J. A. HERRICK.

CHARGING DEVICE FOR GAS PRODUCERS.

APPLICATION FILED APR. 15, 1913.

1,119,280.

Patented Dec. 1, 1914

2 SHEETS—SHEET 1.

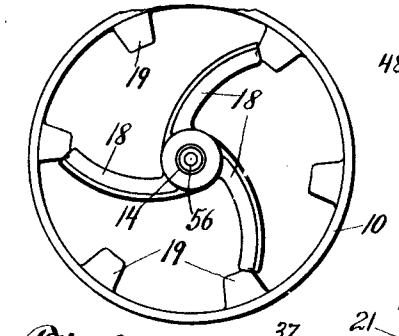


Fig 2

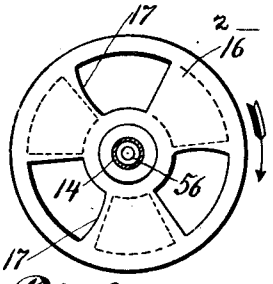


Fig 3

Fig 1

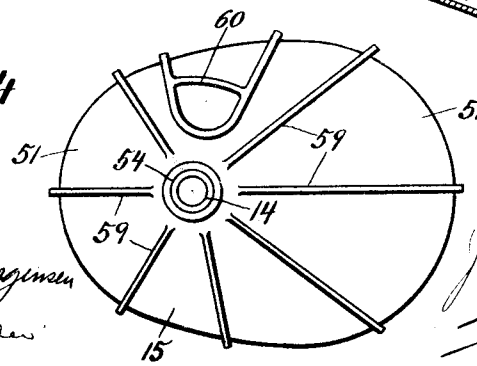


Fig 4

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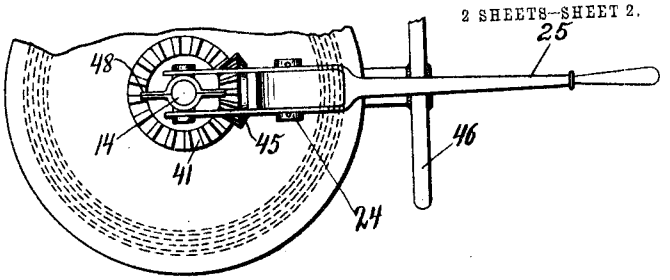
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2 SHEETS—SHEET 2.

Fig 6



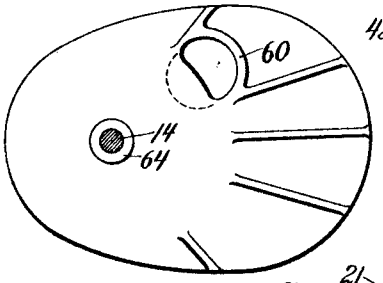


Fig 7

Fig 5

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CHARGING DEVICE FOR GAS-PRODUCERS.

1,119,280. Specification of Letters Patent. Patented Dec. 1, 1914.

Application filed April 15, 1913. Serial No. 761,179.

To all whom it may concern:

Be it known that I, JAMES A. HERRICK, a citizen of the United States of America, and resident of Newark, in the county of Essex and State of New Jersey, whose post-office address is No. 90 West street, New York, N. Y., have invented certain new and useful Improvements in Charging Devices for Gas-Producers, of which the following is a specification.

This invention relates to charging devices for gas producers or the like, and has for its object to provide, in connection with the usual hopper upon the cover of the producer, a distributer member below the inner end of the hopper, which distributer serves also the function of a valve or closure for the hopper, the distributer being rotatable and being also capacitated for reciprocatory movement.

Another object of the invention is to improve the structure of the distributer member so that by its use there will be secured a more even distribution of the fuel in the producer.

Still another object is to provide a form of distributer member which, while simple in construction, shall have adequate heat-resisting quality, without the necessity for water-cooling.

Other objects and aims of the invention, more or less broad than those stated above, together with the advantages inherent, will be in part obvious and in part specifically referred to in the course of the following description of the elements, combinations, arrangements of parts, and applications of principles constituting the invention; and the scope of protection contemplated will appear from the claims.

In the accompanying drawings, which are to be taken as a part of this specification, and in which I have shown a form of embodiment of the invention as at present preferred: Figure 1 is a view partly in section and partly in elevation, and with parts broken away, illustrating a form of embodiment of my invention and its application to the cover of a producer; Fig. 2 is a sectional view, taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows; Fig. 3 is a section on the line 3—3 of Fig. 1 and looking in the direction of the arrows; Fig. 4 is a top plan view of the distributer member shown in Fig. 1; Fig. 5 is a view similar to Fig. 1, illustrating another form of embodiment of the invention; Fig. 6 is a top plan view of the same; and Fig. 7 is a view similar to Fig. 4, of the particular form of distributer member shown in Fig. 5.

Referring to the numerals on the drawings, there is indicated at 8 the top or cover of a producer, which is provided with an opening 9 through which coal from a hopper 10 may be introduced into the interior of the producer. Overlying the opening 9 and forming the bottom of the hopper 10 in Fig. 1 there is a block 11, which in the present instance is shown provided with three apertures 12, indicated by dotted lines on Fig. 3. This block 11 has also a central aperture through which passes a shaft 14, to the lower end of which is secured a hollow shoe or distributer member 15. Coöperating with the block 11 is a spider 16, which is secured to the shaft 14 and rotates therewith over the face of the block 11. This spider 16 is provided with a plurality of openings, three in the present instance, which are adapted to register with the openings 12 in the block 11. In Fig. 3 the openings in the spider and the openings in the block are shown out of register, so that the lower end of the hopper is substantially closed; and since the contacting surfaces of the block 11 and spider 16 are accurately ground the closure formed thereby at the lower end of the hopper may be substantially gas-tight. One of the walls defining each of the openings of the spider is preferably beveled, as indicated at 17, so that a knife edge is provided, whereby to break up any lumps which may happen to become lodged in any one of the openings 12.

Within the hopper the shaft is provided with a stirring member or members 18 rigidly secured thereto, each of which is preferably beveled to a cutting edge on one side as shown, and which, when a plurality thereof is used, are preferably disposed in regular order about the shaft 14 and at different points along the length thereof. With these stirring members 18 are adapted to coöperate lateral projections 19 on the inner wall of the hopper, there being preferably as many horizontal rows of these projections 19 as there are stirring members 18, one row of projections below each stirring member.

Extending from a wall of the hopper, there is a bracket 20, which has an extension over the top of the hopper to form a

bearing 21, the said bracket also providing bearings for a drive shaft 22 and a fulcrum-bearing 24 for a lever 25. The upper end of the cover is provided with a surrounding annular trough 26, and over the top of the hopper there is a spider 27, having an aperture as indicated at 28. This spider has an annular flange 29 whereby it is secured to the inner wall of the hopper, as by means of screws 30, and has also an annular trough centrally thereof, as shown at 31. Coöperating with this spider 27 there is a top or cover 32, which has an overhanging edge 34, a depending annular flange 35 which is intended to dip into water contained within the trough 26, an annular depending flange 36 which is intended to dip into water contained within the annular trough 31, and an aperture 37 which may be brought into registry with the aperture 28 of the spider 27 whenever desired. The contacting faces of spider 27 and cover 32 are accurately ground, so that when the openings 28 and 37 are out of registry the top of the hopper may be closed in a substantially gas-tight manner. The spider 27 has a hub 38, about which the cover-disk 32 rotates, and this hub 38 is securely held within the bearing 21 as by means of screws 39. The shaft 14 passes centrally through this hub 38, and through the hub 40 of a gear wheel 41, this gear-wheel hub 40 being interposed between the shaft 14 and the hub 38 of the spider 27. For the purpose of steadying the gear wheel I may provide a collar 42 surrounding the hub of the gear wheel at its lower end and secured thereto as by means of a set-screw, which collar 42 bears against the lower end of the hub of the spider 27. It is intended that the gear wheel 41 shall rotate with the shaft 14, and that said shaft 14 may have reciprocatory motion relatively to the said gear wheel 41. The shaft and the gear wheel are accordingly keyed together as indicated at 44, so that they rotate together, while the shaft may reciprocate relatively to the gear wheel. The gear wheel 41 meshes with the gear 45 carried on the end of the shaft 22, which shaft 22 may be caused to rotate by means of the hand-wheel 46, or may be driven by a chain drive indicated at 47. I have shown a stepped arrangement of driven pulleys or sprockets 47, which will of course coöperate with corresponding driving pulleys or sprockets, so that the shaft 22 and therefore the shaft 14 may be caused to rotate at various speeds. For accomplishing the reciprocation of the shaft 14, I employ the lever 25, having its fulcrum at 24, and having a slot-and-pin connection with a box 48 that is secured to the upper end of the shaft 14.

It will be obvious that by means of the hand-wheel 46, or by means of the power connections described, the shaft 22 and consequently the shaft 14 may be rotated as necessary or desirable, while, through the medium of the lever 25, the vertical position of the distributer member 15 may be regulated. In the form shown in Fig. 1, the raising or lowering of the distributer member results in giving to the coal discharged from the distributer member a greater or less fall, while in the form shown in Fig. 5 the vertical movement of the shaft 14 determines whether the lower end of the hopper is open or closed or partly open, and thereby determines the escape of fuel from the hopper, as well as regulating the length of fall of the fuel from the distributer member.

In the apparatus shown in Fig. 1 there is provided a quadrant 49 with the notches whereof is adapted to engage the end of a spring-pressed manipulative keeper or latch 50, so that the shaft 14 may be held in one of a number of vertical positions. The distributer member shown in Fig. 1 comprises a hollow shoe, substantially as shown, having a relatively short heel portion 51 and a relatively long toe 52, and sloping downwardly in every direction from the shaft 14 which enters the upper end of the shoe, and to which the shoe is secured. The shaft 14 is preferably threaded at its lower end, and there is a nut 54 threaded on the end of the pipe, between which and a second nut 55 also threaded on the end of the pipe the top wall of the shoe is held, the top wall of the shoe being of course apertured for the passage of the shaft 14. In the form of embodiment shown in Fig. 1, the shoe 15 is hollow and is intended to be water-cooled. Accordingly the shaft 14 is hollow in this embodiment, and there is a pipe 56 that passes through the hollow shaft 14 and conducts water into the interior of the shoe 15 as by means of the extension 57. I also provide a hand-hole and closure 58 therefor in the lower face of the shoe, whereby access to the interior of the shoe may be had. The upper face of the shoe, besides sloping downwardly in every direction, is provided with ribs 59 extending in different directions radially from the shaft 14, whereby the coal is guided in its downward travel. I have found that in order to secure a positive discharge of the necessary quantity of coal at the center of the producer, commensurate with the discharge that takes place out toward the sides of the producer, it is very advantageous to employ the arrangement of shoe shown in Fig. 1, where there is an opening extending through the top and bottom walls of the shoe, and bounded by continuous side walls, through which fuel may pass to points directly underneath the shoe. To this end the through opening referred to is located between two of the ribs or ridges 59, and the fuel in its descending travel between these two ribs reaches the through

opening, and by means of the end wall 60 thereof is directed downwardly but in an opposite direction to its previous direction of travel.

The apparatus shown in Fig. 5 is in general similar to that already described with reference to Fig. 1, with the exception that the shaft 14 is not a hollow shaft, and there are no stirring devices shown within the hopper. Neither is the apertured block 11 present, nor the spider 16. The hopper in Fig. 5 has its lower end supported on one annular wall of a trough 61, and has an offset annular depending flange 62 which is intended to dip into water within the trough 61, this trough being supported on the cover of the producer. The shoe employed in connection with this Fig.-5-embodiment is not water-cooled, but its general shape is like that shown in Fig. 1. The shaft 14 extends through the shoe, and the latter is held between a collar 64 on the shaft and a nut 65 threaded on to the end of the shaft. The lower edges of the shoe are inturned as indicated at 66, and there are reëntrant projections 67, so that the lower face of the shoe, from the hub thereof downwardly toward the edges in every direction, may be covered or lined with fire resisting material, such as fire bricks or the like.

Inasmuch as many changes could be made in the above construction, and many apparently widely different embodiments of my invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

I claim:

1. In apparatus of the kind described, a cover having an opening therein, a hopper located above said opening, a water-seal for the lower end of said hopper, a rotative vertically movable shaft extending through the hopper and carrying a distributer member at its lower end coöperating with the water seal to close said opening, a water-sealed cover for the upper end of the hopper providing a bearing for said shaft, a gear wheel keyed to said shaft for relative longitudinal movement and rotatable therewith, said gear wheel having a bearing centrally of said hopper-cover, means for driving said gear wheel, and means for imparting vertical movement to said shaft.

2. In apparatus of the kind described, a hopper having an annular trough about its upper end, a cover for said hopper having a fuel opening and having a depending flange secured to the inner wall of the hopper at the upper end thereof, said cover providing also a central annular trough, and a hub, a closure having a fuel aperture adapted to register with the fuel aperture of said cover and having a depending flange entering the outside annular trough of the hopper and having also an edge overhanging said trough, said closure having also a central annular depending flange extending into the central annular trough of the cover, and means engaging said hub portion.

3. In apparatus of the kind described, a hollow shoe having an attaching portion and having upper surfaces sloping downwardly in the same direction from said attaching portion, radial ribs extending from said attaching portion and along said sloping surfaces, and said shoe being provided with a through opening between two adjacent ribs, said opening having an end wall that projects at both sides of the shoe in a direction opposite to the direction of the slope between said two ribs.

4. In apparatus of the kind described, a hollow shoe having an attaching portion and having upper surfaces sloping downwardly in the same direction from said attaching portion, radial ribs extending from said attaching portion and along said sloping surfaces, said shoe being provided with a through opening between two adjacent ribs, said opening having an end wall that projects at both sides of the shoe in a direction opposite to the direction of the slope between said two ribs, and means for conducting fluid through said hollow shoe.

In testimony whereof, I have hereunto signed my name in the presence of two witnesses.

JAMES A. HERRICK.

In the presence of—
MARY H. LEWIS,
ALDA L. MILLER.