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CHARACTER DISPLAY UNIT

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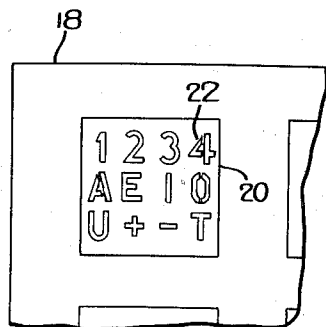
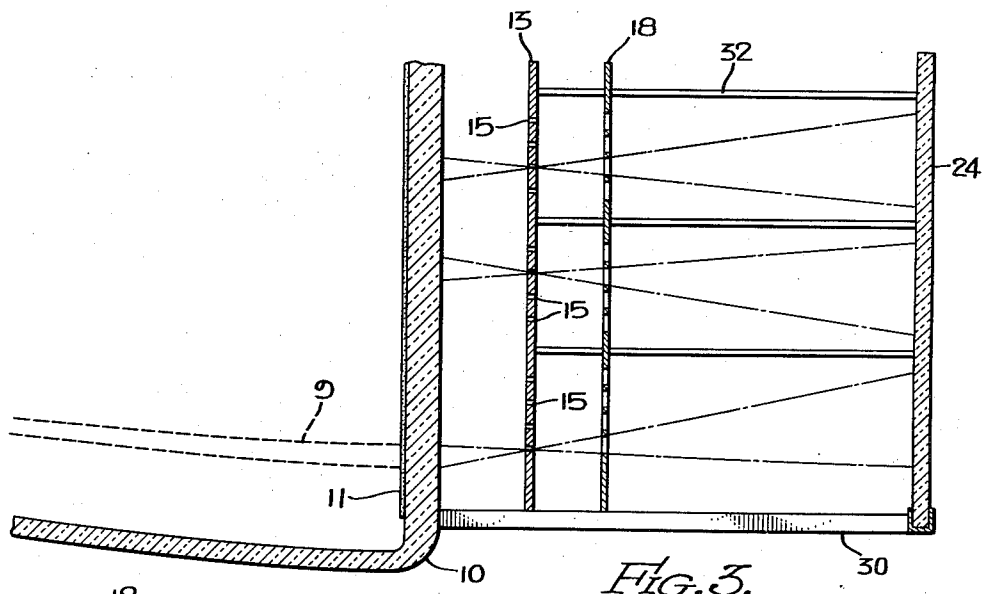
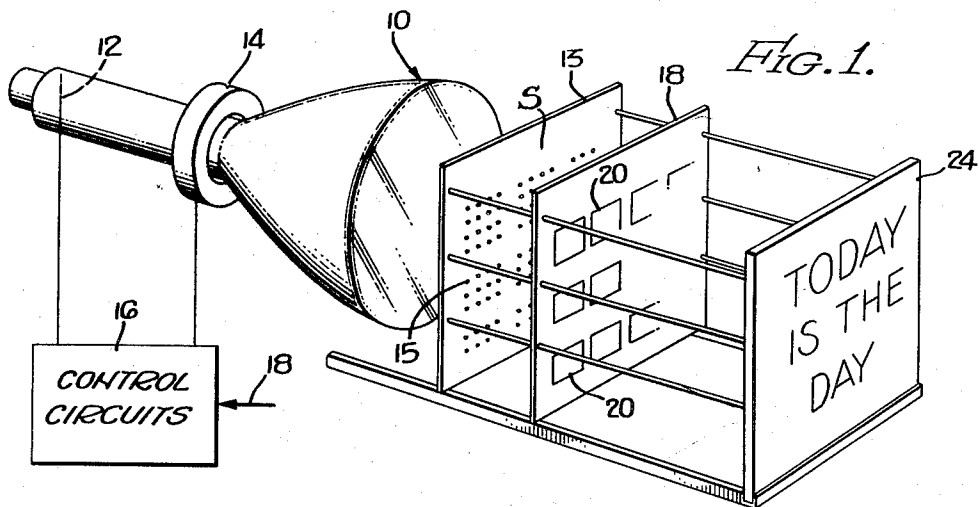


FIG. 2.

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## CHARACTER DISPLAY UNIT

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5 Claims. (Cl. 340—368)

This invention relates to character display systems and, more particularly, to improvements therein.

One of the problems presented by the advent of present-day high-speed data-handling systems is that the machines can usually produce results in the form of data output at a much higher rate of speed than can be handled by present-day electromechanical printers which are used for printing out such data. As a result, if it is desired to employ the presently known output printers, it is necessary to provide some sort of delay or buffer between the high-speed information-handling machine and the output printer to slow down the data to the speed for which the output printer is operable. Alternative to this, there have been devised complex and costly cathode-ray apparatus which can handle the high-speed outputs of the data-handling machines. The face of the cathode-ray tube is usually photographed when this type of apparatus is employed.

An object of the present invention is to provide a novel, high-speed character-display unit.

A further object of the present invention is to provide a simple and inexpensive character-display unit.

These and other objects are achieved by providing a system wherein there is a selectively positionable light beam means, such as a cathode-ray tube, a lens system positioned adjacent the light-beam means, the light mask spaced from the lens system, and viewing means spaced from the light mask. The light mask consists of the plurality of matrix areas, each of which comprises a plurality of character-shaped apertures. The lens system provides a lens for each character-shaped aperture which is positioned opposite to the aperture. The lens system may comprise a simple plate which has pin holes opposite each character to serve as a lens. Each matrix area has the same character apertures as the other. The spacing of the light-beam means, lens system, light mask, and viewing means is such that no matter which one of the characters in any one matrix area is illuminated, this illumination will be seen on substantially the same area of the viewing means. Therefore, by selectively illuminating a character in each matrix, it is possible to construct meaningful words, sentences, and numbers on the viewing means.

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention itself, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings, in which:

Figure 1 is an isometric view of an embodiment of the invention;

Figure 2 shows a typical matrix arrangement employed in the embodiment of the invention; and

Figure 3 is an enlarged sectional view of the embodiment of the invention.

Referring now to Figure 1, there may be seen an isometric view of an embodiment of the invention. It com-

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prises a source of a selectively positionable light beam, such as a cathode-ray tube device 10, which has a brightness control grid 12 and a deflection yoke 14. These receive signals from control circuits 16, input signals to which are applied over the line 18. The output of the control circuit comprises deflection signals which selectively position the cathode-ray beam in accordance with the instructions received over the line 18, and which also blanks the cathode-ray beam in accordance with these instructions.

In front of the cathode-ray tube there is supported a lens system 13 which may comprise a screen S, which is opaque to light and which has therein a plurality of pinhole apertures, the positioning for which will become clearer as this explanation progresses. Positioned to intercept any light which passes through the lens system 13 is a light mask 18, which has a plurality of matrix areas 20. Each matrix area 20, as shown in Figure 2, has a plurality of character-shaped apertures 22. Any light which passes through these character-shaped apertures falls upon a screen 24, where it may be viewed.

Reference is now made to Figure 3, which shows a cross-sectional enlargement of the pertinent sections of the embodiment of the invention. The cathode-ray tube 10 has a screen 11, upon which the cathode-ray beam 9, represented by the dotted lines, falls. As is well known, this causes the phosphor of the screen to luminesce, providing as a result light rays which may fall upon one of a plurality of pinholes 15 made in the screen S.

These pinholes are positioned to be opposite an associated one of the character apertures 22, which is within the matrix area. Therefore, there are as many pinholes, or lenses, as there are character apertures in the light mask 18. Thus, selective positioning of the cathode-ray beam can provide selective illumination of a character in each matrix area through the pinhole lens 15. The effect of the spacing between the cathode-ray tube and the pinhole lens and between the pinhole lens and the light mask is to cause the light which illuminates any one of the apertures within a given matrix field area to fall upon substantially the same area for that particular matrix. Thus, it is possible to construct meaningful words and sentences by selecting a character within each one of the matrix areas rapidly in sequence. This is made possible, of course, by positioning the cathode-ray beam to selectively illuminate a desired aperture within each matrix area, which is then projected upon the screen 24.

The arrangement of the lens system, aperture system, and viewing screen is held together by supports 30, 32 in a manner so that the arrangement is portable and can be applied to the surface or screen area, of any cathode-ray tube. Thus, there is provided an economical high-speed output character presentation device. The size of the device may be varied as required. The viewing screen 24 may either be a ground glass, a photosensitive film, a translucent material, or any other arrangement whereby the output of the system is desired to be recorded. The amount of light available at the viewing surface of the screen will be a function of numerous parameters, such as the number of different symbols desired to be displayed, the amount of light that can be made available at the selected spots on the cathode-ray tube screen, the distance a given light has to be projected, the size of the displayed symbol, etc. The number of characters may be as many as 64, or more, within a matrix area. The circuits within the control circuits 16 are the well-known deflection-control circuits of a cathode-ray tube, which may receive the deflection current as such directly or may receive the control signals as digital signals, which, by well-known means, are converted to analog currents for the purpose of deflecting the cathode-

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ray beam to a desired area of the screen. The control grid may be blanked off between successive positions of the cathode-ray beam. The length of time during which the cathode-ray beam is permitted to remain at any single spot for illuminating the characters in succession is usually determined by whether the screen is to be viewed by the eye or whether the screen is a recording medium such as photographic film, in which event the amount of light required for providing a recording is the determining factor. The intensity of the cathode-ray beam light can be increased to shorten this dwell time.

While certain embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art, and the invention is to be given its broadest possible interpretation within the terms of the following claims.

I claim:

1. A character-display device comprising selectively positionable light beam means providing a light beam, a light mask having a plurality of character-shaped apertures, a lens system comprising a plate positioned between said light mask and said light beam means, said plate having a pinhole aperture opposite each character-shaped aperture, said light beam from said selectively positionable light beam means selectively illuminating a character-shaped aperture through its applicable pinhole aperture, and a viewing screen positioned adjacent said light mask to be illuminated by the light passing through a selected one of its apertures.

2. A character-display device comprising a cathode-ray tube having a screen at one end for generating selectively positionable light upon said screen, a lens system comprising a plate having a plurality of pinhole apertures, said plate being adjacent said cathode-ray tube screen, a light mask having a plurality of character-shaped apertures each of which is located opposite a corresponding pinhole, said light mask being spaced from said lens system a distance to insure illumination of a

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character-shaped aperture by said light passing through the corresponding pinhole from said tube, and a viewing screen positioned adjacent said light mask to be illuminated by the light passing through a selected one of its apertures.

3. A character-display device comprising a selectively positionable light beam means, a lens system positioned adjacent said light beam means, a light mask spaced from said lens system, and viewing means spaced from said light mask; said light mask having a plurality of matrix areas each of which comprises a plurality of character-shaped apertures, said lens system having a lens for each character-shaped aperture positioned opposite an associated character, and means for selectively positioning the beam of said selectively positionable light beam means to illuminate a desired one of the characters in each matrix through the lens opposite to it.

4. A character-display device as recited in claim 3 wherein said lens system includes an opaque plate having a pinhole for each lens.

5. A character-display device comprising a cathode-ray tube having a screen at one end, a lens system spaced from said screen, a light mask spaced from said lens system, and a viewing screen spaced from said light mask; said light mask having a plurality of matrix areas each of which comprises a plurality of character-shaped areas, said lens system comprising an opaque plate having a pinhole opposite each character-shaped aperture in said light mask, and means for selectively positioning the cathode-ray beam of said tube for illuminating a desired one of the characters in each matrix through the pinhole opposite to it.

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