O. T. BROWN.

GAS PRODUCER FEED.

APPLICATION FILED JULY 10, 1919.

1,433,109.

Patented Oct. 24, 1922.

2 SHEETS—SHEET 1.

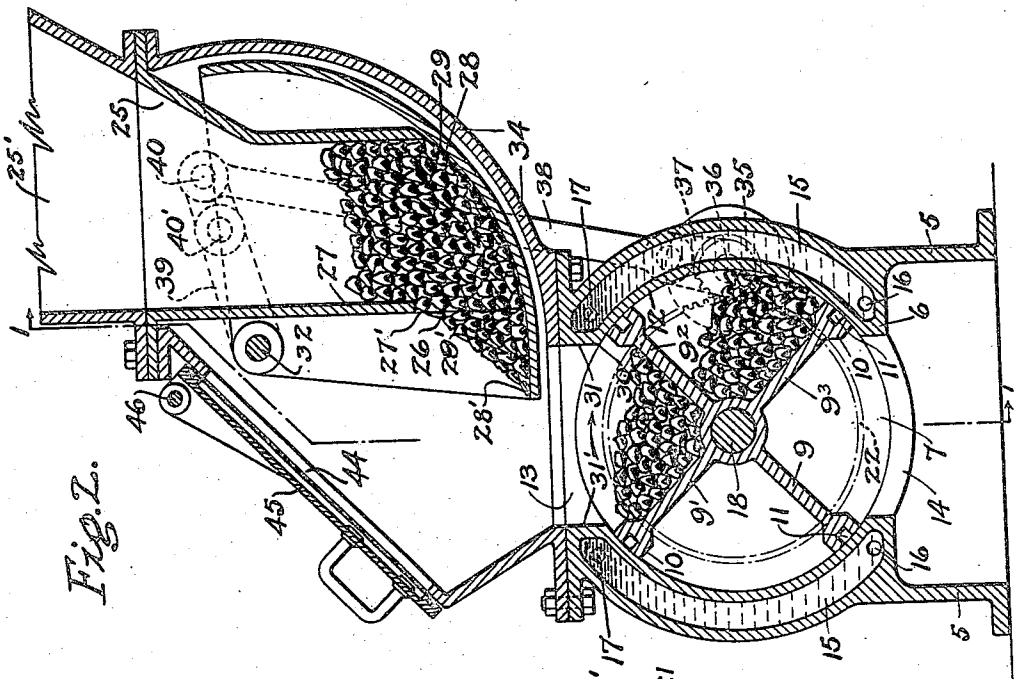


Fig. 2.

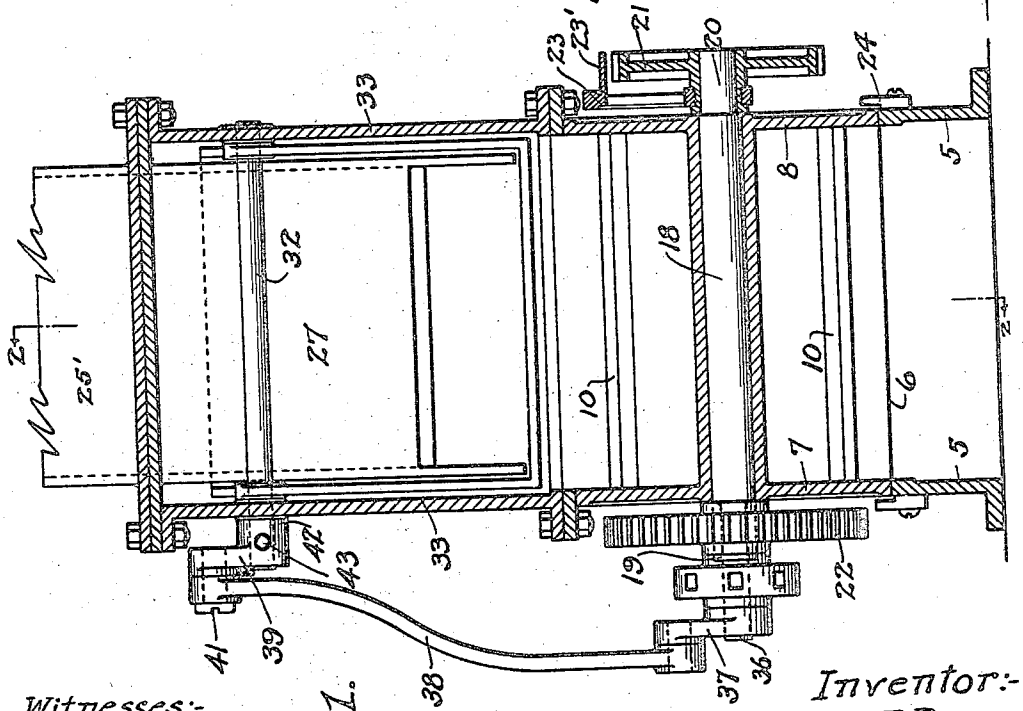


Fig. 1.

Witnesses:-

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2 SHEETS—SHEET 2.

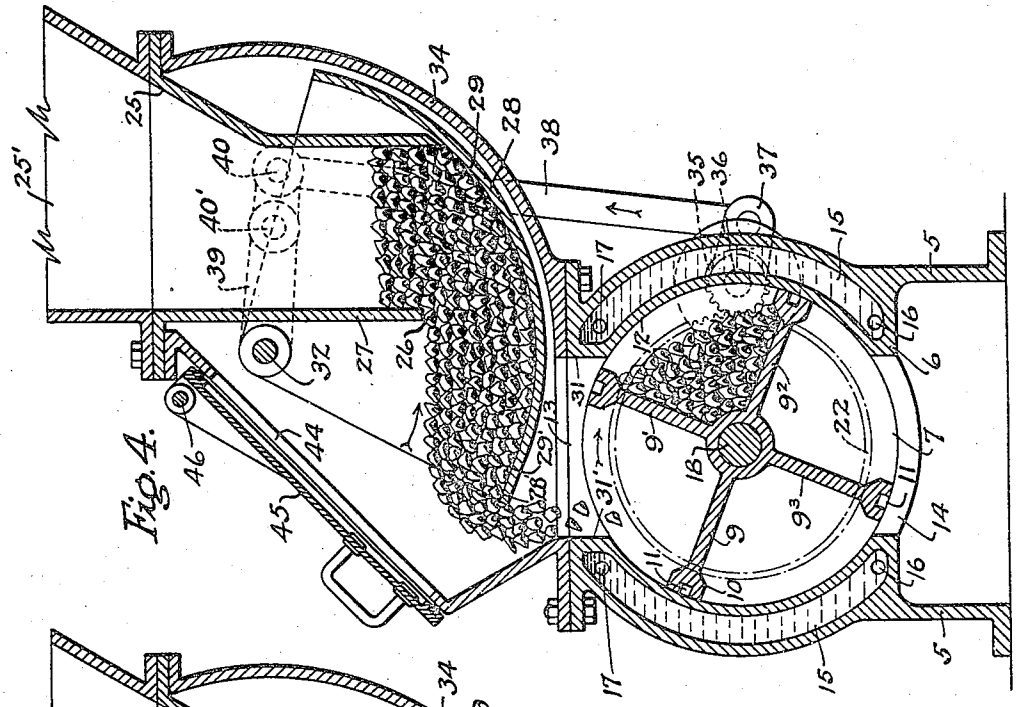


Fig. 4.

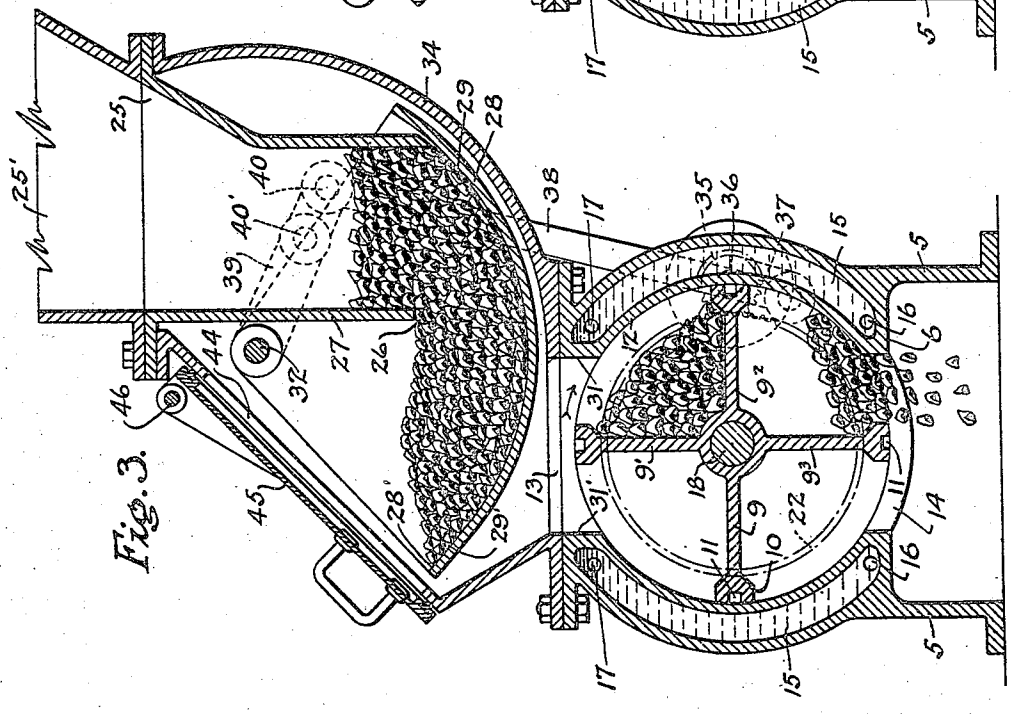


Fig. 3.

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Patented Oct. 24, 1922. 1,433,109

UNITED STATES PATENT OFFICE.

OAKLEY T. BROWN, OF AUDUBON, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED STATES CAST IRON PIPE AND FOUNDRY COMPANY, OF BURLINGTON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

GAS-PRODUCER FEED.

Application filed July 10, 1919. Serial No. 309,939.

To all whom it may concern:

Be it known that I, OAKLEY T. BROWN, a citizen of the United States, residing at 345 Barrett Avenue, Audubon, in the county of Camden and State of New Jersey, have invented a certain new and useful Gas-Producer Feed, of which the following is a specification.

My invention relates to feeding mechanisms for supplying fuel, etc., to gas producers, furnaces, kilns and the like at intervals and at the same time sealing against gas discharge therefrom.

The purpose of my invention is to provide a small and effective automatic control for the fuel etc., located back of (generally above) the sealing mechanism.

A further purpose is to supply the fuel, etc., through a rotary sealing spider or drum to which the fuel is fed from above by means of an oscillatory scoop upon which the coal is initially received and rests.

A further purpose is to utilize an oscillatory bottom for the chute and to feed the material therefrom through a seal by withdrawing the bottom.

A further purpose is to utilize a movable chute bottom above a sealing rotary device and to feed the chute contents to the rotor wholly by withdrawal movement of the bottom.

Further purposes will appear in the specification and in the claims.

I have preferred to illustrate my invention by but one construction among the various constructions in which it may be embodied, selecting a form which is extremely simple, practical and inexpensive, but is reliable in use and which at the same time well illustrates the principles of my invention.

Figure 1 is a section of Figure 2 taken upon line 1—1 thereof.

Figures 2, 3 and 4 are sections corresponding to line 2—2 in Figure 1 but with some coal in the chute and a normal charge in each rotor compartment, and show different positions of the parts.

Similar numerals indicate like parts.

In the feeding of fuel and like materials into a gas producer, kiln or other like furnaces it is desirable that the feed shall be reasonably regular and that the amounts of feed may be controlled without affecting the sealing of the opening against discharge of gas.

In the form which I have illustrated I have provided for adjustment of speed of the feeding rotor and adjustment of extent of feed to the rotor so that in both respects variation of the quantity of feed may be had.

In the drawings I have shown a casing 5 adapted to rest upon the top of the producer or kiln and supporting an open-ended cylindrical shell 6 within which a rotor 7 is adapted to turn.

The ends 8 of the rotor close and seal the ends of the shell and the circumference of the rotor not only here seals against the interior of the shell during rotation but has bearing therein. I have preferred to illustrate this rotor as a spider having blades 9, $9'$, 9^2, 9^3 terminating in slightly enlarged edges 10 grooved at 11 so that dirt, tar and other matter which may accumulate in the grooves may assist in the sealing function.

The inner cylindrical shell surface 12 is interrupted at the top to provide a filling opening 13, and at the bottom to provide a discharge opening 14. Between these two it is sufficiently extended on each side to span the distance between two adjoining terminals 10 so that one at least constantly maintains a seal with this surface.

The cylindrical shell is preferably water-cooled by compartments 15 having water inlet at 16 and water outlet at 17 connecting with any suitable water supply. This construction as so far described is my invention but is not claimed herein, being claimed by me in a copending application for water-cooled feeder for gas producers and the like, Serial No. 289,715, filed April 12, 1919.

The filling opening 13 is shown as directly over the center of the rotor though it may be moved to either side of the center circumferentially without affecting my invention, which resides primarily in the mechanism for delivering the fuel or other material from any suitable chute or supply to the sealing discharge mechanism.

The rotor is shown as carrying a shaft

18 terminating outside the rotor as at 19 and 20. Upon one end of this shaft is located a ratchet wheel 21 and upon the other a gear 22. Power may be applied to the ratchet wheels in any of various well known ways, of which one is shown by me in a copending application—Serial #234,400, filed May 14, 1918—providing an adjustable intermittent drive by a swinging latch engaging the ratchet teeth. The number of teeth exposed to the drive can be varied by a movable shield 23′ carried by an arm 23, so as to vary the rate of delivery of the fuel. It is not my purpose to claim this mechanism here but instead to point out that driving means as well as control for the speed of drive of such a spider are known and may be used in connection with the delivery mechanism therefor forming the main subject of my invention.

In the form herein illustrated I have intended to omit the bearings ordinarily used for supporting the shaft 18 and use the interior cylindrical surface of the casing to give bearing for the head of the spider, preventing undue end movement by any convenient devices conventionally shown as guides 24.

I supply the fuel to the rotor from above through a chute 25 connecting with any bin bottom or hopper 25′ for storage or supply of coal 26. For clearness of illustration the coal—which will usually be soft coal, and often "run-of-the-mine"—is shown as but partly filling the chute but in use would fill it completely. The chute may be cut away as at 27′, if desired upon the face 27 toward the inlet 13, here, for convenience of nomenclature considered the side face to increase the outlet provided by the slope of the bottom as hereinafter more fully pointed out. It has a swinging bottom or scoop 28 adapted to receive and retain the body of fuel etc., at this point except as the scoop bottom itself acts to feed the fuel.

The portion 29 of the scoop or bottom is sloped to assist in feeding the fuel out with movement of the scoop in one direction. Though not needed for this purpose, the slope will also retard return movement of the fuel as the bottom swings back. On account of this slope in the bottom the swinging bottom is spaced considerably from the bottom of wall 27 even without cutting this wall away, giving a side outlet here for fuel discharge which may be provided wholly by the spacing of the normal edge of side 27 of the chute at this point from the scoop bottom or partly by cutting away the side here to give additional outlet as desired.

The bottom is shown in Figure 2 in its farthest position to the right, at which it still extends at 28′ beyond the side wall 27 of the chute. In this position it is preferred that the fuel slope shall be a safe one; i. e., one in which no fuel escapes, in order that with clockwise movement of the rotor, no material may be dropped into the rotor just as the blades are closing against the edge 30 of the limiting face 31.

Obviously with the position of the parts shown the mechanism could be timed to avoid dropping of fuel within any compartment which was just being closed with an opposite direction of rotor movement in the same figure.

The swinging chute bottom 28 is supported by a shaft 32 having bearings lying upon the side toward the opening 13 of the center line of the lower part of the chute 25. They are formed in the sides 33 of the upper feed casing 34. The bottom preferably swings between the positions shown in Figures 2 and 3. The swinging is effected in the illustration by means of the gear 22 meshing with a gear 35 mounted upon a shaft 36 in any suitable bearings supported from the casing 5.

The same shaft supports a crank arm 37 from which a thrust rod 38 connects with a crank arm 39 upon shaft 32. The extent of swinging movement may readily be made adjustable by change in the length of or point of attachment of the thrust rod to either crank arm. I have preferred to select the upper crank arm, choosing two points of attachment 40, 40′ for the pin 41. The points at which the swinging bottom stops and starts may also readily be adjusted, as by shifting the boss 42 of the crank arm 39 about the shaft 32 and setting it in the adjusted position by set screw 43. The swinging bottom may be made to close the inlet opening 13 or not in the left hand position (Figure 3) as preferred.

For convenient access to the mechanism I provide an opening 44 closed by door 45 pivoted at 46.

In operation the rotor is turned constantly or intermittently as preferred and the swinging bottom is timed to oscillate once for each compartment of the rotor, i. e., once for each rotation of a drum and once for each compartment of a spider, accommodating the type of rotor which is used. Since the rotor in the illustration is a spider, no extended "dwell" or rest of the bottom is provided and the bottom can be rocked conveniently by a gear-driven crank as shown. As there are four pockets, the gear 35 is one-quarter the size of the gear 21, giving a complete oscillation of the bottom for each opening of the rotor.

Though so little fuel would fall from the bottom when in the position shown in Figure 3 and fuel fall at this point would make so little difference with the direction of rotation indicated that closing of the inlet 13 by the bottom is not necessary, this opening may so easily be effectively closed by the

bottom that it is desirable to construct the bottom and associated parts with this in view. Except as this closing may be desired the exact point at which the bottom stops on its clockwise or forward movement makes little difference.

At the right hand end of the movement of the bottom it is desirable to stop the edge 28′ short of the face 31 to avoid danger of fuel falling from the edge as one of the blades is closing against the edge 30 of the sealing surface and becoming caught between the blade and edge 30. As it is my purpose to feed less fuel than the compartment will hold, the exact point at which the counter-clockwise or "return" movement of the bottom stops also makes little difference. The two limits are selected in connection with the size of opening at 27′ between the wall 27 and the bottom or scoop so that less than the capacity of the compartment will be released at each return stroke and the feeding is desirably timed to begin the return (fuel releasing or discharging) stroke of the bottom with the parts in some such position as seen in Figure 3.

In operation: Starting with the parts in the position shown in Figure 1, with the fuel resting upon the bottom, the latter is swung forward (clockwise, in the figures) to the position shown in Figure 3, the rotor meantime advancing the compartment last filled so that an empty compartment opens beneath the end of the bottom. Because of the pressure of the fuel in the chute and the slope of that portion of the bottom beneath it, the coal follows the bottom somewhat as shown in Figure 3. On the return stroke of the bottom the fuel is dropped into the compartment as seen in Figure 4. Since the bottom and the nearest blade or vane of the rotor are now moving in the same direction and may be given the same or nearly the same peripheral speeds, the fuel may readily be dropped into the same part of the compartment opening or the discharging edge of the bottom may be made to gain upon or lose with respect to the edge of the blade according to the radii given the parts and their timing with respect to each other.

The quantity of fuel fed depends upon the extent of outlet at 27′ between the wall 27 and the bottom, the extent of slope of the portion of the bottom beneath the chute, the character of the fuel, the pressure above the fuel outlet, the width of the bottom, perpendicular to the paper and the length of stroke given the bottom.

The fuel feed may thus be nicely suited to the needs and practically all of it may be fed while the rotor opening is wide open, at the same time that the opening 13 may be closed by extension of the bottom beyond face 31′ for any desired dwell and any spacing of the edge of the bottom from the face 31 may be maintained to protect from danger of fuel being caught by dropping between the forward edge of the casing inlet and the trailing edge of the rotor opening.

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

1. In a feed for gas producers and like coal using devices, a rotor having a compartment, a casing having inlet and discharge openings and providing sealing engagement with the rotor and a supply chute and bottom above the rotor providing a side opening, the bottom being movable across the said inlet opening to withdraw fuel from the chute and reversely to discharge fuel through the inlet opening in combination with operating connections between the rotor and the bottom to swing the bottom in timed relation to the rotor movement.

2. In the feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces, and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a supply chute for fuel having an outlet and a swinging bottom for the supply chute adapted to carry fuel upon it out from the chute in one direction of movement and to drop the fuel so carried into the inlet opening with a reverse direction of movement and timed operating connections between the rotor and the bottom.

3. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces, and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a supply chute for fuel having an outlet and a swinging bottom for the supply chute adapted to carry fuel upon it out from the chute in one direction of movement and effectively close the inlet opening of the casing and to drop the fuel so carried into the inlet opening with a reverse direction of movement and timed operating connections between the rotor and the bottom.

4. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, a supply fuel chute, a bottom for the chute comprising the entire effective support for the fuel in the chute and movable from beneath the fuel

to drop the fuel into the rotor and timed operating connections between the rotor and bottom.

5. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a chute and bottom for the chute movable to carry fuel therefrom out over the inlet opening in one direction of movement and to retract to drop the fuel into the inlet opening in the opposite direction of movement.

6. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a chute fuel supply open at the side and a fuel supporting movable bottom for the chute, the two affording a side opening and the bottom maintained at a slope downwardly toward the open side and movable in a direction across the said inlet opening to withdraw fuel from the chute and in a retracting direction to drop the fuel withdrawn through the inlet opening.

7. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, and a feed therefor adapted to carry fuel over the inlet opening on its forward stroke and to be withdrawn from under the fuel during the retractive movement to discharge the fuel through the opening of the rotor.

8. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a chute fuel supply and a bottom providing between a side opening, the bottom for the chute having a tapered surface and being movable transversely of the chute to carry fuel upon its surface out through the side opening and to drop it through said inlet opening with retractive movement of the bottom.

9. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a fuel delivery chute and an oscillatory curved bottom therefore timed in agreement with the rotor and so pivoted as to present a sloping surface to the fuel in the chute.

10. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a chute at one side of the inlet opening and an oscillating bottom for the chute presenting a sloping surface to the fuel of the chute and spaced from the chute at one side to provide a passage, and a connection with the rotor to oscillate across the inlet opening to withdraw fuel through the side opening and back again to deposit this fuel through the inlet opening.

11. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with openings adapted to move into registry with and past the inlet and discharge openings, in combination with a delivery chute for the fuel an oscillatory bottom for said chute, pivoted at the side of the chute axis toward the inlet opening and spaced from the chute wall at one side to provide an outlet toward the inlet opening and operating connections between the rotor and the bottom adapted to move the bottom across the inlet opening as a rotor opening passes the inlet opening, carrying fuel with the bottom and to retract the bottom as the opening of the rotor approaches registry with the inlet opening.

12. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces anl inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a closure for the inlet opening operative to open and deposit fuel in the rotor during the earlier part of the movement of the rotor when its opening overlaps the inlet opening and to carry forward another charge for subsequent deposit during the latter part of the overlapping of the rotor opening and the inlet opening.

13. In a feed for gas producers and like

coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with openings adapted to move into registry with and past the inlet and discharge openings, in combination with a fuel supply chute and a fuel feeding bottom therefor movable across the inlet opening to close the same and feed fuel thereover and with return movement to deposit the fuel there-through and connections between the rotor and bottom timed to deposit the fuel within the time when the rotor and inlet openings overlap.

14. In a feed for gas producers and like coal using devices, a casing having cylindrical sealing surfaces and inlet and discharge passages to and from the cylindrical space thereof, a rotor therein having a compartment provided with an opening adapted to move into registry with and past the inlet and discharge openings, in combination with a fuel chute at one side of the inlet opening a bottom therefor comprising a portion of a cylinder pivoted out of line with the axis of the chute, and spaced from the chute wall at one side to allow fuel outlet, a crank arm adapted to swing the bottom transversely of the chute to cross the inlet opening tending to close and open the same, a crank arm operatively connected with the rotor and a connection between the arms.

15. In a fuel feed for gas producers and like coal using devices, a sealing mechanism having a movable compartment provided with an opening for receipt and discharge of the fuel in combination with a fuel feeding mechanism therefor located over the compartment and having a fuel discharging member movable during discharge in the same direction as that of the compartment opening.

16. In a fuel feed for gas producers and like coal using devices, a rotary sealing member adapted to receive and discharge fuel, in combination with a fuel feed therefor located above said member and having swinging movement during delivery of fuel therefrom in the same direction as the adjoining surface of the rotary member.

17. A rotary feeding member adapted to receive and discharge fuel while sealing against gas leakage therethrough, in combination with an oscillatory scoop thereover, adapted to supply fuel thereto and carrying fuel into position for discharge thereinto during one portion of the movement of the rotary member and in the reverse movement of the scoop moving in the same direction as the adjoining surface of the rotary member and dropping the fuel from the scoop which has been carried over the rotary member.

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