April 26, 1932. J. J. HIRZEL 1,855,833

WATER TUBE BOILER

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Fig. 1.

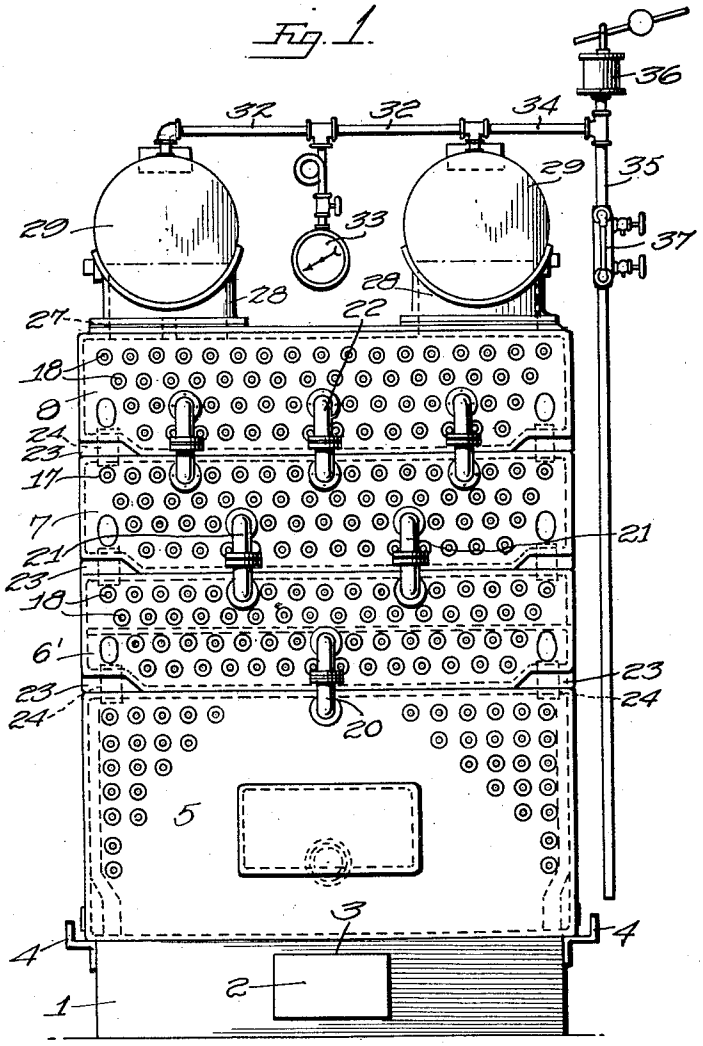


Fig. 13

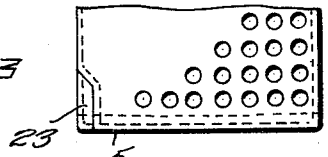
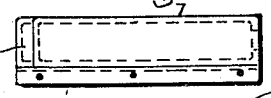


Fig. 14



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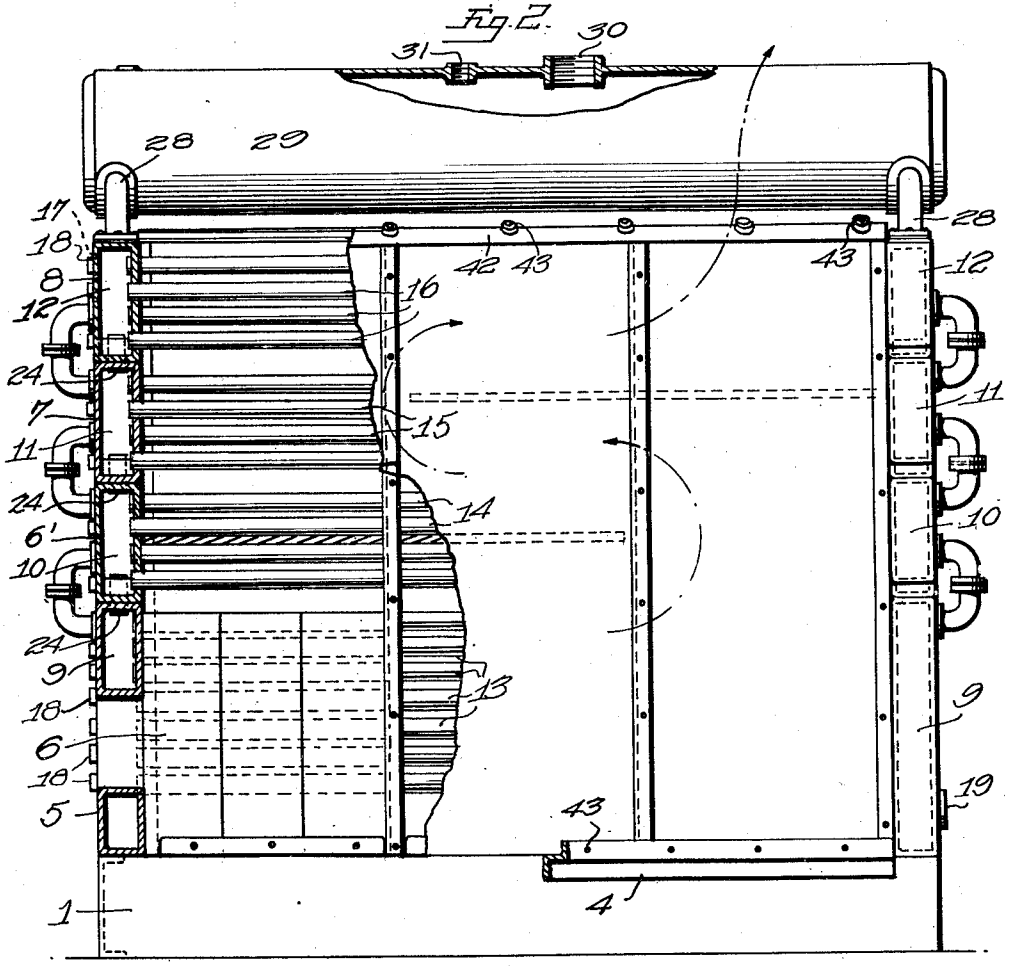
Attorney

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WATER TUBE BOILER

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Fig. 2.



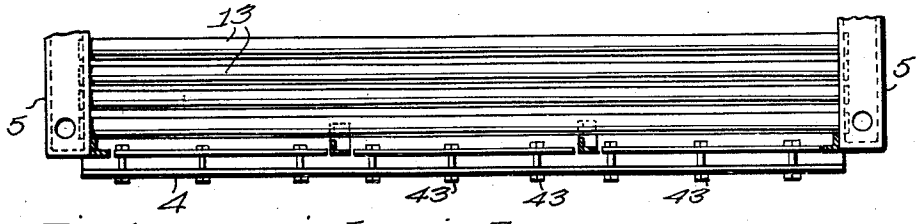
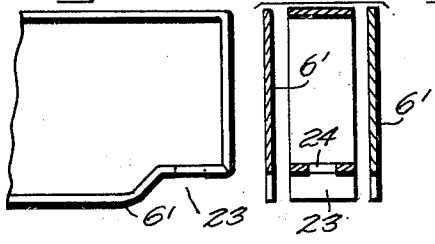


Fig. 4. Fig. 5. Fig. 3.



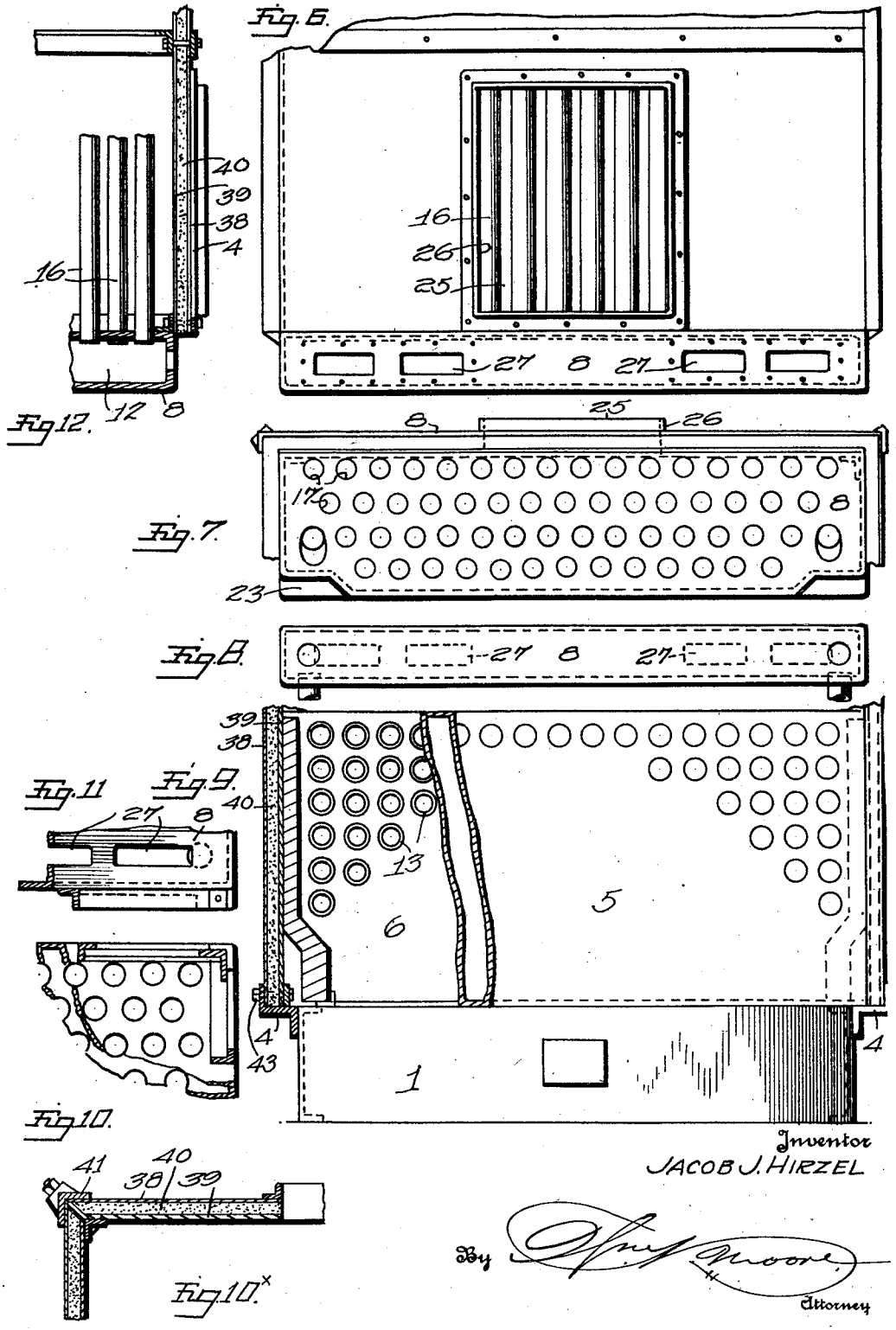
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WATER TUBE BOILER

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WATER TUBE BOILER

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Fig. 16.

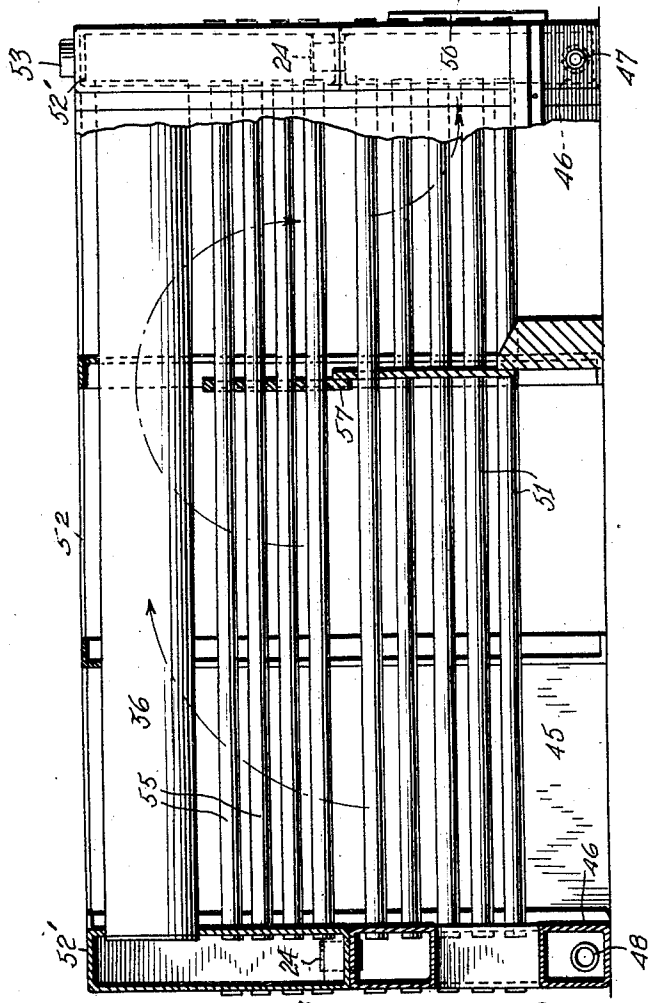
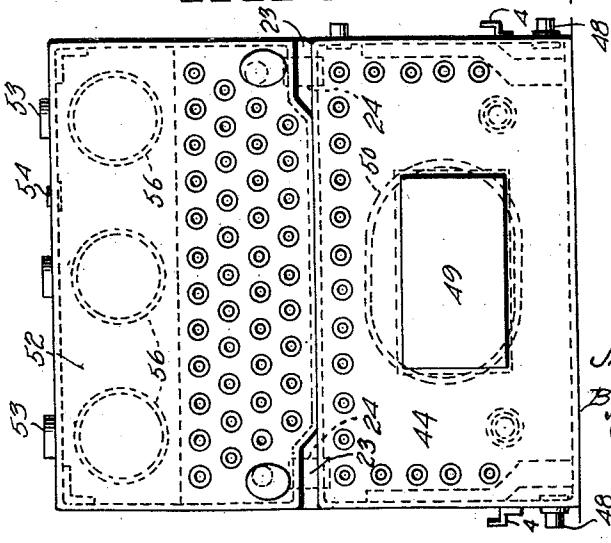


Fig. 15.



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Patented Apr. 26, 1932 1,855,833

UNITED STATES PATENT OFFICE

JACOB J. HIRZEL, OF UPPER DARBY, PENNSYLVANIA

WATER TUBE BOILER

Application filed December 20, 1930. Serial No. 503,807.

My invention relates to improvements in water tube boilers, and refers particularly to a boiler of this type for heating purposes.

One object of my invention is the provision of a water tube boiler composed of sections adapted to be placed one upon the other in vertical relation with the sections of practically uniform size and shape.

Another object of my invention is the provision of a sectional water tube boiler in which the sections are of rectangular form in general outline to cause them to fit snugly together in vertical formation.

Another object of my invention is the provision of a water tube boiler composed of rectangular sections of uniform size and which will be so disposed and connected as to insure a circulation of water both in a vertical and horizontal direction and thus insure the most practical heating with the proper amount of fuel.

Another object of my invention is the provision of a water tube boiler which can be easily repaired when found necessary and which will allow the entire replacement of a part or section at a small cost and in short order.

Another object of my invention is the production of a water tube boiler which will permit access to its interior for purpose of repair or cleaning and which can be quickly assembled, the shape of the sections allowing them to be carried through a window opening.

Another object of my invention is the provision of a water tube boiler which will possess merit in point of simplicity and durability of construction, which can be sold at a comparatively low price and which will be thoroughly efficient and practical from every point of view.

With these objects in view my invention consists of a sectional water tube boiler embodying novel features of construction and combination of parts, substantially as described and claimed and as shown in the accompanying drawings, in which:

Figure 1 represents a front elevation of a sectional water tube boiler constructed in accordance with and embodying my invention.

Figure 2 represents a side elevation of the boiler with parts broken away and in section to show details of construction and arrangement of parts.

Figure 3 represents a detail plan view showing the construction of the panel holding frame.

Figure 4 represents a detail view of a part of one of the water legs or jackets.

Figure 5 represents a sectional view showing the composition or parts of one of the water legs.

Figure 6 represents a top plan view of the upper section of my boiler with the tanks or drums removed to show details more clearly.

Figure 7 is a side view of the top section shown in Figure 6.

Figure 8 is an end or edge view of the structure shown in Figure 7.

Figure 9 represents a view partly in elevation and partly in section of the base with ash pit, the lower section with fire box or chamber, and the panels in their relation to the section.

Figures 10, 10ˣ, 11 and 12 represent detail views showing particularly the panel construction and the manner of connection of the panels in an air tight manner and their relation to the body of the boiler.

Figures 13 and 14 represent detail views of the water leg or jacket structure.

Figure 15 represents a front elevation of a modified form of my boiler, and

Figure 16 represents a central longitudinal sectional view of the said modified form.

Referring by numerals to the drawings in which the same numbers of reference denote like parts in all the views of the drawings:

The numeral 1 designates the base of my boiler, which is formed with the ash pit 2, and with a door 3, to permit access to said pit, and to each side of the base and disposed longitudinally thereof are the angled or flanged rails 4, which support the panel structure as will presently appear.

On the base is supported the section 5, which contains the fire chamber 6, and upon this section is mounted in a vertical tier the series of like sections 6, 7 and 8, all of said

sections being of substantially rectangular form in general outline and the fire pot section being somewhat wider than the surmounting sections, and while only four sections are shown in the drawings, it will be understood that any number of sections may be used in series according to conditions and requirements.

From this construction it will be noted that the structure as a whole forms a vertical boiler with similar individual sections of rectangular form which rest one upon the other and each of these sections is provided fore and aft with water legs or jackets 9, 10, 11 and 12, and that in the fire chamber are arranged the series of horizontal water tubes 13, and in the surmounting sections are also arranged the series of similar horizontal water tubes 14, 15 and 16, all of which tubes lead into the said water legs of said individual sections.

The front wall of the series of sections noted is provided with openings 17, which register with the tubes of each section, such openings being normally closed by caps 18, and which arrangement allows the caps to be removed for the purpose of flushing said tubes or inserting a suitable cleaning tool to remove scale or foreign matter from the tubes, and this horizontal arrangement possesses great advantage over an inclined arrangement as the cleaning tool can be easily moved back and forth, or a hose easily inserted to clean with a stream of water.

It will thus be noted that the sections are each provided with water legs at the front and rear and also that each section has mounted therein and leading to said water legs a series of similar horizontal water tubes and that the water inlet 19, is provided to supply the water to said tubes, and to connect the said water legs I provide at each end of the sections the elbow connections 20, 21 and 22, arranged as shown in Figures 1 and 2, and by this arrangement the water passes from the lower or fire pot section to the next section above and from said next section to the above sections from the lower to the upper forming a horizontal flow of water direct from the lower or fire box chamber throughout the series, and to provide an additional vertical flow of the water I provide the lower corners of each section above the fire pot section with a cut out portion 23, which admits the vertical sleeves or nipples 24, to connect the sections at their corners and also to form a vertical water passage, and this is of great importance as in addition to forming a means for connecting the sections in series, these nipples form a means to direct the water in a vertical line.

The upper section of my boiler is formed with an opening 25, surrounded by a flanged frame 26, and to which a stack connection may be secured and is further provided with passages 27, in the upper wall of its water legs which lead to the hollow fore and aft supports 28, of the twin tanks or drums 29, which tanks are provided with the service outlet 30, and with the smaller outlets 31, which are connected by the pipes 32, with the pressure gage 33, and by pipe 34, with the vertical pipe 35, carrying the relief valve 36 and the water gage 37, as most clearly shown in Figure 1.

For the purpose of enclosing the sides of my boiler and to insulate the boiler in an air tight manner I provide a panel construction, which comprises an outer metal sheet 38 and an inner parallel arranged metal sheet 39, with an insulating layer 40, of asbestos or other desirable insulating material, which are fastened in close relation by the corner clamps 41, and by the rails 42, and fastenings 43, the whole forming a panel mounting or frame secured at the upper and lower edge to the sides of the boiler, as most clearly shown in Figures 2, 9, 10, 10^x, 11 and 12, which makes an ornamental covering and also provides an air tight insulation for the boiler.

From the foregoing description taken in connection with the drawings the operation and advantages of my sectional water tube boiler will be fully understood and appreciated, and it will be apparent that the boiler is compact and small in size but insures a large heating capacity; also that the structure can be easily built or assembled at any time and in any character of building; also that the water circulates both in a vertical and horizontal direction insuring the most practical heating results; also that the boiler may be used either with coal or oil as a fuel and prove satisfactory with either fuel; also that the parts of the boiler are easily and quickly accessible for purpose of cleaning or repair; also that the enclosing panels may be applied or removed when necessary and that they form a complete air tight insulation.

In the modified form of my boiler shown in Figures 15 and 16, I provide a more simple structure and which is more compact and smaller in size, and in this form I employ a lower section 44, in which is provided a combustion chamber 45, which may use coal, oil, or gas, as found desirable, and this lower section has the front and rear water chambers 46, to which lead the water inlet 47 at the rear and the water inlet 48, at the front, and the section is also provided with the fire chamber door 49 and the outlet 50, to the stack.

I also provide said lower section with the series of water tubes 51, and on this lower section is placed the section 52, having the front and rear water chambers 52′, and service outlets 53, and outlet 54, for connection with a pressure gage, water gage, and safety valve, and this section is also provided with

the water tubes 55, and above said tubes are arranged the water drums 56, and a vertical baffle 57, is also provided, as shown in Fig. 16.

I claim:

1. A sectional water tube boiler composed of a lower fire chamber section and a series of sections mounted in vertical relation upon said fire pot section, water legs at the front and rear end of all of said sections, horizontal tubes in said sections in communication with said water legs, elbows connecting said water legs to provide circulation between said sections, nipples connecting and securing said sections and forming vertical circulating means, a passage in the upper section to connect with a stack, twin drums or tanks in communication with the water legs of the upper section, and a pressure gage, relief valve, and water gage associated with said tanks.

2. A sectional water tube boiler, composed of a lower fire chamber section and a series of sections mounted in vertical relation upon said fire chamber section, water legs at the front and rear end of all of said sections, horizontal tubes in said sections in communication with said water legs, elbows connecting said water legs to provide circulation, insets at the corners of said sections, nipples connecting and securing said sections and forming vertical circulating means and arranged within said insets, a passage in the upper section to connect with a stack, a tank in communication with the water legs of the upper section, and a pressure gauge, relief valve and water gauge associated with said tank.

In testimony whereof I affix my signature.

JACOB J. HIRZEL.