

Sept. 10, 1935.

H. A. FISCHEL

2,014,171

SECTIONAL BOILER

Filed Oct. 18, 1933

2 Sheets-Sheet 1

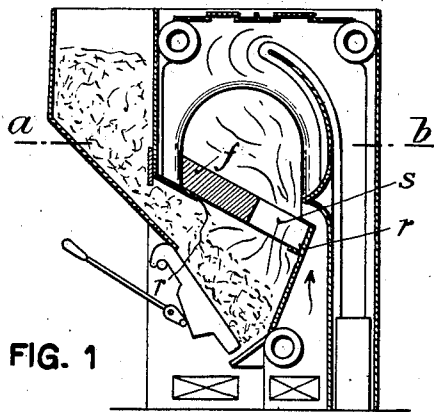


FIG. 1

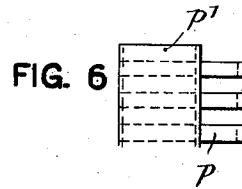


FIG. 6

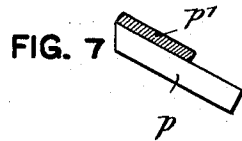


FIG. 7

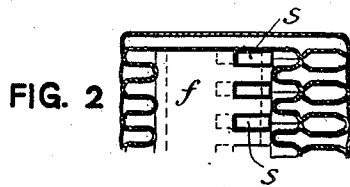


FIG. 2

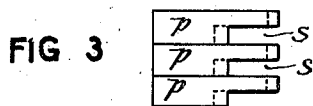


FIG. 3

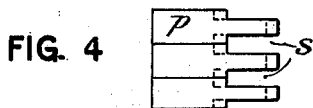


FIG. 4

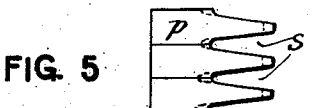


FIG. 5

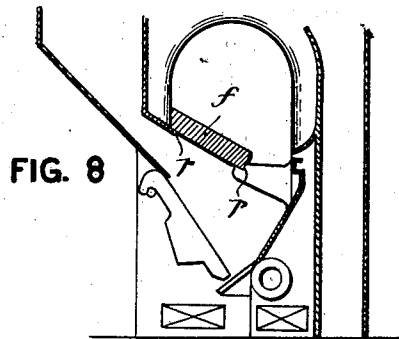


FIG. 8

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2 Sheets-Sheet 2

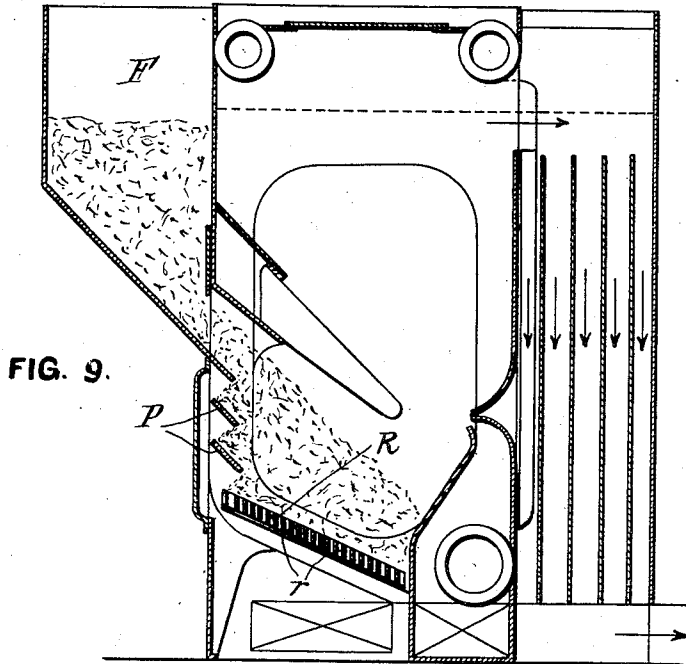


FIG. 9.

FIG. 10

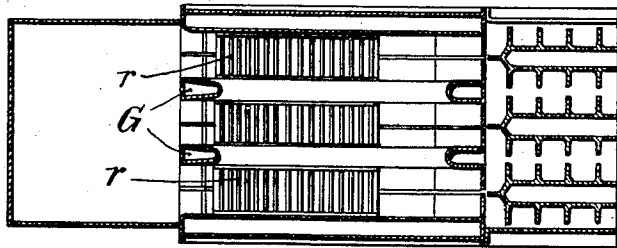
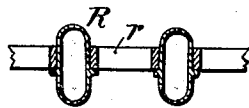


FIG. 11



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UNITED STATES PATENT OFFICE

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SECTIONAL BOILER

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Application October 18, 1933, Serial No. 694,157
In Germany October 21, 1932

3 Claims. (Cl. 122—212)

This invention relates to a sectional boiler for water or low pressure steam and has for its object to make it possible to burn low quality fuel as well, for instance, crude lignite in a more perfect manner than hitherto, even without expert attention.

The peculiarity of the boiler consists, in the first place, substantially in this that the fire bridge divides up the fire space and extends into it for a considerable distance, the complete combustion of the fire gases taking place with a free development of the flames above the fire bridge in the roomy recombustion chamber. The fire bridge has the advantage that its under side acts as an ignition arch for the gaseous products of incomplete combustion and for fuels which do not readily ignite, while its upper surface, which acts as a radiating surface, favours the combustion in the recombustion chamber lying above the fire space and the constriction at its end produces eddies which cause the flue gases to mix with the additional air. In order that the radiating effect of the upper surface of the fire bridge shall not be hindered by particles of flue dust settling on it, this surface is preferably placed at such a steep angle that the flue dust is forced to slide down.

A constructional form of the boiler is shown in Figures 1 to 8 of the accompanying drawings.

Figure 1 is a vertical cross section through this constructional form of boiler. The fire plate *f* which is in one piece, is provided at its lower end with slots *s* for the passage of the primary air. The plate rests on either side on supports *r* provided on the inside of the boiler walls.

Figure 2 is a horizontal cross section through the boiler on the section line *a—b* Figure 1.

Figures 3, 4 and 5 show different possible constructions of the fire plate. It will be seen that the plate may consist of separate blocks *p* which placed next to one another form the cover in the front part of the fire space and are provided in the rear part opposite the air inlet with the slot-like openings *s*.

Figures 6 and 7 show in plan view and elevation a constructional form, in which a plurality of prism-like elongated blocks *p* rests on the supports *r*, covering blocks *p*₁ resting in the front part of the bridge on the elongated blocks and leaving the fire slots in the rear part of the bridge open.

Figure 8 shows an arrangement in which the fire plate does not occupy the whole breadth of the fire space and the supports or projections of the boiler sections project sufficiently far from

the inlet side of the additional air to support the outer portion of the fire plate.

A further constructional form of the sectional boiler is shown in Figures 9 to 11. The main feature of this form of construction is the introduction of the fuel between the boiler sections which form a closed frame around the furnace. This constitutes a considerable simplification and improvement of the constructional forms hitherto used.

Figure 9 is a vertical cross-section through the boiler, and Fig. 10 is a horizontal section through the furnace, showing the trapezium-like shape of the boiler sections at the side where the fuel is introduced and the arrangement of the grates. Figure 11 is a cross-section through the parts of the sections supporting the grate *r*.

From the hopper *F* the fuel passes laterally between the separate sections *G* of the boiler into the furnace. Between the relatively narrow water-carrying sections *G* sufficient space is provided. Preferably the sections have a cross-section which tapers from the hopper to the furnace (Fig. 10).

In order to ensure a sufficient supply of air when there is a considerable depth of fuel on the fire, grate plates *P* are provided between the sections *G*, the inclination of which plates is greater than the sliding angle of the fuel, so that the accumulation of fine ash which would occur with horizontal or less inclined plates is prevented and the supply of combustion air is not hindered.

Below the grate plates is the grate proper *R*, which is formed on the one hand by the lower parts of the boiler sections and on the other hand by grate bodies *r* which are interposed or are cast on the sections. The former grate bodies are made easily movable in order that by shaking them the ash may be removed or by withdrawing them further clinker and ash may be deposited in the ash chamber. They may be shaken either separately by hand after the fire door has been opened, or jointly by means of a cam shaft or the like from the outside without opening the fire door. The shape of the grate bodies is made suitable for the properties of the fuel used.

What I claim is:

1. In a sectional boiler a boiler body having a fire space therein, a fuel hopper disposed laterally of the boiler body and communicating with the fire space, said body including a plurality of separate water-containing sections having spaces between the sections for the introduction of the

fuel from the said hopper into the fire space, a fire bridge extending into the fire space of the boiler at a point above the point of communication of the hopper with the fire space and extending for a considerable distance and dividing it up into a lower space and a capacious upper recombustion chamber for the fire gases, in which complete combustion with a free flame development can take place, and means for the introduction of preheated additional air into the fire

space of the boiler opposite the said fire bridge.

2. A sectional boiler as claimed in claim 1, wherein the boiler sections have a trapeziform cross-section where the fuel is introduced tapering from the hopper to the fire space.

3. A sectional boiler as claimed in claim 1, wherein a grate is disposed between the separate water container boiler sections and rests on said sections.

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