

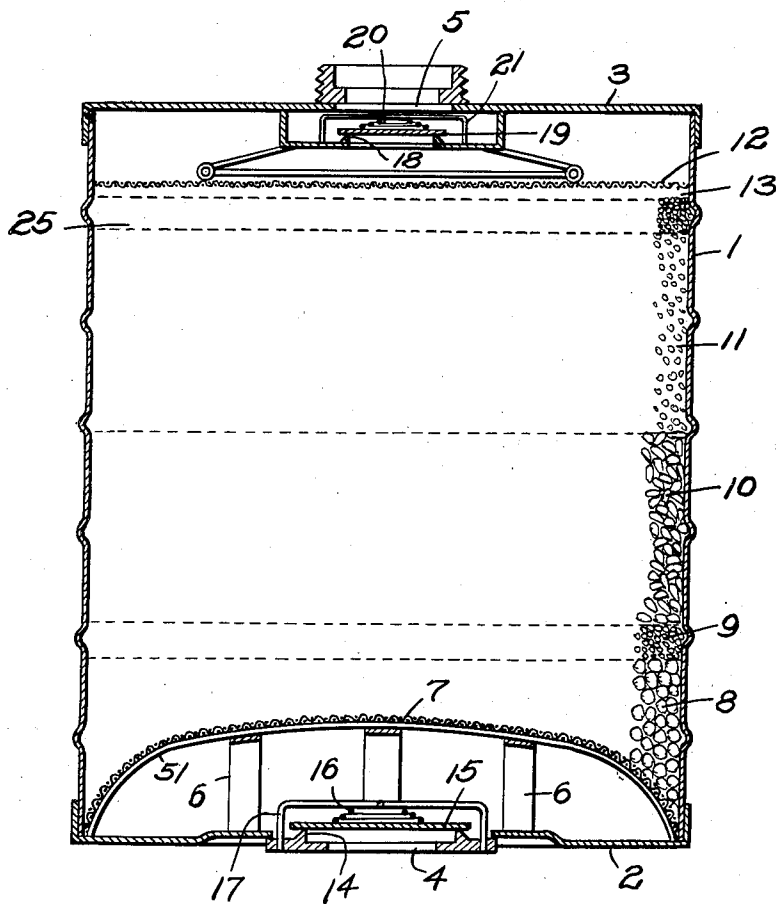
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CANISTER FOR GAS MASKS AND THE LIKE

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WITNESSES
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UNITED STATES PATENT OFFICE.

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CANISTER FOR GAS MASKS AND THE LIKE.

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The invention relates to canisters for gas masks, and an object thereof is to provide a canister in which a carbon monoxide catalyst which functions best when dry is protected by a moisture-remover, which, when it becomes incapable of effectively removing moisture from the air passing through the canister will render breathing through the canister difficult and thereby warn the user of the apparatus that a fresh canister should be substituted for the one in use.

A further object of the invention is to provide a canister for gas masks with means to prevent air entering the canister in all positions thereof when it is not in use.

The invention is illustrated in the accompanying drawing which shows a canister in longitudinal central sectional view.

In the practice of the invention, a casing or container is packed or otherwise provided with a body of catalytic material capable of converting poisonous monoxide into nonpoisonous carbon dioxide so that air to be breathed which contains carbon monoxide will have this poisonous gas removed from it. The catalytic material is preferably what is known as "hopcalite", a mixture of two or more metallic oxides in granular form. For example, it may be a mixture of manganese dioxide and copper oxide, the former being in excess of the latter, or a mixture of these two oxides plus cobaltic and silver oxides. This mixture of oxides functions best in the manner explained when dry. To remove the moisture from the air or gas, before the latter passes through the catalyst, the container is provided with a body of moisture-removing material which may take the form of granular calcium chloride or caustic soda either free or impregnated into a carrier such as pumice stone. After this moisture-removing material has been used for a time it becomes incapable of properly removing moisture from the air with the result that the moisture passes through it into the metallic oxides slowly rendering them less active against carbon monoxide. To serve as a warning to the user of the canister that it is becoming incapable of purifying the air being breathed, the container is further provided with another body of material in con-

tact with the body of moisture-removing material and capable of reacting with it when the latter becomes moist as it does after having removed an appreciable amount of moisture from the air. The contact between these reacting materials may be effected either by mixing them or arranging them in stratified layers. The material resulting from the reaction that thus takes place clogs the interstices of the moisture-removing materials to such an extent that it is difficult to draw air through the canister. This serves as a warning to the user that a new canister should be substituted for the one in use. The body of material in contact with the moisture-removing material is preferably a body of sodium hydroxide which is also a moisture-removing material and has the additional function of removing from the air carbon dioxide or other gases having an acid reaction.

In the illustrative embodiment of the invention, the canister includes a casing having side walls 1, a bottom 2 and a cover 3, the bottom being provided with an air inlet 4 and the cover with an air outlet 5. Adjacent to the bottom there is an arched frame comprising longitudinal and transverse strips 51 and 6 supporting a screen 7 above the inlet 4. The several materials entering into the canister charge are preferably arranged in layers within the casing. Immediately above and supported by screen 7, there is a layer 8 of calcium chloride preferably impregnated into a carrier and forming a primary moisture-removing material, and immediately above and in contact with it, there is a layer 9 of sodium hydroxide capable of reacting with the calcium chloride and also forming a secondary moisture-removing material. A second layer 10 of calcium chloride is preferably arranged on top of the layer 9 of sodium hydroxide for the purpose of further removing moisture from the air, or, viewed differently, the layer of sodium hydroxide may be considered as being contained within the body of calcium chloride. On top of the layer 10 of calcium chloride is a layer 11 of mixed metallic oxides, above which the casing is provided with a screen 12. Between the screen and metallic oxides there may be arranged a thin layer of cotton 13 forming a

dust filter, and also a layer 25 of calcium chloride, the latter being provided to protect the metallic oxides against moisture from air that might leak into the canister through its outlet 3 when the canister is not in use.

To protect the canister against the ingress of air in all positions of the canister during the time it is not in use, and to thereby avoid the deterioration of the canister charge, the inlet and outlet openings of the casing are preferably provided with normally closed check valves. Adjacent to air inlet 4 the casing may be provided with an inwardly projecting annular valve seat 14 against which a plate 15 is yieldingly urged by means of a spring 16 backed by a cage 17. Plate 15, which may be made of rubber, mica, ground metal and the like, forms a check valve which, when seated upon valve seat 14, effectively closes the inlet against the ingress of air regardless of the position of the canister.

The valve at the air outlet 5 is constructed similar to that at the inlet, and includes a valve seat 18, and a plate 19 backed by a spring 20 arranged in a cage 21.

The canister may be used in gas masks intended for use by miners, firemen, steel workers and others when compelled to be in an atmosphere containing carbon monoxide. The body of granular mixed metallic oxides in the canister effectively catalyzes the carbon monoxide into carbon dioxide as long as such body is not too greatly saturated with moisture. Moisture is removed from the air by the primary and secondary moisture-removing materials, namely, the layers 8 and 10 of calcium chloride and the layer 9 of sodium hydroxide, which are in contact with each other. When the moisture-removing materials have become moist by reason of the removal of moisture from the air, they react with each other with the result that the interstices of these materials at the point of reaction are sufficiently clogged to render difficult the drawing of air through the canister. This serves as a warning to the user of the mask that a fresh canister should be substituted in the place of the one used.

In all positions of the canister when it is not in use, the valves at its inlet and outlet effectively prevent the ingress of moisture through the air-purifying materials so that the canister charge does not deteriorate while idle.

According to the provisions of the patent statutes I have described the principle and operation of my invention together with the construction which I now consider to represent the best embodiment thereof. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced by other

forms of construction than that particularly shown and described.

I claim:—

1. A canister for a gas mask and the like, comprising a casing having an air inlet and an air outlet, and provided with a body of moisture-removing material and a body of material in contact with and capable of reacting with said moisture-absorbing material when the latter is moist, and further provided with a carbon monoxide catalyst, the air flowing from the inlet to the outlet of the casing passing first through the moisture-absorbing material and then through the catalyst, and said flow of air being retarded when said moisture-absorbing material reacts with said body of material in contact with it.

2. A canister for a gas mask and the like, comprising a casing having an air inlet and an air outlet, and provided with stratified layers of a primary moisture-removing material, a secondary moisture removing material in contact with and capable of reacting with said primary moisture-absorbing material when both are moist, and a carbon monoxide catalyst, the air flowing from the inlet to the outlet of the casing passing through said layers in the order named, and said flow of air being retarded when said primary and secondary moisture-removing materials react with each other.

3. A canister for a gas mask and the like, comprising a casing having an air inlet and an air outlet, and provided with a body of calcium chloride and a body of sodium hydroxide in contact with the calcium chloride, and further provided with a body of mixed metallic oxides for catalyzing carbon monoxide, the air flowing from the inlet to the outlet of the casing passing first through the calcium chloride and sodium hydroxide and then through the mixed metallic oxides, and said flow of air being retarded when said bodies of calcium chloride and sodium hydroxide react with each other.

4. A canister for gas masks and the like, comprising a casing having an air inlet and an air outlet, and provided in the order named with stratified layers of calcium chloride, sodium hydroxide in contact with the calcium chloride, calcium chloride in contact with the sodium hydroxide, and mixed metallic oxides, the air flowing from the inlet to the outlet of the casing passing through said layers in the order named, and said flow of air being retarded when said bodies of calcium chloride react with said body of sodium hydroxide.

5. A canister for gas masks and the like, comprising a casing having an air inlet and an air outlet, and provided with air-purifying material which deteriorates when subjected to moisture, and check valves normally closed in all positions of the canister

for preventing flow of moisture-laden air into said casing through said inlet and outlet when the canister is not in use.

6. A canister for a gas mask and the like, comprising a casing having an air inlet and an air outlet, and provided with an air-purifying material which deteriorates when subjected to moisture, and spring-pressed

check valves normally closed in all positions of the canister for preventing flow of moisture-laden air into said casing through said inlet and outlet when the canister is not in use. 10

In testimony whereof, I sign my name.

ROSCOE P. MASE.