May 20, 1930. H. E. NORVIEL 1,759,461

IGNITION APPARATUS

Filed March 25, 1926

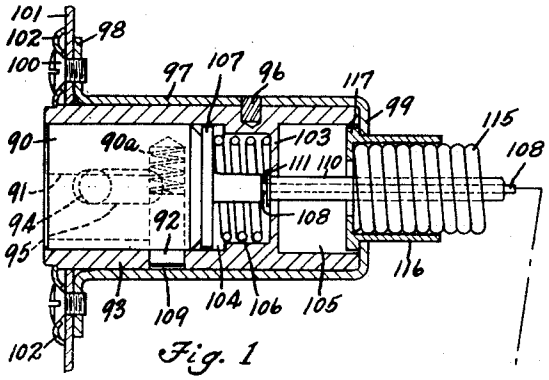


Fig. 1

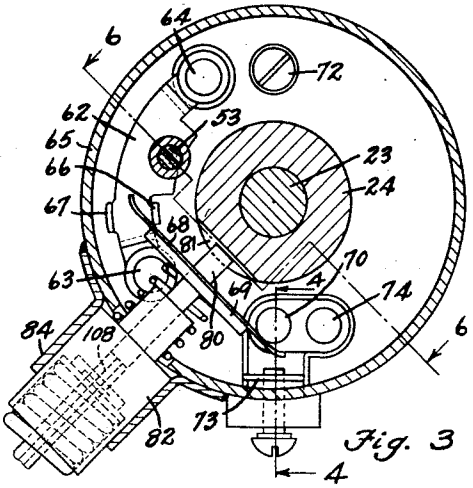


Fig. 3

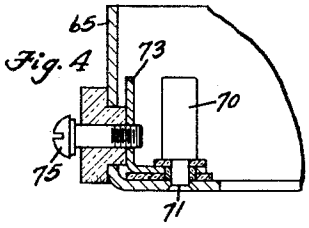


Fig. 4

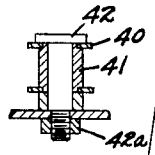


Fig. 7

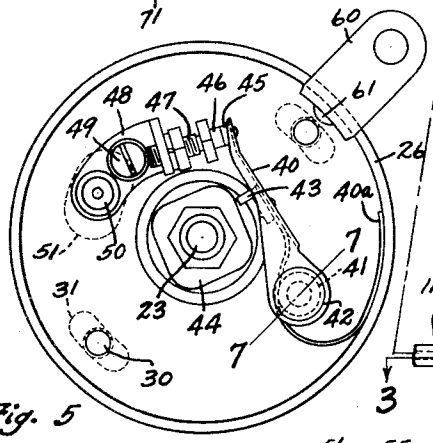


Fig. 5

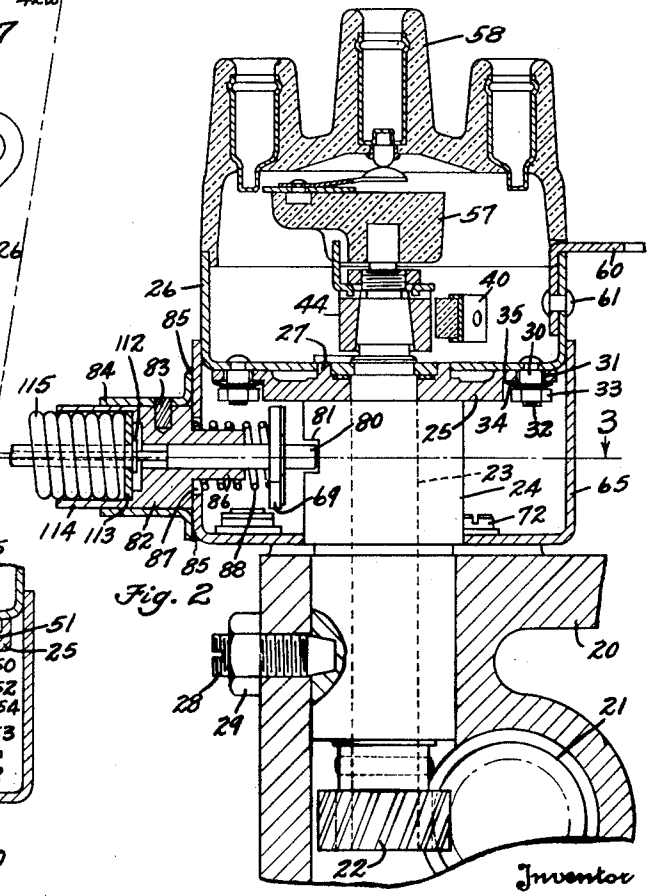


Fig. 2

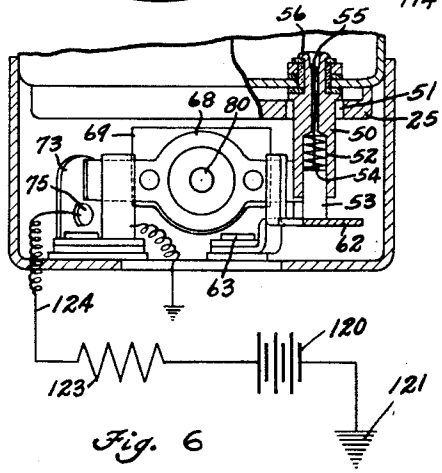


Fig. 6

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UNITED STATES PATENT OFFICE

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IGNITION APPARATUS

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One of the objects of the present invention is to prevent the theft of an automotive vehicle, and this object is accomplished according to the present invention by a key operated device which, when moved to locking position, will prevent the removal of the engine ignition timer from the engine frame and will render the ignition timer inoperative by switch mechanism which is inaccessible so long as the ignition timer remains attached to the engine frame. In the disclosed form of the invention the switch mechanism is enclosed by a case, the cover of which is provided by the ignition timer housing. The switch case is attached to the engine frame by screws or the like which are inaccessible so long as the ignition timer is attached to the frame. Since the key operated device may be moved to lock the ignition timer to the frame the switch case can not be removed or its contents disturbed. The switch mechanism provided by the present invention not only disconnects the timer from the battery and ignition coil, but also grounds the timer on the engine frame so that the timer can not be used with any other ignition coil which a thief may attempt to connect with the battery and the timer in order to secure engine ignition. Since the timer can not be removed from the engine frame another timer can not be substituted.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of embodiment of the present invention is clearly shown.

In the drawings:

Figs. 1 and 2 taken together constitute a longitudinal sectional view of a timer and theft prevention apparatus constructed in accordance with the present invention.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

Fig. 5 is a plan view of the ignition timer, the ignition head and rotor being removed.

Fig. 6 is a fragmentary view partly in section, the section being taken on the line 6—6 of Fig. 3. Fig. 6 also includes a wiring diagram illustrating the use of certain features shown in Fig. 6.

Fig. 7 is a fragmentary sectional view on line 7—7 of Fig. 5.

Referring to the drawings, 20 designates an engine frame which supports an engine-driven gear 21 meshing with a gear 22 drivingly connected with an ignition timer cam shaft 23 supported by the shank 24 of a supporting plate 25. The plate 25 supports an ignition timer cup 26 having a central aperture which receives an annular bearing ring 27 provided by the plate 25. The cup 26 is rotatable relative to the supporting plate 25 which is fixed to the engine frame by a set screw 28 entering the recess in the shank 24 and secured in position by nut 29. The cup 26 is retained upon the plate 25 by means which include studs 30 riveted to the bottom of cup 26 and extending through slots 31 of plate 25 and having threaded ends 32 cooperating with nuts 33 which clamp dished washers 34 against finished surfaces 35 provided by the plate 25. In this way the bottom of cup 26 is yieldingly pressed by the spring 34 against the plate 25. The cup 26 cannot be removed from the plate 25 except by removal of nuts 33 which are enclosed by the switch case to be described.

The cup 26 supports a non-insulated breaker lever 40 having a metal hub 41 mounted on a metal pin 42 carried by the bottom of the cup 26. The breaker lever carries a rubbing block 43 which co-operates with a cam 44 drivingly connected with shaft 23. The lever 40 carries a contact 45 which engages a stationary contact 46 carried by a screw 47 which is adjustably supported by a bracket 48 which is insulatingly and adjustably supported by the bottom of the timer cup 26. The bracket 48 is attached to the cup by a screw 49 and by a tubular rivet 50 which extends through a slot 51 into plate 25 and is provided with a tubular recess 52 for receiving a conducting brush 53 urged downwardly by a spring 54. A flexible conductor 55 which extends through a central bore in the rivet 50 and is soldered to the rivet

50 provides a good electrical connection between the brush 53 and the rivet.

The cup 26 is turned by a lever 60 attached thereto by a rivet 61 for the purpose of advancing or retarding the spark; and the brush 53 bears against a plate conductor 62 which is attached by rivets 63 and 64 to the bottom of a switch case 65 and which is insulated from the switch case. The conductor 62 is provided with two contact portions 66 and 67 which are adapted to be engaged by a movable contact 68 mounted on a non-conducting plate 69. Contact 68 is adapted to engage a metal stud 70 which is metallically connected at 71 to the switch case 65. Case 65 is metallically connected with the engine frame 20 and is attached thereto by one or more screws 72. The contact 68 is adapted to engage a conductor 73 which is attached to the bottom of the switch case 65 by the studs 70 and a rivet 74. Conductor 73 insulated from the case 65 is connected with a terminal screw 75.

The non-conducting plate 69 which carries the contact 68 is attached to a slidable locking bolt 80 which is received by a notch 81 in the shank 24. The bolt 80 is guided by a sleeve 82 which is permanently attached by a screw pin 83 to a flanged collar 84 which is soldered or welded at 85 to the switch case 65. The sleeve 82 includes a tubular extension 86 which extends through a hole 87 in the case 65. A spring 88 is supported by the extension 86 and bears at one end against the sleeve and at the other against the non-conducting plate 69.

The mechanism in operating the locking bolt 80 comprises a key controlled device including a pin tumbler cylinder lock barrel 90 which receives a key plug 91. As this type of lock is known to the trade as the "automobile type cylinder lock" it is not illustrated in detail, but it will be understood that the turning of key plug 91 by a suitable key will cause a pin 92 to be drawn within the cylinder 90. The cylinder 90 is slidingly supported by a sleeve 93 which carries a pin 94 entering a slot 95 in the side of the cylinder 90. In this way the cylinder is guided during its endwise movements relative to the sleeve 93. Sleeve 93 is permanently attached by screw pin 96 to a case 97 having an outwardly turned flange 98 and an inwardly turned flange 99. The flange 98 is attached by screws 100 to a suitable instrument board 101. The screws 100 also secure in position a face plate 102. The sleeve 93 includes a partition 103 separating recesses 104 and 105. Recess 104 receives a spring 106 bearing at one end against the wall 103 and at the other end against a disc 107 to which a Bowden wire 108 is attached. The other end of the Bowden wire is attached, as shown in Fig. 2, to the locking bolt 80. When the key plug 91 is turned by a suitable key to withdraw the bolt 92 from a hole 109 in the sleeve 93, the spring 106 will be released to cause the disc 107 and the cylinder 90 to slide toward the left as viewed in Fig. 1. This motion of the disc 107 will cause the Bowden wire 108 to pull the bolt 80 out of notch 81 and will cause the contact 68 to engage the conductors 67 and 73. When this occurs the insulated timer contact 46 will be connected with the ignition coil and the battery. The primary ignition circuit includes, as shown in Fig. 6, a battery 120, grounded at 121, an ignition coil primary winding 123, a wire 124, terminal screw 75, conductor 73, conductor 68, contact 67, plate 62, brush 53, rivet 50, bracket 48, screw 47 and contact 46. The ignition circuit will be completed to ground through contact 48, lever 40, hub 41, stud 42, timer cup 26 and plate 25, shank 24 and grounded engine frame 20. A leaf spring 40^a, which urges the lever 40 in a counter-clockwise direction in Fig. 5, also provides a part of the ground connection of the contact 45.

The withdrawing of the locking bolt 80 from the notch 81 permits removal of the timer from the engine frame 20 after the nut 29 has been loosened and the screw 28 has been withdrawn from the shank 24. The switch parts within the case 26 are then accessible since the switch case cover provided by the ignition timer cup 26 has been removed. After removal of the ignition timer the nuts 32 may be removed so that ignition timer cup 26 may be removed from the plate 25, if desired. After this is done the nut 42^a which screws the timer breaker lever stud 42 in position may be removed so that the breaker lever may be disassembled in order to grind the flat surface of the contact 45, if desired.

When the cylinder 90 is moved into position shown in Fig. 1 a spring will be released to move the bolt into hole 109 provided by the sleeve 93. When this occurs the locking bolt 80 will be moved into position shown and the switch contact 68 will connect the contact 66 with the contact 70, as shown in Fig. 3. When this occurs the insulated contact 46 will be connected with ground through the following circuit: screw 47, bracket 48, rivet 50, brush 53, plate 62, contact 66, contact 68 and grounded stud 70. Since both of the contacts of the timer are grounded the timer can not function to cause the ignition coil to produce sparking impulses. When the ignition timer is locked in position on the engine frame no other ignition timer can be substituted, nor can an insulated breaker lever 40 be substituted for a grounded one in order that one of the timer contacts will be insulated. The locking of the ignition timer to the engine frame also renders the ignition switch inaccessible so that the ground connections can not be interferred with. The locked assembly of parts 65 and 26 prevents access to the nuts 33 which would permit re-

moval of the timer cup and contact members. Since the cup 26 can not be disassembled from the plate 25 the nut 42ª holding the breaker lever 40 in position can not be removed.

The Bowden wire 108 extends through a Bowden wire tube 110 having one end flared at one end over a partition 103 and the other end flared at 112 against a disc 113 which is received by a recess 114 in the sleeve 82. The Bowden wire and case are enclosed by a flexible hard metal conduit 115 having one end received by the recess 114 and permanently attached to the sleeve 82 and having the other end permanently attached to a sleeve 116. The sleeve 116 has a flange 117 which engages the flange 99 to prevent withdrawal of the sleeve. Moving of conduit 115 sidewise will not affect the position of the Bowden wire 108 so that the bolt 80 might be withdrawn from the notch 81 by movement of conduit 115. If the conduit 115 is moved sidewise in such a manner as to increase its length the sleeve 116 will slide within the recess 105 toward the partition 103.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Ignition apparatus comprising, in combination, an ignition timer, a switch having a case and devices within the case for rendering the timer operative or non-operative, said ignition timer providing a cover for the case; and key controlled means for locking the timer and switch case in assembled relation and for operating the switch so as to render the timer non-operative.

2. Ignition apparatus comprising, in combination, a timer having one contact insulated and the other grounded on the timer housing; a switch having a case closed by the timer housing and stationary contacts and a movable contact which, in one position, connects the insulated timer contact with a switch terminal and which in another position, connects the insulated timer contact with ground; and key controlled means for locking the timer and switch case in assembled relation and for connecting the insulated timer contact with ground.

3. Ignition apparatus comprising, in combination, an engine having a frame and an engine operated shaft; a timer having a housing attached to the frame and a shaft supported by the housing and mechanically connected with the engine shaft; and key controlled means for grounding the ignition circuit rendering the timer non-operative, and for preventing removal of the timer from the engine frame.

4. Ignition apparatus comprising, in combination, an engine having a frame and an engine operated shaft; a timer having a housing attached to the frame and a shaft supported by the housing and mechanically connected with the engine shaft; a switch having a case attached to the frame by means accessible only within the switch case, and devices within the case for rendering the timer operative or non-operative, said case co-operating with the timer housing to provide an enclosure for said switch devices and case attaching means; and key controlled means for locking the timer and switch case in assembled relation and for operating the switch so as to render the timer non-operative.

5. Ignition apparatus comprising, in combination, an engine having a frame and an engine operated shaft; a timer having a housing attached to the frame and a shaft supported by the housing and mechanically connected with the engine shaft; a switch for connecting the timer with a current source; and key controlled means for locking the switch in open position and for preventing removal of the timer from the engine frame.

6. Ignition apparatus comprising, in combination, an engine having a frame and an engine operated shaft; a timer having a housing attached to the frame and a shaft supported by the housing and mechanically connected with the engine shaft; a switch movable into one position for connecting the timer with a current source and movable into another position for connecting the timer with ground; and key controlled means for locking the switch in timer grounding position and for preventing removal of the timer from the engine frame.

7. Ignition apparatus comprising, in combination, an ignition timer having a base and a shank extending therefrom and adapted to be received by a recess in an engine frame and having a timer drive shaft extending through said shank; a switch for connecting the timer with a current source and having a cup-shaped case closed by the timer base, the switch having a bottom wall apertured to receive said shank and attached to the engine frame by means accessible only within the switch case; and key controlled means for locking the switch in open position and for locking the timer base to the switch case.

8. Ignition apparatus comprising, in combination, an ignition switch having a case; means for attaching the case to the frame of an engine; an engine ignition timer adapted to prevent access to said attaching means; and key controlled means for operating the switch and for locking the timer to the switch case.

9. Ignition apparatus comprising, in combination, an engine ignition timer adapted to be assembled with an engine frame; an ignition switch having a case covered by the timer and retained by the timer in assembly

with the frame while the timer is assembled with the frame, and key controlled means for operating the switch and for preventing removal of the timer from the engine frame.

10. In an anti-theft device for automotive vehicles, a unitary control means, comprising, in combination, a timer having a housing supported by the engine frame, a switch case surrounding the timer shaft and located between the engine frame and timer housing and covered by the housing and attached to the frame by means accessible only within the case, an insulated terminal carried by the case for making connection with an ignition circuit; an insulated stationary switch contact within the case; means housed by the case for electrically connecting the insulated switch contact with the insulated timer contact; a switch contact grounded on the switch case; a movable contact within the case either for connecting the terminal with the insulated switch contact, or for connecting the insulated switch contact with the grounded switch contact; and key controlled means for locking the timer housing to the switch case and for connecting the movable contact with the insulated switch contact and with the grounded switch contact.

In testimony whereof I hereto affix my signature.

HARRY E. NORVIEL.