

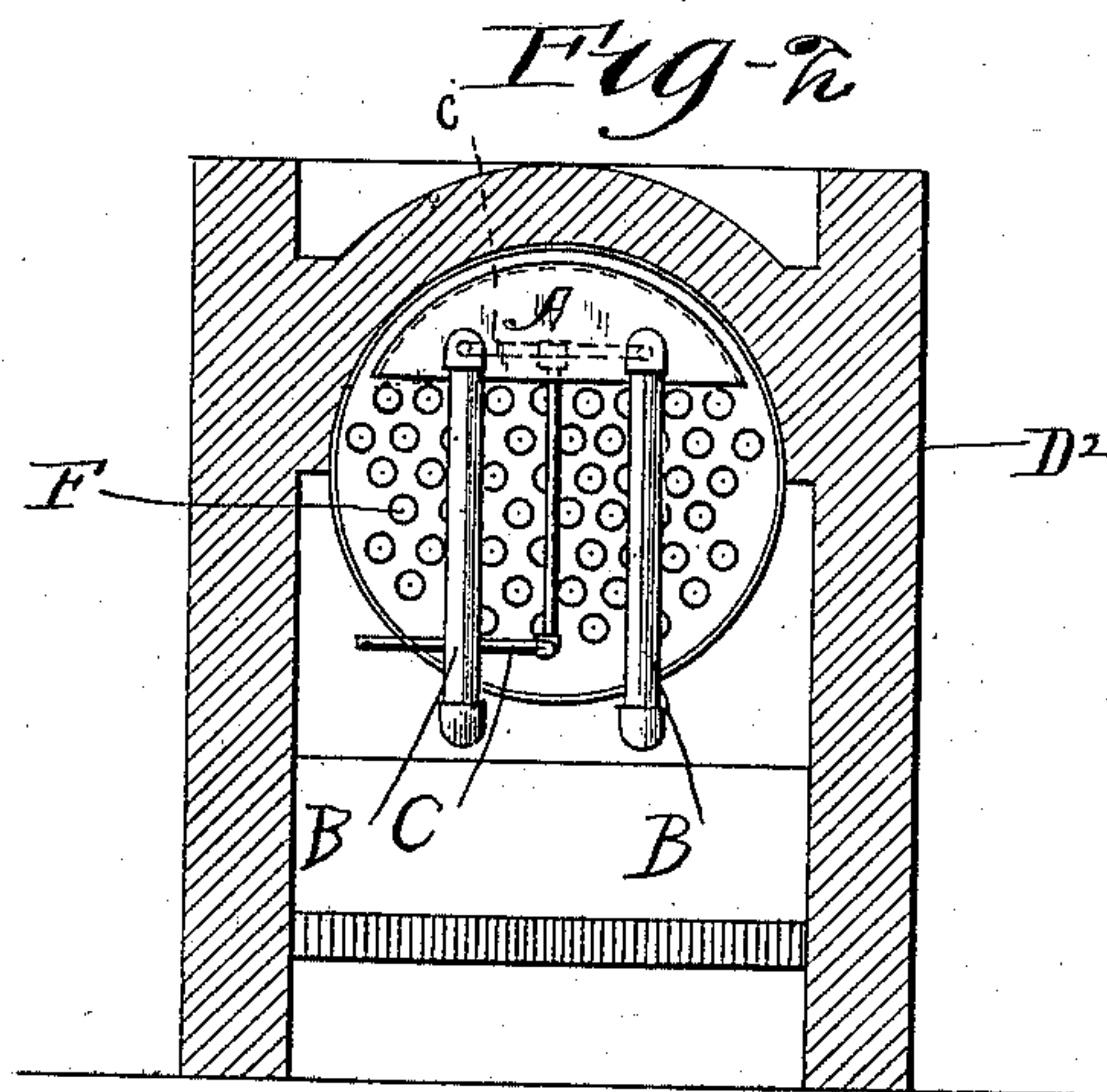
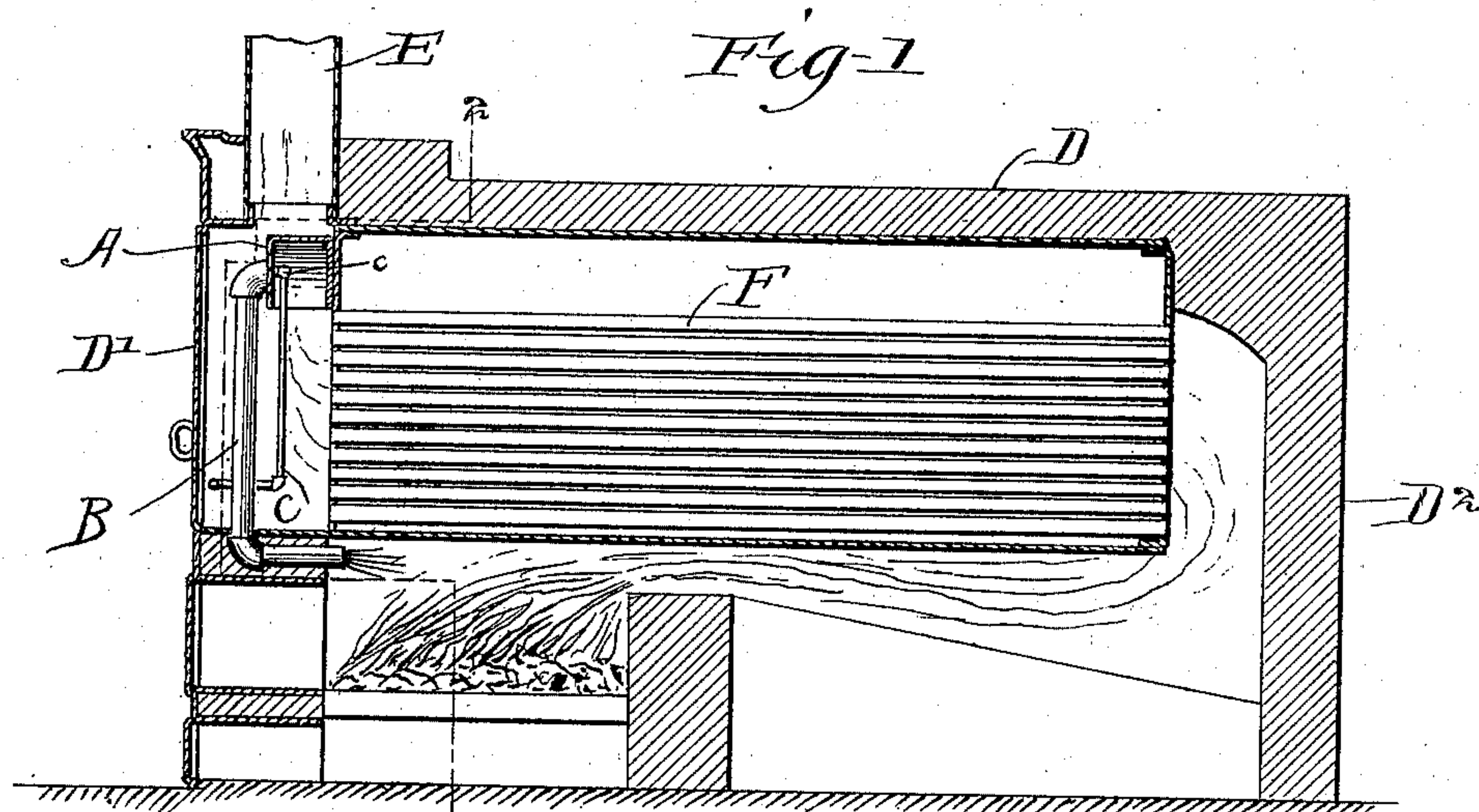
No. 608,105.

D. H. BURNS.
FURNACE.

Patented July 26, 1898.

(Application filed Jan. 17, 1898.)

(No Model.)



Witnesses
Harold H. Baugh
Wm. M. Rhine

by.

Inventor
Dennis H. Burns
William H. Hall
his Atty.

UNITED STATES PATENT OFFICE.

DENNIS H. BURNS, OF CHICAGO, ILLINOIS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 608,105, dated July 26, 1898.

Application filed January 17, 1898. Serial No. 667,015. (No model.)

To all whom it may concern:

Be it known that I, DENNIS H. BURNS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which
10 form a part of this specification.

This invention relates to improvements in furnaces for steam-boilers, and refers more specifically to an apparatus of that class designed for use with return-flue boilers, which
15 apparatus is located between the front flue-sheet of the boiler and the front wall of the furnace; and it consists of a hood located just above the uppermost line of flues in position to intercept a portion of the products
20 of combustion and one or more return-pipes opening into said hood above the level of the flues, through which the products of combustion are returned to the combustion-chamber, and is provided with means to create an artificial draft whereby the return draft to the
25 furnace is facilitated.

In said drawings, Figure 1 is a diagrammatic view in side elevation of a furnace and return-flue boiler therein provided with my
30 invention, showing the latter partly in vertical section. Fig. 2 is a vertical sectional view taken on line 2 of Fig. 1.

In said drawings, D designates the upper wall of the furnace, D' the front wall, and D² the rear wall thereof. E designates a smoke-stack opening into the furnace at the front end thereof.

F indicates, diagrammatically, a return-flue boiler, or one in which the products of combustion after passing from the fire-box are
40 returned to the forward end of the furnace through the flues of the boiler.

Referring now to the parts constituting my invention, A designates a hood which is preferably made of cast metal and which is located at the base of the smoke-stack between the front flue-sheet of the boiler and the front wall of the furnace above the uppermost line of flues. Said hood consists of connected top
50 wall and inner and outer side walls and is arranged with its open side directed downwardly. Said inner and outer side walls of

the hood are located at some distance apart, so as to provide a relatively large downwardly-directed mouth or opening to intercept the
55 smoke as it issues from the flues, and the hood is located with its inner wall closely adjacent to the front flue-sheet of the boiler. The lower edges of said inner and outer walls are horizontal, and said walls are preferably
60 curved at their top edges to correspond to the circumferential curvature of the front end of the boiler, the upper wall, by which said side walls are connected, being curved to correspond to said curvature of the upper edges
65 of the side walls. The length of the said hood at the bottom edges of the side walls is preferably slightly greater than the distance between the outside flues of the uppermost line of flues, and for a medium-sized boiler the
70 distance between the lower edge of the front wall of the hood and the flue-sheet will be not less than six inches and from ten to twelve inches in its highest part. For different
75 classes of boiler-furnaces the shape of the hood may be varied, and will be made in each instance of such size as to properly fit the boiler with which it is to be used.

B B designate return-pipes, which open at their upper ends through the outer wall of
80 the hood adjacent to the opposite ends thereof and above the level of the uppermost line of flues of the boiler. Said pipes are directed downwardly toward the combustion-chamber and forwardly at their lower ends substantially in line with the lower cylindric side of the boiler and discharge at their lower ends
85 into the combustion-chamber on each side of the central line of the boiler toward the rear end of the boiler, thereby adding to the natural draft of the furnace. Said return-pipes
90 pass at their lower ends through the boiler-supporting plate and are secured rigidly thereto in such manner as to support the apparatus in place ordinarily without the necessity of
95 other attaching means. The means for creating a forced draft through said hood and return-pipes consists of a pipe C, adapted to deliver in the present instance steam under pressure inside of said hood adjacent to the upper
100 ends of said return-pipes. Said pipe C will conveniently be connected with the boiler F by any suitable steam connection. The upper end of the pipe C is provided with later-

ally-directed nozzles *c c*, which discharge into the hood at the upper ends of the return-pipes *B B*, which creates a forced draft through said pipes and acts to draw the smoke intercepted by the hood therethrough to the furnace to be again subjected to the action of the flame, and thereby aids the natural draft of the furnace. The circulation thus created will result in a thorough consumption of the smoke and sparks, thereby preventing the escape of large volumes of smoke laden with unconsumed fuel through the smoke-stack and at the same time greatly increases the draft.

The opening of the upper end of the return-pipes into the outer wall of the hood, made as shown and described, and above the uppermost line of flues is of great importance, as said pipes are in position to effectively catch all the smoke intercepted by the hood and prevent the same from being deflected to the smoke-stack after it has been directed toward the furnace by the means described.

A further and important advantage of the apparatus described is its simplicity and cheapness. It is located entirely within the furnace, no part being visible from the outside, and is of such construction that it may be quickly and readily applied to boilers already installed with little work and without the necessity of disturbing the furnace structure. Moreover, the parts of the apparatus are so located as not to hinder in any way the operation of any type of boiler-furnace to which it may be applied.

I claim as my invention—

1. In combination with a furnace and a return-flue boiler therein, of a hood consisting of connected top and inner and outer side walls, located between the front wall of the furnace and the front flue-sheet of the boiler, above the uppermost line of flues of said boiler, said hood being of such size as to be

entirely contained within the circumference of the front end of the boiler, and arranged with its open side or mouth directed downwardly, two return-pipes opening into the hood through the outer wall thereof, and leading downwardly into the combustion-chamber, and directed rearwardly at their lower ends substantially in line with the lower side of the boiler, and a pipe leading from the boiler provided with laterally-separated nozzles adapted to deliver steam under pressure to the interior of the hood adjacent to the upper ends of said return-pipes.

2. In combination with a furnace and a return-flue boiler therein of a hood located between the front wall of the furnace and the front flue-sheet of the boiler, and above the uppermost line of flues of said boiler, said hood consisting of a connected inner and outer side and top walls, the lower sides of said walls of the hood being horizontal, and located at such distance apart as to provide a relatively wide downwardly-opening mouth for said hood, two return-pipes opening into the interior of the hood through the outer wall thereof and above the level of the uppermost line of flues of the boiler, and leading downwardly and directed at their extreme lower ends rearwardly into the combustion-chamber, and a pipe leading from the boiler provided with laterally-separated nozzles adapted to deliver steam under pressure to the interior of the hood adjacent to the upper ends of said return-pipes.

In testimony that I, DENNIS H. BURNS, claim the foregoing as my invention I hereto affix my signature, in the presence of two witnesses, this 15th day of January, A. D. 1898.

DENNIS H. BURNS.

Witnesses:

WILLIAM L. HALL,
HENRY C. HALL.