May 27, 1969 W. R. AIKEN 3,447,150

MULTICOLOR SIGNALLING DEVICE

Filed Oct. 31, 1966 Sheet 1 of 2

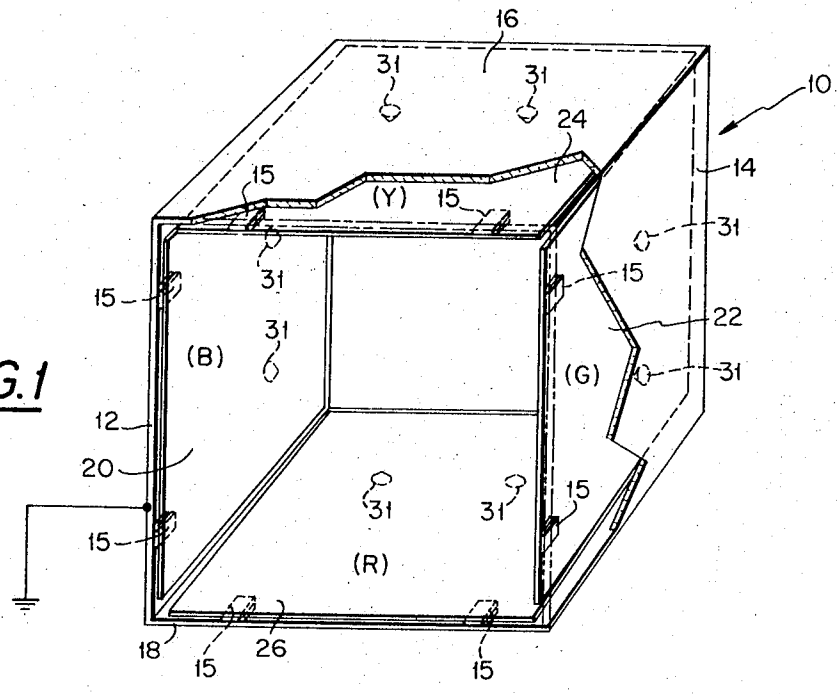


FIG. 1

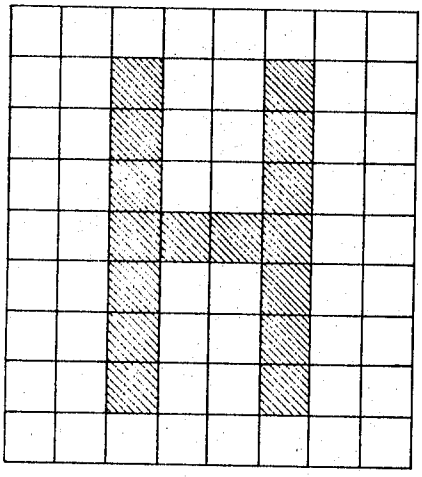


FIG. 4

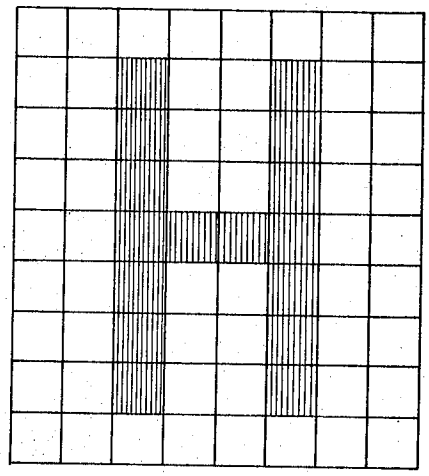


FIG. 5

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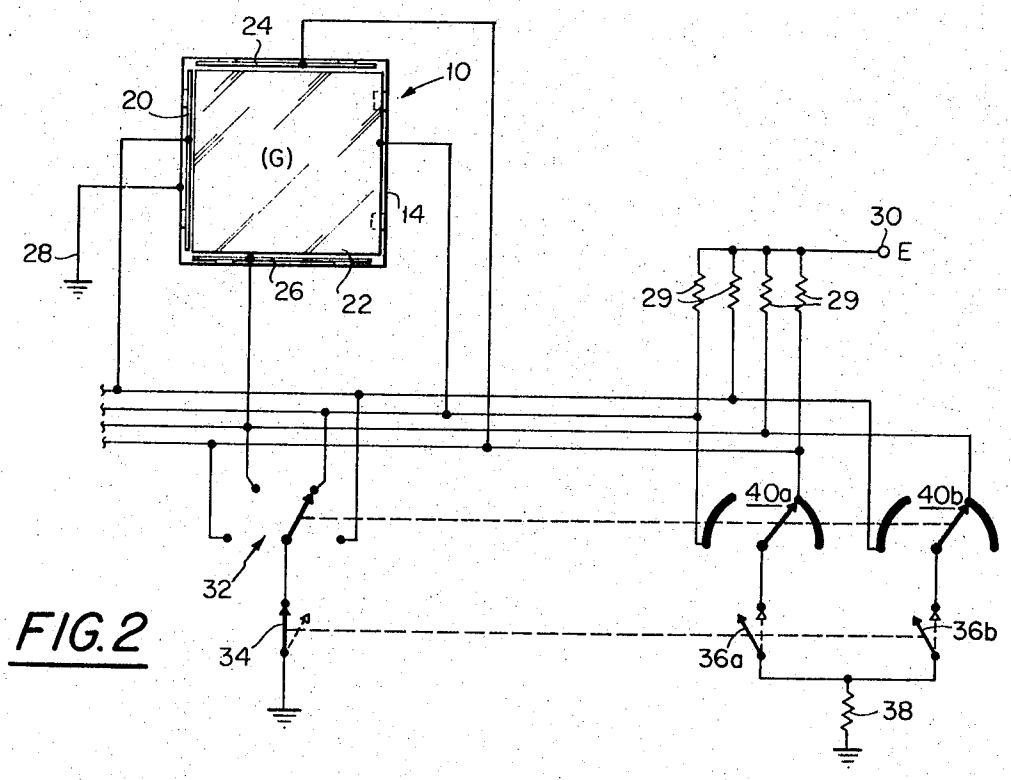


FIG. 2

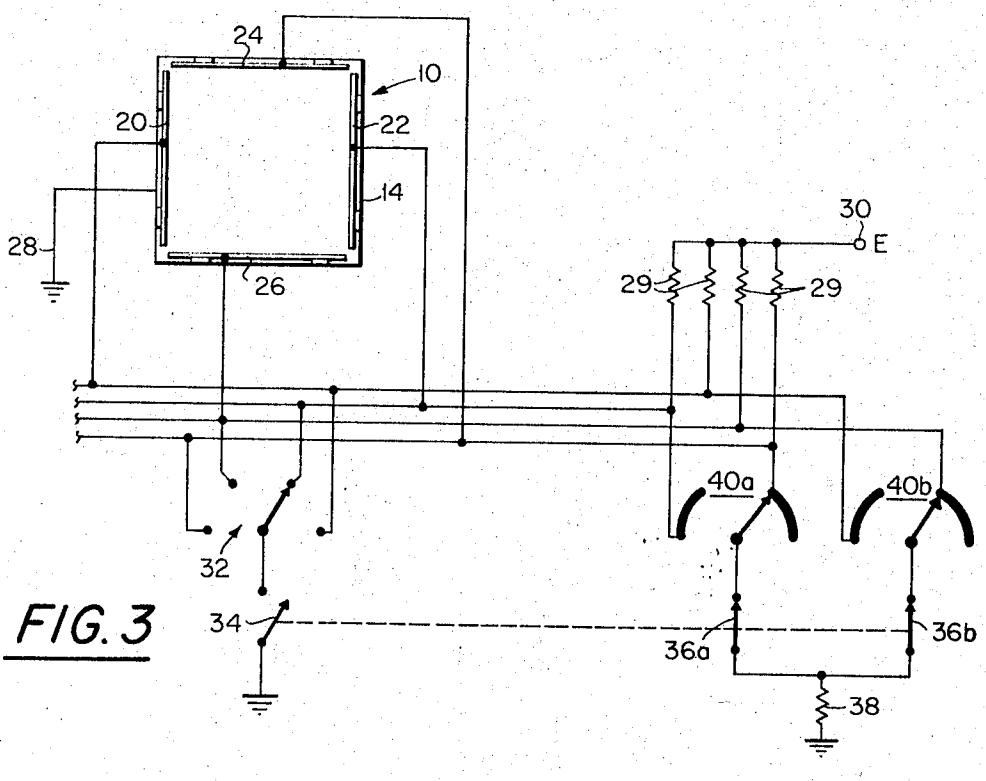


FIG. 3

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MULTICOLOR SIGNALLING DEVICE

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U.S. Cl. 340—373 7 Claims

ABSTRACT OF THE DISCLOSURE

A signalling device comprising electrode means arranged to define a many-sided enclosure, a plurality of vanes having differently colored surfaces mounted within said enclosure for swinging movement between first positions adjacent corresponding sides of said enclosure wherein they are concealed from a common line of view axially of the enclosure and second positions withdrawn from the sides of the enclosure wherein their colored surfaces are exposed to said common line of view, and means operable to establish vane-actuating electro-static fields between a selected one of said vanes, the remaining vanes and said electrode means to swing the selected vane into said second position thereof and thus expose its colored surface to said common line of view and to return the exposed vane to said first concealed position thereof.

The present invention relates to adjustable signs or signalling devices of the type wherein hingedly mounted vanes are moved by the repelling and/or attracting effect of electrostatic fields, to display, expose or conceal an identifying mark, such as a letter, a warning sign or a brightly painted surface. Devices of this type are described in my U.S. Patent No. 3,089,120, issued May 7, 1963, for a Signalling Device. A plurality of devices of this type may be assembled in groups in the manner of a honeycomb or mosaic, and adjustment of selected ones of said devices to positions wherein their vanes expose brightly colored surfaces to the outside, may be employed to form large and clearly visible numbers, letters and like symbols, as likewise disclosed in my aforementioned U.S. Patent No. 3,089,120.

It is an object of the present invention to provide a signalling device of the type referred to, that furnishes a selection of different colors; in other words, an electrostatically actuated signalling device that may selectively be operated to display differently colored vane surfaces so that when used in groups of the type described above it may be operated to display messages selectively in any-one of a number of different colors.

Another object of the invention is to provide an adjustable multi-color sign or signalling device, of the type referred to, that is of compact construction, easy to operate and dependable in operation.

These and other objects of my invention will be apparent from the following description of the accompanying drawings which illustrate a preferred embodiment thereof and wherein:

FIGURE 1 is a fragmentary perspective of a single unit of a multi-color signalling device embodying my invention;

FIGURES 2 and 3 are schematic front elevations of the device illustrating different positions of adjustment thereof, and showing the control circuitry for the device in different operational positions; and

FIGURES 4 and 5 are schematic front elevations of signalling apparatus composed of groups of the devices shown in FIGURES 1, 2 and 3, illustrating display of the same symbol in different colors.

Having first reference to FIGURE 1, the device of the invention comprises a housing or enclosure **10** of rectangular cross section which has side walls **12** and **14**, a top wall **16** and a bottom wall **18** and may be open in front. Hingedly supported from the side walls **12** and **14**, by means of flexible strips **15** for folding movement about vertical axis parallel and adjacent to the front edges of the side walls, are vanes **20** and **22**, respectively, of rectangular shape, which may be swung from idle positions adjacent the side walls to positions wherein they fill out the open front of enclosure **10**. A top vane **24** and a bottom vane **26** are hingedly supported by means of flexible strips **15** from the top wall **16** and the bottom wall **18**, respectively, of the enclosure for swinging movement about axis parallel and adjacent to the front edges of the top and bottom walls from positions adjacent said top and bottom walls into positions wherein they fill out the free front of the enclosure **10**. Initially, all the vanes are held in positions adjacent the walls from which they are supported so that they are withdrawn from view through the open front of the device, and for this purpose vane-attracting electrostatic fields are set up between the walls of the enclosure and the vanes supported therefrom. In the particular embodiment of the invention illustrated in the accompanying drawings all the walls of the enclosure are in conductive contact with each other and serve as a single all embracing electrode, and retention of the vanes in positions adjacent said walls is accomplished by placing the enclosure at ground potential, as indicated at **28** in FIGURE 2, while connecting the vanes through suitable resistors **29** to a source of high potential indicated at **30**. As a result thereof, vane-attracting electrosatic fields are set up between the vanes and the walls which keep the vanes in the withdrawn positions illustrated in FIGURES 1 and 3 wherein they are not visible from points in front of the device.

To prevent conductive contact between the vanes in their idler positions and the walls of the enclosure, which might impair the vane-attracting electrostatic fields, it is advisable that suitably located spacers **31** be provided on the vanes and/or the walls of the enclosure. The surfaces of the vanes which are exposed to the outside when the vanes occupy the front end of the enclosure, are painted in different colors. Thus, the display surface of vane **20** may be painted blue as indicated by the letter B, the display surface of the vane **22** may be painted green as indicated by the letter G, the display surface of the vane **24** may be painted yellow as indicated by the letter Y, and the display surface of the vane **26** may be painted red as indicated by the letter R. To move the vanes selectively into positions wherein they display their painted surfaces to the outsides, a multi-contact color selection switch **32** is provided that may be manipulated to connect the vanes individually to ground. With both the enclosure **10** and a vane at ground potential, both the vane and the wall behind it are the same potential. In this condition the attracting fields between the grounded and the other vanes are effective to swing the grounded vane into a position wherein it fills the open front wall of the enclosure **10** and displays its painted surface to the outside, as illustrated in FIGURE 2, wherein switch **32** connects the green vane **22** to ground and said vane therefore exposes its green surface G to view from the outside.

To return an actuated vane to its idle or concealed position, an initially closed master switch **34** is provided in in the ground connection of the color selection switch **32**. When switch **34** is opened, the actuated vane **22** is again placed at a higher than ground potential, an attracting electrostatic field is, therefore, set up between the vane and its supporting enclosure wall, and the vane returns to its inactive position adjacent its respective wall of enclosure **10**.

To aid in the return movement of an actuated vane up-

on opening of switch **34**, additional switch means may be provided which operates in unison with said switch **34** to place the vanes adjacent an actuated vane at potentials that establish attracting electrostatic fields between said adjacent vanes and the actuated vane. Having reference to FIGURE 3, when the master switch **34** is opened to initiate return movement of the green vane **22**, two ganged switches **36***a* and **36***b* are closed and connect the vanes located adjacent the green vane, i.e. the yellow vane **24** and the red vane **26** to ground through a resistor **38**, thus applying potentials to said yellow and said red vanes which are different from the potential possessed by the green vane at the instant when the master switch **34** is opened. Hence, attracting electrostatic fields are set up between the returning vane on one side and the red and yellow vanes on the other side. These fields aid effectively in the return movement of the green vane to a position wherein it is not longer visible from the outside. It will be understood that the size of resistor **38** is somewhat critical so that the potentials placed on the vanes adjacent a returning vane, while effective to aid in the return movement of a previously actuated vane, are still too weak to effect a noticeable repulsion of said adjacent vanes from the adjacently located walls of enclosure **10**.

To apply the return-operation-supporting potentials to the proper vanes depending upon which vane has been actuated and is in the process of returning to its concealed or idle position, each of the return-operation-supporting switches **36***a* and **36***b* is connected to a four point switch **40***a* and **40***b*, respectively, which condition the device for erase operation whenever the color selection switch **32** is actuated to move a vane into display position. For this purpose said four point selection switches are ganged and are arranged to move in unison with the color selection switch **32** to establish connection to the proper vanes whenever the color selection switch is moved. Since each vane of the device may be required to aid two adjacent vanes in their return movement, each of the conditioning switches **40***a* and **40***b* is capable of establishing a conductive connection to the same vane for each two positions of the color selection switch **32**. For instance, when the color selection switch **32** is operated to activate the green vane (FIGURE 2), the conditioning switch **40***a* is automatically set to a position wherein it connects the yellow vane to the contact pole of the erase operation-supporting switch **36***a*. Hence, it applies a potential to said yellow vane which aids in the return movement of the green vane, as soon as the master erase switch **34** is opened and the erase support activating switch **36***a* is closed; and when the color selection switch **32** is moved to the next pole to the right to activate the blue vane **20**, the conditioning switch **40***a* retains conductive contact with the yellow vane and will operate to apply a vane-return supporting potential to said yellow vane as soon as the master erase switch **34** is opened, which operation is accompanied by closure of erase operation-support switch **36***a*; for the yellow vane is as much a neighbor of the blue vane as it is of the green vane and, hence, is capable of aiding in the return movement of the blue vane as well. What has been said with regard to the connections and operation of switch **40***a* is analogically true for its twin **40***b*.

In practical use the master erase switch **34** is initially open. Color selection is made by setting the color selection switch **32** to the proper pole, say, the pole leading to the green vane as illustrated in FIGURE 2. This setting of the color selection switch **32** moves the conditioning switches **40***a* and **40***b* to contacts wherein they establish conductive paths to the red and yellow vanes **24** and **26**, respectively, and thus condition these vanes for later cooperation in the erase movement of the selected green vane. Now when the master switch **34** is closed, the green vane swings into the line of vision of the person viewing the device. Closure of the master switch **34** is accompanied by opening of the return operation-support switches **36***a* and **36***b*. Hence, the red and yellow vanes

of the device wil not interfere with the movement of the green vane into its display position. When the green display is to be terminated, the master switch **34** is opened. This operation is accompanied by closure of return-movement-support switches **36***a* and **36***b*. With ground potential withdrawn from the green vane, attracting electrostatic fields are estabilshed not only between the green vane and the corresponding side wall **14** of enclosure **10**, but also between the green vane and the adjacent vanes **24** and **26**. As a result thereof, the green vane returns quickly and dependably to its idle position adjacent the side wall **14** of the enclosure wherein it can on longer be seen from the outside.

The present invention is of particular usefulness in signs of the type wherein a multitude of units such as illustrated in FIGURE 1, are assembled in the manner of a mosaic or honeycomb. Composite signs of this type may be made to display members, letters and whole messages by activating selected ones of the units and when such signs are constructed from multi-color signalling devices of the type disclosed hereinbefore, it is possible to display the symbols selectively in different colors depending upon their relative importance, the subject matter to which they relate and the category of information conveyed. FIGURES 4 and 5 illustrate how a composite sign assembled from the signalling units of the present invention can be made to display the letter "H" in green (FIGURE 4) or in red as symbolically represented by the different shadings of the display surface of the activated vanes (FIGURE 5). Suitable switch arrangements for such composite signalling devices are described in my U.S. Patent No. 3,304,549 issued Feb. 14, 1967, for a Composite Signalling Device.

While I have explained my invention with the air of certain particular embodiments thereof, it will be understood that the invention is not limited to the specific constructional details or the control circuitry shown and described by way of example which may be departed from without departing from the scope and spirit of the invention. Thus, the color display vanes need not necessarily be of square shape, but may be triangular or elliptic, and hinges other than those specifically illustrated at **15** may be employed.

I claim:

1. A signalling device comprising electrode means arranged to define a many-sided enclosure, a plurality of vanes within said enclosure mounted for swinging movement between first positions adjacent corresponding sides of the enclosure wherein said vanes are concealed from a common line of view axially of the enclosure, and second positions withdrawn from the sides of the enclosure wherein they are exposed to said common line of view, and means operable to establish vane-actuating electrostatic fields between a selected one of said vanes and the remaining vanes to swing the selected vane into said second position thereof exposing it to said common line of view.

2. A multicolor signalling device according to claim **1** wherein the surfaces of said vanes that are exposed to view in said second positions thereof, are differently colored.

3. A signalling device according to claim **1**, including four vanes mounted to form a tunnel of square cross section when in said first position thereof and wherein said electrode means are formed by an open ended enclosure of square cross section.

4. A signalling device according to claim **1** including means operative in unison with said vane-actuating field-establishing means when said field-establishing means is operated to establish an attracting field between an actuated vane and said electrode means, for simultaneously establishing an attracting electrostatic field between said actuated vane and an adjacently located non-actuated vane.

5. A multicolor signalling device comprising four vanes

having differently colored display surfaces and mounted for swinging movement between first positions wherein said vanes form a tunnel of square cross-section and said display surfaces thereof are concealed from view in a direction axially of said tunnel, and second positions wherein said display surfaces thereof are exposed to view in a direction axially of said tunnel, an enclosure arranged to surround said vanes with its side walls disposed adjacent to respective ones of said vanes in said first positions thereof, and means selectively operable to estabilsh vane-actuating electrostatic fields between a selected one of said vanes, the remaining vanes and the walls of said enclosure to swing the selected vane into said second position thereof and return it to said first position thereof.

6. A signalling device according to claim **5** including means operative in unison with said field-establishing means when said field establishing means is operated to establish an attracting electrostatic field between an actuated vane and the corresponding side wall of said enclosure, for simultaneously establishing an attracting

electrostatic field between said actuated vane and a vane adjacent said actuated vane.

7. A signalling device according to claim **5** including means operative in unison with said electrostatic field-establishing means when said field establishing means is operated to establish an attracting electrostatic field between an actuated vane and the corresponding side wall of said enclosure, for simultaneously establishing attracting electrostatic fields between said actauted vane and the non-actuated vanes at either side of said actuated vane.

References Cited

UNITED STATES PATENTS

3,021,519	2/1962	McLaughlin	340—373
3,089,120	5/1963	Aiken	340—44

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340—336, 378