W. F. Morgan,

Support for Furnace-Grate Bar.

No. 50,023. Patented Sep. 19, 1865.

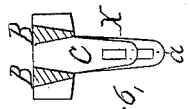

Fig. 6.

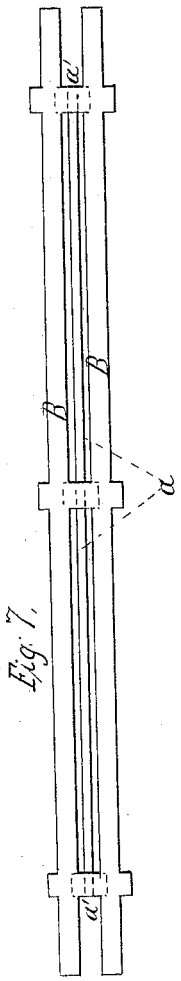

Fig. 7.

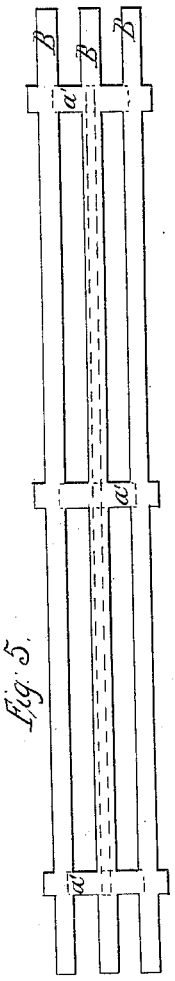

Fig. 5.

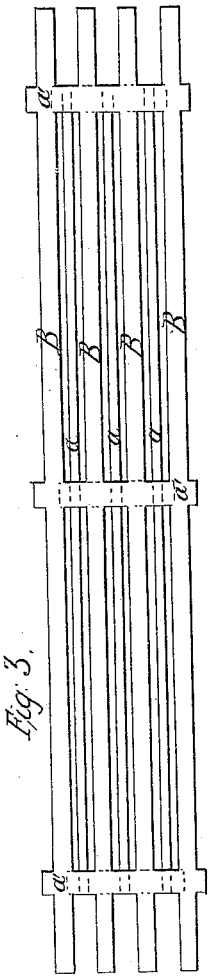

Fig. 3.

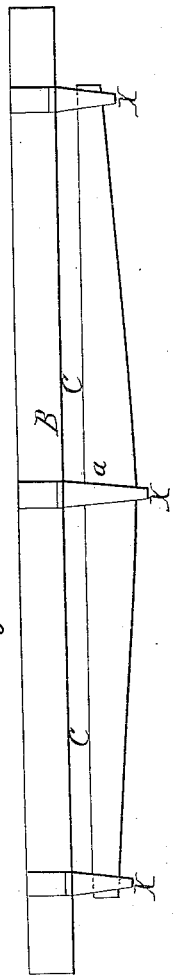

Fig. 1

Witnesses;

Thomas D. Stetson

D. W. Stetson

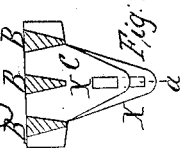

Fig. 4.

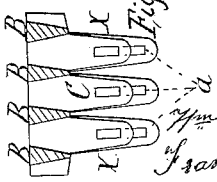

Fig. 2.

Inventor

Wm. F. Morgan

by Francis C. Bartlett

UNITED STATES PATENT OFFICE.

WM. F. MORGAN AND F. C. BARTLETT, OF NEW YORK, N. Y.

GRATE-BAR SUPPORTER.

Specification forming part of Letters Patent No. **50,023**, dated September 19, 1865; antedated September 6, 1865.

To all whom it may concern:

Be it known that we, WILLIAM F. MORGAN and FRANCIS C. BARTLETT, of the city, county, and State of New York, have invented a certain new and useful Grate-Bar Supporter; and we do hereby declare that the following is a full and exact description thereof.

It is well known that ordinary grate-bars of any considerable length are liable to be materially injured and have their utility destroyed by sinking and twisting at and near their middle portions by their own weight and the superincumbent weight of the fuel while the bars are much heated. Many unsuccessful attempts have been made to overcome this difficulty by modifying the form of the bar, &c. Our invention designs to remedy the evil by the application of an auxilliary truss-bar below each bar or fagot of bars, meaning by "fagot" two, three, or four, or other number of bars cast together and connected in one piece.

The drawings hereto annexed form a part of this specification.

Figure 1 is a side view, Fig. 2 is an end view, and Fig. 3 is a plan view, of a fagot of four bars, B, that support the fuel during combustion, with truss-bars *a* applied. Figs. 4 and 5 are corresponding views of the fagot of three bars with the truss-bar *a* located directly under the middle bar, while in Figs. 2 and 3 the truss-bars are located under the spaces between the other bars. Figs. 6 and 7 are corresponding views of a fagot of two bars.

Similar letters of reference indicate corresponding parts in all the figures.

The several bars in each fagot are cast together in the usual way and tied across at proper intervals, as at *a'*, and from these cross-ties project loops or hangers X, cast solid with the respective bars or fagot, or riveted or otherwise secured thereto. Through these hangers X pass the respective truss-bars *a*.

The truss-bars are inserted into the loops or hangers X as follows: The end of the bar *a* is first inserted through the middle loop and is then pushed on through one of the end loops until the opposite extremity of the bar passes by the corresponding loop or hanger X, when it will spring back into line, and by a retrograde movement its end is passed into the latter loop, and the whole is ready for use. In effecting the insertion in this manner the truss-bar *a* has to spring in the operation but little over its own thickness, which is not great in proportion to its length. In order to avoid the necessity for springing the bars, or in any case where the bar shall be so thick as to involve difficulty in springing it, we can make one of the loops or hangers X open on one side, to allow the introduction of the bar *a* therein by a lateral instead of an endwise movement.

Now it will be seen that as the bars B are to be supported at their ends as usual when in use, and the truss-bars are supported at their ends by the hangers located close to the points of support of the grate-bars proper, even when the former should be considerably heated by contact with the burning fuel they cannot sag because of the support they receive from the truss-bar *a*, which not only is so separated from the grate-bars by the intervening spaces C that it can never be overheated, but is of such form as to possess great vertical strength; and inasmuch as in our improved grate-bar its power to resist downward pressure may be left mainly dependent on the truss-bars, the bars proper that support the fuel during combustion may be made of less depth, thus saving metal, and they may be cast comparatively thin, thus permitting such an arrangement of them as will allow a more even distribution and free passage of air through the fuel.

It will be seen, also, that as the truss-bar *a* is not necessarily fixed to the corresponding fagot of bars, but is free to slide endwise when necessary, the latter can expand and contract freely by changes of temperature irrespective of the expansion and contraction of the truss-bar.

It will be seen that whether the truss-bar be located under one of the grate-bars or under a space between two of them it does not interfere with the free use of the poker in the ordinary way.

It will sometimes happen in practice that the supporter *a* will become cemented by rust, wet ashes, &c., and refuse to slide freely through the supports or hangers X; but such setting fast will never occur at first, or until the parts have had opportunity to accommodate themselves to each other and find their easiest position.

Having now fully described our improved grate-bar supporter, what we claim therein, and desire to secure by Letters Patent, is as follows:

In combination with a grate-bar or "fagot" of bars of any convenient form, the application of the truss-bar *a*, with the space C intervening between it and the main bars B, and the loops X, or their equivalents, supporting the truss-bar *a* in such manner that the expansion and contraction of the latter shall be allowed by sliding one upon the other, substantially as herein set forth.

WM. F. MORGAN.
FRANCIS C. BARTLETT.

Witnesses:
THOMAS D. STETSON,
D. W. STETSON.