

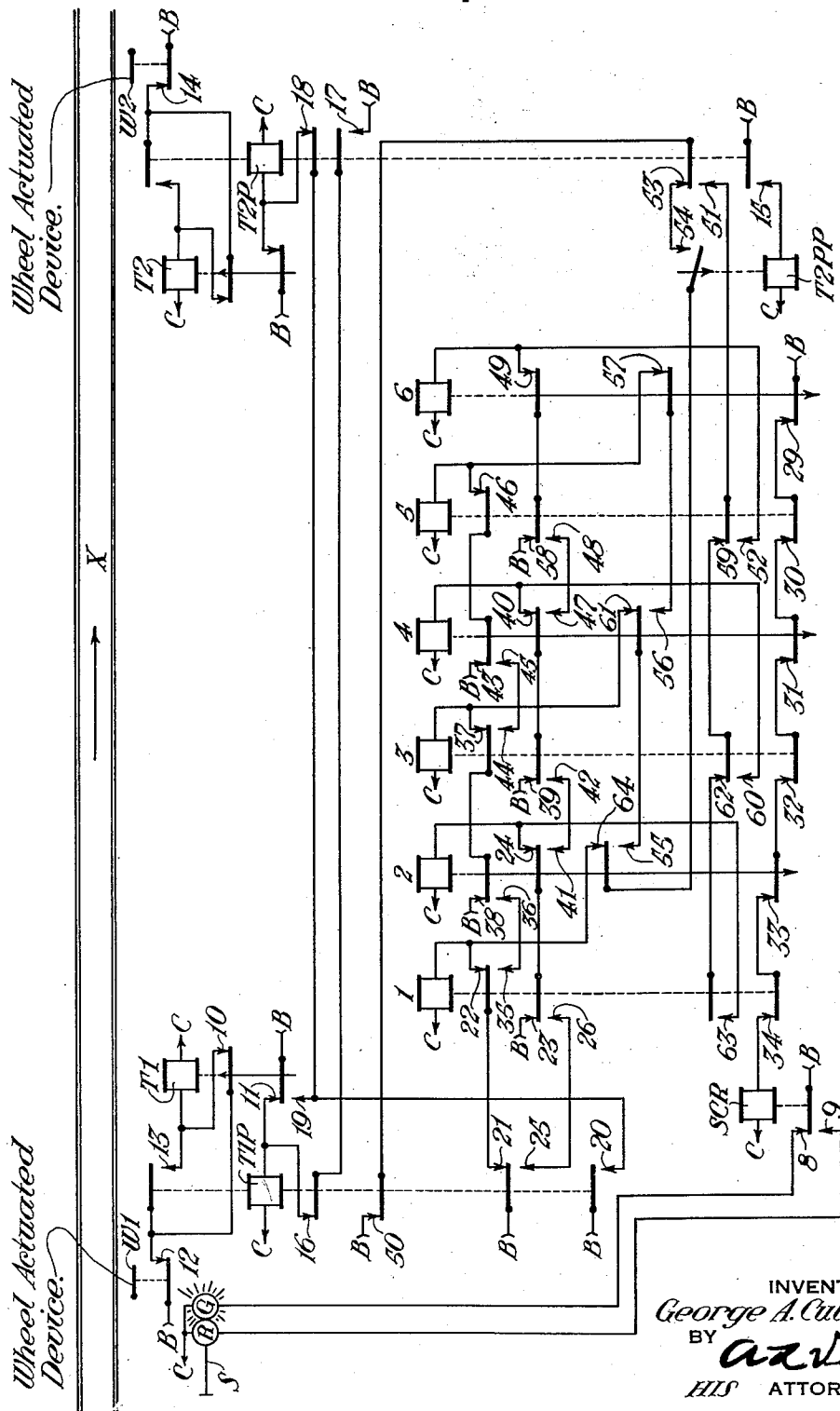
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G. A. CULBERTSON

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VEHICLE COUNTING APPARATUS

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VEHICLE COUNTING APPARATUS

George A. Culbertson, Long Branch, N. J., assignor
to The Union Switch and Signal Company,
Swissvale, Pa., a corporation of Pennsylvania

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My invention relates to vehicle counting apparatus and has particular reference to the organization of such apparatus into systems for counting the number of vehicles moving along a trackway. More particularly, my invention relates to counting systems of the class incorporating means wherewith each vehicle is registered when it passes a given point and is again registered when it passes a second given point, and which means is effective to compare the number of vehicles which pass the given points.

The present invention is particularly adapted for, but in no way limited to, use in a signal system arranged for signaling a stretch of track or roadway provided with wheel actuable devices, such as treadles, disposed at longitudinally spaced points.

An object of my invention is the provision of novel and improved counting relay chains arranged on the closed circuit principle so as to employ normally energized relays.

Another object of my invention is to provide a novel and improved counting relay chain incorporating normally energized relays arranged to register by means of a single chain the number of vehicles that pass two selected points spaced apart along a stretch of roadway.

An additional object is to provide a novel and improved means for controlling a counting relay chain when a vehicle passes selected points spaced apart along a roadway.

A further object is to provide novel and improved counting relay chains.

In practicing the invention, the above-mentioned and other important objects and characteristic features are attained by normally energizing the first relay of a chain over a stick circuit governed by a first control relay; by normally energizing each of the succeeding relays of the chain over stick circuits each governed by the preceding relay in the chain; by arranging the circuits so that each relay when released transfers the control of the stick circuit for the next succeeding relay to the first control relay; and by providing a second control relay and circuits governed thereby whereby the released counting relays are sequentially picked up one each time the second control relay releases or picks up.

I shall describe one form of apparatus embodying my invention, and shall then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatic view illustrating one form of apparatus embodying my invention.

Referring to the drawing, the reference character X designates a roadway traversed by vehicles in the direction indicated by an arrow or from left to right as viewed in the drawing.

5 Suitable wheel actuated devices W1 and W2 are mounted in the roadway at selected longitudinally spaced points and divide the roadway into a section which extends between the devices. The devices may be of any suitable type well known in the art, such as, for example, the type illustrated and described in Letters Patent of the United States No. 2,096,404, granted October 19, 1937, to Bernard E. O'Hagan. This type of a device comprises a treadle mounted in the roadway so as to be depressed each time a pair of vehicle wheels passes over the device, and one or more contacts actuated by the treadle.

15 Traffic operating in the normal direction in the section of roadway extending between the devices W1 and W2 is governed by a signal S comprising two lamps G and R effective when energized to indicate "proceed" and "stop" respectively. The lamps G and R are controlled by a signal control relay SCR in such a manner that when relay SCR is energized, its front contact 8 is closed and completes an obvious circuit for lamp G of signal S, and when relay SCR is released, its back contact 9 completes an obvious circuit for lamp R of signal S. The signal control relay SCR is controlled in a manner which will be explained in detail in the description which follows.

20 The reference character T1 designates a first control relay normally energized over a stick circuit which extends from one terminal B of a suitable source of current, such as a battery not shown, through normally closed contact 12 of device W1, and front contact 10 and the winding of relay T1 to the other terminal C of the same source of current. Relay T1 is provided with a repeater relay T1P normally energized over an obvious circuit extending from terminal B through front contact 11 of relay T1 and the winding of relay T1P to terminal C. Relay T1P controls a pick-up circuit for relay T1, which circuit passes from terminal B through treadle contact 12, back contact 13 of relay T1P and the winding of relay T1 to terminal C.

25 The reference character T2 designates a second control relay provided with a repeater relay T2P. These relays are controlled by contact 14 of the wheel actuated device W2 in a manner corresponding to that just described for relays T1 and T1P, as is obvious from an inspection of the drawing. Relay T2P has associated there-

with a slow releasing repeater relay T2PP energized over an obvious circuit including back contact 15 of relay T2P.

Repeater relay T1P is provided with an obvious stick circuit when its front contact 16 and back contact 17 of relay T2P are closed; while repeater relay T2P is likewise provided with a stick circuit whenever its front contact 18 and either or both back contacts 19 and 20 of relays T1 and T1P, respectively, are closed.

Associated with the control relays T1 and T2 and their repeater relays is a novel form of counting relay chain comprising a plurality of normally energized counting relays serially arranged to count or register the number of vehicles entering and leaving the section of roadway extending between the devices W1 and W2. The first relay of the chain is normally energized over a stick circuit controlled by the first control relay, while each of the succeeding relays of the chain is energized over a stick circuit controlled by the preceding relay of the chain. The arrangement of the circuits is such that each relay in releasing transfers the control of the stick circuit of the succeeding relay to the first control relay. For example, relay 1 is the first relay of the chain and is normally energized over a stick circuit that extends from terminal B through front contact 21 of relay T1P and front contact 22 and the winding of relay 1 to terminal C. The next succeeding relay 2 of the chain is normally energized over a stick circuit which is controlled by relay 1 and which extends from terminal B through front contact 23 of relay 1 and front contact 24 and the winding of relay 2 to terminal C; but when relays 1 and T1P are released, relay 2 is then energized over a second or auxiliary stick circuit which is controlled by relay T1P and which extends from terminal B through back contact 25 of relay T1P, back contact 26 of relay 1 and front contact 24 and the winding of relay 2 to terminal C. Each of the other succeeding relays of the chain is similarly controlled by the preceding relay when it is energized and this control is transferred to relay T1P when the preceding relay releases, as can be seen from an inspection of the drawing. The particular relay chain shown incorporates six relays arranged so as to count or register a maximum of three vehicles entering the section, but it is to be understood, of course, that this number of relays may be varied at will so as to count any desired number of vehicles.

The previously mentioned signal control relay SCR is controlled over a circuit which extends from terminal B through front contacts 29, 30, 31, 32, 33 and 34 of relays 6, 5, 4, 3, 2 and 1, respectively, hence it follows that relay SCR will be energized only when all relays of the counting chain are energized and will be released whenever any relay of the chain is released.

In the normal condition of the apparatus as represented in the drawing, all relays except relay T2PP are picked up, and lamp G of signal S is energized. When a vehicle operating along the roadway X in the normal direction of traffic actuates device W1, its first pair of wheels cause contact 12 of device W1 to open and deenergize relay T1, whereupon that relay opens its front contact 11 to deenergize in turn repeater relay T1P. Back contacts 19 and 20 of relays T1 and T1P respectively are now closed and complete the previously traced stick circuit for relay T2P, thus locking relay T2P in its

picked-up position for a reason which will be pointed out hereinafter.

The stick circuit of relay 1 is now open at front contact 21 of relay T1P, whereupon relay 1 releases and opens its front contact 23 to interrupt the first stick circuit of relay 2 but since relay 1 closes its back contact 26, relay 2 is held energized over a second or auxiliary stick circuit which includes back contact 25 of relay T1P and back contact 26 of relay 1. At this time, therefore, relay 1 is released but all of the succeeding relays of the chain are held energized. The energizing circuit of signal control relay SCR is now open at front contact 34 of relay 1 and relay SCR releases to deenergize lamp G and energize lamp R of signal S.

When the first pair of wheels clears device W1, treadle contact 12 closes to complete the pick-up circuit of relay T1 but that relay is preferably slow to pick up and is adjusted so as to remain released during the time required for the vehicle to actuate the treadle with its front and rear wheels. The actuation of device W1 by the rear pair of wheels will therefore have no function and will not be reflected by the counting chain. After the rear wheels of the vehicle clear device W1, relay T1 picks up at the end of its slow pick-up period, and closes its stick circuit at front contact 10 and the energizing circuit of relay T1P at front contact 11. Relay T1P accordingly opens its back contact 25 to open the just traced second stick circuit of relay 2, whereupon the latter relay releases and opens a first stick circuit for relay 3 extending from terminal B through front contact 38 of relay 2, front contact 37 and the winding of relay 3 to terminal C; but back contact 36 of relay 2 closes to complete a second stick circuit for relay 3, which circuit extends from terminal B through front contact 21 of relay T1P, back contact 35 of relay 1, back contact 36 of relay 2 and front contact 37 and the winding of relay 3 to terminal C. Relays 1 and 2 are now released to indicate that a vehicle has passed device W1 and that the treadle contacts and apparatus associated therewith are restored to their normal conditions.

If a second vehicle should enter the section between devices W1 and W2 prior to the time that the first vehicle clears device W2, then the actuation of device W1 by the wheels of the second vehicle results in the release of relays T1 and T1P, in the manner pointed out in detail hereinbefore, accompanied by a release of relay 3 which now has its previously traced second stick circuit interrupted at front contact 21 of relay T1P. Relay 3 of course releases to interrupt at its front contact 39 the first stick circuit of relay 4, which circuit includes front contact 40 of relay 4, but relay 4 is retained energized over a second stick circuit which extends from terminal B through back contact 25 of relay T1P, back contact 26 of relay 1, back contact 41 of relay 2, back contact 42 of relay 3, and front contact 40 and the winding of relay 4 to terminal C. After the second vehicle clears device W1, relay T1 picks up at the end of its slow pick-up interval to cause relay T1P to pick up also. When this happens, the previously traced second stick circuit of relay 4 is interrupted at back contact 25 of relay T1P, and relay 4 accordingly releases to indicate that the apparatus associated with device W1 is restored to its normal condition following the passage of the second vehicle. At this time, the normal stick circuit of relay 5, which

circuit includes front contact 43 of relay 4 and front contact 46 and the winding of relay 5, is open at front contact 43 of relay 4 but relay 5 is held energized over a second stick circuit which extends from terminal B through front contact 21 of relay T1P, back contact 35 of relay 1, back contact 36 of relay 2, back contact 44 of relay 3, back contact 45 of relay 4, and front contact 46 and the winding of relay 5 to terminal C.

The apparatus remains in the condition described until a third vehicle enters the stretch or until one of the vehicles in the stretch passes device W2. If, for example, a third vehicle enters the section prior to the time that the first vehicle actuates device W2, then the actuation of device W1 by the wheels of the third vehicle results in the release of relays T1 and T1P, accompanied by the release of relay 5 effected when its previously traced second stick circuit becomes open at front contact 21 of relay T1P. Relay 5 in releasing opens its front contact 58 to interrupt the normal stick circuit of relay 6, which circuit comprises front contact 58 of relay 5 and front contact 49 and the winding of relay 6, but relay 6 is held energized over its second stick circuit completed at back contact 48 of relay 5 and extending from terminal B through back contact 25 of relay T1P, back contact 26 of relay 1, back contact 41 of relay 2, back contact 42 of relay 3, back contact 47 of relay 4, back contact 48 of relay 5, and front contact 49 and the winding of relay 6 to terminal C.

After the third vehicle clears device W1, relay T1 picks up at the end of its slow pick-up period, and relay T1P also picks up to open the just traced second stick circuit for relay 6 at back contact 25 of relay T1P. Relay 6 accordingly releases to indicate that the apparatus associated with device W1 occupies its normal condition following the passage of the third vehicle.

It follows from the foregoing that the relay chain is arranged so that a relay of the chain is released each time device W1 is actuated by a vehicle, and another relay of the chain is released each time the control apparatus associated with device W1 is restored to its normal condition after the vehicle clears the device. It is apparent, therefore, that the entrance of a vehicle in the section is registered by the release of a relay of the chain, and the restoration of the apparatus associated with the entering device following the passage of a vehicle is registered by the release of another relay of the chain.

The counting chain just described also functions to count vehicles out of the section. For example, if the section is occupied by three vehicles, as has been assumed hereinbefore, then all relays of the chain are released. In this condition of the apparatus, when the first vehicle actuates device W2 in leaving the section, relays T2 and T2P are caused to release in a manner corresponding to that pointed out in detail hereinbefore with reference to the corresponding relays T1 and T1P associated with device W1. When relay T2P releases, its back contact 17 closes the previously mentioned stick circuit for relay T1P to lock that relay in its energized position for a purpose which will be explained presently, and back contact 15 also closes to energize relay T2PP whereupon that relay picks up. Relay 6 of the counting chain is now picked up over a circuit which extends from terminal B through front contact 50 of relay T1P, back contact 51 of relay T2P, back contact 52 of relay 5, and the winding of relay 6 to terminal C; and this relay is

held energized over that circuit until relay T2P picks up at the end of its slow pick-up period following the clearing of device W2 by the first vehicle. When relay T2 picks up, relay T2P also picks up to deenergize relay T2PP but that relay is slow to release and hence relay 5 in turn becomes energized over a circuit which extends from terminal B through front contact 50 of relay T1P, front contact 53 of relay T2P, front contact 54 of relay T2PP, back contact 55 of relay 2, back contact 56 of relay 4, front contact 57 of relay 6 and the winding of relay 5 to terminal C. The slow releasing features of relay 5 enable that relay to hold up for the period intervening between the opening of its pick-up circuit at back contact 51 of relay T2P and the closing of its first stick circuit when relay 5 closes its front contact 58 to complete the previously mentioned first stick circuit for relay 6. When relay 5 picks up it is then held energized over its previously traced second stick circuit which includes its own front contact 46 and front contact 21 of relay T1P as well as back contacts 35, 36, 44 and 45 of relays 1, 2, 3 and 4, respectively. This second stick circuit is completed immediately when relay 5 picks up and holds relay 5 energized after T2PP releases at the end of its slow release period.

When the second vehicle leaves the section, the actuation of device W2 results in the release of relays T2 and T2P and in the picking up of relay T2PP. Relay 4 also becomes energized over a circuit which extends from terminal B through front contact 50 of relay T1P, back contact 51 of relay T2P, front contact 59 of relay 5, back contact 60 of relay 3 and the winding of relay 4 to terminal C. Relay 4 is held energized over this circuit until relay T2 picks up at the end of its slow pick-up period following the passage of the second vehicle. When this happens, relay T2P picks up to deenergize relay 4 but that relay is held up by its slow release features until its first stick circuit is subsequently established, while relay T2PP is also deenergized but during the slow release interval of the latter relay, relay 3 becomes energized over a circuit which extends from terminal B through front contact 50 of relay T1P, front contact 53 of relay T2P, front contact 54 of relay T2PP, back contact 55 of relay 2, front contact 61 of relay 4 and the winding of relay 3 to terminal C. Relay 3 completes at its front contact 39 the previously mentioned first stick circuit of relay 4, and also completes its own second stick circuit which includes its own front contact 37, front contact 21 of relay T1P, and back contacts 35 and 36 of relays 1 and 2, respectively.

When the third vehicle actuates device W2 in leaving the section, relays T2 and T2P release; relay T2PP picks up; and relay 2 also picks up over a circuit which extends from terminal B through front contact 50 of relay T1P, back contact 51 of relay T2P, front contact 59 of relay 5, front contact 62 of relay 3, back contact 63 of relay 1, and the winding of relay 2 to terminal C. Then, when relay T2 picks up after the vehicle clears the device, relay T2P also picks up to interrupt the pick-up circuit of relay 2 but that relay is held up by its slow release features until its first stick circuit is subsequently completed. Relay T2PP also becomes deenergized and during the slow release period of the latter relay, relay 1 becomes energized over a circuit which extends from terminal B through front contact 50 of relay T1P, front contact 53 of relay T2P,

front contact 54 of relay T2PP, front contact 54 of relay 2, and the winding of relay 1 to terminal C. When relay 1 picks up, its front contact 23 completes the previously traced first stick circuit of relay 2, while front contact 22 completes its own first stick circuit controlled by relay T1P. In addition, front contact 34 of relay 1 closes to complete the energizing circuit of relay SCR whereupon that relay picks up to deenergize lamp R and energize lamp G of signal S.

It follows from the foregoing that a relay of the chain is picked up each time relay T2P is caused to release by a vehicle actuating device W2, and that another relay of the chain is picked up each time relay T2P is picked up following the passage of a vehicle. It is to be noted that the order in which the relays of a chain are picked up is the reverse of that in which they are released, that is, the relay last to be released is the relay first to be picked up.

In the event that the section is occupied by one or more vehicles, and one of the vehicles leaves the section at substantially the same time that another vehicle enters the stretch, the apparatus will function to insure counting the one vehicle out of and the other vehicle into the stretch. This is effected by means of the stick circuits provided for the repeater relays T1P and T2P. For example, if a vehicle actuates device W2 just before the time that another vehicle actuates device W1, relays T2 and T2P release to complete the stick circuit for relay T1P. When, therefore, relay T1 is released in response to the actuation of device W1, that relay remains released while relay T1P remains locked in its picked-up position until the proper operations of the relay chain take place to report the departure of the vehicle. Then when relays T2 and T2P pick up after the vehicle passes device W2, the relay chain operates to report this event and relay T1P releases to initiate the operation of the chain to report the arrival of the vehicle at device W1. The release of relay T1P of course results in the energization of relay T1 so that the apparatus associated with device W1 restores to its normal condition at the end of the slow pick-up period of relay T1, and the relay chain is of course effective to register this restoration. It follows, therefore, that the apparatus is arranged to store the control relating to a vehicle passing device W1 should such event occur while the apparatus is registering a vehicle past device W2.

In the event that a vehicle actuates device W1 at the same time or just prior to the time that another vehicle actuates device W2, the control relating to the departing vehicle will then be stored. This is effected since the release of relays T1 and T1P results in the completion of the stick circuit of relay T2P so that when relay T2 releases it will remain released until the entrance of the one vehicle has been registered by the chain and relays T1 and T1P pick up. When this happens, relay T2P will of course release to cause the chain to register the departure of the other vehicle, and the apparatus will then function to restore itself to the normal condition. Because of the fact that relay T2P has one path of its stick circuit completed at back contact 19 of relay T1 whereas relay T1P has its stick circuit completed at back contact 17 of relay T2P, the entrance device W1 will be given preference if both devices are actuated simultaneously so that under such circumstances the actuation of device W1 will be registered while the actuation of device W2 will be stored until the apparatus

restores after registering the actuation of device W1.

It is readily apparent from the foregoing description that I have provided a novel and improved counting means incorporating relays which are normally energized and hence operate on the closed circuit principle in that failure such as loss of power or a broken wire will result in a release of the relays and consequently indicate an unsafe condition. In addition, it is apparent that the apparatus provides means whereby a single counting relay chain is utilized for counting vehicles passing two spaced points along a roadway.

Although I have herein shown and described only one form of vehicle counting 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. In combination, a control relay, a chain of counting relays, a stick circuit for normally energizing the first relay of said chain including its own front contact and connected to a source of current over a contact of said control relay, a stick circuit for each succeeding relay of said chain connected to a current source over a front contact of the preceding relay in the chain, and means including a back contact of each relay of the chain for transferring to a contact of said control relay the connection of the source to the stick circuit of the succeeding relay of said chain.

2. In combination, a control relay, means for governing said control relay, a chain of counting relays, a stick circuit including its own front contact for energizing the first relay of said chain and connected to a source of current over a contact of said control relay, a stick circuit for each of the succeeding relays of said chain connected to a current source over a front contact of the preceding relay of said chain, and means including a back contact of each of said relays of said chain and rendered effective when a relay is released for transferring to a contact of said control relay the connection of the current source to the stick circuit of the succeeding relay of the chain.

3. In combination, a control relay, means for governing said control relay, a chain of normally energized counting relays, a stick circuit governed by said control relay and including the front contact of the first relay of said chain for normally energizing that relay, a stick circuit for each of the succeeding relays of said chain connected to a current source over a front contact of the preceding relay in said chain, means including a back contact of each of said relays of said chain for transferring to a contact of said control relay the connection of the source to the stick circuit of the succeeding relay of the chain, a second control relay, and means governed by said second control relay and by the relays of said chain for sequentially picking up the relays of the chain in the reverse order in which they were released.

4. In combination, a normally energized control relay, means for governing said relay, a chain of counting relays, a stick circuit including a front contact of said control relay and a front contact of the first relay of said chain for normally energizing said first relay, means for normally energizing each of the succeeding relays of said chain over a stick circuit including a front

contact of that relay and a front contact of the preceding relay of the chain, and means governed by a back contact of each relay of said chain for completing a second stick circuit for the succeeding relay including a back contact of said control relay in the second stick circuit of the second and each alternate succeeding relay of said chain and a front contact of said control relay in the second stick circuit of each of the intervening relays of said chain.

5. In combination, a normally energized control relay, means for governing said relay, a chain of counting relays, a stick circuit including a front contact of said control relay and a front contact of the first relay of said chain for normally energizing said first relay, means for normally energizing each of the succeeding relays of said chain over a stick circuit including a front contact of that relay and a front contact of the preceding relay of the chain, means governed by each relay of said chain when released for completing through its back contact a second stick circuit for the succeeding relay including a back contact of said control relay in the second stick circuit of the second and each alternate succeeding relay of said chain and a front contact of said control relay in the second stick circuit of each of the intervening relays of said chain, a second control relay, and a pick-up circuit for each relay of said chain comprising a back contact of said second control relay and a back contact of the preceding relay of said chain for each of said alternate relays and comprising a front contact of said second control relay and a front contact of the succeeding relay in the chain for each of said intervening relays.

6. In combination, a normally energized control relay, means for governing said relay, a chain of counting relays, a stick circuit including a front contact of said control relay and a front contact of the first relay of said chain for normally energizing said first relay, means for normally energizing each of the succeeding relays of said chain over a stick circuit including a front contact of that relay and a front contact of the preceding relay of the chain, means governed by each relay of said chain when released for completing through its back contact a second stick circuit for the succeeding relay including a back contact of said control relay in the second stick circuit of the second and each alternate succeeding relay of said chain and a front contact of said control relay in the second stick circuit of each of the intervening relays of said chain, a second control relay, means for governing said second control relay, a slow releasing repeater relay energized over a back contact of said second control relay, a pick-up circuit for each of said alternate relays of said chain comprising a back contact of said second control relay and a back contact of the preceding relay of said chain, and a pick-up circuit for each of said intervening relays of said chain comprising a front contact of said second control relay, a front contact of said repeater relay and a front contact of the succeeding relay of said chain.

7. In a system for a roadway provided with a pair of wheel actuatable devices; in combination with said devices, a first control relay normally energized over a stick circuit including its own front contact and a normally closed contact of a first of said wheel actuatable devices, a first repeater relay energized over a circuit including a front contact of said first control relay, a pick-up circuit for said first control re-

lay including in series said contact of said first wheel actuatable device and a back contact of said first repeater relay, a second control relay normally energized over a stick circuit including its own front contact and a normally closed contact of the second of said wheel actuatable devices, a second repeater relay energized over a circuit including a front contact of said second control relay, a pick-up circuit for said second control relay including in series said contact of said second wheel actuatable device and a back contact of said second repeater relay, a stick circuit for said first repeater relay including in series its own front contact and a back contact of said second repeater relay, a stick circuit for said second stick relay including in series its own front contact and a back contact of said first repeater relay, and means governed by said first and second repeater relays for counting the number of vehicles actuating said first and second wheel actuatable devices respectively.

8. In combination, two control relays, means for independently controlling each of said control relays, a chain of normally energized counting relays including a first relay held energized over a stick circuit controlled by a front contact of one of said control relays and a plurality of succeeding relays each held energized over a stick circuit controlled by a front contact of the preceding relay in said chain, means controlled by each relay in said chain when released for transferring the stick circuit of the succeeding relay to a contact of said one control relay, the stick circuits of the second and each succeeding alternate relay being controlled by a back contact of said one control relay and the stick circuits of the other succeeding relays of said chain being controlled by a front contact of said one control relay whereby the relays of said chain are sequentially released one at a time upon each release or pickup of said one control relay, and pick-up circuits for the last relay and each preceding alternate relay of said chain including a back contact of the second of said control relays and a back contact of the preceding relay of said chain and pick-up circuits for the other preceding relays of said chain including a front contact of said second control relay and a front contact of the succeeding relay of said chain whereby the relays of said chain when released are picked up in sequence one at a time each time said second control relay releases or picks up.

9. In combination, two control relays, means for independently controlling each of said control relays, a chain of counting relays each normally held energized over a stick circuit including a front contact of the preceding relay in said chain with the stick circuit for said first relay of said chain including a front contact of one of said control relays, means controlled by each relay of said chain when released for establishing a secondary stick circuit for the succeeding relay of said chain alternately through a back contact or a front contact of said one control relay whereby said one control relay effects sequential release of said relays of said chain one at a time upon each release or pickup of said one control relay, and pick-up circuits for the last relay and each preceding alternate relay of said chain including a back contact of the second of said control relays and a back contact of the preceding relay of said chain and pick-up circuits for the other preceding relays of said chain including a front contact of said second control

relay and a front contact of the succeeding relay of said chain whereby the relays of said chain when released are picked up in sequence one at a time each time said second control relay releases or picks up.

10. In a system for a roadway provided with a pair of wheel actuatable devices each having a normally closed contact which opens when said device is actuated by a wheel, in combination, two control relays one for each of said devices, a stick circuit for each of said control relays controlled by said normally closed contact of the associated wheel actuatable device, a repeater relay for each of said control relays controlled by a front contact of the associated control relay, a pick-up circuit for each of said control relays including said normally closed contact of said associated wheel actuatable device and a back contact of the associated repeater relay, a stick circuit for each repeater relay including a back contact of the other repeater relay, a chain of counting relays each normally held energized over a stick circuit including a front contact of the preceding relay in said chain with the stick circuit for said first relay of said chain including a front contact of one of said repeater relays, means controlled by each relay of said chain when released for establishing a secondary stick circuit for the succeeding relay of said chain alternately through a back contact or a front contact of said one repeater relay whereby said one repeater relay effects sequential release of said relays of said chain one at a time upon each release or pickup of said one repeater relay, pick-up circuits for the last relay and each preceding alternate relay of said chain including a back contact of the second of said repeater relays and a back contact of the preceding relay of said chain and pick-up circuits for the other preceding relays of said chain including a front

contact of said second repeater relay and a front contact of the succeeding relay of said chain whereby the relays of said chain when released are picked up in sequence one at a time each time said second repeater relay releases or picks up, and control means for vehicles in said roadway controlled by said chain of counting relays.

11. In a vehicle counting system for a roadway provided with two wheel actuatable devices, in combination, two control relays one for each of said devices, means governed by each of said devices for releasing the associated control relay during the interval of actuation of the device, a chain of counting relays each normally held energized over a stick circuit including a front contact of the preceding relay in said chain with the stick circuit for said first relay of said chain including a front contact of one of said control relays, means controlled by each relay of said chain when released for establishing a secondary stick circuit for the succeeding relay of said chain alternately through a back contact or a front contact of said one control relay whereby said one control relay effects sequential release of said relays of said chain one at a time upon each release or pickup of said one control relay, and pick-up circuits for the last relay and each preceding alternate relay of said chain including a back contact of the second of said control relays and a back contact of the preceding relay of said chain and pick-up circuits for the other preceding relays of said chain including a front contact of said second control relay and a front contact of the succeeding relay of said chain whereby the relays of said chain when released are picked up in sequence one at a time each time said second control relay releases or picks up.

GEORGE A. CULBERTSON.