Sept. 22, 1936. G. K. E. H. STAMPE 2,054,890

PURIFYING DEVICE

Filed Oct. 6, 1931

Fig. 2.

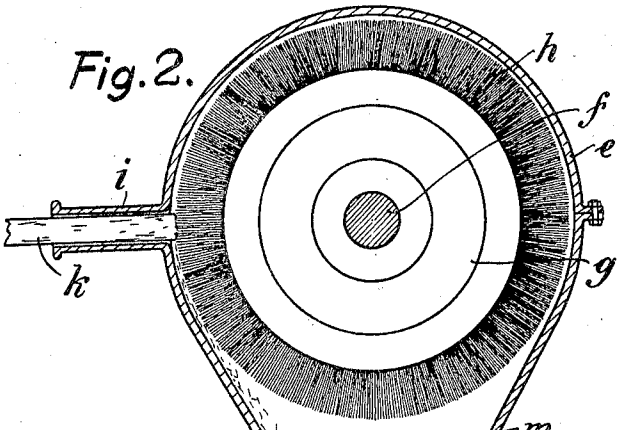
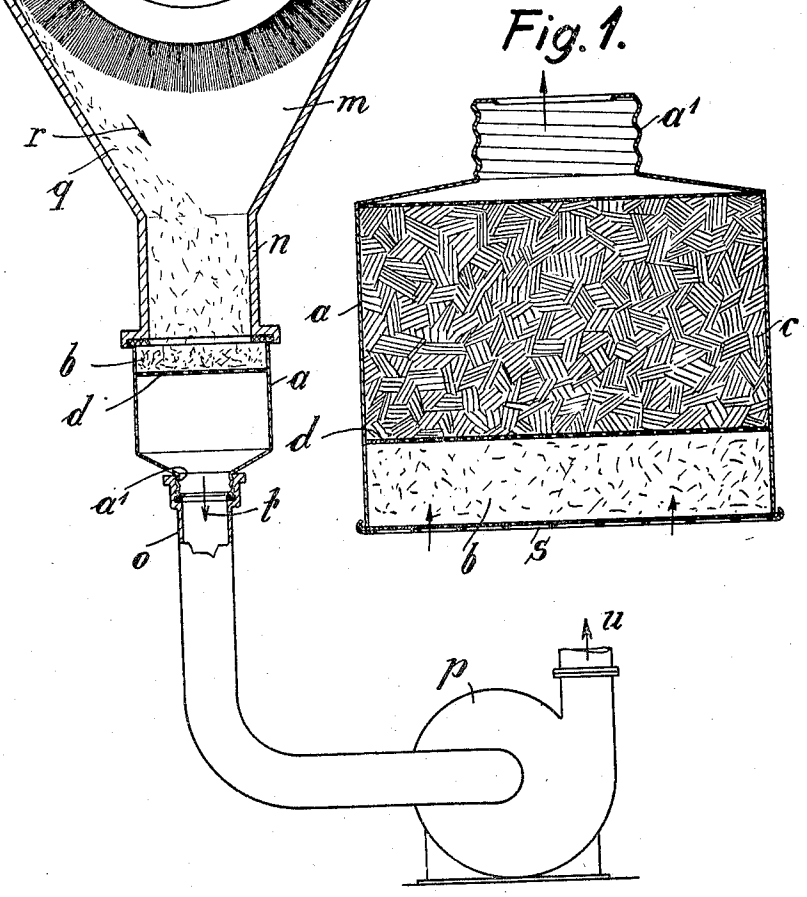


Fig. 1.



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Patented Sept. 22, 1936

2,054,890

UNITED STATES PATENT OFFICE

2,054,890

PURIFYING DEVICE

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Application October 6, 1931, Serial No. 567,277
In Germany January 26, 1931

3 Claims. (Cl. 183—45)

The present invention relates to a breathing canister for smokes, gases or vapours to be used especially in connection with gas masks or the like.

Such breathing canisters usually are manufactured in two sizes, one being larger than the other. The canisters of larger size must be connected to the face-piece of the mask by means of an intermediary member such as a hose or similar device, whereas the small boxes may be attached directly to the face-piece.

Breathing canisters generally contain layers of material having gas absorbing and gas fixing qualities, and of filtering materials adapted to retain noxious smokes or vapours. For making an efficient smoke-filter it was hitherto necessary to use rather a considerable quantity of such filtering material (either in combination with or without gas absorbing or binding material). Therefore, the volume of an efficient filter required a casing of considerable size that is to say one of said large-sized canisters above mentioned which are attached to the face-piece mostly by a hose or the like and which are heavy and cumbersome in use.

The present invention has relation especially to a small breathing canister for all sorts of gases and smokes which may be attached directly to the face-piece of the mask. According to the invention the canister contains besides a layer of gas binding material, a further layer of a smoke filtering material of special character which will be explained in the following specification in detail.

One object of the invention is to construct a small breathing box of about 90 to 110 millimetres diameter for direct connection to the face-piece of a gas mask in such a manner that it contains a layer of filtering material for use against smoke as well as sufficient layers of the usual gas fixing or gas absorbing material without making the canister so heavy as to prevent direct attachment to the face-piece of the masks.

A further object of the invention is to provide such a canister with a smoke filter in addition to gas fixing or gas absorbing material without increasing the breathing resistance of the canister in an unsuitable manner.

With these objects in view the invention consists in certain features which will be explained hereinafter by having reference to the accompanying drawing.

In this drawing Fig. 1 is a section through a breathing canister manufactured in accordance with the invention.

Fig. 2 is a somewhat diagrammatical sectional view (partly a side view) of an apparatus adapted to provide the casing with the smoke filter.

In Fig. 1 *a* is a casing having the usual shape and size of a small breathing box with a diameter of about 90 to 110 millimetres and a height not exceeding 100 millimetres. a^1 is the screw-threaded attachment pipe for attaching the filter directly to the mask. The air is flowing through the canister in the direction of the arrows. Near the inlet of the air a layer *b* of the special smoke filtering material is placed, the character and composition of which material will be presently explained. The thickness of this layer *b* is at most 30 millimetres, preferably less. Further the usual gas absorbing and fixing material *c* is arranged in the usual manner. A wire screen *d* is placed between the layers *b* and *c*.

In Fig. 2 an apparatus is shown by means of which the casing *a* may be filled with the layer of smoke filtering material *b*. *e* is a closed casing within which a shaft *f* is rotatably mounted. On this shaft a cylinder or roller *g* is fixed being provided on its circumference with sharp bristles *h* or the like giving the cylinder or roller *g* the character of a rotating brush. An inlet opening *i* is provided in the wall of casing *e* for inserting a body *k* of cellulose or other suitable fibrous material such as wadding, felt, asbestos, wool or the like. This fibrous body *k* may have been obtained in any suitable manner for instance by pressing it into such a shape that it may be inserted through the opening *i*. The casing has a funnel-shaped portion *m* which ends in an outlet *n* to which is attached the casing of a breathing canister *a* such as shown in Fig. 1. To the connecting piece a^1 of the casing a pipe *o* is attached which is connected to and forms the intake pipe of a blower *p*.

The casing *a* is attached to the outlet *n* in such a manner that the wire screen *d* is held in its place in any suitable manner thus forming a resistance for the purpose presently to be explained.

The state of cohesion of the fibrous body *k* is broken up by the aid of the rotating brush *g*, *h*. Hereby the individual fibres are isolated. The roller-shaped brush combs the mass apart to a certain extent. Preferably the fibrous substance is fed to said brush uninterruptedly.

The individual fibres are then, as is indicated at *q* in Fig. 2 whirled away in the direction of arrow *r* by a powerful current of air which is generated within the casing *e* and the attached parts by the blower *p*. They are drawn through funnel *m* and outlet *n* into the casing *a* where

they find a resistance on the perforated sheet *d*. Above this sheet the fibres are irregularly stapled or assembled without being interconnected with each other. They are held together only by the walls of the casing *a*, by the perforated sheet *d* and by a perforated cover *s* (shown in Fig. 1) to be applied after the filling operation has been finished and the casing *a* has been disconnected from outlet *n*. The air is drawn through the perforations of sheet *d* and flows through pipe *o* through the blower *p* and out from it in the direction of the arrows *t* and *u*.

The fibres of the layer *b* may be pressed together into a certain density or compactness to a certain extent by the current of air the suction effect of which must be chosen to obtain this effect. If, however, the use of stronger currents of air is desired to be avoided, the slight compression of the fibres may be carried out by mechanical means. The fibres thus assembled or stapled form an excellent smoke filter without using any binding medium whatsoever.

Instead of using a suction current of air a blowing air current may be caused to act upon the fibres. The suction effect emanating from the filter casing to be partially filled is, however, preferable as in this way as low a loss as possible of the fibres to be whirled away is achieved.

After having been partially filled with the fibrous filtering layer *b* in the manner described and shown and after having been closed with the perforated cover *s* the casing *a* is further filled in the usual manner with the layer *c* of gas absorbing and gas fixing material and is then ready for use. These filling steps may be reversed, that is to say the casing may first be filled with the layer *c* and then with the fibrous filtering layer *b*.

The layer *b* of filtering fibres is of very light specific weight. Its resistance to the passage of air through it is so small that it is not objectionable. This is obtained largely by the uniformity of the pores between the individual fibres. Furthermore the surface presented within the filtering layer to the air passing therethrough is large.

I claim:—

1. A purifying device for the removal of smoke, vapours, and gases from air which is intended for respiratory use in gas masks, comprising a canister with partially air-permeable walls adapted for suspension from a gas mask, a layer of gas fixing and absorbing material within said canister, a layer of smoke removal material composed of unconnected fibers held together as a compact mass by the walls of said canister irregularly stapled by assembling them from a state in which they are isolated from each other and have no interconnection with each other into a state in which they are also uninterconnected and form a loosely built up but coherent layer, positioned within said canister and adapted to cooperate with the first mentioned layer to effect air purification, and a perforated sheet metal plate positioned between said two layers of purifying material and forming part of the walls enclosing the irregularly stapled fibers.

2. A purifying device for the removal of smoke, vapours, and gases from air which is intended for respiratory use in gas masks, comprising a canister with partially air-permeable walls adapted for suspension from a gas mask, a layer of gas fixing and absorbing material within said canister, and a layer of smoke removal material composed of short, fine fibers, irregularly stapled by assembling them from a state in which they are isolated from each other and have no interconnection with each other into a state in which they are also uninterconnected and form a loosely built up but coherent layer in which they are held together as a more or less compact mass by the walls of said canister.

3. A purifying device as set forth in claim 2 in which the smoke removal layer does not exceed 30 millimeters in thickness.

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