

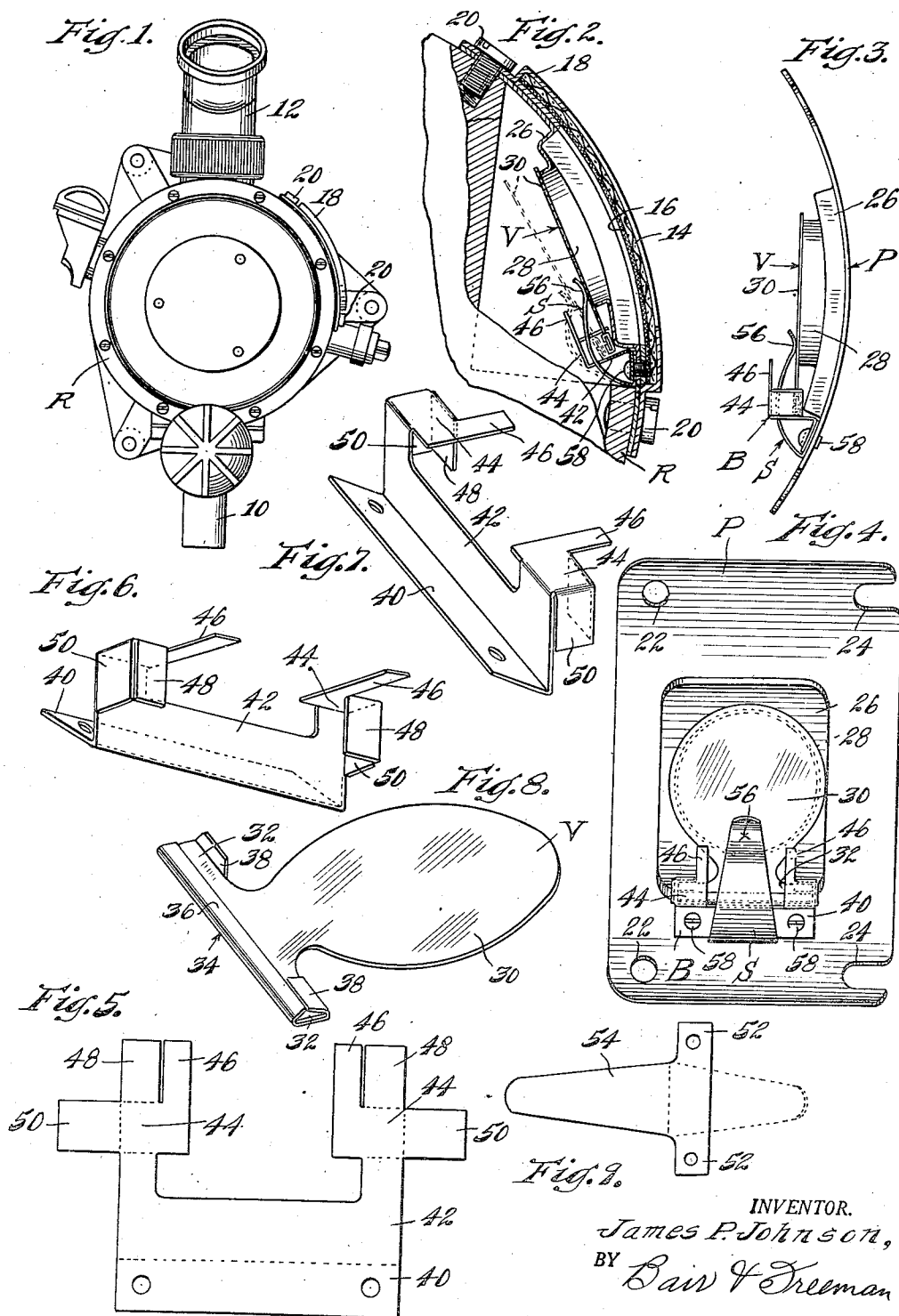
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CHECK VALVE

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CHECK VALVE

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My present invention relates to a check valve which is particularly adapted for oxygen regulators and for interposition between an air intake screen and the housing of the regulator.

One object of the invention is to provide a check valve assembly which is inexpensive to manufacture and light in construction, and which can be interposed between the intake screen of a regulator housing and the housing itself without interfering with the mounting of the screen in any manner.

Another object is to provide an air intake check valve which includes a mounting plate with all of the valve mechanism mounted thereon so that a unit is provided which can be interposed between the screen and the housing.

Still another object is to provide the mounting plate with an embossed central portion terminating in an annular valve lip against which a disc-like vane of mica or the like is adapted to be seated by a light leaf spring, the leaf spring being mounted on the mounting plate and engaging the vane within the outline of the valve lip.

A further object is to provide a means to anchor the vane, yet prevent its dislocation without interference with the action of the vane when it is opened by the intake of air into the oxygen regulator.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, wherein:

Fig. 1 is a front elevation of an oxygen regulator with my air intake check valve applied thereto;

Fig. 2 is a vertical sectional view through the air intake screen, the check valve structure here disclosed and a portion of the regulator housing;

Fig. 3 is a side elevation of the air intake check valve per se;

Fig. 4 is an inside elevation thereof looking toward the right in Fig. 3;

Fig. 5 is a layout view of a pivot bracket used in the construction of the assembly;

Figs. 6 and 7 are perspective views of the bracket after its formation to the proper shape;

Fig. 8 is a perspective view of the vane of the check valve; and

Fig. 9 is a layout view of the leaf spring which is used to normally retain the valve seated.

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On the accompanying drawing I have used the reference character R to indicate an oxygen regulator of the automatic type for mixing oxygen from an inlet 10 and air together, and discharging the mixture through an outlet 12 to a gas mask or the like. The air is taken in through an intake screen comprising a heavy metal screen 14 and a fine one 16, held in a suitable frame 18. The frame is normally secured to the housing of the regulator R by screws 20.

My air intake and check valve assembly comprises a mounting plate P, a vane V, a bracket B, and a spring S. These are assembled together, as shown in Fig. 3, and the assembly interposed between the intake screen frame 18 and the housing of the regulator R, as shown in Fig. 2, whereby the intake check valve assembly is mounted as a unit without interfering with the operation of the screen.

The plate P has a pair of openings 22 and a pair of slots 24 to receive the screws 20. Adjacent the center of the plate a raised portion 26 is embossed and terminates in an annular valve lip 28. The embossed portion 26 prevents restriction of the air through the screens 14 and 16.

The vane V is preferably formed of mica having a disc portion 30 and a pair of pivot portions 32. The pivot portions 32 are reinforced by a sheet metal reinforcement 34 having a flange 36 and a pair of flanges 38. The flanges 38 are bent over, as shown adjacent the bottom of Fig. 3, for assembly, the upper flange 38 in this figure being shown before bending to its final position.

The bracket B is made of sheet metal cut to the shape shown in Fig. 5, and includes flanges 40, 42, and a pair of flanges 44. The flanges 44 extend as at 46 to form stop arms, and two sides of the flanges 44 have depending flanges 48 and 50 which, together with the flange 42, form a pair of box-like pivot receiving portions for the pivots 32 of the vane V.

The spring S is initially shaped as shown in Fig. 9, with a pair of perforated ears 52 and an arm 54. The arm 54 is adapted to contact with the vane V at the point marked 56 in Figs. 3 and 4, whereas the perforated ears 52 are anchored against the flange 40 and the flange against the plate P, by a pair of screws 58. Thus the vane, bracket and spring are assembled in relation to the mounting plate, and a complete unit is provided with the spring S bearing against the vane within the outline of the valve lip 28. The spring is relatively light, and the pivots 32 are loosely mounted in the box-like elements formed by the

flanges 42, 44, 48 and 50 so that the pivots may freely float therein, and the vane is thereby free to move without restriction as to the dotted line position in Fig. 2 when air is taken into the regulator by the user thereof inhaling.

From the foregoing specification it will be evident that I have provided a relatively simple air intake check valve assembly which can be assembled and tested as a unit, and readily installed in an oxygen regulator by interposition between the intake screen and the housing thereof. The device is relatively light in weight and effectively permits the entry of air into the regulator, but prevents air or oxygen from leaving it through the air intake. The edge of the valve lip 28 may be finished flat, and the mica disc will effectively seat thereagainst under the light pressure of the spring S. When inhalation takes place, however, the vane will readily be drawn away from the valve lip in opposition to the spring and permit the intake of air with minimum reclosing movement when air suction stops. The pivots for the vane freely float in the box-like elements of the bracket B and are protected with a metallic reinforcement which eliminates wear on the mica. The valve allows a substantially large air flow with a minimum of restriction, and will withstand vibration due particularly to the light character of the vane V whereby inertia is reduced to a minimum and results in the elimination of the disc chattering on the seat under the force of vibration as encountered in an airplane. The vane is definitely located with respect to the valve lip by the pivot and box-like element combination, and the spring S merely bears against the disc 39 without the necessity of piercing the disc to form a positive connection between the two. This reduces the amount of wear and eliminates a leak at this point.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

I claim as my invention:

1. In a check valve of the character disclosed, a mounting plate having a central opening terminating in a circular valve lip, a relatively thin disc-like vane adapted to seat against said valve lip, a leaf spring having a portion engaging said vane within the outline of said valve lip to normally retain said vane seated against the lip, a bracket having a first flange, a second flange extending from one edge thereof and a pair of flanges at the terminal of said second flange extending substantially parallel to said valve lip and spaced therefrom, and flanges extending downwardly from said pair of flanges and cooperating therewith and with said second flange to form box-like pivot receiving elements, said third flanges terminating in stop arms extending beyond the box-like elements to limit opening movement of said vane, said vane having a pair of pivot ears loosely received in said box-like elements to permit free floating movement therein when the vane is opened with relation to the valve lip by the intake of air through the opening, said spring and said first flange being secured to said mounting plate.

2. In a check valve structure, a mounting plate having a portion defining an opening and terminating in a valve lip, a disc-like vane against said valve lip, a spring connected with said mounting plate and having a portion engaging said vane within the outline of said valve lip to normally retain said vane seated against the lip, a bracket having a mounting flange, an outstanding flange and a pair of flanges spaced from said valve lip, and flanges downwardly from said last flanges and cooperating therewith and with said outstanding flange to form box-like pivot receiving elements, said vane having a pair of pivot ears loosely received in said box-like elements.

3. In a check valve of the character described, a mounting plate having a central portion defining an opening and terminating in a circular valve lip, a vane against said valve lip, a spring connected for seating said vane thereagainst, a bracket having a mounting flange, an outstanding flange and a pair of aligned flanges, and flanges downwardly from said pair of flanges cooperating therewith and with said outstanding flange to form pivot receiving elements, said vane having a pair of pivot ears loosely received in said pivot receiving elements to permit free floating movement therein when the vane is opened with relation to the valve lip.

4. In a check valve structure of the kind disclosed, a mounting plate having a central portion defining an opening and terminating in a valve lip, a disc of mica or the like constituting a vane for seating against said valve lip, a leaf spring having one end connected with said mounting plate and its other end engaging said vane to seat it on said valve lip, said vane having a pair of pivotal portions, sheet metal reinforcements surrounding said portions, and a bracket having a pair of box-like, pivot-receiving elements receiving said pivot ears and permitting free floating of the ears therein without restriction to the opening movement of the vane relative to the valve lip upon flow of air through the lip.

5. In a check valve structure, a plate having a valve lip, a disc of mica or the like for seating against said valve lip, a spring for seating it, said vane having a pair of pivotal portions, sheet metal reinforcements surrounding said portions, and a pair of pivot-receiving elements receiving said pivot ears and permitting free floating of the ears therein.

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