H. ROMANOFF.

ANTIGAS RESPIRATOR.

APPLICATION FILED FEB. 9, 1918.

1,298,404.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

Fig. 1,

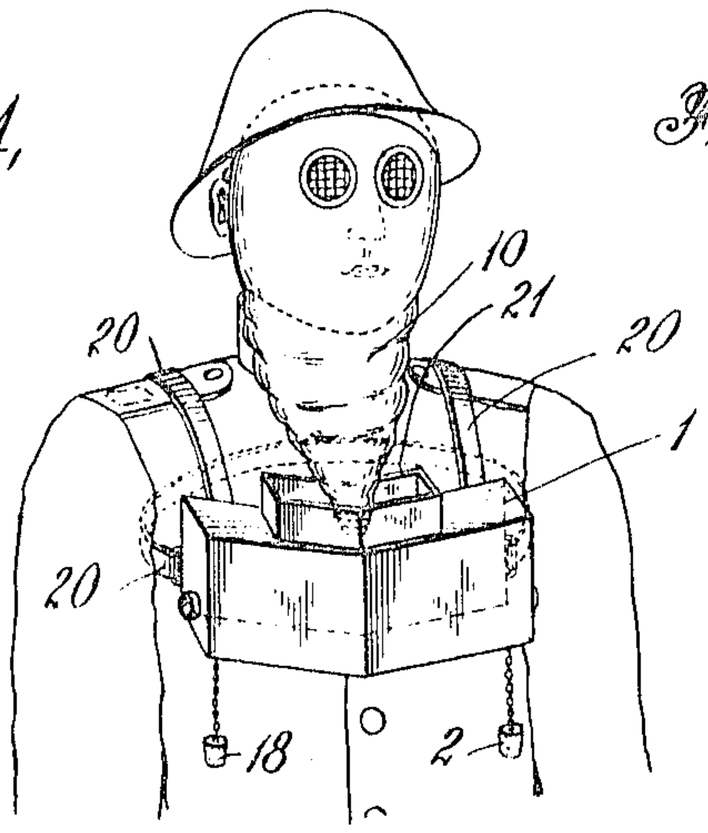


Fig. 4,

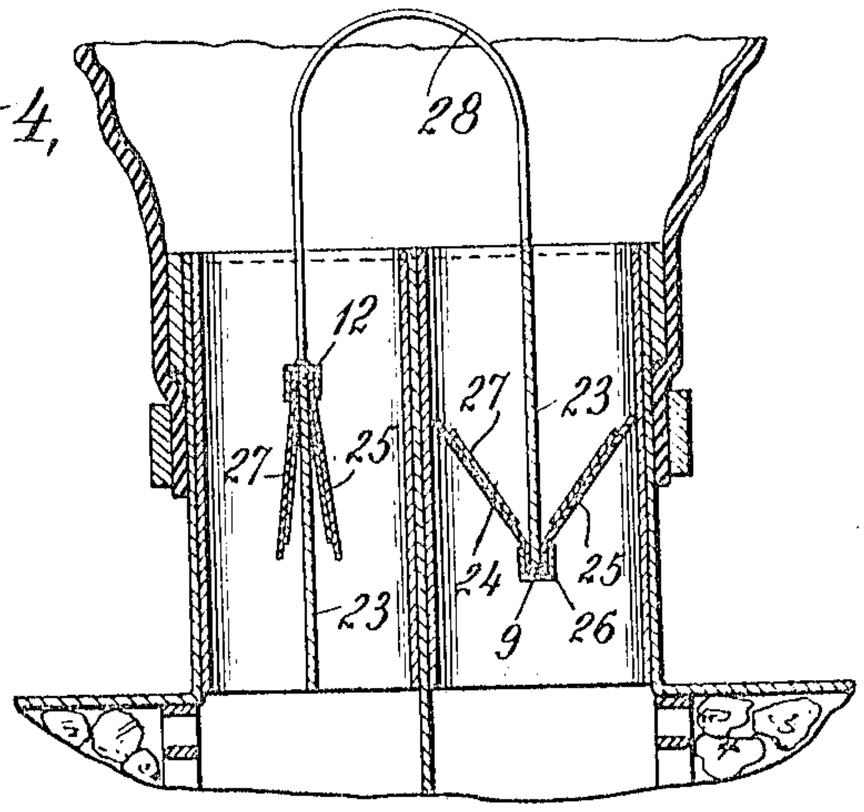


Fig. 2,

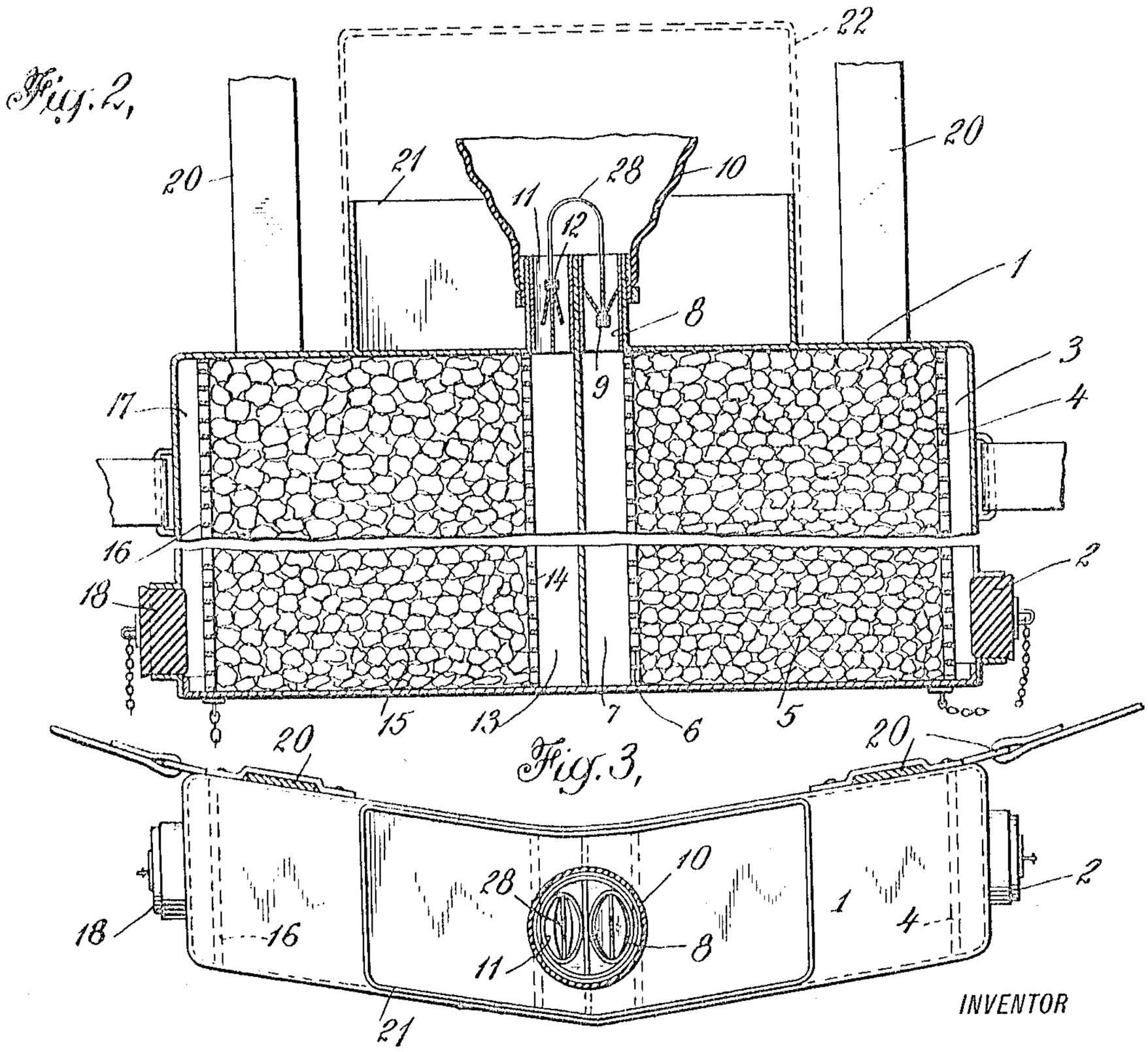


Fig. 3,

INVENTOR

H. Romanoff

BY

Connie Davis Morrison & Edwards

ATTORNEYS.

H. ROMANOFF.

ANTIGAS RESPIRATOR.

APPLICATION FILED FEB. 9, 1918.

1,298,404.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 2.

Fig. 5,

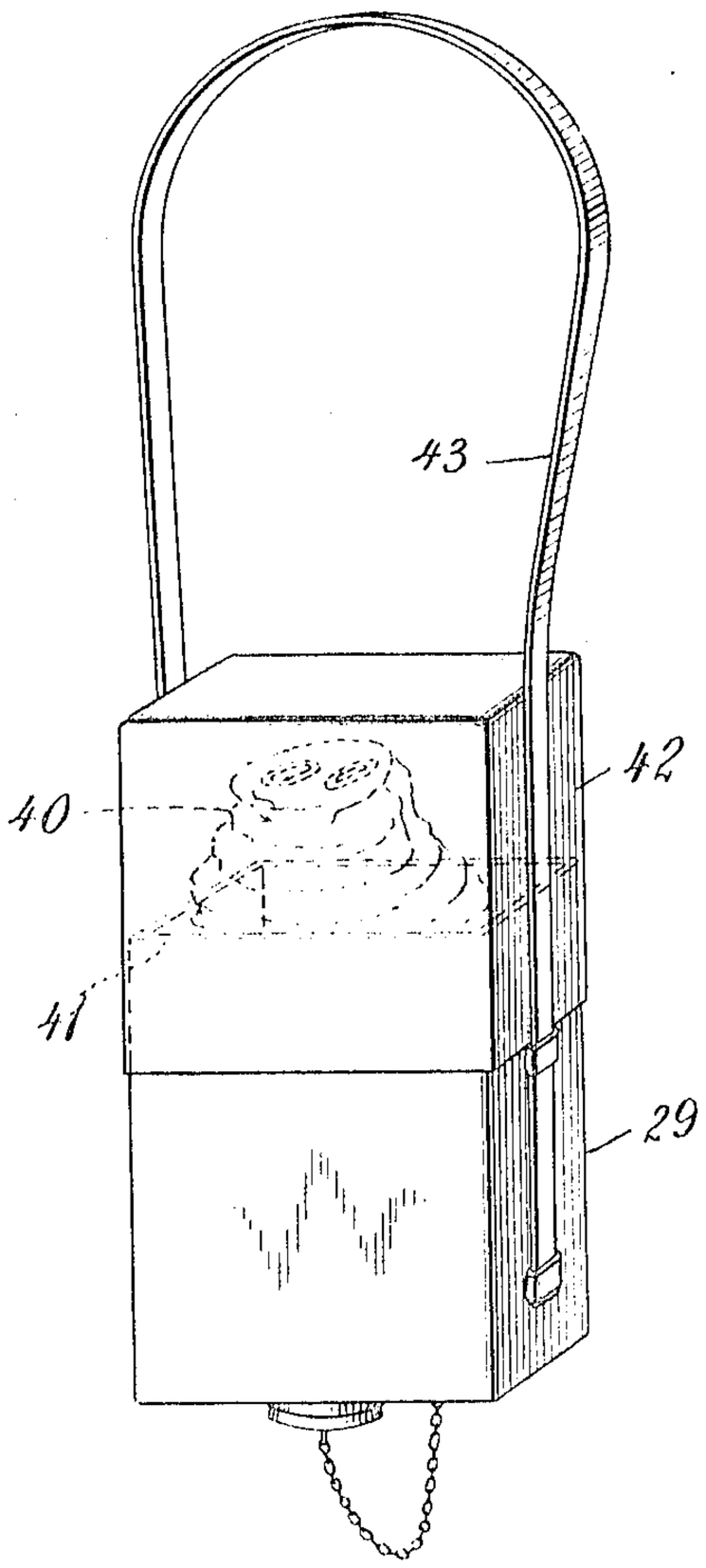


Fig. 6,

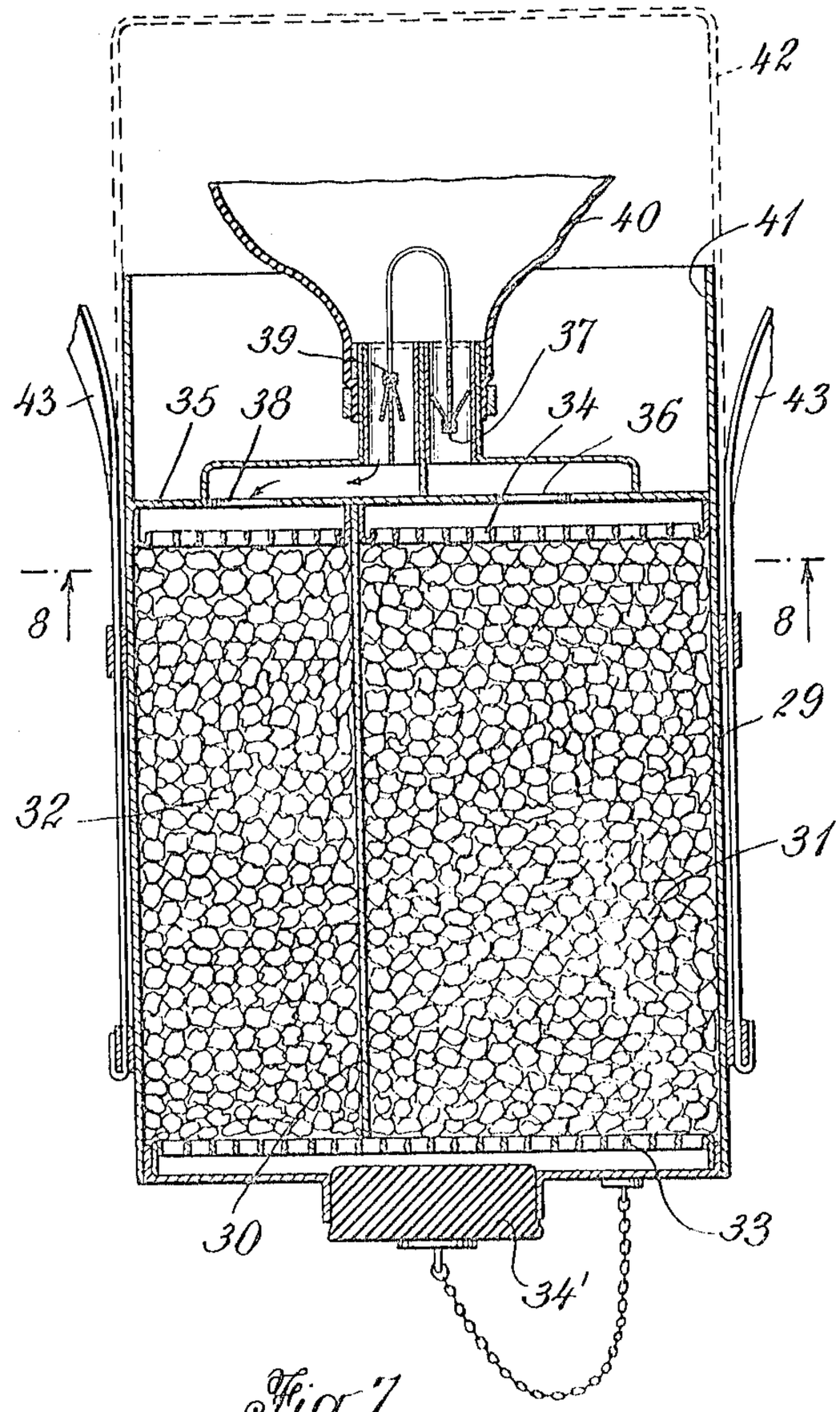


Fig. 8,

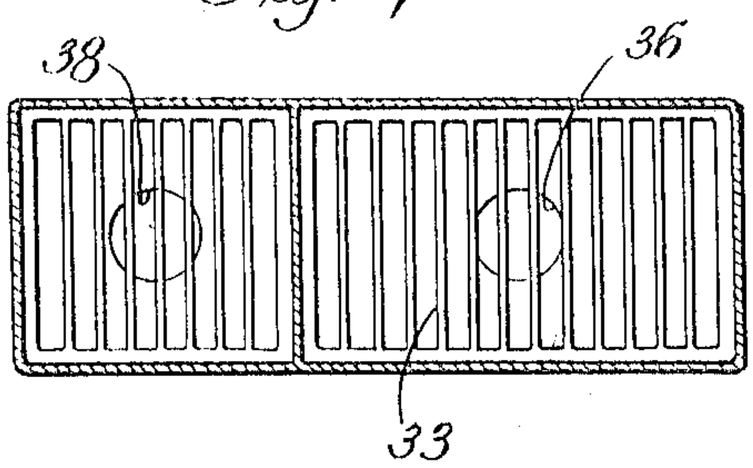
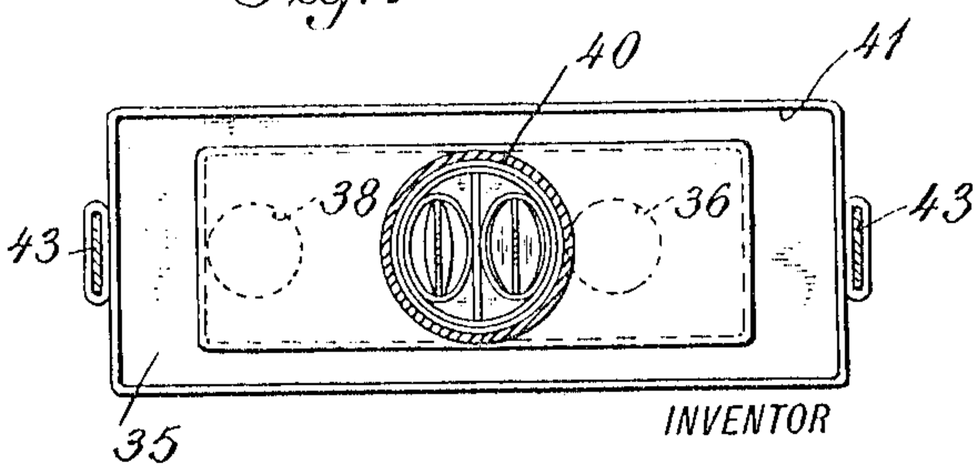


Fig. 7



INVENTOR

H. Romanoff

BY

Dennie Davis Marvin & Edmonds

ATTORNEY

UNITED STATES PATENT OFFICE.

HIPPOLYTE ROMANOFF, OF NEW YORK, N. Y.

ANTIGAS-RESPIRATOR.

1,298,404. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed February 9, 1918. Serial No. 216,398.

To all whom it may concern:

Be it known that I, HIPPOLYTE ROMANOFF, a citizen of Russia, residing at 200 West 59th street, in the county of New York, State of New York, have invented certain new and useful Improvements in Antigas-Respirators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

It is an object of the present invention to provide an apparatus for the protection of a soldier against noxious gases such as are used in war. More particularly the apparatus of the present invention provides a valved conduit through which air may be inhaled by the user and a second and separate conduit through which the operator may exhale, suitable purifying media being inserted in the intake conduit and preferably also in the other conduit to remove from the passing air any chlorin, bromin, arsenated hydrogen or other noxious gases or fumes with which the user may come in contact.

The particular embodiment hereinafter described in detail is reliable in its action and is capable of delivering to the user substantially pure air unmixed with previous exhalations from his lungs. It is light in weight, cheap to manufacture, convenient to carry and quickly adjustable to operating condition. When not in use the purifying chemical or agent is well protected from deterioration. In an emergency, the valve mechanism can be rendered inactive, leaving the operator free to inhale or exhale through both conduits simultaneously, though under normal conditions this result is not desired and in fact is carefully guarded against.

Other details and objects and advantages of the invention will become clear from the following detailed description which is to be taken in conjunction with the accompanying drawings wherein Figure 1 is a perspective view showing the apparatus in operating condition; Fig. 2 is a sectional elevation through the conduits and valve mechanism; Fig. 3 is a plan view of the apparatus; Fig. 4 is an enlarged sectional detail of the valve mechanism; Fig. 5 is a perspective view of a modified form; Fig. 6 is a sectional elevation through the structure shown in Fig. 5; Fig. 7 is a plan view of the same, and Fig. 8 is a detail of the grating with which the active chemical mass is covered as shown in Fig. 6.

In the embodiment illustrated in Figs. 1 to 4 inclusive, the intake conduit is in the form of a rectangular box 1 having a removable cork 2 at its inlet and a passage 3 just beyond the inlet from which, through a grating 4, the incoming air may pass to the active chemical material 5. This material may be of known composition and suitable for freeing the incoming air from such corrosive or other destructive agencies as it may carry. Beyond this chemical material is a second grating 6 through which the purified air may pass to a vertical passage 7. At the upper end of this passage is an oval tube or conduit 8 provided with a check valve 9 of the butterfly type as shown more in detail in Fig. 4. After passing the check valve, the air is drawn upwardly through a flexible funnel 10 forming a part of the gas mask, and after having been inhaled by the wearer, is expelled downward through funnel 10, and as it cannot pass check valve 9 it enters a conduit 11, the valve 12 of which, being the reverse of valve 9, permits its entrance into passage 13. The impure air passes through a grating 14 and through chemical purifying material 15 and finally out through a second grating 16 and passage 17 to the outlet, the removable closure 18 of which must, of course, have previously been removed. Suitable supporting straps 20 hold the apparatus in convenient position on the chest of the wearer and when the apparatus is not in use, the gas mask can be stored in a box 21 at the top of the apparatus and there protected by a suitable sheet metal cover 22. Corks 2 and 18 suitably close the inlet and outlet when the device is not in action.

Each valve mechanism, as shown more particularly in Figs. 3 and 4, comprises a sheet metal plate 23 serving as a support for the wings of the valve. The wings 24 and 25 for valve 9 consist of a single sheet of rubber which is passed beneath the lower straight edge of support 23 and is there gripped and held by a metal channel 26. Each wing is reinforced on its upper surface by a segmental plate 27 of Bristol board or other stiffening material, and each wing is of segmental shape as shown in Fig. 3 and consequently is adapted to completely shut off the passage of air in reverse direction through the conduit in which valve 9 is lo-

cated. Valve 12 of the other conduit is similarly constructed but is inverted. Its support is connected with the support for valve 9 by a strip or bail 28 which projects up into the funnel 10. The operator may grasp this bail between his teeth and pull both valves and their supports out of the tubes thereby completely opening both passages. This is an emergency measure but is of importance. Owing to the flexible character of funnel 10 it is even possible for the operator to withdraw the valves by hand and without removing the mask from his face.

No claims are herein made for the valve structure *per se*, as the same is covered in my co-pending application Serial No. 216,397, filed Feb. 9, 1918.

With an apparatus constructed as above described there is a purification of the incoming air and after the air as thus purified has been breathed, it is expelled through another path and so does not become mixed with the incoming pure air and does not in any way impair the activity of the chemical purifying agent relied on to remove the noxious gases from the air. By interposing a purifying agent in the path of the outgoing air, the operator is protected against inhaling destructive gases even though the valves be sluggish in operation or be removed entirely. However, with valves of the construction here described, the operation is not sluggish for they respond very quickly to the flow of air and are reliable in action in addition to being of cheap construction and easily renewable.

In the modification illustrated in Figs. 5 to 7 the same general principles are employed. A metal container 29 is divided by a transverse partition 30 into an intake conduit 31 and an outlet conduit 32, in both of which active absorbing material is stored above the grating 33 and beneath the grating 34. An opening at the bottom of the apparatus and initially closed by a cork 34′ communicates with both conduits through grating 33. Over the top of the metal container is a plate 35 having an orifice 36 leading to a valve 37 of the construction heretofore described, and similarly there is an orifice 38 communicating with an outlet conduit or pipe in which is a valve 39. The flexible funnel 40 of the gas mask embraces both valved conduits and when not in use can be stored together with the mask itself within the chamber formed by a flange 41 in which the metal container terminates at its upper edge. A cover 42 incloses all of these parts when they are not in use and the structure as a whole may be conveniently carried by a strap or bail 43.

I am aware that various changes may be made in the apparatus without departing from the spirit of my invention as defined by the appended claims.

I claim:

1. The combination, with a gas mask; of a rigid container connected therewith and having internal air inlet and outlet compartments which are distinct from each other and both of which are in communication with the atmosphere, to permit air to be drawn from the atmosphere directly into the inlet compartment and discharged from the outlet compartment directly into the atmosphere; purifying material in the inlet compartment; a check valve allowing air to be drawn through the inlet compartment directly into said mask; and a check valve allowing respirated air to be expelled from said mask directly into and through the outlet compartment.

2. The combination, with a gas mask; of a rigid container connected with said mask and adapted for attachment to the chest of the wearer and having internal air inlet and outlet compartments which are distinct from each other and both of which are in communication with the atmosphere, to permit air to be drawn from the atmosphere directly into the inlet compartment and discharged from the outlet compartment directly into the atmosphere; purifying material in each compartment; a check valve allowing air to be drawn through the inlet compartment directly into said mask; and a check valve allowing respirated air to be expelled from said mask directly into and through the outlet compartment.

3. The combination, with a gas mask including a depending funnel; of a container connected with the lower end of said funnel and having internal air inlet and outlet compartments which are distinct from each other and both of which are in communication with the atmosphere, said inlet and outlet compartments being provided, respectively, with an outlet opening and an inlet opening communicating directly with said funnel; purifying material in the inlet compartment; and a pair of reversely-acting check valves associated with said outlet and inlet openings for causing the air to pass successively through the outlet opening into said funnel and from the latter through the inlet opening.

4. In an anti-gas apparatus, the combination, with a gas mask, and a depending, flexible funnel connected thereto; of a rigid container to which the lower end of the funnel is connected having internal air inlet and outlet compartments which are distinct from each other and both of which are in communication with the atmosphere to permit air to be drawn from the atmosphere directly into the inlet compartment and discharged from the outlet compartment directly into the atmosphere; purifying material in said inlet compartment; a check valve allowing air to be drawn through the inlet

compartment directly into said funnel; a check valve allowing respirated air to be expelled from said funnel directly into and through the outlet compartment; a chamber upon the top of the container to receive the mask and funnel when the apparatus is not in use; and a cover for said chamber.

5. The combination, with a gas mask including a depending funnel; of an air inlet conduit and an air outlet conduit leading, respectively, to and from the lower end of the funnel; purifying material in each conduit; a pair of reversely-acting check valves arranged in said conduits at the points where the latter open into said funnel for causing the air to pass through said conduits in succession; and a member connecting said valves and projecting into said funnel to be grasped between the teeth of the wearer, thereby to withdraw both valves from their conduits into the funnel, so as to completely open both conduits.

6. The combination, with a gas mask including a depending funnel; of a container connected with the lower end of said funnel, and having internal air inlet and outlet conduits leading, respectively, to and from said funnel end; purifying material in each conduit; a pair of reversely-acting check valves associated with said conduits for causing the air to pass therethrough in succession; and a member connecting said valves and projecting into said funnel to be grasped between the teeth of the wearer, thereby to withdraw both valves from their conduits into said funnel, so as to completely open both conduits.

In testimony whereof I affix my signature.

HIPPOLYTE ROMANOFF.