

1,061,502.

Fig. 1

Fig. 2

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SMOKE-CONSUMER.

1,061,502.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES A. RUSH, citizen of the United States, residing at La Grange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

This invention relates to smoke consumers and is designed to provide an improved device whereby air can be supplied to a furnace and water can be heated in the furnace, with the result that the products of combustion are mixed with an abundant supply of air and the water is brought into contact with the heating zone of the furnace.

One of the objects of the invention is the provision of a boiler and furnace with improved means for facilitating the thorough combustion of the fuel and improved means for establishing an efficient circulation of the water through the furnace.

With the above and other objects in view the invention comprises certain combinations, constructions and arrangements of parts, clearly described in the following specification and clearly illustrated in the accompanying drawings, in which,

Figure 1 is a vertical sectional view through the furnace and boiler, Fig. 2 is a detail sectional view of a portion of the smoke stack.

Referring to the accompanying drawings, illustrating the invention 1 denotes the rear brick wall of the furnace, which is provided with a series of pipe shelves adapted to support the rear ends of the coils 2, which are arranged vertically in parallel groups over the combustion chamber 3. The upper ends of the coils 2 are connected to a boiler or tank 4, which is provided with a baffle plate 5, while the lower ends of said coils are connected by a pipe 6 with the tubes 7 of the boiler. One of the tubes 7 is connected by a pipe 8 with the feed pump. The boiler or tank 4 is supported on the front wall 9 of the furnace, and is connected by depending pipes 9 with a cross pipe 10, arranged at the bottom of the entrance 11 of the combustion chamber 3, and with a cross pipe 12 arranged above the pipe 10. A plate 13 is arranged between the coils 2, over the combustion chamber 3, as shown in Fig. 1, so as to direct the flames and the escaping gases toward the rear of the furnace.

To facilitate the combustion of the fuels

an air inlet device 14 is positioned at the entrance 11 rearwardly of the furnace. This device is formed with two spaced walls, connected together at their outer ends and spaced apart at their inner ends. Between these walls a series of partitions 15 are spirally disposed, so as to cause the air inflowing through the inlet pipe 16 to take a somewhat spiral course.

Above the tubes 7 a series of superheating coils 25 are arranged. The lower end of these coils is connected to a vertically disposed pipe 26 arranged within the boiler 4, and the other end is connected to a pipe 27 leading to the engine or use point.

A smoke stack 28 ascends from the top 29, and an air inlet device 30 is inbuilt in said smoke stack. This device is similar to the device 14 and is adapted to allow air to flow through an inlet pipe 31 between the walls of said device, and in a spiral course against the partitions fixed between the walls of the device. In this way air is mixed with the escaping products of combustion and they are thus consumed.

Having described my invention I claim:—

1. In combination a furnace comprising a preliminary combustion chamber and a secondary combustion chamber, water heating coils situated within said secondary combustion chamber, said preliminary combustion chamber having its top, side and rear walls converging to a centrally disposed outlet an annular opening surrounding said outlet, said outlet discharging through said opening into said secondary combustion chamber, said outlet being funnel shaped, an air heating chamber directly and completely incasing said outlet, an air inlet into said air heating chamber, a spiral rib connecting the walls of said outlet and said air heating chamber whereby air is fed with a whirling motion directly to the gases of combustion as they issue from said outlet through said opening.

2. In combination a furnace comprising a preliminary combustion chamber and a secondary combustion chamber, water heating coils situated within said secondary combustion chamber, said preliminary combustion chamber having its top, side and rear walls converging to a centrally disposed outlet, said outlet discharging into said secondary combustion chamber, said outlet being funnel shaped, an air heating chamber directly and completely incasing said outlet, an air

inlet into said air heating chamber, a spiral
rib connecting the walls of said outlet and
said air heating chamber, said outlet and
air heating chamber terminating in a mix-
5 ing chamber, the air from said air chamber
being discharged spirally into the gases as
they pass from said outlet into said mixing
chamber in order that said air and gases

be thoroughly commingled and caused to
impinge upon said coils. 10

In testimony whereof I affix my signa-
ture, in presence of two witnesses.

CHARLES A. RUSH.

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