No. 888,875. PATENTED MAY 26, 1908.

C. W. CROSBY.

STOKING APPARATUS.

APPLICATION FILED JULY 21, 1906.

4 SHEETS—SHEET 1.

Fig. 1.

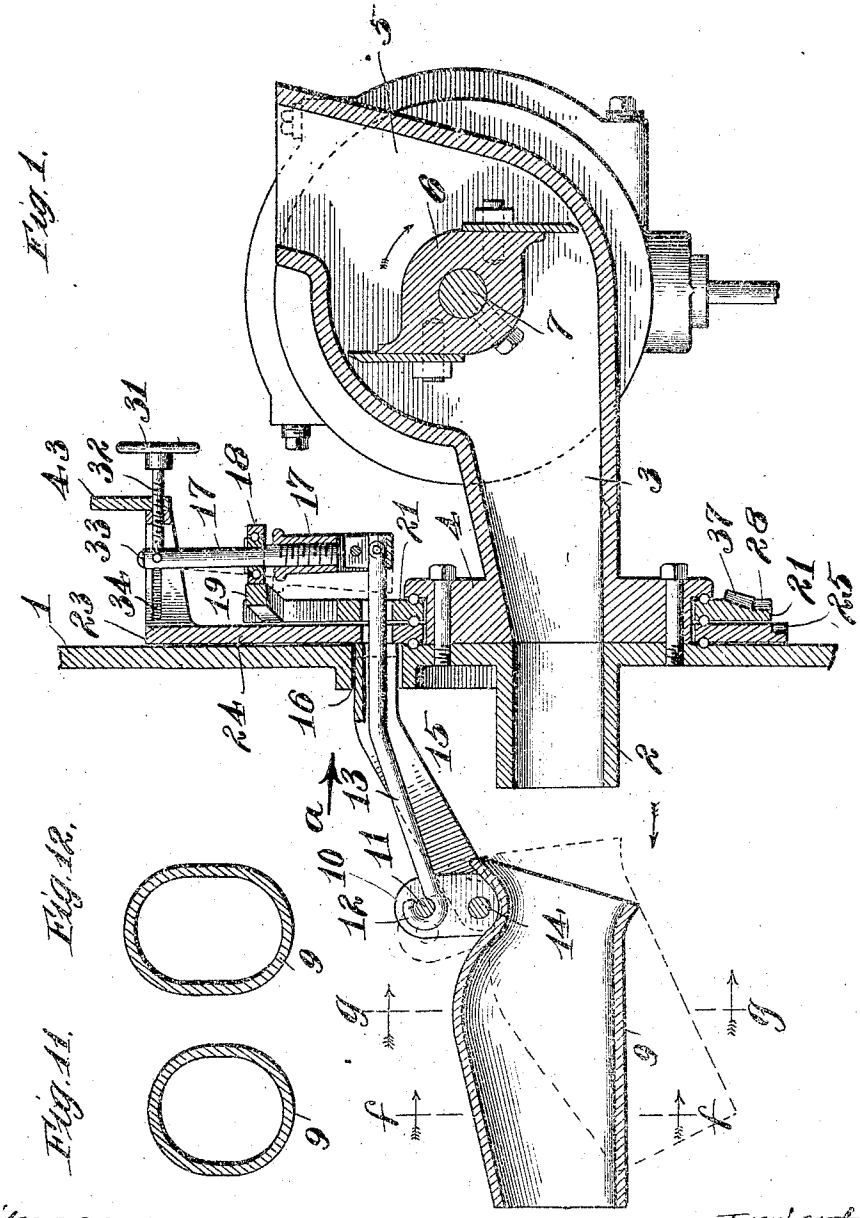

Fig. 12.

Fig. 11.

Witnesses:

G. A. Taubenschmitt

Leon E. Stroh

Inventor:

Clarence W. Crosby

By G. L. Cragg.

Atty

No. 883,875. PATENTED MAY 26, 1908.

C. W. CROSBY.

STOKING APPARATUS.

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4 SHEETS—SHEET 2.

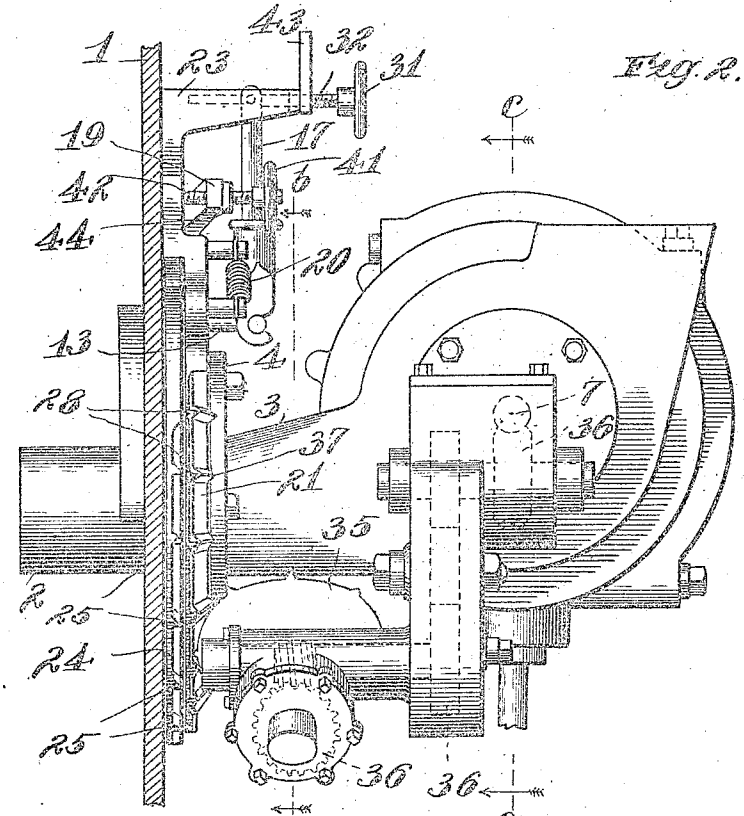


Fig. 2.

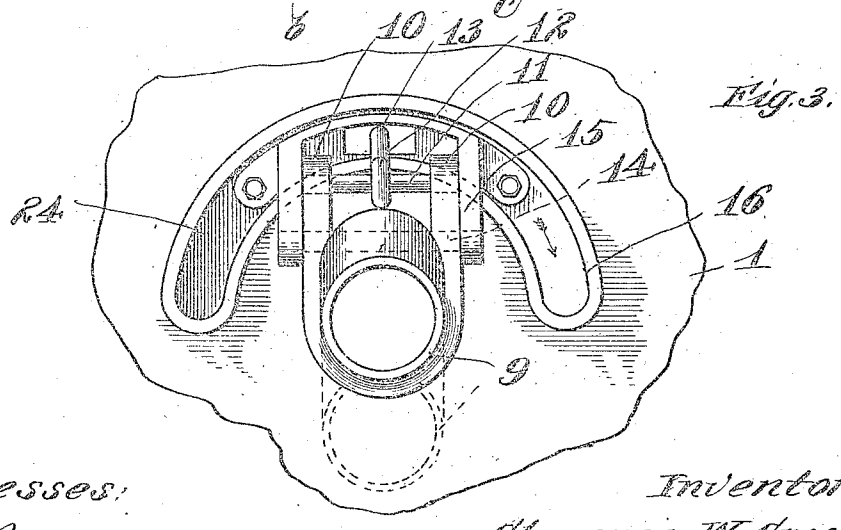


Fig. 3.

Witnesses:

G. A. Paulenschmidt

Leon F. Stroh

Inventor:

Clarence W. Crosby

By G. K. Gregg

Atty

No. 888,875. PATENTED MAY 26, 1908.

C. W. CROSBY.

STOKING APPARATUS.

APPLICATION FILED JULY 21, 1906.

4 SHEETS—SHEET 3.

Fig. 4.

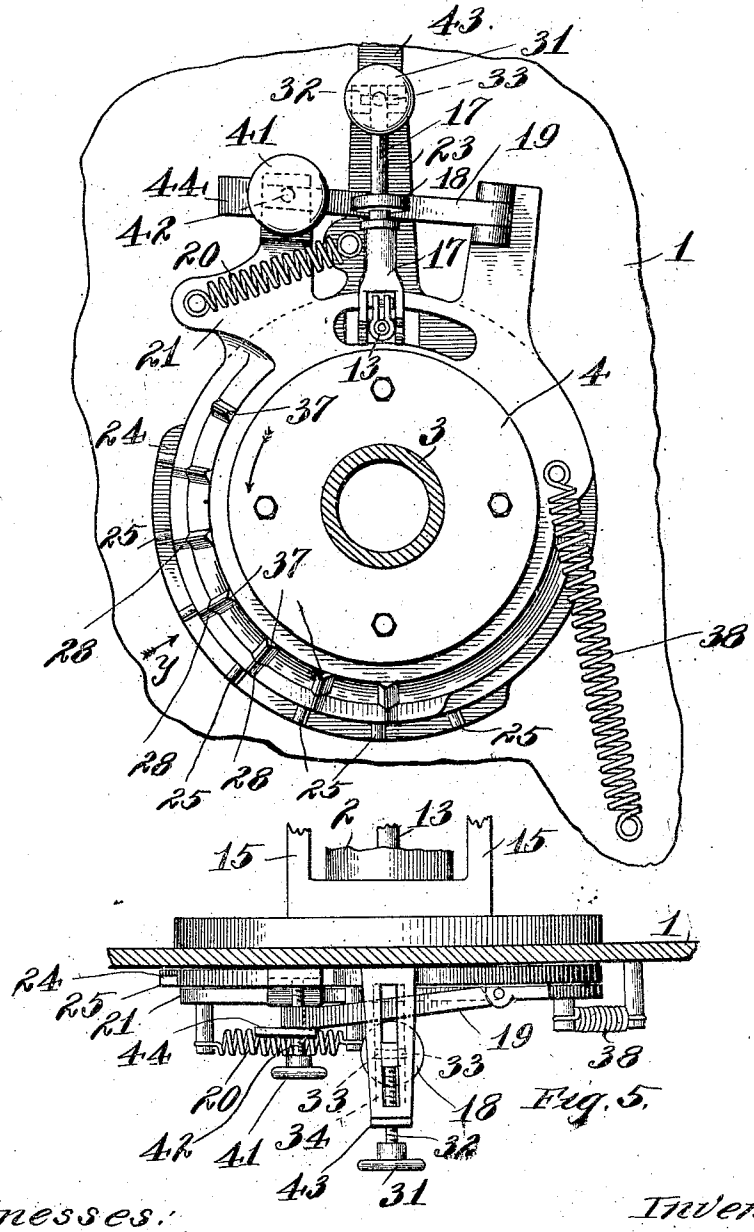


Fig. 5.

Witnesses:

G. A. Raubenschmidt

Leon S. Strobe.

Inventor:

Clarence W. Crosby,

By G. L. Crosby

Atty.

No. 888,875. PATENTED MAY 26, 1908.

C. W. CROSBY.

STOKING APPARATUS.

APPLICATION FILED JULY 21, 1906.

4 SHEETS—SHEET 4.

Fig. 6.

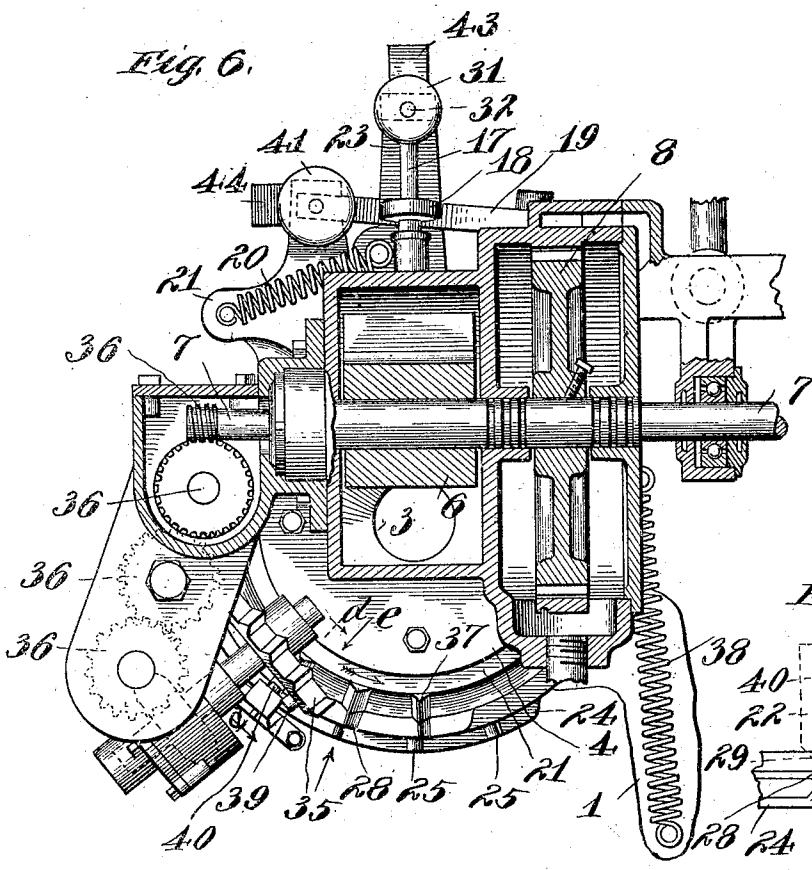


Fig. 7.

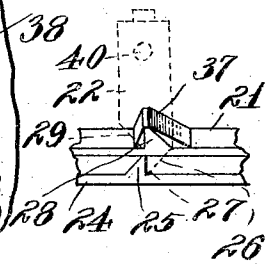


Fig. 8.

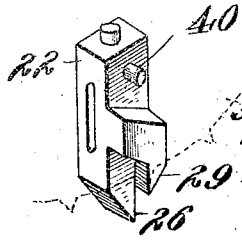


Fig. 9.

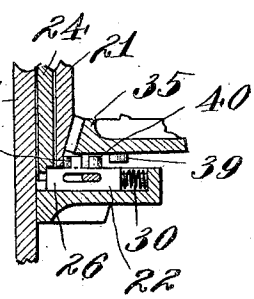
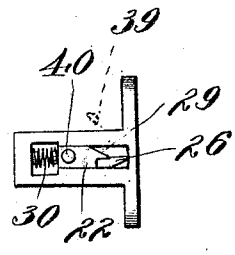


Fig. 10



Witnesses:

G. A. Taubenschmidt

Leon E. Stirk

Inventor:

Clarence W. Crosby,

By G. L. Cragg

Atty

UNITED STATES PATENT OFFICE.

CLARENCE W. CROSBY, OF CHICAGO, ILLINOIS, ASSIGNOR TO INTERNATIONAL STOKER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF SOUTH DAKOTA.

STOKING APPARATUS.

No. 888,875. Specification of Letters Patent. Patented May 26, 1908.

Application filed July 21, 1906. Serial No. 327,244.

To all whom it may concern:

Be it known that I, CLARENCE W. CROSBY, 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 Stoking Apparatus, 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 apparatus for stoking furnaces, and has for its general object the provision of an improved overfeed stoking mechanism which is especially adaptable for use in firing locomotives, though the invention is not to be restricted to this adaptation thereof.

In practicing my invention, I employ mechanism that casts streams of subdivided coal in the fire box, these streams of coal being spread abreast, preferably longitudinally of the fire box. After the coal has fallen, it lays in rows upon the bed of fuel, and as these rows may be comparatively thin, they may be deposited upon the bed of fuel without breaking up the formation of the burning bed of fuel.

In accordance with one feature of my invention, I employ a device which disposes these rows of fresh fuel upon the burning bed of fuel, and after the predetermined number of rows of green fuel have been placed upon the burning bed, the distributer of the green fuel is quickly returned to an initial position, whereafter the operation previously described may be continued. By this arrangement, no green fuel is immediately deposited upon the row of green fuel last placed, but rather is disposed upon or near the first row of the series of rows of green fuel, which by this time may have formed a part of the burning bed of fuel. In the formation of each row, I also desirably impart to the distributer a gradual movement as the fuel is being deposited and a quick return movement to another initial position, so that green fuel is not likely to be placed upon other green fuel just laid. Thus, in the preferred embodiment of my invention, I employ a distributer which is moved to dispose a plurality of rows of fuel upon a burning bed of fuel and is caused to return to an initial position suddenly, and which distributer is moved gradually so as to lay the fuel along its course in the different rows, one by one, and quickly return to another initial position with reference to this operation, for the purposes stated.

In the preferred embodiment of the invention, the fuel is not thrown with such force as to disturb the fuel bed structure, though I do not wish to be limited to this aspect of the preferred form of the invention.

That feature of my invention whereby rows of green fuel are placed abreast on the previously formed bed of fuel, is important.

My invention has other features and aspects which will be more fully hereinafter set forth in connection with the accompanying drawings, in which—

Figure 1 is a sectional elevation of the preferred form of the invention. Fig. 2 is a side elevation of the structure shown in Fig. 1. Fig. 3 is a view in the direction of arrow *a* of Fig. 1, of certain parts of the structure. Fig. 4 is a view on line *b b* of Fig. 2, certain of the parts, however, being omitted. Fig. 5 is a plan view of a part of the mechanism. Fig. 6 is a view on line *c c* of Fig. 2. Fig. 7 is a detail of a part of the mechanism entering into the structure. Fig. 8 is a view on a larger scale, of a compound dog or detent entering into the construction. Fig. 9 is a sectional view of a part of the structure on line *d* of Fig. 6, showing the location of the compound dog or detent. Fig. 10 is a view in the direction of arrow *e* of Fig. 6, showing the compound dog and certain parts immediately associated therewith. Fig. 11 is a sectional view on line *f* of Fig. 1. Fig. 12 is a sectional view on line *g* of Fig. 1.

Like parts are indicated by similar characters of reference throughout the different figures.

The device of my invention may, if desired, be disposed upon the door 1 of a fire box, which door is provided with an insetting throat 2 through which the fuel is discharged into the interior of the fire box, and which throat communicates with the throated portion 3 of a fuel injector, this throated portion 3 being flanged at 4, whereby it may be attached to the door 1. The throat 3 communicates with the receiving chamber 5, into the top of which green fuel (preferably coal subdivided to a sufficient extent so that it may be properly fed and distributed) is disposed. Within the receiving chamber 5 there is disposed an injector 6 of any suitable construction, whose operating shaft 7 may

be driven by any suitable form of motor, such as the turbine construction illustrated clearly in Fig. 6, the blade wheel 8 of which is keyed to the driving shaft 7. Inasmuch as any suitable mechanism may be employed for operating the injector and inasmuch as any suitable injector may be employed for discharging the fuel into the furnace or fire box, I will not further describe these parts that I have embodied in the preferred form of my invention.

I provide a fuel distributer or fuel guide 9 in front of the throat 2, so that the fuel that finds swift exit from the throat 2 is guided and distributed according to the method of operation of the device 9. This distributer is desirably substantially circular at its ends and of the shapes in cross-section at the lines *f* and *g* and elsewhere in cross-section of substantially the shapes shown in Figs. 11 and 12. The lower portion of the distributer 9, when occupying the position illustrated in Fig. 1, is substantially semi-cylindrical with an axis that may preferably, if desired, be made coincident with the axis of the throat 2 with said distributer in one of its positions. The upper portion of the distributer 9 above the horizontal plane (considering the structure in the position shown in Fig. 1) is so shaped as to coöperate with the lower portion of the distributer properly to distribute the coal in the fire box when the proper movements are imparted to said distributer. The distributer is so shaped upon its interior, that the fuel will not have such violent contact therewith as to overcome the proper emission thereof from the distributer, while the upper portion of the distributer causes the injected fuel to be directed sufficiently downward for the purpose of the stoking operation.

In forming each row of fuel in the fire box, I employ mechanism that gradually moves the distributer in a plane coincident with the row of fuel that is to be laid, whereafter the distributer is quickly restored, the restoring movement being preferably effected while the distributer takes its position for forming the next row of fuel. The gradual movement of the distributer is preferably in a downward direction, so that the formation of the rows of green fuel commences at the front or further end of the fire box and terminates at the other or back end of the fire box, that end of the fire box contiguous to the distributer (using locomotive parlance). The quick return motion of the distributer is effected after the row is finished at the back end of the fire box. I do not wish to be limited, however, to this particular method of controlling the operation of the distributer. In addition to this up and down movement of the distributer, I partially rotate the distributer so that the part above the plane of the axis of the distributer in the position the distributer occupies as shown in Fig. 1, is moved throughout an arc that is suited to the width of the fire box. In the embodiment of the invention illustrated, this portion of the distributer 9 is moved throughout an arc that approximates one hundred and twenty degrees. The distributing spot 9 is so shaped that in addition to its capacity to form the rows of green fuel longitudinally of the fire box, it nevertheless can be caused to locate the streams of fuel abreast of each other throughout the width of the fire box. The shape of this distributer is also such that at its end near the throat 2 it will gather the flying particles of fuel, and where it is bulged the most, the fuel will be properly engaged and discharged from the spout without having such violent contact therewith as to prevent its deposit at the proper and selected portions of the fuel bed, notwithstanding the angular position of said spout with reference to the throat 2. In order that this operation of the distributing spout 9 may be effected, I desirably employ the operating mechanism illustrated. The distributer or spout 9 has two ears 10 that are rigid with respect thereto and which are joined by a shaft or wrist 11 that is engaged by a bearing 12 carried by an operating arm 13 that is moved in and out or reciprocated by means of the mechanism to be described, whereby the distributer 9 is rotated upon a shaft 14 that is supported at the lower free ends of a bracket construction 15, whereby the distributer 9 is moved in the formation of each of the different rows of green fuel. The bracket construction 15 is adapted to be reciprocated or moved back and forth in a direction transverse to the lengths of the rows of fuel, whereby these rows of fuel may be formed side by side, as hitherto stated.

In order that the operating mechanism may be disposed upon the exterior of the fire box, I provide a curved slot 16 whose center is coincident with the axis of the throat 2. The bracket formation 15 and the link 13 project through this slot 16. The link 13 is linked to an operating bar 17 provided with a roller 18 which may be constructed and mounted as illustrated particularly in Fig. 1, this roller 18 being adapted to ride upon a run-way 19, whose direction is oblique or slanting with respect to the furnace door, whereby the link 13 is reciprocated for the purposes stated. The descent of the distributing spout 9 is gradual and its elevation is sudden, to which end the roller 18 rides down on the inclined track 19 toward the furnace door 1 and is brought suddenly to the high point of the track 19 after it has finished its downward journey upon said track. In order that this result may be accomplished, I employ a spring or other suitable agency 20 which is placed under stress or tension by the rotation of the ring 21 in a counter-clockwise direction by mechanism to be set forth.

When the roller 18 has reached the lower limit of its travel, said spring is placed under sufficient tension suddenly to restore the roller to the other end of the track, but during the time that the spring is being placed under this tension, a compound dog or detent 22 is effective to prevent the operation of the spring and the rotation of the ring 24 until the roller has reached the low part of the track 19, as stated. The high end of the spring 20 is anchored to an extension 23 of a ring 24 (to which the bracket 15 is secured), the ring carrying a series of locking lugs 25, and the lower end of said spring 20 is anchored to the ring 21, which latter ring is gradually rotated a predetermined distance in one direction and is restored to its initial position by movement in a reverse direction, as will appear. While the ring 21 is moved gradually in one direction, the spring 20 effects a gradual though intermittent movement of the ring 24 in the same direction, and this movement of the ring 24 is made intermittent because of the compound dog 22, the lower member 26 of which is in engagement with the vertical side 27 of a lug 25, while the spring 20 is having its tension increased, the engagement of the parts 25, 26 being broken when an incline 28 traveling with the ring 21 is brought under the incline 29 of the compound dog, whereby said dog is elevated against the force of a spring 30, whereupon there is nothing to prevent the action of the spring 20, which then moves the ring 24 a step. After this escape of the compound dog from the engaging lug 25, the spring 30 forces the descent of the dog 22, whereby the nose 26 is brought into the path of the surface 27 of the next lug 25, whereupon, the lower end of the spring 20 continuing to rotate with the ring 21, said spring is again placed under tension preparatory to the time when the next ensuing surface 28 will ride under the surface 29 to again relieve the spring 20 of its impediment (25), whereupon the ring 24 is suddenly rotated another step again to restore the distributer to its raised position by causing the roller 18 to ascend the incline 19.

It will be seen particularly by reference to Figs. 1 and 5 that the elements 13, 17 and 18 are mounted upon the inner ring 24 so that each time the said inner ring is moved a step the roller 18 is moved toward the high end of the track 19, the track 19 moving underneath the roller 18, whereby the said roller is caused to roll upon the track, due to the weight of the distributing spout 9 acting through the intermediation of the connections 10, 11, 12, 13 and 17. It will thus be seen how the spout 9 is moved gradually in one direction by the riding action of the roller 18 upon the track 19 and how it is moved rapidly in the reverse direction by the action of the spring 20. The extreme positions occupied by the distributing spout 9 in forming each row of fuel, are determined by means of a hand regulator 31 which has a threaded stem 32 that may be moved in and out and which engages at its inner end the upper end of operating bar 17. By means of the regulating mechanism 31, 32, the pins 33 (carried at the upper end of the bar 17) are moved to the selected position in the sustaining slots 34, said pins 33 thus constituting a shiftable trunnion support.

The ring 21 is caused to rotate in a counter-clockwise direction through the same angle that the ring 24 rotates through, the rotation of the ring 21 being continuous while the rotation of the ring 24, though gradual, is step-by-step, the purpose of which rotation of the ring 21 is to cause the bodily movement of the link 13 and bracket 15 throughout a range of travel commensurate with the width of the fire box, whereby the entire fire box has layers of green fuel distributed thereover preferably longitudinally thereof, the groove 16 permitting of this movement of the parts 13, 15, etc.

Any suitable means may be employed for effecting the rotation of the ring 21. I have shown a gear wheel 35 driven by means of intermediate gearing 36 that is interposed between the wheel 35 and the shaft 7. This gear wheel 35 coöperates with a limited number of teeth 37 provided upon the ring 21, whereby said ring is rotated gradually, the number of teeth 37 being suited to the number of rows of fuel that are to be laid in each cycle of operations of the mechanism, and, in order that the distributing spout may be quickly restored to its initial position (regarding now its movement in distributing rows of fuel across the fire box) I so form the gear wheel 35 that when it has performed its office in rotating the ring 21 the required extent, it will escape the teeth 37, whereupon the spring 38 which is anchored at one end to the ring 21 and at the other end to the door of the furnace, restores the ring 21 by moving it in a clockwise direction, by which time the gear wheel 35 has been brought into position to reëngage the teeth 37 to initiate another cycle of operations.

It will be seen that the spring 38 has its tension increased as the ring 21 is rotated in a counter-clockwise direction in order that it may be prepared to perform its function when the wheel 35 escapes the teeth 37, and for the purpose of this escapement, there may be a comparatively wide gap 35^1 between two adjacent teeth of the wheel 35, this space enabling the teeth 37 to pass by said wheel when the spring 38 is to operate. In order that the ring 24 may at the same time be restored to its normal position through the action of the spring 38 and the intermediation of the spring 20, the pin 39 (carried by the wheel 35) engages the pin 40 upon the com-

pound dog, whereby said dog is raised against the action of the spring 30.

The degree of inclination of the track 19 may be determined by the adjusting device 41, whose stem 42 works through the free end of the track 19, as indicated most clearly in Fig. 2. By regulating the degree of inclination of the track 19, the length of the row of fuel that is cast into the box is determined. Suitable locking bars 43, 44 are employed to maintain the stems of the devices 31, 41 in the positions to which they are rotated.

By way of a short résumé, it will be seen that the track 19 carried by the outer ring 21, governs the elevation and depression of the distributing spout 9 in the formation of the different rows of fuel, while the inner ring 24, by its intermittent movements, effects the movement of the bracket 15 carrying the distributing spout 9 in a curved path, whereby said spout is positioned to enable it to form the different rows of fuel in the fire box, the axis of rotation of the support 15 coinciding with the axis of the distributing spout 9 when said spout occupies the position illustrated in full lines in Fig. 1, these axes always occupying, in the preferred embodiment of the invention, the same plane.

By reason of the compound movements imparted to the distributing spout 9 by the devices 13 and 15, the exit opening of said spout is directed to form the different rows of fuel and the spout itself is, looking down on it, pointed toward the different parts of the fire box, as the shaft 14 upon which the spout 9 may rotate is itself bodily rotated about an axis that is coincident with the axes of the throat 2 and of the spout—when said spout occupies the position shown in full lines in Fig. 1. In other words, the mounting 14 for the spout is moved from side to side and desirably in a curvilinear path, though I do not wish to be limited to the precise direction in which the said mounting is moved. It will be seen that the axis of rotation of the mounting 14 is coincident with the path followed by the fuel as it is injected into the distributing spout 9. The process herein disclosed is claimed in my copending application Serial No. 327,245, filed July 21, 1906.

It will be seen that I have illustrated a stoker including a distributing spout which is swingingly mounted, the mounting upon which the spout is swung being the shaft 14, and a rotatable mounting for said support, which, in the embodiment of the invention shown, is the rotating bracket 15 that carries the support 14 at its free ends.

I do not limit myself to a machine the result of whose operation is the distribution of rows of fuel that are distinct from each other after they are laid.

In the claims I speak of quick return movements of the distributing spout, by which I mean that the spout is returned to an initial position after it has effected distribution of fuel, the return being so quick that the spout has had no appreciable opportunity for distributing further fuel while it is returning to its initial position.

While I have herein shown and particularly described the preferred embodiment of my invention, I do not wish to be limited to the precise construction shown, as modifications may be made without departing from the spirit of my invention, but,

Having thus described my invention, I claim as new and desire to secure by Letters-Patent:

1. A stoking apparatus including a distributing spout, mechanism for elevating and lowering the discharge end thereof for feeding fuel, and means whereby said mechanism moves said discharge end in one of these directions gradually and in the other direction quickly.

2. A stoking apparatus including a distributing spout with its support, a rotatable mounting upon which the support for the spout is carried, and mechanism for elevating and lowering the discharge end of the spout for feeding fuel and serving to move said mounting gradually in one direction and quickly in the return direction.

3. A stoking apparatus including a distributing spout, mechanism for elevating and lowering the discharge end thereof for feeding fuel, said mechanism including a link 13 attached at one end to the spout, a support 17 to which the other end of the link is attached, an inclined track upon which said support rides, a rotatable mounting upon which the support for the spout is carried, and means serving to move said mounting in one direction and quickly in the return direction.

4. A stoking apparatus for feeding fuel in rows, including a distributing spout, a support therefor, a rotatable mounting upon which the support for the spout is carried, and mechanism for elevating and lowering the discharge end of the spout for laying fuel and for moving said mounting a step in one direction after the spout has laid each of several rows of fuel.

5. A stoking apparatus including a distributing spout, mechanism for elevating and lowering the discharge end thereof for feeding fuel, said mechanism including a link 13 attached at one end to the spout, a support 17 to which the other end of the link is attached, an inclined track upon which said support rides, a rotatable mounting upon which the support for the spout is carried, and means for moving said mounting step-by-step in one direction.

6. A stoking apparatus including a distributing spout, mechanism for elevating and lowering the discharge end thereof for feeding fuel, said mechanism including a link 13 attached at one end to the spout, a support

17 to which the other end of the link is attached, an inclined track upon which said support rides, a rotatable mounting upon which the support for the spout is carried, and means for moving said mounting step-by-step in one direction and returning the same quickly in the reverse direction.

7. A stoking apparatus for feeding fuel in rows, including a distributing spout, a support therefor, a rotatable mounting upon which the support for the spout is carried, and mechanism for elevating and lowering the discharge end of the spout for laying fuel, for moving said mounting a step in one direction after the spout has laid each of several rows of fuel, and for returning said mounting to its initial position.

8. A stoker including a distributing spout, a rotatable mounting therefor, and mechanism for causing the step-by-step movement of said mounting in one direction and the quick return movement of said mounting.

9. A stoker including a swingingly mounted distributing spout, a mounting upon which the spout is swung, a rotatable mounting for the aforesaid mounting, and mechanism for causing the step-by-step rotation of said mounting in one direction and the quick return movement of said mounting and for swinging said spout upon its mounting.

10. A stoker including a swingingly mounted distributing spout, a mounting upon which the spout is swung, a rotatable mounting for the aforesaid mounting, and mechanism for effecting the rotation of said mounting in one direction and a quick return movement of said mounting in the opposite direction and for swinging said spout upon its mounting.

11. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting quick return of the discharge end of the spout after it lays a row of fuel, and for effecting the movement of the spout transverse to the aforesaid movement of the spout.

12. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting quick return of the discharge end of the spout after it lays a row of fuel, and for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout a step in one direction after each of several rows of fuel is laid.

13. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel and effecting quick return of the discharge end of the spout after it lays a row of fuel, for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout, and for effecting quick return of the discharge end of the spout to a starting position after the spout has distributed a set of rows of fuel.

14. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel and effecting quick return of the discharge end of the spout after it lays a row of fuel, for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout a step in one direction after each of several rows of fuel is laid, and for effecting quick return of the discharge end of the spout to a starting position after the spout has distributed a set of rows of fuel.

15. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel and for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout a step in one direction after each of several rows of fuel is laid.

16. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout, and for effecting quick return of the discharge end of the spout to a starting position after the spout has distributed a set of rows of fuel.

17. A stoking apparatus for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting the movement of the discharge end of the spout transverse to the aforesaid movement of the discharge end of the spout a step in one direction after each of several rows of fuel is laid, and for effecting quick return of the discharge end of the spout to a starting position after the spout has distributed a set of rows of fuel.

18. A stoking apparatus for feeding fuel in rows, including a distributing spout with its support, a rotatable mounting upon which the support for the spout is carried, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting a quick return of the discharge end of the spout after the spout has laid a row of fuel, and for moving said mounting after the spout has laid each of several rows of fuel a step in one direction.

19. A stoking apparatus for feeding fuel in rows, including a distributing spout with its support, a rotatable mounting upon

which the support for the spout is carried, and mechanism for elevating and lowering the discharge end thereof for feeding fuel, for effecting a quick return of the discharge end of the spout after the spout has laid a row of fuel, for moving said mounting a step in one direction after the spout has laid each of several rows of fuel in one direction, and for returning the spout to its initial position after it has laid said rows of fuel.

20. A stoker including a distributing spout, a rotatable mounting therefor, and mechanism for effecting the gradual rotation of said mounting in one direction and a quick restoring movement of said mounting, and for swinging said spout slowly in a direction angular to the movement imparted to the spout by the rotation of its rotatable mounting and for quickly returning said spout after it has fed a stream of fuel.

21. A stoker for feeding fuel in rows, including a distributing spout, a rotatable mounting therefor, and mechanism for effecting a step of a rotating movement of said mounting in one direction after each of several rows of fuel is laid, and a quick restoring movement of said mounting, and for swinging said distributer gradually upon its mounting in a direction angular to the movement imparted to the spout by the rotation of its rotatable mounting and for quickly returning said spout after it has fed a stream of fuel.

22. A stoker including a distributing spout, a rotatable mounting therefor, and mechanism for effecting step-by-step rotation of said mounting in one direction and a quick restoring movement of said mounting, and for swinging said spout gradually upon its mounting in a direction angular to the movement imparted to the spout by the rotation of its rotatable mounting and for quickly returning said spout after it has fed a stream of fuel.

23. A stoking apparatus including a distributing spout, a support therefor, a mounting upon which the support for the spout is carried to enable the fuel to be laid in rows, and mechanism for elevating and lowering the discharge end of the spout for laying fuel and for moving said mounting a step in one direction after the spout has laid each of several rows of fuel.

24. A stoking apparatus including a distributing spout, a support therefor, a mounting upon which the support for the spout is carried to enable the fuel to be laid in rows, mechanism for elevating and lowering the discharge end of the spout for laying fuel and for moving said mounting a step in one direction after the spout has laid each of several rows of fuel, and for returning said mounting to its initial position.

25. A stoker for feeding fuel in rows, including a distributing spout, and mechanism for elevating and lowering the discharge end of the spout to form each row of fuel, for moving the discharge end of said spout a step in one direction transverse to the direction of the rows of fuel after each of several rows of fuel has been laid, and for returning the discharge end of said spout to its initial position after a plurality of rows of fuel have been laid.

In witness whereof, I hereunto subscribe my name this 19th day of June A. D., 1906.

CLARENCE W. CROSBY.

Witnesses:

G. L. CRAGG,

LEON E. STROH.