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Wächter

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[54] **SAFETY AIR SUPPLY DEVICE**

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[52] **U.S. Cl.** **55/312,** 55/316, 55/467, 55/482

[51] **Int. Cl.** **B01d 50/00**

[58] **Field of Search** 55/309–314, 316, 323, 55/350, 385, 467, 470–473, 482

[56] **References Cited**

UNITED STATES PATENTS

1,840,253	1/1932	Richardson	55/467
2,503,568	4/1950	Timin	55/472
2,610,565	9/1952	Stuart	98/1.5
3,239,305	3/1966	Potapenko	21/74 R
3,545,500	12/1970	Bovio	55/312
3,149,940	9/1964	Wachter	55/316
3,304,783	2/1967	Quigley	55/309
3,668,825	6/1972	McIlvaine	55/316

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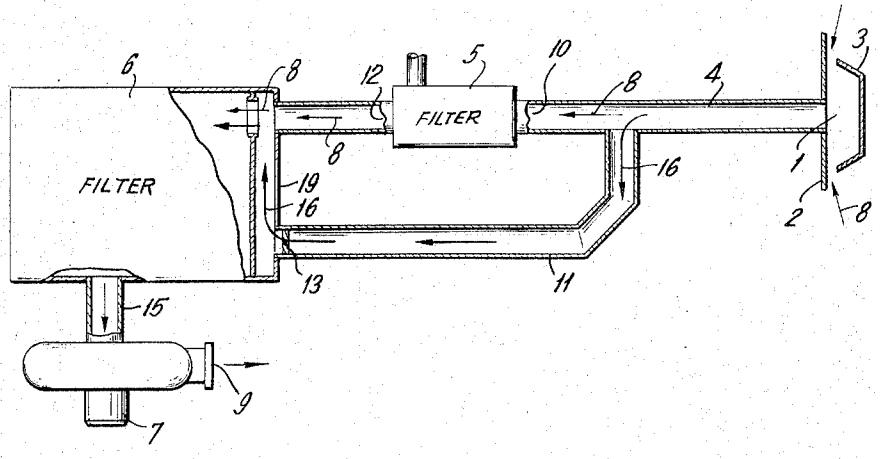
[57] **ABSTRACT**

A safety air supplying device by means of which a room is supplied with air which is purified from poisonous substances includes an inlet connected to a coarse dust filter which, in turn, is connected to a suspended-matter filter, or gas filter and to an intake fan which discharges into the room. A by-pass line extends from the inlet to the coarse dust filter and to a line which connects into the outlet of the coarse dust filter at the location where it connects into the gas filter. This line is provided with a rapid closure valve. In those cases, in which the quantity of air which must be delivered must be considerably increased rapidly, this quick closure valve is opened, and, at the same time, the speed of the delivery of the fan can be increased.

2 Claims, 1 Drawing Figure



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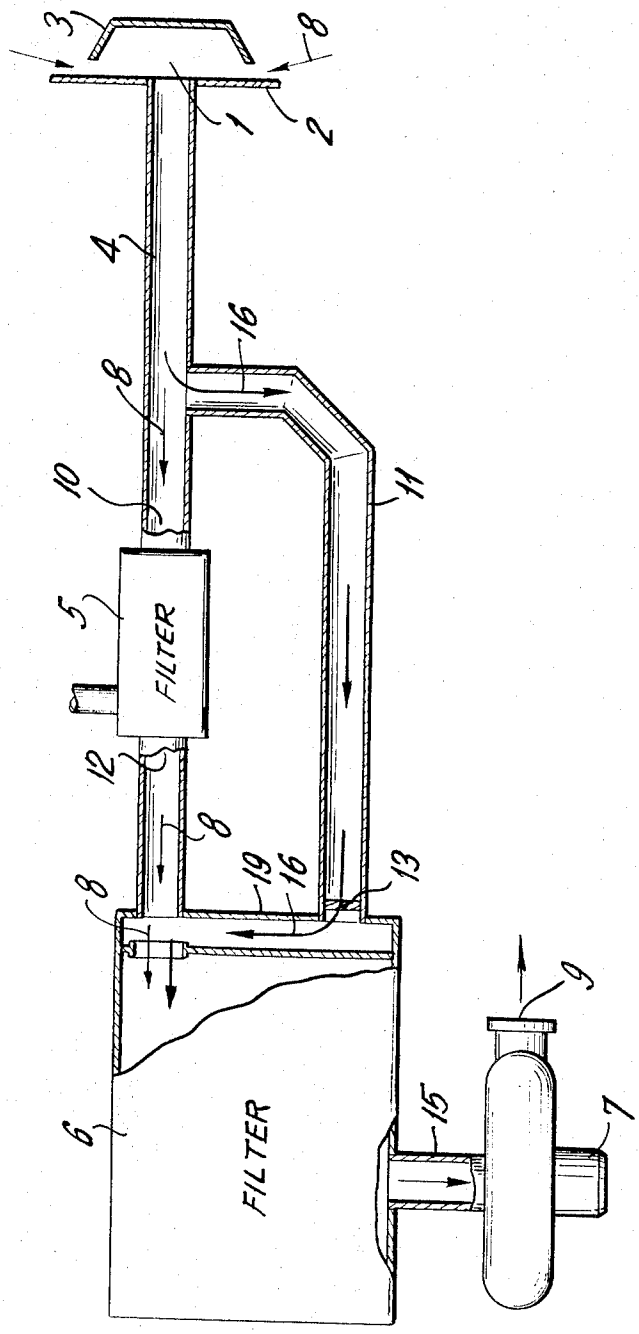

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SAFETY AIR SUPPLY DEVICE

SUMMARY OF THE INVENTION

This invention relates, in general, to the construction of safet air supplying devices and, in particular, to a new and useful device particularly for supplying air which is purified from poisonous substances to a compartment space of a vehicle.

Safety air devices are known by means of which a room is supplied with air purified from poisonous substances. Such safety air devices are used in particular for vehicles which have a crew room which is to be supplied with clean air. In the order of the passage of the air through the device, the safety air device consists of a coarse dust filter which retains the coarse particles entrained in the air, a suspended-matter filter, which serves to retain the fine suspended particles, a gas filter in which gaseous components are absorbed from the air and a fan which draws the air through the installation and forces it into the room to be ventilated. These safety devices are generally lodged inside the rooms to be ventilated. Any occurring leaks in the ventilation system do not disturb the safety device since the air already filtered is drawn back into the installation.

In accordance with the present invention, there is provided a safety device for supplying emergency air in which the quantity of air which is delivered may be considerably increased for a short period of time. An increase of the quantity of intake air by adjustment of the fan to a higher delivery is generally not sufficient since, with the higher delivery of the fan, there is an increased flow resistance through the entire system.

In accordance with the invention, the gas entrance side and the gas exit side of the course dust filter are connected by an air line having a rapid closure valve. This closure valve may be opened to by-pass the coarse filter and provide a rapid air flow thorugh the system. With the invention, the quantity of air delivered by the device can be increased considerably for a period during which the rapid closure valve is opened to permit the by-pass of air around the carse filter. The coarse dust filters then by-pass completely or partially so that its share in the flow resistance of the system is eliminated. If, simultaneously with the opening of the rapid closure valve, the delivery of the fan is increased, a considerably greater quantity of air can be delivered by the device. This temporary by-passing of the coarse dust filter is permissible for the brief operating period of the device as the air is purified in the following filter parts.

The rapid closure valve advantageously comprises a pivotal damper or an elastic shutter member which can be actuated, for example, electrically. The insertion of a rapid closure valve of this type does not present any disadvantage to the ventilation system since the air bypassing the coarse dust filter is purified by subsequently acting filter elements.

Accordingly, it is an object of the invention to provide an emergency air supply device which includes an inlet connected to a coarse filter which, in turn, connects through one or more other filters and is discharged by an inlet fan into the space of use and wherein means are provided for rapidly increasing the flow through the system by by-passing a quantity of the air around the coarse filter and feeding it through the remaining filter elements.

A further object of the invention is to provide a safety air supply device which is simple in design, rugged in consturction, and economical to manufacture.

For an understanding of the principles of the invention, reference is made to the following descripiton of a typical embodiment thereof as illustrated in the accompanying drawing.

BRIEF DESCRIPITON OF THE DRAWINGS

The only FIGURE of the drawing is a diagrammatic illustration of the safety air supply device constructed in accordance with the inention.

GENERAL DESCRIPTION OF THE PREFERRED EMBOIDMENT

The safety air supplying device is used in connection with a vehicle having a wall **2** with an inlet **1** which is covered by a protective flap **3.** The inlet **1** is defined at the end of an inlet flow pipe **4** which leads to a course dust filter **5** and then to a suspended matter filter and gas filter **6.** The flow is then from the suspended matter filter and gas filter **6** through a conduit **15** of a fan **7** which discharges through an outlet **9** into the interior of the vehicle. Flow of the air is as indicated by the arrows **8** to the inlet side **10** of the coarse dust filter **5** and out through the outlet side **12** to the suspended matter filter and gas filter **6.** In accordance with the invention, a by-pass line **11** permits a flow as indicated by the arrows **16** through a by-pass line **11** and through a rapid closure valve **13** and into a passage **19** which joins the flow from the outlet **12** of the coarse dust filter **5.** The coarse dust filter **5** is advantageously a cyclone separator. A closure valve **13** comprises in the embodiment illustrated a damper valve which includes a member pivotal about a center shaft. In another form, the vaLve **13** comprises a rapid closure valve having an elastic shutter.

At normal air ratio, the rapid closure valve **13** is closed so that the air is drawn through the coarse dust filter **5** and then through the other filter elements **6** and forced into the room through the discharge **9.** Air passing through due to leakage of the valve **13** is purified in the suspended-matter-and-gas filters generally designated **6.**

In case of air which must be delivered through the discharge **9** must be considerably increased and rapidly, the valve **13** is opened. At the same time, the delivery speed of the fan **7** can be increased.

What is claimed is:

1. A device for supplying air which is purified from poisonous substances to a space, for example to the interior of a vehicle, comprising an inlet conduit, a coarse dust filter disposed in said inlet conduit for flow of air through said coarse dust filter, a suspended matter and gas filter connected in said inlet conduit downstream of said coarse dust filter for the flow of air from said coarse dust filter to and through said suspended matter and gas filter, an inlet fan connected to said suspended matter and gas filter and adapted to discharge into the space for the supply of filtered air thereto, a by-pass line connected from said inlet conduit upstream of and around said coarse dust filter to said suspended matter and gas filter, and a rapid closure valve in said by-pass line which is openable to permit the flow of air around said coarse dust filter.

2. A safety air device, according to claim **1,** wherein said rapid closure valve comprises a damper valve.

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