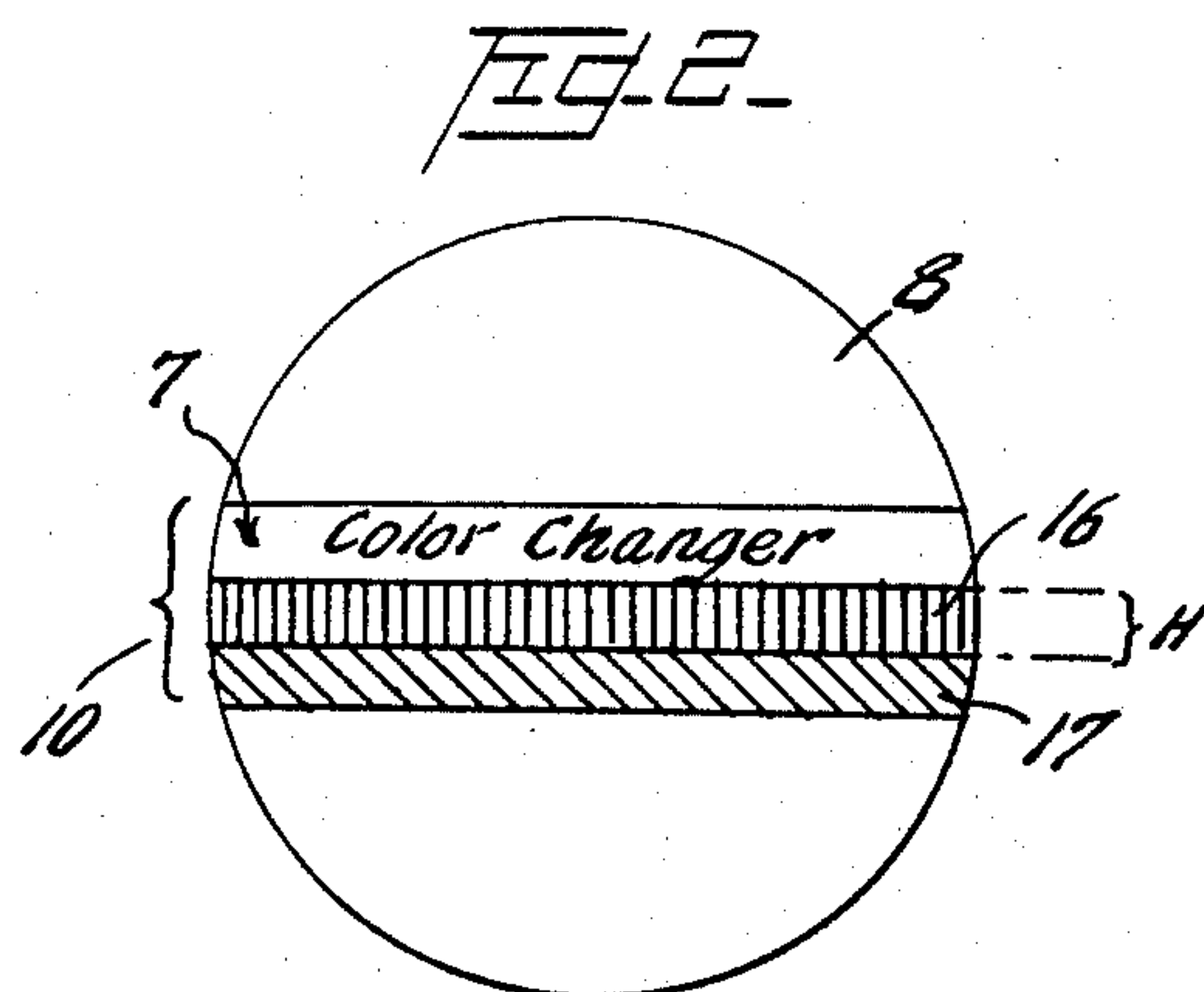
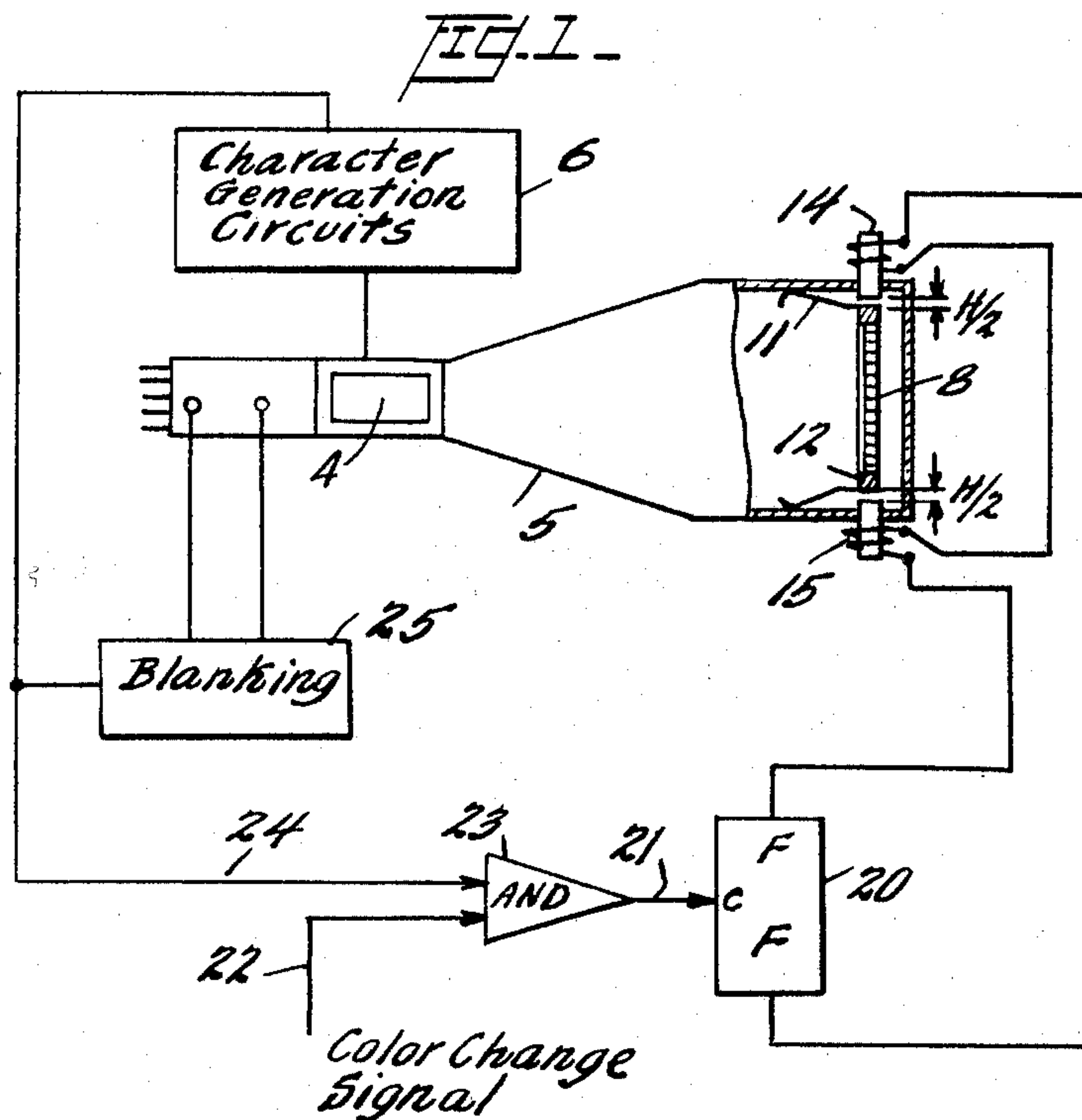


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C. R. CORPEW
SYSTEM FOR GENERATION OF CHARACTERS WITH A CATHODE RAY
TUBE IN DIFFERENT COLORS
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INVENTOR.
Charles R. Corpew
BY
Watson, Cole, Grindle & Co.
Watson
ATTORNEYS

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3,418,517 SYSTEM FOR GENERATION OF CHARACTERS WITH A CATHODE RAY TUBE IN DIFFERENT COLORS

Charles R. Corpew, La Mesa, Calif., assignor to Stromberg-Carlson Corporation, Rochester, N.Y., a corporation of Delaware

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ABSTRACT OF THE DISCLOSURE

A system for displaying characters on a cathode ray tube provides for presentation in different colors by an electromechanically moved screen placed adjacent the cathode ray tube screen to reside in at least two stable positions against stops while a character display is being generated on the screen. Thus, different colors are moved by means of electronic control signals into registration with the portion of a CRT screen where a line of characters is reproduced. Movement of the screen is synchronized with generation of characters.

This invention relates to character generators and, more particularly, it relates to character displays produced upon the screen of a cathode ray tube.

The generation of character shapes in the cathode ray tube has long been known. Such tubes have been used in printing and photographic reproduction systems as well as for visual displays directly observed by a viewer. However, in the present development of the cathode ray tube art, complex techniques and critical cathode ray tube construction are employed to produce color displays.

It is therefore an object of this invention to provide a simplified display for presenting characters in various colors on the screen of a cathode ray tube.

A further object of the invention is to produce a multiple color display compatible with operational requirements of a character generating cathode ray tube.

Therefore, in accordance with the invention, a cathode ray tube of the character display type is provided with a movable phosphor screen and appropriate control circuits to provide for selection of character displays in multiple colors.

The foregoing and further features and objects of the invention are discussed in more detail throughout the following specification, with reference to the accompanying drawing, wherein

FIGURE 1 is a system block diagram of a system for generation of characters displayed on a cathode ray tube in various colors; and

FIGURE 2 is a diagram of a typical color screen display provided by the invention.

As seen from the drawing, a character generating cathode ray tube (CRT) 5 is provided together with appropriate circuits 6 to provide a display of characters 7 upon the screen 8 of the CRT. These display tubes and the corresponding circuits are well known and may be of the type described in the U.S. Patent 2,735,956 issued to Joseph T. McNaney. As shown in that patent the cathode ray tube structure includes an internal tube structure in the form of a mask for shaping the electron beam to form each character of a set. This tube structure is identified generally in FIGURE 1 by the reference character 4.

In accordance with this invention, however, the displayed characters 7 may be viewed in multiple colors by provision of colored phosphor stripes 10 upon the CRT screen 8. These stripes are wide enough to contain a full character line with character heights H. The screen itself

is mounted for movement within the CRT envelope by means of flexible mounts or straps 11 sealed to or welded in the side of the CRT envelope, for example. This permits movement from a non-excited free mid-position to two limiting positions at respective uppermost and lowermost stops, which may comprise magnetic cores 14.

The screen 8 is thus mounted between two electromagnetic members 12 which are drawn to magnetic cores 14 when energized in proper magnetic polarity by windings 15. The cores may be external to the tube, or may partly extend through the envelope.

As may be seen from the movement distance $H/2$ from mid-position to either limit, the screen is moved the full color stripe distance H when changed from the uppermost to the lowermost stop. Thus, either red stripe 16 or green stripe 17 may be positioned to receive the row of characters 7 by electromagnetic signals provided to coils 15.

A typical control system for color selection is embodied in flip-flop circuit 20 which changes polarity of drive current to coils 15 alternately with input signals received at complementing terminal 21. Thus, a color change signal is introduced at lead 22 of coincidence (AND) circuit 23, which also requires a signal at lead 24 before the flip-flop 20 may be complemented.

From the character generation circuits a signal is provided at lead 24 between each of two successive characters to blank the electron beam by means of blanking circuits 25. Thus, the color selection attained by movement of screen 8 is accomplished in synchronism with characters produced by the system, so that alternate characters may be produced in different colors, for example.

This system is well adapted for greater color variety either by means of changes to the screen or the electronic controls. For example, the same character may be generated twice to display in a third color the merged views (retained by the eye) of both colors and thereby produce a third color without a more complex screen. The screen itself may be varied without departing from the spirit or scope of this invention. For example, three color stripes could be employed so that the mid-position displays a third color, or a checkerboard pattern could be moved along two axes.

It is evident from the foregoing preferred embodiment of the invention that a novel display system is provided which simply produces from a character forming CRT a multiple-color presentation. Accordingly, those novel features representative of the scope and spirit of the invention are defined with particularity in the appended claims.

What is claimed is:

1. In a cathode ray tube system producing shaped characters upon the cathode ray tube screen of a cathode ray tube, the improvement comprising in combination, electrical means including a mask for shaping the electron beam to form and present a series of individual characters and position them within a selected line on said cathode ray tube screen, a multiple line color screen with each line exhibiting a different color positioned adjacent the cathode ray tube screen relatively movable with respect to said line to a sequence of rest positions respectively placing each color at said selected line at which the characters are presented, wherein the different lines of said color screen are positioned to direct a display of said characters in different colors of light at a viewing position in response to the formation of the character by the shape of the cathode ray beam in said tube, electromechanical means for moving the color screen selectively between said rest positions in response to discrete electrical signals, and electrically actuated means coupled in synchronism to operate between presentation of two of the characters produced by said electrical means to generate discrete electrical signals coupled to said electromechanical

means to move said lines on said color screen relative to said line on said cathode ray tube screen from one rest position to another, wherein said cathode ray tube screen has a phosphor for forming characters with said shaped electron beam within a line of a height H, and character generation circuits are coupled to the system for forming with said shaped electron beam a row of characters along said line having a character height substantially equal to H, and wherein the color lines on said color screen have a height substantially equal to H registered with said row of characters, whereby the entire character formed by said shaped beam is presented in a single selected color.

2. The combination defined in claim 1 wherein the screen has magnetic elements attached thereto within the envelope and the electromechanical means comprises electromagnets at least partly extending outside the envelope.

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RODNEY D. BENNETT, *Primary Examiner*.

B. L. RIBANDO, *Assistant Examiner*.

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178—5.4; 340—324.1