Nov. 25, 1941. W. W. MULBERG 2,264,140

TRANSPARENT SUNSHADE

Filed Feb. 1, 1939

Fig. 1.

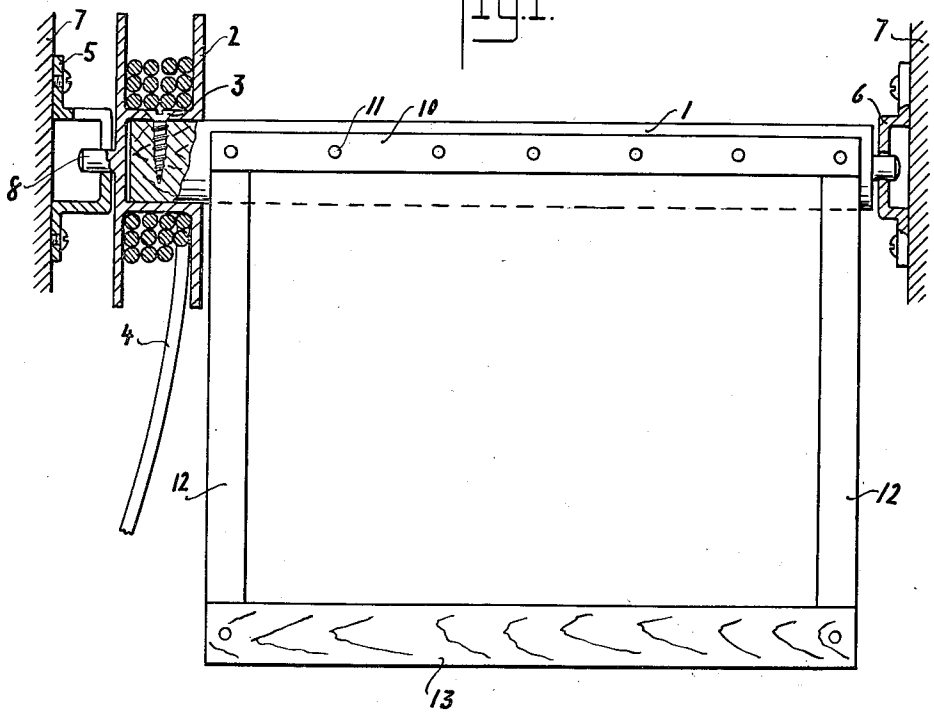




Fig. 2.

INVENTOR.
W. W. Mulberg

BY

Knight Bros
ATTORNEYS

Patented Nov. 25, 1941 2,264,140

UNITED STATES PATENT OFFICE

2,264,140

TRANSPARENT SUNSHADE

Walter W. Mulberg, Kew Gardens, N. Y., assignor of one-half to Rudolph Axel, New York, N. Y.

Application February 1, 1939, Serial No. 253,948

4 Claims. (Cl. 88—115)

My invention relates to a shade, in particular for display windows, for excluding certain undesirable wave-lengths of sunlight.

The common way of protecting articles in display windows, and the like, from the detrimental effects of sunlight, is to provide awnings or use shades which partly cover the window, and which are opaque or to a certain extent translucent. Protective means of this kind present a number of drawbacks. They darken the interior of the display window and of the room, for instance the store, behind the window. They further inconvenience spectators and obstruct the visibility of the display.

It has been suggested to protect perishable goods exposed to sunlight by wrapping them individually with a cellulose film which absorbs part of the ultra violet rays. This suggestion aims mainly at protecting food products containing fats which are liable to become rancid if exposed to ultra violet rays. However, this way of protection is impracticable in many cases, since it requires covering each individual display article, and is hardly applicable with a number of articles such as wearing apparel, textile material, furniture, tapestry, etc. This way of protection is further insufficient, since the films heretofore used still have an appreciable permeability to ultra violet and other noxious rays.

An object of my invention is to improve the protection of articles, in particular in displays, against undesirable wave-lengths of sunlight.

Another object is to produce protective means of the above-mentioned kind in the form of a roller blind so that they may easily be removed under conditions where their presence is unnecessary.

An object also is to produce a transparent protective shade having a reduced permeability to noxious, in particular invisible, sun rays, as compared with the transparent materials heretofore used for similar purposes. More particularly, the invention aims at reducing the permeability of sheets of plastics with respect to the ultra violet range of sunlight.

Among the shade materials especially adapted for shielding against undesirable wave-lengths of sunlight, are such which are inflammable to a certain extent. Therefore, another object of the invention is to decrease the inflammability of these materials to a point where the shades are practically fireproof.

An object, finally, is to increase the resistance of transparent sun shades to humidity, temperature variations, and with respect to mechanical stresses.

According to my invention, a rotatably mounted rod or roller is provided with a flexible shade consisting of a transparent plastic of the particular composition and properties specified in the following in connection with the description of the embodiment illustrated in the drawing, in which—

Fig. 1 shows a front view of a sun shade according to my invention, the scale of the illustration being reduced with respect to the length of the roller and the length and width of the shade material; and

Fig. 2 shows a cross section through a vertical edge of the shade material.

In the drawing, 1 designates a rotary rod or roller consisting of wood or the like. A drum 2 is firmly attached to the rod by means of a screw 3. A rope 4 is fixed to the drum, for instance also by means of the screw 3, and serves for operating the roller. Two brackets 5 and 6 attached to the wall 7 or to the frame of the window form the journals for the trunnions 8 of the roller 1. 9 designates the shade proper. The shade consists of a transparent material, the composition and properties of which will be specified in a later paragraph. The material 9 forms a thin sheet and has its edges reinforced so that its cross section near the edges has at least twice the thickness of the shade material proper. The upper edge of shade 9 is covered with an adhesive textile tape 10 and is attached to the roller 1 by means of tacks 11 or the like. The vertical edges of the sheet 9 are enforced by strips 12 consisting of the same transparent material as the sheet 9, and being attached to the sheet by means of an adhesive, for instance a solvent. Since the materials to be used have a certain stiffness, the shade is provided with a weight 13 covering the lower edge of the sheet 9. The weight may consist of wooden ledges arranged at both sides of the material 9. Metallic inserts, for instance of lead, may be provided underneath or within the ledges.

The material forming the sheet 9 consists of two essential components, namely, a transparent plastic and a dye. The plastic is selected from those materials which have a high absorptivity of invisible sun rays and exhibit a high resistance to humidity and a low inflammability. Polymerization products, for instance of the vinyl group, may be employed to advantage. Cellulose plastics also have proved favorable, for instance cellulose acetate or pyroxylin plastics.

The above-mentioned vinyl compounds, such as polymerized esters of acrylic acid, or polymerized styrene products, are absolutely fireproof. Cellulose acetate also has this quality. While pyroxylin plastics show a certain inflammability, they have the advantage of an especially low permeability to ultra violet rays. The inflammability of these products, however, is very low if the plastic contains only about 11% nitrogen or less. If, further, according to my invention the edges of the material are reinforced so as to have twice or three times the thickness of the other portions of the material, the shade as a rule is less inflammable than common textile shades and the display articles themselves. Another way of embodying the invention consists in making the shade of a mixture of cellulose or pyroxylin plastics and vinyl plastics. Such mixtures show relatively high absorption of ultra violet rays together with good mechanical properties, in particular a great hardness which prevents the surface from being easily scratched. Some of these mixed compositions further are practically fireproof even if they contain a certain amount of cellulose nitrate.

The shade material according to my invention further contains as its second essential component a dye which increases the absorption of noxious rays especially in the range of the invisible wave-lengths. Azo dyes, especially methyl orange, are especially favorable. Methyl orange reduces the permeability of the above-mentioned products to ultra violet rays to a conspicuous extent. It is, for instance, possible to increase the absorption of a transparent cellulose plastic having an absorption of 50 to 60% to a value above 90% without unduly darkening the shade.

According to one of the preferred embodiments of my invention, I employ a shade material consisting of cellulose nitrate with less than 12% and preferably about 11% nitrogen, the material containing methyl orange in an amount necessary to reduce the permeability to ultra violet rays below 10% or even below 5%. A permeability of 5%, i. e. an absorption of 95% of ultra violet light, and even an absorption of as much as 98% and slightly more, is easily obtainable. The material just mentioned remains clear and has a high resistance to mechanical stresses so that it is not liable to be scratched when being operated. The material further is practically not inflammable especially if the edges are protected by reinforcements as above described. The amount of dye necessary for obtaining an absorption of 95% to 98%, further does not undesirably darken the material so that the display is brightly illuminated and clearly visible through the shade.

Another preferred embodiment of the invention employs a mixture of pyroxylin resin with a vinyl polymer, in particular a vinyl ester of acrylic acid. For instance, a vinyl resin may be added to the aforementioned cellulose nitrate. The resultant product is practically fireproof, has still favorable mechanical properties, and, if provided with methyl orange, shows a great absorption of ultra violet rays. All of the aforementioned plastics may contain plasticizers.

The above-described examples not only show a high absorption of ultra violet rays, but also absorb infra red rays. It has been found that textile articles and shoes, displayed in windows and protected by transparent shades, are absolutely prevented from fading.

In certain cases, a modification of the invention by employing another dye than methyl orange, appears favorable. It is, for instance, known that insects prefer certain colors of the sun spectrum, and that they avoid places illuminated by blue light. This fact may be utilized according to my invention by dyeing the above-mentioned plastic with a blue dye, for instance methyl blue. A display window containing articles which usually attract insects therefrom may be protected to a certain extent by employing a blue shade according to the invention. A shade material dyed with methyl blue does not have the high absorption of ultra violet rays. The material above mentioned, having an absorption of 95% and more when dyed with methyl orange, shows an absorption of little more than 60% if dyed with methyl blue, i. e. practically no improvement as far as the ultra violet range of sunlight is concerned. Though the absorption is also dependent upon the amount of dye, this amount is limited by the fact that the shade must not become too dark. The last-mentioned shade, therefore, is less suitable as protection against ultra violet rays, but may serve the other purpose here referred to or for producing decorative light effects.

The shades according to the invention may also be designed and mounted in the form of a transparent awning.

I claim:

1. In a roller shade, the shade material consisting of a flexible sheet of a transparent plastic of low inflammability and high surface resistance to scratching, said plastic being selected from the group consisting of vinyl plastics, pyroxylin plastics with at most about 11% nitrogen and cellulose acetate plastics, and containing methyl orange dye in an amount corresponding to at least about 90% total absorption of ultra violet sun rays.

2. In a roller shade, the shade material consisting of a sheet of a transparent uninflammable cellulose acetate plastic of high flexibility and high surface resistance to scratching and containing methyl orange in an amount corresponding to at least about 90% total absorption of ultra violet sun rays.

3. A roller shade having the shade material consisting of a flexible sheet of transparent cellulose acetate containing methyl orange in an amount corresponding to at least about 95% total absorption of ultra violet sun rays.

4. Roller shades for display windows and the like having the shade material consisting of a flexible sheet of transparent cellulose acetate containing methyl orange in an amount sufficient to prevent sunlight from fading display objects.

WALTER W. MULBERG.