

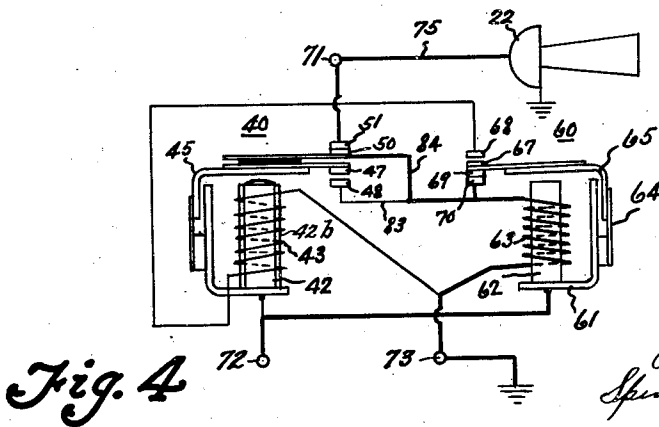
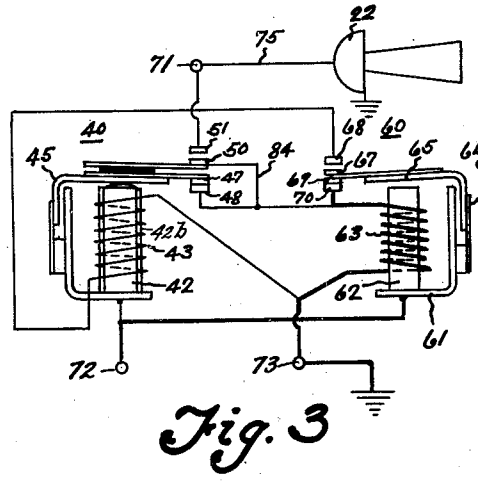
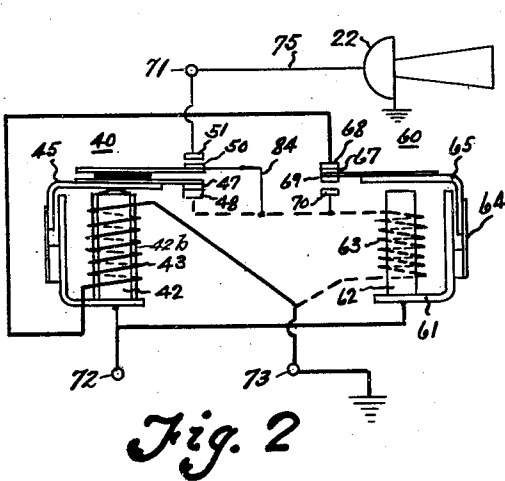
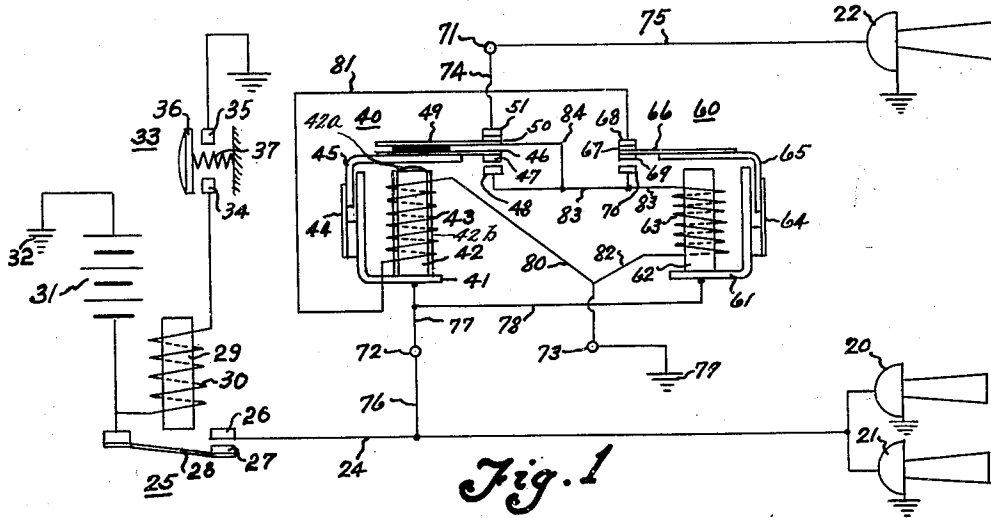
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TIME DELAY RELAY SYSTEM

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TIME DELAY RELAY SYSTEM

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4 Claims. (Cl. 175—320)

This invention relates to systems of control for automobile horns and more particularly for automobiles which are equipped with a low volume horn for use in city driving and with a high volume horn for use when driving in the country.

It is an object of the invention to provide a system in which a brief closure of the horn button for the control switch will cause only the sounding of the low volume horn and in which a prolonged closure of the horn button will cause the high volume horn to sound also. This object is accomplished by a system including two single coil relays for withholding the connection of the high volume horn with the battery for a predetermined period after the horn switch is closed.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is a wiring diagram illustrating the embodiment of the present invention.

Figs. 2, 3, and 4 are fragments of the diagram shown in Fig. 1 and shows the relay of the system in different stages of operation.

According to Fig. 1 the warning signal for city driving is provided by a pair of low volume horns 20 and 21 having different frequencies and so related that a harmonious chord is produced. For country driving or for use in an emergency the system includes a high volume horn 22. Horns 20 and 21 are connected with ground and with a wire 24 connected with stationary contact 26 of a horn relay 25. Contact 26 is normally separated from contact 27 carried by armature 28, attracted by an electromagnet including core 29 and a coil 30. Armature 28 and coil 30 are connected with battery 31 grounded at 32. The circuit of the coil 30 is controlled by a control switch or horn button 33 comprising stationary contacts 34 and 35 and a movable contact 36 normally held away from the stationary contact by spring 37. When switch 33 is closed relay coil 30 is energized; and relay contacts 27 and 26 close in order that low volume horns 20 and 21 may be connected with battery 31.

The means for withholding the connection between the battery 31 and the horn 22 for a predetermined time following the closing of horn switch 33 including two single coil relays 40 and 60. Relay 40 comprising a magnet frame 41

carrying a core 42 surrounded by coil 43. Frame 41 supports a resilient armature hinge-blade 44 attached to an armature 45 which is biased normally away from the core 42. Armature 45 carries a spring blade 46 carrying a contact 47 normally out of engagement with a contact 48. Armature 45 insulatingly supports a blade 49 carrying a contact 50 normally engaging a contact 51. Core 42 has a chromium plated pole face 42a against which the armature 45 seals when attracted to it. Core 42 is surrounded by a copper tube 42b which retards flux decay. Therefore there is a delay in the retraction of armature 45 following the open circuiting of magnet coil 43.

The relay 60 comprises a frame 61 supporting a core 62 surrounded by coil 63. Frame 61 supports an armature hinge-blade 64 attached to armature 65 supporting a blade 66 carrying a contact 67 normally engaging a contact 68. Blade 66 carries also a contact 69 for making engagement with a contact 70.

The relays 40 and 60 may be mounted upon the same base to provide a double relay unit. This unit will have three terminals 71, 72 and 73. Terminal 71 is connected by wire 74 with contact 51 of relay 40 and by wire 75 with high volume horn 22. Terminal 72 is connected by wire 76 with wire 24 and by wire 77 with frame 41 of relay 40 and by wire 78 with frame 61 of relay 60. Terminal 73 which is grounded at 79 is connected by wire 80 with one end of the coil 43 of relay 40 having its other end connected by wire 81 with contact 68 of relay 60. Terminal 73 is connected by wire 82 with coil 63 of relay 60 also connected by wire 83 with contact 70 of relay 60 and contact 48 of relay 40. Wire 84 connects wire 83 with contact 50 of relay 40. The normal status of the system is shown in Fig. 1. When the horn switch 33 is closed, relay 25 is closed to connect battery 31 with low volume horns 20 and 21. If switch 33 is closed for a period exceeding the time usually required to give the city warning signal, then the relays 40 and 60 will operate in the manner disclosed in Figs. 2, 3, and 4 in order to connect the high volume horn 22 with the battery.

The first stage shown in Fig. 2. Following the closing of relay 25, the coil 43 of relay 40 will be connected with the battery through the circuit indicated in heavy lines in Fig. 2. This will cause armature 45 to be attracted toward core 42 so that contacts 47 and 48 will be closed. Following this coil 63 of relay 60 will be ener-

gized as indicated by the heavy dash lines in Fig. 2.

Then armature 65 of relay 60 will be attracted toward core 62 as shown in Fig. 3 thereby causing contact 67 to be separated from contact 68 and contact 69 to engage contact 70. This causes coil 43 of relay 40 to be disconnected from the battery while coil 63 of relay 60 is connected with the battery independently of contacts 47 and 48 of relay 40 as indicated in heavy lines in Fig. 3.

Then armature 45 of relay 40 moves upwardly to cause the contact 50 to reengage contact 51 and separate contact 47 from contact 48. This establishes a circuit between wire 24 connected with relay 25 and battery 31, and wire 75 leading to the horn 22 as shown by the heavy lines in Fig. 4. Therefore, horn 22 is connected with battery 31 and is caused to sound a loud warning signal.

Because a substantial period of time elapses during the operations of the relays through the various stages indicated in Figs. 2, 3, and 4, the sounding of the horn 22 has been withheld for a predetermined time after the closing of the control switch 33. In this way the sounding of the low volume signal for city driving and the high volume for country driving is controlled through a single switch or horn button. The high volume signal is caused to sound only when the driver presses the horn button for a period longer than is usually required to give the ordinary city signal.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A circuit control system comprising a current consuming device; a current source; manually controlled switch for establishing a connection in the circuit between the source and the device; and means set into action by the establishment of said connection for completing the circuit between the source and the device a predetermined time after commencement of the establishment of the said first connection, said last mentioned means including a first relay having a core surrounded by a tube for retarding flux decay, a second relay having a core, each of said cores being surrounded by a single coil adapted to be connected in a different circuit, said first relay controlling a normally closed switch in the circuit of the device and a normally open switch having connections with the coil of the second relay, and the second relay controlling a normally closed switch having connections with the coil of the first relay and a normally open switch having connections with the coil of the second relay and both switches controlled by the first relay, the first coil being energized upon closure of the manually controlled means to open the first mentioned normally closed switch and close the first mentioned normally open switch whereby the second coil is in circuit with the source, the energization of the second coil opening the second normally closed switch and closing the second normally open switch for completing another circuit for the second coil with the source, the closing of the second mentioned normally opened switch opening the circuit to the first coil, said first coil, after its flux decay, permitting the

first mentioned normally open switch to close, and complete the circuit to the device through a circuit including the closed normally open switch of the secondary relay and the closed manually controlled switch.

2. A circuit control system comprising a current consuming device; a current source; manually controlled switch for establishing a connection in the circuit between the source and the device; and means set into action by the establishment of said connection for completing the circuit between the source and the device a predetermined time after commencement of the establishment of the said first connection, said last mentioned means including a first relay having a magnet coil and having means associated therewith for retarding flux decay, said magnet controlling a normally closed switch and a normally open switch; a second relay having an armature attracting coil and an armature, said armature carrying a movable contact disposed between two stationary contacts with the movable contact normally engaging one of the stationary contacts having connections with the coil of the first relay and the other stationary contact not normally engaged having connections with the coil of the second relay and both of said first mentioned switches, said first relay when energized operating to open the first normally closed switch and close the first normally open switch to connect the second mentioned magnet coil in a circuit with the source, the energization of the second coil attracting the armature of the second relay to move the movable contact into engagement with the other stationary contact to maintain the energization of said coil but open the circuit to the first mentioned coil, said first relay returning, after its delayed flux decay, to its normal position whereby the first mentioned normally closed switch will complete the circuit to the device through a circuit including the closed normally open switch of the second relay and the closed manually controlled switch.

3. A circuit control system comprising a current consuming device; a current source; manually controlled switch for establishing a connection in the circuit between the source and the device; and means set into action by the establishment of said connection for completing the circuit between the source and the device a predetermined time after commencement of the establishment of the said first connection, said last mentioned means comprising a first relay and a second relay, said first relay having a single magnet coil and having means associated therewith for retarding flux decay and said second relay having a single magnet coil, both of said relays having an armature for controlling a normally closed and a normally open switch, said first relay when energized operating to open its normally closed switch and close the normally open switch to connect the coil of the second relay in a circuit, said second coil when energized operating to open its normally closed switch and close its normally open switch to retain the second coil in circuit, the opening of the normally closed switch open-circuiting the coil of the first relay, said first relay, after its flux decay, returning to its normal position to complete a circuit to the device which includes the closed manually controlled switch, the closed normally open switch of the second relay, and the normally closed switch of the first relay, said device

remaining connected with the current source so long as the manually controlled switch is closed.

4. A circuit control system comprising a current consuming device; a current source; manually controlled switch for establishing a connection in the circuit between the source and the device; and means set into action by the establishment of said connection for completing the circuit between the source and the device a predetermined time after commencement of the establishment of the said first connection, said means comprising two relays each having a core and a single magnet coil surrounding its core, one of the relays being relatively fast-operating and the other being a time-lag relay having flux-decay-retarding means, each relay having a normally open switch and a normally closed switch, said switches being respectively closed and opened when the relay is energized, and circuits in series with the manually controlled switch, one of the circuits comprising the two normally open relay switches connected in parallel and a second parallel circuit connected in series with the first parallel circuit and comprising the coil of the fast-operating relay in parallel with a circuit comprising the normally closed switch of

the time-lag relay and the current consuming device, and another circuit paralleling said series of parallel circuits and comprising the normally closed switch of the fast-operating relay and the magnet coil of the time-lag relay, whereby, upon closure of the manually controlled switch, the time-lag relay operates to close its normally open switch to connect the coil of the fast-operating relay with the source while opening its normally closed switch to prevent the connection of current consuming device with the current source, and the fast-operating relay operates to close its normally open switch to provide for connection of its coil with the current source independently of the then closed switch of the time-lag relay, and the fast-operating relay operates to open its normally closed switch to disconnect the coil of the time-lag relay from the current source, and the time-lag relay finally operates to restore its switches to normal status whereby the current consuming device is connected with the source through the manually controlled switch, the closed normally open switch of fast-operating relay and the normally closed switch of the time-lag relay.

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