No. 647,303.

Patented Apr. 10, 1900.

R. HUTCHISON.

AUTOMATIC STOKER.

(Application filed Oct. 14, 1898.)

(No Model.)

Fig. 2.

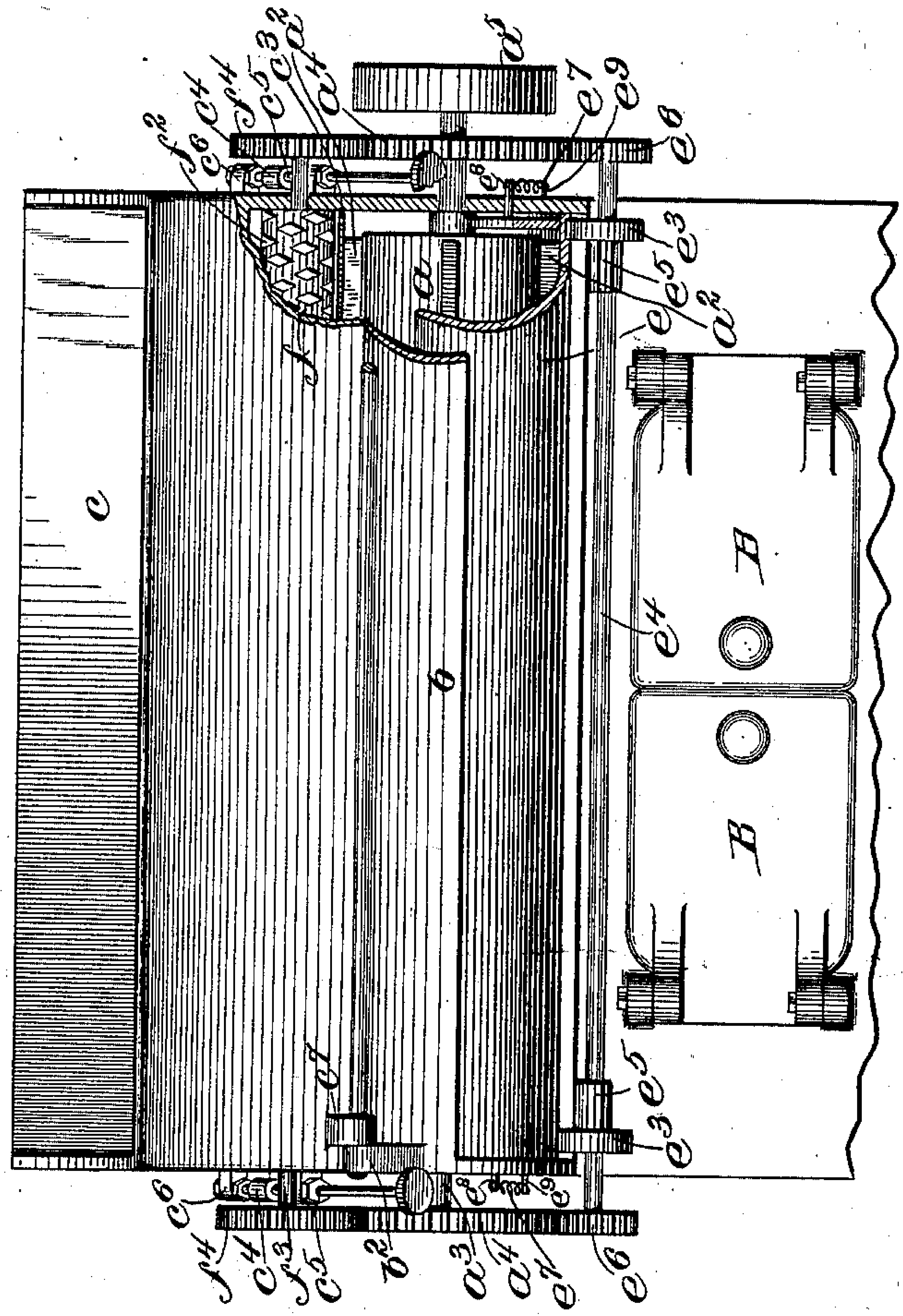
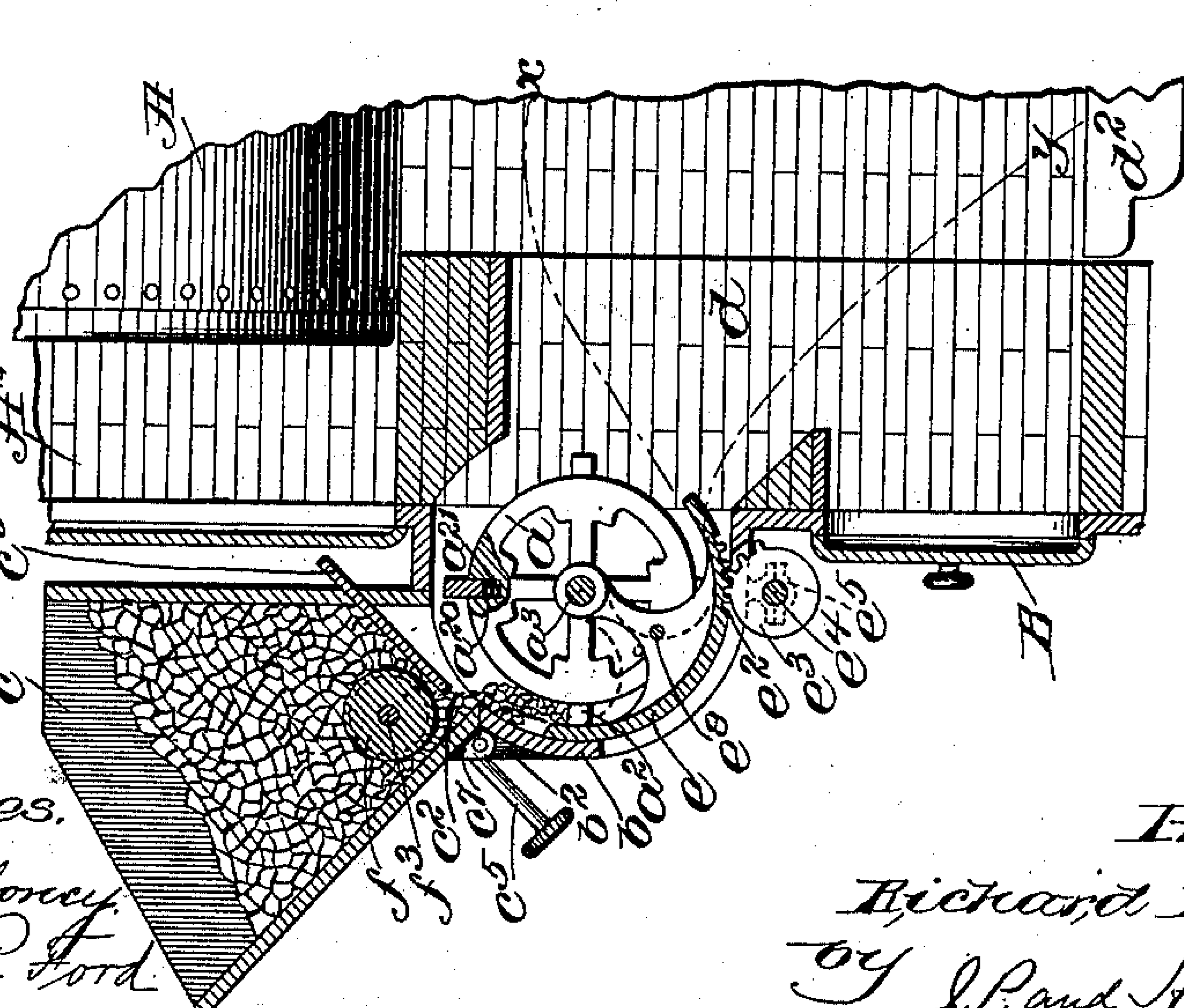


Fig. 1.



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UNITED STATES PATENT OFFICE.

RICHARD HUTCHISON, OF SOMERVILLE, MASSACHUSETTS.

AUTOMATIC STOKER.

SPECIFICATION forming part of Letters Patent No. 647,303, dated April 10, 1900.

Application filed October 14, 1898. Serial No. 693,505. (No model.)

To all whom it may concern:

Be it known that I, RICHARD HUTCHISON, a subject of the Queen of Great Britain, residing in Somerville, county of Middlesex, and State of Massachusetts, have invented an Improvement in Automatic Stokers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to an automatic stoker or mechanical device for feeding fuel to a furnace, such devices been especially adapted for use with steam plants where the fire has to be continually maintained as uniformly as possible. In an apparatus of this class it is desirable not only to continuously and uniformly feed the fuel, but also to properly distribute the same throughout the fire-box, which extends for a considerable distance beyond the feed-opening employed for the fuel-supply.

The object of the present invention is to afford means for properly distributing a supply of coal which is continuously thrown in by a traveling feeding device during the operation of the stoker. It is obvious that in the use of a traveling feeding device the coal upon leaving the impelling member of said feeding device will travel in the direction in which it is impelled by said feeding device at the moment it leaves the same, so that if said impelling device travels on a curved path the initial direction of the fuel upon leaving the same can be determined by determining the point in the path of movement of the feeding device at which the fuel is permitted to leave the same. If, for example, the impelling device travels in a circular path, it is obvious that the initial direction of the fuel upon leaving the same will be in a line tangential to the path of the impelling device at the point where the fuel leaves the same. In accordance with the present invention the apparatus is provided with means for varying the direction in which the fuel is thrown, as by varying the point at which the fuel leaves the feeding device, so that assuming the fuel to be thrown into the fire-box from one end the elevation of the same may be varied, a portion of the fuel leaving the feeding device at such an angle as to be thrown to the farther end of the grate and a portion thereof leaving at such an angle as to be dropped near the front of the grate, while the remainder is evenly distributed throughout. This may be accomplished, as herein shown, by providing the apparatus with a rotatable feeding device, such as a cylinder, provided with blades or projections to engage the fuel and carry the same along, and a controlling device movable with relation to the periphery of said feeding device and adapted to keep the fuel in engagement therewith during a variable extent of the travel thereof, so that the point at which the fuel leaves the feeding device is continually shifted from one extreme to the other, thereby evenly scattering or distributing the fuel throughout the length of the fire-box.

To regulate the amount of coal fed to the furnace, the size of the opening from the hopper to the feeding device may be adjustable, so that while the traveling member can be maintained at constant speed, and thereby always caused to impart sufficient impulse to the coal to properly distribute the same, the amount of coal thus delivered may be varied.

The invention consists, further, in certain details of construction and arrangement which will be hereinafter more fully described.

Figure 1 is a transverse vertical section of an automatic stoker embodying the invention, and Fig. 2 is a front elevation of the same with a part broken away and shown in section.

As herein shown, the coal-feeding device comprises a traveling member or rotatable cylinder a, provided with projecting blades a^2, which may be arranged to project at any desired angle or inclination with relation to the axis and surface of the cylinder, the said cylinder being adapted to rotate within a casing b, to which the fuel is adapted to be supplied, as by gravity, from a hopper c. The fuel passes from the hopper c through a delivery-opening c^2 into the annular passage between the cylinder a and the casing b and is acted upon in the rotation of the cylinder a by the projecting blades a^2, which carry the fuel along toward the fire-box d, which is provided, as usual, with the grate d^2. The cas-

ing *b*, as shown in Fig. 1, opens directly into the said fire-box, so that the fuel will be properly delivered from the blades a^2.

As has been hereinbefore stated, it is desirable to distribute the fuel throughout the fire-box so that a portion of the fuel will be thrown to that end of the grate which is farthest from the feeding device, a portion dropped along that end of the grate which is nearest the feeding device, and a substantially-equal portion delivered along the intermediate portions of the grate. This is accomplished in accordance with the present invention by varying the point at which the fuel is permitted to leave the feeding device to thereby control or vary the direction in which the fuel is thrown off. For this purpose the apparatus is provided with a movable controller *e*, arranged to act upon the fuel and to practically keep the fuel in contact with the feeder *a*, said controller, however, by its movement varying or shifting the point in the travel of the feeder at which the fuel leaves the same. As herein shown, the said controller *e* may consist of a concave plate or guide extending along or forming the inner wall of the casing *b*, so that the coal when acted upon by the blades a^2 will be retained in the path of the feeder *a* by said controller, the point at which it leaves the same being determined by the position of the controller. By oscillating the said controller, therefore, the said point may be shifted and the direction in which the coal is delivered may be varied. The two extreme positions of the controller are indicated, Fig. 1, respectively, in full and dotted lines, it being obvious that the fuel will leave the feeder when it is no longer acted upon by the controller, so that when the controller is in the position shown in full lines the fuel will be thrown from the feeder in such a manner as to follow substantially the path indicated by the dotted line *x*, while if the controller is in the dotted-line position the fuel leaving the feeder will follow approximately the path indicated by the dotted line *y*, and while the controller is in intermediate positions the fuel will obviously follow various paths intermediate between the path *x* and the path *y*. In order that the fuel may be thus scattered or distributed, the controller is arranged to move in a direction parallel to the direction of movement of the controller, substantially continually back and forth from one extreme to the other, and may be actuated by any suitable mechanism to coöperate with the feeding-cylinder *a*.

As herein shown, the controller *e* is provided at its ends with gear-teeth e^2, arranged to coöperate with a mutilated gear e^3 on a shaft e^4, having suitable bearings e^5 and provided with gears e^6, which coöperate with gears a^4 on a shaft a^3, which carries the cylinder *a* and is provided with a drive-pulley a^5. At each rotation of the shaft e^4, therefore, the said controller *e* will be moved to the position shown in Fig. 1 and will then be released by the teeth of the mutilated gear e^3, which in their further movement travel away from the toothed portion of the controller. To restore the controller to its normal position, it is shown as provided with a restoring-spring e^7, which may be connected at one end to a pin e^8, projecting from said controller through a suitable slot in the wall of the casing *b* and at the other end to a pin e^9 upon the outer wall of said casing, the said spring obviously acting as soon as the teeth of the mutilated gear pass out of mesh. The controller may obviously be timed to move at any desired speed relative to that of the feeder by properly proportioning the gears a^4 and e^6.

In order to regulate the supply of coal to be delivered to the furnace, the delivery-outlet c^2 of the hopper *c* is shown as provided with an adjustable slide c^3 to regulate the capacity of said outlet. The said slide is shown as provided with lugs c^4, projecting from suitable openings in the side walls of the hopper and adapted to be engaged by screws c^5, rotatably mounted in bearings c^6, but fixed longitudinally with relation thereto, so that by turning the said screws the lugs, and consequently the slide, will be moved transversely across the bottom of the hopper to enlarge or contract the opening.

To insure uniform delivery of the coal through the opening c^2, the hopper may be provided with an agitating device *f*, having teeth or projections f^2, Fig. 2, to engage and forward the coal toward the delivery-opening, the said agitator being adjacent to the wall of the hopper above said opening and crushing or excluding such coal as is too large to be properly delivered to the furnace. The said agitator, as shown, is mounted on a shaft f^3, provided with a gear f^4, arranged to mesh with the gears a^4 and to be continuously rotated during the operation of the device.

In order that the stoker, which is mounted in front of the furnace above the door thereof, may be easily moved out of the way in case it is necessary to reach the boiler-tubes through the boiler-door, the hopper *c* is shown as pivotally supported and provided with lugs c^7, pivotally connected with corresponding lugs b^2 on the casing *b*, so that the said hopper can be tipped down out of the way in case it is necessary to have access to the opening A^2, which leads to the boiler A. Furthermore, the stoking device embodying the invention may be situated, as shown, above the furnace and out of the way of the fire-doors B, so that if the said stoker fails to work properly the furnace can be fed by hand in the usual way and need not be shut down for repairs.

While the agitator *f* practically insures a uniform distribution of the coal to the feeding device *a*, there may in some cases be a tendency for the coal to clog in the annular passage around said feeding device, and in order to prevent damage to the wings a^2 the said wings are shown as yieldingly supported

in sockets a^{20}, being engaged, for example, by springs a^{21}, which tend to keep them in their normal position, but which can yield in case any abnormal force is exerted upon the said blades by the jamming of the coal.

It is not intended to limit the invention to the specific construction and arrangement herein shown and described, since modifications may be made without departing from the spirit of the invention.

I claim—

1. In a fuel-feeding device or stoker, a cylindrical feed member having projections or blades to engage and forward the fuel; and a distributing device comprising means for retaining the fuel in engagement with the cylindrical surface of said feed member and for continuously varying the point in the travel of said member at which the fuel leaves the same, substantially as described.

2. In a fuel-feeding device or stoker, a cylindrical feed member having projections or blades to engage and forward the fuel; and a controlling device comprising a concave plate or guide parallel to the said feeding device; and means for reciprocating said controller to vary the point at which the fuel leaves the surface of said cylindrical feeding device, substantially as described.

3. An automatic stoker comprising a feeding device arranged to travel at substantially-constant speed, and to receive fuel and deliver the same to the furnace; means for regulating the amount of fuel supplied to said feeding device; and a controller traveling back and forth in a direction parallel to the direction of movement of said feeding device to control the distribution of the fuel, substantially as described.

4. In an automatic stoker, the combination with a cylindrical feeding device adapted to receive upon its surface the fuel from a suitable hopper; of blades projecting radially from the said surface; a controller comprising a concave plate mounted coaxially with said feeding device to retain the fuel in contact with the surface thereof; and means for oscillating the said controller on its axis to vary the position at which the fuel leaves the surface of said feeding device, substantially as set forth.

5. An automatic stoker comprising a cylindrical feed member having blades or projections to act upon the coal delivered to the surface of said feed member; an oscillating controller, the surface of which is parallel to that of the feed member, said blades projecting toward the surface of said controller; and means for yieldingly supporting said blades on said feed member, substantially as and for the purpose described.

6. An automatic stoker comprising a casing mounted above the furnace, and having an opening leading to the furnace-grate; a traveling feeding device in said casing; an oscillating controller movable in a direction parallel to that of the feeding device; means for distributing the fuel throughout the area of the grate; and a hopper pivotally supported above said casing and delivering device, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD HUTCHISON.

Witnesses:

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