United States Patent

[11] 3,594,724

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[45] Patented July 20, 1971

[54] **LANE CHANGING SIGNAL DEVICE**
5 Claims, 19 Drawing Figs.

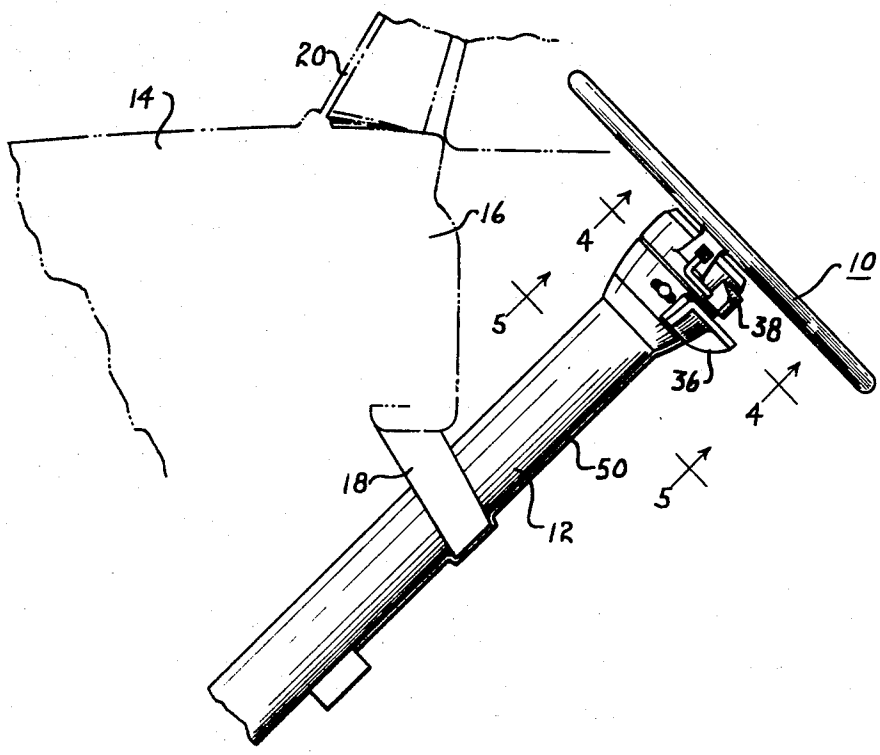
[52] U.S. Cl. 340/81, 340/74, 200/61.27, 200/61.54
[51] Int. Cl. B60q 1/26
[50] Field of Search 340/74, 81, 53, 54, 55; 315/81; 200/61.27, 61.34, 61.54; 174/117.6; 240/8.24, 8.25

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Primary Examiner—Alvin H. Waring
Attorneys—Marmaduke A. Hobbs and Kemon, Palmer, Stewart and Estabrook

ABSTRACT: The present invention relates to a signal for automobiles and more particularly to a signal device for indicating the driver's intention to change highway lanes.



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SHEET 1 OF 4

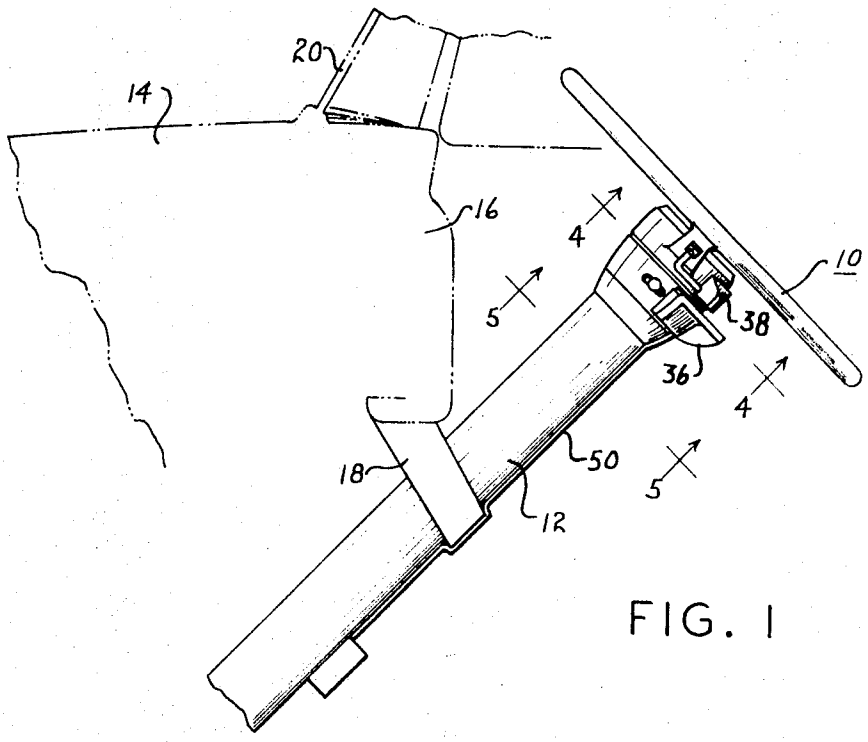


FIG. 1

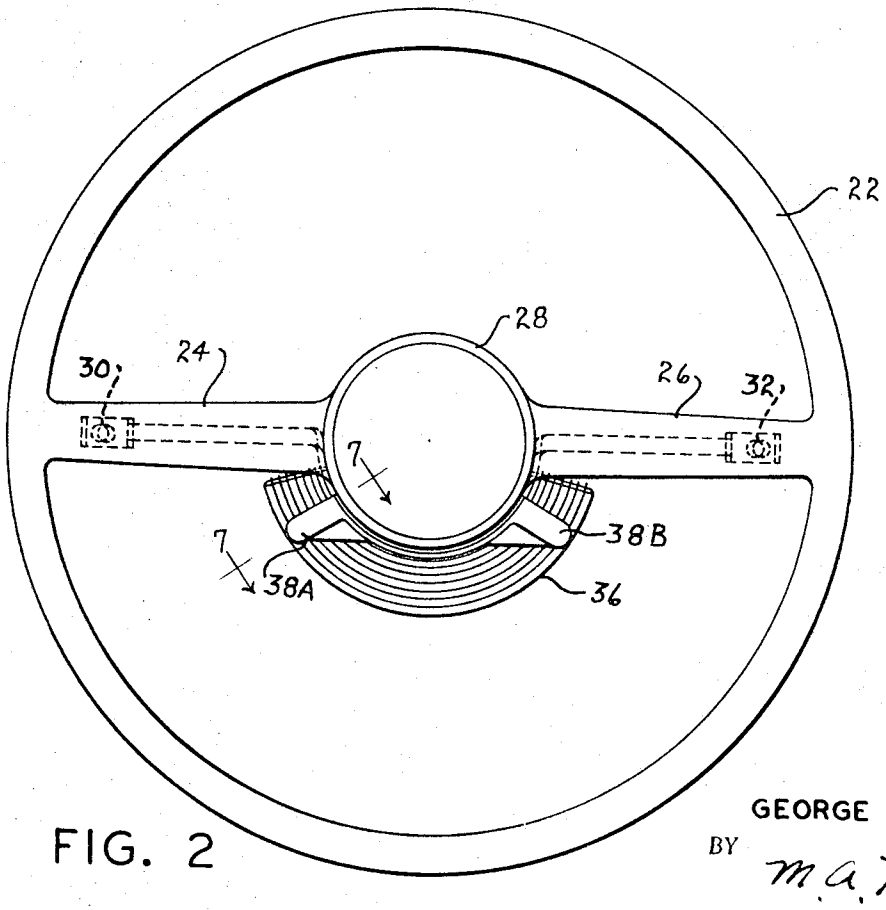


FIG. 2

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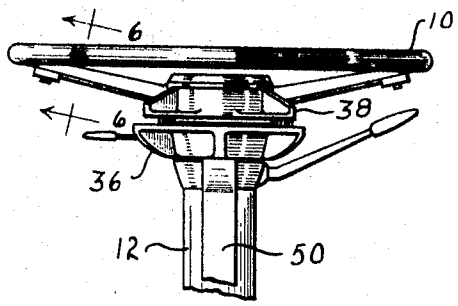


FIG. 3

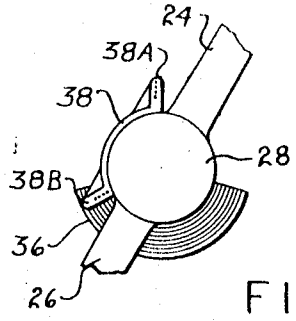


FIG. 8

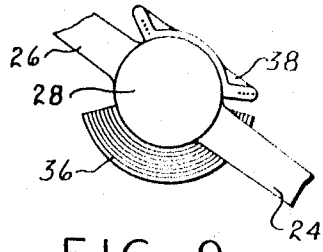


FIG. 9

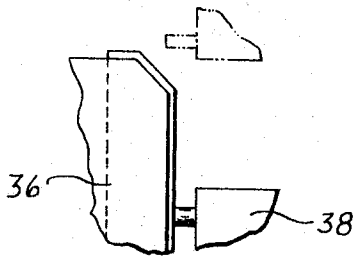


FIG. 11

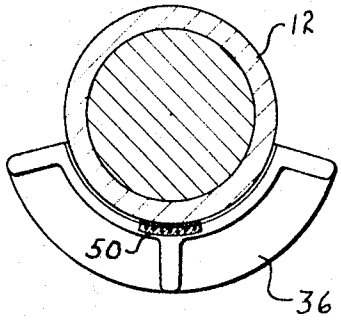


FIG. 5

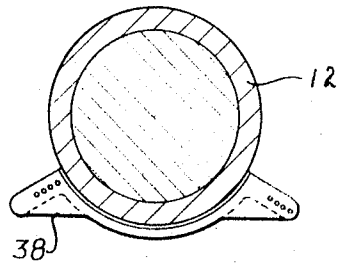


FIG. 4

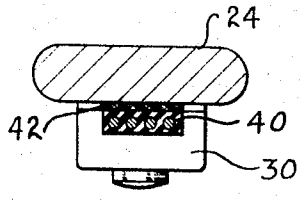


FIG. 6

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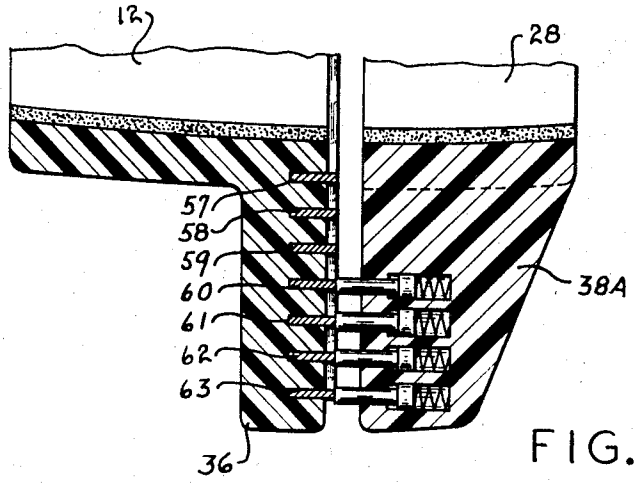


FIG. 7

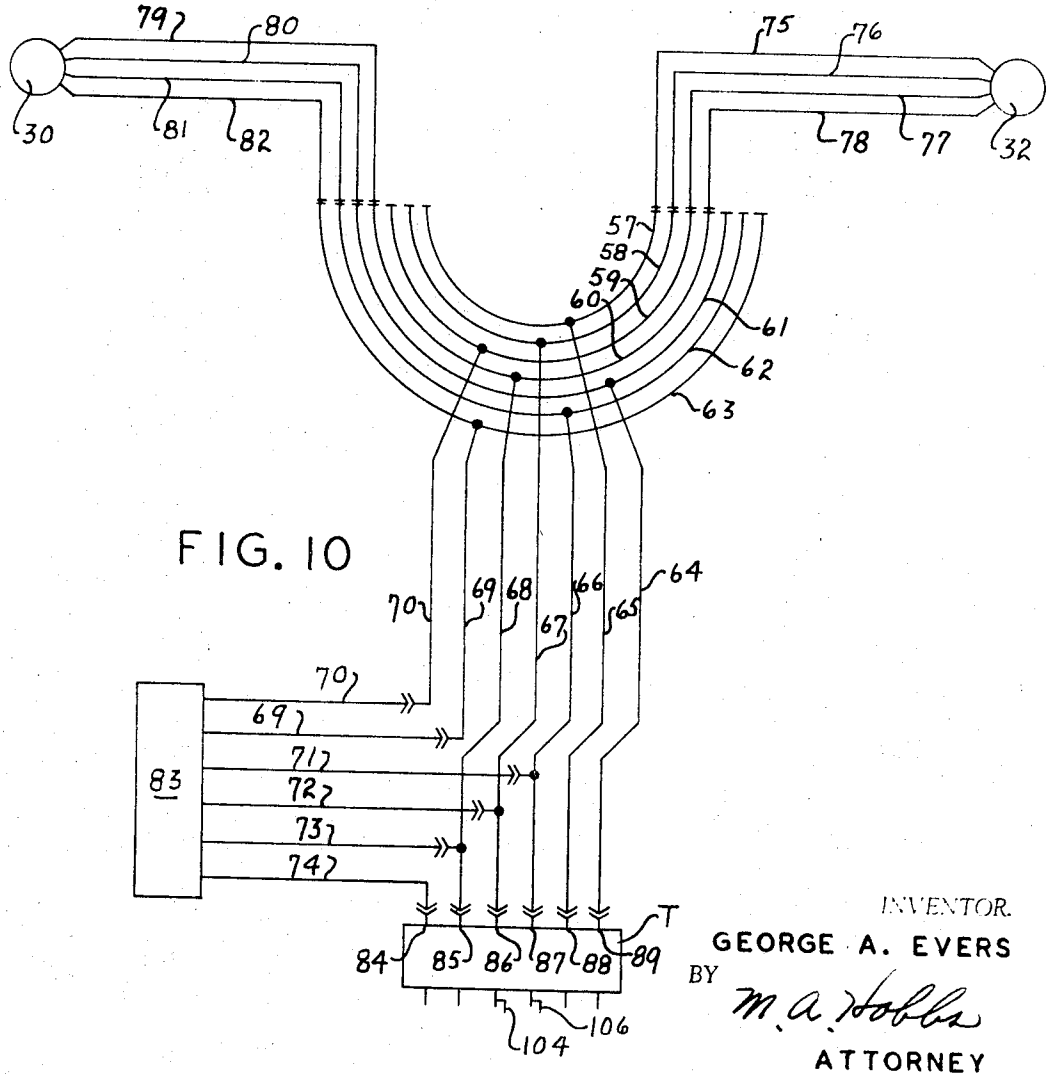


FIG. 10

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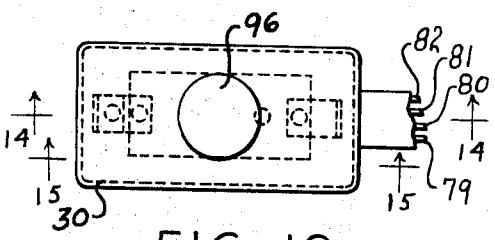


FIG. 12

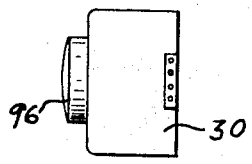


FIG. 13

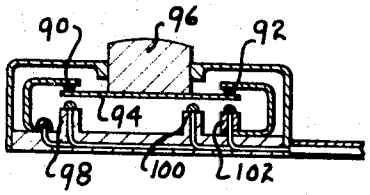


FIG. 14

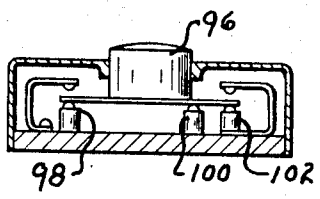


FIG. 15

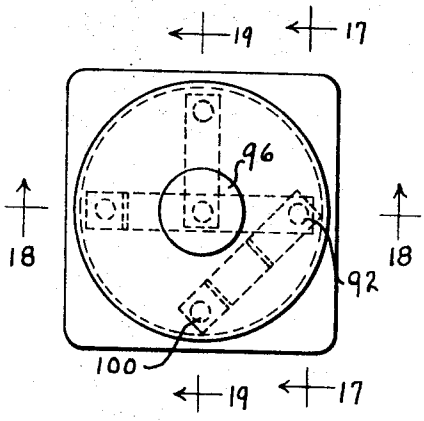


FIG. 16

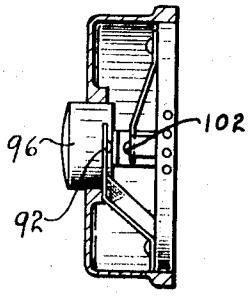


FIG. 17

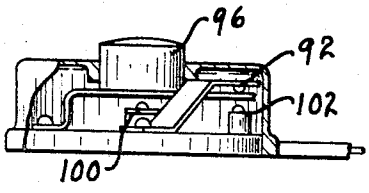


FIG. 18

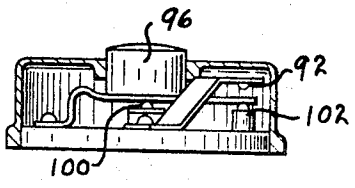


FIG. 19

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LANE CHANGING SIGNAL DEVICE

With the development of superhighways having multiple lanes of traffic moving in the same direction, the practice generally used by vehicle drivers in changing lanes has been to signal their intention to do so by the use of the conventional turn lights, operating the light on the side of the vehicle adjacent the lane into which the vehicle will be driven. While most automobiles at the present time are equipped with turn-light devices which will automatically cease operation when the steering wheel returns the front wheels to their straight forward position, i.e. when the turn has been completed, the magnitude of the turn made in changing lanes is often insufficient to cause the automatic mechanism to operate, and consequently, the turn-signal continues to blink after the lane has been changed and the vehicle is again being driven straight forward in the new lane. If the driver is aware of the failure of the automatic mechanism to turn off the signal, he will then manually operate the controls to interrupt the operation. Thus, in passing a vehicle and returning to the original lane of traffic, the driver may be required to operate the signal controls of the turn-light four separate times; first, turning on the signal and then turning off the signal in changing to the first lane and then again turning on and turning off the signal in changing back to the original lane of traffic. These manipulations of the turn-signal controls under those conditions and/or the incorrect signals resulting from the failure of the automatic mechanism to turn off the signal when the lane change has been completed, often create a traffic hazard as well as making the operation of the vehicle difficult and inconvenient while the passing maneuver is being performed. It is therefore one of the principal objects of the present invention to provide a signal device or system for indicating the driver's intention to change lanes, which is convenient to operate regardless of the direction in which the lane change is made, and which will automatically cease operation as soon as the control thereof is released by the driver.

Another object of the invention is to provide a traffic lane changing signal device which can quickly and easily be manipulated to operate the signal means without removing either hand from the steering wheel or without requiring either hand or the fingers thereof to reach from the wheel in order to operate the control means.

Still another object of the invention is to provide a signal device of the aforesaid type which can be readily incorporated into the conventional turn-signal circuitry through controlled independently thereof, and which can be easily installed on an automobile, truck or bus either at the vehicle factory or while the vehicle is in service.

A further object is to provide a device for signalling the intention of the drive to change lanes, which is simple in design, construction and operation, and which can be installed on any standard automobile without the use of any special tools or equipment and without any special skill or training, and which does not interfere with the normal operation of the vehicle steering mechanism or the conventional electrical signal systems of the vehicles.

Additional objects and advantages of the invention will become apparent from the following description and accompanying drawings, wherein:

FIG. 1 is a side elevational view of a vehicle steering mechanism having the present lane changing signal device mounted thereon;

FIG. 2 is a plan view of the steering wheel, showing the position of the controls for the present lane changing signal device thereon in broken lines;

FIG. 3 is another elevational view of the steering wheel and a portion of the steering column, showing the present lane changing signal device mounted thereon;

FIG. 4 is a schematic cross-sectional view of the steering column shown in the preceding figures, the section being taken on line 4–4 of FIG. 1;

FIG. 5 is a further cross-sectional view of the steering column, showing the details of the present lane changing signal device, the section being taken on line 5–5 of FIG. 1;

FIG. 6 is a sectional view of the steering wheel showing one of the controls for the present device, the section being taken on line 6–6 of FIG. 3;

FIG. 7 is an enlarged cross-sectional view of a portion of the present device, the section being taken on line 7–7 of FIG. 2;

FIGS. 8 and 9 are fragmentary views of the steering wheel column and a portion of the control device represented in two positions, respectively;

FIG. 10 is a wiring diagram of the present lane changing signal device as incorporated in the signal system of the automobile;

FIG. 11 is an enlarged fragmentary view of a portion of the present signal device, illustrating the manner in which it operates in conjunction with the steering wheel;

FIGS. 12, 13, 14 and 15 illustrate one form of the control means of the present signalling device, FIGS. 14 and 15 being cross-sectional views, the sections being taken on lines 14–14 and lines 15–15 of FIG. 12; and

FIGS. 16 through 19 show a modified control means for the signalling device, FIGS. 17, 18 and 19 being cross-sectional views taken on the respective lines of FIG. 16.

Referring more specifically to the drawings and to FIGS. 1 and 2 in particular, numeral 10 designates a conventional steering wheel, 12 the column for the steering wheel, and 14 a portion of the vehicle body in front of the steering wheel and driver compartment, including dashboard 16, steering wheel support 18 and windshield 20. The steering wheel consists of rim 22 and diametrically opposed arms 24 and 26, extending from hub 28 to the inner side of rim 22, the two arms being formed integrally with the hub and rim. While the steering wheel shown in the drawings is one form which is widely used in the passenger car automotive field, the present device may be used with other types of wheels having a different number of arms and positioned at different angles with respect to the rim and hub.

The present lane changing signal system consists basically of the blinker light on either side of the front of the automobile, and blinker lights on each of the rear of the automobile, these lights being incorporated in part of the turn-light circuitry, and a control for the two lights mounted on the steering wheel near the rim thereof which can be operated manually by the driver by merely pressing thereon and which will automatically turn off the system when the driver releases the control means. The controls can be readily and easily installed and once installed, do not in any way interfere with the normal operation or handling of the steering wheel by the driver.

The present lane changing signal device consists of control buttons 30 and 32 mounted on the underside of arms 24 and 26, respectively, and connected to a slip ring contact unit 36 and brush ring 38, mounted on column 12 and wheel hub 28 for rotation relative to one another. The brush ring is provided with brush elements which are mounted in element holding members 38A and 38B and which contact corresponding rings in unit 36. One of the important features of the present invention is the manner in which the device is mounted on the steering wheel and column so that it can be attached in place while the car is being serviced at a service station or service garage. The two buttons and connecting wires initially have on the side to be placed on the wheel, a coating of tacky material 42 with a protective sheet which is removed when the buttons and connecting wires are secured to arms 24 and 26. By the use of this type of construction, the contact unit and brush rings are mounted on the steering column and wheel, and the buttons which are attached to ring 38 by cable 40 are secured to the arms by removing a backing sheet from the tacky side 42 of insulated cable 40 and from the tacky material 42 on the back of the buttons, and the insulating material and buttons are pressed firmly against the underside of the two arms. This construction enables the entire assembly, consisting of the slip ring unit, the two buttons, and connecting cables, to be assem-

bled readily and easily without the use of any special tools or equipment. The two rings **36** and **38** may be mounted on and secured to the column and wheel by any suitable means, such as by a clamp or bracket attached directly to the column or wheel, or by tacky material initially applied to the inner sides of the two rings and protected by a removable strip of sheet material.

A cable **50** containing the wires leading to the signal lights is attached at one end to contact ring **36** and likewise contains adhesive material protected by a removable sheet. When the sheet has been removed, the tacky side of the cable is pressed firmly against the steering wheel column to secure the cable firmly in place so that it will not interfere with the normal operation of the vehicle. In view of the manner in which the two buttons **30** and **32** are operated, their position on the underside of the arms of the steering wheel is likewise considered important, since they are in the natural position to be contacted and operated by the driver's fingers as he is making a right or left turn.

While the present lane changing signal device and control system therefor may be installed and connected to the lights at the front and rear corners of the automobile by various arrangements, either with or without direct use of the standard electrical system of the automobile, the embodiment of the invention illustrated in the drawings utilizes the turn-light system for the lane changing signal device lights and wiring. Hence, for a full understanding of the invention, one suitable diagram of the wiring has been illustrated in FIG. **10** and consists of seven contact rings **57, 58, 59, 60, 61, 62** and **63**, all on the lower contact ring **36**, with contacts **57, 58, 59** and **60** connected to the right-hand button **32** as viewed in FIG. **10**, and contacts **60, 61, 62** and **63** being connected to the left-hand button **30**. Both the right- and left-hand buttons make a common contact by separate brushes on contact brush ring **38** through contact ring **60**. Wires **64, 65, 66, 67, 68, 69** and **70** are connected to contact rings **61, 57, 62, 58, 60, 63** and **59**, respectively, and are incorporated in the sleevelike harness or cable **50** secured, preferably, to the underside of the steering column, and are connected to harness terminal T. Button **30** is connected to the standard left rear stop-light by wire **80** to contact ring **61** and wire **64** to the male plug entering the harness terminal block at connection **89**, and button **32** is connected to the standard right rear stop-light by wire **75**, contact ring **57** and wire **65** at connection **88**. The circuit is completed to the standard left front blinker light by wire **66** from contact ring **62** to the harness terminal T at connection **87** and wire **81** from the left-hand button **30** to contact ring **62** and intersecting wire **71** to turn-signal **83** on the steering wheel. The circuit is completed to the standard right front blinker light by wire **67** from contact **58** to harness terminal T at connection **86** and wire **76** from the right-hand button to the contact ring **58** and intersecting wire **72** from turn-signal **83** on the steering wheel. The circuit is completed to the standard flasher signal on the automobile by wire **68** from contact ring **60** to harness terminal T at connection **85** and wire **78** from the right-hand button and wire **79** from the left-hand button to contact ring **60** and intersecting wire **73** connected to turn-signal **83** on the steering wheel. Wire **69** from contact **63** to turn-signal **83** and wire **82** from the left-hand button energize the left rear standard stoplight. Wire **70** from contact ring **59** to turn-signal **83** and wire **77** from the right-hand button energize the right rear standard stoplight, and wire **74** from turn-signal **83** to the harness terminal T at connection **84** energizes the standard stoplight control.

It is seen from FIGS. **8, 9, 10** and **11** how the brush ring and contact rings operate as the steering wheel is turned, and, since the lane changing signal lights are only required during a small portion of the entire rotation of the steering wheel, a relatively small section of the contact ring is used, i.e. the contact brushes pass beyond the contact rings after the steering wheel has been moved beyond a relatively short predetermined rotation, as illustrated in FIG. **11**. FIG. **4** represents the position of the steering wheel when the automobile is traveling straight forward, FIG. **8** represents the automobile making a right turn, with one of the contact brush rings completely disengaged from the contact ring, and FIG. **9** illustrates the automobile making a left-hand turn with both brush rings completely disengaged from the contact ring.

Referring to the switch shown in FIGS. **12, 13, 14** and **15**, the switch is normally in the position illustrated in FIG. **14** with contacts **90** and **92** closed by movable element **94**, thus completing the circuit to the brake stoplight signals in operation when neither button is depressed to indicate a lane change. When a lane change is to be made, button **96** is depressed, breaking the contacts **90** and **92** and completing the connection at contacts **98, 100** and **102**, contacts **98** and **102** being completed to maintain the brake stoplight signals working when the button is depressed. When the pushbutton is depressed, contact element **94** makes contact with contact **100** which is connected to button wire **81** on the left button and wire **76** on the right button, and thereby actuates either the left or right front blinker lights. Dashboard turn-signal flasher lights are combined in front of the firewall on opposite sides of the harness terminal T. Six wires **84, 85, 86, 87, 88** and **89** enter the terminal block and eight wires leave the block, the two additional wires **104** and **106** being connected to the dashboard flasher lights. Contact element **102** also completes the three-way contact when depressed as illustrated in FIG. **15** by making simultaneous contact with terminal **98** which is connected with wires **78** and **79** of the right and left buttons, actuating the flasher control under the hood.

The button modification shown in FIGS. **16** through **19** is different in construction but substantially the same in operation as the switch of FIGS. **12** through **15**; consequently, similar numbers have been used to designate corresponding or equivalent parts in order to facilitate a ready understanding of the construction and operation of the switch. This switch, while somewhat different in shape, likewise is secured to the underside of the arms of the steering wheel and the wires therefrom to the slip ring contact unit are secured to the underside of the arms.

It is seen from the foregoing construction that the present invention can be readily installed on an automobile and connected directly into the turn-light electrical circuitry with little difficulty, whether during the manufacturing of the vehicle or while the vehicle is in service. When the driver wishes to turn from a lane into the lane on his left, he merely depresses button **30**, thus causing blinker lights on the left-hand side to operate. As the wheel is turned, the button is held in its depressed condition until the turn outwardly has been completed. The button is then released and the car driven in the lane until the vehicle has passed the vehicle ahead, for example, and then button **32** is depressed and the steering wheel turned to maneuver the automobile back into the original lane. As the automobile enters the original lane, the button is released, thus turning of the lights. It is not possible, with this construction and arrangement, to inadvertently leave the blinker light on after the turn has been completed. Further, the driver can readily depress the buttons without removing his hands from the steering wheel and without releasing his grip on the wheel or moving the hands from the normal steering position.

While only one embodiment of the present invention has been described in detail herein, various changes and modifications may be made without departing from the scope of the invention.

I claim:

1. For use with a vehicle having two signal lights at the front and two signal lights at the rear and a steering wheel and column, said wheel having a rim, hub and two diametrically disposed radially extending arms connecting said hub and rim; a lane changing signal device comprising a control button unit for mounting on the underside of each of said arms adjacent to said rim and having contacts therein, a layer of material on the rear of said buttons for securing said units to the underside of said arms, an electrical contact ring for mounting on said

column, said ring extending less than half the circumference of said column and having a plurality of contacts, an electrical brush ring for mounting on said hub, said brush ring having radially extending members with brushes for connecting each of said button units to said contact ring, leads connected to said contacts and extending to said signal lights, said leads being enclosed in a cable of insulating material having a material thereon for securing said cable to said steering column, and leads connected to said brushes said brushes and extending to the contacts in each of said control button units, said leads being enclosed in a cable of insulating material having a material thereon for securing said cable to said steering column, and the brushes for each of said button units being adapted to ride off the respective end of said contact ring when the steering wheel is turned beyond a predetermined distance in the respective direction to interrupt the signal from the respective control button without interfering with the effective operation of the other control button.

2. For use with a vehicle having two signal lights at the front and two signal lights at the rear and a steering wheel and column, said wheel having a rim, hub and two radially extending arms connecting said hub and rim: a lane changing signal device comprising a control button unit for mounting on the underside of each of said arms adjacent to said rim and having contacts therein, a layer of material on the rear of said button units for securing said units to the underside of said arms, an electrical contact ring for mounting on said column, said ring extending less than half the circumference of said column and having a plurality of contacts, an electrical brush ring for mounting on said hub, said brush ring having radially extending members with brushes for connecting each of said button units to said contact ring, each of said brushes being so positioned relative to said ring that the contact therewith of one of said brushes will be broken before the contact of the other of said brushes as the steering column is turned in the direction of said one brush, leads connected to said contacts and extending to said signal lights, said leads being enclosed in a cable of insulating material having a material thereon for securing said cable to said steering column, and leads connected to said brushes and extending to the contacts in each of said control button units, said leads being enclosed in a cable of insulating material having a material thereon for securing said cable to said steering column.

3. For use with a vehicle having two signal lights at the front and two signal lights at the rear and a steering wheel and column, said wheel having a rim, hub and two diametrically disposed radially extending arms connecting said hub and rim: a lane changing signal device comprising a control button unit for mounting on the underside of each of said arms adjacent to said rim and having contacts therein, a layer of material on the rear side of said button units for securing said units to the underside of said arms, an electrical contact ring for mounting on said column, said ring extending less than half the circumference of said column and having a plurality of contacts, an electrical brush ring for mounting on said hub, said brush ring having radially extending members with brushes for connecting each of said button units to said contact ring, each of said brushes being so positioned relative to said ring that the contact therewith of one of said brushes will be broken before the contact of the other of said brushes as the steering column is turned in the direction of said one brush, and leads connected to said brushes and extending to the contacts in each of said button units, said leads being enclosed in a cable of insulating material having a material thereon for securing said cable to said steering column.

4. For use with a vehicle having two signal lights at the front and two signal lights at the rear and a steering wheel and column, said wheel having a rim, hub and two radially extending arms connecting said hub and rim: a lane changing signal device comprising a control button unit for mounting on the underside of each of said arms adjacent to said rim and having contacts therein, a layer of material on the rear of said button units for securing said units to the underside of said arms, an electrical contact ring for mounting on said column, said ring extending less than half the circumference of said column and having a plurality of contacts, an electrical brush ring for mounting on said hub, said brush ring having radially extending members with brushes for connecting each of said button units to said contact ring, leads connected to said contact and extending to said signal lights, and leads connected to said brushes and extending to the contacts in each of said control buttons, the brushes for each of said button units being adapted to ride off the respective end of said contact ring when the steering wheel is turned beyond a predetermined distance in the respective direction to interrupt the signal from the respective control button without interfering with the effective operation of the other control button.

5. For use with a vehicle having two signal lights at the rear and a steering wheel and column, said wheel having a rim, hub and two radially extending arms connecting said hub and rim: a lane changing signal device comprising a control button unit for mounting on the underside of each of said arms adjacent to said rim and having contacts therein, an electrical contact ring for mounting on said column, interconnecting brushes and rings on said column and wheel hub, and leads connected to said brushes and extending to the contacts in each of said control button units, the brushes for each of said button units being adapted to ride off the respective end of said contact ring when the steering wheel is turned beyond a predetermined distance in respective direction to interrupt the signal from the respective control button without interfering with the effective operation of the other control button.