

No. 691,764.

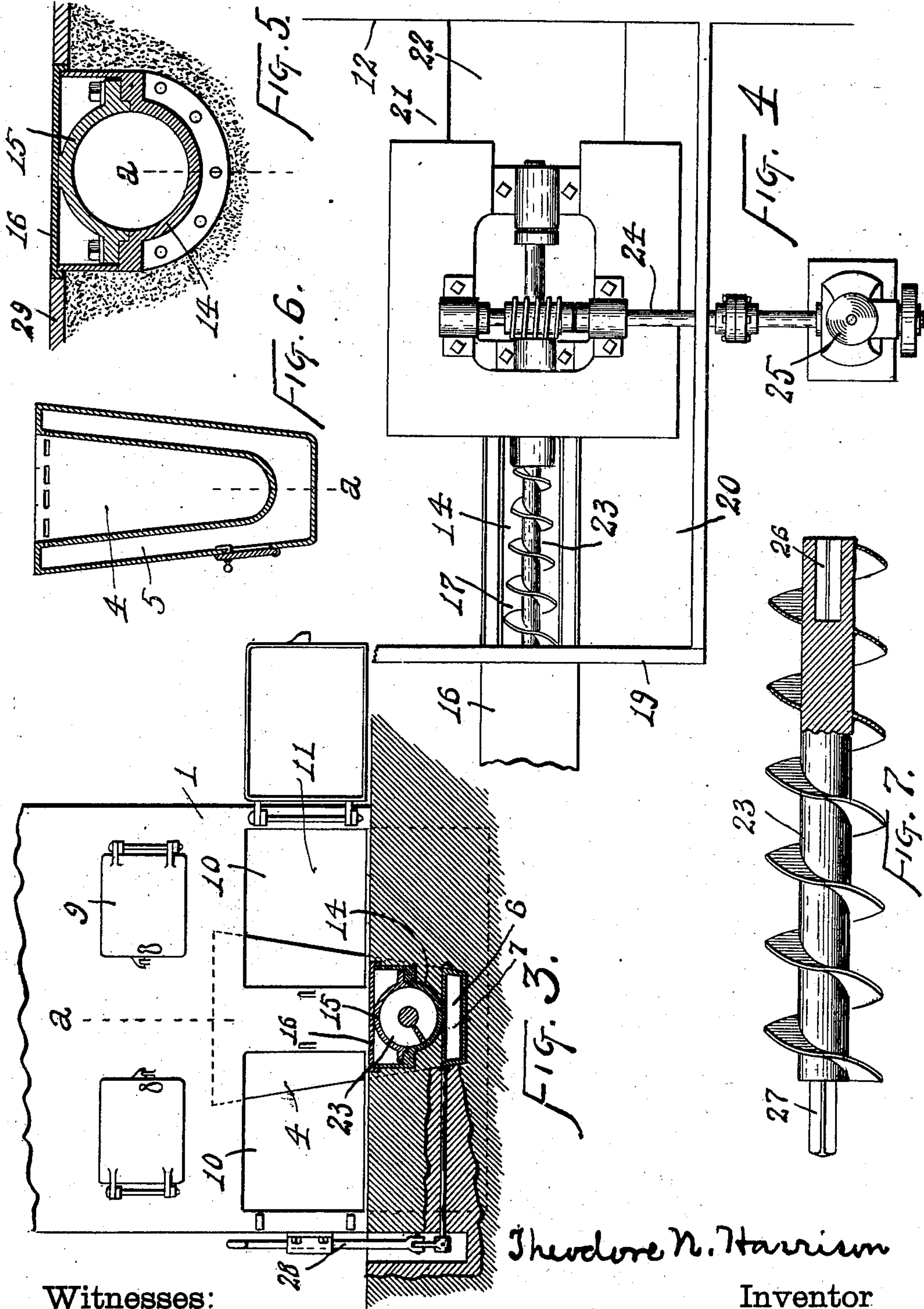
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MECHANICAL STOKER.

(Application filed Oct. 21, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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MECHANICAL STOKER.

SPECIFICATION forming part of Letters Patent No. 691,764, dated January 28, 1902.

Application filed October 21, 1901. Serial No. 79,338. (No model.)

To all whom it may concern:

Be it known that I, THEODORE N. HARRISON, a citizen of the United States, residing at Middletown, Butler county, Ohio, (post-office address No. 158 Baltimore street, Middletown, Ohio,) have invented certain new and useful Improvements in Mechanical Stokers, of which the following is a specification.

This invention, pertaining to improvements in mechanical stokers for furnaces, steam-boilers, and the like, will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of my improved stoker shown as applied to a boiler-furnace, the section being in the plane of line *a* of other figures; Fig. 2, a plan of the same, parts appearing in horizontal section in the planes of lines *b* and *c*, two of the floor-plates and one of the tube-tops being removed; Fig. 3, a vertical transverse section in the plane of line *d*; Fig. 4, a plan, on an enlarged scale, reproducing the right-hand portion of Fig. 2 with the bin-floor removed; Fig. 5, a vertical transverse section of the tube in the plane of line *e*; Fig. 6, a vertical transverse section in the plane of line *f*; and Fig. 7, a side elevation of a section of the feed-worm, an end portion appearing in vertical longitudinal section.

In the drawings, 1 indicates the furnace-front; 2, the bridge-wall; 3, that portion of the boiler over the furnace; 4, the stoker-basin, the same being in the form of a deep rectangular trough, with its rim at the grate-level and with its base well below the level of the floor of the fire-room, this basin being disposed within the furnace and extending, preferably, fore and aft from the front to the rear wall thereof, the general form and disposition of this basin being not unusual; 5, the hollow wall of the stoker-basin, the same being adapted, as usual, to receive air from suitable pressure means and discharge the same inwardly to the basin at ports around the rim of the basin; 6, an air-conduit communicating with hollow wall 5 and adapted to have connection with the air-pressure means; 7, a damper in this air-conduit; 8,

the grates or plates flooring the furnace alongside the stoker-basin, these plates being dead plates or grates to such extent as may be desired; 9, the fire-doors through the furnace-front over the grate to serve in manipulating the fuel or ashes or to serve as fuel-doors in case of hand-firing; 10, the ash-doors leading to the ash-chamber below the grate-level and at the sides of the stoker-basin; 11, the ash-chamber; 12, a wall of the fire-room opposite to and distant from the front wall 1 of the furnace; 13, an opening in the wall 12 at some distance up from the floor of the fire-room and preferably substantially opposite the front of the furnace; 14, a semicircular trough disposed below the level of the fire-room floor and extending from near the wall 12 to an opening in the front end of the stoker-basin, this trough forming a continuation toward the wall 12 of the floor of the stoker-basin and being formed of lengthwise sections united at their ends, as by flanges and bolts, so as to form a straight continuous trough; 15, the top of the trough, the same being formed in lengthwise sections and securely bolted by flanges to the top of the trough, so as to complete the trough into a circular tube entirely below the level of the fire-room floor; 16, floor-plates in lengthwise sections covering over the trough structure and giving to the fire-room floor an even surface over the trough; 17, an uncovered portion of the trough at its end nearer wall 12; 18, a bin-floor or slope-board extending from wall 12 below opening 13 downwardly to the fire-room floor at a point corresponding with the outer end of uncovered portion 17 of the trough, this floor forming a slope down which the coal may slide on its way to the trough; 19, a check-board disposed parallel with wall 12 and crossing the line of the trough at the inner end of the uncovered portion 17 of the trough, this check-board serving to arrest the fuel sliding down the slope-board; 20, the coal-bin considered as a whole, the same being formed by floor 18, check-board 19, suitable side boards, the uncovered portion of the trough, and portions of the fire-room floor at each side of the trough; 21, a triangular chamber under slope-board 18; 22, a pit in that

portion of this chamber nearest the wall 12; 23, a feed worm or screw journaled in and fitting the trough and extending through the uncovered portion 17 thereof and entirely
 5 through the covered portion thereof and projecting well into the base of the stoker-basin, the main portion of this screw being of uniform diameter, that end at the uncovered portion 17 of the trough being, however, tapered,
 10 so as to be smaller at the outer end of the uncovered portion of the trough, the opposite end of this screw where it enters the stoker-basin being reversely tapered, so as to be smallest at its extreme end in the basin, this
 15 screw being formed in lengthwise sections properly coupled together; 24, gearing and transmitting mechanism connected with the outer end of the screw 23 and located in the chamber 21 and adapted to serve in giving
 20 rotary motion to the screw, the gearing being illustrated as a transverse shaft disposed above the floor of the fire-room and connected by worm and worm-gear with the screw; 25, an engine or other motor for producing the rotation of the screw; 26, a non-circular socket
 25 in one end of each section of the screw 23; 27, a corresponding non-circular tenon at the opposite end of the section of the screw, the sockets and tenons serving as means by which
 30 the sections of the screw are coupled up into a continuous screw; 28, the handle for regulating the damper 7 of the air-conduit, and 29 the general fire-room floor.

Referring to Fig. 1, the coal is to be deposited in bin 20 most conveniently by taking it
 35 from a car exterior to the fire-room and throwing it into the bin through opening 13. The coal forms a heaping pile in the bin, the base of the pile settling into the trough at opening 17. The screw, in constant motion, conveys the coal along below the level of the fire-room floor and into the stoker-basin, which becomes finally filled and heaped up under
 40 pressure from below, the combustion taking place at the top of the fuel in the stoker-basin, where it is supplied with air under pressure through the air-ports in the rim thereof. If
 45 grates are employed alongside the stoker-basin, the ashes, moved sidewise from the mass of burning fuel, may go down into the ash-pit and be removed through the ash-doors at the front of the furnace, which is entirely clear and unobstructed. If dead-plates
 50 instead of grates are used at the sides of the stoker, then the ashes may be dumped from these plates to the ash-pit or they may be removed through the fire-doors or through side doors provided in the furnace-walls for the purpose. The chamber 21 under the
 55 slope-board 18 provides a well-protected space for the gearing, and the pit 22 gives standing-room for a workman when inspecting and oiling the gearing. The tapering of the screw at the opening 17 in the trough causes its lifting
 60 tendency to be lessened at the initial end

of the screw, thus causing the screw to gradually increase its general conveying effect at the opening and prevent the coal between its spirals from forming a solid rotary core working under the superincumbent mass. 70

I claim as my invention—

1. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor
 75 disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor and to a point distant from the front of the
 80 furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a coal-bin provided with a slope-board and a check-board at the opposite ends of said longitudinal opening, a feed-screw disposed within
 85 said tube and extending continuously through the same and lengthwise of said longitudinal opening therein and lengthwise into the stoker-basin, and mechanism for rotating said feed-screw. 90

2. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor
 95 disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor and to a point distant from the front of the
 100 furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a coal-bin provided with a slope-board and a check-board at the opposite ends of said longitudinal opening, a feed-screw disposed within
 105 said tube and extending continuously through the same and lengthwise of said longitudinal opening therein and lengthwise into the stoker-basin the end of said screw being tapered at said longitudinal opening so as to be smaller at the end of said opening farthest
 110 from the furnace, and mechanism for rotating said screw. 115

3. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor
 115 disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor
 120 and to a point distant from the front of the furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a coal-bin provided with a slope-board and a check-board at the opposite ends of said longitudinal opening, a feed-screw disposed within
 125 said tube and extending continuously through the same and lengthwise of said longitudinal opening therein and lengthwise into the stoker-basin, gearing disposed below said
 130

slope-board and connected with said screw, and mechanism for giving rotary motion to said gearing and screw.

4. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a semicircular trough extending endwise from said stoker-basin below the fire-room floor and forming a prolongation of the semicircular floor of the basin to a point distantly in front of the furnace, a coal-bin disposed over the end of said trough distant from the furnace so as to leave a clear space between said coal-bin and the front of the furnace, sectional cover-work for said trough at the portions thereof between the coal-bin and the furnace-front, said trough and cover-work producing a circular tube extending between the bin and stoker-basin, a feed-screw disposed within the trough and extending the length thereof and endwise into the stoker-basin, and mechanism for rotating said feed-screw.

5. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a semicircular trough extending lengthwise from said stoker-basin below the fire-room floor and forming a prolongation of the semicircular floor of the basin to a point distantly in front of the furnace, a coal-bin disposed over the end of said trough distant from the furnace so as to leave a clear space between said coal-bin and the front of the furnace, a sectional semicircular trough-cover secured to said trough and covering the same between the coal-bin and the furnace-front, section floor-plates disposed over said trough-cover, a feed-screw disposed within said trough and extending the length of the same and endwise into the stoker-basin, and mechanism for giving rotation to said screw.

6. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a semicircular trough extending lengthwise from said stoker-basin below the fire-room floor and forming a prolongation of the semicircular floor of the basin to a point distantly in front of the furnace, a coal-bin disposed over the end of said trough distant from the furnace so as to leave a clear space between said coal-bin and the front of the furnace, a sectional semicircular trough-cover secured to said trough and covering the same between the coal-bin and the furnace-front, section floor-plates disposed over said trough-cover, a continuous feed-screw formed of sections with tenon-and-socket joints and disposed within said trough and extending the length of the same and endwise into the stoker-basin,

and mechanism for giving rotation to said feed-screw.

7. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor and to a point distant from the front of the furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a wall parallel with the furnace-front across the end of said tube and having an opening above the level of the fire-room floor, a slope-board extending from said wall below said opening therein to the nearer end of said longitudinal opening in the tube, a check-board across the end of said longitudinal opening farthest from said wall, a continuous feed-screw disposed within said tube and extending the length of said longitudinal opening and projecting endwise into the stoker-basin, and mechanism for giving rotation to said screw.

8. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor and to a point distant from the front of the furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a wall parallel with the furnace-front across the end of said tube and having an opening above the level of the fire-room floor, a slope-board extending from said wall below said opening therein to the nearer end of said longitudinal opening in the tube, a check-board across the end of said longitudinal opening farthest from said wall, a continuous feed-screw disposed within said tube and extending the length of said longitudinal opening and projecting endwise into the stoker-basin, gearing disposed below said slope-board and within said wall and connected with said screw, and mechanism for driving said gearing and screw.

9. In a stoker, the combination, substantially as set forth, of a furnace, a rectangular stoker-basin disposed therein with its rim at the grate-level and having a semicircular floor disposed below the level of the fire-room floor, a circular tube disposed concentric with the floor of the stoker-basin and extending longitudinally therefrom below the fire-room floor and to a point distant from the front of the furnace, a longitudinal opening in the top of said tube at its end farthest from the furnace, a wall parallel with the furnace-front across the end of said tube and having an opening above the level of the fire-room floor, a

slope-board extending from said wall below
said opening therein to the nearer end of said
longitudinal opening in the tube, a check-
board across the end of said longitudinal open-
5 ing farthest from said wall, a continuous feed-
screw disposed within said tube and extend-
ing the length of said longitudinal opening
and projecting endwise into the stoker-basin,
gearing disposed below said slope-board and

within said wall and connected with said 10
screw, mechanism for driving said gearing
and screw, and a pit in the fire-room floor be-
tween said wall and gearing.

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