Nov. 10, 1959 W. R. AIKEN 2,912,674

ADJUSTABLE SIGN

Filed May 8, 1958 3 Sheets-Sheet 1

FIG_1

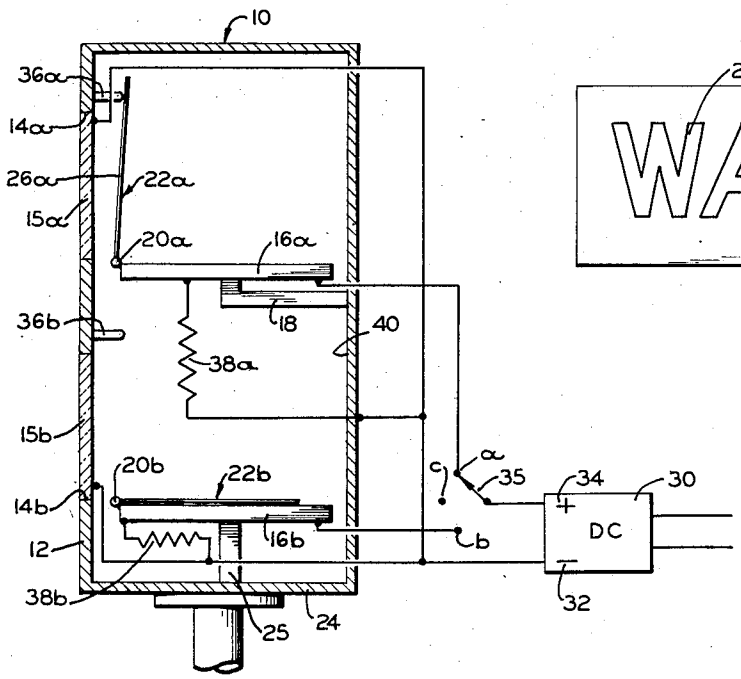


FIG_3

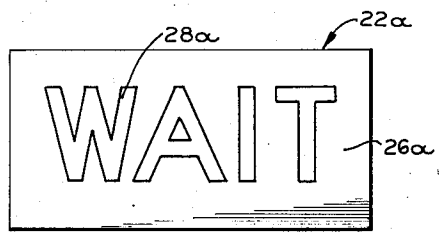


FIG_2

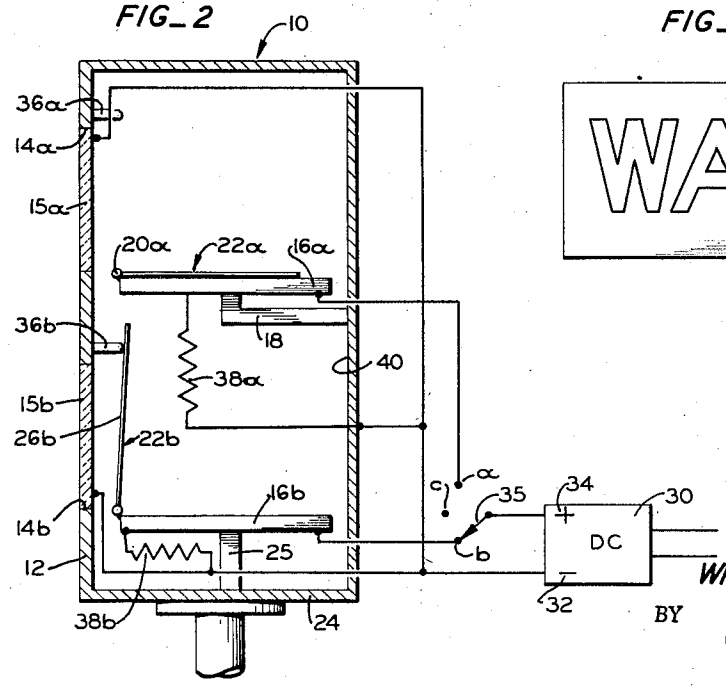
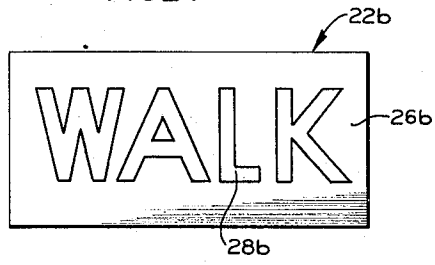


FIG_4



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ADJUSTABLE SIGN

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FIG_5

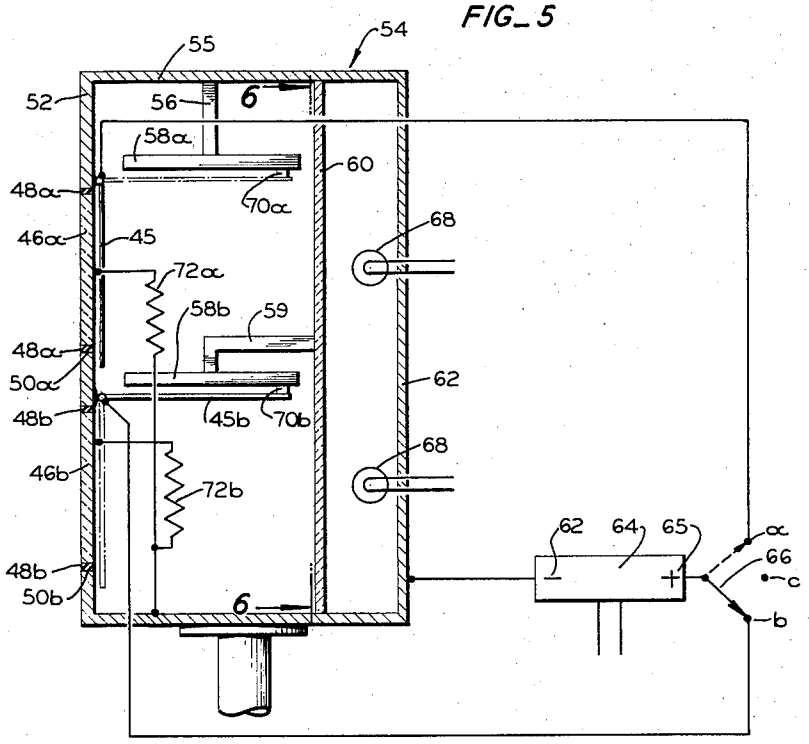
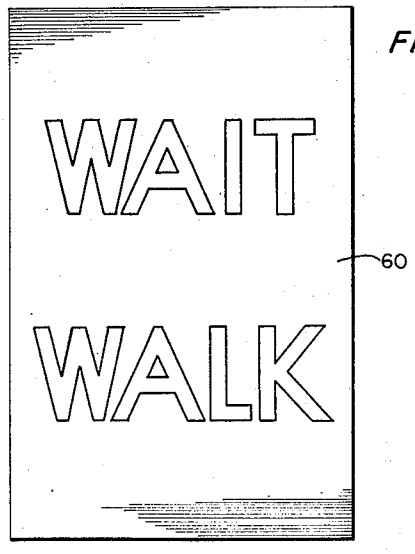


FIG_6



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ADJUSTABLE SIGN

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FIG_7

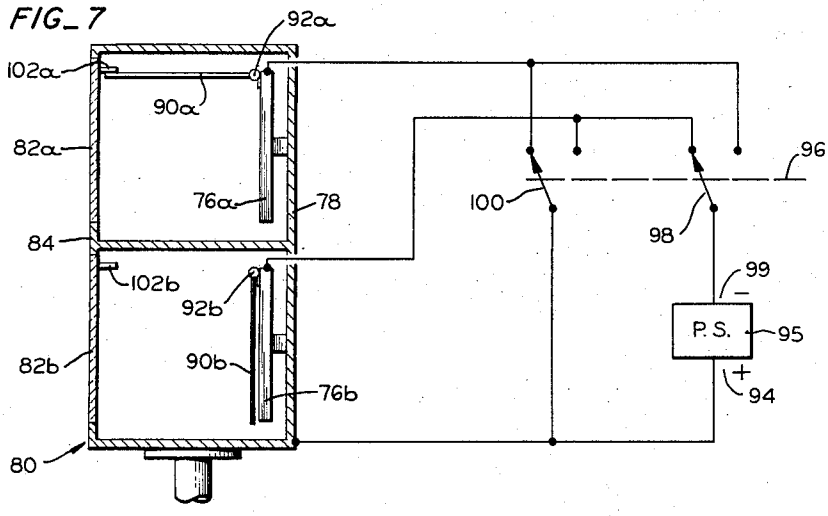
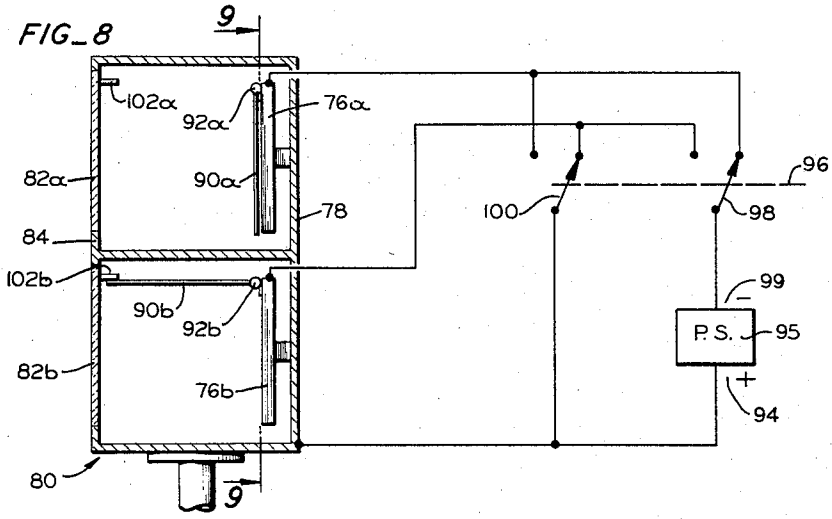


FIG_8



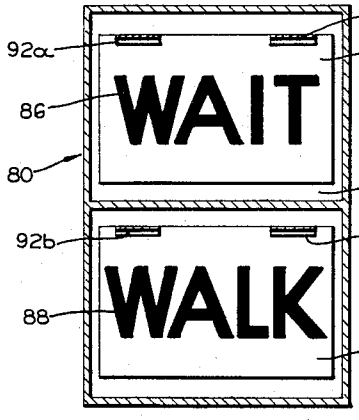


FIG_9

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2,912,674

ADJUSTABLE SIGN

William Ross Aiken, Los Altos Hills, Calif.

Application May 8, 1958, Serial No. 733,936

11 Claims. (Cl. 340—44)

The present invention relates to adjustable signs such as are employed as traffic signs.

It is an object of my invention to provide an adjustable sign, of the type referred to, that is of a simple and inexpensive construction.

Another object of the invention is to provide an adjustable sign that is easy to operate and dependable in operation.

Still another object of my invention is to provide an adjustable sign, of the type referred to, that requires a minimum of power for operation.

These and other objects of my invention will be apparent from the following description of the accompanying drawings, which illustrate certain preferred embodiments thereof and wherein—

Figures 1 and 2 are somewhat schematic vertical sections through a traffic sign embodying my invention, illustrating different operational positions thereof.

Figures 3 and 4 are front elevations of component parts of the device shown in Figures 1 and 2.

Figure 5 is a vertical section, similar to Figures 1 and 2, of a modified embodiment of the invention;

Figure 6 is a front elevation of a component part of the device shown in Figure 5.

Figures 7 and 8 are schematic vertical sections, similar to Figures 1 and 2, of yet another modified embodiment of the invention; and

Figure 9 is a section taken along line 9—9 of Figure 7.

In accordance with my invention I employ the principle of the electroscope to actuate the display members of an adjustable sign, of the type here under consideration, to move said members selectively into their display or neutral positions.

Having reference to Figures 1 and 2, the adjustable traffic sign illustrated therein comprises an outer housing **10** which may be made from sheet metal. Provided in the front wall **12** of said housing are two superposed openings **14***a* and **14***b* containing window panes **15***a* and **15***b* respectively, of an electrically conductive glass, such as the glass known under the trade name NESA. Arranged within the housing **10** at a level slightly below the lower edge of the upper window **14***a* is a horizontally disposed electrically conductive plate **16***a* which may be made of metal, such as aluminum, and which is rigidly supported from the housing **10** by means of a bracket **18** of insulating material. Hingedly connected to the front edge of said plate, as indicated at **20***a*, is another plate **22***a* of an electrically conductive material, which is preferably a thin sheet, such as a relatively stiff aluminum foil. Arranged at a level slightly below the lower edge of the lower window **14***b* is another horizontally disposed plate **16***b* of an electrically conductive material, which may be rigidly supported from the bottom **24** of the housing **10** by a stem **25** of insulating material; and hingedly connected to the front edge of said plate **16***b*, as indicated at **20***b*, is another plate or sheet **22***b* of an electrically conductive material, such as the hereinbefore mentioned aluminum foil.

The outer or upper surface **26***a* of the upper sheet **22***a* may be painted red with a suitable electrically conductive paint, and the warning "Wait" may be cut into the sheet or may be painted in black upon its outer surface, as illustrated at **28***a* in Figure 3. Similarly, the upper or outer surface **26***b* of the lower sheet **22***b* may be painted green with an electrically conductive paint, and the instruction "Walk" may be cut into said sheet or may be painted upon its outer surface, as illustrated at **28***b* in Figure 4.

To operate the described structure so as to display alternatively the outer surface of the upper sheet **22***a*, and the outer surface of the lower sheet **22***b*, through the windows **14***a* and **14***b* respectively, I apply a voltage to the electrically conductive window panes **15***a* and **15***b* and I provide means for selectively applying a voltage of opposite polarity to either the upper plate **16***a* or the lower plate **16***b*. Having again reference to Figures 1 and 2, the reference numeral **30** indicates a high voltage source of D.C. current, whose negative pole **32** is permanently connected to the window panes **15***a* and **15***b* and whose positive pole **34** may selectively be connected to either the upper plate **16***a* or the lower plate **16***b* by means of a switch **35**. When the upper plate **16***a* is connected to the positive pole of the source of direct current by setting the switch to its contact *a*, said plate repels the sheet **22***a* with which it is in electrically conductive connection, and as said sheet commences to swing upwardly about the hinge **20***a*, it is attracted by the opposite charge on the electrically conductive window pane **15***a*, so that it finally assumes an almost vertical position determined by a stop member **36***a* of insulating material that may be provided at or near the upper edge of the window pane **15***a*. In this position the sheet **22***a* displays the warning "Wait" through the window **14***a* to the outside. On the other hand, when the switch **35** is moved to its contact *b* as illustrated in Figure 2, the positive charge of said plate **16***a* may leak off through a suitable resistor indicated at **38***a* so that the sheet **22***a* is permitted to drop under the force of gravity back upon the plate **16***a* into the position illustrated in Figure 2. At the same time the positive voltage applied to the lower plate **16***b* causes its co-acting sheet **22***b* to rise into the near vertical position determined by the stop member **36***b* at the upper end of window **14***b*, wherein it displays the instruction "Walk" to the outside as illustrated in said Figure 2. When the switch **35** is returned to the position illustrated in Figure 1, the positive charge of plate **16***b* leaks off through resistor **38***b*, permitting the sheet **22***b* to drop back into its idle or inactive position, while the upper sheet **22***a* is again set up to display its warning through the upper window **14***a*.

To avoid any diversion of the person or persons watching the described traffic sign for instructions, the rear wall **40** of housing **10** is preferably painted black so that the windows **14***a* and **14***b* show only a dark space, whenever their respective signalling sheets are in their idle or inactive positions. To completely deactivate the traffic sign, a third contact *c* may be provided for the switch **35** which is a dead contact and establishes no connections whatsoever.

The actuating mechanism of the described traffic sign is of the simplest construction, it is easy to operate, it responds quickly to the control settings of the switch **35** and is dependable in operation, and while I prefer to use a power supply of a high voltage, such as 3000 volts for its operation, the actual current consumption is extremely small so that the cost of operating the device of the invention is very low.

Figure 5 shows a modified embodiment of the invention wherein the electrostatically actuated sheets **45***a* and **45***b* are hingedly supported adjacent to, and in electrically

conductive contact with, window panes 46*a* and 46*b* of electrically conductive glass. Said panes are mounted in frames 48*a* and 48*b* that are held in superposed openings 50*a* and 50*b*, respectively, in the front wall 52 of the metallic housing 54. Rigidly supported from the top wall 55 of the housing by an electrically conductive stem 56 at a level slightly above the upper end of window 50*a* is a horizontally disposed metal plate 58*a*, and another horizontally disposed metal plate 58*b* is rigidly supported by a conductive bracket 59 at a level slightly above the upper end of the lower window 50*b* from a vertical metal partition 60 that extends parallel to the rear wall 62 of the housing 54. The metallic housing 54, and hence the stationary plates 58*a* and 58*b* which are conductively connected to said housing, are connected to the negative pole 62 of a source of D.C. power represented by the block 64, and the positive pole 65 of said source of power may selectively be connected to either the sheet 45*a* and the window pane 46*a*, or the sheet 45*b* and window pane 46*a* depending on whether a switch 66 is set to contact *a* or *b*. Arranged in the space between the partition 60 and the rear wall 62 of the housing 54 are a number of electric bulbs 68 which are illuminated when the device of the invention is in operation. The front surface of partition 60 is preferably painted black, and cut into said partition in the region opposite the upper window 50*a* is the warning "Wait" as shown in Figure 6, while the region of said partition opposite the lower window 50*b* has the instruction "Walk" cut thereinto, as likewise shown in Figure 6. When the switch 66 is set to contact *b*, as illustrated by a full line in Figure 5, a positive voltage is applied to the lower sheet 45*b* and the adjacent window pane 46*b* which is made of a conductive glass and insulated from the housing 54 by the insulating frame 48*b*, and which is in electrically conductive contact with the sheet 45*b*, as has been explained hereinbefore. As a result thereof the sheet 45*b* is repelled from the window pane 46*b* and attracted by the negatively charged metal plate 48*b*, and moves from the position illustrated in broken lines, wherein it covers the window 50*b* and conceals the illuminated instruction "Walk," since it is made of an opaque material, to the position illustrated in full lines in said Figure 5 and determined by a limit stop 70*b* of insulating material, wherein said instruction may be seen from the outside through said window 50*b*. During this phase in the operation of the device, the upper sheet 45*a* covers the upper window 50*a*, since any positive charge previously applied to said sheet and the window pane 46*a* has leaked off through a resistor 72*a*, and said sheet, therefore, conceals the illuminated warning "Wait" from view. On the other hand, when the switch 66 is set to contact *a*, as indicated by a broken line in Figure 5, which applies a positive voltage to the upper sheet 45*a* and the upper window pane 46*a*, said upper sheet is moved to a position determined by a limit stop 70*a* of insulating material and extends parallel to the negatively charged plate 58*a*, as shown in broken lines in Figure 5, so that the illuminated warning "Wait" may now be seen through the window 50*a*. At the same time the positive charge of the lower sheet 45*b* and the lower window pane 46*b* leaks off through resistor 72*b* permitting the sheet 45*b* to return at a position, wherein it covers the lower window and in this manner conceals the illuminated instruction "Walk" from view. To avoid that light might be reflected from the front surfaces of the sheets 45*a* and 45*b* through the window panes 46*a* and 46*b* respectively, when said sheets are in their vertical sign-concealing positions, said front surfaces are preferably painted black.

In the embodiment of the invention illustrated in Figures 7, 8 and 9 the stationary plates 76*a* and 76*b* are vertically disposed above each other and are supported from the rear wall 78 of the metallic housing 80 opposite to, and in horizontal alignment with, the windows 82*a* and 82*b* in the front wall 84 of said housing. The

front surface of the upper plate 76*a* may bear the inscription "Wait" in black letters upon a white ground, as indicated at 86 in Figure 9, and the front surface of the lower plate 76*b* may bear the inscription "Walk" in black letters upon a white ground, as indicated at 88 in said Figure 9. The electrostatically actuated metal sheets 90*a* and 90*b* are hingedly connected to the upper edges of the stationary plates 76*a* and 76*b*, respectively, as indicated at 92*a* and 92*b*, in such a manner that they cover the front surfaces of said plates and conceal the inscriptions marked thereon when no electric charge is applied to said plates and their co-acting sheets.

In accordance with my invention I provide means selectively operable to apply an electric charge to the upper plate 76*a* and its co-acting sheet 90*a* while permitting any charge previously applied to the lower plate and its co-acting sheet to dissipate, or to apply an electric charge to the lower plate and its co-acting sheet while permitting the charge previously applied to the upper plate and its co-acting sheet to dissipate. For this purpose the positive pole 94 of a suitable source of D.C., such as a battery 95, may be permanently connected to the housing 80, and a two-pole switch 96 may either be set to the position illustrated in Figure 7 or the position illustrated in Figure 8. In the former case, the arm 98 of said switch connects the negative pole 99 of the battery 95 to the upper plate 76*a* and its cover sheet 90*a*, while its other arm 100 connects the lower plate 76*b* and its cover sheet 90*b* to the connection between the housing 80 and the positive pole 94 of the battery. When thus connected, the negative charge on the upper plate 76*a* repels the upper sheet 90*a* causing it to swing into the horizontal position determined by the stop member 102*a* of insulating material that is mounted upon the window 82 near the upper edge thereof. In this position the sheet 90*a* uncovers the inscription "Wait" upon the front surface of the stationary plate 76*a* so that it may be seen through window 82*a*. At the same time the connection established by the second switch arm 100 permits any negative charge previously applied to the lower plate 76*b* and its co-acting cover sheet 90*b* to dissipate, causing said sheet to assume a position parallel to the front surface of the plate 76*b* so that the inscription "Walk" on said surface is concealed from view.

On the other hand, when the two pole switch 96 is moved to the position illustrated in Figure 8, a negative charge is applied to the lower plate 76*b* and its co-acting cover sheet 90*b* causing said sheet to swing into the horizontal position determined by the stop member 102*b*, wherein it uncovers the inscription "Walk" on the front surface of plate 76*b* so that said inscription is now visible from the outside through the window 82*b*. At the same time the negative charge previously applied to the upper plate and its co-acting cover sheet is dissipated through arm 100 of switch 96 permitting the upper sheet 90*a* to drop into a position wherein it covers the inscription "Wait" on the front surface of said plate 76*a*.

While I have described my invention with the aid of certain preferred embodiments thereof, it will be understood that the invention is not limited to the specific constructional details shown and described which may be departed from without departing from the scope and spirit of my invention. Thus, while I have described the stationary plates and the actuated sheets as made from metal, it will be understood that they may also be made from other electrically conductive materials, such as plates and sheets of suitable plastics that may be provided with thin coats of an electrically conductive paint.

Furthermore, sheets of transparent wire mesh may take the place of the panes of electrically conductive glass mentioned in the specification and illustrated in the accompanying drawings. Also, while I specifically point out in the foregoing specification, that I prefer to employ what is known as electrically conductive glass for the window panes, I have found that under certain cir-

cumstances ordinary glass may be sufficiently conductive to operate appropriately in the device of my invention.

Moreover, while I have illustrated and described the identifying markings upon the mechanism of my invention to be in the form of inscriptions, in the appended claims this terms is intended to include situations wherein the total surfaces to be alternately exposed and concealed, are painted in a solid color, such as white, red or black. Furthermore, while I have illustrated my invention as comprised of two units that operate in phase opposition, it is within the scope of my invention to employ two or more such units in synchronism to cause signs, figures and letters formed by aligned and brightly colored surfaces of several synchronously operating units to appear and disappear by appropriate manipulation of a common control switch.

It will likewise be understood by those skilled in the art that while I have shown the embodiments of the invention described hereinbefore as operated by a source of direct current, these embodiments may also be operated by a source of alternating current provided the frequency of current reversals is high enough to avoid visible fluttering of the actuated sheets in either of their positions of adjustment relative to their cooperating plates and window panes.

I claim:

1. An adjustable sign comprising a housing having a front wall, a vertically disposed window pane of an electrically conductive transparent material provided in said front wall, a horizontally disposed stationary plate of an electrically conductive material mounted within said housing adjacent the lower edge of said window pane, a sheet of an electrically conductive material hingedly connected with one of its edges to the edge of said stationary plate adjacent said window pane for movement from a position substantially parallel to and above said stationary plate to a position folded away from said stationary plate in a direction toward said window pane, said sheet bearing an identifying mark upon its upper surface, means operable to apply a common voltage to said plate and said sheet while applying a voltage of opposite polarity to said window pane to cause said sheet to swing away from said stationary plate into a position adjacent said window pane wherein it exposes the mark on its upper surface through said window pane, and a stop member effective to prevent electrically conductive contact of said movable sheet with said window pane.

2. An adjustable sign comprising a housing having a front wall, an upper and a lower window pane of an electrically conductive transparent material provided in said front wall, horizontally disposed stationary plates of an electrically conductive material mounted adjacent the lower edges of said window panes, sheets of an electrically conductive material hingedly connected to said stationary plates at the edges thereof adjacent said window panes for movement from a position parallel to and above said stationary plates to a raised position removed from said stationary plates and adjacent said window panes, said sheets having different identifying markings provided on their upper surfaces, means effective to apply a voltage to said window panes and selectively operable to apply a voltage of opposite polarity to said upper or said lower plates to cause a selected one of said movable sheets to swing away from its stationary plate and display its marking through its associated window pane, and stop means effective to prevent electrically conductive contact of said movable sheets with their respective window panes.

3. An adjustable sign comprising a vertically disposed pane of an electrically conductive transparent material, a member bearing an identifying mark disposed behind said pane a distance removed therefrom, a sheet of an electrically conductive opaque material hingedly mounted adjacent the upper edge of and in electrically conductive contact with said pane for movement out of a substantially vertical position adjacent said pane wherein it covers said pane, a horizontally disposed plate of an electrically conductive material arranged adjacent the upper edge of said pane in the space between said pane and said member, means operable to apply a voltage to said pane and said movable sheet while applying an opposite voltage to said horizontally disposed plate, to cause said movable sheet to swing away from said pane into a substantially horizontal position adjacent said stationary plate and thus expose the identifying mark on said member to view through said pane, and stop means effective to prevent electrically conductive contact between said movable sheet and said stationary plate.

4. An adjustable sign comprising a housing having a front wall and a rear wall, upper and lower window panes of an electrically conductive transparent material provided in the front wall of said housing, sheets of an opaque electrically conductive material hingedly mounted adjacent the upper edges of said window panes in electrically conductive contact therewith for movement out of a position in which they cover said window panes, different markings provided adjacent the rear wall of said housing opposite said window panes, horizontally disposed plates of an electrically conductive material supported adjacent the upper edges of said window panes, means effective to apply a voltage to said horizontally disposed plates, and selectively operable to apply a voltage of opposite polarity to the upper window pane and the movable sheet associated therewith or the lower window pane and the movable sheet associated therewith so as to cause a selected one of said sheets to swing away from its window pane into a position wherein it exposes the marking opposite its window pane to view from the outside, and means effective to prevent electrically conductive contact between said sheets and their respective plates.

5. An adjustable sign of the type involving relative physical movement of component parts thereof comprising an identifying mark and means selectively operable to display or conceal said identifying mark including a stationary plate of an electrically conductive material, a sheet of an electrically conductive material, means hingedly mounting said sheet in electrically conductive contact with said plate for movement from an initial position adjacent to and parallel with said plate to an elevated position swung away from said plate, switch means settable from an ineffective to an effective position wherein an electrical charge is applied to said plate and said sheet causing said sheet to be repelled from said plate and swing from its initial position into said elevated position, and means effective, upon return of said switch means to its ineffective position, to effect rapid dissipation of the electrical charge on said plate and said sheet causing return of said sheet from its elevated position to its initial position under the force of gravity.

6. An adjustable sign of the type involving relative physical movement of component parts thereof comprising an identifying mark and a mechanism selectively operable to display or conceal said identifying mark including a stationary plate of an electrically conductive material, a sheet of an electrically conductive material, means hingedly mounting said sheet in electrically conductive contact with said plate for movement from an initial position adjacent to and parallel with said plate into an elevated position swung away from said plate, an electrically conductive element mounted at a point adjacent said sheet in its elevated position, means for applying an electrical charge to said element, switch means settable from an ineffective position to an effective position wherein an electrical charge of opposite polarity is applied to said plate and said sheet causing said sheet to be repelled from said plate and to be attracted by said element and therefore swing from said initial position to said elevated position, stop means effective to block electrically conductive contact of said sheet with said element when said sheet swings into said elevated position, and means effective, upon return of

said switch means to its ineffective position, to effect rapid dissipation of the electrical charge on said plate and said sheet causing return of said sheet from its elevated position to its initial position under the force of gravity.

7. An adjustable sign according to claim 6 wherein said identifying mark is provided upon said sheet.

8. An adjustable sign according to claim 6 wherein said element is a vertically disposed electrically conductive window pane, said plate is mounted in a horizontal position adjacent the bottom edge of said window pane, said sheet is hingedly connected to the edge of said plate adjacent said window pane, and said identifying mark is provided upon the upper surface of said sheet.

9. An adjustable sign according to claim 6 wherein said plate is a vertically disposed electrically conductive window pane having an outer and an inner surface, said identifying mark is located in line with said pane a distance removed from the inner surface thereof, said sheet is hingedly mounted adjacent the top edge of said pane, and said element is a horizontally disposed metal

plate located adjacent the top edge of said window pane.

10. An adjustable sign according to claim 5 wherein said plate is vertically disposed, said sheet is hingedly mounted adjacent the top edge of said plate, and said identifying mark is provided upon said sheet.

11. An adjustable sign according to claim 6 including a metal housing having a front wall, a rear wall, a top wall and a window pane mounted in said front wall, and wherein said plate is vertically disposed adjacent to but spaced from said rear wall, said sheet is hingedly mounted adjacent the upper edge of said plate, said identifying mark is provided on said sheet, and said element is formed by the top wall of said housing.

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