June 2, 1936. C. B. McELWAINE 2,042,906

BALANCED PRESSURE REGULATOR

Filed July 23, 1935

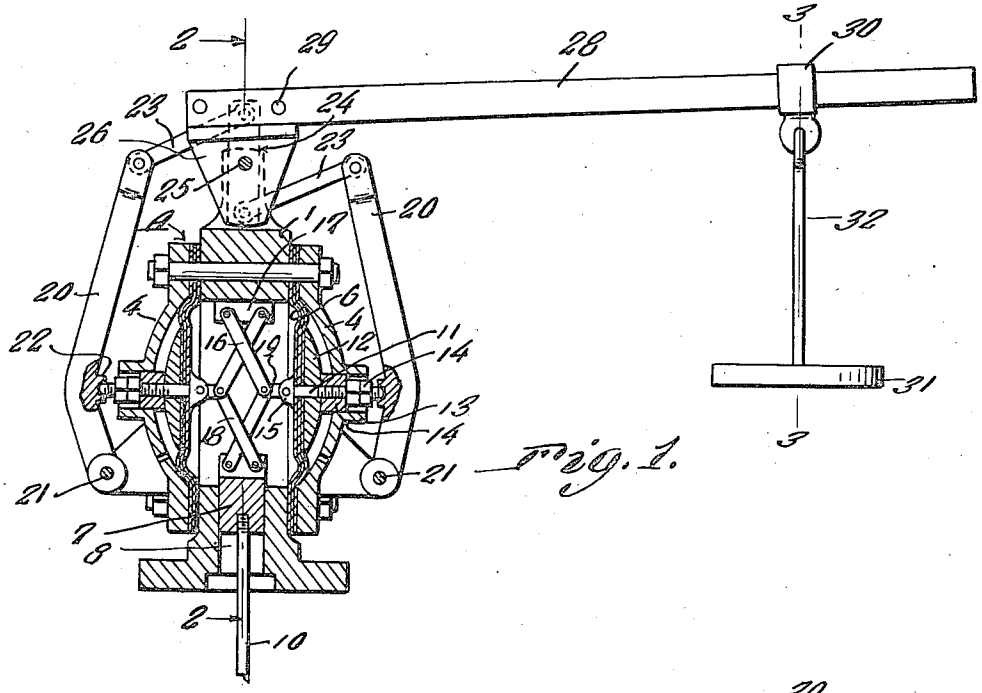


Fig. 1.

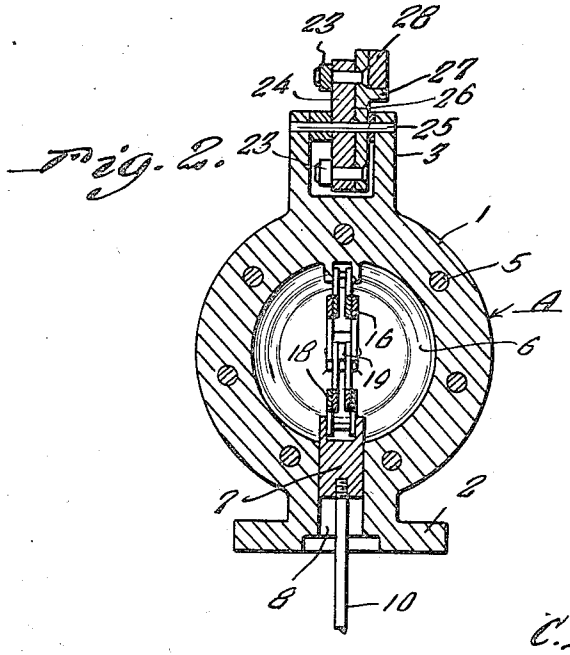


Fig. 2.

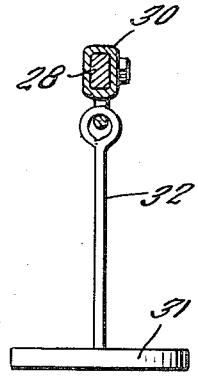


Fig. 3.

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BALANCED PRESSURE REGULATOR

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2 Claims. (Cl. 137—156)

This invention relates to a balanced pressure regulator, the general object of the invention being to provide means for resisting the outward movement of the diaphragms of a pressure regulator in which the internal pressure causes the diaphragms to move outwardly to close or partly close a controlling valve.

This invention also consists in certain other features of construction and in the combination and arrangement of several parts, to be hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawing wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a vertical sectional view through the regulator with the external pressure applying means in elevation,

Figure 2 is a section on line 2—2 of Figure 1,

Figure 3 is a section on line 3—3 of Figure 1.

In this drawing, the letter A indicates a casing which is composed of substantially circular part 1 having the base 2 and the upstanding ears 3 at its top and the outwardly bowed side plates 4 which are fastened to the part 1 by the bolts 5. The pair of diaphragms 6 are held in place against the sides of the part 1 by the clamping action produced by the plates 4 when the bolts are tightened. A guide member 7 is slidably arranged in the opening 8 which extends from the bottom of the casing through the base and this guide is connected to a rod 10 which is connected to an upwardly closing valve. Of course, the base 2 is connected to the valve casing by a passage so that the fluid under pressure passing through the valve casing will form pressure in the diaphragm casing as the pressure can pass by the guide 7.

A bolt 11 passes through each diaphragm and through a plate 12 which rests against the outer face of the diaphragm and thru a boss 13 on each plate 4. Nuts 14 are threaded on the outer part of the bolt and clamp the diaphragm and plate between themselves and the internal head 16 of the bolt. A pair of toggle levers 16 have their upper ends pivoted to a projection 17 in the upper part of the casing A, and a second pair of toggle levers 18 have their lower ends pivoted to the top of the guide 7, the other ends of the two sets of levers being connected by links 19 to the heads 15 of the bolts.

Each lever is of the double construction shown in Figure 2, with the two parts of one lever passing between the two parts of the companion lever.

Thus it will be seen that when the pressure in the conduit becomes excessive, some of the compressed fluid will enter the casing A and force the diaphragms apart and this will cause the toggle assembly to raise the guide 7 and thus close or partly close the valve, which is connected to the rod 10.

A pair of levers 20 have their lower ends pivoted to the casing as shown at 21, these levers having recessed bosses 22 for receiving the outer ends of the bolts and the upper ends of the levers are connected by the links 23 with the rocker arm 24 pivoted between the projections 3, by the pin 25. This pin passes through the center of the rocker arm, and one of the arms or links 23 is pivoted to the lower end of the arm and the other to the upper end thereof as shown. A plate 26 is fastened to one side of the rocker arm and has an outwardly extending flange or ledge 27 thereon spaced from its upper end which forms a seat for a lever 28 which is fastened to the upper part of the plate 26, as shown at 29. A collar 30 is adjustably connected with the outer part of the lever and supports a weight 31 which has a stem 32 provided with an eye which passes through an eye on the collar 30 as shown in Figure 3.

Thus it will be seen that the weighted lever 28 acts through the rocker arm 24, the links 23 and the levers 20 to resist outward movement of the diaphragms and this resistance can be increased or decreased by adjustment of the weight.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

Having thus described the invention what is claimed as new is:

1. In combination with a pressure regulator including a casing having a pair of diaphragms therein moved outwardly by pressure, members connected with the diaphragms and extending outwardly, a pair of levers located exteriorly of the casing and engaging the outer ends of said members, a rocker arm, a link connecting one lever to the rocker arm to one side of the pivot thereof, a link connecting the other lever to the

other side of the pivot thereof, and a weighted lever connected with the rocker arm for resisting outward movement of the levers.

2. In combination with a pressure regulator casing including a pair of vertically arranged diaphragms moved outwardly by pressure within the casing, members connected with the diaphragms and extending through the sides of the casing, a pair of levers pivotally supported at their lower ends and having portions engaging the outer ends of said members, a rocker arm pivoted intermediate its ends to the top of the casing, a link connected to the lower end of the rocker arm and to the upper end of one lever, a link connecting the upper end of the rocker arm and to the upper end of the other lever, a plate connected with the rocker arm, a lever connected with the top of the plate, and a weight adjustably arranged on the lever.

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