J. OLD.

Grate for Furnace.

No. 168,770. Patented Oct. 11, 1875.

Fig. 1.

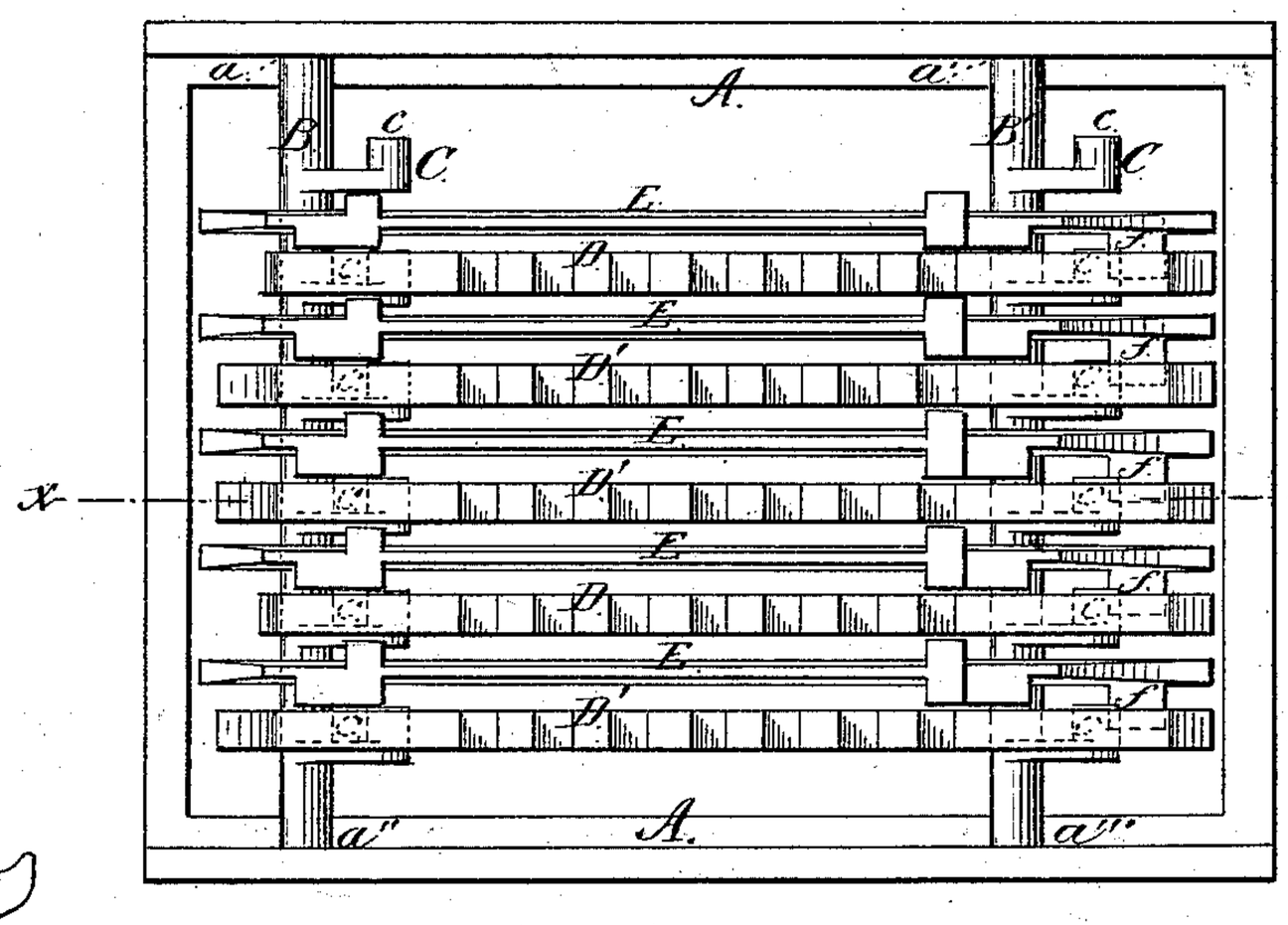


Fig. 6.

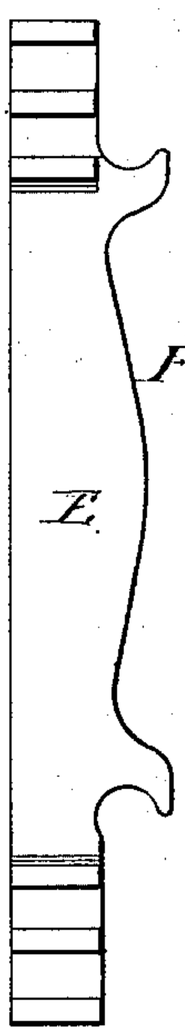


Fig. 2.

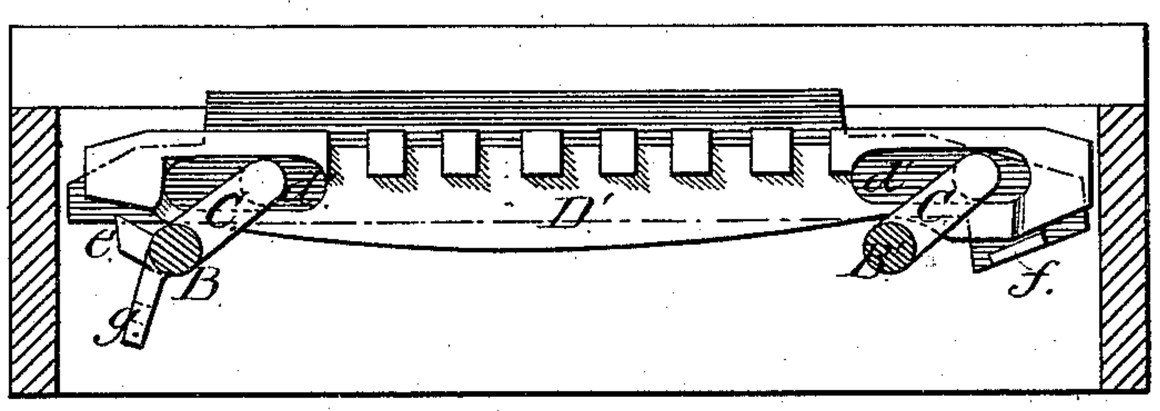


Fig. 3.

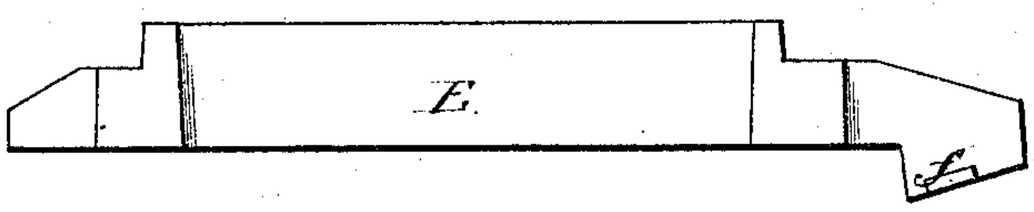


Fig. 4.

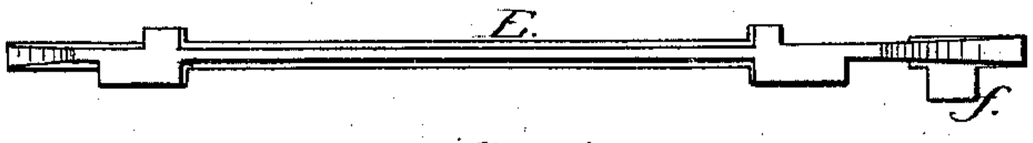


Fig. 5.

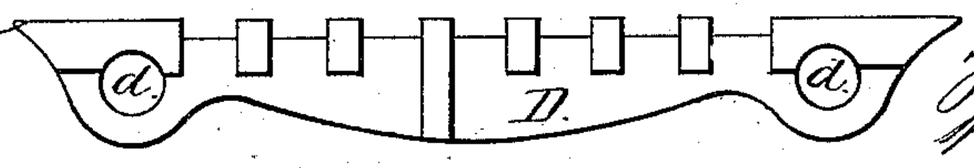


Fig. 7.

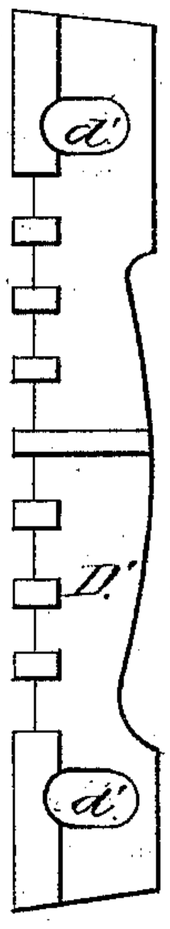
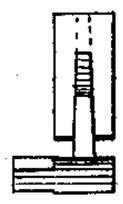


Fig. 8.



Witnesses:

M. Gardner,

F. Gsoff.

Inventor:

James Old

per W. C. Dunn

attorney.

UNITED STATES PATENT OFFICE.

JAMES OLD, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN GRATES FOR FURNACES.

Specification forming part of Letters Patent No. **168,770**, dated October 11, 1875; application filed August 23, 1875.

To all whom it may concern:

Be it known that I, JAMES OLD, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Grates for Furnaces, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in the construction of grates for stoves, furnaces, open fire-places, &c., the objects of which are to give passage for the draft to all parts of the fire, to facilitate the shaking of the grate, to regulate the extent of the agitation of the fire, and to enable a double motion to be given to the agitating-bars.

It consists in constructing the grate with rock-shafts provided with cranks, to the wrists of which the ends of the agitating-bars are secured, so that when vibrated the bars are moved up and down and back and forth, or up and down alone, according as the crank-wrists pass through slots or holes in the bars. The connection is such that the bars must follow the movements of the cranks, and thus there is no liability of their being thrown from their places. It further consists in combining with the agitating-bars stationary bars, that fill the spaces, and hold the agitating-bars in position. Lastly, it consists of an arrangement for filling the spaces between the ends of the bars and the walls of the grate.

In the accompanying drawings forming part of this specification, Figure 1 is a plan of the grate, showing the bars in position on the shafts. Fig. 2 is a vertical section of the same on line *x x*. Fig. 3 is a side elevation of the stationary bar, and Fig. 4 is a top view of the same. Fig. 5 represents one of the agitating-bars. Figs. 6 and 7 are, respectively, different forms of the stationary and agitating bars.

Referring to the drawings, A represents the fire-chamber of a furnace, stove, or open fire-place, having the bearings *a a' a'' a'''* in the side walls, in which are supported the ends of the rock-shafts B' B', which have a number of cranks, C, projecting from them. D D' are the agitating-bars, the ends of which are provided with holes *d*, as in Fig. 5, or horizontal or vertical slots *d'*, as in Figs. 2 and 7. The wrists *c* of the cranks are passed through these holes or slots, and the agitating-bars are held vertically in their position on the shafts B B' by the stationary bars E, one of which is placed between each agitating-bar and the next crank, as shown in Fig. 1, thus serving the double purpose of holding the bars D in their places, and filling the space between each of them, serving all the purposes of the ordinary grate-bar. The agitating-bars are slightly different in construction and in operation. Those with the round holes D, Figs. 1 and 5, are shorter than the fire-chamber, and the wrists of the cranks fit them snugly, so that when the shafts B B' are vibrated these bars receive both an up-and-down and a forward-and-back motion, and in addition these bars connect the two shafts, so that when one is vibrated the other is acted on simultaneously, making it necessary to operate but one of them directly. On the other hand, the bars D', Figs. 2 and 7, by giving room for the play of the crank-wrist in one direction, are capable of but one motion—*i. e.*, in the case of the horizontal slot, Fig. 2, the bar D' receives only an up-and-down motion, it being prevented from any horizontal movement by the ends abutting against the end walls of the fire-chamber. In the case of the bar with the vertical slot, Fig. 7, it receives only a horizontal movement. Either one or both of the slotted bars D' may be used in making up the grate with the bars D and E. It is necessary, however, that one or more of the bars D should be used, in order to connect the two shafts, as before mentioned. The short projection *e* from the shaft B is designed to fill up the space between the end of the short bars D that work back and forth and the walls of the fire-chamber, to prevent the coals from falling through. One of these projections should be placed on the shaft at each end of the horizontally-moving bars. In place of them, however, a flange, *f*, may be placed on the end of the stationary bar E, to effect the same purpose, or the stationary bar may be made thicker at

the ends, so as to fill up the spaces at the ends of the bars D, or other horizontally-moving bar, as indicated in Fig. 6.

It will be observed that this construction and arrangement of the grate-bars enables a combined up-and-down and back-and-forth motion to be given them, which thoroughly opens up the fire, permitting a free passage for the draft to all parts of it, and grinds out the cinders and ashes, freeing the whole surface of the bars, and thus prevents the coal from packing and the ashes and cinders from choking up the draft-passages.

In constructing the grate the rock-shafts may be supported in the side walls of the furnace, as described, or they may be supported on stationary bars fixed within the chamber. The grate is shaken by a lever inserted in the lug *g* projecting from the front rock-shaft B′, or, if preferred, the end of one or both shafts may project through the walls of the fire-chamber, and be operated by a wrench or lever.

Where a number of furnaces are employed side by side the end of the shafts may be supported in bearings in a stationary bar placed within the fire-chamber, with its ends supported in the end walls, or in any other suitable position.

The motion of the grate-bars may be increased or diminished by altering the lengths of the cranks, and it may also be changed by dropping the journals lower than the shaft.

What I claim to be new, and desire to secure by Letters Patent, is—

1. The agitating-bars D, provided with the holes or slots in their ends, as described, to confine the wrists of the cranks, in combination with the wrists *c*, cranks C, and rock-shafts B B′, substantially as set forth.

2. The stationary bars E, provided with the flanges *f*, arranged between the cranks to fill the spaces between the agitating-bars, and hold them in position on the wrists of the cranks, in combination with the agitating-bars D, crank-wrists *c*, and rock-shafts B B′, substantially as set forth.

3. The projections *e*, on the shafts B B′, in combination with the short bars D and rock-shafts, substantially as described.

4. The combination of a grate, constructed as described, with the fire-chamber of a furnace-stove or open fire-place, substantially as described.

In testimony that I claim the foregoing as my own, I have affixed my signature in presence of two witnesses.

JAMES OLD.

Witnesses:
W. V. DIEHL,
ANDREW HUMBERT.