(No Model.)

T. POORE.

FURNACE.

No. 335,621. Patented Feb. 9, 1886.

Fig 1.

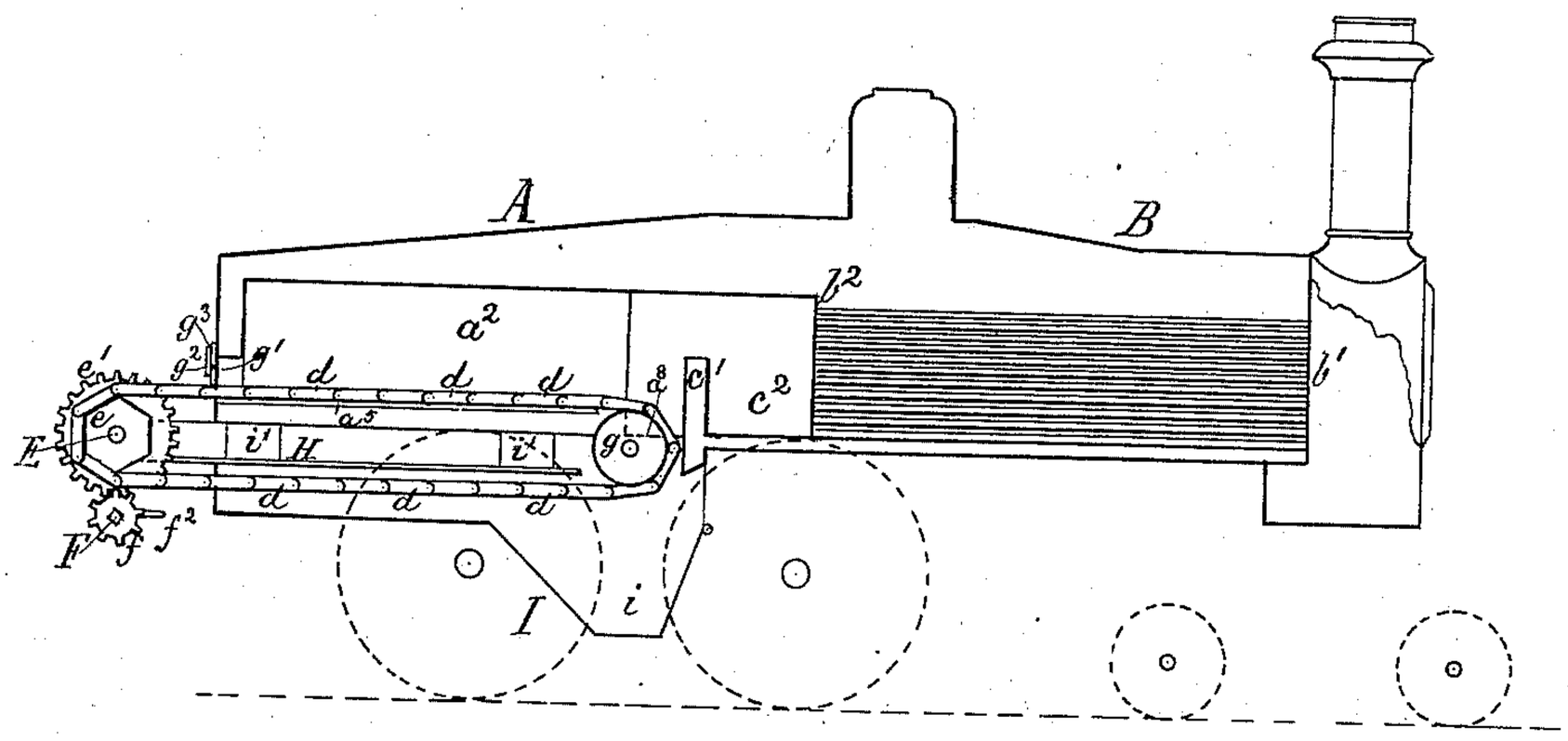


Fig 2.

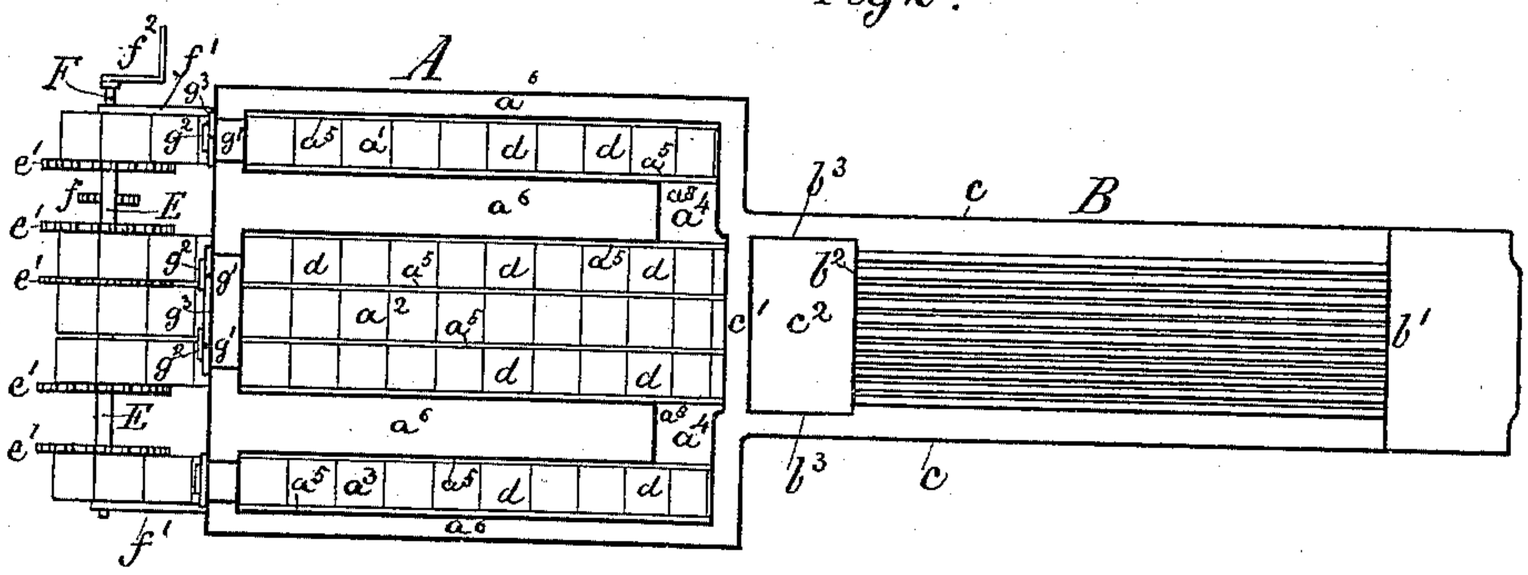
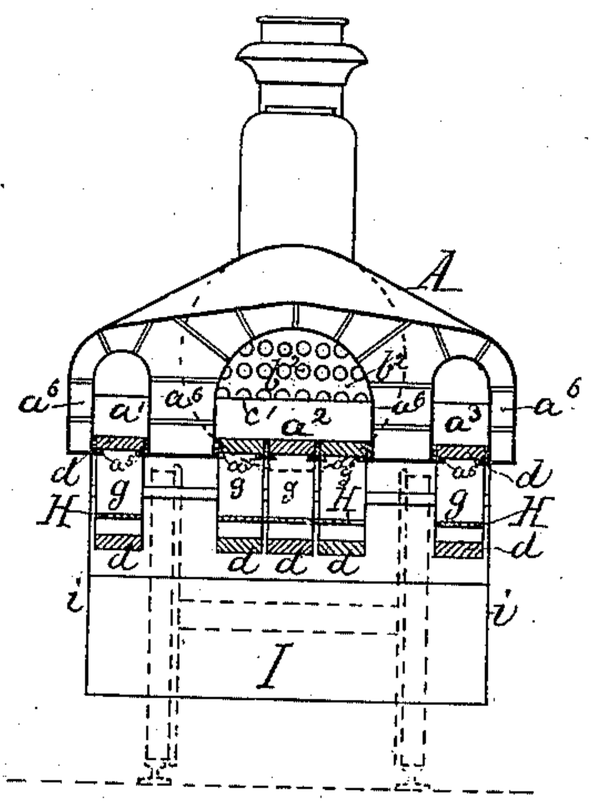


Fig 3.



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UNITED STATES PATENT OFFICE.

TOWNSEND POORE, OF SCRANTON, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 335,621, dated February 9, 1886.

Application filed May 18, 1885. Serial No. 165,893. (No model.)

To all whom it may concern:

Be it known that I, TOWNSEND POORE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and Improved Combined Furnace and Boiler, of which the following is a specification.

My invention consists, first, in the combination, with a tubular boiler, of a furnace of greatly extended width and provided with vertical longitudinal water-legs; second, in a boiler-furnace comprising parallel fire-boxes, a uniting fire-box, and a bridge-wall; and, third, in the combination of an endless-chain traveling grate with the improved combined furnace and boiler.

By my invention a very large increase of direct fire-surface is gained, and the boiler-furnace is adapted for the use of culm or fine coal as well as other fuel with increased beneficial effects.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section of my improved boiler. Fig. 2 is a central horizontal section of the same, and Fig. 3 is a vertical transverse section of the same immediately behind the front wall of the furnace portion of the combined furnace and boiler.

In the drawings, A represents the fire-box portion, and B the flue or tube portion, of my improved combined boiler and furnace. The tubes or flues *b* of the combined boiler and furnace are arranged between front and back flue-sheets, b' b^2, the back flue-sheet, b^2, being fastened to an inner extension-wall, b^3, of the fire-box portion A, between which wall and the outer shell of the boiler a space, *c*, is formed which furnishes a water or steam communication between the tubular portion and fire-box portion. Some distance from the flue-sheet b^2 a transverse bridge-wall, c', is provided, and thus a chamber, c^2, is formed between the flue-sheet b^2 and said bridge-wall. The bridge-wall serves for preventing the fuel on the grates being drawn into the tubes of the boiler.

The fire-box portion of the furnace may be in form of those used on locomotives, except that it should extend laterally beyond the wheels of the locomotive, and be divided by vertical longitudinal water-legs a^6 into three fire-boxes, a' a^2 a^3, as shown. The two inner water-legs do not extend the whole length of the fire-boxes a' a^2 a^3, and hence a transverse fire-box, a^4, is formed between the ends of the water-legs and the bridge-wall, and said fire-box a^4 is closed against entrance of air by "dead-plates," as shown by dotted lines a^8. By this construction of the fire-boxes the products of combustion from the fire-boxes a' a^2 a^3 unite in the fire-box a^4 before reaching the bridge-wall c'. The fuel may be conducted or fed to these fire-boxes by means of sectional endless-chain grates operated in the same manner as described in my pending application for a patent, Serial No. 162,319, filed April 15, 1885.

The grates shown consist of continuous chains of broad-surfaced links *d* stretched over spiders or hexagon drums *e*, carried around drums *g*, and supported between said drums upon longitudinal T-shaped girders or guides a^5, suitably secured to the legs of the fire-box portion of the furnace. The drums *e* are loosely fitted to a shaft, E, and are provided with spur-wheels e', which are geared, as desired, with pinions *f* and turned by said pinions. The pinions are loosely fitted to a square or suitably-shaped shaft F, which is suitably hung to the furnace by means of bearing-arms f' and revolved by hand by means of a crank, f^2, or other suitable means. Suitable doors, g^3, are provided, and in the same are peep-holes g', covered by swinging or pendent covers g^2, whereby observation of the fires is permitted without opening the doors.

An ash screen or platform, H, is provided under the top portion of the grates, which platform is suitably secured to the walls *i* of the ash-pan I, and is cleaned through doors i' in the sides of the ash-pan. Said doors i' and the furnace-doors g^3 may be used for regulating the draft of the furnace. My improved construction of boiler and furnace gives a much greater amount of direct heating than any other known constructions, in consequence of which the boiler produces a larger amount of steam from culm or fine coal than ordinary boiler-furnaces using like fuels.

The described grates *d* adapt the furnace for burning culm, a result not very satisfactorily accomplished by any other kind of grate.

Other grates and different fuels may, however, be used with my furnace, and still better results than ordinary will be secured on account of the increased amount of fire-surface provided.

My furnace and boiler can be used for stationary engines and steamboat-engines with beneficial results. The grate for the fire-box a^3 may consist of a single chain, if desired.

By making the fire-box portion of the boiler with two intermediate water-legs additional to the two outer water-legs the boiler can be placed low down, and room is afforded for placing the endless-chain grate above the wheels and frame, so that said grates can pass around between the legs on a plane below the peripheries of the wheels; or, in other words, I occupy the space directly over the frame and wheels with the intermediate water-legs because the endless-chain grate could not be used there without throwing the boiler too high.

What I claim as my invention is—

1. The fire-box of a combined furnace and tubular boiler having parallel longitudinal fire-boxes a' a^2 a^3 and four water-legs, the intermediate two of which are shorter than the outer ones, and a transverse fire-box of a length equal to the width of all the fire-boxes a' a^2 a^3, and serving to unite said fire-boxes in rear of the bridge-wall, substantially as and for the purpose described.

2. A boiler-furnace comprising separated parallel longitudinal fire-boxes a' a^2 a^3, a transverse uniting fire-box, a^4, extending from one outer water-leg a^6 to another, a bridge-wall, c', and a combustion-chamber, c^2, substantially as and for the purpose described.

3. The combination of the furnace A, having four water-legs, a^6, two of which are short and two long, longitudinal fire-boxes a' a^2 a^3, the uniting transverse fire-box a^4, extending from one outer water-leg a^6 to another outer one, endless traveling grates d, extending from outside the fire-boxes to near the bridge-wall c', and a boiler B, substantially as and for the purpose described.

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Witnesses:
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