REMOTE STARTING DEVICE FOR MOTOR VEHICLES

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This invention relates to engine starting devices and more particularly to a system for remotely starting the engine of a vehicle and operation of accessory items.

In the past, various types of remote control starting devices have been developed using such things as photoelectric cells and mechanical contact between a portion of the vehicle to be started and a contact connected to a remote control. All of these systems, however, have been extremely costly in construction and installation as well as being limited to a single starting location due to the permanently fixed remote control station. The prior art devices further are inadequate in that there is no positive control of accessory equipment such as heaters and air conditioners. There have also been developed many types of automatic starting devices utilizing a clock or similar timer. This has the obvious disadvantage of forcing the operator of the vehicle to determine many hours in advance the exact time he wishes the engine to start with no remote means for changing the time should that originally set become inconvenient or undesirable.

The present invention has been developed after much research and study into the above mentioned problems and is designed to provide an improved portable remote control system for motor vehicles having a dependable starting means which substantially duplicates manual starting procedures. The device also keeps the operator informed as to whether the engine of the vehicle is operating and incorporates a means for preventing unauthorized movement of the vehicle should the running engine thereof become tempting to indiscreet persons. Since one of the main reasons for remotely starting vehicle engines is to warm up the engine so that the vehicle will be ready to go almost instantaneously, a means has also been provided for remotely controlling the climatic conditioning of the interior of the vehicle by allowing control of both the heater and air conditioner units. To further overcome the difficulties presented by the prior art devices, Applicant has developed a system which is simple to operate and install in the vehicle as well as being completely portable thereby eliminating the limiting features of fixed remote units. This has a definite advantage of allowing the remote starting device to be used from a motel or hotel room or from any location where the operator may wish to start his vehicle without entering it.

It is, therefore, an object of the present invention to provide an improved, combined remotely controlled engine starting system and accessory control system which substantially duplicates the manual operation of these units.

Another object of the present invention is to provide, in combination with an improved remote control start-
In actual operation of the remote control device of the present invention, remote transceiver 22 (of the same type as transceiver 17) is placed in a desired location within transmission and receiving range of the vehicle transceiver 17. When the operator decides to start the engine of the vehicle, he can actuate switch 23 of transceiver 22 which sends a signal to transceiver 17 which in turn allows current to flow from battery 10 to throttle actuator 18 thereby opening the throttle of the engine (not shown). If a pumping effect is desired similar to pumping the accelerator pedal to prime a cold engine, switch 23 may be moved from on to off position several times. Next, switch 28 of the remote transceiver is used to close the circuit in vehicle transceiver 17 to energize the overall primary electrical system 14 including the ignition system (not shown). When this is done, switch 24 of transceiver 22 is actuated so as to transmit a signal to transceiver 17 which closes the circuit from battery 10 to starter motor 15. As this motor turns, the engine will start thereby building up oil pressure within the crank case and this build up of oil pressure is relatively rapid, and since in most automobiles the starter motor disengagement is automatic upon the starting of the engine, as soon as oil pressure of a predetermined amount is reached a circuit through oil pressure sensing switch 21 will be completed from the transceiver 17 through the switch and back thereby which automatically opens the circuits from battery 10 to starter motor 15 and throttle actuator 18. The closing of the circuit through the oil pressure sensing switch also activates the transmitter portion of vehicle transceiver 17 thereby sending a signal to the receiver portion of remote transceiver 22 which in turn lights indicator 25 to show that the operator that the engine is running.

Thus it can be seen that the manual starting procedures for the vehicle engine may be duplicated from a remote position including informing of the operator of the remote device that the engine is running.

Either immediately after the starting process or at a later time after the engine has had time to warm up and run smoothly, the heater 20 or air conditioner 19 may be selectively turned on by manipulation of remote transceiver heater switch 26 or air conditioner switch 27. The delayed manipulation of either of these two accessories is usually desirable since in the winter the heater is not usually turned on until the engine has warmed up and the air conditioner would not be turned on in the summer until the engine is running smoothly due to the additional load placed on the engine by the engagement of the refrigeration system compressor.

Since the operation of the heater and air conditioner is directly from the battery 10 by way of transceiver 17, the overall automobile primary circuit 14 through which these two units usually operate does not necessarily have to be on. Should some of the other accessories in the vehicle which are connected to the circuit be desired to operate such as the radio, stereo, windshield wipers, etc., switch 23 must be manipulated to send a signal to transceiver 17 to energize the system.

After the engine of the vehicle has been started and warmed up and the heater or air conditioner, as the case may be, has been operating long enough to climatically control the temperature within the vehicle, the operator may or may not continue to use the vehicle in the normal manner by inserting a key into ignition switch 12 and turning the same to the on position which will automatically open the circuit through relay 13 thereby rendering transceiver 17 and all systems connected thereto inoperative while at the same time closing the circuit indicated by the irregular broken lines of circuit 14 which include the heater 20, air conditioner 19 and the other accessory equipment (not shown) of the vehicle as well as to the engine ignition system. Thus it can be seen that by turning the ignition switch to the on position, immediate shift from the remote control system to the normal manual system of the vehicle is possible. If desired, a reset switch (not shown) may be provided in vehicle transceiver 17 so that once placed in a desired location, the transceiver cannot be reactivated until reset manually.

Likewise, it is obvious that once the ignition switch has been turned to the on position, should the engine for some reason stall or stop, the starter motor 15 may be activated to restart the engine, as shown by the irregular broken lines connecting switch 12 and motor 15, without having to go through the vehicle transceiver 17.

The throttle actuator 18 may be either an electromagnetic type device or any other desired electrical means to accomplish the end result. It should be noted that it is not necessary to in any way connect this device through the primary circuit system since it is only used when the vehicle is on remote control. Likewise, the oil pressure sensing switch is only used during automatic operation although it, of course, could have either an automatic pressure gage or an indicator light connected thereto so that it would serve the dual purpose of circuit control and indicate oil pressure.

Should the operator of the vehicle inadvertently forget to insert the ignition key into ignition switch 12 or should some unauthorized person attempt to drive the car by placing the gear shift lever in the drive position, the circuit between relay 13 and vehicle transceiver 17 would be interrupted thereby automatically cutting off the vehicle engine by interrupting the flow of current to primary circuit 14 to which the engine ignition system, as hereinabove described, is attached. This feature of the system not only will prevent thefts of the vehicle but should allow the running of the engine unattended without infringing the laws in certain metropolitan areas which prohibit the leaving of a vehicle unattended while the engine is running since the vehicle would be attended, at least technically, from a remote position.

In place of the oil pressure sensing switch 21 could be substituted either a manifold pressure sensing switch, a temperature sensing switch preferably connected to the cylinder head or cylinder wall, an electrical surge sensing switch connected to the generator or alternator or a RPM sensing switch such as a tachometer since any of these means could serve the purpose of sensing the fact that the engine has started.

If the vehicle to which the remote system of the present invention is connected does not have an automatic choke device connected to the throttle, a choke could be connected from vehicle transceiver 17 to operate similar to throttle actuator 18. This choke device could also be so connected that it would not automatically cut off as throttle actuator 18 does upon the starting of the engine, but could be maintained in position until cut off or reduced from a switch (not shown) on remote transceiver 22.

It is obvious that the present invention has the advantages of providing a simplified remote operation system for vehicular type machines which is inexpensive to install and operate and which substantially duplicates the manual operation of the various systems from a remote position.

The system of the present invention likewise has the advantage of allowing the remote transceiver to be transported to various locations without any specific operational relationship except to be within the predetermined transmitting and receiving range of the system.

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive in any characteristics coming within the meaning and equivalency range are intended to be embraced herein.

What is claimed is:

1. A remote control vehicle engine and accessory operating system comprising: a portable remote radio transceiver for transmitting and receiving electromag-
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netic wave signals propagated through the atmosphere; a vehicle mounted radio transceiver operatively tuned to receive from said to transmit to said remote radio transceiver electromagnetic wave signals propagated through the atmosphere; a source of electrical energy operatively connected to said vehicle transceiver; a throttle actuating means operatively connected to said vehicle transceiver; means within said vehicle transceiver to connect said electrical source to said actuating means upon receipt of a predetermined signal from said remote transceiver; an engine starting means operatively connected to said vehicle transceiver; means within said vehicle transceiver to connect said electrical source to said starter means upon receipt of a predetermined signal from said remote transceiver; and engine operation sensing means operatively connected to said vehicle transceiver in such a manner that when the engine of the vehicle begins operating the connections between the electrical source and the engine starting means and the throttle actuator means will be automatically disconnected.

2. The system of claim 1 wherein the disconnection of the connections to the engine starting means and the throttle actuator means by the engine operation sensing means causes the transmission of a signal from the vehicle transceiver to the remote transceiver to energize an indicator means operatively connected to said remote transceiver.

3. The remote control system of claim 1 including a vehicle heating means operatively connected to said vehicle transceiver; and means within the vehicle transceiver to connect said electrical source to said heater upon receipt of a predetermined signal from said remote transceiver whereby the heating means may be remotely operated.

4. The remote control system of claim 1 including a vehicle interior cooling means operatively connected to said vehicle transceiver; and means within the vehicle transceiver to connect said electrical source with said cooling means upon receipt of a predetermined signal from said remote transceiver whereby the cooling means may be remotely operated.

5. The remote control system of claim 4 including a vehicle heating means operatively connected to said vehicle transceiver; and means within the vehicle transceiver to connect said electrical source with said heater upon receipt of a predetermined signal from said remote transceiver whereby the heating means may be remotely operated.

6. The remote control system of claim 1 including an ignition switch having an "on" position; a relay between said electrical source and said vehicle transceiver; and means operatively connecting said ignition switch to said relay whereby when said ignition switch is in on position the circuit between the electrical source and the vehicle transceiver is broken.

7. The system of claim 1 wherein said vehicle is equipped with a gear shift means having a park position and at least one gear engaged position; a shift switch operatively connected between said electrical source and said vehicle transceiver and mounted on said gear shift means in such a manner that the circuit through said switch is closed when said gear shift means is in park position and said switch is open when said gear shift means is in the gear engaged position whereby the engine and all accessories being operated through said vehicle transceiver will become inoperative upon the shifting of the gear shift means from park to gear engaged position.

References Cited

UNITED STATES PATENTS

2,569,332 9/1951 Perkins.
2,832,426 4/1958 Seargeant --------- 180—2
3,154,689 10/1964 Bubbenmoyer ------- 290—38
5,275,836 9/1966 Vancha ------------- 290—38

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