

J. SCHWAB.
SINGLE BOILER HEATING SYSTEM.
APPLICATION FILED APR. 12, 1911.

1,010,964.

Patented Dec. 5, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

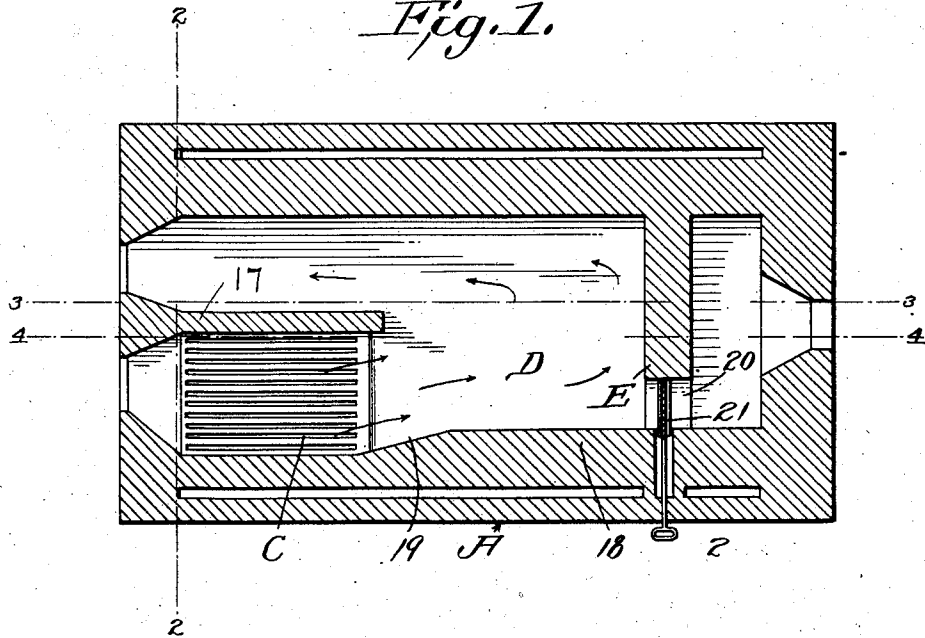
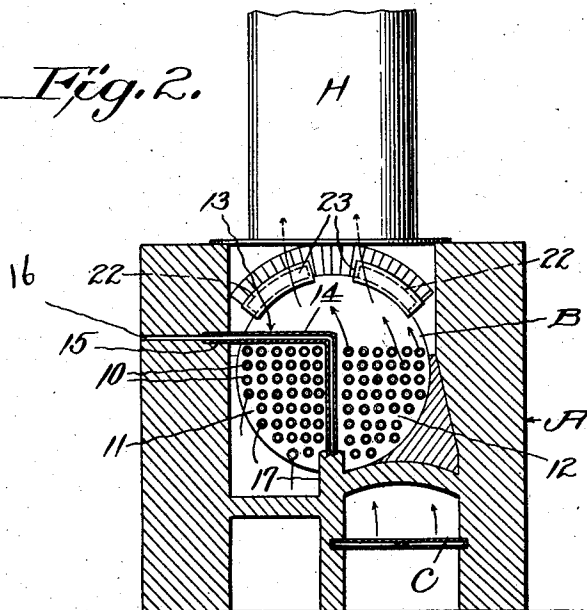


Fig. 2.



WITNESSES
W. L. Troughton
P. H. Morris

INVENTOR
John Schwab
By *Fred B. Fitchelsonhaugh*
Attorney

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2 SHEETS-SHEET 2.

Fig. 3.

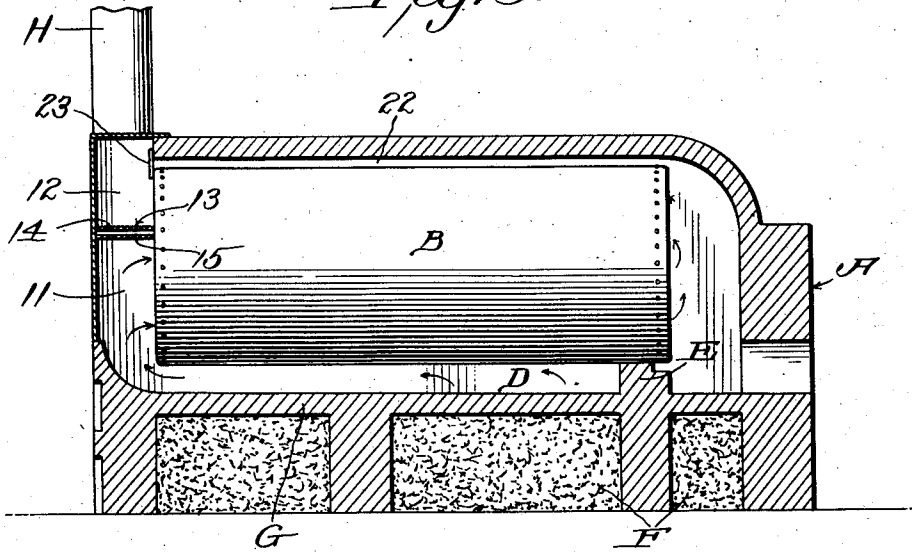
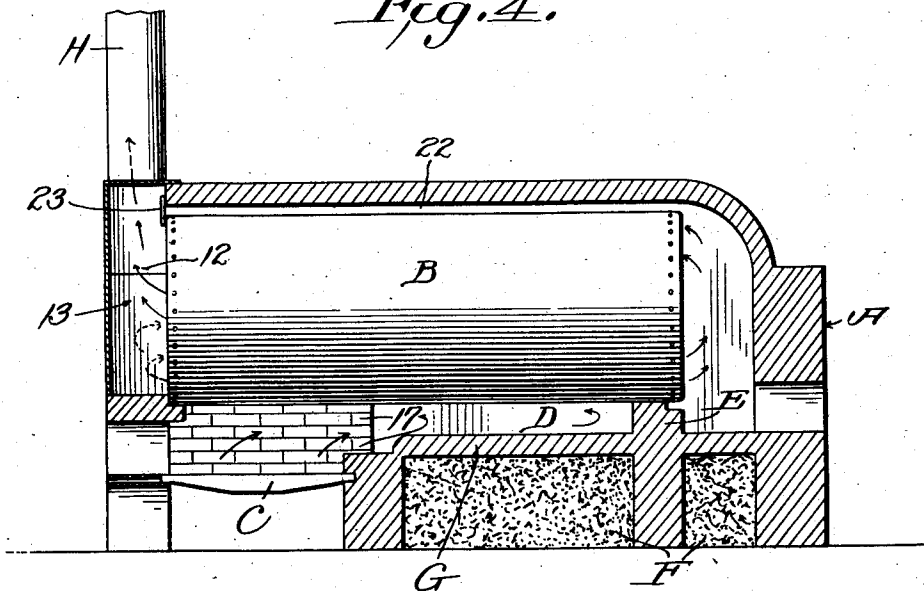


Fig. 4.



WITNESSES
E. A. Trought.
P. H. Moore

INVENTOR
John Schwab
By *Fred B. Fitchman*
Attorney

UNITED STATES PATENT OFFICE.

JOHN SCHWAB, OF WINNIPEG, MANITOBA, CANADA.

SINGLE-BOILER-HEATING SYSTEM.

1,010,964.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN SCHWAB, of 274 Selkirk avenue, in the city of Winnipeg, county of Selkirk, in the Province of Manitoba, Dominion of Canada, have invented certain new and useful Improvements in Single-Boiler-Heating Systems, of which the following is a specification.

My invention relates to improvements in single boiler heating systems, and the objects of my invention are to effect an economy in fuel by obtaining substantially all the heat from the products of combustion before they reach the chimney.

In the ordinary steam boiler furnace the products of combustion pass only once beneath the boiler and once through the tubes, and it will usually be found that a large percentage of the heat units pass into the chimney. It is proposed to remedy this defect according to the present invention by causing the products of combustion to pass both backwardly and forwardly beneath the boiler, and both backwardly and forwardly through the tubes. These results are accomplished by dividing the tubes into separated sections and providing a grate which only extends part way across the furnace, and baffle plates arranged to lead the products of combustion along the desired path, as hereinafter more fully set forth and described in the accompanying specification and drawings.

In the drawings: Figure 1 is a horizontal section through the furnace of a boiler embodying the present invention. Fig. 2 is a section on the line 2—2, Fig. 1. Fig. 3 is a section on the line 3—3, Fig. 1. Fig. 4 is a section on the line 4—4, Fig. 1.

In the drawings like characters of reference indicate corresponding parts in all the figures.

Referring to the drawings A represents the masonry structure inclosing and supporting the boiler B, both of which are in their main details, the same as at present known in the art.

The boiler is provided with the usual tubes 10, and these in accordance with the present invention are divided into two separate sections 11 and 12. As at present constructed, the tubes are usually formed in two sections with a vertical space between them, and in applying the present invention to an existing boiler, it is only necessary to place a division element 13 between the sections.

The improved form of division element which I have devised comprises two parallel plates 14 and 15 spaced a short distance apart to form an air space, between, which air space is placed in communication with the open air by causing the air space to open into a passage-way 16 in the side wall which leads to the open air.

The division element 13 leads vertically between two sections 11 and 12, and horizontally across the top of the section 11; the lower edge of the division element being in part supported by a division wall 17 at the side of the grate C.

The grate C is itself of usual construction but is arranged to extend only part way across the furnace D. In fact, it is desirable that it should extend only to the center thereof and to provide room for the grate at one side, the side wall 18 may be recessed at 19 to accommodate the width of the grate.

The products of combustion from the fire on the grate are prevented from passing directly through the tubes at the rear end of the boiler by a baffle wall E which extends upwardly from the bottom of the furnace to the lower surface of the boiler.

In order to maintain the hot products of combustion near the lower surface of the boiler, the combustion chamber of the furnace is filled in substantially to a level somewhat higher than the grates, with suitable filling F, which filling may be covered with a layer of bricks G.

The division wall 17 extends slightly farther rearwardly than the ends of the grates, and it will be seen that the products of combustion will first pass from the grate backwardly, then around the end of the division wall 17 forwardly to the front end of the tubes in the section 11; then backwardly through the tubes in the section 11 and then forwardly through the tubes of the section 12 and thence to the chimney H.

The arrangement just described embodies the invention as applied to an ordinary boiler. Certain further features may be used when the invention is to be employed where exceptionally quick steaming and a high pressure is desired, such as in a power plant or street railway system. In this case, the baffle wall E is formed with an aperture 20 controlled by a slide 21, and by-pass passage ways 22 are formed in the masonry structure over the top of the boiler ways being controlled by dampers 23 so that they

may or may not be used as desired. When, therefore, it is desired to obtain steam quickly, the slide 21 and the dampers 23 are opened so that the greater part of the products of combustion may pass directly from the combustion chambers to the tubes in section 12 and thence to the chimney. The smoke which will be on top of the hot gases passing through the by-pass passage-ways 22 will thereby leave the tubes clear for the hot gases. In the ordinary operation of the boiler, however, it should not be necessary to open the slide or dampers.

It will be seen that the present system causes the products of combustion to pass both backwardly and forwardly beneath the boiler and then backwardly and forwardly through the tubes. This effects great economy in fuel, and will enable the fire grates and fire furnaces to be constructed of two thirds the size ordinarily used, thus very materially reducing the cost of operation.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention, within the scope of the claim, constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as my invention is:

In a boiler furnace, the combination of a boiler having a multiplicity of tubes, and a supporting structure inclosing the boiler and forming therewith a combustion cham-

ber beneath the boiler, and chambers at the ends of the boiler into which the tubes open, the wall of the supporting structure which divides the combustion chamber from the chamber at the rear of the boiler being adapted to cut off direct communication between said chambers and to form a support for the rear end of the boiler, a plate dividing the chamber at the front end of the boiler into two non-communicating spaces, one of said spaces being in direct communication with the combustion chamber and with one section of the boiler tubes and the other space being in direct communication with the other section of the boiler tubes and with the chimney, the two sections of tubes being in free communication with each other through the chamber at the rear of the boiler, a furnace grate situated within the combustion chamber at one side thereof and near the front end of the furnace and a baffle wall extending inward from the front of the furnace along the inner side of the grate and terminating short of the rear end of the combustion chamber, whereby the products of combustion from the grate are caused to pass backward and forward through the combustion chamber and then successively through the sections of boiler tubes.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN SCHWAB.

Witnesses:

C. L. SIMMONDY,
A. A. MOFFAT.