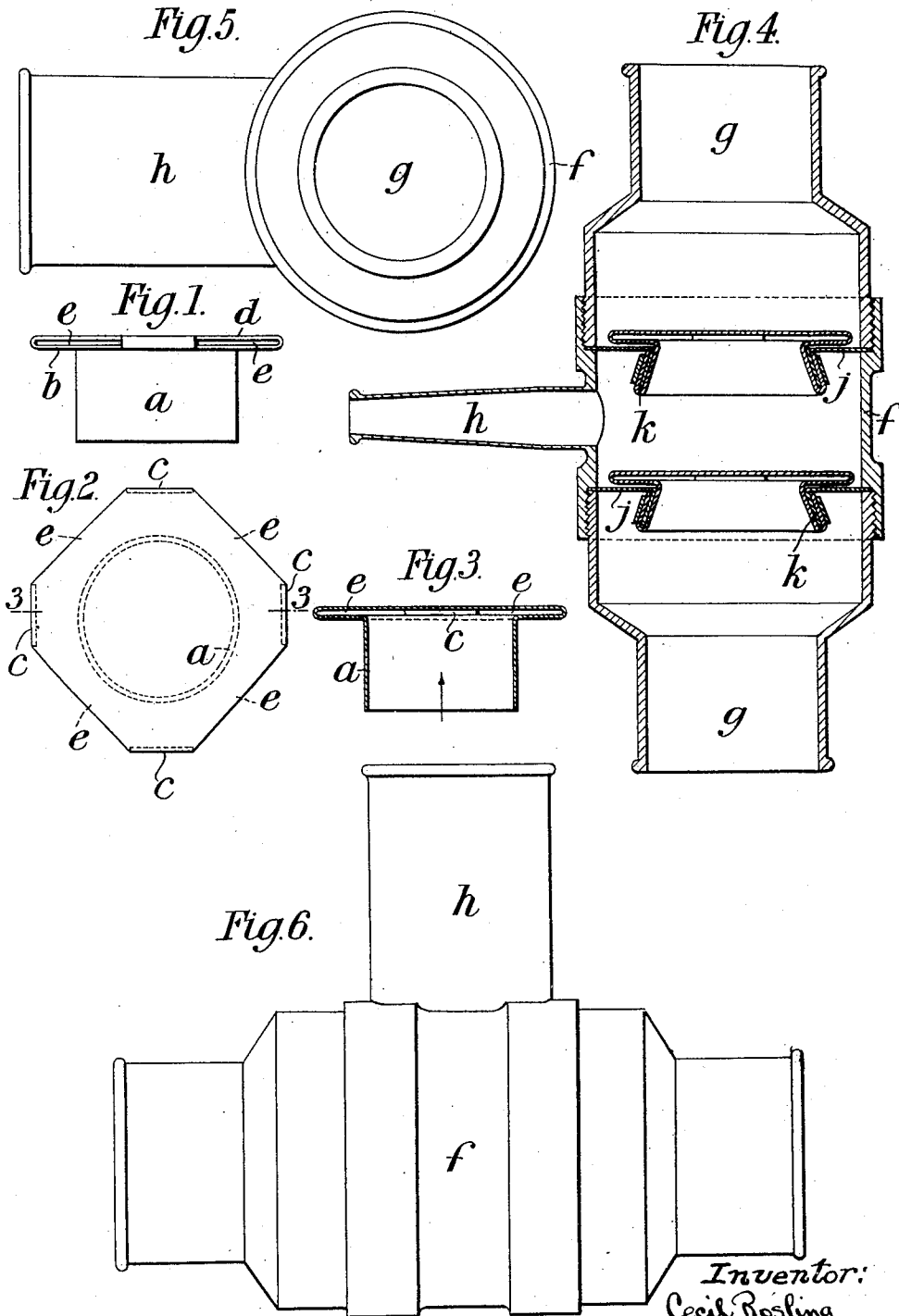


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NONRETURN VALVE.
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1,404,408.

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UNITED STATES PATENT OFFICE.

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NONRETURN VALVE.

1,404,408.

Specification of Letters Patent. Patented Jan. 24, 1922.

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To all whom it may concern:

Be it known that I, CECIL ROSLING, a subject of the King of Great Britain, residing at 187 Westminster Bridge Road, London, England, have invented new and useful Improvements in Nonreturn Valves, of which the following is a specification.

My invention relates to non-return valves chiefly designed for use in connection with respirators but which are also capable of other applications where it is desired to control the flow of gas under a comparatively low pressure.

According to the invention the improved valve comprises a cylindrical portion, preferably of rubber, furnished at one end with a flange, which is preferably of polygonal shape, such as a square. To the outer face of this flange there is applied a piece of flexible material, such as rubber, of the same shape as the flange, to which it is secured at, say the four corners, in the case of the square, leaving a series of apertures or slits between the strip and the flange between the points of connection.

As will be obvious the flexible strip which is attached to the flange as described, acts as a non-return valve, that is to say, the said strip is drawn away from the flange so as to open the aforementioned apertures between these two parts when the suction or pressure is in the outward direction, and is closed tightly against the said flange when the pressure or suction is in the opposite direction, thus acting efficiently as a non-return valve.

Our improved non-return valve is especially suitable for use in connection with respiratory exchange-pieces such are employed, for example, in examining samples of inspired and expired air. A suitable construction of exchange-piece comprises a casing, which may be designed to be used either vertically or horizontally, the said casing being open at each end and being fitted at its middle with a mouthpiece. The interior of the casing is fitted on either side of the mouth-piece orifice, with a non-return valve of the type above described, the said valves being so arranged that one of them opens to admit air when suction action is exerted on the mouthpiece whilst the other opens to permit of the escape of the air expired from the mouth-piece.

To enable the invention to be fully under-

stood I will describe it by reference to the accompanying drawing, in which:—

Figure 1 is an elevation of a non-return valve constructed according to the invention, and

Figure 2 is a plan thereof.

Figure 3 is a vertical section on the line 3—3, Figure 2.

Figure 4 is a section of an exchange-piece having a pair of the improved non-return valves fitted thereto, the said exchange-piece being designed to be used in a vertical position.

Figure 5 is a plan of the said exchange-piece, and

Figure 6 is a plan of an exchange-piece designed to be used in a horizontal position.

a is the cylindrical portion of the improved valve, which portion is preferably composed of rubber. *b* is the flange with which the portion *a* of the valve is provided, the said flange, in plan, being preferably of the square form with flattened corners *c* shown in Figure 2. *d* is the piece of flexible material such as rubber, applied to the outer face of the flange *b* to which it is secured at the corners *c*, leaving a series of apertures or slits *e* between the points of connection of the said flange *b* and piece *d*.

In the operation of the valve, the flexible piece *d* is separated from the flange *b* so as to open the apertures *e* when the suction or pressure is in the direction of the arrow, Figure 3. When, however, the suction or pressure is in the opposite direction to that of the said arrow, the piece *d* is closed tightly against the flange *b* thus preventing the flow of gas or air through the valve.

The exchange-piece in which a pair of the improved non-return valves are located, is in the form of a cylindrical casing *f*, Figure 4, open at the ends *g* and having a mouth-piece *h* midway between its ends and between the said two valves which are arranged so that one of them, for instance, the lower one, opens to admit air when suction action is exerted by way of the said mouth-piece whilst the other valve opens to permit of the escape of the air expired from the said mouth-piece, the suction or pressure which opens either valve maintaining the other valve closed. The casing *f* is advantageously made in three parts screwed together, division plates *j* being secured between the said parts and having openings

provided with downwardly extending flanges *k* to which the cylindrical portions *a* of the valve are secured in the manner indicated.

In the construction of exchange-piece 5 illustrated in Figure 6, the cylindrical casing is arranged for use in a horizontal position relatively to the mouthpiece *h*.

Claims.

10 1. A non-return valve comprising a cylindrical portion of flexible material, a flange at one end thereof and a piece of flexible material covering the said flange and opening of the cylindrical portion and having

its edge secured to that of the flange at intervals so as to leave a series of slits for 15 the passage of the air or gas controlled by the valve, substantially as described.

2. A respiratory exchange-piece comprising a casing open at both ends, a pair of valves as defined in claim 1, fitted within 20 the said casing with a space between them and a mouthpiece fitted to the casing and opening into the space between the valves, substantially as described.

CECIL ROSLING.