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Aug. 19, 1969 W. STOI ET AL Re. 26,648
AUTOMATIC CANCELLING TURN SIGNAL WITH AN INTERMEDIATE SIGNAL POSITION WHICH IS MANUALLY OPERABLE AND RELEASABLE
Original Filed Oct. 11, 1965 2 Sheets-Sheet 1

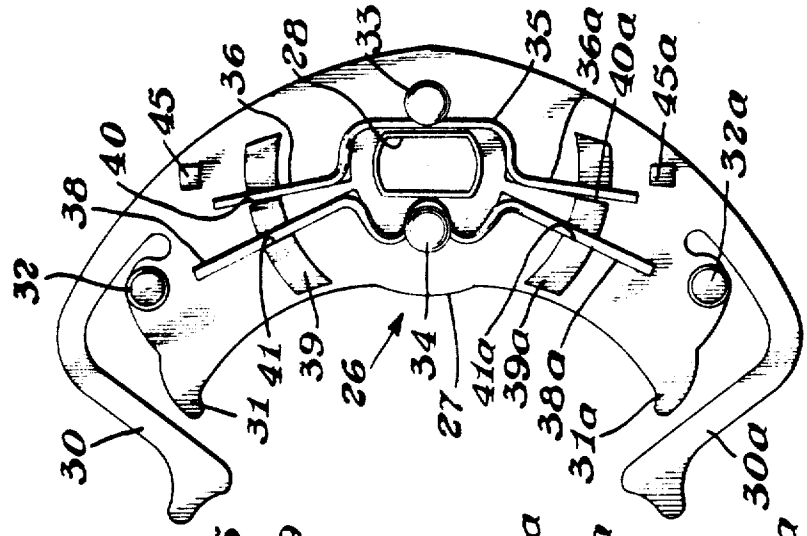


Fig. 2

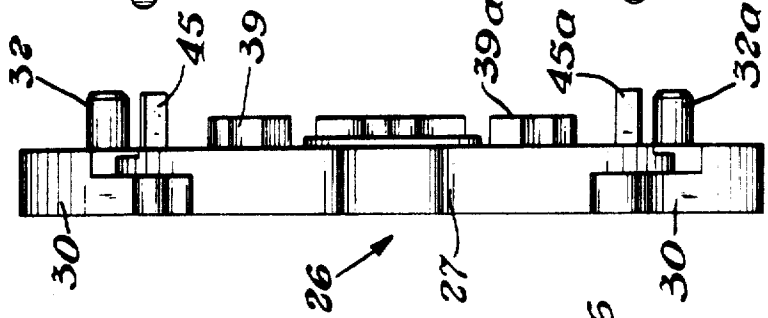


Fig. 3

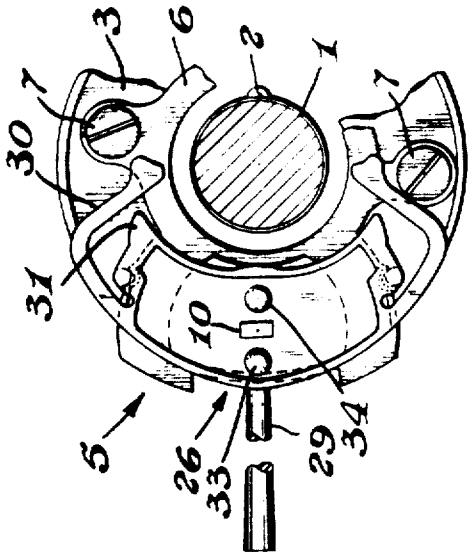


Fig. 1

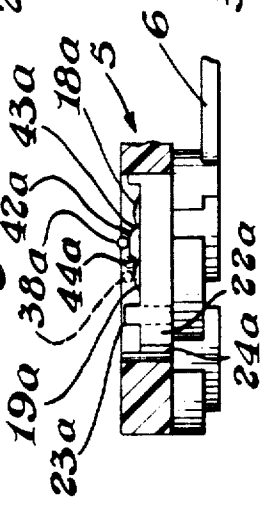


Fig. 8

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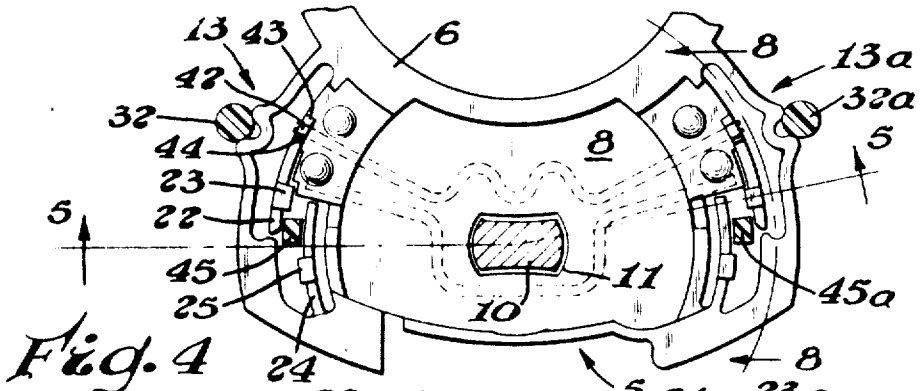


Fig. 4

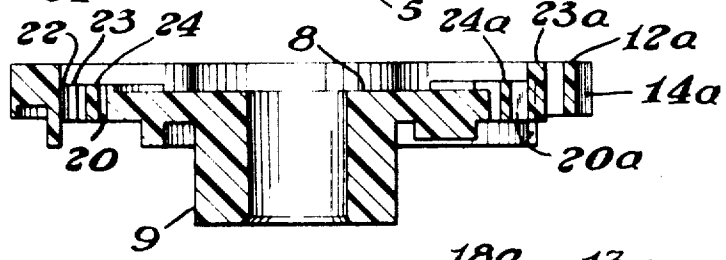


Fig. 5

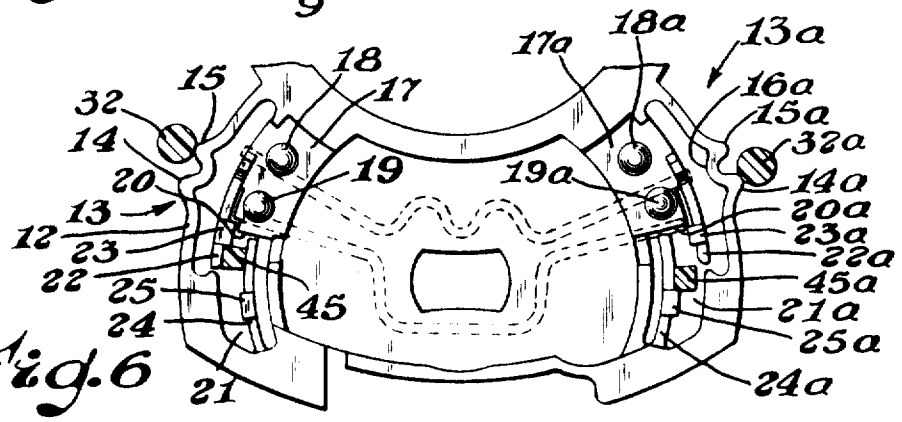


Fig. 6

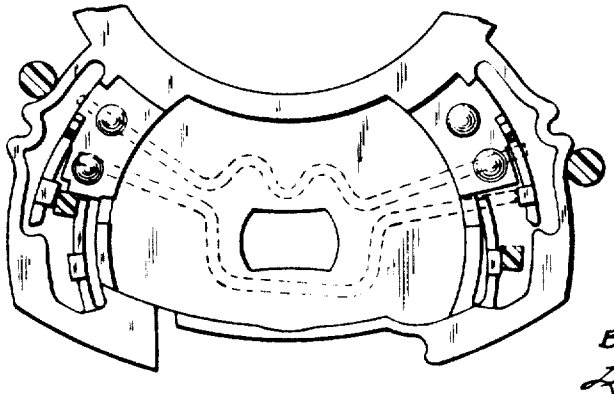


Fig. 7

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AUTOMATIC CANCELLING TURN SIGNAL WITH AN INTERMEDIATE SIGNAL POSITION WHICH IS MANUALLY OPERABLE AND RELEASABLE

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Int. Cl. H01h *3/16*

U.S. Cl. 200—61.34 18 Claims

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

ABSTRACT OF THE DISCLOSURE

Vehicle direction signal operating apparatus has an actuator movable manually from a neutral position to either one of two latched operating positions for operating selectively the vehicle's left or right direction signals and movable automatically from either operating position to the neutral position in response to operation of the vehicle's steering mechanism. Yieldable abutment means in the path of manual movement of the actuator from its neutral position toward either operating position arrests the actuator in an intermediate position in which a selected one of the left or right direction signals is operable. From either intermediate position the actuator may be returned automatically to its neutral position or alternatively to either of its latched operating positions.

This invention relates to vehicle directional signaling apparatus and more particularly to apparatus which may be actuated to indicate an impending change in direction of the vehicle and in which the cancellation of the signaling indicators may be effected either in response to movement of the vehicle's steering mechanism or upon release of the actuating means by the vehicle's driver.

Direction signaling apparatus currently in use on most vehicles includes a manually operable actuator which may be moved from a neutral position to either one of two operating positions so as to indicate either a left-hand or a right-hand turn. The actuator of such mechanism conventionally is releasably latched in either of the operating positions and may be restored to its neutral position upon rotation of the vehicle's steering wheel through a predetermined arc. There are many instances, however, in which the driver of the vehicle wishes to signal a change in direction and which will not result in movement of the steering wheel through an arc sufficient to effect concellation of the signal. For example, a change of lanes on an expressway or other highway ordinarily will not require rotation of the vehicle's steering wheel through an arc sufficiently great to restore an actuated direction signal to its neutral position. In those instances where a driver actuates the vehicle's direction signal to indicate a lane change and then fails to cancel the direction signal, the vehicle may travel for many miles with the direction signal operating. Operation of a vehicle's direction signals under these circumstances can be both annoying and hazardous.

An object of this invention is to provide direction signaling apparatus which selectively may be moved from a neutral position to a latched operating position or from a neutral position to an unlatched operating position and which may be restored automatically to neutral position from either operating position.

Another object of the invention is to provide direction signaling apparatus of the character described which requires no substantial modification of the electrical circuitry of the vehicle with which the apparatus is intended for use.

A further object of the invention is to provide direction signaling apparatus of the kind referred to and which may be moved from its neutral position to either of the above referred to operating positions without requiring any substantial increase in the operating effort required to effect movement of the actuating mechanism to either operating position.

A further object of the invention is to provide direction signaling apparatus of the character described and in which movement of the actuating mechanism to either of the operating positions above referred to may be effected in the same way that the actuating mechanism of currently available direction signaling devices are adjusted.

Other objects and advantages of the invention will be pointed out specifically or will become apparent from the following description when it is considered in conjunction with the appended claims and the accompanying drawings, in which:

FIGURE 1 is a fragmentary plan view of direction signaling apparatus constructed in accordance with the invention and illustrating its relationship with the steering shaft of a vehicle, the shaft being shown in section;

FIGURE 2 is an enlarged, bottom plan view of the actuating member of the direction signaling apparatus;

FIGURE 3 is a front elevational view of the actuating member;

FIGURE 4 is an enlarged, fragmentary plan view of the support or switch casing of the direction signaling apparatus, with portions of the actuating member being shown in section and illustrating the positions of the parts when the actuating member is in its neutral position;

FIGURE 5 is a longitudinal sectional view taken on the line 5—5 of FIGURE 4;

FIGURE 6 is a view similar to FIGURE 4, but illustrating the positions of the parts when the actuating member is moved to an intermediate, unlatched operating position;

FIGURE 7 is a view similar to FIGURE 6, but illustrating the positions of the parts when the actuating member has been moved to one of its latched operating positions; and

FIGURE 8 is an enlarged, sectional view taken on the line 8—8 of FIGURE [6] *4*.

Apparatus constructed in accordance with the invention is adapted for use in conjunction with a vehicle having a rotatable steering shaft **1** which may be rotated in response to rotation of the vehicle's steering wheel (not shown), and which includes a radially projecting canceling cam **2** that rotates with the shaft **1**. Surrounding the shaft **1** is a tubular column terminating at its upper end in a housing **3** on which the direction signaling apparatus may be mounted.

The direction signaling apparatus constructed in accordance with the disclosed embodiment of the invention comprises a molded, arcuate casing or support **5** formed of insulating material such as nylon to which is integrally joined an annular flange **6** which may be secured to the housing **3** by suitable means such as screws **7**. The casing **5** includes a base **8** from which depends a tubular boss **9** in which is mounted a shaft **10** which, at its upper end, is substantially rectangular in cross-section. A generally hourglass-shaped opening **11** is formed in the base **8** so as to permit oscillation of the shaft **10**.

At one end of the casing **5** is an integral, flexible rib **12** at substantially the center of which is a latching detent **13** comprising a pair of spaced apart, outwardly projecting nodes **14** and **15** joined by substantially U-shaped web **16**. Similar parts are provided at the opposite end

of the casing and are identified by similar reference characters, followed by the suffix a.

Adjacent one end of the casing **5** is a raised shelf **17** on which is secured a pair of spaced apart, electrically conductive, fixed contacts **18** and **19** which may be connected by suitable wiring (not shown) to the right front and left rear signaling devices (not shown), respectively, of the vehicle. Similar parts are located at the opposite end of the casing and are identified by similar reference characters followed by the suffix a, it being understood that the fixed contacts **18a** and **19a** are connected respectively to the left front and right rear vehicle signaling devices.

The shelf **17** terminates adjacent the contact **19** in an abrupt wall **20** which forms one end of an opening **21** provided in the casing **5**. Integrally joined to the shelf **17** is a resilient arm or finger **22**, the other end of which projects beyond the wall **20** and is free, thereby enabling the free end of the arm **22** to flex toward and away from the adjacent rib **12**. Adjacent the free end of the arm **22** is a stop block **23** which subsequently will be referred to in more detail.

It is preferred that a second flexible arm **24** be accommodated in the opening **21**. One end of the arm **24** is integrally joined to the casing **5** and its other end projects toward but terminates short of the end wall **20** of the shelf **17**. Thus, the arm **24** is capable of being flexed similarly to the arm **22**. The arm **24** preferably includes a stop block **25** for a purpose presently to be described. Similar apparatus is provided at the opposite end of the casing **5**.

An actuating member designated generally by the reference character **26** and molded of nylon or other insulating material includes an arcuate body ortion **27** having a generally rectangular opening **28** therein in which the shaft **10** may be accommodated so as to effect rocking movement of the actuating member in either of two opposite directions from the neutral position shown in FIGURE 1. To effect rocking of the actuating member, a handle **29** may be secured to the shaft **10** as is conventional.

At one end of the actuating member is provided an integral, flexible return finger **30** which projects toward, but is out of the path of rotation of the cam **2** when the actuating member is in its neutral position. Adjacent the finger **30** the body **27** of the actuating member terminates in an abutment **31** which normally is free of the arm **30**, but which may be engaged by the latter under certain conditions which presently will be described. Also integrally formed on the under surface of the actuator body **27** is a latch post or detent **32** which, when the actuator and casing are assembled, engages the latching detent **13**. Similar parts are provided at the opposite end of the actuating body **27** and are identified by similar reference characters followed by the suffix a.

Secured to the actuating member **26** is a pair of electrically conductive contacts **33** and **34**. The contact **33** may be connected to the vehicle's battery (not shown) through a brake pedal operated switch (not shown) in a conventional manner. The contact **34** may be connected by wiring to the vehicle's battery through a flasher unit (not shown) as also is conventional. In electrical engagement with the contact **33** is an electrically conductive switch member **35** having arms **36** and **36a** formed of springy material and which are adapted to engage the contacts **19**, **19a**, respectively. In electrical engagement with the contact **34** is a switch member **37** having arms **38** and **38a** formed of springy material and which are adapted to be engaged with the contacts **18**, **19** and **18a**, **19a**, respectively. The arms **36** and **38** are flexible and are maintained in spaced apart relation for movement with the actuating member by means of a positioning rib **39** formed on the under surface of the actuating member respective arms are accommodated. Similar means are and having a pair of grooves **40** and **41** in which the associated with the arms **36a** and **38a**.

The arms **38**, **38a** of the switching member **37** are longer than the arms of the switching member **35**. The length of the latter arms is such that, when the actuating member is assembled with the casing, the arms **36**, **36a** span the distance between the fixed contacts **19**, **19a** and rest upon the latter when the actuator is in its neutral position. The arms of the switching member **37**, however, project radially beyond the associated fixed contacts so as to span the distance between the flexible arms **22**, **22a**. When the actuator is in its neutral position, the arm **38** rests upon an upstanding platform **42** formed on the arm **22** and having downwardly inclined ramps **43** and **44** at its opposite ends. The level of the platform **42** is such that the arm **38**, in the neutral position of the actuating member, is supported at a level above the level of the fixed contacts **18** and **19**. A similar platform **42a** is formed on the arm **23a** so as to support the arm **38a** above the level of the fixed contacts **18a** and **19a** when the actuating member is in its neutral position. The springiness of the arms **38**, **38a**, however, biases them in such direction as to move them toward the level of the respective fixed contacts. Accordingly, upon movement of the actuating member **26** in either direction about the axis of the shaft **10**, the arms **38**, **38a** will ride down the appropriate ramps so as to engage the upper surfaces of the appropriate fixed contacts.

In the operation of the apparatus thus far described, movement of the operating handle **29** clockwise from the position shown in FIGURE 1 will effect corresponding movement of the actuating member **26** to an operating position in which the switching members **35** and **37** move clockwise from the positions shown in FIGURE 4 to the positions shown in FIGURE 7. In the latter positions, the arm **38** will have been moved off the platform **42** through such an arc as to engage the fixed contact **18**. The arm **38a** will have been moved off the platform **42a** through a similar arc and into engagement with the contact **19a** so as to supply to the contacts **18** and **19a** intermittent electrical energy via the flasher unit and thereby enable the direction signaling devices at the right front and right rear of the vehicle to flash intermittently. The arm **36** of the switching member **35** will have moved through a similar arc, but will continue to engage the fixed contact **19** so as to enable current to be supplied to the latter upon the closing of the brake pedal actuated switch. The arm **36a**, however, will have been moved clockwise to a position free of engagement with the contact **19a** and out of circuit with the signaling devices of the vehicle.

Closewise movement of the actuating member **36** from the position shown in FIGURES 1 and 4 to the position shown in FIGURE 7 also will effect corresponding and over centering movement of the posts **32**, **32a** relative to the detents **13**, **13a** to positions in which the posts engage the nodes **15** and **14a**, respectively, thereby yieldably latching the actuating member in its operating position. In these positions of the parts, the return finger **30** will lie in the path of rotation of the cam **2** so that, upon counterclockwise rotation of the steering shaft **1**, the cam **2** will engage the finger **30** and urge it into engagement with the abutment **31** so as to restore the actuating member to its neutral position.

It will be understood that the actuating member **26** may be rocked counterclockwise from the position shown in FIGURE 1 so as to effect relative movement of the members **4** and **26** to such positions that the switching member **37** engages the contacts **19**, **18a** and the switch ing member **35** engages only the contact **19a**, in which event the direction signaling devices, at the left-hand side of the vehicle will be actuated to indicate a left-hand turn.

Upon movement of the actuator member to either of the operating positions just described, the actuating mem-

ber will be latched in the selected operating position until such time as it is restored to its neutral position in response to engagement of the cam **2** with the appropriate return finger **30**, **30a**. Apparatus constructed in accordance with the invention, however, includes means for arresting the actuating member in either one of two intermediate positions in which the direction signaling devices may be operated, but from either of which the actuating member may be restored to its neutral position without regard to rotation of the steering mechanism, and from either of which the actuator may be moved to one of its latched operating positions. The means for arresting the actuating member in an intermediate position comprises a pair of depending stop posts or blocks **45** and **45a** located adjacent opposite ends of the actuator body **27** and formed integrally therewith. The post **45** is of such size and is so located that, when the actuator **26** is in its neutral position, the post **45** occupies a position (see FIGURE 4) between the flexible fingers **22** and **24** and between the stop members **23** and **25**. The post **45a** occupies a similar position between the arms **22a** and **24a**. The blocks **23**, however, lies in the path of clockwise movement of the post **45**, and the block **25** lies in the path of counterclockwise movement of the post **45**. Similarly, the block **23a** lies in the path of counterclockwise movement of the post **45a**, and the block **25a** lies in the path of clockwise movement of the post **45a**.

Upon movement of the handle **29** to effect clockwise rocking of the actuator **26** clockwise from the position shown in FIGURE 1, the posts **45** and **45a** will move clockwise from the positions shown in FIGURE 4 to the positions shown in FIGURE 6 and in which they engage the blocks **23** and **25a**, respectively. Upon engagement of the posts and stop blocks, the operator will encounter some resistance to further clockwise rocking of the actuator member and, although the resistance is not great, it will signify to the operator that the actuating member has been moved through an arc to an intermediate or arrested position between its neutral position and one of its fully adjusted operating positions.

In the intermediate position referred to above, the arm **36** of the switch member **35** will remain in engagement with the contact **19** and the arm **38** will have moved down the ramp **43** so as to engage the contact **18**. The arm **36a** will have moved out of engagement with the contact **19a**, and the arm **38a** will have moved down the ramp **44a** and into engagement with the contact **19a**, thereby enabling the direction signaling devices at the right-hand side of the vehicle to flash intermittently. In the arrested positions of the parts, however, the actuator body will not have been moved clockwise through an arc of such magnitude as to effect over centering of the latch parts **13**, **13a** and **32**, **32a**. Thus, in the positions of these parts shown in FIGURE 6, the nodes **15** and **14a** exert forces on the respective posts **32** and **32a** tending to restore the actuating member to its neutral position. In order to maintain the actuating member in its immediate position, therefore, the operator must hold the handle **29** in its adjusted position. Upon release of the handle by the operator, the resilience of the latch detents **13**, **13a** will effect restoration of the actuating member to its neutral position and effect cancellation of the direction signaling devices.

FIGURE 8 shows in full lines the position of the arm **38a** when it is in its neutral position atop the platform **42a**. In the dotted line position just to the left of the platform, the arm **38a** is shown in its intermediate position and, to the left of that position, the arms **38a** is shown in its fully operating position.

When it is desired to move the actuating member to either of its fully adjusted or latched operating positions, the stop posts **45**, **45a** will engage the associated stop blocks, whereupon the application of a slight additional force on the operating handle **29** will enable the flexible fingers **22**, **24** and **22a**, **24a** to be deflected or withdrawn from the paths of posts **45**, **45a** and permit movement of the blocks **45**, **45a** past the associated arm-mounted stops. Once the detent posts **32**, **32a** have been shifted to an over center position with respect to the associated detents **13**, **13a**, the actuating member will be biased toward and releasably latched in one of its operating positions as aforesaid. Movement of the actuating member beyond its fully adjusted or latched operating positions is limited by engagement of the posts **45**, **45a** with the respective end walls **20**, **20a** of the shelf members **17**, **17a**.

The disclosed embodiment is representative of a presently preferred form of the invention, but is intended to be illustrative rather than definitive thereof. The invention is defined in the claims.

We claim:

1. In direction signaling apparatus of the kind having an actuating member mounted on a support member for movement from a neutral position toward a latched operating position, electrical contact means operable in response to such movement to condition an electrical circuit for operation, and operating means for moving said actuating member from said neutral position toward said latched position: abutment means on said members engageable in response to movement of said actuating member from said neutral position toward said latched position to arrest said actuating member in an intermediate position between said neutral position and said latched position and in which said electrical contacts are operable to condition said circuit for operation, said operating means being capable of exerting sufficient force on said actuating member to disable said abutment means and move said actuating member from said intermediate position to said latched position *; and return means independent of said operating means for returning said actuating member from said latched position to said neutral position.*

2. Apparatus as set forth in claim **1** including means reacting between said members for biasing said actuating member to said neutral position from said intermediate position.

3. Apparatus as set forth in claim **[2]** *1* including means reacting between said members in response to movement of said actuating member past said intermediate position toward said operating position to bias said actuating member toward said operating position.

4. In direction signaling apparatus of the kind having an actuating member mounted on a support member for movement from a neutral position toward a latched operating position, electrical contact means operable in response to such movement to condition an electrical circuit for operation, and operating means for moving said actuating member from said neutral position toward said latched position: first abutment means carried by said actuating member; second abutment means carried by said support member in the path of movement of said first abutment means and engageable with the latter in response to movement of said actuating member from said neutral position toward said latched position to arrest said actuating member in an intermediate position between said neutral position and said latched position and in which said electrical contacts are operable to condition said circuit for operation, at least one of said abutment means being yieldable, said operating means being capable of exerting sufficient force on said actuating member to deflect said yieldable abutment means and enable movement of said actuating member from said intermediate position to said latched position; *and return means independent of said operating means for returning said actuating member from said operating position to said neutral position.*

5. Apparatus as set forth in claim **4** including means reacting between said support member and said actuating member for biasing the latter to said neutral position from said intermediate position.

6. Apparatus as set forth in claim **4** including means reacting between said support member and said actuating

member in response to movement of the latter past said intermediate position toward said operating position to bias said actuating member toward said operating position.

7. Apparatus as set forth in claim 4 wherein said one of said abutment means is carried by said support member.

8. Direction signaling apparatus comprising a support member; first electrical contact means carried by said support member; an actuating member mounted on said support member for movement from a neutral position to a latched position; second electrical contact means connected to said actuating member for movement with the latter into and out of engagement with said first contact means; cooperable stop means on each of said members engageable with one another in response to movement of said actuating member from said neutral position toward said latched position for arresting said actuating member in an intermediate position between said neutral and latched positions; [and] operating means for moving said actuating member from said neutral position to said intermediate position and being capable of exerting sufficient force on said actuating member to disable said stop means and move said actuating member to said latched position, said first and second contact means being so located relatively to said members that they are out of engagement with one another when said actuating member is in said neutral position and are in engagement with one another when said actuating member is in each of said intermediate and operating positions; *and return means independent of said operating means for returning said actuating member from said operating position to said neutral position.*

9. Apparatus as set forth in claim 8 wherein one of said stop means is flexible whereby said one of said stop means may be displaced relatively to the other of said stop means to permit said actuating member to be moved from said intermediate position to said operating position.

10. Apparatus as set forth in claim 8 including means reacting between said support means and said actuating member for biasing the latter to said neutral position from said intermediate position.

11. Apparatus as set forth in claim 8 including means reacting between said support member and said actuating member in response to movement of the latter past said intermediate position toward said operating position to bias said actuating member toward said latched position.

12. Direction signaling apparatus comprising a support member; first electrical contact means carried by said support member; an actuating member mounted on said support member for rocking movement about an axis from a neutral position to an operating position; second electrical contact means connected to said actuating member for rocking movement with the latter into and out of engagement with said first contact means; yieldable stop means on one of said members; second stop means on the other of said members and engageable with said yieldable stop means in response to movement of said actuating member to an intermediate position between said neutral and operating positions for arresting movement of said actuating member to said operating position, said first and second contact means being so located relatively to said members that they are out of engagement with one another when said actuating member is in said neutral position and are in engagement with one another when said actuating member is in each of said intermediate and operating positions; [and] *operating* means connected to said actuating member for rocking the latter from said neutral position to said intermediate position and for applying a force of such magnitude on said actuating member as to enable said second stop means to deflect said yieldable stop means and effect movement of said actuating member to said operating position; *and return means independent of said operating means for returning said actuating member from said operating position to said neutral position.*

13. Apparatus as set forth in claim 12 wherein said yieldable stop means is mounted on said support member.

14. Apparatus as set forth in claim 12 including spring means acting on said members and biasing said actuating member to said neutral position from said intermediate position.

15. Apparatus as set forth in claim [14] *12* including cooperable latch means on said members operable to latch said operating member in said operating position.

16. Direction signaling apparatus for use with cam means rotatable in a path, said apparatus comprising a support member; first electrical contact means carried by said support member; an actuating member; means mounting said actuating member on said support member for rocking movement about an axis from a neutral position to an operating position; second electrical contact means connected to said actuating member for rocking movement with the latter into and out of engagement with said first contact means; yieldable stop means on one of said members; second stop means on the other of said members and engageable with said yieldable stop means in response to movement of said actuating member to an intermediate position between said neutral and operating positions for arresting movement of said actuating member to said operating position, said first and second contact means being so located relatively to said members that they are out of engagement with one another when said [acuating] *actuating* member is in said neutral position and are in engagement with one another when said actuating member is in each of said intermediate and operating positions; means connected to said actuating member for rocking the latter from said neutral position to said intermediate position and for applying a force of such magnitude on said actuating member as to enable said second stop means to deflect said yieldable stop means and effect movement of said actuating member to said operating position; cooperable latch means on said members engageable to latch said actuating member in said operating position; and return means carried by said actuating member and movable into the path of movement of said cam means for engagement thereby in response to movement of said actuating member to said operating position, engagement between said cam means and said return means being operable to disengage said latch means and return said actuating member to said neutral position.

17. Apparatus as set forth in claim 16 including spring means acting on said members and biasing said actuating member to said neutral position from said intermediate position.

18. Apparatus as set forth in claim [12] *16* including spring means acting on said members and biasing said actuating member to said operating position from said intermediate position.

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U.S. Cl. X.R.

200—61.27, 166