C. B. THOMPSON.

SECTIONAL BOILER.

APPLICATION FILED JULY 15, 1912.

1,146,743.

Patented July 13, 1915.

Fig. 2.

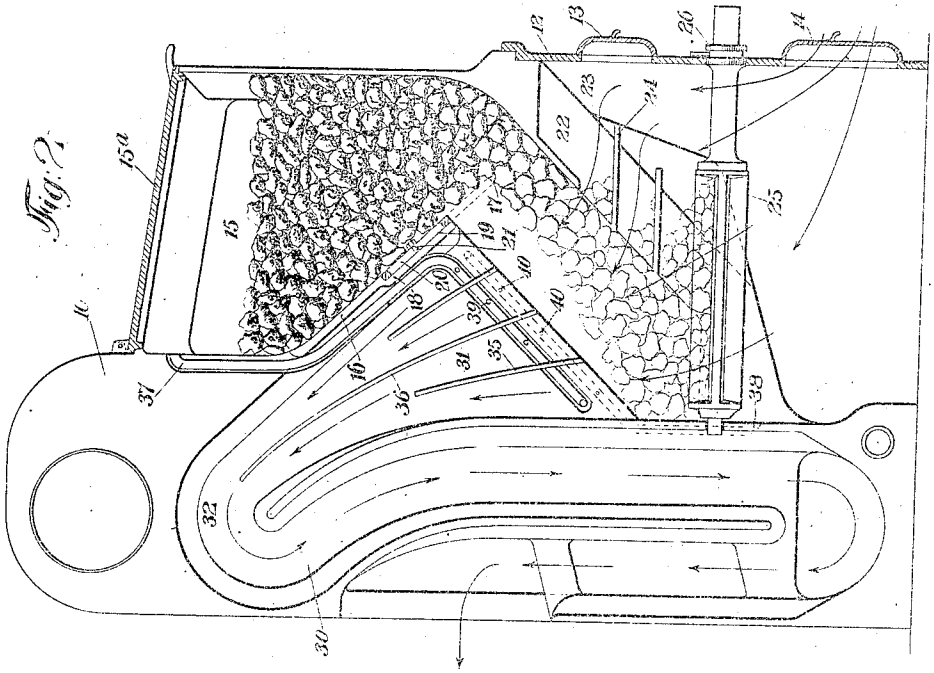
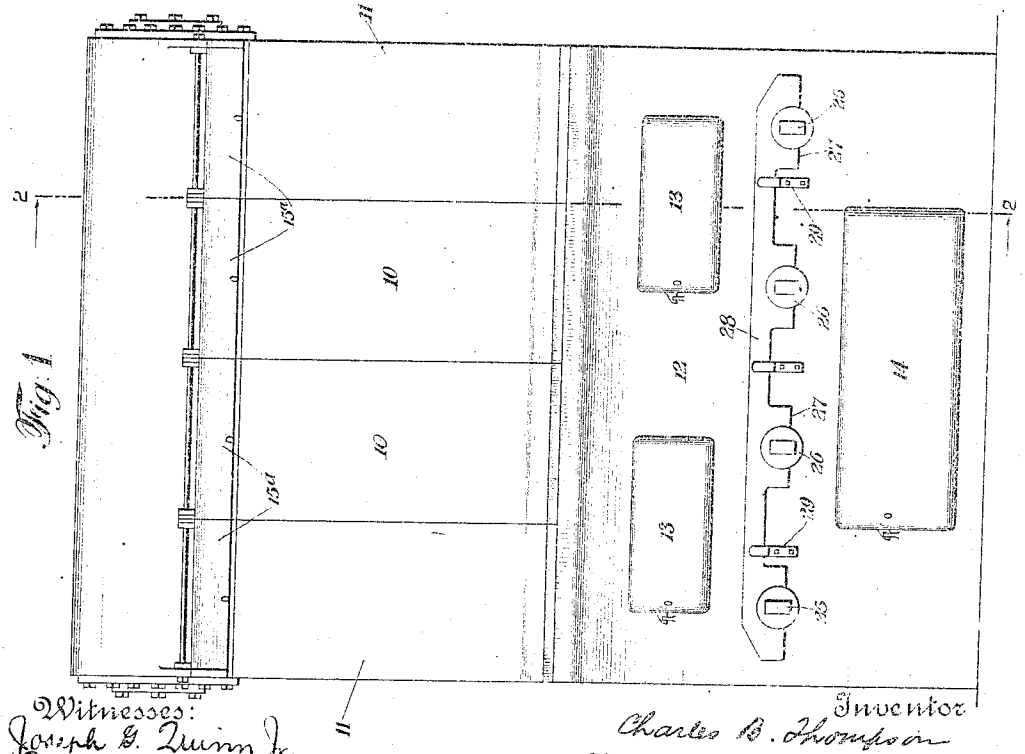


Fig. 1.



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UNITED STATES PATENT OFFICE.

CHARLES B. THOMPSON, OF BUFFALO, NEW YORK, ASSIGNOR TO AMERICAN RADIATOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

SECTIONAL BOILER.

1,146,743. Specification of Letters Patent. Patented July 13, 1915.

Application filed July 15, 1912. Serial No. 709,330.

To all whom it may concern:

Be it known that I, CHARLES B. THOMPSON, a citizen of the United States, residing at the city of Buffalo, Erie county, in the State of New York, have invented certain new and useful Improvements in Sectional Boilers, of which the following is a full, clear, and exact specification.

My invention relates to improvements in heating apparatus, and the same has for its object more particularly to provide a simple, efficient and reliable boiler of the magazine type in which the highest heat efficiency may be obtained for the fuel employed.

Further, said invention has for its object to provide a boiler which may be readily adapted to burn fuel of any size without impairing the efficiency of the boiler.

Further, said invention has for its object to provide a magazine boiler having an inclined grate, and flues, so arranged relatively to said grate that the air entering the same shall pass through the grate at right angles thereto, and as it continues its said course thence pass into the flues which have their entrance portions also arranged at right angles to said grate.

Further said invention has for its object to provide a magazine boiler in which the parts are so arranged relatively to each other that the fuel will be discharged from the magazine to the inclined grate at the upper forward edge thereof.

Further, said invention has for its object to provide a boiler in which the size of the opening leading to the inclined grate may be readily increased or diminished according to the character of the fuel employed.

Further, said invention has for its object to provide a boiler with means for introducing air in a plurality of small jets to the combustion chamber thereof.

Further said invention has for its object to provide a boiler having an inclined grate, the bars of which are so arranged as to cause the thinnest portion of the fuel thereon to be maintained adjacent to the upper end, and at the same time prevent the fuel adjacent to the lower portion of said grate falling over the front edges of said grate bars, and dropping unconsumed into the ash pit.

Further objects will in part be obvious, and in part be hereinafter described.

To the attainment of the aforesaid objects and ends, my invention consists in the novel details of construction, and in the combination, connection and arrangement of parts hereinafter more fully described, and then pointed out in the claims.

In the accompanying drawings forming part of this specification, wherein like numerals of reference indicate like parts, Figure 1 is a front elevation showing one form of sectional boiler constructed according to, and embodying my said invention, and Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1.

In said drawings the boiler shown is of the sectional type comprising a series of intermediate vertical flue sections, 10, 10, secured to each other and to conforming end sections 11, 11.

In the construction illustrated the boiler is shown as composed of eight vertical sections or elements, of which each two adjoining sections or elements constitute a working unit. The said sections or elements at their lower forward portion unite with a front plate 12 which is suitably secured thereto, and provided with a plurality of clinker doors 13, 13, and below said clinker doors with an ash-pit opening and door 14.

Each working unit is provided at its upper portion with a fuel magazine 15 having a downwardly and forwardly inclined bottom 16 provided with an opening 17 at its lowermost portion, which communicates with the combustion chamber. The forward portion of the magazine floor along the edge of the opening 17 is recessed at 18 to receive an adjustable plate 19 provided at its rear portion with transverse slots 20, 20 to receive bolts 21, 21 extending into the recessed portion 18 of the magazine floor, whereby said plate 19 may be secured to its adjusted positions to vary the extent of the opening 17 in order to suit the different kinds of fuel employed. At the upper ends of each magazine is provided a pivoted cover 15ª.

22, 22 denote inclined water legs having

horizontally extended surfaces forming a grate 23, comprising a series of grate bars 24, 24 arranged one above the other and each having its forward edge extending beyond the forward edge of the bar next below. The grate 23 is arranged at an angle of about 45 degrees, and the bars 24, 24 thereof are so disposed horizontally relatively to each other as to permit of the use of any size fuel, and to prevent the same dropping unconsumed over the front edges of said bars and into the ash pit. By arranging the grate 23 at about an angle of 45 degrees, it brings the same substantially at an angle of 90 degrees to the base of the fuel magazine, and by means of the adjustable plate 19 the fuel is deposited upon the grate in such manner that the thinnest portion of the fuel bed is at the top of the grate, and the portion supported upon each grate bar is broadest at its base resting upon the bar and thinnest at its upper portion immediately below the grate bar next above. This permits the air to pass through the inclined bed of fuel at its thinnest portions, and enter the combustion chamber in a series of parallel superposed layers of air each composed of numerous small jets.

Between each pair of vertical sections 10, 10 adjacent to the lower end of the inclined grate 23 is a pivoted or revoluble shaking grate bar 25 which has its rear end supported in the rear wall of the ash pit, and its forward end extending through the front plate 12. The extreme projecting end of said shaking grate bar 25 is squared to receive the end of a suitable tool for actuating said bar, and directly to the rear of said squared end is provided a grooved collar 26, adapted to receive the depending lugs 27, 27 of a locking bar 28 movably supported in guides 29, 29 secured upon the front plate 12.

30, 30 denote flues which are arranged partly in each two opposing sections 10, 10. Each flue has an inclined flaring entrance portion 31, and a constricted portion 32 extending upwardly and rearwardly therefrom. The entrance portion 31 of each flue is made substantially co-extensive in length with said inclined grate 23, and arranged parallel thereto. Each flue has its entrance portion 31 and the constricted portion 32 leading therefrom arranged longitudinally at right angles to the inclination of the grate 23, and has its entrance portion, which is substantially co-extensive in length with said inclined grate 23, arranged parallel thereto. Thus providing a sufficiently large combustion chamber portion directly facing the grate into which the hot gases may pass immediately upon being liberated, and while the same are in a most highly expanded state. From the rear end of the constricted portion 32 the flue 30 is carried rearward, downward and forward, and thence vertically downward, and upward part way to the smoke outlet. In order to heat the water more effectively, the entrance portion 31 and constricted portion 32 of each flue is provided with longitudinal fins 35, 36, 36.

In order to obtain a more perfect combustion of the fuel, the sections 10, 10 may be provided upon their opposing faces with recesses to receive air blast pipes 37, 38 having outlets 39, 40 respectively arranged adjacent to the entrance portions 31 of the flues. One of said pipes, as for example the pipe 37, may be carried upwardly into the magazine, and the other downwardly into the ash pit and connected to a suitable source of air supply.

The operation of the boiler will be obvious from the foregoing description. However, it is to be noted that by arranging the floor of the magazine so as to extend downward and forward, and arranging the inclined grate at substantially right angles to the floor of the magazine the fuel is caused to be deposited upon the grate in a relatively thin layer adjacent to the upper end of said grate, which layer becomes thicker as it extends downwardly to the shaking grate. By this arrangement a liberal supply of air can be fed through the thin layer of fuel to the combustion chamber to the point therein the same is most effective in combining with the hot gases liberated by the fuel.

Further, it is to be noted that by providing the opening at the base of the magazine with an adjustable slide the extent of said opening may be varied to deposit the fuel upon the upper portion of the grate in a layer of any desired thickness regardless of the size of the fuel employed, and thus insure the proper supply of air therethrough to mix with the products of combustion liberated in the combustion chamber.

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

1. In a boiler, the combination with an inclined grate, of a tortuous flue extending therefrom having its entrance portion arranged substantially at right angles to said grate and provided with a plurality of longitudinal fins, said entrance portion comprising a constricted outlet portion and a flaring mouth disposed parallel to said grate and co-extensive in area therewith and exposed directly to the entire bed of incandescent fuel upon said grate, substantially as specified.

2. In a boiler, the combination with an inclined grate, of a tortuous flue extending therefrom having its entrance portion arranged substantially at right angles to said grate and provided with a plurality of longitudinal fins, said entrance portion comprising a constricted outlet and a flaring mouth disposed parallel to said grate, and

co-extensive in area therewith and exposed directly thereto and means for conducting air to said flue and discharging the same adjacent to said flaring mouth, substantially as specified.

3. In a boiler, the combination with an inclined grate, of a tortuous flue extending therefrom having its entrance portion arranged substantially at right angles to said grate and provided with a plurality of longitudinal fins, said entrance portion comprising a constricted outlet and a flaring mouth disposed parallel to said grate and co-extensive in area therewith and exposed directly thereto and means for conducting air to said flue and discharging the same in a series of separated jets transversely across the mouth of said flue and parallel with the edge thereof, substantially as specified.

4. In a boiler, the combination with an inclined grate, of a tortuous flue extending therefrom having its entrance portion arranged substantially at right angles to said grate and provided with a plurality of longitudinal fins, said entrance portion comprising a constricted outlet and a flaring mouth disposed parallel to said grate and co-extensive in area therewith and exposed directly thereto, and an air pipe extending into said flue having its discharge portion arranged adjacent to and parallel with said flaring mouth, substantially as specified.

5. In a boiler, the combination with an inclined grate, of a tortuous flue extending therefrom having its entrance portion arranged substantially at right angles to said grate and provided with a plurality of longitudinal fins, said entrance portion comprising a constricted outlet and a flaring mouth disposed parallel to said grate and co-extensive in area therewith and exposed directly to the entire bed of incandescent fuel upon said grate, and air pipes located in opposite sides of said flue having discharge openings in their opposing portions for projecting air in a series of jets transversely across said flue adjacent to the mouth thereof, substantially as specified.

Signed at the city of Chicago, Cook county, in the State of Illinois, this 2nd day of July, nineteen hundred and twelve.

CHARLES B. THOMPSON.

Witnesses:

R. J. HAMILTON,

F. J. KEARNS.