April 25, 1933. B. E. O'HAGAN 1,905,186

RAILWAY TRAFFIC CONTROLLING APPARATUS

Filed April 16, 1932

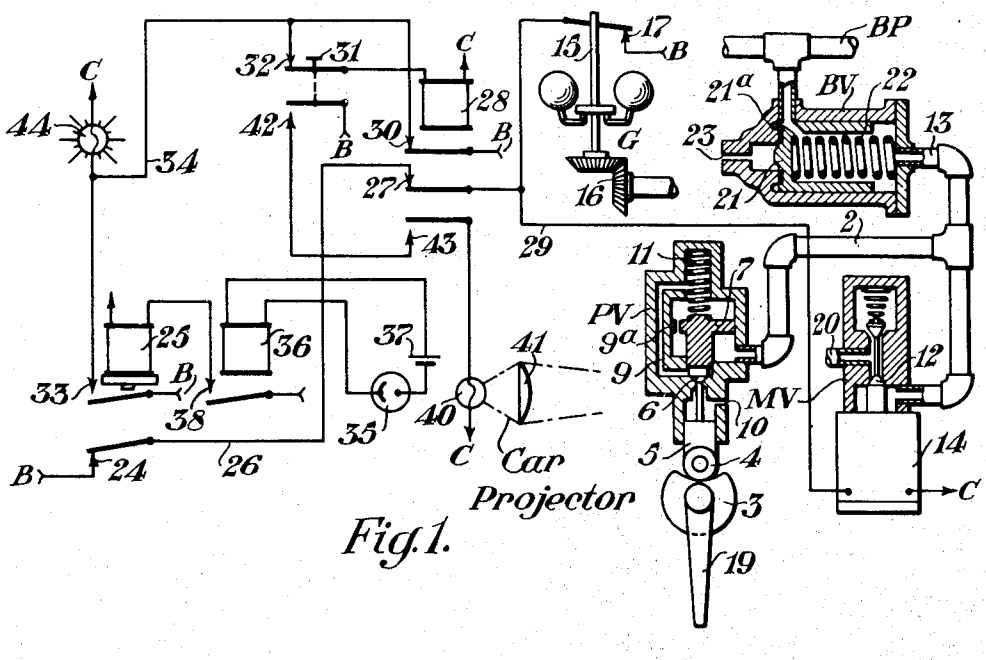


Fig. 1.

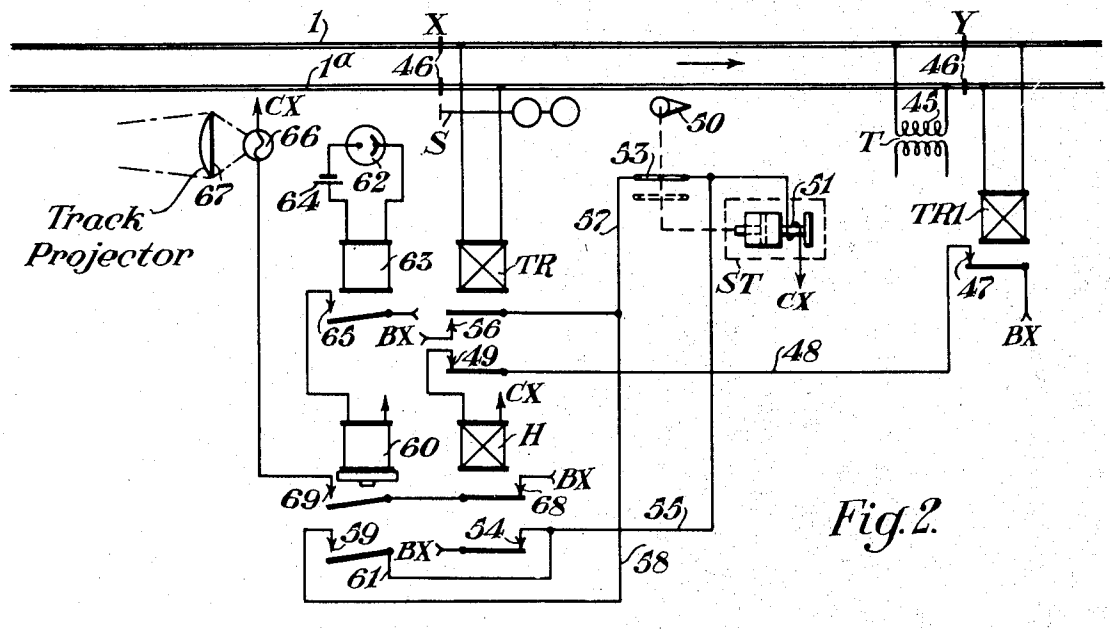


Fig. 2.

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UNITED STATES PATENT OFFICE

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RAILWAY TRAFFIC CONTROLLING APPARATUS

Application filed April 16, 1932. Serial No. 605,653.

My invention relates to railway traffic controlling apparatus, and particularly to apparatus of the type involving brake applying and speed governing means on a car or other railway vehicle controlled by suitable cooperating devices located in the trackway.

A feature of my invention is the provision of novel and improved means for conveying signaling influences both ways between car-carried apparatus and trackway devices by beams of light. In this instance, one such influence is utilized for clearing a trackway tripping device at a stop signal so that the car or other railway vehicle may proceed past the stop signal without making it necessary for it to come to a complete stop, and the car apparatus is so arranged that when the trackway device has been so cleared a low speed limit is imposed on the car until a clear signal is passed. Once a low speed limit is established for a car, a complete exchange of influences from the car to the trackway and then from the trackway back to the car, by beams of light, is utilized to effect the release of the low speed condition. It will be understood, however, that I do not limit myself to this particular use of such exchange of influences by light beams, and the form of apparatus here shown will serve to illustrate only one of the different ways in which such exchange of influences between car-carried and trackway equipment can be made to perform a useful function. Other features of my invention will appear as the specification progresses.

In order that my invention will be more fully understood, I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a diagrammatic view of one form of car-carried apparatus embodying my invention. Fig. 2 is a diagrammatic view of one form of trackway apparatus also embodying my invention, and adapted to cooperate with the car-carried apparatus of Fig. 1.

In Fig. 1, the reference character 19 designates a trip arm that is suspended from the body or truck of a car in the customary manner so as to clear all road bed equipment but yet in a position to engage a trackway trip arm to be referred to later.

It will be understood that the car or other railway vehicle is provided with the usual standard air brake equipment of which a pipe designated by the reference character BP is the brake pipe which, when vented to atmosphere, will cause an automatic application of the brakes. Connected with the brake pipe BP is a brake application valve BV, comprising a valve member 21 which is biased by a spring 22 to such position as to close an exhaust port 23 leading to atmosphere. The pressure on the two sides of the valve member 21 is equalized by a small connecting port 21ª in the member, whereby when the pipe 13 connected to the right-hand side of the valve is closed, the pressure is equalized and the valve member 21 occupies its left-hand position closing the exhaust port 23. When pipe 13 is opened to atmosphere, however, the pressure on the right-hand side of member 21 is reduced, where upon the brake pipe pressure on the left-hand side of the member will cause the member to be moved to the right to vent the brake pipe BP to atmosphere through the port 23.

Connected directly to the pipe 13 is a magnet valve MV and through a second pipe 2 a pilot valve PV. The pilot valve PV is actuated by the trip arm 19 which projects downward to engage each trackway trip arm, as will appear later, when such trackway trip arm is in its tripping position, but not when the trackway trip arm is in its non-tripping position. The car-carried trip arm 19 is biased to a mid position so that it automatically returns to that position after it has been swung to either the right or left. Whenever the trip arm 19 is swung out of its vertical position, a cam 3 attached to the arm 19 will raise a roller 4 attached to a vertical sliding member 5, and this member 5, in turn, will raise a valve 6 which is attached to a sliding piston 7. The pipe 2 enters the lower end of the casing of the pilot valve PV and is shut off from atmosphere when the valve 6 is

closed. When the valve 6 is raised by an operation of the trip arm 19, a passage 9 will be connected to atmosphere, through an exhaust port 10, reducing the pressure above the piston 7. The pressure in the pipe 2 acting on the underside of the piston will cause the piston to rise further against the action of a spring 11, thus providing a direct communication from pipe 2 through valve 6 and port 10 to atmosphere. As the pressure in pipe 2 is reduced, spring 11 will tend to close valve 6, but the valve is so constructed that the direct exhaust from pipe 2 is cut off before piston 7 reaches its lowest position. It follows that the outflowing air will maintain a differential pressure on piston 7 to hold valve 6 open. When the pressure in pipe 2 is reduced low enough so that the pressure exerted below the piston 7 is less than the pressure exerted by spring 11, the valve will close. The small communicating port 9^a permits pressure to be normally equalized on both sides of the piston 7. A valve device of this character is disclosed in United States Patent No. 1,243,782, granted to W. V. Turner on Oct. 23, 1917, for automatic train control. The pipe 13 is also shut off from atmosphere by the valve 12 of the magnet valve MV as long as its magnet 14 is energized. It follows that as long as magnet 14 is energized and the trip arm 19 is in its vertical position, the brake valve BV will hold the exhaust port 23 closed. Whenever the magnet 14 of magnet valve MV is deenergized, the pipe 13 will be connected to atmosphere through the valve 12 and the port 20; and whenever the trip arm 19 is moved out of its vertical position, the pipe 13 will be connected through pipe 2, valve 6, and port 10 to atmosphere; and in either case the brake valve BV will be actuated to open the exhaust port 23.

Each car or railway vehicle is equipped with a speed governor designated in Fig. 1 by the reference character G. This speed governor, as here shown, is of the inertia fly ball type, and the shaft 15 on which the fly balls are mounted is driven by a car axle through the medium of gears 16. This speed governor G operates a single circuit controlling contact 17 which is so adjusted that its contact is closed, as shown in Fig. 1, at all speeds below some predetermined low speed which I will speak of in this description as being ten miles per hour. At all speeds above this predetermined low speed limit of ten miles per hour, the contact 17 is open. It is obvious that any other predetermined speed limit may be selected should it seem desirable to do so.

The magnet 14 of the magnet valve MV may be energized by either one of two circuits. One of these circuits is from the positive terminal B of a convenient source of current not shown, through back contact 24 of a slow release relay 25 to be described later, wire 26, front contact 27 of an acknowledging relay 28 also to be referred to later, wire 29, and winding of magnet 14, to the negative terminal C of the current source. The second circuit extends from the terminal B through contact 17 of speed governor G when the speed is at or below ten miles per hour, wire 29, winding of magnet 14, and thence to the terminal C. It follows that magnet 14 is energized whenever the speed of the car is at or below ten miles per hour irrespective of the condition of the two relays 28 and 25, and is also energized when relay 25 is deenergized and relay 28 energized irrespective of the speed of the car.

The acknowledging relay 28 is normally energized by virtue of a stick circuit from the terminal B of the current source, through its own front contact 30, contact 32 of a manually operated acknowledging key 31, and winding of relay 28, to the terminal C of the current source. The pick-up circuit for relay 28 extends from the terminal B through the front contact 33 of the relay 25, wire 34, contact 32 of key 31, and thence through the winding of relay 28 to the terminal C.

Carried on the car is a light sensitive photocell 35 and a relay 36 associated therewith. This light sensitive cell may be any one of several types well known to the art, and it is considered sufficient for this application to point out that normally the cell prevents sufficient current flowing from a battery 37 through the winding of the relay 36 to cause this relay to close its front contact 38. The cell 35, upon being exposed to a beam of light of high intensity, is so influenced as to permit current of sufficient value to flow from the battery 37 to cause relay 36 to close its front contact 38. When contact 38 closes, it completes a simple circuit for the slow release relay. Thus normally both relays 25 and 36 are deenergized, but the exposing of the photocell 35 to a beam of light of high intensity results in both relays being picked up. When the acknowledging key 31 is manually depressed, the stick circuit for relay 28 will be ruptured and that relay will become deenergized. If the key 31 is held depressed after relay 28 becomes deenergized, a circuit will be closed to a lamp 40 of a car-carried projector, designated by the reference character 41, thereby causing a beam of light of high intensity to be projected from the car towards the trackway, for a purpose which will be explained hereinafter. This circuit for the lamp 40 includes back contact 42 of key 31, back contact 43 of relay 28, and lamp 40. It follows that when the operator depresses the acknowledging key 31, the

relay 28 will first be deenergized, and then the lamp 40 will be illuminated.

An indicator lamp 44 on the car is normally lighted, by virtue of a circuit that includes the front contact 30 of relay 28, to normally indicate to the operator the condition of that relay. It is to be noted that indicator lamp 44 will also be lighted when the relay 25 is picked up even though the relay 28 is at the time deenergized. The reason for lighting the indicator lamp 44 at the time relay 25 is energized will be pointed out when the operation of apparatus is described.

Referring now to Fig. 2, the reference characters 1 and 1ª designate the traffic rails of a stretch of track over which traffic normally moves in the direction indicated by the arrow. These rails are divided by the usual insulated rail joints 46 to form a plurality of successive track sections, of which only one section X—Y is shown in the drawing. The track section X—Y of Fig. 2 is provided with a standard track circuit consisting of a convenient source of current such as the secondary 45 of a track transformer T connected across the rails 1 and 1ª at the outgoing end of the section, and a track relay TR connected across the rails at the entrance end of the section. Traffic through the section X—Y is governed by a wayside signal S which may be of any standard type such as a color light signal. The operating circuits for the signal S are governed in part at least, by a home relay H in accordance with standard practice. As these operating circuits for signal S form no part of my invention, they are omitted from the figure to simplify the disclosure. As is the usual practice when automatic stops are installed in connection with wayside signals, the home relay H is controlled by the track relays of two track sections in advance of the signal. To be explicit, the home relay H is energized by a circuit extending from the terminal BX of a source of current (not shown) through front contact 47 of the track relay TR1 for the section in advance of section X—Y, line wire 48, front contact 49 of track relay TR for section X—Y, winding of relay H, and thence to the CX terminal of the same source of current. It follows that relay H is deenergized when either the section X—Y or the section next in advance is occupied, and is energized when and only when both of these sections are unoccupied.

At each signal location there is provided an automatic stop mechanism indicated by the reference character ST which is adapted to operate a trackway trip arm 50. The trip arm 50 is positioned to engage the car-carried trip arm 19. The automatic stop mechanism ST may take any one of several forms, but a preferred form is that disclosed and claimed in the United States Patent 1,775,811, granted Sept. 16, 1930, to J. P. Coleman, for railway traffic controlling apparatus, and to which reference is made for a full description of such automatic stop mechanism. For this application, it is thought sufficient to say that when the magnet 51 is energized, the trip arm 50 is moved to a horizontal or nonstripping position, but when magnet 51 is deenergized, the trip arm 50 moves to a vertical or tripping position. A circuit controlling contact 53 is also actuated by the mechanism ST in such a manner that it occupies the position shown in the drawing when the trip arm 50 is lowered to its non-tripping position, and is moved to the position indicated by dotted lines when the trip arm 50 is raised to its tripping position. Although, as illustrated in the drawing, the trip arm 50 is located some little distance in advance of the signal S, this is done only to avoid crowding the drawing. In practicing my invention, the trip arm is usually located but a few feet in advance of the insulated rail joints at the entrance of the associated track section.

The magnet 51 of the automatic stop mechanism ST is normally energized by virtue of a circuit extending from the BX terminal of the current source, through front contact 54 of the home relay H, were 55, and winding of magnet 51, to the CX terminal of the current source. Once the trip arm 50 is lowered, and the circuit controlling contact 53 closed, the magnet 51 may be retained energized by a circuit from the BX terminal through the back contact 56 of track relay TR, wire 57, circuit controlling contact 53, wire 55, and winding of magnet 51, to the CX terminal. Thus when a car enters the section X—Y under a clear signal with the trip arm 50 lowered, the magnet 51 will be retained energized and the trip arm 50 held in its lowered position until the car has passed over the trip arm and has vacated the section X—Y, so that when multiple unit trains are operated over the railroad, the forward cars will not trip the rear cars of the same train.

Another auxiliary circuit is provided for the magnet 51 that passes from the BX terminal of the current source, through back contact 56 of the track relay TR, wires 57 and 58, front contact 59 of a slow release relay 60 to be shortly described, wires 61 and 55, and winding of magnet 51, to the terminal CX. Thus by means of this auxiliary circuit, the magnet 51 can be energized in the event the track relay TR is shunted and the relay 60 picked up, irrespective of the condition of the home relay H. That is, in the event the relay 60 is picked up, a car entering the section X—Y and shunting the track relay TR will cause

the trackway trip arm 50 to be moved to its non-tripping position even though the home relay H is deenergized.

There is provided at each trip arm location a light sensitive photocell 62 and an associated relay 63. This cell 62 may be of a type similar to the car-carried cell 35. When the cell 62 is exposed to a beam of light of high intensity it will cause sufficient current to pass from a battery 64 to energize the relay 63, but normally not sufficient current flows in the circuit to pick up the relay 63. The relay 63, when picked up, closes at its front contact 65 a simple circuit to energize the relay 60, which circuit will be readily understood by an inspection of the drawing. At each trackway trip arm location, there is also provided a lamp 66 and a track projector 67. The lamp 66 may be energized by virtue of a circuit from the BX terminal, through front contact 68 of the home relay H, front contact 69 of relay 60 when that relay is energized, and lamp 66, to the CX terminal of the current source. It follows that exposing the trackway cell 62 to a beam of light of high intensity will result in relay 63 being energized, and then relay 60, in turn, being picked up, so that, in the event relay H is picked up, the trackway lamp 66 will be illuminated and a beam of light of high intensity will be projected from the trackway. It is to be understood that in the practice of my invention, the trackway photocell 62 is so located with respect to the trip arm 50 and the entrance of the track section X—Y that it will come within the path of the beam of light projected by the car-carried projector 41 just after the car has entered the track section and shunted the track relay TR but before the car-carried trip arm 19 engages the trackway trip arm 50. It will be further understood that the car-carried photocell 35 and the trackway projector 67 are so positioned that the car-carried cell comes within the path of the beam of light projected from the track projector 67 at the same time or just after the beam of light from the car-carried projector has fallen upon the trackway cell 62.

In describing the operation of my system, I will assume both the car-carried apparatus and the trackway apparatus to be in the conditions illustrated in Figs. 1 and 2, respectively. It is apparent that when the car passes the signal S in its clear position and enters the section X—Y, it will shunt the track relay TR. This will deenergize the relay H and so will set the signal S at stop in the customary manner, and it will also complete at the back contact 56 the stick circuit for retaining the magnet 51 energized to hold the trip arm 50 lowered in its non-tripping position. The car-carried trip arm will thus not engage the trackway arm 50 and the car can travel through the section X—Y at full speed. As the car passes out of the section X—Y and enters the section next in advance, the shunting of the track relay TR1 will keep the relay H deenergized. The picking up of the track relay TR as the car vacates the section X—Y will open the back contact 56 in the stick circuit to the magnet 51, and as relay H is now deenergized, the trip arm 50 is raised to its tripping position.

Assuming a second car approaches the stop signal while the first car occupies the section to the right of section X—Y, the trip arm 50 will be in the tripping position, and in the event the operator attempts to pass signal S, the car-carried trip arm 19 will engage the trackway arm 50 with the result that an automatic brake application is initiated in the manner described hereinbefore. To pass the stop signal S without an automatic application of the brakes, the operator on the second car will depress the acknowledging key 31, thus rupturing the stick circuit for the acknowledging relay 28, so that this relay will be deenergized. The opening of the acknowledging relay 28 will remove the normal supply of current from the magnet 14 of magnet valve MV, so that the magnet can now be energized only through the contact 17 of the speed governor G. The operator will hold the key 31 depressed after the relay 28 is deenergized, so that the lamp 40 will be illuminated causing a beam of light of high intensity to be projected by projector 41. This beam of light will fall upon the trackway light sensitive cell 62 with the result that both trackway relays 63 and 60 will become energized. With relay 60 picked up, the magnet 51 will be energized by the auxiliary circuit through back contact 56 of track relay TR and front contact 59 of relay 60. This will cause the trackway trip arm 50 to be lowered and thus the second car can advance into section X—Y without incurring an automatic application of the brakes. The relay 60 is made slow-releasing so as to retain the circuit of magnet 51 closed until the trip arm 50 is lowered and the circuit controlling contact 53 closed. This second car can now proceed through the section X—Y, but cannot exceed the speed at which contact 17 opens, which speed I have assumed to be ten miles per hour. If the trip arm at the next signal is in its tripping position, the operator of the car must again depress the acknowledging key 31 to again light the lamp 40. This action must be repeated each time the car approaches a trip arm in the tripping position. At no point after the car passed the first such trip arm can the car exceed the low speed limit without an automatic brake application until a clear signal is reached.

If a car traveling under speed restriction approaches a clear signal, the operator will depress the acknowledging key 31 as before to energize the lamp 40. The light beam from the car, striking the photocell 62, will cause the trackway relay 60 to be picked up and, as relay H is now energized, the trackway lamp 66 will become lighted. The light beam from the trackway projector 67 will strike the photocell 35 on the car and so will cause both relays 36 and 25 to become energized. The energizing of relay 25 will close the pick-up circuit for the acknowledging relay 28, and as soon as the operator releases the acknowledging key 31, the relay 28 will become energized, reclosing the normal circuit to the magnet 14 and thus removing the low speed restriction. The relay 25 is made slow-releasing so that its front contacts will remain closed to bridge the pick-up time of relay 28. The indicator 44 will be displayed when relay 25 picks up to inform the car operator when to release the acknowledging key 31. It is to be noted that the energizing circuit for the magnet 14 includes the back contact 24 of relay 25, thus avoiding the possibility of having the low speed limit removed after a car has passed an elevated trackway trip arm in the event the relay 36 associated with the light sensitive cell 35 should fail to open. That is to say, a check is provided to insure the return of photocell 35 and its relay 36 to their normal inactive conditions.

In the case of the wayside apparatus, if relay 60 should be retained energized due to failure of relay 63 to open, the only effect would be that the trip arm 50 might clear when a car enters the section X—Y even though the operator on the car does not press his acknowledging key. This condition, however, would not be likely to arise, because the car operator would not have any way of knowing that he could pass the trip arm without operating his acknowledging key.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. Railway traffic controlling apparatus comprising, a trackway trip arm movable to a non-tripping or a tripping position according as traffic conditions in advance are safe or unsafe, a car-carried brake applying trip arm arranged to be operated by the trackway trip arm when the latter is in its tripping position but not when it is in its non-tripping position, a car-carried source of light, manually controlled means adapted when actuated to illuminate said source of light, a light sensitive trackway element influenced by said light source to effect the movement of the trackway trip arm to its non-tripping position under unsafe traffic conditions, and car-carried speed governing means rendered active to establish a low speed restriction in response to such actuation of the manually controlled means.

2. Railway traffic controlling apparatus comprising, a trackway trip arm movable to a non-tripping or a tripping position according as traffic conditions in advance are safe or unsafe, a car-carried brake applying trip arm arranged to be operated by the trackway trip arm when the latter is in its tripping position but not when it is in its non-tripping position, a car-carried source of light, manually controlled means adapted when actuated to render said source of light active, a light sensitive trackway element influenced by light from said source to effect the movement of the trackway trip arm to its non-tripping position under unsafe traffic conditions, and car-carried speed governing means rendered active to establish a low speed restriction in response to said actuation of the manually controlled means.

3. Railway traffic controlling apparatus comprising, a trackway trip arm movable to a non-tripping or a tripping position according as traffic conditions in advance are safe or unsafe, a car-carried brake applying trip arm arranged to be operated by the trackway trip arm when the latter is in its tripping position only, a normally inactive car-carried source of light, manually controlled means to render active said source of light, a trackway photoelectric device influenced by the light from said source, and means governed by said trackway device effective to move the trackway trip arm to its non-tripping position under unsafe traffic conditions in response to the influence on the trackway device of the light from said source.

4. Railway traffic controlling apparatus comprising, a car-carried means arranged to at times establish a low speed restriction for the car, a car-carried source of light and a car-carried light sensitive cell, a trackway source of light and a trackway light sensitive cell, manually controlled means adapted when actuated to render the car-carried source of light active to influence the trackway light sensitive cell, trackway means controlled by the trackway cell effective under clear traffic conditions to render the trackway source of light active to influence the car-carried light sensitive cell, and means controlled by the car-carried cell to release the low speed restriction.

5. Railway traffic controlling apparatus comprising, a car-carried means arranged

to at times establish a restrictive traffic condition for the car, a car-carried source of light and a car-carried light sensitive cell, a trackway source of light and a trackway light sensitive cell, manually controlled means adapted to render the car-carried source of light active to influence the trackway light sensitive cell, trackway means controlled by the trackway cell effective under clear traffic conditions to render the trackway source of light active to influence the car-carried light sensitive cell, and means controlled by the car-carried cell to establish a non-restrictive traffic condition for the car.

6. Railway traffic controlling apparatus comprising, car-carried car-governing means having different conditions, a car-carried source of light and a car-carried light sensitive element, a trackway source of light and a trackway light sensitive element, means for at times rendering the car-carried source of light active to influence the trackway light sensitive element, means controlled jointly by said trackway element and traffic conditions to render the trackway source of light active to influence the car-carried light sensitive element, and means controlled by said car-carried element to establish a given condition of the car-governing means.

7. Railway traffic controlling apparatus comprising, a trackway light sensitive element, a car-carried source of light adapted to at times influence said trackway light sensitive element, a car-carried light sensitive element, a trackway source of light adapted when active to influence said car-carried light sensitive element, trackway means effective under certain traffic conditions in response to the influencing of the trackway light sensitive element by the car-carried source of light to render the trackway source of light active to influence the car-carrried light sensitive element, and car-governing means arranged to establish a given operating condition in response to the influencing of said car-carried element.

8. The method of conveying a signal indication from a trackway to a passing car which consists in projecting a light beam from the car to a trackway photoelectric device, then projecting a light beam from the trackway to a car-carried photoelectric device in accordance with the influence on said trackway photoelectric device and traffic conditions in advance, and establishing a signal indication on the car in accordance with the influence on said car-carried photoelectric device.

9. The method of establishing a speed governing condition for a car passing along a trackway which consists in projecting a light beam from the car to a trackway photoelectric device, then projecting a light beam from the trackway to a car-carried photoelectric device in accordance with the influence on said trackway photoelectric device and traffic conditions in advance, and establishing a speed governing condition for said car in accordance with the influence on said car-carried photoelectric device.

10. Railway traffic controlling apparatus including, a car-carried relay adapted when deenergized to establish a restrictive operating condition, a car-carried source of light and a light responsive element, a trackway source of light and a light responsive element, means controlled by the trackway light responsive element under clear traffic conditions to illuminate the trackway source of light in response to a beam of light projected by the car-carried source of light, and means controlled by the car-carried light responsive element to energize said relay in response to a beam of light projected by the trackway source of light for annulling the restrictive operating condition.

11. Railway traffic controlling apparatus including, a car-carried relay adapted when energized to establish a given operating condition, a car-carried source of light adapted when illuminated to at times influence a trackway light sensitive element, a trackway source of light adapted when illuminated to at times influence a car-carried light sensitive element, means governed by said trackway element under clear traffic conditions in response to influence by the car-carried source of light to illuminate the trackway source of light for influencing the car-carried light sensitive element, means governed by said car-carried element in response to said influence by the trackway source of light to energize said relay to establish the given operation condition, and means on the car for causing the car-carried source of light to become illuminated.

12. Railway traffic controlling apparatus comprising, trackway means having a stopping or a non-stopping condition according as traffic conditions in advance are unsafe or safe, a car-carried car-governing means arranged to be operated by said trackway means when the latter is in its stopping condition but not in its non-stopping condition, a car-carried source of light, a manually controlled means adapted when actuated to illuminate said source of light, and a light sensitive trackway element influenced by light radiated from said source to establish the non-stopping condition of said trackway means irrespective of traffic conditions in advance.

13. Railway traffic controlling apparatus comprising, trackway means having a stopping and a non-stopping condition according as traffic conditions in advance are unsafe or safe, a car-carried car-governing

means arranged to be operated by said trackway means when the latter is in its stopping condition but not in its non-stopping condition, a car-carried source of light, a manually controlled acknowledging means adapted when actuated to illuminate said source of light and to establish a low speed condition for said car, and a trackway photoelectric cell arranged to be influenced by light from said car source for establishing the non-stopping condition of said trackway means irrespective of traffic conditions.

14. Railway traffic controlling apparatus comprising, a track section, a normally energized track relay for the section, a trackway trip arm located slightly in advance of the entrance of the section for governing traffic through said section and movable to a non-tripping or a tripping position according as traffic conditions in advance are safe or unsafe, a car-carried brake applying trip arm arranged to be operated by the trackway trip arm when the latter is in its tripping position but not when it is in its non-tripping position, a car-carried source of light, a trackway photoelectric cell and a normally deenergized relay associated therewith arranged to energize said relay when the photoelectric cell is influenced by light from said car-carried source, a circuit including a front contact of the relay associated with the photoelectric cell and a back contact of said track relay adapted when closed to move the trackway trip arm to its non-tripping position, and manually controlled means on the car to illuminate the source of light and thereby cause the trackway trip arm to be moved to its non-tripping position as the car enters the section.

15. Controlling means for a power driven vehicle arranged to travel along a given trackway comprising, a vehicle-carried source of light, a photocell located along the trackway arranged to be influenced by light from said vehicle-carried source, a trackway source of light controlled in part by the trackway photocell and in part by traffic conditions of said trackway, a vehicle-carried photocell arranged to be influenced by light from the trackway source, a vehicle governing means controlled by said vehicle-carried photocell, and a vehicle-carried manually controlled means for illuminating the vehicle-carried source of light.

In testimony whereof I affix my signature.

BERNARD E. O'HAGAN.