H. RYDER.

Grate-Bar.

No. 167,126. Patented Aug. 24, 1875.

Fig. 1.

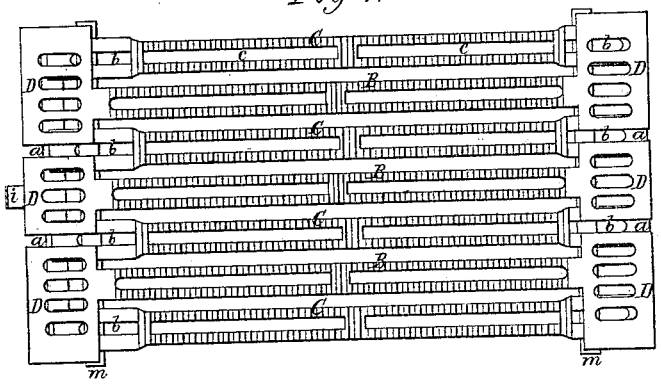


Fig. 6

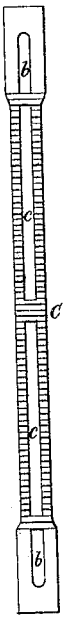


Fig. 2.

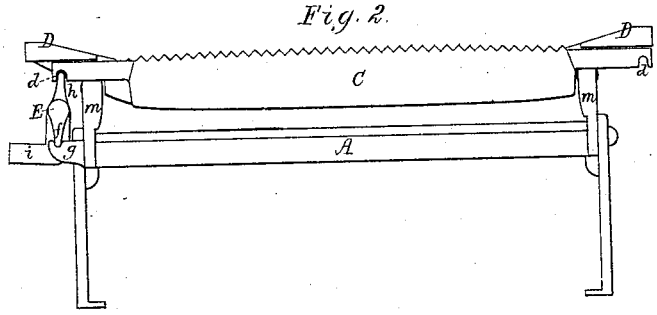


Fig. 3.

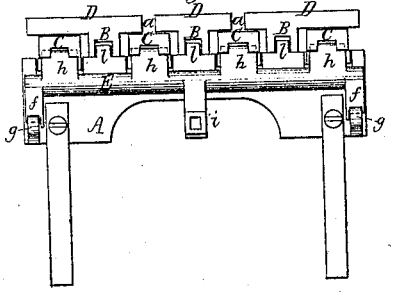


Fig. 4.

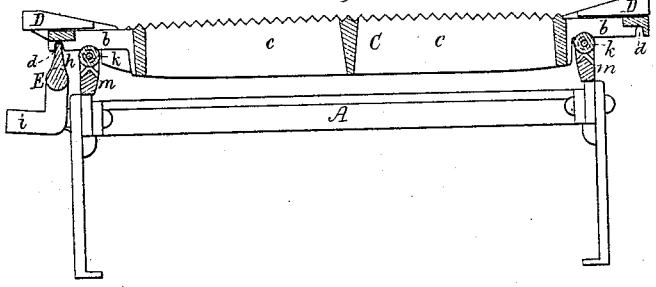


Fig. 5

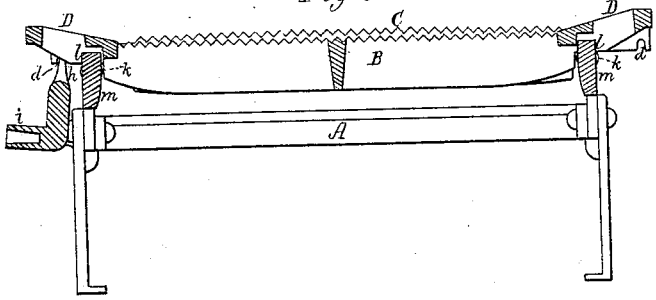
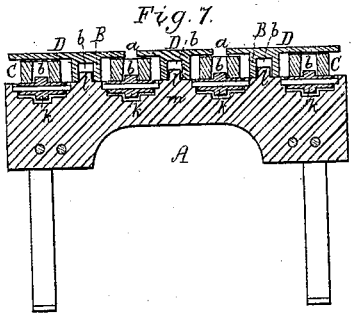


Fig. 7.



Witnesses.
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by his attorney
R. H. Eddy

UNITED STATES PATENT OFFICE.

HENRY RYDER, OF SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. **167,126**, dated August 24, 1875; application filed February 12, 1875.

To all whom it may concern:

Be it known that I, HENRY RYDER, of Somerville, of the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Grates for Furnaces; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a side elevation, Fig. 3 a front end elevation, and Figs. 4 and 5 longitudinal sections, of a grate provided with my invention.

This grate, like others in use, has one set of stationary and one set of movable bars, all being supported on a frame or bars disposed beneath them.

In the drawings, A denotes the grate-bars supporting-frame, B B B being the set of stationary bars, and C C C C the series of movable ones. Each stationary bar, as represented, is placed between two of the movable bars, and at each of its ends it is provided with a cap or grid, D, cast in one piece with and extending in opposite directions from it, so as to lap over the two next contiguous movable bars. The two outer stationary bars have their end caps or grids projecting entirely across the two outer movable bars, though they, together with their fellow intermediate stationary bars, have their caps or grids projecting but partially across the next intermediate movable bars, such being so that there may be spaces *a a* between the caps of each bar and those of the next one, and directly over the guide-slots or said passages *b b* of the movable bars. Each of the grate-bars, as represented, has two end slots, *b b*, and two intermediate and longer slots, *c c*, extending down through it, in manner as shown, a top view of one of the movable bars C being given in Fig. 6. Fig. 7 is a transverse section of the grate-bars and their supporting frame and rollers. Furthermore, each of the movable grate-bars C has two notches or recesses, *d d*, made upward in it close to its ends, each being to enable the bar to be used either end foremost, with the mechanism for moving all the said bars C simultaneously and longitudinally. This mechanism, as shown, consists of a rock-shaft, E, provided with legs *f f* to rest on brackets *g g*, and also with a series of arms, *h*, to enter the notches *d* of the grate-bars. The rock-shaft also has a socketed arm, *i*, extended from it to receive a lever for imparting to it a reciprocating motion, such as will cause the movable grate-bars to be moved first forward and next backward.

It frequently happens that a bar will burn out faster in one half than in the other, in which case it becomes desirable to change the bar around so as to bring the rear end to the front. This can be done when each bar has two recesses, *d d*, arranged in it, as either of such may be used with the operative arm of the rock-shaft.

The movable bars rest on rollers K, that extend up into them a short distance; but the stationary bars rest on the end bars *m m* of the frame A, which are furnished with tenons or projections *l* to extend up into the end slots *b b*.

I usually make each space *a* equal, or about equal, in width to that of the slot *b* under it; and, furthermore, instead of making the end caps as grids or grates, they may be solid or without slots down through them. It is better, however, to have them slotted, as in such case they serve as means of sifting the coals of the ashes. The object of the grids is to prevent the movable bars from being clogged in their movements by coals or clinkers.

Each of the grate-bars of each series is toothed or serrated along its upper edge, as shown in the drawings, whereby, when stationary and movable grate-bars are used and arranged to operate together, as described, important useful advantages follow, that do not take place when one set only of the bars has teeth, or when all the bars of a grate are so provided, and they are simultaneously movable.

It will be seen when one set having teeth is stationary, and the other set having teeth is movable lengthwise between the first set, and has its bars arranged with those of the other, in manner as shown, that the stationary set will hold the clinkers, so that the other can break or cut them in pieces. It is found in practice that this produces a better ventilation, and clearing the fire of ashes and clinkers, for the toothed movable bars, when in

movement, disturb the fuel so as to cause the ashes and clinkers to settle in it, the toothed stationary bars not only contributing to such disturbance, but operating to catch and hold the clinkers, so that the teeth of the movable bars may break them up. If all the bars were movable simultaneously in one direction, and each of them had teeth, such a result would not follow.

Each of the movable grate-bars C, besides its two end notches *d d*, has, next to each of them, a straight bearing surface or surfaces, *s*, to rest and run or move on the periphery of the friction-roller *k*, next to said notch. The part of the bar which comes between the bearing-surfaces *s*, next the two notches *d d*, is deeper than either of the parts over the said bearing-surfaces. By having the bars so made each can be turned end for end, and used with either bearing-surface on either roller, the projection of the rocker-bar going into the next adjacent notch *d*.

I would remark that I do not herein claim covering-plates arranged to project over all the grate-bars at their opposite ends, and detached from them whether such covering-plates be fastened to the support-frame of the bars, or be arranged to rest in inclined positions against shoulders of the bars, such being shown in one or more patents heretofore granted. By having two series of short caps or grids fixed to the stationary bars, the difficulties arising from breakage or warping of long grids or covering-plates separate from the bars are prevented or done away with.

I claim—

1. Each stationary grate-bar B, provided with the end caps or grids D D, as described, fastened to or cast in one piece with it, and to so project from it as when the bar is in place in the grate to either partially or wholly overlap the next adjacent movable grate-bars, all being substantially as set forth and represented.

2. The movable grate-bars C, provided with the ends slots *b b* in each, in combination with the stationary bars B and their end caps or grids D, arranged to lap over the movable bars, and to have spaces *a* between the several grids of each range of them, all as specified.

3. Each movable grate-bar C, as provided with the two recesses or notches *d d*, and the straight friction-roller bearings *s s*, all being arranged as specified.

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Witnesses:
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