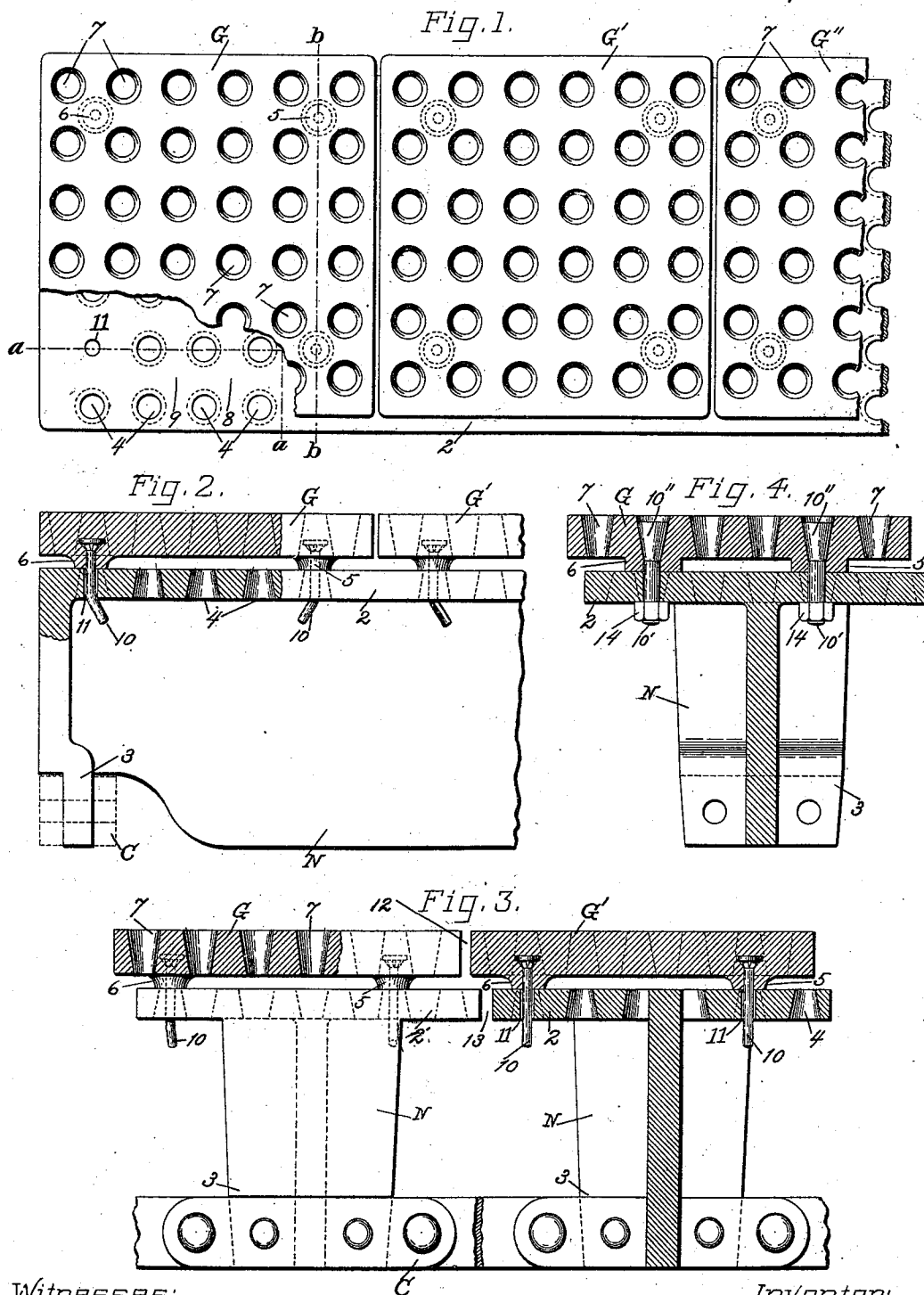


(No Model.)

E. B. COXE.
FURNACE FLOOR.

No. 510,571.

Patented Dec. 12, 1893.



Witnesses:
Fred. J. Doll.
Fredrick A. Boland.

Inventor:
Eckley B. Cox.
By his Attorney,
J. W. Richards

UNITED STATES PATENT OFFICE.

ECKLEY B. COXE, OF DRIFTON, PENNSYLVANIA.

FURNACE-FLOOR.

SPECIFICATION forming part of Letters Patent No. 510,571, dated December 12, 1893.

Application filed July 10, 1893. Serial No. 479,987. (No model.)

To all whom it may concern:

Be it known that I, ECKLEY B. COXE, a citizen of the United States, residing at Drifton, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Furnace-Floors, of which the following is a specification.

This invention relates to grate-bars for furnaces; the object being to furnish a grate-bar, or furnace-floor plate, especially adapted for use in burning the finer sizes of anthracite coal.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a grate-bar embodying my present improvements. Fig. 2 is a side elevation of the grate-bar, one edge being broken away to the line *a-a*, Fig. 1. Fig. 3 is an end view of two of my improved grate-bars set side by side, the one at the right-hand being shown in section on the line *b b*, Fig. 1. Fig. 4 is a side view of one form of fastening device for holding the upper floor-plates of the furnace in place on the lower plates thereof.

Similar characters designate like parts in all the figures.

My present improvements are especially designed for use in that class of furnaces described and claimed in Letters Patent No. 499,716, granted to me June 20, 1893, and especially in connection with the improved furnace described and claimed in my prior application, Serial No. 477,264, filed June 12, 1893; but said improvements are also applicable for use in any furnace for the purposes hereinbefore mentioned.

The grate-bar proper consists, according to my present improvements, of two parts, the lower plate, and an upper plate supported above and free of the lower plate. In the drawings the lower plate 2 is shown forming the upper rib or member of the beam N, this beam corresponding to the one so designated in my aforesaid application, Serial No. 477,264. Said beam N is shown provided at the end thereof with the end-plate 3, whereby it may be connected with a chain, as C, Fig. 3, for carrying the beams along in the furnace, as described in my aforesaid application.

By the term "free" as herein used, I mean that the plates are so far separated as to produce an air-space between them.

The lower plate 2 is shown perforated by numerous holes or openings, 4, which, as indicated in the drawings, are formed smallest on the upper end thereof, being of a conical or pyramidal shape, or substantially so. The upper plate is usually formed in sections of moderate length, as G and G', Figs. 1 and 2; these sections are set at a little distance above the lower plate 2, being upheld by suitable bosses, or like projections, as 5 and 6, which may be integral with, or separate from, the plates, as preferred. Said upper plates have numerous holes or perforations, 7, which in the general structure are interspersed between the holes of the lower plate 2, as will be understood by comparison of the several figures of drawings. The upper-plate holes, 7, are, in practice, formed largest at the upper end thereof, and the lower ends thereof are of a smaller diameter than the spaces, as 8 and 9, Fig. 1, between the adjacent holes of the lower plate 2. By this means the fine fuel, when laid upon the upper plates and running down into the perforations thereof, is prevented from passing through the lower plate and being wasted. The upper plates being of short length, and separate from the lower plate, and there being an air-space between the two plates, the lower plate is thereby fully protected against any undue expansion by heat, and from injury or wear.

For holding the floor-plates G and G', &c., in place upon the lower plates, or ribs of the beams, the upper plate is shown provided with the projections 5 and 6, on its under surface for supporting the same. Into each of said supporting projections and cast integral therewith, are the pins 10, each projection being provided with its respective pin; said pins pass downwardly through corresponding holes, 11, in the grate-beam N. The upper plate and the lower plate being thus assembled are rigidly secured together by bending the ends of the pins 10 as illustrated in Fig. 2; this operation being readily performed with a hammer, and binding the parts firmly together. The upper grate-sections are easily detached by straightening the pins, and thereby loosening the same from their engagement with the lower plate.

Another method, and one which in some

cases I deem preferable to the device already described, for securing the upper plates in place, is shown in Fig. 4, where bolts and nuts are employed for such purpose. The bolts, designated by 10', are shown made with conical heads, 10'', which fit into the conical perforations, 7, of the upper plate and extend through correspondingly-located holes in the lower plate; these lower-plate holes being, of course, intermediate to the regular openings or air-passages 4 formed therein. Ordinary nuts, as 14, are screwed upon the threaded ends of the bolts 10', for binding the several parts together. In practice, I prefer to use two or more bolts for holding in place each of the upper plates. It will, of course, be understood that in this kind of work all of the parts should be loosely fitted together; the bolts, with their tapered heads, when the parts are fitted and assembled as stated, adjust themselves, in practice, to the various inequalities and bind the plates together firmly, preventing any play of the one upon the other; also, the bolts being inserted in the air-holes of the upper plate, the regularity of these is not disturbed; and when the plate is made of a square form, as shown in Fig. 1, it may be set either side first upon the lower plate, thus being most perfectly and fully interchangeable.

The perforations of the upper-plate are shown located symmetrical in rows, so that the plate is not only renewable by removal of the bolts, but is also reversible, being adapted to be set on the lower-plate either side first.

The lower plates, when in use in the furnace, stand side by side, as shown in Fig. 3, in near proximity to each other. The upper plates are likewise disposed side by side upon the lower plates, but are off-set as shown in said Fig. 3, so that the joint at 12 between the upper plates is at some distance one side of the joint 13 between the lower plates 2 and 2'. This construction of the plates further guards against loss of fuel, by preventing the finer particles from falling down through the said openings 12 and 13. It also guards against any undue elevation or lowering of one beam or floor-section relatively to the other, the overlapping edges of the plates serving as stops for limiting the vertical movements of the same.

In Figs. 2 and 3, the grate is shown in position for use; each part is assembled in its proper relation and position, the grate beams being held to the chain by rivets, and the connecting links of the chain firmly fastened rotatively together. In Fig. 3, two of these

grate sections are shown, but in the described furnace, a sufficient number are used to form an endless traveling grate.

The particular kind of fastening-device shown in Figs. 2 and 3 is not specifically claimed herein, it being shown and claimed in a separate application, Serial No. 480,620, filed July 15, 1893.

Other features herein shown and described but not claimed herein, constitute the subject-matter of a separate application, Serial No. 481,528, filed July 26, 1893.

Having thus described my invention, I claim—

1. In a grate or furnace-floor, in combination, two perforated plates set one above the other and having a slight space between them, the perforations of one plate being at points intermediate to the perforations of the other plate, substantially as described.

2. In a grate or furnace-floor, the combination with the perforated lower plate, of a series of interchangeable upper-plates supported above and free of the lower-plates, substantially as described.

3. In a grate or furnace-floor, the combination with a lower-plate substantially as described, of the conically perforated upper-plate, having its perforations located symmetrical in rows, and removable bolts fitting said perforations and extending into the lower-plate, whereby the upper-plate is renewable and reversible, substantially as described.

4. In a grate or furnace-floor, the combination with the lower-plate, of a perforated upper-plate set on and free of the lower-plate, and plate-holding means substantially as described for removably securing the upper-plate to the lower one, substantially as described.

5. In a grate or furnace-floor, the combination with a pair of lower-plates and means for carrying the same side by side, of upper-plates supported on and free of the lower-plates, respectively, and overlapping the adjacent lower-plate, substantially as described.

6. In a grate or furnace-floor, the combination with a beam, of side flanges at one edge of the beam and forming a lower plate with air-passage openings, a perforated upper-plate set on and free of the lower-plate and removably secured thereto, and means for supporting the beam, substantially as described.

ECKLEY B. COXE.

Witnesses:

STEWART F. MACFARLANE,
ELLIOTT A. OBERRENDER.