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CROSS-POLARIZED LIGHTING TECHNIQUE FOR IMPROVING OPERATION OF CATHODE-RAY TUBE DISPLAYS

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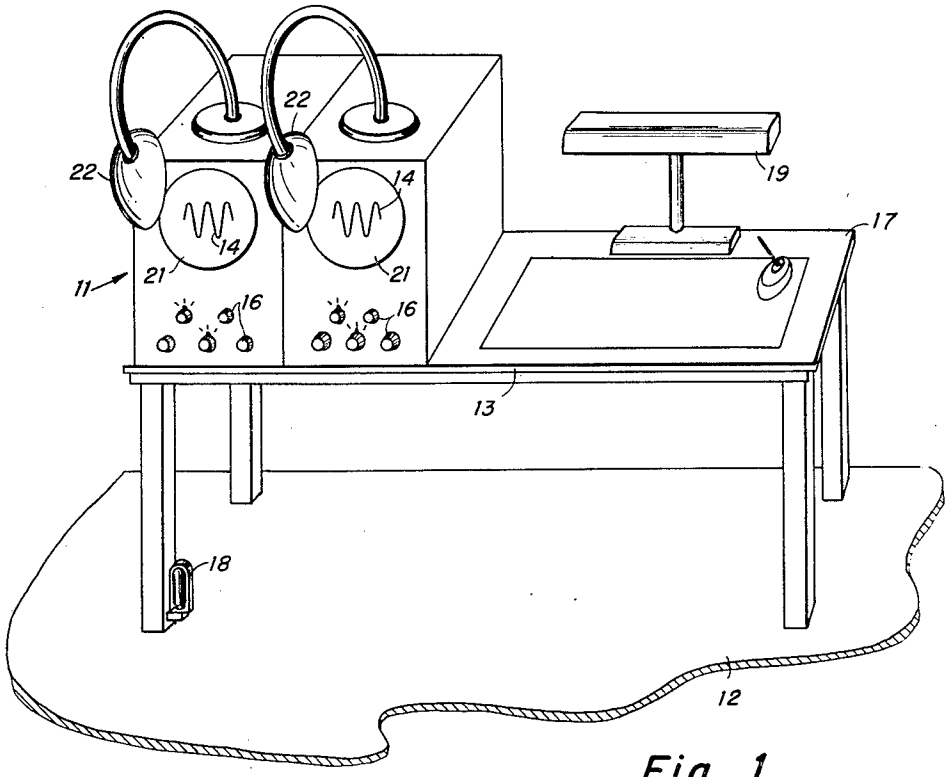


Fig. 1

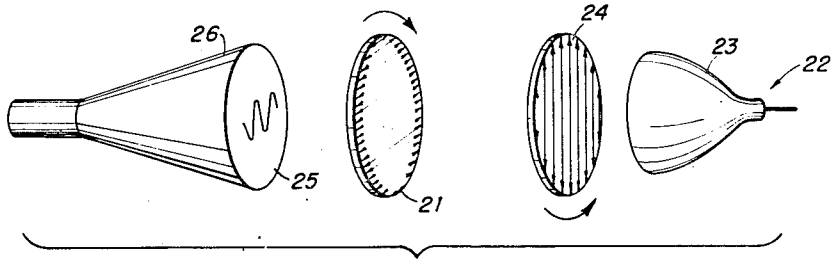


Fig. 2

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CROSS-POLARIZED LIGHTING TECHNIQUE FOR IMPROVING OPERATION OF CATHODE-RAY TUBE DISPLAYS

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4 Claims. (Cl. 340—369)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to an improved lighting technique for cathode-tube displays and more particularly to a lighting technique involving the use of cross polarization to permit illumination in the working area around a cathode-ray tube display without decreasing the visibility of the display itself. Light intensity of over 0.5 foot-candles on the face of the scope will reduce the visual detectability of information on the scope by about 5 db, which would seriously effect early detection.

Previous approaches to this problem have involved monochromatic lighting used in conjunction with filters on the tube faces which do not pass the light used in the area. Other methods cancel out colors in the areas involved (thereby eliminating color-coding), and usually demand highly specialized lighting fixtures. The use of colored light is not very good for most practical applications.

The practice of this invention in radar installations would mean that all maintenance operations can be performed in a better lighted area, resulting in more efficient performance, without the additional lighting interfering with the functioning of the cathode-ray tube display.

An object of the present invention is the provision of an improved lighting technique for illuminating the working area around a cathode-ray tube display.

Another object is to provide for the illumination of the surrounding area without impairing the visibility of information on the screen of a cathode-ray tube.

Another object of the present invention is to provide for the illumination of the working area around a cathode-ray tube display without the use of highly specialized lighting fixtures.

Still another object of the present invention is to provide for the illumination of the area around a cathode-ray tube display without alteration or modification of the display.

A further object of the present invention is the provision of illumination of the area surrounding a cathode-ray tube display to minimize the contrast of light intensity between the light emitted from the tube and the light in the surrounding area.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 shows the working area around a cathode-ray tube display; and

Fig. 2 shows a diagram of the polaroid lens over the tube display and a lamp lighting the area around it.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 1 the working

area surrounding a cathode-ray tube display, such as may be found in a sonar or radar installation. The displays **11** are placed at a convenient height above the floor **12** on a bench **13** such that the display pictures **14** may be viewed easily by an operator. In observing intelligence on the display the operator usually adjusts one or more of dials **16** and either he or a second person makes reports and/or records observations on the bench top **17** in near proximity to the displays **11**.

To avoid working in total darkness or in dimly lighted areas which results in eye-strain and inefficiency in operation, glow lamps **18** are placed along the floor **12** and a conventional reading lamp **19** is placed near the writing area **17**. A Polaroid filter **21** is mounted over the display screen and a polarized light source **22** illuminates the dials **16**.

Referring now to Fig. 2, the polarized light source **22** consists of a light **23** preferably mounted as illustrated or by any other suitable means positioning light **23** outside the field of view of the screen **25** of the tube **26** and directing light on the display. The light **23** is covered by a plane-polarizing filter **24** placed in such a position that the display and its immediate surroundings are illuminated. The plane Polaroid filter **21** is placed over the face or screen **25** of the cathode-ray display tube **26** at right angles to the plane of polarization of the light source **22**, blocking out light from the light source **22** on the face of tube **26**. Filter **21** also partially filters out the reflected indirect light from lamps **18** and **19**. Thus, the operator sees the light polarized in one plane by filter **21** and emitted from the tube **26** and sees the surrounding area lighted by a source of light polarized in another plane by filter **24** and emitted from light **23**. Therefore, light from source **22** does not brighten the face **25** from which the light and information is emitted from tube **26** of the display **11**. As a consequence, there is no light interference between the light emitted from tube **26** and the light emitted from source **22**. However, light from source **22** does illuminate the area surrounding the face of tube **26**. In this manner any task requiring light (reading, writing, repair, adjustment, etc.) can be accomplished in the presence of the cathode-ray tube display with a minimum of interference with the effectiveness of that display.

In application to television viewing especially, the brightness level of the area surrounding the set can be raised to about the degree of brightness of the picture itself, thus eliminating the marked brightness differences which tend to produce eye-strain from prolonged viewing.

While the preferred embodiment of the present invention has been shown in its simplest form, modifications may be incorporated as desired to suit the needs of any particular installation. For example, either filter **21** or **24** may be made rotatable, if a non-electronic contrast control device is desired. The only limitation as to placement of the light source relative to the display tube is that specular reflections from the display filter must be avoided. In most cases the light source can be attached to the display itself, but some installations may require attachment of the light to an overhead, or some other means.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. In a cathode-ray display system of the character disclosed, the combination of a cathode-ray display tube, means for lighting the area surrounding the tube, means for directing said light toward said tube, means disposed outside the field of view of said tube for polarizing said

directed light in one plane, and a polaroid filter placed over the face of the tube and oriented with the plane of light polarization thereof at right angles to said plane of polarization of said directed light whereby the directed light is prevented from interfering with the light emitted from the face of the tube while illuminating the area thereabout.

2. A system as in claim 1 comprising a second Polaroid filter included in said polarizing means and rotatable relative to said first named filter to provide a non-electronic contrast control for said tube.

3. Apparatus for illuminating the area surrounding a cathode-ray tube display without minimizing the detection of information on the display comprising, in combination, lighting means disposed outside the field of view of said

tube for directly lighting the front of said display, a first filter over said lighting means for filtering the light waves emitting from said lighting means in one plane, and a second filter covering the picture tube of said display for filtering light waves emitted from said lighting means in a different plane.

4. The apparatus of claim 3 in which at least one of said first and second filters is rotatable with respect to the other.

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