(No Model.)

F. SHRIVER.

FURNACE GRATE.

No. 265,158. Patented Sept. 26, 1882.

Fig. 1.

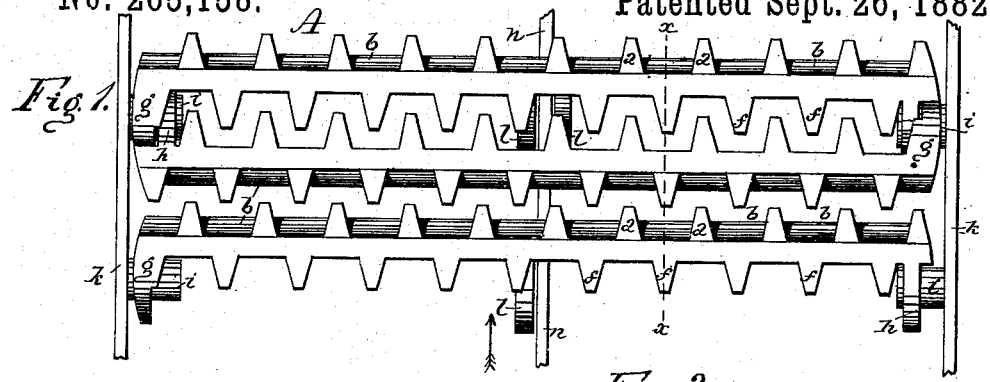


Fig. 2.

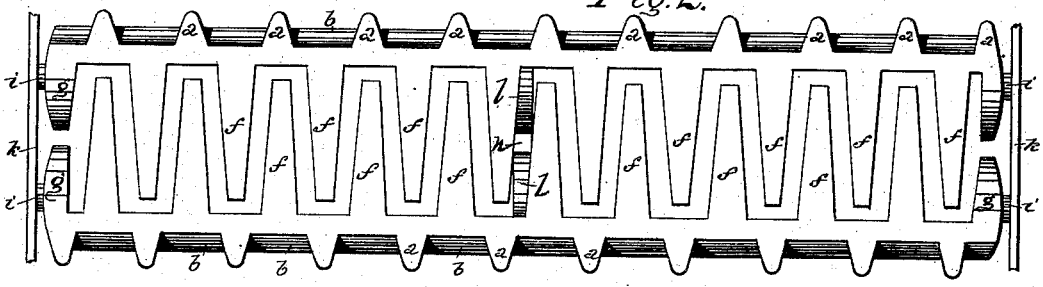
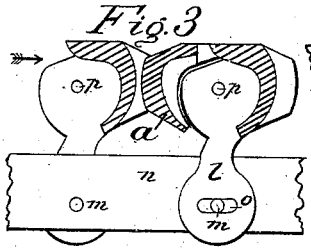


Fig. 3



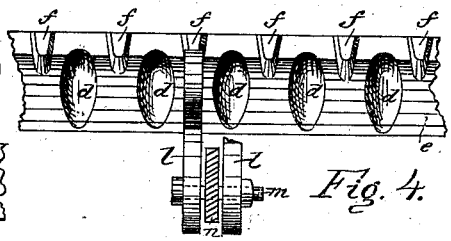


Fig. 4.

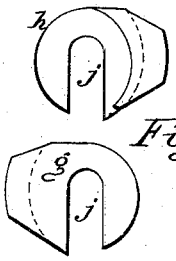


Fig. 5.

Fig. 6.

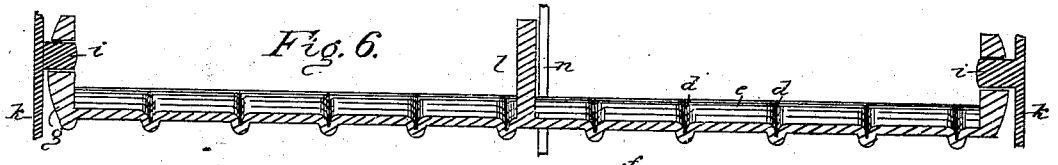


Fig. 7

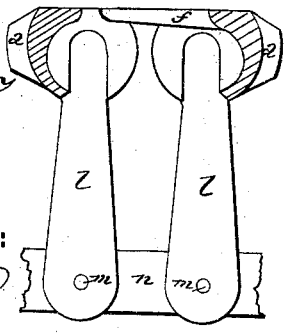
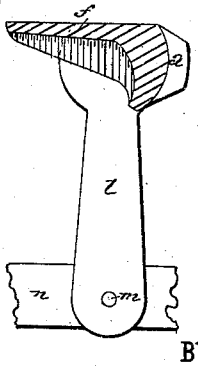


Fig. 8.



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UNITED STATES PATENT OFFICE.

FREDERICK SHRIVER, OF GRAND RAPIDS, MICHIGAN.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 265,158, dated September 26, 1882.

Application filed May 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK SHRIVER, of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a full, clear, and exact description.

The invention consists of an improvement in the form of the grate-bar, calculated to enable the bar to resist the tendency of the heat to spring and bend it more effectually.

It also consists of improvements in the construction of the points or projections of the sides of the bars, designed to facilitate the discharge of the ashes and other matters by the rocking of the grates and without the use of the poker.

It also consists of an improved mode of pivoting the grate-bars, calculated to simplify and improve the efficiency of the same; and it also consists of improvements in the apparatus for shaking the bars to discharge the ashes, all as hereinafter fully described.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved furnace-grate as constructed and arranged for heavy fires. Fig. 2 is a plan of the same as arranged for light fires. Fig. 3 is a section of Fig. 1 on line *x x*. Fig. 4 is a side elevation of Figs. 1 and 3, looking in the direction of the arrows. Fig. 5 represents end elevations of the grate-bars. Fig. 6 is a horizontal section of one of the bars, and Figs. 7 and 8 are sections of the bars as represented in Fig. 2.

I make the bars A in concavo-convex form in cross-section from bottom to top, with projections *a* on the convex side *b*, that are hollowed or chambered by the cavities *d* on the concave sides *e* of the bars, and on the opposite or concave sides *e* of said bars I make the fingers *f* longer than the projections *a*, the projections of one side of the bars being opposite to the spaces between the fingers of the other side. By the concavo-convex form of the bars, together with the alternating arrangement of the projections and fingers and the corrugations of cavities *d*, it is believed that the bars will have great power of resistance to the tendency of the heat to spring or bend them. The ends of the bars are made with laterally-projecting pivot-heads *g* and *h* turned to the side having the fingers *f*—that is, the concave side of the bar—the head *g* of one bar and the head *h* of the other bar being matched, so as to go on one and the same pivot, *i*, to locate the bars in pairs, with the fingers *f* of the two bars intermeshing with each other, and so that the projections *a* of the bars of one pair will mesh with the projections *a* of the bars of the next pair. The heads *g h* have slotted pivot-bearings *j*, to be mounted on fixed pivot-studs *i* projecting from bars *k*, attached to the furnace-walls, or from metal walls of the furnace when such are used; or it may be rods or bars inserted in and projecting from the sides of the walls or from between two metal plates, whereby the bars may be made adjustable, so that they can be easily adjusted to round or square fires. The said pivot-bearings *j* are slotted through the heads downward, so that the bars can be placed on the pivots from above, and will rest thereon without being fastened, and so that they can be readily taken off and reapplied when desired. The bars have an arm, *l*, cast on the concave side, and projecting down and connecting by pivots *m* with a shaking-bar, *n*, the said arms *l* being located about the middle of the bars lengthwise, so that by arranging the shaking-bar to have suitable supports to rest on when in the normal position the grate-bars will have substantial support between their pivots. The arms *l* are, like the pivot-heads, arranged so that the two arms of a pair of bars lap each other on opposite sides of bar *n*, to be connected by one pivot, *m*, when the bars are arranged in pairs upon one pivot, *i*, and the arms *l* will have a slot, *o*, for the pivot *m*, so that, although the two bars of a pair mainly turn together as one bar, the intermeshing fingers *f* of the pair will work a little on each other, so as to facilitate the discharge of the ashes. Besides connecting the two arms *l* of a pair of bars together at the connection with the bar *n*, I also connect them together by a pin at *p*, for staying the bars by each other against springing by the heat. When the bars are constructed for light fires, by extending the fingers *f* the heads *g h* and arms *l* will not be required to lap each other, as when arranged in pairs, and only half the number of bars will be used, or thereabout,

the said bars being more widely separated according as the fingers are extended and placed on independent pivots for each bar. The bars are also independently connected to the shaking-bar *n*, so that the fingers *f* of the respective bars will work reversely to each other. The shaking-bar *n* is to be detachably connected to the arms *l* by bolts or otherwise, so that the grate-bars can be detached readily when desired.

It is designed that in practice the fingers *f* shall project slightly upward from the bars when arranged in position in the grate.

The grate-bars will be arranged crosswise of the fire, so that the shaking-bar will project out through the wall of the ash-pit to be operated by a connected lever.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The improved fire-grate bar, made concavo-convex in vertical transverse section, and provided with slotted pivot-heads, substantially as described.

2. The improved fire-grate bar, made concavo-convex in vertical transverse section, and having projections *a* on the convex side of the bar, hollowed by cavities *d* on the opposite side, substantially as described.

3. The improved fire-grate bar, made concavo-convex in vertical transverse section, and having hollow projections *a* on the convex side and fingers *f* on the concave side, said fingers and projections being arranged alternately, substantially as described.

4. The improved fire-grate bar, made in concavo-convex transverse section, and having the sides armed with alternating projections and fingers, and also having slotted pivot-heads *g h*, arranged to overlap for the connection of the bars to the pivots in pairs, substantially as described.

5. The improved fire-grate bar, made in concavo-convex transverse section, and having the sides armed with alternating projections and fingers, also having slotted pivot-heads, and also having arms connecting with the shaking-bar, substantially as described.

6. The improved fire-grate bar, made in concavo-convex transverse section, and having the sides armed with alternating projections and fingers, and also having arms connecting them with the shaking-bar, said arms being arranged whereby the arms of a pair of said bars connect with the shaking-bar by one and the same pivot, *m*, substantially as described.

7. The improved fire-grate bar, made in concavo-convex transverse section, and having the sides armed with alternating projections and fingers, also having overlapping pivot-heads, and also having arms connecting them with the shaking-bar, said bars being arranged in pairs, and the arms of the pairs being connected together in the axis of the pivots of the said bars, substantially as described.

8. The grate-bars, arranged in pairs upon the same pivots and connected by arm *l* with the shaking-bar by one and the same pivot, and the said arms being slotted for the pivots connecting them with said shaking-bar, substantially as described.

FREDERICK SHRIVER.

Witnesses:
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LINCOLN BOWEN.