G. E. HULSE.

PRESSURE REGULATOR.

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905,188. Patented Dec. 1, 1908.

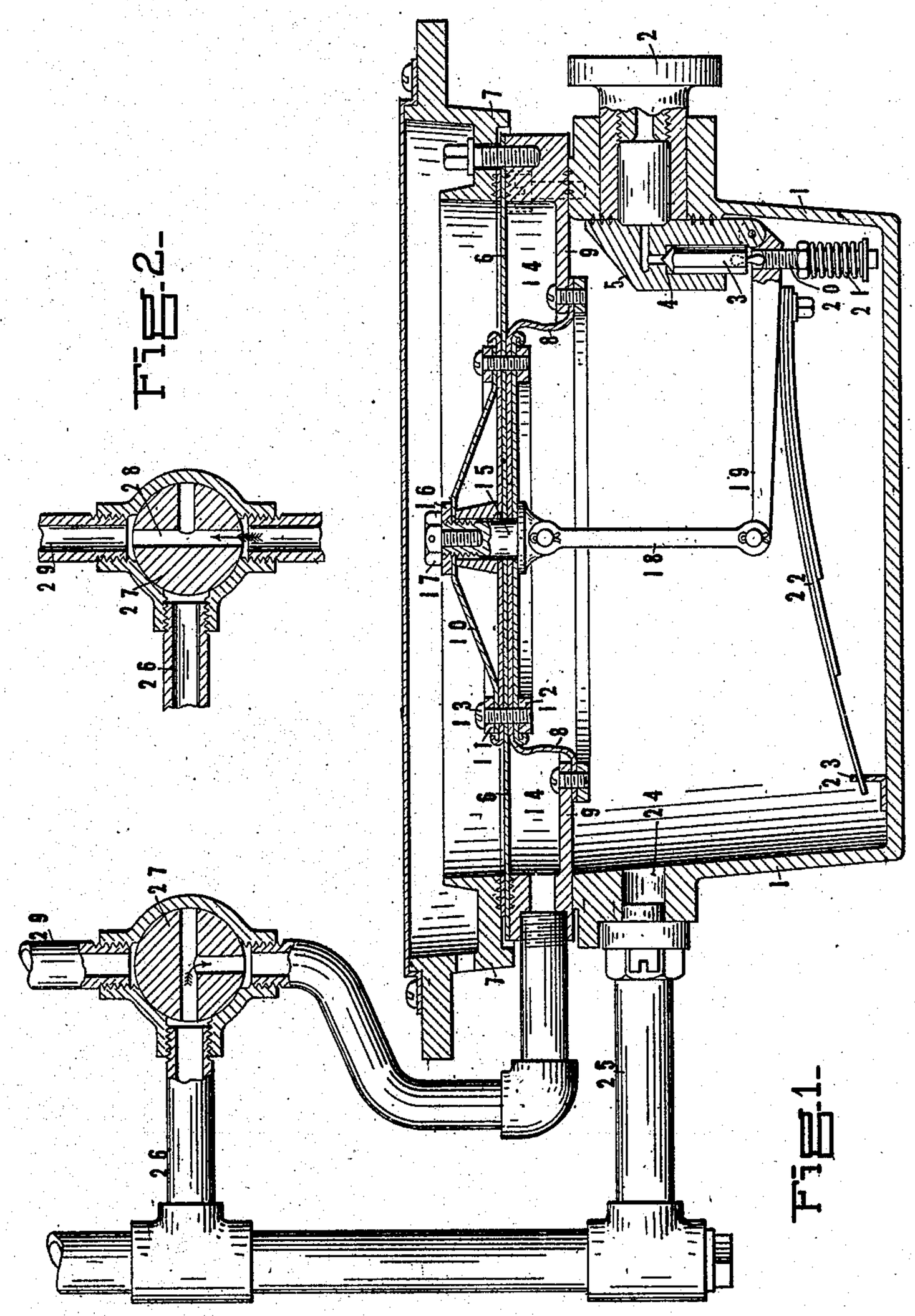

FIG. 1.

FIG. 2.

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PRESSURE-REGULATOR.

No. 905,188. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed October 2, 1907. Serial No. 395,541.

To all whom it may concern:

Be it known that I, GEORGE EGBERT HULSE, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to lighting apparatus and is more especially directed to gas lighting apparatus adapted for use in railway cars or similar structures.

One of the objects of my invention is to provide new and improved means whereby the gas pressure to the lamps or other gas utilizing devices may be varied at will.

Another object of the invention is to provide in a gas lighting system of the above character a new and improved device for regulating the gas pressure having means whereby the gas may be supplied to the utilizing devices at two or more given pressures.

A further object is to provide a new and improved regulator for gas lighting systems the use of which will effect a great saving of gas.

Other objects will be in part obvious and in part pointed out hereinafter.

In the accompanying drawings, wherein is illustrated one of the various possible embodiments of my invention, Figure 1 is a vertical sectional view taken through my improved regulator, some of the parts being shown in side elevation. Fig. 2 is a similar view taken through a portion thereof, but showing a different adjustment of the valve.

Similar reference characters refer to similar parts in both views of the drawings.

Referring now to the drawings, 1 indicates the casing of the regulator which is provided with an inlet nipple 2, through which gas is conducted from a suitable source of supply to the interior of the casing, the flow thereof being controlled by means of a valve 3 which, in the present instance, takes against a seat 4 formed in a valve casing 5 located interiorly of casing 1. A flexible diaphragm 6 is clamped at its outer edges between the upper portion of casing 1 and a cover section 7, said diaphragm being tightly stretched across the casing. A second diaphragm 8 is clamped at its outer edges to an inwardly extending annular ledge 9 of casing 1, and the central portions of diaphragms 6 and 8 are connected by means of a clamp plate 10 and clamping rings 11 and 12, secured together, in the present instance, by screws 13. It will be observed that diaphragm 8 is of a considerably smaller area than diaphragm 6 and is secured at a distance beneath the same to provide a space 14 the purpose of which will be apparent hereinafter. A bolt 15 extends through the diaphragms and clamp plate 10 and is held in position by means of a nut 16 and a clamp or lock bolt 17 threaded into the upper end of bolt 15. The lower end of bolt 15 is connected by means of a link 18 to the outer end of a lever 19 upon which is mounted the stem 20 of valve 3 by means of the usual spring adjustment 21. A laminated leaf-spring 22 is secured at one end to lever 19 and at its opposite end is attached to a bracket 23 fastened within the casing. Spring 22 through lever 19 resists the distentions of diaphragms 6 and 8.

Leading from an exit opening 24 of the casing is a conduit 25 which is adapted to conduct the gas from the pressure chamber of the regulator to the gas utilizing devices, and leading from conduit 25 is a by-pass conduit 26 which leads into the space 14 provided between diaphragms 6 and 8. It will be understood, of course, that conduit 26 could lead directly from the pressure chamber to the space between the diaphragms. This by-pass conduit, in the present instance, is provided with a three-way cock 27 adapted when adjusted in the position shown in Fig. 1 to allow gas to be conducted from the pressure chamber through conduits 25 and 26 to the space 14 provided between the diaphragms and thus equalize the pressure above and below diaphragm 8. This three-way cock may also be adjusted to the position shown in Fig. 2, in which the flow of gas through by-pass conduit 26 is shut off and space 14 vented to the atmosphere through a passage way 28 of the valve and a vent pipe 29.

Having thus described the structure of this embodiment of my invention, the operation thereof, which should to a large extent

be obvious, is substantially as follows: With the three-way cock adjusted to the position shown in Fig. 1 of the drawings, the gas pressure above and below diaphragm 8 is equalized inasmuch as the spaces below and above the same are connected by means of conduit 25 and by-pass conduit 26. This adjustment of the parts will give the lowest outlet pressure inasmuch as the gas pressure within the valve chamber operates upon the interior surface of the smaller diaphragm 8 and the portion of the larger diaphragm 6 exterior thereto. When, however, the three-way cock is adjusted to the position shown in Fig. 2 of the drawings, the flexible wall of the pressure chamber is restricted to the size of diaphragm 8, the underside of the large diaphragm 6 being relieved of the pressure through vent pipe 29. This restriction of the size of the diaphragm will, of course, require a higher pressure of gas to distend it and therefore a higher outlet pressure will obtain.

It will accordingly be seen that I have provided a regulator well adapted to attain the several ends and objects of my invention in an exceedingly simple yet efficient manner. That my improved regulator will effect a great saving of gas is apparent when it is considered that in railway trains it is customary to light the several lamps of the train while the cars are in the yard or station and not yet open to the public. It is possible by employing my invention to reduce the gas pressure so as to have the lamps burn low or dim by merely turning the three-way cock to the position shown in Fig. 1 of the drawings. When it is desired to burn the lights to full capacity it is merely necessary to manipulate the three-way controlling cock. In both adjustments of the cock the gas pressure will be automatically regulated. In order to attain a similar object in gas lighting systems as heretofore provided, it has been necessary for a trainman or other employee to manipulate the valve of the individual lamps. It will also be readily seen that the size of the diaphragms may be proportioned to furnish the gas to the utilizing system at any desired degree of pressure. While I have shown my improved regulator in the above relation, it is apparent that the same may be advantageously employed in other relations although the same is particularly well adapted for use in the relation shown.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. In a pressure regulator, in combination, a casing having gas inlet and exit openings, a valve for controlling the flow of gas through the inlet opening, a plurality of diaphragms located in said casing, portions of which lie in contact with each other and other portions of which are spaced apart, a by-pass connecting the pressure chamber of said casing with the space between said diaphragms, and means for closing said by-pass and for venting the space between said diaphragms to the atmosphere.

2. In a pressure regulator, in combination, a casing having gas inlet and outlet openings, a valve for controlling the flow of gas through the inlet opening, a flexible diaphragm stretched across said casing, a second diaphragm stretched across said casing, portions of said diaphragms lying in contact and other portions thereof being spaced apart, and means whereby the gas pressure may be exposed to one of said diaphragms to the exclusion of the other, or to said first diaphragm and a portion of the other.

3. In a pressure regulator, in combination, a casing having gas inlet and outlet connections, a valve for controlling the admission of gas to the casing, a large diaphragm stretched across said casing and forming a wall of the pressure chamber thereof, a smaller diaphragm also stretched across said casing and connected with said first diaphragm, both of said diaphragms being connected with said valve, and means whereby the gas pressure may be exposed to the under side of said small diaphragm or to the under side of said small diaphragm and a portion of the under surface of said large diaphragm.

4. In a pressure regulator, in combination, a casing having gas inlet and discharge openings, a valve located in said inlet opening and adapted to control the flow of gas therethrough, a flexible diaphragm stretched across said casing to form a wall of the pressure chamber, a ledge extending inwardly from said casing beneath said diaphragm, a diaphragm secured to said ledge, means for clamping the central portions of said diaphragms together, an annular space being provided between said diaphragms, means whereby the pressure chamber may be confined to the walls of the casing and the portion thereof formed by said second mentioned diaphragm, and means whereby the same may be confined by the walls of the casing and said second diaphragm together with the portion of the first diaphragm out of contact therewith.

5. In a pressure regulator, in combination, a casing provided with gas inlet and exit openings, a valve for controlling the ad-

mission of gas to said casing through said inlet opening, a pair of diaphragms of different diameters independently clamped at their outer edges within said casing, means for securing together portions of the central areas of said diaphragms, said diaphragms being connected to said valve and adapted to operate the same, and means for connecting the space beneath one of said diaphragms with a space thereabove exteriorly of the joined portions of said diaphragms.

6. In a pressure regulator, in combination, a casing having gas inlet and outlet openings, a valve for controlling the admission of gas into said casing, a flexible diaphragm stretched across said casing and clamped at its outer edges to form one wall of the pressure chamber, a second flexible diaphragm secured to said first diaphragm, lying in contact therewith for a portion of its central area, and clamped at its outer edges to a ledge extending inwardly within the casing, said diaphragms near their outer edges being spaced apart, a gas exit conduit leading from said casing to the utilizing devices, a by-pass conduit connecting said last-named conduit with the space provided between said diaphragms, and a valve for controlling the flow of gas through said by-pass conduit.

7. In a pressure regulator, in combination, a casing having gas inlet and outlet connections, a valve for controlling the admission of air into said casing, said casing having an inwardly extending annular ledge, a diaphragm clamped at its outer edges to said ledge, a flexible diaphragm stretched across said casing above said first-mentioned diaphragm and clamped at its outer edges therein, means for causing portions of the central areas of said diaphragms, to lie in contact leaving an annular space between the two at their outer edges, and means for connecting the space below said first-mentioned diaphragm with the space between said diaphragms and for venting the latter space to the atmosphere.

In testimony whereof I affix my signature, in the presence of two witnesses.

GEORGE EGBERT HULSE.

Witnesses:
G. R. JEWETT,
E. E. ALLBEE.