

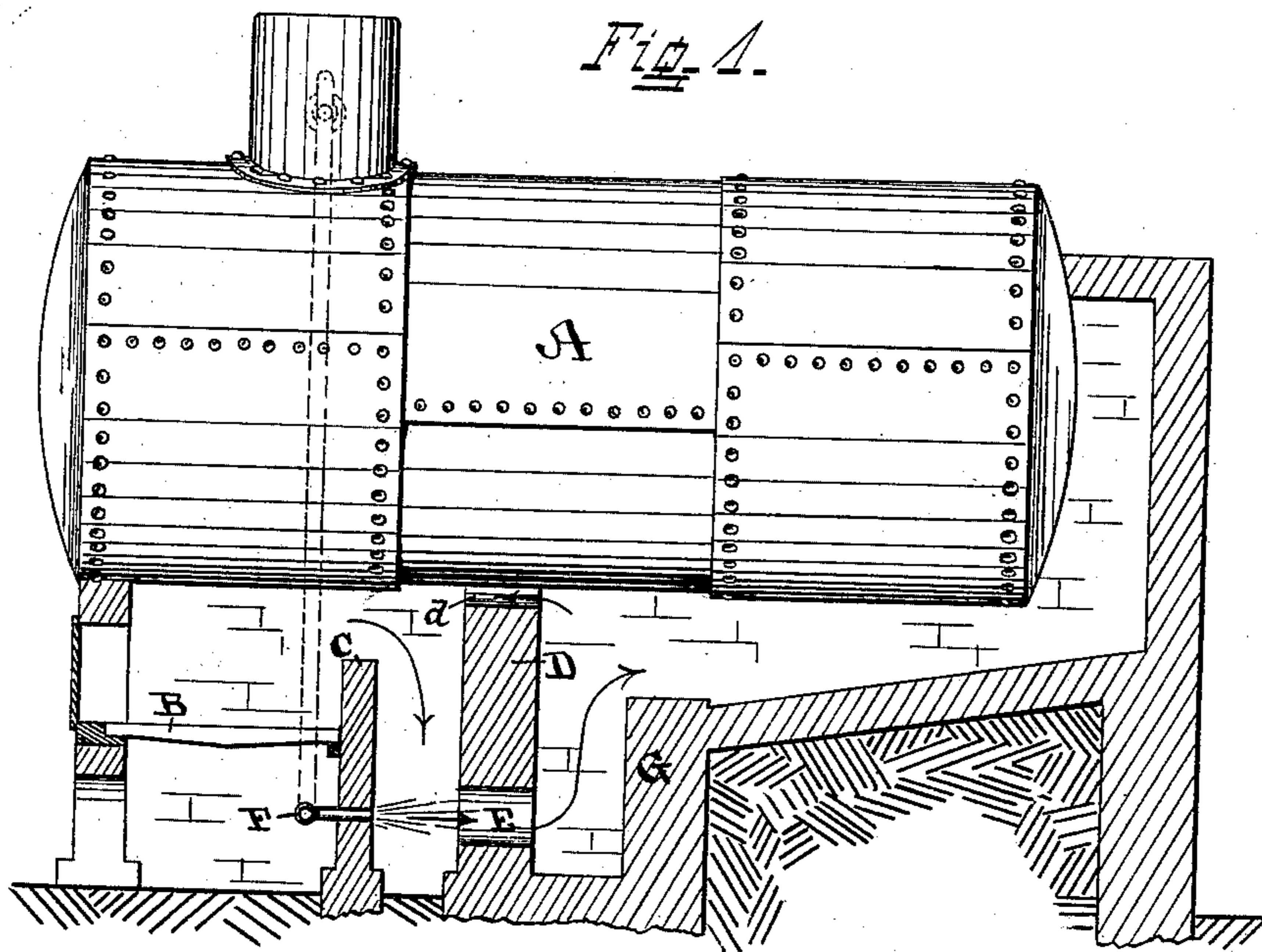
(No Model.)

G. T. WOODS.  
STEAM BOILER FURNACE.

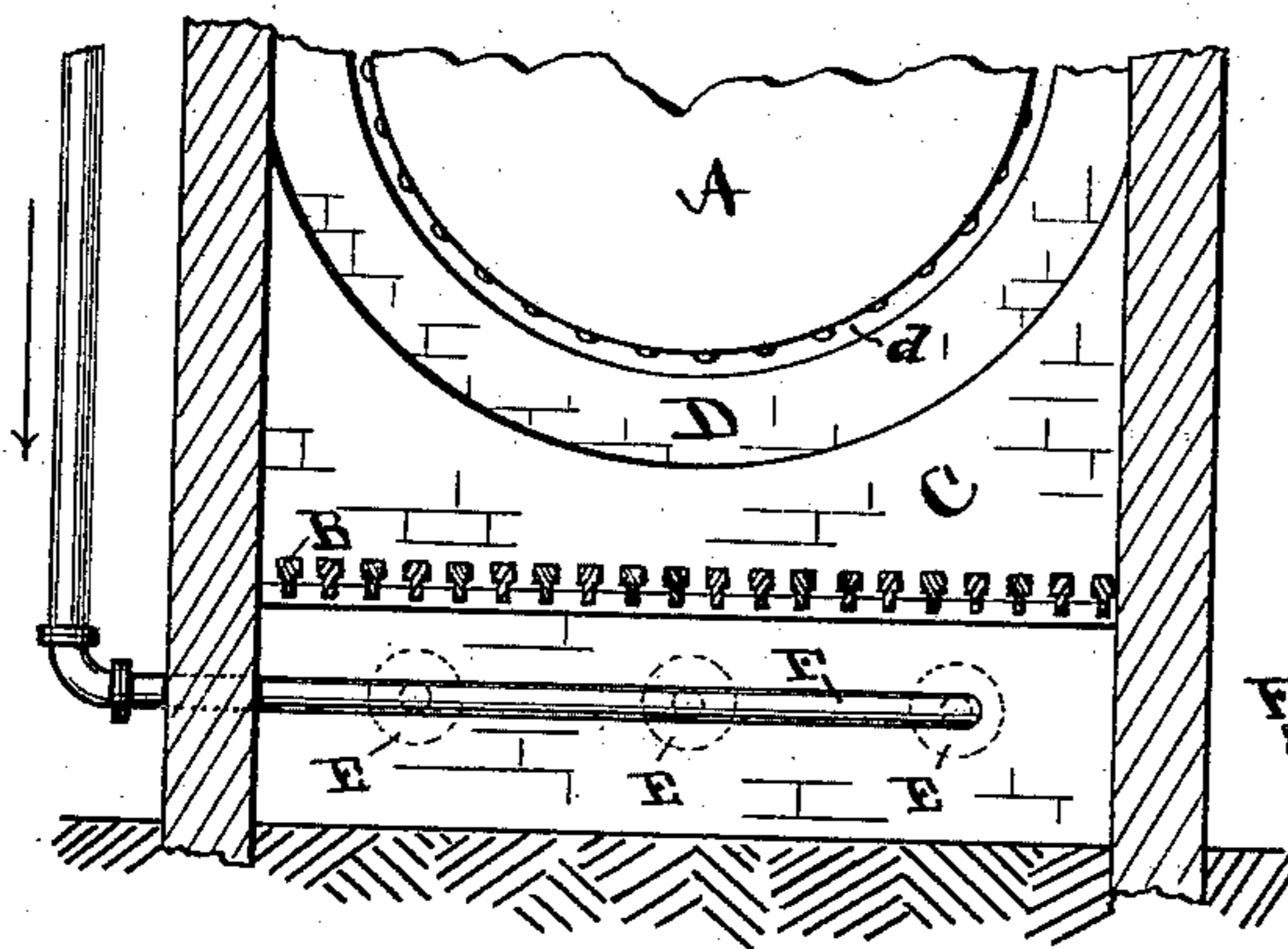
No. 299,894.

Patented June 3, 1884.

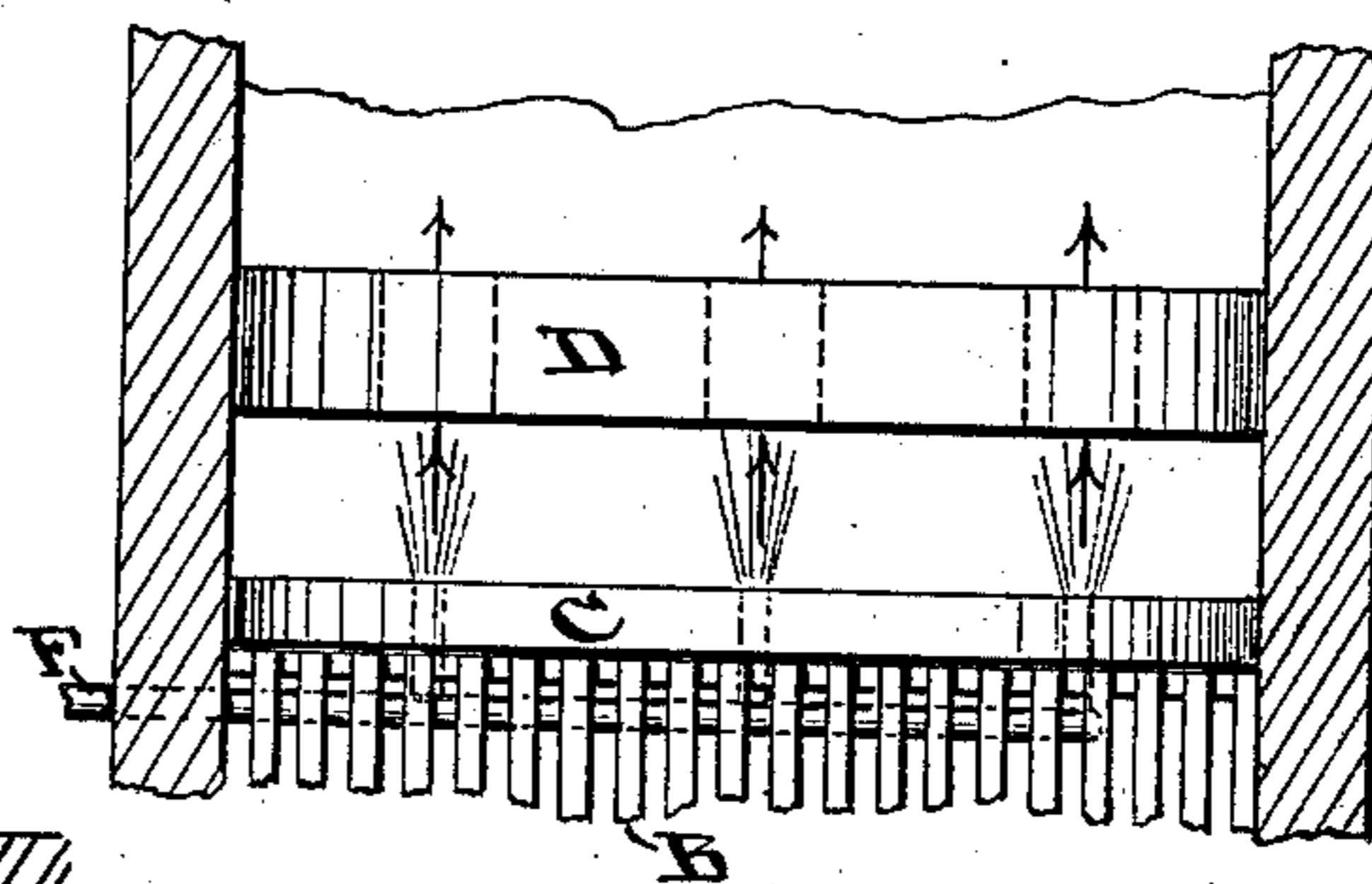
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

GRANVILLE T. WOODS, OF CINCINNATI, OHIO, ASSIGNOR TO EZRA W. VANDUZEN, OF SAME PLACE.

## STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 299,894, dated June 3, 1884.

Application filed June 19, 1883. Renewed May 12, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, GRANVILLE T. WOODS, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to steam-boiler furnaces, and is designed to increase their efficiency by promoting combustion and economizing fuel; to which end it consists in the provision, construction, and arrangement of an auxiliary bridge-wall, in connection with a forced blast, as and for the purposes hereinafter more fully set forth.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical section of the furnace-setting of an ordinary flue-boiler, taken longitudinally through the fire-grate and rear combustion-chamber; Fig. 2, a front sectional elevation taken across the grate, and Fig. 3 a partial plan-section showing the relative arrangement of the bridge-walls.

A designates the boiler, B the grate, and C the ordinary bridge-wall, these parts being constructed and arranged in the ordinary manner, and requiring no special description, except as hereinafter indicated.

In rear of the bridge-wall C, I place an auxiliary bridge-wall, D, extending from about the level of the ash-pit to within, say, an inch or less of the boiler, around the lower exposed portion of its contour, and between the side walls of the furnace, and in rear of that a wall, G, forming the end wall of the ordinary flue constituting the bottom of the combustion-chamber. The three walls C, D, and G are constructed of refractory fire-brick.

Through the supplemental bridge-wall D, a little below the grate-level, are one or more horizontal apertures, E—usually three for a single boiler—of sufficient size to permit the free passage of the gaseous products of combustion as impelled by blasts of air or steam from a pipe, F, arranged before or in the bridge-wall C, and having suitable nozzles projecting toward the axis of the apertures rearward.

The action of the apparatus is as follows: The pipe F being supplied with steam from

the boiler, (as indicated by the dotted lines showing a connection with the steam-dome,) or with air from a fan-blower or other source, the blasts issuing rearward toward and through the apertures E produce a partial vacuum above the grate-bed, thus stimulating the draft of air passing through the burning fuel in the ordinary and natural manner. The gaseous products of combustion are then driven through the apertures E and against the wall G, which action tends to thoroughly mingle the gases; and, moreover, by impelling them against and between the walls C, D, and G, which are highly heated, and at the same time withdrawing them from contact with the cooler surfaces of the boiler, their temperature is highly increased and kept above the point of thorough combustion. Furthermore, the partial vacuum being thus produced in the space forward of the auxiliary bridge-wall D, a portion of the gases cooled by contact with the boiler at the rear of the wall D are drawn forward through the space *d*, between the said wall and the boiler, and carried downward and reheated and discharged again through the apertures E.

The most effective use of my invention is attained in connection with the ordinary damper in the uptake of the boiler, by which a partial pressure may be maintained in the space at the rear of the auxiliary bridge-wall D, tending to promote the thorough combustion of the gases while passing beneath the boiler and back through its flues, and maintain thereby a higher temperature. The arrangement also tends efficiently to prevent the formation of smoke.

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

1. In a steam-boiler furnace, a supplemental bridge-wall, D, in rear of the ordinary bridge-wall, arranged with apertures E below the grate-level, and a space, *d*, adjacent to the boiler, in combination with a blast-pipe, F, provided with nozzles arranged to discharge rearward through the apertures E, substantially as and for the purpose specified.

2. In a steam-boiler furnace, the ordinary grate and bridge-wall, the supplementary

bridge-wall D, having apertures, as described,  
and a space adjacent to the boiler, the wall G  
in rear of wall D, and an inclined surface  
extending backward from the top of said wall,  
5 and a series of blast-pipes corresponding with  
the apertures in wall D, all the elements in  
combination, substantially as set forth.

In testimony whereof I have hereunto set  
my hand in the presence of two subscribing  
witnesses.

GRANVILLE T. WOODS.

Witnesses:

L. M. HOSEA,

A. HAMILTON.