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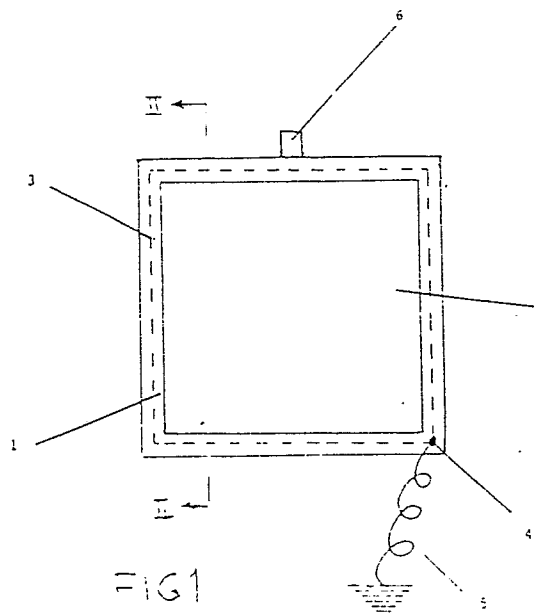
71 Applicant: Lämmli, Walter
Dersbachstrasse 17
CH-6330 Cham(CH)

72 Inventor: Lämmli, Walter
Dersbachstrasse 17
CH-6330 Cham(CH)

74 Representative: Barnieske, Hans Wolfgang
c/o H.W. Barnieske Patentbyrå AB P.O. Box
25 Turingegatan 26
S-151 21 Södertälje 1(SE)

54 **Radiation reduction device for CRT.**

57 A transparent cellulose film is applied over the picture screen of a cathod ray tube in order to screen off electrostatic fields and other radiation from the picture screen. The cellulose film (21) may be supported by a transparent support film (22) which imparts suitable strength properties and optical properties to the aggregate of cellulose film and support film. The support film may consist of cellulose acetate butyrate, and could to advantage contain closely spaced microlouvers for improvement of optical properties of the screen device and the observable picture on the picture screen.



BAD ORIGINAL

EP 0 301 118 A1

Device for reducing radiation emission from a cathod ray tube screen such as a TV picture screen or a data monitor screen

The invention refers to a device for reducing radiation emission from TV picture tube screens or data picture screens of the cathod ray tube type, said device comprising a screen which is mountable in front of the said picture screen and consists partly of a frame provided with an electric leader which is connectable to earth, partly a transparent film which is mountable in the frame.

In the prior art, several attempts have been made in order to screen off electrostatic fields from TV picture tubes of the cathod ray tube type by the use of plastic foils or special devices designed for the purpose. However, it has turned out that prior art devices either have been too complex or have not provided the desired effect.

An object of the invention is now to provide such a device which in an efficient manner screens off electrostatic fields from picture tube screens. This object is obtained in accordance with the invention at a device of the type indicated in the preamble herein, thereby that the transparent film consists of cellulose. Preferably the foil consists of Cellophane® or Tenoplast®.

Preferably the cellulose film itself can be stabilized in the frame by means of a supporting plastics film. For this purpose, the supporting plastics film could consist of cellulose acetate butyrate (CAB). This supporting plastics film could to advantage be adapted on top of the cellulose film, whereby the cellulose film will be placed between the support film and the picture screen. The support film is chosen to consist of a material which to advantage minimizes reflection and also is stable to permit cleaning of the inventive screen by wiping and other conventional cleaning methods. Moreover, the material for the support film is preferably chosen to minimize reflections, and to permit the cellulose film to be applied substantially without greases onto the picture. Such supporting films also provide a tear protection for the cellulose film which in itself has a relatively low tear resistance, especially edge tear resistance.

However, all homogeneous optically acceptable transparent plastics films which are suitable as support film, are not able to eliminate the reflections which are inherent with the cellulose film. In order to remedy this deficiency, the support film could to advantage contain closely spaced microlouvers whereby the support film reduces glare, improves contrast and controls reflections. A film with such closely spaced microlouvers is commercially available from 3M as Light Control Film (LCF), in the form of a substrate consisting of cellulose acetate butyrate (CAB) having a refractive

index of about 1,48, an abbe number of about 82, a specific gravity of 1,2 and stands temperatures at least up to 100°C. This 3M Light Control Film (LCF) is well compatible with the cellulose film and provides together with the cellulose film a screen film combination which maintains the advantages of both film types and eliminates the drawback of the cellulose film. Thus, the specific support film does not significantly alter the protective property of the cellulose film, but rather tends to increase the efficiency of the inventive screen.

The invention will now be closer described in the form of an example of an embodiment which is shown on the appended drawing.

Fig 1 shows schematically a view of the inventive device.

Fig 2 shows a partial section through the device shown on fig 1.

The device comprises a frame 1 in which a screen 2 of a relatively thin transparent sheet material is extended. The screen 2 comprises a thin transparent film of cellulose in the form of Cellophane® or Tenoplast®. Inside this frame and in contact with said screen, specifically the cellulose film thereof, there is an electric leader 3 which at point 4 is connected to a lead 5 for connection to earth. A device 6 for keeping the screen 2 and the frame 1 together is also shown on fig 1, but it is appreciated that frame and screen could be held together in many different ways.

The screen 2 also comprises a relatively thin transparent support film 22, which supports the cellulose film and imparts a sufficient resilience and strength to the screen. The inventive screen device is preferably mounted on the TV picture surface or the like in such a manner that the cellulose film 21 faces the TV screen and the support film faces the viewer.

A device constructed as indicated above, but without the support film 22, was tested with regard to its capability of screening off an electrostatic field.

The device was then placed at some distance in front of a TV picture screen, and thereafter the screening off was measured.

As is appreciated, a relocation of charges will occur on any material which is placed in an electrostatic field, whereby the field will be counteracted.

If the material is galvanically connected to the earth of the surroundings, the charges will transported and distributed on the surface of the material so that the field is screened off. The time this will take is decisive on whether the material should

be considered as off-screening or not.

By measuring the surface resistance of the material, it is possible to decide whether the material is useful as a screen, because there is an inverted relation between time and resistance.

At the tested device, the measurement of the surface resistance was carried out in accordance with IEC 167 with parallel electrodes (100 × 1 mm, distance 10 mm). The following results were obtained.

1. After conditioning of the cellulose film at 23 °C, 50% relative moisture for one day (24 hours) $\leq 0,5 \cdot 10^9$ Ohm.

2. After drying at 40 °C, $\leq 20\%$ relative moisture for one day (24 hours) $\leq 1,2 \cdot 10^9$ Ohm.

The above results illustrate that the suggested material with the above mentioned surface resistance will screen off an electrostatic field within a few seconds, provided that there is an effective galvanic connection to the surrounding earth.

Therefore the transparent thin cellulose film is arranged in the frame as per the invention is an effective means for screening off electrostatic fields and also other radiation emanating from picture tubes of the type at issue.

However, substantial additional advantages may be had if the inventive cellulose film is laminated with a support film 22, which imparts to the screen material 2 the desired strength and reduced reflection properties to make the inventive device more acceptable as to optical behaviour and sensitivity at mounting and cleaning of the exposed surface.

For this purpose the support film 22 could advantageously consist of a cellulose acetate butyrate film (CAB), especially a so called Light Control Film (LCF), available from 3M Company, comprising closely spaced microlouvers, preferably black microlouvers which provide improved viewing effects as mentioned in the product leaflet issued by 3M Company on 3M Automotive Light Control Systems. Thus, a suitable support film could consist of a Light Control Film of the mentioned type in a substrate having a thickness of 0.030", a louver spacing of 0.005 or 0.010", and a louver thickness of 0.0005". The louver angle, i.e. louver angle related to a normal to the plastics film, could be chosen for adaption to viewing direction on to the picture screen at issue, and moreover the louver orientation could be chosen to eliminate the disturbing light which is at hand in a normal application. Reference is made to the 3M publication "3M Automotive Light Control Systems" (70-0701-232-0(26.1)R1), the content of which is hereby incorporated herein. Further reference is made to Report C219/85, IMechE 1985, which discusses var-

ious aspects of the Light Control Film (LCF) which to advantage is used as support film in the inventive device.

In practical tests, the inventive screen with the cellulose film laminated with a support film consisting of the 3M Company Light Control Film has turned out to provide excellent results in all practical aspects. Thus, the excellent field screening property of the cellulose film is maintained, while the less advantageous properties of the cellulose film, for example as to reflection and strength, are eliminated by the suggested lamination of the cellulose film to the 3M Light Control Film with suitably oriented louvers. However, it is appreciated that the inventive object is obtained by a simple transparent cellulose film of materials such as transparent Cellophane® or Tenoplast®, and that many transparent support films having suitable strength properties and optical properties add advantages to the basic inventive screen. Further to that, the specific preferred support film consisting of the 3M Company Light Control Film adds an excellent optical feature to the device, said feature being known per se from the references, the relevant content of which is incorporated herein.

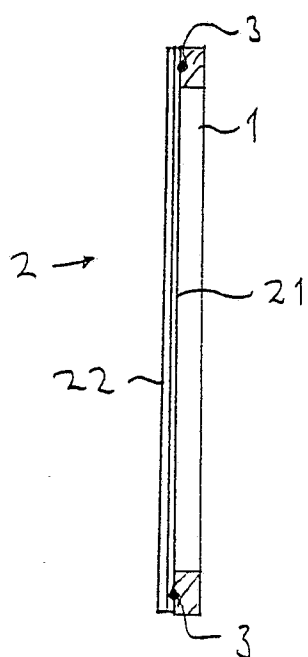
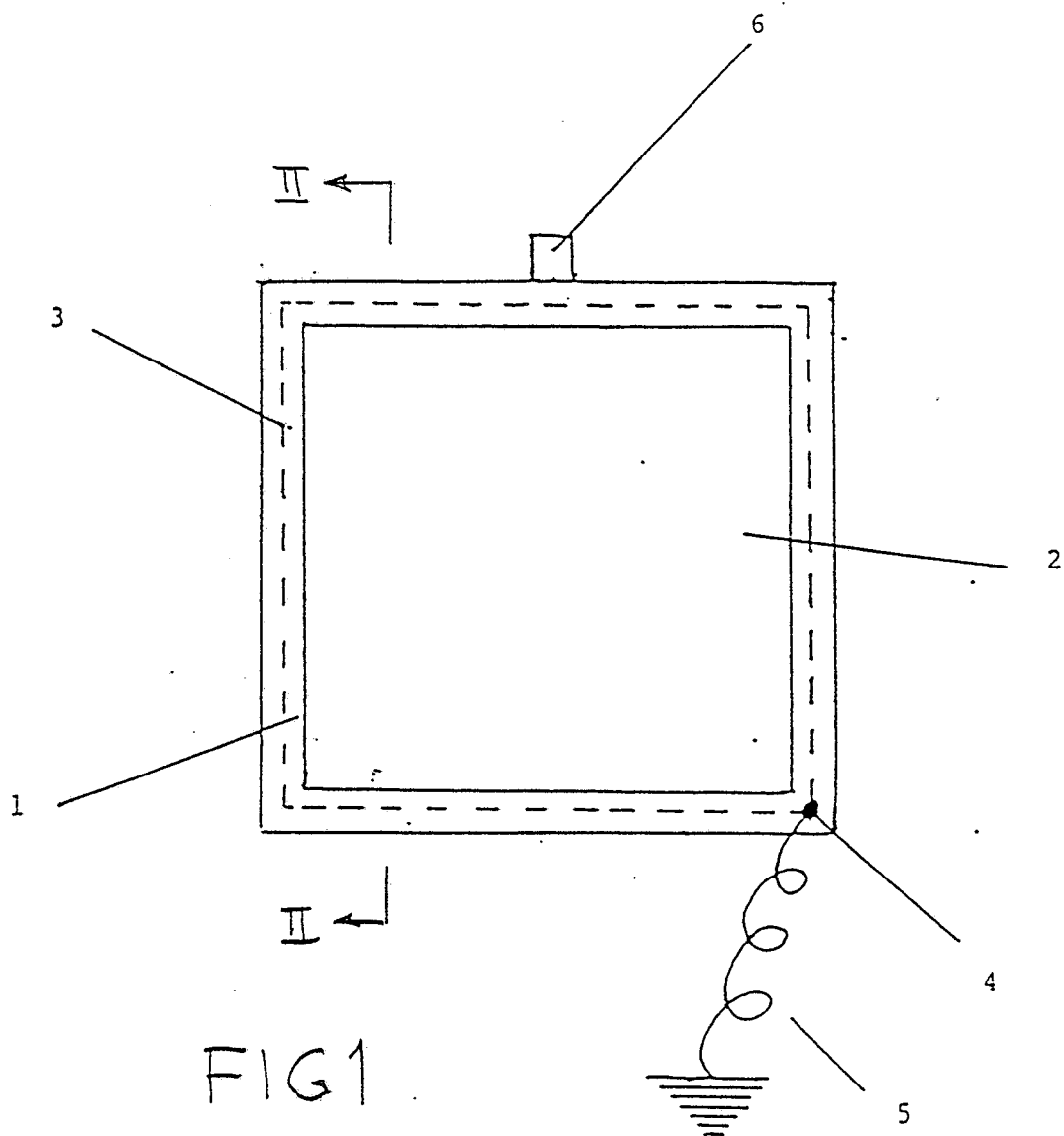
Claims

1. Device for protection against radiation from picture screens of cathod ray tubes, said device comprising a screen which is mountable in front of the picture screen and consists partly of a frame provided with an electrical leader which is connectable to earth, partly of a transparent film which is mounted in the frame, **characterized** in that the film consists of cellulose.

2. Device according to claim 1, **characterized** in that the transparent cellulose film is supported by a transparent plastics film which stabilizes the cellulose film and is located to cover the outer surface of the cellulose film.

3. Device according to claim 2, **characterized** in that the support film is a transparent light control film, known per se, containing closely spaced microlouvers.

4. Device according to claim 2' or 3, **characterized** in that the support film comprises a substrate of cellulose acetate butyrate.





DOCUMENTS CONSIDERED TO BE RELEVANT															
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)												
A	JP-A-62 051 140 (MITSUBISHI) & PATENT ABSTRACTS OF JAPAN, vol. 11, no. 237 (E-528)[2684], 4. August 1987 ---	1	H 01 J 29/89 H 04 N 5/72												
A	US-A-4 661 856 (SCHNACK) * Column 5, lines 37-44; figures 1,5,6 *	1													
A	EP-A-0 200 452 (TORAY) * Abstract * -----	1													
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)												
			H 01 J 29/00 H 05 K 9/00 H 04 N 5/00 G 02 B 1/00												
The present search report has been drawn up for all claims															
Place of search THE HAGUE		Date of completion of the search 14-03-1988	Examiner WITH F.B.												
<table border="0"><tr><td>CATEGORY OF CITED DOCUMENTS</td><td>T : theory or principle underlying the invention</td></tr><tr><td>X : particularly relevant if taken alone</td><td>E : earlier patent document, but published on, or after the filing date</td></tr><tr><td>Y : particularly relevant if combined with another document of the same category</td><td>D : document cited in the application</td></tr><tr><td>A : technological background</td><td>L : document cited for other reasons</td></tr><tr><td>O : non-written disclosure</td><td>.....</td></tr><tr><td>P : intermediate document</td><td>& : member of the same patent family, corresponding document</td></tr></table>				CATEGORY OF CITED DOCUMENTS	T : theory or principle underlying the invention	X : particularly relevant if taken alone	E : earlier patent document, but published on, or after the filing date	Y : particularly relevant if combined with another document of the same category	D : document cited in the application	A : technological background	L : document cited for other reasons	O : non-written disclosure		P : intermediate document	& : member of the same patent family, corresponding document
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