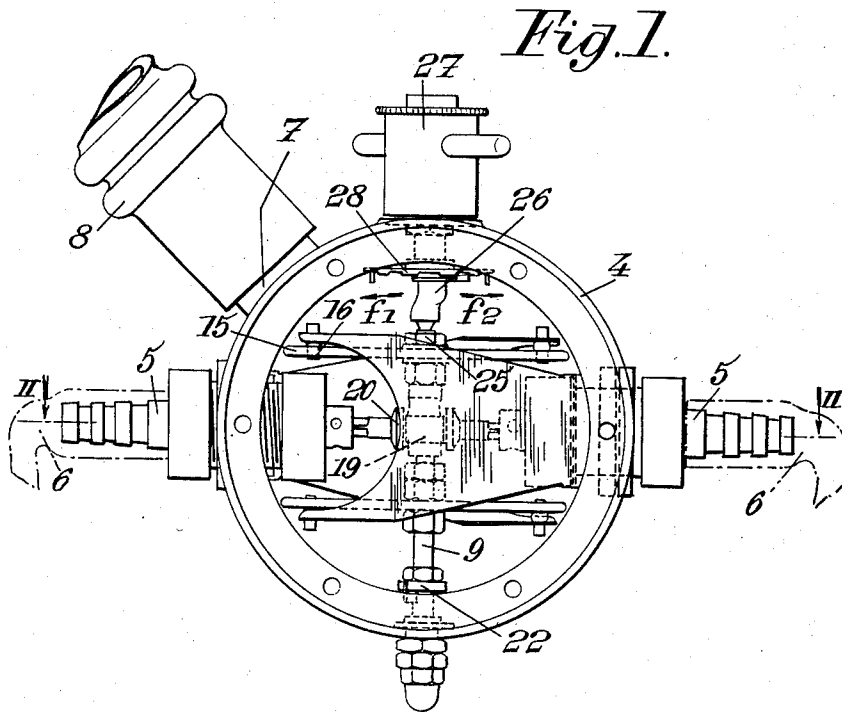
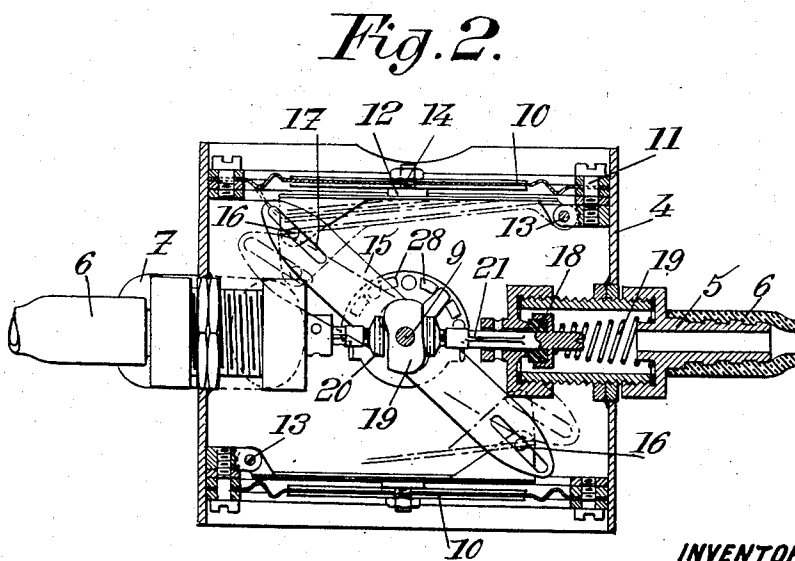


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GAS DELIVERY REGULATOR

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GAS DELIVERY REGULATOR

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2 Claims. (Cl. 137—64)

The present invention relates to gas delivery regulators of the kind in which gas delivery is regulated in response to variations of the pressure existing in a vessel and acting upon diaphragms or the like, as it is for instance the case when it is desired to supply a breathing mask, for anaesthesia or other applications, from a source of gas in response to the patient's inspiration.

Its chief object is to provide a distributor of this kind which is more accurate and more reliable in its working than up to now.

My invention consists chiefly in providing, to control the regulator operation, at least two parallel diaphragms acting symmetrically on a lever extending obliquely to said diaphragms from one side of one to the opposite side of the other and pivoted in its middle part, so as thus to form an astatic system uninfluenced by the movements or vibrations of the support or apparatus which carries it.

A preferred embodiment of my invention will be hereinafter described with reference to the accompanying drawings, given merely by way of example and in which:

Figs. 1 and 2 show, respectively in plan view (the diaphragm being supposed to be removed) and in axial section on the line II—II of Fig. 1, a gas delivery regulator made according to my invention.

It will be reminded that many gas delivery regulators, both of the diaphragm and of the piston type, were proposed up to this time. As a rule, such devices are rather sensitive so that they have the disadvantage of being influenced by the movements, in particular the vibrations, which may be transmitted from the outside to their casing.

In order to avoid this disadvantage, I make use, according to my invention, of a gas delivery regulator arranged in such manner that operation thereof is achieved by means of at least two deformable parts or diaphragms disposed opposite each other and acting on the respective ends of a lever pivoted at its middle point and extending diagonally with respect to said diaphragms so as thus to form an astatic system which is uninfluenced by movements transmitted from the outside.

The gas delivery regulator shown by the drawing includes a fluidtight box or casing 4 of cylindrical shape intended to be connected on the one hand to a source of gas under pressure through at least one nozzle 5 and one conduit 6 and on the other hand to a breathing mask, through a nozzle 7 and a conduit 8. I dispose, symmetrically, on either side of a central control shaft 9, two diaphragm devices which are substantially similar or include common parts, these devices being adapted to combine their movements so as to react to external influences in opposed directions, whereby the whole remains unresponsive to said influences.

In the construction shown by the drawings, such devices are constituted by two diaphragms 10 which close casing 4 in a fluidtight manner at 11, these diaphragms being respectively connected at 14 with two plates 12 pivotally mounted at 13 symmetrically with respect to shaft 9 so that these plates 12 are pivoted inwardly when diaphragms 10 are deformed inwardly. The movements of plates 12 are transmitted to shaft 9 by a lever 15 rigid with shaft 9 and connected with said plates through fingers 16 rigid with these plates and slidable at 17 in the respective ends of lever 15.

This transmission thus transforms the deformations of said diaphragms into pivoting movements of arm 15 and

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therefore rotations of shaft 9, as visible in particular on Fig. 2.

This rotation of shaft 9 is then transmitted to two check valves 18 subjected to the action of springs 19, mounted symmetrically on either side of shaft 9, which controls them through a cam 19 rigid with said shaft and acting upon push-pieces 20 rigid with said valves.

The gas enters, in the construction shown, by flowing along rod 21, which is for instance of triangular cross section. As valves 18 are mounted in symmetrical positions, they convey the gas through two conduits 6.

Advantageously, I further provide means for manually controlling the two check valves when so desired.

For this purpose, one of the ends of shaft 9 may be mounted at 22 in a bearing so as to have some degree of freedom, whereas the other end of this shaft is mounted on a crank shaft 26 rotatable by means of a manual control member 27, whereby said end can undergo certain displacements in direction f_1 or in direction f_2 , making it possible to control either of push-pieces 20, without involving a movement of rotation of said shaft 9 and of its cam 19.

Manual control member 27 may be provided at 27 with stop means capable of fixing various positions of operation corresponding to different flow rates, in combination with a graduation or with marks traced on the outside of the casing opposite control member 27.

Of course, instead of introducing the same fluid or gas through both check valves 18, I might also introduce therethrough two distinct fluids. In this case, the above mentioned manual control means, including crank 26 or the like, would further permit of determining the relative proportions of the two fluids since, by operating this crank one of the check valves is opened to a greater degree than the other, and this without preventing automatic control through shaft 9 and cam 19.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. A gas delivery regulator which comprises, in combination, a fluidtight box constituted by a rigid side wall provided with a hole therein and two substantially identical flexible diaphragms forming the end walls of said box and located opposite each other, said two diaphragms being symmetrical with respect to each other about an axis transverse to said side wall, gas inlet conduit means opening into said box through said side wall, a valve mounted in said conduit means for controlling the gas inflow therethrough, a lever oblique to said diaphragms pivoted at its middle part in said box about said axis of symmetry of said diaphragms, means operatively connecting the two ends of said lever with said two diaphragms respectively for moving each lever end inwardly in response to an inward displacement of the corresponding diaphragm, and means operatively connected with said lever for opening said valve in response to a pivoting movement of said lever in the direction which moves the respective ends thereof inwardly.

2. A gas delivery regulator which comprises, in combination, a fluidtight box constituted by a rigid side wall provided with a hole therein and two substantially identical flexible diaphragms forming the end walls of said box and located opposite each other, said two diaphragms being symmetrical with respect to each other about an axis transverse to said side wall, gas inlet conduit means opening into said box through said side wall, a valve mounted in said conduit means for controlling the gas inflow therethrough, a lever oblique to said diaphragms pivoted at its middle part in said box about said axis of symmetry of said diaphragms, means operatively connecting the two ends of said lever with said two diaphragms respectively for moving each lever end inwardly in response to an inward displacement of the corresponding diaphragm, and a cam carried by said lever, in operative contact with a part of said valve, to open it in response

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to a pivoting movement of said lever in the direction
which moves the respective ends thereof inwardly.

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