

No. 869,830.

PATENTED OCT. 29, 1907.

G. DALÉN.
GAS PRESSURE REGULATING DEVICE.
APPLICATION FILED AUG. 8, 1905.

Fig. 1.

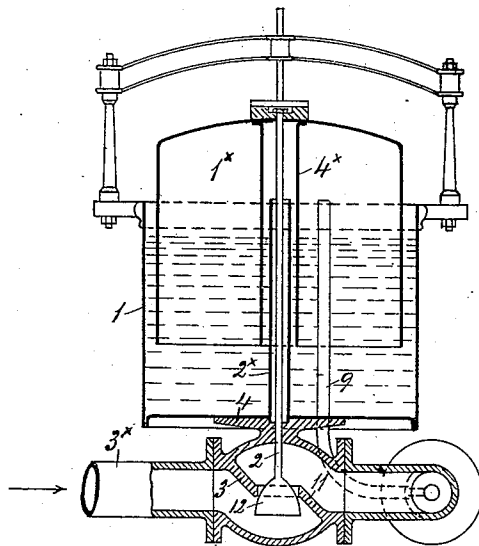
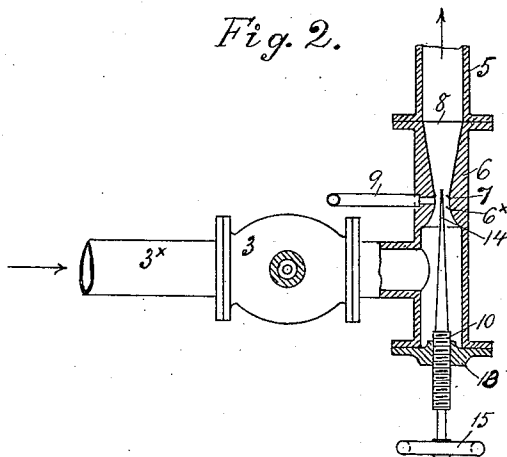


Fig. 2.



Witnesses
Hm. Kuehne
J. W. Stephens

Inventor
Gustaf Dalén

By *Kuhndorff*

Attorneys

UNITED STATES PATENT OFFICE.

GUSTAF DALÉN, OF STOCKHOLM, SWEDEN, ASSIGNOR TO AKTIEBOLAGET GAS ACCUMULATOR, OF STOCKHOLM, SWEDEN.

GAS-PRESSURE-REGULATING DEVICE.

No. 869,830.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed August 8, 1905. Serial No. 273,286.

To all whom it may concern:

Be it known that I, GUSTAF DALÉN, a subject of the King of Sweden, residing at Stockholm, Sweden, have invented new and useful Improvements in Gas-Pressure-Regulating Devices, of which the following is a specification.

The present invention relates to gas pressure regulating devices of that kind, in which a predetermined and constant pressure is maintained in a main or conduit at a point distant from the main gas holder or supply.

The invention constitutes a further improvement especially of the gas pressure regulating device, described in my U. S. Patent No. 797766, granted August 22, 1905 and filed May 19, 1904. Said device consists principally of a pipe, inserted in the main or conduit between the distant place in question and a regulating gas holder, said pipe having its bore provided with a contracted inlet portion from the smallest section of which the sectional area of the bore continually increases to the largest section of the bore, which is equal to the sectional area of the gas conduit coupled to the outlet of the pipe and constituting the continuance of the main gas conduit leading to the distant point of consumption. The operation of said device is based on the fact that the increase of pressure, established during the passage of the gas through said pipe, may be made equal to the reduction of gas pressure during the flow of the gas from the largest section of said pipe to the distant point of consumption. As however the said increase of pressure is depending upon the relation between the largest and the smallest section of the bore of said pipe, and the said reduction of pressure is depending *inter alia* upon the length and section of the main from the largest section to the distant point of consumption, it will be clear that the above mentioned operation, viz. the equalizing between the increase of pressure in the pipe and the reduction of pressure in the main, will be obtained only when inserting a pipe with certain dimensions of its bore in a certain main with a corresponding length to the distant point of consumption. It is desirable however to be able to employ pipes of the same dimensions for different mains or conduits in order to avoid the manufacturing of different pipes for each case in question. This can be done according to the present invention by varying the velocity of flow in the said pipe, whereby the degree of the increase of pressure is correspondingly varied.

The invention is illustrated in the accompanying drawing in which,—

Figure 1 is a vertical section, and Fig. 2 a horizontal section of the device. In this drawing, 3^x indicates the gas main or conduit leading from a main gas holder, not shown on the drawing, and 3 is a valve casing cou-

pled to the end of said gas conduit. 1 indicates a regulating gas holder of any suitable construction, the bottom of which is fixed to a flange 4 on said valve casing 3. The spindle 2 of the valve 12 extends through the center of the gas holder and is fixed to the roof of the bell 1^x. A central pipe 2^x surrounds the valve spindle 2 and opens into the valve casing 3, said pipe 2^x in turn being surrounded by a pipe 4², extending downwardly from the roof of the bell 1^x. To the outlet opening 11 of the valve is coupled a T-shaped pipe 6, the one branch of which is provided with a contracted portion 6^x, from the smallest section 7 of which the sectional area of the bore continually increases to the largest section at 8 which is equal to the sectional area of the gas conduit 5, coupled to the outlet of the pipe and constituting the continuance of the main gas conduit leading to the distant point of consumption. In the smallest section 7 of the pipe 6 or in the proximity thereof a pipe 9 opens which extends into the gas chamber of the bell 1^x.

The operation of the above described device is as follows:—The gas from the main gas holder flows through the main conduit 3^x valve casing 3, pipe 6 and conduit 5 to the distant place where the gas is to be consumed. During the passage through the contracted portion 6^x of pipe 6 the velocity of the gas is increased, so that it will be greater at the smaller section 7 than at the inlet of the pipe 6. The pressure of the gas is simultaneously reduced so that it will be smaller at 7 than at the inlet of the pipe 6. The gas pressure at 7 is the same as that of the gas chamber of the bell 1^x owing to the communication through pipe 9 and the gas pressure of said gas chamber is maintained constant, owing to the well known combination of the gas holder 1 with the valve 12. It will be needless to enter into any further description of the construction of said gas holder as this is well known. It may be sufficient to state that if the pressure of the gas chamber of the bell 1^x should tend to increase, the bell will ascend, whereby the valve 12 will throttle the gas flow through the valve casing until the gas pressure resumes its former amount. If on the contrary the gas pressure of the bell tends to decrease, the bell will descend, whereby the valve 12 opens the flow through the valve casing until the gas pressure is sufficiently increased. During the passage from section 7 to section 8 the velocity energy of the gas is converted into pressure energy in the well known manner due to the continued increase of the sectional area from 7 to 8 and the throttling of the gas flow beyond the largest section 8, which throttling is effected by the openings of the gas burners at the consumption place or places, said openings being considerably smaller than the sectional area 8. Thus

the gas pressure at 8 will be greater than the gas pressure at 7, while the velocity of the gas is correspondingly reduced and said increase of pressure may be calculated and determined by persons skilled in the art and be made equal to the reduction of gas pressure during the flow of the gas from the point 8 to the distant point of consumption, due to friction, curvatures, and the like, said reduction of pressure also being easily calculated in the well known manner by persons skilled in the art. The dimensions of the bore of the pipe 6 thus being properly determined the result will be that at the point of consumption the pressure is maintained equal to the pressure at 7, at which is the same, equal to the pressure of the gas chamber of the bell 1*, which is a constant pressure as above set forth.

The parts above described are arranged and operate substantially in the same manner as described in my U. S. Patent 797766.

A screw spindle 10 centrally extends through the threaded hole in the bottom plate 13, covering the end of the branch pipe 6, and enters with its conical end 14 the smallest section 7 of the bore. By means of a hand wheel 15 the conical end of the screw spindle will enter said section more or less whereby the area of said section is varied. In this way the velocity of flow in the smallest section is varied and thus the increase of pressure established between the smallest and the largest section 8 of the bore, so that said increase of pressure can be made corresponding to the reduction of pressure in different mains or conduits extending from the largest section 8 to the distant place of consumption.

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

1. In a gas pressure regulating device, the combination with the gas main, of means for maintaining a constant gas pressure at a point of the gas main, means for raising the gas pressure corresponding to the reduction of pressure due to friction and the like during the flow between said point and a distant point therefrom, and means for varying said raising of gas pressure corresponding to variations of distances between said point of constant gas pressure and said distant point therefrom.

2. In a gas pressure regulating device, the combination with the gas main of a gas holder, a pipe inserted in the gas main having its bore provided with means for variably converting velocity energy into pressure, and a pipe connecting said pipe with the gas chamber of the gas holder.

3. In a gas pressure regulating device, the combination with the gas main of a gas holder, a pipe inserted in the gas main provided with a contracted inlet portion and from said inlet portion with continually increasing sectional areas, means for varying the area of the smallest section of the pipe, and a pipe connecting the gas chamber of said gas holder with the smallest section of said pipe.

4. In a gas pressure regulating device, the combination with the gas main of a gas holder, a pipe inserted in the gas main, provided with a contracted inlet portion and from said inlet portion with continually increasing sectional areas, a conical screw spindle entering the smallest section of said pipe and a pipe connecting the gas chamber of said gas holder with the smallest section of said pipe.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAF DALÉN.

Witnesses:

WALDEMAR BORNAN,
CARL FRIBERG.