(No Model.) 3 Sheets—Sheet 1.

L. M. WOODCOCK.

FURNACE GRATE.

No. 384,410. Patented June 12, 1888.

Fig. 1.

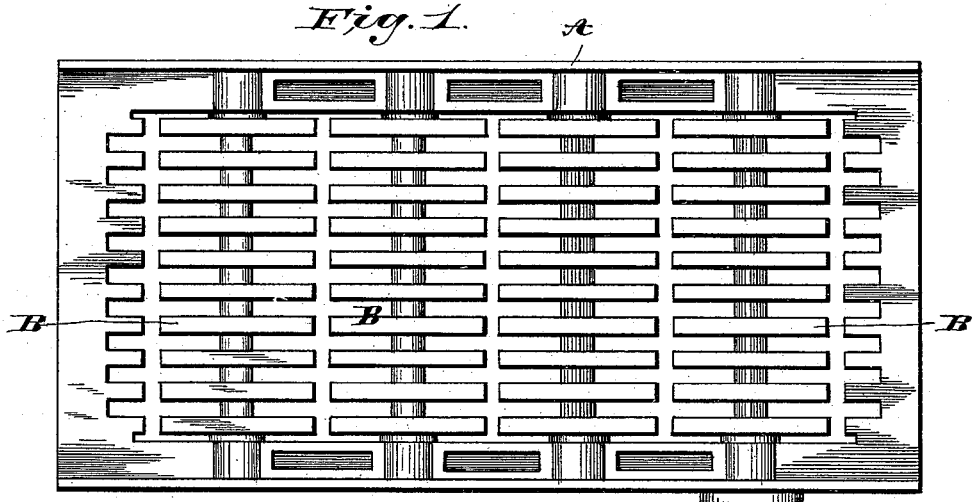
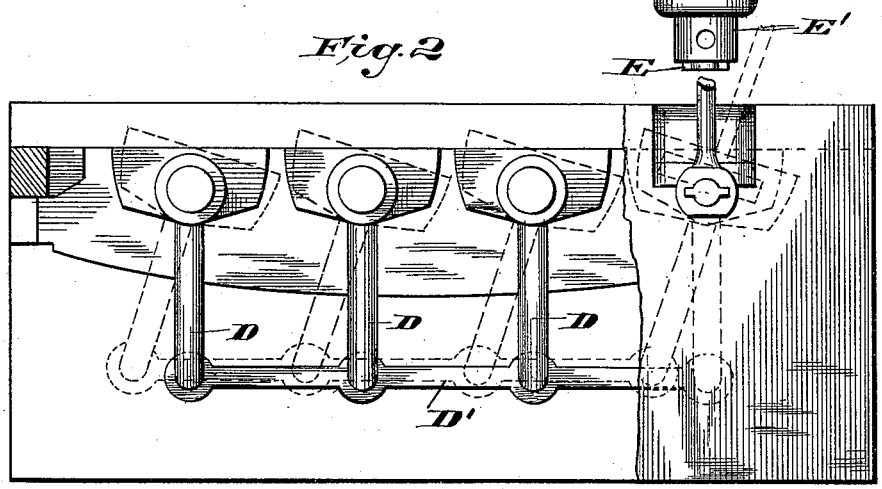


Fig. 2



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L. B. Whitaker.

Inventor.
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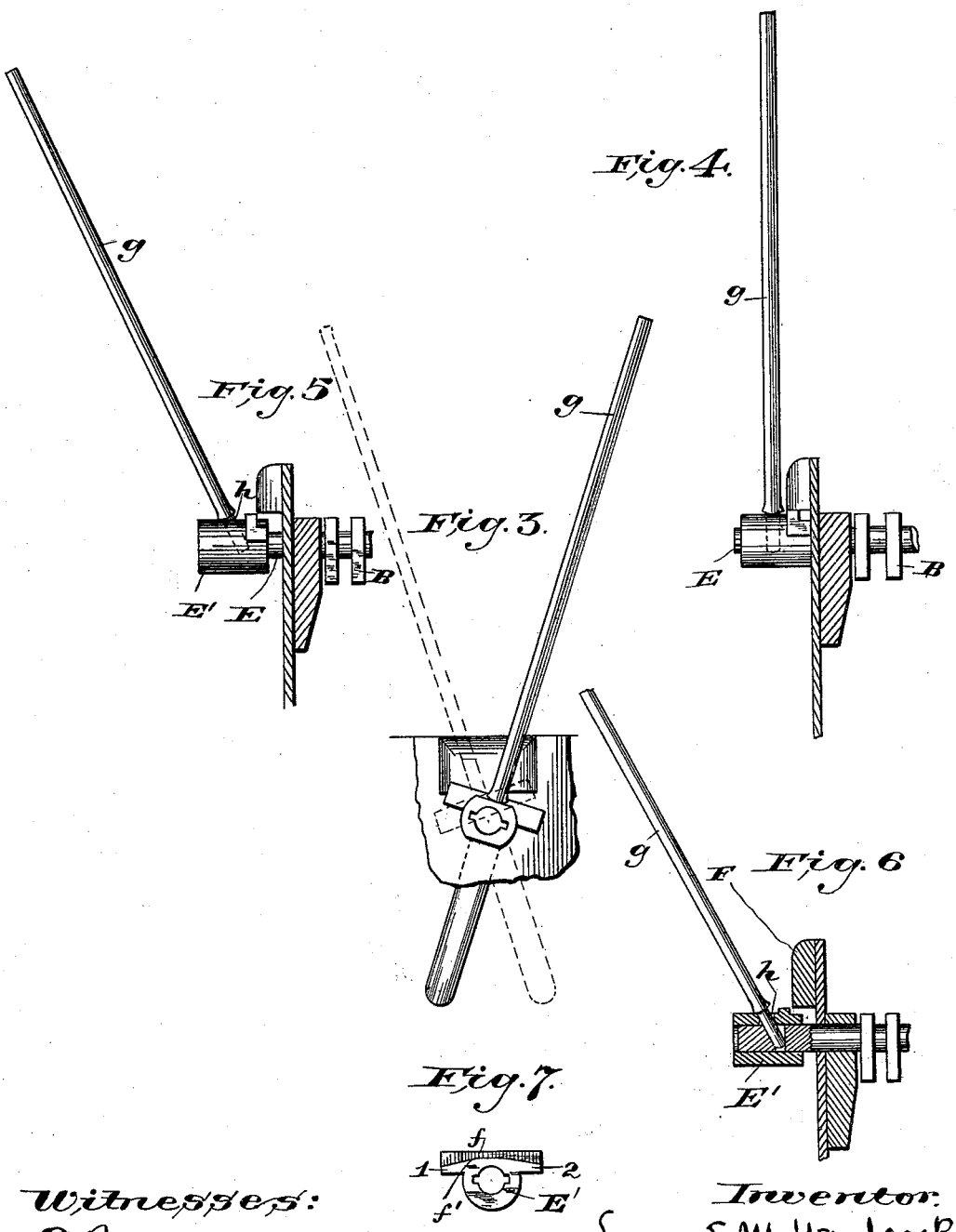
Whitaker & Prout.

(No Model.) 3 Sheets—Sheet 2.

L. M. WOODCOCK.

FURNACE GRATE.

No. 384,410. Patented June 12, 1888.



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(No Model.) 3 Sheets—Sheet 3.

L. M. WOODCOCK.

FURNACE GRATE.

No. 384,410. Patented June 12, 1888.

Fig. 8

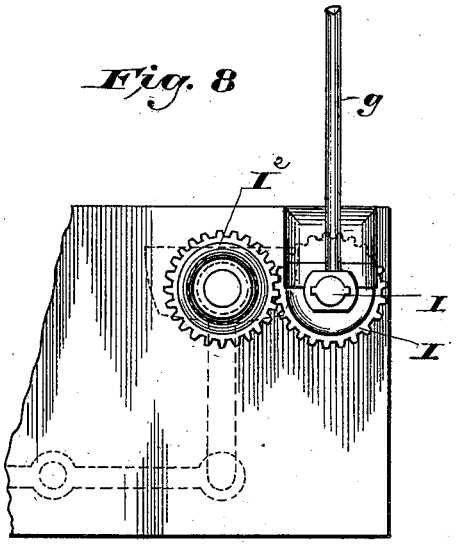


Fig. 10.

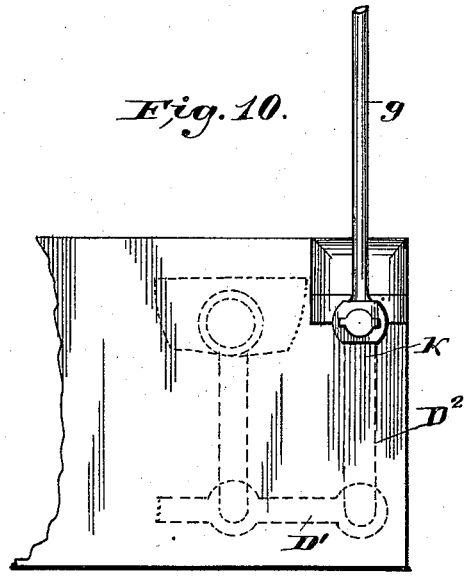


Fig. 9

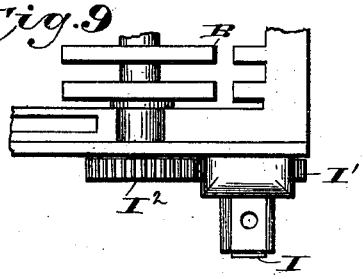


Fig. 11.

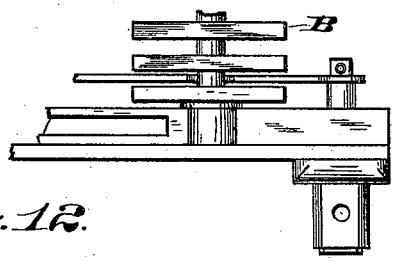
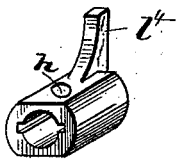


Fig. 12.

Fig. 13.



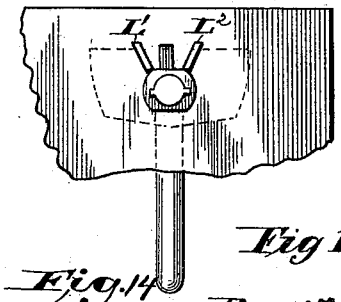


Fig. 15.

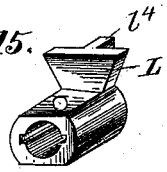


Fig. 16.

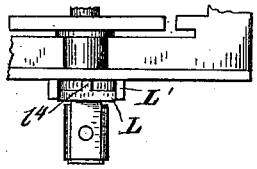
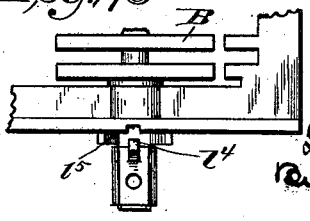


Fig. 14



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Inventor.
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By his attys
Whitaker & Prout.

UNITED STATES PATENT OFFICE.

LEONARD M. WOODCOCK, OF AUBURN, NEW YORK.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 384,410, dated June 12, 1888.

Application filed February 4, 1888. Serial No. 263,028. (No model.)

To all whom it may concern:

Be it known that I, LEONARD M. WOODCOCK, a citizen of the United States, residing at Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Furnace Grates; and I do hereby 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.

My invention relates to furnace-grates; and it consists of certain improved constructions and arrangements of parts for shaking and dumping the same.

In order that my invention may be clearly understood, I have illustrated it in the annexed drawings, a description of which will be found in the specification following.

Similar reference-letters indicate identical parts throughout.

In the drawings, Figure 1 is a plan view of my improved grate. Fig. 2 is a side elevation with a part of the side wall broken away. Figs. 3, 4, 5, 6, and 7 are detail views of the improved parts which form the basis of this application. Figs. 8, 10, 12, 13, and 15 are modifications of my invention. Figs. 9, 11, 14, and 16 are views of working parts of the same.

The construction of the supporting-frame A and the arrangement of the grate-bars B B are substantially the same as the construction and arrangement of the corresponding portions as described in my United States Patent No. 359,120. The frame is of rectangular form and the grate-bars are journaled therein, as shown and described in said patent. Each grate-bar has a downwardly-depending arm, D, and said arms are attached to a connecting-bar, D′, so that motion imparted to one of the grate-bars affects all and causes them to move in unison in shaking the grate for the removal of ashes and cinders or for dumping.

In my preferred form one of the grate-bars is provided with an extension, E, which, preferably, I provide with two splines, but which may be polygonal or of any form having unequal diameters, so as to allow a sleeve, E′, which is made to fit it, to rotate with it, but at the same time to have an independent longitudinal movement. This sleeve is provided with lateral extensions or projections 1 2, which are of the form most clearly seen in Fig. 7. The upper surface of the inner side of the projections 1 2 is cut away and reduced, leaving a straight upper edge or face, *f*, and a cut-away and reduced face, *f′*.

Rigidly attached to the frame A is the projection or stop F, having a straight under surface, and so located that when the sleeve E′ is placed upon the extension E and moved close to the frame the lower face of the stop F will be immediately over and in contact with the upper face, *f*, of said sleeve, and, the two faces being straight, it will be seen that when the parts are in this position the grate-bars are locked from movement.

In order to agitate the grate-bars the sleeve E′ is retracted on the extension E until the stop F is over the cut-away and reduced face *f′*, in which position the bar may be turned until one extremity of the face *f′* comes in contact with the lower face of the stop F. All of the grate-bars, being connected, are affected by the movement of one, and are therefore oscillated equally with the one provided with the extension and sleeve.

To empty the grate, the sleeve is retracted until entirely free from possible contact with the stop F, when the bars may be tipped to any extent. Any desirable means may be employed to move the sleeve longitudinally on the extension E or to rotate the grate-bar; but I prefer to use a shaker, *g*, one end of which passes through an opening, *h*, in the sleeve and enters a corresponding opening in the extension E. The latter opening is made smallest at its lower extremity and inclines outward therefrom; hence, if the shaker is inserted and then inclined to the position indicated in Fig. 5, the sleeve is moved out of contact with the stop F and the grate may then be shaken. By moving the shaker into a vertical position the sleeve is forced close to the frame and the bars are again locked.

A modification of my invention is shown in Figs. 8 and 9, where, instead of extending the shaft of one of the grate-bars, I provide a short additional shaft, I, which is journaled in the main frame A, and which has mounted rigidly upon it a gear-wheel, I′, which meshes with a similar wheel, I^2, rigidly secured to a shaft of one of the grate-bars. The shaft is rotated or locked in all the modifications of my invention in the manner already described. The oscillating movement is imparted to the grate-bars in this instance by means of the gear-wheels I′ I^2, operated by the arm *g*.

In Fig. 10 the additional shaft I has a downwardly-depending arm, D^2, rigidly connected to it and constructed substantially as shown, the lower end of the arm being attached to the connecting-bars D'. Any rotary motion imparted to the shaft by means of the arm *g* will cause the arm D^2 to swing backward or forward and shake the grate.

Figs. 15 and 16 show another form of projection and stop which may be employed. The projection L on the sleeve is made with upper acute angles, and has a forwardly-extending rib, l^4. The frame is provided with a correspondingly-recessed projection, L', into which the projection L fits snugly to lock the grate-bars from movement. When the sleeve is retracted sufficiently to withdraw the projection L from recess L', the bars are allowed a limited movement, the rib l^4 moving within the recessed projection L'.

The lug L may be entirely dispensed with, as shown in Figs. 12, 13, and 14, and the rib l^4 alone employed by forming within the recessed projection L' a recess to receive such rib and lock it from movement, as shown.

I do not claim, broadly, the idea of locking and limiting the movement of the grate in shaking; but

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

1. The combination, with a supporting-frame and an oscillating grate-bar, of a shaft connected with said grate-bar, journaled in the supporting-frame, and extending outwardly therefrom, and a sleeve movable longitudinally on the shaft and adjacent to a stationary portion of the construction, the said stationary portion and the said sleeve being provided, the one with a lug and the other with stops, adapted to engage when the sleeve is moved toward the stationary part and rocked, substantially as described.

2. The combination, with a supporting-frame and an oscillating grate-bar, of a shaft connected with said grate-bar, mounted in suitable bearings, and extending beyond the face of the frame at one end, and a sleeve movable longitudinally on the shaft, the frame and the sleeve being provided, the one with a lug and the other with stops, adapted to engage when the sleeve is moved toward the frame and rocked, substantially as described.

3. The combination, with a supporting-frame and an oscillating grate-bar supported in suitable bearings, of a shaft connected to said grate-bar, extending beyond the face of the frame at one end, and a sleeve movable longitudinally on the shaft, the said frame and the said sleeve being provided, the one with a lug and the other with stops, adapted to engage when the sleeve is moved inward toward the grate, the said lug having a reduced portion adjacent to the stops, whereby the sleeve and shaft are locked when the sleeve is in its inmost position, and are permitted a certain limited movement when the said sleeve is moved outward and the reduced portion only of the lug brought into position to engage the stops, substantially as described.

4. The combination, with a supporting-frame and an oscillating grate-bar supported on suitable bearings, of a shaft connected to said grate-bar, extending beyond the face of the frame at one end, a sleeve movable longitudinally on the shaft, the said frame and the said sleeve being provided, the one with lugs and the other with stops, and the said shaft having a recess the outer side of which inclines outwardly, and the sleeve being provided with a registering opening of less diameter than the outer diameter of the recess lengthwise of the shaft, and an arm for loosely engaging the opening in the sleeve and extending into the recess, whereby the sleeve may be moved longitudinally on the shaft to bring the reduced portion of the lug in line with the stops, and the shaft rocked when the parts are in position, substantially as described.

5. The combination, with a supporting-frame and oscillating grate-bars connected for joint movement, of a shaft of unequal diameters connected with said grate-bars and journaled in the supporting-frame, a sleeve fitting said shaft and capable of longitudinal movement thereon, having a projection or projections extending laterally therefrom, a portion of the inner face of said projection or projections being cut away or reduced, as shown and described, a stop located in the path of the projection or projections, and an arm for rotating said shaft and sleeve, whereby the sleeve can be moved outward to bring the reduced portion of the projection or projections against the stop to permit a lateral oscillation of said shaft, and moved inward for the projection or projections to engage said stop or lock or further limit the movement of the shaft, substantially as described.

6. The combination, with a supporting-frame and oscillating grate-bars connected for joint movement, of a shaft rigidly secured to one of the grate-bars, journaled in the frame, and having one extremity passing through and extending outwardly therefrom, the outwardly-extending portion having unequal diameters, a sleeve fitting said outwardly-extending portion, movable longitudinally therefrom, and provided with a projection or projections having a reduced portion, an arm for rotating said sleeve and shaft and moving the former longitudinally of the shaft, and a stop or stops located in the path of the projection or projections, limiting the movement of said shaft according to the position of the sleeve in respect to said stops, substantially as described.

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

LEONARD M. WOODCOCK.

Witnesses:

R. J. CARSON,

B. M. WILCOX.