H. TIELKEMEYER.

CONVERTIBLE UPDRAFT AND DOWNDRAFT BOILER.

APPLICATION FILED AUG. 2, 1916.

1,206,272.

Patented Nov. 28, 1916.

3 SHEETS—SHEET 1.

Fig. 2.

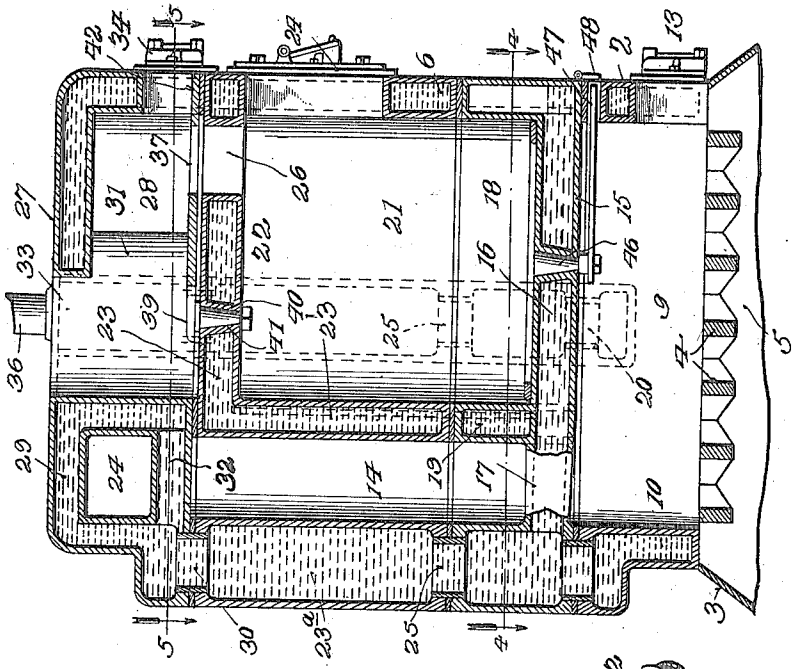
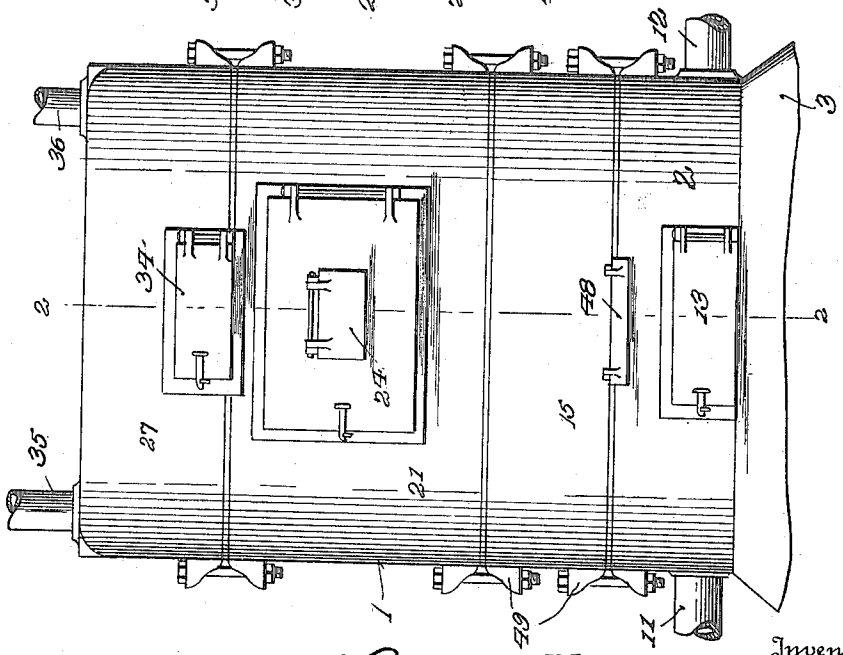


Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 4.

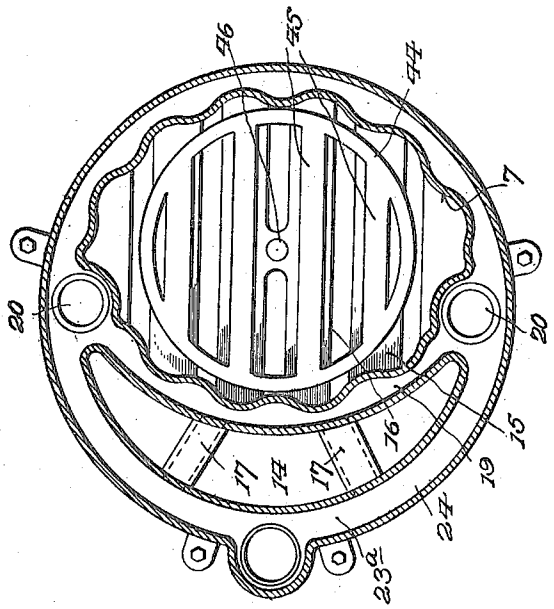
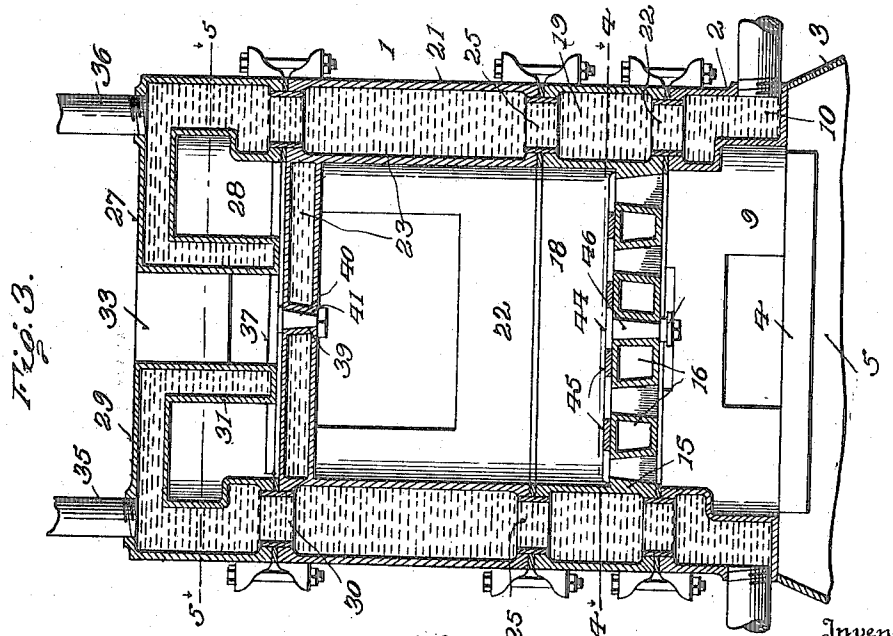


Fig. 3.



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3 SHEETS—SHEET 3.

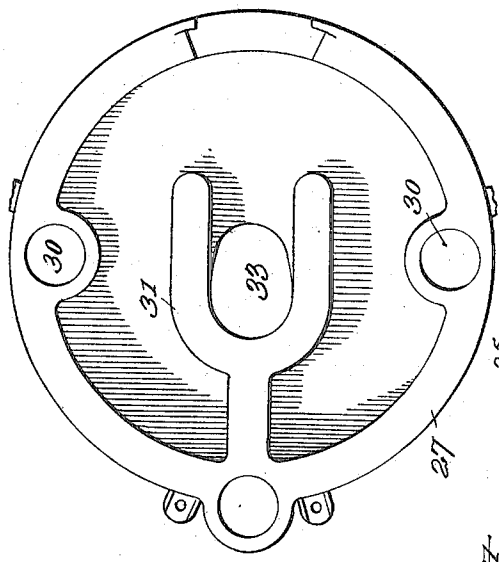


Fig. 6.

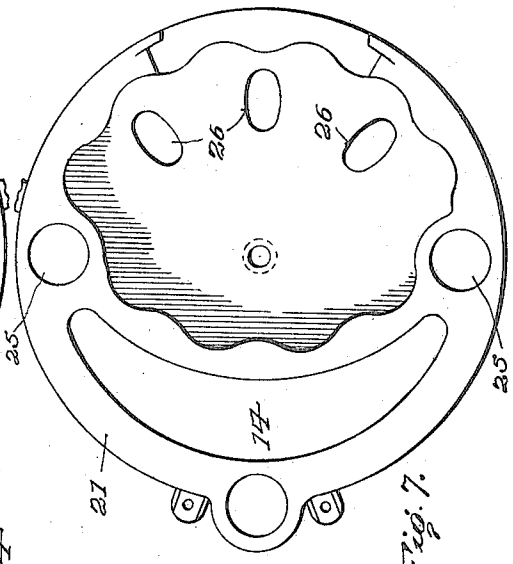


Fig. 7.

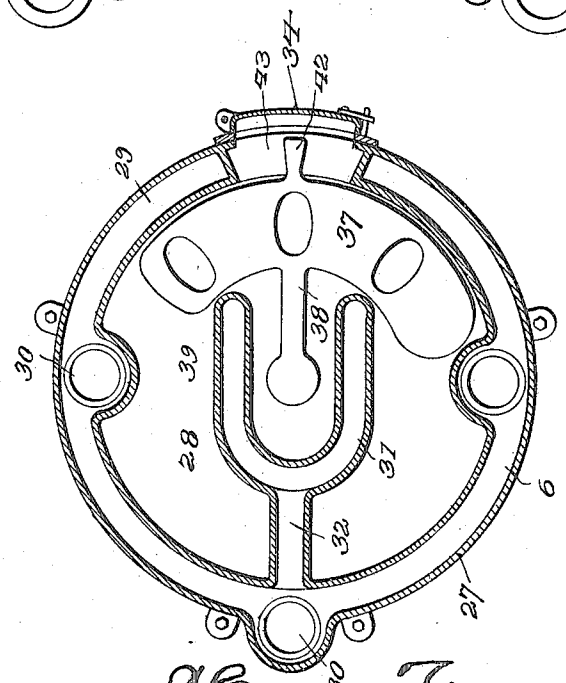


Fig. 5.

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UNITED STATES PATENT OFFICE.

HENRY TIELKEMEYER, OF ST. LOUIS, MISSOURI.

CONVERTIBLE UPDRAFT AND DOWNDRAFT BOILER.

1,206,272. Specification of Letters Patent. Patented Nov. 28, 1916.

Application filed August 2, 1916. Serial No. 112,733.

To all whom it may concern:

Be it known that I, HENRY TIELKEMEYER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Convertible Updraft and Downdraft Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in heating boilers of the up and down draft type and more especially that design embodying a plurality of superimposed water sections having draft passages therethrough, as set forth in my application for United States Letters Patent filed April 28, 1916, Serial Number 94,194.

An object of the present invention is to produce an efficient and economical convertible up and down draft boiler comprising a series of superimposed communicating water sections having arranged therethrough a plurality of maximum heat radiating passages for directing the flow of the products of combustion in an upward or downward path as may be desired.

Another object of this invention is the production of a boiler in which the circulating medium of either hot water or steam entirely surrounds the products of combustion, thereby securing the highest possible absorption of heat, irrespective of which draft passage is employed.

This invention has for another object the production of a substantially cylindrical vertical boiler composed of a plurality of superimposed water sections, among which is interposed a hollow water grate formed integral with one of the water sections.

A further object of the present invention is to produce a compact steam or hot water boiler having means for controlling the direction of the draft or flow of the products of combustion, the said means including an operable connection extending to the outside of the boiler within easy reach of the operator.

A still further object of this invention is to produce a steam or hot water boiler of the down and up draft type embodying a combined integrally formed hollow water grate and a regulating shaker element positioned thereon.

With these and other objects in view the invention further consists in the combination and arrangement of the several parts hereinafter described and pointed out in the appended claims.

In the drawings which show by way of illustration an embodiment of my invention: Figure 1 is a front elevation of my improved boiler. Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1. Fig. 3 is a vertical sectional view taken at right angles to Fig. 2 of the heating boiler. Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 3. Fig. 5 is a horizontal sectional view on the line 5—5 of Fig. 3. Fig. 6 is a bottom plan view of the top or cap water section illustrating the U or horseshoe shaped portion formed therein, and Fig. 7 is a bottom plan view of the major or intermediate water section, showing the crescent-shaped draft passage on one side thereof, and the series of openings for draft passage on the other side.

The present invention has been designed to include a series of superimposed hollow water sections suitably positioned upon a lower or basic section which preferably consists of the usual ash-box and grate of any well known construction. These several superimposed hollow water sections when positioned and secured together are designed to produce a vertical substantially cylindrical boiler, portions of which, such as the hollow water grate, the circulating chambers, and the baffling draft conduits, are cast integral with the said sections and arranged to establish communication between them in a compact and highly efficient heat producing manner.

In the production of the herein-described boiler there is included a lower or bottom hollow water section positioned and secured to the basic ash-box section, a hollow water grate section having cast integral therewith a hollow water grate, between which latter and the encircling chamber circulating communication of the heating medium is established; a major or intermediate hollow water section positioned and secured to the hollow water grate section; a top or uppermost hollow water section provided with suitable means for absorbing a

maximum amount of heat from the products of combustion as they pass therethrough; means provided in the said boiler between the said top and major water section for converting the boiler into an up draft or down draft type; and means for facilitating the complete consumption of the fuel, including a shaking element mounted on the hollow water grate.

Referring to the drawings in which corresponding reference characters designate similar parts, the boiler as a heating unit is indicated by the numeral 1, and comprises the bottom section 2 mounted upon a suitable base 3 which may be provided with the usual grate bars 4 and ash pit 5. As these elements are of any well known form of construction, a further detailed description thereof will not be given.

The boiler 1 is of circular double shell formation, as indicated at 6, and when the several water sections are secured together a vertical cylindrical or round heating boiler is produced. The compactness of this boiler for accommodation in limited areas requiring a high efficiency of heat will be apparent from this design in construction.

The circular double shell is preferably corrugated internally, or otherwise similarly shaped, as indicated at 7, for purposes of absorbing a maximum amount of heat. The heating medium, whether it be hot water or steam, is designed to circulate between the double shell formation of the superimposed sections of the boiler and communicate with the hollow water grate section, as will be readily understood, by referring to Fig. 2.

Referring to the respective hollow water sections hereinbefore mentioned, the bottom section 2 is provided with the interior heating chamber 9, extending the full diameter thereof between the circular double shell.

The chamber 10 is formed between the double wall construction of the water section and receives the returning heating medium from the system through pipe connections 11 and 12, see Figs. 1 and 3. A door 13 is preferably provided, as shown in this bottom water section 8.

Communicating with the chamber 9 of the bottom water section 8 is a vertical arcuately arranged draft passageway 14 which extends upward and leads into the top water section, thus establishing an outlet flue for the products of combustion when the boiler is used with a down draft. This passageway or flue 14 is of crescent shape in cross section, and affords a ready exit and heat distributing area for the products of combustion, see Fig. 4.

The hollow water grate section 15 is mounted upon the bottom section 8, and has cast integrally therewith a hollow water grate 16 adapted to communicate with the double shell formation of the said section through the connecting heat medium conduits 17. These conduits 17 are arranged in spaced relation at the rear of the boiler and span the vertical flue 14, as clearly shown in Fig. 2. Communication is also established at the front of the boiler between the hollow water grate and the double wall construction as shown.

The water grate comprises a plurality of longitudinally extending bars of substantially rectangular cross section having slightly tapered sides, as shown in Fig. 3. While these sections are shown as of substantially rectangular formation, it will be understood that various other cross sectional areas can be substituted, such as a square, hexagonal, diamond, irregular, oval, elliptical or egg-shaped, etc.

A heating chamber 18 is provided in the water grate section 15, above the water grate, and the encircling chamber 19 between the double wall construction receives the heating medium which circulates through the openings 20 formed between the sections.

The major or intermediate water section 21 is mounted upon the hollow water grate section 15 and is formed with an interior heating chamber 22 around and over which the chamber 23 extends between the double wall construction, as clearly shown in Figs. 2 and 3. The major section is provided with a double door construction, as shown, through which fuel is introduced. The general contour of this major section, more especially the heating chamber 22 and the encircling chamber 23, is elliptical. The portion of this major section through which the flue 14 extends is provided at the rear thereof with a chamber 24 formed between the double wall construction. This chamber 24 and the chamber 23 has circulating communication with the water grate section of the boiler through the openings 25. The top of the major water sections is provided with draft openings or passageways 26. These openings form the vertical draft flues for the products of combustion when the boiler is used with an up draft. The opening and closing of these being controlled by a damper or regulating means mounted between the major and top water sections, and operable from the outside of the boiler, as hereinafter described.

The top water section 27 is mounted upon the major water section and is provided with an interior heating chamber 28 around and over which extends an encircling chamber 29 formed between the double wall construction for the circulation of the heating medium. Openings 30 establish communication between the chambers 24 and 23 of the major section and the chamber 29 of the top section.

Communicating with the encircling chamber 29 of the top section there is provided

another U or horseshoe-shaped chamber 31 between a double wall construction formed integral with the top section. This chamber 31 has communication with the chamber 29 through the conduit or passageway 32.

The general arrangement of the U-shaped chamber 31 is longitudinal with respect to the front and rear of the boiler, thereby affording a maximum absorption of heat from the products of combustion in their passage through the hereinbefore described flue according to the direction of draft. While I have preferably shown and described this circular form of chamber as U-shaped and longitudinally disposed, it will be understood that various modifications thereof can be resorted to without departing from the spirit of the invention.

The products of combustion are adapted to pass through an opening 33 formed between the U arms of the chamber 31, and into a suitable chimney, not shown, and a door 24 is provided in the top section, as shown. Outlet pipe connections 35 and 36 are positioned in the top section and provided for the circulation of the heating medium from the said top section out into the system in the usual manner.

The damper or regulating means for converting the boiler into an up draft or down draft heater will now be described. Referring to Figs. 2, 3, and 5 of the drawings, the said means comprises a shiftable damper or covering plate 37 adapted to rest upon the surface of the major water section and to cover and uncover the openings 26 therein, according to the draft desired. The damper plate 37 is formed with a suitable arm 38 pivoted at 39 in the major section. The pivotal connection 39 consists of a stud 40 revolubly mounted on a socket 41, see Figs. 2 and 3. A suitable handle 42 is provided on the damper plate 37 and protrudes into the space 43 covered by the door 34 of the top section, where it can be easily grasped by the attendant for the purpose of changing the draft of the boiler. The manipulation of this draft converting means will be apparent. When it is desired to use the boiler as a down draft heater the damper 37 is moved by agency of the handle 42 to cover the openings 26 in the major water section thereby directing the draft downwardly through the water grate into the chamber 9 and thence upwardly through the flue 14 into the chamber 28, thence through the chamber 33 of the U-shaped portion in the top section, and out into the chimney. When it is desired to convert the boiler into an up draft heater, the damper plate 37 is moved by the handle 42 to uncover the openings 26, thereby allowing the draft to flow upwardly through the water grate into the chamber 22, thence upwardly through the draft openings 26 in the major section into the chamber 28, and then on through the chamber 33 to the chimney, as hereinbefore described. The result of the use of these convertible drafts is to substantially consume the bulk of the products of combustion before the chimney is reached, thereby providing a maximum absorption of heat by the surrounding heating medium chambers within the substantially cylindrical boiler unit.

Any suitable shaking means may be provided on the hollow water grate for effectively obtaining a free and uninterrupted flow of the products of combustion. As shown, this shaking means comprises a grate 44 composed of space bars 45 arranged within a suitable frame. The grate is movable on the pivot 46, and can be operated by a handle 47 projecting outwardly through an opening in the bottom water section, which may be closed by the door 48, as shown. In providing this shaking means it will be obvious that all tendency of the accumulation of clinkers and other foreign substances can be eliminated, and the highest possible efficiency of the fuel obtained. The parallel arrangement of the bars 45 will also provide for further draft adjustment. The relatively positioned bars 45 upon the water grate over the spaces formed therebetween will permit of obtaining further varying draft adjustment when the shaker is shifted.

The means for securing the several sections together in forming a substantially cylindrical heating unit includes a plurality of lugs 49 through which pass suitable draw bolts 65, as clearly shown in Fig. 1. A sufficient number of these fastening devices is provided around and between the sections of the boiler in order to prevent leakage therefrom. Suitable packing material may be used between the sections in order to further prevent any tendency of the boiler to leak, as shown in the drawings.

From the foregoing it will be seen that a compact and efficient heater has been produced in which all of the advantages of the convertible up and down draft boiler are incorporated, and the circular or cylindrical form of the heater as a unit maintained.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A cylindrical boiler of the class described consisting of a plurality of horizontally arranged superimposed hollow sections through which a heating medium circulates, the said sections including a major hollow section having a vertical flue therein, a water grate section arranged beneath the major hollow section, a bottom hollow section arranged beneath the water grate section, a top section positioned upon the major hollow section, a vertical arcuate shaped flue extending from the said bot-

tom section to the top section, an adjacent flue communicating with said flue and extending to the outside of the boiler, and means interposed between the vertical flue in the major water section and the aforesaid flues for directing the flow of the products of combustion through said boiler.

2. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section having a vertical flue therein, a hollow grate section arranged below said major section, a vertical arcuate shaped flue extending from beneath the hollow grate section to a point above the major section, an adjacent conduit communicating with said vertical arcuate flue and extending to the outside of the boiler, and means for controlling the direction of the products of combustion through said boiler.

3. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section, having a flue therein, a hollow grate section beneath said major section, an arcuate shaped flue extending from beneath the said hollow grate section to a point above the flue opening in the section to the outside of the boiler, and means for relatively controlling the direction of the products of combustion through the aforesaid flue openings.

4. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section having arcuate flue openings therein, a hollow grate section beneath said major section, an arcuate shaped flue extending from beneath the hollow grate section to a point above the arcuately arranged flue openings to the outside of the boiler, and means for relatively controlling the direction of the products of combustion through the first mentioned flue openings.

5. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section having a plurality of flue openings therein, a hollow grate section beneath said major section, a crescent shaped flue extending from beneath the hollow grate section to a point above the flue openings of the major section to the outside of the boiler, said flue being arranged within the cross sectional boundaries of the boiler on one side thereof, and means for relatively controlling the direction of the products of combustion through the first mentioned flue openings.

6. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section having a vertical flue therein, a hollow grate section, a top section positioned upon said major section having a series of vertically disposed baffles having an opening therebetween, a flue extending from beneath the hollow grate section to a point above the major section, a conduit communicating with said second mentioned flue and the opening formed between the vertical baffles and extending to the outside of the boiler, and means for relatively controlling the direction of the products of combustion through the first mentioned vertical flue opening.

7. A substantially round boiler of the class described consisting of a plurality of superimposed hollow sections through which a heating medium circulates, the said sections including a major section having a vertical flue therein, a hollow grate section beneath said major section, a top section positioned upon said major section having a U-shaped baffle formed therein, a flue extending from beneath the hollow grate section to a point above the major section, a conduit communicating with said second mentioned flue and extending to the outside of the boiler, and means for relatively controlling the direction of the products of combustion through the first mentioned vertical flue opening.

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

HENRY TIELKEMEYER.

Witnesses:

MAX SIGOLOFF,

J. SIGOLOFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."