Sept. 15, 1931. F. B. CROSBY 1,822,885

GAS PRODUCER

Filed April 29, 1929 5 Sheets-Sheet 1

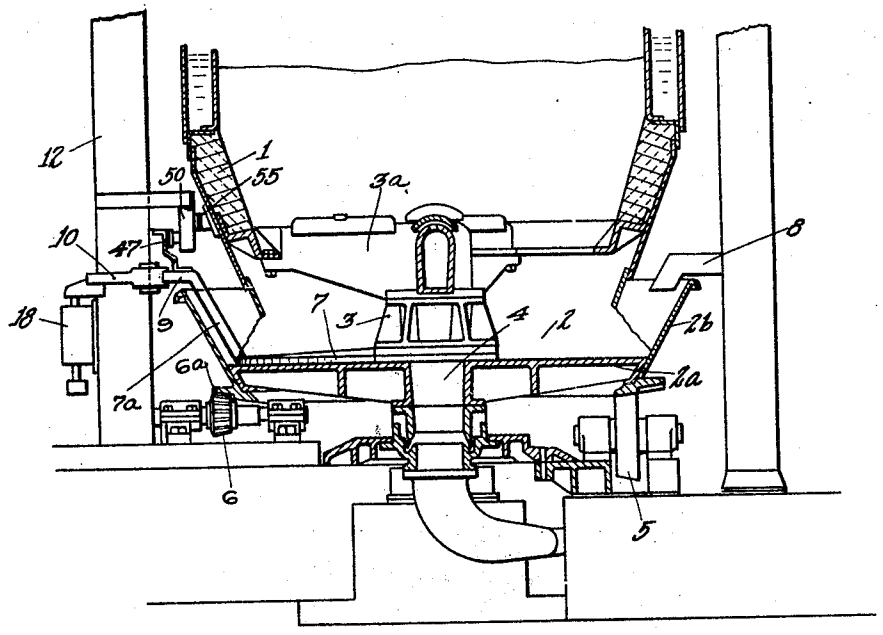


Fig. 1.

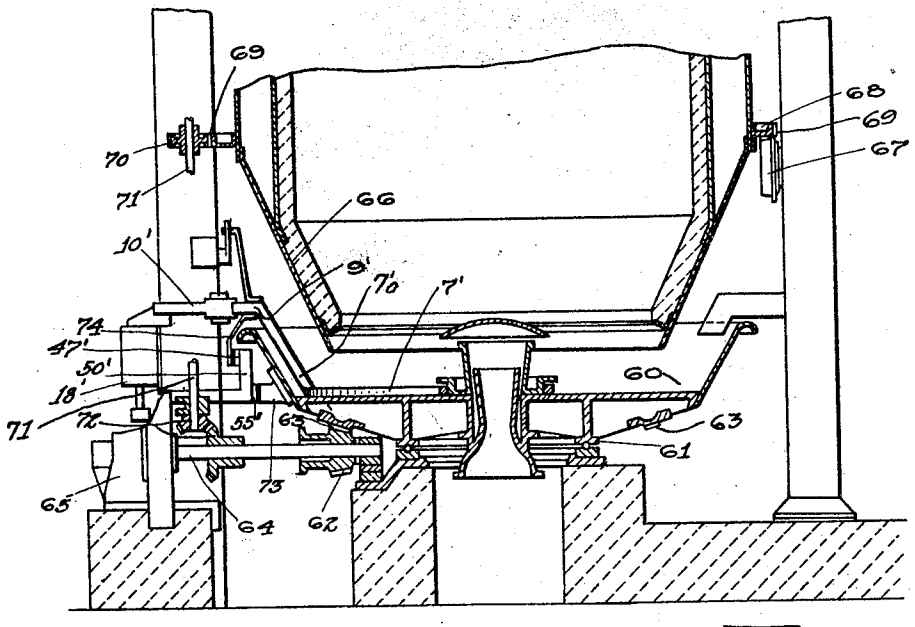


Fig. 9.

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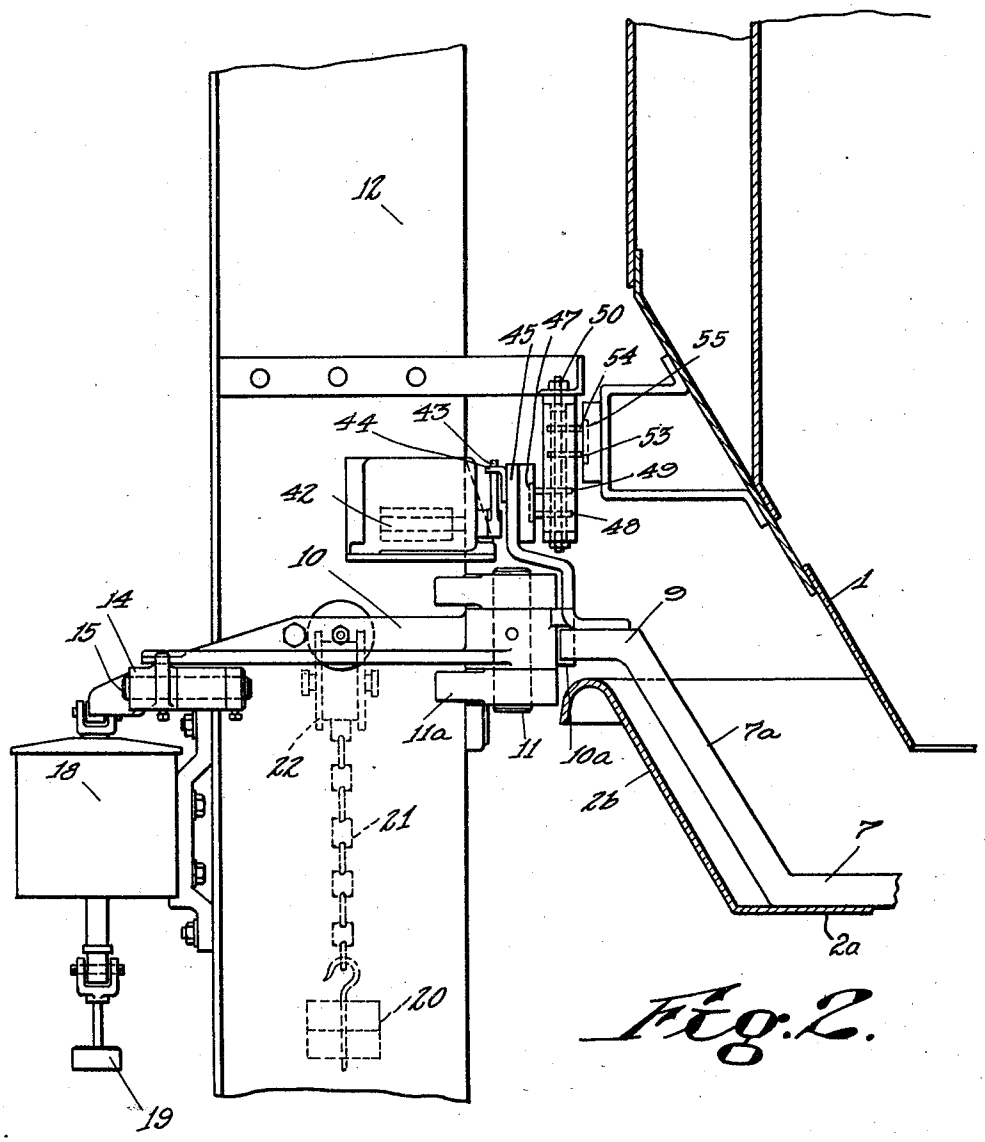


Fig. 2.

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Filed April 29, 1929 5 Sheets-Sheet 3

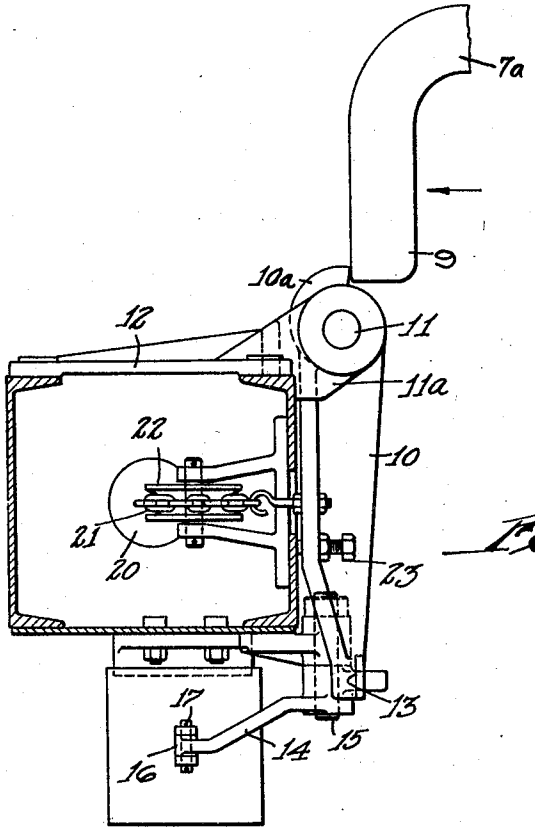


Fig. 3.

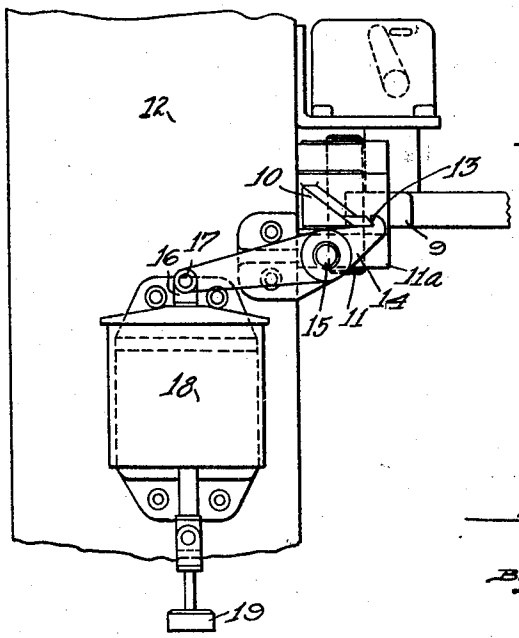


Fig. 4.

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GAS PRODUCER

Filed April 29, 1929 5 Sheets-Sheet 4

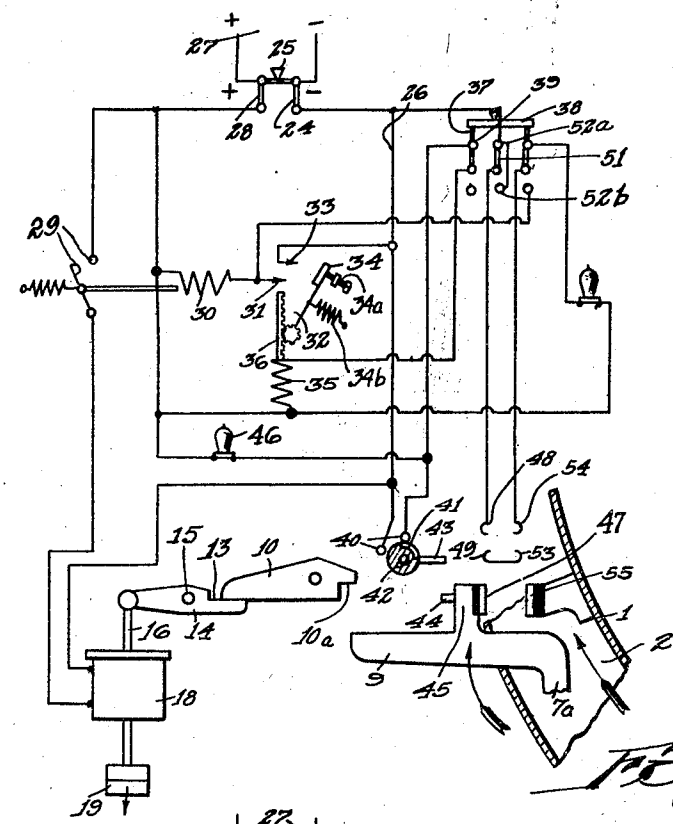


Fig. 5.

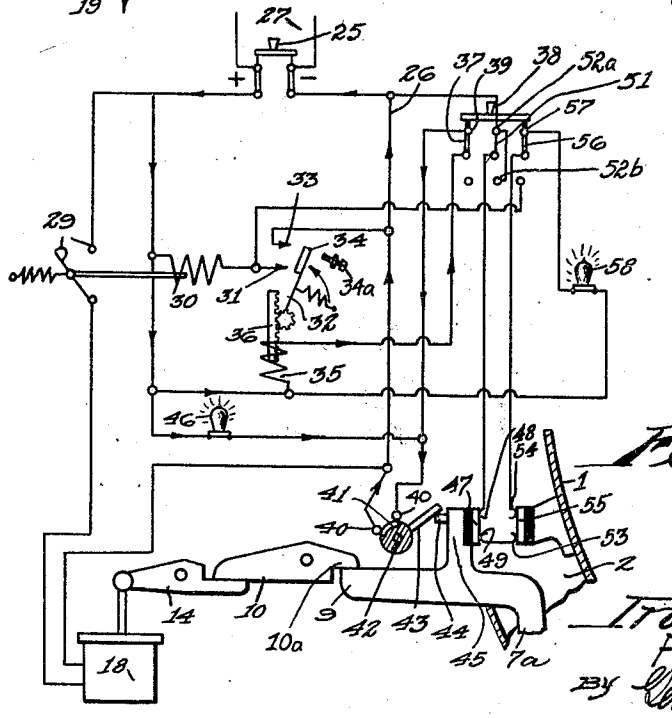


Fig. 6.

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GAS PRODUCER

Filed April 29, 1929 5 Sheets-Sheet 5

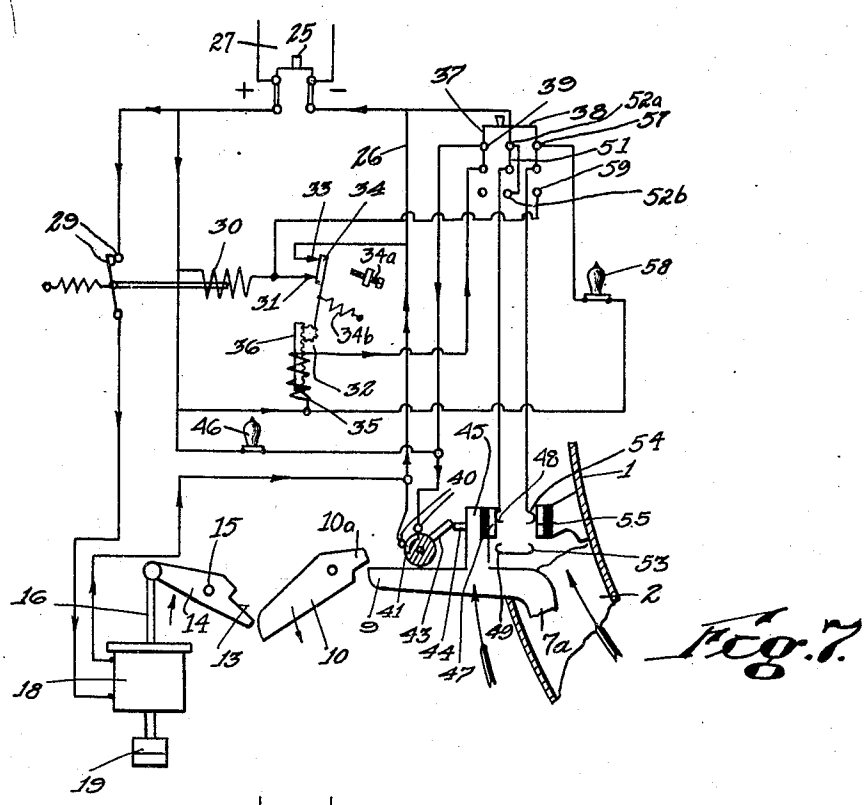


Fig. 7.

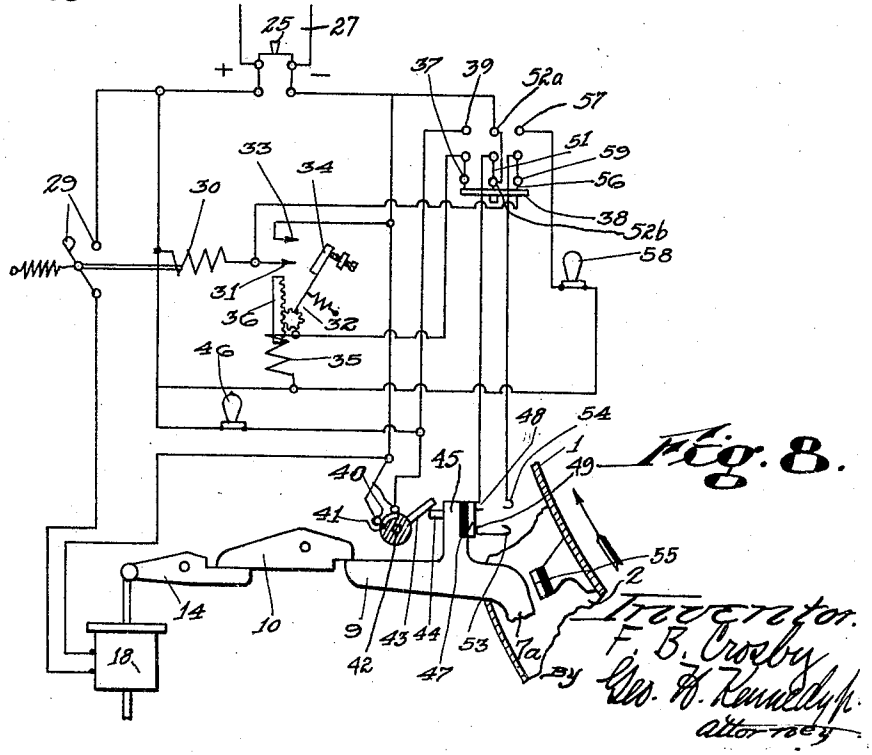


Fig. 8.

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Patented Sept. 15, 1931 1,822,885

UNITED STATES PATENT OFFICE

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GAS PRODUCER

Application filed April 29, 1929. Serial No. 359,048.

The present invention relates to gas producers and more particularly involves an arrangement adapted to automatically secure the intermittent discharge of ashes from the bottom of the producer during the gas making operation.

In gas producers of the type employing a rotatable ash pan, it has been customary to cause ashes to be discharged from the producer by means of a plow normally rotatable with the ash pan, but adapted to be held stationary when desired, so as to cause the ashes to be crowded over the edge of the flaring sides of the ash pan. The object of the present invention is to provide electrically operated means for automatically interrupting the normal rotation of the plow with the ash pan, at predetermined intervals, thereby causing intermittent discharge of the ashes from the bottom of the producer while it is in operation, and doing away with the necessity for having an operator to manually control the discharge of ashes, as heretofore. A further object of the invention is to provide means for readily varying the length of the time intervals during which the plow is held stationary, whereby a greater or less discharge of ashes from the producer can be effected for a given speed of operation. The above and other advantageous features of the invention will hereinafter more fully appear, reference being had to the accompanying drawings, in which

Fig. 1 is a vertical sectional view of the lower portion of a gas producer embodying the invention.

Fig. 2 is a view partially in section and partially in side elevation showing a portion of the parts in Fig. 1, on an enlarged scale.

Fig. 3 is a plan view of the parts shown in Fig. 2.

Fig. 4 is an elevation at right angles to Fig. 2.

Figs. 5, 6 and 7 are diagrammatic views illustrating the functioning of the electrical control devices for different phases of operation of the mechanism.

Fig. 8 is a diagrammatic view similar to Fig. 5 showing the circuit connections for securing continuous discharge of ashes during a complete revolution of the producer.

Fig. 9 is a view similar to Fig. 1 showing the automatic plow control applied to a different type of producer.

Like reference characters refer to like parts in the different figures.

Referring to the drawings, there is shown in Fig. 1 the lower portion of a well known type of producer providing a gas producing chamber enclosed within a wall or shell 1 which constitutes the fuel supporting section of the producer. The lower end of the shell 1 opens into a concentric ash support or pan 2 providing a horizontal bottom 2*a* and flaring walls 2*b* which surround and are spaced from the shell 1. The shell 1 is supported from the ash pan 2 by means of a centrally disposed casting 3 providing radial arms 3*a*, only one being shown, which serve the double purpose of supporting the shell 1 and distributing the blast to the fuel bed from the blast passage 4.

The ash pan 2 carrying the shell 1 is rotatably supported on a number of rollers 5, only one of which is shown, and rotation is adapted to be imparted to the entire producer structure by means of a pinion 6 meshing with a rack 6*a* on the underside of the ash pan 2. An ash plow 7 is pivoted concentrically with respect to the rotative axis of the ash pan 2, the plow 7 lying flat on the bottom 2*a* of the ash pan so that in the absence of restraint, the plow 7 is adapted to partake of the rotary motion imparted to the ash pan 2. The plow 7 provides an upwardly inclined portion 7*a* and it is obvious that should the plow be prevented from rotating with the ash pan 2, this inclined portion 7*a* will tend to force ashes upwardly from the bottom of the ash pan so as to be readily removed by a stationary skimmer 8 cooperating with the flaring wall of the ash pan 2.

As best shown in Figs. 2 and 3, the upper end of the inclined plow portion 7*a* terminates in an arm 9 spaced above and projecting over the rim of the ash support 2. Rotation of the plow 7 with the pan 2, in the direction of the arrow, is adapted to carry the projecting end of the arm 9 into engagement with a shoulder

10*a* provided at one end of a pivoted latch 10 which is shown locked against turning so as to hold the plow 7 stationary and cause ashes to be discharged from the producer. The latch 10 is mounted on a shaft 11 supported by a bracket 11*a* secured to a vertical column 12 of the producer structure and the end of the latch 10 opposite to the plow arm 9 is received in a notch 13 provided at one end of a locking lever 14, see Fig. 4. The lever 14 is mounted on a pivot 15 and its other end is connected to a plunger 16 by means of a pin 17. The plunger 16 is movable within a solenoid 18 and when the solenoid 18 is deenergized, as shown, a weight 19 at the lower end of the plunger 16 tends to pull the plunger 16 downwardly and turn the lever 14 in a counterclockwise direction so as to maintain the end of the latch 10 in the notch 13 of the locking lever 14 and prevent turning of the latch 10.

With the parts in the position shown, it is evident that the plow 7 will be prevented from turning with the ash pan 2 by the engagement of its arm 9 with the latch shoulder 10*a* so long as the opposite end of the latch 10 remains engaged with the locking lever 14. However, should the solenoid 18 be energized, as will be hereinafter described with reference to Fig. 7, the upward movement of the plunger 16 will release the end of the latch 10 from the notch 13. When this occurs, the push of the plow arm 9 on the latch shoulder 10*a* will turn the latch 10 about its pivot shaft 11 until the shoulder 10*a* clears the arm 9, whereupon the plow 7 will move with the ash pan 2 and the discharge of ashes from the producer will be interrupted. When the plow arm 9 clears the latch shoulder 10*a* and passes on, the latch 10 will be returned to its former position with its shoulder 10*a* in the path of movement of the plow arm 9 by means of a weight 20 pulling on a chain 21 passing over a pulley 22 mounted within the column 12, the chain 21 being connected at its other end to the latch 10. Therefore, the weight 20 always exerts a force tending to hold the latch shoulder 10*a* in position to trip the plow 7, although the pull of the weight 20 itself is not sufficient to offer any appreciable resistance to turning of the latch 10 by the plow arm 9 when the locking lever 14 is turned to release the end of the latch 10 from the notch 13. In order to cause the plow engaging shoulder 10*a* of the latch 10 to occupy the proper position, an adjusting stud 23 is provided which is threaded into the latch with its end adapted to bear on the column 12 under the pull of the weight 20, see Fig. 3.

Referring now to Fig. 5, there is shown diagrammatically the electrical devices for automatically controlling the energization of the solenoid 18 so as to release the latch 10 and permit the plow 7 to rotate with the ash pan 2. One terminal of the solenoid 18 is permanently connected to one blade 24 of a knife switch 25 through a conductor 26, so that when the switch 25 is closed, this terminal of the solenoid 18 is connected to the − side of a source 27 of electrical energy. The other terminal of the solenoid 18 is adapted to be connected to the other blade 28 of the switch 25 through a pair of relatively movable and normally open contacts 29 of a contactor providing an energizing winding 30. When the winding 30 is deenergized, the contacts 29 are open so that normally the solenoid 18 is in a deenergized condition, as shown in Fig. 5.

One terminal of the winding 30 of the contactor is permanently connected to the blade 28 of the switch 25 so that when the switch 25 is closed, one side of the winding 30 is connected to the + side of the source 27. The other terminal of the contactor winding 30 is connected to one stationary contact 31 of a time delay relay generally indicated at 32, the contact 31 being spaced from a second stationary contact 33 that is permanently connected to the conductor 26 leading from the − side of the source 27. The relay 32 provides a pivoted arm 34 which is adapted to bridge the space between the contacts 31 and 33 when the arm 34 is moved into engagement with these contacts under the pull of a solenoid 35. A plunger 36 is movable within the solenoid 35 and the rack and pinion connection indicated between the plunger 36 and the arm 34 is such that an appreciable time interval occurs between the energization of the solenoid 35 and the bridging of the contacts 31 and 33 by the arm 34. This time interval is adjustable, as is usual in time delay relays of this type and one way of obtaining such adjustment is by means of a set screw 34*a* which determines the retracted position of the arm 34 under the pull of the spring 34*b* which also holds the plunger 36 withdrawn from the solenoid 35. Obviously, other ways of varying the time element could be provided. One terminal of the solenoid 35 of the relay 32 is permanently connected to the + side of the source through the switch blade 28 while the other terminal thereof is connected to one blade 37 of a three-pole double-throw knife switch 38. When this switch 38 is thrown to its upper position, as shown at Fig. 5, the blade 37 is connected to a stationary contact 39 which is in turn connected to one of a pair of spaced stationary contacts 40. The contacts 40 are adapted to be engaged by a bridging member 41 turnable on a shaft 42 carrying an arm 43, and as shown in Fig. 2, the arm 43 is in the path of movement of a finger 44 projecting from an extension 45 of the arm 9 of the plow which cooperates with the latch 10.

In Fig. 5, the plow arm 9 is indicated as moving with the ash pan 2, in the direction of the arrow, towards the latch 10 which presents its shoulder 10*a* in the path of move-

ment of the arm 9. At this time the solenoid 18 is deenergized, as are also the contactor winding 30 and the solenoid 35 of the time delay relay 32. At this time also, while no ash is being discharged from the producer, the knife switch 25 has been closed and the movable blades of the three-pole switch 38 have been thrown to their upper position for the purpose of causing ashes to be discharged from the producer for a predetermined period, as will now be described.

When further rotation of the ash pan 2 carries the plow 7 from the position shown in Fig. 5 to the position shown in Fig. 6, it is obvious that the latch 10 will prevent the plow from further movement with the ash pan 2, so that immediately following engagement of the plow arm 9 with the latch 10, the plow 7 starts to discharge ashes. Coincident with the engagement of the plow arm 9 with the latch 10, the finger 44 movable with the plow engages the arm 43 on shaft 42, thereby turning the bridging member 41 into engagement with the spaced contacts 40. When this occurs, the solenoid 35 of the time delay relay 32 is energized, current then flowing from the + side of the source through the solenoid 35 to the contacts 37 and 39 of the three-pole switch 38 and from thence across the bridged contacts 40 through the conductor 26 back to the − side of the source 27. The plunger 36 is thereupon drawn within the solenoid 35 to cause the arm 34 to slowly approach the open contacts 31 and 33, during which time the ashes are being discharged from the producer by the stationary plow 7. After the lapse of a predetermined time interval, determined by the distance which the end of the arm 34 has to move from its retracted position in engagement with its stop 34*a* towards contacts 31 and 33, these contacts will be bridged by the arm 34 thereby energizing the winding 30 of the contactor and closing its contacts 29. As soon as this occurs, the plow locking solenoid 18 will be energized thereby rocking the lever 14 and releasing the end of the latch 10, as shown in Fig. 7. The latch 10 is then free to turn on its shaft 11 under the push of the plow arm 9, so that the plow 7 immediately frees itself from the latch 10 and resumes its rotative movement with the ash pan 2, thereby interrupting the discharge of ash from the producer, all as indicated in Fig. 7.

As indicated above, the period of plowing is determined by the time it takes the plunger 36 of the solenoid 35 to turn the arm 34 into engagement with the contacts 31 and 33 and a normal setting of the relay would give five or six seconds for the plowing of ash. This is based on the assumption that the normal speed of rotation of the producer is one revolution in six minutes, or 360° of turning in 360 seconds. Since this is at the rate of 1° per second and it is assumed that the relay 32 is set to close the contacts 31 and 33 in six seconds, it follows the plow 7 will discharge ash through 6° of rotation of the ash pan 2. Obviously, the relay 32 can be set by means of an adjustable stop 34*a* to operate for a greater or less interval than six seconds, which value is assumed merely for the sake of giving an idea of the manner in which the plow functions to discharge ashes.

After the plow 7 has freed itself from the latch 10, and continues its rotation with the ash pan 2 for another revolution, the latch 10 is reset by the weight 20 and again presents its shoulder 10*a* in the path of the plow arm 9. The lever 14 also resumes its locking position with respect to the latch 10, upon the deenergization of the solenoid 18 which takes place almost as soon as the finger 44 releases the arm 43 to permit a spring acting on the shaft 42 to separate bridging member 41 from the contacts 40. When this occurs, the solenoid 35 of the relay 32 is deenergized, whereupon the arm 34 is disengaged from the contacts 31 and 33 to interrupt the circuit of the winding 30 of the contactor. Upon opening of the contacts 29, the latch solenoid 18 is deenergized, thereby permitting the weight 19 to pull the plunger 16 downwardly and move the latch lever 14 in position so that the end of the latch 10 is again received in the notch 13. Therefore, as the plow 7 completes another revolution with the ash pan 2, after a lapse of about six minutes, the latch 10 will again hold the plow 7 stationary and cause the producer to discharge ashes a second time. This second period of plowing is the same as the first and after the relay 32 closes, energization of the solenoid 18 will again release the latch 10 and permit the plow 7 to resume its rotation with the pan 2. Therefore, while the switch 25 is closed and the three-pole switch 38 is in its upper position, the producer will discharge ashes for a predetermined interval during each complete revolution of the ash pan 2. This intermittent discharge of ashes will take place entirely automatically, so that no attention is required by an operator.

While the plow 7 is being held stationary to cause discharge of ashes, this condition is indicated by the illumination of a red lamp 46 located where it may be readily observed. One terminal of the lamp 46 is permanently connected to the + side of the source 27 while the other terminal is connected to one of the spaced contacts 40. Consequently, when the contacts 40 are engaged by bridging member 41 during the period that the plow 7 is stationary, the lamp 46 will be illuminated. When the plow 7 is released, opening of the contacts 40 will extinguish the lamp and it will not be illuminated again until the plow 7 is again held stationary by the latch 10, as described above.

In the operation of a gas producer over

long periods, it is often desirable to have the plow operate so as to discharge ashes for a considerably longer interval than would be possible by adjusting the time delay relay 32 for its longest period. That is to say, every six or eight hours it may be desirable to hold the plow stationary for one complete revolution of the producer in order to discharge ashes continuously for that period. For the purpose of causing continuous plowing for the period of one complete revolution only, independently of the intermittent plowing as previously described, the extension 45 carried by the plow arm 9 from which projects the finger 44 also carries an insulated contact segment 47. This is adapted to bridge the gap between a pair of spaced insulated contact fingers 48 and 49 carried by a rod 50 supported from the stationary column 12, see Fig. 2. The upper finger 48 is connected to the middle blade 51 of the double throw switch 38 which is adapted to be engaged with stationary contacts 52*a* and 52*b* permanently connected to the − side of the source 27, in either position of the double throw switch 38. The lower contact finger 49 is permanently connected to a contact finger 53 also carried by the rod 50, this finger 53 being separated from a second finger 54 except when the gap between them is bridged by an insulated contact segment 55 carried by the producer body 1, see Fig. 2. The contact segments 47 and 55, being carried by the plow 7 and shell 1 respectively, are subject to progressive movement with respect to each other, due to the intermittent movement of the plow 7, so that at regular intervals the segments 47 and 55 will simultaneously bridge the gaps between fingers 48 and 49 and fingers 53 and 54, see Fig. 6. This position corresponds to what will be termed the zero position of the plow 7 in which it is engaged by the latch 10 at the end of a complete revolution of the producer.

The upper contact finger 54 is connected to the right hand blade 56 of the double-throw switch 38, and when this blade 56 is in the upper position, for causing normal intermittent operation of the plow 7, a circuit is established from the upper stationary switch contact 57 through a green lamp 58 to the + side of the source 27. Therefore, both the red lamp 46 and the green lamp 58 are illuminated when the plow 7 is held stationary, as shown in Fig. 6, and the green lamp 58 is extinguished as soon as the segment 55 carried by the shell 1 leaves the lower finger 53, as shown in Fig. 7. However the green lamp 58 will be illuminated only when the switch 38 is in its upper position and when the segment 55 lines up with segment 47 every six hours, under the operating conditions previously assumed.

When it is desired to cause continuous discharge of ashes for the full 360° of rotation of the producer, the operator waits until the plow 7 is locked under the conditions described above, which condition is indicated by simultaneous illumination of both the red and green lamps 46 and 58. Then as soon as the green lamp 58 is extinguished by the segment 55 leaving the stationary fingers 53 and 54, but before the time delay relay 32 can cause energization of the trip solenoid 18, the operator throws the movable blades of the double-throw switch 38 from the upper position to the lower position, as shown in Fig. 8. When this occurs, the left hand blade 37 is disconnected from the contacts 40 thereby deenergizing the solenoid 35 of the time delay relay 32; consequently the latch 10 will continue to hold the plow 7 stationary while the ash pan 2 continues to rotate. Prior to the throw over of the switch 38, rotation of the producer shell 1 with respect to the stationary contact carrying rod 50, has moved the contact segment 55 out of engagement with the fingers 53 and 54 so that when the right hand blade 56 of the switch 38 is moved into engagement with the lower stationary switch contact 59, the direct circuit from contact 59 to the winding 30 of the contactor is incomplete owing to the gap between the contacts 53 and 54.

Bearing in mind the fact that the switch 38 is thrown from its upper position to its lower position in the first few degrees of rotation of the producer shell 1 from its zero position, before the time delay relay 32 can energize the solenoid 18, it is obvious that the plow 7 will remain stationary while the producer is rotating through 360°, for during this period there is no way for the solenoid 18 to become energized. However, when the producer completes one revolution with the switch 38 in its lower position for continuous plowing, the contact segment 55 reengages the pair of contact fingers 53 and 54. Since at this moment the other fingers 48 and 49 are bridged by the segment 47 on the then stationary plow, a circuit is established from the − side of the source 27 through the middle blade 51 of the switch 38 through all four fingers and their engaged plates 47 and 55 back to the right hand blade 56 of the switch and its contact 59. And since the switch contact 59 is connected directly to one terminal of the contactor winding 30, the circuit through the contactor winding 30 to the + side of the source 27 is completed independently of the time delay relay contacts 31 and 33. Therefore, the solenoid 18 is energized to release the latch 10, holding the plow 7 and the plow 7 automatically resumes its rotation with the producer upon the completion of the full 360° of plowing.

When the producer completes its next revolution with the switch 38 in its lower position, the solenoid 18 will again be energized

to release the latch 10, so the plow 7 will continue to rotate with the shell 2 and no more plowing will occur while the switch 38 is in its lower position. This condition is indicated by momentary illumination of the red lamp 46 for each revolution until the operator throws the switch 38 to its upper position thereby reestablishing the circuit arrangements for automatically bringing about plowing over a short period for each complete revolution of the producer, as previously described.

In the previous discussion of the automatic control of the plow 7 to cause intermittent discharge of ashes from the producer, it has been assumed that the producer shell and the ash pan rotate in unison in accordance with the showing of Fig. 1. However, in the operation of some gas producers, it has been found desirable to rotate the fuel containing shell and the ash pan at slightly different speeds, the purpose of this being to secure a certain amount of shearing effect between the body of incandescent fuel in the shell and the ashes in the pan with resulting agitation of the lower part of the fuel bed. It is within the contemplation of the present invention to provide for the intermittent discharge of ashes from a producer of this modified type and there is shown in Fig. 9 the lower portion of a gas producer of a type in which the shell and the ash pan rotate at different speeds.

In this type of producer, the ash pan 60 is mounted on a ball bearing 61 and is adapted to be rotatably driven by means of a pinion 62 engaging the teeth 63 of a rack on the underside of the ash pan 60. The pinion 62 is mounted on a shaft 64 driven through reduction gearing, not shown, by an electric motor 65. The producer shell 66 is mounted for rotation independently of the ash pan 60 on rollers 67 supporting a ring 68 which also provides gear teeth 69 in mesh with a pinion 70 on a countershaft 71. The shaft 71 is adapted to be driven from the motor 65 through gearing 72 and the gear ratio between the pinion 62 driving the rack 63 on the one hand and the pinion 70 driving the teeth 69 on the other hand is such that for a given speed of rotation of the motor 65, the ash pan 60 will be driven at a slightly greater speed than the shell 66, although in the same direction of rotation. This difference in the rotative speeds is slight, under normal conditions being about only one revolution per hour, so that the shearing action between the incandescent fuel bed in the shell 66 and the ashes in the pan 60 is just enough to give the desired agitation in the lower part of the fuel bed.

A plow 7′ is carried by the bottom of the ash pan 60 in substantially the same manner as the plow 7 is carried by the ash pan 2. This plow also provides an arm 9′ which projects over the rim of the ash pan 60 and is adapted to cooperate with a latch 10′ under the control of a solenoid 18′ in substantially the same manner as described with reference to the plow 7. The arrangement of electrical control devices cooperating with the plow 7′ is exactly the same as shown in Fig. 5, with the exception that the contact 55′ in Fig. 9 is carried by the outside of the pan 60 on a bracket 73, whereas the contact 55 is carried by the shell 1 in Fig. 1. This positioning of the contact 55′ necessitates mounting the rod 50′ carrying the four contacts 48, 49, 53 and 54 below the latch 10′ and the provision of a finger 74 projecting downwardly from the plow arm 9′ to carry the contact 47′. In the operation of the modified arrangement of Fig. 9, the rotation of the pan 60 entirely controls the automatic operation of the plow 7′ in the same manner as described with reference to Fig. 1, so that the slightly lower speed of the shell 66 has no effect on the functioning of the apparatus.

I claim,

1. In a gas producer, a rotating ash support, an ash removing plow carried by said support, means normally held in the path of said plow to arrest its rotation with said ash support and thereby cause the discharge of ashes from the producer, and automatic means set in operation upon the arrival of said plow in its arrested position for causing said plow arresting means to release said plow after ashes have been discharged from said producer for a predetermined interval.

2. In a gas producer, a rotating ash support, an ash removing plow carried by said support, means normally held in the path of said plow to arrest its rotation with said ash support and thereby cause the discharge of ashes from the producer, means set in operation upon the arrival of said plow in its arrested position for automatically releasing said plow from said plow arresting means after a predetermined interval, and means for restoring said plow arresting means to its initial position, whereby said plow effects the delivery of ashes from said producer at regular predetermined intervals in the rotation of said ash support.

3. In a gas producer, a rotating ash support, an ash removing plow carried by said support, means normally held in the path of said plow to arrest its rotation with said ash support and thereby cause the discharge of ashes from the producer, and electrically-operated means comprising a time delay relay device adapted to be energized upon the arrival of said plow in its arrested position for automatically causing the said plow arresting means to release said plow after a predetermined interval.

4. In a gas producer, the combination with a rotating ash support and an ash removing plow carried by said support and adapted to

normally rotate therewith, said plow providing a portion extending upwardly through the ash bed and projecting outside of said support, of a latch member disposed in the path of movement of the projecting portion of said plow to prevent rotation thereof with said support, and an electrically-operated means controlled by the arrival of said plow for releasing said plow in its locked position after it has been held stationary a predetermined interval.

5. In a gas producer, the combination with a rotating ash support and an ash removing plow carried by said support and adapted to normally rotate therewith, said plow providing a portion extending upwardly through the ash bed and projecting outside of said support, of a latch disposed in the path of movement of the projecting portion of said plow with said ash support for preventing movement thereof, a solenoid for controlling said latch, and a circuit controller actuated by the movement of said plow for energizing said solenoid a predetermined interval after the arrival of said plow in its locked position for releasing said plow from said latch to cause its rotation with said ash support.

6. In a gas producer, the combination with a rotating ash support and an ash removing plow carried by said support and adapted to normally rotate therewith, said plow providing a portion extending upwardly through the ash bed and projecting outside of said support of a pivotally mounted latch disposed in the path of movement of the projecting portion of said plow with said ash support, means for preventing pivotal movement of said latch by said plow to thereby lock said plow against rotation with said ash support, and adjustable time delay means set in operation by the arrival of said plow in its locked position for automatically releasing said latch to cause said plow to resume rotation with said ash support after ashes have been discharged from said producer over a predetermined interval.

7. In a gas producer, the combination with a rotating ash support and an ash removing plow carried by said support and adapted to normally rotate therewith, said plow providing a portion extending upwardly through the ash bed and projecting outside of said support, of a latch disposed in the path of movement of the projecting portion of said plow with said ash support, means for locking said latch against pivotal movement to prevent rotation of said plow, a solenoid for controlling the operation of said latch locking means, and an adjustable time delay switch controlled by the arrival of said plow in its locked position for automatically energizing said solenoid to release said latch after ashes have been discharged from said producer during a predetermined interval.

8. In a gas producer, the combination with a rotating ash support and an ash removing plow carried by said support and adapted to normally rotate therewith, said plow providing a portion extending upwardly through the ash bed and projecting outside of said support, of a latch disposed in the path of movement of the projecting portion of said plow for preventing movement thereof with said ash support, a solenoid for controlling said latch normally in a deenergized condition, and circuit controlling devices set in operation upon the engagement of said plow with said latch for automatically energizing said solenoid to release said latch and permit said plow to rotate with said ash support after ashes have been discharged by said producer during a predetermined interval.

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