Sheet 1, 4 Sheets.

R. Winans.

Grate for Steam Engines.

No. 19,890. Patented Apr. 6, 1858.

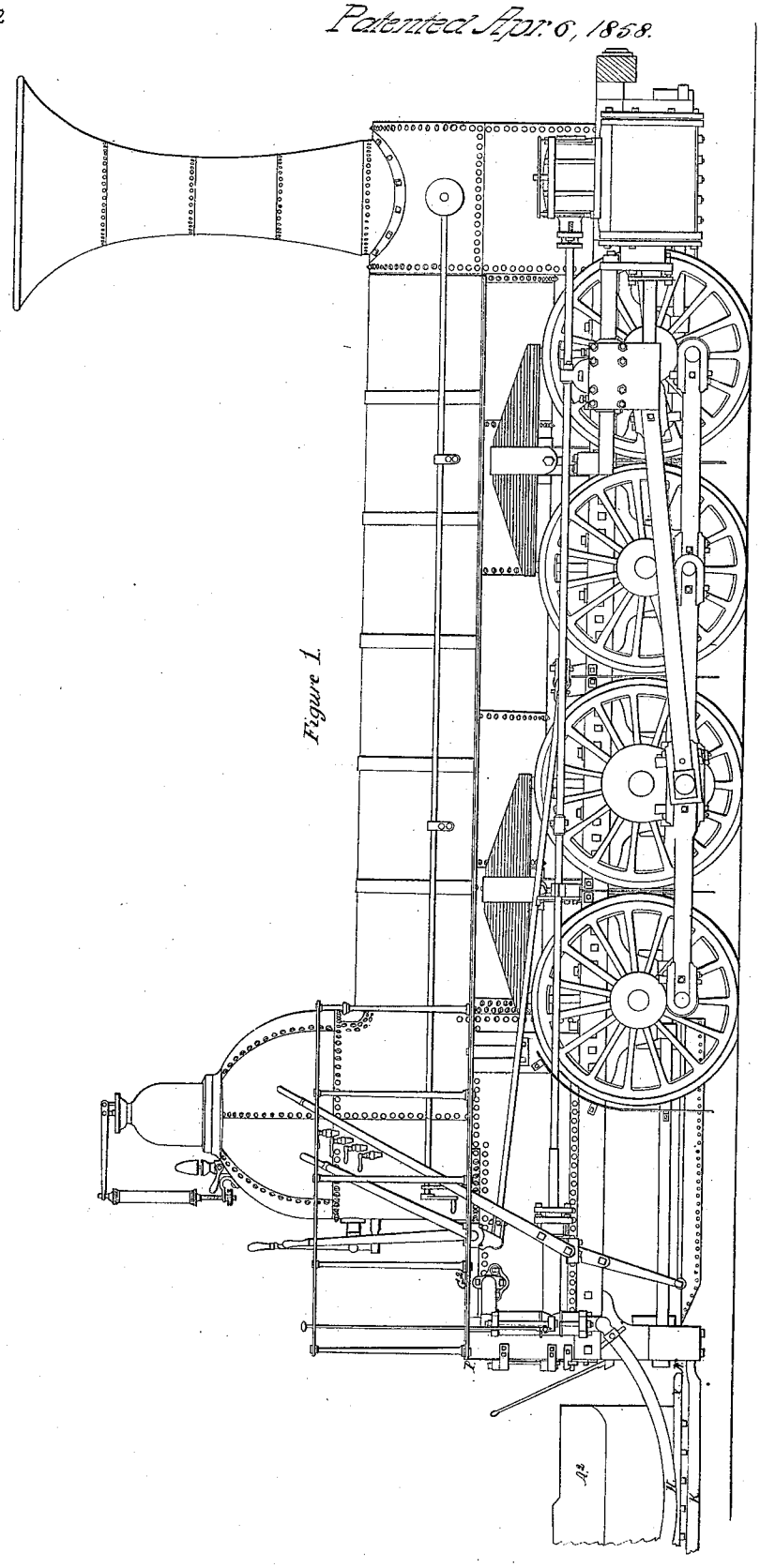

Figure 1.

Sheet 2, 4 Sheets.

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Fig. 1.

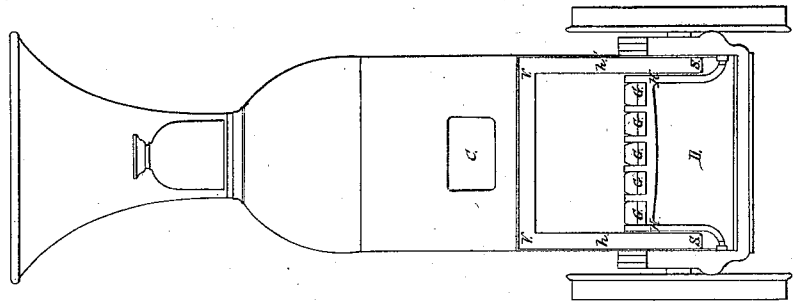


Fig. 3.

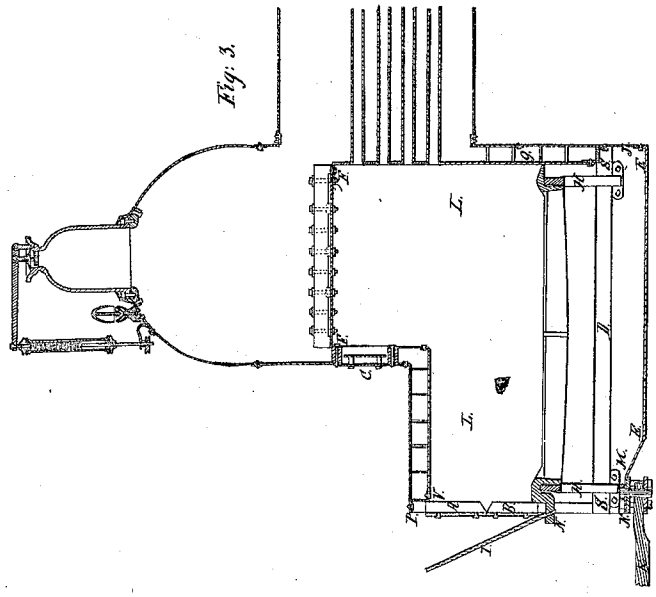
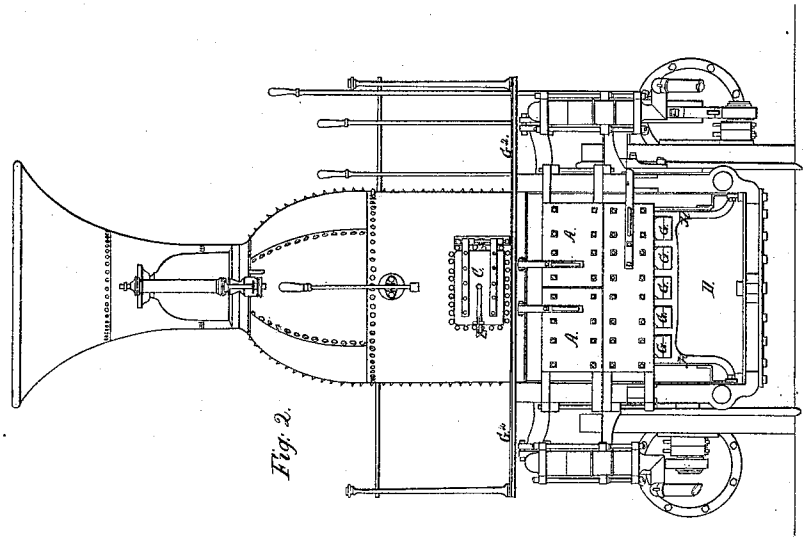


Fig. 2.



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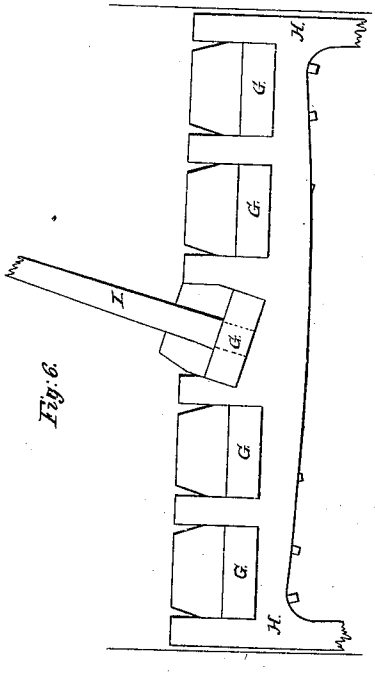

Fig. 6.

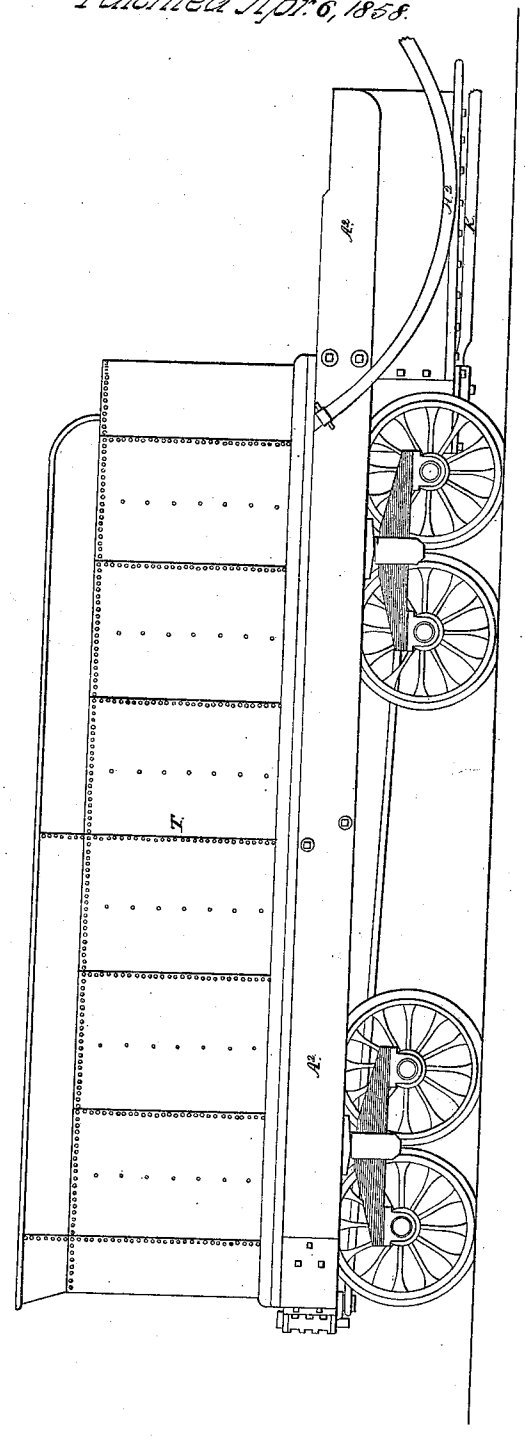

Fig. 4.

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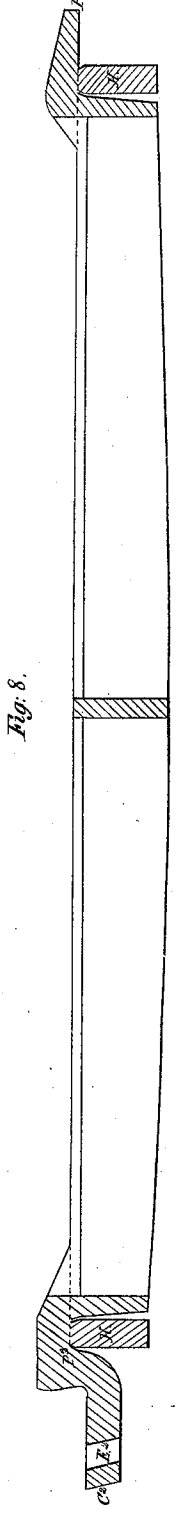

Fig. 8.

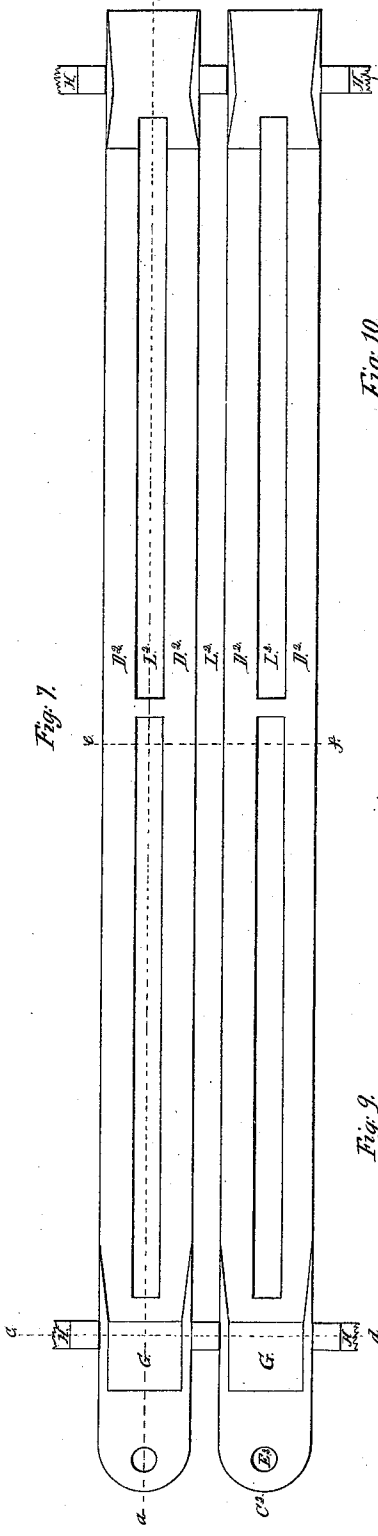

Fig. 7.

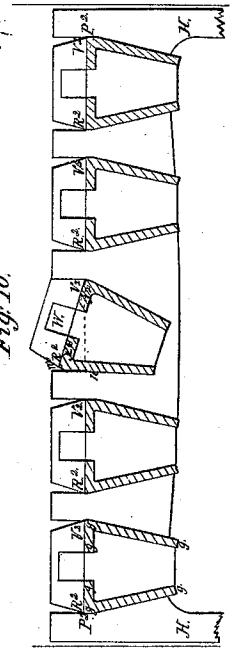

Fig. 10.

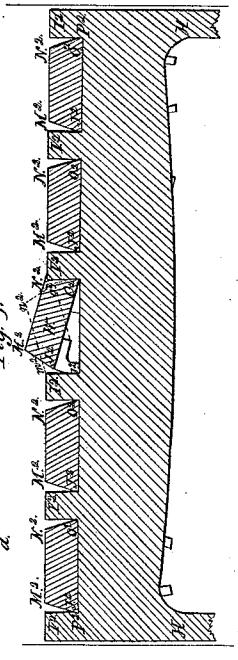

Fig. 9.

UNITED STATES PATENT OFFICE.

ROSS WINANS, OF BALTIMORE, MARYLAND.

GRATE FOR STEAM-ENGINES.

Specification of Letters Patent No. 19,890, dated April 6, 1858.

To all whom it may concern:

Be it known that I, Ross WINANS, of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Locomotive-Engines for Railroads, of which the following is a full, clear, and exact description, reference being had to the drawings, which are hereto annexed, and in which—

Figure 1 represents a side elevation of a locomotive engine with my improvements applied thereto. Fig. 2 represents an elevation of the hinder end of the same. Fig. 3 a vertical longitudinal section of the fire-box of the same, and of the parts connected therewith. Fig. 4 a side elevation of the tender of such a locomotive. Fig. 5 an end view of the fire-box of the locomotive with the furnace doors removed, and Figs. 6, 7, 8, 9 and 10, represent detached views, upon a large scale, of the grate bars, and of the means by which they are supported and rocked.

My improvements have reference to locomotive engines in which coal is used as a fuel; and particularly to the fire-box, or that portion of the locomotive in which the fuel is burned.

The difficulties which obstruct the successful employment of coal as fuel for locomotives, arise principally from two causes, viz; the slowness with which it burns, when compared with wood, and the large amount of earthy matter it contains. This earthy matter being melted, in whole or in part, by the intense heat of the fire, forms what is commonly called "clinker" which clogs the grate-bars, obstructs the free passage of air, and, if permitted to accumulate, at length prevents the fuel from burning. Hence, it becomes necessary to provide some means by which this earthy matter can be readily removed, in order that the fire may be maintained, and the supply of steam kept up.

My improvements are directed to this object; and they consist of means by which the grate-bars may be shaken so as to break up the clinker and work the same down through the spaces between the grate bars, into the ash-pan.

In order to permit the grate bars to be thoroughly shaken I have constructed the grate of a series of sections each comprising two or more bars; and these sections are arranged in such manner that each may be rocked laterally to and fro independently of the others. By combining the bars into sections of two or more, much labor is saved and the fire is put in order more quickly; the force required for rocking the bars being so small, a section of two or three bars can be shaken as conveniently as one bar could, with the further advantage of clearing the fire sufficiently, and shaking down less of the fine coal with the ashes. In order that the bars may be reached conveniently by the fireman, I construct them in such manner that their ends project beyond the hinder end of the fire-box, and fit these ends to receive a bar or key by which to rock them. The means which I prefer for rocking consists of a simple hand bar or lever which is inserted in a socket formed in the projecting extremity of each section of the grate, and which may be applied, in succession, to rock the whole series of sections

My improvements are shown, in the accompanying drawings, as applied to a locomotive having eight connected driving wheels. The fire-box L, L, is inclosed at its front end (g) and at its two sides (h h) by a water-space of the usual construction. At its hinder end there is no water-space, this part of the fire-box being fitted with doors (A A, B) which when open expose the whole upper surface of the grate.

Beneath the fire-box is the ash-pan D, which, in this instance, is formed in part by the prolongation of the water-space of the fire-box beneath the grate, and in part by an iron pan (E E); and it is opened at its hinder end so as to permit a free view of the lower side of the grate. The hinder end of the iron pan has a low ledge raised on the bottom, so that the pan forms a tight but shallow receptacle in which water may be placed to extinguish the cinders, or to furnish vapor to prevent the grate-bars from burning.

Immediately behind the fire-box is the foot-board K, upon which the fireman stands. In this example it forms part of the tender, being suspended from the side pieces A^2, thereof, which are prolonged for this purpose. This foot-board is located sufficiently below the level of the grate to enable the fireman upon it, by stooping, to look under the grate while the engine is running. The low position of the foot-board likewise enables the fireman to rock the grate-bars conveniently, while he is observing through the fire doors the effect he is producing by the operation. The grate is composed, in this in-

stance, of five sections (G) each comprising two grate-bars D^2 D^2, separated by an intermediate space L^2. These sections are supported by two grate-bearers (H H) whose upper edges are studded with protuberances (I^2) to separate the sections of the grate, and leave between them notches in which these sections lie. The bars of each section are inclined toward each other, so that when any section is rocked, as shown in Figs. 9 and 10, the space between its bars and the opposite bar of the adjacent section is not made narrower than the spaces between the upper edges of the bars when they are at rest, by which means the squeezing of the clinkers, in the spaces between the sections, by the operation of rocking the bars, and the consequent choking of the spaces, is prevented. The hinder extremity of each section is prolonged, as shown in Figs. 3, 7, 8, and 9, and has a socket (E^2) formed in it to receive the lower end of a hand bar (I) by means of which the section may be rocked laterally. The sockets, in all the sections, are of the same size, so that the hand bar may be used to rock any one at will. As each section constitutes only a small portion of the whole grate a much less amount of power is required to work it than would be necessary to work the whole series of grate bars at once; moreover, the rocking motion imparted to the bar is peculiarly suited to break up clinkers, and to work them down between the bars of the adjacent sections; and, as the hinder extremities of the sections are prolonged beyond the doors which close the hinder end of the fire-box, the rocking motion is readily imparted to them by the hand bar, without requiring the fireman to adopt an inconvenient position, or to apply his hand bar within the confined space of the fire-box or ash-pan, where there would not be room to work the grate-bars to advantage.

Those parts of the grate-bars which rest upon the bearers H, are raised above the other parts, as shown at P^2, Fig. 8, so that the grate-bars rest upon the bearer in the plane of their greatest width. The grate-bars may thus be said to be suspended upon the bearers at their plane of greatest width, and the sections of the grate turn alternately upon the opposite edges of these raised parts, as axes, when the sections are rocked. The grate-bars incline toward each other at such an angle that the space between the adjacent sides of adjoining sections, is not made narrower by rocking the sections laterally; therefore, the clinkers which enter between the sections, drop freely through into the ash-pan, and are not jammed between the sections to choke the spaces, as they would do but for this inclination of the adjacent sides of the sections.

What I claim as my invention and desire to secure by Letters Patent is—

1. The grate of a locomotive engine; composed of a series of narrow sections each containing two or more bars and supports therefor; the sections and their supports being constructed and arranged substantially as herein set forth to permit each section to be rocked independently of the others by means of a hand lever applied outside of the fire-box, as herein set forth.

2. I claim also the construction of the series of bars of the grate and the bearers for supporting the same as herein described, so that any member of the series may be rocked, upon two axes, without contracting the narrowest part of the spaces between it and the adjacent stationary members of the series, as described.

In testimony whereof, I have hereunto subscribed my name.

ROSS WINANS.

In presence of—
WILLIAM LATROBE,
L. GENE. H. GROVE.