

J. Green,

Steam-Boiler Furnace,

No. 15,009,

Patented June 3, 1856

Fig. 3.

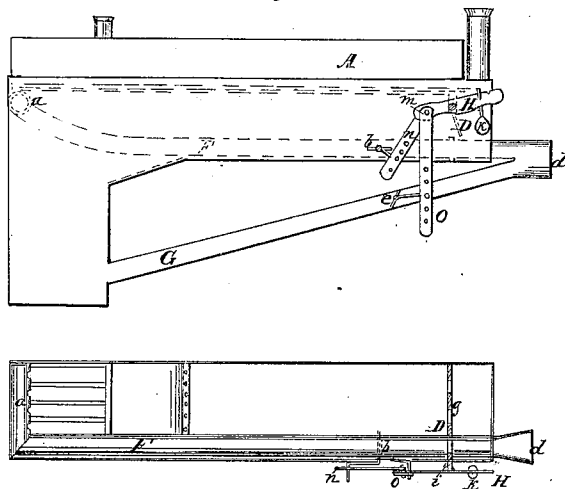


Fig. 2.

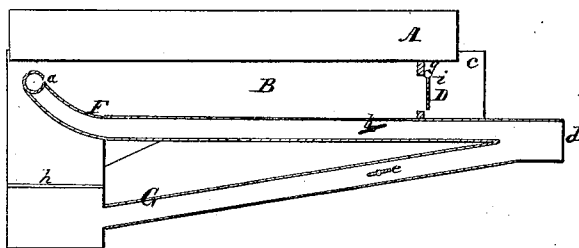
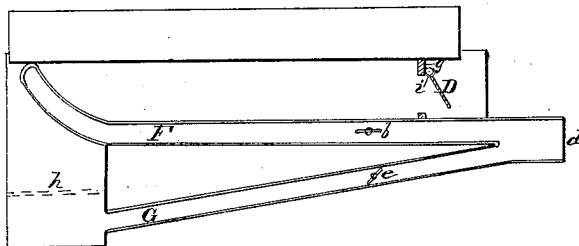


Fig. 1.



UNITED STATES PATENT OFFICE.

JACOB GREEN, OF PHILADELPHIA, PENNSYLVANIA.

GAS-CONSUMING FURNACE.

Specification of Letters Patent No. 15,009, dated June 3, 1856.

To all whom it may concern:

Be it known that I, JACOB GREEN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Gas-Consuming Furnaces; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my improvement consists in so regulating and controlling the entrance of a blast from a blowing apparatus in furnaces of steam boilers that the introduction of said blast in the quantity or proportion of hot and cold air, or in the quantity of air thrown into the fire space, or under the grate may be self regulated by a damper placed at the mouth of the stack or in other suitable position.

The following description will enable others to construct and use my improvement: A, represents an ordinary cylindrical boiler; B, the fire space; C, the mouth of chimney stack; D, a hinged valve hanging from a partition (*g*) whose movement controls the inlet valves (*b*) and (*e*) placed in the pipes F and G.

(*d*) is the main pipe from the blower or other blast apparatus; the pipe F, starts from (*d*) and is passed through the fire space, and carried to the front of the furnace, for reasons that will be hereafter given. G likewise starts from (*d*) and terminates in the ash pit, furnishing air under the grate (*h*). In Figure 1 the position of the valves is shown, when the fire is first kindled, or when fresh fuel is added. The valves D and *b* are there represented open, as the supply of hot air is then required for more perfectly consuming the gases that are freely eliminated from the coal, particularly so in the use of bituminous qualities. The valve (*e*) at this period is represented nearly closed, so as to check the quantity entering under the bars (*h*). The ash pit door, as well as the furnace door are to be understood as closed, so that the only supply of air is that received through the pipe (*d*).

In Fig. 2, the valve D is nearly closed and the valve (*e*) or inlet to the air under the grate bars, *h*, open. In this case the fuel is supposed to be fully ignited and consequent supply of air to the under side

thereof is desirable, to insure its full and economical combustion.

Fig. 3 exhibits the arrangement of levers, &c., by which the valves are operated. H, is a lever secured on the shaft *i*, on which the main valve D, is hung. On the extended end of H may be placed a shifting weight (K) and at the opposite end, is connected by a bolt (*m*) a perforated bar (*n*) for operating the valve (*b*), also a second bar (O) for moving the valve (*e*). The object of shifting the weight K is to balance the weight of the valve, D, to the pressure of the gas escaping from the burning fuel.

In the position occupied by the pipe F, in the body of the furnace, and by the extension of it to the front end of the boiler where it discharges into a perforated tube (*a*) immediately under the boiler, it more advantageously accomplishes the economy of fuel, as the air is not only heated in its passage but being discharged at the upper stratum of gas and in contact with the boiler, an increase of heat is obtained by this ignition; and all possibility of blowing back, or escaping when the furnace door is opened for supplying fuel, is avoided.

The operation may be thus explained: Having adjusted the valve D by means of a shifting weight K, so as to be readily influenced or opened by the gas from the fuel, the valve (*b*) is so connected with the bar (*n*) that it shall be open, as shown in (Fig. 1) and the valve (*e*) connected with the bar (O) so that it shall be nearly closed; on noticing the effect of the valves as thus adjusted, it being found that the supply to the upper side of the fuel by the pipe F, is greater than requisite, by simply shifting the crank arm of the shaft carrying the valve (*b*) it can be opened less; the same remark applies to the valve (*e*); after being properly adjusted, the valves become self operating, and as before observed when fresh fuel is applied, and gas freely generated in the fire space, air will flow in to mingle over the fuel, and the entrance under the grate and fuel will be reduced.

I am aware that the mere introduction of air into furnaces by union pipes, for the purpose of furnishing a portion through the grate bars, and a part to the upper side or behind the fuel is not new. I therefore do not claim that as the point of novelty, but

I believe that the means I have presented for simultaneously operating the controlling valves of such union pipes are new. I am aware that Elkanah Ingall, proposed an improvement in smoke consuming furnaces wherein a mere circulation of the smoke or gases from the fire space or flue with the underside of the grate bars is effected by the use of a fan or blower situated in said circulation pipe; and that he also provided inlet valves to supply a vacuum if occurring, as well as an exit valve in the smoke stack for excess of pressure, all of said valves operating independent of and uncontrolled by each other, I therefore do not claim such as my improvement, but
Having described the nature and proper-

ties of my iprovement, what I claim as my invention and desire to secure by Letters Patent is— 20

The mode of regulating the admission of air to furnaces, so that such admission shall be controlled by the furnace itself by means of lever H and valve D in connection with the rod *n*, and valve *b* and the rod O and valve *e*, operating substantially in the manner described. 25

In testimony whereof I have hereunto signed by name before two subscribing witnesses.

JACOB GREEN.

Witnesses:

WM. S. CLARKE,
JOHN S. HOLLINGSHEAD.