E. RATHBUN.

GAS PRODUCER.

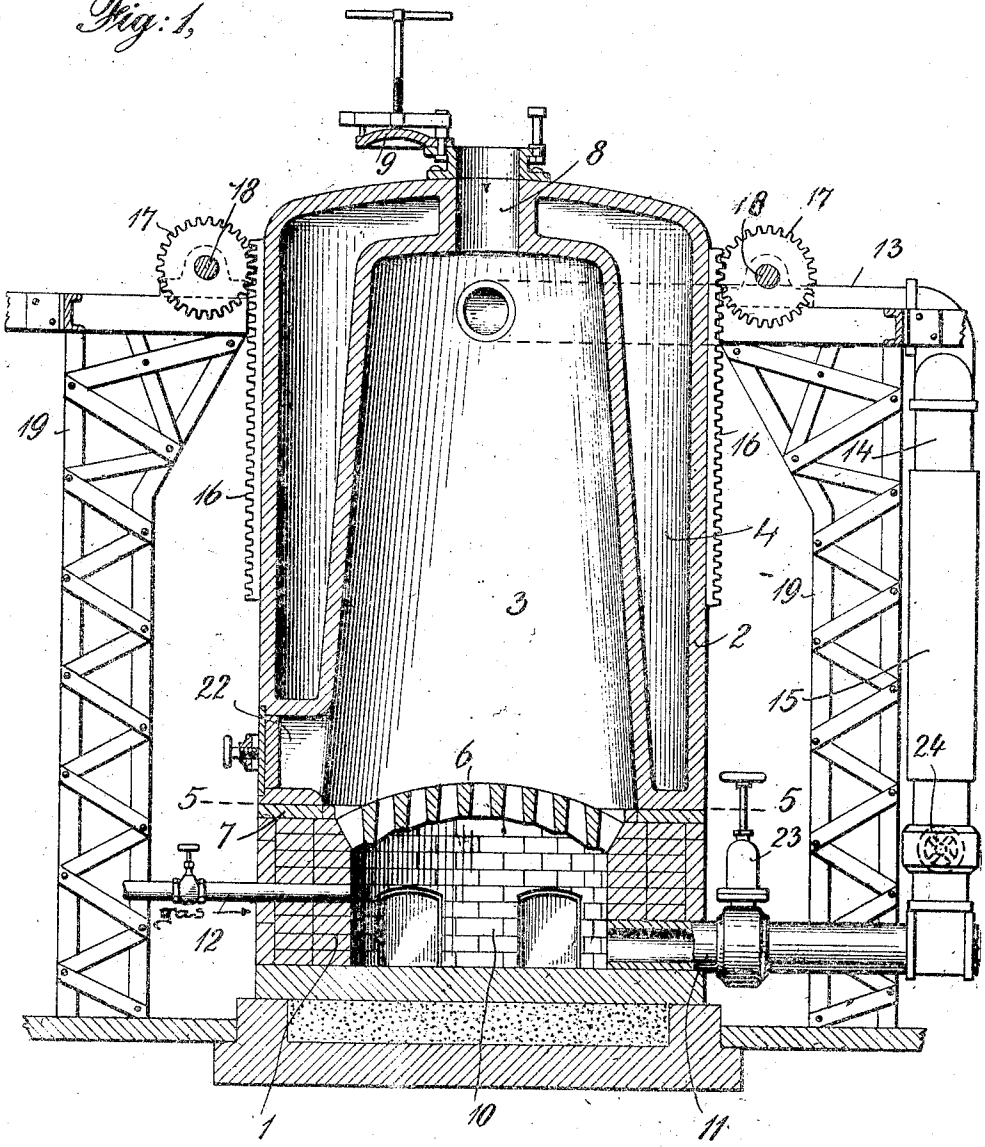
APPLICATION FILED FEB. 5, 1910.

1,007,797.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

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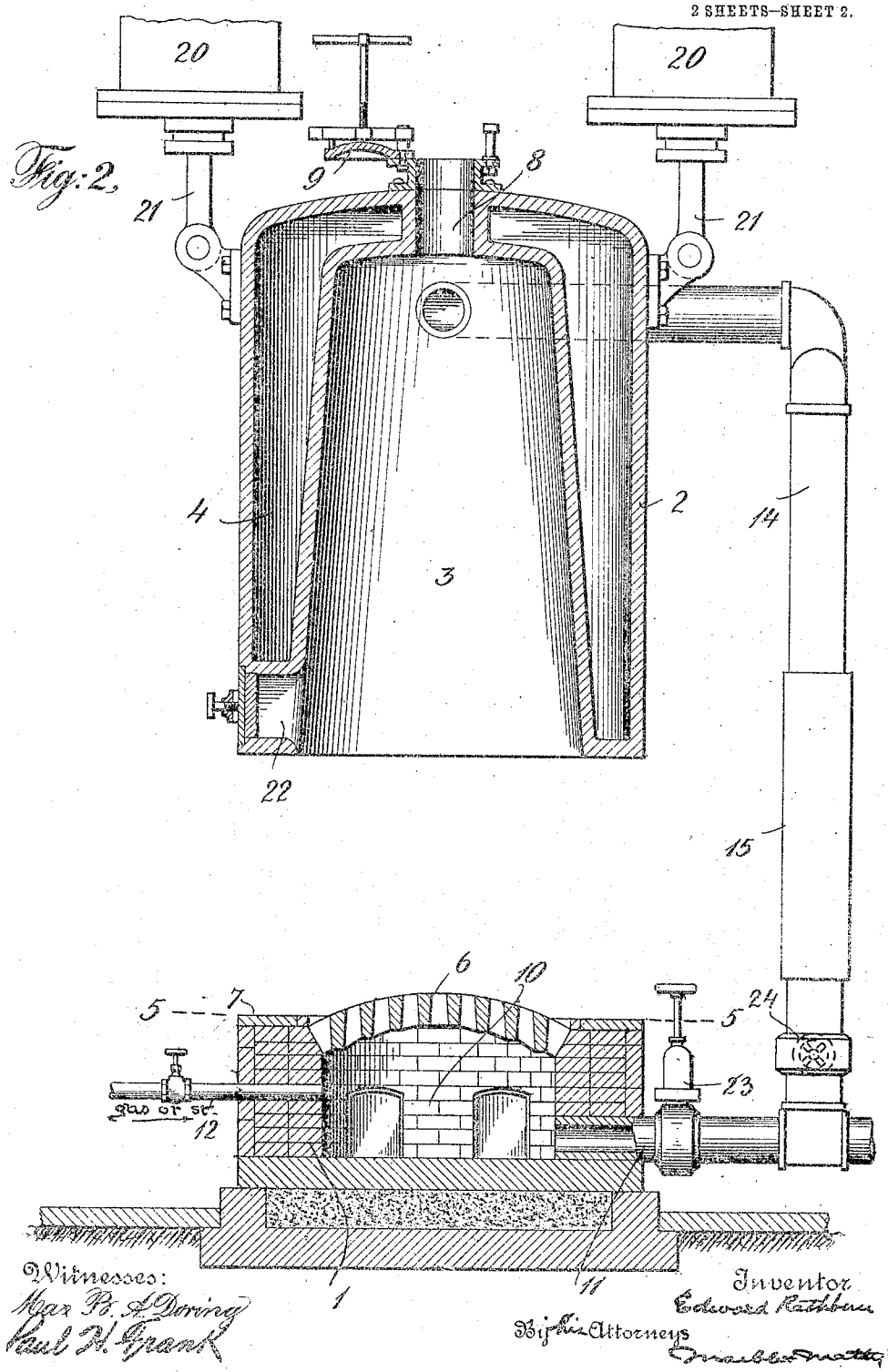
2 SHEETS—SHEET 2.

Fig: 2.

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# UNITED STATES PATENT OFFICE.

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## GAS-PRODUCER.

1,007,797. Specification of Letters Patent. Patented Nov. 7, 1911.

Application filed February 5, 1910. Serial No. 542,178.

*To all whom it may concern:*

Be it known that I, EDWARD RATHBUN, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

My invention relates to improvements in gas producers, and, particularly, in gas producers of the down draft type. Much trouble is experienced in cleaning this type of producer, which, nevertheless, is much used because of its high efficiency and the fact that bituminous coal may be used in it without the presence of excessive proportions of tar and the like in the resulting gas. As at present constructed, these down draft producers commonly become clogged in time with cinder and slag. And despite numerous expedients employed for loosening up the fire, such producers usually must be shut down at frequent intervals and allowed to cool off, after which men must go into the producer and chip out the accumulated cinder and slag. This cleaning of the producer is at once difficult, extremely disagreeable, and a somewhat dangerous operation, and is objectionable, not only for that reason, but also because the necessity of shutting down the producer for a considerable length of time frequently necessitates the installation of a duplicate producer, so that one producer may be working while the other is shut down. According to my invention I obviate these difficulties by forming the producer in two parts, arranged to be separated at a parting line located about on a level with the grate or fuel-support of the producer, the upper section of the producer being arranged to be elevated bodily away from the lower section, and being of upwardly tapering form inside, and metal-surfaced and positively cooled so as to prevent sticking of the fuel to the wall. By lifting the upper part of the producer the grate is exposed so that it may be swept clean, and any clinker adjacent the sides of the producer will fall away therefrom, owing to the taper of said walls.

My invention consists, therefore, in a producer comprising upper and lower sections, and means for raising the upper section away from the lower section to expose the grate; also in various other features hereinafter described and particularly pointed out in the claims.

The objects of my invention are to facilitate the cleaning of gas producers, particularly of producers of the down draft type, and to make it possible to operate the producers more nearly continuously than is at present practicable; also to make the producer simple and easy to operate.

I will now proceed to describe my invention with reference to the accompanying drawings, illustrating, more or less diagrammatically, two embodiments of my invention, and will then point out the novel features in claims.

In said drawings: Figure 1 shows a central vertical section of my improved producer, with the two parts together in readiness for operation, and Fig. 2 is a similar view showing the upper part of the producer raised from the lower part, and also showing alternative means to that shown in Fig. 1, for raising and lowering the producer.

In the drawings, 1 designates the base of the producer and 2 the upper portion or shell of the producer, said shell having within it the fuel chamber 3 and being provided, as is customary, with a jacket 4 through which cooling water or the like may be circulated. These parts are of substantially ordinary construction except that they are arranged to part from each other at the line 5—5, namely, at about the level of the grate or fuel-support 6, such grate or fuel-support being a part of the lower section or base 1 of the producer. To distribute the weight of the upper portion of the producer upon this base 1, and also to form a suitable hearth upon the top of such lower section or base 1, I provide said lower section or base with a hearth plate 7, which in practice may be of metal. At the top, the producer is provided with the usual charging opening 8, arranged to be closed by a suitable door 9. In the base 1 there is the usual ash pit 10, and the usual delivery pipe 11 for the gas produced, also a blast pipe 12 through which gas or steam under pressure may be introduced into the fuel from below to break up the fuel, the operation of the producer being at such times reversed, for which purpose the upper part of the producer is provided with the usual delivery pipe 13 for the gas produced; which de-

livery pipe, however, is normally closed. This delivery pipe may be connected, through a down take 14, with the lower delivery pipe 11, and such down take 14 will comprise a suitable telescopic joint 15, so that it is not necessary to break joint or connection between pipes 13 and 11 when raising the upper portion of the producer. However, in lieu of this construction, any other suitable construction for the same purpose may be employed, or a joint may be broken when elevating the upper portion of the producer.

For raising the upper portion of the producer I have shown in Fig. 1, rack bars 16 secured to the shell of the producer and engaged by pinions 17 on suitable shafts 18, which shafts may be driven in any suitable manner; and I have shown these shafts 18 carried by supports 19. In the alternative arrangement shown in Fig. 2 I have shown the upper portion of the producer arranged to be elevated by means of hydraulic or pneumatic cylinders 20, the piston rods 21 of which are connected to the upper portion of the producer. I have not shown means for supporting these hydraulic cylinders 20, but it will be understood that they may be supported in any ordinary or suitable manner.

In operating this producer, it will be operated in general as down draft producers are generally operated, charging opening 8 serving as a draft inlet; the fuel bed being poked from the top from time to time, when necessary, to cause the fuel to descend, and also if necessary, being poked from time to time through the side door 22, (if the producer be provided with such a side door, such a door being less important, however, in a producer constructed as herein described than in producers the upper portions of which are not arranged to be elevated). And as is common in the operation of these producers, from time to time the direction of draft through the producer may be reversed, by closing the charging opening 8, closing the valve 23 in the lower discharge pipe 11, admitting gas or steam through the pipe 12, and opening the valve 24 in the upper discharge pipe 13. When it becomes necessary to clean the fire thoroughly, the supply of air to the producer is discontinued temporarily and the discharge valves are closed, the upper portion of the producer is elevated, and the fire cleaned as described earlier in this specification; after which the upper portion of the producer is lowered and the fire rebuilt. If necessary the joint between the upper and lower portions of the producer may be luted in any customary way. Such luting will not interfere with the separation of the two parts of the producer.

By preference, the producer has metal walls, and lining the producer with fire brick, as in ordinary practice, is avoided by providing the water jacket 4, separated from the fuel space, within the converter, by metal walls only, so that there may be adequate cooling of these walls by the water circulated through the jacket. In this way, the expense and bulk of a fire brick lining are avoided, and the producer is made more compact, and sticking of the fuel to the side of the producer is avoided.

What I claim is:

1. A gas producer comprising upper and lower sections, separable vertically, the upper section comprising a fuel chamber, and the lower section comprising a fuel support, each such section provided with a draft inlet and a gas-discharge connection.

2. A gas producer comprising upper and lower sections separable vertically, the upper section comprising a fuel chamber and the lower section comprising a fuel support, said sections separable at about the level of said fuel support, the upper section provided with a draft inlet and a gas-discharge connection, the lower section having, beneath the fuel support, an ash pit provided with a draft inlet and a gas-discharge connection.

3. A gas producer comprising upper and lower sections, the upper section comprising a fuel chamber, and the lower section comprising a fuel support, said sections separable vertically, and each having a draft inlet and a gas-discharge connection, which, in the case of the lower section, are located beneath said fuel-support; the lower section having at its top a plate adapted to receive the lower end of the upper section.

4. A gas producer of the down-draft type comprising upper and lower sections separable vertically one from the other, the upper section comprising a fuel chamber and provided with a draft inlet, the lower section comprising a fuel support and an ash pit beneath the same and means for drawing off gas from said ash pit, said sections separable relatively at about the level of said fuel support.

5. A gas producer of the down-draft type comprising upper and lower sections separable vertically one from the other, the upper section comprising a fuel chamber and a charging opening, the lower section comprising a fuel support and an ash pit beneath the same, and a valved pipe connected with said ash pit for drawing off gas therefrom and another pipe connected with the upper portion of said upper section of the producer, for drawing off gas, such upper pipe having a yielding connection with said lower gas pipe adapted to permit vertical separation of the one section of the producer from the other.

6. A gas producer comprising upper and lower sections, separable vertically, the up-

per section comprising a fuel chamber and a cooling jacket surrounding said chamber, and the lower section comprising a fuel support, each such section provided with a draft inlet and a gas-discharge connection.

7. A gas producer comprising upper and lower sections, separable vertically, the upper section comprising in a single unitary structure an inner wall, inclosing a fuel chamber, an outer wall, and a cooling jacket between said walls, the lower section comprising a fuel support, each such section provided with a draft inlet and a gas-discharge connection.

8. A gas producer comprising upper and lower sections, separable vertically, the upper section comprising in a single unitary structure an inner wall, inclosing a fuel chamber, an outer wall, and a cooling jacket between said walls, the lower section comprising a fuel support, and means for raising and lowering said upper section, each such section provided with a draft inlet and a gas-discharge connection.

9. A gas producer comprising upper and lower sections, separable vertically, the upper section comprising a fuel chamber, and the lower section a fuel support, a gas discharge conduit leading from beneath such fuel support, a gas discharge conduit leading from the upper portion of such upper section, and a telescopic connection between such conduits.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWARD RATHBUN.

Witnesses:
H. M. MARBLE,
EUGENE D. BOYER.