

G. J. SCHANZ.

BOILER.

APPLICATION FILED NOV. 21, 1912.

1,069,583.

Patented Aug. 5, 1913.

2 SHEETS—SHEET 1.

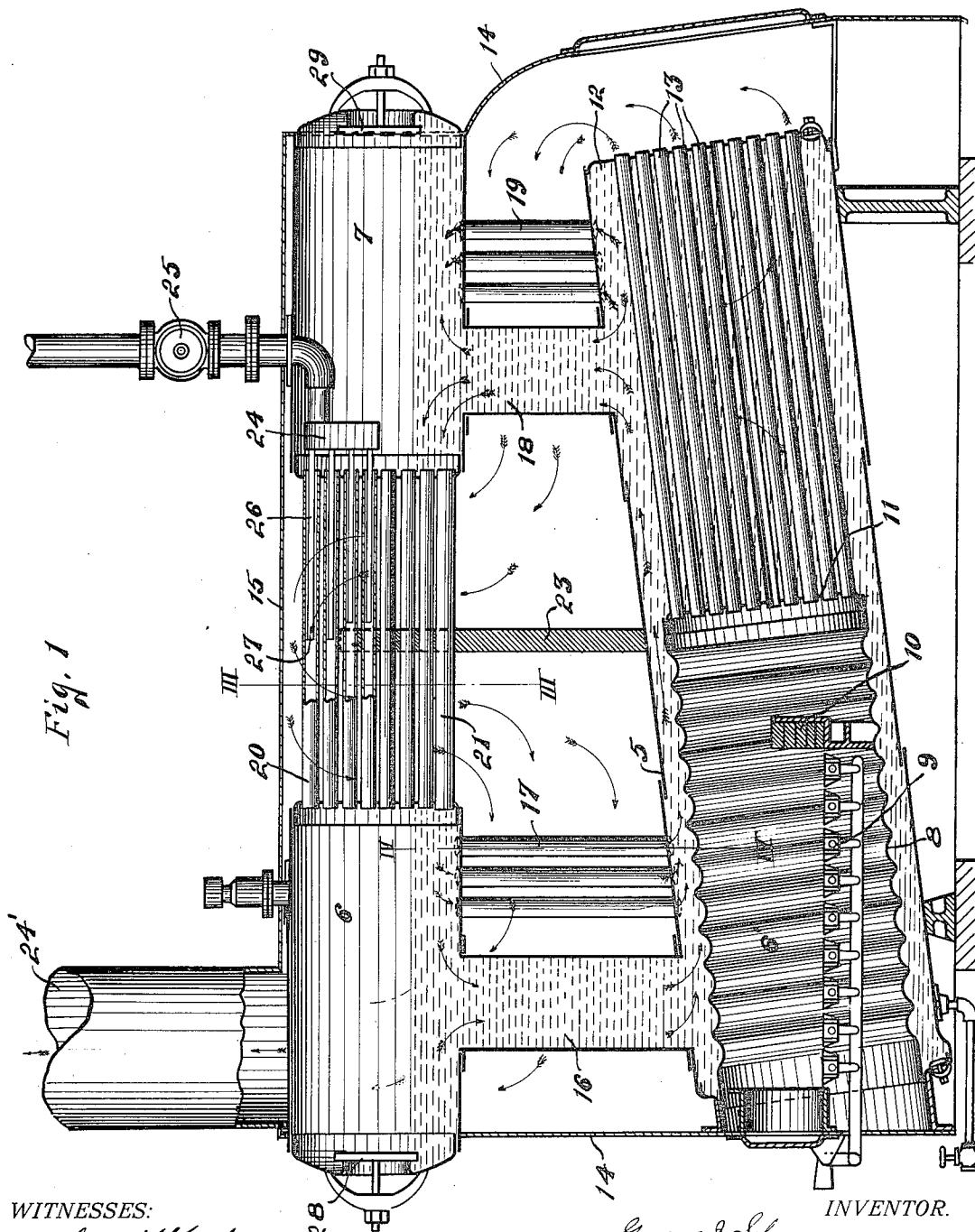


Fig. 1

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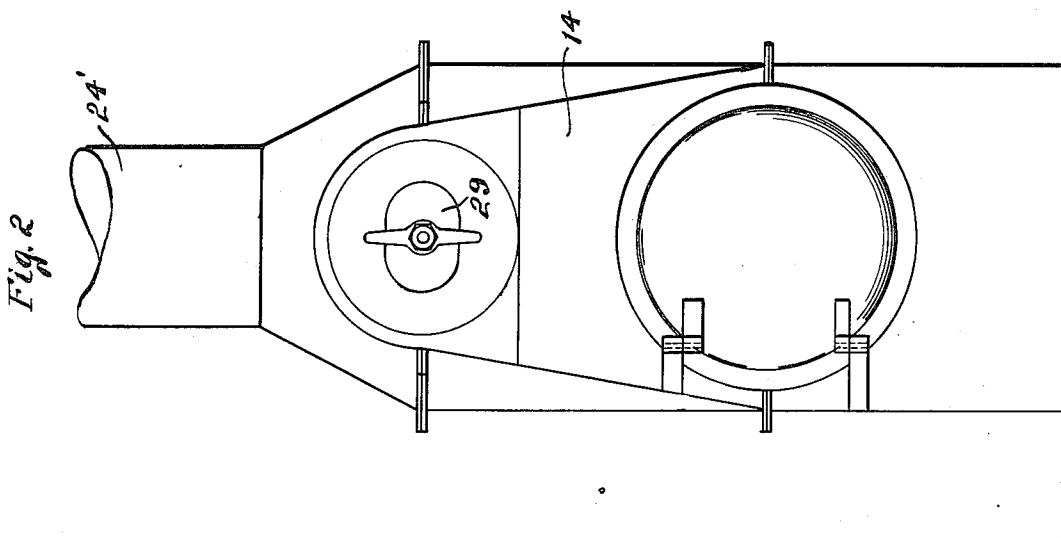
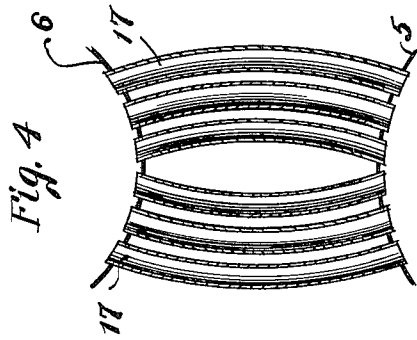
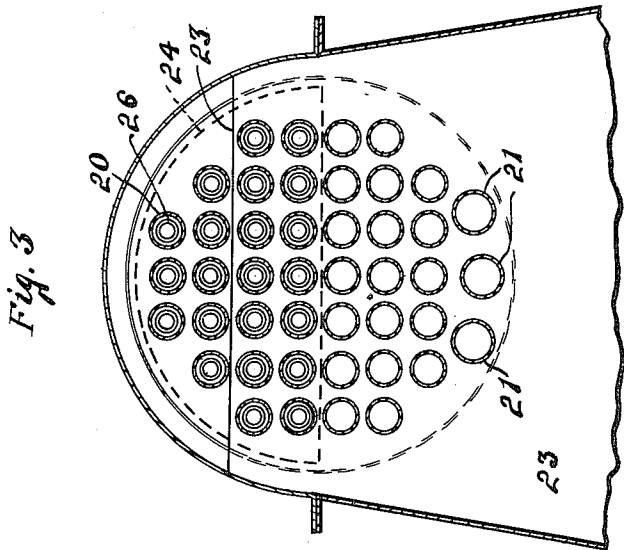
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2 SHEETS—SHEET 2.



WITNESSES:

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BOILER.

1,069,583.

Specification of Letters Patent.

Patented Aug. 5, 1913.

Application filed November 21, 1912. Serial No. 732,668.

To all whom it may concern:

Be it known that I, GEORGE J. SCHANZ, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention has reference to an improved boiler construction which is of a type that combines certain features of the water tube apparatus and the use of a firebox and flues in conjunction therewith.

The first of the objects of the invention, is the provision of an apparatus of the character referred to, which will give a maximum of efficiency and will at the same time be simple in construction so that it may be built at a moderate cost and will have its several parts all easily accessible for cleaning and repairs, and will be capable of giving satisfactory results in the hands of even comparatively inexperienced firemen.

The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawing wherein—

Figure 1 is a longitudinal vertical sectional view through a boiler embodying my improvement; Fig. 2 is an end elevation; Fig. 3 is a sectional view taken on the line III—III of Fig. 1, and Fig. 4 is a sectional view taken on the line IV—IV of Fig. 1, indicating a portion of the water tubes employed.

Referring now more particularly to Fig. 1, it will be seen that I have therein indicated a boiler construction composed fundamentally of three drums, the lower one marked 5 having a considerable length, and the upper ones marked 6 and 7 being located in position above the lower drum 5, number 6 being near the front end and 7 near the rear end of the lower drum.

The lower drum 5 is set in an inclined position as indicated, and in the lower end, toward the front, I provide a firebox 6 which is preferably of the usual corrugated formation known as the Morrison type, although other types might be used if preferred. The grate is indicated at 9, and there is provided at 10 a refractory wall or partition that extends part of the way upward in the firebox in order to properly di-

rect the heat and the products of combustion.

Connecting the fluesheets shown at 11, with the end wall 12 of the drum 5 I provide a number of flues 13, as clearly shown in Fig. 1, and the entire lower portion of the structure is inclosed by the sheets 14 and the top sheet 15.

Connecting the drum 5 with the drum 6 which is located above the forward end of the drum 5, I provide a large tube or vertically disposed drum 16, and also a plurality of water tubes 17 arranged with an outward curvature as indicated in Fig. 4, and in position to be acted upon to the best advantage by the blow of the hot gases and the products of combustion. The drum 7 which is located above the rear end of the drum 5 is connected with the said drum 5 in a similar manner, by a large vertical passage or drum 18 and a series of water tubes 19, which latter are also preferably formed as indicated in Fig. 4 and so located as to be operated upon to the best advantage by the products of combustion and the heat of the gases as they pass around the same.

Connecting the drums 6 and 7 in the manner shown in Fig. 1, I provide a plurality of tubes 20 at the upper portion of the said drums, and other tubes preferably somewhat larger in diameter marked 21 which are along the lower portion of the drums, and between the drums I place the baffle wall 23 in the position shown and extended upward to a point below the top of the boiler, but preferably above the water level or the normal water line, so that the flow of the gases and the hot products of combustion will be in the direction indicated by the arrows and pass up around the end of the tubes 20 and 21 and over the baffle wall 23 and down around the tubes 20 and 21 at their left ends, and around the tubes 17 and vertical drum 16 and out of the stack 24.

It will be clear that the steam in the tubes 20 connecting the steam spaces of the drum 6 and 7, will be superheated by the passing of the products of combustion over the baffle wall 23.

By making the tubes 21 of larger diameter I permit freer circulation of the water in the boiler, since the tubes 21 are located in the lower part and the water line extends upward to about the point where the smaller

group of tubes commences. The circulation of the water in the boiler is indicated also by arrows, and, as will be clear, starts at the firebox and extends to the right and upwardly and up through the drum or large tube 18 into the drum 7, and then to the left into the larger tubes 21, into the drum 6, and thence downwardly through the vertical tube or drum 16, back to the firebox, except in so far as a portion will pass through the vertical water tubes 17 and 19 in a like cycle of movement whereby the efficiency of the apparatus is materially increased.

In order to draw off the steam from the tubes 20 at the hottest portions thereof, I provide a header or connection 24 from which the outlets or supply pipe for live steam leads past the valve 25, and to said header 24 I connect a series of small tubes 26 that extend inwardly to the several tubes 20, but are of considerably smaller diameter than the latter, and are open at the points 27 which are preferably at about the middle portions of the tubes 20 and just above the baffle wall 23, as I find such place to be approximately the location of the hottest portion of the steam. The header 24 is preferably segmental in shape as indicated by the dotted outline shown in Fig. 3, and there are connected with the same a large number of the inner tubes 26, so as to supply ample facility for free flow of steam to the outlet pipe leading past the pipe 25.

In order to provide a convenient means of access to the interior of the lower drum 5 I prefer to make the upright tubular connections 16 and 18 of considerable diameter, as is relatively shown on Fig. 1 of the drawing. The drums 6 and 7 are provided with manhole devices marked 28 and 29 respectively.

From the above described operation it will be clear that the tubes 20 constitute in effect a superheater apparatus forming connection between the two upper drums 6 and 7 above the plane of the water tube connections formed by the larger tubes 21, and therefore my apparatus presents in combination with the flue boiler located below, a pair of drums—one located approximately above each end of the flue boiler—and connections between the said drums and the flue boiler or lower drum 5 with the combination superheater connection and water tube connection between the two upper drums, and by said arrangement of parts together with the tubes 26 I attain a very high degree of efficiency.

Having thus described my invention and

illustrated its use, what I claim as new and desire to secure by Letters Patent, is the following:

1. A boiler comprising in combination, a lower drum having a flue with a grate therein in its front portion and fire tubes leading from the flue through the rear portion of the drum, a pair of drums above the lower drum and communicating therewith, a plurality of tubes connecting the two upper drums, a bridge wall between the lower drum and the intermediate portion of the plurality of tubes, and a discharge outlet for the gases of combustion to the front of the said bridge wall.

2. A boiler comprising in combination, a lower drum having fire tubes leading there-through, a furnace for supplying heated gases through the tubes, a pair of drums above the lower drum and communicating therewith, a plurality of tubes connecting the two upper drums, a bridge wall between the lower drum and the intermediate portion of the plurality of tubes, and a discharge outlet for the gases of combustion to the front of the said bridge wall.

3. A boiler comprising in combination a lower drum having a flue with a grate therein in its front portion and fire tubes leading from the flue through the rear portion of the drum, a pair of drums above the lower drum and communicating therewith, a plurality of steam tubes and water tubes connecting the two upper drums, a bridge wall between the lower drum and the intermediate portion of the plurality of tubes, and a discharge outlet for the gases of combustion to the front of the said bridge wall.

4. A boiler comprising in combination, a lower drum having tubular means extending therethrough and surrounded by the water in the drum, a furnace for supplying heated gases through the tubular means, a pair of drums above the lower drum and communicating therewith, a plurality of steam tubes connecting the two upper drums, an outlet steam pipe leading from said steam tubes, a bridge wall between the lower drum and the intermediate portion of the plurality of tubes, and a discharge outlet for the gases of combustion to the front of the said bridge wall.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

GEO. J. SCHANZ.

Witnesses:

J. H. DURFIELD,
HARRY C. CUSTER.