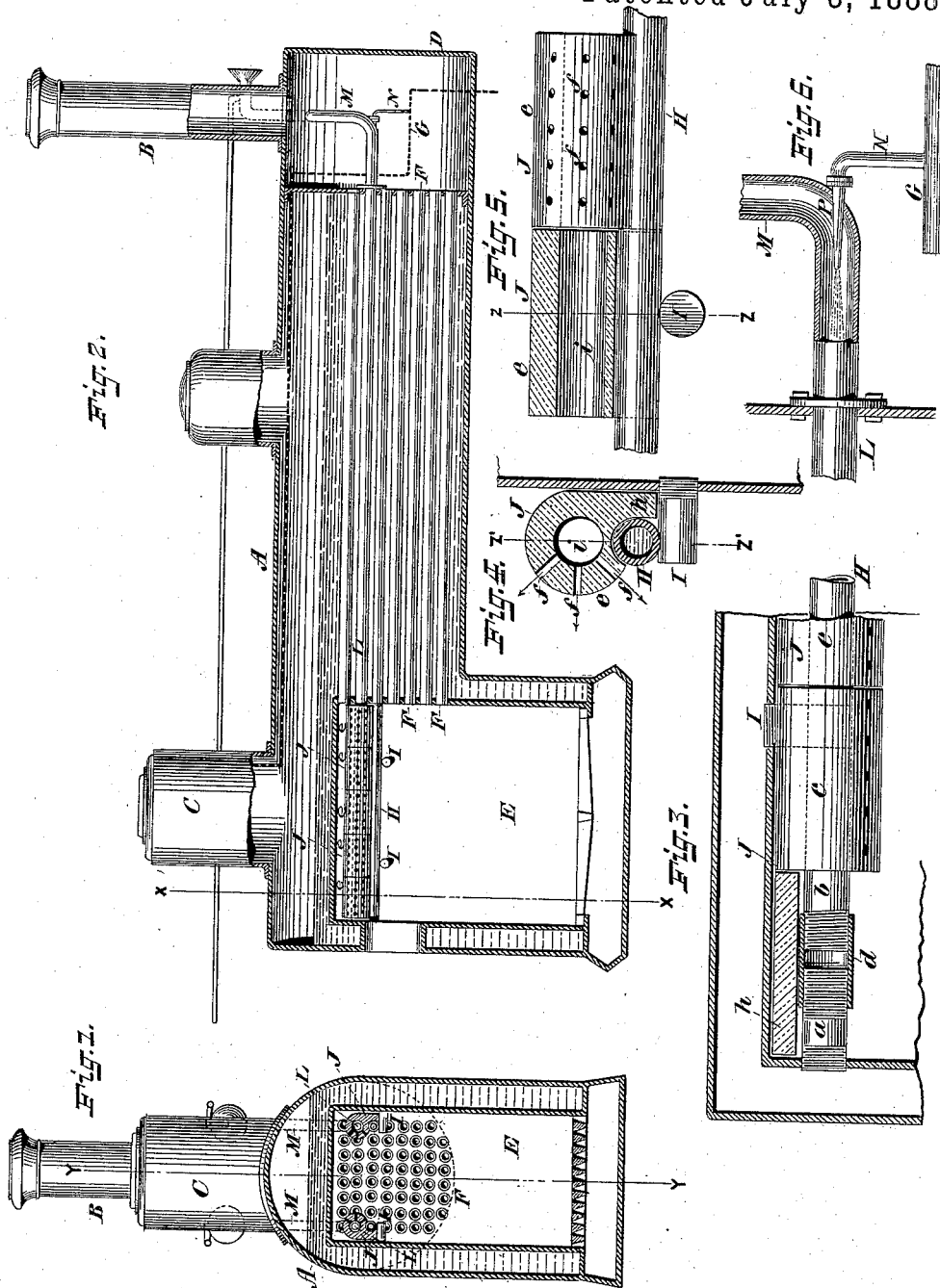


(No Model.)

J. F. CLARK.
STEAM BOILER FURNACE.

No. 385,444.

Patented July 3, 1888.



WITNESSES:
Gustave Dietrich
Robert A. Porteous

INVENTOR,
John F. Clark
Chas. C. Rice
ATTORNEY,

UNITED STATES PATENT OFFICE.

JOHN F. CLARK, OF NEW YORK, N. Y.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 385,444, dated July 3, 1888.

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To all whom it may concern:

Be it known that I, JOHN F. CLARK, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

The invention relates to improvements in steam-boiler furnaces, and particularly to improvements in furnaces for locomotives, the object being to provide durable and efficient means for distributing air to the fire-box and of creating a forced draft during such time as the locomotive is in use.

The invention will be more fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical transverse section of a boiler-furnace embodying the invention, the section being on the dotted line X X of Fig. 2, which is a central vertical longitudinal section of the same on the dotted line Y Y of Fig. 1. Fig. 3 is an enlarged transverse section of the fire-box, the section being on a line with the top of the pipe supporting the air-distributors, hereinafter referred to, one part of the distributors being left whole. Fig. 4 is a vertical transverse section on the dotted line X X of Fig. 5, which is a longitudinal section on the dotted line Z' Z' of Fig. 4. Fig. 6 is a detached view of the injector for creating a forced draft through the pipes supplying the air to the air-distributors in the fire-box.

In the accompanying drawings, A indicates the boiler of a locomotive; B, the smoke-stack; C, the steam-dome; D, the smoke-box, and E the fire-box, the fire-box and smoke-box being connected in the usual manner by the longitudinal flues F. The usual pipe for conducting the steam from the steam-dome to the steam-chests (not shown) is lettered G, and indicated by dotted lines.

Within the upper part and at each side of the fire-box is arranged the longitudinal pipes H, extending from the front to the back end of the box, and the short transverse pipes or hollow arms I, which extend from the side walls of the fire-box inward below and in close prox-

imity to the lower surfaces of the longitudinal pipes H. The ends of the pipes H and the outer ends of the pipes I open into the water-space surrounding the fire-box, and when in use will contain water. The pipes H are each composed of two sections, lettered *a b*, respectively, connected by an internally-threaded sleeve, *d*, as illustrated in Fig. 3, the extreme ends of the pipe being threaded to enter suitably-threaded apertures in the front and rear walls of the fire-box.

In applying the pipes H in position the sections *a b* therein are screwed into the sleeve *d* until their meeting ends come into contact with each other, at which time the pipe is inserted in the fire-box opposite to the apertures at each end thereof adapted to receive its threaded ends, whereupon the sections *a b* will be screwed apart a sufficient distance to cause the extreme ends of the pipe to enter and engage the thread of the said apertures in the walls of the fire-box, thereby securing the pipe in position. The pipes H are employed as a support for the air-distributors J, located one at each side of the fire-box, as illustrated in Fig. 1, and each being composed of sections *e*, made from fire-clay or other suitable material which will not readily be affected by heat from the fire. The external outline of the sections *e* of the air-distributors is illustrated in Fig. 4, where it will be seen that the center of the distributor is hollow and parallel with, though on a higher plane than, the supporting-pipe H, apertures *f* being provided for the distribution of the air into the fire-box. That portion of the air-distributor adjacent to the side walls of the fire-box is flattened and has a downward extension, *h*, forming a leg which extends downward between the said walls of the fire-box and the pipes H and serves to aid in the sustaining of the distributors in position upon the pipes H. The lower surface of the sections *e* of the air-distributors is made concave so as to snugly rest upon and pass partly around the surface of the pipes H. A sufficient number of sections *e* are arranged upon the pipes H, as illustrated in Fig. 2, to form air-distributors extending from the front to the rear walls of the fire-box. The hollow centers of the sections *e* form air-chambers *i*, in line with the

flues L, as indicated in Figs. 1 and 2, each flue L being in connection with the pipe M, which extends upward through the smoke-box, as indicated by dotted lines in Figs. 1 and 2, and terminates in a bell-shaped mouth opening frontward, so as to receive a strong current of air when the locomotive is in motion.

There are two flues L, one on each side of the center of the boiler, and each is in line with the air-chamber *i*, formed in the air-distributors, and each is in connection with a pipe, M, extending upward to one side of the smoke-stack, whereby during the use of the boiler the air will enter the pipes M and pass through the same and the flues L into the air-distributors and thence escape into the fire-box through the apertures *f*.

In the smoke-box I have provided a small pipe, N, connecting the pipe G with the pipe M, the upper end of the pipe N being provided with a nozzle, P, as shown more clearly in Fig. 6, whereby, when the engine is in motion and the steam is passing to the steam-chests, a portion thereof will ascend through the pipe N and be injected into the pipe M and flue L, creating thereby a forced draft through said flue and into the air distributors. Each of the pipes M will be provided with the steam-connection N, having the injector-nozzle P, in order that a like draft may be provided for each of the air-distributors.

The purpose of having the pipes H and I in connection with the water-chamber around the fire-box is to permit the water to enter said pipes and thus preserve them from being destroyed by the heat. The pipes I are screwed into the said walls of the fire-box and are used principally to support the pipes H.

The sections *e* of the air-distributors, being made from fire-clay, will not readily yield to the action of the heat, and when any one or more of them has become affected it will be removed and another quickly substituted.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In the fire-box of a boiler-furnace, the pipe supporting the air-distributors, combined with the pipes I, which open into the water-space and support the said pipe, and a pipe leading to the open air and being in connection with the air-distributors, substantially as set forth.

2. In a boiler-furnace, the air-distributors composed of hollow apertured sections *e*, having the downwardly-extending leg-extensions *h*, and being concave on their lower contact-surfaces, combined with the hollow supporting-pipes H, which open into the water-space around said fire-box, the flues L, and pipes M, substantially as and for the purposes set forth.

3. In a boiler-furnace, the supporting-pipes H, having threaded ends and composed of sections *a b*, and sleeve *d*, combined with the air-distributors supported by said pipes, and flues leading from the open air to said distributors, substantially as and for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 22d day of December, A. D. 1887.

JOHN F. CLARK.

Witnesses:

CHAS. C. GILL,

W. A. C. MATTHIE.