W. T. HANNA.

AUTOMATIC STOKER.

APPLICATION FILED OCT. 10, 1905.

979,849. Patented Dec. 27, 1910.

3 SHEETS—SHEET 1.

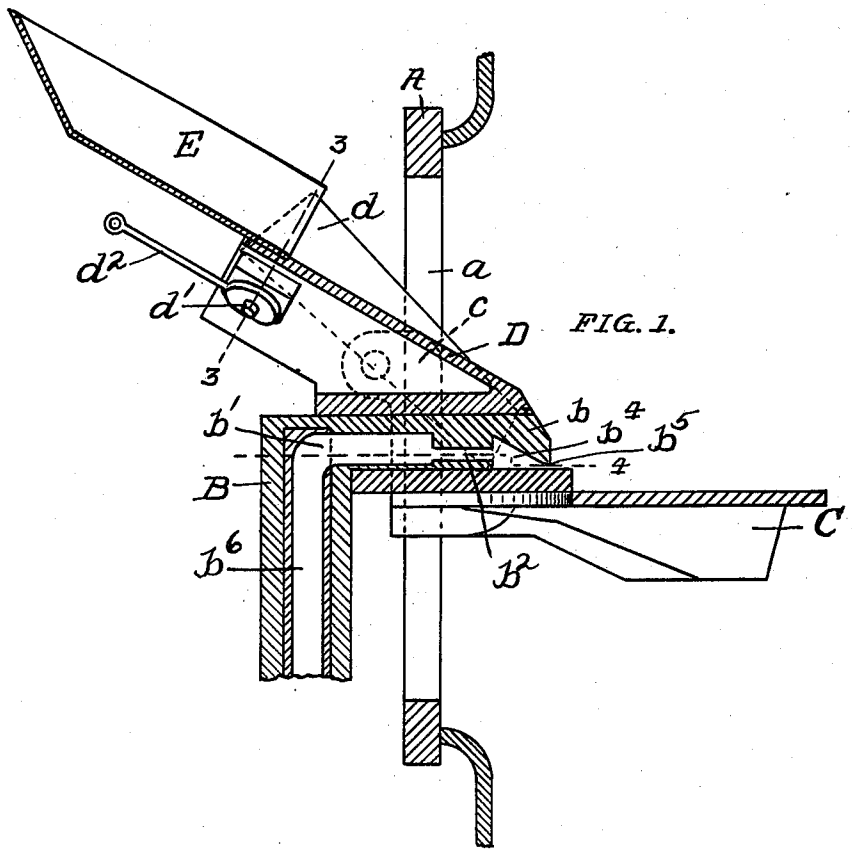

FIG. 1.

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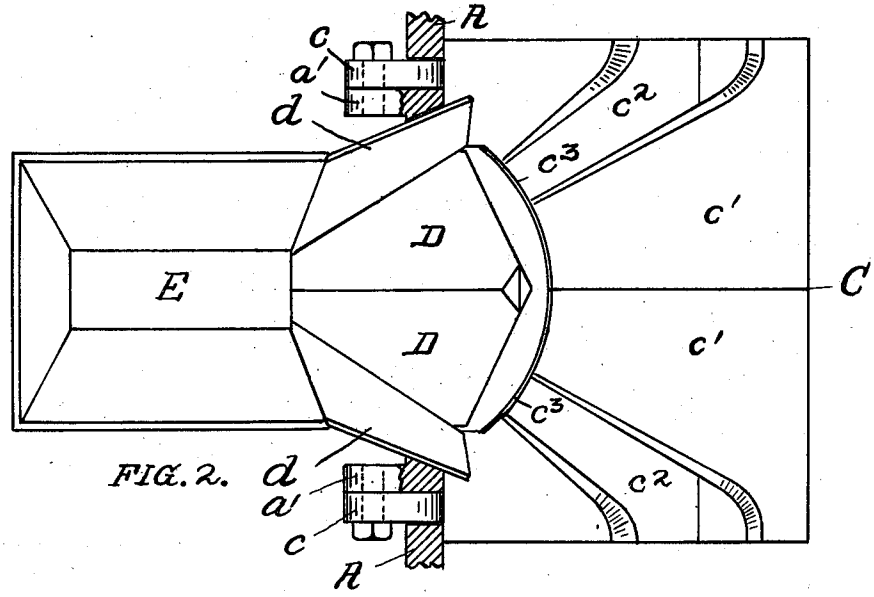


FIG. 2.

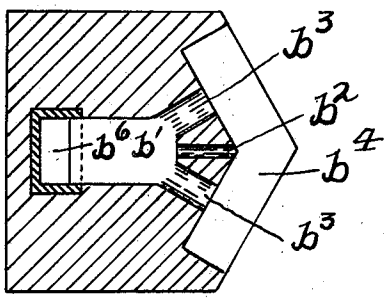
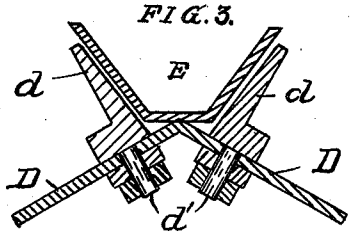


FIG. 4.

FIG. 3.



Witnesses

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3 SHEETS—SHEET 3.

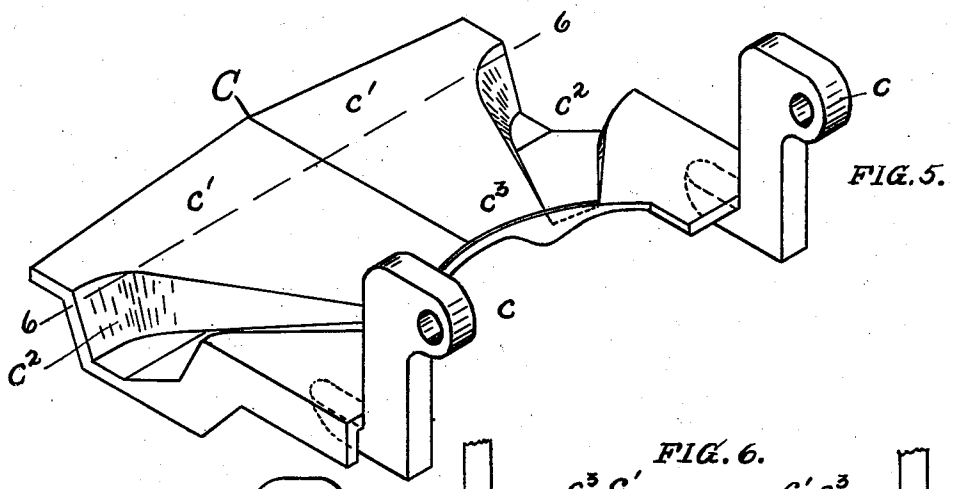

FIG. 5.

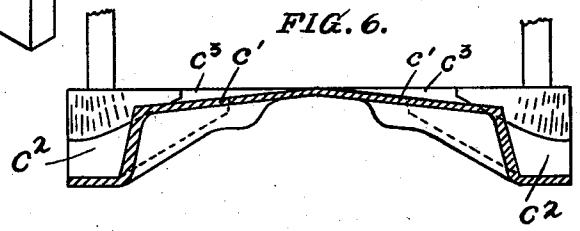

FIG. 6.

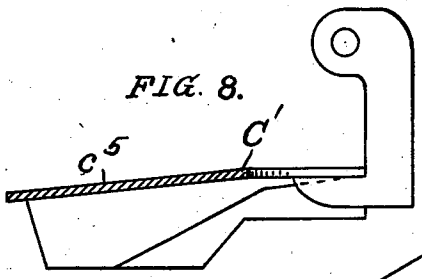

FIG. 8.

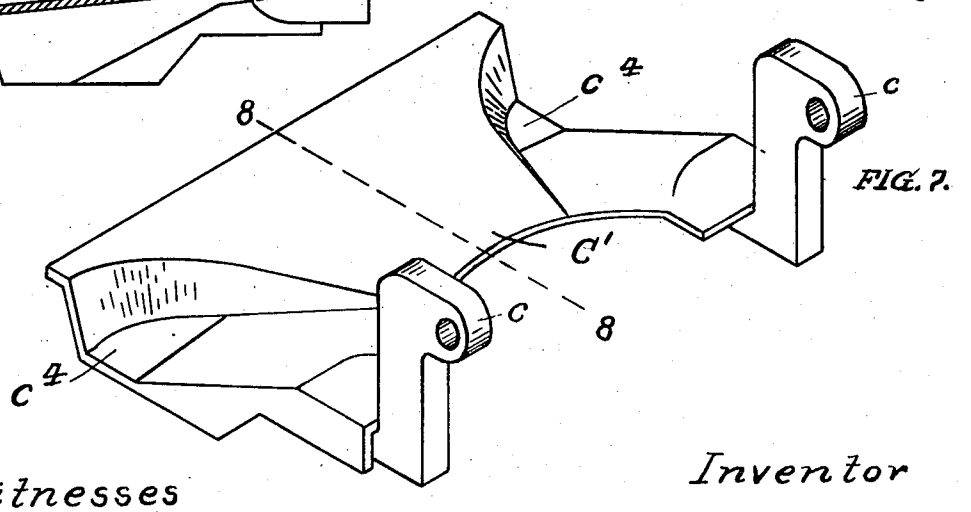

FIG. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM T. HANNA, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MECHANICAL CONSTRUCTION COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

AUTOMATIC STOKER.

979,849. Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed October 10, 1905. Serial No. 282,142.

To all whom it may concern:

Be it known that I, WILLIAM T. HANNA, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Stokers, of which the following is a specification.

The object of my invention is to provide an improved stoker for automatically feeding fuel to boiler furnaces.

My invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings Figure 1, is a vertical section through the feeding mechanism of a stoker embodying my invention; Fig. 2, a top plan view of Fig. 1, partially in section; Fig. 3, a section on line 3—3 of Fig. 1; Fig. 4, a section on line 4—4 of Fig. 1; Fig. 5, a perspective view of the firing or distributing plate; Fig. 6, a section on line 6—6 of Fig. 5; Fig. 7, a perspective view of a modified form of firing or distributing plate; and Fig. 8, a section on line 8—8 of Fig. 7.

A door plate A is mounted in any suitable manner, in front of the usual furnace door opening and provided with an opening a communicating therewith. In front of plate A, a blast casing B is mounted with its blast discharge b projecting through opening a, well within the furnace door opening. This blast discharge consists of a supply throat b' terminating in a central port b^2 and larger diverging side ports b^3, which lead into a chamber b^4. The chamber b^4 is angular in form, each angular arm of which is set at right angles to ports b^3, as shown in Fig. 4. Adjacent to the ports, this chamber is of considerable height, but slopes abruptly to the discharge slit b^5 which is also angular in form with its angular arms set at right angles to ports b^3. A supply opening b^6 leads from throat b' to a suitable valve (not shown) for supplying intermittent blasts of steam, or other gas under pressure, as will be readily understood by those skilled in the art. By this arrangement the blasts from throat b' are delivered to chamber b^4 in the form of a powerful divergent blast to either side and a weaker central blast. In chamber b^4, these blasts expand to some extent and pass out through slit b^5 in the form of a thin sheet retaining, to a large extent, the initial direction and distribution of power imparted by the ports. The effect of this construction is to deliver a sheet or fan like blast, the sides of which are formed by the comparatively powerful divergent blasts from ports b^3 and the center by the weaker and direct blasts from port b^2. Thus it will be seen that a blast in sheet form and having comparatively powerful and divergently directed sides and a weaker and direct center, is discharged across the distributing plate.

A distributing plate C is secured to plate A by means of arms c and lugs a' in such manner as to extend into the furnace immediately in front of and below the blast. The central portion of plate C is unobstructed and slopes slightly to either side from a medial line. In the sides of the plate are divergent channels c^2 lying below the central portion. At its inner edge, immediately in front of slit b^5, the plate C is provided with a wall c^3 commencing flush with the plate at the center, and rising gradually to the outside edges of channels c^2. The channels c^2 commence at the foot of this wall, comparatively shallow and deepen as they extend outwardly until they are of considerable depth at their outer ends, their walls being slightly inclined to the vertical. At their outer ends, the channels turn somewhat abruptly to a direction substantially at right angles to the general direction of the plate.

Above the blast casing B, is mounted a feed plate D, which is in the form of an inclined ridge, having directing guides d pivoted to the ridge sides. The guide pivots d' extend through the ridge sides, perpendicularly, and carry handles d^2 by means of which the guides may be rotated to different positions on the ridge sides. A feed pan E is mounted above feed plate D and is adapted to direct its contents thereon.

In Figs. 7 and 8 I have illustrated a modified form of distributing plate C′ which may be used with good results. Here the side channels c^4 have not as prominent interior walls nor is the turn at the outer end of the channels quite so abrupt, and the cen-

tral portion c^5 is given a slight forward slope.

In operation, coal, or other fuel, is supplied to pan E by any suitable form of feed hopper, or by hand, if desired. The coal passes from pan E onto feed plate D whence it flows down onto plate C. It will be seen that with guides d in the position shown in full lines in Fig. 2, the stream of coal will divide on the ridge of plate D, part passing to one side and part to the other, so that the bulk of the coal will be directed onto plate C directly in the path of the strong divergent portions of the blasts from slit b^5, and into channels c^2. The combined effect of the blasts and channels is to throw the coal toward the sides and rear corners of the fire box adjacent to the door. The coal actually entering the channels, strikes against the outer abruptly turned walls thereof and is distributed into the rear corners, while that which passes out over the channels, is distributed toward the sides and farther forward, some of it striking the walls and rebounding toward the central portion of the fire bed, a result which is facilitated by the slope of the central portion of plate C. By raising one of the guides and depressing the other substantially all of the coal may be directed to one side or, the other of the fire box, or by raising both guides, substantially all of the coal may be directed to the center of the fire box. Thus it will be seen that the distribution of the coal is placed entirely under the control of the operator, who may direct it to those portions of the fire bed where most needed. Owing to the fact that the distributing plate is set slightly below the slit b^5, the main force of the blasts will pass over the plate slightly above its upper surface and strike lumps of coal thereon near or above their centers of gravity and thus project them in a horizontal and downward direction, instead of projecting them upwardly as is the case when the main force of the blasts strikes the lumps below their centers of gravity. I have found by experience that when the coal is thrown up to any considerable extent, above the plane of the distributing plate, the finer particles are liable to be drawn into the boiler flues and choke them up. By setting the distributing plate below the blast, and employing a comparatively weak central blast, I prevent this choking up of the flues. The walls c^3 insure that some of the coal will fall well within the channels c^2, before being struck by the blasts and their direction thus fully controlled by said channels.

The distributing plate C′ illustrated in Figs. 7 and 8, operates in substantially the same manner as the one just described, except that the absence of walls c^3 causes a little less coal to be projected to the sides and rear corners, and the forward slope assists in preventing the coal from being projected into the air.

While I have illustrated and described the preferred construction for carrying my invention into effect, this is capable of modification without departing from the spirit of the invention. I therefore do not wish to be limited to the exact construction shown, but

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

1. In a blast feed stoker, a feed plate angular in cross section, and having its sides sloping downwardly from the median line, in combination with guide wings, adjustable upon the sloping sides of the plate, substantially as specified.

2. In a blast feed stoker, a feed plate angular in cross section, and having is sides sloping downwardly from the median line in combination with guide wings independently adjustable upon the sloping sides of the plate, substantially as specified.

3. In a blast feed stoker, a feed plate angular in cross section, inclined from the receiving toward the discharge end, and having its sides sloping downwardly from the median line, in combination with guide wings adjustable upon the sloping sides, substantially as specified.

4. In a blast feed stoker, a feed plate angular in cross section, inclined from the receiving toward the discharge end, and having its sides sloping downwardly from the median line, in combination with guide wings independently adjustable upon the sloping sides, substantially as specified.

5. In an automatic stoker, a blast casing having a supply throat, a central port and diverging side ports leading from the supply throat, and a discharge face of angular form with its arm substantially at right angles to the discharge ends of the side ports, substantially as specified.

6. In an automatic stoker, a blast casing having a supply throat, a central port and diverging side ports leading from the supply throat, and a spreading chamber of angular form arranged to receive the discharge from the ports and having its walls diverging rearwardly from the longitudinal median line of the casing, substantially as specified.

7. In an automatic stoker, a blast casing having a supply throat, a central port and diverging side ports leading from the supply throat, and a spreading chamber of angular form arranged to receive the discharge from the ports and having its walls substantially at right angles to the discharge ends of the side ports, substantially as specified.

8. A blast casing for stokers comprising a supply throat, a spreading chamber provided

with a discharge slit, a central port and side ports leading from the supply throat to the spreading chamber, the central port being smaller in cross section than the side ports, substantially as specified.

9. A distributing plate for blast feed stokers having a wide unobstructed central portion, and a comparatively narrow divergent channel at each side below the central portion of the plate and discharging at the side of the plate.

10. A distributing plate for blast feed stokers having an unobstructed central portion and divergent side channels lying below the central portion of the plate and gradually deepening from the receiving to the discharge end, substantially as specified.

11. A distributing plate for blast feed stokers having an unobstructed central portion and divergent side channels lying below the central portion of the plate and turned at their outer ends to a direction approximately at right angles to the longitudinal axis of the plate, substantially as specified.

12. A distributing plate for blast feed stokers having an unobstructed central portion and divergent side channels lying below the central portion of the plate, gradually deepening from the receiving to the discharge end and turned at their outer ends to a direction approximately at right angles to the longitudinal axis of the plate, substantially as specified.

13. A distributing plate for blast feed stokers having its central portion sloping from a medial line to either side and provided in its sides with divergent channels lying below the central portion of the plate and deepening from the receiving to the discharge end, substantially as specified.

14. A distributing plate for blast feed stokers having its central portion sloping from a medial line to either side and provided in its sides with divergent channels lying below the central portion of the plate and turning abruptly at their outer ends toward the sides of the furnace, substantially as specified.

15. A distributing plate for blast feed stokers having its central portion sloping from a medial line to either side and provided in its sides with divergent channels lying below the central portion of the plate, deepening from the receiving to the discharge end, and turning abruptly at their outer ends toward the sides of the furnace, substantially as specified.

16. In an automatic stoker, the combination of a distributing plate having side channels below the main surface of the plate and adapted to direct fuel toward the sides of the fire box, with a blast casing comprising a supply throat, a spreading chamber provided with a discharge slit, a central port and side ports leading from the supply throat to the spreading chamber, the central port being smaller in cross section than the side ports, substantially as specified.

17. In an automatic stoker, the combination of a distributing plate; means for feeding fuel to the rear of the plate; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and divergently directed, and the center of lower pressure, substantially as specified.

18. In an automatic stoker, the combination of a distributing plate; means for directing fuel to different portions of the plate; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and divergently directed, and the center of lower pressure, substantially as specified.

19. In an automatic stoker, the combination of a distributing plate having side channels below the main surface, and adapted to direct fuel to the sides of the fire box; means for feeding fuel to the rear of the distributing plate; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and divergently directed and the center of lower pressure, substantially as specified.

20. In a blast feed stoker, the combination of a distributing plate having side channels below the main surface and adapted to direct fuel to the sides of the fire box; means for directing fuel to different portions of the plate and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and divergently directed and the center of lower pressure, substantially as specified.

21. In an automatic stoker, the combination of a distributing plate having side channels below the main surface and turned at their outer ends to a direction substantially at right angles to the median longitudinal line of the plate; means for feeding fuel to the rear of the distributing plate; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and the center of lower pressure, substantially as specified.

22. In an automatic stoker, the combination of a distributing plate having side channels adapted to direct fuel to the sides of the fire box; a feed plate arranged to feed fuel to the distributing plate, the feed plate being angular in cross section with its sides sloping downwardly from the median line; guide wings adjustable on the sloping sides; and means for discharging a blast across the distributing plate from the rear, the sides of the blast being of high pressure and the center of lower pressure, substantially as specified.

23. In an automatic stoker, the combination of a distributing plate having an unobstructed central portion and divergent channels lying below the main surface of the plate, and turned at their outer ends to a direction substantially at right angles to the body of the plate; means for feeding fuel to the distributing plate from the rear; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and the center of low pressure, substantially as specified.

24. In an automatic stoker, the combination of a distributing plate having an unobstructed central portion and divergent channels lying below the main surface of the plate, and turned at their outer ends to a direction substantially at right angles to the body of the plate; means for feeding fuel to the distributing plate from the rear; a plate arranged to feed fuel to the distributing plate, the feed plate being angular in cross section with its sides sloping downwardly from the median line; guide wings adjustable on the sloping sides; and means for discharging a blast across the plate from the rear, the sides of the blast being of high pressure and the center of low pressure, substantially as specified.

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