(No Model.)

G. A. COLBY.

FURNACE.

No. 341,883. Patented May 18, 1886.

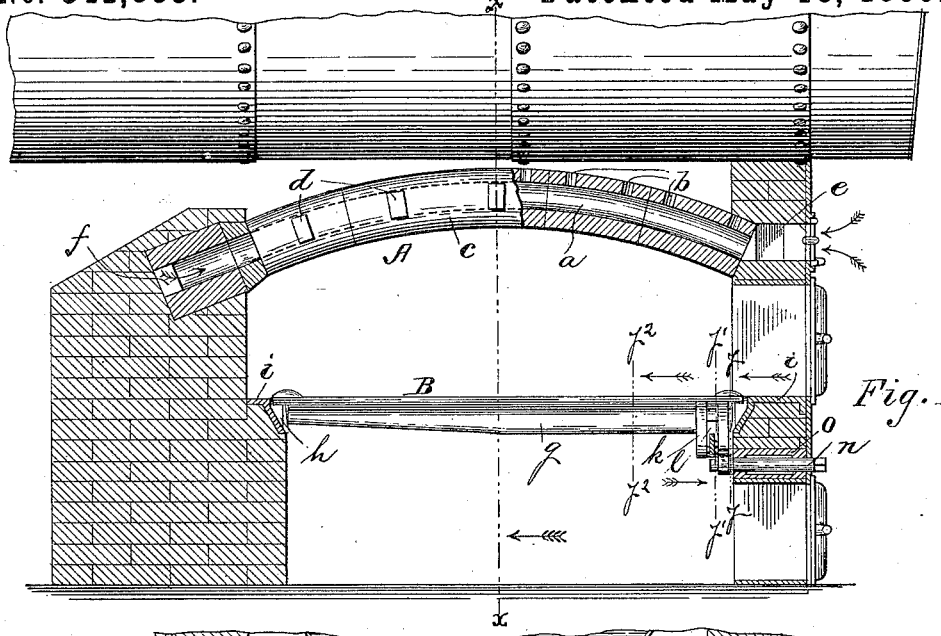


Fig. 1

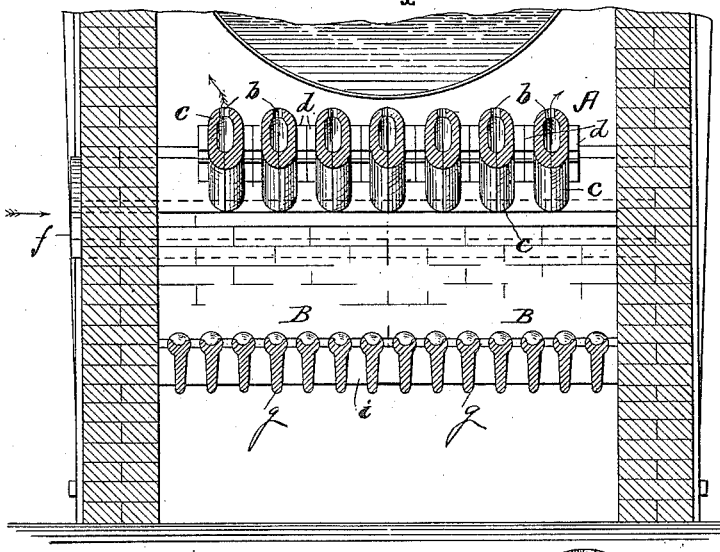
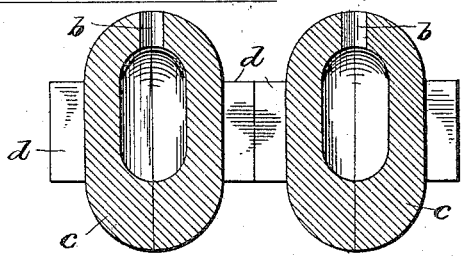


Fig. 2.

Fig. 3.



Witnesses.
Henry Faulkner
Sam'l B. Dover.

Inventor.
Gilbert A. Colby.
By Geo. P. Barton
Attorney.

UNITED STATES PATENT OFFICE.

GILBERT A. COLBY, OF CHICAGO, ILLINOIS.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 341,883, dated May 18, 1886.

Application filed November 28, 1884. Serial No. 149,133. (No model.)

To all whom it may concern:

Be it known that I, GILBERT A. COLBY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Furnaces, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to steam-boiler furnaces in which soft coal is used for fuel; and it consists of a combustion-arch placed directly under the boiler above the fire.

My invention will be readily understood by reference to the accompanying drawings, in which Figure 1 is a side view, partly in section, of a furnace embodying my improvements. Fig. 2 is a transverse sectional view thereof upon line *x x* of Fig. 1. Fig. 3 is a detailed view of the tile or fire-brick which form the combustion-arch.

Like parts are indicated by similar letters of reference throughout the different figures.

As shown in Figs. 1 and 2, the combustion-arch A is placed directly under the boiler and above the fire, extending preferably from front to rear, and supported by the walls, as shown. The different conduits *a* of the arch are placed at a short distance from one another, and are provided with perforations or openings *b*. The flames are thus drawn up between and around the different conduits or sections of the arch, which, becoming heated, acts reciprocally upon the burning coal, and thus aids the combustion. The arch, also, when heated, serves to prevent cold air from striking the tubes or boiler when the doors of the furnace are opened for stoking the fire.

The tile *c*, of which the arch is composed, are preferably made of fire-brick material, each tile being provided with an ear, *d*, as shown in Fig. 3. The ears of the tile opposite one another hold the conduits in place, so that the spaces between them may be uniform. I have found that the spaces should be in area equal to about one-third of the whole space or area of the arch—that is to say, in case the conduits are four inches wide the ears *d* should project about one inch, so that the spaces between the different conduits may be two inches in width.

At the front and rear of the furnace I provide the openings *e f*, which connect, respectively, with the different ends of the conduits *a* of the combustion-arch. When the arch becomes heated air is drawn in and distributed through the perforations *b*. The arch is thus prevented from burning down, while at the same time a fresh supply of heated oxygen is thrown into the flame at the right point, thus aiding materially the combustion of the gases.

The arch shown in Fig. 2 consists of seven air-conduits. It is evident, however, that any number of conduits may be used, the number depending upon the size of the furnace.

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

1. In a steam-boiler furnace, the combustion-arch placed directly above the fire and below the boiler, said combustion-arch consisting of conduits extending from the front to rear of the furnace, and separating devices between the conduits, whereby the flame is allowed to pass around said conduits while the conduits, becoming heated, act upon the fuel to aid the combustion and protect the boiler from cold drafts, as and for the purpose specified.

2. The combination, with the boiler, of the combustion-arch A, placed below the same and above the fire, said arch consisting of conduits composed of fire-brick tile, the tile being perforated, and provided with ears *d*, for keeping the conduits apart, said conduits extending over the furnace and supported by the wall, as shown, whereby the combustion of the fuel is aided by radiation of heat from the arch while the boiler above is protected from cold drafts of air, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 18th day of November, A. D. 1884.

GILBERT A. COLBY.

Witnesses:

GEORGE P. BARTON,

E. KINGLAND.