Oct. 28, 1924. 1,512,950

J. T. RYAN

REGENERATOR FOR BREATHING APPARATUS

Filed April 26, 1921 2 Sheets-Sheet 1

FIG. 1.

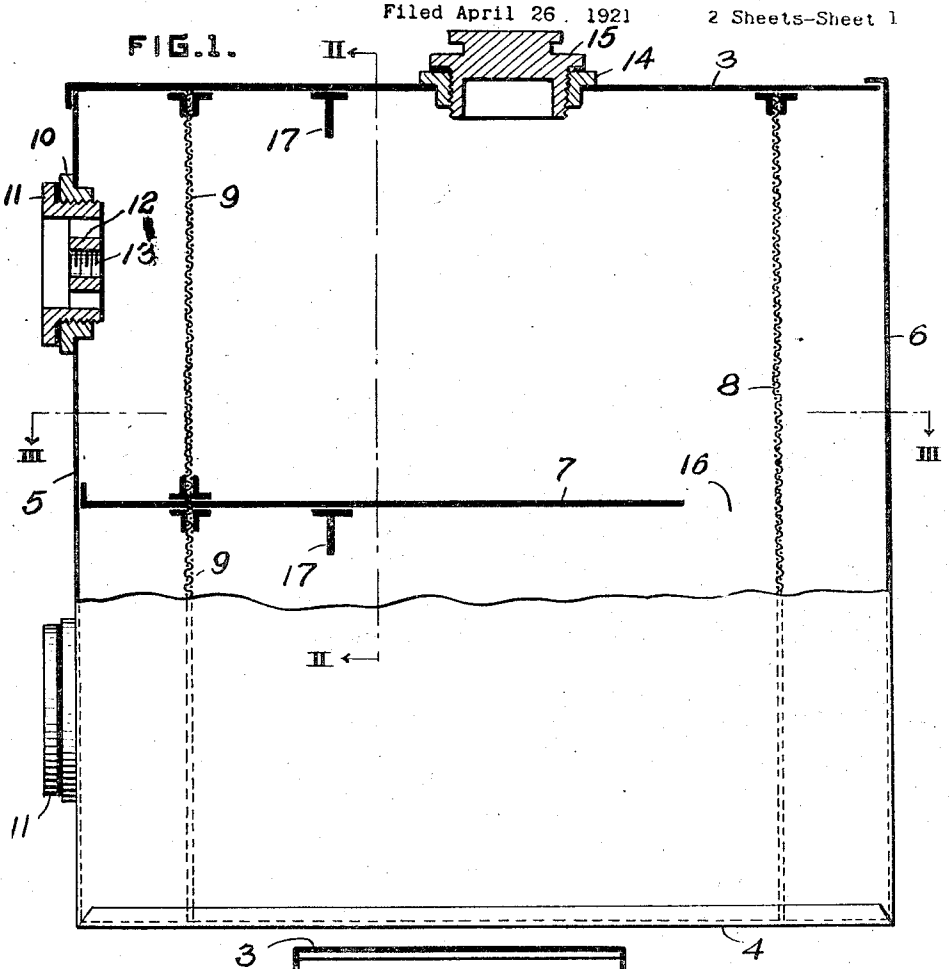
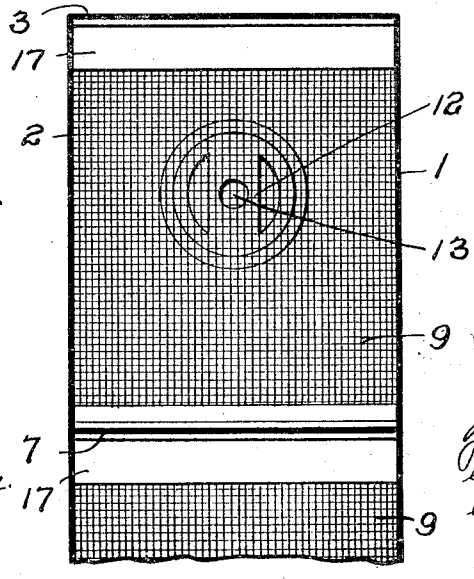


FIG. 2.



WITNESSES

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FIG. 3.

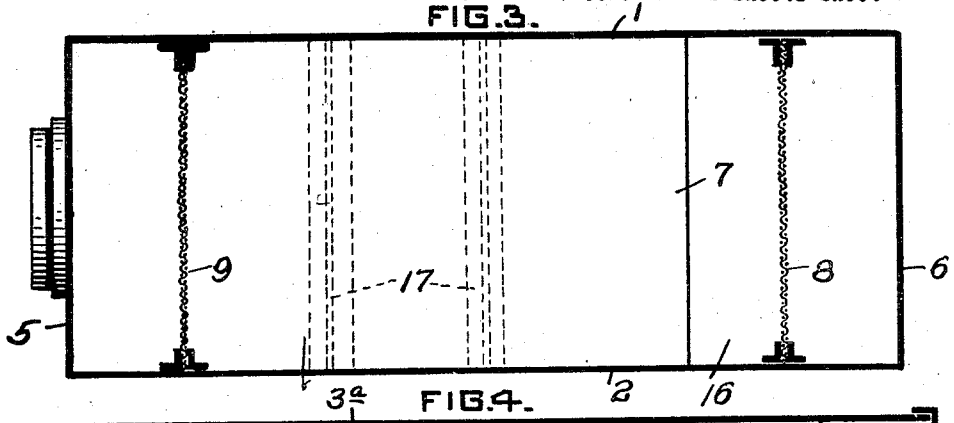
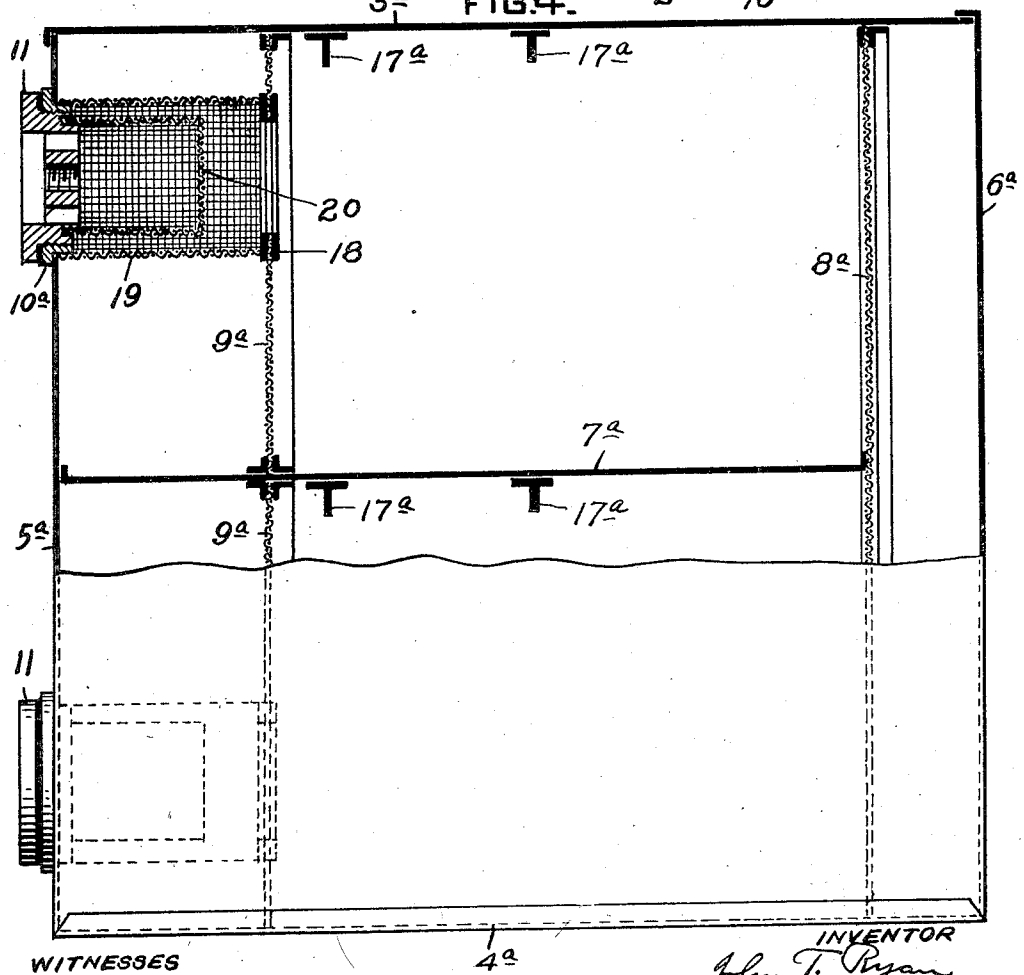


FIG. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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REGENERATOR FOR BREATHING APPARATUS.

Application filed April 26, 1921. Serial No. 464,548.

To all whom it may concern:

Be it known that I, JOHN T. RYAN, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Regenerators for Breathing Apparatus, of which the following is a specification.

The invention relates to breathing apparatus, that is to say, apparatus for supplying breathable air to a person surrounded by noxious or poisonous gases.

Apparatus of this sort is provided with a regenerator containing a chemical, usually of granular form, which serves to regenerate the exhaled air by absorbing the carbon dioxide gas from it.

The object of the invention is to provide a regenerator having orifices in its side walls for attaching it to the inhalation and exhalation sides of the apparatus, and constructed and arranged interiorly in such manner that the air being regenerated is circulated through a maximum volume of the chemical regenerating material, and also that the air may not by-pass such material.

The invention is illustrated in the accompanying drawings of which Fig. 1 is a combined side and vertical central sectional view of a regenerator; Figs. 2 and 3 sectional views taken respectively on the lines II—II and III—III, Fig. 1; and Fig. 4 a view similar to Fig. 1 showing a modification of construction.

The regenerator comprises an outer casing having side walls 1 and 2, top and bottom walls 3 and 4 and front and rear walls 5 and 6, all preferably formed of sheet metal united by seams and joints of such a character that the entire structure is gas tight. The casing is divided into upper and lower compartments by a horizontal partition 7 which extends rearwardly from the front wall 5. Adjacent to the rear wall 6 a vertical screen 8 extends from the top to the bottom wall and from one to the other of the side walls and forms with these walls a passageway for air, and adjacent to the front wall 5 in both the upper and lower compartments there is a screen 9 forming an air space between it and the front wall. When the regenerator is in use the space between the screens is filled with the regenerating material.

The front wall is provided with two orifices, one communicating with the upper and the other with the lower compartment, at which orifice connections may be made to the inhalation and exhalation sides of the breathing apparatus. Each opening forming an orifice is provided with a flanged sleeve 10 threaded interiorly to receive a plug 11 provided with a transverse bridge 12 having a threaded opening 13 for attachment to a coupling plug of the breathing apparatus.

For filling the regenerator with a chemical reagent, the top of the casing is provided with an orifice having an interiorly threaded flanged sleeve 14 adapted to be closed by a plug 15. The upper and lower compartments are placed in communication with each other by a passageway 16 formed between the end of partition 7 and screen 8, through which the reagent may pass from the upper to the lower compartment. The granular material for charging the regenerator is poured through the filling orifice when plug 15 is removed, and the regenerator is manipulated in such a manner that the material for the lower compartment flows into it through the passageway 16.

Baffle plates 17 extend downwardly from the top wall 3 and from the partition 7 into the upper portions of the upper and lower compartments and into the granular chemical material in such compartments for the purpose of preventing air from by-passing the material. Because the material from the upper compartment will keep the lower compartment filled, the baffle 17 may, if desired, be omitted in the lower compartment with little liability of air by-passing the material in such compartment.

Assuming that the orifice in the lower compartment is attached to the exhalation side of the breathing apparatus, the breathed air containing carbon dioxide flows rearwardly through screen 9 into the chemical material in the lower compartment and from thence through the lower portion of perforate screen 8 into the passageway at the rear thereof. From this passageway the air flows forwardly through the chemical material in the upper compartment, and, after passing through the vertical screen 9 in the upper compartment, it is withdrawn through the upper orifice

attached to the inhalation side of the apparatus. Some of the air may pass directly from the lower to the upper compartment through passageway 16. However, such air is caused to flow through substantially the same amount of regenerating chemical material as the air which flows into the passageway at the rear of screen 8 for the reason that horizontal partition 7 extends substantially to the screen 8.

In the embodiment of the invention illustrated in Fig. 4 the regenerator is constructed in such manner that each chamber may be separately charged with chemical material through the inhalation and exhalation orifice. For this purpose each screen 9^a is provided with an opening reenforced by a ring 18. Arranged between such ring and the inner end of flanged sleeve 10^a there is a cylindrical screen 19. The lower end of plug 11 has a cup-shaped screen 20 attached to it which is removable from within the cylindrical screen 19 upon the removal of plug 11. In this embodiment of the invention partition 7^a extends from the front wall 5^a to the vertical screen 8^a, and one or more baffle plates 17^a extend downwardly into the upper and lower compartments from the top wall 3^a and partition 7^a.

In this embodiment of the invention the compartments are filled separately. To fill either the upper or lower compartment, plug 11^a with its cup-shaped screen 20 is removed from flanged ring 10^a so that the material may be poured through the cylindrical screen directly into the compartment.

I claim:

A regenerator for breathing apparatus comprising a casing having a vertical front wall provided with inhalation and exhalation orifices, a horizontal partition dividing the casing into upper and lower compartments for receiving loose granular regenerating material, one of said compartments communicating with the inhalation and the other with the exhalation orifice, a vertical screen forming with the casing walls and said horizontal partition two air spaces, one of which is adjacent to each of said orifices, a vertical screen forming with the rear and side walls of the casing an air passage placing said two compartments in communication with each other, the top wall of the casing being provided with a filling orifice between said two vertical screens, said horizontal partition being provided with a passageway through which loose granular regenerating material may flow from the upper to the lower compartment, and a baffle plate extending downwardly from the upper horizontal wall of the casing into the upper compartment to prevent air from bypassing the regenerating material in the upper compartment.

In testimony whereof, I have hereunto set my hand.

JOHN T. RYAN.

Witness:
EDWIN O. JOHNS.