

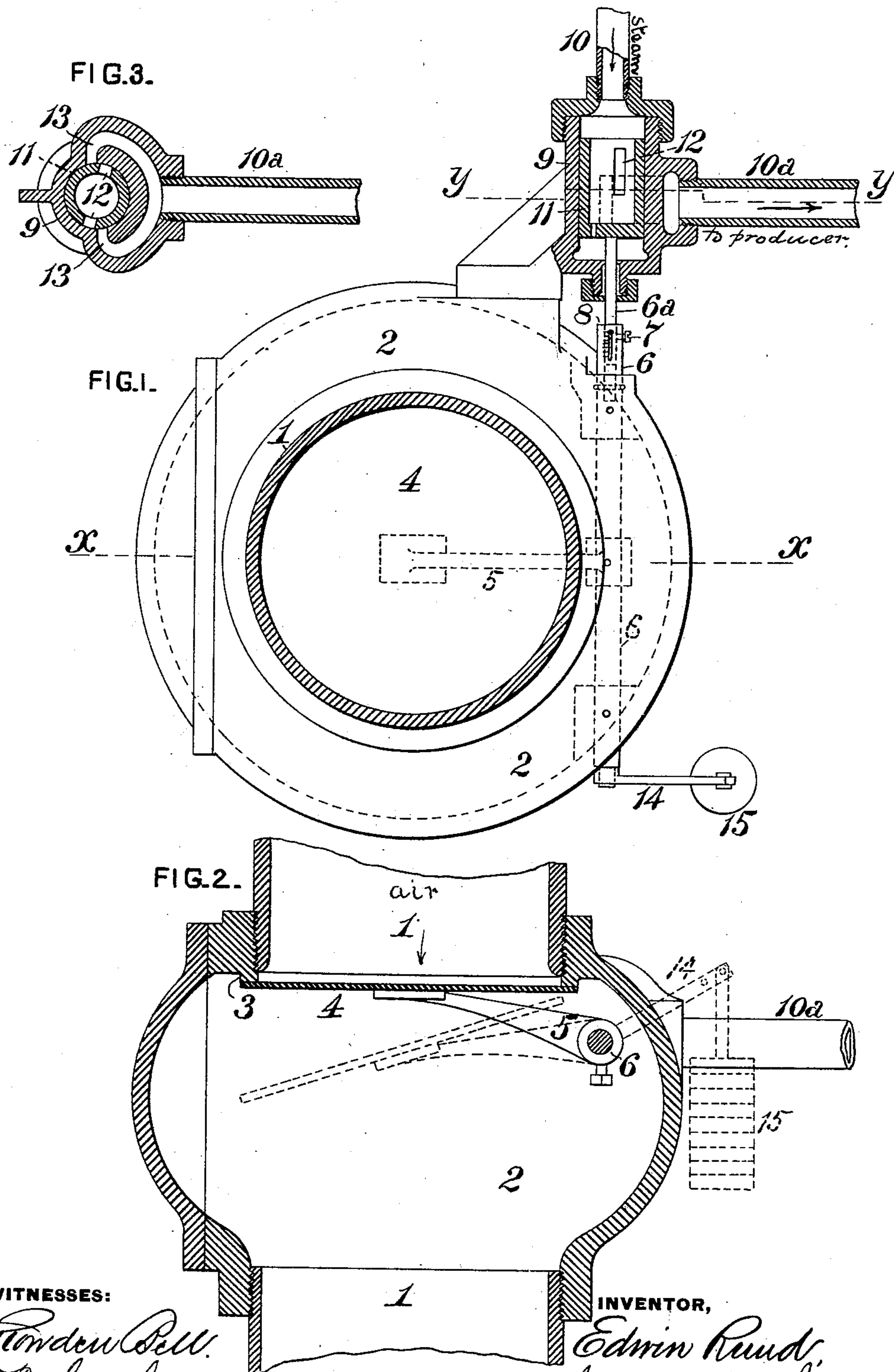
(No Model.)

E. RUUD.

AUTOMATIC STEAM REGULATOR FOR GAS PRODUCERS.

No. 482,320.

Patented Sept. 6, 1892.



WITNESSES:

Johnston Bell.
F. E. Gaither.

INVENTOR,

Edwin Ruud.
by *George H. Christie*
Att'y.

UNITED STATES PATENT OFFICE.

EDWIN RUUD, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE FUEL
GAS AND MANUFACTURING COMPANY, OF SAME PLACE.

AUTOMATIC STEAM-REGULATOR FOR GAS-PRODUCERS.

SPECIFICATION forming part of Letters Patent No. 482,320, dated September 6, 1892.

Application filed August 29, 1891. Serial No. 404,108. (No model.)

To all whom it may concern:

Be it known that I, EDWIN RUUD, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Automatic Steam-Regulators for Gas-Producers, of which improvement the following is a specification.

My invention relates to the class of gas-generating apparatus ordinarily termed "producers," in which the generation of gas containing a greater or less percentage of hydrogen is effected by the passage of blasts of air and steam through a body of ignited carbonaceous material in a furnace-chamber or producer.

The normal and successful operation of a gas-producer, as well as the composition of the gas generated and its effective utilization as fuel, depends largely upon the admixture in proper proportions of the air and steam delivered to the producer; and the object of my invention is to automatically regulate the quantity of steam passed into the producer proportionately to that of the air-blast, so that when the apparatus is adjusted for operation with any determined charge a limited variation of the air-blast shall be accompanied by a corresponding variation of the steam-blast in order to maintain a practically uniform percentage of hydrogen in the evolved gas.

To this end my invention, generally stated, consists in the combination of an air and a steam blast pipe, valves controlling the passage of fluid through said pipes, a shaft by which said valves are coupled and caused to move coincidently in opening and closure, and a counter-balance coupled to said shaft and acting thereon in opposite direction to the opening movement of the valves.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a plan view, partly in section, of an apparatus embodying my invention; and Figs. 2 and 3, vertical sections at the lines *x x* and *y y*, respectively, of Fig. 1.

In the practice of my invention I interpose between two sections of and at any convenient point in the length of the air-blast pipe 1, leading to a gas-producer, a valve case or

chamber 2, having formed upon it a face or seat 3, which surrounds the opening of the adjacent connected section of the air-blast pipe, and upon which an air-regulating valve 4, which controls the passage of fluid through said pipe, is adapted to close. The valve 4 is fixed upon the free end of an arm 5, the opposite end of which is secured upon a shaft 6, journaled in bearings in the shell of the valve-chamber 2 and projecting outwardly through the same. The shaft 6 is extended, preferably, as shown, by an adjustably-connected supplemental section 6^a into a valve-chamber 9, which is interposed between and connected to two sections 10 and 10^a of the steam-blast pipe, the supply-section 10 leading from the generator to the valve-case, and the delivery-section 10^a leading from the valve-case to the producer. A steam-regulating valve 11, fixed upon the shaft-section 6^a, is fitted to move circumferentially in unison with said shaft-section in the valve-chamber 9 and to control the passage of steam from the section 10 of the steam-blast pipe through the valve-chamber to the section 10^a and producer. The valve 11 is in the form of a cylindrical shell, which is open at its end adjoining the supply-steam-pipe section 10, and should be provided with one or more openings in its opposite end to maintain it in proper longitudinal balance. Ports 12 are formed in the shell of the valve 11, said ports being adapted in the traverse of the valve about its axial line to register with ports 13, formed in the shell of the valve-chamber 9 and leading to the delivery-pipe section 10^a, the passage of steam from the supply to the delivery sections being regulated or wholly cut off, as the case may be, by the greater or less degree of opening of the ports 12 to the ports 13 or the total closure of the ports 12 by being brought opposite to closed portions of the shell of the valve-chamber. A balance-arm 14 is fixed upon the shaft 6 exterior to the valve-chamber 2, said arm projecting from the shaft in opposite direction to the arm 5, to which the regulating-valve 4 is secured, and having its outer end coupled to a suitable counter-balance, in this instance an adjustable weight 15, the gravity of which acts against the incoming pressure of air on the valve 4 and the

gravity of said valve and tends to close the same, such closure being effected to a greater or less degree coincidentally with corresponding reduction of air-blast pressure. A spring
5 acting by its tension correspondingly to the gravity of the weight may, if desired, be substituted as a mechanical equivalent of the latter.

The supplemental shaft-section 6^a is fitted
10 freely in a longitudinal central bore in the main section 6, so as to be movable and adjustable endwise therein, and is secured in adjusted position by a set-screw 7. Such capacity of longitudinal adjustment is provided
15 in order to vary the degree of steam admission relatively to that of air admission for a determined valve traverse, so that the relative proportions of the former and the latter may be regulated as desired by causing a
20 greater or less length of the valve-ports 12 to register with the valve-chamber ports 13 by the movement of the supplemental shaft-section 6^a and connected valve 11 toward or from,
25 tion 6.

The proportionate opening of the steam-ports is indicated by an index 8, secured to the shaft-section 6^a and projecting through a longitudinal slot in the shaft-section 6, a series of graduations being marked on the latter adjacent to the slot.
30

In operation the pressure of the air-blast in the pipe 1 overcomes the resistance of the weight or spring connected to the arm 15 of
35 the shaft 6 and opens the air-regulating valve 4, coincidentally rocking the shaft-section 6 in its bearings and with it the connected supplemental section 6^a and steam-regulating valve 11. The movement of the valve 11 coincidentally opens a passage for steam to the
40 producer, the degree of opening being by the connection of the two valves increased or diminished coincidentally with and proportionately to variations in the degree of opening
45 of the valve 4, the quantity of steam admitted to the producer thus bearing a constant determined ratio to the quantity of air.

I am aware that means for proportionately

varying the supply of two different fluids, as valves controlling gas and steam pipes or gas
50 and air pipes, respectively, and coupled one to the other by intermediate lever connections, so as to coincidentally and proportionately regulate the supply of the respective
55 fluids, were known in the art prior to my invention, and such constructions, broadly, I therefore distinctly disclaim.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of an air-blast pipe, a
60 steam-blast pipe, valve-chambers interposed between sections of each of said pipes, a regulating-valve controlling the air-blast pipe, a shaft journaled in bearings and connected to said valve, a regulating-valve connected to
65 said shaft and fitted to move circumferentially within the valve-chamber of the steam-blast pipe and having ports adapted to register with ports formed therein, and a counter-
70 balance connected to the valve-shaft and acting thereon in opposite direction to the opening movement of the valves, substantially as set forth.

2. The combination of an air-blast pipe, a
75 steam-blast pipe, valve-chambers interposed between sections of each of said pipes, a regulating-valve controlling the air-blast pipe, a shaft journaled in bearings and connected to said valve, a regulating-valve constructed to
80 move longitudinally and circumferentially within the valve-chamber of the steam-blast pipe and having ports adapted to register with ports formed therein, a shaft secured to said valve and connected adjustably to the
85 shaft of the regulating-valve, and a counter-balance coupled to the valve-connecting shafts and acting thereon in opposite direction to the opening movement of the valves, substantially as set forth.

In testimony whereof I have hereunto set
90 my hand.

EDWIN RUUD.

Witnesses:

J. SNOWDEN BELL,
R. H. WHITTLESEY.