

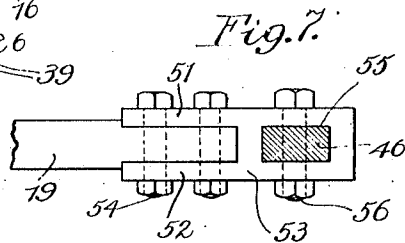
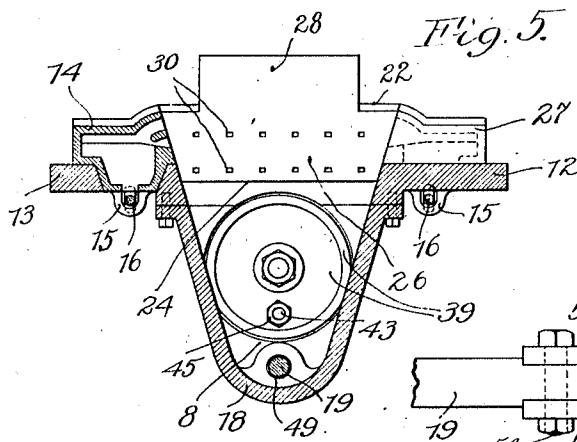
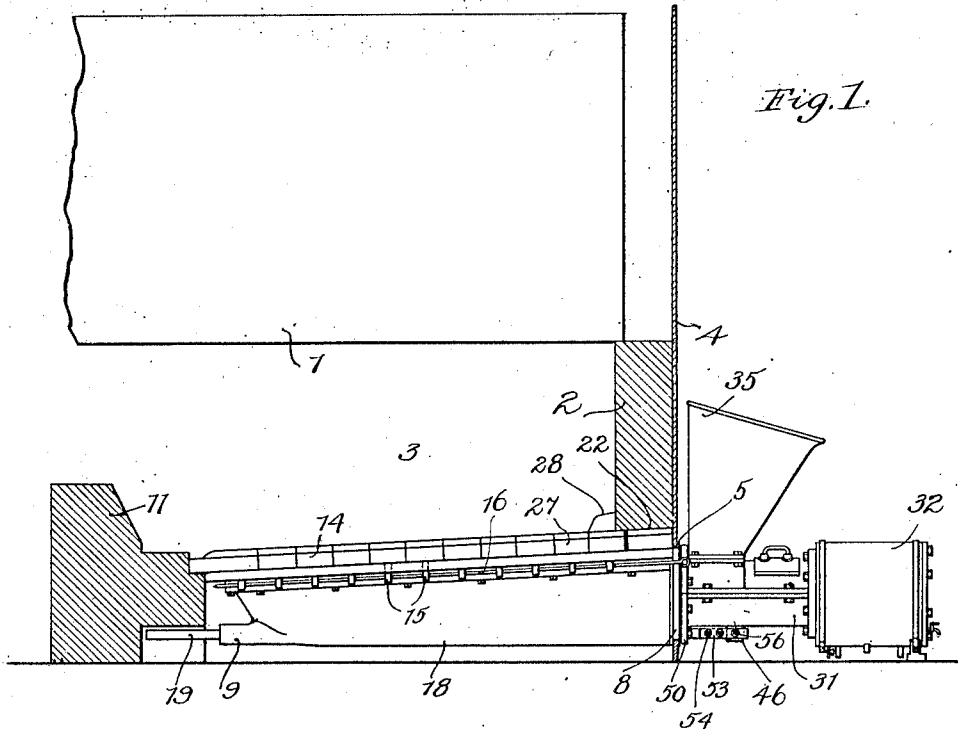
W. J. KENNEY.
AUTOMATIC STOKER.

APPLICATION FILED FEB. 28, 1906.

992,207.

Patented May 16, 1911.

3 SHEETS-SHEET 1.



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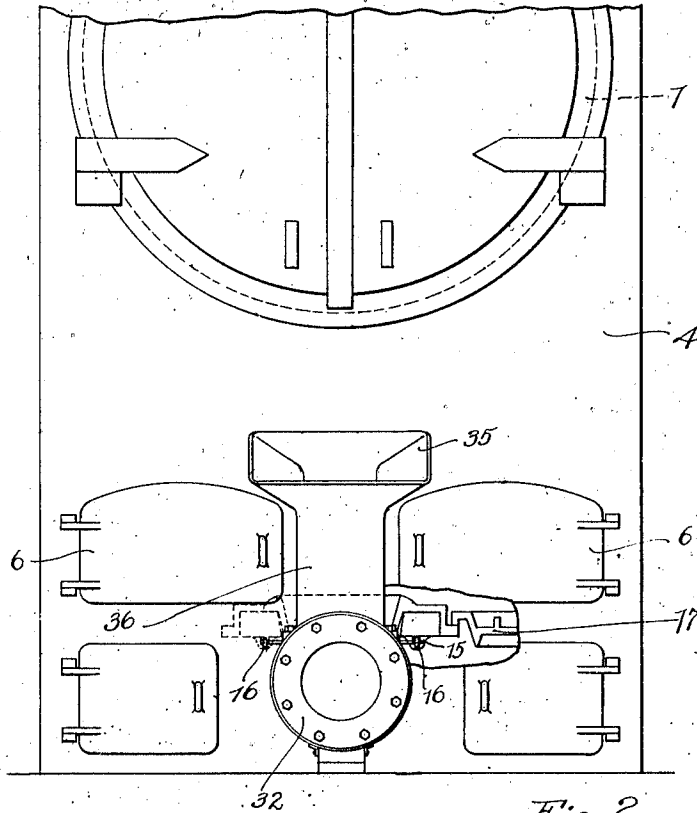


Fig. 2

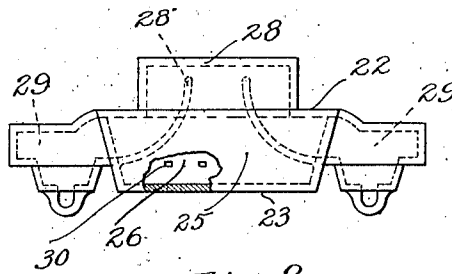


Fig. 8.

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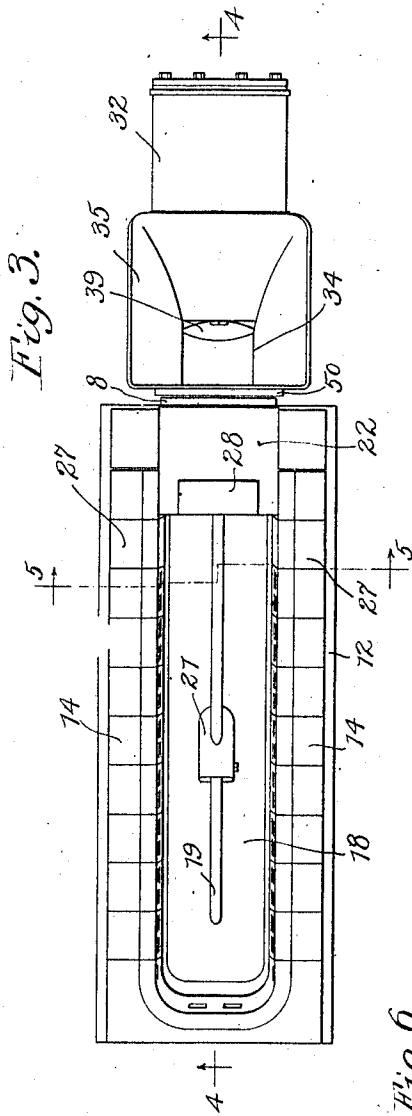
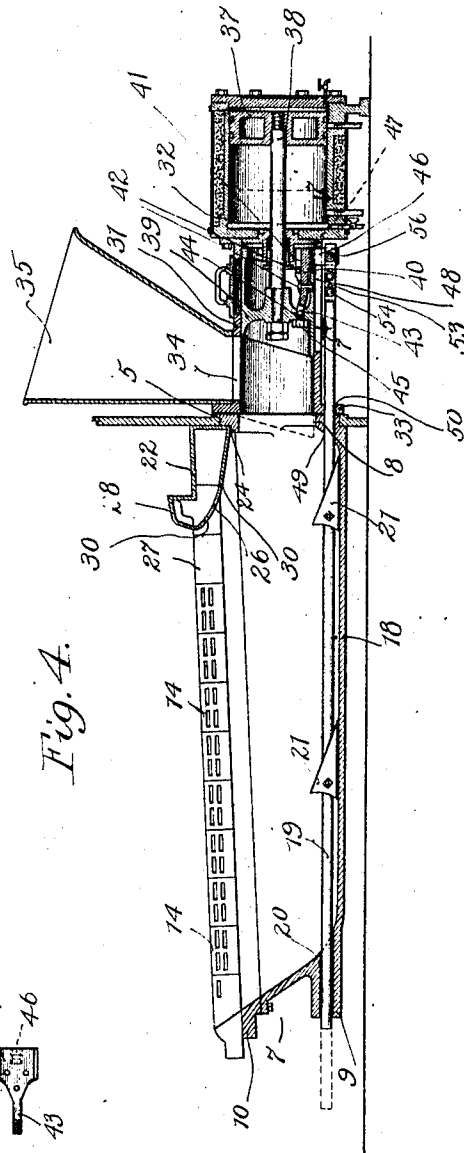
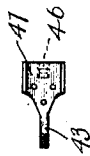


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM J. KENNEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNDER-FEED STOKER COMPANY OF AMERICA, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

AUTOMATIC STOKER.

992,207.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed February 28, 1906. Serial No. 303,338.

To all whom it may concern:

Be it known that I, WILLIAM J. KENNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Stokers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to stokers, particularly to underfeed stokers and contemplates improved features of construction and arrangement therefor, whereby the efficiency thereof may be greatly increased.

Where stokers of this class are used, a great deal of trouble has been experienced in the cracking of the boiler front caused by having square openings through which the stoker projects, but my invention provides for a circular opening which eliminates such cracking. Also in stokers of this class the base of the retort slanted upwardly and rearwardly which necessitated a correspondingly slanted pusher rod which connected with the horizontally reciprocating ram. The pusher rod was therefore usually hinged to an end piece by means of a bolt, which end piece was adjustably connected to an extension from the ram usually by means of a bolt, and the entire strain and distortion was taken up by the bolts which soon became worn, bent or broken. My invention, however, provides for a retort having a horizontal base which allows the use of a horizontal pusher rod, and the connection with the ram head may, therefore, be greatly simplified, and I use bolts merely for holding the connecting parts together, but the push of the ram head is directly against and longitudinal of the pusher rod. I also reduce the outlet of the hopper and the length of stroke of the ram head but increase the rate of travel of the ram head. Less coal will, therefore, be necessary and the fire will oftener be agitated and the coal in the furnace brought into contact with air to a greater extent than formerly. Shortening of the ram stroke also shortens the stroke of the piston head and this, together with the fact that the straight pusher rod which I employ requires very much less power to operate, enables me to operate the stoker

under greatly reduced steam pressure and the saving is thus apparent. I also prevent escape of gases from the furnace through the ram chamber and hopper by providing a specially designed deflecting plate which is connected with the air supply and has openings adapted to direct the air to checkmate the gases which otherwise would escape into the ram case and out into the hopper. This deflecting plate or frame is also shaped to better deflect the coal upwardly and to prevent packing at the end of the ram case and entrance to the retort.

Several other features are also provided by my invention which will be better understood when described with reference to the accompanying drawings, in which—

Figure 1 shows a side view of the front end of a boiler and inclosing wall with the under-feed stoker of my invention associated therewith, the walls being in section. Fig. 2 is a front view of the boiler and stoker mechanism. Fig. 3 is a top view of the stoker mechanism alone. Fig. 4 is a sectional view taken on line 4—4 of Fig. 3. Fig. 5 is a sectional view taken on line 5—5 of Fig. 3. Fig. 6 is a top view of the pusher rod connecting block. Fig. 7 is a sectional view taken on line 7—7 of Fig. 4 showing the top view of the pusher rod connection with the connecting block, and Fig. 8 is a front view of the deflecting frame.

The boiler 1 is suitably mounted upon a setting 2 and is adapted to receive heat generated in the fire chamber 3. The boiler front plate 4 is disposed before the setting 2 and has the circular opening 5 for accommodating the stoker mechanism, and the fire doors 6—6. The retort 7 has a circular neck 8 within the opening 5 and at its rear end has the projections 9 and 10 the projection 10 being supported in the wall 11. Disposed along the sides of the retort chamber and mounted on the shelves 12 and 13 are the twyer blocks 14, said twyer blocks having extensions 15 projecting through the shelves and provided with openings for receiving the twyer rods 16. The shelves 12 and 13 which may be integral with the retort body or separate plates as shown, assist in supporting the dead plates 17 which extend from the twyer blocks to the side walls of the furnace chamber. The base 18

of the retort is horizontal instead of slanted, as was heretofore the case, and the pusher rod 19 may, therefore, also be horizontal, this rod at its rear end extending through the opening 20 through the extension 9 and provided at suitable points with pusher rod blocks 21 secured thereto in a suitable manner. The twyer blocks and dead plates, however, are in a plane which slants downwardly toward the rear instead of in a horizontal plane, as was heretofore the case, and I find that by this arrangement there is more available space for the combustion of gases and the operation is otherwise greatly improved.

Directly above the entrance to the retort I arrange the deflecting frame 22 which serves very useful purposes. The construction of this frame is best shown in Fig. 8, it having the front edge 23 for engaging with the ledge 24 at the front of the retort frame, the front 25 of the deflecting frame abutting against the furnace front plate 4. The lower wall 26 slants upwardly from the front and curves upwardly and rearwardly at its end to properly deflect and guide the incoming fuel upwardly toward the twyer blocks. In advance of the twyer blocks proper on each side of the retort are the blank twyer blocks 27 which have no air outlets, and owing to the upward slant of the deflecting frame these blank twyers are always covered and protected by fresh coal. Concentration of heat at this point and burning out of the blank twyer blocks, as was heretofore the case, is, therefore, prevented. The rear end of the deflecting frame has also the ridge 28. This ridge being of metal, prevents adhesion of clinkers which will take place if the clinkers would come in contact with the masonry. As the ridge slants downwardly, these clinkers will fall away from this point and can be more readily removed. At each side is an extension 29 corresponding in shape to the twyer blocks. The entire deflecting frame is hollow and is connected with the air supply source. The lower wall of the frame has a plurality of openings 30 directed downwardly and rearwardly and the air passes into the compartments 29 through the body part of the deflecting frame and then is directed through these openings downwardly and rearwardly against the gases in this part of the retort which would otherwise tend to escape into the ram chamber and out through the retort. Deflecting plates or ribs 28' are provided for causing the air to pass through the ridge 28 which is thereby kept cooler.

The ram chamber or barrel 31 is secured at its front end to the steam cylinder 32 and at its rear end terminates in the flange 33 which abuts against the furnace front plate 4 about the circular opening 5, being suit-

ably secured in this position, the wall 4 being between the flange 33 and the retort front. Directly to the rear of the flange 33 and at the top of the ram case is the hopper opening 34 over which is secured the hopper 35, this hopper being quite narrow along its lower part 36 to prevent interference with the firing doors. The upper part of the hopper, however, is sufficiently expanded to receive a proper amount of fuel.

The piston head 37 reciprocates within the cylinder 32 and by way of the piston rod 38 connects with the ram head 39. The construction of these various parts is such that when the piston is at the front end of its stroke the ram head lies at the front of the ram case and directly in front of the hopper outlet, and when the piston is at the rear end of its stroke the ram head will be at the rear end of the ram case, projecting a slight distance into the retort.

Disposed within the ram head and secured to the lower part thereof is the pusher rod connecting block 40, as best shown in Fig. 4. This block comprises the body part 41 secured to the ram wall by the bolts or rivets 42, the body part terminating in a threaded extension 43 passing through the opening 44 of the ram head to be engaged by the nut 45. From the rear end of the body part a lug 46 extends downwardly through the slot 47 in the ram wall and engages the front edge of this slot, the entire connecting block being thus securely held to the ram head by means of the bolts, the nut and the engagement with this edge. The lug 46 also passes through the slot 48 through the lower wall of the ram case, and as the ram head reciprocates, this projection reciprocates therewith back and forth in said slot. The pusher rod 19 extends through the opening 49 in the front end of the retort and through the opening 50 in the flange 33 of the ram case. As best shown in Fig. 7, the front end of the pusher rod is flattened and secured between the legs 51 and 52 of the connecting piece 53 by means of bolts 54, the body part of this connecting piece having an opening 55 into which the lug 46 closely fits and secured therein by a bolt 56'. The entire thrust and pull of the connecting block 40 on the push rod is directly through the connecting piece 53 against the rod, and the bolts are entirely free from strain other than that merely to hold the parts together. In devices where the pusher rod slants instead of being horizontally disposed, as herein, the entire strain is taken up by bolts which become loose and worn, thus introducing lost motion, or eventually become broken and a great deal more power is necessary to operate the pusher rod.

I find that by increasing the number of strokes per minute of the ram head and decreasing the outlet opening of the hopper

that much less coal is necessary for obtaining the same results. This short stroke feature combined with my improved arrangement of the pusher rod mechanism, also enables me to operate the stoking mechanism with greatly reduced pressure, thereby economizing in steam or other power which drives the system. Increased number of strokes per minute also means that the fire will be more often agitated and the coal brought in contact with air to a greater extent. The short stroke combined with the feature of having the hopper opening close to the retort entrance and my improved deflector plate cooperate also to prevent packing of the fuel at the entrance of the retort. The short stroke arrangement also allows the cylinder and ram case to be shortened, thus greatly reducing the space occupied by the stoking mechanism in front of the boiler.

As before stated, where a square opening through the boiler front is provided for the stoking mechanism, cracks soon begin at the corners of the opening and the entire plate soon becomes cracked. By using a round opening, however, this tendency to crack is eliminated.

I do not wish to be limited to the arrangement and construction herein disclosed, as changes may readily be made without departing from the spirit of the invention.

What I claim as new and desire to secure by Letters Patent is:

1. In combination with a furnace, a retort disposed within the furnace, charging mechanism for feeding fuel into the retort, a deflecting frame disposed approximate to the entrance of the retort, said deflecting frame being hollow and having compartments for connection with the air supply for the furnace, ribs within said deflecting frame for directing the air upwardly to the top of the frame, there being openings from said frame for directing air into the retort to prevent the escape of gases through the retort entrance.

2. In combination with a furnace, of a retort disposed within the furnace, charging mechanism disposed outside of the furnace for feeding fuel into the retort, a deflector frame roofing over the entrance of the retort for deflecting fuel, said deflector being made hollow and being adapted to be connected with the air supply for the furnace, said deflector frame being provided with a ridge for preventing the adhesion of clinkers thereto, ribs within said deflector frame for directing the air toward the said ridge to thereby cool said ridge, there being openings through the lower wall of the frame for directing air downwardly and rearwardly to blow the gases away from the retort entrance to prevent their escape through said entrance.

3. In combination with a furnace, of a retort disposed within the furnace, means for feeding fuel into the retort, a deflecting frame disposed adjacent to the entrance of the retort, said deflecting frame being hollow, there being air inlet ports to said frame and air outlet ports, and ribs within the frame for deflecting the air as it passes from the inlet ports to the outlet ports.

4. In combination with a furnace, of a retort disposed within the furnace, means for feeding fuel into the retort, a hollow deflecting frame lying above the retort at the entrance thereof, the under surface of said deflecting frame extending rearwardly and upwardly, said frame having air inlet ports and also having outlet ports disposed at the rear end of the under surface for directing air downwardly and rearwardly to blow the gases away from the retort entrance and prevent their escape through said entrance.

5. In an automatic stoking mechanism, a retort, a ram for forcing fuel into said retort, a pusher rod slidably mounted in the front and back walls of said retort, the front end of said pusher rod being reduced to form transverse shoulders, a connecting piece abutting against said shoulders, transverse bolts for securing said connecting piece to said rod, and means for rigidly securing said connecting piece to said ram, the line of travel of said pusher rod being parallel with the line of travel of the ram.

6. In an automatic stoking mechanism, a retort having a horizontal bottom, a ram for forcing fuel into said retort movable in a direction parallel with the bottom of the retort, a pusher rod extending through the retort close to and parallel with the bottom of the retort, said pusher rod having bearings in the front and rear walls of the retort, a connecting piece rigidly secured to said ram, said connecting piece and said rod having engaging faces at right angles to the direction of movement of the ram, and transverse bolts rigidly connecting said rod and said connecting piece together.

7. In an automatic stoking mechanism, a retort, a ram for forcing fuel into the retort, a pusher rod slidably mounted in the retort so as to be movable in a line parallel with the line of movement of the ram, said pusher rod having a part containing an opening therethrough transverse to the direction of movement, a member rigidly secured to the ram and fitting into said opening, and a bolt passing through the portion of said member lying within said opening.

8. In an automatic stoking mechanism, a retort, a ram for forcing fuel into said retort, a pusher rod slidably mounted in the retort so as to be movable along a line parallel with the line of travel of the ram, a connecting piece rigidly secured to the ram, said connecting piece and said pusher rod

having transverse engaging faces for transmitting the thrust from the connecting piece to the pusher rod during the working stroke of the ram, and transverse bolts passing
5 through the pusher rod and said connecting piece for securing the same together.

In witness whereof, I hereunto subscribe

my name this 26th day of February A. D., 1906.

WILLIAM J. KENNEY.

Witnesses:

CHARLES J. SCHMIDT,
LEONARD W. NOVANDER.