

- UNITED STATES PATENTS

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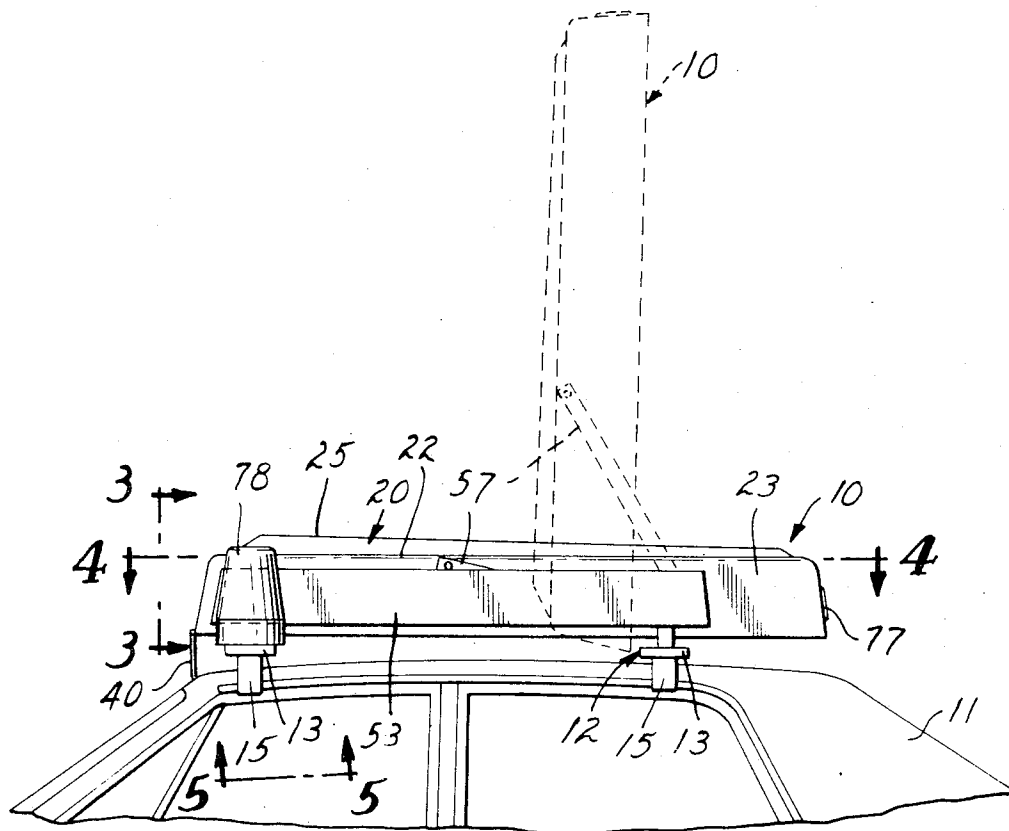
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Attorney—Alexander, Sell, Steldt & Delahunt

ABSTRACT

Apparatus comprising in combination a variable copy command apparatus including an enclosed container that may be moved between an upright position, that will permit oncoming motorists to view the copy message, and a lower position to decrease the air drag on the vehicle. The enclosed container includes a movable transparent copy web, having a plurality of copy messages thereon, and reflective means behind the copy web to provide relatively brilliant daytime and nighttime viewing of the copy message. The container further includes traffic control lamps to provide illuminated animation to the copy message.

10 Claims, 9 Drawing Figures



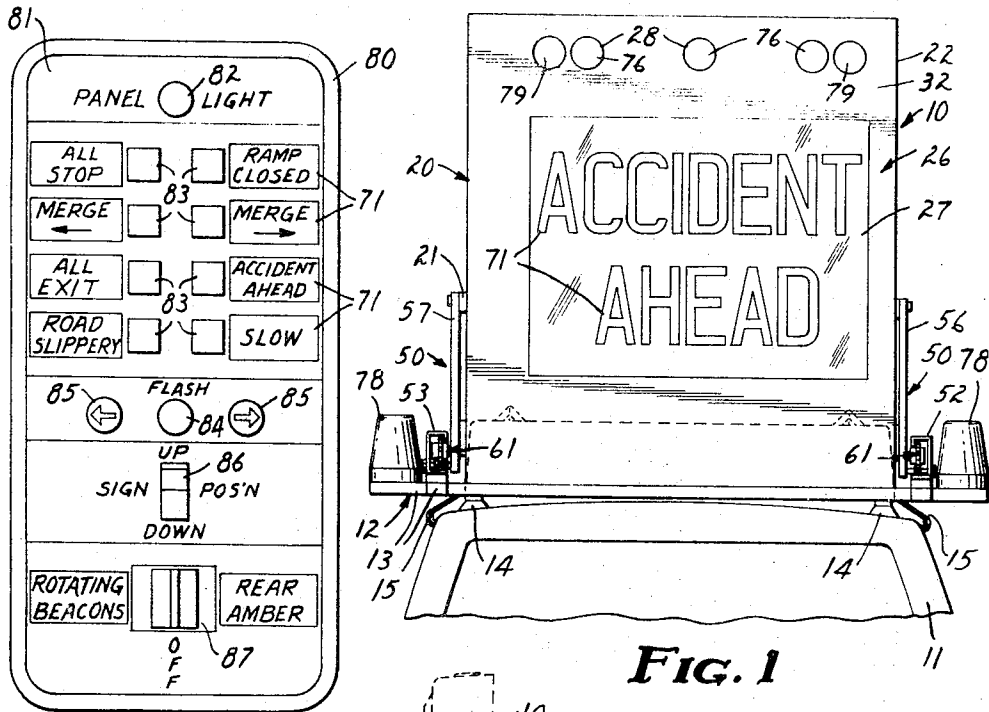
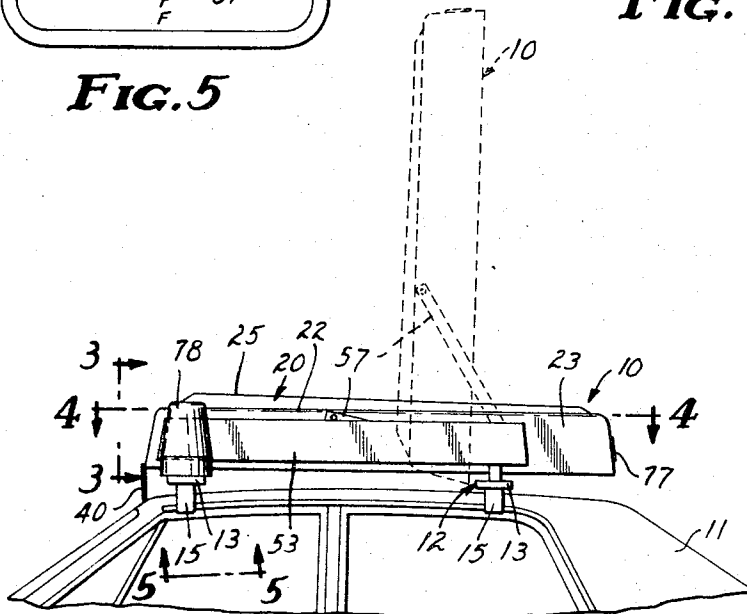
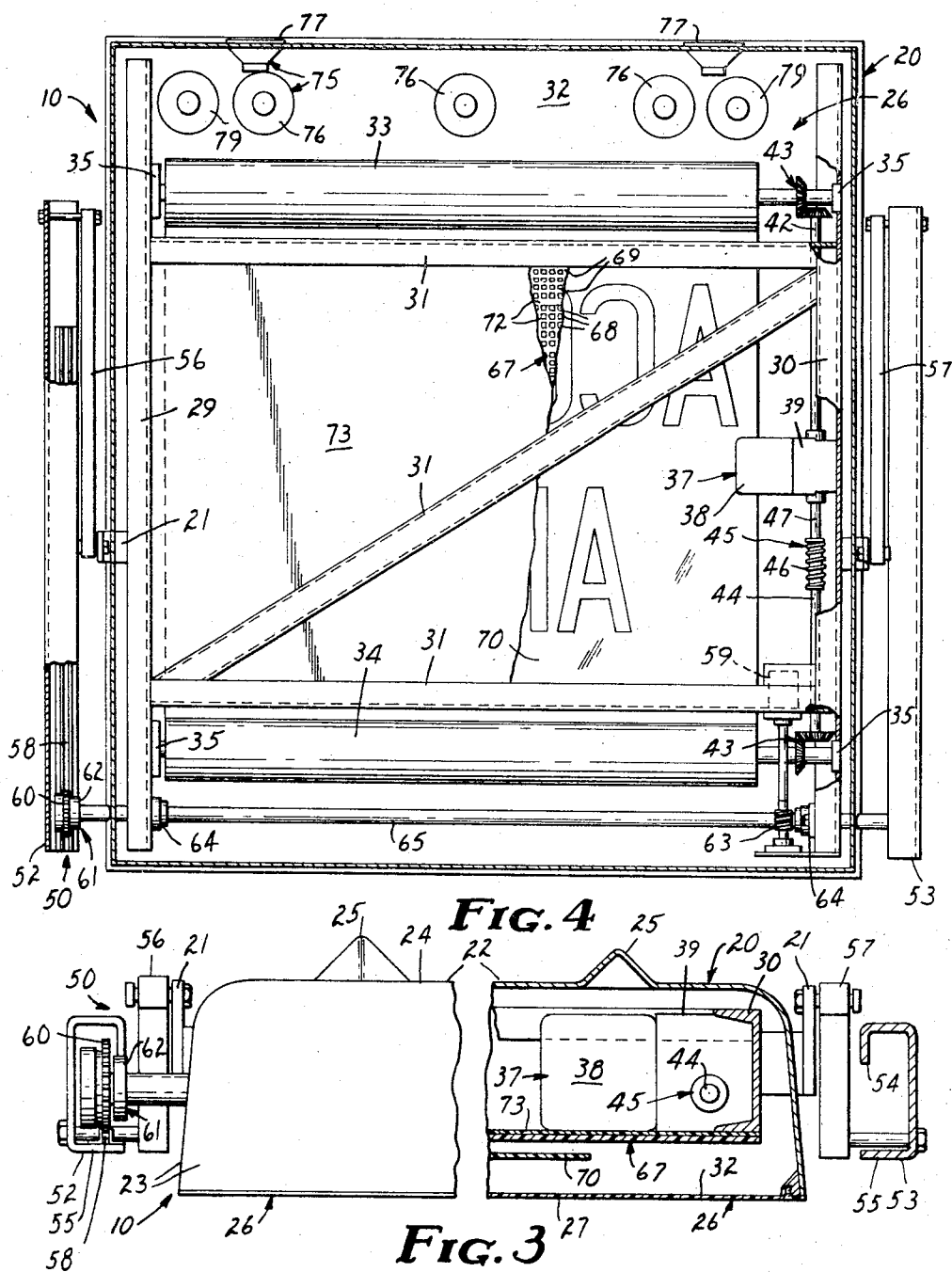


FIG. 5





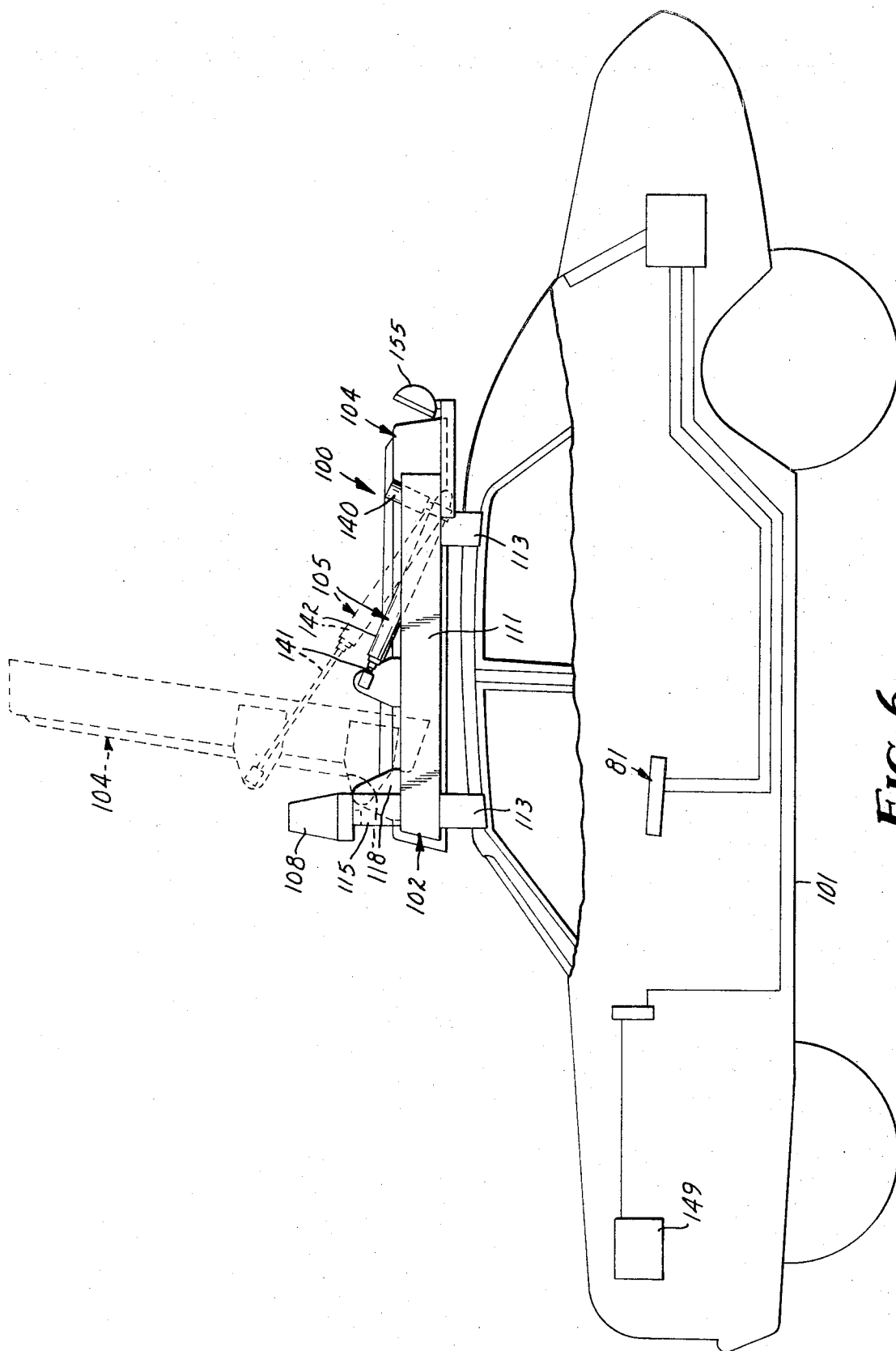


FIG. 6

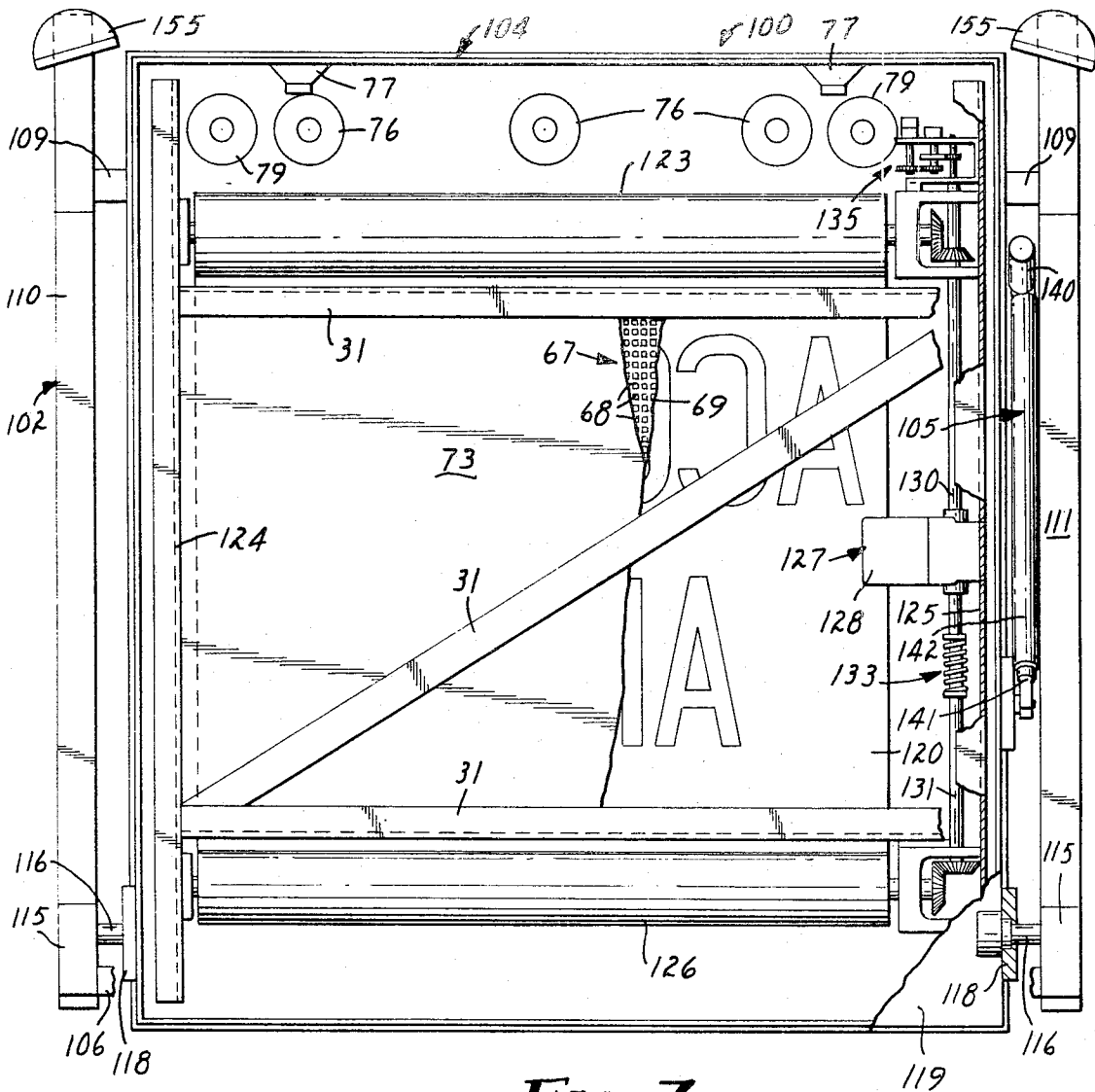


FIG. 7

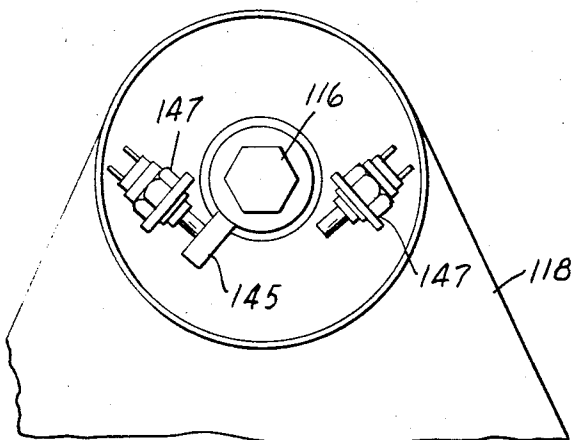


FIG. 8

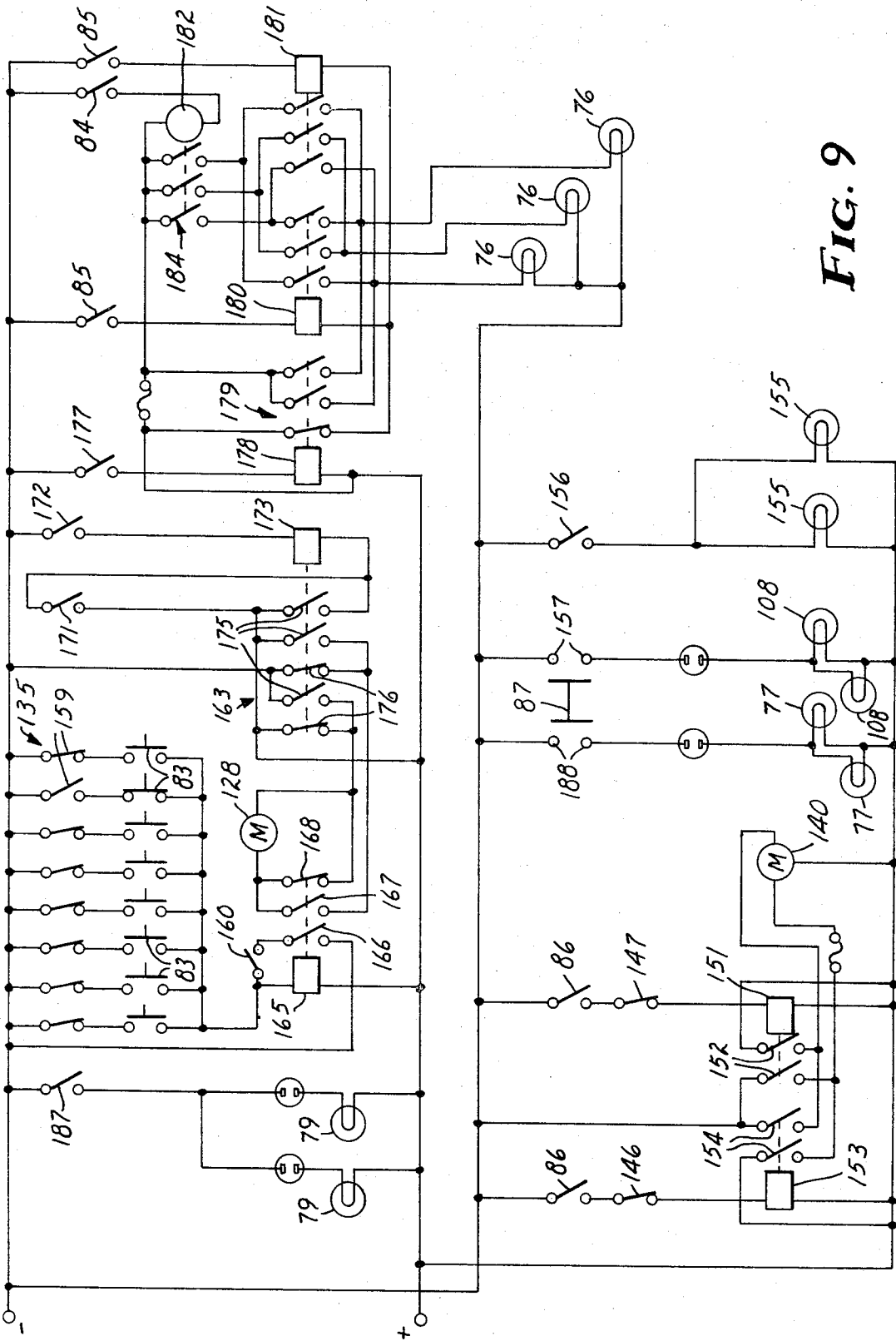


FIG. 9

VARIABLE COPY COMMAND APPARATUS

CROSS-REFERENCES

This application is a continuation-in-part of application Ser. No. 47,387, filed June 18, 1970.

BACKGROUND OF THE INVENTION

On today's highways, police personnel have great difficulty in trying to effectively control rapidly approaching traffic, which control may be necessitated because of a traffic accident. The degree of difficulty and the hazardousness of this problem is substantiated by the excessive number of police vehicles involved in accidents, while parked along a modern highway with their full complement of flashing lights fully operating, while trying to control the rapidly approaching traffic. Thus, while these emergency vehicles are stopped, trying to block traffic, investigating an accident, or otherwise attempting to control the traffic, a substantial number of these vehicles are involved in accidents resulting in corresponding personal injuries to officers at the scene and to the people in the cars colliding with the emergency vehicle.

The need is to provide the police vehicle with a combination of components which will provide an uncomplicated and readily useful means for communicating a distinct command type message to the oncoming motorist. This message should provide a specific order as to what the motorist should do to control his motor vehicle in a manner so that he will not add to the accident or trouble ahead. The device has to provide a sufficiently large message area to make the same discernible from a relatively great distance to a rapidly approaching motorist; the device has to provide sufficient illumination to make the message clearly readable at nighttime; and the device has to provide sufficient animation to capture the motorist's attention. If the device is to be added to the emergency vehicle, such as secured to the upper portion of a standard sedan, then it must be designed so as not to cause a significant amount of wind drag while the vehicle is operated at a relatively high speed and yet provide a large message area discernible to the rapidly approaching motorist.

SUMMARY OF THE INVENTION

The present invention relates to a variable copy command apparatus having particular utility for providing distinct command type messages to oncoming motorists. The command apparatus includes a support adapted for attachment to a vehicle, an enclosed container pivotably supported by the support and movable by actuation means between a first position wherein the container is positioned generally horizontal and a second position wherein the container is placed in an upstanding position on the vehicle. The container includes a movable, light transmissive, copy web positioned between a transparent face plate and light reflective means. The light reflective means includes retroreflective areas to provide nighttime viewing of the copy and diffuse reflective areas for providing daytime viewing of the copy.

Thus, where it is imperative or at least desired to provide a variable and distinct command type message to an oncoming motorist, to provide nighttime viewing by retroreflective illumination, and where it is also desired to provide brilliant daylight illumination of the message, the apparatus of the present embodiment will ful-

fill such objectives. This apparatus enhances the target value to the oncoming motorist by providing a relatively large message area to render the message discernible from a position relatively distant from the apparatus; by providing relatively brilliant nighttime and daytime illumination of the message; and by providing animation to the system. Basically, it is a matter of putting something that is bigger, brighter and recognizably different from all the other things commonly seen along the highway and placing such a system on top of an emergency vehicle where it can be plainly seen and easily understood by the oncoming motorists from a great distance as a motorist approaches the emergency situation. Once the motorist's attention is captured, then presumably he will read the message, know what to do or not to do and abide by the instruction. The disclosed apparatus permits the operator of an emergency vehicle, such as a highway patrol car, to select a predetermined message and cause the apparatus to be erected while the vehicle is still moving so that by the time the officer steps from his vehicle, the command type message, with animation if desired, will be in position for viewing by the oncoming motorist. Also, with this apparatus, the entire sign face or desired portions thereof may be uniformly illuminated (as viewed from a distance) by retroreflective or daylight illumination of the sign face.

DESCRIPTION OF THE DRAWING

Further uses and many of the attendant advantages of this invention will be readily appreciated as the same becomes more fully understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like numerals designate like parts throughout the FIGS. and wherein:

FIG. 1 is a rear view of the vehicle illustrating one embodiment of the command apparatus of the present invention in an upright position;

FIG. 2 is a side elevational view of the command apparatus of FIG. 1 illustrating the apparatus in a horizontal position and alternatively in an upper position as shown by the dotted lines of FIG. 2;

FIG. 3 is a fragmentary front elevational view, partially in section, of the command apparatus looking in the direction of the arrows 3—3 of FIG. 2;

FIG. 4 is a horizontal-sectional view of the command apparatus taken along lines 4—4 of FIG. 2;

FIG. 5 is a diagrammatic view of the control panel in the direction of the arrows 5—5 as shown in FIG. 2;

FIG. 6 is a side elevational view of a second embodiment of a command apparatus according to the present invention in a horizontal solid line position and alternatively in an upper position as shown in dotted lines with a vehicle and the controls for the command apparatus shown schematically;

FIG. 7 is a horizontal-sectional view of the command apparatus of FIG. 6;

FIG. 8 is a detail view of the position control switches taken approximately along the lines 8—8 of FIG. 7; and

FIG. 9 is a schematic circuit drawing of the control circuit for the command apparatus of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the embodiment illustrated in the drawings, there is shown in FIG. 1 a variable copy com-

mand apparatus generally designed by the reference numeral 10. As used throughout this application in the interest of maintaining consistent orientation of the various components, the portion of the apparatus to the left of a person viewing the command apparatus as dotted in FIG. 2 will be the "front" or "forward" portion of the apparatus and the portion of the apparatus to the right of the person will be the "rear" or "rearward" portion of the apparatus. This orientation corresponds to the normal front and rear nomenclature for the vehicle illustrated in the drawings; however, such "front" and "rear" orientation does not limit the utility of the command apparatus and is only in the interest of brevity of description in locating the relative position of the various components of the apparatus.

The variable copy command apparatus 10 of FIG. 1, which has particular utility for providing distinct command type messages to oncoming motorists, includes a support 12 adapted for attachment to a vehicle 11, an enclosed container 20, and actuation means 50 (as shown in detail in FIGS. 3 and 4) for moving the container 20 between a first position wherein the container is positioned substantially horizontal relative to the vehicle and a second position wherein the container 20 is placed in an upstanding position relative to the vehicle 11. The vehicle 11 is illustrated as an automobile; other movable vehicles such as a trailer could be utilized in combination with apparatus 10.

The support 12, as illustrated, includes cross-bars 13 having rubber suction cups 14 and adjustable straps 15 to engage the rain gutters of the vehicle 11 and secure the support 12 to the vehicle 11. The actuation means 50, which is connected to the container 20 and supported by the vehicle 11 via the cross-bars 13, as illustrated in the drawings, includes first and second guide frames 52, 53 secured to the cross-bars 13, and first and second rods 56, 57 pivotably secured to the first and second guide frames 53, 53, respectively, and pivotably secured to container brackets 21, to permit the container to move or swing between the upper and lower positions. The actuation means 50 further includes gear racks 58, 58, an actuation motor 59, pinions or sprockets 60, 60 to engage the racks 58, 58, a shaft 65 to transfer the torque of the actuation motor 59 to the sprockets 60, 60 to advance the sprockets 60, 60 along the racks 58, 58 for moving the container 20 between the first and second positions, and sprocket guide means 61 for maintaining the sprockets 60, 60 in engagement with the gear racks 58, 58. The guide frames 52, 53 more clearly shown in cross-section in FIG. 3, include a guide surface 54, 54 to engage guide bushings 62, 62 (secured to the shaft 65) of the sprocket guide means 61. The bearing engagement between the bushings 62, 62 and the guide surfaces 54, 54 maintains the sprockets 60, 60 in proper engagement with the gear racks 58, 58. The gear racks 58, 58 which are secured to the lower flanges 55, 55 of guide frames 52, 53, opposite the guide surfaces 54, 54, have a pitch distance corresponding to the pitch distance of the sprockets 60, 60. Although the word sprocket is used, for items 60, 60, sprocket as used herein is inclusive of wheels with gear teeth. Similarly, gear racks is inclusive of a chain with openings to receive the teeth of the sprocket 60. Also, the sprockets 60, 60 and the racks 58, 58 could have smooth engaging surfaces whereby a frictional force would permit the sprockets 60, 60 to advance along the racks 58, 58. The actuation motor

59, secured to the cross brace 31, is a bidirectional 12 volt (corresponding to the available voltage of the vehicle 11) DC electric motor. Activation of the motor 59 will apply a torque through the worm gear coupling 63 and through the shaft 65 (rotatably secured to the first and second side frames 29, 30 by bearings 64) to drive the sprockets 60, 60 against the gear racks 58, 58. Since the racks 58, 58 are stationary, relative to the vehicle 11, the torque of the motor 59 will advance the sprockets 60, 60 along the racks 58, 58 and swing the container 20 about the pivoted first and second rods 56, 57 to the upright position. The direction of the motor 59 may be reversed to swing the container 20 down to the lower or horizontal position.

15 The container 20 includes a plastic shell 22 comprising four side walls 23 and a forward cover 24 having reinforcing ribs 25. The shell 2, as illustrated in FIG. 3, defines a substantial rearward opening which is closed by the face plate 26 secured to the rearward position of the shell 22. The container 20 includes internal structural framing comprising a first side frame 29, a second side frame 30, and cross braces 31 welded to the first and second side frames 29, 30. The cover 24 is secured (not shown) to the cross braces 31 of the internal structural framing. A first roll 33 is rotatably secured between the first and second side frames 29, 30, with suitable bearings 35, and adapted to receive a portion of the copy web 70 wound therearound and secured thereto. A second roll 34 is rotatably secured between said first and second side frames 29, 30, with suitable bearings 35, and is adapted to receive a portion of the copy web 70 wound therearound and secured thereto. The face plate 26 includes a first transparent area 27, to provide viewing of the copy message 71 (as shown in FIG. 1) in registration with the first transparent area 27, second transparent areas 28, to provide viewing of the lamps 76, 79 located behind the areas 28, and an opaque area 32 to prohibit viewing of the components within the enclosed container 20.

40 The copy motor means 37, which is operatively connected to said copy web 70 for moving said copy web 70 to position a copy message 71 in registration with the first transparent area 27, includes a copy motor 38 secured to the second side frame 30, a second drive shaft 42 connected to the first roll 33 through a set of bevel gears 43, and a third drive shaft 44 connected to the second roll 34 through a set of bevel gears 43. A copy web tensioning means 45, for maintaining the copy message 71 in registration with the first transparent area 27 in a substantially unwrinkled condition, comprises a coil spring 46 secured at one end to the motor drive shaft 47 and at the other end to the third drive shaft 44. The spring 46 is biased so as to drive the second roll 34 to wind-up additional copy web 70 and thus maintain tension in the copy web 70 between the first and second rolls 33, 34. Alternatively, the drive shaft 44 could be directly connected to the motor 38 and the tensioning means 45 excluded. The copy motor 38, secured to the second side frame 30, is a bidirectional 12 volt DC electric motor. The copy motor 38 includes a rotational counter 39 electrically connected to the control means 80 for determining and locating when a predetermined copy message 71 is in registration with the transparent area 27.

60 The light reflective means 67 (shown in FIGS. 3 and 4) includes light diffusing reflecting areas 69 for diffusely reflecting received light and retroreflective areas

68, interspersed throughout the areas 69, for retroreflecting received light. The areas 69 diffuse light as the reflective means 67 includes a light diffusing panel 73 positioned adjacent to the rearward portion or surface of a reflective panel (see FIG. 3) and is secured to internal structural framing. The panel 73, as illustrated in the preferred embodiment, is a sheet of white plastic material but could be constructed of similar material to reflect received light in a scattered fashion.

One type of panel for the light reflective means 67 is a cube-corner cellular construction as described in U.S. Pat. No. 3,417,959 (Schultz) and is incorporated herein by reference for the sake of brevity of description. The cellular construction of Schultz includes retroreflective cube-corners to provide nighttime viewing of the copy message 71 and light transmissive intersecting septa 72 uniformly positioned among the retroreflective areas 68 for transmitting light to and back from the panel 73 to provide relatively uniform brilliant daytime viewing of the copy message 71.

The variable copy command apparatus 10 further includes lamp means 75 secured to the container 20, operatively connected to the control means 80, for providing distinctive emergency and directional light flashing coordinated with the selected predetermined copy message 71 to thus provide additional command control movement of the oncoming motorist. The lamp means 75 includes directional lamps 76, which may be red or amber in color as desired, secured to the container and located behind the second transparent areas 28 of the face plate 26, traffic control lamps 79 (commonly red in color), and warning lamps 77 (see FIG. 4) secured to the side wall 23 of the container 20 to provide the emergency vehicle with illuminated warning when the apparatus 10 is in the lower position as the vehicle 11 (see FIG. 2) is approached from the rear by an oncoming motorist. Red rotating beacons 78 have been secured to the cross-bars 13 to provide additional attention capturing power for the emergency vehicle 11, see FIGS. 1 and 2. A coaming 40 (FIG. 2) has been added to the vehicle to inhibit dirt contamination of the face plate 26. The coaming 40 could be extended around the periphery of the container 20 to substantially seal the face plate 26 from the elements when the container 20 is in the lower position.

The control means 80, as schematically shown in FIG. 5, is connected to the copy motor to permit predetermined selection and control of the copy message 71 to be positioned in registration with the first transparent area 27. The control panel 81, of FIG. 5, is adapted to be secured to the headliner of the vehicle 11 between the driver and the passenger.

In operation, as the emergency vehicle 11 approaches the scene of an accident, the driver may readily reach to the control panel 81 (illuminated by the panel light 82) and select one of the copy messages 71, as illustrated on the control panel 81, to be positioned in registration with the first transparent area 27 of the face plate 26. The driver makes the selection by pushing the selected corresponding push button 83. The driver then will select the red traffic control lamps 79 to flash in unison, by pushing the flash button 84, and/or the driver may desire the direction lamps 76 to flash in a sequential operation (right or left) to add illuminated animation with the selected copy message 71 by pushing one of the buttons 85, 85. The sequential flashing of the directional lamps 76 would be coordi-

nated with "Merge" left or "Merge" right of the copy message 71. The driver activates the apparatus by pushing the sign position switch 86 to the "up" position. Thus, while the driver is slowing his vehicle 11 to a stop, the message 71 may be selected and the sign position switch 86 may be switched to the "up" position to cause the actuation motor 59 to rotate the shaft 65 and advance the sprockets 60, 60 along the gear racks 58, 58 to position the enclosed container 20 in an upstanding position relative to the vehicle. The red rotating beacons 78 may be energized in addition, by operating a selector switch 87, to provide additional attention capturing power to the variable copy command apparatus 10. Thus, this variable copy command apparatus allows the driver of an emergency vehicle, such as a police patrol car, to select and erect a large, illuminated command message with additional animated illumination (to control the rapidly approaching motorist) before the police officer has even stopped his vehicle.

To operate the apparatus 10 from a remote position, a short range coded radio signal could be utilized to activate the sign position switch 86.

Referring now to FIGS. 6 through 8 there is disclosed a second embodiment of the variable copy command apparatus constructed according to the present invention and generally designated in the drawing by the reference numeral 100. This apparatus 100 includes a support 102 adapted for attachment to a vehicle 101, an enclosed container 104 and actuation means 105 for moving the container 104 between a first position where the container is positioned substantially horizontal relative to the vehicle 101 and a second position wherein the container 104 is placed in an upstanding position relative to the vehicle 101.

The support 102 includes several rigid frame members including a front cross bar 106 upon which rotating beacons such as 108 may be mounted, a rear cross bar log, and side bars 110 and 111. The support 102 is secured to the top of the vehicle 101 by suitable mounting straps or plates 113. The container 104 is pivotally mounted on the support 102 by means of brackets 115 extending upwardly from the side bars 110 and 111 and which brackets support the cross bar 106. The brackets 115 support stub shafts 116 which are axially aligned and disposed on opposite sides of the container 104 and are secured to ears 118 secured to the container 104. The ears 118 extend forwardly from a forward cover 119 of the container 104. A container 104 is formed of an aluminum shell comprising the forward cover 119 and a rear face corresponding to the face plate 26. The face plate has a first transparent area through which one can see the messages on a transparent copy web 120 and lamps corresponding to those on container 20.

Within the container 104 is a first roll 123 rotatably secured between first and second side frames 124 and 125. The roll 123 receives a portion of the copy web 120 wound therearound and secured thereto. A second roll 126 is rotatably secured between the first and second side frames 124 and 125 and is adapted to receive a second portion of the copy web 120 wound therearound and secured thereto. The copy web has eight copy messages formed thereon and is moved between the rolls 123 and 126 by copy motor means 127 which includes a reversible copy motor 128 secured to the second side frame 125, a drive shaft 130 connected to the first roll 123 through a set of beveled gears and a

second drive shaft 131 connected to the second roll 126 through a second set of beveled gears. A copy web tensioning means 133, for maintaining the copy web 120 in registration with the first transparent area in the rear face plate is similar to that described with reference to the apparatus of FIGS. 1 through 5.

In this embodiment the shaft 130 extends past the first roll 123 to operate a rotary contact switch means 135 for the purpose of determining and locating a predetermined copy message on the web 120 at the transparent area. This rotary contact switch means makes rotations in proportion to the rotations of the rolls 123 and 126 and will open and close contacts to respond to the selection made on the operator control panel as will hereinafter be described with reference to FIG. 9.

The actuation means 105 for moving the container 104 of the command apparatus 100 between the first and the second positions comprises a commercially available 12 volt DC linear actuator. This actuator is commercially available from Duff-Norton Inc. of Charlotte, N.C., and is identified as Model MPD-6405-18. The linear actuator comprises a drive motor 140 which rotates an externally threaded inner rod causing a fixed internally threaded sleeve 141 to telescope from the housing 142. As the shaft 141 telescopes from the housing 142 it causes the container 104 to pivot about the stub shafts 116 and move to the vertical position as shown in dotted lines in FIG. 6. This movement is controlled to the extent that when the housing reaches the first or the second position the motor control circuit is interrupted by the operation of a sensing switch.

Referring now to FIG. 8 there is shown the ear 118 fixed to the container 104 and this ear pivots about the shaft 116 which is held in fixed position. The shaft 116 has a radially extending abutment 145 which will contact switches 146 and 147 which determine respectively the first and second position for the container 104. In the first position shown, the abutment 145 contacts the switch 146. Actuation of the motor 140 causes rotation of the ear 118 in a clockwise direction from that shown, moving the switch 147 toward the fixed abutment 145 and when the switch 147 contacts the abutment 145 the switch 147 discontinues operation of the motor 140.

Referring now to FIGS. 5, 6 and 9, the control means will be described for the second embodiment. The control means is operated by the control panel 81 positioned adjacent the driver in the automobile 101, and the control means is electrically powered from the battery 149. To raise or lower the container 104 to control the traffic, the officer uses the up-down rocker switch 86 on the control panel 81 to activate the motor 140 and the final position of the panel will be controlled by the limit switch 147. The sign is erected by placing the switch 86 in the up position. This energizes a relay 151 which results in the closing or relay contacts 152 and the linear actuator motor 140 is powered. The erect operation continues until the activation of switch 147 which de-energizes the relay 151 and thus de-energizes the motor 140. Placing the rocker switch 86 in the down position energizes the coil of a relay 153 which closes contacts 154, resulting in a reversal of the motor 140. The retraction of the container continues until switch 146 is opened.

The rotating beacons 108 are actuated by closing the switch contacts 157 of the switch 87. A pair of flood lamps 155 are located on the rear of the side rails 110

and 111. These flood lamps 155 increase the illumination of the traffic control message displayed through the transparent area and are energized by actuation of a switch 156 which may be placed on the control panel.

These flood lamps 155, while only providing additional illumination of the sign board, do not change the brilliance provided in the nighttime due to the retroreflective areas 86 on the panel of the light reflective means 67.

The rotary switch means 135 which is utilized for determining and locating the selected copy message 71 comprises a first rotary switch having ten contacts including eight contacts 159, and two additional contacts 171 and 172, and a second rotary switch or index switch 160. The rotary switch having contacts 159 is used for the coarse location of the copy message and the index switch having a contact 160 is used to provide a precise message registration with the openings. These rotary switches are driven at different speeds from the drive shaft 130 as described above. A further rotary switch associated with the rotary switch having contacts 159 is driven therewith and is used in a drive motor direction reversing circuit 163.

Electrical contacts 159 at present indicate that all of the contacts are closed except for the second contact indicating the "Accident Ahead" message is displayed, and the indexing switch 160 is open, stopping the web drive to display that particular message. If the operator wishes to change the message he presses the desired push button 83, it is latched in closed position and control relay 165 is energized to close contacts 166 and 167 and to open contact 168. This energizes the motor 128 to move the web and the contacts of the indexing switch 160 are closed. As the rotary switch moves to advance the desired message to the transparent display area the switches 159 are successively opened, and when the switch of a predetermined message on the rotary switch is opened the circuit through the rotary switches to the relay 165 is interrupted and as soon as the indexing switch 160 is opened which relates to that specific signal, then motor 128 is dynamically braked by the subsequent closing of switch 168 and the predetermined message is registered with the transparent area on the rear face panel. The facts of latching in one button 83 serves to unlatch the previously depressed button when operating the variable command apparatus.

As the web 130 is moved the rotary switch in the motor reversing circuit is also driven. As the web is moved between the rolls 123 and 126 the contact 171 or 172 on the rotary switch will be closed before reaching the predetermined selected contact 159 causing an operation of the relay 173 which operates a set of contacts 175 or a pair of contacts 176. This causes the direction of the motor 128 to be reversed and the rotary switch will then be reversed and likewise driven in the opposite direction until the predetermined contact 159 is opened.

The sign is now erected and the operator may desire to light the amber lamps 76 which are spaced across the face of the rear panel. These lamps may be turned on or actuated to flash on and off or they may be actuated to flash sequentially from right to left or from left to right. Such operation is controlled by the actuation of switch 84 and one of the switches 85 or a further switch 177. The switch 177 shown in FIG. 9 may be closed to energize the relay 178 to close contacts 179. Contacts

179 close the circuit to two of the outer amber lamps 76 and opens a set of contacts which opens the circuit to a pair of relays 180 and 181. Operation of the switch 84 will energize a flasher 182 which will control contacts 184. Then if it is desired to sequence the flashing of the lights 76 to the right or left, one of the switches 85 will be actuated, to energize respectively the relay 180 and 181. The relay 180 will close its associated contacts to sequence the lamps in one direction as viewed in FIG. 9, and the closing of the relay 181 and its contacts causes the lamps 76 to be flashed sequentially in the opposite direction.

The red traffic control lamps 79 are actuated by a switch 187 which is not shown on the control panel 81. The warning lamps 77 are actuated by closing contacts 188 of switch 87.

Having thus described the invention with reference to two embodiments, it is appreciated that this is for the purpose of illustration and that additional changes in either of the embodiments could be made without departing from the spirit and the scope of the invention as set forth in the appended claims.

What is claimed is:

1. A variable copy command apparatus having particular utility on a vehicle for providing distinct command type messages to oncoming motorists, said apparatus comprising:
 - A. a support means adapted for attachment in a generally horizontal position on a vehicle;
 - B. an enclosed rigid container pivotably supported by said support means for movement in relationship to said support means between a first position wherein said container is positioned parallel to said support means and generally horizontal on a said vehicle, and a second position wherein said container is positioned in an upstanding position on said support means and relative to a said vehicle, said container including:
 1. a rectangular shell including side walls, a cover, and a face plate secured to the side walls opposite the cover, said face plate including a rectangular first transparent area and second transparent areas,
 2. a pair of driven rolls mounted within said shell,
 3. a movable transparent copy web within said shell with portions thereof wound on each said roller and positionable to locate various copy messages thereon adjacent said first transparent area,
 4. copy motor means connected to said rolls for driving said rolls to move said web between said rolls to change the copy message at said first transparent area, and
 5. lamp means disposed within said shell adjacent said second transparent areas for providing emergency and directional light flashing coordinated with the various copy messages of said copy web;
 6. light reflective means located with said shell on the side of said copy web opposite said first transparent area for providing a reflective background to said copy messages, said reflective means including
 - a. light diffuse reflecting areas for diffusely reflecting light passed through said first transparent area and through said copy web back through said copy web and said first area to

provide relatively brilliant daytime viewing of said copy message, and

- b. areas which are retroreflective and interspersed with said light diffuse reflecting areas for retroreflecting light passed through said first transparent area and through said copy web back through said copy web and said first transparent area toward the source of such light to provide nighttime viewing of said copy message; and
 - C. actuation means connected to said container for moving said container between said first and said second positions, and
 - D. control means adapted to be controlled from within the vehicle by the driver and connected to said support means to energize said copy motor means, said lamp means and said actuation means for positioning a preselected copy message at said first transparent area, for illuminating said lamp means in a desired manner and for placing said container in said second position without stopping or stepping from said vehicle.
2. A variable copy command apparatus having particular utility on a vehicle for providing distinct command type messages to oncoming motorists, said apparatus comprising:
 - A. a support means adapted for attachment in a generally horizontal position on a vehicle top;
 - B. an enclosed container pivotably supported by said support means for movement in relationship to said support means between a first position wherein said container is positioned parallel to said support means and generally horizontal on a said vehicle, and a second position wherein said container is positioned in an upstanding position on said support means and relative to a said vehicle, said container including:
 1. a rectangular shell including side walls, a cover, and a face plate secured to the side walls opposite the cover, said face plate including a first transparent area;
 2. a movable transparent copy web bearing copy messages within said shell and positionable to locate various copy messages on said web adjacent said first transparent area;
 3. light reflective means located within said shell on the side of said copy web opposite said first transparent area for providing a reflective background to said copy messages, said reflective means including
 - a. light diffuse reflecting areas for diffusely reflecting light passed through said first transparent area and through said copy web back through said copy web and said first area to provide relatively brilliant daytime viewing of said copy message, and
 - b. areas which are retroreflective and interspersed with said light diffuse reflecting areas for retroreflecting light passed through said first transparent area and through said copy web back through said copy web and said first transparent area toward the source of such light to provide nighttime viewing of said copy message; and
 - C. actuation means connected to said container for moving said container between said first and said second positions.

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3. The apparatus according to claim 2 wherein said actuation means includes:

- A. a guide frame secured to said support means;
- B. a rod pivotably secured to said guide frame and to said container;
- C. a gear rack secured to said guide frame;
- D. an actuation motor;
- E. a sprocket to engage said gear rack;
- F. sprocket guide means to engage said guide frame for maintaining said sprocket in engagement with said gear rack; and
- G. a shaft secured to said sprocket and connected to said motor and rotatably secured to said container whereby rotational movement of said sprocket along said gear rack will move said container between said first and second positions.

4. The apparatus according to claim 2 wherein said container includes:

- A. a first roll within said container and rotatably secured to said container, said first roll having a portion of said copy web wound thereon;
- B. a second roll within said container and rotatably secured to said container, said second roll having a portion of said copy web wound thereon, and
- C. bidirectional motor means for driving the copy web between said first and second roll whereby various copy messages can be positioned in registration with said first transparent area to present various command type messages to oncoming motorists.

5. The apparatus according to claim 4 wherein tensioning means are connected to said bidirectional motor means and a said roll for maintaining the copy message in registration with said first transparent area in a substantially unwrinkled condition.

6. The apparatus according to claim 2 wherein said light reflecting means includes a light diffusing panel

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supported parallel to said first transparent area, and a structure interposed between said light diffusing panel and said first transparent area and having areas which are provided with retroreflective elements, which structure is a panel having light transmissive intersecting septa uniformly positioned among cube-corner retroreflective areas for transmitting the diffusely reflected light to provide relatively uniform brilliant daytime viewing of said copy message and brilliant nighttime brightness.

7. The apparatus according to claim 2 wherein said apparatus includes:

- A. copy motor means operatively connected to said copy web for moving said copy web to position a copy message adjacent to said first transparent area; and
- B. control means connected to said copy motor means to permit predetermined selection and control of the copy message to be positioned adjacent to said first transparent area.

8. The apparatus according to claim 7 wherein said copy motor means includes copy web tensioning means for maintaining the copy message in registration with said first transparent area in a substantially unwrinkled condition.

9. The apparatus according to claim 2 wherein said apparatus includes lamp means secured to said container and operatively connected to said control means for providing distinctive emergency and directional light flashing to provide additional command control to movement of the oncoming motorists.

10. The apparatus according to claim 2 wherein said actuation means comprises motor means for driving said actuation means and wherein said actuation means includes an extensible actuator secured to said container and to said support for pivoting said container.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,761,890 Dated September 25, 1973

Inventor(s) Robert W. Fritts and Harold C. Zeman

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 17, change "tryking" to --trying--.

Column 2, line 19, change "appratus" to --apparatus;
line 52, change "prsent" to --present--.

Column 3, line 1, change "appratus" to --apparatus--;
line 1, change "designed to" to --designated--;
line 17, change "distingt" to --distinct--;

Column 4, line 17, change "shell 2" to --shell 22--;
lines 35-36, change "transpaent" to --transparent;
line 66, change "diffusing" to --diffuse--.

Column 5, line 22, change "conainer" to --container--.

Column 6, line 38, change "log" to --109--.

Column 8, line 44, change "facts" to --acts--.

Signed and sealed this 1st day of January 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents