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TRAFFIC RESPONSIVE DEVICE

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Original application April 8, 1930, Serial No. 442,560, now Patent No. 2,077,924, dated April 20, 1937. Divided and this application March 19, 1936, Serial No. 69,623

9 Claims. (Cl. 200—36)

This invention relates to a control having functionally and structurally improved characteristics.

This application is a division of application S. N. 442,560 filed April 8, 1930, now Patent Number 2,077,924, issued on April 20, 1937, and relates in particular to a traffic operated control device for insertion in road surfaces or the like, as shown in Figure 1. The present application shows and describes Figs. 1, 2, and 3 of the parent application for the purpose of complete illustration but the claims in the present application are restricted to the invention of Figure 1.

Application S. N. 69,622 filed March 19, 1936, which is also a division of Patent Number 2,077,924, claims subject matter specific to Figure 2 of the present application.

It is an object of the invention to construct a mechanism of this character which will be capable of advantageous use in numerous different associations but which has been primarily developed to provide a vehicle actuated control and when utilized in this connection being of major value when associated with a traffic control system.

Another object of the invention is that of providing a structure which will provide a sequence of impulses upon passage of a vehicle.

A still further object is that of providing structures of this character capable in certain respects of independent use but primarily adapted for cooperative functioning and which structures will involve relatively few parts individually simple and rugged in construction and capable of ready assembly and set up to furnish mechanisms operating over long periods of time with freedom from electrical and mechanical difficulties.

With these and further objects in mind, reference is had to the attached sheet of drawings illustrating practical embodiments of the invention, and in which:

Fig. 1 is a diagrammatic illustration of a vehicle actuated control;

Fig. 2 is a similar view of the control in association with the mechanism to be operated thereby; and

Fig. 3 shows a slightly different layout of the system from that illustrated in Fig. 2.

Referring to Figs. 1 and 2 of the drawing there is shown a schematic embodiment of an impulse relay mechanism constructed in accordance with our invention and connected to a mechanism to be controlled. For the purpose of illustrating a practical embodiment of the invention, a mechanism to be controlled is indicated by the

letter "S" and may be for example a timer or an automatic traffic counter constructed and arranged to count vehicles moving along a highway.

The road unit 1 conveniently includes a body located in the street so as to be actuated by a vehicle passing over the device and causing contacts to be made in a predetermined manner. One novel feature of the invention is that these contacts may be connected to be effective to control the circuits only when the vehicle moves over the unit in a certain direction. This road unit may for example be of the general construction shown in U. S. Patent #1,950,490 to Geer and Stirren, except that one of the plates is divided into a plurality of parts for the special purpose of this invention.

In the illustrated embodiment of our invention this unit includes three separate contact numbers 2, 3 and 4 insulated from each other by spacer members 5. These contact members are preferably yieldable plates which may readily be flexed into contact with each other as the vehicle passes over the device. The entire assemblage is located within a resilient moisture and waterproof envelope or casing indicated by the numeral 6. The contact plates 2, 3 and 4 are connected in circuit to a suitable source of electrical energy by means of lead wires 7, 8 and 9 respectively.

Connected in circuit with the switch members are electro-magnets 10 and 11 provided with armatures 12 and 13 respectively for opening and closing circuits as hereinafter described. Disposed adjacent the armature 12 are double contacts 14 and 15, a single contact 16 being provided adjacent the armature 13. Magnet 10 and armature 13 are connected in circuit with plate 2 by means of leads 8 and 17, and magnet 11 is connected in circuit with plate 3 and armature 12 by means of leads 9 and 20 and contact 14. The designated unit S to be controlled by the operation of the several switch members may, as shown in Fig. 2, be connected in circuit therewith by means of lead wires 18 and 19.

Having thus described one embodiment of a relay mechanism constructed in accordance with our invention, the operation thereof is as follows: Assuming that the switch mechanism 1 is located in a street pavement wherein it is desired to record the presence of vehicles passing only in the direction indicated by the arrow, the circuits for operating the counter or timer will be completed in the following manner. A passing vehicle wheel engages plate 2 and deflects it as indicated by the dotted line, Fig. 2, so as to con-

tact with plate 4 thereby energizing relay 10 and causing armature 12 to engage contact 15 and thus connect one terminal of the power supply to unit S by lead wire 19. When the vehicle proceeds further over the road unit, the gap is closed between plates 2 and 3 by the engagement of the latter with plate 4, and the other terminal of the power supply also is connected to S via plate 3, and leads 9 and 13, thus causing S to operate and register the impulse created by the passing vehicle. As the vehicle continues along the unit, contact between plates 2 and 4 is broken and magnet 10 is de-energized, thereby causing armature 12 to interrupt the circuit 19, so that current is cut off from the unit S. The armature 12 now engages with contact 14 and establishes a circuit over wire 20 to energize magnet 11 while a vehicle is continuing further over plate 3 alone. The energization of magnet 11 causes its armature 13 to disengage from contact 16 to interrupt the circuit through magnet 16 but this has no effect since the circuit has already been interrupted through the breaking of contacts 2 and 4 as the vehicle wheel left contact 2. As the vehicle leaves contact 3 in the direction of the arrow the circuit via wire 9 from magnet 11 becomes interrupted deenergizing this magnet and causing its armature 13 to resume engagement with contact 16. Now the mechanism is again at its normal condition of rest. It will be observed that the contact plates 2 and 4 together serve as one switch or contact maker and the contacts 3 and 4 together serve as another switch or contact maker.

From the foregoing, it will be noted that the impulse for operating the unit S is effected by the predetermined order in which contact is made between the plates 2, 4 and 3. To further illustrate the operation of the device: If a vehicle should approach in a direction opposite to that indicated by the arrow, plate 3 first makes contact with plate 4 and thereby energizes relay 11 which causes armature 13 to interrupt the circuit 17 to magnet 10. As the vehicle proceeds and causes plate 2 to also engage plate 4, the circuit to magnet 10 remains unchanged and thereby prevents relay 10 from becoming energized while plates 3 and 4 are in contact and thus the circuit 19 to the counter cannot be completed so as to produce an operative impulse. As the vehicle proceeds further and the plates 3 and 4 separate, the relay 11 becomes deenergized, and as its armature 13 reengages contact 16 the relay 10 is energized, and remains energized as long as plate 2 is in contact with plate 4. However, at this time, the plates 3 and 4 being separated, the circuit over wire 9 through the unit S is open and remains open as the vehicle continues over plate 2 alone. After the vehicle has passed off the unit 1, the circuit conditions return to normal without producing any effects on the mechanism S.

From the above description, it will be noted that it is necessary that the relays 10 and 11 be successively energized in a predetermined order so as to permit an electrical impulse to operate the counter mechanism. Thus we have provided a simple and efficient mechanism which shall accurately register vehicles passing over the device in only one direction.

Referring to Fig. 3, it will be observed that the same layout has been illustrated as that shown in Fig. 2 with the exception that the unit S is not connected directly into the operating circuit. More particularly, it will be noted that

the circuit breaker 22 controlling the flow of current through leads 23 is coupled in this view to be closed when the armature 13 is attracted by the electro-magnet 11. This may be achieved by having the circuit breaker 22 within the sphere of influence of the magnet 11 or as has been indicated in dotted lines coupling the member 22 to the armature 13. Additionally, in this view it will be observed that the armature 13 in addition to operating with contact 16 for the purpose of closing the circuit through electro-magnet 10 engages a contact 24 when attracted and this contact is connected to the lead corresponding to lead 20 in Fig. 2. Obviously, the same operation as that heretofore described will follow in connection with the construction presently considered. In other words, current will not flow through the leads 23 unless the control is actuated in a predetermined manner.

The value of the present construction will be apparent when it is considered that by means of the same, a vehicle moving over a highway in a direction contrary to that in which control is to be exercised will not effect operation of the present mechanism. In other words, a vehicle which for example is on the wrong side of the road or overlaps the center thereof and has passed the intersection will not cause an actuation of the control mechanism even although it may traverse the control unit. Accordingly, no operation of the timer and/or counter connected to this unit will follow, but the passage of the vehicle in a proper direction will immediately result in such operation.

It will be appreciated that Fig. 1 shows a cross-sectional view laterally across the road unit and along the path of traffic and that the road unit will ordinarily have considerable length extending transverse to the road and across the path of traffic as in the Geer and Stirren Patent 1,950,490 referred to above.

It will also be appreciated that the contact plates 2 and 3 or the insulating spacers 5 or both must be resilient so as to permit the plates 2 and 3 to contact with plate 4 under pressure of a wheel and to restore the plates to the normal separated condition shown in Fig. 1 after passage of the wheel as described, and that if the plates 2 and 3 are resilient for example the spacers 5 may be relatively more rigid, whereas if the spacers 5 are sufficiently resilient the plates 2 and 3 may be relatively rigid.

It will also be observed that the road unit may be mounted in the roadway by means of the receptacle 25.

It will be appreciated that numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

We claim:

1. A vehicle traffic responsive device for directionally detecting the ordinary passage of vehicles in a roadway comprising in combination a substantially rigid receptacle adapted to be anchored in a road surface, a plurality of contact plates and a common contact plate within said receptacle, a resilient tread cover over said plates and fastened into said receptacle, a flexible insulating mounting supporting said plurality of plates in permanent lateral spaced relation with one another and in individually yieldable vertical spaced relation with said common plate whereby said plurality of plates will be brought into contact with said common plate in sequence by ordinary passage of a vehicle wheel thereover and

in accordance with the direction of such passage along the roadway, said plurality of plates being so closely spaced that ordinary pressure of a wheel traversing the resilient cover will bring all of said plurality of plates into contact with the common plate between contact only of the first of said plurality of plates with said common plate and contact only of the last of said plurality and said common plates.

2. A multi-contact street traffic switch to be mounted in a road surface for sequential operation of its contacts by vehicles traversing it in the ordinary course of traffic and having a plurality of narrow, laterally spaced contact plates, a relatively broad common contact plate, resilient insulating means normally maintaining said narrow plates in vertically spaced relation with said common plate and yieldable under ordinary pressure of a vehicle wheel traversing the switch to permit said narrow plates to engage sequentially with said common plate and upon passage of said wheel from the switch to cause said narrow plates to disengage again from the common plate, and a flexible protective envelope enclosing said plates, said narrow plates being arranged side by side and so closely spaced laterally that upon such passage of a wheel the contact between one of the narrow plates and the common plate is made before contact between the preceding adjacent one of the narrow plates and the common plate is broken.

3. A multi-contact street traffic switch to be mounted in a roadway for sequential operation of its contacts by ordinary passage of a vehicle wheel thereover, including in combination a relatively broad base contact element, a pair of relatively narrow contact plates arranged side by side and over said base element, resilient insulating means under portions of said narrow plates to maintain them normally separated from said base element and adapted to permit said plates to be depressed individually and sequentially into contact with said base element upon ordinary pressure on said plates by a wheel rolling thereover and to restore said plates to normal separation upon release of such pressure, and a flexible protective envelope enclosing said plates, said plates being so closely arranged that contact of the individual plates with the base element overlaps in the middle of the sequential operation.

4. A multi-contact street traffic switch to be mounted in a roadway for sequential operation of its contacts by ordinary passage of a vehicle wheel thereover, including in combination a relatively broad base contact element, a pair of relatively narrow contact plates arranged side by side and over said base element, resilient insulating means under portions of said narrow plates to maintain them normally separated from said base element and adapted to permit said plates to be depressed individually and sequentially into contact with said base element upon ordinary pressure on said plates by a wheel rolling thereover and to restore said plates to normal separation upon release of such pressure, and a flexible protective envelope enclosing said plates, said resilient insulating means being located between portions of the edges of said narrow plates and said base element, said plates being so closely arranged that contact of the individual plates with the base element overlaps in the middle of the sequential operation.

5. A multi-contact street traffic switch to be mounted in a roadway for sequential operation of its contacts by ordinary passage of a vehicle

wheel thereover, including in combination a relatively broad base contact element, a pair of relatively narrow contact plates arranged side by side and over said base element, resilient insulating means under portions of said narrow plates to maintain them normally separated from said base element and adapted to permit said plates to be depressed individually and sequentially into contact with said base element upon ordinary pressure on said plates by a wheel rolling thereover and to restore said plates to normal separation upon release of such pressure, and a flexible protective envelope enclosing said plates, said plates being so closely arranged that contact of the individual plates with the base element overlaps in the middle of the sequential operation, and at least said narrow plates being of resilient material to aid in restoration of said plates to normal separation from said base element on release of pressure.

6. A traffic responsive device for directional operation by the ordinary passage of vehicles in a roadway comprising, in combination, a pair of contact plates, a third contact plate, a flexible insulating mounting for supporting said pair of plates in closely but permanently spaced lateral relation with each other and in yieldable vertical spaced relation with said third plate, means including a flexible upper surface covering for said plates for mounting same in a roadway for sequential operation of said pair of plates into contact with said third plate by pressure from ordinary passage of a vehicle wheel thereover and in accordance with the direction of such passage along the roadway and whereby both plates of said pair will be concurrently in contact with the third plate between contact solely of the first and third and contact solely of the second and third of said plates during such sequential operation.

7. A directional vehicle traffic responsive device comprising in combination a substantially rigid receptacle adapted to be anchored in a road surface, a pair of contact plates, a third common contact plate within said receptacle, a resilient protective tread cover mounted over said plates and fastened into said receptacle, a flexible insulating mounting supporting said pair of plates in permanent lateral spaced relation with one another and in yieldable vertical spaced relation with said third plate, said pair of plates being so closely spaced that ordinary pressure of a vehicle wheel traversing said tread cover in one direction will cause sequential operation of the pair of plates into contact with the third plate in the order first, first and second, second and ordinary pressure of a vehicle wheel traversing said tread cover in the opposite direction will cause sequential operation of the pair of plates into contact with the third plate in the order second, second and first, first.

8. A traffic actuable multiple switch device to be installed in a roadway for directionally sequential operation of its switches by the ordinary passage of vehicle wheels thereover in accordance with the direction of passage of the vehicle and comprising a plurality of switches arranged closely side by side, a flexible protective envelope enclosing said plurality of switches, resilient insulating supporting means along the side of said switches for normally maintaining said switches open but yieldable under ordinary pressure of a vehicle wheel rolling over said flexible envelope from side to side in either one direction to close said switches sequentially in accordance with

such direction, said switches being arranged so closely adjacent that said switches are operated concurrently between individual operation of said switches separately as a vehicle wheel rolls over said device.

5 9. A multi-contact street traffic switch to be mounted in a roadway for sequential operation of its contacts by ordinary passage of a vehicle wheel thereover, including in combination a base
10 contact means, a pair of relatively narrow contact plates arranged side by side and over said base contact means, insulating means between the edges of said narrow plates and said base contact means to maintain said contact plates

normally separated from said base contact means, said contact plates being sufficiently resilient to permit them to be flexed individually and sequentially into contact with said base contact means upon ordinary pressure on said plates by a wheel rolling thereover and to restore said plates to normal separation upon release of such pressure, and a flexible protective envelope enclosing said plates, said plates being so closely arranged that contact of the individual plates with the base contact means overlaps in the middle of the sequential operation.

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