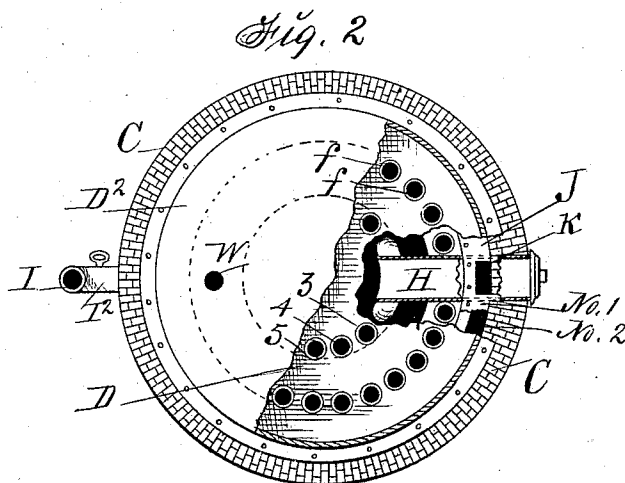
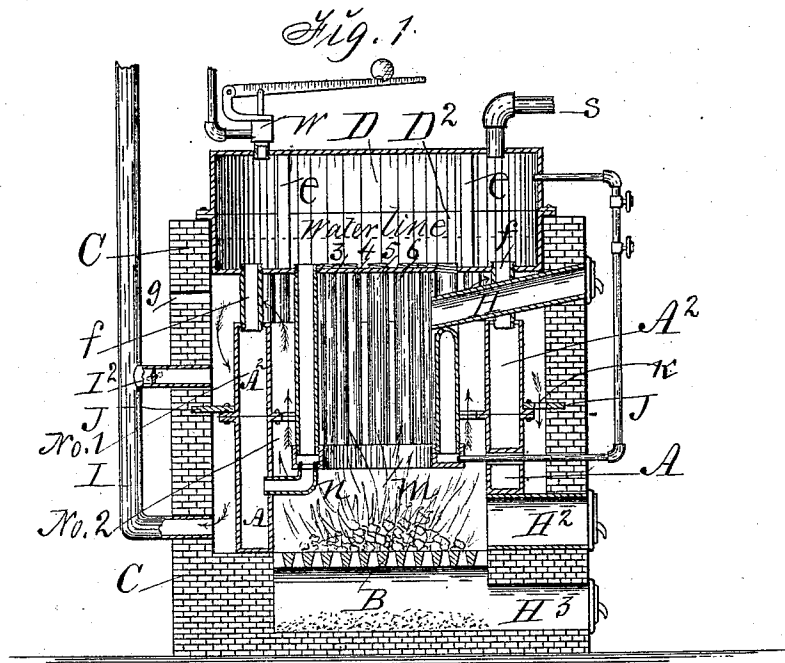


(No Model.)

J. COLLIS.
BOILER FURNACE.

No. 265,945.

Patented Oct. 17, 1882.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN COLLIS, OF DES MOINES, IOWA.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 265,945, dated October 17, 1882.

Application filed February 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN COLLIS, of Des Moines, in the county of Polk and State of Iowa, have invented an Improved Boiler-Furnace, of which the following is a specification.

The object of my invention is to increase the heating-surface in a boiler-furnace, and thereby augment the power and capacity of a steam-generator, and at the same time reduce the cost of construction and operation, to facilitate the perfect combustion of fuel and the cleaning and general management of a complete apparatus adapted for heating buildings, driving machinery, or for any other purpose for which steam may be used.

It consists, first, in arranging and combining a double-walled fire-box and vertical boiler-section, a horizontal boiler section and dome, an outer wall, and an annular plate in such a manner that the products of combustion arising within the double fire-wall and vertical boiler-section will circulate around the outside of the same wall; second, in combining a skeleton fuel-magazine with the horizontal boiler and dome and the double-walled fire-box and vertical boiler-section in such a manner that the products of combustion will envelop the fuel-magazine in their ascent from the furnace and within the double-walled fire-box and vertical boiler-section, all as hereinafter fully set forth.

Figure 1 of my accompanying drawings is a vertical central section of my combined furnace and boiler. Fig. 2 is a sectional top view. Together these figures clearly illustrate the construction, operation, and advantages of my complete invention.

A A represent the base or lower portion of my double-walled fire-box and boiler-section. It is preferably of circular form, and may vary in size as desired. It may be cast complete in one piece or composed of sections fixed together by means of rivets, or in any suitable way, so that it can be readily placed in an elevated position upon a solid wall of masonry and grate B, as clearly shown in Fig. 1.

A² is the upper section of the double-walled fire-box. It corresponds in shape and size with the lower section. The two sections are connected by means of flanges that extend out-

ward at right angles, and through which bolts or rivets are readily passed to fasten them firmly together, as required, to produce water-tight joints.

C C represent masonry in the form of a brick wall built up to surround my double-walled fire-chamber, at some distance therefrom, so as to leave an annular space between the two concentric walls and to support a crown-plate and dome.

D is a crown-plate that has an annular flanged rim that engages the top of the wall C.

D² is a corresponding plate in an inverted position, fixed to the crown-plate to close the top of my complete boiler, and to produce a steam chamber and dome from whence steam can be conducted by means of suitable education-tubes and utilized as desired.

e e e represent posts fixed between the two plates D and D² to strengthen and support the complete structure.

f f represent a series of tubes that connect my double-wall fire-box with the crown-plate and boiler-dome and form a skeleton top to my fire-wall, through which the products of combustion can pass outwardly, and through which a hose and nozzle can be passed inwardly for the purpose of cleaning the heating-surface.

g is one of a series of ports in the wall C, adapted to admit a hose.

H is a chute at the front of the furnace, that extends through the outside wall, C, and also through between the tubes f into the fuel-magazine.

H² is a door frame and opening, that extends through the wall C and the lower portion, A, of the double wall of the fire-chamber to afford access to the grate B.

H³ represents a doorway and passage to the ash-pit under the grate.

I is a smoke-flue on the rear side of the furnace, connected with the lower portion of the annular chamber surrounding my double-walled fire-chamber.

I² is a branch extending from the flue I through the wall C into the upper portion of the same annular chamber, to create a more direct draft, when desired, by simply opening a damper located therein.

J is a circular plate, that rests upon the out-

side flanges of the connected sections A and A² of the double wall of my fire-chamber, and extends into the wall C, as clearly shown in Fig. 1, to divide the annular chamber around the double-walled fire-chamber and boiler-section into two compartments—an upper, No. 1, and a lower, No. 2.

k is an opening through the plate J at the front of the furnace, through which the products of combustion pass from the upper, No. 1, compartment to the lower, No. 2, compartment to circulate around the lower portion of my double-walled fire-chamber, and thereby allow the heat to be absorbed and utilized, while the smoke escapes through the flue I at the bottom and rear side of the same compartment.

Nos. 3 4 5 6 represent a series of tubes connected with the crown-plate D and top of my complete boiler-furnace. They form a concentric circle within the fire-chamber and double wall A A² and tubes *f*, and a suspended skeleton fuel-magazine and boiler-section, by connecting their lower ends by means of a tubular ring, *m*, of corresponding size.

n n represent elbow-shaped tubes, that connect the tubular ring *m* and the combined fuel-magazine and boiler-section with the water-chamber of my combined double-walled fire-box and boiler-section A and A², and serve to support the fuel-magazine and also to connect the water-chambers of the two distinct boiler-sections, as required to produce a water-circulation in the complete boiler.

r represents a tube connected with the tubular ring *m* of the combined fuel-magazine and boiler-section and the steam-chamber in the top or dome of the complete boiler, to which a water-gage and steam-gage may be attached.

s represents a steam-education tube on top of the dome, through which steam may be conveyed and utilized for any of the various purposes contemplated.

w represents a safety-valve.

From the foregoing detailed description of the construction and function of each element and sub-combination of my complete invention the unitary actions of the various parts and the practical operation of the complete apparatus and the advantages to be derived from its use are clearly apparent to those skilled in the art of constructing and operating steam-generators.

I claim as my invention—

1. In a boiler-furnace, the combination of a double-walled fire-box and vertical boiler-section having a skeleton top, a horizontal boiler section and dome, an outer wall or jacket, and an annular plate having an opening to allow the downward passage of the products of combustion, substantially as shown and described, for the purposes specified.

2. The improved boiler-furnace and steam-generator, composed of the double-walled fire-box and boiler-section A A² *f*, a grate, B, a surrounding wall, C, having a series of ports, *g*, a crown-plate and boiler-section, D D², an annulus, J, having an opening, *k*, a fuel-magazine, 3 4 5 6 *m*, having connecting-branches *n* at its base, and a chute for conveying fuel to the fuel-chamber, substantially as shown and described, to operate in the manner set forth, for the purposes specified.

JOHN COLLIS.

Witnesses:

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