(No Model.)

E. B. COXE.

FURNACE.

No. 510,588. Patented Dec. 12, 1893.

Fig. 1.

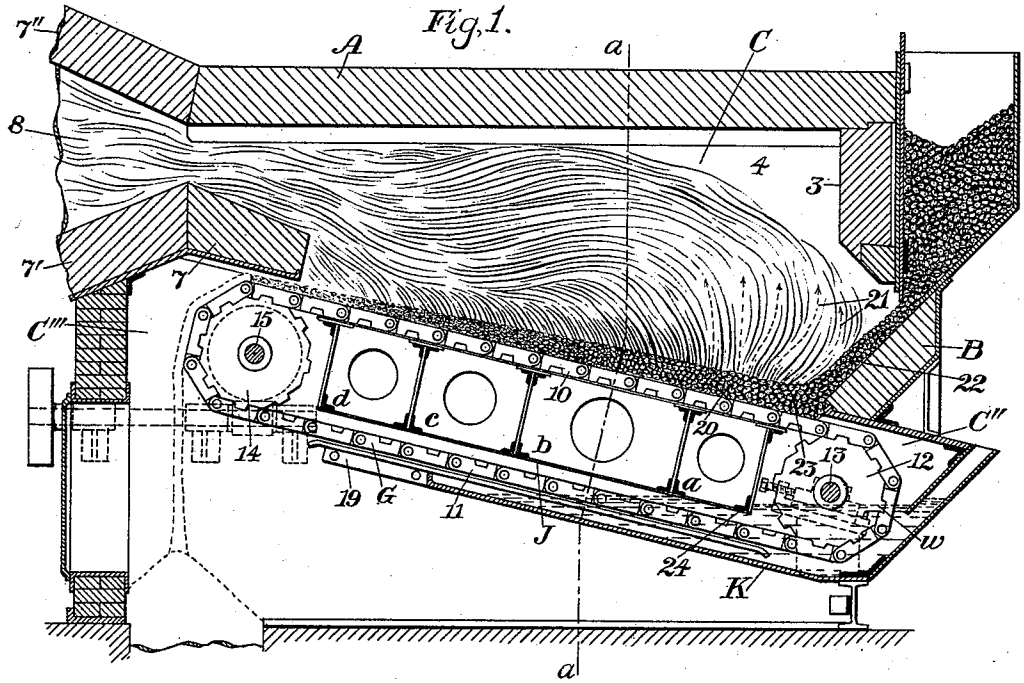


Fig. 2.

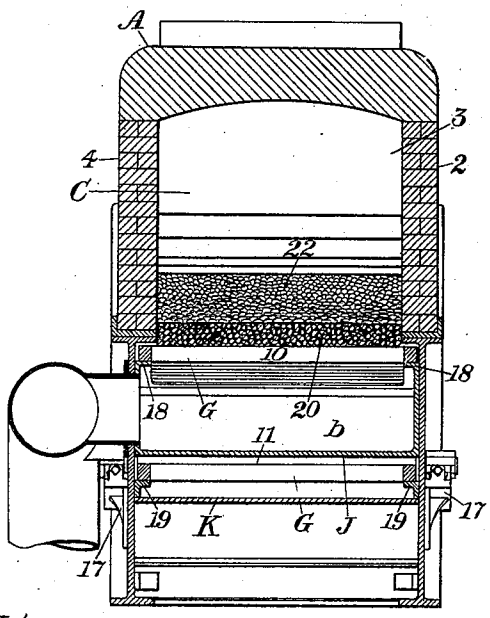
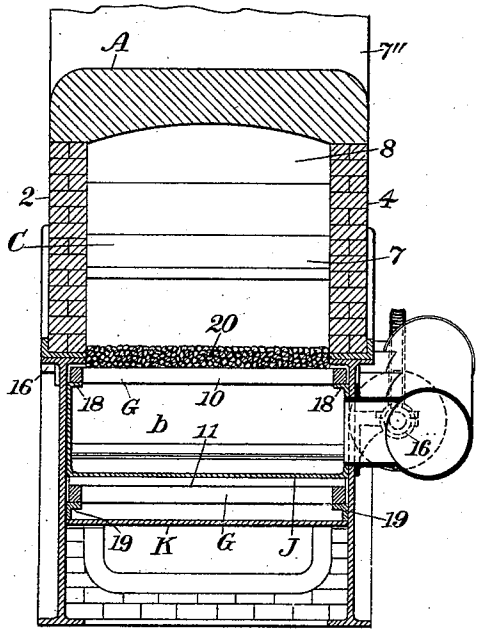


Fig. 3.



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FURNACE.

SPECIFICATION forming part of Letters Patent No. 510,588, dated December 12, 1893.

Application filed October 16, 1893. Serial No. 488,278. (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; the object being to provide an improved furnace of the class described in the 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 side elevation of a furnace of the class specified, embodying my present improvements. Fig. 2 is a cross-sectional elevation, in line *a*—*a*, Fig. 1, showing the parts at the right-hand of said line as seen from a point at the left-hand thereof. Fig. 3 is a cross-section taken on the same line *a*—*a*, but from an opposite point of view.

Similar characters designate like parts in all the figures.

As in the furnace described in my aforesaid Letters Patent, the furnace-chamber, designated by C, has a floor composed of a traveling grate, and is inclosed at the ends and sides thereof by suitable walls, and is covered by a suitable roof, herein designated by A. The side-walls 2 and 4 extend downwardly to the foundation on which the furnace is set, the upper portions of said walls 2 and 4 being ordinarily composed of fire-brick. The front end-wall of the furnace is shown composed of the upper portion 3, and the lower portion B; said lower portion being inclined, and constituting an ignition-block, as described and claimed in my prior application, Serial No. 472,891, filed May 3, 1893. At the rear of the furnace-chamber is the usual bridge-wall 7, between which and the roof of the furnace is the outlet-passage 8, for the heated gases; as herein described, said passage consists of the oppositely-disposed tunnel-shaped portions 7′ and 7″ operating as a "contractor" for mixing together, and promoting the perfect combustion of, the gases.

The endless grate, designated in a general way by G, is carried upon chain-wheels, 12 and 14, which are fixed upon the shafts 13 and 15, that are supported in suitable bearings, 16 and 17, on the framework of the furnace. The upper and lower runs, 10 and 11, of said endless grate are supported by guide-ways, 18 and 19, respectively, and the entire grate-mechanism is set upon an incline toward the ignition-block or table B, (see Fig. 1) and so that the forward end of the lower run thereof dips below the water-line *w* of the air-seal tank K.

Underneath the upper run 10 of the endless grate is placed the air-blast chamber J, which, after the manner described in my aforesaid Letters Patent, is preferably divided into successive chambers, *a*, *b*, *c* and *d*, which, in practice, are usually provided with means for regulating the air-pressure therein.

The endless grate being set upon an incline as shown, and the air-blast chambers being correspondingly set, and the tendency of the air-blast being to pass directly (by the shortest distance) through the grate and the layer 20 of fuel thereon, the heated gases of the furnace are thereby naturally blown first toward the forward end of the furnace, as indicated by the arrows at 21, Fig. 1, so that said gases are thereby much more strongly than otherwise thrown against the descending layer 22 of fuel upon the ignition-block B. By this means the fuel-supply is much more thoroughly heated before being delivered to the grate for combustion; and also owing to the forward direction of the air-blast as this passes through the fuel, the gases are driven first forward and upwardly in the chamber C, and then follow backward along under the heated roof of the furnace, being thereby thoroughly mixed and the combustion of the same greatly promoted; also, the gases impinge upon the nearly spent fuel near the rear end of the furnace-chamber thereby more effectively burning the same, with a minimum supply of air supplied thereto; by this means the highest economy in the consumption of low-grade fuel is readily obtained.

For preventing the leakage of the air-blast forwardly of the ignition-point 23 in the furnace, the air-seal tank K is shown arranged after the manner described in my prior application, Serial No. 475,222, filed May 23, 1893, to which reference may be had; and one por-

tion, 24, of the air-chamber J, is extended downward underneath the water-line *w* in said tank so as to effectually shut off communication between the forward portion C″ of the grate-mechanism chamber and the rearward portion C‴ thereof.

By means of the peculiar combination and arrangement of the several portions of the furnace-mechanism as herein set forth, the several advantages hereinbefore described are obtained by a single means; and the described water-seal feature of the furnace is obtained without the use of an extra chain-wheel for that purpose (as described in my said application, Serial No. 475,222) and without requiring any additional length of the endless grate, thereby effecting an important economy in the construction and repair of the furnace.

Having thus described my invention, I claim—

1. In a furnace, the combination with the ignition-table and means for supplying fuel to the same, of a traveling grate of its fuel-carrying run in proximity to the lower side of and set inclined toward said table, and an air-supply underneath the said fuel-carrying run adjacent to said table whereby the air-blast through the fuel upon the grate is directed toward said ignition-table for acting upon the fuel thereon, substantially as described.

2. In a furnace of the class specified, the combination with the inclosed furnace-chamber, of an endless traveling grate forming the floor of said chamber and set inclined, a water-wheel substantially as described, covering the lower end of the grate, and an inclined air-blast chamber between the runs of the grate and having its lower end depending into the water-seal, substantially as described and for the purpose specified.

3. In a furnace of the class specified, the combination of the inclosed furnace-chamber, and with the ignition-table and the water-seal tank, of the lower forward shaft, the upper rearward shaft, the grate-carrying wheels on said shafts, the endless grate carried on said wheels and having its upper and lower runs set forwardly inclined as described, and the air-blast chamber set between said upper and lower runs and extending at one end thereof into said water-seal tank, substantially as described.

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