Feb. 23, 1932. T. J. HART 1,846,032

SAFETY STOP FOR VEHICULAR TRAFFIC

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Fig. 1.

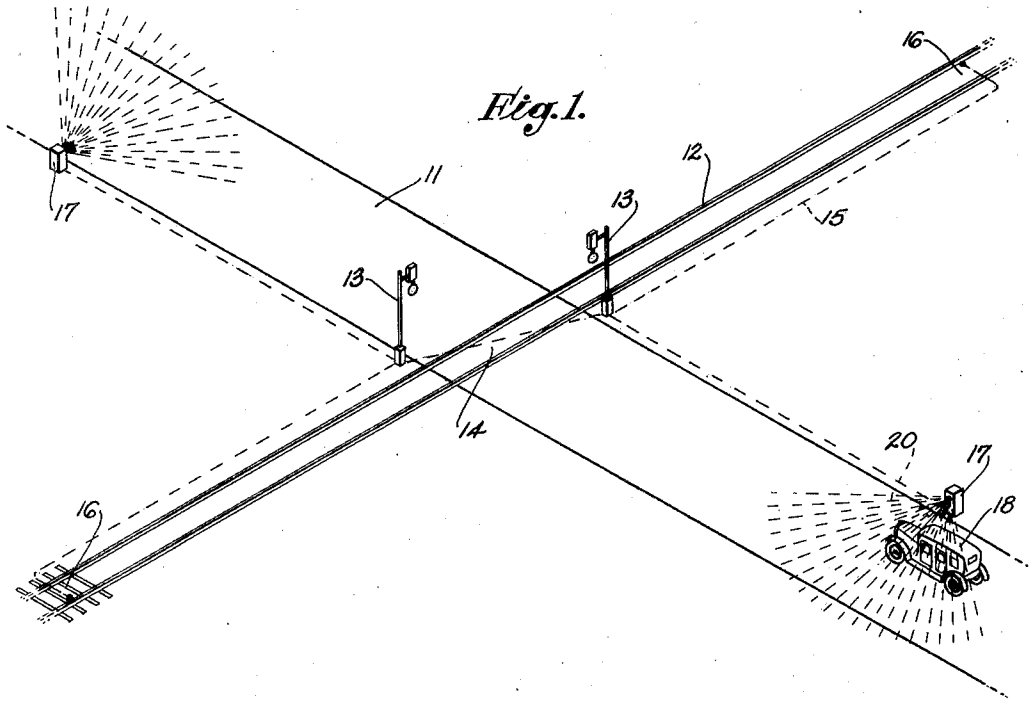
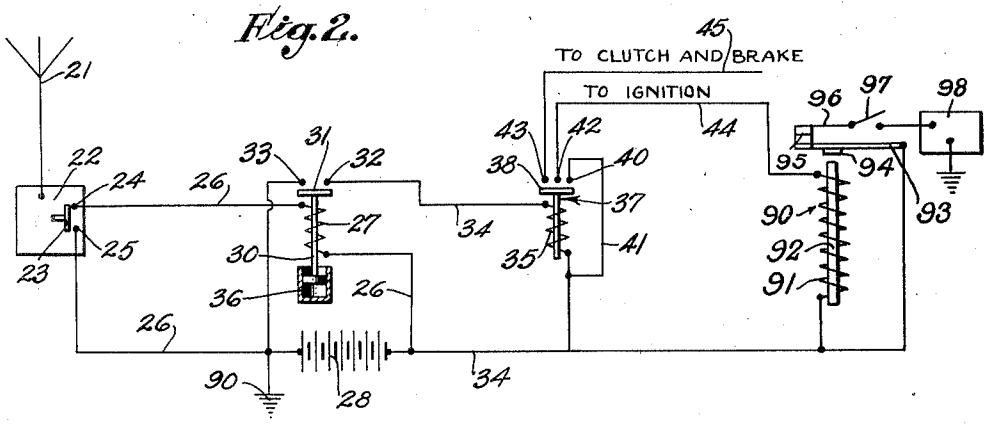


Fig. 2.



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Fig. 3.

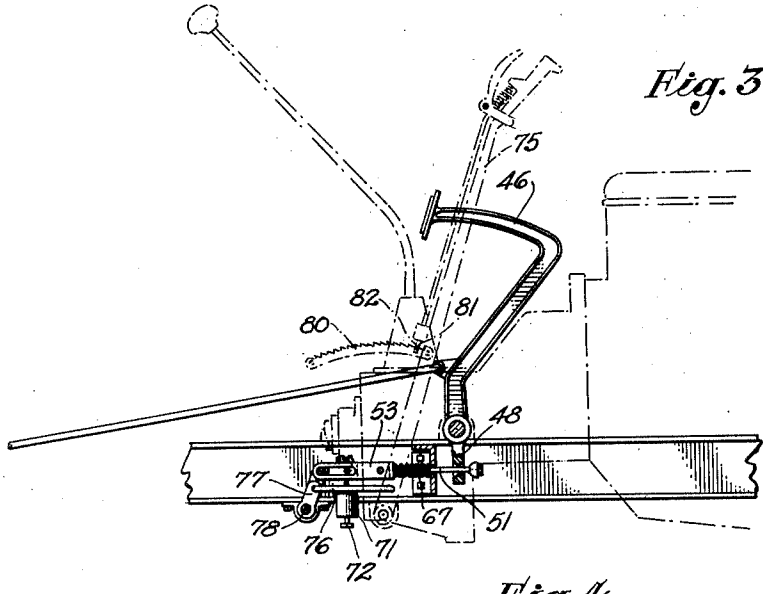


Fig. 4.

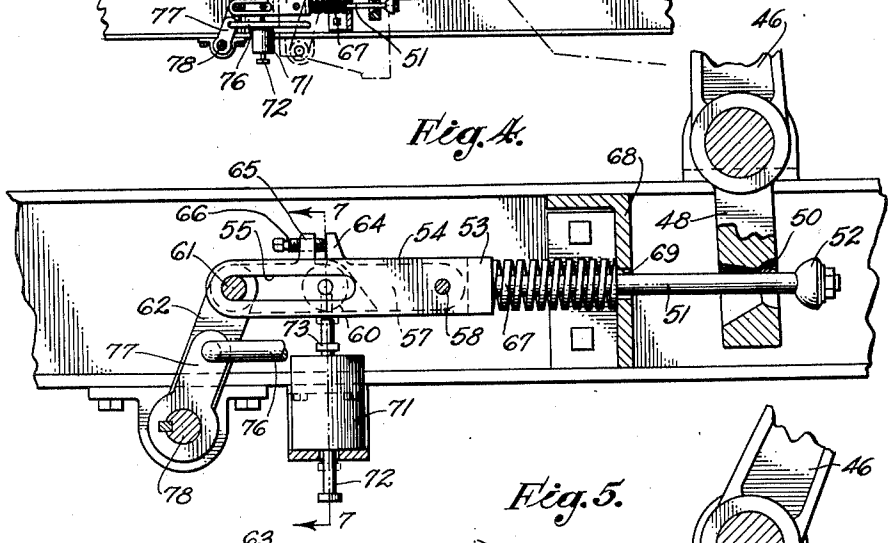
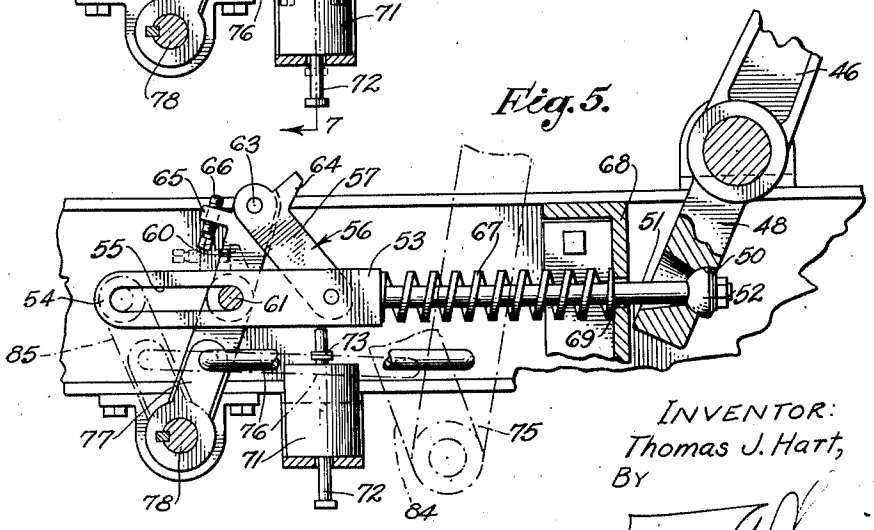


Fig. 5.



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Fig. 6.

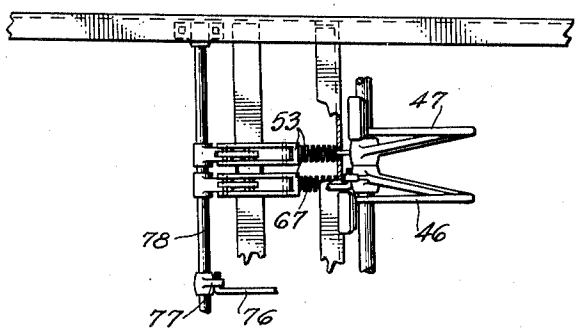


Fig. 7.

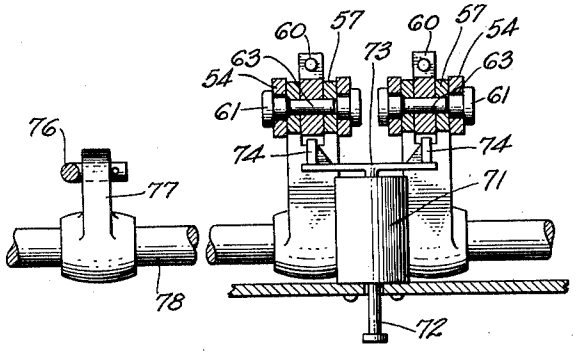
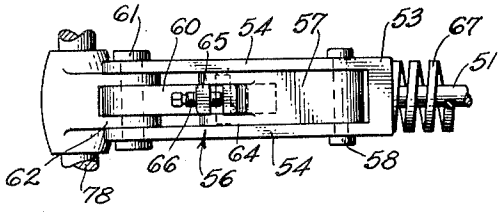


Fig. 8.



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Patented Feb. 23, 1932

1,846,032

UNITED STATES PATENT OFFICE

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SAFETY STOP FOR VEHICULAR TRAFFIC

Application filed November 29, 1930. Serial No. 498,932.

My invention relates to means for automatically stopping traffic at a railroad crossing when a train, engine, or car is approaching the crossing on the railroad tracks, and relates to a device of this character which operates through the transmission of radio waves or impulses.

It is an object of the invention to provide an impulse emitting device adapted to emit radio waves. This device is placed adjacent the point of crossing of a road and railroad tracks. An approaching train as it passes over a portion of the track adjacent the crossing actuates the wave emission device so that electronic waves or impulses are transmitted across the highway or road. In addition to the foregoing, the invention includes automatic means adapted to be incorporated in a vehicle, this means functioning so as to automatically stop the vehicle before it reaches the railroad tracks and thus preventing the vehicle from moving onto the tracks in the path of an approaching train.

Although it is a feature of the invention to have the device for emitting electronic waves automatically operated by an approaching train, a wave emitting device of such character may be placed at any point along a highway or at the point of crossing of two highways so that movement of the traffic along one or both of the crossing highways may be stopped in response to operation of the wave emitting mechanism by a police officer. The invention may be employed in various ways, but since its principal utility appears to be in the control of traffic at points where highways cross railroad tracks, I shall for the purpose of brevity and clearness describe the simple form of my invention adapted for this use.

A further object of the invention is to provide means adapted to be installed in a vehicle, which means automatically stop the vehicle and prevent operation thereof during the time the vehicle is within the range or influence of electronic waves or impulses. In the preferred practice of the invention this means includes mechanism for applying the brakes and disengaging the clutch of an automobile, such mechanism being representative of other types of mechanisms which may be employed in other types of vehicles for stopping and preventing further movement of such vehicles.

Further objects and advantages of the invention will be made evident throughout the following part of the specification.

Referring to the drawings, which are for illustrative purposes only,

Fig. 1 is a perspective view showing a preferred use of my invention.

Fig. 2 is an electrical diagram showing the control mechanism of my invention carried on an automobile.

Fig. 3 is a fragmentary view showing the manner in which my invention controls the clutch and brake operating mechanism.

Fig. 4 is an enlarged fragmentary view showing the control mechanism of Fig. 3 in inactive position.

Fig. 5 is a view similar to Fig. 4 showing the control mechanism in active position.

Fig. 6 is a plan view corresponding to Fig. 3.

Fig. 7 is a fragmentary cross section on a plane represented by the line 7—7 of Fig. 4.

Fig. 8 is a plan view of one of the collapsible link mechanisms in extended position.

In Fig. 1 I show a road or highway 11 for one class of vehicular traffic crossing a roadway or trackway 12 for another type of vehicular traffic. The trackway 12 is a portion of a railroad the vehicular traffic of which consists of locomotives, trains, or individually driven railroad cars, such as electric railway cars. The traffic of the highway 11 ordinarily consists of automobiles, trucks, or other motor propelled vehicles. In the ordinary use of safety devices wigwag signals 13 are mounted on each side of the crossing 14,

and from these signals conduits 15, indicated by dotted lines, carry electrical conductors down the tracks to control zones 16. The use of such devices is old, and it is well known that the passage of a vehicle along the tracks 12 will cause the wigwag signals 13 to operate when a vehicle reaches or passes through the control zones 16. My invention is not concerned with the details of this wigwag signal installation as any of the present types may be employed. In conjunction with or separate from the wigwag signals, I employ emission devices 17 adapted to emit electronic waves or impulses in such a manner and magnitude that a vehicle, such as the vehicle 18, in traveling along the road 11 toward the crossing 14 will pass through the zone of influence of the electronic emissions of a device 17, which electronic emissions I have indicated by radial lines 20. On the vehicle 18 I employ vehicle controlling devices adapted in turn to be controlled or actuated by the electronic waves or emissions 20 of a device 17. On the vehicle 18, as shown in Fig. 2, an antenna or receiving circuit 21 is mounted, this receiving circuit extending to a relay 22 adapted to be actuated by the input thereinto of electronic force, and having a switch member 23 adapted to engage contacts 24 and 25 forming a part of a circuit 26 including an electromagnet 27 and an automobile storage battery 28. The electromagnet 27 is adapted to move an armature 30 so as to cause a switch member 31 to engage contacts 32 and 33 of a circuit 34 which includes an electromagnet 35 and the battery 28. The switch 31 serves as an intermediate relay between the switch 23 and the magnet 35 and is provided with a dash-pot 36 adapted to delay the opening of the circuit 34 by removal of the switch member 31 from engagement with the contacts 32 and 33. The electromagnet 35 forms part of a master switch 37 having a switch plate 38 adapted to engage a contact 40 which is connected to one pole of the battery 28 through a conductor 41 and part of the circuit 34, and contacts 42 and 43 from which conductors 44 and 45 extend to control devices for the automobile 18 which will cause the automobile to stop when the antenna 21 moves into the zone of the electronic emissions 20 and will prevent further operation of the vehicle until the switch member 31 of the intermediate relay is disengaged from the contacts 32 and 33.

The devices 17 are preferably small radio broadcasting devices which will send forth electronic emissions 20 in the form of radio waves whenever a train or other vehicle adapted to travel on the tracks 12 passes through a control zone 16. The device 22 is of the radio receiver character having vacuum tube amplifiers for building up the current induced by the reception of radio waves to sufficient strength to produce an operation of the switch member 23.

I have shown the devices 17 and 22 diagrammatically for the reason that both of these devices are old to the radio art as will be seen from an inspection of the following patents: No. 1,522,359, issued January 6, 1925, to E. E. Clement, for radio metering system; No. 1,536,130, issued may 5, 1925, to D. B. Perry, for operation of printing apparatus by radio; and No. 1,685,480, issued September 25, 1928, to T. E. Clark, for safety installation for grade crossing.

In Figs. 3 and 6 I indicate a brake pedal 46 and a clutch pedal 47 of an automobile adapted to respectively operate the brake and clutch mechanisms of the automobile. Downwardly extending from each of the pedals 46 and 47 is an arm 48 having an opening 50 therein through which an actuating rod 51 extends, such rod having a head 52 thereon. As shown in Figs. 4 and 8, the rod 51 has its leftward end secured to a head 53 which is of forked form and has legs 54 projecting leftwardly therefrom. The outer ends of these legs 54 are provided with longitudinal slots 55, and operative within the space between the legs 54 is a collapsible or toggle mechanism 56 consisting of a rightward link 57 which is pivoted to a pin 58 extending through the rightward ends of the legs 54, and a leftward link 60, the leftward end of which is pivoted on a pin 61 which extends through the upper end of a lever 62 and also through the slots 55 in the outer ends of the legs 54. The links 57 and 60 are hinged together by means of a pin 63 and are adapted to swing from the extended position in which they are shown in Fig. 4 to the collapsed position in which they are shown in Fig. 5. Adjacent the pin 63 projections 64 and 65 extend upwardly from the links 57 and 60, and through one of the projections, such as the projection 65, an adjustment screw 66 is extended in a position to engage the projection 64, as shown in Fig. 4, so as to limit the downward movement of the links 57 and 60.

When the links are in extended position as shown in Fig. 4, the pin 61 is maintained at the leftward or outer end of the slots 55. When the links 57 and 60 are collapsed, the head 53 may move leftwardly so that the rightward ends of the slots 55 will surround the pin 61. When the head 53 moves leftwardly under the force exerted by a spring 67 which is disposed between the head 53 and a plate 68 having an opening 69 through which the rod 51 extends, the head 52 on the rightward end of the rod will engage the lever 48 and move the associated pedal, such as the pedal 46. As there are two heads 53, as shown in Fig. 6, both the pedal 46 and the pedal 47 may be automatically operated by energization of an electromagnet or solenoid

71 having an armature 72 and a cross bar 73 at the upper end of the armature. This cross bar or yoke 73 has upwardly projecting fingers 74 at the ends thereof adapted to engage the central portions of the toggles 56 when such toggles are in extended position as shown in Fig. 4, and to swing the links 57 and 60 upwardly so that they will move into the positons in which they are shown in Fig. 5, or in other words, to collapsed position, allowing both of the heads 53 to move leftwardly under force exerted by the springs 67, with the result of swinging the brake and clutch pedals 46 and 47 rightwardly or forwardly and thereby applying the vehicle brakes and disengaging the clutch of the automobile. When the heads are in rightward position as shown in Fig. 4, and held there by the extended toggles 56, the force exerted by the springs 67 is carried by the pins 61. The positions of these pins are controlled by means of a lever which may very satisfactorily be the emergency or parking brake lever 75. This parking brake lever has a link 76 extending therefrom to a short lever 77 which is secured to a shaft 78 which also supports the levers 62 carrying the pins 61 in the outer ends. When the emergency lever 75 is swung, the interconnecting link 76 causes the levers 77 and 62 to swing proportionately. A latch plate 80 provided for the lever 75 has a notch 81 at its forward end adapted to be engaged by the manually actuated latch dog 82 of the lever 75 so as to retain the lever 75 in the forward position in which it is shown in Fig. 3 and also retain the pins 61 in the forward position in which they are shown in full lines in Fig. 5. After actuation of the device through collapsing of the toggles 56, the device may be reset by disengaging the dog 82 from the notch 81 and swinging the lever 75 rearwardly into the position in which it is shown in dotted lines 84 in Fig. 5, this causing the levers 77 and 62 to swing into the positions indicated by dotted lines 85, moving the pins 61 into the outer ends of the slots 55 and extending or straightening the toggles 56. By then swinging the lever 75 back into the forward position in which it is shown in Fig. 3, the forward movement of the pins 61 will move the straightened toggles 56 and all of the parts connected thereto back into the position in which the toggles and their associated parts are shown in Fig. 4, compressing the springs 67 and holding the heads 52 in a position of disengagement relative to the extensions 48. The solenoid 71 may be energized through the conductor 45 shown in Fig. 2, this conductor extending to one terminal of the winding of the solenoid 71, and the other terminal of the winding being grounded with the frame of the vehicle so as to complete the electrical circuit through the ground 90 shown in Fig. 2. In Fig. 2 I have shown a separate conductor 44 which may extend to a magnetic device of a character similar to that shown in Figs. 4 and 5, for shutting off the ignition of the automobile engine, if desired. Such an ignition control might consist of a simple relay 90 as shown in Fig. 2, said relay consisting of a coil 91 surrounding a magnetic core 92. Upon energization of the conductor 44 by an operation of the switch 37, the armature 94 attached to the spring conductor 93 is attracted to the magnetic core 92, thereby separating the contacts 95. This causes an interruption in the ignition circuit of the automobile engine, said circuit consisting of the battery 28, the conductor 34, the spring conductor 93, the contacts 95, the conductor 96 which includes the usual manually operated ignition switch 97, the ignition system 98, and a return to the battery through the ground, as shown. The spring 93 normally closes the contacts 95, thus permitting normal ignition control by the driver.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be employed in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. A device for controlling vehicular traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having brakes and a disconnectable driving mechanism; and electrically actuated vehicle controlling mechanism on said vehicle operated by said receiving device to cause application of said brakes and disconnection of said driving mechanism when electronic energy from said emission device is received by said receiving device.

2. A device for controlling vehicular traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having brakes and a disconnectable driving mechanism; force exerting means for applying forces to apply said brakes and disconnect said driving mechanism; holding means for preventing operation of said force exerting means during the normal operation of said vehicle; and electrically actuated mechanism controlled by said receiving device for

rendering said holding means ineffective when electronic energy from said emission device is received by said receiving device.

3. A device for controlling vehicular traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having brakes and a disconnectable driving mechanism; force exerting means for applying forces to apply said brakes and disconnect said driving mechanism; holding means for preventing operation of said force exerting means during the normal operation of said vehicle, said holding means comprising a collapsible toggle mechanism; and electrically actuated mechanism controlled by said receiving device for collapsing said toggle mechanism when electronic energy from said emission device is received by said receiving device.

4. A device for controlling vehicular traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having brakes and a driving mechanism; force exerting means for applying forces to apply said brakes and render said driving means ineffective; holding means for preventing operation of said force exerting means during the normal operation of said vehicle; and electrically actuated mechanism controlled by said receiving device for rendering said holding means ineffective when electronic energy from said emission device is received by said receiving device.

5. A device for controlling vehicular traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having brakes and a driving mechanism; force exerting means for applying forces to apply said brakes and render said driving mechanism ineffective; holding means for preventing operation of said force exerting means during the normal operation of said vehicle, said holding means comprising a collapsible toggle mechanism; and electrically actuated mechanism controlled by said receiving device for collapsing said toggle mechanism when electronic energy from said emission device is received by said receiving device.

6. A device for controlling vehicular traffic, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having a control lever; a spring-forced member adapted to operate said control lever; a collapsible toggle for preventing operation of said spring-forced member; an electromagnet for causing collapse of said toggle; a circuit for energizing said electromagnet; and a switch for closing said circuit, said switch being closed by said receiving device in response to the receiving of electronic energy by said receiving device from said emission device.

7. A device for controlling vehicular traffic, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having a control lever; a spring-forced member adapted to operate said control lever; a collapsible toggle for preventing operation of said spring-forced member; an electromagnet for causing collapsation of said toggle; a circuit for energizing said electromagnet; a switch for closing said circuit, said switch being closed by said receiving device in response to the receiving of electronic energy by said receiving device from said emission device; and means for delaying the opening of said switch.

8. A device for controlling vehicular traffic, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having a control lever; a spring-forced member adapted to operate said control lever; a collapsible toggle for preventing operation of said spring-forced member; an electromagnet for causing collapsation of said toggle; a circuit for energizing said electromagnet; a switch for closing said circuit, said switch being closed by said receiving device in response to the receiving of electronic energy by said receiving device from said emission device; and means for resetting said toggle so that it will again function to prevent operation of said spring-forced member.

9. A device for controlling vehicular traffic, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having a control lever; a spring-forced member adapted to operate said control lever; a collapsible toggle for preventing operation of said spring-forced member; means for causing collapsation of said toggle in response to the receiving of electronic energy by said receiving device from said emission device; and means for resetting said toggle so that it will again function to prevent operation of said spring-forced member.

10. A device for controlling vehicular

traffic at the crossing of a highway and railroad tracks, including: an emission device for emitting electronic energy into the atmosphere; a receiving device for picking up said electronic energy, said receiving device being adapted for mounting on a vehicle having a disconnectable driving mechanism; and electrically actuated vehicle controlling mechanism on said vehicle operated by said receiving device to cause disconnection of said driving mechanism when electronic energy from said emission device is received by said receiving device.

In testimony whereof, I have hereunto set my hand at Buttonwillow, California, this 24th day of Nov., 1930.

THOMAS J. HART.