May 10, 1960 R. A. ADCOX, JR 2,936,348

AUTOMATIC STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

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Fig. 1

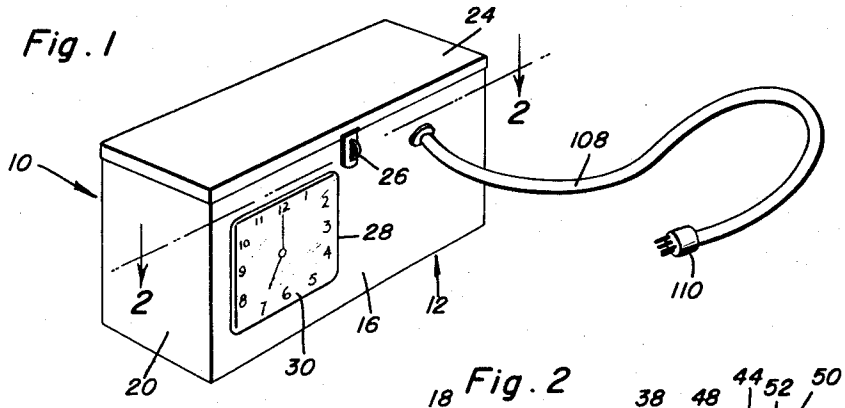
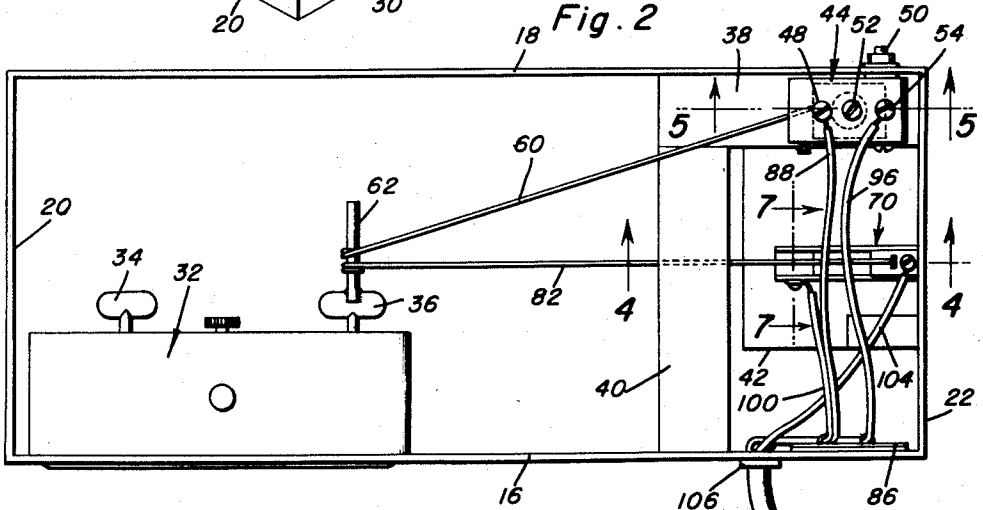


Fig. 2



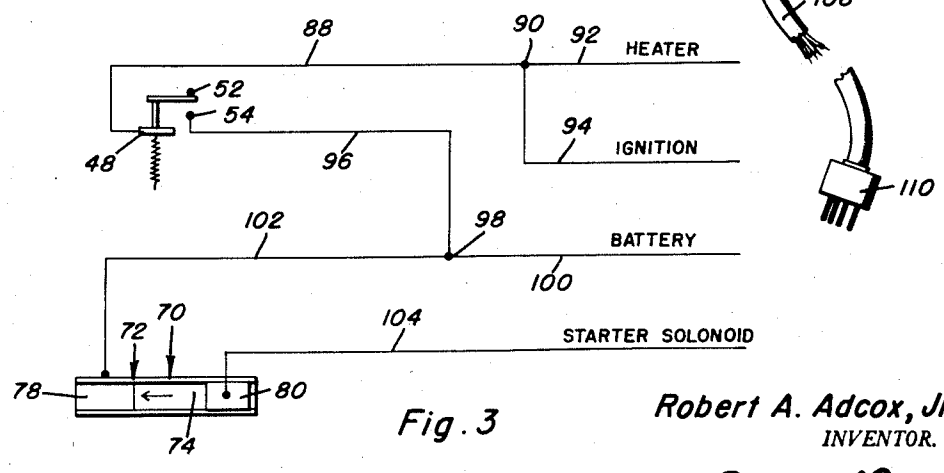


Fig. 3

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AUTOMATIC STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

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Fig. 4

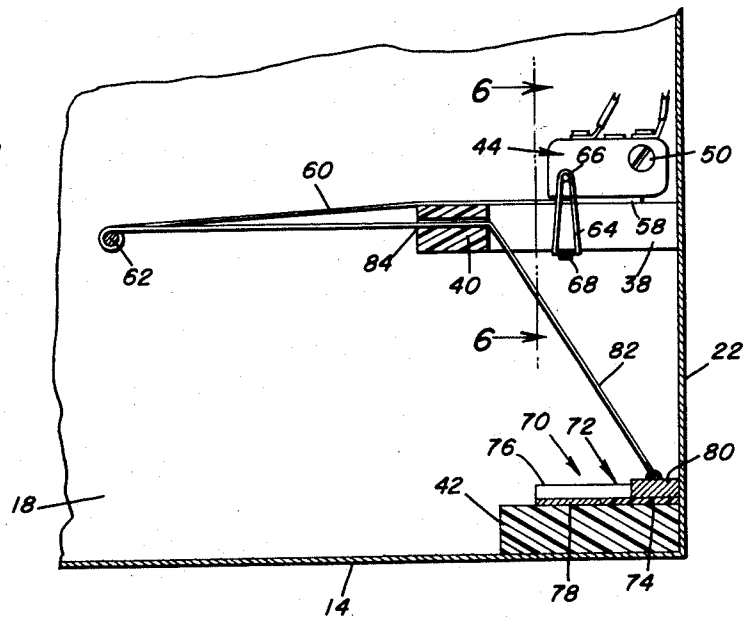


Fig. 6

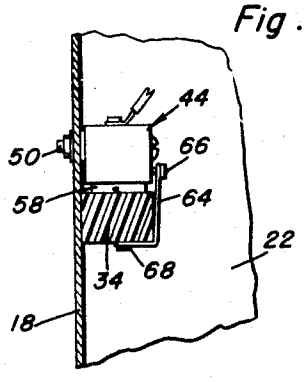


Fig. 5

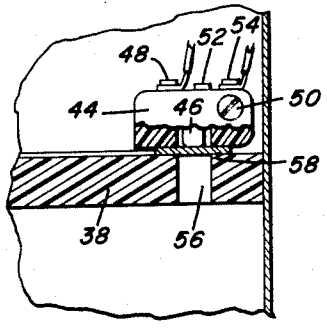
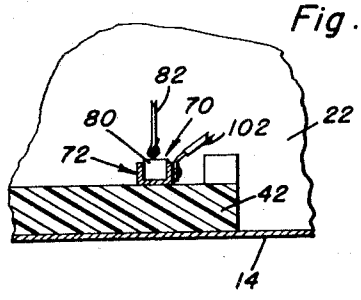


Fig. 7



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AUTOMATIC STARTING DEVICE FOR INTERNAL COMBUSTION ENGINES

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4 Claims. (Cl. 200—35)

This invention relates in general to attachments for internal combustion engines and more specifically to an automatic starting device for internal combustion engines.

In many instances there are installations where it is desired to start an internal combustion engine at a predetemined time. While starting devices of all types have been provided, such starting devices are normally relatively expensive and, therefore, while in many instances where we would use such a starting device, because of the cost we have not done so.

It is therefore the primary object of this invention to provide an automatic starting device for internal combustion engines which is of relatively simple construction and which is made from readily obtainable materials so that the cost of manufacture thereof is economically feasible.

The average automobile is stored in the open. As a result, in cold weather it is desirable that the engine of the automobile be started in advance, both for the purpose of warming up the engine and for heating the interior of the automobile so that it may be comfortable. It is also desirable to permit the heat from the internal combustion engine to clear any ice which may have formed on the windshield and windows of the vehicle.

It is therefore another object of this invention to provide an automatic starting device which is suitable for mounting on an internal combustion engine of an automobile, the automatic starting device requiring no outside lines and being of such a nature whereby it may be conveniently mounted either within the body of the vehicle or under the hood of the vehicle in an out-of-the-way position to prevent tampering.

Another object of this invention is to provide an improved automatic starting device for internal combustion engines, the starting device being disposed in a small housing and being readily portable so that it may be stored when desired and may be temporarily mounted in any vehicle having the necessary wiring connections.

A further object of this invention is to provide an improved automatic starting device for vehicles, the starting device including not only means for starting the internal combustion engine of the vehicle, but also means for controlling the operation of the heater of the vehicle, whereby a vehicle equipped with defrosters will be assured of having both the interior of the vehicle heated and the windshield completely defrosted at such time as the operator of the vehicle arrives to use the vehicle.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the automatic starting device which is the subject of this invention and shows the general outline thereof;

Figure 2 is an enlarged, longitudinal sectional view taken substantially upon the plane indicated by the section line 2—2 of Figure 1 and shows the specific internal construction of the automatic starting device;

Figure 3 is a wiring diagram for the automatic starting device;

Figure 4 is an enlarged, fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of Figure 2 and shows the specific details of a second switch for the operation of the starter of the internal combustion engine;

Figure 5 is an enlarged, fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of Figure 2 and shows the specific details of a first switch for operating both the ignition system of the internal combustion engine and the heater of a vehicle;

Figure 6 is an enlarged, fragmentary transverse sectional view taken substantially upon the plane indicated by the section line 6—6 of Figure 4 and shows further the details of the engine mounting of the first switch; and

Figure 7 is an enlarged, fragmentary sectional view taken substantially upon the plane indicated by the section line 7—7 of Figure 2 and shows further the details of the second switch.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figure 1 the automatic starting device which is the subject of this invention, the automatic starting device being referred to in general by the reference numeral 10. The automatic starting device 10 includes a housing 12 which is in the form of a small box.

The housing 12 includes a bottom wall 14 which has extending upwardly along opposite edges thereof a front wall 16, a rear wall 18 and end walls 20 and 22. Hingedly connected to the upper edge of the rear wall 18 is a cover 24. The front portion of the cover 24 and the upper part of the front wall 16 are provided with suitable latch means 26 for retaining the cover 24 in a closed position.

The front wall 16 is provided with an opening 28. The opening 28 is disposed adjacent the end wall 20 and has seated therein a dial portion 30 of a spring-type alarm clock 32. It is to be understood that the alarm clock 32 includes a clock mechanism and an alarm mechanism. The clock mechanism is driven by a spring (not shown) wound by means of a key 34. The alarm mechanism, which will be considered a power unit, includes a spring (not shown) which is wound by a key 36. It will be readily apparent that the normal clock mechanism functions as a timer and controls the operation of the alarm mechanism or power unit. The alarm clock 32 will be provided with suitable means for setting the timer part thereof for the actuation of the alarm mechanism.

Secured to the rear wall 18, adjacent the end wall 22 and intermediate the upper and lower edges of the rear wall 18, is an elongated support 38. Extending between the left end portion of the support 38 and the front wall 16 is a transversely disposed guide 40 which is disposed in the same plane as the support 38. Mounted in the bottom part of the housing 12 and resting upon the bottom wall 14 immediately adjacent the end wall 22 is a supporting block 42. The support 38, the guide 40 and the supporting block 42 all are formed of a suitable insulating material, such as wood.

Disposed immediately above the support 38 is a first switch 44. The switch 44 is preferably of the micro-type and includes a plunger type operator 46. The operator 46, when recessed, retains the first switch 44 in an "off" position. The switch 44 is hingedly mounted on the rear wall 18 by means of a single fastener 50 passing through

the main part thereof. The first switch 44 includes a main terminal 48 and a pair of lead out terminals 52 and 54.

As is best illustrated in Figure 5, the first switch 44 is disposed only slightly above the support 38. Formed in the support 38 in alignment with the operator 46 is an operator passageway 56 for receiving the operator 46 when it is in its extended position.

Normally the operator 46 would pass down into the passageway 56 and the first switch 44 would be such that the terminal 52 is closed and the terminal 54 open. However, positioned intermediate the support 38 and the first switch 44 is a retaining member 58 which overlies the passageway 56. The retaining member 58 has connected thereto a flexible connector 60 which passes over the guide 40 and is connected to a shaft 62 which is connected to the winding key 36. When the winding key 36 rotates in the operation of the alarm mechanism or power unit, the connector 60 will be wound upon the shaft 62 so as to pull the retaining member 58 out from overlying relation with respect to the passageway 56 and thus permit the operator 46 to move downwardly into the passageway 56 and moving the first switch 44 from its original position to a position where the terminal 52 is open and the terminal 54 is closed.

The purpose of hingedly mounting the first switch 44 on the fastener 50 is to facilitate the positioning of the retaining member 58. The first switch 44 is normally held in its position of Figures 4 and 5 by means of the resilient member 64 which is passed over a suitable retaining member 66 on the first switch 44 as similar retaining member 68 on the support 38.

Mounted on the block 42 is a second switch which is referred to by the reference numeral 70. The second switch 70 includes a guideway 72 having a bottom portion 74 and upstanding sides 76. The guideway 72 is formed of a suitable insulating material. The left portion of the guideway 72, as viewed in Figure 4, has the bottom thereof cut away and replaced by contact plate 78.

Disposed in the guideway 72 and normally positioned at the right end thereof, as is illustrated in Figure 4, is a movable contact member 80. The contact member 80 has connected thereto a flexible connector 82 which passes through a bore 84 in the guide 40 and is wound upon the shaft 62. Thus, when the shaft 62 is rotated, the flexible connector 82 will be wound thereupon. This will cause movement of the movable contact 80 to the right until such time as it engages the contact plate 78 to effect a "on" position of the second switch 70. Further rotation of the shaft 62 will result in a winding of the flexible connector 82 to a position whereby the movable contact 80 is lifted up off of the contact plate 78 and thus effects an "off" position of the second switch 70.

Carried by the front wall 16 in insulated relation is a terminal block 86. The terminal block 86 is used for the connection of the various wires.

Referring now to Figure 3, it will be seen that there is connected to the terminal 48 a wire 88 which is connected to a terminal 90 of the terminal block 86. Also connected to the terminal 90 are wires 92 and 94, the wire 92 being a heater wire and the wire 94 being an ignition wire.

Connected to the terminal 54 of the first switch 44 is a wire 96. The wire 96 is connected to a terminal 98 of the terminal block 86. Also connected to the terminal 98 is a wire 100 which is a battery wire. Further connected to the terminal 98 is a wire 102 which is connected at its opposite end to the contact plate 78. A wire 104 is connected to the movable contact 80, the wire 104 being a starter solenoid wire.

The wires 92, 94, 100 and 104 pass out through front wall 16 and are prevented from being chafed by means of a grommet 106. Further, the wires 92, 94, 100 and 104 may be disposed in a suitable casing 108 and are connected to a plug 110.

It is to be understood that the vehicle which is to use the automatic starting device 10 will be provided with the wires corresponding to the wires 92, 94, 100 and 104 and will be connected to a plug (not shown) which is complementary with the plug 110. Thus, by forming a simple connection between the two plugs, the automatic starting device may be mounted within the vehicle.

The vehicle will be provided with a wire (not shown) which corresponds with the battery wire 100. This wire, it is preferred, will be provided with both a fuse and a master switch. The master switch should be turned off once the ignition switch of the vehicle has been turned on with the engine of the vehicle operating. This is a desirable safety factor.

In the event the automatic starting device 10 is used in conjunction with a stationary engine as against being used with an automobile, then the wire 92 may either be eliminated or merely just not connected to the other wire when the two plugs are connected together.

The first switch 44 may be used for other purposes, such as ringing bells, turning on lights, turning off lights, etc. If a device is to be actuated, it will be connected to the terminals 48 and 54. If the device is to be turned off, it will be connected to the terminals 48 and 52.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An automatic starting device for internal combustion engines comprising a power unit, a timer attached to said power unit for operating said power unit at a desired time, a first switch for connection to a vehicle ignition circuit, a second switch for connection to a vehicle starter solenoid, and control means connecting said power unit to said first and second switches, said second switch including an insulated guideway, a contact plate disposed in said guideway at one end thereof, a movable contact normally seated in said guideway at the other end thereof, said control means including a connector extending between said power unit and said movable contact for first sliding said movable contact onto said contact plate and then withdrawing said movable contact from said guideway and out of engagement with said contact plate whereby said second switch is operated only for a predetermined time interval.

2. An automatic starting device for internal combustion engines comprising a power unit, a timer attached to said power unit for operating said power unit at a desired time, a first switch for connection to a vehicle ignition circuit, a second switch for connection to a vehicle starter solenoid, and control means connecting said power unit to said first and second switches, said second switch including an insulated guideway, a contact plate disposed in said guideway at one end thereof, a movable contact normally seated in said guideway at the other end thereof, said control means including a connector extending between said power unit and said movable contact for first sliding said movable contact onto said contact plate, a guide for said connector intermediate said power unit and said movable contact, said guide being disposed above said contact plate whereby further movement of said connector lifts said movable contact out of engagement with said contact plate so that said second switch is operated only for a predetermined time interval.

3. An automatic starting device for internal combustion engines comprising a power unit, a timer attached to said power unit for operating said power unit at a

desired time, a first switch for connection to a vehicle ignition circuit, a second switch for connection to a vehicle starter solenoid, and control means connecting said power unit to said first and second switches, said first switch including a plunger type operator and being in an open position when said operator is depressed, a support underlying said first switch, an operator passageway in said support in alignment with said operator, said control means including an operator retaining member normally overlying said passageway and maintaining said operator depressed, means connecting said retaining member to said power unit for retraction thereby to release said operator, means hingedly mounting said first switch to facilitate repositioning of said retaining member.

4. An automatic starting device for internal combustion engines comprising a power unit, a timer attached to said power unit for operating said power unit at a desired time, a first switch for connection to a vehicle ignition circuit, a second switch for connection to a vehicle starter solenoid, and control means connecting said power unit to said first and second switches, said first switch including a plunger type operator and being in an open position when said operator is depressed, a support underlying said first switch, an operator passageway in said support in alignment with said operator, said control means including an operator retaining member normally overlying said passageway and maintaining said operator depressed, means connecting said retaining member to said power unit for retraction thereby to release said operator, said second switch including an insulated guideway, a contact plate disposed in said guideway at one end thereof, a movable contact normally seated in said guideway at the other end thereof, said control means including a connector extending between said power unit and said movable contact for first sliding said movable contact onto said contact plate and then withdrawing said movable contact from said guideway and out of engagement with said contact plate, whereby said second switch is actuated only for a predetermined time interval.

References Cited in the file of this patent

UNITED STATES PATENTS

1,678,217	Gonsett	July 24, 1928
1,757,456	Frooks	Sept. 6, 1928
1,877,169	Gonzales	Sept. 13, 1932
2,135,435	Zwack	Nov. 1, 1938
2,438,544	Dakoski	Mar. 30, 1948
2,438,640	Lees	Mar. 30, 1948
2,650,987	Doyle	Sept. 1, 1953
2,691,110	Lincoln	Oct. 5, 1954
2,748,759	Schiffer	June 5, 1956
2,780,700	Wallace	Feb. 5, 1957
2,791,699	Taylor	May 7, 1957