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TELEVISION RECEIVER SCREEN

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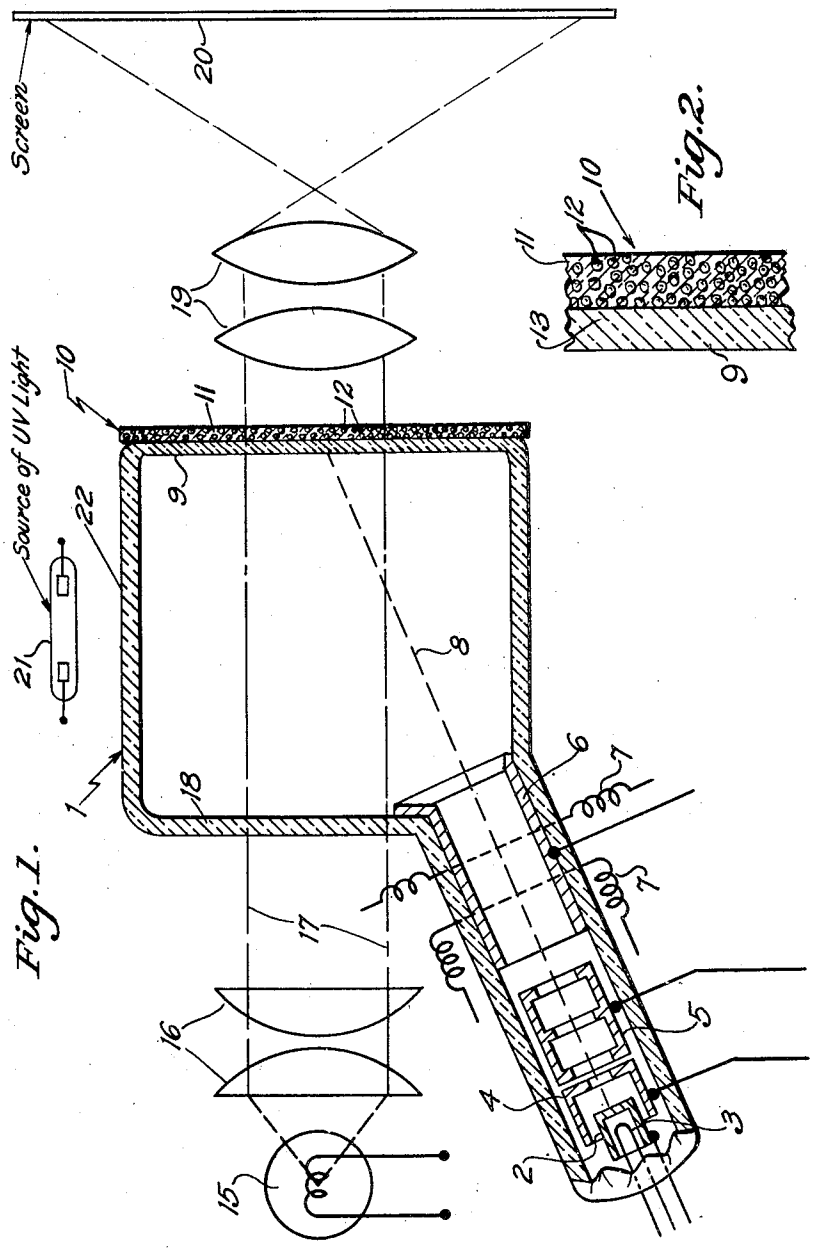


Fig. 1.

Fig. 2.

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TELEVISION RECEIVER SCREEN

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6 Claims. (Cl. 88—61)

1

This invention relates to a television receiving tube screen.

In television receiving systems it is desirable to utilize a receiver screen which will act to modulate a light beam passing through it, the modulation varying from point to point on the screen in accordance with the intensity values of the received picture signals so that the light thus modulated may either be viewed directly or enlarged and projected onto a viewing screen to give a reproduction of the picture.

An object of this invention is to produce a novel screen of the foregoing type utilizing a composite light filter consisting of one light refracting material dispersed throughout a second light refracting material, said materials undergoing different changes in the indices of refraction under the action of an electrostatic field.

Another object of this invention is to produce such changes in the above indices of refraction as will change the transparency of the light filter from point to point in order to recreate a received picture.

Another object is to produce the above variation in the transparency of the filter by an electrostatic field pattern created by bombarding an insulating wall with a beam of electrons.

The foregoing and other objects of this invention will be best understood from the following description of an exemplification thereof, reference being had to the accompanying drawings wherein:

Fig. 1 represents one form of apparatus embodying my invention; and

Fig. 2 is an enlarged fragmentary section of the end wall of the cathode ray tube shown in Fig. 1.

In Fig. 1 a cathode ray tube is provided with an evacuated envelope 1 which contains at one end thereof a cathode 2 adapted to be heated to temperature of thermionic emission by a heating filament 3. The electrons emitted from the cathode 2 are controlled by means of a control electrode 4, accelerated by a first anode 5 and focused by the electrostatic field formed between the first anode 5 and a second anode 6. The electron beam thus produced is deflected by deflecting coils 7 or any other well-known deflecting means so as to produce a scanning beam of electrons 8. The electron beam 8 is directed toward an end wall 9 of the envelope 1, said end wall being made of suitable clear glass.

Mounted on the outer surface of the end wall 9 is my novel composite filter 10. This filter consists of a sheet of clear light refractive substance

2

such as Canada balsam 11 through which is dispersed small spheres 12 of another light refractive material such as crown glass. The crown glass which is selected is preferably of substantially the same index of refraction as that of Canada balsam. This light filter may be attached in any suitable manner as by being cemented to the outer face of the end wall 9.

A strong source of light 15, which may be an incandescent lamp, is provided to produce the beam of light to be modulated. The light coming from a source 15 is concentrated by an optical condenser 16 and thus forms a beam of light 17. This beam of light passes through an end wall 18 of the envelope 1, said end wall being formed of suitable clear glass. After the beam of light enters the envelope 1, it passes through the opposite end wall 9 and the light filter 10.

When light passes through such a filter in which the two components have the same index of refraction, said filter is transparent. However, when such a filter is subjected to an electrostatic field, changes in the index of refraction of each of the components of said filters occur. These changes in the index of refraction will not be the same for each of the components and therefore under the action of such an electrostatic field the filter will be composed of components having different indices of refraction, the difference between said indices of refraction being a function of the intensity of said electrostatic field. Under these conditions the filter becomes relatively opaque to light which falls upon it, the degree of opacity being a function of the difference between said indices of refraction, and, thus, also, of the intensity of said electrostatic field. When the beam of electrons is projected onto the end wall 9, it will produce electrostatic charges on said end wall varying in intensity in accordance with the signal impressed upon the control electrode 4. Thus wherever these electrostatic charges are of sufficient intensity to produce an electrostatic field which in turn causes a substantial difference between the indices of refraction of the two components of the light filter 10, said light filter will become relatively opaque, whereas where the intensity of the electrostatic charges is substantially less, the light filter 10 will be relatively transparent. It will be seen, therefore, that as the electron beam 8 scans the end wall 9, the elemental light and dark areas of the desired picture will be created on the end wall 9 in terms of electrostatic charge and this in turn will recreate the desired picture in terms

of the relative transparency and opacity of the light filter 10.

As the beam of light emerges from the light filter 10, it is projected by a projection lens 19 and cast as an enlarged image on the projection screen 20.

In order that the electrostatic charges on the end wall 9 may be removed between each picture frame, said end wall is subjected to the action of ultra-violet light which may be generated by any suitable source such as a lamp 21. This ultra-violet light passes through the upper wall 22 of the envelope 1, which is made of suitable ultra-violet transparent glass and falls upon the end wall 9. With sufficient intensity of ultra-violet light, the electrons which were trapped on the end wall 9 are liberated by photoelectric action. In this way the light modulation screen is made ready for the subsequent scanning by the electron beam. Other well-known means for removing the electron charges from the end wall 9 between successive picture frames may be utilized.

Instead of constructing the light filter 10 of two components which have substantially equal indices of refraction, the components may be chosen initially to have different indices of refraction which under the action of an electrostatic field are brought into closer agreement with each other. Thus the filter initially will be relatively opaque and will become relatively transparent under the action of the electron beam.

Of course it is to be understood that this invention is not limited to the particular details as described above inasmuch as many equivalents will suggest themselves to those skilled in the art. For example, the description of the means for producing the electron beam 8 and the scanning thereof is intended to be purely diagrammatic and in many instances it will be found desirable to substitute other types of screening arrangements. It is accordingly desired that the appended claims be given a broad interpretation commensurate with the scope of the invention within the art.

What is claimed is:

1. In combination: a mass of light refractive material, a second light refractive material dispersed in discrete spherical particles throughout the thickness of said mass, said materials having differently variable indices of refraction in the presence of an electric stress thereacross, and means for impressing an electrostatic field across said materials for changing the indices of refraction of said materials whereby the transparency of the composite structure may be varied in accordance with said electrostatic field.

2. In combination: a mass of light refractive material, a second light refractive material dispersed in discrete spherical particles throughout the thickness of said mass, said second material having an index of refraction substantially the same as that of said first material in the absence of electric stress thereacross but substantially different in the presence of such electric stress, and means for impressing an electrostatic field across said materials for changing the indices of refraction of said materials whereby the transparency of the composite structure may be varied in accordance with said electrostatic field.

3. In combination: a light modulating member comprising a mass of light refractive material, a second light refractive material dispersed in discrete spherical particles throughout said mass, said materials having differently variable indices of refraction in the presence of an electric stress thereacross, and means for scanning one side of said member with an electron beam for impressing an electrostatic field across said materials for changing the indices of refraction of said materials whereby the transparency of the composite structure may be varied in accordance with said electrostatic field.

4. In combination: a mass of light refractive material, a second light refractive material dispersed in discrete spherical particles throughout said mass, said materials having differently variable indices of refraction in the presence of an electric stress thereacross, means for passing a beam of light through said materials, and means for impressing an electrostatic field across said materials for changing the indices of refraction of said materials whereby the transparency of the composite structure may be varied in accordance with said electrostatic field to modulate said beam accordingly.

5. In combination: a light modulating member comprising a mass of light refractive material, a second light refractive material dispersed in discrete spherical particles throughout said mass, said materials having differently variable indices of refraction in the presence of an electric stress thereacross, means for passing a beam of light through said member, and means for scanning one side of said member with an electron beam for impressing an electrostatic field across said materials for changing the indices of refraction of said materials whereby the transparency of said member may be varied in accordance with said electrostatic field to modulate said beam accordingly.

6. In combination: a mass of Canada balsam, glass, having substantially the same index of refraction as Canada balsam in the absence of an electric stress thereacross but a different index of refraction than has Canada balsam in the presence of an electric stress thereacross, dispersed in discrete spherical particles throughout said mass, and means for impressing an electrostatic field across the composite structure for changing the index of refraction of said Canada balsam to a different degree than said field changes the index of refraction of said glass whereby the transparency of said composite structure may be varied in accordance with said electrostatic field.

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