S. M. WALKER.

BOILER.

APPLICATION FILED DEC. 5, 1908.

993,480. Patented May 30, 1911.

Fig. 1.

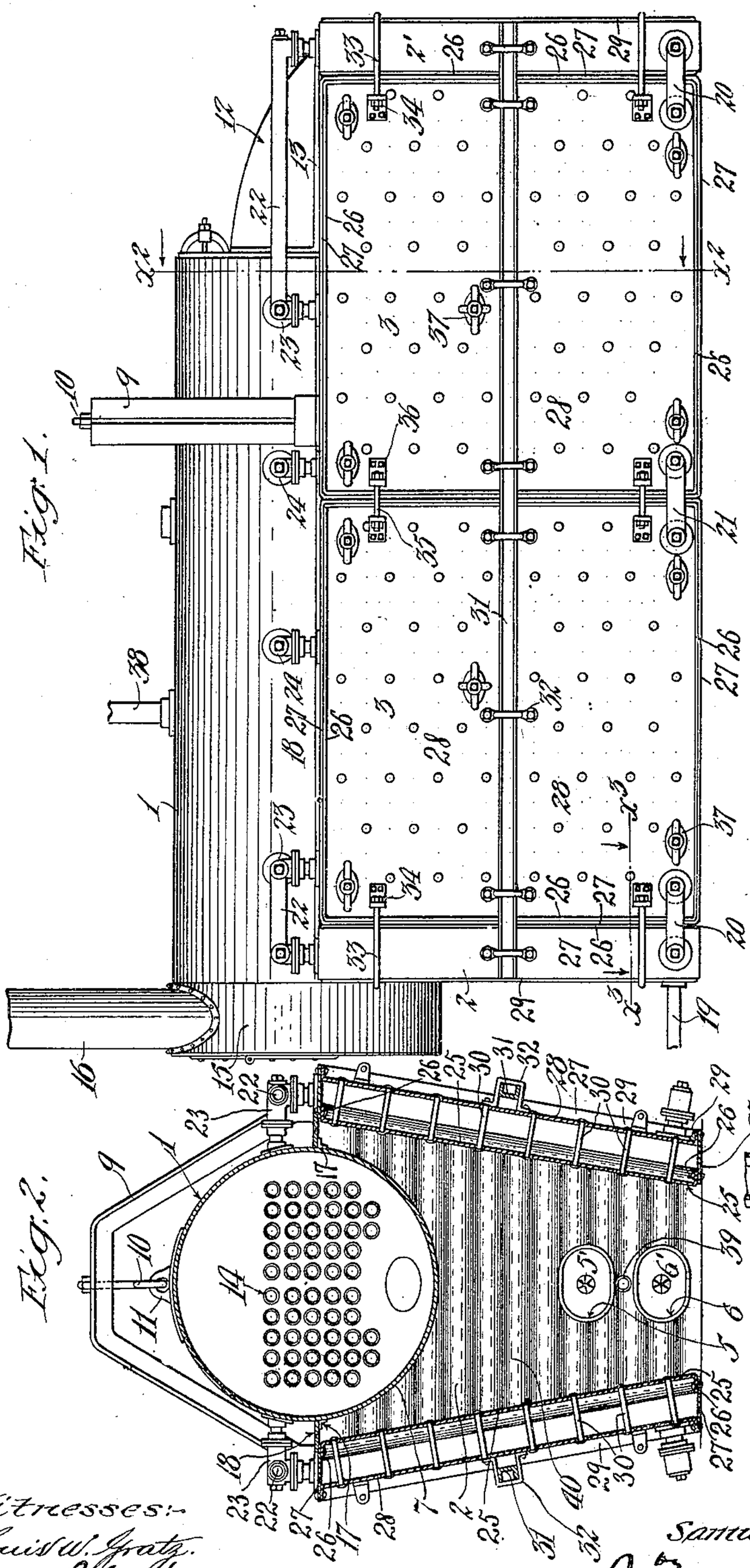


Fig. 4.

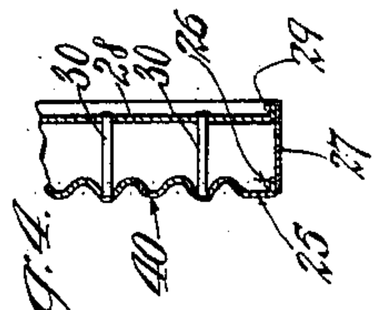
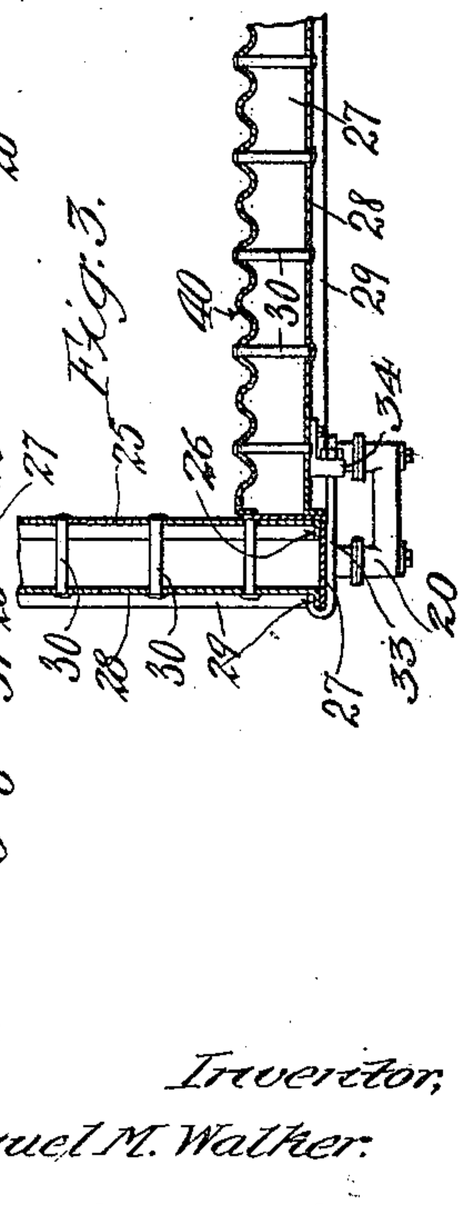


Fig. 2.

Fig. 3.



Witnesses:-

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UNITED STATES PATENT OFFICE.

SAMUEL M. WALKER, OF LOS ANGELES, CALIFORNIA.

BOILER.

993,480. Specification of Letters Patent. Patented May 30, 1911.

Application filed December 5, 1908. Serial No. 466,170.

To all whom it may concern:

Be it known that I, SAMUEL M. WALKER, a citizen of the United States of America, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Boiler, of which the following is a specification.

The main object of the present invention is to provide a steam boiler of large steam-raising capacity and simple and cheap construction.

Another object is to provide a boiler with water legs wholly inclosing the fire zone under the boiler, in which water is heated before being introduced into the boiler, the water in such legs being entirely below the level of the water level of the boiler and communicating pipes arranged to take the water from the top of such legs and feed the same into the boiler near the water level therein.

An important object of the invention is to provide a boiler which is adapted for shipment, the boiler being of knock-down or sectional construction so that it can be readily shipped in separate pieces and assembled at the place where it is to be used.

Another object of the invention is to provide a steam boiler in which the same construction is adaptable to different sizes of plant with slight variation, by use of a unit construction.

A further object of the invention is to provide a steam boiler particularly adapted for maximum economy of fuel and high pressure.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention, and referring thereto:—

Figure 1 is a side elevation of the boiler. Fig. 2 is a vertical section on line x^2—x^2 Fig. 1 looking in the direction of the arrows. Fig. 3 is a horizontal section on the line x^3—x^3 in Fig. 1 looking in the direction of the arrows, showing the means for fastening the side and end sections of the boiler together. Fig. 4 is a horizontal section of part of the rear section of the fire box.

The boiler comprises a cylindrical shell member 1 and a fire-box supporting the shell member. The fire-box is formed in sections, there being in the form shown, section 2 at the front end, a section 2′ at the rear end of the fire-box and two sections 3 at each side of the fire-box. These sections are hollow, each section being formed as a substantially rectangular box serving as a water leg for the boiler, and the several sections are placed with their edges or ends in proximity to form a closed fire-box from the base to a point about half way up the sides and ends of the boiler. The end section 2 at the forward end of the boiler has a passage 5 formed therethrough to serve as a fire hole and another passage 6 serving as an ash pit hole, these passages being normally closed by the usual doors 5′, 6′ respectively. The forward section 2 is recessed or provided with a semicylindrical depression 7 in its top to receive and support the forward portion of the cylindrical boiler shell 1.

The rear portion of the boiler shell is supported by a bridge 9 whose ends rest on top of two of the side sections 3 of the fire-box, said bridge arching over the cylindrical boiler shell and provided at its middle portion with a suspension means such as an eye bolt 10 engaging with an eye 11 secured to the top of the boiler shell. The rear end of the boiler shell 1 sets forward of the rear end of the fire-box a sufficient distance to provide for the uptake of products of combustion, the uptake chamber being covered by an arched plate 12 flanged at 13 to rest on the top of the fire-box sections and against the rear end of the boiler shell 1. Boiler shell 1 is provided with internal tubes 14 extending from this uptake to a chamber 15 at the other end of the boiler which communicate with stack 16. An angle iron 17 is attached to each side of boiler shell 1, on a level with the top of sections 3, and suitable closure means such as rabbeted tile 18 are placed across the opening between the parts 17, 3 to close the joint.

The water supply pipe shown at 19 leads into the front fire-box section near the bottom thereof. Each section is connected to the adjoining section at each side thereof by a connecting pipe near the bottom of the sections, a pipe 20 leading from near the bottom of each of the two end sections 2, 2′ to the adjacent lower corner of the adjoining side section 3, and the lower adjacent corners of the two side sections 3 being connected by a similar connecting pipe 21. The top of each end section is connected by a pipe 22 with the adjacent upper corner portion of the adjoining side section 3 and from this connecting pipe 22 a coupling or connection 23 leads into the boiler shell 1 some-

what below the water level line thereof. Other connecting pipes formed as elbows 24 lead from various points along the side sections 3 into the side of the boiler shell 1. These connections establish water supply connection between the top of each leg and the boiler near the water level thereof, and also establish communication from the feed water pipe to the boiler through the medium of the water legs and the connecting pipes 20 and 21. Each section communicates independently at its top with the boiler to deliver heated water thereto as well as any steam which may be generated in the water legs.

The sections 3 are all similar in construction, each comprising an inside plate 25 having its ends bent to form a flange 26, a rim plate 27 extending completely around the inside plate and riveted to the flange thereof, and an outer wall plate 28 having its edge formed with an outwardly directed flange 29 extending completely around the edge thereof, said flange fitting within the rim plate 27 and being riveted thereto. As so constructed the section presents on its outer wall an outwardly extending flange around the entire periphery of the section. Each fire-box section 3 has its top and bottom extending obliquely to the inside and outside walls and when the parts are assembled said top and bottom extend longitudinally, and the side plates 25, 28 and the section as a whole, extend obliquely upward and outward, so that two opposite sections diverge upwardly, and said sections in connection with the boiler shell 1, bridge or arch 9, and their connecting parts, form a truss resisting lateral distortion of the structure.

Sections 2, 2′ are similar in general construction to sections 3, but their rims are at right angles to the body of the sections, the latter standing vertically, and the ends of each end section are upwardly diverging to correspond with the inclination of the side walls 3. Stay bars 30 extend from the inside to the outside wall of each section and are riveted thereto. A rail or bar 31 extends along the outside of the fire-box at each side thereof and is secured thereto by clamps 32 which are fastened to the outside walls of each side section and to the end walls of the end sections. The end sections are further fastened to the side sections by bolts 33 supported on brackets 34 fastened to the outside walls of the side sections and having their ends hooked or bent to extend over and engage the flanges 29 of the end sections. The two side sections are also connected together by bolts 35 supported by brackets 36 fastened to the outside walls of the side sections. Hand holes provided with the usual removable closure means 37 are formed at suitable parts of each section in the outer wall thereof. A hole 39 is provided through the front end section 2 of the fire-box to receive an oil burner.

The inner walls of the sections 2, 3 or of any of them, may be corrugated as shown at 40. It is preferred to construct the side sections 3 with the corrugations 40 extending vertically, and the rear end section 2, with the corrugations extending horizontally, so that in each case the corrugations extend across the line of draft and cause the hot gases to more effectually deliver their heat to the walls. The increased area presented by the corrugations also increases the heat absorbing capacity of the walls. The corrugations also serve to stiffen the boiler plates, enabling the number of stay bolts to be reduced and generally stiffening the entire structure. They also aid in freeing the plates from scale.

By reason of the sectional or unit construction, the boiler is capable of being shipped in minimum bulk and assembled at the place of use, or the boiler may be shipped as a whole, it being the advantage in this connection that it is a self-contained structure forming both boiler and fire box.

By providing the communicating pipes from one section to the adjoining section I insure a full and free circulation of the water throughout all of the different sections, and by placing these pipes on the outside of the structure I prevent their erosion by the flame and also insure against all liability of springing leaks through the attendant shrinking and expanding when such pipes are exposed to the flames inside a fire box. The pipes connecting the top of each of the side sections and the boiler shell also serve as supports for the boiler and the sections, thereby increasing the rigidity of the structure without the aid of masonry or other reinforcement. By clamping the bar 31 onto the sides of the side sections and onto the ends of the end sections I produce a rigid and stable construction which is especially adapted to support the entire weight of the boiler when filled with water and at the same time allow for contraction and expansion of the different sections.

What I claim is:—

1. A boiler comprising a cylindrical casing, a closed fire box formed of approximately rectangular hollow side and end sections, extending from the base to a point about half way up the sides and ends of the cylindrical casing, means for securing the side sections together, means for securing the end sections to the side sections, pipes and couplings connecting the side sections, pipes and couplings connecting the end sections to the side sections, a supply pipe connected with the forward end section, pipes and couplings connecting the side and end sections with the cylindrical casing, an

arched cover plate resting on the top of the rear side sections and against the rear end of the cylindrical casing, and means for supporting the rear end of the cylindrical casing upon the rear side sections.

2. A boiler comprising a cylindrical casing, a closed fire box formed of approximately rectangular hollow side and end sections, extending from the base to a point about half way up the sides and ends of the cylindrical casing, means for securing the side sections together, means for securing the end sections to the side sections, brace bars extending the length of the closed fire box and clamps securing the brace bars to the side and end sections, pipes and couplings connecting the side sections, pipes and couplings connecting the end sections to the side sections, a supply pipe connected with the forward end section, pipes and couplings connecting the side and end sections with the cylindrical casing, an arched cover plate resting on the top of the rear side sections and against the rear end of the cylindrical casing and means for supporting the rear end of the cylindrical casing upon the rear side sections.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 24th day of November 1908.

SAMUEL M. WALKER.

In presence of—
ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.