

Dec. 20, 1949

L. J. P. GILBERT

2,491,968

RADIO SELECTOR SYSTEM FOR AUTOMOBILES

Filed April 2, 1946

4 Sheets-Sheet 1

Fig 1

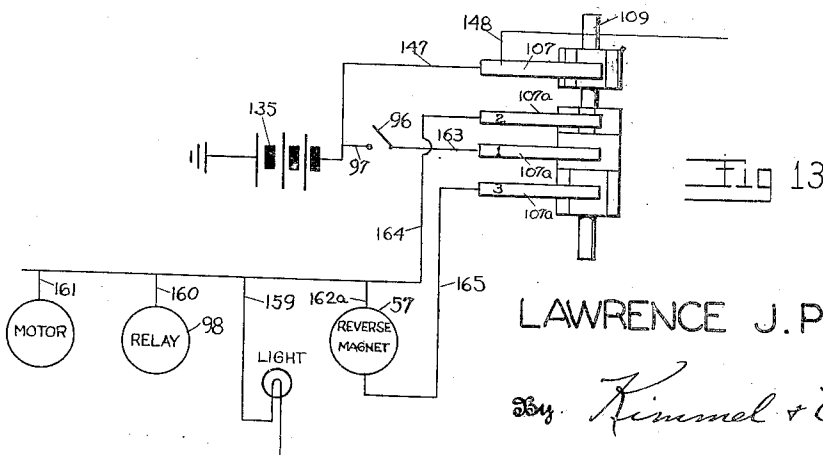
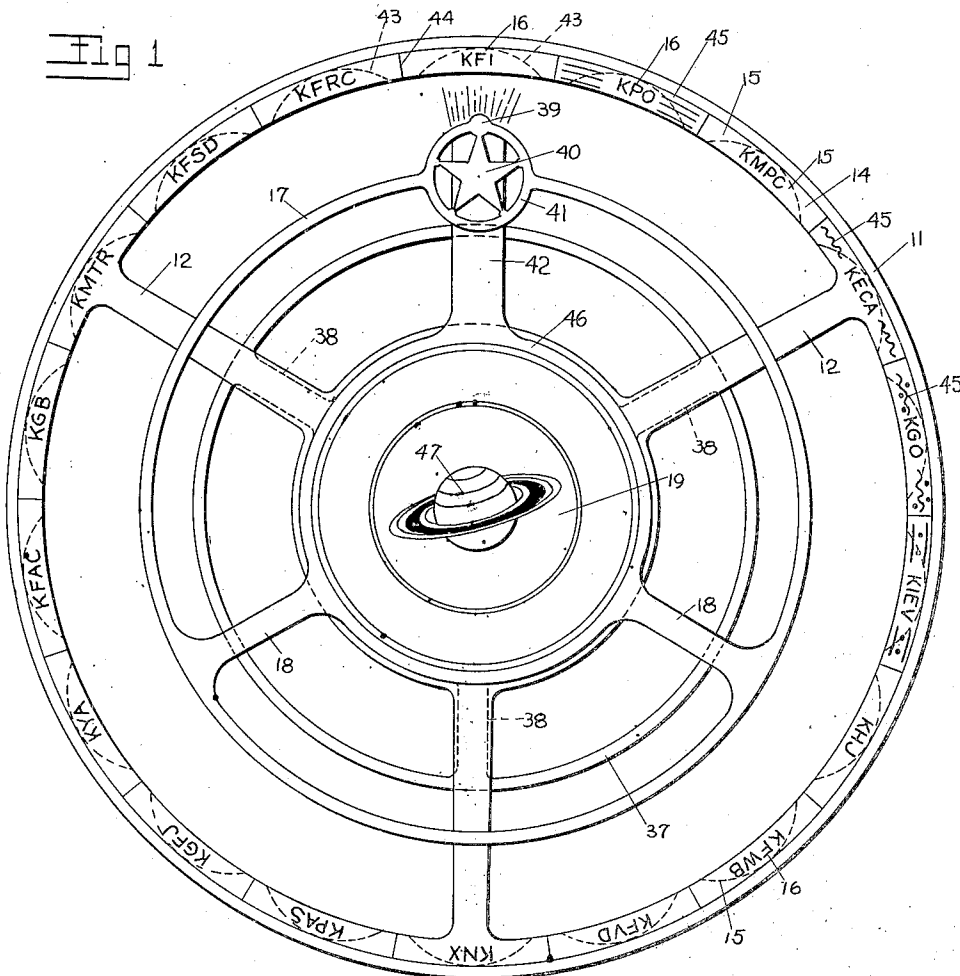


Fig 13

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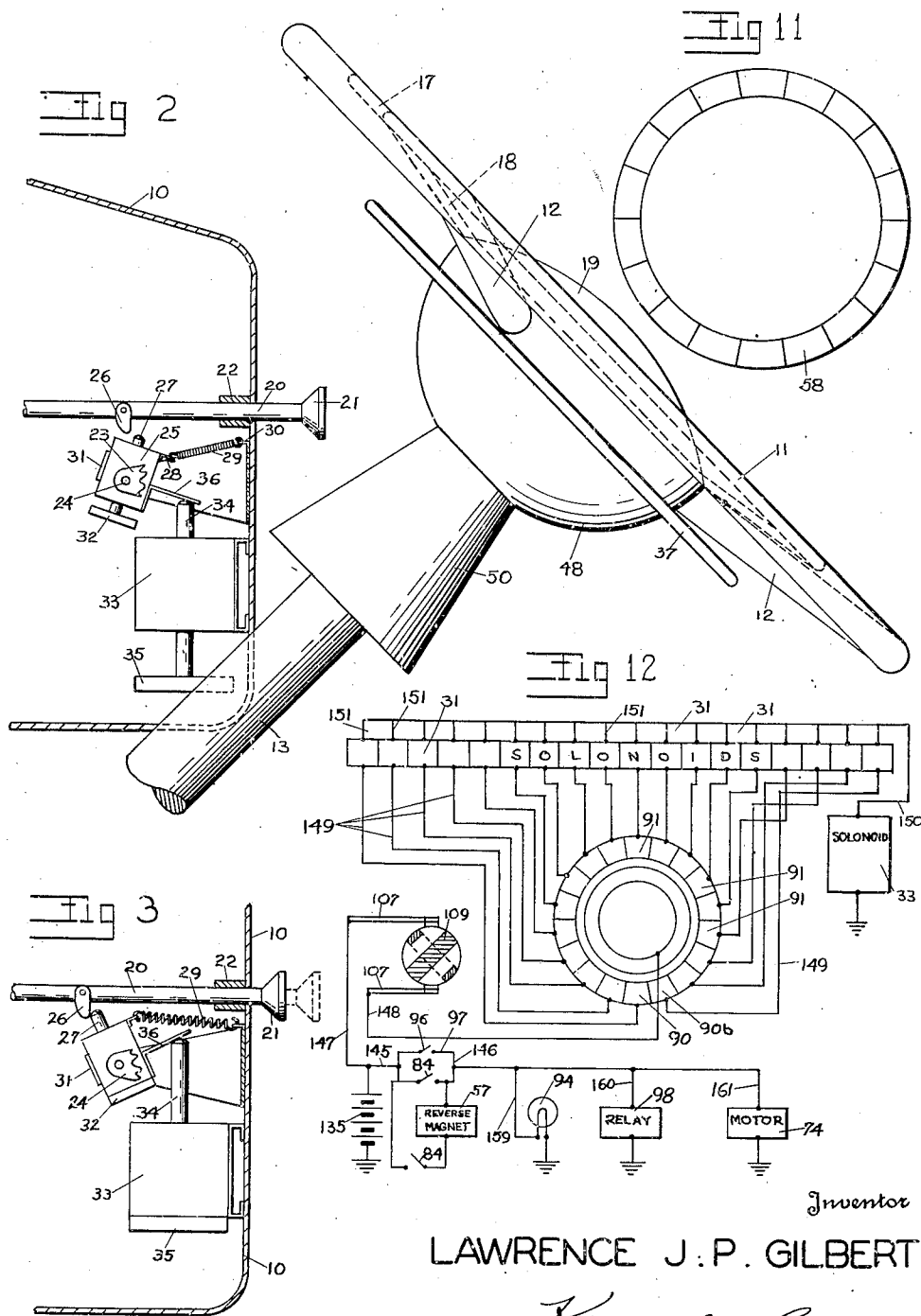
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4 Sheets-Sheet 2



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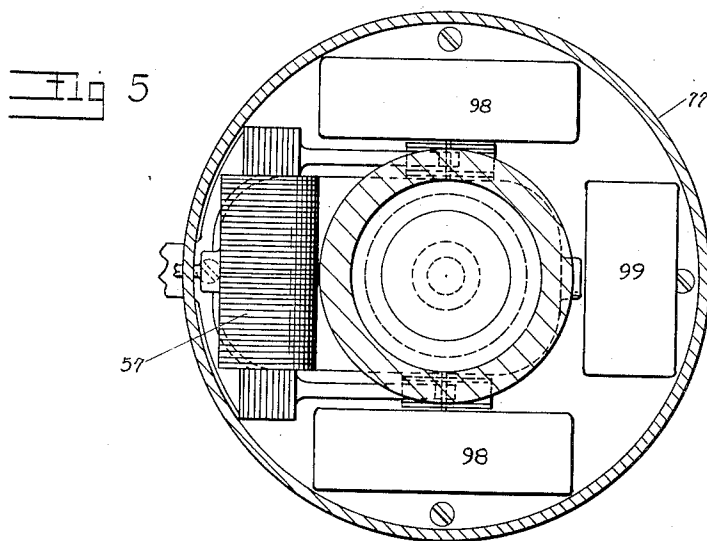
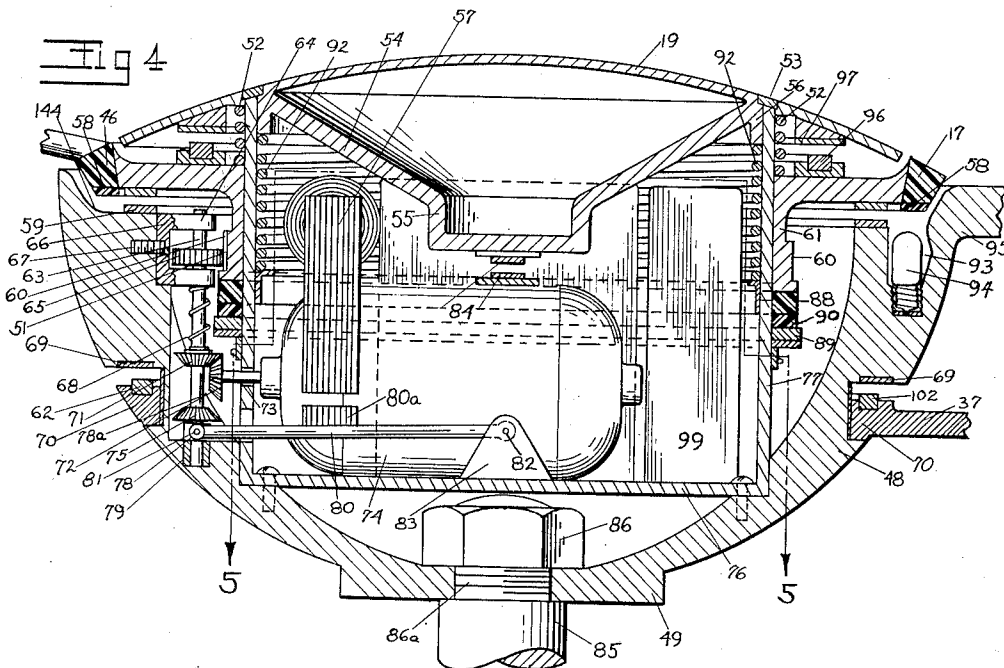
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RADIO SELECTOR SYSTEM FOR AUTOMOBILES

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4 Sheets-Sheet 3



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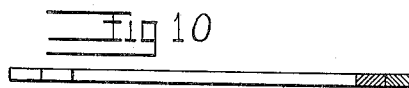
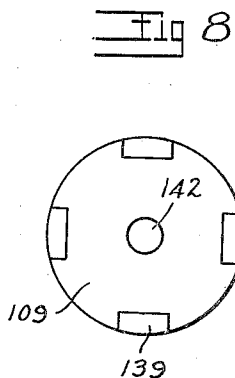
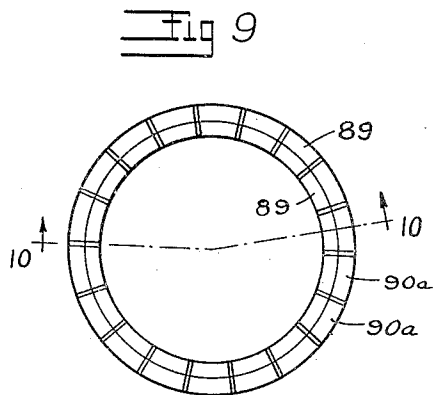
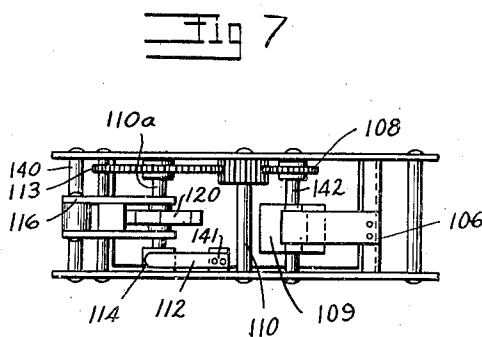
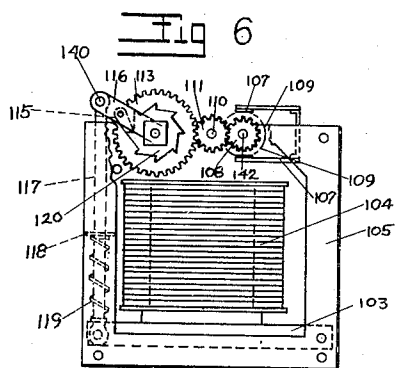
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RADIO SELECTOR SYSTEM FOR AUTOMOBILES

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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RADIO SELECTOR SYSTEM FOR
AUTOMOBILES

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Application April 2, 1946, Serial No. 659,108

4 Claims. (Cl. 250—20)

1

The present invention relates to improvements in radio apparatus and more particularly to a radio station selector system for automobiles and self-propelled vehicles in general.

One of the main objects thereof is to provide a simple, efficient and inexpensive device for installation upon the steering wheel of a self-propelled vehicle designed to free the operator from the hazardous task of reaching out from his seated position behind the steering wheel to actuate a radio control means under circumstances which necessarily calls for taking his eyes and mind off from conditions in the road ahead of him, to the detriment of his safety and security.

Another object thereof is to provide upon the steering wheel apparatus of a self-propelled vehicle novel radio station control means so shaped, designed, assembled and functioning, that the operator of the vehicle need not take his hands off from the wheel at any time in order to secure whatever selective radio station or program he desires.

Another object of the present invention is to provide, in conjunction with the steering wheel of the vehicle, a novel arrangement of visual illuminated dial upon which is indicated, by a definite predetermined color schedule, variable selective radio stations so designated and functioning that the operator can instantly tell, even when his eyes are trained straight ahead to watch traffic conditions ahead of him, when any particular color is flashed upon the dial, which radio station is tuned-in selectively, because of the colored glow imparted upon his clothing or some other surface within focus of his eyesight.

Another object thereof is to provide, in conjunction with a steering wheel apparatus and a radio hook-up located preferably on the dash, novel means for imparting to a pointer a movement whereby it cycles the dial indicating selective stations by color or otherwise so that it may be brought into registration with any station indicating part of the dial visually in a manner permitting the operator to take cognizance thereof without having to transfer ocular attention to the dial.

A further object thereof is to provide, in conjunction with an automobile steering wheel and a radio hook-up preferably located upon the dash, novel means for illuminating the dial and the pointer cooperating therewith to indicate the preference of the operator for any particular radio station, the arrangement of parts being such that both the dial and the pointer and attendant parts are transparent enabling a bril-

2

liant visual effect to be produced whenever electrical illumination is trained upon these parts.

A still further object thereof is to provide, in a device of the kind described, a separate radio station selector electrical circuit, as well as an optional automatically operative electrical circuit for causing the other circuit to be separately closed whether the pointer moves in one direction upon the dial or in a counterdirection, according to whichever station identifying indications the operator wants to skip for quickly selecting the station he prefers.

Another object of this invention is to provide magnet-controlled means of an electrical circuit for timing and controlling the operation of the radio station selector apparatus, in accordance with the predetermined schedule of colored flash lights indicatable upon a station identification dial. The arrangement and disposition of the parts is such that control of all moving parts included in said circuit is made upon a predetermined rotary movement imparted to a selector pointer which traverses the dial.

In carrying out the foregoing objects I have combined visual and audible instrumentalities of a radio hook-up within a compact control center of movement upon the usual steering wheel of an automobile and the like self-propelled vehicle, such as the loud speaker and station identification dial, and, at the same time, have brought within ready reach of the operator, whilst his hands are upon the steering wheel and able to actuate the loud speaker and dial, manually controllable means for selecting the desired radio station.

With the above and other objects in view my invention consists in the combination, arrangement and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings, wherein similar reference characters designate similar parts throughout the several views,

Figure 1 is a top plan view of my invention,

Figure 2 is a fragmental sectional elevation of an instrument board on the dash of an automobile showing parts of my invention,

Figure 3 is a view similar to Figure 2 but showing parts in a qualified position,

Figure 4 is a cross sectional elevational view of the housing of my invention, containing various radio control instrumentalities,

Figure 5 is a cross section taken on line 5—5 of Figure 4,

Figure 6 is a side elevation of a circuit control device to be described.

Figure 7 is a top plan view of Figure 6,

Figure 8 is a side elevation of a rotor,

Figure 9 is a front elevation of a radio selector station ring to be described,

Fig. 10 is a side view of the station tuning-in ring,

Figure 11 is a side elevation of one of two station selector rings,

Figure 12 is a diagrammatic view showing the circuit connections from the radio station selector ring to particular magnet controlled radio tuning-in solenoids, and

Figure 13 is another diagrammatic view showing the alternative circuit connections for the station selector system.

Referring to the drawings, which are merely illustrative of my invention the various parts thereof are disclosed. On the dash board of the self-propelled vehicle will be mounted an instrument case 10, seen in Figure 2, housing some parts of my invention. The usual steering wheel 11 has the usual column 13 and radiating spokes 12. Fixedly mounted circumferentially of the steering wheel 11 as upon the rim thereof is an annular radio dial 14, seen in Figure 1, formed preferably of Lucite, as is also the steering wheel itself. This dial is composed of a circumferentially extending series of segments 15 which are transparent, designated 15 upon each of which, in any desirable manner, station identifying legends or indications 16 are placed for visual inspection. I prefer to employ a predetermined color scheme by virtue of which a different identifying color is assigned to each separate segment 15 of the dial, for the purpose of safeguarding the operator in selectively registering any of these station identifying legends or indications, especially when the dial is illuminated in the manner hereinafter disclosed.

Mounted concentrically within the wheel 11 and of a lesser diameter with respect to it is a klaxon-ring 17 having an inwardly extending series of radial spokes 18 connected to a klaxon inner ring 46 soon to be described. This ring 17 is made transparent by composing it of Lucite or similar light transparent material. A loud speaker cover 19 is made of transparent material such as Lucite and is preferably made concave-convex in configuration.

This cover is mounted to close the upper end of a preferably transparent Lucite housing or casing 48 having a boss 49 secured operatively upon the steering torque shaft 85, as shown in Figure 4. This housing is designed to contain many different radio instrumentalities, with which is functionally associated certain parts in the instrument case 10 now to be described.

In this case 10 is a radio station selecting push-pull rod 20 having the operating head 21. It slides in a guide collar 22 formed upon the case 10. Bracket arms 23 project forwardly from the front of the case 10, carrying a pivot 24 upon which is trunnioned swivelably a magnet case 25. The rod 20 carries a wiper clip 26 adapted for engagement with a magnet plunger 27. The magnet case has a lug 28 to which is attached one end of a spring 29, the other end of which is attached as at 30 to the adjacent wall of the instrument case. Inside of the magnet case is a small magnet 31, having a solenoid inside which carries a head 32. The master magnet case 33, carries a solenoid plunger shaft 34, whose head is designated 35, located at its opposite end. A lever arm bracket 36, projects laterally of the magnet case

25 for engagement with the plunger 34 of the master magnet in case 33.

Also mounted upon the steering wheel 11 is a volume control ring 37 having radially disposed spokes 38. Inside of this ring is the klaxon inner ring 46 of smaller diameter than ring 37, which is formed with a radially extending master klaxon ring spoke 42. The ring spoke 42 is shaped terminally into a pointer which consists of the ring 41 and bulb 39 of Lucite. The star in the ring is designated 40, 43 designates mirrors or reflectors placed opposite to the color materials or the like media 45 mounted upon the individual segments 15 of the dial 14. Spacers for the segments are shown at 44. The media 45 are in reality coding symbols which by color imprint serve readily to convey to the operator a particular radio station, he is interested in. They present differently colored shadings for station differentiating purposes. Inscribed operatively upon the transparent cover 19 is a legend representing the planet Saturn, since it is obvious that the annular dial encircling the cover simulates Saturn.

The steering wheel hub housing or casing 48 adjoins the gear shift lever housing 50 as shown in Figure 2. In Figure 4, 51 is the ring hub casing shaped to form a collar dependently mounted upon the radial arms or spokes 18. A coiled balance spring 52 rests upon the ring hub and also engages the inner surface of the assembly container. A retainer ring 53 has a snap fit for holding the preferably Lucite cover 19 in its frame. Concentrically disposed in the housing 48 at its upper part is a loud speaker of Lucite designated 54 which has its horn flaring outwardly and which is formed at its inner end with a cup-shaped body 55 closing it at this point. This loud speaker will be included in the radio control selector circuit hereinafter set forth. It is formed at its upper end with a jacketing flange 56 which rests upon a stout coiled spring 92.

The klaxon reverse gear pick-up magnet 57 is operatively mounted in the assembly container or box 77. 58 is a color segment ring seated annularly upon the upper side of the ring 46, being made of Lucite or like material. The horn contact rings are designated 59 and are normally spaced apart. An annular series of gear teeth 60 are formed upon the collar 31 connected to spokes 18, with which meshes a spur gear 65 fixed upon a vertically disposed drive shaft 63, mounted at the bearing arm 64 formed upon a holder 66 which is attached by screws 67 to the inner wall of the housing 48. Coil spring 68 is wound around the shaft 63 bearing at one end against bearing arm 64 and at its other end bearing against bevel gear 71.

Drive shaft bevel gear 71 meshes with motor bevel gear 72 upon motor shaft 73 of the electric motor 74. The drive shaft reverse bevel gear 75 is out of engagement with motor shaft gear 72 when bevel gear 71 is in engagement with same. The floor of the container or box 77 is designated 76 and supports the motor 74. The drive shaft throw-out or reversing collar 78 has pivotally attached thereto as at 81, the lever arm 80, while the other end of this lever arm is pivotally mounted at 82 upon a fixed bracket 83 on the floor 76 of the box 77. Between the ends of the lever arm or rod 80 is the armature contact member 80a shown in Figure 4. It will be observed that a pair of spaced switch contacts in the klaxon reverse mechanism is shown at 84, one on the cup-shaped part 55 of the loud speaker and the other fixed within the box 77.

5

The clamping nut 86 is screwed home upon the reduced stem 86a of the torque shaft 85 so as to engage the base portion 49 of the housing 48. Inside of the box 77, between its lower and upper parts is operatively mounted a retainer ring 88 to hold and support the coil spring 92 which, at its upper end, bears against the under surface of the collar flange 56 formed upon the loud speaker horn.

The master radio station selector brush ring 90 is operatively and insulatedly mounted upon the collar 61 of ring 46, and it consists of one master brush segment 90b, Figure 12, which is a good electrical conductor, while the remaining circumferentially extending series of segments composing this ring (Figure 12) are dummy segments, non-conductors. Reference numeral 93 designates a light socket formed peripherally of the housing 48 in which is attached a light bulb 94, associated with which, in said socket, is a light shade or guide 95. Brush contact 96 is insulatedly mounted upon the collar 61 for the transparent ring 46 and is spaced apart from the klaxon contact rings 97 insulatedly mounted upon the inner surface of the cover frame portion of container box 77.

The radio station selector circuit relay magnet, generally referred to by the numeral 98, is mounted in the box 77 and also a small motor 99. Figures 6 and 7 illustrate the interior construction of the relay magnet 98. The plunger of magnet 104 in relay magnet 98 is designated 103, this being the tuning control magnet. It is mounted upon frame 105, as shown in Figure 6 and on this frame is a bracket 106 which carries projecting separated spring fingers or contact 107 engageable with the contact points or brushes 139 of the rotor 109 (Figure 8). The contact rotor gear 108 meshes with a pinion or gear 111 on gear shaft 110, 112 being a flat spring bearing upon a cam 114 on a shaft 110a. A lever arm 116 or arms 116 are mounted upon a cross pin 140 and carries pivoted pawl 115 for engagement with ratchet wheel 120, on shaft 110a, upon which latter shaft is also fixed the gear 113 which meshes with gear 111. A spring stop 118 is fixedly mounted on frame 105, against which bears one end of a coiled spring 119 wound about a push and pull rod 117 pivotally mounted at its upper end to the lever arm 116, and at its lower end being pivotally attached to the plunger head 103 of the solenoid of magnet 104. The other end of the spring is mounted so as to force this plunger head down.

144 represents the chambered out portion in the upper part of the housing 48 in which klaxon or horn contact rings 59 are movable.

In practice it will be understood that the main radio station selector electrical circuit calls for operation elevation of the ring 17 in order to move the pointer bulb 39 in one direction, say in a clockwise direction. In order to move it in a counterclockwise direction, should the operator desire to do this, it is necessary in one method to depress the cover 19, instead of elevating the ring 17. In each case an electrical circuit is closed for attaining the desired result.

In order to tune in any desired selective radio station, in the operation of the present invention, the procedure will be as follows: the radio is turned on, and a radio station is mentally selected. The operator then with his finger raises the klaxon ring 17 in order to bring into engagement contacts 96 and 97 in the radio station selector control circuit. Current flows from bat-

6

tery 135 by wire 145 (Figure 12) to movable contact 96, then to brush 97, which forms a radio selector circuit switch. Thence current flows by wire 146, wire 159 to the light bulb 94. This light, when burning, will shine through the color segment ring 58 for the purpose of changing the color of lighting in the klaxon inner ring 46, in the master klaxon ring spoke 42, in the radial klaxon spokes 18, in the klaxon ring 17, in the pointer the bulb 39, and in the star in the ring pointer 40. All these parts being made from Lucite are transparent, and when the light flashes against the colored background of these parts there will be a correspondingly colored glow reflected upon surrounding parts of the vehicle, or upon the hand of the operator, or his clothing which he can notice without training his eyes to inspect the particular radio station he has selected.

In closing this radio selector control circuit by means of switches 96, 97 current will also flow through wire 160 to the relay magnet 98 to energize the magnet 104 and lift the plunger 103. Finally, current flows through wire 161 for operating the motor 74. As the motor turns its bevel gear 72, meshing with bevel gear 71 of the drive shaft rotates this drive shaft, so that gear 65 on this same shaft, in meshing with the gear teeth formed upon the collar 61 in turn will rotate the klaxon ring 46 and master klaxon ring spoke 42. The operator will hold the klaxon ring 17 at its raised position long enough until it is pointing to the station that was selected.

At this point, when the pointer bulb registers the selected radio station on the dial 14, the klaxon ring 17 is released, and having been raised against the tension of spring 52, this spring now relaxes retracting the ring 17 and opening the selector circuit, by separating switch contacts 96 and 97, thereby effecting the turning out of the light, the de-energizing of relay magnet 98 and stopping of rotation of the motor 74. When the contacts 96 and 97 are separated, and the relay magnet 98 is de-energized, the plunger 103 in the magnet 104 drops by reason of its own weight and the force of the spring 119. The pull rod 117 will thus move downwardly rocking the arms 116 and the pivoted pawl 115 to rotate the ratchet 120 and the gear 113. The rotation of the gear 113 is imparted to the gear 108 through gear 111 and this will effect the rotation of the rotor 109. Through the proper proportioning of the various parts the de-energizing of the relay magnet 98 achieves a rotation of the rotor 109 of more than 90° so that the contact points 107 will engage the contacts 139 rather than the insulated portions of the rotor upon which they rested at the beginning of the cycle. Now electrical current is transferred through wire 147, contact points 107, rotor 109, and wire 148 to the master radio station selector ring brush 90. Then when the klaxon ring 17 is retracted, in the manner disclosed, this master brush 90 will make contact with the proper segment corresponding with the particular segment on ring 89 (Figure 9) in order to tune in the required particular radio station desired. In effecting this, the pointer bulb will be pointing to the particular station selected. Current flows through wire 149 to the associated small magnet 31 so its plunger 27 will begin to pick up magnetically, causing its plunger 27 to be long enough to strike the wiper clip 26 on pusher rod 28. Current is also carried by wire 150, in series with the solenoid or magnet 31, into the master magnet in case

33 and will pick up its solenoid plunger 34. As this occurs, the plunger 34 will engage the lever arm bracket 36, causing it to rock the magnet case 25 on pin 24 in brackets 23, thereby causing plunger 27 to push clip 26 and with it push rod 20 to the left, as viewed in Figure 3, for selecting the proper radio station.

The operator may desire, to save time, to move the pointer bulb 39 over a small arc relatively to the annular dial 14 instead of a long arc, and finds that this is accomplished by moving the pointer bulb in a direction counter to that in which he previously has moved it. The operation of the radio station selector control circuit is now as follows: There are two ways of doing this. In accordance with the first way, the loud speaker 54 will be pressed downwardly, compressing the balance spring 92 and in doing so, contacts 84, seen in Figure 12, about electrically being the reverse contacts, and now the circuit to the electric light 94 will again be closed and the light then will burn, the relay 98 will pick up, and the motor 74 will rotate. The closing of this switch will also energize the reverse magnet 57, causing the reverse gear lever arm 80 to pick up or be elevated. This action disengages bevel gear 71 and engages the reverse bevel gear 75, causing a reverse rotation of the remaining mechanism, so that now the klaxon ring will rotate in a counter direction.

The other method of accomplishing counter-rotation of the klaxon ring that tunes in a predetermined station is as follows: Referring to Figure 12, to the radio station selector control circuit, it is readily seen that the spring fingers 107 contact the points of the rotor 109 for the purpose of completing the circuit into the radio station selector ring 90b. In the radio selector control circuit rotor 109 never stops on the contacts but passes electricity through the fingers 107 only during the time it is rolling over the 90 degree angle mentioned.

However, as shown in Figure 13, for the purpose of rotating the klaxon ring in a reverse direction, without employing horn 54 and contacts 84 the wiring has been changed over what is shown in Figure 12 in the particular that, besides assembling the rotor 109 for making engagement with contacts 107, three contact fingers 107a are also assembled in relation to this rotor 109; what is left out in Figure 13 that appears in Figure 12 are contacts 84. The rotor 109 is here arranged to stop its rotation so that two of the three fingers 107a are always in electrical contact with rotor 109, now when the relay 98 drops and rotates this rotor 90 degrees, it will alternate the flow of electricity from finger 1 and finger 2, to finger 1 and finger 3. In other words, the rotation of this rotor 109, in diagram Figure 13 will close one circuit, one time and the other circuit the other or next time.

The klaxon ring reversing circuit includes the following connectors shown in Figure 13.

When switch and brush 96 and 97 contact current will flow from one side of battery 135 to these engaged switch points 96, 97. Thence current flows directly to finger 1 of the series of fingers 107a associated with rotor 109 by way of wire 153. Current is conducted by rotor 109 to finger 2 of the series, whence current flows by wire 154 to wires 161, 160, and 159 for operation of the motor 74, relay 98, and light bulb 94 respectively. The battery being grounded, the motor circuit is closed and klaxon ring turns in one direction, since the reverse magnet circuit is open.

But rotor 109 will soon turn to a position where finger 2 will engage an insulated portion on its periphery while spring finger 3 will electrically contact the rotor. Now electricity passes from finger 1 to rotor 109 through finger 3 and by way of wire 165 through reverse magnet 57 to wire 132a which is in series therewith by wire 161 to the motor, by wire 160 to relay 98, and by wire 159 to light bulb 94. The reverse magnet 57 will be energized and will lift the arms 80 and hence the shaft 63. The gear 72 on the motor 74 will be disengaged from the upper bevel gear 71 and engaged with the bevel gear 75 for causing the reverse rotation of the shaft 63 and the gear 65.

From the foregoing it will be readily seen the present invention, when installed upon the steering gear of a self-propelled vehicle serves the dual purpose of safeguarding the car operator from promoting traffic hazards as he now does in reaching out from over the steering wheel to some part of the dash to tune in a particular station, but also rendering easier and more convenient the operations involved just at the moment when he may have to turn the steering wheel to properly steer the vehicle. He does not have to remove his hands from the wheel at all at any time, in operation of the radio apparatus herein set forth. His attention will never be distracted from proper and safe operation of the machine because of the radio hook-up. The loud speaker being now located in the center of the hub of the control wheel, it is brought closer to the occupants and located further away from the vehicle's noises and vibrations, thereby requiring less volume. By familiarizing himself with the color schedule employed on the station identification dial, it will enable the operator to select desired radio stations by means of the code colors, thereby making it unnecessary for him to read the dial.

At least the spokes of the control unit of this invention should be made of Lucite; so should be the station identification dial so it may be lighted in part or in whole, the mirrors reflecting the colored lights. The spacers 44 on the dial may be used to block out the station identification letter area or blocking off the lighting of the station identification means. The klaxon ring spokes are connected to the klaxon inner ring as shown in Figure 1. It includes the ring around said star which is a pointer. The klaxon inner ring is made of Lucite. The light bulb will be installed inside of master spoke 42 as a booster light in the event that the light bulb 94 proved to be too weak to provide sufficient light to illuminate dial 14 properly.

What I claim is:

1. A radio station selector for automobile radio receivers comprising a plurality of station selection push rods slidably mounted in said vehicle, an electromagnetic operator for each of said push rods, a steering column in said automobile, a fixed contact member on said steering column, a plurality of contacts on said fixed contact member, circuit connecting means between said contacts and said electromagnetic operators for said push rods, a rotatable contact member about said steering column, a single contact on said rotatable member for engagement with a selected contact of said fixed contact member, an electric motor operator for said rotatable member, a switch connecting the circuit of said motor in an independent electrical circuit, an annular spring-pressed handle for said switch about said steering column, a rotatable switch member in the circuit of said push rod operators, an electric

operator for said rotatable switch in said motor circuit, said rotatable switch operator opening said push rod circuit upon completion of said motor circuit by said motor circuit switch, and said electric operator for said rotatable switch closing the circuit of said push rod operators upon opening of said motor circuit, whereby a desired station is selected by closing said motor circuit by said annular switch handle, and the corresponding station selecting push rod will be actuated upon release of said annular handle.

2. A radio station selector for automobile radio receivers comprising a plurality of station selector push rods slidably mounted in said automobile, an electro-magnetic operator for each of said push rods, a steering column in said automobile, a fixed contact member on said steering column, a plurality of contacts on said fixed contact member, circuit connecting means between said contacts and said electro-magnetic operators, a rotatable contact member about said steering column, a single contact on said rotatable member for engagement with a selected contact on said fixed contact member, an electric motor operator for said rotatable member, a switch connecting the circuit of said motor in an independent electrical circuit, an operating member for said switch on said steering column, a rotatable switch member in the circuit of said push rod operators, an electrical operator for said rotatable switch in said motor circuit, said rotatable switch operator opening said push rod circuit upon completion of said motor circuit by said motor circuit switch, said electric rotatable switch closing the circuit of said push rod operators upon opening of said motor circuit, and electric means for reversing the rotation of said rotatable contact member relative to said fixed contact member.

3. A radio station selector for automobile radio receivers comprising a plurality of station selector push-rods slidably mounted in said automobile, an electro-magnetic operator for each of said push rods, a steering column in said automobile,

a fixed contact member on said column, a plurality of contacts on said fixed contact member, circuit connecting means between said contacts and said electro-magnetic operators, a rotatable contact member on said column, a single contact on said rotatable member adapted to engage a selected contact on said fixed contact member, an electric motor operator for rotating said rotatable member, a switch connecting said motor in an independent electrical circuit, a spring pressed operating member for said switch on said column, a second switch in the circuit of said electro-magnetic push-rod operators, an electrically excited operator for said second switch connected in said motor circuit, said last named operator being adapted to open said second switch when said first named switch is closed and to close said second switch when said first named switch is open whereby a desired station is selected by closing said first named switch to energize said motor for rotating said rotatable contact, and the corresponding station selecting push rod is actuated upon opening of said first named switch by release of said spring pressed operating member.

4. A radio station selector as set forth in claim 3, including means for reversing the rotation of said rotatable contact member relative to said fixed contact member.

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