June 8, 1937. E. M. HYMANS 2,083,264

BUS REGISTERING SYSTEM

Filed July 5, 1933 2 Sheets-Sheet 1

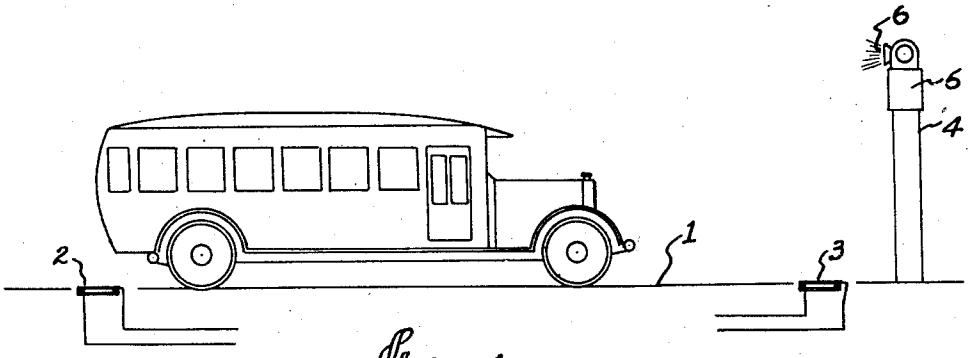


Fig. 1.

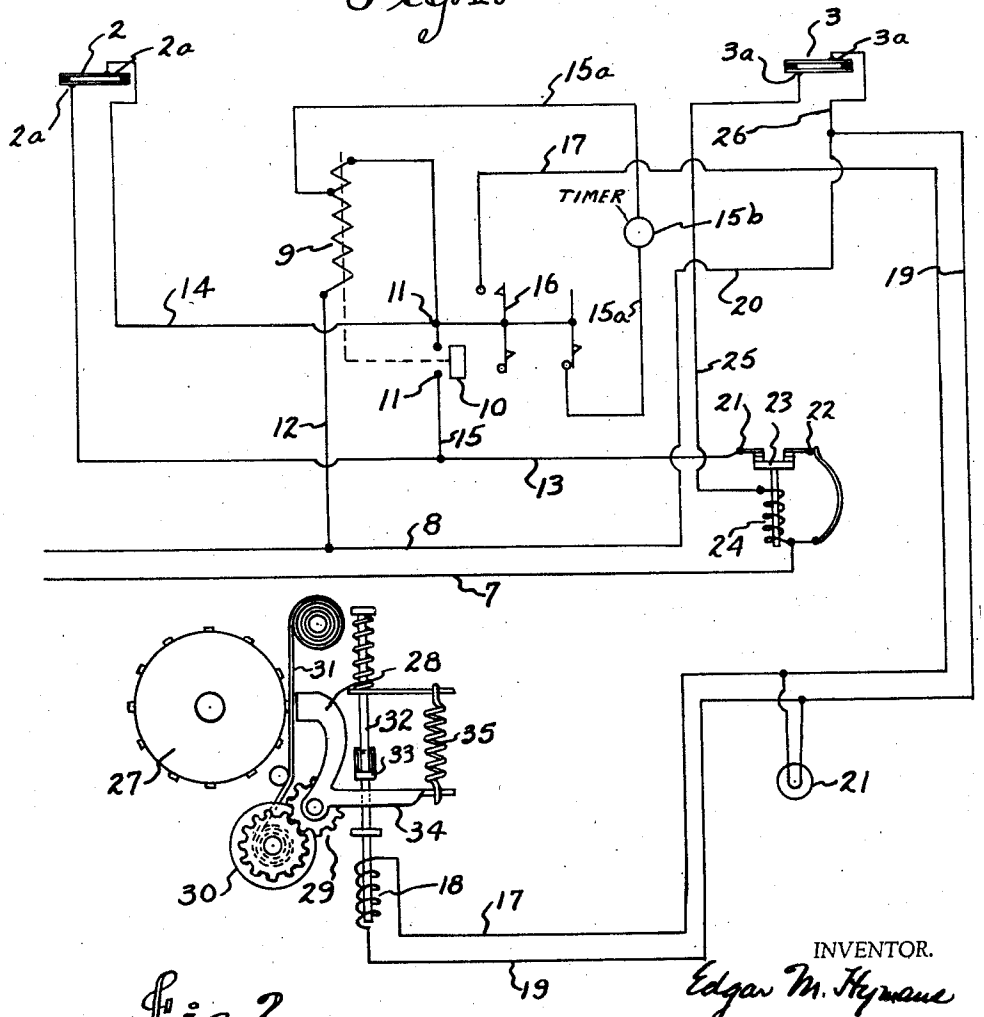


Fig. 2.

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Fig. 4.

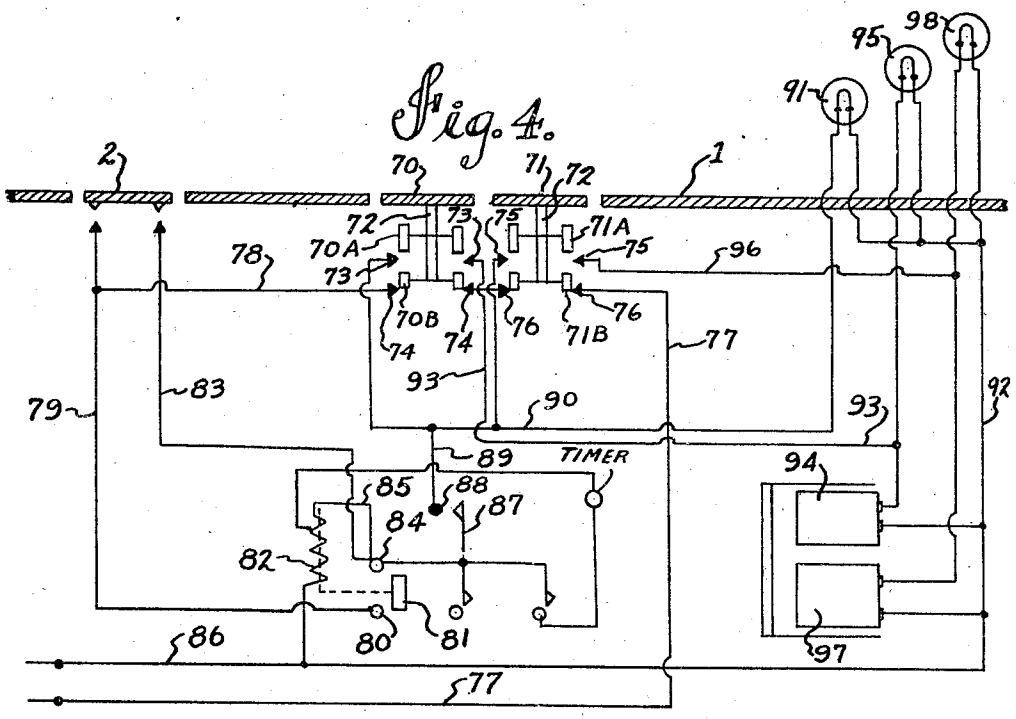
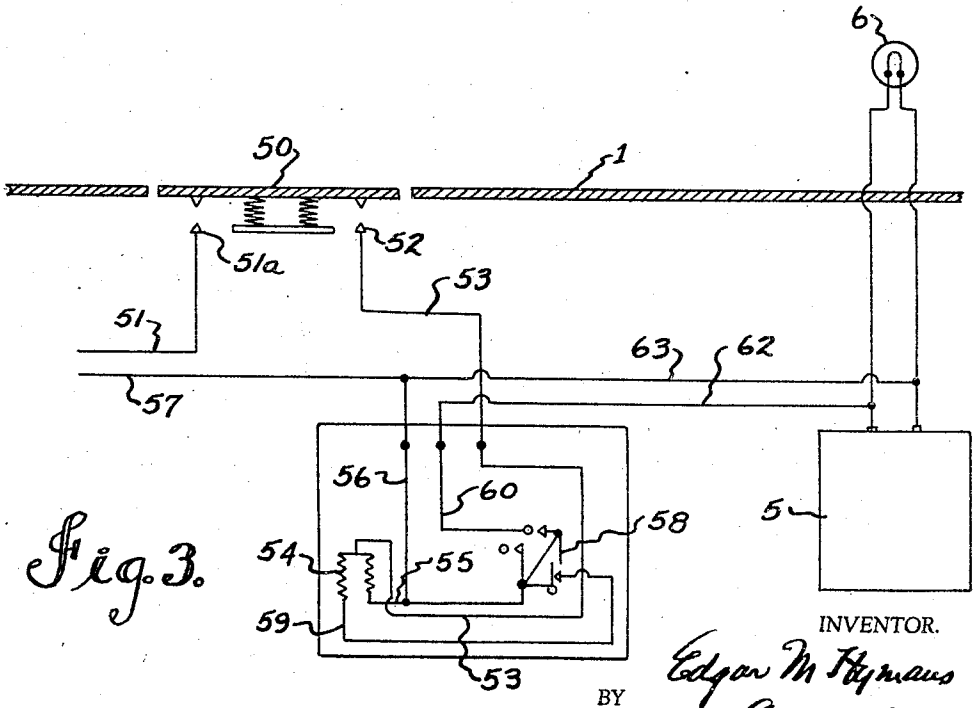


Fig. 3.



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BUS REGISTERING SYSTEM

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4 Claims. (Cl. 234—36.5)

It is highly desirable in transportation systems using motor buses which operate over the regular or private highways, to provide some sort of registering system whereby the leaving time of each bus from some station is automatically recorded. This registering is done in surface street cars by electrical means which is automatically operated; but with motor buses using the regular highways over which all types of vehicles are operating, there has been no registering system of which I have been able to receive information, which will respond only to motor buses and will not respond to motor vehicles generally as well.

It is the object of my invention to provide for selective automatic time registration for motor buses or other road vehicles, the system and apparatus being such that the driver of the vehicle whose leaving time is to be recorded, will not only be able to effect the registration, but will know from a suitable signal that he has done so.

The basic theory of my apparatus, and the principle of my system is to provide for electrical contacts controlled by a treadle or treadles in the traveled highway, and a time registering system operated thereby, with a requirement for an elapsed time between original preparation for and final establishment of the time registering circuit and arrangements whereby a vehicle regularly and normally moving over the highway will disenable the final establishment of the registering circuit by continued movement before said recording device has an opportunity to operate.

In the drawings:

Figure 1 is a diagram showing the preferred location of parts for a motor vehicle registration system on a traveled highway.

Figure 2 is a diagram of a combined elapsed time relay switch and breaker switch, with a diagram of portions of a time recording machine.

Figure 3 is a diagram of another arrangement for accomplishing my object.

Figure 4 is still another arrangement which is used for registering selectively two different routes of buses, or buses traveling in two directions, using the same initial treadle operation.

In Figure 1 I have indicated by the numeral 1 a traveled highway, with road treadles 2 and 3 so mounted and connected as to close electric circuits, as indicated by contacts 2*a* and contacts 3*a*. Located at the side of the roadway or other convenient point, is a pole 4, on which is mounted the time relay and circuit breaker, and on which may be mounted the time recorder, in a box 5. Within sight of the driver is a light 6, which is illuminated at the instant the recording takes place, and which stays lighted until the apparatus is deenergized by the passing of the motor vehicle over the second treadle. The light may be replaced by a bell or other signal, and the recording device may be at a remote point, such as a central office.

The type of elapsed time relay switch which I illustrate in diagram in Figure 2 is a commercial type of such a switch, and I refer to U. S. Letters Patent No. 1,483,433, as fully describing such a structure and its operation.

Referring to the diagram, the incoming electric current is by wires 7 and 8. The switch includes a solenoid 9, which draws into contact position an armature 10, thereby closing contacts 11, 11. A lead wire 12 extends from supply wire 8 to one side of the solenoid. A lead wire 13 extends from the breaker switch to one of the contacts 2*a* of the first treadle. From the other contact 2*a* of the treadle a wire 14 extends to the upper contact 11. There is a wire 15 from the wire 13 to the other of the contacts 11.

The result of the connections and structure now noted is that when the treadle 2 is depressed by a motor vehicle, the solenoid 9 is energized, drawing over the armature 10. The current then continues to maintain the solenoid energized, even if the first treadle is instantly released by the motor vehicle moving ahead.

Connected by shunt leads 15*a* with the solenoid is a synchronous motor timing device diagrammatically indicated at 15*b*, which starts into movement as soon as the solenoid is energized, and is maintained in movement through the circuit closing action of the armature 10. The motor or timing device operating through an adjustable, self-resetting mechanical feed rotates a contact establishing member which swings the contact element 16, so that at the end of the prescribed elapsed time this contact element establishes a contact with a lead wire 17 (see Fig. 2).

The lead wire 17 extends to the time recording device, where it connects with the coil of a solenoid 18 and thence back to the supply wire 8 through lead wires 19 and 20. There is also a signal light 21 which is connected across the leads 17 and 19, and which will light up when the solenoid 18 is energized.

It is evident from the above that a vehicle passing over treadle 2 and coming to a stop beyond it, will cause the time recording solenoid and the signal light to operate after a given length of time, depending on the timing motor, its adjustment, its connections, and its time setting.

Located in the roadway beyond the first treadle, but in a position such that a vehicle passing over the one treadle will also pass over the other in natural forward movement, is the second treadle 3. Current to the apparatus above described comes from supply wire 7 through a breaker switch. This switch has contacts 21 and 22 connected by an armature 23, around which is a solenoid 24, which will, when energized, cause the armature to move so as to break the circuit.

The solenoid 24 is connected at one end with the supply wire 7, and at the other end with one of the contacts 3a of the treadle by means of a wire 25. The other contact 3a is connected to the return wire 20 to supply wire 8 by means of the wire 26.

The result of this structure is that when the second treadle is depressed, the solenoid 24 will be energized, the armature 23 withdrawn, and circuit connections with the time switch disestablished. When this happens, the armature 10 of the time switch structure opens, and the circuit is broken to the timing motor. Also, the mechanism for operating the contact member 16 will return it to original position. Reference to the patent above cited will explain how the timing switch may be constructed in detail, and how the contact member 16 is completely reset to starting position each time the circuit is broken to the timing motor, no matter how far it has rotated. This prevents the recording device being set off as a result of a series of operations or energizing and de-energizing, without the required wait or elapse of time between passing over the two treadles.

As for the registering mechanism itself, I have indicated a set of time wheels which will be clock-operated at 27. The printing hammer of the recorder is indicated at 28, mounted on a shaft which has a pinion 29 thereon. The pinion operates a ball clutch pinion 30, which reels a short section of the paper band 31, which is supplied for recording of the time imprint. The clutch is set to operate when the printing hammer is pulled back, and not when it is released to make a printing. The solenoid 18 has as its armature the hammer operating jump bar 32 of the time recorder, which is arranged so that when the solenoid is energized the lug 33 on the jump bar contacts with the finger 34 on the printing hammer shaft and rocks the shaft against the spring 35. The hammer is held thus until the second treadle is depressed, opening the several circuits, which immediately releases the printing hammer and causes it to strike against the paper band and results in an imprint of the time from the time wheels.

I have not made any attempt to show complete mechanisms in the above description, as all are purchasable on the market as units except, perhaps, for the solenoid device for retracting and releasing the printing hammer of the time recorder. Also, any one of a large variety of specific mechanisms which function as those described will serve my purposes.

It will be apparent from the above that without interference with regular traffic over the highway, the arrangement or system described will permit each motor bus driver to make a time record of leaving a selected registration point on his route and know that it is made. Any other vehicle in normal movement will naturally de-energize the apparatus and reset it unless it should pause for the required time. Regular traffic over the highway, unless influenced by some unusual circumstance, will effect no registrations.

Referring to Figure 3, I have shown a treadle 50, which may have, if desired, a spring resistance so as to respond only to vehicles of a given weight. This will exclude most of the traffic on the highway to begin with. It is required that the vehicle remain on this treadle until the required time has elapsed, whereupon it will proceed. If the vehicle stays too short a time on the treadle, the device will be deenergized and nothing will take place on the registering devices, which I have classified as method I—A.

The supply wire 51 brings current to the terminal 51a at the treadle, which, when depressed, makes connection with the terminal 52. The lead 53 extends to one side of the time motor 54. From the other side of the time motor a lead 55 connects with a lead 56 which is connected to the other supply wire 57. When the time motor has completed the movement which consumes the desired time, it will operate the switch 58. The closing of this switch will take current entering through lead 53, passing through the motor, out through the lead 59, through the switch, through the lead 60, to the lead 62 to the registering and signal apparatus. From the apparatus the current comes back through the lead 63 to the supply wire 57. If the treadle is released before the switch 58 is closed, the supply will be cut off, the motor will stop, and the device will reset itself. The time relay in this instance will be the same as in the first case, but without the solenoid which permits the first treadle to return to original position without interrupting the current to the motor.

The form of apparatus shown in Figure 4 is like that shown in the first embodiment, except that the circuit breaker member is omitted. In this form there are two or more treadles which can be used as second treadles, for completing the registration, thus permitting me to arrange that a vehicle after passing the first treadle, can then drive over either one of two (in this instance) second treadles, thereby selecting which of two recording devices or indicators on the same recording device will make a record.

The first treadle will be as in the first instance, as will the solenoid and the time motor and switch. The second treadles are different, however, as well as the connections. Each of the second treadles 70 and 71 is provided with a plunger member 72 of any desired type, which carries two sets of contactors. I have marked the contactors for the first of the second treadles as 70A and 70B, and the like ones for the second treadle as 71A and 71B. A depression of either treadle will first make contact between two upper terminals and then break contact between two lower terminals.

I have indicated the upper terminals for treadle 70 at 73, and the lower terminals at 74. Those of the second treadle are 75 and 76. The line wire 77 is connected to terminal 76, and the lower contactors 70B and 71B carry the current through to a lead wire 78, there being connection between the two inner terminals 74 and 76. Current thus reaches the wire 79, which extends to one of the terminals of the first treadle, and also to the terminal 80, which is arranged to be contacted by the armature 81 of the solenoid 82. The other terminal at the treadle connects to the wire 83, which is connected to the terminal 84, the other terminal contacted by the solenoid

armature. This terminal is connected to the solenoid by the wire 85, and the solenoid is connected directly to the other line wire 86.

Accordingly, when the first treadle is depressed the solenoid is actuated, and the solenoid closes; whereupon the vehicle can leave the first treadle, waiting, however, until the timing motor, as in the first instance, has closed the switch 87.

When the time switch is closed current then travels from the terminal 88, which is then in circuit with the line wire 77, through a wire 89, to a lead 90. It passes from the lead 90 to a first signal light or other signal 91, and thence by a wire 92 to the line 86.

Thus, when the time has elapsed and the parts are arranged for making a record, this first light will indicate to the bus driver that he may proceed. In doing this he will select which of the second treadles he will pass over. For example, the first of the two second treadles may be directly ahead of the first treadle, and the second may be located on a cross street. In this way a bus line which turns a corner at the recording station may make a record, and one which does not turn this corner may also make a record. Also, two second treadles may be used side by side, to record two routes at that location traveling in the identical direction, or there may be a first treadle in the middle of a street, and second treadles at the sides of the street, but in opposite directions from the first treadle, thereby permitting separate registration of buses going in opposite directions.

When the bus passes over the selected second treadle, it brings about a connecting of the upper terminals 73 or 75, as the case may be. If the former, then current passes from the lead 90, through terminals 73 and the connector between them, and by a wire 93 to an indicator or registering device 94 and a signal light 95, and thence out to the line 86. If the treadle 71 is depressed the current passes through a wire 96, to the other indicator or registering device 97 and signal light 98, and thence to the line 86.

The selected registration and the signal that it has been accomplished is done instantaneously, and the treadle plungers, as they descend, act to move the contactors for the two lower sets of terminals out of circuit closing position. This cuts off the supply to the apparatus from the line wire 77, and the entire switch mechanism is deenergized, and the solenoid opens.

If a vehicle passes over the first treadle and then, without waiting, passes over one of the second treadles, it will result in cutting off current from the apparatus and will reset it without any recording.

This last noted modification employs the double contactor switch mechanism on the second treadle for deenergizing the apparatus, and also for connecting up the recording instrumentalities. It may be used with only one second treadle instead of with two or more second treadles, as described above, or instead of the circuit breaker type of treadle described in Figure 1.

By illustrating the two modifications of my preferred embodiment, I do not wish thereby to exclude other modifications, as there are many which could be devised according to the principles hitherto set forth, and the novelty inherent in which is set forth in my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a system for recording time for vehicles on a traveled highway, the combination of a circuit closing means in the highway adapted to be actuated by a vehicle on the highway, a time switch set in operation in response to closure of said circuit closing means and arranged to close a second circuit at the end of a predetermined time, a time recording device having impression means requiring the closing of said second circuit and the opening of the same for its actuation, and means in the highway beyond the first circuit closing means in the direction of travel of the vehicle, and actuable by the vehicle, for opening said second circuit.

2. A system for recording time for vehicles on a traveled highway comprising a first circuit having a holding circuit and a second circuit, said first circuit actuating a time switch which closes said second circuit, said second circuit containing motive means for a time recording device which requires the successive closing and opening of said circuit for actuation, and means located along the highway for closing said first circuit and holding circuit and a second means located along the highway in the direction of travel of a vehicle from said first means for opening said second and said first circuit, both said first and second means being actuable by a vehicle traveling on the highway.

3. In a system for recording time for vehicles on a traveled highway, the combination of circuit closing means in the highway controlling a circuit and actuable by a vehicle moving along the highway, a time switch within said circuit controlled by said circuit closing means and arranged to close a second circuit, a time recording device having marking means requiring closing said second circuit and opening the same for its actuation, and means actuable by further movement of the vehicle along the highway a given distance for opening both said first and second circuits.

4. A system for recording time for vehicles on a traveled highway comprising 1st and 2nd circuit-closing means located successively along said highway, a circuit, a time switch for closing said circuit, another circuit made in response to operation of said first circuit-closing means for operating said time switch, a time recorded impression means operative in response to a successive make and break of said first-mentioned circuit, means responsive to said second circuit closing means for opening said first-mentioned circuit and said other circuit.

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