T. BURKE.
Grate Bar.

No. 243,057. Patented June 21, 1881.

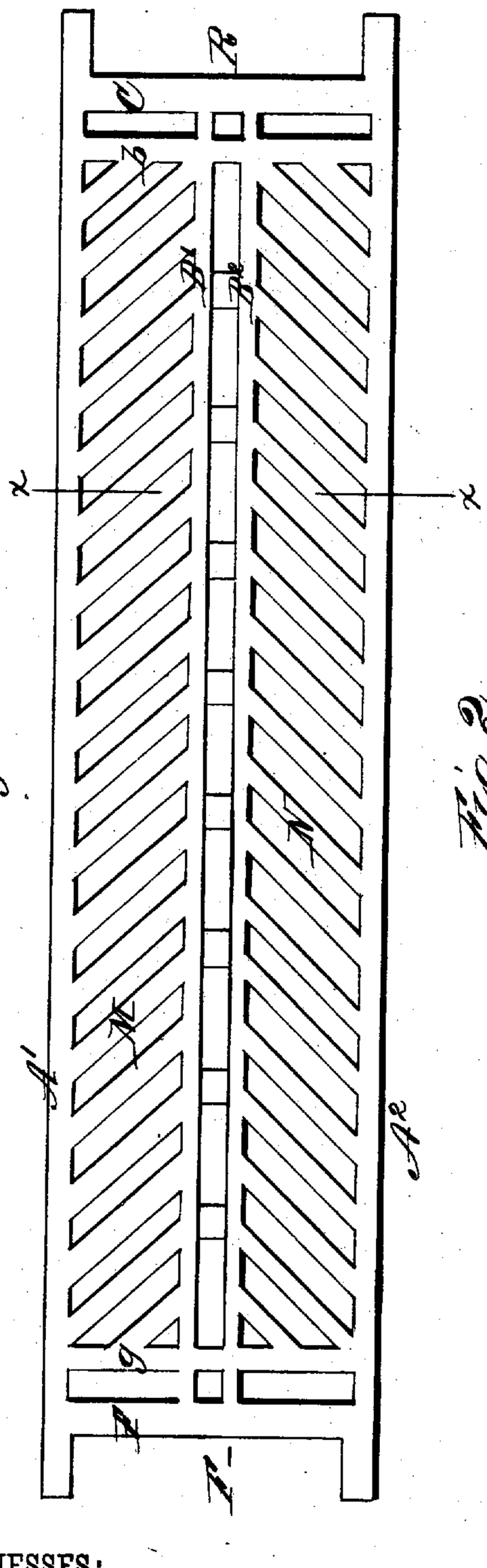

Fig. 1.

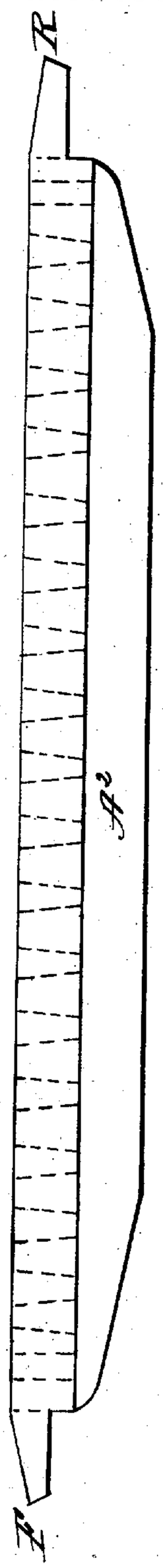

Fig. 2.

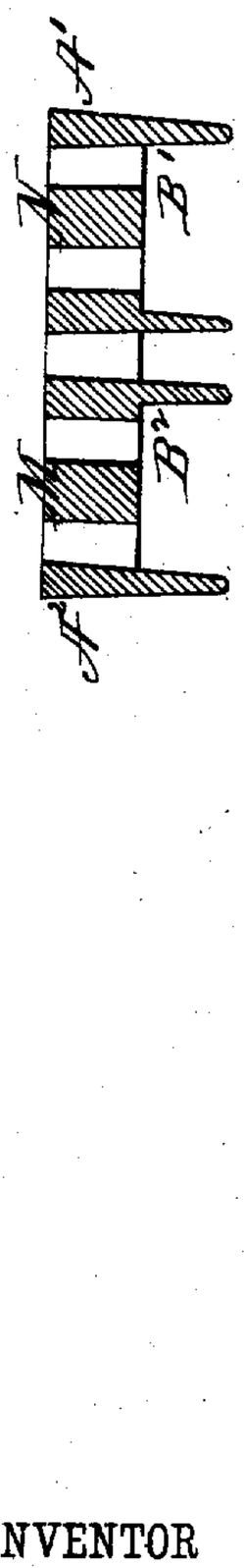

Fig. 3.

WITNESSES:
E. G. Delaney
J. F. Dugan

INVENTOR
Thomas Burke
by W. H. McDougall.

ATTORNEY.

UNITED STATES PATENT OFFICE.

THOMAS BURKE, OF NEW YORK, N. Y.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 243,057, dated June 21, 1881.

Application filed November 10, 1879.

To all whom it may concern:

Be it known that I, THOMAS BURKE, of the city, county, and State of New York, have invented a new and useful Improvement in Grate-Bars, of which the following is a specification.

The object of my invention is to construct a grate-bar for furnaces having its material and strength equally distributed, and in a manner to render the bar as durable as possible, while at the same time to permit the passage of a sufficiency of air and compel its uniform distribution.

In grate-bars as heretofore constructed the greatest strength and body of material have been in the center, whereby the draft at that portion is hindered, so that the middle portion becomes most highly heated, and by its unequal expansion and weight the bar becomes warped, cracked, and burned out.

My invention consists of a new and novel combination and arrangement of grate-bars for furnaces, whereby the air is admitted to the coals at an angle which throws the draft to the rear of the furnace without changing or breaking the current; a large increase of air-space is obtained; the draft or current of air, instead of converging to the center of the furnace, (as in the case of all grate-bars that have preceded mine,) is shed or distributed to each side of the furnace with equal regularity, the tendency to warp and break by expansion and contraction is obviated, and a uniform strength imparted to the bar.

To accomplish these improvements I have constructed and arranged four longitudinal bars, A′ B′ A² B², parallel with each other, and connected at each end by two cross-bars, C *b* and F *g*, with an air-space between, and these longitudinal bars are so constructed that they taper slightly toward the ends and toward their lower edge or side, so that the expansion and contraction by the varying degrees of heat are rendered uniform, and the tendency to warp and break is thus obviated. Between these longitudinal bars I have constructed and arranged two series or sets of bars, M and N, at a uniform angle of about forty-five degrees, and slightly tapering toward their lower side or edge to admit a larger quantity of air than would be admitted if the bars were of a uniform thickness, and thus increase and intensify the draft when coming in contact with the fuel to create combustion.

To prevent the two center bars, B′ B², from warping or breaking I have introduced stays or braces between the bars at regular intervals, as shown.

This combination and arrangement of grate-bars is shown in the accompanying drawings, wherein—

Figure 1 is a plan view. Fig. 2 is a vertical longitudinal sectional side view. Fig. 3 is a vertical transverse section.

F is the front, and R the rear, of the grate.

Similar letters of reference indicate corresponding parts.

The bars forming this combination are made of cast-iron, and are united in the casting. The upper surface of the bars is made or cast flat, instead of being grooved, as usual, as I have found from experience and experiment that such grooves are a source of weakness. The center bars, B′ B², are slightly deeper than the cross or angular bars M and N. The side bars extend beneath in the form of trusses to prevent sagging of the bars between the ends.

The construction and arrangement above described give sufficient strength, reduce the weight of the grate, give a free and unbroken draft or current to the center and rear of the furnace, and the air or current, when introduced at an angle which corresponds to the angle of the bars M and N, is not broken or changed, as in other grate-bars which have preceded mine, but is thus thrown to the rear of the furnace in an unbroken current, which is the primary advantage to be secured in a perfect grate-furnace; for by this means a greater degree of heat is obtained from a smaller quantity of coal than by any other means now known or in use. The air-current which is admitted in a vertical direction in the center of the grate between the bars B′ B² overcomes any tendency of the general air-draft to converge to the center of the grate or furnace and sheds it to the right and left, thus securing an equal and uniform distribution of the draft to a degree never before attained. The central longitudinal opening

formed by the bars B′ B² also secures uniformity of strenth and provides for a uniform expansion and contraction of the bars by heat through the entire grate, so that the tendency of bars to break is greatly reduced, if not entirely removed.

I am aware of the structures shown in United States Letters Patent No. 80,844, and English Letters Patent No. 2,050 of 1875, and 1,641 of 1877. In none of these, however, are shown the particular improvements to which my invention is directed.

Having described my invention, what I claim is—

1. The combination and arrangement of the longitudinal bars A′, B′, A², and B² with the series or sets of angular bars M and N, substantially and for the purpose described.

2. The combination and arrangement of the longitudinal bars A′, B′, A², and B² with the series or sets of angular bars M and N, the transverse bars C *b* and F *g*, substantially as described.

THOMAS BURKE.

Witnesses:
E. P. STEERS,
F. J. THOMSON.