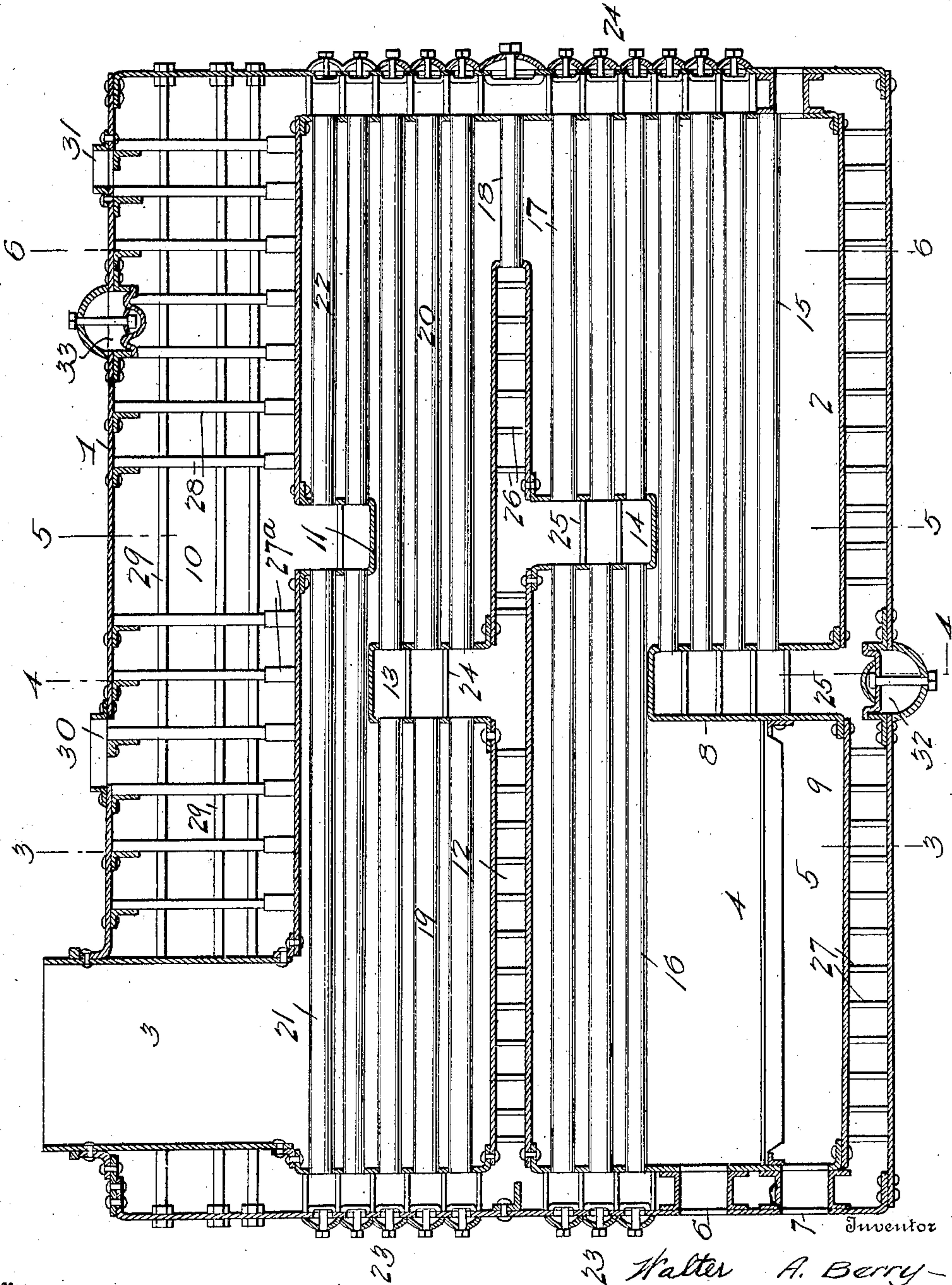


W. A. BERRY.
STEAM BOILER.

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919,528.

Patented Apr. 27, 1909.



Witnesses

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STEAM-BOILER.

No. 919,528.

Specification of Letters Patent.

Patented April 27, 1909.

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To all whom it may concern:

Be it known that I, WALTER AUTHER BERRY, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to boilers for marine or other engines, and the primary object of the same is to increase the water heating capacity of devices of this class by materially multiplying the number of water tubes used in ordinary boilers, and to derive therefrom the greatest benefits possible with a minimized amount of fuel and an increase in horse-power within reduced boiler proportions.

A further object of the invention is to provide a boiler having a plurality of water legs or water-receiving compartments so arranged therein and in relation to the water tubes as to obviate burning out or other injury to the tubes and various parts of the furnace, and at the same time derive material benefits from the increased water area, which will be practically influenced by the heat of the furnace.

This invention consists of an improvement on the construction disclosed by my Patent No. 825,696, dated July 10, 1906.

In the drawing, the figure is a longitudinal vertical section of a boiler embodying the features of the invention.

Numeral 1 designates the main surrounding shell or inclosure of the boiler and 2 the inner shell, to the front upper extremity of which the stack tube or cylinder 3 is secured, as clearly shown by the drawing. The boiler is equipped with a furnace 4 having the usual ash-pit 5 and doors 6 and 7, respectively, leading to the furnace and ash-pit. At regular intervals throughout the boiler organization, handholes will be provided for the purposes of interior access and cleaning, and will be hereinafter referred to in particular as the description progresses. At the rear of the grate is a hollow bridge wall 8 and communicating with the lower extremity thereof is the said inner shell or casing 2 extending fully around and through different parts of the boiler and forming mainly with the outer shell an inclosing water chamber at the bottom, front, rear, opposite side portions and top.

The said water chamber or jacket is materially enlarged at the top in rear of the tube 3, as at 10 and has a central depending drop or leg 11. At an intermediate point the water chamber takes the form of an elongated horizontal leg 12 which extends from the front of the boiler nearly to the rear of the same, and is provided with an upwardly extending water leg 13 communicating therewith and located about vertically over the bridge wall 8, and a second depending water leg 14 which is practically in vertical alinement with the leg 11 and in rear of the said bridge wall.

It will be observed that the water legs 11, 13 and 14 are disposed in such positions as to perform the function of baffles, and between the rear portion of the bridge wall 8 and the rear end of the inner casing 2 a series of water tubes 15 are located. Between the front end of the inner casing 2 above the furnace and the leg 14 is another series of water tubes 16, the latter tubes connecting with the front wall of the said leg 14. Between the rear wall of the leg 14 and the rear end of the inner casing 2, are another series of shorter tubes 17, and between the rear end of the elongated horizontal leg 12 and the rear end of the inner casing 9 is a series of short tubes 18. Between the front and rear ends of the inner casing 2 and the front and rear walls of the projecting legs 13 are other series of water tubes 19 and 20, and between the same walls of the inner casing and the drop or depending leg 11 are water tubes 21 and 22. Thus it will be seen that the water tubes are fully distributed to the best advantage throughout the interior of the boiler, and in addition the water chamber is continued in between the tubes without obstructing the draft of the furnace, but on the contrary disposing the water within the several series of tubes in such manner as to be thoroughly heated by the products of combustion which are forced to pass rearwardly over the bridge wall under the leg 14, upwardly in rear of the horizontal leg 12 and between the legs 11 and 13 forwardly to the tube 3 and out through the stack. The water tubes are all rendered accessible for cleaning and repair purposes through the medium of removable heads 23 and 24 of any approved construction and applied to the outer sides of the ends of the inclosing casing 1.

The several water legs as well as the bridge wall are braced by stay bolts 25 extending longitudinally from one wall to the other, the bridge wall and legs being provided with a number of these stay bolts proportionately to the extent of the same, and the elongated chamber or leg 12 is likewise provided with stay bolts 26 extending vertically therethrough at intervals, and also the inner and outer casings are connected by similar bolts 27. The elongated chamber or water leg 12 forms an extended baffle plate of which the legs 13 and 14 may be said to be diversions or angular projections, and by the provision of this intermediate baffle plate having the legs 13 and 14 directly communicating therewith, an extended water surface is not only brought into relation to the heat units of the furnace, but at the same time cause the products of combustion to be directed fully throughout the entire furnace and to completely cooperate with the several water tubes before reaching the stack tube or cylinder 3.

Extending upwardly from the crown bars 27^a over the crown sheet 27^b forming the bottom of the upper enlarged chamber 10 are a plurality of crown bar braces 28, which connect with the top portion of the outer casing or crown sheet, and intersecting these bars are a plurality of flues 29 extending longitudinally through the chamber 10 from the front end to the rear end of the outer casing. The crown bars 27^a are secured to the crown sheet 27^b by crown bar bolts 27^c. In the top of the crown sheet or chamber 10 is an opening 30 for the steam, and at the rear is another opening 31 for the safety valve. Beneath the bridge wall 8 is a manhole 32 covered by a suitable cap and in the top boiler between the openings 30 and 31 is another similar manhole 33.

From the foregoing description it will be seen that a thorough circulation of water is set up through the several series of tubes and spaces provided as hereinbefore explained, thus giving the boiler an increased water capacity, as well as an increased exposed heating surface and results in the rapid formation of steam with a minimized amount of fuel. By the increase in steam production, the horse-power of the boiler is necessarily augmented with advantages in

steam engineering, particularly in marine engines where economy in space with the greatest power obtainable is desirable.

What I claim is:

1. In a boiler of the class specified, the combination of an outer main shell, an inner auxiliary shell forming with the latter a water space around the outer portion of the boiler and having a water containing baffle plate continued therefrom and provided with angular legs, a furnace, a hollow bridge wall at the rear of the furnace communicating with the said water space, and a series of water tubes connected to the front and rear portions of the water space and to the angular legs and bridge wall.

2. In a boiler of the class set forth, the combination of an outer main shell, an inner auxiliary shell, the two shells forming a water space surrounding the outer portion of the boiler and having an intermediate baffle plate continuing therefrom into the boiler, and provided with upwardly and downwardly extending water legs, the upper portions of the two casings forming an enlarged chamber having a depending leg, a furnace having a hollow bridge wall communicating with the water space between the shells, and series of water tubes connected to the water space at the front and rear and to the legs and bridge wall and also to the rear extremity of the baffle plate.

3. In a boiler of the class set forth, the combination of an outer main shell, an inner auxiliary shell forming with the main shell a water space surrounding the outer portion of the boiler and having a baffle plate projecting from the front thereof toward the rear extremity of the boiler, water legs carried by and communicating with said baffle plate, a furnace below the baffle plate, and a plurality of water tubes extending above and below the baffle plate and communicating with the front and rear water spaces.

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

WALTER AUTHER BERRY.

Witnesses:

H. P. LARIMORE,
J. L. McLEAN.