Oct. 13, 1970 N. WILKINSON 3,534,189

DIRECTION INDICATOR SWITCHES FOR ROAD VEHICLES

Filed Dec. 11, 1968 2 Sheets-Sheet 1

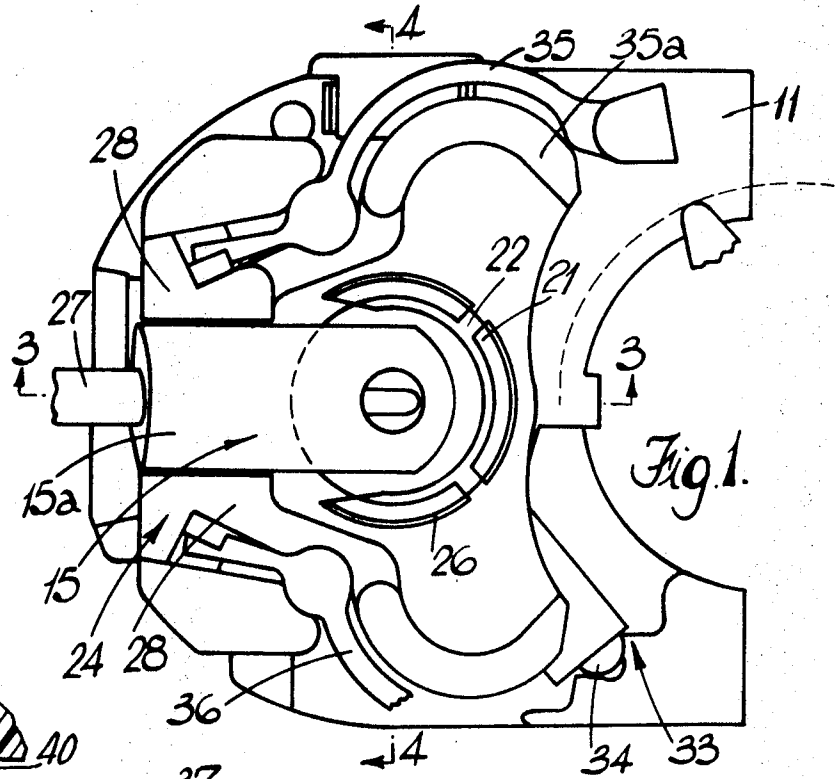

Fig. 1.

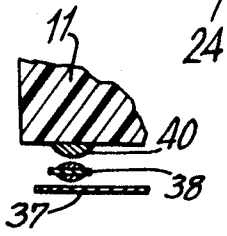

Fig. 5.

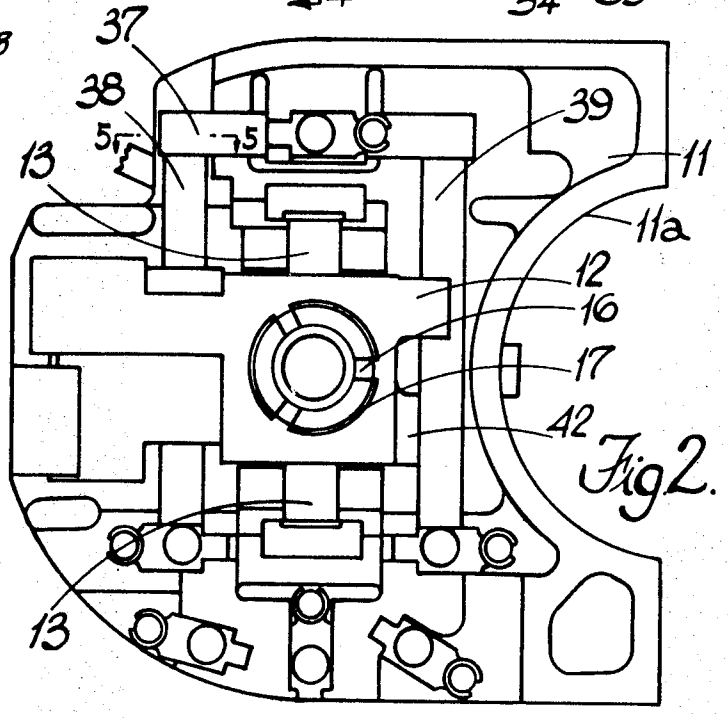

Fig 2.

INVENTOR
Norman Wilkinson
BY Holman, Glascock, Downing & Seebold
ATTORNEYS

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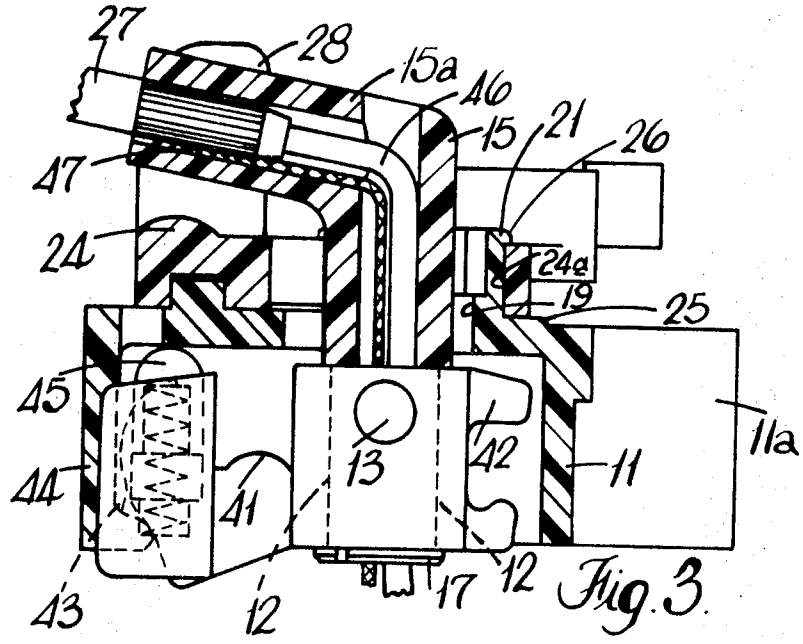

Fig. 3.

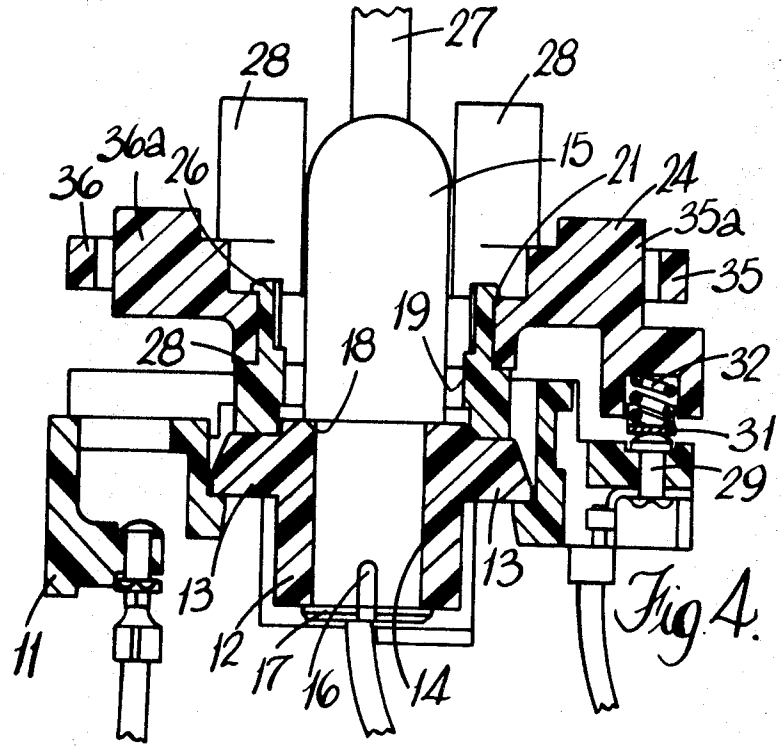

Fig. 4.

INVENTOR
Norman Wilkinson.
BY Holman, Glascock, Downing & Seibold
ATTORNEYS

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DIRECTION INDICATOR SWITCHES FOR ROAD VEHICLES

Norman Wilkinson, Barrowford, near Nelson, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England, a British company

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Int. Cl. H01h 3/16
U.S. Cl. 200—61.34 6 Claims

ABSTRACT OF THE DISCLOSURE

A direction indicator switch includes a body carrying a rotor. The rotor is mounted for pivoting movement on the body, and operates a first set of switch contacts. A pivot piece is pivotally mounted on the body for pivotal movement about an axis at right angles to the axis of the rotor and a second set of switch contacts is operable by the pivot piece. An operating member is pivotally connected to the pivot piece for pivotal movement relative thereto and has an axis at right angles to the pivotal axis of the pivot piece, and there is provided means interconnecting the operating member and the rotor so that pivotal movement of the operating member relative to the pivot piece operates the rotor.

This invention relates to direction indicator switches for road vehicles.

A direction indicator switch for a road vehicle according to the invention includes a body, a first set of switch contacts supported by the body, a first pivot piece means mounting the first pivot piece on the body for pivotal movement relative thereto whereby pivotal movement of the first pivot piece operates said first set of switch contacts, an operating member, complemental means on the first pivot piece and operating member mounting the operating member on the first pivot piece for pivotal movement about an axis at right angles to the axis about which the first pivot piece is movable whereby movement of the operating member in a plane at right angles to the axis of pivotal movement of the first pivot piece effects pivotal movement of the first pivot piece, a second set of switch contacts carried by the body, a second pivot piece means mounting the second pivot piece on the body independently of the first pivot piece for movement about an axis at right angles to the axis about which the first pivot piece is movable to operate said second set of switch contacts, said second piece having an aperture therein through which said operating member extends, and means on said second pivot piece cooperable with said operating member so that pivotal movement of the operating member relative to the first pivot piece only is transmitted to the second pivot piece to operate said second set of switch contacts.

One example of the invention is illustrated in the accompanying drawings wherein:

FIG. 1 is a fragmentary plan view of a direction indicator switch,

FIG. 2 is an inverted plan view of the switch shown in FIG. 1,

FIGS. 3 and 4 are sectional views on the lines 3—3 and 4—4 respectively in FIG. 1, and

FIG. 5 is a fragmentary sectional view on the line 5—5 in FIG. 2.

Referring to the drawings the switch includes a body 11 moulded in synthetic resin material, and adapted to receive a moulded pivot piece 12. The pivot piece 12 includes a pair of integral, diametrically opposite outwardly extending posts 13 which are received in corresponding recesses in the body 11, the pivot piece 12 being engaged with the body 11 as a snap fit. The posts 13 support the pivot piece 12 for pivotal movement relative to the body 11 about a horizontal axis, and the pivot piece 12 is formed with a vertical bore 14 within which is received one end of a hollow, moulded operating member 15. Said one end of the operating member 15 is provided with axially extending slots 16 which render said one end of the operating member resilient, and at the free end of the operating member the operating member includes an integral outwardly extending flange 17. Intermediate its ends the operating member includes an outwardly extending shoulder 18, and the operating member is engaged with the pivot piece 12 by inserting said one end of the operating member through the bore 14 in the pivot piece 12 until the shoulder 18 engages the upper surface of the pivot piece 12. The shoulder 18 and the flange 17 of the operating member 15 are of larger diameter than the bore 14 of the pivot piece 12, and so as the operating member 15 is engaged with the pivot piece 12 the end portion of the operating member 15 is compressed as permitted by the slots 16, by engagement of the flange 17 with the wall of the bore 14. When the shoulder 18 of the operating member 15 engages the upper surface of the pivot piece 12, the flange 17 is clear of the lower end of the bore 14, and so the end portion of the operating member 15 expands to engage the flange 17 with the lower surface of the pivot piece 12. Thus, the operating member 15 is engaged with a snap fit with the pivot piece 12, and is capable of movement relative to the pivot piece 12 about a vertical axis. The operating member 15 extends upwardly from the pivot piece 12 through a bore 19 in the body 11. The wall of the bore 19 of the body 11 is extended upwardly to define a cylindrical hollow spigot 21 which is rendered resilient by providing the walls thereof with slots 22.

A moulded rotor 24 having a central bore 24*a* is engaged with the body 11 for rotation about a vertical axis. The rotor 24 is engaged as a snap fit on the spigot 21 of the body 11, the spigot 21 being provided adjacent its base with an outwardly extending shoulder 25, and at its free end with an outwardly extending flange 26. During the engagement of the rotor 24 with the body 11, the spigot 21 is compressed inwardly until the lower surface of the rotor engages the shoulder 25, whereupon the flange 26 is clear of the upper end of the bore in the rotor so permitting the spigot 21 to expand outwardly to engage the flange 26 with the upper surface of the rotor. The body 11 is provided with means whereby the direction indicator switch can be secured to the steering column of a road vehicle, the body 11 having a semi-cylindrical depression 11*a* which engages the outer fixed tube of the steering column of the road vehicle in the manner of a saddle.

The operating member 15 extends upwardly through the spigot 21 of the body and through the rotor 24, and is cranked to extend generally horizontally in a direction away from the depression 11*a* in the body. The cranked portion 15*a* of the operating member 15 is adapted to receive an operating lever 27, and extends between a pair of parallel upstanding lugs 28 integral with the rotor 24. Thus, it will be appreciated, that by moving the operating lever 27 in a vertical plane, the pivot piece 12 is pivoted relative to the body 11 about a horizontal axis without affecting the position of the rotor 24. Moreover, by moving the operating lever in a horizontal plane the rotor 24 is caused to pivot relative to the body about a vertical axis, by engagement of the portion 15*a* of the operating member 15 with one or other of the lugs 28

without affecting the position of the pivot piece **12**, the operating member **15** pivoting relative to the pivot piece **12** about said vertical axis.

The upper surface of the body **11** carries a plurality of fixed contacts one of which is shown at **29**, the fixed contacts being engageable by a movable bridging piece **31** carried by the rotor **24**. The bridging piece **31** is urged into engagement with the fixed contacts by a compression spring **32**, the fixed contacts and the bridging piece **31** controlling the direction indicator function of the switch. Thus, by moving the rotor **24** angularly relative to the body **11** about said vertical axis, the bridging piece **31** is caused to electrically connect alternative pairs of the fixed contacts. The rotor **24** has three angularly spaced stable positions relative to the body **11**. The three positions of the rotor **24** relative to the body **11** are defined by detent means in the form of a cam track **33** on the body **11** which is engaged by a spring pressed ball **34** carried by the rotor **24**. The central position of the three positions is an off position wherein the bridging piece **31** does not complete any circuits between the fixed contacts. By moving the rotor **24** angularly relative to the body **11** in one direction from the central position a first operative position is reached wherein the bridging piece **31** completes a circuit between the supply contact **29** and an adjacent fixed contact to energise the direction indicator lamp on one side of the vehicle, and similarly movement of the rotor **24** relative to the body **11** in the opposite direction from the central off position moves the bridging piece **31** to a position wherein it completes the circuit between the contact **29** and a further fixed contact to energise the direction indicator lamps on the opposite side of the vehicle. It will be appreciated, that the circuits to the direction indicator lamps are made through a flasher unit so that the direction indicator lamps are energised intermittently.

In order to return the rotor to its central off position from either of the operative positions when the turn being indicated has been negotiated, the rotor is provided with a pair of resilient arms **35**, **36**, the arm **36** being shown broken away in FIG. 1. The arms **35**, **36** are engaged as a snap fit in the rotor **24**, and extend from the rotor **24** towards the depression **11***a* in the body **11**. The arrangement is such that in use, when the rotor **24** is moved to one or other of its operative positions, then one or other of the arms **35**, **36**, dependent on which operative position is chosen, is moved into the path of movement of a striker carried by the rotatable part of the steering column of the vehicle. Thus, as the turn is commenced the steering wheel of the vehicle is turned in the required direction and the striker engages the respective arm, and rides past the respective arm as permitted by flexure of the arm outwardly. When the turn has been negotiated, the steering wheel is returned to the straight ahead position and in so doing the striker is caused to engage the arm again. The rotor **24** is provided with walls **35***a*, **36***a* which prevent flexure of the arms **35**, **36** inwardly, and so when the striker engages the arm during its return movement, the arm cannot flex to permit the striker to reach the straight ahead position, and so the return movement of the striker forces the rotor to rotate back to its central position wherein the arm is out of the path of movement of the striker.

Vertical movement of the operating lever **27** relative to the body **11** in use controls the headlamps of the road vehicle. The body **11** carries an electrical supply contact **37** in the form of a metal strip which is engageable by a pair of leaf spring contacts **38**, **39**. Moreover, the body carries a further fixed contact **40** which is engageable by the leaf spring contact **38** upon movement of the leaf spring **38** in a direction away from the contact **37**. The supply contact **37** is connected to the D.C. source of the vehicle through an on/off switch. Said further contact is electrically connected directly to the D.C. source. The leaf spring contact **38** is electrically connected in the main

beam circuit of the vehicle headlamps, and the leaf spring contact **39** is electrically connected in the dipped beam circuit of the vehicle headlamps. The pivot piece **12** is provided with a pair of cams **41**, **42** engageable with the leaf spring contacts **38**, **39** respectively. The leaf spring contact **38** is stressed towards the contact **37**, so that in its rest position it engages the contact **37**, while the leaf spring **39** in its rest position, is spaced from the contact **37**. The pivot piece **12** has a pair of stable positions relative to the body **11** which are defined by detent means acting between the pivot piece **12** and the body **11**. The pivot piece **12** carries a projection **43** which is engageable with a flexible leg **44** integral with the body **11**. Moreover, the pivot piece **12** carries a spring pressed plunger **45** which is engageable with the inner surface of the body **11**. In FIG. 3, the pivot piece **12** is shown in its second stable position, and in the second stable position the leaf spring contact **39** is held by the cam **42**, in engagement with the contact **37** while the leaf spring contact **38** is held by the cam **41** out of engagement with the contact **37**. Thus the second stable position of the pivot piece **12** relative to the body **11** is the dipped beam position, wherein if the main on/off switch is in its on position the dipped beams of the vehicle are energised through the contact **37** and leaf spring contact **39**. In order to move the pivot piece to its first stable position from its second stable position the operating lever **27** is moved in a vertical plane towards the body **11**. During the movement from the second stable position to the first stable position the projection **43** on the pivot piece **12** is caused to ride over a rib on the leg **44** of the body **11**, as permitted by flexure of the leg. When the projection **43** has cleared the rib on the leg **44**, the leg **44** is returned to its original position to hold the pivot piece in its first stable position. In the first stable position of the pivot piece **12** relative to the body **11**, the cams **41**, **42** are moved out of engagement with their respective leaf spring contacts, so that the leaf spring contact **38** engages the contact **37** while the leaf spring contact **39** is disengaged from the contact **37**. Thus with the main on/off switch in its on positon the main beam headlight circuit of the vehicle will be completed through the contact **37** and the leaf spring contact **38**. The main beam headlight circuit of the vehicle can be completed by moving the operating lever **27** in a vertical plane away from the body **11**, so that the pivot piece **12** is moved beyond its second stable position. During such movement the leaf spring contact **38** is flexed by the cam **41** into engagement with said further fixed contact thereby completing the main beam headlight circuit regardless of the position of the main on/off switch. This movement of the pivot piece engages the plunger **45** with the body **11** and depresses the plunger into the pivot piece **12** against the action of its respective spring. Thus, upon release of the operating lever **27** the spring pressed plunger **45** urges the pivot piece **12** back to its second position. This function of the switch is particularly useful for flashing the headlights of the vehicle and it will be appreciated that if the main on/off control switch is in its on position, then the main beam circuit of the vehicle can be completed while the dipped beam circuit of the headlamps is completed since the cam **42** will be urging the leaf spring contact **39** into engagement with the contact **37**.

At its end remote from the operating member **15**, the operating lever **27** carries a pushbutton switch which, in use, controls the horn of the road vehicle. The operating lever **27** is formed from conductive material and constitutes one of the connections to the pushbutton switch, the other connection being made through an insulated lead **46** which extends within the operating lever **27**. The operating lever **27** is electrically connected to earth in use, through a conductive braid **47**.

It will be appreciated that the terms "vertical" and "horizontal" used throughout the specification are used

in relation to the drawings and not in relation to the physical position of a switch in use.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A direction indicator switch for a road vehicle including a body, a first set of switch contacts mounted on the body, a first pivot piece, means mounting the first pivot piece on the body for pivotal movement relative thereto whereby pivotal movement of the first pivot piece operates the first set of switch contacts, an operating member, complemental means on the first pivot piece and operating member mounting the operating member on the first pivot piece for pivotal movement about an axis at right angles to the axis about which the first pivot piece is movable whereby movement of the operating member in a plane at right angles to the axis of pivotal movement of the first pivot piece effects pivotal movement of the first pivot piece, a second set of switch contacts mounted on the body, a second pivot piece, means mounting said second pivot piece on the body independently of the first pivot piece for movement about an axis at right angles to the axis about which the first pivot piece is movable, with movement of the second pivot piece operating the second set of contacts, said second pivot piece having an aperture therein through which the operating member extends, and means on the second pivot piece cooperable with the operating member so that pivotal movement of the operating member relative to the first pivot piece only is transmitted to the second pivot piece for operating said second set of switch contacts.

2. The switch as claimed in claim 1 wherein said second set of switch contacts controls, in use, direction indicator lamps of the road vehicle, said second pivot piece having three angularly spaced stable positions relative to

the body, a central off position and a pair of operative positions, and said second pivot piece carrying a pair of resilient arms which are engageable in the operative positions of the second pivot piece respectively, by a striker carried by a movable part of the steering column of the road vehicle to return the second pivot piece from its operative positions to its central off position.

3. The switch as claimed in claim 2 wherein said arms are detachably engaged with the second pivot piece.

4. The switch as claimed in claim 1 wherein said first pivot piece has a pair of stable positions relative to the body and said first set of contacts controls, in use, headlamps of the road vehicle.

5. The switch as claimed in claim 1 wherein said first set of contacts is operable by at least one cam on said first pivot piece during movement of the first pivot piece relative to the body.

6. The switch as claimed in claim 1 wherein said first set of contacts includes a pair of independently movable contacts which are movable by respective cams on said first pivot piece during movement of the first pivot piece relative to the body.

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ROBERT K. SCHAEFER, Primary Examiner

M. GINSBURG, Assistant Examiner