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DEVICE FOR AUTOMATICALLY STOPPING MOTOR VEHICLE ENGINES AFTER PREDETERMINED IDLING PERIOD

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Fig. 1.

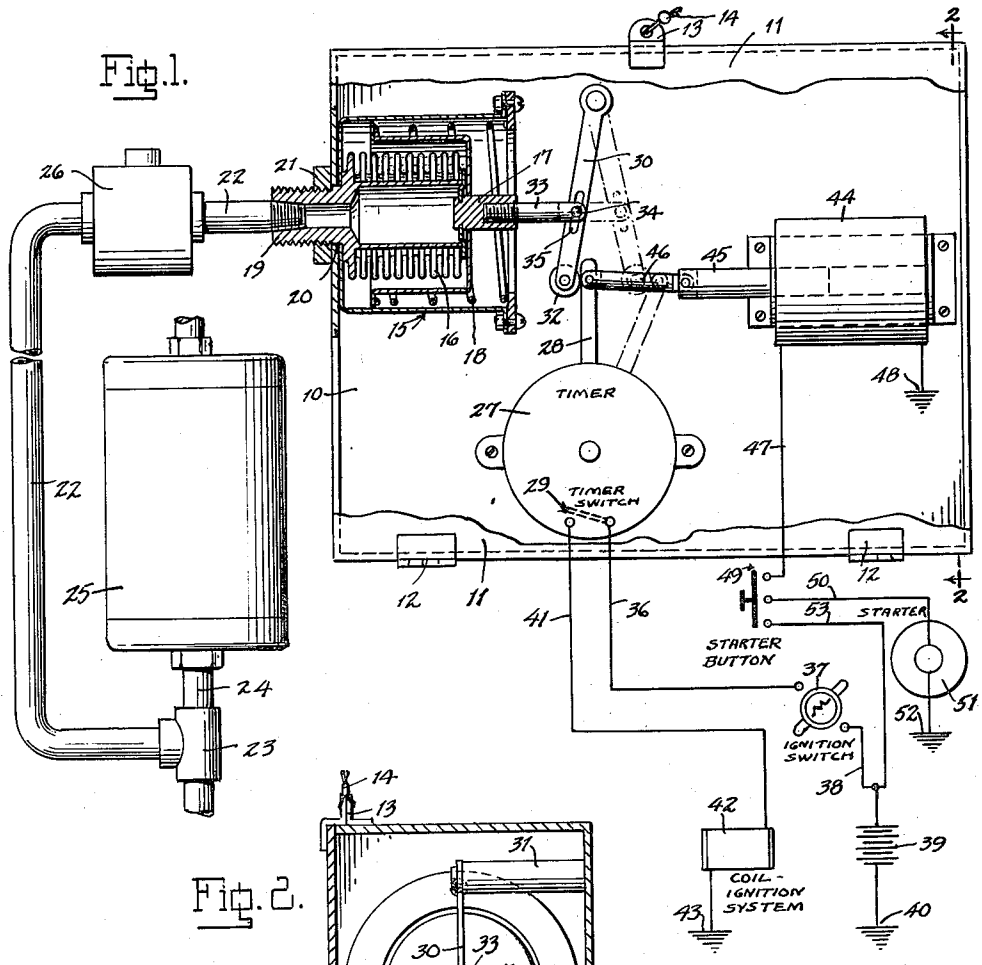
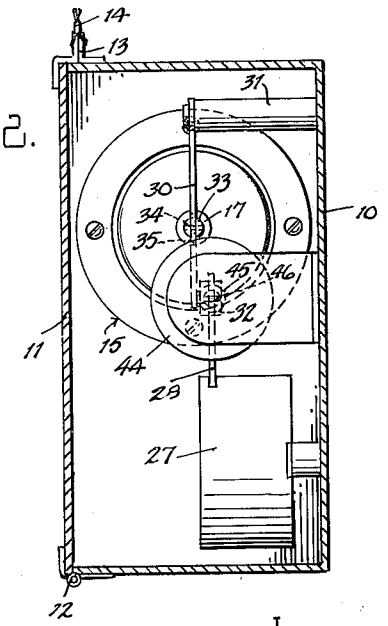


Fig. 2.



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DEVICE FOR AUTOMATICALLY STOPPING MOTOR VEHICLE ENGINES AFTER PREDETERMINED IDLING PERIOD

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6 Claims. (Cl. 161—1)

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The present invention relates to a device for automatically stopping automobile engines after a predetermined idling period, and is particularly intended for use with an internal combustion or other type of engine having a pressure oil lubricating system, it being an object of the invention to utilize the oil pressure of the lubricating system in the automatic operation of the device.

The invention is especially intended to prevent the continued operation of an engine if it is left running unintentionally, or in the case of delivery trucks and the like, if the delivery man leaves the engine running for a relatively long period while making a delivery. Thus in the case of a milk truck the timer means employed as a part of the device can be set so that it will not stop the engine during normal door-to-door delivery periods requiring the stoppage of the truck for only a minute or so, but will stop the engine if the milkman is delayed for an unusually long period, say four minutes or more.

In addition to preventing needless idling of the engine with a consequent saving in gas and oil as well as wear and detriment to the engine and associated battery and other operating parts from overheating, low oil pressure, etc., the invention also has for an object the protection of the lubricating system of the engine, stopping operation of the engine in the event that the oil is insufficient for the proper running of the engine, or when there is inadequate or faulty oil pressure due to oil leaks, oil blocks or other causes. To this end it is proposed to provide an automatic device for breaking the ignition circuit and shutting off the engine after a predetermined period when the engine is idling and the oil pressure is at a predetermined low pressure, or in the case of the engine running at normal speeds when the oil pressure is below normal due to inadequate or faulty lubrication.

With the above and other objects in view an embodiment of the invention is shown in the accompanying drawing, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawings:

Fig. 1 is a front elevation of the device, partially broken away and partially in vertical section, and showing schematically the electrical connections with the starter and ignition system of the automobile engine.

Fig. 2 is a vertical sectional view taken along the line 2—2 of Fig. 1.

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Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings the main control parts of the device are contained in a box 10, of generally rectangular form and preferably constructed of metal, provided with a cover 11 hinged at 12 and provided with a hasp 13 adapted to be secured by a suitable seal 14, so that the operating parts of the device cannot be tampered with to render them inoperative without first breaking the seal.

Upon one wall of the container there is mounted an oil pressure operated unit 15, shown in the form of a bellows 16 having a plunger 17 at one end adapted to be projected when a predetermined oil pressure exists within the bellows, the bellows being normally retained in its retracted position by a spring 18. The bellows is provided with a threaded stud 19 engaged through a hole 20 in the wall of the container and secured therein by a nut 21, the stud having connected thereto the end of an oil pressure supply pipe 22 connected by a union 23 at a suitable point in the oil line of the engine, shown in the illustrated embodiment of the invention as the tube 24 connected to the oil filter 25. Within the oil line 22 there is provided a pressure regulator 26 adapted to be adjusted so as to reduce whatever idling oil pressure exists in a particular engine to the requirements of the bellows, thus making the device adaptable to widely different conditions. Thus if the bellows is adapted to operate at pressures in excess of 6 lbs. the regulator may be adjusted so as to deliver 6 lbs. pressure to the bellows when the oil pressure is either above or below this amount. Thus the device may be adapted for use with an engine where the idling oil pressure may be as much as 15 lbs. as well as to an engine where the idling pressure is as low as 3 or 4 lbs.

Within the container there is also mounted a timer switch unit 27 having a pivoted reset arm 28 and a switch 29, the timer mechanism being such that in the normal position of the arm shown in full lines the switch is open, and in the reset position shown in dotted lines the switch is closed, and remains closed as the arm moves back to the full line position at which time the switch opens automatically. The timer is preferably adjustable so that the timing period required for the movement of the arm from its reset to its normal position may be varied as desired. Timer devices of this type are well known being used on automatic washers, toasters, industrial ap-

plications, kitchen timers, etc. so that a detailed illustration of the timing mechanism is not deemed necessary. For the purpose of the present invention it is only necessary that the switch have sufficient capacity to carry ignition without affecting operation of the engine, that it be able to stand heavy use, that the resetting lever may be operated without great force by the oil pressure actuated means employed, and that it have enough follow through in its operation to keep the breaker points well open after the predetermined time interval has elapsed.

For the purpose of operating the timer by means of the oil pressure unit 15 there is provided a lever 30 pivotally mounted upon a post 31 and provided at its lower end with a roller 32 engaging one side of the reset lever 28, the lever 30 being connected to the plunger 17 by a rod 33 screwed at one end within the plunger and pivotally connected at its other end to the lever by a pin 34 engaging a slot 35 in the lever. Thus when the oil pressure is reduced during idling of the engine, or for other reasons, the bellows is retracted and the timer is in its normal switch opening position as shown in full lines. Any increase in the speed of the engine, such as putting a truck in motion is normally sufficient to cause considerable increase in the oil pressure and thus cause the bellows to be projected and the timer to be reset, thus closing the timer switch which is suitably connected in the ignition system so that the ignition system is complete when the timer switch is closed, allowing the engine to run, and is broken when the timer switch is open, thus stopping the engine.

The connection with the ignition system is shown schematically in Fig. 1, and consists of a lead 36 extending from one side of the timer switch 29 to one side of the key-operated ignition switch 37, the other side of which is connected by a lead 38 to the battery 39 which is grounded in the usual manner, as at 40. The other side of the timer switch is connected by a lead 41 to the coil 42 of the ignition system of the engine which system is grounded in the usual manner as at 43.

In order to close the ignition system upon starting the engine, and before the oil pressure of the engine is raised to the point where it will take over the automatic operation of the device, a solenoid 44 is provided in the box 10 and has its core 45 connected by a link 46 to the reset lever 28. The solenoid is connected at one side by a lead 47 to the starter circuit and is grounded at its other side as at 48. The lead 47 is connected to the first contact of a three-contact starter button or switch 49, a lead 50 extending from the second contact to one side of the starter 51 which is grounded at its other side as at 52. The starter circuit is completed to the battery 39 by a lead 53 extending from the third contact of the starter button to the battery. Thus when the starter button is pressed to operate the starter, the solenoid is simultaneously energized to pull the reset lever into its dotted line position to close the timer switch and thus close the circuit of the ignition system, the ignition switch 37 having previously been closed as a preliminary to the starting operation.

After the engine is started it will run at idling speed for the predetermined period for which the timer is set, and will be automatically shut off if it is allowed to idle beyond the predetermined set period. Any acceleration of the engine however will produce an increase in the oil pressure and will therefore operate the plunger 17 to reset the timer, so that during normal operation of the vehicle the oil pressure actuated means will take over the automatic operation of the device to keep the engine running. Whenever the engine is allowed to idle for the predetermined period for which the timer is set, or in the event that there is insufficient or faulty lubrication, the timer will automatically shut off the engine.

It will be understood that instead of the oil pressure actuated bellows, other well known means capable of converting changes in oil pressure to mechanical motion may be employed. It is also pointed out that the electrical circuits may include relays, transformers and other suitable elements in accordance with well known electrical engineering practice. The three-contact switch 49 may, if desired, be of a type to allow for resetting the timer independently of the starter.

I have illustrated and described a preferred and satisfactory embodiment of the invention but it will be understood that changes may be made therein, within the spirit and scope thereof, as defined in the appended claims.

What I claim is:

1. An idling period control device for an engine having means to control the stopping of the engine and an oil pressure lubricating system, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position, and means adapted to be operatively connected to said control means to stop the engine at the end of said operating period of said timer means.

2. An idling period control device for an engine having means to control the stopping of the engine, and an oil pressure lubricating system, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position, and means adapted to be operatively connected to said control means to stop the engine at the end of said operating period of said timer means, and means arranged to actuate said reset means independently of said oil pressure actuated means.

3. An idling period control device for an engine having means to control the stopping of the engine, an oil pressure lubricating system, and an electrical starter circuit, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position, and means adapted to be operatively connected to said control means to stop the engine at the end of said operating period of said timer means, and a solenoid arranged to actuate said reset means independently of said oil pressure actuated means and adapted to be connected to said electrical starter

circuit for actuation through closing of said starter circuit.

4. An idling period control device for an engine having an electrical circuit to control the stopping of the engine, and an oil pressure lubricating system, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position, and a switch adapted to be closed during said operating period and to be opened at the end of said period, said switch adapted to be interposed in said electrical control circuit to stop the engine upon opening of said switch.

5. An idling period control device for an engine having an electrical circuit to control the stopping of the engine, and an oil pressure lubricating system, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position and a switch adapted to be closed during said operating period and to be opened at the end of said period, said switch adapted to be interposed in said electrical control circuit to stop the engine upon opening of said switch, and means arranged to actuate said reset means independently of said oil pressure actuated means.

6. An idling period control device for an engine having an electrical circuit to control the stopping of the engine, an oil pressure lubricating system, and an electrical starter circuit, comprising oil pressure actuated means adapted to be connected to the oil pressure lubricating system and movable between relatively low and high oil pressure positions, timer means having a predetermined operating period and including reset means arranged to be actuated to reset position by movement of said oil pressure actuated means into high oil pressure position and a switch adapted to be closed during said operating period and to be opened at the end of said period, said switch adapted to be interposed in said electrical control circuit to stop the engine upon opening of said switch, and a solenoid arranged to actuate said reset means independently of said oil pressure actuated means and adapted to be connected to said electrical starter circuit for actuation through closing of said starter circuit.

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