

(No Model.)

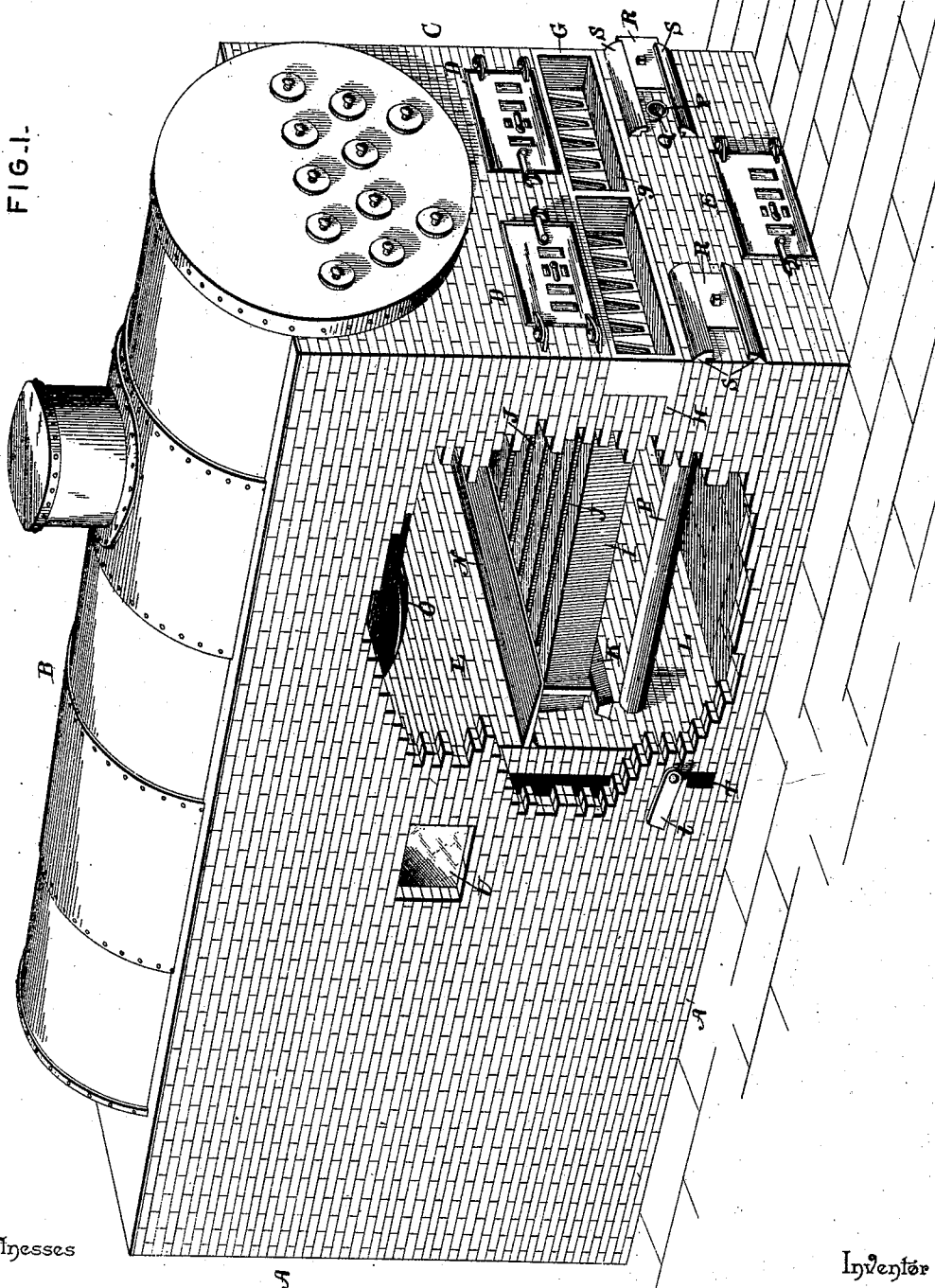
C. H. ALLEN, Sr.
BOILER FURNACE.

2 Sheets—Sheet 1.

No. 501,907.

Patented July 25, 1893.

FIG. 1.



Witnesses

Inventor

Jas. H. McCutcheon
S. P. Wolhaupter

By *his* Attorneys,

C. H. Allen Sr.

Ca Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

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FIG.2.

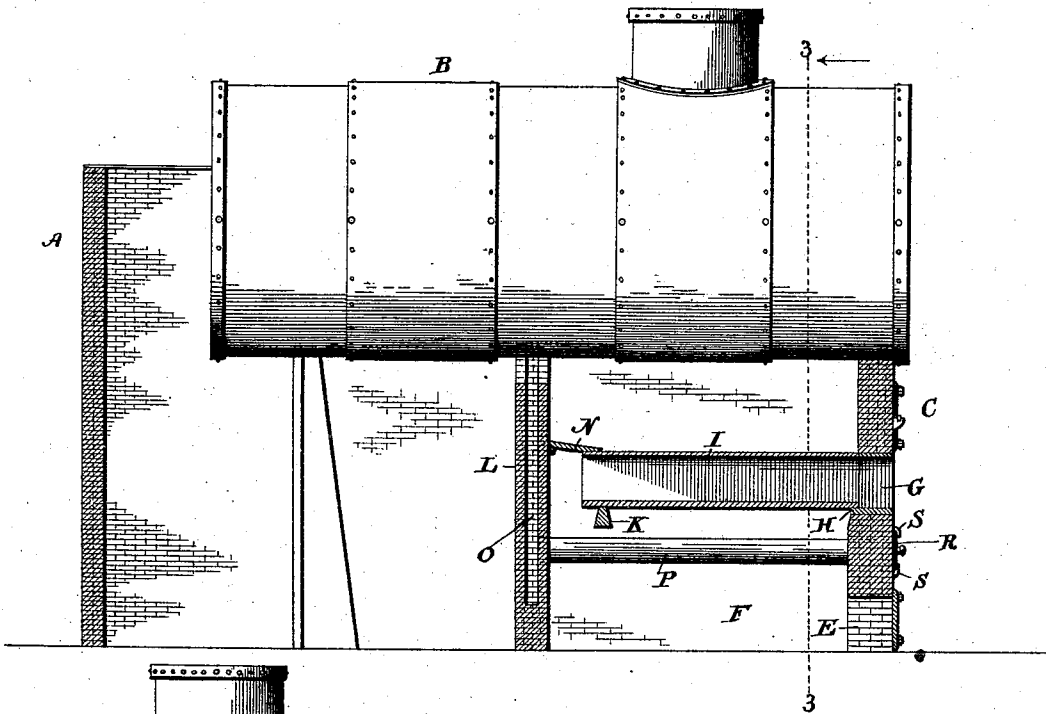


FIG.3.

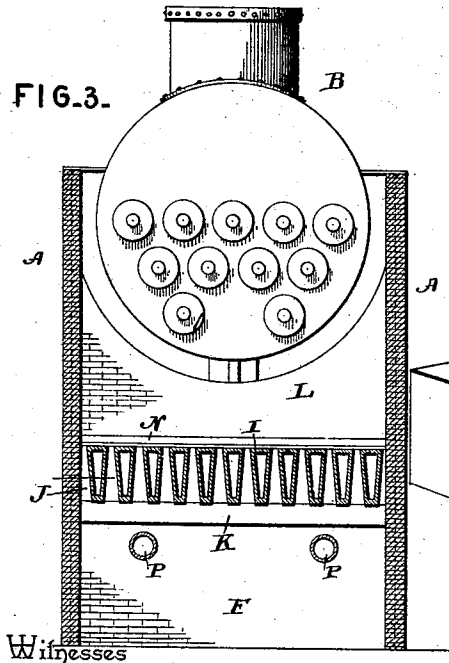
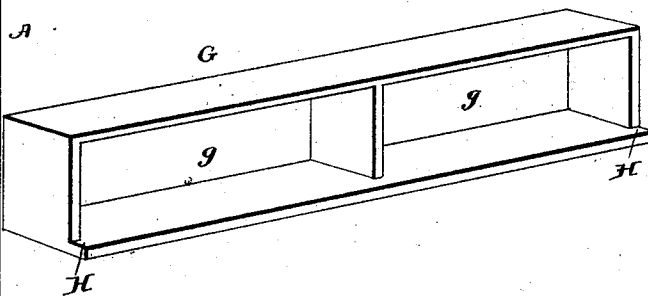


FIG.4.



Witnesses

Jas. H. McLathran
D. P. Wolhaupter

Inventor
C. H. Allen, Sr.

By his Attorneys,

Chas. Snow & Co.

UNITED STATES PATENT OFFICE.

COURTLAND HAY ALLEN, SR., OF CHATTANOOGA, TENNESSEE.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 501,907, dated July 25, 1893.

Application filed November 11, 1892. Serial No. 451,681. (No model.)

To all whom it may concern:

Be it known that I, COURTLAND HAY ALLEN, Sr., a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Boiler-Furnace, of which the following is a specification.

This invention relates to boiler furnaces; and it has for its object to provide an improved construction of furnaces used in connection with steam boilers, which shall be provided with improved draft devices whereby a hot draft for the fire is secured, while at the same time in combination therewith auxiliary means are provided for insuring a complete combustion of the fuel, so that the smoke issuing from the fuel is consumed and thereby providing a thorough and complete utilization of the fuel.

With these and other objects in view which fall within the scope of this invention, the same consists in the novel construction, combination and arrangement of parts herein-after more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a perspective view of a boiler furnace constructed in accordance with this invention, one side of the furnace being broken away. Fig. 2 is a vertical longitudinal sectional view thereof. Fig. 3 is a vertical transverse sectional view on the line 3—3 of Fig. 2. Fig. 4 is a detail in perspective of the open draft box.

Referring to the accompanying drawings:—A represents a boiler furnace having the inclosing side end and front walls, and in the top of which is supported a return-flue boiler B, of usual construction and which is adapted to be heated from the fire and products of combustion within the furnace A. The front wall C, of the furnace is provided with the opposite fire door openings D adapted to be arranged on a line with the fire grate, and the ash-pit door opening E, arranged on a line with the bottom of the furnace and opening into the ash pit F, as is usual in all constructions of furnace.

Built into the front wall C, of the furnace intermediate of the openings D and E, is a rectangular elongated open draft box G. The open draft box G, extends transversely across the entire front wall of the furnace and is

provided with the separate rectangular draft openings *g*, opening directly at the front of the furnace, and with the inwardly extending supporting flange or shoulder H, projecting inwardly from the lower inner edge of the box, and adapted to receive for support the front open ends of the parallel series of hollow draft grate bars I. The hollow draft grate bars I, are preferably rectangular in cross section and are regularly spaced from each other to form vertical draft openings J, between the same, and connecting the fire box and ash-pit. As stated, the front open ends of the bars I, rest upon and open into the front draft box G, and said bars extend rearwardly from said draft box to the rear supporting bar K. The rear supporting bar K is supported transversely above the bottom of the ash-pit, and receives the inner ends of the grate bars so as to firmly support the same in position, and said hollow grate bars have such inner open ends terminate short of the hollow vertical bridge wall L, so as to leave a free circulation of the air through the inner ends of said bars. The circulation of air passing through the inner ends of the hollow grate bars I, is directed or deflected downward into the ash-pit by means of the transverse fire brick or tile deflecting plate N. The deflecting plate N, extends from the top inner ends of the grate bars I, to the bridge wall L, and thereby provides means for this downward deflection of the circulating air. Now it will be readily seen that after the fire has been placed upon the grate, the draft of air is supplied through the front draft box G. From the draft box G, the air circulates through the several hollow grate bars, in which the same is heated by the fire to provide a hot draft, and passing out of the inner open ends of the hollow grate bars is deflected into the ash-pit, from which the air circulates through the vertical draft openings J, and the fuel upon the grate, so as to supply such fuel with the requisite draft without chilling the fire, and thereby providing an efficient auxiliary for good combustion. The hollow vertical bridge wall L, extends from the bottom of the furnace to a point near the boiler at the rear end of the grate as is usual, and in the present invention such bridge wall incloses a perfectly straight vertical circulating space O,

which opens directly into the furnace at the upper edge of the wall, so as to supply the products of combustion and unconsumed products with the necessary oxygen to provide for their complete consumption while at the same time providing a circulating space which cannot possibly choke up. The necessary supply of oxygen is led to the hollow bridge wall L, through the opposite circulating pipes P, extending longitudinally through the ash-pit, and connected at their inner ends with the inclosed space of the bridge wall and at their outer ends with the supply openings Q, in the front wall of the furnace and over which work the regulating slides or dampers R, moving in the grooved guides S at the front of the furnace, and which provide for a regulation of the proper supply of air to the bridge wall. As the furnace is in operation, as an auxiliary to the hot draft thereof, oxygen-containing air is admitted directly from the front of the furnace to the hollow bridge wall through the pipes P, so that as the smoke from the fire passes over the top of the bridge wall, the same unites with the oxygen in the air passing out of said bridge wall so that the same is consumed and broken up with the other gases, as products of the combustion, and thereby fully utilizes the fuel employed, and securing the consequent additional heat for the boiler. By reason of having the air-pipes P, arranged within the ash-pit F, so that the circulating hot air from the hollow grate bars I, will circulate there-around, means are necessarily provided whereby the air passing through such pipes is heated by the hot air from the hollow grate bars. Therefore the air which passes into the hollow bridge wall is in a heated condition, owing to its passage through pipes in the heated air of the ash-pit, and passing out of the top of the hollow bridge wall to mingle with the products of combustion to consume the smoke, will not in any way lower the temperature in the furnace and cool a portion of the boiler. This result would follow if cold air were led directly to the bridge wall without being heated, which is an obvious objection.

From the above it is thought that the construction, operation and many advantages of the herein described boiler furnace will be readily apparent to those skilled in the art.

It may be observed at this point, that the hollow bridge wall L, is further provided with a side cleaning opening T, inclosed by the cleaning door t, at one side of the furnace, and providing means for removing accumulations of ashes or dust within said bridge wall, so that the same cannot possibly clog up and one side wall of the furnace is provided with a transparent inspection opening U, arranged in the rear of the bridge wall so that the smoke or flames from the fire can be seen and thereby indicate what circulation of air should be admitted to the bridge wall through the openings Q controlled by the sides or dampers R.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

In a boiler furnace, the combination of the front wall having separate air supply openings and grooved guides at both sides of said openings, a series of hollow draft grate bars arranged with their front ends opening at the front of the furnace above the air supply openings in said front wall, a bridge wall having a perfectly straight air circulating space therein and communicating at its upper end with the space between the top of the bridge wall and the boiler in the furnace, a deflector arranged over the inner open ends of the grate bars, separate air circulating pipes arranged longitudinally of the ash pit below the hollow grate bars and connected at their inner ends with the inclosed circulating space of the bridge wall and having their outer ends registering in the air supply openings in the front wall, and air supply regulating dampers or slides working in the guides and over the air supply openings, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

COURTLAND HAY ALLEN, SR.

Witnesses:

A. SHELTON,
T. A. EVANS.