



No. 721,513.

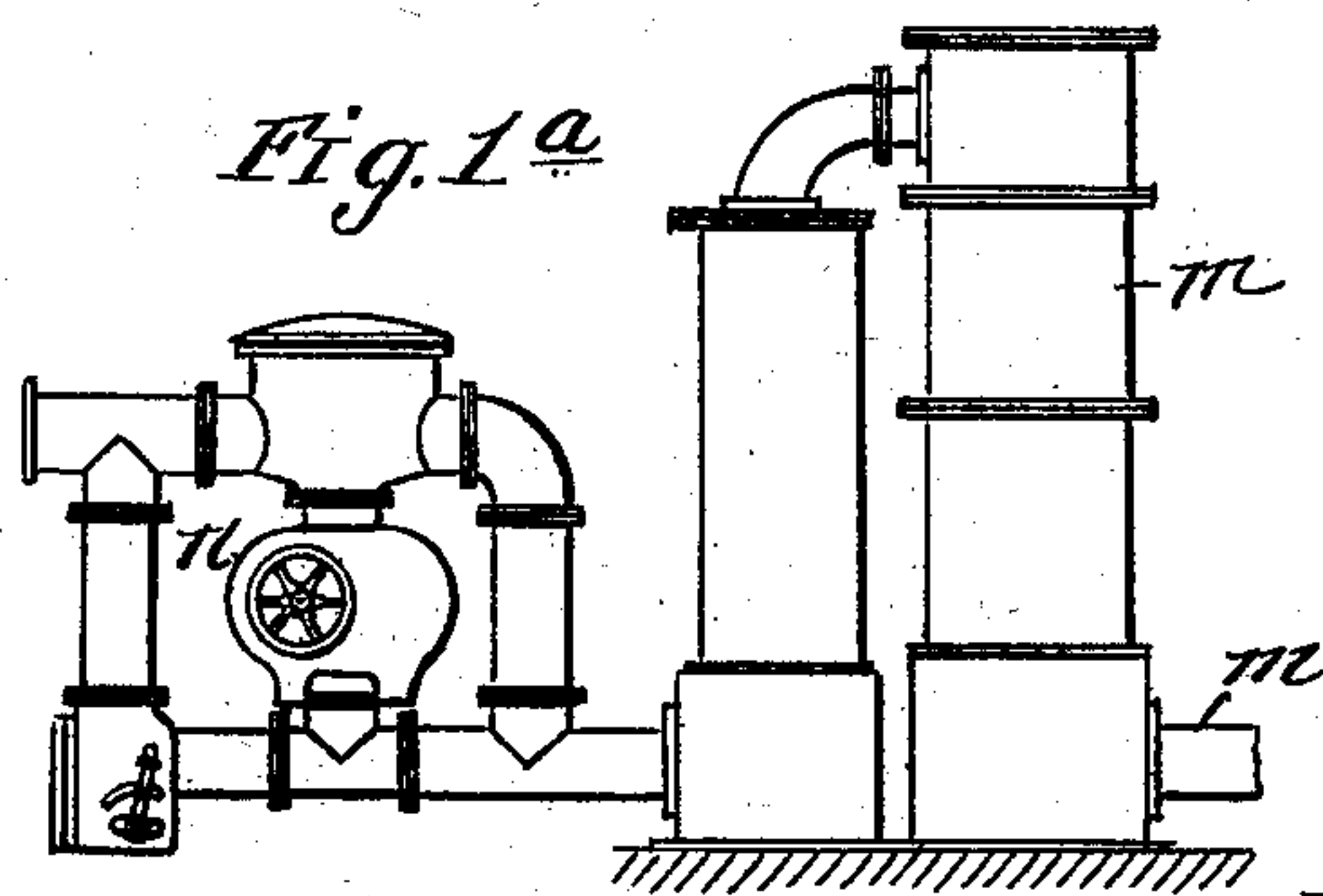
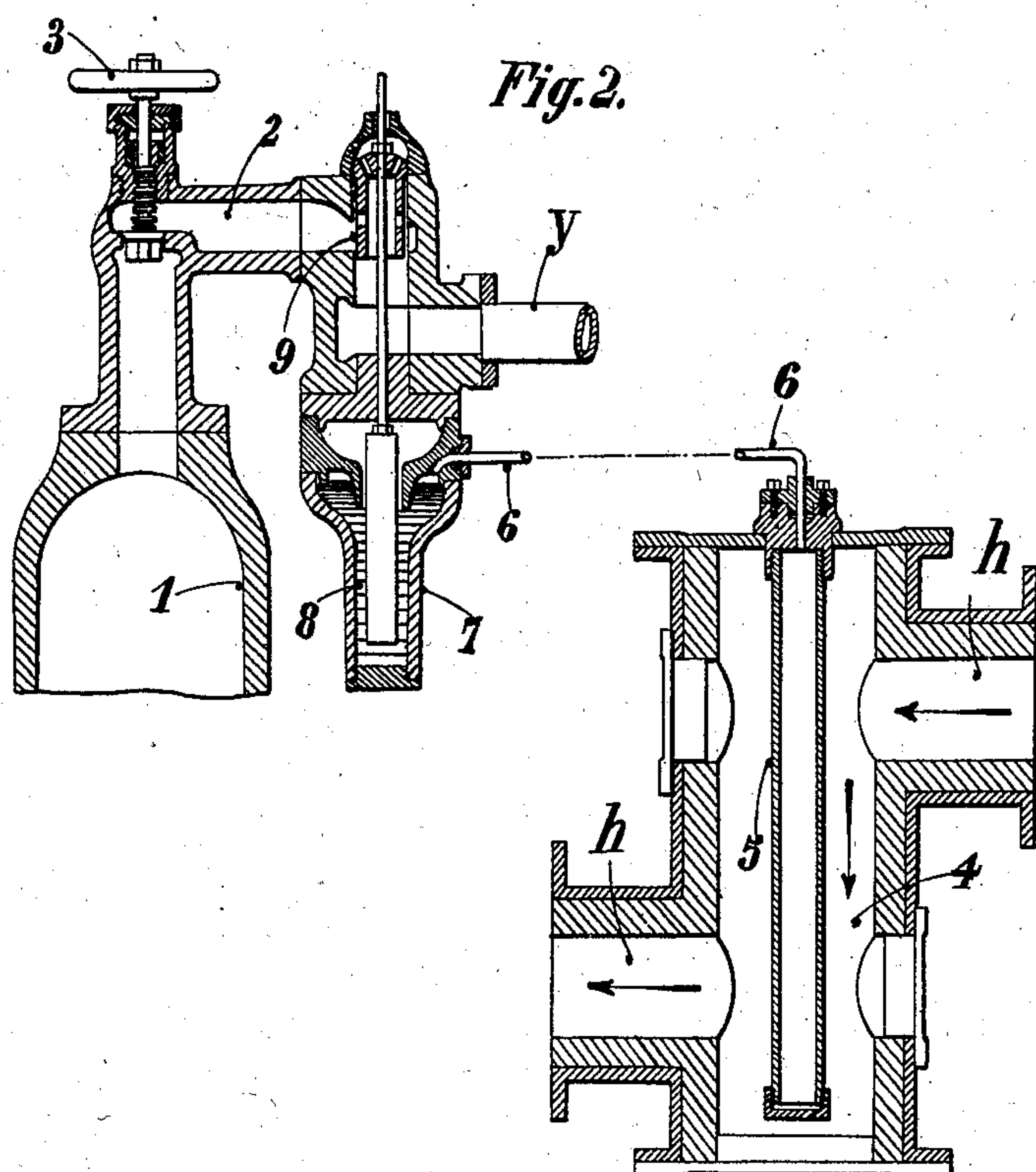
PATENTED FEB. 24, 1903.

L. GENTY.  
GAS PRODUCER.

APPLICATION FILED NOV. 4, 1901.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:  
N. L. Bryan  
C. D. Kessler

Inventor  
Lucien Genty  
By  
James L. Norris  
Atty.



# UNITED STATES PATENT OFFICE.

LUCIEN GENTY, OF MARSEILLES, FRANCE, ASSIGNOR TO HIMSELF, AND  
LA SOCIÉTÉ GÉNÉRALE DES INDUSTRIES ECONOMIQUES, OF PARIS,  
FRANCE.

## GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 721,513, dated February 24, 1903.

Application filed November 4, 1901. Serial No. 81,040. (No model.)

*To all whom it may concern:*

Be it known that I, LUCIEN GENTY, engineer, a citizen of the French Republic, residing at Marseilles, Bouches-du-Rhône, France, (and  
5 having post-office address 61 Rue St. Jacques, in said city,) have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

This invention relates to gas-producers  
10 working by suction, and has for its object to provide a device for regulating the amount of steam required for the air and steam mixture supplied to the producer.

According to this invention a mixture of  
15 air and steam is produced in any known way; but the mixture is regulated in such a manner that the amount of steam is not sufficient for the production of the gas in the generator. The necessary amount of steam is fur-  
20 nished by a complementary supply produced by a different apparatus from that which provides the steam for the first mixture, the said complementary supply being regulated by a device as hereinafter set forth and which is  
25 regulated by means of a steam-regulating device operated by the variations of temperature of the gases escaping from the gas-producer.

The principle of the regulating device is as follows: The temperature of the gas evolved  
30 from the producer decreases when the steam is supplied in excess to the generator, and, on the contrary, the temperature of the gas rises when the amount of the steam-supply is not sufficient. Therefore the invention aims to  
35 provide a regulating device adapted to increase or decrease the complementary amount of steam, according to the volume of the gas generated.

In order that the invention may be clearly  
40 understood, reference is had to the accompanying drawings, wherein like reference characters denote corresponding parts throughout the several views, and in which—

Figures 1 and 1<sup>a</sup> when taken together form  
45 an elevation, partly in section, of a gas-producer provided with the improved regulating device according to this invention. Fig. 2 is a sectional elevation, on an enlarged scale, of the regulating device.

50 Referring to the drawings, the right-hand

part of which shows a gas-producer provided with a hearth *a*, a shaft *b*, a retort *c*, an ash-pit *d*, a pipe *e*, leading from the top of the retort *c* to the lower part of the shaft *b*, and through the said pipe *e* the most volatile prod- 55  
ucts of distillation are returned to the shaft by means of an exhaustor *i* or other suitable device communicating with the pipe *e*. The gases escape from the producer through a pipe  
60 *h*, communicating with an annular space *g*, interposed between the retort *c* and the shaft *b*. The gases escaping from the producer through the pipe *h* enter the regenerator *j*, surround-  
65 ed by a jacket *l*, and heats the water contained in the boiler *l* and then passes through the pipe *m* to the scrubbers *m'*, where they are extracted by an exhaustor provided with a fan *n*. The air and steam mixture is adapt-  
70 ed to enter the tubes *k*, extending within the regenerator *j*. The air is drawn in the apparatus by the fan *n* of the exhaustor and enters through an inlet-tube *t*, opening into a chamber *u*, provided at the top of the gas-producer and above the boiler *f*, sur-  
75 rounding the producer, the chamber *u* being in communication through an opening *w* with the steam-space of the boiler *f*. The opening *w* is arranged in the bottom *v* of the chamber *u* at a point diametrically opposite  
80 to the air-inlet tube *t*. This arrangement compels the air entering through the air-inlet to come in contact with the surface of the water in the annular boiler *f*, so that the air becomes charged with moisture and air and  
85 steam enter the regenerator *j* through the tube *x*. The air and steam as they are fed to the regenerator *j* through the pipe *x* are supplied through a pipe *y*, which communicates with the tube *x*, with a further quantity of steam  
90 from the boiler *l*, arranged in the regenerator *j*. The specific manner of the passage of the air and steam from the boiler *f* and when fed with additional steam through the pipe *y* from the boiler *l* is that the air and steam first enter the chamber 10 at the top of the regenera- 95  
tor *j* and then in the tubes 11, which open at their bottom into the tubes *k*, and after the mixture is heated in the tubes *k* it passes out through the chamber 12 into the connecting-  
100 pipe *o*, which directs the mixture to the gas



producer or generator. If it be necessary to add a further quantity of steam to the steam and air coming from the producer-boiler, it is, as before stated, supplied through the pipe 5 *y*, and this additional supply of steam is regulated as follows: The boilers *f* and *l* are connected by a pipe *z* and the boiler *l* is surmounted by a dome 1, which is connected by a small pipe 2 with the regulating device and 10 the tube *y*. Through the latter the steam passes from the boiler *l* to the tube *x*. A hand-wheel connected with a valve 3, controlling a passage at the top of the dome 1, permits supply of additional steam to the air 15 and steam coming from the boiler *l* to be stopped; but the amount of this additional steam is regulated by a device constructed as follows: The outlet-pipe *h*, conducting the gases generated in the producer to the regenerator, is fitted with a cylindrical chamber 4, 20 containing a central tube 5, closed at its lower end and filled with air. The upper end of this central tube 5 is connected by a small pipe 6 to a vessel 7 containing mercury. A float 8 dips into the mercury and has a stem 25 carrying a cylindrical valve 9, the apertures of which establish between the short tube 2 and the air-pipe *y* from the producer-boiler a communication which varies with the position 30 of the float.

The working of this regulating device is as follows: If the temperature of the gas coming from the producer rises, it is because the combustion in the producer is too active. The 35 air in the central tube 3 expands and exerts pressure on the mercury in 7, and the float 8 and cylindrical valve 9, attached to it, rise, so that a greater amount of steam is taken from the boiler *l* in the regenerator. If the temperature of the gases issuing from the producer decreases, it is because steam is supplied in excess, and the reverse action of the 40 regulating device decreases the amount of steam supplied to the air. These changes in the amount of steam supplied allow to keep the hearth at a temperature as constant as possible, like a watchful stoker, and this is the condition of a good working. When the 45 amount of steam taken from the regenerator-boiler *l* decreases, the pressure of the steam accumulating in this boiler forces back a part of the water into the producer-boiler *f* through pipe connecting the two boilers, and therefore the regulation of the pressure is completed by the fact that the heating-surface in 50 contact with the water of the regenerator-boiler *l* varies with the amount of steam which this boiler has to generate. If this amount is below, the steam is superheated by the heating-surface of the boiler which is not in contact with the water. 60

As indicated by the arrow in Fig. 1, the gas passes from the producer through the pipe 65 *h* into the regenerator and then out of the regenerator through the pipe *m* into the scrubber, where it is exhausted by means of the exhauster. The passage of the gas through

the regenerator and out therefrom is indicated by arrows in Fig. 1. The air enters at *t*, as indicated by the arrow, and passes into 70 the producer-boiler, and from there the air and steam pass through the pipe *x* into the chamber 10, as indicated by the arrow, and into the tubes *k*, and then pass up the tubes *k*, as indicated by the arrow, into the pipe *o*, 75 as indicated by the arrow, and then into the producer, as indicated by the arrow. The steam from the regenerator-boiler passes therefrom through the regulating means into the pipe *y*, as indicated by the arrow, and 80 then into the pipe *x*. The operation of the regulating device for regulating the amount of steam required for the air and steam mixture as the latter passes from the producer-boiler through the pipe *x* has been hereinbefore 85 referred to.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for supplying a gas-producer with a mixture of steam and air, the combination of a regenerator provided with a chamber, a boiler and a steam and air heating chamber, a producer provided with a gas-generating chamber and a boiler communicating with the atmosphere, a connection between the producer-boiler and the steam and air heating chamber, connections between the regenerator-chamber and the said generating-chamber, and a connection between the 90 air and steam heating chamber and the gas-generator chamber. 95

2. In combination, a producer provided with a gas-generating chamber and a boiler communicating with the atmosphere, a regenerator provided with a boiler and a steam and air heating chamber, a pipe for connecting the producer-boiler and the steam and air heating chamber, a connection between the regenerator-boiler and the said pipe, a 100 connection for establishing communication between the gas-generating chamber of the producer and with the interior of the regenerator, means communicating with the connection between the regenerator and the gas-generating chamber and the connection between the regenerator-boiler and said pipe 105 for regulating the amount of steam passing from the regenerator-boiler to the said pipe, and means for establishing communication 110 between the air and steam heating chamber and producer. 115

3. In combination, a regenerator provided with a steam and air heating chamber and a boiler, a producer having a gas-generating chamber and a boiler communicating with the atmosphere, means for establishing communication between the said steam and air heating chamber and said gas-generating chamber, means for establishing communication between the regenerator-boiler, a producer-boiler and the steam and air heating chamber for supplying said latter chamber 120 with a mixture of steam and air, a connection 125 130



for establishing communication between said gas-generating chamber and the interior of said regenerator, and means extending in said connection and adapted to regulate the supply of steam and air to said steam and air heating chamber.

4. In combination, a producer provided with a boiler communicating with the atmosphere, said producer further provided with a gas-generating chamber, a regenerator provided with a boiler, said regenerator further provided with a steam and air heating chamber, a connection between the said gas-generating chamber and the interior of the regenerator, a connection between the producer-boiler and the said steam and air heating chamber, a connection between the regenerator-boiler and the connection between the producer-boiler and the steam and air heating chamber, a valve arranged in the connection between the regenerator-boiler and the connection between the producer and the steam and air heating chamber, means communicating with the connection between the gas-generating chamber and the interior of the regenerator and with the connection between the regenerator-boiler and the connection between the producer-boiler and the steam and air heating chamber for suitably operating the said valve, and means for establishing communication between the steam and air heating chamber and the said gas-generating chamber.

5. In combination, a regenerator provided with a steam and air heating chamber and a boiler, a producer provided with a boiler communicating with the atmosphere and with a gas-generating chamber, means for supplying a mixture of steam and air from the producer-boiler to said steam and air heating chamber, a pipe for establishing communication between said gas-generating chamber and the interior of the regenerator, means communicating with the regenerator-boiler and the means for supplying a mixture of steam and air to the steam and air heating chamber adapted to supply an additional quantity of steam to the said steam and air mixture as it passes from the producer-boiler to the steam and air heating chamber and to regulate the quantity of said supply, and means for establishing communication between the said steam and air heating chamber and the said gas-generating chamber for supplying a mixture of steam and air to the said gas-generating chamber.

6. In combination, a gas-producer provided with a boiler communicating with the atmosphere, a regenerator provided with a chamber for heating steam and air, a boiler arranged in the regenerator and communicating with the boiler of the producer, a pipe communicating with the boiler of the producer and with the chamber for supplying a mixture of air and steam to the regenerator, means communicating with the boiler in the regenerator and with the said pipe for sup-

plying a complementary supply of steam to the steam and air mixture as it passes through said pipe, a connection between the gas-producer and the regenerator for discharging the gas generated in the producer into the regenerator, means arranged in said connection for regulating the complementary supply of steam to the said air and steam mixture, and a suitable connection between the regenerator and the producer for establishing communication between the same and supplying the air and steam mixture from the regenerator to the producer.

7. In combination, a producer provided with a boiler communicating with the atmosphere, a regenerator provided with a boiler and air and steam heating tubes, a connection between the regenerator and the producer for discharging the gas generated in the producer into the regenerator for heating said tubes and regenerator-boiler, suitable connections between the producer-boiler and the tubes for supplying the latter with a mixture of air and steam, means for supplying the mixture with a complementary amount of steam from the regenerator-boiler, means for regulating the additional supply of steam to said mixture, and means for supplying the regulated mixture of air and steam to the producer.

8. In an apparatus of the character described, the combination with a regenerator provided with an air and steam heating chamber, of a steam-generating device communicating with the atmosphere and adapted to supply a mixture of steam and air to said chamber, a gas-producer, a boiler arranged in the regenerator for generating an amount of additional steam required for the said mixture, means for controlling the additional supply of steam to the said air and steam mixture, and means communicating with the chamber and with the producer for supplying the said mixture to the producer.

9. In combination, a gas-producer, a regenerator provided with a boiler and receiving-tubes for an air and steam mixture, said boiler and receiving-tubes adapted to be heated by the gases discharged from the gas-producer, a steam-generating device communicating with the atmosphere and with said tubes for supplying a mixture of steam and air thereto, means for supplying an additional amount of steam from the boiler in the regenerator to the steam and air mixture from the steam-generating device, means for regulating the additional supply of steam to the steam and air mixture, and means for discharging said steam and air mixture into the producer from said tubes.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LUCIEN GENTY.

Witnesses:

ROBERT K. FAST,  
ALLAN MACFARLANE.