(No Model.)

D. J. MORGAN.

LOCKING FIRE BAR.

No. 451,652. Patented May 5, 1891.

Fig. 1.

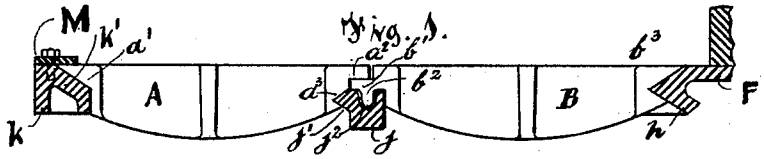


Fig. 2.

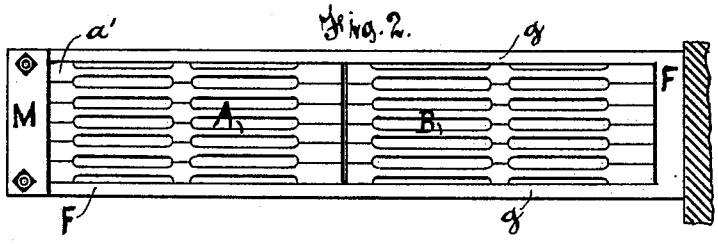


Fig. 3.



Fig. 4.

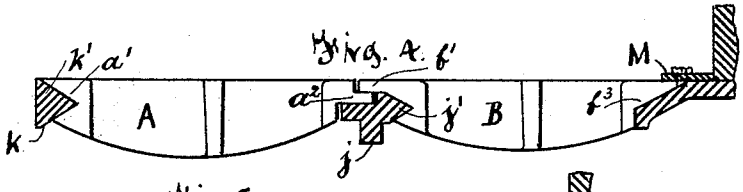


Fig. 5.

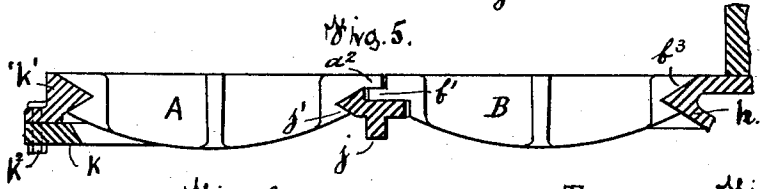


Fig. 6.

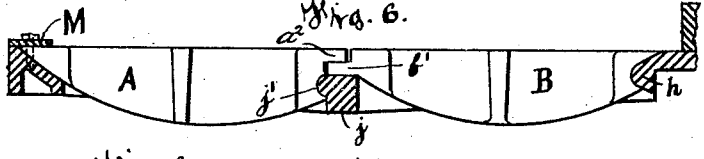


Fig. 7.

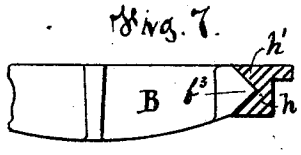


Fig. 8.

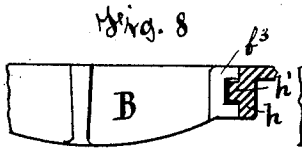


Fig. 9.

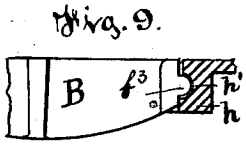


Fig. 10.

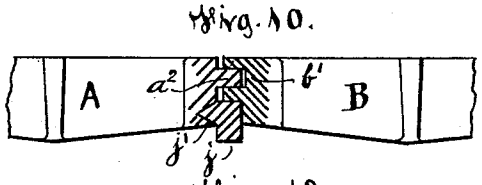


Fig. 11.

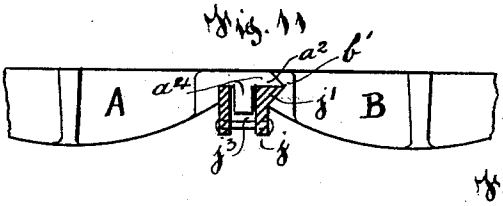


Fig. 12.

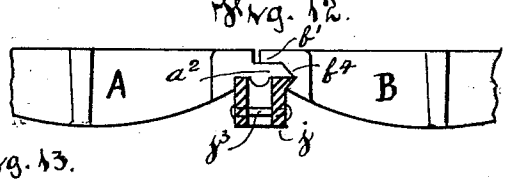


Fig. 13.



Witnesses:
Wm. T. Norton
G. M. Copenhaver

Inventor:
David John Morgan
by F. L. Browne
Attorney

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UNITED STATES PATENT OFFICE.

DAVID JOHN MORGAN, OF CARDIFF, ENGLAND.

LOCKING FIRE-BAR.

SPECIFICATION forming part of Letters Patent No. 451,652, dated May 5, 1891.

Application filed October 22, 1890. Serial No. 368,939. (No model.) Patented in England March 3, 1890, No. 3,344.

To all whom it may concern:

Be it known that I, DAVID JOHN MORGAN, a subject of the Queen of Great Britain, and a resident of Fitzhamon Embankment, Cardiff, in the county of Glamorgan, England, have invented certain new and useful Improvements in Fire-Bars and Furnace-Grates, (for which I have obtained a patent in Great Britain, No. 3,344, dated March 3, 1890,) of which the following is a full, clear, and exact specification.

My present invention relates to furnace-grates and fire-bars used therefor.

Hitherto fire-bars when arranged and fitted in the ordinary manner were easily, and therefore frequently, forced upward and out of place when the stoker picked between said bars in order to remove clinker or ash, so as to free the grate for the passage of air and the removal of burned dust, and in consequence of said bars becoming so disarranged or forced from their original positions they immediately exposed a larger surface to the direct action of the fire, and so became more easily burned and necessarily shorter-lived than if they at all times only exposed their upper faces or tops to the fire.

The object, therefore, of my present invention is to so construct the fire-bars and arrange the furnace-grate that the fire-bars become effectually locked in their normal positions, and consequently they cannot be disarranged or forced out of original positions by being picked or by means of the fire being roughly stoked.

To obtain the before-described object, therefore, I construct the fire-bars and arrange the furnace-grate in the manner set forth in the accompanying drawings, which are to be taken as part of this specification and read therewith.

Figure 1 is a longitudinal sectional elevation of my improved fire-bars, showing the locking arrangement thereof. Fig. 2 is a plan of the furnace-grate fitted with my improved fire-bars, and Fig. 3 is a cross-sectional elevation of the same. Figs. 4, 5, and 6 are longitudinal sectional elevations, respectively, of modifications of my improved fire-bars and locking arrangements. Figs. 7, 8, and 9 are sectional elevations of portions of the aft fire-bars, illustrating modified arrangements of securing or locking the ends of said fire-bars. Figs. 10, 11, and 12 are longitudinal sectional elevations of modified forms or means of interlocking the fire-bars in the center of the furnace-grate; and Fig. 13 is an enlarged transverse-sectional elevation of the form of fire-bar I prefer to employ with my present improvements.

Similar letters of reference denote corresponding parts in all the views.

Referring to Figs. 1, 2, and 3, the fire-bars A and B are preferably laid in a horizontal position fore and aft of the furnace-grate. As shown, they are fitted or laid upon a specially-constructed frame F, composed of two sides g and three cross-pieces h, j, and k. Each of the fore set of bars A, Fig. 1, has its front end a' beveled, so that it may rest or bear freely upon the beveled part k' of the front cross-piece k of the frame F, and the opposite end of each said bar A is rabbeted as shown at a^2, Fig. 1, the lower portion of said end being formed with a V-shaped recess or groove a^3, in order that it may fit upon or against a corresponding V-shaped projection j', secured to or made with the middle cross-piece j of frame F. The rabbeted part a^2 of each bar A, Fig. 1, rests upon the rabbeted part b' of the fore end of each aft bar B, and beneath said rabbeted part b' is a projection b^2, which rests or fits freely into a suitable channel or groove j^2, formed in the middle cross-piece j of frame F. The back end b^3 of each aft bar B is formed with a V-shaped indent or groove and the cross-piece h is of a similar shape in cross-section, as shown, Fig. 1, in order that the ends b^3 may bear or rest firmly thereon.

In fitting up my improved furnace-grate, Figs. 1, 2, and 3, the aft bars B are first placed in position upon the frame F, their ends b^3 resting against or upon the cross-piece b and their rabbeted fore ends upon the middle cross-piece j. After being so placed the fore bars A are then arranged so that their rabbeted ends a^2 rest upon the rabbeted ends b' of aft bars B and their beveled ends a' upon the beveled part k' of cross-piece k.

It will now be obvious that the aft set of fire-bars B cannot be removed unless the bars A are in the first instance removed, as the latter effectually lock the former. Therefore in order to complete the full locking or secur-

ing in position of the whole of the fire-bars A and B, I employ a cross bar or plate M, which I place over the upper part of front end a' of the fire-bars A, and I fasten the same down to the frame F either by bolts, rivets, screws, or by any other ordinary and suitable method. Referring to Fig. 4, the front bar A is made with its end a' grooved, and the cross-piece k is arranged with a V-shaped projection k', in order that the ends a' may fit or rest thereon, and in this arrangement the center cross-piece j has a projection j' formed at the aft side thereof, and the rabbeted part b' of the bar B rests upon the rabbeted part a^2 of the bar A. In order to complete the locking of the bars A and B, the plate M is secured to the frame F over the ends b^3 of the bars B. As shown in this arrangement, it is necessary to remove the bars B before the bars A can be taken out from the furnace-grate.

With reference to Fig. 5, the projection k' is attached to the cross-piece k of frame F by means of bolts k^2, and the end b^3 of aft bar B fits on the V-shaped cross-piece h. In this case it is necessary to remove the projection k' before the bars can be unlocked or taken out from the furnace-grate.

Referring to Fig. 6, the cross-piece j is made flat upon its top and the projection j' is rounded, and the cross-piece h is also rounded, as shown.

With reference to Fig. 7, the cross-piece h is made with a V-shaped groove h', and the bar B is formed with a correspondingly-shaped projection, which fits therein.

In Fig. 8 the cross-piece h is formed with a spigot h', and the end b^3 of bar B is formed with a suitable corresponding hole or faucet to fit thereon; and in Fig. 9 the end of bar B has a tongue b^3, and the cross-piece h is grooved at h', in order to receive the same.

Figs. 10, 11, and 12 represent the interlocking of the fire-bars A and B where they meet in the center of the furnace-grate, respectively.

In Fig. 10 the bar A is made with a spigot a^2 and the bar B with a faucet b', as shown.

In Fig. 11 the bar A is made with a projection a^4, and the cross-piece j is arranged in two pieces, which are riveted or bolted together so that a space j^3 is left between, and the end b' of bar B is lipped or formed with a V-groove, in order to fit over the end a^2 of bar A and under the projection j', formed on the cross-piece j.

In Fig. 12 the bar B has a V-groove b^4 and also a rabbeted portion b', the latter resting upon the rabbeted part a^2 of the bar A. In consequence of the locking of fire-bars in the manner hereinbefore described with reference to Figs. 1 to 12, it becomes impossible even under rough stoking or usage to disturb or disarrange the bars when removing the clinker or stirring the fire. Therefore a much lighter and thinner fire-bar in all cases may be employed in my improved furnace-grate than can safely and economically be so employed when using furnace-grates arranged in the ordinary manner, and for reasons hereinbefore stated considerable economy is effected in using fire-bars and furnace-grates constructed and arranged according to my present invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In grate-bars for furnaces and the like, the combination, with a series of interlocking fore and aft bars, one set of these bars having indents or sockets, of a frame for supporting and holding the outer ends of said bars and a cross-piece for supporting the inner ends of the bars and having a projecting portion adapted to enter said indents or sockets, for the purpose set forth.

2. In grate-bars for furnaces and the like, the combination, with a series of interlocking fore and aft bars, one set of these bars having indents or sockets at their inner ends and both sets having sockets and projections at their outer ends, of a cross-piece for supporting said inner ends and having a projection adapted to enter said indents or sockets, and the frame for engaging said outer ends, one portion of which is provided with suitable locking devices, whereby when one series of bars are inserted the second series are adapted to lock the first series and be held in turn by the locking devices on the frame.

3. In grate-bars for furnaces and the like, the combination, with the cross-piece having the projection and groove, as described, and with the frame, one portion of which is provided with a projection and the other portion is provided with a socket or groove formed by the frame and a detachable locking-piece, of a series of interlocking fore and aft bars, one set having a projection adapted to enter the groove in the cross-piece and with an indent for the projection on the frame and the other set having an indent for the projection on the cross-bar, and a projection for the groove formed by the frame and locking-piece, for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of September, 1890.

DAVID JOHN MORGAN.

Witnesses:

CHARLES A. NORTH,
183 *Newport Rd., Cardiff.*

A. T. MORGAN,
29 *Queen St., Cardiff.*