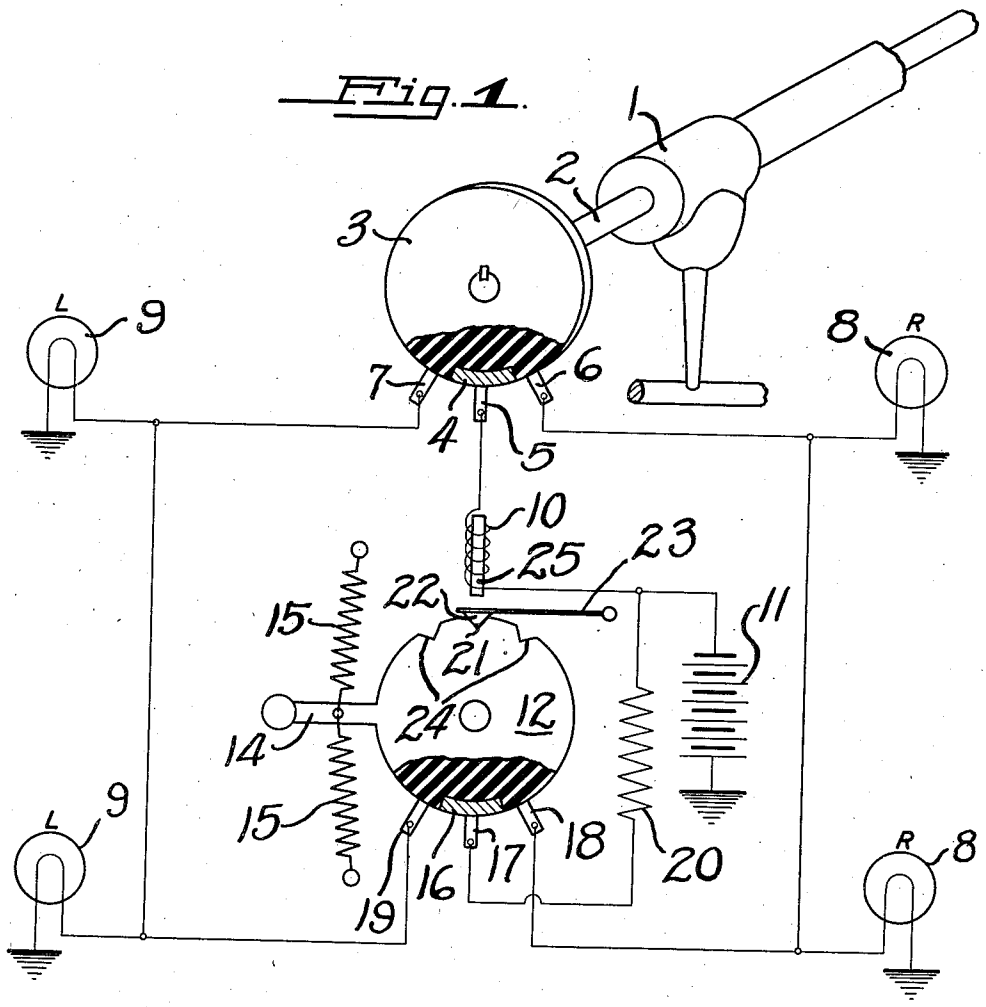
Jan. 9, 1940. H. E. METCALF 2,186,766

VEHICLE SIGNAL CIRCUIT

Filed March 19, 1938 2 Sheets-Sheet 1

Fig. 1.



INVENTOR,
HERBERT E. METCALF.
BY
Lippincott & Metcalf
ATTORNEYS.

VEHICLE SIGNAL CIRCUIT

Filed March 19, 1938 2 Sheets-Sheet 2

Fig. 2.

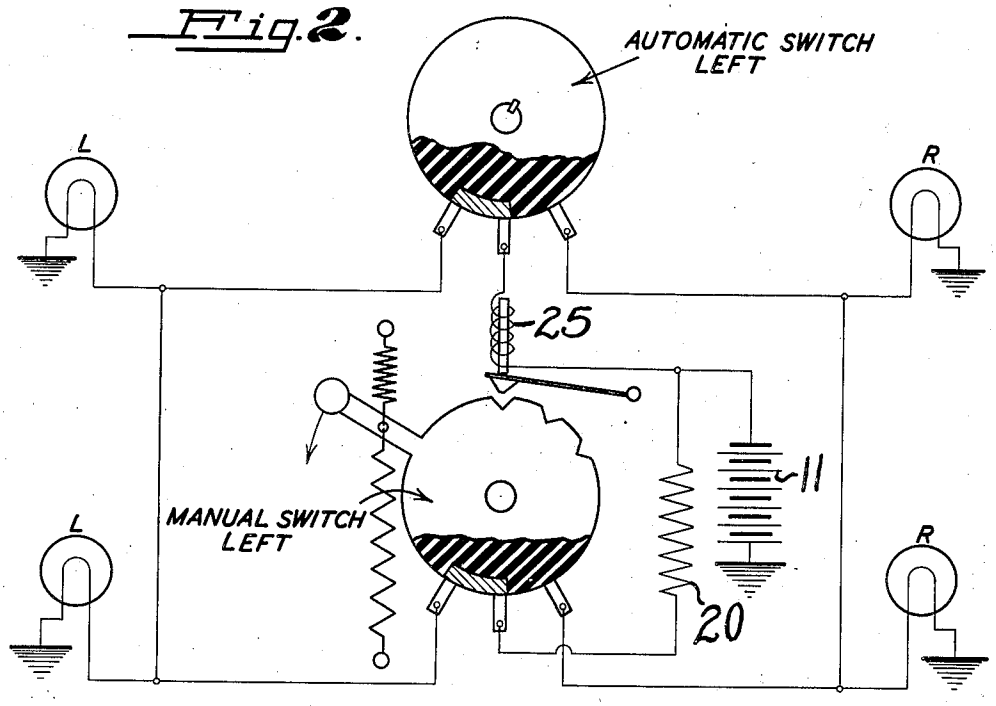
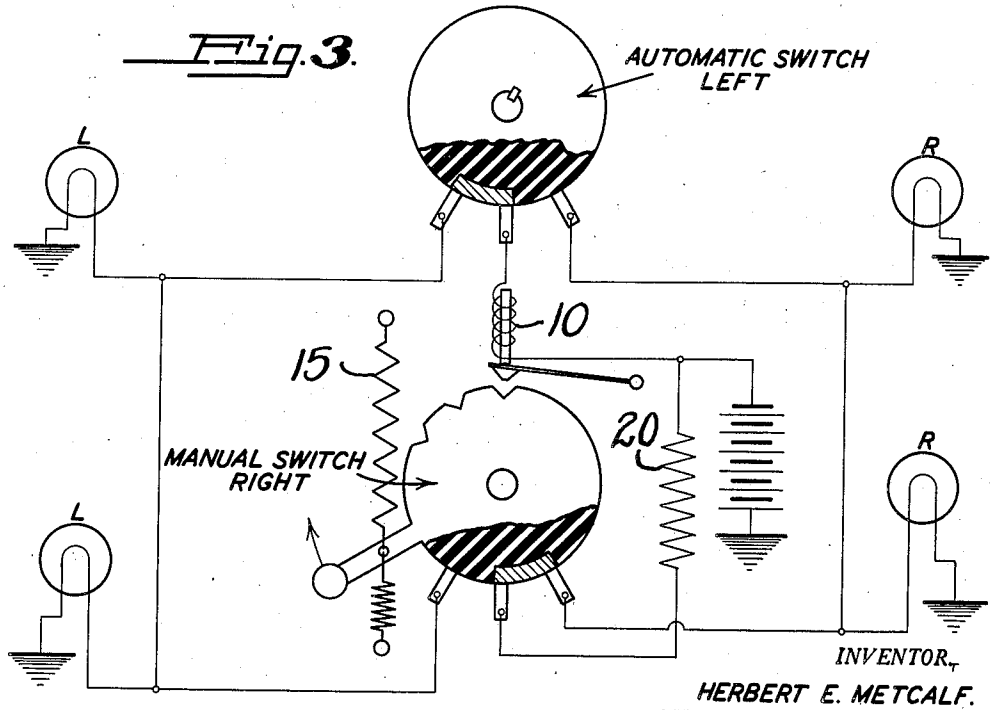


Fig. 3.



INVENTOR,
HERBERT E. METCALF.
BY
Lippincott & Metcalf
ATTORNEYS.

Patented Jan. 9, 1940 2,186,766

UNITED STATES PATENT OFFICE

2,186,766

VEHICLE SIGNAL CIRCUIT

Herbert E. Metcalf, Walnut Creek, Calif., assignor, by mesne assignments, to Signacator Systems, Inc., Oakland, Calif., a corporation of California

Application March 19, 1938, Serial No. 196,925

2 Claims. (Cl. 177—339)

My invention relates to vehicle signal circuits, and more particularly to such a circuit wherein an automatic switch and a hand switch are utilized to energize the same signalling indicators, the broad idea of such a combination being described and claimed in the Clarence B. Howard application for United States Letters Patent entitled "Vehicle direction indicator", Serial No. 136,709, filed April 14, 1937, since matured into United States Patent No. 2,111,931, dated March 22, 1938.

In the Howard application cited above, an automatic switch attached to the steering gear of a vehicle energized right and left signalling circuits having signalling indicators therein. A hand switch was also used to directly energize the same circuits and indicators in parallel with the automatic switch. The automatic switch was made to hold in contact making position by the use of an electromagnet, and the hold was released by passage of current through a bucking coil creating a flux in the opposite direction to that of the holding flux, thus releasing the hand switch upon passage of any current through the automatic switch.

The present application deals with a signalling circuit utilizing an automatic switch and a hand switch, wherein the hand switch is mechanically held in circuit making position, and an electromagnet is used in the automatic switch circuit to release the mechanical hold. In the prior application of Howard referred to, two coils were utilized, one in series with the hand switch for holding, and one in series with the automatic switch for releasing, whereas the circuit of my invention herein to be described and claimed utilizes only a single coil in series with the automatic switch for causing release.

The main object of the present invention is to provide, with such a system utilizing only a single release coil, means for properly apportioning current through the hand switch and through the release coil and automatic switch when the indicators on the same side of the vehicle are being simultaneously energized by both switches.

Other objects of my invention will be apparent or will be specifically pointed out in the description forming a part of this specification, but I do not limit myself to the embodiment of the invention herein described, as various forms may be adopted within the scope of the claims.

My invention may be more fully understood by direct reference to the drawings, wherein

Fig. 1 is a circuit diagram, showing schematically the relationship of the automatic and hand switches when no current is being passed through either switch.

Fig. 2 is a similar diagram, showing simultaneous energization of the left indicating lamps by both switches.

Fig. 3 is a similar diagram, showing the automatic switch energizing the left indicating lamps, and the hand swtch energizing the right indicating lamps.

Referring directly to Fig. 1, which shows the condition of one preferred circuit embodying my invention when a vehicle is proceeding straight ahead with no signal needed, numeral 1 represents the steering gear of an automobile. An extension shaft 2 is attached thereto in any convenient manner, this shaft rotating an automatic switch disc 3 carrying a movable segment 4. Movable segment 4 is in constant contact with a common automatic brush 5, and spaced to right and left of movable segment 4 are right and left signal circuit brushes 6 and 7 respectively. Contact segment 4 is of insufficient length to bridge brushes 6 and 7 when in the central or straight-ahead position of steering gear 1, but when steering gear 1 is turned, will bridge common brush 5 with either circuit brush 6 or 7 to signal a vehicle turn. Right and left signal brushes 6 and 7 are connected to right and left signal lamps 8 and 9 respectively, preferably two lamps showing to the front and rear of a vehicle. Common automatic brush 5 is connected through release coil 10 to vehicle battery 11, or similar source. Thus, it will be seen, with the circuit so far described, upon every turn away from the straight-away, vehicle lamps 8 and 9 will be energized from source 11, in accordance with the direction of turn of the vehicle.

In addition to the automatic switch, a hand switch is provided, comprising hand switch disc 12 rotated by handle 14 and centralized in central position by centering springs 15. In this position a manual sector 16, of conductive material, is in contact with a manual common brush 17. At each side of manual sector 16 are positioned manual circuit brushes 18 and 19 respectively, connected to lamps 8 and 9. Manual common brush 17 is connected to source 11 through a balancing resistor 20. When handle 14 is moved either to right or left, sector 16 moves and makes electrical connection between manual common brush 17 and manual circuit brushes 18 or 19, in accordance with the movement of handle 14.

Manual disc 12 is provided with a central notch 21 into which is fitted a pawl 22 mounted on a

pawl spring 23, and on both sides of central notch 21 are positioned lateral notches 24. Core 25, inside solenoid 10, is positioned to lift pawl 22, which is made of magnetic material, out of notches 21 or 24, as the case may be.

In operation, assuming that the vehicle is proceeding straight-ahead, no circuits will be energized by the automatic switch. If it is then desired to set up a right or left signal, handle 14 is moved to right or left, respectively, and pawl 22 will ride out of central notch 21 and come to rest in one of the lateral notches 24, and the manual switch will remain in contact making position, illuminating the lamps selected. Thereafter, when a vehicle turn is made, following the presetting of the signal, the automatic switch will make contact to either the right or left lamps, current will pass through solenoid 10, magnetizing core 25, pulling pawl 22 out of notch 24, and the return spring 15 will return the handle 14 to neutral position. This will happen irrespective of whether the automatic switch energizes the same lamps energized by the hand switch, or the opposite lamps.

However, the same condition does not exist under these two possibilities. Referring directly to Fig. 3, I have shown a condition where the automatic switch energizes the left hand lamps and the hand switch energizes the right hand lamps. Under these circumstances, presupposing balancing resistor 20 were not used, current equal to the consumption of the left lamps would invariably flow through solenoid 10, irrespective of current flowing through the right lamps via the hand switch. Under these circumstances, the pawl would pull out, and Fig. 3 shows the condition of the circuit immediately after the pawl has been pulled out of the notch and extended spring 15 is ready to pull the handle 14 to central position.

Under these circumstances, however, balancing resistor 20 simply acts to reduce the current through the right hand lamps by a relatively small amount, and this resistor may be made equal or substantially equal to the resistance of solenoid 10, and thus there will be no difference in the brilliancy of the right or left lamps. It will be noticed that both lamps will be lit for a fraction of a second, just as long as necessary for the manual switch to return to central position. However, I have found that the lag in the filaments of the lamps is sufficient so that the observer cannot actually see that current is flowing through both lamps. In other words, the return time of the manual switch may be made so fast that the left hand lamps do not get up to brilliancy before the right hand lamps are extinguished.

A different condition exists, however, when both switches are simultaneously energizing the same lamps. This condition is shown in Fig. 2. Here, the automatic switch is shown energizing the left hand lamps, and the manual switch is also shown energizing the left hand lamps. Under normal circumstances, and viewing the diagram as if resistor 20 were left out and no other resistance substituted therefor, it will be seen that the path from source 11 through the manual switch to the left hand lamps is a short around release coil 10, and if this were a complete short, release coil 10 would not operate.

In actual practice, however, I have found that when these devices are used on the actual automotive vehicles, the length of cable plus the contact resistance of manual brushes 17, 18 and 19, may be sufficient to cause enough current to pass through solenoid 10 to operate the release of pawl 22. However, I have found that when the leads are quite short, as in many special installations, the resistance drop through the manual switch may not be sufficient to cause an emphatic release. I therefore supply a balancing resistor 20, positioned in series with the manual common brush 17, thus dividing the current when the same lamps are being energized by both switches, so that under any and all circumstances there will always be sufficient current passing through solenoid 10 to cause efficient magnetization of core 25.

In actual practice, I have found it satisfactory to utilize a resistor 20 with a resistance of a value substantially equal to the D. C. resistance of solenoid 10, thus ignoring the inherent circuit resistance. Under such circumstances, I am always able to utilize a minimum of wire in solenoid 10, and I am able to ensure unfailing operation of the release latch.

While I have shown resistor 20 as being inserted in series with the manual common brush 17, it is obvious that such a resistor may be placed at any point between the source 11 and the connection of the manual switch lateral brushes to lamps 8 and 9. In other words, I do not wish to be limited to the position of the resistor, and furthermore, I do not wish to be limited to any exact value of this resistor, this value depending not only on the resistance of release solenoid 10, but also upon the resistance which is inherently present in the circuits passing through the manual switch.

I claim:

1. In a vehicle signalling system, right and left indicator circuits, indicating devices in each of said circuits, a power source, a manual switch having a power brush and lateral brushes, each of said lateral brushes being connected to an indicator circuit, a manual member movable to two positions to selectively connect one of said lateral brushes to said power brush in each of said positions, resilient means for centralizing said manual member, means for holding said manual member in the selected position, electromagnetic means for releasing the hold of said holding means, an automatic switch having a central brush and a pair of lateral indicator brushes, each of said lateral indicator brushes being connected to an indicator circuit, an automatic member movable by turning of the steering gear of said vehicle for connecting one of said lateral indicator brushes to said central brush, in accordance with a vehicle turn made, said central brush in said automatic switch being connected to said power source through said electromagnetic means, and a resistor in series connection between said power brush in said hand switch and said power source.

2. In a vehicle signalling system, right and left indicator circuits, indicating devices in each of said circuits, a power source, a manual switch having a power brush and lateral brushes, each of said lateral brushes being connected to an indicator circuit, a manual member movable to two positions to selectively connect one of said lateral brushes to said power brush in each of said positions, resilient means for centralizing said manual member, means for holding said manual member in the selected position, electromagnetic means for releasing the hold of said holding means, an automatic switch having a central brush and a pair of lateral indicator

brushes, each of said lateral indicator brushes being connected to an indicator circuit, an automatic member movable by turning of the steering gear of said vehicle for connecting one of said lateral indicator brushes to said central brush, in accordance with a vehicle turn made, said central brush in said automatic switch being connected to said power source through said electromagnetic means, and a resistor in series connection between said power brush in said hand switch and said power source, said resistor having a resistance value substantially approaching the resistance value of said electromagnetic means.

HERBERT E. METCALF.