

(No Model.)

J. S. LOOMIS.

BOILER FURNACE.

No. 335,825.

Patented Feb. 9, 1886.

Fig. 1.

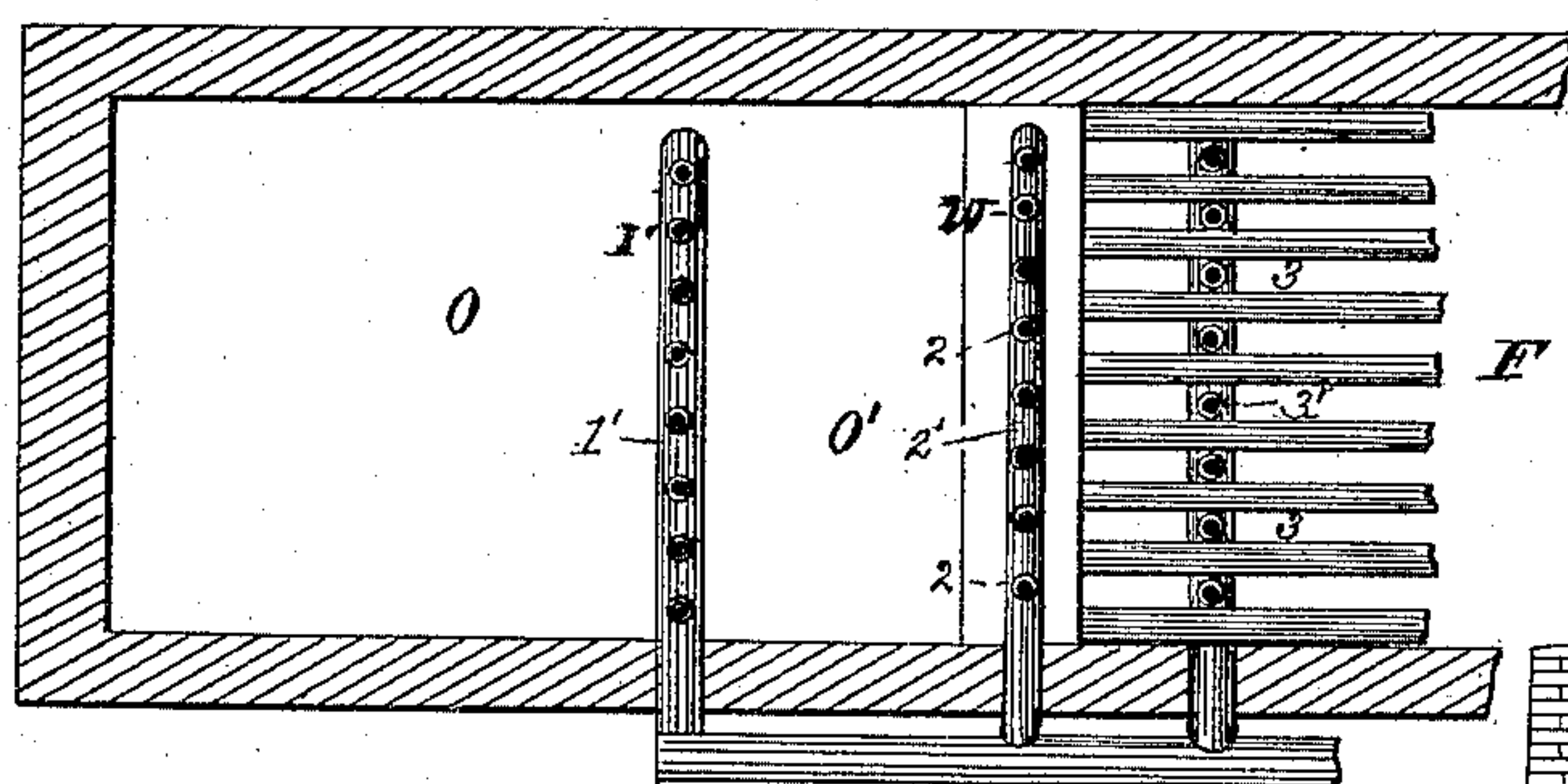
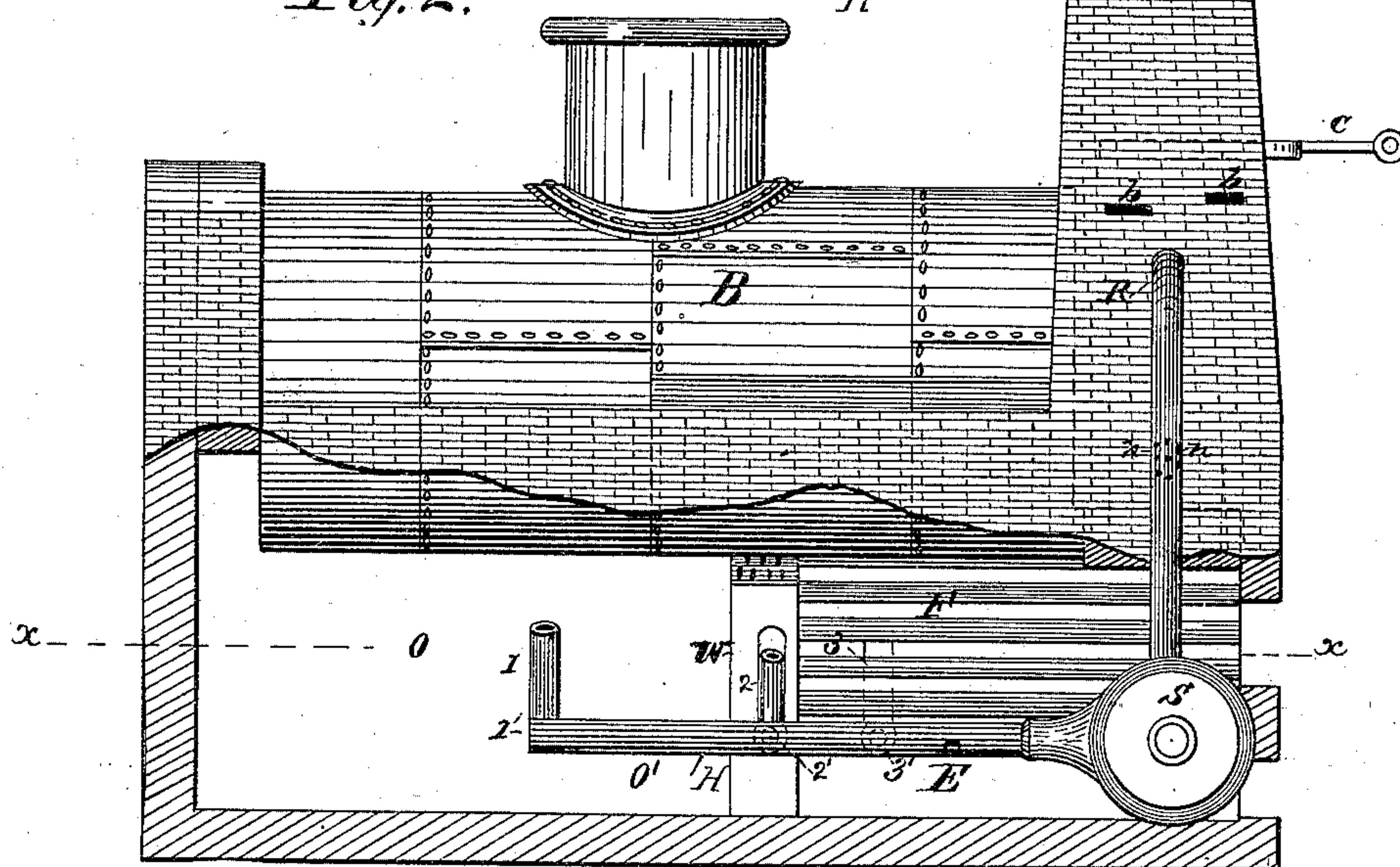


Fig. 2.



WITNESSES

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BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 335,825, dated February 9, 1886.

Application filed October 15, 1885. Serial No. 179,942. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. LOOMIS, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Boiler-Furnaces; and I hereby declare the following to be a full, clear, and exact description of the same, such as will enable those skilled in the art to practice my invention.

My invention relates to that class of furnaces known as "smoke-burners," and has for its object the complete combustion of all the volatile and combustible gases which have heretofore escaped through the chimney or smoke-stack.

It is well known that the smoke in large manufacturing districts has become very annoying, and also that a great quantity of combustible gases pass out of the chimney or smoke-stack and are wasted. To prevent this waste and annoyance is the object of my invention; and to this end it consists in the combination and arrangement of parts, as will hereinafter more particularly appear.

In the accompanying drawings, Figure 1 represents a horizontal section through the bridge-wall, shown at Fig. 2 in dotted line *xx*. Fig. 2 shows a side elevation, partly in section, showing the uptake-blower and side connecting-pipes.

It is evident that my improved apparatus may be applied to any form of furnace.

I am aware that smoke and gases have been drawn from the smoke-boxes of locomotives and also from stationary furnaces and introduced into the combustion-chamber, and also that cold-air has been mixed with said gases after they have been withdrawn, none of which arrangements embody my invention, and I do not, therefore, claim them in this application.

Referring more particularly to the drawings herewith attached, A shows the smoke-stack; B, an ordinary boiler; C, a damper or cut-off located well up in the stack A, the object being to form an enlarged chamber for the better admixture of the smoke and unconsumed gases preparatory to and before their withdrawal from the stack. By this admixture I change the character of the escaping smoke and gases by uniting them with pure oxygen, thus producing an inflammable and highly-combustible gas. This damper C may be operated to auto-

matically control the draft in the chimney by any of the well-known means.

S indicates a fan-blower of any ordinary construction, and performs the triple functions of exhausting the gases from the smoke-stack, drawing in from outside atmospheric air, and then forcing this mixture into the various compartments of the combustion-chamber.

R shows a pipe connected with the chimney nearly two-thirds the distance between its base and damper, and its other end is connected to the exhaust-fan. I locate the upper end of aforesaid pipe at the point indicated for this reason. The smoke and gases when they enter the chimney ascend against the damper when closed, the cold air enters the aperture *b* in the chimney some distance below the damper, and by its superior specific gravity it descends. The smoke and gases and the atmospheric air are thus made to meet each other, and in this way they are made to more intimately commingle, the cold air extracting from the gases a portion of their heat, thus making a comparatively cool mixture by which the journals of the blower are prevented from burning out.

The pipe R is provided with minute perforations *nn*, by which additional atmospheric air is drawn in, by which means the great want of pure oxygen is supplied to the volatile gases to insure their complete combustion.

H represents the exit-pipe from the fan and also the supply-pipe for the jets. Attached to the pipe H are three or more horizontal pipes, 1', 2', and 3', which run across the base of the furnace in the following manner: Pipe 1' runs across the furnace back of the bridge-wall W, well down out of the path of the flame. Pipe 2' runs across and is embedded in the bridge-wall W, and pipe 3' runs across under the grate-bars. These horizontal cross-pipes 1' 2' 3' are in turn provided with numerous vertical jet-pipes, 1 2 3, by which the gases from the fan-blower are equally distributed, and thus brought in close contact with the burning flame at the very points where it is most essential to effect complete combustion. Jet-pipes 3, extending up through the fuel from pipe 3', supplies air at or near the surface of the burning fuel.

I have found in a deep bed of fuel that a proper supply of air from under the grate is

almost indispensable, particularly in such
grates as mine when the grate is filled with
sawdust. Therefore by my vertical jet-pipes
extending up through the bed of fuel this
5 very essential element is fully supplied.

E is the ash-pit, and *o o'* auxiliary or rear
combustion-chamber. W is the bridge-wall,
provided with openings to receive the cross-
pipe 2' and the vertical jet-pipes 2. The top
10 of the bridge-wall is perforated with any num-
ber of minute jet-holes, through which the air
and smoke and gases from the fan-blower are
distributed.

F shows what I call a "basket-grate"—that
15 is, its sides and bottom are formed of grate-
bars, through which atmospheric air passes to
the fuel.

Persons who are in the practice of burning
sawdust, tan-bark, bagasse, and not fuel gen-
20 erally, know the difficulties experienced in the
successful combustion of these fuels, and which
by my improved apparatus I have overcome.

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

1. In a furnace, the smoke-stack A, provid-
ed with damper C, air-apertures *b*, flue-cham-
ber and pipe R, said pipe having air-aper-

tures *n n*, and fan-blower S, with its distribut- 30
ing branches, all constructed and arranged in
the manner set forth and described.

2. In a furnace, the combination of the
smoke-stack A, provided with a damper, C,
apertures *b*, and smoke, gas, and air mixing 35
chamber located between the suction-pipe R
and damper C, the fan-blower S, and distrib-
uting branches H 1' 2' 3' and 1, 2, and 3, with
the grate-bridge wall and rear combustion-
chamber, substantially as described. 40

3. In a furnace adapted for burning soft
fuel—such as sawdust, tan-bark, bagasse,
&c.—consisting of the smoke-stack A, fan-
blower S, pipe R, and air and gas distributing
pipes H 1' 2' 3' and jet-pipes 1 2 3, with per- 45
forated bridge-wall and the basket-formed
grate F, said jet-pipes 3 being arranged within
the grate, by which the combined air and gas
are thrown near the surface of the burning
fuel, in the manner shown and specified. 50

4. The pipe R, provided with openings *n n*,
in combination with pipe H, perforated pipe 2,
and the bridge-wall, all constructed, arranged,
and operated as set forth.

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Witnesses:

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