Feb. 9, 1965 W. R. AIKEN 3,169,241

SIGNALLING DEVICE

Filed March 1. 1961 2 Sheets-Sheet 1

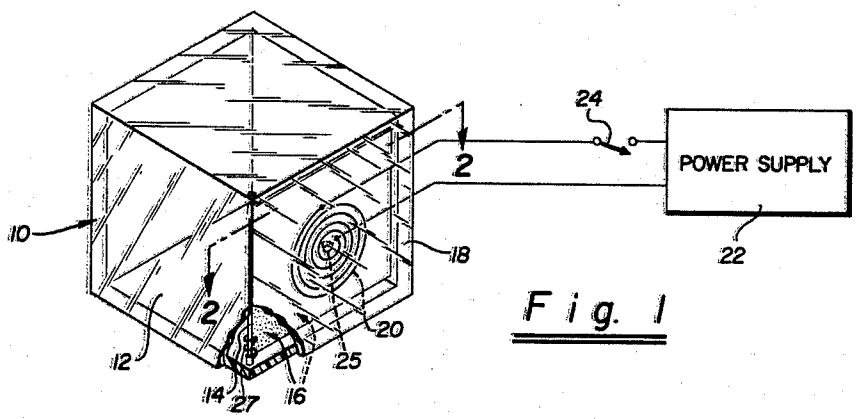


Fig. 1

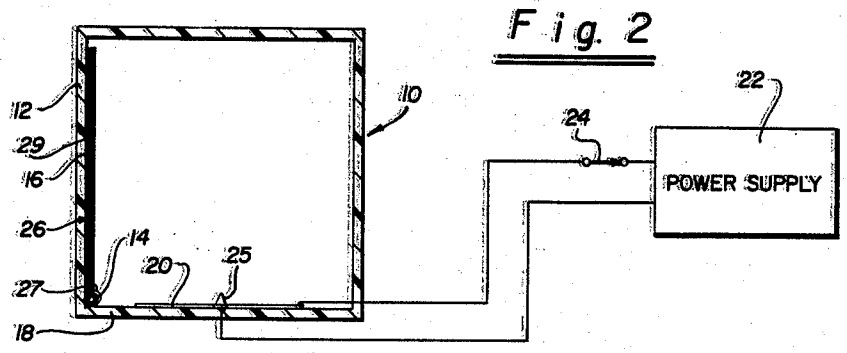


Fig. 2

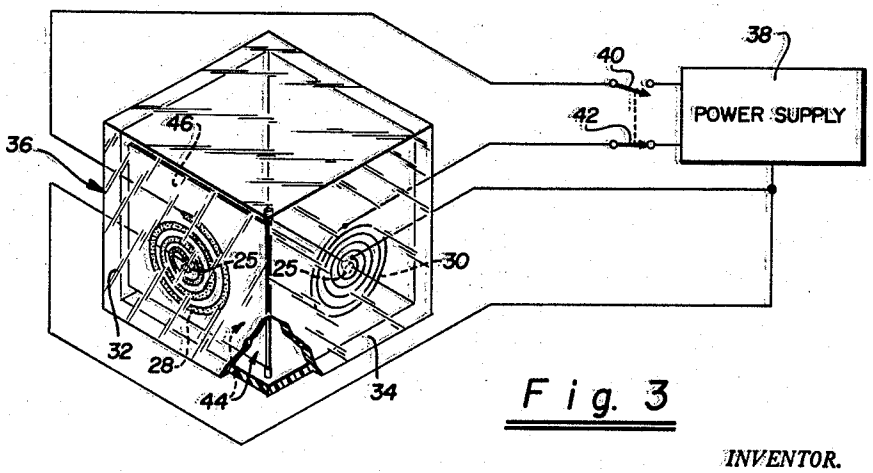


Fig. 3

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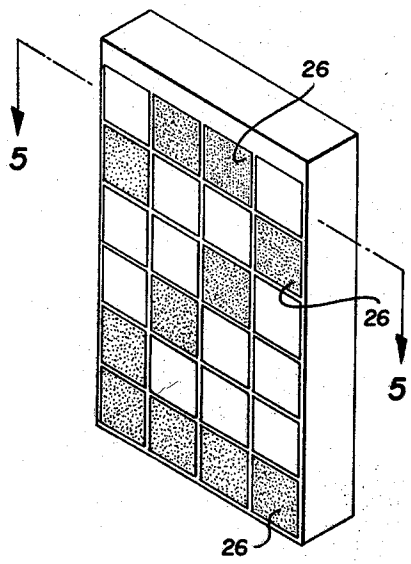


Fig. 4

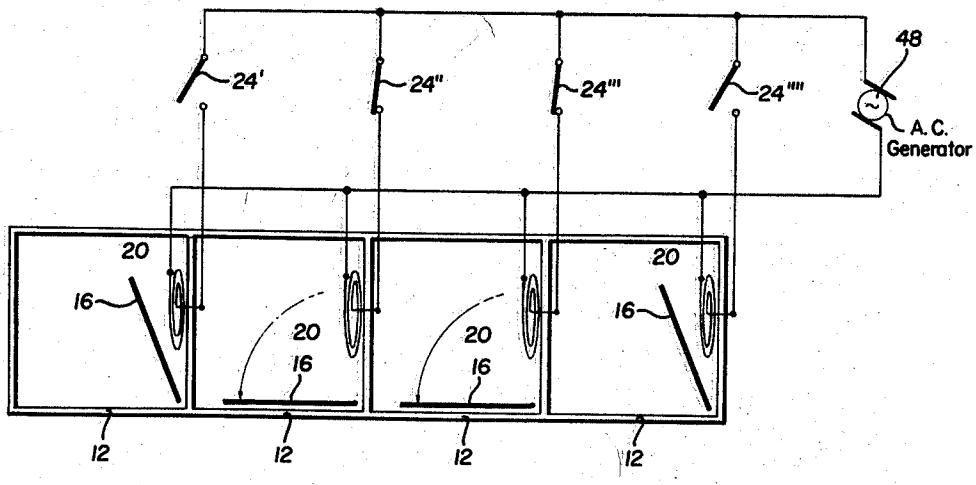


Fig. 5

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United States Patent Office 3,169,241 Patented Feb. 9, 1965

3,169,241

SIGNALLING DEVICE

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Filed Mar. 1, 1961, Ser. No. 92,691
2 Claims. (Cl. 340—373)

The present invention relates to signalling devices of the type employing relatively movable components to display, expose or conceal an identifying mark, such as a number, a letter, a warning sign or brightly painted surface.

It is an object of my invention to provide a signalling device of the type referred to, that is of simple and inexpensive construction, is inexpensive and easy to operate, and is dependable in performance.

This and other objects of the present invention will be apparent from the following description of the accompanying drawings which illustrate certain preferred embodiments thereof and wherein

FIGURE 1 is a schematic perspective of an embodiment of my invention;

FIGURE 2 is a plan view of the embodiment illustrated in FIGURE 1 in a different operational position;

FIGURE 3 is a schematic perspective similar to FIGURE 1, of a modified embodiment of the invention;

FIGURE 4 is a perspective of an apparatus formed by a plurality of superposed rows of devices such as illustrated in FIGURES 1 to 3; and

FIGURE 5 is a schematic plan view of the uppermost row of an apparatus of the type shown in FIGURE 4 illustrating an exemplary control circuit therefor.

For actuating a hinged component, such as a sheet or plate, to display, expose or conceal an identifying mark, the present invention makes use of the motion-producing effect of force fields upon conductive bodies. More specifically, the present invention makes use of the motion-producing effect of magnetic force fields upon conductive bodies whether they are made of a magnetizable or non-magnetizable material. For this purpose a magnetizing coil is provided in the vicinity of the hinged component, and if said component is made of a non-magnetizable electrically conductive material, energization of the coil with an alternating current produces an alternating magnetic field which induces eddy currents in the component. This is effective to repel the component from the coil in the same manner in which the rotor of an eddy current motor is actuated, causing said component to move about its hinges from a position of rest wherein it conceals an identifying mark to a position wherein it exposes or displays the mark; in other words, the magnetic field acts directly upon the display-controlling component to effect movement thereof. Alternatively, the hinged component may be made of a magnetizable material in which case it will be attracted by the magnetizing coil when said coil is energized whether the energization is effected by an alternating current or a direct current. Here again the magnetic force field acts directly upon the display controlling component, and by energization of the coil, said component may be moved from a position wherein it displays or exposes an identifying mark into a position wherein said mark is concealed from view.

In FIGURE 1 the reference numeral **10** identifies a cube-shaped cell or enclosure which may be made of a suitable plastic. Said enclosure has a transparent front wall or window **12** or may be open at the front. In the accompanying drawings the enclosure **10** has been represented as if it were entirely transparent so as to show the components in its interior. In practice, however, all its walls except the front wall **12** are preferably opaque. Arranged for rotation about a vertically disposed hinge rod **14**

located in a corner adjacent the window **12** is a flap or vane **16** of an electrically conductive non-magnetic material, such as stiff aluminum foil. Attached to the side wall **18** of the enclosure **10** is a spiral coil **20** whose leads are connected to the poles of a suitable source of alternating voltage **22** and contain a normally open switch **24**. Also attached to said side wall at a center point thereof may be a suitable spacer **25**. By mounting the hinge rod **14** of the vane **16** in an appropriately tilted position or by suitable spring means as indicated at **27** in FIGURES 1 and 2, the vane may be arranged to assume ordinarily a position closely adjacent to the side wall **18** as illustrated in FIGURE 1 as determined by the spacer **25**. Upon closure of switch **24**, however, the alternating magnetic field generated by the energized coil **20** repels the flap **16** causing it to move into a position adjacent the window **12**, as illustrated in FIGURE 2. In this position the vane may display any identifying mark that may be provided upon its outer surface **26** as indicated by the line **29** in FIGURE 2. This may be a letter, a character, or a warning sign, or the total outer surface of the vane may be painted in a bright color, such as red. Whenever the switch **24** is opened, however, and the magnetic field generated by the coil **20** disappears, the flap **16** returns to its initial position adjacent the side wall **18** and thus withdraws the identifying mark on its outer surface **26** from view. Hence, by closing or opening the switch **24**, the described device may be operated to display or conceal an identifying mark.

The embodiment of the invention illustrated in FIGURE 3 differs from the embodiment illustrated in FIGURES 1 and 2 in that it employs two magnetizing coils **28** and **30** instead of one. Coils **28** and **30** are located adjacent the transparent front wall or window **32** and the side wall **34** of the cube-shaped enclosure **36**, respectively, and may alternately be energized from the same source of alternating voltage **38** by a pair of ganged switches **40** and **42**. When the switches are in the position illustrated in FIGURE 3, the coil **28** adjacent the window **32** is de-energized, but the coil **30** at the side wall **34** is energized, and the magnetic field generated by said coil **30** moves the flap **44** into a position adjacent the window **32** wherein it displays whatever identifying mark may be provided on its outer surface **46**. By reversing the position of the switches **40** and **42**, the coil **30** is de-energized but the coil **28** is energized and establishes an alternating field that repels the flap or vane **44** from the window **32** of the enclosure into a position adjacent the side wall **34** thereof so that its signalling surface is no longer visible through the window. The embodiment of the invention illustrated in FIGURE 3 requires no mechanical means for returning the flap or vane **44** from its display position to its idle position, as does the embodiment illustrated in FIGURES 1 and 2. However, it has the disadvantage that the magnetizing coil **28** adjacent the window **32** must be made of a transparent material such as transparent conductive coating deposited onto a surface of said window, lest it interfere with the clear visibility of whatever identifying mark may be provided upon the outer surface of the flap.

FIGURE 4 illustrates a plurality of signalling devices of the type illustrated in FIGURES 1 to 3, assembled in superposed rows to form an apparatus that may be manipulated by activation of selected ones of said signalling devices to form letters or characters, such as the character "2" shown in said FIGURE 4. The apparatus illustrated in FIGURE 4 is assembled from devices of the type illustrated in FIGURES 1 and 2, and the outer surfaces **26** of the flaps **16** of all devices comprised in the apparatus are painted black. The magnetizing coils **20** of any one of the devices comprised in the apparatus may selectively be energized from a common source of alter-

nating voltage 48 by appropriate setting of individual switches 24', 24'', 24''' and 24'''' as illustrated in FIGURE 5. Said figure is a plan view of the uppermost row of juxtaposed signalling devices in an apparatus of the type illustrated in FIGURE 4 and shows that the switches 24'' and 24''' are closed to energize the coils of the two center devices of said uppermost row to cause the flaps 16 thereof to expose their black outer surfaces 26 through the window 12, which surfaces are necessary to form the character "2" upon the front surface of the apparatus. The magnetizing coils of the devices in the lower rows of the apparatus illustrated in FIGURE 4 may be individually connected to the source of power 48 by individual switches so that the complete character "2," or any other character or letter may readily be displayed on the front surface of the apparatus shown in FIGURE 4 by closure of the appropriate switches 24.

Analogically operating devices may be constructed by employing magnetizable material for the flaps or vanes 16 or 44, respectively, the only difference being that energization of the magnetizing windings will then attract, instead of repel said vanes. If the vane 16 (FIGURES 1 and 2) is constructed from a magnetizable material, such as iron, it has to be biassed by appropriate tilting of its hinge rod 14, or suitable spring means 27 in such a manner it will normally assume a position adjacent the window 12 wherein it displays whatever identifying mark may be provided on its outer surface 26. Energization of the magnetizing coil 20 as effected by closure of switch 24 will then pull the vane 16 into a position adjacent the side wall 18 of the enclosure, wherein its identifying mark is concealed from view.

Similarly, if the vane 44 of the device illustrated in FIGURE 3 is constructed from a magnetizable material, it will perform as satisfactorily as if the vane were constructed from an electrically conductive, non-magnetizable material, but closure of switch 40 and opening of switch 42 would cause the vane 44 to move into its display position, and opening of switch 40 and closure of switch 42 would cause it to return to its position of rest. It will be understood that the composite apparatus illustrated in FIGURE 5 may be assembled from signalling devices employing vanes of a magnetizable material. The embodiments of the invention employing vanes made from a magnetizable material have the advantage of operating with direct current as well as alternating current. However,

when the vanes 16 and 34 of the apparatus illustrated in FIGURES 1 to 5 are constructed of magnetizable material, the provision of spacers adjacent the magnetizing coils, such as indicated at 25 in FIGURES 1, 2, 3 and 5 to prevent direct contact of the vane with the magnetizing coils, is practically a necessity for satisfactory performance of the devices, in order that the vanes may dependably detach themselves from their positions adjacent the magnetizing coils whenever they are supposed to swing into their opposite positions.

I claim:

1. A signalling device comprising an enclosure having side portions and at least one window, a sheet of magnetizable material, means mounting said sheet for movement between a position wherein it conceals an identifying mark from view through said window and a position wherein it displays the mark to view through said window, a spiral coil mounted on the surface of a side portion of said enclosure which is adjacent to said window, the convolutions of said coil being substantially in a surface parallel with the side portion on which it is mounted, and means operable to energize said spiral coil to move said sheet from one to the other position thereof.

2. A signalling device comprising an enclosure having a window and a side wall adjacent said window, a sheet of magnetizable material, hinge means mounting said sheet for rotation between a position adjacent said side wall and a position adjacent said window, a spirally wound magnetizing coil mounted in a surface parallel with and adjacent to said side wall, and means for energizing said coil to withdraw said sheet from said window.

References Cited by the Examiner

UNITED STATES PATENTS

596,774	1/98	Herzog	340—338
2,359,546	10/44	Carroll	340—373
2,367,299	1/45	McLarn et al.	340—373
2,405,429	8/46	Jewell	340—373
2,909,973	10/59	Koelsch et al.	340—378
2,912,674	11/59	Aiken	340—44
2,952,835	9/60	Aiken	340—44
3,021,519	2/62	McLaughlin	340—373

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