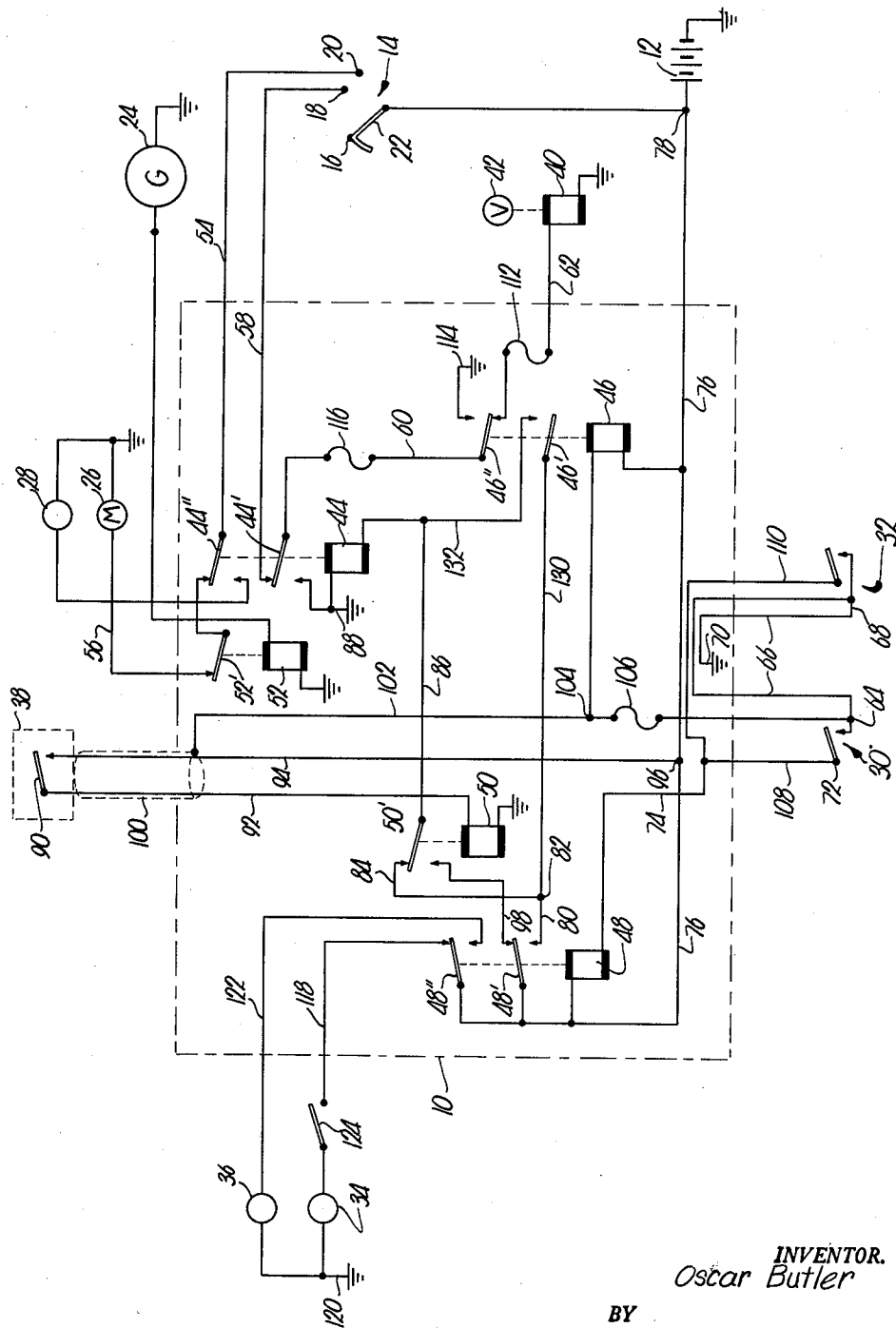


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CONTROL SYSTEM FOR PUBLIC CONVEYANCE
VEHICLES HAVING DIESEL ENGINES
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**CONTROL SYSTEM FOR PUBLIC CONVEYANCE
VEHICLES HAVING DIESEL ENGINES**
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This invention relates to control systems for public conveyance vehicles and, more specifically, to a tamper-proof control system for vehicles having diesel engines to insure that the operator of the vehicle properly records the transportation of passengers.

The profitable operation of taxicab companies is dependent upon the income received for services rendered in transporting passengers. Such being the case, it is naturally important that the management of taxicab companies be assured that their drivers are honest and that all money received during operation of the vehicles is deposited with the company.

To insure that this is done, and to regulate the amount charged a passenger, meters are commonly installed in taxicabs or other public conveyance vehicles to register the proper fare as determined by the distance travelled. This system, however, is only satisfactory if the operator of the vehicle renders the meter operable at the beginning of each trip.

This limitation inherent in meter-controlled taxicabs, has encouraged dishonest cab drivers to cheat the cab company by failing to operate the meter. Thus, if a particular trip is not recorded, the driver is free to retain the fare received from the passenger for himself and the company has no means of knowing about his dishonest act.

In many cases it has been found that the dishonesty of cab drivers has contributed materially to the financial failure of a particular company. Although control devices are available such as disclosed in my copending application, Serial No. 121,036, filed June 30, 1961, now Patent No. 3,111,185, for vehicles using gasoline power motors, the recent use of diesel engines in taxicabs has brought about the need for a control system particularly adapted to the latter type of power means. Furthermore, the tendency of cab drivers to attempt to tamper with any control device so that they may continue their dishonest practices, necessitates that any such device have tamper-proof means incorporated therewith.

It is, therefore, an object of this invention to provide a control system operable to stop the engine of the vehicle adapted for use with vehicles powered by diesel engines.

It is another object of this invention to provide such a control system operable to stop the engine of the vehicle if the driver does not properly record each trip for hire.

It is still another object of this invention to provide such a control system that is resistant to any attempts by the driver of the vehicle to tamper with the control system in an effort to circumvent its operation.

Other objects will become apparent as the detailed description proceeds.

In the drawing:

The figure is a schematic diagram of the circuitry of the present invention.

Referring to the figure, a closed dashed line 10 illustrates a tamper-proof housing used to enclose a majority of the components of the present invention. Externally of such housing, a battery 12 is shown connected to an ignition switch 14, said ignition switch being the switch provided on the vehicle to control the operation thereof. It is evident that battery 12 may be the on-vehicle power source.

Ignition switch 14 has switch positions 16, 18 and 20 corresponding to "off," "on" and "start," respectively. Ignition switch 14 also contains a contactor arm 22 which may be rotated by an ignition key or the like to engage the various switch positions. It should be noted that in starting the vehicle, the contactor arm is adapted to engage both positions 18 and 20, simultaneously, contact with the "on" position being maintained while the arm 22 is advanced to the "start" position.

Also externally of the housing is provided a generator 24, a starting motor 26, an indicator light 28, seat switches 30 and 32, an identification and passenger signal light 34, a "stoolie" light 36, a meter 38, solenoid 40, and a fuel shut-off valve 42. Generator 24 and starting motor 26 are both component parts of the vehicle.

As the operation of the various devices located externally of the tamper-proof housing can only be discussed in coordination with the apparatus within the housing, the description and operation of such apparatus will now be discussed. Before this is undertaken, however, it should be understood that the basic function of this system is to provide a linkage between the battery 12 and the solenoid 40 such that the fuel valve 42, to which the solenoid is connected, will only allow fuel to flow to the engine when passengers are being transported if the meter is first rendered operable by the driver.

The basic controlling point in the system is the seat switches 30 and 32 which are operable by the weight of a seated passenger. The remainder of the apparatus provides means by which the fuel valve 42 will close the fuel line if the driver does not operate the meter when a passenger is present in the vehicle such that one of the seat switches 30 or 32 is actuated. It should be understood that switches 30 and 32 are only illustrative and that any number of switches may be utilized, depending on the capacity of the vehicle and the particular seat configuration. With regard to these switches, my copending application cited above is incorporated herein by reference as may be necessary for complete understanding of the nature and manner of operation of switches 30 and 32 and their component parts.

It will be noted that relays 44, 46, 48, 50 and 52 are shown positioned internally of the tamper-proof housing represented by 10. Relay 46 is shown in its energized state while the remaining relays are shown in their de-energized state. These states represent the condition of the relays prior to starting the vehicle. In this regard it should be noted that relay 46 is normally maintained energized at all times. The significance of this feature will become apparent later in the specification. Furthermore, it should be understood that the reference character designations of the relays actually refer to the coils of such relays which, through their associated armature means, actuate the various switches that comprise the relay assembly. In this regard, these various switches are designated by the same numerical reference character as their associated relay coil except that prime and double prime notations are utilized. The switches of the relays will be referred to in the description of the operation of the apparatus as being in either "upper" or "lower" positions, said positions denoting the two possible contact conditions possible for a given relay switch.

If the ignition switch 14 is advanced to the "start" position 20, current will flow along conductor 54, through switch 44', switch 52', and conductor 56 to the starter motor 26. The return path for the electric current is represented by the ground symbols. This causes the energization of starting motor 26 which is coupled to the engine (not shown) in conventional manner. Switch position 18 being also engaged by the ignition switch while said switch is in the "start" position as aforesaid,

current simultaneously flows along conductor 58, through switch 44', conductor 60, switch 46'', and conductor 62 to the solenoid 40. This energizes solenoid 40 which actuates the fuel valve 42 to open the fuel line to the engine. Thus, starting of the engine may be effected. It should be understood that valve 42 may be a variety of conventional means capable of blocking the flow of fuel through a fuel line until actuation thereof by some means, solenoid 40 being here used for such purpose.

Once starting of the vehicle is effected, generator 24, through its coupling with the engine in conventional manner (not shown), generates sufficient electric current to energize relay 52 thus moving its associated switch 52' into the lower position where switch 52' opens the circuit through conductor 56. This disconnects starting motor 26 from the power circuit. At this point, the arm 22 of ignition switch 14 will be engaged only with switch position 18 as the start position 20 is no longer needed.

The operation of the control apparatus is best illustrated by an example. It will be assumed that it is desired to transport a passenger, and that the passenger has entered the vehicle and seated himself such that seat switch 30 is closed. It should be understood that seat switches 30 and 32 are normally open as shown in the figure, but are adapted to close in response to the weight of a seated passenger.

One electrical side, designated 64, of switch 30 is connected to ground by conductor 66 which is returned within the tamper-proof housing and back to a corresponding electrical side 68 of switch 32 and then returned within the housing to ground as at 70. The other electrical side 72 of switch 30 is connected by conductor 74 to relay 48, the relay coil thereof being connected in series with conductor 74 and conductor 76. Conductor 76 extends through the tamper-proof housing and connects to battery 12 at the junction point 78. Thus, it may be seen that the closure of seat switch 30 by the presence of a seated passenger connects the coil of relay 48 to the battery 12 to place relay 48 in the energized state. The energization of relay 48 causes switches 48' and 48'' to engage the lower contacts.

With reference now to the action of switch 48' when relay 48 is energized, it may be seen that the battery 12 through conductor 76, is now connected to conductor 80 which terminates at junction point 82. From junction point 82, a conductor 84 routes the current from battery 12, through switch 50' along conductor 86, to relay 44 and ground as at 88. This energizes relay 44, thus pulling switches 44' and 44'' to the lower positions. With switch 44' in the lower position, the circuit through the ignition switch, conductor 58, conductor 60, and conductor 62 to the solenoid 40 is interrupted. This de-energizes solenoid 40 and closes the valve 42 to shut off the fuel to the engine.

It may be seen from the foregoing that the vehicle will not long be operable under these conditions. Valve 42 may be located sufficiently distant from the cylinders of the engine such that the engine will not immediately cease operation, but it is evident that something else must soon occur or the vehicle will halt.

Reference is now made to the meter 38 which may be a variety of conventional meters often used in the taxicab business. Within such meters is contained a switch 90 which closes when the handle of the meter is operated by the driver to place the meter in operation. This switch commonly connects an electric lamp to the vehicle power source so that the passenger will be able to clearly read the figures on the meter that display the amount of the fare. A cable having conductors 92 and 94 is connected to this switch, conductor 92 being connected to relay 50 and conductor 94 being connected to battery 12 through interconnection with conductor 76 at junction point 96. Thus, when the meter is rendered operable by the driver of the vehicle, relay 50 is energized, thus moving switch 50' to the lower position. This breaks

the circuit between conductor 84 and conductor 86 and thus prevents the energization of relay 44. Therefore, the vehicle will continue to run as the solenoid 40 remains energized and the fuel supply is maintained. As an additional feature, it may be seen that conductor 98 interconnecting switches 48' and 50' prevents the driver from operating the vehicle for any substantial period of time with the meter operating but with no passenger present. Since the total receipts indicated in the meter mechanism are checked at the end of the day against the receipts in the possession of the operator, this feature serves to prevent the operator from inadvertently shorting himself.

It has been the practice of dishonest cab drivers to attempt to close the circuit between conductors 92 and 94 by other means than by actually operating the meter to close switch 90. The idea behind this, of course, is to be able to operate the vehicle without the meter actually recording the miles travelled or the fare that should have been received. Therefore, the invention is provided with a shield of conducting material 100 which surrounds the conductors 92 and 94 when they are external of the tamper-proof housing. As it is often desirable to maintain the cable flexible that contains conductors 92 and 94 to facilitate the connection thereof to switch 90, the shield 100 may be made of a flexible material which is inherently soft and subject to puncture should the driver decide to attempt to short across conductors 92 and 94. The method often used in practice by such drivers is to insert a pin or other sharp, conducting instrument in the cable and thus interconnect conductors 92 and 94. However, the flexible conducting shield 100 extends within the tamper-proof housing and has a conductor 102 connected thereto which terminates at junction point 104. As mentioned previously, relay 46 normally is maintained in the energized state, such being effected by the connection of relay 46 to battery 12 through interconnection with conductor 76 and the junction point 104 and electrical side 64 of seat switch 30. Thus, a circuit is established through relay 46 from conductor 76 to ground at 70.

A fuse 106 interconnects junction point 104 with electrical side 64 of switch 30 which, through its connection with conductor 102, enables any tampering with the cable from the meter switch 90 to be detected by the cab company officials. It may be seen that a pin inserted in the cable to interconnect conductors 92 and 94 will necessarily connect conductor 94 with the shield 100. This connects fuse 106 directly between junction point 96 and ground 70, junction point 96 in turn being connected by conductor 76 to battery 12. Thus, fuse 106 is connected directly across battery 12 and the value of the fuse may be selected such that the fuse will melt and the power circuit for relay 46 thereby permanently interrupted. This will cause switch 46'' to move to the upper position thus breaking the electrical circuit between conductors 60 and 62 to de-energize solenoid 40 and close fuel valve 42. Operation of the vehicle without replacing fuse 106 may then be effected only by placing a jumper lead from the battery 12 to the solenoid 40.

The failure of fuse 106 is easily detected at the end of the operating day by simple inspection of the tamper-proof housing by the cab company officials. In practice, the tamper-proof housing would be provided with a removable plate or hinged door secured by a lock (not shown), whereby the housing could be opened for inspection. Or, if it is not desired to inspect the housing, it will soon be evident that some part of the vehicle is not functioning properly as the normal operation of starting the vehicle will be ineffective unless the jumper is connected. This makes it quite simple to determine who the guilty party is as such party will be the only driver capable of rapidly starting the vehicle as he, of course, is instantly aware that the jumper must be connected before the vehicle will start.

Another common method employed by dishonest driv-

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ers in an effort to circumvent the control of the vehicle by such control apparatus as described, is to cut the wires leading to the seat switches 30 and 32. In the present invention, however, it may be noted that the severing of the conductors external of the tamper-proof housing connected to the electrical side 64 of seat switch 30, or the electrical side 68 of seat switch 32, will interrupt the connection from relay 46 to ground 70 and thus cause de-energization of solenoid 40 in the same manner as previously described. Should the driver happen to sever conductors 108 and 110 rather than the conductors in the power circuit of relay 46, then relay 48 will no longer be responsive to the presence of a seated passenger in the vehicle. For example, the severing of conductor 108 prevents seat switch 30 from closing the power circuit to relay 48 when a passenger is present. Thus, if the meter is operated by the cab driver, switch 50' will move to its lower position as described above, and relay 44 will be connected to its power circuit through conductor 36, switch 50', conductor 98, switch 48' in the position shown in the drawing, and conductor 76. It is now impossible for the vehicle to operate with the meter operating and with a passenger seated over switch 30. Therefore, it will be obvious to cab company personnel at the end of the day that this driver has been attempting to cheat the company because if this type of operation is continued for any length of time, the miles travelled by the cab will be grossly out of proportion to the receipts. In other words, the odometer on the vehicle will register mileage well out of proportion to the receipts deposited with the cab company. Generally speaking, it is the practice of cab drivers who indulge in these illegal practices to only pocket a small portion of the total receipts each day so as to leave the company unsuspecting. This, of course, is now made impossible.

Another practice of dishonest cab drivers is to attempt to run the vehicle by connecting a jumper lead directly from the battery to solenoid 40, again in an effort to circumvent the control apparatus. This is prevented however, in the present invention as a fuse 112 is connected in series with the solenoid 40. Fuse 112 is of such a value that the fuse will melt when connected directly across the battery 12. The direct short will occur when a passenger is transported and the meter is not operated by the driver, as relay 44 will be energized as previously described, thus moving switch 44' to the lower position and creating a short circuit from the jumper lead through fuse 112, switch 46'', conductor 60, and switch 44' to ground at 38. It is then impossible to operate the vehicle without the jumper lead. Therefore, as discussed above, it will be evident to the cab company personnel that the driver has been attempting to cheat the company.

Another possible way in which a dishonest cab driver might attempt to bypass the control apparatus is by disconnecting the battery 12 from the tamper-proof housing by cutting conductor 76 or disconnecting conductor 76 from junction point 78. If this is attempted, however, the relay 46 will be deenergized and switch 46'' will move to its upper position. With the ignition switch 14 in the "on" position (arm 22 engaged with switch position 18), an electric circuit is completed from the battery 12 through ignition switch 14, conductor 58, switch 44', conductor 60, switch 46'', and ground at 114. It will be noted that a fuse 116 is interposed in series with conductor 60. Therefore, fuse 116 will melt due to the shorting currents therethrough from the battery 12 to ground at 114. It will then be impossible to operate the vehicle without the use of a jumper lead from battery 12 to solenoid 40 as the melting of fuse 116 prevents the energization of solenoid 40 even if the battery is reconnected to conductor 76. Again, the actions of the driver are easily traceable by the cab company.

Since fuse 116 and fuse 112 are connected in series in the power circuit of solenoid 40, fuse 112 should have a lower rating than fuse 116 to insure that fuse 112 will

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melt before fuse 116 when it is attempted to operate the vehicle by connecting a jumper lead from the battery 12 to solenoid 40. This preserves fuse 116 for the tamper prevention function described in the foregoing paragraph. In this manner, company personnel, upon inspection of the fuses within the tamper-proof housing, may ascertain exactly in what manner the driver of the vehicle has been attempting to circumvent the control apparatus. Thus, company officials will not only know when a particular driver has been attempting to cheat the company, but they will also be able to tell by examination of the fuses exactly which portions of the system have been tampered with. It should be understood that circuit breakers may be employed in place of fuses 106, 112 and 116. It is only necessary that a current-responsive circuit breaking device be employed that is capable of permanently interrupting an electric circuit until replaced by company officials or reset for subsequent use, as in conventional circuit breakers.

An additional feature of the present invention is the coupling of signal light 34 and "stoolie" light 36 to switch 48''. The coupling of signal light 34 is accomplished by conductor 118 and ground connection 120, while stoolie light 36 is connected to switch 48'' by conductor 122 and the ground connection 120. It may easily be seen that when switch 48'' is in the upper position as shown in the figure, that signal light 34 will be connected across the power circuit from conductor 76 to ground at 120. Likewise, when relay 48 is energized and switch 48'' is in its lower position, the stoolie light 36 will be connected across the power circuit by conductor 122. Signal light 34 is often mounted on the top of taxicabs to both display the name of the cab company and indicate if the cab is cruising and available for hire. Light 34 may be turned off during day-time operations by switch 124. It may be seen that the light 34 will be automatically connected to the battery when there is no passenger seated in the passenger seat of the vehicle, while the stoolie light 36 will automatically be connected to the battery when a passenger is seated. This stoolie light is generally a small lamp mounted externally of the vehicle and used primarily by cab personnel who are observing cab operations in a particular area, the stoolie light giving such personnel an indication of the activity of the particular cab.

The indicator light 28, which may be mounted on the dashboard of the vehicle, also supplements the present invention by providing a visual indication of the energization of relay 44. Such indication occurs only when starting is attempted and serves to inform the driver that the vehicle will not start due to the valve 42 being closed. The common cause of such a stoppage would be due to the driver's failure to properly operate the meter 38 while transporting a passenger. As previously discussed, relay 44 will become energized if a passenger is present in the vehicle and the meter 38 is not placed in operation. The energization of relay 44 moves its associated switch 44'' into the lower position, thus connecting light 28 through switch 44'' to conductor 54 and the battery 12 when the ignition switch is in the "start" position (arm 22 engaged with position 20). This reminds the driver that the meter must be placed in operation if he intends to transport a passenger.

The indicator 28 will also light if starting of the vehicle is attempted while relay 46 is de-energized. Such would occur upon legitimate failure of relay 46 or upon failure of the fuse 106 due to tampering with the cable from the meter switch 90 as previously described. In either event, the relay 46 will become de-energized and the fuel will cease to flow to the engine. A conductor 130 interconnects junction point 82 and switch 46' to provide an electric circuit to relay 44 through conductor 132 upon movement of switch 46' to the upper position. Therefore, when a passenger closes one of the seat switches by seating himself in the vehicle and relay 48 thereby be-

comes energized, current flows from battery 12, through conductor 76, switch 48' and conductor 80, to junction point 82 and hence to the relay 44 along the path aforesaid.

This apparatus may also be operated in diesel motor electrical systems utilizing alternators rather than D.C. generators. In such systems the alternator would replace generator 24, while a diode would be connected between the "hot" or ungrounded side of the alternator and the positive or ungrounded terminal (junction point 78) of battery 12.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In vehicles for hire wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, and wherein said meter contains a switch that is actuated when the meter is operated, tamper-proof apparatus for actuating a fuel shut-off means to stop the vehicle if the meter is not rendered operable when a passenger is present in the passenger section of the vehicle, said apparatus comprising:

a tamper-proof housing;

a source of electrical power external of said housing; electrically responsive control means external of said housing and operable upon de-energization to actuate the fuel shut-off means;

first circuit means connecting said control means to the power source, said circuit means including conductors external of said housing and first electrically responsive switching means internal of said housing operable to interrupt said first circuit means to de-energize said control means;

switching structure comprising switching means disposed external of said housing in the seats of the passenger section operable by the presence of a seated passenger and second electrically responsive switching means internal of said housing responsive to said seat switching means;

means coupling said switching structure to the power source, said coupling means including conductors external of said housing connecting said seat switching means in series with the power source and said second electrically responsive switching means;

second circuit means internal of said housing operable to electrically couple said second electrically responsive switching means to said first electrically responsive switching means, said second circuit means including switching means responsive to the actuation of the meter switch for preventing said electrical coupling when a seated passenger is present in the passenger section and the meter is rendered operable, whereby said first electrically responsive switching means is actuated to permit the actuation of the fuel shut-off means by the control means when the meter is not in operation while a passenger is transported;

first conductor means including conductor external of said housing electrically coupling the meter switch with said meter-responsive switching means and the power source;

a shield of conducting material surrounding the external conductors of said first conductor means and extending within said housing;

third electrically responsive switching means internal of said housing interposed in said first circuit means for maintaining the continuity thereof only when said third electrically responsive switching means is connected to the power source;

second conductor means connecting said third electrically responsive switching means to the power source; current responsive circuit interruptor means internal of said housing interposed in series with said second conductor means and operable to disconnect said third electrically responsive switching means from the power source; and

a conductor internal of said housing interconnecting said shield and said circuit interruptor means to allow the latter to permanently interrupt the electrical circuit therethrough if a pin or the like is forced through said shield contacting a conductor of said first conductor means to provide a flow of electric current through said interruptor means, whereby said third electrically responsive switching means will be disconnected from the power source and said control means de-energized thereby.

2. In vehicles for hire wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, tamper-proof apparatus for actuating a fuel shut-off means to stop the vehicle if the meter is not rendered operable when a passenger is present in the passenger section of the vehicle, said apparatus comprising:

a tamper-proof housing;

a source of electrical power external of said housing; electrically responsive control means external of said housing and operable upon de-energization to actuate the fuel shut-off means;

first circuit means connecting said control means to the power source, said circuit means including conductors external of said housing and first electrically responsive switching means internal of said housing operable to interrupt said first circuit means to de-energize said control means;

switching structure comprising switching means disposed external of said housing in the seats of the passenger section operable by the presence of a seated passenger and second electrically responsive switching means internal of said housing responsive to said seat switching means;

means coupling said switching structure to the power source, said coupling means including conductors external of said housing connecting said seat switching means in series with the power source and said second electrically responsive switching means;

second circuit means internal of said housing operable to electrically couple said second electrically responsive switching means to said first electrically responsive switching means, said second circuit means including switching means responsive to the operation of the meter for preventing said electrical coupling when a seated passenger is present in the passenger section and the meter is rendered operable, whereby said first electrically responsive switching means is actuated to permit the actuation of the fuel shut-off means by the control means when the meter is not in operation while a passenger is transported;

third electrically responsive switching means internal of said housing interposed in said first circuit means for maintaining the continuity thereof only when said third electrically responsive switching means is connected to the power source; and

conductor means connecting said third electrically responsive switching means to one electrical side of the power source, said last-mentioned means being connected to the other electrical side of the power source through the external conductors connected to the corresponding electrical side of said seat switching means, whereby the severance or disconnection of any of the last-mentioned external conductors disconnects said third electrically responsive means from the power source and thereby interrupts said first circuit means and de-energizes said control means.

3. In vehicles for hire wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, tamper-proof apparatus for actuating a fuel shut-off means to stop the vehicle if the meter is not rendered operable when a passenger is present in

the passenger section of the vehicle, said apparatus comprising:

- a tamper-proof housing;
- a source of electrical power external of said housing; electrically responsive control means external of said housing and operable upon de-energization to actuate the fuel shut-off means;
- first circuit means connecting said control means to the power source, said circuit means including conductors external of said housing and first electrically responsive switching means internal of said housing operable to interrupt said first circuit means to de-energize said control means;
- switching structure comprising switching means disposed external of said housing in the seats of the passenger section operable by the presence of a seated passenger and second electrically responsive switching means internal of said housing responsive to said seat switching means;
- means coupling said switching structure to the power source, said coupling means including conductors external of said housing connecting said seat switching means in series with the power source and said second electrically responsive switching means;
- second circuit means internal of said housing operable to electrically couple said second electrically responsive switching means to said first electrically responsive means, said second circuit means including switching means responsive to the operation of the meter for preventing said electrical coupling when a seated passenger is present in the passenger section and the meter is rendered operable, whereby said first electrically responsive switching means is actuated to permit the actuation of the fuel shut-off means by the control means when the meter is not in operation while a passenger is transported; and
- current responsive circuit interrupter means interposed in said first circuit means internal of said housing and operable to permanently interrupt said first circuit means responsive to the placing of a jumper lead from the power source to said control means, whereby the vehicle is rendered immobile without the continued use of the jumper lead if such a lead is attached to said control means.

4. In vehicles for hire wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, tamper-proof apparatus for actuating a fuel shut-off means to stop the vehicle if the meter is not rendered operable when a passenger is present in the passenger section of the vehicle, said apparatus comprising:

- a tamper-proof housing;
- a source of electrical power external of said housing; electrically responsive control means external of said housing and operable upon de-energization to actuate the fuel shut-off means;
- first circuit means connecting said control means to the power source, said circuit means including conductors external of said housing and first electrically responsive switching means internal of said housing operable to interrupt said first circuit means to de-energize said control means;
- an ignition switch in series with the power source and said first circuit means for establishing an electrical connection therebetween when it is desired to operate the vehicle;
- switching structure comprising switching means disposed external of said housing in the seats of the passenger section operable by the presence of a seated passenger and second electrically responsive switching means internal of said housing responsive to said seat switching means;
- means coupling said switching structure to the power source, said coupling means including conductors ex-

- ternal of said housing connecting said seat switching means in series with the power source and said second electrically responsive switching means;
- second circuit means internal of said housing operable to electrically couple said second electrically responsive switching means to said first electrically responsive switching means, said second circuit means including switching means responsive to the operation of the meter for preventing said electrical coupling when a seated passenger is present in the passenger section and the meter is rendered operable, whereby said first electrically responsive switching means is actuated to permit the actuation of the fuel shut-off means by the control means when the meter is not in operation while a passenger is transported;
- third electrically responsive switching means internal of said housing interposed in said first circuit means for maintaining the continuity thereof only when said third electrically responsive switching means is connected to the power source;
- conductor means including at least one conductor external of said housing connecting said third electrically responsive switching means to the power source; and
- current responsive circuit interrupter means internal of said housing interposed in said first circuit means and operable to permanently interrupt said first circuit means whenever said third electrically responsive switching means is disconnected from said power source and said ignition switch is turned on to operate the vehicle.

5. In vehicles for hire wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, and wherein said meter contains a switch that is actuated when the meter is operated, tamper-proof apparatus for actuating a fuel shut-off means to stop the vehicle if the meter is not rendered operable when a passenger is present in the passenger section of the vehicle, said apparatus comprising:

- a tamper-proof housing;
- a source of electrical power external of said housing; electrically responsive control means external of said housing and operable upon de-energization to actuate the fuel shut-off means;
- first circuit means connecting said control means to the power source, said circuit means including conductors external of said housing and first electrically responsive switching means internal of said housing operable to interrupt said first circuit means to de-energize said control means;
- an ignition switch in series with the power source and said first circuit means for establishing an electrical connection therebetween when it is desired to operate the vehicle;
- switching structure comprising switching means disposed external of said housing in the seats of the passenger section operable by the presence of a seated passenger and second electrically responsive switching means internal of said housing responsive to said seat switching means;
- means coupling said switching structure to the power source, said coupling means including conductors external of said housing connecting said seat switching means in series with the power source and said second electrically responsive switching means;
- second circuit means internal of said housing operable to electrically couple said second electrically responsive switching means to said first electrically responsive switching means, said second circuit means including switching means responsive to the actuation of the meter switch for preventing said electrical coupling when a seated passenger is present in the passenger section and the meter is rendered oper-

able, whereby said first electrically responsive switching means is actuated to permit the actuation of the fuel shut-off means by the control means when the meter is not in operation while a passenger is transported;

first conductor means including conductors external of said housing electrically coupling the meter switch with said meter-responsive switching means and the power source;

a shield of conducting material surrounding the external conductors of said first conductor means and extending within said housing;

third electrically responsive switching means internal of said housing interposed in said first circuit means for maintaining the continuity thereof only when said third electrically responsive switching means is connected to the power source;

second conductor means including at least one conductor external of said housing connecting said third electrically responsive switching means to one electrical side of the power source, said last-mentioned means being connected to the other electrical side of the power source through the external conductors connected to the corresponding electrical side of said seat switching means, whereby the severance or disconnection of any of the external conductors connecting said third electrically responsive means to the power source interrupts said first circuit means and de-energizes said control means;

first current responsive circuit interrupter means internal of said housing interposed in said first circuit means and operable to permanently interrupt said first circuit means whenever said third electrically responsive switching means is disconnected from said power source and said ignition switch is turned on to operate the vehicle;

second current responsive circuit interrupter means internal of said housing interposed in series with the external conductors connecting said third electrically responsive switching means to said other side of the power source;

a conductor internal of said housing interconnecting said shield and said second circuit interrupter means to allow the latter to permanently interrupt the electrical circuit therethrough if a pin or the like is forced through said shield contacting a conductor of said first conductor means connected to said one electrical side of the power source, whereby said third electrically responsive switching means will be disconnected from the power source and said control means de-energized thereby; and

third current responsive circuit interrupter means interposed in said first circuit means internal of said housing and operable to permanently interrupt said first circuit means responsive to the placing of a jumper lead from the power source to said control means, whereby the vehicle is rendered immobile

without the continued use of the jumper lead if such a lead is attached to said control means;

6. In vehicles for hire provided with fuel shutoff means wherein passengers are transported for a fee determined and registered by a meter which may be rendered operable or inoperable at the option of the driver, apparatus in combination with the meter and the fuel shutoff means for stopping the vehicle if the meter is not rendered operable when a passenger is present in the passenger section of the vehicle, said apparatus comprising:

a source of electrical power;

electrically responsive operating means coupled with said fuel shutoff means for actuating the latter to halt the vehicle;

first circuit means coupling said operating means with said source;

an electrically responsive switching device interposed in said first circuit means and having a first operational state permitting current flow in said circuit means and a second operational state preventing said flow;

second circuit means coupling said device with said source for supplying electrical energy to the device to cause the latter to change from one of said operational states to the other state;

switching structure interposed in said second circuit means and responsive to the presence of a passenger in the passenger section;

switching means interposed in said second circuit means and having a first operational state for permitting current flow in the second circuit means and a second operational state preventing said flow therein;

means operably intercoupling said meter and said switching means, the latter being operable to change from one of said states thereof to its other state in response to operation of the meter, whereby the operational state of said device, and hence the actuation of the fuel shutoff means, is controlled by the presence of a passenger in the passenger section in conjunction with operation of the meter by the driver; and

circuit interrupter means interposed in said first circuit means, coupled with said device, and conditioned, upon placing of said device in the operational state thereof corresponding to presence of a passenger in the passenger section and failure of the driver to operate the meter, to interrupt the electrical continuity of the first circuit means when a jumper lead is coupled between the power source and the operating means.

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