

J. G. HAYDEN.

BOILER.

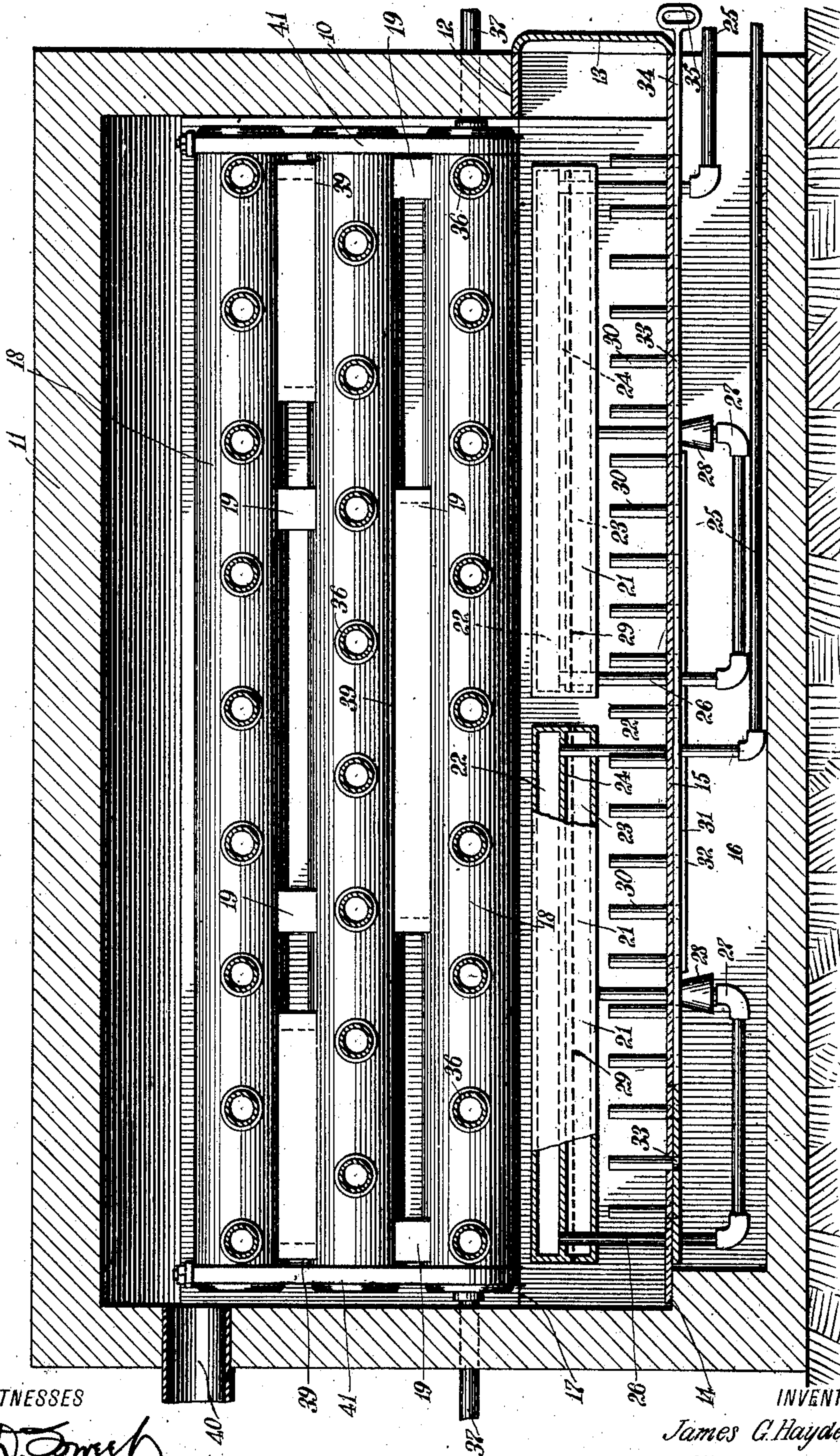
APPLICATION FILED DEC. 7, 1909.

Patented Nov. 22, 1910.

2 SHEETS-SHEET 1.

976,650.

Fig. 1



WITNESSES

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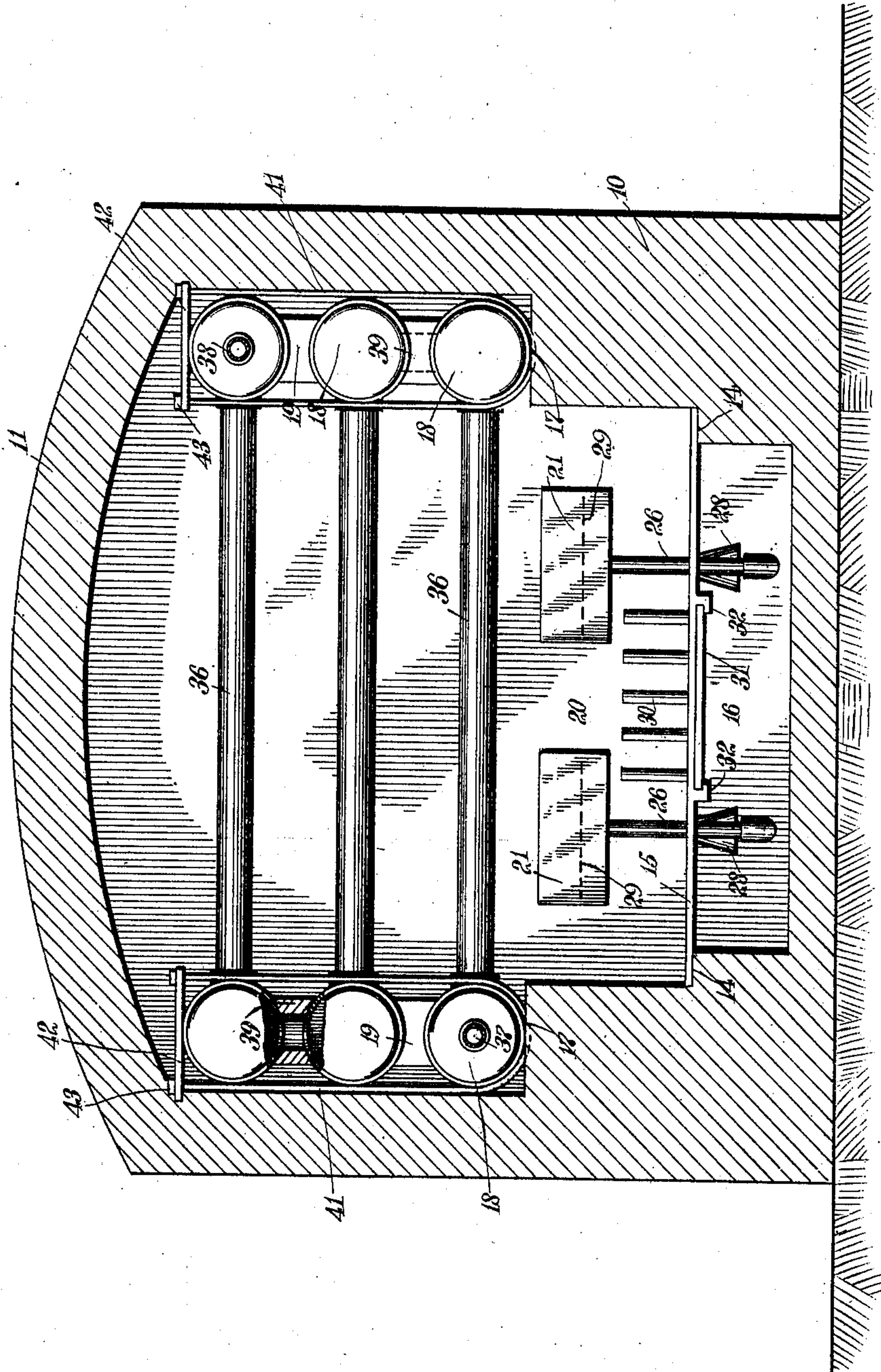
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2 SHEETS—SHEET 2..

Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES G. HAYDEN, OF NEW LEXINGTON, OHIO.

BOILER.

976,650.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed December 7, 1909. Serial No. 531,756.

To all whom it may concern:

Be it known that I, JAMES G. HAYDEN, a citizen of the United States, and a resident of New Lexington, in the county of Perry and State of Ohio, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

This invention relates to boilers especially useful for supplying hot water to dwellings and the like, and relates more particularly to a boiler adapted to be heated by means of natural gas or any other suitable heat-producing agent, and comprising series of superposed drums, water tubes connecting corresponding drums of the series, and connecting tubes between certain of the drums of each series, so that a thorough circulation of the water in the parts can be effected.

The object of the invention is to provide a simple, economic and efficient boiler for heating water for dwelling houses and the like or for supplying steam for different purposes; in which any suitable heat-producing device can be employed; in which a thorough circulation of the water is effected, and which is formed of elements which can be easily assembled and as easily taken apart and which may be of any suitable number, so that the size and capacity of the boiler can be varied for different purposes.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views, and in which—

Figure 1 is a longitudinal section of an embodiment of my invention; and Fig. 2 is a transverse section of the same.

Before proceeding to a more detailed explanation of my invention, it should be clearly understood that while any suitable heat-producing grate, burner or other device can be employed, I prefer to use with the present form of the boiler, the burner disclosed in my United States patent application filed January 29, 1909, under Serial No. 475,081. I have shown for example, in

the accompanying drawings a form of my boiler which is inclosed in a shell or casing of masonry or the like. I wish to emphasize the fact that this and others of the constructive details can be varied in accordance with individual preference and special conditions, without departing from the underlying spirit of the invention.

Referring more particularly to the drawings, I employ a shell or casing 10, fashioned from brickwork or the like and having an arched roof 11, and an inlet opening 12 near the bottom and at the front end. A suitable closure 13 for the opening 12 is provided. The side walls of the casing are inwardly extended near the bottom of the shell to form shoulders or supports 14, upon which is positioned a metal division plate or partition 15, under which is located the air chamber 16. The latter, for a purpose to appear hereinafter, is open at the front end of the boiler. The side walls of the shell above the shoulders 14, are offset to form shelves 17, upon each of which is arranged a series of preferably cylindrical drums 18. The drums of each series are superposed, and separated predetermined distances by means of saddles 19, fashioned from cast-iron or the like and having the upper and lower faces concave to conform to the shape of the cylindrical drums.

The space above the division plate 15 constitutes a combustion chamber 20, and has located therein a suitable number of burner casings 21, of which any desired number can be employed, depending upon the size of the boiler and the purpose for which it is designed. Each casing has a gas inlet pipe 25. These inlet pipes enter the air chamber through the open end of the same at the front of the boiler. Gas inlet pipes 26, extend from the casings to the air chamber 16, and have discharge nozzles 27 under the casing inlets 28. The latter extend through openings of the partition 15, into the air chamber, where they are outwardly flared. The casings have openings 29, through which the gases escape and at which they are burned.

The partition 15 has a plurality of openings therethrough in which are arranged

upwardly extending air pipes 30. Underneath the partition is positioned a movable, sliding plate 31, provided with openings 33 therethrough, adapted to register respectively with the air pipes 30 in a predetermined position of the plate. The latter is operable from the outside of the boiler, to regulate the passage of air from the air chamber to the combustion chamber. The arrangement of the burner parts set forth above is similar to that of the corresponding elements disclosed in my beforementioned patent application.

The corresponding drums 18 of the series of superposed drums are connected by substantially horizontal, transversely extending water tubes 36, which may be of any suitable number, and which are staggered, as is shown most clearly in Fig. 1. For example, the water tubes connecting the middle drums are arranged intermediate adjacent water tubes connecting the lowermost and the uppermost drums of the series. The lower drum 18 of one of the series has at each end an inlet 37, through which water is introduced into the drum. The upper drum of the other series, at each end has an outlet 38 through which the water escapes from the boiler. If so desired, the inlets and the outlets can be reversed. Certain of the adjacent drums of each series are joined by elongated saddles 39 having openings registering in the openings of the drums and constituting passages, so that a continuous circulation of the water can be effected through the boiler. The arrangement illustrated for example, is as follows: The lowermost drum 18 of the series not having the inlets, is connected intermediate its ends by a single connecting saddle 39 with the drum 18 above it. The middle drum of the series having the inlets is connected at each end by a connecting saddle 39 with the uppermost drum of the same series. Owing to this arrangement, the water enters through the inlets 37 and flows from the lowermost drum of that series, through the water tubes 36 to the lowermost drum of the opposite series, from the last-mentioned drum to the middle drum of the same series, and from the middle drum of this series to the corresponding drum of the other series. From the last-mentioned drum the water flows to the drum directly above it, and from the latter through the water tubes to the outlet drum of the opposite series. To equalize the flow, the single passage 39 is equivalent in cross-sectional area to both of the other passages 39.

While I have shown for example, a boiler including two series of three drums each, additional drums may be employed, and if so desired three series or more, of three or more drums each, may be used. The number of the elements will of course depend upon

the size of the boiler and the purposes for which it is designed. At the rear end of the boiler, near the top, I provide an escape flue 40, which can be connected with a chimney or the like, so that the waste gases produced by the combustion can escape.

I prefer to employ suitable retaining devices for securing the drums in position one above the other. These devices consist for example, of U-shaped members 41 fashioned from straps of metal or the like and encompassing the drums, as is shown most clearly in Fig. 2. At the extremities the members 41 are threaded and receive cross-bars 42 held in place by nuts 43 screwed upon the threaded ends. I have found it advantageous to employ a U-shaped member 41 at each end of each series of drums, as is shown most clearly in Fig. 1.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. A boiler, comprising spaced series of superposed drums, removable saddles separating said adjacent drums of each of said series, water tubes connecting corresponding drums of said series, the lowermost drum of one of said series having an inlet, the uppermost drum of the other of said series having an outlet, and a burner under said water tubes, certain of said saddles effecting communication between certain of said drums.

2. A boiler, comprising spaced series of superposed drums, removable saddles separating certain of said drums at the ends thereof, other removable saddles separating others of said drums intermediate the ends thereof, said saddles having passages effecting communication between said certain drums, and water tubes connecting corresponding drums of said series, one of said drums having an inlet, another of said drums having an outlet.

3. A boiler, comprising spaced series of superposed drums, removable saddles separating certain of said drums at the ends thereof, other removable saddles separating others of said drums intermediate the ends thereof, said saddles having passages there-through, effecting communication between said certain drums, additional saddles between certain of said drums, and serving to space the same, water tubes connecting corresponding drums of said series, an inlet and an outlet for said series of drums, and members for holding said series of drums in position.

4. A boiler, comprising spaced series of superposed drums, saddles independent of said drums, separating said adjacent drums of each of said series, and water tubes connecting corresponding, opposite drums of said series, one of said drums of one of said series having at each end an inlet, one of said drums of the other of said series hav-

ing at each end an outlet, said saddles having passages therethrough connecting said adjacent drums, certain of said saddles being positioned between said drums at the ends,
5 and others of said saddles being positioned between said drums, intermediate the ends of said drums.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES G. HAYDEN.

Witnesses:

JOHN FERGUSON,
B. B. FRISTOE.