





# UNITED STATES PATENT OFFICE.

ERNEST BLASSER, OF BOSTON, MASSACHUSETTS.

## GAS AND AIR MIXING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 685,027, dated October 22, 1901.

Application filed December 17, 1900. Serial No. 40,076. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST BLASSER, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Gas and Air Mixing Apparatus, of which the following is a specification.

This is an improvement in that class of gas-distributing apparatus in which air is mixed with the gas before it reaches the burners; and the invention applies particularly to apparatus or systems which supply or comprise a considerable number of burners. In my apparatus I draw, by means of a pump, gas and air through respective inlets, the proper proportions being regulated by means of valves, into a mixing-chamber in the pump and discharge the mixture of air and gas by means of the return action of the pump into a receiver or reservoir, from which it is distributed by pipes and valves to different parts of a building or through the street-main to different house-pipes. The reservoir or receiver is provided with an automatic regulator, which starts or stops the motive power for operating the pump at any set pressure. A needle-valve is provided at the base of each burner for regulating the pressure at its burner.

By using high pressure in the main pipe and regulating it at the entrance to the house by reducing-valves smaller pipe can be used throughout the entire system, thereby reducing the cost of construction and maintenance, and, moreover, a more equal distribution of the pressure of the lighting fluid is produced. In other systems of lighting of this general class now in common use pressure is applied only to the air which is supplied, the gas having only the pressure in the main, and the air and gas are mixed at a given point in the main pipe, with the effect that when one or more lights are added or extinguished resort must be had to the regulating-valves. In my system or apparatus the pressure is equalized automatically, and the air and gas are mixed in the pump, so that the putting on or off of any number of lights does not in the least affect their regularity. I do not regulate in the main pipe, but govern the flow at each burner by means of individual needle-valves

at the burners, thus obviating the necessity for regulators or for different-sized openings in the burners. In this system the pressure on the gas and air is equalized before distribution. Moreover, when all the lights are turned off there is no back pressure against the gas nor valves to close, as in the systems now in use, and in such systems if the air and gas valves are not closed when the last light is turned off the air will force the gas back (there being no outlet) against the check-valve close to the meter.

The nature of the invention is fully described below and illustrated in the accompanying drawing, in which the figure is a view in elevation of my improved apparatus, a portion of the pump being represented as broken out.

Supported by a base *a* is a pump *A* of ordinary construction and provided with the piston *A'* and piston-rod *A''*. The broken-out portion of the pump shows the mixing-chamber *B*. Supported on the base is a receiver or reservoir *C*. An air-inlet pipe *D*, provided with a suitable regulating-valve *D'* and check-valve *D''*, leads into the mixing-chamber *B*. A gas-inlet pipe *E*, provided with a suitable regulating-valve *E'* and check-valve *E''*, and the equalizing gas-bag *F*, leads into the mixing-chamber, and a pipe *G*, provided with a regulating-valve *G'* and check-valve *G''*, connects the mixing-chamber with the interior of the reservoir. A steam-pipe *b* supplies the power to the pump, such supply being automatically regulated by means of the regulator *H*, which acts on the arm *H'*, extending from a valve *h* in said pipe. The lever-arm *H'* in the illustration rests upon an upright stem projecting from the regulator *H*, which stem on well-known principles rises and falls through a determined range in accordance with the variations of pressure in the reservoir *C*, thus moving the lever-arm *H'* through a small arc. This arc of movement is sufficient to control the efficient aperture of valve *h*, and thus regulate the delivery of steam or any other form of fluid-pressure to the motor, a steam-motor being herein used for purposes of illustration.

*K* represents a main pipe provided with a shut-off device *L*, from which pipe house-pipes



or branch pipes K' extend to different houses or sections, each said branch pipe being provided with a pressure-regulating device L'.

P P represent the distributing-pipes in the  
5 houses, provided with a plurality of burners S, two only being shown for each pipe for purposes of illustration, these two representing the burners throughout an entire building or locality supplied by a single pipe K'. Each  
10 burner is provided at its base with a needle-valve V, extending into the coupling V', formed with the chamber V'', from which a passage V''' extends from the burner. The operation and construction of a needle-valve  
15 are well known.

The air and gas enter the mixing-chamber B in the pump through the pipes D and E, respectively, the former opening into the atmosphere and the latter connecting with the  
20 street-main. The pump is operated by steam-power through the pipe b, and as the piston moves toward the left it draws in the air and gas and mixes them in the proportions allowed by the valves D' E', and as the piston  
25 moves toward the right it forces the mixture of air and gas through the pipe G into the receiver or reservoir C, the amount entering said reservoir being regulated by the valve G'. The passage of steam, and hence the power applied to the pump, is automatically regulated,  
30 according to the pressure in the reservoir, by the regulator H. The gas is forced from the reservoir through the main pipe K (the shut-off L being opened) and thence through the  
35 branch pipes K', provided with the pressure-regulators L', to the pipes P, which directly supply the burners. As each burner is provided with a needle-valve, which regulates absolutely the supply of gas to its corresponding burner, which when once adjusted is permanently adjusted, there is no necessity for  
40 regulating the supply between the pressure-regulators L' and the burners when the number of lights is increased or decreased, nor  
45 for the employment of any kind of a regulator, aside from the needle-valves described, between the pressure-regulators and the burners, nor for the employment of any regulator whatever between the pressure-regulators and the burners, which acts upon the  
50 main or general supply in contradistinction from the individual supply to each burner. Hence it is not necessary to apply to the burners in a system of this character orifices of  
55 different sizes, through which the gas is fed

to the different burners. In my contrivance any number of burners may be used and any proportion of them lighted or extinguished without operating any regulator or valve of any kind, as the pressure or supply at the  
60 burners is equalized, and there is no effect produced upon one burner by the use or disuse of another. In other words, I do not regulate the main supply, but regulate at the individual burners. The regulation and mixture really occur in the pump. 65

Another advantage of this invention is that instead of being obliged to apply larger pipes than those found in towns and cities for the supply of ordinary gas when a system of this  
70 general character is to be applied I can use the same pipes with greater pressure. This is because in other systems of this class only the gas-pressure found is employed, while in my system I employ a pump and mix my gas  
75 in it, so that from that point the gas is ready for use. This is contrary to the ordinary method of applying pressure to the air alone and mixing the gas and air at a point in the main pipe, so that regulating-valves must be  
80 provided and frequently resorted to as the number of lights is lessened or increased.

Any suitable power may be employed to operate the pump.

Having thus fully described my invention, 85 what I claim, and desire to secure by Letters Patent, is—

In a gas-distributing apparatus, a mixing-pump, a gas-inlet pipe to said pump, an air-inlet pipe to said pump, said pipes each provided with a suitable regulating-valve and a check-valve respectively, a reservoir for mixed air and gas under pressure, a pipe connection between said reservoir and said pump, provided with a suitable regulating-valve and  
90 a check-valve, a regulator mounted on said reservoir, controlled by the fluid-pressure in the reservoir, a motor for the pump, means for regulating said motor, a connection between said means and the regulator mounted  
95 on the reservoir whereby the power is automatically controlled by the pressure in the reservoir, and a pipe leading from the reservoir to a distributing system, substantially as specified. 100

ERNEST BLASSER.

Witnesses:

HENRY W. WILLIAMS,  
A. N. BONNEY.