Dec. 8, 1925. 1,564,813

A. O. BABENDREIER

STOKER GRATE

Filed Nov. 15, 1922

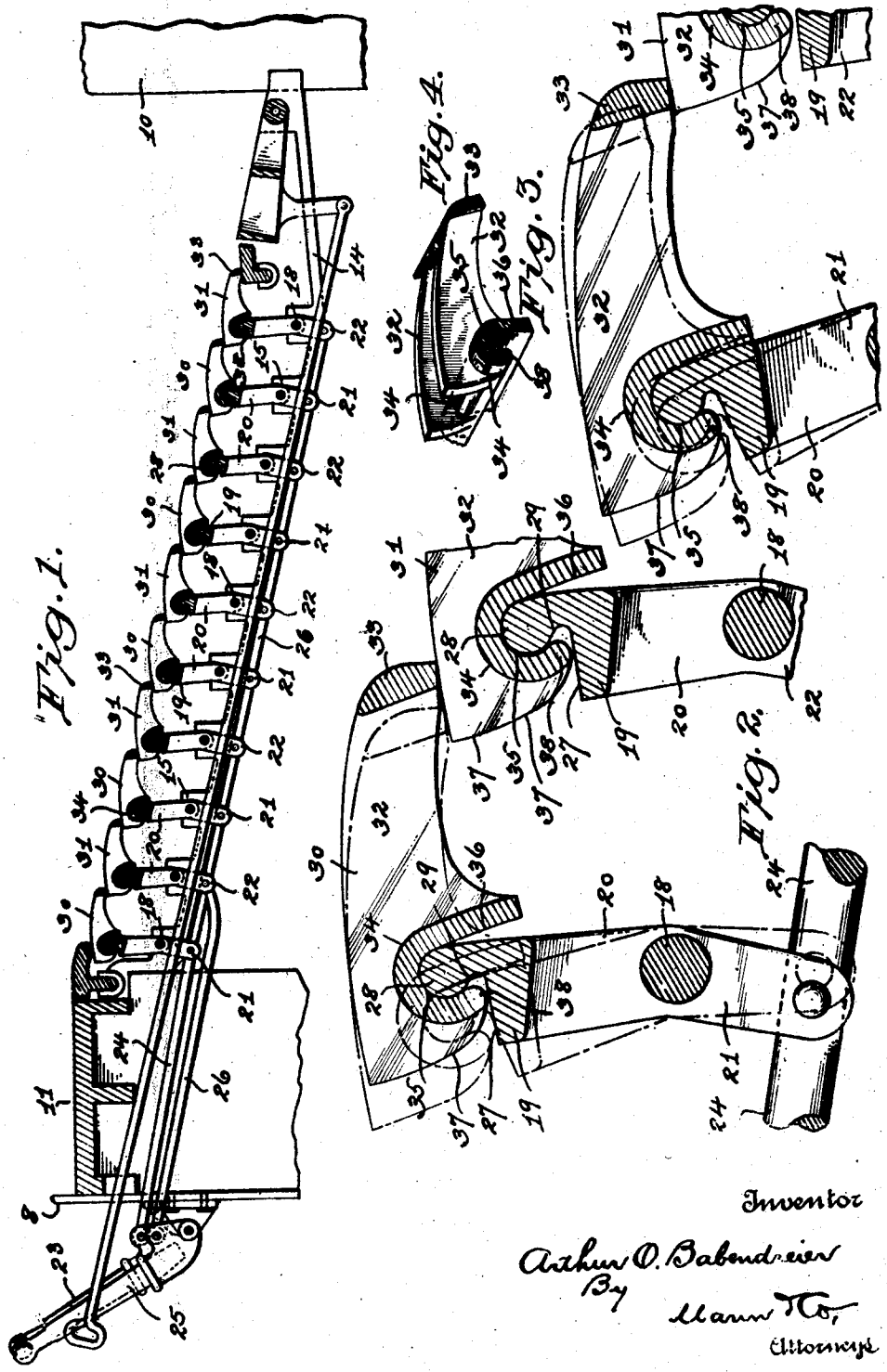


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

Inventor

Arthur O. Babendreier

By Mann & Co.

Attorneys

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UNITED STATES PATENT OFFICE.

ARTHUR O. BABENDREIER, OF BALTIMORE, MARYLAND, ASSIGNOR TO PATTERSON HAND STOKER CORPORATION, A CORPORATION OF MARYLAND.

STOKER GRATE.

Application filed November 15, 1922. Serial No. 601,032.

To all whom it may concern:

Be it known that ARTHUR O. BABENDREIER, a citizen of the United States, residing at Baltimore, in the State of Maryland, has invented certain new and useful Improvements in Stoker Grates, of which the following is a specification.

This invention relates to improvements in furnace grates and is particularly directed to that character of grate which is known as a stoker grate.

In grates of this character the stoker bars are mounted so as to be reciprocated in a direction fore and aft with respect to the furnace to push the burning fuel bed by intermittent steps from the front to the rear of the furnace.

In these stoker grates, it is desirable to arrange the stoker bars so that during the operation of stoking, every other or alternate stoker-bar will be moved or reciprocated while the intervening stoker-bars will remain stationary.

The present invention is especially an improvement on the type of stoker grate illustrated in the U. S. patent to Patterson Number 1,395,006 granted October 25th, 1921, and the improvement resides in the construction of the coacting parts of the stoker-bars with the oscillating bars on which they are mounted and through which said stoker-bars are reciprocated.

The object of the present invention is to provide an improved connection between the stoker and oscillating bars whereby liability of the bars becoming accidentally disconnected from the oscillating bars will be avoided and prevent accidental dumping of the fire when stoking.

The invention is illustrated in the accompanying drawing, wherein,—

Fig. 1 shows a vertical longitudinal section through a furnace wherein the stoker and oscillating bars embody the invention.

Fig. 2 illustrates two stoker-bars and two adjacent oscillating bars on a much enlarged scale to show the particular construction of their coacting parts.

Fig. 3 shows the same parts but illustrates by broken lines how the stoker-bars are retained and prevented from dropping when too great a backward stroke is given them during the stoking operation, and

Fig. 4 illustrates a perspective detail of a portion of a stoker-bar.

Referring to the drawing the numeral 8 designates the front wall of the furnace and 10 the bridge-wall thereof. The usual fuel-door opening 11 is provided in the front wall 8.

As in the said Patterson patent, inclined bearing bars 14 are provided in the furnace-chamber which extend from the front wall to the bridge wall and incline downwardly toward the said bridge wall.

Each of these bearing bars is provided along its inner side with a series of concave sockets or bearing recesses 15 which latter are uniformly spaced and are open at their upper sides.

These bearing bars 14, it will be understood, are arranged in spaced-apart pairs,—the distance between them being slightly greater than the width of the grate so that the oscillating and stoker bars will be located between and supported by two spaced-apart bearing bars.

The oscillating supports comprise a horizontal lower cross-bar 18; an upper bearing bar 19 and arms 20 which connect the lower and upper bars.

The lower cross-bars 18 have projecting ends which seat in the recesses 15 on the inner sides of the bearing bars 14 so that the oscillating supports may be rocked in order to swing the upper bearing bars 19 back and forth.

One arm 20 of each oscillating support depends below the lower bar 18, and these lower depending ends are connected to actuating levers by which latter they may be moved as and for the purpose now to be explained.

For a better understanding of the operation of the structure certain of the depending arm-ends are designated 21 while the others are designated 22, thus dividing said arm-ends into two groups with alternate arms included in the same group.

All of the arm-ends 21 are connected so

as to oscillate in unison while the other arm-ends 22 remain idle or stationary, and all the arm-ends 22 are connected so they may be oscillated while the arm-ends 21 remain stationary.

Link bars 24 and 26 beneath the grate connect the actuating levers 23 and 25 with the respective groups of arms 21 and 22 whereby said arms may be rocked to effect the stroking operation.

It will thus be seen that either group of oscillating supports may be oscillated independently of the other group.

All of the features hereinbefore described are substantially shown in the said Patterson Patent 1,395,006 referred to, and are not in themselves claimed by me, except in combination with the improvements now to be explained.

The upper bearing-bars 19 of each oscillating support, as best shown in Figs. 2 and 3 of the drawing, has the form of a so-called bulb-angle in that it has a flat upper front face 27 above which there is a cylindrical or bearing head 28, which latter is connected by a reduced neck to the bearing bar 19. This reduced neck connection between the bearing-head and bar produces a front under-cut or shoulder 29 between the head and upper face 27 of the bearing-bar. At the rear, the face of the neck is shown tangent to the rear part of the cylindrical head and this rear face of the bar serves as a stop-face as will presently be explained.

It will be noted that the curvature of the bearing-head 28 extends through more than one-half of a complete circle.

The bearing-head 28 of the upper bar 19 of each oscillating support forms a horizontal support for a stoker bar or a series of stoker-bar sections which will now be explained.

The stoker-bars may have the form of a continuous bar or may be made up of a series of units or sections such as are illustrated in the said Patterson patent, but whether they have one form or the other, they differ from the Patterson sections or bars in the construction of the surfaces that seat upon or coact with the cylindrical or bearing head 28 of the upper bearing-bars 19.

In my improved form, I have devised a construction which permits the stoker-bars to be so engaged with the bearing bars as to prevent accidental disengagement during the stoking operation and also to prevent the rearward free ends of the stoker-bars from dropping down during such stoking operation.

By reference to Fig. 1, it will be noted that the stoker-bars are designated 30 and 31 in order that one set of stoker-bars may be distinguished from the other because they are both constructed alike, but one set will be actuated with one set of arms 21 while the other set of said bars will be actuated with the other set of arms 22.

As both sets of stoker-bars are alike in construction, a description of one will serve for both.

Each stoker-bar or stoker-bar section as shown in Fig. 4 of the drawing, is made up of a series of spaced-apart bars 32 which are united at their rearward ends by a continuous cross-bar 33 and are united in a cross-wise direction near their front ends by a cross-web 34 which extends across the spaces intervening between one bar and the next.

Each bar 32 has a novel and useful form of recessed seat at its front under side as will be noted in Figs. 2 and 3 of the drawings. This recess in cross-section has a special curvature so that its bearing face 35 will form an arc of a circle with a depending rear face 36 that depends from the arc on a tangent thereto whereby to form a rear depending stop-face.

The front face or edge 37 of each bar curves downwardly and rearwardly and merges with the front wall of the arc that forms the bearing face 35.

At the point where this merger of the front edge 37 with the bearing face 35 takes place, the bar has the form of a rearwardly-curved ledge or hook 38,—the hook extending rearwardly toward the opposite stop-face 36 at the entrance to the bearing recess above it. This recess entrance is an important and desirable feature of the present invention as will presently be explained.

It is to be understood that the cross-webs 34 which connect the bars 32 are located or alined with the bearing-faces 35 in the recessed under side of the bars and that these webs 34 have the same shape of cross-recess as the bars so that the recess will be continuous and not merely a recess of the width of a single bar 32.

It will be noted by reference to Figs. 2 and 3 of the drawing that the stoker-bars, or stoker-bar sections, have their front recessed-ends seated on the cylindrical or bearing heads 28 of the bearing-bars 19 and that said stoker-bars or stoker-bar sections extend rearwardly from the heads on which they are seated.

An important feature in this invention resides in the coaction and fitting-together of the cylindrical or bearing head 28 with the curved bearing face 35, so that the rearwardly-extending hook 38 and rear stop-face or edge 36 of each stoker-bar will so engage the head 28 as to prevent the stoker-bars from becoming accidentally dislodged by any ordinary stoking movement of the bars.

It is to be understood that during any normal stoking operation, including both the

backward and forward movement of the stoker-bars, the free rear end of one stoker-bar rests upon the front of the next stoker-bar at the rear of it. At the normal forward or left-hand limit of the stroke, see Fig. 3 of the drawing, the rear depending stop-face 36 of the stoker-bar will seat against the stop-face of the bearing bar 19 in front of it, and any further left-hand movement of the oscillating supports and stoker-bar will cause the rearward free end of the stoker-bar to be lifted, as shown by broken lines in Fig. 3 so that even though the rear edge of the stoker-bar should, for any reason, be withdrawn or moved from the front edge of the bar at its rear, such bar would not drop and dump the fire because the stop shoulder 36 will engage the stop face of bar 19 and limit the downward movement of the rear cross-bar end 33.

In case the rear end of a stoker-bar should be withdrawn from the front edge of the bar at its rear its rear end will be held up in a position where it will pass over said rear edge when the rearward stroke to the right is made.

When the stoker-bars are seated on the heads 28 of the bearing bars, as shown in full lines in Fig. 2 of the drawing, the hook 38 on the stoker-bars will extend under the curved shoulder 29 and hold the front end from upward disengagement, while the rear end of the stoker-bars in one vertical plane will extend rearwardly and rest upon the front ends of the stoker-bars next at their rear. This construction and arrangement permits the front ends of the stoker-bars to rock on the rounded heads 28 of the bearing-bars without however lifting from said head, while the rear ends are free to ride over the upper curved faces of the stoker-bars at the rear as said stoker-bars are reciprocated through the oscillations of the supports 19—20.

By means of this invention the rear ends of the stoker-bars are prevented from swinging down under any conditions because when the bearing bars 19 have moved far enough to the left to leave the rear ends unsupported the stop-faces 36 will seat against the rear faces of the bearing-bars and prevent the said rear ends of the stoker-bars from tilting downwardly so that any further movement of the arms and stoker-bars to the left will cause the latter bars to assume the broken-line positions shown in Fig. 3 of the drawing in which positions they will be held until the stoker-bars are returned.

The connection between the stoker-bars and bearing bars is such that they may be disconnected only when the rear free ends of the stoker-bars are deliberately raised until the hooks 38 can be withdrawn from the rounded heads 28 by moving the rear ends of the stoker bars upwardly on an inclined line to the left from the rounded heads of the bearing-bars.

The curves imparted to the bearing faces of the bars 19 and 32 and the stop faces 36 are therefore important in the present invention because they prevent accidental displacement and also prevent the rearward ends of the stoker-bars from accidentally dropping.

Having described my invention, I claim,—

1. In a furnace grate, the combination with a series of reciprocating stoker-bars arranged in rows with the rear edge of each bar except the rearmost bar normally held from dropping downwardly by resting upon and having sliding contact on the front upper surface of the next bar at its rear, of means for reciprocating each stoker bar with respect to the bar next at its rear which supports it and means at the forward portion of each stoker-bar for limiting the downward tilting movement of the rear end of the same bar and to hold said rear end up sufficiently in case it is withdrawn from the support of the bar next at the rear to enable said rear end of the front bar to clear the front edge of the bar at its rear when making a rearward stroke.

2. In a stepped furnace grate, the combination with a series of oscillating pivoted bars each having an upper bearing surface above its pivot point, of a series of reciprocating stoker-bars the stoker-bars in one plane being pivotally connected at their forward ends to the bearing face of one oscillating bar and having their rear ends normally free and resting upon the pivoted ends of another series of stoker-bars at their rear so as to slide thereon when they are reciprocated the pivot means at the forward ends of said series of stoker-bars being formed and arranged to limit the downward movement of the rear ends of said stoker bars and to keep said rear ends raised sufficiently in case said rear ends are withdrawn from the forward ends of the bars next at the rear to enable said rear ends to clear the forward ends of the bars on which they normally rest and slide.

3. In a furnace grate the combination with a series of parallel supports each having an upper bar with a head that is rounded in cross-section and with a flat face at the rear side of each head and an undercut or groove along the front side of and at the base of the head said flat rear face on each bar forming a rear stop-face, of a series of stoker-bars above the parallel supports and each stoker-bar having a rounded recess in its under side near its forward end, said recess being shaped with a downwardly and rearwardly-extending hook at the front side of said recess and at the rear side of each recess each stoker-bar having a downwardly-extending straight-faced stop-flange,—the

rear edge of each stoker-bar except the rearmost seating upon and being normally held up by the bar in its rear so that the stop-flange of the stoker-bar and the stop-face of the supporting-bar will normally be spaced apart and the relation between the said recess and the rounded head being such that in case the said rear ends of the stoker-bars become withdrawn from the forward ends of the stoker-bars at their rear, the flat stop-face on the rear of the head and the flat stop-face on the stoker-bar will engage each other and hold the rear ends of the stoker-bars elevated sufficiently to clear the forward ends of the said bars at the rear.

In testimony whereof I affix my signature.

ARTHUR O. BABENDREIER.