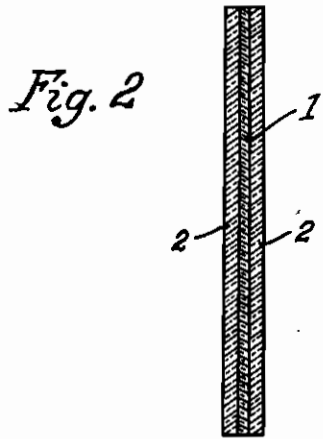
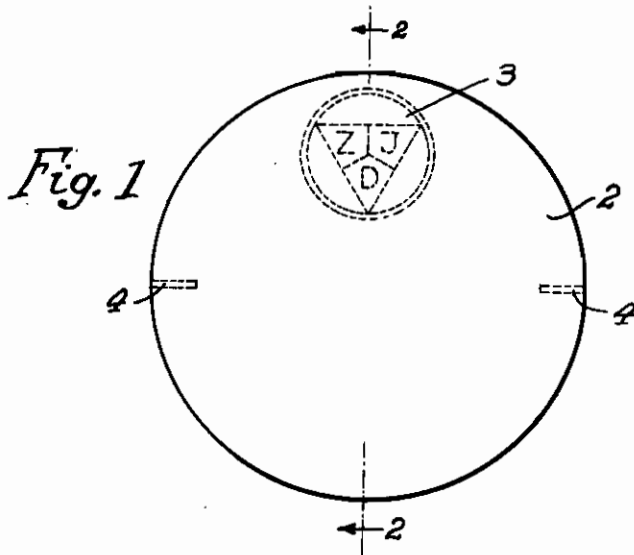


PUBLISHED  
APRIL 27, 1943.  
BY A. P. C.

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POLARIZING FILTER AND METHOD  
OF MAKING THE SAME  
Filed April 25, 1941

Serial No.  
390,216



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# ALIEN PROPERTY CUSTODIAN

## POLARIZING FILTER AND METHOD OF MAKING THE SAME

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Application filed April 25, 1941

This invention relates to improvements in polarizing filters and to a method of making the same.

It is an object of the invention to provide polarizing filters with marks for indicating the plane of vibration or with other indicators, trade-marks or the like, and to apply these indicators to the material of the polarizing filter directly.

It is also an object of the invention to provide polarizing filters with indicators permanently retaining their relation to the polarizing filters regardless of any alteration in the relation of the polarizing filters to protective panes or frames, for the same.

Another object of the invention is to provide polarizing filters with indicator marks covering a relatively restricted portion of the total area of said filters, whereby the remainder of the total area of the filters is free of any indicator marks within the field of vision of the user of the polarizing filter.

It is, furthermore, an object of the invention to provide a polarizing filter with an indicator over a sharply defined restricted area portion of the polarizing filter by altering or destroying within the restricted area portion the polarizing qualities of the filter, leaving, however, the remainder of the area of the polarizing filter unimpaired as far as the polarizing strength of the filter is concerned.

With these and numerous other objects in view, the invention is described in the appended specification, in which reference is made to the accompanying drawing showing by way of example a polarizing filter produced in accordance with the method of the present invention.

In the drawing:

Fig. 1 is a front elevation of a polarizing filter provided with an indicator, according to the present invention, and

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

At the present time, polarizing filters are produced in the form of films made of dichroitic material, which has the quality of enforcing vibration of the light in a single predetermined plane. These films are interposed between protective transparent plates, and frequently the assembly of plates and film is surrounded by a rim of metal or some other material permitting the filter and its protection to be marketed as a self-contained structure. In order to indicate the direction of the plane of vibration, it had been customary to apply a mark either on the rim or on the protective transparent plates or on one of these

plates to permit the user to hold the filter in a predetermined orientation with respect to the light. Upon loosening of the rim and shifting of the same circumferentially with respect to the filtering material, the indication on the rim, of course, then lost its function, and similarly also any indication on a protective plate became useless if through accident or for other reasons the cementing material between the dichroitic film and the guard plate became loose.

The present invention eliminates this defect of relative movement between dichroitic material and indicator mark by applying the indicator mark directly to the filter material itself. In this manner, any movement of the rim or of the cover plate with respect to the dichroitic material will not have any influence upon the orientation of the filter during use.

In the embodiment illustrated by way of example, the filtering material in the form of a film 1 made of dichroitic material is positioned between two cover plates 2 of transparent material. Any suitable cement for holding the elements in position may be employed. The structure may be surrounded by a rim where necessary although this is not illustrated in the drawing. A trade-mark 3 is shown to be applied, and this trade-mark as well as the marks 4 indicating the direction of vibration are applied to the dichroitic material 1 itself, the marks 3 and 4 then being visible at all times through the cover plates and permitting the user to hold the structure in a predetermined direction with respect to these indicator marks.

The marks 3 and 4 occupy sharply defined restricted portions of the entire area of the filter, and even if the polarizing strength of the dichroitic material should have been impaired by the application of these marks on the material, the area portion free of these indicator marks is sufficient for effecting the polarization of the light.

The application of these indicator marks to the dichroitic material may be effected in different ways.

It may, for instance, be effected by mechanical force. For this purpose, a stamp or die showing the desired marking may be forcibly impressed upon the dichroitic material. Owing to the pressure, the orientation of the particles or crystals of dichroitic material may be altered at the restricted area portions, and the polarizing strength of the filter at these area portions may be interfered with or may be destroyed entirely. Upon use of the filter, the portions having the altered

relation of the particles of dichroitic material will become noticeable, thereby rendering the use of this structure very easy. Since the area acted upon by the die or stamp, however, is relatively small, the effect of the polarizing filter remains satisfactory in every respect.

Another method of applying indicator marks upon the dichroitic material is a method of applying chemical reagents, acids, bases or even water upon the dichroitic material over those restricted area portions which are to constitute the indicator marks. The selection of an acid or of a base or of water as chemical reagent will depend upon the use to be made of the filter.

The indicator marks also may be applied to definitely localized area portions of the dichroitic material by heat which may likewise destroy, or at least interfere with, the polarizing strength of the dichroitic material. The application of pressure for the purpose of imparting to the localized area portions distinctive polarizing or non-polarizing qualities may be combined with the application of heat.

Another process of applying the markings to the dichroitic material consists of exposing the dichroitic material over a definitely localized area portion thereof to radiation, as for instance, to radiation by ultraviolet light, by ultra-red light, or to X-rays. The effect of this irradiation of a predetermined area portion likewise imports destruction of the polarizing qualities of the dichroitic material at the selectively determined portions.

The markings also may be produced by electric effects applied to the filter material over predetermined area portions, as for instance, by the discharge of an electric spark or by the bombardment with electrons or by electrolysis.

In producing these markings, the polarizing filter may be subjected to the respective mechanical, chemical or electric treatment during the production of the material itself, or after the polarizing film of dichroitic material has been produced. The markings also may be applied to the layer of polarizing material after it has been cut to the desired shape and placed in operative position on one of the cover plates, or even after it has been positioned between the cover plates, but prior to the cementing of the filter to the cover plates.

The advantages of these markings applied to the polarizing filter material itself, as contrasted with the application of these markings to an accessory part as cover plates or rim can readily be

understood. These markings applied to the dichroitic material are inseparable from the polarizing layer itself, and retain their value even though the cover plates may crack or alter their position with respect to the polarizing layer. They remain of permanent value even after the rim carrying a corresponding marking should have been removed or should have been shifted accidentally with respect to these markings.

The indication marks applied to the filtering material itself may be observed by the user, whether the filter is employed independently of other filters or whether it be used in association with a second filter, the plane of vibration whereof may be at an angle to the plane of vibration determined by the first described filter.

It is, furthermore, an advantage of the present invention that the filtering material, even though provided with the indicator marks over a definitely selected and restricted area portion may be combined in the ordinary way with the protective transparent plates or with the rim or both. The application of the indicator marks on the dichroitic material or embedded therein will not prevent the cementation of the same to the protective plates.

Where the indicator marks in the dichroitic material are produced by exposing the dichroitic material to the action of destructive rays over a restricted area portion, this treatment may be applied even after the assembly of dichroitic film and cover plates or the assembly of the film and cover plates with the rim has been completed.

To further emphasize the marking and to facilitate the reading of the indicator marks determining the plane of vibration, it is also within the spirit of the invention to remove closely adjacent to said marks the dichroitic material entirely from the assembly. The markings are then surrounded or are in the close neighborhood to a zone having no polarizing qualities or polarizing qualities which are entirely different from those of the filter body itself, thereby making it easier for the user of the assembled structure to locate at a glance the markings and to place the filter in proper position for use. This removal of a small zone close to the markings will not destroy the indicating quality of the markings and will leave also unimpaired the polarizing strength of the filtering material over that area portion through which the altered vibration of the light is to take effect.

HANS SAUER.