No. 675,061.

Patented May 28, 1901.

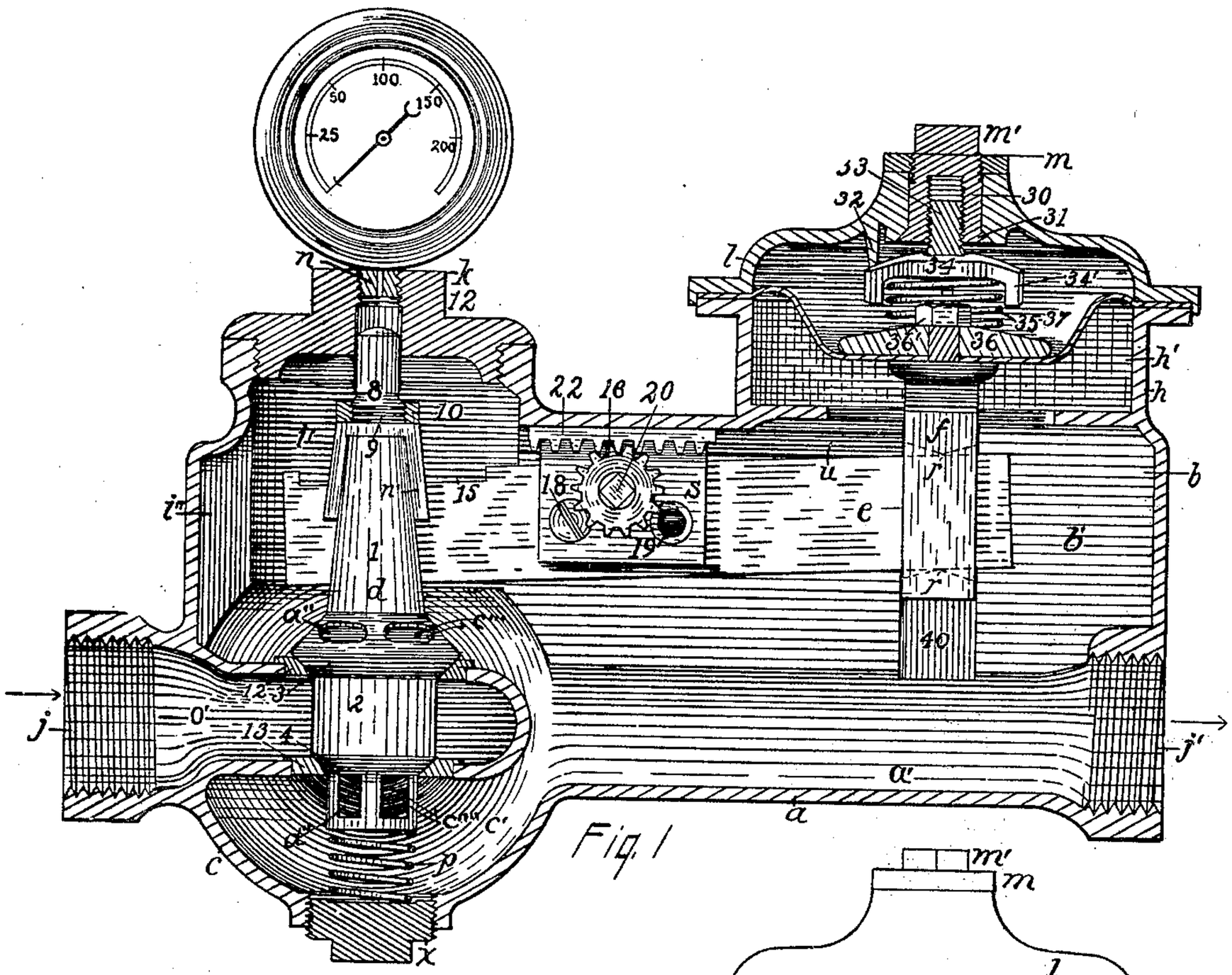
I. J. GRIFFIN.

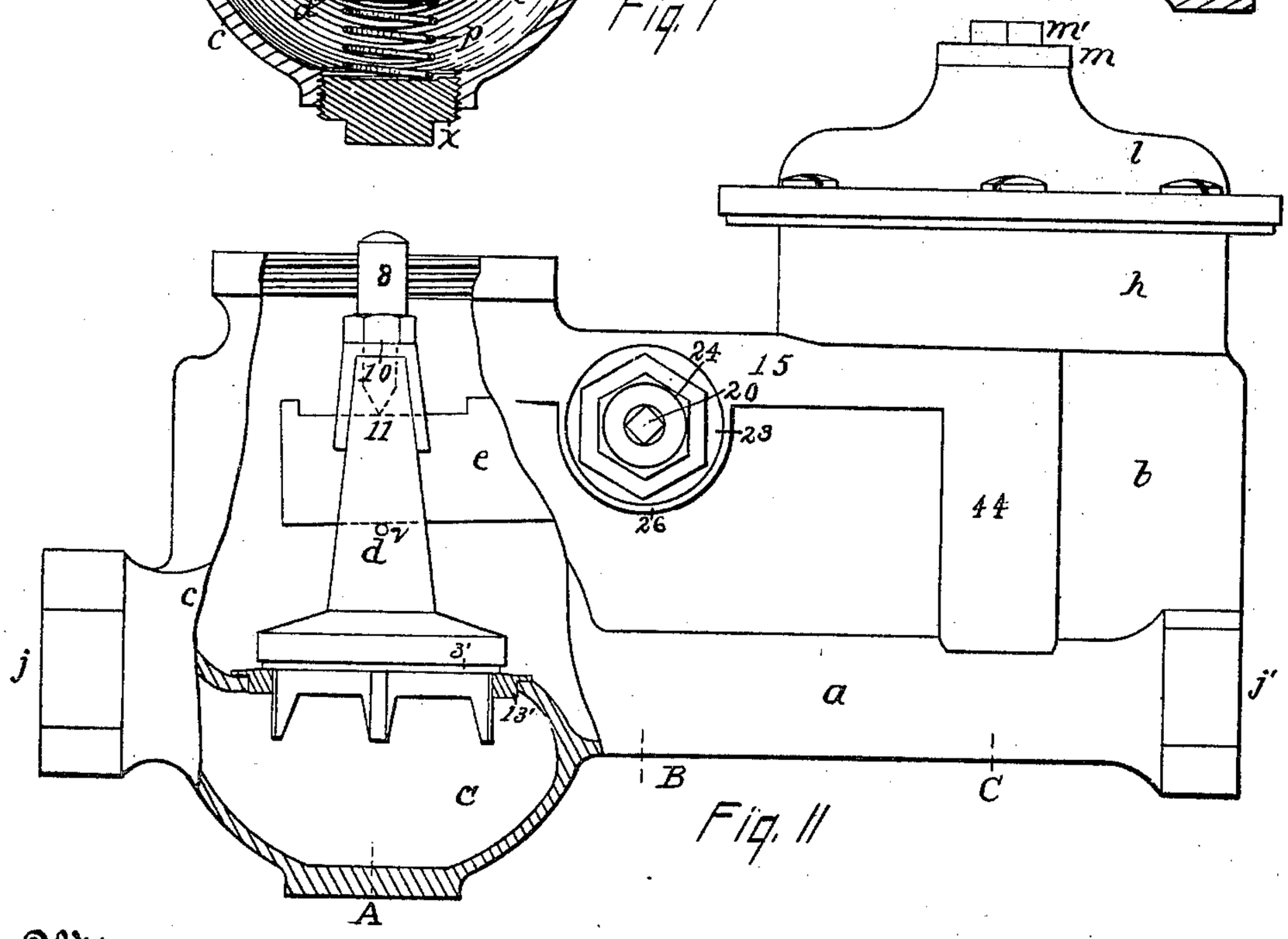
PRESSURE REGULATOR.

(Application filed Mar. 27, 1896.)

(No Model.)

2 Sheets—Sheet 1.





A

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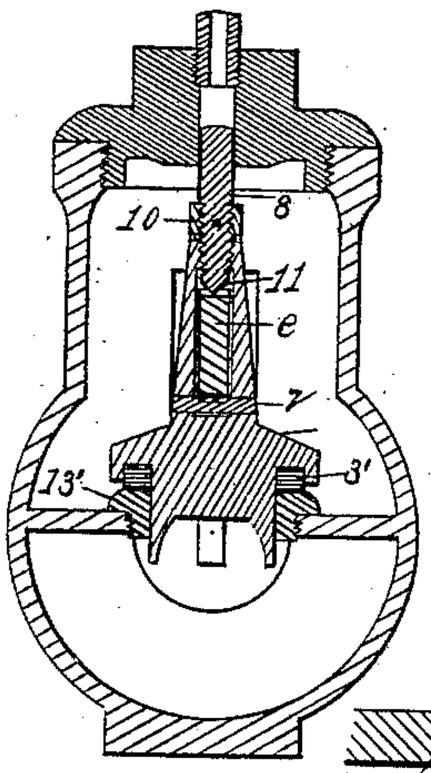

Fig. III

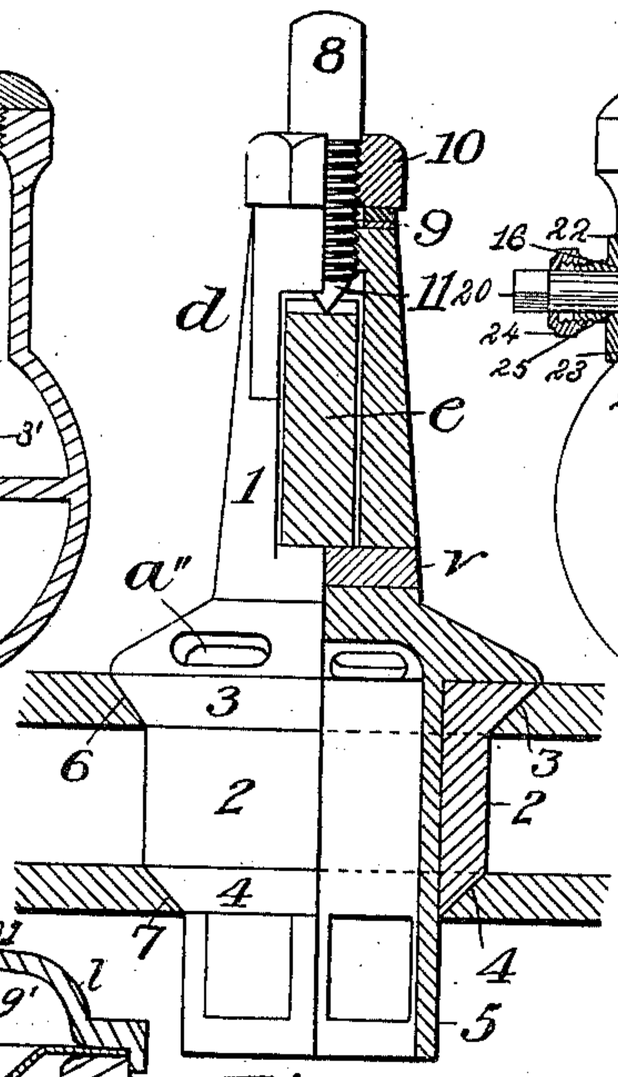

Fig. 9.

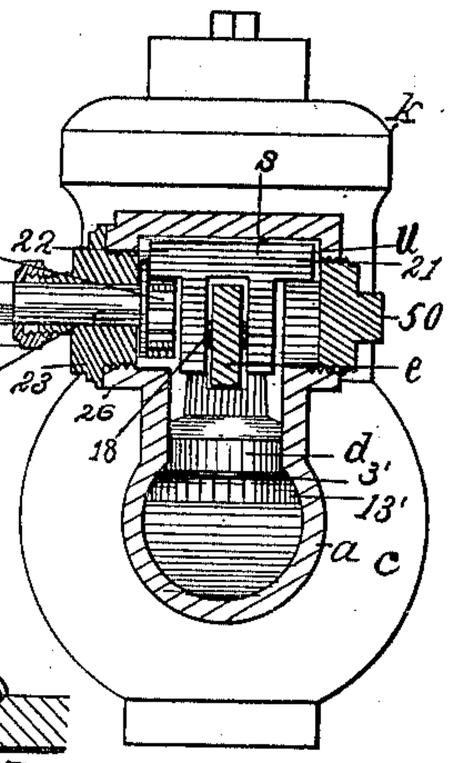

Fig. IV

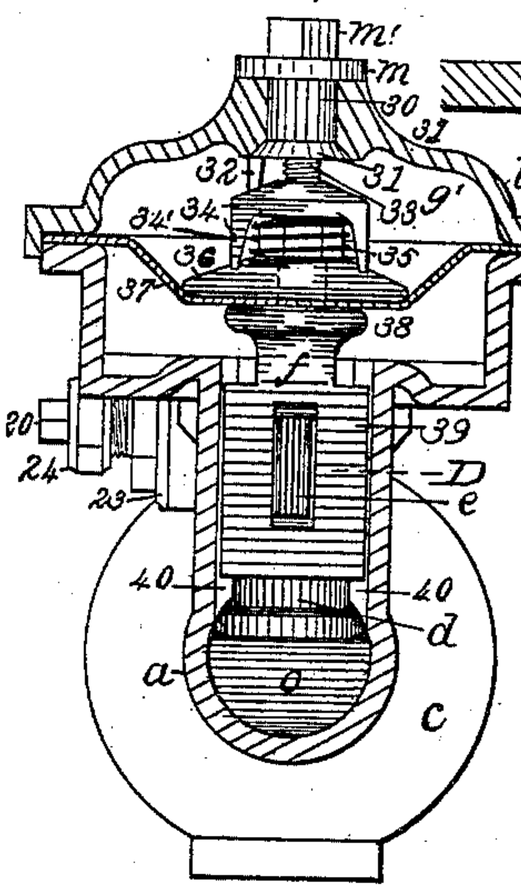

Fig. V

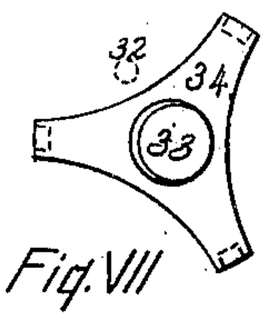

Fig. VII

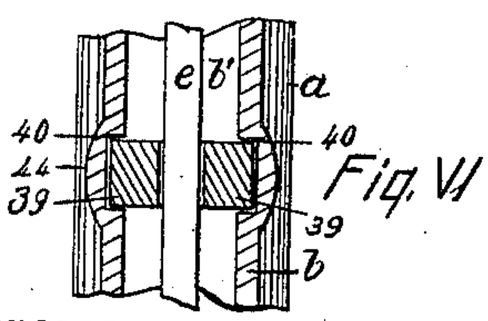

Fig. VI

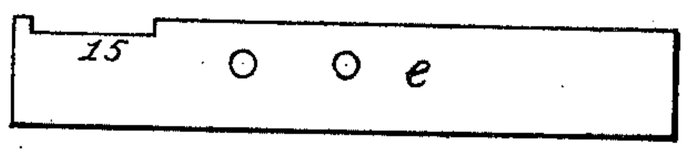

Fig. VIII

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IRA J. GRIFFIN, OF SING SING, NEW YORK.

PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 675,061, dated May 28, 1901.

Application filed March 27, 1896. Serial No. 585,112. (No model.)

To all whom it may concern:

Be it known that I, IRA J. GRIFFIN, a citizen of the United States, and a resident of Sing Sing, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Pressure-Regulators, of which the following is a specification.

My invention relates to a class of valves called "pressure regulators and reducers," and has for its object positive and reliable means for the purpose that may be easily adjusted to a wide range of pressures. The objects are attained by the means set forth in the specification and the accompanying drawings, which together constitute a full and accurate description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The drawings cover three sheets, and like characters refer to like parts throughout the several views.

Figure I is a transverse section showing all the internal and working parts of the regulator. Fig. II shows its outer appearance and the employment of a single-seated valve. Fig. III is a vertical cross-section through line A, Fig. II. Fig. IV is a vertical cross-section through line B, Fig. II. Fig. V is a vertical cross-section through line C, Fig. II. Fig. VI is a horizontal cross-section through line D, Fig. V. Figs. VII and VIII are details to be described. Fig. IX represents the construction of the double-seated valve as shown in Fig. I.

By reference to Fig. II it will be observed that the body of the regulator begins with a valve portion *c*, resembling the globe of a globe-valve; but it has a tubular elongation *a*, the two ends *j j'* terminating in the usual threaded form for pipe connections, as in Fig. I. The globe part *c* extends upward to form a chamber *i'* large enough to give ample room for the valve extension *d* and end of the lever *e*. The top is closed by a cap *k*, Fig. I. A narrow extension *i'* of this chamber will admit a projection of the lever *e* into the chamber *i''*. A contracted portion *b* of the body extends upward from the tube *a* and unites with the part *i* and also with the diaphragm-chamber *l h*, forming a chamber *b'*, within which are the parts operated by the diaphragm 37. The chambers *a'*, *b'*, *h'*, *i'*, and *c'*, Fig. I, are all united; but in Fig. II when a single-seated valve is used the part *c'* is by the partition *o* made to correspond with the inlet *o'* in Fig. I.

The inlet to the regulator is through the passage *j o'*, Fig. I, and through *j c'*, Fig. II. The valve *d* is kept closed normally by the lever *e*. An upper extension 1 of the valve receives the lever through it. The lever has a fulcrum at 18, Fig. I, and the right-hand end of the lever is actuated by the diaphragm 37 through the plunger *f*. The upper end 8 of the valve-stem passes through a hole 12 in the cap *k*, by which it is steadied in its movement. The gage shown is not always a requirement, in which case it is replaced by a plug in place of the nipple *n*, Fig. I.

The valve-seats 13 14, Fig. I, and 13', Fig. II, are made preferably of composition, while the bearings of the valves 3 and 4, Fig. I, and 3', Fig. II, are of some elastic material, such as what is known as "Jenkin's packing." In certain uses a spring *p* is employed beneath the valve, as shown in Fig. I, by which a more sensitive action is obtained. The diaphragm 37 is held in place by the conical cover *l*, bolted over it to the bowl *n*. The collar 36, with the nut 36' (see Fig. I) above, secures the diaphragm to the plunger *f*, as indicated in Figs. I and V. The lever *e* passes through said plunger *f*, as in Figs. I and V, the lever finding bearing-points *r r*, Fig. I. The swell 4 4 on the outside of the part *b*, Fig. II, is to afford grooves within the chamber *b'* for the plunger *f*, as in Figs. V and VI. The latter figure is a cross-section through line D of Fig. V and shows that the edges 39 39 of the plunger *f* slide in grooves 40 40, which steady the plunger and allow it only vertical movement. The piece or what I call the "tripod" 34 hangs above the diaphragm by means of its threaded end 33, Fig. V. It serves a double purpose. First, the drooping guards 34' retain the spring 35 in its place, and, second, the piece may be depressed until the said guards come in contact with the collar 36, so that if occasion requires it may be screwed down to overcome the pressure against the under side of the diaphragm and so hold the valve *d* open, admitting full pressure through the valve.

In Fig. I it will be seen that the screwed end 33 of the tripod 34 enters the stem 30. Said stem, as will be seen by reference also to Fig. V, has a beveled seating 31, similarly to a valve-seat, at its lower end. On its end projecting through the cover *l* a ring *m* is secured to it, so that it is held closely to its place, but may be readily turned by means of a wrench on the squared head *m'*. Within the cover a projection 32, Figs. I and V, is secured to the top of the cover or is usually cast integral with it and extends downward between the arms of the tripod, so that the tripod cannot turn when the stem 30 is turned. The result is that the turning of said stem will cause the raising or lowering of the tripod. Fig. VII is a top view of the tripod, and the circle of broken lines 32 represents the position of the projection relative to the arms of the tripod.

Reference to Figs. I and IV will make plain the features of the adjustable fulcrum for the lever *e*. An end view of a movable piece or hanger *s*, Fig. IV, shows that it has flanges 21 22, by which it hangs in grooves *u*, provided inside the chamber *b'*. Between the depending sides of the hanger the lever *e* is suspended by means of the screw 18, which is the fulcrum on which the lever swings. The bearings the lever *e* has within the stem of the valve *d* are shown in Fig. III, a screw-point 11 just touching it, while it rests on a steel pin *v* at the bottom, Figs. II and III. Between these two bearings and the bearings *r r* in the plunger *f*, Fig. I, the lever is movable longitudinally to the limit of the notch 15 in the lever, Figs. I, II, and VIII. The flange 22 is provided on its under side with rack-teeth, as in Fig. I. A toothed pinion 16 gears into this rack and is supported on a stem 25, (see Fig. IV,) which has a bearing through a nut 23, screwed into a side projection 26 of the body. The nut is provided with a stuffing-box cap 24, and the outer end of the stem is squared for wrench, as at 20. The swell 45, Fig. II, on the outside of the body is occasioned by the provision of the hanger-grooves on the inside. It is plain that by turning the pinion the fulcrum carrier or hanger may be moved, with the fulcrum, toward or away from valve *d*, thus varying the leverage the diaphragm will have on the valve. Thus, as represented in Fig. I, the fulcrum 18 is movable within the limits of notch 15 up to the center of the pinion. If it is desirable to shift this fulcrum to the right of the pinion, the screw 18 is removed to the hole 19, when the variations within the same limits may be effected on that side, of the center of the pinion. As shown in Fig. VIII, the lever *e* has two holes to admit of this change.

Access to the screw 18 may be had by removing the cap 23, or the screw may be put in from the reverse side, in which case access to it is through an opening on that side, shown in Fig. IV as closed with a plug 50.

The double-seated valve is shown in Fig. IX in enlarged form. Its especial feature is the form of its construction. The body of the valve is of metal and is hollow, having cored openings *a'' a'''*, Fig. I, so that fluids will circulate through it, as indicated by the arrows *c''' c''''*, Fig. I. The ring 2 comprises both valve-seats 3 and 4 and is of one piece. It may be either of metal or any suitable valve material and is adapted to fit tightly on the metal body, as indicated. By making them in this manner repairs are easily effected. The screw 8 passes through the upper end of the valve, the point 11 just touching the lever *e*, which is thus held between the screw-point and the steel pin *v*. The valve-bearings 6 7 are here shown to be in the metal of the regulator-body, while in the other figures the seats are shown to be screwed in.

The operation of the combinations thus described will be manifest. The greater area of the diaphragm as compared with that of the valve *d*, combined with its leverage on said valve through the lever *e*, will have the effect of closing the valve *d* with a less pressure than may be against the said valve. The pressure that will cause movement in the diaphragm may be regulated by means of compression on spring 35 through the stem 30, and the power this pressure may have through the lever *e* is adjustable by means of the rack and pinion, as described. By means of the two springs 35 and *p* and the movable fulcrum it is possible to obtain desired results under all conditions.

I claim—

1. In a pressure-regulator substantially as shown and described, means for adjusting the diaphragm consisting of a tripod inclosing a spring above the diaphragm, the end of the tripod screwing into a stem adapted to be turned outside of the casing, whereby the tripod may be raised or lowered from without the casing, a collar 36 bearing on the upper side of the diaphragm and fastened to the plunger *f*, and a projection from within the casing engaging with the tripod to prevent its turning, substantially as herein shown and described.

2. In a double-seated valve for a pressure-regulator the combination of a metallic body having a free waterway through it longitudinally with a removable shell on said body having valve-faces integral with the shell, substantially as herein shown and described.

3. The combination substantially as shown of a movable hanger *s*, the rack and pinion coacting with and adapted to adjust said hanger substantially as described, lever *e* supported in said hanger by means of the fulcrum-lever 18 and additional holes in the lever and hanger by means of which the fulcrum may be shifted, substantially as and for the purposes set forth.

4. In a double-seated valve for a pressure-regulator the combination of a metallic body

having a free water-passage through it longitudinally, a yoke extension to receive an actuating-lever, an adjusting-screw in said extension, and a removable shell on said body having valve-faces integral with the shell, substantially as herein shown and described.

5. The combination in a pressure-regulator of an elongated valve-body containing a shut-off valve at its inlet end, said valve closing against the pressure and having a yoke connection with a lever contained and fulcrumed within said body, a diaphragm within an enlargement of said body at the outlet end of said body, said diaphragm yoked to one end of said lever, within said body all substantially as shown, a spring and tripod above said diaphragm with means substantially as shown for adjusting said spring from without said diaphragm-chamber, means comprising a rack and pinion substantially as shown for shifting said lever from without said body, and a removable fulcrum for said lever and extra fulcrum-holes in said lever, all substantially as herein shown and described.

Signed at Sing Sing, in the county of Westchester and State of New York, this 17th day of March, A. D. 1896.

IRA J. GRIFFIN.

Witnesses:
FRANK L. YOUNG,
WALTER SMITH.