Bassett & Smith,

Steam-Boiler Furnace.

No. 48,011. Patented May 30, 1865.

Fig. 1.

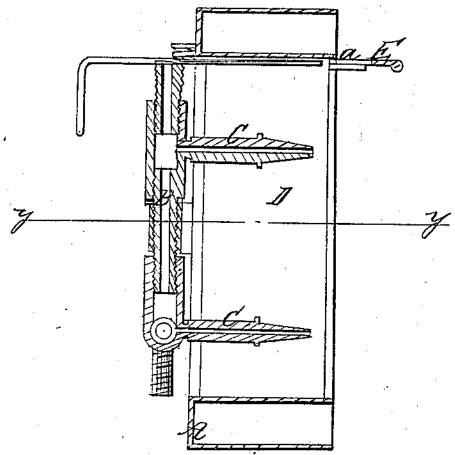
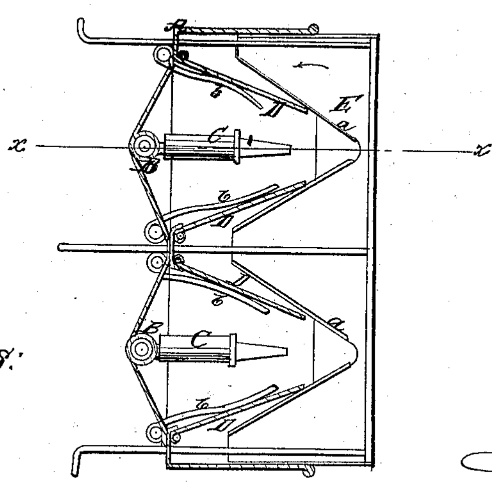


Fig. 2



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UNITED STATES PATENT OFFICE.

J. A. BASSETT AND O. C. SMITH, OF SALEM, ASSIGNORS TO OLIVER BENNETT, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN AIR-INJECTORS.

Specification forming part of Letters Patent No. **48,011**, dated May 30, 1865.

To all whom it may concern:

Be it known that we, J. A. BASSETT and O. C. SMITH, of Salem, in the county of Essex and State of Massachusetts, have invented a new and Improved Air-Injector; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a transverse vertical section of this invention, the plane of section being indicated by the line *x x*, Fig. 2. Fig. 2 is a horizontal section of the same, the line *y y*, Fig. 1, indicating the plane of section, and looking in the direction of the arrow opposite to that line.

Similar letters of reference indicate like parts.

The object of our invention is to inject air into and through the ignited fuel of a furnace through adjustable openings by means of the force of jets of ordinary and superheated steam.

We have found by experiment that the advantages to be derived from this mode of supporting combustion are: The intensity and power of the fire may be varied to suit the conditions under which the heat is required. A more perfect combustion, and consequent economy of the fuel, takes place when the proportions of steam mixed with the injected air are adjusted to the quality of the fuel used.

In the use of a coal rich in hydrocarbons it is necessary to inject a large proportion of steam with the air. Then, when anthracite is used, the product of the decomposition of the steam upon the incandescent portion of the fuel unites with the vapors of the hydrocarbons evolved in the upper strata, changing the character of the gases, so that there is no formation of soot or smoke. It is desirable to regulate the proportions of steam and air, and also the pressure of the blast, in order to obtain the best results under different requirements, and there is a particular advantage in using superheated steam for this purpose, for not only is the temperature of the blast increased, but the proportional volume of steam used is varied as the temperature.

We make use of the following-described arrangements as one of the means by which the invention may be carried out, consisting of adjustable hinged shutters, in combination with the channels through which steam is introduced into a furnace, either below or among the fuel, in such a manner that by opening or closing said shutters the force of the blast can be regulated according to the nature of the fuel, or to the pressure of the steam, or to other circumstances which may make an increased or diminished force of the blast desirable. The shutters are adjusted by a slide, which catches simultaneously over two or more pairs in such a manner that by moving said slide the several shutters are opened or closed and held in the desired position.

A represents a portion of the ash-pit, or of that portion of the furnace which is situated below the grate. Into this ash-pit steam, either wet or superheated, is introduced by means of a pipe, B, with a series of mouth-pieces or discharge-spouts, C, as clearly shown in the drawings. The discharge-channels may be rectilinear or convergent, like those of a fish-tail burner, according to the effect to be produced, and the number of spouts may be increased or diminished, as experience may dictate, and the said spouts are arranged in rows of two or more each, which are situated between the shutters D. These shutters are hinged to the frame, to which the pipe B is secured, and they are exposed to the action of springs *b*, which have a tendency to throw the same open. A slide, E, with **V**-shaped recesses *a*, is fitted into the frame of the ash-pit, and said recesses catch over the loose ends of the shutters, as shown in Fig. 2 of the drawings, and by moving the slide in the direction of the arrow marked on it in said figure the shutters are closed, whereas by moving the slide in the direction opposite to said arrow the shutters are allowed to follow the action of the springs *b* and to open. By closing the shutters, the passage through which the steam issuing from the spouts C has to pass is contracted, and the velocity of the air, and consequently its force, is increased, and by opening said shutters the effect is the reverse and the force of the air is diminished.

By these means the action of the steam on the incandescent fuel can be regulated to suit circumstances.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The injection of air through adjustable openings, constructed as described, into and through burning fuel by means of the force of jets of steam used direct from the boiler or superheated, as may be required.

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