J. S. McCLIMON AND R. WETHERILL, JR.

FEED MECHANISM FOR GAS PRODUCERS.

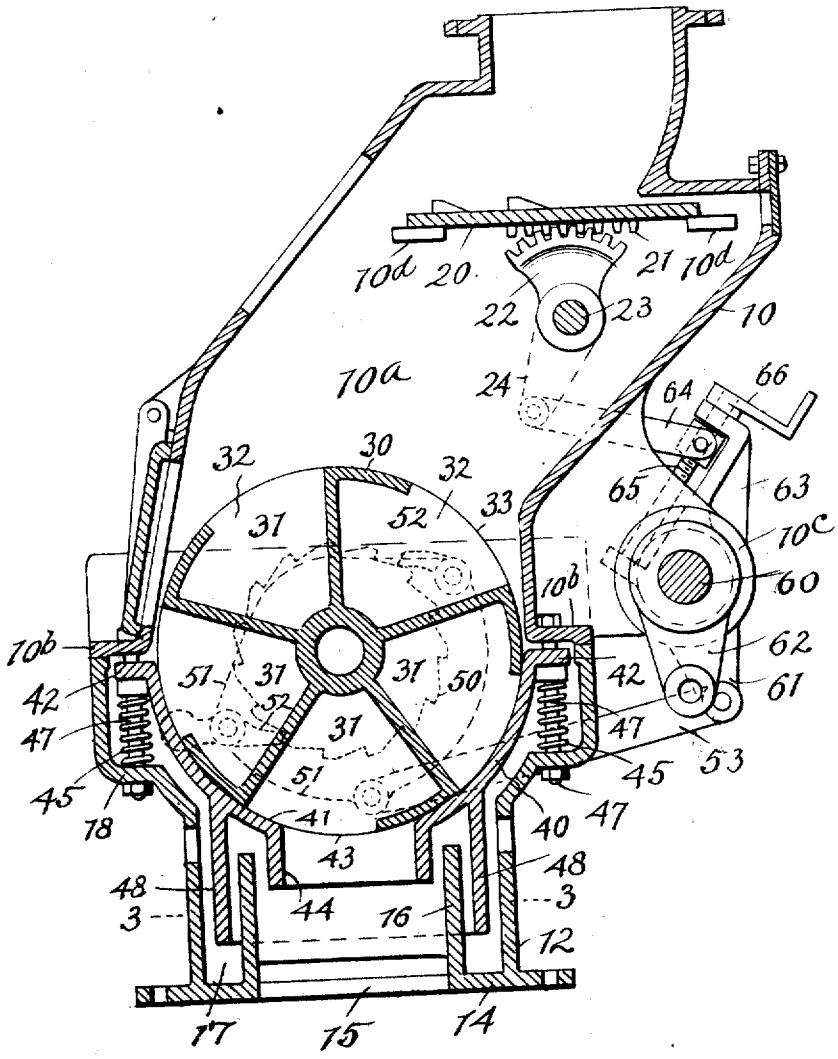
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1,382,371.

Patented June 21, 1921.

3 SHEETS—SHEET 1.

Fig. 1.



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Fig. 2.

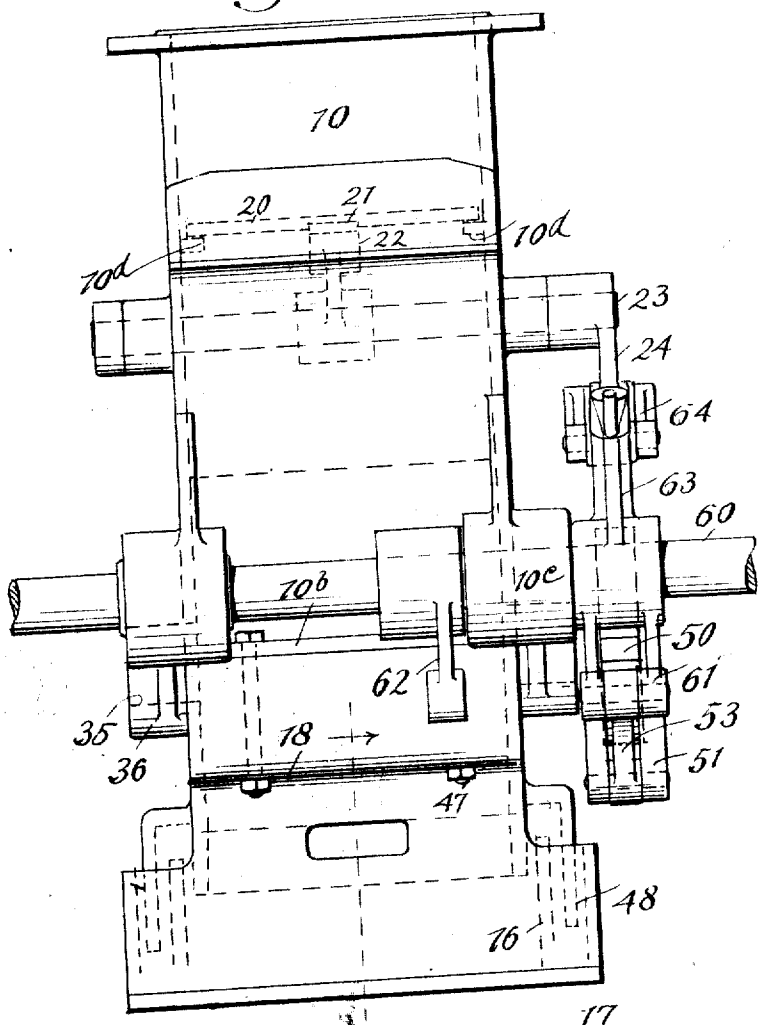
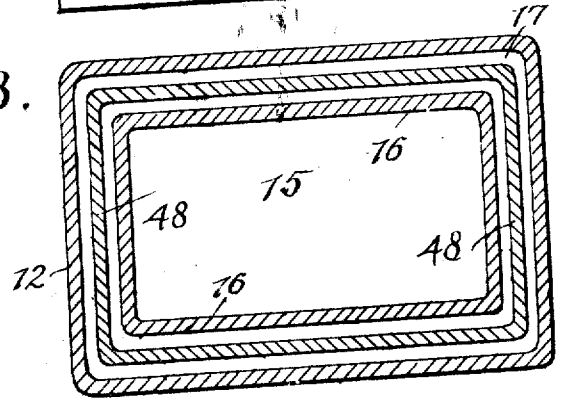


Fig. 3.



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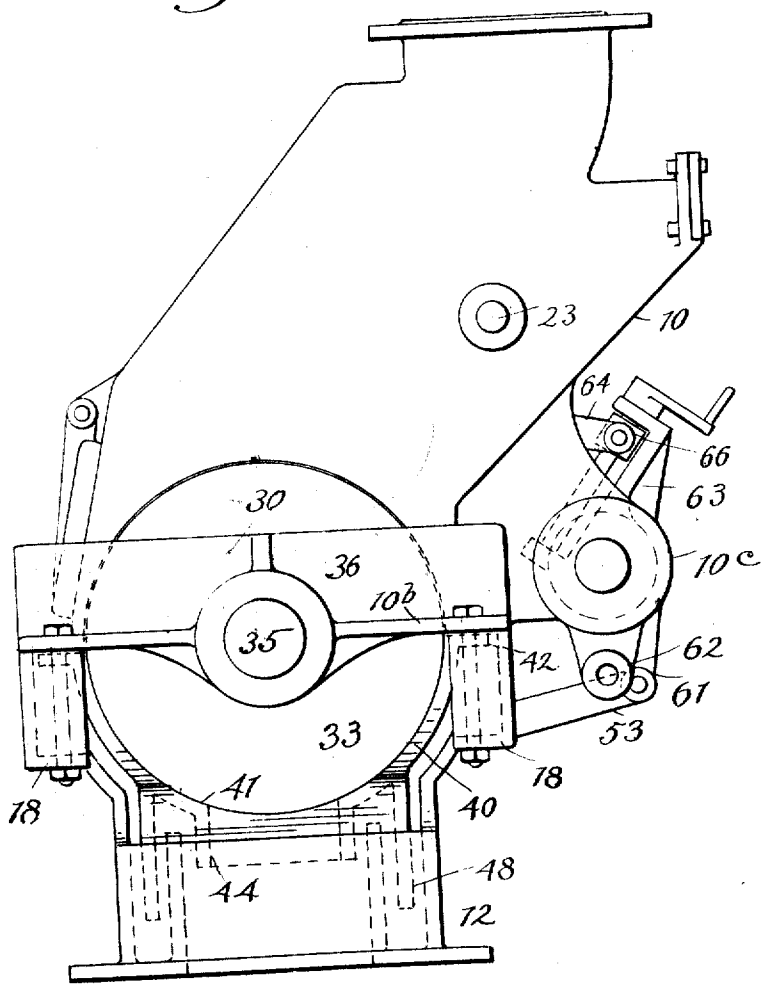
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3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

JAY S. McCLIMON AND ROBERT WETHERILL, JR., OF CLEVELAND, OHIO, ASSIGNORS TO THE WELLMAN-SEAVER-MORGAN COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

FEED MECHANISM FOR GAS-PRODUCERS.

1,382,371. Specification of Letters Patent. Patented June 21, 1921.

Application filed February 24, 1919. Serial No. 278,715.

To all whom it may concern:

Be it known that we, JAY S. McCLIMON and ROBERT WETHERILL, Jr., citizens of the United States, and residents, respectively, of Cleveland, in the county of Cuyahoga and State of Ohio, and Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Feed Mechanism for Gas-Producers, of which the following is a full, clear, and exact description.

The object of this invention, speaking generally, is to provide efficient mechanism, which will act automatically, to periodically feed to a gas producer such measured charges of fuel as may be required for the continuous efficient functioning of the producer, and to do this without substantial loss of gas from the producer.

The invention consists in the construction shown in the accompanying drawings and hereinafter described and pointed out definitely in the appended claims.

In the drawings, Figure 1 is a sectional side elevation of the invention; Fig. 2 is a front elevation; Fig. 3 is a sectional plan view in the plane of line 3—3 on Fig. 1; and Fig. 4 is a side elevation.

The apparatus includes a four-sided chute which, as shown, is made up of an upper member 10 and a lower member 12. When the apparatus is in use the upper end of the upper member 10 is in open communication with a fuel bin, (not shown) and contains a column of fuel which is supported by a horizontal gate 20. This gate is supported on lugs or flanges 10^a on the sides of the chute. It has a rack 21 on its lower side, and this is engaged by a gear segment 22 fixed to a rock shaft 23 which is mounted in bearings in the sides of the chute, and projects outside of the chute at one end, which projecting end carries an operating arm 24 to which power is applied, substantially as hereinafter specified, to rock said rock shaft, and thereby cause the desired forward and backward sliding movement of the gate 20.

In Fig. 1 the gate is shown in its forward positoin, in which it stops the down flow of the fuel; but when the gate is moved rearward some of the fuel will flow over the front end of said gate into the chamber 10^a below the gate,—the quantity of fuel being obviously dependent upon the rearward movement of the gate, and the time it remains away from its forward fuel sustaining position.

The part of the chute below this gate is inclined forward and downward and incloses a chamber 10^a whose lower end is closed by a cylindrical fuel valve 30. The cylindrical fuel valve contains one or more (preferably five) fuel pockets 31, the mouths of which are elongated slots 32 in the cylindrical peripheral wall of the valve. The valve cylinder has end plates 33 which close the ends of these pockets. The valve is provided on its ends with trunnions 35 that project out of the chute through holes in its sides, and are rotatably mounted in external bearings 36 which are fixed to the lower chute member. The means for turning the valve operate upon one of these trunnions, as will be presently explained.

The lower chute member 12 has a base 14 through which is the fuel discharge opening 15. This base is to be secured to the top of a gas producer, over an opening therethrough, whereby fuel discharged from the discharge opening 15 will pass directly into the producer. An upwardly extended flange 16 is formed around the margin of the opening 15, and serves two purposes, viz: it forms a guide tube for the fuel periodically discharged from the valve pockets; and it also forms the inner wall of a water seal trough 17.

40 represents a valve seat member having upon its upper surface a concave seat 41, which is fitted to and engages the lower half, or slightly less than half of the cylindrical valve. Springs 45 yieldingly press this valve seat member against the valve. This valve seat member has an elongated discharge opening 43 through its bottom, and surrounding this opening is a downwardly extended tubular flange 44 which extends loosely into the upper end of the guide tube 16 of the lower chute member. When one of the mouths 32 of a valve pocket is carried over the discharge opening 43, the fuel in said pocket will pass to the producer, being guided by the tubular flanges 44, 16. The gas passing upward through tubular flange 44 is prevented from escaping by the seal afforded by the engaging surfaces of the valve and valve seat member; and a water seal is provided to prevent the escape of the gas around the valve seat member. This water seal includes the trough

17 before referred to, and a tubular flange 48 which surrounds the flange 44 and projects down from the valve seat member.

The valve seat member 40 is for most part within the lower chute member, although its ends are, for convenience, extended out through holes in the sides of said chute member. Along the upper edges of the front and rear sides of the valve seat member are outwardly extended flanges which lie within the enlarged upper end of the lower chute member; and those rest upon coil springs 45, which in turn are seated on the outwardly extended flanges 18 of the lower chute member. Outwardly extended flanges 10^b on the lower edges of the front and rear sides of the upper chute member rest upon the upper edges of the front and rear sides of the lower chute member. And the two chute members are connected by bolts 47 which likewise go through the springs 45 and keep them in operative position.

The valve 30 has as has been stated, a cylindrical trunnion 36 at each end. To one of these a ratchet wheel 50 is fixed. A rocking pawl plate 51 is mounted on this trunnion, and carries one or more rocking pawls 52 for engagement with the ratchet wheel.

A rocker 60 is mounted in brackets 10^c carried by the chute member 10. This rocker has one arm 61 that is connected by link 53 with the rocking pawl plate 51. It has another arm 62 to which power is applied to rock the rocker. It has a third arm 63 which is connected by a link 64 with the arm 24 before referred to. Specifically, the arm 63 supports a screw 65 upon which a non-rotative nut 66 is mounted; and the link 64 is pivotally connected with this nut. By turning the screw the nut is moved toward and from the axis of the rocker, and the movement of the gate 20 produced by a given rocking movement of the rocker is varied so that any desired quantity of fuel will be discharged into chamber 10^a during each reciprocation of the gate 20.

It will be understood that the rocker is to be continuously oscillated through a known path by suitable mechanism which may be like that shown in said prior application. The rocking movement of the rocker will, through the described mechanism, cause the gate 20 to move forward and backward through a path which may be made shorter or longer as required by the means which have been described.

The rocking of the rocker will likewise oscillate the pawl plate 51 associated with valve 30 and thereby said valve will be turned intermittently through definite arcual distances. As the gate 20 moves rearward a certain controllable quantity of fuel will be discharged into the chamber upon the valve 30, and this fuel will find its way into the valve pockets and will distribute itself with practical uniformity therein. The step by step rotative movement of the valve will carry these pockets progressively into discharging relation with the discharge opening 43, through which the fuel charges will fall and go directly into the producer as stated.

The engagement of the cylindrical surface of the valve with the yielding seat member will provide an effectual seal which will prevent any escape of gas from the producer, except such as may enter the emptied pockets. This apparatus, and especially the valve, and valve seat member, are within the influence of the hot gases and other products of coal distillation. These parts will be expanded and contracted as their temperature varies. Among the products of the distillation of the coal will be vapors which may condense upon the seating surface of the valve seat member. Likewise the coal dust may deposit upon this seating surface; and these deposits taken in connection with the expansion and contraction of the parts referred to may sometimes make the turning of the valve difficult. But the spring controlled movement of the valve seat member will enable it to automatically assume an operative position under all of these occasionally arising difficult practical conditions, and thereby the device will continue to operate efficiently at all times.

Having described our invention, we claim:—

1. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed fuel valve therein, a valve seat member having a substantially semi-cylindrical upper seating surface with which the lower part of said valve engages, which valve seat member has a downwardly directed discharge opening through its seating surface, springs yieldingly pressing said valve seat member up against said valve, and means to impart step by step rotary motion to said cylindrical valve.

2. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed fuel valve therein, a valve seat member with which the lower part of said valve engages, which valve seat member has a downwardly directed discharge opening through its seating surface, a water seal surrounding said discharge opening, and springs yieldingly pressing said valve seat member up against said valve.

3. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed fuel valve therein and having trunnions at its ends, bearings outside of said chute in which said trunnions are rotatably mounted, a valve seat member within said chute below said valve, which valve seat member has a downwardly directed discharge opening through its seating surface,

and springs yieldingly pushing said valve seat member upward against said valve.

4. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed fuel valve therein, a valve seat member with which the lower part of said valve engages, which valve seat member has a downwardly directed discharge opening through its seating surface, and springs yieldingly pressing said valve seat member up against said valve, and means periodically delivering measured charges of fuel into the part of the chute above said fuel valve.

5. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed valve therein, a valve seat member with which the lower part of said valve engages which valve seat member has a downwardly directed discharge opening through its seating surface, the lower part of said chute below said valve seat member having a downwardly directed discharge opening and a water seal trough surrounding said discharge opening, and said valve seat member having around its discharge opening a downwardly extended continuous flange which projects into said water seal trough, and springs yieldingly pressing said valve seat member up against said valve.

6. In fuel feeding mechanism, the combination of a fuel chute, a rotatable cylindrical pocketed valve therein, a valve seat member with which the lower part of said valve engages which valve seat member has a downwardly directed discharge opening through its seating surface, the lower part of said chute below said valve seat member having a downwardly directed discharge opening and a water seal trough, surrounding said discharge opening, and said valve seat member having around its discharge opening a downwardly extended continuous flange which projects into said water seal trough, and said valve seat member having also around its discharge opening a flange which projects down into the discharge opening of the chute within said water seal trough.

7. In fuel feeding mechanism, the combination of a lower chute member having an enlarged upper end, an upper chute member supported on the lower chute member and having along its front and rear edges outwardly projecting horizontal flanges which rest on the top of the lower chute member, a rotatable cylindrical pocketed fuel valve in said chute and provided with trunnions which project out of the chute, supporting bearings for said trunnions external to the chute, a valve seat member located within the enlarged upper part of the lower chute member which valve seat member is fitted to the lower part of the valve and has a downwardly directed discharge opening through its seating surface and has outwardly projecting flanges along its front and rear edges, springs which are seated on the lower chute member and engage beneath said flanges to yieldingly support said valve seat member.

8. In fuel feeding mechanism, the combination of a lower chute member having an enlarged upper end, an upper chute member supported on the lower chute member and having along its front and rear edges outwardly projecting horizontal flanges which rest on the top of the lower chute member, a rotatable cylindrical pocketed fuel valve in said chute and provided with trunnions which project out of the chute, supporting bearings for said trunnions external to the chute, a valve seat member located within the enlarged upper part of the lower chute member which valve seat member is fitted to the lower part of the valve and has a downwardly directed discharge opening through its seating surface and has outwardly projecting flanges along its front and rear edges, springs which are seated on the lower chute member and engage beneath said flanges to yieldingly support said valve seat member, a water seal trough carried by the lower chute member, and a downwardly extended flange carried by the valve seat member surrounding the discharge opening therein and projecting into said water seal trough.

9. In fuel feeding mechanism for gas producers, the combination of a chute, a pocketed fuel valve rotatably mounted within said chute, a horizontal sliding gate in said chute above said valve, and means for imparting step by step arcual movement to said fuel valve and horizontal reciprocating movement to said gate.

10. In fuel feeding mechanism for gas producers, the combination of a chute, a pocketed fuel valve rotatably mounted within said chute, a horizontal sliding gate in said chute above said valve, and means for imparting step by step arcual movement to said fuel valve and horizontal reciprocating movement to said gate, and means to vary the extent of movement of said gate without varying the arcual movements of said valve.

11. In a fuel feeding mechanism, a chute, a valve provided with fuel receiving pockets rotatably mounted in said chute, a movable fuel supporting plate located above the rotary valve in said chute and obstructing the free flow of fuel to the rotary valve, and means for moving the supporting plate and rotating the valve in timed relation to each other whereby fuel in limited quantity will fall from said plate to a pocket in the rotary valve.

In testimony whereof we hereunto affix our signatures.

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ROBERT WETHERILL, Jr.