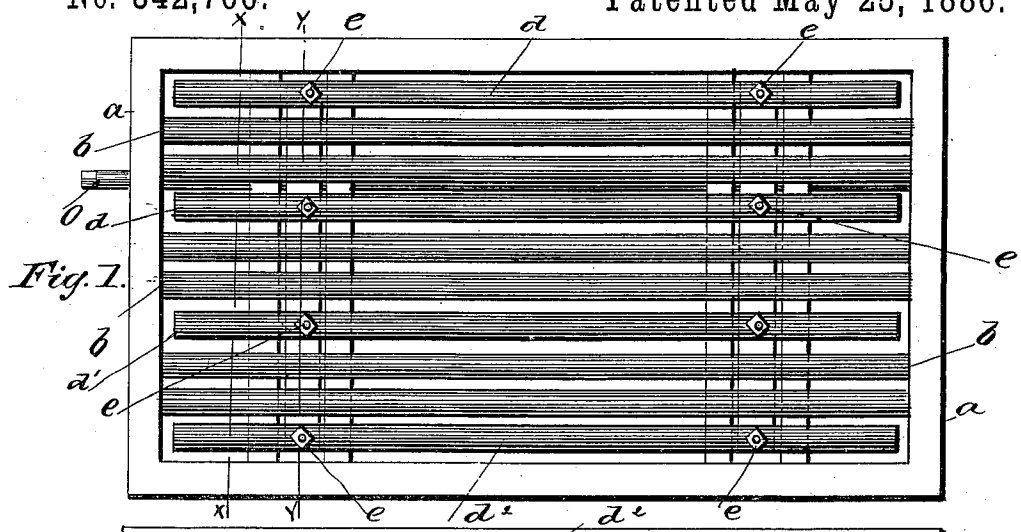
(No Model.)

I. W. SWALLOW.

GRATE BAR, &c.

No. 342,766. Patented May 25, 1886.



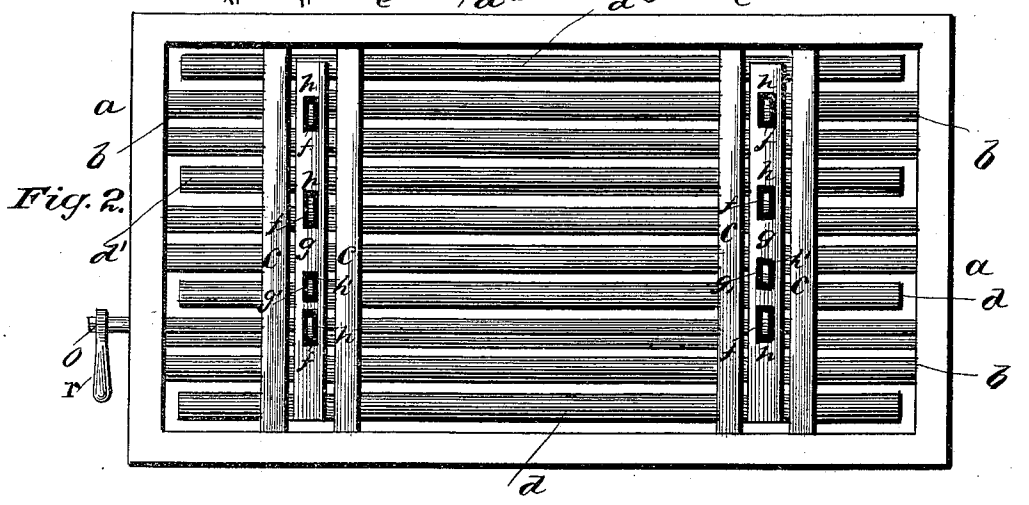


Fig. 3.

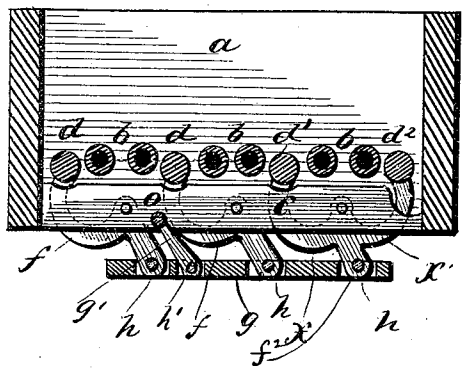
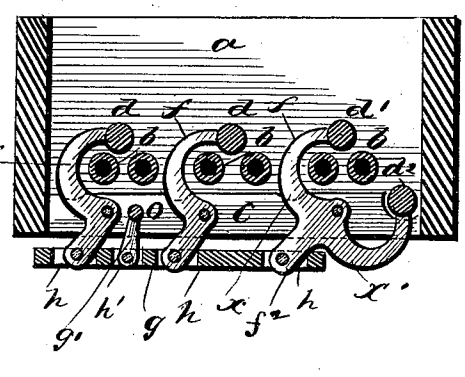


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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GRATE-BAR, &c.

SPECIFICATION forming part of Letters Patent No. 342,766, dated May 25, 1886.

Application filed December 5, 1885. Serial No. 184,839. (No model.)

To all whom it may concern:

Be it known that I, ISAAC W. SWALLOW, a citizen of the United States, residing at Kingston, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Grate-Bars, &c.; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a plan view of a grate as applied to a locomotive. Fig. 2 is a similar view showing the same in reversed or bottom plan. Fig. 3 is a transverse section taken on line *x x*, Fig. 1, showing the grate closed; and Fig. 4 is a similar section taken on line *y y*, Fig. 1, showing the grate open.

My invention has relation to grate-bars for stoves, ranges, locomotive-engines, &c.; and it consists in the construction and novel arrangement of parts, as will be hereinafter set forth, and pointed out in the claims.

Referring by letter to the accompanying drawings, I will describe this improvement as applied to a locomotive grate-bar, which description, taken in connection with the accompanying drawings, will be sufficient to enable persons skilled in the art to which the invention pertains to apply it to a stove, range, or the like.

a designates the fire-box, which is rectangular in form, and is provided with rigid longitudinal bars *b b*, arranged in pairs in the end walls of the fire-box, and resting also (where more than one section of bars are needed) on intermediate cross-bars, *c c*, near the bottom of the fire-box.

d d d are the tumbler-bars, which are free at their ends, and are connected intermediately of their ends by bolts and nuts *e* to the upper ends of curved arms *f f*, pivoted in bearing between the cross-bars *c c*. The tumbler-bars *d* are of solid wrought-iron, and rest, when in their normal position, in notches in the upper edges of the cross-bars *c c*, where water-bars are used, in order that the water-bars may prevent the tumbler-bars from being so rapidly burned out as they would otherwise be. The lower ends of the pivoted arms *f f* are straight, and are connected by slotted bars *g g*, the ends of said arms being pivoted in slots *h h* and *h'* by nut-bolts. The upper ends of the pivoted arms *f* are curved, as shown, so that when the tumbler-bars *d* are raised they will come directly over the space between the rigid bars or water-bars, as the case may be, of each pair of the latter bars.

At one side of the grate a double curved arm, X X', connects two of the tumbler-bars, *d' d²*, and is provided with a straight arm, *f²*, at its lower end. These two connected bars *d' d²* I term the "double tumbler-bars." By this construction, when the single tumbler-bars and the bar *d'* are raised between and over the rigid bars, the bar *d²* of the double tumbler-bar next to one wall of the fire-box will be lowered, and vice versa.

The shaking-rod O is provided with arms *g' g'*, which depend through spaces between the adjacent cross-bars *c c*, and are pivoted by nut-bolts in the slots *h'* of the slotted connecting-bars *g g*, so that all of the tumbler-bars are operated at one and the same time by means of the shaking-lever *r*, adapted to fit the projecting end of the shaking-rod O.

The heads of the nut-bolts that secure the tumbler-bars to their respective arms rest in countersinks in the top sides of said bars, making the top surfaces of the grate smooth, and also shielding the thread and nut from the fire.

The construction is so simplified and arranged that in case any part becomes worn out or broken it will take but a few minutes to replace it with a new one, as it is only necessary to take off two or three nuts to get out any of the several pieces.

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

1. The combination, with the rigid grate-bars, of the single tumbler-bars, the double

tumbler-bar, the slotted connecting-bar, and supports, substantially as specified.

2. The combination, with a fire-box having the horizontal rigid grate-bars, arranged in pairs, of the single tumbler-bars and the double tumbler-bar pivoted below the rigid grate-bars, and connected by the slotted connecting-bar, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC W. SWALLOW.

Witnesses:
F. H. GATES,
J. BARTON NORRIS.