

(No Model.)

G. WESTINGHOUSE, Jr.
MEANS FOR CONVEYING AND SUPPLYING GAS.

No. 328,368.

Patented Oct. 13, 1885.

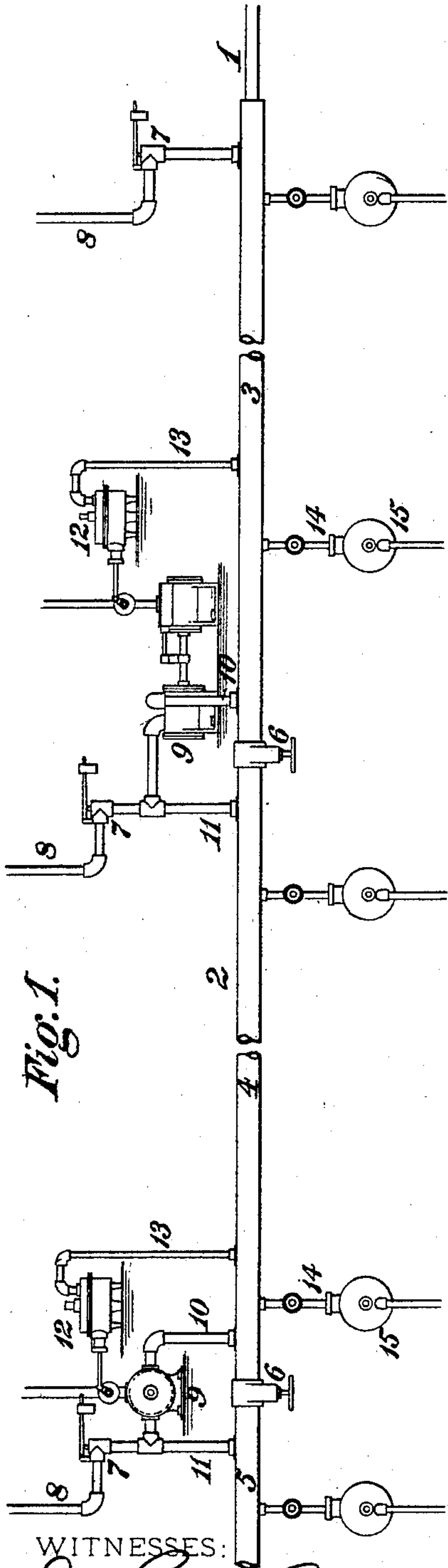


Fig. 1.

WITNESSES:

J. Thomson Bell.
L. M. Clarke.

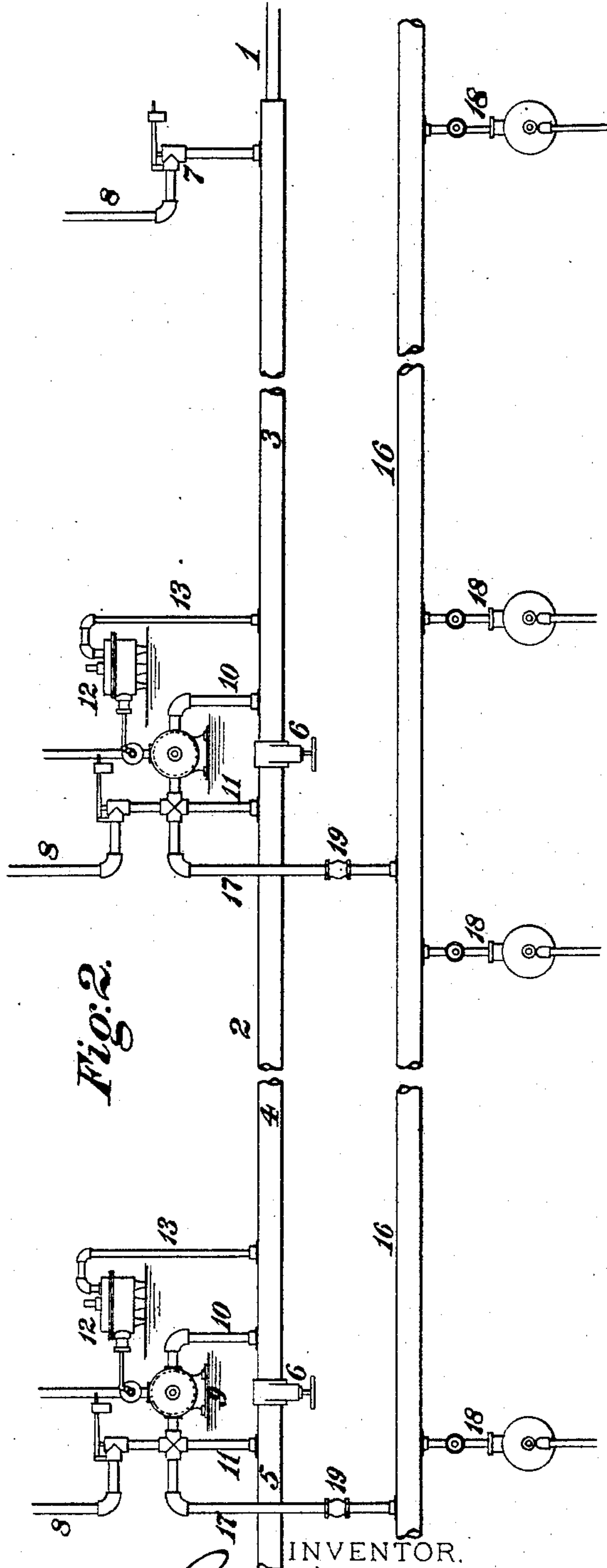


Fig. 2.

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MEANS FOR CONVEYING AND SUPPLYING GAS.

SPECIFICATION forming part of Letters Patent No. 328,368, dated October 13, 1885.

Application filed February 3, 1885. Serial No. 154,830. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Means for Conveying and Supplying Gas, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a diagrammatic plan of a pipe-line embodying my invention, and Fig. 2 a similar plan illustrating a modification thereof.

In an application for Letters Patent of even date herewith, Serial No. 154,829, I have set forth an improved method of conveying gas through a series of adjacent longitudinal divisions of a conducting-main and reducing the average pressure therein by exhausting gas from the delivery end of one section and forcing the same into the receiving end of an adjoining section, and also conveying gas by exhaustion from one to another section of a conducting-main in which an average pressure below that of the atmosphere is maintained, forcing the same at increased pressure into an auxiliary supply-main, and delivering the same at such increased pressure, or a regulated proportion thereof, from the auxiliary main to desired points of supply.

The object of my present invention is to afford effective and desirable means for the practical operation of a system, as above specified; and my improvements consist in certain novel apparatus therefor, hereinafter fully set forth.

To carry out my invention I provide a conducting-main, 2, which is divided into a series of separate and longitudinally-adjoining chambers or compartments, 3 4 5, by gate, stop, or check valves 6. A gas supply pipe, 1, leads from a well or generator to the receiving end of the adjacent section 3 of the conducting-main. Each section or compartment of the conducting-main is provided with an escape-valve, 7, fitted in a casing, which communicates with the compartment adjacent to its receiving end, said valves being loaded to such degree as to admit of the relief of any excess of pressure in the compartments above

that determined as safe, and being provided with escape-pipes 8 leading to proper points of discharge.

A suitable exhausting device, 9, as a reciprocating or rotary pump or blower, which may be driven by steam, compressed air, or high-pressure gas, conveyed in properly-protected pipes, or a jet apparatus actuated by high-pressure gas, located adjacent to the delivery end of each of the compartments, exhausts the gas therefrom through a pipe, 10, and forces it through a pipe, 11, into the receiving end of the next succeeding compartment, thus effecting a reduction of pressure toward the delivery end of one compartment and a relative increase toward the receiving end of the next.

The speed of the motors by which the exhausters are actuated is increased or diminished, or their operation stopped, as may be required, in accordance with variations of pressure in the compartments, preferably by automatically-acting pressure-regulators 12, of any well-known description, upon which the pressure of the gas in the compartments acts through pipes 13, leading therefrom, and which are connected with the throttle or supply valves through which operating fluid, as steam or compressed air, passes to the motors.

Upon the stoppage of the exhausters, gas passes from one to another compartment, either through the openings governed by the valves 6, which valves may, in such case, be automatic check-valves opening toward the receiving ends of the compartments, or be provided with supplemental valves of such character, or through the valves of the exhausting mechanism, which may be so arranged as to admit of the passage of gas through the pipes 10 and 11 during the stoppage of the exhausting mechanism.

Upon the reduction of pressure in the compartments to the normal point the pressure-regulators 12 increase the opening of the supply-valves, and the exhausters resume or accelerate their operation, as the case may be, in accordance with the conditions of delivery instituted by the degree of pressure in the main. Service-pipes 14, controlled by pressure-regulators 15, convey the gas to the locations at which it is required for consumption.

In the modification illustrated in Fig. 2 an auxiliary or supplemental main, 16, is laid adjacent to the conducting-main 1, and is supplied with gas through connecting-pipes 17, leading from the delivery sides of the exhausters 9, and provided with check-valves 19 to prevent any return of gas, or from separate exhausters of sufficient capacity to supply the supplemental main for local use. In operation an average pressure below that of the atmosphere is maintained by the exhausters in the compartments of the main 1, and gas is supplied at a pressure slightly above the atmosphere to the auxiliary main, from which it is delivered through service-pipes 18 for supplying mills or manufactories or small quantities for domestic use.

I am aware that the employment of forcing or forcing and exhausting apparatus, in connection with a gas-main, for the purpose of delivering a larger quantity at a given point is not new, and am further aware that it has been proposed to combine with a system of gas pipes or mains two exhausters, one of which forces gas from a supply-holder into the mains and the other draws out the gas from the opposite extremity of the mains and forces the excess into a second holder. I disclaim therefore, broadly, the combination of an exhausting apparatus with a gas-main, and I further disclaim herein the method of conveying and delivering gas, to which the apparatus herein described and shown is adapted, as the same constitutes the subject-matter of a separate application by me, Serial No. 154,829.

I claim herein as my invention—

1. In an apparatus for conducting and supplying gas, the combination of a main divided into longitudinally-adjointing sections or compartments, a gas supply pipe leading into the outer end of one of said compartments, a pump or exhauster having its suction-pipe connected to the delivery end of one compartment and its delivery-pipe to the receiving end of the adjacent compartment, and safety-valves located at the receiving ends of the compartments, whereby the average pressure is limited so as not to exceed a predetermined amount, substantially as set forth.

2. In an apparatus for conducting and supplying gas, the combination of a main divided into longitudinally-adjointing sections or com-

partments, a gas-supply pipe leading into the outer end of one of said compartments, a pump or exhauster having its suction-pipe connected to the delivery end of one compartment and its delivery-pipe to the receiving end of the adjoining compartment, and a pressure-regulator actuated by the pressure of gas in a compartment of the main and governing the supply of motive fluid to said exhauster, substantially as set forth.

3. In an apparatus for conducting and supplying gas, the combination of a conducting-main divided into a series of longitudinally-adjointing compartments, a gas-supply pipe leading into the outer end of one of said compartments, a series of escape-valves, each adapted to admit of the relief of excess of pressure from the delivery end of one of the compartments, a series of exhausting mechanisms, each having a suction-pipe connected to the delivery end of one compartment and a delivery-pipe connected to the receiving end of the adjoining compartment, pressure-regulators governing the motive fluid supply valves of the exhausting mechanisms and actuated by the pressure of gas in the compartments of the main, and valves adapted to admit of the passage of gas from one to another compartment during the cessation of operation of the exhausting mechanisms, substantially as set forth.

4. In an apparatus for conducting and supplying gas, the combination of a conducting-main divided into a series of longitudinally-adjointing compartments, a gas-supply pipe leading into the outer end of one of said compartments, a series of exhausting mechanisms, each having a suction-pipe connected to the delivery end of one compartment and a delivery-pipe connected to the receiving end of the adjoining compartment, a supplemental supply-main communicating with the delivery-pipes of the exhausting mechanisms, and service pipes leading from said supplemental main to points of consumption or utilization, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

Witnesses:

J. SNOWDEN BELL,
R. H. WHITTLESEY.