B. SPITZER.

WATER GAS PRODUCER.

APPLICATION FILED AUG. 13, 1906.

981,708. Patented Jan. 17, 1911.

Fig. 1.

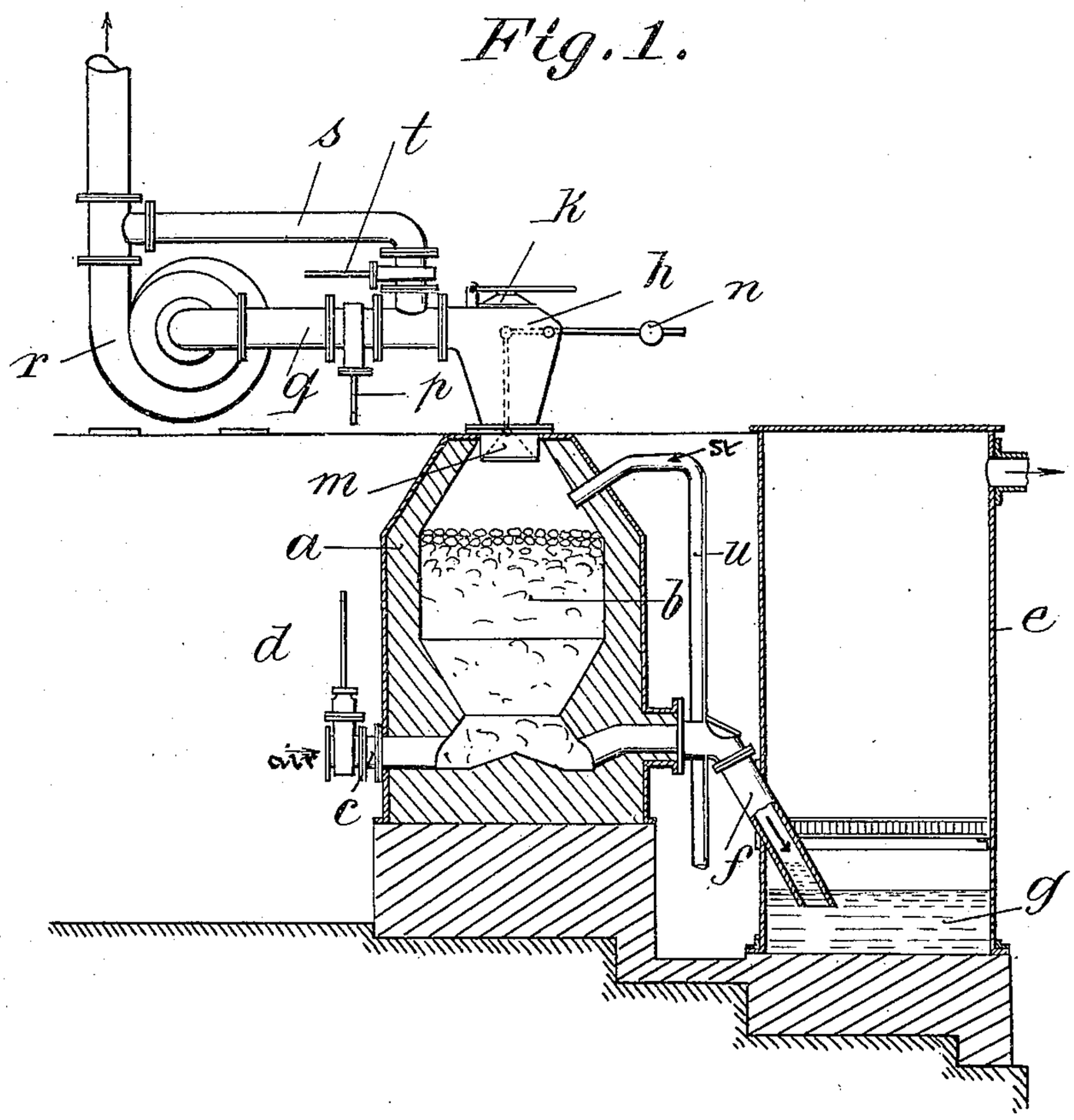
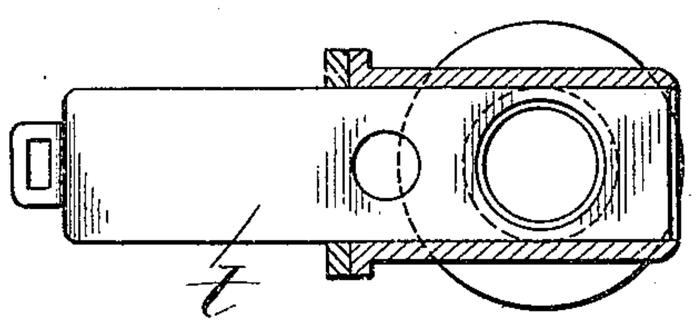


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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WATER-GAS PRODUCER.

981,708. Specification of Letters Patent. **Patented Jan. 17, 1911.**

Application filed August 13, 1906. Serial No. 330,520.

To all whom it may concern:

Be it known that I, BERNHARD SPITZER, enginer, and resident of 25 Schweizerstrasse, Frankfort-on-the-Main, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Water-Gas Producers, of which the following is a specification.

This invention relates to a water-gas producer and has for its object more particularly to avoid all risk of explosion and at same time to cheapen the cost of manufacture and render the working of the apparatus more simple than heretofore. With this object in view, ideas which are partly known are employed in a new combination.

The invention relates more especially to producers which work on the Dellwik system of water-gas generation and which have hitherto been worked solely with compressed air. The producer of this invention however is worked with "suction air" (this being a feature that has been long known in connection with gas producers), the plant being provided with a charging device in the form of a coal feed hopper erected directly upon the producer, and the gas main leading from said charging device to a fan. A by-pass pipe for the fan is provided for the purpose of heating up and of keeping the producer hot while at rest. The grate which has hitherto usually been employed for such producers has now been dispensed with in a known manner *per se*, so that the producer charge rests immediately on the producer bottom or rather the resulting layer of ashes and slag. The steam pipe opens at the top into the producer, while the gas pipe is led off at the bottom and discharges into the scrubber arranged at a lower level. Here solely, a water seal is provided, such that the issuing gas is easily able to pass into the scrubber, while the in-drawing of the air when the producer is being blown up for heating, results only in causing a rise of the scrubber water into the said gas pipe. By this means there is provided a general construction which possesses extreme simplicity coupled with safety in operation. All cut-off devices between the producer and the scrubber together with the appurtenant piping and consequently also all the safety devices hitherto required, are now dispensed with. These cut-off devices, which have hitherto been absolutely necessary, have (in consequence of their exposure to the white hot stream of gas) been very liable to suffer from the heat as well as from the impurities in the gas (dust, sulfureted hydrogen) and they have therefore been a constant source of breakdowns and loss of gas. In fact, when the specially provided safety devices break down or become damaged, the cut-off devices, which are dispensed with according to the present invention, have even been the cause of explosions. Instead of the expensive special blast valve with a relief arrangement which has hitherto been necessary, a simple slide valve is now sufficient for controlling the admission of the blast during gasification. The costly reversing and mutual locking of the several valves which have hitherto been necessary for the purpose of insuring a safe working are also dispensed with. In addition the handling is also more under inspection and more simple than hitherto.

In the drawings Figure 1 is a vertical section showing the construction of the producer as a whole, and Fig. 2 is a plan of the slide valve controlling the by-pass about the suction fan.

The producer *a* is filled with the charge of coke *b*. The blast enters through the pipe *c* which is fitted with a slide valve *d*, while communication with the scrubber *e* which is at a lower level, is established by means of the gas pipe *f* which extends below the level of the water *g* into the scrubber.

h is the coal-feed hopper which can be filled when the cover *k* has been opened, and which is emptied by depressing the cone *m* by means of the lever *n*. The coal-feed hopper has connected to it the pipe *q* which is provided with a sheet metal slide valve *p* and connected to the fan *r*.

s is a by-pass pipe fitted with a sheet metal slide valve *t* which has a large opening corresponding to the cross-sectional area of the pipe, and also a very small opening; it may however be also entirely closed.

u is the steam pipe.

The operation of the apparatus is as follows:—On starting, the slide valve *p* is closed, and the slide valve *t* is fully opened, so that the resulting gases can escape freely into the uptake. Subsequently, the blast

slide valve *d* is opened full and also slide valve *p*, and the fan *r* is started, and the slide valve *t* closed. During gasification, the fan is stopped, and during this period it is advisable for the sake of economy in time to fill the coal-feed hopper. During the "slagging" operation the slide valve *p* is entirely closed and the slide valve *t* is moved into a position in which the resulting waste gases can escape only through its very small opening. The same position is chosen when the producer is stopped over night, but when it is desired to maintain the heat.

In addition to the well known advantages of the absence of a grate, the light work of slagging, the generation of good water gas containing little CO_2 which always issues at the hottest point, there may be further mentioned that no loss of steam through badly shutting gas valves can occur, because there are none, and that the danger of poisoning from water gas passing out at the uptake, is obviated, because even if the feed-hopper *m* should shut imperfectly, only steam and never water gas, can escape outward because the gas is led away at the bottom at *f*, and the upper space of the producer is filled only with steam during gasification. Similarly, during the heating blow, blast gases cannot escape at the top into the space as has been the case hitherto, because by reason of the suction-working, if there are any leaky joints and covers although air may be sucked in, gas can never pass out. For these reasons, in this case, a rather less careful construction of the joints at the upper part of the producer, is allowable than that which was required in the producers hitherto constructed.

Claims:

1. An air suction generator for the production of water gas, having at its upper part a gas outlet provided with a suction fan, a by-pass pipe bridging the inlet and outlet of the fan, valve devices for directing the passage of the gases or a portion thereof through the by-pass pipe, a hopper for supplying the generator with coal, a steam inlet pipe opening into the top of the generator, and a water sealed dip pipe for establishing communication between the lower part of the generator and the scrubber; substantially as described.

2. An air suction generator for the production of water gas, having at its upper part a gas outlet provided with a suction fan, a by pass pipe bridging the intake and outlet of the fan, a slide valve in said pipe having a small opening therein, a steam inlet pipe, a hopper for supplying the generator with coal in the upper part of the generator, and a water sealed dip pipe for establishing communication between the lower part of the generator and the scrubber; substantially as described.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses.

BERNHARD SPITZER.

Witnesses:

JEAN GRUND,

ROBERT BÜHL.