Oct. 27, 1936. J. E. MALIVERT 2,058,703

METHOD FOR TREATING CELLOPHANE AND LIKE PRODUCTS

Filed Sept. 24, 1934

Fig. 1

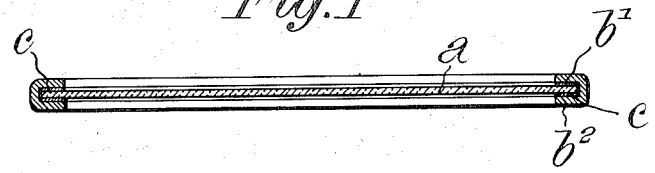


Fig. 2

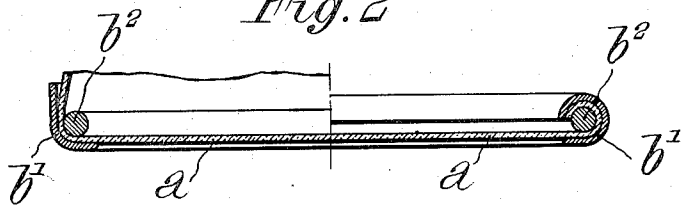


Fig. 3

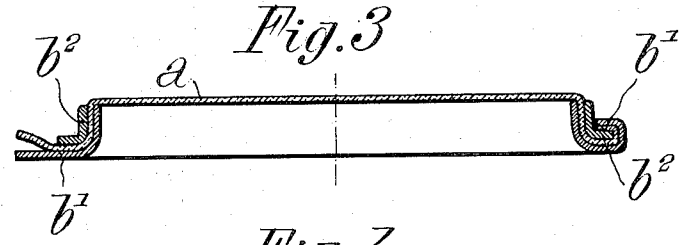


Fig. 4

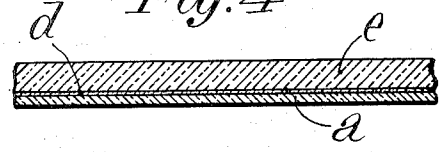


Fig. 5

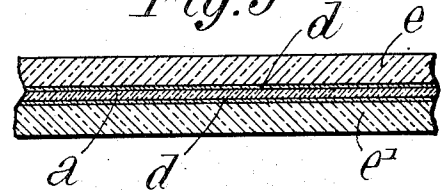
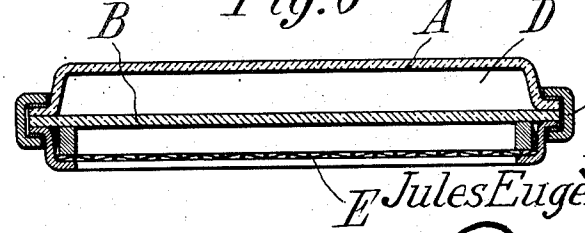


Fig. 6



Inventor:
Jules Eugène Malivert
Attorneys:
Bailey & Carson

Patented Oct. 27, 1936 2,058,703

UNITED STATES PATENT OFFICE

2,058,703

METHOD FOR TREATING CELLOPHANE AND LIKE PRODUCTS

Jules Eugéne Malivert, Levallois-Perret, France, assignor to Society "L'Accessoire De Precision", Levallois-Perret, France, a society of France

Application September 24, 1934, Serial No. 745,346
In France September 30, 1933

5 Claims. (Cl. 154—2)

The present invention relates to methods of treating "Cellophane" and like regenerated cellulose products and it is more particularly, although not exclusively, concerned with methods for use in the treatment of transparent walls, such for example as those comprised by gas masks.

It has for its object principally so to treat the "Cellophane" or like product that it cannot be deformed under the action of moisture while maintaining its property of being transparent in a humid medium.

In accordance with the present invention, the "Cellophane" is saturated with a liquid and the wetted member is then mounted on a support adapted to prevent subsequent contraction as a result of the drying.

In order that the nature of the invention may be more clearly understood, reference will now be made to the accompanying drawing, in which:—

Fig. 1 shows in axial section a transparent wall of "Cellophane" or like material arranged according to a first embodiment of the invention.

Fig. 2 shows in axial section, on the two sides of the centre line, two stages of the preparation of a transparent wall of "Cellophane" or like material, the left hand part showing the preparatory phase and the right hand part the final phase, according to a first embodiment of the invention.

Fig. 3 shows similarly, a transparent "Cellophane" wall according to another embodiment.

Figs. 4 and 5 show in section two other transparent walls of "Cellophane" according to the invention, and

Fig. 6 shows in section a window for a gas mask constructed according to the invention.

Supposing, in the first place, that it is proposed to construct a transparent wall, for example a window for a gas mask, the following or a similar construction can be adopted:

A sheet of "Cellophane" or like material of suitable dimensions, more particularly as regards its thickness, is immersed for a certain time in a liquid bath, such as water, advantageously heated to 50° C. for example. The liquid is not necessarily water. It is sufficient that it should be absorbed by the "Cellophane", that it should not affect this latter, more particularly as regards the properties of transparence thereof, and that it may evaporate after the sheet has been withdrawn from the bath.

While the "Cellophane" is immersed in the liquid, it absorbs the said liquid and swells, which is shown principally by an increase in the dimensions of the sheet in length and width. When it is impregnated to the saturation point, for example after about fifteen minutes, it is withdrawn from the bath and while it is still wet it is fitted on a support which maintains it under tension despite the fact that on drying there is a tendency to contract by reason of the loss of moisture. It should be understood that the support should be arranged in such a way that it could resist the high interior contracting tensions of the "Cellophane" and that the sheet cannot become detached, which would permit the sheet to contract to its original dimensions.

The sheet of "Cellophane" or like material being thus maintained under tension, it will be understood that it loses, by drying, the liquid contained therein and that it may then absorb moisture up to the saturation point without deformation and without losing its transparency to any considerable extent. This feature makes the wall more particularly suitable for use as a transparent wall or as a part of a transparent wall for the production of articles, objects or instruments to which moist air may have access, that is to say it may be employed as an "anti-mist" device.

The difficulties of the known transparent walls of "Cellophane" mounted in a support and not preliminarily treated as referred to above, are thus avoided. In effect, the "Cellophane", when it is located in a damp medium, absorbs moisture and swells and at the same time it is irregularly deformed. This deleteriously influences the appearance of the wall, considerably destroys its visibility and destroys the rigidity of the wall, which leads to danger of perforation by coming into contact with a pointed article such as a branch of a tree. It will be understood that once deformed, the transparent wall never again returns to its original plane form, even if it is placed in a practically dry medium.

Figs. 1 to 5 show various examples of the manner in which a sheet of "Cellophane" impregnated with a liquid may be retained in the tensioned state or may be prevented from retracting, such as would occur if it had been left to itself to dry.

The examples according to Figs. 1 to 3 are more particularly applicable to the production of transparent walls of circular form, such as are utilized for the windows of gas masks, lookouts, the elements of viewing, measuring or optical instruments, or the like. It is to be understood that the invention is in no way limited to these particular applications and that the form, dimen-

sions and use of the transparent walls thus obtained are of little importance as regards the nature of the present invention.

In the example according to Fig. 1, the edge of the sheet of "Cellophane" *a* which is swelled in the liquid preferably up to the point of saturation and thus damp, is secured between the curved-over edges b^1, b^2 of a frame or window, the clamping action thereof being sufficient to overcome the internal tensions of the sheet when it tends to contract on drying. For this purpose there may advantageously be arranged between the frame and the edge of the sheet, rings *c* of more or less flexible material, for example pressboard, which increase the retaining effect.

For the example according to Fig. 2, the sheet *a* which is in a wet state and not cut to exact measurements, is introduced into a frame b^1 of which the transverse section has the form of a rounded angle (see the left hand part of Fig. 2). The tensioning of the sheet is effected with the aid of a ring b^2 which is placed in the cavity at the inside of the frame b^1. The raised edge of the latter is turned over, for example by spinning (see the right hand part of Fig. 2) and the excess part of the sheet of "Cellophane" is cut away around the edge of the member thus obtained.

For the example according to Fig. 3, the damped sheet *a* is placed on the upper edge of the frame b^1 of which the transverse section is of angle form (see the right hand part of Fig. 3). On the said frame there is placed a second frame b^2 of similar form and the lower edge of the first frame b^1 is bent over on frame b^2, for example by spinning (see the right hand part of Fig. 3). In this case again, the excess parts of the sheet of "Cellophane" are cut away.

In the embodiment of Fig. 4 the preserving of the sheet of "Cellophane" or the like under tension is obtained in a quite different manner. In this case the damped sheet of "Cellophane" is stuck to a rigid transparent support, such as glass, triplex glass, safety glass, rhodoid or celluloid and the connection thus produced between the rigid support and the sheet of "Cellophane" prevents deformation of this latter when it is placed alternatively in a dry or in a damp medium, while preserving its property of preventing the deposition of mist.

To effect the adherence to the rigid support, use may be made of any suitable method, that indicated below being given only by way of example.

In the first place the sheet of "Cellophane" *a* is left in a liquid bath for the time necessary for it to swell up to saturation (about fifteen minutes for water) and at a suitable temperature (about 50° C. for water). Then the transparent rigid support is suitably cleaned and it is preferably brought to a higher temperature than the surrounding temperature, for example about 50° C. There is spread on this support a layer of adhesive *d*, for example a solution of gelatine in dilute acetic acid and alcohol, this being applied while hot. The sheet of "Cellophane", after preliminary cleaning, is placed on this adhesive layer in the hot state. The assembly is then placed in a press to obtain perfect adhesion and to eliminate the presence of bubbles of air. In such cases one can obviously secure another sheet of "Cellophane" to the outer face of the transparent support *e*. The member thus prepared may then be placed in a frame similar to that of Fig. 1 and is thus ready for the use for which it is destined.

It is also possible, as shown in Fig. 5, to apply to the sheet of "Cellophane" fixed to a support, another transparent rigid support e^1 in such a way as to obtain a wall or panel of complex construction which is similar to triplex glass but which is distinguished therefrom not only by its construction but also by its method of manufacture. In this case the property of "Cellophane" of acting as an anti-mist forming substance is no longer utilized but as its flexibility has not been altered by the treatment, the wall or panel may be utilized as a safety glass, that is to say a product wherein there is no danger of forming sharp splinters in the case where the wall is broken.

It should be noted also that the same advantages of safety can be obtained with the arrangement according to Fig. 4 and that in this case the "Cellophane" acts also as an anti-mist forming member. The only difficulty shown by this latter arrangement is that the "Cellophane" is not protected from external influences.

On Fig. 6 there is shown, purely by way of example, the manner in which the invention may be applied to a double walled window for a gas mask.

The outer transparent wall is designated as A, the inner transparent wall as B. The spectacle or frame C maintains the two walls clamped one against the other in a fluid-tight manner and it is destined to be engaged in a removable manner in the rubber packing comprised by the gas mask. Between the two walls A and B, a space D is left, filled with dry air or another, poorly conducting fluid or solid. In this case, the wall A can be formed of glass, celluloid or rhodoid utilized as such or carrying at least on its internal face, a layer of "Cellophane", gelatine or other material adapted to absorb the moisture contained in the space D. The wall B may also be arranged as shown in Figs. 1 to 3.

As regards the wall B, it may be constituted in any one of the methods explained above with reference to Figs. 1 to 4 but it may also be constituted by a transparent support carrying another absorbent than "Cellophane", for example an outer layer of gelatine, and in this case it is necessary to provide a grid E which prevents this delicate layer of gelatine from being touched or detached.

The invention it not limited to the precise forms or details of construction described, as these may be varied to suit particular cases.

What I claim is:—

1. A process for manufacturing transparent partitions from regenerated cellulose, comprising first completely saturating a regenerated cellulose foil in a liquid so that the foil cannot swell further, then fastening the foil securely in a flat tensioned state to a carrier, then drying the foil while so fastened, whereby contraction of the foil which would otherwise occur on drying is substantially prevented.

2. A process for manufacturing transparent partitions from regenerated cellulose, comprising first completely saturating a regenerated cellulose foil in a liquid so that the foil cannot swell further, then fastening the foil securely in a flat tensioned state in a frame, then drying the foil while so fastened, whereby contraction of the foil which would otherwise occur on drying is substantially prevented.

3. A process for manufacturing transparent partitions from regenerated cellulose, comprising first completely saturating a regenerated cellulose

foil in a liquid so that the foil cannot swell further, then adhesively securing the whole surface of the foil on a rigid transparent carrier, then drying the foil while so fastened, whereby contraction of the foil which would otherwise occur on drying is substantially prevented.

4. A process as claimed in claim 1 in which the saturation of the foil is carried out at a temperature of substantially 50° C.

5. A transparent element comprising a carrier, and a sheet of regenerated cellulose foil, said sheet having the dimension corresponding to its natural dimensions when completely saturated with liquid, and means rigidly securing said sheet to said carrier, whereby when said sheet is dry it is subjected to an internal tension caused by those forces which normally produce shrinkage of such a sheet upon drying.

JULES EUGÉNE MALIVERT.