L. V. LEWIS.

CONTROLLING APPARATUS FOR RAILWAY CARS OR TRAINS.

APPLICATION FILED AUG. 7, 1912.

1,167,334.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

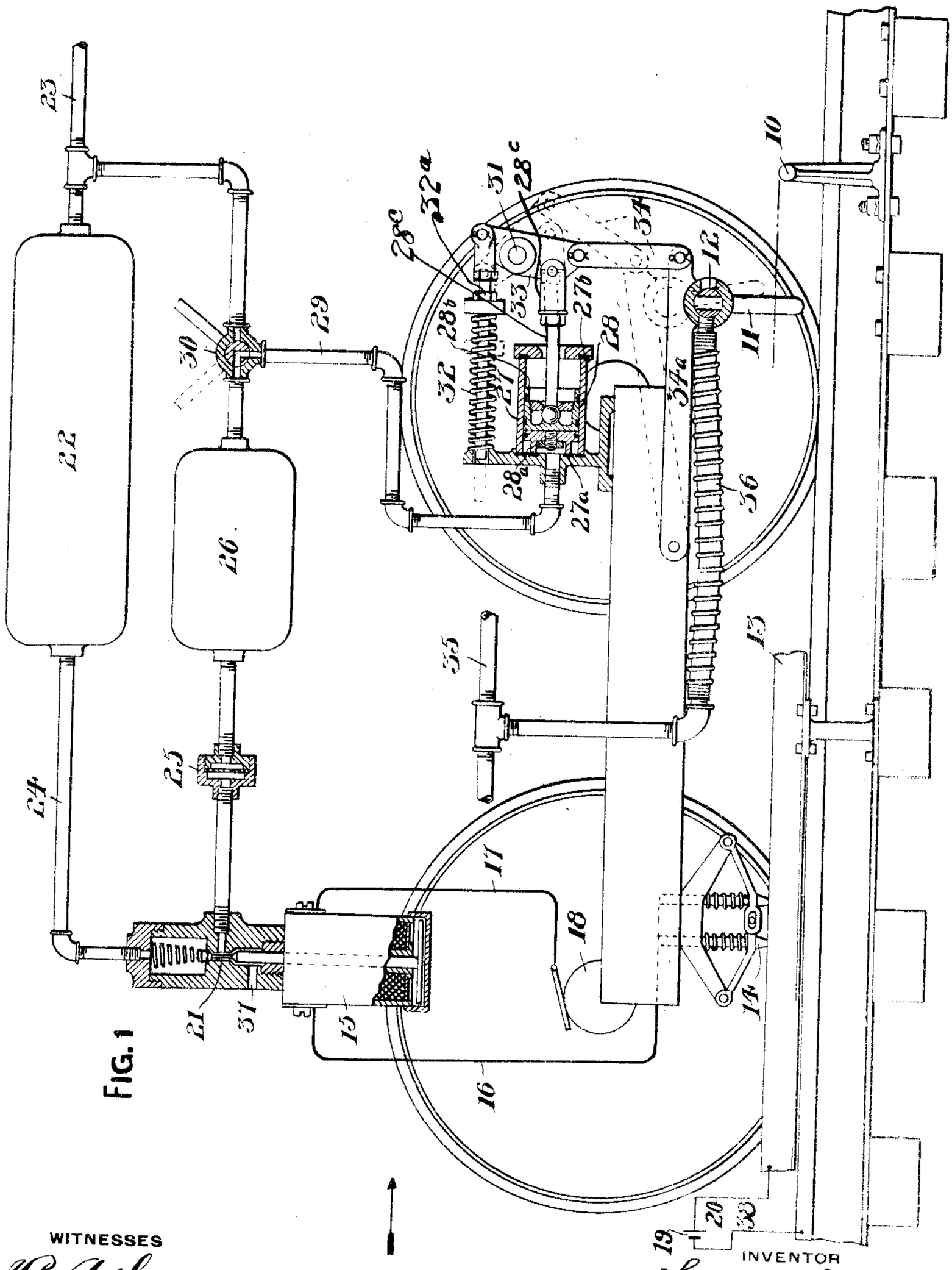

FIG. 1

WITNESSES

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3 SHEETS—SHEET 2.

FIG. 2

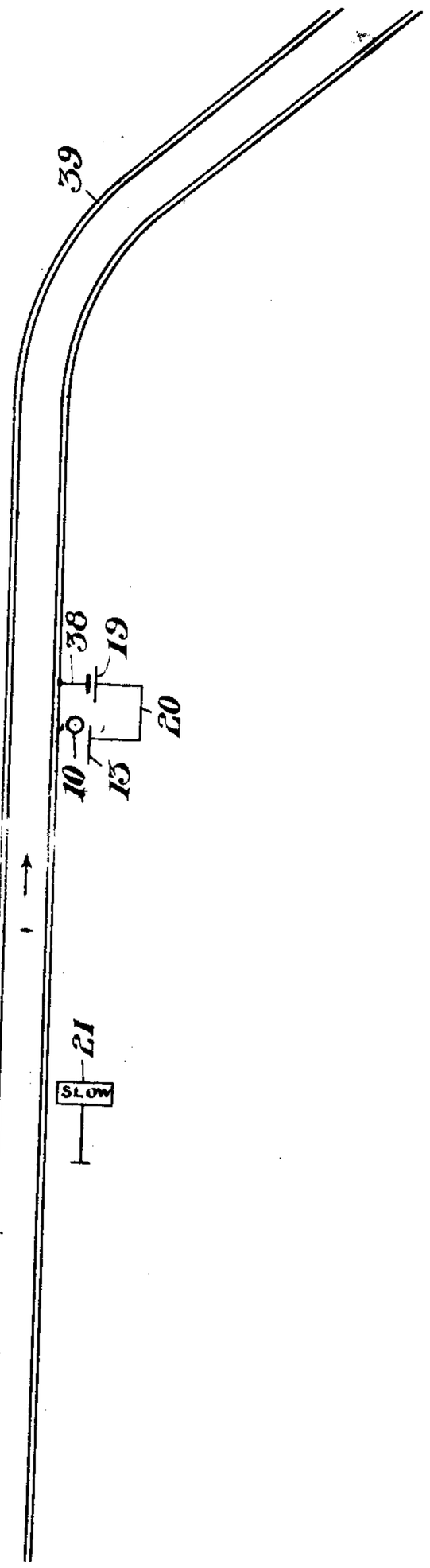
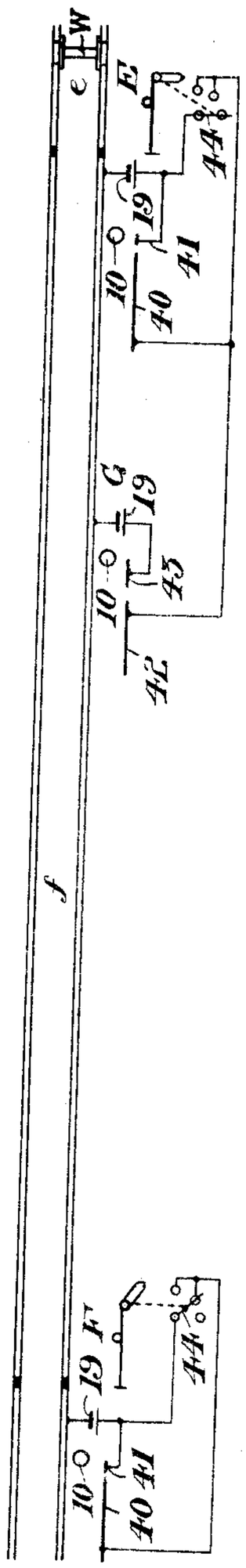


FIG. 3



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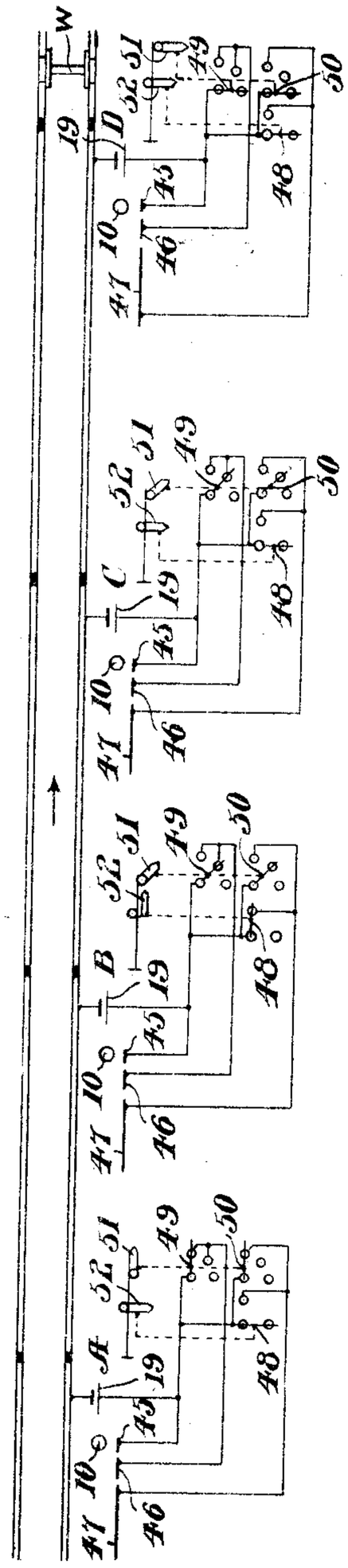

FIG. 4

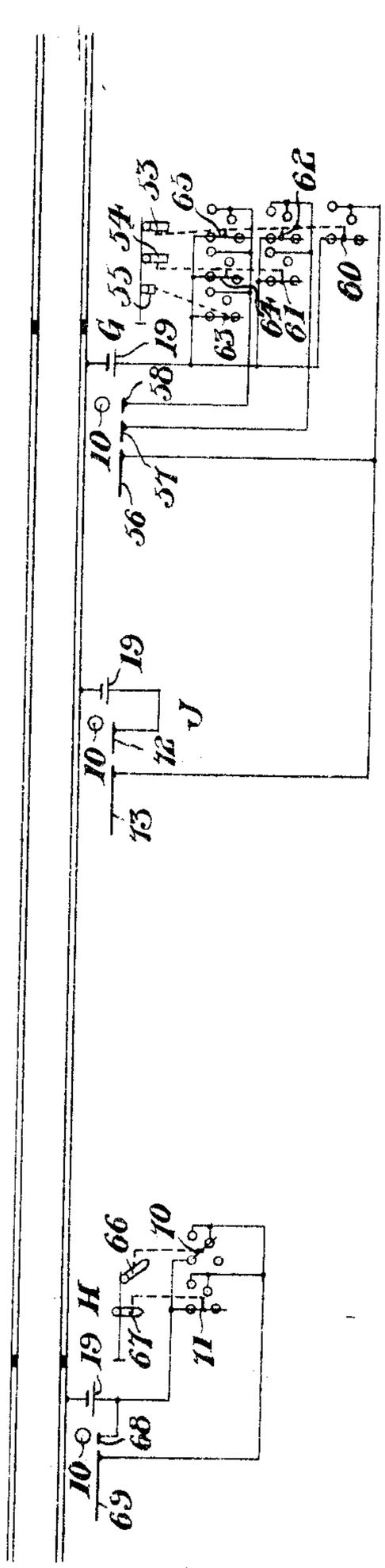

FIG. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

LLOYD V. LEWIS, OF EDGEWOOD BOROUGH, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONTROLLING APPARATUS FOR RAILWAY CARS OR TRAINS.

1,167,334. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed August 7, 1912. Serial No. 713,638.

To all whom it may concern:

Be it known that I, LLOYD V. LEWIS, a citizen of the United States, residing at Edgewood borough, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Controlling Apparatus for Railway Cars or Trains, of which the following is a specification.

My invention relates to apparatus for governing the speed of railway cars or trains at points along the railway.

I will describe an apparatus embodying my invention and describe its application to various situations, and will then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view showing one form of apparatus carried by a car or train and embodying my invention, and showing also a portion of one form of apparatus located along a trackway and embodying my invention. Figs. 2, 3, 4 and 5 are diagrammatic views showing several forms of apparatus located along a trackway and embodying my invention.

Similar reference characters refer to similar parts in each of the several views.

Referring particularly to Fig. 1 of the drawings, which is partly diagrammatic in so far as it illustrates a car or vehicle traveling along a trackway, and the relative arrangement of the several parts therein illustrated, 10 designates a trip located adjacent the trackway which is here shown as being constantly in tripping position, although I do not wish to be limited to this particular arrangement, or to the partcular form of trip shown. 11 designates a device carried by a car and arranged thereon so that at times, it may engage the trip to affect apparatus on the car having to do with controlling the speed of the car. The apparatus on the car having to do with the control of the speed of the car is here shown as a valve 12, and the device 11 is here shown as an arm. The arm 11 is operatively connected with the valve 12 which valve is adapted to close and open a pipe 36 connected with the train pipe 35. When the valve 12 is moved by reason of the arm 11 engaging the trip 10, the pipe 36 is opened to the atmosphere and an automatic application of the brakes is the result. This is well understood in the art.

The arm 11 and the valve 12 operated thereby, are suitably supported so that the arm 11 may be moved into and out of its position in which it can be engaged by the trip 10; for which movement I provide a suitable actuating mechanism. The operation of said mechanism is initiated by a track device, and preferably an interval of time elapses before the full operation of said mechanism to move the arm to its inoperative position.

As here shown the arm 11 and its valve 12 are suitably supported by a lever 34^a, which is pivoted on the car or vehicle at some suitable point. The full line position in Fig. 1 indicates the operative position of the arm 11, and the dotted line position the inoperative position of the arm 11. The mechanism for moving the arm 11 from its operative to its inoperative position may be any desired. As here shown, this actuating mechanism as I shall hereinafter call it, comprises a cylinder 27, in which a piston 28 moves, the rod 28^c of which is connected with a crank 33 pivoted at 31. One end of the crank is connected by a link 34 with the lever support 34^a, while the other end of the crank is connected with a rod surrounded by a coiled spring 32. One function of the spring 32 is to act as a load which has to be overcome by the outward movement of the piston in its cylinder when the arm 11 is moved to its inoperative position. An adjustable nut 32^a is provided for regulating the tension of the spring 32 and therefore the load to be moved by the piston. Another function of the spring 32 is to assist gravity in returning the arm 11 to its operative position. The pivotal point 31 and the connecting points of the link 34 are preferably arranged in a straight line when the arm 11 is in its operative position so that a lock is formed by the crank 33 and link 34 to hold the arm 11 against accidental displacement.

The piston 28 of the actuating mechanism is moved in its cylinder by air pressure from

a reservoir 22, in which the pressure is maintained substantially constant. This reservoir may be supplied from any suitable source through a pipe 23. The supply of air pressure from reservoir 22 to the cylinder 27 and piston 28 is controlled by means of a valve 21, the actuation of which is controlled by a device located alongside the trackway which I will hereinafter term a track device. The preferred form of track device is a ramp rail 13 which engages a shoe 14 carried by the car. The ramp and shoe may form part of a circuit to control an electromagnet 15 which in turn controls the valve 21, or the shoe may be made to mechanically control the valve 21. In the electric form of control shown in the drawing, when the shoe 14 engages the ramp rail 13, the following circuit is closed: from a source of current 19 through wire 20, ramp rail 13, contact shoe 14, wire 16, electromagnet 15, wire 17, axle 18, wheel of car, a track rail, wire 38 to source 19.

In order that an interval of time may elapse between the opening of valve 21 and the instant that the piston 27 moves outwardly to move the arm 11 to its inoperative position, I provide means between the reservoir 22 and the cylinder 28 which act to reduce the pressure from the source and afterward let it build up behind the piston until sufficient pressure is secured to cause the piston 28 to move. These means may assume many forms and for convenience I will hereinafter refer to them as "timing means". As shown in Fig. 1 these means take the form of a diaphragm 25 provided with an orifice of small area, and a reservoir 26. As here shown, when the electro-magnet 15 is deënergized the reservoir 26 is open to atmosphere through a port 37, and when the electro-magnet 15 is energized the port 37 is closed and the reservoir 26 is connected with the supply reservoir 22. It will be seen that by means of this apparatus, when the electro-magnet 15 is energized a period of time will elapse before sufficient pressure reaches the piston 28 to overcome the load and move the trip arm 11 to its inoperative position. This period of time may be determined by making the reservoir 26 the proper capacity, and by making the orifice 25 of the proper area.

In order to render the movement of the piston 28 positive and quick when the pressure behind the piston builds up to the required point, I preferably provide the rear end of the piston with an annular lug 28^a, which engages a seat 27^a of leather or other suitable material. The area thus exposed to air pressure when the piston is seated against the seat 27^a is less than the area of the cylinder, so that as soon as the piston begins to move outwardly and the lug 28^a leaves the seat 27^a the area exposed to air pressure is suddenly increased to the full area of the cylinder and the remainder of the movement is positive and quick. I also preferably provide the outside end of the cylinder 27 with a seat 27^b of leather or other suitable material, which is engaged by an annular extension 28^b on the piston when the piston reaches the extreme outer end of its stroke, thereby preventing leakage of air past the piston and out at the open end of the cylinder.

It will be seen from the foregoing that as the car proceeds along the railway in the direction indicated by the arrow in Fig. 1, when the contact shoe 14 engages the ramp rail 13 the electro-magnet 15 is energized thereby connecting the cylinder 27 with the supply reservoir 22, and if the speed of the car is such that the arm 11 is moved out of engaging position before it reaches the trip 10, the valve 12 will not be opened, hence the brakes will not be applied. If, however, the speed of the car is such that the arm 11 is not moved out of engaging position before the trip 10 is reached, the valve 12 will be opened and the brakes will be applied. It will be seen, therefore, that the permissive speed of the car past the trip 10 will depend upon the distance at which the ramp rail 13 terminates in the rear of the trip 10.

A purpose of my invention primarily is to insure that the driver of the car or train obeys the signals or other indicating devices along the trackway, also if they are not obeyed, to automatically bring the car or train to a stop before entering the danger zone. Obviously if the signals or other devices are obeyed the apparatus should not be called into use.

In Fig. 2, I have shown a specific application of my invention, the railway track having a curve 39 over which the speed for safety should be limited. 21 designates a speed signaling device, that is a device which conveys to the driver information as to the speed allowed on the curve. In this situation the trip 10 is located at a point which will insure that the train will be traveling at the safe speed when it reaches the curve if it is traveling at a greater speed when it passes trip 10. The permissive speed past the trip 10 is designated at such a value that if a car or train passes the trip at this permissive speed it cannot be accelerated to a speed higher than the safe speed by the time it reaches the curve. Assume for the present example that this permissive speed is 25 miles per hour. The ramp rail 13 terminates at such distance in the rear of the trip that if the speed of the car or train when it reaches the ramp rail is at or below 25 miles per hour the arm 11 will be moved out of engaging position before it reaches trip 10, but that if the speed at this point

is above 25 miles per hour the arm 11 will not be moved out of engaging position and the brakes will be applied. If now the car or train approaches the trip 10 at 25 miles per hour or less, a sufficient period of time will elapse after the contact shoe 14 engages ramp rail 13 before the arm 11 reaches the trip 10 to permit the arm 11 to move out of position for engagement with the trip 10 and the brakes will therefore not be applied. If, however, the speed of the car or train is greater than 25 miles per hour, a sufficient period of time will not elapse after the shoe 14 engages with the ramp rail 13 to permit the arm 11 to be moved out of engaging position and the arm will therefore engage the trip 10 and will open the valve 12, thereby applying the brakes.

In Fig. 3 I have shown another specific application of my invention. In this case it is applied to a railway signaling system. F is a signal governing the speed of traffic through a block *f*, and E is a signal governing the speed of traffic through a succeeding block *e*. Each signal as here shown is of the three-position type, adapted to indicate "stop"; "proceed, prepare to stop at next signal"; and "proceed". It is however understood that when one of these signals indicates "stop", a train after being brought to a stop may proceed into the next block at a low speed. As here shown, block *e* is occupied by a car or train W, so signal E indicates "stop", and signal F indicates "proceed, prepare to stop at next signal". For each signal I provide a trip 10. Each of these trips is preferably located at such a distance in the rear of its signal that if the brakes are applied to a train passing the trip at medium speed, the train will be brought to a stop at or in the rear of the corresponding signal. Extending in the rear of each of these trips is a ramp rail which is divided into two insulated sections 40 and 41. The section 41 is constantly connected with a source of current 19, and terminates a short distance in the rear of the trip 10, this distance being such as to permit the passage of a car past the trip 10 at a low speed, say five miles per hour, without being stopped. Operatively connected with each signal is a circuit controller 44 which, when the signal indicates "proceed" or "proceed, prepare to stop at next signal", connects section 40 also with the source 19, but which disconnects this section from the source when the signal indicates "stop". The section 40 terminates at such distance in the rear of the trip 10 as to permit a car or train to pass this trip at the maximum speed, say 75 miles per hour, without being stopped, when the section 40 is connected with the source 19.

Located at a point G is another trip 10 and extending in the rear of this trip 10 is a ramp rail divided into two insulated sections 42 and 43. The point G is at such distance in the rear of signal E that if the brakes are applied at G to a train passing G at the maximum speed, the train will be brought to a stop at or in the rear of signal F. The section 43 is constantly connected with a source of current 19; the section 42 is connected with the source 19 at signal E when signal E indicates "proceed" and "proceed, prepare to stop at next signal" and is disconnected from this source when the signal E indicates "stop". The section 43 terminates at such distance in the rear of the trip 10 as to permit a car or train to pass this trip at a medium speed such as 25 miles per hour without being stopped, and the section 42 terminates at such distance in the rear of the trip 10 as to permit a car or train to pass this trip at the maximum speed such as 75 miles per hour without being stopped when this section is connected with the source 19 at signal E.

The operation of the apparatus shown in Fig. 3 is as follows: When signals E and F are both in "proceed" position, sections 40 and 42 are connected with the sources 19 so that a car or train may pass these signals at 75 miles per hour without being stopped. When signal E indicates "stop" and signal F indicates "proceed, prepare to stop at next signal" which are the indications shown, a car or train may pass signal F at 75 miles per hour without being stopped and if this car or train slows down to 25 miles per hour or less before reaching point G, it may pass this point without being stopped and its speed will then be such that it can be brought to a full stop before reaching signal E. If however the car or train does not slow down after passing signal F, and attempts to pass point G at a speed greater than 25 miles per hour, its brakes will be applied by trip 10 at point G and it will consequently be automatically brought to a stop before reaching signal E.

In Fig. 4 I have shown another specific application of my invention with another form of railway signaling system. In this signaling system each signal A, B, C and D comprises two semaphore arms 51 and 52. When the arms are in the positions shown at D the signal indicates "stop", due to the presence of a car or train W; when the arms are in the positions shown at C the signal indicates "proceed, prepare to stop at next signal"; when the arms are in the positions shown at B the signal indicates "proceed, prepare to pass the next signal at medium speed"; when the arms are in the positions shown at A the signal indicates "proceed." For each signal I provide a trip 10. Each trip 10 is, as in Fig. 3, located a short distance in the rear of the corresponding signal, for the same reason as explained in de-

scribing Fig. 3. Extending in the rear of each trip 10 is a sectional ramp rail here shown as comprising three insulated sections 45, 46 and 47. Section 45 is constantly connected with a source of current 19 and terminates at such distance in the rear of the trip 10 as to permit a car or train to pass the trip 10 at low speed, such as for example 5 miles per hour, without being stopped. Section 46 is connected with and disconnected from the source 19 by means of a circuit controller 49 operatively connected with semaphore arm 51 and section 47 is similarly connected with and disconnected from the source 19 by means of a circuit controller 50 operatively connected with semaphore arm 51 and also by means of a circuit controller 48 operatively connected with semaphore arm 52. The section 46 terminates at such distance in the rear of the trip 10 as to permit a car or train to pass the trip at medium speed, such as 25 miles per hour, without being stopped; and the section 47 terminates at such distance in the rear of the trip 10 as to permit a car or train to pass the trip at maximum speed such as 75 miles per hour without being stopped.

The operation of the apparatus shown in Fig. 4 is as follows: When the signals are in the positions shown, if a car or train moving in the direction of the arrow approaches signal A at 75 miles per hour it may pass the trip 10 without being stopped for the reason that section 47 of the contact rail adjacent this trip is connected with source 19. The car or train may also pass signal B at 75 miles per hour for the reason that section 47 of the contact rail adjacent this signal is connected with source 19. Signal B however indicates to the driver of the car or train that he must reduce speed before reaching signal C; if the speed is reduced to 25 miles per hour or less before reaching signal C the car or train may pass this signal without being stopped for the reason that section 46 of the contact rail adjacent this signal is connected with source 19. If however the speed of the car or train is greater than 25 miles per hour at the signal C, it will be automatically stopped by the action of the trip 10 for the reason that section 47 of the contact rail adjacent this member is not connected with source 19. At signal D neither section 46 nor 47 of the contact rail is connected with source 19; hence if a car or train attempts to pass this signal at a speed greater than 5 miles per hour it will be automatically stopped by the action of the trip 10.

In Fig. 5 I have shown a specific application of my invention for an arrangement of signals adjacent an "interlocking." In this view signal G comprises three arms 53, 54 and 55 which when in the proceed position indicate different permissive speeds past the signal. For example, when arm 53 indicates "proceed," the speed may be 75 miles per hour; when arm 54 indicates "proceed," the speed may be 25 miles per hour; when arm 55 indicates "proceed" the speed may be 10 miles per hour; and when all three arms are in "stop" position the signal indicates absolute stop. A trip 10 is located a short distance in the rear of the signal G and extending in the rear of this trip is a ramp rail comprising three insulated sections 56, 57 and 58, these three sections terminating respectively at such distances in the rear of the trip 10 that when connected with a source 19 they will permit a car or train to pass the trip 10 at 75 miles per hour, 25 miles per hour and 10 miles per hour, respectively, without being stopped. These sections 56, 57 and 58 are connected with and disconnected from the source 19 by means of circuit controllers 60 to 65, inclusive, which are operatively connected with the semaphore arms 53, 54 and 55 as indicated in the drawing. H is a signal comprising two arms 66 and 67 which signal is adapted to indicate the speed at which a car or train may pass signal G, except that when the block between G and H is occupied this signal indicates "stop." A short distance in the rear of signal H is a trip 10 and extending in the rear of trip 10 is a ramp rail comprising two sections 68 and 69 which sections terminate respectively at such distances in the rear of trip 10 that when they are connected with a source 19, a car or train may pass the signal H at respectively a low speed or the maximum speed without being stopped. As here shown section 68 is constantly connected with source 19 so that a car or train may always pass this signal at a low speed without being stopped. Section 69 is connected with and disconnected from source 19 by means of two circuit controllers 70 and 71 which are operatively connected respectively with semaphore arms 66 and 67. These circuit controllers are so arranged that section 69 is connected with source 19 when the signal indicates "proceed" regardless of the particular proceed indication given by this signal. Located at a suitable point J in the rear of signal G is another trip 10 in the rear of which extends a ramp rail comprising two sections 72 and 73 which sections terminate respectively at such distances in the rear of the trip that when energized they permit a car or train to pass the trip at respectively a medium speed and the maximum speed, such for example as 25 miles per hour and 75 miles per hour. Section 72 is constantly connected with the source 19 at point J so that a car or train may always pass this point at a medium speed. Section 73 is connected with source 19 at signal G by circuit con-

troller 60 when arm 53 indicates "proceed," but is disconnected from this source 19 at all other times. It will be seen therefore that if signal G gives any indication other than "proceed at maximum speed" section 73 will not be connected with source 19, and that therefore if a car or train attempts to pass the point J at a speed greater than 25 miles per hour, it will be stopped by the action of trip 10 at that point.

Although I have herein shown and described only one form of apparatus embodying my invention and have shown it applied to only a few situations, 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.

The speed control of the car or train as herein set forth is accomplished through the brakes thereof. It is obvious that the movement of the arm 11 may be made to control the supply of motive power to the car or to operate suitable signals in the cab, these functions to be performed by the movement of the arm 11 being well known equivalents in the art.

Having thus described my invention, what I claim is:—

1. An apparatus for governing railway cars or trains comprising a trip located adjacent the trackway, a device carried by a car or train and adapted to engage with the said trip to control the speed of the car or train, time-controlled means carried by the car or train for moving the said device out of position to engage with the said trip, and means located adjacent the trackway for setting said time-controlled means into operation at a predetermined distance before the car or train reaches the said trip.

2. A speed control apparatus for cars or trains traveling along a trackway, comprising apparatus on the car or train for controlling the speed thereof, a device on the car or train for operating said apparatus, means adjacent the trackway for engaging said device to have it operate said apparatus, mechanism also on the car or train for moving the device to a position in which it cannot be operated by the said means, said mechanism requiring time for its operation, and other means adjacent the trackway for starting the operation of said mechanism so that the car or train may proceed at a safe speed between the two said means.

3. A speed control apparatus for cars or trains traveling along a trackway having in combination, means on the car or train for controlling the speed thereof, a device on the car or train for operating said means and having an operative and an inoperative position, two devices located in the trackway, one of which will engage the device on the car or train, and the other of which causes the device on the car or train to be moved to the inoperative position if the car or train is proceeding at a safe speed between the two said devices.

4. A speed control apparatus for railways comprising a signal adapted to indicate to a driver of a car or train a plurality of permissive speeds, a trip located adjacent the trackway, a device carried by the car or train and adapted to coöperate with the trip to control the speed of the car or train, means carried by the car or train for rendering the said device ineffective to coöperate with the trip said means requiring a predetermined period of time for operation, and means located adjacent the trackway and controlled in accordance with the speed indicated by the signal for setting the other said means into operation at one of a plurality of distances before the car or train reaches the trip, said distance depending upon the speed indicated by the signal.

5. A speed control apparatus for railways comprising a signal adapted to indicate to a driver of a car or train a plurality of permissive speeds, a trip located adjacent the trackway, a device carried by the car or train and adapted to coöperate with the trip to control the speed of the car or train, means carried by the car or train for rendering the said device ineffective to coöperate with the trip, said means requiring a predetermined period of time for operation, a plurality of conductor sections extending along the trackway and terminating at different distances in the rear of the said trip, means controlled in accordance with the speed indicated by the signal for energizing one or another of said conductor sections, a second device carried by the car or train and adapted to coact with the conductor sections, and means carried by the car or train for setting into operation the first-named means when the said second device coacts with a conductor section which is energized.

6. A speed control apparatus for railways comprising a trip located adjacent the trackway, a device carried by a car or train and adapted to coöperate with the said trip to control the speed of the car or train, time-controlled means carried by the car or train for rendering the device ineffective to coöperate with the said trip, a conductor extending along the trackway in the rear of the said trip, means for energizing said conductor, a second device carried by the car or train and adapted to coact with the conductor, and means carried by the car or train for setting the time-controlled means into operation when the said second device coacts with the conductor.

7. A speed control apparatus for railways comprising a trip located adjacent the trackway, a device carried by a car or train and adapted to coöperate with the said trip to con-

trol the speed of the car or train, time-controlled means carried by the car or train for rendering the device ineffective to coöperate with the said trip, a plurality of conductor sections extending along the trackway the several sections terminating at different distances in the rear of the said trip, means for energizing the several sections, a second device carried by the car or train and adapted to co-act with the said conductor sections, and means carried by the car or train and controlled by the said second device for setting the time-controlled means into operation when the said second device coacts with a conductor section which is energized.

8. An apparatus for governing railway cars or trains comprising a trip located adjacent the trackway, a device carried by a car or train and adapted to coöperate with the said trip to control the car or train, time-controlled means carried by the car or train for rendering the device ineffective to coöperate with the trip, a conductor extending along the trackway and terminating a predetermined distance in the rear of the trip, means for energizing said conductor, a contact shoe carried by the car or train and adapted to engage with the conductor, and an electro-responsive device carried by the car or train and connected with the contact shoe and adapted when energized to set the time-controlled means into operation.

9. In combination, a railway, a trip located adjacent the trackway thereof, a device carried by a car and adapted to engage with the trip, a source of fluid pressure on the car, a fluid pressure device on the car for moving the first-named device out of position for engagement with the trip, means for connecting said source of fluid pressure with and disconnecting it from said fluid pressure device, and means interposed between the source and the fluid pressure device for requiring a predetermined period of time for sufficient pressure to reach said fluid pressure device to cause it to move the first-named device out of engaging position.

10. In combination, a railway, a trip located adjacent the trackway thereof, a device carried by a car and adapted to engage with the trip, a source of fluid pressure on the car, a fluid pressure device on the car for moving the first-named device out of position for engagement with the trip, means for connecting said source of fluid pressure with and disconnecting it from said fluid pressure device, and means interposed between the source and the fluid pressure device for requiring a predetermined period of time for sufficient pressure to reach said fluid pressure device to cause it to move the first-named device out of engaging position, and means located adjacent the trackway for causing the first-named means to connect the source with the fluid pressure device at a predetermined distance before the car reaches the trip.

11. In combination, a railway, a trip located adjacent the trackway thereof, a car traveling along the railway, an arm carried by the car and normally in position for engagement with the trip, means on the car for moving the arm out of such engaging position, said means requiring a predetermined period of time for operation, and means located in the trackway for setting said means into operation at a predetermined distance before the arm reaches the trip.

12. A speed control apparatus for railways, comprising a plurality of successive blocks, signals for the blocks each adapted when its own block is occupied to indicate "stop, proceed at low speed" and each adapted at other times to indicate the speed at which the next succeeding signal may be passed, a trip located along the trackway adjacent each signal, a car traveling along the railway, a device on the car adapted to engage the trip to control the speed of the car, mechanism on the car for moving the device out of engaging position said mechanism requiring a predetermined period of time for operation, and means adjacent each signal and controlled in accordance with the speed indicated by the signal for setting said mechanism into operation at a distance in the rear of the trip, said distance depending on the speed indicated by the signal.

13. A speed control apparatus for railways, comprising a signal adapted to indicate stop and proceed, a preceding signal adapted to indicate the speed at which the first named signal may be passed, a trip located on the trackway adjacent the first named signal, a device carried by a car and adapted to coact with the trip to compel the car to run at low speed past said trip when the signal indicates stop, means controlled by the signal for rendering the said device inoperative when the signal indicates proceed, a second trip located at substantially the maximum braking distance in the rear of the first named signal and adapted to coact with the device on the car to compel the car to run at medium speed past said second trip when the first-named signal indicates stop, said device being rendered inoperative to coact with the second trip when the first-named signal indicates proceed.

14. In combination, a railway truck, a vehicle adapted to travel thereon; a trip located in the trackway, a device carried by the vehicle and biased to position for engagement with the trip to govern the vehicle, a source of fluid pressure on the vehicle, means on the vehicle operated by said fluid pressure for moving said device out of position for engagement with said trip, controlling means for controlling the application of said fluid pressure to said means, and

means for requiring a predetermined period of time for said controlling means to change to cause a movement of said device out of position for engagement with said trip.

15. In combination, a railway track, a vehicle adapted to travel thereon; a trip located in the trackway, a device carried by the vehicle and biased to position for engagement with the trip to govern the vehicle, a source of fluid pressure on the vehicle, a fluid pressure motor on the vehicle for moving said device out of position for engagement with the trip, a valve for controlling the supply of fluid pressure from said source to said motor, means for operating the valve, and means interposed between the valve and the motor for requiring a predetermined time-interval to elapse from the time the valve is operated until sufficient pressure reaches the motor to cause the latter to move the device.

16. In combination, a railway vehicle, a device located in the trackway, controlling means on the vehicle normally in condition to be operated by said trackway device, time-measuring means on the vehicle for preventing operation of said controlling means by said trackway device, and means located in the trackway for setting said time-measuring means into operation at a predetermined distance in the rear of said trackway device.

17. In combination, a railway vehicle, a device located in the trackway, controlling means on the vehicle normally in condition to coact with said trackway device to control the vehicle, time-measuring means on the vehicle for preventing coaction of said controlling means and said trackway device to control the vehicle, and means located in the trackway for setting said time-measuring means into operation at a predetermined distance in the rear of said trackway device.

18. In combination, a railway vehicle, vehicle-controlling means thereon, a device in the trackway for causing operation of said vehicle-controlling means, time-measuring means on the vehicle for preventing operation of the vehicle-controlling means by said trackway device, and means located in the trackway and controlled by traffic conditions for setting said time-measuring means into operation at a predetermined distance in the rear of the trackway device.

19. In combination, a railway vehicle, vehicle-controlling means thereon, a device in the trackway for causing operation of said vehicle-controlling means, time-measuring means on the vehicle for preventing operation of the vehicle-controlling means by said trackway device, and means located in the trackway and controlled by traffic conditions for setting said time-measuring means into operation at one of a plurality of distances in the rear of said trackway device, the distance depending on the speed at which it is safe for the vehicle to pass said trackway device.

20. In combination, a railway vehicle, a trip located in the trackway, a device carried by said vehicle and adapted normally to coact with said trip, and time-controlled means carried by the vehicle for rendering said device ineffective to coact with said trip.

21. In combination, a railway vehicle, a device located in the trackway, a device carried by said vehicle and adapted normally to coact with said trackway device, and time-controlled means carried by the vehicle for rendering said vehicle-carried device ineffective to coact with said trackway device.

22. In combination, a railway vehicle, vehicle-controlling means thereon, operating means for said vehicle-controlling means, time-measuring means on the vehicle for determining the effectiveness of said operating means, and a series of devices located in the trackway and defining progressively varying space intervals for controlling said time-measuring means and said operating means.

23. In combination, a railway vehicle, vehicle-controlling means thereon, operating means for said vehicle-controlling means, time-measuring means on the vehicle for determining the effectiveness of said operating means, and a series of devices located in the trackway and defining progressively varying space intervals for controlling said time-measuring means and said operating means, and means for controlling said trackway devices in part at least by traffic conditions.

24. In combination, a railway vehicle, vehicle-governing means thereon, a series of devices located in the trackway each adapted to cause operation of said vehicle-governing means, time-measuring means on the vehicle for preventing operation of said vehicle-governing means, by said trackway devices, and means located in the trackway and controlled by traffic conditions for setting said time-measuring means into operation at predetermined distances in the rear of said trackway devices, said distances progressively decreasing in the direction of the movement of the vehicle under dangerous traffic conditions in advance.

25. In combination, a railway vehicle, vehicle-governing means thereon, a series of devices located in the trackway each adapted to cause operation of said vehicle-governing means, time-measuring means on the vehicle for preventing operation of said vehicle-governing means, by said trackway devices, and means located in the trackway and controlled by traffic conditions for setting said time-measuring means into operation at predetermined distances in the rear of said trackway devices, said distances defining the safe permissive speed of the vehicle at the corresponding points under dangerous traffic conditions in advance.

26. In combination, a railway vehicle, vehicle-controlling means thereon, two devices spaced along the trackway and defining a definite space interval, one of said devices being controlled by traffic conditions, and means on the vehicle coöperating with said trackway devices and with said vehicle-controlling means for preventing operation of the vehicle-controlling means when the vehicle consumes more than a predetermined time interval in passing over said space interval under dangerous traffic conditions.

In testimony whereof I affix my signature in presence of two witnesses.

LLOYD V. LEWIS.

Witnesses:
W. L. McDaniel,
A. L. Vencill.