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CARL-GUSTAV S. JOHANSSON
 DEVICE FOR AUTOMATIC CONTROL OF THE FUEL
 SUPPLY TO DIESEL ENGINES
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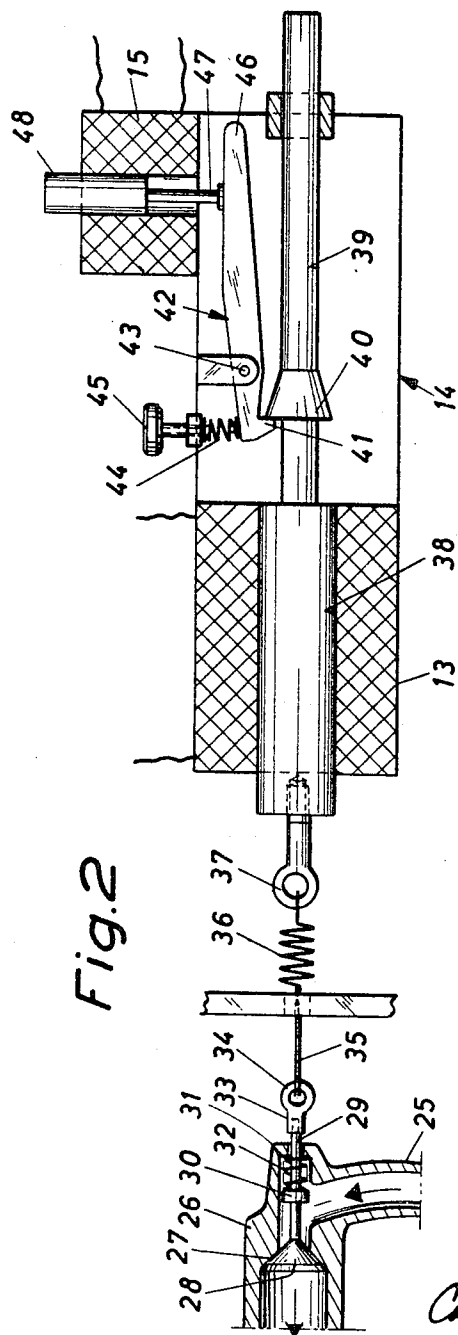


Fig. 2

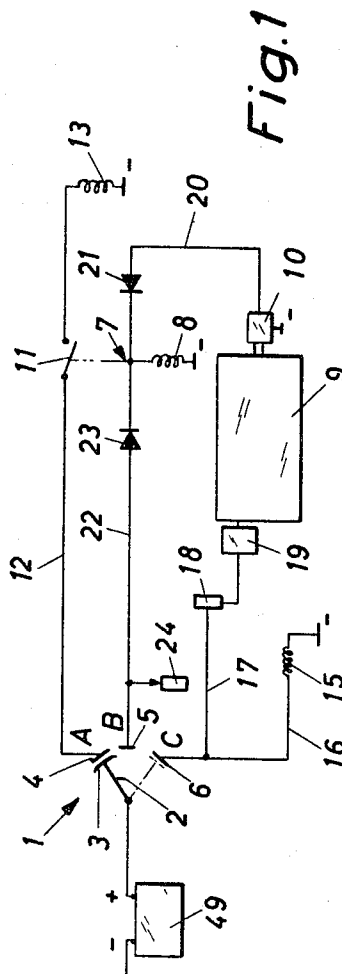


Fig. 1

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DEVICE FOR AUTOMATIC CONTROL OF THE FUEL SUPPLY TO DIESEL ENGINES

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8 Claims. (Cl. 123—198)

ABSTRACT OF THE DISCLOSURE

A device for automatic cutting off the fuel supply conduit to diesel engines of the kind provided with a charging generator, an electric battery, a start relay and a key lock. An additional relay is coupled between the generator and earth having a core connected to a switch in a current circuit to the positive pole of the battery via an off position of the key lock to a solenoid. The operation of the generator serves to energize the additional relay to close the switch and the solenoid is adapted at current passage in the circuit to cut off the fuel supply conduit.

In order to stop a diesel engine one must in one way or another throttle the feed of fuel to the motor. This is commonly achieved by means of some kind of a mechanical throttle device, e.g., by means of a pull or push control means on the instrument panel. For the sake of safety it is of importance that this control means is left in throttling position when a car provided with a diesel motor is parked. Should namely the car be parked in a slope with a gear in and the manual brake not be tightened sufficiently, the weight of the car proper may cause the motor to rotate whereby it is started and the car will thereupon be driven by means of the motor. Many mechanical devices are known for obtaining the throttling of the fuel feed but it is common for all of them that they are easily brought out of function.

The present invention has reference to a device where the fuel supply is throttled by means of a key lock similar to the ignition lock of a car driven by means of gasoline and remains throttled until the motor is started next time. The main feature of the invention is to be seen therein that a relay is connected between the generator of the car and earth this relay adapted when passed through by current to close a contact in a current circuit from the positive pole of the car battery via the zero position of the key lock to a solenoid which is adapted when passed through by current to cut off the fuel supply. The device considerably facilitates the manipulation of diesel engines and the engine is simultaneously kept cut off until it is started next time.

According to a preferred embodiment of the invention there is inserted a throttle valve in the fuel conduit to the engine and this valve is adapted to be closed by means of an axial displacement of an armature of said solenoid at the passage of current through the same. The armature is preferably kept in attracted position by means of a latch behind an abutment on the armature, said latch adapted to be brought, when another solenoid, a releaser solenoid is passed through by current, to released position away from said abutment in such a way that the throttle valve is automatically opened.

In the following the invention will be elucidated with reference to the accompanying drawing. In the drawing:

FIG. 1 shows a coupling diagram of a device according to the invention, and

FIG. 2 shows partly diagrammatically a longitudinal section through a regulation device comprised in the coupling.

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The device comprises a key lock 1 the coupling arm 2 of which can take three positions, viz. a zero position A, an intermediate position B and a start position C. The coupling arm 2 is in a common way returned from last mentioned position to the coupling position B by means of a spring. The coupling arm 2 is provided with a sliding contact 3 which in the different positions coacts with the coupling plates 4, 5, and 6, respectively, of the key lock. The device further comprises a coupling relay 7 the solenoid 8 of which is connected to the charge generator 10 of the diesel engine 9 and earth. The contact 11 of the coupling relay 7 is connected in a conduit 12 from the control device 14 (FIG. 2). This control device also comprises a second solenoid 15 which is connected in a conduit 16 between the contact sheet 6 and earth. From the conduit 16 also issues a conduit 17 to the start relay 18 of the engine 9 for connecting its start motor 19. In the conduit 20 from the generator 10 to the solenoid 8 of the coupling relay 7 there is connected a diode 21 and in the conduit 22 from the contact sheet 5 of the key lock 1 to the solenoid 8 there is also connected a diode 23. To the conduit 22 there are also connected other electrical means 24 of the car, e.g., direction indicators, the radio, a cigarette lighter, etc.

In FIG. 2 there is shown a valve housing 26 in the fuel supply conduit 25 to the engine 9, this valve housing 26 provided with a seat 27 a valve body 28 tightening against this seat 27. The valve spindle 29 is provided with a flange 30 and between this flange 30 and an end piece 31 on the valve housing 26 there is inserted a helical spring 32. On the outer end of the valve spindle 29 there is arranged a nipple 33, the latter provided with a loop 34, and one end of a steel wire 35 is attached to said loop 34. The opposite end of the wire is attached to another helical spring 36 having a greater stiffness than the spring 32. The opposite end of the spring 36 is attached to a loop bolt 37 in one end of an armature 38 which is displaceable in the solenoid 13. On an elongation portion 39 of the armature 38 there is arranged an abutment 40 in the shape of a flange and a latch 41 may be swung in behind this abutment, said latch arranged on one end of a two-armed lever 42 the arms of which have different lengths. Said arms are journaled on a transverse shaft 43. By means of a helical spring 44 which can be set by means of a set screw 45 the latch is kept in contact against the elongation piece 39 or in latching position behind the abutment 40. There abuts against the long arm 46 of the lever 42 a downwardly directed elongation portion 47 on an armature 48 which is vertically displaceable through the solenoid 15.

When the diesel engine 9 is out of operation the coupling arm 2 of the lock 1 will take the position A for the reason that none of the electrical means of the car is connected. When the diesel engine is to be started, the coupling arm 2 is turned past the position B to the position C. As in common ignition locks last mentioned position shall be spring loaded such that one has to hold the hand on the key (not shown) belonging to the lock 1 during the start period. A current flows from the positive pole of the electric battery 49 to the releaser solenoid 15 of the control device 14 whereby the armature 48 is pushed downwards and swings the lever 42 in clockwise direction so that the latch 41 is lifted from the abutment 40 and frees the armature 38. The spring 32 then opens the valve 28. Simultaneously also the start relay 18 is connected to the battery 49 which brings the start motor to rotate whereby the diesel engine 9 is started. When the engine has started, one has to release the key such that the coupling 2 automatically returns to the position B whereby the start engine is disconnected.

In the position B a current flows from the positive pole

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of the battery 49 via the diode 23 to the solenoid 8 of the start relay 7. The diode 21 prevents this current from reaching further in the direction towards the generator 10 if the latter should not already have reached full voltage. Simultaneously the other electric means 24 of the car are connected.

When the diesel engine 9 is to be stopped, the coupling arm 2 of the key lock 1 is turned to the position A. The relay 7 will still be attracted for the reason that the generator 10 is charging and a current flows via the diode 21 through the solenoid 8 to earth. The diode 23 prevents this current from reaching the other electric means 24 of the car. When the coupling arm 2 is in the position A, a current circuit is closed via the contact 11 in such a way that the main solenoid 13 of the control device 14 will receive current and attracts the armature 38 which in turn causes the valve 28 to close and the engine to stop. The generator 10 will then cease to charge and the relay 7 therefor falls and the current to the main solenoid 13 is cut off. When the armature 38 was attracted by the main solenoid 13, the lever 42 was swung in counter clockwise direction by the spring 44 whereby the latch engaged behind the abutment 40. Hereby the armature 38 will remain in attracted position, which means that the valve 28 in the fuel supply conduit 25 is closed.

When the diesel engine 9 is to be restarted, the coupling arm 2 of the key lock 1 is brought to take the position C whereby the releaser solenoid 15 is fed with current. This causes the armature 48 to be attracted in such a way that the latch 41 is released and frees the armature 38 whereupon the course of event described is repeated.

The sliding contact 3 on the coupling arm 2 of the key lock 1 and also the contact sheets 4 and 5 are shaped in such a way that the connection with the contact sheet 5 is not cut off until the contact has been closed also over the contact sheet 4 in such a way that the current from the positive pole of the battery 49 can be obtained temporarily on one hand via the sliding contact 3 of the coupling arm 2 and on the other hand via the contact sheet 4 to the main solenoid 13 for the reason that the relay 7 then keeps the contact 11 closed. The purpose of this device is, if for any reason the diesel engine 9 does not start and there is not obtained any supply to the solenoid of the coupling relay 7, to ensure that a current nevertheless will reach to pass the contact 11 for attracting the main solenoid 13 of the control device 14 before the relay 7 falls.

The invention has been described in the foregoing for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. Thus, the means comprised in the coupling may be modified in many ways without departure from the inventive idea. This is true in first hand for the shaping of the throttle valve 28 and the control device 14 for the operation of this valve.

What I claim is:

1. In a device for automatic cutting off the fuel supply

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conduit to diesel engines of the kind provided with a charging generator, an electric battery, a start relay and a key lock, an additional relay coupled between said generator and earth, said additional relay having a core connected to a switch in a current circuit to the positive pole of said battery via an off position of the key lock to a solenoid, operation of said generator serving to energize said additional relay to close said switch, said solenoid adapted at current passage in said circuit to cut off the fuel supply conduit.

2. A device as claimed in claim 1, in which a throttle valve is connected in said fuel supply conduit, said valve adapted to be closed by an axial displacement of an armature of said solenoid at current passage through the latter.

3. A device as claimed in claim 2, in which a releaser solenoid is connected between a start position of the key lock and earth, said releaser solenoid adapted at current passage to influence a latch for retaining said armature in a position closing the throttle valve.

4. A device as claimed in claim 1 in which a throttle valve is connected in said fuel supply conduit, said valve adapted to be closed by an axial displacement of an armature of said solenoid at current passage through the latter, a releaser solenoid connected between a start position of the key lock and earth, said releaser solenoid adapted at current passage to influence a latch for retaining said armature in a position closing the throttle valve.

5. A device as claimed in claim 3, in which said armature is provided with an abutment or equivalent means adapted to be engaged by said latch and said latch at current passage through the releaser solenoid, to be brought to releasing position away from said abutment.

6. A device as claimed in claim 1, in which a semiconductor is connected between said generator and said additional relay.

7. A device as claimed in claim 1, in which a diode is connected between said generator and said relay.

8. A device as claimed in claim 1, in which said key lock is provided with a coupling arm, said coupling arm adapted to render possible a temporary and simultaneous connection between the battery and on one hand said additional relay and on the other hand said solenoid.

References Cited

UNITED STATES PATENTS

2,423,728	7/1947	Ray	123—198
2,771,068	11/1956	Jettinghoff	123—198
2,469,942	5/1949	Armstrong et al.	123—198
2,924,209	2/1960	Schott	123—179

FOREIGN PATENTS

364,227	1/1932	Great Britain.
610,439	12/1960	Canada.

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