Nov. 18, 1924.

M. YABLICK

1,515,645

VALVE

Filed April 14, 1922

Fig. 1.

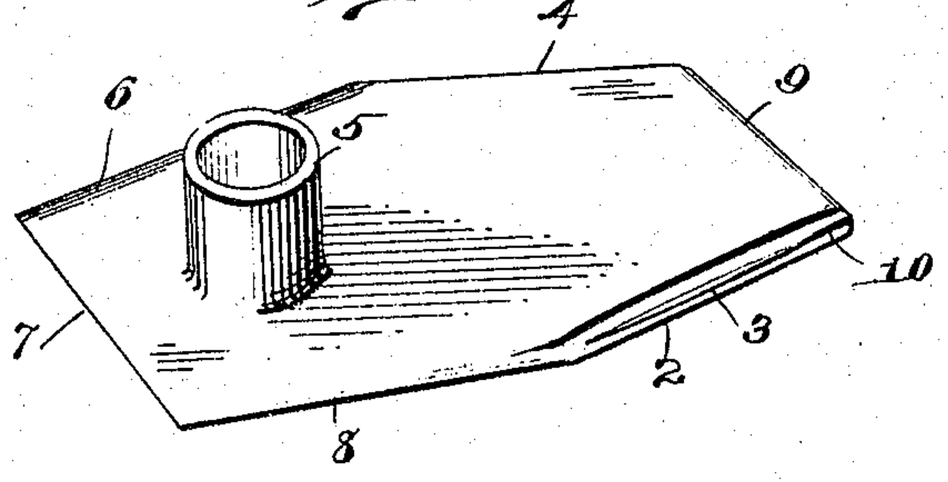


Fig. 2.

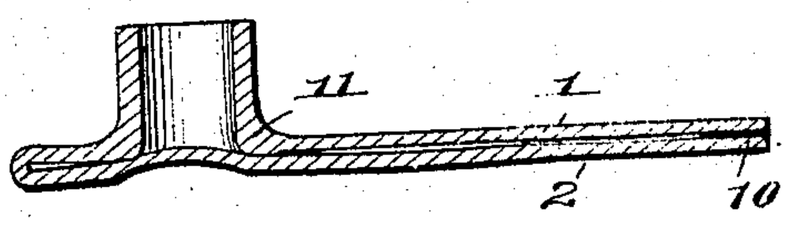


Fig. 3.

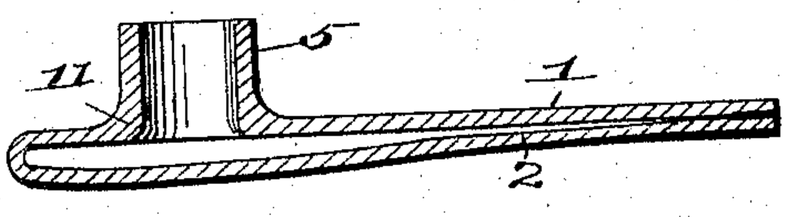


Fig. 4.

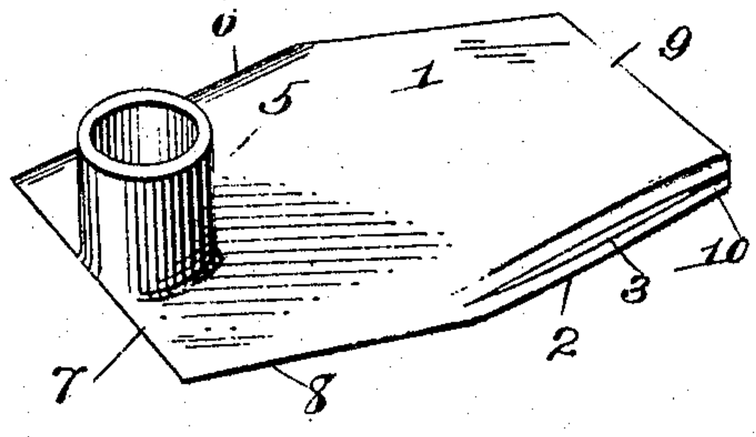


Fig. 5.

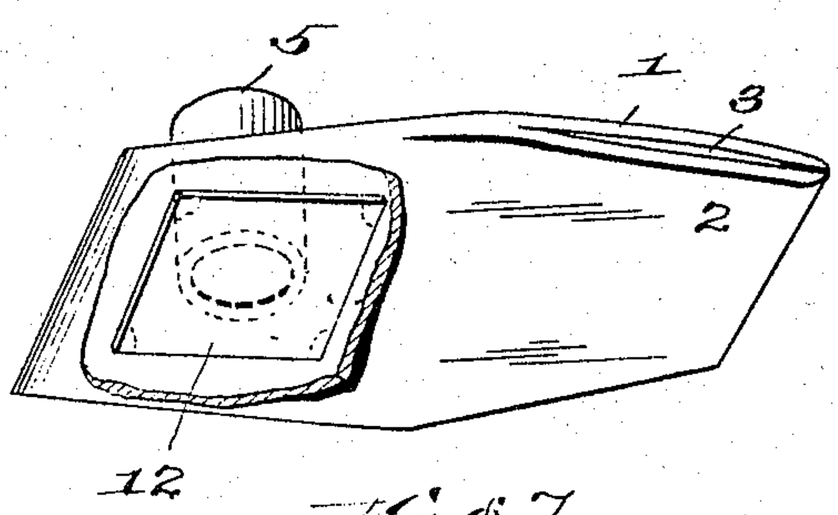


Fig. 6.

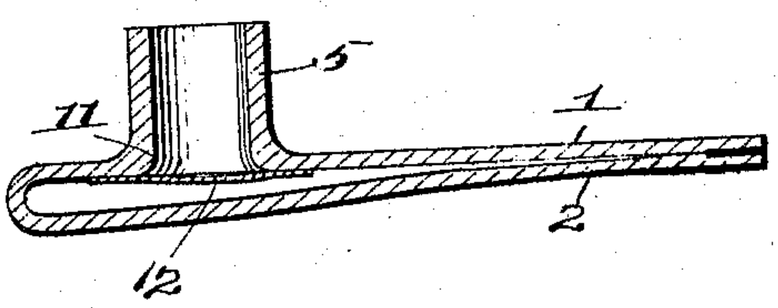


Fig. 7.

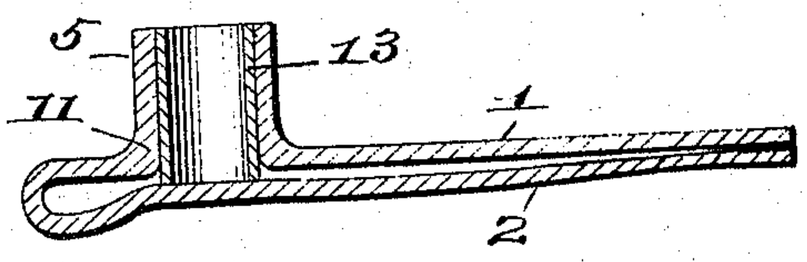
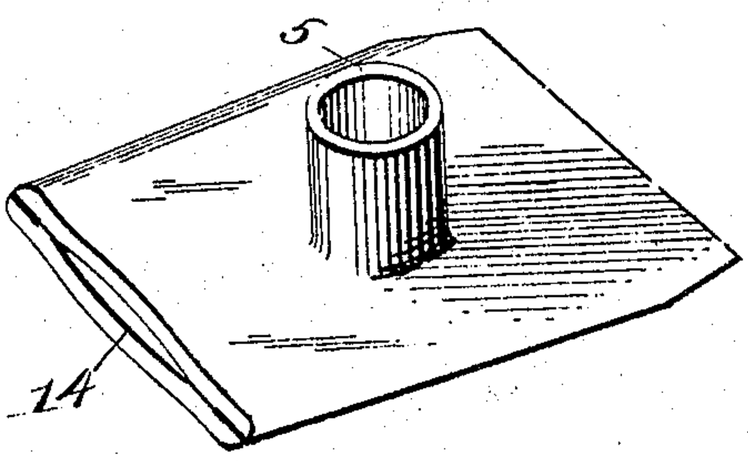


Fig. 8.



Inventor:
Max Yablick

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UNITED STATES PATENT OFFICE.

MAX YABLICK, OF NEWARK, NEW JERSEY.

VALVE.

Application filed April 14, 1922. Serial No. 552,529.

To all whom it may concern:

Be it known that I, MAX YABLICK, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to one-way valves of flexible material and more specifically to improvements upon the type of valves commonly known as "flutter" valves which are extensively employed in gas masks for the discharge of exhaled air therefrom, although not necessarily limited to such use.

It is customary to provide means in connection with respirators or gas masks to readily permit outflow of the exhaled air. This means should positively and effectively close during inhalation to prevent admission of air therethrough, so that the air which is breathed in is taken entirely from the fresh air compartment or through the air purifying means as the case may be.

The "flutter" valve heretofore employed for this purpose consisted of a bag of soft, pliable rubber, connected at one end with a fitting through which the air is exhaled, and provided with slits at the other end. The walls of the bag were arranged to lie directly one upon the other, and in exhaling, the walls separated sufficiently to permit the air to pass therethrough and out through the slits. In inhaling, the natural arrangement of the walls together with the suction caused by inhaling pulled the walls of the tube or bag tightly together and prevented entrance of air therethrough.

One of the disadvantages of this type of valve is that it does not afford absolute safety against the entrance of atmospheric air therethrough into the mask when the wearer inhales. Thus, if solid particles, such as sand, grit, etc., become lodged between the walls of the bag, the valve will not close tightly and therefore fail to function properly. The necessary protection is thus lost.

Another disadvantage of this type of valve is that when placed upon the fitting of the mask through which the exhaled air passes, the valve projects a considerable distance beyond the face-piece of the mask, thus greatly interfering with the freedom of movement of the wearer. This disadvantage is further accentuated by the fact that these valves of pliable rubber are almost invariably protected by a surrounding frame of rigid material, such as metal, and this rigid frame also projects beyond the face-piece of the mask at even a greater distance than the valve itself.

My improved valve overcomes these disadvantages and when placed upon a gas mask or respirator renders it more compact and more efficient.

Referring to the drawings, Fig. 1 is a perspective view of the preferred form of my device; Fig. 2 is a section through the centre of the valve, showing the position of the walls of the valve when in closed position; Fig. 3 is a section similar to Fig. 2, showing the position of the walls when air is being exhaled through the valve; Fig. 4 is a perspective view of a modified form of valve which operates similarly to the valves shown in Figs. 1 to 3; Fig. 5 is a perspective view of another modification of the preferred valve, parts of the device being broken away to illustrate the interior of the valve; Fig. 6 is a section through the centre of the valve shown in Fig. 5; Fig. 7 is a section through the centre of another modification; Fig. 8 is a perspective view of another modification.

My valve comprises the bag-shaped construction of the ordinary flutter valve having the walls 1 and 2 of flexible or pliable material, which is usually molded rubber. The walls are joined at their edges, except at the openings 3 and 4. To one of these walls is attached a neck 5 at right angles or other angular relationship, preferably integral therewith and of the same material, and this neck is adapted to be placed over the fitting of the mask through which air is exhaled. The walls 1 and 2 are also preferably integral at the edges 6, 7 and 8, the smaller edges 9 being cemented at 10.

When exhaled air from the mask enters the valve through the neck 5, the walls 1 and 2 will separate as shown in Fig. 3, and the air will pass out through the openings or slits 3 and 4. On inhalation, suction occurs at the neck 5 of the valve and the walls 1 and 2 will close together as shown in Fig. 2. The base 11 of the neck 5 forms a seat against which the wall 2 is drawn, thus closing the valve against incoming air.

Ordinarily, when the wearer of a mask equipped with this valve inhales, the base 11 and wall 2 constitutes the valve closing mechanism, but if for any reason these parts should fail to function properly or perfectly, an additional protection is provided by the extended walls 1 and 2, since any suction at the base 11 will cause the walls 1 and 2 to come together at the slits as in the ordinary flutter valve. It is therefore clear that my device provides additional protection to that afforded by the ordinary flutter valve.

In Fig. 4, the neck 5 of the valve is positioned at one end of the walls of the valve, while in the type shown in the other views the neck is located so as to provide projecting portions in all directions.

When still further protection is desired against leakage of air through the valve during inhalation the constructions shown in Figs. 5 and 6 may be used. Here I provide a thin sheet 12 of flexible material which is attached at spaced points to the base 11 of the neck 5, as shown in Fig. 5. On exhalation, this sheet 12 will separate from the base 11 and allow the exhaled air to pass between the walls 1 and 2. On inhalation, the sheet 12 will be drawn to the base 11 and prevent the entrance of air into the neck 5 of the valve. It is to be understood that should there be imperfection in the operation of the valve-closing mechanism of the sheet 12 and base 11, the other valve-closing mechanisms in my device, heretofore described, would function to effect proper valve closure.

In using my device the neck 5 is placed over the fitting of the mask through which the exhaled air passes. The walls 1 and 2 of the valve will assume a position substantially parallel with the face-piece of the mask instead of projecting outwardly therefrom as do the ordinary flutter valves, thus doing away with the interference of movement of the wearer of the mask. Also, if a rigid protecting frame is used with my valve, it will be substantially parallel to the face-piece of the mask.

If solid particles become lodged between the walls of the ordinary flutter valve, it would fail to give the necessary security, but with my valve the additional valve-closing mechanisms would afford the proper protection against inhaling air therethrough.

The neck 5 of the valve is thickened at the base 11 so as to provide a better seat against which the wall 2 is drawn on inhalation. This rigidity may be further improved upon by having the tube 13, of the metal or other fitting of the mask over which the neck of the valve is placed, project beyond the wall 1, as shown in Fig. 7, so as to form with the wall 2 a valve-closing mechanism.

The valve shown in Fig. 8 is provided with only one slit or opening 14 instead of the two slits shown in the other constructions.

The present invention is not limited to the specific details set forth in the foregoing examples which should be construed as illustrative and not by way of limitation, and in view of the numerous modifications which may be effected therein without departing from the spirit and scope of this invention, it is desired that only such limitations be imposed as are indicated in the appended claims.

I claim as my invention:

1. A flutter valve comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

2. A flutter valve of flexible material comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

3. A flutter valve of flexible material comprising a pair of walls, one of said walls being provided with a neck integral therewith and at substantially a right angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

4. A flutter valve of flexible material comprising a pair of walls, one of said walls being provided with a cylindrical neck integral therewith and at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

5. In a flutter valve, a flattened bag slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

6. In a flutter valve, a flattened bag of flexible material slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

7. In a flutter valve, a flattened bag of flexible material slitted along the edges near an end thereof and forming a valve-closing mechanism, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

8. In a flutter valve, a flattened bag of flexible material slitted along the edges near an end thereof and forming a valve-closing mechanism, one wall of said bag being pro-

vided with a neck integral therewith and at substantially a right angle thereto and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

9. In a flutter valve, a flattened bag of flexible material slitted along the edges near an end thereof and forming a valve-closing mechanism, one wall of said bag being provided with a cylindrical neck integral therewith and at an angle thereto and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

10. In a flutter valve, a flattened bag of pliable rubber slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism.

11. In a flutter valve, a flattened bag of pliable rubber slitted along the edges near an end thereof and forming a valve-closing mechanism, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

12. In a flutter valve, a flattened bag of pliable rubber slitted along the edges near an end thereof and forming a valve-closing mechansm, one wall of said bag being provided with a neck integral therewith and substantially perpendicular thereto and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

13. In a flutter valve, a flattened bag of pliable rubber slitted along the edges near an end thereof and forming a valve-closing mechanism, one wall of said bag being provided with a cylindrical neck integral therewith and the base of said neck being adapted to engage with the other wall to form an auxiliary valve-closing mechanism.

14. A flutter valve comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and means for adding rigidity to said neck.

15. A flutter valve comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and means for adding rigidity to said neck, said means engaging the other wall to form a valve-closing mechanism.

16. A flutter valve comprising a pair of walls of pliable rubber, one of said walls being provided with a neck at an angle thereto and means for adding rigidity to said neck, said means engaging the other wall to form an auxiliary valve-closing mechanism.

17. A flutter valve comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and stiffening means at the base of the neck for adding rigidity thereto.

18. A flutter valve comprising a pair of walls, one of said walls being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism, and stiffening means at the base of the neck for adding rigidity thereto.

19. In a flutter valve, a flattened bag slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism, and stiffening means at the base of the neck for adding rigidity thereto.

20. In a flutter valve, a flattened bag of flexible material slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and means for adding rigidity to said neck.

21. In a flutter valve, a flattened bag of flexible material slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and means for adding rigidity to said neck, said means engaging the other wall to form an auxiliary valve-closing mechanism.

22. In a flutter valve, a flattened bag of pliable rubber slitted along the edge near an end thereof, one wall of said bag being provided with a neck at an angle thereto and the base of said neck being adapted to engage with the other wall to form a valve-closing mechanism and stiffening means at the base of the neck for adding rigidity thereto.

MAX YABLICK.