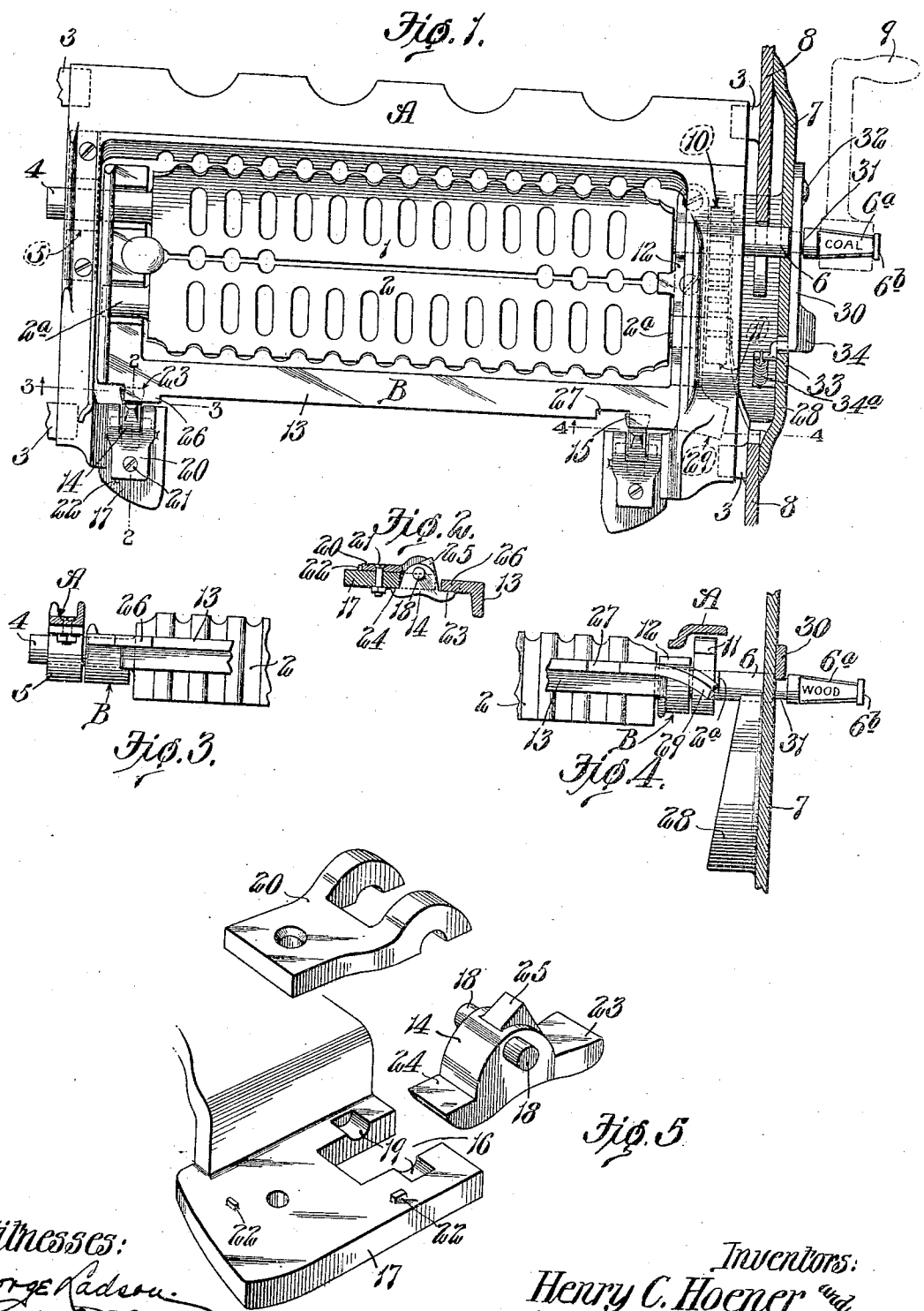


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DUMPING GRATE.
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UNITED STATES PATENT OFFICE.

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DUMPING-GRATE.

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To all whom it may concern:

Be it known that we, HENRY C. HOENER and FREDERICK ANDREAS, both citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Dumping-Grates, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to stove grates, and particularly to that type which are generally termed "duplex" grates.

The ordinary duplex grates which have heretofore been in general use comprise a plurality of grate-bars that are adapted to be turned or oscillated slightly so as to permit the load on the grate to fall downwardly between the grate-bars into the ash-pit. These grates have not proved entirely satisfactory for the reason that large clinkers will not pass between the grate-bars into the ash-pit when said grate-bars are turned or oscillated, and the main object of our present invention is to provide a grate that comprises a frame and grate-bars, and improved means for actuating or tilting said frame to dump the entire load on the grate-bars and then returning the frame to its normal position.

Another object of our invention is to provide a grate that comprises a grate-bar frame that is adapted to be swung downwardly to discharge the load on the grate, means for sustaining said frame in its normal position, and means for causing said frame to move automatically into such a position that it will be engaged by said sustaining means when it is swung upwardly to its normal position.

Other objects and desirable features of our invention will be hereinafter pointed out.

Figure 1 of the drawings is a top plan view of a grate constructed in accordance with our invention; Fig. 2 is a detail vertical sectional view taken on approximately the line 2—2 of Fig. 1; Fig. 3 is a detail vertical sectional view taken on approximately the line 3—3 of Fig. 1 looking in the direction of the arrow; Fig. 4 is a detail vertical sectional view taken on approximately the line 4—4 of Fig. 1 looking in the direction of the arrow; and Fig. 5 is a detail perspective

view of one of the pivotally mounted supporting devices for the swinging frame and the members which carry said device and retain it in position.

Referring to the drawings which illustrate the preferred form of our invention, 1 and 2 designate a pair of grate-bars of the duplex type, and A designates a horizontally disposed stationary frame arranged inside of a stove adjacent the lower end of the fire-pot and supported by some suitable means such, for example, as lugs 3 that project inwardly from the walls of the stove. The grate-bar 1 is provided at its rear end with a long trunnion 4 that rests in a bearing 5 on the under side of the stationary frame, and said grate-bar is provided at its front end with a long trunnion 6 that projects through an opening in a plate 7 connected to the front wall 8 of the stove. This front trunnion 6 is provided with a non-circular extension 6^a that is adapted to receive an operating lever or shaker 9, shown in dotted lines in Fig. 1, which is used for turning the grate-bars and also shifting the swinging frame hereinafter described, said extension being provided with a head 6^b with which the shaker coöperates to shift the grate-bar 1 longitudinally. The grate-bar 2 is provided at its front and rear ends with trunnions 2^a that rest in bearings in a swinging frame B which is oscillatingly mounted on the trunnions of the grate-bar 1, said swinging frame having bearings through which the front and rear trunnions of the grate-bar 1 pass. Toothed members 10 and 11 that mesh with each other, are connected to the front trunnions of the grate-bars, as shown in dotted lines in Fig. 1, so as to transmit the oscillating movements of the positively actuated grate-bar 1 to the grate-bar 2. The swinging frame B is preferably provided with a removable cap-piece 12 that extends over the front trunnions of the grate-bars so as to prevent them from moving upwardly or longitudinally of said frame.

The swinging frame B comprises a side portion 13 that extends longitudinally of the fire-pot of the stove and two laterally projecting portions in which the bearings for the trunnions of the grate-bars are formed, said side portion 13 coöperating

with pivotally mounted members 14 and 15 that sustain the swinging frame in an approximately horizontal position. These pivotally mounted members are carried by the stationary frame A and as both of them are of the same construction we will only describe the member 14 that is arranged adjacent the rear end of the side portion 13 of the swinging frame. This member 14 is arranged in a slot 16 formed in a horizontally disposed extension 17 on the stationary frame A and is provided with trunnions 18 that rest in sockets 19 in said extension, said trunnions being held seated in the sockets 19 by means of a cap-piece 20 that is connected to the extension by means of a screw 21 or other suitable fastening device. If desired, the extension 17 can be provided with lugs 22 that prevent the cap-piece 20 from twisting. The member 14 is provided with a lug 23 on which the side portion 13 of the swinging frame rests and also a lug 24 that bears against the under side of the extension 17 so as to limit the movement of said member in one direction and thus hold the lug 23 thereon in an approximately horizontal position. By mounting the member 14 in this manner we prevent the front end thereof; namely, the end from which the lug 23 projects, from moving downwardly, but said front end can swing upwardly so as to permit the swinging grate to pass by same when it is moving back to normal position. The member 14 is preferably provided with a projection 25 that is adapted to engage the cap-piece 20 and limit the movement of said member in one direction; namely, when said member is tripped by the swinging frame as it moves back to its normal position.

The side portion 13 of the swinging frame is provided adjacent its rear end with a lug 26 that rests upon the supporting surface 23 of the member 14 when the swinging frame is in its normal horizontal position, and a notch 27 is formed in said side portion 13 adjacent the point where it rests upon the supporting lug of the pivotally mounted member 15. When it is desired to dump the grate, the shaker or operating member 9 is mounted on the non-circular extension 6^a of the front trunnion of the grate-bar 1 and then moved forwardly so as to shift said grate-bar and the swinging frame B forwardly far enough to bring the notch 27 in the side portion 13 of said frame into alignment with the supporting member 15 and also carry the lug 26 on said side portion out of alignment with the rear supporting member 14.

When the swinging frame has been shifted into the position above described, it will swing downwardly and thus discharge the load on the grate-bars. As the frame B swings downwardly it is shifted rearwardly

automatically by means of a stationary cam or inclined face member 28 that engages an extension 29 on the front end of the swinging frame B, as shown in dotted lines in Fig. 1 and in full lines in Fig. 4. This cam 28 does not restore the swinging frame to its normal position but it shifts it rearwardly far enough to bring the lug 26 on the side portion 13 into alignment with the supporting member 14 and the notch 27 in said side portion out of alignment with the front supporting member 15. The grate is swung upwardly to its normal position by turning the shaker 9, the toothed members 10 and 11 on the grate-bars being so constructed that said grate-bars can only oscillate and not make a complete rotation. When the side portion 13 of the swinging frame strikes the supporting members 14 and 15 said members will swing on their fulcrums and thus permit the frame to pass by same, said supporting members thereafter dropping back into normal position so as to sustain the frame B in an approximately horizontal position.

The shaker 9 can be actuated to rock the grate-bars in the same manner as the ordinary duplex grate, and to eliminate the possibility of accidentally shifting the movable frame B and thus dumping the entire load on the grate, we have provided a locking device 30 that can be moved into a notch 31 on the front trunnion 6 of the grate-bar 1 so as to prevent it from moving longitudinally. This locking device 30 is pivotally connected at 32 to the plate 7 on the front wall of the stove and is provided with a hook-shaped extension 33 that projects through a slot in said front plate, as shown in Fig. 1, so as to prevent the locking device from moving outwardly. If desired, this latch or locking device 30 can be provided at its outer end with a weight or heavy portion 34 that causes it to swing downwardly whenever it is released, or a spring 34^a can be connected to said latch.

While we have herein shown a grate provided with duplex grate-bars we wish it to be understood that our broad idea is not limited to such a construction for the swinging frame B could be provided with any suitable means for supporting the fuel without departing from the spirit of our invention.

A grate of the construction above described has all of the desirable features of a duplex grate and it can also be turned into a position to discharge the entire load on the grate-bars. The latch or locking device 30 prevents the swinging frame from swinging downwardly accidentally and as said frame is shifted rearwardly automatically as it swings downwardly it is only necessary for the operator to rotate the shaker or operating member 9 to restore the swinging frame to its normal position.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A grate comprising a movable frame provided with means for supporting fuel, means for normally sustaining said frame in a certain position, said frame being adapted to be shifted to disengage it from said sustaining means so that it can move into a position to discharge the load thereon, and means for automatically shifting said frame in the opposite direction so that when it is returned to normal position it will be engaged by said sustaining means.

2. A grate comprising a swinging frame provided with means for supporting fuel, a movable device that supports said frame in a horizontal position, said frame being adapted to be shifted to disengage it from said device so that it can swing downwardly to discharge its load, and means for causing said frame to shift automatically in the opposite direction as it swings downwardly, said supporting device being so constructed that the frame can move upwardly past same.

3. A grate comprising a swinging frame provided with means for supporting fuel, a movable device cooperating with said frame to sustain it in a certain position, said frame being adapted to be shifted bodily and having a notch or cut-out portion that is brought into alinement with said device when the frame is shifted in a certain direction, thus permitting the frame to swing downwardly to discharge its load, and said sustaining device being so constructed that it will permit the frame to swing upwardly back to normal position even though said notch or cut-out portion is not in alinement with same.

4. A grate comprising a swinging frame provided with means for supporting fuel, pivotally mounted devices cooperating with said frame to sustain it in approximately horizontal position, said frame being provided with notches or cut-out portions adjacent said devices and being adapted to be shifted so as to bring said notches into alinement with said devices and thus permit the frame to swing downwardly to discharge the load thereon, and means for automatically shifting the frame in the opposite direction as it swings downwardly, said frame being adapted to be thereafter swung upwardly to its normal position.

5. A grate comprising a pivotally mounted frame provided with means for supporting fuel, movable devices that sustain said frame in a certain position, means for locking said frame, said frame being adapted to be shifted out of engagement with said sustaining means when it is unlocked so that it can swing downwardly and discharge the load thereon, and means for automatically

shifting said frame in the opposite direction so that it will be engaged by said sustaining means when it is returned to its normal position.

6. A grate comprising a swinging frame provided with means for supporting fuel, a stationary frame provided with an extension having a slot formed therein, and a pivotally mounted device arranged in the slot in said extension and provided at one end with a lug that projects underneath said extension and on its other end with a lug on which the swinging frame rests, said device being so mounted that it swings in a vertical plane.

7. A grate comprising a swinging frame provided with means for supporting fuel, a stationary frame provided with an extension in which a slot is formed, a device arranged in said slot and provided with trunnions that rest in sockets in said extension, said device having a lug that cooperates with the extension to limit its movement in one direction and a lug on which the swinging frame rests, and a cap-piece connected to said extension for retaining said device in operative position.

8. A grate comprising a swinging frame provided with means for supporting fuel, devices that sustain said frame in an approximately horizontal position, means for shifting said frame to disengage it from said sustaining means and thus permit it to swing downwardly to discharge the load thereon, and means for automatically shifting said frame in the opposite direction as it swings downwardly, said sustaining devices being so constructed that they will automatically engage the frame when it arrives at its normal position.

9. A grate comprising a grate-bar having trunnions that are journaled in stationary bearings, one of said trunnions being adapted to receive a shaker or operating member, a frame pivotally mounted on the trunnions of said grate-bar, a cooperating grate-bar journaled in said frame, means for transmitting the rotary movement of one bar to the other, movable devices cooperating with said frame to sustain it in an approximately horizontal position, said frame being adapted to be shifted out of engagement with said devices so that it will swing downwardly to discharge the load thereon, and means for causing said frame to shift automatically in the opposite direction when it swings downwardly.

10. A grate comprising a stationary frame, a grate-bar having trunnions that are journaled in bearings on said frame, a swinging frame journaled on said trunnions and provided with notches or cut-out portions, an oscillating grate-bar journaled in said frame, and pivotally mounted devices cooperating with said frame to sustain it in

an approximately horizontal position, said frame being adapted to be shifted bodily so as to bring the notches or cut-out portions therein into alinement with said sustaining devices.

11. A grate comprising a stationary frame, a grate-bar journaled in said frame, a swinging frame journaled on said grate-bar and provided with notches, a cooperating grate-bar journaled in said swinging frame, and pivotally mounted devices carried by the stationary frame for sustaining the swinging frame in an approximately horizontal position, and being so constructed that they will not permit the frame to swing downwardly when it rests thereon, the grate-bar which carries the swinging frame being adapted to be moved longitudinally so as to bodily shift said frame and permit it to swing downwardly when the notches in said frame come into alinement with said pivotally mounted sustaining devices.

12. A grate comprising a stationary frame, a grate-bar journaled in said frame and adapted to be moved longitudinally thereof, a swinging frame journaled on said grate-bar, a cooperating grate-bar journaled in said swinging frame, pivotally mounted devices carried by the stationary frame for sustaining the swinging frame in an approximately horizontal position, and being so constructed that they will not permit the frame to swing downwardly when it rests thereon, said frame having notches or cut-out portions that permit it to swing downwardly when the grate-bar that carries the frame is shifted longitudinally of said stationary frame, a locking device cooperating

with said shiftable grate-bar, and a stationary cam that causes the swinging frame and the grate-bar on which it is mounted to shift back when the frame swings downwardly.

13. A grate comprising a stationary frame, a grate-bar provided with trunnions that rest upon bearings in said frame, a swinging frame journaled on said trunnions and provided with an oscillating grate-bar, one of the trunnions of the grate-bar first referred to being constructed to receive a shaker or operating member for turning said grate-bar and also shifting it longitudinally, means for causing both grate-bars to oscillate simultaneously, pivotally mounted devices carried by extensions on the stationary frame for supporting the swinging frame in an approximately horizontal position, said swinging frame being provided with notches or cut-out portions that aline with said sustaining devices when said swinging frame is shifted and thus permit it to move downwardly to discharge the load thereon, a gravity-operated latch that engages a shoulder on one trunnion of the grate-bar first referred to so as to lock said bar and swinging frame in position, and a stationary cam cooperating with the swinging frame to shift it in a certain direction when it swings downwardly.

In testimony whereof, we hereunto affix our signatures, in the presence of two witnesses, this 19th day of February, 1909.

HENRY C. HOENER.

FREDERICK ANDREAS.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.