No. 739,305. PATENTED SEPT. 22, 1903.

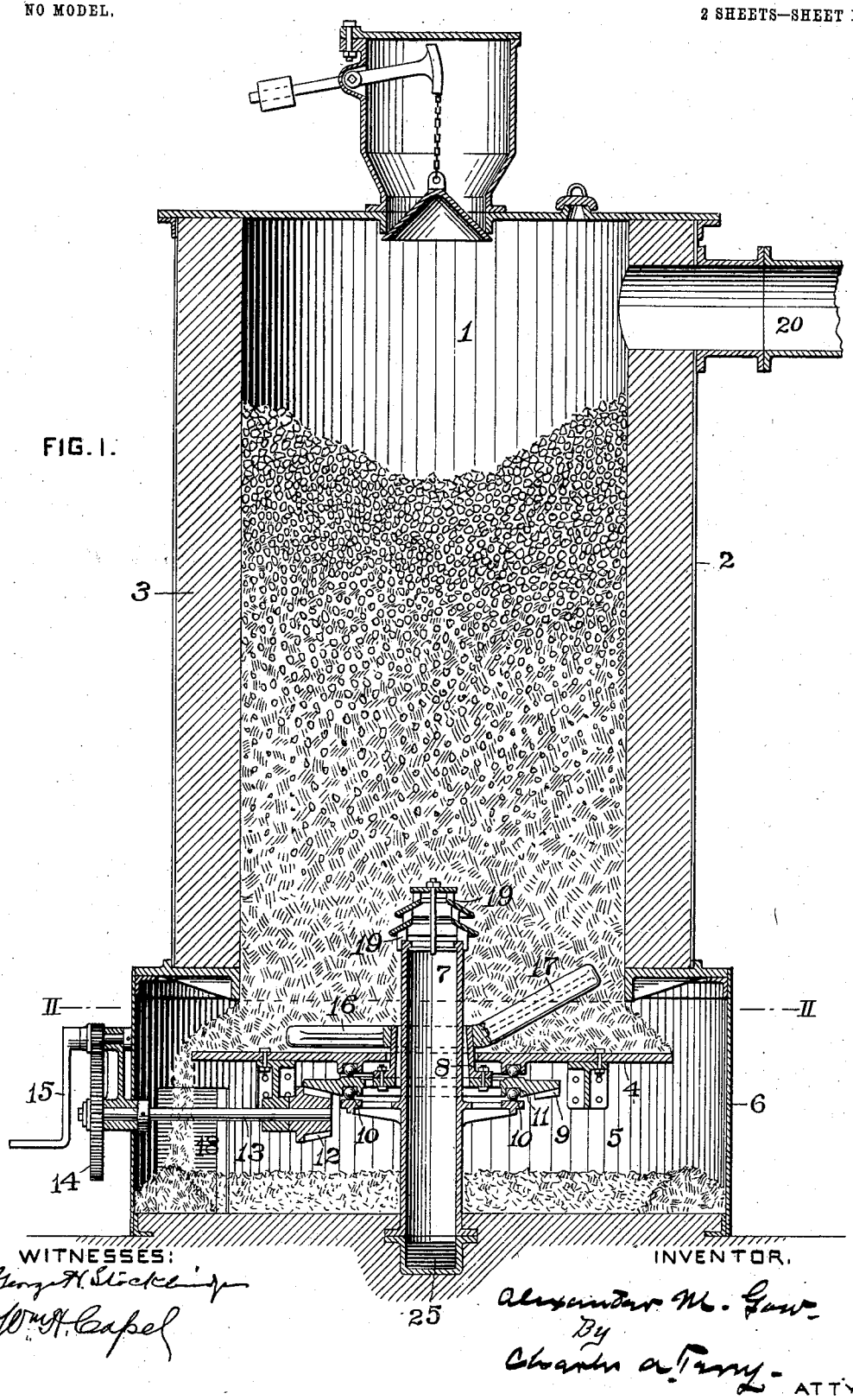
A. M. GOW.

GAS PRODUCER.

APPLICATION FILED FEB. 5, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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Charles A. Terry

ATTY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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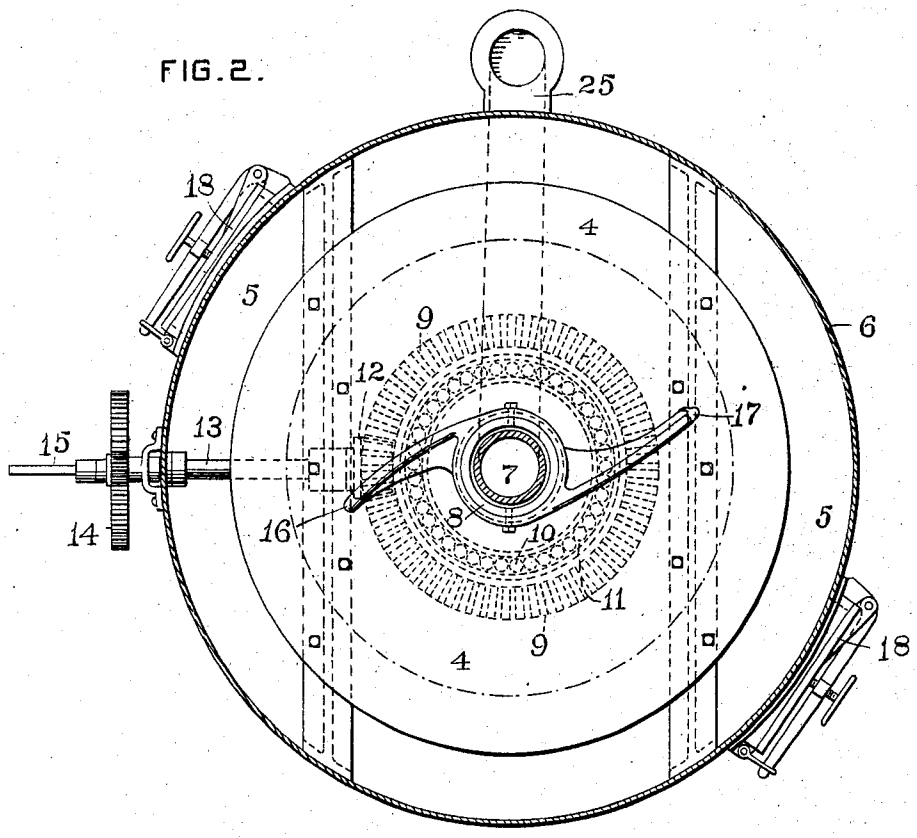
A. M. GOW.

GAS PRODUCER.

APPLICATION FILED FEB. 5, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

FIG. 2.



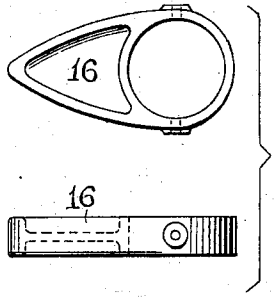


FIG. 3.

WITNESSES:

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No. 739,305. Patented September 22, 1903.

UNITED STATES PATENT OFFICE.

ALEXANDER M. GOW, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 739,305, dated September 22, 1903.

Application filed February 5, 1902. Serial No. 92,620. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER M. GOW, a citizen of the United States, and a resident of Edgewood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

My invention relates to a new and improved apparatus for the conversion of solid fuel into gas. Among the obstacles encountered in the operation of existing apparatus for this purpose may be mentioned the difficulty of removing ash and clinker that form at the bottom of the fuel-bed, the unequal descent of the fuel-bed, the formation of holes through the fire, the greater consumption of fuel at the walls than at the center, and the production of gas of varying composition. To those conversant with the operation of producers it is well known that these obstacles are productive of waste of fuel and general inefficiency.

To provide an apparatus from which the ash may be removed readily and with a minimum of unconsumed fuel, to avoid the formation of clinker as far as possible and provide for its ready removal, to maintain a fuel-bed of uniform character, to cause the descent of the fuel along the line of its greatest consumption, and to produce a gas of uniform quality, I have designed a gas-producer as shown in the accompanying drawings.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a gas-producer having my improvements applied to it. Fig. 2 is a transverse section along the line 2 2 in Fig. 1; and Fig. 3, illustrated in plan and in elevation, a modified form of arm adapted to remove the ash.

In Fig. 1 of the drawings, 1 is a gas-making chamber, preferably of circular cross-section, formed of an iron casing 2 and lined with fire-brick 3 after the usual manner. Near the mouth or bottom of the producer is a fixed table 4 of greater diameter than the gas-making chamber 1. Below the table 4 is an ash-chamber 5, consisting of a shell or casing 6. The table 4 is so located with reference to the walls of the gas-making chamber 1 that an annular space is provided of sufficient size to discharge ash or clinker that may accumulate on the table 4. At the same time the diameter of the table 4 is such that when the apparatus is in a state of repose no ash or clinker will fall off the table into the chamber below. Extending through the ash-chamber is a twyer 7, which passes through the fixed table 4 and into the gas-chamber 1, being centrally located with respect thereto. The bottom of the twyer 7 is connected to a pipe 25, which extends to the outside of the ash-chamber 5 for the admission of steam and air in the usual way. Concentric with the twyer 7 is a hub or sleeve 8, which revolves freely around the twyer and is connected to a bevel-gear 9. The latter is supported on balls 10 10, which are carried in a ball-race 11. The gear 9 is driven by a pinion 12, the shaft 13 of which extends through the casing 6, outside of which it is connected through suitable gearing 14 to a driving mechanism 15, which is here represented as a crank. Upon the hub or sleeve 8 I also mount one or more arms 16 17, so located with reference to the fixed table 4 that in case they are made to revolve they tend to loosen up the bed of ashes surrounding the central twyer 7 and push them off the table 4 into the ash-chamber 5. I have shown the arm 16 as being adapted to act in a plane parallel to the face of the table 4, while the arm 17 is adapted to act at an angle to the said face. The arm 17 extends up into the bed of ash and serves to crush clinkers that may form at or near the lower end of the brick lining 3. I do not, however, limit myself to the exact form or location of these arms, inasmuch as such form and location will depend to a greater or less extent upon the nature of the fuel and the percentage of ash contained. If the fuel contains a large percentage of highly-infusible ash, with consequent tendency to form clinker, it is evident that the arms should be placed otherwise and be of other shape than if the fuel contained but a small percentage of highly-infusible ash. In fact, with some fuel the arm 17 may be dispensed with entirely, as the arm 16 will serve the purpose of removing the ash.

By referring to Fig. 2 it will be seen that doors 18 18 are provided in the shell or cas-

ing 6 for cleaning purposes. A single door will sometimes suffice, but the number of doors may be varied at will.

In the operation of the producer the fire is started in the usual way. Air or a mixture of air and steam is admitted to the central twyer in any convenient manner—as, for instance, by a blower, fan, or injector—or, if desired, the gas-making chamber 1 may be maintained under a slight vacuum and the steam and air sucked in through the twyer. The air and steam passing through the apertures 19 19 in the twyer 7 are distributed through the fuel-bed and cause the production of what is commonly known as "producer" gas. This gas passes off through a suitable pipe 20 at or near the top of the producer. When the producer has been operated a sufficient length of time to cause a sufficient accumulation of ashes on the table 4 to such a depth that the economical operation of the producer is interfered with, the shaft 13 is turned from the outside, causing the pinion 12 to revolve, and thus turning the bevel-gear 9. This results in the hub or sleeve 8 being revolved, turning the arms 16 and 17 in the ash-bed, breaking the clinker, if any, and shoving the ash off the table 4 into the ash-chamber 5.

It will be noticed that the operation of the arms 16 and 17 is such that the ash is pushed away from the central twyer outward off the edge of the table. This is a very desirable feature of the apparatus, for by the removal of the ash outward the body of fuel above is caused to descend in the center uniformly around the twyer. The amount removed depends upon the number of turns given to the arms. The tendency of the descending fuel-bed is, therefore, to draw toward the central twyer through which the air and steam are admitted. This prevents the formation of a cone of ashes above the twyer and the descent of the fuel down the side walls, as would be the case were the ash removed from the periphery of the table and not from its center.

It sometimes happens in the operation of a gas-producer that the fuel is consumed more on one side than on the other. In such a case the removal of a uniform layer of ash from the face of the table 4 might not be desirable. In order to remove ash in any amount desired from any part of the table, I have shown in Fig. 3 a modification of the movable arm 16. This arm may be revolved in either direction through any desired arc of the circle of the table, and at a point where it is desired to remove the most ash it can be worked back and forth by a back-and-forth movement of the crank on the outside of the ash-chamber. The form is such that moved in either direction the ash is forced from the center of the table outward off the periphery of the table, thus enabling the operator always to control the descent of the fuel-bed.

It will be understood that the arm illustrated in Fig. 3 will be attached to the hub 8 in place of the arms 16 and 17 appearing in Figs. 1 and 2.

I claim as my invention—

1. The combination of a gas-making chamber, a fixed table of larger diameter located below the gas-making chamber and supporting the fuel-body, a fixed twyer for the admission of air and steam located centrally in the gas-making chamber, an ash-poker having its opposite sides of similar curvature concentric with the twyer, and capable of being moved in either direction in a plane parallel to the face of the fixed table.

2. The combination of a gas-making chamber, a fixed table of larger diameter located below the gas-making chamber and supporting the fuel-body, a fixed twyer for the admission of air and steam, located centrally in the gas-making chamber, a hub surrounding the twyer and connected by suitable gearing with a source of power outside the gas-making apparatus so as to be capable of being moved in either direction, and an ash-poker connected with the hub and having its opposite sides of similar curvature, the ash-poker lying in a plane parallel to the face of the fixed table.

Signed at East Pittsburg, in the county of Allegheny and State of Pennsylvania, this 1st day of February, A. D. 1902.

ALEXANDER M. GOW.

Witnesses:
CHAS. F. MILLER,
JNO. A. ADAMS.