

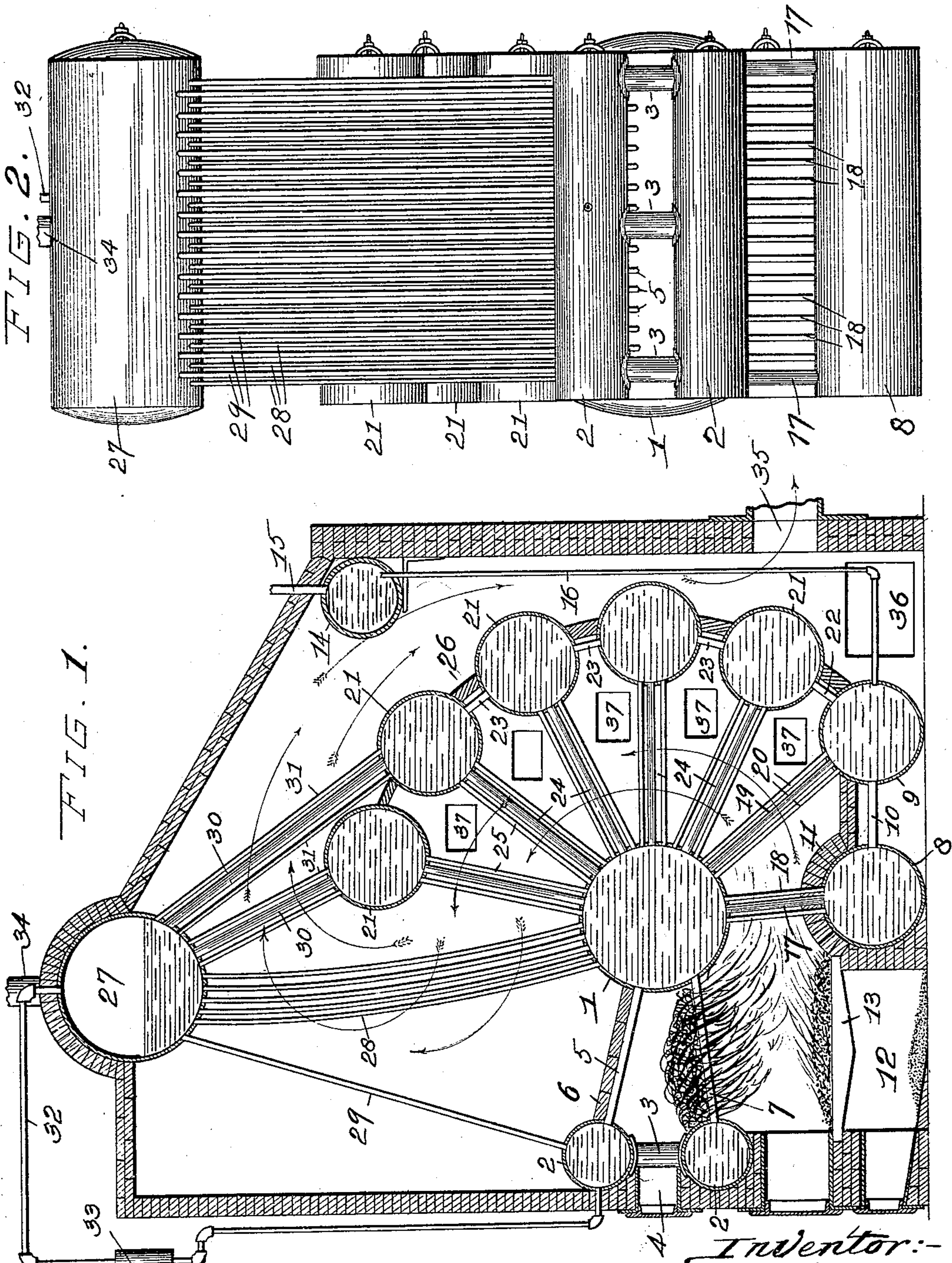
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Patented Jan. 2, 1900.

C. M. HARGIS.
WATER TUBE BOILER.

(Application filed May 11, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

CHARLES M. HARGIS, OF ST. LOUIS, MISSOURI.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 640,655, dated January 2, 1900.

Application filed May 11, 1899. Serial No. 716,369. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HARGIS, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Water-Tube Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to water-tube boilers; and it consists of the novel construction, combination, and arrangement of parts hereinafter described and claimed.

Figure 1 is a longitudinal sectional view taken through the center of my improved water-tube boiler, the same being shown in position in its setting. Fig. 2 is a front elevation of the boiler, the same being removed from the setting.

In the construction of my improved boiler I make use of a centrally-arranged drum 1, the same being preferably constructed with oval ends, in one of which ends is located the usual manhole. This central drum 1 is transversely arranged in the central portion of the boiler-setting, and said drum is supported at its ends in the side walls of the setting in any suitable manner. Located upon the inner face of the front wall of the boiler-setting and immediately in front of the drum 1 is a pair of smaller drums 2, the same being separated a slight distance from one another, and said drums are connected by a plurality of water-legs 3. The firing-door 4 of the furnace is formed in the front wall immediately between these drums 2, and connecting the upper one of said drums with the drum 1 is a row of tubes 5, upon which is arranged a layer of fire-bricks 6. A set of tubes 7 connects the lower one of the drums 2 with the drum 1, this row of tubes performing the function of grate-bars.

Located upon the floor of the boiler-setting immediately below and to the rear of the drum 1 are the mud-drums 8 and 9. Said mud-drums are connected by a horizontally-arranged row of tubes, 10 and surrounding the front one 8 of said mud-drums is a layer of fire-brick 11, and said layer of fire-brick is extended from the mud-drum 8 to the mud-drum 9 over the row of tubes 10.

Located between the mud-drum 8 and the front wall of the boiler-setting is the ash-pit

12 and immediately over said ash-pit are arranged the grate-bars 13, their ends resting upon the front wall of the boiler-setting upon the fire-brick 11. Located in the upper rear corner of the boiler-setting is a transversely-arranged drum 14, to which is extended the feed-water tube 15, and a tube 16 leads from this drum 14 downwardly and into the rear one 9 of the mud-drums. Connecting the ends of the forward mud-drum 8 with the ends of the drum 1 is a pair of large tubes 17, and between this pair of tubes 17 and connecting the mud-drum 8 with the drum 9 is a plurality of rows of pipes 18. A pair of large pipes 19 connect the ends of the rear mud-drum 9 with the drum 1, with which pair of large pipes 19 is arranged a plurality of rows of circulation-pipes 20.

Radially arranged around the central drum 1, to the rear thereof, is a plurality of drums 21, the same being arranged equidistant from each other, and said drums being equal in diameter to the mud-drums 8 and 9. The mud-drum 9 is connected to the adjacent drum 21 by a row of circulation-tubes 22, and each drum 21 is connected to the succeeding drum by similar rows of tubes 23. Connecting the ends of each of the drums 21 with the end of the drum 1 are the large tubes 24, between which large tubes is arranged a plurality of rows of circulation-tubes 25. Fire-brick or tiling 26 is arranged between all of the drums 21 and between the mud-drum 9 and the lower one of said drums 21, which brick or tiling is positioned just outside the connecting-tubes 21 and 23, and said brick or tiling extends from one side wall of the boiler-setting to the other. Transversely arranged in the extreme upper end of the boiler-setting is a drum 27, equal in diameter to the drum 1, which drum 27 performs the function of a steam-dome, and connecting said drum 27 with the drum 1 is a plurality of rows of tubes 28. A single row of tubes 29 connect the drum 27 with the upper one of the drums 2, and a pair of large tubes 30 connect the ends of the upper pair of drums 21 with the drum 27, between which pair of large tubes are the circulation-tubes 31. A tube 32 is extended from the drum 27 forwardly to the front of the boiler-setting, thence downwardly, and the lower end of said tube is tapped into the

upper one of the pair of drums 2, and suitably located in this tube 32 is an ordinary water-gage 33. A suitable steam-outlet 34 is provided for the drum 27, and located in the lower portion of the rear wall of the boiler-setting is an opening 35, which leads to a smoke-stack.

Located in the lower portion of one of the side walls of the boiler-setting is an opening 36, the same being normally closed by a door, through which opening access may be had to the interior of the boiler-setting for the purpose of cleaning the same, and formed through the side wall of the setting at points between the tubes connecting the drums 21 with the centrally-arranged drum 1 are normally closed openings 37, which are for the same purpose as is the opening 36.

In the operation of my improved boiler the fuel is fed through the opening 4 between the water-legs 3 and between the drums 2 and onto the tubes 7, and all the heat and products of combustion from the fire upon said tubes 7 will pass downwardly between the drum 1 and the front mud-drum 8, and from thence around the rear of the drum 1 in front of the drums 21, and from thence over the upper one of said drums 21 beneath the drum 27, and from thence downwardly to the rear of all of the drums 21, and finally find exit through the opening 35. It will be plainly seen that in thus passing around the various drums the heat from the fire will circulate between all of the tubular connections, over the radially-arranged drums and the central drum 1, and between the tubular connections between the drum 1 and drum 27 and also the tubular connections between the upper pair of drums 21 and the drum 27.

By my improved construction of the boiler the entire volume of water is divided into a large number of smaller bodies, and as said small bodies of water are very quickly heated a circulation of the water is rapidly established, and the evaporation of said water into steam is very quickly accomplished.

I provide a very large heating-surface with-

in a small compass, and owing to the arrangement of the circulation-tubes all of the sediment in the tubes and drums will quickly pass to the mud-drums 8 and 9.

All of the tubing made use of is very short and can thereby be easily cleaned, and a defective tube can be very easily and quickly replaced.

All of the smaller drums are preferably provided with manholes at one end, and therefore said drums can be very easily cleaned when desired. The boiler occupies very little floor-space, and as great heating-surface is provided steam can be generated in a very short space of time.

I claim—

1. In a water-tube boiler, a centrally-arranged drum, a plurality of drums radially arranged relative to the central drum, tubular connections between said radially-arranged drums and the central drum, a pair of drums arranged in front of the first-mentioned drum, tubular connections between said last-mentioned drums and the first-mentioned drums, a drum positioned above the first-mentioned drum and the radially-arranged drums, and tubular connections between said last-mentioned drum and the first-mentioned drum and between the last-mentioned drum and certain of the radially-arranged drums, substantially as specified.

2. In a tubular boiler, a centrally-arranged drum, tubular grate-bars extending forwardly from said drum, a plurality of drums arranged radially around the rear portion of said first-mentioned drum, tubular connections between said radially-arranged drums and the central drum, and means whereby the fire on the tubular grate-bars is deflected between the central drum and the radially-arranged drums, substantially as specified.

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

CHARLES M. HARGIS.

Witnesses:

EDWARD E. LONGAN,
ALBERT J. MCCAULEY.