A T. BENNETT.

Feeding Air to Furnaces.

No. 211,082. Patented Jan. 7, 1879.

Fig. 1

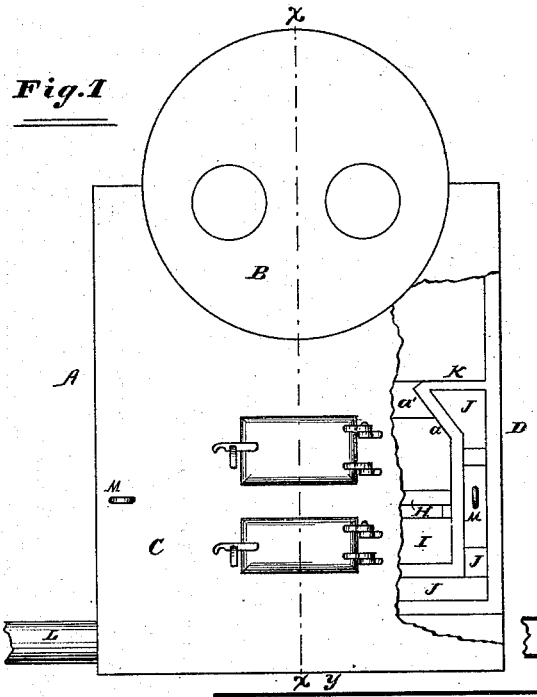


Fig. 2

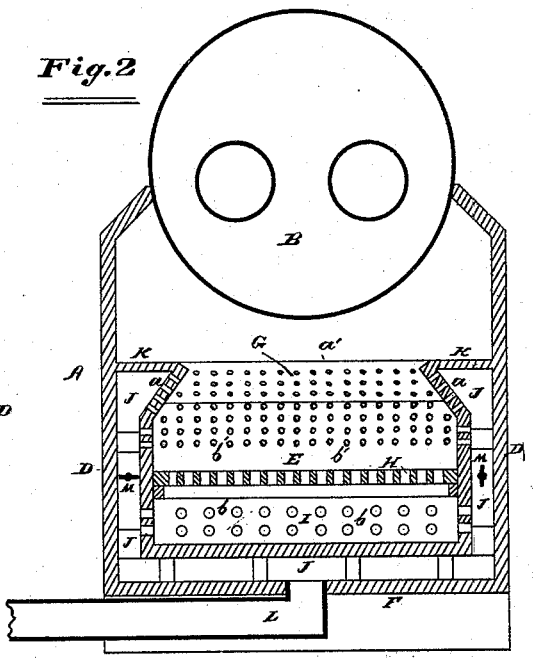
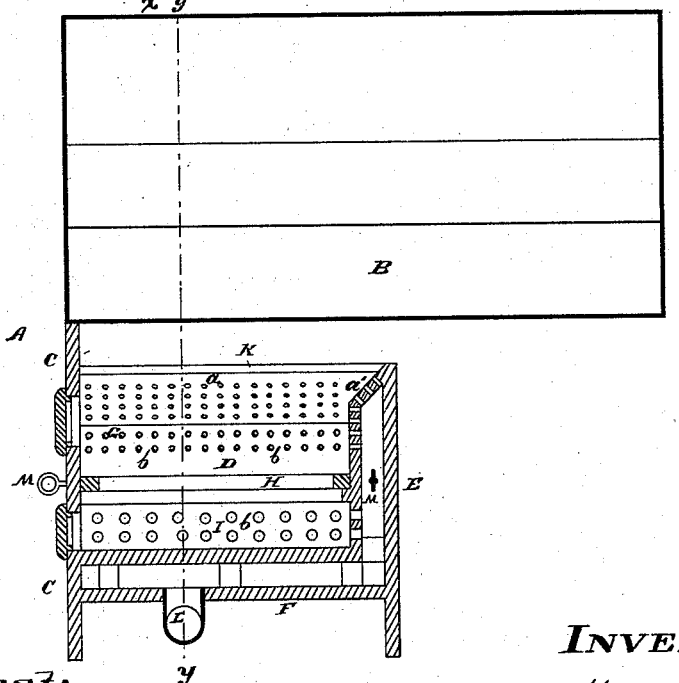


Fig. 3



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UNITED STATES PATENT OFFICE.

ALLAN T. BENNETT, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO AUSTIN P. WHITE, OF SAME PLACE.

IMPROVEMENT IN FEEDING AIR TO FURNACES.

Specification forming part of Letters Patent No. **211,082**, dated January 7, 1879; application filed May 20, 1878.

To all whom it may concern:

Be it known that I, ALLAN T. BENNETT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Feeding Air to Furnaces, of which the following, in connection with the accompanying drawing, is a specification.

In the drawing, Figure 1 is a front view of a furnace in which my invention is embodied, a portion of the front being broken away to show a part of the interior; Fig. 2, a vertical cross-section of the same in the plane of the line *y y* of Fig. 3, and Fig. 3 a section in the plane of the line *x x*.

Like letters of reference indicate like parts.

My invention relates to stoves, furnaces, and fuel-consumers in general, in which the combustion of the fuel is more or less imperfect, owing to the imperfect commingling with the carbon, inflammable gases, and other products of combustion of the oxygen introduced with the air-currents. I aim to render the combustion perfect by producing a proper intermixture of the oxygen with the particles of carbon and with the freed products of combustion, and, as an essential feature of my invention, I accomplish this result to a great degree by impinging blasts of air either into, upon, or over the incandescent fuel, or in any or all of these ways, through the instrumentality of means substantially the same as hereinafter described, and specifically set forth in the final summary of my invention.

In the drawing, A represents a boiler-furnace constructed in accordance with the principle of my invention, and B is a boiler set thereon. C is the front wall of the furnace; D D, the side walls; E, the bridge-wall, and F the floor or base of the furnace. G is the fuel-chamber; H, the grate; and I, the ash-pit; and between the walls inclosing these parts and the outer or exterior walls first above referred to is an air-receiving chamber, J. The upper portions of the side walls of the fuel-chamber are inclined toward each other, by preference, as shown at *a a*, and *a'* is an inclined partition extending from the rear wall of the fuel-chamber to the bridge-wall.

K K are horizontal partitions extending from the side walls of the fuel-chamber to the walls D D, and meeting the partition *a'* and the wall C. The chamber J is thus closed at the top by means of the partitions *a'* and K K, and, with the exceptions hereinafter mentioned, is rendered tight by means of these partitions and the outer walls and bridge-wall.

L is an air-flue entering the floor or base F, and *b b'* are perforations passing through the inner walls of the chamber J.

The perforations *b b*, it will be perceived, enter the ash-pit, or are arranged below the grate, and the perforations *b' b'* enter the fire box or chamber G, entering above the grate.

It will also be perceived that the chamber J surrounds the fire-box and ash-pan, and extends underneath the bottom of the latter and to the top of the former.

The bottom of the ash-pan and the walls of the fire-pot may be supported in any suitable manner, and the interior of the fire-pot may be lined, if necessary, to prevent injury from the heat.

M M are dampers, arranged in the chamber J, and situated between the perforations *b* and *b'*.

In the example shown, the floor F is represented as raised sufficiently to admit the flue L underneath it; but it is not absolutely essential that it should be raised for that purpose, as the flue L may enter the chamber J at some other place; but it should, to produce the best effect, enter the lower part of the chamber. There may also be more than one air-inducting flue. The bridge-wall is open above the fire-box, to allow the air-currents, heat, and unconsumed products of combustion to pass out through the boiler-flues and enter the chimney or draft-flue in the usual manner. The front wall of the furnace may be provided with the doors and dampers commonly employed.

The air may be either forced into and through the flue L by means of a fan or blower employed for that purpose, or it may be drawn in by means of the draft-flue or chimney. The air entering the chamber I becomes heated, owing to the position of the chamber with relation to the fire-box and ash-pit. A part of this heated air enters the ash-pit through the perforations *b b*, and thus furnishes sufficient draft

and enough oxygen to keep the fuel incandescent and produce the required amount of heat, the air passing, of necessity, up through or into the fuel. The remaining portion of the heated air entering the chamber J passes through the perforations *b' b'*, and thus enters the fire-box in such a manner as to mingle with the products of combustion, and cause their combustion by supplying a due amount of oxygen.

The perforations *b' b'* may be so arranged as to cause the air passing through them to be either impinged upon or into the body of incandescent fuel, or both upon and into it.

The supply of air furnished to the perforations *b* and *b'* may be regulated by means of the dampers M M, a greater or less amount being thus shut off from one set of perforations and allowed to enter the other.

The heat radiated from waste-steam pipes or from the smoke-stack may also be utilized for heating the air entering the chamber J, the fire-pot, and the ash-pit; or an independent heater may be employed for that purpose.

It is to be understood, of course, that the air introduced through the air-inducting flues is not to be sufficiently heated to destroy its vitality before it reaches the fuel.

I am aware that air has heretofore been inducted into the fire-pot for the purpose of aiding combustion in addition to the air introduced for the purpose of producing a draft; and I do not, therefore, here intend to claim, broadly, the impinging of air into or upon the incandescent fuel for the purposes hereinbefore set forth, the principal feature of my invention being the introduction of heated air, substantially as herein described.

It is obvious that my invention may be used in connection with any kind of fuel, and in connection with the several classes of fuel-consumers.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fuel-consumer wherein the fire-pot is surrounded by an air-heating chamber extending underneath the ash-pit and entered by an air-inducting flue, and perforated to allow the air to escape from the said chamber into the fire-pot, substantially as and for the purposes specified.

2. A fuel-consumer wherein the fire-pot and ash-pit are surrounded by an air-heating chamber extending underneath the ash-pit and entered by one or more air-inducting flues, and perforated both above and below the grate to allow the air to escape from the said chamber into the fire-pot and ash-pit, substantially as and for the purposes specified.

3. A fuel-consumer wherein the fire-pot and ash-pit are surrounded by an air-heating chamber entered by one or more air-inducting flues, and perforated both above and below the grate, the said chamber also containing one or more dampers arranged between the upper and lower series of perforations, substantially as and for the purposes specified.

4. The air-heating chamber J, surrounding the fire-pot and ash-pit of a fuel-consumer and entered by the air-inducting flue L, and also having therein the ports *b* and *b'* and the dampers M M, all arranged, substantially as specified, with relation to each other and the outer walls of the consumer, for the purposes set forth.

ALLAN T. BENNETT.

Witnesses:
AUSTIN P. WHITE,
F. F. WARNER.