(No Model.)

T. HENDERSON.

GRATE.

No. 482,556. Patented Sept. 13, 1892.

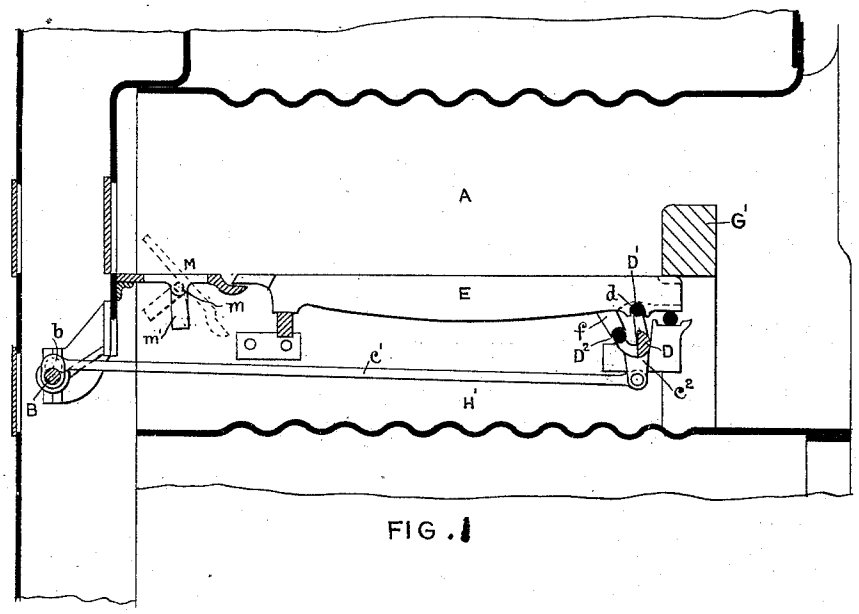

FIG. 1

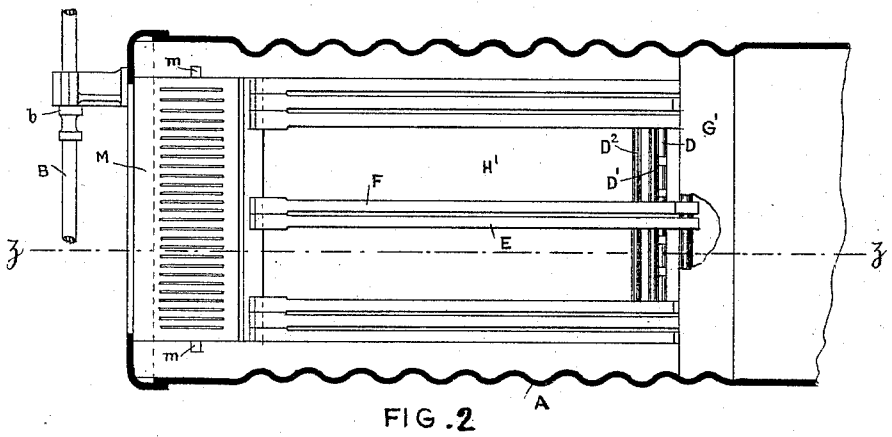

FIG. 2

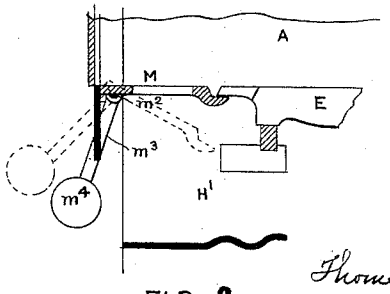

FIG. 3

Witnesses
Charles L. Stutevant
J. M. Copenhaver

Inventor
Thomas Henderson
By Atty,
Frankland Jamieson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C

UNITED STATES PATENT OFFICE.

THOMAS HENDERSON, OF LIVERPOOL, ENGLAND.

GRATE.

SPECIFICATION forming part of Letters Patent No. 482,556, dated September 13, 1892.

Application filed March 13, 1890. Serial No. 343,805. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HENDERSON, engineer, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster, England, have invented certain new and useful Improvements in Grates, of which the following is a specification.

This invention relates to cleaning appliances for steam-boiler or other furnaces, and more especially to certain improvements in the system of self-cleaning fire-bars which was patented by me under Patent No. 403,840. These improvements are, however, also applicable in part to other arrangements or systems of fire-bars.

The improvements in the present instance relate, mainly, to the construction, operation, and position of the clinker grate or plate.

The object of this invention is to afford facilities for dealing with the clinker and for removing from time to time, as desired, any accumulation of the same, whether such accumulation has accrued through carelessness or inexperience or in the ordinary course of working.

In the drawings, Figure 1 is a longitudinal section. Fig. 2 is a plan view of the grate-bars and clinker grate or plate. Fig. 3 is a modification showing the clinker grate or plate arranged with a counter-balance for returning it to position after the clinker has been dumped.

A is the furnace; E F, the grate-bars; M, the clinker-plate.

B is the main driving-shaft located in front of the furnace, and it is provided with an actuating-crank *b*, which operates the grate-bars through the link *c'*, depending arm c^2, attached rigidly to the shaft D, and bails D' D^2. The bail D' engages a corresponding end of a recess *d*, formed on the lower edge of each of the alternate bars E, so that the latter are moved to and fro intermittently. In like manner the bail D^2 on the shaft D engages a projecting piece *f* on each of the alternate bars F and imparts an alternate rising-and-falling movement to the forward ends of the same synchronously with the oscillation of the shaft D. The effect of the combined movements of the bars E and F is to feed the fuel, with the clinker, steadily toward the front ends of the bars. No dead-plate is used in this construction, but a fire-bridge G', the fuel being thrown well back toward said bridge.

The clinker grate or plate M is located between the front ends of the bars E and F and the furnace-door. This plate M is shown in the form of a flat grate or plate provided with narrow elongated slots or air-spaces, and it is pivoted at or about its center, as at *m*. Its under side is fitted with a depending arm *m'*, onto which a socketed bar may be fitted for the purpose of tilting the grate or plate; or the arm *m'* may be made long enough to serve itself as an operating-handle. Any suitable catch device or counter-balance may be employed to retain the grate or plate M in its normal position. In Fig. 3 the clinker grate or plate M is shown pivoted at its front edge, as at m^2, and provided with an arm m^3 and a counter-balance m^4, which holds the grate or plate always in its elevated position. The grate or plate may be tipped by simply drawing forward the balance-weight. When the clinker grate or plate is located at the front end of the furnace, the clinker is discharged directly into the front portion of the ash-pit and can be very quickly removed, which is an advantage when a forced draft is employed.

It will be obvious that other arrangements of mechanism not shown in the drawings could be employed for operating the clinker grate or plate; also, this plate could be employed with many other arrangements of fire-bars, self-cleaning or otherwise, the clinker being automatically fed or simply pushed or drawn by hand onto the plates, the main object of the latter being to afford a ready means of discharging the clinker into the ash-pit or other similar space below the level of the bars.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the moving grate-bars of a furnace, of a tilting clinker grate or plate dumping directly into the ash-pit and forming a continuation of the said bars at their ends nearest the furnace-door, said clinker-plate being located adjacent to the latter.

2. The combination, with the movable grate-bars of a furnace, of a tilting clinker grate or plate forming a continuation of said grate

bars and located between them and the furnace-door and adjacent to the latter, said clinker grate or plate having a counter-balance normally holding its surface in the same horizontal plane as the surface of the grate-bars.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOS. HENDERSON.

Witnesses:
W. P. THOMPSON,
H. P. SHOOBRIDGE.