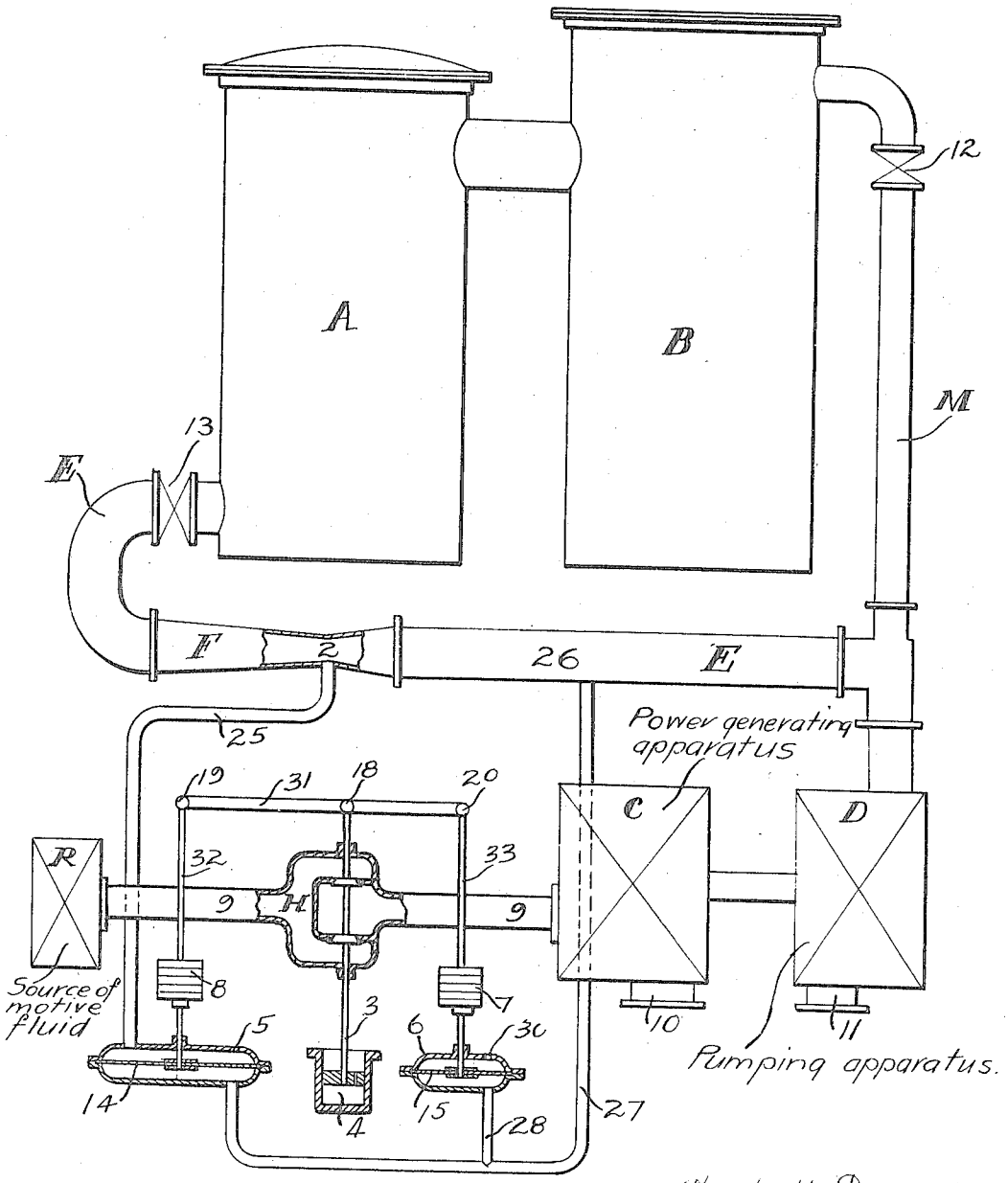
C. H. SMOOT.

REGULATION OF AIR BLAST IN GAS GENERATORS.

APPLICATION FILED OCT. 19, 1915.

1,198,162.

Patented Sept. 12, 1916.



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INVENTOR

WITNESSES:

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UNITED STATES PATENT OFFICE.

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REGULATION OF AIR-BLAST IN GAS-GENERATORS.

1,198,162. Specification of Letters Patent. Patented Sept. 12, 1916.

Application filed October 19, 1915. Serial No. 56,770.

To all whom it may concern:

Be it known that I, CHARLES H. SMOOT, a citizen of the United States, residing at 15 Glenside road, South Orange, New Jersey, have invented certain new and useful Improvements in the Regulation of Air-Blast in Gas-Generators, which improvements are fully set forth in the following specification.

My invention has for its object improved means by which the flow of air delivered to a water gas generator by a pumping apparatus is regulated for constant volume until the pressure of the flow of air reaches a predetermined limit, and is then prevented from becoming greater.

A second feature of my invention consists in providing means by which part of the flow of air may be diverted to another portion of the gas generating apparatus without interfering with the regulation of the flow of air delivered to the generator or combustion chamber of the gas generating apparatus.

In the accompanying drawing, the figure is a vertical cross section through my apparatus.

A is the generator in a gas generating equipment.

B is the carbureter.

C is a power generating apparatus driving D, a pumping apparatus for the air to be delivered to the gas generating equipment.

E, E is a pipe leading the air from pumping apparatus D into generator A.

F is a Venturi meter interposed in the length of pipe E.

M is a pipe leading air from pipe E into carbureter B.

12 is a valve located on pipe M.

R is a source of the motive fluid used to drive power generating apparatus C.

9, 9 is a pipe leading motive fluid from R to C.

H is a valve interposed in pipe 9, 9.

10 is the exhaust of motive fluid from C.

11 is a pipe leading air into pumping apparatus D.

13 is a valve shown diagrammatically adapted to close and open pipe E.

2 is the throat of the Venturi meter F.

25 is a pipe adapted to transmit the pressure prevailing at point 2 on diaphragm 14 contained in box 5.

26 is a hole tapped in pipe E.

27 is a pipe which allows the pressure prevailing in pipe E at point 26 to be applied to diaphragm 14 of box 5.

28 is a pipe transmitting pressure from pipe 27 under diaphragm 15 of box 6.

30 is an opening in box 6 allowing atmospheric pressure to be applied to diaphragm 15.

4 is a dashpot.

3 is the stem of valve H.

18 shows diagrammatically a point around which rod 31 can oscillate.

19 and 20 are pivot joints fastened to stems 32 and 33. These stems transmit the pressures applied to diaphragms 14 and 15 to rod 31. Adjustable weights 7 and 8 are held by stems 32 and 33.

A constant volume of air has to be furnished by the pumping engine D to generator A. The regulation of power generating apparatus C is controlled by valve H, which valve H in opening and closing allows a given amount of motive fluid to be discharged into C, in order to control valve H in such a way that the volume of air will be constant. I subject diaphragm 14 contained in box 5 to the pressure of the flow of air into throat of Venturi meter F—*i. e.*, point 2—and also to the pressure of the air in pipe E. To adjust the control due to displacement of diaphragm 14, I use the weights 8 as loading. It is well-known that the regulation of valve H, due to the control of diaphragm 14, will assure constant volume in generator A. It is desirable that the pressure of the air discharged into generator A be maintained under a predetermined limit. In order to prevent the pressure generated by pumping engine D from increasing above the predetermined limit, rod 31 is connected at point 20 to stem 33, which stem is controlled by the displacement of diaphragm 15 in box 6, which displacement is due to the variation of pressure in pipe E. The adjustment of this constant pressure regulator is obtained with weights 7, which are used to load diaphragm 15. The pressure in pipe E forces diaphragm 15 upward and atmospheric pressure, plus weight 7, opposes the pressure under the diaphragm. It will be seen that with proper adjustment my apparatus will give a constant volume of air until it reaches a predetermined limit, at which

time, regardless of the volume of air delivered the pressure will remain at or under the predetermined limit.

4 is a dashpot which is connected to stem 3 of the valve H, which has as object to prevent rapid up and down motions of valve H.

It is common practice in manufacturing water gas to divert part of the flow of air passing through E into carbureter B. By means of my invention this diversion of air can take place through pipe M, controlled by valve 12, without disturbing the constant volume of air going into A. This is due to the fact that in my invention the point of control as regards the output of air pumped by D is located closer to generator A than to the point from which the air discharged by D is tapped from point E.

It will be seen that the regulation of valve H is independent of the amount of air passing through M and that by means of my invention I have obtained a constant volume control for the air discharged into generator A, regardless of the amount diverted prior to the point of control I have selected in pipe E. It is self-evident that this control will remain possible as long as the discharge of air through pipe M is not made such as to over-reach the capacity of power of generating unit C and of air pumping apparatus D.

I do not wish to be limited to a gas generating apparatus as regards the regulation of the motive fluid driving the power generating apparatus, as it will be readily seen that the fluid discharged by the pumping apparatus may be used in devices foreign to the gas generating industry.

Having thus described my invention, I claim as new:

1. In a gas generating apparatus, the combination with a generator, of a carbureter, an air pumping apparatus for delivering air to the generator and the carbureter, and automatic means to regulate the volume of air discharged by the pumping apparatus controlled by the air which is delivered to the generator, whereby a constant volume of air is delivered to the generator regardless of the amount of air delivered to the carbureter.

2. In a gas generating apparatus, the combination with a generator, of a carbureter, an air pumping apparatus for delivering air to the generator and the carbureter, and automatic means to regulate the volume of air discharged by the pumping apparatus and to limit the pressure at which said air shall be discharged controlled by the air delivered to the generator, whereby a constant volume of air is delivered to the generator at a pressure not exceeding a predetermined maximum regardless of the amount of air delivered to the carbureter.

3. In a gas generating apparatus, the combination with a generator, of a carbureter, an air pumping apparatus for delivering air to the generator and the carbureter, and automatic means to regulate the volume of air discharged by the pumping apparatus controlled by the air which is delivered to the generator, whereby a constant volume of air is delivered to the generator regardless of the amount of air delivered to the carbureter, and means for adjusting the amount of air delivered to the carbureter.

4. In an apparatus for compressing a fluid, in combination a pumping apparatus, a power generating apparatus adapted to drive the pumping apparatus, a pipe conveying the compressed fluid to the point of use, a Venturi meter located on said pipe, regulating means adapted to maintain constant volume in the flow of fluid controlled by the difference of the fluid pressures in the pipe proper and at the throat of the Venturi meter and means controlled by the fluid pressure in the pipe proper adapted to control the flow of fluid for constant pressure when a fixed predetermined maximum pressure has been reached during the regulation of the flow of fluid or constant volume.

In witness whereof I have hereunto subscribed my name this 18th day of October, 1915.

CHARLES H. SMOOT.

Witnesses:
L. BATTU,
C. T. BROOKS.