(No Model.)

C. WHITFIELD.

GRATE.

No. 510,623. Patented Dec. 12, 1893

Fig 2.

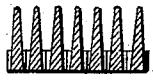


Fig 5.

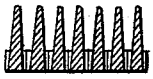


Fig 8.

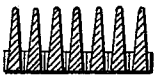


Fig 11.

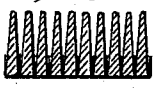


Fig 3.

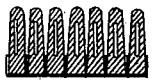


Fig 6.

Fig 9.

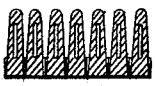


Fig 12

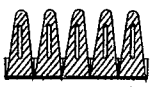


Fig 1.

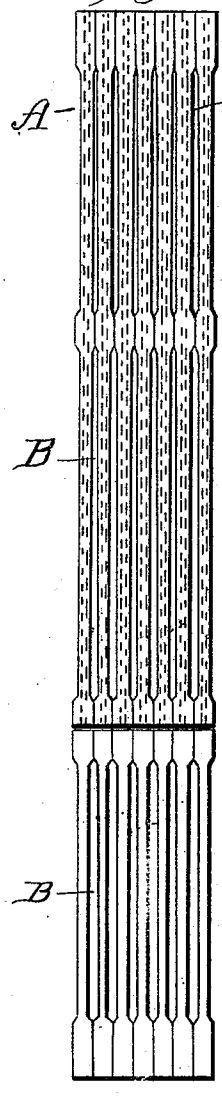


Fig 4.

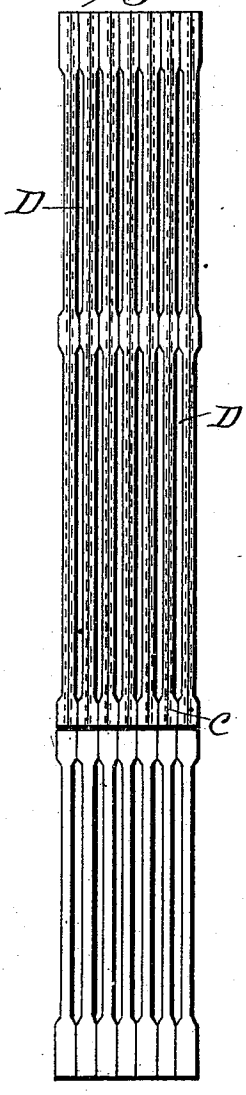


Fig 7.

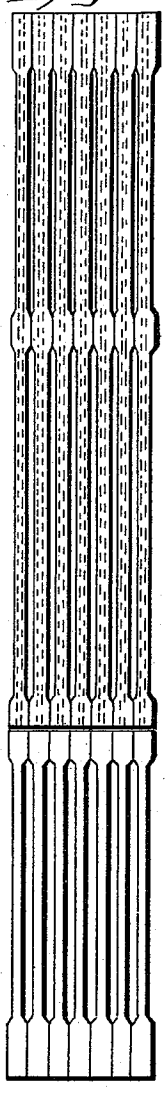
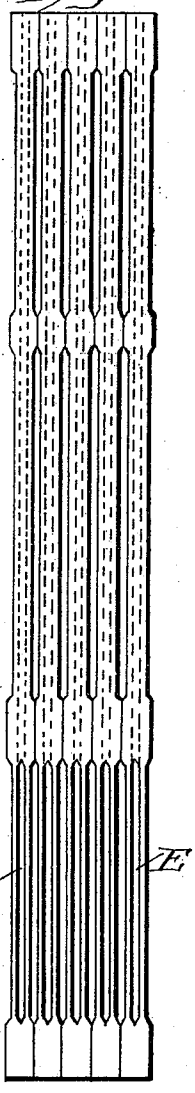


Fig 10.



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WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES WHITFIELD, OF KETTERING, ENGLAND.

GRATE.

SPECIFICATION forming part of Letters Patent No. 510,623, dated December 12, 1893.

Application filed November 15, 1892. Serial No. 452,180. (No model.) Patented in England March 2, 1892, No. 4,090.

To all whom it may concern:

Be it known that I, CHARLES WHITFIELD, a subject of the Queen of Great Britain and Ireland, and a resident of Kettering, in the county of Northampton, England, have invented certain new and useful Improvements in Grates, (for which I have obtained a patent in Great Britain, No. 4,090, bearing date the 2d day of March, 1892,) of which the following is a specification.

The object of my invention is to provide an improved arrangement of the bars of steam boiler furnaces to more effectually consume the smoke produced by such furnaces. I have found in constructing steam boiler furnaces that this is most effectually accomplished by a differential spacing of the fire bars from the fire door toward the bridge, that is with a maximum amount of air space at the front near the fire door and gradually diminishing toward the bridge. The combustion on a grate built in this manner is most intense at the fire door end of the grate, while at the bridge end the combustion although not so active is sufficient to keep the fuel in a state of incandescence and is very effective in raising the passing gases up to the necessary temperature to produce perfect combustion at the bridge.

In order that this my said invention may be readily understood and carried into practical effect I have hereunto annexed a sheet of drawings illustrative of my improvements and will now proceed to describe the same with the assistance of the various letters of reference marked thereon.

Figure 1 is a plan view and Figs. 2 and 3 transverse sectional views of a furnace grate embodying my improvements. Figs. 4 to 12 are similar views of modifications of my invention.

In carrying out my invention according to one modification as in Fig. 1, I construct my improved furnace grate of tapering fire bars A. A. the thinner ends of such bars being situated in the front portion of the furnace and the wider ends at the rear portion of the furnace so that when such bars are put together air spaces B B are produced tapering from front to back of the furnace. The fire bars of this form of my improved grate are by preference formed in two portions the front being solid as illustrated in Fig. 2 while the rear portion is hollow as is illustrated in Fig. 3 for the passage of air to the back of the fire grate.

Figs. 4, 5 and 6 illustrate a furnace grate built up of fire bars C. C the sides of every third or other suitable length of the bar being parallel instead of tapering, thus forming air spaces D. D, diminishing in width for every third or other suitable length of the bar from front to back of the furnace and reducing the spaces in the rear portion of the grate to just sufficient width to keep the fuel in a state of incandescence. These last mentioned bars are formed in two portions as illustrated the rear portion being formed in halves with cavities or channels in their inner faces which when put together equal the thickness of the hollow fire bars aforesaid and form air passages as illustrated.

Figs. 7, 8 and 9 also illustrate a grate composed of bars formed in two portions the rear portion however being cast hollow as in the case of tapering bars in Fig. 1.

Figs. 10, 11 and 12 illustrate another furnace grate built up of bars formed in one continuous length with air slits or openings E in the front portion which come opposite air passage in the rear portion of the fire bar as illustrated. In this manner I construct furnace grates with diminished or differential air spaces from front to back of the furnace a small amount of air space sufficient to keep the fuel in a state of incandescence being at the back of the furnace while a large amount of air space is provided at the front of the furnace where it is most required in order to give a copious supply of air to the fuel which is thrown on that portion of the grate from time to time so as to insure that the smoke produced at the front of the furnace shall be completely consumed after passing over the incandescent fuel in the rear portion of the furnace.

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

A furnace grate consisting of grate bars having the front portions made solid and the rear portions hollow with a series of air spaces between said bars of greatest width at the front and diminishing toward the bridge, substantially as described.

In testimony whereof I affix my signature to the foregoing specification.

CHARLES WHITFIELD.

Witnesses:
W. THOS. MARSHALL,
EDMUND S. SNEWIN.