(No Model.)

# E. B. COXE.

## FURNACE.

No. 510,587. Patented Dec. 12, 1893.

Fig. 1.

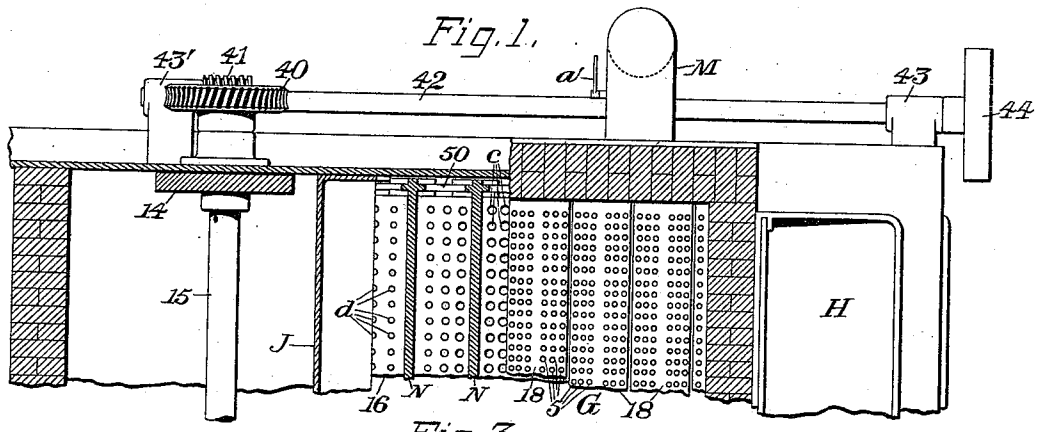



Fig. 3.

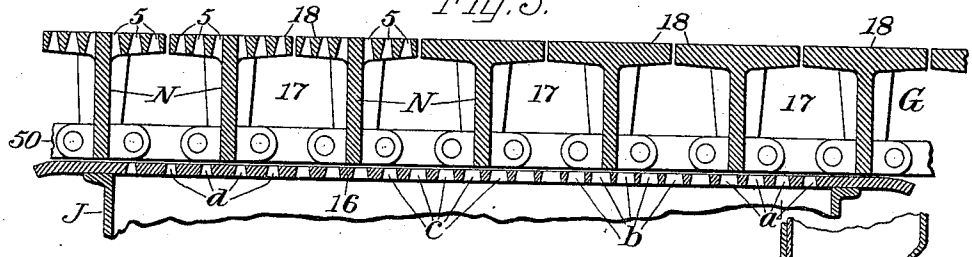



Fig. 2.

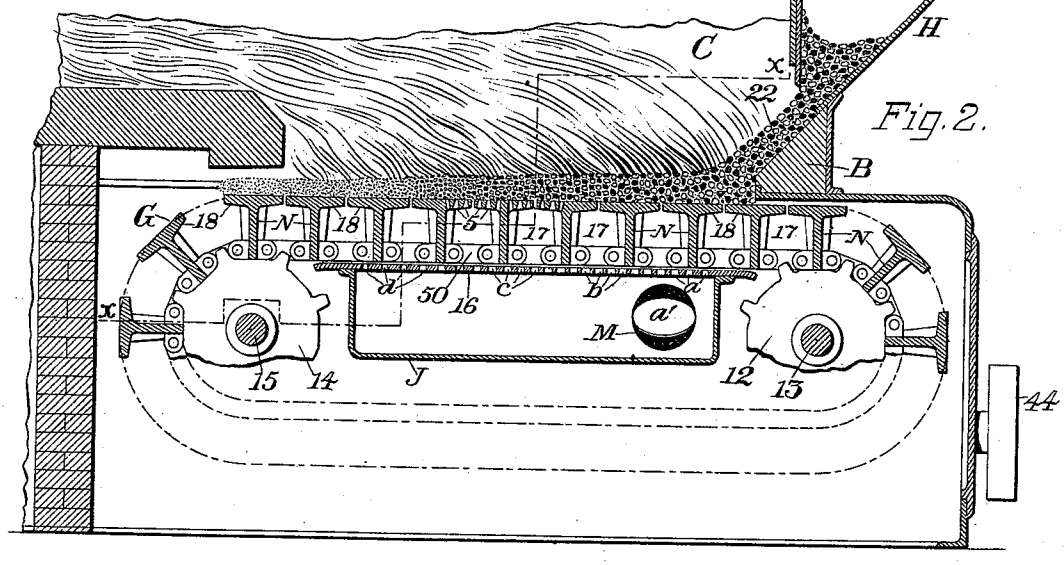
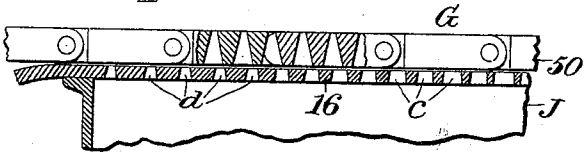



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## FURNACE.

SPECIFICATION forming part of Letters Patent No. 510,587, dated December 12, 1893.

Application filed October 16, 1893. Serial No. 488,277. (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 Furnaces, of which the following is a specification.

This invention relates to traveling grate furnaces, and is in the nature of an improvement upon the furnace described in the prior Letters Patent No. 499,716, granted to me June 20, 1893.

In the drawings accompanying and forming a part of this specification, Figure 1 is a sectional plan view of a portion of a furnace embodying my present improvements. Fig. 2 is a sectional side elevation of the furnace, as seen from below in Fig. 1. Fig. 3 is an enlarged view, corresponding to a portion of Fig. 2, for more clearly illustrating the character of the present improvements. Fig. 4 is a view, similar to a portion of Fig. 3, for illustrating a modification of certain details of the furnace-mechanism.

Similar characters designate like parts in all the figures.

For convenience, my present improvements are herein shown and described in connection with the furnace described in my aforesaid Patent No. 499,716. It will be remembered that in said furnace the floor of the furnace-chamber C consists of an endless traveling grate, designated in a general way by G, and which may be of any suitable and well-known form, as, for instance, of the form shown in Fig. 4 of this application and in said Letters Patent; or, of the improved construction described in my prior application, Serial No. 477,264, filed June 12, 1893. The endless grate shown in Figs. 1, 2 and 3 of this application is similar to the endless grate shown in said application Serial No. 477,264, it comprising a series of grate-beams, N, each carrying a furnace-floor plate, 18, suitably perforated for the passage of air. In the present instance, said floor-plates 18 are shown perforated with numerous holes, 5. The grate-beams N are shown carried by chains, 50, which run over, and are actuated by chain-wheels 12 and 14, which are carried upon the shafts 13 and 15, after the manner described in said Letters Patent. Said shafts and chains are or may be actuated by means of a worm-wheel, 40, fixed to one of said shafts and meshing with the worm 41 on a driving-shaft, 42, supported in bearings 43 and 43′, and provided with the pulley 44 whereby it may be revolved.

For the purpose of properly supplying the air to the successive portions of the length of the traveling furnace-floor, an air-chamber J, is located underneath the upper run of the endless grate, as illustrated in Fig. 2, the upper side or cut-off plate, 16, of said air-chamber lying contiguous to the under side of said upper run, and having at successive points in its length perforations of varying capacity, so as to supply air to said successive points in the length of the furnace at successively reduced or varying pressures. The air is or may be supplied to said chamber J through an ordinary supply-pipe M, which will usually have therein some suitable regulator-valve, as *a′*, for controlling the admission of air to said chamber; and this chamber and its air-pipe constitute means for supplying air to the cut-off plate.

The plate 16 forming the upper side of the air-supply chamber, is shown perforated with numerous holes, designated in groups by the characters *a*, *b*, *c*, *d*. The perforations *a*, under the front end of the furnace-chamber, supply air to the grate at a moderate pressure, for igniting the fuel adjacent to the ignition-block B, of the furnace. At a point a little farther toward the rearward end of the furnace-chamber, said perforations, designated by *b*, are of larger size, so as to supply an increased quantity of air to the grate at that point, for the purpose of blowing the fire with a maximum pressure. Still farther toward the rearward end of the furnace-chamber, said perforations, here designated by *c*, are somewhat smaller, so as to supply air to that portion of the furnace-floor at a somewhat lower pressure. And near the rearward end of the furnace-chamber said perforations are of still smaller size (and also less numerous) so as to supply air to the rearward portion of the furnace-floor at a minimum pressure. The object of the construction and combination here described is to carry out, by means of my present improvements, the process of burning fuel which is described and claimed in the Letters Patent No. 499,715, granted to me June 20, 1893.

When the more simple form of grate shown in Fig. 4 is used, the air passing through the perforations of the cut-off or top plate 16 passes directly into the spaces or perforations of the floor-plates, as will be understood by inspection of Fig. 4 and by reference to the aforesaid Patent No. 499,716; but with the construction shown in Figs. 1, 2 and 3 of this application, the air passing through said perforations enters the spaces 17 of the traveling grate and thence passes through the perforations 5 of the floor-plates which lie above said spaces.

For supplying fuel to the furnace-floor, I have shown the usual hopper, H, from which the fuel slides downward in a stream, 22, over the ignition-block B, onto the grate or furnace-floor, after the manner illustrated in said prior Letters Patent.

For the purpose of simplifying the illustration of the invention, only such portions of the described furnace are herein shown as are deemed necessary for the proper understanding of my present improvements. In Fig. 2, for instance, the lower run of the endless grate G is not shown, but is indicated by dotted lines, after a manner well understood. For a similar reason, the sectional plan view, Fig. 1, is taken on the dot-and-dash line *x*—*x* of Fig. 2.

Having thus described my invention, I claim—

1. In a furnace, the combination with a traveling grate, of means for supplying air at varying pressures to successive portions of the grate, comprising a plate, substantially as described, underneath the grate and having in the successive corresponding portions thereof air-passages of varying size, substantially as described.

2. In a furnace, the combination with a traveling grate comprising beams and floor-plates substantially as described, of the cut-off plate set contiguous to the beams and having in the successive portions thereof air-passages of varying capacity, substantially as described and for the purpose specified.

3. In a furnace, the combination with a traveling grate substantially as described, of a cut-off plate underneath the grate and having in the successive portions air-passage perforations of successively reduced capacity, and an air-supply apparatus for said plate, substantially as described.

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