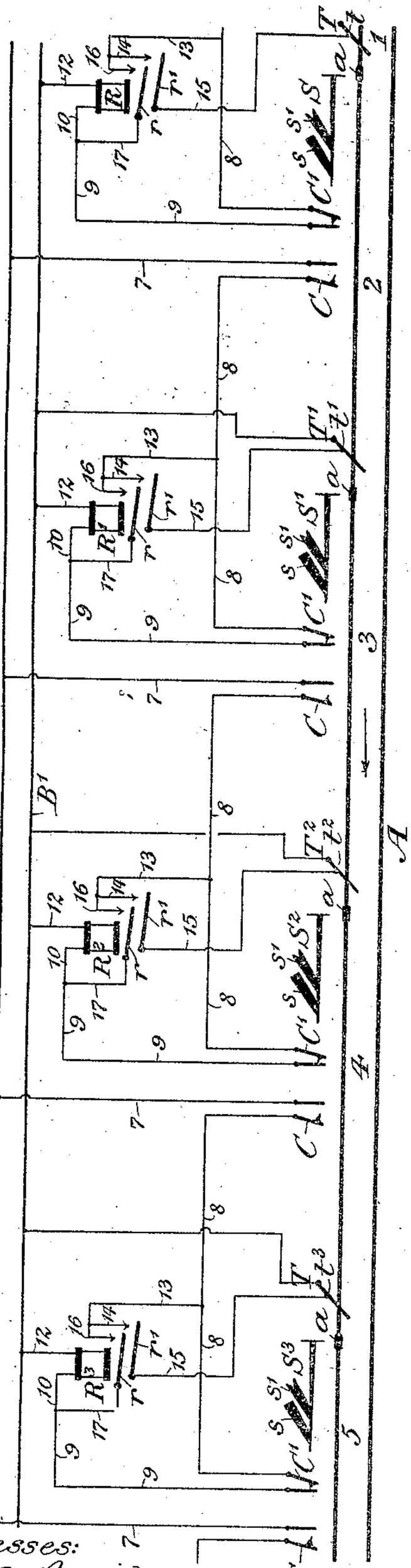
No. 819,326. PATENTED MAY 1, 1906

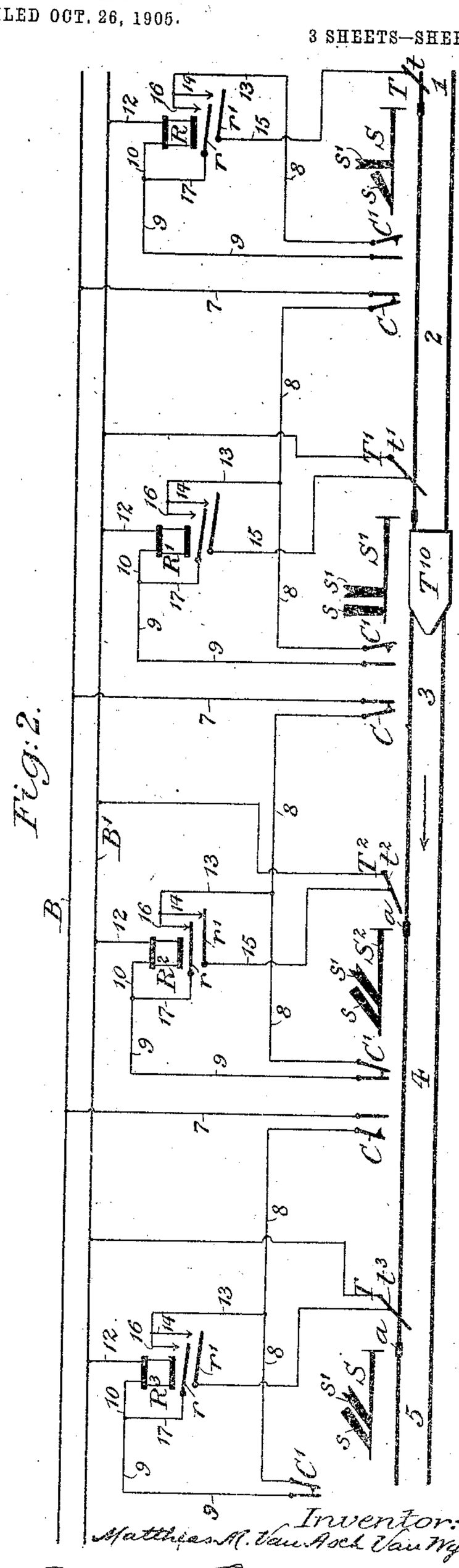
M. VAN A. VAN WYCK.

CONTROL OF APPARATUS GOVERNING THE PASSAGE OF CARS OR VEHICLES ALONG A RAILWAY.

APPLICATION FILED OCT. 26, 1905.

3 SHEETS—SHEET 1.





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3 SHEETS—SHEET 2.

Fig. 3.

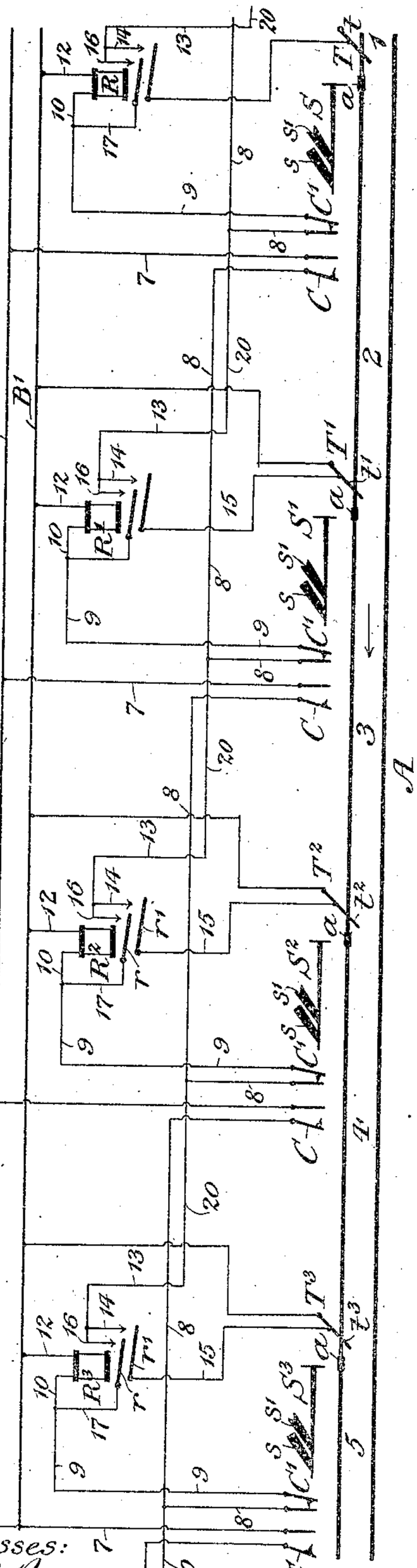
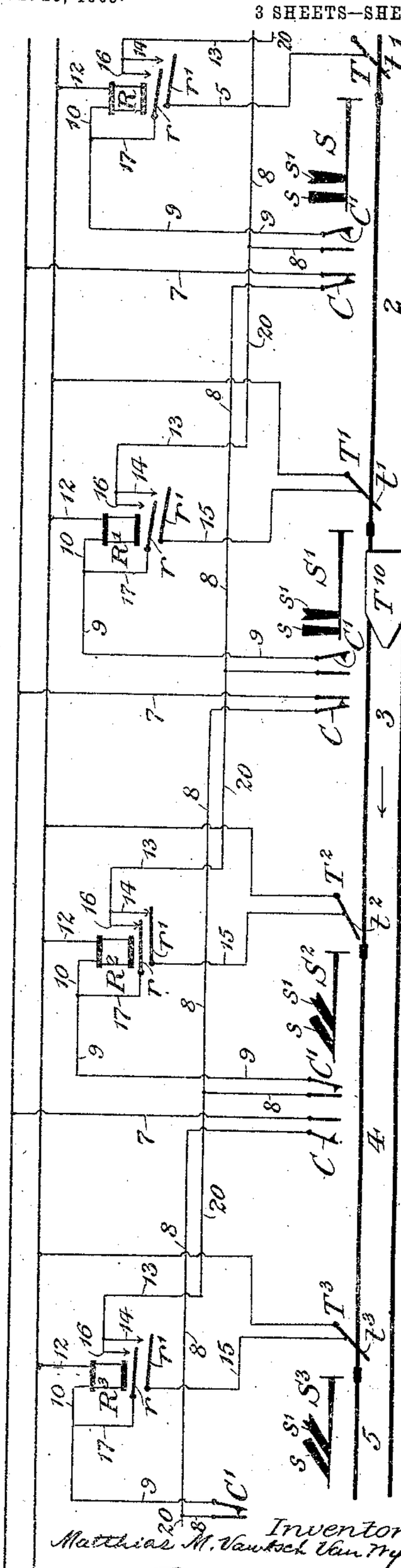


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

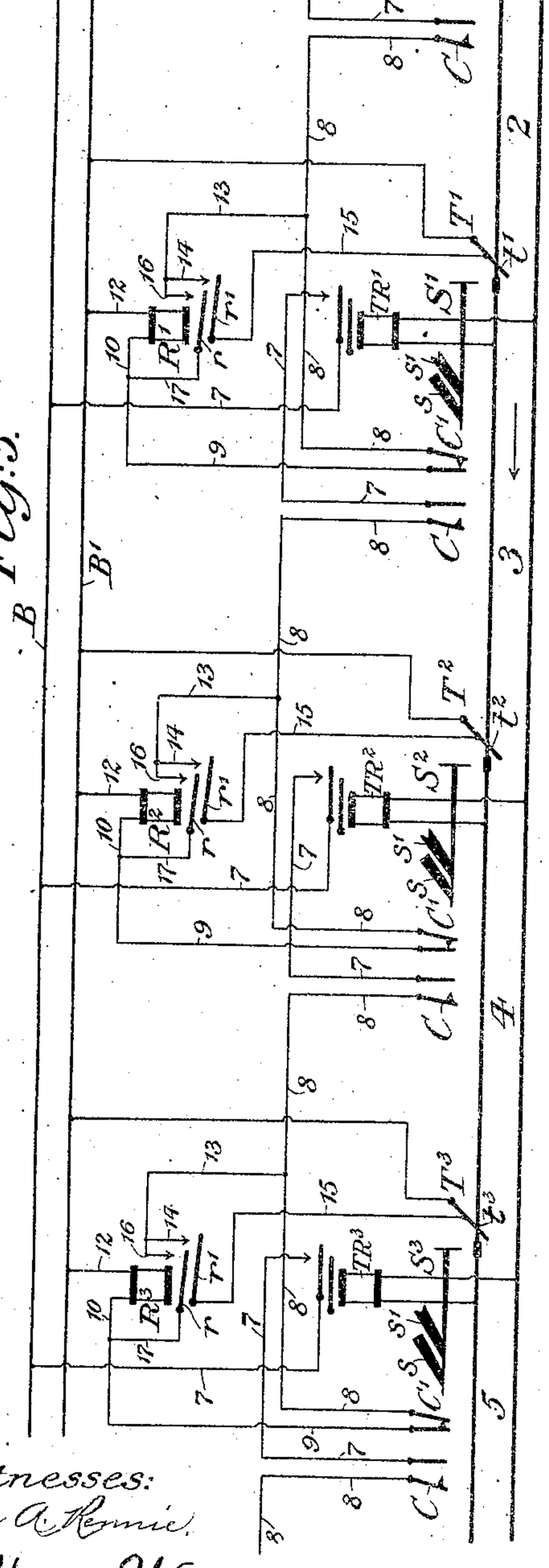
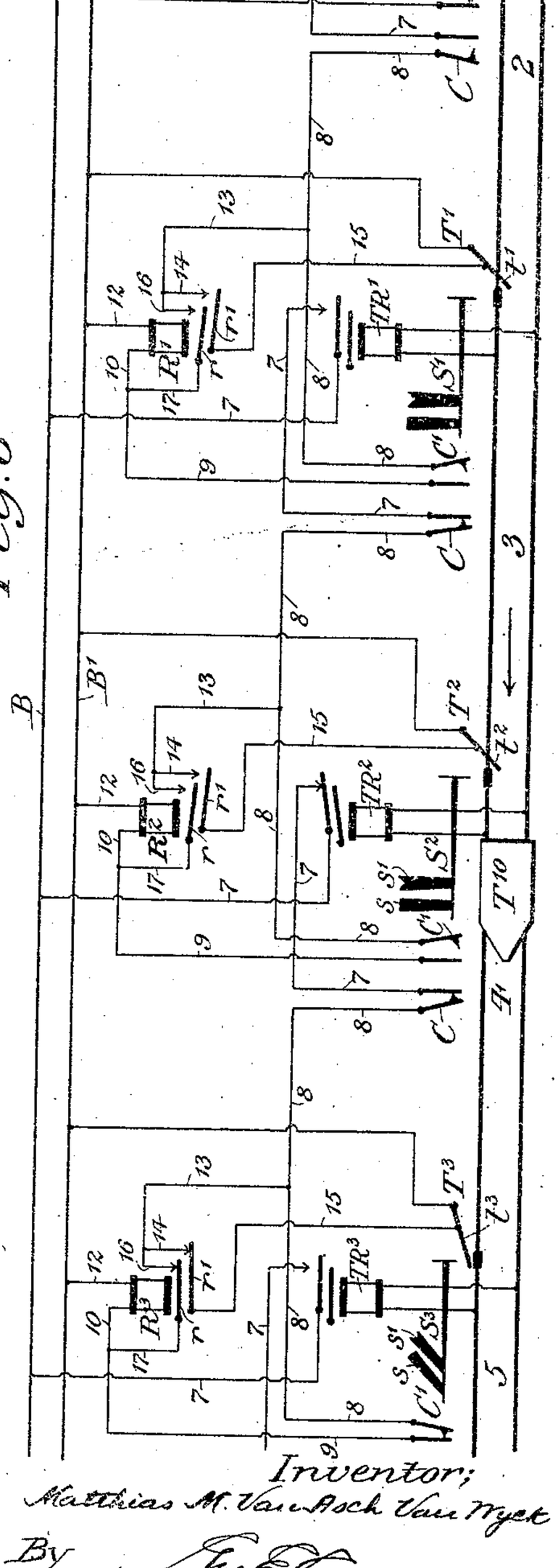


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CONTROL OF APPARATUS GOVERNING THE PASSAGE OF CARS OR VEHICLES ALONG A RAILWAY.

No. 819,326. Specification of Letters Patent. Patented May 1, 1906.

Application filed October 26, 1905. Serial No. 284,584.

To all whom it may concern:

Be it known that I, MATTHIAS VAN ASCH VAN WYCK, a subject of the Queen of the Netherlands, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in the Control of Apparatus Governing the Passage of Cars or Vehicles Along a Railway, of which the following is a specification.

My invention relates to the control of apparatus governing the passage of cars or vehicles along a railway.

My invention more particularly relates to the control of that form of apparatus generally known in the art as "train-stops." This apparatus is preferably automatic in its operation and comprises a trip which has at least two positions, one of which I will herein term its "operative" position and the other of which I will herein term its "inoperative" position, a suitable form of motor for moving the trip from its operative to its inoperative position, and suitable means for controlling the supply of motive power to the motor. The trip is preferably moved to its operative position by gravity when power or energy employed to hold it in its operative position is cut off from the train-stop, though, if desired, suitable means may be employed for this purpose. The cutting off of the supply of power to the motor of the apparatus is generally through an electrically-operated device, and in this invention it is intended that when a circuit on a device is closed power will be supplied to move and hold the trip thereof in its inoperative position, and when the same circuit is opened such power will be cut off and the trip will move or be moved to its operative position.

I have not herein illustrated any specific form of train-stop, as my invention relates more particularly to the control of such apparatus, and therefore any form of such apparatus comprising the parts hereinbefore employed may be used. A function of the apparatus is to automatically set the brakes of a car or train or shut off the motor-power from the car or train motors, or both, should a car or train proceed past a "danger-point" without authority. This is generally accomplished by having the trip engage and operate an arm or arms carried by the car or train, which arm operates apparatus provided in the braking or power system of the train or otherwise affects such braking or power system. I have not herein illustrated any such arrangement on a car or train, as there are many and are well understood in the art.

I will now proceed to describe a system of control for such apparatus embodying my invention and will point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatical view of a portion of a railway, railway-signals located at points along the railway, a train-stop located at each signal-point, and a portion of an arrangement of circuits embodying my invention for controlling the operation of the train-stops. Fig. 2 is a view similar to Fig. 1, but illustrating a different condition of some of the circuits due to the presence of a train. Fig. 3 is a view similar to Fig. 1, but illustrating a modification of the circuits of Fig. 1. Fig. 4 is a view similar to Fig. 3, but illustrating a different condition of some of the circuits due to the presence of a train. Fig. 5 is a view similar to Fig. 1, but illustrating still another modification of the circuits of Fig. 1. Fig. 6 is a view similar to Fig. 5, but illustrating a different condition of some of the circuits due to the presence of a train.

Similar characters of reference designate corresponding parts in all of the figures.

A designates a portion of a railway which is divided into "block-sections" in a manner well known in the art. In the drawings I have shown one of the two traffic or running rails divided by insulation *a* to form the block-section, though, if desired, both of the traffic or running rails may be so divided. I have illustrated three block-sections 2, 3, and 4 end portions of two others 1 and 5. At the entrance ends of the block-sections I locate, preferably, an automatic railway-signal of any approved semaphore type. S S', &c., designate such railway-signals. As shown, each railway-signal is provided with two semaphores, one, *s*, being a home signal and the other, *s'*, being a distant signal. This arrangement of the semaphores is well known in the art and need not be described. If desired, only one semaphore may be used at the entrance end of each block-section. I

prefer to have the railway-signals automatically controlled by the passage of a train along the railway, and therefore any of the well-known railway-signaling systems employing track-circuits may be employed. These are so well known that I have not deemed it necessary to illustrate or describe any of them. The semaphores are also illustrated as being normally in their clear position of indication.

T T′ T², &c., designate train-stops, which are only diagrammatically illustrated. As hereinbefore stated, each comprises a trip or tripping-arm, a motor operatively connected with the trip, and a device to control the supply of motive power to the motor. A form of trip which may conveniently be used is illustrated in Fig. 19 of United States Patent No. 769,058, issued August 30, 1904, to J. P. Coleman, E being the motor connected with the trip, and C² the device to control the supply of motive power to the motor. In the drawings, *t t′ t²*, &c., designate the trip or trip-arm.

The home semaphore *s* of each railway-signal is arranged to alternately operate two circuit-controllers C and C′, both of which are embodied in the system of control for the train-stops. They may be of any desired type and construction, and one, C, is closed when the home semaphore *s* moves to its danger position of indication, and the other, C′, is opened by the same movement of the semaphore, and vice versa when the home semaphore *s* is moved to its clear position of indication.

B B′ designate line-wires, one a feeder and the other a return, constituting a part of a circuit which also includes a suitable source of current. (Not shown.) These line-wires extend along the line of railway and supply current to the different devices and circuits comprised in the control system.

In this form of my invention the trips or trip-arms *t t′ t²*, &c., usually stand in their operative position—that is, in such position that they will engage and operate an arm or arms carried by the cars or trains to set the brakes or cut off the motive power or perform both functions. This may be said to be their usual position. This is an advantage, in that no matter what disarrangement occurs in the signaling system which might cause a false indication of a signal or signals or in the system of control for the train-stops all trips will be in their operative position. As a train proceeds along the railway it successively, should traffic conditions warrant it, which traffic conditions are usually indicated by the positions of the semaphores, causes each trip in advance of it to be moved to its inoperative position, and when the rear of a train has passed a train-stop the trip thereof returns to its danger position, as will be hereinafter described.

Referring now particularly to Figs. 1 and 2, R R′ R², &c., designate relays, one relay being provided for each train-stop. Each relay is included in what I herein term a "main circuit" and a "supplemental circuit." Each relay is provided with an armature which when attracted abuts against what is generally termed two "front contacts." This construction of a relay is well understood in the art, the two contacts being in separate circuits, which are electrically independent of one another. In the drawings I have diagrammatically illustrated this arrangement for each relay by two armatures *r r′* and two contact-points. One of these contact-points is included in a circuit for the train-stop, while the other is included in the supplemental relay-circuit, which supplemental relay-circuit when current is flowing in it keeps the relay energized to hold the train-stop circuit closed.

Fig. 1 illustrates the usual condition of the circuits, railway-signals, (normally clear,) and the train-stops, the trip-arms of which are in their operative position. The railway-signal S controls the entry of and passage of cars or trains along the block-section 2, the railway-signal S′, the block-section 3, and so on. Train-stop T guards block-section 2; T′, block-section 3, and so on. The main circuit for the relay for any one train-stop includes the open-circuit controller on the railway-signal in the rear of the stop and the closed-circuit breaker on the railway-signal provided for the block-section which the train-stop guards. Each such circuit may be traced as follows: Starting from the line-wire B, it is wire 7, open-circuit controller C, wire 8, closed-circuit controller C′, wires 9 10, relay R R′, &c., and wire 12 to line-wire B′. The circuit for any one train-stop may be traced as follows: Starting from line-wire B it is wire 7, open-circuit controller C, wires 8, 13, and 14, armature of relay *r′*, wire 15, and train-stop to ground or line-wire B′. The supplemental circuit for any one relay may be traced as follows: Starting from line-wire B it is wire 7, open-circuit controller C, wires 8 13 16, armature *r* of relays R R′, &c., wires 17 10, relay R R′, &c., and wire 12 to line-wire B. It will be seen that all circuits connected with any train stop or stops are open at one or more points, (except the track-circuits,) and hence as the circuits on the train-stops are open the trip-arms thereof will be in their operative position. As soon as a car or train enters a block-section (and I wish it understood that wherever I use the words "car" or "train" I mean a vehicle of any description traveling along the railway either as a unit or a train of two or more units) the track-relay for that section will be short-circuited and by dropping its armature will open the circuit or circuits holding the semaphores in their clear position of indication and permit

them to assume their danger position of indication, as is well understood in the art. In moving to their danger position the home semaphore will close the open-circuit controller C and open the closed-circuit controller. The closing of circuit-controller C will cause current to flow in the main circuit of the relay of the train-stop in advance, and the relay in turn by picking up its armatures will close the train-stop circuit to have the motor thereof move the trip to its inoperative position, and also the supplemental relay-circuit. Thus it will be seen that the closing of the main relay-circuit at one point will cause current to flow in the main relay-circuit and in the supplemental relay-circuit. The opening of the closed-circuit breaker C′ prevents a succeeding train from closing the relay-circuit of the next train-stop in the rear of the train-stop just operated, thus insuring that a trip will be in its operative position to guard the rear of a train. This will be clear from an examination of Fig. 2. A train T^{10} is shown as being completely in block-section 3 and the train-stop T′ set to its operative position. As soon as the first pair of wheels and their axle of the car or train entered block-section 3 they acted as a short circuit on the relay of block-section 3, which being deënergized dropped its armature and opened the local circuits of the railway-signal S′ and permitted the semaphores *s s′* to move to their danger position. In doing this the open-circuit breaker C of this railway-signal was closed to complete the main circuit on relay R^2, as shown, causing it to pick up its armature and close its supplemental circuit and the main circuit of the train-stop T^2, thus having it move its arm t^2 to its inoperative position. Of course if a car or train is in block-section 4 the main circuit on the relay R^2 would be open at C′ on railway-signal S^2, and thus the train-stop T^2 would not be operated. The function of the supplemental relay-circuit will now be explained. Assume the train T^{10} to be at the end of block-section 3 and about to enter block-section 4; so long as any part of it remains in block-section 3 the semaphore *s* of railway-signal S′ will be in its danger position, and thus the main circuit of relay R^2 will be closed through C at that point. As soon, however, as the first pair of wheels and their axle enter block-section 4 the local circuits of railway-signal S^2 are opened, thus allowing its semaphores *s s′* to move to their danger position. The semaphore *s* in moving to "danger" closes the open main relay-circuit of relay R^3 and opens the closed circuit-controller C′ at that point, thus opening the main circuit on relay R^2, and were this the only circuit, the relay would open the circuit of its train-stop, and thus permit of the trip t^2 moving to its operative position before all of train T^{10} has passed it. The supplemental circuit consisting of line B, wire of circuit-closer C, wires 8 13 16, armature *r*, wires 17, 10, and 12, and line B′, will keep current on the relay R^2, and thus have it keep the circuit of the train-stop closed. As soon as the last pair of wheels and axle moves out of block-section 3 railway-signal S′ will be operated to move its home semaphore to its safety position, and thus open circuit-controller C and the main and supplemental relay-circuits.

Of course in what is known as an "overlap" signal system the home semaphore of a railway-signal may be made to remain in its danger position until after the train has passed out of the block-section next in advance of the block-section which it controls. For example, (see Fig. 2,) the home semaphore *s* of railway-signal S, which ordinarily only remains in its danger position so long as a train is in block-section 2, may be held in its danger position until the train T^{10} had completely passed out of block-section 3. This is well understood and need not be explained. In such event the trip *t′* of train-stop T′ will be held in its inoperative position until after the train T^{10} has completely passed out of block-section 3.

Referring now to Figs. 3 and 4, I have shown a slightly different arrangement of the supplemental relay-circuits and the train-stop circuit. In Figs. 3 and 4 the railway-signals are included in what is known as "overlap" signal system—that is, a home semaphore *s* of any railway-signal not only controls for it the block-section for which it is provided, but also controls for the next succeeding block-section. For example, in Fig. 4 the home semaphore *s* of railway-signal S controls not only block-section 2, but also block-section 3. The arrangement of the main relay-circuit is the same as in Figs. 1 and 2, but the supplemental circuit for any relay is controlled by the home semaphore on a preceding railway-signal. For example, the supplemental circuit for the relay R^2 is controlled from railway-signal S instead of from railway-signal S′, as in Figs. 1 and 2, as is also the train-stop circuit. This necessitates the use of an additional wire. The supplemental circuit for a relay R^2, for example, may be traced as follows: From line B it is wire 7, circuit-controller C on the second railway-signal in its rear, wires 8 20 13 16, armature *r*, wires 17, 10, relay R^2, and wire 12 to line B′. Thus it will be seen that this circuit is the same as the supplemental relay-circuit in Figs. 1 and 2, with the addition of the wire 20 and the closing of the circuit at a point different from the closing of the main relay-circuit. The train-stop circuit for a train-stop—for example, train-stop T^2—may be traced as follows: From line B it is wire 7, circuit-controller C on the second railway-signal in its rear, wires 8 20 13 14, armature *r′* of relay R^2, wire 15, train-stop T^2 to ground or

line B′. It will be seen that in Fig. 3 all circuits connected with any train stop or stops are open at one or more points, and as the train-stop circuits are open the trips thereof will be in their operative position. Assume now that a train T^{10}, Fig. 4, has passed out of block-section 2 and is passing along block-section 3. As soon as the train entered block-section 3 the semaphores *s s′* of railway-signal S′ moved to their danger position. The home semaphore of this railway-signal in moving to "danger" closed its circuit, opened circuit-breaker C, and thus closed the main relay-circuit of relay R^2. As soon as this circuit was closed it picked up its armature and closed its supplemental circuit and the main circuit on train-stop T^2, the current being furnished these circuits through the closed circuit-breaker C on railway-signal S, which remains at "danger" so long as the train T^{10} is in block-section 3, the signaling system in these figures being, as hereinbefore stated, operated on the overlap principle. As soon as the train T^{10} entered block-section 3 it opened the main circuit on the relay R′; but the supplemental circuit thereof remains closed by reason of the home signal on railway-signal for the block-section in the rear of block-section 1 remaining at "danger." As soon, however, as the train completely passed out of block-section 2 the home signal for the block-section in the rear of block-section 1 moved to its clear position, and in doing so opened its circuit-controller C, thus opening the supplemental relay-circuit of relay R′, (the only circuit remaining closed,) and thus opened the main circuit on train-stop T′, permitting its trip to move to its operative position.

In Figs. 5 and 6 I have shown the same arrangement of circuits as in Figs. 1 and 2, with the exception that the wire 7, which in this form, as in Figs. 1 and 2, forms part of the main and supplemental relay-circuits and the main train-stop circuit, is carried through what is known in the art as the "back" contact of a track-relay. TR TR′ TR^2, &c., designate such relays. This being so, as soon as a train moves out of a block-section and the relay thereof picks up or attracts its armature to its front contact all circuits of a relay and its associated train-stop controlled from that contact are opened, and the train-stop immediately allows its trip to move to its operative position. Thus it will be seen that no matter what system of control may be employed for the railway-signals a train-stop or train-stops may be made to move their trips to operative position immediately behind a train. While it is true that in Figs. 1 and 2 a train-stop moves its trip to its operative position after a train moves out of a block-section, this would not be the case were the railway-signals of Figs. 1 and 2 controlled in an overlap system, as has been pointed out. In other words, the control-circuits for the train-stops (illustrated in Figs. 1 and 2) may be used with simple home and distant signaling systems, in which case a train-stop moves its trip to an operative position so soon as a train moves out of a block-section. This is true also of the circuits illustrated in Figs. 3, 4, 5, and 6. If, however, the railway-signals of Figs. 1 and 2 are controlled by an overlap system of signaling, then a train-stop does not move its trip to its operative position until the train has completely entered the next or a succeeding block-section. Figs. 3 and 4 illustrate an arrangement of control-circuits for train stop which will permit of a train stop or stops moving its trips to its operative position as soon as a train moves out of a block-section, which may advantageously be used with overlap systems of control for railway-signals. Figs. 5 and 6 illustrate an arrangement of control-circuits for train-stops which will permit of a train stop or stops moving its trips to its operative position as soon as a train moves out of a block-section, which can be used with any of the known signaling systems using track-circuits, it being immaterial whether there are one or a plurality of semaphores on each railway-signal.

It will be understood, of course, that in the application of my invention to existing signaling systems many of the wires or conductors and apparatus used in such systems may be used in common with the wires or conductors and apparatus involved in my invention.

If desired, instead of open and closed circuit breakers operated by a home semaphore of a railway-signal a relay controlled from a track-circuit may be substituted for each pair of open and closed circuit controllers. The armature of the relay when against its front contact will take the place of the closed-circuit controller, and the armature when against the back contact will take the place of the open-circuit controller. The same alternate operation in the relay will be had when it is deënergized and energized, due to a train entering a block-section and leaving a block-section, as in the case of the closed and open circuit controllers when operated by a home semaphore in moving from one of its two positions to its other, due to a train entering a block-section and leaving a block-section.

It will be seen, therefore, that my invention in its broadest aspect comprises a train-stop the trip of which is usually in its operative position and means affected by a train for first causing the train-stop to move its trip to its inoperative position and afterward or at a later period of time to again have the train-stop move its trip to its operative position. In the preferred arrangement and viewed in its broadest aspect I provide a circuit for the train-stop which is usually open

and close this circuit by means which are affected by a train. This is true, of course, only when the railway-signals give indications that the train may proceed along the several block-sections. The means for opening and closing the circuit may be a track-relay or a railway-signal acting upon a relay (R R′, &c.) or equivalent device to open and close the circuit, or both a relay and a railway-signal. In the preferred arrangement and viewed in an aspect slightly narrower than the aforesaid broad aspect, I provide an open circuit for the train-stop which is opened and closed by a relay or other equivalent device, which relay or other device is included in a plurality of usually open circuits, both of which are closed either entirely, simultaneously, or at different periods of time by means (which may be either a track relay or relays or a railway-signal or railway-signals) affected by a train to have the train-stop move its trip to its inoperative position and opened by the same means simultaneously or one by the said same means at one period, the other at a later period by the same or different means, which latter means are also affected by a or the same train.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a train-stop the trip of which is usually in its operative position, an open circuit for said trip, and means affected by a train for closing said circuit to have the train-stop move its trip to its inoperative position.

2. In combination with railway-signals the semaphores of which are usually in their clear position of indication, a train-stop the trip of which is usually in its operative position adjacent each railway-signal, an open circuit for each train-stop, and means affected by a train for closing said circuits to have the train-stop move its trip to its inoperative position.

3. In combination with railway-signals, a train-stop adjacent such railway-signal the trip of which is usually in its operative position, and an open circuit for each train-stop, said circuit being arranged to be closed when a railway-signal gives a danger indication.

4. In combination with block-sections of a railway, a train-stop for each block-section the trip of which is usually in its operative position, an open circuit for each train-stop, and means affected by a train for closing an open circuit on a train-stop of a block-section before it reaches the block-section and for opening the circuit which it previously closed after passing the train-stop to have the trip thereof again move to its operative position.

5. In combination with a block-section of a railway, a train-stop for said block-section the trip of which is usually in its operative position, train-controlled means for automatically causing the train-stop to move its trip to its inoperative position as a train approaches the block-section and for causing the train-stop to reset its trip in its operative position after the train has completely entered the block-section or passed beyond the block-section.

6. In combination with a block-section of a railway, a train-stop for said block-section the trip of which is usually in its operative position, an open circuit for said train-stop, a device for closing and opening said circuit, and means affected by a train to operate said device to have it close said open circuit and again affected by the same train for to have said device again open said circuit after it has passed the train-stop.

7. In combination with a block-section of a railway, a train-stop for said block-section, the trip of which is usually in its operative position, an open circuit for said train-stop which when closed causes the train-stop to move its trip to its inoperative position, a relay for closing and opening said circuit, and means affected by a train in one block-section to have said relay close the circuit of the train-stop, and again affected by the same train in another block-section to have said relay again open the circuit.

8. In combination with a block-section of a railway, a train-stop therefor the trip of which is usually in its operative position, an open circuit for said relay, and means affected by a train approaching said block-section to close said circuit to have the train-stop move its trip to its inoperative position, and again affected by the same train after it has passed the train-stop to again open said circuit.

9. In combination with a block-section of a railway, a train-stop therefor, the trip of which is usually in its operative position, an open main circuit for said train-stop, a relay for opening and closing said main train-stop circuit, a main and supplemental circuit, both open, for said relay, and means affected by a train for closing said main and supplemental relay-circuits, and at a later time for again opening said circuits either simultaneously or at different periods of time.

10. In combination with a block-section of a railway, a train-stop therefor the trip of which is usually in its operative position, an open circuit for said train-stop which when closed causes the train-stop to move its trip to its inoperative position, a relay for opening and closing said circuit, a main and supplemental circuit, both open, for said relay, means controlled by a train for closing said main and supplemental circuit, and at another time for opening one of said circuits, and other means controlled by the same train for opening said other circuit of the relay.

11. The combination with a train-stop the trip of which is usually in its operative posi-

tion, an open circuit for said trip, and means comprising a circuit-controller usually open and affected by a train to close said circuit to have the train-stop move its trip to its inoperative position.

12. In combination with a series of sections of a railway, a series of train-stops the trips of which are usually in their operative position, and means comprising track-circuits actuated by an approaching train for successively causing the trips to be moved to their inoperative position.

13. In combination with a series of sections of a railway, railway-signals for controlling the passage of cars or trains along the sections, a series of train-stops the trips of which are usually in their operative position, and means comprising track-circuits actuated by an approaching train, when the signals permit of the passage of the train, for successively causing the trips to be moved to their inoperative position.

In testimony whereof I have signed my name to this specification in the presence of two subscribed witnesses.

M. VAN ASCH VAN WYCK.

Witnesses:
A. HERMAN WEGNER,
HENRY R. BAUER.