Dec. 3, 1935. J. E. MALIVERT 2,023,332

TRANSPARENT PARTITION

Filed May 10, 1934

Fig. 1.

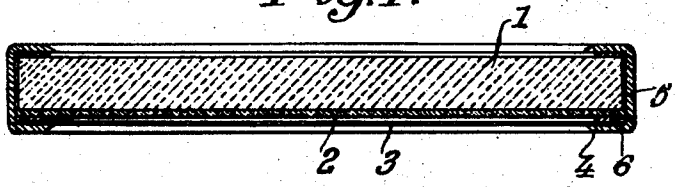


Fig. 2.

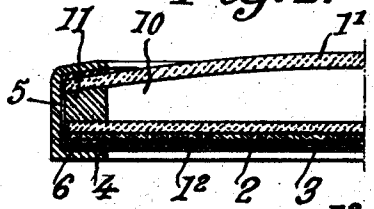


Fig. 3.

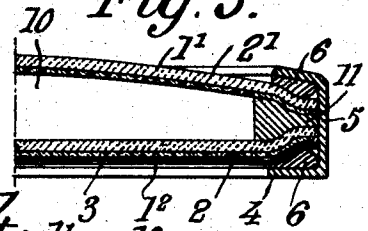


Fig. 4.

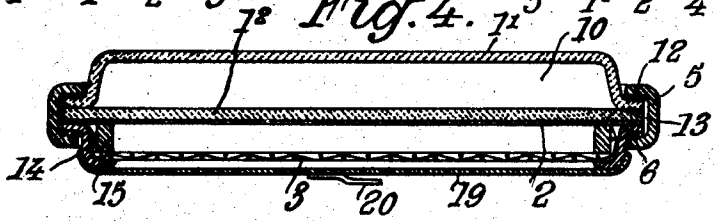


Fig. 5.

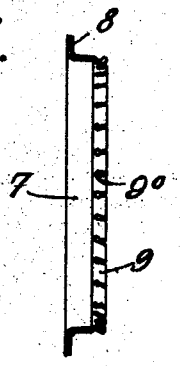


Fig. 6.

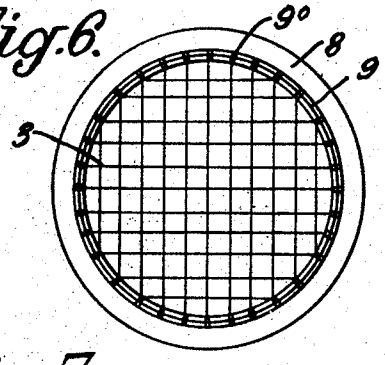


Fig. 7.

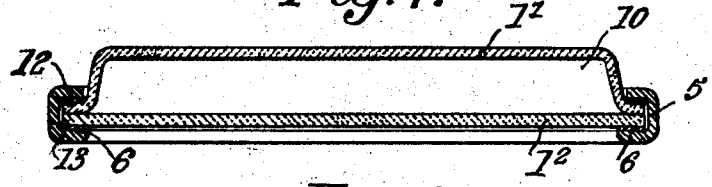
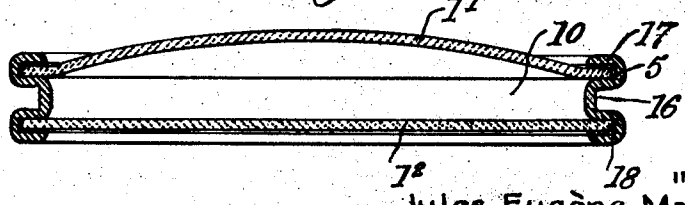


Fig. 8.



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UNITED STATES PATENT OFFICE

2,023,332

TRANSPARENT PARTITION

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6 Claims. (Cl. 2—14)

The present invention relates to transparent partitions for separating mediums in which the temperatures are different, and for preventing moisture from condensing on one of the faces of the partition. The invention is especially concerned with partitions for use as glasses in gas masks. In the prior art, condensation has been avoided either by applying on one face of the partition a layer of hygroscopic material, such as gelatin, or by the use of two transparent elements between which is a fluid which is a poor conductor of heat.

The object of the present invention is to provide an improved transparent partition of the type above referred to, which is better adapted to comply with the requirements of actual practice, especially from the point of view of time of service and facility of fitting.

A first feature of my invention consists in protecting the face of the partition of the type above referred to which carries the layer of hygroscopic material by means of a transparent grid.

Other features of the present invention apply more particularly to the case in which the transparent partition of the type above referred to consists of two rigid transparent elements, leaving between them a space filled with a fluid which is transparent and a bad conductor of heat.

One of these features consists in applying on the inner face of at least one of these elements, which limit this space, a transparent layer of a hygroscopic material capable of absorbing the condensed moisture that might be produced by water present in said space.

A third feature consists in arranging the frame or holding member for the two transparent elements so that it can engage in the aperture of a gas mask.

A fourth feature consists in making the element that serves to connect these two transparent elements with each other of a non-metallic material which is a bad conductor of heat.

A fifth feature of the present invention consists in protecting the face of the transparent partition of the type above referred to by means of a removable lid, for instance of cardboard as long as the device is not in use (for instance stocked).

These and other features of the present invention will appear from the following detailed description thereof.

Preferred embodiments of the present invention will be hereinafter described with reference to the accompanying drawing, given merely by way of example, and in which:

Figs. 1, 2, 3, and 4 are cross sectional views of four glasses for gas masks made according to the present invention;

Fig. 5 is a sectional view of a particular embodiment of one of the elements of the combined structures illustrated by the preceding figures;

Fig. 6 is an elevational view corresponding to Fig. 5;

Figs. 7 and 8 are cross sectional views of other embodiments of glasses for gas masks made according to the present invention.

According to the present invention, the rigid transparent support 1 (Fig. 1) can be made of glass, crystal, pyrex glass, multiplex glass, hardened glass, unbreakable glass, or the like.

It can also be made of a material which is more adiathermic than glass, such as mica, derivatives of cellulose, transparent condensation products (urea-formaldehyde condensation products) etc.

These materials are utilized either in their natural state or in combination with a transparent reinforcing structure consisting of a kind of grid which is either metallic or made of a textile matter (muslin).

On one of the faces of this support, to wit, the face that is intended to be on the inside of the mask, I apply a transparent layer 2, the thickness of which may vary according to the specific cases, of a material capable of absorbing moisture. Such a material may be either gelatinous (gelatin, various glues, agar-agar, etc.) or albuminoid. It may consist of cellulose or derivatives of cellulose, which can, eventually, be made insoluble in water, for instance by treating them with chromic acid.

The layer of the material intended to prevent condensed moisture from forming a film on the transparent partition can be applied onto the transparent support by spreading it, or by dipping this support into said material, by atomization, or through any other suitable method.

Most of the moisture absorbing materials above referred to, and especially gelatin, which serve to constitute layer 2, must not be touched with a moist finger or a moist fabric, for instance with a view to cleaning them, because in this case the moisture absorbing material, such as gelatin, sticks to the fabric or finger and is deformed.

According to the present invention, the hygroscopic layer 2 is advantageously protected by means of a grid 3 made of elements sufficiently spaced apart for permitting a good visibility but arranged in such manner as to prevent the moisture absorbing layer from being touched. As shown in the drawing, this grid is held between

the edge 4 of the annular setting 5 and the layer to be protected by means of flexible joints 6.

Figs. 5 and 6 show a particular arrangement of grid 3 in which use is made of a ring 7 one of the edges 8 of which is adapted to be placed behind the bent edge 4 of the setting 5 which setting is particularly shown in Figs. 1, 2, 3, 7, and 8. The other edge 8 of ring 7 is provided with notches 9° suitably distributed along the periphery thereof and in which one or several wires is, or are, passed so as to form the protecting grid.

When relatively considerable differences of temperature may exist between the mediums on either side of the partition (in the case of gas masks this difference may be as high as 60° C.), it is advisable to thermically insulate, as much as this is possible, the inner face, which carries the moisture absorbing layer from the external face of support 1 by giving the latter a relatively great thickness, as shown in the embodiment of Fig. 1.

The same result can be obtained, as shown by the embodiments of Figs. 2 to 4 inclusive, 7 and 8, by providing a plurality of transparent supports, for instance two elements 1^1 and 1^2, leaving between them a space which is closed in a fluid tight manner. This space contains a medium which is a bad conductor of heat, such as a vacuum, dry air, or even a liquid or a transparent solid material.

When the space 10 between the elements 1^1 and 1^2 is filled with air or a gas containing moisture, or a gas which may contain moisture due to leakage past the setting 5, I may apply, according to the present invention, on the inner face of at least one of the elements 1^1, 1^2 a layer 2^1 of a hygroscopic or moisture absorbing material, for instance one of the matters above stated and preferably gelatin.

When the structure according to the present invention consists of two transparent elements 1^1 and 1^2, fluid tightness between these elements can be obtained by means of an elastic joint 11, made of india-rubber for instance, the different parts of the structure being maintained together, with joints 6 interposed between them, by means of a ring or the equivalent forming the setting 5. In order to obtain a suitable tensioning of the elements 1^1 and 1^2 in the case of the latter having a certain elasticity due to their being made for instance of celluloid, the fluid-tight packing member 11 can be given a shape somewhat similar to that of a trapezium, as shown in the embodiment of Fig. 3, joints 6 being given a triangular cross section so that they can engage in a wedge-like manner into the peripheral grooves of member 11.

The embodiments of Figs. 2 and 3 have the disadvantage that the juxtaposition of the various parts gives a relatively great height to the whole, so that certain difficulties are experienced for engaging and maintaining the structure in the housing (generally a rubber ring) that is provided for it in the mask.

Furthermore, the metallic setting 5 is a good conductor of heat and as its outer edge is bent or applied against the external element of the combined partition and as this edge is not protected by the rubber ring above referred to, it transmits cold to the gaseous fluid present in space 10 and therefore produces condensation of the moisture present in said space, which moisture deposits upon the inner faces of elements 1^1 and 1^2. Finally, as the total height of the structure to be engaged in the rubber ring above referred to is limited, the heat insulating space 10 cannot be given a thickness as great as it would be desirable.

These drawbacks are avoided, according to the present invention, by giving at least one of the elements 1^1 and 1^2 the shape of a dish, for instance by moulding or stamping. The free edge 12 of this dish-shaped element is curved outwardly so as to be substantially parallel to the general plane of the dish (the bottom of which can be either plane or curved). The other element may have a plane or a slightly bulging shape and its edge 13 is applied against the edge of the first mentioned element and secured thereto by means of a ring 5 of small height.

Such an arrangement is illustrated by Fig. 4 (with a protecting grid) and by Fig. 7 (without a protecting grid). These figures clearly show that the height of ring 5 is relatively small, that it may be fully engaged in the housing (rubber ring) provided in the mask and that there is practically no limit to the thickness of space 10.

In order to obtain, in the case of Fig. 4, a suitable fixation of the grid, I make use of a ring 14 of Z-shaped cross section. Before assembling the parts, the grid is posed in the recess formed by said ring. A rigid ring 15 is forced into this recess so as to stretch the grid and to tightly maintain it against the lower edge of the ring 14. The whole thus assembled is then applied against element 1^2 and the various parts of the structure are fixed together by means of the annular setting 5. With such an arrangement it is possible, without increasing the thickness or height of the annular setting 5, to place grid 3 as far as it is desired from the hygroscopic layer 2 that is to be protected by said grid.

The modification shown in Figs. 5 and 6 can be easily applied in place of the grid 3 as shown in Figs. 1, 2, and 3. In such a case, the rim 8 of these modifications is inserted between the flexible joints 6 and is secured to the structure by means of the annular setting 5 in the same way as the grid 3 is shown to be secured in these figures. This arrangement may likewise be applied in the same manner in the modifications shown in Figs. 7 and 8, which do not disclose the protective grid 3.

The arrangement disclosed by Fig. 8 differentiates from the preceding embodiments in that the setting acts also as a distance piece between elements 1^1 and 1^2. However, instead of being cylindrical, this setting 5' is provided, in its intermediate part with a peripheral groove 16, thus forming two ribs 17 and 18 the height of which is such that one of them can be engaged and maintained without difficulty in the usual housing (rubber ring) provided in the gas mask. When this setting 5' is made of metal, it is preferable to engage rib 17 in this housing, rib 18 being then located on the inside of the mask and being therefore not exposed to cold. On the contrary, if, according to the invention, the setting 5' is made of a material which is a bad conductor of heat, for instance a mouldable product such as a phenol-formaldehyde condensation product (bakelite), it does not matter whether rib 17 is on the outside or the inside of the mask. It is obvious that a setting made of a material that is a bad conductor of heat could be employed with the embodiments shown in Figs. 1 to 7.

When the mask is not being used, for instance when it is being stocked for a period which may be very long, it may be advantageous to protect at least the hygroscopic layer 2 (Fig. 4) by means of a cover 19 which can be readily removed. This

cover may be made of cardboard and comprise a small flap 20 by means of which it can be removed without any difficulty.

While I have, in the preceding description, disclosed what I deem to be preferred embodiments, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of my invention as comprehended within the scope of the appended claims.

What I claim is:

1. A transparent partition of the type described, which comprises in combination, at least one rigid transparent support, a gelatinous layer of a moisture absorbing transparent material on at least one side of said support, a perforated element comprising a grid of large mesh on the same side of said support for protecting said layer from contact with outside media, and means for holding said parts in assembled relation.

2. A transparent partition of the type described, which comprises in combination, at least one rigid transparent support, a gelatinous layer of a moisture absorbing transparent material on at least one side of said support, a perforated element comprising a grid of large mesh adjacent to said layer on the outer side thereof for protecting said layer from contact with outside media, and an annular setting for holding said parts in assembled relation.

3. A transparent partition of the type described, which comprises in combination, two rigid supports, means for joining together the edges of said supports so as to leave between them a closed space, a medium which is transparent and a bad conductor of heat in said space, a gelatinous layer of a moisture absorbing transparent material on the outer face of at least one of said supports, a perforated element comprising a grid of large mesh on the same side of said support for protecting said layer from contact with outside media, and means for holding said parts together in assembled relation.

4. A transparent partition of the type described, which comprises in combination, a rigid transparent support, a dish-shaped rigid transparent support the edge of which is adapted to fit against the edge of the first mentioned rigid transparent support so as to leave between said supports a closed space, a medium which is transparent and a bad conductor of heat in said space, a layer of a moisture absorbing transparent material on the outer face of the first mentioned support, a ring of Z-shaped cross section applied against the peripheral portion of said face of the first mentioned support, a grid having its edge inserted between said face and said ring, a cylindrical member located inside said ring between said face of the first mentioned support and said grid for stretching said grid, and a ring having bent edges tightly holding together the edges of said supports and the edge of said first mentioned ring.

5. A partition according to claim 4 further comprising a lid of a material such as cardboard adapted to be applied against the outer face of the first mentioned ring.

6. A transparent partition comprising in combination at least one rigid transparent support, a gelatinous layer of moisture absorbing transparent material on at least one side of said support, a screen having closely spaced openings therein on the same side of said support permitting free vision therethrough, whereby said layer will be protected from contact with external media, and means for holding said parts in assembled relation.

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