J. S. LODER.

GAS GENERATOR.

APPLICATION FILED APR. 4, 1908.

935,119.

Patented Sept. 28, 1909.

3 SHEETS—SHEET 1.

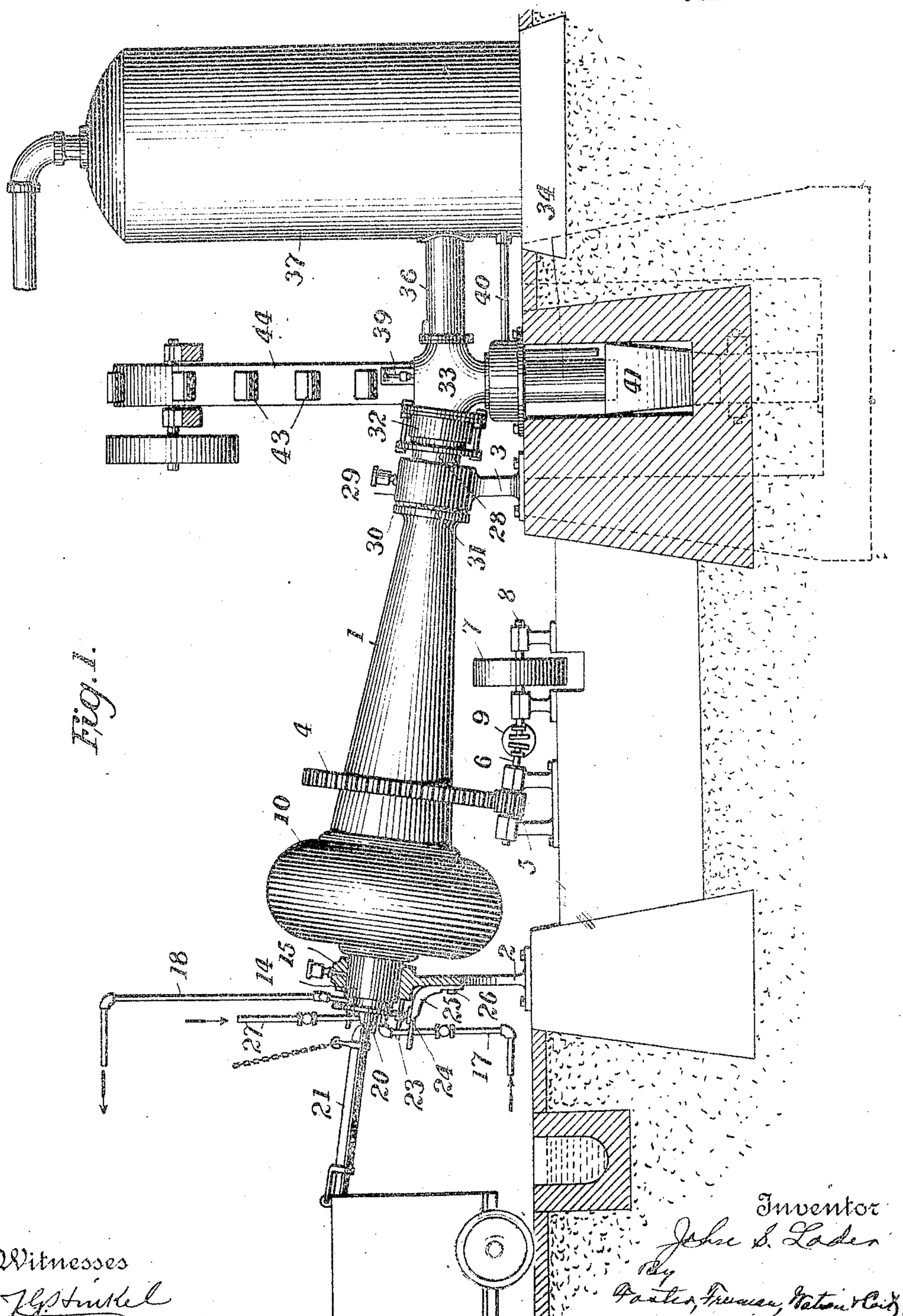

Fig. 1.

Witnesses

Jos. Finkel

J. J. McCarthy

Inventor

John S. Loder

By

Parker, Freeman, Watson & Coit

Attorneys

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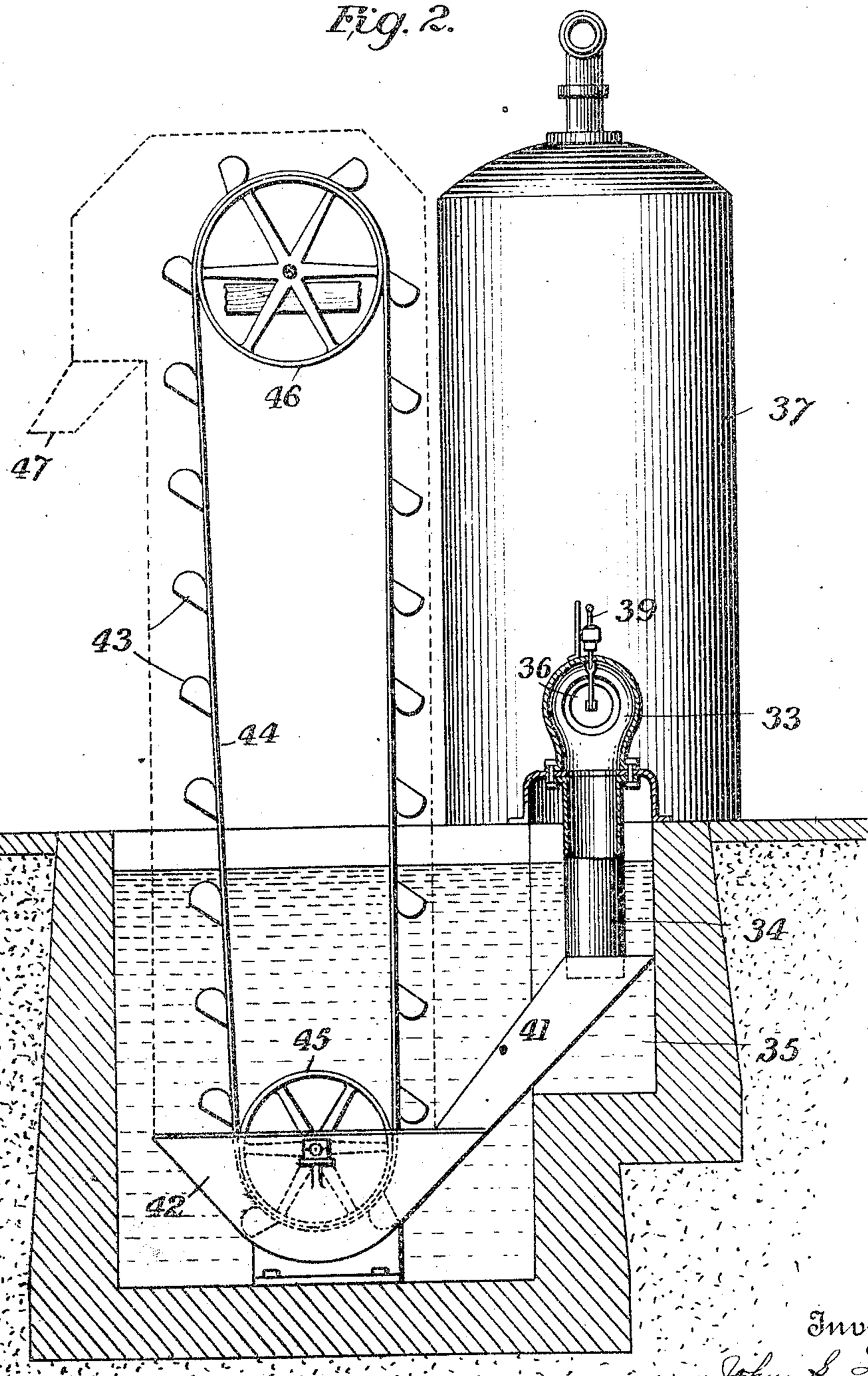
3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

J. J. Finkel

F. J. McCarthy

Inventor

John S. Loder

By

Foster, Freeman, Watson & Coit

Attorneys

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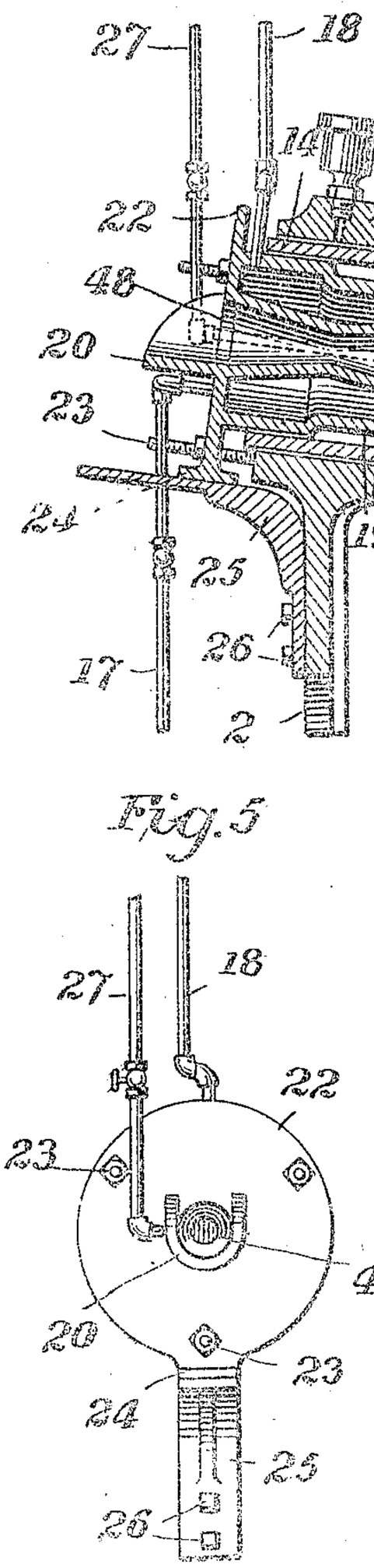


Fig. 5.

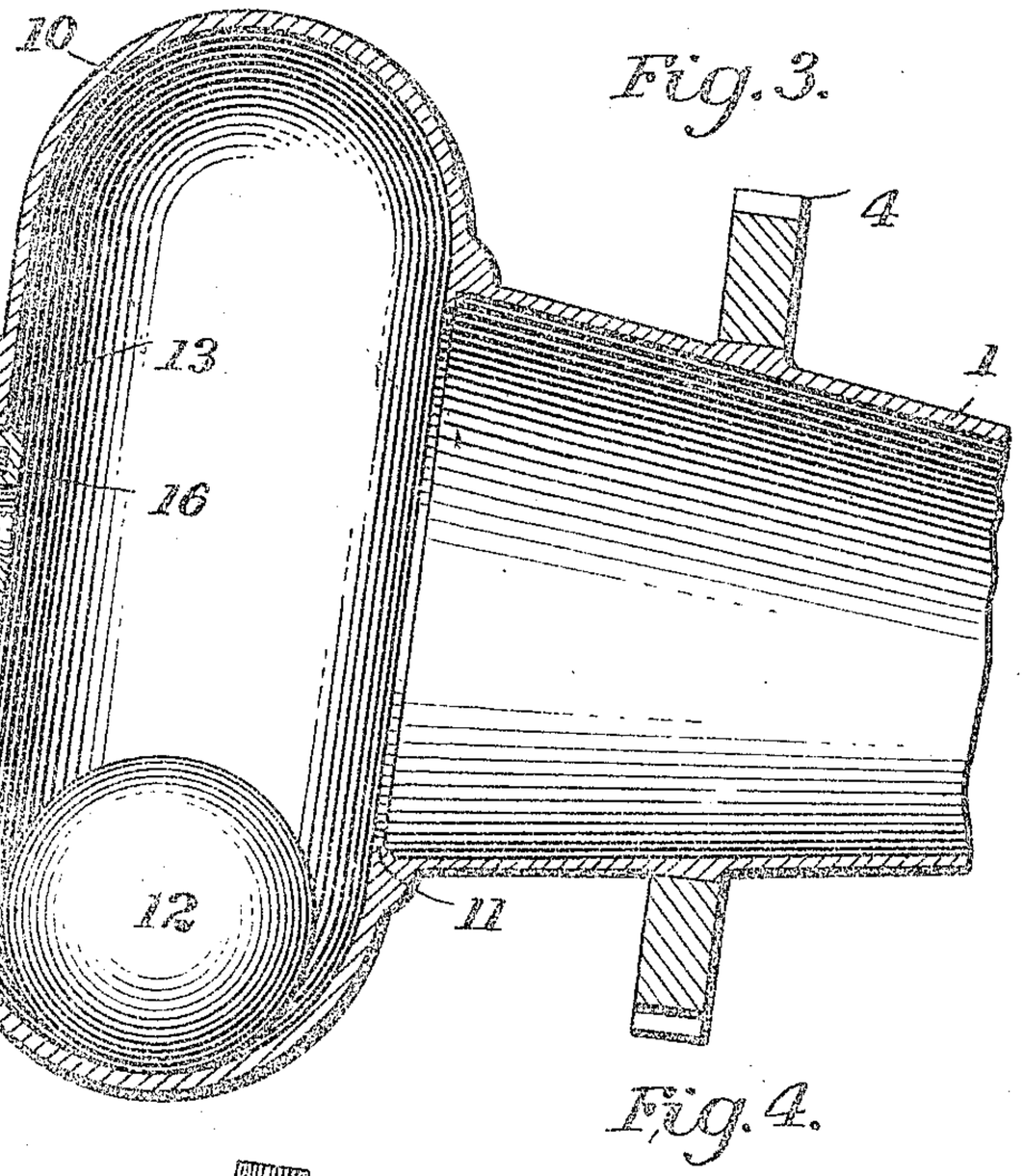
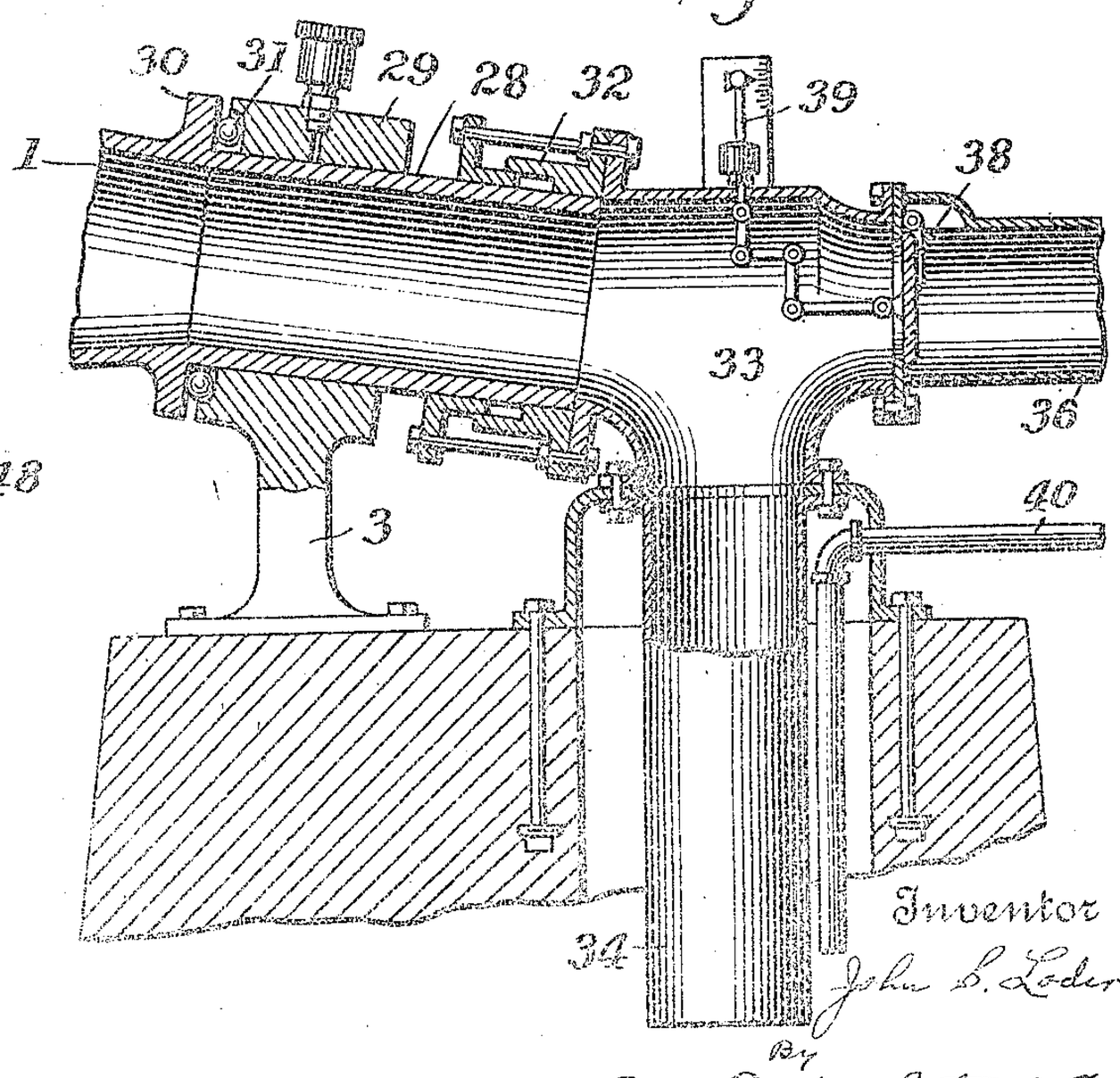


Fig. 4.

Fig. 3.



Witnesses

J. Stinkel

A. J. McCarthy

Inventor

John S. Loder

By

Foster, Freeman, Watson & Coit

Attorneys

UNITED STATES PATENT OFFICE.

JOHN S. LODER, OF RENO, NEVADA, ASSIGNOR TO LODER SMELTER & REFINER CO., OF RENO, NEVADA, A CORPORATION OF NEVADA.

GAS-GENERATOR.

935,119. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed April 4, 1908. Serial No. 425,164.

To all whom it may concern:

Be it known that I, JOHN S. LODER, a citizen of the United States, residing at Reno, in the county of Washoe and State of Nevada, have invented certain new and useful Improvements in Gas-Generators, of which the following is a specification.

This invention relates to an apparatus for and a process of producing gas. Its objects are to simplify and improve the construction of gas producers and to utilize the waste slag from smelting furnaces as the source of heat for generating the gas.

It consists of the novel features hereinafter pointed out and claimed.

In the accompanying drawings, Figure 1 is a side view of my apparatus showing the relationship of its main parts; Fig. 2 is an end view partly in section taken on the line 2—2 of Fig. 1 and showing the means for removing the solid material discharged from the gas producer; Fig. 3 is a longitudinal section of the upper enlarged end of the gas producer; Fig. 4 is a longitudinal section through the lower end of the gas producer and through the water seal into which the solid material is discharged; and Fig. 5 is a cross section on line 4—4 of Fig. 3.

My apparatus includes a gas producing chamber 1 which is tubular in form, is made tapering, and set at an angle to the horizontal with its enlarged end highest. This gas producer is adapted to be rotated, and for that purpose it is mounted in bearings on the fixed standards 2 and 3. A gear wheel 4 is rigidly secured to the producer and it meshes with pinion 5 carried by shaft 6 which is mounted in bearings parallel to the axis of the producer. The shaft 6 is driven from the wheel 7 by means of the shaft 8 and the universal joint 9.

The upper end of the producer has an enlargement 10 semi-spherical in shape and there is a slight shoulder or flange 11 on the interior between this enlargement and the tapered portion of the producer. A heavy spherical roller 12 rests loosely within the enlargement and rolls around therein as the producer is rotated. There is a central circular opening 13 in the end of the enlargement 10 and surrounding this opening but slightly removed therefrom is a short tube 14 which constitutes a bearing to support the upper end of the producer. This tube 14 fits within the inclined bearing 15 in the standard 2.

The material to be used is admitted to the producer through the short supply tube 16 which is made with double separated walls so as to permit of cooling by means of water supplied through pipe 17 and discharged through pipe 18. The outer surface of this tube is made of two diameters, the smaller inner end fitting closely within the opening 13, and the outer end fitting closely within the tube 14, and in order to insure a tight joint packing may be used at 19. The inner wall of the supply tube is made in the shape of an hour glass, and partly surrounding the outer open end is a lip 20 adapted to receive the slag from trough 21 or other source of supply. The outer end of the tube is extended to form a flange 22 through which pass the screw threaded bolts 23 secured to the standard 2, and thus means is provided for securing the supply tube in any adjusted position. The lower end of this flange 22 is made in the form of a flat bearing surface 24 which is adapted to slide on the inclined supporting shelf 25 secured to the standard 2 by bolts 26. Oil or coal dust is supplied to the producer by pipe 27 which passes through the water cooled space of the inlet tube 16.

The lower end of the producer 1 has the straight bearing portion 28 fitting within the bearing 29 on the standard 3, and it also has the peripheral flange 30 between which flange and the bearing are inserted balls 31 to reduce the friction due to the weight of the producer. The bearing 28 is extended into a packing joint 32 secured to a fixed T joint 33. The T joint 33 is connected by a vertical pipe 34 with the water seal 35, and since the lower end of pipe 34 is open solid matter which travels down the inclined producer drops down this pipe 34 and sinks in the water. Extending horizontally from the T joint 33' is the pipe 36 which leads to the gas tank 37, and in this pipe there is a check valve 38 to prevent the passage of gas from the tank back into the producer when the pressure in the producer falls. Connected to this check valve by link arms is a pointer 39 which indicates to the operator whether the valve 38 is open or closed, and consequently informs him whether or not all of the gas has been produced from the material

supplied to the gas producer. A pipe 40 leads from the bottom of the gas tank below the level of the water in the water seal so that any water formed by condensation in the tank 37 will be permitted to escape.

As will be seen by reference to Fig. 2, the solid material discharged down through pipe 34 passes beneath the surface of the water and enters the inclined chute 41 into the curved retainer 42, where it is picked up by the perforated buckets 43 carried by the belt 44, passing over wheels 45, 46. The material is discharged at the top through the chute 47.

It is believed that the operation of the device will be plain from the above description of the structure, but it may be said that slag in a highly heated condition is introduced by any suitable means through the opening 48 in the supply 16, and that this opening is then closed in the usual manner, as by the use of clay. The slag falls into the enlarged portion 10 and is crushed and spread in a layer over the surface by the roller 12 as the chamber 1 rotates. It then passes over the flange 11 and down the inclined lower surface of the producer 1 until it is discharged into the pipe 34. The oil or coal dust admitted through pipe 27 coming in intimate contact with this hot slag is converted into gas and that gas passes through valve 38 and pipe 36 into the gas tank 37. The gas may be taken from tank 37 and compressed in any suitable way.

Having thus described the invention, what is claimed is:

1. In a device of the class described, the combination with a gas producing chamber, of means for passing molten slag through said chamber, means for crushing and spreading said slag within the chamber, and means for passing a hydrocarbon through said chamber in contact with the molten slag.

2. In a device of the class described, the combination with a tubular gas producing chamber, of means for rotating the same, means for passing molten slag through said chamber, means for passing a hydrocarbon through said chamber in contact with the molten slag, means for drawing off the gas, a water seal, and means for drawing off the solid matter through said water seal.

3. In a device of the class described, the combination with a tubular inclined gas producer, of means for rotating said producer, means for supplying molten slag, and a hydrocarbon to the upper end of said producer, means at the lower end of said producer for drawing off the gas, and means for separately drawing off the solid matter.

4. In a device of the class described, the combination with a tubular inclined gas producer, of means for rotating said producer, means for supplying molten slag and a hydrocarbon to the upper end of said producer, means at the lower end of said producer for drawing off the gas, and a receptacle for water to form a seal near the lower end of said producer into which the solid matter is discharged.

5. In a device of the class described, the combination with a tubular inclined gas producer, of means for rotating said producer, means for supplying molten slag and a hydrocarbon to the upper end of said producer, means at the lower end of said producer for drawing off the gas, a receptacle for water to form a seal near the lower end of said producer into which the solid matter is discharged, and means for removing said solid matter from the water receptacle.

6. In a device of the class described, the combination with a gas producing chamber having one end higher than the other, of means for rotating said chamber, means for passing molten slag through said chamber, means for passing a hydrocarbon through said chamber in contact with the molten slag, a fixed tube constituting a continuation of the said producer at its lower end, and a receptacle for water below said tube and communicating therewith near the end of the producer.

7. In a device of the class described, the combination with a gas producing chamber having one end higher than the other, of means for rotating said chamber, means for passing molten slag through said chamber, means for passing a hydrocarbon through said chamber in contact with the molten slag, a fixed tube constituting a continuation of the said producer at its lower end, a receptacle for water below said tube and communicating therewith near the end of the producer, and a conveyer entering said water receptacle for carrying away the solid matter.

8. In a device of the class described, the combination with a tubular inclined gas producer having an enlargement at its upper end, of a roller in said enlargement, means for rotating said producer, means for supplying molten slag and a hydrocarbon to the upper end of said producer, means at the lower end of said producer for drawing off the gas, and means for separately drawing off the solid matter.

9. In a device of the class described, the combination with a tubular inclined gas producer having a semi-spherical enlargement at its upper end, of a heavy spherical roller resting freely in said enlargement, means for rotating said producer, means for supplying molten slag and a hydrocarbon to the upper end of said producer, means at the lower end of said producer for drawing off the gas, and means for separately drawing off the solid matter.

10. In a device of the class described, the combination with a rotary gas producer,

of a tubular bearing member extending centrally from said producer at one end, and communicating with the interior thereof, a bearing support for said bearing member, a double walled supply tube fitting within the tubular bearing member, means for supplying a cooling fluid to the space between the double walls of the supply tube, and means for rotating the gas producer.

11. In a device of the class described, the combination with a rotary gas producer, of a tubular bearing member extending centrally from said producer at one end, and communicating with the interior thereof, a bearing support for said bearing member, a double walled supply tube fitting within the tubular bearing member, packing between said bearing member and supply tube to form a tight joint, means for supplying a cooling fluid to the space between the double walls of the supply tube, and means for rotating the gas producer.

12. In a device of the class described, the combination with a rotary gas producer, of a tubular bearing member extending centrally from said producer at one end, and communicating with the interior thereof, a bearing support for said bearing member, a double walled supply tube fitting within the tubular bearing member, packing between said bearing member and supply tube to form a tight joint, means for adjusting the supply tube within the bearing member and securing it in place, means for supplying a cooling fluid to the space between the double walls of the supply tube, and means for rotating the gas producer.

13. In a device of the class described, the combination with a rotary gas producer, of a tubular bearing member extending centrally from said producer at one end and communicating with the interior thereof, a bearing support for said bearing member, a short open ended supply tube fitting within said bearing member, a circumferential flange on said supply tube, adjustable connecting means between said flange and bearing support for holding the tube in position, packing between the bearing member and the supply tube, and means for rotating the gas producer.

14. In a device of the class described, the combination with a tapered tubular inclined gas producer, of means for rotating said producer, a tubular bearing for said producer at its upper enlarged end furnishing an inlet opening, a thrust bearing near the lower end, a tube constituting a continuation of the lower restricted end of the producer, and a gas tight bearing connection between said tube and producer.

15. In a device of the class described, the combination with a tapered tubular inclined gas producer, of means for rotating said producer, a tubular bearing for said producer at its upper enlarged end furnishing an inlet opening, a thrust bearing near the lower end, a T joint constituting a continuation of the lower restricted end of the producer, a gas tight bearing connection between said joint and producer, and a water receptacle below the T joint into which one arm of the joint projects.

16. In a device of the class described, the combination with a tapered tubular inclined gas producer, of means for rotating said producer, a tubular bearing for said producer at its upper enlarged end furnishing an inlet opening, a thrust bearing near the lower end, a T joint constituting a continuation of the lower restricted end of the producer, a gas tight bearing connection between said joint and producer, a water receptacle below the T joint into which one arm of the joint projects, and a conveyer extending into the water receptacle for removing solid matter.

17. In a device of the class described, the combination with a tapered tubular inclined gas producer, of means for rotating said producer, a tubular bearing for said producer at its upper enlarged end furnishing an inlet opening, a thrust bearing near the lower end, a T joint constituting a continuation of the lower restricted end of the producer, a gas tight bearing connection between said joint and producer, a water receptacle below the T joint into which one arm of the joint projects, a conveyer extending into the water receptacle for removing solid matter, a receiving tank for gas connected to the T joint, and a pipe leading from the bottom of said tank into the water receptacle.

18. In a device of the class described, the combination with a tapered tubular inclined gas producer, of means for rotating said producer, a tubular bearing for said producer at its upper enlarged end furnishing an inlet opening, a thrust bearing near the lower end, a tube constituting a continuation of the lower restricted end of the producer, a gas tight bearing connection between said tube and producer, a gas tank connected to said tube, a check valve in said tube, and an indicator connected with said valve to show when it is open.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. LODER.

Witnesses:
VICTOR A. TAMODY,
J. A. HAY.