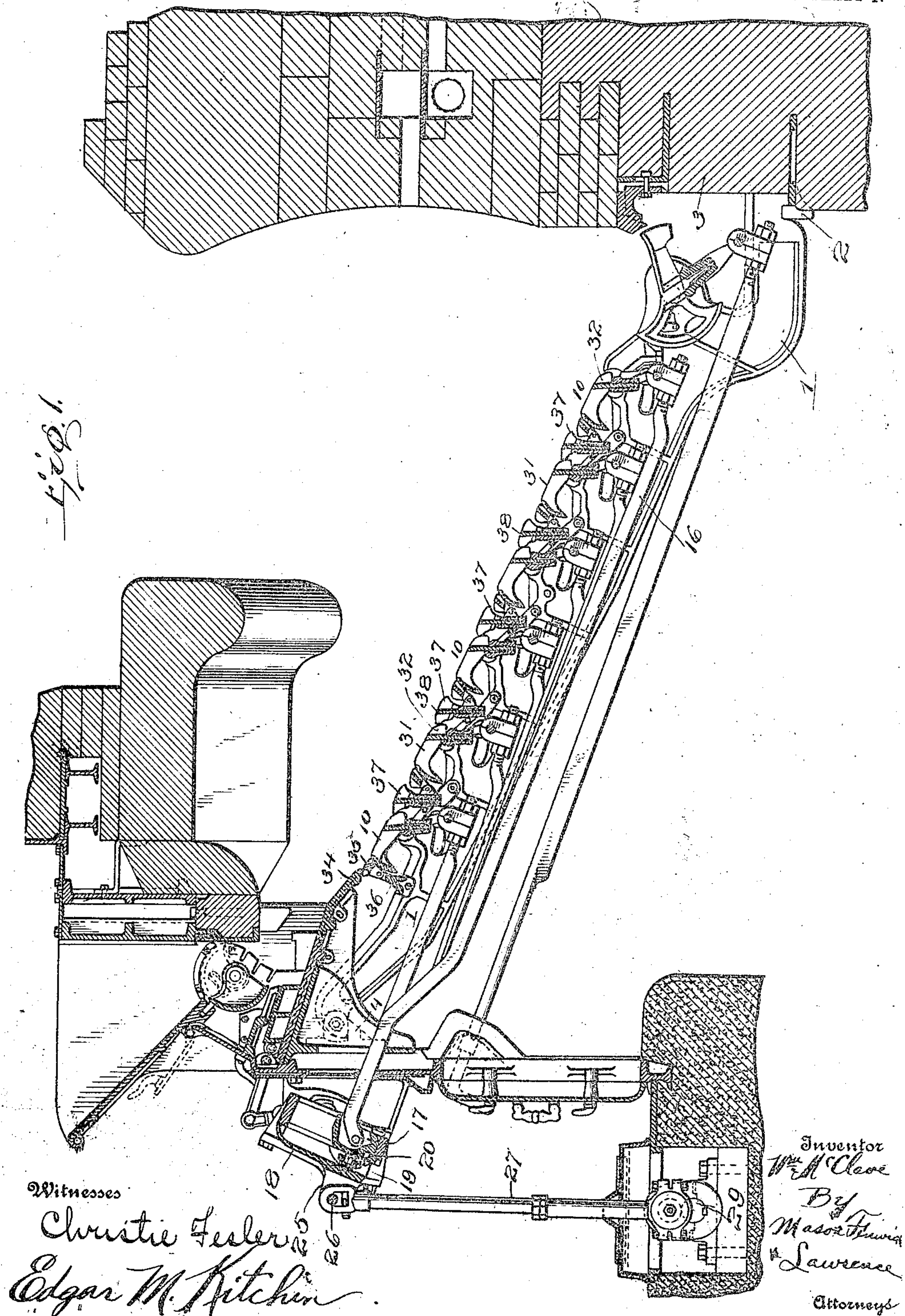


No. 849,913.

PATENTED APR. 9, 1907.

W. McCLAVE.
STOKING GRATE MECHANISM.
APPLICATION FILED APR. 12, 1906.

5 SHEETS—SHEET 1.

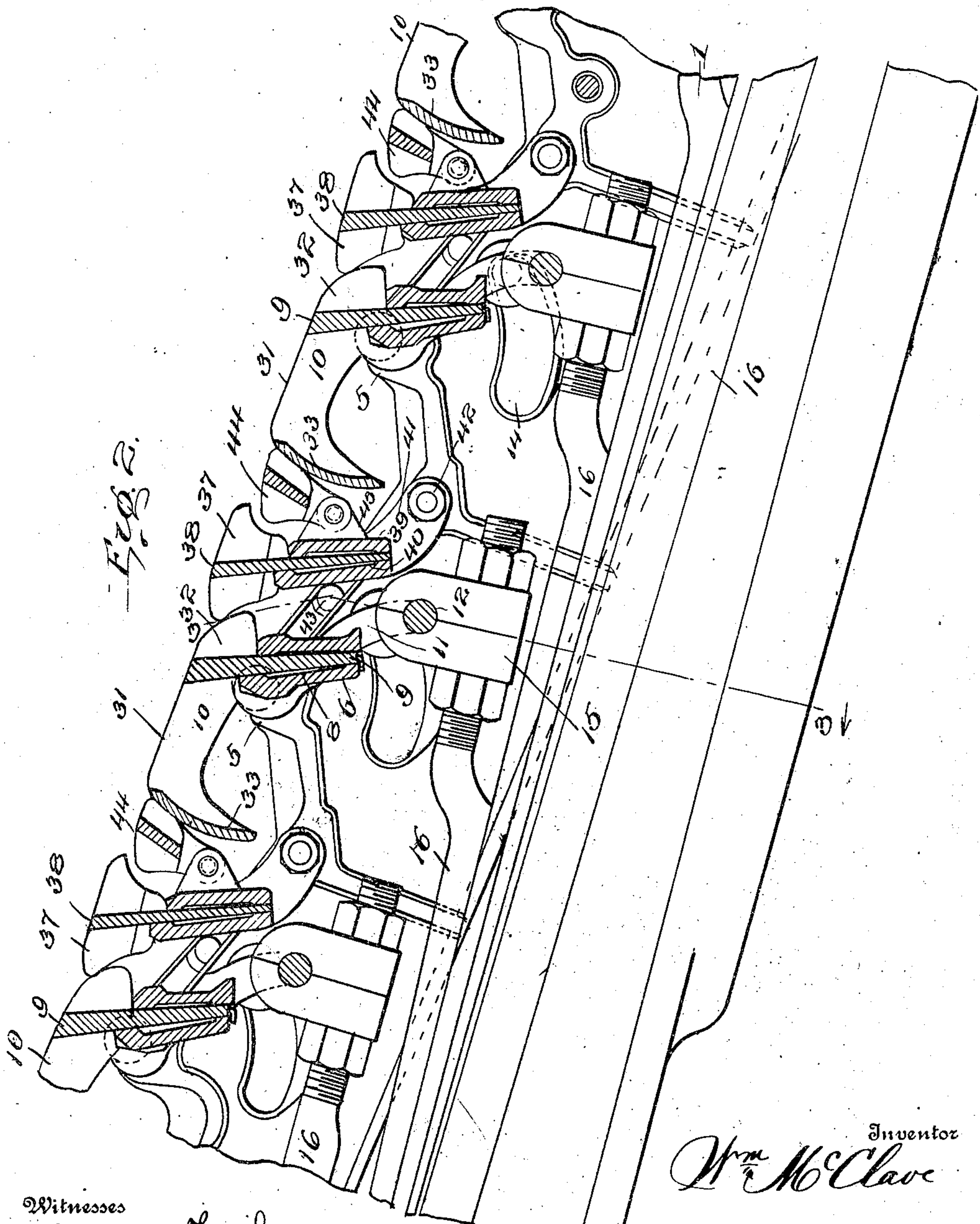


No. 849,913.

PATENTED APR. 9, 1907.

W. McCLAVE.
STOKING GRATE MECHANISM
APPLICATION FILED APR. 12, 1906.

5 SHEETS—SHEET 2.



Witnesses
Christie Feiler
Edgar M. Kitchen

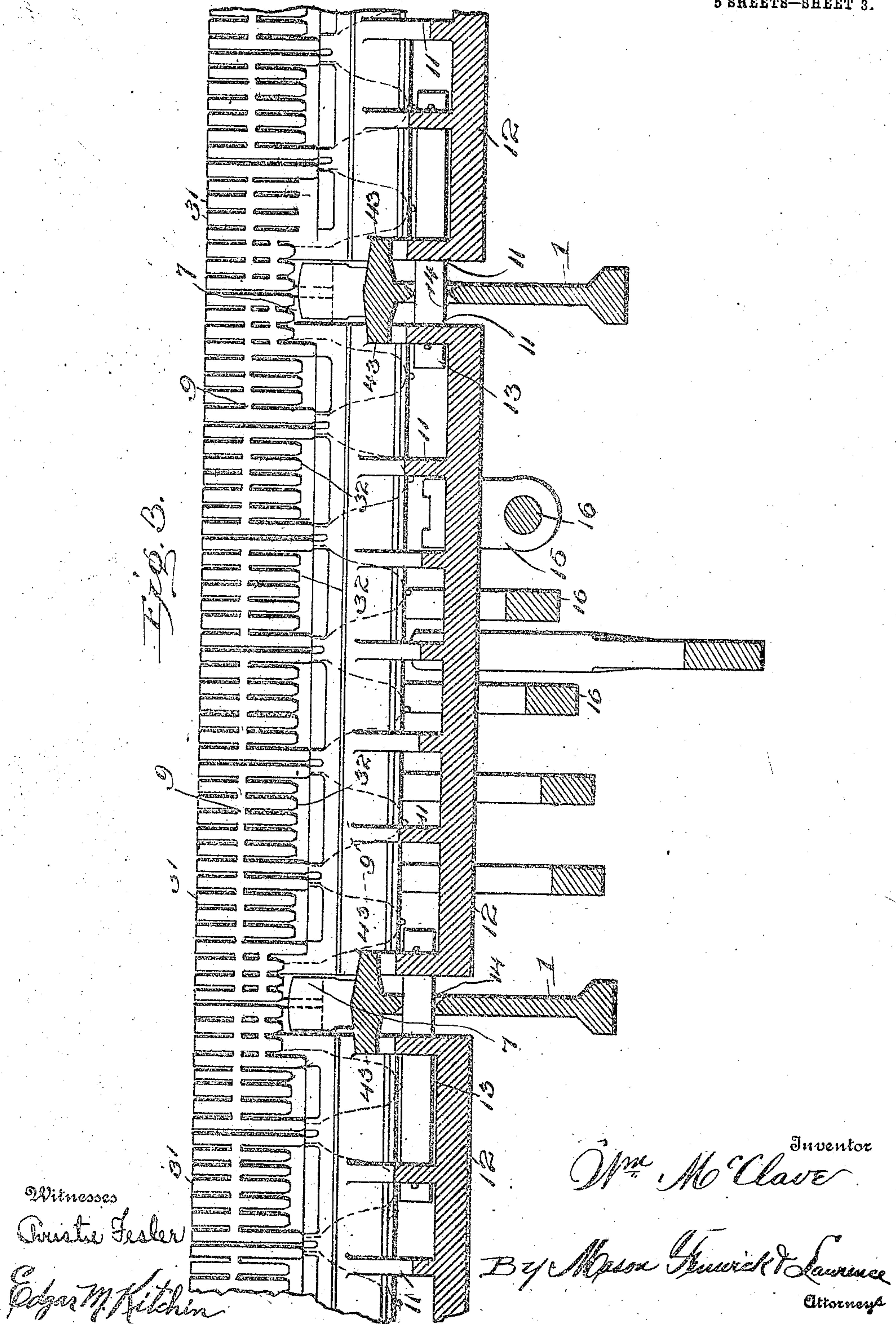
Inventor
Wm. McClave
By
Mason Fenwick & Lawrence
Attorneys

No. 849,913.

PATENTED APR. 9, 1907

W. McCLAVE.
STOKING GRATE MECHANISM.
APPLICATION FILED APR. 12, 1906.

5 SHEETS—SHEET 3.



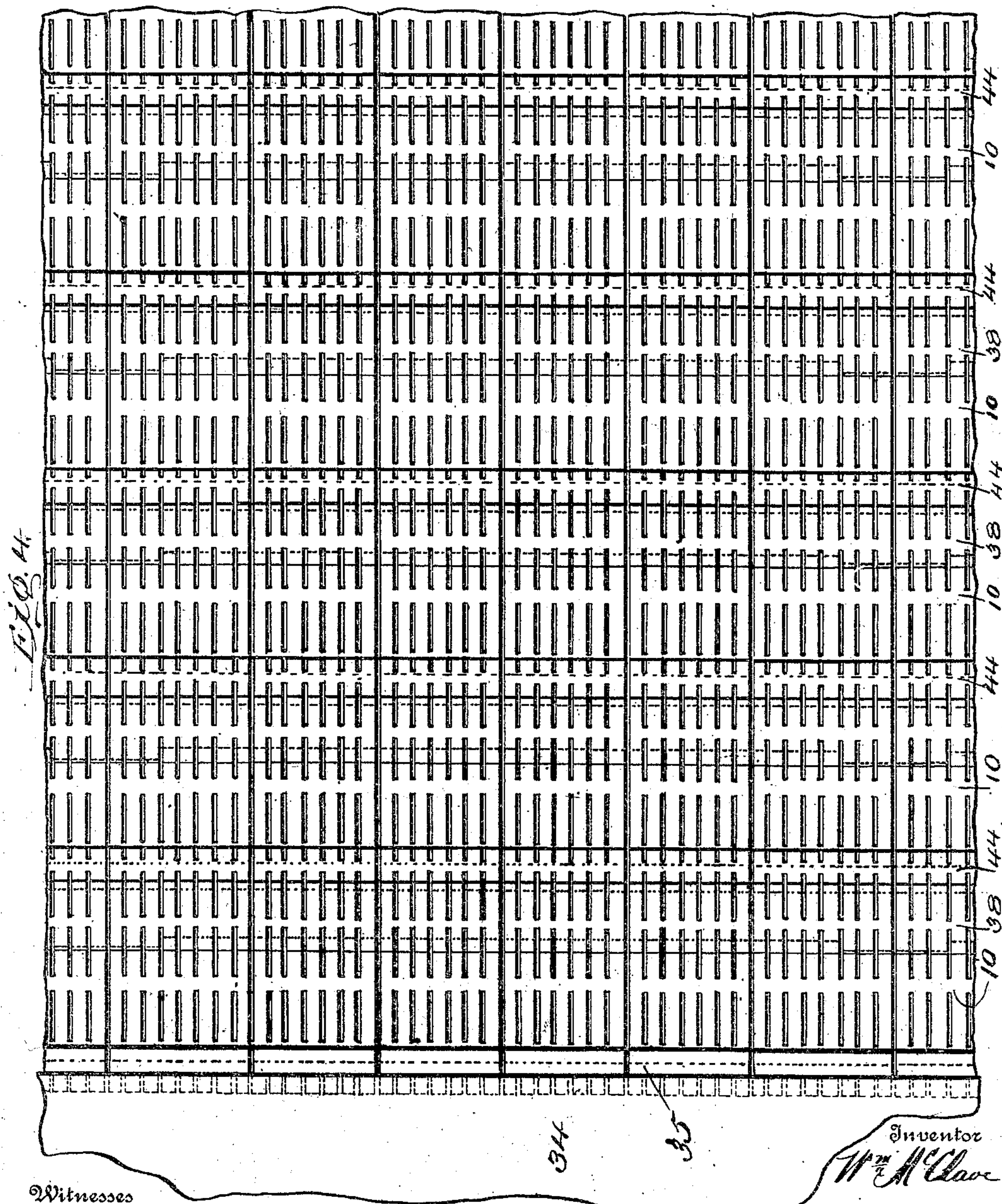
No. 849,913

PATENTED APR. 9, 1907.

W. McCLAVE.
STOKING GRATE MECHANISM.

APPLICATION FILED APR. 12, 1906.

5 SHEETS—SHEET 4.



Witnesses

Christie Fesler

Edgar M. Fitchin

By

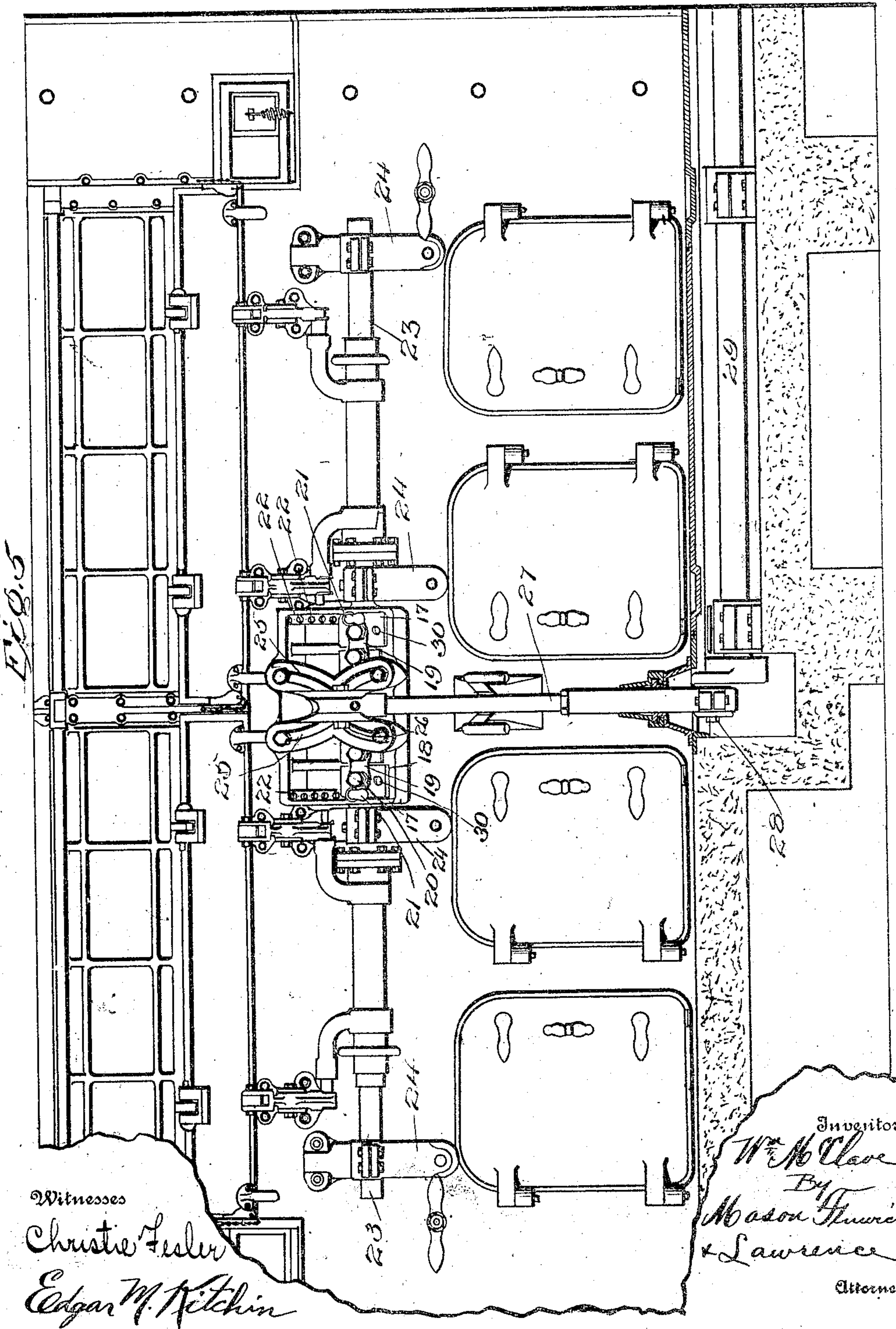
Mason Fenwick & Lawrence
Attorneys

No. 849,913.

PATENTED APR. 9, 1907.

W. McCLAVE.
STOKING GRATE MECHANISM.
APPLICATION FILED APR. 12, 1906.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

WILLIAM McCLAVE, OF SCRANTON, PENNSYLVANIA, ASSIGNOR TO McCLAVE-BROOKS COMPANY, OF SCRANTON, PENNSYLVANIA; A CORPORATION OF PENNSYLVANIA.

STOKING-GRATE MECHANISM.

No. 849,913.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed April 12, 1906. Serial No. 311,391.

To all whom it may concern:

Be it known that I, WILLIAM McCLAVE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Stoking-Grate Mechanisms; 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.

This invention relates to certain novel features in stoking-grate mechanism, and more particularly is in the nature of certain improvements in the structure shown in my application for patent for stoking-grate mechanism filed August 4, 1905, and designated by Serial No. 272,705.

The object in view is the more efficient accomplishment of the results sought to be attained in my invention set forth in my above-mentioned previous application for patent.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of a grate mechanism embodying the features of the present invention. Fig. 2 is an enlarged detail fragmentary section taken longitudinally of the grate. Fig. 3 is a transverse sectional view taken on the plane of line 3-3 of Fig. 2 and looking in the direction indicated by the arrow. Fig. 4 is a view in top plan of a fragment of a grate-surface looking at the same as if it occupied a horizontal plane. Fig. 5 is a view in front elevation of a furnace provided with a stoking-grate mechanism embodying the features of the present invention, parts being broken away for the saving of space.

While it is to be noted that a number of the elements illustrated in the accompanying drawings correspond to similar elements disclosed in my previous application above referred to for the purpose of making the utility of the present invention obvious in this application, I will briefly describe the elements found in the former application and which are therefore not claimed herein.

In carrying out the present invention I preferably embody the same in the form of an incline grate-surface, the degree of inclination being only comparatively slight in view of the operation of the mechanism as herein-

after set forth. This grate-surface is carried by certain carrier-bars or carriages 1, spaced apart at suitable distances, a greater or less number of carriages being employed, according to the size of the grate-surface. Each of the carriages 1 at its lower end is mounted upon a suitable bearer bar or plate 2, sustained by the usual bridge-wall 3. At the upper end each of the carriages 1 rests upon a suitable ledge 4, (indicated in dotted lines in Fig. 4,) projecting inwardly from the front wall of the furnace. Each of the carriages 1 is provided with a plurality of trunnion blocks or bearings 5, said bearings being spaced apart longitudinally of the respective carriages, and preferably consists simply of a raised portion of the edge of the carriage, as clearly indicated in Fig. 2, which is formed with a semicircular recess and adapted to receive one of the trunnions or journals of one of the stoking-grate bars 6. The bearing 5 is formed in the raised portion of the carriage in order that the grate-surface may be spaced above the carriage for the greater portion thereof, so as to permit free circulation of air and to prevent deterioration of the carriage by the intense heat on the grate-surface.

Mounted upon the carriages 1 are the rocking grate-bars 6, the number of bars employed being dependent upon the area of the grate-surface required, which is immaterial to this invention. Each of the bars is of sufficient length to extend from one carriage to the other, as is best seen in Fig. 3, and each bar is provided with a trunnion or a journal 7, projecting from each end and in operation lying within the bearings 5 for sustaining the grate-bar in position, while permitting rocking of the same.

Each of the grate-bars 6 is made up of a body portion having a series of sockets 8, into each of which is adapted to be inserted the shank 9 of a cap 10, said caps constituting the main portion of the grate-surface. From each of the bars 6 extend downwardly suitably-curved arms 11, suitably spaced apart and carrying at their outer ends a rod 12, which is disposed longitudinally of and parallel to the bar 6, so that said bar may be caused to swing upon its journals 7 by swinging of the rod 12. The bars 6 are spaced apart longitudinally of the carriages 1 at the distance

necessary for accommodating the caps 10 and the interposed elements between the rows of caps, and when more than two carriages 1 are provided the bars 6, which are in alignment transversely of the grate-surface, have their ends connected together, so that motion may be transmitted from the actuated mechanism of one bar to all the other bars. The connecting means preferably consists, as seen in Fig. 3, of a shaft or rod 13, which extends through a segmental slot 14 in the respective carriages and at one end engages one of the arms 11, preferably extending therethrough, and at the other end by preference engaging two of said arms 11, extending therethrough. By engaging two of the arms 11 on one side of the carriage and one of the arms 11 on the other the shaft 13 is held rigid with respect to the operating-rods 12 and the bars to which said rods are connected. Thus if the intermediate bar 6 is rocked by actuation of the rod 12 thereof the rods 12 of the next contiguous bars at the ends of the bar being actuated directly will be correspondingly moved.

It is of course noted that the grate-bars 6 are thus arranged in series, each series being spaced longitudinally of their carriages 1 from the next series. One of the rods 12 of each series of grate-bars is engaged by a clamp 15, the clamp preferably being connected with the rod 12 of the intermediate bar of a series. Each clamp 15 is carried by a pitman 16, which extends longitudinally beneath the grate-surface, and, as best seen in Fig. 1, each of the pitmen projects through the front wall and extends to and pivotally engages a sliding block 17. Each of the blocks 17, as seen in Figs. 1 and 5, is mounted within an oscillating frame or head 18. The blocks 17 are preferably connected together by suitable transversely-arranged plates 19, which plates are connected to the blocks by bolts 20. The blocks 17 are adjustable within the head or frame 18, and said blocks are adapted to be secured at various points of adjustment within the head or frame 18 by means of pins 21 21, passed through a portion of the two outermost blocks in position for engaging any one of the series of apertures 22 22 formed in the guideway of the frame or head 18 for the boxes 17. The head or frame 18 is fixed to a transversely-arranged shaft 23, which shaft is journaled in bearings carried by brackets 24 24, fixed to the furnace-front. Fixed to the frame or head 18 and extending outwardly therefrom are suitable brackets 25 25, which brackets are connected by a bolt or pin 26. The pin 26 is engaged by a pitman 27 between the brackets 25, the said pitman being connected with the crank 28 of a power-shaft 29. The shaft 29 receives power from any suitable source and operates to reciprocate the

pitman 27 and to oscillate the frame or head 18, which oscillation of the head rocks the shaft 23, to which it is connected. Thus it will be observed that when the shaft 29 is driven the oscillating head 18 will be operated and the pitmen 16 caused to reciprocate. When the blocks 17 are arranged, as indicated, in direct alignment with the shaft 23, (said shaft being of two-part formation, one fixed to and extending laterally from each side of the head 18,) only a comparatively small amount of longitudinal movement will be imparted to the pitmen 16. When a greater amount of movement is desired, the blocks 17 are adjusted away from the line of shaft 23, and the farther that the blocks are adjusted the greater will be the longitudinal thrust of the pitmen. For the purpose of convenience I preferably provide the outermost blocks 17 with apertures 30, adapted to receive an operating-tool.

The shaft 23 is connected with mechanism (illustrated in Figs. 5 and 1) for aiding in the automatic feeding of fuel, which mechanism has a distinct classification in the Patent Office from a grate mechanism and is therefore not described or claimed herein.

From the foregoing it will be observed that all of the grate-bars 6 may be rocked either continuously or intermittently by suitable driving of the shaft 29, and the caps 10 will be caused to oscillate correspondingly for feeding fuel down the grate-surface.

Each of the caps 10 consists of a shank 9, forwardly-extending fingers 31 31, and rearwardly-extending fingers 32 32. The forwardly-extending fingers 31 are preferably connected by a transverse web 33, said web being struck on the arc of a circle concentric to the pivotal mounting of the bar 6.

The feeding mechanism above referred to delivers the fuel across a dead-plate 34, and a small space is left between the edge of the dead-plate and the forwardly-projecting fingers of the first row of caps 10, and in order to fill the said space to prevent running through of fine fuel a movable cap 35 is pivotally mounted in said space, said cap being pivoted to suitable lugs carried by a transversely-arranged bar 36, secured to and supported by the carriages 1. The rear face of the cap 35 is curved to conform to the curvature of the web 33 of the first cap 10, and said cap 35 rests against said web at all times, the web being of sufficient width to permit the movement of the cap 10 without passing upwardly out of contact with the cap 35.

Arranged between each two rows of caps 10 are filler-caps 37, arranged in a row. The caps 37 are each made up of forwardly and rearwardly extending fingers and a downwardly-extending, preferably tapering, shank. A bar 39 is disposed beneath each row of filler-caps 37 and is provided with a socket

for the reception of the shanks 38. The construction and arrangement of each bar 39 and the shanks 38 is similar to the construction and arrangement of each bar 6 and shanks 9. Each of the bars 39 extends parallel to the contiguous bar 6 and is of a length equal to the width of the space between the carriages 1. Each end of each bar 39 is provided with an arm 41, which extends downwardly and rearwardly therefrom and is pivotally supported by means of a bolt 42, passed through the carriage 1. As a matter of convenience each bolt 2 may be caused to support an arm 41 on each side of the carriage 1, as the bars 39 are of course arranged in alignment. Forwardly of each of the bars 39 each carriage 1 is provided with a laterally-extending lug 43, against which the respective bar 39 normally rests. It is here to be observed that each arm 41 is carried well rearwardly, so that the center of gravity with respect to the bar 39 and arm 41 is a considerable distance to the front of the pivot pin or bolt 42, whereby the retention of the bar 39 against the lugs 43 under normal conditions is assured. At the same time the pivotal supporting of the arms 41 insures freedom of the bar 39 to move rearwardly when necessary. Under normal conditions the forward fingers of the caps 37 normally overhang a portion of the rear fingers of the caps 10 and preferably contact with the curved surfaces of said fingers, such curved surfaces being concentric with the pivotal mounting of the caps 10.

The caps 37 are not of sufficient width to close the space between two rows of caps 10, and I therefore interpose a row of supplemental filler-bars 44 between the row of caps 37 and the next lower row of caps 10. The filler-bars 44 are pivotally mounted on rearwardly-extending webs 45, preferably formed integral with the respective bar 39. The bars 44 are arranged with the center of gravity in the rear of the pivot-point, and each filler-bar is provided with rearwardly-extending fingers adapted to normally lie in contact with the web 33 of the next succeeding cap 10. Each of the filler-bars 44 is also formed with forwardly-extending fingers which are preferably overhung by the rearwardly-extending fingers of the caps 37.

It is to be observed that in operation as the grate-bars 6 are oscillated the caps 10 will be swung vertically without interference by contiguous elements of the grate-bar and without creating an opening in the grate-surface. The filler-bar 44 retains its close contact with the cap 31, as does also the cap 37. The weight of the respective filler-bars 44 is not sufficient to cause the wear produced by contact with the caps 10 to be material, and any "growing" of the filler-bar 44, due to excessive heat, will be accommodated by pivotal movement of the bar. The caps 37 nor-

mally contact with the rearwardly-extending fingers of the caps 10, and it is well understood that when metal, and particularly cast-iron, is subjected to continued heat it will grow, or, in other words, increase in size, due to a swelling or dislocating of the molecules comprising the metal. This growing of the caps 37 will be accommodated by a swinging movement of the bars 39, the bars temporarily relieving the contact with the lugs 43. However, the continued wear on the caps 37 will soon permit the same to be restored to their former position with bars 39 in contact with lugs 43.

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

1. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps carried thereby, of removable filler-caps interposed between the rocking-bar caps and movable independently of said rocking-bar caps.

2. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps carried thereby, of pivotally-mounted bars disposed between said rocking grate-bars and overbalanced at one side of its pivot, and filler-caps removably carried by said pivotally-mounted bars in position for at times resting by gravity upon some of the rocking grate-bar caps.

3. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps therefor, of filler-caps interposed between the grate-bar caps of the respective grate-bars, shanks for said filler-caps, and means pivotally and removably supporting said filler-bar shanks independently of the rocking grate-bars.

4. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps carried thereby, of filler-caps pivotally and removably supported between the rocking grate-bar caps independently thereof.

5. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps therefor, of a pivotally-mounted bar interposed between said grate-bars and independent thereof, said pivotally-mounted bar being formed with sockets, and filler-caps having shanks extending into said sockets and removably supported thereby.

6. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps therefor, of a bar interposed between said grate-bars, arms extending rearwardly from said interposed bar, means pivotally carrying said arms, and filler-caps carried by said interposed bar.

7. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps therefor, of a bar interposed between said grate-bars and independent

thereof, and mounted to swing laterally therebetween, and removable filler-caps for said interposed bar.

8. In a stoking-grate mechanism the combination with rocking grate-bars spaced apart, and caps therefor, of a pivotally-supported bar interposed between said grate-bars, filler-caps carried by said interposed bar, and filler-bars interposed between said filler-caps and the caps of one of said grate-bars, said filler-bars being pivotally carried by said interposed bar.

9. In a stoking-grate mechanism the combination with rocking grate-bars spaced apart and caps therefor, of a pivotally-mounted bar interposed between said grate-bars, filler-caps carried by said interposed bar and extending forwardly of the same, lugs projecting rearwardly from said interposed bar, and a filler-bar pivotally carried by said lugs.

10. In a stoking-grate mechanism, the combination with rocking grate-bars spaced apart, and caps therefor, of a swinging bar interposed between said grate-bars, filler-caps carried by the swinging bar and means projecting in the path of movement of the swinging bar for normally sustaining the same with one edge of the caps thereof in contact with the caps of one of the grate-bars.

11. In a stoking-grate mechanism, the

combination with carriages spaced apart, grate-bars journaled in said carriages and also spaced apart, and caps for said grate-bars, of a bar pivotally supported by said carriages between said grate-bars; the center of gravity of the pivoted bar being at one side of the pivot, lugs projecting laterally from one of the carriages for preventing downward pivotal movement of said pivoted bar, and filler-caps carried by said pivoted bar.

12. In a stoker-grate mechanism, the combination with carriages spaced apart, grate-bars journaled therein, actuating mechanism connected with said grate-bars for rocking the same on their journals, caps carried by said grate-bars, a pivotally-mounted bar arranged between each two of the grate-bars, lugs projecting from the carriages for normally sustaining the interposed bars against downward movement upon their pivots while permitting upward movement thereof, and caps carried by said interposed bars.

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

WILLIAM McCLAVE.

Witnesses:

D. J. DAVIS,

H. A. KELLOW.