

April 21, 1964

G. C. CURTIS
AUTOMATIC STARTING MEANS FOR AUTOMOBILE ENGINES AND
THE LIKE INCLUDING A BALL VACUUM SWITCH
Filed Jan. 23, 1959

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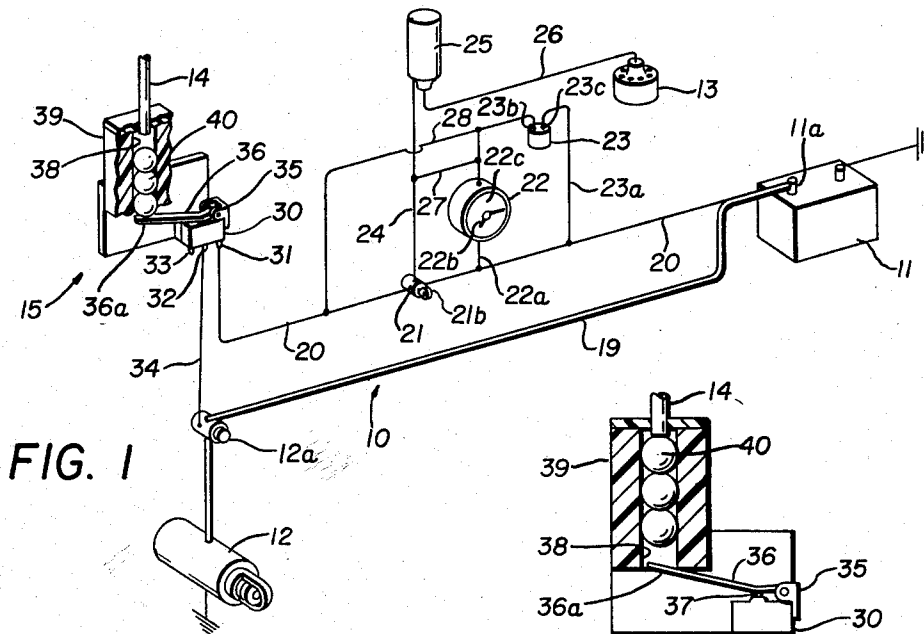


FIG. 1

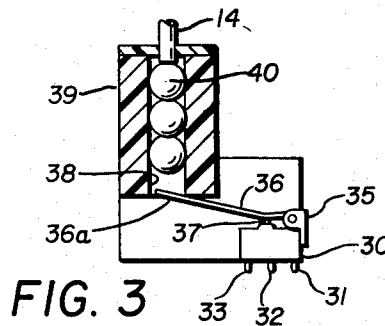


FIG. 3

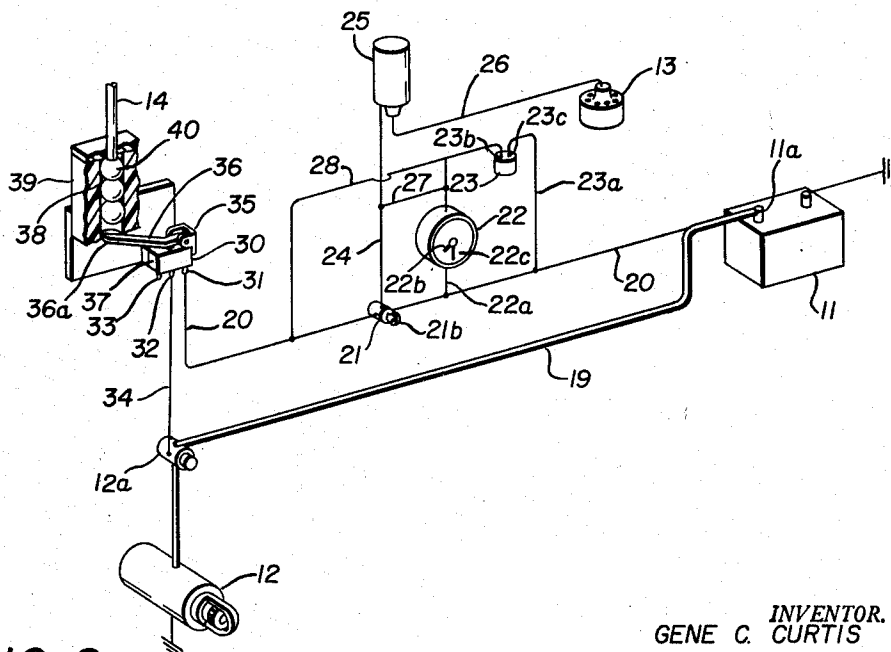


FIG. 2

INVENTOR.
GENE C. CURTIS

BY *William Freeman*

ATTORNEY

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AUTOMATIC STARTING MEANS FOR AUTOMOBILE ENGINES AND THE LIKE INCLUDING A BALL VACUUM SWITCH

Gene C. Curtis, 13125 Cleveland Ave. NW.,

Uniontown, Ohio

Filed Jan. 23, 1959, Ser. No. 788,671

1 Claim. (Cl. 290—38)

This invention relates to the art of internal combustion engines and in particular has reference to starting devices that operate to automatically start such engines upon the happening of certain occurrences.

It has been known in the past that an automobile engine can be automatically started by the use of certain mechanisms associated therewith, with the normal device of this type being intended to warm up the automobile engine so that the same is ready for operation prior to driving.

In the known prior art devices of this kind, the usual procedure is to have the conventional starter motor of the automobile engine energized by the device, with the result that the automobile engine will start upon operation of the starter mechanism.

The complexity of devices in this general category ranges from simple timer switches associated with the starter motor to complex structures that employ a special type of starter motor that has the automatic features incorporated therein.

While the aforementioned devices are, to some extent, satisfactory, the same are disadvantageous in that the cost thereof is normally rather excessive, with installation frequently requiring a replacement of certain components with specially built devices that must be employed.

In addition to the aforementioned disadvantage, the known prior art automatic starting devices are further known to be limited to the performance of a single function, with the result that the overall value thereof is, accordingly, limited.

Additionally, and as a still further disadvantage, it has oftentimes been found in the prior art devices that after the motor has started the automatic devices are frequently defective with regard to terminating the operation of the starter motor, with the result that the same frequently runs along with the engine to cause premature destruction of the starter mechanism.

It has been discovered that the aforementioned disadvantages can be obviated by providing an automatic starting mechanism that is releasably associated with the standard component parts of an automobile engine, with automatic starting of the engine happening upon any one or more of a plurality of events.

It has been further discovered that by associating the improved mechanism with the vacuum line of the engine that automatic shut off of the starter motor will occur after the car engine has started, with the result that the possibility of damage by virtue of the starter motor continuing to run will be obviated.

Production of an improved automatic starter mechanism of the type described is accordingly the principal object of this invention, with other objects thereof becoming more apparent upon a reading of the following brief specification, considered and interpreted in the light of the accompanying drawings.

Of the drawings:

FIGURE 1 is a schematic view showing the location of the automatic starting equipment, with respect to the components of an automobile engine, with the component parts being shown in the position that the same will assume when the car engine is off.

FIGURE 2 is a view similar to FIGURE 1 but showing the position of the component parts when the car engine is running.

FIGURE 3 is a sectional view of the improved control apparatus for the automatic starting system.

Referring now to the drawings and in particular to FIGURES 1 and 2 thereof, the automatic starting means, generally designated by the numeral 10, are shown connected between battery 11, starter motor 12, distributor 13 and vacuum line 14, it being understood that the just-mentioned component parts are preferably located in conventional locations on the engine to which the mechanism 10 is attached.

In this regard, the automatic starting means 10 includes a control unit 15 that is shown associated with the just-described component parts so that the same can permit or prevent the flow of electrical current to starter motor 12, dependent upon the operating conditions that are in existence.

Accordingly, the positive terminal 11a is shown provided with the usual heavy duty cable 19 that leads to starter motor 12 through relay 12a, with the unit 15 actually serving to permit or prevent electrical current to starter motor 12 by virtue of its control over relay 12a. Branching from cable 19 is an electrical line 20 that leads to a key switch 21, with switches 22 and 23 being disposed across line 20 by lines 22a and 23a, as illustrated in the drawings; the arrangement being such that the switch 21 is preferably a key operated contact type of switch, while the switches 22 and 23 are clock operated and thermostatically operated, respectively.

A line 24 leads from switch 21 to coil 25, with line 26, in turn, leading from coil 25 to distributor 13 for the purpose of distributing electrical current to the engine (not shown) in conventional manner. Lines 27 and 28 also lead from switches 22 and 23 into lines 24 and 20 so that these switches can simultaneously deliver current to coil 25 and switch 30 when the same have their contacts closed.

The remaining portion of line 20 is connected, as has been indicated, to the switch 30, with valve 30 having a plurality of selective contacts 31, 32 and 33, with the preferred invention showing lines 20 and 34 connected to contacts 31 and 32 to create a normally closed circuit. In this manner, when no vacuum exists in line 14, current from battery 11 will pass through switch 30 and line 34 to energize relay 12a and permit delivery of current through cable 19 to starter motor 12.

Referring next to FIGURE 3, the switch 30 is illustrated as having secured thereon a bracket 35, to which is pivoted a contoured arm 36; the arrangement being such that the arm 36 will overlie the spring loaded switch plunger 37 so as to cause the same to be depressed upon application of weight against end 36a thereof.

In this regard, the end 36a of arm 36 is shown disposed under the bore opening 38 of a block member 39, with balls 40 being received in the bore 38 so as to normally bear against end 36a and cause depression of switch plunger 37, as shown in FIGURE 1. In the position of FIGURE 1 the weight of the balls 40 is acting on the end 36a and, accordingly, the plunger 37 is depressed, with the result that current can be delivered from battery 11 to starter motor 12.

However, it is to be understood that because switch plunger 37 is preferably spring loaded, that upon release of pressure on end 36a thereof, the same will pivot around bracket 36 to the position of FIGURE 2, at which time the switch 30 will be open so that current will not be delivered to the relay 12a.

With regard to the construction of the individual switches 21, 22 and 23, it is not believed necessary that a detailed description of the same be furnished in order to fully understand the invention. It is believed sufficient to note that each switch 21, 22 and 23 is provided with contact points and the switches will be normally open to

prevent current flow therethrough. However, when one of the switches is closed, current may flow through the particular line and into the switch 30 and distributor 13 to cause energization of the starter motor 12, followed by operation of the car motor.

In this regard, the switch 21 can be closed as by turning key 21b, while switch 22 can be closed when hands 22b of the timer mechanism reach a set time on dial 22c. In like fashion, when the control element (not shown) of thermostatic control 23 indicates a certain temperature has been reached, the contacts 23b and 23c thereof can be closed to permit current flow through lines 27 and 28 into starter motor 12 and distributor 13.

In use or operation of the improved device, it will first be assumed that the component parts have been positioned in association with the battery 11, starter motor 12, distributor 13, vacuum 14 and coil 25, as has previously been described. Accordingly, if the user desires to operate the car in conventional fashion, it is merely necessary that key 21b be turned to permit current flow from terminal 11a of battery 11 through lines 20 and 21 for delivery to switch 30 and distributor 13. The switch 30 will, at this time, be closed as shown in FIGURE 1, due to the weight of the balls 40 on end 36a, with this weight causing depression of the spring loaded switch plunger 37 so that current from line 20 can be delivered through relay 12a to starter motor 12 to cause initiation of the starting cycle of the car engine, with the current from distributor 13 serving to keep the engine running after the same has been started by motor 12.

When the engine is running it is well recognized that a vacuum will build up in line 14 and when the proper degree of vacuum has been built up, the balls 40 will be lifted out of contact with end 36a, at which time the arm 36 will be pivoted about bracket 35 by the action of spring loaded solenoid plunger 37.

This just-described pivotal movement will cause the switch to be open to stop current flow therethrough, with the result that the relay 12a will stop current flow through cable 19 so that the starter motor 12 will be stopped. If for any reason the car motor should stall, the vacuum in line 14 will disappear and the balls 40 will, by gravity, fall against the end 36a to cause reclosing of the switch 30.

In setting the device for use as a time operated mechanism, the timer 22 would be set to close line 22a at a certain predetermined time and when the hands 22b reach the preset time it is believed apparent that current will be delivered to relay 12a and starter motor 12 through the closed switch 30. Upon starting of the motor, the vacuum in line 14 will raise the balls 40 to the position of FIGURE 2, with the result that the switch 30 will open to de-energize motor 12.

In like fashion and when it is desired to automatically start the motor upon the attainment of a certain temperature, the thermostatic switch 23 will close upon the reaching of the temperature to which the same is set so that current will flow from battery 11 through closed switch 30 into relay 12a and starter motor 12 to automatically start the car. As before, when the vacuum in line 14 builds up, the motor 12 will be de-energized by virtue of

the fact that the balls 40 are raised out of contact with the end 36a.

It will be seen from the foregoing that there has been provided a new and novel type of automatic starting apparatus that has particular utility with respect to the automatic starting of an automobile engine.

It has been shown how the device prevents, by incorporation of a novel shut-off switch, the overrunning of the starter motor 12. It has further been shown how the device permits the car engine to be started in ordinary fashion by turning of the usual key 21b. It has been further shown how the car can be set for starting at a predetermined time so that the car, on cold days, could be warmed up before the scheduled departure of the user.

It has additionally been illustrated how the improved automatic starting means contemplate the preventing of freeze-ups in the automotive engine by providing a thermostatic switch that will automatically start the engine when the temperature falls below a certain point.

While a full and complete disclosure of the invention has been set forth in accordance with the dictates of the Patent Statutes, it is to be understood that the invention is not intended to be so limited.

Accordingly, appropriate modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claim.

What is claimed is:

A control mechanism of the character described, comprising; a body having an axial bore therethrough; a piston received in said bore; a suction line attached to one end of said bore; a switch having an actuating extension pivoted thereto; means urging said extension into overlying relationship with respect to the opposite end of said bore, with said extension being engaged by said piston in the absence of suction pressure in said suction line; said suction line separating said piston from said extension during the presence of suction pressure in said suction line; said switch being open during the time said piston is separated from said extension and further being closed upon pivotal movement of said extension arm, said piston including a plurality of ball members arranged in series within said bore and each having a diameter approximating the diameter of said bore.

References Cited in the file of this patent

UNITED STATES PATENTS

1,300,107	Bacon	Apr. 8, 1919
1,635,078	Gilbert	July 5, 1927
1,893,242	Peters	Jan. 3, 1933
2,142,698	Paton	Jan. 3, 1939
2,507,065	Trautman	May 9, 1950
2,579,958	Perhats	Dec. 25, 1951
2,606,298	Merritt	Aug. 5, 1952
2,607,013	Drummond	Aug. 12, 1952
2,648,016	Van Gastle	Aug. 4, 1953
2,691,110	Lincoln	Oct. 5, 1954
2,698,391	Braden et al.	Dec. 28, 1954
3,015,037	Parsons et al.	Dec. 26, 1961