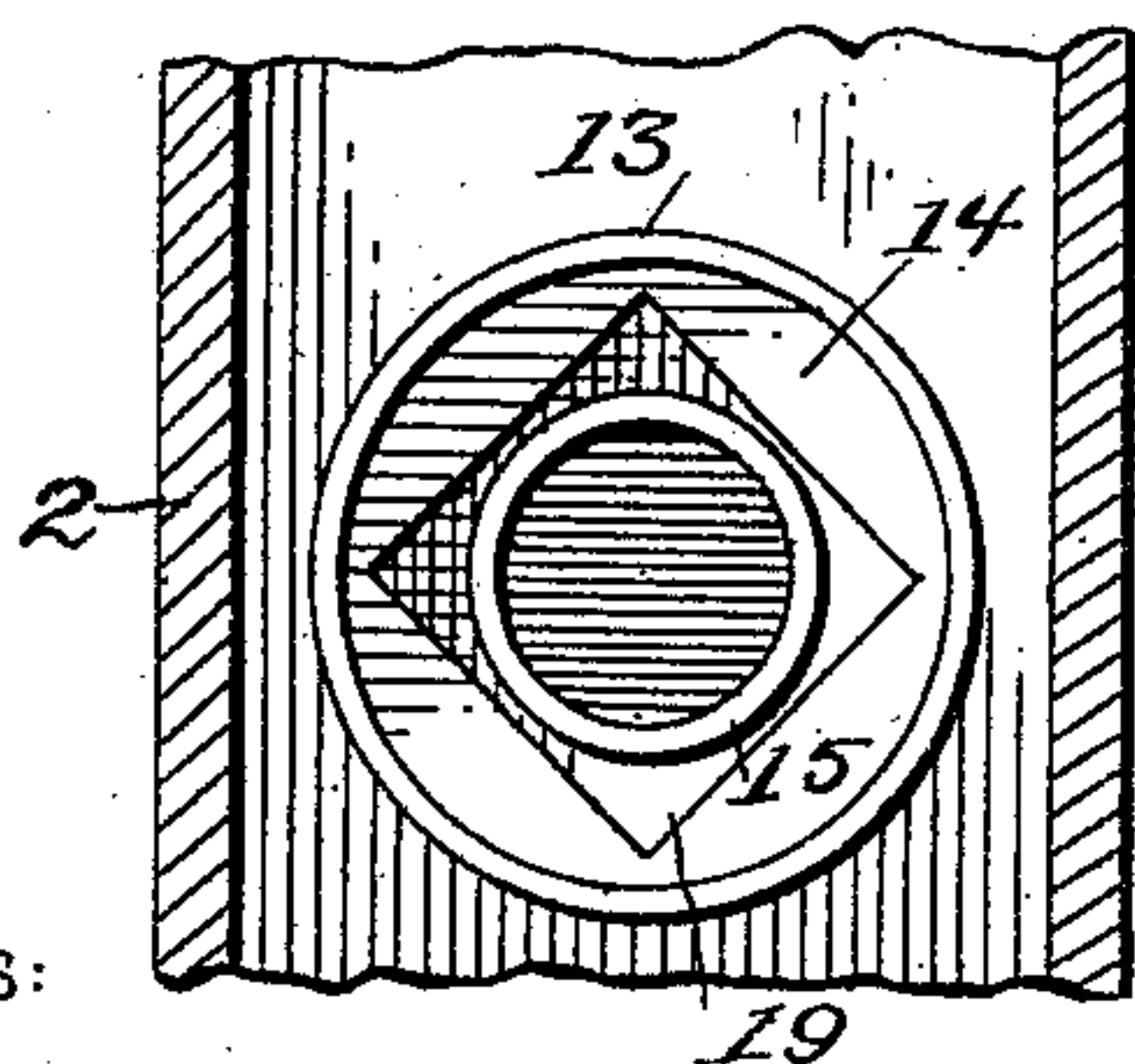
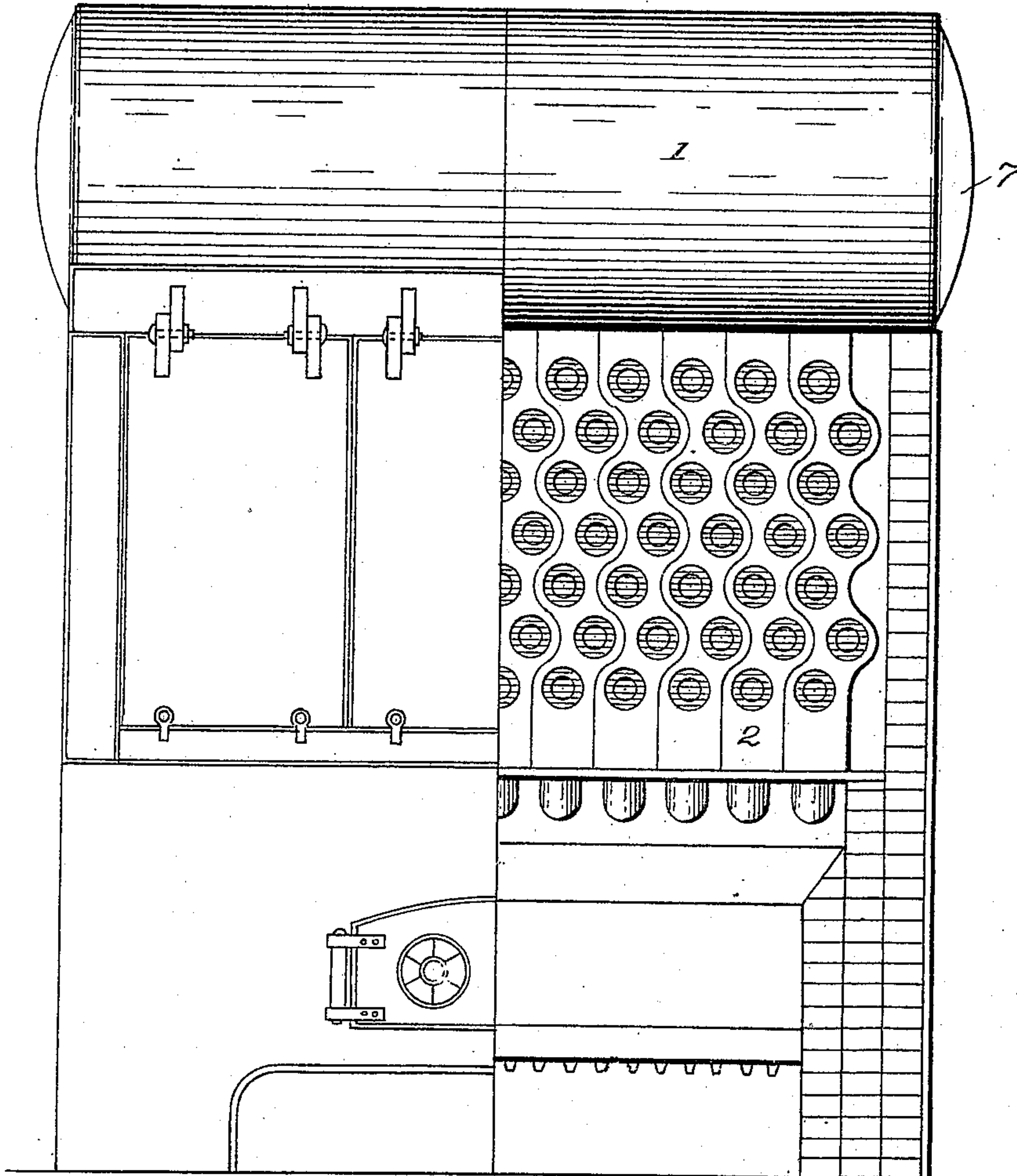
M. H. PLUNKETT.
WATER TUBE BOILER.

(Application filed May 8, 1901. Renewed Feb. 3, 1902.)

(No Model.)

FIG. 2.

2 Sheets—Sheet 2.



WITNESSES:

John F. Kelly
John F. Kelly

INVENTOR
M. H. PLUNKETT.

BY *S. B. Brashers*
ATTORNEY

UNITED STATES PATENT OFFICE.

MICHAEL H. PLUNKETT, OF BALTIMORE, MARYLAND.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 711,645, dated October 21, 1902.

Application filed May 8, 1901. Renewed February 3, 1902. Serial No. 92,338. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL H. PLUNKETT, a citizen of the United States, residing in the city of Baltimore, State of Maryland, 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to steam-boilers, and particularly to that class known as "water-tube" boilers, the object of the invention being to provide an improved water-tube boiler having a very high steam-generating capacity of the most simple and economical construction occupying a very small space and being of the least weight consistent with the strength necessary to resist the strains encountered in the practical use of the boiler, it being applicable for use in all situations, but especially in seagoing vessels.

With this object in view my invention consists in the improved construction, arrangement, and combination of the parts composing such a boiler, which will be hereinafter fully described and afterward specifically claimed.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of a boiler embodying my improvements. Fig. 2 is a view of the same in front elevation with half the outer case or cover removed. Fig. 3 is a detail view, in horizontal section, on an enlarged scale, of the double header and rear plate with their tube connections, the central portion being broken out to shorten the figure. Figs. 4 and 5 are detail views illustrating, on an enlarged scale, the double-header pipe connections.

Like numerals indicate the same parts wherever they occur in the several figures of the drawings.

Referring to the drawings by numerals, 1 indicates the steam-drum, which is set above and communicates with two sets of headers 2 and 3 through openings 4 and 5, a pipe 6 extending from the opening 5 into the boiler and terminating above the water-line 7.

There are a number of headers in the boiler, depending upon the number of rows of vertical water-tubes, and consequently upon the width of the boiler, and the headers 2 and 3 of each set are parallel with those of the other sets, being of a wave-line or corrugated construction in order to permit the water-tubes of each set to alternate with those of the adjacent vertical sets or to be "staggered" with relation thereto.

8 indicates the back plate of the boiler, which also serves to loosely support the rear ends of the water-tubes to allow them to freely expand and contract longitudinally, as hereinafter explained.

9 indicates a water-tube of any set, such tube being secured in the rear wall of the header 3 in any suitable manner, while its rear end is reduced in diameter, as at 10, and closed by means of a cap 11, screw-threaded upon said reduced end, the outside diameter of the cap being equal to or slightly less than that of the main body of the tube, so as not to interfere with the expansion or contraction of the tube in the opening of plate 8. The plate 8 between the tubes is provided with a heavy lining 12, of asbestos. The two headers of each set are placed with their adjacent faces or walls in contact, and these contacting walls are provided with registering openings, in which a nipple 13 is rolled or otherwise firmly secured, thus firmly fastening the headers together. In this nipple is secured, by screw-threading or otherwise, a bushing 14, in which is threaded or otherwise secured the forward end of a tube 15, which passes through the rear header 3 into and nearly through tube 9, ending at 16 near the rear end of said tube 9, the tube 15 being of a diameter small enough to leave a space 17 around it within the tube 9.

The tubes are inclined downward from front to rear to facilitate the circulation of the water and steam, and each header 2 is provided with a suitable hand-hole in line with each tube (said hand-holes being closed by a suitable cover, as at 18) to permit the removal of any desired tube for repair or replacement.

The tubes being located in the fire-box will be quickly heated, and the circulation will be from the drum 1 downward through opening 4 into header 2, from which it will pass into

and through inner tubes 15, then back through spaces 17 into headers 3, and finally upward through said headers, the openings 5 and pipes 6 being delivered from said pipes into drum 1 above the water-line 7.

From the foregoing description it will be seen that I have provided a simple, cheap, and strong structure of great steaming capacity and light weight which fully satisfies the object of the invention.

The headers are each separate and independent, being connected together only by means of the nipples, so that any one of them may be removed readily and quickly and replaced with equal facility, a damage to or the destruction of one involving none of the others. The manner of securing the tubes in the headers is simple and efficient, and any tube may be removed without impairing the usefulness of the others. The delivery of the circulation in the drum above the water-line prevents any running of the water from the drum back into headers 3 or the connected tubes.

While I have specifically described the construction of the various parts, it will be evident to those skilled in the art that modifications may be made therein without departing from the spirit of my invention—such, for instance, as changing the construction of bushing 14 from that shown in Figs. 3 and 4, in which it is provided with a square or angular hole 19 for the introduction of a tool with a similarly-shaped end for unscrewing the bushing, to a construction similar to that of the cap 11, (shown enlarged in Fig. 4,) which is provided with an angular end to receive a wrench for the same purpose.

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

1. The combination, in a water tube boiler, of a drum, a plurality of sets of headers, each set consisting of two separate and distinct chambers, one arranged in front of the other, the front header communicating with the drum at the bottom thereof and the rear header wholly above the water-line thereof, an outer tube secured in the rear wall of each rear header, and an inner tube secured in the rear wall of each front header, passing through the rear header and into the outer tube and a

rear wall for the fire-box slidably supporting the rear end of the outer tube, substantially as described.

2. The combination, in a water-tube boiler, of a set consisting of two distinct and separate vertical headers arranged one in front of the other, the contacting walls being provided with registering openings and the rear wall of the rear header with an opening in line with the said openings, a nipple secured in the registering openings fastening the headers together, a thimble removably secured in the nipple, a tube secured in the opening in the wall of the rear header, and having its rear end closed, and a smaller tube removably secured in the nipple and projecting into the larger tube, substantially as described.

3. The combination, in a water-tube boiler, of a set of two vertical separate headers at the front of the boiler, one header in front of the other, a rear wall provided with holes, and a plurality of sets of inner and outer tubes, the outer tubes fitting loosely in the holes of the rear wall and connected at their front ends to the rear header, and the inner tubes centering in the outer tubes and secured at their front ends in the rear wall of the front header, substantially as described.

4. The combination, in a water-tube boiler of two separate headers one in front of the other with their walls contacting and provided with registering openings in the contacting walls, and openings in the front wall of the front header, and rear wall of the rear header, a rear boiler-wall provided with an opening, a thimble in the registering openings securing the contacting walls together, a hand-hole cover for the opening in the front wall of the front header, an outer pipe secured in the rear wall of the rear header, passing loosely through the rear boiler-wall opening and having a reduced rear end, a screw-cap on said reduced end, and an inner pipe secured in the contacting walls, and passing through the rear header and ending in the outer tube, substantially as described.

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

MICHAEL H. PLUNKETT.

Witnesses:

JOHN L. HEBB,
WALTER WOLF.