

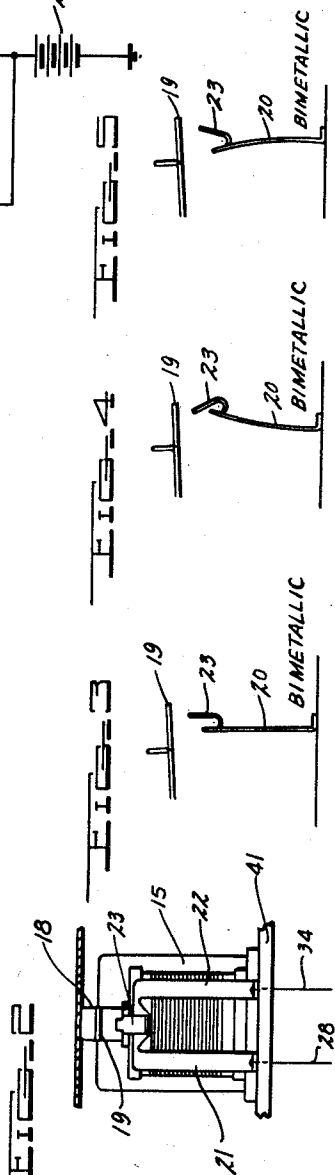
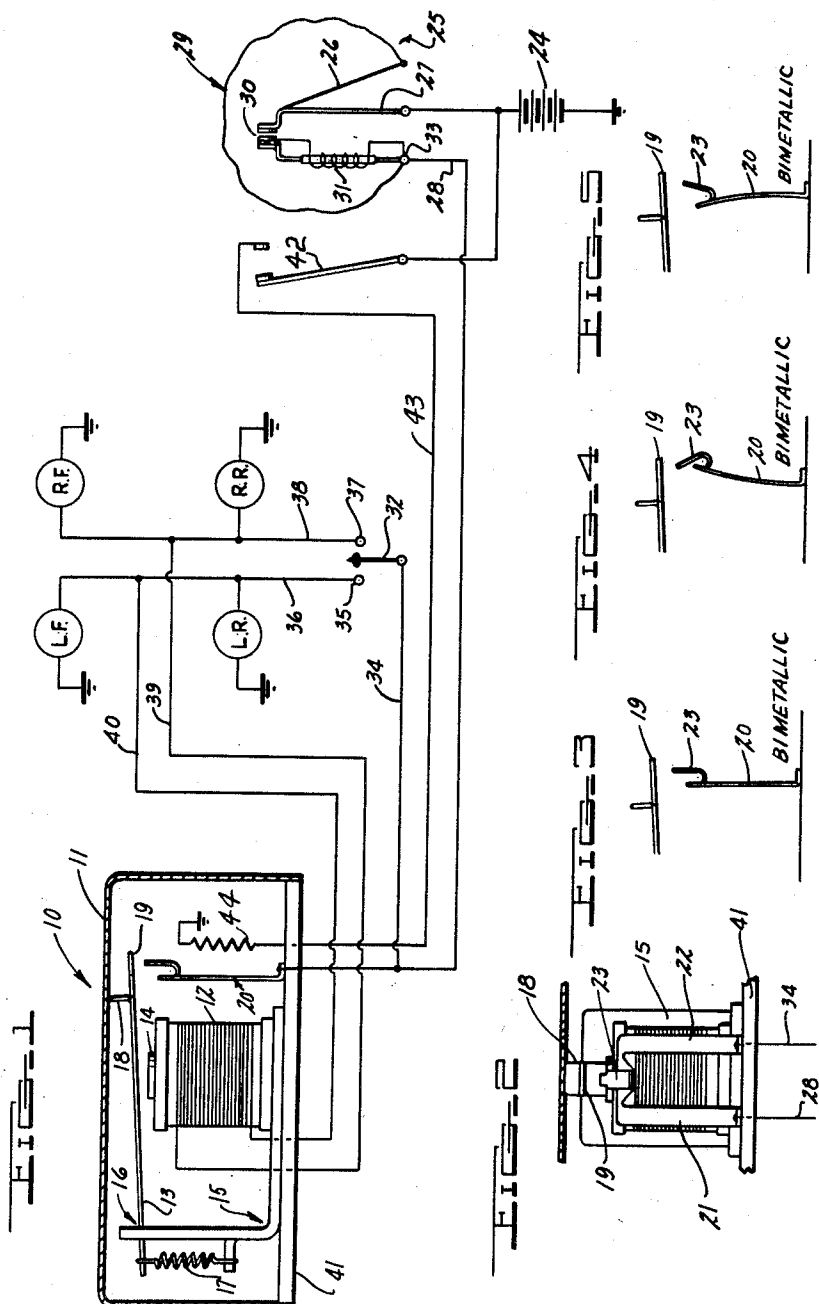
May 20, 1958

G. A. DU ROCHER ET AL

2,835,879

DIRECTIONAL TURN SIGNAL

Filed May 4, 1955



INVENTORS.
GIDEON A. DU ROCHER
BY GEORGE L. WEBB

Karl W. O'Halley
ATTORNEY

1

2,835,879

DIRECTIONAL TURN SIGNAL

Gideon A. Du Rocher, Grosse Pointe, Mich., and George L. Webb, Logansport, Ind., assignors to Essex Wire Corporation

Application May 4, 1955, Serial No. 505,882

8 Claims. (Cl. 340—74)

This invention relates to a sounder for signalling the lapse of a predetermined time period of turn signal energization. The purpose of the sounder is to indicate only that a turn signal has been energized for a certain time. Thus, if the turn signal has been actuated, subsequently non-cancelled and forgotten, the sounder will alert the driver who in turn can manually cancel the turn signal. If the turn signal remains energized, but not cancelled because the signalled movement is not executed, as might well be the case if the operator is unable to make a left hand turn due to oncoming traffic, the sounder will operate, but the turn signal will also continue to operate. The sounder therefore alerts the driver who may cancel or not cancel the signal as the situation may demand.

In the drawings:

Fig. 1 is a side elevation of the sounder and turn signal circuit diagram.

Fig. 2 is a front elevation of the sounder.

Figs. 3, 4, and 5 are illustrative examples of the operation of the sounder ambient compensator.

Referring to Fig. 1, the sounder is indicated generally at 10. The sounder includes the metallic sounder cover 11, coil 12, and armature 13. When the coil 12 is energized the armature 13 is attracted to the coil core piece 14 by completion of a magnetic circuit through the coil core piece 14, L-frame 15 and armature 13. The armature 13 is pivoted on the L-frame 15 at point 16 and held normally open by means of the spring 17. The armature 13 is additionally provided with a hammer 18 and an extension 19. Release of the armature 13 by de-energization of the coil 12 causes the hammer to strike the sounder cover 11 resulting in audible sound. Cycling operation of the sounder coil will therefore produce an intermittent audible sound.

The bi-metal support 20 normally acts as a stop for the armature 13 due to engagement with the armature extension 19. Thus, the armature normally moves the distance permitted by the stopping action of the cover 11 on the hammer 18 and the bi-metal support 20 on the extension 19. The bi-metal support is designed, in a manner hereinafter to be described, to move out of butting engagement with the armature extension at induced elevated temperatures making it possible for the armature to travel over a greater distance. The uppermost stop is, as before, provided by butting engagement of armature hammer 18 with the sounder cover 11. Downward travel is limited by the butting engagement of the armature with the coil core 14. Therefore, it can be seen that when the bi-metal support 20 engages the armature extension, the armature travel provides a given noise level. When the bi-metal is moved out of engagement with the armature extension, an increased amount of armature travel is possible and the increased striking force of the armature hammer against the sounder cover produces a higher rated noise level.

In Fig. 1, the location of the high expansion side causes the bi-metal support to move to the right, as shown,

2

when the bi-metal is heated thereby clearing the armature extension 19.

A front view of the bi-metal support is shown in Fig. 2. The bi-metal includes legs 21 and 22 which are insulated from and attached to an insulator base member 41. The lead 34 is in electrical engagement with the bi-metal leg 22 and lead 28 is in electrical engagement with bi-metal leg 21. A circuit is thus completed from the lead 34 through the bi-metal legs to lead 28. Passage of current therethrough tends to heat the bi-metal causing it to move to the right as described above.

A third bi-metal leg 23 is stamped from the bi-metal and folded back in position to engage the armature extension 19. It will be noted that by lancing out the leg 23 and reversing it in the described manner, the low expansion side of leg 23 faces toward the low expansion side of the body of the bi-metal support. This construction provides ambient compensation so that the effect of ambient variations on the release temperature is minimized.

The method of ambient compensation can be best understood by reference to the schematic drawings of Figs. 3, 4, and 5. Fig. 3 indicates the bi-metal support in a given neutral position. Fig. 4 shows the action of the bi-metal at a relatively higher ambient. The body of the bi-metal, being fixed at the base, moves to the right with increasing temperature. The leg 23 moves to the left to maintain the same relative supporting position with respect to the armature extension 19. In Fig. 5, the operation of the bi-metal is shown in a relatively lower ambient. Here the body of the bi-metal moves toward the left with decreasing temperature and the leg 23 moves to the right again maintaining the same relativity with respect to support of the armature extension 19.

Fig. 1 is further illustrative of the manner in which the sounder is connected into a standard automotive turn signal system. In operation, the power source for the system is the grounded battery 24. A flasher unit indicated generally at 25 is used to provide intermittent current for the signal. In the flasher indicated, a cycling current is obtained by virtue of the action of the hot wire 26 on the contact carrying arm 27. The hot wire 26 has a nominal length constraining the contact carrying arm 27 in an open position. A circuit is initially completed to the power lead 28 through the contact carrying arm 27, hot wire 26, and jumper 29. When the hot wire 26 expands due to temperature rise on the passage of current, the contacts 30 close, shunting the hot wire and the jumper wire. This permits a cooling of the hot wire which thereafter contracts, opening the contacts and the cycle is repeated. When the contacts 30 close, sufficient power is available to energize the signal lamps. When the contacts 30 are opened the high resistance of the hot wire 26 causes a dimming of the lights with the result that the lights alternate between a luminous and non-luminous condition. The coil 31 is alternately energized by the closing of the contacts 30 and utilized in a manner to be hereinafter described. The operation of such a flashing device is generally well-known and further described in U. S. Patent No. 1,979,349.

The switch 32 provides for manual selection of right or left turn indicating lights. Manual selection of a signal completes a circuit to the signal lights from the terminal 33, which can be considered as a source of intermittent current including lead 28, bi-metal leg 21, bi-metal leg 22, and lead 34. If the switch is manually moved in the contacting engagement with contact 35, the circuit is continued through lead 36 to the left front and left rear indicating lamps. Conversely if the switch is moved to a right turn indicating position, the circuit is continued through terminal 37 and lead 38 to the right turn indicating lamps. Due to the passage of signal current through the bi-metal support 20 suitable calibra-

tion of the support can be effected whereby a given heat rise due to the passage of intermittent signal current over a given time will cause the bi-metal support to move out of supporting relation with armature extension 19. Thus, after the signals have been on for a given time, the bi-metal serves as a means to increase the audible signal.

In addition to the heating effect of the current flow through the bimetal 20, the legs 21 and 22 are also subject to a heating source comprising a resistor 44 which is connected to the battery 24 when the switch 42 is closed. Because switch 42 is closed upon energization of coil 31 when contacts 30 close, the heating circuits through the resistor 44 and the bimetal legs 21 and 22 are simultaneously completed whenever the indicating lamps and the sounder coil 12 are intermittently energized. After a predetermined time, sufficient heat is obtained to cause the bimetal 12 to move to a position where it cannot be engaged by the armature extension 19. This permits the armature 13 to be attracted to the core 14, and armature 13 when released will travel a greater distance before the hammer 18 strikes the case 11. With a greater distance of travel, the hammer 18 will strike the case 11 with a greater force to provide a noise of greater intensity than obtained when the armature travel is limited by bimetal leg 23.

The sounder, consisting of the coil 12 and armature 13 is cycled by the same intermittent current that is used for signalling. Leads 39 and 40 energize the sounder coil in a cycling manner. In the case where switch 32 contacts terminal 35, a coil exciting current includes lead 40, coil 12, lead 39 and either right lamp to ground. Due to the power dissipation in the sounder coil there is insufficient energization available to render the right lamps luminous as a contrary signal to that indicated by the left front lamp. Conversely a coil circuit is completed through the left front lamp to ground upon the contacting of the terminal 37 by the manual switch 32. It can, therefore, be seen that upon energization of either right or left turn indicating lamps the sounder 10 provides an audible signal. After the signals have been energized for a given period of time the audible signal increases in intensity thereby alerting the motor vehicle driver to the fact that the lamps are signalling.

Having thus described the invention, we claim:

1. A sounder comprising: in combination, a metal cover having a coil supported therein; an armature movable between magnetically attracted and unattracted positions; spring means biasing said armature to cause a portion thereof to engage said cover in said unattracted position; a bimetal stop member limiting movement of said armature to a first attracted position upon energization of said coil and which upon being sufficiently heated moves to permit said armature to move beyond said first attracted position; and a fixed stop member limiting movement of said armature to a second attracted position located at a greater distance from said cover than said first attracted position when movement of said armature is not limited by said bimetal stop member.

2. A sounder as set forth in claim 1 wherein current flow through said bimetal stop member heats said bimetal stop member for movement thereof.

3. A sounder as set forth in claim 1 wherein current flow through a resistor adjacent to said bimetal stop member heats said bimetal stop member for movement thereof.

4. A sounder as set forth in claim 1 wherein said bimetal stop member consists of a main bimetallic strip and an auxiliary strip secured to said main bimetallic strip; said main and auxiliary bimetallic strips being arranged to deflect in opposite directions such that under normal ambient temperature variations said first attracted position is located at a relatively constant distance from said cover; and said main bimetallic strip when heated

above a predetermined temperature moving sufficiently to permit said armature to move between said unattracted position and said second attracted position.

5. In a directional signalling system having turn signal indicating lamps selectively energizable by a signal selecting switch, a sounder device for signalling the lapse of a predetermined time period of turn signal indicating lamp energization comprising, in combination: a magnetic core structure; a coil carried on said structure and energized upon energization of one of said signal lamps; an armature movable between magnetically attracted and unattracted positions; means biasing said armature to said unattracted position; a bimetal stop member limiting movement of said armature to a first attracted position upon energization of said coil and which upon being sufficiently heated moves to permit said armature to move beyond said first attracted position; means energizable upon energization of one of said signal lamps for heating said bimetal stop member; and a fixed stop member limiting movement of said armature to a second attracted position when movement of said armature is not limited by said bimetal stop member.

6. In a directional signalling system having turn signal indicating lamps selectively energizable by a signal selecting switch, a sounder device for signalling the lapse of a predetermined time period of turn signal indicating lamp energization comprising, in combination: a metal cover; a magnetic core structure carried within said cover; a coil carried upon said core structure; a circuit connecting said coil to said lamps for energization of said coil upon energization of one of said lamps; an armature movable between magnetically attracted and unattracted positions; spring means biasing said armature to cause a portion thereof to engage said cover in said unattracted position; a main bimetal strip mounted within said cover; an auxiliary bimetal strip secured to said main bimetal strip and arranged to deflect in a direction opposite from the deflection of said main bimetal strip; said bimetal strips limiting movement of said armature to a first attracted position upon energization of said coil; said main bimetal strip upon being sufficiently heated moving to permit additional movement of said armature to a second attracted position; a circuit connecting said main bimetal strip to said lamps for the passage of current through said main bimetal strip upon energization of one of said lamps; and a fixed stop member limiting movement of said armature to a second attracted position located at a greater distance from said cover than said first attracted position when movement of said armature is not limited by said bimetal strips.

7. In the directional signalling system as set forth in claim 6: a resistor located adjacent said main bimetal strip; and a circuit connecting said resistor to said lamps for energization of said resistor upon energization of one of said lamps.

8. In a directional signalling system as set forth in claim 7: a flasher switch; a circuit connecting said flasher energization switch to said lamps for intermittent energization thereof, and circuits connecting said flasher to said coil, bimetal strip, and resistor for the simultaneous intermittent energization of said coil, main bimetal strip, and resistor upon energization of one of said lamps.

References Cited in the file of this patent

UNITED STATES PATENTS

1,474,936	Lawrence	Nov. 20, 1923
1,550,098	Sanders	Aug. 18, 1925
1,848,685	Wyatt	Mar. 8, 1932
2,151,726	Allen	Mar. 28, 1939
2,248,760	Kirby	July 8, 1941
2,293,671	Alexander	Aug. 18, 1942
2,506,379	Muchow	May 2, 1950
2,648,059	Hostetler	Aug. 4, 1953